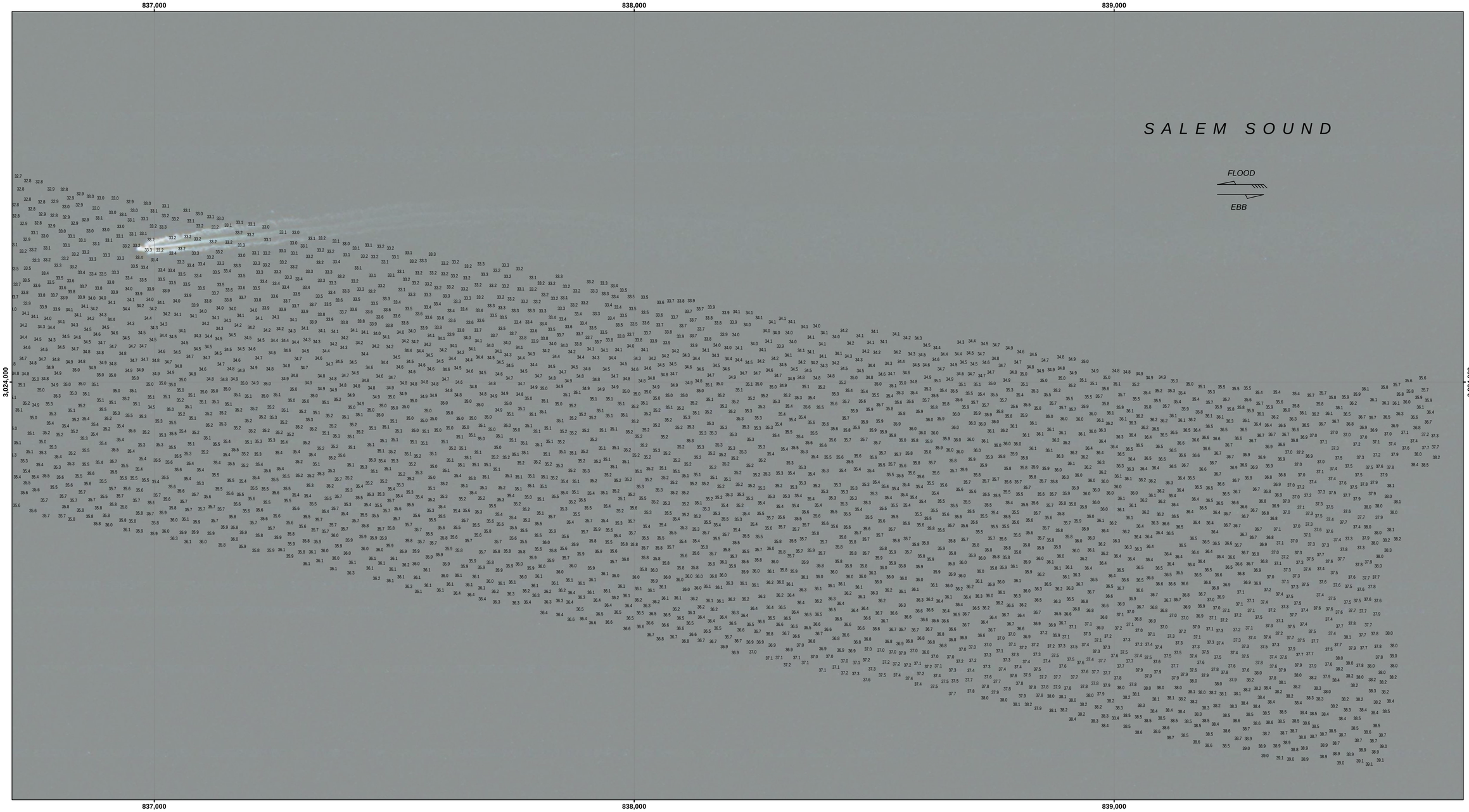

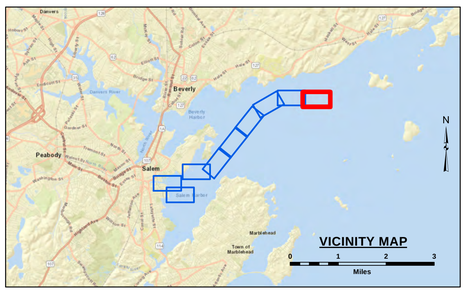

LEGEND

- Federal Navigation Channel
- Cable or Pipe Areas
- Channel Center Line
- Non-USACE Maintained
- Contour Line
- Obstruction Point
- Fixed Navigation Aids
- Red Navigation Buoy
- Green Navigation Buoy
- Shoaling Area
- Shoalest Sounding**

** Shoalest Sounding per Quarter per Reach

GRAPHIC SCALE

100 0 100 200

1" = 100' Feet

N W E S

Notes:

Horizontal Datum: Mass Mainland, MA-2001 NAD 83
Distance Units: Distance_Units
Vertical Datum: MLLW
Depth Units: U.S. Survey Feet
Vessel Name: CELESTIAL
Sonar System: R2 Sonic 2024 (Multibeam Sonar)
Sounding Frequency: 300 kHz
Survey Method: RTK GPS Tides
GPS_System: Trimble SPS 855 (RTK)
RTK Base Station: MTS Smartnet Imax
Software Used: Hypack
Sounding Sort Distance: 20'
Field Books: R&H 4286
Survey No.: MA_11_SAL_20210902_CS_036
Reference NOAA Chart No.: 13276

The information depicted on these charts represents the results of surveys made on the dates indicated, and can only be considered as indicating the conditions existing at that time.

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Project Remarks

Approach and additional coverage beyond navigation project limits surveyed.

Water Level Information

Tides were recorded using RTK GPS.The MLLW to NAVD88 corrections for this project range from 5.13 feet to 5.16 feet. These corrections are referenced from NOAA's V-Datum Model Version 4.1, ME/NH/MA region Version 2.3, in the vicinity of Salem Harbor, Salem, Massachusetts. NAVD88 is above MLLW; therefore the correction should be added to NAVD88 to convert to MLLW. No tide gauges were used on this project.

US Army Corps of Engineers
District: CENAE

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U.S. ARMY CORPS OF ENGINEERS
NEW ENGLAND DISTRICT

SURVEYED BY: MJV
CHECKED BY: ZSM
ISSUE DATE: 9/14/2021
SUBMITTED BY: Zachary McAvoy
APPROVED BY: NAE Survey
MAP DOCUMENT: MA_11_SAL_20210902_CS_036
SIZE: ANSI D

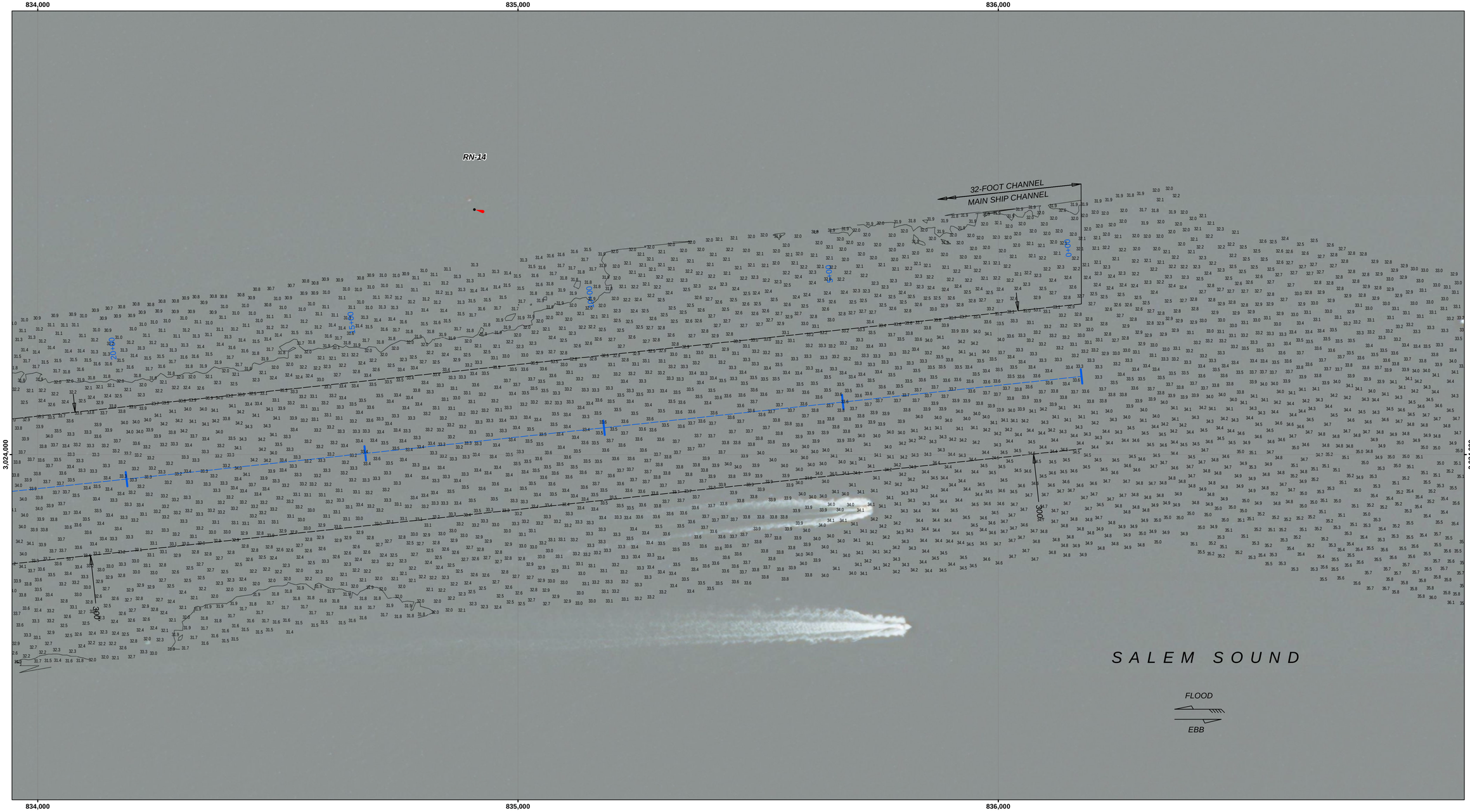
SALEM HARBOR
SALEM, BEVERLY AND MARBLEHEAD, MASSACHUSETTS
CONDITION SURVEY
32, 10, 8 AND 6-FOOT CHANNELS, 8-FOOT CHANNEL AND TURNING BASIN

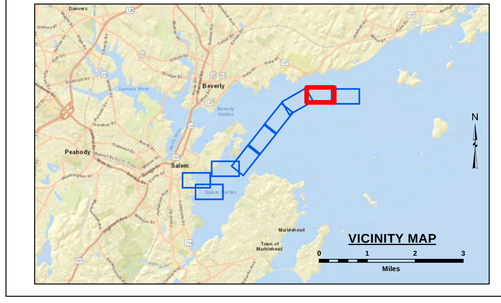
File Name: MA_11_SAL_20210902_CS_036

SHEET IDENTIFICATION
Salem Harbor

Sheet 1 of 9

Revison Number: 4.2-20200420





LEGEND

- Federal Navigation Channel
- Cable or Pipe Areas
- Channel Center Line
- Non-USACE Maintained
- Contour Line
- Obstruction Point
- Fixed Navigation Aids
- Red Navigation Buoy
- Green Navigation Buoy
- Shoaling Area
- Shoalest Sounding**

** Shoalest Sounding per Quarter per Reach

GRAPHIC SCALE

1" = 100' 100 0 100 200 Feet

N W E S

Notes:

Horizontal Datum: Mass Mainland, MA-2001 NAD 83
Distance Units: Distance_Units
Vertical Datum: MLLW
Depth Units: U.S. Survey Feet
Vessel Name: CELESTIAL
Sonar System: R2 Sonic 2024 (Multibeam Sonar)
Sounding Frequency: 300 kHz
Survey Method: RTK GPS Tides
GPS_System: Trimble SPS 855 (RTK)
RTK Base Station: MTS Smartnet Imax
Software Used: Hypack
Sounding Sort Distance: 20'
Field Books: R&H 4286
Survey No.: MA_11_SAL_20210902_CS_036
Reference NOAA Chart No.: 13276

The information depicted on these charts represents the results of surveys made on the dates indicated, and can only be considered as indicating the conditions existing at that time.

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Project Remarks

Approach and additional coverage beyond navigation project limits surveyed.

Water Level Information

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US Army Corps of Engineers
District: CENAE

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U.S. ARMY CORPS OF ENGINEERS
NEW ENGLAND DISTRICT

SUBMITTED BY: Zachary McAvoy
APPROVED BY: NAE Survey

SURVEYED BY: MJV
CHECKED BY: ZSM
ISSUE DATE: 9/14/2021
SIZE: ANSI D

MAP DOCUMENT: MA_11_SAL_20210902_CS_036

SALEM HARBOR
SALEM, BEVERLY AND MARBLEHEAD, MASSACHUSETTS
CONDITION SURVEY
32, 10, 8 AND 6-FOOT CHANNELS, 8-FOOT CHANNEL AND TURNING BASIN

File Name: MA_11_SAL_20210902_CS_036

SHEET IDENTIFICATION
Salem Harbor

Sheet 2 of 9

Revison Number: 4.2-20200420

832,000 3,024,000 833,000

3,023,000 834,000

32-FOOT CHANNEL
MAIN SHIP CHANNEL

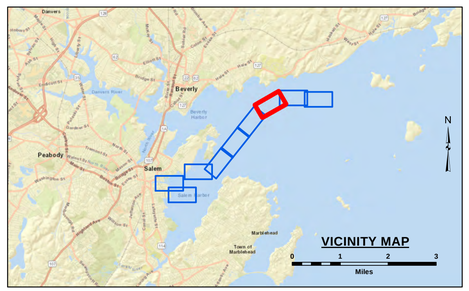
SALEM SOUND

FLOOD

EBB

PIPELINE AREA

3,022,000 833,000 3,023,000 834,000



VICINITY MAP

LEGEND

- Federal Navigation Channel
- Cable or Pipe Areas
- Channel Center Line
- Non-USACE Maintained
- Contour Line
- Obstruction Point
- Fixed Navigation Aids
- Red Navigation Buoy
- Green Navigation Buoy
- Shoaling Area
- Shoalest Sounding**

** Shoalest Sounding per Quarter per Reach

GRAPHIC SCALE

100 0 100 200

1" = 100' Feet

N W E S

Notes:

Horizontal Datum: Mass Mainland, MA-2001 NAD 83
Distance Units: Distance_Units
Vertical Datum: MLLW
Depth Units: U.S. Survey Feet
Vessel Name: CELESTIAL
Sonar System: R2 Sonic 2024 (Multibeam Sonar)
Sounding Frequency: 300 kHz
Survey Method: RTK GPS Tides
GPS_System: Trimble SPS 855 (RTK)
RTK Base Station: MTS Smartnet Imax
Software Used: Hypack
Sounding Sort Distance: 20'
Field Books: R&H 4286
Survey No.: MA_11_SAL_20210902_CS_036
Reference NOAA Chart No.: 13276

The information depicted on these charts represents the results of surveys made on the dates indicated, and can only be considered as indicating the conditions existing at that time.

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Project Remarks

Approach and additional coverage beyond navigation project limits surveyed.

Water Level Information

Tides were recorded using RTK GPS.The MLLW to NAVD88 corrections for this project range from 5.13 feet to 5.16 feet. These corrections are referenced from NOAA's V-Datum Model Version 4.1, ME/NH/MA region Version 2.3, in the vicinity of Salem Harbor, Salem, Massachusetts. NAVD88 is above MLLW; therefore the correction should be added to NAVD88 to convert to MLLW. No tide gauges were used on this project.

US Army Corps of Engineers
District: CENAE

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U.S. ARMY CORPS OF ENGINEERS
NEW ENGLAND DISTRICT

SURVEYED BY: MJV
CHECKED BY: ZSM
ISSUE DATE: 9/14/2021
SUBMITTED BY: Zachary McAvoy
APPROVED BY: NAE Survey
MAP DOCUMENT: MA_11_SAL_20210902_CS_036
SIZE: ANSI D

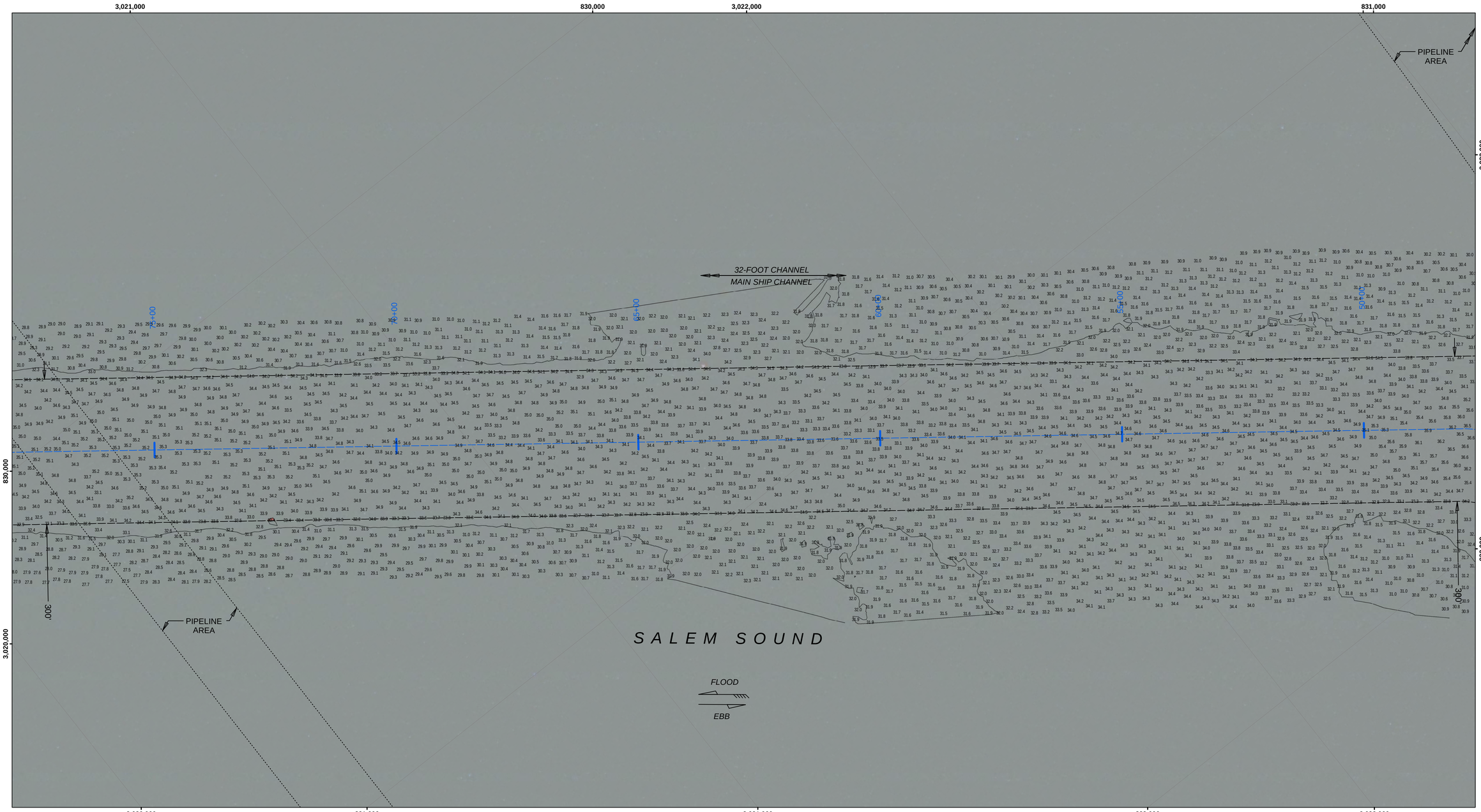
SALEM HARBOR
SALEM, BEVERLY AND MARBLEHEAD, MASSACHUSETTS
CONDITION SURVEY
32, 10, 8 AND 6-FOOT CHANNELS, 8-FOOT CHANNEL AND TURNING BASIN

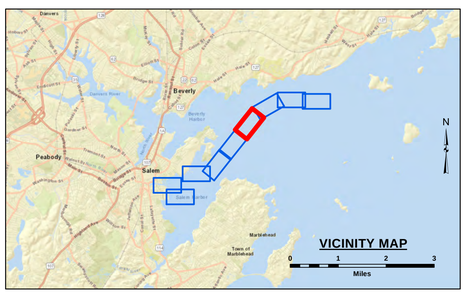
File Name: **MA_11_SAL_20210902_CS_036**

SHEET IDENTIFICATION
Salem Harbor

Sheet 3 of 9

Revison Number: 4.2-20200420





LEGEND

- Federal Navigation Channel
- Cable or Pipe Areas
- Channel Center Line
- Non-USACE Maintained
- Contour Line
- Obstruction Point
- Fixed Navigation Aids
- Red Navigation Buoy
- Green Navigation Buoy
- Shoaling Area
- Shoalest Sounding**

** Shoalest Sounding per Quarter per Reach

GRAPHIC SCALE

1" = 100' 100 0 100 200 Feet

Notes:

Horizontal Datum: Mass Mainland, MA-2001 NAD 83
Distance Units: Distance_Units
Vertical Datum: MLLW
Depth Units: U.S. Survey Feet
Vessel Name: CELESTIAL
Sonar System: R2 Sonic 2024 (Multibeam Sonar)
Sounding Frequency: 300 kHz
Survey Method: RTK GPS Tides
GPS_System: Trimble SPS 855 (RTK)
RTK Base Station: MTS Smartnet Imax
Software Used: Hypack
Sounding Sort Distance: 20'
Field Books: R&H 4286
Survey No.: MA_11_SAL_20210902_CS_036
Reference NOAA Chart No.: 13276

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Project Remarks

Approach and additional coverage beyond navigation project limits surveyed.

Water Level Information

Tides were recorded using RTK GPS.The MLLW to NAVD88 corrections for this project range from 5.13 feet to 5.16 feet. These corrections are referenced from NOAA's V-Datum Model Version 4.1, ME/NH/MA region Version 2.3, in the vicinity of Salem Harbor, Salem, Massachusetts. NAVD88 is above MLLW; therefore the correction should be added to NAVD88 to convert to MLLW. No tide gauges were used on this project.

US Army Corps of Engineers
District: CENAE

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U.S. ARMY CORPS OF ENGINEERS
NEW ENGLAND DISTRICT

SUBMITTED BY: Zachary McAvoy
APPROVED BY: NAE Survey
SURVEYED BY: MJV
CHECKED BY: ZSM
ISSUE DATE: 9/14/2021
SIZE: ANSI D
MAP DOCUMENT: MA_11_SAL_20210902_CS_036

SALEM HARBOR
SALEM, BEVERLY AND MARBLEHEAD, MASSACHUSETTS
CONDITION SURVEY

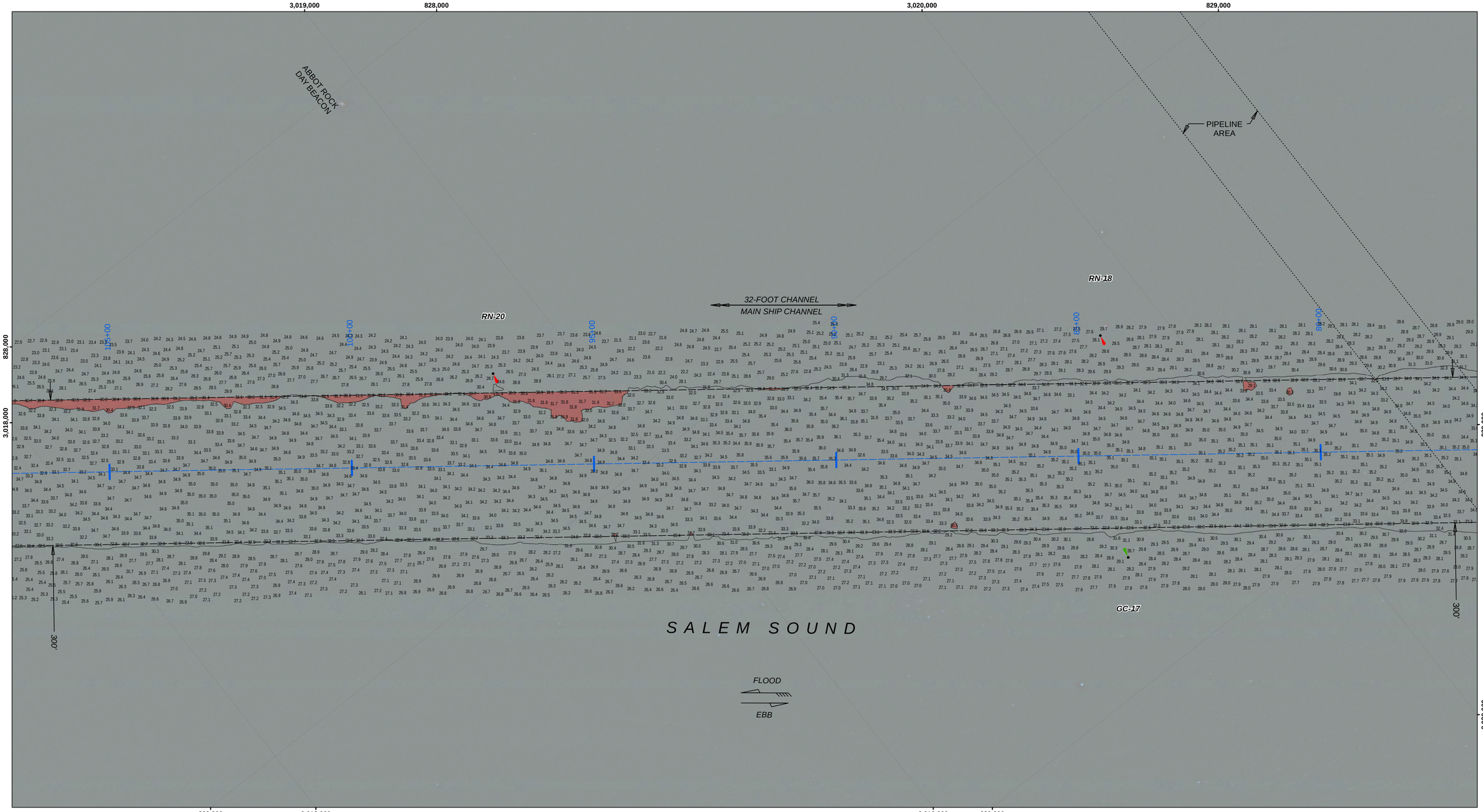
32, 10, 8 AND 6-FOOT CHANNELS, 8-FOOT CHANNEL AND TURNING BASIN

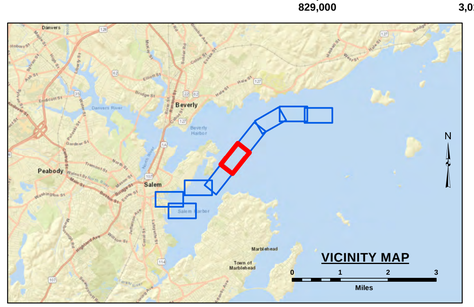
File Name: MA_11_SAL_20210902_CS_036

SHEET IDENTIFICATION
Salem Harbor

Sheet 4 of 9

Revison Number: 4.2-20200420





LEGEND

- Federal Navigation Channel
- Cable or Pipe Areas
- Channel Center Line
- Non-USACE Maintained
- Contour Line
- Obstruction Point
- Fixed Navigation Aids
- Red Navigation Buoy
- Green Navigation Buoy
- Shoaling Area
- Shoalest Sounding**

** Shoalest Sounding per Quarter per Reach

GRAPHIC SCALE

100 0 100 200

1" = 100' Feet

Notes:

Horizontal Datum: Mass Mainland, MA-2001 NAD 83
Distance Units: Distance_Units
Vertical Datum: MLLW
Depth Units: U.S. Survey Feet
Vessel Name: CELESTIAL
Sonar System: R2 Sonic 2024 (Multibeam Sonar)
Sounding Frequency: 300 kHz
Survey Method: RTK GPS Tides
GPS_System: Trimble SPS 855 (RTK)
RTK Base Station: MTS Smartnet Imax
Software Used: Hypack
Sounding Sort Distance: 20'
Field Books: R&H 4286
Survey No.: MA_11_SAL_20210902_CS_036
Reference NOAA Chart No.: 13276

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Project Remarks

Approach and additional coverage beyond navigation project limits surveyed.

Water Level Information

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US Army Corps of Engineers
District: CENAE

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U.S. ARMY CORPS OF ENGINEERS
NEW ENGLAND DISTRICT

SUBMITTED BY: Zachary McAvoy
APPROVED BY: NAE Survey

SURVEYED BY: MJV
CHECKED BY: ZSM
ISSUE DATE: 9/14/2021
SIZE: ANSI D
MAP DOCUMENT: MA_11_SAL_20210902_CS_036

SALEM HARBOR
SALEM, BEVERLY AND MARBLEHEAD, MASSACHUSETTS
CONDITION SURVEY

32, 10, 8 AND 6-FOOT CHANNELS, 8-FOOT CHANNEL AND TURNING BASIN

File Name: MA_11_SAL_20210902_CS_036

SHEET IDENTIFICATION
Salem Harbor

Sheet 5 of 9

Revison Number: 4.2-20200420

826,000 3,017,000 827,000 3,018,000

826,000 3,016,000

WINTER ISLAND
FORT PICKERING
FORT PICKERING LIGH

135+00 130+00 125+00 120+00 115+00 110+00

32-FOOT CHANNEL
MAIN SHIP CHANNEL

SALEM HARBOR
FLOOD
EBB

827,000 3,016,000 828,000 3,017,000

LEGEND

- Federal Navigation Channel
- Cable or Pipe Areas
- Channel Center Line
- Non-USACE Maintained
- Contour Line
- Obstruction Point
- Fixed Navigation Aids
- Red Navigation Buoy
- Green Navigation Buoy
- Shoaling Area
- Shoalest Sounding**

** Shoalest Sounding per Quarter per Reach

VICINITY MAP
Danvers, Beverly, Beverly Harbor, Peabody, Salem, Salem Sound, Marblehead, Town of Marblehead
0 1 2 3 Miles

GRAPHIC SCALE
100 0 100 200
1" = 100' Feet

Notes:
Horizontal Datum: Mass Mainland, MA-2001 NAD 83
Distance Units: Distance_Units
Vertical Datum: MLLW
Depth Units: U.S. Survey Feet
Vessel Name: CELESTIAL
Sonar System: R2 Sonic 2024 (Multibeam Sonar)
Sounding Frequency: 300 kHz
Survey Method: RTK GPS Tides
GPS_System: Trimble SPS 855 (RTK)
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Software Used: Hypack
Sounding Sort Distance: 20'
Field Books: R&H 4286
Survey No.: MA_11_SAL_20210902_CS_036
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US Army Corps of Engineers
District: CENAE

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U.S. ARMY CORPS OF ENGINEERS
NEW ENGLAND DISTRICT

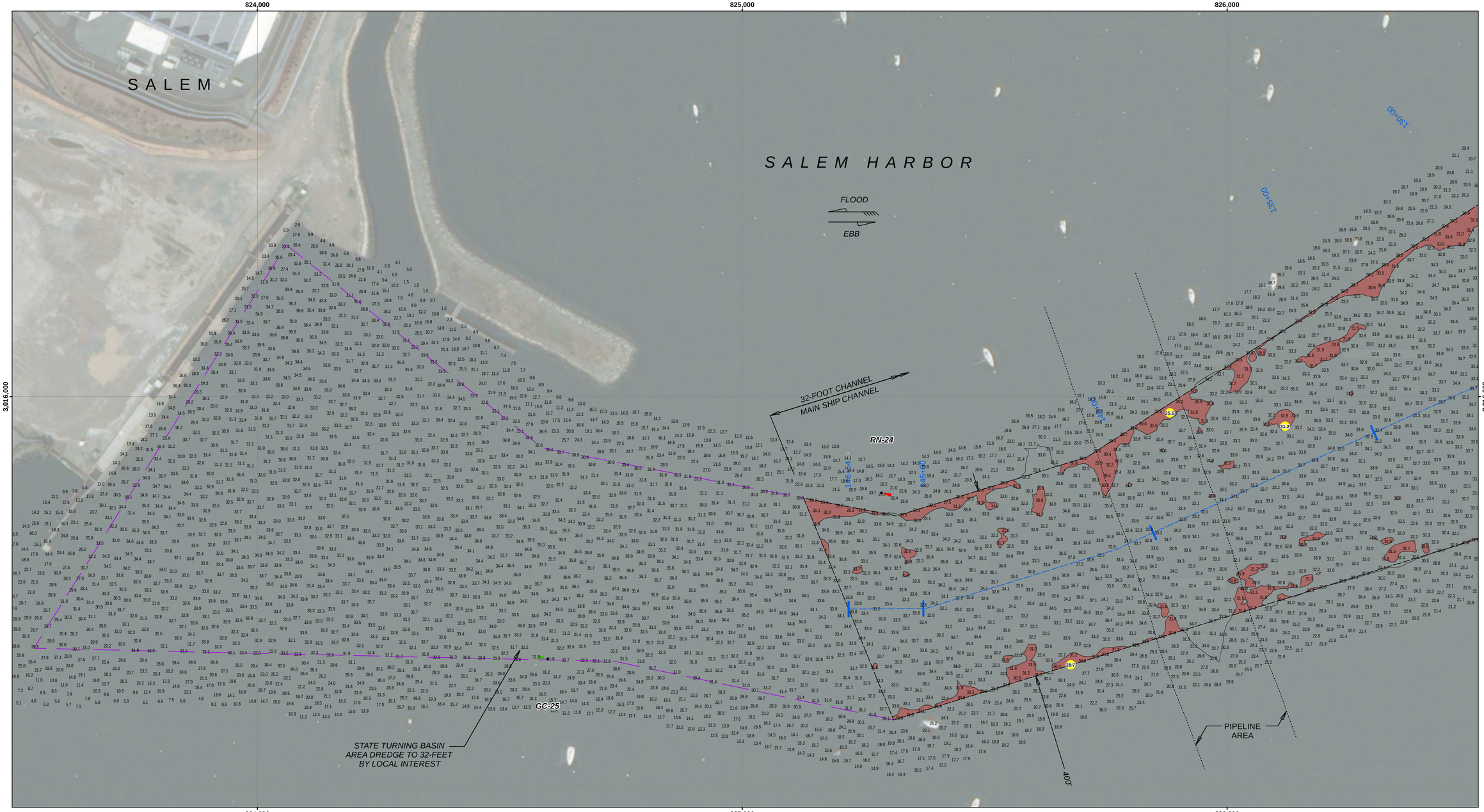
SURVEYED BY: MJV
CHECKED BY: ZSM
ISSUE DATE: 9/14/2021
SUBMITTED BY: Zachary McAvoy
APPROVED BY: NAE Survey
MAP DOCUMENT: MA_11_SAL_20210902_CS_036
SIZE: ANSI D

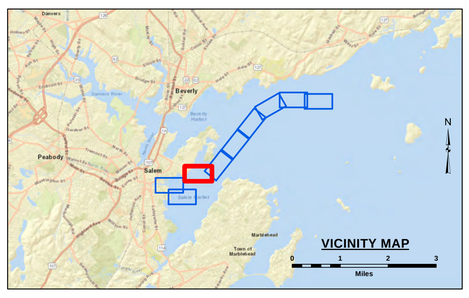
SALEM HARBOR
SALEM, BEVERLY AND MARBLEHEAD, MASSACHUSETTS
CONDITION SURVEY
32, 10, 8 AND 6-FOOT CHANNELS, 8-FOOT CHANNEL AND TURNING BASIN
File Name: MA_11_SAL_20210902_CS_036

SHEET IDENTIFICATION
Salem Harbor

Sheet 6 of 9

Revison Number: 4.2-20200420





VICINITY MAP

LEGEND

- Federal Navigation Channel
- Cable or Pipe Areas
- Channel Center Line
- Non-USACE Maintained
- Contour Line
- Obstruction Point
- Fixed Navigation Aids
- Red Navigation Buoy
- Green Navigation Buoy
- Shoaling Area
- Shoalest Sounding**

** Shoalest Sounding per Quarter per Reach

GRAPHIC SCALE

1" = 100' 100 0 100 200 Feet

N W E S

Notes:

Horizontal Datum: Mass Mainland, MA-2001 NAD 83
Distance Units: Distance_Units
Vertical Datum: MLLW
Depth Units: U.S. Survey Feet
Vessel Name: CELESTIAL
Sonar System: R2 Sonic 2024 (Multibeam Sonar)
Sounding Frequency: 300 kHz
Survey Method: RTK GPS Tides
GPS_System: Trimble SPS 855 (RTK)
RTK Base Station: MTS Smartnet Imax
Software Used: Hypack
Sounding Sort Distance: 20'
Field Books: R&H 4286
Survey No.: MA_11_SAL_20210902_CS_036
Reference NOAA Chart No.: 13276

The information depicted on these charts represents the results of surveys made on the dates indicated, and can only be considered as indicating the conditions existing at that time.

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Project Remarks

Approach and additional coverage beyond navigation project limits surveyed.

Water Level Information

Tides were recorded using RTK GPS.The MLLW to NAVD88 corrections for this project range from 5.13 feet to 5.16 feet. These corrections are referenced from NOAA's V-Datum Model Version 4.1, ME/NH/MA region Version 2.3, in the vicinity of Salem Harbor, Salem, Massachusetts. NAVD88 is above MLLW; therefore the correction should be added to NAVD88 to convert to MLLW. No tide gauges were used on this project.

US Army Corps of Engineers
District: CENAE

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U.S. ARMY CORPS OF ENGINEERS
NEW ENGLAND DISTRICT

SUBMITTED BY: Zachary McAvoy
APPROVED BY: NAE Survey
SURVEYED BY: MJV
CHECKED BY: ZSM
ISSUE DATE: 9/14/2021
SIZE: ANSI D
MAP DOCUMENT: MA_11_SAL_20210902_CS_036

SALEM HARBOR
SALEM, BEVERLY AND MARBLEHEAD, MASSACHUSETTS
CONDITION SURVEY

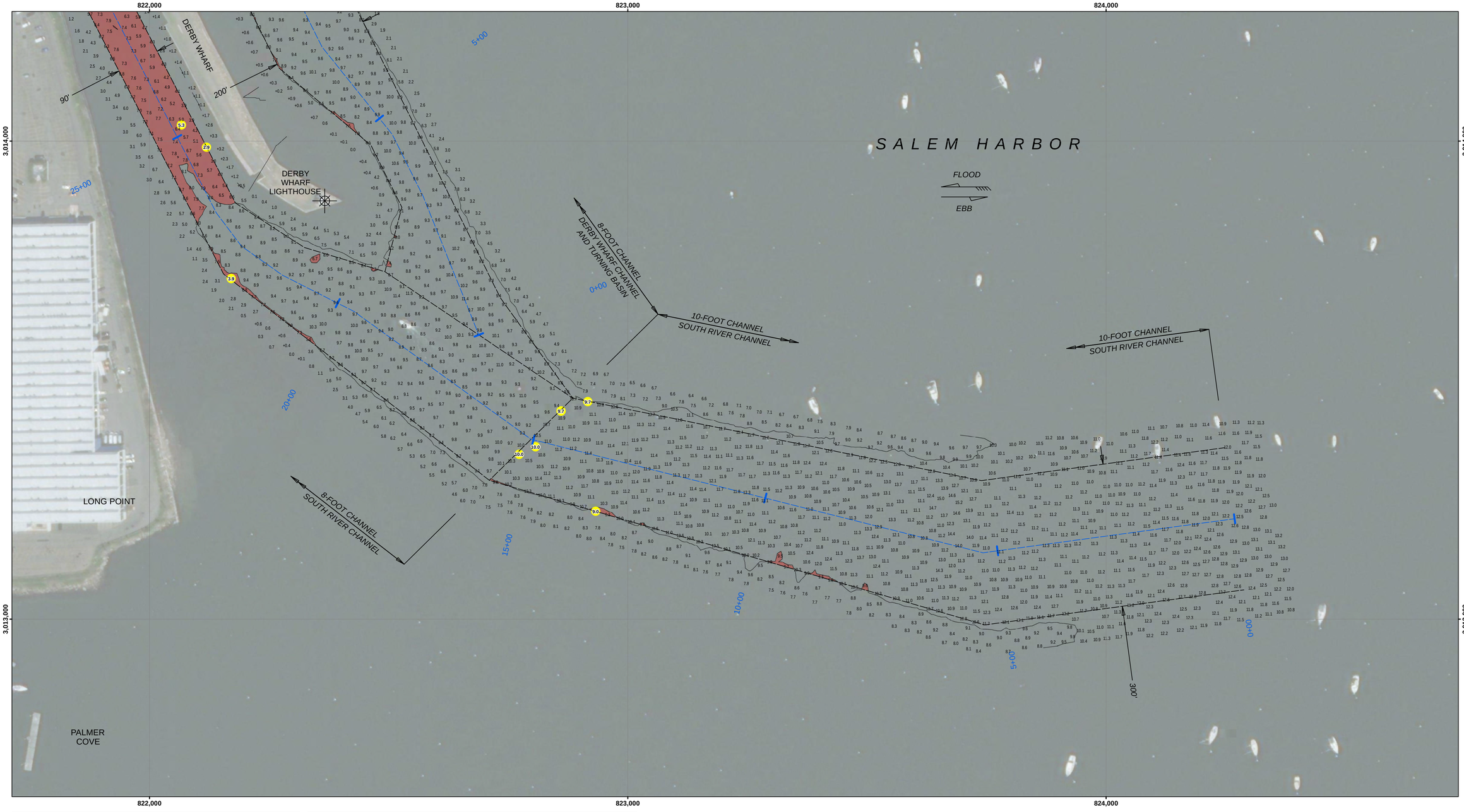
32, 10, 8 AND 6-FOOT CHANNELS, 8-FOOT CHANNEL AND TURNING BASIN

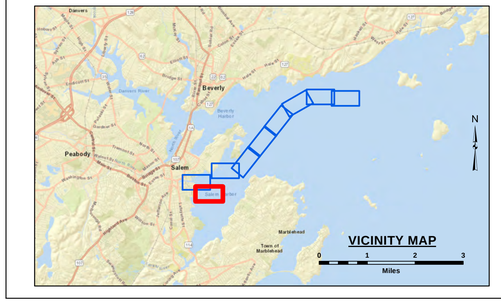
File Name: MA_11_SAL_20210902_CS_036

SHEET IDENTIFICATION
Salem Harbor

Sheet 7 of 9

Revison Number: 4.2-20200420





LEGEND

- Federal Navigation Channel
- Cable or Pipe Areas
- Channel Center Line
- Non-USACE Maintained
- Contour Line
- Obstruction Point
- Fixed Navigation Aids
- Red Navigation Buoy
- Green Navigation Buoy
- Shoaling Area
- Shoalest Sounding**

** Shoalest Sounding per Quarter per Reach

GRAPHIC SCALE

1" = 100'

100 0 100 200 Feet

N W E S

Notes:

Horizontal Datum: Mass Mainland, MA-2001 NAD 83
Distance Units: Distance_Units
Vertical Datum: MLLW
Depth Units: U.S. Survey Feet
Vessel Name: CELESTIAL
Sonar System: R2 Sonic 2024 (Multibeam Sonar)
Sounding Frequency: 300 kHz
Survey Method: RTK GPS Tides
GPS_System: Trimble SPS 855 (RTK)
RTK Base Station: MTS Smartnet Imax
Software Used: Hypack
Sounding Sort Distance: 20'
Field Books: R&H 4286
Survey No.: MA_11_SAL_20210902_CS_036
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US Army Corps of Engineers
District: CENAE

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U.S. ARMY CORPS OF ENGINEERS
NEW ENGLAND DISTRICT

SUBMITTED BY: Zachary McAvoy
APPROVED BY: NAE Survey

SURVEYED BY: MJV
CHECKED BY: ZSM
ISSUE DATE: 9/14/2021

SIZE: ANSI D

MAP DOCUMENT: MA_11_SAL_20210902_CS_036

SALEM HARBOR
SALEM, BEVERLY AND MARBLEHEAD, MASSACHUSETTS
CONDITION SURVEY
32, 10, 8 AND 6-FOOT CHANNELS, 8-FOOT CHANNEL AND TURNING BASIN

File Name: MA_11_SAL_20210902_CS_036

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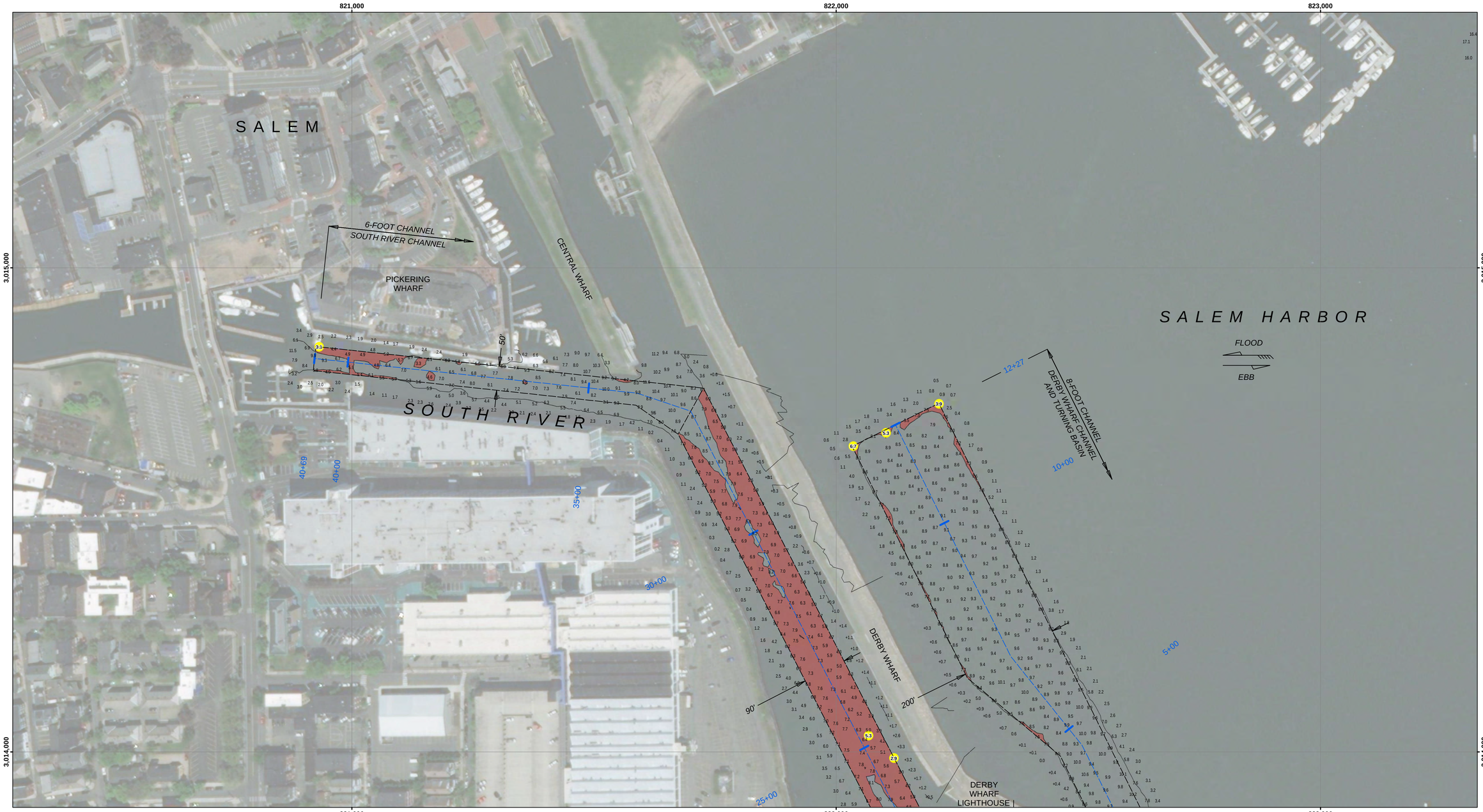
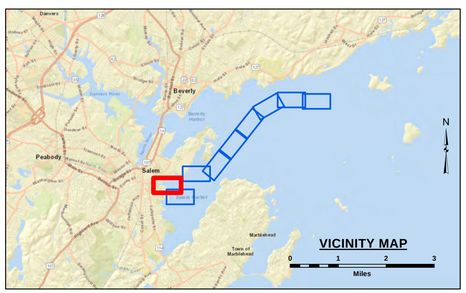
Revison Number: 4.2-20200420





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