APPENDIX C

NBSA Bathymetry and Navigational Charts

ARCADIS Design & Consultancy for natural and built assets

OXY Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum Corporation

REMEDIAL INVESTIGATION REPORT APPENDIX C – NBSA BATHYMETRY AND NAVIGATIONAL CHARTS

Newark Bay Study Area
Newark Bay, New Jersey

May 2022

CONTENTS

Appendix C-1 NBSA Channel Survey (February 2018)

Appendix C-2 Historical NOAA Nautical Charts (1844 through 2020)

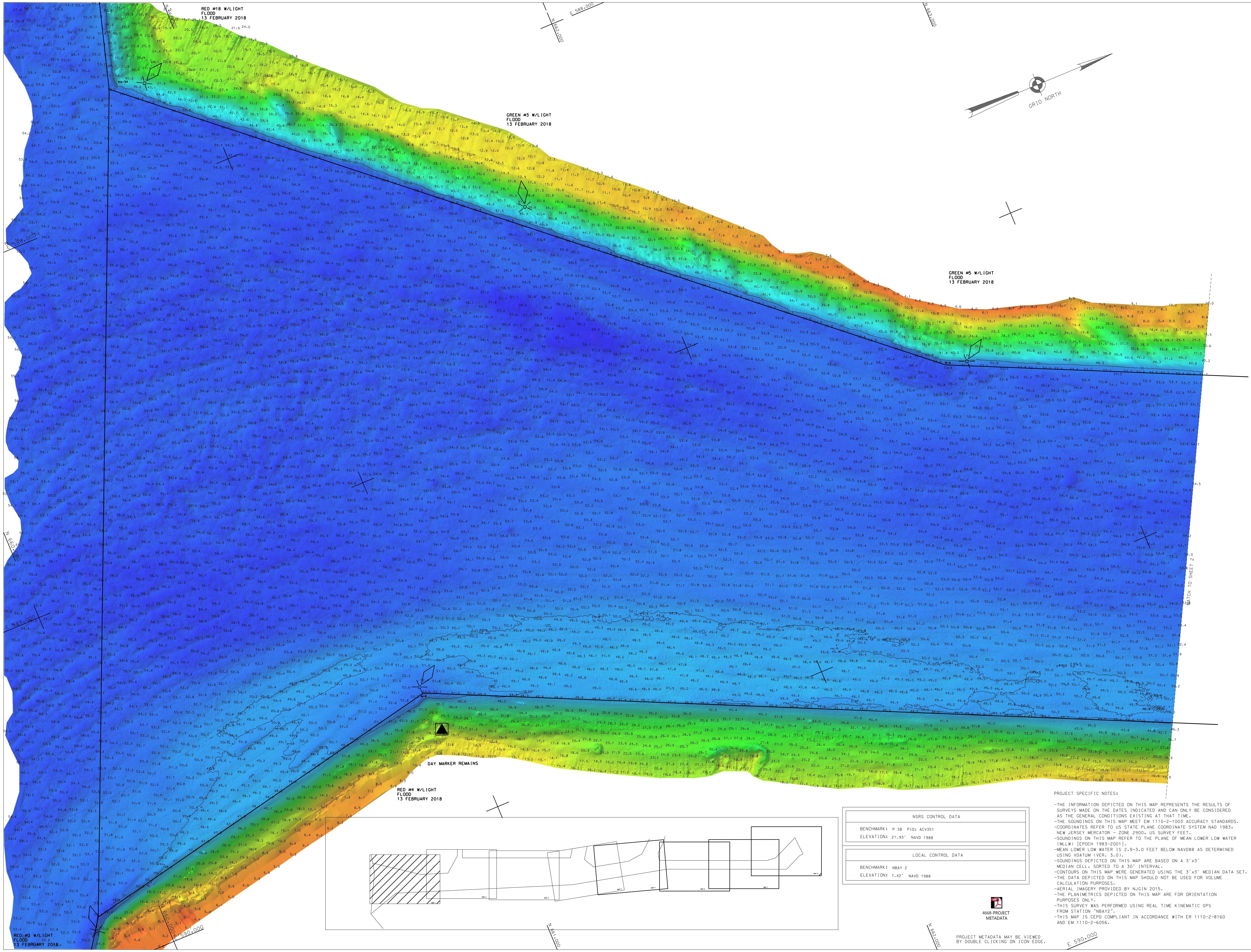
Appendix C-3 Datum for 8519483, Bergen Point, NY (Figure B-1 from CSM)

Appendix C-1

NBSA Channel Survey (February 2018)

CORPS OF ENGINEERS

U. S. ARMY


RED #18 W/LIGHT
FLOOD
13 FEBRUARY 2018
GREEN #3 W/LIGHT
FLOOD
13 FEBRUARY 2018
GREEN #5 W/LIGHT
FLOOD
13 FEBRUARY 2018
GRID NORTH
MATCH TO SHEET 2
DAY MARKER REMAINS
RED #4 W/LIGHT
FLOOD
13 FEBRUARY 2018
RED #2 W/LIGHT
FLOOD
13 FEBRUARY 2018
E 588,000
N 662,000
N 663,000
E 589,000
E 590,000
N 660,000
N 661,000
N 662,000
E 590,000
SHEET 8

NSRS CONTROL DATA

BENCHMARK: P 38 PID: ACV351
ELEVATION: 21.93' NAVD 1988

LOCAL CONTROL DATA

BENCHMARK: NBAY 2
ELEVATION: 7.42' NAVD 1988

4668-PROJECT METADATA

PROJECT METADATA MAY BE VIEWED BY DOUBLE CLICKING ON ICON EDGE.

PROJECT SPECIFIC NOTES:

- -THE INFORMATION DEPICTED ON THIS MAP REPRESENTS THE RESULTS OF SURVEYS MADE ON THE DATES INDICATED AND CAN ONLY BE CONSIDERED AS THE GENERAL CONDITIONS EXISTING AT THAT TIME.
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- -THIS MAP IS CEPD COMPLIANT IN ACCORDANCE WITH ER 1110-2-8160 AND EM 1110-2-6056.

US ARMY CORPS
OF ENGINEERS
NEW YORK DISTRICT

ESQ	PR
PDC	MP

DATES OF SURVEY:
13-16,20-23,26 FEBRUARY 2018

FILE NO.: 992
REQUEST NO.: 4668/D/N3

SCALE:
ONE INCH = 100 FEET

FIELD BOOKS:

APPROVED: M. APPELD/ L. GEORGE/ R. ARIWOOLA
FIELD CARTOGRAPHER

APPROVED: M. FORTE
CIVIL ENGINEERING TECHNICIAN

APPROVED: D. CLARKE
LEAD CARTOGRAPHER

APPROVED: J. MRAZ
DEPUTY CHIEF OF SURVEY

DATE: 2 MARCH 2018

DEPARTMENT OF THE ARMY
NEW YORK DISTRICT
CORPS OF ENGINEERS
NEW YORK, NEW YORK 10278

OPERATIONS DIVISION
SURVEY SECTION
CENAN-OP-S

NEWARK BAY, HACKENSACK & PASSAIC RIVERS

NEW JERSEY

NEWARK BAY MAIN CHANNEL
CONDITION SURVEY

VH-101

SHEET 1 OF 8

FILE NO: 992
REQUEST NO: 4668/D/N3

CORPS OF ENGINEERS

U. S. ARMY

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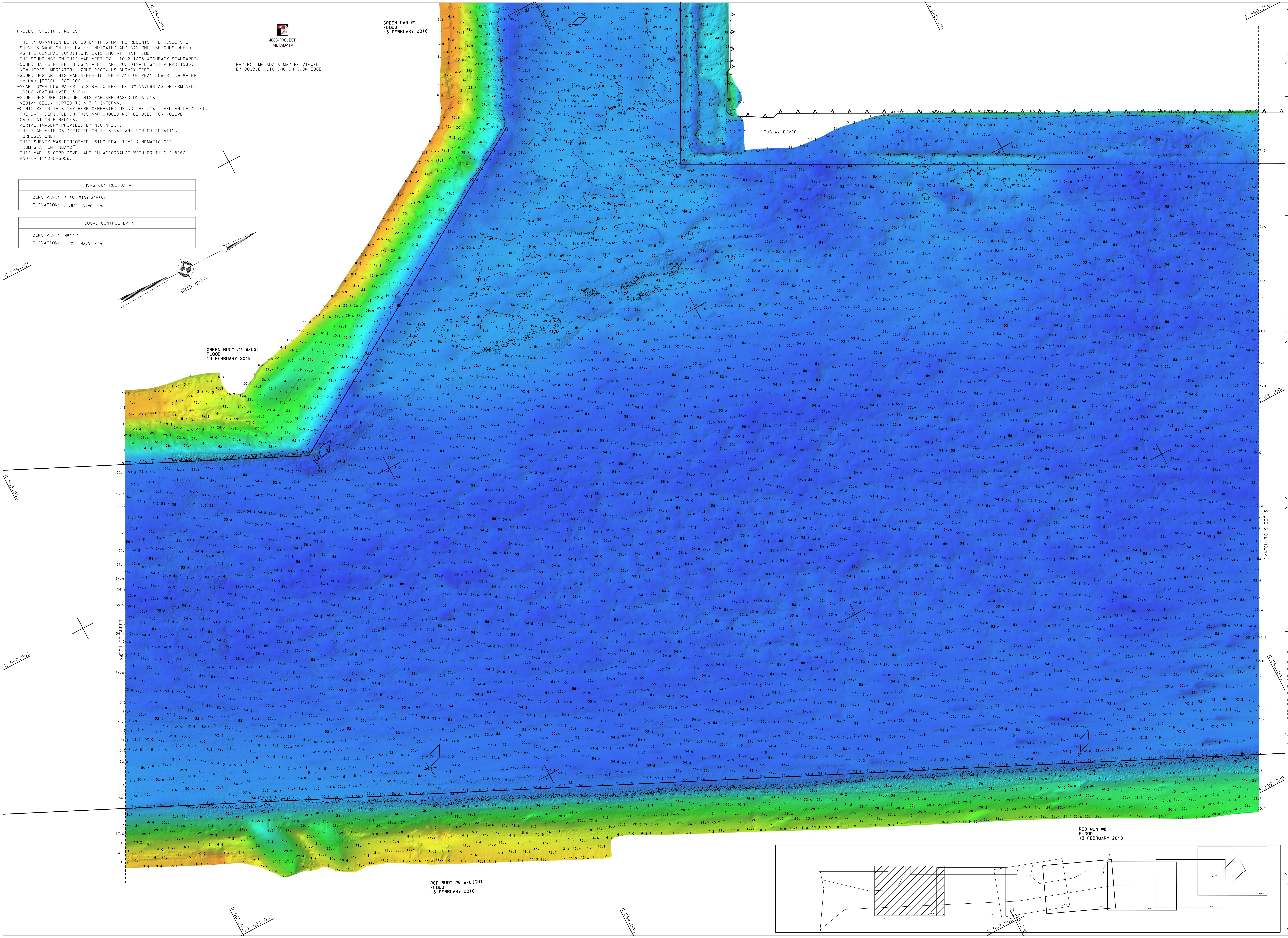
N 664,000
GREEN CAN #1
FLOOD
13 FEBRUARY 2018
N 666,000
E 590,000
TUG W/ DIVER
E 589,000
GRID NORTH
GREEN BUOY #7 W/LGT
FLOOD
13 FEBRUARY 2018
N 663,000
E 591,000
MATCH TO SHEET 1
E 590,000
MATCH TO SHEET 3
N 665,000
E 592,000
RED NUN #8
FLOOD
13 FEBRUARY 2018
RED BUOY #6 W/LIGHT
FLOOD
13 FEBRUARY 2018
N 663,000
E 591,000
N 664,000
E 592,000
N 665,000

US ARMY CORPS
OF ENGINEERS
NEW YORK DISTRICT

ESQ PR
PDC MP

DATES OF SURVEY:
13-16,20-23,26 FEBRURARY 2018

FILE NO.: 992
REQUEST NO.: 4668/D/N3

SCALE:
ONE INCH = 100 FEET

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APPROVED: M. FORTE
CIVIL ENGINEERING TECHNICIAN
APPROVED: D. CLARKE
LEAD CARTOGRAPHER
APPROVED: J. MRAZ
DEPUTY CHIEF OF SURVEY
DATE: 2 MARCH 2018

DEPARTMENT OF THE ARMY
NEW YORK DISTRICT
CORPS OF ENGINEERS
NEW YORK, NEW YORK 10278

OPERATIONS DIVISION
SURVEY SECTION
CENAN-OP-S

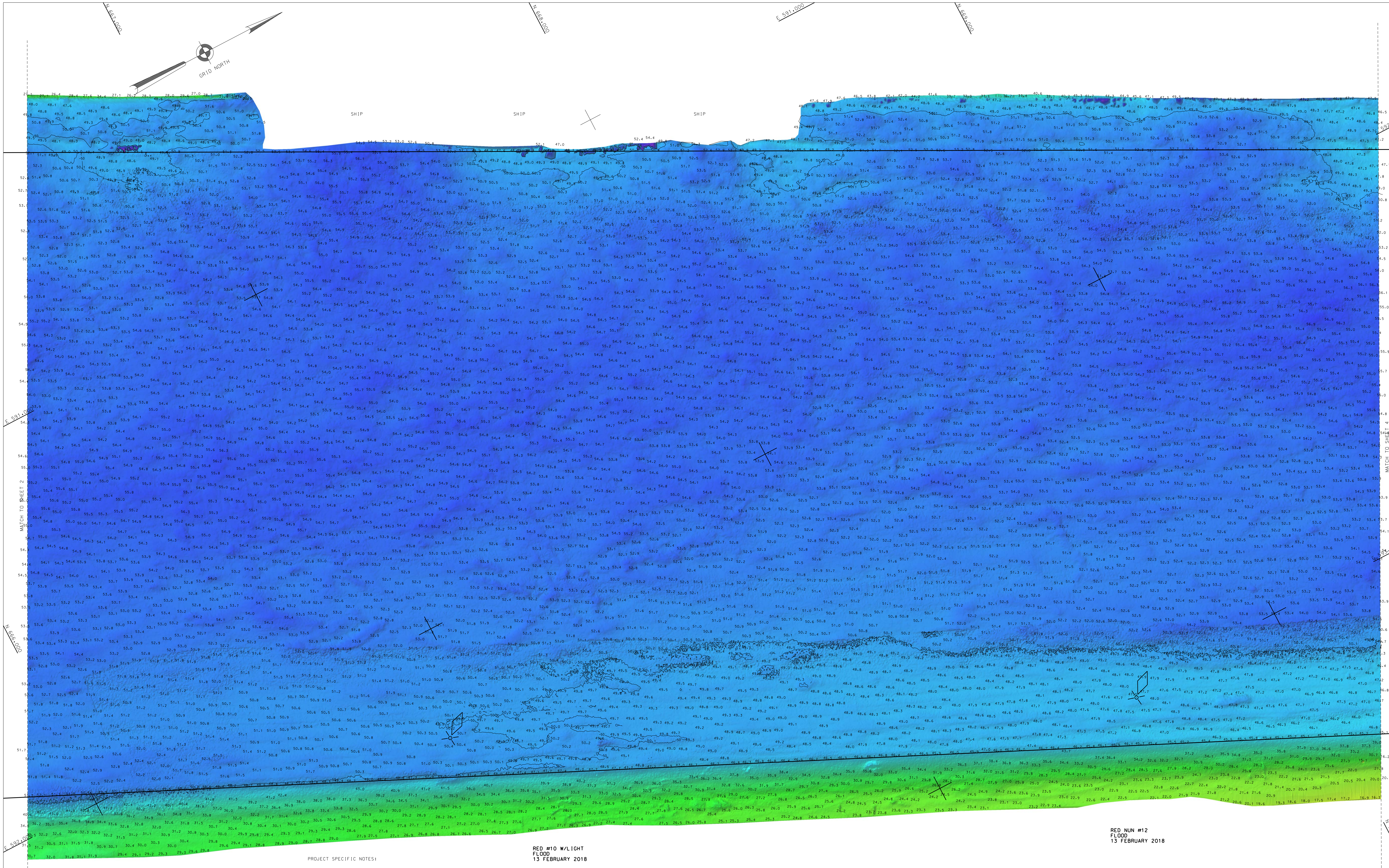
NEWARK BAY, HACKENSACK & PASSAIC RIVERS
NEW JERSEY
NEWARK BAY MAIN CHANNEL
CONDITION SURVEY

VH-102

SHEET 2 OF 8

FILE NO: 992
REQUEST NO: 4668/D/N3

US ARMY CORPS
OF ENGINEERS
NEW YORK DISTRICT



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4668-PROJECT
METADATA

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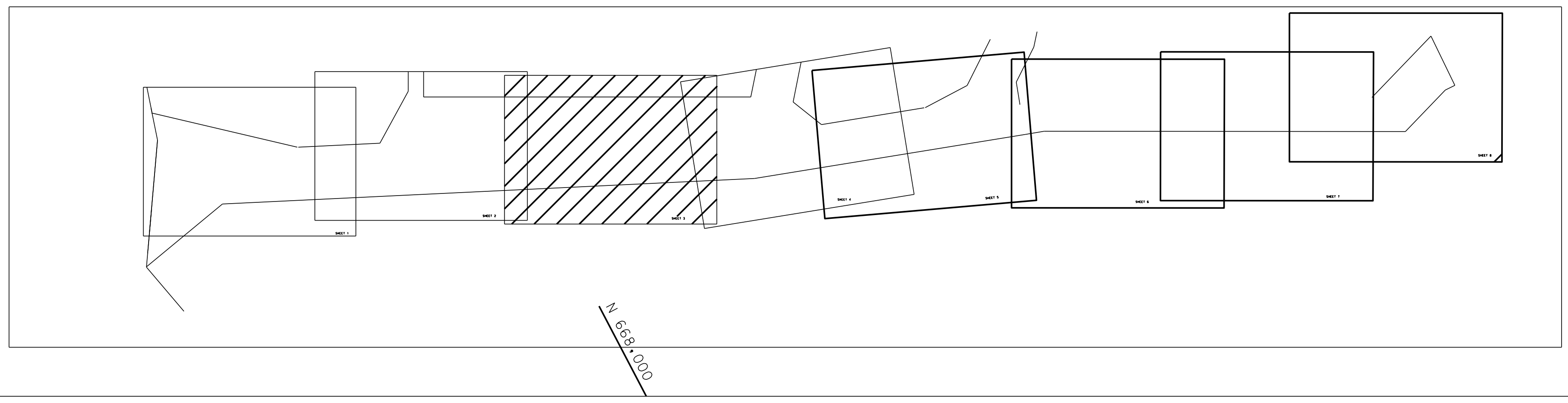
NSRS CONTROL DATA

BENCHMARK: P 38 PID: ACV351
ELEVATION: 21.93' NAVD 1988

LOCAL CONTROL DATA

BENCHMARK: NBAY 2
ELEVATION: 7.42' NAVD 1988



						ESQ	PR
						PDC	MP

DATES OF SURVEY:
13-16,20-23,26 FEBRURARY 2018

FILE NO.: 992
REQUEST NO.: 4668/D/N3

SCALE:
ONE INCH = 100 FEET

FIELD BOOKS:

APPROVED: M. APPELD/ L. GEORGE/ R. ARIWOOLA
FIELD CARTOGRAPHER
APPROVED: M. FORTE
CIVIL ENGINEERING TECHNICIAN
APPROVED: D. CLARKE
LEAD CARTOGRAPHER
APPROVED: J. MRAZ
DEPUTY CHIEF OF SURVEY
DATE: 2 MARCH 2018

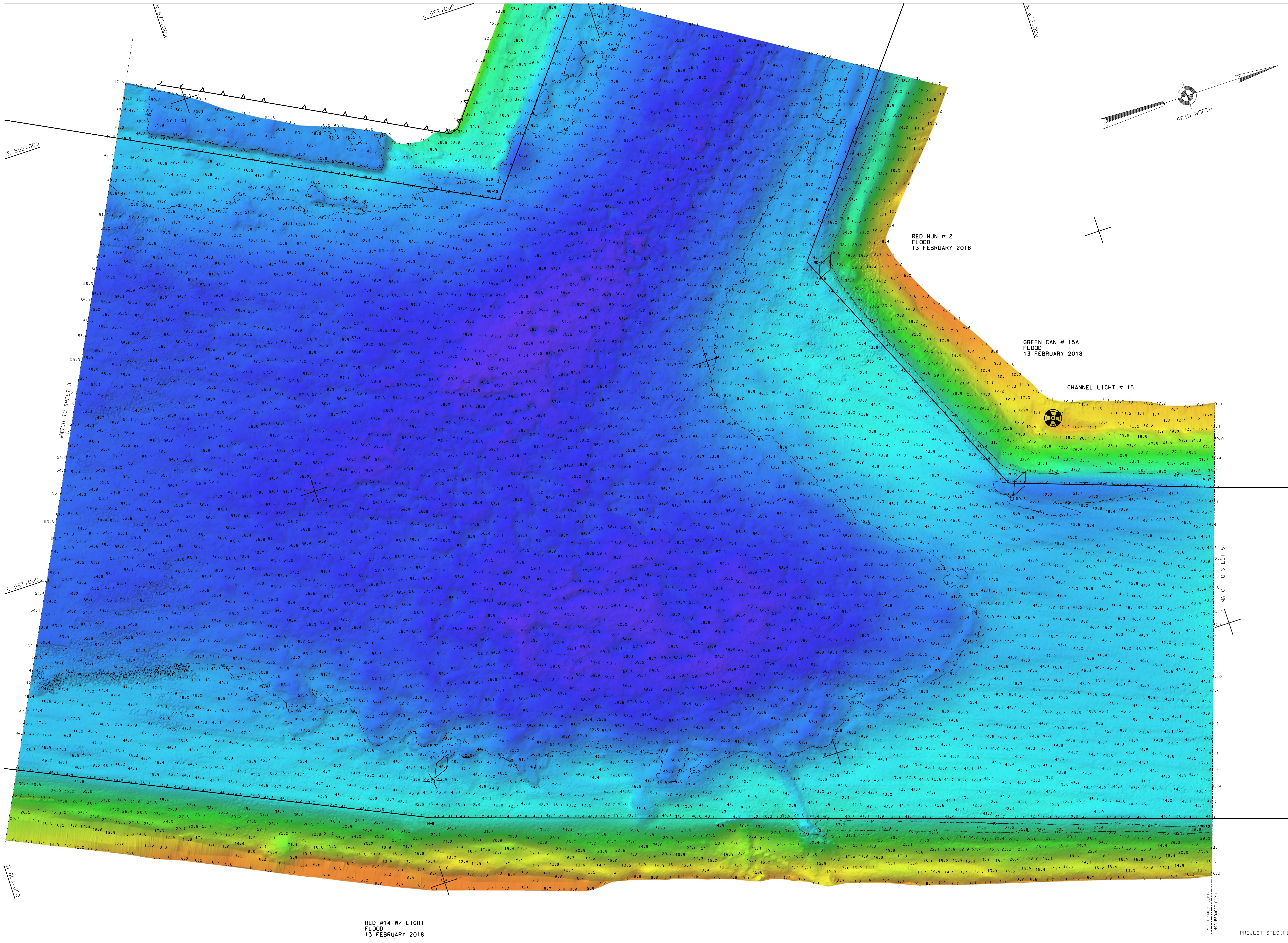
DEPARTMENT OF THE ARMY
NEW YORK DISTRICT
CORPS OF ENGINEERS
NEW YORK, NEW YORK 10278

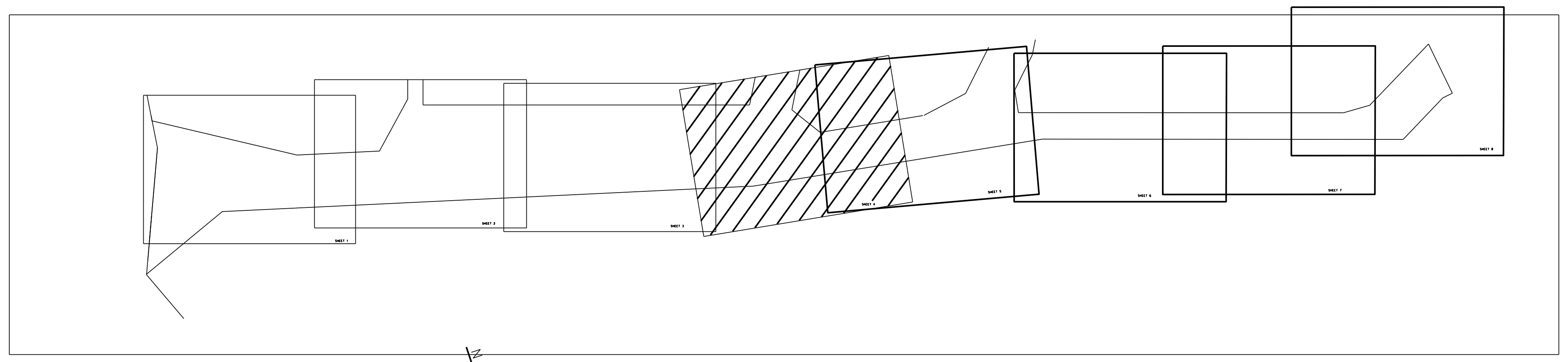
OPERATIONS DIVISION
SURVEY SECTION
CENAN-OP-S

NEWARK BAY, HACKENSACK & PASSAIC RIVERS
NEW JERSEY
NEWARK BAY MAIN CHANNEL
CONDITION SURVEY

VH-103

SHEET 3 OF 8


E 592,000
E 593,000
E 594,000
E 595,000
N 669,000
N 670,000
N 671,000
N 672,000
N 673,000
GRID NORTH
RED NUN # 2
FLOOD
13 FEBRUARY 2018
GREEN CAN # 15A
FLOOD
13 FEBRUARY 2018
CHANNEL LIGHT # 15
RED #14 W/ LIGHT
FLOOD
13 FEBRUARY 2018
MATCH TO SHEET 3
MATCH TO SHEET 5
50' PROJECT DEPTH
40' PROJECT DEPTH



NSRS CONTROL DATA
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ELEVATION: 21.93' NAVD 1988

LOCAL CONTROL DATA
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US ARMY CORPS
OF ENGINEERS
NEW YORK DISTRICT

ESQ	PR			
PDC	MP			

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13-16,20-23,26 FEBRURARY 2018

FILE NO.: 992
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APPROVED: M. FORTE
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APPROVED: D. CLARKE
LEAD CARTOGRAPHER
APPROVED: J. MRAZ
DEPUTY CHIEF OF SURVEY
DATE: 2 MARCH 2018

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NEW YORK DISTRICT
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NEW YORK, NEW YORK 10278

OPERATIONS DIVISION
SURVEY SECTION
CENAN-OP-S

NEWARK BAY, HACKENSACK & PASSAIC RIVERS

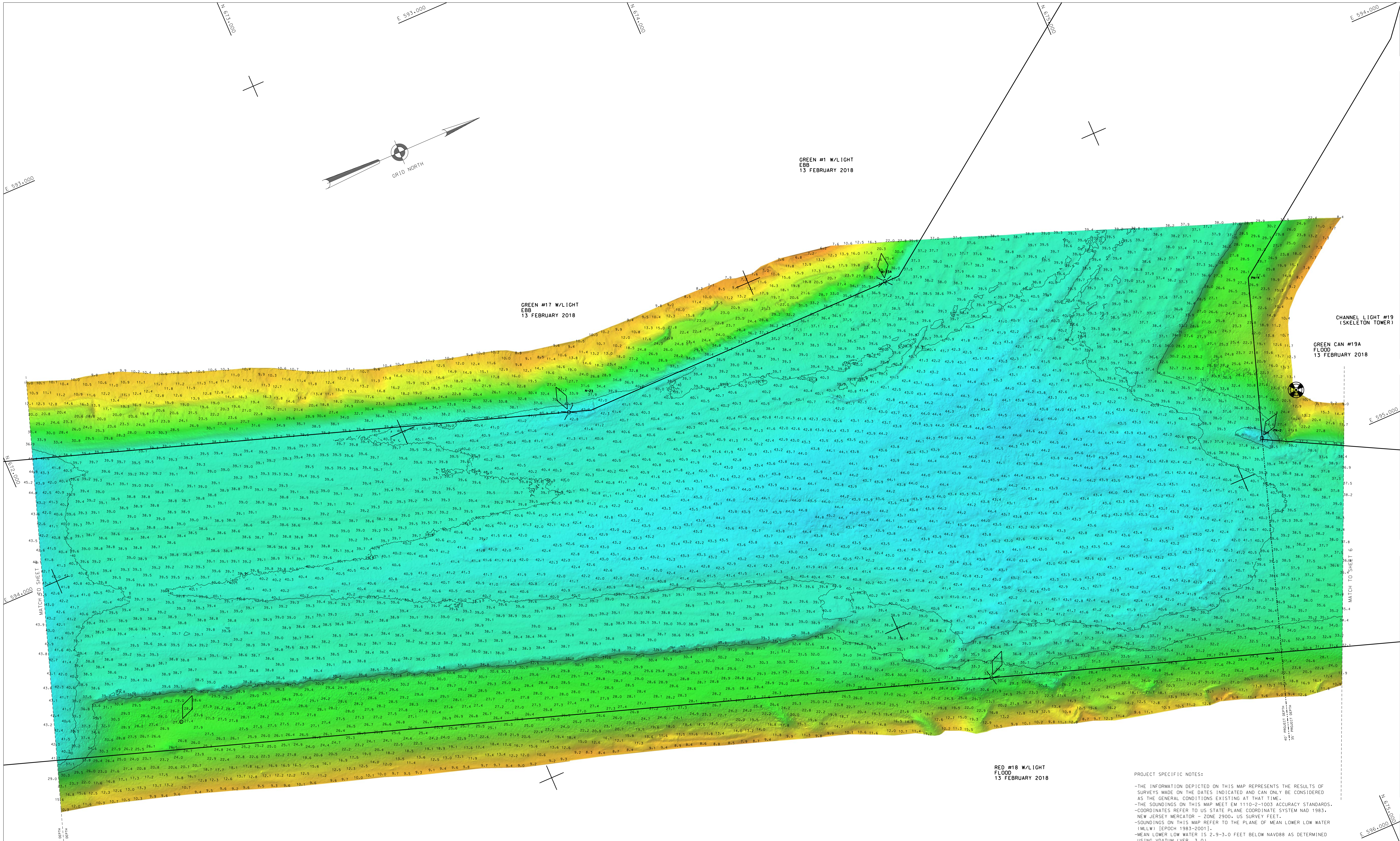
NEW JERSEY

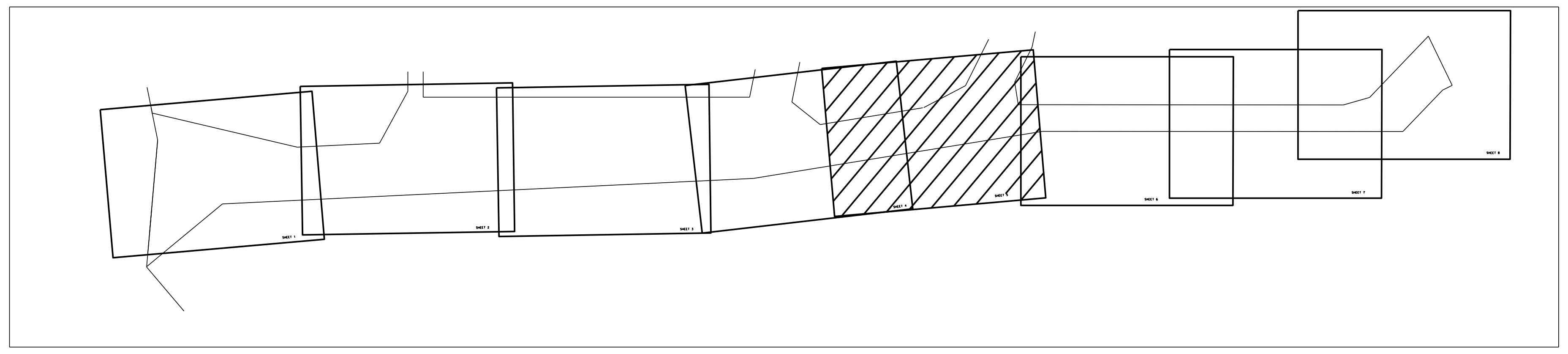
NEWARK BAY MAIN CHANNEL
CONDITION SURVEY

VH-104

SHEET 4 OF 8

US ARMY CORPS
OF ENGINEERS
NEW YORK DISTRICT


N 673,000
E 593,000
N 674,000
N 675,000
E 594,000
GRID NORTH
E 593,000
GREEN #1 W/LIGHT
EBB
13 FEBRUARY 2018
GREEN #17 W/LIGHT
EBB
13 FEBRUARY 2018
CHANNEL LIGHT #19
(SKELETON TOWER)
GREEN CAN #19A
FLOOD
13 FEBRUARY 2018
E 595,000
N 672,000
E 594,000
MATCH TO SHEET 4
MATCH TO SHEET 6
40' PROJECT DEPTH
35' PROJECT DEPTH
50' PROJECT DEPTH
40' PROJECT DEPTH
RED #18 W/LIGHT
FLOOD
13 FEBRUARY 2018
RED NUN #16
FLOOD
13 FEBRUARY 2018



NSRS CONTROL DATA

BENCHMARK: P 38 PID: ACV351
ELEVATION: 21.93' NAVD 1988

LOCAL CONTROL DATA

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4668-PROJECT
METADATA

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ESQ	PR
PDC	MP

DATES OF SURVEY:
13-16,20-23,26 FEBRURARY 2018

FILE NO.: 992
REQUEST NO.: 4668/D/N3

SCALE:
ONE INCH = 100 FEET

FIELD BOOKS:

APPROVED: M. APPELD/ L. GEORGE/ R. ARIWOOLA
FIELD CARTOGRAPHER
APPROVED: M. FORTE
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DEPUTY CHIEF OF SURVEY
DATE: 2 MARCH 2018

DEPARTMENT OF THE ARMY
NEW YORK DISTRICT
CORPS OF ENGINEERS
NEW YORK, NEW YORK 10278

OPERATIONS DIVISION
SURVEY SECTION
CENAN-OP-S

NEWARK BAY, HACKENSACK & PASSAIC RIVERS

NEW JERSEY

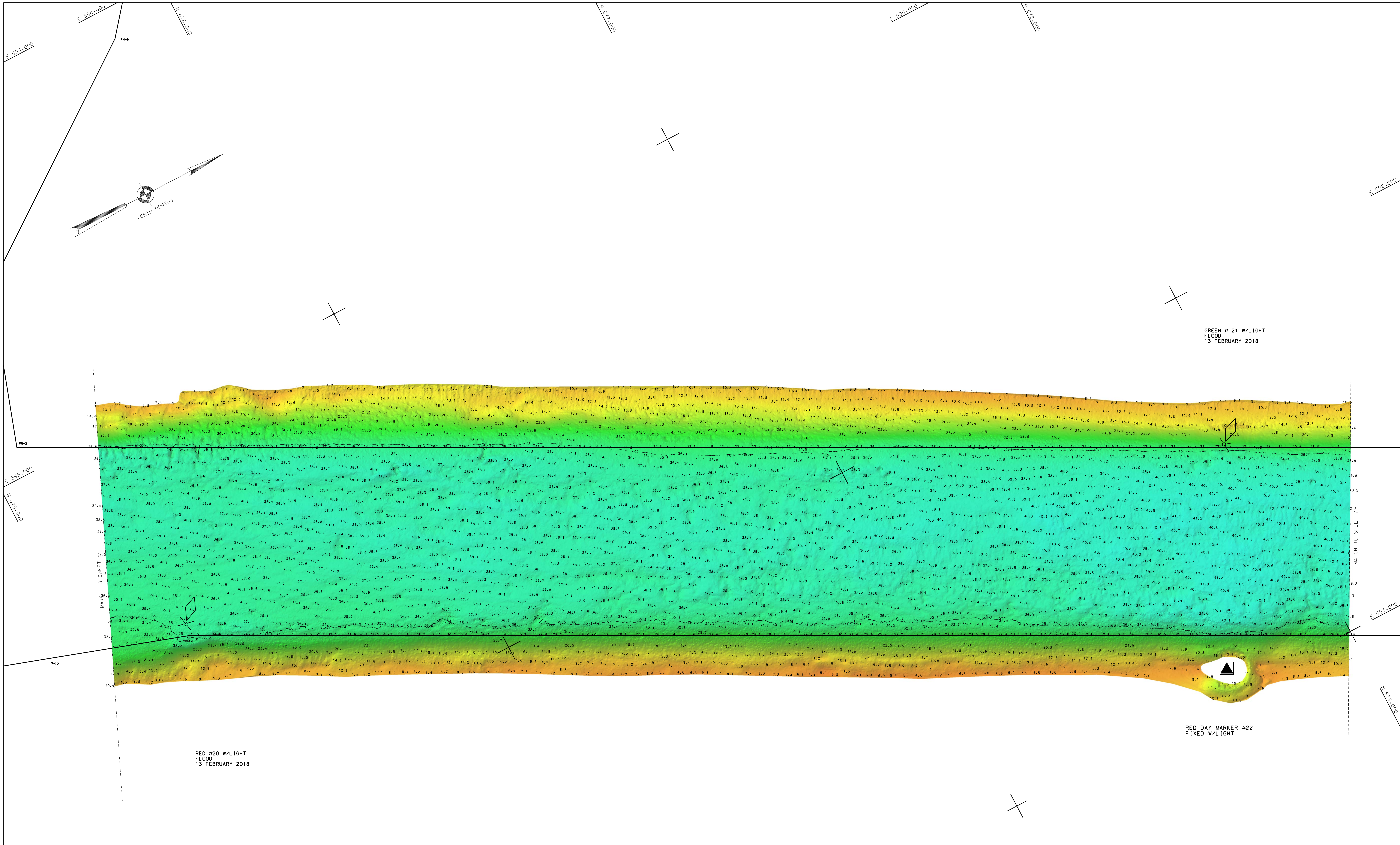
NEWARK BAY MAIN CHANNEL
CONDITION SURVEY

VH-105

SHEET 5 OF 8

CORPS OF ENGINEERS

U. S. ARMY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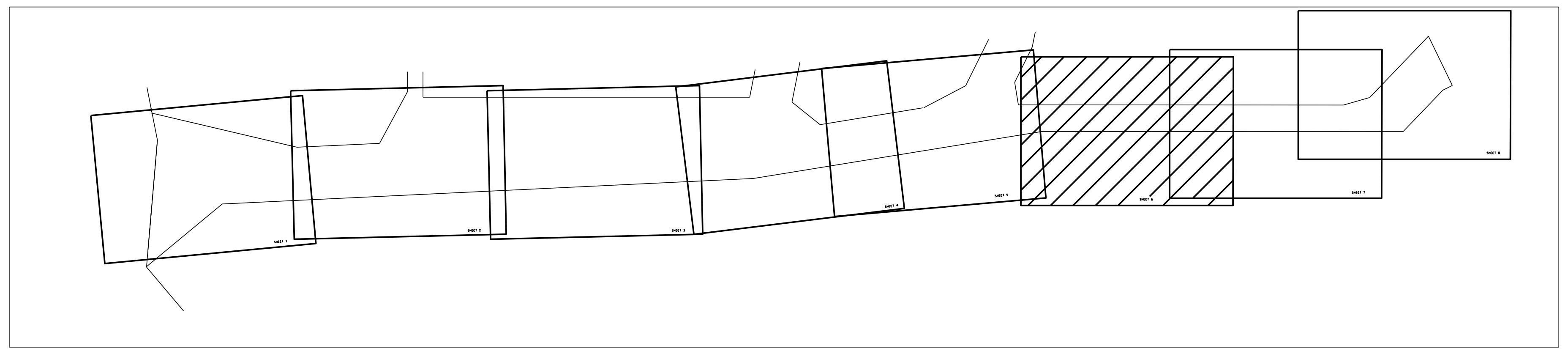
N 676,000
N 677,000
E 595,000
N 678,000
E 596,000
N 675,000
E 597,000
N 678,000
PN-6
PN-2
N-12
N-14
(GRID NORTH)
GREEN # 21 W/LIGHT
FLOOD
13 FEBRUARY 2018
RED DAY MARKER #22
FIXED W/LIGHT
RED #20 W/LIGHT
FLOOD
13 FEBRUARY 2018
MATCH TO SHEET
MATCH TO SHEET 7


SHEET 2
SHEET 3
SHEET 4

NSRS CONTROL DATA	
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OF ENGINEERS
NEW YORK DISTRICT

ESQ	PR
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NEW YORK DISTRICT
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NEW YORK, NEW YORK 10278

OPERATIONS DIVISION
SURVEY SECTION
CENAN-OP-S

NEWARK BAY, HACKENSACK & PASSAIC RIVERS

NEW JERSEY

NEWARK BAY MAIN CHANNEL
CONDITION SURVEY

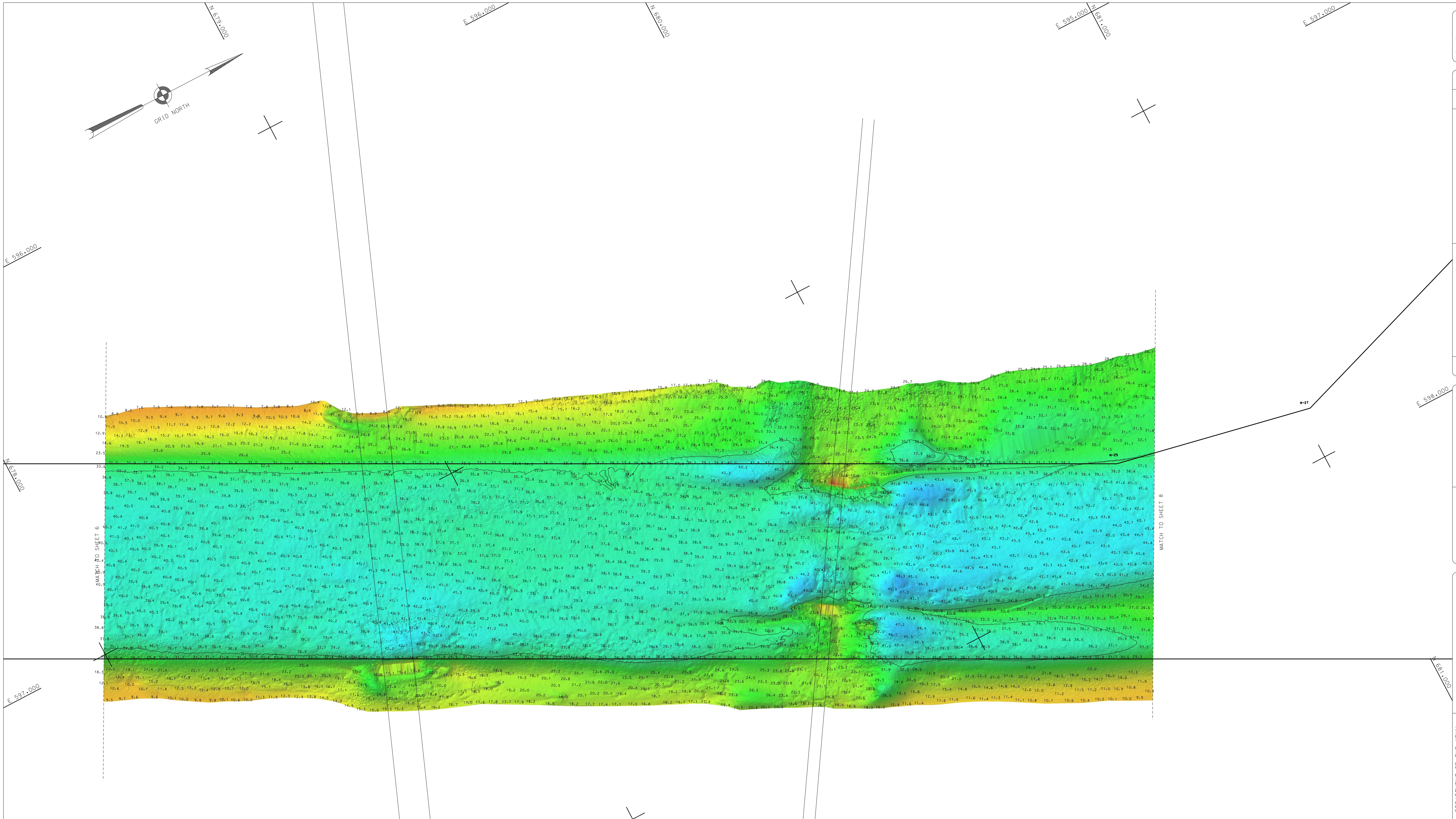
VH-106

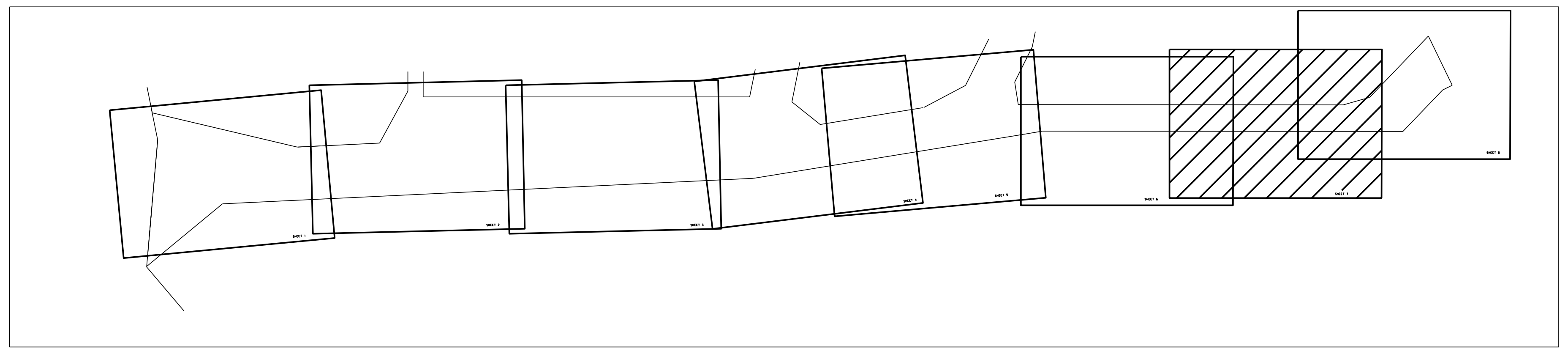
SHEET 6 OF 8

FILE NO: 992
REQUEST NO: 4668/D/N3

CORPS OF ENGINEERS

U. S. ARMY





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US ARMY CORPS
OF ENGINEERS
NEW YORK DISTRICT

ESQ	PR
PDC	MP

DATES OF SURVEY:
13-16,20-23,26 FEBRURARY 2018

FILE NO.: 992
REQUEST NO.: 4668/D/N3

SCALE:
ONE INCH = 100 FEET

FIELD BOOKS:

APPROVED: M. APPELD/ L. GEORGE/ R. ARIWOOLA
FIELD CARTOGRAPHER
APPROVED: M. FORTE
CIVIL ENGINEERING TECHNICIAN
APPROVED: D. CLARKE
LEAD CARTOGRAPHER
APPROVED: J. MRAZ
DEPUTY CHIEF OF SURVEY
DATE: 2 MARCH 2018

DEPARTMENT OF THE ARMY
NEW YORK DISTRICT
CORPS OF ENGINEERS
NEW YORK, NEW YORK 10278

OPERATIONS DIVISION
SURVEY SECTION
CENAN-OP-S

NEWARK BAY, HACKENSACK & PASSAIC RIVERS

NEW JERSEY

NEWARK BAY MAIN CHANNEL
CONDITION SURVEY

VH-107

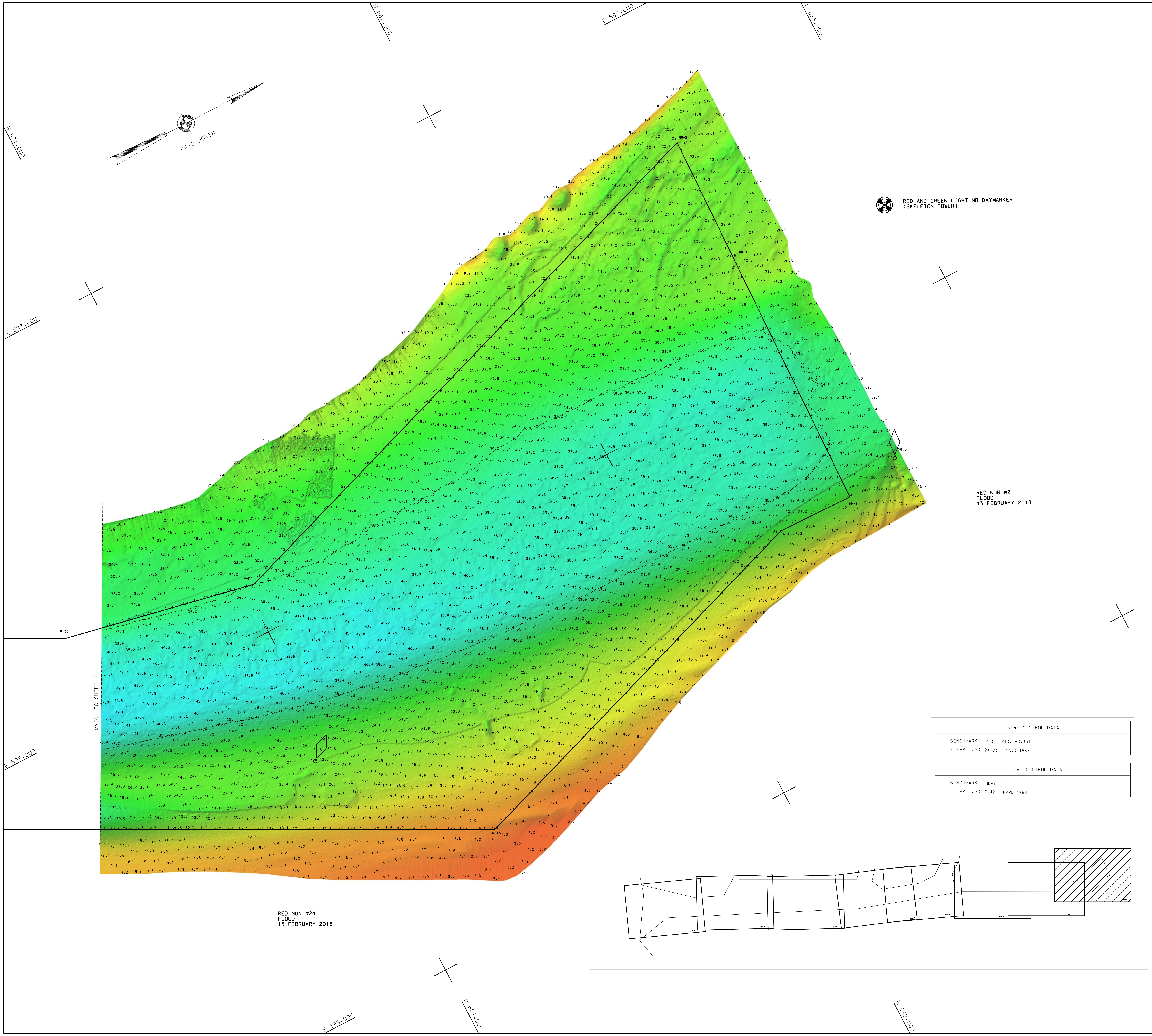
SHEET 7 OF 8

FILE NO: 992
REQUEST NO: 4668/D/N3

CORPS OF ENGINEERS

U. S. ARMY

US ARMY CORPS
OF ENGINEERS
NEW YORK DISTRICT


GRID NORTH
N 681,000
N 682,000
N 683,000
N 684,000
E 597,000
E 598,000
E 599,000
RED AND GREEN LIGHT N8 DAYMARKER
(SKELETON TOWER)
RED NUN #2
FLOOD
13 FEBRUARY 2018
RED NUN #24
FLOOD
13 FEBRUARY 2018
MATCH TO SHEET 7
N-25
N-27
N-16
N-18
NH-2
NH-3
NH-4
NH-5

NSRS CONTROL DATA

BENCHMARK: P 38 PID: ACV351
ELEVATION: 21.93' NAVD 1988

LOCAL CONTROL DATA

BENCHMARK: NBAY 2
ELEVATION: 7.42' NAVD 1988

PROJECT SPECIFIC NOTES:

- THE INFORMATION DEPICTED ON THIS MAP REPRESENTS THE RESULTS OF SURVEYS MADE ON THE DATES INDICATED AND CAN ONLY BE CONSIDERED AS THE GENERAL CONDITIONS EXISTING AT THAT TIME.
- THE SOUNDINGS ON THIS MAP MEET EM 1110-2-1003 ACCURACY STANDARDS.
- COORDINATES REFER TO US STATE PLANE COORDINATE SYSTEM NAD 1983, NEW JERSEY MERCATOR - ZONE 2900, US SURVEY FEET.
- SOUNDINGS ON THIS MAP REFER TO THE PLANE OF MEAN LOWER LOW WATER (MLLW) [EPOCH 1983-2001].
- MEAN LOWER LOW WATER IS 2.9-3.0 FEET BELOW NAVD88 AS DETERMINED USING VDATUM (VER. 3.0).
- SOUNDINGS DEPICTED ON THIS MAP ARE BASED ON A 3'x3' MEDIAN CELL, SORTED TO A 30' INTERVAL.
- CONTOURS ON THIS MAP WERE GENERATED USING THE 3'x3' MEDIAN DATA SET.
- THE DATA DEPICTED ON THIS MAP SHOULD NOT BE USED FOR VOLUME CALCULATION PURPOSES.
- AERIAL IMAGERY PROVIDED BY NJGIN 2015.
- THE PLANIMETRICS DEPICTED ON THIS MAP ARE FOR ORIENTATION PURPOSES ONLY.
- THIS SURVEY WAS PERFORMED USING REAL TIME KINEMATIC GPS FROM STATION "NBAY2".
- THIS MAP IS CEPD COMPLIANT IN ACCORDANCE WITH ER 1110-2-8160 AND EM 1110-2-6056.

4668-PROJECT
METADATA

PROJECT METADATA MAY BE VIEWED
BY DOUBLE CLICKING ON ICON EDGE.

ESQ	PR
PDC	MP

DATES OF SURVEY:
13-16,20-23,26 FEBRURARY 2018

FILE NO.: 992
REQUEST NO.: 4668/D/N3

SCALE:
ONE INCH = 100 FEET

FIELD BOOKS:

APPROVED: M. APPELD/ L. GEORGE/ R. ARIWOOLA
FIELD CARTOGRAPHER
APPROVED: M. FORTE
CIVIL ENGINEERING TECHNICIAN
APPROVED: D. CLARKE
LEAD CARTOGRAPHER
APPROVED: J. MRAZ
DEPUTY CHIEF OF SURVEY
DATE: 2 MARCH 2018

DEPARTMENT OF THE ARMY
NEW YORK DISTRICT
CORPS OF ENGINEERS
NEW YORK, NEW YORK 10278

OPERATIONS DIVISION
SURVEY SECTION
CENAN-OP-S

NEWARK BAY, HACKENSACK & PASSAIC RIVERS
NEW JERSEY
NEWARK BAY MAIN CHANNEL
CONDITION SURVEY

VH-108

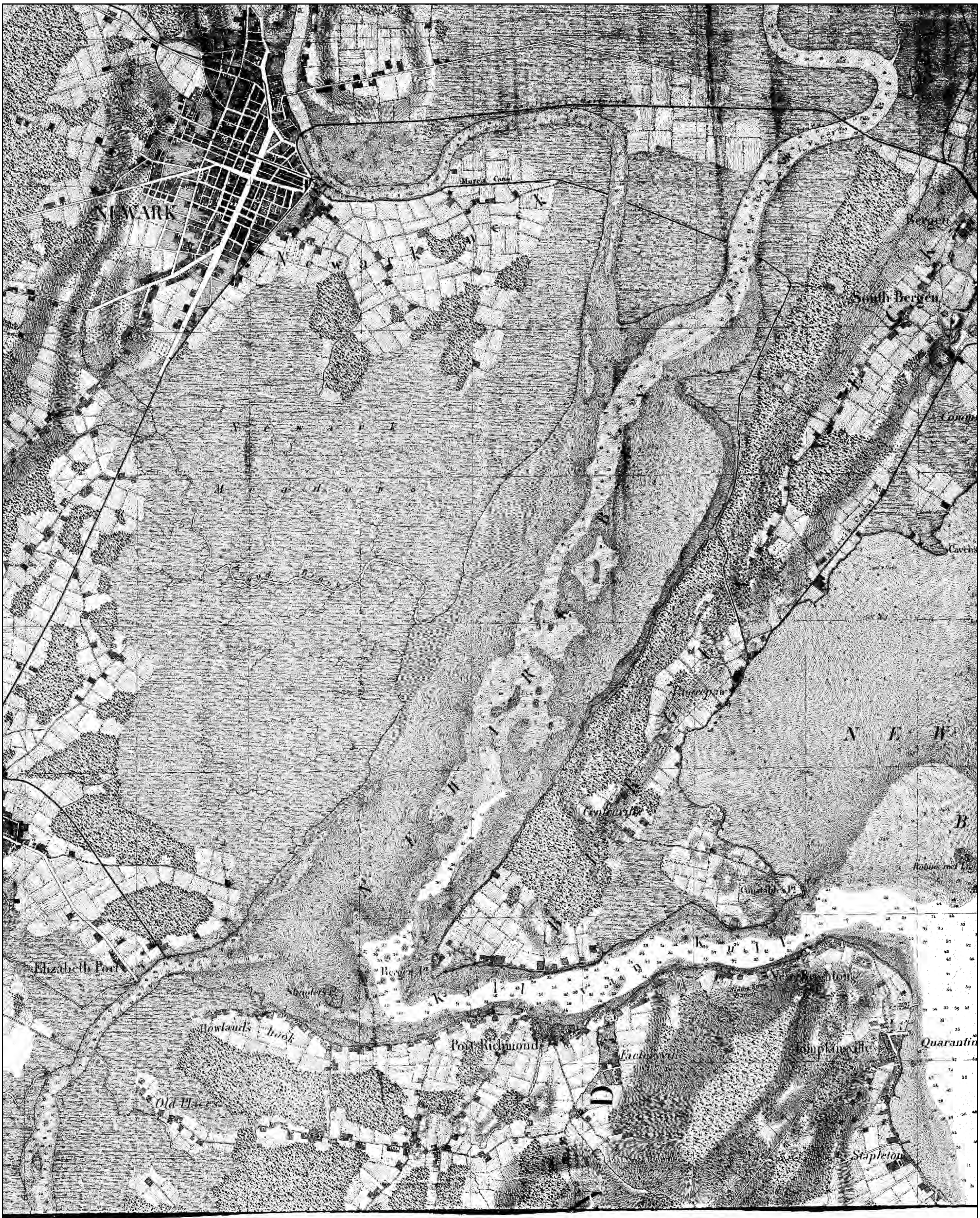
SHEET 8 OF 8

FILE NO: 992
REQUEST NO: 4668/D/N3

Appendix C-2

Historical NOAA Nautical Charts (1844 through 2020)

CITY: SYR DIV/GROUP: SYE40 DB: KES PM: LL
Newark Bay (B0009989.0004.00005)
T:_ENV\GSH\GIS\Task\NBSA\RemedialInvestigation\mxd\Appendix\FigC-1_NOAA_Charts_1844.mxd


NEWARK
Morris Canal
Newark Neck
Newark
Meadows
Bergen
South Bergen
Commu
Cavin
Newark Bay
Pamrepaw
Centreville
N E W
B
Robins reef Light
Constable's Pt
Elizabeth Port
Bergen Pt
Shooters Is.
Kill van Kull
New Brighton
Howland's hook
Port Richmond
Factoryville
Tompkinsville
Quarantin
Old Places
D
Stapleton

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
REMEDIAL INVESTIGATION REPORT

NOAA 1844 NAUTICAL CHART

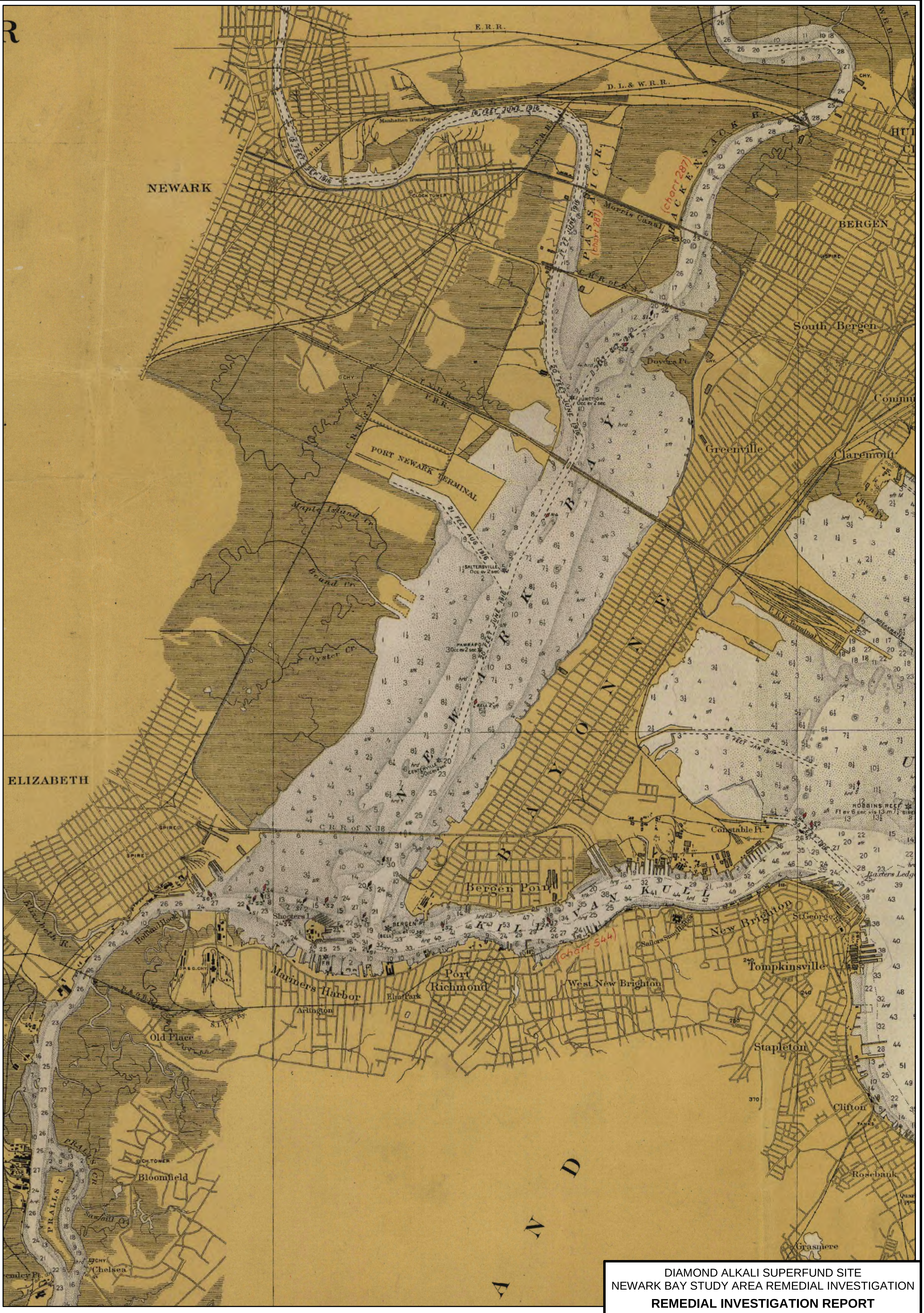
NOTE:

1. NOAA. 1844. NEW YORK BAY AND HARBOR AND THE ENVIRONS. NAUTICAL CHART NO. 602NS1A. AVAILABLE ONLINE AT: https://historicalcharts.noaa.gov.

0 4,000 8,000
Feet
GRAPHIC SCALE

OXY Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
C-1


NEWARK
ELIZABETH
E. R. R.
D. L. & W. R. R.
Manhattan Transfer
PASSAIC R.
(chart 287)
HACKENSACK R.
Morris Canal
BERGEN
South Bergen
Droyers Pt.
Greenville
Claremont
PORT NEWARK TERMINAL
Maple Island Cr.
Bound Cr.
Oyster Cr.
NEWARK BAY
BAYONNE
21 FEET AUG 1916
Constable Pt.
ROBBINS REEF
Baxters Ledge
Bergen Point
Shooters I.
KILL VAN KULL
(chart 544)
New Brighton
St. George
Sailors Snug Harbor
Tompkinsville
Mariners Harbor
Port Richmond
Elm Park
West New Brighton
Arlington
Old Place
Stapleton
Clifton
Rosebank
Grasmere
Elizabeth R.
PRALLS I.
Bloomfield
Chelsea
AND

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION

REMEDIAL INVESTIGATION REPORT

NOAA 1917 NAUTICAL CHART

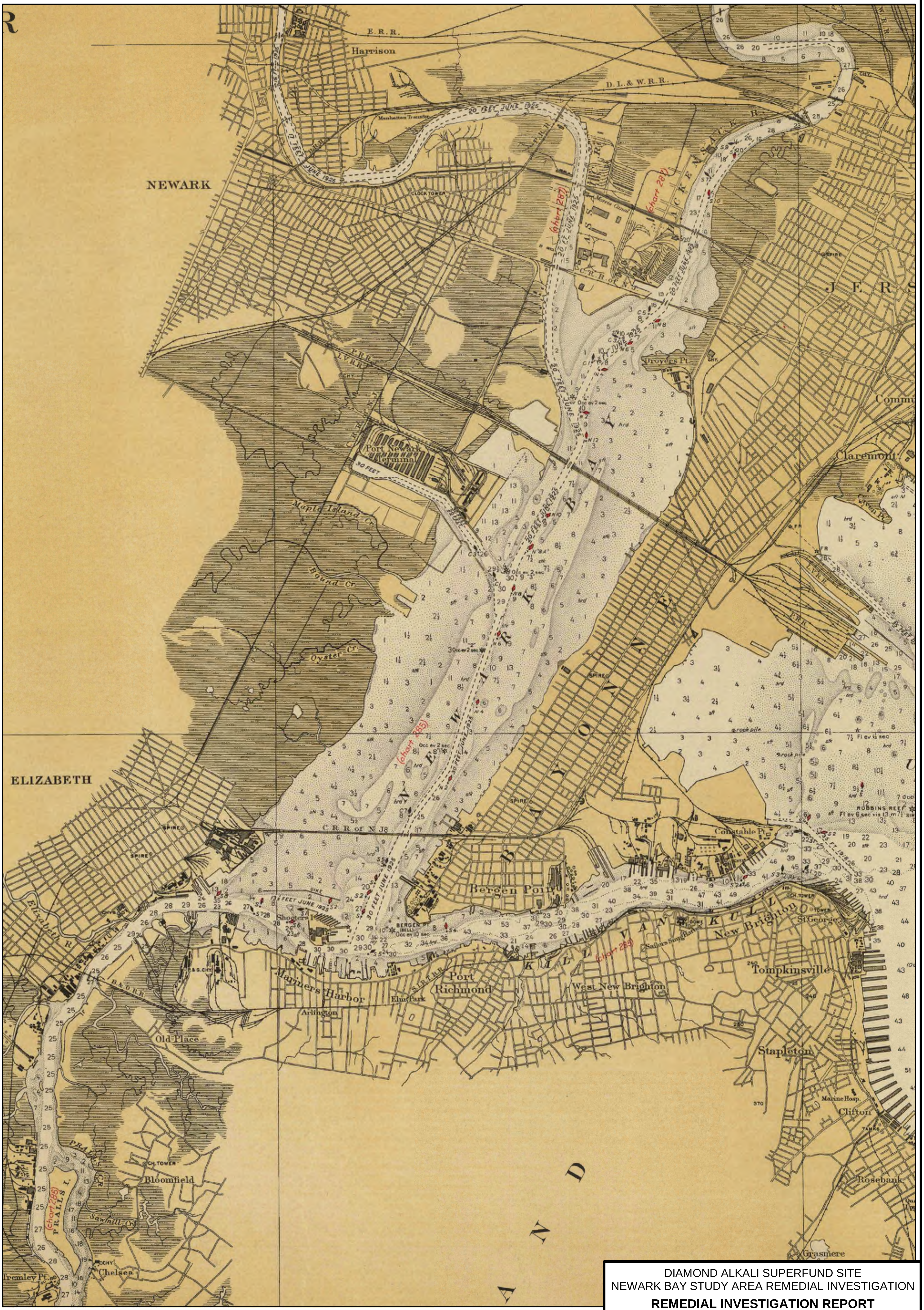
Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
C-2

NOTE:

1. NOAA. 1917. NEW YORK HARBOR. NAUTICAL CHART NO. 369. MAY. AVAILABLE ONLINE AT: http://historicalcharts.noaa.gov/historicals/historical_zoom.asp.

0 4,000 8,000
Feet
GRAPHIC SCALE


NEWARK
Harrison
E.R.R.
D.L.& W.R.R.
Manhattan Transfer
CLOCK TOWER
Morris Canal
20 FEET JUNE 1925
17 FEET JUNE 1925
(chart 287)
(chart 287)
PASSAIC R.
HACKENSACK R.
C.R.R. of N.J.
P.R.R.
L.V.R.R.
Droyers Pt.
Port Newark Terminal
30 FEET
Maple Island Cr.
Bound Cr.
Oyster Cr.
NEWARK BAY
30 FEET JUNE 1925
(chart 285)
BAYONNE
JERS
Claremont
Comm
Constable Pt.
rock pile
ROBBINS REEF
ELIZABETH
Elizabeth R.
Bergen Point
Shooters I.
KILL VAN KULL
(chart 288)
Sailors Snug Harbor
New Brighton
St George
Tompkinsville
Mariners Harbor
Arlington
Port Richmond
Elm Park
West New Brighton
Old Place
Stapleton
Marine Hosp.
Clifton
Rosebank
Grasmere
Bloomfield
Sawmill Cr.
PRALLS I.
(chart 286)
Tremley Pt.
Chelsea
D N A

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION

REMEDIAL INVESTIGATION REPORT

NOAA 1925 NAUTICAL CHART

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
C-3

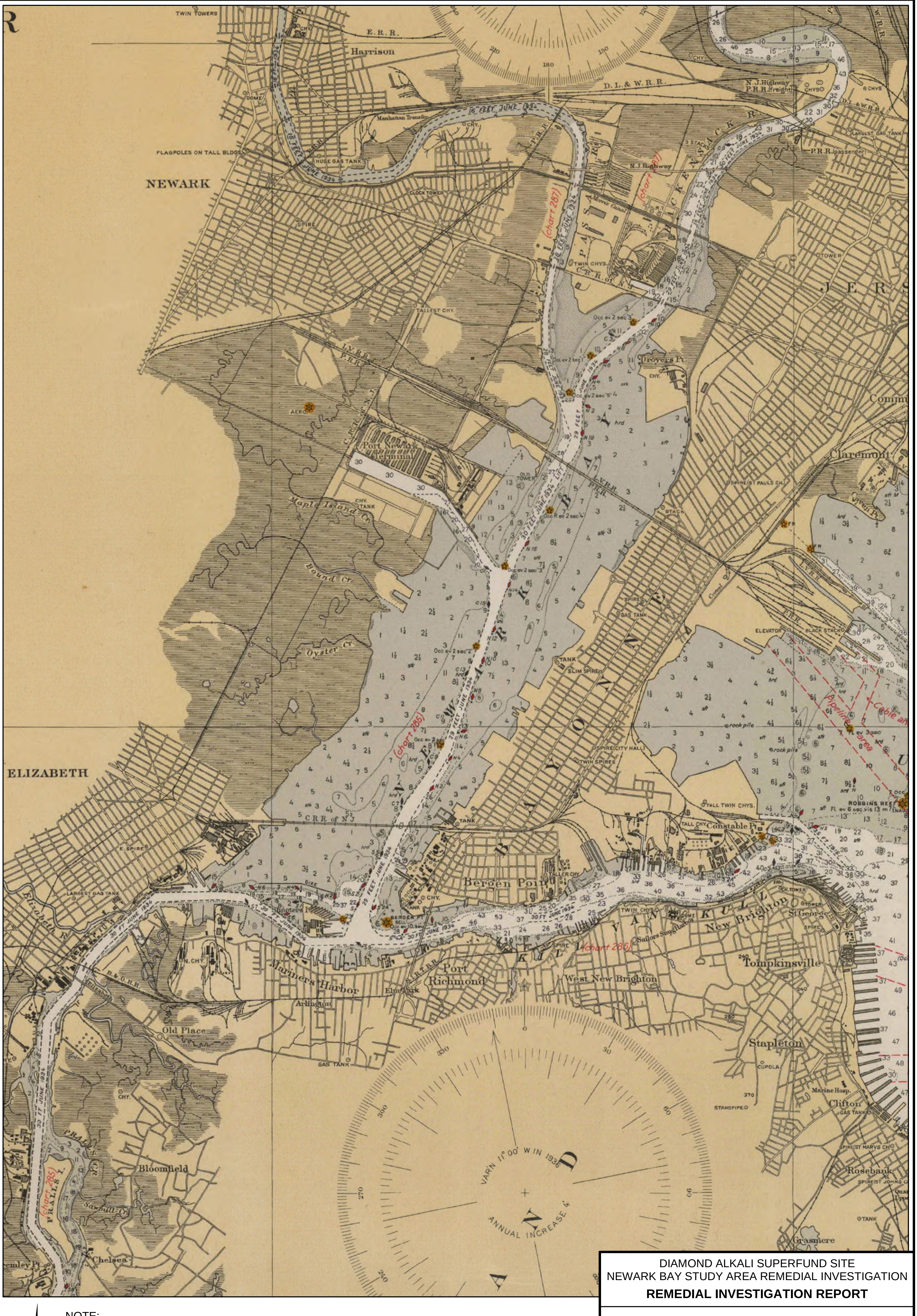
NOTE:

1. NOAA. 1925. NEW YORK HARBOR. NAUTICAL CHART NO. 369. SEPTEMBER. AVAILABLE ONLINE AT: http://historicalcharts.noaa.gov/historicals/historical_zoom.asp.

0 4,000 8,000 Feet

GRAPHIC SCALE

CITY: SYR DIV/GROUP: SYE40 DB: KES PM: LL
Newark Bay (B0009989.0004.00005)
T:_ENV\GSH\GIS\Task\NBSA\RemedialInvestigation\mxd\Appendix\FigC-4_NOAA_Charts_1935.mxd


TWIN TOWERS
E.R.R.
Harrison
D.L.& W.R.R.
N.J.Highway
P.R.R.(freight)
Manhattan Transfer
16 FEET JUNE 1934
FLAGPOLES ON TALL BLDGS.
HUGE GAS TANKS
NEWARK
CLOCK TOWER
(chart 287)
PASSAIC R.
HACKENSACK R.
TWIN CHYS.
C.R.R. of N.J.
TALLEST CHY.
Droyers Pt.
Port Newark Terminal
Maple Island Cr.
Bound Cr.
Oyster Cr.
NEWARK BAY
BAYONNE
JERS
Claremont
Comm
SPIRE (CITY HALL)
ROBBINS REEF
Pipeline Area
Cable area
(chart 285)
ELIZABETH
Constable Pt.
Bergen Point
KILL VAN KULL
(chart 286)
New Brighton
St. George
Tompkinsville
West New Brighton
Port Richmond
Mariners Harbor
Elm Park
Arlington
Old Place
Elizabeth R.
PRALLS I.
Bloomfield
Chelsea
Stapleton
Marine Hosp.
Clifton
Rosebank
Grasmere
VAR'N 11° 00' W IN 1936
ANNUAL INCREASE 4'

NOTE:

1. NOAA. 1935. NEW YORK HARBOR. NAUTICAL CHART NO. 369. JANUARY. AVAILABLE ONLINE AT: http://historicalcharts.noaa.gov/historicals/historical_zoom.asp.

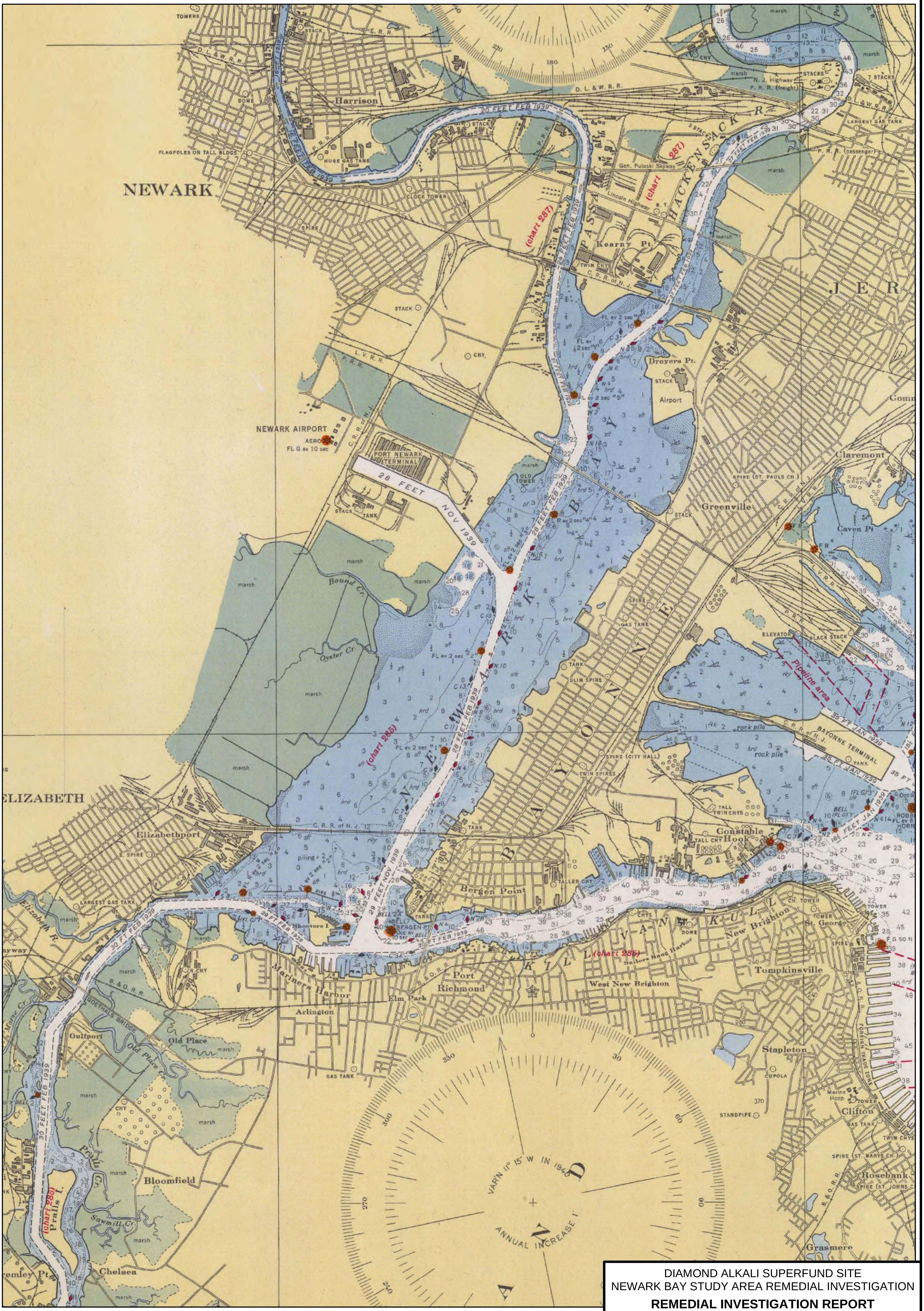
0 4,000 8,000
Feet
GRAPHIC SCALE

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
REMEDIAL INVESTIGATION REPORT

NOAA 1935 NAUTICAL CHART

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
C-4


NEWARK
Harrison
NEWARK AIRPORT
PORT NEWARK TERMINAL
28 FEET NOV 1939
20 FEET FEB 1939
PASSAIC R.
HACKENSACK R.
(chart 287)
Kearny Pt.
Droyers Pt.
Airport
Gen. Pulaski Skyway
Lincoln Highway
NEWARK BAY
(chart 285)
BAYONNE
Greenville
Claremont
Caven Pt
JER
Pipeline area
BAYONNE TERMINAL
38 FT JAN 1939
Constable Hook
Bergen Point
Shooters I.
ELIZABETH
Elizabethport
KILL VAN KULL
(chart 286)
New Brighton
St. George
Tompkinsville
Sailors Snug Harbor
West New Brighton
Port Richmond
Mariners Harbor
Elm Park
Arlington
Old Place
Gulfport
Bloomfield
Chelsea
Prall's I.
30 FEET FEB 1939
GOETHALS BRIDGE
Stapleton
Clifton
Rosebank
Grasmere
VARN 11° 15' W IN 1940
ANNUAL INCREASE 1'
marsh

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
REMEDIAL INVESTIGATION REPORT

NOAA 1940 NAUTICAL CHART

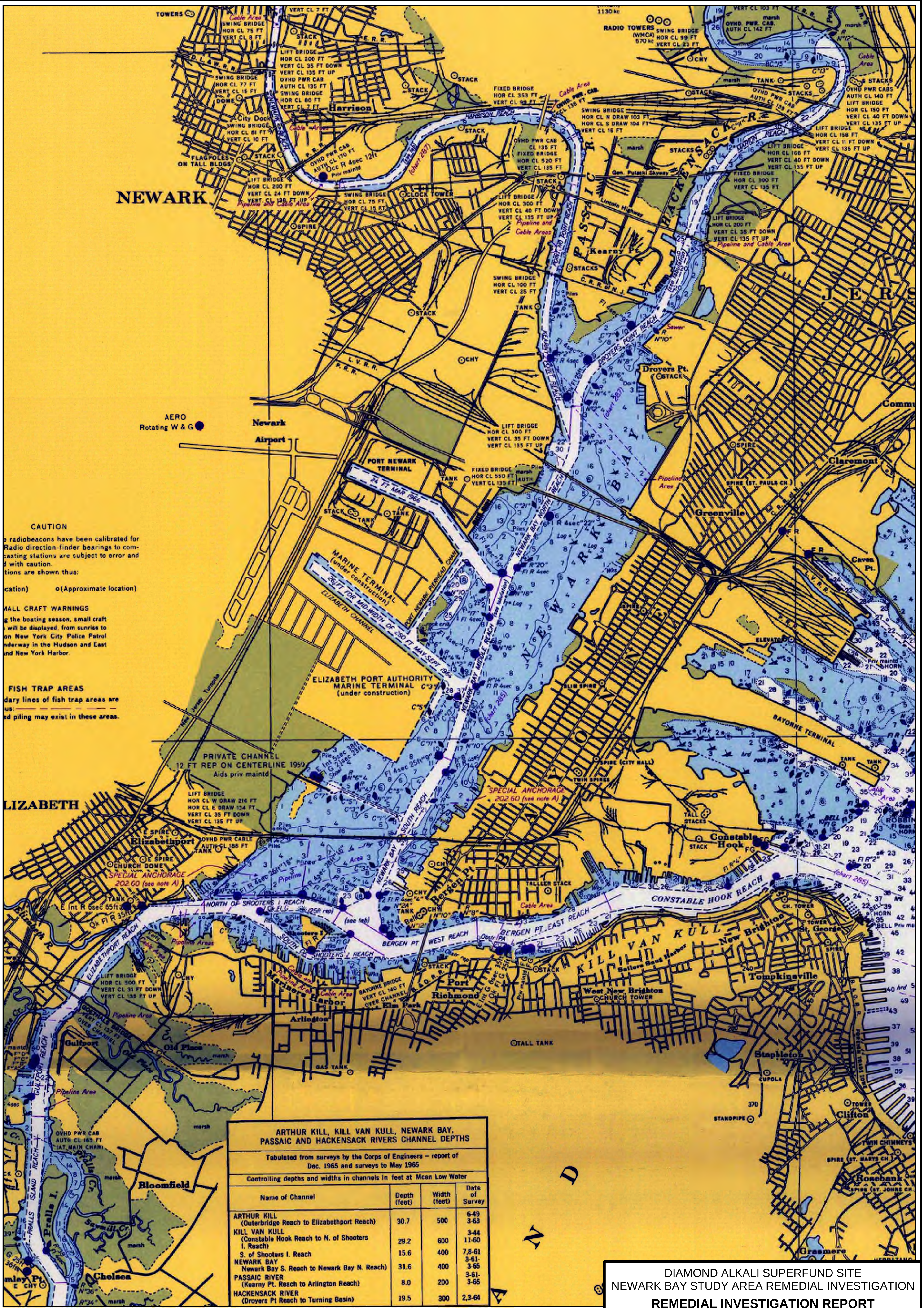
Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
C-5

NOTE:

1. NOAA. 1940. NEW YORK HARBOR. NAUTICAL CHART NO. 369. FEBRUARY. AVAILABLE ONLINE AT: http://historicalcharts.noaa.gov/historicals/historical_zoom.asp.

0 4,000 8,000 Feet
GRAPHIC SCALE


NEWARK
Harrison
Kearny Pt.
Droyers Pt.
Greenville
Claremont
Caven Pt.
Newark Airport
PORT NEWARK TERMINAL
ELIZABETH PORT AUTHORITY MARINE TERMINAL (under construction)
PRIVATE CHANNEL 12 FT REP ON CENTERLINE 1959 Aids priv maintd
LIZABETH
Elizabethport
NEWARK BAY
PASSAIC R.
HACKENSACK R.
KILL VAN KULL
CONSTABLE HOOK REACH
BERGEN PT EAST REACH
BERGEN PT WEST REACH
NORTH OF SHOOTERS I. REACH
SOUTH OF SHOOTERS I. REACH
ELIZABETHPORT REACH
Constable Hook
Bergen Pt.
BAYONNE TERMINAL
SPECIAL ANCHORAGE 202.60 (see note A)
Port Richmond
Mariners Harbor
Arlington
Elm Park
West New Brighton
New Brighton
St. George
Tompkinsville
Stapleton
Clifton
Rosebank
Grasmere
Old Place
Gulfport
Bloomfield
Chelsea
Prall's I.
CAUTION
SMALL CRAFT WARNINGS
FISH TRAP AREAS
AERO Rotating W & G

ARTHUR KILL, KILL VAN KULL, NEWARK BAY, PASSAIC AND HACKENSACK RIVERS CHANNEL DEPTHS

Tabulated from surveys by the Corps of Engineers – report of Dec. 1965 and surveys to May 1965

Controlling depths and widths in channels in feet at Mean Low Water

Name of Channel	Depth (feet)	Width (feet)	Date of Survey
ARTHUR KILL (Outerbridge Reach to Elizabethport Reach)	30.7	500	6-49 3-63
KILL VAN KULL (Constable Hook Reach to N. of Shooters I. Reach)	29.2	600	3-44 11-60
S. of Shooters I. Reach	15.6	400	7,8-61
NEWARK BAY Newark Bay S. Reach to Newark Bay N. Reach)	31.6	400	3-61- 3-65
PASSAIC RIVER (Kearny Pt. Reach to Arlington Reach)	8.0	200	3-61- 3-65
HACKENSACK RIVER (Droyers Pt Reach to Turning Basin)	19.5	300	2,3-64

NOTE:

1. NOAA. 1967. NEW YORK HARBOR. NAUTICAL CHART NO. 369. FEBRUARY. AVAILABLE ONLINE AT: http://historicalcharts.noaa.gov/historicals/historical_zoom.asp.

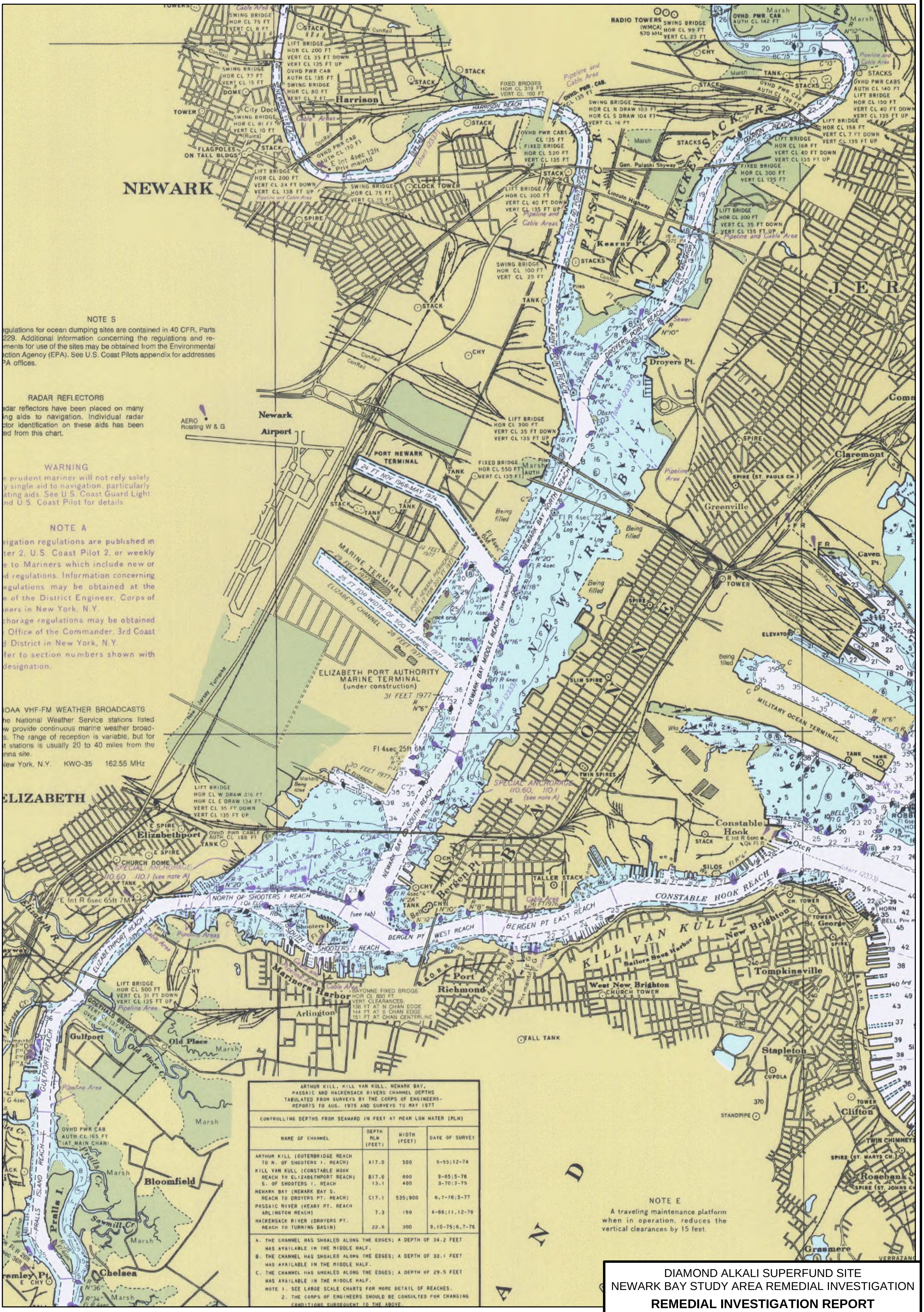
0 4,000 8,000
Feet
GRAPHIC SCALE

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
REMEDIAL INVESTIGATION REPORT

NOAA 1967 NAUTICAL CHART

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
C-6


NEWARK
Harrison
Newark Airport
PORT NEWARK TERMINAL
ELIZABETH PORT AUTHORITY MARINE TERMINAL (under construction)
ELIZABETH
Elizabethport
PASSAIC R.
HACKENSACK R.
NEWARK BAY
BAYONNE
Kearny Pt.
Droyers Pt.
Greenville
Claremont
Caven Pt.
MILITARY OCEAN TERMINAL
Constable Hook
KILL VAN KULL
Bergen Pt
Shooters I.
Port Richmond
Mariners Harbor
Arlington
West New Brighton
New Brighton
Tompkinsville
St. George
Stapleton
Clifton
Rosebank
Grasmere
Old Place
Gulfport
Bloomfield
Chelsea
Pralls I.
ARTHUR KILL
CONSTABLE HOOK REACH
BERGEN PT EAST REACH
BERGEN PT WEST REACH
ELIZABETHPORT REACH
GULFPORT REACH
PRALLS ISLAND REACH
NEWARK BAY SOUTH REACH
NEWARK BAY MIDDLE REACH
NEWARK BAY NORTH REACH
DROYERS POINT REACH
HARRISON REACH
ELIZABETH CHANNEL
MARINE TERMINAL
SPECIAL ANCHORAGE 110.60, 110.1 (see note A)
AERO Rotating W & G
STATEN ISLAND

NOTE S

egulations for ocean dumping sites are contained in 40 CFR, Parts
229. Additional information concerning the regulations and re-
ments for use of the sites may be obtained from the Environmental
ction Agency (EPA). See U.S. Coast Pilots appendix for addresses
PA offices.

RADAR REFLECTORS

adar reflectors have been placed on many
ing aids to navigation. Individual radar
ctor identification on these aids has been
ed from this chart.

WARNING

e prudent mariner will not rely solely
y single aid to navigation, particularly
ating aids. See U.S. Coast Guard Light
nd U.S. Coast Pilot for details.

NOTE A

vigation regulations are published in
ter 2, U.S. Coast Pilot 2, or weekly
e to Mariners which include new or
d regulations. Information concerning
egulations may be obtained at the
e of the District Engineer, Corps of
eers in New York, N.Y.
chorage regulations may be obtained
Office of the Commander, 3rd Coast
d District in New York, N.Y.
fer to section numbers shown with
designation.

OAA VHF-FM WEATHER BROADCASTS

he National Weather Service stations listed
w provide continuous marine weather broad-
s. The range of reception is variable, but for
t stations is usually 20 to 40 miles from the
nna site.
New York, N.Y. KWO-35 162.55 MHz

NOTE E

A traveling maintenance platform when in operation, reduces the vertical clearances by 15 feet.

ARTHUR KILL, KILL VAN KULL, NEWARK BAY, PASSAIC AND HACKENSACK RIVERS CHANNEL DEPTHS TABULATED FROM SURVEYS BY THE CORPS OF ENGINEERS-REPORTS TO AUG. 1975 AND SURVEYS TO MAY 1977

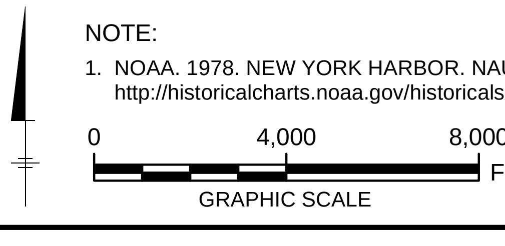
CONTROLLING DEPTHS FROM SEAWARD IN FEET AT MEAN LOW WATER (MLW)

NAME OF CHANNEL	DEPTH MLW (FEET)	WIDTH (FEET)	DATE OF SURVEY
ARTHUR KILL (OUTERBRIDGE REACH TO N. OF SHOOTERS I. REACH)	A17.0	500	5-55;12-74
KILL VAN KULL (CONSTABLE HOOK REACH TO ELIZABETHPORT REACH)	B17.0	600	9-65;5-76
S. OF SHOOTERS I. REACH	13.1	400	3-70;3-75
NEWARK BAY (NEWARK BAY S. REACH TO DROYERS PT. REACH)	C17.1	535;900	6,7-76;5-77
PASSAIC RIVER (KEARY PT. REACH ARLINGTON REACH)	7.3	150	4-66;11,12-76
HACKENSACK RIVER (DROYERS PT. REACH TO TURNING BASIN)	22.0	300	9,10-75;6,7-76

A. THE CHANNEL HAS SHOALED ALONG THE EDGES; A DEPTH OF 34.2 FEET WAS AVAILABLE IN THE MIDDLE HALF.
B. THE CHANNEL HAS SHOALED ALONG THE EDGES; A DEPTH OF 33.1 FEET WAS AVAILABLE IN THE MIDDLE HALF.
C. THE CHANNEL HAS SHOALED ALONG THE EDGES; A DEPTH OF 29.5 FEET WAS AVAILABLE IN THE MIDDLE HALF.
NOTE 1. SEE LARGE SCALE CHARTS FOR MORE DETAIL OF REACHES.
2. THE CORPS OF ENGINEERS SHOULD BE CONSULTED FOR CHANGING CONDITIONS SUBSEQUENT TO THE ABOVE.

NOTE:

1. NOAA. 1978. NEW YORK HARBOR. NAUTICAL CHART NO. 12327. FEBRUARY. AVAILABLE ONLINE AT: http://historicalcharts.noaa.gov/historicals/historical_zoom.asp.

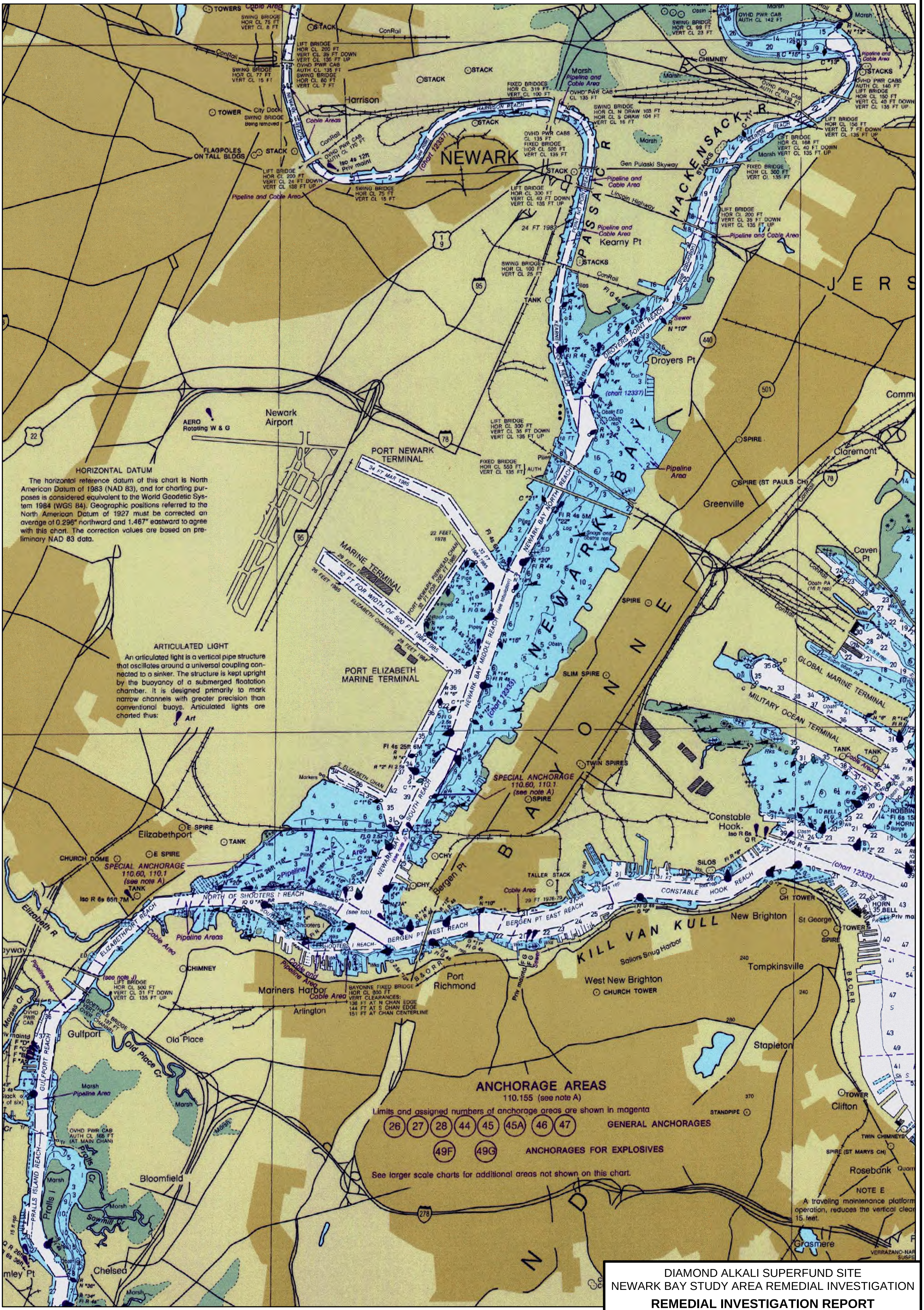

0
4,000
8,000
Feet
GRAPHIC SCALE

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
REMEDIAL INVESTIGATION REPORT

NOAA 1978 NAUTICAL CHART

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
C-7


NEWARK
Harrison
PASSAIC R
HACKENSACK R
Kearny Pt
Droyers Pt
Newark Airport
PORT NEWARK TERMINAL
MARINE TERMINAL
PORT ELIZABETH MARINE TERMINAL
NEWARK BAY
BAYONNE
JERS
Greenville
Caven Pt
Claremont
GLOBAL MARINE TERMINAL
MILITARY OCEAN TERMINAL
Constable Hook
Elizabethport
Elizabeth R
Bergen Pt
KILL VAN KULL
Port Richmond
New Brighton
West New Brighton
Sailors Snug Harbor
Tompkinsville
St George
Stapleton
Clifton
Rosebank
Grasmere
Mariners Harbor
Arlington
Gulfport
Old Place
Bloomfield
Chelsea
Prall's I
SPECIAL ANCHORAGE 110.60, 110.1 (see note A)
HORIZONTAL DATUM
The horizontal reference datum of this chart is North American Datum of 1983 (NAD 83), and for charting purposes is considered equivalent to the World Geodetic System 1984 (WGS 84). Geographic positions referred to the North American Datum of 1927 must be corrected an average of 0.296" northward and 1.467" eastward to agree with this chart. The correction values are based on preliminary NAD 83 data.
ARTICULATED LIGHT
An articulated light is a vertical pipe structure that oscillates around a universal coupling connected to a sinker. The structure is kept upright by the buoyancy of a submerged floatation chamber. It is designed primarily to mark narrow channels with greater precision than conventional buoys. Articulated lights are charted thus: Art
ANCHORAGE AREAS
110.155 (see note A)
Limits and assigned numbers of anchorage areas are shown in magenta
26 27 28 44 45 45A 46 47 GENERAL ANCHORAGES
49F 49G ANCHORAGES FOR EXPLOSIVES
See larger scale charts for additional areas not shown on this chart.
NOTE E
A traveling maintenance platform operation, reduces the vertical clear 15 feet.

NOTE:

1. NOAA. 1986. NEW YORK HARBOR. NAUTICAL CHART NO. 12327. MARCH. AVAILABLE ONLINE AT: http://historicalcharts.noaa.gov/historicals/historical_zoom.asp.

0 4,000 8,000 Feet

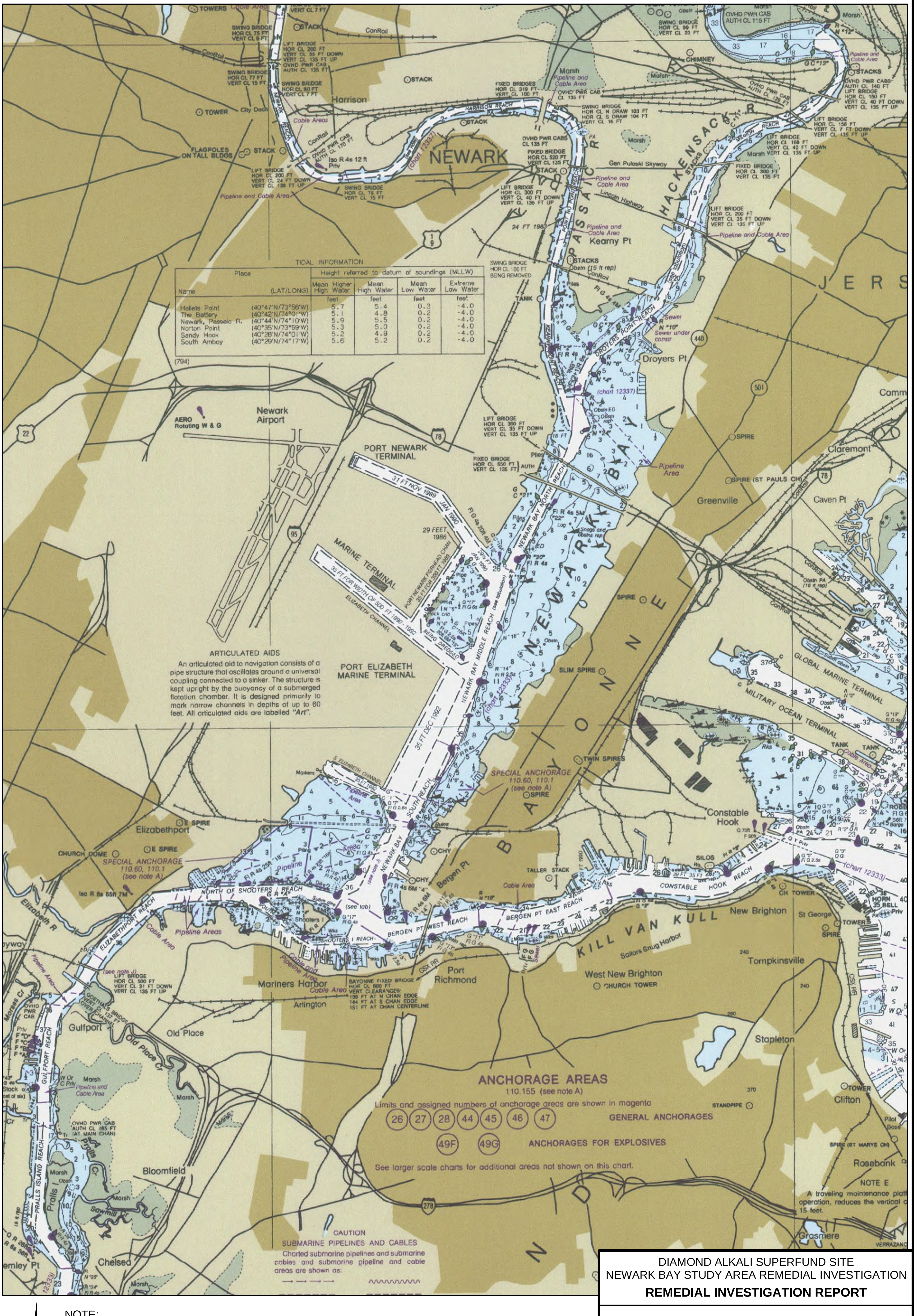
GRAPHIC SCALE

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
REMEDIAL INVESTIGATION REPORT

NOAA 1986 NAUTICAL CHART

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
C-8


NEWARK
Harrison
Kearny Pt
Droyers Pt
Newark Airport
PORT NEWARK TERMINAL
PORT ELIZABETH MARINE TERMINAL
MARINE TERMINAL
Elizabethport
NEWARK BAY
BAYONNE
JERSEY
HACKENSACK R
PASSAIC R
KILL VAN KULL
Constable Hook
Bergen Pt
Port Richmond
Mariners Harbor
Arlington
West New Brighton
New Brighton
Tompkinsville
Stapleton
Clifton
Rosebank
Grasmere
Greenville
Claremont
Caven Pt
Gulfport
Old Place
Bloomfield
Chelsea
Elizabeth R
SPECIAL ANCHORAGE 110.60, 110.1 (see note A)
NORTH OF SHOOTERS I REACH
BERGEN PT WEST REACH
BERGEN PT EAST REACH
CONSTABLE HOOK REACH
ELIZABETHPORT REACH
GULFPORT REACH
PRALLS ISLAND REACH
NEWARK BAY SOUTH REACH
NEWARK BAY MIDDLE REACH
NEWARK BAY NORTH REACH
GLOBAL MARINE TERMINAL
MILITARY OCEAN TERMINAL
AERO Rotating W & G
NOTE E
A traveling maintenance platf operation, reduces the vertical c 15 feet.

TIDAL INFORMATION

Place		Height referred to datum of soundings (MLLW)			
Name	(LAT/LONG)	Mean Higher High Water	Mean High Water	Mean Low Water	Extreme Low Water
		feet	feet	feet	feet
Hallets Point	(40°47'N/73°56'W)	5.7	5.4	0.3	-4.0
The Battery	(40°42'N/74°01'W)	5.1	4.8	0.2	-4.0
Newark, Passaic R.	(40°44'N/74°10'W)	5.9	5.5	0.2	-4.0
Norton Point	(40°35'N/73°59'W)	5.3	5.0	0.2	-4.0
Sandy Hook	(40°28'N/74°01'W)	5.2	4.9	0.2	-4.0
South Amboy	(40°29'N/74°17'W)	5.6	5.2	0.2	-4.0

(794)

ARTICULATED AIDS

An articulated aid to navigation consists of a pipe structure that oscillates around a universal coupling connected to a sinker. The structure is kept upright by the buoyancy of a submerged flotation chamber. It is designed primarily to mark narrow channels in depths of up to 60 feet. All articulated aids are labelled *"Art"*.

ANCHORAGE AREAS
110.155 (see note A)

Limits and assigned numbers of anchorage areas are shown in magenta

26 27 28 44 45 46 47 GENERAL ANCHORAGES

49F 49G ANCHORAGES FOR EXPLOSIVES

See larger scale charts for additional areas not shown on this chart.

CAUTION
SUBMARINE PIPELINES AND CABLES

Charted submarine pipelines and submarine cables and submarine pipeline and cable areas are shown as:

NOTE:

1. NOAA. 1994. NEW YORK HARBOR. NAUTICAL CHART NO. 12327. NOVEMBER. AVAILABLE ONLINE AT: http://historicalcharts.noaa.gov/historicals/historical_zoom.asp.

0 4,000 8,000 Feet

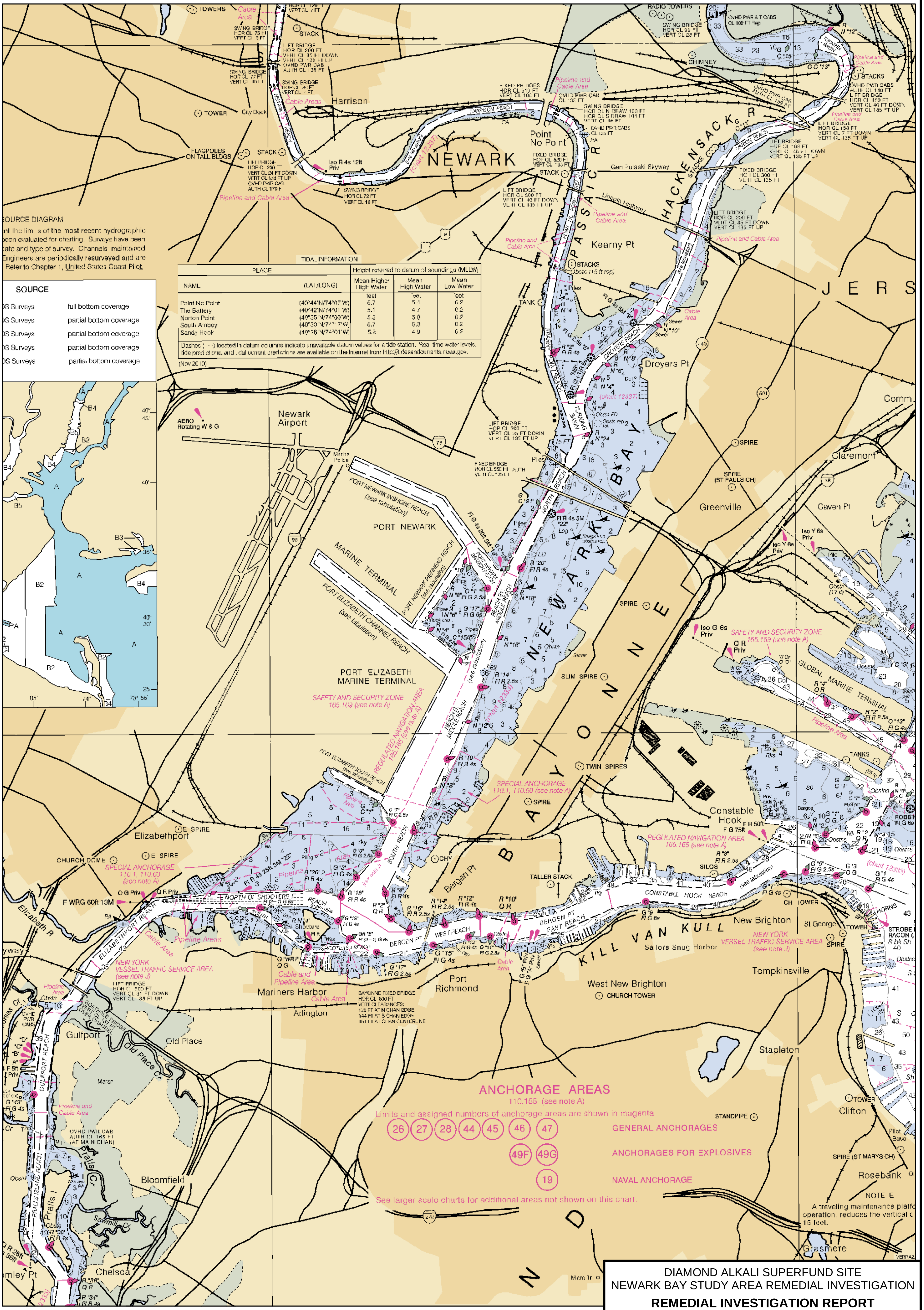
GRAPHIC SCALE

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
REMEDIAL INVESTIGATION REPORT

NOA 1994 NAUTICAL CHART

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
C-9


NEWARK
Harrison
Point No Point
PASSAIC R
HACKENSACK R
Kearny Pt
Droyers Pt
NEWARK BAY
Newark Airport
PORT NEWARK
PORT ELIZABETH MARINE TERMINAL
MARINE TERMINAL
Elizabethport
Elizabeth R
BAYONNE
Constable Hook
KILL VAN KULL
Bergen Pt
Port Richmond
Mariners Harbor
Arlington
West New Brighton
New Brighton
Sailors Snug Harbor
Tompkinsville
Stapleton
Clifton
Rosebank
Grasmere
Greenville
Claremont
Caven Pt
GLOBAL MARINE TERMINAL
JERSEY
Gulfport
Old Place
Bloomfield
Chelsea
Gen Pulaski Skyway
Lincoln Highway
SOURCE DIAGRAM
SOURCE
SAFETY AND SECURITY ZONE 165.169 (see note A)
REGULATED NAVIGATION AREA 165.165 (see note A)
SPECIAL ANCHORAGE 110.1, 110.60 (see note A)
NEW YORK VESSEL TRAFFIC SERVICE AREA (see note J)
Pipeline and Cable Area
ANCHORAGE AREAS
110.155 (see note A)
Limits and assigned numbers of anchorage areas are shown in magenta
26 27 28 44 45 46 47 GENERAL ANCHORAGES
49F 49G ANCHORAGES FOR EXPLOSIVES
19 NAVAL ANCHORAGE
See larger scale charts for additional areas not shown on this chart.
NOTE E

TIDAL INFORMATION

PLACE		Height referred to datum of soundings (MLLW)		
NAME	(LAT/LONG)	Mean Higher High Water	Mean High Water	Mean Low Water
		feet	feet	feet
Point No Point	(40°44'N/74°07'W)	5.7	5.4	0.2
The Battery	(40°42'N/74°01'W)	5.1	4.7	0.2
Norton Point	(40°35'N/74°00'W)	5.3	5.0	0.2
South Amboy	(40°30'N/74°17'W)	5.7	5.3	0.2
Sandy Hook	(40°28'N/74°01'W)	5.2	4.9	0.2

Dashes (- -) located in datum columns indicate unavailable datum values for a tide station. Real-time water levels, tide predictions, and tidal current predictions are available on the Internet from http://tidesandcurrents.noaa.gov.

(Nov 2010)

NOTE:

1. NOAA. 2010A. NEW YORK HARBOR. NAUTICAL CHART NO. 12327. NOVEMBER. AVAILABLE ONLINE AT: http://www.charts.noaa.gov/RNCs/RNCsIndv.shtml.

0 4,000 8,000 Feet

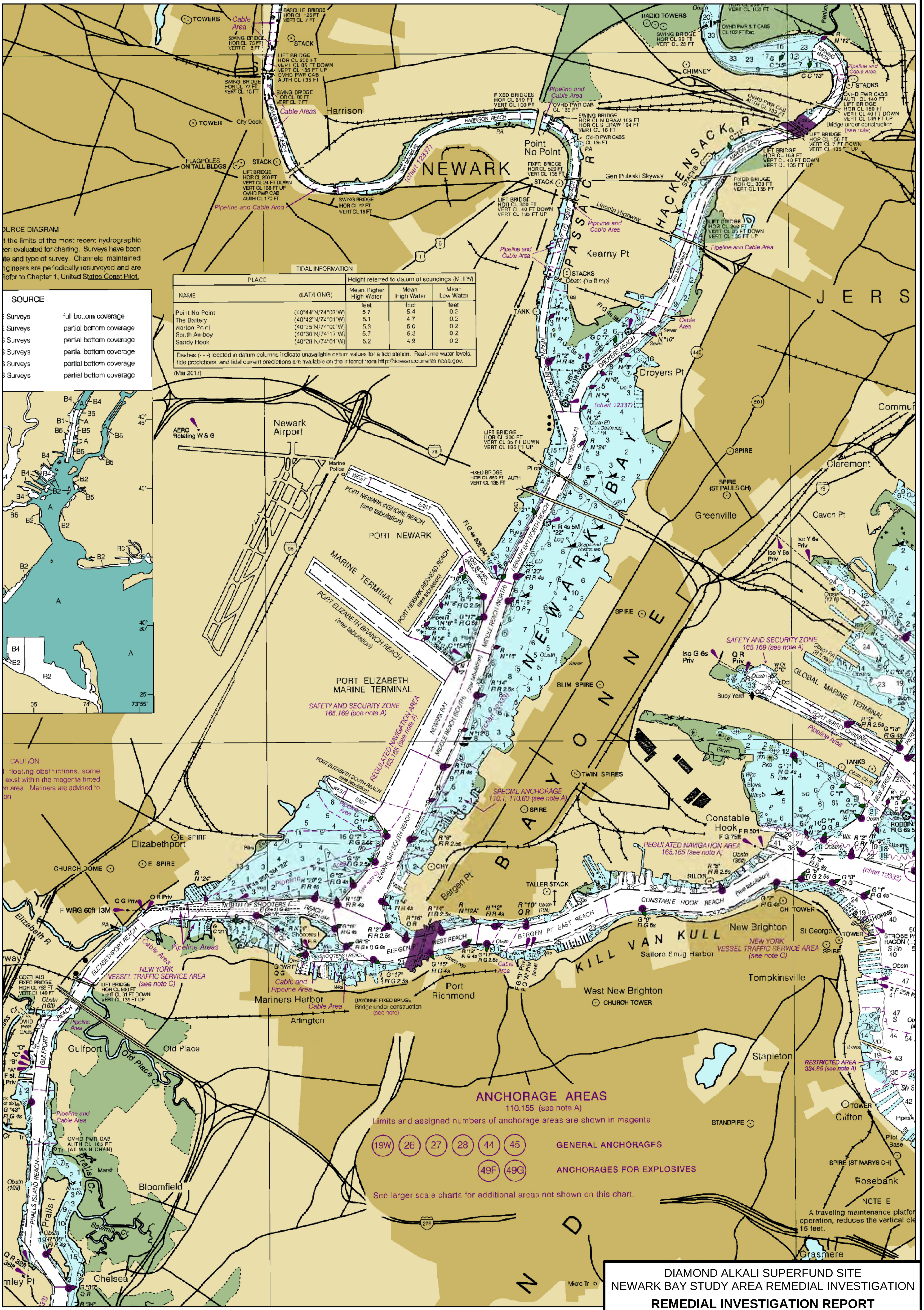
GRAPHIC SCALE

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
REMEDIAL INVESTIGATION REPORT

NOAA 2010 NAUTICAL CHART

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
C-10


NEWARK
Harrison
Point No Point
Kearny Pt
Droyers Pt
NEWARK BAY
PASSAIC R
HACKENSACK R
Newark Airport
PORT NEWARK
PORT ELIZABETH MARINE TERMINAL
Elizabethport
BAYONNE
JERSEY
Constable Hook
KILL VAN KULL
New Brighton
Port Richmond
Mariners Harbor
West New Brighton
Tompkinsville
Stapleton
Clifton
Rosebank
Bergen Pt
Greenville
Claremont
Caven Pt
Gulfport
Old Place
Bloomfield
Chelsea
Arlington
Grasmere
SOURCE DIAGRAM
CAUTION
ANCHORAGE AREAS
110.155 (see note A)
Limits and assigned numbers of anchorage areas are shown in magenta
19W 26 27 28 44 45 GENERAL ANCHORAGES
49F 49G ANCHORAGES FOR EXPLOSIVES
See larger scale charts for additional areas not shown on this chart.
SAFETY AND SECURITY ZONE 165.169 (see note A)
REGULATED NAVIGATION AREA 165.165 (see note A)
SPECIAL ANCHORAGE 110.1, 110.60 (see note A)
NEW YORK VESSEL TRAFFIC SERVICE AREA (see note C)
NOTE E
A traveling maintenance platform operation, reduces the vertical clearance 15 feet.

TIDAL INFORMATION

PLACE		Height referred to datum of soundings (MLLW)		
NAME	(LAT/LONG)	Mean Higher High Water	Mean High Water	Mean Low Water
		feet	feet	feet
Point No Point	(40°44'N/74°07'W)	5.7	5.4	0.2
The Battery	(40°42'N/74°01'W)	5.1	4.7	0.2
Norton Point	(40°35'N/74°00'W)	5.3	5.0	0.2
South Amboy	(40°30'N/74°17'W)	5.7	5.3	0.2
Sandy Hook	(40°28'N/74°01'W)	5.2	4.9	0.2

Dashes (- - -) located in datum columns indicate unavailable datum values for a tide station. Real-time water levels, tide predictions, and tidal current predictions are available on the Internet from http://tidesandcurrents.noaa.gov.

(Mar 2017)

NOTE:

1. NOAA. 2020. NEW YORK HARBOR. NAUTICAL CHART NO. 12327. NOVEMBER. AVAILABLE ONLINE AT: http://www.charts.noaa.gov/RNCs/RNCsIndv.shtml.

0 4,000 8,000 Feet

GRAPHIC SCALE

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
REMEDIAL INVESTIGATION REPORT

NOAA 2020 NAUTICAL CHART

Glenn Springs Holdings, Inc.
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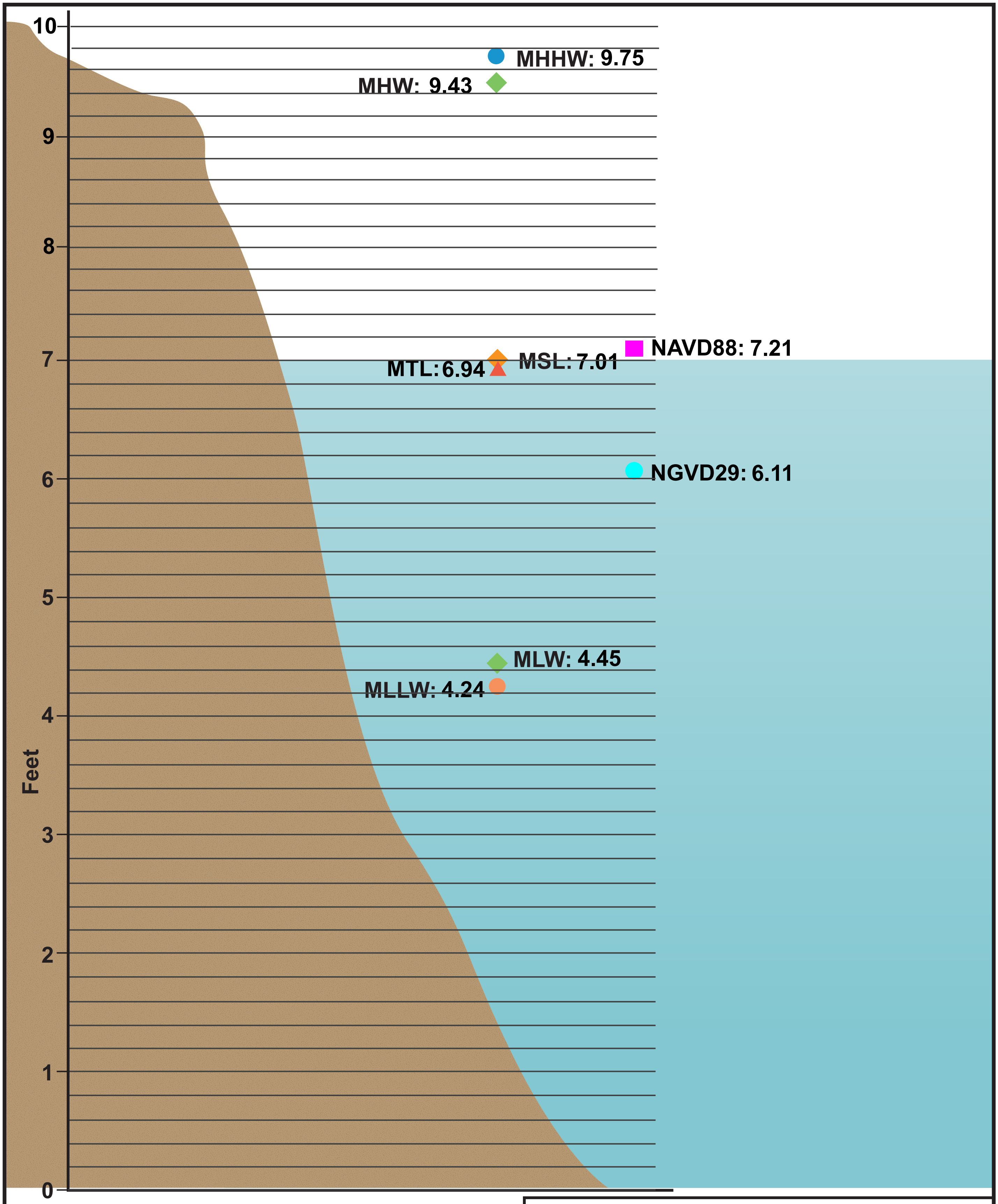
FIGURE
C-11

Appendix C-3

Datum for 8519483, Bergen Point, NY (Figure B-1 from CSM)



Datums

(Elevations in feet relative to station datum)

Reference:
https://tidesandcurrents.noaa.gov/datums.html?id=8519483

NEWARK BAY STUDY AREA

CONCEPTUAL SITE MODEL

DATUM FOR 8519483, BERGEN POINT, NY

January 2019

FIGURE
B-1