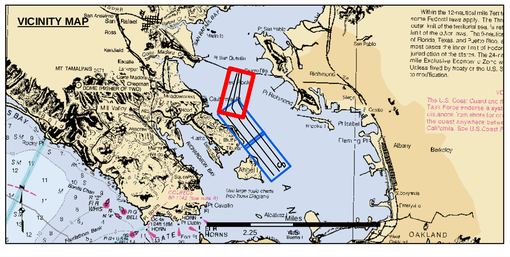

Angle Point	Easting	Northing
1	6001411.92	2168757.69
2	6000607.32	2160858.09
3	6003074.82	2156153.19
4	6013227.12	2142894.39
5	6010430.32	2140664.79
6	5996932.22	2157596.09
7	6000210.52	2168757.69
C1	6000811.22	2168757.69
C2	5998769.72	2159227.09
C3	6001548.62	2154936.49
C4	6011828.72	2141779.59

1 inch = 400 feet
Relative Scale (ANSI D 22x34)

1:4,800
Absolute Scale

— Federal Navigation Channel
🟥 Shoaling Area
▭ Placement Area
⬚ Anchorage Area
▨ Wreck Area
Submerged Wreck
∠ Angle Point
Beacon, General
⊗ Obstruction Point
◆ Navigation Buoy
◆ Navigation Buoy
● Shoalest Sounding*

Contours	
—	-45
—	-44
—	-43
—	-42
—	-41

NOTES:

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*SHOALEST SOUNDING PER QUARTER PER REACH

SURVEYED BY THE CORPS OF ENGINEERS.

SOUNDINGS ARE BASED ON THE DATUM OF MEAN LOWER LOW WATER (MLLW) AT THE LOCALITY AND ARE SHOWN TO THE TENTHS OF A FOOT.

THE PROJECT DEPTH IS 45 FEET MLLW.

VERTICAL DATUM:
MLLW (MEAN LOWER LOW WATER)
TIDAL EPOCH 1983-2001
TIDAL DATUM CONTROL STATION: 9414863, RICMOND CA
PUBLISHED 11/10/2011

HORIZONTAL CONTROL DATUM:
NAD83(2011) EPOCH 2010.00

HORIZONTAL CONTROL DATUM:
NAD83(2011) EPOCH 2010.00

CONTROL:
DESIGNATION: A557
PID: HT1064
MLLW: 10.58 FT (3.224M) - DERIVED FROM VDATUM
NAD83(2011): -95.40FT (-29.079M) | OPUS APRIL 2020

DESIGNATION: COE DOCK
PID: BBBZ96
NAD83(2011): -95.08FT (-28.981M) | OPUS APRIL 2020

TIDE GAUGE LOCATION:
NOAA ONLINE GAUGE 9414863 RICHMOND, CA USED AS TIDE VALIDATION

POSITIONS AND DEPTHS HAVE BEEN CORRECTED USING PPK TECHNIQUES USING A GNSS BASE STATION AT A557 (4/21/2020) AND COE DOCK (4/22-24/2020). TIDE LEVELS HAVE BEEN EXTRAPOLATED USING GEOID18 AND VDATUM V4.0.1 AND VALIDATED AGAINST THE TIDAL DATUM CONTROL STATION.

SURVEY VESSEL / EQUIPMENT:
- S/V RANDY CUMMINGS
- RESON T50-R SINGLE-HEAD MULTIBEAM ECHOSOUNDER
- POS MV 220 VER5 HW2.5-12
- IMU TYPE 42
- TRIMBLE AT1675-540TS GPS ANTENNA
BASE STATION:
- TRIMBLE SPSS852 GPS RECIEVER
- TRIMBLE GEODETIC MODEL 2 GPS ANTENNA
- TRIMBLE FIXED HEIGHT TRIPOD

US Army Corps of Engineers
San Francisco District
1455 Market Street
San Francisco, CA 94103

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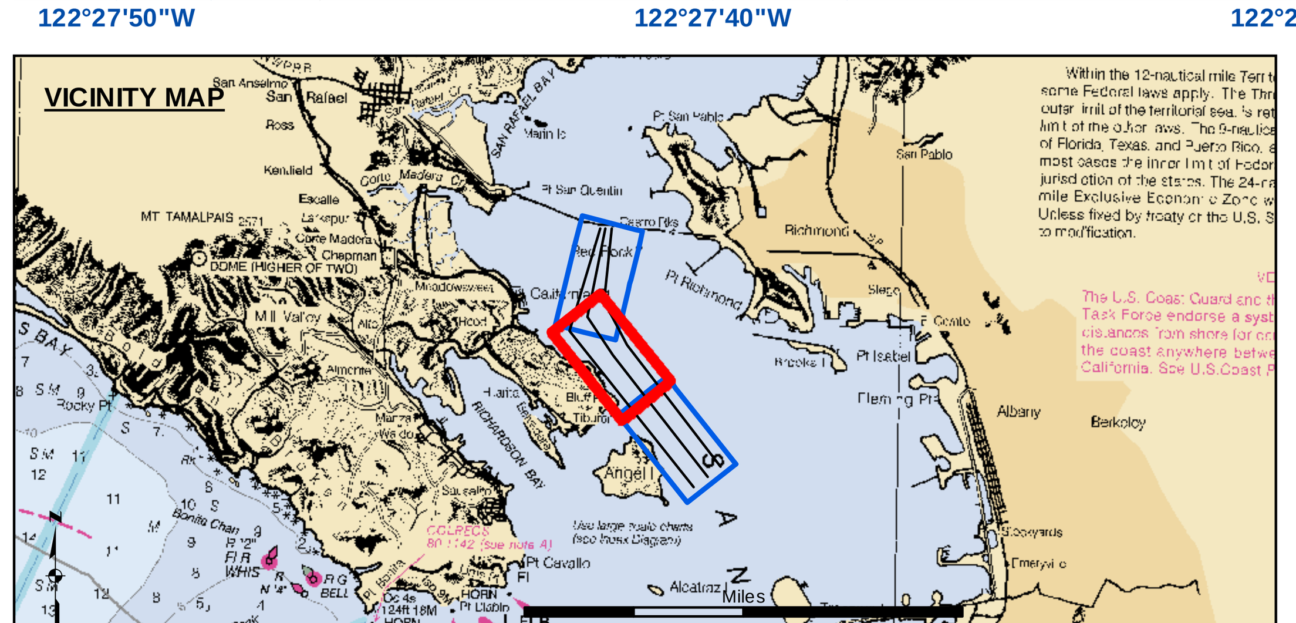
PREPARED UNDER THE DIRECTION OF JOHN D. CUNNINGHAM LT. COLONEL, C.E., DISTRICT ENGINEER	Surveyed By:	Chart Date: Apr 30, 2020
Submitted: ____ Hydro Survey Team Leader Recommended: ____ Chief, Hydro Survey Section	Plotted By: PDT	Designed by:
Approved: ____ Chief, Construction Branch	Checked By: PDT	Drawn by: PDT

CONTRA COSTA COUNTY CALIFORNIA

NORTH SHIP CHANNEL
CONDITION SURVEY
21-24 APRIL 2020

Sheet Reference Number
1 of 3



Legend	
Federal Navigation Channel	Beacon, General
Shoaling Area	Obstruction Point
Placement Area	Navigation Buoy
Anchorage Area	Navigation Buoy
Wreck Area	Shoalest Sounding*
Submerged Wreck	
Angle Point	

Contours
-45
-44
-43
-42
-41

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TIDAL EPOCH 1983-2001
TIDAL DATUM CONTROL STATION: 9414863, RICMOND CA
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HORIZONTAL CONTROL DATUM:
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PID: HT1064
MLLW: 10.58 FT (3.224M) - DERIVED FROM VDATUM
NAD83(2011): -95.40FT (-29.079M) | OPUS APRIL 2020

DESIGNATION: COE DOCK
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PREPARED UNDER THE DIRECTION OF JOHN D. CUNNINGHAM LT. COLONEL, C.E., DISTRICT ENGINEER	Surveyed By:	Chart Date: Apr 30, 2020
Submitted: Hydro Survey Team Leader	Plotted By: PDT	Designed by:
Recommended: Chief, Hydro Survey Section	Checked By: PDT	Drawn by: PDT
Approved: Chief, Construction Branch		

CONTRA COSTA COUNTY — CALIFORNIA

NORTH SHIP CHANNEL
CONDITION SURVEY
21-24 APRIL 2020

CORPS OF ENGINEERS

U.S. ARMY

122°25'10"W 37°53'20"N 122°25'0"W 37°53'10"N 122°24'50"W 37°53'0"N 122°24'40"W 37°52'50"N 122°24'30"W 37°52'40"N 122°24'20"W 37°52'30"N 122°24'10"W 122°24'0"W 122°23'50"W 122°23'40"W

6,008,076 2,150,944 6,011,076 2,147,944 2,144,944 6,014,076

122°25'20"W 37°53'20"N 122°25'40"W 37°53'10"N 122°25'50"W 37°53'0"N 122°26'0"W 37°52'50"N 122°26'10"W 37°52'40"N 122°26'20"W 37°52'30"N 122°24'10"W 37°51'50"N 122°24'0"W 37°51'40"N 122°23'50"W 37°51'30"N 122°23'40"W 37°51'20"N

6,005,076 2,141,944 6,014,076 6,011,076

204+00 206+00 208+00 210+00 212+00 214+00 216+00 218+00 220+00 222+00 224+00 226+00 228+00 230+00 232+00 234+00 236+00 238+00 240+00 242+00 244+00 246+00 248+00 250+00 252+00 254+00 256+00 258+00 260+00 262+00 264+00 266+00 268+00 270+00 272+00 274+00 276+00 278+00 280+00 282+00 284+00 286+00 288+00 290+00 292+00 294+00 296+00 298+00 300+00 302+00 304+00 306+00 308+00 310+00 312+00 314+00 315+56

FLOOD

EBB

Feet

0 400 800 1,600 2,400

1 inch = 400 feet

Relative Scale (ANSI D 22x34)

1:4,800

Absolute Scale

China Cove

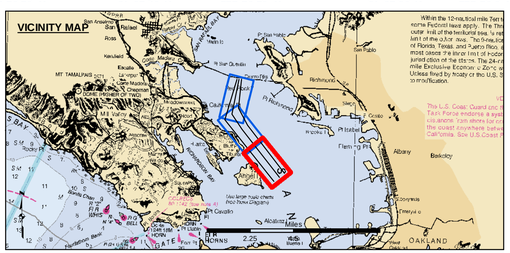
Winslow Cove

San Francisco Bay North Channel Light 5

2,147,944 2,144,944 6,005,076 2,141,944 6,008,076

122°26'20"W 37°52'40"N 122°26'10"W 37°52'30"N 122°26'0"W 37°52'20"N 122°25'50"W 122°25'40"W 122°25'30"W 122°25'20"W 122°25'10"W 122°25'0"W 122°24'50"W

VICINITY MAP



- Federal Navigation Channel
- Shoaling Area
- Placement Area
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- Wreck Area
- Submerged Wreck
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- Navigation Buoy
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Contours

-45 -44 -43 -42 -41

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NAD83(2011) -95.40FT (-29.079M) | OPUS APRIL 2020

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BASE STATION:
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- TRIMBLE GEODETIC MODEL 2 GPS ANTENNA
- TRIMBLE FIXED HEIGHT TRIPOD

US Army Corps of Engineers

San Francisco District
1455 Market Street
San Francisco, CA 94103

PREPARED UNDER THE DIRECTION OF
JOHN D. CUNNINGHAM
LT. COLONEL, C.E. DISTRICT ENGINEER

Surveyed By:		Chart Date:	Apr 30, 2020
Plotted By:	PDT	Designed by:	
Checked By:	PDT	Drawn by:	PDT

Submitted: Hydro Survey Team Leader

Recommended: Chief, Hydro Survey Section

Approved: Chief, Construction Branch

CONTRA COSTA COUNTY CALIFORNIA

NORTH SHIP CHANNEL
CONDITION SURVEY
21-24 APRIL 2020

Sheet Reference Number

3 of 3