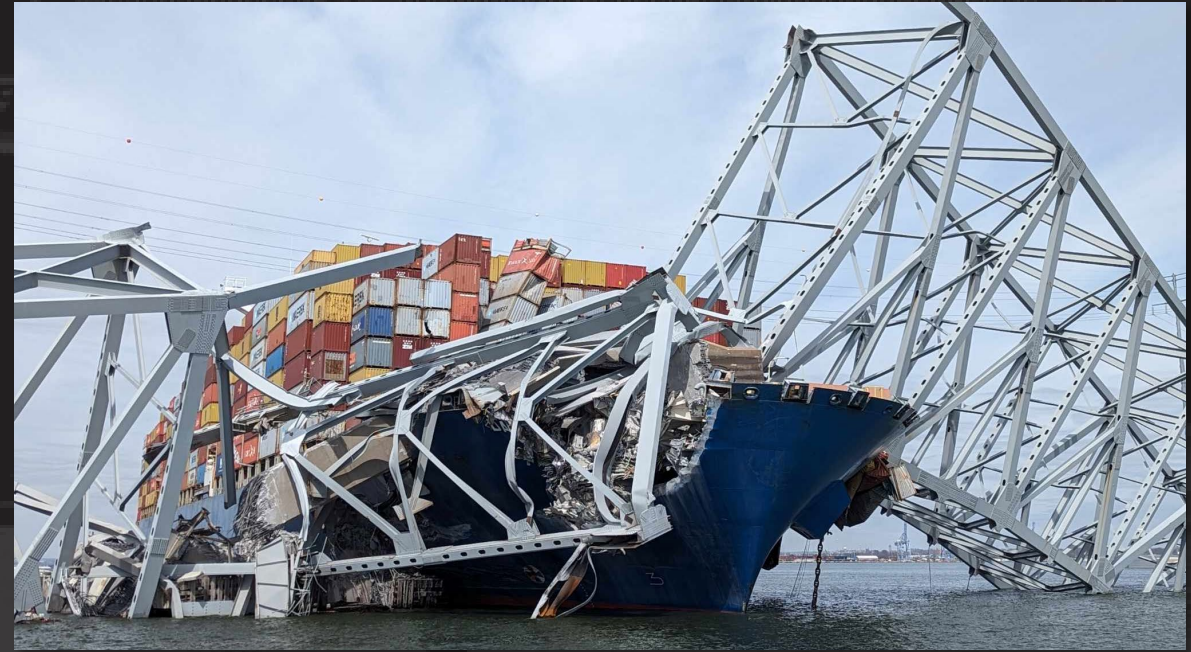


# FRANCIS SCOTT KEY BRIDGE COLLAPSE

Presented by  
Amy M. Guise  
Chief, Planning Division



US Army Corps  
of Engineers®

U.S. ARMY



U.S. ARMY

**26 MARCH 2024**



**“This is an ALERT Message.**

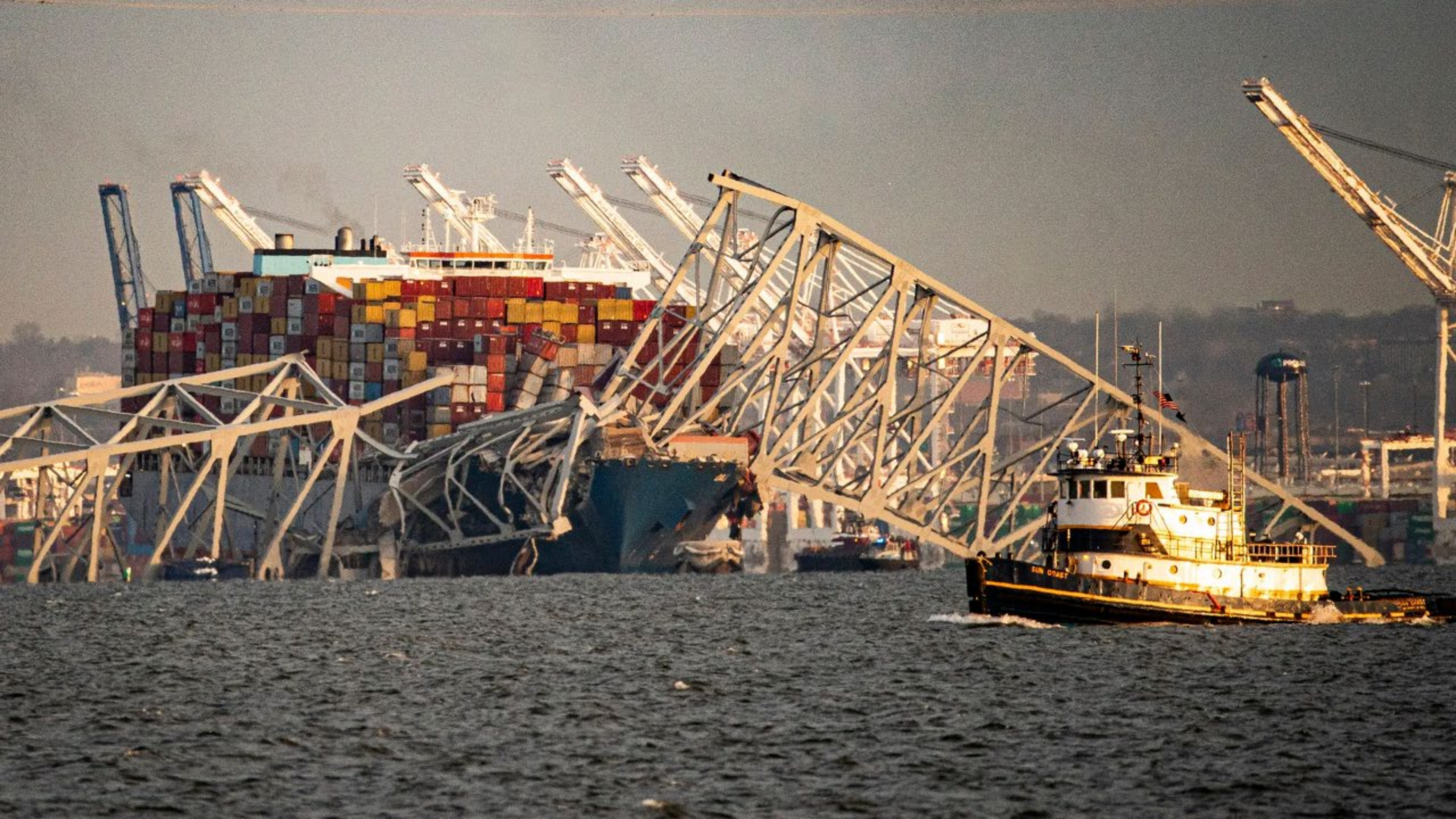
**In response to the incident that occurred at the Key Bridge this morning, the Baltimore District Emergency Operations Center is activated.”**

Baltimore County State of Emergency.

**The Port of Baltimore is closed.**

USACE vessels are supporting recovery efforts, as directed by the USCG.

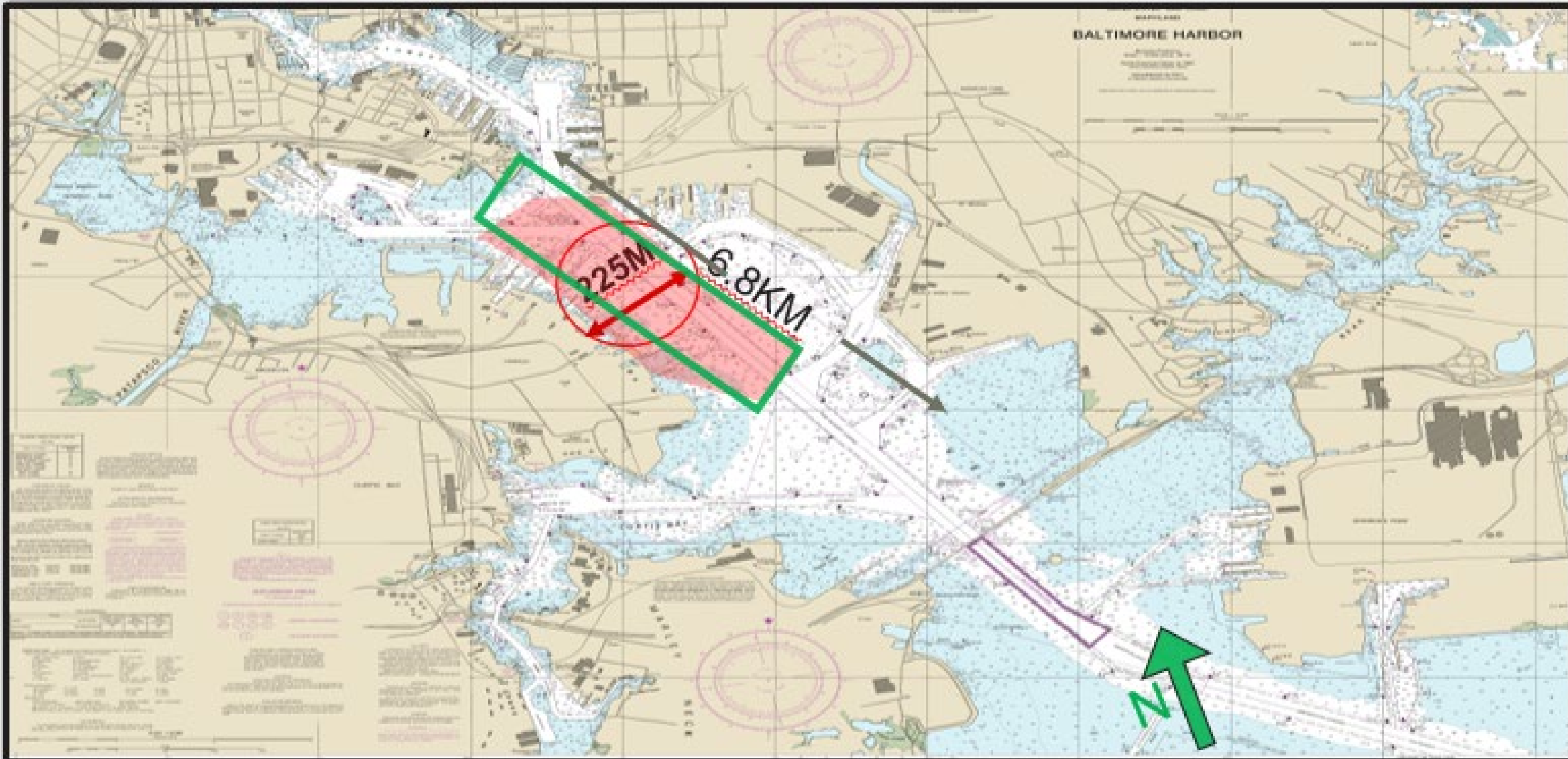
Technical assistance is being provided to the USCG and Unified Command Center.





# INITIAL HOURS

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## Site Overview

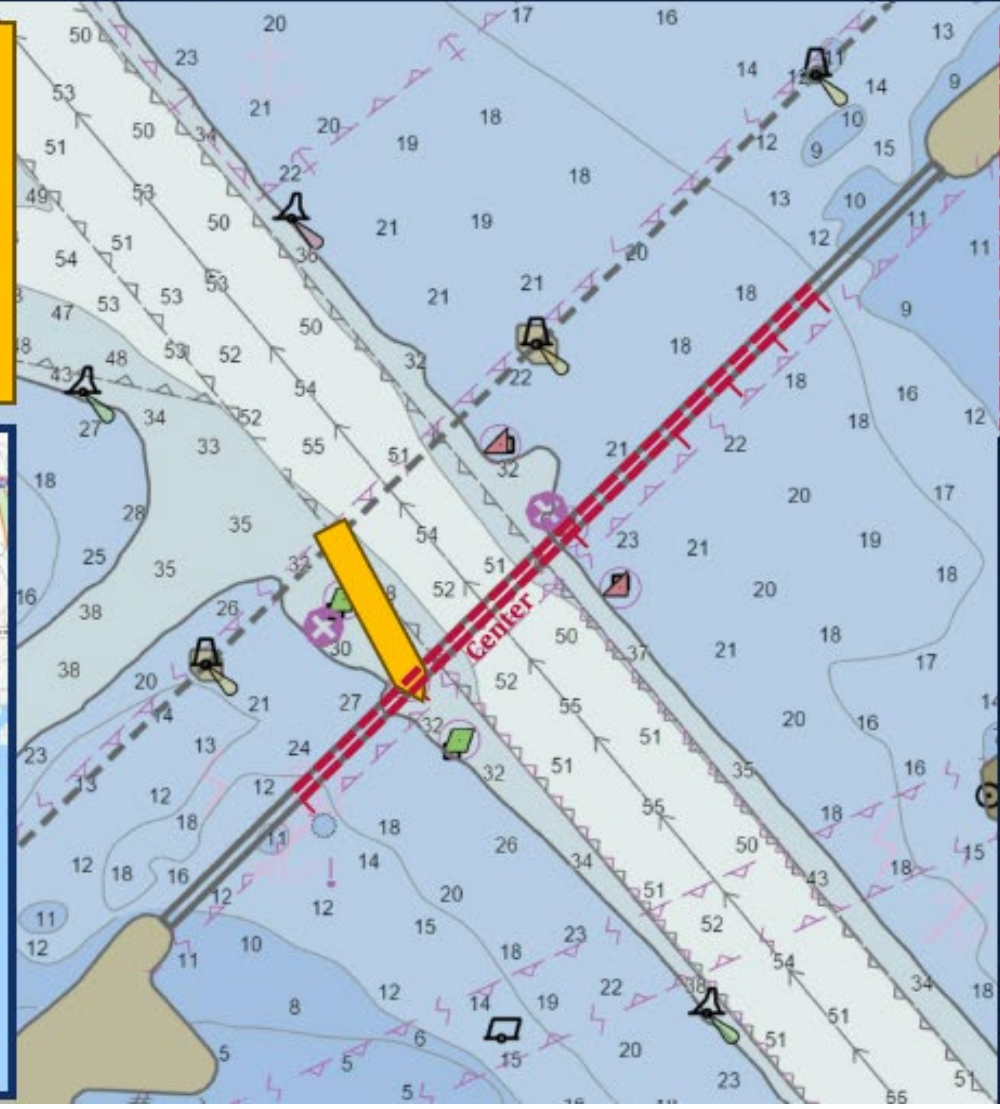
### M/V DALI

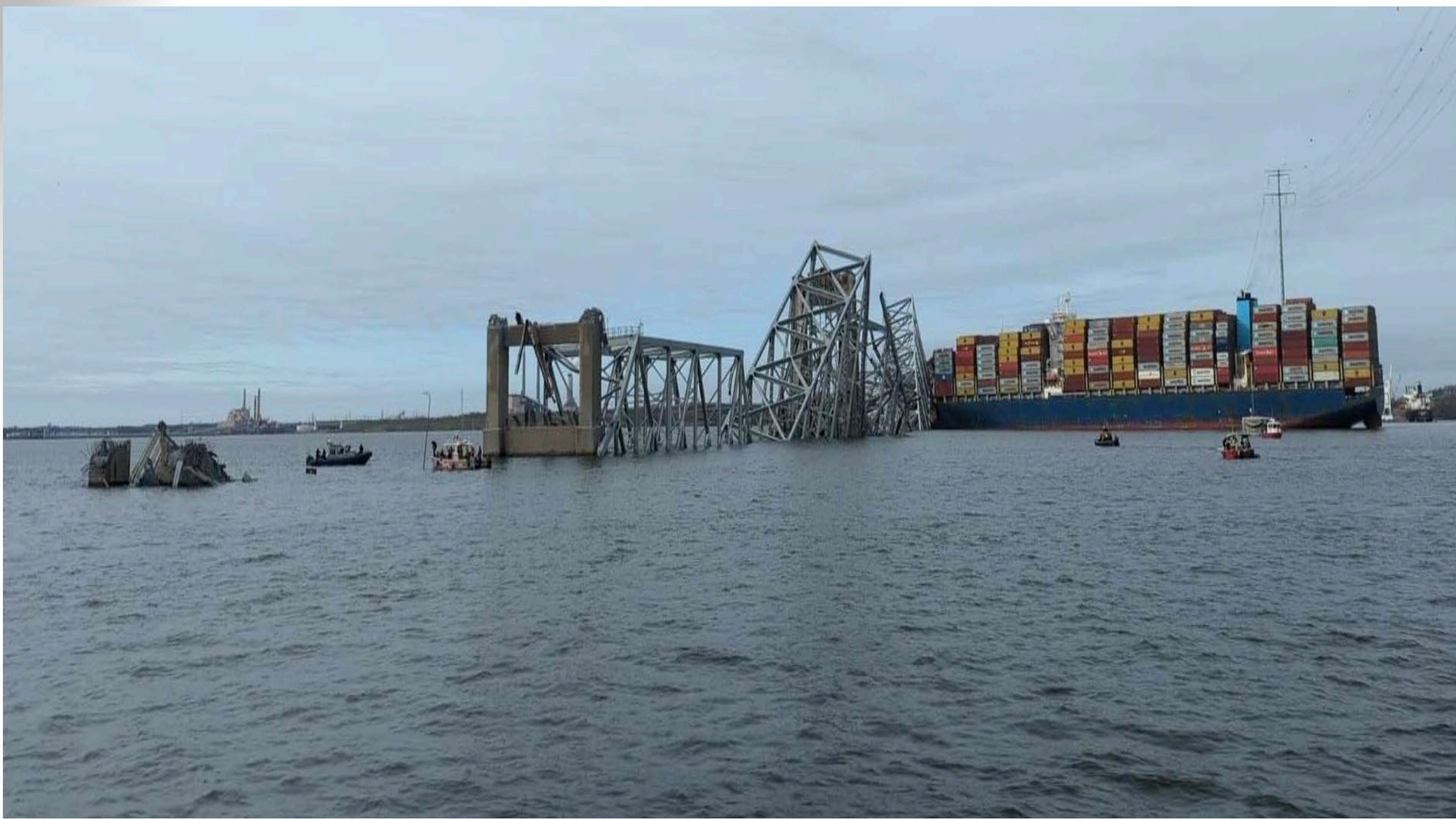
- 3000ft of containment boom deployed around the vessel
- 4,679 containers onboard
  - 14 of the 56 HAZMAT containers were crushed
- Vessel bow is aground and port anchor is underfoot, 3 additional anchors installed
- 21 Crew On Board
  - 20 India
  - 1 Sri Lanka

### Francis Scott Key Bridge

- M/V DALI allided with the southwest main truss pier, destroying it
- Center span is collapsed and on M/V DALI, navigable channel is blocked
- One span south of the center span also collapsed
- Four spans north of the center span also collapsed
- MDTA is assessing structural integrity of the remaining spans
- Four members of bridge repair crew remain unaccounted for

### Hazardous Vehicle Cargo routed via I-695 west of Baltimore







U.S. ARMY

# COL PINCHASIN UPDATE TO BG LLOYD



26 March 2026, 4:43pm

“Maryland Transportation Authority Police hand off to the Coast Guard when search and rescue operations conclude.

Search and Rescue Operations are planned for the next 24-36 hours with sonar and remote operation/underwater vehicles to assess the safety and hazards under and around the bridge.

Priority remains recovery operations, while trying to determine the structural integrity of the damaged structure as it sits in the water comingled with the vessel.”

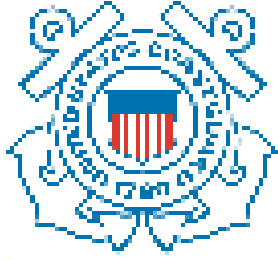


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# UNIFIED COMMAND



US Army Corps of Engineers



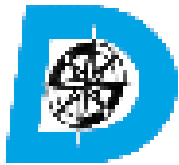
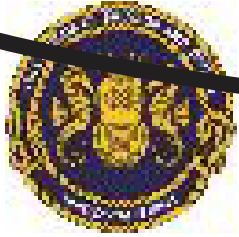
Maryland  
Department of the Environment



Maryland  
Transportation  
Authority

WITT O'BRIEN'S

ambipar<sup>®</sup>  
response



DONJON MARINE CO., INC







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# USACE VESSELS





U.S. ARMY

# COL PINCHASIN UPDATE TO BG LLOYD

10



28 March 2026, 12:36am

“Dive teams recovered one pick-up truck with two passengers. Four people remain unaccounted for. 1x additional vehicle was cleared containing 0x passengers.

The transition to salvage operations includes extensive survey, assessment and engineering evaluations to inform salvage plans for the channel, the vessel and areas outside the channel.

NAB Engineering and Operations representatives are integrating into Unified Command planning for channel clearance and potential navigation options.

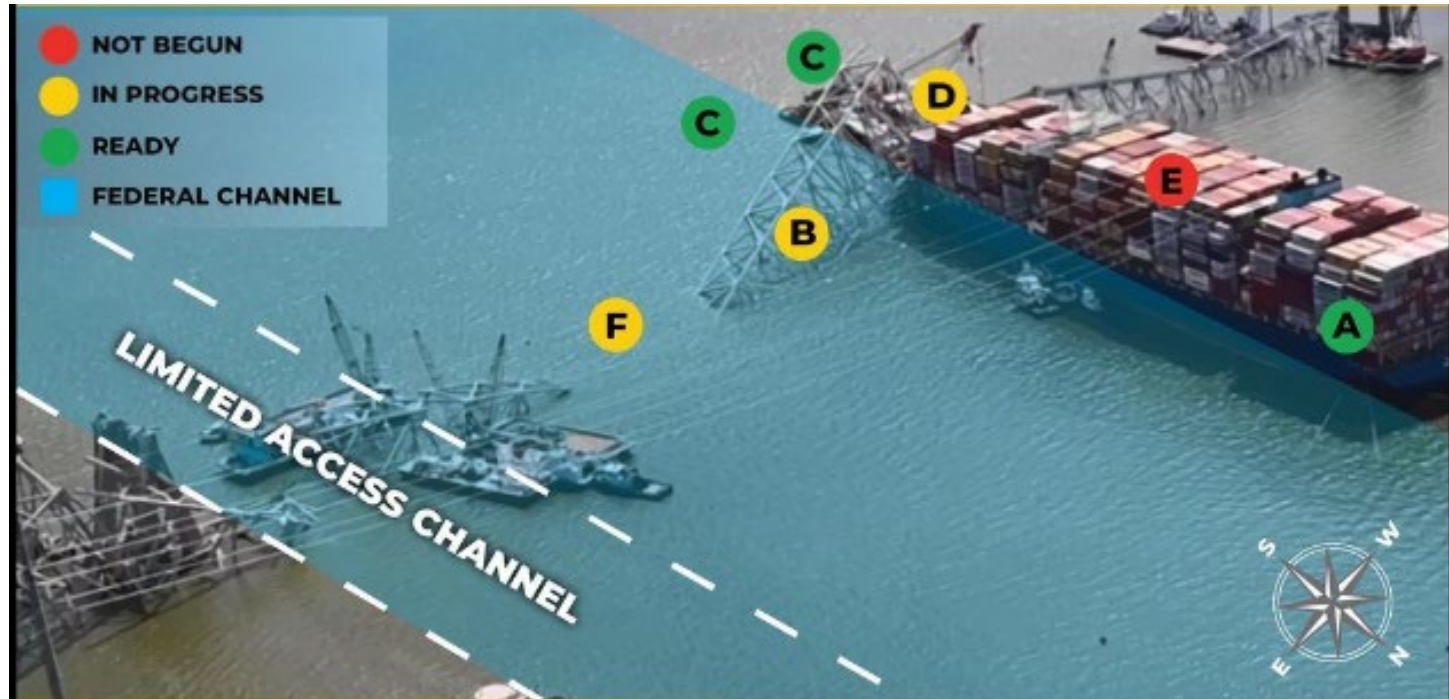
Preliminary survey data of existing utility lines indicate that they are trenched 10’ below the vessel (most likely on either side of the channel) and 50’ beneath the main channel.

Additional survey data is forthcoming to confirm exact locations and depths. This limits the options for alternate navigation channels bypassing the main channel.”



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# UNIFIED COMMAND



## PRIORITIES

### CLEAR FEDERAL CHANNEL

- Establish limited access channel
- Establish wreckage consolidation point
- Position cranes to remove bridge span from DALI
- Clear wreckage from DALI
- Remove wreckage from Federal Channel

### REFLOAT & REMOVE M/V DALI

- Assess cargo and remove containers as necessary
- Stage assets for repositioning of M/V DALI
- Refloat and move M/V DALI from hard grounding

### CLEAR REMAINING WRECKAGE

- Systematically clear wreckage from outside of the federal channel
- Facilitated under the direction of Maryland Department of Emergency Services

## OBJECTIVES

- A** Stabilize M/V DALI to prevent pivoting.
- B** Analyze internal bridge truss structure.
- C** Position 1000-ton and 500-ton floating cranes.
- D** Remove wreckage from M/V DALI.
- E** Refloat M/V DALI away from wreckage.
- F** Disassemble and remove bridge.

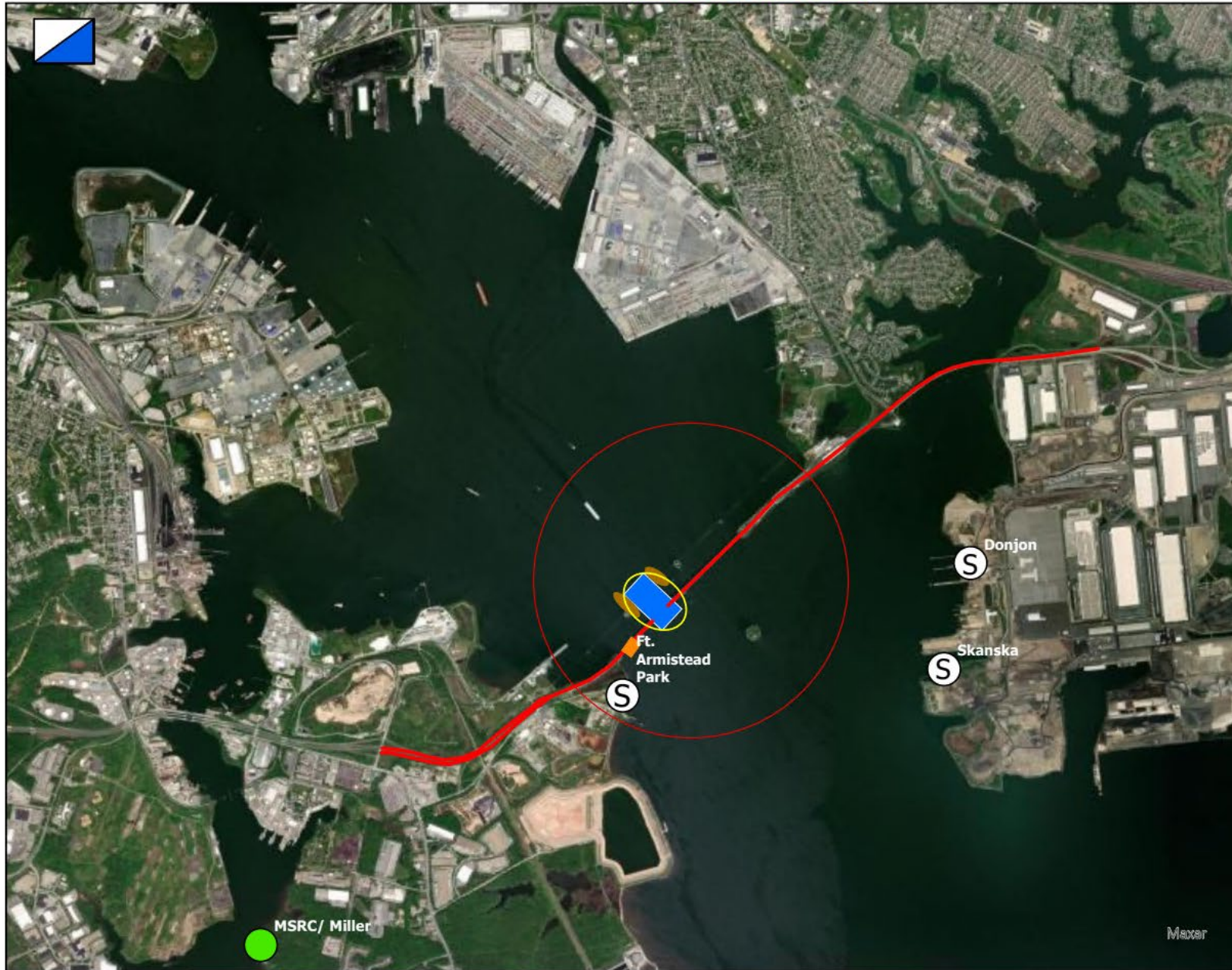


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








UNCLASSIFIED



# KEY BRIDGE RESPONSE 2024



## LEGEND

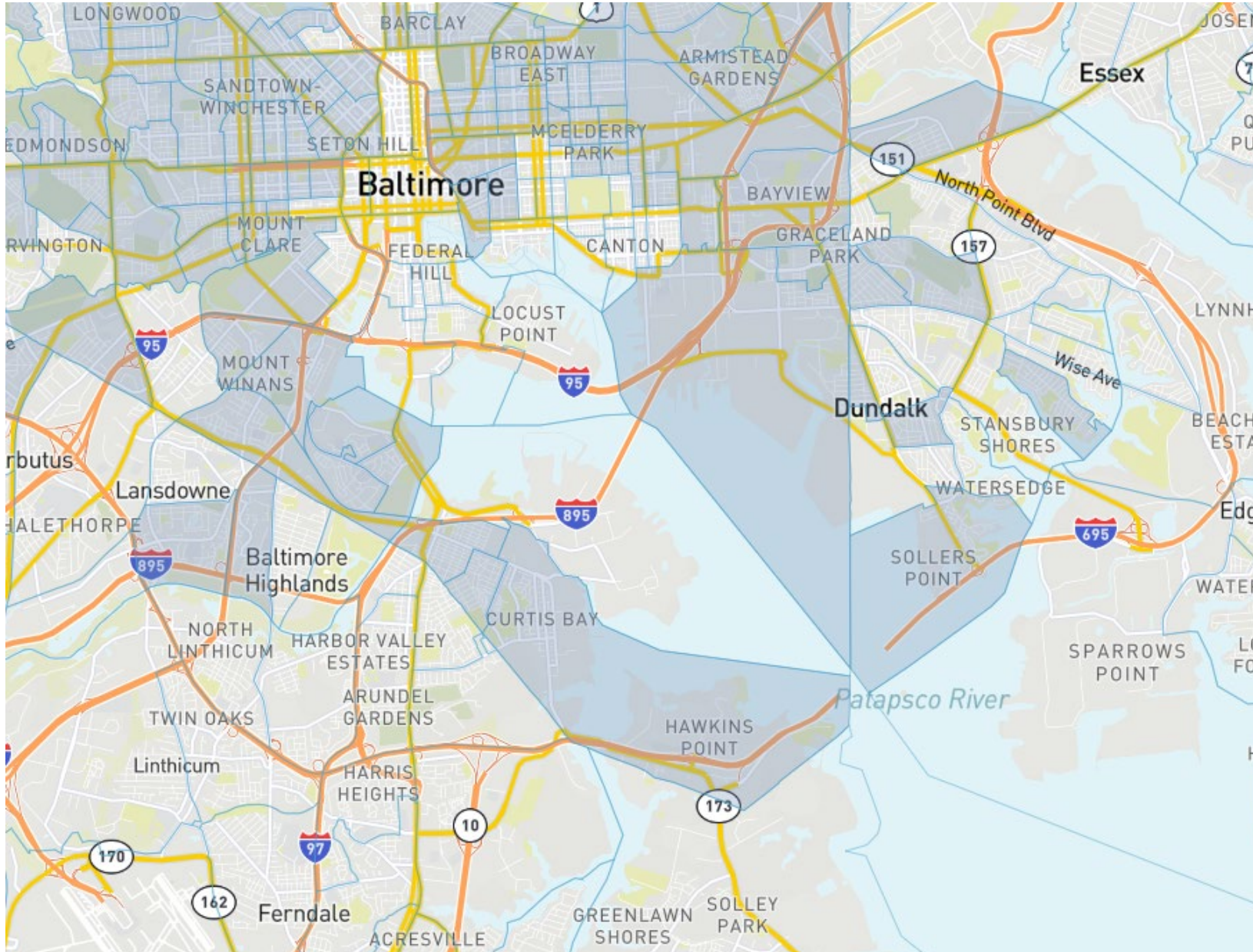
-  DALI
-  SAFETY ZONE
-  SHEEN
-  BOOM
-  STAGING AREA
-  DEPLOYMENT SITE
-  ICP
-  ROAD CLOSURE
-  SUBMERGED BEAM





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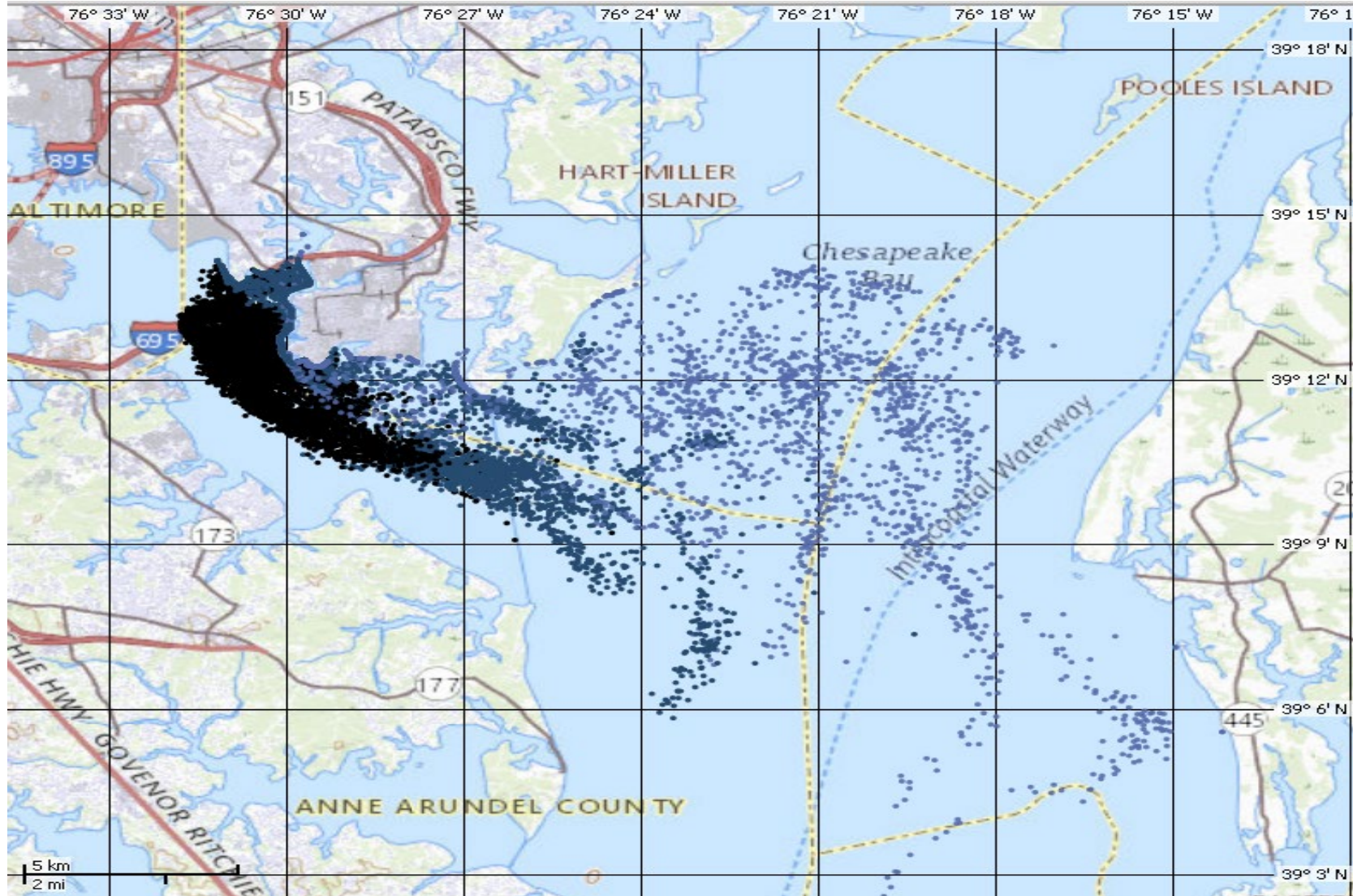
# CLIMATE & ECONOMIC JUSTICE TOOL (CEJST)





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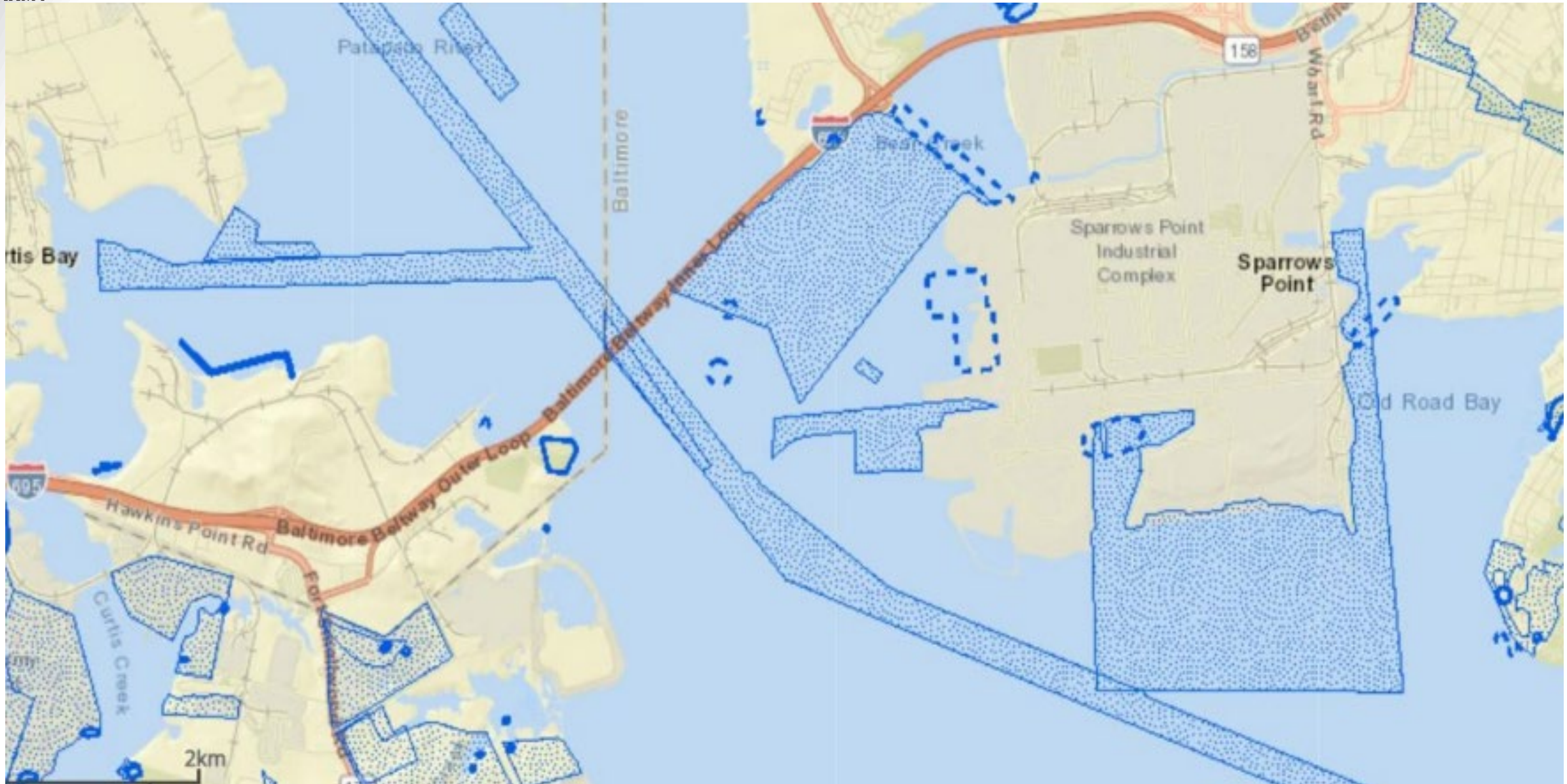
# NOAA POTENTIAL CONTAMINANT FLOW: **DID NOT OCCUR**





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# CULTURAL RESOURCE SURVEYS









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# DEVELOPING A PLAN



D+29 Response+30 Zulu: 11:59 PM Wed Local: 07:59 PM Wed Baltimore: 07:59 PM Wed



## Francis Scott Key Bridge

Storyboard

Priorities

Weather

JIC

Map

Dive Ops

Photos

Battle Rhythm

3D

sUAS

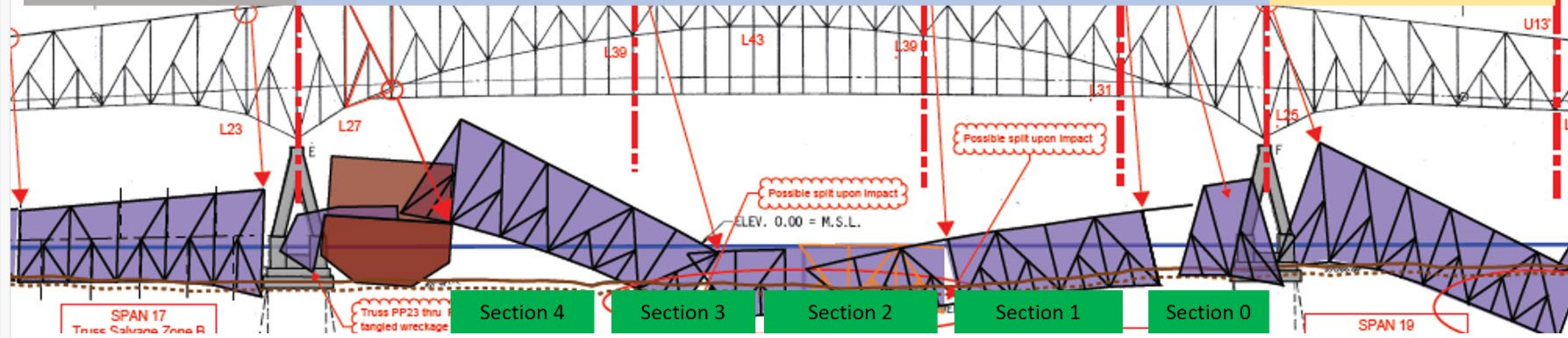
RFI

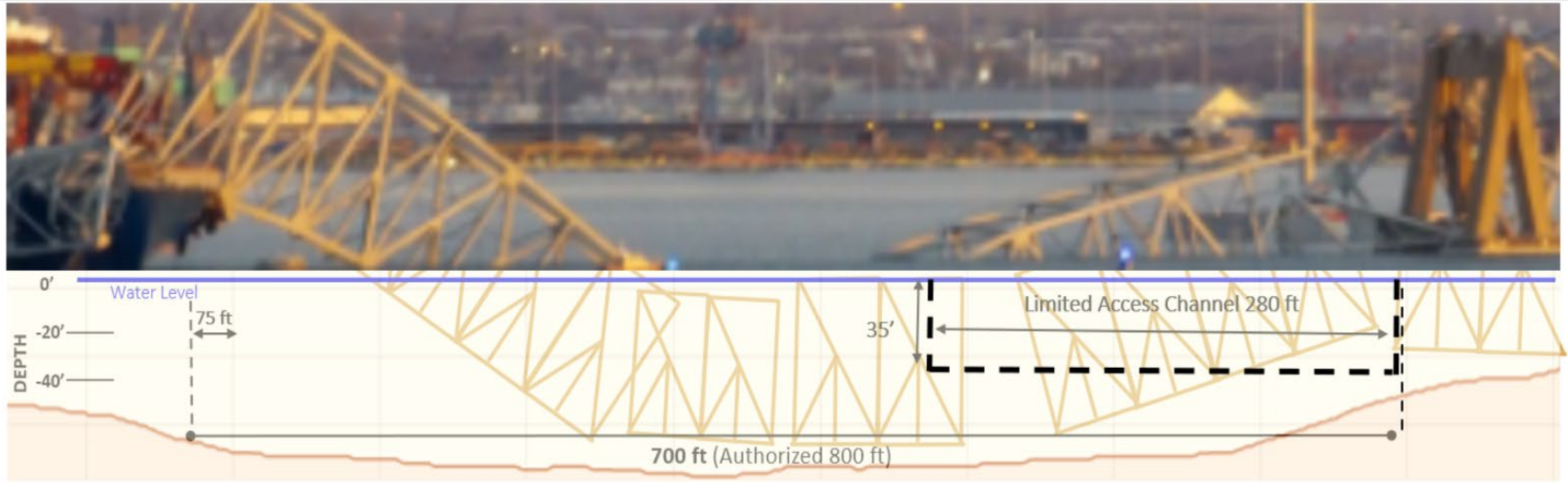


SPAN 17

SPAN 18

SPAN 19





Not Started
Plan / Assess
In-Progress / On-Schedule
Behind Schedule
Significantly Behind / Not Resourced / At Risk

## Vessel Refloating



## Channel Wreckage Clearance



Milestone	Restored Ca...	ECD
35' Limited ...	41%	30 April
50' Full Acc...	100%	31 May

Milestone	ECD	Progress
Clear Bow Obstructions	27 April	17%
Acquire, Rig, and Cut Section 4	01 May	11%
Cut Span 17	10 May	2%
Prepare to Refloat	13 May	13%
Retract M/V DALI	26 May	0%

Milestone	ECD	Progress
Rig, Cut & Clear Section 1	19 April	16%
Mobilize 1000 MT Grab	14 April	23%
Clear Section 2 & 3	01 May	0%
Rig Clear Section 4	29 May	0%



Francis Scott Key Bridge  
Response

## Executive Summary

30 March 24  
As of 1500

MILESTONES



OPERATIONS

**TODAY** M1 M2 M5

- Deploy Anchors for Ship Stability (Remaining 3).
- Initiate Process to Secure Underwater Gas Pipeline.
- First Wreckage Lift Ops (Span 19).
- Continue Dive Ops to Assess Structural Integrity.
  - Inspection span 19 & 17.
- Continue Waterways Assessment to Restore Navigation (Main and Auxiliary Channels).

**TOMORROW** M1 M2 M5

- Continue Lift Ops (Span 19).
- Test Auxiliary Channel (Shallow Draft).
- Review Initial Salvage Plans for Main Channel Restoration.
- Continue Dive Ops to Assess Structural Integrity.
  - Inspection span 19 & 17





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# SALVAGE PRIORITIES

1. Channel Clearance (**SUPSALV/Donjon**)
2. Vessel Refloating (**Resolve**)
3. Wreckage Removal (**MDTA/Skanska**)

**SUPSALV** Overall Salvage Coordination





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# COL PINCHASIN UPDATE TO BG LLOYD

21



31 March 2026, 10:19pm

“Today’s survey and dive data shows bridge truss damage in the federal channel is far more extensive than initially assessed and will likely make recovery difficult.

3D underwater scan mosaics show that some truss sections are totally pancaked or driven into the mud, with road sections ABOVE the truss sections.

The situation is still very dynamic, but SUPVSALV and its contractor are exploring availability of assets to augment heavy lift capabilities.

Expecting additional surveys and analysis to provide better understanding of wreckage tomorrow.”



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# COL PINCHASIN UPDATE TO BG LLOYD

22



31 March 2026, 10:19pm

“ Last night’s first pick was followed by two cuts and small picks today on Span 19 (north side of main channel) to support opening a shallow draft (~20-25’) alternate channel.

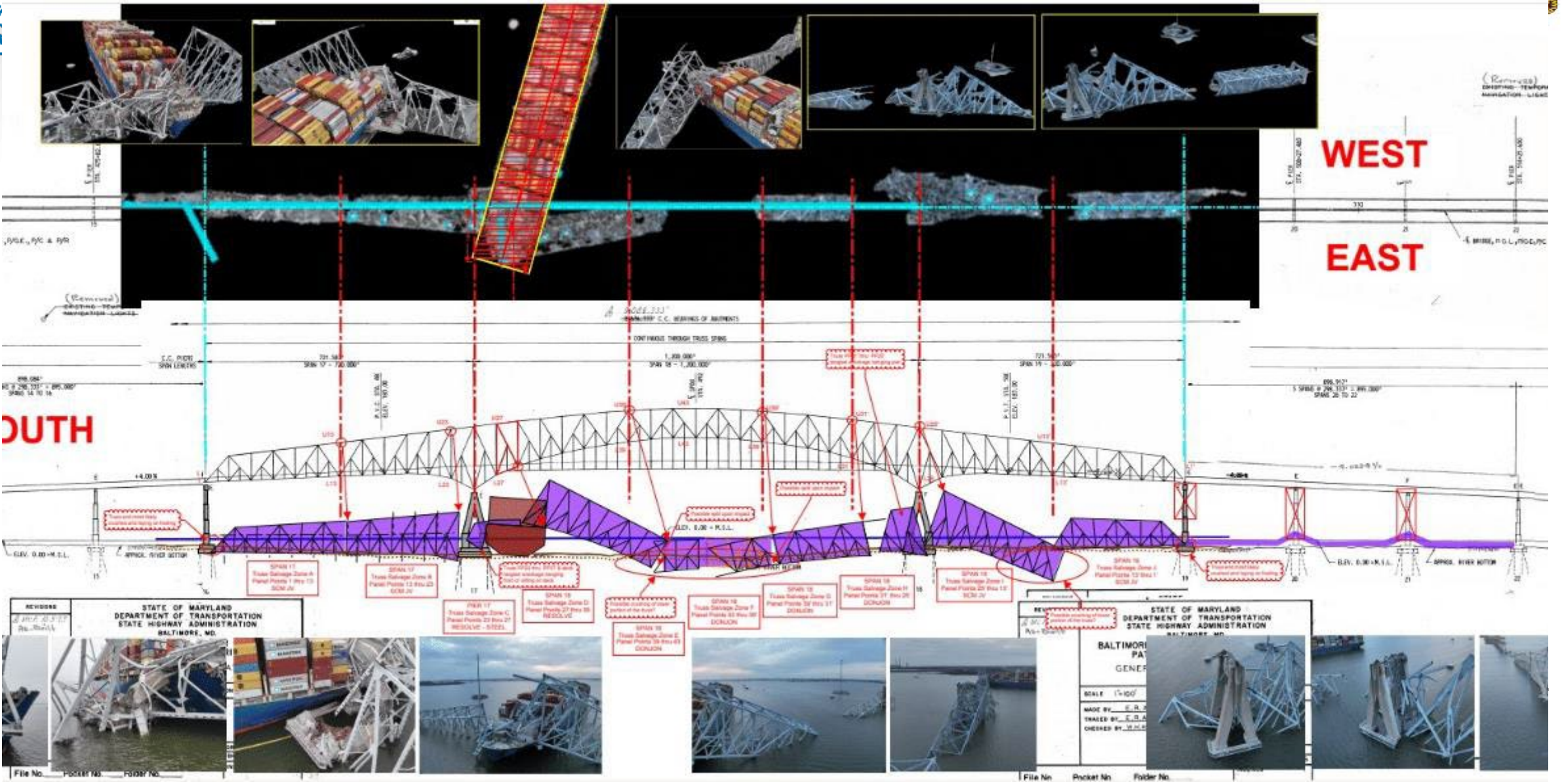
NAB survey partnering with NOAA to estimate potential dredging requirements.

Diving and surveys continue in main channel and adjacent to grounded vessel. Integrated salvage plan development continues,  
informed by high quality 3D side scan sonar surveys and dive operations.

SUPSALV Naval Architect arrives on station tomorrow to support salvage planning.”

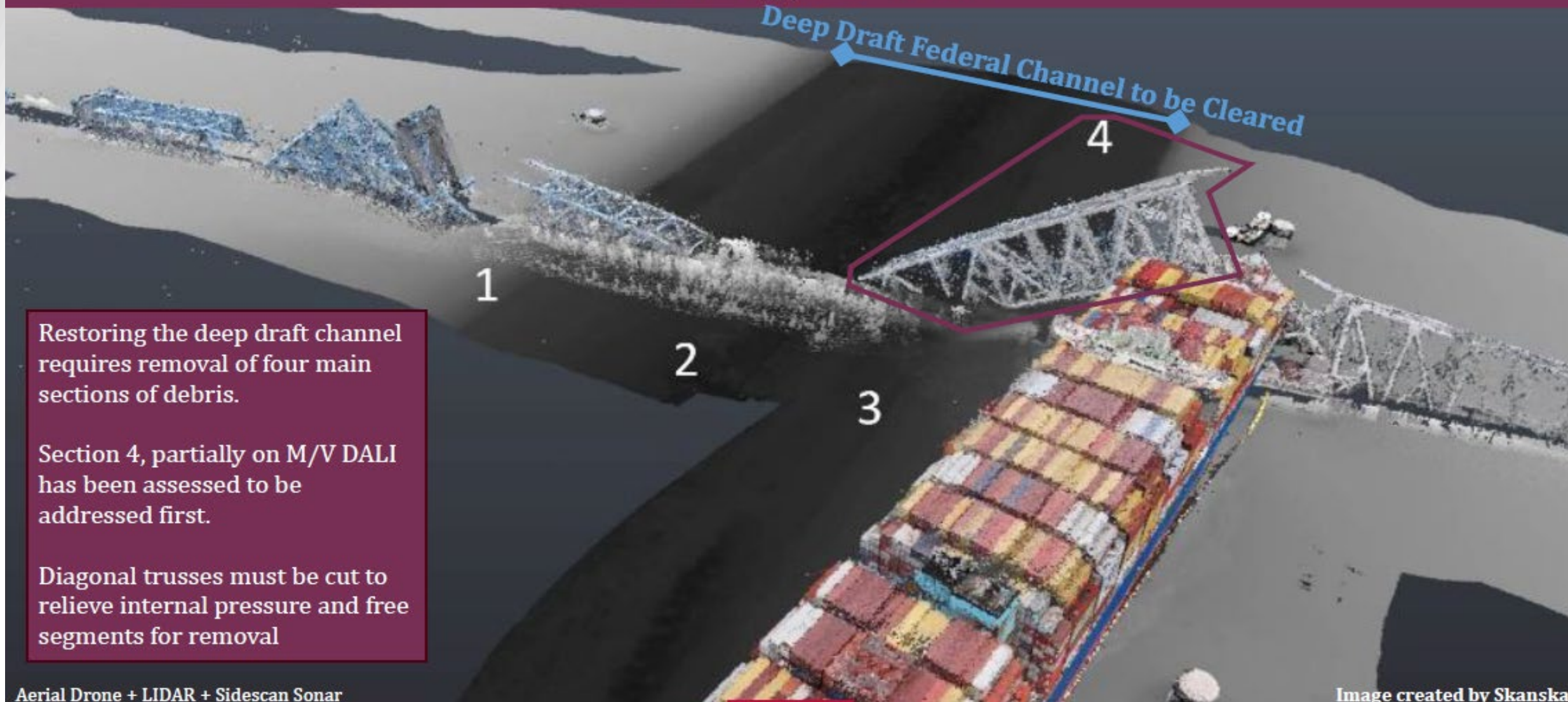


# KEY BRIDGE RESPONSE





## Salvage Plan



Restoring the deep draft channel requires removal of four main sections of debris.

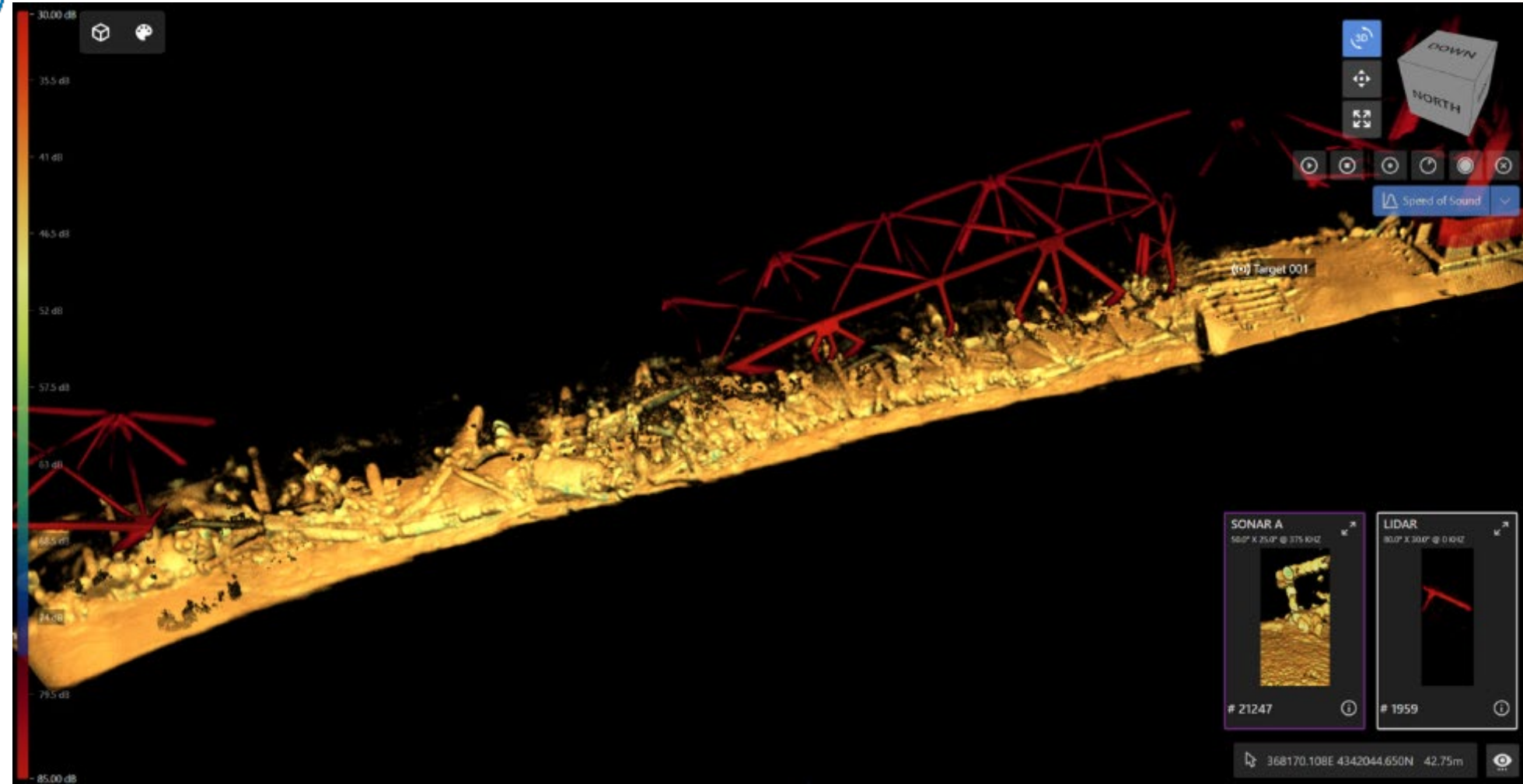
Section 4, partially on M/V DALI has been assessed to be addressed first.

Diagonal trusses must be cut to relieve internal pressure and free segments for removal



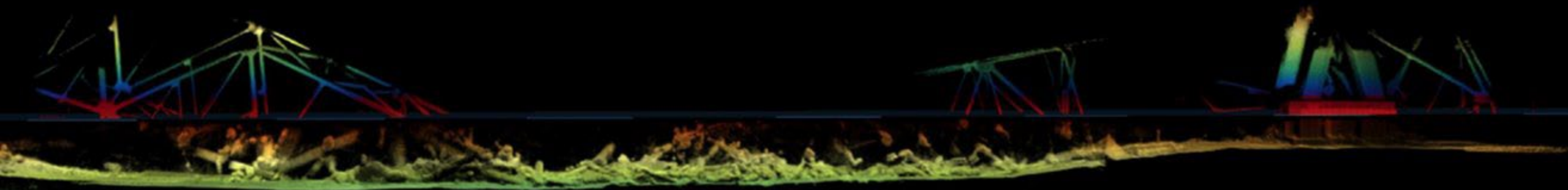


# NAVIGATION CHANNEL



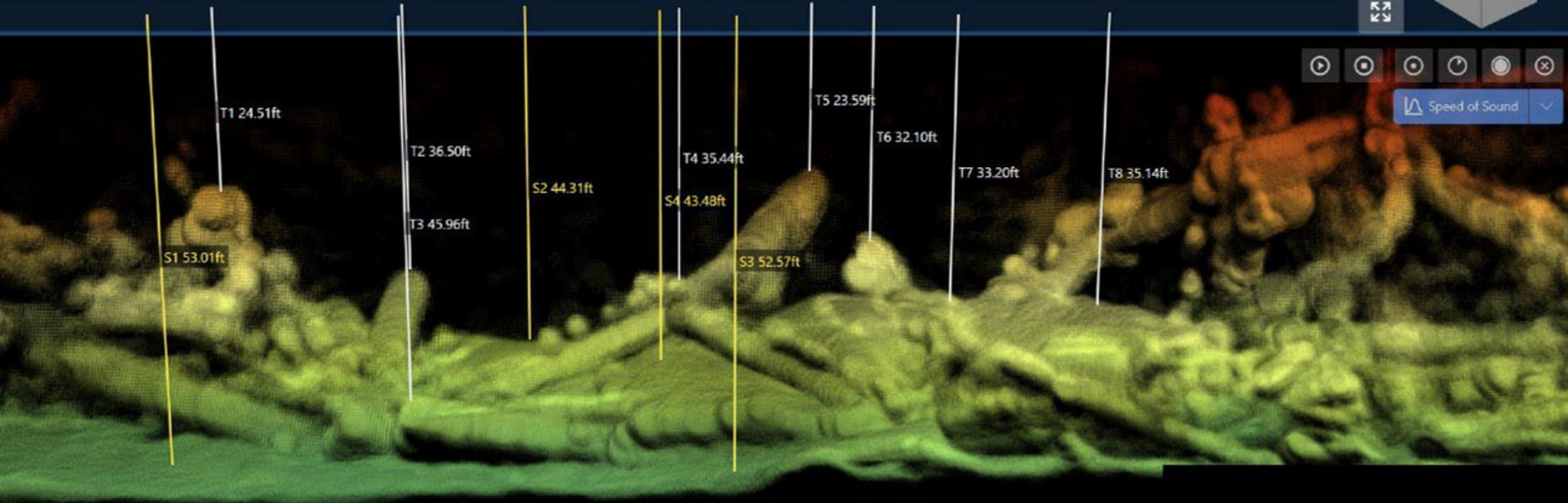
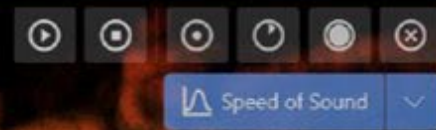


Speed of Sound



  
**Coda Octopus**  
Sound Underwater Intelligence







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# UNDERWATER WORKING CONDITIONS IN BALTIMORE HARBOR



## What divers are overcoming when executing the FSK salvage mission?

Throughout this salvage process and respectful recovery of victims, safety is of the utmost importance as this is dangerous, methodical work. All work is undertaken with care and precision to minimize the risk faced by divers. These dangers include but are not limited to:

- Bridge wreckage, particularly sharpened steel columns, busted concrete and asphalt as well as twisted steel rebar. These hazards can cause impalement and entanglement dangers which can injure divers, cut air hoses and lead to drowning.
- Working at 50 feet below the water surface with limited light, tons of complicated and unstable wreckage. It's like playing underwater games of Twister and Jenga.
- Cold, blackened water with no light and swirling currents of one-knot or higher.
- Dirty, murky water high in turbidity that decreases underwater visibility to less than two feet forward forcing divers to search and work by touch and feel only.

**Extraordinary teamwork between Maryland State Police, Baltimore Police / Fire Department and Phoenix International divers allowed for the safe and respectful recovery of a third FSK Bridge victim 05 April 24.**



Maryland State Police Recovery Diver

### Diver's view



**What the diver sees when working underwater in Baltimore Harbor.**

**What the dive supervisor sees from the diver's camera on the surface.**



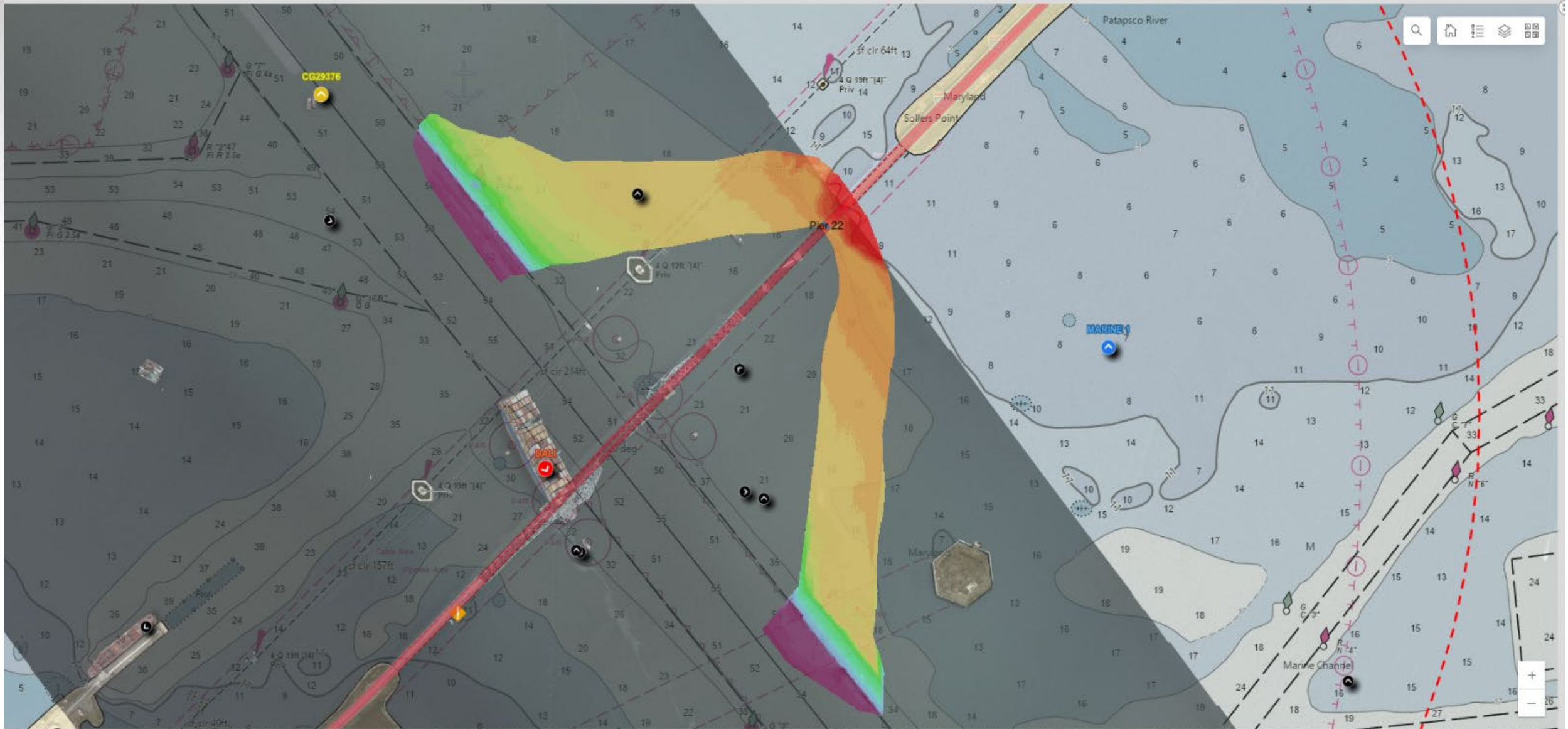
Dive supervisor's view



# SURVEY AND BATHYMETRY



## Key Bridge Response 2024 Common Operating Picture





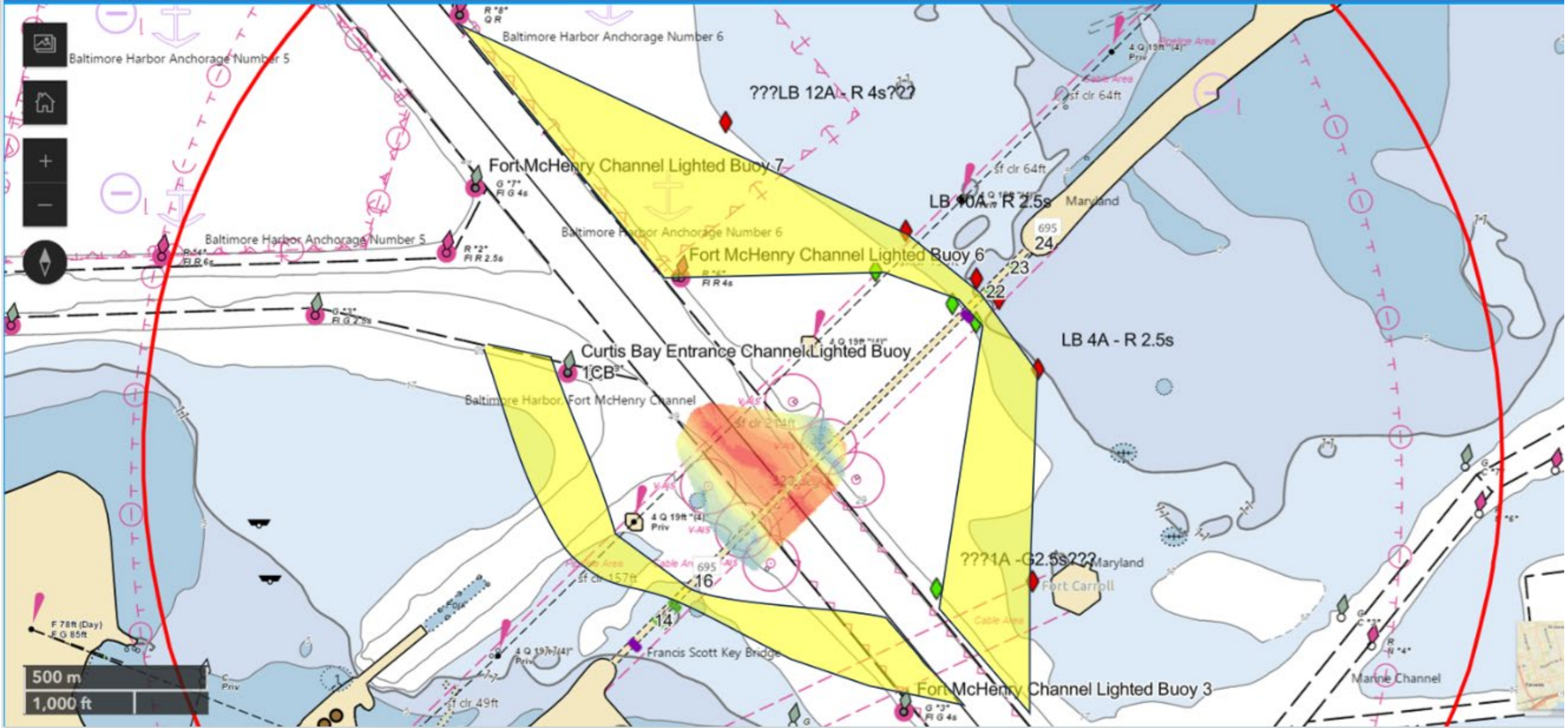
## 2 APRIL 2024 (1 WEEK)

- Temporary 11-foot deep channel open (Sollers Point), 264 foot horizontal clearance and 95 foot vertical clearance
- Temporary 14-foot deep channel open (Hawkins Point), 280 foot horizontal clearance and 124 foot vertical clearance
- Pauses to work due to lightening within 5-10 miles
- Truss cutting
  - Cold cuts (Barge mounted shears, diamond wire, grab dredge)
  - Hot cuts (torch cuts)
  - Precision cuts (small precise cuts using explosives)
- No hot cutting on Span 18, Section 4 sitting on the Dali due to HAZMAT concerns



# SURVEY AND BATHYMETRY

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# CHESAPEAKE 1000







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# TRUSS CUTTING





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# TRUSS CUTTING





## Executive Summary

NOT FOR PUBLIC RELEASE

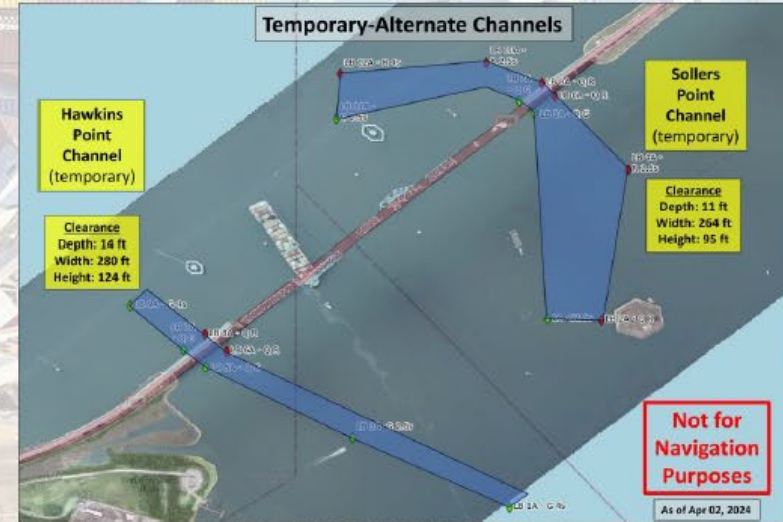
### YESTERDAY'S ACTIONS

M1

M2

M5

- ESTABLISHED additional alternate/south navigational channel, marked by CG aids to navigation teams; limited to 14-foot depth
- CONTINUED dive ops to assess structural integrity and grounding points
- CONTINUED waterways assessment to restore navigation (main and auxiliary channels)
- CONTINUED development of salvage plan
- COORDINATED 5 vessel movements



### YESTERDAY'S KEY ENGAGEMENTS

- Maryland Governor standing brief
- ICP visit from Maryland Governor
- White House Advance Team visited ICP
- Indian Charge d'Affairs/delegation visited M/V DALI

- Media vessel embarkment (ABC National, Baltimore Sun, Fox45 Local)
- Media Interviews (WTOP)



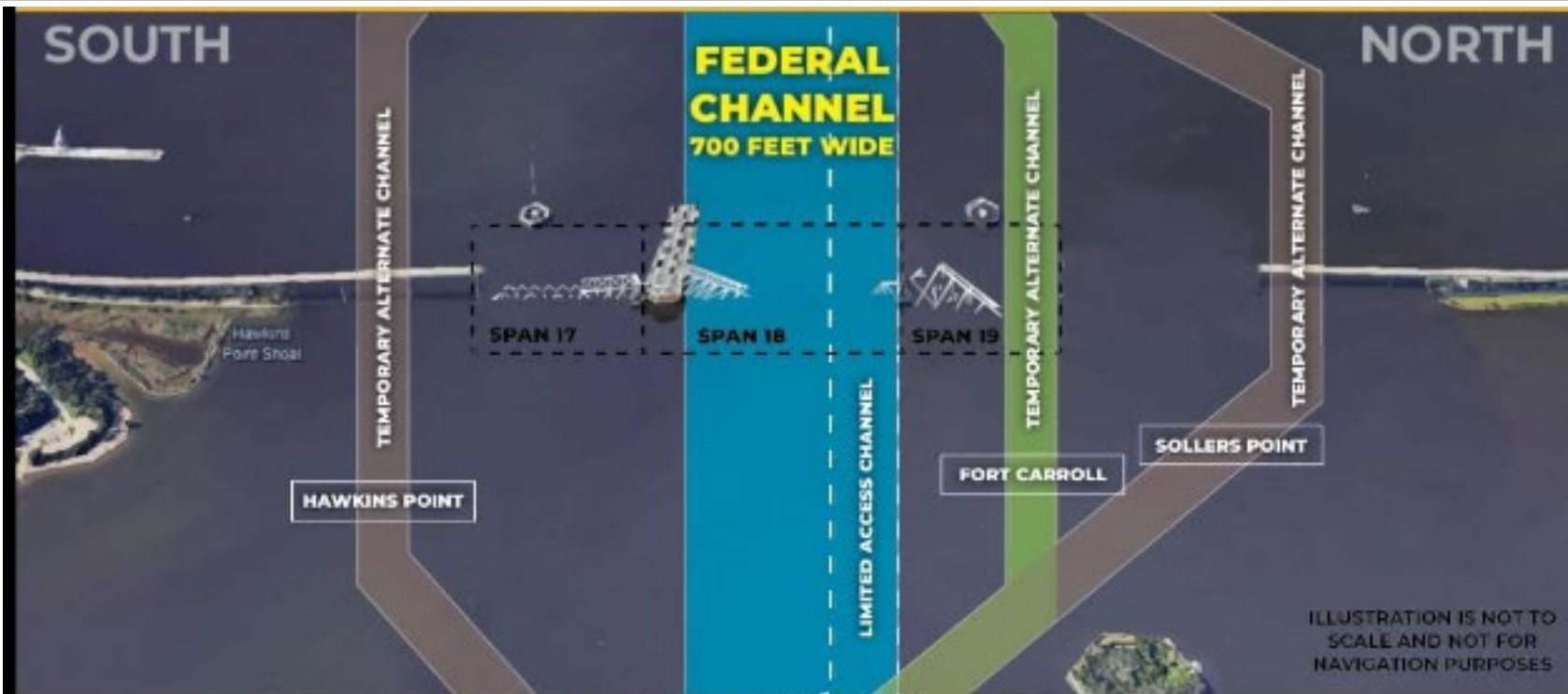


## 8 APRIL 2024

- Two temporary channels open at Soller's Point and Hawkins Point.
- RESOLVE removing containers from the bow of the ship and bagging soybeans (sulfuric acid).
- Potential third temporary channel with approximate depth of 20' near Span 19.
- Limited Access Channel, with a minimum depth of 35' and width of 280', within SPAN 18, between the federal channel and the pier the DALI did not strike; 75% of cargo traffic to traverse as prioritized by USCG recovery plan.
- Transponders installed on viable vessels (cranes, dive platforms), to be tracked by USCG
- DALI remains stable; dive operations discovered stern is free floating. Engineering the solution to remove the Span 4, pinning bow of the boat.
- Electrical cutting materials ordered.
- Sparrows Point prepared for material acceptance to 10 acres.



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### HAWKINS POINT

- 14 Feet Deep
  - 280 Feet Wide
  - 124 Foot High Clearance
- Empty barges, small tugs, survey vessels, crew boats, floating cranes, Coast Guard Buoy Tenders, crane barges, Coast Guard Patrol Boats, Navy YPs, commercially essential vessels.

**OPERATIONAL**

### FEDERAL CHANNEL

- 50 Feet Deep
  - 700 Feet Wide
  - 214 Foot High Clearance
- Restoration of normal port operations.

**NON-OPERATIONAL**

### LIMITED ACCESS

- 35 Feet Minimum Depth
  - 300 Feet Wide
  - 214 Foot High Clearance
- Some larger deep draft vessels, large marine tugs, MARAD vessels.

**NON-OPERATIONAL**

### FORT CARROLL

- 20 Feet Deep
  - 300 Feet Wide
  - 135 Foot High Clearance
- Loaded Barges
- Commercially essential traffic through the Port of Baltimore.

**OPERATIONAL**

### SOLLERS POINT

- 11 Feet Deep
  - 264 Feet Wide
  - 95 Foot High Clearance
- Empty barges, small tugs, survey vessels, crew boats, floating cranes, Coast Guard Buoy Tenders, crane barges, Coast Guard Patrol Boats, Navy YPs, commercially essential vessels.

**OPERATIONAL**



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**“I want to make sure that the families know they’ve got the best team working on this for them.”**

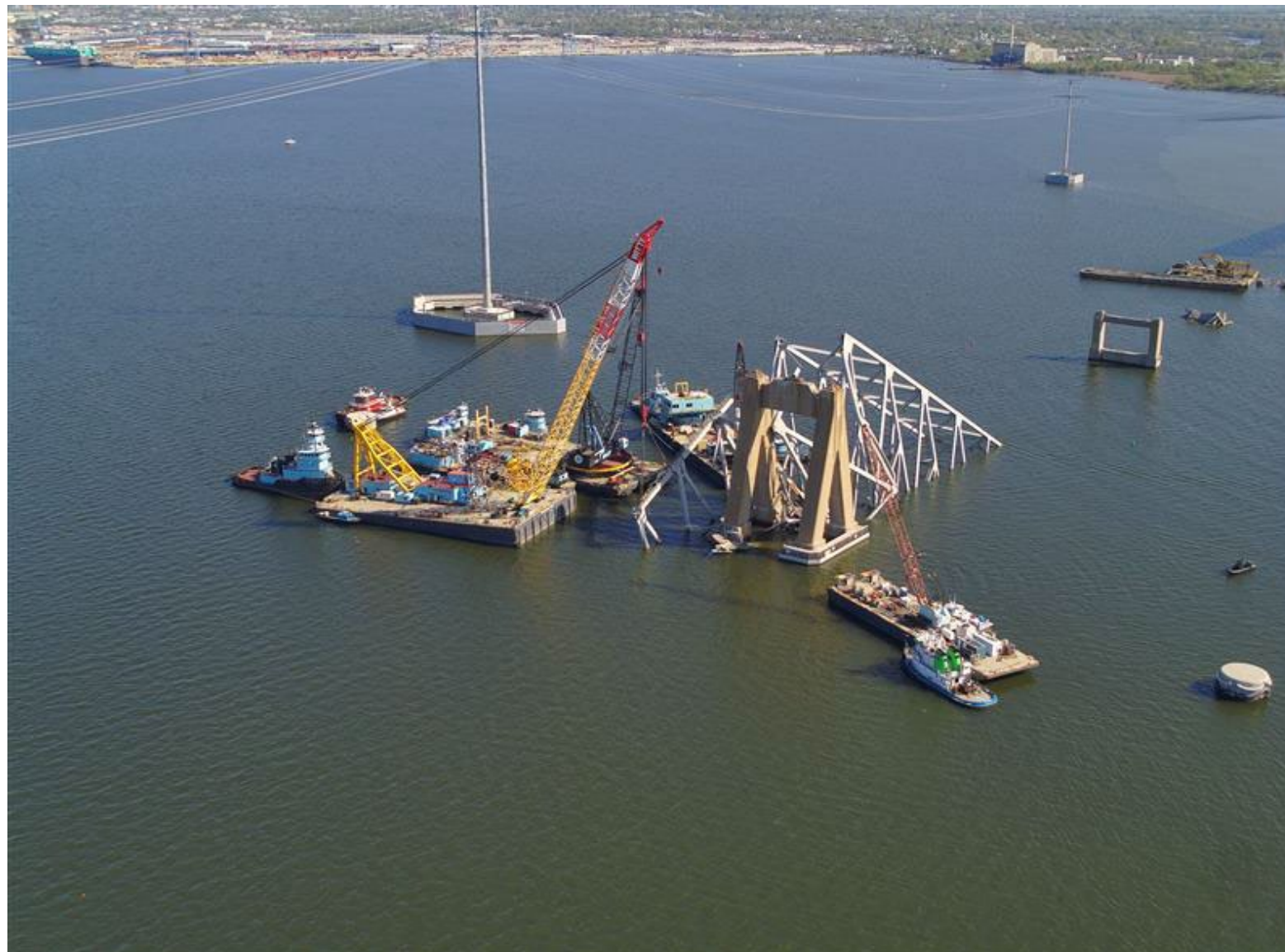
**COL. ESTEE PINCHASIN  
BALTIMORE DISTRICT COMMANDER  
U.S. ARMY CORPS OF ENGINEERS**

 **17 APRIL 2024**

- **Continue** dive operations
- Bucket ops **continued** for debris removal
- **Continue** transponder installation
- **Continuing** to refine the refloat plan
- **Continued** working to restore power to bow winches
- **Continue** soybean removal and HAZMAT mitigation
- Pre-rig to prepare for lift. **Continue** to cut and prep for lift
- **Continuously** monitoring wreckage and V/S DALI movement
- **Continue** container removal operations (inspections, rigging, lifting and securing)



 23 APRIL 2024



**Drone footage of continuing wreckage removal**  
Photo from DVIDS





# 14 APRIL 2024

- EM monitoring severe weather in PA/NY; dams making releases
- NY Federal levee system significantly damaged by drilling for new sewer interceptor; deployed teammates
- 62 containers removed to date from Dali
- All soybeans bagged and ready for offloading



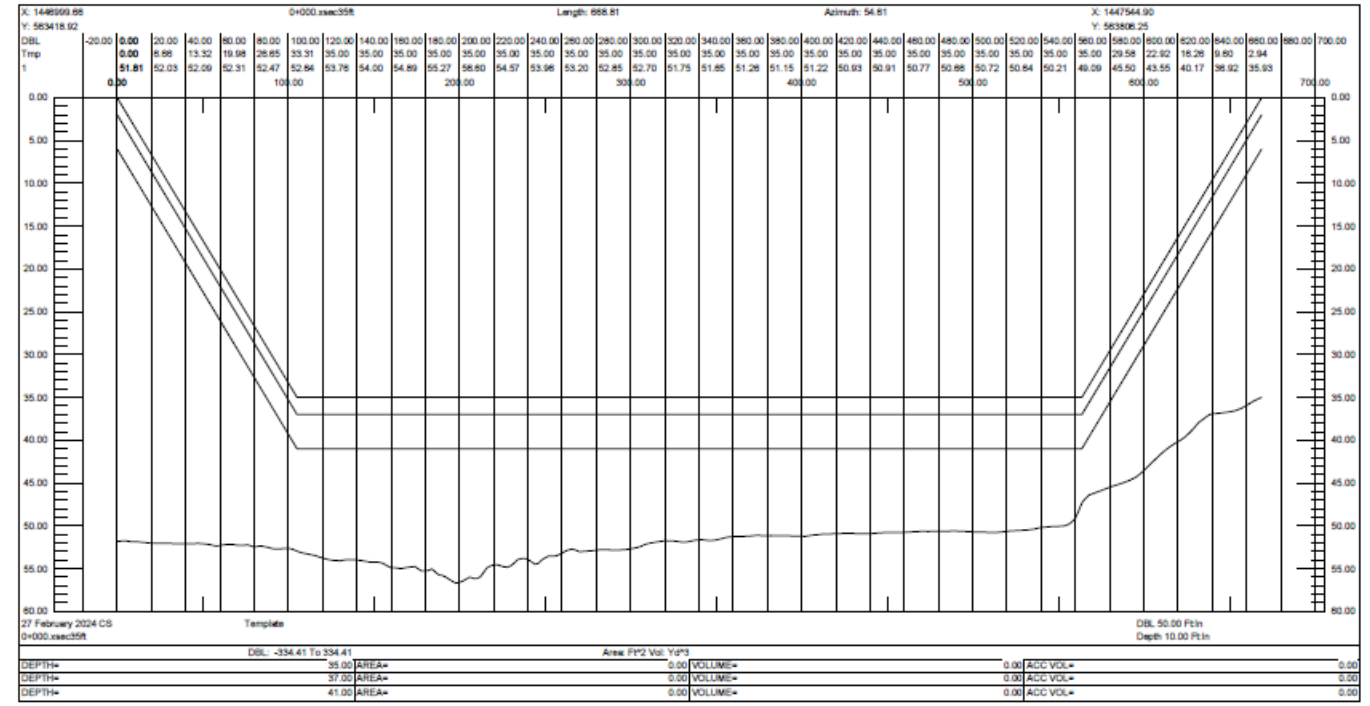
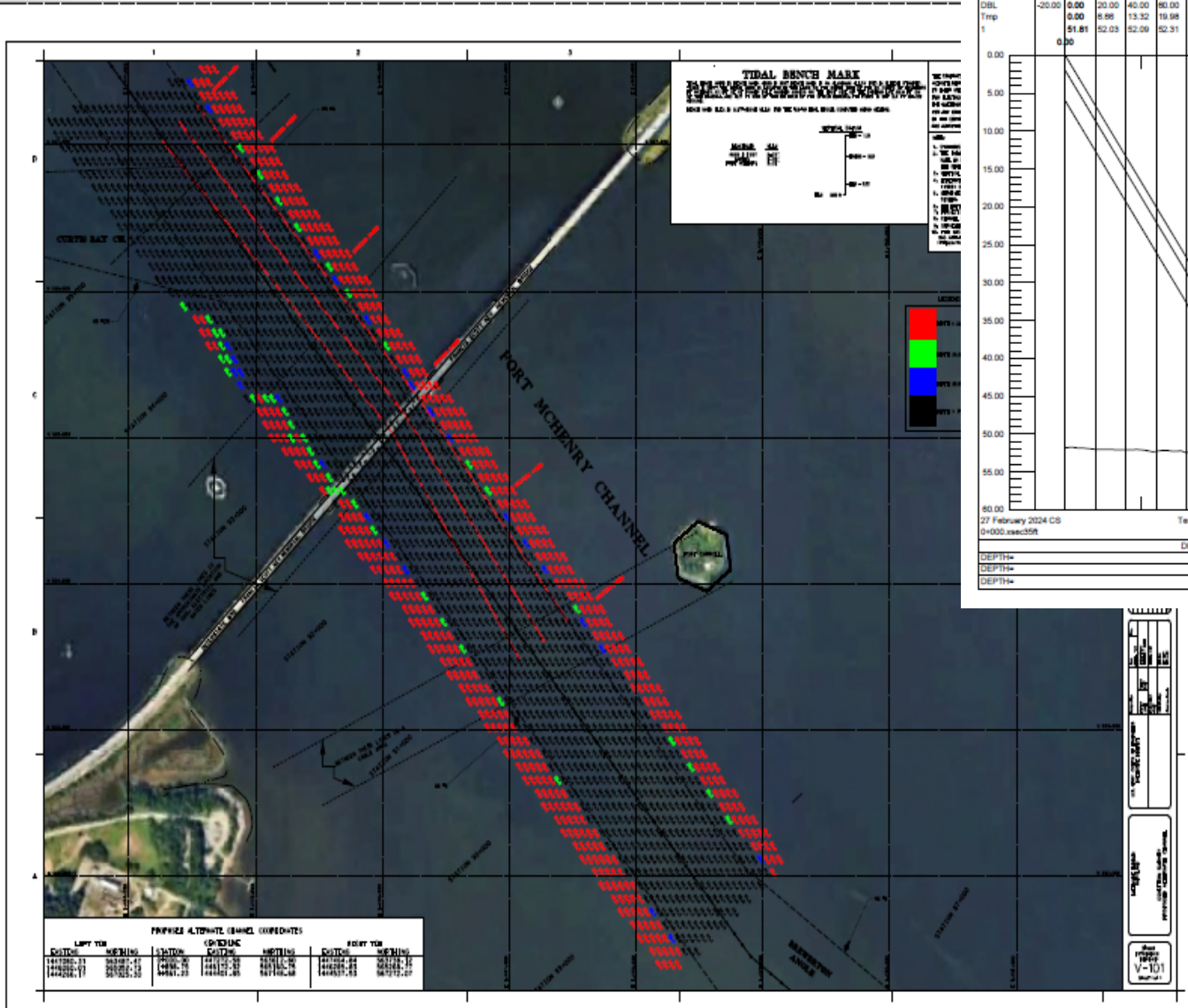
Soybean germination



# FORT MCHENRY LIMITED ACCESS CHANNEL



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DREDGING QUANTITIES SUMMARY					
DEPTH=	35.00	AREA=	0.00	VOLUME=	0.00
DEPTH=	37.00	AREA=	0.00	VOLUME=	0.00
DEPTH=	41.00	AREA=	646.56	VOLUME=	2426.83

DREDGING QUANTITIES CALCULATION					
0+000.xsec35ft -229.33 To 229.33					
DEPTH=	35.00	AREA=	0.00	VOLUME=	0.00
DEPTH=	37.00	AREA=	0.00	VOLUME=	0.00
DEPTH=	41.00	AREA=	0.00	VOLUME=	0.00
0+100.xsec35ft -225.40 To 225.39					
DEPTH=	35.00	AREA=	0.00	VOLUME=	0.00
DEPTH=	37.00	AREA=	0.00	VOLUME=	0.00
DEPTH=	41.00	AREA=	0.00	VOLUME=	0.00
0+200.xsec35ft -221.46 To 221.45					
DEPTH=	35.00	AREA=	0.00	VOLUME=	0.00
DEPTH=	37.00	AREA=	0.00	VOLUME=	0.00
DEPTH=	41.00	AREA=	0.00	VOLUME=	0.00



# FORT MCHENRY LIMITED ACCESS CHANNEL

- ERDC ship simulation with pilots
- Optimized buoy locations
- 300-foot wide, 35-foot deep
- One-way traffic in/out of the Port for barge container service and some roll-on/roll-off vessels that move automobiles and farm equipment
- Survey completed 24 APRIL 2024



**Placing buoys in preparation for the temporary channel opening**

(Photo credit: DVIDS)



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# 25 APRIL 2024; FIRST VESSEL IN LAC





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# WRECKAGE REMOVAL





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# A "PICK" MOVING TO SPARROWS POINT

46





# SPARROWS POINT PROCESSING YARD



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Skanska/United Demolition Sparrow Point Yard





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# 1000-TON BUCKET GRAB







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# 1000-TON BUCKET GRAB

49

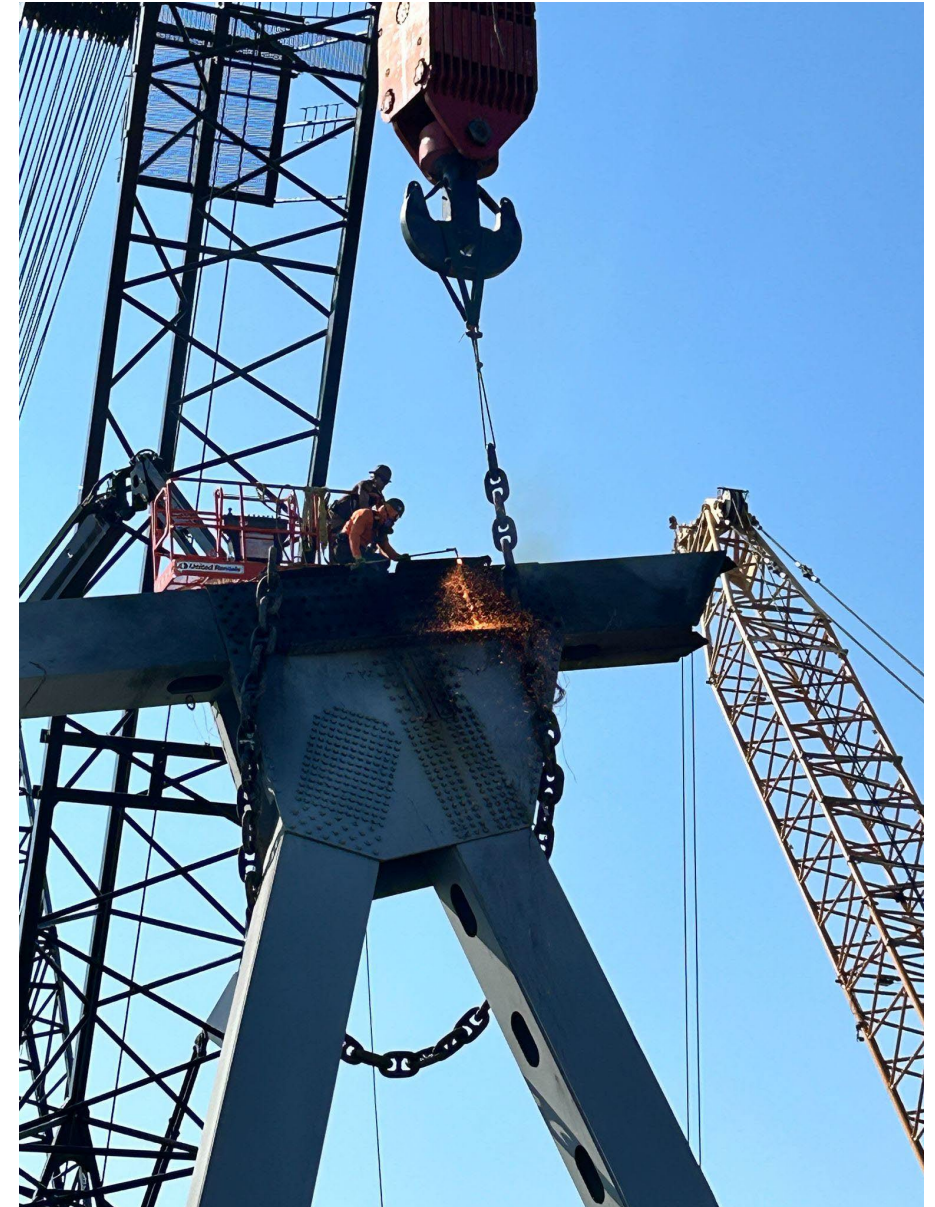


The Chesapeake 1000 barge, Chessy, and the HSWC500-1000 hydraulic claw, Gus, are removing parts of the Francis Scott Key Bridge.



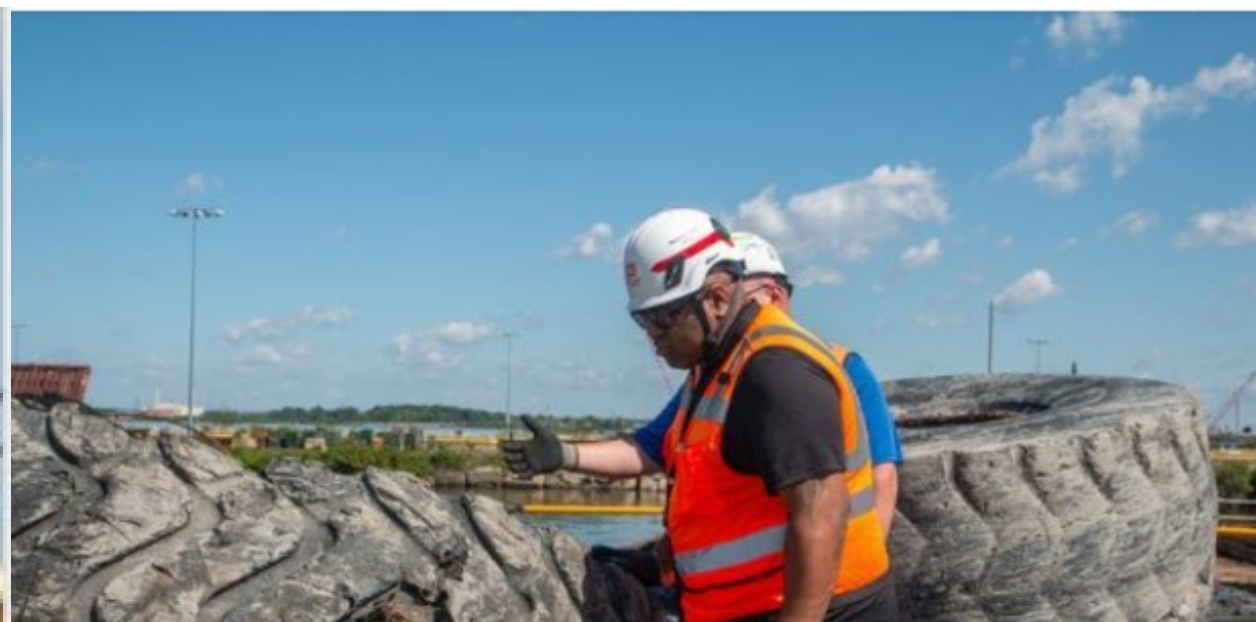
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# RIGGING





# PLACEMENT AND RECYCLING





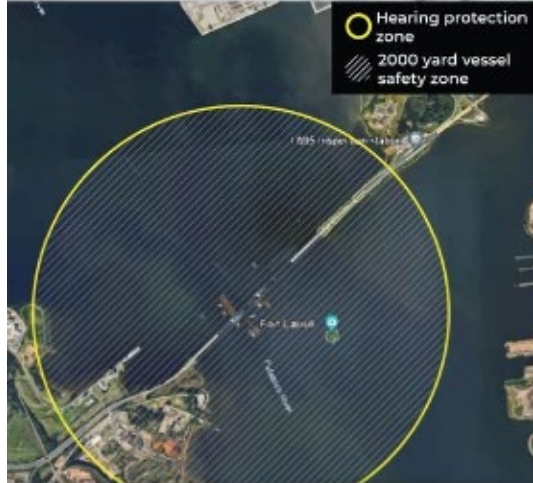
# PRECISION CUTTING - OUTREACH



## RESPONSE 20

Command is scheduled to use precision cuts made with small charges to remove a large section of the Francis Scott Key Bridge wreckage from on top of the M/V DALI.

**The safest and swiftest method to remove the bridge piece from on top of the M/V DALI is by precision cuts made with small charges. This is an industry standard tool in controlled demolition that will break the span in smaller pieces. We can then begin the work of refloating the vessel and removing it from the Federal Channel.**



### WHAT WILL I SEE & HEAR?

It will look like multiple puffs of smoke and sound like fireworks.

### IS THIS SAFE?

Safety is our highest priority. This includes the safety of the crew onboard the M/V DALI, our responders, and the local communities. For your own safety, we do not recommend observing from the water and wear hearing protection if outdoors within 2,000 yards of the site.



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# PRECISION CUTTING





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# MORE CUTTING





## AND MORE...

- **SAFETY EVERY DAY!**
- Critical Incident Stress Management (CISM)
- Freedom of Information Act Requests
- Funding coordination
- Interagency collaboration
- VIP site visits



# INTERAGENCY SUPPORT

- Unified Command
  - U.S. Coast Guard
  - U.S. Army Corps of Engineers (and U.S. Navy SUPSALV)
  - Maryland Department of Transportation (MDTA)
  - Maryland Department of the Environment (MDE)
  - Responsible Party (Witt O'Briens)
- National Oceanic and Atmospheric Administration (NOAA)
- U.S. Environmental Protection Agency (USEPA) – HAZMAT, toxic air/water response
- Occupational Safety and Health Administration (OSHA)
- Maryland Department of Natural Resources (MdDNR)
- International Marine Spill Pollution Response (ITOPF)
- Industry Partners





# TEAMWORK

