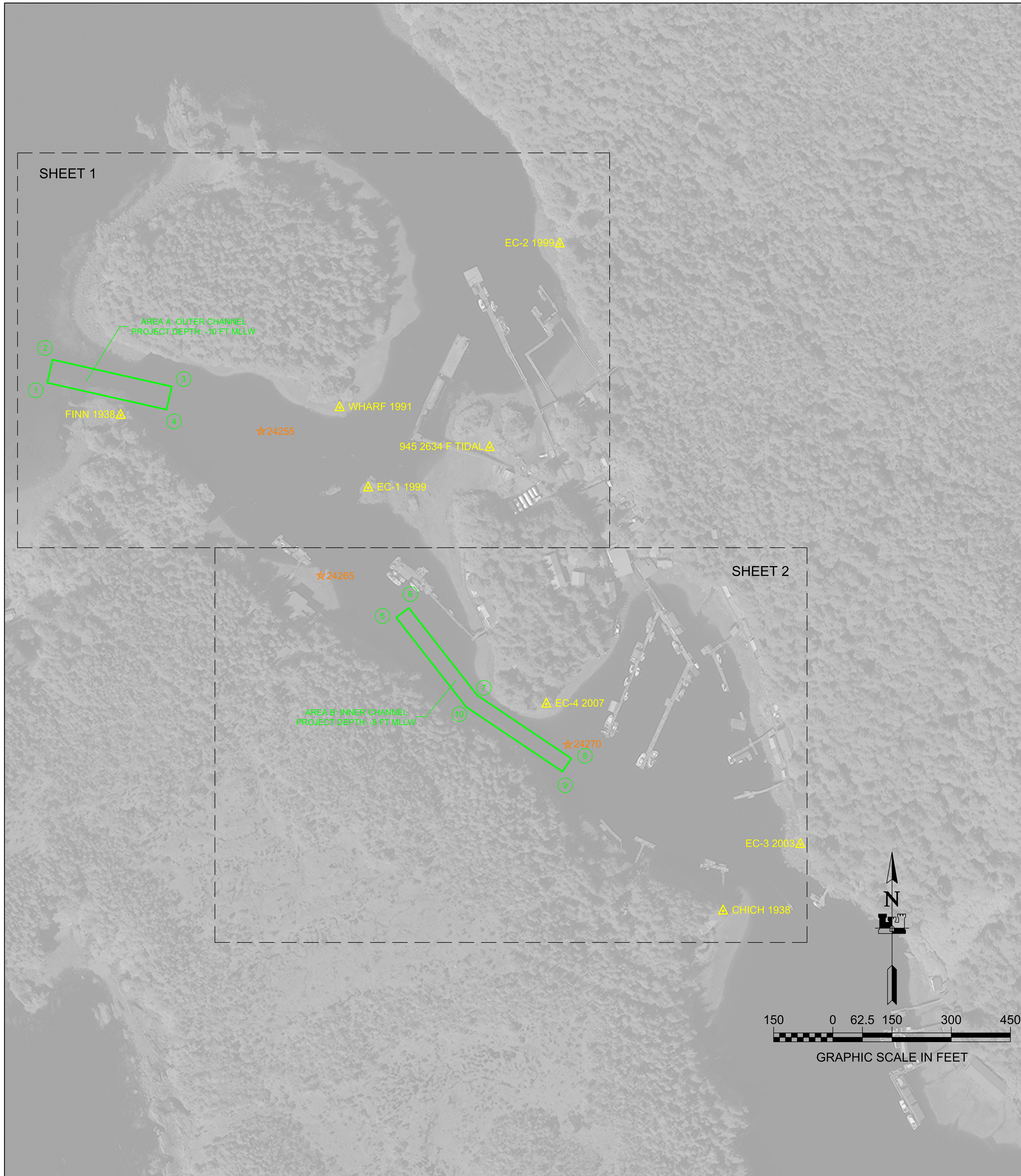


VOLUME COMPUTATIONS

AREA A: OUTER CHANNEL	MLLW=0	CU. YD.
AVAILABLE TO PROJECT DEPTH (PD)	-10.0	494
AVAILABLE TO MAX PAY DEPTH (MP)	-11.0	936
AVAILABLE SIDE SLOPES (SS) AT 3:1 (H:V) & 25' WIDE	VARIES	453
AREA B: INNER CHANNEL		
AVAILABLE TO PD	-8.0	567
AVAILABLE TO MP	-9.0	1,269
AVAILABLE SS AT 3:1 (H:V) & 25' WIDE	VARIES	794
TOTAL MAXIMUM VOLUME AVAILABLE (MP + SS)		3,452

NAVIGATION AIDS

NO.	NORTHING	EASTING	DESCRIPTION
24245	2,333,554	216,000	ENTRANCE LIGHT 2 FI R 4S
24255	2,333,545	2,168,367	DAYBEACON 3
24265	2,333,179	2,168,518	DAYBEACON 6
24270	2,332,751	2,169,144	DAYBEACON 7

PROJECT LIMITS

CORNER#	NORTHING	EASTING
1	2,333,667.70	2,167,825.51
2	2,333,726.24	2,167,838.69
3	2,333,658.25	2,168,140.69
4	2,333,599.71	2,168,127.51
5	2,333,072.73	2,168,709.53
6	2,333,097.40	2,168,741.02
7	2,332,876.40	2,168,914.11
8	2,332,715.94	2,169,152.85
9	2,332,682.74	2,169,130.54
10	2,332,846.74	2,168,886.53

NOTES

1. PRIMARY PROJECT HORIZONTAL CONTROL IS ALASKA STATE PLANE, ZONE 1, NAD83 (CORS96) EPOCH 2002.00, IN U.S. SURVEY FEET BASED ON A FULLY CONSTRAINED STATIC GPS NETWORK HOLDING THE PUBLISHED NAD83 (CORS96) EPOCH 2002.00 VALUES OF NGS CORS STATIONS: "GUSTAVUS 5 CORS ARP" (GUS5 - PID DK6299) AS N 2,410,505.75', E 2,296,637.77', "BIORKA ISLAND 5 CORS ARP" (BIS5 - PID DK6423) AS N 1,838,865.17', E 2,311,186.49', AND "JUNEAU WAAS 1 CORS ARP" AS N 2,385,816.86', E 2,509,443.55'.

   LOCAL PROJECT HORIZONTAL CONTROL IS ALASKA STATE PLANE, ZONE 1, NAD83 (CORS96) EPOCH 2002.00, IN U.S. SURVEY FEET HOLDING "945 2634 F TIDAL" AS N 2,333,503.71' E 2,168,945.98'.

2. VERTICAL CONTROL IS MEAN LOWER LOW WATER (MLLW=0.0'), BASED ON THE NOAA/NOS TIDAL BENCH MARK LIST "945 2634 ELFIN COVE, PORT ALTHROP", PUBLISHED 13 OCTOBER 2020. THIS TIDAL DATUM IS BASED ON THE 1983-2001 TIDAL EPOCH AND IS REFERENCED BY HOLDING NOAA/NOS TIDAL BENCH MARK "945 2634 F TIDAL" (PID BBBB67/VM#17943) AS 17.66'.

3. VERTICAL TIES TO THE NATIONAL SPATIAL REFERENCE SYSTEM ARE BASED ON PUBLISHED NAVD88 (GEOID 12B) ELEVATIONS HOLDING NOAA/USACE TIDAL BENCHMARK "945 2634 F TIDAL" (PID BBBB67/VM#17943) AS 17.55'.

4. SOUNDINGS ARE IN U.S. SURVEY FEET AND ARE MINUS UNLESS OTHERWISE INDICATED.

5. BATHYMETRY WAS COLLECTED MARCH 27-29, 2022. SOUNDINGS WERE COLLECTED USING AN R2SONIC 2020 MULTIBEAM ECHOSOUNDER OPERATING AT 400 KHZ. SOUND VELOCITY THROUGH THE WATER COLUMN WAS DETERMINED WITH AN AML BASE X2 SOUND VELOCITY PROBE. POSITION AND VESSEL ORIENTATION WERE MEASURED USING AN APPLANIX POSMV WAVEMASTER V5 SYSTEM RECEIVING RTK CORRECTIONS FROM A TRIMBLE R8 MODEL 3 GPS RECEIVER SET AT CONTROL STATION "945 2634 F TIDAL" (PID BBBB67/VM#17943). DATA WAS COLLECTED AND PROCESSED USING QINSY 8.1 AND QIMERA 2.2 SOFTWARE. HORIZONTAL CONTROL WAS VERIFIED USING RTK GNSS EQUIPMENT AND TECHNIQUES. VERTICAL CONTROL WAS SURVEYED USING DIFFERENTIAL LEVELING TECHNIQUES.

6. TERRESTRIAL LASER SCANNING DATA COLLECTED MARCH 26-27, 2022. DATA WAS COLLECTED USING A REIGL VZ400 LASER SCANNER. MOBILE SCANNING WAS COLLECTED AND PROCESSED USING QINSY 8.1 SOFTWARE. POSITION AND VESSEL ORIENTATION WERE MEASURED USING AN APPLANIX POSMV WAVEMASTER V5.

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

8. 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 SOUNDINGS.

SURVEY CONTROL DATA

STATION	NORTHING	EASTING	MLLW	DESCRIPTION
945 2634 F TIDAL	2,333,503.71	2,168,945.98	17.49	3-1/2 IN. NOS SBC
CHICH 1938	2,332,329.64	2,169,537.25	18.72	3-1/2 IN. USCGS SBC
EC-1 1999	2,333,401.40	2,168,638.16	13.23	3 IN. DOMED BC
EC-2 1999	2,334,019.59	2,169,123.70	15.19	3 IN. DOMED BC
EC-3 2003	2,332,498.28	2,169,733.00	13.55	3 IN. DOMED BC
EC-4 2007	2,332,853.75	2,169,089.49	11.06	3 IN. DOMED BC
FINN 1938	2,333,585.13	2,168,011.30	20.11	3-1/2 IN. USCGS SBC
WHARF 1991	2,333,604.76	2,168,566.01	14.86	3-1/2 IN. NOS SBC

STATE OF ALASKA
Lewis J. Epps
NO. 2510-S
REGISTERED PROFESSIONAL LAND SURVEYOR

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

ADAM L. TAYLOR C.H. (339)

US ARMY CORPS OF ENGINEERS®
ALASKA DISTRICT

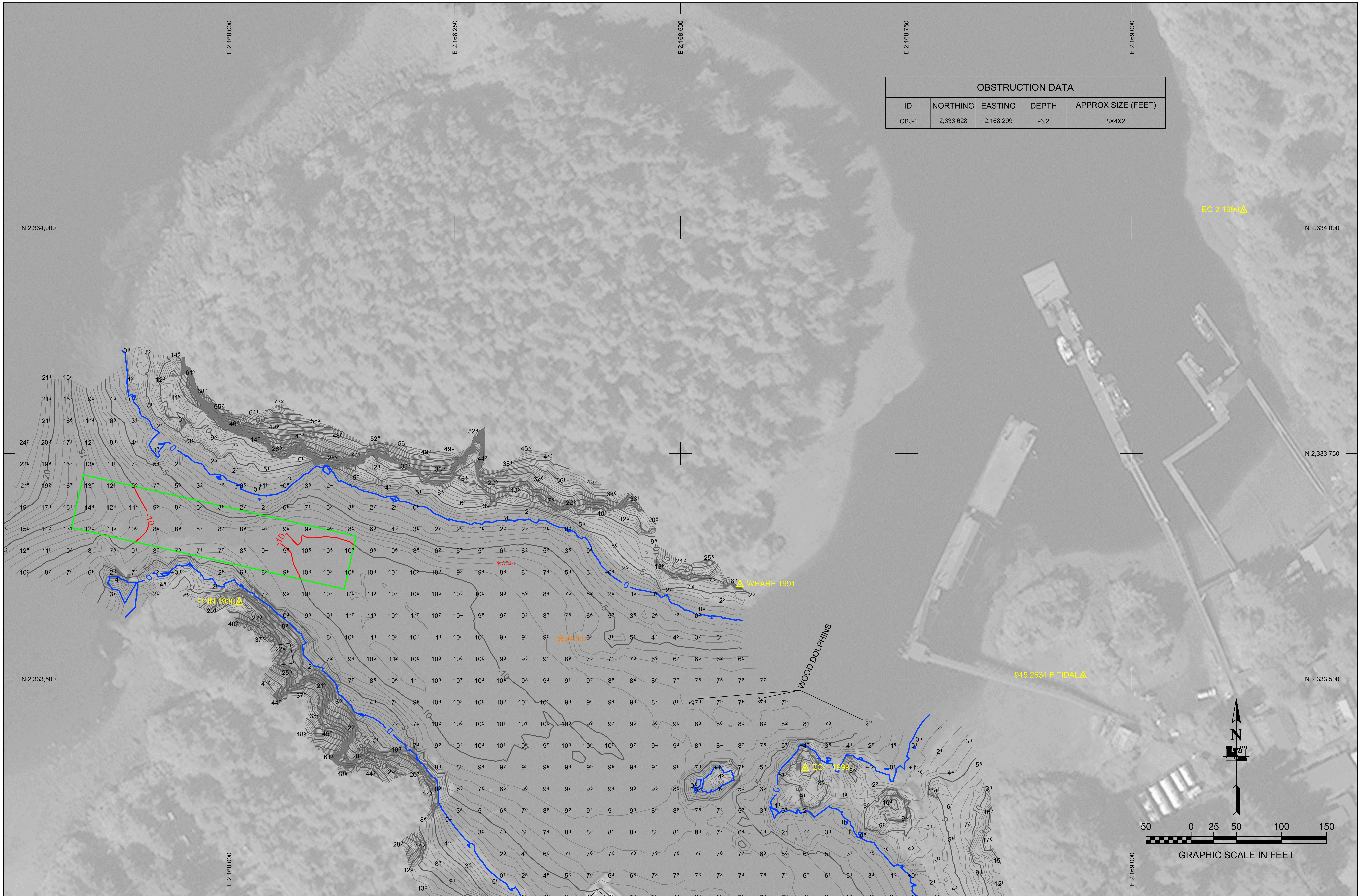
REV.	DATE	BY	APPR.	DESCRIPTION

U.S. ARMY CORPS OF ENGINEERS
ALASKA DISTRICT
2204 3RD STREET
JBER, ALASKA 99506-0898

SURVEYED BY: JOHN EPPS
DRAWN BY: ROBERT GOUGHNOUR
CHECKED BY: TAS/JBG/ALT
APPROVED BY: THOMAS SLOAN, CHIEF GEOMATICS SECTION
FILE: ELF001-VH01.DWG
UPC: ELF001
PLOT DATE: 12 May 2022
SIZE: ANSI D
SCALE: 1" = 150'
CONTRACT NO.: W911KB-18-D-0014
TASK ORDER NO.: 22F0002
JOB NO.: 2721
CONTRACTOR: ETRAC, INC.
CITY: WASILLA
STATE: ALASKA

ELFIN COVE, ALASKA
ELF001- ELFIN COVE DREDGING
HYDROGRAPHIC / TOPOGRAPHIC SURVEY
MARCH 23 - 29, 2022

REFERENCE NUMBER:
1-ELF-92-07-02



OBSTRUCTION DATA

ID	NORTHING	EASTING	DEPTH	APPROX SIZE (FEET)
OBJ-1	2,333,628	2,168,299	-6.2	8X4X2

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FILE: ELF001-VH01.DWG
UPC: ELF001
PLOT DATE: 12 May 2022
SIZE: ANSI D
SCALE: 1" = 50'
CONTRACT NO.: W911KB-18-D-0014
TASK ORDER NO.: 22F0002
JOB NO.: 2721
CONTRACTOR: ETRAC, INC.
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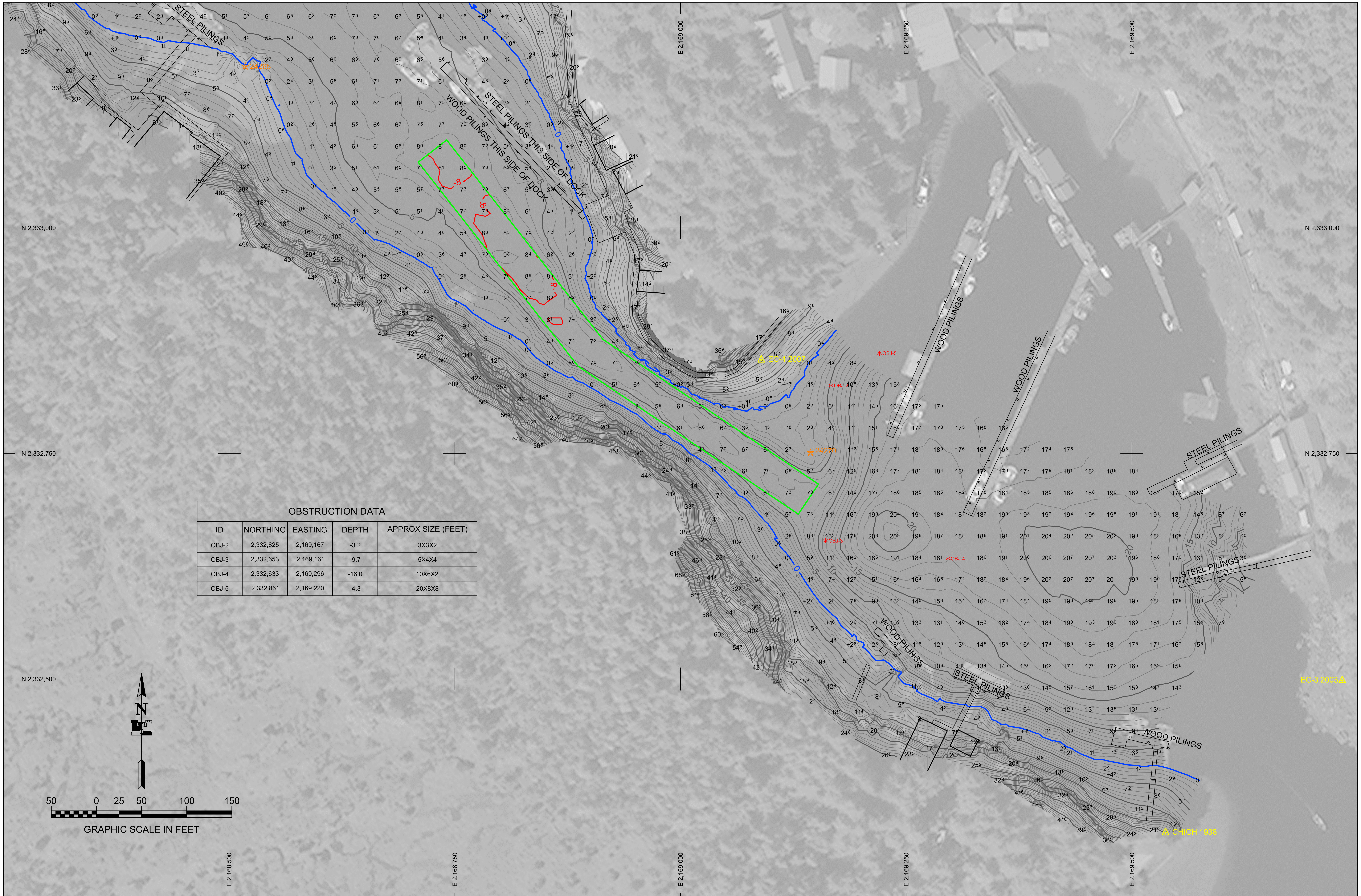

OBSTRUCTION DATA

ID	NORTHING	EASTING	DEPTH	APPROX SIZE (FEET)
OBJ-2	2,332,825	2,169,167	-3.2	3X3X2
OBJ-3	2,332,653	2,169,161	-9.7	5X4X4
OBJ-4	2,332,633	2,169,296	-16.0	10X6X2
OBJ-5	2,332,861	2,169,220	-4.3	20X8X8

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CHECKED BY: TAS/JBG/ALT	SIZE: ANSI D / SCALE: 1" = 50"	JOB NO.: 2721
APPROVED BY: THOMAS SLOAN, CHIEF GEOMATICS SECTION		CONTRACTOR: ETRAC, INC.
FILE: ELF001-VH01.DWG		CITY: WASILLA / STATE: ALASKA

ELFIN COVE, ALASKA
ELF001- ELFIN COVE DREDGING
HYDROGRAPHIC / TOPOGRAPHIC SURVEY
MARCH 23 - 29, 2022

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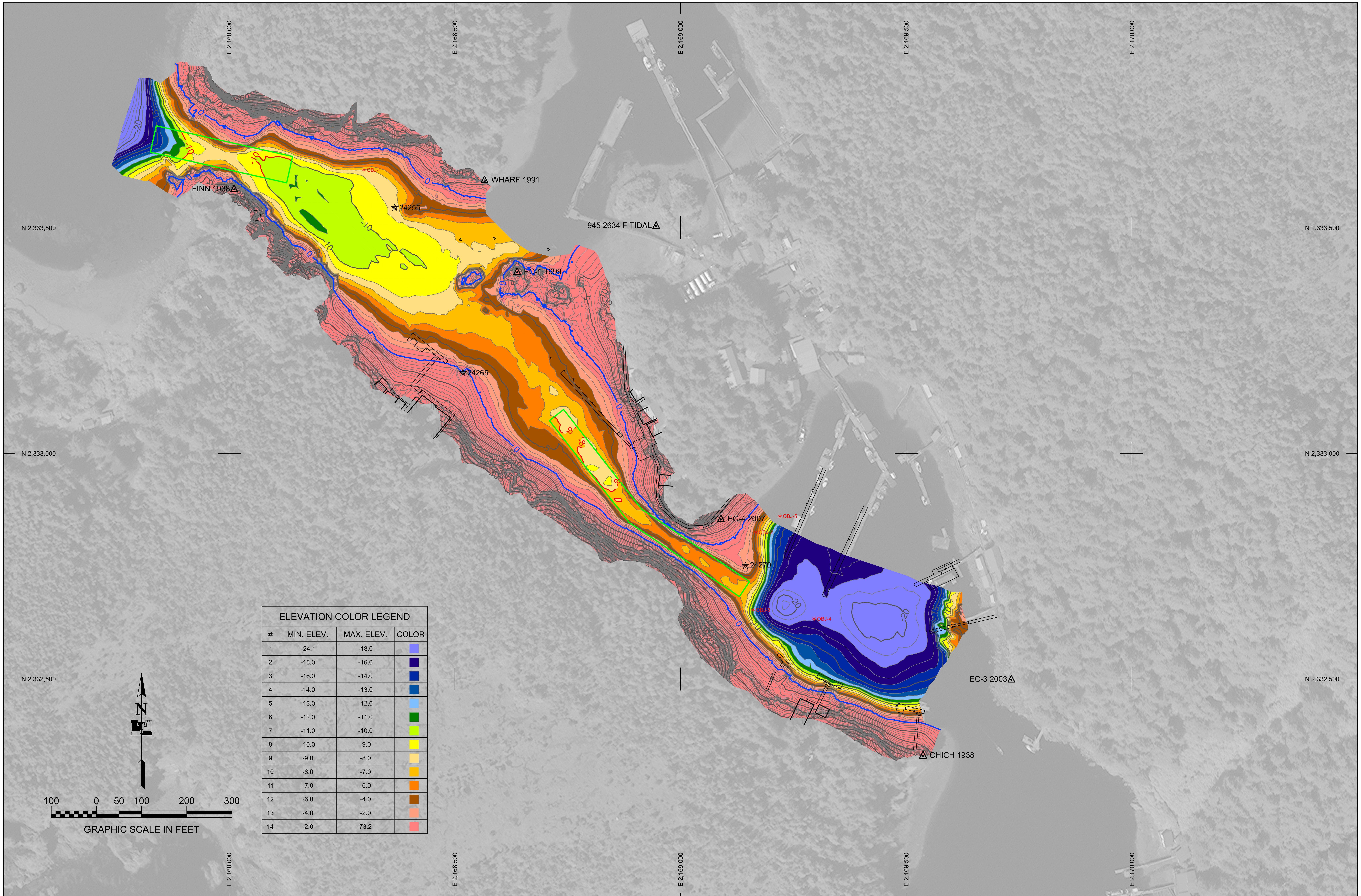

ELEVATION COLOR LEGEND

#	MIN. ELEV.	MAX. ELEV.	COLOR
1	-24.1	-18.0	
2	-18.0	-16.0	
3	-16.0	-14.0	
4	-14.0	-13.0	
5	-13.0	-12.0	
6	-12.0	-11.0	
7	-11.0	-10.0	
8	-10.0	-9.0	
9	-9.0	-8.0	
10	-8.0	-7.0	
11	-7.0	-6.0	
12	-6.0	-4.0	
13	-4.0	-2.0	
14	-2.0	73.2	

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SHEET 4 OF 4