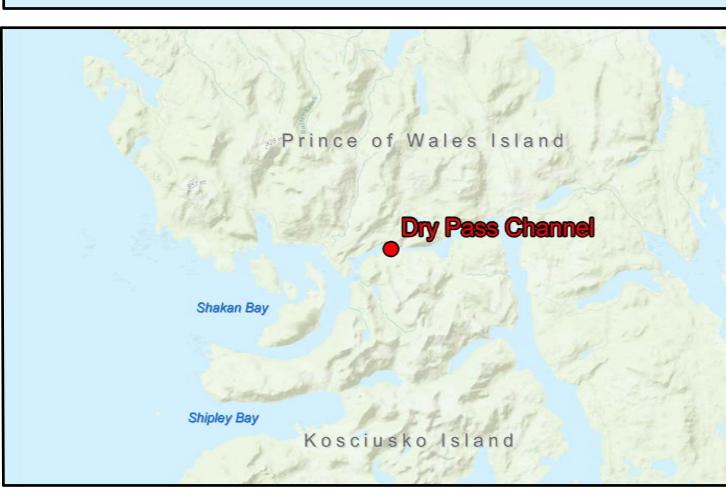




US Army Corps of Engineers ® ALASKA DISTRIC



NOTES

PRIMARY PROJECT HORIZONTAL CONTROL IS ALASKA STATE PLANE, ZONE 1, NAD83, (2011)(2010.00), IN US SURVEY FEET BASED ON A FULLY CONSTRAINED STATIC GPS NETWORK HOLDING THE PUBLISHED NAD83 2010.00 EPOCH VALUES OF NGS CORS STATIONS: "KLAWOCKAIRAK2006 CORS ARP" (PID DM7451); "ATLIN CORS ARP" (PID DP5991); "JUNEAU WAAS 1 CORS ARP" (DF4367) .

LOCAL PROJECT HORIZONTAL CONTROL IS ALASKA STATE PLANE, ZONE 1, NAD83, IN US SURVEY FEET HOLDING "945 0998 TIDAL 3" AS N 1,581,007.620', E 2,737,111.435', "945 0987 BM 1" AS N 1,575,471.975', E 2,727,634.500', AND "945 0997 LYN" AS N 1,581,415.916', E 2,754,466.054'.

VERTICAL CONTROL IS MEAN LOWER LOW WATER (MLLW=0.0 FT), BASED ON THE NOAA/NOS TIDAL BENCH MARK LISTS: "945 0987 SHAKAN STRAIT (NORTHEAST END), AK" PÜBLISHED 04/26/2011, "945 0997 EL CAPITAN PASSAGE, ALASKA" PUBLISHED 07/14/2014, AND "945 0998 DRY PASS, EL CAPITAN PASSAGE, AK" PUBLISHED 07/14/2014. THIS TIDAL DATUM IS BASED ON THE 1983-2001 TIDAL EPOCH AND IS REFERENCED TO A TILTED-PLANE MLLW DATUM HOLDING NOAA/NOS TIDAL BENCH MARKS: "945 0987 BM 1" (VM#14026) AS 14.43 FT., "945 0997 LYN" (VM#20876) AS 10.59 FT., AND "945 0998 TIDAL 3" (VM#20878) AS

VERTICAL TIES TO THE NATIONAL SPATIAL REFERENCE SYSTEM ARE BASED ON PUBLISHED NAVD88 (GEOID 12B) ELEVATIONS HOLDING NOAA/USACE TIDAL BENCHMARKS: "945 0987 BM1" (VM#14026) AS 12.94 FT, "945 0997 LYN" (PID BBCV41/VM#20876) AS 9.43 FT, AND "945 0998 TIDAL 3" (PID BBCV62/VM#20878) AS

SOUNDINGS ARE IN US SURVEY FEET AND ARE MINUS UNLESS OTHERWISE INDICATED.

BATHYMETRY WAS COLLECTED MARCH 31 AND APRIL 1. SOUNDINGS WERE COLLECTED USING AN R2SONIC 2024 MULTIBEAM ECHOSOUNDER OPERATING AT 200KHZ. SOUND VELOCITY THROUGH THE WATER COLUMN WAS DETERMINED WITH AN AML BASE X SOUND VELOCITY PROBE. POSITIONING AND VESSEL ORIENTATION WERE MEASURED USING AN APPLANIX POSMV OCEANMASTER V5 SYSTEM RECEIVING RTK CORRECTIONS FROM A TRIMBLE SPS855 GPS RECEIVER SET AT CONTROL STATION "TIDAL 3". SURVEY DATA WAS COLLECTED AND PROCESSED USING QINSY 8.1 SOFTWARE. HORIZONTAL CONTROL WAS SURVEYED USING STATIC GNSS EQUIPMENT AND TECHNIQUES. VERTICAL CONTROL WAS SURVEYED USING STATIC GNSS EQUIPMENT AND DIFFERENTIAL LEVELING.

MOBILE TERRESTRIAL LASER SCANNING DATA WAS COLLECTED USING A REIGL VZ400 LASER SCANNER. POSITION AND VESSEL ORIENTATION WERE MEASURED USING AN APPLANIX POSMV OCEANMASTER V5 RECEIVING RTK CORRECTIONS FROM A TRIMBLE SPS855 GPS RECEIVER SET AT CONTROL STATION "TIDAL 3". MOBILE SCANNING WAS COLLECTED AND PROCESSED USING QINSY 8.1 SOFTWARE.

THIS DRAWING INDICATES GENERAL CONDITIONS AT THE TIME OF THE SURVEY...

SURVEY CONTROL DATA STATION NORTHING EASTING MLLW DESCRIPTION 0987 BM 1 | 1,575,471.98 | 2,727,634.50 | 14.43 3.5" USCS DOMED BC BETSY 1996 | 1,580,869.08 | 2,732,943.94 | 14.72 DOMED SBC 1,581,415.92 | 2,754,466.05 | 10.59 3.5" USACE DOMED BC 1,580,391.15 | 2,741,998.01 | 12.27 1" PIPE WITH TACK 1,578,763.46 | 2,729,012.51 | 14.34 3" DOMED SBC

PROJECT CENTERLINE			PROJECT CENTERLINE			
CORNER#	CORNER# NORTHING EASTING		CORNER#	NORTHING	EASTING	
1	1,577,302.17	2,727,990.18	7	1,582,013.12	2,735,743.96	
2	1,577,760.13	2,728,747.65	8	1,580,909.56	2,739,084.66	
3	1,579,124.63	2,729,625.06	9	1,580,502.23	2,740,770.21	
4	1,580,499.83	2,732,171.49	10	1,579,579.97	2,742,779.60	
5	1,580,712.58	2,732,965.17	11	1,579,407.64	2,744,265.08	
6	1,581,798.91	2,734,585.78				

•			
ü	VOLUME COMPUTATIONS	3	
~	AREA A: CHANNEL	MLLW=0	CU. YD.
100	AVAILABLE TO PROJECT DEPTH (PD)	-12.0	2,371
40	AVAILABLE TO MAX PAY DEPTH (MP)	-13.0	4,949
ur.	AVAILABLE SIDE SLOPES (SS) AT 3:1 (H:V) & 25' WIDE	VARIES	10,592
	TOTAL MAXIMUM VOLUME AVAILABLE (MP + SS)		15,541

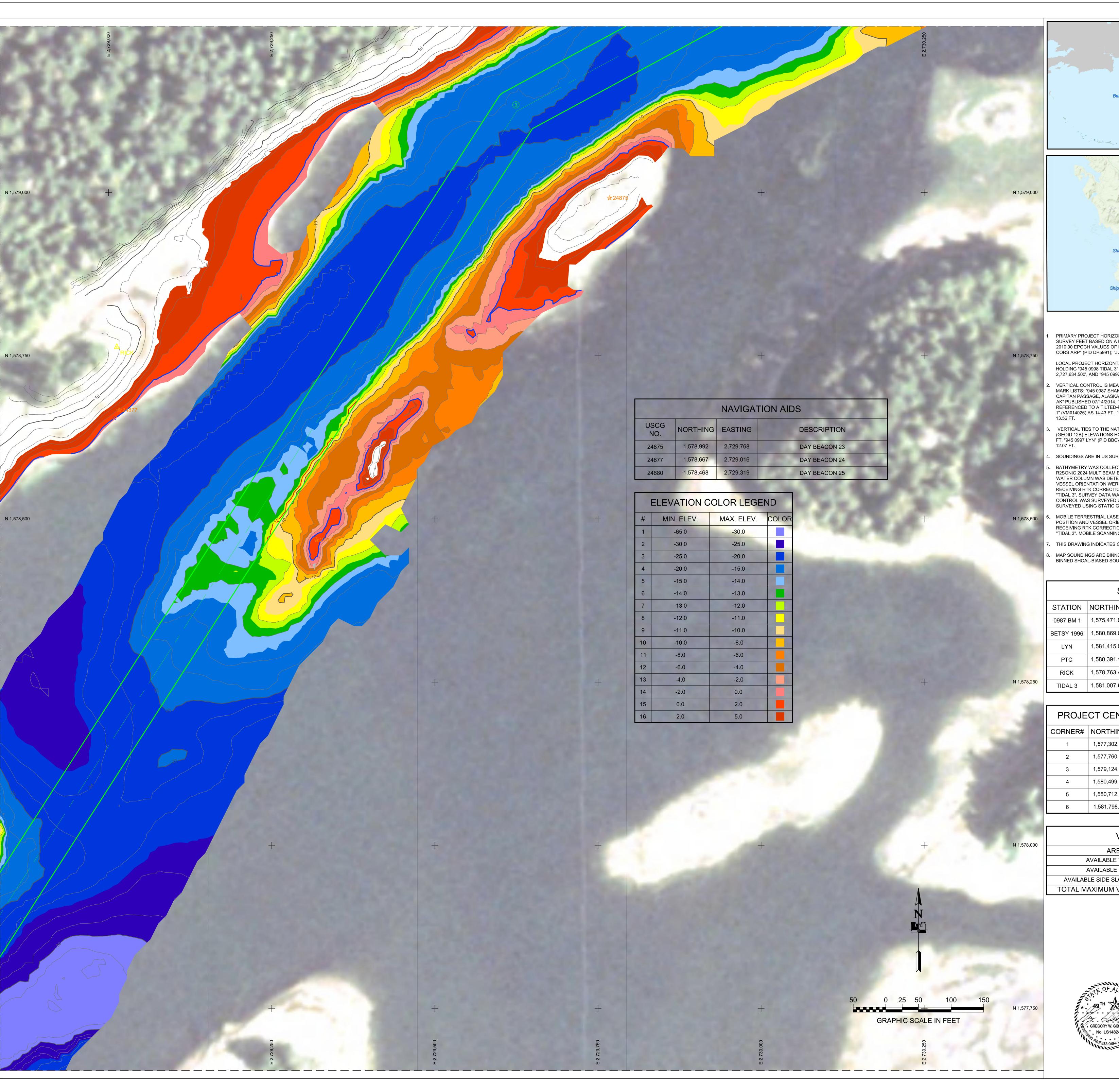


THIS HYDROGRAPHIC SURVEY WAS COMPLETED CERTIFIED HYDROGRAPHER

3.5" USCS DOMED BC

David R. Neff C.H. (275)

IDENTIFICATION 1-DRP-92-07-02





US Army Corps of Engineers ® ALASKA DISTRIC



NOTES

PRIMARY PROJECT HORIZONTAL CONTROL IS ALASKA STATE PLANE, ZONE 1, NAD83, (2011)(2010.00), IN US SURVEY FEET BASED ON A FULLY CONSTRAINED STATIC GPS NETWORK HOLDING THE PUBLISHED NAD83 2010.00 EPOCH VALUES OF NGS CORS STATIONS: "KLAWOCKAIRAK2006 CORS ARP" (PID DM7451); "ATLIN CORS ARP" (PID DP5991); "JUNEAU WAAS 1 CORS ARP" (DF4367) .

LOCAL PROJECT HORIZONTAL CONTROL IS ALASKA STATE PLANE, ZONE 1, NAD83, IN US SURVEY FEET HOLDING "945 0998 TIDAL 3" AS N 1,581,007.620', E 2,737,111.435', "945 0987 BM 1" AS N 1,575,471.975', E 2,727,634.500', AND "945 0997 LYN" AS N 1,581,415.916', E 2,754,466.054'.

- VERTICAL CONTROL IS MEAN LOWER LOW WATER (MLLW=0.0 FT), BASED ON THE NOAA/NOS TIDAL BENCH MARK LISTS: "945 0987 SHAKAN STRAIT (NORTHEAST END), AK" PUBLISHED 04/26/2011, "945 0997 EL CAPITAN PASSAGE, ALASKA" PUBLISHED 07/14/2014, AND "945 0998 DRY PASS, EL CAPITAN PASSAGE, AK" PUBLISHED 07/14/2014. THIS TIDAL DATUM IS BASED ON THE 1983-2001 TIDAL EPOCH AND IS REFERENCED TO A TILTED-PLANE MLLW DATUM HOLDING NOAA/NOS TIDAL BENCH MARKS: "945 0987 BM 1" (VM#14026) AS 14.43 FT., "945 0997 LYN" (VM#20876) AS 10.59 FT., AND "945 0998 TIDAL 3" (VM#20878) AS
- VERTICAL TIES TO THE NATIONAL SPATIAL REFERENCE SYSTEM ARE BASED ON PUBLISHED NAVD88 (GEOID 12B) ELEVATIONS HOLDING NOAA/USACE TIDAL BENCHMARKS: "945 0987 BM1" (VM#14026) AS 12.94 FT, "945 0997 LYN" (PID BBCV41/VM#20876) AS 9.43 FT, AND "945 0998 TIDAL 3" (PID BBCV62/VM#20878) AS
- SOUNDINGS ARE IN US SURVEY FEET AND ARE MINUS UNLESS OTHERWISE INDICATED.
- BATHYMETRY WAS COLLECTED MARCH 31 AND APRIL 1. SOUNDINGS WERE COLLECTED USING AN R2SONIC 2024 MULTIBEAM ECHOSOUNDER OPERATING AT 200KHZ. SOUND VELOCITY THROUGH THE WATER COLUMN WAS DETERMINED WITH AN AML BASE X SOUND VELOCITY PROBE. POSITIONING AND VESSEL ORIENTATION WERE MEASURED USING AN APPLANIX POSMV OCEANMASTER V5 SYSTEM RECEIVING RTK CORRECTIONS FROM A TRIMBLE SPS855 GPS RECEIVER SET AT CONTROL STATION "TIDAL 3". SURVEY DATA WAS COLLECTED AND PROCESSED USING QINSY 8.1 SOFTWARE. HORIZONTAL CONTROL WAS SURVEYED USING STATIC GNSS EQUIPMENT AND TECHNIQUES. VERTICAL CONTROL WAS SURVEYED USING STATIC GNSS EQUIPMENT AND DIFFERENTIAL LEVELING.
- MOBILE TERRESTRIAL LASER SCANNING DATA WAS COLLECTED USING A REIGL VZ400 LASER SCANNER. POSITION AND VESSEL ORIENTATION WERE MEASURED USING AN APPLANIX POSMV OCEANMASTER V5 RECEIVING RTK CORRECTIONS FROM A TRIMBLE SPS855 GPS RECEIVER SET AT CONTROL STATION "TIDAL 3". MOBILE SCANNING WAS COLLECTED AND PROCESSED USING QINSY 8.1 SOFTWARE.
- THIS DRAWING INDICATES GENERAL CONDITIONS AT THE TIME OF THE SURVEY...
- MAP SOUNDINGS ARE BINNED AT 24 FEET AND ARE SHOAL BIASED. CONTOURS ARE BASED ON 12 FEET BINNED SHOAL-BIASED SOUNDINGS. VOLUME SOUNDINGS ARE BINNED AT 3 FEET AND ARE MEAN VALUE.

					1	
SURVEY CONTROL DATA						
STATION	STATION NORTHING EASTING MLLW DESCRIPTION					
0987 BM 1	1,575,471.98	2,727,634.50	14.43	3.5" USCS DOMED BC		
BETSY 1996	1,580,869.08	2,732,943.94	14.72	DOMED SBC		
LYN	1,581,415.92	2,754,466.05	10.59	3.5" USACE DOMED BC		
PTC	1,580,391.15	2,741,998.01	12.27	1" PIPE WITH TACK		
RICK	1,578,763.46	2,729,012.51	14.34	3" DOMED SBC		
TIDAL 3	1,581,007.62	2,737,111.44	13.56	3.5" USCS DOMED BC		

	PROJE	CT CENTE	ERLINE	PROJECT CENTERLINE			
	CORNER#	NORTHING	EASTING	CORNER#	NORTHING	EASTING	
	1	1,577,302.17	2,727,990.18	7	1,582,013.12	2,735,743.96	
۱	2	1,577,760.13	2,728,747.65	8	1,580,909.56	2,739,084.66	
	3	1,579,124.63	2,729,625.06	9	1,580,502.23	2,740,770.21	
ı	4	1,580,499.83	2,732,171.49	10	1,579,579.97	2,742,779.60	
1	5	1,580,712.58	2,732,965.17	11	1,579,407.64	2,744,265.08	
	6	1,581,798.91	2,734,585.78		_	_	

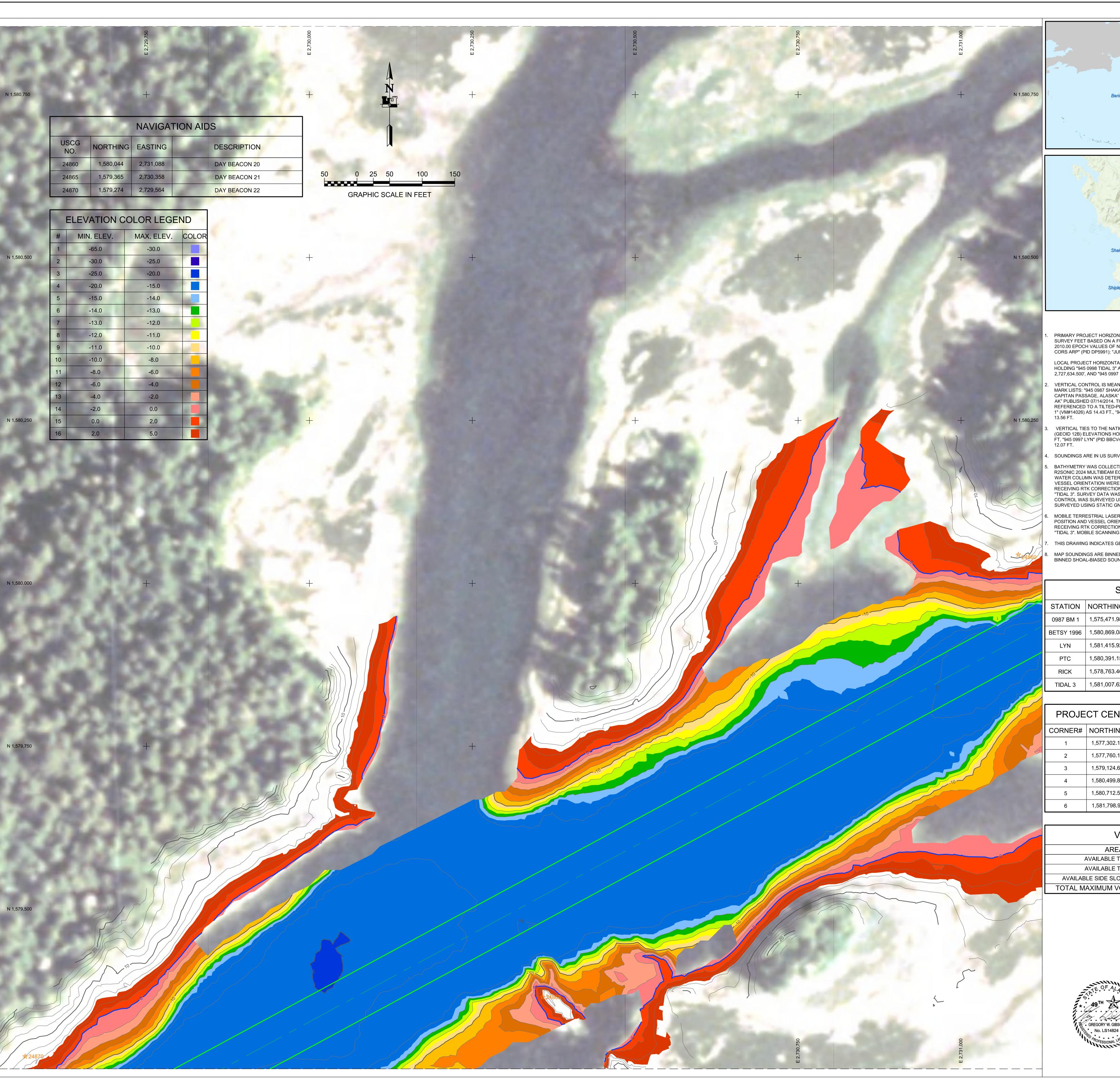
	VOLUME COMPUTATIONS							
	AREA A: CHANNEL	MLLW=0	CU. YD.					
	AVAILABLE TO PROJECT DEPTH (PD)	-12.0	2,371					
	AVAILABLE TO MAX PAY DEPTH (MP)	-13.0	4,949					
	AVAILABLE SIDE SLOPES (SS) AT 3:1 (H:V) & 25' WIDE	VARIES	10,592					
	TOTAL MAXIMUM VOLUME AVAILABLE (MP + SS)		15,541					
- 1								

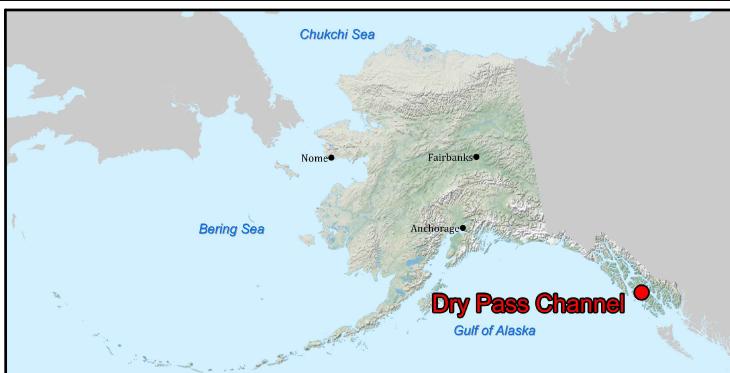


THIS HYDROGRAPHIC SURVEY WAS COMPLETED UNDER THE OVERSIGHT OF AN ACSM/THSOA CERTIFIED HYDROGRAPHER

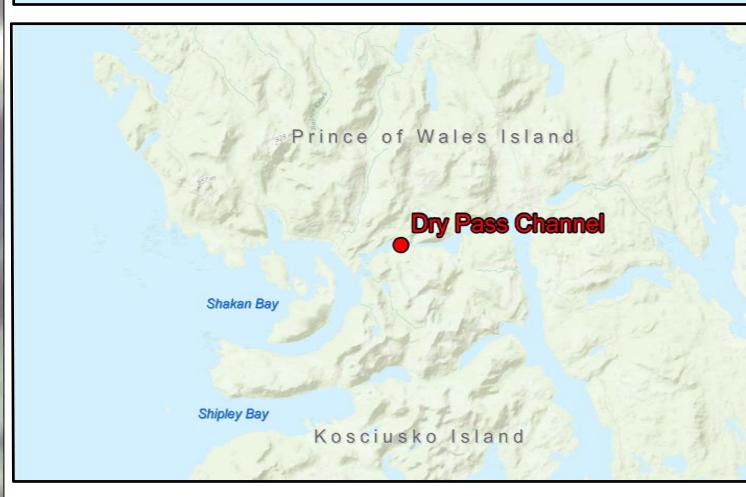
David R. Neff C.H. (275)

SHEET IDENTIFICATION 1-DRP-92-07-02





US Army Corps of Engineers ® ALASKA DISTRICT



NOTES

PRIMARY PROJECT HORIZONTAL CONTROL IS ALASKA STATE PLANE, ZONE 1, NAD83, (2011)(2010.00), IN US SURVEY FEET BASED ON A FULLY CONSTRAINED STATIC GPS NETWORK HOLDING THE PUBLISHED NAD83 2010.00 EPOCH VALUES OF NGS CORS STATIONS: "KLAWOCKAIRAK2006 CORS ARP" (PID DM7451); "ATLIN CORS ARP" (PID DP5991); "JUNEAU WAAS 1 CORS ARP" (DF4367) .

LOCAL PROJECT HORIZONTAL CONTROL IS ALASKA STATE PLANE, ZONE 1, NAD83, IN US SURVEY FEET HOLDING "945 0998 TIDAL 3" AS N 1,581,007.620', E 2,737,111.435', "945 0987 BM 1" AS N 1,575,471.975', E 2,727,634.500', AND "945 0997 LYN" AS N 1,581,415.916', E 2,754,466.054'.

VERTICAL CONTROL IS MEAN LOWER LOW WATER (MLLW=0.0 FT), BASED ON THE NOAA/NOS TIDAL BENCH MARK LISTS: "945 0987 SHAKAN STRAIT (NORTHEAST END), AK" PUBLISHED 04/26/2011, "945 0997 EL CAPITAN PASSAGE, ALASKA" PUBLISHED 07/14/2014, AND "945 0998 DRY PASS, EL CAPITAN PASSAGE, AK" PUBLISHED 07/14/2014. THIS TIDAL DATUM IS BASED ON THE 1983-2001 TIDAL EPOCH AND IS REFERENCED TO A TILTED-PLANE MLLW DATUM HOLDING NOAA/NOS TIDAL BENCH MARKS: "945 0987 BM 1" (VM#14026) AS 14.43 FT., "945 0997 LYN" (VM#20876) AS 10.59 FT., AND "945 0998 TIDAL 3" (VM#20878) AS

VERTICAL TIES TO THE NATIONAL SPATIAL REFERENCE SYSTEM ARE BASED ON PUBLISHED NAVD88 (GEOID 12B) ELEVATIONS HOLDING NOAA/USACE TIDAL BENCHMARKS: "945 0987 BM1" (VM#14026) AS 12.94 FT, "945 0997 LYN" (PID BBCV41/VM#20876) AS 9.43 FT, AND "945 0998 TIDAL 3" (PID BBCV62/VM#20878) AS

SOUNDINGS ARE IN US SURVEY FEET AND ARE MINUS UNLESS OTHERWISE INDICATED.

BATHYMETRY WAS COLLECTED MARCH 31 AND APRIL 1. SOUNDINGS WERE COLLECTED USING AN R2SONIC 2024 MULTIBEAM ECHOSOUNDER OPERATING AT 200KHZ. SOUND VELOCITY THROUGH THE WATER COLUMN WAS DETERMINED WITH AN AML BASE X SOUND VELOCITY PROBE. POSITIONING AND VESSEL ORIENTATION WERE MEASURED USING AN APPLANIX POSMV OCEANMASTER V5 SYSTEM RECEIVING RTK CORRECTIONS FROM A TRIMBLE SPS855 GPS RECEIVER SET AT CONTROL STATION "TIDAL 3". SURVEY DATA WAS COLLECTED AND PROCESSED USING QINSY 8.1 SOFTWARE. HORIZONTAL CONTROL WAS SURVEYED USING STATIC GNSS EQUIPMENT AND TECHNIQUES. VERTICAL CONTROL WAS SURVEYED USING STATIC GNSS EQUIPMENT AND DIFFERENTIAL LEVELING.

MOBILE TERRESTRIAL LASER SCANNING DATA WAS COLLECTED USING A REIGL VZ400 LASER SCANNER. POSITION AND VESSEL ORIENTATION WERE MEASURED USING AN APPLANIX POSMV OCEANMASTER V5 RECEIVING RTK CORRECTIONS FROM A TRIMBLE SPS855 GPS RECEIVER SET AT CONTROL STATION "TIDAL 3". MOBILE SCANNING WAS COLLECTED AND PROCESSED USING QINSY 8.1 SOFTWARE.

THIS DRAWING INDICATES GENERAL CONDITIONS AT THE TIME OF THE SURVEY..

MAP SOUNDINGS ARE BINNED AT 24 FEET AND ARE SHOAL BIASED. CONTOURS ARE BASED ON 12 FEET BINNED SHOAL-BIASED SOUNDINGS. VOLUME SOUNDINGS ARE BINNED AT 3 FEET AND ARE MEAN VALUE.

	SURVEY CONTROL DATA					
STATION NORTHING EASTING MLLW DESCRIPTION				DESCRIPTION		
0987 BM 1	1,575,471.98	2,727,634.50	14.43	3.5" USCS DOMED BC		
BETSY 1996	1,580,869.08	2,732,943.94	14.72	DOMED SBC		
LYN	1,581,415.92	2,754,466.05	10.59	3.5" USACE DOMED BC		
PTC	1,580,391.15	2,741,998.01	12.27	1" PIPE WITH TACK		
RICK	1,578,763.46	2,729,012.51	14.34	3" DOMED SBC		
TIDAL 3	1,581,007.62	2,737,111.44	13.56	3.5" USCS DOMED BC		

	PROJE	CT CENTE	ERLINE	PROJECT CENTERLINE			
	CORNER#	NORTHING	EASTING	CORNER#	NORTHING	EASTING	
	1	1,577,302.17	2,727,990.18	7	1,582,013.12	2,735,743.96	
9	2	1,577,760.13	2,728,747.65	8	1,580,909.56	2,739,084.66	
	3	1,579,124.63	2,729,625.06	9	1,580,502.23	2,740,770.21	
	4	1,580,499.83	2,732,171.49	10	1,579,579.97	2,742,779.60	
	5	1,580,712.58	2,732,965.17	11	1,579,407.64	2,744,265.08	
	6	1,581,798.91	2,734,585.78				

VOLUME COMPUTATIONS					
AREA A: CHANNEL	MLLW=0	CU. YD.			
AVAILABLE TO PROJECT DEPTH (PD)	-12.0	2,371			
AVAILABLE TO MAX PAY DEPTH (MP)	-13.0	4,949			
AVAILABLE SIDE SLOPES (SS) AT 3:1 (H:V) & 25' WIDE	VARIES	10,592			
TOTAL MAXIMUM VOLUME AVAILABLE (MP + SS)		15,541			



THIS HYDROGRAPHIC SURVEY WAS COMPLETED UNDER THE OVERSIGHT OF AN ACSM/THSOA

David R. Neff C.H. (275)

SHEET IDENTIFICATION