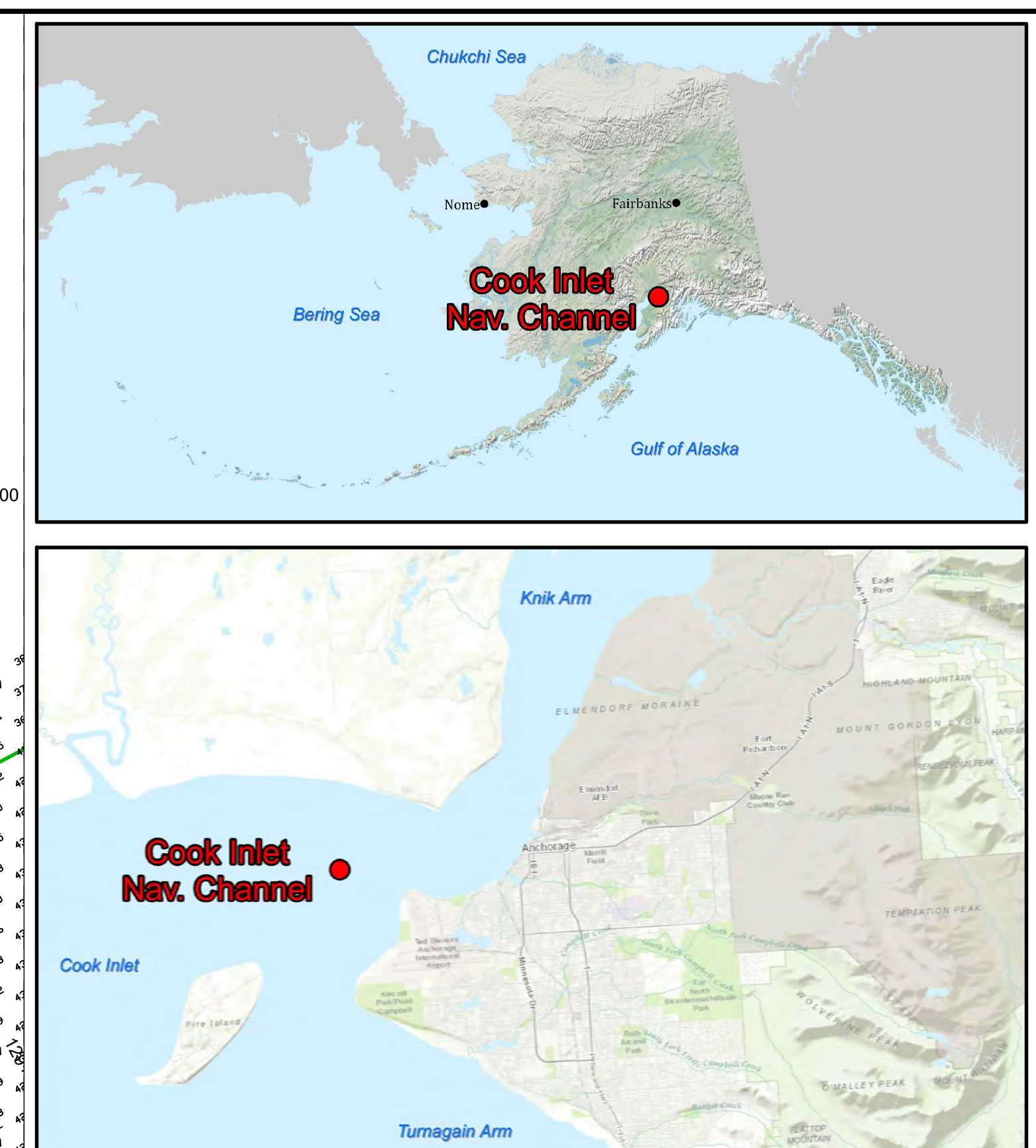


VOLUME COMPUTATIONS		
DREDGE AREA C	MLLW=0	CU. YD.
VOLUME AVAILABLE ABOVE	-38.0	345
VOLUME AVAILABLE ABOVE	-40.0	2,111
VOLUME AVAILABLE ABOVE	-43.0	54,846
DISPOSAL AREA		
VOLUME AVAILABLE BELOW	-45.0	1,505,605
TOTAL MAXIMUM VOLUME AVAILABLE IN AREA C (ABOVE -43.0)		54,846



- NOTES**
- PRIMARY PROJECT HORIZONTAL CONTROL IS ALASKA STATE PLANE, ZONE 4, NAD83 NAD2011 EPOCH 2010.00, IN US SURVEY FEET BASED ON A FULLY CONSTRAINED STATIC GPS NETWORK HOLDING THE PUBLISHED NGS STATIONS "VAN DUSEN" (PID TT14676) AND "LOOP 2 RM 3" (PID UV446) AND INCLUDED NGS CORS STATIONS "ANC2" (PID DL6498), "TBCN" (PID DK4055), "TSEA" (PID AI0952), AND "ZAN1" (PID DE9153).
 - LOCAL PROJECT HORIZONTAL CONTROL IS ALASKA STATE PLANE, ZONE 4, NAD83, IN US SURVEY FEET HOLDING USACE "TERRA 11" AS N 2,644,969.84, E 1,660,159.24.
 - VERTICAL TIES TO THE NATIONAL SPATIAL REFERENCE SYSTEM ARE BASED ON PUBLISHED NAVD83 (GEOID 128) ELEVATIONS HOLDING "TIDAL 16" (PID T07131/VHM135) AS 29.79 FT.
 - SOUNDINGS ARE IN U.S. SURVEY FEET AND ARE MINUS UNLESS OTHERWISE INDICATED.
 - BATHYMETRY WAS COLLECTED MAY 01, 2019, BY ETAC INC. SOUNDINGS WERE COLLECTED USING AN RSONIC 2024 MULTIBEAM ECHOSOUNDER OPERATING AT 200 KHZ WITH A 120-DEGREE SWATH-WIDTH WITH A 1.0" BEAM-WIDTH. SOUND VELOCITY THROUGH THE WATER COLUMN WAS DETERMINED USING AN AML BASE X SVP. SOUND VELOCITY WAS ALSO MEASURED AT THE SOUNDER HEAD USING A VALEPORT MINIVS. POSITIONING, VESSEL ATTITUDE, AND RTK TIDES WERE PROVIDED IN REAL TIME USING AN APRILANK POSNAV NAV 45 WAVEMASTER POSITIONING SYSTEM RECEIVING RTK CORRECTS FROM A TRIMBLE SP885 RECEIVER SET AT CONTROL STATION "TERRA 11" LOCATED ATOP THE PORT OFFICE BUILDING. POST-PROCESS KINEMATIC CORRECTION USING POSPAC MMS 8.2 SOFTWARE WERE APPLIED TO DATA FOLLOWING ACQUISITION. VESSEL NAVIGATION, DATA ACQUISITION AND PROCESSING WERE PERFORMED USING QPS INTEGRATED SOFTWARE.
 - THIS DRAWING INDICATES GENERAL CONDITIONS AT THE TIME OF THE SURVEY.
 - MAP SOUNDINGS ARE BINNED AT 48 FEET (SHOAL-BIASED). COLOR ELEVATIONS ARE BINNED AT 12 FEET (SHOAL-BIASED). VOLUME SOUNDINGS ARE BINNED AT 3 FEET (MEAN VALUE).

SURVEY CONTROL DATA				
STATION	NORTHING	EASTING	MLLW	DESCRIPTION
5920 THERMO 1 1988	2,642,784.70	1,660,183.87	37.3	AL MON (DISTURBED)
BM 12 1974	2,620,563.82	1,604,566.35	27.63	BRASS CAP
BM 5934 F	2,655,203.73	1,655,049.51	36.48	BRASS CAP
CRAIG	2,642,635.95	1,661,029.47	44.73	BRASS CAP
ETRAC-1	2,646,395.57	1,660,814.72	38.22	BRASS CAP
ETRAC-2	2,644,443.04	1,660,120.66	36.31	BRASS CAP
MIKE	2,645,987.73	1,661,875.48	48.38	BRASS CAP
NORTH END	2,646,649.84	1,660,584.80	41.51	USACE SBC
PORT 1989	2,639,934.29	1,656,925.43	39.64	AL MON
PORT MAC	2,655,563.46	1,654,968.22	41.51	BRASS CAP
RIFE 1960	2,620,502.19	1,604,162.70	29.99	BRASS CAP
SOUTH END	2,644,296.27	1,659,728.03	40.57	USACE SBC
TERRA 11 ARP	2,644,969.84	1,660,159.24	80.48	GPS ANTENNA REFERENCE POINT
TERRA 12 ARP	2,644,990.65	1,660,166.56	81.21	GPS ANTENNA REFERENCE POINT

DREDGE LIMITS			DREDGE LIMITS		
CORNER#	NORTHING	EASTING	CORNER#	NORTHING	EASTING
DL-28	2,632,288.21	1,628,921.02	DS-6	2,626,323.49	1,616,673.28
DL-29	2,633,360.88	1,628,352.82	DS-7	2,624,354.99	1,616,673.28
DL-30	2,628,708.65	1,619,570.25	DS-8	2,624,354.99	1,614,619.08
DL-31	2,627,635.79	1,620,138.09	DS-9	2,624,587.68	1,614,048.61
DS-5	2,626,323.49	1,614,048.61			

SURVEY LIMITS			SURVEY LIMITS		
CORNER#	NORTHING	EASTING	CORNER#	NORTHING	EASTING
SL-20	2,628,562.99	1,619,081.63	SL-24	2,626,423.49	1,613,948.61
SL-21	2,627,313.36	1,619,743.03	SL-25	2,624,254.99	1,613,948.61
SL-22	2,632,899.16	1,630,288.87	SL-26	2,624,254.99	1,616,773.28
SL-23	2,634,148.83	1,629,627.56	SL-27	2,626,423.49	1,616,773.28

STATE OF ALASKA
49TH
GREGORY W. GIBSON
No. LS14824
REGISTERED PROFESSIONAL LAND SURVEYOR

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

Gregory W. Gibson (317)

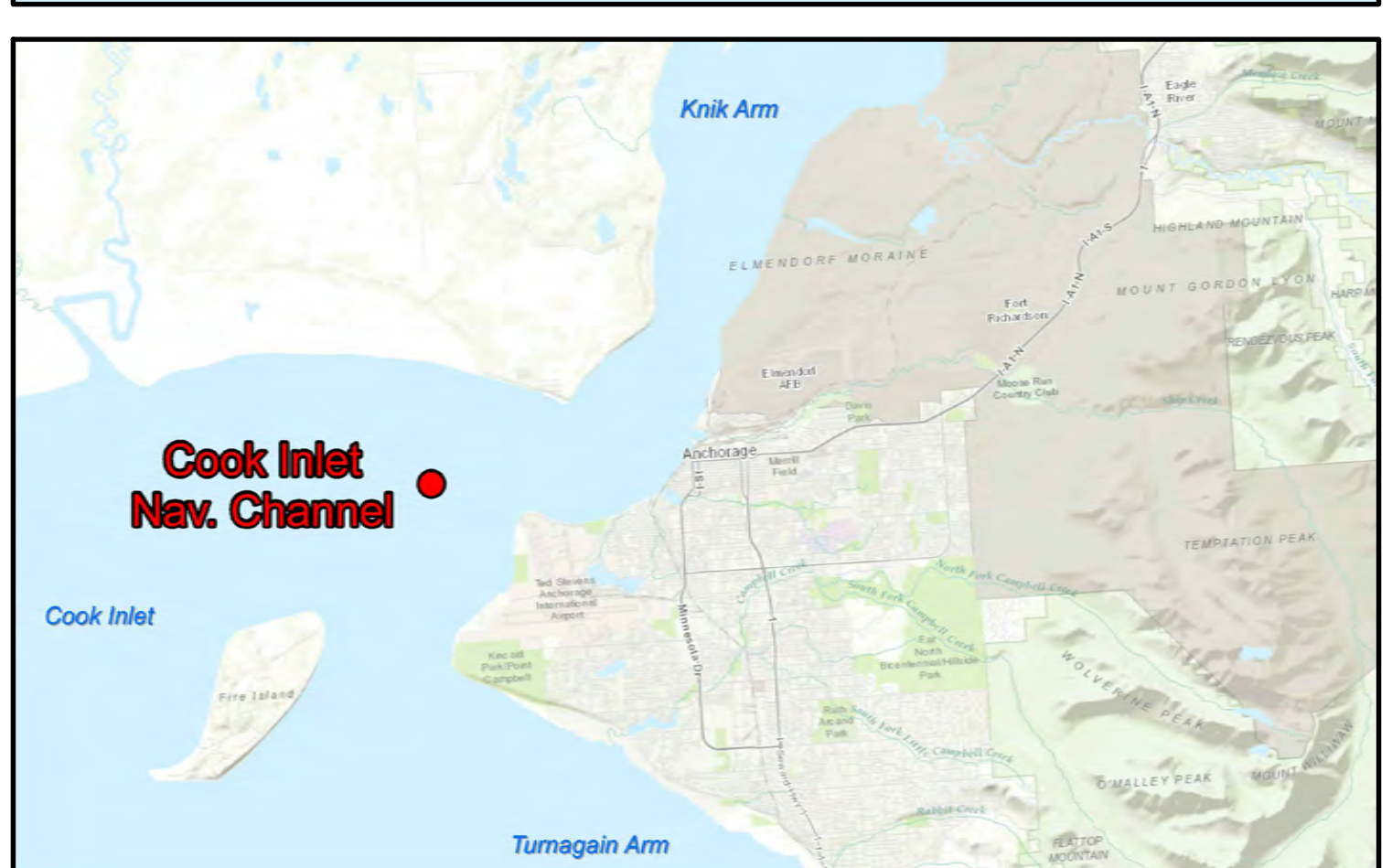
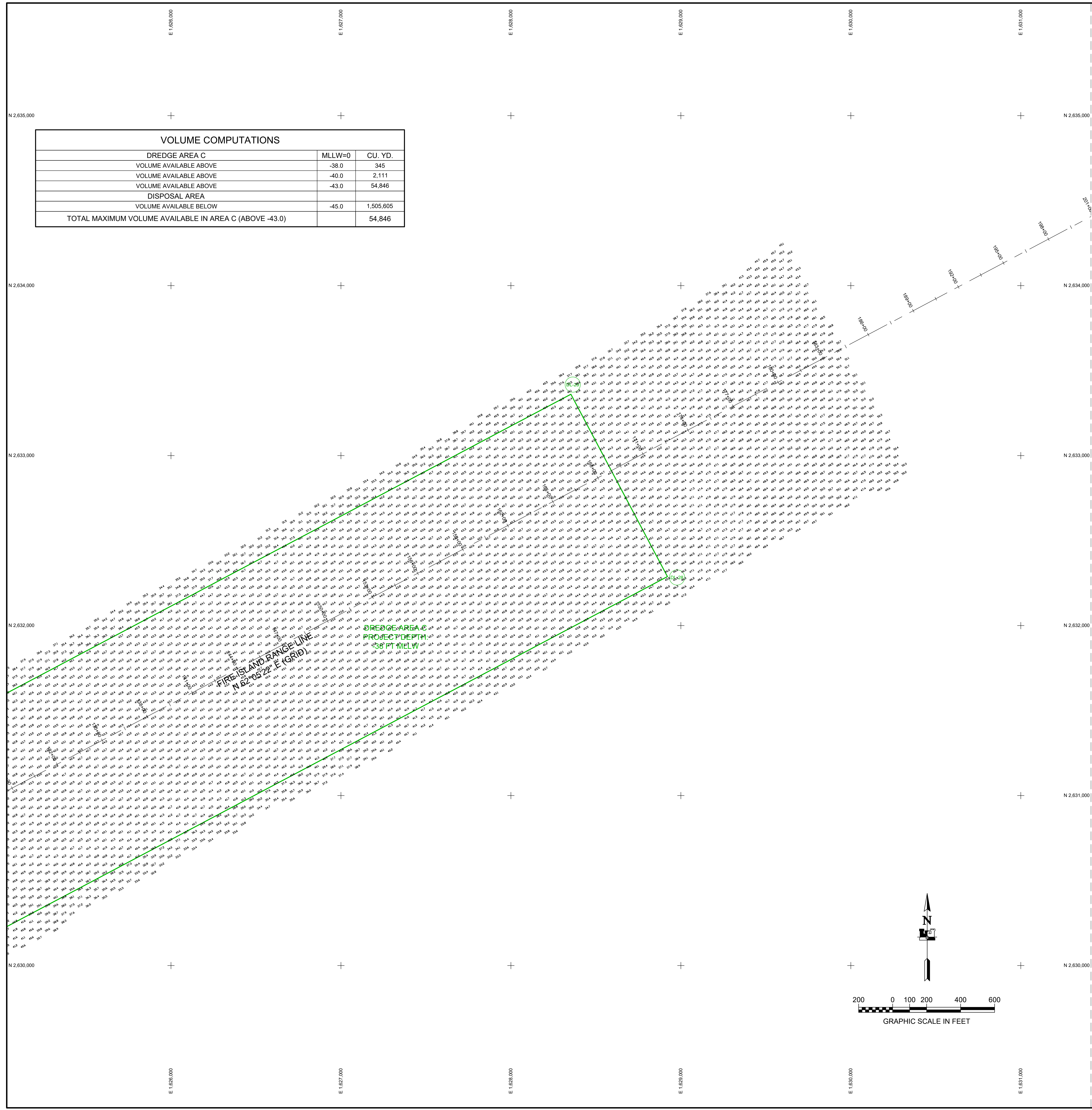
US Army Corps of Engineers
ALASKA DISTRICT

CONTRACT NO. W16HLE-C-0004
CONTINUATION: MANDATORY CONSTRUCTION CO.
CITY: SEATTLE STATE: WASHINGTON
APPROVED: [Signature] DATE: [Date]

DATE: 10/20/2018
BY: [Signature]
JOB NO.: 2018-2020 MAINTENANCE DREDGING, COOK INLET HYDROGRAPHIC SURVEY PRE_20190501_CINC

SHEET IDENTIFICATION
V-101
Sheet 1 of 6

VOLUME COMPUTATIONS		
DREDGE AREA C	MLLW=0	CU. YD.
VOLUME AVAILABLE ABOVE	-38.0	345
VOLUME AVAILABLE ABOVE	-40.0	2,111
VOLUME AVAILABLE ABOVE	-43.0	54,846
DISPOSAL AREA		
VOLUME AVAILABLE BELOW	-45.0	1,505,605
TOTAL MAXIMUM VOLUME AVAILABLE IN AREA C (ABOVE -43.0)		54,846



- NOTES**
- PRIMARY PROJECT HORIZONTAL CONTROL IS ALASKA STATE PLANE, ZONE 4, NAD83 NAD2011 EPOCH 2010.00, IN US SURVEY FEET BASED ON A FULLY CONSTRAINED STATIC GPS NETWORK HOLDING THE PUBLISHED NGS STATIONS "VAN DUSEN" (PID TT4676) AND "LOOP 2 RM 3" (PID UV446) AND INCLUDED NGS CORS STATIONS "ANC2" (PID DL6498), "TBN" (PID DK4055), "TSEA" (PID AI0952), AND "ZAN1" (PID DE9153). LOCAL PROJECT HORIZONTAL CONTROL IS ALASKA STATE PLANE, ZONE 4, NAD83, IN US SURVEY FEET HOLDING USACE "TERRA 11" AS N 2,644,969.84, E 1,660,159.24.
 - VERTICAL CONTROL IS A TILTED-PLANE MLLW DATUM DERIVED IN 2013 AND BASED ON THE NOAA/NOS TIDAL BENCH MARK LISTS "9455920, ANCHORAGE, KNIK ARM, COOK INLET, ALASKA" PUBLISHED 10/24/2011, "9455910, FIRE ISLAND, ALASKA" PUBLISHED 05/21/2004, AND "9455934, PORT MACKENZIE, COOK INLET, ALASKA" PUBLISHED 05/23/2003. THIS TILTED-PLANE MLLW IS BASED ON THE 1983-2001 TIDAL EPOCH AT THOSE STATIONS AND IS REFERENCED BY HOLDING GPS CONTROL STATION "TERRA 11" (PID B8C04) AS 80.48 FT.
 - VERTICAL TIES TO THE NATIONAL SPATIAL REFERENCE SYSTEM ARE BASED ON PUBLISHED NAVD08 (GEOID 128) ELEVATIONS HOLDING "TIDAL 16" (PID TT0713/VMH135) AS 29.79 FT.
 - SOUNDINGS ARE IN U.S. SURVEY FEET AND ARE MINUS UNLESS OTHERWISE INDICATED.
 - BATHYMETRY WAS COLLECTED MAY 01, 2019, BY ETRAC INC. SOUNDINGS WERE COLLECTED USING AN RSONIC 2024 MULTIBEAM ECHOSOUNDER OPERATING AT 200 KHZ WITH A 120-DEGREE SWATH-WIDTH WITH A 1.0' BEAM-WIDTH. SOUND VELOCITY THROUGH THE WATER COLUMN WAS DETERMINED USING AN AML BASE X SVP. SOUND VELOCITY WAS ALSO MEASURED AT THE SOUNDER HEAD USING A VALEPORT MINISVS. POSITIONING, VESSEL ATTITUDE, AND RTK TIDES WERE PROVIDED IN REAL TIME USING AN APRILANK POSNAV MV 6/5 WAVEMASTER POSITIONING SYSTEM RECEIVING RTK CORRECTS FROM A TRIMBLE SP5885 RECEIVER SET AT CONTROL STATION "TERRA 11" LOCATED ATOP THE PORT OFFICE BUILDING. POST-PROCESS KINEMATIC CORRECTION USING POSPAC MMS 8.2 SOFTWARE WERE APPLIED TO DATA FOLLOWING ACQUISITION. VESSEL NAVIGATION, DATA ACQUISITION AND PROCESSING WERE PERFORMED USING QPS INTEGRATED SOFTWARE.
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SURVEY CONTROL DATA				
STATION	NORTHING	EASTING	MLLW	DESCRIPTION
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BM 12 1974	2,620,563.82	1,604,566.35	27.63	BRASS CAP
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CRAIG	2,642,635.95	1,661,029.47	44.73	BRASS CAP
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DREDGE LIMITS			DREDGE LIMITS		
CORNER#	NORTHING	EASTING	CORNER#	NORTHING	EASTING
DL-28	2,632,288.21	1,628,921.02	DS-6	2,626,323.49	1,616,673.28
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DL-30	2,628,708.65	1,619,570.25	DS-8	2,624,354.99	1,614,619.08
DL-31	2,627,313.36	1,620,138.09	DS-9	2,624,587.68	1,614,048.61
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SURVEY LIMITS			SURVEY LIMITS		
CORNER#	NORTHING	EASTING	CORNER#	NORTHING	EASTING
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STATE OF ALASKA
49TH
GREGORY W. GIBSON
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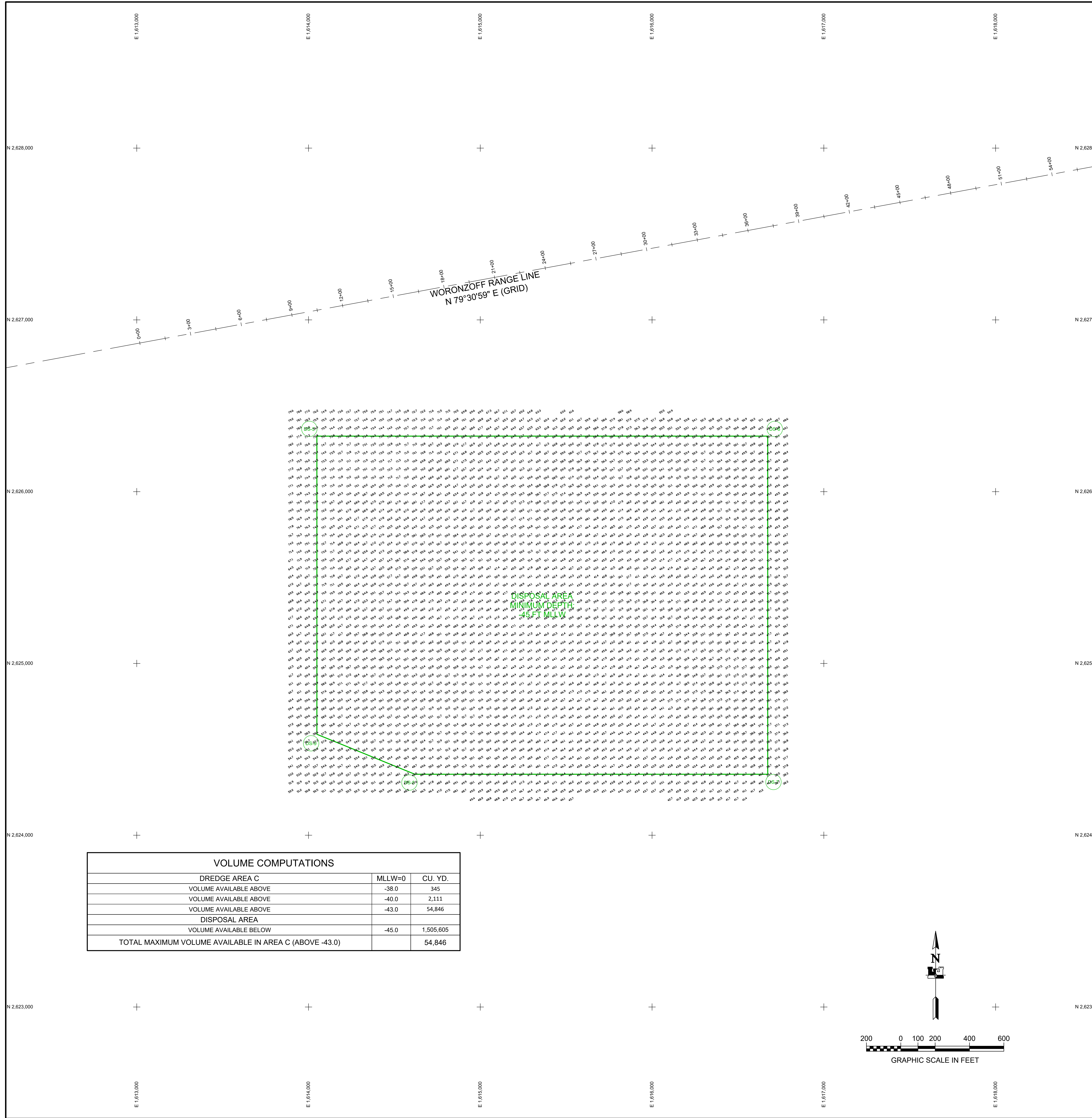
US Army Corps of Engineers
ALASKA DISTRICT

CONTRACT NO. W16HLE-C-0004
CONTINUATION: WANDER CONSTRUCTION CO.
CITY: SEATTLE
STATE: WASHINGTON
APPROVED: [Signature]
DATE: [Blank]

DATE: 10/20/19
SCALE: 1"=200'
FILE NAME: 20191918_14_A4M_SHEET 17
TABLE: [Blank]

ANCHORAGE, ALASKA
2018-2020 MAINTENANCE DREDGING, COOK INLET
HYDROGRAPHIC SURVEY
PRE_20190501_CINC

SHEET IDENTIFICATION
V-101
Sheet 2 of 6



VOLUME COMPUTATIONS		
DREDGE AREA C		
	MLLW=0	CU. YD.
VOLUME AVAILABLE ABOVE	-38.0	345
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 - VERTICAL TIES TO THE NATIONAL SPATIAL REFERENCE SYSTEM ARE BASED ON PUBLISHED NAVD83 (GEOID 128) ELEVATIONS HOLDING "TIDAL 16" (PID T10713/VHM1335) AS 29.73 FT.
 - SOUNDINGS ARE IN U.S. SURVEY FEET AND ARE MINUS UNLESS OTHERWISE INDICATED.
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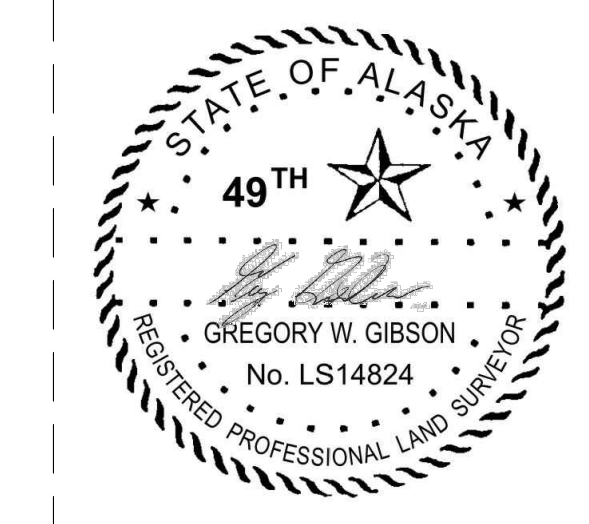
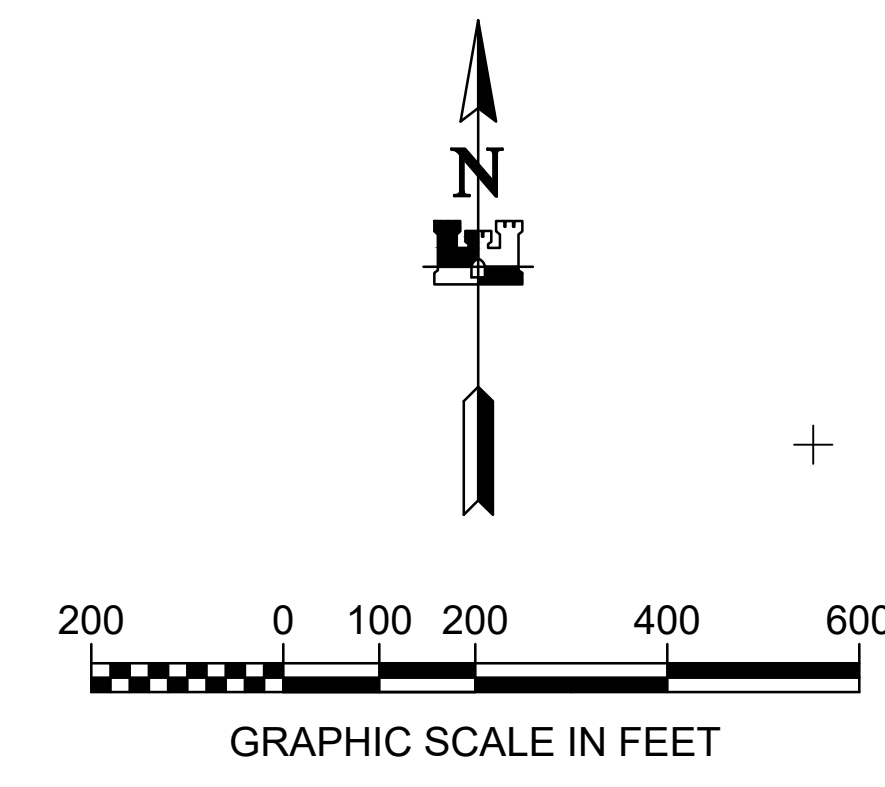
SURVEY CONTROL DATA				
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DL-31	2,627,635.79	1,620,138.09
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DREDGE LIMITS		
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DS-7	2,624,354.99	1,616,673.28
DS-8	2,624,354.99	1,614,619.08
DS-9	2,624,587.68	1,614,048.61

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CORNER#	NORTHING	EASTING
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SL-22	2,632,899.16	1,630,288.87
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SURVEY LIMITS		
CORNER#	NORTHING	EASTING
SL-24	2,626,423.49	1,613,948.61
SL-25	2,624,254.99	1,613,948.61
SL-26	2,624,254.99	1,616,773.28
SL-27	2,626,423.49	1,616,773.28



THIS HYDROGRAPHIC SURVEY WAS COMPLETED UNDER THE OVERSIGHT OF AN NSPS/THSOA CERTIFIED HYDROGRAPHER
 Gregory W. Gibson (317)

US Army Corps of Engineers - ALASKA DISTRICT

CONTRACT NO. W110118-1-0000
 CONTRACTOR: MANSOUR CONSTRUCTION CO.
 CITY: SEATTLE, STATE: WASHINGTON
 APPROVED: _____ DATE: _____
 RECOMMENDED: _____

DATE: 9 May 2019
 DESIGNED BY: JWB/AR/BSH
 CHECKED BY: JWB/AR/BSH
 CONTRACT NO.: W110118-1-0000
 SURVEY NO.: 1588-19
 SCALE: 1" = 200'
 FILE NAME: PRE_20190501_CINC_FINAL.DWG

ANCHORAGE, ALASKA
 2018-2020 MAINTENANCE DREDGING, COOK INLET
 HYDROGRAPHIC SURVEY
 PRE_20190501_CINC

SHEET IDENTIFICATION
 V-101
 Sheet 3 of 6