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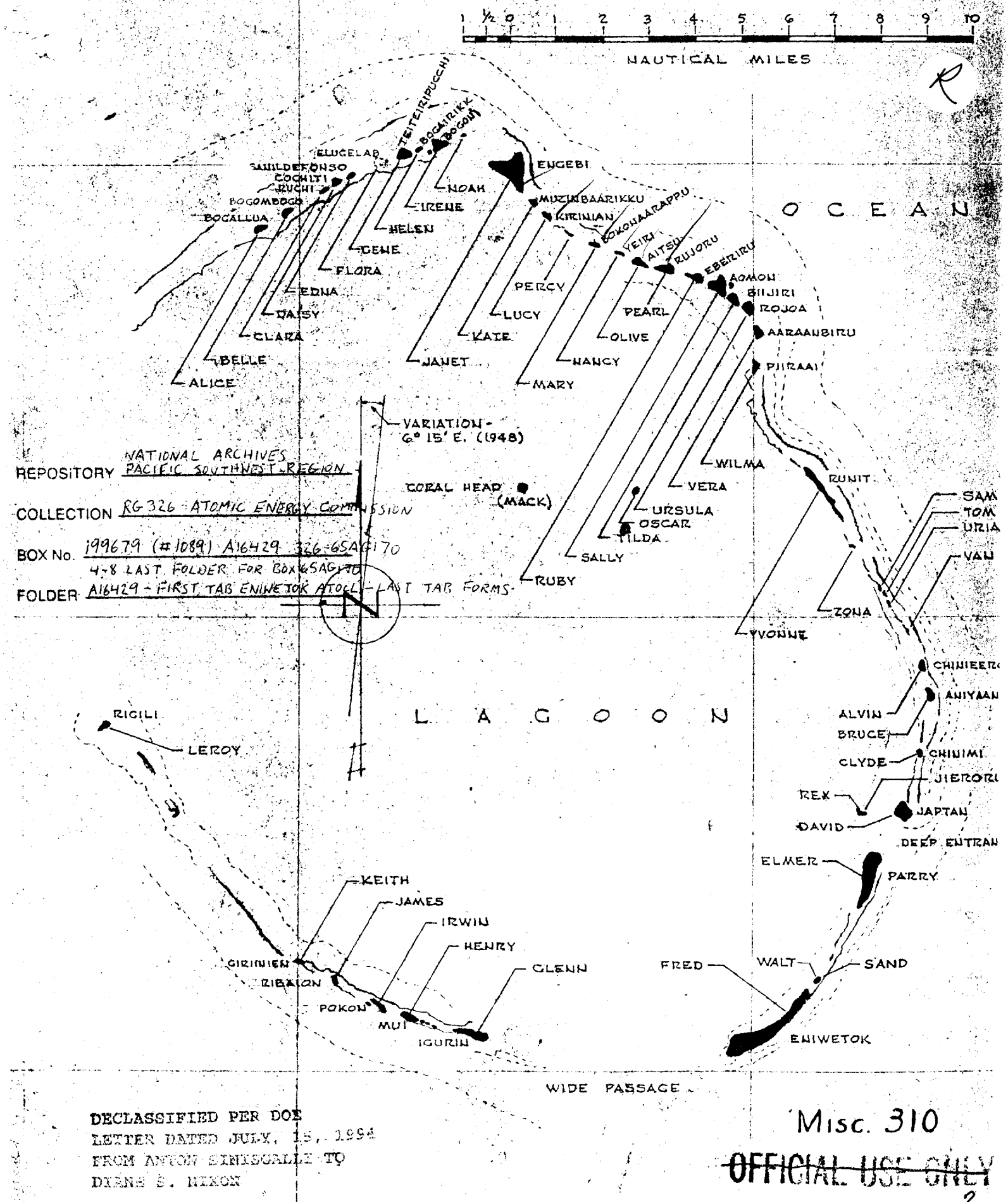
405693

ENIWETOK ATOLL



REPOSITORY NATIONAL ARCHIVES PACIFIC SOUTHWEST REGION

COLLECTION RG 326 ATOMIC ENERGY COMMISSION

BOX No. 199679 (#1089) A16429 326-65A6170
4-8 LAST FOLDER FOR BOX 65A6170

FOLDER A16429 - FIRST TAB ENIWETOK ATOLL - LAST TAB FORMS

DECLASSIFIED PER DOE
LETTER DATED JULY, 15, 1994
FROM ANTON SINISGALLI TO
DIANE S. NIXON

Misc. 310

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MARINE LANDING AND BEACHING INFORMATION
FOR ALL SITES
ENIWETOK ATOLL

ALICE

LCMs and LCUs beach on sand bar through break in reef. Require plus 1.5 tide or under. Tracked equipment and vehicles only.

Channel Markings: None at present.

CLARA

LCMs beach on sand bar through break in reef. Require plus 1.5 tide or under. Tracked equipment and vehicles only.

Channel Markings: None at present.

GENE
HELEN
IRENE

Causeway out between HELEN and GENE. Landings for LCUs and LCMs on west side of GENE. LCMs can beach at IRENE but require a plus 2.5 tide. IRENE and HELEN connected by causeway. Old channel at GENE useable but not recommended.

Channel Markings: None.

JANET

LCMs and LCUs at any tide.

Facilities: Hard sand ramp. (Note: Freight pier in damaged condition, not recommended for use until repairs made.)

Channel Markings: None.

KATE

LCMs requirea plus 1.5 tide and LCUs require a plus 3.0 tide.

Facilities: Sandy beach landing.

Channel Markings: None.

LUCY

LCMs require a plus 1.5 tide and LCUs require a plus 3.0 tide.

Facilities: Sandy beach landing.

Channel Markings: None

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MARINE LANDING AND BEACHING INFORMATION FOR ALL SITES (Cont'd)

MARY

LCMs can enter at any tide. LCUs require a plus 2.0 tide.

Facilities: Sandy beach landing.

Channel Markings: None.

NANCY
OLIVE
PEARL

LCU (Only) require a plus 2.0 tide.

Facilities: Sandy and coral beach landing.

Channel Markings: None.

RUBY
SALLY
TILDA
URSULA

Connected by causeway. Entrance channel at URSULA. LCMs and LCUs can enter at any tide.

Facilities: Freight pier and concrete ramp.

Channel Markings: One lighted entrance buoy (Fl.-W.) and eleven channel buoys. (Oil drums; 6 red and 5 black.)

Note: The channel to the causeway landing between TILDA and URSULA and the channel to the damaged pier at SALLY have sanded in and are not being used. (Some old channel marking buoys are still in place.)

WILMA

LCMs can enter at any tide. LCUs require a plus 2.0 tide.

Facilities: Sandy beach landing.

Channel Markings: None.

YVONNE

LCMs, LCUs, and YTLs (Tugs) can enter at any tide.

Facilities: Freight pier and [illegible] concrete ramp.

Channel Markings: One lighted entrance buoy (Fl.-W.).

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MARINE LANDING AND BEACHING INFORMATION FOR ALL SITES (Cont'd)

ZONA — DUKWs only.

ALVIN
BRUCE
CLYDE

LCMs can enter at any tide. LCUs require a plus 2.0 tide.

Facilities: Sandy beach landing.

Channel Markings: None.

DAVID

LCMs, LCUs, and YTLs (Tugs) can enter at any tide.

Facilities: Freight pier and a sandy beach landing.

Channel Markings: None.

ELMER

LCMs, LCUs, and YTLs (Tugs) can enter at any tide.

Facilities: Freight pier, personnel pier and two concrete ramps.

Channel Markings: None.

FRED

LCMs, LCUs, and YTLs (Tugs) can enter at any tide.

Facilities: Freight pier, personnel pier, 40 feet concrete ramp by personnel pier and sand ramp by freight pier.

Channel Markings: One clearance buoy just off the personnel pier.

GEORGE
HENRY
IRVIN
JAMES
KENTH

LCMs (Only) require a plus 2.0 tide.

Facilities: Pure coral beach landing. (Sandy in spots.)

Channel Markings: None. (Note: Not used very much.)

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LEROY

LCMs require a plus 2.0 tide and LCUs require a plus 4.0 tide.

Facilities: Sandy beach landing

Channel Markings: One large nun buoy (Red #2) and four other channel buoys (oil drums) (3 red and 1 black).

Note: Red nun buoy #2 serves also as a mooring buoy for LCMs. Keep all red buoy close to starboard when entering channel. Beaching area is between the last red buoy (#8) and only black buoy (#7).

OSCAR

LCMs (Only) at any tide.

Facilities: A ladder is at the southeast side of tower.

Channel Markings: None.

MACK

LCMs and LCUs at any tide.

Facilities: Landing platform is at the north side of tower base.

Channel Markings: None.

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HOLMES & NARVER, Inc.

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Bench Marks - Site Elmer

Bench Mark	Elev.	F.B.	Pg	Date	Remarks
Firehouse	17.590	229	12	10/27/54	
(Cross Cut in Conc. Door Pad)					
B.M. #1, Parry	24.951	229	12	10/27/54	Settling
(On Conc Slab in compound around Bldg. #311)					
P.I. "H"	13.208	229	9	10/21/54	Disc
(In Center of Heavy Equip. Storage yard)					
P.I. "Elm"	12.229	229	9	10/21/54	Disc
(In front of Bldg #162 Opp. P.O.L. Area)					
P.I. "B"	11.578	229	9	10/21/54	Disc
(Nr. Southwest Corner P.O.L. Fence.					
P.I. "C"	11.426	229	9	10/21/54	Disc
(In roadway at center of West P.O.L. Area Fence)					
P.I. "D"	11.593	229	9	10/21/54	Disc
(Nr. Northwest Corner of P.O.L. Area Fence)					
Tria Sta "Parry"	8.656	229	9	10/21/54	Disc
(Opposite Bldg. #229 in Marine Equip Storage yard)					
Mon. "Morry"	14.224	229	18	12/3/54	Disc
(Near Sawmill Next to Road)					
Mon. "Magnetic"	13.323	229	19	12/3/54	Disc
(North Airstrip Shoulder)					
R.M. 50'	13.246	229	19	12/3/54	Disc
(Off Edge of Airstrip Shoulder)					
R.M. 100'	13.691	229	19	12/3/54	Disc
(100 ' From Magnetic, in line with R.M. 50')					
Mon. "Manley"	12.994	229	20	12/3/54	Disc
(South and East of Bldg. #130)					
Mon. "Baldwin"	11.006	229	21	12/3/54	Disc
(South and East of Bldg #120 - Near Fence)					
R.P. for P.I. #23	12.872	229	14	11/26/54	L & T in Conc
(Near North East Corner CMR Area Fence-Lagoon Side)					
P.I. "L"	11.064	229	14	11/26/54	Disc
(Due North of Bldg #347 - CMR Salt Water Pumps)					
P.I. #25	10.848	229	15	11/26/54	Disc
(North of Sta 1131 Nr Assembly Area Gates)					
P.I. #26	9.732	229	15	11/26/54	Disc
(South End of Island Near Generator Shed and Water Tower)					
P.I. "M"	17.973	229	15	11/26/54	Disc
(Top of hill opposite Power House near Bldg 218)					

All Bench Marks indicated as discs are standard 2 5/8" Brass markers imbedded in a concrete monument approximately 6" below Existing ground grades

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HOLMES & NARVER, Inc

Survey Department

Bench Marks - Site Fred

Bench Mark	Elev	F.B.	Pg.	Date	Remarks
Top Tide Staff	9.72	229	23	11/22/54	
Tria. Sta. Eniwetok	11.02	229	23	11/22/54	Disc In Conc Mon
U.S.C. & G.S. B.M. #1	9.515	229	23	11/22/54	Disc In Conc Mon
U.S.C. & G.S. B.M. #2	11.21	229	23	11/22/54	Disc In Conc Mon
P.I. "Pansy"	10.39	229	23	11/22/54	Disc In Conc Mon
U.S.C. & G.S. B.M. #3	10.875	229	23	11/22/54	Disc in Conc Mon
P.O.L. #7	10.075	236	4	10/13/54	Al Bolt in Road
P.O.L. #17	9.95	236	4	10/13/54	Al Bolt in Road
P.O.L. #16	9.71	236	4	10/13/54	Al Bolt in Road
P.I. "Agnes"	9.39	236	4	10/13/54	Al Bolt in Road
P.O.L. #506	10.09	236	5	10/13/54	Al Bolt in Road
B.M. #6	10.28	236	5	10/13/54	Disc in Conc Mon
P.O.L. #113	10.03	236	5	10/13/54	Al Bolt in Road
P.I. "Mabel"	10.67	236	5	10/13/54	Al Bolt in Road
P.O.L. #54	10.17	236	5	10/13/54	Al.Bolt in Road
P.I. "Tulip"	11.67	236	6	10/13/54	Disc in Conc Mon
P.I. #15	12.08	236	6	10/13/54	Disc in Conc Mon
Disc in Conc Nr Old P.I. #16	9.50	236	6	10/13/54	Disc in Conc Mon
P.I. #17	11.14	236	7	10/13/54	Disc in Conc Mon
P.I. #18	12.29	236	7	10/13/54	Disc in Conc Mon
P.I. #19	14.075	236	7	10/13/54	Disc in Conc Mon
P.I. #20	9.58	236	7	10/13/54	Disc in Conc Mon
P.I. "Linda"	10.63	236	10	10/23/54	Al Bolt in Road
Eniwet "B"	10.825	236	10	10/23/54	Disc in Conc Mon

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Bench Mark	Elev	F.B.	Pg.	Date	Remarks
P.I. "Becky"	11.49	236	10	10/23/54	Al Bolt in Road
P.I. "B"	9.68	236	10	10/23/54	Disc in Conc Mon
Eniwet "C"	13.87	236	11	10/23/54	Disc in Conc Mon
P.I. "Sue"	13.31	236	11	10/23/54	Al Bolt in Road
P.O.L. #73	13.88	236	11	10/23/54	Al Bolt in Road
P.I. "E"	14.78	236	11	10/23/54	Disc in Conc Mon
P.I. "Delia"	14.675	236	11	10/23/54	Al Bolt in Road
P.I. #12	11.79	236	11	10/23/54	Disc in Conc Mon
P.O.L. "Taxi"	9.445	236	12	10/23/54	Al Bolt in Taxiway
P.O.L. "Bay"	11.26	236	12	10/23/54	Disc in Conc Mon
P.I. "Port"	12.37	236	13	10/23/54	Disc in Conc Mon
Eniwet "A"	15.06	236	13	10/23/54	Disc in Conc Mon
P.O.L. #67	16.83	236	20	11/20/54	Al Bolt in Road
P.I. "F"	15.94	236	20	11/20/54	Disc in Conc Mon
P.I. "Judy"	18.31	236	20	11/20/54	Al Bolt in Road
H&N Disc Conc Mon	14.77	236	20	11/20/54	
P.I. "Lana "	14.21	236	21	11/20/54	Al Bolt in Road
P.I. "Karen"	13.125	236	21	11/20/54	Al Bolt in Road
P.I. #6	9.61	236	21	11/20/54	Disc in Conc Mon
P.I. "Lily"	13.36	236	22	11/20/54	
P.I. #8	10.55	236	22	11/20/54	Conc Mon
Mon "Air"	10.997 (11.00)	236	22	11/20/54	Conc Mon
P.O.L. "Wing"	9.40	236	23	11/20/54	Conc Mon
P.O.L. "Strut"	8.53	236	23	11/20/54	Conc Mon
P.O.L. "Flap"	7.50	236	24	11/20/54	Conc Mon
P.O.L. "Bomb"	7.37	236	25	11/20/54	Conc Mon

BENCH MARKS

SITE	STATION	ELEV	FIELD BOOK	PAGE	DATE	DESCRIPTION		REMARKS
ALICE	BOGA #2	8.675	20	21	1-10-50	H&N DISC, CONC. MON.	F.S. 516	CLOSED CIRCUIT FROM STA. BOGA (STA. BOGA, TIDE OBSERVATIONS)
BELLE	P.I. "A"	8.06	148	22	10-12-51	COPPER PIPE, LEAD & TACK, CONC. MON.	F.S. 522	RUN FROM BOGA #2
	P.I. "E"	8.16	151	25	11-14-51	H&N DISC, CONC. MON.	F.S. 537	CLOSED CIRCUIT FROM P.I. "A"
CLARA	P.I. "R"	6.57	157	2	2-15-52	H&N DISC. CONC. MON.	F.S. 550	CLOSED CIRCUIT FROM P.I. "E"
	RUCHI	9.72	157	16	2-20-52	ALUM. PIPE & CAP, CONC. MON.	F.S. 550	CLOSED CIRCUIT FROM P.I. "R"
DAISY	PYNE	7.80	157	16	2-20-52	ALUM. PIPE & CAP, CONC. MON.	F.S. 554	CLOSED CIRCUIT FROM P.I. "R"
	CHITI	8.39	157	16	2-20-52	ALUM. PIPE & CAP, CONC. MON.	F.S. 554	CLOSED CIRCUIT FROM P.I. "R"
EDNA	SAM	6.87	158	5	2-26-52	ALUM. PIPE & CAP, CONC. MON	F.S. 555	CLOSED CIRCUIT FROM CHITI
	FONSO	(8.86	158	5	2-26-52	ALUM. PIPE & CAP,	F.S. 555	CLOSED CIRCUIT FROM CHITI
		(8.53	158	7	2-27-52	CONC. MON.	F.S. 555	CLOSED CIRCUIT FROM ELUG
FLORA	R.P. "X"	8.965	164	17	5-8-52	ALUM. PIPE & CAP, CONC. MON.		CLOSED CIRCUIT FROM ELUG
	ELUG	8.115	152	5	11-20-51	H&N DISC, CONC. MON.	F.S. 543	CLOSED CIRCUIT FROM TEITEIR
	ELAB	10.09	152	5	11-20-51	H&N DISC, CONC. MON.	F.S. 543	CLOSED CIRCUIT FROM TEITEIR
GENE	PUCCHI	9.215	152	20	12-3-51	H&N DISC, CONC. MON.	F.S. 543	CLOSED CIRCUIT FROM TEITEIR
	INTER "X"	8.07	152	20	12-3-51	H&N DISC, CONC. MON.	F.S. 543	CLOSED CIRCUIT FROM TEITEIR
	TENT POLE T	6.81	155	12	2-1-52	ALUM. PIPE & CAP, CONC. MON.	F.S. 543	CLOSED CIRCUIT FROM TEITEIR
	TEITEIR	8.545	158	20	3-1-52	H&N DISC, CONC. MON.	F.S. 543	TIDE OBSERVATIONS
HELEN	BOGAIR	6.51	152	20	12-3-51	ALUM. PIPE & CAP, CONC. MON.	F.S. 543	CLOSED CIRCUIT FROM TEITEIR
	RIKK	5.29	152	20	12-3-51	ALUM. PIPE & CAP, CONC. MON.	F.S. 543	CLOSED CIRCUIT FROM TEITEIR
IRENE	JIM	6.59	156	26	2-14-52	ALUM. PIPE & CAP, CONC. MON.	F.S. 543	CIRCUIT NOGOB TO BOGON
	NOGOB	5.75	152	20	12-3-51	ALUM. PIPE & CAP, CONC. MON.	F.S. 543	CLOSED CIRCUIT FROM TEITEIR
	BOGON	7.15	152	20	12-3-51	H&N DISC, CONC. MON.	F.S. 543	CLOSED CIRCUIT FROM TEITEIR
	MART	10.99	156	26	2-14-52	ALUM. PIPE & CAP,	F.S. 543	CIRCUIT NOGOB TO BOGON
JANET	ENGEBI	10.08	10	18	5-14-59	U.S.C.&G.S., CONC. MON.	F.S. 73	TIDE OBSERVATIONS
	LADEDA	9.76	43	14	6-2-50	H&N DISC, CONC. MON.	F.S. 73	CLOSED CIRCUIT FROM ENGEBI
	T.A.K.	9.39	69	23	9-13-50	NAIL IN CONC. MON.	F.S. 73	CLOSED CIRCUIT FROM ENGEBI
	R.P. 4	9.09	168	7	4-28-52	20MM SHELL IN CONC. MON.	F.S. 73	CLOSED CIRCUIT FROM ENGEBI
	R.P. 3	9.86	168	27	5-3-52	H&N DISC, CONC. MON.	F.S. 73	CIRCUIT, TANKS TO R.P. 4

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BENCH MARKS

SITE	STATION	ELEV	FIELD BOOK	PAGE	DATE	DESCRIPTION	REMARKS
FRED	B.M. 53-J	11.78	LIST OF	VALID	BENCHES	S.W. COR SLAB BLDG. #84	
	B.M. 53-K	15.67	LIST OF	VALID	BENCHES	S.E. COR. OF W. STEP BLDG. #90	
	P.I. #6	8.55	203	19	4-21-53	STANDARD H&N DISC IN CONC.	
	P.I. #8	10.49	208	19	4-21-53	STANDARD H&N DISC IN CONC.	
	P.I. #10	15.33	203	19	4-21-53	STANDARD H&N DISC IN CONC.	
	P.I. #12	11.81	204	17	6-1-53	STANDARD H&N DISC IN CONC.	
	P.I. #15	12.01	203	19	4-21-53	STANDARD H&N DISC IN CONC.	
	P.I. #17	12.16	203	19	4-21-53	STANDARD H&N DISC IN CONC.	
	P.I. #20	9.59	203	19	4-21-53	STANDARD H&N DISC IN CONC.	
	P.I. "B"	9.66	203	19	4-21-53	STANDARD H&N DISC IN CONC.	
	P.I. "E"	14.76	203	19	4-21-53	STANDARD H&N DISC IN CONC.	
	P.I. "F"	15.92	203	19	4-21-53	USN DISC IN TRUNCATED CONC PYRAMID	
	ENIWETOK	11.05	LIST OF	VALID	BENCHES	CONC. MON.	
	USC & GS #3	10.90	LIST OF	VALID	BANCHES	NAVY MON. NR. BLDG. #1	
	PANSY	10.40	LIST OF	VALID	BENCHES	USC & GS DISC IN CONC. MON.	
	VIOLET	12.25	LIST OF	VALID	BENCHES	STANDARD H&N DISC IN CONC.	
	ROSE	11.61	LIST OF	VALID	BENCHES	STANDARD H&N DISC IN CONC.	

NOTE: STANDARD H&N DISC IN CONCRETE IS A 2 5/8" DIA BRASS DISC SET IN A CONCRETE MONUMENT FROM 6 TO 8 INCHES BELOW GROUND ELEVATION, WITH NAME OR NUMBER DESIGNATION STAMPED ON ITS FACE.

REFERENCE TO "LIST OF VALID BENCHES" REFERS TO LIST ASSEMBLED, ADJUSTED AND REPRODUCED FROM VARIOUS LEVEL CIRCUITS ON SITE FRED.

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BENCH MARKS

SITE	STATION	ELEV	FIELD BOOK	PAGE	DATE	DESCRIPTION	REMARKS
KATE	MUZIN	6.40	28	27	3-30-50	CONC. MON.	TIDE OBSERVATIONS
	P.I. "A"	8.72	141	28	6-31-51	STANDARD H&N DISC. IN CONC.	CLOSED CIRCUIT FROM MUZIN
LUCY	BEACON "M"	8.60	37	7	4-12-50	USN CONC. MON	TIDE OBSERVATIONS
	R.P. "A"	6.71	142	5	6-15-51	STANDARD H&N DISC IN CONC.	CLOSED CIRCUIT FROM BN "M"
	R.P. "B"	7.09	142	5	6-15-51	STANDARD H&N DISC IN CONC.	CLOSED CIRCUIT FROM BN. "M"
MARY	BOKON	10.40	31	6	3-27-50	CONC. MON.	TIDE OBSERVATIONS
	MATT	9.53	159	10	4-3-52	CONC. MON.	CLOSED CIRCUIT FROM BOKON
	ROOK	10.04	215	18	12-22-53	CONC. MON.	CLOSED CIRCUIT FROM BOKON
NANCY	NICK	10.54	159	10	4-3-52	CONC. MON.	CIRCUIT BOKON TO RUJURO
	YEIRI	9.96	159	10	4-3-52	CONC. MON.	CIRCUIT BOKON TO RUJURO
	JON	10.955	207	25	11-14-53	ALUM. BOLT IN CONC. MON.	CIRCUIT FROM YIERI
OLIVE	OMAR	11.57	159	21	4-3-52	CONC. MON.	CIRCUIT BOKON TO RUJURO
	AITSU	10.05	159	21	4-3-52	CONC. MON.	CIRCUIT BOKON TO RUJURO
	EATON	13.51	207	22	11-13-53	CONC. MON.	CLOSED CIRCUIT FROM AITSU
	EVY	9.29	207	22	11-13-53	Bolt in Conc Mon.	CLOSED CIRCUIT FROM AITSU
PEARL	PAUL	9.73	159	8	4-7-52	CONC. MON.	CIRCUIT BOKON TO RUJURO
	RUJURO	10.90	159	9	3-21-52	CONC. MON.	CLOSED CIRCUIT FROM BOKON
	TENT POLE "J"	9.33	207	24	11-14-53	CONC. MON.	CLOSED CIRCUIT FROM RUJURO
	TENT POLE "K"	13.88	207	24	11-14-53	CONC. MON.	CLOSED CIRCUIT FROM RUJURO
	TENT POLE "L"	11.62	207	24	11-14-53	CONC. MON.	CLOSED CIRCUIT FROM RUJURO
RUBY	RUBY	8.837	212	26	11-7-53	STANDARD H&N DISC IN CONC.	
SALLY	AOMON	8.41	202	11	5-12-53	U.S.C. & G.S. BRASS DISC IN CONC.	DISTURBED ABOUT 5-1-53
	DUKE	6.10	202	12	5-12-53	STANDARD H&N DISC IN CONC.	CIRCUIT SALLY-URSULA
	DAN	12.40	202	12	5-12-53	STANDARD H&N DISC IN CONC.	CIRCUIT SALLY-URSULA
TILDA	JACK	7.18	202	11	5-12-53	STANDARD H&N DISC IN CONC.	CIRCUIT SALLY-URSULA
	JEAN	8.78	202	11	5-12-53	STANDARD H&N DISC IN CONC.	CIRCUIT SALLY-URSULA
	IOWA	7.95	202	11	5-12-53	STANDARD H&N DISC IN CONC.	CIRCUIT SALLY-URSULA
URSULA	KATE	8.66	202	11	5-12-53	STANDARD H&N DISC IN CONC.	CIRCUIT SALLY-URSULA
	R.P. KATE	8.33	202	11	5-12-53	STANDARD H&N DISC IN CONC.	CIRCUIT SALLY-URSULA
	UTAH	8.34	202	11	5-12-53	STANDARD H&N DISC IN CONC.	CIRCUIT SALLY-URSULA
	LUKE	10.94	207	20	11-11-53	6" CENTER PUNCHED BOLT IN CONC.	CLOSED CIRCUIT FROM KATE
VERA *	LUCY	8.44	33	2	12-( )-50	STANDARD H&N DISC. IN CONC.	TIDE OBSERVATIONS
	BEACON "K"	12.22	33	2	12-( )-50	USN DISC IN CONC.	CLOSED CIRCUIT FROM LUCY
WILMA	PIIRAAI	8.80	24	22	1-20-50	CONC. MON.	TIDE OBSERVATIONS
	STA. 60	9.88	124	18	3-9-51	✓ CHISELED IN SE FTG OF NE TOWER	CLOSED CIRCUIT FROM PIRAAI
	STA. 62	9.55	124	18	3-19-51	✓ CHISELED IN SE FTG SW	CLOSED CIRCUIT FROM PIRAAI
YVONNE	#59	4.26	104	16	5-23-51	NOT AVAILABLE	C.C. FROM TRAVERSE RUNIT
	USC&GS NO BASE	6.60	104	16	5-23-51	U.S.C. & G.S. CONC. MON.	CC. FROM TRAVERSE RUNIT
	#26 (L&T)	23.40	104	16	5-23-51	NOT AVAILABLE	C.C. FROM TRAVERSE RUNIT
VERA *	BABE	13.32	217	7	12-22-53	CLOSED CIRCUIT FROM LUCY (STA)	CONCRETE MONUMENT SET 1953

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BENCH MARKS

SITE	STATION	ELEV	FIELD BOOK	PAGE	DATE	DESCRIPTION	REMARKS
YVONNE	TRAVERSE RUNIT	12.95	5	2	3-16-49	U.S.C. & G.S. MON.	TIDE OBSERVATIONS
	SOUTH BASE	8.33	134	15	6-16-51	U.S.C. & G.S. MON.	C.C. FROM TRAVERSE RUNIT ALSO CALLED RUNIT
ZONA	TOWER FTGS	6.67	73	20	11-29-50	NOT AVAILABLE	C.C. FROM RUNIT
	WINCH BASE	6.64	73	20	11-29-50	NOT AVAILABLE	C.C. FROM RUNIT
ALVIN							
BRUCE	ANIYAANII	9.60	165	14	4-17-52		TIDE OBSERVATIONS
	BESS	8.70	165	18	4-19-52		C.C FROM ANIYAANII
	BYRL	9.07			4-19-52		C.C. FROM ANIYAANII
CLYDE							
DAVID	PIER	9.00	85	12	12-9-50	PILE CUTOFF - BASE OF PIER	FROM M.H. INVERT GRADES
	BLDG. 48	10.17	32	3	3-14-50	BOOSTER PUMP STATION	NO SOURCE GIVEN
ELMER	ASH	9.86	F.S. 578			STANDARD H&N DISC IN CONC.	
	PARRY	8.63	F.S.578			STANDARD H&N DISC IN CONC.	
	MAGNETIC	[illegible]	F.S.578			STANDARD H&N DISC IN CONC.	
	"H"	13.24	F.S. 578			STANDARD H&N DISC IN CONC.	
	"L"	11.07	F.S.578			STANDARD H&N DISC IN CONC.	
	"M"	17.97	F.S.578			STANDARD H&N DISC IN CONC.	
	P.I. #25	10.84	F.S.578			STANDARD H&N DISC IN CONC.	
	P.I. #26	9.77	F.S.578			STANDARD H&N DISC IN CONC.	
FRED	ENIWET "A"	15.03	LIST OF	VALID	BENCHES	USC & GS MON. 220' N OF NE COR.	AIRSTRIP
	ENIWET "B"	10.83	LIST OF	VALID	BENCHES	USC & GS MON. NO. BLDG. 117A & B	
	ENIWET "C"	13.85	LIST OF	VALID	BENCHES	USC & GS MON. ACCR. RD FR BLDG 61	
	B.M. #4	12.02	LIST OF	VALID	BENCHES	CONC. MON. 93' SW USC & GS #2	
	B.M. #6	10.27	LIST OF	VALID	BENCHES	CONC. MON. NO. SIDE CHAPEL	
	B.M. #7	11.65	LIST OF	VALID	BENCHES	CONC. PYRAMID ACROSS FR WOODS FIELD	STAMPED H&N TULIP
	B.M. 53-A	10.87	LIST OF	VALID	BENCHES	N.W. COR. SLAB BLDG. #7	
	B.M. 53-B	11.17	LIST OF	VALID	BENCHES	N.E. COR. DOOR SLAB BLDG. #15	
	B.M. 53-C	12.33	LIST OF	VALID	BENCHES	N.E. COR. SLAB BLDG. #50	
	B.M. 53-D	13.82	LIST OF	VALID	BENCHES	TOP FIRE HYD. OPP. WHSE #37	
	B.M. 53-F	11.32	LIST OF	VALID	BENCHES	S.W. COR. CENTER SLAB BLDG. #56	
	B.M. 53-H	19.84	LIST OF	VALID	BENCHES	TOP FIRE HYD. #16 OPP. BLDG #160	
	B.M. 53-I	17.21	LIST OF	VALID	BENCHES	TOP FIRE HYD. #17 83' N. OPP. BLDG. #156	
LEROY	RIGILI	9.11	159	4	2-21-52	50 Cal shell in Conc Mon	Tide Observations

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ENGINEERING CALCULATION SHEET

HOLMES & NARVER, INC.
ENGINEERS - CONSTRUCTORS

JOB NO. 942
SHEET 1 OF
BY ES DATE

TITLE HEIGHT OF TIDE AT ANY TIME

Obtain from the predictions the high water and low water, one of which is before and the other after the time for which the height is required. The difference between the times of occurrence of these tides is the duration of rise or fall, and the difference between their heights is the range of tide. Find the difference between the time of the nearest high or low and the time for which the height is required. (Cont'd at bottom of page)

DURATION OF RISE OR FALL h m	TIME FROM NEAREST HIGH OR LOW WATER														
4 00	0 08	0 16	0 24	0 32	0 40	0 48	0 56	1 04	1 12	1 20	1 28	1 36	1 44	1 52	2 00
4 20	0 09	0 17	0 26	0 35	0 43	0 52	1 01	1 09	1 18	1 27	1 35	1 44	1 53	2 01	2 10
4 40	0 09	0 19	0 28	0 37	0 47	0 56	1 05	1 15	1 24	1 33	1 43	1 52	2 01	2 11	2 20
5 00	0 10	0 20	0 30	0 40	0 50	1 00	1 10	1 20	1 30	1 40	1 50	2 00	2 10	2 20	2 30
5 20	0 11	0 21	0 32	0 43	0 53	1 04	1 15	1 25	1 36	1 47	1 57	2 08	2 19	2 29	2 40
5 40	0 11	0 23	0 34	0 45	0 57	1 08	1 19	1 31	1 42	1 53	2 05	2 16	2 27	2 39	2 50
6 00	0 12	0 24	0 36	0 48	1 00	1 12	1 24	1 36	1 48	2 00	2 12	2 24	2 36	2 48	3 00
6 20	0 13	0 25	0 38	0 51	1 03	1 16	1 29	1 41	1 54	2 07	2 19	2 32	2 45	2 57	3 10
6 40	0 13	0 27	0 40	0 53	1 07	1 20	1 33	1 47	2 00	2 13	2 27	2 40	2 53	3 07	3 20
7 00	0 14	0 28	0 42	0 56	1 10	1 24	1 38	1 52	2 06	2 20	2 34	2 48	3 02	3 16	3 30
7 20	0 15	0 29	0 44	0 59	1 13	1 28	1 43	1 57	2 12	2 27	2 41	2 56	3 11	3 25	3 40
7 40	0 15	0 31	0 46	1 01	1 17	1 32	1 47	2 03	2 18	2 33	2 49	3 04	3 19	3 35	3 50
8 00	0 16	0 32	0 48	1 04	1 20	1 36	1 52	2 08	2 24	2 40	2 56	3 12	3 28	3 44	4 00
8 20	0 17	0 33	0 50	1 07	1 23	1 40	1 57	2 13	2 30	2 47	3 03	3 20	3 37	3 53	4 10
8 40	0 17	0 35	0 52	1 09	1 27	1 44	2 01	2 19	2 36	2 53	3 11	3 28	3 45	4 03	4 20
9 00	0 18	0 36	0 54	1 12	1 30	1 48	2 06	2 24	2 42	3 00	3 18	3 36	3 54	4 12	4 30

RANGE OF TIDE FT	CORRECTION TO HEIGHT														
0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2
1.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.4	0.4	0.5
1.5	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.2	0.3	0.4	0.4	0.5	0.6	0.7	0.8
2.0	0.0	0.0	0.1	0.1	0.1	0.2	0.3	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
2.5	0.0	0.0	0.1	0.1	0.2	0.2	0.3	0.4	0.5	0.6	0.7	0.9	1.0	1.1	1.2
3.0	0.0	0.0	0.1	0.1	0.2	0.3	0.4	0.5	0.6	0.8	0.9	1.0	1.2	1.3	1.5
3.5	0.0	0.0	0.1	0.2	0.2	0.3	0.4	0.6	0.7	0.9	1.0	1.2	1.4	1.6	1.8
4.0	0.0	0.0	0.1	0.2	0.3	0.4	0.5	0.7	0.8	1.0	1.2	1.4	1.6	1.8	2.0
4.5	0.0	0.0	0.1	0.2	0.3	0.4	0.6	0.7	0.9	1.1	1.3	1.6	1.8	2.0	2.2
5.0	0.0	0.1	0.1	0.2	0.3	0.5	0.6	0.8	1.0	1.2	1.5	1.7	2.0	2.2	2.5
5.5	0.0	0.1	0.1	0.2	0.4	0.5	0.7	0.9	1.1	1.4	1.6	1.9	2.2	2.5	2.8
6.0	0.0	0.1	0.1	0.3	0.4	0.6	0.8	1.0	1.2	1.5	1.8	2.1	2.4	2.7	3.0
6.5	0.0	0.1	0.2	0.3	0.4	0.6	0.8	1.1	1.3	1.6	1.9	2.2	2.6	2.9	3.2
7.0	0.0	0.1	0.2	0.3	0.5	0.7	0.9	1.2	1.4	1.8	2.1	2.4	2.8	3.1	3.5

Enter the table with the duration of rise or fall, which most nearly agrees with the actual value, and on that horizontal line find the time from the nearest high or low water which agrees most nearly with the corresponding actual diff. The correction sought is in the

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TIDE TABLES

ENIWETOK ATOLL, MARSHALL ISLANDS

1957

This tabulation is extracted from "Tide Tables, Central and Western Pacific Ocean and Indian Ocean, 1957", and published by the U.S. Department of Commerce, Coast and Geodetic Survey.

Datum, elevation 0.0, is defined in the above publication as follows: "Heights are reckoned from the datum of soundings on the largest scale charts of the locality which is ½ foot below mean low water springs" for Kwajalein Atoll, Marshall Islands.

The reference station is Kwajalein Atoll, time meridian 180 degrees east. The following tabulation appears in Table 2. - Tidal Differences and ranges:

	Lat	Long.	Time	Ranges Mean	Ranges Spring
Eniwetok Atoll	11° 21'	162° 21'	-05 min.	2.7'	3.9'

Range is the difference between successive tides, i.e., between a high and a low or a low and a high. Mean range is the average range of all tides in the year. Spring range is the average of the largest ranges in the year. Springs occur once each lunar month (approximately 28 days) when the highest highs and the lowest lows are recorded.

The values in this tabulation are based on average weather conditions. Unusual weather, particularly high winds from a direction other than seasonally normal, affect both the times and the heights.

Each site in the Atoll has a slightly different time and height of highs and lows. This can be disregarded for all practical purposes in the lagoon. The water level on the ocean reef is always higher than that of the lagoon, the difference varying from a few tenths to 1.5'.

COMPILED BY:

HOLMES & NARVER, INC.,
ENGINEERS-CONSTRUCTORS
SURVEY DEPARTMENT
ENGINEERING DIVISION
SITE ELMER

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ENIWETOK ATOLL, MARSHALL ISLANDS

TIDE TABLE FOR JANUARY 1957

HOLMES & NARVER, INC., ENGINEERS-CONSTRUCTORS

DAY	TIME	HEIGHT	DAY	TIME	HEIGHT	DAY	TIME	HEIGHT	DAY	TIME	HEIGHT
1	0416	H 3.7	9	0236	L 1.5	17	0450	H 4.2	25	0519	L 1.9
Tu	1007	L 0.9	W	0902	H 3.3	Th	1046	L 0.4	F	1230	H 3.3
	1628	H 4.6		1503	L 1.9		1705	H 5.1		1935	L 2.0
	2255	L 0.8		2103	H 3.2		2329	L 0.2		----	- ---
2	0448	H 3.8	10	0336	L 1.7	18	0528	H 4.3	26	0117	H 2.8
W	1039	L 0.8	Th	1023	H 3.2	F	1126	L 0.4	Sa	0704	L 1.9
	1658	H 4.6		1650	L 2.1		1744	H 5.0		1350	H 3.5
	2324	L 0.7		2235	H 2.9		----	- ---		2037	L 1.7
3	0519	H 3.8	11	0506	L 1.8	19	0006	L 0.3	27	0226	H 3.0
Th	1111	L 0.8	F	1202	H 3.4	Sa	0607	H 4.2	Su	0808	L 1.7
	1728	H 4.6		1946	L 1.9		1206	L 0.5		1439	H 3.8
	2353	L 0.7		---	- ---		1822	H 4.8		2115	L 1.4
4	0550	H 3.8	12	0030	H 2.9	20	0043	L 0.5	28	0306	H 3.2
F	1141	L 0.9	Sa	0637	L 1.7	Su	0646	H 4.2	M	0851	L 1.4
	1758	H 4.5		1320	H 3.7		1247	L 0.8		1515	H 4.2
	----	- ---		1959	L 1.5		1900	H 4.4		2145	L 1.1
5	0022	L 0.8	13	0149	H 3.2	21	0119	L 0.8	29	0339	H 3.5
Sa	0621	H 3.8	Su	0744	L 1.4	M	0727	H 3.9	Tu	0927	L 1.2
	1212	L 1.1		1416	H 4.1		1329	L 1.2		1546	H 4.4
	1827	H 4.3		2050	L 1.2		1939	H 4.0		2212	L 0.8
6	0051	L 0.9	14	0244	H 3.5	22	0158	L 1.2	30	0407	H 3.8
Su	0652	H 3.2	M	0837	L 1.1	Tu	0812	H 3.7	W	1001	L 1.0
	1244	L 1.2		1502	H 4.5		1418	L 1.5		1616	H 4.5
	1857	H 4.1		2133	L 0.8		2022	H 3.5		2239	L 0.7
7	0121	L 1.1	15	0329	H 3.8	23	0241	L 1.5	31	0436	H 3.9
M	0727	H 3.5	Tu	0923	L 0.8	W	0908	H 3.5	Th	1030	L 0.8
	1319	L 1.5		1544	H 4.8		1523	L 1.9		1644	H 4.6
	1929	H 3.8		2213	L 0.5		2217	H 3.1		2305	L 0.6
8	0155	L 1.3	16	0410	H 4.0	24	0339	L 1.8			
Tu	0807	H 3.4	W	1005	L 0.5	Th	1032	H 3.2			
	1402	L 1.7		1625	H 5.0		1726	L 2.2			
	2007	H 3.5		2251	L 0.3		2300	H 2.8			

DAY	SUNRISE	SUNSET
1	0731	1858
11	0734	1904
21	0735	1910
31	0736	1914

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ENIWETOK ATOLL, MARSHALL ISLANDS

TIDE TABLE FOR FEBRUARY 1957

HOLMES & NARVER, INC., ENGINEERS-CONSTRUCTORS

DAY	TIME	HEIGHT	DAY	TIME	HEIGHT	DAY	TIME	HEIGHT	DAY	TIME	HEIGHT
1	0504	H 4.1	9	0345	L 1.8	17	0548	H 4.6	25	0226	H 2.9
F	1059	L 0.8	Sa	1054	H 3.4	Su	1154	L 0.4	M	0800	L 1.9
	1732	H 4.6		1705	L 2.1		1804	H 4.8		1424	H 3.7
	2331	L 0.6		2350	H 2.8		----	-----		2100	L 1.5
2	0531	H 4.2	10	----	-----	18	0016	L 0.5	26	0257	H 3.3
Sa	1123	L 0.8	Su	0555	L 1.9	M	0623	H 4.5	Tu	0844	L 1.6
	1738	H 4.6		1249	H 3.6		1231	L 0.6		1459	H 4.0
	2356	L 0.6		1945	L 1.7		1838	H 4.4		2125	L 1.2
3	0558	H 4.2	11	0139	H 3.1	19	0048	L 0.8	27	0325	H 3.6
Su	1156	L 0.8	M	0729	L 1.6	Tu	0658	H 4.3	W	0917	L 1.3
	1805	H 4.5		1400	H 4.0		1308	L 1.0		1529	H 4.2
	----	-----		2039	L 1.2		1911	H 4.0		2150	L 1.0
4	0021	L 0.8	12	0237	H 3.5	20	0119	L 1.1	28	0350	H 3.9
M	0626	H 4.1	Tu	0829	L 1.2	W	0735	H 4.0	Th	0947	L 1.1
	1225	L 1.0		1451	H 4.5		1348	L 1.5		1557	H 4.5
	1831	H 4.2		2121	L 0.8		1944	H 3.5		2214	L 0.8
5	0047	L 0.9	13	0320	H 3.8	21	0151	L 1.5			
Tu	0654	H 4.0	W	0916	L 0.8	Th	0816	H 3.7			
	1256	L 1.2		1534	H 4.8		1439	L 1.8			
	1859	H 3.9		2159	L 0.5		2021	H 3.1			
6	0114	L 1.1	14	0359	H 4.2	22	0228	L 1.8			
W	0727	H 3.8	Th	0959	L 0.5	F	0917	H 3.3			
	1331	L 1.5		1614	H 5.0		1616	L 2.2			
	1931	H 3.6		2236	L 0.3		2133	H 2.6			
7	0146	L 1.3	15	0436	H 4.5	23	0343	L 2.2			
Th	0808	H 3.6	F	1038	L 0.3	Sa	1131	H 3.2			
	1419	L 1.8		1652	H 5.2		1929	L 2.2			
	2013	H 3.2		2310	L 0.2		----	-----			
8	0229	L 1.6	16	0512	H 4.6	24	0116	H 2.6			
F	0909	H 3.5	Sa	1116	L 0.3	Su	0643	L 2.2			
	1538	L 2.0		1723	H 5.0		1331	H 3.4			
	2124	H 2.9		2344	L 0.2		2029	L 1.8			

DAY	SUNRISE	SUNSET
5	0735	1915
15	0733	1918
25	0728	1920

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ENIWETOK ATOLL, MARSHALL ISLANDS

TIDE TABLE FOR MARCH 1957

HOLMES & NORVER, INC., ENGINEERS-CONSTRUCTORS

DAY	TIME	HEIGHT	DAY	TIME	HEIGHT	DAY	TIME	HEIGHT	DAY	TIME	HEIGHT
1 F	0417	H 4.2	9 Sa	0151	L 1.6	17 Su	0451	H 4.9	25 M	0046	H 2.7
	1015	L 0.8		0829	H 3.7		1102	L 0.3		0602	L 2.5
	1623	H 4.6		1507	L 2.0		1708	H 4.8		1244	H 3.3
	2238	L 0.6		2055	H 2.9		2317	L 0.4		1950	L 1.9
2 Sa	0441	H 4.3	10 Su	0259	L 1.9	18 M	0525	H 4.9	26 Tu	0202	H 3.0
	1042	L 0.8		1005	H 3.5		1137	L 0.4		0738	L 2.2
	1649	H 4.6		1733	L 2.1		1742	H 4.6		1350	H 3.5
	2302	L 0.6		2330	H 2.8		2347	L 0.5		2025	L 1.6
3 Su	0506	H 4.5	11 M	0526	L 2.1	19 Tu	0558	H 4.8	27 W	0233	H 3.4
	1109	L 0.7		1220	H 3.6		1213	L 0.7		0823	L 1.8
	1715	H 4.6		1923	L 1.8		1814	H 4.3		1429	H 3.8
	2326	L 0.6		----	-----		----	----		2051	L 1.4
4 M	0531	H 4.5	12 Tu	0127	H 3.2	20 W	0017	L 0.8	28 Th	0258	H 3.8
	1137	L 0.7		0717	L 1.8		0631	H 4.5		0856	L 1.5
	1741	H 4.5		1341	H 3.9		1248	L 1.0		1500	H 4.1
	2350	L 0.7		2018	L 1.3		1845	H 3.9		2116	L 1.1
5 Tu	0557	H 4.5	13 W	0221	H 3.6	21 Th	0045	L 1.2	29 F	0323	H 4.1
	1205	L 0.8		0818	L 1.3		0705	H 4.2		0925	L 1.2
	1807	H 4.2		1445	H 4.4		1325	L 1.4		1528	H 4.3
	----	-----		2059	L 0.9		1916	H 3.5		2140	L 0.9
6 W	0014	L 0.8	14 Th	0303	H 4.1	22 F	0113	L 1.5	30 Sa	0348	H 4.3
	0625	H 4.4		0904	L 0.8		0740	H 3.8		0953	L 0.9
	1236	L 1.0		1518	H 4.7		1409	L 1.8		1555	H 4.5
	1835	H 4.0		2137	L 0.5		1951	H 3.1		2205	L 0.8
7 Th	0041	L 1.0	15 F	0341	H 4.5	23 Sa	0143	L 1.9	31 Su	0413	H 4.5
	0657	H 4.2		0946	L 0.5		0827	H 3.5		1021	L 0.8
	1311	L 1.3		1557	H 4.9		1524	L 2.2		1623	H 4.5
	1907	H 3.7		2211	L 0.4		2047	H 2.7		2229	L 0.7
8 F	0111	L 1.3	16 Sa	0416	H 4.8	24 Su	0236	L 2.2			
	0735	H 4.0		1025	L 0.3		1007	H 3.2			
	1356	L 1.6		1635	H 5.0		1830	L 2.2			
	1948	H 3.3		2245	L 0.3		----	-----			

DAY	SUNRISE	SUNSET
2	0726	1921
12	0720	1922
22	0714	1922

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ENIWETOK ATOLL, MARSHALL ISLANDS

TIDE TABLE FOR APRIL 1957

HOLMES & NARVER, INC., ENGINEERS-CONSTRUCTORS

DAY	TIME	HEIGHT	DAY	TIME	HEIGHT	DAY	TIME	HEIGHT	DAY	TIME	HEIGHT
1 M	0439	H 4.7	9 Tu	0508	L 2.2	17 W	0535	H 4.9	25 Th	0148	H 3.4
	1049	L 0.7		1147	H 3.6		1156	L 0.8		0746	L 2.0
	1650	H 4.5		1847	L 1.7		1753	H 4.2		1341	H 3.6
	2254	L 0.7		----	----		2350	L 0.9		2003	L 1.5
2 Tu	0505	H 4.8	10 W	0059	H 3.3	18 Th	0608	H 4.7	26 F	0220	H 3.8
	1118	L 0.7		0657	L 1.8		1231	L 1.1		0824	L 1.7
	1718	H 4.4		1313	H 3.8		1825	H 3.8		1420	H 3.8
	2321	L 0.8		1947	L 1.4		----	------		2033	L 1.3
3 W	0533	H 4.8	11 Th	0157	H 3.8	19 F	0019	L 1.2	27 Sa	0248	H 4.1
	1149	L 0.8		0801	L 1.4		0641	H 4.4		0857	L 1.4
	1748	H 4.2		1410	H 4.2		1309	L 1.4		1454	H 4.0
	2348	L 0.8		2030	L 1.0		1859	H 3.5		2101	L 1.1
4 Th	0603	H 4.7	12 F	0240	H 4.2	20 Sa	0049	L 1.5	28 Su	0316	H 4.4
	1222	L 1.0		0840	L 1.0		0717	H 4.1		0928	L 1.1
	1819	H 3.9		1455	H 4.5		1352	L 1.7		1526	H 4.2
	----	------		2108	L 0.8		1939	H 3.2		2129	L 0.9
5 F	0017	L 1.1	13 Sa	0312	H 4.6	21 Su	0123	L 1.9	29 M	0343	H 4.6
	0637	H 4.5		0929	L 0.7		0800	H 3.7		0959	L 0.9
	1301	L 1.2		1535	H 4.6		1453	L 2.0		1557	H 4.2
	1855	H 3.7		2144	L 0.6		2042	H 2.8		2158	L 0.8
6 Sa	0050	L 1.4	14 Su	0354	H 4.9	22 M	0216	L 2.2	30 Tu	0412	H 4.8
	0717	H 4.2		1009	L 0.5		0908	H 3.4		1030	L 0.8
	1348	L 1.5		1612	H 4.6		1646	L 2.2		1628	H 4.2
	1940	H 3.3		2216	L 0.5		2319	H 2.8		2226	L 0.8
7 Su	0134	L 1.7	15 M	0428	H 5.0	23 Tu	0437	L 2.5			
	0812	H 3.8		1046	L 0.5		1112	H 3.2			
	1501	L 1.8		1647	H 4.5		1833	L 2.0			
	2055	H 3.0		2249	L 0.5		----	------			
8 M	0246	L 2.0	16 Tu	0502	H 5.1	24 W	0112	H 3.1			
	0943	H 3.6		1122	L 0.5		0759	L 2.3			
	1704	L 1.9		1721	H 4.4		1243	H 3.4			
	2315	H 3.0		2322	L 0.7		1927	L 1.[illegible]			

DAY	SUNRISE	SUNSET
1	0706	1902
11	0702	1902
21	0656	1903

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ENIWETOK ATOLL, MARSHALL ISLANDS

TIDE TABLE FOR MAY 1957

HOLMES & NARVER, INC., ENGINEERS-CONSTRUCTORS

DAY	TIME	HEIGHT	DAY	TIME	HEIGHT	DAY	TIME	HEIGHT	DAY	TIME	HEIGHT
1	0443	H 4.9	9	0022	H 3.5	17	0550	H 4.7	25	0129	H 3.7
W	1103	L 0.8	Th	0629	L 1.8	F	1219	L 1.1	Sa	0744	L 1.8
	1700	H 4.2		1230	H 3.7		1812	H 3.7		1331	H 3.5
	2257	L 0.8		1907	L 1.5		----	-----		1943	L 1.5
2	0514	H 4.9	10	0126	H 3.8	18	0001	L 1.2	26	0208	H 4.0
Th	1138	L 0.8	F	0738	L 1.5	Sa	0625	H 4.5	Su	0825	L 1.5
	1734	H 4.1		1341	H 3.9		1256	L 1.3		1417	H 3.7
	2329	L 0.9		1956	L 1.2		1849	H 3.5		2021	L 1.3
3	0549	H 4.8	11	0213	H 4.2	19	0035	L 1.5	27	0243	H 4.3
F	1216	L 0.9	Sa	0829	L 1.2	Su	0700	H 4.2	M	0904	L 1.2
	1811	H 3.8		1431	H 4.1		1336	L 1.5		1456	H 3.8
	----	-----		2037	L 1.0		1931	H 3.3		2056	L 1.1
4	0004	L 1.2	12	0255	H 4.6	20	0113	L 1.8	28	0317	H 4.6
Sa	0627	H 4.6	Su	0914	L 0.9	M	0739	H 3.8	Tu	0940	L 1.0
	1259	L 1.2		1513	H 4.2		1424	L 1.8		1533	H 3.9
	1843	H 3.6		2115	L 0.8		2027	H 3.1		2130	L 0.9
5	0044	L 1.4	13	0333	H 4.8	21	0203	L 2.1	29	0350	H 4.8
Su	0712	H 4.3	M	0954	L 0.8	Tu	0830	H 3.5	W	1016	L 0.8
	1350	L 1.4		1551	H 4.2		1529	L 1.9		1611	H 4.0
	1946	H 3.4		2150	L 0.8		2149	H 3.0		2205	L 0.8
6	0134	L 1.7	14	0409	H 5.0	22	0325	L 2.3	30	0426	H 4.9
M	0803	H 4.0	Tu	1031	L 0.7	W	0944	H 3.3	Th	1053	L 0.8
	1457	L 1.7		1627	H 4.2		1651	L 1.9		1648	H 4.1
	2102	H 3.2		2224	L 0.8		2329	H 3.1		2242	L 0.8
7	0250	L 2.0	15	0443	H 5.0	23	0523	L 2.4	31	0503	H 5.0
Tu	0927	H 3.8	W	1108	L 0.8	Th	1117	H 3.2	F	1132	L 0.8
	1629	L 1.8		1702	H 4.1		1806	L 1.8		1727	H 4.0
	2247	H 3.2		2256	L 0.8		----	----		2318	L 0.9
8	0444	L 2.1	16	0517	H 4.9	24	0042	H 3.4			
W	1109	H 3.6	Th	1143	L 0.8	F	0649	L 2.2			
	1801	L 1.7		1736	H 3.9		1236	H 3.4			
	----	-----		2320	L 1.1		1902	L 1.7			

DAY	SUNRISE	SUNSET
1	0652	1925
11	0649	1926
21	0647	1928
31	0646	1931

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ENIWETOK ATOLL, MARSHALL ISLANDS

TIDE TABLE FOR JUNE 1957

HOLMES & NARVER, INC., ENGINEERS-CONSTRUCTORS

DAY	TIME	HEIGHT	DAY	TIME	HEIGHT	DAY	TIME	HEIGHT	DAY	TIME	HEIGHT
1 Sa	0542	H 4.9	9 Su	0148	H 4.1	17 M	0023	L 1.4	25 Tu	0214	H 4.2
	1212	L 0.8		0813	L 1.5		0642	H 4.3		0843	L 1.4
	1808	H 3.8		1408	H 3.6		1313	L 1.2		1434	H 3.5
	----	-----		2009	L 1.3		1913	H 3.5		2028	L 1.2
2 Su	0000	L 1.1	10 M	0235	H 4.4	18 Tu	0059	L 1.6	26 W	0256	H 4.5
	0623	H 4.8		0902	L 1.2		0716	H 4.0		0925	L 1.1
	1256	L 1.0		1456	H 3.8		1351	L 1.4		1519	H 3.8
	1853	H 3.8		2051	L 1.2		1956	H 3.4		2111	L 1.1
3 M	0044	L 1.2	11 Tu	0315	H 4.6	19 W	0141	L 1.8	27 Th	0335	H 4.8
	0709	H 4.5		0944	L 1.0		0755	H 3.8		1005	L 0.8
	1345	L 1.2		1536	H 3.8		1432	L 1.6		1559	H 3.9
	1946	H 3.5		2129	L 1.0		2047	H 3.3		2152	L 0.8
4 Tu	0136	L 1.5	12 W	0353	H 4.8	20 Th	0234	L 2.1	28 F	0415	H 4.9
	0800	H 4.2		1022	L 0.9		0842	H 3.5		1045	L 0.7
	1441	L 1.4		1614	H 3.8		1525	L 1.8		1640	H 4.1
	2049	H 3.5		2206	L 1.0		2154	H 3.2		2234	L 0.8
5 W	0242	L 1.8	13 Th	0428	H 4.8	21 F	0350	L 2.2	29 Sa	0455	H 5.1
	0905	H 3.8		1057	L 0.8		0946	H 3.2		1123	L 0.6
	1550	L 1.5		1649	H 3.8		1632	L 1.8		1720	H 4.1
	2209	H 3.4		2240	L 1.0		2314	H 3.3		2314	L 0.8
6 Th	0413	L 1.9	14 F	0502	H 4.8	22 Sa	0530	L 2.2	30 Su	0535	H 5.0
	1026	H 3.5		1132	L 0.9		1114	H 3.2		1203	L 0.6
	1708	L 1.6		1724	H 3.8		1746	L 1.8		1802	H 4.1
	2337	H 3.5		2315	L 1.1		----	-----		2356	L 0.8
7 F	0554	L 1.9	15 Sa	0536	H 4.7	23 Su	0029	H 3.5			
	1155	H 3.5		1205	L 1.0		0656	L 2.0			
	1822	L 1.5		1759	H 3.8		1238	H 3.2			
	----	----		2349	L 1.2		1851	L 1.7			
8 Sa	0051	H 3.8	16 Su	0609	H 4.5	24 M	0127	H 3.8			
	0714	L 1.7		1238	L 1.1		0755	L 1.7			
	1310	H 3.5		1835	H 3.6		1343	H 3.3			
	1921	L 1.5		----	-----		1943	L 1.5			

DAY	SUNRISE	SUNSET
5	0646	1933
15	0647	1936
25	0649	1938

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ENIWETOK ATOLL, MARSHALL ISLANDS

TIDE TABLE FOR JULY 1957

HOLMES & NARVER, INC., ENGINEERS-CONSTRUCTORS

DAY	TIME	HEIGHT	DAY	TIME	HEIGHT	DAY	TIME	HEIGHT	DAY	TIME	HEIGHT
1	0616	H 4.8	9	0222	H 4.2	17	0039	L 1.3	25	0240	H 4.4
M	1243	L 0.7	Tu	0857	L 1.4	W	0649	H 4.2	Th	0912	L 1.1
	1845	H 4.0		1448	H 3.4		1312	L 1.2		1508	H 3.7
	----	-----		2037	L 1.4		1919	H 3.8		2100	L 1.1
2	0040	L 1.0	10	0305	H 4.4	18	0113	L 1.5	26	0323	H 4.8
Tu	0659	H 4.6	W	0937	L 1.2	Th	0719	H 3.9	F	0952	L 0.8
	1326	L 0.9		1529	H 3.6		1343	L 1.4		1549	H 4.0
	1930	H 3.8		2118	L 1.2		1955	H 3.6		2144	L 0.8
3	0128	L 1.2	11	0342	H 4.5	19	0152	L 1.8	27	0404	H 5.0
W	0745	H 4.2	Th	1012	L 1.0	F	0755	H 3.6	Sa	1031	L 0.5
	1412	L 1.2		1605	H 3.8		1420	L 1.5		1628	H 4.2
	2022	H 3.7		2155	L 1.1		2042	H 3.5		2225	L 0.6
4	0224	L 1.5	12	0416	H 4.7	20	0244	L 2.0	28	0443	H 5.1
Th	0836	H 3.8	F	1045	L 0.9	Sa	0839	H 3.3	Su	1108	L 0.4
	1505	L 1.5		1637	H 3.8		1508	L 1.8		1707	H 4.4
	2126	H 3.6		2230	L 1.0		2147	H 3.4		2306	L 0.5
5	0336	L 1.8	13	0448	H 4.8	21	0406	L 2.2	29	0523	H 5.1
F	0941	H 3.5	Sa	1115	L 0.8	Su	0951	H 3.1	M	1145	L 0.4
	1611	L 1.7		1709	H 3.9		1622	L 1.9		1746	H 4.5
	2247	H 3.5		2303	L 1.0		2319	H 3.4		2347	L 0.5
6	0515	L 2.0	14	0519	H 4.7	22	0604	L 2.2	30	0602	H 4.9
Sa	1107	H 3.2	Su	1144	L 0.8	M	1145	H 2.9	Tu	1221	L 0.5
	1731	L 1.8		1741	H 3.9		1758	L 1.8		1825	H 4.4
	----	-----		2335	L 1.0		----	-----		----	-----
7	0014	H 3.6	15	0550	H 4.6	23	0046	H 3.6	31	0028	L 0.8
Su	0654	L 1.9	M	1213	L 0.9	Tu	0732	L 1.8	W	0641	H 4.6
	1241	H 3.2		1813	H 3.9		1319	H 3.1		1258	L 0.8
	1848	L 1.7		----	-----		1914	L 1.7		1905	H 4.2
8	0127	H 3.8	16	0006	L 1.2	24	0150	H 4.0			
M	0807	L 1.7	Tu	0619	H 4.4	W	0828	L 1.5			
	1355	H 3.2		1242	L 1.0		1420	H 3.4			
	1949	L 1.5		1844	H 3.8		2012	L 1.4			

DAY	SUNRISE	SUNSET
5	0652	1939
15	0655	1939
25	0657	1937

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ENIWETOK ATOLL, MARSHALL ISLANDS

TIDE TABLE FOR AUGUST 1957

HOLMES & NARVER, INC., ENGINEERS-CONSTRUCTORS

DAY	TIME	HEIGHT	DAY	TIME	HEIGHT	DAY	TIME	HEIGHT	DAY	TIME	HEIGHT
1	0111	L 1.1	9	0330	H 4.4	17	0118	L 1.5	25	0349	H 5.0
Th	0720	H 4.2	F	0957	L 1.1	Sa	0715	H 3.7	Su	1010	L 0.5
	1337	L 1.1		1552	H 3.8		1329	L 1.4		1612	H 4.5
	1950	H 4.0		2145	L 1.1		1949	H 3.8		2215	L 0.5
2	0158	L 1.4	10	0400	H 4.6	18	0200	L 1.8	26	0428	H 5.2
F	0803	H 3.8	Sa	1024	L 0.8	Su	0753	H 3.4	M	1045	L 0.3
	1419	L 1.4		1621	H 4.0		1407	L 1.7		1648	H 4.8
	2041	H 3.8		2217	L 0.9		2041	H 3.5		2254	L 0.4
3	0258	L 1.8	11	0430	H 4.7	19	0307	L 2.1	27	0505	H 5.1
Sa	0854	H 3.3	Su	1051	L 0.8	M	0852	H 3.0	Tu	1120	L 0.3
	1512	L 1.8		1649	H 4.2		1509	L 1.9		1724	H 4.8
	2151	H 3.5		2247	L 0.8		2210	H 3.4		2332	L 0.4
4	0432	L 2.1	12	0457	H 4.7	20	0518	L 2.2	28	0542	H 4.9
Su	1016	H 2.9	M	1116	L 0.7	Tu	1101	H 2.8	W	1153	L 0.5
	1633	L 2.0		1717	H 4.2		1710	L 2.1		1800	H 4.7
	2337	H 3.5		2316	L 0.8		----	-----		----	-----
5	0645	L 2.1	13	0525	H 4.6	21	0010	H 3.5	29	0010	L 0.6
M	1229	H 2.8	Tu	1141	L 0.8	W	0714	L 1.9	Th	0617	H 4.5
	1824	L 2.0		1744	H 4.2		1308	H 3.0		1227	L 0.8
	----	-----		2345	L 0.9		1858	L 1.8		1837	H 4.5
6	0113	H 3.6	14	0552	H 4.5	22	0131	H 3.9	30	0050	L 0.9
Tu	0808	L 1.8	W	1207	L 0.8	Th	0812	L 1.5	F	0654	H 4.2
	1357	H 3.1		1813	H 4.2		1410	H 3.4		1300	L 1.1
	1942	L 1.8		----	-----		2002	L 1.5		1916	H 4.2
7	0213	H 3.9	15	0014	L 1.1	23	0224	H 4.3	31	0132	L 1.4
W	0854	L 1.5	Th	0618	H 4.3	F	0856	L 1.1	Sa	0730	H 3.7
	1446	H 3.3		1232	L 1.0		1455	H 3.8		1334	L 1.5
	2032	L 1.5		1841	H 4.1		2051	L 1.1		1958	H 3.8
8	0256	H 4.2	16	0044	L 1.3	24	0309	H 4.7			
Th	0927	L 1.2	F	0646	H 4.0	Sa	0934	L 0.7			
	1522	H 3.5		1259	L 1.2		1534	H 4.2			
	2111	L 1.3		1911	H 3.9		2134	L 0.7			

DAY	SUNRISE	SUNSET
4	0659	1935
14	0700	1931
24	0701	1926

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ENIWETOK ATOLL, MARSHALL ISLANDS

TIDE TABLE FOR SEPTEMBER 1957

HOLMES & NARVER, INC., ENGINEERS-CONSTRUCTORS

DAY	TIME	HEIGHT	DAY	TIME	HEIGHT	DAY	TIME	HEIGHT	DAY	TIME	HEIGHT
1	0223	L 1.8	9	0406	H 4.6	17	0236	L 2.0	25	0444	H 4.9
Su	0812	H 3.2	M	1020	L 0.8	Tu	0823	H 3.0	W	1052	L 0.4
	1414	L 1.8		1623	H 4.5		1422	L 2.0		1701	H 5.1
	2058	H 3.5		2227	L 0.8		2121	H 3.5		2315	L 0.4
2	0350	L 2.2	10	0432	H 4.6	18	0445	L 2.2	26	0520	H 4.7
M	0925	H 2.8	Tu	1044	L 0.7	W	1043	H 2.8	Th	1124	L 0.5
	1526	L 2.2		1649	H 4.5		1638	L 2.2		1736	H 4.9
	2251	H 3.3		2255	L 0.8		2336	H 3.5		2353	L 0.6
3	0639	L 2.2	11	0458	H 4.5	19	0649	L 1.8	27	0554	H 4.4
Tu	1235	H 2.7	W	1108	L 0.7	Th	1254	H 3.1	F	1157	L 0.8
	1811	L 2.3		1714	H 4.5		1845	L 1.9		1811	H 4.7
	----	-----		2322	L 0.8		----	-----		----	-----
4	0057	H 3.5	12	0524	H 4.5	20	0108	H 3.8	28	0030	L 0.9
W	0800	L 1.8	Th	1132	L 0.8	F	0749	L 1.5	Sa	0628	H 4.0
	1359	H 3.0		1740	H 4.5		1354	H 3.5		1227	L 1.1
	1938	L 2.0		2350	L 0.9		1951	L 1.5		1846	H 4.4
5	0200	H 3.8	13	0550	H 4.2	21	0205	H 4.2	29	0109	L 1.3
Th	0837	L 1.5	F	1156	L 0.9	Sa	0832	L 1.1	Su	0703	H 3.5
	1437	H 3.4		1807	H 4.5		1437	H 4.0		1257	L 1.5
	2025	L 1.7		----	-----		2038	L 1.0		1924	H 4.0
6	0239	H 4.0	14	0019	L 1.1	22	0251	H 4.6	30	0157	L 1.8
F	0906	L 1.3	Sa	0617	H 4.0	Su	0909	L 0.7	M	0742	H 3.2
	1507	H 3.7		1221	L 1.1		1515	H 4.5		1332	L 1.8
	2100	L 1.4		1837	H 4.2		2120	L 0.6		2013	H 3.6
7	0311	H 4.3	15	0053	L 1.4	23	0330	H 4.8			
Sa	0931	L 1.1	Su	0647	H 3.7	M	0944	L 0.5			
	1533	H 4.0		1250	L 1.4		1551	H 4.8			
	2131	L 1.2		1911	H 4.0		2200	L 0.4			
8	0339	H 4.5	16	0134	L 1.6	24	0408	H 4.9			
Su	0956	L 0.8	M	0724	H 3.3	Tu	1019	L 0.3			
	1558	H 4.2		1325	L 1.7		1626	H 5.0			
	2159	L 0.9		1959	H 3.8		2238	L 0.3			

DAY	SUNRISE	SUNSET
3	0701	1920
13	0700	1913
23	0700	1907

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ENIWETOK ATOLL, MARSHALL ISLANDS

TIDE TABLE FOR OCTOBER 1957

HOLMES & NARVER, INC., ENGINEERS-CONSTRUCTORS

DAY	TIME	HEIGHT	DAY	TIME	HEIGHT	DAY	TIME	HEIGHT	DAY	TIME	HEIGHT
1	0312	L 2.1	9	0405	H 4.4	17	0413	L 1.9	25	0500	H 4.4
Tu	0851	H 2.8	W	1011	L 0.7	Th	1025	H 2.9	F	1059	L 0.6
	1427	L 2.2		1622	H 4.7		1613	L 2.2		1716	H 5.0
	2148	H 3.3		2233	L 0.8		2259	H 3.5		2338	L 0.6
2	0555	L 2.2	10	0432	H 4.4	18	0609	L 1.8	26	0534	H 4.2
W	1217	H 2.7	Th	1036	L 0.7	F	1226	H 3.2	Sa	1131	L 0.8
	1736	L 2.5		1648	H 4.8		1822	L 1.9		1750	H 4.8
	----	-----		2302	L 0.7		----	-----		----	-----
3	0016	H 3.3	11	0459	H 4.3	19	0038	H 3.7	27	0015	L 0.8
Th	0726	L 1.9	F	1101	L 0.8	Sa	0716	L 1.4	Su	0609	H 3.8
	1342	H 3.1		1714	H 4.8		1329	H 3.7		1203	L 1.1
	1922	L 2.2		2331	L 0.8		1932	L 1.5		1825	H 4.5
4	0130	H 3.5	12	0527	H 4.2	20	0140	H 4.1	28	0054	L 1.2
F	0804	L 1.6	Sa	1127	L 0.9	Su	0802	L 1.1	M	0645	H 3.5
	1415	H 3.4		1743	H 4.6		1413	H 4.2		1234	L 1.5
	2007	L 1.8		----	-----		2022	L 1.1		1901	H 4.1
5	0210	H 3.8	13	0003	L 1.0	21	0228	H 4.3	29	0138	L 1.5
Sa	0832	L 1.4	Su	0557	H 3.9	M	0842	L 0.8	Tu	0726	H 3.2
	1441	H 3.8		1154	L 1.1		1453	H 4.5		1309	L 1.8
	2040	L 1.5		1814	H 4.5		2105	L 0.7		1944	H 3.7
6	0242	H 4.0	14	0038	L 1.2	22	0310	H 4.5	30	0237	L 1.8
Su	0857	L 1.2	M	0631	H 3.6	Tu	0918	L 0.5	W	0828	H 2.8
	1506	H 4.1		1225	L 1.3		1530	H 4.8		1401	L 2.2
	2110	L 1.2		1851	H 4.2		2145	L 0.5		2048	H 3.4
7	0311	H 4.2	15	0122	L 1.5	23	0348	H 4.6	31	0421	L 2.1
M	0922	L 0.9	Tu	0713	H 3.3	W	0953	L 0.5	Th	1042	H 2.8
	1531	H 4.4		1304	L 1.6		1606	H 5.1		1609	L 2.4
	2138	L 1.0		1939	H 3.9		2224	L 0.4		2246	H 3.2
8	0338	H 4.3	16	0226	L 1.8	24	0425	H 4.5			
Tu	0946	L 0.8	W	0817	H 3.0	Th	1027	L 0.5			
	1556	H 4.5		1405	L 2.0		1641	H 5.1			
	2206	L 0.8		2057	H 3.6		2302	L 0.5			

DAY	SUNRISE	SUNSET
3	0700	1906
13	0700	1854
23	0701	1849

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ENIWETOK ATOLL, MARSHALL ISLANDS

TIDE TABLE FOR NOVEMBER 1957

HOLMES & NARVER, INC., ENGINEERS-CONSTRUCTORS

DAY	TIME	HEIGHT	DAY	TIME	HEIGHT	DAY	TIME	HEIGHT	DAY	TIME	HEIGHT
1 F	0614	L 1.9	9 Sa	0442	H 4.1	17 Su	----	-----	25 M	0004	L 0.8
	1245	H 3.0		1038	L 0.8		0633	L 1.5		0557	H 3.7
	1834	L 2.2		1656	H 4.8		1254	H 3.6		1148	L 1.0
	----	-----		2320	L 0.7		1909	L 1.5		1810	H 4.5
2 Sa	0028	H 3.2	10 Su	0514	H 3.9	18 M	0110	H 3.7	26 Tu	0041	L 0.9
	0711	L 1.8		1108	L 0.8		0728	L 1.2		0633	H 3.5
	1333	H 3.3		1728	H 4.8		1348	H 4.1		1222	L 1.3
	1934	L 2.0		2355	L 0.8		2006	L 1.2		1845	H 4.2
3 Su	0126	H 3.5	11 M	0549	H 3.8	19 Tu	0205	H 3.8	27 W	0119	L 1.3
	0748	L 1.5		1141	L 1.0		0813	L 0.9		0713	H 3.2
	1406	H 3.7		1304	H 4.6		1431	H 4.5		1258	L 1.6
	2013	L 1.6		----	-----		2052	L 0.8		1921	H 3.8
4 M	0206	H 3.7	12 Tu	0034	L 1.0	20 W	0251	H 4.0	28 Th	0203	L 1.5
	0818	L 1.2		0627	H 3.6		0854	L 0.8		0801	H 3.1
	1435	H 4.0		1218	L 1.2		1512	H 4.7		1343	L 1.9
	2046	L 1.3		1844	H 4.3		2135	L 0.6		2006	H 3.5
5 Tu	0240	H 3.8	13 W	0120	L 1.2	21 Th	0332	H 4.2	29 F	0259	L 1.7
	0846	L 1.1		0714	H 3.4		0931	L 0.6		0912	H 2.9
	1502	H 4.3		1303	L 1.5		1549	H 4.9		1451	L 2.2
	2116	L 1.1		1932	H 4.0		2214	L 0.5		2108	H 3.2
6 W	0311	H 4.0	14 Th	0218	L 1.5	22 F	0409	H 4.2	30 Sa	0419	L 1.8
	0914	L 0.9		0817	H 3.2		1007	L 0.6		1057	H 2.9
	1530	H 4.5		1405	L 1.8		1625	H 5.0		1653	L 2.3
	2146	L 0.8		2039	H 3.7		2251	L 0.5		2244	H 3.1
7 Th	0341	H 4.1	15 F	0338	L 1.7	23 Sa	0446	H 4.1			
	0941	L 0.8		0952	H 3.1		1041	L 0.7			
	1558	H 4.7		1546	L 2.0		1700	H 4.9			
	2216	L 1.1		2216	H 3.5		2329	L 0.6			
8 F	0411	H 4.1	16 Sa	0516	L 1.6	24 Su	0521	H 3.9			
	1010	L 0.8		1140	H 3.2		1115	L 0.8			
	1627	H 4.8		1748	L 1.9		1735	H 4.8			
	2248	L 0.7		2357	H 3.5		----	-----			

DAY	SUNRISE	SUNSET
2	0704	1845
12	0706	1844
22	0710	1844

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ENIWETOK ATOLL, MARSHALL ISLANDS

TIDE TABLE FOR DECEMBER 1957

HOLMES & NARVER, INC., ENGINEERS-CONSTRUCTORS

DAY	TIME	HEIGHT	DAY	TIME	HEIGHT	DAY	TIME	HEIGHT	DAY	TIME	HEIGHT
1	0543	L 1.8	9	0508	H 3.9	17	0036	H 3.3	25	0023	L 0.8
Su	1225	H 3.2	M	1101	L 0.8	Tu	0652	L 1.4	W	0619	H 3.7
	1838	L 2.2		1721	H 4.8		1323	H 3.8		1210	L 1.1
	----	-----		2351	L 0.6		1952	L 1.4		1828	H 4.3
2	0016	H 3.1	10	0546	H 3.8	18	0145	H 3.4	26	0055	L 0.9
M	0647	L 1.7	Tu	1138	L 0.8	W	0749	L 1.2	Th	0654	H 3.5
	1319	H 3.5		1759	H 4.7		1416	H 4.2		1245	L 1.3
	1938	L 1.8		----	-----		2045	L 1.1		1859	H 4.1
3	0120	H 3.2	11	0030	L 0.8	19	0238	H 3.5	27	0128	L 1.2
Tu	0732	L 1.5	W	0626	H 3.7	Th	0836	L 1.0	F	0731	H 3.4
	1400	H 3.8		1218	L 1.0		1500	H 4.5		1321	L 1.5
	2020	L 1.5		1839	H 4.5		2129	L 0.8		1932	H 3.8
4	0207	H 3.4	12	0113	L 0.9	20	0322	H 3.7	28	0204	L 1.4
W	0810	L 1.2	Th	0711	H 3.5	F	0917	L 0.8	Sa	0814	H 3.2
	1435	H 4.1		1304	L 1.2		1539	H 4.7		1404	L 1.8
	2057	L 1.2		1926	H 4.2		2209	L 0.7		2010	H 3.4
5	0247	H 3.5	13	0200	L 1.2	21	0401	H 3.8	29	0248	L 1.6
Th	0845	L 1.1	F	0804	H 3.4	Sa	0954	L 0.8	Su	0911	H 3.2
	1507	H 4.4		1359	L 1.5		1615	H 4.8		1505	L 2.1
	2131	L 1.0		2020	H 3.8		2245	L 0.6		2101	H 3.1
6	0322	H 3.7	14	0259	L 1.4	22	0438	H 3.8	30	0348	L 1.8
F	0918	L 0.9	Sa	0914	H 3.3	Su	1030	L 0.8	M	1034	H 3.1
	1539	H 4.6		1514	L 1.8		1650	H 4.8		1653	L 2.2
	2205	L 0.8		2131	H 3.5		2319	L 0.6		2228	H 2.9
7	0358	H 3.8	15	0415	L 1.5	23	0512	H 3.8	31	0513	L 1.8
Sa	0951	L 0.8	Su	1043	H 3.3	M	1104	L 0.8	Tu	1210	H 3.2
	1612	H 4.8		1702	L 1.8		1723	H 4.7		1848	L 2.1
	2239	L 0.6		2304	H 3.3		2351	L 0.7		----	-----
8	0432	H 3.9	16	0540	L 1.5	24	0545	H 3.8			
Su	1025	L 0.7	M	1213	H 3.5	Tu	1137	L 0.8			
	1646	H 4.8		1842	L 1.7		1756	H 4.5			
	2314	L 0.6		----	-----		----	-----			

DAY	SUNRISE	SUNSET
2	0715	1845
12	0721	1848
22	0726	1853

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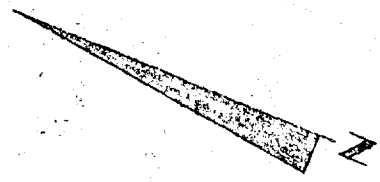
LETTER DATED JULY, 15, 1994
FROM ANTON SINISGALLI TO
DEANE S. NIXON



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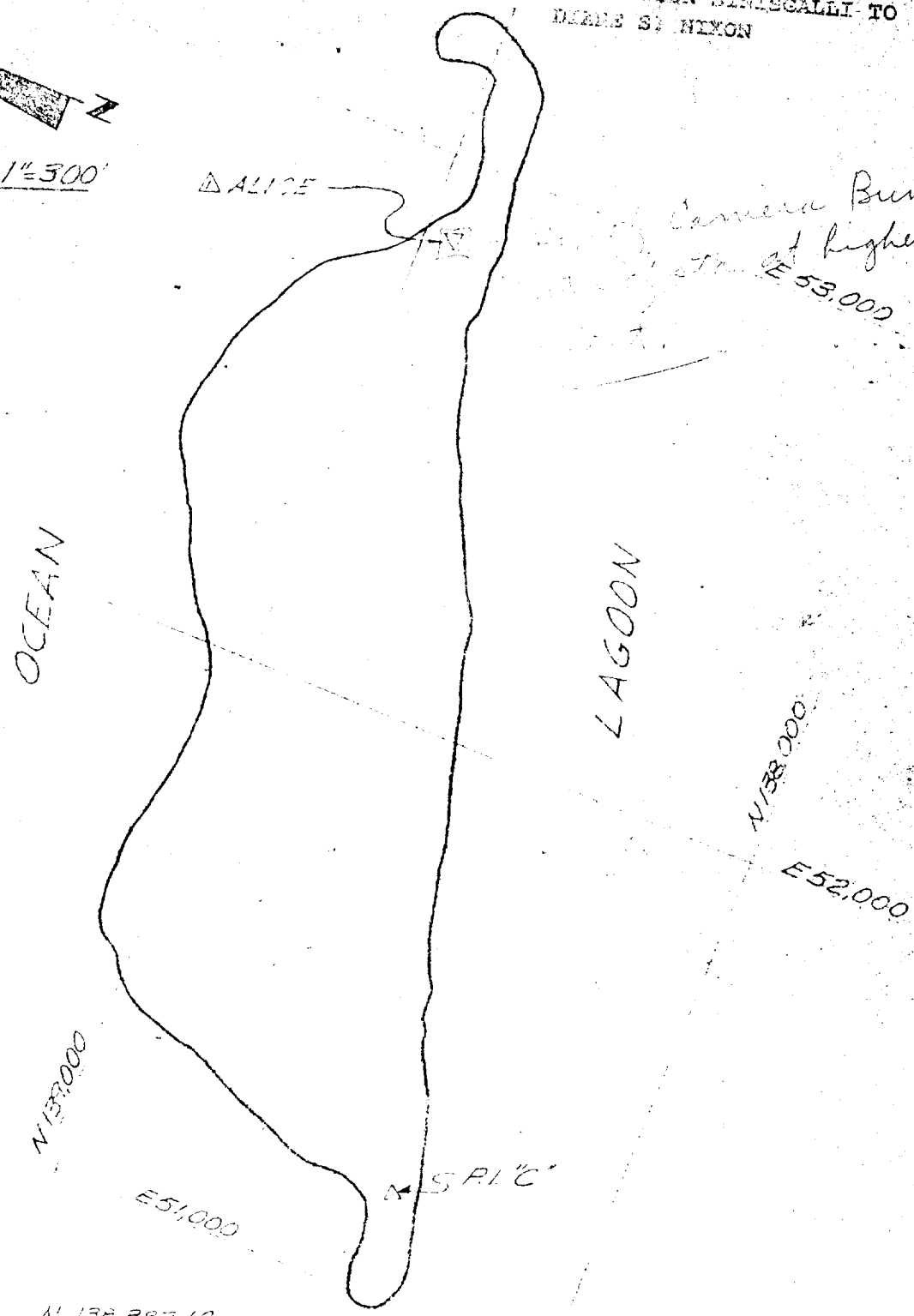

P.I. "C"	N 138,387.19 E 51,196.73
ALICE	N 138,951.392 E 52,852.237

△ TO DATE 11-30-55 AM

DATE		GENERAL CONTROL LAYOUT
7-1-54		SITE ALICE
DRAWN ES	CHECKED J.D.	

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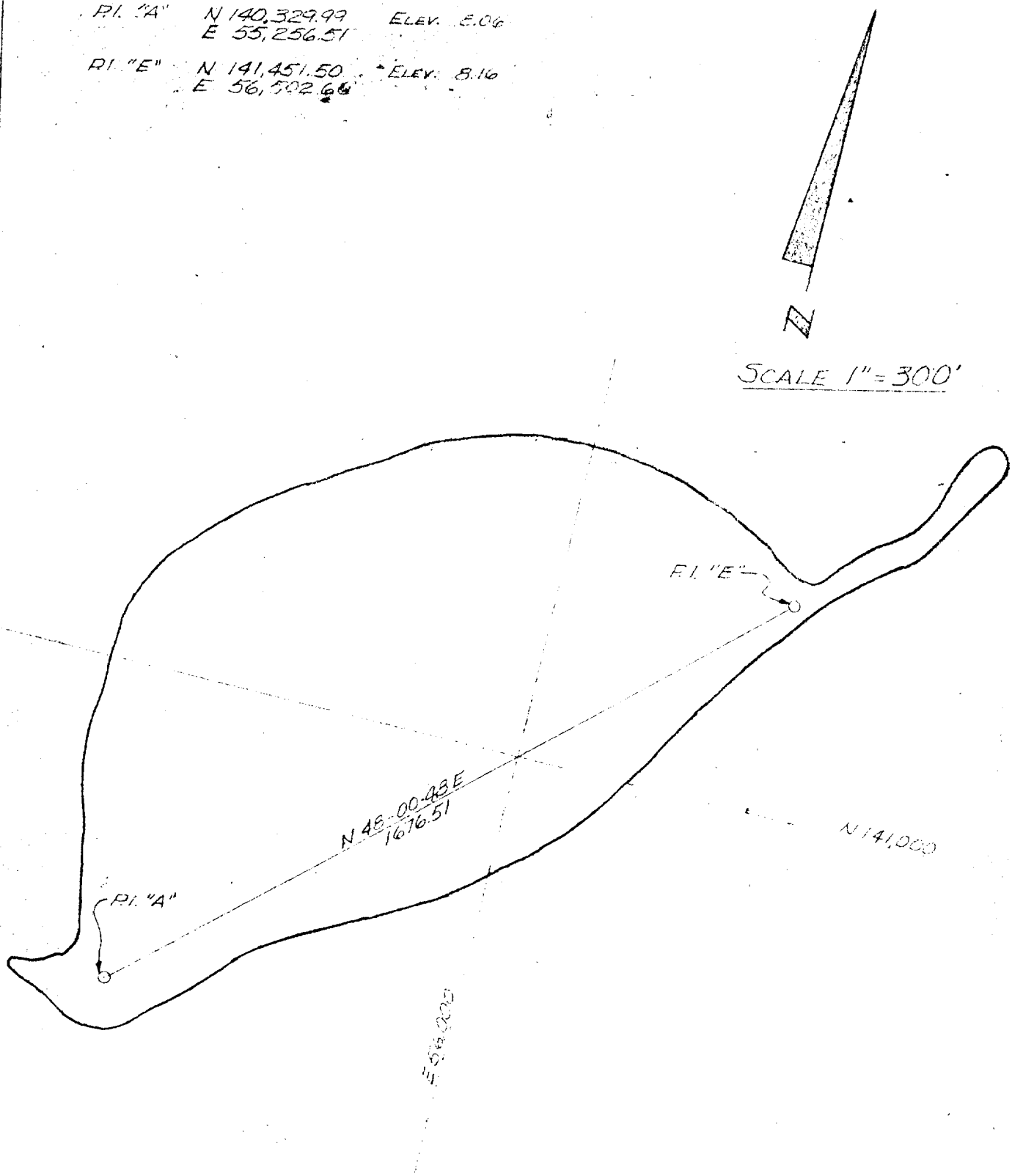
P.I. "A" N 140,329.99 E 55,256.51 ELEV. 8.06

P.I. "E" N 141,451.50 E 56,502.66 ELEV. 8.16



DATE 4-19-54	GENERAL CONTROL LAYOUT
DRAWN ES / CHECKED J.D.	SITE BELLE

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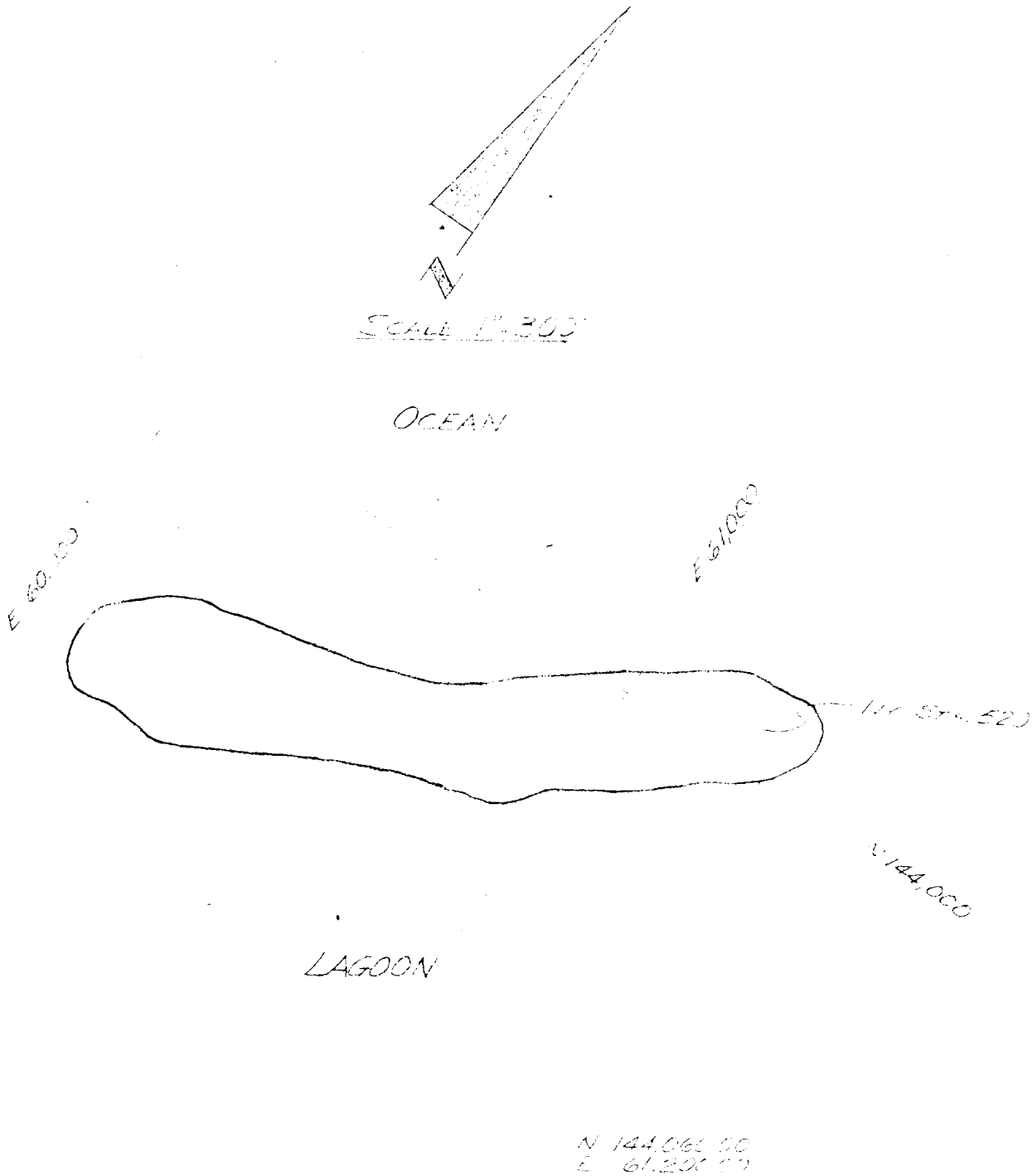

DATE 4-14-84		GENERAL CONTROL LAYOUT
DRAWING	CHECKED	SITE CLEAR

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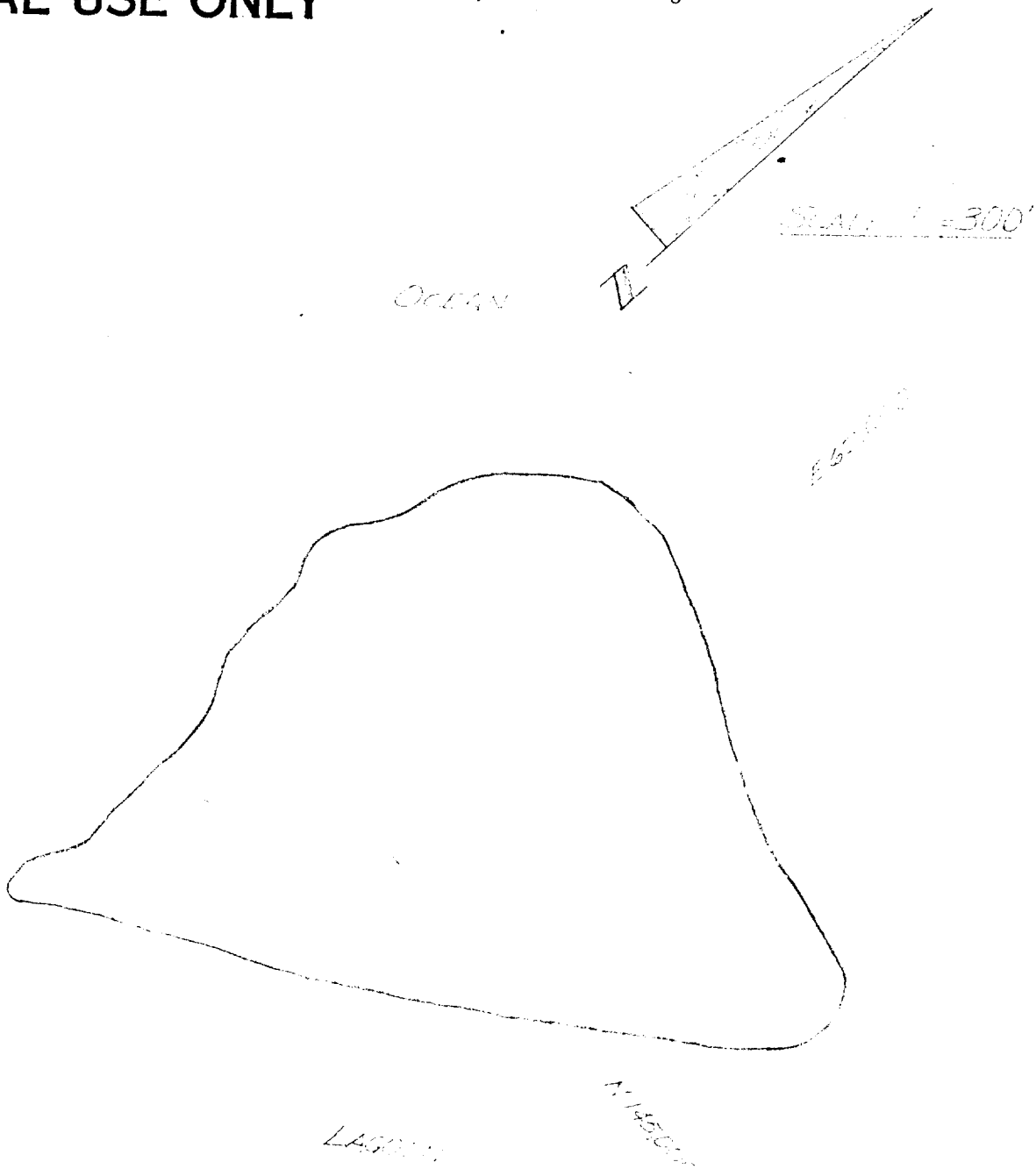

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DRAWN ES		[illegible]

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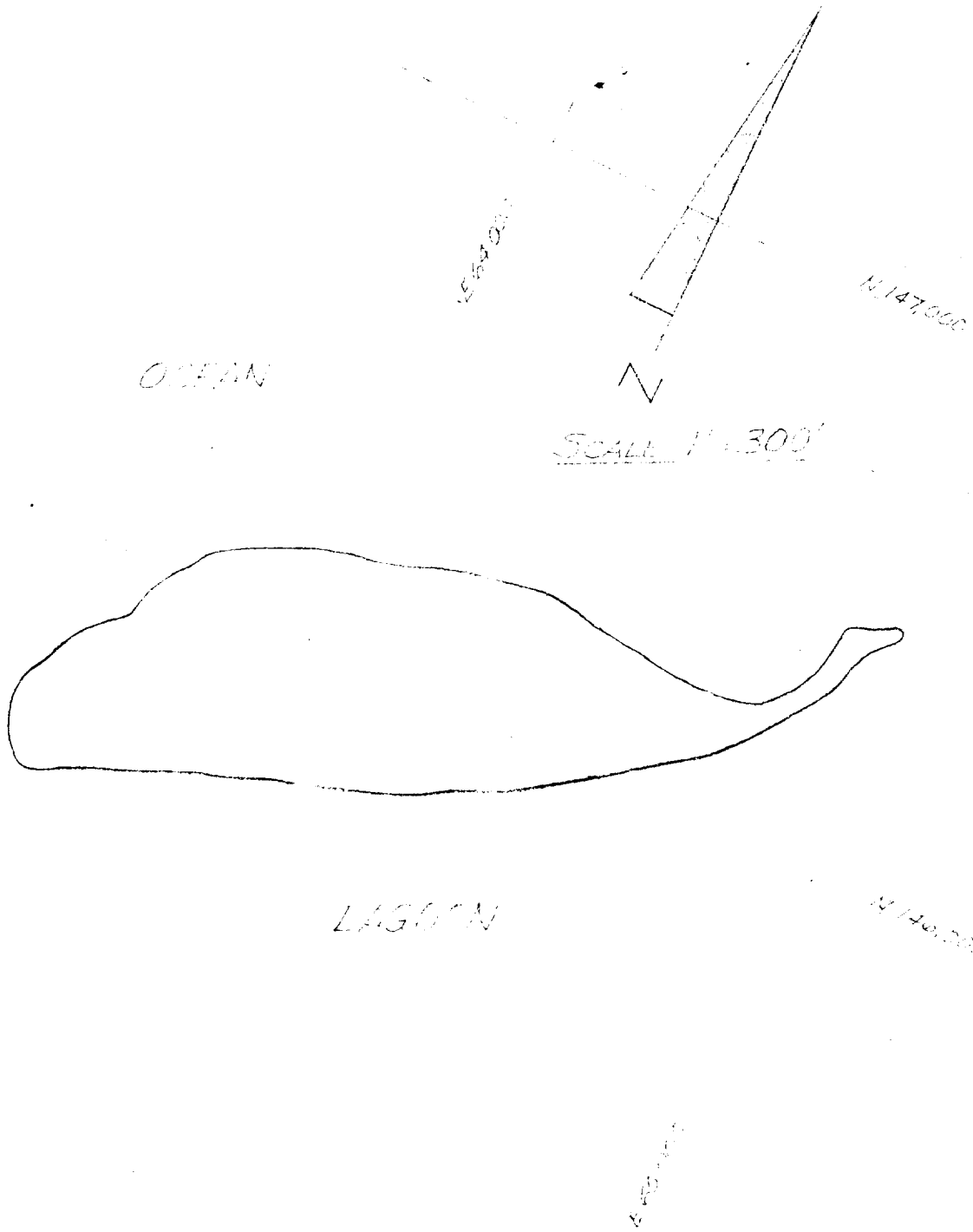

DATE 4-19-54	GENERAL CONTROL LAYOUT
DRAWN ES / CHECKED	SITE ELNA

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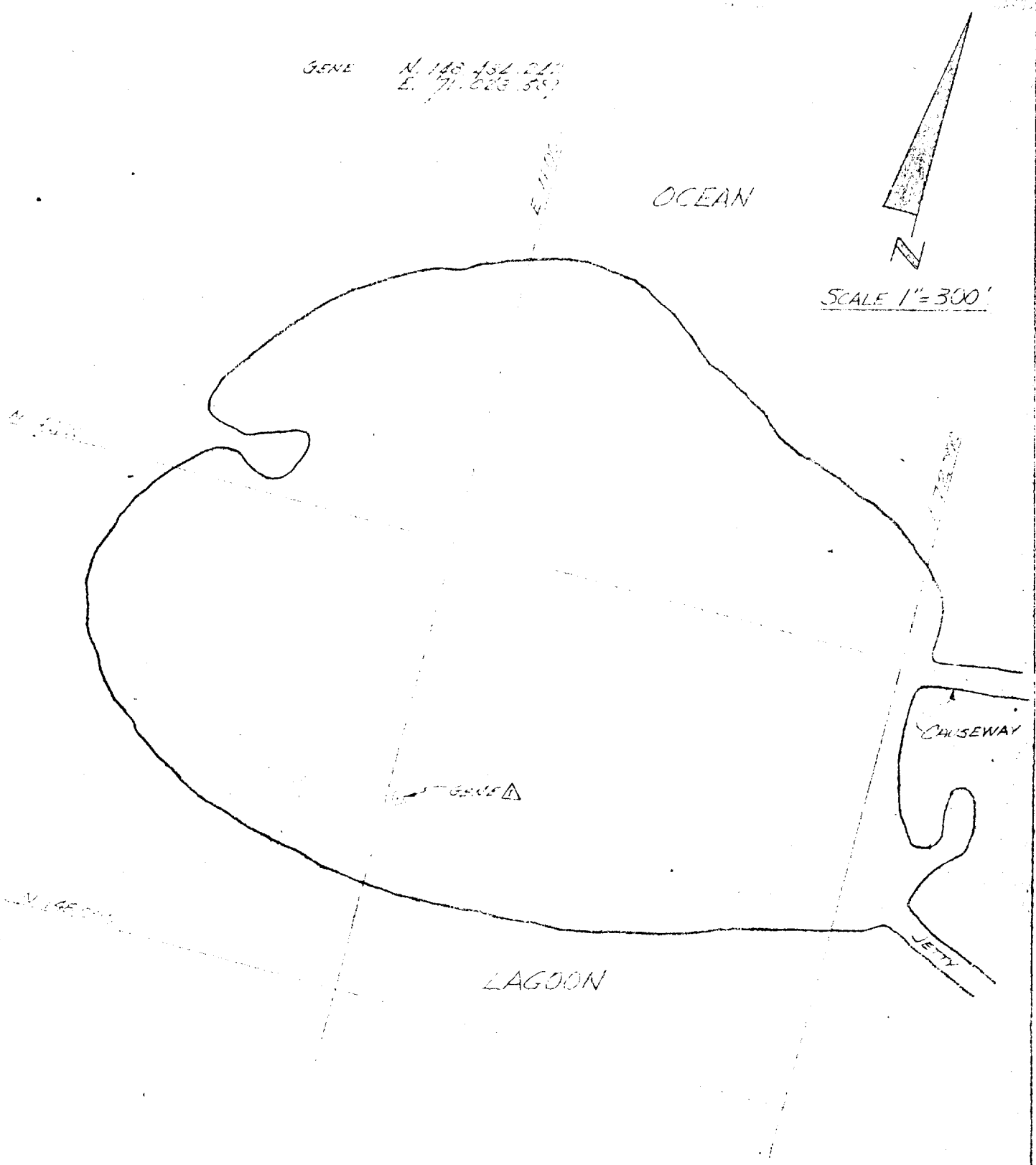

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DATE 4-16-54		GENERAL CONTROL LAYOUT
DRAWN ES	CHECKED	SITE GENE

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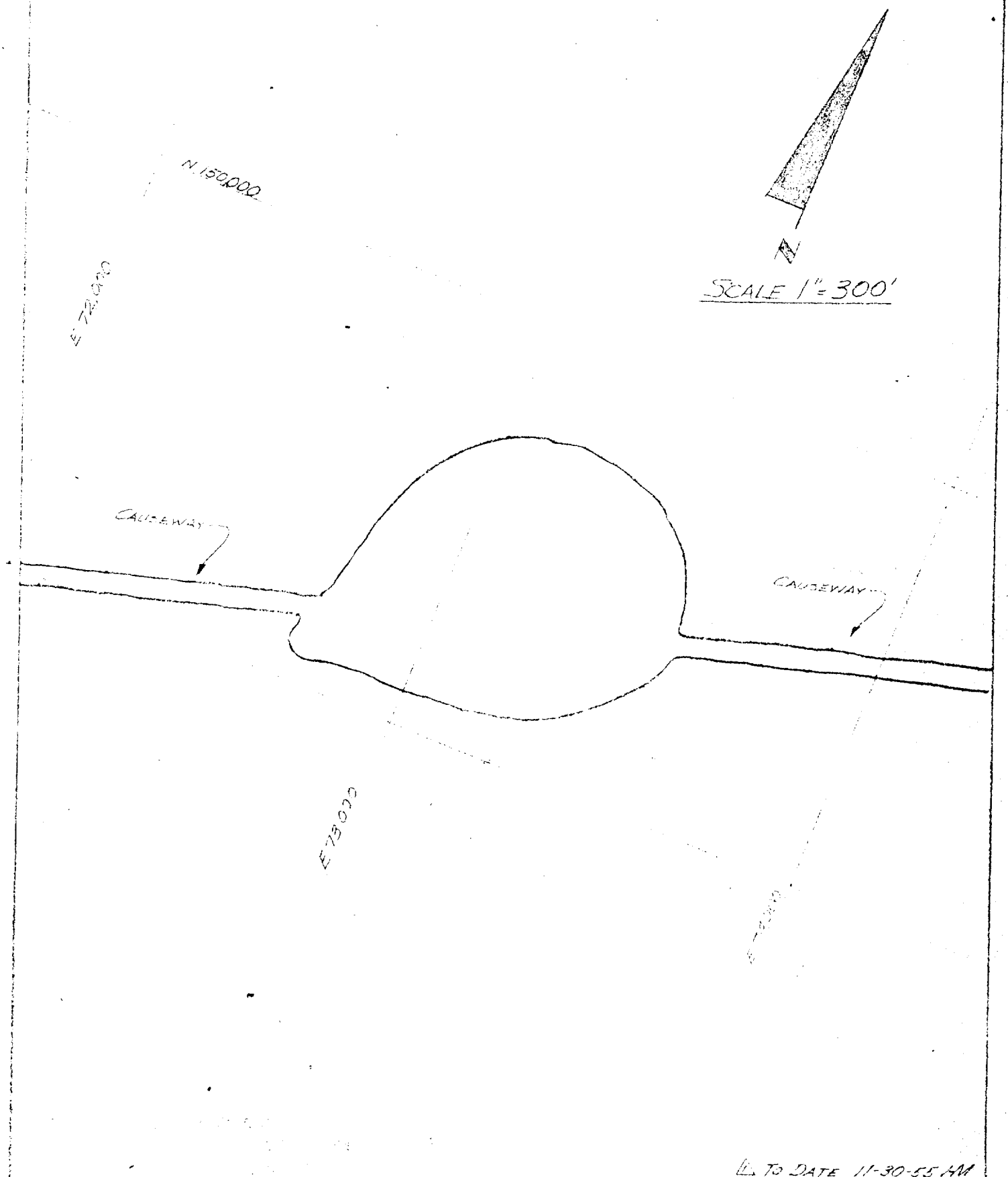

DATE 4-16-54		GENERAL CONTROL LAYOUT
DRAWN ES	CHECKED MMM	SITE HELEN

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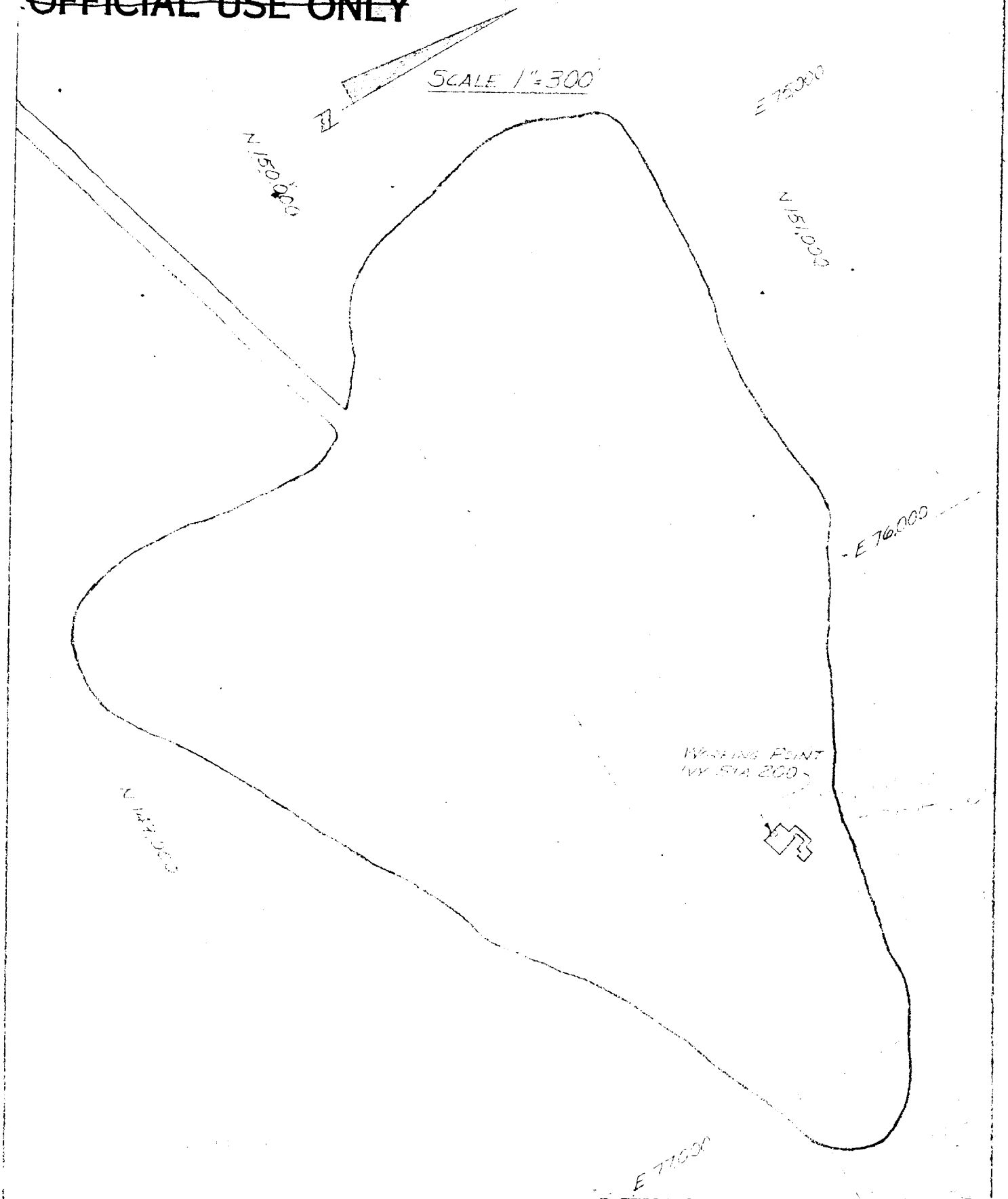

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△ TO DATE 11-30-55 HW		
DATE 4-16-54		GENERAL CONTROL LAYOUT
DRAWN ES.	CHECKED J.O.	SITE IRENE

W.P. STA. 100 N 150,243.57
E 75,437.66

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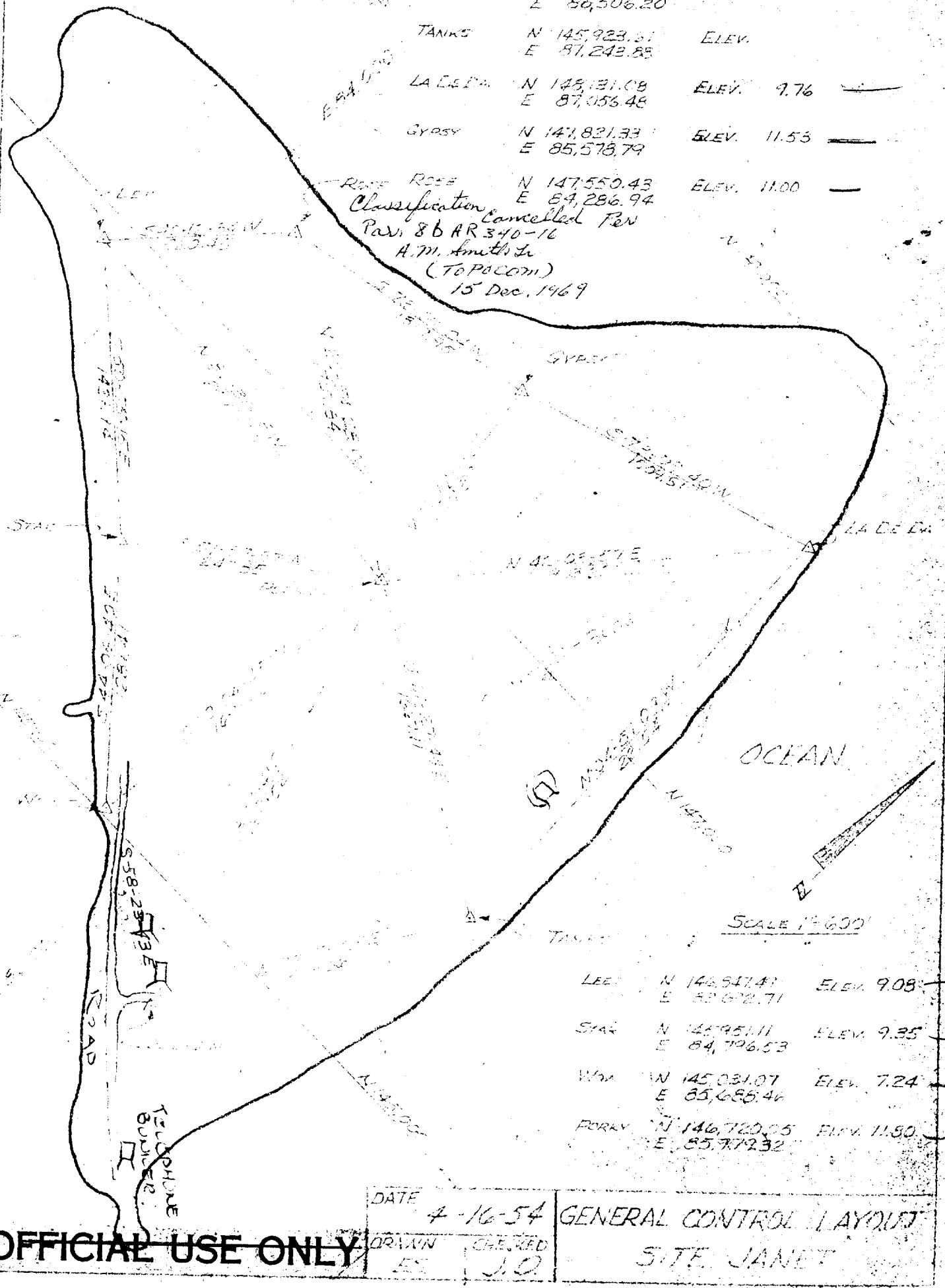

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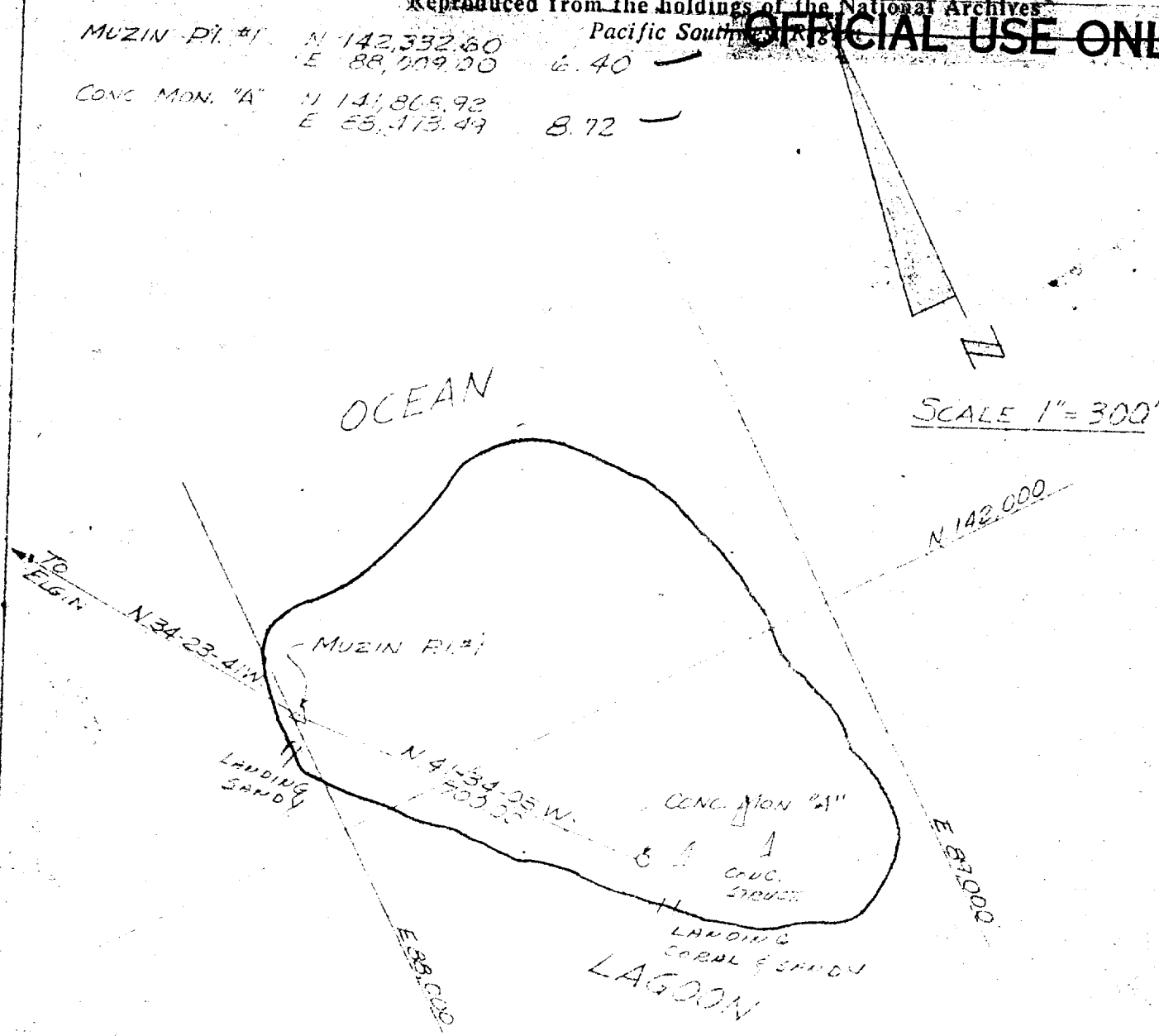
E 88,209.20 6.40

CONC MON. "A" N 141,869.92
E 85,173.49 8.72



DATE 4-17-54	GENERAL CONTROL LAYOUT SITE KATE
DRAWN E.S. / CHECKED J.C.	

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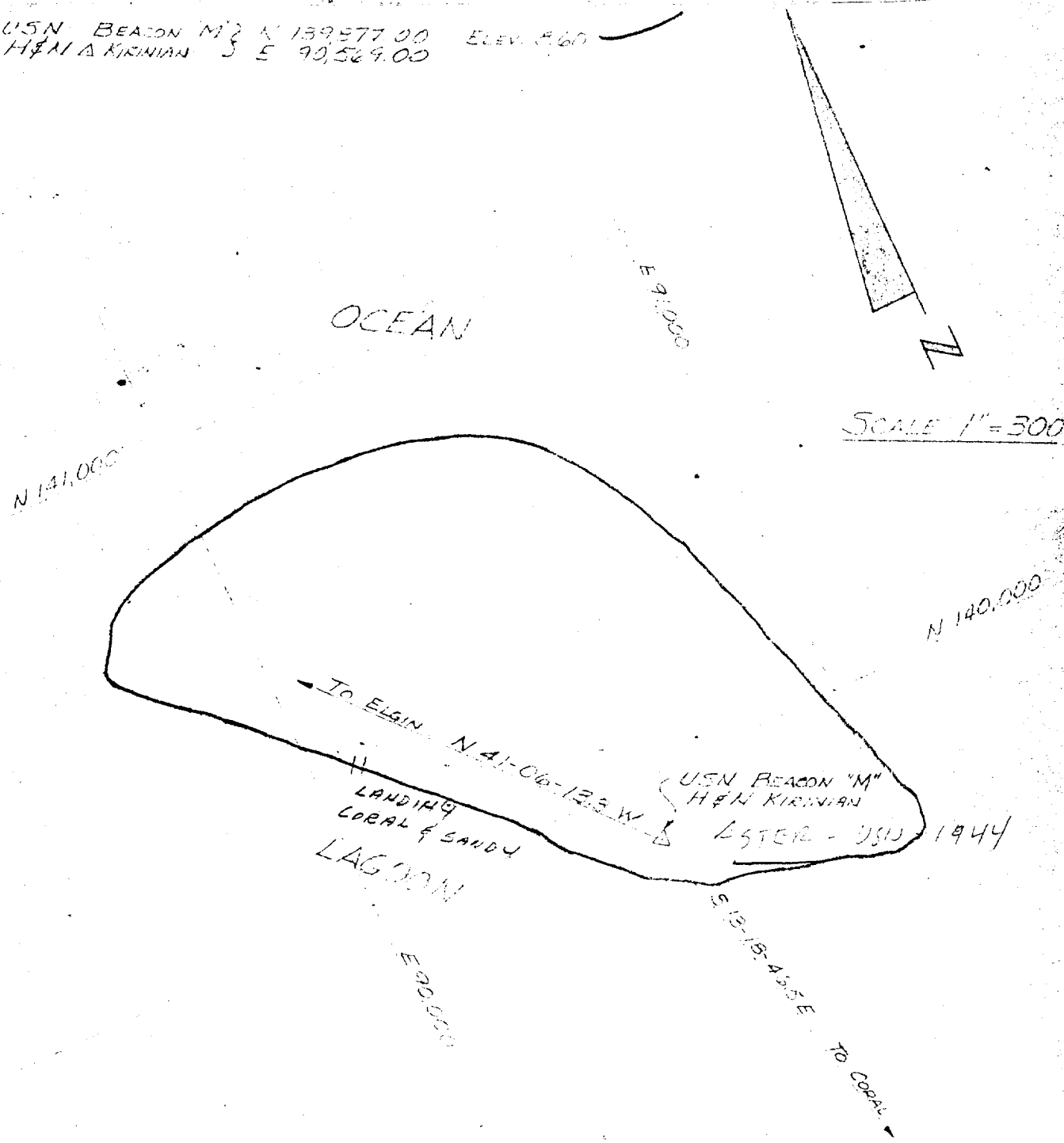

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1994

DATE 4-17-54		GENERAL CONTROL LAYOUT
DRAWN ES	CHECKED J.O.	SITE LUCY

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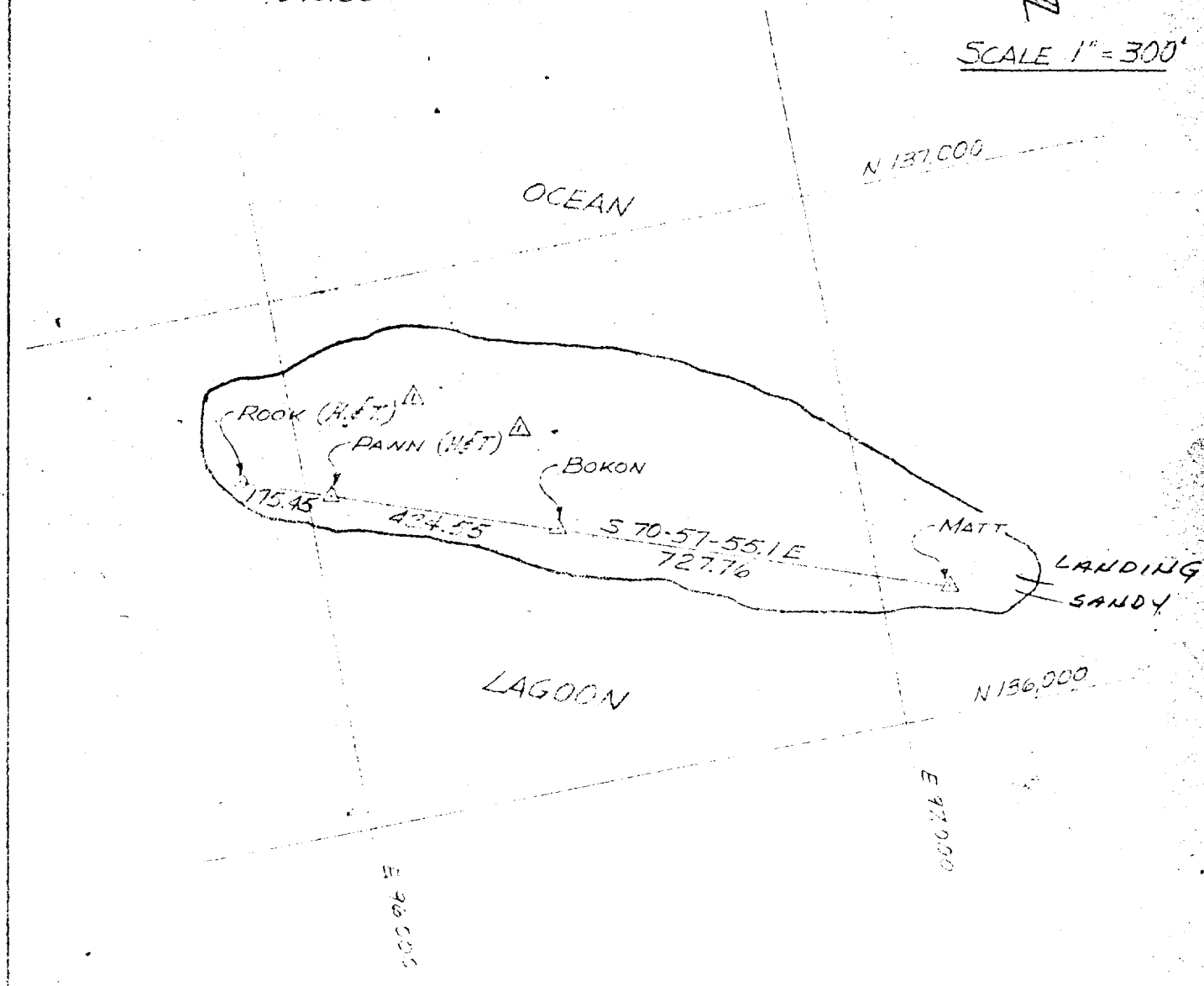
BOKON	N 136 470.80 E 96,441.70	ELEV.	10.40
MATT	N 136,233.45 E 97,129.67	ELEV.	9.53
ROOK	N 136,666.48 E 95,874.51	ELEV.	10.04
PAWN	N 136,609.26 E 96,040.36	ELEV.	8.64



△ TO DATE 11-30-55 H.F.T.

DATE 4-19-54		GENERAL CONTROL LAYOUT
DRAWN ES	CHECKED J.C.	SITE MARY

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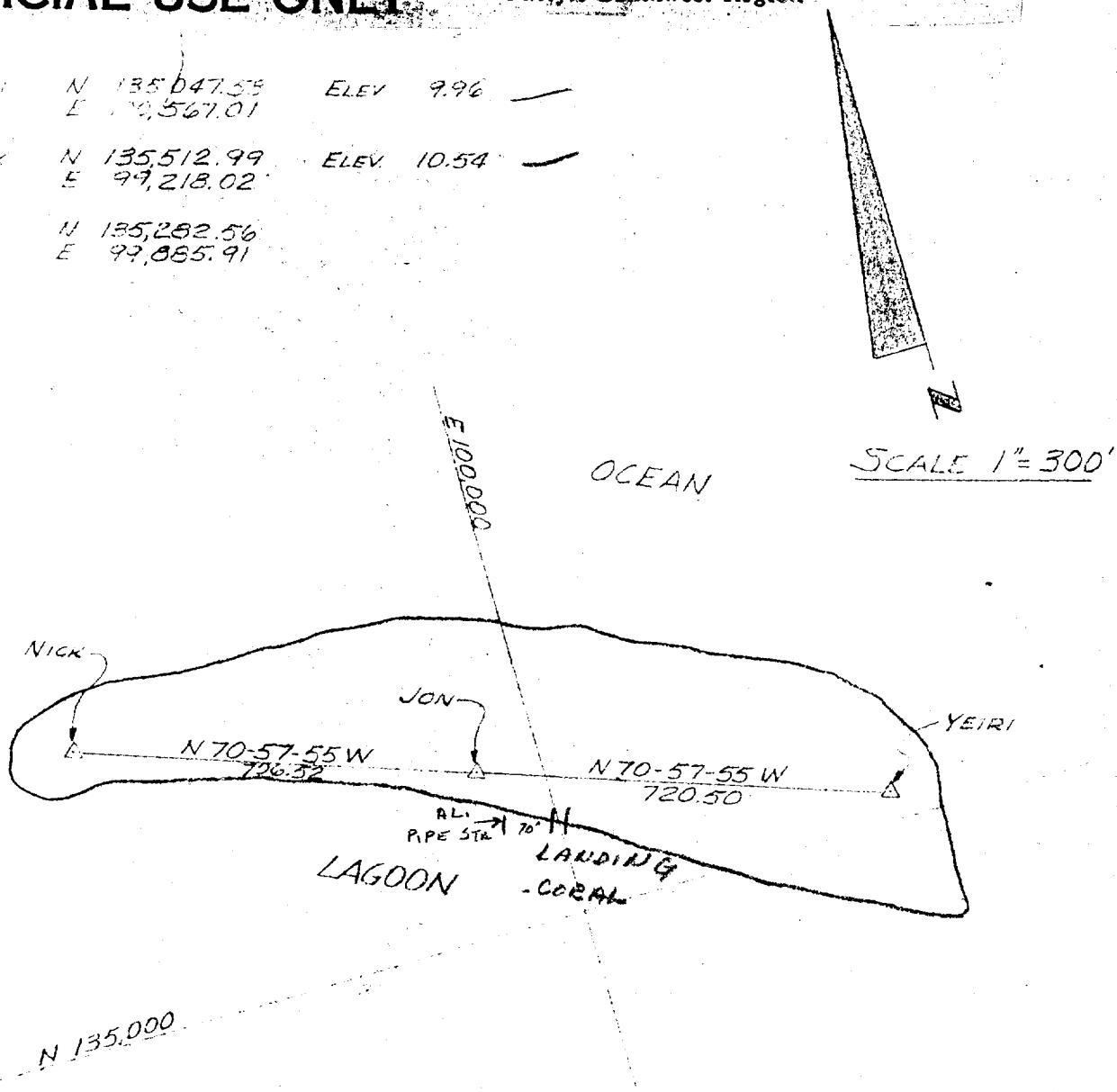
YEIRI	N 135,047.55 E 99,567.01	ELEV	9.96
NICK	N 135,512.99 E 99,218.02	ELEV.	10.54
JON	N 135,282.56 E 99,885.91		



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[illegible] 1994
[illegible] DO
[illegible]

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DRAWN ES	CHECKED J.D.	SITE NANCY

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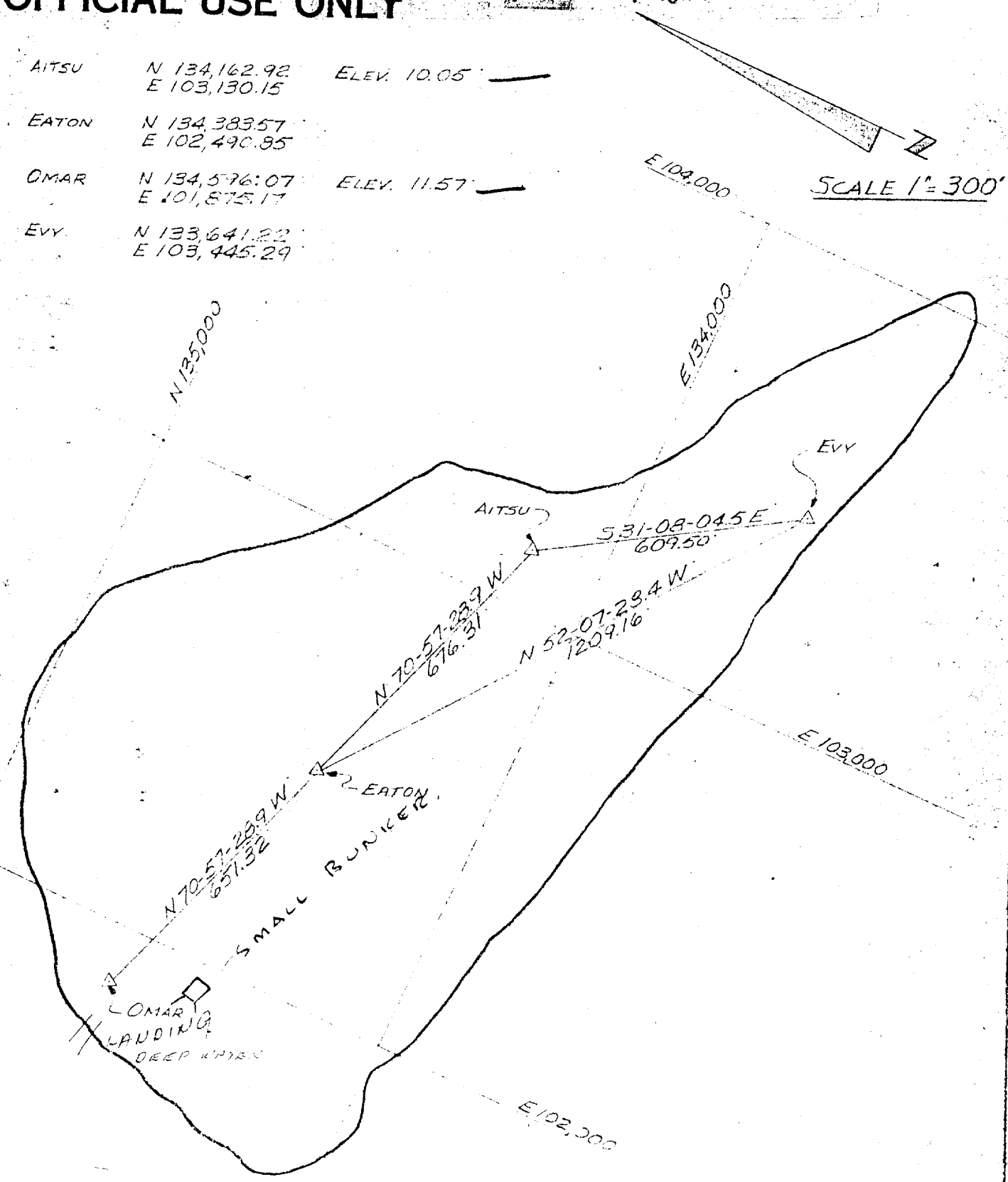
AITSU	N 134,162.92 E 103,130.15	ELEV. 10.05
EATON	N 134,383.57 E 102,490.85	
OMAR	N 134,596.07 E 101,875.17	ELEV. 11.57
EVY	N 133,641.22 E 103,445.29	



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LETTER DATED JULY 15 1996
FROM [illegible] TO
DERIVE [illegible]

DATE 4-19-54	GENERAL CONTROL LAYOUT
DRAWN ES. / CHECKED J.C.	SITE OLIVE

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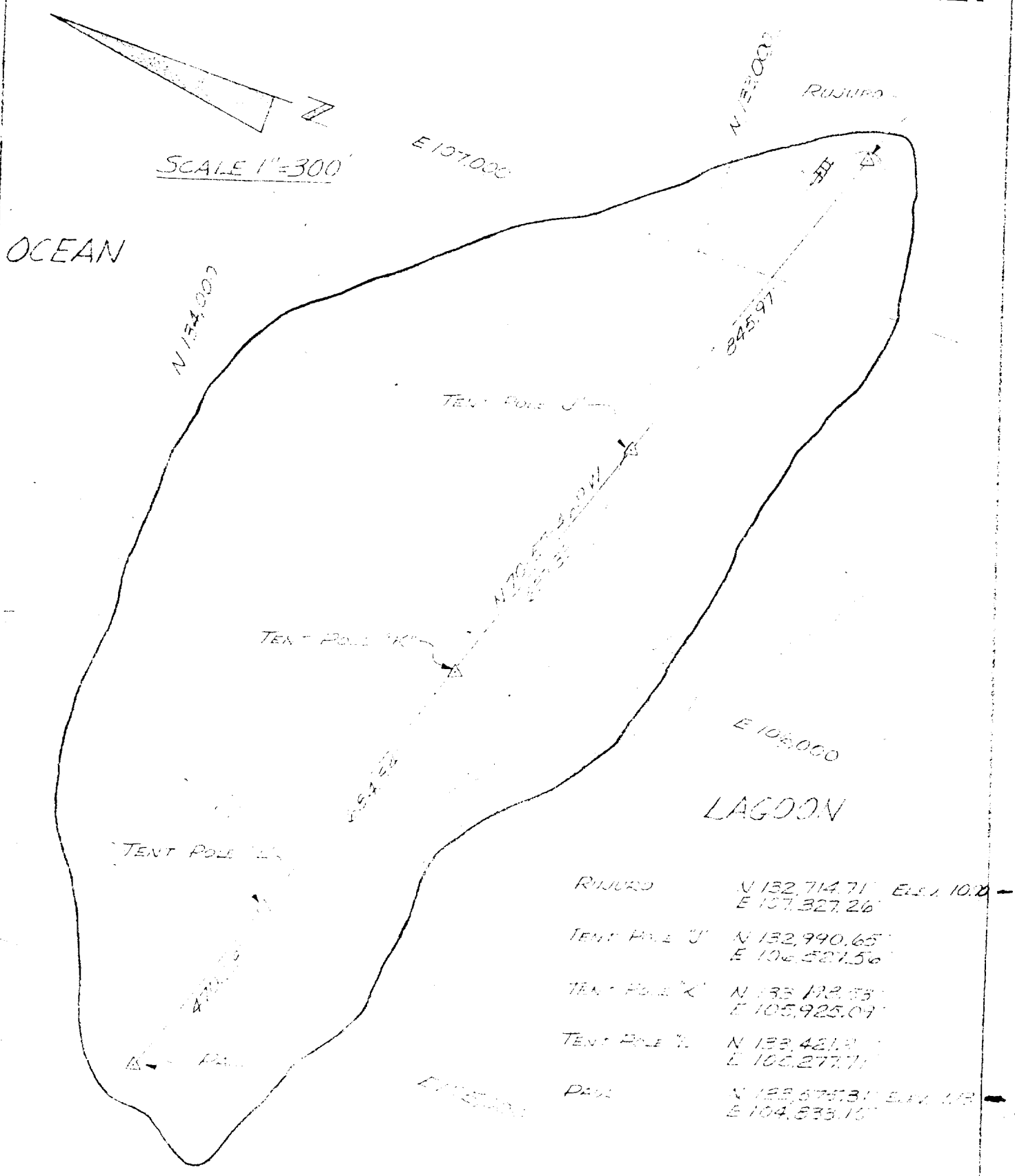

DATE	GENERAL CONTROL LAYOUT
DRAWN CHECKED	SITE PEARL

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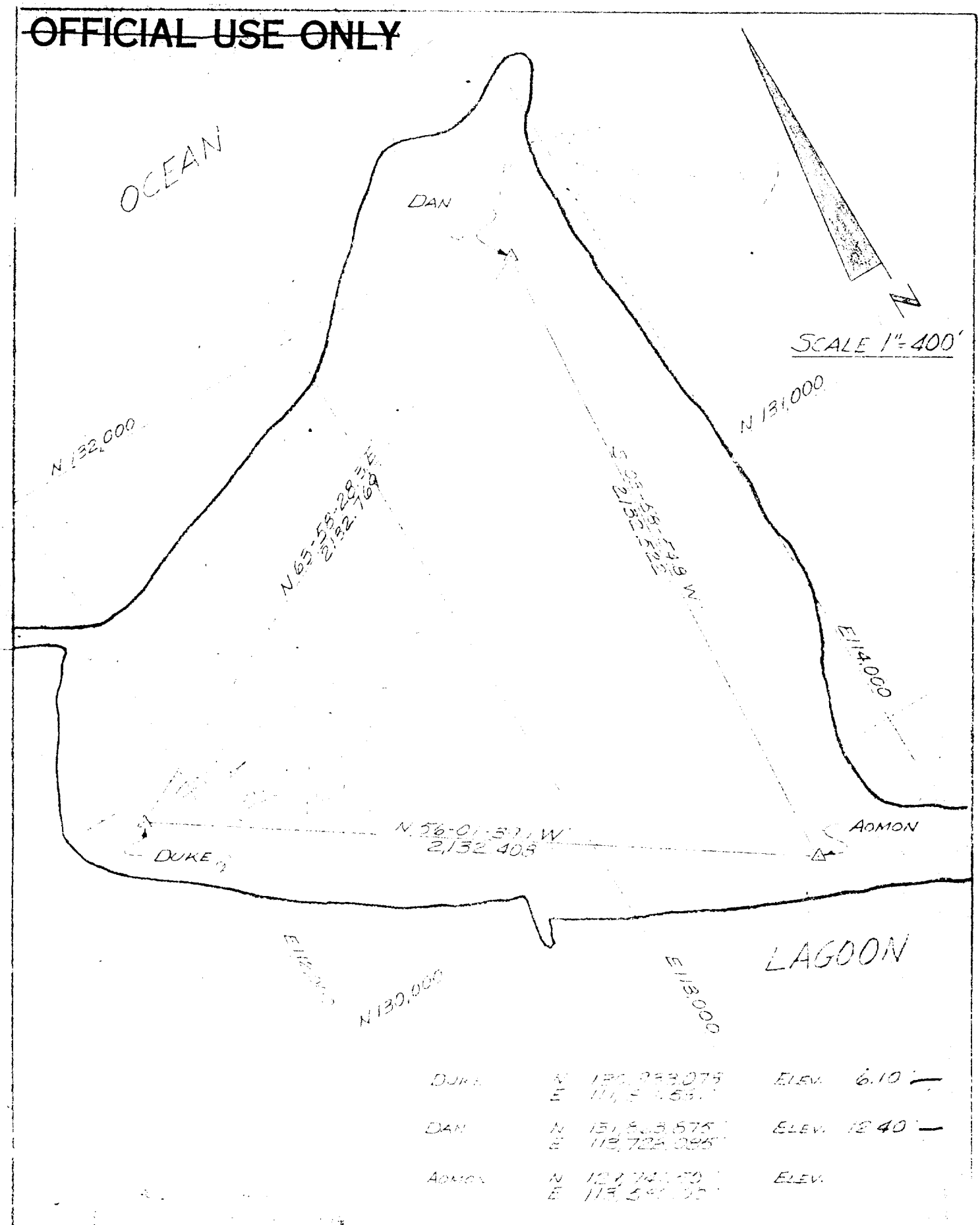

DATE 4-14-54		GENERAL CONTROL LAYOUT
DRAWN ES	CHECKED J.O.	SITE SALLY

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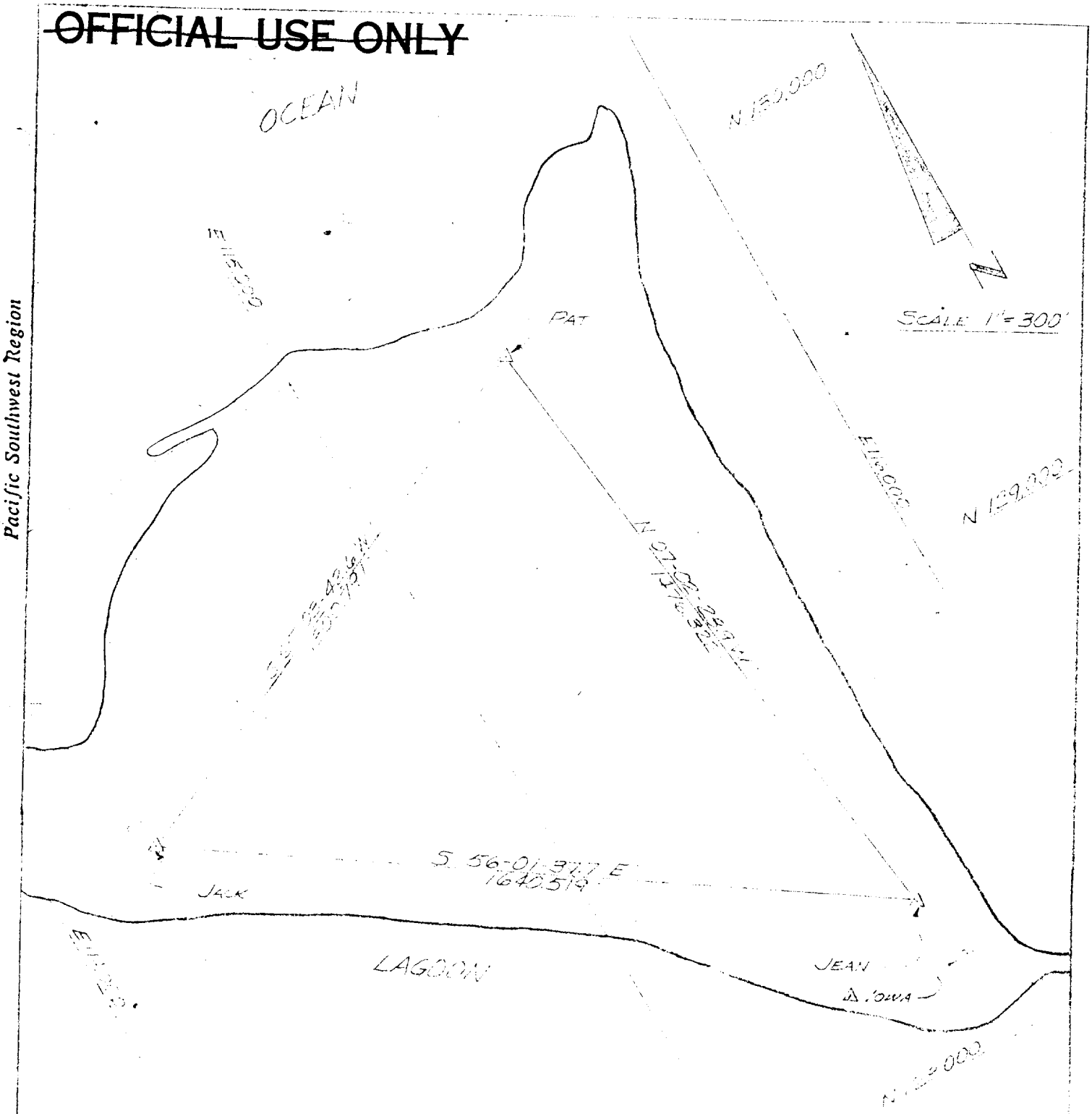

△ TO DATE 11-30-55 AM

DATE 4-11-54	GENERAL CONTROL LAYOUT
DRAWN ES / CHECKED J.L.D.	SITE TILDA

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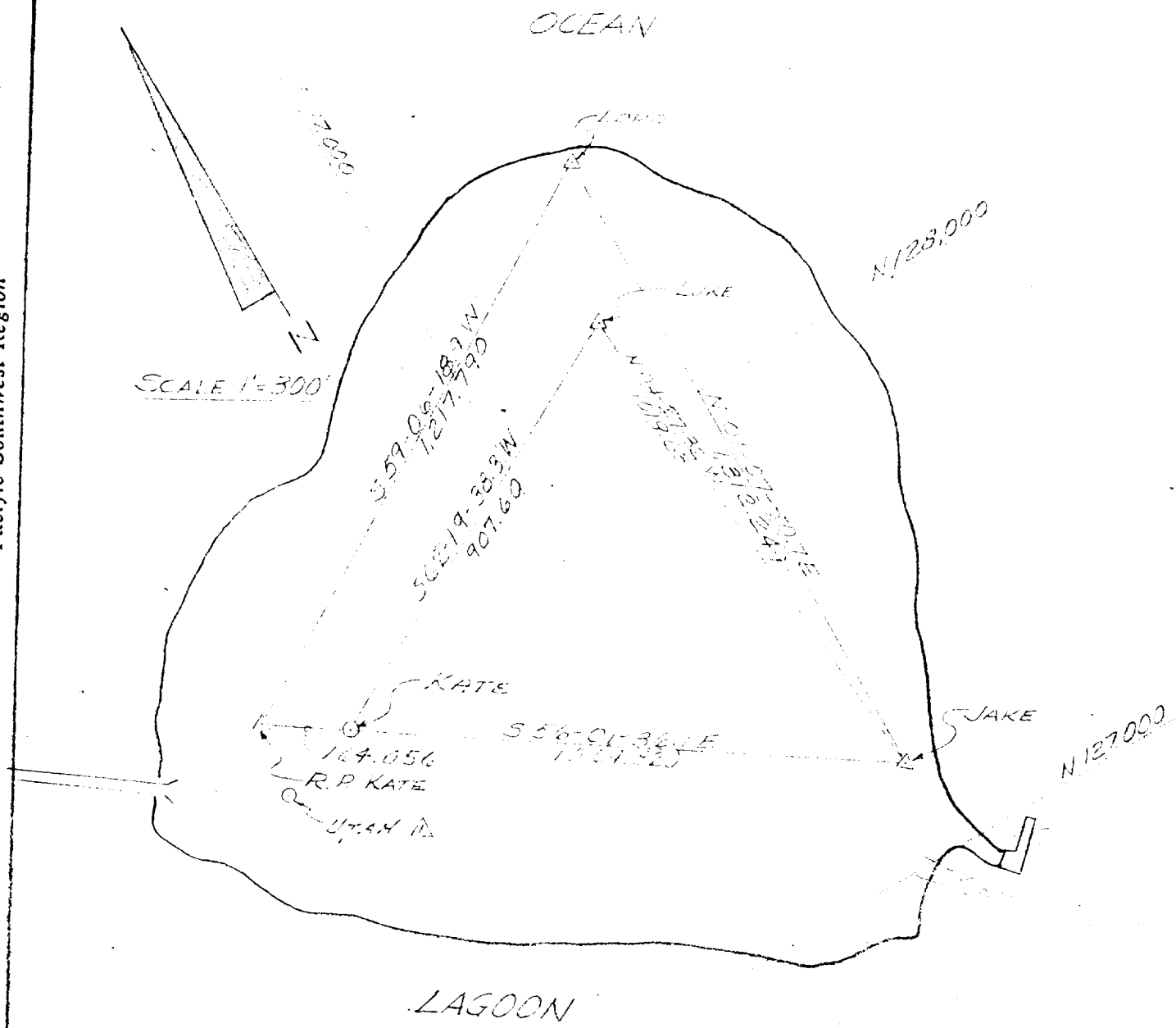

UTAH	N 127,735.53 E 116,326.92	
KATE	N 127,795.22 E 116,483.29	
R.P. KATE	N 127,876.873 E 116,347.239	ELEV. 8.33'
JAKE	N 127,190.199 E 117,366.343	
LORD	N 128,502.18[illegible] E 117,3[illegible]2.239	
LAKE	N 126,206.73' E 117,257.07'	E.[illegible] [illegible]

DATE 4-20-54		GENERAL CONTRD. LAYOUT
DRAWN ES	CHECKED JO	SITE URSULA

L. TO DATE 11-30-55 [illegible]

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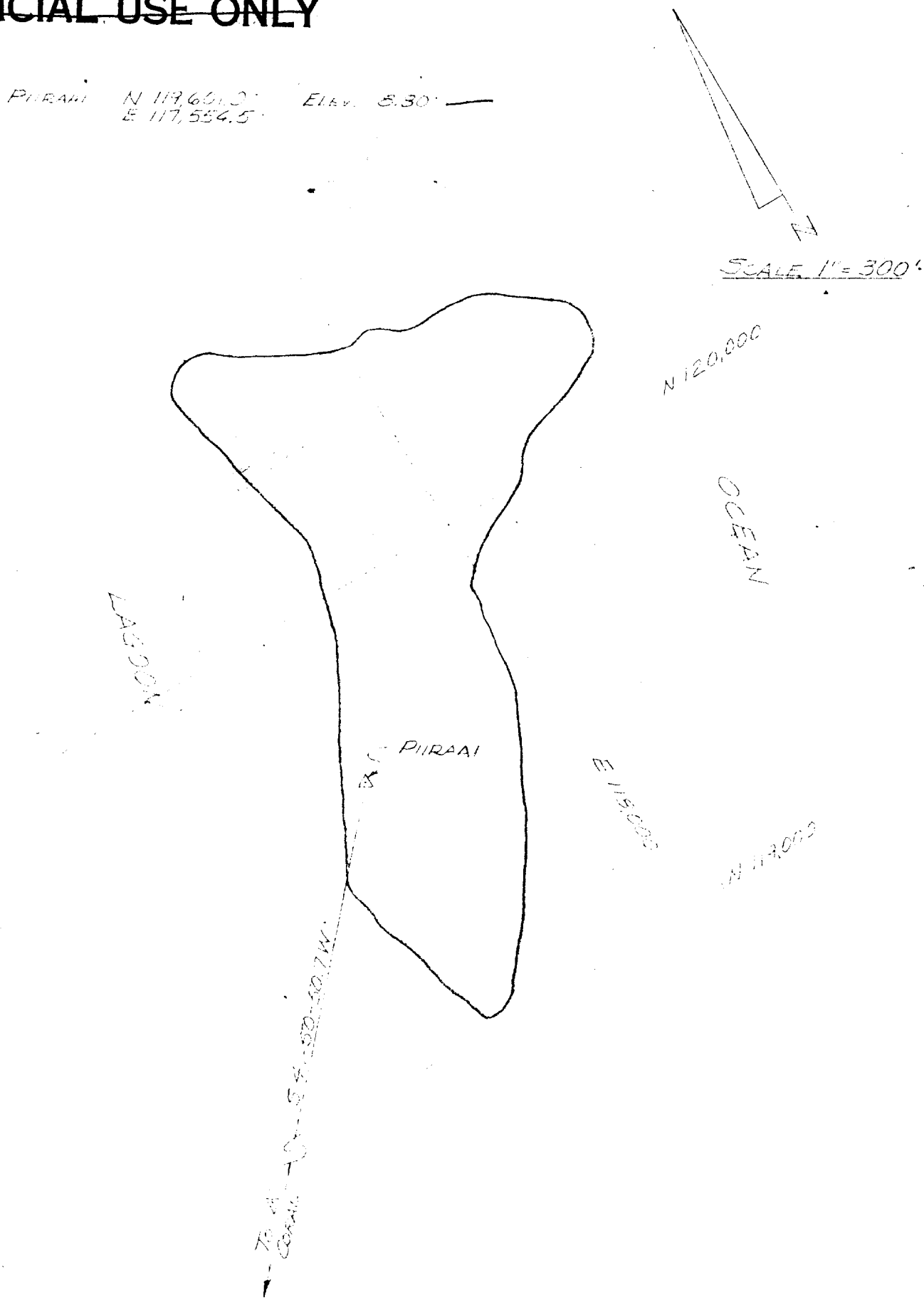

DATE 4-19-54		GENERAL CONTROL LAYOUT
DRAWN ES	CHECKED J.D.	SITE WILMA

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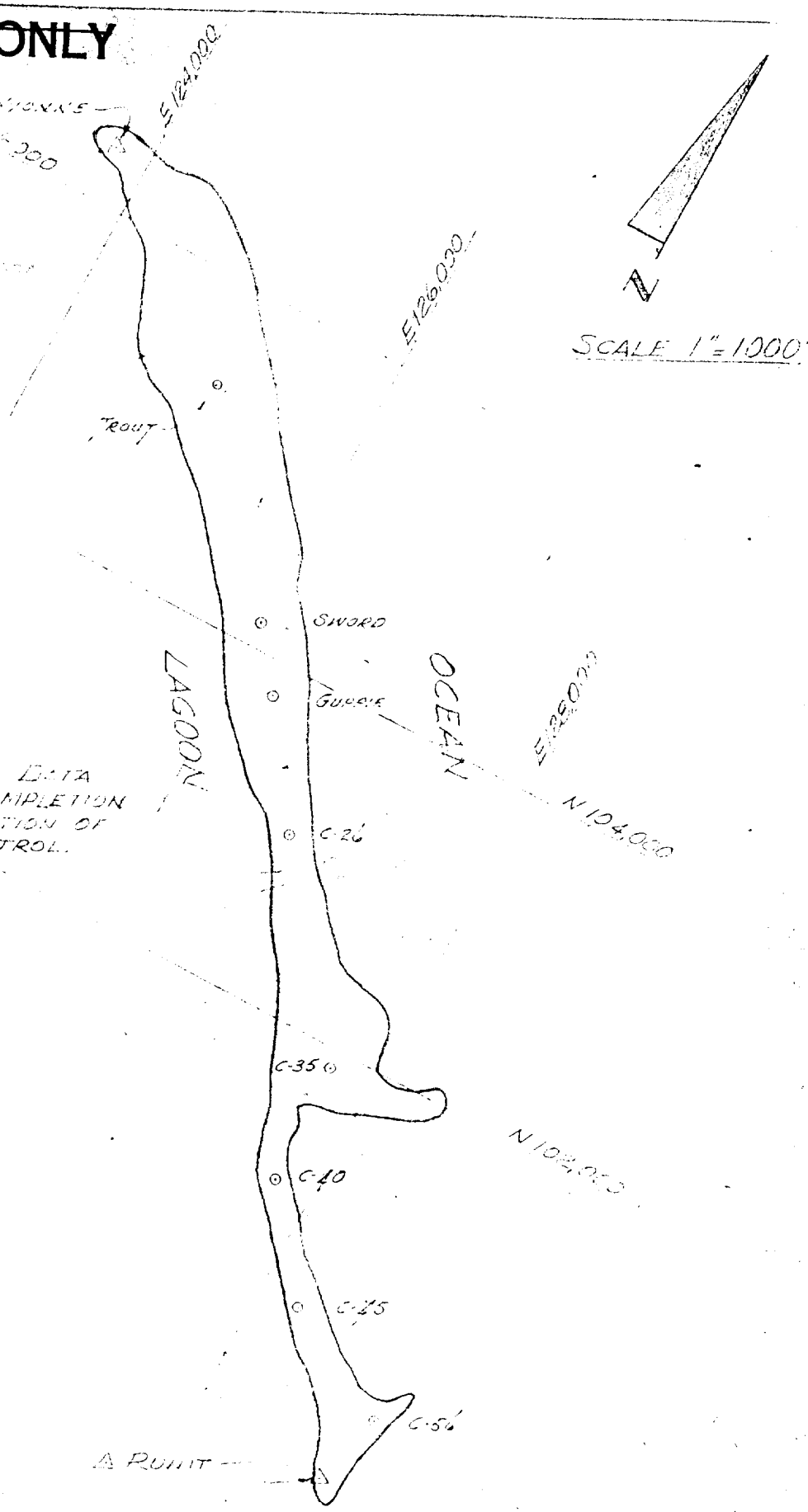

NOTE:
ADDITIONAL CONTROL DATA TO BE ADDED UPON COMPLETION OF RECOVERY & VERIFICATION OF VALUES OF EXISTING CONTROL.

YVONNE	N	106354.60
	E	125752.66
TROUT	N	105363.51
	E	125042.89
SWORD	N	104159.87
	E	125000.28
GUPPIE	N	[illegible]
	E	[illegible]
C-26	N	[illegible]
	E	[illegible]
C-35	N	[illegible]
	E	[illegible]
C-40	N	[illegible]
	E	[illegible]
C-45	N	[illegible]
	E	[illegible]
C-56	N	[illegible]
	E	[illegible]
RUNIT	N	[illegible]
	E	[illegible]

DATE		GENERAL CONTROL LAYOUT
4-19-54		
DRAWN ES	CHECKED J.D.	SITE YVONNE

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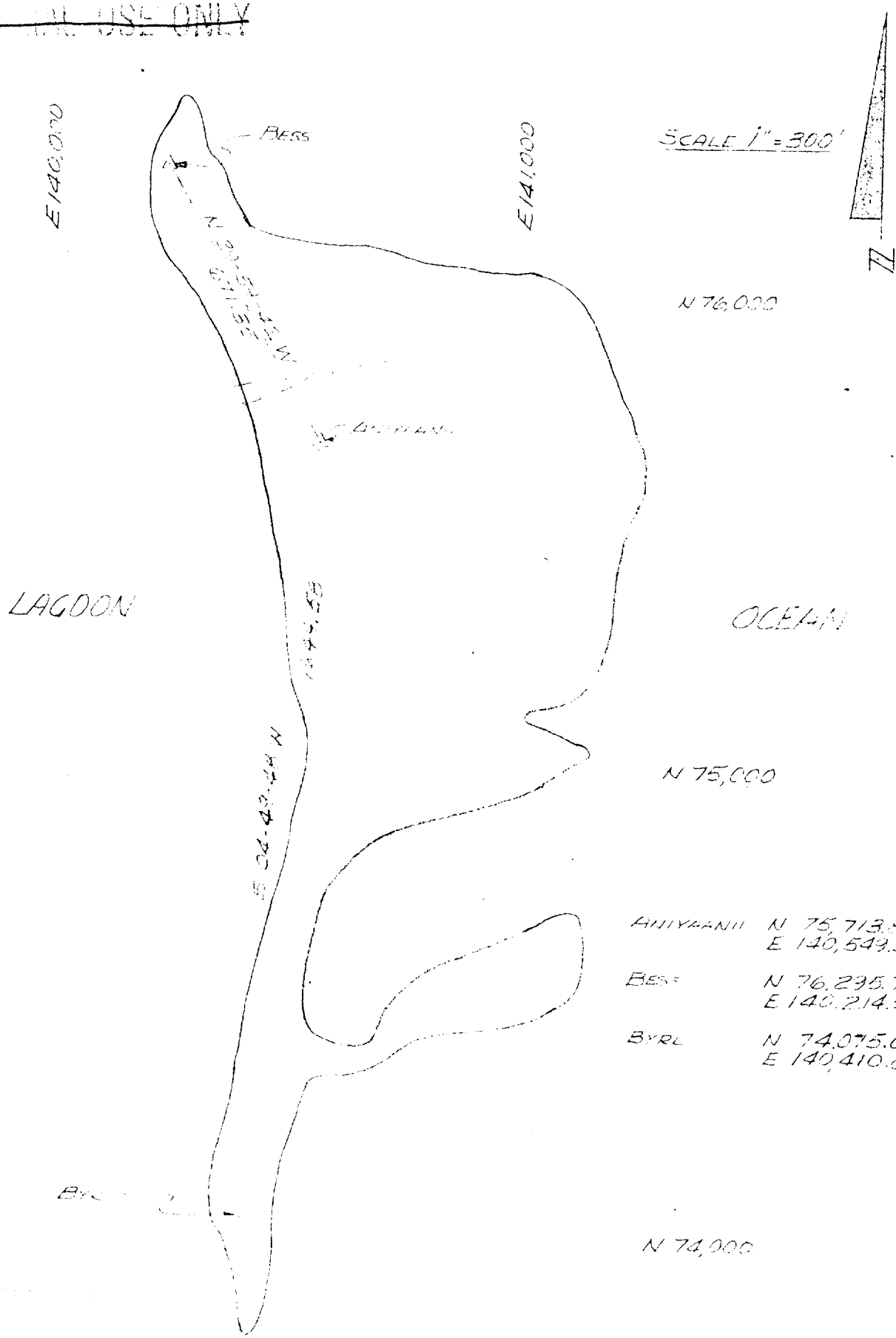

DATE		GENERAL CONTROL LAYOUT
8-4-60		SITE BRUCE
DRAWN ES	CHECKED NCA	

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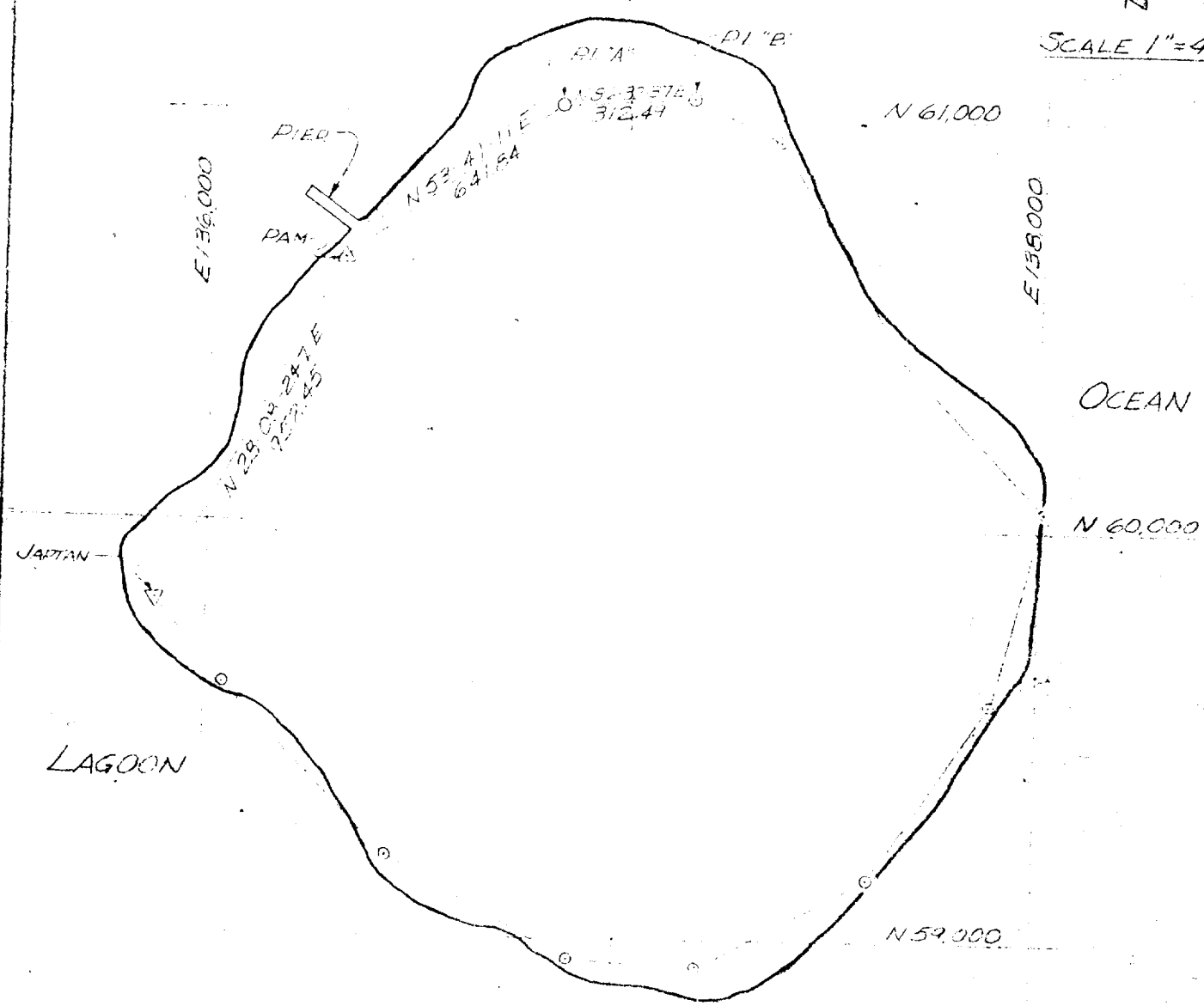
JAPTAN N 59,804.90 E 135,574.90

PAM N 60,644.67 ELEV. 9.41 E 136,324.10

PI "A" N 61,024.32 ELEV. 10.11 E 136,841.62

PI "B" N 61,043.16 ELEV. 11.09 E 137,158.54



SCALE 1" = 400'

NOTE

PI'S A B ARE MONUMENTED.

DATE 4-26-54		GENERAL CONTROL LAYOUT
DRAWN E5	SCALE 1"	SITE DAVID

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SITE FRED

BUILDING & STRUCTURE NUMBERS

HOLMES & NARVER, INC.

REVISED TO 1 OCT. 1956

MISC. 415

NOTE: Any corrections or changes to this list should be made only on the master list which is maintained in the Office Engineering & Design Department of the Engineering Division

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54

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GENERAL NOTES

1. For further information on sizes and types of buildings, refer to the As-Built Drawings.

*2. Column denoted by an asterisk contains numbers which represent General Layout Drawing Number or area on which building appears on the new 1" - 50' topographic sheets.

3. The building numbers in this index pertain to Holmes & Narver Plans, General Layouts and Survey notes.

4. Symbol beside building number (M) indicates Military owned building or structure.

5. Symbol beside building number (C) indicates A.E.C. owned building or structure that is capitalized, or, Construction-Work-Is-In-Progress.

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SITE FRED

BLDG. NO.	SIZE	USE	TYPE	#
1 - M	96'x115'	E.M. Recreation (Navy)	Wood & Corr. Metal, "T" Shape	1
1A - M	12'x12'	Latrine	Wood	1
2 - M	20'x68'	Officers Beach Club	"L" shape, wood & Corr. Transite	1
	20'x28'		Wood & Corr. Transite	
3 - C	24'x24'	Transmitter (Power)	Prefabricated Aluminum	2
4 - C	24'x120'8½"	Receiver	Prefabricated Aluminum	2
4A- C	8½x8½'	Storage Shed	Wood Frame on 4x4 Wood Foundation	2
5 - C	24'x36'8½"	Shower & Latrine	Prefabricated Aluminum	2
6 - C	24'x36'8½"	Shower & Latrine	Prefabricated Aluminum	2
7 - C	24'x36'8½"	Shower & Latrine	Prefabricated Aluminum	2
8 - C	24'x36'8½"	Shower & Latrine	Prefabricated Aluminum	2
9 - C	8'x12'x6'8½"	Open Air Shower & Latrine	Canvas on Wood	6
10 - C	24'x128'8½"	Quarters, 36 Man	Prefabricated Aluminum	3
11 - C	24'x140'8½"	Quarters, 72 Man	Prefabricated Aluminum	3
12 - C	24'x140'8½"	Quarters, 72 Man	Prefabricated Aluminum	3
13 - C	24'x140'8½"	Quarters, 72 Man	Prefabricated Aluminum	3
14 - C	24'x24'8½"	Dispatcher Shack	Prefabricated Aluminum	5
15 - C	24'x172'8½"	Group HQ, "H" shape	Prefabricated Aluminum	3
	24'x148'8½"		Prefabricated Aluminum	3
	24'x31'8½"		Prefabricated Aluminum	3
15A - C		Assigned to Incinerator	Concrete & Brick	3
16 - C	24'x100'8½"	P.O., P.X. & B.S.	Prefabricated Aluminum	3
	2-24'x50'8½"	with 3 wings	Prefabricated Aluminum	3
	24'x28'8½"		Prefabricated Aluminum	3
	24'x24'8½"		Prefabricated Aluminum	3
17 - C	24'x36'8½"	Latrine & Showers	Prefabricated Aluminum	2
18 - C	24'x68'8½"	Quarters, 18 Man	Prefabricated Aluminum	3
19 - C	24'x68'8½"	Quarters, 18 Man	Prefabricated Aluminum	3
20 - C	24'x68'8½"	Quarters, 18 Man	Prefabricated Aluminum	3
21 - C	24'x68'8½"	Quarters, 18 Man	Prefabricated Aluminum	3
22 - C	24'x68'8½"	Hospital Wards	Prefabricated Aluminum	3
23 - C	24'x68'8½"	Hospital Wards	Prefabricated Aluminum	3
24 - C	24'x138'8½"	Dispensary with 4 wings	Prefabricated Aluminum	3
	24'x94'8½"		Prefabricated Aluminum	3
	2-24'x54'8½"		Prefabricated Aluminum	3
	9'7"x14'	Lean-to Addition	Wood	3
	9'7"x10'10"	Lean-to Addition	Wood	3
25	22'0"x44'0"	Boathouse	Wood Frame	1
26 - M	38'6"x46'	AtCom Residence	Wood	3
27 - M	59'x87'7"	Officers Club	Wood	3
28 - M	7x17'	Ammo Storage	2 Steel cubes with corrugated metal top	3
29 - C	24'x60'8½"	Fire Station	Prefabricated Aluminum	3
30 - C	800 Man	Open Air Theater	Wood Proj. booth seats, and transite screen	3
31 - C	24'x148'8½"	Laundry	Prefabricated Aluminum	3
	24'x26'8½"			
	24'x84'8½"			
31A	10'x12'	Laundry Wrapping Paper Storage	Wood Shed - No Foundation	3
32		Chapel, shape of Cross	(Demolished)	
33 - C	24'x236'8½"	Reefer Bank	Prefab. Aluminum, Elevated	3

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BLDG. NO.	SIZE	USE	TYPE	*
34 - [illegible]	24'x44'8½"	Boiler House	Prefabricated Aluminum	3
35 - C	50'6"x76'8½"	Bakery	Prefabricated Aluminum	4
36 - C	50'6"x76'8½"	Mess Hall	Prefabricated Aluminum	3
	50'6"x259'2"	Mess Hall	Prefabricated Aluminum	3
	50'6"x54'8½"	Mess Hall	Prefabricated Aluminum	3
	50'6"x82'8½"	Mess Hall	Prefabricated Aluminum	3
	2-24'x22'8½"	Scullery	Prefabricated Aluminum	3
	24'x22'8½"	Heater Rm & Dry Storage	Prefabricated Aluminum	3
	8'6"x10'	Garbage	Wood	3
	16'x12'6"	Pot Washing	Wood	3
	24'x45'10½"	Storage Supply	Prefabricated Aluminum	3
	24'x24'8½"	Butcher Shop	Prefabricated Aluminum	3
36A	18'x70'	Reefer Shelter	Wood	3
37 - C	24'x173'8½"	Commissary W/6 reefers	Prefabricated Aluminum	4
38 - C	24'x68'8½"	Quarters, 18 Man BOQ	Prefabricated Aluminum	4
39 - C	24'x68'8½"	Quarters, 18 Man BOQ	Prefabricated Aluminum	4
40 - C	24'x68'8½"	Quarters, 18 Man BOQ	Prefabricated Aluminum	4
41 - C	24'x68'8½"	Quarters, 18 Man BOQ	Prefabricated Aluminum	4
42 - C	24'x68'8½"	Quarters, 18 Man BOQ	Prefabricated Aluminum	4
43 - C	24'x36'8½"	Latrine & Showers	Prefabricated Aluminum	4
44 - C	24'x36'8½"	Latrine & Showers	Prefabricated Aluminum	4
45 -				
46 - C	24'x140'8½"	Quarters, 72 Man	Prefabricated Aluminum	4
47 - C	24'x140'8½"	Quarters, 72 Man	Prefabricated Aluminum	4
48 - C	24'x140'8½"	Quarters, 72 Man	Prefabricated Aluminum	4
49 -	24'x140'8½"	Quarters, 72 Man	Prefabricated Aluminum	4
50 - C	24'x140'8½"	Quarters, 72 Man	Prefabricated Aluminum	4
51 - C	24'x36'8½"	Latrine & Showers	Prefabricated Aluminum	4
52 - C	24'x36'8½"	Latrine & Showers	Prefabricated Aluminum	4
53 - C	24'x36'8½"	Latrine & Showers	Prefabricated Aluminum	4
54 - C	24'x36'8½"	Latrine & Showers	Prefabricated Aluminum	5
55 - C	24'x36'8½"	Latrine & Showers	Prefabricated Aluminum	5
56 - C	51'8"x136'8½"	Power & Dist. Plant	Prefabricated Aluminum, Elevated	5
56A-C	33'10"x55'	Badger Shed	Wood & Corr Aluminum	5
56B - [illegible]	10'2"x10'4"	Pump House	Corr. Aluminum	5
57 - C	24'x12'8½"	Laboratory	Prefabricated Aluminum	6
58 - M		Ordnance Warehouse	(Demolished)	
59 - M	40'x100'	Ordnance Warehouse	Jumbo Quonset	8
60 - M	40'x100'	General Whse.	Jumbo Quonset	8
61 - M	40'x100'	Gear Loft	Jumbo Quonset	7
62 - M	40'x100'	Salvage Warehouse	Jumbo Quonset	8
63 - M		Special Service Whse	(Demolished)	
64 - M		Ordnance Shop	(Demolished)	
65 - M		Q.M. Supply	(Demolished)	
66 - M	40'x100'	Q.M. Sales & Stores	Jumbo Quonset	7
67 - M	40'x100'	Q.M. Expendable Whse	Jumbo Quonset	7
68 - M	70'x81'	Reefer Bank and Packing and Crating Bldg.	[illegible] (Demolished)	
69 - M		Warehouse	(Demolished)	
70				-
71 - M	40'x100'	Warehouse	Jumbo Quonset	7
72 -	20'x60'	Square & Compass Club	2-Story Quonset	7
73 - M	40'x100'	Army Engineer Whse.	Jumbo Quonset	7

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BLDG. NO.	SIZE	USE	TYPE	*
74 - M	40'x100'	P.X. Warehouse	Jumbo Quonset	7
75 - M	40'x100'	H & N Warehouse	Jumbo Quonset	7
76 - M	40'x100'	Army Supply Whse	Jumbo Quonset	7
77 - C	24'x80'8½"	Drone H.Q.	Corr. Prefab. Aluminum	13
78 - M	21'x21'	Aircraft Decontamination Office	Plywood	15
79 - M	40'x100'	Electronic Control	Jumbo Quonset	13
80 - M	40'x196'	Bulk Storage	Jumbo Quonset	13
81	15'x15'	Tower	Wood w/concrete piers	16
82 - M	80'x100'	Aircraft Maintenance Shop	(2) Butler Type	12
83 - M		Signal Corps Whse.	Demolished	
84		Transmitter (Power)	Demolished	
85 - C	24'x56'8½"	Receiver	Prefabricated Aluminum	12
86				
87 - C	10'7½"x10'7¼"	Hydrogen Storage	Wood and Aluminum	18
88 - C	15'x15'	Weather Station	Wood and Aluminum	18
89 - C	24'x96'8½"	Base Operations "U"	Prefabricated Aluminum	16
	24'x78'8½"	Shape	Prefabricated Aluminum	16
	23'7½"x23'7½"	Tower	Wood and Aluminum	16
	24'x72'8½"	Terminal Whse	Prefabricated Aluminum	16
90 - C	(24'x2"x144'8½"	Air Force Task Gp HQ	Prefabricated Aluminum	16
	(3-24'x50'8½"	"E" shape W/Add N End	Prefabricated Aluminum	16
90C - M	20'x94'	Office & Storage	Wood	16
90G - M	30'x40'	Emergency Power Plant	Wood	16
91 - C	24'x20'8½"	Alert Crew Office	Pacific Iron & Steel Bldg.	16
91A	57'x22'	Crash Truck Shelter	Wood	16
92 - C	24'x32'8½"	L-13 Operations	Prefabricated Aluminum	16
93 - C	50'x60'	L-13 Maintenance	Steel & Aluminum	14
94 - C	24'x48'8½"	POL Pump House	Prefabricated Aluminum	12
95 - C	4-1000 Bbl	Storage 100 Oct AvGas	Tank-Steel Bolted, Vertical (T-33-36 incl.)	1
95A - C	1-1000 Bbl	Storage, MoGas	Tank-Steel Bolted, Vertical (T-28)	12
	4-10,000 Gal.	Storage, 91 Oct AvGas	Tank-Steel Bolted, Horizontal (T-29-30)	12
96 - C	2-1000 Bbl	Storage, JP1, Fuel	Tank-Steel Bolted, Vertical (T37 & T43)	12
96A - C	4-10,000 Gal.	Storage, Diesel Fuel	Tank-Steel Bolted, Horizontal (T39-42)	12
	1-1000 Bbl.	Storage, Diesel	Tank-Steel Bolted, Vertical (T-38)	12
97 - M		AACS Supply Whse. and Radio Maintenance	(Demolished)	
98 - M		Warehouse	Demolished	
99 - M	20'x56'	Warehouse	Quonset	13
100 - M		Warehouse	Demolished	
101 - M		Warehouse	Demolished	
102 - M		Warehouse	Demolished	
103 - M		Warehouse	Demolished	
104 - M		Warehouse	Demolished	
105 - M		Warehouse	Demolished	
106 - M		Warehouse	Demolished	
107 - M	2-1000 Bbl	Storage, Fresh Water	2-Tanks, Steel, Bolted, Vertical	
107 - C	3-1000 Bbl	Storage, Fresh Water	3-Redwood Stave, Vertical	
108 - C	712 Man	Open Air Theater	Proj. Booth, Stage & Seats Wood	5
			Screen Transite	4
109 - C	24'x36'8½"	Latrine & Showers	Prefabricated Aluminum	2
110 - C	24'x36'8½"	Latrine & Showers	Prefabricated Aluminum	2
111 - C	24'x36'8½"	Latrine & Showers	Prefabricated Aluminum	2
112 - C	24'x36'8½"	Latrine & Showers	Prefabricated Aluminum	2
113 - C	24'x36'8½"	Latrine & Showers	Prefabricated Aluminum	4

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BLDG. NO.	SIZE	USE	TYPE	*
11 - M	12'x15'	Generator Shed	Wood & Plywood	9
115 - C	24'x36'8½"	Latrine & Showers	Prefabricated Aluminum	5
116 - M	24'x100'8½"	Loran	Prefabricated Aluminum	1
116A - M		Loran Annex	(Demolished)	
117A - C	24'x20'8½"	NRDL	Prefabricated Aluminum	6
117B - C	24'x12'8½"	NRDL	Prefabricated Aluminum	6
117C - C	15'10"x31'10"	NRDL	Tent on Concrete Slab	6
117D - C	14'x2"x14'4"	NRDL	Tent on Concrete Slab	6
117E - C	15'10"x31'10"	NRDL	Tent on Concrete Slab	6
117F - C	32'x8'	NRDL	Shelter Wood	6
117G	20'x24'	NRDL	Quonset	6
117H	15'10"x31'10"	NRDL	Tent on Concrete Slab	6
117I	15'10"x31'10"	NRDL	Tent on Concrete Slab	6
118 - M	195'x198'	B-50 Hanger	Steel & Galv. Iron	12
119 - M	45'x20'	Petroleum Products Supply	Concrete Slab	7
120 - C	40' x 130'	M-Boat Ramp	Concrete	1
121 - C	27'x52'	Elevated Water Storage	Timber Tower W/1-1000 bbl and 1-500 bbl tank	3
122 - C	24'x36'8½"	Latrine & Shower	Prefabricated Aluminum	4
123 - C	24'x36'8½"	Latrine & Showers	Prefabricated Aluminum	4
124 - C	24'x32'8½"	Salt Water Pump Station	Prefabricated Aluminum	2
125 - C	24'x20'8½"	Latrine & Decontamination Shower	Prefabricated Aluminum	15
126 - C	12' x 12'	Latrine	Wood and Corr. Metal	12
127 - C	24'x20'8½"	Latrine	Prefabricated Aluminum	12
128 C	12'x12'	Latrine	Wood and Corr. Metal	7
129		Latrine	(Demolished)	
130 - C	24'x20'8½"	Latrine	Prefabricated Aluminum	13
131 - C	13'x16'	Booster Pump House	Wood and Aluminum	12
132 - C	4'x4'	Sentry Post	Concrete Slab	6
133	20'x48'	Weather Station	Concrete Slab w/8 Man Tent	18
134 - M		Signal Corps Repair	Quonset (Demolished)	
135 - M		Auxiliary Equip. Storage	2-Story [illegible] (Demolished)	
136 - M			Slab	3
137 - M		Magazine	[illegible] (Demolished)	
138 - M	20'x80'	AF Auxiliary Power	Galv. Iron Shelter	12
139	20'x48'	Weather Station	Concrete Slab w/8 Man Tent	18
140 - C	59'x64'	Cargo Pier W/Approach Dock 20'x35'3"	Timber Construction	12
141	5'x20'	Storage Sheds	3-Sided Wood Shelters	1
142 - C	16'x80'	Personnel Pier	Wood on Wood Piling	1
143 - M	20'x20'	AACS Emergency Power	Wood	16
144 - M	22'x4"x44'4"	Ice Plant	Wood Shelter	3
145	14'x20'x15'	Assigned to Hydrogen Generating Bldg.	Wood, Sheet Metal	18
146 - M		Hut	(Demolished)	
147 - M		Base Flight Maintenance	(Demolished)	
148 - M	13'x13'	Inflation Shelter	Wood	18
149 - M	12'x24'	Shower	4 Man Tent on Larger Slab	18
149A -	4'x4'	Latrine	Wood on Concrete Slab	18
150 - M		AACS UC Storage	[illegible] Slab	
151 M		AACS UC Storage	Quonset (Demolished)	
152	8'x16'	Storage Shed	Wood w/Dirt Floor	18
153 - M	20'x25'	Navy Boat Supply	Quonset	12
154 - M	16'x16'x75'	Navigation Tower	Steel	12
155 - M	20'x62'	Small Boat Repair	Quonset	13

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BLDG. NO.	SIZE	USE	TYPE	*
156 M		HQ, HQ, Squadron	Demolished)	
157 M		Warehouse	(Demolished)	
158 - M	30'x34'	Vehicle Wash Stand	Concrete	13
158A - M	10'x12'	Wash Rack Utility Room	Metal	13
159 - M		Warehouse	(Demolished)	
160 - M		Warehouse	(Demolished)	
161 - M			Slab	13
162 - M	20'x44'	Warehouse	Quonset	9
163 - M	20'x30'	Warehouse	Quonset	9
164		Garbage Ramp	Concrete	17
165 - M	20'x50'	Magazine	Corr. Metal, Earth Covered	15
166 -			Slab	-
167 - M	20'x32'	Utility Operation	Quonset	7
168		Pershing Field, Parade Ground		3
169 - M	20'x36'	H.& N. Maint. Office	Quonset	7
170 - M		Office	(Demolished)	
171		Radar Tower	(Demolished)	
172 - M	8'x12'	Pier Office	Wood	22
173 - M		Dump Master's Shack	Wood (Demolished)	
174 - M	8'x8'x8'	Weather Radar Tower	Wood	16
175 - M	20'x30'	H.& N. Inspector's Off.	Plywood and Metal	7
176	52'x98'	Basketball Court		3
177	30'x80'	Handball Court		3
178				-
179				-
180		Grease Rack	(Demolished)	
181		Truck Loading Rack Sve Station	(Demolished)	
182		Service Station	(Demolished)	
183		Grease Rack	(Demolished)	
184		Acid Tank Building	Wood (Demolished)	
185 -M	12'x12'	Latrine	Wood	14
186 - C	24'x20'8½"	Pump House	Prefabricated Aluminum	5
187 - M				-
188 - M		Monitor Units	(Demolished)	
189 - M		Monitor Units	(Demolished)	
190 - M	8'x12'	Telephone Terminal Building	Wood	16
191 - M		JATO STOR. IGLOO		-
192		Storage	Demolished)	
193 - M		Shed	(Demolished)	
194				-
195				-
196				-
197				-
198				-
199				-
200				-
201-211 212-217	16'x32'	Quarters, 8 Man	Tent on Concrete Slab	2
218-270 271-275	16'x32'	Quarters, 8 Man Tents	Tent on Concrete Slab	2
276-280 281-286	16'x32'	Quarters, 8 Man Tents	Tent on Concrete Slab	2
287- 293-298	16'x32'	Quarters, 8 Man Tents	Tent on Concrete Slab	2
299-304 305-310	16'x32'	Quarters, 8 Man Tents	Tent on Concrete Slab	3

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BLDG. NO.	SIZE	USE	TYPE	*
31[illegible] 16 317-328	16'x32'	Quarters, 8 Man Tents	Tent on Concrete Slab	3
329-332 333-338	16'x32'	Quarters, 8 Man Tents	Tent on Concrete Slab	4
339-342 343-348	16'x32'	Quarters, 8 Man Tents	Tent on Concrete Slab	4
349-363 364-367	16'x32'	Quarters, 8 Man Tents	Tent on Concrete Slab	4
368-377	16'x32'	Quarters, 8 Man Tents	Tent on Concrete Slab	4
378-422	16'x32'	Quarters, 8 Man Tents	Tent on Concrete Slab	4
423-471	16'x32'	Quarters, 8 Man Tents	Tent on Concrete Slab	5
472-476	16'x32'	Quarters, 8 Man Tents	Tent on Concrete Slab	5
477-478	16'x32'	Quarters, 8 Man Tents	Tent on Concrete Slab	5
479-480	16'x32'	Quarters, 8 Man Tents	Tent on Concrete Slab	4
481-482	16'x32'	Quarters, 8 Man Tents	Tent on Concrete Slab	4
483	16'x32'	Quarters, 8 Man Tents	Tent on Concrete Slab	4
484	16'x32'	Quarters, 8 Man Tents	Tent on Concrete Slab	4
485	16'x32'	Quarters, 8 Man Tents	Tent on Concrete Slab	4
486	16'x32'	Quarters, 8 Man Tents	Tent on Concrete Slab	4
487	16'x32'	Quarters, 8 Man Tents	Tent on Concrete Slab	4
488	16'x32'	Quarters, 8 Man Tents	Tent on Concrete Slab	4
489	14'x15'	Quarters, 4 Man Tents	Tent on Concrete Slab	5
490	16'x32'	Quarters, 8 Man Tents	Tent on Concrete Slab	9
491	16'x32'	Quarters, 8 Man Tents	Tent on Concrete Slab	12
492	16'x32'	Quarters, 8 Man Tents	Tent on Concrete Slab	12
49[illegible]	16'x32'	Quarters, 8 Man Tents	Tent on Concrete Slab	12

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BLDG. NO.	SIZE	USE	TYPE	-
494				
495	16'x32'	Quarters, 8 Man Tent	Tent on Concrete Slab	11
496	16'x32'	Quarters, 8 Man Tent	Tent on Concrete Slab	11
49	16'x32'	Quarters, 8 Man Tent	Tent on Concrete Slab	14
498	16'x32'	Quarters, 8 Man Tent	Tent on Concrete Slab	15
499	20'x24'	Living Quarters	Wood on Concrete Blocks	4
500 - M	53'6"x20'	General Officer Qtrs	"L" shape Wood	3
501 - M	6'x6'	Assigned to Pumphouse (Motor Pool)	Wood	6
502 - M	38'x16'	H.Q. & H.Q. Detachment	Wood	3
502A-		Photo Lab	(Demolished)	
503 - M	126'6"x25'	Motor Pool Repair Shop	Wood and Galv. Metal	6
504 - M	24'x115'	Swimmers Tavern	"L" shape wood & Corr. Transite	
			Corr. Transite & Wood	2
505 - M	66'x32'9"	Duffy's Tavern	Wood	4
505A		Latrine	(Demolished)	
506 - M	48'8"x88'6"	NCO Club	Corr. Transite & Wood	4
506A	10'x18'	Reefer Shelters	Wood Frame - Plywood Siding	4
507 - M			Slab	3
507A - M	48'x20'	Hobby Shop	Wood	3
508 - M	18'x42'	Store Room	Wood Frame Corrugated Metal Siding	3
509 - M	20'x87'	Furniture Repair	Wood	5
510 - M	5'x5'	Telephone Terminal	Metal Cube	12
511 - C	12'x16'	Office	Wood and Aluminum	5
512 - M	12'x12'	Equipment Storage	Wood Frame-Corrugated Metal Cover	7
513 - M	16'x16'	Fire Dept. Stor. Shed	Corr. Metal & Wood	5
514 - M		Woods Athletic Field		5
515 - M	17'8"x48'	Engr. Maint. Office	Wood & Metal	4
516 - M	14'10"x24'10"	Storage for 50 Gal. Drums	2 Concrete Slabs	15
517 M	18'x31'	POL Office	Wood and Transite	12
518 - M	14'10"x24'10"	Storage for 50 Gal Drums	Concrete Slab	15
519 - M	16'x20'	Engineers Paint Shop	Corr. Metal & Screen	7
520 - M	24'8"x10'7" 8'3"x8'7"	Motor Pool Shop Office	Wood, "L" Shape	6
520A - M		Service Station	Wood Bldg. & Gas Pumps	6
521 - M		Grease Rack	Wood	6
522 - M		Skeet Range		15
523 - M	16'x32'	Army Sec. Monitoring U.	Tent	5
524 - M	16'x32'	Army Sec. Monitoring U.	Tent	5
525 - M	16'x32'	Army Sec. Monitoring U.	Tent	5
526 - M	22'x64'	P.X. Warehouse	Prefabricated Aluminum	5
527 - M	12'x24' & 14'x18'	Heavy Equipment Shacks	Wood	5
528 - M	8'x12'	Storage Shed	Wood	6
529 - M	18'x45'	Motor Pool Office	Wood,Wood Flr, No Fndn,Corr.Metal Roof	6
530 - M	16'x35'	Ammo Storage	Quonset	7
531 - M	15'x30'	Sand Blast Shed	Wood & Corrugaged Metal	7
532 - M	8'x12'	Sand Blast Shed	Wood & Corrugated Metal	7
533 - M	8'x8'	Sand Blast Shed	Wood & Corrugated Metal	7
534 - M	25'x25'		Slab	8
535 - M	8'x10'	Ordinance Inspection	Wood	8
536 - M	20'x85'	Engineer Supply Storage	Wood Frame - Canvas Covered	7
537 - M	12'x12'	Office	Wood Frame-Corrugated Metal Cover	7
538 - M	8'x16'	Office	Metal	13
539 - M	12'x16' & 20'x24'	Shed	Metal	13
540 - M	18'x20'	Pump House	Wood w/Metal Roof	13
540A M	12'x12'	Water Tower	Cube on Wood Tower	13

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BLDG. NO.	SIZE	USE	TYPE	
541 - M	12'x18'	Shed	Wood Frame - Canvas Cover	13
542 - M	6'x10'	Storage Shed	Wood w/concrete floor	13
54 M	15'x20'	Paint Storage	Metal	12
544	24'x120'	Reefer Shelter	Wood on Elevated Fdn.-Metal Roof	4
545		Generator Shed	Wood with metal roof (Demolished)	
546	12'x20'	Hot Locker Bldg.	Wood Frame w/corrugated metal	4
547	12'x15'	Barber Shop	Wood on Wood Blocks	4
548 - M	8'x16'	Air Force Mail Room	Wood Frame - Corrugated Metal covered	4
549 - M	24'x26'	Air Force Gym	Wood & Corr. Metal, Wood Floor	4
550				
551 - M	16'x34'	Storage	Wood & Corrugated Metal	12
552	8'x32'	Tool Shed	Wood & Corr. Metal on Skids	12
553	20'x25'		Concrete Slab	14
554	15'x25'	Sand Blast Pad	2 Sided Wood Wall - Metal Roof	15
555	12'x12'		Slab	15
556	200'x300'	Jet Warm Up Pad	Concrete Slab	13
557	135'x260'	Decontamination Pad	Concrete Slab	15
558	100'x150'	Decontamination Pad	Concrete Slab	15
559	32'x50'	Jet Deflector Pad	Concrete Pad	15
560				-
561 - C	5000 bbl	Storage Av-Gas	Tank, Steel, Welded, Vertical (T-1)	12
562 - D	5000 bbl	Storage, Jet Fuel	Tank, Steel, Welded, Vertical (T-2)	12
563 - C	10,000 bbl	Storage, Av. Gas	Tank, Steel, Welded, Vertical (T-3)	12
564 - C	10,000 bbl	Storage, Jet Fuel	Tank, Steel, Welded, Vertical (T-4)	12
565				-
566				-
567				-
56				
569 - C		Av-Gas Fill Stand	Steel Platform - Concrete Pad	15
570 - C		Av-Gas Fill Stand	Steel Platform - Concrete Pad	15
571 - C		Mo-Gas Fill Stand	Steel Platform - Concrete Pad	12
572		F. W. Tank		15
573				-
574				-
575				-
576				-
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581				-
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583				-
584				-
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586				-
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597				-

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BLDG NO.	SIZE	USE	TYPE	*
59[illegible]				-
59[illegible]				-
600 - C	80'x120'	Warehouse	(2) Butler Type	13
601 -				
602 - C	40'x120'	Warehouse	Prefabricated Steel	7
603 - C	51'x102'	Special Services	Prefabricated Aluminum	3
	51'x128'	In "L" Shape	Prefabricated Aluminum	3
604 - M	20'x48'	Electronics Maintenance	Prefabricated Steel	12
605 - M	20'x48'	Electronics Maintenance	Prefabricated Steel	12
606 - M	20'x48'	Tech. Supply & Inspect.	Wood	12
607 - M	20'x48'	Air Weather Service	Prefabricated Steel	9
608 - M	20'x48'	Air Weather Service	Prefabricated Steel	9
609 - M	20'x48'	Air Weather Service	Prefabricated Steel	9
610 - M	20'x48'	Photo Laboratory	Prefabricated Steel	12
611 - M	20'x48'	Line Maintenance	Wood	12
612 - M	20'x48'	Supply	Prefabricated Steel	9
613 - M	20'x48'	Supply	Prefabricated Steel	9
614 - M	20'x48'	Depot Supply	Prefabricated Steel	7
615 - M	20'x48'	Depot Supply	Prefabricated Steel	7
616 - M	20'x48'	Mess Hall Storage	Prefabricated Steel	4
617 - M		Gear Loft	(Demolished)	
618 - M	20'x48'	AG Office	Prefabricated Steel	3
619 - M	20'x48'	Special Ser. Whse.	Prefabricated Steel	3
620 - M	20'x48'	Ordnance Maintenance	Prefabricated Steel	8
621 -	16'x16'	Radar Tower	Steel	16
622 - M	20'x48'		Slab	8
62[illegible]			(Demolished)	10
624 - M	7'x32'	Storage	Wood	9
625 - M	20'x100'		Slab	9
626 - M	40'x40'		Slab	9
627 - M	20'x35'		Slab	9
628 - C	10x13'x8'	25-Man Latrine	Wood	14
629 -	20'x20'8½"	Storm Detection Radar	Pacific Bldg. (Esp. Const.)	16
630 - M	20'x72'	Parachute Repack Bldg.	Prefabricated Steel	12
631 - M	24'x20'	Carpenter Shop	Prefabricated Steel	12
632 - M	20'x48'	WRECEP Personal Equipment (A.F. Whse.)	Wood	9
633 - M	20'x48'	Aircraft Parts	Wood	12
634 - M	20'x48'	Navy Operations	Wood	14
635 - M	20'x48'	Navy Operations	Wood	14
636 - M	20'x48'	Navy Operations	Wood	14
637 - M	20'x48'	AF Personal Gear Storage	Wood	13
638 - M	12-20'x48'	Supply Warehouse	Wood	9
639 - M	16'x16'x35'	Parachute Drying Tower and Boiler House	Wood	12
640 - M	20'x48'	A.E.C. Warehouse	Prefabricated Steel	12
641 - C	120'x120'	Q.M. Non-expendable Whse	Prefabricated Steel	7
642 - C	80'x120'	Ordnance Whse	Prefabricated Steel	8
643 - C	80'x120'	Q.M. Expendable Whse	Prefabricated Steel	7
644 - C	40'x120'	Q.M. Sales	Prefabridated Steel	7
645 - C	40'x101'x16'	T.C. Gear Loft & Security Storage		12
646 -	40'x101'	Aircraft Engine Bldg. & Storage	Prefabricated Steel	12
647 - C	24'x80'	M.P. Hdqtrs	Prefabricated Alum	4
648 - C	78'x120'	Warehouse (AF Supply)	Prefabricated Steel	13

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BLDG. NO.	SIZE	USE	TYPE	*
649 - C	78'4"x120'	Warehouse (AF Supply)	Prefabricated Steel	13
650 - C	38'4"x120'	Warehouse (AF Supply)	Prefabricated Steel	13
651 - C	38'4"x100'	Equip. & Storage Bldg.	Prefabricated Steel	12
652 - M	20'x48'	Radio Station WXLE	Prefabricated Steel	3
653				-
654	24'x128'8½"	Assigned to 40-Man Bks.	Aluminum (Not built)	-
655				-
656				-
657				-
658	24'x128'8½"	Assigned to 40-Man Bks.	Aluminum (Not Built)	-
659	24'x128'8½"	Assigned to 40-Man Bks.	Aluminum (Not Built)	-
660 - M	20'4¼"x48'4¼"	RAWINSONDE	Prefab. Steel (Weather Detach.)	18
661 - C	25'2"x85'10½"	Eng. Equip. Bldg. & Main.Shop	Prefabricated Aluminum	5
662	24'x148'8½"	Assigned to 48-Man Barracks	Prefabricated Aluminum (Not Built)	-
663 - C	24'x148'8½"	48-Man Barracks	Prefabricated Aluminum	2
664 - C	24'x148'8½"	48-Man Barracks	Prefabricated Aluminum	2
665 - C	24'x148'8½"	48-Man Barracks	Prefabricated Aluminum	2
666 - C	24'x148'8½"	48-Man Barracks	Prefabricated Aluminum	2
667 - C	24'x148'8½"	44-Man Barracks w/latrine	Prefabricated Aluminum	3
668 - C	24'x148'8½"	48-Man Barracks	Prefabricated Aluminum	2
669 - C	24'x148'8½"	48-Man Barracks	Prefabricated Aluminum	4
670 - C	24'x148'8½"	48-Man Barracks	Prefabricated Aluminum	4
671 - C	24'x148'8½"	48-Man Barracks	Prefabricated Aluminum	4
672 - C	24'x148'8½"	48-Man Barracks	Prefabricated Aluminum	4
673 - C	24'x148'8½"	48-Man Barracks	Prefabricated Aluminum	5
674 - C	15'x20'	Welding Shed	Wood Frame - Conc. Floor	5
675 - M	24'x48'	C.G. Quarters & Storage	Prefabricated Aluminum	1
676 - C	46'x90'	Guest House	Wood Frame	3
677 - M	42'x100'	Swimming Pool	Concrete	1
678 - C	33'x80' L Shape 24'x33'	Chapel	Wood	3
679 - C	121'2"x161'2"	Operations & Admin.	Prefabricated Steel	12
680 - M	10'x12'	Pump House (Swimming Pool)		1
681 - C	19'x48'	Electronics & Com. Bldg.	Prefabricated Steel	12
682 - C	24'x72'	Consolid. Shop	Prefabricated Aluminum	8
683 - C	48'x100'	" "	Prefabricated Steel	7
684 - C	40'x120'	" "	Prefabricated Steel	8
685 - C	24'x38'7¼", 50'6"x72'	Crash Fire Sta.	Prefab. Aluminum P.I.&.E.	7
686 - M	48'x104'	T.G. 7.1 Lab. Bldg.	Prefabricated Steel	15
687 - M	48'x104'	T.G. 7.1 Admin. Bldg.	Prefabricated Steel	15
688		Assigned to T.G. 7.1 Bldg.	(Not built)	-
689				-
690				-
691				-
692				-

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BLDG NO.	SIZE	USE	TYPE	*
700 - M	16'x32'	Quarters - 8 Man Tent	Tent on Concrete Slab	15
701 - M	16'x32'	Quarters - 8 Man Tent	Tent on Concrete Slab	15
702 - M	16'x32'	Quarters - 8 Man Tent	Tent on Concrete Slab	16
703 - M	16'x32'	Quarters - 8 Man Tent	Tent on Concrete Slab	16
704 - M	16'x32'	Quarters - 8 Man Tent	Tent on Concrete Slab	18

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SITE DAVID

BUILDING & STRUCTURE NUMBERS

HOLMES & NARVER, INC.

REVISED TO 1 OCT. 1956

MISC. 427

NOTE: Any corrections or changes to this list should be made only on the master list which is maintained in the Office Engineering & Design Department of the Engineering Division.

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GENERAL NOTES

1. For further information on [illegible] of buildings refer to the As-Built Drawings.

2. Subpar [illegible] on each [illegible] which appear on General Legend, showing number of [illegible] which building type are or the [illegible] designated [illegible].

3. The building [illegible] shown on this [illegible] are [illegible] Plans, General Legends and Drawing [illegible].

4. Symbol [illegible] building number (A) [illegible] building [illegible] building or [illegible].

5. Symbol [illegible] building number (A) [illegible] building or structure that is applicable only [illegible].

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[illegible]

BLDG. NO.	SIZE	USE	TYPE
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BLDG NO.	SIZE	USE	TYPE	#
51				
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85				
86				
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88				
89	[illegible]	Generator [illegible]		3
90	[illegible]	[illegible]	Wood	2
91	[illegible]	[illegible]	Wood	2
92	[illegible]	[illegible]	Wood & Corr. Metal Roof	2
93	[illegible]	[illegible]	Wood & Corr. Metal Roof	2
94	[illegible]	[illegible]	Wood & Corr. Metal Roof	2
95	[illegible]	[illegible]		2
96	[illegible]	[illegible]		2
97	[illegible]	[illegible]		2
98	[illegible]	[illegible]	Wood	1
99	[illegible]	[illegible]		2
100		[illegible]		1
		[illegible]	Steel Tank	1

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[illegible]	No.	[illegible]	[illegible]	[illegible]	*
101	- [illegible]	[illegible]	[illegible]	[illegible]	1
102	- [illegible]	[illegible]	[illegible]	[illegible]	2
103	- [illegible]	[illegible]	[illegible]	[illegible]	1
104			[illegible]	[illegible]	
105		[illegible]		[illegible]	1
106	- [illegible]	[illegible]	[illegible]	[illegible]	1
107		[illegible]	[illegible]	[illegible]	1
108		[illegible]		[illegible]	1
109				[illegible]	
110	- [illegible]	[illegible]	[illegible]		
			[illegible]	[illegible]	1
111				[illegible]	
112		[illegible]		[illegible]	1
113		[illegible]		[illegible]	1
114			[illegible]	[illegible]	
115		[illegible]	[illegible]	[illegible]	1
116			[illegible]	[illegible]	
117			[illegible]	[illegible]	
118			[illegible]	[illegible]	
119		[illegible]	[illegible]	[illegible]	1
120		[illegible]	[illegible]	[illegible]	1
121		[illegible]	[illegible]	[illegible]	1
122		[illegible]	[illegible]	[illegible]	
123		[illegible]	[illegible]	[illegible]	1
124		[illegible]	[illegible]	[illegible]	1
125		[illegible]	[illegible]	[illegible]	1
126			[illegible]	[illegible]	
127		[illegible]	[illegible]	[illegible]	1
128		[illegible]	[illegible]	[illegible]	1
129		[illegible]	[illegible]	[illegible]	1
130		[illegible]	[illegible]	[illegible]	1
131		[illegible]	[illegible]	[illegible]	1
132		[illegible]	[illegible]	[illegible]	1
133		[illegible]	[illegible]	[illegible]	1
134		[illegible]	[illegible]	[illegible]	1
135		[illegible]	[illegible]	[illegible]	1
136		[illegible]	[illegible]	[illegible]	1
137		[illegible]	[illegible]	[illegible]	1
138			[illegible]	[illegible]	
139		[illegible]	[illegible]	[illegible]	2
140		[illegible]	[illegible]	[illegible]	1
141		[illegible]	[illegible]	[illegible]	1
142		[illegible]	[illegible]	[illegible]	
143		[illegible]	[illegible]	[illegible]	1
144		[illegible]	[illegible]	[illegible]	1
145		[illegible]	[illegible]	[illegible]	1
146		[illegible]	[illegible]	[illegible]	1
147		[illegible]	[illegible]	[illegible]	1
148				[illegible]	
149				[illegible]	
150		[illegible]	[illegible]	[illegible]	1

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[illegible]	[illegible]	[illegible]	TYPE	
[illegible]	10'x15'		Concrete Slab	1
171	20'x20'		Concrete Slab	1
[illegible]	10'x30'		Concrete Slab	1
[illegible]	10'x30'		Concrete Slab	1
[illegible]	10'x30'		Concrete Slab	1
[illegible]			Demolished	
157			Demolished	
[illegible]	10'x20'	Shed	Shed	1
[illegible]	20'x20'		Demolished	
160	8'x8'		Concrete Slab	2
161		Concrete Slab [illegible]	Concrete Slab	1
162			Demolished	
163	20'x15'		Demolished	
[illegible]			Concrete Slab	1
[illegible]	20'x20'		Demolished	
[illegible]	20'x20'	Powder Magazine	Buried Quonset	3
[illegible]	20'x20'	Powder Magazine	Buried Quonset	3
[illegible]	20'x20'	Powder Magazine	Buried Quonset	3
[illegible]	15'x[illegible]		Concrete Slab	1
[illegible]	12'x12'		Concrete Slab	1
[illegible]			Demolished	
[illegible]			Demolished	
[illegible] - C	10'x20'	Garage	Demolished	
[illegible]	8'x11'		Wood Frame, Corr. Alum.	1
[illegible]			Concrete Slab	1
176			Demolished	
177	20'x[illegible]	Shed	Demolished	
178	12'x12'	Shed	Concrete Slab	1
179	20'x[illegible]	Shed	Concrete Slab	1
180 - C	10'x12'	Emergency Power Gen. Bldg.	Concrete Slab	1
181	20'x20'	(Old Shed)	Wood Frame, Corr. Alum., Roof	2
182				

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SITE ELMER

BUILDING & STRUCTURE NUMBERS

HOLMES & NARVER, INC.

REVISED TO 1 OCT 1956

MISC. 416

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GENERAL NOTES

1. For further information on sizes and types of buildings, refer to the As-built [illegible] Plans.

*2. Column denoted by an asterisk contains numbers which represent General Layout Drawing Number or area on which building appears on the new 1" = [illegible] topographic charts.

3. The building numbers in this index [illegible] to Bolster & Murray Plans, General Layout [illegible] and Murray [illegible].

4. Symbol beside building number (M) [illegible] military owned building or structure.

5. Symbol beside building (C) indicates [illegible] owned building or structure that is capitalized, [illegible] Work-In-In-Progress.

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USE	BLDG. NO.
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Fresh Water Storage	326
Galley	201
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Gasoline Storage	376-379
Grease Rack	191
Guard & Const. Office	177
Guardhouse, Assy. Area	414
Guard Post	213-214
Guard Post	332
Guard Shack	408
Guard Shelter (CMR)	362
Guard Tower	335-336
Gymnasium	179 - 244
Heavy Equipment	188
Heavy Equipment Machine Shop	405
Heavy Equipment Repair	421
Heavy Equipment Repair Shop	404
Heavy Equipment Shops	430
H.E. Riggers Loft	181
High Explosives Building	412
Hobby Shop	176 - 243
H&N Administration	208
H&N Administration	208A
H&N Motor Pool Bldg.	188
H&N Personnel	208B
Infirmary	117
Instrument Laboratory	211
Iron Workers Shed	399
JTF Recreation	432
Laboratory	223
Laboratory	231
Laboratory	329
Laboratory	330
Laboratory	344
Lab. Material Testing	309
Lanai	320
Latrine	165

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USE	BLDG. NO.
Latrine (Ball Park)	240
Latrine & Showers	227-228
Latrine & Showers	233-236
Latrine (Mess Hall)	215
Latrine (100 Man)	680-684
Latrine, Warehouse Area	551
Latrine, Warehouse Area	552
Laundry	302
Lubrication Rack	167
Machine Shop	426
Magazine	351
Magazine	413
Magazine	415
Marine Elect. & Injector Shop	184
Marine Injector Shop	325
Marine Operations	406
Marine Welding Shop	429
Materials Testing Lab	309
Mess Hall, 3 Wings	201
Mill & Saw Shed	186 & 428
Mogas Storage	383
Mogas Storage	384
Motor Pool Ab	189
Motor Pool Hq	188
M-Boat Ramp	138
M-Boat Ramp	139
M.P. Guards Tent	239
Nitrogen Storage	257
Nurses Quarters & Dentist	118
Operations Building	164
Oxygen Tabernacle	422
Paint Shop	424
Paint Shop & Parts Warehouse	401
Paint Storage	425
Pass & Badge Office	222
Personnel Pier	140
Photo Laboratory	210
Pier, Deep Water	142
Pier, Freight Dock	137
Pier, Personnel	140
Pier, Guard Shelter	187
Plumbing & Refrigeration	314
PO, PX, & Snack Bar	204
POL Pump House	300
Power Plant	339
Power & Distillation Plant	301-301A-301B
Pump House	162

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USE	BLDG. NO.
Quarters, 4 Land	120
Quarters, 8 Man (Tent)	51-99A
Quarters, 8 Man (Tent)	99B-99H
Quarters, 18 Man	111-114
Quarters, 18 Man	115-116
Quarters, 18 Man	119
Quarters, 18 Man	121-130
Quarters, 4 Man (Tent)	1-50
Quarters, 36 Man	131-134
Quarters, 36 Man	206
Quarters, 36 Man	100-110
Quarters, 48 Man	135-136
Quarters, 48 Man	680-684
Quarters, 36 Man	144
Quarters, 8 Man	600-671
Quarters, 8 Man	145-146
Radio Repair Shop	180
Radsafe Building	323
Radsafe Hutment	324
Rank Diesel Storage	192
Receiving & Classified Warehse	515
Recreation Bldg	185
Recreation Bldg	237
Reefer	217
Reefer Banks	196
Reefer Banks	197
Refrigeration Shop	316
Refreshment Bldg.	409
Refreshment Stand	252
Reservoir (2 Sections)	166
Salt Water Intake	347-A
Salt Water Intake	347-B
Salt Water Pump House	410
Saw Mill	428
Scientific User Bldg	232
Scullery	201
Security Office	222
Sheet Metal Shop	314A
Shelter	331
Shelter	334
Skeet Range	141
Shop	342
Shop & Laboratory	418
Shop and Storage	341
Shop with Dehumidifier	194
Steam Cleaning for Marine Depot Bldg	322A
Stock Building	299
Storage Tent, Tire Equipment	207
Storage Building (OMB)	350
Storage (Proposed)	245
Supply Dev. Off. & Store	313

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USE	BLDG NO.
Tank (Water)	220
Task Force H	221
Telemeter & Receiver Building	229
Television Center	338
Test Shelter (Aerial Camp)	193
Theater, open air	200
Tire Equip. Storage	207
Tower	406
Typewriter Repair Shop	318
Warehouse	319
Warehouse	320
Warehouse, A-1	511
Warehouse, A-2	512
Warehouse, Bulk Storage	516
Warehouse, Camp Supplies	507
Warehouse, Dry Stores	504
Warehouse, Electrical	501
Warehouse, Food	308
Warehouse, General Stores	509
Warehouse, Heavy Duty Parts	505
Warehouse, Plumbing	502
Warehouse, Property	508
Warehouse, Rec. & Class.	515
Warehouse, Ref. Marine & Power	506
Warehouse, Shipping	503
Warehouse, Tool Crib & Sta. Locker	510
Water Storage - Elevated	220 & 345
Water Storage, Press	312 & 326

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SITE [illegible]

BLDG. NO.	SIZE	USE	TYPE	*
1-50 -	14'2"x14'4"	Quarters, 4 Man	Tent on Concrete Slab	5
51-82 -	15'10"x31'10"	Quarters, 8 Man	Tent on Concrete Slab	5
83-99A -	15'10"x31'10"	Quarters, 8 Man	Tent on Concrete Slab	7
99B-99H - M	15'10"x31'10"	Quarters, 8 Man	Tent on Concrete Slab	5
100-110 - C	24'x128'8½"	Quarters, 36 Man	Prefabricated Aluminum	3
111-114-C	24'x68'8½"	Quarters, 18 Man	Prefabricated Aluminum	3
115-116 - C	24'x68'8½"	Quarters, 18 Man	Prefabricated Aluminum	3
117 - C	24'x92'8½"	Infirmary	Prefabricated Aluminum	3
118 - C	24'x44'8½"	Nurses Quarters & Dentist	Prefabricated Aluminum	3
119 - C	24'x68'8½"	Quarters, 18 Man	Prefabricated Aluminum	3
120 - C	24'x68'8½"	Quarters & Lanai	Prefabricated Aluminum	3
[illegible]	58'8"x20'8"	Lanai	Wood	3
121 - C	24'x68'8½"	Quarters, 18 Man	Prefabricated Aluminum	3
122-130 - C	24'x68'8½"	Quarters, 18 Man	Prefabricated Aluminum	5
131-132 - C	24'x68'8½"	Quarters, 18 Man	Prefabricated Aluminum	3
133 - C	24'x128'8½"	Quarters, 36 Man	Prefabricated Aluminum	1
134 - C	24'x128'8½"	Quarters, 36 Man	Prefabricated Aluminum	1
135 - C	24'x168'8½"	Quarters, 48 Man w/Latrine	Prefabricated Aluminum	3
136 - C	24'x168'8½"	Quarters, 48 Man w/Latrine	Prefabricated Aluminum	3
137 - C	40'x180'	Freight Cargo Pier	Concrete - Steel - Wood	4
13[illegible] - C	50'x180'	M-Boat Ramp	Concrete	6
13[illegible] - C	50'x85'	M-Boat Ramp	Concrete	6
140 - C	30'x200'	Personnel Pier	Wood	8
141 - C		Skeet Range		7
142 - C		Deep Water and LST Pier	Wood on Steel Frame	2
143	38'x63'	36-Man Decontamination	Tents on Slab	8
144	24'x128'8½"	Assigned to Quarters, [illegible] Man	Prefabricated Aluminum	3
145	24'x128'8½"	Assigned to Quarters, [illegible] Man	Prefabricated Aluminum	3
146	16'x32'	Quarters, 8 Man	Tent on Concrete Slab	5
147	16'x32'	Quarters, 8 Man	Tent on Concrete Slab	4
148 - C	32'x60'	Volley Ball Court	Compacted Coral	3
149	14'2"x14'4"	Crew Chief Shelter	Tent (Type A)	8
150 - C	10'7"x10'10"	Garbage Can Building	Wood w/Concrete Floor	3
151 - C	32'x47'	Beach Club	Wood on Concrete Floor	6
151A	32'x47'	Life Guard Tower	Wood on Concrete Floor	8
152 - C	32'x47'	Life Guard Tower	Wood on Concrete Floor	8
153-158		[illegible]	Demolished	
159 - C	4'x20'	Gasoline Filling [illegible]	Pumps, Tanks & Concrete Slab	2
160-161		[illegible]	Demolished	
162 - C	10'x[illegible]	[illegible]	Wood on Concrete Floor	2
163				
164 - C	16'x30'	Operations Bldg. (Admin.)	Wood & Aluminum on Conc. Floor	8
165 - C	10'x12'	Latrine	Wood on Concrete Floor	4
166	51'x6"x52'[illegible]"	Reservoir - Fresh Water Storage	Concrete, partly underground	4
167 - C	6'x24'	Lubrication [illegible]	Concrete	4
168 - C	10'8"x13'6"	Pottery & Tin [illegible]	Wood	4
	30'x50'			4
	38'x42'			
169 - C	32'x60'	Volley Ball Court	Compacted Coral	3
170A - C	32'x60'	Volley Ball Court	Compacted Coral	3
170B - C	32'x60'	Volley Ball Court	Compacted Coral	3
171 - C	30'x63'	Handball Court	Wood & Concrete Slab	3
172 - C	32'x[illegible]	Tennis Court	[illegible]	

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BLDG. NO.	SIZE	USE	TYPE
173 - C	32'x60'	Volley Ball Court	
174A - C	12'x12'x8'	Marine Ways Shed	Wood Frame, Plywood Siding
174B - C	12'x12'x8'	Marine Ways Shed	Wood Frame, Plywood Siding
174C -	8'x10'x8'	Marine Ways Shed	Wood Frame, Plywood Siding
174 - C	20'x56'	Men's Locker	Quonset
175 - C	20'x56'	Chapel	Quonset
176 - C	20'x56'	Hobby Shop	Quonset
177 - C	20'x56'	Guard & Const. Office	Quonset
178 - C	20'x56'	Camp Office	Quonset
179 - C	20'x56'	Gymnasium	Quonset
180 - C	20'x56'	Radio Repair Shop	Quonset
181 - C	20'x56'	H.E. Riggers Loft	Quonset
182		Supply Hardware Whse	(Demolished)
183		Beer & Elect.Eqmt. Whse	(Demolished)
184 - C		Marine Elect. & Injector Shop	Jumbo Quonset
185 - C	20'x56'	Recreation Bldg.	Quonset
186 - C	20'x30'	Mill & Saw Shed	Wooden Shelter
187 - C	8'x12'	Pier Guard Shelter	Wood
188	10'x12'	H&N Motor Pool Dispatcher Heavy Equipment	Wood
189		ABC Motor Pool Disp.	(Demolished)
190 - C	32'x50'	Beach Club (Riviera)	Wood w/Concrete Floor
190A		Life Guard Tower	Wood
191	39'x16'	Timber Grease Rack	Wood
192 - C	7'x18'	Tank, Diesel Storage	Marine Steel, Welded Horiz 5000 Gallon
193	11'x12'	Admin. Compound Test Shelter	Wood
194 - C	24'x60'8½"	Shop with Dehumid Ex	Prefabricated Aluminum
194A - C	15'2"x37'	Equipment Room	Wood
195		Shoe Shop	RAZED
196	21'4"x90'5"	Reefer Banks	Wood & Canvas Shelters
197	23'10"x80'6"	Reefer Banks	Wood & Canvas Shelters
198		Marine Electric Shop	RAZED
199 - C		Cooper Baseball Field & Announcer's Booth	Wood
200 - C	1350 Man	Theater, open air	Wood and Alum., Proj. Room Shelter, Seats, Stage & Screen
201 - C	3 - 24'x104'8½" 1 - 24'x84'8½"	Mess Hall, 3 wings	Prefabricated Aluminum
	24'x26'	Scullery	
	24'x110'8½"	Galley	
	24'x38'	Galley	
	24'x38'	Galley	
202 - C	24'x48'8½"	Bakery	Prefabricated Aluminum
203 - C	24'x24'8½"	Boiler House	Prefabricated Aluminum
204 - C	24'x128'8½"	PC, PX & Snack Bar	Prefabricated Aluminum
205 - C	24'x52'8½"	Fire Sta. & Quarters	Prefabricated Aluminum
206 - C	24'x128'8½"	Barbers, 34 Bar	Prefabricated Aluminum

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BLDG. NO.	SIZE	USE	TYPE	
207		Storage Tent, Fire Equipment	(Demolished)	
208 C	24'x105'8½"	H&N Administration	"L" Shape, Prefabricated Aluminum	5
	24'x60'			5
208A - C	24'x[illegible]'8½"	H&N Administration	Prefabricated Aluminum	5
208B - C	24'x64'8½"	H&N Personnel	Prefabricated Aluminum	5
209 - C	24'x124'8½"	AEC Administration	Prefabricated Aluminum	5
	24'x118'8½"	"T" Shape	Prefabricated Aluminum	5
210 - C	24'x88'8½"	Photo Laboratory	Prefabricated Aluminum	5
211 - C	24'x128'8½"	Instrument Laboratory	Prefabricated Aluminum	5
	24'x74'8½"	Instrument Laboratory	Prefabricated Aluminum	5
212A - C	24'x16'8½"	Counting & Sampling Lab	Prefabricated Aluminum	5
212B - C	24'x24'8½"	Counting & Sampling Lab	Prefabricated Aluminum	5
212C - C	7'4"x7'4"	Counting & Sampling Lab	Wood Frame, Earth Covered	5
213 - C	4'x4'	Guard Post (Adm Comp).	Wood	5
214 - C	4'x4'	Guard Post (Adm Comp)	Wood	3
215 - C	9'x12'	Latrine (Mess Hall)	Prefabricated Aluminum	3
216 - C	24'x72'8½"	Day Room & Library	Prefabricated Aluminum	3
217 - C	24'x156'8½"	Roofer	Prefabricated Aluminum on Elevated Slab	3
218 - C	24'x36'8½"	BIO-MED. Building	Prefabricated Aluminum	9
219 - C	10'x10'2"	Commissary Office	Wood Frame, Wood Floor & Aluminum Roof	3
220 - C	27'x52'	Elevated Water Storage	50' Timber Tower	3
	1000 Bbl	Tank	Bolted Steel, Vertical	3
	500 Bbl	Tank	Bolted Steel, Vertical	3
221 - C	24'x158'8½"	Tank Force H.Q.	"L" Shape, Prefab Aluminum	
	3-24'x106'8½"		with 3 wings	5
222 C	24'x72'8½"	Pass & Badge Office	Prefabricated Aluminum	5
223 - C	24'x160'	Laboratory	Prefabricated Aluminum	5
224		Assigned to Communications Bldg.		5
225	16'x20'	Assigned to TV Film Process Lab.	Concrete Blocks	1
226	12'x14'	Radio Shop. Storage	Plywood - Wood Frame & Floor	1
227 - C	24'x36'8½"	Latrine & Showers	Prefabricated Aluminum	6
228 - C	24'x36'8½"	Latrine & Showers	Prefabricated Aluminum	6
229 - C	24'x12'8½"	Survey Field Office	Prefabricated Aluminum	1
230 - C	24'x68'8½"	Commissary	Prefabricated Aluminum	3
231 - C	24'x28'8½"	Laboratory	Prefabricated Aluminum	5
232 - C	24'x56'8½"	Scientific User Shop	Prefabricated Aluminum	5
233 - 234	25'x36'	Latrine & Showers	Wood & Aluminum	6
235 - 236	25'x36'	Latrine & Showers	Wood & Aluminum	7
237 - C	24'x144'8½"	Recreation Building	Prefabricated Aluminum	3
238 - C	24'x48'	Chill. Storage	Concrete Block	3
239	16'x32'	M.P. Guards Tent	6-Man Tent on Conc. Slab	4
240 - C	4'6"x8'	Latrine (Ballpark)	Wood Frame - Conc. Slab	4
241 - C	28'x30'	Add. to Film Station Bldg	Prefabricated Aluminum	4
242 - C	25'x48'	Chapel	Wood	3
	18'x25'			
243	24'x60'	Assigned to Hobby Shop	Prefabricated Aluminum	6
244	24'x60'	Assigned to Gymnasium	Prefabricated Aluminum	6
245	24'x50'	Assigned to Ventilated Storage Bldg.		3
246	16'x32'		Tent on Conc. Slab	4
247	16'x32'		Tent on Conc. Slab	4
248	90'x100'	Tractor Repair Yard	Shed	4
249 - C	150'x300'	Recor. Area	Trailer Shed & Slab - Fenced	7

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BLDG. NO.	SIZE	USE	TYPE	
250 - C		Backstop & Locke Field	Wood & Wire, Locke Field	7
251 C	10'x10'	Announcers Booth	Wood, Locke Field	7
252 - C	25'x25'	Refreshment Stand	Wood, Lock Field	7
253 - C	8'x10'	Incinerator	Brick & Conc. Fenced	5
254 - C	10'7"x20'	Garbage Building	Wood, one Concrete w/Ramp	3
255	8'x12'	Acid House	Wood	4
256	10'x20'	Beach Combers Shack	Wood Frame, Corr. Metal Siding	5
257 - C	12'x12'	Nitrogen Storage	Canvas, on Wood Frame	1
258 -	24'x50'	Acetylene Storage	Canvas, on Wood Frame	1
259	9'x10'	Storage Shed	Wood	1
260	16'x32'	Scientific Tent	Tent on Coral Floor	1
261	16'x32'	Scientific Tent	Tent on Conc. Slab	1
262	16'x32'	Scientific Tent	Tent on Conc. Slab	1
263	16'x32'	Scientific Tent	Tent on Conc. Slab	1
264	10'x24'	Generator House	Wood Frame, Corr. Metal Siding	1
265	12'x15'	A.E.C. Motor Pool Dispatcher	Prefabricated Aluminum	3
266	10'x17'	Compressor Shed	Wood, Corr. Metal Roof, Dirt Floor	4
267	20'x20'	Vehicle Cleaning	Slab	4
268	10'x13'	Boiler House	Wood, Corr. Metal Roof, Conc. Floor	4
269	16'x32'	Scientific, 8 Man	Tent on Conc. Slab	5
270	16'x32'	Scientific, 8 Man	Tent on Conc. Slab	5
271	16'x32'	Scientific, 8 Man	Tent on Conc. Slab	5
272	16'x32'	Scientific, 8 Man	Tent on Conc. Slab	5
273	14'2"x14'4"	Scientific, 4 Man	Tent on Conc. Slab	5
274	14'2"x14'4"	Scientific, 4 Man	Tent on Conc. Slab	5
275	14'2"x14'4"	Scientific, 4 Man	Tent on Conc. Slab	5
276	14'2"x14'4"	Scientific, 4 Man	Tent on Conc. Slab	5
277	14'2"x14'4"	Scientific, 4 Man	Tent on Conc. Slab	5
278	16'x32'	Scientific, 8 Man	Tent on Conc. Slab	5
279	16'x32'	Scientific, 8 Man	Tent on Conc. Slab	5
280	16'x32'	Scientific, 8 Man	Tent on Conc. Slab	5
281	16'x32'	Scientific, 8 Man	Tent on Conc. Slab	5
282	16'x32'	Scientific, 8 Man	Tent on Conc. Slab	5
283	16'x32'	Scientific, 8 Man	Tent on Conc. Slab	5
284	16'x32'	Scientific, 8 Man	Tent on Conc. Slab	5
285	16'x32'	Scientific, 8 Man	Tent on Conc. Slab	5
286	6'x8'	Storage Shed	Plywood Panel	5
287	16'x32'	Quarters, 8 Man	Tent on Conc. Slab	6
288 - C	40'x40'	Volley Ball Court	Compacted Coral	6
289 - C	40'x60'	Volley Ball Court	Compacted Coral	6
290 - C	40'x60'	Volley Ball Court	Compacted Coral	7
291	17'x32'	Steel Shed	Wood & Canvas Roof	6
292	14'x23'	Welders Shed	Wood and Canvas, Dirt Floor	6
293 - C	6'x52'	Shuffle Board Court	Conc.	6
294 - C	6'x52'	Shuffle Board Court	Conc.	8
295 - C	6'x52'	Shuffle Board Court	Conc.	8
296 - C	6'x52'	Shuffle Board Court	Conc	11
297	16'x32'	Quarters, 8 Man	Tent on Conc. Slab	7

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BLDG. NO.	SIZE	USE	TYPE	
298	16'x32'	Quarters, 8 Man	Tent on Conc. Slab	7
299 - C	40'x101'7"	Steel Bldg.	Butler type, Aluminum	4
30[illegible] - C	24'x32'8½"	POL Pump House	Prefabricated Aluminum	2
301 - C	52'x105'6½"	Power & Distill. Plant	Prefab Alum. & Reinf. Concrete	4
301A - C	24'x24'8½"	Boiler House	Prefabricated Aluminum	4
301B		Shelter for additional dist. units	(Demolished)	
302 - C	24'x144'8½" 24'x42'8½"	Laundry	Prefabricated Aluminum	4
303 - C	24'x24'8½"	Boiler House	Prefabricated Aluminum	4
304		Diesel Storage	(Demolished)	
305		Diesel Storage	(Demolished)	
306	16'x32'	Storage	Tent on Conc. Slab	4
307		Gasoline Storage	(Demolished)	
308 - C	50'x100'8½"	Warehouse, Food	Prefabricated Aluminum	4
309 - C	24'x24'8½"	Materials Testing Lab	Prefabricated Aluminum	4
310 - C	40'x100'	Elec. Overhaul & Stor	Butler Building - Aluminum	4
311	24'x24'8½"	Control Building	Prefabricated Aluminum	4
312 - C	1000 Bbl	Fresh Water Storage	Tank, Redwood - [illegible], Vertical	4
313 - C	50'x100'8½"	Supply Div Off & Whse	Prefabricated Aluminum	4
314 - C	24'x80'8½"	Plumbing & Refrigeration	Prefabricated Aluminum	4
314A - C	24'x74'8½"	Sheet Metal Shop		4
315 - C	24'x60'8½"	Electrical Repair Shop	Prefabricated Aluminum	4
316 - C	24'x60'8½"	Refrigeration Shop	Prefabricated Aluminum	4
317 - C	24'x60'8½"	Carpenter Shop	Prefabricated Aluminum	4
318 - C	24'x32'8½"	Typewriter Repair Shop	Prefabricated Aluminum	4
319 - C			Conc. Slab	6
32[illegible] - C	40'x100'	Warehouse	Jumbo Quonset	6
32[illegible] - C	20'4"x43'0½"	Assigned to Heavy Equip. Rigging Loft	Structural Steel	
322 - C	24'x60'8½"	DUKW, Meter Repair	Prefabricated Aluminum	6
322A - C	10'x15'	Steam Cleaning Pad	Concrete & Wood	6
322B - C	11'x13'	Storage Shed	Plywood Panel, Corrugated Roof	6
322C -	7'x10'	Storage Shed	Plywood Panel	6
322D -	7'x8'	Storage Shed	Plywood Panel	6
323 - C	24'x96'8½" 24'x12'	Radsafe Building	Prefabricated Aluminum	8
323A - C	14'2"x14'4"	Protective Clothing Stor	Tent on Wood Floor (4 Man)	8
324 - C	6'x6'x8'	Radsafe Butment	Wooden Frame	8
325	24'x48'	Assigned to Marine Injector Shop	Prefabricated Aluminum	6
326		Fresh Water Storage	(Demolished)	
327	5'x9'	Flake Ice Machine	Conc. Slab	3
328	5'x9'	Flake Ice Machine	Conc. Slab	3
329	24'x60'8½" 10'8"x60'8½"	Laboratory	Prefabricated Aluminum	10
330	40'x80'6" 12'4"x19'8" 5'9"x8'8"	Laboratory	Steel & Aluminum	10
331	8'2"x8'2"	Shelter	Concrete, Underground	10
332	4'x4'	Guard Post at Personnel Pier	Wood	8
333	15'x18'9"	AC Bldg., GMR	Wood and Aluminum	10
334	10'x10'	Shelter	Concrete Underground	10
335-336	6'x6'	Guard Tower	Wood, 8' above ground	10
337		Calibration Station	BLAZED	
338	24'x56'	Assigned to Television Center	Prefabricated Aluminum	9
339 C	64'6"x100'6"	Power Plant	Steel and Aluminum	9
339A		Repair Shed	Wood & Corr. Metal	
339B		"Cat" Gen. Housing	Wood & Corr. Metal	
340A to D	4-20'x40'	Cylinder Shelters	Wood	10
340E to H	4-20'x40'	Cylinder Shelters	Wood	

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BLDG. NO.	SIZE	USE	TYPE	
341	21'x41'	Shop & Storage	Steel and Aluminum	10
	25'x10[illegible]'			
	13'x51'			
342	24'x60'8½"	Shop	Prefabricated Aluminum	10
342A - C	15'2"x25'8"	Dehumid. Section For Shop	Wood Frame - Plywood Siding	10
343 - C	9'x22'	K46B, Parry Is. Annex Radio Sta.	Old Field Kitchen	9
344	75'x80'6"	Laboratory	Steel Frame, Wood & Aluminum	
	22'x77'		Siding and Roof	10
345A & B	2-56'6"x80'6"	Cylinder Racks	Concrete	10
346		Golf Course		5
347A - C	17'6"x28'x16'6"	Salt Water Intake	Reinf. Concrete, Underground	10
347B - C	14'x14'	Pump Shelter	Wood Frame, Corr. Alum. Roof	10
348	14'x18'		Conc. Slab	8
349	30' High	Elevated Water Storage	Wood Tower	
	5000 Bbl		Steel Tank	10
350	12'8"x25'0"	Storage Bldg. (CMR)	Plywood Panel, Composition Roof	10
351	16'x25'	2000# Magazine (CMR)	Steel Frame, Buried	10
351A	50'x50'		Concrete Slab	10
352	16'x32'	Quarters, 8 Man	Tent on Concrete Slab	8
353	16'x32'	Quarters, 8 Man	Tent - Wood Floor	8
354	16'x32'	Quarters, 8 Man	Tent - Wood Floor	8
355	16'x32'	Quarters, 8 Man	Tent on Conc. Slab	8
356	16'x32'	Quarters, 8 Man	Tent on Conc. Slab	8
357	70'x100'	Decontamination Area	Fenced	8
358	56'x90'	Tennis Court		8
359	16'x32'		Conc. Slab	8
360 C	41'x54'	DUKW Repair Shelter	Canvas on Wood w/Concrete Slab	6
361				
362	8'x12'	Guard Shelter (CMR)	Wood, Aluminum Roof	8
363	20'x50'	Conc.	Conc. Slab	8
364	14'2"x14'4"	Scientific, 2 Man	Tent - Wood Floor	9
365	16'x32'		Conc. Slab	10
366	16'x32'	Quarters, 8 Man	Tent on Conc. Slab	10
367	16'x32'	Quarters, 8 Man	Tent on Conc. Slab	10
368 - C	1000 Bbl	Diesel Fuel Oil	Tank, Steel, Bolted, Vertical (T-1)	9
369 - C	1000 Bbl	Diesel Fuel Oil	Tank, Steel, Bolted, Vertical (T-2)	10
370 - C	1000 Bbl	Diesel Fuel Oil	Tank, Steel, Bolted, Vertical (T-3)	10
371-375		Diesel Storage	(Demolished)	
376-379 - C	4-10,000 Gal.	Gasoline Storage	Tank, Steel, Horizontal (Abandoned)	2
380 - C	1-10,000 Bbl	Diesel Storage	Tank, Steel, Vert. Welded	2
381 - C	1-10,000 Bbl	Diesel Storage	Tank, Steel, Vert. Welded	2
382 - C	1-10,000 Bbl	Diesel Storage	Tank, Steel, Vert. Welded	2
383 - C	1- 5,000 Bbl	Mogas Storage	Tank, Steel, Vert. Welded	2
384 - C	1- 5,000 Bbl	Mogas Storage	Tank, Steel, Vert. Welded	2
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BLDG. NO.	SIZE	USE	TYPE	
39[illegible]				
394	5'x5'	Water Pump Pad	Concrete	11
395	8'x30'	Rock Crusher	Str. Steel on Conc. Fdn	11
396	12'x16'	Power Shed	Wood, Corr. Metal Roof	11
397	15'x20'	Batch Hopper	Str. Steel on conc. piers	11
398	10'x10'	Water Tower	Navy Cube on Timber Tower	11
399 - C	20'x20'	Iron Workers Shed	Wooden Frame	4
400		Electrical Warehouse	Demolished	
401 - C	40'x100'	Paint Shop & Parts Warehouse	Jumbo Quonset	4
402		Tool Crib & Parts Whse	Demolished	
403		Heavy Equip. Parts Whse	Demolished	
404 - C	40'x100'	Heavy Equipment Repr. Shop	Jumbo Quonset	4
404A - C	30'x30'	Welding Shop	Wood, Corr. Alum. Roof	4
405 - C	40'x100'	Heavy Equip. Machine Shop	Jumbo Quonset	4
406 - C	24'x60'	Marine Operations	Prefabricated Aluminum	4
	4'x4'12'	Tower	Wood on Conc. Piers	2
407	14'2"x14'4"	Scientific, 4 Man	Tent on Conc. Slab	11
408 - C	4'x4'	Guard Shack	Wood	
409 - C	24'x44'8½"	Refreshment Bldg.	Prefabricated Aluminum	4
410 - C	24'x32'8½"	Salt Water Pump Sta.	Prefabricated Aluminum	4
411	44'x83'x34'9"	Assembly Building	Steel and Aluminum	11
412	25'6"x31'x18'[illegible]"	High Explosives Bldg	Steel and Aluminum	11
413	22'x22'x14'4"	Magazine	Concrete, Earth Covered	11
414	8'0"x12'0"	Guardhouse, Ass'y Area	Wood	11
41[illegible]	21'4"x25'4"x1[illegible]'6"	Magazine	Concrete, Earth Covered	11
41[illegible]	14'2"x14'4"	Scientific, 4 Man	Tent on Conc. Slab	11
417	14'2"x14'4"	Scientific, 4 Man	Tent on Conc. Slab	11
418	25'0"x29'0"x9'9½"	Shop & Laboratory	Plywood, Conc. Floor, Corr. Roof	5
418A	20'0"x40'0"x1[illegible]'9"		Wood Shelter	6
419	81'8"x136'8"	Barge Slip, "U" Shape Ass'y Area	Steel & Wooden Piling	11
420 - C	50'x60'	Marine Rigging Loft	[illegible] -Steel, Wood & Aluminum	6
421 - C	3200 Sq. Ft. 60'x40'	Heavy Equip. Repair	Concrete Slab	
422 - C	24'x40'	Oxygen Tabernacle	Wood w/Concrete Slab	1
423 - M	24'x40'	JTF Recreation	Prefabricated Aluminum	5
424 - C	40'x100'	Paint Shop	Butler Type - Aluminum	6
425 - C	40'x60'	Paint Storage	Butler Type - Aluminum	6
426 - C	80'x100'	Machine Shop	Butler Type - Aluminum	6
42 7 - C	50'x80'	Assigned to Carpenter Shop	Butler Type - Aluminum	6
42 8	24'x80'	Assigned to Saw Mill	Prefabricated Aluminum	6
429	12'x24'	Marine Welding Shop	Prefabricated Aluminum	6
430	50'x300'	Assigned to Vehicle, Tire & Welding Shop	Butler Type - Aluminum	6
431	14'2"x14'4"	Scientific, 4 Man	Tent on Conc. Slab	5
432	14'2"x14'4"	Scientific, 4 Man	Tent on Conc. Slab	5
433 - C	46' High	Flag Pole	Steel Pipe	5
434 - C	22' High	Flag Pole	Steel Pipe	5
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BLDG. NO.	SIZE	USE	TYPE
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BLDG. NO.	SIZE	USE	TYPE	
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501 - C	40'x180'	Warehouse, Electrical	Prefabricated Aluminum	4
502 - C	40'x180'	Warehouse, Plumbing	Prefabricated Aluminum	4
503 - C	40'x101'	Warehouse, Shipping	Prefabricated Aluminum	4
504 - C	40'x100'	Whse. Dry Stores	Prefabricated Aluminum	4
505-6 - C	80'x180'	Whse., Heavy Duty Parts	Prefabricated Aluminum	4
507-8 - C	80'x140'	Whse., Camp Supplies	Prefabricated Aluminum	4
509-10 - C	80'x100'	Whse., General Stores	Prefabricated Aluminum	4
511 - 512 - C	80'x100'	Warehouse, A.E.C.	Prefabricated Aluminum	4
512 - C			Prefabricated Aluminum	4
513	24'2"x60'1½"	New Distillation Plant	Prefabricated Steel	4
514	24'x40'	Assigned to Distillation Maintenance Shop	Prefabricated Steel	4
515 - C	50'2"x80'	Receiving & Classification Whse	Prefabricated Steel	4
51	40'x140'	Assigned to Bulk Storage Whse	Butler Bldg.	2
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BLDG. NO.	SIZE	USE	TYPE	
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551 - C	10'x12'	Latrine, Warehouse Area	Aluminum	4
552 - C	10'x12'	Latrine, Warehouse Area	Aluminum	4
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BLDG. NO.	SIZE	USE	TYPE	
606-627	16'x32'	Quarters, 8 Man	Tent on Conc. Slab	3
628-645	16'x32'	Quarters, 8 Man	Tent on Conc. Slab	4
646				
647-651	16'x32'	Quarters, 8 Man	Tent on Conc. Slab	4
652 - 671	16'x32'	Quarters, 8 Man	Tent on Conc. Slab	3
680 C	24'x20'8½"	Latrine, 100 Man	Prefabricated Aluminum	3
681 C	24'x20'8½"	Latrine, 100 Man	Prefabricated Aluminum	3
682 C	24'x20'8½"	Latrine, 100 Man	Prefabricated Aluminum	3
683 C	24'x20'8½"	Latrine, 100 Man	Prefabricated Aluminum	3
684 C	24'x20'8½"	Latrine, 100 Man	Prefabricated Aluminum	3

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$\frac{x_{000}}{43\,560} = 0.22956841 \times$ square inches

	0	1	2	3	4	5	6	7	8	9
		.2296	.4593	.6889	.9185	1.148	1.377	1.607	1.836	2.065
10	2.295	2.525	2.754	2.983	3.213	3.442	3.672	3.901	4.131	4.360
20	4.591	4.821	5.050	5.281	5.510	5.740	5.969	6.199	6.428	6.657
30	6.887	7.117	7.346	7.576	7.805	8.035	8.264	8.494	8.723	8.953
40	9.183	9.412	9.642	9.871	10.10	10.33	10.56	10.79	11.02	11.25
50	11.48	11.71	11.94	12.17	12.40	12.63	12.86	13.09	13.32	13.55
60	13.77	14.00	14.23	14.46	14.69	14.92	15.15	15.37	15.61	15.84
70	16.07	16.30	16.53	16.76	16.99	17.22	17.45	17.68	17.91	18.14
80	18.37	18.60	18.83	19.06	19.29	19.52	19.74	19.97	20.20	20.43
90	20.66	20.89	21.12	21.35	21.58	21.81	22.04	22.27	22.50	22.73
100	22.96	23.19	23.42	23.65	23.88	24.11	24.33	24.56	24.79	25.02
110	25.25	25.48	25.71	25.94	26.17	26.40	26.63	26.86	27.09	27.32
120	27.55	27.78	28.01	28.24	28.47	28.70	28.93	29.16	29.39	29.61
130	29.84	30.07	30.30	30.53	30.76	30.99	31.22	31.45	31.68	31.91
140	32.14	32.37	32.60	32.83	33.06	33.29	33.52	33.75	33.98	34.21
150	34.44	34.67	34.90	35.13	35.36	35.59	35.81	36.04	36.27	36.50
160	36.73	36.96	37.19	37.42	37.65	37.88	38.11	38.34	38.57	38.80
170	39.03	39.26	39.49	39.72	39.95	40.17	40.40	40.63	40.86	41.09
180	41.32	41.55	41.78	42.01	42.24	42.47	42.70	42.93	43.16	43.39
190	43.62	43.85	44.08	44.31	44.54	44.77	45.00	45.23	45.46	45.69
200	45.91	46.14	46.37	46.60	46.83	47.06	47.29	47.52	47.75	47.98
210	48.21	48.44	48.67	48.90	49.13	49.36	49.59	49.82	50.05	50.28
220	50.51	50.73	50.96	51.19	51.42	51.65	51.88	52.11	52.34	52.57
230	52.80	53.03	53.26	53.49	53.72	53.95	54.18	54.41	54.64	54.87
240	55.10	55.33	55.56	55.79	56.02	56.25	56.47	56.70	56.93	57.16
250	57.39	57.62	57.85	58.08	58.31	58.54	58.77	59.00	59.23	59.46
260	59.69	59.92	60.15	60.38	60.61	60.84	61.07	61.29	61.52	61.75
270	61.98	62.21	62.44	62.67	62.90	63.13	63.36	63.59	63.82	64.05
280	64.28	64.51	64.74	64.97	65.20	65.43	65.66	65.89	66.12	66.35
290	66.57	66.80	67.03	67.26	67.49	67.72	67.95	68.18	68.41	68.64
300	68.87	69.10	69.33	69.56	69.79	70.02	70.25	70.48	70.71	70.94
310	71.17	71.40	71.63	71.86	72.09	72.32	72.54	72.77	73.00	73.23
320	73.46	73.69	73.92	74.15	74.38	74.61	74.84	75.07	75.30	75.53
330	75.76	75.99	76.22	76.45	76.68	76.91	77.13	77.36	77.59	77.82
340	78.05	78.28	78.51	78.74	78.97	79.20	79.43	79.66	79.89	80.12
350	80.35	80.58	80.81	81.04	81.27	81.50	81.73	81.96	82.19	82.42
360	82.64	82.87	83.10	83.33	83.56	83.79	84.02	84.25	84.48	84.71
370	84.94	85.17	85.40	85.63	85.86	86.09	86.32	86.55	86.78	87.01
380	87.24	87.47	87.70	87.93	88.15	88.38	88.61	88.84	89.07	89.30
390	89.53	89.76	89.99	90.22	90.45	90.68	90.91	91.14	91.37	91.60
400	91.83	92.06	92.29	92.52	92.75	92.98	93.20	93.43	93.66	93.89
410	94.12	94.35	94.58	94.81	95.04	95.27	95.50	95.73	95.96	96.19
420	96.42	96.65	96.88	97.11	97.34	97.57	97.80	98.03	98.26	98.49
430	98.71	98.94	99.17	99.40	99.63	99.86	100.1	100.3	100.6	100.8
440	101.0	101.2	101.5	101.7	101.9	102.2	102.4	102.6	102.9	103.1
450	103.3	103.6	103.8	104.0	104.2	104.5	104.7	104.9	105.2	105.4
460	105.6	105.8	106.0	106.3	106.5	106.7	107.0	107.2	107.4	107.7
470	107.9	108.1	108.4	108.6	108.8	109.0	109.3	109.5	109.7	110.0
480	110.2	110.4	110.7	110.9	111.1	111.3	111.6	111.8	112.0	112.3
490	112.5	112.7	112.9	113.2	113.4	113.6	113.9	114.1	114.3	114.5
500	114.8	115.0	115.2	115.5	115.7	115.9	116.2	116.4	116.6	116.9

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VOLUME IN CUBIC YARDS PER CUBIC FOOT IN AREA GRADE OF 0.1 FOOT

Acres	0	.1	.2	.3	.4	.5	.6	.7	.8	.9
		16.14	32.27	48.40	[illegible]	80.67	96.80	112.9	129.1	145.2
1	161.3	177.4	193.6	209.7	[illegible]	242.0	258.1	274.3	290.4	306.5
2	322.7	338.8	[illegible]	371.1	[illegible]	403.3	419.4	435.6	451.7	467.9
3	484.0	500.1	516.3	532.4	[illegible]	564.7	580.8	596.9	613.1	629.2
4	645.3	661.5	[illegible]	693.7	[illegible]	726.0	742.1	758.3	774.4	790.5
5	806.7	822.8	838.9	855.1	[illegible]	887.4	903.5	919.7	935.8	951.9
6	968.0	984.1	[illegible]	1016	[illegible]	1049	1065	1081	1097	1113
7	1129	1145	[illegible]	1178	[illegible]	1210	1226	1242	1258	1275
8	1291	1307	[illegible]	1339	[illegible]	1371	1387	1403	1420	1436
9	1452	1468	[illegible]	1500	[illegible]	[illegible]	1549	1565	[illegible]	1597
10	1613	1629	[illegible]	1662	[illegible]	[illegible]	1710	1726	1742	1759
11	1775	1791	[illegible]	1823	[illegible]	[illegible]	1871	1886	[illegible]	1920
12	1936	1952	[illegible]	1984	[illegible]	[illegible]	[illegible]	[illegible]	2065	2081
13	2097	2113	[illegible]	2146	[illegible]	[illegible]	2194	[illegible]	2226	2243
14	2259	2275	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2403
15	2420	2436	2452	2468	[illegible]	[illegible]	2517	[illegible]	[illegible]	2565
16	2581	2597	[illegible]	2630	[illegible]	[illegible]	2678	[illegible]	[illegible]	2727
17	2743	2759	[illegible]	2791	[illegible]	[illegible]	2839	2856	2872	2888
18	2904	2920	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3017	3033	3049
19	3065	3081	[illegible]	3113	[illegible]	[illegible]	[illegible]	3178	3194	3211
20	3227	3243	3259	3275	[illegible]	[illegible]	3323	3340	3356	3372
21	3388	3404	3420	3436	[illegible]	[illegible]	3485	[illegible]	[illegible]	3533
22	3549	3565	3581	3598	[illegible]	[illegible]	[illegible]	3662	[illegible]	[illegible]
23	3711	3727	[illegible]	3759	[illegible]	[illegible]	3807	3824	3840	3856
24	3872	3888	3904	3920	[illegible]	[illegible]	3969	3985	4001	4017
25	4033	4049	4065	4082	[illegible]	[illegible]	4130	4146	4162	4178
26	4195	4211	4227	4243	[illegible]	[illegible]	4291	[illegible]	4324	4340
27	4356	4372	4388	4404	[illegible]	[illegible]	[illegible]	4469	4485	[illegible]
28	4517	4533	4550	4566	[illegible]	[illegible]	[illegible]	[illegible]	4646	[illegible]
29	4679	4695	[illegible]	4727	[illegible]	[illegible]	[illegible]	4792	4808	4825
[illegible]	4840	4856	[illegible]	4888	[illegible]	[illegible]	4937	4953	4969	[illegible]
31	5001	5017	[illegible]	5050	[illegible]	[illegible]	[illegible]	[illegible]	5113	5130
32	5163	5179	[illegible]	5211	[illegible]	[illegible]	[illegible]	[illegible]	5292	[illegible]
33	5324	5340	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
34	5485	5501	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
35	5647	5663	[illegible]	[illegible]	[illegible]	[illegible]	5788	5760	[illegible]	[illegible]
36	5808	5824	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	5969	5985	[illegible]	[illegible]	[illegible]	[illegible]	6066	[illegible]	[illegible]	[illegible]
38	6131	6147	[illegible]	[illegible]	[illegible]	[illegible]	6227	[illegible]	[illegible]	[illegible]
39	6292	6308	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
40	6452	6468	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
41	[illegible]	6631	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
42	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
43	[illegible]	[illegible]	[illegible]	[illegible]	7007	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
44	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
45	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
46	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
47	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
48	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
49	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
50	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

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[illegible]

[illegible] AND [illegible]

[illegible] OCTOBER 1953

[illegible]
[illegible] Deviation [illegible] from a straight line [illegible] to the earth.
[illegible] point of [illegible]

DISTANCE		CORRECTION	DISTANCE		CORRECTION
[illegible]	- [illegible]	[illegible]	[illegible]	- [illegible]349.03	.043
14[illegible]	- [illegible]	[illegible]	[illegible]	- [illegible]364.42	.044
[illegible]	- [illegible]	[illegible]	[illegible]	- [illegible]	.045
3[illegible].4[illegible]	- [illegible]	[illegible]	[illegible]	- [illegible]	.046
[illegible]	- 43[illegible]	[illegible]	[illegible]	- 14[illegible]	.047
4[illegible]	- 47[illegible]	[illegible]	14[illegible]	- 1424.44	.048
479.0[illegible]	- [illegible]	[illegible]	[illegible]424.44	- [illegible]39.06	.049
[illegible]1.47	- [illegible]	[illegible]	[illegible]	- 14[illegible].4[illegible]	.050
560.1[illegible]	- [illegible]	[illegible]	[illegible]	- [illegible]	.051
596.35	- [illegible].44	[illegible]	[illegible]	- [illegible].01	.052
630.44	- 662.78	[illegible]	[illegible]	- [illegible]96.05	.053
662.7[illegible]	- [illegible]	[illegible]	[illegible]	- 1509.95	.054
693.63	- [illegible]	[illegible]	1509.[illegible]	- [illegible]523.73	.055
[illegible]3.12	- [illegible]	[illegible]	[illegible]	- [illegible]37.44	.056
[illegible]1.52	- [illegible]	[illegible]	[illegible]	- [illegible]50.96	.057
[illegible].88	- 80[illegible]	[illegible]	[illegible]	- [illegible]64.42	[illegible]
[illegible]05.27	- [illegible]	[illegible]	[illegible]64.4[illegible]	- 1[illegible].74	.0[illegible]
830.[illegible]	- [illegible]	[illegible]	[illegible].74	- 15[illegible].93	.060
[illegible]5.66	- [illegible]	[illegible]	1590.93	- 1[illegible]3.9[illegible]	.061
[illegible].71	- [illegible]3.1[illegible]	[illegible]	16[illegible]3.9[illegible]	- 1[illegible]17.0[illegible]	.062
[illegible]3.19	- [illegible]	[illegible]	1[illegible]	- 1[illegible].87	.063
[illegible]	- [illegible]4[illegible]	[illegible]	1[illegible]	- 1[illegible]42.68	.064
[illegible]	- [illegible]	[illegible]	1[illegible]	- 1[illegible]5.29	.065
[illegible]	- [illegible]1.54	[illegible]	1[illegible]	- 1[illegible]7.90	.066
[illegible]1.54	-10[illegible].37	[illegible]4	[illegible]	- 1[illegible].3[illegible]	.0[illegible]
10[illegible].37	-10[illegible]	[illegible]	[illegible]	- [illegible]92.[illegible]	[illegible]
[illegible]3[illegible]	-1[illegible]	[illegible]	[illegible]	- 1[illegible]5.16	[illegible]69
10[illegible]2.[illegible]	-10[illegible]	[illegible]	[illegible]	- 1[illegible]17.38	.070
[illegible]	-1[illegible]	[illegible]	[illegible]	- 1[illegible].48	.071
[illegible]	-1[illegible]	[illegible]	[illegible]	- 1[illegible]	[illegible]
[illegible]	-1[illegible]	[illegible]	[illegible]	- 1[illegible].54	.073
[illegible]	-1[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	-1[illegible]3.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	-1[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	-1[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	-1[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	-1[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	-1[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	-1[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	-1[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	-1[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	-1[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible]

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DISTANCE			CORRECTION
[illegible]	-	1902.30	.086
1902.30	-	1913.23	.087
1913.23	-	1924.17	.088
1924.17	-	1935.03	.089
1935.03	-	1945.77	.090
1945.77	-	1956.51	.091
1956.51	-	1967.18	.092
1967.18	-	1977.79	.093
1977.79	-	1988.33	.094
1988.33	-	1998.81	.095
1998.81	-	2009.22	.096
2009.22	-	2019.63	.097
2019.63	-	2029.98	.098
2029.98	-	2040.27	.099
2040.27	-	2050.49	.100
2050.49	-	2060.64	.101
2060.64	-	2071.44	.102
2071.44	-	2080.88	.103
2080.88	-	2090.91	.104
2090.91	-	2100.87	.105
2100.87	-	2114.00	.106
2114.00	-	2120.66	.107
2120.66	-	2130.49	.108
2130.49	-	2140.33	.109
2140.33	-	2150.09	.110
2150.09	-	2159.79	.111
2159.79	-	2169.43	.112
2169.43	-	2179.07	.113
2179.07	-	2188.64	.114
2188.64	-	2198.21	.115
2198.21	-	2207.66	.116
2207.66	-	2217.10	.117
2217.10	-	2226.54	.118
2226.54	-	2235.92	.119
2235.92	-	2245.24	.120
2245.24	-	2254.55	.121
2254.55	-	2263.80	.122
2263.80	-	2273.05	.123
2273.05	-	2282.23	.124
2282.23	-	2291.35	.125
2291.35	-	2300.67	[illegible]
2300.67	-	2309.53	[illegible]
2309.53	-	2318.5[illegible]	[illegible]
2318.53	-	[illegible]	[illegible]
2327.57	-	[illegible]	[illegible]
2336.57	-	[illegible]	[illegible]
2345.48	-	[illegible]	[illegible]
[illegible]	-	[illegible]	[illegible]
[illegible]	-	[illegible]	[illegible]
[illegible]	-	[illegible]	[illegible]
[illegible]	-	[illegible]	[illegible]
[illegible]	-	[illegible]	[illegible]
[illegible]	-	[illegible]	[illegible]

DISTANCE			CORRECTION
[illegible]	-	2415.73	.139
[illegible]	-	2424.40	.140
2424.40	-	2433.00	.141
2433.00	-	2441.60	.142
2441.60	-	2450.14	.143
[illegible]	-	2458.68	.144
[illegible]	-	2467.22	.145
2467.22	-	2475.63	.146
2475.63	-	2484.10	.147
2484.10	-	2492.51	.148
2492.51	-	2500.85	.149
2500.85	-	2509.19	.150
2509.19	-	2517.54	.151
2517.54	-	2525.81	.152
2525.81	-	2534.10	.153
2534.10	-	2542.24	.154
2542.24	-	2550.59	.155
2550.59	-	2558.74	.156
2558.74	-	2566.96	.157
2566.96	-	2575.04	.158
2575.04	-	2583.90	.159
2583.90	-	2591.21	.160
2591.21	-	2599.29	.161
2599.29	-	2607.32	.162
2607.32	-	2615.34	.163
2615.34	-	2623.36	.164
2623.36	-	2631.47	.165
2631.47	-	2639.20	.166
2639.20	-	2647.16	.167
2647.16	-	2654.98	.168
2654.98	-	2662.88	.169
2662.88	-	2670.70	.170
2670.70	-	2678.53	.171
2678.53	-	2686.54	.172
2686.54	-	2694.12	.173
2694.12	-	2701.88	.174
[illegible]	-	2709.64	.175
[illegible]	-	2717.34	.176
[illegible]	-	2724.97	.177
[illegible]	-	2732.7[illegible]	[illegible]
[illegible]	-	274[illegible].3[illegible]	[illegible]
[illegible]	-	2747.[illegible]	[illegible]
[illegible]	-	2755.[illegible]	[illegible]
[illegible]	-	2763.13	[illegible]
[illegible]	-	2770.70	[illegible]
[illegible]	-	[illegible]	[illegible]
[illegible]	-	[illegible]	[illegible]
[illegible]	-	[illegible]	[illegible]
[illegible]	-	[illegible]	[illegible]
[illegible]	-	[illegible]	[illegible]
[illegible]	-	[illegible]	[illegible]
[illegible]	-	[illegible]	[illegible]
[illegible]	-	[illegible]	[illegible]

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DISTANCE			CORRECTION
[illegible]	-	2837.84	[illegible]
[illegible]	-	2845.21	[illegible]
[illegible]	-	2852.58	[illegible]
[illegible]	-	2859.95	[illegible]
[illegible]	-	2867.20	[illegible]
[illegible]	-	2874.44	[illegible]
2874.44	-	2881.75	.198
2881.75	-	2888.9[illegible]	[illegible]
2888.9[illegible]	-	2896.37	.200
2896.37	-	2903.42	.201
2903.42	-	2910.[illegible]	.202
2910.[illegible]	-	2917.[illegible]	[illegible]
2917.76	-	2924.[illegible]	[illegible]
2924.96	-	2932.[illegible]	[illegible]
2932.07	-	2939.19	[illegible]
2939.19	-	2946.30	.207
2946.30	-	2953.42	.208
2953.42	-	2960.47	.209
2960.47	-	2967.52	.210
2967.52	-	2974.63	.211
2974.63	-	2981.55	.212
2981.55	-	2988.60	.213
2988.60	-	2995.59	.214
2995.59	-	3002.75	.215
3002.75	-	3009.50	.216
3009.50	-	3016.48	.217
3016.48	-	3023.40	.218
3023.40	-	3030.32	[illegible]
3030.32	-	3037.24	[illegible]
3037.24	-	3044.10	[illegible]
3044.10	-	3050.56	[illegible]
3050.56	-	3057.81	[illegible]
3057.81	-	3064.60	.224
3064.60	-	3071.46	[illegible]
3071.46	-	3078.25	[illegible]
3078.25	-	3085.04	[illegible]
3085.04	-	3091.83	[illegible]
3091.83	-	3098.58	[illegible]
3098.58	-	3105.29	[illegible]
3105.29	-	3112.01	[illegible]
3112.01	-	3118.87	[illegible]
3118.87	-	3125.47	[illegible]
3125.47	-	3132.19	[illegible]
3132.19	-	3138.79	[illegible]
3138.79	-	3145.45	[illegible]
3145.45	-	3152.12	[illegible]
3152.12	-	3158.72	[illegible]
3158.72	-	3165.37	[illegible]
3165.37	-	3171.97	[illegible]
3171.97	-	3178.50	[illegible]
3178.50	-	3185.[illegible]	[illegible]

DISTANCE			CORRECTION
[illegible]	-	3191.63	.243
[illegible]	-	3198.23	.244
[illegible]	-	3204.89	.245
[illegible]	-	3211.23	.246
[illegible]	-	3217.77	.247
[illegible]	-	3224.30	.248
[illegible]	-	3230.77	.249
[illegible]	-	3237.23	.250
[illegible]	-	3243.70	.251
[illegible]	-	3250.17	.252
[illegible]	-	3256.51	.253
[illegible]	-	3263.98	.254
[illegible]	-	3269.38	.255
[illegible]	-	3275.92	.256
[illegible]	-	3282.12	.257
[illegible]	-	3288.53	.258
[illegible]	-	3294.86	.259
[illegible]	-	3301.20	.260
[illegible]	-	3307.54	.261
[illegible]	-	3313.88	.262
[illegible]	-	3320.22	.263
[illegible]	-	3326.49	.264
[illegible]	-	3332.77	.265
[illegible]	-	3339.62	.266
[illegible]	-	3345.31	.267
[illegible]	-	3351.52	.268
3351.52	-	3357.73	.269
3357.73	-	3364.01	.270
3364.01	-	3370.22	.271
[illegible]	-	3376.43	.272
3376.43	-	3382.57	.273
[illegible]	-	3388.78	.274
3388.78	-	3394.99	.275
[illegible]	-	3401.68	.276
[illegible]	-	3407.28	.277
[illegible]	-	3413.36	.278
[illegible]	-	3419.50	.279
[illegible]	-	3425.58	.280
[illegible]	-	3431.66	.281
[illegible]	-	3437.74	.282
[illegible]	-	3443.89	.283
[illegible]	-	3449.67	.284
[illegible]	-	3455.98	.285
[illegible]	-	3462.71	.286
[illegible]	-	3468.08	.287
[illegible]	-	3473.96	.288
[illegible]	-	3480.10	.289
[illegible]	-	3486.12	.290
[illegible]	-	3492.14	.291
[illegible]	-	3498.38	.292
[illegible]	-	3504.10	.293

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DISTANCE			CORRECTION
3504.10	-	3510.05	.294
3510.05	-	3516.00	.295
3516.00	-	3522.47	.296
3522.47	-	3527.91	.297
3527.91	-	3533.86	.298
3533.86	-	3539.68	.299
3539.68	-	3545.63	.300
3545.63	-	3550.93	.301
3550.93	-	3557.40	.302
3557.40	-	3563.22	.303
3563.22	-	3569.17	.304
3569.17	-	3574.99	.305
3574.99	-	3580.88	.306
3580.88	-	3586.70	.307
3586.70	-	3592.21	.308
3592.21	-	3598.34	.309
3598.34	-	3604.16	.310
3604.16	-	3609.92	.311
3609.92	-	3615.74	.312
3615.74	-	3622.08	.313
3622.08	-	3627.25	.314
3627.25	-	3633.01	.315
3633.01	-	3638.77	.316
3638.77	-	3644.52	.317
3644.52	-	3650.28	.318
3650.28	-	3655.97	.319
3655.97	-	3661.73	.320
3661.73	-	3667.42	.321
3667.42	-	3673.11	.322
3673.11	-	3678.80	.323
3678.80	-	3684.50	.324
3684.50	-	3690.18	.325
3690.18	-	3695.82	.326
3695.82	-	3701.51	.327
3701.51	-	3707.13	.328
3707.13	-	3712.76	.329
3712.76	-	3718.39	.330
3718.39	-	3724.02	.331
3724.02	-	3729.64	.332
3729.64	-	3735.21	.333
3735.21	-	3740.32	.334
3740.32	-	3746.39	.335
3746.39	-	3752.02	.336
3752.02	-	3757.58	.337
3757.58	-	3763.15	.338
3763.15	-	3768.64	.339
3768.64	-	3774.21	.340
3774.21	-	3779.77	.341
3779.77	-	3785.33	.342
3785.33	-	3790.83	.343
3790.83	-	3796.33	.344
3796.33	-	3801.83	.345

DISTANCE			CORRECTION
3801.83	-	3807.39	.346
3807.39	-	3812.56	.347
3812.56	-	3818.32	.348
3818.32	-	3823.82	.349
3823.82	-	3829.25	.350
3829.25	-	3834.75	.351

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At Lat	" Diff in Lat = Feet	' Diff in Long = Feet
11° 21'	80.80354	.48002
22'	80374	.47424
23'	80394	.46846
24'	80414	.46268
25'	80434	.45690
26'	80454	.45112
27'	80474	.44534
28'	80494	.43945
29'	80514	.43356
30'	80534	.42767
31'	80554	.42179
32'	80574	.41590
33'	80593	.41001
34'	80613	.40412
35'	80633	.39823
36'	80653	.39234
37'	80673	.38646
38'	80693	.38057
39'	80713	.37468
40'	[illegible]	.36879

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CORRECTION FACTORS FOR ALTITUDE [illegible]

Height (in ft.) × Dist. (in miles) × [illegible] = [illegible] (in miles) ÷ Height (in ft.) × 1.32

MILES

		0.1	0.2	0.3	0.4	[illegible]	0.6	0.7	0.8	0.9
0				0.1	0.2	[illegible]	0.2	0.3	0.4	0.5
1	[illegible]	[illegible]	[illegible]	1.0	[illegible]	[illegible]	1.5	1.7	1.9	2.1
2	2.3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	4.2	4.5	4.8
3	5.2	[illegible]	[illegible]	6.2	[illegible]	[illegible]	7.4	7.9	8.3	8.7
4	9.2	[illegible]	[illegible]	10.6	[illegible]	[illegible]	11.1	12.7	13.2	13.8
5	14.4	14.9	[illegible]	16.1	[illegible]	[illegible]	18.0	18.6	19.3	20.0
6	20.6	21.4	[illegible]	22.9	[illegible]	[illegible]	[illegible]	25.5	26.6	27.3
7	[illegible]	28.9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	34.0	34.9	35.8
8	36.7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	43.4	44.5	45.5
9	46.8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	54.0	55.1	56.3
10	57.4	58.5	[illegible]	60.9	[illegible]	[illegible]	65.5	65.7	66.9	68.2
11	69.4	70.7	[illegible]	[illegible]	[illegible]	[illegible]	75.2	76.6	79.9	81.3
12	82.6	84.0	[illegible]	86.5	[illegible]	[illegible]	[illegible]	[illegible]	94.0	95.5
13	97.0	98.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	107.7	109.3	110.9
14	112.5	114.1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	124.0	125.7	127.4
15	129.1	130.8	[illegible]	134.2	[illegible]	[illegible]	[illegible]	141.4	143.3	145.1
16	146.9	148.7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	160.0	162.0	163.9
17	165.8	167.8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	179.8	181.8	183.9
18	185.9	188.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	200.7	202.8	205.0
19	207.2	209.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	223.5	225.0	227.2
20	229.5	231.8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	245.9	248.3	250.7
21	253.1	255.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	272.7	275.2
22	277.7	280.3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	298.3	300.9
23	303.6	306.3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	325.0	327.8
24	330.5	333.3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	352.9	355.8
25	358.6	361.4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	382.0	384.9
26	387.9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	412.7	415.2
27	418.3	421.4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	443.8	446.7
28	449.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	478.[illegible]	479.3
29	482.6	485.9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	513.0
30	516.4	519.9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	540.8	544.4	547.9
31	551.4	554.9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	583.9
32	587.5	591.2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	621.1
33	624.9	628.7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	659.5
34	663.2	667.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	698.9
35	703.9	707.9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	739.6
		0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	.9

(0.5738333)

0.42

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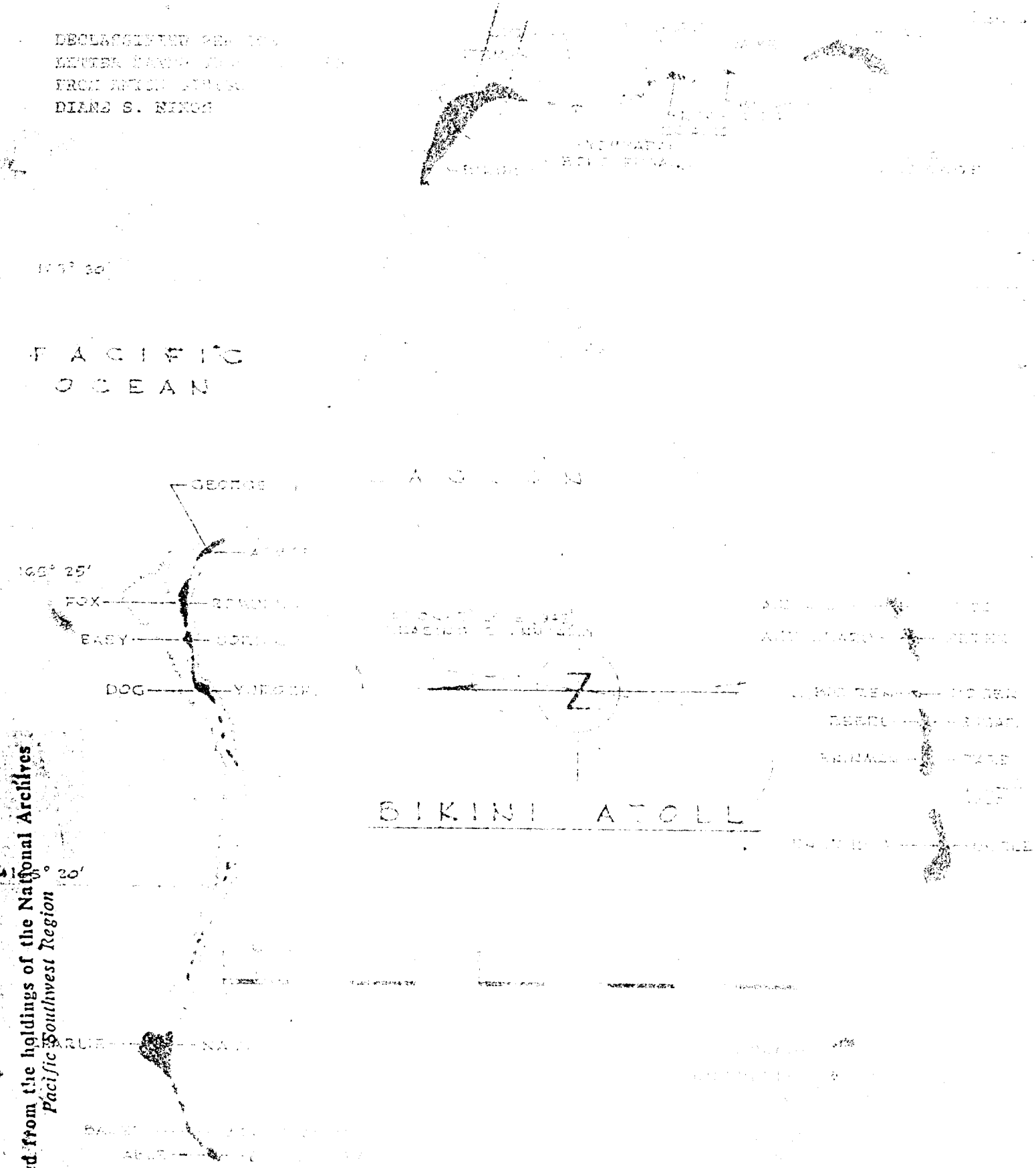

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BENCH MARKS

SITE	STATION	ELEV	FIELD BOOK	PAGE	DATE	DESCRIPTION	REMARKS
ABLE	Tria Sta Able	7.58	1026	18	10/24/53	H & N Disc in 3' Conc Cube	Continuation of Charlie Datum
	P.O.L. #2	7.02	1026	18	10/24/53	H & N Disc in 3' Conc Cube	Continuation of Charlie Datum
BAKER	None						
CHARLIE	Tria Sta Charlie	6.420	1036	13-15	11/ 5/53	H & N Disc in 3' Conc Cube	This Datum is known to be high by approximately 1.5 Feet.
	R.M. #1	3.440	1036	13-15	11/ 5/53	H & N Disc in 3' Conc Cube	Do
	R.M. #2	3.380	1036	13-15	11/ 5/53	H & N Disc in 3' Conc Cube	Do
	R.M. #3	[illegible].590	1036	13-15	11/ 5/53	H & N Disc in 3' Conc Cube	Do
[illegible]	[illegible]	[illegible]	1028	30	11/20/53	H & N Disc in 3' Conc Cube	Tide Observations
[illegible]	None						
[illegible]	Tria Sta [illegible]	[illegible].332	1028	5	9/ 2/53	H & N Disc in 3' Conc Cube	
	R.M. #1	[illegible].015	1028	5	9/ 2/53	H & N Disc in 1'x2½'x2½' Prismoid	
	R.M. #2	[illegible].705	1028	5	9/ 2/53	Do	
	R.M. #3	7.805	1028	5	9/ 2/53	Do	
	[illegible]	[illegible]	1028	[illegible]	9/ 4/53	H & N Disc in 3' Conc Cube	
[illegible]	[illegible]	[illegible].775	1055	[illegible]	[illegible]/ 6/54	Disc in Concrete	
[illegible]	Tria Sta No How	13.38	1039	29	12/ 7/53	H & N Disc in 3' Conc Cube	
	R.M. #1	12.70	1039	29	12/ 7/53	3"x3" Brass Plate in 15 Gal Drum	Filled with Concrete
	R.M. #2	14.29	1039	29	12/ 7/53	Do	
	R.M. #3	14.36	1039	29	12/ 7/53	Do	
	Tria Sta So How	8.98	1040	25	12/ 7/53	H & N Disc in 3' Conc Cube	
	R.M. #1	8.44	1040	25	12/ 7/53	3"x3" Brass Plate in 15 Gal Drum	Filled with Concrete
	R.M. #2	5.97	1040	25	12/ 7/53	Do	
	R.M. #3	8.47	1040	25	12/ 7/53	Do	
	Tria Sta Kans	10.77	1040	25	12/ 7/53	USN Disc in 10½" Square of Conc	400' NW of No How
	Tria Sta Line	9.94	1040	25	12/ 7/53	Center Punched Mach Bolt in Conc	
ITEM	None						
JIG	Tria Sta Jig	8.34	1039	12	11/ 5/53	H & N Disc in 3' Conc Cube	
KING	None						

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BENCH MARKS

			FIELD BOOK	PAGE	DATE	DESCRIPTION	REMARKS
LOVE	Tria Sta Love	11.73	1039	11	11/ 5/53	H & N Disc in 3' Conc Cube	
MIKE	Tria Sta Ebi	9.940	1039	10	11/ 5/53	3/4" Mach Bolt in Hex Conc Block	
	Tria Sta Mike	10.00	1039	11	11/ 5/53	H & N Disc in 3' Conc Cube	
NAN	Tria Sta Enyu (H&N Nan)	[illegible]	1010	23	6/17/53	H & N Disc Grouted into 9" Square Conc Pillar	
	Mon Nile	[illegible]	1010	23	6/17/53	H & N Disc in 3' Conc Cube	
	Mon Neon	[illegible]	1039	15	11/10/53	H & N Disc in 3' Conc Cube	
	Mon Nuget	[illegible]	1039	16	11/10/53	H & N Disc in 3' Conc Cube	
	[illegible]	[illegible]	Unknown			H & N Disc in 15" Square Conc Block	
	[illegible]	[illegible]	Unknown			Bronze Plug in Collar Set in 15" Square Conc Block	
[illegible]	Tria Sta Joe	[illegible]	1038	5	9/26/53	H & N Disc in 3' Conc Cube	
	R.M. #1	[illegible]	1038	5	9/26/53	H & N Disc in Conc Filled 50 Gal Barrel	
	R.M. #2	[illegible]	1038	5	9/26/53	H & N Disc on Conc Filled 15 Gal Barrel	
	Tria Sta [illegible]	[illegible]	1029	20	8/26/53	H & N Disc in 30" Dia Conc Block	
	Mon Onyx	[illegible]	[illegible]	14	8/22/53	H & N Disc in Conc Mon	
[illegible]	Mon [illegible]	[illegible]	[illegible]	[illegible]	[illegible]/53	H & N Disc in Conc Mon	
	Mon [illegible]	[illegible]	[illegible]	[illegible]	[illegible]/53	H & N Disc in [illegible] Conc [illegible]	
	Mon [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	H & N Disc in [illegible] Mon	
[illegible]	Mon [illegible]	[illegible]	[illegible]	[illegible]	8/22/53	H & N Disc in Conc Mon	
	Mon Roger	[illegible]	1029	13	8/22/53	H & N Disc in Conc Mon	
[illegible]	Mon Smith	[illegible]	1029	3	7/21/53	H & N Disc in Conc Mon	
	Tria Sta Salt	9.600	1036	6	10/21/53	H & N Disc in 3' Conc Cube	
	R.M. #1	7.757	1036	6	10/21/53	H & N Disc in Half Barrel of Conc	
	R.M. #2	7.135	1036	6	10/21/53	Do	
	R.M. #3	7.709	1036	6	10/21/53	Do	
	Station 2220 Bench Marks						
	B.M. #2	8.528	1046	15	10/29/53	All Baseline Bench Marks consist of 2" Dia Pipe driven to refusal with a 3"x3"x3/8" Piece of Iron with a $\frac{1}{2}$" Dia by $\frac{1}{4}$" High Brass knob on it, welded to the pipe.	
	B.M. #3	9.352	1046	15	10/29/53		
	B.M. #4	9.785	1046	15	10/29/53		
	B.M. #5	10.299	1046	15	10/29/53		
	B.M. #6	10.560	1046	15	10/29/53		
	B.M. #7	10.958	1046	15	10/29/53		

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BENCH MARKS

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
TARE	Station 2220 Bench Marks						
	B.M. #8	11.376	1046	15	10/29/53	All Baseline Bench Marks consist	
	B.M. #9	11.772	1046	15	10/29/53	of 2" Dia Pipe driven to refusal	
	B.M. #10	11.825	1046	15	10/29/53	with a 3"x3"x3/8" Piece of Iron	
	B.M. #11	10.782	1046	15	10/29/53	with a ½" Dia by ¼" High Brass	
	B.M. #12	12.345	1046	15	10/29/53	knob on it, welded to the pipe	
[illegible]	Tria Sta [illegible]	[illegible]	1036	17	11/11/53	H & N Disc in [illegible] Conc Cube	
	B.M. #1	[illegible]	1036	17	11/11/53	H & N Disc in Half Barrel of Concrete	
	B.M. #2	[illegible]	1036	17	11/11/53	Do	
	B.M. #3	[illegible]	1036	17	11/11/53	Do	
[illegible]	Tria Sta [illegible] (USN [illegible])	5.29	1036	17	11/11/53	USN Survey Disc in 12" Block of Concrete	
	B.M. #1	4.89	1036	17	11/11/53	H & N Disc in Concrete	
	B.M. #2	4.09	1036	17	11/11/53	H & N Disc in Conc filled Half Barrel	
	B.M. #3	5.28	1036	17	11/11/53	Do	
[illegible]	[illegible]						
[illegible]	Tria Sta [illegible]	[illegible]	1036	27	12/ 3/53	Bolt in 10" Square Conc Block	
	Tria Sta [illegible]	[illegible]	1036	27	12/ 3/53	H & N Disc in 3' Conc Cube	
	B.M. #1	[illegible]	1036	27	12/ 3/53	H & N Disc in Conc filled Half Barrel	
	B.M. #2	[illegible]	1036	27	12/ 3/53	Do	
[illegible]	Tria Sta Debra (USN Oruk)	[illegible]	1049	5	12/26/53	H & N Disc in Conc [illegible]	
	R.M. #1	6.90	1049	5	12/26/53	H & N Disc in Conc Filled Half Barrel	
	R.M. #2	6.26	1049	5	12/26/53	Do	
	R.M. #3	7.155	1049	5	12/26/53	Do	
ALFA	Tria Sta Alfa (USN Boku)	9.42	1049	8	12/28/53	USN Survey Disc in 10" Block of Concrete	
	R.M. #1	6.57	1049	8	12/28/53	H & N Disc in Conc Filled Half Barrel	
	R.M. #2	6.35	1049	8	12/28/53	Do	
	R.M. #3	6.67	1049	8	12/28/53	Do	
BRAVO	Tria Sta Bravo (USN Boro)	6.76	1036	30	12/ 9/53	USN Survey Disc in Conc Block	
	R.M. #1	5.14	1036	30	12/ 9/53	H & N Disc in Conc Filled Half Barrel	
	R.M. #2	4.13	1036	30	12/ 9/53	Do	
	R.M. #3	4.96	1036	30	12/ 9/53	Do	

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[illegible]

BIKINI ATOLL, MARSHALL ISLANDS

1952

This tabulation is [illegible] from Pacific Ocean, Northwest and Western Pacific Ocean, and Japan Sea, 1952, and part also by the U.S. Department of Commerce, Coast and Geodetic Survey.

Datum, the zero D.L., is defined by the chart addendum as follows: "Heights are reduced from the datum of soundings, the lowest tide phase of the lunarity cycle (i.e. that below mean low water springs)" for Bikini Atoll, Marshall Islands.

The reference meridian is Greenwich time, the meridian 180 degrees east. The following information appears in Table 2. Tidal differences and ranges:

	Lat.	Long.	Time	Range	Range
				Neaps	Springs
Bikini Atoll	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Large in the difference between neaps and springs, high, low, intermediate high and intermediate low are a high. Mean range is the average range of all tides in the year. Spring tides in the two [illegible] are largest ranges in the year. Springs occur each lunar month (approximately 14 days) when the moon is [illegible] and the lunar and solar [illegible].

The values in this addendum are based on average weather conditions. Unusual weather, particularly high winds from a direction other than [illegible] normal, affect both the times and the heights.

Each side of the chart has a [illegible] of tides and heights of highs and lows. This [illegible] is interpolated for all particular passages in the [illegible]. The water level on the [illegible] side is always [illegible] than that of the [illegible], the difference varying from [illegible] to [illegible].

[illegible]

[illegible]
[illegible]
[illegible]
[illegible]
[illegible]

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TIDES DAILY, MARCH 1957

WEDDELL SEA JANUARY 1957

HOUGH & WINDSS, INC., [illegible]

DAY	TIME	HEIGHT	DAY	TIME	HEIGHT	DAY	TIME	HEIGHT	DAY	TIME	HEIGHT
1	0403	H 4.4	9	[illegible]	[illegible]	17	[illegible]	H 5.3	25	----	------
Tu	0952	L 0.8	W	[illegible]	H 3.0	Th	[illegible]	L 0.1	F	0504	I 2.1
	1613	H 5.3		[illegible]	L 2.1		[illegible]	H 6.2		1315	H 3.9
	2240	L 0.5		[illegible]	H 3.7		[illegible]	L -0.3		1930	I 2.2
2	0435	H 4.5	10	[illegible]	L 1.6	18	[illegible]	H 4.2	26	0102	I 3.2
W	1027	L 0.7	Th	[illegible]	H 3.8	F	[illegible]	L 0.1	Sa	0629	I 2.1
	1643	H 5.6		[illegible]	L 2.3		[illegible]	H 6.1		1335	H 4.2
	2309	L 0.5		[illegible]	H 3.4		[illegible]	L 0.0		2033	L 1.8
3	0504	H 4.6	11	----	----	19	[illegible]	H 5.3	27	0211	H 3.5
Th	1056	L 0.7	F	[illegible]	L 1.2	Sa	[illegible]	L 0.0	Su	0753	I 1.8
	1718	H 5.6		[illegible]	H 4.6		[illegible]	H 5.8		1424	H 4.6
	2338	L 0.5		[illegible]	L 2.1		----	----		2100	I 1.4
4	0555	H 4.5	12	[illegible]	H 3.8	20	[illegible]	L 0.3	28	0351	H 3.2
F	1126	L 0.8	Sa	[illegible]	L 1.6	Su	[illegible]	H 5.0	M	0836	I 1.4
	1743	H 5.4		[illegible]	H 4.3		[illegible]	L 0.6		1500	H 5.0
	----	----		[illegible]	L 2.4		[illegible]	H 5.3		2130	I 1.0
5	0007	L 0.6	13	[illegible]	H 3.5	21	[illegible]	L 0.6	29	0524	H 4.2
Sa	0606	H 4.6	Su	[illegible]	L 1.4	M	[illegible]	H 4.7	Tu	0910	I 1.1
	1157	L 1.0		[illegible]	H 4.9		[illegible]	L 1.1		1521	H 5.3
	1810	H 5.2		[illegible]	L 1.3		[illegible]	H 4.8		2157	I 0.7
6	0056	L 0.8	14	[illegible]	H 4.1	22	[illegible]	L 1.1	30	0552	H 3.5
Su	0637	H 4.9	M	[illegible]	L 1.0	Tu	[illegible]	H 4.4	W	0946	I 0.9
	1239	L 1.2		[illegible]	H 4.4		[illegible]	L 1.6		1601	H 4.5
	1852	H 4.9		[illegible]	L 0.6		[illegible]	H 4.1		[illegible]	I 0.3
7	0100	L 1.0	15	[illegible]	H 4.5	23	[illegible]	L 1.5	31	0621	H 4.7
M	0718	H 4.8	Tu	[illegible]	L 0.7	W	[illegible]	H 4.0	Th	1035	I 0.7
	1304	L 1.6		[illegible]	H 4.3		[illegible]	L 2.0		1659	H 5.6
	1924	H 4.5		[illegible]	L 0.3		[illegible]	H 3.6		2350	I 0.4
8	0140	L 1.3	16	[illegible]	H 4.8	24	[illegible]	L 1.3			
Tu	0753	H 4.6	W	[illegible]	L 0.3	Th	[illegible]	H 3.8			
	1347	L 1.8		1010	H 4.1		1701	L 2.4			
	1950	H 4.1		[illegible]	L 0.0		[illegible]	H 3.2			

DAY	SUNRISE	SUNSET
9	0718	1835
16	0721	1843
23	0723	1856
30	0723	1907

[illegible], [illegible], [illegible]

Time Zone [illegible] for January 1997

[illegible] Daylight Time, [illegible] Corrections

DAY	TIME	HEIGHT	DAY	TIME	HEIGHT	DAY	TIME	HEIGHT	DAY	TIME	HEIGHT
1	0449	H 4.[illegible]	9	[illegible]	L 2.0	17	[illegible]	H 5.6	25	0211	H 3.4
F	1044	L 0.[illegible]	10	[illegible]	H 4.0	18	[illegible]	L 0.3	26	0742	L 2.1
	1657	H 5.[illegible]		[illegible]	L [illegible]		[illegible]	H 5.8		1409	H 4.4
	2316	L 0.[illegible]		[illegible]	H 5.[illegible]		----	----		2045	L 1.6
2	0516	H 5.0	10	----	----	18	[illegible]	L 0.2	26	0242	H 3.9
Sa	1113	L 0.[illegible]	11	0440	L 2.1	19	[illegible]	H 5.5	27	0859	L 1.7
	1723	H 5.[illegible]		1054	H 4.2		1046	L 0.4		1444	H 4.8
	2341	L 0.[illegible]		1900	L 1.8		1709	H 5.3		2110	L 1.2
3	----	----	11	0324	H 3.6	19	[illegible]	L 0.6	27	0310	H 4.3
Su	0543	H 5.0	12	0944	L 1.7	20	[illegible]	H 5.4	28	0907	L 1.3
	1141	L 0.7		1543	H 4.8		1355	L 0.5		1514	H 5.1
	1750	H 5.[illegible]		2024	L 1.[illegible]		1956	H 4.[illegible]		2135	L 1.9
4	0006	L 0.[illegible]	12	0235	H 4.3	20	0105	L 1.0	28	0235	H 4.7
M	0611	H 4.0	13	0854	L 2.[illegible]	21	0750	H 4.[illegible]	29	0932	L 1.0
	1210	L 0.[illegible]		1476	H 5.4		1551	L 1.5		1542	H 5.4
	1818	H 5.0		2108	L 0.7		2[illegible]9	H 4.[illegible]		2139	L [illegible].6
5	0032	L 0.[illegible]	13	0336	H 4.6	21	0[illegible]36	L 1.5			
Tu	0639	H 4.0	14	0950	L 0.7	22	[illegible]	H 4.4			
	1241	L 1.1		1600	H 5.[illegible]		1404	L 2.0			
	1844	H 4.7		2[illegible]4	L 0.[illegible]		2014	H 3.6			
6	0059	L 1.0	14	0444	H 4.[illegible]	22	0[illegible]5	L 2.0			
W	0712	H 4.[illegible]	15	0944	L 0.9	23	0[illegible]	H 3.9			
	1316	L 1.[illegible]		1[illegible]	H 6.1		1[illegible]	L 2.[illegible]			
	1916	H 4.7		2[illegible]	L 0.0		2[illegible]	H 3.0			
7	0131	L 1.[illegible]	15	0[illegible]	H 4.4	23	0[illegible]	L 2.7			
Th	0752	H 4.[illegible]	16	1[illegible]	L 0.6	24	1[illegible]	L 2.7			
	1404	L 1.[illegible]		1[illegible]	H 6.3		1[illegible]	L 3.4			
	1958	H 4.[illegible]		[illegible]	[illegible]		----	----			
8	0214	L 1.7	16	0[illegible]	H 5.6	24	0[illegible]	H 3.0			
F	0854	H 4.0	17	1[illegible]	L 0.0	25	0[illegible]	L 2.[illegible]			
	1523	L 1.[illegible]		1[illegible]	H 6.[illegible]		1[illegible]	H 4.0			
	2109	H 4.[illegible]		2[illegible]	L 0.[illegible]		2[illegible]	L 2.0			

DAY	HEIGHT	DAY	HEIGHT
5	0[illegible]	15	[illegible]
6	0[illegible]	16	[illegible]
7	0[illegible]	17	[illegible]

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[illegible]

[illegible]

[illegible]

DAY	TIME	HEIGHT	DAY	TIME	HEIGHT	DAY	TIME	HEIGHT	DAY	TIME	HEIGHT
1	0401	H 5.[illegible]	9	0036	L 1.7	17	0[illegible]	H 6.0	25	0[illegible]	H 5.1
F	1000	L 0.[illegible]	10	0[illegible]	H 4.4	Sa	[illegible]	L 0.0	M	0[illegible]	L 0.8
	1608	H 5.6		[illegible]	L 1.7		[illegible]	H 5.7		1[illegible]	H 5.9
	2[illegible]	L 0.4		[illegible]	H 5.6		[illegible]	L 0.1		1[illegible]	L [illegible].1
2	0428	H 5.[illegible]	10	0[illegible]	L 2.1	18	0[illegible]	H 6.0	26	0147	H [illegible].5
Sa	1027	L 0.4	Su	0[illegible]	H 4.1	M	[illegible]	L 0.2	Tu	0725	L [illegible].4
	1634	H 5.4		[illegible]	L 1.3		[illegible]	H 5.6		1[illegible]	H 4.2
	2247	L 0.4		[illegible]	H 5.2		[illegible]	L 0.1		2[illegible]	L 1.7
3	0451	H 5.4	11	[illegible]	[illegible]	19	0[illegible]	H 5.8	27	0218	H 4.0
Su	1054	L 0.4	M	0[illegible]	L 2.2	Tu	[illegible]	L 0.6	W	0[illegible]	L [illegible].6
	1700	H 5.5		[illegible]	H 4.3		[illegible]	H 5.2		1[illegible]	H [illegible].6
	2311	L 0.4		[illegible]	L 1.9		[illegible]	[illegible]		2[illegible]	L 1.4
4	0516	H 5.4	12	0[illegible]	L 2.7	20	0[illegible]	L 2.7	28	0[illegible]	H [illegible].5
M	1122	L 0.5	Tu	0[illegible]	L 1.9	W	0[illegible]	H 5.[illegible]	Th	0[illegible]	L [illegible].5
	1736	H 5.4		[illegible]	H 4.7		[illegible]	L 0.5		1[illegible]	H [illegible].9
	2339	L 0.5		[illegible]	L 1.6		[illegible]	H 4.7		2[illegible]	L [illegible].6
5	0542	H 5.4	13	0[illegible]	H 4.7	21	0[illegible]	L 1.7	29	0[illegible]	H 4.9
Tu	1150	L 0.7	W	1[illegible]	L 2.5	Th	0[illegible]	H 5.1	F	0[illegible]	L 1.1
	1752	H 5.1		[illegible]	L 0.5		[illegible]	L 0.4		1[illegible]	H 5.2
	2359	L 0.7		[illegible]	L 0.8		[illegible]	H 4.1		2[illegible]	L [illegible]
6	----	-----	14	0[illegible]	H 4.2	22	0[illegible]	L 1.6	30	0[illegible]	H 1.2
W	0610	H 5.3	Th	0[illegible]	L 0.7	F	0[illegible]	H 4.6	Su	0[illegible]	L [illegible]
	1221	L 0.9		[illegible]	H 6.7		[illegible]	L 0.9		1[illegible]	H [illegible]
	1820	H 4.8		[illegible]	L 0.3		[illegible]	H 5.4		2[illegible]	L [illegible]
7	0026	L 0.9	15	0[illegible]	H 4.4	23	0[illegible]	L 2.1	31	0[illegible]	H [illegible].5
Th	0642	H 5.2	F	[illegible]	L 0.5	Sa	[illegible]	H 4.8	Mo	0[illegible]	L 0.5
	1256	L 1.3		[illegible]	L 0.6		[illegible]	L 0.4		1[illegible]	H 5.5
	1852	H 4.4		[illegible]	L 0.3		[illegible]	H 5.[illegible]		2[illegible]	L 0.5
8	0056	L 1.3	16	0[illegible]	H 5.3	24	[illegible]	L 2.4			
F	0720	H 4.8	Sa	[illegible]	L 0.6	Su	0[illegible]	H 5.[illegible]			
	1341	L 1.7		[illegible]	H 6.1		[illegible]	L 0.3			
	1938	H 5.9		[illegible]	L 0.6		[illegible]	[illegible]			

DAY	SUNRISE	SUNSET
[illegible]	0[illegible]	1[illegible]
[illegible]	0[illegible]	1[illegible]
[illegible]	0[illegible]	1[illegible]

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[illegible] TIDAL TABLES

[illegible] FOR APRIL 1957

[illegible] HARBOR, [illegible] - [illegible]

DAY	TIME	HEIGHT	DAY	TIME	HEIGHT	DAY	TIME	HEIGHT	DAY	TIME	HEIGHT
1	0428	H 5.7	9	0555	H 5.4	17	[illegible]	H 6.0	25	0155	H [illegible]
M	1[illegible]	L 0.4	Tu	[illegible]	H 4.3	W	[illegible]	L 0.6	Th	0721	L [illegible]
	16[illegible]	H [illegible]		1[illegible]	L 1.8		[illegible]	H 4.0		[illegible]	H [illegible]
	2[illegible]	L 0.4		[illegible]	[illegible]		[illegible]	L 0.6		1[illegible]	L [illegible]
2	0[illegible]	H 4.8	10	0[illegible]	H 5.9	18	[illegible]	[illegible]	26	0[illegible]	H [illegible]
Tu	1[illegible]	L 0.4	F	0[illegible]	L [illegible]	Th	[illegible]	H 4.7	F	0[illegible]	L [illegible]
	17[illegible]	H [illegible]		[illegible]	H 4.6		[illegible]	L 1.0		[illegible]	H [illegible]
	[illegible]	L 0.7		[illegible]	[illegible]		[illegible]	H 4.5		[illegible]	L [illegible]
3	0[illegible]	H [illegible]	11	0[illegible]	H [illegible]	19	[illegible]	[illegible]	27	0[illegible]	H [illegible]
W	1[illegible]	L 0.6	Sa	0[illegible]	[illegible]	F	[illegible]	L [illegible]	We	0[illegible]	[illegible]
	17[illegible]	H [illegible]		[illegible]	H [illegible]		[illegible]	H [illegible]		[illegible]	H [illegible]
	[illegible]	L 0.7		[illegible]	[illegible]		[illegible]	[illegible]		[illegible]	[illegible]
4	0[illegible]	H [illegible]	12	[illegible]	H [illegible]	20	[illegible]	[illegible]	28	0[illegible]	H [illegible]
Th	[illegible]	L 0.[illegible]	Su	0[illegible]	L 0.[illegible]	Sa	[illegible]	H [illegible]	Th	0[illegible]	L [illegible]
	[illegible]	H [illegible]		[illegible]	H [illegible]		[illegible]	L [illegible]		[illegible]	H [illegible]
	----	----		[illegible]	L 0.6		[illegible]	H [illegible]		[illegible]	L [illegible]
5	0002	H [illegible]	13	0[illegible]	H [illegible]	21	[illegible]	[illegible]	29	[illegible]	H [illegible]
F	0[illegible]	H [illegible]	M	[illegible]	L [illegible]	Su	[illegible]	H [illegible]	F	[illegible]	L [illegible]
	12[illegible]	L [illegible]		[illegible]	H [illegible]		[illegible]	L [illegible]		[illegible]	H [illegible]
	[illegible]	H [illegible]		[illegible]	L [illegible]		[illegible]	H [illegible]		[illegible]	L [illegible]
6	[illegible]	H [illegible]	14	[illegible]	H [illegible]	22	[illegible]	L [illegible]	30	[illegible]	H [illegible]
Sa	07[illegible]	H [illegible]	Tu	[illegible]	L [illegible]	M	[illegible]	H [illegible]	Su	[illegible]	L [illegible]
	[illegible]	L [illegible]		[illegible]	H [illegible]		[illegible]	L [illegible]		[illegible]	H [illegible]
	[illegible]	H [illegible]		[illegible]	L [illegible]		[illegible]	H [illegible]		[illegible]	L [illegible]
7	[illegible]	L [illegible]	15	[illegible]	H [illegible]	23	[illegible]	[illegible]			
Su	07[illegible]	H [illegible]	W	[illegible]	L [illegible]	Tu	[illegible]	H [illegible]			
	[illegible]	L [illegible]		[illegible]	H [illegible]		[illegible]	L [illegible]			
	[illegible]	H [illegible]		[illegible]	L [illegible]		[illegible]	[illegible]			
8	[illegible]	L [illegible]	16	[illegible]	H [illegible]	24	[illegible]	H [illegible]			
M	[illegible]	H [illegible]	Th	[illegible]	L [illegible]	W	[illegible]	L [illegible]			
	[illegible]	L [illegible]		[illegible]	H [illegible]		[illegible]	H [illegible]			
	[illegible]	H [illegible]		[illegible]	L [illegible]		[illegible]	L [illegible]			

DAY	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]

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[illegible]

[illegible]

[illegible]

DAY	TIME	HEIGHT	DAY	TIME	HEIGHT	DAY	TIME	HEIGHT	DAY	TIME	HEIGHT
1	0428	H 6.4	9	0337	H 4.0	17	0346	H 5.7	25	0112	H 4.[illegible]
W	1048	L 0.4	Th	0614	L 0.0	F	[illegible]	L 1.0	Sa	0739	L [illegible]
	1645	H 1.[illegible]		1022	H 4.4		[illegible]	H 4.4		1316	H 4.[illegible]
	2211	L 0.7		1802	L 1.4		[illegible]	L 1.4		1928	L 1.4
2	0459	H 6.0	10	0100	H 4.6	18	0310	H 4.4	26	0143	H 4.[illegible]
Th	1123	L 0.6	F	0328	L 1.6	Su	[illegible]	L 1.5	Su	0810	L 1.4
	1719	H 4.[illegible]		1026	H 4.7		[illegible]	H 4.1		1402	H 4.4
	2314	L 0.6		1947	L 1.2		—	—		2016	L 1.[illegible]
3	0534	H 5.9	11	0450	H 5.4	19	0355	H 4.6	27	0228	H 5.[illegible]
F	1201	L 0.8	Sa	0834	L 1.2	Mo	0834	L 1.0	M	0839	L 1.[illegible]
	1756	H 4.[illegible]		1038	H 4.9		1035	H 4.[illegible]		1041	H 4.[illegible]
	2349	L 1.[illegible]		2022	L 0.9		2036	H 5.9		2041	L 1.[illegible]
4	----	----	12	0540	H 5.6	20	0448	H 4.0	28	0508	H 5.[illegible]
Sa	0612	H 5.6	Su	0859	L 0.8	T	0854	L 1.6	Tu	0925	L 0.[illegible]
	1244	L 1.[illegible]		1158	H 4.9		1102	H 4.2		1117	H 4.7
	1829	H 4.[illegible]		2100	L 0.7		2102	L 1.6		2110	L 0.[illegible]
5	0029	L 1.4	13	0554	H 5.9	21	0535	H 5.9	29	0025	H 5.[illegible]
Su	0657	H 5.[illegible]	M	0929	L 0.6	Tu	0935	L 1.2	W	1001	L 0.[illegible]
	1335	L 1.[illegible]		1236	H 5.0		1204	H 4.1		1256	H 4.[illegible]
	1921	H 4.[illegible]		2134	L 0.6		2135	H 5.6		2150	L 0.[illegible]
6	0119	L 1.[illegible]	14	0626	H 6.1	22	0606	H 5.6	30	0111	H 6.0
M	0735	H 4.[illegible]	Tu	1014	L 0.5	W	0142	H 5.9	Th	1038	L 0.[illegible]
	1442	L 1.[illegible]		1328	H 5.0		1245	L 0.1		1348	H 4.[illegible]
	2042	H 5.7		2202	L 0.6		2202	L 2.6		2207	L 0.7
7	0235	L 1.[illegible]	15	0658	H 6.1	23	0640	H 5.7	31	0140	H 6.1
Tu	0811	H 4.[illegible]	W	1058	L 0.6	Th	1000	H 5.8	F	1117	L 0.4
	1621	L 1.9		1407	H 4.9		1310	L 0.0		1417	H 4.[illegible]
	2232	H 5.7		2241	L 0.7		—	—		2238	L 0.[illegible]
8	0429	L 0.3	16	0702	H 6.0	24	0647	H 4.0			
W	1056	H 4.[illegible]	Th	1132	L 0.7	F	0034	L [illegible]			
	1746	L 1.8		1507	H 4.7		1334	H 5.0			
	----	----		2313	L 1.0		1957	L 1.6			

DAY	SUNRISE	SUNSET
1	0629	1909
11	0626	1913
21	0623	1916
31	0620	1919

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[illegible] AT ANZA, KAUAI, HAWAII

[illegible] 1957

[illegible] HOURS

DAY	TIME	HEIGHT	DAY	TIME	HEIGHT	DAY	TIME	HEIGHT	DAY	TIME	HEIGHT
1	0527	H 6.0	9	0[illegible]	H 4.9	17	0[illegible]	H 1.4	25	0[illegible]	H 5.[illegible]
Sa	1157	L 0.7	Su	0[illegible]	L 1.[illegible]	M	0[illegible]	L 2.2	Tu	0[illegible]	L 1.[illegible]
	1755	H 4.6		1[illegible]	H 4.8		1[illegible]	H 1.[illegible]		1[illegible]	H 4.[illegible]
	2345	L 1.0		1[illegible]	L 1.3		1[illegible]	H 4.[illegible]		2[illegible]	L 1.[illegible]
2	0600	H 5.6	10	0[illegible]	H 5.9	18	0[illegible]	L 1.[illegible]	26	0[illegible]	H 5.[illegible]
Su	1242	L 0.9	M	0[illegible]	L 1.1	Tu	0[illegible]	H 4.[illegible]	W	0[illegible]	L 1.[illegible]
	2037	H 4.[illegible]		1[illegible]	H 4.6		1[illegible]	H 1.4		1[illegible]	H 4.[illegible]
	----	----		1[illegible]	L 1.3		1[illegible]	L 4.0		2[illegible]	L 1.[illegible]
3	0029	L 1.[illegible]	11	0[illegible]	H 5.6	19	0[illegible]	L 2.0	27	0[illegible]	H 5.[illegible]
M	0654	H 5.4	Tu	0[illegible]	L 0.9	W	0[illegible]	H 4.[illegible]	Th	0[illegible]	L 0.[illegible]
	1337	L 1.1		1[illegible]	H 4.4		1[illegible]	L 1.7		1[illegible]	H 4.[illegible]
	2031	H 4.[illegible]		1[illegible]	L 0.9		2[illegible]	H 3.9		2[illegible]	L 0.[illegible]
4	0121	L 1.0	12	0[illegible]	H 5.8	20	0[illegible]	L 2.[illegible]	28	0[illegible]	H 6.[illegible]
Tu	0745	H 5.0	W	1[illegible]	L 0.8	Th	0[illegible]	H 4.[illegible]	F	1[illegible]	L 0.[illegible]
	1427	L 1.4		1[illegible]	H 4.6		1[illegible]	L 1.7		1[illegible]	H 4.[illegible]
	2034	H 4.[illegible]		2[illegible]	L 0.9		2[illegible]	H 3.[illegible]		2[illegible]	L 0.[illegible]
5	0227	L 1.[illegible]	13	0[illegible]	H 5.9	21	0[illegible]	L 2.5	29	0[illegible]	H 6.[illegible]
W	0853	H 4.6	Th	1[illegible]	L 0.7	F	0[illegible]	H 3.8	Sa	1[illegible]	L 0.[illegible]
	1535	L 1.6		1[illegible]	H 4.6		1[illegible]	L 2.0		2[illegible]	H 4.[illegible]
	2154	H 4.0		2[illegible]	L 0.9		2[illegible]	H 3.9		2[illegible]	L 0.[illegible]
6	0358	L 1.[illegible]	14	0[illegible]	H 5.8	22	0[illegible]	L 2.6	30	0[illegible]	H 6.[illegible]
Th	1011	H 4.[illegible]	F	1[illegible]	L 0.8	Sa	0[illegible]	H 3.7	Su	1[illegible]	L 0.[illegible]
	1658	L 1.7		1[illegible]	H 4.6		1[illegible]	L 1.9		1[illegible]	H 4.[illegible]
	2322	H 4.2		2[illegible]	L 1.0		[illegible]	[illegible]		2[illegible]	L 0.[illegible]
7	0539	L 1.1	15	0[illegible]	H 5.7	23	0[illegible]	H 4.[illegible]			
F	1140	H 4.3	Sa	1[illegible]	L 0.9	Su	0[illegible]	L 2.2			
	1757	L 1.4		1[illegible]	H 4.6		1[illegible]	H 3.7			
	----	----		2[illegible]	L 1.1		1[illegible]	L 1.[illegible]			
8	0726	H 4.1	16	0[illegible]	H 5.5	24	0[illegible]	H 4.5			
Sa	1259	L 1.8	Su	1[illegible]	L 1.0	M	0[illegible]	L 1.[illegible]			
	1[illegible]	H 4.[illegible]		1[illegible]	H 4.3		1[illegible]	H 3.[illegible]			
	1[illegible]	L 1.6		[illegible]	[illegible]		1[illegible]	L 1.6			

DAY	[illegible]	[illegible]
1[illegible]	0[illegible]	1[illegible]
1[illegible]	0[illegible]	1[illegible]
2[illegible]	0[illegible]	1[illegible]

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DAY	TIME	HEIGHT	DAY	TIME	HEIGHT	DAY	TIME	HEIGHT	DAY	TIME	HEIGHT
1	[illegible]	H [illegible]	9	[illegible]	H [illegible]	17	[illegible]	H [illegible]	25	[illegible]	H [illegible]
M	[illegible]	L [illegible]	10	[illegible]	L [illegible]	W	[illegible]	H [illegible]	Th	[illegible]	L [illegible]
	[illegible]	H [illegible]		[illegible]	H [illegible]		[illegible]	L [illegible]		[illegible]	H [illegible]
	----	----		[illegible]	L [illegible]		[illegible]	H [illegible]		[illegible]	L [illegible]
2	[illegible]	L [illegible]	10	[illegible]	H [illegible]	18	[illegible]	L [illegible]	26	[illegible]	H [illegible]
Tu	[illegible]	H [illegible]	11	[illegible]	L [illegible]	Th	[illegible]	H [illegible]	F	[illegible]	L [illegible]
	1311	L [illegible]		[illegible]	H [illegible]		[illegible]	L [illegible]		[illegible]	H [illegible]
	1915	H [illegible]		[illegible]	L [illegible]		[illegible]	H [illegible]		[illegible]	L [illegible]
3	[illegible]	L [illegible]	11	[illegible]	H [illegible]	19	[illegible]	L [illegible]	27	[illegible]	H [illegible]
W	[illegible]	H [illegible]	12	[illegible]	L [illegible]	F	[illegible]	H [illegible]	Sa	[illegible]	L [illegible]
	1357	L [illegible]		[illegible]	H [illegible]		[illegible]	L [illegible]		[illegible]	H [illegible]
	[illegible]	H [illegible]		[illegible]	L [illegible]		[illegible]	H [illegible]		[illegible]	L [illegible]
4	[illegible]	L [illegible]	12	[illegible]	H [illegible]	20	[illegible]	L [illegible]	28	[illegible]	H [illegible]
Th	[illegible]	H [illegible]	13	[illegible]	L [illegible]	Sa	[illegible]	H [illegible]	Su	[illegible]	L [illegible]
	[illegible]	L [illegible]		[illegible]	H [illegible]		[illegible]	L [illegible]		[illegible]	H [illegible]
	[illegible]	H [illegible]		[illegible]	L [illegible]		[illegible]	H [illegible]		[illegible]	L [illegible]
5	[illegible]	L [illegible]	13	[illegible]	H [illegible]	21	[illegible]	L [illegible]	29	[illegible]	H [illegible]
F	[illegible]	H [illegible]	14	[illegible]	L [illegible]	Su	[illegible]	H [illegible]	M	[illegible]	L [illegible]
	[illegible]	L [illegible]		[illegible]	H [illegible]		[illegible]	L [illegible]		[illegible]	H [illegible]
	[illegible]	H [illegible]		[illegible]	L [illegible]		[illegible]	H [illegible]		[illegible]	L [illegible]
6	[illegible]	L [illegible]	14	[illegible]	H [illegible]	22	[illegible]	L [illegible]	30	[illegible]	H [illegible]
Sa	[illegible]	H [illegible]	15	[illegible]	L [illegible]	M	[illegible]	H [illegible]	Tu	[illegible]	L [illegible]
	[illegible]	L [illegible]		[illegible]	H [illegible]		[illegible]	L [illegible]		[illegible]	H [illegible]
	[illegible]	H [illegible]		[illegible]	L [illegible]					----	----
7	[illegible]	L [illegible]	15	[illegible]	H [illegible]	23	[illegible]	L [illegible]	31	[illegible]	L [illegible]
Su	[illegible]	H [illegible]	16	[illegible]	L [illegible]	Tu	[illegible]	H [illegible]	W	[illegible]	H [illegible]
	[illegible]	L [illegible]		[illegible]	H [illegible]		[illegible]	H [illegible]		[illegible]	L [illegible]
	----	----		[illegible]	L [illegible]		[illegible]	L [illegible]		[illegible]	H [illegible]
8	[illegible]	H [illegible]	16	[illegible]	H [illegible]	24	[illegible]	H [illegible]			
M	[illegible]	L [illegible]	17	[illegible]	L [illegible]	W	[illegible]	L [illegible]			
	[illegible]	H [illegible]		[illegible]	H [illegible]		[illegible]	H [illegible]			
	[illegible]	L [illegible]		[illegible]	L [illegible]		[illegible]	L [illegible]			

DAY	SUNRISE	SUNSET
[illegible]	[illegible]	[illegible]
16	[illegible]	[illegible]
26	[illegible]	[illegible]

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[illegible]

[illegible]

[illegible]

DAY	TIME	HEIGHT	DAY	TIME	HEIGHT	DAY	TIME	HEIGHT	DAY	TIME	HEIGHT
1	0256	L 1.0	9	0116	H 5.3	17	[illegible]	H 4.6	25	0334	H 6.1
Th	0705	H 5.1	F	0552	L 1.0	Th	[illegible]	L 1.4	Su	0535	L 0.[illegible]
	1322	L 1.0		[illegible]	H 4.6		[illegible]	H 1.4		1157	H 5.5
	1935	H 4.8		2130	L 1.0		[illegible]	L 4.5		2200	L 0.[illegible]
2	0142	L 1.4	10	0215	H 5.6	18	0[illegible]	L 1.5	26	0419	H 6.[illegible]
F	0745	H 4.5	Sa	0608	L 0.7	Su	[illegible]	H 4.0	M	1060	L 0.[illegible]
	1404	L 2.4		1205	H 4.8		[illegible]	L 1.5		1652	H 5.[illegible]
	2[illegible]	H 4.[illegible]		2209	L 0.8		[illegible]	H 4.2		2250	L 0.1
3	0243	L 1.9	11	0412	H 5.7	19	0[illegible]	H 5.[illegible]	27	0550	H 6.[illegible]
Sa	0839	H 5.0	Su	0956	L 0.6	M	0[illegible]	H 4.5	Tu	1[illegible]	L 0.[illegible]
	1457	L 1.0		1554	H 5.0		[illegible]	L 1.[illegible]		1700	H 5.[illegible]
	2138	H 4.[illegible]		2330	L 0.[illegible]		2[illegible]	H 4.0		2347	L 1.[illegible]
4	0417	L 2.[illegible]	12	0042	H 5.7	20	0[illegible]	L 1.4	28	0[illegible]	H 6.[illegible]
Su	1001	H 5.4	M	1101	L 0.5	Tu	0[illegible]	H 5.5	W	1130	L 0.[illegible]
	1619	L 2.[illegible]		1758	H 5.[illegible]		[illegible]	L 1.[illegible]		1745	H 5.[illegible]
	2327	H 4.[illegible]		2401	L 0.7		[illegible]	H 4.[illegible]		2254	L 0.[illegible]
5	[illegible]	L 2.[illegible]	13	0510	H 5.6	21	0[illegible]	[illegible]	29	0[illegible]	H 5.[illegible]
M	1214	H 5.[illegible]	Tu	1126	L 0.7	W	1[illegible]	H 5.[illegible]	Th	1[illegible]	L 0.[illegible]
	1[illegible]	L 1.[illegible]		1[illegible]	H 4.[illegible]		[illegible]	L 2.0		1[illegible]	H 5.[illegible]
	----	----		2[illegible]	L 0.8		----	----		----	----
6	0[illegible]	H 4.[illegible]	14	0[illegible]	H 5.[illegible]	22	0[illegible]	H 4.7	30	0[illegible]	L 0.[illegible]
Tu	0753	L 2.0	W	1[illegible]	L 0.7	Th	0[illegible]	L 1.5	F	0[illegible]	H 5.[illegible]
	1342	H 5.[illegible]		1[illegible]	H 5.[illegible]		[illegible]	H 5.0		1[illegible]	L 1.[illegible]
	1[illegible]	L 2.0		2[illegible]	L 1.0		[illegible]	L 1.5		1[illegible]	H 5.[illegible]
7	0152	H 4.7	15	0[illegible]	H 4.[illegible]	23	0[illegible]	H 5.[illegible]	31	0[illegible]	L 1.[illegible]
W	0[illegible]	L 1.6	Th	0[illegible]	L 0.[illegible]	F	0[illegible]	L 1.0	Su	0[illegible]	H 4.[illegible]
	1431	L 3.[illegible]		1[illegible]	H 4.[illegible]		[illegible]	H 4.6		1[illegible]	L 1.[illegible]
	2[illegible]	L 1.6		[illegible]	[illegible]		[illegible]	L 1.0		1[illegible]	H 4.[illegible]
8	0241	H 5.0	16	0[illegible]	L 1.[illegible]	24	0[illegible]	H 5.7			
Th	0910	L 1.[illegible]	F	0[illegible]	H 4.[illegible]	Su	0[illegible]	L 0.7			
	1500	H 4.[illegible]		1[illegible]	L 1.[illegible]		[illegible]	H 5.[illegible]			
	2[illegible]	L 1.[illegible]		1[illegible]	H 4.7		[illegible]	L 0.[illegible]			

[illegible]	[illegible]	[illegible]
[illegible]	0[illegible]	1[illegible]
[illegible]	0[illegible]	1[illegible]
[illegible]	0[illegible]	1[illegible]

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[illegible] ARCH, MARSHALL ISLANDS

TIDE TABLE FOR [illegible] 1957

[illegible] & [illegible] DAILY [illegible] CORRECTIONS

DAY	TIME	HEIGHT	DAY	TIME	HEIGHT	DAY	TIME	HEIGHT	DAY	TIME	HEIGHT
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			
	[illegible]	[illegible]		[illegible]	[illegible]		[illegible]	[illegible]			
	[illegible]	[illegible]		[illegible]	[illegible]		[illegible]	[illegible]			

DAY	CORRECTION	DAY	CORRECTION
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[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]

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[illegible]

[illegible]

DAY	TIME	HEIGHT	DAY	TIME	HEIGHT	DAY	TIME	HEIGHT	DAY	TIME	HEIGHT
1	0257	L 2.3	9	0510	H 5.3	17	0[illegible]	L 2.3	25	0445	H 5.3
Tu	0836	H 3.2	W	0[illegible]	L 0.5	Th	1[illegible]	H 3.3	F	1044	L 0.4
	1412	L 2.5		1[illegible]	H 5.7		1[illegible]	L 2.4		1701	H 6.1
	2133	H 3.9		2[illegible]	L 0.6		2[illegible]	H 4.2		2303	L 0.4
2	0540	L 2.4	10	0[illegible]	H 5.5	18	0[illegible]	L 2.1	26	0519	H 5.0
W	1202	H 3.1	Th	1[illegible]	L 0.5	F	1[illegible]	H 3.3	Sa	1113	L 0.6
	1721	L 2.9		1[illegible]	H 5.8		1[illegible]	L 2.4		1735	H 5.8
	----	-----		2[illegible]	L 0.4					----	-----
3	0001	H 3.9	11	0[illegible]	L 0.2	19	0[illegible]	H 4.4	27	0[illegible]	L 0.7
Th	0711	L 2.1	F	1[illegible]	H 5.6	Sa	0[illegible]	L 2.4	Su	0[illegible]	H 4.6
	1327	H 3.6		1[illegible]	L 0.8		1[illegible]	H 4.2		1[illegible]	L 1.[illegible]
	1907	L 2.6		2[illegible]	H 6.2		1[illegible]	L 1.6		1810	H 5.4
4	0115	H 4.0	12	0[illegible]	H 5.6	20	0[illegible]	H 4.9	28	0[illegible]	L 1.2
F	0749	L 1.7	Sa	1[illegible]	L 0.8	Su	0[illegible]	L 1.0	M	0[illegible]	H 4.1
	1400	H 4.0		1[illegible]	H 5.6		1[illegible]	H 5.0		1219	L 1.5
	1952	L 2.0		2[illegible]	L 0.9		1[illegible]	L 1.0		1826	H 4.9
5	0155	H 4.5	13	0[illegible]	H 4.7	21	0[illegible]	H 5.2	29	0123	L 1.6
Sa	0817	L 1.4	Su	1[illegible]	L 1.0	M	0[illegible]	L 0.6	Tu	0711	H 5.7
	1426	H 4.5		1[illegible]	H 5.7		1[illegible]	H 5.5		1254	L 1.9
	2025	L 1.5		[illegible]	[illegible]		1[illegible]	L 0.[illegible]		19[illegible]	H 4.4
6	0227	H 4.8	14	0[illegible]	L 1.2	22	0[illegible]	H 5.6	30	0[illegible]	L 2.0
Su	0842	L 1.1	M	0[illegible]	H 4.1	Tu	0[illegible]	L 0.2	W	0[illegible]	H 5.3
	1451	H 4.9		1[illegible]	L 1.3		1[illegible]	H 5.9		1[illegible]	L 2.4
	2055	L 1.2		2[illegible]	H 5.1		2[illegible]	L 0.2		20[illegible]	H 4.0
7	0256	H 5.1	15	0[illegible]	L 1.6	23	0[illegible]	H 5.6	31	0[illegible]	L 2.3
M	0907	L 0.8	Tu	0[illegible]	H 3.9	W	0[illegible]	L 0.2	Th	1027	H 3.2
	1516	H 5.1		1[illegible]	L 1.2		1[illegible]	H 6.2		1514	L 2.7
	2123	L 0.9		1[illegible]	H 4.2		2[illegible]	L 0.3		2[illegible]	H 3.7
8	0323	H 5.4	16	0[illegible]	L 1.9	24	0[illegible]	H 5.4			
Tu	0921	L 0.6	W	0[illegible]	H 3.6	Th	1[illegible]	L 0.3			
	1541	H 5.3		1[illegible]	L 2.2		1[illegible]	H 6.2			
	2151	L 0.6		2[illegible]	H 4.3		1[illegible]	L 0.3			

DAY	[illegible]	[illegible]
1	0[illegible]	2[illegible]
15	0[illegible]	1[illegible]
29	0[illegible]	1[illegible]

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NORTH [illegible], [illegible] [illegible]

TIDE TABLE FOR NOVEMBER 1957

[illegible] & [illegible], INC., [illegible] [illegible]

DAY	TIME	HEIGHT	DAY	TIME	HEIGHT	DAY	TIME	HEIGHT	DAY	TIME	HEIGHT
1	0559	L [illegible]	9	0[illegible]	H 4.2	17	0[illegible]	L [illegible]	25	0[illegible]	H 4.4
F	1230	H 4.5	Sa	[illegible]	L 0.6	Su	[illegible]	H 4.2	M	[illegible]	L 0.9
	1815	[illegible]		[illegible]	H [illegible]		[illegible]	L [illegible]		1755	H 5.5
	----	----		[illegible]	L 0.5		[illegible]	[illegible]		----	----
2	[illegible]	H [illegible]	10	0[illegible]	H 4.7	18	[illegible]	H 4.[illegible]	26	0[illegible]	L 0.9
Sa	[illegible]	L [illegible]	Su	[illegible]	L 0.7	M	[illegible]	L [illegible]	Tu	0[illegible]	H 4.1
	1310	H [illegible]		[illegible]	H [illegible]		[illegible]	H 4.[illegible]		1[illegible]	L 1.[illegible]
	1919	L [illegible]		[illegible]	L 0.7		[illegible]	L [illegible]		[illegible]	H 5.[illegible]
3	0111	H 4.1	11	0[illegible]	H 4.[illegible]	19	[illegible]	L [illegible]	27	0[illegible]	L 1.3
Su	0733	L 1.5	M	[illegible]	L 0.[illegible]	Tu	[illegible]	L [illegible]	W	0[illegible]	H 5.8
	1351	H 4.4		[illegible]	H 5.7		[illegible]	H [illegible]		[illegible]	L 1.7
	1950	L 1.7		[illegible]	[illegible]		[illegible]	L [illegible]		[illegible]	H 4.[illegible]
4	0151	H 4.4	12	[illegible]	L 0.[illegible]	20	[illegible]	H 4.[illegible]	28	0[illegible]	L 1.[illegible]
M	0803	L 1.[illegible]	Tu	[illegible]	H 4.[illegible]	W	[illegible]	L [illegible]	Th	0[illegible]	H 5.[illegible]
	1420	H 4.8		[illegible]	L 1.[illegible]		[illegible]	H [illegible]		[illegible]	L 2.1
	2041	L 1.5		[illegible]	H 5.[illegible]		[illegible]	L [illegible]		[illegible]	H 4.[illegible]
5	0225	H 4.6	13	[illegible]	L 1.[illegible]	21	[illegible]	H 5.0	29	0[illegible]	L 1.[illegible]
Tu	0831	L 1.0	W	[illegible]	H 4.[illegible]	Th	[illegible]	L 0.[illegible]	F	[illegible]	H 5.4
	1447	H 5.[illegible]		[illegible]	L 1.5		[illegible]	H 5.0		1[illegible]	L 1.4
	2101	L 1.0		[illegible]	H 4.8		[illegible]	L 0.[illegible]		[illegible]	H 5.[illegible]
6	0256	H 4.8	14	[illegible]	L 1.5	22	[illegible]	H 5.0	30	0[illegible]	L 1.0
W	0859	L 0.8	Th	[illegible]	H 4.7	F	[illegible]	L 0.4	Su	1[illegible]	H 5.4
	1515	H 5.5		[illegible]	L 1.0		[illegible]	H 5.[illegible]		1[illegible]	L 1.[illegible]
	2131	L 0.7		[illegible]	H 4.[illegible]		[illegible]	L 0.[illegible]		[illegible]	H 5.6
7	0326	H 4.9	15	[illegible]	L 1.[illegible]	23	[illegible]	H 4.9			
Th	0926	L 0.6	F	[illegible]	H 5.[illegible]	Su	[illegible]	L 0.[illegible]			
	1543	H 5.7		[illegible]	L [illegible]		[illegible]	H 5.7			
	2201	L 0.6		[illegible]	H 4.[illegible]		[illegible]	L 0.4			
8	0356	H 4.9	16	[illegible]	L 1.7	24	[illegible]	H 4.7			
F	0955	L 0.6	Sa	[illegible]	H 3.8	M	[illegible]	L 0.7			
	1610	H 5.8		[illegible]	L [illegible]		[illegible]	H 5.8			
	2233	L 0.6		[illegible]	H 4.[illegible]		[illegible]	L 0.6			

DAY	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]

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PORT [illegible], LANGLEY ISLAND

[illegible] FEBRUARY 1997

[illegible] & [illegible], [illegible] DATUM [illegible]

DAY	TIME	HEIGHT	DAY	TIME	HEIGHT	DAY	TIME	HEIGHT	DAY	TIME	HEIGHT
1	1528	L 0.6	9	0[illegible]	H 4.7	17	0[illegible]	H 5.9	25	0[illegible]	L 0.7
Su	1[illegible]	L [illegible]	M	1[illegible]	L 0.6	Tu	0[illegible]	L [illegible]	W	0[illegible]	H 4.4
	1[illegible]	H 4.4		1[illegible]	H 5.9		1[illegible]	H 4.6		1[illegible]	L 1.0
				2[illegible]	L 0.7		1[illegible]	L [illegible]		1[illegible]	H 5.2
2	[illegible]	H 4.6	10	0[illegible]	H 4.6	18	0[illegible]	H 4.9	26	0[illegible]	L 0.8
M	[illegible]	L [illegible]	Tu	1[illegible]	L 0.7	W	0[illegible]	L [illegible]	Th	0[illegible]	H 4.9
	1[illegible]	H 4.4		1[illegible]	H 5.7		1[illegible]	H [illegible]		1[illegible]	L 1.5
	1[illegible]	L 0.0					2[illegible]	L [illegible]		1[illegible]	H 4.9
3	[illegible]	H [illegible]	11	0[illegible]	L 0.0	19	0[illegible]	H 4.2	27	0[illegible]	L 1.1
Tu	[illegible]	L [illegible]	W	0[illegible]	H 4.4	Th	0[illegible]	L 0.9	F	0[illegible]	H 4.6
	1[illegible]	H 4.9		1[illegible]	L 0.2		1[illegible]	H 4.4		1[illegible]	L 1.4
	2[illegible]	L [illegible]		1[illegible]	H 5.4		2[illegible]	L 0.7		1[illegible]	H 4.5
4	0152	H 4.0	12	0[illegible]	L 0.8	20	0[illegible]	H 4.4	28	0[illegible]	L 1.4
W	[illegible]	L [illegible]	Th	0[illegible]	H 4.2	F	0[illegible]	L 0.7	Sa	0[illegible]	H 3.[illegible]
	1[illegible]	H 4.9		1[illegible]	L 1.[illegible]		1[illegible]	H 5.[illegible]		1[illegible]	L 1.[illegible]
	2042	L [illegible]		1[illegible]	H 5.0		2[illegible]	L 0.7		1[illegible]	H 4.0
5	0232	H 4.[illegible]	13	0[illegible]	L 1.1	21	0[illegible]	H 4.6	29	0[illegible]	L 1.7
Th	[illegible]	L [illegible]	F	0[illegible]	H 4.0	Sa	0[illegible]	L 0.6	Su	0[illegible]	H 3.[illegible]
	1452	H 5.3		1[illegible]	L 1.5		1[illegible]	L [illegible]		1[illegible]	L 2.3
	2114	L 0.9		2[illegible]	L 0.6		2[illegible]	L 0.4		1[illegible]	H 3.6
6	0307	H 4.4	14	0[illegible]	L 1.4	22	0[illegible]	L 0.6	30	0[illegible]	L 1.9
F	0935	L 0.5	Sa	0[illegible]	H 4.[illegible]	Su	1[illegible]	L 0.6	M	1019	H 3.6
	1524	H 5.6		1[illegible]	L 1.9		1[illegible]	H 5.8		1[illegible]	L 2.1
	2150	L 0.4		2[illegible]	H 4.3		2[illegible]	L 0.4		2[illegible]	H 3.4
7	0345	H 4.6	15	0[illegible]	L 1.6	23	0[illegible]	H 4.6	31	0456	L 2.0
Sa	0936	L 0.6	Su	1[illegible]	H 3.9	M	1[illegible]	L 0.6	Tu	1156	H 3.8
	1557	H 5.8		1[illegible]	L 1.6		2[illegible]	L 1.7		1[illegible]	L 2.3
	2222	L 0.4		2[illegible]	H 4.9		2[illegible]	L 0.5			
8	0417	H 4.7	16	0[illegible]	L 1.6	24	0[illegible]	H 4.5			
Su	1010	L 0.5	M	1[illegible]	H 4.2	Tu	1[illegible]	L 0.7			
	1621	H 5.9		1[illegible]	L 1.8		2[illegible]	H 5.5			
	2259	L 0.4									

DAY	SUNRISE	SUNSET
2	0[illegible]	1[illegible]
12	0[illegible]	1[illegible]
22	0[illegible]	1[illegible]

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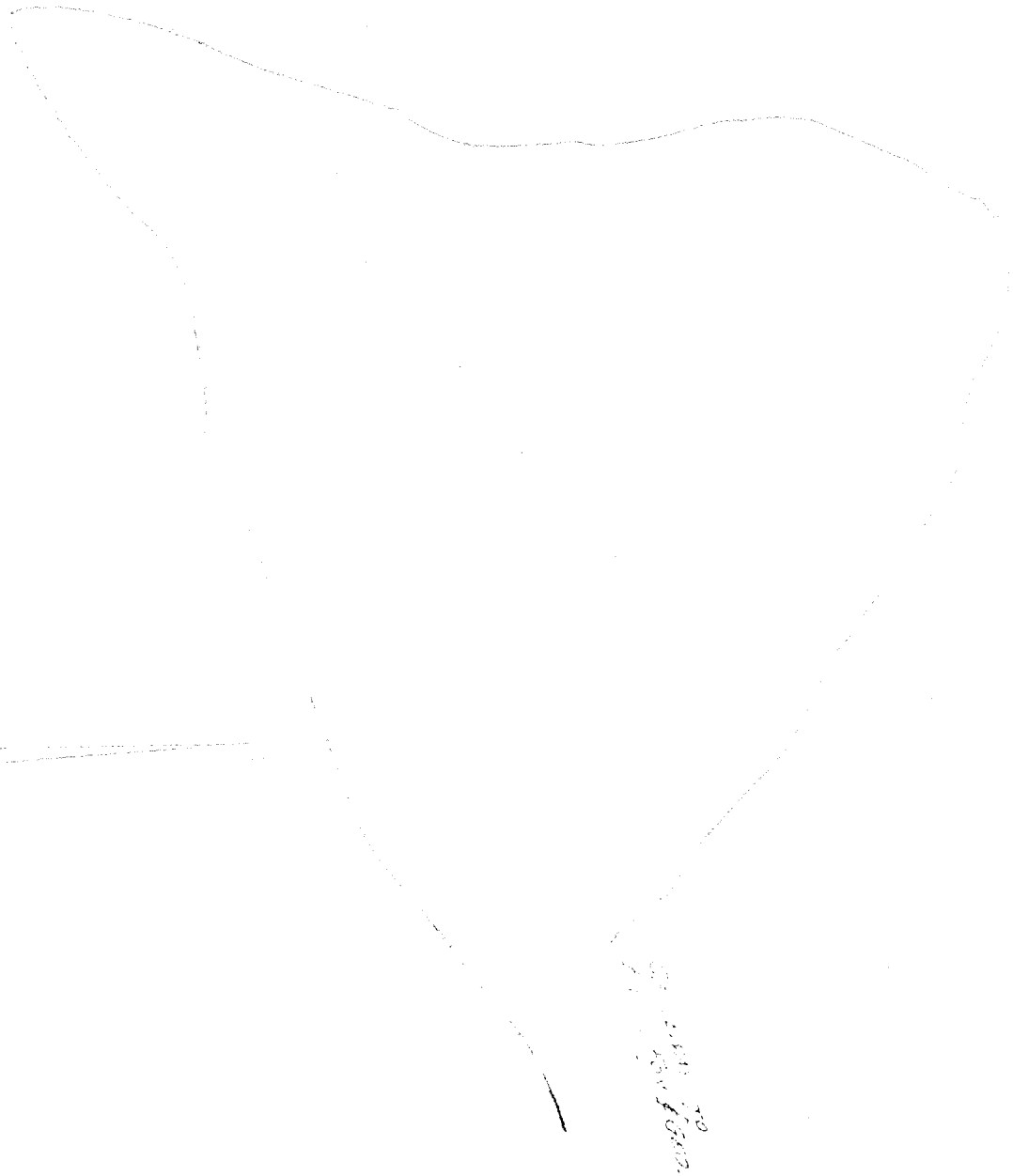

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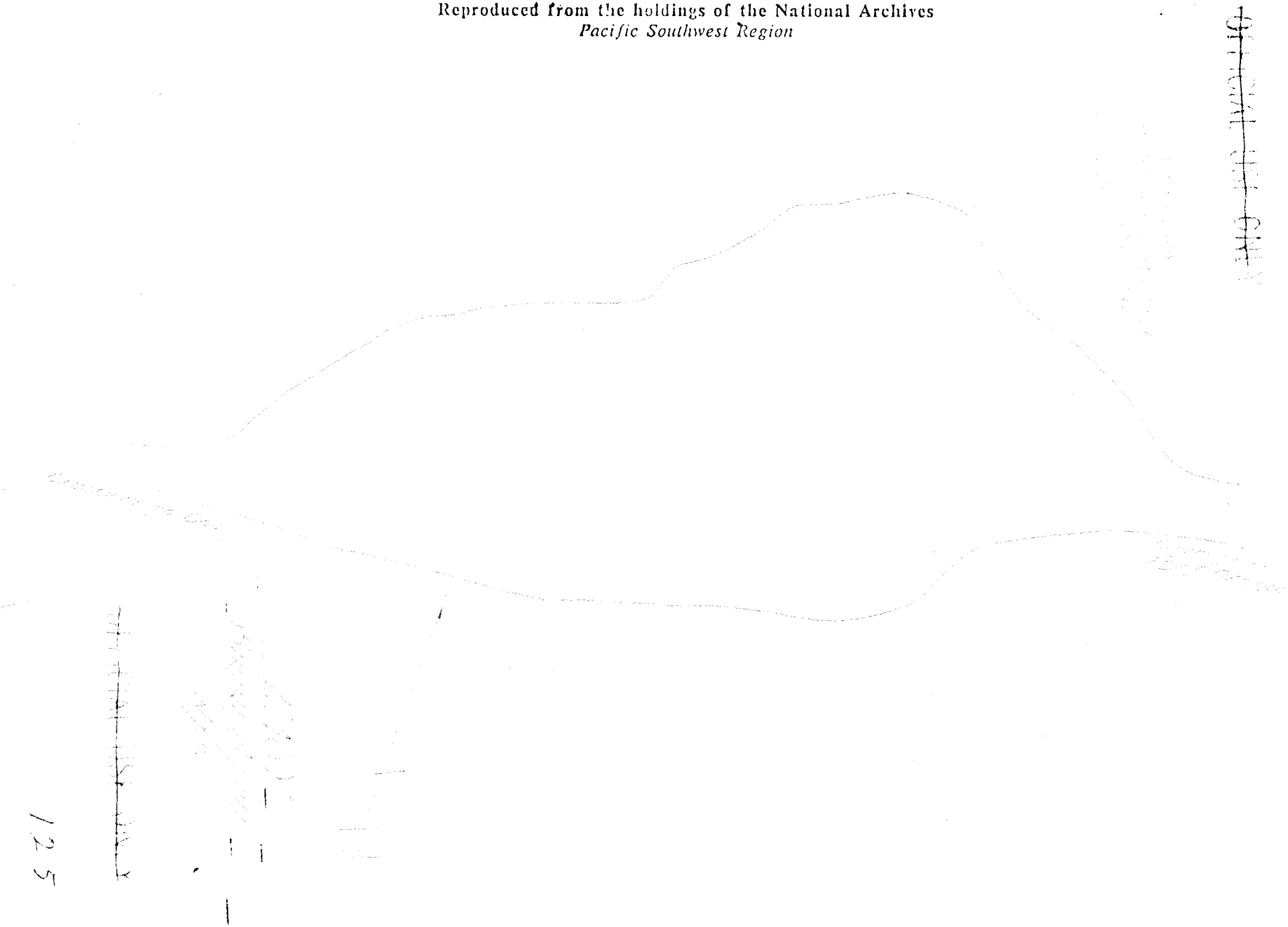

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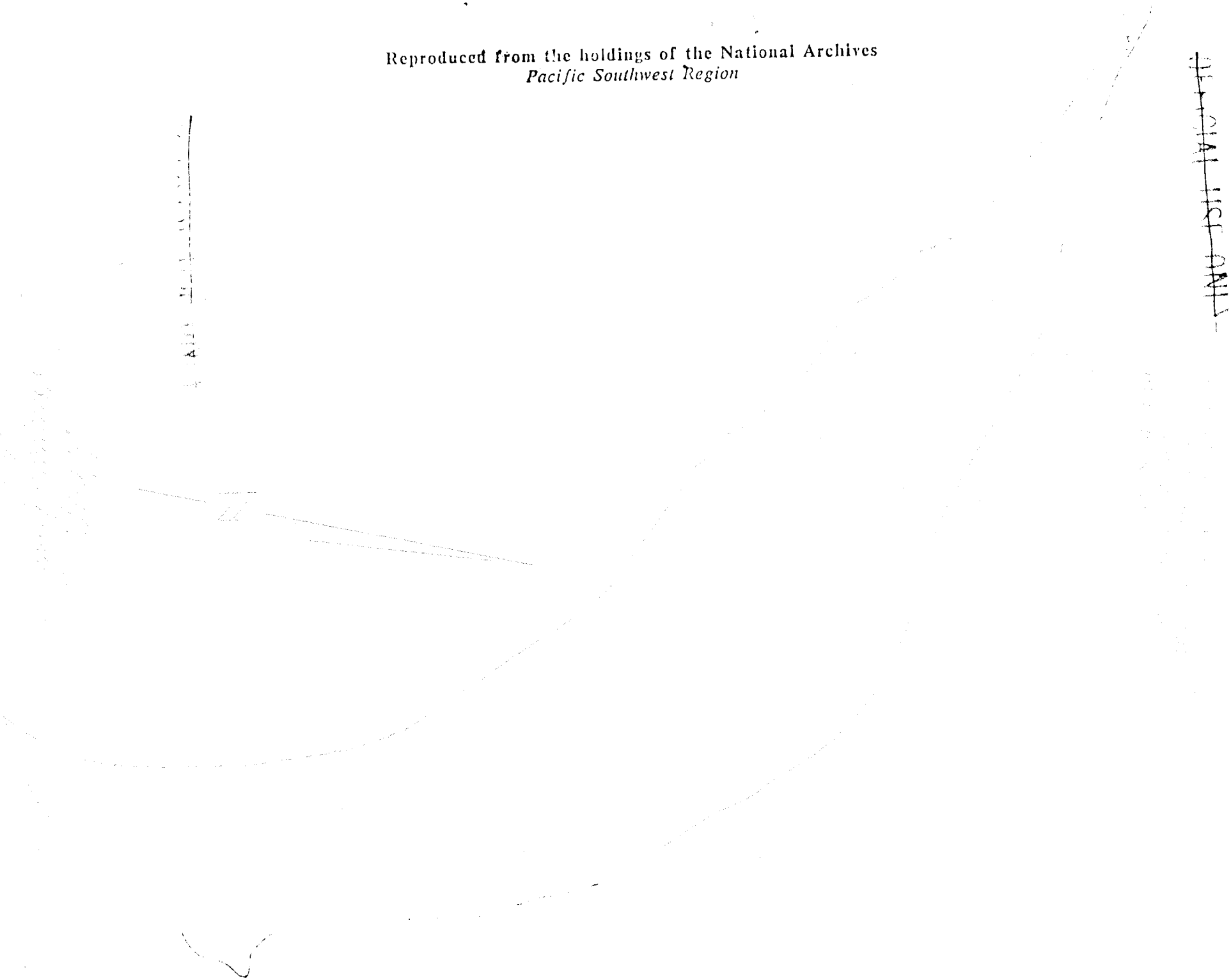

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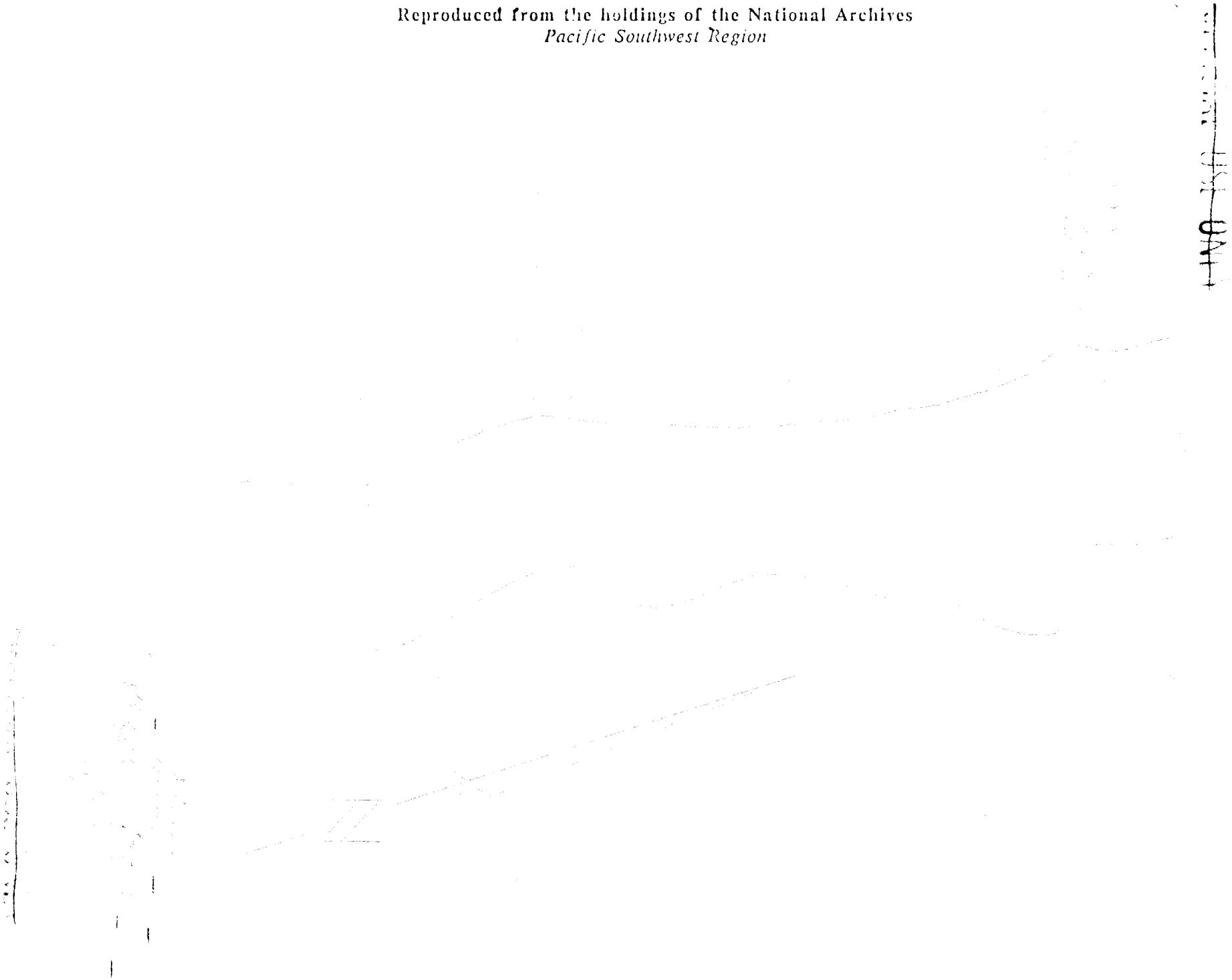

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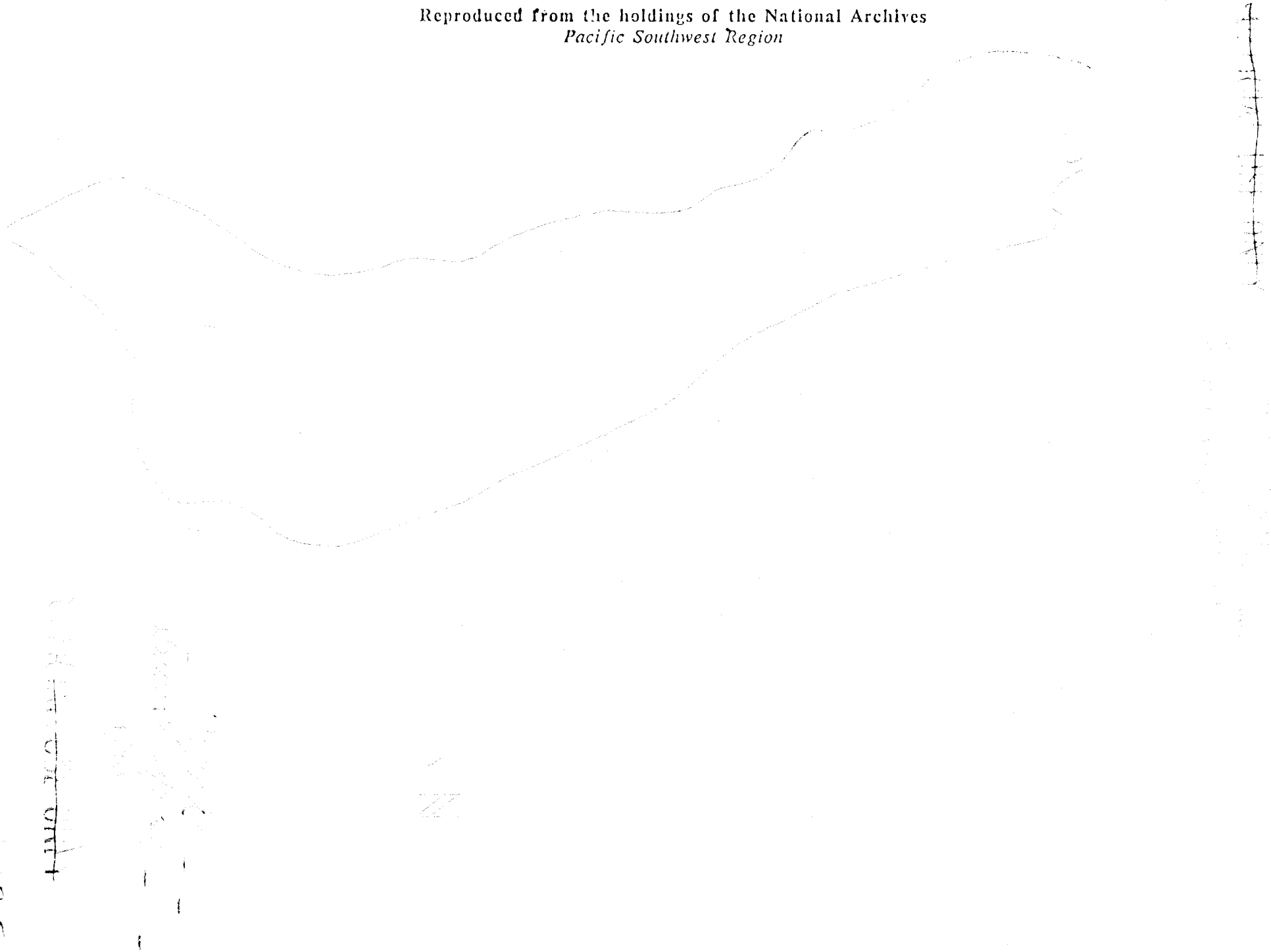

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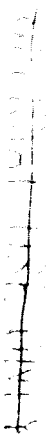

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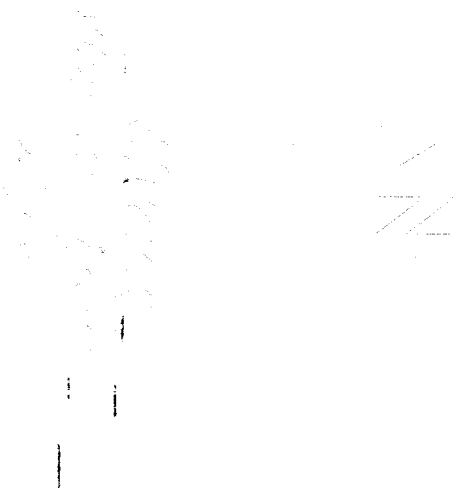

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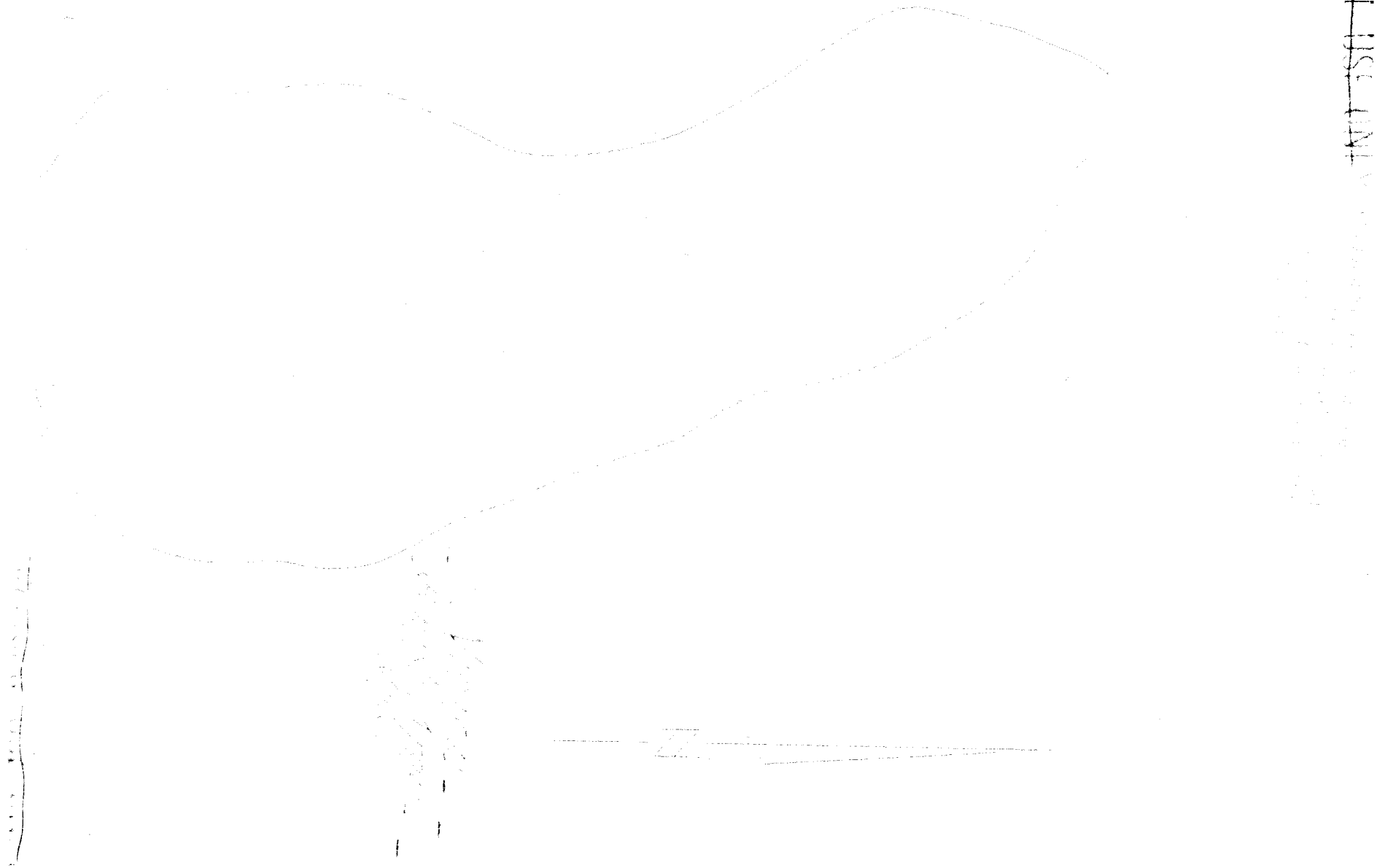

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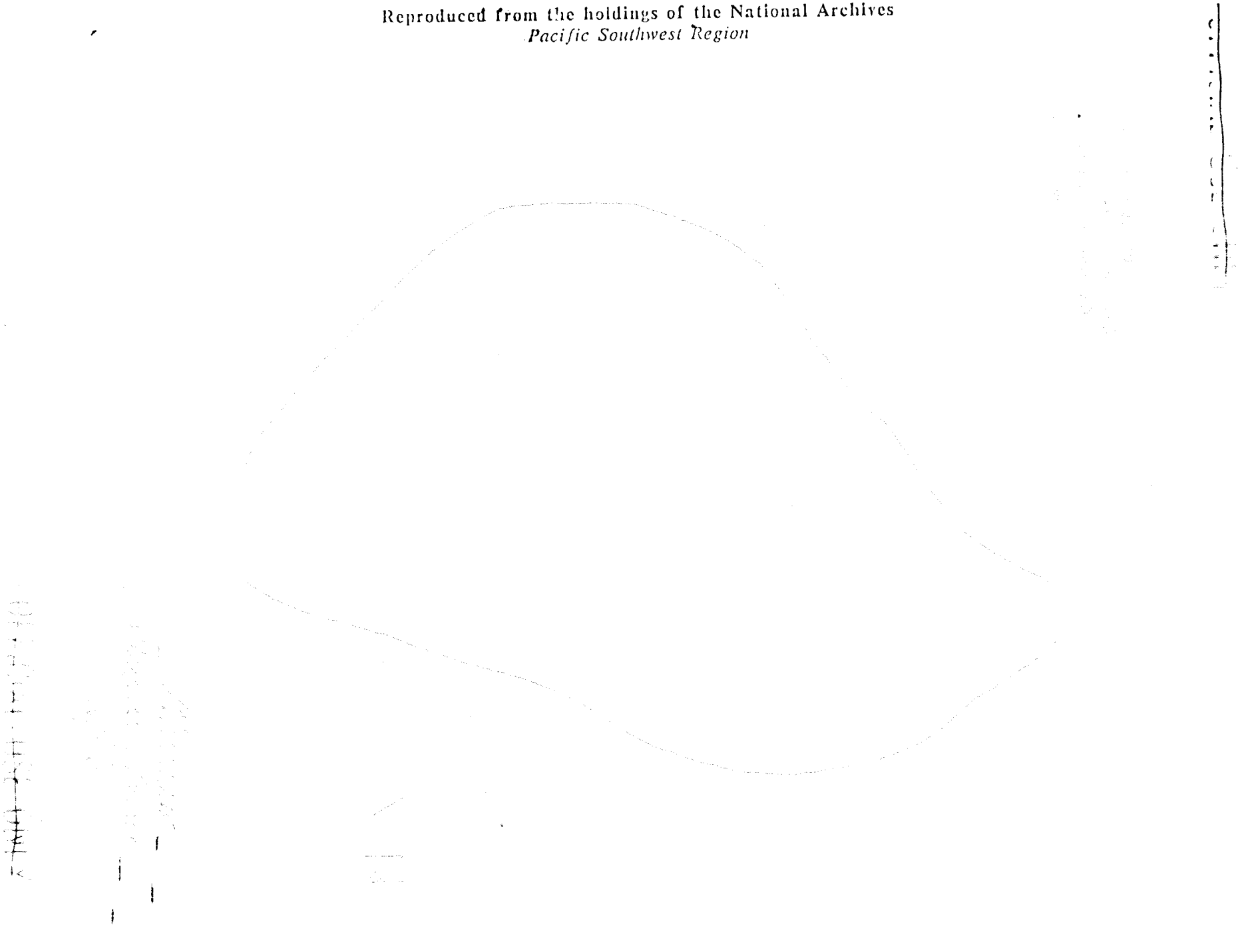

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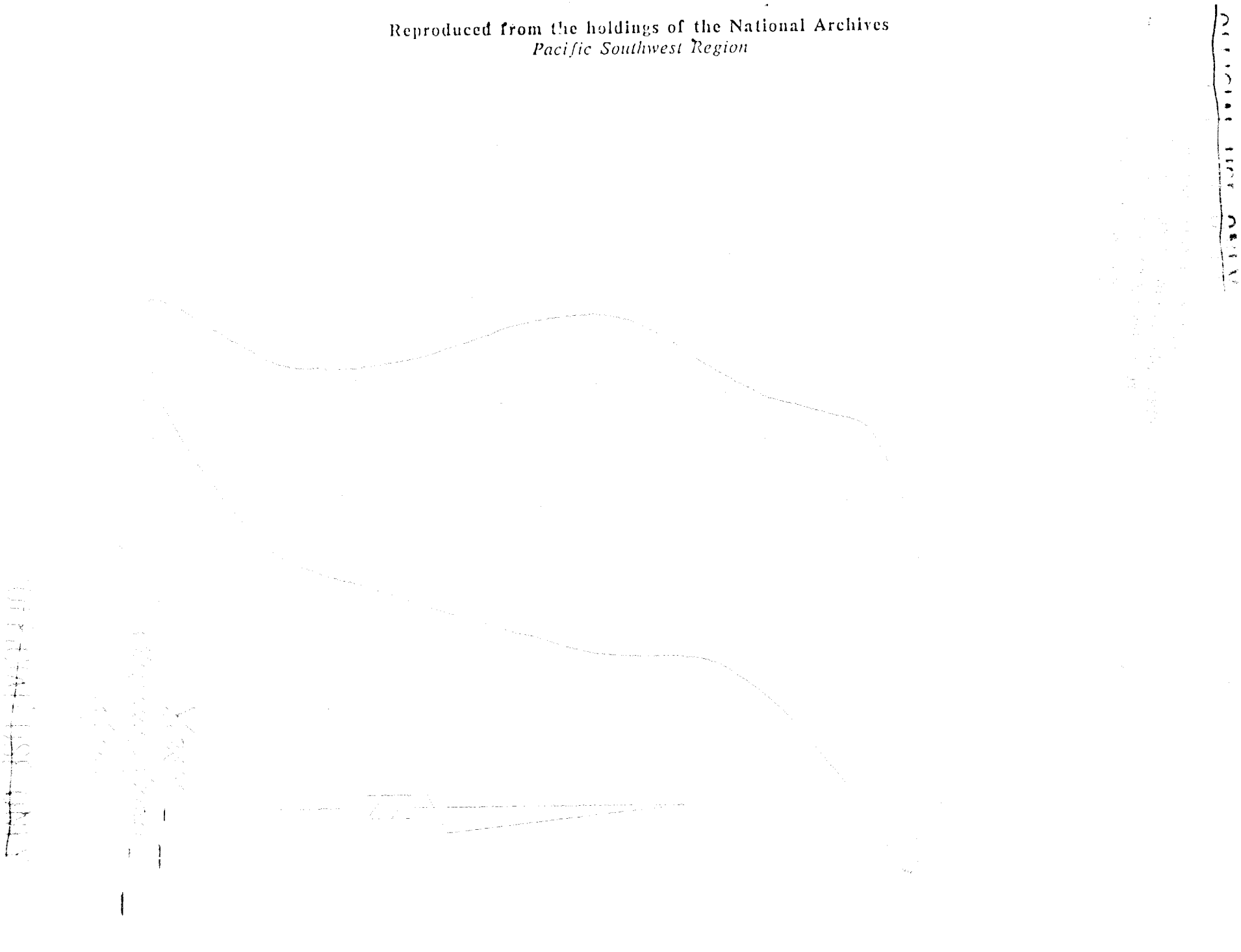

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HORIZONTAL CONTROL SURVEY

Specifications for Geodetic

The basis of classification of geodetic horizontal surveys is the accuracy with which the length and azimuth of a line are determined. Since it is impossible to ascertain the absolute errors, it is assumed that the procedure in executing the survey conforms to standards which have been established as the result of extensive experimentation and research. For this reason, the triangulation surveys of this department will be in accordance with publications of the U.S. Coast and Geodetic Survey.

Specifications and procedure for each class of the work and much other information of value is contained in Special Publication No. 247, Manual of Geodetic Triangulation published by the USCGS. This manual will be the textbook for precise surveys, and personnel involved in the surveys should familiarize themselves with the contents. The following is a summary of the procedure involved in making a survey, and is not intended to supersede the manual.

Generally, the degree of accuracy and the points whose interrelation are required will be specified by the Client. The approximate locations of the triangulation stations will be determined based on reconnaissance and conformance to strength of figure requirements. Instructions including the above information will be issued to the field for execution of the work.

Reconnaissance. Before observing can be established, the stations must be physically established and, if necessary, observing towers erected. Intervisibility of stations must be determined, and the location and height of towers so established that the line of sight has a minimum vertical clearance of ten feet from any object. The minimum safe clearance both vertical and horizontal is dependent on atmospheric conditions, and reference to U.S. 226, Manual of Reconnaissance for Triangulation, is recommended for information on the subject. Formulas and a table for determining intervisibility will be found in U.S. 247, page [illegible]. The computed heights of towers to compensate for the curvature of the earth plus the ten feet will give the actual height of towers.

Reference. The following reference manuals published by the U.S. Coast and Geodetic Survey should be available at the place where precise triangulation is to be accomplished. The chapters on triangulation contained in many textbooks are based on information from these manuals.

U.S. 247, Manual of Geodetic Triangulation
U.S. 226, Manual of Reconnaissance
U.S. 240, Manual of First Order Triangulation
U.S. 215, Manual of Second Order Triangulation
U.S. 218, Manual of Triangulation Computation
U.S. 5, Formulas and Tables for the Computation of Geodetic Positions

U.S. 230 and 245 are superseded by U.S. 247, but do contain more detail on some subjects.

INSTRUCTIONS FOR USE OF THE [illegible] THEODOLITE

(Issued by the U.S. Coast and Geodetic Survey)

These instructions are intended for the [illegible] Theodolite, but contain information applicable to the [illegible].

1. Unpacking and setting up of the instrument. The case is set up with the felt to the rear, and then both lateral screws of the base plate are unscrewed. The hood is then carefully lifted and the two clamping levers are unloosed. The base plate which is fastened to the frame with a milled screw, is taken out and set on the stand, centered, the three levers are pulled out, the theodolite is set in and the tribrach screws are [illegible] with the clamping levers.

2. Leveling. The centering is [illegible] anymore by leveling, since the point of support of the plate [illegible] the plane which passes through the tips of the tribrach screws.

The theodolite should be turned several times about the vertical axis and the telescope transmitted before standing [illegible].

3. Focussing. The focussing of the eye piece is done by turning the black milled ring until the crosswires become very sharp and black, while the telescope is pointed on a moderate [illegible] background. A person should observe and remember the setting of the ring on the numbered scale, and then use this for future focussing. To focus on the image of the signting [illegible], turn the nickel focussing ring (testing for freedom of parallax between image and crosswires, by movement of the eyes). For the focussing of the reading [illegible], the milled black ocular tube, at the side of the telescope is turned until the graduations of the circle become sharply defined.

By changing eye-pieces, a person may work with magnifications of 24, 30 or 40; normally, the magnifying of 30 should be used, and this eye-piece should also be used for the zenith prism.

4. Reading the circle. The horizontal and vertical circles are read in the microscope, adjoining the telescope, to the right, next to the slow motion screw for the vertical circle is the milled head screw for the inverting contrivance. By turning the screw clockwise until the stop, the horizontal circle becomes visible in the microscope; then by turning it counterclockwise the image of the vertical circle becomes visible.

The illumination of the circles should be bright and as equally illuminated as possible. To do this, the illuminating mirrors are turned. During the measurement of an angle, the illumination should not be changed. In the reading microscope appear the images of the diametrically opposite portions of the circle, separated by a fine horizontal line, and below it is the scale image of the second drum.

5. Horizontal [illegible] the signs. The horizontal circle is graduated to 4 minutes, and is read (after [illegible]), by means of the index, to 2 minutes. The lower row of degree figures is read.

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To this circle reading be added double the reading of the seconds drum, since the drum is half graduated. The drum is numbered by tenths from 0.0 to 60.0, but this represents an angle of 30 seconds, so that single drum reading is only half the true value and must be multiplied by two before being added to the circle reading. To use the two readings of the drum should be taken and the sum of the two added to the circle reading, thus accomplishing the same result as multiplying the drum reading by two and giving the added accuracy of two micrometer readings instead of one. The following example will make this clear:

Circle reading		Seconds Drum			Total Reading		
°	′	1st read.	2nd read.	sum	°	′	″
104	58	6.8	6.9	13.7	104	58	13.7
119	10	11.1	11.0	22.1	119	11	22.1
140	20	19.9	19.9	39.8	140	20	39.8
158	30	32.8	33.5	66.3	158	31	06.3
172	52	7.4	6.6	14.0	172	52	14.0
0	12	17.9	17.8	35.7	0	13	35.7
43	28	39.0	39.1	78.1	43	29	18.1

Since only two micrometer readings are taken instead of six as in 3-micrometer instruments, greater care and greater refinement of drum readings must be taken with the two readings than is common practice with 3-micrometer theodolites.

The seconds drum reads directly to 0.1 of a double second (0.2 seconds) and all readings should be taken to this degree of refinement. Record the sum of the two readings, also the mean of direct and reverse readings and the direction to the nearest tenth of seconds.

Experience shows that the difference between two careful micrometer readings will seldom be greater than 0.3 double seconds (0.6 seconds) and generally no more than 0.1 double second (0.2 seconds). If the two readings vary by more than 0.3 double seconds, (0.6 seconds), they should be repeated until two concordant readings are obtained.

4. Vertical circle readings. There is a Vernier reading of the vertical circle, and the angle of elevation or depression is the simple difference between the readings found and reversed. Level the vertical circle bubble before reading the circle. The following is an example of the readings:

		46.96	
Direct	265° 00′ 46.96		265° 57′ 36.96
Reverse	94° 59′ 13.04		94° 58′ 23.04
		13.04	

Difference (angle of depression) = 0° 58′ 23.08″

With vertical circle left

Vertical circle reading over 90° indicates angle of elevation.
Under 90° indicates angle of depression

With vertical circle right

Vertical circle reading under 90° indicates angle of elevation.
over 90° indicates angle of depression

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Records. Forms are provided for each specification in recording the results of observing and computing. These records should be kept on transparencies in order that reproductions can be made of all records of the survey.

All computations which are required to complete these forms should be included in the records of the survey. They should be arranged in an orderly manner, and in sufficient detail that the computations can be checked at the Home Office. References should be made to field books, map explanations data used in computing the survey.

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7. Electrical Illumination. There are two types of illumination:

(a) That for the horizontal circle.
(b) That for the vertical circle and cross-wires.

The second drum is illuminated by the light for whichever circle is being read. The horizontal circle lamp is the one which has three wires attached to it: The vertical circle lamp is the one which has two wires. Remove the horizontal and one vertical illumination prisms (see [illegible]) then in the clips in the base plate of the instrument [illegible] the electrical illumination devices.

The cross wires are illuminated by a piece of paper inside the telescope which intercepts part of the light which goes to the vertical circle. This prism has no adjustment.

A rheostat may be installed in the circuit for regulating the cross-wire illumination. Tests should be made to see if it should be installed between the battery and horizontal circle lamp or between the horizontal and vertical circle lamps. When the [illegible] has been completed, a permanent rheostat can be attached if [illegible].

To switch off the electric current, pull out one of the small pins at the end of one of the wires of the horizontal circle illuminating attachment.

A very important point is the illumination of the horizontal circle. A diffused light is essential, and this diffusion is not provided by the frosted bulbs, provided with the instrument, to the desirable degree. Bulbs should be painted white, or a piece of paper should be fitted over the end of the lamp tube for the illumination of the horizontal circle to give the required diffusion. Permanent changes will be made when field engineers have given the problem their attention. In the meantime tube of white paint and a bottle of shellac should be carried by field engineers [illegible].

Flashlight bulbs for circle illumination of either 2.5 or 3.8 volts may be used. The latter will likely be found preferable. Number 6 dry cells will be found more reliable for illumination current than the batteries supplied in a case with some of the instruments. Some bulbs apparently have the wrong screw thread and size of base to fit into the [illegible]. Before leaving for the field select proper spare bulb for emergency.

8. Other Points. Watch out for dirt in the horizontal circle. Every few nights close the circle in foul weather by closing on the index on the end of the half set.

Carry the theodolite upright when in the [illegible] do not let this case rest on its side. The theodolite is fastened in the case by the bottom only, and if it rests on its side any pressure will be taken on the upper part of the vertical axis, an undesirable condition.

Laboratory tests indicate that the telescope resolution drops considerably when the telescope is not exactly focused. It is therefore desirable to exactly focus the telescope on a star, after the cross wires are focused and always use the telescope at that focus for precise work. After the exact focus is obtained put a scratch across the edge of the focusing [illegible] on the adjacent part of the telescope tube, so that exact focus can be established or checked at any time.

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9. Description of the theodolite.

Effective aperture of the objective [illegible] (1 3/8 inches)
Magnification (3 eyepieces) [illegible] 24.4 and 38.5
Length of telescope [illegible] mm. (10 inches)
Sensitivity of plate level, approx. [illegible] per div. division
Sensitivity of vertical circle level, approx. [illegible] per 2 mm.
(The coincidence adjustment of the bubble [illegible] doubles the accuracy of centering.)
Magnification of reading microscope [illegible]
Diameter of horizontal circle [illegible] mm. ([illegible] inches)
Diameter of vertical circle [illegible] mm. ([illegible] 1/4 inches)
Division of horizontal circle to [illegible] minutes
Division of vertical circle to 2, double to [illegible] minutes.
(really 8 minutes)
Value of smallest division of seconds drum, approximately [illegible] seconds,
really 0.2 seconds
Vertical circle bubble adjusted adjacent to the illumination of the horizontal wire.

Weight of instrument [illegible] 11.5 kg. (25.3 lbs.)
" " case [illegible] 5.9 kg. (12.9 lbs.)
" " tripod and accessories [illegible] kg. (16.5 lbs.)
Resolving power (24X eyepiece) 24
" " (30X ") 30
" " (40X ") 34

10. Zenith prism. This prism is to be used for astronomic observations. The Zenith prism is a tacket on the base plate. The 30 magnification eyepiece is to be used for it.

11. Packing the instrument. The levers of the base plate are released, the instrument is lifted out and set on the base plate of the packing box. In front on one of the supports of the tribrach screws is a nickel mark. A similar mark is on the front side of the base plate, the instrument must be so set in, that these two marks correspond, then the clamps are closed. The telescope is turned over until the eyepiece almost touches the standards, the standards are turned in the horizontal in such a way that the eyepiece comes over the two marks. The clamping screws for the vertical circle and the horizontal circle are moderately tightened. The base plate with the levers pushed in is again attached to the standards or it may be left on the stand. After carefully closing the hood, the two screws for tightening the hood are [illegible].

NOTE: Paragraphs 1 and 11 do not apply to the type of instrument has furnished with the T-2 theodolite owned by this organization.

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Observing Procedure

Eight or Sixteen Positions

Specifications of the [illegible] require a set of sixteen positions to be observed for first order triangulation and six to twelve for second order. Recommendations of the local office of [illegible] for average conditions eight positions be observed for second order triangulation.

The initial settings of the circle for the eight and sixteen position sets are as follows. It is not necessary to set the circle closer than about one-half minute to the setting given.

8 Positions

(1)	D	0°	00'	10"
(2)	R	90°	00	25
(3)	D	45	00	35
(4)	R	225	00	50
(5)	D	90	00	10
(6)	R	270	00	25
(7)	D	135	00	35
(8)	R	315	00	50

16 Positions

(1)	D	0°	00'	10"	(9)	D	90°	00'	10"
(2)	R	180	00	25	(10)	R	281	00	25
(3)	D	45	00	35	(11)	D	112	00	35
(4)	R	225	00	50	(12)	R	302	00	50
(5)	D	45	00	10	(13)	D	135	00	10
(6)	R	225	00	25	(14)	R	326	00	25
(7)	D	0	00	35	(15)	D	157	00	35
(8)	R	180	00	50	(16)	R	348	00	50

After completion of the direct readings on the initial light, direct pointings and readings are made in the clockwise or [illegible] additional light of the schedule. Then the telescope is plunged and pointings and readings made on the lights in the reverse order to and including the initial light. This completes position number one. With the telescope remaining reversed, the circle is set for position two, and pointings on the initial and other lights are made in the same manner as for position one. This procedure is repeated until the required number of positions have been observed. The required positions are observed.

It frequently happens that one or more lights are not visible during all or part of the time the observations are being made upon the other stations. Little time should be spent waiting for a light to rise. The position missed can be observed later, using the same settings as used during the first series, or some other main scheme station observed soon during the series.

Every effort should be made to complete satisfactory sets to all required stations while occupying a station, as a second occupation will generally mean another night's work if the observing station is inaccessible.

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Rejection of Observations

The greater part of the time involved in the observing program is in preparation to observe, transportation, building up, adjusting lights, etc. Once ready to go, any refinement in observing which may help to lessen the probability of re-observing a station is well justified. A rigorous application of the rejection limits to observations, even though the observation separates just outside the limit, will result in a saving of time and effort.

The following is a summary of rejection rules as applied by the USC & GS, and may be found in more detail in [illegible], pages [illegible], [illegible] and [illegible].

(1) Any measurement of a direction deviating by more than four seconds from the mean for first order triangulation, and by more than five seconds for second order, must be rejected if [illegible] observed using the same position setting.

(2) In applying the rejection limits the value of a direction should be rounded off to the nearest tenth of a second, and the criterion applied to each observation to the tenth of a second.

(3) If any observations are so far from the approximate mean as to obviously exceed the limit, these should be rejected before taking the trial mean and that position re-observed.

(4) No reading should be rejected if it is within the limit of retention unless rejected at the time of observation.

(5) A trial mean is taken, and using the rejection limit any observation (including the individual ones forming a position mean) which differs by more than the limit from the trial mean is rejected. The rejected positions are re-observed.

(6) After a trial mean is obtained and the rejection limit applied, none of the observations rejected should be again included even though the new mean would bring them within the limit of rejection.

(7) Using a new mean, the rejection limit is again applied. If any of these observations fall outside the rejection limit they are rejected, and new observations and new means taken until all accepted positions are within the limits of the trial mean.

(8) If one reading of two or more observations falls without and one within the limit of rejection, do not use the mean even though it comes within the limit. Use the reading within the limit and reject the other.

(9) If two readings fall without the limits, one being abnormally high and the other abnormally low, and the mean falls within the limit, both readings should be rejected.

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(10) If two or more readings have been taken for a single position, the mean should be used if the readings are within the limit of retention.

(11) Occasionally conditions will be encountered which make it difficult to bring all readings within rejection limits. There will be no abnormal spread in direct and reverse readings, but the position mean will be well within the limit. If the number of rejections is averaging much in excess of ten percent of the entire series of observations, the rejection limit may be increased. Before doing this, an attempt should be made to determine the cause of the large range.

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Record of Horizontal Directions

The following Record of Horizontal Directions contains the field record of observing an eight-position set to record on [illegible] specifications. It is followed by an "Abstract of Directions" which contains the position directions and the mean of the eight positions and mean directions.

The process of establishing the mean direction of a position may be understood by a study of the records for position no. [illegible].

(a) The direct and reverse readings are recorded for each observed station.

(b) The initial and closing [illegible] readings on the initial station are meaned.

(c) The mean reading on the initial station established by a and b is subtracted from the mean D and R for each successive observed station to establish the direction for that position.

A trial mean is established by dividing the sum of the directions for each of the eight positions by the number of positions. In this case (see Abstract of Directions) 40.0" for station Baker and [illegible] for station [illegible].

With these trial means each position is checked for compliance with rejection limits. Two examples of rejection follow:

<u>Position No. 4.</u> The trial mean for direction Baker is 40.0". It is obvious that [illegible] is outside the five-second rejection limit.

The mean D/R for a direction of 40.0 is obtained by subtracting the difference between the direction and mean D/R for Baker at this position, or: [illegible] (40.0 - 24.0) = [illegible].

It is then found that the direct reading [illegible] is within limits and that the reverse reading [illegible] is outside. The [illegible] is rejected. 21.[illegible] is accepted for the mean D/R.

<u>Position No. 7.</u> The reading direction of [illegible] is obviously outside the five-second rejection limit of [illegible]. 50.0 - (64.1 - 45.0) = 50.[illegible]. The direct and reverse readings of [illegible] and [illegible] are both outside the limits so the position is rejected and is checked (see Notes of the same page).

In the Abstract of Directions a line is drawn through the original direction for Position 4 of 40.0" and the new direction of [illegible] is entered. The new direction for Position 7 of [illegible] is entered in the same manner.

A new mean direction is established and for each of each of the positions to determine that the directions for all positions and all position mean D/R's are within the limits of this field manual.

It will be found that the results are grouped in approximate total mean. The successive positions are charted, and used for readings which are obviously outside limits. This parallel procedure has shown [illegible] before establishing a total mean, and will result in a saving of observing time. For instance, positive directions of [illegible] and [illegible] were recorded for the first three stations of Baker. When a direction of [illegible] was discovered for the station [illegible] repetition was indicated.

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Triangle Closure. A requirement for triangle closure is that the maximum error in closure of any triangle shall not exceed three seconds for first order, five for second, and ten for third order. And that the average triangle closure where triangulation is being established by a network of triangles shall not exceed one second for first order, three for second and five for third order. (See G. L. 247, page xvii.)

Abstract of Wire Lines. An abstract of wire lines will be kept as a part of the observing procedure for each station, and will list the direction for each position, the sum and the mean direction. (G.L. 247, pages 136, 148 to 150.)

List of Directions. The list of directions will generally list only the mean directions from the initial station to each other station. Where an eccentric instrument or signal is involved the recorded direction and corrected direction to the true station will be given. (G.L. 247, pages 151 to 157.)

Triangle Computations. The form for triangle computations is set up to record the computation of the four triangles of a quadrilateral on one sheet. The newly used station is always numbered 1, and the other stations 2 and 3 in a clockwise order, with the line 1-2 always the known line. The procedure in computing the triangles is explained in G.L. 247, pages 158 to 160.

Spherical Excess. The spherical excess of a figure is not considered in computing a plane triangle, but the spherical angle which is required in computing the geographic position. The spherical angle is larger than the plane angle, and the correction should be computed as explained in G.L. 247, pages 162, 272 and 273.

Side Checks. In the computation of a quadrilateral there are always three lines which have two values in view of their length. One of the requirements of triangulation is that the difference between the two values for the logarithm of the length of a line be no greater than two times the logarithm difference for one second of the smallest distance used in the computation of either value for first order triangulation, and twice the second for second order.

These side checks are the first indication of the quality of the observed angles, as it is possible for the computation of a quadrilateral to close within the prescribed limits and not meet the requirements of the side check. The side check condition should be established before observing of a quadrilateral is considered complete, as re-observing may be necessary.

Side checks must should be made when the elevations are large in order to isolate the direction that is faulty. (See G.L. 247, pages 10, 155 to 171, and xvii.)

Geographic Positions. The geographic positions of the stations should be computed at the joints to check position and check on the accuracy of the

previous computations. A description of the method is given in S.P. 8, Formulae and Tables for Computation of Geodetic Positions. The latitude functions listed therein are necessary in computing the positions. (See also S.P. 247, pages 175 to 179.)

Triangulation Adjustment. The procedure outlined to this point is normally considered as included in the observing and field (or jobsite) computing. Due to the limited extent of the schemes surveyed by this organization, it is generally considered that when the side conditions have been satisfied further adjustment is not practical. On surveys where a coordinate system will be established and it is desirable that the values of a station remain exactly the same, independent of the direction of computation through the net, an additional adjustment is applied.

This refinement results in slight changes in the values, and a full least square adjustment is not considered practical for a limited scheme. A modified adjustment which meets the requirements of small schemes is included in this set of instructions.

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JOB NO. _____

RECORD OF HORIZONTAL DIRECTIONS

OBSERVER F.P.C. INST. NO. 17803 STATION RED

RECORDER GHB DATE 11-5-51 SET NO. 1

POSITION	STATIONS OBSERVED	TIME	D/R	CIRCLE READING	MEAN	DIRECTION	REMARKS
1	ABLE	1110 PM	D	00-00-20.0	19.5 +0.5		
			R	180-00-18.9	20.0		
	BAKER		D	74-30-56.5	56.5	36.5	
			R	254-30-56.4			
	FOX		D	163-39-30.6	31.5	11.5	
			R	343-39-32.4			
	ABLE		D	00-00-21.0	21.5 -0.5		
			R	180-00-20.0	20.0		
2	ABLE		D	45-00-50.0	50.7		
			R	225-00-51.5			
	BAKER		D	119-31-32.0	29.0	38.3	
			R	299-31-26.0			
	FOX		D	208-40-00.7	59.7	09.0	
			R	28-39-58.7			
	ABLE		D	45-00-51.2	50.6 +0.1		
			R	225-00-50.0	50.7		
3	ABLE		D	90-01-10.0	11.7		
			R	270-01-13.5			
	BAKER		D	164-31-51.9	51.9	40.2	
			R	344-31-51.9			
	FOX		D	253-40-17.9	17.4	05.7	
			R	73-40-16.9			
	ABLE		D	90-01-13.7	11.8 -0.1		
			R	270-01-10.3	11.7		
4.	ABLE		D	135-01-40.0	38.7 +0.6		
			R	315-01-37.3	39.3		
	BAKER		D	209-32-21.6	21.6		
			R	~~29-32-27.5~~	~~24.6~~		REJECT (R)
	FOX		D	298-4[illegible]	48.0	08.7	
			R	118-4[illegible]			
	ABLE		D	135-01-39.7	39.9 -0.6		
			R	315-01-[illegible]	39.3		
			D				
			R				

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FOLMER & NARVER [illegible] ENGINEERS

JOB NO _____

RECORD OF HORIZONTAL DIRECTIONS

OBSERVER F.P.C. INST. NO. 17803 STATION RED

RECORDER GHB DATE 11-5-51 SET NO. 1

POSITION	STATIONS OBSERVED	TIME	D/R	CIRCLE READING	MEAN	DIRECTION	REMARKS
5	ABLE		D	22-00-20.0	17.4		
			R	202-00-14.8	+2.3 / 19.7		
	BAKER		D	96-30-58.4	57.2	37.5	
			R	276-30-55.8			
	Fox		D	105-39-31.8	30.3	10.6	
			R	05-39-28.9			
	ABLE		D	22-00-23.8	21.9		
			R	202-00-20.0	-2.2 / 19.7		
6	ABLE		D	67-00-50.0	49.7		
			R	247-00-49.4	+1.0 / 50.7		
	BAKER		D	141-31-30.6	29.7	39.0	
			R	321-31-28.8			
	Fox		D	230-40-00.6	58.7	08.0	
			R	50-39-56.7			
	ABLE		D	67-00-53.7	51.8		
			R	247-00-50.0	-1.1 / 50.7		
7	ABLE		D	112-01-10.0	10.8		
			R	292-01-11.6	+0.1 / 10.9		
	BAKER		D	186-31-56.0	~~56.1~~	45.2	REJECT (SEE BELOW)
			R	06-31-56.2			
	Fox		D	275-40-21.7	21.4	10.5	
			R	95-40-21.2			
	ABLE		D	112-01-12.1	11.0		
			R	292-01-10.0	-0.1 / 10.9		
8	ABLE		D	157-[illegible]	[illegible]		
			R	33[illegible]	[illegible]		
	BAKER		D	[illegible]	18.0	38.3	
			R	5[illegible]			
	Fox		D	320-40-44.2	46.9	07.2	
			R	140-40-49.6			
	ABLE		D	157-01-4[illegible]	40.6		
			R	[illegible]	6.9 / 39.7		
			D				
			R				

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RECORD OF HORIZONTAL DIRECTIONS

OBSERVER F.R.C. INST. NO. 1803 STATION RED

RECORDER G.H.B. DATE 11-5-51 SET NO 2

POSITION	STATIONS OBSERVED	TIME	D/R	CIRCLE READING	MEAN	DIRECTION	REMARKS
7	ABLE	1140 PM	D	112-01-10.0	10.7		
			R	292-01-11.4	+0.2 / 10.9		
	BAKER		D	186-31-46.0	48.7	37.8	
			R	06-31-51.4			
	ABLE	1145 PM	D	112-01-12.3	11.1		
			R	292-01-10.0	+0.2 / 10.9		
			D				
			R				
			D				
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JOB NO. ____

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ABSTRACT OF DIRECTIONS

STATION [illegible] COMPUTED BY [illegible] DATE 11-5-51

OBSERVER [illegible] CHECKED BY [illegible] INST. 17803

POSITION	STATIONS OBSERVED		
	ABLE	BAKER	FOX
	INITIAL		
	[illegible]	34°30'	163°39'
1	0.00'	36.[illegible]	[illegible]
2	0.00'	[illegible]	[illegible]
3	0.00'	[illegible]	[illegible]
4	0.00'	42.[illegible]	[illegible]
5	0.00'	[illegible]	[illegible]
6	0.00'	[illegible]	[illegible]
7	0.00'	[illegible]	[illegible]
8	0.00'	[illegible]	[illegible]
9	0.00'		
10	0.00'		
11	0.00'		
12	0.00'		
13	0.00'		
14	0.00'		
15	0.00'		
16	0.00'		
	SUM	[illegible]	[illegible]
	MEAN	[illegible]	[illegible]
CORR FOR TEC			
DIRECTION		[illegible]	[illegible]

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COORDINATE REDUCTION OF THE THREE POINT PROBLEM

The following solution of the three point problem is due to Mr. K. O. Byrd, formerly Chief of the Mapping Section, Division of Surveys, of the Tennessee Valley Authority, Chattanooga, Tennessee.

In the figure are shown the three points of known coordinates, indicated by the subscripts, and the point whose plane coordinates X, Y, are to be determined. The first step is to shift the origin of coordinates to the point X_3, Y_3, obtaining:

$$X_3' = Y_3' = 0$$

$$X_1' = X_1 - X_3$$

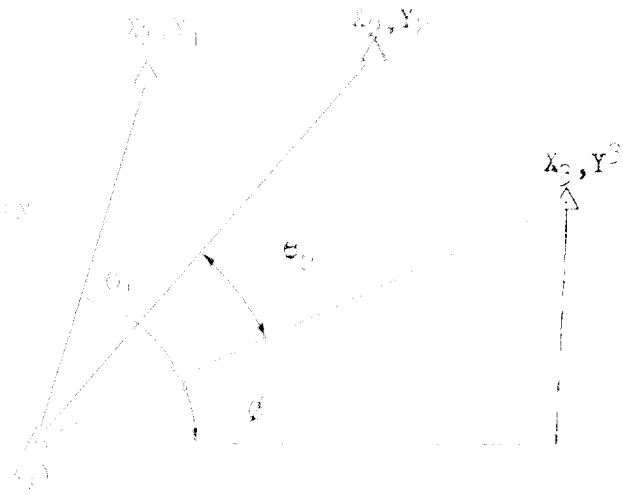
$$Y_1' = Y_1 - Y_3$$

$$X_2' = X_2 - X_3$$

$$Y_2' = Y_2 - Y_3$$

$$X' = X - X_3$$

$$Y' = Y - Y_3$$



From the figure, and by trigonometry

$$\tan(\theta' + \theta_1) = \frac{\tan\theta' + \tan\theta_1}{1 - \tan\theta' \tan\theta_1}$$

$$\tan(\theta' + \theta_2) = \frac{\tan\theta' + \tan\theta_2}{1 - \tan\theta' \tan\theta_2}$$

$$\frac{Y_1' - Y'}{X_1' - X'} = \frac{\frac{Y'}{X'} + \tan\theta_1}{1 - \frac{Y'}{X'}\tan\theta_1} = \frac{Y' + mX'}{X' - mY'} \quad \text{and}$$

$$\frac{Y_2' - Y'}{X_2' - X'} = \frac{\frac{Y'}{X'} + \tan\theta_2}{1 - \frac{Y'}{X'}\tan\theta_2} = \frac{Y' + nX'}{X' - nY'}, \text{ where } \tan\theta_1 = m \text{ and } \tan\theta_2 = n$$

Clearing of fractions:

$$(Y_1' - Y')(X' - mY') = (X_1' - X')(Y' + mX')$$

$$(Y_2' - Y')(X' - nY') = (X_2' - X')(Y' + nX')$$

Performing the indicated multiplications:

$$Y_1'X' - mY_1'Y' - Y'X' + mY'^2 = X_1'Y' + mX_1'X' - X'Y' - mX'^2$$

Collecting terms and dividing the first equation by m, the second by n:

$$(Y_1^2 + X_1^2) - X_1(X_1 - X_p) - Y_1(Y_1 - Y_p) = 0 \qquad \ldots\ldots\ldots\ldots (1)$$

$$(Y_2^2 + X_2^2) + X_2(X_2 - X_p) - Y_2(Y_2 - Y_p) = 0$$

Setting the second factor of the second and third terms in the above equations equal to A, B, C and D, we have

$$A = Y'_1 \cot \theta_1 + X'_1 \qquad B = Y'_1 \cot \theta_2 + X'_1 \qquad C = Y'_2 \cot \theta_1 + X'_2 \qquad D = Y'_2 + X'_2 \cot \theta_2$$

Subtracting the second of the equations (1) from the first,

$$X'(A - C) + Y'(B - D) = 0$$

$$Y' = X' \frac{C - A}{B - D} = X'R \quad \text{where } R = \frac{C - A}{B - D}$$

Substituting this value of Y' into the first of the equations (1) we have

$$X'^2(R^2 + 1) + X'(A - R^2 B) = 0 \text{ whence}$$

$$X = \frac{RB - A}{1 + R^2}$$

And finally $Y = Y'_1 + X_1 + X'_1 Y'_1$

The quantity R furnishes a measure of the "goodness" of the solution, the problem becoming indeterminate as R approaches the form 0/0. For example, if X'_1, Y'_1, X'_2, Y'_2 are of the order of several thousand feet, and C - A and B - D are of the order of 50 or 100 feet, the point X is close to the circle passing through the known points, and the solution is good.

The only formal trigonometric function used in this solution is taking two cotangents from a table of natural functions. For acute angles, these functions might become very large, making the solution worthless. This difficulty can be avoided by so selecting the initial line of the triangulation functions down to a reasonable figure generally less than unity.

R might in some cases come out very close to zero, or become practically infinite, should the point X, with the object North or South of X_1, Y_1. However these difficulties seldom arise in practice. In several hundred three point solutions the writer has had to reject perhaps half a dozen for the first, and has never had to shift the initial line to get a finite value for R.

When a large number of three point determinations are to be made, it is well to solve them on a nine graduated form, such as that in which the following problem is solved has been found highly satisfactory. The first step is to enter the coordinates of the known points in the appropriate places in the table part of the form. After the unknown coordinates have been found the coordinates of X are entered, and the solutions checked by inserting between X_1, Y_1 and one of the known points. The difference in the azimuths of these two lines should agree with the observed angles. Space is provided for the fourth point which should be observed whenever possible, both as a check on the fixes as well as the control, and for use in the event that the solution based on the selected three points should prove to be weak.

The solution differs from the derivation shown in that we solve first for Y instead of X. The solution can be greatly expedited by omitting those lines not marked (#) by carrying the work in the computing machine.

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θ

$m = \cot \theta_1$

θ_2

$m = \cot \theta_2$

X_1

$-X_3$

$\# X_1'$

mX

Y

$\# -B$

Y_1

Y_3

Y_1'

mY_1

X_1

A

D

B

C

A

B

To Shift Coords.

$X_3 = Y_3 = 0$

$X' = X - X_3$ #

$Y = Y - Y_3$

$X = X - X_3$ $\# R = \frac{S}{2}$

$Y = Y - Y_3$

D'

X_2

Y_2

Y_2'

mY_2

X_2'

D

C

A

B

$R^2 + 1$

$A = Y_1 \cot \theta_1 - X_1$

$B = Y_1 + X_1 \cot \theta$

$C = Y_2 \cot \theta_2 - X_2$

$D = Y_2 + X_2' \cot \theta_2$

$A = C - A$

$D - B$

$X' = RB - A$

$+ R^2$

RB

A

C

$Y_2 = RX_2$

Y_3

Y_p

X_1'

X_3

X_p

$Y' = Y' D$

STATION	DISTANCE	AZIMUTH	X (EASTING)	Y (NORTHING)

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[illegible] of spherical triangles

Since the measured angles are spherical in [illegible], each triangle will contain more than 180°. The amount greater than 180° is termed the spherical excess and about one second for each [illegible] square miles of area of triangle. More exactly, the total spherical excess [illegible] triangle is obtained by the formula (see Special Publication No. 5, p. [illegible])

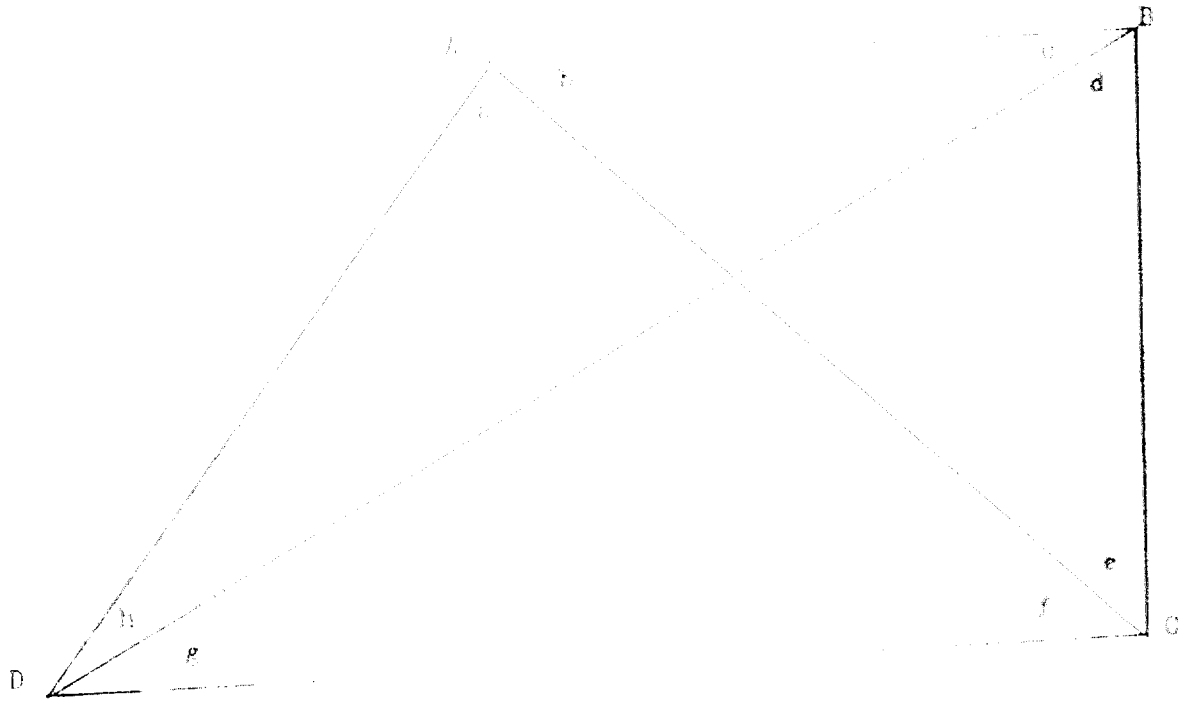
$$\epsilon = a_1 b_1 \sin C_1 \rho'' \quad \text{[illegible]}$$

where ϵ is the spherical excess, [illegible] the two sides and the included angle, respectively, of the corresponding [illegible]. The letter letter m is used to designate that part of the expression above which depends only on the latitude and the dimensions of the spheroid and the values of [illegible] are given with the latitude as an argument in the table on page [illegible] of Special Publication No. 5.

It is clear that no correction for spherical excess will be necessary unless the triangles are very large, and then only in the most precise work. One third of the correction is subtracted from each of the angles.

Adjustment of a quadrilateral

Before starting the adjustment of figures of triangulation the computer should make a good clear sketch showing all the lines on which observations were made. The angles around each station of a quadrilateral are adjusted to total 360° before the figure adjustment is made. In the figure adjustment, two conditions are considered: (1) the geometric condition that the sum of the interior angles of a rectilinear figure is equal to $(n-2)180°$, in which n is the number of sides of the figure; and (2) the trigonometric condition that in any triangle the sines of the angles are proportional to the lengths of the sides opposite.



1. Geometric Conditions. When all angles of a quadrilateral are measured, there are four overlapping triangles. There are three triangles ABC, ACD, ABD, and BCD in the figure. In each of these triangles the sum of the three angles must be 180°. Hence from the figure,

$$b + c + d + e = 180^\circ \qquad (1)$$
$$a + f + g + h = 180^\circ \qquad (2)$$
$$a + b + c + h = 180^\circ \qquad (3)$$
$$d + e + f + g = 180^\circ \qquad (4)$$

Also the sum of the eight lettered angles in the figure must equal 360°, since they form the interior angles of a closed figure of four sides. This may be derived also by the addition of Eqs. (1) and (2) or (3) and (4)

$$a + b + c + d + e + f + g + h = 360^\circ \qquad (5)$$

Further, since the opposite angles at the intersection of the diagonals must be equal, it follows that

$$b + c = f + g \qquad (6)$$

$$d + e = a + h \qquad (7)$$

Equation (6) is the equivalent of Eq. (1) minus Eq. (2) and Eq. (7) is the equivalent of Eq. (3) minus Eq. (4).

If any three of these seven equations are satisfied, the other four must of necessity be satisfied also. Equations (5), (6), and (7) are the ones most convenient to use.

The following procedure is suggested for triangulation of ordinary precision:

A. Make the station adjustment as follows: Adjust the angles around each point to make their sum equal 360° by dividing the error equally (or approximately so) among the several angles (not necessarily with non-repeating instrument).

B. Using the values resulting from the station adjustment A, add the eight angles a, b, c, d, e, f, g, and h, and subtract their sum from 360°. Divide the difference by 8, and add equally into the sum to each of the eight angles, thus satidfying the condition of Eq. (5).

C. Using the adjusted values from B, find the difference between the sums (b + c) and (f + g) and divide this difference by four. Apply the result as a correction to each of the four angles, increasing each of the two whose sum is the smaller and decreasing each of the two whose sum is the larger, thus making these angles satisfy Eq. (6) without disturbing the adjustment for Eq. (5). Proceed in the same way with each of the four angles involved in Eq. (7).

2. Trigonometric Conditions. If the length of one line, as BC, is known, and the length of the side line AB is also computed, the computer may select one or another series of triangles for use in computing this result. For example, a solution of triangle ABC gives the length of AC, then from triangle ACE the required length of CE is found, and in the triangle ABD the length AD is found, then in ADE the length DE is computed. There are four possible chains

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of route through the figure. It now remains to be seen whether the angle [illegible] or no for adjustment, and to attempt to compute the value of the length of a computed side independent of the route used. Assume that the length of BC is known and the length of AB is to be found.

$$\log \frac{AB}{BC} = \log \frac{\sin A}{\sin C}$$

$$\Delta \log \frac{AB}{BC} = \log \frac{\sin A}{\sin C} - \log \frac{\sin A'}{\sin C'} \qquad (9)$$

Similarly,

$$\Delta \log \frac{AB}{BC} = \log \frac{\sin B}{\sin D} - \log \frac{\sin B'}{\sin D'} \qquad (10)$$

Equating these two values of $\Delta \log \frac{AB}{BC}$,

$$\frac{\sin A}{\sin A'} \cdot \frac{\sin C}{\sin C'} = \frac{\sin B}{\sin B'} \cdot \frac{\sin D}{\sin D'} \qquad (11)$$

or

$$\frac{\sin A}{\sin A'} \cdot \frac{\sin C}{\sin C'} \cdot \frac{\sin B'}{\sin B} \cdot \frac{\sin D'}{\sin D} = 1 \qquad (12)$$

The angles are tested for consistency of the equation by taking the logarithmic sines in the two groups as indicated and by finding the difference between the two sums.

Various adjustments by which this difference may be reduced to zero are possible. The least squares solution of course gives the most probable values to the adjusted angles, but it is generally more elaborate than is necessary for most surveys. A simple approximate method which gives a good correction for each angle and does not distort the geometric condition is as follows (see adjustment of the following example):

(a) Record the logarithmic sines as shown in the example.

(b) For each angle, record the tabular logarithmic sine difference for 1" opposite each logarithm.

(c) Find the average logarithmic change (d) in log sin by dividing the difference between the sums by 4.

(d) Find the average difference (e) for 1".

(e) For each angle, find the number of seconds of arc to be applied as a correction to each angle.

(f) Add this correction to each of the four angles the sum of whose log sines is the smaller, and subtract it from each of the angles the sum of whose log sines is the larger, and then the corrected values are obtained.

If one or more of the angles be greater than 90°, adjustment b is made as just described, with the exception that the correction is subtracted. However, since the sine of an obtuse angle decreases as the angle increases, the corresponding log sines will be changed in the direction opposite to that desired. Usually the error introduced by this condition will be negligible for this approximate adjustment; if not, adjustment d should be used.

Example: Given the angles as measured in the quadrilateral (see figure), for which the station adjustment (each in-and-out) has been made (see second column of following table), find the adjusted angles for both the geometric and the trigonometric conditions.

Angle	Station adjustment	Figure adjustment		
		Geometric condition		Trigonometric condition
	Adjustment a	Adjustment b	Adjustment c	Adjustment d
a	94-05-[illegible]	[illegible]	[illegible]	[illegible]
b	48-03-[illegible]	[illegible]	[illegible]	[illegible]
c	20-47-[illegible]	[illegible]	[illegible]	[illegible]
d	60-40-[illegible]	[illegible]	[illegible]	[illegible]
e	50-[illegible]	[illegible]	[illegible]	[illegible]
f	43-[illegible]	[illegible]	[illegible]	[illegible]
g	[illegible]	[illegible]	[illegible]	[illegible]
h	[illegible]	[illegible]	[illegible]	[illegible]
Sum	360-00-[illegible]	360-00-00.0	360-00-00.0	360-00-00.0

Adjustment b. The sum of the angles in the figure resulting from the station adjustment a is found to differ from 360° by the amount of [illegible]. This amount divided by the number of angles gives the amount to be subtracted from each angle as shown in the third column in the table.

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Adjustment 2 [illegible]

Dividing this difference by 4, the correction to each angle is found to be [illegible], to be subtracted from the angles b and [illegible] and added to the angles f and [illegible]. In like manner, the correction to each of the angles a, c, h, and e is found to be 0.7", which is added to a and c, and subtracted from e and h. (Since these computations are carried out only to tenths of seconds, 0.3" is added to d, 0.3" added to g, 0.3" added to [illegible], and 0.3" subtracted from b.) The resultant values are shown in the fourth column of the table.

Adjustment 3. Trigonometric Conditions. The logarithmic sines of the angles as given by adjusts of 2 and 3 indicated in equation (12) are recorded as shown in the following tabulation, and the tabular difference for 1" is recorded for each angle.

		Difference for 1"
log sin a	[illegible]	1.0
log sin c	[illegible]	[illegible]
log sin e	[illegible]	[illegible]
log sin g	[illegible]	[illegible]
	[illegible]	
log sin b	[illegible]	[illegible]
log sin d	[illegible]	[illegible]
log sin f	[illegible]	[illegible]
log sin h	[illegible]	[illegible]
	[illegible]	
	[illegible]	[illegible]
	[illegible]	
	[illegible]	

The difference between the two sums is 62 units of the seven places of logarithms used. This value, divided by 8, gives the average required change in log sine, 7.8 units. The average tabular difference for 1" is 29.7 units.

Hence $\frac{\alpha}{\beta} = \frac{7.8}{29.7} = .26$ (nearly), which is the average correction to be applied to each angle. Obviously, it will be added to angles a, c, e, g, and subtracted from angles b, d, f, and h.

Since this adjustment is applied with opposite signs to alternate angles it does not disturb the pole condition. The final adjustment is given in the fifth column of the following table.

If the triangulation system consists of a chain of quadrilaterals, each quadrilateral is adjusted in the manner just outlined. The computation for length of the sections then follows through the chain from the base line

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COMPUTATION OF TRIANGLES

COMPUTED BY [illegible] CHECKED BY [illegible] DATE 12-29-51

STATION		OBSERVED ANGLE	SPHERICAL ANGLE	SPHERICAL EXCESS	PLANE ANGLE AND DISTANCE	LOGARITHM
2-3					7494.68	3.8747533
1	A	[illegible]			03.3	0.1285794
2	B	[illegible]			06.0	9.9951673
3	C	[illegible]			50.7	9.8872857
1-3					9965.52	3.9985000
1-2					7773.53	3.8906184
2-3						3.9985000
1	D	44 - 29 - 58.[illegible]			59.4	0.1543395
2	A	91 - 05 - 58.[illegible]			58.8	0.9988873
3	C	47 - 21 - [illegible]			01.8	9.8204106
1-3					1418164	4.1517268
1-2					9402.64	3.9732501
2-3					7494.68	3.8747533
1	D	27 - 26 - 1[illegible].7			15.7	0.3365028
2	B	6[illegible] - 4[illegible]			51.8	9.9404703
3	C	9[illegible] - 5[illegible] - [illegible]			52.5	0.9997658
1-3					14181.64	4.1517264
1-2					16256.31	4.2110219
2-3						4.2110219
1	A	[illegible]			02.1	0.2121229
2	B	[illegible]			14.2	9.5501052
3	C	[illegible]			43.7	9.4674730
					9402.64	3.9732500
					7773.53	3.8906178

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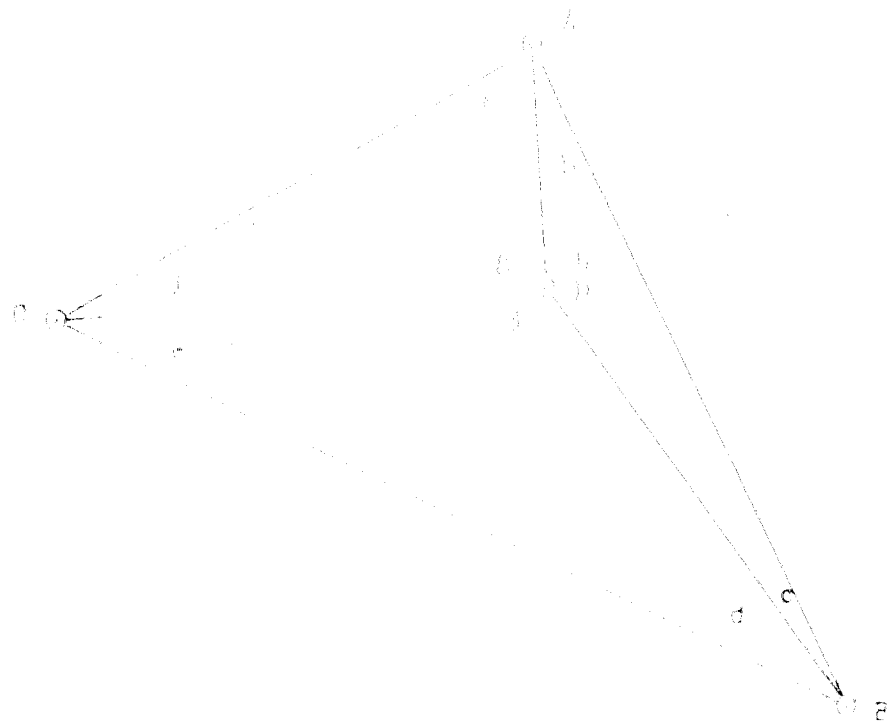
ADJUSTMENT OF A CENTRAL POINT FIGURE

As in the case of the quadrilateral, the angles around each station of a central point figure are adjusted to total 360° before the figure adjustment is made. In the figure adjustment, as in the quadrilateral, two conditions are considered: (1) the geometric condition, and (2) the trigonometric condition.



1. Geometric Condition. In each triangle of a central point figure the sum of the three angles must be 180°. Hence in the figure,

$$a + b + c = 180° \quad (1)$$
$$e + f + g = 180° \quad (2)$$
$$d + h + i = 180° \quad (3)$$

Also the sum of the [illegible] angles forming the closed figure must total to (n-2) 180° where n is the number of sides of the figure (in this case 1800)

$$a + b + c + d + e + f + g + h + i = 1800° \quad (4)$$

Also the sum of the angles around the central point must equal 360°.

$$a + b + c = 360° \quad (5)$$

The following procedure is suggested for a computation of ordinary precision:

A. Make the station adjustment as follows: Adjust the angles around each point to make their sum equal 360° by distributing the error equally (or approximately so) among the several angles.

B. Using the values resulting from the station adjustment A, add the three angles of each triangle and subtract the total from 180°. Distribute the difference among the three angles (not by thirds but 180°), keeping in mind that the sum of the angles around the central point must remain 360°. This will necessitate changing the angles at the central point by an unequal amount from those forming the other angles. This satisfies Eqs. (1), (2), (3) and (5). Eq. (4) is satisfied later shortly.

2. Trigonometric Condition. There can be no particular choice of route through the figure. It is remarkable to have whether the angles, as so far adjusted, are so related as to make the value of a length of a computed side independent of the route used. A derivation, similar to that in the quadrilateral adjustment, gives the following equation:

$$\frac{\sin \alpha_1 \sin \alpha_2 \sin \alpha_3 \cdots \sin \alpha_n}{\sin \beta_1 \sin \beta_2 \sin \beta_3 \cdots \sin \beta_n} = 1 \qquad (6)$$

The angles are tested for satisfaction of this equation by adding the logarithmic sines, as in the procedure for adjustment of a quadrilateral. The approximate method by correcting each angle equally is also suggested for the quadrilateral can be used for the central point figure.

Example: Given the angles as measured in the central point figure (see fig.) for which the station adjustment (adjustment A) has been made (see second column of following table). Find the adjusted angles for both the geometric and the trigonometric conditions.

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Angle	Given Adjusted	Given Adjusted	
		Geometric Condition	Trigonometric Condition
	Adjustment A	Adjustment B	Adjustment C
a	66 - 02 - 32.07	65 - 04 - 30.07	66 - 02 - 32.07
b	21 - 00 - 45.29	21 - 00 - 45.29	21 - 00 - 45.29
c	09 - 16 - 14.83	09 - 16 - 15.06	09 - 16 - 14.83
d	28 - 39 - 04.29	28 - 39 - 04.29	28 - 39 - 04.29
e	90 - 28 - 40.40	90 - 28 - 40.47	90 - 28 - 40.40
f	25 - 37 - 53.12	25 - 37 - 53.12	25 - 37 - 53.12
Sum	180 - 00 - 00.00	180 - 00 - 00.00	180 - 00 - 00.00
g	89 - 37 - 30.00	89 - 37 - 30.00	
h	148 - 45 - 00.00	148 - 45 - 00.00	
i	122 - 38 - 29.00	122 - 38 - 29.00	
Sum	360 - 00 - 00.00	360 - 00 - 00.00	

Adjustment B. Geometric Condition. The sum of the angles in each of the three triangles are:

$$(66^\circ + c + f) + g = 179^\circ - 59' - 59.93''$$
$$(21^\circ + h + f) + g = 180^\circ - 00' - 00.00''$$
$$(28^\circ + d + f) + i = 180^\circ - 00' - 00.00''$$

In triangle ABD the sum of angle f and g differs from 180° by +0.06". If an equal correction were applied to each angle, the correction would be +0.02". Similarly, in triangles ABC and ABD the correction would be +0.01" and -0.10". Applying this first correction to angles g, h and i, the sum is found to differ from 360° by 0.09". Applying and the correction to angle g h and i by 0.10" and then the correction to angle e by 0.07" Eq. (3) is satisfied. The remaining errors in each triangle are distributed equally between the other two angles of each triangle, thus satisfying eqs. (1), (2) and (3).

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<u>Adjustment [illegible]</u>. [illegible] logarithmic sines of the angles as given by [illegible] are recorded as shown in the following tabulation, [illegible] the tabular differences [illegible] recorded for each angle.

		Difference for 1"
Log sin [illegible]	[illegible]5575435	[illegible]
Log sin [illegible]	[illegible]2070994	[illegible]
Log sin [illegible]	[illegible]7051490	[illegible]
	[illegible]3697919	

Log sin [illegible]	[illegible]7649766	[illegible]
Log sin [illegible]	[illegible]7792439	[illegible]
Log sin [illegible]	[illegible]7560660	[illegible]
	[illegible]7207865	[illegible]
	[illegible]3697919	
	54	

The difference between the two sums in the units of the seven places of logarithms used [illegible] divided by [illegible], gives the averabe required change in log sine, [illegible]. The average tabular difference for 1" is 52.0 = β. Hence

$$\frac{\alpha}{\beta} = \frac{9.0}{52.0} = [illegible]$$ (nearly), which is the average correction to be applied to each angle. Obviously, it will be added to angles b, d, f, and subtracted from angles a, c, e.

Since this adjustment is applied both to the sign to alternate angles, it does not disturb the geometric conditions. The final adjustment is given in the fourth column of the foregoing table.

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[illegible]

[illegible]

The difference between forward and back azimuths are caused by convergence of the meridians towards the poles. This relation is shown in the following sketch.

[illegible] represents the [illegible] the meridian through station A, the line AB, [illegible] to B.

It is evident that the angle [illegible] (or angle [illegible]) is not exactly 180° different from the angle [illegible] (or [illegible] from B to A, which is called the back azimuth [illegible]). [illegible] shows that the azimuth AB [illegible] to the [illegible] and

$\Delta\alpha$ [illegible] is [illegible] westerly azimuth precede [illegible] easterly [illegible] exceeding 180°.

[illegible] (or [illegible] of [illegible]) [illegible] $\Delta\alpha$

[illegible] (or [illegible] of [illegible]) [illegible] $\Delta\alpha'$

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To apply the correction for difference in longitude.

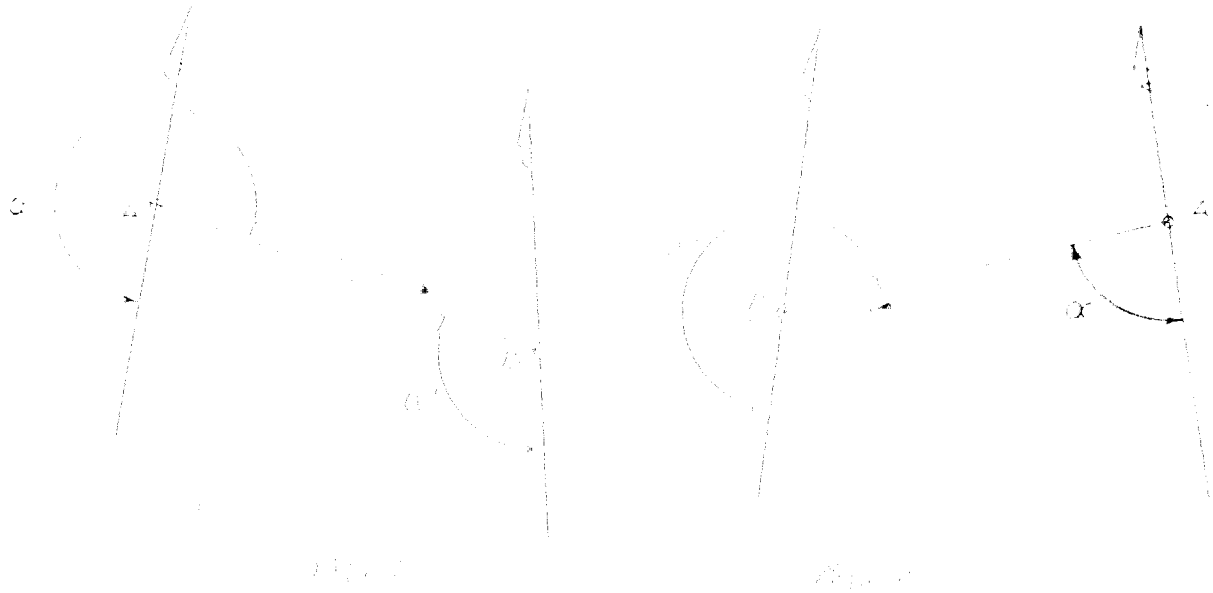

Fig. 1 Fig. 2

Series Arbitrary Arbitrary Series

Note: All meet longitudes are positive in plan.

In Fig. 1 the arbitrary line of longitude is greater than the longitude in succeeding, therefore (Δλ) is minus in plan.

By inspection (θ - θ') is smaller than (θ) therefore a plus correction is applied to the forward azimuth (α) to obtain the back azimuth (α'). (Δλ) and (Δα) are opposite in sign.

In Fig. 2 the arbitrary line of longitude is less than the longitude in succeeding, therefore (Δλ) is plus in sign.

By inspection (θ) is larger than (θ - θ') therefore a minus correction is applied to the forward azimuth (α) to obtain the back azimuth (α'). (Δλ) and (Δα) are opposite in sign.

Note: In each instance the difference in longitude (Δλ) or difference in azimuth (Δα) are opposite in sign.

Arbitrary Series Arbitrary Series

Note: All meet longitudes are minus in sign.

In Fig. 1 the arbitrary of longitude is greater than the longitude in succeeding, therefore the Δλ is plus in sign.

By inspection (θ - θ') is smaller than (θ) therefore a plus correction is applied to the forward azimuth (α) to obtain the back azimuth (α'). (Δλ) and (Δα) are both plus in sign.

23 MARCH 1956

[illegible]

[illegible]

[illegible]

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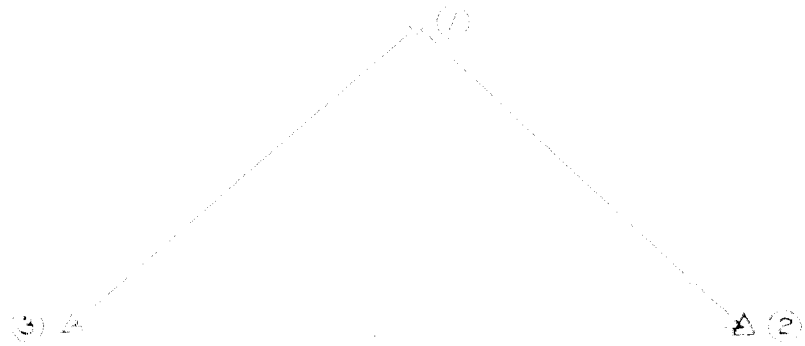
PROCEDURE FOR TRIANGULATION

Problem Type 1 (Triangle)



Known:

Latitude and longitude of stations (1) and (2) and azimuth or back azimuth between them

Length of the sides S_1, S_2, and S_3 in meters

Spherical angles at stations 1, 2, and 3

Required:

Latitude and longitude of station 3 in ordinary and back azimuth of line 3-1, or 3-2

The loxodromic (rhumb line) distances are computed from the latitude equations, angle 1 and 2 being positive and angle 3 negative.

The departures D_1, D_2, D_3 are obtained from Table No. 3. For backing of the new sighting, the others for the latitude of the new station.

After completing all steps (except 7) in the form complete the computations in the following steps (in order of steps):

(5) Compute the log sines and cosines of the forward azimuth (Q) for each side of the form.

(6) Solve the log sin, and log cos for angle that the check has a negative if the new station is in the positive of quadrant of the old station. The second for these for check purposes.

(7) Add the log sin, and log cos for angle with the step 5. Add to obtain the sum which is applied to Q to obtain Q^1. For backing determine the Q on both sides of the line should agree within one tenth of a second of arc.

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POSITION COMPUTATION SECOND ORDER TRIANGULATION

COMPUTED BY _____ DATE _____ B. NO. _____ PAGE _____

(1)	216	27	56.7
(1)	40	59	20.2
(1)	263	27	16.9
(6)		404	29.3

(1)	36	31	17.9
(1)	52	41	28.6

		92	23	17.698	38	20	29.159
(5)			07	14.968		05	06.741 (4)
(5)		92	16	02.730	38	15	22.318 (4)

		4.0271423	
		9.9971600	(2)
		8.5091624	(5)
Sec φ		0.1049921	
		2.6384568	-434.9675 (5)
		9.7917641	
		2.4302209	-269.29 (6)

		3.9925695	
		9.9832015	(2)
		8.5109771	
		2.4867481	
		7.98514	
Sin²		8.87183	
		1.30282	
		8.15979	
		4.9735	
D		2.3804	
		7.3539	
			−Δφ

1st term		+306.7242 (3)
2d term		+0.0144 (3)
3d term		+0.0023 (3)
		+306.7409 (4)

		9.4359133 (2)
		8.5091624 (5)
Sec φ		0.1049921 (5)
		2.0426373 -110.3157
		9.7922254
		1.8348627 - 68.37 (6)

		5.5109843
		1.5949888 -39.3540 (3)
		3.05428
		9.99432
		1.30133
		9.34993 +0.2238 (3)
		3.1899
		2.3801
		5.5700 0 (3)
		-39.1302 (4)

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PROBLEM IN EAST LONGITUDE

23 MARCH 1956

COMPUTATION OF TRIANGLES

Computation of the four triangles of an all-side quadrangle is a required part of the field work in order that it may be established that the observed angles are within tolerances set up by the specifications. This is the first check on the accuracy of the observations so that errors can be within prescribed limits and not need the requirements of the side check.

In the quadrangle shown in the sketch the line MAX-CHARLIE is the base or known line. The expansion of the net is from the line ABLE-DOG as determined from this quadrangle. Two of the computations for the quadrangle are shown on the form which sets up the computations in proper sequence.

The 4 or strongest pair of triangles from which the line ABLE-DOG can be determined are entered first on the form in sections A and B, followed by the second best pair in sections C and D.

The individual triangles are always computed in a clockwise direction with (1) at the new station and (2) and (3) at the stations on the known line. The line 2-3 is always the known line.

Computations are completed in the following order with figures rounded off to the closest hundredth for first order and to the closest tenth for second order triangulation.

(a) Enter the names of the stations and the observed angles in columns 1 and 2 corresponding with the letters in parenthesis in the individual triangles.

(b) The closing error of each triangle is distributed equally, or nearly so, between the three angles and entered in column 3 to give the plane angles which are determined by this operation and entered in column 4 and should total 180°. It should be noted that this distribution of the closing error of the individual triangles does not satisfy the geometric conditions of a quadrilateral adjustment for one of the two possible angles at a station may differ slightly from the correct angle, but this method is satisfactory for the rough and final balancing of the angles and eliminates the side equation adjustment or a more precise adjustment by the method of least squares.

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(d) To complete the first triangle (A), enter logarithms in column 7, enter the logarithm of the known side 2-3, the sum of the log sine of 1 and the log sines of 2 and 3 minus 10 in the row of the logarithms 2-3, 1 and 2. Line 1-3 is the sum of the logarithms 2-3, 1 and 2. Find the logarithms of 1-2 and 1-3 determine the length in meters and enter in column 6. Complete the computation of triangles (B), (C) and (D) in the same manner.

(e) The spherical excess is computed from the formula $e = a_{(\rho)} b_{(\rho)} \times M$ where a, b, and c are the sides and ρ is the radius of the corresponding triangle. Three decimal places are sufficient in computing this quantity.

Obtain log a corresponding to the mean latitude of the quadrangle from S.P.no.8 page 10. Take log b and the logarithm of the logarithm of the sines 2-3, 2 and 1-3 taken from column 7. The sum is the logarithm of the spherical excess which is to be entered in column 8 by distributing this sum equally or nearly so, between the three angles. The correction to plane angles is made to the plane angles and entered in column 9.

Example	Triangle D		
		log a	1.4077
		log b	3.3906
		log c	3.6207
		log sum	4.1787
		log e	0.2777 = 0.6"

The excess of 0.6" is distributed 0.2" each to one of the angles.

(e) The total correction to the observed angle is the difference between it and the spherical angle (column 4). The correction is plus or minus depending on whether the spherical angle is larger or smaller than the observed angle.

SIDE CHECKS. In the computation of a non-fixed quadrangle there are always three lines which have two determinations of their length. One of the requirements of first order triangulation is that the difference between the two values for the logarithm of the length of a line be not greater than two times the log sine difference for one second of the smallest distance angle involved in the computation of either value, or less than this value in the allowance for second order triangulation.

Referring to the following completed table the computation follows:

Line A, 1-2	5.0000 [illegible]	Diff. 1" [illegible]	= 49
" B, 1-2	5.0000000		4
Actual diff.	50	Allowance diff.	170
Line B, 1-3	4.[illegible]	Diff. 1" [illegible]	= 41
" C, 1-3	4.[illegible]		4
Actual diff.	16	Allowance diff.	164
Line B, 1-2	5.[illegible]	Diff. 1" [illegible]	= 55
" D, 1-2	5.[illegible]		4
Actual diff.	[illegible]	Allowance diff.	220

If the computation does not satisfy the conditions of the side check reobserving of one or more angles will be necessary. The most probable angles to remeasure are generally determined by inspection of the computations or by applying a field equation. When these conditions have been satisfied the quadrangle can be considered as meeting the requirements and no further field work is required in this case.

23 MARCH 1956

COMPUTATION OF TRIANGLES

COMPUTED BY [illegible] CHECKED BY [illegible] DATE 8-7-[illegible]

STATION		INCLUDED ANGLE	CORRECTION	CORRECTED ANGLE	SPHERICAL EXCESS	PLANE ANGLE AND DISTANCE	LOGARITHM
2-3							
1	ABLE	[illegible]	[illegible]	[illegible]	0.0	7494.96	3.8747533
2	NAN	[illegible]	[illegible]	[illegible]	0.0	08.0	3.1285782
3	CHARLIE	[illegible]	[illegible]	[illegible]	0.0	08.8	3.9851673
1-3		59.0	[illegible]	[illegible]	0.0	03.5	3.5572850
1-2						9986.49	3.9984998
						7773.20	3.8900165
2-3							3.9984998
1	DOG	[illegible]	[illegible]	[illegible]	0.0	55.0	0.1543401
2	ABLE	[illegible]	[illegible]	[illegible]	0.0	59.0	3.9988873
3	CHARLIE	[illegible]	[illegible]	[illegible]	0.0	03.0	3.8204708
1-3						14181.08	4.1517262
1-2						9401.04	3.9732497
2-3							3.8747833
1	DOG	[illegible]	[illegible]	[illegible]	0.0	15.0	0.0565036
2	NAN	[illegible]	[illegible]	[illegible]	0.0	[illegible]	3.9404709
3	CHARLIE	[illegible]	[illegible]	[illegible]	0.0	12.0	[illegible]
1-3		59.0				[illegible]	4.1517272
1-2						[illegible]	4.1110226
2-3							4.1110226
1	ABLE	[illegible]	[illegible]	[illegible]	0.0	[illegible]	[illegible]
2	NAN	[illegible]	[illegible]	[illegible]	0.0	14.0	[illegible]
3	DOG	[illegible]	[illegible]	[illegible]	0.0	49.9	[illegible]
1-3		59.0				[illegible]	[illegible]
1-2						[illegible]	[illegible]
(1)	(2)	(3)	(4)	(5)		(6)	(7)

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HOLMES & NARVER, INC.

ENGINEERS - CONSTRUCTORS

SURVEY DEPARTMENT

DESCRIPTION & RECOVERY

of

TRIANGULATION STATIONS

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[illegible] TO A [illegible]

Upon establishment of a new station, [illegible] and preferably three reference marks should also be established. The station mark should be a 2-1/2" dia. brass, or other non-ferrous point marker, [illegible] as a bench mark. The station mark should be stamped with the name of the station, U.S.C.&G.S. and the year it is established. The station point should be a punch mark as near the center of the marker as possible. This marker should be set in concrete in such a way that it cannot be easily dislodged. Local conditions should govern this; however, the ideal monument would be a [illegible] reinforced pillar [illegible] to the coral reef underlying the island soil. The reference mark should be a non-ferrous match with a surface large enough to stamp the following on it: [illegible] (2 or 3 lines) - the station name, U.S.C.&G.S. and the date of [illegible]. A 2" [illegible] brass marker is most desirable, but a large [illegible] brass bolt here or pipe [illegible] also acceptable. This marker should be set in a concrete [illegible] 2" [illegible] the top first for the station mark, or [illegible] marker. [illegible] a road end tack in either a concrete slab or the [illegible], a [illegible] (such as a brass escutcheon pin) should be used and the head [illegible] should be large enough to stamp the required data on it.

When the station and the reference marks have been established, a complete description should be prepared covering the following items:

(1) A physical description of the station site and the RM's including what type of marker was used, how it is secured, and how it is set (concrete, pounded into a hole, etc.).

(2) A sketch of the station's location on the island in relation to high tide line, trees, and outstanding buildings or structures.

(3) A measurement of the angle at the station from one of the reference marks from an [illegible] sighting or another station (preferably the central point station (Coral or Johnston Atoll, Lat. 16° 45' N)) or a prominent landmark whose coordinate location is known.

(4) The measured distance from the station mark to each of the Reference Marks and the azimuth between the reference marks.

(5) The elevations of the station with the air reference. In no case is available to obtain the elevation, an elevation should be obtained from vertical observations and note for that purpose. At no time should an assumed elevation be used.

(6) A brief description of the instruments, equipment and methods used in making the measurements in paragraphs 3, 4 and 5.

Where at all practicable the station mark should be witnessed with a triangular wooden barricade and the reference marks by a painted 4 x 4 post on the side away from the station mark.

RECOVERY OF AN EXISTING STATION

The purpose of station recovery is to insure immediately the availability of an existing triangulation station using the geodetic and vertical locations already available without additional field work, and to provide a check on any possible future loss or damage to the station which might occur in nature without further field work.

All previous recovery notes and station description should be made available to the person making the recovery to insure a full and complete recovery of the station.

When the station has been found with the data corresponding to the data required in the preceding section on station description should be obtained. This data should be obtained by or under the same person and using as near the same methods and equipment as was used in the initial station description or recovery. These values should be recorded on a "Recovery Log, Triangulation Station" form which is very similar to the "Description of Triangulation Station" form. Any differences in measured values from previous values should be checked and, if found to be actual changes, should be noted. Any changes in the features of the location which might cause a need for relocating the station should be noted in

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the recovery note and a sketch of the location plotted in context to the sketch required for the Notice. Description sheets should be made in the recovery.

In the event a station or reference mark has been disturbed or damaged in any way, no attempt to correct that should be made by the Indian recovery mission. Instructions for correcting, changes, replacements, etc. will be issued by the Survey Office after evaluation of the Indian recovery notes from the field. When instructions on changes, replacements, etc. are issued, they will be issued in conformity with M. M. G. & G. S. Instructions as outlined in M. M. #2,87, modified to fit details conditions.

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FIELD BOOKS

Survey Department

1. A record must be made of all field survey work in a duplicating Field Book. There are no exceptions. In projects, such as, plane table work, in which the actual work performed is not entered in the Field Book, a Field Book entry must be prepared as outlined in Paragraphs 9 and 11. The data not recorded in a Field Book must show the same information as the Field Book entry.

2. Two Field Books will be carried by each Party Chief. One book will be used for all Domestic (non-scientific) work, the other for Scientific work.

3. In Scientific work, Stations are referred to by number (i.e. not as shot tower, detector, etc.).

4. In Domestic work, all Buildings are referred to by number (i.e. not as mess-hall, water tower, etc.).

5. In both Domestic and Scientific work it is extremely important to show elevations of structures. Unless specifically directed otherwise, this should be in relation to the site datum. The notes must include all the details of the work.

6. Angles turned must show actual details, such as, initial, double or six, and mean. Generally, no pre-planned angles will be shown. Should it be desirable to show a pre-planned angle, it should be clearly labeled as such.

7. Distances measured must show actual details, such as, forward and back measurements, equipment, such as, steel tape, spring balance, etc.

8. Sketches are used to clarify the work performed. When deciding whether one is necessary, remember that the notes will be processed and used by others not as familiar with the circumstances as you may be. Label all points shown and use a north arrow.

9. The first line of the left-hand page must show the specific location and type of work. Examples: Building 20[illegible], Interior Layout; Station 120, W.P. location; Warehouse Area, Topography, Station 100, Levels. On the second line show the site by its current code name, such as, Site Elmer. For work located near a site name (Elmer), use, "The Elmer Reef; Sites Elmer-Fred Lagoon".

10. When continuous pages in the same Field Book are used, it is not necessary to repeat the titling between the pages. The bottom of the first right hand page used must show "continued on page _____". On the following pages, each one must show "continued from page _____" at the top and "continued on page _____" at the bottom of the right hand page. The bottom of the last page used shall show "End of survey". In case the pages used are not in sequence in the Field Book or are in different books, the title shall appear on each page.

11. The first line on the right half of the right hand page is used for the date and beneath it on succeeding lines are the names of the party, state of the weather and the time of starting and stopping work.

12. An index shall be kept on the first page of each Field Book, in the following manner:

PAGE	DESCRIPTION	SITE
[illegible]	Station 100, [illegible]	Ruby
[illegible]	Station 102, [illegible]	Ruby

13. Field Book original pages must be forwarded daily to the Survey Office.

14. <u>ALL</u> FIELD NOTES AND TO BE MADE IN INK. THERE ARE NO EXCEPTIONS.

M. F. Curran:jr
16 August 1956

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FIELD NOTE [illegible]

Field Note original pages (white sheets) are indexed immediately after arriving at the office. They are then thoroughly checked for accuracy and completeness. If the checker finds them unsatisfactory, he returns them to the Chief of Party with a note attached stating the details in question.

When the Field Note originals have been checked and found satisfactory, the checker turns them over to the Department Head. The latter assigns them to a computer or draftsman for necessary action, such as, preparing tabulations, drawings, etc. After all necessary action has been taken, the Field Note originals are filed in the binder labeled with the Field Book number corresponding to that of the Field Notes. At this time a note is made on the Field Note pages in red pencil stating what action was taken.

If no one is available to take the necessary action, the Department Head makes an entry in a pending file. This file is reviewed daily.

When the Chief of Party has used all of the pages in a Field Book from 2 to 30 inclusive, he turns in the Field Book index kept on Page 1. The Field Book originals are checked and the Chief of Party called to account for any missing pages.

The Index of Field Books consists of 3 x 5 inch cards kept in a standard metal file box. A Domestic and a Scientific File is kept for each Atoll. These are subdivided as follows:

DOMESTIC

SITE

Buildings	Numerical order
Roads	Alphabetical order
Sewers	Alphabetical order
Water Lines Electrical Underground Electrical Overhead	Alphabetical order of sheets of Site Plan
Topography	Numerically when not directly related to one of above subdivisions
Hydrography	Numerically when not directly related to one of above subdivisions
Marine Facilities	Numerically when the facility does not have a building number
Horizontal Control	Chronological order
Vertical Control	Chronological order

SCIENTIFIC

Numerical

Station [illegible] and [illegible] only on large sheet [illegible]

Site

Stations [illegible] order

EARTHWORK COMPUTATIONS

COMPUTED BY _____ DATE _____ JOB _____ LOCATION _____

CHECKED BY _____ DATE _____ SHEET _____ OF _____

STATION	DISTANCE	EXCAVATION AREA SQ. FT.	EXCAVATION ½ (A + A')	EXCAVATION CUBIC YARDS	EMBANKMENT AREA SQ. FT.	EMBANKMENT ½ (A + A')	EMBANKMENT CUBIC YARDS
TOTALS (THIS SHEET)			CUT			FILL	
TOTALS BROUGHT FORWARD							
CUMULATIVE TOTALS							

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ENGINEERS - CONSTRUCTORS

EARTHWORK COMPUTATIONS

COMPUTED BY DATE PROJECT LOCATION

CHECKED BY DATE SHEET OF

		EXCAVATION			EMBANKMENT		
STATION	DISTANCE	AREA SQ. FT.	$\frac{1}{2}(A+A')$	CUBIC YARDS	AREA SQ. FT.	$\frac{1}{2}(A+A')$	CUBIC YARDS
TOTALS (THIS SHEET)			CUT			FILL	
TOTALS BROUGHT FORWARD							
CUMULATIVE TOTALS							

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Sub 1

HOLMES & NARVER INC ... CONSTRUCTORS

PLANE COORDINATES

STATION
LOCATION

JOB NO. ____ SHEET ____ OF ____

BEARING | DISTANCE | LATITUDE | DEPARTURE | COORDINATES

22 | 23 | 24 | 25 | 26

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PLANE COORDINATES

STATIONS	BEARING	DISTANCE	LATITUDE	DEPARTURE	COORDINATES NORTH	COORDINATES EAST
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						

LOCATION
PROJECTION

JOB NO.

SHEET OF

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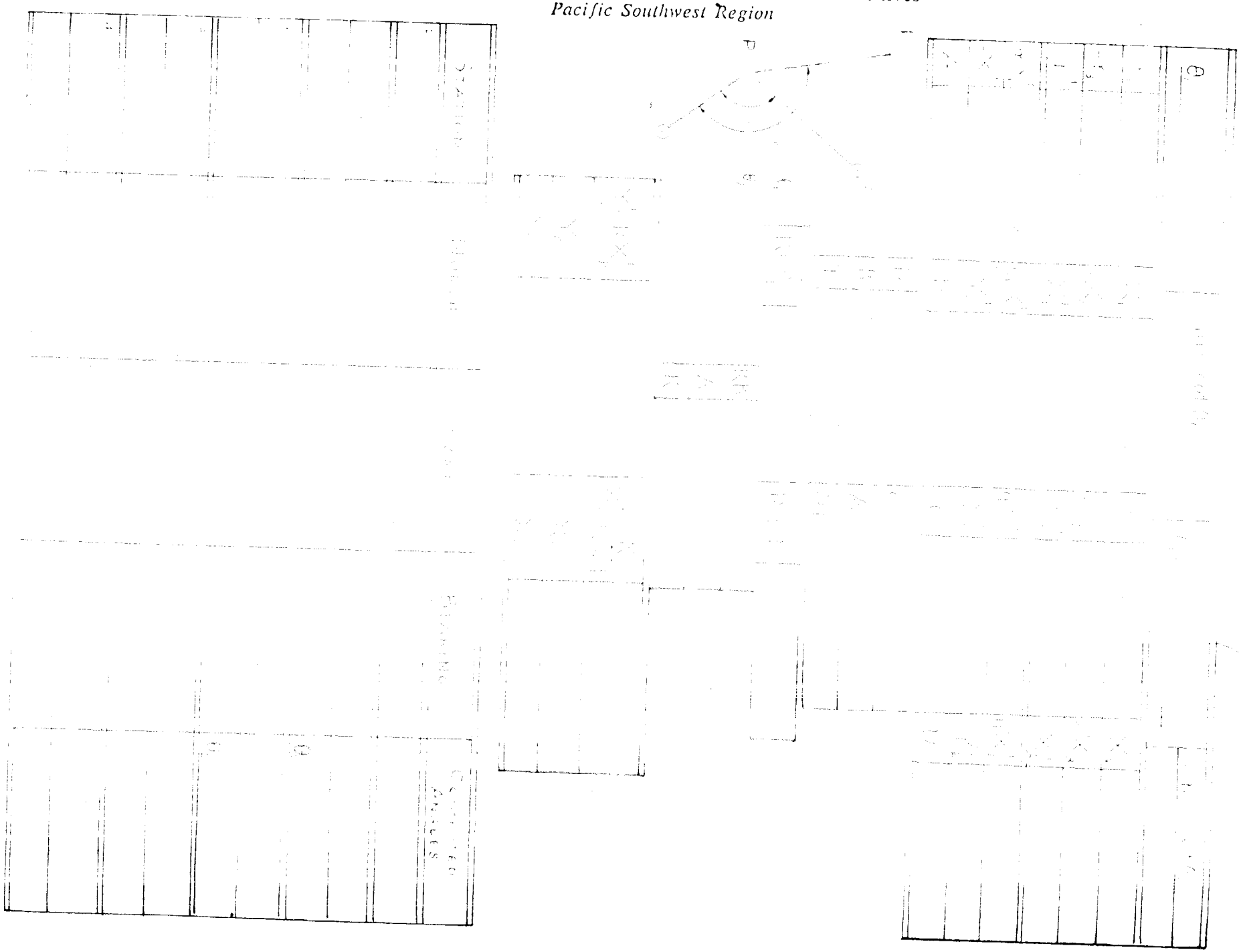

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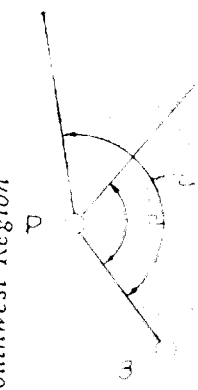

Station	Bearing	Computed Angles
P		
1		
		θ_1
2		
		θ_2
3		
4		

JOB NO _____

HOLMES & NAEYER (INC.) ENGINEERS

COMPUTATION OF TRIANGLES

COMPUTED BY ___ CHECKED BY ___ DATE _____

STATION	OBSERVED ANGLE	CORRECTION	SPHERICAL ANGLE	SPHERICAL EXCESS	PLANE ANGLE AND DISTANCE	LOGARITHM
2-3						
1						
2						
3						
1-3						
1-2						
2-3						
1						
2						
3						
1-3						
1-2						
2-3						
1						
2						
3						
1-3						
1-2						
2-3						
1						
2						
3						
1-3						
1-2						

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JOB NO. _____

HOLMES & NARVER INC. ENGINEERS

COMPUTATION OF TRIANGLES

COMPUTED BY _____ CHECKED BY _____ DATE _____

STATION	OBSERVED ANGLE	CORR-N	SPHERCL ANGLE	SPHERCL EXCESS	PLANE ANGLE AND DISTANCE	LOGARITHM
2-3						
1						
2						
3						
1-3						
1-2						
2-3						
1						
2						
3						
1-3						
1-2						
2-3						
1						
2						
3						
1-3						
1-2						
2-3						
1						
2						
3						
1-3						
1-2						

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HOLMES & NARVER, INC., ENGINEERS

JOB No. ____

ABSTRACT OF WYE LEVELS AND COMPUTATION OF INCLINATION CORRECTIONS.

POLE	DISTANCE	MEAN OF WYE READINGS	INCLINATION CORRECTION	ELEVATION	WYE CORRECTIONS	REMARKS
	FEET	FEET	FEET	FEET	METERS	

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HOLMES & NARVER INC., ENGINEERS

JOB Nº

ABSTRACT OF WYE LEVELS AND COMPUTATION OF INCLINATION CORRECTIONS.

POINT	DISTANCE	MEAN DIFF OF ELEV.	INCLINATION CORRECTION	ELEVATION	MEAN ELEVATION	REMARKS
	METERS	METERS-FEET	MM.	METERS	METERS	

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HOWE & NARSA INC. ENGINEERS

JOB NO. _____

RECORD OF HORIZONTAL DIRECTIONS

OBSERVER _____ INST. NO. _____ STATION _____

RECORDER _____ DATE _____ SET NO. _____

POSITION	STATIONS OBSERVED	TIME	D/R	CIRCLE READING	MEAN	DIRECTION	REMARKS
			D				
			R				
			D				
			R				
			D				
			R				
			D				
			R				
			D				
			R				
			D				
			R				
			D				
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			D				
			R				
			D				
			R				
			D				
			R				
			D				
			R				

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SUR E

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HOLMES & NARVER INC., ENGINEERS

JOB NO._____

RECORD OF HORIZONTAL DIRECTIONS

OBSERVER_____ INST. NO._____ STATION_____

RECORDER_____ DATE_____ SET NO._____

POSITION	STATIONS OBSERVED	TIME	D/R	CIRCLE READING	MEAN	DIRECTION	REMARKS
			D				
			R				
			D				
			R				
			D				
			R				
			D				
			R				
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			R				
			D				
			R				
			D				
			R				

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HOLMES & NARVER, INC., OPERATOR
SURVEY DEPARTMENT

DAILY REPORT

JOB NO. _____ LOCATION _____ DATE _____

WORK REQUESTS

WORK STARTED OR COMPLETED

REMARKS

SIGNED _____

Sur 7

DOUGLAS NARVER, JR. SECRETARY
SURVEY DEPARTMENT

DAILY REPORT

JOB NO. _____ LOCATION _____ DATE _____

WORK STARTED OR COMPLETED

WORK REQUESTS

REMARKS

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SIGNED

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HOLMES & NARVER INC., ENGINEERS

JOB Nº ____

POSITION COMPUTATION SECOND ORDER TRIANGULATION

3d term +

$-\Delta\phi$

Sec ϕ

$\Delta\lambda$

$\sin\frac{1}{2}(\phi+\phi')$

$-\Delta\alpha$

$\sin^2\alpha$

2d term +

3 1 term +

$-\Delta\phi$

Sec ϕ

$\Delta\lambda$

$\sin\frac{1}{2}(\phi+\phi')$

$-\Delta\alpha$

DATE:

COMPUTED:

CHECKED:

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HOLMES & NARVER INC., ENGINEERS

JOB Nº ____

POSITION COMPUTATION SECOND ORDER TRIANGULATION

			°	'	"
α	2	to 3			
3d ∠		8	+		
α	2	to 1			
Δα					
			180	00	00.0
		to 2			

			°	'	"
α	3	to 2			
3d ∠		8	−		
α	3	to 1			
Δα					
			180	00	00.0
α′	1	to 3			

FIRST ANGLE OF TRIANGLE

	°		°	'	"
φ		2	λ		
Δφ			Δλ		
φ′			λ′		

	°	'	"		°	'	"
φ				3	λ		
Δφ					Δλ		
φ′				1	λ′		

					½(φ+φ′)	° ' "				½(φ+φ′)	° '
						Logarithms	Values in seconds		Logarithms	Values in seconds		Logarithms	Values in seconds
					s			s			s		
B					Sin α			Cos α			Sin α		
h		1st term	"		A′			B			A′		
s²					Sec φ′			h		1st term "	Sec φ′		
Sin² α					Δλ		"	s²			Δλ		"
C					Sin ½(φ+φ′)			Sin² α			Sin ½(φ+φ′)		
		2d term	+		−Δα			C		2d term +	−Δα		
h²								h²			DATE:		
D								D			COMPUTED:		
		3d term	+							3d term +	CHECKED:		
		−Δφ								−Δφ			

Sue 8

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HOLMES & NARVER INC - ENGINEERS CONSTRUCTORS

COMPUTATION OF BASE LINE

CALC BY CHKD BY DATE JOB NO LOCATION

SECTION	DATE	DIR OF MEAS	TAPE NO	SUP-PORT	UNCORR LENGTH NO	UNCORR LENGTH METERS	TEMP °C	CORRECTIONS TEMP METERS	CORRECTIONS SET-BACK METERS	CORRECTIONS INCLINATION METERS	CORRECTIONS SEA LEVEL METERS	REDUCED LENGTH METERS	ADOPTED LENGTH METERS-FEET

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HOLMES & NARVER INC.-ENGINEERS CONSTRUCTORS

COMPUTATION OF _____ BASE LINE

CALC BY _____ CHKD BY _____ DATE _____ JOB NO _____ LOCATION _____

SECTION	DATE	DIR OF MEAS	TAPE NO	SUP-PORT	UNCORR. LENGTH		TEMP	CORRECTIONS				REDUCED LENGTH	ADOPTED LENGTH
					NO	METERS		TEMP	SET-UP SET-BACK	INCLINATION	SEA LEVEL		
							"C"	METERS	METERS	METERS	METERS	METERS	METERS-FEET

HOLMES & NARVER, INCORPORATED - CONSULTANTS

RECOVERY NOTE TRIANGULATION STATION

NAME OF STATION: LOCATION: JOB NO.

ESTABLISHED BY

RECOVERED BY: DATE: FIELD BOOK REF.

	DISTANCES AND DIRECTION TO REFERENCE MARKS				
OBJECT	DISTANCES		DIRECTION	AZIMUTH	ELEV
	FEET	METERS			

DETAILED DESCRIPTION OF STATION

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HOLMES & NARVER ENGINEERS-CONSTRUCTORS

RECOVERY NOTE TRIANGULATION STATION

NAME OF STATION_____ LOCATION_____ JOB NO._____

ESTABLISHED BY_____

RECOVERED BY_____ DATE_____ FIELD BOOK REF._____

DISTANCES AND DIRECTIONS TO REFERENCE MARKS					
OBJECT	DISTANCE		DIRECTION	AZIMUTH	ELEV.
	FEET	METERS			

DETAILED DESCRIPTION OF STATION

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HOLMES & NARVER INC. ENGINEERS · CONSTRUCTORS

GEOGRAPHIC POSITIONS

LOCATION _____ ORDER TRIANGULATION

DATUM _____ JOB NO _____ SHEET ____ OF ____

STATION	LATITUDE LONGITUDE	AZIMUTH	BACK AZIMUTH	TO STATION	DISTANCE LOG METERS	DISTANCE METERS	DISTANCE FEET

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HOLMES & NARVER INC. - ENGINEERS - CONSTRUCTORS

GEOGRAPHIC POSITIONS

LOCATION _____

DATUM _____ ORDER _____ TRIANGULATION

JOB NO. _____ SHEET _____ OF _____

STATION	LATITUDE LONGITUDE	AZIMUTH	BACK AZIMUTH	FOR STATION	DISTANCE LOG METERS	DISTANCE METERS	DISTANCE FEET

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CORRECTIONS FOR EARTH'S CURVATURE AND REFRACTION

Height (in ft.) = Dist (in miles) x 0.573 Dist (in miles) = $\sqrt{\text{Height (in ft.) x 1.32}}$

TENTHS

		0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
0				0.1	0.2	0.1	0.2	0.3	0.4	0.5
1	0.6	0.7	0.8	1.0	1.1	1.3	1.5	1.7	1.9	2.1
2	2.3	2.5	2.8	3.0	3.3	3.6	3.9	4.2	4.5	4.8
3	5.2	5.5	5.9	6.3	6.6	7.0	7.4	7.9	8.3	8.7
4	9.2	9.6	10.1	10.6	11.1	11.6	12.1	12.7	13.2	13.8
5	14.4	14.9	15.5	16.1	16.7	17.4	18.0	18.6	19.3	20.0
6	20.6	21.4	22.1	22.8	23.5	24.3	25.0	25.8	26.6	27.3
7	28.1	28.9	29.8	30.6	31.4	32.3	33.2	34.0	34.9	35.8
8	36.7	37.7	38.6	39.5	40.5	41.5	42.5	43.4	44.5	45.5
9	46.5	47.5	48.6	49.6	50.7	51.8	52.9	54.0	55.1	56.3
10	57.4	58.5	59.7	60.9	62.1	63.3	64.5	65.7	66.9	68.2
11	69.4	70.7	72.[illegible]	73.3	74.6	75.9	77.2	78.6	79.9	81.3
12	82.6	84.0	85.4	86.8	88.2	89.7	91.1	92.6	94.0	95.5
13	97.0	98.5	100.[illegible]	101.5	103.[illegible]	104.6	106.1	107.7	109.3	110.9
14	112.5	114.1	115.7	117.3	119.[illegible]	120.6	122.3	124.0	125.7	127.4
15	129.1	130.8	132.6	134.3	136.1	137.9	139.6	141.4	143.3	145.1
16	146.9	148.7	150.6	152.5	154.3	156.2	158.1	160.0	162.0	163.9
17	165.8	167.8	169.8	171.7	173.7	175.7	177.8	179.8	181.8	183.9
18	185.9	188.0	190.1	192.2	194.3	196.4	198.5	200.7	202.8	205.0
19	207.2	209.3	211.[illegible]	213.7	216.[illegible]	218.2	220.4	222.7	225.0	227.2
20	229.5	231.8	234.1	236.5	238.8	241.2	243.5	245.9	248.3	250.7
21	253.1	255.5	257.[illegible]	260.3	262.8	265.3	267.7	270.2	272.7	275.2
22	277.7	280.3	282.[illegible]	285.4	287.[illegible]	290.5	293.1	295.7	298.3	300.9
23	303.6	306.2	308.[illegible]	311.5	314.[illegible]	316.9	319.6	322.3	325.0	327.8
24	330.5	333.3	336.[illegible]	338.8	341.[illegible]	344.4	347.3	350.1	352.9	355.8
25	358.6	361.5	364.4	367.3	370.[illegible]	373.1	376.1	379.0	382.0	384.9
26	387.9	390.9	393.[illegible]	396.9	399.[illegible]	403.0	406.0	409.1	412.2	415.2
27	418.3	421.4	424.[illegible]	427.7	430.[illegible]	434.0	437.1	440.3	443.5	446.7
28	449.9	453.1	456.[illegible]	459.6	462.[illegible]	466.1	469.4	472.7	476.0	479.3
29	482.6	486.9	489.[illegible]	492.6	496.[illegible]	499.4	502.8	506.2	509.6	513.0
30	516.4	519.9	523.4	526.8	530.3	533.8	537.31	540.8	544.4	547.9
31	551.4	555.0	558.[illegible]	562.2	565.8	569.4	573.0	576.6	580.3	583.9
32	587.6	591.3	595.[illegible]	598.7	602.4	606.1	609.8	613.6	617.4	621.1
33	624.9	628.7	632.[illegible]	636.3	640.[illegible]	644.[illegible]	647.8	651.7	655.6	659.5
34	663.3	667.3	671.[illegible]	675.1	679.[illegible]	683.[illegible]	687.0	690.9	694.9	698.9
35	703.0	707.0	711.[illegible]	715.0	719.[illegible]	723.2	727.3	731.3	735.4	739.6
		0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9

(0.5738333)

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TEMPERATURE CORRECTION - STEEL TAPE
CALIBRATED AT 68°

		0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15
66	70	384	1153	1923	2692	3461	4230	5000	5769	6538	7307	8076	8846	9615	10384	11153	11923
64°	72	192	576	961	1346	1730	2115	2500	2884	3269	3653	4038	4423	4807	5192	5576	5961
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1923	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1442	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	846	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	80	[illegible]	[illegible]	[illegible]	448	576	705	833	961	1089	1217	1346	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	384	494	[illegible]	14	824	934	1043	[illegible]	1263	1373	1483	1593	1703
[illegible]	84	[illegible]	144	240	336	432	528	[illegible]	721	817	913	[illegible]	1105	1201	1298	1394	1490
50	86	[illegible]	128	213	299	384	470	555	641	726	811	[illegible]	982	1068	1153	1239	1324
[illegible]	88	[illegible]	[illegible]	192	[illegible]	346	423	500	576	653	730	[illegible]	884	961	1038	[illegible]	1192
46	[illegible]	[illegible]	[illegible]	174	244	314	384	454	524	[illegible]	664	[illegible]	[illegible]	874	944	[illegible]	1183
44	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	238	352	416	[illegible]	544	[illegible]	[illegible]	[illegible]	801	[illegible]	[illegible]	993
[illegible]	94	[illegible]	[illegible]	147	[illegible]	[illegible]	325	[illegible]	443	[illegible]	[illegible]	[illegible]	[illegible]	739	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	56	741	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	128	[illegible]	230	282	333	384	435	487	538	589	641	692	743	794
[illegible]	100	[illegible]	72	120	168	216	264	312	360	408	456	504	[illegible]	600	649	697	745
34°	102	[illegible]	67	113	158	203	248	294	339	384	429	475	520	565	610	656	701
32°	104	21	64	106	149	192	235	277	320	363	405	448	491	534	576	619	662
30°	106	20	60	101	141	182	222	263	303	344	384	425	465	506	546	587	627
28°	108	19	57	96	134	173	211	250	288	326	365	403	442	480	519	557	596
26°	110	18	54	91	128	164	201	238	274	311	347	384	421	457	494	531	567
24°	112	17	52	87	122	157	192	227	262	297	332	367	402	437	472	506	541
22°	114	16	50	83	117	150	183	217	250	284	317	351	384	418	451	484	518
20°	116	16	48	80	112	144	176	208	240	272	304	336	368	400	432	464	496
18°	118	15	46	76	107	138	169	200	230	261	292	323	353	384	415	446	476
16°	120	14	44	73	103	133	162	192	221	251	281	310	340	369	399	428	458

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CHORD AND DEFLECTION TABLE
FOR CURVES OF STANDARD RADII

CHORD = 2R X SIN (DEFL. FOR 1 ARC LENGTH)

DEFL. FOR 1' OF ARC = $\frac{1718.8733}{R}$

RADIUS	LENGTH OF ARC	DEFLECTION FOR ONE ARC LENGTH	CHORD	DEFLECTION FOR A ONE FOOT ARC
75	25	9°-32'-57.5"	24.884	22.91831'
100	"	7°-09'-43.1"	24.935	17.18873'
125	"	5°-43'-46.5"	24.958	13.75009'
150	"	4°-46'-28.7"	24.971	11.45916'
175	"	4°-05'-33.2"	24.979	9.82213'
200	"	3°-34'-51.6"	24.984	8.59437'
225	"	3°-10'-59.2"	24.987	7.63944'
250	"	2°-51'-53.2"	24.990	6.87549'
275	"	2°-36'-15.7"	24.991	6.25045'
300	"	2°-23'-14.4"	24.993	5.72958'
325	50	4°-24'-26.5"	49.951	5.28884'
350	"	4°-05'-33.2"	49.958	4.91107'
375	"	3°-49'-11.0"	49.963	4.58356'
400	"	3°-34'-51.6"	49.967	4.29718'
425	"	3°-22'-13.2"	49.971	4.04441'
450	"	3°-10'-59.2"	49.974	3.81972'
475	"	3°-00'-56.0"	49.977	3.61868'
500	"	2°-51'-53.2"	49.979	3.43775'
525	"	2°-43'-42.1"	49.981	3.27404'
550	"	2°-36'-15.7"	49.983	3.12522'
575	"	2°-29'-28.0"	49.984	2.98934'
600	"	2°-23'-14.4"	49.986	2.86479'
700	"	2°-02'-46.6"	49.989	2.45553'
800	"	1°-47'-25.8"	49.992	2.14859'
900	"	1°-35'-29.6"	49.994	1.90986'
1000	"	1°-25'-56.6"	49.995	1.71887'
1100	"	1°-18'-07.8"	49.995	1.56261'
1200	"	1°-11'-37.2"	49.996	1.43239'
1300	"	1°-06'-06.6"	49.996	1.32221'
1400	"	1°-01'-23.3"	49.997	1.22777'
1500	"	0°-57'-17.8"	49.997	1.14592'
1600	"	0°-53'-42.9"	49.998	1.07430'
1700	"	0°-50'-33.3"	49.998	1.01110'
1800	"	0°-47'-44.8"	49.998	0.95493'
1900	"	0°-45'-14.0"	49.998	0.90467'
2000	"	0°-42'-58.3"	49.998	0.85944
2250	"	0°-38'-11.8"	49.998	0.76394'
2500	"	0°-34'-22.6"	49.998	0.68755'
2750	"	0°-31'-15.1"	49.999	0.62504'
3000	"	0°-28'-38.8"	49.999	0.57296'
3250	"	0°-26'-26.6"	49.999	0.52888'
3500	"	0°-24'-33.3"	49.999	0.49111'
3750	"	0°-22'-55.1"	50.000	0.45837'
4000	"	0°-21'-29.2"	50.000	0.42972'
4250	"	0°-20'-13.3"	50.000	0.40444'
4500	"	0°-19'-05.9"	50.000	0.38197'
4750	"	0°-[illegible]'-[illegible]"	50.000	0.36187'
5000	"	0°-[illegible]'-[illegible]"	50.000	0.34377'
5500	"	0°-[illegible]'-[illegible]"	50.000	0.31252'
[illegible]	"	0°-[illegible]'-[illegible]"	50.000	0.28648'

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TEMPERATURE CORRECTION - STEEL TAPE
CALIBRATED AT 84°

	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15
82° 86	384	1153	1923	2692	3461	4230	5000	5769	6538	7307	8076	8846	9615	10384	11153	11923
80° 88	132	576	961	1346	1730	2115	2500	2884	3269	3653	4038	4423	4807	5192	5576	5961
78° 90	128	384	641	897	1153	1410	1666	1923	2179	2436	2692	2948	3205	3461	3717	3974
76° 92	[illegible]	288	480	673	865	1057	1250	1442	1634	1826	2019	2211	2403	2596	2788	2980
74° 94	[illegible]	[illegible]	[illegible]	384	538	[illegible]	846	1000	1153	1307	1461	1615	1769	1923	2076	2230	2384
72° 96	64	[illegible]	[illegible]	320	448	576	705	833	961	1089	1217	1346	1474	1602	1730	1858	1987
[illegible] 98	64	64	64	384	494	604	714	824	934	1043	1153	1263	1373	1483	1593	1703
[illegible] 100	48	144	240	336	432	528	625	721	817	913	1009	1105	1201	1298	1394	1490
[illegible] 102	[illegible]	128	213	299	384	470	555	641	726	811	897	982	1068	1153	1239	1324
64° 104	[illegible]	96	192	269	346	423	500	576	653	730	807	884	961	1038	1115	1192
[illegible] 106	[illegible]	64	124	244	314	384	464	524	594	664	734	804	874	944	1013	1083
[illegible] 108	[illegible]	32	96	160	224	288	352	416	480	544	608	673	[illegible]	801	865	929	993
[illegible] 110	[illegible]	[illegible]	[illegible]	48	[illegible]	[illegible]	325	384	443	502	562	621	[illegible]	739	798	857	[illegible]
[illegible] 112	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	686	41	796	851
[illegible] 114	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	288	333	384	435	487	538	589	641	692	743	794
[illegible] 116	[illegible]	[illegible]	122	168	216	264	312	360	408	456	504	552	600	649	697	745
[illegible] 118	[illegible]	[illegible]	113	158	203	248	294	339	384	429	475	520	565	610	656	701
48° 120	[illegible]	64	106	149	192	235	277	320	363	405	448	491	534	576	619	662
46° 122	[illegible]	[illegible]	101	141	182	222	263	303	344	384	425	465	506	546	587	627
44° 124	19	57	96	134	173	211	250	288	326	365	403	442	480	519	557	596
42° 126	18	54	91	128	164	201	238	274	311	347	384	421	457	494	531	567
40° 128	17	52	87	122	157	192	227	262	297	332	367	402	437	472	506	541
38° 130	16	50	83	117	150	183	217	250	284	317	351	384	418	451	484	518
36° 132	16	48	80	112	144	176	208	240	272	304	336	368	400	432	464	496
34° 134	15	46	76	107	138	169	200	230	261	292	323	353	384	415	446	476
32° 136	14	44	73	103	133	162	192	221	251	281	310	340	369	399	428	458

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HOLMES & NARVER, INC. ENGINEERS

GRADE SHEET

CALC. BY

CHECKED BY _____ DATE _____

JOB NO _____

LOCATION _____

STA.	GRADE	ELEV.	CUT	FILL	STA.	GRADE	ELEV.	CUT	FILL

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HOLMES & NARVER, INC. ENGINEERS

GRADE SHEETS

CALC. BY _____

CHECKED BY _____ DATE _____

JOB NO _____

LOCATION _____

STA.	GRADE	ELEV.	CUT	FILL	STA.	GRADE	ELEV.	CUT	FILL

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Pacific Southwest Region

HOLMES & NARVER INC., ENGINEERS JOB NO.

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION LOCATION

CHIEF OF PARTY

DATE

DISTANCES AND DIRECTIONS TO REFERENCE MARKS

OBJECT	DISTANCE		DIRECTION	AZIMUTH
	METERS	FEET		

ELEV. OF MARK ABOVE MLWS

HEIGHT OF TELESCOPE ABOVE MARK

HEIGHT OF LIGHT ABOVE MARK

DETAILED DESCRIPTION

DESCRIBED BY

MARKED BY

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Pacific Southwest Region

HOLMES & NARVER INC., ENGINEERS

JOB NO._____

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION_____ LOCATION_____

CHIEF OF PARTY_____

DATE_____

DISTANCES AND DIRECTIONS TO REFERENCE MARKS				
OBJECT	DISTANCE		DIRECTION	AZIMUTH
	METERS	FEET		

ELEV. OF MARK ABOVE MLWS_____

HEIGHT OF TELESCOPE ABOVE MARK_____

HEIGHT OF LIGHT ABOVE MARK_____

DETAILED DESCRIPTION.

DESCRIBED BY_____

MARKED BY:_____

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Degrees						Minutes		Seconds	
0°	0.0000000000	60	1.0471976612	120	2.0943951224	0'	0.0000000000	0"	0.0000000000
1	0.0174532925	61	1.0646508437	121	2.1118484049	1	.0002908882	1	0.0000048481
2	0.0349065850	62	1.0821041362	122	2.1293016974	2	.0005817764	2	0.0000096963
3	0.0523598776	63	1.0995574288	123	2.1467549900	3	.0008726646	3	0.0000145444
4	0.0698131701	64	1.1170107213	124	2.1642082825	4	.0011635528	4	0.0000193925
5	0.0872664626	65	1.1344640138	125	2.1816615750	5	.0014544410	5	0.0000242407
6	0.1047197551	66	1.1519173063	126	2.1991148675	6	.0017453293	6	0.0000290888
7	0.1221730476	67	1.1693705988	127	2.2165681600	7	.0020362175	7	0.0000339370
8	0.1396263402	68	1.1868238914	128	2.2340214426	8	.0023271057	8	0.0000387851
9	0.1570796327	69	1.2042771839	129	2.2514747351	9	.0026179939	9	0.0000436332
10	0.1745329252	70	1.2217304764	130	2.2689280276	10	0.0029088821	10	0.0000484814
11	0.1919862177	71	1.2391837689	131	2.2863813201	11	.0031997703	11	0.0000533295
12	0.2094395102	72	1.2566370614	132	2.3038346126	12	.0034906585	12	0.0000581776
13	0.2268928028	73	1.2740903540	133	2.3212879052	13	.0037815467	13	0.0000630258
14	0.2443460953	74	1.2915436465	134	2.3387411977	14	.0040724349	14	0.0000678739
15	0.2617993878	75	1.3089969390	135	2.3561944902	15	.0043633231	15	0.0000727221
16	0.2792526803	76	1.3264502315	136	2.3736477827	16	.0046542113	16	0.0000775702
17	0.2967059728	77	1.3439035240	137	2.3911010752	17	0.0049450995	17	0.0000824183
18	0.3141592654	78	1.3613568166	138	2.4085543678	18	0.0052359878	18	0.0000872665
19	0.3316125579	79	1.3788101091	139	2.4260076603	19	0.0055268760	19	0.0000921146
20	0.3490658504	80	1.3962634016	140	2.4434609528	20	0.0058177642	20	0.0000969627
21	0.3665191429	81	1.4137166941	141	2.4609142453	21	0.0061086524	21	0.0001018109
22	0.3839724354	82	1.4311699866	142	2.4783675378	22	0.0063995406	22	0.0001066590
23	0.4014257280	83	1.4486232792	143	2.4958208304	23	0.0066904288	23	0.0001115071
24	0.4188790205	84	1.4660765717	144	2.5132741229	24	0.0069813170	24	0.0001163553
25	0.4363323130	85	1.4835298642	145	2.5307274154	25	0.0072722052	25	0.0001212034
26	0.4537856055	86	1.5009831567	146	2.5481807079	26	0.0075630934	26	0.0001260516
27	0.4712388980	87	1.5184364492	147	2.5656340004	27	0.0078539816	27	0.0001308997
28	0.4886921906	88	1.5358897418	148	2.5830872930	28	0.0081448698	28	0.0001357478
29	0.5061454831	89	1.5533430343	149	2.6005405855	29	0.0084357581	29	0.0001405960
30	0.5235987756	90	1.5707963268	150	2.6179938780	30	0.0087266463	30	0.0001454441
31	0.5410520681	91	1.5882496193	151	2.6354471705	31	0.0090175345	31	0.0001502922
32	0.5585053606	92	1.6057029118	152	2.6529004630	32	0.0093084227	32	0.0001551404
33	0.5759586532	93	1.6231562044	153	2.6703537556	33	0.0095993109	33	0.0001599885
34	0.5934119457	94	1.6406094969	154	2.6878070481	34	0.0098901991	34	0.0001648367
35	0.6108652382	95	1.6580627894	155	2.7052603406	35	0.0101810873	35	0.0001696848
36	0.6283185307	96	1.6755160819	156	2.7227136331	36	0.0104719755	36	0.0001745329
37	0.6457718232	97	1.6929693744	157	2.7401669256	37	0.0107628637	37	0.0001793811
38	0.6632251158	98	1.7104226670	158	2.7576202182	38	0.0110537519	38	0.0001842292
39	0.6806784083	99	1.7278759595	159	2.7750735107	39	0.0113446401	39	0.0001890773
40	0.6981317008	100	1.7453292520	160	2.7925268032	40	0.0116355283	40	0.0001939255
41	0.7155849933	101	1.7627825445	161	2.8099800957	41	0.0119264166	41	0.0001987736
42	0.7330382858	102	1.7802358370	162	2.8274333882	42	0.0122173048	42	0.0002036217
43	0.7504915784	103	1.7976891296	163	2.8448866808	43	0.0125081930	43	0.0002084699
44	0.7679448709	104	1.8151424221	164	2.8623399733	44	0.0127990812	44	0.0002133180
45	0.7853981634	105	1.8325957146	165	2.8797932658	45	0.0130899694	45	0.0002181662
46	0.8028514559	106	1.8500490071	166	2.8972465583	46	0.0133808576	46	0.0002230143
47	0.8203047484	107	1.8675022996	167	2.9146998508	47	0.0136717458	47	0.0002278624
48	0.8377580410	108	1.8849555922	168	2.9321531434	48	0.0139626340	48	0.0002327106
49	0.8552113335	109	1.9024088847	169	2.9496064359	49	0.0142535222	49	0.0002375587
50	0.8726646260	110	1.9198621772	170	2.9670597284	50	0.0145444104	50	0.0002424068
51	0.8901179185	111	1.9373154697	171	2.9845130209	51	0.0148352986	51	0.0002472550
52	0.9075712110	112	1.9547687622	172	[illegible]	52	0.0151261869	52	0.0002521031
53	0.9250245036	113	1.9722220548	173	[illegible]	53	0.0154170751	53	0.0002569513
54	0.9424777961	114	1.9896753473	174	[illegible]	54	0.0157079633	54	0.0002617994
55	0.9599310886	115	2.0071286398	175	[illegible]	55	0.0159988515	55	0.0002666475
56	0.9773843811	116	2.0245819323	176	[illegible]	56	0.0162897397	56	0.0002714957
57	0.9948376736	117	2.0420352248	177	[illegible]	57	0.0165806279	57	0.0002763438
58	1.0122909662	118	2.0594885174	178	[illegible]	58	0.0168715161	58	0.0002811919
59	1.0297442587	119	2.0769418099	179	[illegible]	59	0.0171624043	59	0.0002860401
60	1.0471976612	120	2.0943951224	180	[illegible]	60	0.0174532925	60	0.0002908882

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TEMPERATURE CORRECTION - STEEL TAPE
CALIBRATED AT 76°

	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15
4° 78	384	1153	1922	2692	3461	4230	5000	5769	6538	7307	8076	8846	9615	10384	11153	11923
[illegible] 80	[illegible]	[illegible]	[illegible]	2040	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	4038	[illegible]	[illegible]	[illegible]	5576	[illegible]
[illegible] 82	[illegible]	[illegible]	41	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2690	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	48	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	44	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1296	[illegible]	[illegible]
[illegible] 94	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	470	[illegible]	641	726	[illegible]	[illegible]	[illegible]	[illegible]	1153	[illegible]	[illegible]
[illegible] 96	[illegible]	[illegible]	192	[illegible]	347	423	[illegible]	576	653	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	544	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	564	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	442	461	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	344	384	[illegible]	[illegible]	[illegible]	548	[illegible]	[illegible]
36° 116	[illegible]	[illegible]	[illegible]	134	[illegible]	211	[illegible]	[illegible]	[illegible]	365	403	442	480	519	557	[illegible]
34° 118	[illegible]	54	[illegible]	126	164	201	[illegible]	[illegible]	[illegible]	347	384	421	457	494	531	[illegible]
32° 120	[illegible]	[illegible]	[illegible]	[illegible]	157	[illegible]	[illegible]	[illegible]	[illegible]	332	367	402	437	472	[illegible]	541
[illegible] 122	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	418	451	484	[illegible]
28° 124	[illegible]	[illegible]	[illegible]	[illegible]	144	[illegible]	[illegible]	[illegible]	[illegible]	304	[illegible]	[illegible]	400	[illegible]	464	[illegible]
26° 126	[illegible]	46	[illegible]	[illegible]	139	169	200	[illegible]	[illegible]	292	323	353	384	415	446	476
24° 128	[illegible]	[illegible]	[illegible]	103	[illegible]	162	[illegible]	[illegible]	[illegible]	[illegible]	320	340	369	399	428	458

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TEMPERATURE CORRECTION - STEEL TAPE
CALIBRATED AT 76°

	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15
[illegible]	[illegible]	[illegible]	[illegible]	2532	3461	4230	5000	5769	6538	7307	8076	8846	9615	10384	11153	11923
[illegible]	80	[illegible]	[illegible]	[illegible]	1346	1730	2115	[illegible]	2884	3269	3653	4038	4423	4807	5192	5576	5961
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	42	[illegible]	[illegible]	[illegible]	[illegible]	2692	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	84	[illegible]	[illegible]	[illegible]	[illegible]	468	[illegible]	1288	1442	1634	1826	2019	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	446	[illegible]	1152	[illegible]	[illegible]	1611	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	448	[illegible]	705	933	961	[illegible]	1217	1346	[illegible]	1602	1730	1858	1987
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	194	494	594	694	794	894	994	1093	1193	1373	1483	1593	1703
[illegible]	92	[illegible]	44	[illegible]	336	432	528	[illegible]	721	817	913	[illegible]	[illegible]	1201	1298	1394	1490
58	94	42	128	217	299	384	470	555	641	726	811	897	982	1068	1153	1239	1324
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	746	423	[illegible]	576	[illegible]	[illegible]	[illegible]	364	[illegible]	1038	1115	1192
54	98	[illegible]	124	174	244	314	384	454	[illegible]	[illegible]	664	[illegible]	[illegible]	[illegible]	944	1013	1083
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	4	[illegible]	352	415	[illegible]	544	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	325	364	443	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	857	[illegible]
[illegible]	4	[illegible]	[illegible]	[illegible]	[illegible]	4	[illegible]	[illegible]	[illegible]	41	[illegible]	[illegible]	[illegible]	[illegible]	41	[illegible]	[illegible]
[illegible]	6	[illegible]	[illegible]	[illegible]	9	230	262	333	384	435	487	[illegible]	589	641	692	743	794
[illegible]	13	[illegible]	[illegible]	[illegible]	168	216	264	312	360	408	456	504	[illegible]	600	649	697	745
22°110	[illegible]	[illegible]	113	158	203	248	294	339	384	429	475	520	565	610	656	701
20°112	[illegible]	54	109	149	192	235	277	320	363	405	448	491	534	576	619	662
38°114	[illegible]	60	101	141	182	222	263	303	344	384	425	465	506	546	587	627
36°116	13	57	96	134	173	211	250	289	328	366	403	442	480	519	557	596
34°118	15	54	91	128	164	201	238	274	311	347	384	421	457	494	531	567
32°120	13	52	[illegible]	122	157	192	227	262	297	332	367	402	437	472	506	541
30°122	15	50	83	117	150	183	217	250	284	317	351	384	418	451	484	518
28°124	[illegible]	48	80	112	144	176	208	240	272	304	336	368	400	432	464	496
26°126	[illegible]	46	76	107	138	169	200	230	261	292	323	353	384	415	446	476
24°128	[illegible]	44	[illegible]	103	133	162	192	221	251	281	310	340	369	399	428	458

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Sue 20

HOLMES & NARVER INC., ENGINEERS

JOB No.

LIST OF DIRECTIONS

STATION

DATE

CHIEF OF PARTY

COMPUTED BY

OBSERVER

CHECKED BY

OBSERVED STATION	OBSERVED DIRECTION	ECC RED	SEA LEVEL RED	CORRECTED DIR. ZERO INITIAL	ADJ. DIR.
	0° 00' 00.00"			0° 00' 00.00"	

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Pacific Southwest Region

HOLMES & NARVER INC., ENGINEERS

JOB NO. ____

LIST OF DIRECTIONS

STATION _____ DATE _____

CHIEF OF PARTY _____ COMPUTED BY _____

OBSERVER _____ CHECKED BY _____

OBSERVED STATION	OBSERVED DIRECTION	ECC. RED.	SEA LEVEL RED.	CORRECTED DIR. ZERO INITIAL	ADJ. DIR.
	0° 00' 00.00"			0° 00' 00.00"	

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HOLMES & NARVER INC. ENGINEERS

JOB NO. ____

ABSTRACT OF DIRECTIONS

STATION _____ COMPUTED BY _____ DATE _____

OBSERVER _____ CHECKED BY _____ INST. _____

POSITION		STATIONS OBSERVED			
	INITIAL 0° 00'				
1	0.00'				
2	0.00'				
3	0.00'				
4	0.00'				
5	0.00'				
6	0.00'				
7	0.00'				
8	0.00'				
9	0.00'				
10	0.00'				
11	0.00'				
12	0.00'				
13	0.00'				
14	0.00'				
15	0.00'				
16	0.00'				
SUM					
MEAN					
CORR. FOR ECC.					
DIRECTION					

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Pacific Southwest Region

JOB NO. ____

HOLMES & NARVER INC., ENGINEERS

ABSTRACT OF DIRECTIONS

STATION _____ COMPUTED BY _____ DATE _____

OBSERVER _____ CHECKED BY _____ INST. _____

POSITION	STATIONS OBSERVED					
	INITIAL 0° 00′					
1	0.00"					
2	0.00"					
3	0.00"					
4	0.00"					
5	0.00"					
6	0.00					
7	0.00"					
8	0.00					
9	0.00"					
10	0.00"					
11	0.00"					
12	0.00"					
13	0.00"					
14	0.00"					
15	0.00"					
16	0.00"					
SUM						
MEAN						
CORR. FOR ECC.						
DIRECTION						

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TEMPERATURE RRECTION TABLE

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Coefficient of Expansion - 0 000000[illegible]
Standard Temperature - 20°C
Indicated corrections are decimal parts of a meter in the 5th place and are plus for temperatures above 20°

LENGTH IN METERS

TEMP °C	1	2	3	4	5	10	15	20	25	30	35	40	45	50
21							1	1	1	1	1	2	2	2
22						1	1	2	2	2	3	3	4	4
23					1	1	2	2	3	4	4	5	5	6
24				1	1	2	2	3	4	5	6	6	7	8
25			[illegible]	[illegible]	[illegible]	2	3	4	5	6	7	8	9	10
26			[illegible]	[illegible]	[illegible]	2	4	5	6	7	8	10	11	12
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

CONVERSION TABLE

FEET	to	METERS
1		.3048006
2		.6096012
3		.9144018
[illegible]		[illegible]

TEMPERATURE CORRECTION TABLE

Coefficient of Expansion - 0.000000[illegible]

Standard Temperature - 20° C

Indicated corrections are decimal parts of a meter in the 5th place and are plus for temperatures above 20°

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LENGTH IN METERS

TEMP. C°	1	2	3	4	5	10	15	20	25	30	35	40	45	50
21							1	1	1	1	1	2	2	2
22						1	1	2	2	2	3	3	4	4
23					1	1	2	2	3	4	4	5	5	6
24				1	1	2	2	3	4	5	6	6	7	8
25			1	1	1	2	3	4	5	6	7	8	9	10
26			1	1	1	2	4	5	6	7	8	10	11	12
27		1	1	1	1	3	4	6	7	8	10	11	13	14
28		1	1	1	2	3	5	6	8	10	11	13	14	16
29		1	1	1	2	4	5	7	9	11	13	14	16	18
30		1	1	2	2	4	6	8	10	12	14	16	18	20
31		1	1	2	2	4	7	9	11	13	16	18	20	22
32		1	1	2	2	5	7	10	12	14	17	19	22	24
33	1	1	2	2	3	5	8	10	13	16	18	21	23	26
34	1	1	2	2	3	6	8	11	14	17	20	22	25	28
35	1	1	2	2	3	6	9	12	15	18	21	24	27	30
36	1	1	2	3	3	6	10	13	16	19	23	26	29	32
37	1	1	2	3	3	7	10	14	17	20	24	27	31	34
38	1	1	2	3	4	7	11	14	18	22	26	29	32	36
39	1	1	2	3	4	8	11	15	19	23	27	30	34	38
40	1	1	2	3	4	8	12	16	20	24	28	32	36	40
41	1	1	2	3	4	8	13	17	21	25	29	34	38	42
42	1	2	2	4	4	9	13	18	22	26	31	35	40	44
43	1	2	3	4	5	9	14	18	23	28	32	37	41	46
44	1	2	3	4	5	10	14	19	24	29	34	38	43	48
45	1	2	3	4	5	10	15	20	25	30	35	40	45	50

CONVERSION TABLE

FEET	to	METERS
1		.3048006
2		.6096012
3		.9144018
4		1.2192024
5		1.5240030
6		1.8288037
7		2.1336043
8		2.4384049
9		2.7432055
10		3.0480061
20		6.0960122
30		9.1440183
40		12.1920244
50		15.2400305
60		18.2880365
70		21.3360426
80		24.3840487
90		27.4320548
100		30.4800609

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TEMPERATURE CORRECTION TABLE

Coefficient of Expansion - 0.0000004
Standard Temperature - 20° C.
Indicated corrections are decimal parts of a meter in the 5th place and are plus for temperature above 20°

TEMP C°	LENGTH IN METERS 1	2	3	4	5	10	15	20	25	30	35	40	45	50
21							1	1	1	1	1	2	2	2
22						1	1	2	2	2	3	3	4	4
23					1	1	2	2	3	4	4	5	5	6
24				1	1	2	2	3	4	5	6	6	7	8
25			1	1	2	2	3	4	5	6	7	8	9	10
26			1	1	2	2	3	5	6	7	8	10	11	12
27		1	1	1	2	3	4	6	7	8	10	11	13	14
28		1	1	1	2	3	5	6	8	10	11	13	14	16
29		1	1	1	2	4	5	7	9	11	13	14	16	18
30		1	1	2	2	4	6	8	10	12	14	16	18	20
31		1	1	2	2	4	7	9	11	13	16	18	20	22
32		1	1	2	2	5	7	10	12	14	17	19	22	24
33		1	2	2	2	5	8	10	13	16	18	21	23	26
34		1	2	2	3	6	8	11	14	17	20	22	25	28
35		1	2	2	3	6	9	12	15	18	21	24	27	30
36		1	2	2	3	7	10	13	16	19	23	26	29	32
37		1	2	2	3	7	10	14	17	20	24	27	31	34
38		1	2	3	3	7	11	14	18	22	26	29	32	36
39		1	2	3	3	8	11	15	19	23	27	30	34	38
40	1	2	2	3	4	8	12	16	20	24	28	32	36	40
41	1	2	2	3	4	8	13	17	21	25	29	34	38	42
42	1	2	3	4	4	9	13	18	22	26	31	35	40	44
43	1	2	3	4	5	9	14	18	23	28	32	37	41	46
44	1	2	3	4	5	10	14	19	24	29	34	38	43	48
45	1	2	3	4	5	10	15	20	25	30	35	40	45	50

CONVERSION TABLE

FEET to METERS	
1	.3048006
2	.6096012
3	.9144018
4	1.2192024
5	1.5240030
6	1.8288037
7	2.1336043
8	2.4384049
9	2.7432055
10	3.0480061
20	6.0960122
30	9.1440183
40	12.1920244
50	15.2400305
60	18.2880365
70	21.3360426
80	24.3840487
90	27.4320548
100	30.4800609

JOB NO

SITE:

PARTY:

WEEKLY WORK REPORT

WEEK ENDING _____

	SITE	DESCRIPTION OF WORK	REMARKS
MONDAY			
TUESDAY			
WEDNESDAY			
THURSDAY			
FRIDAY			
SATURDAY			
SUNDAY			

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JOB NO. _____

SITE: _____

HOLMES & NARVER

SURVEY DEPARTMENT

WEEKLY WORK REPORT

WEEK ENDING _____

PARTY: _____

	SITE	DESCRIPTION OF WORK	REMARKS
MONDAY			
TUESDAY			
WEDNESDAY			
THURSDAY			
FRIDAY			
SATURDAY			
SUNDAY			

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JOB Nº _____

HOLMES & NARVER INC., ENGINEERS

INVERSE POSITION COMPUTATION

NAME OF STATION

1. ϕ		λ	° ′ ″
2. ϕ'		λ'	
$\Delta\phi\ (=\phi'-\phi)$		$\Delta\lambda\ (=\lambda'-\lambda)$	
$\frac{\Delta\phi}{2}$		$\frac{\Delta\lambda}{2}$	
$\phi_m\left(=\phi+\frac{\Delta\phi}{2}\right)$			
$\Delta\phi\ (\text{secs})$			
$\log \Delta\phi$		$\log \Delta\lambda$	
cor. arc − sin		$\log \sin \phi_m$	
$\log \Delta\phi_1$		$\log \sec \frac{\Delta\phi}{2}$	
$\log \cos \frac{\Delta\lambda}{2}$		$\log a$	
colog B_m		a	
$\log\left\{s_1 \cos\left(\alpha+\frac{\Delta\alpha}{2}\right)\right\}$		b	
		$-\Delta\alpha\ (\text{secs})$	
		$-\frac{\Delta\alpha}{2}$	
		$\alpha+\frac{\Delta\alpha}{2}$	
		$\alpha\ (1 \text{ to } 2)$	
		$\Delta\alpha$	
		$\alpha'\ (2 \text{ to } 1)$	

$\Delta\lambda$	
cor. arc − sin	
$\log \Delta\lambda_1$	
$\log \cos \phi_m$	
colog A_m	
$\log\left\{s_1 \sin\left(\alpha+\frac{\Delta\alpha}{2}\right)\right\}$	
$\log\left\{s_1 \cos\left(\alpha+\frac{\Delta\alpha}{2}\right)\right\}$	
$\log \tan\left(\alpha+\frac{\Delta\alpha}{2}\right)$	
$\alpha+\frac{\Delta\alpha}{2}$	
$\log \sin\left(\alpha+\frac{\Delta\alpha}{2}\right)$	
$\log \cos\left(\alpha+\frac{\Delta\alpha}{2}\right)$	
$\log s_1$	
$\log \alpha_{12}$	
α_{21}	

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Sue 25

JOB Nº _____

HOLMES & NARVER INC. ENGINEERS

INVERSE POSITION COMPUTATION

NAME OF STATION

1 ϕ	° ′ ″		λ	° ′ ″
2 ϕ'			λ'	
$\Delta\phi\ (=\phi'-\phi)$			$\Delta\lambda\ (=\lambda'-\lambda)$	
$\frac{\Delta\phi}{2}$			$\frac{\Delta\lambda}{2}$	
$\phi_m\ (=\phi+\frac{\Delta\phi}{2})$				
$\Delta\phi$ (secs)			$\Delta\lambda$ (secs)	
$\log\Delta\phi$			$\log\Delta\lambda$	
cor. arc − sin			cor. arc − sin	
$\log\Delta\phi_1$			$\log\Delta\lambda_1$	
$\log\cos\frac{\Delta\lambda}{2}$			$\log\cos\phi_m$	
colog B_m			colog A_m	
$\log\{s_1\cos(\alpha+\frac{\Delta\alpha}{2})\}$		(opposite in sign to $\Delta\phi$)	$\log\{s_1\sin(\alpha+\frac{\Delta\alpha}{2})\}$	
			$\log\{s_1\cos(\alpha+\frac{\Delta\alpha}{2})\}$	
$\log\Delta\lambda$		$\partial\log\Delta\lambda$	$\log\tan(\alpha+\frac{\Delta\alpha}{2})$	
$\log\sin\phi_m$		$\log A$	$\alpha+\frac{\Delta\alpha}{2}$	
$\log\sec\frac{\Delta\phi}{2}$		$\log B$	$\log\sin(\alpha+\frac{\Delta\alpha}{2})$	
log a			$\log\cos(\alpha+\frac{\Delta\alpha}{2})$	
a			log s	
b				
$-\Delta\alpha$ (secs)				
$-\frac{\Delta\alpha}{2}$				
$\alpha+\frac{\Delta\alpha}{2}$				
α (1 to 2)				
$\Delta\alpha$				
	INC			
α' (2 to 1)				

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239
Sub 25

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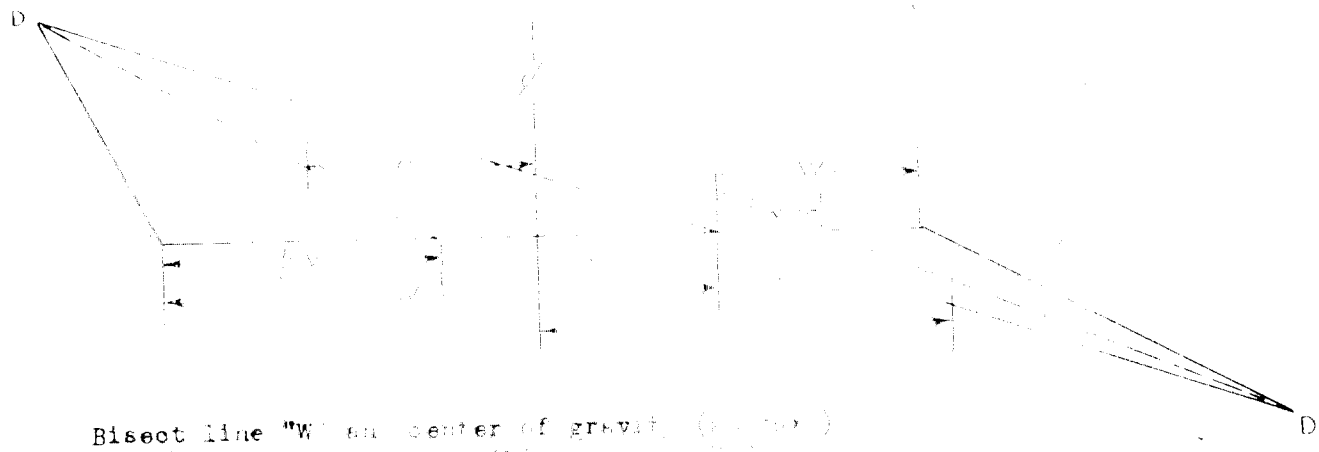
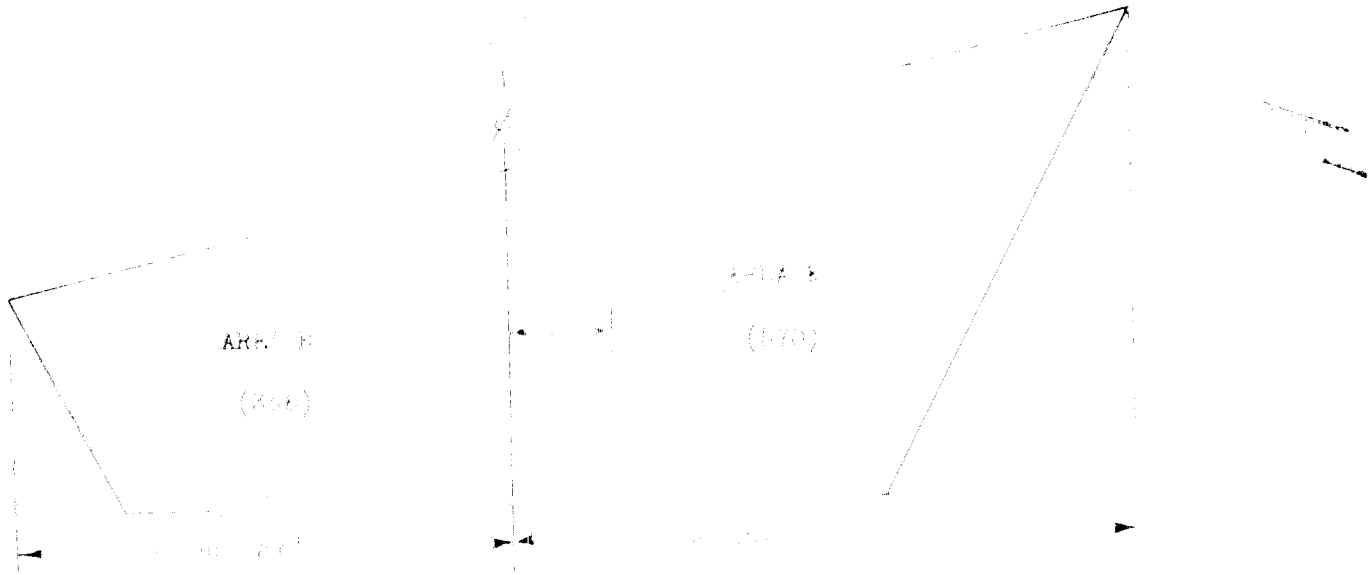
[illegible]

[illegible]



Bisect line "W" on center of gravity ([illegible])
is 1/3 the distance from this point [illegible]

Eccentricity of the section is the [illegible] or
the center of gravity to centerline.



$e = \frac{B + E}{3}$ ([illegible])

B = [illegible]
E = 290
[illegible] = 224

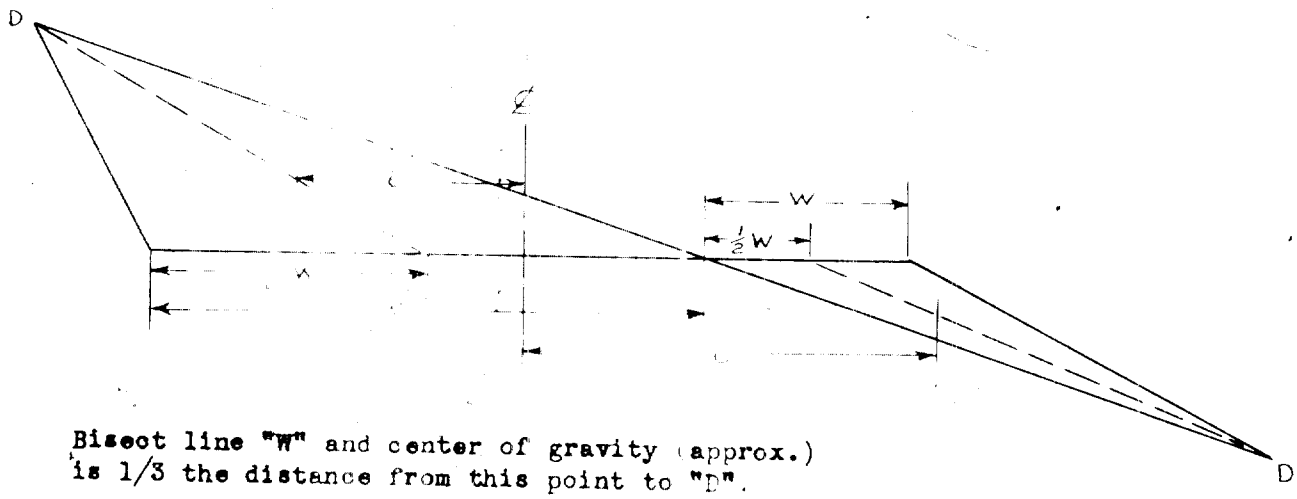
$e = \frac{85}{2448} \times 224$ [illegible]

Determine area of sections each side of the centerline.
Scale the distance from centerline to top of each on each
side and apply the formula.

240
Sue 26

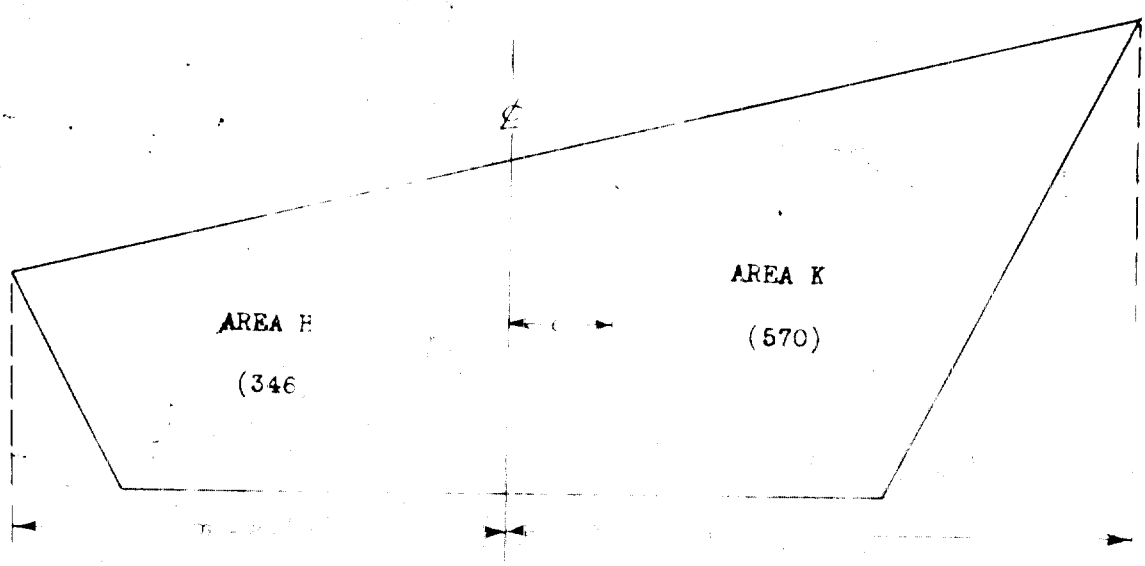
COMPENSATION FOR CURVATURE - [illegible] CARLAGE CALCULATIONS

ECCENTRICITY OF CENTER OF GRAVITY OF SECTION



Bisect line "W" and center of gravity (approx.) is 1/3 the distance from this point to "D".

Eccentricity of the section is the distance from the center of gravity to centerline.



$$e = \frac{n + m}{3A} (K - H)$$

H = 346
K = 570
Sum [illegible] Diff. = 224

$$e = \frac{59}{2448} \times 2.4 \text{ [illegible]}$$

Determine area of sections each side of the centerline. Scale the distance from center line to [illegible] of cut on each side and apply the formula.

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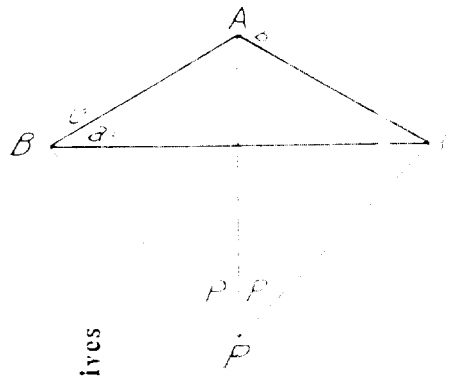
2.41
SUR 26

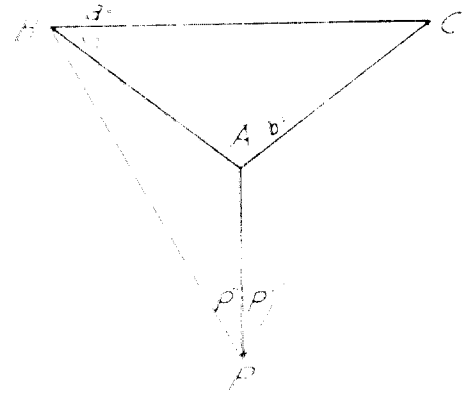
COMPUTATION OF THREE POINT PROBLEM

CASE 1



CASE 2

CASE 3



CASE 1 & 2

P

P''

A

SUM

½ SUM

S = 180° - ½ SUM

CASE 3

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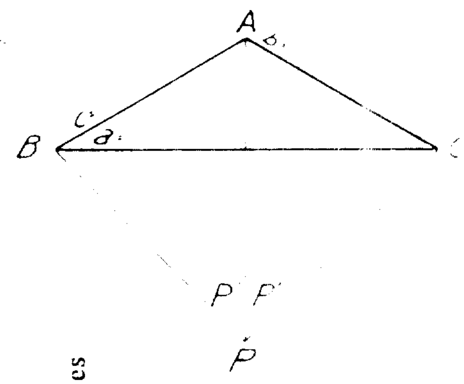
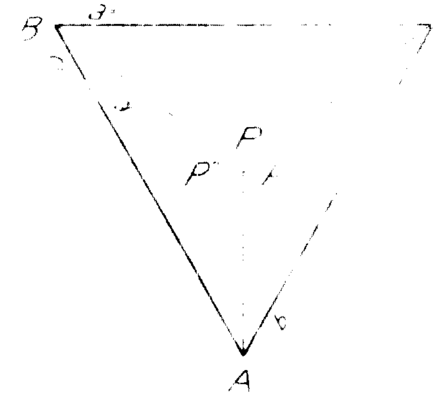
COMPUTATION OF THE THREE POINT PROBLEM

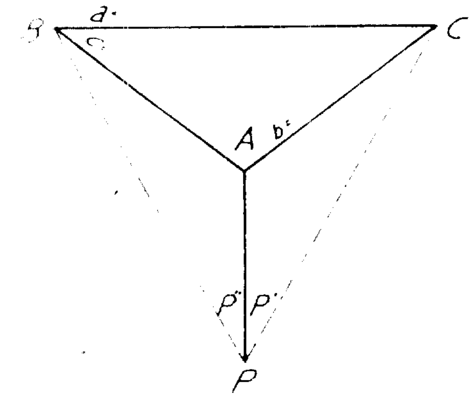
CASE 1



CASE 2



CASE 3



CASE 1 & 2		CASE 3	
P'		a	
P''		b	
A		SUM	
SUM		A	
½ SUM		A - SUM	
S = 180° - ½ SUM =		S = ½ (A - SUM) =	

LOG C		
LOG SIN P'		
COLOG b		
COLOG SIN P''		
SUM = LOG TAN Z =		
Z		
Z + 45°		
LOG COT (Z + 45°)		
LOG TAN S		
SUM = LOG TAN ( )		
[illegible]		
S		
([illegible])		([illegible])
S + [illegible] ANGLE ABP		S [illegible] ANGLE ABP
S - [illegible] ANGLE ACP		S [illegible] ANGLE ACP

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SURVEY DEPARTMENT
PARTY CHIEF'S INVENTORY
PROPERTY [illegible]

DATE

ITEM	MFR & SERIAL NO	[illegible] NO	AEC NO	CONDITION
TRANSIT				
LEVEL				
THEODOLITE				
SEXTANT				
BINOCULARS				
ALIDADE				
PLANE TABLE W/TRIPOD				
TRIPOD, STIFF LEG				
TRIPOD, ADJUSTABLE				
	MAKE	TYPE	AEC NO	
VEHICLE				

THE ABOVE EQUIPMENT IS IN MY CUSTODY

[illegible]

[illegible]

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SURVEY DEPARTMENT
PARTY CHIEF'S INVENTORY
PROPERTY ITEMS

DATE

ITEM	MFR & SERIAL NO	F & N NO	AEC NO	CONDITION
TRANSIT				
LEVEL				
THEODOLITE				
SEXTANT				
BINOCULARS				
ALIDADE				
PLANE TABLE W/ TRIPOD				
TRIPOD, STIFF-LEG				
TRIPOD, ADJUSTABLE				
	MAKE	TYPE	AEC NO	
VEHICLE				

THE ABOVE EQUIPMENT IS IN MY CUSTODY.

SIGNED

TITLE

ATOLL

245

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SURVEY DEPARTMENT
PARTY CHIEF'S INVENTORY
NON-PROPERTY ITEMS

DATE _____

ITEM	QUAN	CONDITION	ITEM	QUAN	CONDITION
TAPE, STEEL, 100'			WATER JUGS, 5 GAL		
TAPE, STEEL, 300'			COFFEE JUGS, 1 GAL		
TAPE, CLOTH			HATCHETS		
HAND LEVELS					
LEVEL RODS					
LEVEL ROD LEVELS					
THERMOMETERS					
READING GLASSES					
TENSION HANDLES					
TAPE CLAMPS					
BOOK BAGS					
PLUMB BOBS					
PLUMB BOB SHEATHS					
AXES					
BRUSH HOOKS					
SLEDGES					
STAKE BAGS					
SHOVELS					
STEEL DIES, NUMBERS					
STEEL DIES, LETTERS					
HAMMERS					
PLIERS					

THE ABOVE EQUIPMENT IS IN MY CUSTODY.

SIGNED

TITLE

ATOLL

246

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SURVEY DEPARTMENT
PARTY CHIEFS INVENTORY
NON PROPERTY ITEMS

DATE _____

ITEM	QUAN	CONDITION	ITEM	QUAN	CONDITION
TAPE, STEEL, 100'			WATER JUGS, 5 GAL.		
TAPE, STEEL, 300			COFFEE JUGS, 1 GAL.		
TAPE, CLOTH			HATCHETS		
HAND LEVELS					
LEVEL RODS					
LEVEL ROD LEVELS					
THERMOMETERS					
READING GLASSES					
TENSION HANDLES					
TAPE CLAMPS					
BOOK BAGS					
PLUMB BOBS					
PLUMB BOB SHEATHS					
AXES					
BRUSH HOOKS					
SLEDGES					
STAKE BAGS					
SHOVELS					
STEEL DIES, NUMBERS					
STEEL DIES, LETTERS					
HAMMERS					
PLIERS					

THE ABOVE EQUIPMENT IS IN MY CUSTODY

SIGNED

ATOLL

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VOLUME IN [illegible]

Acres	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		16[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	112.9	129.1	145.2
1	161.3	177.5	[illegible]	20[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	290.4	306.5
2	322.7	338.8	[illegible]	[illegible]	[illegible]	[illegible]	419.5	43[illegible]	451.7	467.9
3	484.0	500.1	[illegible]	53[illegible]	[illegible]	[illegible]	30.5	576.[illegible]	613.1	629.2
4	645.3	661.5	[illegible]	[illegible]	[illegible]	[illegible]	42.1	[illegible]	774.4	790.5
5	806.7	822.8	[illegible]	85[illegible]	[illegible]	[illegible]	[illegible]	91[illegible]	935.7	951.9
6	968.0	984.1	[illegible]	10[illegible]	[illegible]	[illegible]	65	[illegible]	1097	1113
7	1129	1145	[illegible]	11[illegible]	[illegible]	[illegible]	[illegible]	1[illegible]	[illegible]	1275
8	1291	1307	132[illegible]	1334	[illegible]	[illegible]	1387	1404	1420	1436
9	1452	1468	141[illegible]	150[illegible]	[illegible]	[illegible]	1549	1565	[illegible]	1597
10	1613	1629	[illegible]	16[illegible]	[illegible]	[illegible]	[illegible]	1726	1742	1759
11	1775	1791	[illegible]	1823	[illegible]	[illegible]	1871	[illegible]	[illegible]	1920
12	1936	1952	[illegible]	1984	[illegible]	[illegible]	[illegible]	[illegible]	2065	2081
13	2097	2113	[illegible]	2146	[illegible]	[illegible]	[illegible]	[illegible]	2226	2243
14	2259	2275	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2404
15	2420	2436	[illegible]	246[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2565
16	2581	2597	[illegible]	263[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2727
17	2743	2759	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2872	2888
18	2904	2920	[illegible]	295[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3033	3049
19	3065	3081	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3194	3211
20	3227	3243	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3372
21	3388	3404	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3533
22	3549	3565	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3695
23	3711	3727	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
24	3872	3888	3904	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	4001	4017
25	4033	4049	4066	4082	[illegible]	[illegible]	[illegible]	[illegible]	4162	4178
26	4195	4211	4227	4243	[illegible]	[illegible]	[illegible]	[illegible]	432[illegible]	4340
27	4356	4372	4388	4404	[illegible]	[illegible]	[illegible]	[illegible]	4485	4501
28	4517	4533	4550	4566	[illegible]	[illegible]	[illegible]	[illegible]	4646	4663
29	4679	4695	4711	472[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	4824
30	4840	4856	4872	488[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	4985
31	5001	5017	5034	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5147
32	5163	5179	5195	5211	[illegible]	[illegible]	[illegible]	[illegible]	5292	5308
33	5324	5340	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5469
34	[illegible]	5601	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5631
35	5647	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5792
36	5808	5824	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
37	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
38	6131	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	6276
39	6292	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	6437
40	6453	6469	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	6598
41	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
42	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
43	6937	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
44	7098	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
45	7260	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
46	7421	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
47	7583	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
48	7744	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
49	7905	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
50	8067	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

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[illegible] 333 cu-yds. per 40 ft. = 161.[illegible]73 per 0.1 ft.

		1						7		
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1	[illegible]
10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
30	[illegible]	[illegible]	[illegible]	7.576	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
40	[illegible]	9.[illegible]	[illegible]	[illegible]	10.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
50	[illegible]	11.7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
60	[illegible]	14.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	16.[illegible]	16.3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	20.2	[illegible]
90	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	22.[illegible]	22.73
100	[illegible]	23.1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	23.02
110	25.21	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible].32
120	27.5[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
130	29.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
140	32.14	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible].21
150	34.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
160	36.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
170	39.[illegible]	39.2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
180	41.32	41.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
190	43.02	43.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
200	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	48.21	48.41	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	50.[illegible]	[illegible]
2[illegible]	50.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	52.[illegible]	[illegible]
2[illegible]	52.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	54.[illegible]	54
[illegible]	55.1[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	57.3[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	59.[illegible]	[illegible]
[illegible]	59.6[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]80	64.2[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]90	66.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]00	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]10	71.17	71.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]20	[illegible].40	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]30	75.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible].42
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible].42	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	101.2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

0.22956841 × square inches

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2.49

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TEMPERATURE CORRECTION TABLE

Coefficient of Expansion - 0.0000004
Standard Temperature - 20° C.
Indicated corrections are decimal parts of a meter in the 5th place and are plus for temperature above 20°

TEMP C	LENGTH IN METERS 0	1	2	3	4	5	10	15	20	25	30	35	40	45	50
21								1	1	1	1	1	2	2	2
22							1	1	2	2	2	2	2	2	2
23							1	2	2	2	2	2	2	2	2
24							2	2	2	2	2	2	2	2	2
25							2	2	2	2	2	2	2	2	2
26							2	2	2	2	2	2	2	2	2
27							2	2	2	2	2	2	2	2	2
28							2	2	2	2	2	2	2	2	2
29							2	2	2	2	2	2	2	2	2
30							2	2	2	2	2	2	2	2	2
31							2	2	2	2	2	2	2	2	2
32							2	2	2	2	2	2	2	2	2
33							2	2	2	2	2	2	2	2	2
34							2	2	2	2	2	2	2	2	2
35							2	2	2	2	2	2	2	2	2
36							2	2	2	2	2	2	2	2	2
37							2	2	2	2	2	2	2	2	2
38							2	2	2	2	2	2	2	2	2
39							2	2	2	2	2	2	2	2	2
40							2	2	2	2	2	2	2	2	2
41							2	2	2	2	2	2	2	2	2
42							2	2	2	2	2	2	2	2	2
43							2	2	2	2	2	2	2	2	2
44							2	2	2	2	2	2	2	2	2
45							2	2	2	2	2	2	2	2	2
46							2	2	2	2	2	2	2	2	2
47							2	2	2	2	2	2	2	2	2
48							2	2	2	2	2	2	2	2	2
49							2	2	2	2	2	2	2	2	2
50							2	2	2	2	2	2	2	2	2
51							2	2	2	2	2	2	2	2	2
52							2	2	2	2	2	2	2	2	2
53							2	2	2	2	2	2	2	2	2
54							2	2	2	2	2	2	2	2	2
55							2	2	2	2	2	2	2	2	2
56							2	2	2	2	2	2	2	2	2
57							2	2	2	2	2	2	2	2	2
58							2	2	2	2	2	2	2	2	2
59							2	2	2	2	2	2	2	2	2
60							2	2	2	2	2	2	2	2	2
61							2	2	2	2	2	2	2	2	2
62							2	2	2	2	2	2	2	2	2
63							2	2	2	2	2	2	2	2	2
64							2	2	2	2	2	2	2	2	2
65							2	2	2	2	2	2	2	2	2
66							2	2	2	2	2	2	2	2	2
67							2	2	2	2	2	2	2	2	2
68							2	2	2	2	2	2	2	2	2
69							2	2	2	2	2	2	2	2	2
70							2	2	2	2	2	2	2	2	2
71							2	2	2	2	2	2	2	2	2
72							2	2	2	2	2	2	2	2	2
73							2	2	2	2	2	2	2	2	2
74							2	2	2	2	2	2	2	2	2
75							2	2	2	2	2	2	2	2	2
76							2	2	2	2	2	2	2	2	2
77							2	2	2	2	2	2	2	2	2
78							2	2	2	2	2	2	2	2	2
79							2	2	2	2	2	2	2	2	2
80							2	2	2	2	2	2	2	2	2
81							2	2	2	2	2	2	2	2	2
82							2	2	2	2	2	2	2	2	2
83							2	2	2	2	2	2	2	2	2
84							2	2	2	2	2	2	2	2	2
85							2	2	2	2	2	2	2	2	2
86							2	2	2	2	2	2	2	2	2
87							2	2	2	2	2	2	2	2	2
88							2	2	2	2	2	2	2	2	2
89							2	2	2	2	2	2	2	2	2
90							2	2	2	2	2	2	2	2	2
91							2	2	2	2	2	2	2	2	2
92							2	2	2	2	2	2	2	2	2
93							2	2	2	2	2	2	2	2	2
94							2	2	2	2	2	2	2	2	2
95							2	2	2	2	2	2	2	2	2
96							2	2	2	2	2	2	2	2	2
97							2	2	2	2	2	2	2	2	2
98							2	2	2	2	2	2	2	2	2
99							2	2	2	2	2	2	2	2	2
100							2	2	2	2	2	2	2	2	2

CONVERSION TABLE

Meters	Feet
1	[illegible]
2	[illegible]
3	[illegible]
4	[illegible]
5	[illegible]
6	[illegible]
7	[illegible]
8	[illegible]
9	[illegible]
10	[illegible]
20	[illegible]
30	[illegible]
40	[illegible]
50	[illegible]
60	[illegible]
70	[illegible]
80	24.3340427
90	27.4320548
100	30.[illegible]

250

LENGTHS OF THE ARCS OF [illegible] TO THE RADIUS 1.

Degrees						Minutes		Seconds	
0°	0.0000000000	60°	1.0471975512	120°	2.0943951024	0′	0.0000000000	0″	0.0000000000
1	0.0174532925	61	1.0646508437	121	2.1118484949	1	0.0002908882	1	0.0000048481
2	0.0349065850	62	1.0821041362	122	2.1293018874	2	0.0005817764	2	0.0000096963
3	0.0523598776	63	1.0995574288	123	2.1467549800	3	0.0008726646	3	0.0000145444
4	0.0698131701	64	1.1170107213	124	2.1642082725	4	0.0011635528	4	0.0000193925
5	0.0872664626	65	1.1344640138	125	2.1816615650	5	0.0014544410	5	0.0000242407
6	0.1047197551	66	1.1519173063	126	2.1991148575	6	0.0017453293	6	0.0000290888
7	0.1221730476	67	1.1693705988	127	2.2165681500	7	0.0020362175	7	0.0000339370
8	0.1396263402	68	1.1868238914	128	2.2340214426	8	0.0023271057	8	0.0000387851
9	0.1570796327	69	1.2042771839	129	2.2514747351	9	0.0026179939	9	0.0000436332
10	0.1745329252	70	1.2217304764	130	2.2689280276	10	0.0029088821	10	0.0000484814
11	0.1919862177	71	1.2391837689	131	2.2863813201	11	0.0031997703	11	0.0000533295
12	0.2094395102	72	1.2566370614	132	2.3038346126	12	0.0034906585	12	0.0000581776
13	0.2268928028	73	1.2740903540	133	2.3212879052	13	0.0037815467	13	0.0000630258
14	0.2443460953	74	1.2915436465	134	2.3387411977	14	0.0040724349	14	0.0000678739
15	0.2617993878	75	1.3089969390	135	2.3561944902	15	0.0043633231	15	0.0000727221
16	0.2792526803	76	1.3264502315	136	2.3736477827	16	0.0046542113	16	0.0000775702
17	0.2967059728	77	1.3439035240	137	2.3911010752	17	0.0049450995	17	0.0000824183
18	0.3141592654	78	1.3613568166	138	2.4085543678	18	0.0052359878	18	0.0000872665
19	0.3316125579	79	1.3788101091	139	2.4260076603	19	0.0055268760	19	0.0000921146
20	0.3490658504	80	1.3962634016	140	2.4434609528	20	0.0058177642	20	0.0000969627
21	0.3665191429	81	1.4137166941	141	2.4609142453	21	0.0061086524	21	0.0001018109
22	0.3839724354	82	1.4311699866	142	2.4783675378	22	0.0063995406	22	0.0001066590
23	0.4014257280	83	1.4486232792	143	2.4958208304	23	0.0066904288	23	0.0001115071
24	0.4188790205	84	1.4660765717	144	2.5132741229	24	0.0069813170	24	0.0001163553
25	0.4363323130	85	1.4835298642	145	2.5307274154	25	0.0072722052	25	0.0001212034
26	0.4537856055	86	1.5009831567	146	2.5481807079	26	0.0075630934	26	0.0001260516
27	0.4712388980	87	1.5184364492	147	2.5656340004	27	0.0078539816	27	0.0001308997
28	0.4886921906	88	1.5358897418	148	2.5830872930	28	0.0081448698	28	0.0001357478
29	0.5061454831	89	1.5533430343	149	2.6005405855	29	0.0084357581	29	0.0001405960
30	0.5235987756	90	1.5707963268	150	2.6179938780	30	0.0087266463	30	0.0001454441
31	0.5410520681	91	1.5882496193	151	2.6354471705	31	0.0090175345	31	0.0001502922
32	0.5585053606	92	1.6057029118	152	2.6529004630	32	0.0093084227	32	0.0001551404
33	0.5759586532	93	1.6231562044	153	2.6703537556	33	0.0095993109	33	0.0001599885
34	0.5934119457	94	1.6406094969	154	2.6878070481	34	0.0098901991	34	0.0001648367
35	0.6108652382	95	1.6580627894	155	2.7052603406	35	0.0101810873	35	0.0001696848
36	0.6283185307	96	1.6755160819	156	2.7227136331	36	0.0104719755	36	0.0001745329
37	0.6457718232	97	1.6929693744	157	2.7401669256	37	0.0107628637	37	0.0001793811
38	0.6632251158	98	1.7104226670	158	2.7576202182	38	0.0110537519	38	0.0001842292
39	0.6806784083	99	1.7278759595	159	2.7750735107	39	0.0113446401	39	0.0001890773
40	0.6981317008	100	1.7453292520	160	2.7925268032	40	0.0116355283	40	0.0001939255
41	0.7155849933	101	1.7627825445	161	2.8099800957	41	0.0119264166	41	0.0001987736
42	0.7330382858	102	1.7802358370	162	2.8274333882	42	0.0122173048	42	0.0002036217
43	0.7504915784	103	1.7976891296	163	2.8448866808	43	0.0125081930	43	0.0002084699
44	0.7679448709	104	1.8151424221	164	2.8623399733	44	0.0127990812	44	0.0002133180
45	0.7853981634	105	1.8325957146	165	2.8797932658	45	0.0130899694	45	0.0002181662
46	0.8028514559	106	1.8500490071	166	2.8972465583	46	0.0133808576	46	0.0002230143
47	0.8203047484	107	1.8675022996	167	2.9146998508	47	0.0136717458	47	0.0002278624
48	0.8377580410	108	1.8849555922	168	2.9321531434	48	0.0139626340	48	0.0002327106
49	0.8552113335	109	1.9024088847	169	2.9496064359	49	0.0142535222	49	0.0002375587
50	0.8726646260	110	1.9198621772	170	2.9670597284	50	0.0145444104	50	0.0002424068
51	0.8901179185	111	1.9373154697	171	2.9845130209	51	0.0148352986	51	0.0002472550
52	0.9075712110	112	1.9547687622	172	[illegible]	52	0.0151261869	52	0.0002521031
53	0.9250245036	113	1.9722220548	173	[illegible]	53	0.0154170751	53	0.0002569513
54	0.9424777961	114	1.9896753473	174	[illegible]	54	0.0157079633	54	0.0002617994
55	0.9599310886	115	2.0071286398	175	[illegible]	55	0.0159988515	55	0.0002666475
56	0.9773843811	116	2.0245819323	176	[illegible]	56	0.0162897397	56	0.0002714957
57	0.9948376736	117	2.0420352248	177	[illegible]	57	0.0165806279	57	0.0002763438
58	1.0122909662	118	2.0594885174	178	[illegible]	58	0.0168715161	58	0.0002811919
59	1.0297442587	119	2.0769418099	179	3.1241399611	59	0.0171624043	59	0.0002860401
60	1.0471975512	120	2.0943951024	180	3.1415926536	60	0.0174532925	60	0.0002908882

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Sur 19

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TEMPERATURE CORRECTION - STEEL TAPE
CALIBRATED AT 84°

	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15
82° 86	384	1153	1923	2692	3461	4230	5000	5769	6538	7307	8076	8846	9615	10384	11153	11923
[illegible] 88	[illegible]	[illegible]76	961	1346	[illegible]730	2115	2500	2884	3269	3653	4038	4423	4807	5192	5576	5961
[illegible]° 90	128	384	641	897	1153	1410	1666	1923	2179	2436	2692	2948	3205	3461	3717	3974
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1442	1634	1826	2019	2211	2403	2596	2788	2980
[illegible]	[illegible]	[illegible]	[illegible]74	[illegible]	[illegible]	846	[illegible]	1153	1307	1461	1611	[illegible]	1923	2076	2230	2384
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]4	[illegible]	705	833	961	1089	1217	1346	1474	1602	1730	1858	1987
[illegible]	[illegible]	[illegible]4	[illegible]	[illegible]4	[illegible]	[illegible]4	[illegible]4	[illegible]24	[illegible]34	[illegible]	[illegible]	[illegible]63	1373	1483	1593	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]13	[illegible]	[illegible]	1201	1298	1394	1490
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]41	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1153	[illegible]	1324
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]76	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1038	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]44	[illegible]	[illegible]	[illegible]4	[illegible]	[illegible]	[illegible]64	[illegible]	[illegible]	[illegible]4	[illegible]44	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	549	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	610	[illegible]	[illegible]
[illegible] 120	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	405	446	[illegible]	534	576	619	662
[illegible] 122	[illegible]	[illegible]	[illegible]	[illegible]	182	[illegible]	263	[illegible]	344	[illegible]	[illegible]	465	[illegible]	[illegible]	[illegible]	[illegible]
4[illegible]° 124	[illegible]	[illegible]	[illegible]	[illegible]	173	211	250	288	326	365	403	442	480	519	557	596
42° 126	[illegible]	54	91	126	164	201	238	274	311	347	384	421	457	494	531	567
40° 128	[illegible]	[illegible]	87	122	157	192	227	262	297	332	367	402	437	472	506	541
[illegible]° 130	[illegible]	[illegible]	[illegible]	[illegible]	150	183	217	250	284	317	351	384	418	451	484	518
36° 132	[illegible]	[illegible]	[illegible]	112	144	176	208	240	272	304	336	368	400	432	464	496
34 134	[illegible]	46	[illegible]	107	138	169	200	230	261	292	323	353	384	415	446	476
[illegible]° 136	[illegible]	44	73	103	133	162	192	221	251	281	310	340	369	399	428	458

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CHORD AND DEFLECTION TABLE
FOR CURVES OF STANDARD RADII

CHORD = 2R X SIN (DEFL. FOR 1 ARC LENGTH)

DEFL. FOR 1' OF ARC = $\frac{1718.8733}{R}$

RADIUS	LENGTH OF ARC	DEFLECTION FOR ONE ARC LENGTH	CHORD	DEFLECTION FOR A ONE FOOT ARC
75	[illegible]	[illegible]	24.384	22.91831'
100	"	[illegible]	24.935	17.18873'
125	"	[illegible]	24.968	13.75009'
150	"	[illegible]	24.972	11.45916'
175	"	[illegible]	24.978	9.82213'
200	"	[illegible]	24.984	8.59437'
225	"	[illegible]	[illegible]	7.63944'
250	"	[illegible]	[illegible]	6.87549'
275	"	[illegible]	[illegible]	6.25045'
300	"	[illegible]	24.993	5.72958'
325	[illegible]	[illegible]	[illegible]	5.28884'
350	"	[illegible]	[illegible]	4.91107'
375	"	[illegible]	[illegible]	4.58366'
400	"	[illegible]	[illegible]	4.29718'
425	"	[illegible]	[illegible]	4.04441'
450	"	[illegible]	[illegible]	3.81972'
475	"	[illegible]	[illegible]	3.61868'
500	"	[illegible]	[illegible]	3.43775'
525	"	2°-43'-42"	[illegible]	3.27404'
550	"	2°-36'-[illegible]"	49.983	3.12522'
575	"	2°-29'-[illegible]"	49.984	2.98934'
600	"	2°-23'-14"	[illegible]	2.86479'
700	"	2°-02'-46"	[illegible]	2.45553'
800	"	1°-47'-28"	49.992	2.14859'
900	"	1°-35'-[illegible]"	49.994	1.90986'
1000	"	1°-28'-[illegible]"	49.995	1.71887'
1100	"	1°-18'-[illegible]"	49.995	1.56261'
1200	"	1°-11'-[illegible]"	49.996	1.43239'
1300	"	1°-06'-[illegible]"	49.996	1.32221'
1400	"	1°-01'-[illegible]"	49.997	1.22777'
1500	"	0°-57'-[illegible]"	49.997	1.14592'
1600	"	0°-53'-[illegible]"	49.998	1.07430'
1700	"	0°-51'-33.3"	49.998	1.01110'
1800	"	0°-47'-44.[illegible]"	49.998	0.95493'
1900	"	0°-45'-[illegible]"	49.998	0.90467'
2000	"	0°-42'-[illegible]"	49.998	0.85944
2250	"	0°-38'-[illegible]"	49.998	0.76394'
2500	"	0°-34'-[illegible]"	49.998	0.68755'
2750	"	0°-31'-[illegible]	[illegible]	0.62504'
3000	"	[illegible]	[illegible]	0.57296'
3250	"	[illegible]	[illegible]	0.52868'
3500	"	[illegible]	[illegible]	0.49111'
3750	"	[illegible]	[illegible]	0.45837'
4000	"	[illegible]	[illegible]	0.42972'
4250	"	[illegible]	[illegible]	0.40444'
4500	"	[illegible]	[illegible]	0.38197'
4750	"	[illegible]	[illegible]	0.36187'
5000	"	[illegible]	[illegible]	0.34377'
5500	"	[illegible]	[illegible]	0.31252'
6000	"	[illegible]	[illegible]	0.28648'

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TEMPERATURE CORRECTION - STEEL TAPE
CALIBRATED AT 68°

		0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15
66°	70	384	1153	1923	2692	3461	4230	5000	5769	6538	7307	8076	8846	9615	10384	11153	11923
64°	72	192	576	961	1346	1730	2115	2500	2884	3269	3653	4038	4423	4807	5192	5576	5961
62°	74	128	384	641	897	1153	1410	1666	1923	2179	2436	2692	2948	3205	3461	3717	3974
60°	76	[illegible]	288	480	673	865	1057	1250	1442	1634	[illegible]	2019	2211	2403	2596	2788	2980
58°	78	[illegible]	230	384	538	692	846	1000	1153	1307	1461	1615	1769	1923	2076	2230	2384
56°	80	64	[illegible]	[illegible]	448	576	705	833	961	1089	1217	1346	1474	1602	1730	1858	1987
54°	82	64	164	274	384	494	604	714	824	934	1043	1153	1263	1373	1483	1593	1703
52°	84	48	144	240	336	432	528	625	721	817	913	[illegible]	1105	1201	1298	1394	1490
50°	86	42	128	213	299	384	470	555	641	726	811	897	982	1068	1153	1239	1324
48°	88	35	115	192	269	346	423	500	576	653	730	807	884	961	1038	1115	1192
46°	90	34	104	174	244	314	384	454	524	594	664	734	804	874	944	1013	1083
44°	92	[illegible]	[illegible]	16[illegible]	224	288	352	416	480	544	608	673	737	801	865	929	993
42°	94	[illegible]	[illegible]	147	[illegible]	266	325	384	443	502	562	621	[illegible]	739	798	857	917
40°	96	[illegible]	[illegible]	137	192	247	302	357	412	467	521	576	631	686	741	796	851
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	262	366	364	435	487	538	589	641	692	743	794
[illegible]	[illegible]	4[illegible]	[illegible]	12[illegible]	168	216	264	312	360	408	456	504	552	600	649	697	745
34°	102	[illegible]	87	113	158	203	248	294	339	384	[illegible]	475	520	565	610	656	701
32°	104	[illegible]	84	106	149	192	235	277	320	363	406	448	491	534	576	619	662
30°	106	2[illegible]	80	101	141	182	222	263	303	344	384	425	465	506	546	587	627
[illegible]	108	[illegible]	[illegible]	96	134	173	211	250	288	326	365	403	442	480	519	557	596
26°	110	18	54	91	128	164	201	238	274	311	347	384	421	457	494	531	567
24°	112	17	52	87	122	157	192	227	262	297	332	367	402	437	472	506	541
22°	114	16	50	83	117	150	183	217	250	284	317	351	384	418	451	484	518
20°	116	15	48	80	112	144	176	208	240	272	304	336	368	400	432	464	496
18°	118	15	46	76	107	138	169	200	230	261	292	323	353	384	415	446	476
16°	120	14	44	73	103	133	162	192	221	251	281	310	340	369	399	428	458

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