SUSITNA CAMP ESTIMATES

T... - Susitna

BOOK F

SUSITNA CAMP ESTIMATES

(F)

UNIT PRICES - BACKUP CALCULATIONS

SUSITNA CAMP ESTIMATES

Watana Earthwork

Watana Buildings

Watana Utilities

Watana Indirects

Devil Canyon Earthwork

Devil Canyon Buildings

Devil Canyon Utilities

Devil Canyon Indirects

Watana Permanent Town

Manday Costs

Electrical

Heating/Ventilating

Site Roads

P.O.L.

Access Roads

(F) Susitna Camp Estimates

Watana Earthwork

Alaska International Construction, Inc.
PROJECT: Susitna Hydroelectric Project — SUMMARY SHEET — 1861136 — 1734670 + 4937990 — F3
SPEC. REFERENCE: — Watana Main Const. Camp & Village — EST. BY — SHEET 1 OF 2
DWG. REFERENCE: — BID DATE — ENGR. QUANTITY — CHKD. BY — DATE: 1-21-91

			.1 LABOR HOURS	1 LABOR	2 R&B OR TRAVEL	3 OTHER	4 COMPANY RENTAL	5 3RD PARTY RENTAL	6 FUEL	7 LUBE & WEAR PARTS	.0 SUBTOTAL	8 PERMANENT MATERIALS	9 SUB-CONTRACT	0 DIRECT TOTAL COST	ADJUSTMENTS: Add IND @ 23.439655%	Add @ 8½% OR 13% mes=21.5%	BID	
10	Clearing & Stripping & Fine Grading	163 Acres	11210	390422			609343	62214	299322	86288	1447589	447824		1447589	1786899	2171082	13,319.52	AC
30	Install Granular Pad	885,000 CY	25979	903756			1114926	117765	469499	221596	2827542	862860		2827542	3490308	4240724	4.79	CY
40	Main Roads in Camp [34']	10,200 L.F.	1266	43023			59345	6559	23306	9564	141797	39429		141797	175034	212666	20.85	L.F
50	Connect Camp Road to Access Rd [24']	1,800 L.F.	959	33697			42706	4563	17678	8065	106729	30326		106729	131746	160071	88.93	L.F
60	Ditching	27,000 L.F.	1290	42691			29437	2932	10823	3049	88932	16804		88932	109777	133379	4.94	L.F
70	Culverts	1,200 L.F.	270	8266		12231	1770	163	1838	131	24399	2132		24399	30118	36593	30.49	L.F
80	MEC Perimeter Fencing	11,000 L.F.	2123	72189		46200	3609		4411		126408			126408	156037	189586	17.24	L.F
90	Parking Area (191,200 SF = 4.39 acres)	1 L.S.	413	13982			19217	2124	3550	3099	41922	6773		41922	51748	62874	62874	L.S.
91	Water Intake Pond 3.4 MG	1 L.S.	420	12161		217336	1180	108	1225	154	232164	11487		232164	286582	348197	348197	L.S.
92	Sewage Lagoons	5 EA.	3503	102159		210287	84231	8983	35548	12463	458671	61994		458671	566182	687911	137582	EA
100	Garage Maint Bldg. Gravel Strip	14 Acres	993	33533			52386	5328	25709	7412	124318	38449		124318	153458	186451	13,319.57	
110	P.O.L. Berms	45,000 CY	3854	122081		61062	106271	11300	44628	21449	921791	177321		921791 / 744469	1135223	1379297	30.65	CY
120	Clearing - Stripping & Fine Grading	130 Acres	8979	312742			487135	49724	239523	68958	1158082	358205		1158082	1429532	1736881	13,360.62	
140	Install Granular Pad	835,000 CY	29881	1039528			1276985	135130	531230	253581	3236454	911941		3236454	3995068	4854008	5.81	CY
150	Main Road in Camp [34']	2,200 L.F.	298	10137			18836	1526	5437	2268	38204	9231		38204	47159	57298	26.04	LF
	Secondary Roads in Camp [24']	22,000 L.F.	2847	96976			132359	14591	52012	21696	317634	88299		317634	392086	476384	21.65	LF
	Connection to Access Road [34']	1,600 L.F.	976	33820			42552	4547	17470	8101	106490	30118		106490	131451	159713	99.82	LF
	Ditching	51,600 L.F.	6106	58006			44977	4587	16791	5265	129626	24643		129626	160010	194412	3.77	LF
190	Culverts	13,200 L.F.	2970	90920		131541	19465	1787	20213	2541	266467	29541		266467	332629	404144	30.62	LF
200	Perimeter Fencing	12,000 L.F.	2316	78745		50400	3937		4912		137894	1320		137894	170256	206812	17.23	LF
210	Parking Areas	6,000 S.F.	13	437			603	67	237	97	1441	338		1441	1779	2161	.36	S.F
	Water Storage tanks 3.1MG		945	32146		242210	12600		9100		296056							
	Fuel Storage tanks (50,000 gal)		455	15458		83643	10627	1130	4463	2145	117466					117500		
	MCV Insulated Water tank 1.4 MG		516	15576		100807	8415	880	3520	1650	130848	(6030)		130848				
	Solid Waste (Fencing)	6,884 LF 1 LS	1328	45159		28913	2272		2754		79097			79097			(1723)	
			109910	3612559		1731630	4185134	436008	1845099	744592	12558022 / 18090					(11898731)	123912	LS
	INDIRECTS - Field Support		32260	1148943		732092	31869	3510	91720	13795	2020729							
	Mobilization -		4728	189120		2419701	30420				2639241	1,955,048						
			37488	1338063		3151793	62289	3510	91720	13195	4659970 / 3167485			4659970				
		13858 man days / 23,340 man days	310056 / 124720	7139152	[P&B - not to be put in Items]	3151793	7381626	770711	1907159 / 1,412710 gal	1340561	23081756 / 13655280	1738325	321000	24590681				

F4

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

DATE: _____ SHT.: _____ OF _____
CALCULATIONS BY: _____
SUBJECT: _____

PROJECT: _____

		Labor	materials	Eq. own.	Equip op	
Clearing	5760	1090 28%	389 10%	1479 38%	934 24%	
Waste Excavation	4.80	189 27%	0	136 42%	1.01 31%	
Common Excavation	4.20 1,46	.77 27%	0	1.19 42%	.88 31%	
Rock Excavation	14.90	2.63 27%	3.11 32%	1.85 19%	2.14 22%	
Borrow	6.00	1.30 32%	0	1.58 39%	1.18 29%	
AFS Subbase Material	8.40	1.82 32%	0	2.21 39%	1.65 29%	
Grading "A" Base Material	16.80	3.41 30%	0	4.88 43%	3.06 26%	
D-1 Base Material	21.60	4.38 30%	0	6.28 43%	3.94 26%	
A.C. Surfacing	79.20	3.75 7%	40.67 76%	5.35 10%	3.75 7%	
Guard Rail	43.20	5.84 20%	21.60 74%	.58 2%	1.17 4%	
18" Culverts	28.80	6.62 34%	9.73 50%	1.36 7%	1.75 9%	
" Culverts	179,040	2.3%	66%	5%	6%	
Filter fabric	3.00 2.03	.30 15%	1.72 85%	— —	— —	
Thaw pipes	43.20	9.92 34%	14.59 50%	2.04 7%	2.63 9%	
Topsoil & Seed	3600	316.- 13%	1727.- 71%	170.- 7%	219.- 9%	
Erosion Control Devices	18,000	2919.00 24%	8513 70%	243.- 2%	486.- 4%	
Bridges	2,186.00	1103 14%	96.08 79%	3.65 3%	4.86 4%	
Maintenance		72% 2595.-		39% 3162.-	29% 2351.-	
RR Dock lumber	mat 59% lost 41%	59 121.49 31%	231.22 59%	45%	55%	
		189.-	68	257	162	
		183	—	284	210	
		183	—	284	210	
		183	216	128	149	
		216	—	264	196	
		216	—	264	196	
		203	—	291	183	
		1373 29%	284 6%	1772 37%	1306 28%	4735

Alaska International Construction, Inc.
PROJECT: Susitna Hydroelectric Project
SPEC. REFERENCE: DESCRIPTION Clearing - Reservoir ITEM NO. 32,500 ACRES EST. BY F5 SHEET OF
DWG. REFERENCE: BID DATE ENGR. QUANTITY CHKD. BY DATE:

	UNITS EQP.	UNITS MAN	LABOR	R & B	OTHER	CO. RENT.	3RD PARTY RENT	FUEL	LUBE PARTS	LABOR	R & B OR TRAVEL	OTHER	COMPANY RENTAL	3RD PARTY RENTAL	FUEL	LUBE & WEAR PARTS	SUBTOTAL	PERMANENT MATERIALS	SUB-CONTRACT	TOTAL COST
Figure a crew of 7 D8K Dozers w/Rome blades																				
5 Clearing & piling & 2 bunching & burning																				
1 ATV fuel truck - Fueling dozers & Fires																				
1 Foreman w/P.U.																				
1 Mechanic w/ Mechanic truck																				
1 Dozer will clear .25 acres per hr = 2.25 Acres per det. in gb																				
2.25 x 5 dozers = 11.25 Acres per det 5																				
D8K w/Rome Blade = 7 eqb 134.96	63	63	34.06			64	6.49	24.20	5.71	2146			4037	409	1525	360	8472			8472
1 Fuel truck w/Driver & Bosn/Hlpr 67.37	9	9	33.00		120	11.77	.80	19.34	2.41	297		1080	106	7	179	22	1686			1686
1 Foreman 52.35	9	9	36.92			2.27	.25	11.97	.94	332			20	2	168	8	470			471
1 Mechanic 65.76	9	9	35.17			10.05	.41	17.95	2.18	317			90	4	162	20	593			592
										3092		1080	4240	422	1969	410	11221			
										275		96	378	997	(280) 248		11221 / 11.25 acres = $997/acre			

Alaska International Construction, Inc.

PROJECT: Main Construction Camp - Site Preparatn ITEM NO. 2-17-82 EST. BY 56 SHEET OF

SPEC. REFERENCE: DESCRIPTION Site Prep & Rehabilitate - Main Construction Camp Pad. CHKD. BY

DWG. REFERENCE: BID DATE ENGR. QUANTITY DATE:

	UNITS EQP.	UNITS MAN	LABOR	R & B	OTHER	CO. RENT	3RD PARTY RENT	FUEL	LUBE PARTS	LABOR	R & B OR TRAVEL	OTHER	COMPANY RENTAL	3RD PARTY RENTAL	FUEL	LUBE & WEAR PARTS	SUBTOTAL	PERMANENT MATERIALS	SUB-CONTRACT	TOTAL COST
this Item changed from Clearing & Stripping to Site Rehabilitation																				
Dozers will clear snow and knock down standing brush																				
A thin leveling course of gravel will be spread over the surface if required.																				
Then filter cloth will be placed over all areas.																				
After the camp is decontaminated - topsoil stockpiled from Borrow area "D" will be hauled in - spread and reseeded (1.5' layer)																	Seed			
Filter cloth - 43560÷9 = 4840 sq yds/acre x 1.37 = 1791.6"/acre x 163 = 291,900 for filter cloth																				
1 Dozer to clear snow & prepare base:																				
2 laborers spread filter cloth - Figure 40 days - 3 less than Granular fill																				
Filter cloth												291900					291900			
1 Dozer 40 days @ 10 hr =	400	400	3406	—	—	10266		54.22		13624			41064		21688		76378			
2 laborers 40 days @ 10 hr	800	800	2771	—	—	—	—	—	—	22168							22168			
Flatbed truck 40 days @ 5 hr	200	200	3204	—	—	1177		22.55		6408			2354		457.0		13272			
2 9 trucks 20 days @ 1 Shift/job	400	400	3337	—	—	60		96		42200		291900	43518		26198		403716			
1 ,08 B loader 20 days @ 1 Shift 10 hr	200	200	3586			8999		56.09		13348			24000		18400		55748			
										7172			17998		11218		36388			
										62720		291900	85416		55816		496852			
From: Site Preparation Cleaning & Stripping										390422		—	609343		447824		1447588			
Deduct for Filter Cloth & Snow Removal										62720		291900	85416		55816		495852			
	Filter Cloth = 23.47% Reduce by 76.53%									327702		[291900]	523927		392008		951736			
Rehabilitation										250785			400953		299998		951736			
New Figures Site Preparation										62720		291900	85416		55816		495852			
Rehabilitation Seed & Fertilizer 40 lb/acre =										233433		65852	373210		279241		951736			

7

Alaska International Construction, Inc.

PROJECT: Susitna Hydroelectric Project - Preliminary Estimate ITEM NO. 10 EST. BY [illegible] F7 SHEET 10 OF

SPEC. REFERENCE: Watana Camp & Village DESCRIPTION Main Construction Camp - Site Preparation - Clearing & Stripping CHKD. BY

DWG. REFERENCE: BID DATE ENGR. QUANTITY 163 ACRES DATE: Dec. 1981

Clearing & Stripping 163 ACRES	UNITS EQP.	UNITS MAN	LABOR	R & B	OTHER	CO. RENT	3RD PARTY (Less RENT)	FUEL	LUBE & PARTS	LABOR	R & B OR TRAVEL	OTHER	COMPANY RENTAL	3RD PARTY RENTAL	FUEL	LUBE & WEAR PARTS	SUBTOTAL	PERMANENT MATERIALS	SUB-CONTRACT	TOTAL COST
All brush, trees, roots, and other unsuitable material shall be transported to a suitable disposal area & topsoil shall be stripped and stockpiled for future use. Do clearing work while the ground is still frozen. Strip off brush, moss and the top of the root system - windrow with dozers then load into 22 CY off-highway trucks & haul to a disposal site located where the average haul distance is 4,000 feet. Use Cat 637 scrapers to haul topsoil to a stockpile site located where the average haul is 4,000 ft											Recalculations Reduced cleaning & Stripping to cover rehabilitation only		1-23-81 in Buffalo old price 2439 114 new price 1447589		Reduced by 40.6510%					
163 acres @ 1 acre/hr = 163 dozer hrs. 35,779 cy @ 409 cy/hr = w/3 hrs = 6 trucks = 818 cy/hr use 2 loaders & 6 trucks = (each truck hauls 150) 35779 ÷ 818 = 166 hrs = 16.6 days																				
1 Foreman w/P.U.	166	166	3692	—	—	227	.25	1197	.94	6129	—	—	377	42	1987	156	8691	4	PU	
1 12 yr D8K stripping	166	166	3426	—	—	64.00	649	2420	571	5654	—	—	10624	1077	4017	948	22320	1	D8K	
1 Work D8K bunching to loaders/clean up	209	209	3426	—	—	64.00	649	2420	571	7119	—	—	13376	1356	5058	1193	28102	1	D8K	
2 988 B loaders	418	418	3556	—	—	89.99	9.71	2708	1930	14989	—	—	37616	4059	11319	8067	76050	2	988B	
3 769C Haultrks	1672	1672	3337	—	—	60.00	6.65	2866	1069	55795	—	—	100320	11119	47920	17874	233028	8	769C	
1 D8K on stockpile	209	209	3406	—	—	64.00	649	2420	571	7119	—	—	13376	1356	5058	1193	28102	1	D8K	
1 14G blade on haul road	209	209	3426	—	—	44.98	4.41	1299	469	7119	—	—	9401	922	2715	980	21137	1	14G	
2 Pit lights	199	—	—	—	—	1.77	.11	.56	.05	—	—	—	352	22	111	10	495	2	Pit lights	
Haul top soil 394,460 CY - 100 days (Rehabilitation)																	417921			
Foreman w/P.U.	400	400	3692	—	—	227	.25	1197	.94	14768	—	—	908	100	4788	376	20940	1	P.U.	
1 637B Scrapers @ 400 hr =	2400 4800	2400 4800	3426	—	—	12.11	13.24	52.38	15.21	163488 81.744	—	—	595.728	63552	251424 125712	73008	1447200 723600	12	637	
D9 push cats	800	800	3406	—	—	10.266	10.16	35.16	25.90	27248	—	—	82128	8128	28128	7120	152752	2	D9	
D9L: Ripper cat & 1 Fillcat	800	800	3406	—	—	10.266	10.16	35.16	25.40	27248	—	—	82128	8128	28128	20320	165952	2	D9	
14G Blade	400	400	3406	—	—	4.498	4.41	12.99	4.69	13624	—	—	17992	1764	5196	1876	40452	1	14G	
Bus = Bus only	400	—	—	—	—	7.20	.36	17.95	2.17	—	—	—	2880	144	7180	868	11072	1	Bus	
Pit lights	1995	—	—	—	—	1.77	.11	1.56	.05	—	—	—	2115	131	1864	60	4170 966,138	6	Pit lights	
Mechanical Support per shift (2 shifts)																				
master mechanic w/pu	480	480	3925	—	—	2.27	.25	1197	.94	18840	—	—	1090	120	5786	451	26247	1	PU	
Mechanic Foreman w/pu	960	960	3814	—	—	2.27	.25	1197	.94	36614	—	—	2179	240	11491	902	51426	2	PU	
mechanics w/5 hrs	2400	4800	3517	—	—	10.05	.41	1795	2.19	168816	—	—	24120	984	43080	5232	242232	5	Mech hrs	
Fuelers w/1 truck	480	480	3300	—	—	1177	.80	1934	2.41	15840	—	—	5650	384	9283	1157	32814	1	Fuel trk	
1 Lube w/1 serv truck	480	960	3436	—	—	1261	.90	1934	2.68	32986	—	—	6053	432	9283	1286	50040	1	Serv trk	
1 tiremen w/2 tire trucks	960	960	3588	—	—	1177	.80	1934	2.41	34445	—	—	11299	768	18566	2314	67892	2 tire trks	4.78 lc/hr	strip & Drive
temp shop & shop tools @ $350.00/mo & $100.00/mo	20	—	—	—	—	350.00	—	100.00	—	—	—	—	7000	—	2000	—	9000	1 temp shop		
		11,210								390422			609343	62214	299322	86288	478651 1447589	1,447589		
										657841	—	—	1026712	104828	504342	145391	2439114		14,963.89/acre	

18.889 hr = 115.9831 acres

4,025.83 398.85 641.28 2,000.00 1,462.00/acre

8

Susitna Project

Dozer Production -

Stripping

D8K with 12 ft blade - say 9 ft. wide cut cleared each pass
Push to stockpile 100 ft.

Push @ 2.2 mph 100 ft	=	.52 min
Back @ 3. mph	=	.38 min
maneuver	=	.1 min
		1.0 min per pass

9' x 100 ft = 900 sq. ft/min = 50 min hr = 45,000 sq. ft/hr.

Say there is 6 inches of growth = 22,500 ÷ 27 = 833 cy/hr.

1 Dozer will clear 45,000 sq. ft. say 1 Acre per hour
1 Acre has 833 cy brush & moss

163 Acres = 163 hr cat time
163 x 833 = 135,779 cy material to haul

Haul units Figure 769C @ 22 cy

haul 4000 ft @ 2% grade
Mat speed 20 mph
Rolling Resistance 20%
load-dump turn = 4. min
weight of material @ 2000 lbs/cy

Round trip =	15.49 min
cy/hr/unit =	71.00 - 81.3 cy with 15% overfill
haul 135,779 cy =	1,669 hours for one unit to haul / ÷ 8 units = 209 hr

Loaders 988B

Bucket Capacity	7 cy	
15% overfill		
loading efficiency	90%	135,779 ÷ 409
Cycle time	.77 min	
Capacity of haul unit	22 cy	
Nr yards in bucket	6.3	
time to load	3.08 min	
No. passes	4.	
cy per truck	25.2	
cy per 50 min hr	409	
No truck loads / hr.	16.23	
Number trucks loading each hour	4	

F9

Susitna Project

MC

Stripping use 657B cat scrapers

Haul distance	4000 ft. w/ 2% grade (adverse)
max speed	20 mph
Rolling Resistance	20 %
load dump & turn	3 min.
Weight of material	2000 lbs/cy

657B will make a Roundtrip = 13.49 min
50 min/hr = 118.62 cy
total cy to haul @ 1.5 std/shift = 394,460 cy
total hours for one unit to haul = 3326.7 hrs ÷ = ÷ 8 = 416 hrs

Push cats will load in 35 seconds = .58 min
each scraper trip = 13.49 ÷ .58 = 23 scrapers that push cats will handle

8 scrapers x 118.62 = 949 cy per hr. = 416 hrs

Rippers = Required 949 cy per hr

use 1 D9L under semi-frozen conditions @ 1500 cy/hr

8 657B scrapers @ 949 cy/hr = 949 x 19.5 = 18,505 cy/2 shifts/day

394,460 ÷ 18,505 = 21 days x 20 hrs = 420 hrs

637D scrapers

Same conditions as 657B

394,460 cy to dispose of
total hours for one unit to haul = 4,736 hrs
each scraper hauls 83.28 cy/hr
12 scrapers x 83.28 = 1000 cy per x 19.5 = 19,500 cy/day-2 shifts
394,460 cy ÷ 19,500 = 20 days x 20 hrs = 400 hrs

769B

Truck loads per hr

loader can handle

use 2 loaders

Alaska International Construction, Inc.

PROJECT: Susitna Hydroelectric Project - Preliminary Estimate — ITEM NO. 20 — EST. BY pmj — F10

SPEC. REFERENCE: Watana — DESCRIPTION Main Construction Camp - Site Preparation - Fine Grading — SHEET 20 OF

DWG. REFERENCE: — BID DATE — ENGR. QUANTITY 790,000 Sq. Yds = 163 Acres — CHKD. BY — DATE:

Fine Grading 790,000 Sq. Yds = 163 Acres	UNITS EQP.	UNITS MAN	LABOR	R & B	OTHER	CO. RENT	3RD PARTY RENT	FUEL	LUBE PARTS	LABOR	R & B OR TRAVEL	OTHER	COMPANY RENTAL	3RD PARTY RENTAL	FUEL	LUBE & WEAR PARTS	SUBTOTAL	PERMANENT MATERIALS	SUB-CONTRACT	TOTAL COST
this item included in Cleaning & Stripping																				

Alaska International Construction, Inc.
PROJECT: Susitna Hydroelectric Project - Preliminary Estimate — ITEM NO. 30 — F 11
SPEC. REFERENCE: Watana — DESCRIPTION Main Construction Camp - Site Preparation - Install Granular Pad — EST. BY RWS — SHEET 30 OF
DWG. REFERENCE: — BID DATE — ENGR. QUANTITY 1,770,000 cy — CHKD. BY — DATE:

Install Granular Pad 1,770,000 cy	UNITS EQP.	UNITS MAN	LABOR	R & B	OTHER	CO. RENT	3RD PARTY RENT	FUEL	LUBE PARTS	LABOR	R & B OR TRAVEL	OTHER	COMPANY RENTAL	3RD PARTY RENTAL	FUEL	LUBE & WEAR PARTS	SUBTOTAL	PERMANENT MATERIALS	SUB-CONTRACT	TOTAL COST
Borrow Pit development																				
Strip borrow pit - Figure extra 20 hr with Ripper cats to open pit																				
Borrow Pit F reportedly is good granular material - Unfrozen																				
Construct haul Road Pit to Intersection - ½ charged to MCV fill - 60,554 cy					60,554 cy															
Construct haul Road - Intersection to Pad 29,862 cy					29,862 cy															
Construct gravel Pad 1,770,000 cy					1,770,000 cy															
Total Material = 1,860,416 cy					1,860,416 cy															
Production with 14 B70's @ 2 shift = 43,173 cy/day																				
1,860,416 cy ÷ 43,173 = 43 days * 20 hr = 860 hr																				
43 days																				
Foreman w/P.U.	880	880	36.92	—	—	.27	.25	11.97	.94	32490	—	—	1998	220	10534	827	46069		Lump	
4 D9L's in pit - Ripping & stockpiling	3520	3520	34.06	—	—	102.66	10.16	35.16	25.46	119891	—	—	361363	35763	123763	89619	730399		4 D9L	
4 988 B loaders in pit	3440	3440	35.86	—	—	89.99	9.71	27.08	19.30	123358	—	—	309566	33402	93155	66392	625873		4 988	
Teamster Foreman w/P.U.	860	860	35.59	—	—	2.27	.25	11.97	.94	30607	—	—	1952	215	10294	808	43876		1 P.U.	
14 B70 Belly Dumps	12040	12040	34.59	—	—	80.60	9.40	26.94	18.40	416464	—	—	970424	113176	324858	221536	2045958		14 B70	
2 14G Blades - 1 haul road - 1 fill	1720	1720	34.06	—	—	44.98	4.41	12.91	4.69	58583	—	—	77366	7585	22343	8067	173944		2 14G	
Foreman on fill w/P.U.	860	860	36.92	—	—	2.27	.25	11.97	.94	31751	—	—	1952	215	10294	808	45020		1 P.U.	
2 D9L Fill Cats	1720	1720	34.06	—	—	102.66	10.16	35.16	8.90	58583	—	—	176575	17475	60475	15308	328416		2 D9L	
2 SP56 Vibratory Rollers	1720	1720	32.54	—	—	21.34	2.45	5.98	2.90	55969	—	—	36705	4214	10286	4988	112162		2 SP56	
10 pit lights	5160	—		—	—	1.77	.11	.56	.05	—	—	—	9133	568	2890	258	12849		10 pit lights	
2 Grade Checkers	—	1720	31.16	—	—	—	—	—	—	53595	—	—	—	—	—	—	53595		—	
3 10,000 gal water trucks	2580	2580	32.04	—	—	71.59	8.11	22.75	8.12	82663	—	—	189702	20924	58695	20950	367934		3 10,000 gal water tks	
3 8" water pumps	2580	—	—	—	—	8.37	.46	5.93	.76	—	—	—	21595	1187	15299	1961	40042		3 8" water pumps	
2 18,000 gal water tanks	1720	—	—	—	—	13.62	1.26	—	.98	—	—	—	23426	2167	—	826	26419		2 18,000 gal water tk	
Mechanical Support @ 12 hr																				
1 Master Mechanic w/pu.	1032	1032	39.25	—	—	2.27	.25	11.97	.94	90506	—	—	2343	258	12353	970	56430		1 P.U.	
2 Mechanic Foremen w/pu	2064	2064	38.19	—	—	2.27	.25	11.97	.94	78721	—	—	5717	516	24706	1940	111600		2 P.U.	
10 Mechanics w/5 mech. trucks	5160	10320	35.19	—	—	10.05	1.41	17.95	2.18	362954	—	—	51858	2116	92622	11249	520799		5 mech tk	
2 tiremen w/2 tire trucks	2064	2064	35.88	—	—	1.77	.80	19.34	2.41	74056	—	—	24293	1651	39918	4974	144892		2 tire tks	
2 Service oilers w/1 Service truck	1032	2064	34.36	—	—	12.61	.90	19.34	2.68	70919	—	—	13014	929	19959	2766	107587		1 serv tk	
1 Fueler w/1 Fuel truck	1032	1032	33.00	—	—	11.77	.80	19.34	2.41	34056	—	—	12147	826	19959	2487	69475		1 Fuel tk	
Temporary shop & Shop Equip	43	—	—	—	—	350.00	—	100.00	—	—	—	—	15050	—	4300	—	19350		1 Shop	
4 Shop mechanics	—	4128	35.17	—	—	—	—	—	—	145182	—	—	—	—	—	—	145182		—	
1 Bus - Bus only	860	—	—	—	—	7.20	.36	17.95	2.17	—	—	—	16192	810	15437	1866	23805		1 Bus	
			53.765 hr							1870348	—	—	2307371	243717	971640	458600	5851676		total/cy hauled 1,860,416 =	3.1454/cy
			.030376 hr per cy							1.0567/cy			1.3036/cy	.1377/cy	.5489/cy	.2591/cy	3.3060/cy			
										31.9626%			39.4309%	4.1649%	16.6045%	7.8371%				

See Attached adjustment sheet

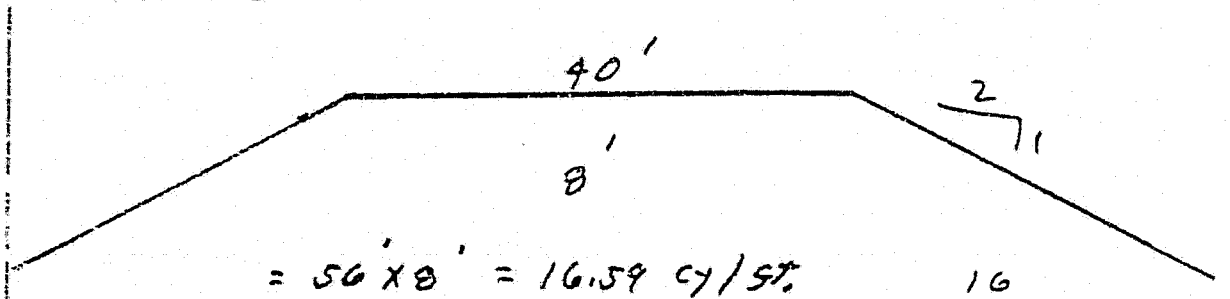
Susitna Project 1-6-82

main Construction camp Fill & Haul Road Construction

1,770,000 cy
use material Site F. - reported to be good granular material unfrozen

Construct haul road From pit F to intersection = 7300 ft
haul Road - Intersection to Main Construction Camp = 1800 Ft
haul Road - intersection to Construction Village = 6,250 ft

Figure 8' Fill with 40' shoulder to shoulder



= 56' x 8' = 16.59 cy/ft. 16

Pit F to intersection = 7300 ft ÷ 2 = 3,650 Ft to Center of Fill from Pit
Intersection to MCC = 1800 ft ÷ 2 = 900 ft + 7300 = 8200 ft to center of fill
Intersection to MCV = 6250 ft ÷ 2 = 3125 Ft + 7300 = 10,425 ft to center of fill

Pit F to intersection = 7,300 X 16.59 = 121,108 cy @ 3,650 Ft. haul
Int. to MCC = 1,800 X 16.59 = 29,862 cy @ 8,200 ft haul
Int to MCV = 6,250 X 16.57 = 103,588 cy @ 10,425 Ft haul

MCC Fill

Pit F to Intersection = 121,108 cy ÷ 2 (½ change to MCV) = 60,554 @ 3,650 ft
intersection to camp = : 29,862 @ 8,200 ft
MCC Pit F to center of site = 10,600 ft 1,770,000 @ 10,800 ft
Pit F to Intersection 6.57 Scrapers)
Haul Dist = 3,650 ft
max speed 20 MPH
Grade 2 % adverse 1,825 Ft 0 % son 1,825 Ft (use 0% - negligible)
load dump turn 3 min

Haul 60,554 cy
Hours son one unit to haul = 271 h

1750 hrs

Susitna Project

main construction camp. Fill

Intersection to MCC Site - 657 Scrapers

Haul Dist =	8,200 ft
max speed	20 MPH
grade	negligible
load-dump-turn	3 min
quantity	29,862 cy

Haul 29,862 cy
Time for one unit to haul = 230 hr

MCC granular fill

Haul Dist	10,800 ft
max speed	20 MPH
grade	negligible
load-turn-dump	3 min
quantity	1,770,000 cy

Haul 1,770,000 cy
time for one unit to haul = 16,895 hr

total =

Pit to Int.	60,554 cy	271 hr
Int. to Site	29,862 cy	230 hr
MCC granular Fill	1,770,000 cy	16,895 hr
	1,860,416 cy	17,396 hr

Main Const. Camp Fill & Haul Road Const.

USE 870's

2% 3500
0%
-2% 3052
0%

Diff to Intersection
Dist 3,650 FT
Max speed 30 MPH
Grade - average 1%
Load-Dump-Turn 5.5 min
Quantity 60,554 cy

Quantity 60,554 cy
time for one unit to haul = 288 hr 1860 mi
1.974639%

Intersection to MCC site
Dist. 8,200 FT
2% grade 3,500 ft
0% grade 4,700 ft
Quantity 29,862 cy

Quantity 29,862 cy
time for one unit to haul 202 hr 2061 mile
1.38498 hr

MCC Granular Fill

Dist. 10,800 ft
2% grade 3,500 ft
0% grade 7,300 ft
Quantity 1,770,000 cy

Quantity 1,770,000 cy
14,095 hr 160,909 mile
96.6+038.0%

1,860,416 cy 14,585 hr 62,970 mile

15

Susitna Project

MCC Gravel Pad

2 loaders will handle 7 trucks @ 1107 cy/h

4 loaders will handle 14 trucks @ 2214 cy/h

1,860,416 cy ÷ (2214 x 19.5T = 43,173 cy/20hr day = 43 days

F 16

Alaska International Construction, Inc.

PROJECT: Modification to MCC — SUMMARY SHEET — EST. BY

SPEC. REFERENCE: Granular Pad — CHKD. BY — SHEET OF

DWG. REFERENCE: — BID DATE — ENGR. QUANTITY — DATE:

	.1 LABOR HOURS	1 LABOR $	2 R & B OR TRAVEL	3 OTHER	4 COMPANY RENTAL	5 3RD PARTY RENTAL	6 FUEL	7 LUBE & WEAR PARTS	.0 SUBTOTAL	8 PERMANENT MATERIALS	9 SUB-CONTRACT	0 TOTAL COST	ADJUSTMENTS BID
As Shown 43 days	53765	1870348			2307371	243717	971640	458600	5851676			5851676	
Deduct for access Road Connectin = 18001.f. @ 1.38498%	745	25904			31957	3375	13457	6352	81045				
	53020	1844444			2275414	240342	958183	452248	5770631			5770631	
Deduct for Haul Road Const. Pit to int @ 1.97963%	1062	36932			45562	4813	19186	9056	115549				
Cost to Granular Pad 41 days	51958	1807512			2229852	235529	938997	443192	5655082			5655082	
Reduce to 4' pad = 1,770,000 = 885,000 cy use 50%													
44	25979	903756			1114926	117765	469999	221596	2827541			2827541	
		1.021			1.260	.133	.531	.50	3.195				
							.914						

17

Alaska International Construction, Inc.

PROJECT: Susitna Hydroelectric Project - Preliminary Estimate — ITEM NO. 40 — EST. BY Acuy — F 17

SPEC. REFERENCE: Watana — DESCRIPTION Main Construction Camp - Site Preparation - Main Roads in Camp [34' wide] — SHEET 40 OF

DWG. REFERENCE: — BID DATE — ENGR. QUANTITY 10,200 L.F. — CHKD. BY — DATE:

	UNITS EQP.	UNITS MAN	LABOR	R & B	OTHER	CO. RENT	3RD PARTY RENT	FUEL	LUBE PARTS	LABOR	R & B OR TRAVEL	OTHER	COMPANY RENTAL	3RD PARTY RENTAL	FUEL	LUBE & WEAR PARTS	SUBTOTAL	PERMANENT MATERIALS	SUB-CONTRACT	TOTAL COST
10,200 LF																				
Crushed D1 - 10,200 ft x .22 = 2244 cy																				
Crushed Grad A: 12,444 cy x 1 = 10,200 cy / 12,444 cy																				
Use Crushed Prorate Costs for 12,444 cy	12,444	12444	1.8929	—	—	2.7650	.3120	1.0489	.3966	23555	—	—	34408	3883	13053	4935	79834			79834
Crushed aggregate for AC Paving = 10,200 x .21 = 2142 cy	2142	2142	1.8929	—	—	2.7650	.3120	1.0489	.3966	4055	—	—	5923	668	2247	850	13743			13773
.056391		823																		
Haul from pit F & Place .030376	14,586	3786	1.0567	—	—	1.3036	.1377	.5989	.2591	15413	—	—	19014	2008	8006	3779	48220			48220
		14586																		
		4924																		
AC Paving - Subcontract paving																				
10,200 x 34 = 346,800 ÷ 9 = 38,533 sq yds @ 7.50 =																			299000	299000
		12666								43023			59345	6559	23306	9564	141797		299000	440827

43.22 / 15.

Alaska International Construction, Inc.

PROJECT: Susitna Hydroelectric Project - Preliminary Estimate — ITEM NO. 50 — EST. BY Avery — F18 — SHEET 50 OF

SPEC. REFERENCE: Watana — DESCRIPTION Main Construction Camp - Site Preparation - Connect Camp Rd to access Road [24'] — CHKD. BY

DWG. REFERENCE: — BID DATE — ENGR. QUANTITY 1,800 LF — DATE:

Connect Camp Rds to access Road 1,800 LF	UNITS EQP.	UNITS MAN	LABOR	R & B	OTHER	CO. RENT	3RD PARTY RENT	FUEL	LUBE PARTS	LABOR	R & B OR TRAVEL	OTHER	COMPANY RENTAL	3RD PARTY RENTAL	FUEL	LUBE & WEAR PARTS	SUBTOTAL	PERMANENT MATERIALS	SUB-CONTRACT	TOTAL COST
Use Crushing factors from work sheet																				
Use haul factors from MCC fill work sheet																				
Road Base construction was put in as a haul road added.																				
Crushed D1 - 1800LF X .22 = 396 CY																				
Basic Grading "A" 1800LF X 1 1800 CY																				
Crushed Aggregate for AC Paving = 1800 X .148 = 266 CY																				
Factors for Crushing 246269 .056391	2462	2462	1.8929	—	—	2.7650	.3120	1.0489	.3966	5001	—	—	7305	824	2771	1048	16949			16949
haul from Pit F to Plant .030376	2462	2462	1.0567	—	—	1.3036	.1377	.5989	.2591	2792	—	—	3944	364	1450	685	8735			8735
AC Paving - Subcontract Paving																				
1800 LF X 24 = 43,200 SFT ÷ 9 = 4800 SY @ 7.50/SY =																			36000	36000
		2144								7793			10749	1188	4221	1733	25684		36000	61684
Construct access Road - Project		745								25904			31957	3375	13457	6352	81045			81045
		959								33697			42706	4563	17678	8085	106729		36000	142729

Alaska International Construction, Inc.

PROJECT: Susitna Hydroelectric Project - Preliminary Estimate — ITEM NO. 60 — EST. BY pwm — F19

SPEC. REFERENCE: Watana — DESCRIPTION Main Construction Camp - Site Preparation - Ditching — CHKD. BY — SHEET 60 OF

DWG. REFERENCE: — BID DATE — ENGR. QUANTITY 27,000 L.F. — DATE:

Ditching - 27,000 L.F.	UNITS EQP.	UNITS MAN	LABOR	R & B	OTHER	CO. RENT	3RD PARTY RENT	FUEL	LUBE PARTS	LABOR	R & B OR TRAVEL	OTHER	COMPANY RENTAL	3RD PARTY RENTAL	FUEL	LUBE & WEAR PARTS	SUBTOTAL	PERMANENT MATERIALS	SUB-CONTRACT	TOTAL COST
Work will be done in conjunction with site fill crew will do 100 ft per hr.																				
27,000 : 100 = 270 hrs - use duration of gravel placement = 43 days x 10 = 430 hrs																				
" 43 days																				
1 D6 Dozer	430	430	34.06			23.48	2.41	12.18	2.40	146.46			100.96	10.36	52.37	10.32	320.47			
1 14G Grader	430	430	34.60			49.98	4.41	12.99	4.69	146.46			193.41	18.96	53.86	20.17	434.86			
1 Grade Checker		430	31.16							133.99							133.99			
		1290 hrs								426.91			294.37	29.32	108.23	30.49	889.32			
																	3.29/LF			

Alaska International Construction, Inc.
PROJECT: Susitna Hydroelectric Project - Preliminary Estimate — ITEM NO. 70 — EST. BY [illegible] — SHEET 70 OF
SPEC. REFERENCE: Watana — DESCRIPTION Main Construction Camp - Site Preparation - Culverts — CHKD. BY
DWG. REFERENCE: — BID DATE — ENGR. QUANTITY 1,200 l.f. — DATE:

F 20

Culverts 18" 1,200 l.f.	UNITS EQP.	UNITS MAN	LABOR	R & B	OTHER	CO. RENT	3RD PARTY RENT	FUEL	LUBE PARTS	LABOR	R & B OR TRAVEL	OTHER	COMPANY RENTAL	3RD PARTY RENTAL	FUEL	LUBE & WEAR PARTS	SUBTOTAL	PERMANENT MATERIALS	SUB-CONTRACT	TOTAL COST
1 Crew will place 4 culverts per day - say 200' 1200 ÷ 100 = 12 days × 10 = 120 h Manual will be distributed along road																				
1 Foreman w/PU.	120	120	3227	—	—	.227	.25	1198	.84	3872	—	—	272	30	1436	101	5711			5711
1 JD 450 w/ hoe	120	120	3406	—	—	1610	136	565	1.48	4087	—	—	1932	163	678	178	7038			7038
2 Laborers	—	240	2770	—	—	—	—	—	—	6650	—	—	—	—	—	—	6650			6650
2 Plate Compactors (1 for half)	240	—	—	—	—	162	20	135	10	—	—	—	401	48	324	24	797			797
2 Dumping Jacks	240	—	—	—	—	195	15	32	06	—	—	—	228	36	77	14	355			355
1 Flatbed truck	60	60	3204	—	—	1177	80	1934	2.41	1922	—	—	706	48	1160	145	3981			3981
Purchase 1200 l.f. Culvert & 25 bands 18" @ 9.73 l/f @ 22.20 bund																		12231		12231
.4500 h/sf		270 h								16531	—	—	3539	325	3675	462	24532	12231		36763
										13.7758/sf	—	—	2.9492/sf	.2708/sf	3.0625	.3850/sf	20.4333			30.6358
.2250 h/sf		270 h								8266			1770	163	1838	131	12168	12231		24497
18" @ 9.73 l/f. 2-20 bund 24" @ 12.90 l/f. 26-4 bund 36" @ 19.16 l/f 37-36 bund										6.8879/sf			1.4746	.1354	1.5313	.1925	10.2217			20.4442

Alaska International Construction, Inc.

F 21

PROJECT: Susitna Hydroelectric Project - Preliminary Estimate — ITEM NO. 80 — EST. BY RWM — SHEET 80 OF

SPECIFICATION REFERENCE: Watana — DESCRIPTION Main Construction Camp - Site Preparation - Perimeter Fencing — CHKD. BY

DWG. REFERENCE: — BID DATE — ENGR. QUANTITY 11,000 LF. — DATE:

Perimeter Fencing	UNITS EQP.	UNITS MAN	LABOR	R & B	OTHER	CO. RENT	3RD PARTY RENT	FUEL	LUBE PARTS	LABOR	R & B OR TRAVEL	OTHER	COMPANY RENTAL	3RD PARTY RENTAL	FUEL	LUBE & WEAR PARTS	SUBTOTAL	PERMANENT MATERIALS	SUB-CONTRACT	TOTAL COST
Subcontract @ 15.00/LF. 11,000 @ 15.00 = 11.40 12.00 @ 18.00 w/OH&PR			6.562b		4.77 20	.3281		.4010		72189		46200	3609		44.1				126403	

Alaska International Constructors, Inc.

PROJECT: Susitna Hydroelectric Project - Preliminary Estimate — ITEM NO. 90 — EST. BY RWP — F22

SPEC. REFERENCE: Watana — DESCRIPTION Main Construction Camp - Site Preparation - Parking Areas — CHKD. BY — SHEET 90 OF

DWG. REFERENCE: — BID DATE — ENGR. QUANTITY 1 unit=Lump Sum — DATE:

Parking Areas	UNITS EQP.	UNITS MAN	LABOR	P & B	OTHER	CO. RENT	3RD PARTY RENT	FUEL	LUBE PARTS	LABOR	R & B OR TRAVEL	OTHER	COMPANY RENTAL	3RD PARTY RENTAL	FUEL	LUBE & WEAR PARTS	SUBTOTAL	PERMANENT MATERIALS	SUB-CONTRACT	TOTAL COST
Figure 8" of D1 - = 10" cy. per acre																				
Figure one acre =																				
Crush D1 :056391 hour/t	1076	1076	1.8929	—	—	2.7650	.3120	1.0489	.3946	2037	—	—	2975	336	1129	427	6904			
haul from pit / Piety .030376 / mile	1076	1076	1.0567	—	—	1.3036	.1377	.5489	.2591	1137	—	—	1903	148	591	279	3558			
	94th									3174	—	—	4378	484	1720	706	10462			

Alaska International Construction, Inc.
PROJECT: Susitna Hydroelectric Project - Preliminary Estimate ITEM NO. 91 EST. BY DMM SHEET 91 OF
SPEC. REFERENCE: DESCRIPTION Utilities - Water intake 3.4 MG Pond CHKD. BY
DWG. REFERENCE: BID DATE ENGR. QUANTITY DATE: 1-9-8

	UNITS EQP.	UNITS MAN	LABOR	R & B	OTHER	CO. RENT	3RD PARTY RENT	FUEL	LUBE PARTS	LABOR	R & B OR TRAVEL	OTHER	COMPANY RENTAL	3RD PARTY RENTAL	FUEL	LUBE & WEAR PARTS	SUBTOTAL	PERMANENT MATERIALS	SUB-CONTRACT	TOTAL COST
3,400,000 gal Pond																				
Develop with material site																				
3.4 MG Pond in Borrow Pit F. - 1 acre 10 ft deep																				
use CMP intake & outlet - Figure 36" inlet/outlet																				
use liner & insulated top 55,560 sq ft liner - 43560 sq ft surface																				
200 lin. Ft. - 36" culvert																				
4 Culvert Crew Days - Prorate		260								7229			1180	108	1225	154	10394			
4 laborers 4 days to install liner		160	2771							4434							4434			
200 ft 36" Culvert @ 4 barrels C 19.16 & 38.86																		3987		
		420								12161			1180	108	1225	154	14828	3987		16815
Liner @ .793 / sq. ft x 55,560 =																		44059		44059
Insulated Cover - Say 55,560 sq ft liner																				
55,560 sq. ft x 4" insulation																				
Liner * .793 x 55.560 = 44,059																				
insulation board @ .67 (in place) / BF = 2.68 / sq. ft																				
46,560 sq. ft x 2.68 = 124,781																		169290		169290
169,290																				
		420 h								12161			1180	108	1225	154	14828	217336		232164
										1.052381			.005083		.001487 .006405			.936131		

Alaska International Construction, Inc.
PROJECT: Susitna Hydroelectric Project - Preliminary Estimate ITEM NO. 92 F-24
SPEC. REFERENCE: DESCRIPTION Sewage lagoons EST. BY BWM SHEET 92 OF
DWG. REFERENCE: BID DATE ENGR. QUANTITY CHKD. BY
DATE: 1-10-81

	UNITS EQP.	UNITS MAN	LABOR R & B	OTHER	CO. RENT	3RD PARTY RENT	FUEL	LUBE PARTS	LABOR	R & B OR TRAVEL	OTHER	COMPANY RENTAL	3RD PARTY RENTAL	FUEL	LUBE & WEAR PARTS	SUBTOTAL	PERMANENT MATERIALS	SUB-CONTRACT	TOTAL COST
385' X 205' = 78,925 sq ft = 1.81 Acres 280 X 155' = 43,400 sq ft = 1 Acres																			
Construct 5 sewage lagoons on previously placed Pad with 10 ft Berms 10' Berm Requires 9.63 cy x 3,770 l.f. Berm = 36,305 cy. 20 days																			
Use Prorate to haul from Plant MCC .030376 Adj/cy Add Crew to Plant Increase - 20 days	36305	36305	1.0567	—	—	1.3036	.1377	.5489	.2891	38363	—	—	47327	4999	19928	5407	126024		
1 Foreman w/PU	400	400	32.79	—	—	2.27	.25	11.97	.84	13176	—	—	908	100	4788	236	19248		
4 Laborers	—	1600	22.71	—	—	—	—	—	—	36336	—	—	—	—	—	—	36336		
1 D38 Dozer	400	400	3586	—	—	.8999	9.71	27.08	19.30	14344	—	—	35996	3884	10832	7720	72776		
Factor - Timber - 5.81 Acres = 253,084 sq ft Side 3,770 x 10 = 37,770 sq ft 290,854 C .723 (Trim on lines in line 10)																	210287		
		3603								102159	—	—	84231	8983	35548	17463	248384	210287	58671

Susitna project

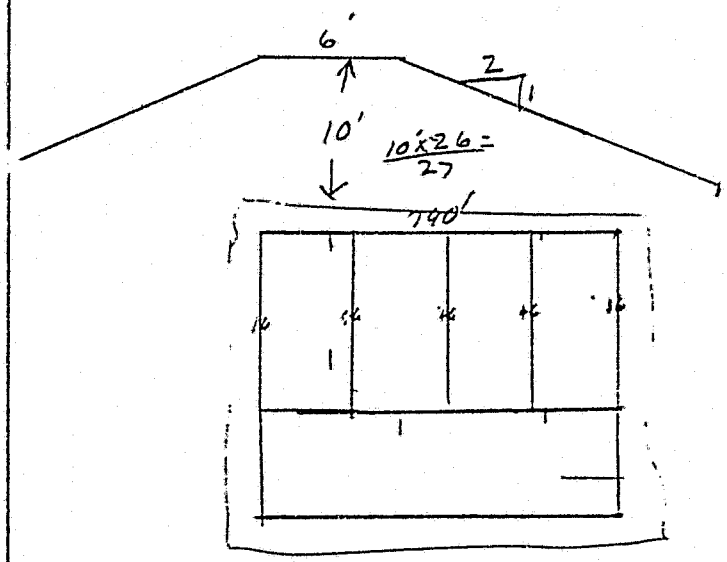
Sewage lagoons

1 Lagoon 385' x 205' = 78,925 sq. ft = 1.81 Acres
4 lagoons 280' x 155' = 43,400 sq. ft = 3.99 Acres
5.80 Acres

5.8 Acres = 252,648 Acre feet of water

252,648 x 7.48 = 1,889,807 gal x 10' = 18,898,070 gal storage

Figure to build the beams 10' high



5 Beams 280'
3 Beams 740' = 3770 sf

10' x 26' = 260 ÷ 27 = 9.63 cy/sf

3,770 x 9.63 = 36,305 cy

Alaska International Construction, Inc.

PROJECT: Susitna Hydroelectric Project - Preliminary Estimate — ITEM NO. 100 — F 26

SPEC. REFERENCE: Watana — DESCRIPTION Garage/Maintenance Building - Earthwork - Clearing & Grubbing — EST. BY RWM — SHEET 100 OF

DWG. REFERENCE: — BID DATE — ENGR. QUANTITY 14 ACRES — CHKD. BY — DATE:

Clearing & Grubbing - 14 ACRES	UNITS EQP.	UNITS MAN	LABOR	R & B	OTHER	CO. RENT	3RD PARTY RENT	FUEL	LUBE PARTS	LABOR	R & B OR TRAVEL	OTHER	COMPANY RENTAL	3RD PARTY RENTAL	FUEL	LUBE & WEAR PARTS	SUBTOTAL	PERMANENT MATERIALS	SUB-CONTRACT	TOTAL COST
Prorate Units from MCC		115,883	1035.83			6,298.85	641.28	3,094.12	891.97											
Extended Units @ 14 ACRES		1622								52502	-	-	88184	8978	43318	12488	209470			
Recalculation 1-23-82		993								33533			52336	5328	25709	7412	124318			
																	50,000	Use 172,000 includes tools @ 25,000		
																	Next Page			

Alaska International Construction, Inc.

PROJECT: Susitna Hydroelectric Project - Preliminary Estimate — ITEM NO.

SPEC. REFERENCE: DESCRIPTION MCC Insulated water tanks — EST. BY F27. — SHEET OF

DWG. REFERENCE: BID DATE — ENGR. QUANTITY — CHKD. BY — DATE: 1-30-82

	UNITS EQP.	UNITS MAN	LABOR	R & B	OTHER	CO. RENT	3RD PARTY RENT	FUEL	LUBE PARTS	LABOR	R & B OR TRAVEL	OTHER	COMPANY RENTAL	3RD PARTY RENTAL	FUEL	LUBE & WEAR PARTS	SUBTOTAL	PERMANENT MATERIALS	SUB-CONTRACT	TOTAL COST
4 laborers will install 10,000 sq. ft liner per day = 11 days 4 laborers place 22,500 board ft insulation per day = 1.5 days																				
Laborers		792	2771	—	—	—	—	—	—	21946							21946			21946
liners 112,800 sq ft @ .793 =	112,800																	89450		89450
insulation board = 228,000 BFC .67 =																		152760		152760
9 Bowl Beams - Prorate @ 110,000 x @ 3.19			1.02		—	1.24		.91		10200	—	—	12600		9100		31900			31900
Deril Canyon																				
4,800,000 gal = 352,028 = 7334 / 100,000 gal x 8 =										58,671 eq lh	32146		12600		9100		53846	242210		296056
100,000																				

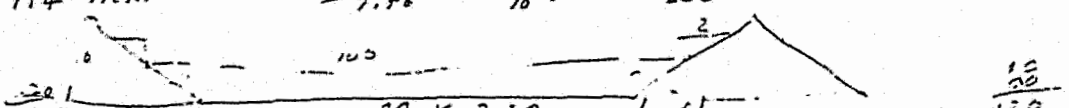
Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

DATE: 1-26-81 SHT.: _____ OF _____
CALCULATIONS BY: _____
SUBJECT: Water Resources
PROJECT: Susitna Hydroelectric

2 each 1.7 mgal
1 each 1.4 mgal

1.7 mgal = $\frac{1,700,000}{7.48} = \frac{228,188 \text{ ft}^3}{10'} = \frac{22,818 \text{ sq ft}}{100} = 228$
1.4 = $\frac{1,400,000}{7.48}$

1.7 mgal = Bond 100 x 228 x 10
1.4 mgal Bond = $\frac{1,400,000}{7.48} = \frac{187,166}{10} = \frac{18,716}{228} = 82'$



80 x 210 on bottom
120 x 250 on top
60 x 210 bottom
100 x 250 on top

$= \frac{120}{210}$
$\frac{120}{250}$
$\frac{60}{320} \times 290.$

Beam = 370 x 2 = 740 SF in length

Gravel = 740 x 7.41 CY = 5483
1 = 490 x 7.41 = $\frac{3631}{3}$
2 = 450 x 7.41 = $\frac{3345}{12449}$ CY FOR BEAMS

Liners 2 each
80 x 210 = 16,800 SF^2
120 x 250 = 30,000 SF^2
70 x 20 = $\frac{15,000}{61,800}$ SF^2 of liner

1 each
60 x 210 = 12,600
100 x 250 = 25,000
70 x 20 = $\frac{14,200}{51,800}$ liner

insulation = 31,000 SF^2 x 2 = 64,000 board ft "insulation
$\frac{4}{256000}$ " "
= 26,000 ft^2 x 4 = 104,000
360,000 board ft 2" insulation

61,800 x 2 = 123,600
51,800
175,400 175,400 SF ft liner

12,449 CY gravel for beams

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

DATE: _____ SHT.: _____ OF _____
CALCULATIONS BY: _____
SUBJECT: _____

PROJECT: _____

1.7 MG Pond = 100 X 228 X 10
1.4 MG Pond = 82 X 228 X 10

120 X 250 = 740 FT
100 X 250 = 450 FT
1190 X 7.41 = 8818 CY for Beams

Liners = 1 @ 61,800 SF²
1 @ 51,800 SF²
112,800 SF² liner

Insulation 31,000 SF²
26,000 SF²
57,000 SF² insulation @ BF X 4 = 228,000 Board FT.

Liner 112,800 Sq. FT
Insulation 228,000 Board FT
Gravel 8,818 CY for Beams
100%
9700

F 30

Alaska International Construction, Inc.

PROJECT: Susitna Hydroelectric Project - Preliminary Estimate — ITEM NO. 110 — EST. BY pc — SHEET 110 OF

SPEC. REFERENCE: Watana — DESCRIPTION POL storage/maintenance bldg - Earthwork - POL Berms — CHKD. BY

DWG. REFERENCE: — BID DATE — ENGR. QUANTITY 45,000 CY — DATE:

	UNITS EQP.	UNITS MAN	LABOR	R & B	OTHER	CO. RENT	3RD PARTY RENT	FUEL	LUBE PARTS	LABOR	R & B OR TRAVEL	OTHER	COMPANY RENTAL	3RD PARTY RENTAL	FUEL	LUBE & WEAR PARTS	SUBTOTAL	PERMANENT MATERIALS	SUB-CONTRACT	TOTAL COST
PROPOSE hauling costs from MCC: cost/cy Mhs=.030376																				
Cost = 3.3060/cy x 45,000 = $148,770.00																				
Tank Farm = 750x750 = 12.91Acres x 1616 cy = 20,892 cy																				
Berms = 24,158 cy = will construct retaining dike 24 use 2871 cy of screened gravel from borrow pit 07	2871	2871	26962	—	—	3.7285	.3898	1.500	.6035	7741	—	—	10705	1119	4307	1733	25605			25605
Hauling costs from MCC cost/cy .030376 1367 mh 1367	45000	45000	1.0367	—	—	1.3036	.1377	.5489	.2591	47552	—	—	58662	6197	24701	11660	148772			148772
20 days																		563930		563930
Add CREW to place liners - Place two liners per day (8 tanks)																				
1 Foreman w/p.u.	400	400	3277	—	—	2.27	.125	11.97	.84	13108	—	—	908	100	4788	336	19240			19240
4 Laborers	—	1600	2721	—	—	—	—	—	—	44336	—	—	—	—	—	—	44836			44336
1 988 loader	400	400	3586	—	—	8999	971	27.08	19.30	14344	—	—	35996	3884	10832	7720	72776	563930		636706
Fabric @ .808 cy/sy																				
40 .085644		3854								127081 2.8240	—	—	106271 2.3616	11300 .2511	44628 .9917	21449 .4766	310729	563930 12.532		874659
4 50,000		385								12708			10627	1130	4463	2145	31073	56393		87466
36 100,000		3469								114373			95644	10170	40165	19304	279656	507587	45000	832193
Fencing P.O.L 3000 l.f @ 15.00																				874659
																				45000
																				919659

Fuel tanks Conservative

87,466 ea. tank
25,000 ea. tank
5,000 piping

Not Bad!

F31 Cont 822-5532

Susitna Project

MCC Watana P.O.L.

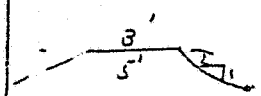
36 - 100,000 gal tanks = 3,600,000
4 - 50,000 gal tanks = 200,000
3,800,000

3,800,000 x 110% = 4,180,000 gal

4,180,000 ÷ 7.48 = 558823 cf

750x750 = 562,500 sq ft

Divide the 750x750 sf area into 40 compartments with a berm 5' high



= 5 x 13 = = 2.4 cy/sf

7 Berms 750 sf = 5250 sf
8 Cross Berms @ 13' = 104' - 750 - 104 = 646 = 5168 sf

5250
5168
10418 x 2.4 cy/sf = 25,003 cy

45,000 cy will construct the 8' pad and construct cross berms retaining dikes for each tank.

Fencing For P.O.L. = 3000 l.f.

Bottom Liner 562,500 sq. ft
Sides 10,418 x 13' = 135,434 sq. ft
697,934 sq. ft @ .808 = $563,930

Alaska International Construction, Inc.

PROJECT: Susitna Hydroelectric — ITEM NO. Watana — EST. BY — SHEET OF

SPEC. REFERENCE: — DESCRIPTION: Fuel tanks For Generators - MCC — CHKD. BY

DWG. REFERENCE: — BID DATE — ENGR. QUANTITY — DATE:

	UNITS EQP.	UNITS MAN	LABOR	R & B	OTHER	CO. RENT	3RD PARTY RENT	FUEL	LUBE PARTS	LABOR	R & B OR TRAVEL	OTHER	COMPANY RENTAL	3RD PARTY RENTAL	FUEL	LUBE & WEAR PARTS	SUBTOTAL	PERMANENT MATERIALS	SUB-CONTRACT	TOTAL COST
Probe from P.O.L. Fuel tank @ 25,000 Piping			1							12708	—	56393	10627	1130	4463	2145	87466			
										2750		25000					25000			
												2250					5000			
										15458		83643	10627	1130	1463 (16220)	2145	117466			

Alaska International Construction, Inc.

PROJECT: Main Const. Village — ITEM NO. 2-11-02 — EST. BY F.S.S — SHEET OF

SPEC. REFERENCE: — DESCRIPTION Site Prep & Rehabilitation — CHKD. BY

DWG. REFERENCE: — BID DATE — ENGR. QUANTITY — DATE:

	UNITS EQP.	UNITS MAN	LABOR	R & B	OTHER	CO. RENT	3RD PARTY RENT	FUEL	LUBE PARTS	LABOR	R & B OR TRAVEL	OTHER	COMPANY RENTAL	3RD PARTY RENTAL	FUEL	LUBE & WEAR PARTS	SUBTOTAL	PERMANENT MATERIALS	SUB-CONTRACT	TOTAL COST
												temp. Mat	Eq. owner		Eq. oper					
USE 130/163 ths of MCC = 79.7546%										62720		211900	85416		55816		495852			
										50022		232804	68123		44516		395465			
From Site Prep & Stripping										312742			487135		358205		1158082			
Deduct for filter cloth & Snow Removal										50022		232804	68123		44516		395465			
										262720		[232804]	419012		313689		762617			
@ 76.6125% for filter cloth										201276			321016		240325		762617			
New Figures Site Preparation										50022		232804	68123		44516		395465			
Rehabilitation Seed & Fertilizing 40#/Acre										187415		52520	298908		223774		762617			

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Alaska International Construction, Inc.

PROJECT: Susitna Hydroelectric Project - Preliminary Estimate — ITEM NO. 120 — EST. BY RWM — F34 — SHEET 120 OF

SPEC. REFERENCE: Watana — DESCRIPTION Main Construction Village - Site Preparation - Clearing & Stripping — CHKD. BY

DWG. REFERENCE: — BID DATE — ENGR. QUANTITY 130 ACRES — DATE:

Clearing & Stripping - 130 ACRES

	UNITS EQP.	UNITS MAN	LABOR	R & B	OTHER	CO. RENT	3RD PARTY RENT	FUEL	LUBE PARTS	LABOR	R & B OR TRAVEL	OTHER	COMPANY RENTAL	3RD PARTY RENTAL	FUEL	LUBE & WEAR PARTS	SUBTOTAL	PERMANENT MATERIALS	SUB-CONTRACT	TOTAL COST
All brush, trees, Roots & other unsuitable material shall be transported to a suitable disposal area. the topsoil shall be stripped and stockpiled for future use																				
Do clearing work while the ground is still frozen - Strip off brush, moss and the top of the Root system - windrow with dozer - then load into 22 cy off-highway trucks & haul to a disposal site located when the average haul distance is 4,000ft use cat 657 Scrapers to haul topsoil to a stockpile site. located where the average haul is 4,000 ft																				
use production rates from main construction site Prep - clearing & Stripping																				
130 Acres @ 1 Acre/day = 130 days																				
use two loaders & 8 trucks = 332 hrs & 1328 hrs - 16 days																				
1 Foreman w/P.U.	166	166	36.92	—	—	2.27	.25	11.92	.94	6129	—	—	377	42	1987	156	8691			
1 Dozer - Stripping - D8K	130	130	34.06	—	—	64.00	6.49	24.20	5.21	4428	—	—	8326	844	3146	742	17480			
Dozer bunching to loaders & clean up D8K	166	166	34.06	—	—	64.00	6.49	24.20	5.21	5654	—	—	10624	1077	4017	948	22320			
2 988 B loaders	332	332	35.86	—	—	89.99	9.71	27.08	19.30	11906	—	—	29877	3224	8991	6408	60406			
8 769 C Haultails	1328	1328	33.37	—	—	60.00	6.65	28.66	10.69	44315	—	—	29680	8831	38060	14196	185082			
1 Dozer on stockpile D8K	166	166	34.06	—	—	64.00	6.49	24.20	5.71	5654	—	—	10624	1077	4017	948	22320			
1 14G blade on haul Road	166	166	34.06	—	—	44.98	4.41	12.99	4.69	5654	—	—	7467	732	2156	779	16788			
2 Pit lights	384	—	—	—	—	1.77	.11	.56	.05	—	—	—	680	42	215	19	956			
Haul top Soil 314,600 CY - 16 days																		3340 83		
1 Foreman w/P.U.	320	320	36.92	—	—	2.27	.25	11.97	.94	11814	—	—	726	80	3830	301	16751			
~~16~~ 637 Scrapers e	~~3840~~ 1920	~~3840~~ 1520	34.06	—	—	124.11	13.24	52.38	15.21	~~130790~~ 65395	—	—	~~476582~~ 238291	~~50842~~ 25421	~~201139~~ 100570	~~58406~~ 29203	~~917759~~ 458880			
2 D9 Pushcats e	640	640	34.06	—	—	102.66	10.16	35.16	8.90	21798	—	—	65702	6502	22502	5696	122200			
2 D9L Ripper/Cat/Cut & Fill	640	640	34.06	—	—	102.66	10.16	35.16	25.90	21798	—	—	65702	6502	22502	16256	132760			
1 14G Blade	320	320	34.06	—	—	44.98	4.41	12.99	4.69	10899	—	—	14394	1411	4157	1501	32362			
1 Bus - Bus only	320	—	—			7.20	.36	17.95	2.17	—	—	—	2304	115	5742	694	8857			
4 Pit lights	960	—	—	—	—	1.77	.11	1.56	.05	—	—	—	1699	106	1498	48	3351			
Mechical Support																		775,161		
1 master mechanic w/P.U.	384	384	39.25	—	—	2.27	.25	11.97	.94	15072	—	—	872	96	4596	361	20997			
2 mechanic Foreman w/P.U.	768	768	38.14	—	—	2.27	.25	11.97	.94	29292	—	—	1743	192	9193	722	41142			
10 mechanics w/5 ths	1920	3840	35.17	—	—	10.05	.41	17.95	2.18	135053	—	—	19296	787	34464	4186	193786			
Fueler w/1 truck	384	384	33.00	—	—	11.77	.80	19.99	2.41	12672	—	—	4520	307	7427	925	25851			
oiler w/1 truck	384	768	34.36	—	—	12.61	.90	19.24	2.68	26380	—	—	4842	346	7427	1029	40032			
2 tiremen w/2 trucks	768	768	35.88	—	—	11.77	.80	19.34	2.91	27556	—	—	9039	614	14853	1851	53913			
temp shed & shop tools	16	—	—	—	—	350.00	—	100.00	—	312742	—	—	5600	—	1600	—	7200			
		89798								526872	—	—	487135 / 820670	49724 / 83769	239523 / 403521	68958 / 116172	1158082 / 1951004	382,921	1,158,082	

Scasitma Project

DOZER @ 1 ACRE per hour = 130 hr cat time

6" = 22,500 ÷ 27 = 833 CY X 130 = 108,290 cy material to haul

Haul units

Round trip = 15.49 mi
cy/hr/unit = 71.00 81.34 w 15% overload
haul 108,290 cy = 1,331 hr for one unit to haul
÷ 8 units = 166 hr

108,290 / 81.34 = 1331 / 8 = 166 hr

Loaders

use 2 loaders & 8 trucks to haul 651 cy/hr

108,290 cy ÷ 651 = 166 hr

Stripping - Same as main const-comp

637 B cat Scrapers

12 Scrapers X 83.28 = 9000 cy/hr =

130 acres @ 1.5 ft topsoil = 314,600 cy ÷ 1000 = 316 hr

Rippers use same number as mcc

1 D9L 332 hp

12 637B Scrapers @ 83.25 = 1000 cy/hr X 19.5 = 19,500 cy/day - 2 shift

314,600 ÷ 19,500 cy = 16 days X 20 hr = 320 hr

Alaska International Construction, Inc.

PROJECT: Susitna Hydroelectric Project - Preliminary Estimate — ITEM NO. 130 — EST. BY pwp — F 36 — SHEET 130 OF

SPEC. REFERENCE: Watana — DESCRIPTION Main Construction Village - Site Preparation - Fine Grading — CHKD. BY

DWG. REFERENCE: — BID DATE — ENGR. QUANTITY 626,000 Sq. Yds. — DATE:

Fine Grading - 626,000 Sq. Yds	UNITS EQP.	UNITS MAN	LABOR	R & B	OTHER	CO. RENT	3RD PARTY RENT	FUEL	LUBE PARTS	LABOR	R & B OR TRAVEL	OTHER	COMPANY RENTAL	3RD PARTY RENTAL	FUEL	LUBE & WEAR PARTS	SUBTOTAL	PERMANENT MATERIALS	SUB-CONTRACT	TOTAL COST
this item included in clearing & Stripping																				

Alaska International Construction, Inc.

PROJECT: Susitna Hydroelectric Project - Preliminary Estimate — ITEM NO. 140 — F 37

SPEC. REFERENCE: Watana — DESCRIPTION Main Construction Village - Site Preparation - Install Granular Pad — EST. BY pmm — SHEET 140 OF

DWG. REFERENCE: — BID DATE — ENGR. QUANTITY 1,670,000 CY — CHKD. BY — DATE:

Granular Fill - 1,670,000 CY	UNITS EQP.	UNITS MAN	LABOR	R & B	OTHER	CO. RENT	3RD PARTY RENT	FUEL	LUBE PARTS	LABOR	R & B OR TRAVEL	OTHER	COMPANY RENTAL	3RD PARTY RENTAL	FUEL	LUBE & WEAR PARTS	SUBTOTAL	PERMANENT MATERIALS	SUB-CONTRACT	TOTAL COST
Borrow Pit Development - Pit F (assumed unfrozen)																				
Strip Borrow Pit - Figure extra 20% with ripper cats to open pit																				
Construct Haul Road - pit to intersection of MCC access road - ½ charged to MCC 60,554 CY																				
Construct haul road intersection to Pad - 103,588 CY																				
Construct gravel Pad 1,670,000 CY																				
Total Material 1,839,142 CY																				
Reduction with 14 B 70's e 2 shifts = 35,860 CY																				
1,839,142 ÷ 35,860 = 51 days = 1020 hrs - 51 days																				
Foreman w/P.U.	1100	1100	36.92	—	—	2.27	.25	11.97	.94	40612	—	—	2497	275	13167	1034	57585			
4 D9L's in pit - Ripping & stockpiling	4180	4180	34.06	/	—	102.66	10.16	35.16	25.46	142371	—	—	429,119	42469	146969	106423	867351			
4 988B loaders in pit	4060	4060	35.86	—	—	89.99	9.71	27.08	19.30	145592	—	—	365359	39423	109945	78358	738617			
Teamster Foreman w/pu	1020	1020	35.59	—	—	2.27	.25	11.91	.94	36302	—	—	2315	255	12209	959	52040			
4 B70 Belly Dumps	14280	14280	34.59	—	—	80.60	9.90	26.94	18.40	493945	—	—	1150968	134232	384703	262752	2426600			
2 14G Graders - 1 Haul Road - 1 Fill	2040	2040	34.06	—	—	44.98	4.41	12.99	4.69	69482	—	—	91759	8996	26500	9568	206305			
1 Foreman on fill w/pu	1020	1020	36.92	—	—	2.27	.25	11.97	.94	37658	—	—	2315	255	12209	959	53396			
2 D9L Fill Cats	2040	2040	34.06	—	—	102.66	10.16	35.16	8.90	69482	—	—	209426	20726	71726	18156	389516			
2 SP56 Vibratory Rollers	2040	2040	32.54	—	—	21.34	2.45	5.98	2.90	66382	—	—	43534	4998	12199	5916	133029			
0 Pit lights	6120	-	—	—	—	1.77	.11	.56	.05	—	—	—	10832	673	3427	306	15238			
2 Grade Checkers	—	2040	31.14	—	—	—	—	—	—	63566	—	—	—	—	—	—	63566			
3 10000 gal water tankers	3060	3060	32.04	—	—	71.59	8.11	22.35	8.12	98042	—	—	219065	24817	69615	24847	436386			
3 8" water pumps	3060	—	—	—	—	8.37	.46	5.93	.76	—	—	—	25612	1408	18146	2326	47492			
2 18,000 gal Water tanks	2040	—	—	—	—	13.62	1.26	—	.48	—	—	—	27785	2570	-	979	31834			
Mechanical Support										—	—	—	—	—	—	—	—			
1 master mechanic w/PU	1224	1224	39.25	—	—	2.27	.25	11.97	.94	48042	—	—	2778	306	14651	1151	66928			
1 Mechanics Foremen w/PU	2448	2448	38.14	—	—	2.27	.25	11.97	.94	93367	—	—	5557	612	29303	2301	131140			
9 mechanics w/5 mech trucks	6120	12240	35.17	—	—	10.05	.41	17.95	2.18	430481	—	—	61506	2509	109854	13342	617692			
2 Firemen w/2 fire trucks	2448	2448	35.88	—	—	11.77	.80	19.34	2.41	87834	—	—	28813	1958	47344	5900	171849			
2 Servicemen w/1 service truck	1224	2448	34.36	—	—	12.61	.90	19.34	2.68	84113	—	—	15435	1102	23672	3280	127602			
1 Fueler w/1 Fuel Truck	1224	1224	33.00	—	—	11.77	.80	19.34	2.1	40392	—	—	14406	979	23672	2950	82399			
4 Shop mechanics	-	4896	35.17	—	—	—	—	—	—	172192	—	—	—	—	—	—	172192			
Temporary shop & Shop equipment	51	—	—	—	—	350.00	—	100.00	—	—	—	—	17850	—	5100	—	22950			
Sm... ...t		—																		
		63,808																	CY hauled	
	.038208 hr/cy									2219855	—	—	2726931	288563	1134411	541507	6911267		1,834,142 = 3.768 $/cy	
										1.3293/cy			1.6329/cy	.1728/cy	.6793/cy	.3243/cy	4.1385			
									See	attached adjustment sheet										

9 4/

1-6-82

Main Construction Village

Quantity of Haul Road taken from sheet 1 MCC

½ quantity from Pit F = 60,554 CY

657 SCRAPERS 16.59 cy/lb

Pit to intersection
use comp. from MCC haul

Quantity 60,554 CY
time for one unit to haul 271 h

2,616 mi

Intersection to MCV location

Haul dist. 10,425 ft.
2% grade = 3,500 ft.
0% grade = 6,500 ft.
-2% grade = 425 ft.

Quantity 103,588 CY

Quantity 103,588 CY
time for one unit to haul 961 h 12,733 mi

MCV Fill

Haul Dist 15,300 ft
2% grade = 3,500 ft
0% grade = 6,500 ft
-2% grade = 3,025 ft
0% grade = 2,275 ft

Quantity 1,670,000 cy

Quantity 1,670,000 cy
21,278 h
302,450 mi

1,834,142 cy 22,510 h

31.5% more than hauling with B 70's

F39 2/

Main Construction Village 1-6-82

USY B70's

Pit F to intersection

Quantity & time from sheet 3 - MCC computations

Quantity 603,554 CY
time for one unit to haul 288 hr = 1.68205%
1860 min

Intersection to MCC location

Haul dist = 10,425 FT
2% grade = 3,500 FT
0% grade = 4,500 FT
-2% grade = 425 FT

Quantity = 103,588 CY

Quantity 103,588 CY
time for one unit to haul 298 hr = 4.66067
594 = 3.46922
9090 min
204 = 1.19145

MCC F = 1.11

Haul dist 15,300 FT
2% grade = 3,500 FT
0% grade = 4,500 FT
-2% grade = 3,025 FT
0% grade = 2,275 FT

Quantity 1,670,000 CY

Quantity 1,670,000
time for one unit to haul 16,036 hr = 93.65728%
215,076 min

1,834,142 CY 17,122 hr 226,026 min

MCV Gravel Pad

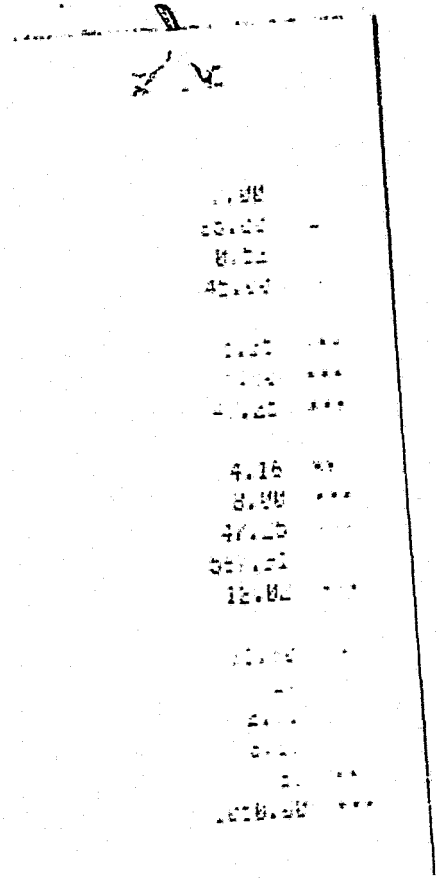
2 loaders will handle 8 trucks @ 1050 cy/h
4 loaders will handle 16 trucks @ 2100 cy/h

1,834,142 ÷ (2100 cy x 19.5 = 49950) = 45 days

14, B 70's.

2.78 mi/trip x 47.25 = 131.36 x 14 = 1,839 cy/day
1,839 cy/h x 19.5 = 35,860 cy / 2 shift day
1,834,142 ÷ 35,860 = 51 days

Figure to use 14 B 70's. haul for 51 days



Alaska International Construction, Inc.

PROJECT: Modification to MCV — SUMMARY SHEET — EST. BY — SHEET OF

SPEC. REFERENCE: Granular Pad — CHKD. BY

DWG. REFERENCE: 1,670,000 — BID DATE — ENGR. QUANTITY — DATE:

	.1 LABOR HOURS	1 LABOR	2 R & B OR TRAVEL	3 OTHER	4 COMPANY RENTAL	5 3RD PARTY RENTAL	6 FUEL	7 LUBE & WEAR PARTS	.0 SUBTOTAL	8 PERMANENT MATERIALS	9 SUB-CONTRACT	0 TOTAL COST	ADJUSTMENTS	BID
As Shown 51 days	63808	2219855			2726931	288563	1134411	541507	6911267			6911267		
Deduct for Access Road connection -1600 LF -1.19145%	760	26448			32490	3430	13516	6452	82344			82344		
	63048	2193407			2694441	285125	1120895	535055	6828923			6828923		
Pit to Intersection 60,554 CY 1.68205%														
Intersect. to MCV Intersect. 77,044 CY 3.46922%														
5.15125%	3287	114351			140471	14865	58436	27894	356017			356017		
MCV Granular Pad	59761	2079056			2553970	270260	1062459	507161	6472906			6472906		
Reduce Pad thickness to 4' or 50%	29881	1039528			1276985	135130	531230	253581	3236454			3236454		

Alaska International Construction, Inc.

PROJECT: Susitna Hydroelectric Project - Preliminary Estimate — ITEM NO. 150 — EST. BY pm — F42 — SHEET 150 OF

SPEC. REFERENCE: Watana — DESCRIPTION Main Construction Village - Site Preparation — Main Road in Village 34' wide — CHKD. BY

DWG. REFERENCE: — BID DATE — ENGR. QUANTITY 2,200 L.F. — DATE:

Main Road in Village - 34' wide 2,200 L.F.	UNITS EQP.	UNITS MAN	LABOR	R & B	OTHER	CO. RENT	3RD PARTY RENT	FUEL	LUBE PARTS	LABOR	R & B OR TRAVEL	OTHER	COMPANY RENTAL	3RD PARTY RENTAL	FUEL	LUBE & WEAR PARTS	SUBTOTAL	PERMANENT MATERIALS	SUB-CONTRACT	TOTAL COST
use Calculations from MCV on hand																				
D1 2200 l.f. @ 2.2 = 4844 cy																				
"A" 2200 l.f. @ 1.4 = 2200 cy																				
AC aggregate 2200 l.f. = 462 cy = 3146 cf @ 0.038191 m³	3146	3146	1.8929	—	—	2.7650	.3120	1.0989	.3966	5955	—	—	8699	982	3300	1248	20184			201
Haul from MCV 3146 cf .038208	3146	3146	1.3293	—	—	1.6329	.1728	.6793	.3243	4182	—	—	5137	544	2137	1020	13020			130
Subcontract AC Paving																				
2,200 l.f. x 34 = 74,800 ÷ 9 = 1311 sq yds @ 2.5" -																			63333	635
		2980								10137	—	—	13836	1526	5437	2268	33204		63333	965
										461										

National Construction, Inc.

PROJECT: Susitna Hydroelectric Project ITEM NO. 130A EST. BY F-43 SHEET 130A OF

SPEC. REFERENCE: DESCRIPTION Crushing & Screening CHKD. BY

DWG. REFERENCE: BID DATE ENGR. QUANTITY DATE:

	2 UNITS EQP.	1 UNITS MAN	1 LABOR	2 R & B	3 OTHER	4 CO. RENT	5 3RD PARTY RENT	6 FUEL	7 LUBE PARTS	1 LABOR	2 R & B OR TRAVEL	3 OTHER	4 COMPANY RENTAL	5 3RD PARTY RENTAL	6 FUEL	7 LUBE & WEAR PARTS	0 SUBTOTAL	8 PERMANENT MATERIALS	9 SUB-CONTRACT	0 TOTAL COST
CRUSHER																				
Cost to operate 1 day - 10 hr																				
1 Crusher Foreman w/pu.	10	10	37.99	—	—	2.27	.25	11.97	.84	3.80	—	—	23	3	120	8	534			
1 Crusher w/op "	10	10	34.06	—	—	7.598	.996	—	1.64	3.41	—	—	7.60	1.00	—	16	1217			
1 D8K Dozer/Ripper	10	10	34.06	—	—	6.400	6.49	24.20	5.71	3.41	—	—	6.40	.65	24.2	5.7	1345			
1 Station Conveyor & Feeder	10	—	—	—	—	4.439	4.95	—	4.00	—	—	—	4.44	.50	—	.40	534			
1 500 kW Electric Gen.	10	—	—	—	—	17.45	1.69	48.25	10.75	—	—	—	1.75	.17	4.83	1.08	783			
1 988 Loader	10	10	35.86	—	—	8.999	.971	27.08	19.30	3.59	—	—	9.00	.97	2.71	1.93	1820			
2 Laborers	—	20	29.66	—	—	—	—	—	—	5.93	—	—	—	—	—	—	593			
Produce 200 tons per hr = 133 cy/hr		60								20.14	—	—	29.42	3.32	11.16	4.22	6820			
OP 9 hr = 133 x 9 = 1197 cy	.0563911 /cy									1.8927/cy			2.7650/cy	.3120/cy	1.0489/cy	.3966/cy	6.415 /cy			
OP 8 hr = 133 x 8 = 1064 cy - allows for setup & tear down																				
Screening Plant																				
1 Plant Foreman w/pu.	10	10	37.99	—	—	2.27	.25	11.97	.84	3.80	—	—	23	3	120	8	534			
1 Screening plant w/ op	10	10	33.28	—	—	1.484	.085	—	.18	3.33	—	—	1.48	.09	0	2	492			
2 Station Conveyors	20	—	—	—	—	4.439	4.95	—	4.00	—	—	—	8.88	.99	0	.80	1067			
1 Electric Generator - 500kW	10	—	—	—	—	17.45	1.69	48.25	10.75	—	—	—	1.75	.17	4.83	1.08	783			
1 D8K Dozer/Ripper	10	10	34.06	—	—	6.400	6.49	24.20	5.77	3.41	0	—	6.40	.65	2.42	.58	1344			
1 988 loader	10	10	35.86	—	—	8.999	.971	27.08	.1930	3.59	—	—	9.00	.97	2.71	1.93	1820			
2 Laborers	—	20	29.66	—	—	—	—	—	—	5.93	—	—	—	—	—	—	593			
Produce 140 tons concrete aggregate / hr. = 93 cy / hr																				
OP 8 hr x 93 = 744 cy/day - allows for setup & tear down		60								2006	—	—	2774	290	1116	449	6635			
	.0806451 cy/hr									2.6962/cy	—	—	3.7285/cy	.3898/cy	1.5000/cy	.6035/cy	8.9180/cy			

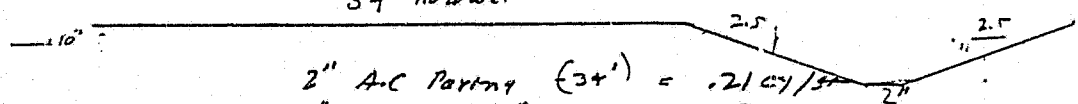
F44

Susitna Project 1981

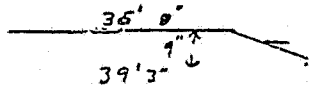
Main Road quantities

34' RW width
2% slope

34' Roadway

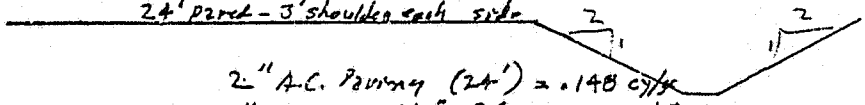


2" A.C Paving (34') = .21 CY/SF
2" Base - 3/4" D1 = .22 ÷ CY/SF
9" Base 2" Graded A = 1.00 CY/SF
8'0" Granular Pad



37.45 SF x .75 ÷ 27 = 1. CY/SF.

30 FT Roadway
24' Pave - 3' shoulder each side



2" A.C. Paving (24') = .148 CY/SF
2" Base 3/4" D1 = .22 CY/SF
9" Base 2" Graded A = 1.CY/SF
8.0' Granular fill

Alaska International Construction, Inc.

PROJECT: Susitna Hydroelectric Project - Preliminary Estimate — ITEM NO. 160 — EST. BY RWP — SHEET 160 OF

SPEC. REFERENCE: Watana — DESCRIPTION Main Construction Village - Site Preparation - Secondary Roads - 24' wide — CHKD. BY

DWG. REFERENCE: — BID DATE — ENGR. QUANTITY 22,000 L.F. — DATE:

Secondary Roads - 24' wide 22,000 LF	UNITS EQP.	UNITS MAN	LABOR	R & B	OTHER	CO. RENT	3RD PARTY RENT	FUEL	LUBE PARTS	LABOR	R & B OR TRAVEL	OTHER	COMPANY RENTAL	3RD PARTY RENTAL	FUEL	LUBE & WEAR PARTS	SUBTOTAL	PERMANENT MATERIALS	SUB-CONTRACT	TOTAL COST
Use Calculations from MCV on haul																				
D1 22,000 L.F. @ .22 = 4840 CY																				
A 22,000 LF @ 1.0 22000 CY																				
A.C. aggregate 22,000 LF @ .148 3,256 CY																				
30,096 CY																				
Produce from Crushing 30,096 CY .056391 mh	30096	30096	1.8929	—	—	2.7650	.3120	1.0489	.3966	56969	—	—	83215	9390	31568	11936	193078	—	—	193078
Haul (MCV) 30,096 CY .038208 mh	30096	30096	1.3293	—	—	1.6329	.1728	.6793	.3243	40007	—	—	49144	5201	20444	9760	124556	—	—	124556
Subcontract A.C. Paving 22,000 LF x 24 = 528,000 SF ÷ 9 = 58,667 SY @ 7.50																			440003	440003
		2847								96986	—	—	132359	14591	52012	21696	317634	—	440003	757637

Alaska International Construction, Inc.
PROJECT: Susitna Hydroelectric Project - Preliminary Estimate — ITEM NO. 170 — EST. BY F46 — SHEET 170 OF
SPEC. REFERENCE: Watana — DESCRIPTION Main Construction Village - Site Preparation - Connection to Access Road 34' wide — CHKD. BY
DWG. REFERENCE: — BID DATE — ENGR. QUANTITY 1,600 L.F. — DATE:

Connection to Access Road - 1,600 LF	UNITS EQP.	UNITS MAN	LABOR	R & B	OTHER	CO. RENT	3RD PARTY RENT	FUEL	LUBE PARTS	LABOR	R & B OR TRAVEL	OTHER	COMPANY RENTAL	3RD PARTY RENTAL	FUEL	LUBE & WEAR PARTS	SUBTOTAL	PERMANENT MATERIALS	SUB-CONTRACT	TOTAL COST
D1 1,600 LF @ .22 = 352 CY																				
"A" 1,600 LF @ 1.0 = 1600																				
AC Aggregate 1,600 LF @ .21 = 336 CY																				
2,288 CY																				
Prorate From Crushing 2,288 CY .056391	2288	2288	1.8929			2.1650	.3120	1.0489	.3564	4331			6326	714	2400	907	14678			14678
Prorate From Haul/Place 2,288 CY .038208	2288	2288	1.3293			1.6329	.1228	.6793	.3243	3041			3736	395	1554	342	9468			9468
Subcontract A.C. Paving																			45330	45330
1,600 L.F. x 34 = 5440 ÷ 9 = 604.8 S/Y @ 7.50																				
		216								7372			10062	1109	3954	1649	24146		45330	69476
Construct Access Road - Prorate		760								26448			32490	3438	13516	6452	82344			82344
		976								33820			42552	4547	17470	8101	106490		45330	151820

Alaska International Constructors, Inc.
PROJECT: Susitna Hydroelectric Project - Preliminary Estimate ITEM NO. 180 EST. BY F47 SHEET 180 OF
SPEC. REFERENCE: Watana DESCRIPTION Main Construction Village - Site Preparation - Ditching CHKD. BY
DWG. REFERENCE: BID DATE ENGR. QUANTITY 51,600 L.F. DATE:

Ditching 51,600 LF.	UNITS EQP.	UNITS MAN	LABOR	R & B	OTHER	CO. RENT	3RD PARTY RENT	FUEL	LUBE PARTS	LABOR	R & B OR TRAVEL	OTHER	COMPANY RENTAL	3RD PARTY RENTAL	FUEL	LUBE & WEAR PARTS	SUBTOTAL	PERMANENT MATERIALS	SUB-CONTRACT	TOTAL COST
Work will be done in conjunction with site fill																				
Crew will do 100 LF per hr.																				
51,600 L.F. ÷ 100 = 516 hr = use duration of ground placement																				
51 days @ 10 h = 510 h																				
51 days																				
1 D6 Dozer	510	510	34.06	—	—	23.46	2.41	12.18	2.40	17371	—	—	11975	1229	6212	1224	38011			
1 14 G Grader	510	510	34.06	—	—	44.98	4.41	12.99	4.69	17371	—	—	22940	2249	6625	2392	51577			
1 Grade Checker	—	510	31.16	—	—	—	—	—	—	15892	—	—	—	—	—	—	15892			
		4106 h								58006	—	—	44977	4587	16791	5265	129626			

Alaska International Construction, Inc.

PROJECT: Susitna Hydroelectric Project - Preliminary Estimate — ITEM NO. 190 — EST. BY RWM — SHEET 190 OF

SPEC. REFERENCE: Watana — DESCRIPTION Main Construction Village - Site Preparation - Culverts - 560 lots — CHKD. BY

DWG. REFERENCE: — BID DATE — ENGR. QUANTITY 13,200 L.F. — DATE:

F46

Culverts 18" 13,200 L.F.	UNITS EQP.	UNITS MAN	LABOR	R & B	OTHER	CO. RENT	3RD PARTY RENT	FUEL	LUBE PARTS	LABOR	R & B OR TRAVEL	OTHER	COMPANY RENTAL	3RD PARTY RENTAL	FUEL	LUBE & WEAR PARTS	SUBTOTAL	PERMANENT MATERIALS	SUB-CONTRACT	TOTAL COST
1 Crew will Place 2 Culverts per day = 100 ft.																				
13,200 L.F ÷ 100 = 132 days x 10 = 1320 hr																				
Use 1 Foreman & 2 Crews																				
Material will be distributed along Road																				
2 Crews will do work = 61 days																				
61 days																				
1 Foreman w/P.U. 6104	610	610	32.27	—	—	2.27	.25	1.97	.84	19.685	—	—	1385	153	7302	512	29037			29037
2 JD 450 w/hoe	1320	1320	34.06	—	—	16.10	1.36	5.65	1.48	44.959	—	—	21252	1795	7458	1954	77418			77418
8 Laborers	—	4880	27.71	—	—	—	—	—	—	135225	—	—	—	—	—	—	135225			135225
4 Plate Compactors	1320	—		—	—	1.67	.20	1.35	.10	—	—	—	2204	264	1782	132	4382			4382
2 Jumping Jacks	1320	—		—	—	.95	.15	.32	.06	—	—	—	1254	198	422	79	1953			1953
1 Flatbed Truck	610	610	32.04	—	—	11.77	.80	19.34	2.41	19544	—	—	7180	488	11797	1470	40479			40479
Purchase 13,200 LF Culvert & bands - 225 ea 18" @ 9.73 & 2220																		134541		134541
		7420 hr								219413	—	—	33275	2898	28761	4147	288494	134541		423035
USA Prorate from MCC																				
		2970 hr								90920	—	—	19465	1787	20213	2541	134926	134541		269467

Alaska International Construction, Inc.

PROJECT: Susitna Hydroelectric Project - Preliminary Estimate — ITEM NO. 200 — EST. BY [illegible] — SHEET 200 OF

SPEC. REFERENCE: Watana — DESCRIPTION Main Construction Village - Site Preparation - Perimeter Fencing — CHKD. BY

DWG. REFERENCE: — BID DATE — ENGR. QUANTITY 12,000 L.F. — DATE:

Perimeter Fencing 12,000 L.F.	UNITS EQP.	UNITS MAN	LABOR	R & B	OTHER	CO. RENT	3RD PARTY RENT	FUEL	LUBE PARTS	LABOR	R & B OR TRAVEL	OTHER	COMPANY RENTAL	3RD PARTY RENTAL	FUEL	LUBE & WEAR PARTS	SUBTOTAL	PERMANENT MATERIALS	SUB-CONTRACT	TOTAL COST
Subcontract 12,000 L.F. @ ~~18.00~~ = 12.00 Direct			60621		4.20	.3281		.4010		78745		56520	3937		.4812				137894 +44014	

Alaska International Construction, Inc.

PROJECT: Susitna Hydroelectric Project - Preliminary Estimate — ITEM NO. 210 — EST. BY FSD — SHEET 210 OF

SPEC. REFERENCE: Watana — DESCRIPTION Main Construction Village - Site Preparation - Parking Areas — CHKD. BY

DWG. REFERENCE: — BID DATE — ENGR. QUANTITY 6,000 Sq. Ft. — DATE:

Parking Areas 6,000 sq. ft.	UNITS EQP.	UNITS MAN	LABOR	R & B	OTHER	CO. RENT	3RD PARTY RENT	FUEL	LUBE PARTS	LABOR	R & B OR TRAVEL	OTHER	COMPANY RENTAL	3RD PARTY RENTAL	FUEL	LUBE & WEAR PARTS	SUBTOTAL	PERMANENT MATERIALS	SUB-CONTRACT	TOTAL COST
15% prorate from MCC Parking Areas																				
	13 Mtn Rig									437	—	—	603	67	237	97	1441			

Alaska International Construction, Inc.

PROJECT: Susitna Hydroelectric Project ITEM NO. FS1

SPEC. REFERENCE: DESCRIPTION WATANA MCV - Insulated Water tank EST. BY SHEET OF

DWG. REFERENCE: BID DATE ENGR. QUANTITY CHKD. BY

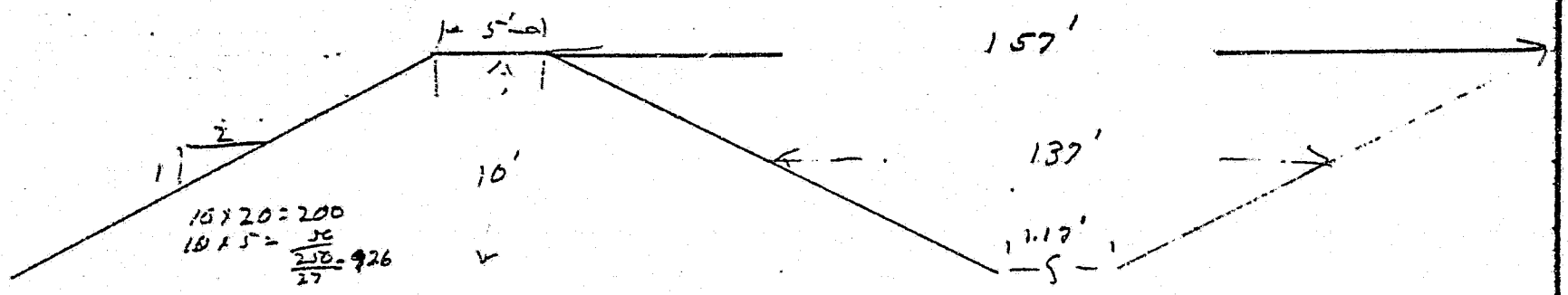
DATE: 1-30-82

	UNITS		LABOR	R & B	OTHER	CO. RENT	3RD PARTY RENT	FUEL	LUBE PARTS	LABOR	R & B OR TRAVEL	OTHER	COMPANY RENTAL	3RD PARTY RENTAL	FUEL	LUBE & WEAR PARTS	SUBTOTAL	PERMANENT MATERIALS	SUB-CONTRACT	TOTAL COST
	EQP.	MAN																		
1.4 MG																				
4 Laborers will install 10,000 SF Ft liner per day																				
43,818 ÷ 10,000 ≈ 4.38 X 9 = X4		158																		
4 Laborers will install 22,500 BF insulation per day																				
98,596 BF ÷ 22,500 = 4.38 X 9 X4 =		156																		
- Labor		316	2771							8756							8756			
Liner- 43818 SF e .793												34748					34748			
Insul. = 98,596 BF e .67												66059					66059			
Probable Barrel from MCV 5,500		200	1.24			1.53	.16	.64	.30	6820			8415	880	3520	1650	21285			
		576								15576		100807	8415	880	3520	1650	130848			
															(6050)					

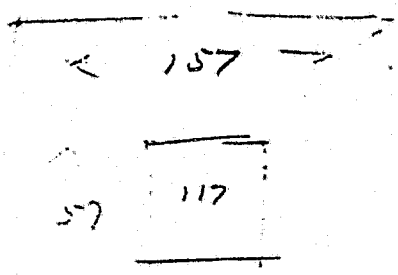
Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

DATE: 2-1-82 SHT.: _____ OF _____
CALCULATIONS BY: _____
SUBJECT: _____

PROJECT: Watana MCV



1.4mG ÷ 10' = 140,000 gl/ft
140,000 ÷ 7.48 = 18,717 ft³
9 | 18,717 = 1~~3~~8 524 137 ft²



- Beams
- 157 x 2 = 314
137 x 2 = 274
588 ~~ft~~ x 9.26 = 5,445 cy (5,500)

Liner = 117 x 117 = 13,689
157 x 157 = 26,649
137 x 4 x 10 = 5,480
43,818 sq. yds

Insulation (top)

157 x 157 = 24,649
24,649 x 4" = 98596 BF

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

DATE: 2-5-82 SHT.: _____ OF _____
CALCULATIONS BY: BWM
SUBJECT: _____

PROJECT: _____

Crew Bus Parking Area at Dorms

6 each 10' x 300'

Gravel fill is in place - Use square foot parking area MCC cost

10 x 300 x 6 = 18,000 sq. ft.

		Labor	Equip	Equip. operation	total
18,000 sq. ft.		.073	.101	.067	.240
18,000 x	=	1,314.-	1818.-	1,206.-	4,338.-

4,338 x 1.5 = $6,500.-

7,000 ÷ 69

E54

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

DATE: 2-5-82 SHT.: _____ OF _____
CALCULATIONS BY: [illegible]
SUBJECT: _____

PROJECT: _____

Parking Area for 500 Cars
Wetana Main Const. Camp.

400' x 400' outside fence in borrow area "D" = 3.5 Acres
Place 1 foot of gravel from Borrow Area "F" over area. Use cost from MCC granular fill.

3.5 Acres @ 1614 cy/ Acre + 15% Subsidence = 1856 x 3.5 = 6,496 cy

		Labor 1021	ownership 1.260	operation .914	total 3.195
6,496 cy =		4,632.	8,185.	5,937	20,755.-

20,755.-
x 1.5 = 31,132.-

$ 31,100

4 Acres @ 7,775.-

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

DATE: 1-26-91 SHT.: 1 OF

CALCULATIONS BY:

SUBJECT: Solid Waste Disposal site

PROJECT: Susitna

10 each 30 cy dumpsters per day.

30 CY X 27 CF = 810 CF x 10 = 8100 CF/day x 365 = 2,956,500 CF / year

$\frac{2,956,500}{5'} = \frac{591,300}{43,560} = 13.6$ Acres

$\frac{2,956,500}{10'} = \frac{295,650}{43560} =$

6.8 Acres x 10 years = 68 Acres

$\sqrt{}$ 68 Acres x 43560 = 1721 SF per side = 6,884 L.F. Fencing

6,884 x 10^{00} = 123,912

use

Labor	mat	Equip	op.
6.5626	4.71	.3281	.4010

45,

(F) Susitna Camp Estimates

Watana Buildings

REFERENCES

CRAFTSMAN - BUILDING COST MANUAL

- NATIONAL CONSTRUCTURE ESTIMATOR

DODGE - BUILDING CONSTRUCTION PRICING & SCHEDULING

- PUBLIC WORKS & HEAVY CONSTRUCTION COSTS

- CONSTRUCTION SYSTEMS COSTS

ENGELSMAN - HEAVY CONSTRUCTION COST FILE

LAND - INDUSTRIAL MACHINERY & EQUIPMENT PRICING GUIDE

MEANS - BUILDING SYSTEMS COST GUIDE

RICHARDSON - CONSTRUCTION ESTIMATOR GUIDE

WALKER - BUILDING ESTIMATOR'S REFERENCE BOOK

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

ESTIMATE WORK SHEET

Project SUSITNA HYDROELECTRIC PROJECT Estimator RLC Item No. 5.2

Type of Work BACHELOR DORMITORIES Date 2-3-82 Sheet

DESCRIPTION	QUANTITY	UNIT	LABOR EXPENSE HOURS U.P.	HOURS TOTAL	WAGES U.P.	WAGES TOTAL	ADD-ONS U.P.	ADD-ONS TOTAL	SUBTOTAL U.P.	SUBTOTAL TOTAL	PER. MAT. U.P.	PER. MAT. TOTAL	SUB CONTRACTS U.P.	SUB CONTRACTS TOTAL	TOTAL U.P.	TOTAL TOTAL
LABOR	11650	SF		2000												
CONTINGENCY				300												
				2300		80500		OWNERSHIP 3720 OPERATION 4770								
SEATLE TO JOB SITE											BLDG STRUCT	1/6	186400			
WASHERS, DRYERS, BEDDING, FURNITURE, ETC.											FREIGHT	1/7	58250			
											FURNISHINGS		24300			
-108 PERSONS, DOUBLE BEDROOMS, 60SF PERSON, TRAILER TYPE FACTORY BUILT MODULES, SITE ASSEMBLED, COMPLETE WITH HEATING, LIGHTING, PLUMBING, FURNISHINGS, EQUIPMENT																TJS 00
-UTILITIES WATER, SEWER, ELECTRICAL POWER FOR LIGHTING & HOT WATER, FUEL OIL HEATING																
Totals					80500		8490				268950					357940

Checked By

Analysis HISTORICAL DATA HAPPY HORSE CAMP 108 MAN CAMP $400,000 TOTAL COST - LABOR 10 MEN 20 DAYS 10 HOURS DAILY - ATCO (WADE OSBORNE - ANALYSIS) NORMAL USED 1200 PER MAN BUT THIS SCOPE REQUIRES ±50%

REFERENCES 1982 CRAFTSMAN BUILDING COST MANUAL, MEANS, DODGE, ENGELSMAN,

60

O&P 298190

Item No.
Sheet No.

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

ESTIMATE WORK SHEET

Project SUSITNA HYDROELECTRIC PROJECT
Estimator ROD CALVERT Item No. 5.3
Type of Work DORMS MAINT A
Date 2-3-82 Sheet

DESCRIPTION	QUANTITY	UNIT	LABOR EXPENSE HOURS U.P.	HOURS TOTAL	WAGES U.P.	WAGES TOTAL	ADD-ONS U.P.	ADD-ONS TOTAL	SUBTOTAL U.P.	SUBTOTAL TOTAL	PER. MAT. U.P.	PER. MAT. TOTAL	SUB CONTRACTS U.P.	SUB CONTRACTS TOTAL	TOTAL U.P.	TOTAL TOTAL
LABOR	3360	8.1	.22	770	35	26950	11%L 15%F	13020								
JOB MATERIAL	3360						PNN	13500		BLDG	18	60480				
½ PER SF INCREASE							OF	1670		FURNISHG	2	6720				
DUE TO SHARED BATHROOM	EVERY TWO ROOMS									FRIGHT	5	16800				
& SNACK PREPARATION	AREA										25	84000				
(SINK, REFRIGERATOR,	HOT PLATE & COUNTER)															
Totals	3360	38			26950		3020				84000					113970

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Analysis

Item No.
Sheet No.

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

ESTIMATE WORK SHEET

Project SUSITNA HYDROELECTRIC PROJECT — Estimator R&D CALVERT — Item No. 5.4

Type of Work FORMS MGMNT B — Date 2-7-82 — Sheet

DESCRIPTION	QUANTITY	UNIT	LABOR EXPENSE HOURS U.P.	HOURS TOTAL	WAGES U.P.	WAGES TOTAL	ADD-ONS U.P.	ADD-ONS TOTAL	SUBTOTAL U.P.	SUBTOTAL TOTAL	JOB PER. MAT. U.P.	JOB PER. MAT. TOTAL	SUB CONTRACTS U.P.	SUB CONTRACTS TOTAL	TOTAL U.P.	TOTAL TOTAL
LABOR	2880		.22	670	35	23450	11% .95=	EQUIP 2490								
BLDG										BLDG	18	51840				
										FURNISHING	12	5760				
										FRIGHT	15	14400				
											25	72000				
Totals		37				23450		2490				72000				97940

F60

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Analysis

24

Item No.

Sheet No.

109665

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

ESTIMATE WORK SHEET

Project WATANA SUSITNA HYDROELECTRIC Estimator ROD CALVERT Item No. 5.5

Type of Work GUEST HOUSE Date 2-3-82 Sheet

DESCRIPTION	QUANTITY	UNIT	LABOR EXPENSE HOURS U.P.	HOURS TOTAL	WAGES U.P.	WAGES TOTAL	ADD-ONS U.P.	ADD-ONS TOTAL	SUBTOTAL U.P.	SUBTOTAL TOTAL	PER. MAT. U.P.	PER. MAT. TOTAL	SUB CONTRACTS U.P.	SUB CONTRACTS TOTAL	TOTAL U.P.	TOTAL TOTAL
	3360		.25	870	35	30,450	11.83 .958	1150 OWN 1140 OR 1690								
BLDG STRUCT											18	60480				
FREIGHT											5	16800				
FORM/EQUIP											3	10080				
											26	87360				
		40				30450		2030				87360				119840

Totals

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Analysis

W 04/P
135065

Item No.
Sheet No.

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

ESTIMATE WORK SHEET

Project WATANA

Estimator ROD CALVERT Item No. 5.6

Type of Work CAMP MANAGER OFFICE

Date 2-3-82 Sheet

DESCRIPTION	QUANTITY	UNIT	LABOR EXPENSE HOURS U.P.	LABOR EXPENSE HOURS TOTAL	LABOR EXPENSE WAGES U.P.	LABOR EXPENSE WAGES TOTAL	LABOR EXPENSE ADD-ONS U.P.	LABOR EXPENSE ADD-ONS TOTAL	SUBTOTAL U.P.	SUBTOTAL TOTAL	PER. MAT. U.P.	PER. MAT. TOTAL	SUB CONTRACTS U.P.	SUB CONTRACTS TOTAL	TOTAL U.P.	TOTAL TOTAL
	1200		.25	310	35	10850	%	1080								
BLDG STRUCT.											18	21600				
FREIGHT											5	6000				
FURN. & MISC											3	3600				
											26	31200				
Totals		40				10850		1080				31200				43130

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Analysis

Item No.

Sheet No.

48.660

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

ESTIMATE WORK SHEET

Project WASANA

Estimator ROD CALVERT Item No.

Type of Work STAFF CLUBHOUSE

Date 2-3-87 Sheet

DESCRIPTION	QUANTITY	UNIT	LABOR EXPENSE HOURS U.P.	HOURS TOTAL	WAGES U.P.	WAGES TOTAL	ADD-ONS U.P.	ADD-ONS TOTAL	SUBTOTAL U.P.	SUBTOTAL TOTAL	PER. MAT. U.P.	PER. MAT. TOTAL	SUB CONTRACTS U.P.	SUB CONTRACTS TOTAL	TOTAL U.P.	TOTAL TOTAL
50X50	4000 SF 2.500		.68	2700 1700	35	94500 59,500		OWNSHIP 2000 3200 OPERATION 2500 4000								
BLDG — STRUCT.											18	72000				
— FREIGHT											5	20000				
— FURNITURE, SNACK											6	24000				
PREPARATION AREA, DISHWASHING											29	11,6000				
TV VIEWING LOUNGE 50 PERSON												72,500				
4' GAMES TABLES																

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

ESTIMATE WORK SHEET

Project WATANA

Estimator ROD CALVERT Item No. 5.7

Type of Work DINING HALL #1

Date 2-3-82 Sheet

DESCRIPTION	QUANTITY	UNIT	LABOR EXPENSE HOURS U.P.	HOURS TOTAL	WAGES U.P.	WAGES TOTAL	ADD-ONS U.P.	ADD-ONS TOTAL	SUBTOTAL U.P.	SUBTOTAL TOTAL	PER. MAT. U.P.	PER. MAT. TOTAL	SUB CONTRACTS U.P.	SUB CONTRACTS TOTAL	TOTAL U.P.	TOTAL TOTAL
	~~15600~~ 15000	SF		5900		240,000		13,000 15,000								
										STRUCT	20	312,000				
MAJOR EQUIPMENT REQUIRED	(LAND'S)									FREIGHT	10	156,000				
COFFEE URNS 40 CAL	5280									FURNISHED	68	1,060,000				
GRIDDLES	2400															
COOKING UNIT 73" WIDE	2400															
STAND SELF-REFRIGERATION	5440															
STEAM TABLES	1600															
SALAD COOLERS	4320															
DISHWASHERS LARGE DOUBLE	18400															
FREEZER ICE CREAM	23200															
ELECT. OVENS 3-SEC.	11200															
BREAD BAKING 11'x17'x33	256,000															
REFRIGERATORS 80 CF 3-DOOR	7040															
Totals						240,000		28,000				1,528,000				1,796,000

P.64

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Analysis EQUIPMENT REQUIREMENT BASED UPON S.E. GUIDELINE FOR U.S. MILITARY CONSTRUCTION FROM OFFICE OF SECRETARY OF DEFENSE FOR DINING FACILITIES #116 PER SF REDUCT 20 SF FOR TRAILER COMPLEXES & ADD ALASKA FACTOR +62%.

OH/P 1,916,000

Item No.

Sheet No.

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

ESTIMATE WORK SHEET

Project WATANA — Estimator RBC — Item No. 5.7

Type of Work DINING HALL #2 — Date 2-4-82 — Sheet

DESCRIPTION	QUANTITY	UNIT	LABOR EXPENSE HOURS U.P.	HOURS TOTAL	WAGES U.P.	WAGES TOTAL	ADD-ONS U.P.	ADD-ONS TOTAL	SUBTOTAL U.P.	SUBTOTAL TOTAL	PER. MAT. U.P.	PER. MAT. TOTAL	SUB CONTRACTS U.P.	SUB CONTRACTS TOTAL	TOTAL U.P.	TOTAL TOTAL
LABOR	28800			13 000		455 000										
EQUIPMENT OWNSHIP								25 000								
OPERATION								30 000								
BLDG STRUCT											2P	576 000				
FREIGHT											14	288 000				
FURNISHINGS											64	1 843 000				
Totals					455,000		55,000					3,607,000				3,117,000

P65

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Analysis SEE DINING HALL #1

Item No.

Sheet No.

OH/P 3.345,000

63

Frank Moolin & Associates, Inc.
(An Akzona International Industries Company)

ESTIMATE WORK SHEET

Project WATANA — Estimator RBC — Item No. 5.8

Type of Work RECREATION BLDG #1 — Date 2-4-82 — Sheet

DESCRIPTION	QUANTITY	UNIT	LABOR EXPENSE HOURS U.P.	HOURS TOTAL	WAGES U.P.	WAGES TOTAL	ADD-ONS U.P.	ADD-ONS TOTAL	SUB TOTAL U.P.	SUB TOTAL TOTAL	PER. MAT. U.P.	PER. MAT. TOTAL	SUB CONTRACTS U.P.	SUB CONTRACTS TOTAL	TOTAL U.P.	TOTAL TOTAL
LABOR	14,400			6300		220,000										
ERVIPMENT																
OWNSHIP								17700								
OPERATION								18800								
BLDG STRUCT											19	274,000				
FREIGHT											8	115,000				
FURNISHINGS											19	274,000				
25 CARD TABLES, POOL	TABLES,	PING	PONG, VIDEO		GAMES,											
POST OFFICE, BARBER	SHOP, SNACK	BAR,														
TV VIEWING 250	25 PERSONS															
Totals						220,000		36000				663000				946 000

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Analysis

60

+H&P
1,056,000

Item No.
Sheet No.

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

ESTIMATE WORK SHEET

Project WATANA Estimator RRL Item No. 5.8

Type of Work RECREATION BLDG #2 Date 2-4-82 Sheet

DESCRIPTION	QUANTITY	UNIT	LABOR EXPENSE HOURS U.P.	HOURS TOTAL	WAGES U.P.	WAGES TOTAL	ADD-ONS U.P.	ADD-ONS TOTAL	SUBTOTAL U.P.	SUBTOTAL TOTAL	PER. MAT. U.P.	PER. MAT. TOTAL	SUB CONTRACTS U.P.	SUB CONTRACTS TOTAL	TOTAL U.P.	TOTAL TOTAL
LABOR	30,000			13,200		462 000										
EQUIPMENT OWNERSAIP								25 000								
OPERATION								30 000								
BLDG STRUCT											19	570,000				
FREIGHT											8	240,100				
FURNISH- POST OFFICE, SNACK BARS											19	579100				
2 LARGE SCREEN TV 250 EA			JOIN FOR THEATER				450									
2- TV VIEWING 25 EA																
VIDEO GAME ROOM																
25 GAME TABLES																
POOL & PING PONG TABLES																
Totals					462,000		55,000					1,380,000				1,897,000

F 67

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Analysis

Item No.

Sheet No.

+OH/P
7 128.000

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

ESTIMATE WORK SHEET

Project WATANA — Estimator ROD CALVERT — Item No. 5.1

Type of Work GYMNASIUM — Date 2-4-82 — Sheet

DESCRIPTION	QUANTITY	UNIT	LABOR EXPENSE HOURS U.P.	HOURS TOTAL	WAGES U.P.	WAGES TOTAL	ADD-ONS U.P.	ADD-ONS TOTAL	SUBTOTAL U.P.	SUBTOTAL TOTAL	PER. MAT. U.P.	PER. MAT. TOTAL	SUB CONTRACTS U.P.	SUB CONTRACTS TOTAL	TOTAL U.P.	TOTAL TOTAL
INCL. EQUIP STORAGE, OFFICES,	40,000		.89	35,500		1,242,500										
COURTS,							1.4	56,000								
DC 120X120	14,400			12,816	35	448,560	1.5	60,000								
								20,160								
BLDG STRUCT								21,600			18	720,000				
FREIGHT											7	280,000				
FURNISHING - FITNESS CENTER,											20	800,000				
SAUNA, WEIGHT ROOM, MALE/FEMALE SHOWERS											45					
BASKETBALL, HANDBALL, TRACT, ETC.												648,000				
INCL WOOD FLOORING																
NATIONAL CONSTRUCTION ESTIMATOR																
BUILT UP WOOD FLOORING 8,45 SF (AF)																
BACKSTOPS 3700 EA. (AF)																
SCOREBOARD 2700 (AF)																
Totals		89				1,242,500		116,000				1,800,000				3,158,500

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Analysis

Item No.

Sheet No.

20

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

ESTIMATE WORK SHEET

Project WATANA Estimator REC Item No. 5.12

Type of Work SECURITY OFFICE Date 2-5-82 Sheet

DESCRIPTION	QUANTITY	UNIT	LABOR EXPENSE HOURS U.P.	HOURS TOTAL	WAGES U.P.	WAGES TOTAL	ADD-ONS U.P.	ADD-ONS TOTAL	SUBTOTAL U.P.	SUBTOTAL TOTAL	PER. MAT. U.P.	PER. MAT. TOTAL	SUB CONTRACTS U.P.	SUB CONTRACTS TOTAL	TOTAL U.P.	TOTAL TOTAL
LABOR	3600			1440		50400										
EQUIPMENT OWNERSHIP								1400								
OPERATION								1800								
BLDG STRUCT,											18	64800				
FREIGHT											5	18000				
FURNISHINGS											34	102000				
Totals					50400		3200					184800				238400

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Analysis

12

TOTAL P. 263,600

Item No. ____
Sheet No. ____

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

ESTIMATE WORK SHEET

Project WATANA — Estimator ROD CALVERT — Item No. 5.13

Type of Work FIRE STATION — Date 2-4-82 — Sheet

DESCRIPTION	QUANTITY	UNIT	LABOR EXPENSE HOURS U.P.	HOURS TOTAL	WAGES U.P.	WAGES TOTAL	ADD-ONS U.P.	ADD-ONS TOTAL	SUBTOTAL U.P.	SUBTOTAL TOTAL	PER. MAT. U.P.	PER. MAT. TOTAL	SUB CONTRACTS U.P.	SUB CONTRACTS TOTAL	TOTAL U.P.	TOTAL TOTAL
CONCRETE SLAB / ERECT BLDG, OVERHEAD DOORS,	3200		1.	3200	35	112000		OWNERSHIP OP. 7360 8640								
BLDG W 5 10'x10' OVERHEAD DOORS INSUL, + 1 SIDE DOOR											20	64,000				
FREIGHT											6	19,200				
FURNISHINGS											40	128,000				
MAINTENANCE SHOP FOR EQUIP.											66	211,200				
HOSES, EXTINGUISHERS, BRUSH & FOREST FIRE FIGHTING EQUIP., EXTINGUISHER RECHARGING																710
Totals		126			112000		15900					211200				739,100

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Analysis PRE-ENGINEERED INSULATED STEEL BLDG

Item No.

Sheet No.

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

ESTIMATE WORK SHEET

Project WATANA Estimator RBE Item No. 5.11

Type of Work SOILS / CONCRETE TESTING LABORATORY Date 2-6-82 Sheet

DESCRIPTION	QUANTITY	UNIT	LABOR EXPENSE HOURS U.P.	HOURS TOTAL	WAGES U.P.	WAGES TOTAL	ADD-ONS U.P.	ADD-ONS TOTAL	SUBTOTAL U.P.	SUBTOTAL TOTAL	PER. MAT. U.P.	PER. MAT. TOTAL	SUB CONTRACTS U.P.	SUB CONTRACTS TOTAL	TOTAL U.P.	TOTAL TOTAL
LABOR	5000			5000		175000										
EQUIPMENT OWNERSHIP								9000								
OPERTION								12000								
BLDG STRUCT											20	100,000				
FREIGHT											7	35,000				
FURNISHINGS											40	217,000				
Totals					175000		21000					352000				548000

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Analysis EQUIPMENT

10H/P
635,000

Item No.
Sheet No.

73

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

ESTIMATE WORK SHEET

Project WAINWA

Estimator ROD CALVERT Item No. 5.14

Type of Work MAINTENANCE BLDG

Date 2-4-82 Sheet

DESCRIPTION	QUANTITY	UNIT	LABOR EXPENSE HOURS U.P.	HOURS TOTAL	WAGES U.P.	WAGES TOTAL	ADD-ONS U.P.	ADD-ONS TOTAL	SUBTOTAL U.P.	SUBTOTAL TOTAL	PER. MAT. U.P.	PER. MAT. TOTAL	SUB CONTRACTS U.P.	SUB CONTRACTS TOTAL	TOTAL U.P.	TOTAL TOTAL
SLAB 2100 MHS	8000		.91	7300		255,500										
ERECT BLDG 2400 MHS 80X50	4000					128,000		3200								
FINISH WORK 2800 MHS								3900								
STRUCTURE (48,000 INSUL BLDG, 4 DOOR)		6 VEH DOORS, 6-6 PR SLIDING DOORS, 2 OSF					OFFICE & WASH		HEATING, ELECTRIC		11	88,000				
CAMP MAINTENCE SHOPS,									FREIGHT		5	40,000				
CARPENTRY (DRILL PRESS, SAWS, ETC)									FURNISHINGS		17	136,000				
PLUMBING																
ELECTRICAL																
(1) COMPRESSOR, 3500																
(2) HYDRAULIC LIFT 13,000 LBS 3900 EA. ASSMY 2 (VENDOR INSTALLED):																
(2) VEH. PUMPS 4950 (VENDOR INSTALLED)																
(1) 10,000 STORAGE 6500 (VENDOR INSTALLED)																
Totals		79			255,500		7100				132.00	264000				526600

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Analysis PRE ENGINEERED INSULATED BLDG W CONCRETE SLAB

E-12

Item No.

Sheet No.

74

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

ESTIMATE WORK SHEET

Project WATANA

Estimator ROD CALVERT Item No. 5.19

Type of Work WAREHOUSE — MONAGERS

Date 2-4-82 Sheet

DESCRIPTION	QUANTITY	UNIT	LABOR EXPENSE								PER. MAT.		SUB CONTRACTS		TOTAL	
			HOURS		WAGES		ADD-ONS		SUBTOTAL							
			U.P.	TOTAL	U.P.	TOTAL	U.P.	TOTAL	U.P.	TOTAL	U.P.	TOTAL	U.P.	TOTAL	U.P.	TOTAL
	19200		.55	10500		367,500		OWN 16,800 or 18,000								
STRUCT											1	211200				
FREIGHT												76800				
FURNISH - STORAGE BINS,												79,200				
Totals						367,500		34,800				307200				712,500

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Analysis

896,000

Item No.

Sheet No.

273

25

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

ESTIMATE WORK SHEET

Project WATANA — Estimator ROD CALVERT — Item No. 5.18

Type of Work WAREHOUSE - FOOD SERVICE — Date 2-4-82 — Sheet

DESCRIPTION	QUANTITY	UNIT	LABOR EXPENSE HOURS U.P.	HOURS TOTAL	WAGES U.P.	WAGES TOTAL	ADD-ONS U.P.	ADD-ONS TOTAL	SUBTOTAL U.P.	SUBTOTAL TOTAL	PER. MAT. U.P.	PER. MAT. TOTAL	SUB CONTRACTS U.P.	SUB CONTRACTS TOTAL	TOTAL U.P.	TOTAL TOTAL
LABOR	12000		.55	6600		231,000				66 000						
EQUIPMENT- OWNERSHIP	6000					110,500		16 800								
OPERTION								18000								
100 X 60								8,400								
								9,000								
BLDG STRUCT											9	108 000				
FREIGHT											5	60,000				
FURNISHINGS											2	24,000				
												350 000				
												$50 000				
																274
												346,000				7
Totals					231,000		34800					892,000				957 800

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Analysis

Item No.

Sheet No.

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

ESTIMATE WORK SHEET

Project WATANA ..... Estimator ROD CALVERT ..... Item No. 5.15

Type of Work COMMUNICATION BLDG ..... Date 2-4-82 ..... Sheet

DESCRIPTION	QUANTITY	UNIT	LABOR EXPENSE								PER. MAT.		SUB CONTRACTS		TOTAL	
			HOURS		WAGES		ADD-ONS		SUBTOTAL							
			U.P.	TOTAL	U.P.	TOTAL	U.P.	TOTAL	U.P.	TOTAL	U.P.	TOTAL	U.P.	TOTAL	U.P.	TOTAL
LABOR	600SF			700		7000										
EQUIPMENT – OWNERSHIP								240								
OPERATION								300								
BLDG STRUCTURE											20	12000				
FREIGHT											5	3000				
FURNISHINGS											8	5000				
Totals					7000			540				20000				27540

F-15

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Analysis

Item No.

Sheet No.

7

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

ESTIMATE WORK SHEET

Project WATANA

Estimator ROD CALKERT Item No. 5.17

Type of Work HOSPITAL 20 BED CAPACITY

Date 7-4-82 Sheet

DESCRIPTION	QUANTITY	UNIT	LABOR EXPENSE HOURS U.P.	HOURS TOTAL	WAGES U.P.	WAGES TOTAL	ADD-ONS U.P.	ADD-ONS TOTAL	SUBTOTAL U.P.	SUBTOTAL TOTAL	PER. MAT. U.P.	PER. MAT. TOTAL	SUB CONTRACTS U.P.	SUB CONTRACTS TOTAL	TOTAL U.P.	TOTAL TOTAL
LABOR	22,400	..	.34	17600		266,000		ONVEHICLE								
EQUIPMENT OWNERSHP							.10	18000								
OPERATION							.90	21900								
DC = .90X90	81,000	..				96,390	..	6500								
								7300								
	WITHOUT ALASKA FACTOR															
SURGICAL INSTR.	18,500				SPECTRAL ANALYSER		39,000									
BLOOD BANK EQUIP.	11,990				INCUBATOR		3750									
SURGICAL TABLE	5,850				SCRUB SINK		3,400									
CHROMATOGRAPHS	14,500				FRACTIONATOR		8950									
STERILIZER & AUTOCLAVE	14,400				MICROTOME		5650									
DENTAL EQUIP	18,000				ELECTROCARDIOGRAPH		8200									
WHIRLPOOL BATH	8500				BLOOD COUNTER		9500									
OXYGEN TENTS	2100				ANESTHESIA		2050									
OPERATING LIGHTS	10,200				NITROGEN ANALYZ		9000									
X-RAY	6700				SURFACE "		62,500									
OPERATING MICROSCOPE	135,000				ALIP "		87000									
Totals		113				266,000		139,900				2,287,500				2,593,700

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Analysis BLDG COST MANUAL

HOSPITALS	123	SF
DISPENSARIES	85	SF
DENTAL	128	SF

- 40 PREFAB STEEL ASSUME
65% HOSPITAL/DENTAL
35% DISPENSARIES
+ ALASKA FACTOR = 171/SF

H&P

Item No.

Sheet No.

276

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

ESTIMATE WORK SHEET

Project WATANA

Type of Work ICE RINK

Estimator R.D. CALVERT Item No.

Date 2-4-82 Sheet

DESCRIPTION	QUANTITY	UNIT	LABOR EXPENSE HOURS U.P.	HOURS TOTAL	WAGES U.P.	WAGES TOTAL	ADD-ONS U.P.	ADD-ONS TOTAL	SUBTOTAL U.P.	SUBTOTAL TOTAL	PER. MAT. U.P.	PER. MAT. TOTAL	SUB CONTRACTS U.P.	SUB CONTRACTS TOTAL	TOTAL U.P.	TOTAL TOTAL
LABOR	42000		.54	23000		805,000										
EQUIPMENT OWNERSHIP								43600								
OPERATION								53000								
BLDG STRUCT.											1	378,000				
FREIGHT											1	170,000				
FURNISHINGS											1	82,000				
Totals		45				805,000	12%	96,600				630,000				1,581,600

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Analysis BARE MIN. ADD 50% FOR AVERAGE TO ABOVE AVERAGE ICE RINK

ASSUME 36,000 SF RINK AREA

2,000 SF SPECTATOR SEATING

4,000 SF DRESSING ROOMS, EQUIPMENT STORAGE, TOILETS, SNACK BAR

O/H/P 1,934,100

Item No.

Sheet No.

77

79

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

ESTIMATE WORK SHEET

Project WATANA

Type of Work BANK

Estimator ROD CALVERT Item No. 5.22

Date 2-4-87 Sheet

DESCRIPTION	QUANTITY	UNIT	LABOR EXPENSE HOURS U.P.	HOURS TOTAL	WAGES U.P.	WAGES TOTAL	ADD-ONS U.P.	ADD-ONS TOTAL	SUBTOTAL U.P.	SUBTOTAL TOTAL	PER. MAT. U.P.	PER. MAT. TOTAL	SUB CONTRACTS U.P.	SUB CONTRACTS TOTAL	TOTAL U.P.	TOTAL TOTAL
LABOR	3000			1320		46,200		ON								
EQUIPMENT - OWNERSHIP								3100								
OPERATION								3890								
BLDG STRUCT											20	60,000				
FREIGHT											10	30,000				
FURNISHINGS											38	114,000				
500 DEPOSIT BOX 5"X10"	110 EA.	55,000														
VAULT 3½"		33,000														
RECORD STORAGE 4"		5,000														
		93,000 + FURNITURE														
Totals						46200		6990				204000				257,190

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Analysis

Item No.

Sheet No.

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

ESTIMATE WORK SHEET

Project WATANA

Type of Work STORE

Estimator ROD CALVERT Item No. 5.2

Date 2-4-82 Sheet

DESCRIPTION	QUANTITY	UNIT	LABOR EXPENSE HOURS U.P.	HOURS TOTAL	WAGES U.P.	WAGES TOTAL	ADD-ONS U.P.	ADD-ONS TOTAL	SUBTOTAL U.P.	SUBTOTAL TOTAL	PER. MAT. U.P.	PER. MAT. TOTAL	SUB CONTRACTS U.P.	SUB CONTRACTS TOTAL	TOTAL U.P.	TOTAL TOTAL
LABOR	1800		.55	1000		35000		ow								
EQUIPMENT OWNERSHIP								OP 1440								
OPERATION								1800								
BLDG STRUCT											18	32400				
FREIGHT											5	9000				
FURNISHINGS											30	54000				
Totals						35000		3240				95400				133640

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Analysis

18

011/1 STORE
TO → 150,000

Item No.

Sheet No.

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

ESTIMATE WORK SHEET

Project WATANA

Type of Work LAUNDRY

Estimator ROD CALVERT Item No. 5.21

Date Sheet

DESCRIPTION	QUANTITY	UNIT	LABOR EXPENSE HOURS U.P.	HOURS TOTAL	WAGES U.P.	WAGES TOTAL	ADD-ONS U.P.	ADD-ONS TOTAL	SUBTOTAL U.P.	SUBTOTAL TOTAL	PER. MAT. U.P.	PER. MAT. TOTAL	SUB CONTRACTS U.P.	SUB CONTRACTS TOTAL	TOTAL U.P.	TOTAL TOTAL
LABOR	1600			600		21000										
EQUIPMENT OWNERSHIP								1640								
OPERATION								1800								
BLDG STRUCT											20	32000				
FREIGHT											5	8000				
FURNISH 10 WASHERS & DRYERS											10	16000				
150 GALLON HIGH RECOVERY WATER HEATER																TBD
Totals						21000		2440				56000				79440

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Analysis CHANGE FROM 600 TO 1600 SF TO INCLUDE STORAGE SPACE

Item No.

Sheet No.

82

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

ESTIMATE WORK SHEET

Project WASILLA — Estimator BOB CALVERT — Item No. 5.23

Type of Work SWIMMING POOL — Date 2-4-82 — Sheet

DESCRIPTION	QUANTITY	UNIT	LABOR EXPENSE HOURS U.P.	HOURS TOTAL	WAGES U.P.	WAGES TOTAL	ADD-ONS U.P.	ADD-ONS TOTAL	SUBTOTAL U.P.	SUBTOTAL TOTAL	PER. MAT. U.P.	PER. MAT. TOTAL	SUB CONTRACTS U.P.	SUB CONTRACTS TOTAL	TOTAL U.P.	TOTAL TOTAL
LABOR	12000		166	8500		297500										
EQUIPMENT OWNERSHIP								14600								
OPERATION								18000								
BLDG STRUCT											19	716000				
FREIGHT											4	36000				
FURNISH, INCLUDES, FILTERS,											19	108000				
CHLORINATORS, HEATERS																
TRAINING SCHOOL SIZE 42X75																
																781
Totals		69				297,500		32000				350000				679500

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Analysis PRE-ENGINEERED INSULATED STEEL BLDG. WITH CONCRETE SLAB & CONCRETE POOL.

Item No.

Sheet No.

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

WATANA

SINGLE FAMILY UNITS

		MHS	LABOR COST	EQUIPMENT				
2 BR	840 SF	220	7700	ow 340 or 420	s 20/16800 F 5/4200 E 5/4200	25,200	33,660	OH/P 37510
3BR	840 SF	220	7700	ow 340 or 420	s 21/17640 F 5/4700 E 5/4500	26,880	35340	OH/P 39190
2BR	1200 SF	350	12250	ow 480 or 600	s 22/26400 F 5/6000 E 5/6000	38400	51,730	OH/P 57855
3BR	1200 SF	350	12250	ow 480 or 600	s 23/27600 F 5/6000 E 6/7200	40800	54130	OH/P 60255
4BR	1400 SF	400	14000	ow 560 or 700	s 22/30800 F 5/7000 E 5.5/7700	45500	60760	OH/P 67760

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

WATANA

SINGLE FAMILY UNITS

BLDG STRUCT TO INCLUDE BUILT-IN OVEN, RANGE, DISHWASHER, GARBAGE DISPOSER, RANGE HOOD & FAN, ALL AVERAGE QUALITY WITH 12 LF OF CABINETS & COUNTER TOP
2 BATHROOMS BACK TO BACK
8 GOOD QUALITY FIXTURES.

FURNISHINGS TO INCLUDE WASHER, DRYER, BEDDING, GENERAL FURNITURE

T83

58

Frank Moolin & Associates, Inc.
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WATANA VILLAGE

MGR/OWNER OFFICE 19,200	3	5760	201600	7680	S 20/384,000 (H)	537600	722880
CONTRACTOR OFFICE				9600	E 5/96,000		
					E 3/57600		723680
SCHOOL 34,000 SF	12	11000	385,000	40 13600	S 20/680,000 (H)	1,520,000	1,935,600
WATER, SEWER, HOSE STA, LET, HOT WATER,				50 17000	E 5/170,000		
OFFICE EQUIP, FUEL OIL HEATING					E 20/670,000		2,125,10
					95		1,122,100
GYMNASIUM 10,000 SF		9000	315,000	4000	S 18/180000		
				5000	E 7/70,000	458,000	774,000
					E 20/200,000		
							931,500
SWIMMING POOL 10,000 SF	66	6600	231,000	4000	S 18/180,000	310,000	550,000
				5000	E 4 40000		
?					E 9 90,000		
							665,50
RECREATION CENTER 8,000 SF	44	4600	161,000	3200	S 14/112,000	240 368,000	240 497,700
+				4000	E 8/64000	1793,000	737,700
28 BOWLING LANES (16)				8000-2000 BOWLING LANES 6000 x 23	E 23/137,000	552,000	
+ SNACK BAR				6 BOWLING LANES	40,000/240,000		788,00
							558,95

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

WATANA VILLAGE

STORE 16,000 SCAB 3,000 ERECT 8,000 TOTAL 27,000 ✓ COLD STORAGE	1E 11,000	385,000	16400 18000 COLD STORAGE	S 18/ 288,000 F 5/ 80,000 S 80,000 E 40/ 160,000	608,000	1,019,400	1,201,400
FIRE STATION 1200	1 1200	42,000	480 600	S 20/ 24000 F 5/ 6000 E 40/ 48000	78,000	121080	142080

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

ESTIMATE WORK SHEET

Project SUSITNA HYDROELECTRIC PROJECT Estimator RBC Item No. 6.12

Type of Work GAS STATION CAMP EST. Date Sheet

DESCRIPTION	QUANTITY	UNIT	LABOR EXPENSE HOURS U.P.	HOURS TOTAL	WAGES U.P.	WAGES TOTAL	ADD-ONS U.P.	ADD-ONS TOTAL	SUBTOTAL U.P.	SUBTOTAL TOTAL	PER. MAT. U.P.	PER. MAT. TOTAL	SUB CONTRACTS U.P.	SUB CONTRACTS TOTAL	TOTAL U.P.	TOTAL TOTAL
PRE-ENG. INSUL. STEEL	1300SF		1	1300		45500		520			25	32500				
FRAME BLDG 12' CLEAR HEADROOM								650			8	10400				
3 VEH. DOORS 10'x10'																
150 SF OFFICE																
150 SF STORAGE/PRODUCTS	TOTAL 1300 SF															
3 HYDRAULIC LIFTS 12,000 LB.	3			2450 x 1.62 =		4000 EA				(3)	4000	12000				
2 10,000 GAL U/G STORAGE TANKS				4370 x 1.62 =		7120 EA				(2)	7120	14240				
6 VEH PUMPS	6			3300 x 1.62 =		5350 EA				(6)	5350	32100				
AIR & WATER - ISLAND				1000 x 1.62 =		1620						1620				
ISLAND LIGHTERS	6 FIXES			1090 x 1.62 =		1770						1770				
CASH BOX				125 x 1.62 =		200						200				
AIR COMPRESSORS 7½ HP				2350 x 1.62 =		3800						3800				
SIGNS 4' OF POST 20'	2			1481 x 1.62 =		2400						2400				
												6813.0				
										Misc	10	13000				
Totals						45500		1170				124030				170700

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Analysis BLDG COST MANUAL '82 P.164 AVE. @ 42

193,000

Item No.

Sheet No.

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

ESTIMATE WORK SHEET

Project WATANA

Type of Work POL GARAGE & MAINTENANCE BLDG

Estimator ROD CALVERT Item No.

Date 12-4-87 Sheet

DESCRIPTION	QUANTITY	UNIT	LABOR EXPENSE HOURS U.P.	HOURS TOTAL	WAGES U.P.	WAGES TOTAL	ADD-ONS U.P.	ADD-ONS TOTAL	SUBTOTAL U.P.	SUBTOTAL TOTAL	PER. MAT. U.P.	PER. MAT. TOTAL	SUB CONTRACTS U.P.	SUB CONTRACTS TOTAL	TOTAL U.P.	TOTAL TOTAL
	30005F			2500		91000		OVERSIZE 4500 OR 5500								
STRUCT.											15	30,000				
FREIGHT											5	15000				
EQUIP AIR COMP	2350	EA X 1.5 =	3525								10	30,000				
2 HYDRAULIC LIFTS 17,000	35	2450	EA X 1.5 =	7875												
2 PUMPS	3300	X 1.6	=	5280												
			16870	+ TOOLS & OFFICE FURNITURE												
Totals						91,000		10,000				75,000				176,000

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Analysis

OH/P 221,500

Item No.

Sheet No.

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

ELECTRICAL PLUG-INS FOR AUTOS

PARKING AREA	#100 EA.	TO INCLUDE OVERHEAD RACK WITH HANGING PLUGS					
		#100 EA X 500 =		50,000			
RESIDENCE	#30 EA	TO BE PLUG-IN	ENG. INTO DESIGN OF BUILDINGS OUTSIDE				

TM 83

90

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CAMP ESTIMATE : PER TELEX 1/13/82

GARAGE PER RESIDENCE 12 x 21 = 250 SF							
AVERAGE CARPORT NO SLAB (SINGLE	250 SF	@ 8 SF x 1.62 =		113 SF x 0.6	=	3900	
SINGLE GARAGE WITH SLAB	250 SF	@ 15.15 SF x 1.62 =		24.3	250 SF 6080 SAY 6100	6100	
DOUBLE GARAGE WITH SLAB	500 SF	@ 13 SF x 1.62		21.0	500 SF	10,500	

16

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GENERATING STATIONS

SLAB 160 MH ERECT 340 MH	600 SF	500 MH	17,500	UNDER 240 OR 300			
INSUL STEEL BLDG 10'x10' OVERHEAD DOOR	1				15 15000 5 3000 5 3000		
			17500	540	15000	33040	
						41790	

1500

12

ACRES

Calculations

SUBJECT: SUSITNA HYDRO PROJECT

WATANA

JOB NUMBER P5700.09
FILE NUMBER
SHEET 1 OF 1
BY RET DATE 26 Feb 82
APP DATE

MOVE EXISTING 160 man camp

Use same price to move & re-erect as for Type B 20 man units, except cut labor from 27,600/unit to 17,600 - / shorter trip, only 2 yrs of use

	Labor	Job Mat'l	EQUIP OWNRSHP	EQUIP OPN	Factor
per 20 man unit	17,600 x 8	2,500 x 8	1300 x 8	1800 x 8	
LS	= 140,800	20,000	10,400	14,400	1.22

FORM NO. 152 REV. 1

(F) Susitna Camp Estimates

Watana Utilities

F93 $397,750

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

DATE: _____ SHT.: _____ OF _____

CALCULATIONS BY: _____

SUBJECT: _____

PROJECT: _____

Rod	DC adders
modular	1.24
Butler	1.29

watana Radio Sta. $250,000 with markup

33,333 value
133,333 materials =
166,666 value w/ markup = 250,000

250,000 x 50% = 125,000 trans. to DC
250,000 — 125,000 = 125,000 value @ DC
25,000 to Fairbanks = 150,000 total value

25,000 =

value at watana = $250,000.- x 60% = $150,000 cost with markup.

250,000 x 50% = 125,000 - the difference between the 60% or 150,000 and the 50% OR 125,000 = labor. = 25,000 with markup 25,000 ÷ 1.5 = $16,667 labor

Prefab. 998,140 ~~397,750~~ x 60% = 238,650-

397,750 x 25% = 99,438 = 139,213 ÷ 1.48 = $92,808 labor & Equip.

1.48

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

DATE: 2-5-82 SHT.: _____ OF _____
CALCULATIONS BY: Tom
SUBJECT: _____

PROJECT: _____

Fuel Oil Piping
Watana Camp

		Material	Labor	total
3"	500 ft			
	Pipe 500 @ 8.55 - 8.78	4,275.-	4,390 -	8,665.-
	Valves 3 @ 217.50 - 29.03	652.-	87 -	739.-
		4,927.-	4,477 -	9,404.-
2½"	1300 ft			
	Pipe = 1300 @ 6.59 - 7.58	8,567	9,854 -	18,421.-
	Valves 26 @ 157.50 - 25.13	4,095	653 -	4,748 -
		12,662	10,507	23,169.-
2"	2100 ft			
	Pipe = 2100 @ 4.53 - 5.90	9,513.	12,390.	21,903.-
	Valves 42 @ 69.- 19.05	2,898	800.	3,698.-
		12,411.	13,190	25,601.-
1½"	2400 ft			
	Pipe = 2400 @ 3.15 - 4.71	7,560	11,304.	18,864.-
	Valves 48 @ 49.50 - 16.13	2,376	774.	3,150
		9,936	12,078	22,014.-
1"	2520 ft			
	Pipe = 2520 @ 2.25 - 3.95	5,670.-	9,954.-	15,624.-
	Valves: 126 @ 28.65 - 11.03	3,610	1390	5,000 -
		9,280.-	11,344.-	20,624.-
3/4"	200 ft			
	Pipe = 200 @ 1.58 - 3.44	316.-	688.-	1,004.-
	Valves = 20 @ 25.58 - 10.50	512.-	210.-	722
		828.-	896.-	1726 -
1/2"	600 ft			
	Pipe = 600 ft @ 1.44 - 3.33	864.-	1998.-	2,862.
	valves: 60 @ 21.60 - 8.70	1296.-	522.-	1818
		2160 -	2520.-	4,680
		52,204	55,014	107,218
			× 1.5 =	160,800.-

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

DATE: 2-5-82 SHT.: ____ OF ____
CALCULATIONS BY: DWM
SUBJECT: ____
PROJECT: ____

Fuel oil Piping
Wlatana Village

2½"	100 ft					
	Pipe - 100 @	6.59 -	7.58	659.-	758.-	1417.-
	Valves: 2 @	157.50	25.13	315.-	50.20	= 365.20
				974	808.-	1782.-
1½"	400 ft					
	Pipe = 400 @	3.15	4.71	1260.-	1,884	= 3144.-
	Valves = 8 @	49.50	16.13	396.-	129	= 525.-
				1,656.-	2,013.-	3,669.
				2,630.-	2,821.-	5451.-

Fuel tanks

550 gal	tank	825.-	94.50	
	Fittings	78.-	21.-	
	Pipe	75.-	197.-	
		978.-	212.-	=
1000 gal	tank	1,103.-	203.-	
	Fittings	78	21	
	Pipe	75	197	
		1256.-	421.-	
2000 gal.	tank	1,425.-	270.-	
		78	21	
		75	197	
		1,578.-	488.-	
		75	197	
		1,653	685.-	= 30 X 1,653 - 685. = 132,240 - 54,800 - 187,040.-

320 housing Units use one 2000 gal tank
for 4 units = 80 tanks

132,240	54,800	187,040
134,870.-	57,621.-	192,491
X 1.5 =	288,736	

F96

Frank Moolin & Associates, Inc.
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	Pipe		Valves		Blanks	bac
	Mat 2ab				3000 IF	
	LF		each			
3"	5.70	5.85	14.5	19.35		
	43'/day		13/dy			
2½"	4.39	5.05	10.5	16.75		
	50'/day		15/dy			
2"	3.02	3.13	46.	12.70		
	69'/day		11/dy			
1½"	2.10	3.14	33.	10.75		
	80'/day		13/dy			
1"	1.50	2.63	19.10	7.35		
	53'/day		19/dy			
3/4"	1.05	2.29	17.05	7		
	61'/day		20/dy			
1/2"	.96	2.22	14.40	5.80		
	63'/day		24/dy			

EQ

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

DATE: 1-28-82 SHT.: _____ OF _____
CALCULATIONS BY: _____
SUBJECT: _____

PROJECT: Susitna Project

Watana Camp
Fire Alarm System

93 Units

Control Panel, Single zone = 93 zones @ 713.25		66,332.—
Heat Detector 3087	@ 75.—	231,525.—
Annunciator, master monitor, 25-Zone 4X @ 7186		28,744.—
		326,600.—

Watana Village

Control Panel, Single zone = 9	@ 713.25	6,419.—
Heat Detector 65	@ 75.—	4,875.—
Annunciator = 1	@ 7186.—	7,186.
		18,480.

Labor 63.50 %
Materials 36.50 %

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

DATE: 1-28-82 SHT.: _____ OF _____
CALCULATIONS BY: _____
SUBJECT: _____

PROJECT: Susitna

Watana & Deril Canyon

Phone & Radio

Watana

use 1,100,000 for Phone system

1000 phones @ 110.00 per year per phone with a 10 year Payoff
= Cost of Phone service
split 60% camp & 40% village

1,100,000 x 60% = 660,000 camp
40% = 440,000 village

use 250,000 for Radio - T.V. set up in watana camp.

Deril Canyon

use 60% of Watana cost for size differential

Figure 60% Salvage in Watana as base cost in D.C.
& 60% Deril canyon camp
40% Deril canyon village

1,100,000 x 60% = 660,000 x 60% = 396,000 x 60% = 237,600

Deril Canyon Camp = 237,600 —
Village = 158,400 —

Deril Canyon Camp Radio = 60% of Watana

250,000 x 60% = 150,000 —

F99

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(An Alaska International Industries Company)

Microwave System - WATANA

2 terminals
1 Talketna
1 Watana

6 Repeater Stations

15X20 ft Bldg w/2. 10 KW Electric Generators each

use telephone exchanges for building costs

total Project Costs 15X20 ft. Bldg = 69.25 X 1.5 = 103.88 X 300 =	31,160.-
Generators 2 @ 5,120 X 1.5 X 2 =	= 15,400.-
Switchgear, fuel tanks, etc @5,500 =	5,500.-
Antenna towers - 60' high = 2,950 x 1.5 =	4,425.-
Helecopter - Concrete foundations & set up = 18 hrs @ 1,500.-	27,000.-
	83,485.-

terminals -
Deduct 1 Generator & Helicopter = 34,700- = 48,785

2 terminals @	48,785	=	97,570.-
6 Repeater Stations @	83,485	=	500,910.-
16 Dishes @ 5,000.-			90,000.-
8 Electronic Equipment @ 100,000 per Sta.			800,000.
			1,488,480

terminals @ 45,795+5,000 = 50,795.- = 101,590
Repeater @ 83,485+5,000 = 88,485.- 590,910 632,500
Electronic Equip, Repeater @
6 @ 150,083 = 900,500.-
2 @ 300,167 = 600,333
1,501,833.

Terminal = 350,962
Repeater = 238,568

X 1.5 = 2,232,720.-

3,200,000 ÷ 1.5 = 2,133,333

102

ASSUMPTIONS & NOTES

GENERAL

1. For labor costs: Where ever possible crews were projected and basic hourly rates applied as follows:

SKILLED WORKERS	55.00/HR.
FOREMAN	50.00/HR.
LABORERS	30.00/HR.

- Based on a 10 hr work day.
- rate includes all fring benefits.

Average to below average productivity was assumed in all cases. Any costs pulled from cost manuals were escalated by a factor of 1.5.

2. To develop material costs vendor quotes were obtained. For some items we have not yet received the desired quotation. These items will be noted. Any item pulled from a cost manual was escalated by a factor of 1.50.
3. For all piping, Ductile Iron pipe was used for estimating purposes.

4. For all heat tracing a blanket cost per linear foot was used. This is based on the high end cost of electric strip heat tracing. A liquid type heat tracing system would cost less than the electric strip type.

5. Insulation for all piping has been included as a seperate item.

6. I am awaiting a vendor quote on factory insulated and heat straped ductile iron piping. This information will be forwarded.

SPECIFIC

WATANA WASTE WATER PLANT

1. Costs for the specified processes were gleaned from an EPA publication "CONSTRUCTION COSTS FOR MUNICIPAL ~~MUNICIPAL~~ WASTEWATER TREATMENT PLANTS 1973-1978". Exceptions to this were the sewage lagoons and the outfall. The lagoons cost were developed by Tink Morton. I added 20% to his cost for aeration. The outfall cost is the cost of an outfall line at Barrow Alaska.

For the other items, the total construction cost from the EPA manual was escalated 1% per month from 4th QTR 1978 and escalated another 50% for Alaska. These costs were then distributed back to labor/materials/equipment using the percentages indicated in the margin. The basic assumption

604

here was that these items would be as preconstructed as possible and therefore installation costs would be much smaller than the cost of the equipment.

Also note the quantity of items. My suggestion and assumption here is that at least three components will be provided for each process i.e. three clarifiers instead of one. There are two advantages to this: the system will have more resiliency to upset and more importantly the system will lend itself to transfer between the watana and Devils canyon sites. For example, as the watana camp begins to wind down, one of the three units could be removed and installed at the Devils canyon camp. Estimate of the Devils canyon wastewater (and water) treatment plant reflect this assumption. Then as further manpower is shifted from Watana to Devils Canyon a second component would be transferred during devils Canyon its required capacity.

WATER TREATMENT SYSTEM – WATANA

The cost of the water treatment plant was derived by using the construction cost of a similar sized plant recently built in Homer, Alaska.

Packaged water treatment plants are available. Again it is suggested that three .6 MGD Packaged units be installed at watana and then transferred to Devils Canyon as required.

POL TANKS

Vendor quotation indicates that only 50,000 gal. bladder type tanks are easily available. 100,000 gal tanks have to be specially made.

UTILIDORS

For village utilidors, nothing was included for excavation or berming.

WATER PUMP STATIONS - Devils Canyon

It was assumed that the pumps and motor control centers and diesel generators (backup) could be transfered from Watana to the Devils Canyon site.

Devils Canyon Piping

It was assumed that any savings incurred by reusing Watana piping would be offset by the cost of removal. Therefore all Devils Canyon piping was estimated as new.

ITEMS NOT INCLUDED - To be forwarded ASAP.

1. BACK UP WCHS
2. ELECTRICAL SYSTEMS
3. Piping for fuel stations & Fuel stations themselves.

k Moolin & Associates, Inc.
(An Alaska International Industries Company)

ESTIMATE WORK SHEET

Project | Estimator | Item No.

Type of Work | Date | Sheet

DESCRIPTION	QUANTITY	UNIT	LABOR EXPENSE HOURS U.P.	HOURS TOTAL	WAGES U.P.	WAGES TOTAL	ADD-ONS U.P.	ADD-ONS TOTAL	SUBTOTAL U.P.	SUBTOTAL TOTAL	PER. MAT. U.P.	PER. MAT. TOTAL	SUB CONTRACTS (TOTAL EQUIP.) U.P.	SUB CONTRACTS (TOTAL EQUIP.) TOTAL	TOTAL U.P.	TOTAL TOTAL
INTAKE PUMP HOUSE																
LAYOUT		LS		4	35.00	140										
FOOTING EXCAVATION	30	CY		60	60.00	1800										
FOOTING/STEM WALL FORMWORK	660	SFCH		75	3.72	2482					.88	581				
REINFORCING STL. = 100#/CY	10	CY		8	28.00	280					23.75	238				
PLACING CONCRETE/FOOTING	10	CY		48	164	1640					62.87	629				
FINISH CONCRETE/1' SLAB.	80	CY		16	32.80	656					62.81	1257				
REINFORCING STL. = 100#/CY	20	CY		16	28.00	560					23.75	475				
FINISHING		LS		4	3.00	140										
STUD WALLS (2X6)	600	BF		50	1.54	1000					.55	330				
WALL SHEATHING (3/4" PLY)	720	SF		12	.55	400					.77	555				
JOISTS (2X10)	400	BF		1.2	1.00	400					.55	225				
RAFTERS (2X10)	800	BF		18	.75	600					.65	520				
ROOF SHEATHING (3/4" PLY)	600	SF		12	.66	400					.77	462				
METAL SIDING	720	SF		30	1.39	1000					2.00	1440				
METAL ROOFING	600	SF		30	1.67	1000					2.00	1200				
INSULATION R-19	720	SF		4	.12	240					.35	252				
R-30	500	SF			.30	150					.53	262				
Totals																

P105

Checked By

Analysis

Item No.

Sheet No.

P21

Form FMAA-1004

Hank Moolin & Associates, Inc.
(An Alaska International Industries Company)

ESTIMATE WORK SHEET

Project

Type of Work

Estimator

Date

Item No.

Sheet

TL. EQUIP

DESCRIPTION	QUANTITY	UNIT	LABOR EXPENSE HOURS U.P.	HOURS TOTAL	WAGES U.P.	WAGES TOTAL	ADD-ONS U.P.	ADD-ONS TOTAL	SUBTOTAL U.P.	SUBTOTAL TOTAL	PER. MAT. U.P.	PER. MAT. TOTAL	SUB CONTRACTS U.P.	SUB CONTRACTS TOTAL	TOTAL U.P.	TOTAL TOTAL
FLOOR DRAIN SYSTEM	2	EA		4	65	130					92	184				
PIPE & FITTING	1	EA		2	75	70					316	316				
LIGHTING 6 1'x8'fluor. fixtures & Lamps	6	EA		8	43.33	260					42	252				
OVERHEAD ROLL UP DOOR & FRAME	150	SF		10	8.33	1350					30	4500	FORK LIFT 1.15	172		
CEILING MOUNTED ELECT. HEATER/FAN	1	EA		12		550						1400	68	68		
ELECTRICAL	10%	LS		20		2000						1450				
BUILDING TOTALS				485		17,254						16,528		240		
SF COSTS (500SF)					$34.51 (51%)						$33.50 (48%)		$.48 (1%)		$68	
Totals																

Checked By

Analysis

607

Form FMAA-1004

F106

Item No.
Sheet No.

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

ESTIMATE WORK SHEET

Project | Estimator | Item No.

Type of Work | Date | Sheet

DESCRIPTION	QUANTITY	UNIT	LABOR EXPENSE HOURS U.P.	HOURS TOTAL	WAGES U.P.	WAGES TOTAL	ADD-ONS U.P.	ADD-ONS TOTAL	SUBTOTAL U.P.	SUBTOTAL TOTAL	PER. MAT. U.P.	PER. MAT. TOTAL	SUB CONTRACTS U.P.	SUB CONTRACTS TOTAL	TOTAL U.P.	TOTAL TOTAL
INTAKE PUMP SYSTEM[1] (SEE Basic Design-FOLLOWING PAGES)																
• INTAKE STRUCTURE																
FORMWORK	50	SFCA		6	3.77	189					.28	14				
REINFORCING STEEL 100#/CY	6	CY		6	28.00	168					23.75	143				
[1] CONCRETE PLACEMENT	6	CY		6	32.50	196					62.87	377				
METAL INTAKE GRATE	1	LS		6	—	200					—	750				
• INTAKE PIPING (8" DI)	60	LF		35	21.67	1300					12.00	720	12.80	768		
EXCAVATION	20	CY		10	16.50	330					—	—	76.75	1535		
[2] PIPE INSULATION (8")	60	LF		24	13.00	780					10.07	604				
[3] HEAT TRACING	100	LF		15	5.00	500					1.00	400				
CONCRETE PAD for PUMPS	1	CY		8	270.00	270					80	80				
OVERHEAD HOIST	1	EA		18	—	600					—	1500				
[4] PUMPS	3	EA		24	270.00	810					3500	10,500				
						5343						4618		2308		
Totals																

Checked By

Analysis

[1] INCLUDES THRUST BLOCKS FOR PIPING (SEE DESIGN Page)

[2] FOAM PLASTIC TUBE INSULATION.

[3] ELECTRIC STRIP HEAT TRACING.

[4] ASSUMED that OVERHEAD HOIST will be used to PLACE PUMPS.

* QUOTE from PACO PUMPS Seattle. TRUCKED FROM Sea. to job site

Item No.

Sheet No. 107

011

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

ESTIMATE WORK SHEET

Project | Estimator | Item No.

Type of Work | Date | Sheet 3

DESCRIPTION	QUANTITY	UNIT	LABOR EXPENSE HOURS U.P.	HOURS TOTAL	WAGES U.P.	WAGES TOTAL	ADD-ONS U.P.	ADD-ONS TOTAL	SUBTOTAL U.P.	SUBTOTAL TOTAL	PER. MAT. U.P.	PER. MAT. TOTAL	SUB CONTRACTS U.P.	SUB CONTRACTS TOTAL	TOTAL U.P.	TOTAL TOTAL
PIPING																
1 INTAKE PUMP HOUSE - SAY 8"	150	LF		40	9.33	1400					30.00	1500				
VALVES:																
2 GATE 150#, FLANGED-8"	10	EA		40	140	1400					1500	15,000				
SWING CHK FLANGED-8"	5	EA		20	130	650					1100	5500				
INSTRUMENTATION		LS		20	LS	600						1500				
3 MOTOR CONTROL STATIONS	3	EA		40	467	1400					1800	14,400				
HAND/OFF/AUTO SWITCHES	3	EA		4	47	140					22	66				
METAL CONNECTIONS	3	EA		3	70	210					60	180				
CONDUIT, PVC, IN SLAB, 2"	80	LF		4	1.74	140 -					.93	75				
WIRE	100	LF		4	1.40	140 -					10	1000	(FORKLIFT 3 HRS)			
DIESEL STAND BY GENERATOR 1 200 KW	1	LS		12		405					LS	40,500		1067		
ELECTRICAL - for PUMPS																
TRANSFORMER	1	EA			EA	1400					EA	10,500				
				FACE TOTALS:		7935						93,221		1067		
PUMP STATION TOTALS						30,532						124,867		2649		
Totals																

Checked By

Analysis

1 Assumed Ductile Iron (8")

2 Assumed 2 pipefitters, 2 hrs each/day, $45.00/hr each, overhead + profit and lighting.

3 Includes, starters, control devices, and Nema type 1 enclosure (Richardson Div 16, Sect 52, Page 3)

Item No.
Sheet No.

Form FMAA 1004

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

ESTIMATE WORK SHEET

Project | Estimator | Item No.

Type of Work | Date | Sheet 4

EQUIP. TOTAL

DESCRIPTION	QUANTITY	UNIT	LABOR EXPENSE HOURS U.P.	HOURS TOTAL	WAGES U.P.	WAGES TOTAL	ADD-ONS U.P.	ADD-ONS TOTAL	SUBTOTAL U.P.	SUBTOTAL TOTAL	PER. MAT. U.P.	PER. MAT. TOTAL	~~SUB~~ CONTRACTS U.P.	~~SUB~~ CONTRACTS TOTAL	TOTAL U.P.	TOTAL TOTAL
TRANSMISSION LINES to WATER TREATMENT PLANT																
(SEE DESIGN, PAGE)																
WOOD UTILIDOR	10,000	LF		2712	10.12	104,200					10.00	100,010	4.02	10,905		
6" DI, MJ, water pipe	10,000	LF		1430	4.58	15,800					7.14	71,400	2.87	28,737		
8" DI, MJ, WATER PIPE	10,000	LF		1735	5.50	55,500					10.08	100 800	3.43	34,299		
1 HEAT TRACING-ELECTRIC — OPTIONAL —	20,000	LF		3000	5.25	105,000					4.00	80,000				
2 PIPE INSULATION 6"	18,200	LF		1220	3.30	40,260					8.14	98,942				
PIPE INSULATION 8"	12,200	LF		1525	4.13	50,386					10.07	122,854				
RE-FILL OVER UTILIDOR	7500	CY		1368	5.84	43,800							2.25	16,875	TINS Page	
SUPPLY LINES TOTAL						444,946						373,996		120,816		
Totals																

Checked By

Analysis 1 ASSUMED THAT PIPES WILL BE INSTALLED WITH LINE TO PROVIDE FOR PERIODIC POWER TO HEAT TRACE CABLE, INCLUDE PERIODIC DISCONNECT, PANEL & SHOP, TRANSFORMER etc. PRODUCTION OF 10 LF/MH AND 25 MH PER TIE-IN (AVG. 500')

2 INSULATION FOR FITTINGS, 4 LF PER FITTING.

Item No.
Sheet No.

211

P108

Form FMAA 1004

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

ESTIMATE WORK SHEET

Project | Estimator | Item No.

Type of Work | Date | Sheet 5

DESCRIPTION	QUANTITY	UNIT	LABOR EXPENSE HOURS U.P.	HOURS TOTAL	WAGES U.P.	WAGES TOTAL	ADD-ONS U.P.	ADD-ONS TOTAL	SUBTOTAL U.P.	SUBTOTAL TOTAL	PER. MAT. U.P.	PER. MAT. TOTAL	SUB CONTRACTS U.P.	SUB CONTRACTS TOTAL	TOTAL U.P.	TOTAL TOTAL
INTAKE PUMP STATION																
FOUNDATION & CURBING (EA 15'X15')	225	SF		220	34.5	7765					33.00	7425	.48	108		
CENTRIFUGAL IN LINE PUMPS (1 BACK UP)	3	EA		27	270	810					3500	10,500				
OVERHEAD HOIST	1	EA		18	—	600					—	1500				
CONCRETE PADS	1	CY		8	270	270					90	80				
VALVES:																
GATE, 150# FLANGED 6"	2	EA		8	160	320					820	1640				
GATE, 150# FLANGED 8"	2	EA		8	180	360					1500	3000				
CHECK, 150# FLANGED 6"	1	EA		4	180	180					550	550				
CHECK, 150# FLANGED 8"	1	EA		4	180	180					1100	1100				
MOTOR CONTROL STATION	2	EA		26	667	1334					4800	9600				
MOTOR CONNECTIONS	2	EA		2	70	140					60	120				
CONT'L 2" PVC, INSIDE	40	LF		2	1.74	70					.93	37				
WIRE	50	LF		2	.140	70					.10	500				
DIESEL STANDBY GENERATOR	1	EA		12		465					LS	40,000	FORK LIFT	1067		
Totals INSTRUMENTATION	LS			10		350						500				

Checked By

Analysis 1 SQ. FT. COST OF INTAKE PUMP HOUSE USED.

* QUOT FROM PACO PUMPS, CAN BE TRUCKED TO JOBSITE.

Item No.

Sheet No.

2110

113

Form FMAA 1004

Frank Moolin & Associates, Inc.
(An Alaska Information Industries Company)

ESTIMATE WORK SHEET

Project | Estimator | Item No.

Type of Work | Date | Sheet 6

DESCRIPTION	QUANTITY	UNIT	LABOR EXPENSE HOURS U.P.	HOURS TOTAL	WAGES U.P.	WAGES TOTAL	ADD-ONS U.P.	ADD-ONS TOTAL	SUBTOTAL U.P.	SUBTOTAL TOTAL	PER. MAT. U.P.	PER. MAT. TOTAL	SUB CONTRACTS U.P.	SUB CONTRACTS TOTAL	TOTAL U.P.	TOTAL TOTAL
ELECTRICAL FOR BOOSTER PUMP:																
TRANSFORMER	1	LS				1400						10,500				
BOOSTER PUMP STATION TOTALS						14,194						87,562		210		
WATER TREATMENT PLANT																
LAYOUT		LS	10			700								CAT 225 BACKHOE		
EXCAVATION FOR FOOTING	85	CY	28		11.50	960							14.15	1208		
FORMWORK	960	SFCA	108		3.77	3619					.88	845				
REINFORCING STEEL #4	100	CY	83		8.00	9800					24.00	2400				
CONCRETE FOUR	305	CY	240		25.90	7,900					62.87	19,175				
PRE ENGINEERED, METAL																
BUILDING (60X100X60)														90 ton crane		
2 FRAME, SIDING, ROOFING	6000	SF	570		3.53	21,180					6.86	41,160	1.52	9,100		
DOORS/FRAMES	4	EA	16		260	1040					285	1140				
MECH & ELECTRICAL	6000	SF	300		1.65	9900					2.00	12,000				
Totals	BUILDING		TOTALS:			$46,179 ($7.80/SF)						$76,720 ($12.79/SF)		$10308 ($1.72/SF)		135,147 = $22.53/SF

Checked By / REINFORCING BARS ONLY IN FOOTINGS, WWM for SLAB.

Analysis - ASSUMED THAT SIDING AND ROOFING ARE INSULATED PANELS.

Item No.

Sheet No.

114

Form FMAA 1004

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

ESTIMATE WORK SHEET

Project | Estimator | Item No.

Type of Work | Date | Sheet 7

EQUIP

DESCRIPTION	QUANTITY	UNIT	LABOR EXPENSE HOURS U.P.	HOURS TOTAL	WAGES U.P.	WAGES TOTAL	ADD-ONS U.P.	ADD-ONS TOTAL	SUBTOTAL U.P.	SUBTOTAL TOTAL	PER. MAT. U.P.	PER. MAT. TOTAL	~~SUB CONTRACTS~~ U.P.	~~SUB CONTRACTS~~ TOTAL	TOTAL U.P.	TOTAL TOTAL
PUMPS TO RESERVOIRS																
CONCRETE PADS-GRAVEL	1.5	CY		12		270						80		120		
VERTICAL PUMP-15HP	4	EA		32		270		1080			*	1500		6000		
GATE VALVES 6"	8	EA		32		180		1440				1275		10,200		
CHECK VALVES 6"	4	EA		16		180		720				595		2100		
PIPING - GAL SOLE, 6"	50	LF		20		14		700				30		1500		
CENTRIFUGAL PUMP-1HP	2	EA.		16		270		540			*	2500		5000		
GATE VALVES - 8"	4	EA		16		180		720				1500		6000		
CHECK VALVES - 8"	2	EA.		8		180		360				1100		2200		
ELECTRICAL STATIONS	3	EA.		40		467		1400				4850		14,550		
PRESSURE SWITCHES	6	EA		10		60		360				22		132		
CONDUIT, 2" INSTALL	150	LF		8		124		261				13		140		
WIRE	200	LF		8		140		280				10		2000		
INSTRUMENTATION		LS		10				350						1000		
MISC CONNECTIONS	6	EA		6		35		210				60		360		
PUMP STA TOTALS						8126						51,302		500		
Totals																

Checked By

Analysis 1 ea 6" vert, 300GPM @ 1.5 TDH.
2 ea 8" vert, 500GPM @ 75 TDH.

* NEED COST

Item No.
Sheet No.

Form EMAA 1004

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

ESTIMATE WORK SHEET

Project | Estimator | Item No.

Type of Work | Date | Sheet B

EQUIP TOTAL

DESCRIPTION	QUANTITY	UNIT	LABOR EXPENSE HOURS U.P.	HOURS TOTAL	WAGES U.P.	WAGES TOTAL	EQUIP. ADD-ONS U.P.	EQUIP. ADD-ONS TOTAL	SUBTOTAL U.P.	SUBTOTAL TOTAL	PER. MAT. U.P.	PER. MAT. TOTAL	~~SUB-CONTRACTS~~ U.P.	~~SUB-CONTRACTS~~ TOTAL	TOTAL U.P.	TOTAL TOTAL
TRANSMISSION LINES TO STORAGE RESERVOIRS									FABRICATED COST							
— TRENCH —																
WATER UTILITIES	3500	LF	1020		10.12	36,170					40	140,000	4.02	14,315		
6" DI, AU, WATER PIPE	3500	LF	453		4.35	15,225					7.14	24,990	2.87	10,045		
8" DI, AU, WATER PIPE	3500	LF	544		5.22	18,270					10.08	35,280	3.43	12,005		
LIGHT TRACING - ELECTRIC	7000	LF	1050		5.25	36,750					4.00	28,000				
— TRENCH —																
WATER UTILITIES	8,300	LF	2421		10.42	86,496					40	332,000	4.07	33,947		
6" DI, AU, WATER PIPE	8,300	LF	1075		4.35	36,105					7.50	62,250	2.87	23,821		
LIGHT TRACING - ELECTRIC	8,300	LF	1245		5.25	43,575					4.00	33,200				
— OPTIONAL —																
PIPE INSULATION - 6"	11,800	LF	1180		3.20	37,760					8.11	95,698				
PIPE INSULATION - 8"	3500	LF	438		4.00	14,000					10.07	35,245				
PERMANENT UTILITIES	11,800	LF														
	= 8740	CF	1595		5.81	51,041							2.25	19,665		
TO CAMP + INSUL						147,054						391,130		36,365		
TO TANANA + INSUL						336,632						174,745		71,582		
Totals																

Checked By

Analysis

911

T-13

Item No.
Sheet No.

Form FMAA 1004

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

ESTIMATE WORK SHEET

Project | Estimator | Item No.

Type of Work | Date | Sheet

DESCRIPTION	QUANTITY	UNIT	LABOR EXPENSE HOURS U.P.	HOURS TOTAL	WAGES U.P.	WAGES TOTAL	EQUIP ADD-ONS U.P.	EQUIP ADD-ONS TOTAL	SUBTOTAL U.P.	SUBTOTAL TOTAL	PER. MAT. U.P.	PER. MAT. TOTAL	SUB CONTRACTS U.P.	SUB CONTRACTS TOTAL	TOTAL U.P.	TOTAL TOTAL
CHAP WATER DISTRICT SYSTEM.																
RESERVOIR - INTAKE STR. TO WATER TREATMENT STATION																
1 CONCRETE	5	CY		16	12[35]	462					8[43]	431				
INTAKE GATE		LS		6		200						750				
2 INTAKE PIPE 8"	50	LF		42	27[12]	1359					12[00]	600	5[11]	256		
PIPE EXCAVATION/BURIED	50	LF		19	13[00]	650					10[02]	504				
HEAT TAPING	75	LF		12	5[25]	394					4[00]	300				
WATER HOUSE (15X15)	225	SF		843	34[51]	7765					33[00]	7425	.48	108		
PACKAGED PUMP SYSTEM	1@5500gph	EA		30		1050						60,000		271		
DIESEL BACK UP GENERATOR CAPACITY - 100KW	1	EA		12		405					LS	30,300		231 FORKLIFT 4 HRS		
		D. H. TOTALS				12865						60,316		866		
UTILITIES	8400	LF		2735	10[12]	87,528					4[80]	336,000	4[09]	34,356		
SYSTEM PIPING																
10" DI MJ (DIRECT BURY)	2700	LF		1612	21[45]	57,816					16[72]	45,738	17[22]	46,494		
FOUNDATION & BACKFILL	1600	CY		214	4[06]	7490							10[27]	16,424		
Totals PIPE INSTALLATION	2700	LF		696	8[25]	22,275					19[11]	51,597				

Checked By [1] COMPLETE FROM VIEWS IN THE STRUCTURE. [2] INCLUDES EXCAVATION

Analysis [3] EQUIPMENT: (1) LOWBOY = 232[54]
(1) BACK HOE
(1) FLATBED
PRODUCTIVITY = 200 LF/HR
CREW = 2 C/HR (TRANSITION)

[4] PRODUCTIVITY: 15CY/HR. CREW = OPER. 35 OILER 35 = $70/HR

L11

T-14

Item No.
Sheet No.

EMAA 1004

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

ESTIMATE WORK SHEET

Project | Estimator | Item No.

Type of Work | Date | Sheet

DESCRIPTION	QUANTITY	UNIT	LABOR EXPENSE HOURS U.P.	HOURS TOTAL	WAGES U.P.	WAGES TOTAL	ADD-ONS U.P.	ADD-ONS TOTAL	SUBTOTAL U.P.	SUBTOTAL TOTAL	PER. MAT. U.P.	PER. MAT. TOTAL	EQUIP ~~SUB CONTRACTS~~ U.P.	EQUIP ~~SUB CONTRACTS~~ TOTAL	TOTAL U.P.	TOTAL TOTAL
12" DI - INTERLOCK	3,100	LF	20E0.		21.18	66588					16.94	49600	17.22	53382		
6" DI - SHIELD	300	LF	157		16.76	5038					7.14	2142	19.76			
6" PIPE INSULATION	300	LF	30		3.20	960					8.11	2433				
6" DI - MECHANICAL	4,300	LF	1623		12.08	51944					7.14	30702	9.62	41,667		
1" DI - MECHANICAL	960	LF	322		10.71	10310					6.30	6048	8.61	8266		
HEAT TRACING																
12"	5800	LF	874		5.25	30,450					4.00	23200				
6"	4600	LF	690		5.25	24,150					4.00	18400				
4"	960	LF	144		5.25	5040					4.00	3840				
INSTRUMENT VALVES																
12"	6	EA.	40		216	1300					80	4800				
6"	5	EA	20		130	650					350	1750				
4"	2	EA	4		130	260					200	400				
3 HEADERS	15	EA.	120		266	4000					825	12,375				
Totals																

Checked By

Analysis 1 EXCAVATOR = 200 LF/DAY. 2 CREW: 2 PLUMBERS, 2 LABORERS @ $150, PRODUCTIVITY 60 LF/DAY
3 PRODUCTIVITY 12/CREW/DAY. 4 PRODUCTIVITY: 10/5HR DAY.
5 CREW: 2 PLUMBERS, 1 LABORER @ $150 PRODUCTIVITY = 4/10HR DAY

Item No. 115

Sheet No.

Form FMAA 1004

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

ESTIMATE WORK SHEET

Project | Estimator | Item No.

Type of Work | Date | Sheet

DESCRIPTION	QUANTITY	UNIT	LABOR EXPENSE HOURS U.P.	HOURS TOTAL	WAGES U.P.	WAGES TOTAL	ADD-ONS U.P.	ADD-ONS TOTAL	SUBTOTAL U.P.	SUBTOTAL TOTAL	PER. MAT. U.P.	PER. MAT. TOTAL	SUB CONTRACTS U.P.	SUB CONTRACTS TOTAL	TOTAL U.P.	TOTAL TOTAL
VILLAGE DISTRIBUTION	1 SYST.	EA														
1 PUMP STATION	1	EA		380		12,285						60,316		8166		
PIPING:																
2 10" DI	1500	LF		1007	21.48	32,220					16.94	25,410	17.22	25,830		
8"	1000	LF		534	17.98	17,080					12.88	12,880	13.68	13,620		
6"	1500	LF		680	14.50	21,750					10.08	15,120	11.63	17,445		
4"	8400	LF		4983	12.98	159,456					7.44	94,248	9.69	127,908		
VALVES:																
10"	200	LF		246	25	7875					4.00	6000				
8"	1500	LF		164	25	5250					4.00	4000				
6"	300	LF		246	25	7875					4.00	6000				
4"	1400	LF		2166	25	69,300					4.00	52,800				
HYDRANTS	20	EA		166	26	520					825	16500				
UTILIDORS																
1" [illegible]	16,900	SF		5503	10.12	176,098					40.00	676,000	4.09	69,121		
Totals [illegible]	1000	LF		326	10.42	10420					40.00	40,000	4.09	4090		

Checked By [illegible]

Analysis [illegible]

[illegible] NO EXCAVATION.

Item No.
Sheet No.

Form FMAA 1004

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

ESTIMATE WORK SHEET

Project | Estimator | Item No.

Type of Work | Date | Sheet

DESCRIPTION	QUANTITY	UNIT	LABOR EXPENSE HOURS U.P.	HOURS TOTAL	WAGES U.P.	WAGES TOTAL	ADD-ONS U.P.	ADD-ONS TOTAL	SUBTOTAL U.P.	SUBTOTAL TOTAL	PER. MAT. U.P.	PER. MAT. TOTAL	SUB CONTRACTS U.P.	SUB CONTRACTS TOTAL	TOTAL U.P.	TOTAL TOTAL
STOCK TO + VALVES	11,200	LF		347	10.52	116,704					10.00	448,000	1.42	15,808		
PIPE INSULATION - CAMP &																
1 12"	4600	LF		690	5.00	23000					19.11	87906				
2 10"	1000	LF		100	4.00	4000					17.10	17,100				
3 8"	1500	LF		150	3.33	5000					10.07	15,105				
4 6"	17,00	LF		1700	2.94	50,000					8.41	41,985				
5 4"	960	LF		72	2.50	8400					6.00	5760				
INSULATION VALVES																
6"	20	EA		92	130	2600					350	7000				
6"	8	EA		8	1.10	260					450	900				
10"	2	EA		10	150	300					600	1200				
12"	2	EA		14	46	432					800	1600				
Totals																

Checked By

Analysis

1 PRODUCTIVITY: 20LF/HR, CREW $110/HR - 3 MEN

2 PRODUCTIVITY: 25LF/HR, CREW $110/HR - 3 MEN

3 PRODUCTIVITY: 30LF/HR, CREW $100/HR - 3 MEN

4 PRODUCTIVITY: 35LF/HR, CREW $100/HR - 3 MEN

5 PRODUCTIVITY: 40LF/HR, CREW $100/HR - 3 MEN

021

Item No.
Sheet No.

Form FMAA 1004

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

ESTIMATE WORK SHEET

Project | Estimator | Item No.

Type of Work | Date | Sheet

DESCRIPTION	QUANTITY	UNIT	LABOR EXPENSE HOURS U.P.	HOURS TOTAL	WAGES U.P.	WAGES TOTAL	ADD-ONS U.P.	ADD-ONS TOTAL	SUBTOTAL U.P.	SUBTOTAL TOTAL	PER. MAT. U.P.	PER. MAT. TOTAL	SUB CONTRACTS U.P.	SUB CONTRACTS TOTAL	TOTAL U.P.	TOTAL TOTAL
SEWER SYSTEM																
CHAIN CONNECTION SYSTEM																
4"	1,900			635	10.34	20406					6.30	11970	3.61	16,359		
6"	1,600			604	12.08	19328					7.11	11424	7.69	15,504		
8"	3,300			1495	14.50	47850					10.06	33264	11.63	38,379		
10"	2,300			1574	21.46	49,404					16.94	26155	17.22	39,606		
16"	1,200			1088	29.00	34800					24.15	28,980	23.25	27,900		
HEAT TRACING																
4"	1,900				5.25	9975					4.00	7600				
6"	1,600				5.25	8400					4.00	6400				
8"	3,300				5.25	17325					4.00	13200				
10"	2,300				5.25	12075					4.00	9200				
16"	1,200				5.25	6300					4.00	4800				
FIBERGLASS - 16" MAIN SEWER	1,200	LF		391	10.72	12504					10.00	48,000	4.07	4908		

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121

Item No.
Sheet No.

EMAA-1004

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

ESTIMATE WORK SHEET

Project | Estimator | Item No.

Type of Work | Date | Sheet

DESCRIPTION	QUANTITY	UNIT	LABOR EXPENSE HOURS U.P.	HOURS TOTAL	WAGES U.P.	WAGES TOTAL	ADD-ONS U.P.	ADD-ONS TOTAL	SUBTOTAL U.P.	SUBTOTAL TOTAL	PER. MAT. U.P.	PER. MAT. TOTAL	SUB CONTRACTS U.P.	SUB CONTRACTS TOTAL	TOTAL U.P.	TOTAL TOTAL
VINE INSULATION	ALREADY ADDED FOR EA. JOINT.															
4"	2325	LF		200	2.75	6394					6.68	15,531				
6"	1,952	LF		201	3.30	6442					8.11	15,831				
8"	4033	LF		521	4.13	16656					10.01	40,612				
12"	2,811	LF		725	8.25	23,191					19.11	53,718				
16"	1,467	LF		756	16.50	24,206					24.00	35,208				
VILLAGE COLLECTION SYSTEM																
DUCTILE IRON PIPE																
6"	7,200	LF		2950	12.08	94,224					7.74	55692	7.69	75582		
8"	6,300	LF		2945	14.50	94,250					10.08	65520	11.63	75595		
10"	1,100	LF		586	17.06	18,766					12.87	14168	13.68	15,048		
12"	800	LF		537	21.48	17,184					16.94	13552	17.22	13,776		
14"	700	LF		544	25.00	17,500					20.00	14,000	20.00	14,000		
16" LOOP MAIN	13,800	LF		5810	12.06	166,704					7.14	98,532	9.69	133,722		
Totals																

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Analysis

121

Item No.
Sheet No.

F-119

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

ESTIMATE WORK SHEET

Project | Estimator | Item No.

Type of Work | Date | Sheet

DESCRIPTION	QUANTITY	UNIT	LABOR EXPENSE HOURS U.P.	HOURS TOTAL	WAGES U.P.	WAGES TOTAL	ADD-ONS U.P.	ADD-ONS TOTAL	SUBTOTAL U.P.	SUBTOTAL TOTAL	PER. MAT. U.P.	PER. MAT. TOTAL	SUB CONTRACTS U.P.	SUB CONTRACTS TOTAL	TOTAL U.P.	TOTAL TOTAL
HEAT TRACING																
6"	21,600	LF		3515	5.25	113,100					4.00	86,400				
8"	6,500	LF		1066	5.25	34,125					4.00	26,000				
10"	1,100	LF		180	5.25	5775					4.00	4400				
12"	800	LF		131	5.25	4200					4.00	3200				
14"	700	LF		115	5.25	3675					4.00	2800				
HEADER FOR 5 PUMP STATION																
EXCAVATION	250	CY		10	14.00	350							2.77	695		
8" DIA. RETURN	1	LS		40	—	1475					3000	—	618			
INSULATED PUMP STATION SUMP	6	LS		60	—	2175					*23,600	—	818			
CONCRETE SLAB FOR INSTALLATION	3	CY		300	3.00	960					75	225				
WELDING, INSULATION AND HEAT TRACING OF PUMP STATION SUMP & FLOW STATION "A" ASSEMBLY	—	LS		30		1000					—	2000				
Totals	3	EA		162		1736 5,190					16628	19884	585	1755		

*Quote from Pico

Amp. Sandia

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Analysis

123

Form FMAA 1004

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

ESTIMATE WORK SHEET

Project | Estimator | Item No.

Type of Work | Date | Sheet

DESCRIPTION	QUANTITY	UNIT	LABOR EXPENSE HOURS U.P.	HOURS TOTAL	WAGES U.P.	WAGES TOTAL	ADD-ONS U.P.	ADD-ONS TOTAL	SUBTOTAL U.P.	SUBTOTAL TOTAL	PER. MAT. U.P.	PER. MAT. TOTAL	SUB CONTRACTS U.P.	SUB CONTRACTS TOTAL	TOTAL U.P.	TOTAL TOTAL
SEWAGE TREATMENT PLANT																
BUILDING:																
CONCRETE FOOTING	Bldg.															
EXCAVATION	350	CY		82	7.25	2500							1.01	355		
FOUNDATION	1800	SFCA		212	3.77	6785					.88	1584				
CONCRETE SLAB	200	CY		208	33.25	6650					24.00	4800				
PIPE	950	CY		535	18.00	17,100					62.87	59,726				
REINFORCED SLAB FINISH BUILDING 100'x200' x 24' + MECH. & ELECT.	20,000	SF		3440	5.50	110,000					9.30	186,000	1.52	30,400		
BUILDING TOTALS SF COSTS						143,645 #7.18/SF						252,110 #12.60/SF		30755 #1.53/SF		#21.31/SF
Totals																

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Analysis

T-21

Item No.
Sheet No.

T-21

Form FMAA 1004

Fink Moolin & Associates, Inc.
(An Alaska International Industries Company)

ESTIMATE WORK SHEET

Project | Estimator | Item No.

Type of Work | Date | Sheet

DESCRIPTION	QUANTITY	UNIT	LABOR EXPENSE HOURS U.P.	HOURS TOTAL	WAGES U.P.	WAGES TOTAL	ADD-ONS U.P.	ADD-ONS TOTAL	SUBTOTAL U.P.	SUBTOTAL TOTAL	PER. MAT. U.P.	PER. MAT. TOTAL	SUB CONTRACTS U.P.	SUB CONTRACTS TOTAL	TOTAL U.P.	TOTAL TOTAL
TREATMENT PLANT UNIT PROCESSES																
UNIT PROCESSES AND/OR COMPONENTS																
1. SKIMMING TANK																55,000
2. LAGOONS (from FINK MARTIN)																1,533,000
3. RBC'S																1,836,000
4. PHYSICAL/CHEM UNIT																184,000
5. CLARIFIER																347,000
6. DISINFECTION																184,000
7. HEAT PUMP																15,000
8. THICKENER																204,000
9. FILTER PRESS																209,000
10. DRYING BEDS																193,875
11. CUTFALL																240,000
12. CONTROLS/INSTRUMENTATION																245,000
13. PIPING																693,000
14. LABORATORY																75,000
Totals																5789,1[illegible]

Checked By

Analysis

Item No.
Sheet No.

125

Form FMAA-1004

Lynk Moolin & Associates, Inc.
(An Alaska International Industries Company)

ESTIMATE WORK SHEET

Project

Type of Work PIPE INSULATION - TOTAL

Estimator

Date

Item No.

Sheet

DESCRIPTION	QUANTITY	UNIT	LABOR EXPENSE HOURS U.P.	HOURS TOTAL	WAGES U.P.	WAGES TOTAL	ADD-ONS U.P.	ADD-ONS TOTAL	SUBTOTAL U.P.	SUBTOTAL TOTAL	PER. MAT. U.P.	PER. MAT. TOTAL	SUB CONTRACTS U.P.	SUB CONTRACTS TOTAL	TOTAL U.P.	TOTAL TOTAL
PIPE INSULATION - 4 LF ADD'D AREA JOINT - CRIMP																
4"	1200	LF			2.75	3300					6.68	8016				
6"	22,000	LF			3.30	72,600					8.11	178,420				
8"	16,500	LF			4.13	68,145					10.01	166,155				
12"	7,100	LF			8.25	58,575					19.11	135,681				
16"	1500	LF			16.50	24,750					24.00	36,000				
PIPE INSULATION - 4 LF ADD'D for 6# JOINT - Village																
6"	52,700	LF			3.30	173910					8.11	427,397				
8"	9,800	LF			4.11	40,174					10.01	98,686				
10"	2600	LF			5.50	14,300					17.00	44,460				
12"	2500	LF			8.25	20,625					19.11	47,775				
14"	850	LF			14.00	11,900					21.00	17,850				
Totals																

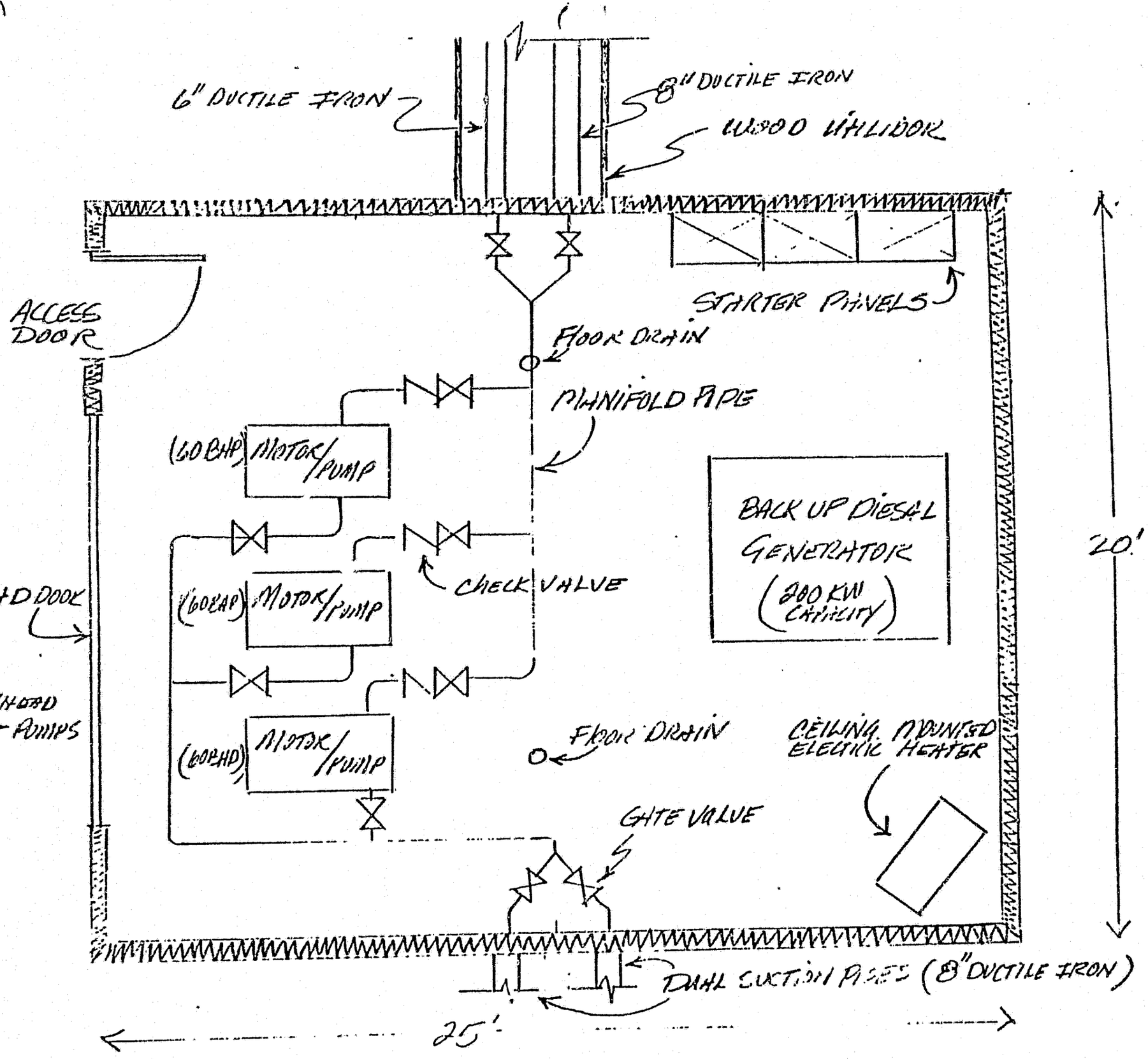
T-23

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Analysis

321

Form FMAA-1004



NOTES:

1. PROVIDE OVERHEAD HOIST TO LIFT PUMPS FOR REPAIR.
2.

WATER INTAKE PUMP STATION

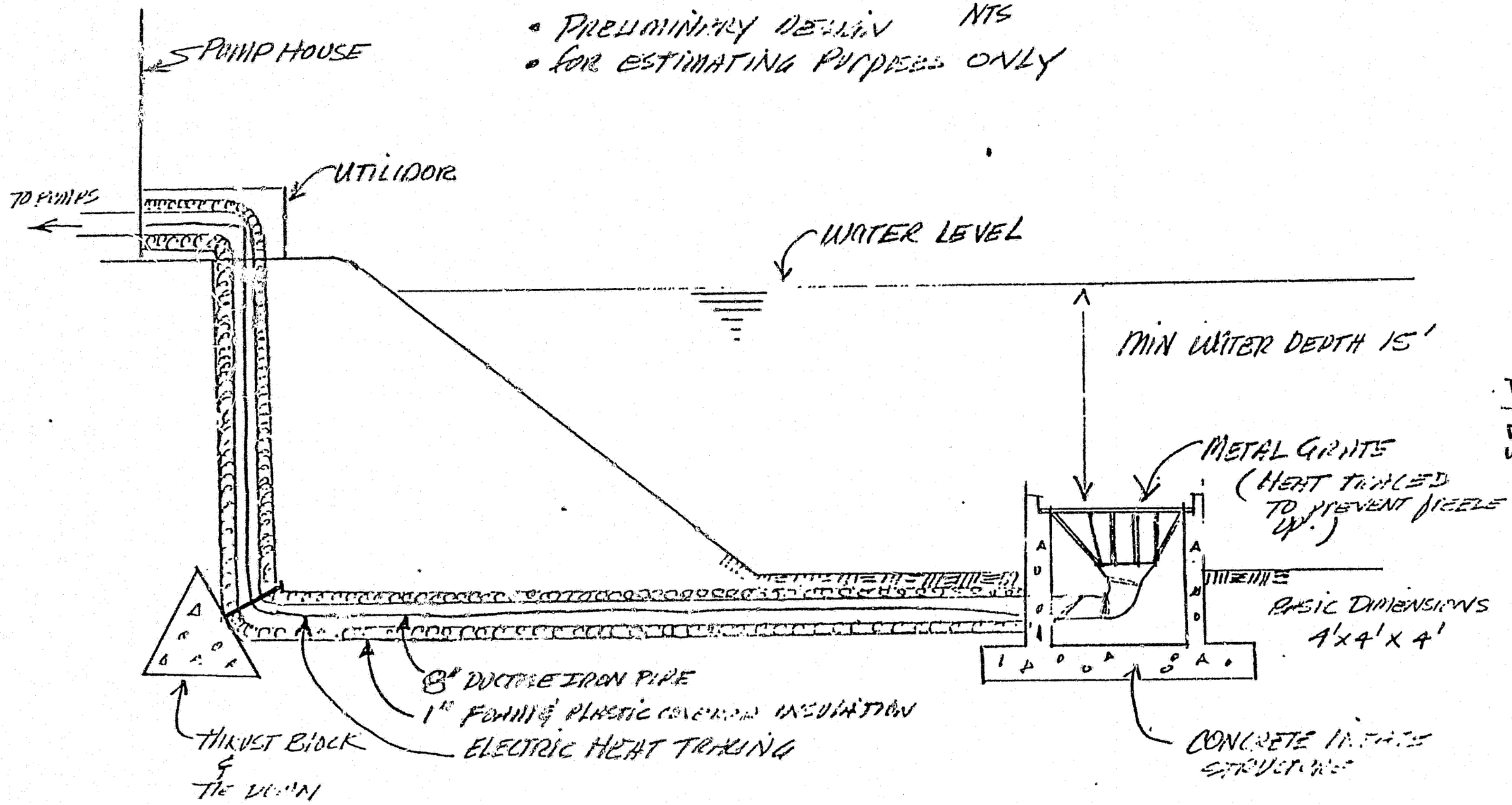
• PLANT CAPACITY DECISION. MTS

E124

121

POTABLE WATER INTAKE

- PRELIMINARY DETAIL NTS
- FOR ESTIMATING PURPOSES ONLY



B-25

B-1

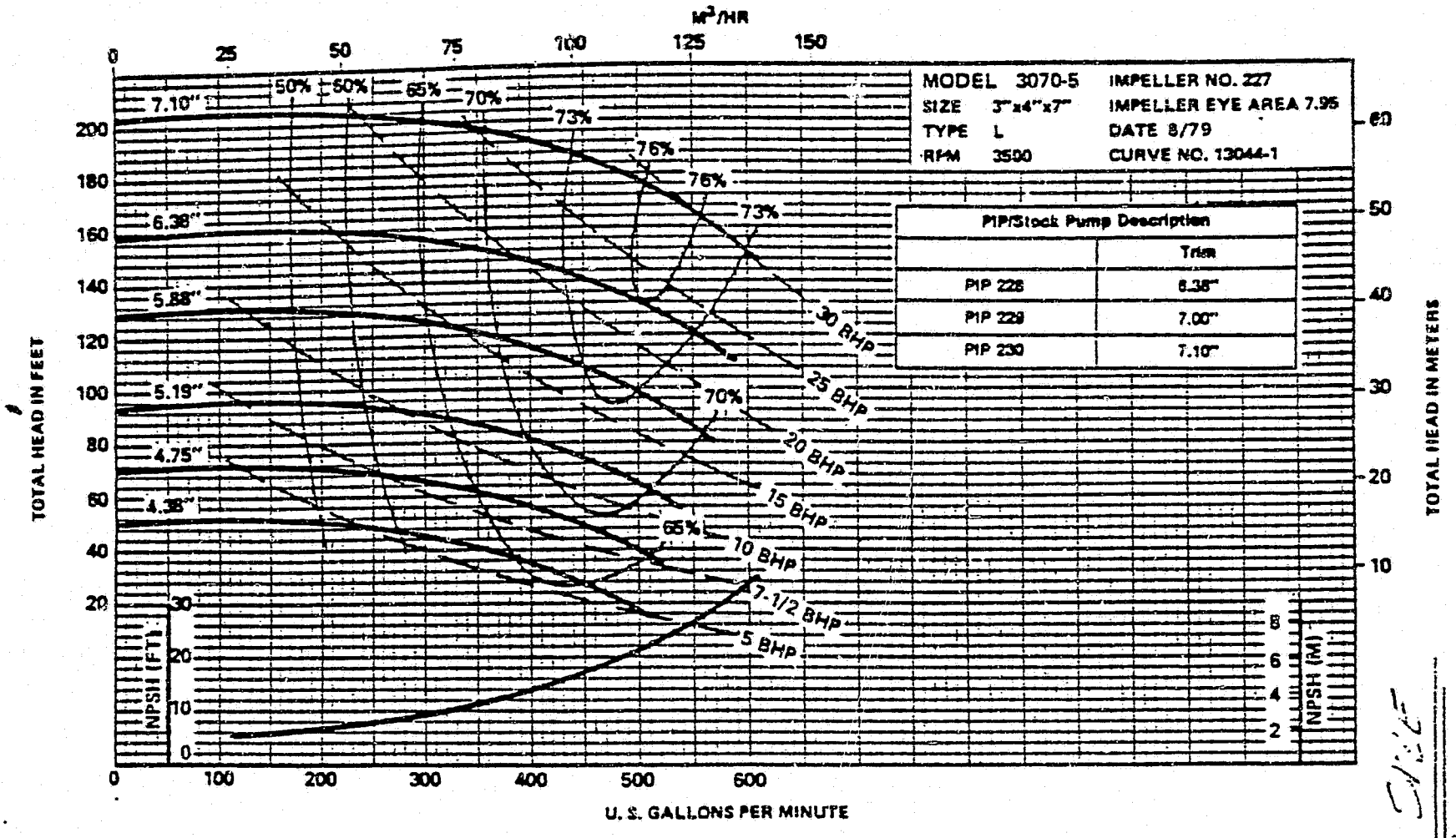
F126

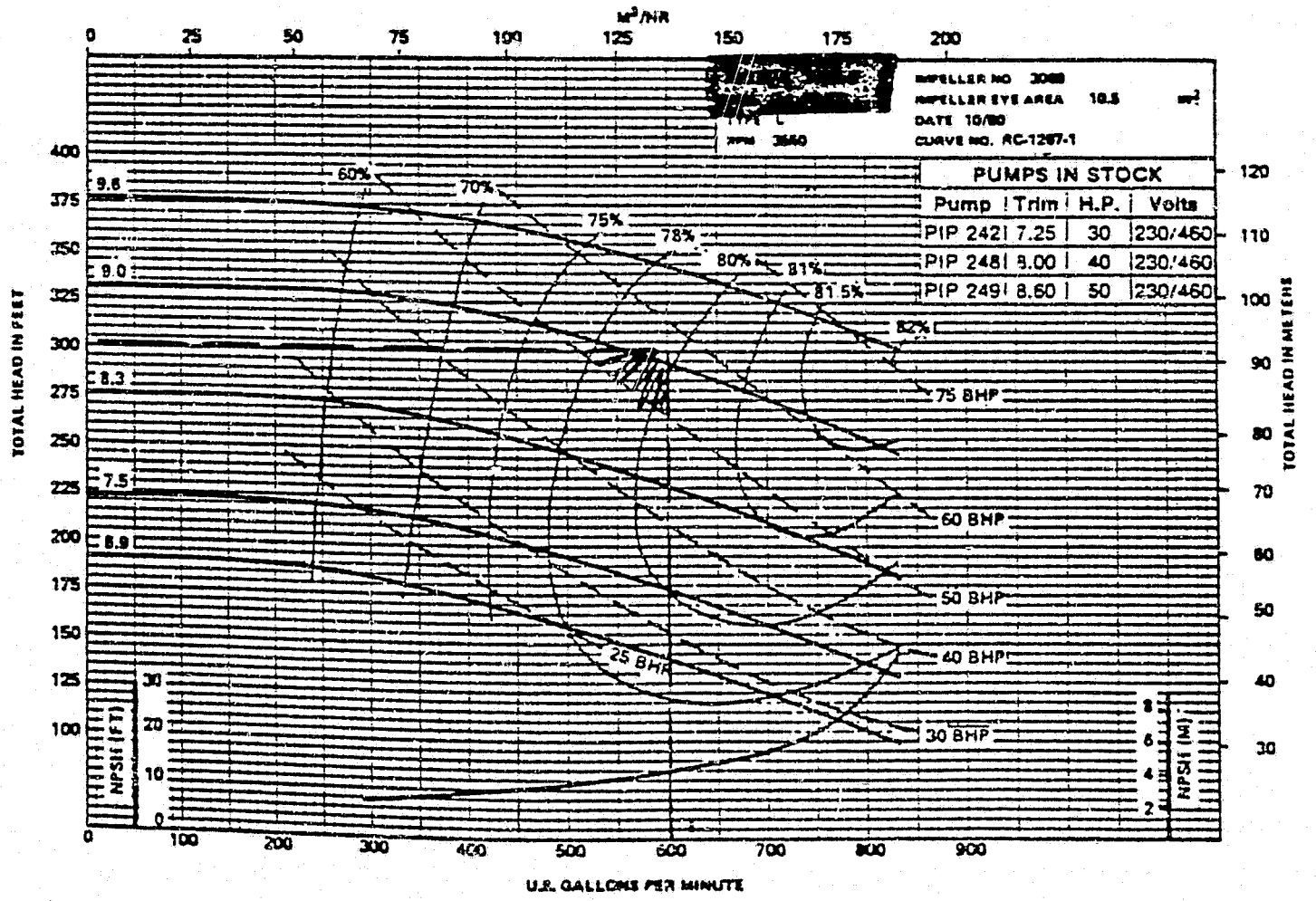
PACO PUMPS

PERFORMANCE CURVES
END SUCTION CENTRIFUGAL PUMPS
TYPE L

A1b

3500 RPM





ENTIRE PUMP

For additional pump

PACO PUMPS

Paco Pumps, a division of Baltimore Aircoil Co., Inc.
PO Box 12924, 845 92nd Avenue
Oakland, California 94604

Paco Pumps of Canada
a division of Baltimore Aircoil InterAmerican Corp.
35 Sinclair Ave., Georgetown, Ontario, Canada

Plant Locations: Oakland, CA • Dallas, TX • Los Angeles, CA • Portland, OR • Milford, DE • Georgetown, Canada

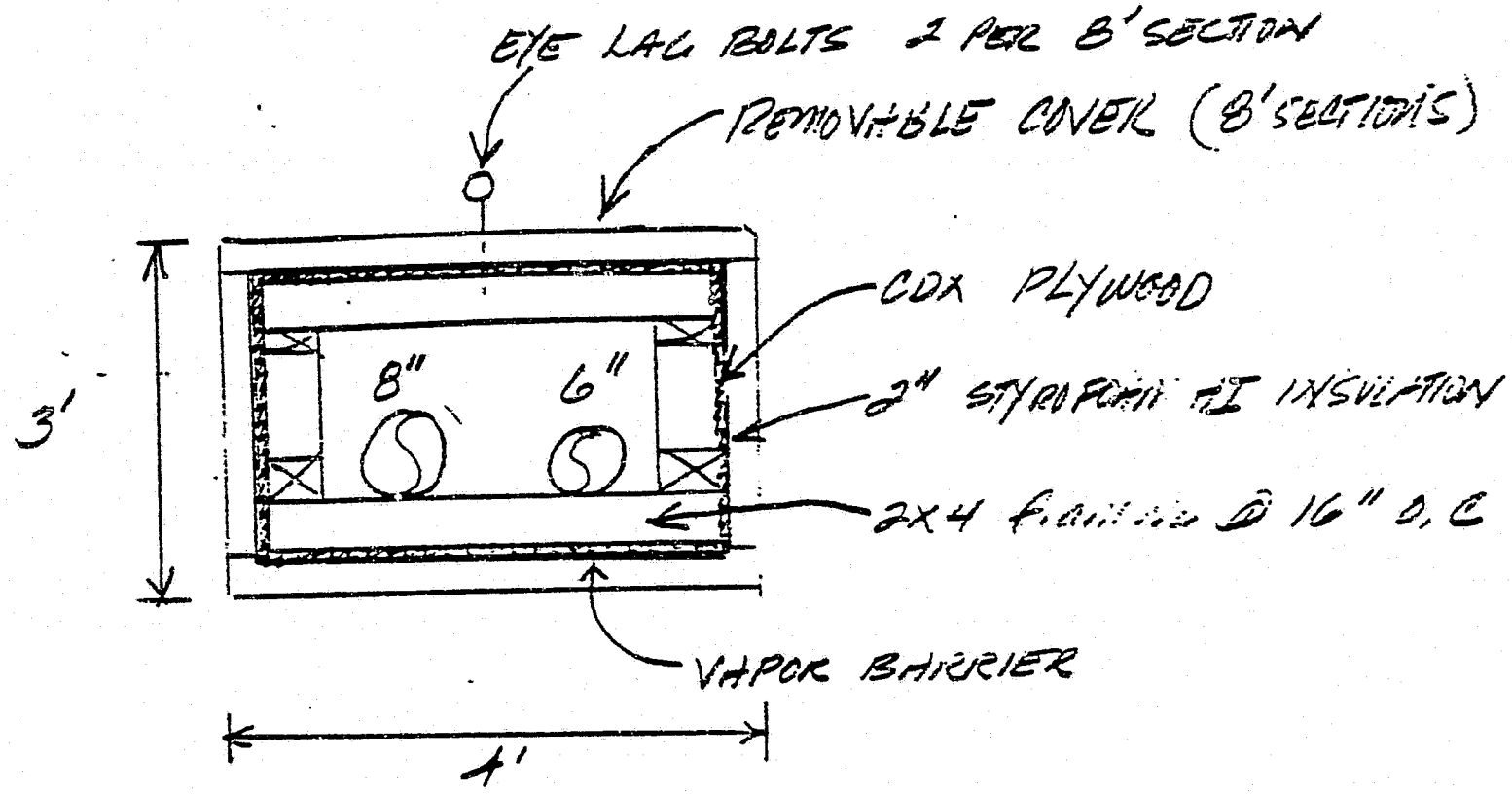
3/81 Supersedes 2/80

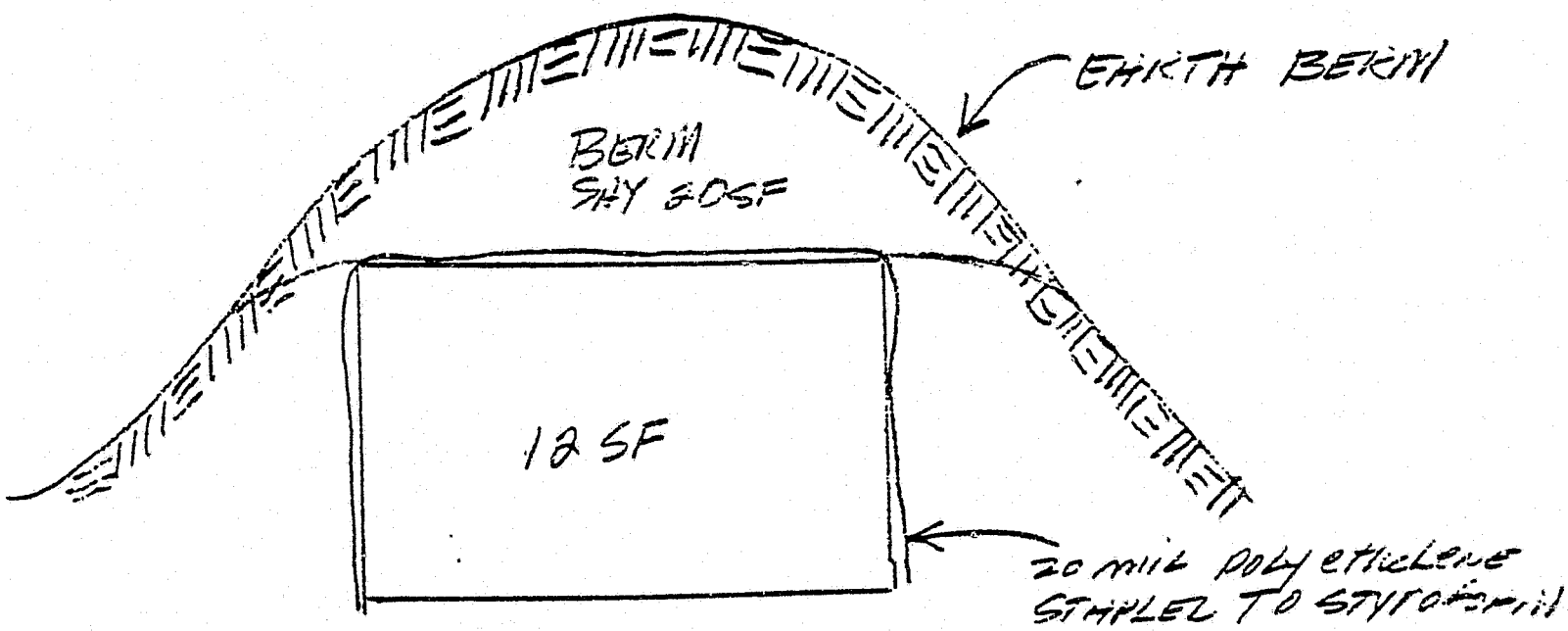
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F127

1/7/82
NMK.

[redacted]





COST TO PRODUCE (CONT.) FIG 2-5

BATCH PLANT

- TOTAL TIME, SAY 4 HRS.
- CAPACITY = 30 CU YDS/HR
- RENTAL = $6,160/MONTH
- OPN. COST = $5.85/HR

RENTAL COST

(6,160)(4)(1.35 for weeks) = $33,264

OPER. COST

TO PRODUCE 5,000 CY/30 CY/HR = 167 HRS

(167)(5.85)(1.35) = $1319

MIX TRUCKS SAY 4 TRUCKS

RENTAL = (4)(1,785)(1.35) = $9639. ← BLUE BOOK COST/MONTH

OPN. COST = (35.67/HR)(1250) = 44,588 ← FROM LINK

COST PER CY - TO FORMS

CEMENT - 6.20/SACK +10 Freight to job	5 SACK	31 50
AGGREGATE - $8.96/CY ÷ 2780 #/CY OR $4.72/TON	1.02 ton	4 81
SAND @ 7.97/ton	.7 tons	5 57
BATCH PLANT $33,264 / 5000 CY = 1.92/CY		1 92
MIX TRUCKS $9639 / 5000 = 1.92/CY		8 92
LABOR - BATCH PLT (35)(20 hrs) $7000 / 5000 CY = 1.40		1 40
LABOR - MIX TRUCKS (35)(125) = $3,750 / 5000 = .75/CY		8 75
		$ 62.27 PER CY

LF COST - PIPING (SUMMARY)

• FOR "IN CAMP" & "IN VILLAGE" SYSTEMS

	TO PLACE IN UTILIDOR			INSULATION - REF: P. 193 6" 1" & 1½" FIBERGLASS.	
	LABOR	MAT	EQUIP	LABOR	MAT EQUIP
16"	29.66	24.15	23.25	16.50	24.00
12"	01.48	16.94	17.66	8.25	19.11
10"	17.06	12.63	13.68	5.50	17.10
8"	14.50	10.08	11.63	4.13	10.07
6"	12.08	7.14	9.69	3.30	8.11
4"	10.74	6.30	8.61	2.75	6.42

• DUCTILE IRON PIPE - CLASS 350 - MECHANICAL JT. 18' LENGTHS.

• PRODUCTIVITY ASSUMPTIONS, CREW SIZE & EQUIPMENT Page —.

E130

PIPE INSTALLATION

CREW:	(3)	LABORERS	90
	(2)	ASS. WORKERS	70
		FOREMAN (1/10)	5
			$165/HR

PRODUCTIVITY:	(ASSUMED)	LABOR COST/LF
16"	10 LF/HR	16.50
12"	20 LF/HR	8.25
10"	30 LF/HR	5.50
8"	40 LF/HR	4.13
6"	50 LF/HR	3.30
4"	60 LF/HR	2.75

CONCRETE: FORMWORK, REINFORCING STEEL, POUR

• FORMWORK

CREW: (3) CARPENTERS $3(35^{00}) = 105$
(2) LABORERS $2(30^{00}) = 60^{00}$
165^{00}

PRODUCTIVITY: AVERAGE VALUE FOR REINFORCED CONCRETE WORK — 350 SFCA/DAY

COST: $\frac{\$165\ (8\text{ HR})}{350\ SFCA} = \$3^{11}/SFCA$

• REINFORCEMENT

CREW: (4) REINFM $(4)(35) = \$140$

PRODUCTIVITY: .5 TON/DAY OR .26 TONS/DAY

COST: $\frac{\$140/HR}{.25\ TON/HR}$ (LABOR) = $\$538/TON$ OR $\$5^{37}/100\#$

MATERIAL:
$\$475/TON$ OR $\$23^{75}/100\#$ (1.4 FOR WASTE)
$= \$33^{25}/100\#$

NOTE: ALL REINFORCEMENT ASSUMED TO BE 100 #/CY OF CONCRETE
THEREFORE STEEL COST = $\$53^{25}$/CY OF CONCRETE

• POUR (SNORKEL, CHUTE TRUCK)

CREW: (4) LABORERS $4(30) = 120$
(1) FOREMAN 50
$\$170/HR$

PRODUCTIVITY:
FOOTINGS: USE 10 CY/HR FACTOR OR 1.25 CY/HR
SLAB: USE 50 CY/DAY = 6.25 CY/HR

PIPING - TO PLACE
(STRAIGHT STRETCHES)

PIPE SIZE	PRODUCTIVITY (1.5x Productivity in Metro.)	CREW SIZE/COST	EQUIP COST/HR
16"	10 LF/HR	9 MAN / $290/HR	232 ±
18"	13.5 LF/HR	9 MAN / $290/HR	232 ±
10"	17 LF/HR	9 MAN / 290/HR	232 ±
8" (EPOXY COATED) FIELD RES. IN UTILIDOR	90 LF/HR (5 JTS/HR)	MAINS 108/SHL. 4 MAN / $195/HR	308 ±
6" (EPOXY COATED) FIELD RES. IN UTILIDOR	106 LF/HR (6 JTS/HR)	MAINS 168/SHL 4 MAN / $195/HR	305 ±
8" (INSIDE CAMPGROUND) IN UTILIDOR	60 LF/HR	9 MAN / $290/HR	232 ±
6" (INSIDE CAMPGROUND) IN UTILIDOR	64 LF/HR	9 MAN / $290/HR	232 ±
4"	27 LF/HR	9 MAN / 290 HR	232 ±

NOTES:

1. PRODUCTIVITY RATES HIGHER THAN RATES FOR "MAINS" BECAUSE LESS CUTTING IS ASSUMED AND NO BENDS OR TEES — ALSO PLACED IN UTILIDOR.
2. TO PLACE IN UTILIDORS - NO EXCAVATION.
3. LABOR RATES ASSUMED: OPERATING ENGINEERS, PIPEFITTERS, LABORERS = $35.00/HR = $28/HR = $19.15

PLACING WOOD UTILIDORS

• NO EXCAVATION

• CREW:

	LOADER OPERATOR	1(35) 35
(2)	FORKLIFT OPERATORS	2(35) 60
(2)	TRUCK DRIVERS	2(35) 60
(4)	CARPENTERS	4(35) 140
	OILER	1(35) 35
	FOREMAN	1(50) 50
(3)	LABORERS	3(30) 120
14 HR		$500/HR

• PRODUCTIVITY:

WORK includes: CLEANING ANY DEBRIS, moving utilidors from camp construction storage yard to placement using flat bed trucks(2) with fork lifts at excl location, placement and joining of utilidor sections, and securing of cables and inspection membranes of utilidor.

SAY 6 SECTIONS/HOUR OR 48 LF/HR

• LABOR COST → $\frac{\$500/HR}{48 LF/HR} = \$10.42/LF$

• MAN HOURS → $\frac{10{,}000 LF}{48 LF/HR} = 208 \times \underset{\text{FOREMAN}}{14 HR} = 2912$ MAN HOURS (Project time)

• EQUIPMENT

ITEM	OWNERS COST	OPERATING COST	TOTAL
(2) FLAT BED TRUCKS	(20.20) 41.60	(13.97/ea) 28.00	
(2) CONSTRUCTION Fork Lifts	(28.75 ea) 57.50	(12.69) 25.30	
1 LOADER CRAWLER CAT 931	36.22	7.49	
	135.32	60.87	

TOTAL = 196.19

TOTAL COST = $196.19 (8.75 hrs) = $1716.66/DAY

WATER PIPE INSTALLATION IN WOOD UTILIDORS

- FROM WATER SUPPLY RES. TO WATER TR. PLANT.
- FROM WTP TO RESERVOIRS.

- CREW:

LIFT OPERATOR-BACKHOE	35.00
(2) LOADER OPERATORS	70.00
OILER	35.00
(5) PIPE FITTERS	175.00
(2) LABORERS	60.00
FOREMAN	50.00
(2) TRUCK DRIVERS	70.00
14 HRS.	$495/HR

- PRODUCTIVITY:

6" PIPE SAY: 6 JTS/HR, @ 18' LENGTHS = 108 LF/HR
COST/LF = 195/108 = $4.58/LF

8" PIPE SAY: 5 JTS/HR, @ 18' LENGTHS = 90 LF/HR
COST/LF = 495/90 = $5.50/LF

12" PIPE SAY 3 JTS/HR @ 12' LENGTHS 36 LF/HR
= $13.75/LF

- MAN-HOURS:

6" PIPE 10,000 LF / 108 LF/HR = 92.6 CREW HRS
MAN HOURS = (92.6)(14) = 1297 MAN HOURS

8" PIPE 10,000 LF / 90 LF/HR = 111
MAN HOURS = (111)(14) = 1554 MAN HOURS

- EQUIPMENT:

1.35 ESCALATION FACTOR for Alaska

ITEM	OWNERS COST	OPER. COST	TOTAL
(2) FLAT BED TRUCKS	$15.40 x 1.35 = (20.79) 2 = 41.60	$10.35 x 1.35 = (13.97) 2 = 25.00	
(1) WHEEL LOADER - CAT. 930	$27.00 (1.35) = 36.45/HR	$5.00 x 1.35 = 7.49/HR	
(1) BACKHOE (FOR 4 FT DIA PIPE) - CAT 225	$15.00/HR x 1.35 = 20.25/HR	$13.00 x 1.35 = $17.55/HR	
(1) CRANE, 12 TON, FIXED (1.4) (TOTAL EQUIP. COST = 61.29)	$21.00 x 1.35 = $28.35	$9.00 x 1.35 = $12.60/HR	

FURNISH & INSTALL 8" DI INTAKE PIPING

- CREW (EXCAVATION)

BACK HOE OPERATOR	$35.00
OILER	$35.00
2 LABORERS	2(30) $60.00
FOREMAN	$35.00
	$165/HR

- PRODUCTIVITY

150 CY/8HR DAY OR 18.7 CY/HR

- QUANTITY OF EXCAVATION = 4'x4'x 30LF = 480 CF
  OR 17.8 CY
  SAY 20 CY

- HRS = 1+ SAY 2 HRS

- EQUIPMENT - BLUEBOOK

CAT 225 BACKHOE

OWNER COST	OPER. COST.
100.00/HR	13.00 x 1.25 = $18.5/HR
x 1.35 = $135/HR	

TOTAL COST = $153.5/HR

- CREW (PIPE INSTALLATION)

BACKHOE OPERATOR	35.00
OILER	35.00
(1) LABORER	30.00
3 PIPE FITTERS	3(35.00) = 105.00
FOREMAN	35.00

F136

DIVE LENGTH = 18'
PRODUCTIVITY = (4)(18) = 72'/HR

NOTE: DUE TO THE COMPLEXITY OF THE INTAKE, # OF DIVERS AND TIE DOWN NEEDED, ESTIMATE A TASK TIME OF 5 HRS.

- MAN HOURS = (5)(7) = 35 HOURS

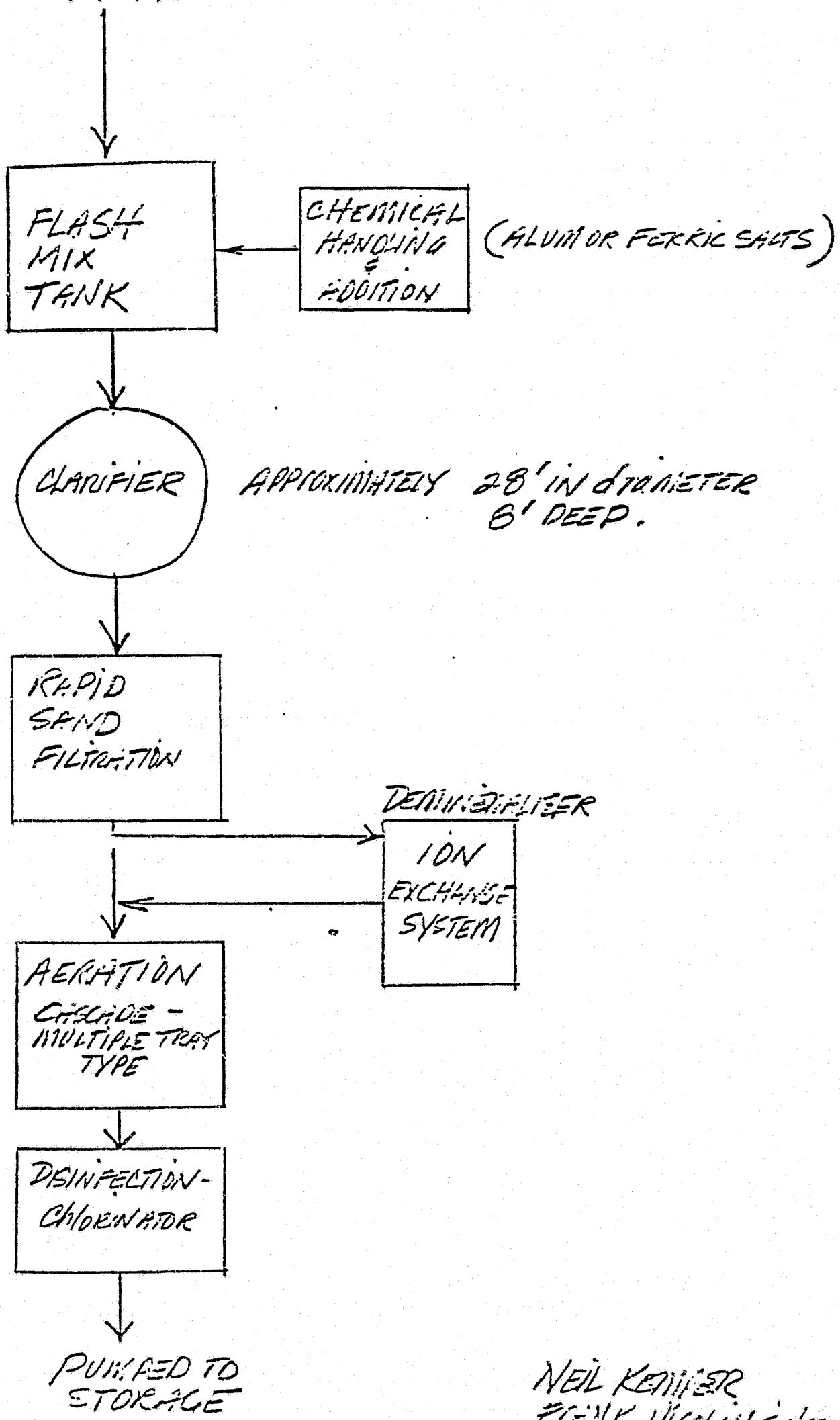
- EQUIPMENT:

	OWNERSHIP	OPERATING
CAT 225 BACKHOE	$135/HR	$185.00/HR

WATER TREATMENT - SCHEMATIC

F137

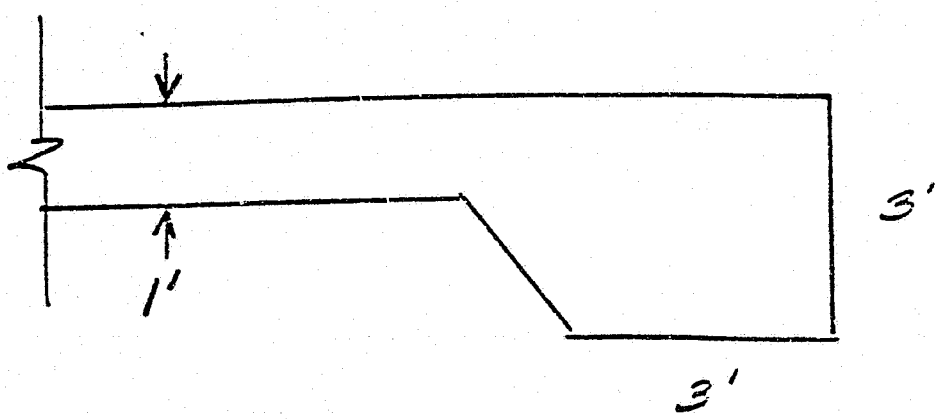
1.7 MGD OR 1200 GPM



NEIL KENNER
FINK INGALLS & KESSLER
276-7454

SLAB FOR WATER TREATMENT PLANT

F130



QUANTITYS:

CONCRETE:

60'x100'x1' = 6000 CF
2'x3.5'x360' = 2240
8240/27 = 305 CY

EXCAVATION:

85 CY
BACKHOE PRODUCTIVITY = 100 CY/EIGHT HR DAY

CREW: BACKHOE OPERATOR 1
2 LABORERS 2
FOREMAN Yetimis 1/2
4
EQUIP: CAT 225

FORMWORK

SFCA: 3'x360' = 960

REINFORCING ST. SAY 50#/CY

USE 1400/CY for Labor
1200/CY for Material

POUR: CREW - LARGER POURS
1 FOREMAN 1/2
3 TRUCK OPERATORS 3(25) = 105
8 LABORERS 6(20) = 240
345/HR

PRODUCTIVITY: SAY
- EA. TRUCK = 8 CY SAY 40 CY/DAY
- USE FOUR TRUCKS - 160 CY/DAY

PROJECT LENGTH = 2 DAYS TOTAL MH = 240

F139

PRE-ENGINEERED METAL BUILDING FOR WATER TREATMENT PLANT

TO FRAME, SIDE, ROOF

CREW

(1) FOREMAN		50
(4) STRUCTURAL WORKERS		4(50)=140
(1) EQUIP. OPER.		35
(1) WELDER		35
7 HRS		$260

PRODUCTIVITY 750 SF/10 HR day

PROJECT DURATION = 8 DAYS OR 80 HRS

MINUTES

7 X 80 = 560

MATERIAL

HANGER Project at BETHEL Airport: Material = $4.25/SF
MEANS, Avg = $7.50/SF, Min = $3.00/SF
∴ MATERIAL cost used = 6.00

EQUIPMENT

90 TON CRANE – TRUCK MOUNTED – AMERICAN (8x4) 40' BOOM
Page 13-127 BLUE BOOK. assumed time needed = 60 hrs.

Owning Cost
1375/HR
Alaska = 1.35(1375) = $1855/HR

Op. Cost
3950
Alaska 1.35(3950) = $5332.5/HR

Weekly rate = $4970 x 1.25 = 6710

Op. cost = $6390 / 60 HR

TOTAL = 9099.50 or $9100

PRELIMINARY DESIGN OF PUMPS FROM WATER TREATMENT TO RESERVOIRS

TO Village

- 6000 LF 6" PIPE
- 50' ELEVATION HEAD
- MAX FLOW = 350 GPM

TDH = ELEVATION = 50
FRICTION (1.01)(50) = 50
MISC = 25
125'

TO CAMP

for 6" • 10,000 LF 6"
• 0 ELEVATION HEAD
• MAX FLOW = 350 GPM

TDH = EL. = 0
FRICTION (1.01)(100) = 100
MISC = 25
125'

for 8" • 10,000 LF = 8"
• 0 ELEV. HEAD
• MAX. FLOW = 500 GPM

TDH = EL = 0
FRICTION (.464)(100) = 46
MISC = 25
71
SAY 75'

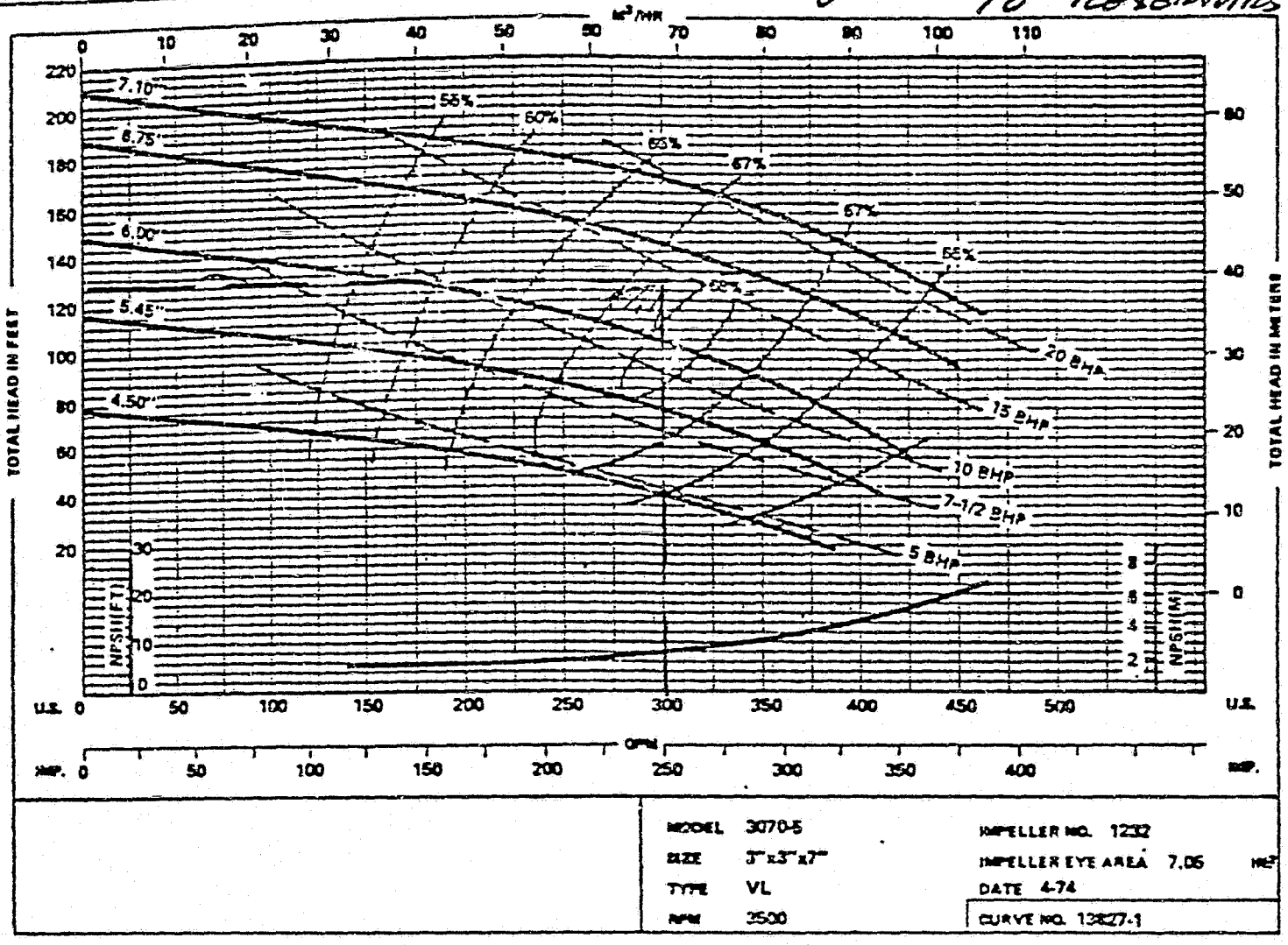
PACO PUMPS

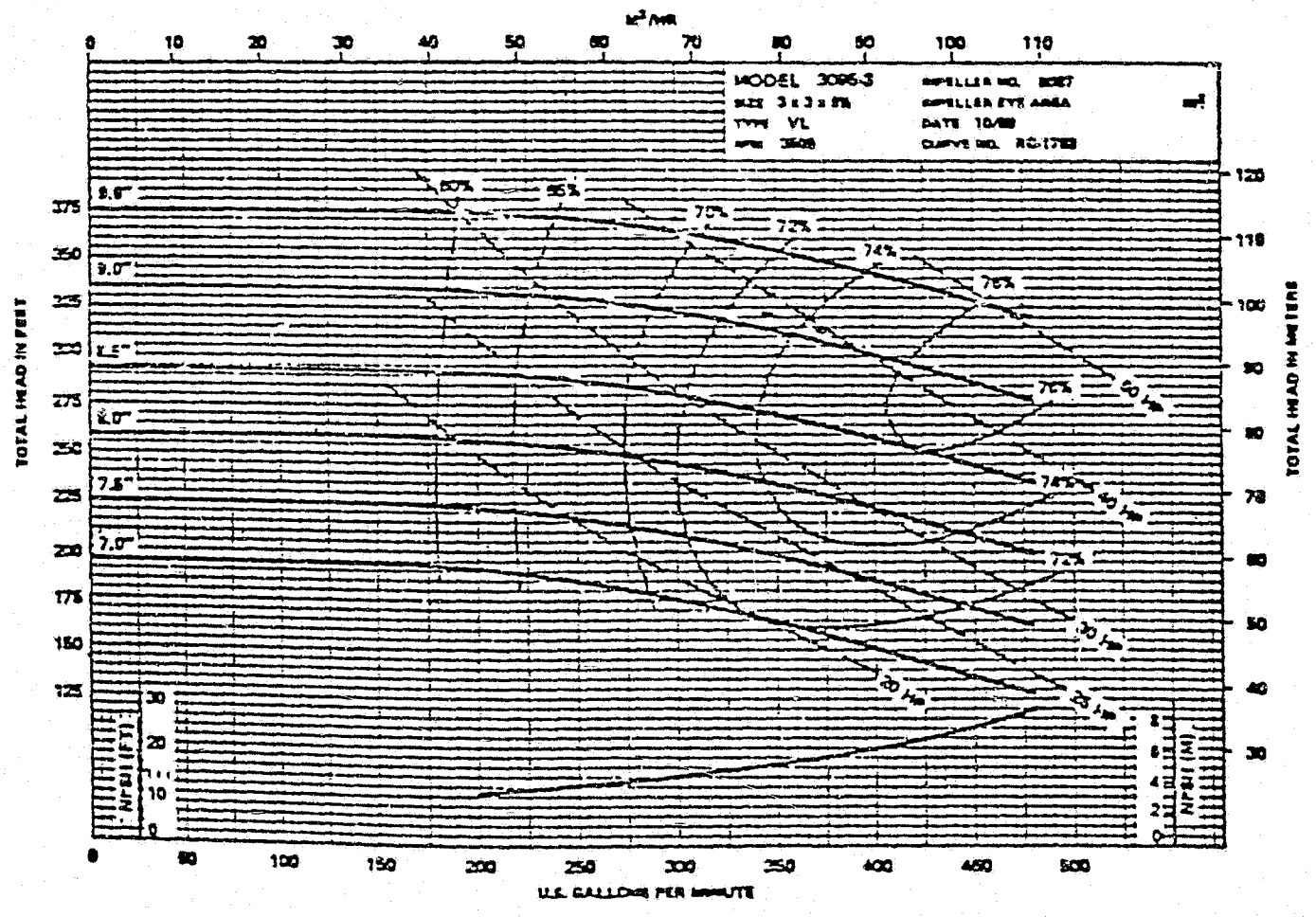
IN-LINE CENTRIFUGAL PUMPS
TYPE VL F(4)

A3b.1

3500 RPM

PUMP FOR 6" LINES FROM WTP TO RESERVOIRS, VILLAGE & CAMP





PACO PUMPS

Paco Pumps, a division of Baltimore Aircoil Co., Inc.
PO Box 12924, 645 92nd Avenue
Oakland, California 94604

Paco Pumps of Canada
a division of Baltimore Aircoil InterAmerican Corp.
35 Sinclair Ave., Georgetown, Ontario, Canada

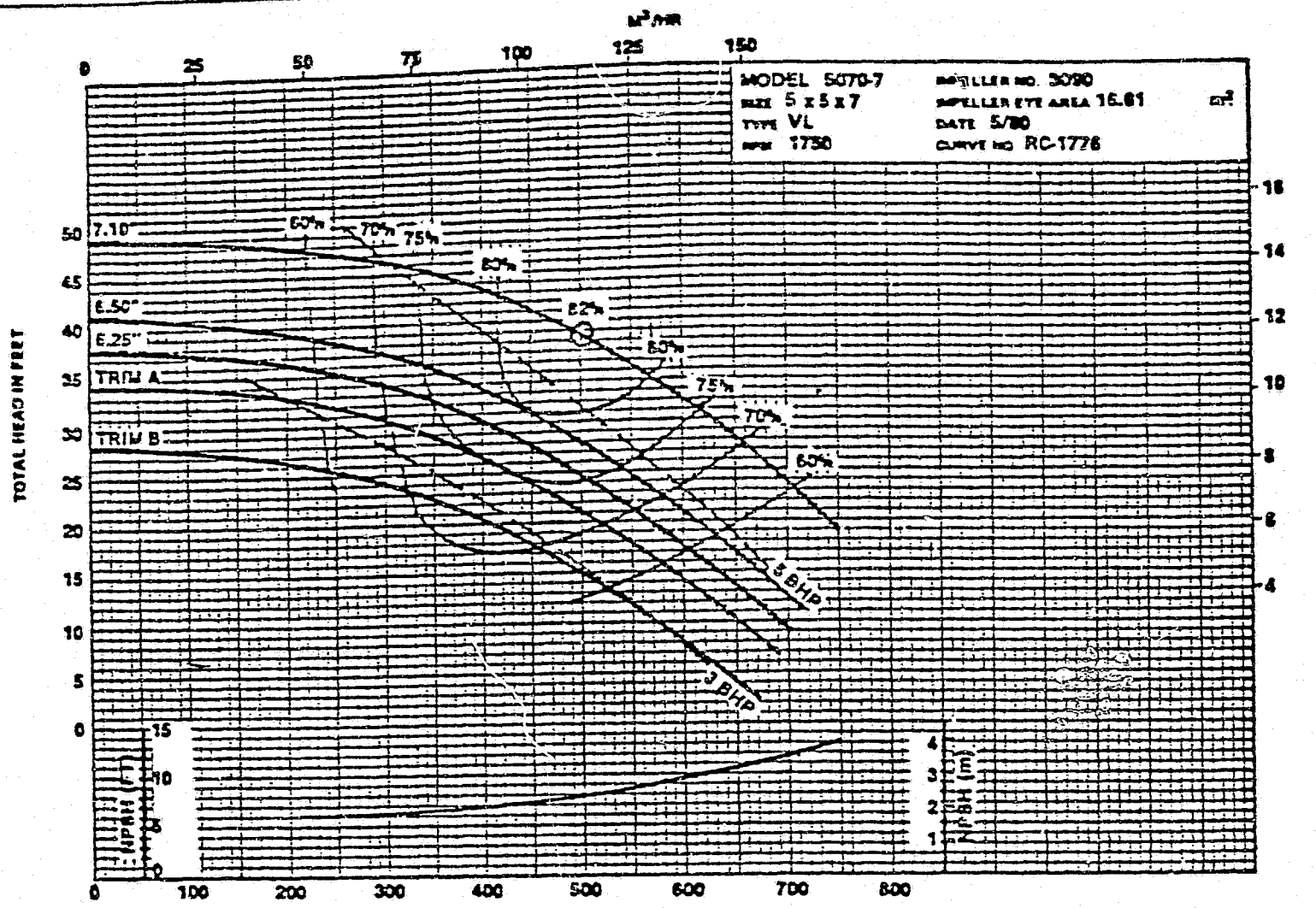
3/81 Supersedes 1/78

Paco Locations: Oakland, CA • Dallas, TX • Los Angeles, CA • Portland, OR • Milford, DE • Georgetown, Canada

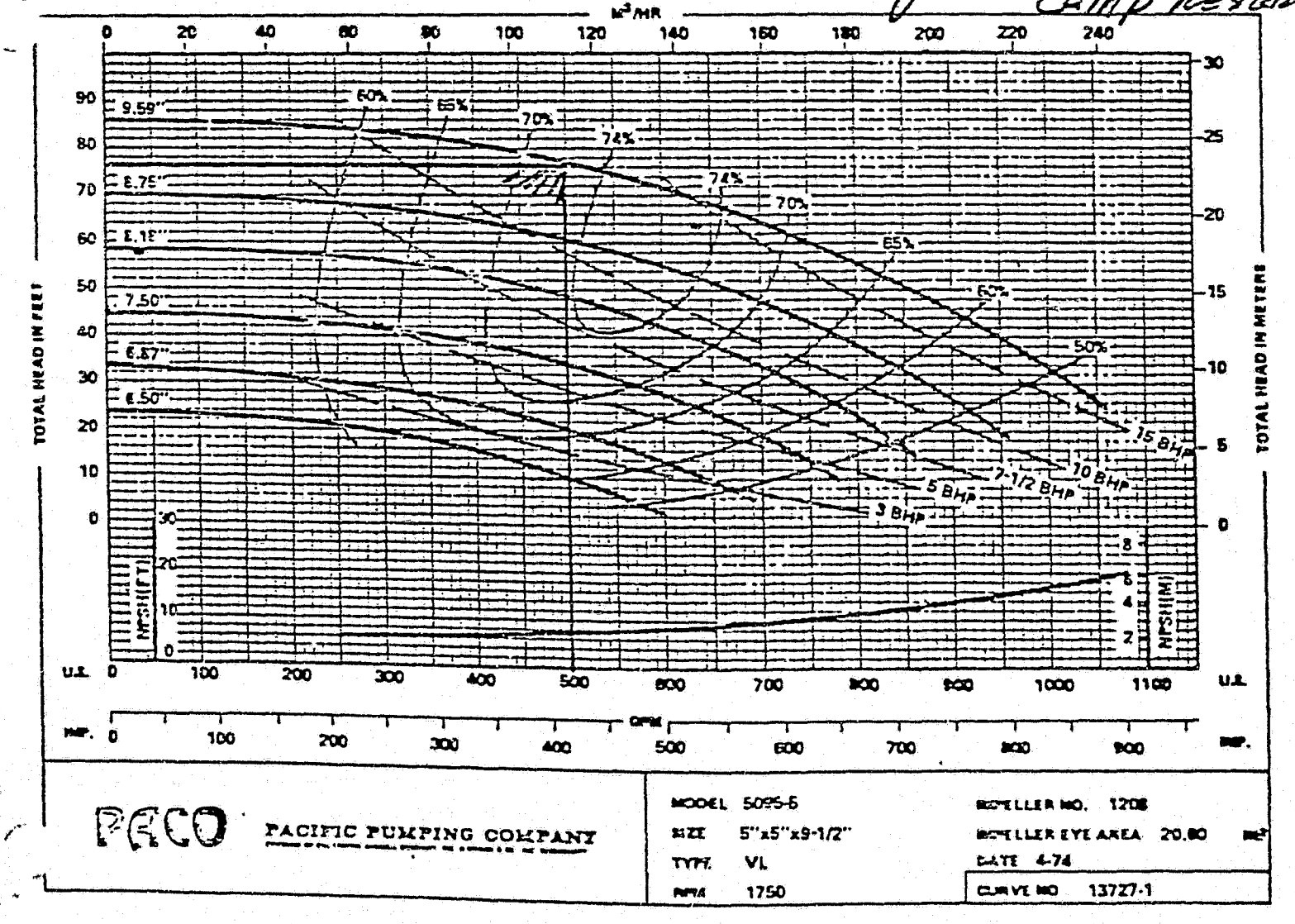
Printed in U.S.A.

144

1750 RPM



PUMP from WATER TR PLANT TO CAMP RESERVOIR 8" LINE

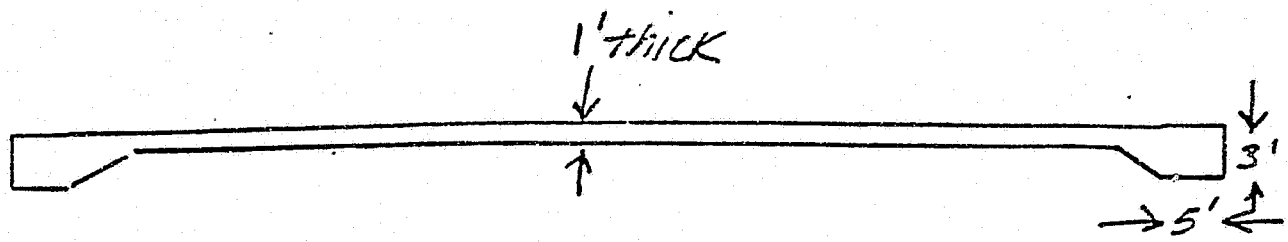


1/11/82

Fi43

SEWAGE

SLAB FOR TREATMENT PLANT



AREA = 100 X 200 = 20,000 SF
CF = 20,000 CF
PLUS 2'X7'X400' = 5600 CF

TOTAL = 25,600 CF ≐ 950 CY

NOTE: To maintain proper hydraulic gradient through treatment plant the bypass must provide for a higher surface level than the other process.

EXCAVATION

350 CY

CREW: OPERATOR 35
(3 LABORERS FOREMAN 1/2) 90
5
125

PRODUCTIVITY = 150 CY/DAY OR 18¾ CY/HR
SAY 20 HRS

	OWNER.	CONTR.
EQUIP RATES: CASE 780 CK	$180/day	45/HR
ACKLA —	343/day	560 = 112½ days
		= $355 OR 10½/CY

POUR

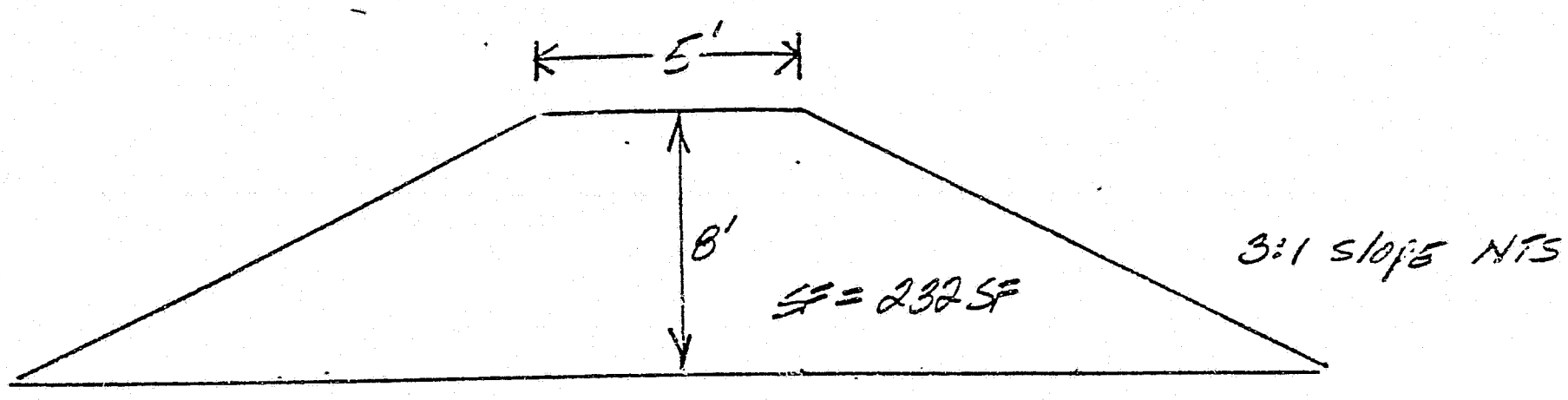
CREW. FOREMAN 50
LABORERS 240
290

4 TRUCKS
PRODUCTIVITY = 160 CY/day OR 16 CY/HR OR $18/CY

F-44

CALCULATIONS FOR LAGOON QUANTITIES

BERM CROSS SECTION:



LARGE LAGOON, LF of BERM = 1180 LF

CF = (232)(1180) = 273,760 CF
= 10,140 CY

SMALL LAGOONS, LF of BERM = 670 LF

CF = (232)(670) = 201,840 = 7,476 CY

TOTAL BERM EXCAVATION = 10,140
4(743) = 29,900
40040 CY

LINER AREA: ASSUME LINER ANCHORED at Top.

LARGE LAGOON ~ SAY 400 X 220 = 88000
SMALL LAGOON ~ SAY 300 X 170 = 51,000 X 4 = 220,000
308,000 SF

INSULATED COVER: ASSUME LARGE LAGOON & 2 SMALL LAGOONS FOR WINTER USE.

LARGE LAGOON: 79,040 SF
2 SMALL: 2(43,40) = 86,800
165,800 SAY 167,840 SF

CLARIFIER DESIGN

ASSUMPTIONS:

1. CIRCULAR METAL CLARIFIER
2. MAX. OVERFLOW RATE OF 300 GPD/FT²
3. HT. OF CLARIFIER TO BE 10' for ESTIMATING PURPOSES

DESIGN FLOW = 1.7 MGD

$$\therefore \text{SF SURFACE AREA} = \frac{1.7\ \text{MGD}}{300\ \text{GPD/FT}^2}$$

$$= 5667\ \text{FT}^2$$

$$\pi R^2 = 5667\ \text{FT}^2$$

$$R^2 = \frac{5667\ \text{FT}^2}{3.14}$$

$$R = \sqrt{1804}$$

$$R = 42'$$

$\therefore$ DIAMETER OF CLARIFIER = 84'

THICKENER SIZE

ASSUMPTIONS:

1. SLUDGE PRODUCED = 5000 LBS / 1.0 MGD
   = 5000 (1.7) = 8500 GPD TO THICKENER
   SAY 10,000 GPD

FILTER PRESS SIZE & WET AIR OXIDATION UNIT SIZE

LBS. SLUDGE PRODUCED/DAY = BOD IN − BOD OUT
= 440 MG/L − 30 MG/L = 410 MG/L

$$\text{LBS/DAY} = (.410\ \text{LBS/LB})(1700\ \text{1000 GAL/DAY})(8.34\ \text{LBS/GAL/1000 GAL})$$
$$= 5812\ \text{LBS/DAY}$$

SINCE SLUDGE IS RETURNED TO LAGOONS for STORAGE, SIZE PRESS & OXIDATION UNIT AT SAY 6000 LBS/DAY CAPACITY

DESIGN CALCS - RBC'S

DESIGN BOD_5 = 150 mg/L (Lagoon effluent)
DESIGN FLOW = 1.7 MGD Peak flow
EFFLUENT BOD = 30

ASSUMPTIONS:

1. 37½% BOD_5 to RBC is soluble BOD

- BOD LOADING RATE TO RBC (MAX)

= (1.7)(150)(8.34)(.375) = 800 lb/day

- APPLICATION RATE TO RBC's FROM TABLE 3 for EFFLUENT of $SBOD_5$ = 30

= 2¾ lbs SDO/1000 SF/day

- TEMPERATURE CORRECTION FACTOR

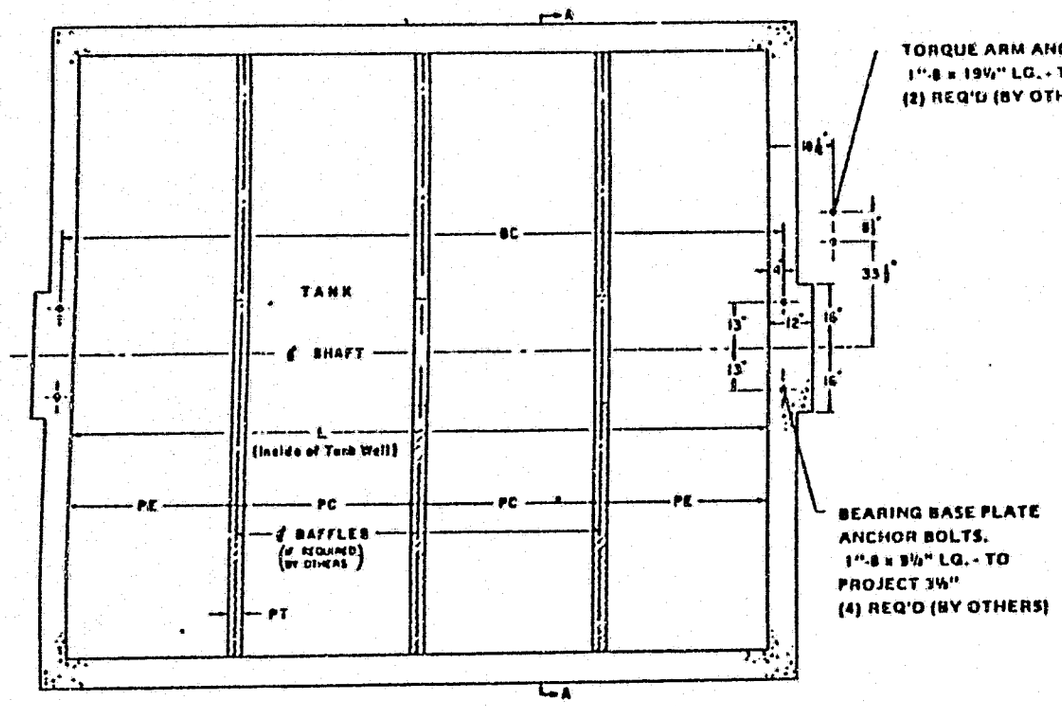
°F = 40° = 1.5

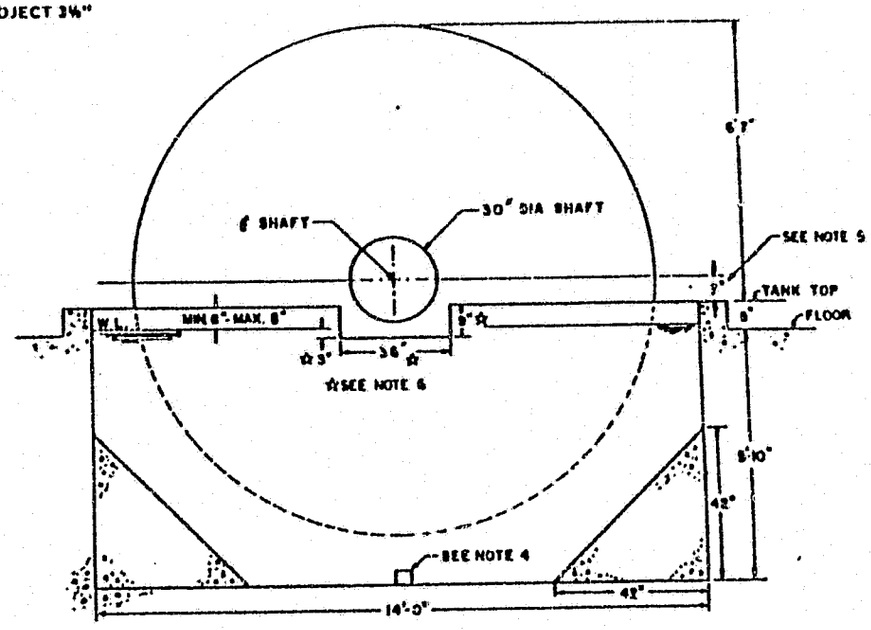
- AREA REQUIRED

$$= \frac{800 \text{ lb/day}}{2\frac{3}{4} \text{ lbs}/1000 \text{ SF}} \times 1.5 = 436.4 \text{ KSF}$$

SIZE OF EACH UNIT — ASSUME 7 UNITS NEEDED, 2 as back-up.

$$\frac{436,400}{7} = 62,343 \text{ SF PER RBC}$$





SECTION A-A

MODEL	MEDIA AREA (SQ FT.)	WET WEIGHT (LBS)(3)	DIMENSIONS					
			L	BC		PC	PE	PT (MAX.)
D-45	31,000	45,750	15'-4"	15'-10"		3'-9"	3'-11"	4"
E-53	60,000	53,500	17'-4"	18'-0"		4'-3"	4'-5"	4"
E-65	70,000	62,000	19'-1"	20'-3"		4'-9⅛"	4'-11⅛"	4"
E-69	79,000	69,000	21'-4"	22'-0"		5'-2⅛"	5'-5⅛"	4"
F-77	88,000	77,500	23'-6"	24'-0"		5'-9"	6'-0"	4"
F-89	100,000	87,500	26'-4"	27'-0"		6'-5⅛"	6'-8⅛"	4"

NOTES

1. ALTERNATE TANK DESIGNS AND CONFIGURATIONS ARE POSSIBLE.
2. REFER TO DWG. A330412746 FOR MULTIPLE UNIT INSTALLATION.
3. MAXIMUM WEIGHT WITH A FULL BIOLOGICAL GROWTH.
4. MINIMUM 2" x 2" OPENING FOR HYDRAULIC EQUALIZATION WHEN FILLING TANK.
5. DIMENSION SHOWN DOES NOT ALLOW FOR GROUTING BENEATH BEARING BASE PLATE. (OPTIONAL)
6. BAFFLE CUTOUT SHALL BE SIZED (A) TO PERMIT 3" (MIN.) CLEARANCE BETWEEN SHAFT AND BAFFLE, (B) TO PREVENT ESCESSIVE HEAD LOSS FROM STAGE TO STAGE.

RBC TANK DESIGN INFORMATION - MODELS D-45 THRU F-89
(DWG. A330410744)

Clow Envirodisc

PRELIMINARY DESIGN CALCS. FOR SEWAGE LIFT STATION:

E148

1ST APPROXIMATION

GIVEN: 1. 6" FORCE MAIN 13,800 LF
2. ELEVATION HEAD — 100'
3. GPM = 600 GPM

TDH:

ELEVATION HEAD = 100'

FRICTION HEAD:

4.7'/100LF for 15yr old CAST IRON PIPE. ∴ USE 3.1'/100LF for NEW PIPE (.66 of value)(3.1'/100LF)(13,800LF)

= 427'

427'
527' TOO LARGE

2ND APPROXIMATION

1. USE 6" FORCE MAIN
2. DROP GPM TO 400 GPM

TDH: ELEVATION HEAD = 100'
FRICTION (.54/100)(.54 for NEW PIPE) =

(.29/100)(13,800) = 40

TDH = 140'

VELOCITY of FLUID = 2.60 ft/sec.

3RD APPROX.

1. SUCTION LIFT = 50'
2. PUMP 600 GPM THRU 6" LINE

EL. HEAD 50
FRICTION
(1.14)(.54)(139) = 85

TDH = 135
MISC = 50
SAY 185' HEAD

Shaded Areas Not By Station Mfr.

Mechanical Joint Wall Sleeve

Water Seal Unit

High Voltage Motor Control

Suction Line ___ Inch

NEOPRENE FLOOR MAT

Discharge Line ___ Inch

Gate Valve ___ Inch

Gate Valve ___ Inch

Check Valve ___ Inch

Elevator Control Panel

Heater

SECTION (B)

Elevator

Alarm Light (OPTIONAL)

Weatherhead

Meter

Disconnect Switch

Screened Air Intake

Service Conduit ___ Inch

Power Supply

___ VOLTS ___ PHASE

___ HZ ___ WIRE

Fiberglass Cover

Bubbler Line Looped Above Grade

Max. Frost Depth Plus 6"

Vent

2'-0" Min.

Pump Lift Eye

Light

Blower

Logic Center

Plug

Aluminum Ladder

Dehumidifier

2-17lb. Magnesium Packs

SPACED 120° APART

(Locate Per Station NFPA Recommendations)

Sump Pump

Pump Rating

___ GPM @ ___ Ft. TDH

___ RPM

SECTION (A)

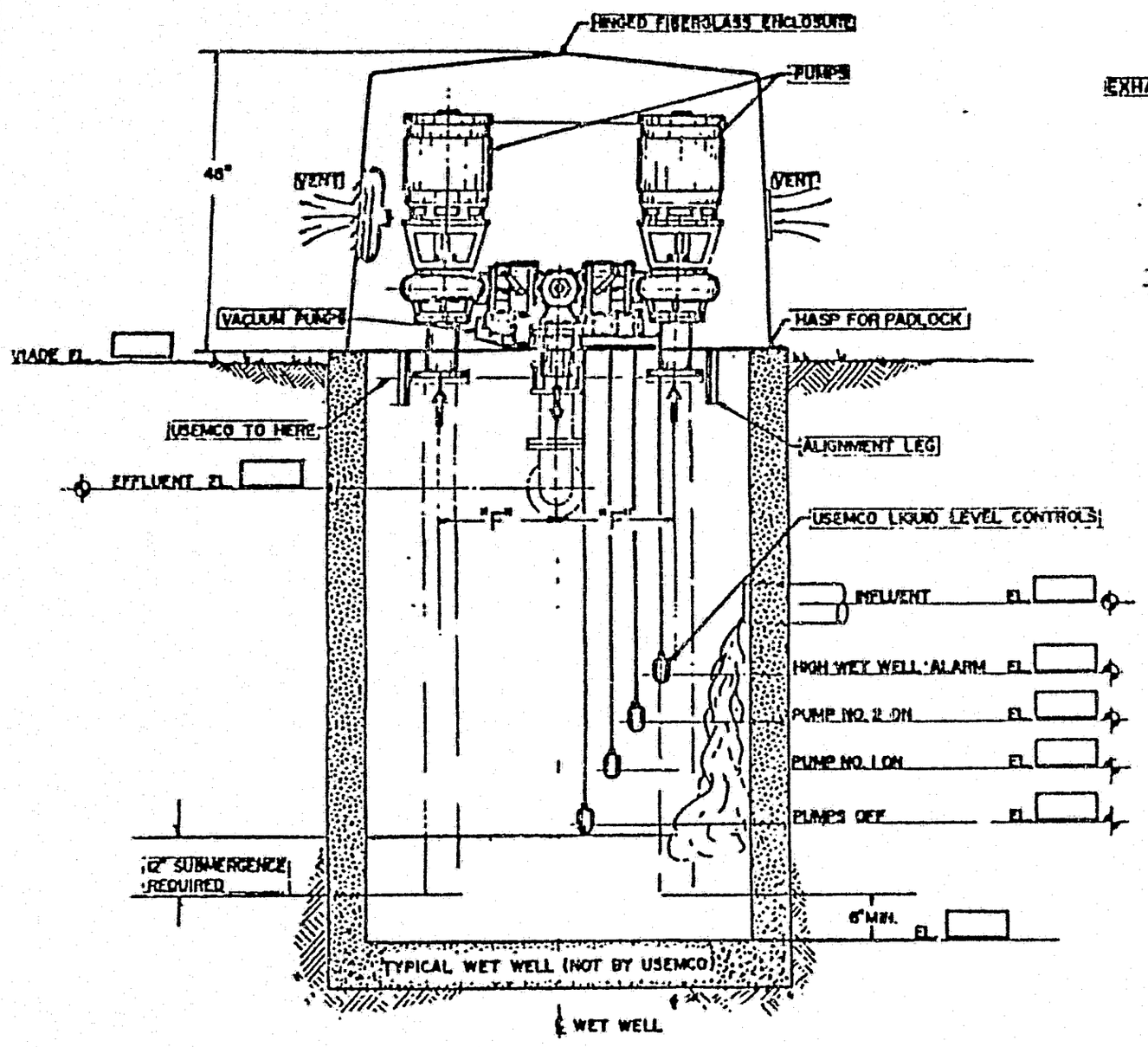
USEMCO

Standard Sump Unit

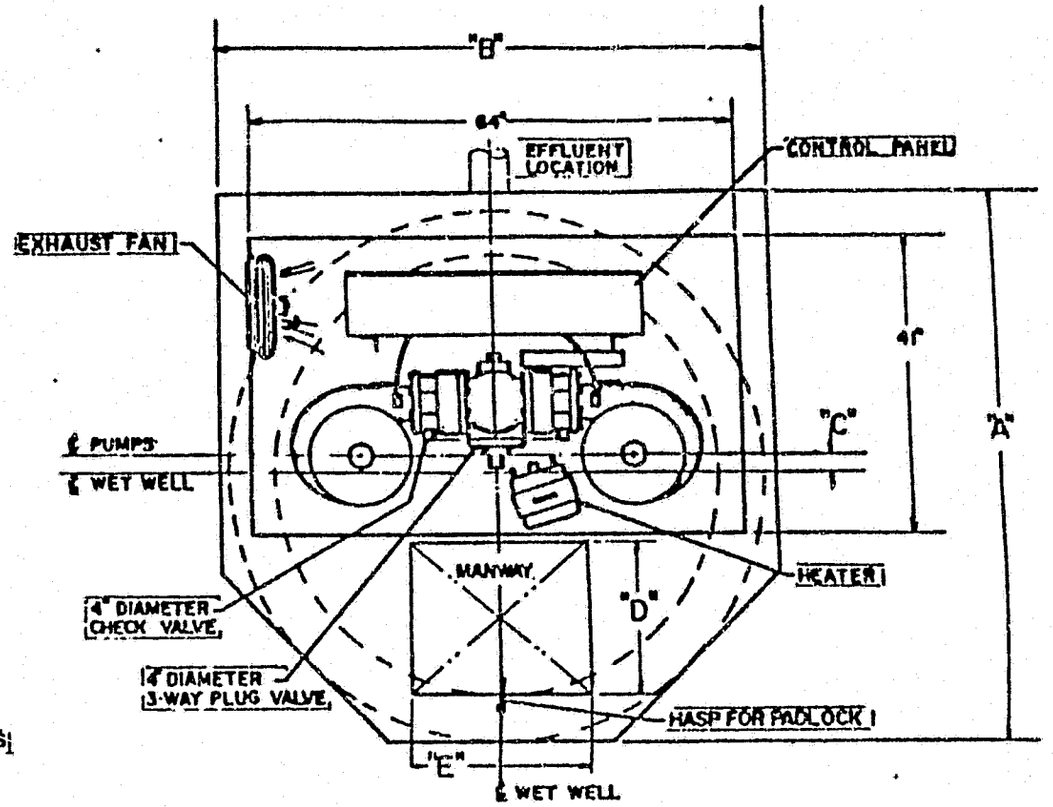
Series Close Coupled

B-45

152



CROSS SECTION



PLAN VIEW

WET WELL DIAMETER	DIM. "A"	DIM. "B"	DIM. "C"	DIM. "D"	DIM. "E"
4'-0"	72"	72"	3"	14"	24"
5'-0"	72"	72"	1"	16"	24"
6'-0"	84"	84"	1"	16"	24"

PUMP MODEL	DIM. "F"
470	15 1/2"
493	17 1/2"
412	19 1/2"

SPECIAL NOTES:
- MAXIMUM CAPACITY - 300 G.P.M.
- MAXIMUM PUMP MOTOR H.P. - 20
- PROVIDE 60° SLOPE IN WET WELL - AS REQUIRED

USEMCO

ABOVE GROUND VACUUM PRIME LIFT STATION

153

PLACE SEWAGE PUMP SYSTEM

CREW:

CRANE OPERATOR	35
RIGGER	35
5 WORKERS	175
FOREMAN	50
	$295/HR

EQUIP. $915/day (BLDR) ($95/HR (CRANE)) ($55/HR (BLDR)) ($39.62/HR (CRANE))

SET WET WELL: 5HR

LABOR = (5)(295) = 1475
EQUIP = 618 + 200 = $818

SET PUMP STA: SAME AS WET WELL

CONNECT: PUMP STATION TO WET WELL
PUMP STATION WET WELL TO SEWER
FOREMAN TO PUMP STATION
HOOK UP POWER, CHECK OUT ETC.

SAY 20 MANHOURS AT $35/HR

TOTAL LABOR
1475
700
$2175.00

SET STA:
HARD

INSULATION & WATERPROOFING

INSULATION WITH POLYURETHANE FOAM AND WATERPROOF (INSIDE OF FOAM WITH 20 MILS OF WATERPROOFING. HEATTRACE WET WELL PIPING. PACKAGE PUMP STATION COMES WITH HEATER.

ESTIMATED MANHOURS = 35
ESTIMATED MATERIALS = 850

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

ESTIMATE WORK SHEET

Project | Estimator | Item No.

Type of Work | Date | Sheet

DESCRIPTION	QUANTITY	UNIT	LABOR EXPENSE HOURS U.P.	HOURS TOTAL	WAGES U.P.	WAGES TOTAL	ADD-ONS U.P.	ADD-ONS TOTAL	SUBTOTAL U.P.	SUBTOTAL TOTAL	PER. MAT. U.P.	PER. MAT. TOTAL	SUB CONTRACTS U.P.	SUB CONTRACTS TOTAL	TOTAL U.P.	TOTAL TOTAL
PERIMETER WALKS 6' WIDE (10 LF)																
FOUNDATION																
6x6 @ 10'	80	BF									.10	18.00				
PLYWOOD 3/4"	40	SF									.68	1.500				
FRAMING																
2x12	520	BF									.62	135.20				
½" PLYWOOD	160	SF									.41	211.60				
INSULATION R-30	660	SF									.52	135.20				
FRAMING 2x6	120	BF									.15	54				
METAL ROOFING	160	SF									2.00	320				
FLOOR GRATING	40	SF									1.00	810				
11 HR TOTAL SHIFT				1560								1189				
LIGHTS/HEAT	15%			234								178				
TOTALS				1794								1367				
PER LF				$180/LF								$137/LF				
PER SF				$30/SF								$22.83/SF				

Totals

Checked By

Analysis CREW:

3 CARPENTERS 3(30) = 90

2 LABORERS 2(20) = 40

130/HR

SAY 12 HRS/10' SECTION.

FOR 10' WIDE LABOR (160 X 12/6) = 300 USE 280

LIGHT (137 X 12)/6 = 274/6 = 216

16' WIDE (120)(16)/6 = 160 LF (140)

(137 X 16)/6 = 365 (325)

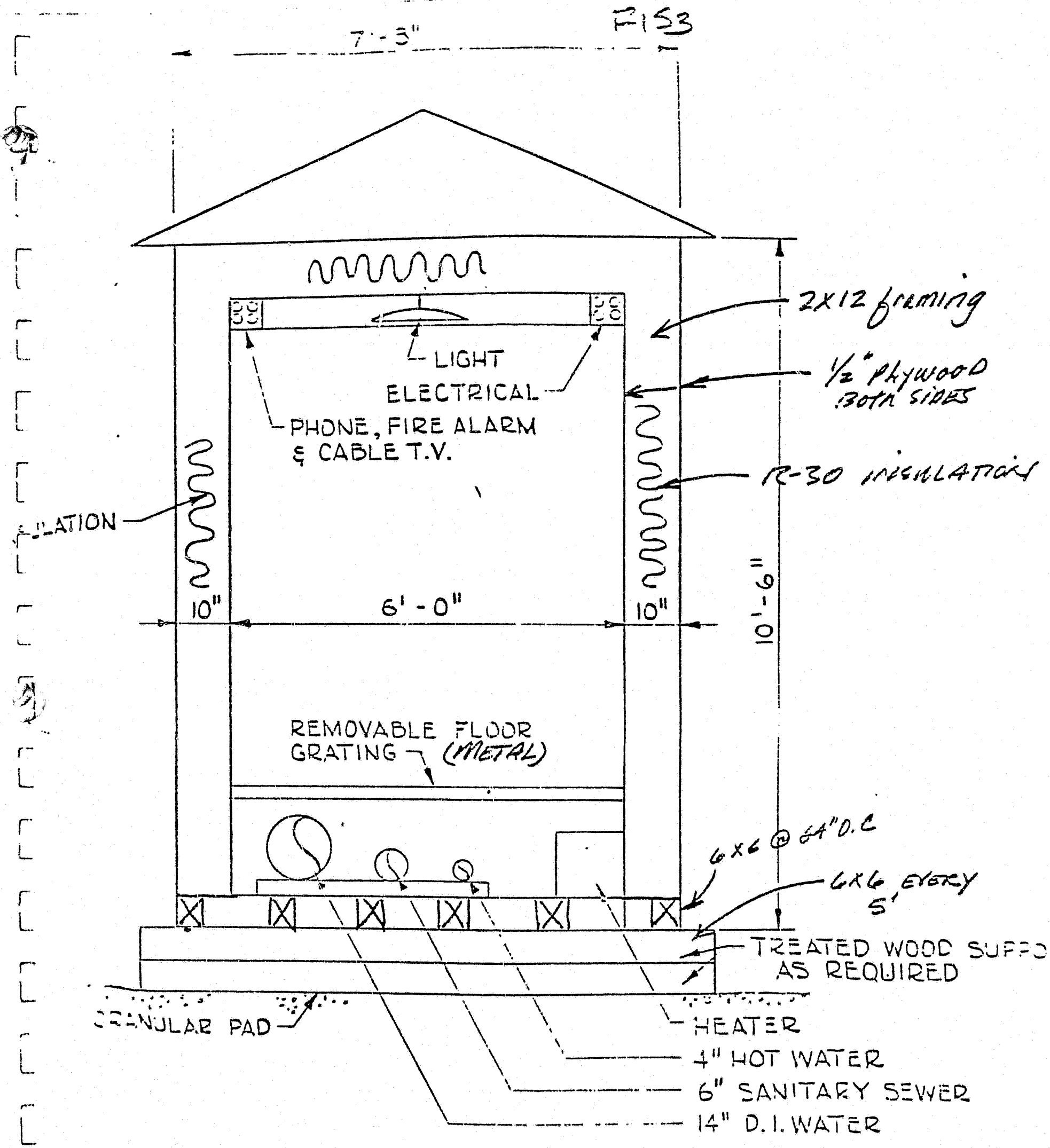
T-52

Item No.

Sheet No.

Form FMAA 1004

F153



TYPICAL PERMAWALK WITH UTILIDOR (AT DORMS)

SCALE: 1" = 20'

F154

EQUIPMENT LIST

ALASKA - 1.35 ANCHORAGE

EQUIPMENT	EST. #	TIME REQUIRED	OWNERS COST	OPER. COST
1. BACKHOE - CAT 225 R 10-11 BLUE BOOK HYDRAULIC, CRAWLER			$135/HR	$18.50/HR
2. FORKLIFT - 530 PNEUMATIC TIRE 10,000 CAP. PAGE 13-193			$49.38/HR	$16.50/HR
3. LOADER (CRAWLER) CAT 931			$36.29/HR	$7.11/HR
4. FLAT BED TRUCK 6X4			$80.11/HR	$13.03/HR
5. 90 TON CRANE -TRUCK MOUNTED- -40' BOOM -Page 13-127 BLUE BOOK	1		6710/WK	$39.63/HR
6. CASE 420 CK TRACTOR, LOADER, BACKHOE -for small EXCAVATING -7/8 CY BUCKET	1		243/day	$5.60/HR

Detailed Estimate Summary Sheet

FISS

* - INDICATES ADDITIONAL LINE ITEMS.

SHEET 1 OF 6

PROJECT SUSITNA HYDRO. PROJECT

BY NMK DATE 1/22/82

CONTRACT PACKAGE UTILITIES PRELIMINARY ESTIMATE FOR WATANA CAMP & Village

CKD DATE

ITEM No.	DESCRIPTION	QUANTITY	UNIT	LABOR UNIT COST	LABOR AMOUNT	JOB MATERIALS UNIT COST	JOB MATERIALS AMOUNT	PERM. MATERIALS UNIT COST	PERM. MATERIALS AMOUNT	SUBCONTRACTS UNIT COST	SUBCONTRACTS AMOUNT	EQPT. ~~OWNERSHIP~~ TOTAL UNIT COST	EQPT. ~~OWNERSHIP~~ TOTAL AMOUNT	EQPT. OPERATION UNIT COST	EQPT. OPERATION AMOUNT	Equiv UNIT	TOTAL AMOUNT
63.13	UTILITIES																
	WATER																
	SUPPLY SYSTEM																
	INTAKE POND 3.4MG	1	LS														(FROM TINK MARTIN) 283,790
	PUMP STATION	1	LS		30,500				124,867				2650	✓			
	BOOSTER PUMP STA.	1	LS		14,294				87,552				810	✓			
	SUPPLY LINES																
	6" DUCTILE IRON	10,000	LF	4.58	45,800			7.14	71,400			2.87	28,737	? / 3.60			
	8" "	10,000	LF	5.50 / 10.08	55,500			10.08 / 17.22	100,800			3.43 / 6.30	34,299	?			
	TREATMENT PLANT																
*	BUILDING & FOUNDATION	6,300	SF	8.02	48,099			12.19	76,720			1.72	10,328	?			282,518
*	WATER TRAT. SYSTEM	1	LS												10,828		
*	PUMP STA - TO RESERVOIRS	1	LS		8,126 / 54,225				51,302 / 178,022				500		193,022		4,000,000
*	WOOD UTILIDORS	10,000	LF	10.04	104,200			40.00	400,000			4.09	40,905	6.17			4,730,215
*	BERM OVER UTILIDOR	7500	CY		← 7950							2.25	16,875				4,730,215 - 1,939,425 = 2,790,790
	DISTRIBUTION			10.06													
	LINES TO CAMP																
	6" DUCTILE IRON	3500	LF	4.58	16,030			7.14	24,990			2.87	10,045				
	8" "	3500	LF	5.50	19,250	10.08		10.08	35,280	17.22		3.43	12,005	6.30 / 33.60			
VK MARTIN →	RESERVOIRS	2	LS														
	PUMP STATION - 5500 GPM	1	LS		12,285				60,316				866				
	(BURIED) 12" DUCTILE IRON PIPE	2700	LF	24.35	65486			16.94	45,738			23.30	62,918	✓			66.99
	(BURIED) 6" "	300	LF	16.76	5028			7.14	2142			17.29	5988				21 "
	(UTILIDOR) 12" "	3100	LF	21.49	66,588			16.94	49,600			17.22	53,382	✓			55.65
	" 6" "	4300	LF	12.08	51,944			7.14	30,702			9.69	41,667	✓			
	" 4" "	960	LF	10.74	10,310			6.30	6048			8.61	8266	✓			
	HEAT TRACING																
	12"	5800	LF	5.25	30,450			4.00	23,200	✓							
	6" & 8"	11,600	LF	5.25	60,900			4.00	46,400	✓							
	4"	960	LF	5.25	5040			4.00	3840	✓							
	VALVES		LS		2210				6950	✓							
	UTILIDORS	8400	LF	10.04	84,336			40.00	336,000			4.09	34,356	✓			

Detailed Estimate Summary Sheet

Fish

SHEET 2 OF 6

PROJECT

CONTRACT PACKAGE WATANA

BY NMK DATE 1/22/82

CKD DATE

ITEM No.	DESCRIPTION	QUANTITY	UNIT	LABOR UNIT COST	LABOR AMOUNT	JOB MATERIALS UNIT COST	JOB MATERIALS AMOUNT	PERM.MATERIALS UNIT COST	PERM.MATERIALS AMOUNT	~~PERM.MATERIALS SUBCONTRACTS~~ UNIT COST	~~PERM.MATERIALS SUBCONTRACTS~~ AMOUNT	EQPT.~~OWNERSHIP~~ UNIT COST	EQPT.~~OWNERSHIP~~ AMOUNT	EQPT.OPERATION UNIT COST	EQPT.OPERATION AMOUNT	Equiv UNIT	TOTAL AMOUNT
63.13	SEWERAGE																
	COLLECTION SYSTEM																
	4" DUCTILE IRON PIPE	1,900	LF	10.74	20,406					6.30	11,970	8.61	16,359				
	6"	1,600	LF	12.08	19,328					7.14	11,424	9.69	15,504				
	8"	3,300	LF	14.50	47,850					10.08	33264	11.63	38,379				
	12"	2,300	LF	21.12	49,404					16.94	26,155	17.22	39,606				
	16"	1,200	LF	29.00	34,800					24.15	28,480	23.25	27,900				
	HEAT TRACING																
	4"	1,900	LF	5.25	9975					4.00	7600						
	6"	1,600	LF	5.25	8400					4.00	6400						
	8"	3,300	LF	5.25	17,325					4.00	13200						
	12"	2,300	LF	5.25	12,075					4.00	9200						
	16"	1,200	LF	5.25	6300					4.00	4800						
	UTILIDOR-for 16"	1,200	LF	10.04	12,504					40.00	48000	4.09	4908				
	PIPE INSULATION BERM	900	CY	1.06	954							2.25	2025				
*	4"	1200	LF	2.75	3300					6.68	8016						
*	6"	22,000	LF	3.30	72,600					8.11	588,786						
*	8"	16,500	LF	4.13	68,145					10.07	166,155						
*	12"	7100	LF	8.25	58,575					19.11	135,681						
*	16"	1500	LF	16.50	24,750					24.00	36,000						
	WASTEWATER TREATMENT PLANT																
20/10	SKIMMING TANK	1	EA				16,600				33000		5500	?			
	SEWAGE LAGOONS	5	EA				196,210										
35/10	RBC's	9	EA		275400						314,427		196,497				55,000
20/10	PHYS/CHEM UNITS	~~3~~ 1	EA		36800						1377,000		183600				707,134
	CLARIFIERS	~~3~~ 1	EA		69400						128,800		18400				1,836,000
	DISINFECTION	1	EA		36800						242,900		34,700				184,800
	HEAT PUMP	1	EA		2000						128,800		18400				347,000
	THICKENER	~~3~~ 1	EA		40800						10,500		1500				184,600
	FILTER PRESS	~~3~~ 1	EA		40,000						142,800		20400				15,000
60/10	DRYING BEDS	1	EA		58,140						140,000		20,000				204,000
26/37	OUTFALL LINE & OUTFALL	2,000	LF		88,800						116,280		19,380				200,000
											62,400		88800				193,800

Detailed Estimate Summary Sheet

F157

SHEET 3 OF 6

PROJECT

CONTRACT PACKAGE WATANA

BY NMK DATE 1/22/82

CKD DATE

ITEM No.	DESCRIPTION	QUANTITY	UNIT	LABOR		JOB MATERIALS		PERM.MATERIALS		SUBCONTRACTS		EOPT-~~OWNERSHIP~~ TOTAL		EOPT.OPERATION			
				UNIT COST	AMOUNT	UNIT COST	AMOUNT	UNIT COST	AMOUNT	UNIT COST	AMOUNT	UNIT COST	AMOUNT	UNIT COST	AMOUNT	Equiv UNIT	TOTAL AMOUNT
63.13 *	BUILDING	20,000	SF	7.15	143,645			12.60	252,110			1.55	30,755				
*	CONTROLS/INSTRUMENTATION		LS		122500				122500								245,000
*	PIPING/VALVES/PUMPS				346500				346500								693,000
*	LABORATORY - TRAILER				5000				20,000								75,000

Detailed Estimate Summary Sheet

F158

SHEET 4 OF 6

PROJECT

CONTRACT PACKAGE — WATANA

BY NMK DATE 1/25/82 CKD DATE

ITEM No.	DESCRIPTION	QUANTITY	UNIT	LABOR UNIT COST	LABOR AMOUNT	JOB MATERIALS UNIT COST	JOB MATERIALS AMOUNT	PERM.MATERIALS UNIT COST	PERM.MATERIALS AMOUNT	SUBCONTRACTS UNIT COST	SUBCONTRACTS AMOUNT	EQPT. OWNERSHIP (TOTAL) UNIT COST	EQPT. OWNERSHIP (TOTAL) AMOUNT	EQPT.OPERATION UNIT COST	EQPT.OPERATION AMOUNT	Equiv UNIT	TOTAL AMOUNT
63.23	UTILITIES																
	WATER																
	SUPPLY LINE - 6"	8,300	LF	4.35	36,105			7.14	59,262			2.87	23,821 ✓				
	PUMP STATION	1	LS		12,285				60,316				866 ✓				
TINK MARTIN →	STORAGE TANK - 1.4 MG	1	EA ✓														
	DISTRIBUTION																
	6" DUCTILE IRON	13,200	LF	12.08	159,456			7.14	25,410			9.69	127,908	✓			
	8" "	1,500	LF	14.50	21,750			10.88	12,880			11.63	17,445	✓			
	10" "	1,000	LF	17.06	17,080			12.82	15,120			13.68	13,680	✓			
	12" "	1,300	LF	21.49	32,220			16.94	94,248			17.90	25,830	✓			
	HEAT TRACING																
	6"	21,500	LF	5.25	122,875			4.00	86,000 ✓								
	8"	1500	LF	5.25	7875			4.00	6000 ✓								
	10"	1000	LF	5.25	5250			4.00	4000 ✓								
	12"	1500	LF	5.25	7875			4.00	6000 ✓								
	VALVES																
	6"	20	EA	130	2600			350	7000 ✓								
	8"	2	EA	130	260			450	900 ✓								
	10"	2	EA	150	300			600	1200 ✓								
	12"	2	EA	216	432			800	1600 ✓								
	HYDRANTS	20	EA	266	5320			825	16,500 ✓								
	SEWERAGE																
	COLLECTION SYSTEM																
	6" DUCTILE IRON	7,800	LF	12.08	94,224			7.14	55,692			9.69	75,582	✓			
	8"	6,500	LF	14.50	94,250			10.08	65,520			11.63	75,595	✓			
	10"	1,100	LF	17.06	18,766			12.86	14,168			13.68	15,048	✓			
	12"	800	LF	21.49	17,184			16.94	13,552			17.22	13,776	✓			
	14"	700	LF	25.00	17,500			20.00	14,000			20.00	14,000	✓			
	6" FORCE MAIN	13,800	LF	4.35	60,030			7.14	98,532			2.87	39,606				
*	UTILIDOR	13,800	LF	10.35	143,730 (6,10)			40.00	552,000			4.07	53,988				
*	BERM INC. UTILIDOR	10,200	CY	5.84	59,568												

Detailed Estimate Summary Sheet

F159

PROJECT

CONTRACT PACKAGE WATANA

SHEET 5 OF 6

BY NMK DATE 1/23/82 CKD DATE

ITEM No.	DESCRIPTION	QUANTITY	UNIT	LABOR UNIT COST	LABOR AMOUNT	JOB MATERIALS UNIT COST	JOB MATERIALS AMOUNT	PERM.MATERIALS UNIT COST	PERM.MATERIALS AMOUNT	SUBCONTRACTS UNIT COST	SUBCONTRACTS AMOUNT	EOPT. ~~OWNERSHIP~~ TOTAL UNIT COST	EOPT. ~~OWNERSHIP~~ TOTAL AMOUNT	EOPT. OPERATION UNIT COST	EOPT. OPERATION AMOUNT	Equiv UNIT	TOTAL AMOUNT
	HEAT TRACING																
	6"	21,600	LF	5.25	113,400			4.00	86,400								
	8"	6,500	LF	5.25	34,125			4.00	26,000								
	10"	1,100	LF	5.25	5775			4.00	4400								
	12"	800	LF	5.25	4200			4.00	3200								
	14"	700	LF	5.25	3675			4.00	0800								
	SEWAGE PUMP STATION		LS		11,150				78,709				4086				
*	SEWAGE LIFT STATIONS-AS REQUIRED		EA		1,750				16,628				585				
*	PIPE INSULATION																
	6"	52,700	LF	3.30	173910			8.11	427,397								
	8"	9,800	LF	4.13	40,474			10.07	98,686								
	10"	2600	LF	5.50	14,300			17.10	44,460								
	12"	2500	LF	8.25	20,625			19.11	47,775								
	14"	850	LF	14.00	11,900			21.00	17,850								
	UTILIDORS																
	MAIN RUNS IN Village	16,900	LF	10.42	176,098			40.00	676,000			4.09	69,121				
	STREET CROSSINGS	1000	LF	10.42	10420			40.00	40,000			4.01	4090				
	STUBS TO HOUSES	11200	LF	10.42	116704			40.00	448,000			4.00	45,808				

Detailed Estimate Summary Sheet

R160

SHEET 6 OF 6

PROJECT

CONTRACT PACKAGE — WATANA – Misc ITEMS

BY KMK. DATE 1/25/82

CKD DATE

ITEM No.	DESCRIPTION	QUANTITY	UNIT	LABOR		JOB MATERIALS		PERM.MATERIALS		SUBCONTRACTS		TOTAL EQPT.OWNERSHIP		EQPT.OPERATION			
				UNIT COST	AMOUNT	UNIT COST	AMOUNT	UNIT COST	AMOUNT	UNIT COST	AMOUNT	UNIT COST	AMOUNT	UNIT COST	AMOUNT	Equip UNIT	TOTAL AMOUNT
	PERMAWALKS																
	6' WIDE	1,000	LF	180.00	180,000			137.00	137,000								
	16' WIDE	3,000	LF	280.00	840,000			210.00	630,000								
	16' WIDE	1,300	LF	440.00	572,000			325.00	422,500								
	POL TANKS																
	50,000 GAL.	76	EA					25000 EA.									1,900,000

Detailed Estimate Summary Sheet

* - INDICATES ADDITIONAL LINE ITEMS

E161

SHEET 1 OF 4

PROJECT SUSITNA HYDRO. PROJECT

BY NMK DATE 1/23/82

CONTRACT PACKAGE DEVILS CANYON PRELIMINARY ESTIMATE - UTILITIES

CKD DATE

ITEM No.	DESCRIPTION	QUANTITY	UNIT	LABOR		JOB MATERIALS		PERM. MATERIALS		SUBCONTRACTS		EQPT. OWNERSHIP		EQPT. OPERATION			
				UNIT COST	AMOUNT	UNIT COST	AMOUNT	UNIT COST	AMOUNT	UNIT COST	AMOUNT	UNIT COST	AMOUNT	UNIT COST	AMOUNT	EQUIV UNIT	TOTAL AMOUNT
63.13	UTILITIES																
	WATER																
	SUPPLY SYSTEM																
* MARTIN →	INTAKE POOL																
	PUMP STATION	1	LS		36,000				75,000				4000 ✓				
	BOOSTER PUMP STATION	1	LS		17,200				37,000				1000 ✓				
	SUPPLY LINES																
	4" DUCTILE IRON	4,500	LF	10.74	48,330			6.30	28,350			8.61	38,745				
	6" DUCTILE IRON	4,500	LF	12.08	54,360			7.14	32,130			9.69	43,605				
	TREATMENT PLANT																
	BUILDING/FOUNDATION	4800	SF	8.02	38,500			12.79	61,400			1.72	8,250				
*	WATER TRMT. SYSTEM		LS		50,000								50,000 ✓				
*	PUMP STATION TO RES.		LS		9,800				26,500				1000 ✓				
	DISTRIBUTION SYSTEM																
	10" DUCTILE IRON - BURIED	800	LF	20.52	16,500			12.28	9824			21.37	17,100 ✓				
	8" "	240	LF	18.00	4,320			10.08	2419			19.33	4639 ✓				
	6" "	100	LF	16.76	1676			7.14	714			17.29	1729 ✓				
	DISTRIBUTION LINES - UTILIDOR				30708												
	10"	1,800	LF	17.06	1817			12.88	23,184			13.68	24,624 ✓				
	8"	2,500	LF	14.50	36,250			10.88	27,200			11.63	29,075 ✓				
	6"	2,000	LF	12.08	24,160			7.14	14,280			9.69	19,380 ✓				
	4"	1,800	LF	10.24	18,432			6.30	11,340			8.61	15,498 ✓				
	HEAT TRACING	9,240	LF	5.25	48,510			4.00	36,960 ✓								
	VALVES		LS		2000				4,000 ✓								
	HYDRANTS	12	EA.	267	3204			825	9900 ✓								
	UTILIDORS	8,400	LF	18.4	84,336			40.00	336,000			4.09	34,356 ✓				
*	UTILIDOR - SUPPLY LINES	4,500	LF	10.04	45,180			40.00	180,000			4.09	18405				
*	BERM OVER UTILIDOR	3350	CY	2.40	8040							5.13 / 5.22	17,487				

Detailed Estimate Summary Sheet

F162

SHEET 2 OF 4

PROJECT

CONTRACT PACKAGE DEVILS CANYON

BY DATE

CKD DATE

ITEM No.	DESCRIPTION	QUANTITY	UNIT	LABOR UNIT COST	LABOR AMOUNT	JOB MATERIALS UNIT COST	JOB MATERIALS AMOUNT	PERM.MATERIALS UNIT COST	PERM.MATERIALS AMOUNT	SUBCONTRACTS UNIT COST	SUBCONTRACTS AMOUNT	EOPT.OWNERSHIP UNIT COST	EOPT.OWNERSHIP AMOUNT	EOPT.OPERATION UNIT COST	EOPT.OPERATION AMOUNT	EQUIP UNIT	TOTAL AMOUNT
	SEWAGE																
	COLLECTION SYSTEM																
	4" DUCTILE IRON - UTILIDOR	2,000	LF	10.74	21,480			6.30	12,600			.86	17,220				
	6" "	3,000	LF	12.08	36,240			7.14	21,420			9.69	29,070				
	8" "	2,400	LF	14.50	34800			10.08	24,216			11.63	27912				
	10" "	800	LF	21.48	17,184			16.94	13552			17.22	13776				
	12" "	2,800	LF	29.00	81,200			24.15	67,620			23.25	65,100				
	HEAT TRACING	~~9840~~ 11,000	LF	5.25	57,750			4.00	44,000								
	TREATMENT PLANT																
	SKIMMING TANK	1	EA		9,800				19,400				3,500				32,700
	SEWAGE LAGOONS	3	EA		115,800				185,500				116,000				417,300
	RBC'S	5	EA		~~612,000~~		267,138		—				~~204,000~~		178,000		~~816,000~~
	PHYS/CHEM UNIT	21	EA		43,000								21,500				64.500
	CLARIFIERS	21	EA.		81,000								40,500				121,500
	DISINFECTION	21	EA.		43,000								21,500				64,500
	HEAT PUMP	1	EA.		3,000				10,500				1500				15,000
	THICKENERS	7 1	EA.		47,600								23800				71,400
	FILTER PRESSES	2	EA.		47,000								24,000				71, 000
	DRYING BEDS	1	EA.		58,140				116,280				19,380				193, 380
	OUTFALL LINE & OUTFALL	4,200	LF	14.29	186,480			31.22	131, 040			14.29	186,480				504,000
*	BUILDING	13,500	SF	7.18	96,930			12.60	170,100			1.53	20,655				287,685
*	CONTROLS/INSTRUMENTATION		LS		122,275				122,275								144,550
*	PIPING, VALVES, PUMPS		LS		200,000				200,000								400,000
*	LABORATORY		LS		1000												1000

~~445,136~~ 445,1..

Detailed Estimate Summary Sheet

F163

SHEET 3 OF 4

PROJECT

CONTRACT PACKAGE DEVILS CANYON

BY DATE

CKD DATE

ITEM No.	DESCRIPTION	QUANTITY	UNIT	LABOR		JOB MATERIALS		PERM.MATERIALS		SUBCONTRACTS		EQPT.OWNERSHIP		EQPT.OPERATION			
				UNIT COST	AMOUNT	UNIT COST	AMOUNT	UNIT COST	AMOUNT	UNIT COST	AMOUNT	UNIT COST	AMOUNT	UNIT COST	AMOUNT	Equiv UNIT	TOTAL AMOUNT
63.12	PERMAWALK																
	6' WIDE	600	LF	180	108,000			137	82,200								
	10' WIDE	2,250	LF	280	630,000			210	472,500								
	16' WIDE	1,000	LF	440	440,000			325	325,000								
63.13	POL TANKS																
	500,000 gals.	44	EA					25000	EA.								
63.23	UTILITIES																
	WATER																
	SUPPLY LINE-6"	4,900	LF	12.08	59,192			6.30	30,870			8.61	42,188				
TINK MARTIN →	RESERVOIR-850,000gal	1	EA														
	PUMP STATION - 4500 GPM	1	EA		10,000 (16.87)				50,000 (82.37)				700 (1.15%)		60,100		
	DISTRIBUTION - BURIED			20.57													
	10" DUCTILE IRON	850	LF	17.06	174,845			12.28	10,438			2.38	18,173				
	8" "	305	LF	18.00	5490			10.08	30,744			19.37	5896				
	6" "	260	LF	16.76	4358			7.14	1857			17.29	4495				
	DISTRIBUTION - UTILIDOR																
	10"	7,650	LF	17.06	130,509			12.88	98,532			13.68	104,652				
	8"	2,750	LF	14.50	39,875			10.88	29,920			11.63	31,983				
	6"	2,350	LF	12.08	28,388			7.14	16,779			9.69	02,772				
	HEAT TRACING	14,150	LF	5.05	71,288			4.00	56,600								

Detailed Estimate Summary Sheet

F164

SHEET 4 OF 4

PROJECT

CONTRACT PACKAGE DEVILS CANYON

BY DATE

CKD DATE

ITEM No.	DESCRIPTION	QUANTITY	UNIT	LABOR		JOB MATERIALS		PERM.MATERIALS		SUBCONTRACTS		EQPT.OWNERSHIP		EQPT.OPERATION			
				UNIT COST	AMOUNT	UNIT COST	AMOUNT	UNIT COST	AMOUNT	UNIT COST	AMOUNT	UNIT COST	AMOUNT	UNIT COST	AMOUNT	Equiv UNIT	TOTAL AMOUNT
	VALVES																
	10" - 8	8	EA	150	1200			600	4800								
	8" - 4	4	EA	130	520			450	1800								
	6" - 2	2	EA.	130	260			350	700								
	HYDRANTS	21	EA	266	5586			825	17,325								
	SEWAGE																
	COLLECTION																
	6"	5,450	LF	12.08	65,836			7.14	38,913			9.69	52,811				
	8"	3,000	LF	14.50	43,500			10.08	30,240			11.63	34,890				
	10"	2,350	LF	17.06	40091			12.88	30268			13.68	31,960				
	12"	100	LF	21.48	2148			16.94	1694			17.22	1722				
	HEAT TRACING	10,900	LF	5.25	57,225			4.00	43,600								
	SEWAGE PUMP STATION	1	LS		6,600				47,000				4000				
	6" FORCE MAIN	11,000	LF	12.08	132880			7.14	78540			9.69	106,590				
*	UTILIDOR	11,000	LF	10.42	114,620			40.00	440,000			4.09	44990				
	BERM OVER UTILIDOR	8,150	CY	2.40	19,500							5.13	41,850				
*	PIPE INSULATION - CAMP & Village																
	4"	10,200	LF	2.75	28,060			6.68	68,136								
	6"	21,500	LF	3.30	70,950			8.14	174,365								
	8"	13,683	LF	4.13	56511			10.07	137788								
	10"	17,500	LF	5.50	96,250			17.10	299,250								
	12"	3600	LF	8.25	29,700			19.11	68,796								
	UTILIDORS - Village (Lumped Together)	25,050	LF	10.42	261,021			40.00	1,002,000			4.09	102,455				

TELEX # - 9-16423 ALAS-BUF F165 REC'D FROM FMA 10 JAN 1982

WATANA CAMP

ITEM	QUANTITY	UNITS	UNIT PRICE	
63.12 BUILDINGS				
PUMP HOUSE	400	SF	102	
PERIMWALKS				
6 ft WIDE	1,000	LF	475	90
10 ft WIDE	5,000	LF	735	140
16 ft WIDE	1,300	LF	1147	240
63.13 UTILITIES				
WATER				
SUPPLY SYSTEM				
INTAKE — TINK MARTIN				
PUMP STA.	1	LS	158,000	
BOOSTER PUMP STA.	1	LS	147,000	
SUPPLY LINES				
6"	10,110	LF	21.77	
8"	10,000	LF	28.50	NOT LISTED (25.13)
TREATMENT UNIT	1	EA	1,300,000	
UTILIDOR	10,110	LF	85.47	
DISTRIBUTION LINES				
6"	3,500	LF	21.77	
8"	5,500	LF	28.50	25.13
RESERVOIRS — TINK MARTIN				522,568
PUMP STATION	1	LS	110,000 (141,000)	310,000
12"-BURIED	870	LF	96.70	
6"-BURIED	300	LF	61.76	
12"	2100	LF	63.43	
6"	1300	LF	43.35	
4"	960	LF	38.42	
HEAT TRACING	18,360	LF	13.87	
VALVES	1	LS	14,000	
UTILIDOR	6,400	LF	85.47	
HYDRANTS	15	EA	4,500 (4,150)	NOT LISTED
SEWAGE				
4"	1,940	LF	38.46	
6"	1,440	LF	43.35	
8"	5,300	LF	54.28	
12"	2,340	LF	63.43	
16"	1,200		1.19.86	

168

W R166

ITEM	QUANTITY	UNITS		UNIT PRICE
HEAT TRACING	10,300	LF		13.87
UTILIDOR	1,200	LF		85.41
NOT LISTED — PIPE INSULATION — OPTIONAL				
4"	1,200	LF		16.27
6"	2,600	LF		18.35
8"	16,500	LF		21.29
12"	7,100	LF		41.03
16"	1500	LF		60.73
WHITE WATER TREAT PLANT				
SKIMMING TANK		LS		55,000
SLUDGE LAGOONS	5 EA.	LS	141,400	707,000 ? T.M. 13,582
RBC'S	9 EA	LS EA	204,000	1,836,000
PHYS/CHEM UNITS		LS		184,000
CLARIFIERS		LS		347,000
DISINFECTION		LS		184,000
HEAT PUMP		LS		15,000
THICKENER	0 EA	LS	REQ'D	204,000
FILTER PRESS		LS		240,000
DRYING BEDS	2 EA.	LS	96,900 / 80 EA	193,800
OUTFALL LINE & DIFFUSER	2,000 LF	LS	OUTFALL 80,000	240,000
BUILDING TREATMENT PLANT	EA.	LS		648,000
CONTROLS/INSTRUMENTATION		LS		245,000
PIPING/VALVES/FITTINGS		LS		893,000
LABORATORY		LS		75,000

DEVILS CANYON - CAMP

ITEM	QUANTITY	UNIT	UNIT PRICE
33.13 UTILITIES			
WATER			
SUPPLY SYSTEM:			
INTAKE POOL	- TINK MARTIN -		
PUMP STATION	1	LS	172,500
BOOSTER PUMPSTA.	1	LS	83,000
SUPPLY LINES			
4"	4,500	LF	38.46 40.90
6"	4,500	LF	43.35
TREATMENT PLANT	1	LS	370,000
RESERVOIR	- TINK MARTIN -		
DISTRIBUTION:			
10" BURIED	800	LF	63.00
8" BURIED	400	LF	72.00
6" BURIED	100	LF	61.74
10" UTILIDOR	1,800	LF	65.41
8"	2,500	LF	54.30
6"	2,000	LF	43.35
4"	1,800	LF	37.71
HEAT TRACING	9,240	LF	13.87
VALVES	1	LS	8997
HYDRANTS	12	EA.	11.50
UTILIDORS	6,900	LF	61.74
UTILIDORS	4,500	LF	8547
SEWAGE			
4"	2,000	LF	37.71
6"	3,000	LF	43.35
8"	2,400	LF	54.30
10"	600	LF	65.41
12"	2,000	LF	83.43
HEAT TRACING	11,000	LF	13.87
TREATMENT PLANT		1	
SKIMMING TANK		LS	32,700
SLUDGE LAGOON		LS	230435 417,300
RBC	5	EA LS	89000 445,000
PHOTOSYNTHETIC UNIT		LS	64,500
CLARIFIERS		LS	L70 121,500

NOTE: 220

DC F16B

(4)

ITEM	QUANTITY		UNIT	UNIT COST	
DISINFECTION			LS		64,500
HEAT PUMP			LS		15,000
THICKENER			LS		7,400
FILTER PILES			LS		71,000
DRYING BEDS	4200 LF	2 EA	LS	96750	193,500
OUTFALL LINE & OUTFALL		11257	LS		504,000
BUILDING TREATMENT PLANT			LS	171,000	238,000
CONTROLS/INSTRUMENTATION			LS		144,500
PIPING/VALVES/FITTINGS			LS		400,000
LABORATORY			LS		1600
UTILIDOR			LF		85,47

171

8"	13,625	R169	LF	21.25
	17,500		LF	33289
16"	3,600		LF	4103
12"				

ITEM	QUANTITY	UNIT	UNIT PRICE
PEDMA WALK			
6' WIDE	600	LF	475
10' WIDE	2,250	LF	735
16' WIDE	1,000	LF	1147
DEVILS CANYON - VILLAGE			
63.83 UTILITIES			
WATER			
SUPPLY LINE 6"	4,900	LF	21.53
RESERVOIR	— TINK MARTIN —		
PUMP STATION	1	LS	100,500
DISTRIBUTION			
10" BURIED	850	LF	83.00
8" BURIED	315	LF	72.00
6" BURIED	260	LF	61.74
10" UTILIDOR	7,650	LF	65.41
8" UTILIDOR	2,750	LF	54.30
6" UTILIDOR	2,350	LF	43.35
HEAT TRACING	14,150	LF	13.87
VALVES			
10"	5	EA	1125
8"	1	EA	870
6"	2	EA	720
HYDRANTS	21	EA	1650
SEWERAGE			
6"	5450	LF	43.35
8"	3000	LF	54.30
10"	2350	LF	65.41
12"	100	LF	83.43
HEAT TRACING	10,900	LF	13.87
PUMP STATION	1	LS	84,650
6" F.M.	11,000	LF	43.35
UTILIDOR	5,500	LF	85.47
PIPE INSULATION:			
4"	10,200	LF	14.14
6"	21,900	LF	17.11
8"	13,625	LF	21.29

(6)

WATANA-VILLAGE

ITEM	QUANTITY	UNIT	UNIT PRICE
43.23 UTILITIES			
WATER			
SUPPLY LINE 6"	830	LF	21.53
PUMP STATION	1	LS	110,000
WATER STORAGE	— TINK MARTIN —		
DISTRIBUTION			
6"	13,200	LF	43.35
8"	1,500	LF	54.30
10"	1,000	LF	65.41
12"	1,300	LF	83.43
HEAT TRACING	25,500	LF	13.87
VALVES:			
6"	20	EA.	720
8"	2	EA.	870
10"	2	EA.	1185
12"	2	EA.	1535
HYDRANTS	20	EA	1650
SEWERAGE:			
6"	7,800	LF	43.35
8"	6,500	LF	54.30
10"	1,100	LF	65.41
12"	800	LF	83.43
14"	700	LF	97.47
6" F.M.	17,600	LF	43.35
HEAT TRAING	30,700	LF	13.87
PUMP STATION	1	LS	141,000
LIFT STATIONS	1	EA.	29,000
PIPE INSULATION			
6"	58,700	LF	17.11
8"	9,500	LF	21.29
10"	2,400	LF	33.89
12"	2,500	LF	41.03
14"	850	LF	52.18
UTILIDORS	29,100	LF	81.74
BACK UP WELL SYSTEMS		LS	200,000
UTILIDOR-PUMP STA TO TANK #1	8,300	LF	85.47

Not Listed

V3

12171

(1)

Cmm

Citations – Village 20,000 AF $ 8174

R172

8

ELECTRICAL

WATANA CAMP

ITEM	QUANTITY	UNIT	UNIT PRICE
GENERATING STATION			
BUILDING	— RED CALVERT —		
GENERATORS (650KW)	6	EA	? PRICE 245,000 2 88
DAY TANK (INCLUDED ABOVE)			
FUEL & STORAGE TANK	1	EA	(TANK MARTIN)
SUB STATION	2	EA	100,000
DISTRIBUTION		LS	250,000
LIGHTING			
POLE MOUNTED LUMINAIRES	70	EA	2000
FLOOD LIGHTS	25	EA	750

WATANA Village

ITEM	QUANTITY	UNIT	UNIT PRICE
GENERATING STA.			
BUILDINGS			
GENERATORS			
650KW	4	EA	2.7,000 270,000
500KW	2	EA	203,000 207,000
DAY TANKS (INCL. ABOVE)			5000
FUEL STORAGE TANKS	2	EA	(TANK MARTIN)
SUBSTATIONS	2	EA	100,000
DISTRIBUTION		LS	250,000

(1)

ELECTRICAL

DEVILS CANYON CAMP

ITEM	QUANTITY	UNIT	UNIT PRICE
GENERATING STA.			
BUILDING			— RCD CALVERT —
— GENERATORS (500 kW) CAN WE USE 450 USED	(1) 2 0	EA	207,000
DAY TANK (INCL ABOVE)	(2) 2 1		
FUEL STORAGE TANK		GAL	22,000 TIME MATRIX
SUBSTATION			100,440
LIGHTING			
POLE MOUNTED LUMINAIRS	44	EA	2600
FLOOD LIGHTS	15	EA.	750
DISTRIBUTION		LS	150,000

DEVILS CANYON - VILLAGE

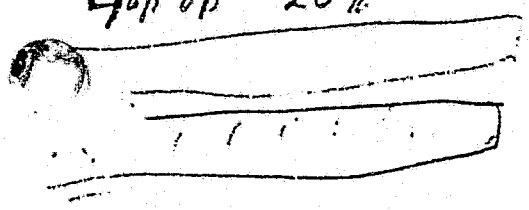
ITEM	QUANTITY	UNIT	UNIT PRICE
GENERATING STA.			
BUILDING			RCD CALVERT
GENERATORS (600kW)	4	EA	256,000
DAY TANK (INCL ABOVE)			5,000
FUEL STORAGE TANK			122,000 TIME MATRIX
SUBSTATION	2	EA	100,430
DISTRIBUTION	1	LS	200,000

Labor 32%
Eq. own 40% DIRTWORK
Equip op 28%

40 5-C

F 174
1735
130

2000 3000 .54 18,000



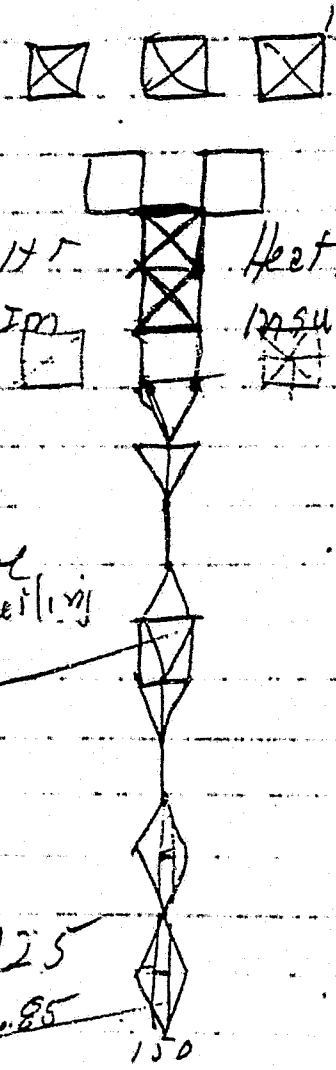


Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

1875 5.25 4 ∞

Utilidor

Insul. Lines



		Labor	Materials	
4"	175	Heat trace	5.25	4.—
	IPS	Insulation	2.75	6.68
			8.00	10.68	28.01
6"			5.25	4.—
insulation value wall-ceiling			3.30	8.11
			8.55	12.11	30.98
8"			5.25	4.—
			4.13	10.07
			9.38	14.07	35.16
10"	125 .85		5.25	4.—
	125	150	5.50	17.10
			10.75	21.10	47.76
12"			5.25	4.—
			8.25	19.11
			13.50	23.11	54.90
14"			5.25	4.—
			14.—	21.—
			19.25	25.—	66.35
16"			5.25	4.—
			16.50	24.—
			21.75	28.—	74.60

By Rod Calvert
Feb 1982

1.77

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

DATE: 2-16-82 SHT.: ____ OF ____
CALCULATIONS BY: Rod Calvert
SUBJECT: Construction Camps
Credit for utilities

PROJECT: SUSITNA

.13 utilities		Watana Credit	DC Debit
Pump Sta 5500 G.P.M.		30,000	30,000
Booster Pump Sta 720GPM		2,000	2,000 ←
Water treatment plant		504,000	504,000 ←
Skimming tank		4,000	4,000 ←
RBC's		153,000	153,000 ←
PHYS/Chem unit		26,000 ✓	26,000 ←
clarifier		49,000	49,000 ←
Disinsection		26,000	26,000 ←
thickener		29,000	29,000 ←
DRYing Beds		28,000	28,000 ←
Distribution System			
Building Waste water trtmnt		29,000	29,000
Controls & Instrumentation		74,000	74,000 ✓
Piping, Valves, Fittings	30%	207,900	207,900
Labor for	30%	22,500	22,500
- Microwave		662,500	662,500
- Fuel tanks Village		66,000	66,000
Sprinkler System		13,000	13,000
Pump Station 5500 GPM		30,000	30,000
		~~1,956,000~~	

credited to Watana, debited to Devil Canyon

F176

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

DATE: 2-10-82 SHT.: 1 OF 1
CALCULATIONS BY: Red Calvert
SUBJECT: Construction Camps

PROJECT: SUSITNA

	LABOR	MATERIALS	EQUIP. 45/55
Fire Alarm System	63.5%	36.5%	
Pole Mounted Luminaires	20. %	80. %	
Flood lights	20 %	80. %	
Telephone System	63.5 %	36.5 %	
Substations	17. %	80. %	3. %
Radio/ T.V. Station	20. %	80. %	
Piping	45. %	55. %	
Fuel Station	42. %	56. %	3. %
Generators (for packaged)	8. %	91. %	1. %
Distribution System	17. %	80. %	3. %
Devil Canyon 4500 G.P.M. Pump Sta	16.5 %	82.3 %	1.2 %
Auto. Plug Ins	20. %	80. %	
Back-Up Well System	15. %	75 %	10 %
Microwave	20 %	70 %	10 %

(F) Susitna Camp Estimates

Watana Indirects

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

DATE: 2-8-91 SHT.: 1 OF 2
CALCULATIONS BY: T. Martin
SUBJECT: SUSITNA - WATANA
Camp - Indirects

PROJECT: Field Supervision

Buildings

Mobilization
1 Sept. 1984 to 1 May 1985 = 2064 lb
Proj mgr
Bldg supt
office mgr
Accountant
Secretary
Materials Clerk
Schedule Eng.
Expediter

Erect Bldgs 1 may to 15 oct = 1416 lb
Proj mgr
& all Crews

Site Work

Mobilization
1 Feb to 7 April 1985
1 supt 552 lb
1 Equip Supt.

Site Work 7 April to 15 July
1 supt days 846 lb
1 supt nights
1 Equip supt

1985

1986

mobilization 15 Jan to 1 may
906 lb
Proj mgr
Bldg Supt
office mgr.
Accountant
Secretary
materials clerk
Schedule Eng.
Expediter

Erect Bldgs 1 may to 15 oct
1614 lb
2 supt. days
2 supt nights

Direct (A) 21.7% 64,834 107 624
28,721

Subcontracts

64,834 x 1.217 % = 78903
78,903 x 1.215 % = 95867
28,721 x 1.217 = 34,953
28,721 x 1.135 = 32,598
163 418 = 51.84 %

1,217 x 1.215 = 47.866 %

64,834 x 1.47866 = 95867.
28,721 x 1.05 = 30157
28,721 : 8.5 % : 2,441
128,465

128,465 - 93,555 = 34,910

34,910 ÷ 93,555 = 37.31 %

F134

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

DATE: _____ SHT.: 2 OF 2
CALCULATIONS BY: T. Martin
SUBJECT: SUSITNA - WATANA
CAMP - INDIRECTS

PROJECT: Field Supervision

1987

Mobilization 15 Jan to 1 May

Proj mgr
Bldg Supt.
office mgr
Accountant
Secretary
Materials Clerk
Scheduling Eng
Expediter

906 lb

Erect Bldgs
all Crew 1 May to 15 Oct.

1614 lb

2 supt - days
2 supt nights

Labor Materials : ,uip own. Equip op total - Sub

29 682

subtotal	64,834	
subContract.	28721 -	30.07
total	93,555	

	Subtotal	S Contract	total
Direct	64,834	28,721	93,555
indirect	14,069	-	14,069
	78903	28,721	107,624

8r 0
13

21.70%

21.70 % 2 21.5% 5%

64,834 14069 + = 78 903 16,964 = 95,867 1436 = 97303 + 28,721 126,024

ALASKA INTERNATIONAL CONSTRUCTORS, INC.

CONSTRUCTION SCHEDULE

PROJECT Watana

PERIOD _____ SHEET ____

DATA DATE _____

ACTIVITY _____

No.	DESCRIPTION	MONTHS / WEEK ENDING	1985 1 2 3 4 5 6 7 8 9 10 11 12	1986 1 2 3 4 5 6 7 8 9 10 11 12	1987 1 2 3 4 5 6 7 8 9 10 11 12
	MCC Site Work				
	MCV Site Work				
	Stage I A: Utilities				
	I B Dormitorys				
	I C Main Camp Dormitorys				
	Stage II A Village Core				
	II B Relocate 100 Mobile Units				
	II C Main Camp Housing				
	II D Village - Family Housing				
	Stage III A Main Camp - Dorm Housing				
	III B Village - Balance Housing				

RM AIC 002

7 mo

6

CONSTRUCTION SCHEDULE

PROJECT _____

ALASKA INTERNATIONAL CONSTRUCTORS, INC.

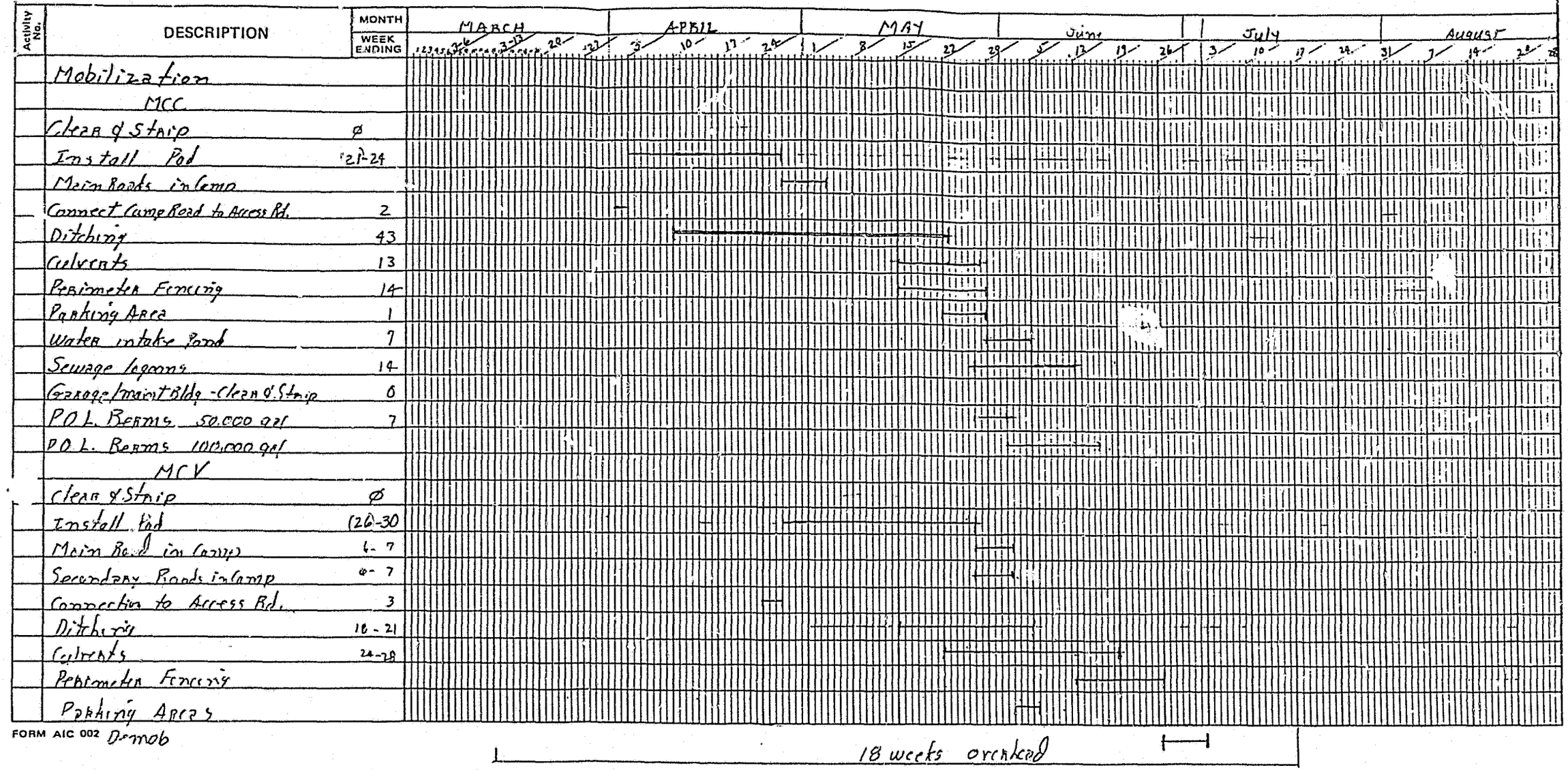
CONSTRUCTION SCHEDULE

PROJECT 1985

PERIOD _____ SHEET ___ OF ___

DATA DATE _____

ACTIVITY _____



FORM AIC 002 Demob

0502-1067

WATANA

F187

2-8-82

	1985 BLDG mob	1985 BLDG Erect	1985 Site mob	1985 Site Strk	1986 BLDG mob	1986 BLDG Erect	1987 Bldg Mob	1987 Bldg Erect	WATANA total	Days	nights	
Project Manager	2064	1416			906	1614	906	1614	8520			
Civil Supt Days			552	846					1398	1398		13,946
" Supt. Nights				846					846		846	9,518
Bldg Supt Days	2064	1416			906	3628	906	3628	12548	12,548		
Bldg Supt. Nights		1416				3628		3628	8672		8672	
Proj. Engineer		1416				1614		1614	6456			
Field Engineer Days		1416				1614		1614	6456	13946	9518	
Field Eng. Nights		1416				1614		1614	6456			
Assist Eng.		1416				1614		1614	6456			
Scheduling Engineer		1416				1614		1614	6456			
Office Manager	2064	1416			906	1614	906	1614	8520			
Accountant	2064	1416			906	1614	906	1614	8520			
timekeeper Clerk Days		1416				1614		1614	6456			
timekeeper Clerk Nights		1416				1614		1614	6456			
Secretary	2064	1416			906	1614	906	1614	8520			
Materials Clerk-2 shift	2064	2832			906	3228	906	3228	13164			
Expediter-2 or 2 shift	2064	5664			906	6456	906	6456	22452			
Survey-Party Chief		2832				3228		3228	9288			
Ass. Men		2832				3228		3228	9288			
H. Chainmen		2832				3228		3228	9288			
R. Chainmen		2832				3228		3228	9288			
Safety Engineer		1416				1614		1614	6456			
Equip Supt.			552	846	—	—	—	—	1398			
Mech Foreman 1						1614		1614	3228			
Mech Welder 2						3228		3228	6456			
Fueler 1						1614		1614	3228			
Service Oiler 1						1614		1614	3228			
	Delete mob for Devil Canyon							Delete this year for Devil Canyon				

Alaska International Construction, Inc.

PROJECT: SUSITNA - WATANA ITEM NO. EST. BY F191 SHEET OF

SPEC. REFERENCE: DESCRIPTION Mob & Demob Equipment CHKD. BY

DWG. REFERENCE: BID DATE ENGR. QUANTITY DATE:

		UNITS EQP.	UNITS MAN	LABOR	R & B	OTHER	CO. RENT	3RD PARTY RENT	FUEL	LUBE PARTS	LABOR	R & B OR TRAVEL	OTHER	COMPANY RENTAL	3RD PARTY RENTAL	FUEL	LUBE & WEAR PARTS	SUBTOTAL	PERMANENT MATERIALS	SUB-CONTRACT	TOTAL COST
P.U.	14 X 9 =	126	126	40.00	—	—	15.43				5040			1944				6884			
Lowbed	56 X 9 =	504	504	40.00			68.00				20160			34272				54432			
14G	5 X 9 =	45	45	40.00			67.00				1800			3015				4815			
637D	12 X 9 =	~~108~~	~~108~~	~~40.00~~			~~275.00~~				~~4320~~			~~29700~~				~~34020~~			
Bull	2 X 9 =	18	18	40.00			27.70				720			499				1219			
Mech. tk	10 X 9 =	90	90	40.00			30.00				3600			2700				6300			
Fuel tk	2 x 9 =	18	18	40.00			34.50				720			621				1341			
Serv. tk	2 X 9 =	18	18	40.00			35.50				720			639				1359			
Fifty tk	3 X 9 =	27	27	40.00			34.50				1080			932				2012			
B 70	14 X 9 =	126	126	40.00			135.00				5040			17010				22050			
10,000 gal tanker	3 X 9 =	27	27	40.00			110.00				1080			2970				4050			
Flat Bed	1 X 9 =	9	9	40.00			37.00				360			306				666			
769C	~~8 X 9~~ =	~~72~~	~~72~~	~~40.00~~			~~100.00~~				4464.0			94608				139248			
Mob & Demob											~~2880~~			~~9632~~				~~10512~~			
											~~47520~~			~~102240~~				~~149760~~			
			22326								40320			64908				105228			
load & unload =			33766								135040										
			13524								54080		7500	30420							
			4728								189120		7500	30420				227040			
											192000		7500	132660				332160			

Alaska International Construction, Inc.
PROJECT: Susitna Hydroelectric Project - ITEM NO. WATANA EST. BY 1 SHEET 1 OF 2
SPEC. REFERENCE: DESCRIPTION Orig. I. - to be distributed CHKD. BY
DWG. REFERENCE: BID DATE ENGR. QUANTITY DATE: 1-13-82

1 ARR. to 30 Sept = 26 weeks	UNITS EQP.	UNITS MAN	LABOR	R & B	OTHER	CO. RENT	3RD PARTY RENT	FUEL	LABOR	R & B OR TRAVEL	OTHER	COMPANY RENTAL	3RD PARTY RENTAL	FUEL	LUBE & WEAR PARTS	SUBTOTAL	PERMANENT MATERIALS	SUB-CONTRACT	TOTAL COST
Safety Meetings & Orientation @ 1% of total labor = ½ hr/man/week																			
Expediter - Anchorage 18 26 weeks @ 32.04/hr	1080 / 540	1	49982.80			227	.25	6.00	34603 / 49982	—	—	2451 / 3541	270 / 390	6480 / 9360	1015 / 1466	44819 / 64739			
Expediter - Job 18 26 weeks (1 each shift)	1080 / 540	3120	32.04			227	.25	5.75	34603 / 49982	—	—	2451 / 3541	270 / 390	6210 / 8970	1015 / 1466	44549 / 64349			
Lodging & Meals - Staff & Crafts																			
Airline tickets - Staff & Crafts																			
Mob & Demob Travel Pay say 500 m Say 500 men @ 8 h = 4000 h @ 30.00		4000	30.00						120000							120000			
Freight																			
Small Tools & Consumables @ 6% direct labor 3,612,559 @ 6%																216754			
Field office General expense	6				2000.00							21675 / 12000				365770 / 12000 / 8308			
Job office Rent	6				2000.00							12000				12000 / 8308			
Electric / heat / water / sanitary Facilities	6				3000.00							18000				18000			
Telephone expense @ 3400/mo.	6				3400.00							20400				14123 / 20400			
Office Supplies @ 600/mo.	6				600.00							3600				2492 / 3600			
Office Equipment @ 600/mo	6				600.00							3600				2492 / 3600			
Safety Equipment & Supplies @ 1,000/mo	6				1000.00							6000				4154 / 6000 / 8308			
Radio @ 2000/mo.	6				2000.00							12000				12000			
Job Photos	6				250.00							1500				1038 / 1500			
Reproduction & Blue Print	6				500.00							3000				207 / 3000	1280.51		
Reduce to 18 weeks			21604						214964			457870	7002	780	18230	2932	706898		
Field Supervision		20520							189206			280576	4903	540	12690	2030	489884	489,884	
									643139			162565	17160	1890	43470	7105	875330		
		22,680							832345			443081	22063	2430	56160	9135	1365214		

188

PROJECT: ITEM NO. EST. BY P193 SHEET 2 OF

SPEC. REFERENCE: DESCRIPTION CHKD. BY

DWG. REFERENCE: BID DATE ENGR. QUANTITY DATE:

		UNITS EQP.	UNITS MAN	LABOR	R & B	OTHER	CO. RENT	3RD PARTY RENT	FUEL	LUBE PARTS	LABOR	R & B OR TRAVEL	OTHER	COMPANY RENTAL	3RD PARTY RENTAL	FUEL	LUBE & WEAR PARTS	SUBTOTAL	PERMANENT MATERIALS	SUB-CONTRACT	TOTAL COST
Project Manager	26 wks @ 2500.00/wk	1560	1560	4167	—	—	2.27	.25	5.75	.94	65005	—	—	3541	390	8970	1466	79372			
Project Supt. Days	26 wks @ 2400/wk	1560	1560	40.00	—	—	2.27	.25	5.75	.94	62400	—	—	3541	390	8970	1466	76767			
Project Supt. Nights	26 wk @ 2400/wk		1560	40.00	—	—	—	—	—	—	62400	—	—	—	—	—	—	62400			
Project Engineer	26 w @ 2260/wk	1560	1560	3767			2.27	.25	5.75	.94	58765	—	—	3541	390	8970	1466	73132			
Office Manager	26 w @ 2080/wk		1560	3767	—	—	—	—	—	—	54085 32663	—	—	—	—	—	—	54085			
timekeeper/clerk days	26 @ 1350/wk		1560	22.50	—	—	—	—	—	—	35100	—	—	—	—	—	—	35100			
timekeeper/clerk nights	26 @ 1350/wk		1560	2250	—	—	—	—	—	—	35100	—	—	—	—	—	—	35100			
Materials Clerk	26 @ 1350/wk		1560	2250	—	—	—	—	—	—	35100	—	—	—	—	—	—	35100			
Equipment Supt	26 @ 2400/wk	1560	1560	40.00	—	—	2.27	.25	5.75	.94	62400	—	—	3541	390	8970	1466	76767			
Expediter - Job		1560	3120	3204	—	—	2.27	.25	5.75	.94	49982	—	—	3541	390	8970	1466	64349			
Survey - Party Chief	26 wks	3120	3120	3171	—	—	2.27	.25	5.75	.94	98935	—	—	7082	780	17940	2933	127670			
2 Parties Inst. Man			3120	2909	—	—	—	—	—	—	90761	—	—	—	—	—	—	90761			
HD Chainman			3120	2831	—	—	—	—	—	—	88327	—	—	—	—	—	—	88327			
Rear Chainman			3120	2770	—	—	—	—	—	—	86424	—	—	—	—	—	—	86424			
Safety Engineer	26 @ 1700/wk		1560	2833	—	—	1.54	.50	5.75	.94	44195	—	—	—	—	—	—	44195			
General liability Ins. @ 4½% of gross Labor 3,612,559 @ 4½%											—	—	162,565 274282	—	—	—	—	162565 274282			
Refuse to 18 weeks			~~29644~~ 20520								~~928999~~ 643,139	—	~~274282~~ 162565	~~24787~~ 17160	~~2730~~ 1890	~~62790~~ 43470	~~10263~~ 7105	~~1303831~~ 875330	875,330		

189

(F) Susitna Camp Estimates

Devil Canyon Earthwork

Alaska International Construction, Inc.
PROJECT: Susitna Hydroelectric Project — SUMMARY SHEET — EST. BY — SHEET OF
SPEC. REFERENCE: — Devil Canyon Const Camp & Village — CHKD. BY
DWG. REFERENCE: (36)(14) — BID DATE — ENGR. QUANTITY — 42% Rev - 58% Stripping — DATE: 1-21-81

			.1 LABOR HOURS	1 LABOR	2 R & B OR TRAVEL	3 OTHER	4 COMPANY OWNED RENTAL	5 3RD PARTY RENTAL	6 FUEL	7 LUBE & WEAR PARTS	.0 SUBTOTAL	8 PERMANENT MATERIALS	9 SUB-CONTRACT	0 TOTAL COST	ADJUSTMENTS: Alb Indirect 28.922492%	ADJ 8½% OH&P 13% PROFIT 21.5%	.	BID
1	Clearing - Stripping & Fine Grading	83 ACRES	9031	314979		22410	483457	49078	241551	60113	1171588	350742		1171588	1510440	1835185	22,110.66	AC
2	Install Granular Pad	439,400 CY	20746	722487	—	—	872189	94244	367653	176691	2233264	638588		2233264	2879180	3498204	7.96	CY
3	Const. Main Roads in Camp [34']	6,100 L.F.	1095	37528	—	—	49490	5464	19844	10225	122551	35533		122551	157996	191965	31.47	L.F
4	Connecting Road & Access Rd [34']	7,200 L.F.	9557	332022	—	—	406161	44035	170353	80622	1033193	295019		1033193	1332018	1618402	224.78	L.F
5	Secondary Road [24']	400 L.F.	69	2353	—	—	3103	343	1245	539	7583	2127		7583	9776	11878	29.70	L.F
6	Ditching	31,400 L.F.	930	30778	—	—	21223	2114	7803	2198	64116	12115		64116	82550	100298	3.19	L.F
7	Culverts	640 L.F.	144	4908	—	6456	944	87	980	123	6542	6190 6458		12998	16750	20351	31.80	L.F
8	Perimeter Fencing	7,850 L.F.	1515	51512	—	32970	2576	—	3148	—	90206			90206	116296	141299	18.00	L.F
9	Parking Areas	37,000 S.F.	115	3937	—	—	5191	573	2082	1073	12856	3728		12856	16574	20137	.54	S.F
10	P.O.L. Clearing & Stripping	9 ACRES	979	34154	—	2430	52423	5322	26192	6518	127039	36032		127039	163782	198995	22,110.66	AC
11	P.O.L. Earthwork Berms	30,000 CY	2569	84720	—	37595	70848	7533	29751	14298	207150	375953	57,582	583103	751751	913377	30.45	CY
12	MCV Clearing-Stripping & Fine Grading	95 ACRES	9818	342433	—	25650	555239	55595	306584	71666	1357087	423265		1357088	1749592	2125754	22,376.36	AC
13	Install Granular Fill	459,800 CY	21591	739797	—	—	905146	98027	391887	184164	2319021	671028		2319021	2989740	3632534	7.90	
(a)	Main Road	2,300 L.F.	413	14131	—	—	18266	2024	7638	3222	45881	13004		45881	59151	71868	31.25	LF
(b)	Secondary Road [24']	19,600 L.F.	3363	115199	—	—	152967	16906	62262	26676	374030	108844		374030	482209	585884	29.89	L.F
13	Connection to Access Road [34']	4,000 L.F.	5771	206021	—	—	247296	26856	106222	99365	629760	182402		629760	811902	986461	246.62	L.F.
14	Ditching	51,600 L.F.	1560	51625	—	—	35600	3546	13089	3687	107547	31322		107547	138652	168462	3.26	L.F.
15	Culverts - 320 lbs	7,440 L.F.	1674	51296	—	7461	10921	1007	11393	1432	76049	13,833 74611		150660	194235	235996	31.22	L.F
16	Perimeter Fencing	9,100 L.F.	1756	59715	—	38220	2986	—	3649	—	104570			104570	134815	163800	18.00	L.F.
17	Parking Areas	37,500 S.F.	116	3979	—	—	5283	584	2150	921	12917	3655		12917	16653	20233	.54	SF
18	Sewage Lagoons	3 EA	3370	98297		202338	81047	8643	34204	16803	238994	59,650		441332	568974	691306		
	Water Reservoirs (800,000 gl)	2 EA	1280	40012		169696	31364	3414	13548	6400	264424	(11681)		264424				EA
	Intake Reservoirs (850,000 gl)	1 EA	656	20506		86964	16074	1750	6943	3280	135517	(11973)		135517				
19	Indirects					1037698	4030364		1830091		10741885							
			115403	3866435		2202263	3933690	415494	1823271	701500	12964873			13625287				
		12,872 mandays							1857475					14066619		17245897		
	Solid Waste								1,375,907 gal.									
	2 each 800,000 gl water storage tanks			6146		109848	596		752					117342	151280	183805	91,902.62	EA
	Earthwork /SF			6.5621		4.20	.3281		.4010								192	

Alaska International Construction, Inc.

PROJECT: Devil Canyon Clearing & Stripping SUMMARY SHEET — EST. BY FIGI — SHEET OF

SPEC. REFERENCE: MCC - Site Prep — CHKD. BY

DWG. REFERENCE: BID DATE — ENGR. QUANTITY — DATE: 2-2-82

	.1 LABOR HOURS	1 LABOR	2 R & B OR TRAVEL	3 OTHER	4 COMPANY RENTAL	5 3RD PARTY RENTAL	6 FUEL	7 LUBE & WEAR PARTS	.0 SUBTOTAL	8 PERMANENT MATERIALS	9 SUB-CONTRACT	0 TOTAL COST	ADJUSTMENTS	BID
Previous total GR 83 Acres	9031	314979	—	22410	483457	49078	241 557 (350 742)	60113	1171588					
Debit Hauling with headtails - (the top 6' can go on the bottom of the stockpile & stay there) Reduce Scraper Hours to 767 = 573,600÷2400 = 239 x 1683									96362 390287 486649					
										Rev.	486,649	= 42%		
										Strip.	684,939	= 58%		
											1171588			
Strip =		182688		22410	280405		203430		688933					
Excavation		123100		33532	126945		137078		482655					499123

193

E:92

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

DATE: 2-2-92 SHT.: _____ OF _____
CALCULATIONS BY: _____
SUBJECT: _____

PROJECT: Susitna Hydroelectric

Clearing
Use D8K w/Rome blade to push over trees & windrow
Susan DeBais

Stripping
83 ACRES @ 1.5' = 200,860 c.y. to haul one dispose of
Figure a 1,000 ft haul to a stockpile 75' high

- SCRAPER will make a Round trip in 4.39 min
1 unit will haul 200,860 c.y. in 767 hr @ 262 c.y./hr
Previously calculated for a 4,000 ft haul.

Alaska International Construction, Inc.

PROJECT: Susitna Hydroelectric Project - Preliminary Estimate — ITEM NO. 1 — EST. BY — SHEET 1 OF

SPEC. REFERENCE: Devil Canyon — DESCRIPTION Main Construction Camp - Site Preparation - Clearing & Stripping — CHKD. BY

DWG. REFERENCE: — BID DATE — ENGR. QUANTITY 83 Acres — DATE: 12-29-81

Clearing & Stripping 83 Acres

	UNITS EQP.	UNITS MAN	LABOR	R & B	OTHER	CO. RENT	3RD PARTY RENT	FUEL	LUBE PARTS	LABOR	R & B OR TRAVEL	OTHER	COMPANY RENTAL	3RD PARTY RENTAL	FUEL	LUBE & WEAR PARTS	SUBTOTAL	PERMANENT MATERIALS	SUB-CONTRACT	TOTAL COST
All brush, trees, roots & other unsuitable material shall be transported to a suitable disposal area. The topsoil shall be stripped & stockpiled for future use. Do clearing work while the ground is still frozen - Strip off brush, moss and the top of the root system. Use clearing blades and windrower. Burn timber and haul debris to disposal area located where the average haul distance is 4,000 ft. Use D8K with some blade to fell & windrow trees - Burn. Use same hauling spread as Watana MCC but with 1/2 material (1/2 will be burned). Use cat 637D Scrapers to haul topsoil to a stockpile site located where the average haul is 4,000 ft. - Figure 1½ ft of topsoil.																					
Clearing & Burning																				
3 D8K w/some blade - 83 Acres @ 3.1B h/acre (estimate each)	264	264	34.06	—	—	64.00	6.49	24.20	5.71	8992	—	—	16896	1713	6389	1507	35497			
Fuel 4k w/driver → 70 lb	70	70	33.00	—	—	11.77	.80	19.34	2.41	2310	—	—	824	56	1354	169	4713			
Diesel oil @ 2009 gl per acre - 16,600	16,600	—	—	—	—	1.35	—	—	—	—	—	22410	—	—	—	—	22410			
1 Foreman w/P.U.	88	88	36.92	—	—	2.27	.25	11.97	.94	3249	—	—	200	22	1053	83	4607			
Dozer bunching to loaders & clean up - 8K	53	53	36.04	—	—	64.00	6.49	24.20	5.71	1910	—	—	3392	344	1283	303	7232	D8K	7227 / 67	
2 966 E loaders	106	106	35.86	—	—	89.99	9.71	27.08	19.30	3801	—	—	9539	1029	2870	2046	19285	D6	74454 / 83 =	897.00
8 769C Dump Trucks (34,570 CY)	424	424	33.37	—	—	60.00	6.65	28.66	10.69	14149	—	—	25440	2820	12152	4583	59094	D6		
1 Dozer on stockpile D8K	53	53	34.06	—	—	64.00	6.49	24.20	5.71	1805	—	—	3392	344	1283	303	7127			
1 D6 dozer on haul road	53	53	34.06	—	—	44.98	4.41	12.99	4.69	1805	—	—	2384	234	688	249	5360	D6		165.52
2 Pit lights	106	—	—	—	—	1.77	.11	.56	.05	—	—	—	188	12	59	5	264	D6	98 / 382	
Haul top soil (200,860 CY) 10 days																				
1 Foreman	200	200	36.92	—	—	2.27	.25	11.97	.94	7384	—	—	454	50	2394	188	10470			
12 Scrapers - 637D - Cat	2400	2400	34.06	—	—	124.11	13.24	62.38	15.21	81744	—	—	297864	31776	125712	36504	573600			
2 D9H Push Cats	400	400	34.06	—	—	102.66	10.16	35.16	8.90	13624	—	—	41064	4064	14064	3560	76376			
2 D9L Ripper Cats	400	400	34.06	—	—	102.66	10.16	35.16	8.90	13624	—	—	41064	4064	14064	3560	76376			
1 14G Blade	200	200	34.06	—	—	44.98	4.41	12.99	4.69	6812	—	—	8996	882	2598	938	20226			
1 Buy - Bus only	200	—	—	—	—	7.20	.36	17.95	2.17	—	—	—	1440	72	3990	434	5936			
6 Pit lights	1200	—	—	—	—	1.77	.11	1.56	.05	—	—	—	2124	132	1072	60	4188			
Mechanical Support (10 days each) Big shop = 240 lb																				
1 master mechanic w/p.u. each	240	240	39.25	—	—	2.27	.25	11.97	.94	9420	—	—	545	60	2873	226	13124			
2 mechanic foreman w/p.u.	480	480	38.14	—	—	2.27	.25	11.97	.94	18307	—	—	1090	120	5746	451	25714			
10 mechanics w/5 tools	1200	2400	35.17	—	—	10.05	.41	12.95	2.18	84400	—	—	12060	492	21540	2616	121116			
1 Fueler	240	240	33.00	—	—	11.77	.80	19.34	2.41	7920	—	—	2825	192	4642	578	16157			
2 oilers	240	480	34.36	—	—	12.61	.90	19.34	2.68	16493	—	—	3026	216	4642	643	25020			
2 tiremen	480	480	35.88	—	—	11.77	.80	19.34	2.41	17222	—	—	5650	384	9283	1157	33696			
Tmp shop & tools @ 450.00/day	10		—	—	—	300.00	—	100.00	—	—	—	—	3000	—	1000	—	4000			
		9031 hrs								314979	—	22410	483457	49078	241551	60113	1171588			195

108.81 man hrs/acre — 3774.71 /acre — 270.00/acre — 5824.78/acre — 591.30/acre — 2910.25/acre — 724.25/acre — 14,115.42/acre

F 200

Susitna Project

Devil Canyon mcc 83 acres

Clearing

use D8K w/Romo blade to push over trees 5 min/acre
bunching into windrows 60 min/hr

2 hrs. 11 hrs/acre
2.18 hrs/acre

Burning

Figure 200 gal diesel oil/acre
1 D8K for bunching same as windrows = = 1 hr 1

= 3.18 hr/acre

6" = 22,500 ÷ 27 = 833 cy x 83 acres = 69,139 ÷ 2 = 34,570 cy

Haul units

Round trip = 15.49 min
cy/hr/unit = ~~71.00~~ 81.65 w/15% overfill
haul 34,570 cy = 423 hrs for one unit to haul
423 ÷ 8 units = 53 hrs

Loaders

use 2 loaders / 8 trucks to haul 651 cy/hr

34,570 cy ÷ 651 = 53 hrs

Stripping same as mcc

637 D cat scrapers = 1 to haul
12 scrapers x 83.28 cy/hr = 999.36 say 1000 cy/hr

83 acres @ 1.55 ft = 200,860 ÷ 1000 = 200 hrs = 10 days

Rippers use same numbers as mcc

2 D9L @ 200 hrs

Alaska International Construction, Inc.

PROJECT: Susitna Hydroelectric Project - Preliminary Estimate — ITEM NO. 2 — EST. BY F201 — SHEET 2 OF

SPEC. REFERENCE: Devil Canyon — DESCRIPTION Main Construction Camp - Site Preparation - Fine Grading — CHKD. BY

DWG. REFERENCE: — BID DATE — ENGR. QUANTITY 399,000 Sq. Yds — DATE: 12-29-81

Fine Grading - 399,000 Sq. Yds.

	UNITS EQU.	UNITS MAN	LABOR	R & B	OTHER	CO. RENT	3RD PARTY RENT	FUEL	LUBE PARTS	LABOR	R & B OR TRAVEL	OTHER	COMPANY RENTAL	3RD PARTY RENTAL	FUEL	LUBE & WEAR PARTS	SUBTOTAL	PERMANENT MATERIALS	SUB-CONTRACT	TOTAL COST
this Item included in Clearing & Stripping																				

19

Alaska International Construction, Inc.

PROJECT: Susitna Hydroelectric Project - Preliminary Estimate — ITEM NO. 3 — EST. BY F202 — SHEET 3 OF

SPEC. REFERENCE: Devil Canyon — DESCRIPTION Main Construction Camp - Site Preparation - Install granular pad — CHKD. BY

DWG. REFERENCE: — BID DATE — ENGR. QUANTITY 1,063,000 cy — DATE: 12-29-81

Granular Pad 1,063,000 cy	UNITS EQP	UNITS MAN	LABOR	R & B	OTHER	CO. RENT	3RD PARTY RENT	FUEL	LUBE PARTS	LABOR	R & B OR TRAVEL	OTHER	COMPANY RENTAL	3RD PARTY RENTAL	FUEL	LUBE & WEAR PARTS	SUBTOTAL	PERMANENT MATERIALS	SUB-CONTRACT	TOTAL COST
Borrow Pit Development Borrow Area G																				
Strip Borrow pit - Figure extra 20ft with Ripper Cats to open pit																				
Borrow Pit G is reported to be good clean but course material unfrozen																				
Haul Road (±) will be an add on																				
Construct Gravel Pad 1,063,000 cy +10% = 1,169,300 cy																				
Production with 21 B 70's = 55 days x 20h = 1100 h																				
Figure some crews as Watana MCC																				
55 days																				
1 Foreman w/P.U.	1120	1120	36.92	—	—	.227	.25	11.97	.94	41350	—	—	2542	280	13406	1053	58631			
2 D9L's in Pit - Ripping & Stockpiling	2240	2240	34.06	—	—	10.216	10.16	35.16	35.46	76294	—	—	229958	22758	78758	57030	464798			
2 988 B Loaders in pit	2200	2200	35.86	—	—	6.997	9.71	22.08	19.30	78892	—	—	19798	21362	48576	42460	389268			
1 Teamster Foreman w/P.U.	1100	1100	35.59	—	—	.227	.25	11.97	.94	39149	—	—	2497	275	13167	1034	56122			
21 B-70 S	23100	23100	31.59	—	—	8060	9.40	26.94	18.60	799029	—	—	186186	217140	622314	425040	3925383			
3 14G Blades	3300	3300	34.01	—	—	4498	4.41	12.99	4.62	112398	—	—	148434	14553	42867	15477	333729			
1 Foreman on Sill w/P.U.	1100	1100	36.92	—	—	.227	.25	11.97	.44	40612	—	—	2497	275	13167	484	57035			
D9L Sillcat	1100	1100	34.06	—	—	10.216	10.16	35.16	8.90	37466	—	—	112926	11176	38676	9790	210034			
2 SP 56 Vibratory Rollers	2200	2200	32.54	—	—	2134	2.45	5.98	2.90	71588	—	—	46948	5390	13156	6380	143462			
10 Oil Lights	6600	—	—	—	—	177	.11	.52	.05	—	—	—	11682	736	3696	330	16434			
1 Grade Checker	1100	1100	31.16	—	—	—	—	—	—	34276	—	—	—	—	—	—	34276			
3 10,000 gal water trucks	3300	3300	32.04	—	—	7154	8.11	22.26	8.12	105732	—	—	236247	26763	75075	26795	443817	443,817		26,795
3 8" water pumps	3300	—	—	—	—	837	.46	5.93	.76	—	—	—	27621	1518	19536	2508	51183			
2 18,000 gal water tanks	2200	—	—	—	—	1363	1.26	—	.48	—	—	—	29964	2772	—	1056	33792			
— mechanical Support @ 12h 2 shifts																				
1 master mechanic w/P.U.	1320	1320	39.25	—	—	2.27	.25	11.91	.94	58810	—	—	2996	330	15800	1241	72177			
2 Mechanic Foremen w/P.U.	2640	2640	38.44	—	—	2.27	.25	11.97	.94	100690	—	—	5993	660	31601	2482	141426			
12 Mechanics w/6 mech trucks	7920	15840	35.17	—	—	10.05	1.41	17.95	2.18	557093	—	—	79596	3247	142164	17266	799366			
2 Firemen w/2 fire trucks	2640	2640	35.88	—	—	11.77	.80	19.34	2.41	94723	—	—	31073	2112	51058	6363	185328			
2 Service Oilers - w/1 Service truck	1320	2640	34.36	—	—	12.61	.90	19.34	2.28	90710	—	—	16645	1188	25529	3534	137596			
1 Fueler w/1 Fuel truck	1320	1320	33.00	—	—	11.77	.50	19.34	2.41	43560	—	—	15536	1056	25529	3181	88862			
4 Shop Mechanics	—	5280	35.17	—	—	—	—	—	—	185698	—	—	—	—	—	—	185698			
1 Bus - Bus only	1320	—	—	—	—	7.20	.76	17.95	3.51	—	—	—	9504	475	23694	2864	36537			
Temporary shop & Shop Equipment	55	—	—	—	—	350.00	—	1000.42	—	—	—	—	19250	—	5500	—	24750			
		73540								2561070	—	—	3091747	334056	1303269	626357	7916499		198,001	
11% on 50% 1/2 of access Road Costs .069182 (Delete)										2.4093			2.9085	.3143	1.2260	.5892	7.4473			
													See Recapitulation Sheet							
Cost per hour		3.184								110869			133.842	14.461	56.419	27.115	342.706			

(23,100 hp)

MCC GRANULAR FILL

3.10	***
5500.00	***
16.77	***
4.00	***
2500.00	***
21.35	***
2.90	***
3500.20	***
26.97	***
0.00	***
1000.00	***
27.26	***
-13.00	***
750.00	***
29.44	***
0.00	***
4500.00	***
33.96	***
-6.70	***
1500.00	***
35.16	***
0.00	***
3200.00	***
38.38	***
8.00	***
2500.00	***
45.31	***
0.00	***
2000.00	***
47.42	***
52.82	***
26950.00	***
42.60	***
1063000.00	***
hours 25011.84	***
241143.52	***

7.00	1
85.00	2
0.52	3
45.00	4
5.95	***
0.00	***
45.00	***
4.16	***
8.00	***
45.00	***
540.87	***
12.02	***
52.82	***
2.	***
1.14	***
21.16	***
21.	***
1[illegible]3.00	***
[illegible].00	***
1165[illegible].00	***
[illegible].42	***
[illegible]	***

Susitna Project

Devil Canyon - Site Preparation

MCC GRANULAR FILL 1,063,000 cy

Haul 1,063,000 cy

5500'	@ 9.1%	grade
2500'	@ 4.0%	"
3500'	@ 2.9%	"
1000'	@ 0%	"
750'	@ -13.%	"
4500'	@ 0%	"
1500'	@ -6.7%	"
3200'	@ 0%	"
2500'	@ 8%	"
2000'	@ 0%	"

Quarry

5:1 mile 26,950 = 1,063,000 cy 24953 lb

52.82 min / trip

Use 21 B-70's - working 20 h / day

1,063,000 + 10% sub. = 1,169,300 cy

55 days x 20 = 1100 h

Recalculation

haul from Quarry location

Figure from quarry dist: 52.82
29.44
23.38 min per Round trip

13,700 ft haul dist

60 min ÷ 23.38 = 2.14 trips per hr. x 45 cy = 96.24 cy / h

132,875 ÷ 96.20 1381

265,750 ÷ 96.24 = 2761

PROJECT: Susitna Hydroelectric Project — ITEM NO. — EST. BY 1-20-1 — SHEET OF

SPEC. REFERENCE: — DESCRIPTION Haul Road Construction — CHKD. BY

DWG. REFERENCE: — BID DATE — ENGR. QUANTITY — DATE:

	UNITS EQP.	UNITS MAN	LABOR	R & B	OTHER	CO. RENT	3RD PARTY RENT	FUEL	LUBE PARTS	LABOR	R & B OR TRAVEL	OTHER	COMPANY RENTAL	3RD PARTY RENTAL	FUEL	LUBE & WEAR PARTS	SUBTOTAL	PERMANENT MATERIALS	SUB-CONTRACT	TOTAL COST
40' wide Cost to build Haul Road from Pit G to intersection Requires 242,333 cy																				
Use Prorate from MCC haul costs																				
Haul cost / day for 11 days	11	11	46,584.93	—	—	5623.58	6,073.75	23,695.80	14,968.33	512214			618 349	66 811	266 654	169 872	1622900			
		14708																		
1/2 =		73546								256107			309175	33405	130 327	82436	811450			
Nine Years																				

200

Susitna Project

Derivation

Haul Road Construction

Rit.

Segment	1	39,105 cy	241 hr
Segment	2	41,475 cy	453 hr
Segment	3	58,065 cy	765 hr
Segment	4	16,590 cy	243 hr
Segment	5	12,443 cy	189 hr
Intersection Segment	6	74,655 cy	1235 hr
		242,333 cy	3,126 hr

Use Segment 4 + 2 mi extra running as average time
32.98 + 2 = 24.98 mi per trip

did not use subsidence figure

Susitna Project

Devil Canyon

Install Granular Pad.

Haul Road Construction to intersection of MCC & MCV access roads

Figure 4' fill with 90' shoulder to shoulder to elev 1600 which is 5500' in length & .8' fill the additional haul dist.

40+8 = 48 x 4 = 192 ÷ 27 = 7.11 cy/sf 4' fill
40+16 = 56 x 8 = 448 ÷ 27 = 16.59 cy/sf 8' fill

Segment 1 5500' x 7.11cy = 39,105 cy @ 5500 ÷ 2 = 2750' @ 9.1% grade

Segment 2 2500' x 16.59 cy = 41,475 cy @ 2500 ÷ 2 = 1250'
5500' @ 9.1% grade
1250' @ 4% grade

Segment 3 3500' x 16.59 = 58065 cy @ 3500 ÷ 2 = 1750'
5500' @ 9.1%
2500' @ 4.%
1750' @ 2.9%

Segment 4 1000' x 16.59 = 16,590 cy @ 1000 ÷ 2 = 500'
5500' @ 9.1%
2500' @ 4.0%
3500' @ 2.9%
500' @ 0%

Segment 5 750' x 16.59 = 12,443 cy @ 750 ÷ 2 = 375'
5500' @ 9.1%
2500' @ 4.0%
3500' @ 2.9%
1000' @ 0%
375' @ -13%

Segment 6 4500' x 16.59 = 74,655 cy @ 4500 ÷ 2 = 2,250'
5500' @ 9.1%
2500' @ 4.%
3500' @ 2.9%
1000' @ 0%
750' @ -13%
2250' @ 0%

Alaska International Construction, Inc.
PROJECT: Susitna Hydroelectric Project ITEM NO. EST. BY FCD pm SHEET OF
SPEC. REFERENCE: DESCRIPTION Main Construction Camp Recalculation Sheet CHKD. BY
DWG. REFERENCE: BID DATE ENGR. QUANTITY DATE: 1-21-81

Filgtman -

	UNITS EQP.	UNITS MAN	LABOR	R & B	OTHER	CO. RENT	3RD PARTY RENT	FUEL	LUBE PARTS	LABOR	R & B OR TRAVEL	OTHER	COMPANY RENTAL	3RD PARTY RENTAL	FUEL	LUBE & WEAR PARTS	SUBTOTAL	PERMANENT MATERIALS	SUB-CONTRACT	TOTAL COST
Figure to Reduce Pad Fill from 8' to 3' 2' to be Strippings from spillway excavation 1' granular topping to conv from pit "G" Project Pit "G" haul - 10% subsidence is figured in cost																				
1' = 132,875 cy = Pit "G" .069182 hrs/cy		(9,193)	2.4093	—	—	2.9085	.3143	1.2260	.5892	320136	—	—	386467	41763	162905	78290	989561	7.447		
2' = 306,528 cy = 2,761 h Quarry/Loader 2,761 hrs		(8,791)	110.869	—	—	133.842	14.161	52.419	27.115	306109	—	—	369538	39927	155773	74865	996212	3.56/cy		
3.184																				
439,403 cy		17984								626245			751005	81690	318678	153155	1935773			
																	4.41			

Alaska International Construction, Inc.

PROJECT: Susitna Hydroelectric Project- Preliminary Estimate — ITEM NO. 4 — EST. BY [illegible] — SHEET 4 OF

SPEC. REFERENCE: Devil Canyon — DESCRIPTION Main Construction Camp - Site Preparation - Const. Main Roads in Camp "34' wide" — CHKD. BY

DWG. REFERENCE: — BID DATE — ENGR. QUANTITY 6,100 L.F. — DATE: 12-29-81

Camp roads 6,100 Lf.	UNITS EQP.	UNITS MAN	LABOR	R & B	OTHER	CO. RENT	3RD PARTY RENT	FUEL	LUBE PARTS	LABOR	R & B OR TRAVEL	OTHER	COMPANY RENTAL	3RD PARTY RENTAL	FUEL	LUBE & WEAR PARTS	SUBTOTAL	PERMANENT MATERIALS	SUB-CONTRACT	TOTAL COST
Use Crushing factors from work sheet																				
Use Haul factors from MCV fill work sheet																				
Crushed D1 - 6,100 l.f. x 1.22 = 1342 cy																				
Crushed "A" 6,100 l.f. x 1.0 6100 cy																				
Crushed Aggregate for A.C. = 6,100 l.f. x .21 1281 cy																				
8723 cy																				
Factors for Crushing ..... .056391 h/cy	8723	8723	1.8929	—	—	2.7650	.3120	1.0489	.3966	16572	—	—	24119	2722	9150	3460	55963			
Haul Factors .069182 h/cy	8723	8723	2.4093	—	—	2.8085	.3193	1.2260	.7755	21016	—	—	25371	2742	10694	6765	66588			
AC lining - Subcontract																				
6,100 l.f x 34 = 207,400 ÷ 9 = 23,044 sq yd @ 7.50																			172830	
		10956								37528	—	—	49490	5464	19844	10225	122557		172830	295387

2 of

PROJECT: Susitna Hydroelectric Project - Preliminary Project | ITEM NO. 5 | EST. BY RWH | SHEET 5 OF

SPEC. REFERENCE: Devil Canyon | DESCRIPTION Main Construction Camp - Site Preparation - Connecting Rd. to Access Rds. | CHKD. BY

DWG. REFERENCE: | BID DATE | ENGR. QUANTITY 7,200 LF 34' | DATE: 12-28-1981

Connecting Road to Access Rds 7,200 LF	UNITS EQP.	UNITS MAN	LABOR	R & B	OTHER	CO. RENT	3RD PARTY RENT	FUEL	LUBE PARTS	LABOR	R & B OR TRAVEL	OTHER	COMPANY RENTAL	3RD PARTY RENTAL	FUEL	LUBE & WEAR PARTS	SUBTOTAL	PERMANENT MATERIALS	SUB-CONTRACT	TOTAL COST
This Road installed as a haul road at the same time as the Main Construction Camp "Install GRANULAR PAD"																				
USE PRORATE FROM MCC Haul & Place Constructed to a 40 ft width 119,448 CY :.069102 mnh	119,448	119,448	2.4093	—	—	2.9085	.3143	1.2260	.5892	287786	—	—	347415	37543	146443	70379	889566			
PRORATE FROM GRAVEL CRUSHING :.179565	7200	7200	6.1439	—	—	8.1591	.9017	3.3209	1.4226	44.236	—	—	58.746	6492	23912	10.243	143622			
Asphalt @ 7,200 x 34 = 244,800 ÷ 9 = 27200 x 7.50																			204000	
	8264 1293 9557									332022	—	—	406161	44035	170353	80622	1033193		204000	1237193

Haul Road Construction - Connecting Road to Access Road

Segment 7 Haul Road Construction 7,200 SF

1,500' x 16.59 = 24,885 cy @ 1500 ÷ 2 = 750'
5500' @ 9.1%
2500' @ 4.0%
3500' @ 2.9%
1000' @ 0%
750' @ -13%
4500' @ 0%
750' @ -6.7%

Segment 8 3200' x 16.59 = 53,088 cy @ 3200 ÷ 2 = 1600
5500' @ 9.1%
2500' @ 4.0%
3500' @ 2.9%
1000' @ 0%
750' @ -13%
4500' @ 0%
1500' @ -6.7%
1600' @ 0%

Segment 9 2500 SF @ 16.59 = 41475 cy @ 2500 ÷ 2 = 1250'
5500' @ 9.1%
2500' @ 4.0%
3500' @ 2.9%
1000' @ 0%
750' @ -13%
4500' @ 0%
1500' @ -6.7%
3200' @ 0%
1250' @ 8%

Segment

Susitna Project
MCC
connecting Road to access Road

Segment	7	24,885 cy	- 443 ft
Segment	8	53,088 cy	- 997 ft
Segment	9	41,475 cy	- 873 ft
		119,448 cy	2,313 ft

7,200 ft

Use B-70's

119,448 cy

time SOA one unit to haul 2,313 ft
(segment 8 43,27 mi)

use 17 B 70's & haul 1086 cy/hr

PROJECT: Susitna Hydroelectric Project - Preliminary Estimate ITEM NO. 6 EST. BY F212 SHEET 6 OF

SPEC. REFERENCE: Deril Canyon DESCRIPTION Main Construction Camp - Site Preparation - Secondary Road 24' wide CHKD. BY

DWG. REFERENCE: BID DATE ENGR. QUANTITY 400 L.F. DATE: 12-29-81

Secondary Road "24' wide" 400 LF	UNITS EQP.	UNITS MAN	LABOR	R & B	OTHER	CO. RENT	3RD PARTY RENT	FUEL	LUBE PARTS	LABOR	R & B OR TRAVEL	OTHER	COMPANY RENTAL	3RD PARTY RENTAL	FUEL	LUBE & WEAR PARTS	SUBTOTAL	PERMANENT MATERIALS	SUB-CONTRACT	TOTAL COST
Use Crushing factors from Work Sheet																				
Use Haul factors from MCC fill work sheet																				
Crushed D1 400 l.f. e.22 = 88 cy																				
Crushed "A" 400 l.f. e 1.0 = 400 cy																				
Crushed Aggregate for AC 400 l.f. e.148 = 59 cy																				
547 cy																				
Factors from Crushing .056391 h/cy	547	547	1.8129	—	—	2.7650	.3120	1.0489	.3966	1035	—	—	1512	171	574	217	3509			
Haul Factors .069182 h/cy	547	547	2.4093	—	—	2.9085	.3143	1.2260	.5892	1318	—	—	1591	172	571	322	4674			
AC Paving - Subcontract 400 x 24 = 9600 ÷ 9 = 1,067 sq yds @ 7.50																			8003	
		696								2353	—	—	3103	343	1245	539	7583		8003	15586

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702

Alaska International Construction, Inc.

PROJECT: Susitna Hydroelectric Project - Preliminary Estimate — ITEM NO. 7 — EST. BY RJ213 — SHEET 7 OF

SPEC. REFERENCE: Deril Canyon — DESCRIPTION Main Construction Camp - Site Preparation - Ditching — CHKD. BY

DWG. REFERENCE: — BID DATE — ENGR. QUANTITY 31,400 L.F. — DATE: 12-29-81

Ditching 31,400 L.F.	UNITS EQP.	UNITS MAN	LABOR	R & B	OTHER	CO. RENT	3RD PARTY RENT	FUEL	LUBE PARTS	LABOR	R & B OR TRAVEL	OTHER	COMPANY RENTAL	3RD PARTY RENTAL	FUEL	LUBE & WEAR PARTS	SUBTOTAL	PERMANENT MATERIALS	SUB-CONTRACT	TOTAL COST
Work will be done in conjunction with site Grill																				
Crew will do 100 SF per hr																				
31,400 L.F ÷ 100 = 314 hrs. = 31 days																				
31 days x 10 hrs = 310 hrs																				
1 Dk Dozer	316	310	34.06	—	—	23.98	2.41	12.18	2.40	10559	—	—	7279	747	3276	744	23705	—	—	—
1 14G Grader	310	310	34.06	—	—	44.98	4.41	12.99	4.69	10559	—	—	13944	1367	4027	1454	31351	—	—	—
1 Grade Checker	—	310	31.16	—	—	—	—	—	—	9660	—	—	—	—	—	—	9660	—	—	—
		930								30778	—	—	21223	2114	7303	2198	64116			

Alaska International Construction, Inc.

PROJECT: Susitna Hydroelectric Project - Preliminary Estimate — ITEM NO. 9 — EST. BY num — F214 — SHEET 8 OF

SPEC. REFERENCE: Devil Canyon — DESCRIPTION Main Construction Camp - Site Preparation - Culverts — CHKD. BY

DWG. REFERENCE: — BID DATE — ENGR. QUANTITY 640 L.F. — DATE: 12-29-81

Culverts 18" 640 LF	UNITS EQP.	UNITS MAN	LABOR	R & B	OTHER	CO. RENT	3RD PARTY RENT	FUEL	LUBE PARTS	LABOR	R & B OR TRAVEL	OTHER	COMPANY RENTAL	3RD PARTY RENTAL	FUEL	LUBE & WEAR PARTS	SUBTOTAL	PERMANENT MATERIALS	SUB-CONTRACT	TOTAL COST
1. Crew will Place 2 Culverts pr day - say 100' 640 ÷ 100 = 6.4 say 7 days x 10 = 70 hp																				
use Prorate from Watana MCC culvert installation 16500 lb/sf	640	640	19.3183	—	—	2.9942	.2708	3.0625	.3850	12 364	—	—	1 887	173	1960	246	16 630			16630
18" @ 9.73 & 22.20 — 640 lin ft culvert 10 ga																		6450		6450
		416								12364	—	—	1887	123	1960	246	16 620	6450		23080
.2250		144	6.8879			1.4746	.1354	1.5313	.1925	1 4408			944	87	980	123	6542			
Q:																				

Alaska International Construction, Inc.
PROJECT: Susitna Hydroelectric Project - Preliminary Estimate ITEM NO. 9 EST. BY RWM 1215 SHEET 9 OF
SPEC. REFERENCE: Devil Canyon DESCRIPTION Main Construction Camp - Site Preparation - Perimeter Fencing CHKD. BY
DWG. REFERENCE: BID DATE ENGR. QUANTITY 7,850 L.F. DATE: 12-29-81

Fencing - 7,850 L.F.	UNITS EQP.	UNITS MAN	LABOR	R & B	OTHER	CO. RENT	3RD PARTY RENT	FUEL	LUBE PARTS	LABOR	R & B OR TRAVEL	OTHER	COMPANY RENTAL	3RD PARTY RENTAL	FUEL	LUBE & WEAR PARTS	SUBTOTAL	PERMANENT MATERIALS	SUB-CONTRACT	TOTAL COST
Subcontract 7,850 LF @ 15.00 12.0017			6,824		4,20	3181		4010		51512		32970	2576		3148				190206	90206
																				141,300

211

Alaska International Construction, Inc.

PROJECT: Susitna Hydroelectric Project - Preliminary Estimate ITEM NO. 10 EST. BY AWM SHEET 10 OF F21

SPEC. REFERENCE: Devil Canyon DESCRIPTION Main Construction Camp - Site Preparation - Parking Areas CHKD. BY

DWG. REFERENCE: BID DATE ENGR. QUANTITY 37,000 Sq. Ft. DATE: 12-29-81

Parking Areas - 37,000 Sq. Ft.	UNITS EQP.	UNITS MAN	LABOR	R & B	OTHER	CO. RENT	3RD PARTY RENT	FUEL	LUBE PARTS	LABOR	R & B OR TRAVEL	OTHER	COMPANY RENTAL	3RD PARTY RENTAL	FUEL	LUBE & WEAR PARTS	SUBTOTAL	PERMANENT MATERIALS	SUB-CONTRACT	TOTAL COST
Use Payback from Watana MCC																				
Figure 8" of D1 = 1076 CY/acre																				
37,000 ÷ 43560 = .85 Acres x 1076 = 915 CY																				
Crushed D1 .056391 h/cy	915	915	1.8929	—	—	2.7650	.3120	1.0489	.1396	1732	—	—	2530	285	960	363	5870			
Haul from MCC .069182 h/cy	915	915	2.4097	—	—	2.5085	.3143	1.2260	.1755	2205	—	—	2661	288	1122	710	6986			
		1158								3937	—	—	5191	573	2082	1073	12856			

2/2

Alaska International Construction, Inc.

PROJECT: Susitna Hydroelectric Project - Preliminary Estimate — ITEM NO. 11 — EST. BY RWM — SHEET 11 OF

SPEC. REFERENCE: Devil Canyon — DESCRIPTION POL - Earthwork - Clearing & Grubbing — CHKD. BY

DWG. REFERENCE: — BID DATE — ENGR. QUANTITY 9 ACRES — DATE: 12-29-81

Clearing & Grubbing 9 ACRES	UNITS EQP.	UNITS MAN	LABOR	R & B	OTHER	CO. RENT	3RD PARTY RENT	FUEL	LUBE PARTS	LABOR	R & B OR TRAVEL	OTHER	COMPANY RENTAL	3RD PARTY RENTAL	FUEL	LUBE & WEAR PARTS	SUBTOTAL	PERMANENT MATERIALS	SUB-CONTRACT	TOTAL COST
Prorate for Site Clearing & Stripping 9 acres 108.81 hr/acre	9	9	3,794.93	—	270.00	5,819.78	591.30	2,910.25	724.25	34154	—	2430	52423	5322	26192	6518	127039			
		979 hr.								34154	—	2430	52423	5322	26192	6518	127039			

Alaska International Construction, Inc.

PROJECT: Susitna Hydroelectric Project - Preliminary Estimate | ITEM NO. 12 | EST. BY F213 RUM | SHEET 12 OF

SPEC. REFERENCE: Devil Canyon | DESCRIPTION P.O.L. - Earthwork - Berms | CHKD. BY

DWG. REFERENCE: | BID DATE | ENGR. QUANTITY 30,000 C.Y. | DATE: 12-7-81

P.O.L. BERMS 30,000 C.Y.

	UNITS EQP.	UNITS MAN	LABOR	R & B	OTHER	CO. RENT	3RD PARTY RENT	FUEL	LUBE PARTS	LABOR	R & B OR TRAVEL	OTHER	COMPANY RENTAL	3RD PARTY RENTAL	FUEL	LUBE & WEAR PARTS	SUBTOTAL	PERMANENT MATERIALS	SUB-CONTRACT	TOTAL COST
USE PRORATE FROM Watana MCC. .085644 L/CY	30,000	30,000	2.8240	—	—	2.3616	.2511	.9917	.4166	84720	—	—	70848	7533	29751	14298	207100	375953		
			2569 lb							84720	—	—	70848	7533	29751	14298	207100	375953		

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

DATE: _____ SHT.: _____ OF _____
CALCULATIONS BY: _____
SUBJECT: _____

PROJECT: _____

2-17-82

Clearing & Stripping 95 Acres

Labor	Materials	Equip. own.	O&P	
342,433	25,650	555,239	433,760	1,357,082
198,611	25,650	322,039	251,584	797,884
133,951	38,380	217,195	169,673	559,198

PROJECT: Susitna Hydroelectric Project - Preliminary Estimate ITEM NO. 13 EST. BY F-219 SHEET 13 OF

SPEC. REFERENCE: Deril Canyon DESCRIPTION Main Construction Village - Site Preparation - Clearing & Stripping CHKD. BY

DWG. REFERENCE: BID DATE ENGR. QUANTITY 111 ACRES DATE: 12-29-81

95 ACRES

Clearing & Stripping - 111 ACRES

	UNITS EQP.	UNITS MAN	LABOR	R & B	OTHER	CO. RENT	3RD PARTY RENT	FUEL	LUBE PARTS	LABOR	R & B OR TRAVEL	OTHER	COMPANY RENTAL	3RD PARTY RENTAL	FUEL	LUBE & WEAR PARTS	SUBTOTAL	PERMANENT MATERIALS	SUB-CONTRACT	TOTAL COST
All brush, trees, roots and other unsuitable material shall be transported to a suitable disposal site. the topsoil shall be stripped & stockpiled for future use. Do clearing work while the ground is still frozen. Strip off brush, moss and the top of the root system. Use clearing blades and windrower. Burn timber and haul residue to disposal area located where the average haul distance is 4000 ft. Use D8K with Rome blade to fell timber & windrow trees. Burn use same haul spread as wetland MCC but with 1/2 the volume (it will be burned). Use Cat 657 Scrapers to haul topsoil to a stockpile site located where the average haul is 4,000 ft - Figure 1½ ft of topsoil																				
12 days																				
Clearing & Burning																				
(3) D8K w/Rome blade - 111 ACRES e3.18h/acre = 353h	353	353	34.06	–	–	64.00	6.49	24.20	5.71	12023	–	–	22592	2291	8543	2016	47465			
Fuel Truck w/ driver 94h	94	94	33.00	–	–	11.77	.80	18.34	2.41	3102	–	–	1106	75	1818	227	6328			
Diesel fuel e 200 gal per hr = 22,700 gal	22700	–	–	–	.35	–	–	–	–	–	–	29970	–	–	–	–	29470			
1 Foreman w/PU	118	118	36.92	–	–	2.27	.25	11.97	.94	4357	–	–	268	30	1412	111	6178			
1 DOZER bunching to loaders & cleanup D8K	71	71	34.96	–	–	64.00	6.49	24.20	5.71	2418	–	–	4544	461	1718	405	9546			
988 loaders	142	142	35.86	–	–	89.99	9.71	27.08	19.30	5092	–	–	12779	1379	3845	2741	25834			
8 769C Haultrils (96, 232 cy)	568	568	33.37	–	–	60.00	6.65	28.66	10.69	18954	–	–	34080	3777	16279	6072	79162			
1 DOZER or stockpile	71	71	34.06	–	–	64.00	6.49	24.20	5.71	2418	–	–	4544	461	1718	405	9546			
1 14G blade on haul Road	71	71	34.06	–	–	44.98	4.41	12.99	4.69	2418	–	–	3194	313	922	333	7180			
2 P.U lights	144	–	–	–	–	1.77	.11	.56	.05	–	–	–	255	16	81	7	359			
Haul top Soil (268, 620cy) 13days	20:160																			
1 Foreman w/pu	260	260	36.92	–	–	2.27	.25	11.97	.94	9599	–	–	590	65	3112	244	13610			
12 SCRAPERS - 637D Cat	3120	3120	34.06	–	–	124.11	13.24	52.38	15.21	106267	–	–	387223	41309	163426	47455	745680			
2 D9L Push Cats	520	520	34.06	–	–	102.66	10.16	35.16	8.80	17711	–	–	53383	5283	18283	4628	99288			
2 D9L Ripper Cats	520	520	34.06	–	–	102.66	10.16	35.16	8.80	17711	–	–	53383	5283	18283	4628	99288			
1 14G Blade	260	260	34.06	–	–	44.98	4.41	12.99	4.69	8856	–	–	11695	1147	3377	1219	26294			
1 Bus - Bus only	260	–	–	–	–	7.20	.36	17.95	2.17	–	–	–	19152	958	47747	5772	73629			
6 P.U lights	1872	–	–	–	–	1.77	.11	1.56	.05	–	–	–	2313	206	2920	94	6533			
Mechanical Support 13 days																				
1 master mechanic w/PU	312	312	39.25	–	–	2.27	.25	11.97	.94	12246	–	–	708	78	3735	293	17060			
2 Mechanic Foremen w/PU	624	624	38.14	–	–	2.27	.25	11.97	.94	23799	–	–	1416	156	7469	587	33427			
10 mechanics w/ 5 trucks	1560	3120	35.17	–	–	10.05	.41	17.95	2.18	109730	–	–	15678	640	28007	3401	157451			
1 FITTER w/1 truck	312	312	33.00	–	–	11.77	.80	19.34	2.41	10296	–	–	3672	250	6034	252	21004			
1 OILER w/1 truck	312	312	34.36	–	–	12.61	.90	19.34	2.68	10720	–	–	3934	281	6034	836	21805			
2 tiremen/2 trucks	624	624	35.88	–	–	11.77	.80	19.34	2.41	22389	–	–	7344	499	12068	1504	43804			
temp shop & shop tools	13	–	–	–	–	300.00	–	100.00	–	–	–	–	3900	–	1300	–	5200			
		11472								400106	–	29970	648753	64758	358128	83730	1585643		95 ACRES	
@ 95 ACRES =		9816								342433		25652	555239	55395	306504	71666	1357082	=	1357082	
		103.35								360456		27000	584462	585.21	3226.36	754.32	1428.07			215

F 220

Susitna Project

Devil Canyon MCV

use same as MCC

Clearing & Burning - 111 Acres @ 3.18 hr/acre w/D8 tractor w/Rome blade
= 353 hrs

Hauling clearing debris

6" = 22,500 ÷ 27 = 833 cy x 111 Acres 92466 cy ÷ 2 = 46,232 cy to haul

Round trip = 15.48..
cy/hr/unit = 81.34
haul 46,232 cy = 568 hrs for one unit to haul
÷ 8 units = 71 hr

Loaders

1 loader will handle 4 trucks

637 D Scrapers Stripping Same as MCC

12 Scrapers x 83.28 = 999.36 sm 1000 cy/hr

111 Acres @ 1.5 ft topsoil = 268,620 cf ÷ 7000 = 269 hr

Rippers

2 D9L 269 hr

PROJECT: Susitna, EST. BY RUM SHEET 15 OF

Alaska International Construction, Inc.
PROJECT: Susitna Hydroelectric Project - Preliminary Estimate ITEM NO. 14 EST. BY RUM (R221) SHEET 14 OF
SPEC. REFERENCE: Devil Canyon DESCRIPTION Main Construction Village - Site Preparation - Fine Grading CHKD. BY
DWG. REFERENCE: BID DATE ENGR. QUANTITY 538,000 Sq. Yds. DATE: 12-29-81

Fine Grading 538,000 Sq. Yds	UNITS EQP.	UNITS MAN	LABOR	R & B	OTHER	CO. RENT	3RD PARTY RENT	FUEL	LUBE PARTS	LABOR	R & B OR TRAVEL	OTHER	COMPANY RENTAL	3RD PARTY RENTAL	FUEL	LUBE & WEAR PARTS	SUBTOTAL	PERMANENT MATERIALS	SUB-CONTRACT	TOTAL COST
This Item includes in clearing & grading																				

PROJECT: Susitna Hydroelectric Project – Preliminary Estimate ITEM NO. 15 EST. BY RWM SHEET 15 OF

SPEC. REFERENCE: Devil Canyon DESCRIPTION Main Construction Village - Site Preparation – Install Granular Pad CHKD. BY

DWG. REFERENCE: BID DATE ENGR. QUANTITY 1,935,000 CY DATE: 12-29-81

Granular Pad 1,435,000 CY	UNITS EQP.	UNITS MAN	LABOR	R & B	OTHER	CO. RENT	3RD PARTY RENT	FUEL	LUBE PARTS	LABOR	R & B OR TRAVEL	OTHER	COMPANY RENTAL	3RD PARTY RENTAL	FUEL	LUBE & WEAR PARTS	SUBTOTAL	PERMANENT MATERIALS	SUB-CONTRACT	TOTAL COST
Borrow Pit Development - Borrow Area G																				
Strip Borrow pit - Figure extra 20% with Ripper Cats to open pit																				
Haul Road (½) will be add on																				
Construct gravel Pad 1,435,000cy + 10% = 1,578,500																				
Production with 22 B 70's = 73 days @ 20hrs = 1460hrs																				
Figure same crew as mcc																				
73 days																				
1 Foreman w/P.U.	1480	1480	36.92	—	—	1.27	.25	11.97	.94	54642	—	—	3360	370	17716	1391	77479			
2 D9L's in pit - Ripping & Stockpiling	2960	2960	34.06	—	—	102.66	10.16	35.86	25.46	100818	—	—	303874	30074	104074	75362	614202			
2 988 Loaders in pit	2920	2920	35.86	—	—	89.99	9.71	21.08	19.30	104711	—	—	262771	28353	79074	56356	531265			
1 Teamster Foreman w/P.U.	1460	1460	35.99	—	—	1.27	.25	11.97	.94	51961	—	—	3314	365	17476	1372	74488			
22 B 70's	32120	32120	34.59	—	—	80.60	9.40	26.94	18.46	1111031	—	—	2588872	301928	865313	591008	5458152			.412
3 14G Blades	4380	4380	34.06	—	—	44.98	4.41	22.89	4.69	149183	—	—	197012	19316	100696	20542	486749			
1 Foreman on Sill w/P.U.	1460	1460	36.92	—	—	1.27	.25	11.97	.94	53903	—	—	3314	365	17476	1372	76430			
1 D9L Sillcut	1460	1460	34.06	—	—	102.66	10.16	35.86	8.92	49728	—	—	149884	14834	51334	12994	278774			
2 SP 56 Vibratory Rollers	2920	2920	32.54	—	—	21.34	2.45	5.58	2.26	95017	—	—	62313	7154	17462	8468	190414			
10 pit lights	8760	—	—	—	—	1.77	.11	.56	.05	—	—	—	15505	964	4906	438	21813			
1 Grade Checker	1460	1460	31.16	—	—	—	—	—	—	45494	—	—	—	—	—	—	45494			
3 10,000 gal water trucks	4380	4380	32.04	—	—	71.59	8.14	22.75	8.12	140335	—	—	313564	35522	99645	35566	624637			
3 8" water Pumps	4380	—	—	—	—	8.37	.46	5.93	.76	—	—	—	36662	2015	25973	3329	67978			
2 18,000 gal water tanks	2920	—	—	—	—	13.62	1.26	—	.48	—	—	—	39770	3679	—	1402	44851			
Mechanical Support @ 12% - 2 shifts																				
1 Master mechanic w/P.U.	1752	1752	39.25	—	—	2.27	.25	11.97	.94	68766	—	—	3977	438	20971	1647	95799			
2 Mechanic Foreman w/P.U.	3504	3504	38.14	—	—	2.27	.25	11.97	.94	133643	—	—	7954	876	41943	3294	187710			
12 Mechanics w/6 mechanic trucks	10512	21024	35.17	—	—	10.05	.41	17.95	2.28	739414	—	—	105646	4310	188690	22916	1060976			
2 Tiremen w/2 tire trucks	3504	3504	35.88	—	—	11.77	.80	19.74	2.41	125724	—	—	41242	2803	67767	8445	245981			
2 Service Oilers w/1 serv. truck	1752	3504	34.36	—	—	12.61	.90	19.34	2.68	120397	—	—	22093	1577	33887	4695	182646			
1 Fueler w/1 Fuel truck	1752	1752	33.60	—	—	11.77	.80	19.34	2.41	57816	—	—	20621	1402	33884	4222	117945			
4 Shop Mechanics	7008	7008	35.11	—	—	—	—	—	—	246471	—	—	—	—	—	—	246471			
1 Bus - Bus only	1752	—	—	—	—	7.20	.36	17.95	2.17	—	—	—	12614	631	31448	3802	48495			
temporary shop & shop equipment	23	—	—	—	—	350.00	—	100.00	—	—	—	—	25550	—	7300	—	32850			
		99048								3449054	—	—	4219911	456976	1827032	858621	10811594			
										2.4035			2.9407	.3185	1.2737	.5983	7.5342			
.069023 hr/cy																				
add on for ½ of access Road																				
(Deleted)																				
total with haul Road		67.84								107.380	—	—	131.380	14.227	56.881	26.732	336.600			
32,120		3.084								See Recalculated Sheet										218

Susitna Project

Devil Canyon Site Preparation
MCV granular fill 1,435,000 cy

Haul 1,435,000 cy

5500'	@	9.1%
2500'	@	4.0%
3500'	@	2.9%
1000'	@	0.%
750'	@	-13.%
4500'	@	0.%
1500'	@	-6-7%
3200'	@	0%
2500'	@	8%
4000'	@	0%
28900		

= 1,435,000 cy 34,967 hrs

5.48 mil

Use B-70's

1,435,000 cy
Time for one unit to haul 34,967 hrs

use 22 B-70's & haul - 1083 cy/hr

use same crews to place

Figure 10% subsidence = 1,435,000
143,500
1,578,500

Recalculation

Haul from Quarry location

Figure from Quarry

15,700 ft haul dist

5483
29.94
25.39 min per Round trip

50 min ÷ 25.39 = 1.97 trips per hr at 45 cy = 88.62 cy per hr per truck

Haul from Quarry location

306,528 ÷ 88.67 = 3459 hrs

PROJECT: Susitna 1 EST. BY [illegible] SHEET 16 OF

PROJECT: Susitna 1Y-jdd electric Project ITEM NO. EST. BY [illegible] SHEET

SPEC. REFERENCE: DESCRIPTION Main Construct. Village Recalculation Sheet CHKD. BY

DWG. REFERENCE: BID DATE ENGR. QUANTITY DATE: 1-21-82

	2	1	1	2	3	4	5	6	7	1	2	3	4	5	6	7	0	8	9	0
	UNITS		LABOR	R & B	OTHER	CO. RENT	3RD PARTY RENT	FUEL	LUBE PARTS	LABOR	R & B OR TRAVEL	OTHER	COMPANY RENTAL	3RD PARTY RENTAL	FUEL	LUBE & WEAR PARTS	SUBTOTAL	PERMANENT MATERIALS	SUB-CONTRACT	TOTAL COST
	EQP.	MAN																		
Pad has been reduced from 111 Acres to 95 Acres																				
Figure to reduce. Still from 8' to 3'																				
2' to be Strippings from spillway excavation																				
1' granular topping from pit G																				
Probable Pit "G" haul																				
									7.53											
1' = 153,264 cy from Pit G = .069023		10,578	2.4035	—	—	2.9407	.3185	1.2732	.5983	368370	—	—	450703	48815	195136	91698	1154722			
2' = 306,528 cy - quarry location ÷ 8862 = 3459 / 3.184		11,013	107.380	—	—	131.380	14.227	56.681	26.732 / 336.6∞	371427	—	—	454443	49212	196751	92466	1164299			
459,792		21,591								739797			905146	98027	391887	184164	2319021			

PROJECT: Susitna · EST. BY BWM · SHEET 17 OF
SPEC. REFERENCE: Devil Canyon · CHKD. BY

PROJECT: Susitna Hydroelectric Project - Preliminary Estimate · ITEM NO. 16 · EST. BY BWM · SHEET 16 OF
SPEC. REFERENCE: Devil Canyon · DESCRIPTION Main Construction Village - Site Preparation - Main Road 34' wide · CHKD. BY
DWG. REFERENCE: · BID DATE · ENGR. QUANTITY 2,300 L.F · DATE: 12-29-81

34' wide main Road 2,300 L.F	UNITS EQP.	UNITS MAN	LABOR	R & B	OTHER	CO. RENT	3RD PARTY RENT	FUEL	LUBE PARTS	LABOR	R & B OR TRAVEL	OTHER	COMPANY RENTAL	3RD PARTY RENTAL	FUEL	LUBE & WEAR PARTS	SUBTOTAL	PERMANENT MATERIALS	SUB-CONTRACT	TOTAL COST
Use Crushing factors from Work Sheet Use Haul factors from MCV Fill work																				
Crushed D1 2,300 l.f @ .22 506 cy Crushed 'A' 2,300 l.f @ 1.0 2300 cy Crushed Aggregate 2,300 l.f @ .21 483 cy 3289 cy																				
Factors from Crushing .056391 d/cy	3289	3289	1.8929	—	—	2.7650	.3120	1.0489	.3966	6226	—	—	9094	1026	3450	1304	21100			
Factors from Haul .069023 h/cy	3289	3289	2.4035	—	—	2.9407	.3185	1.2732	.5983	7905	—	—	9672	1048	4188	1968	24781			
AC Parim Sub 2,300 x 34 = 78,200 ÷ 9 = 8689 x 7.50																			6516	6516
.179565 h/sy		4131								14131	—	—	18764	2074	7630	3272	45881		6516	11104
										6.1439			8.1591	.9017	3.3209	1.4226				

PROJECT: Susitna Hydroelectric Project - Preliminary Estimate ITEM NO. 17 EST. BY Rum SHEET 17 OF

SPEC. REFERENCE: Devil Canyon DESCRIPTION Main Construction Village - Site Preparation - Secondary Roads 24' width CHKD. BY

DWG. REFERENCE: BID DATE ENGR. QUANTITY 19,600 L.F. DATE: 12-29-81

Secondary Roads 24' width 19,600 LF.	UNITS EQP.	UNITS MAN	LABOR	R & B	OTHER	CO. RENT	3RD PARTY RENT	FUEL	LUBE PARTS	LABOR	R & B OR TRAVEL	OTHER	COMPANY RENTAL	3RD PARTY RENTAL	FUEL	LUBE & WEAR PARTS	SUBTOTAL	PERMANENT MATERIALS	SUB-CONTRACT	TOTAL COST
Use Crushing Factors from work sheet Use haul factors from MCV haul																				
Crushed D1 = 19,600 LF @ .22 = 4312 Crushed "A" = 19,600 LF @ 1.0 = 19,600 Crushed aggregate = 19,600 LF @ .148 = 2,901 26,813 cy																				
Factors from Crushing .056391 hr/cy	26813	26813	1.8729	—	—	2.7650	.3120	1.0489	.3964	50 754	—	—	74 138	8364	28124	10 634	172 016			
Factors from Haul .069023 hr/cy	26813	26813	2.4035	—	—	2.9407	.3185	1.2732	.5983	64 445	—	—	78 849	8540	34 138	16 042	202 014			
AC Paving-Sub 19,600 X 24 = 470,400 ÷ 9 = 52,267 X 7.50 =																			392 003	392 00
		3,363 hr								115 199	—	—	152 987	16906	62262	26 676	374 030		392 003	766 03

PROJECT: Susitna Hydroelectric Project - Preliminary Estimate ITEM NO. 18. EST. BY pwm SHEET 18 OF

SPEC. REFERENCE: Devil Canyon DESCRIPTION Main Construction Village - Site Preparation - Connection to Access Rd. 34' width CHKD. BY

DWG. REFERENCE: BID DATE ENGR. QUANTITY 4,000 L.F. DATE: 12-29-81

Connection to Access Rd 34' width 4,000 L.F	UNITS EQP.	UNITS MAN	LABOR	R & B	OTHER	CO. RENT	3RD PARTY RENT	FUEL	LUBE PARTS	LABOR	R & B OR TRAVEL	OTHER	COMPANY RENTAL	3RD PARTY RENTAL	FUEL	LUBE & WEAR PARTS	SUBTOTAL	PERMANENT MATERIALS	SUB-CONTRACT	TOTAL COST
this Road installed as a haul road at the same time MCV - install gravel pad																				
Use Prorate from MCV - Haul & Place constructed to a 40' width 72,996 CY .069023 hr/cy	72996	72996	2.4035	—	—	2.9907	.3185	1.2732	.5983	175 446	—	—	214 659	23 249	92 939	43 674	549 967			
Crushed D1 = 4,000 x .22 = 880																				
Crushed "A" = 4000 x 1.0 = 4,000																				
Crushed Aggregate = 4,000 x .21 = 840 / 5720																				
Prorate from Crushers .056391 hr/cy	5720	5720	1.8929	—	—	2.7650	.3120	1.0489	.3966	10827	—	—	15816	1785	6000	2269	36 697			
Prorate from Haulers .069023 hr/cy	5720	5720	2.4035	—	—	2.9907	.3185	1.2732	.5983	13748	—	—	16821	1822	7283	3422	43 096			
A.C. Purina - Sub 4000 x 34 = 136,000 ÷ 9 = 15,111. x 7.50 =																			113333	113333
		5771								200 021	—	—	247 296	26 856	106 222	49 365	629 760		113333	743 093

223

Susitna Project

MCV
Connection to Access Road 4.000 L.F.

Segment No. 10

4000 X 16.59 = 66,360 cy @ 4000÷2 = 2,000 sx

5500'	@ 9.1%
2500'	@ 4.0%
3500'	@ 2.9%
1000'	@ 0%
750'	@ -13%
4500'	@ 0%
1500'	@ -6.7%
3200'	@ 0%
2500'	@ 8%
2000'	@ 0%
26950'	

Same as MCC Cump haul

use D-70's

time for one unit to haul 52.82

use 21 D 70's working 20 h/dcy

66,360 cy + 10% sub = 72996 cy

Alaska International Construction, Inc.

PROJECT: Susitna Hydroelectric Project - Preliminary Estimate ITEM NO. 19 EST. BY F229 SHEET 19 OF

SPEC. REFERENCE: Devil Canyon DESCRIPTION Main Construction Village - Site Preparation - Ditching CHKD. BY

DWG. REFERENCE: BID DATE ENGR. QUANTITY 51,600 L.F DATE: 12-29-81

Ditching 51,600 L.F

	UNITS EQP.	UNITS MAN	LABOR	R & B	OTHER	CO. RENT	3RD PARTY RENT	FUEL	LUBE PARTS	LABOR	R & B OR TRAVEL	OTHER	COMPANY RENTAL	3RD PARTY RENTAL	FUEL	LUBE & WEAR PARTS	SUBTOTAL	PERMANENT MATERIALS	SUB-CONTRACT	TOTAL COST
Work will be done in conjunction with site prep crew will do 100 ft/hr																				
51,600 ÷ 100 = 516 hr = 52 days x 10 = 520 hr																				
52 days																				
1 D6 Dozer	520	520	34.06			23.98	2.41	12.18	2.40	17711			12210	1253	6334	1240	38728			
1 16G Grader	520	520	34.06			44.98	4.41	12.99	4.69	17211			23390	2293	6755	2439	52588			
1 Grade Checker		520	31.16							16203							16203			
		1560								51625			35600	3546	13089	3687	107547			

225

Alaska International Construction, Inc.
PROJECT: Susitna H. EST. BY PCS/pwm SHEET 21 OF

Alaska International Construction, Inc.
PROJECT: Susitna Hydroelectric Project - Preliminary Estimate ITEM NO. 20 EST. BY PCS/pwm SHEET 20 OF
SPEC. REFERENCE: Devil Canyon DESCRIPTION Main Construction Village - Site Preparation - Culverts, 320 lots CHKD. BY
DWG. REFERENCE: BID DATE ENGR. QUANTITY 7,440 L.F DATE: 12-29-81

Culverts - 320 lots 7,440 L.F.	UNITS EQP.	UNITS MAN	LABOR	R & B	OTHER	CO. RENT	3RD PARTY RENT	FUEL	LUBE PARTS	LABOR	R & B OR TRAVEL	OTHER	COMPANY RENTAL	3RD PARTY RENTAL	FUEL	LUBE & WEAR PARTS	SUBTOTAL	PERMANENT MATERIALS	SUB-CONTRACT	TOTAL COST
1 Crew will Place 2 Culverts/day or 100 SF 7,440 ÷ 100 = 74 days x 10 hr = 740 hr.																				
Use Prorate from Wasilla MCC .6500	7,440	7,440	19.3183	—	—	2.9442	.2708	3.0625	.3850	143.728	—	—	21.942	2.015	22.785	2.864	193.334			193.334
7,440 l.f. Culvert @ 100 bands 18" @ 9.73 @ 22.20																		74.611		74.611
		4836 hr								143.728	—	—	21.942	2.015	22.785	2.864	193.334	74.611		267.945
Use Prorate .2250 hr/SF		1674	6.8879			1.4744	.1354	1.5313	.1925	51.246	—	—	10.971	1.007	11.393	1.432	76.049	74.611		150.660

220

Alaska International Construction, Inc.
PROJECT: Susitna Hydroelectric Project - Preliminary Estimate ITEM NO. 21 EST. BY pum SHEET 21 OF
SPEC. REFERENCE: Devil Canyon DESCRIPTION Main Construction Village - Site Preparation - Perimeter Fencing CHKD. BY
DWG. REFERENCE: BID DATE ENGR. QUANTITY 9,100 L.F. DATE: 12-29-81

Fencing 9,100 L.F.

Sub Contract
9,100 l.f. @ 15.00

59,715 / 34 = 1756 ll

	UNITS EQP.	UNITS MAN	LABOR	R & B	OTHER	CO. RENT	3RD PARTY RENT	FUEL	LUBE PARTS	LABOR	R & B OR TRAVEL	OTHER	COMPANY RENTAL	3RD PARTY RENTAL	FUEL	LUBE & WEAR PARTS	SUBTOTAL	PERMANENT MATERIALS	SUB-CONTRACT	TOTAL COST
	9100		6.561		4.20	.3281		.4010		59715		38220	2986		3649		104570		104570	
																			156,833	

227

PROJECT: Susitna Hydroelectric Project - Preliminary Estimate — ITEM NO. 22 — EST. BY RWM — SHEET 22 OF

SPEC. REFERENCE: Devil Canyon — DESCRIPTION Main Construction Village - Site Preparation - Parking Areas — CHKD. BY

DWG. REFERENCE: — BID DATE — ENGR. QUANTITY 37,500 Sq. Ft. — DATE: 12-29-81

Parking Areas 37,500 Sq. Ft.

	UNITS EQP.	UNITS MAN	LABOR	R & B	OTHER	CO. RENT	3RD PARTY RENT	FUEL	LUBE PARTS	LABOR	R & B OR TRAVEL	OTHER	COMPANY RENTAL	3RD PARTY RENTAL	FUEL	LUBE & WEAR PARTS	SUBTOTAL	PERMANENT MATERIALS	SUB-CONTRACT	TOTAL COST
FIGURE 8' OS DZ = 1076 CY/ACRE																				
37,500 ÷ 43560 = .86 ACRES = 926 CY																				
Place from Crushers .056391 h/cy	926	926	1.8929	—	—	2.7650	.3120	1.0489	.3966	1753	—	—	2560	289	971	367	5940			
Haul from MCV haul & Place .069023 h/cy	926	926	2.4035	—	—	2.9407	.3185	1.2732	.5983	2226	—	—	2723	295	1179	554	6977			
		1166								3979	—	—	5283	584	2150	921	12917			

PROJECT: Susitna Hydroelectric Project ITEM NO. EST. BY SHEET OF

SPEC. REFERENCE: DESCRIPTION MCV Devil Canyon CHKD. BY

DWG. REFERENCE: BID DATE ENGR. QUANTITY DATE:

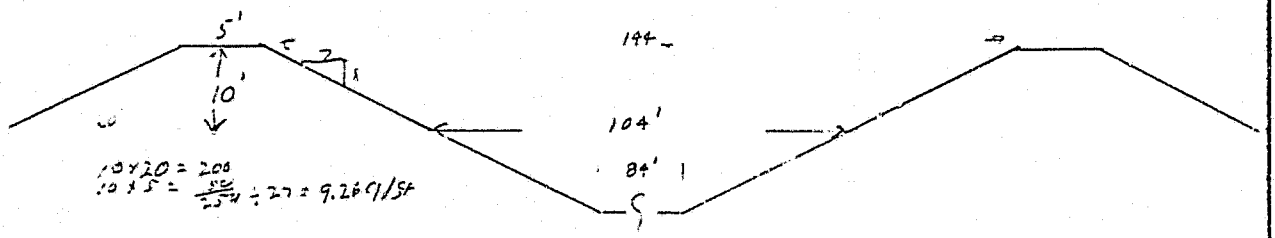
	UNITS EQP.	UNITS MAN	LABOR	R & B	OTHER	CO. RENT	3RD PARTY RENT	FUEL	LUBE PARTS	LABOR	R & B OR TRAVEL	OTHER	COMPANY RENTAL	3RD PARTY RENTAL	FUEL	LUBE & WEAR PARTS	SUBTOTAL	PERMANENT MATERIALS	SUB-CONTRACT	TOTAL COST
800,000 gal insulated (top) Reservoir gravel embankment																				
Liner 36,912 sq.ft c .793												29271					29271			
Insulation 82,944 BFC .67												55572					55572			
Gravel 576 LF c 9.26 CY/F = 5334 CY																				
Crew to place liner & insul.																				
36,912 c 10,000 sf/day w 4 lab. = 130 lb		130	2771							3602							3602			
82,944 c 23,500 sf/day w 4 lab = 133 lb		133	2771							3602							3602			
Gravel - PROR 2 te from P.G 5334 c		377	2.40			2.94	.32	1.27	.60	12801			15682	1707	6774	3200	40165			
800,000 gal		640								20006		84843	15682	1707	6774	3200	132212			
800,000 to 850,000 = 6.25% increase										18726					(11681)					
√6.25 = 2.5%																				
850,000 gal tank [each]		656								20506		86964	16074	1750	6943	3280	135517			
															(11973)					

F22+

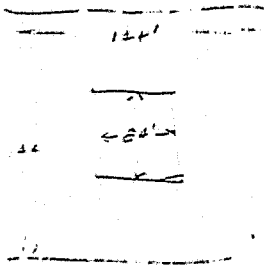
Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

DATE: _____ SHT.: _____ OF _____
CALCULATIONS BY: _____
SUBJECT: _____

PROJECT: Dual Control Water Storage Tanks



104^2 = 10,816 SF x 7.48 = 80904 gal x 10' = 809,039 gal



Beam
144' x 2 = 288
84' x 2 = 288
576 lin. ft.

Liner @ .793 / sq. ft.
Insul. @ .67 / BF

84^2 = 7056
144^2 = 20736
27792 ft² liner

Sides
144 x 20 x 2 = 5,760
84 x 20 x 2 = 3,360
34,912 ft² liner

Insulation = 20,736 sq ft x 4" = 82,944 BF

Beam = 576 lf x 9.26 = 5337 C/

PROJECT:
SPEC. REFERENCE:
DWG. REFERENCE:
DESCRIPTION Devil Canyon Sewage Lagoons
BID DATE
ENGR. QUANTITY
ITEM NO.
EST. BY
CHKD. BY
DATE:
SHEET 23 C.

	UNITS EQP.	UNITS MAN	LABOR	R & B	OTHER	CO. RENT	3RD PARTY RENT	FUEL	LUBE PARTS	LABOR	R & B OR TRAVEL	OTHER	COMPANY RENTAL	3RD PARTY RENTAL	FUEL	LUBE & WEAR PARTS	SUBTOTAL	PERMANENT MATERIALS	SUB-CONTRACT	TOTAL COST
use 3/5 of M.C.C. @ add $4.13/cy 36305 x 3/5 = 21783 cy @ 4.13 = $89,964																				
248,384 x 3/5 = 149,030. 238,994 / 248,384 = .9622%		33706								98297	–	–	81047	81643	34204	16803	238994	202338		441.332

231

F236

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

DATE: 1-26-82 SHT.: 3 OF _____
CALCULATIONS BY: _____
SUBJECT: _____

PROJECT: Devil Canyon Arrow Bridge

Structural Excavation - 775 cy x 5 = 3875 cy @ 150.00 = 581,250 —
Structural Concrete - 305 cy x 5 = 1525 cy @ 250.00 = 381,250 —
962,500
Arrow Bridge

John Ralph 201-933-0450

110 - 278,350. ~~+10,000~~ 110 tons - 2 Rail Cars
120 303,288 - 120 tons 2 Rail Cars

Double Double
Double Wide
Heavy Duty
Del.

2,100,000

2,246,000

962,500

Pedron
632-2202 — ~~8:15 A.M.~~ 10:00 A.M.

516-593-4564 N.Y.

D&L
800-227-6177

Lab 31.96
Equip 29.13
Opr 28.61

232

Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

DATE: _____ SHT.: _____ OF _____
CALCULATIONS BY: _____
SUBJECT: _____

PROJECT: _____

Mgr. John ~~Ralph~~
Bill Killeen

23' 8"

962.500

Labor 35%	336,875		227,618 = 14%
Materials 50%	481,250 + 1,283,500	= 1,764,750 =	1,192,398 = 79%
Equip owned	64,968		43897 - 3%
Equip oper	79,406		53,653 4%

Bridge

1,517,566

2,246,000
962,500

1,283,500

F2.38

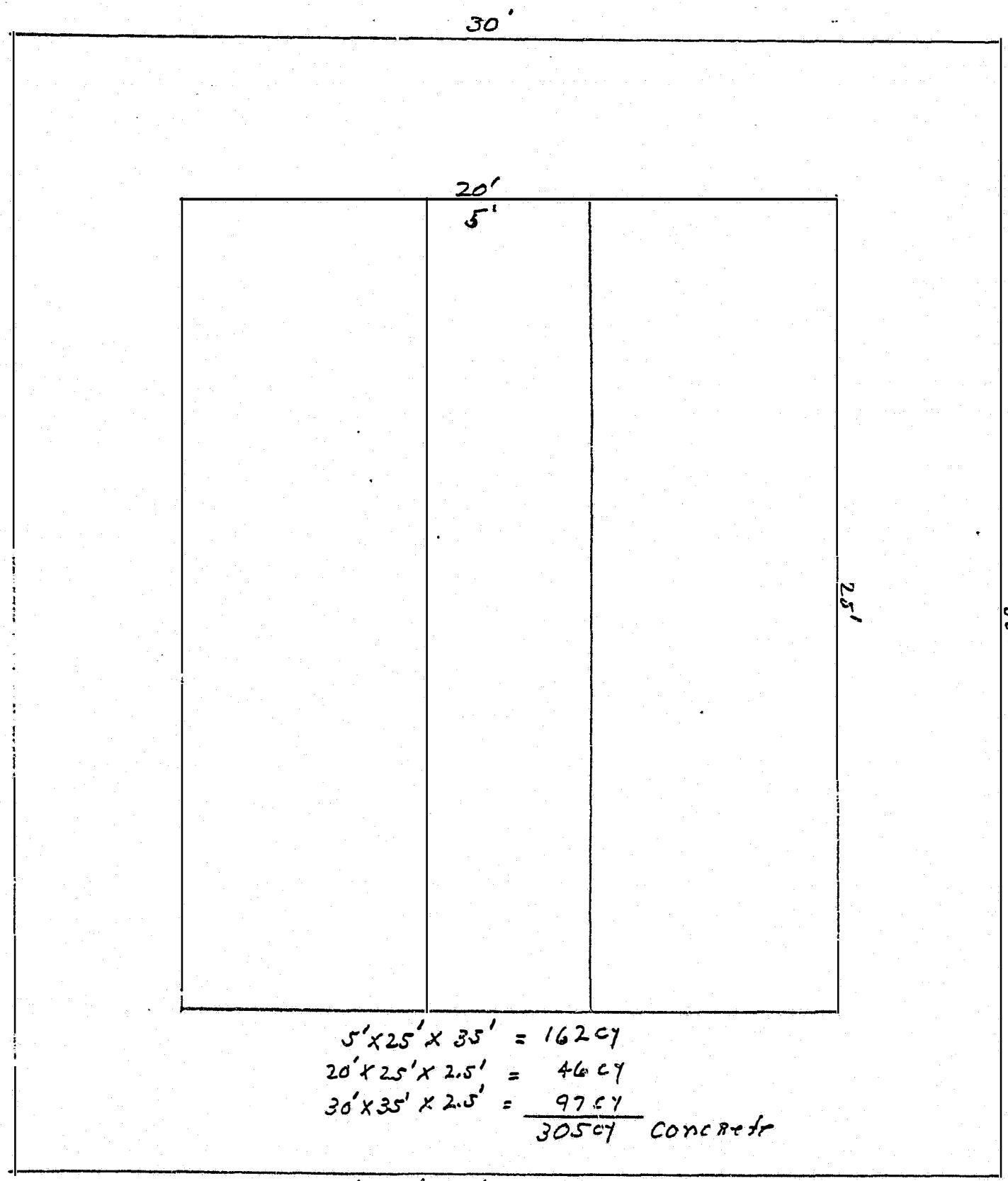
Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

DATE: 1-26-82 SHT.: 1 OF

CALCULATIONS BY:

SUBJECT:

PROJECT: Devil Canyon ACROW Bridge



5'x25'x35' = 162cy
20'x25'x2.5' = 46cy
30'x35'x2.5' = 97cy
305cy Concrete

35'x40'x15' = 775cy Excavation

F239

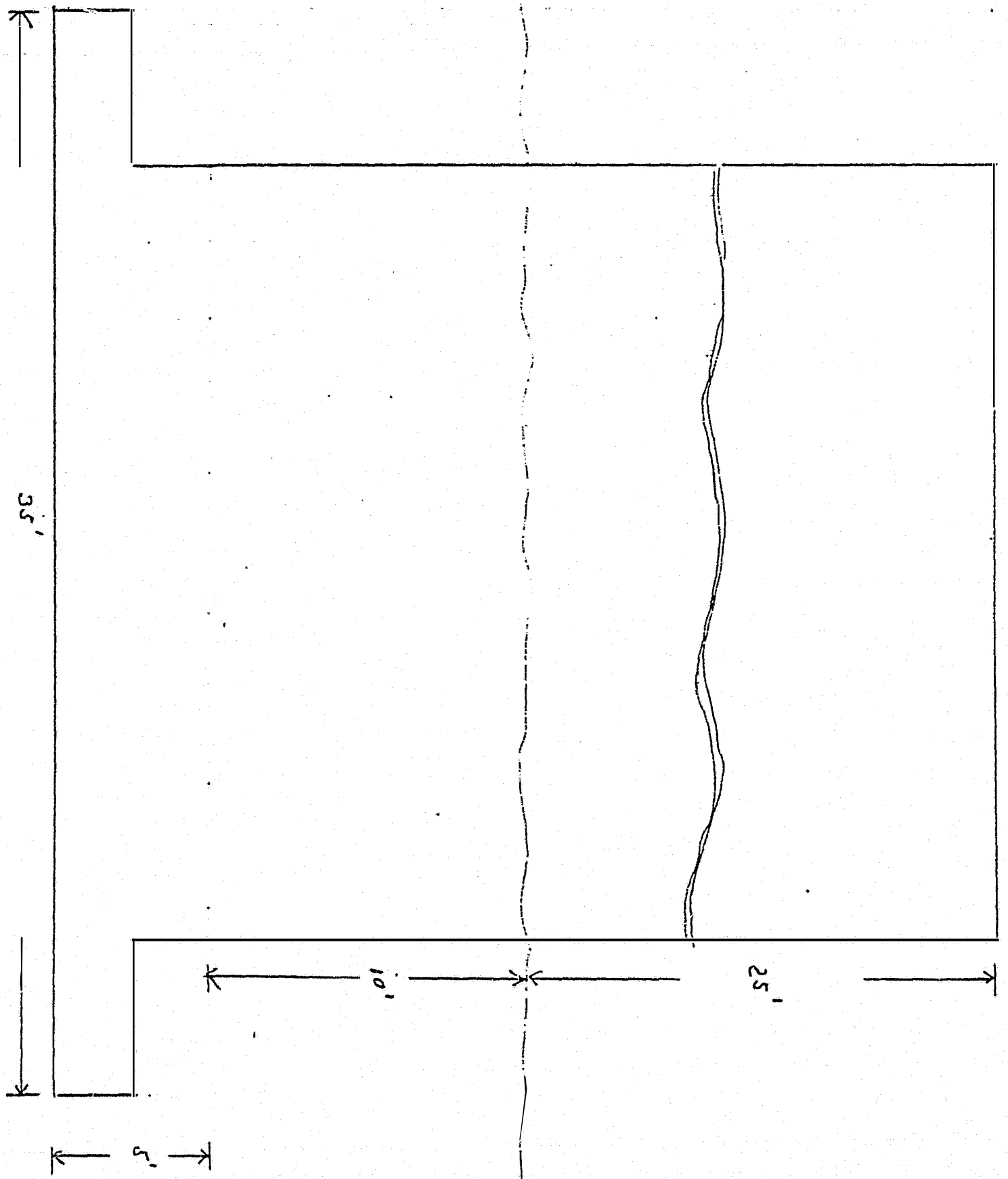
Frank Moolin & Associates, Inc.
(An Alaska International Industries Company)

DATE: 1-26-82 SHT.: 2 OF _____

CALCULATIONS BY: _____

SUBJECT: _____

PROJECT: Devil Canyon Arrow Bridge



235