



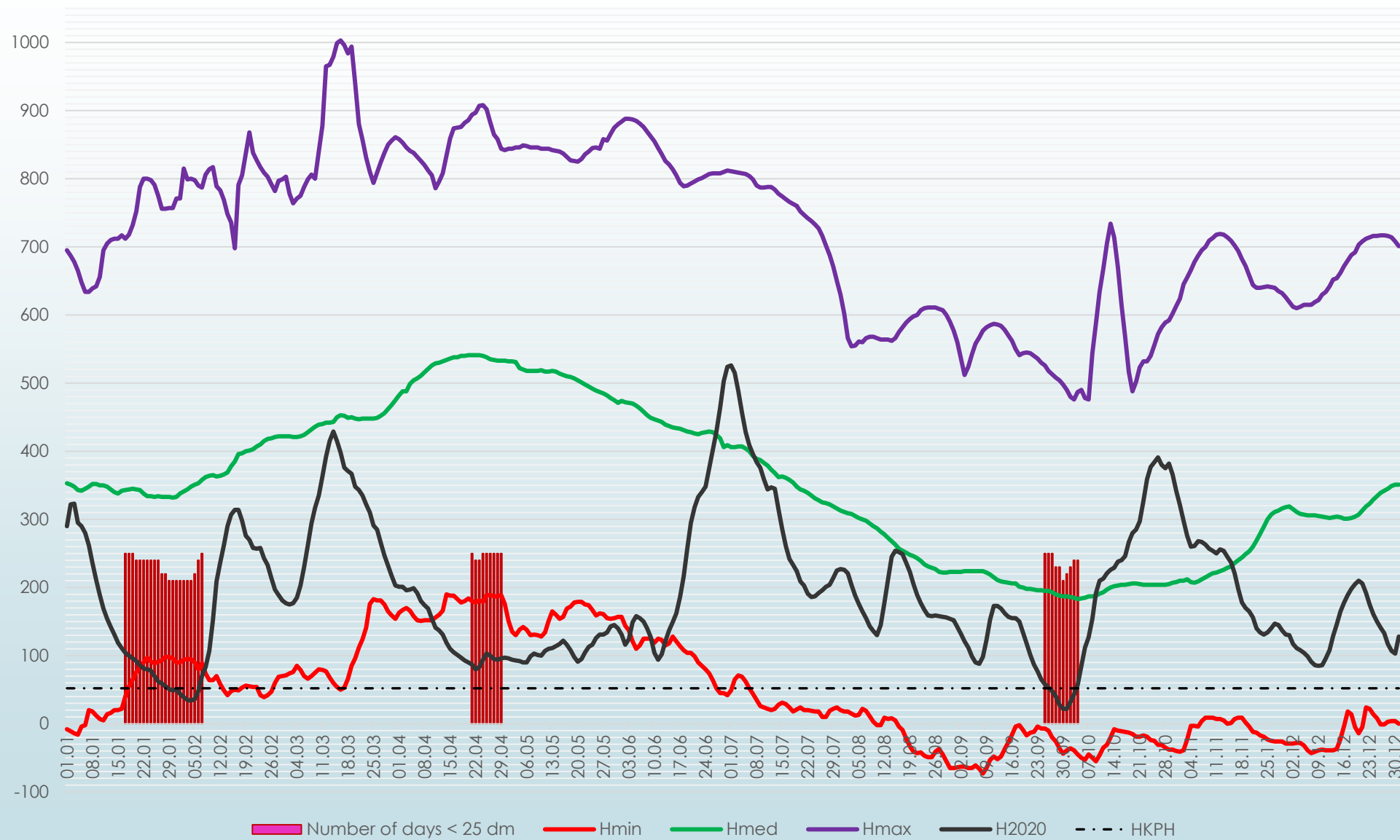
HYDROTECHNICAL EXPERT GROUP WORKSHOP

Danube Commission, Budapest

28th of February 2023

Status of the main critical sections in the period 2020-2022 and hydrological information, Bulgaria

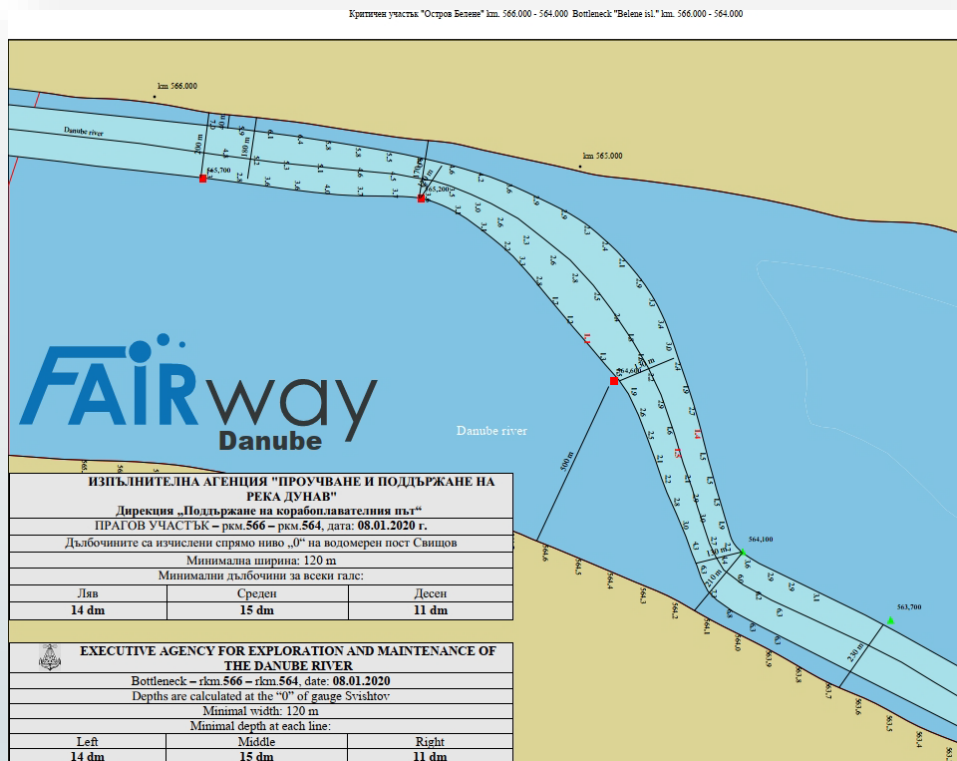
Hydrological conditions for Ruse 2020



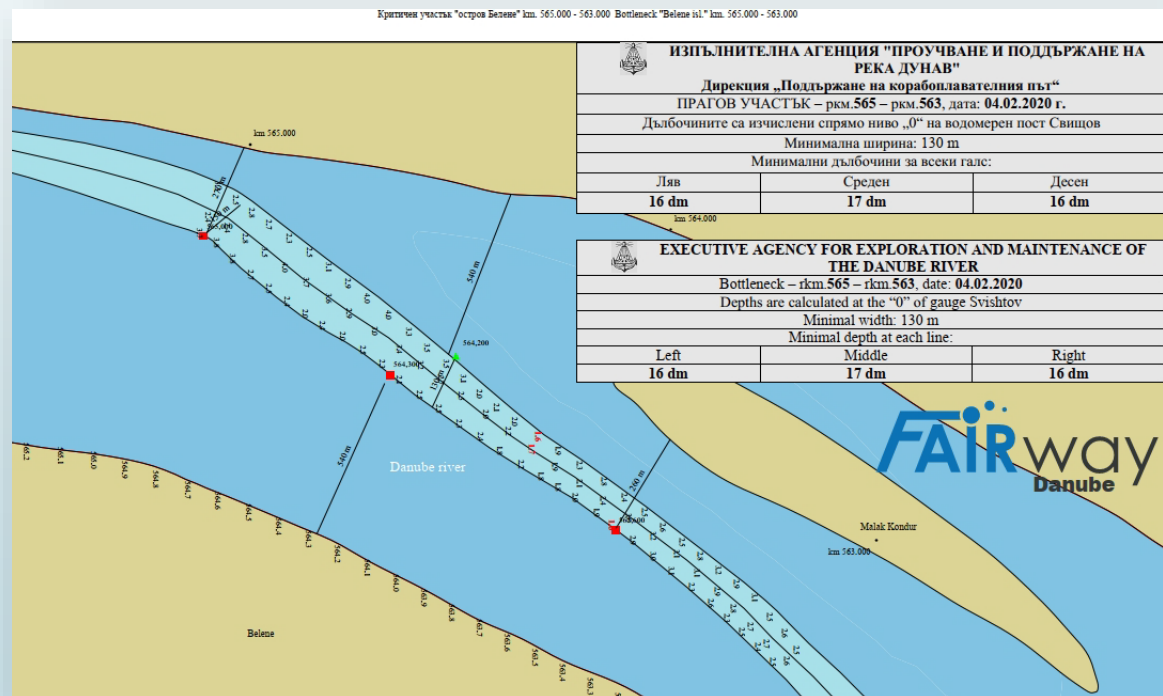
In 2020, permanently change the fairway alignment at the following critical sections:

- rkm 565.000 – rkm. 563.000 since 04.02.2020;
- rkm 458.000 – rkm. 455.000 since 06.02.2020;
- rkm. 422.000 – rkm. 420.000 since 29.04.2020;
- rkm. 412.000 – rkm. 410.000 since 09.06.2020;
- rkm. 576.000 – rkm. 573.000 since 22.07.2020;
- rkm. 576.000 – rkm. 573.000 since 02.09.2020

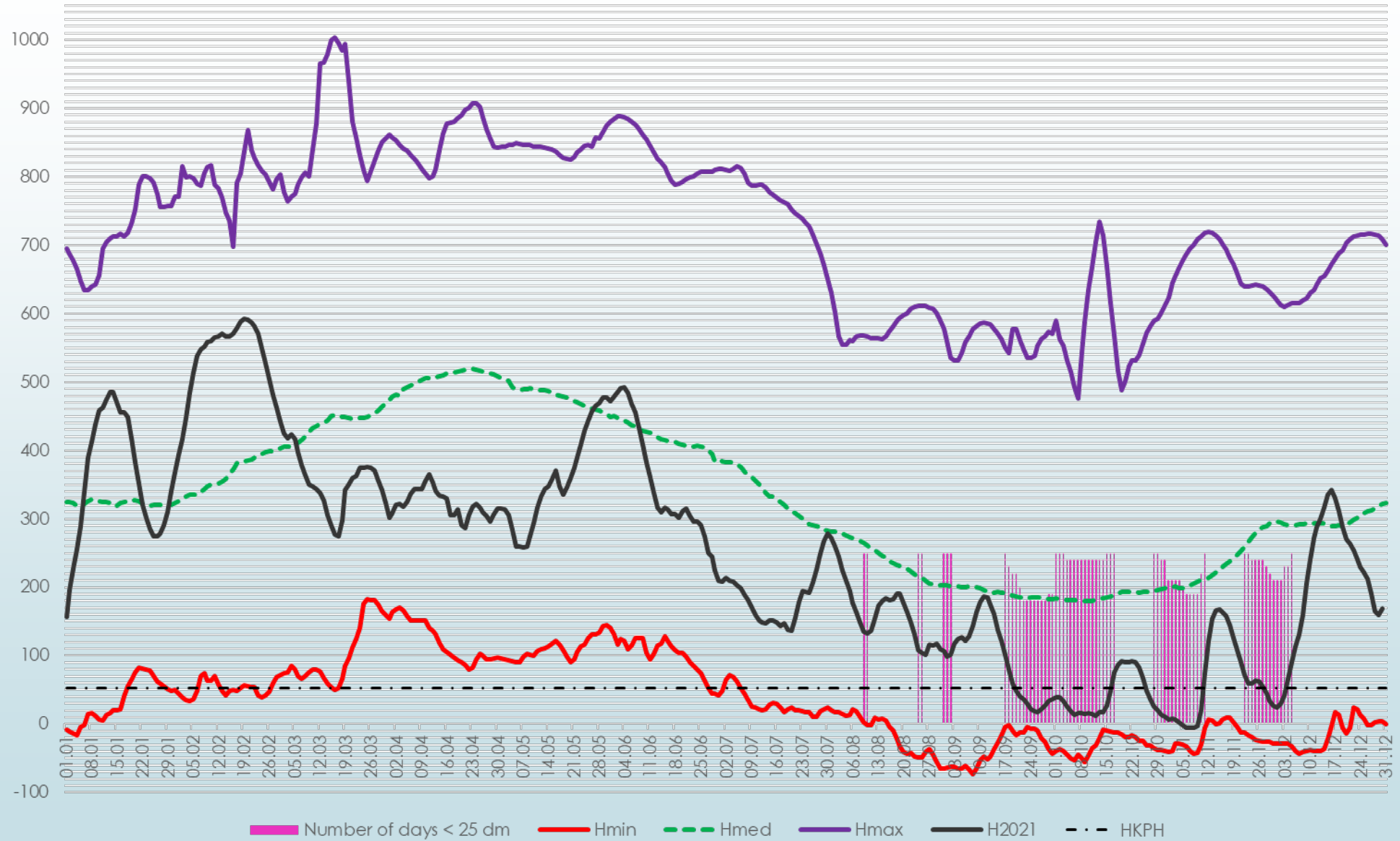




Belene Island rkm565 - rkm563



Hydrological conditions for Ruse 2021

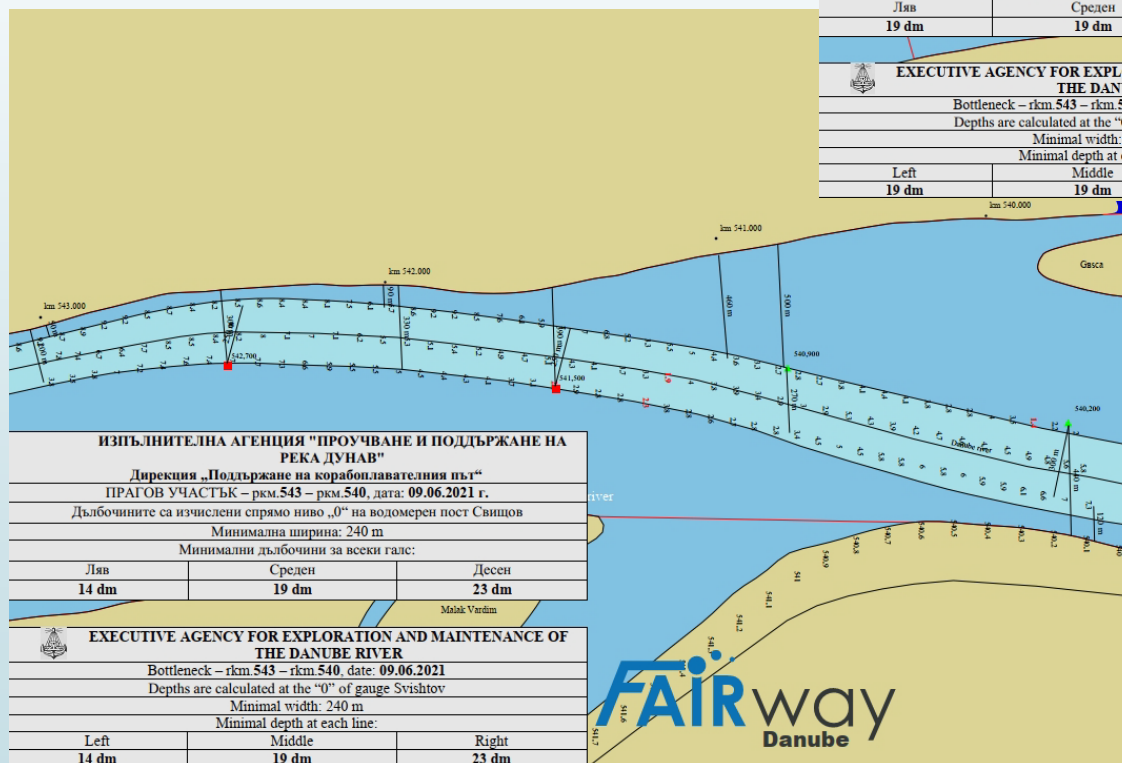
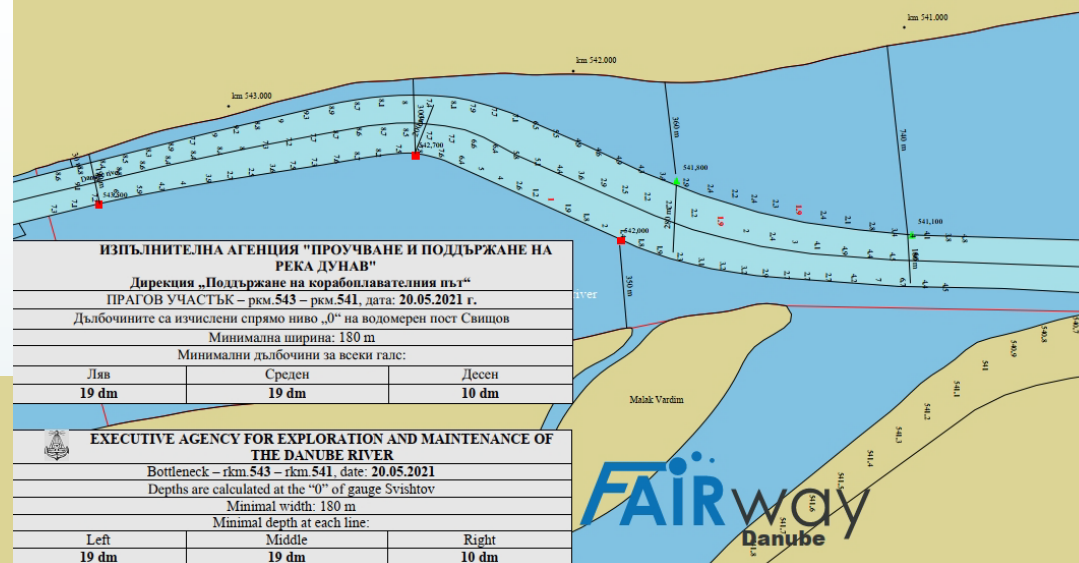


The trajectory of the fairway was permanently changed at the following critical sections:

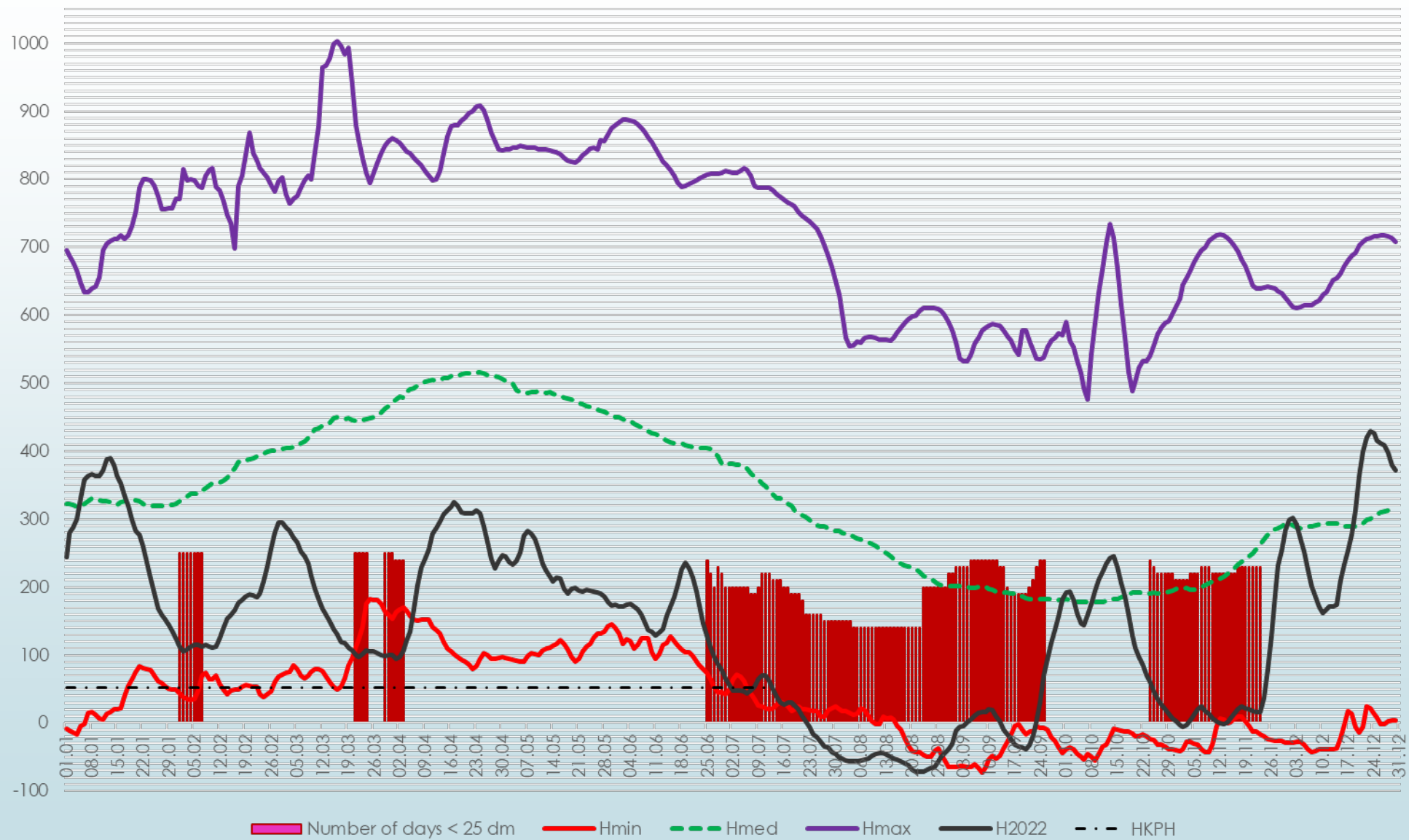
- rkm. 547.000 – rkm. 545.000 since 11.03.2021;
- rkm. 543.000 – rkm. 540.000 since 09.06.2021;
- rkm. 533.000 – rkm. 530.000 since 22.06.2021;
- rkm. 565.000 – rkm. 563.000 since 13.08.2021;
- rkm. 406.000 – rkm. 404.000 since 02.09.2021;
- rkm. 406.000 – rkm. 404.000 since 28.09.2021;
- rkm. 396.000 – rkm. 392.000 since 11.11.2021;
- rkm. 386.000 – rkm. 382.000 since 11.11.2021;
- rkm. 565.000 – rkm. 563.000 since 18.11.2021;
- rkm. 414.000 – rkm. 412.000 since 24.11.2021;
- rkm. 531.000 – rkm. 529.000 since 27.11.2021;



Vardim Island rkm 543 – rkm 540



Hydrological conditions for Ruse 2022



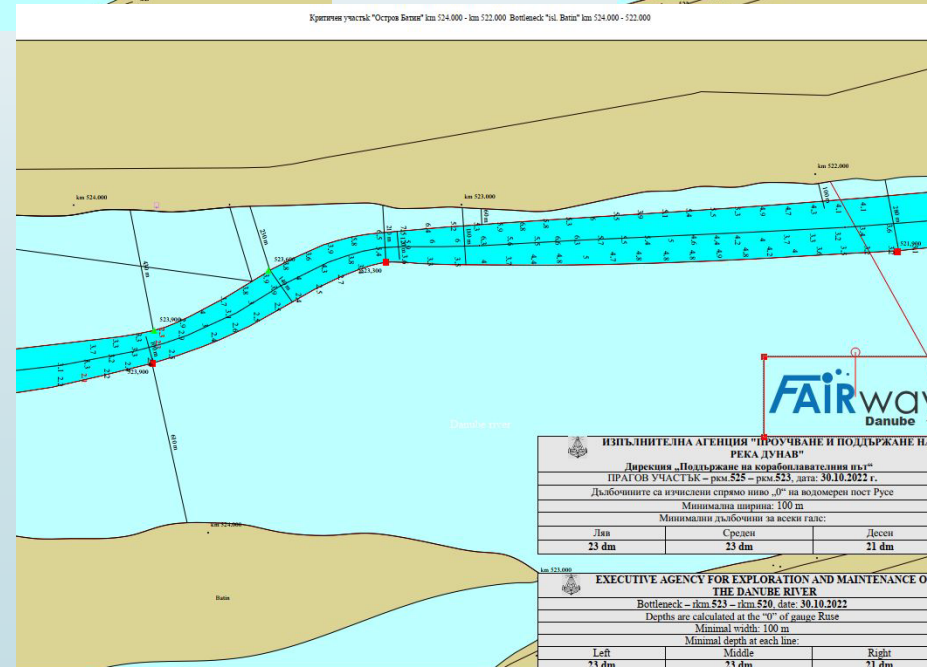
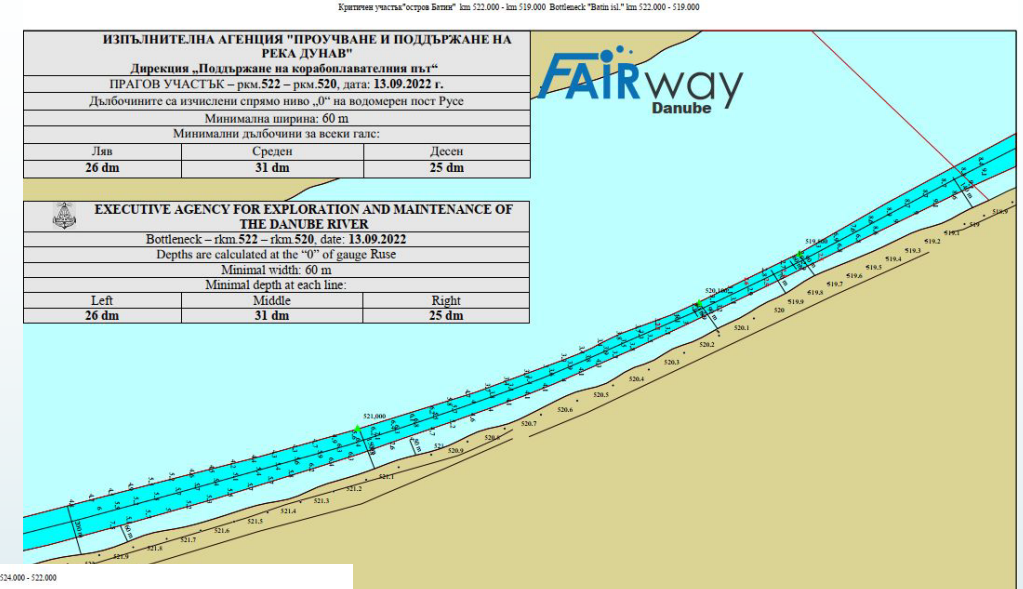
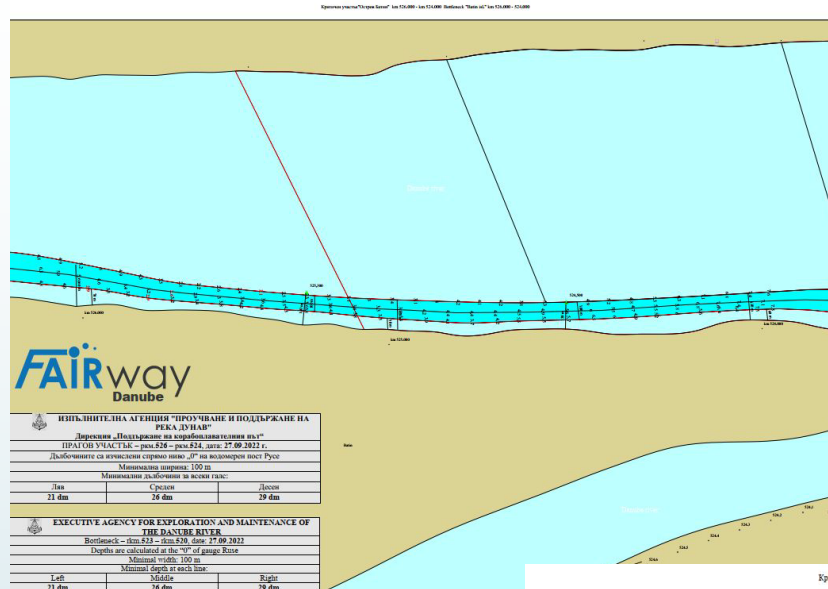
- In 2022, the most critical bottleneck for navigation was again the section in the Belene Island area /rkm 565.000 – rkm 563.000/ with a depth of 19 to 14 dm and a fairway width of 60 m, with the number of days with depth ≤ 25 dm being 141 days.
- Another particularly difficult bottleneck for navigation was the Vardim Island threshold /rkm 547.000 – rkm 544.000/ with the number of days with depth ≤ 25 dm being 123 days and the fairway width reaching 80 m.
- Problems were also caused by the sections in the areas of Golyama Barzina Island /rkm 576.000 – 573.000/, Batin Island /rkm 523.000 – rkm 520.000/, Brashlyan Island /rkm 457.000 – rkm 455.000/, Popina area /rkm 407.000 – rkm 405.000/, Vetren Island area /rkm 394.000 – rkm 390.000/ and the area of Chayka Island /rkm 385.000 – rkm 382.000/.

The trajectory of the fairway was permanently changed at the following critical sections:

- rkm. 531.000 – rkm. 529.000 since 02.06.2022;
- rkm. 565.000 – rkm. 563.000 since 08.07.2022;
- rkm. 565.000 – rkm. 563.000 since 26.07.2022;
- rkm. 396.000 – rkm. 392.000 since 09.08.2022;
- rkm. 565.000 – rkm. 563.000 since 23.08.2022;
- rkm. 423.000 – rkm. 421.000 since 29.08.2022;
- rkm. 423.000 – rkm. 421.000 since 20.09.2022;
- rkm. 407.000 – rkm. 404.000 since 20.09.2022;
- rkm. 525.000 – rkm. 523.000 since 29.10.2022;
- rkm. 609.000 – rkm. 607.000 since 15.11.2022;



Batin Island rkm 525 – rkm 522



Belene

09.2009



Персински блата

Belene

10.2013



Персински блата

Belene

04.07.2022



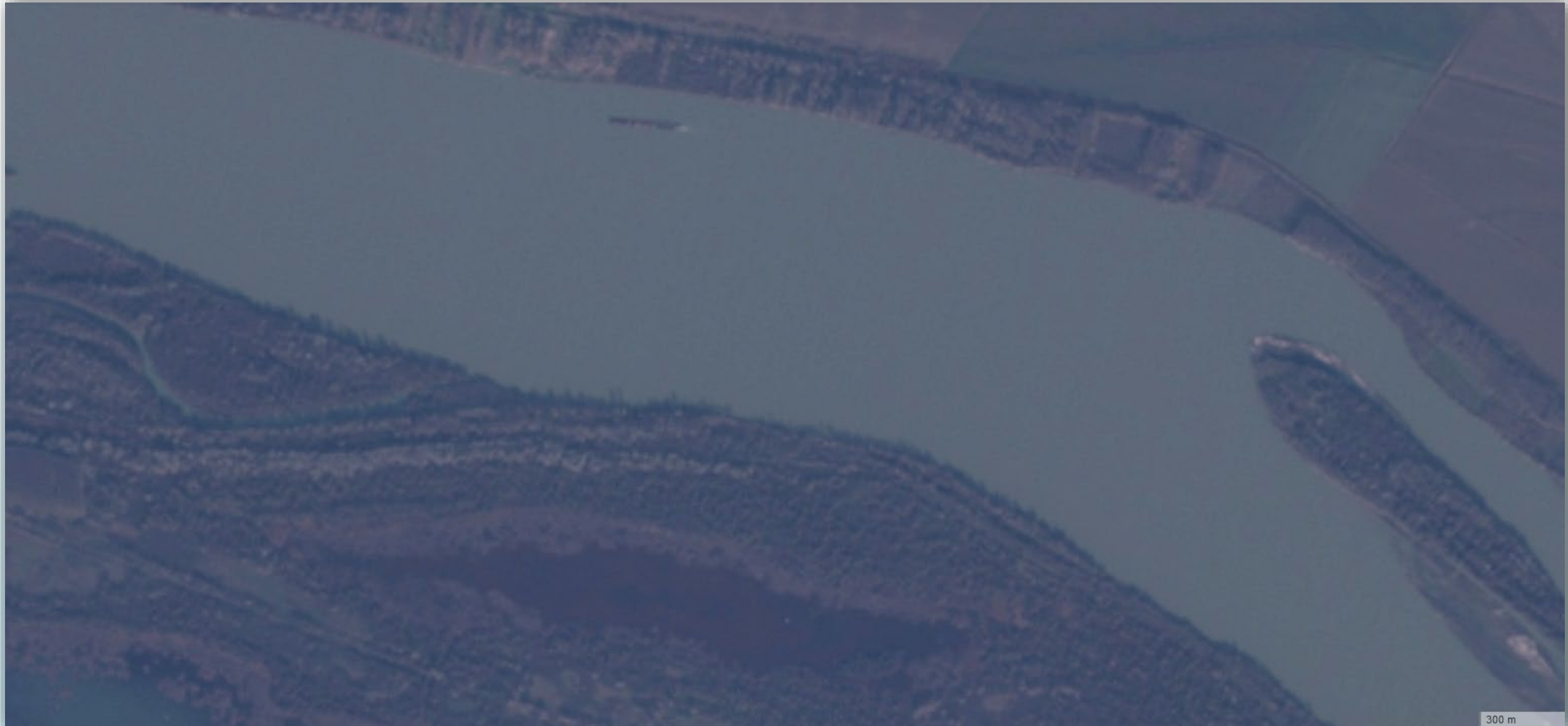
Belene

23.08.2022



Belene

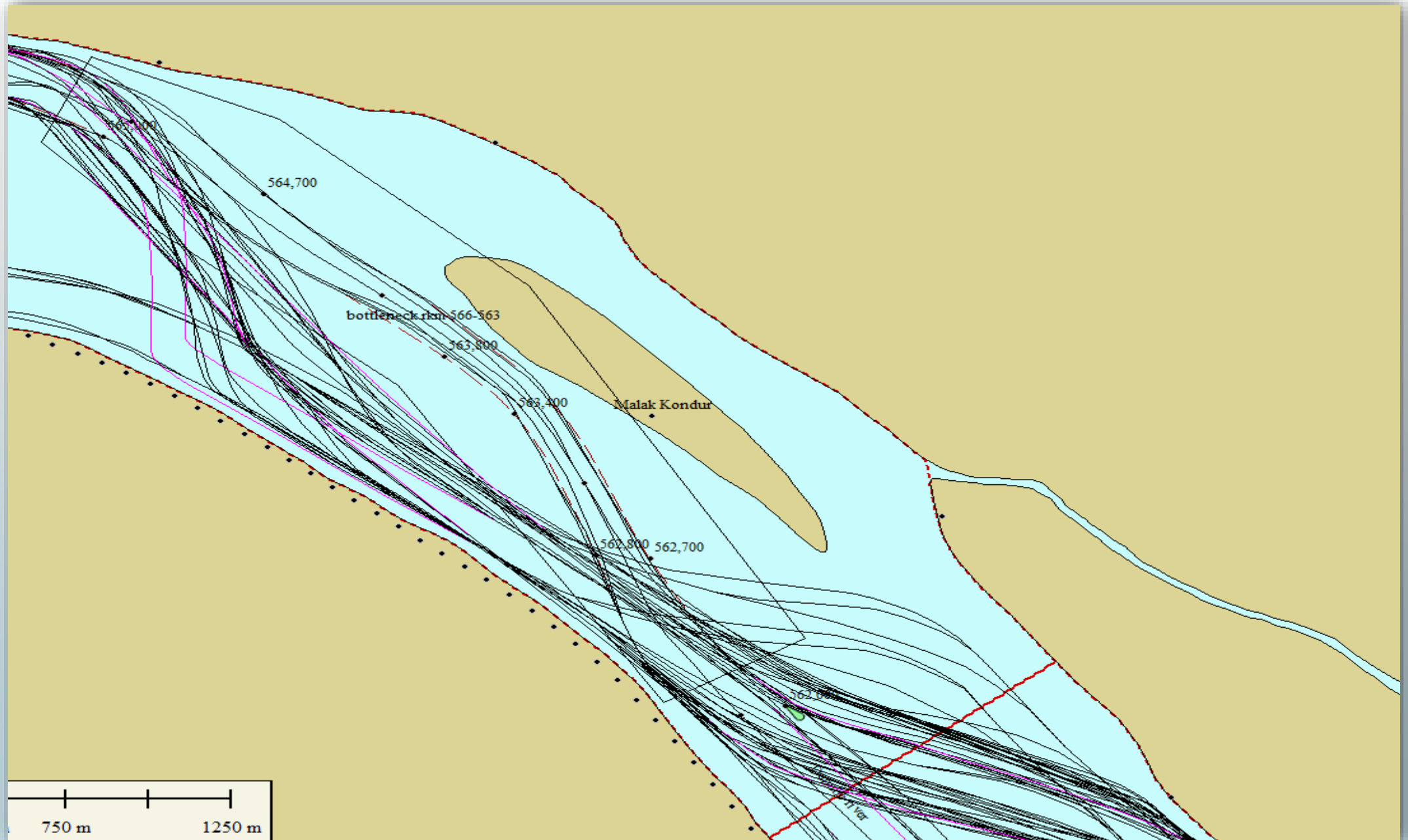
31.12.2022



Belene critical area rkm570 - rkm560



Belene critical area rkm565 - rkm560



Monitoring, rehabilitation and
technical maintenance in 2022

Ship fleet

Hydrographic vessels



Vessel Dunav 1

- Year of construction – 2017
- Dimensions:
L max = 24.18 m;
B max = 7.36 m;
d max = 1.19 m;
- Power:
2 x 368 kw.

Ship fleet

Hydrographic vessels



Vessel Rs 2070

- Year of construction;
- Dimensions:

L max = 7.70 m;

B max = 3.00 m;

d max = 0.40 m;

- Power:

100kw

Ship fleet

Hydrographic boat



Rs 2306

- Year – 2022;
- Dimensions:
L max = 4.96 m;
B max = 1.84 m;
d max = 0.25 m;
- Power:
44 kw.

Ship fleet

Marking vessels



Vessel 'Vit'

- Year of construction – 1979;
- Dimensions:
L max = 41.25 m;
B max = 7.85 m;
d max = 1.39 m;
- Power:
2 x 223 kw.

Ship fleet

Marking vessels



Vessel 'Osam'

- Year of construction – 2018;
- Dimensions:
L max = 34.00 m;
B max = 9.80 m;
d max = 1.30 m;
- Power:
2 x 500 kw.

Ship fleet

Maneuvering vessel



Pusher 'Iskar'

- Year of construction – 2022;
- Dimensions:
L max = 23.60 m;
B max = 9.40 m;
d max = 1.35 m;
- Power:
2 x 290 kw.

Ship fleet

Dredging equipment



Cutter-suction dredger 'Yantra'

- Year of construction 2021;
- Dimensions:

L max = 49.30 m;

B max = 7.95 m;

d max = 1.20 m;

Maximum dredging depth- 14 m

Maximum capacity 4000 m³/h

Ship fleet

Dredging equipment



Non-self-propelled hopper barge
NSPS 1139

- Year of construction– 2021;

- Dimensions:

L max = 59.50 m;

B max = 9.70 m;

d max = 2.35 m;

Loading capacity 600 m³.

Ship fleet

Dredging equipment



Dredging Pontoon DP 1140

- Year of construction – 2021;
- Dimensions:

L max = 36.00 m;

B max = 11.60 m;

d max = 1.30 m;

Ship fleet

Dredging equipment



Self-propelled hopper barge –
1,2,3 – self-unloading barges

- Year of construction – Self-propelled barge – 1 – 1987;
- Self-propelled barge – 2 – 1989;
- Self-propelled barge – 3 – 1991;
- Dimensions:
L max = 47.90 m;
B max = 8.22 m;
d max = 1.94 m;
Loading capacity 368 t.

Ship fleet

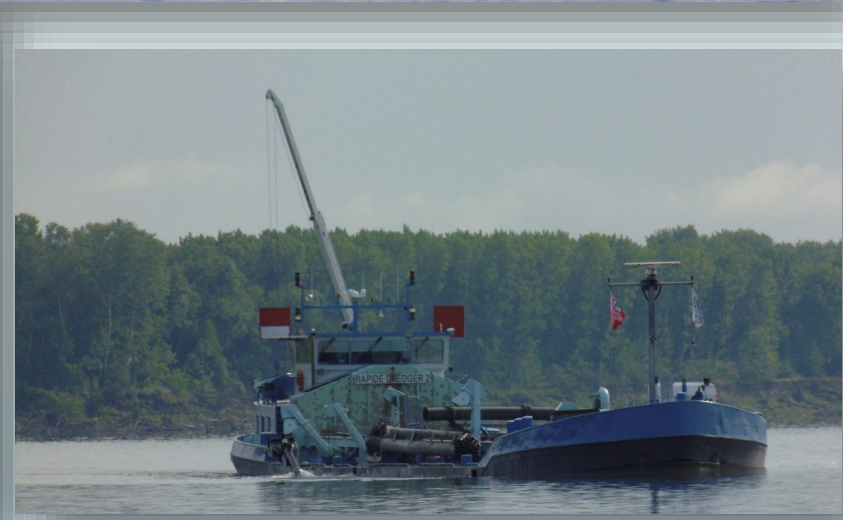
Floating technical vessel



Vessel 'Titan' – 100 ton
floating crane

- Year of construction – 1955;
- Dimensions:
L max = 40.00 m;
B max = 19.00 m;
d max = 1.95 m;

Dredging works



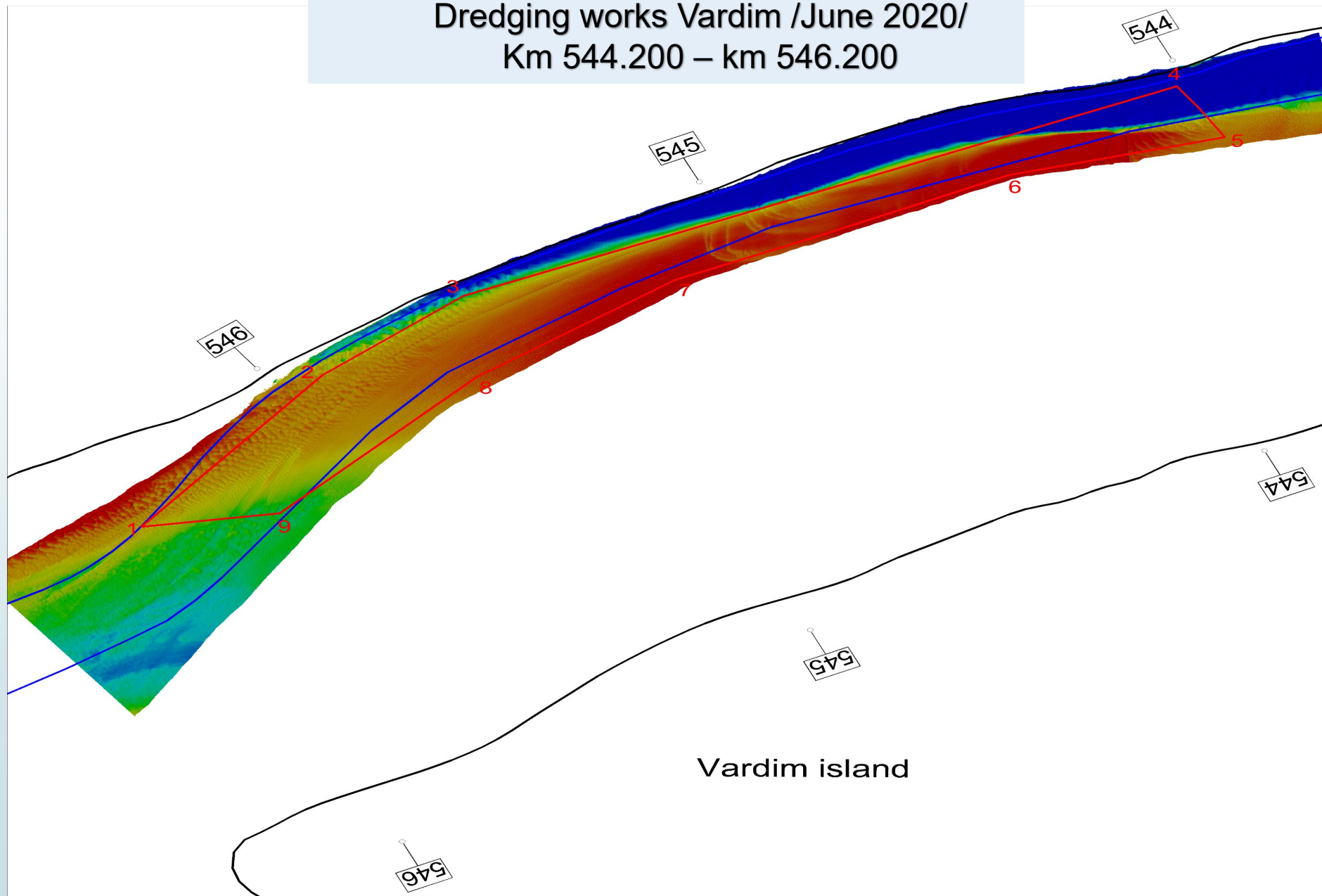
Dredging works - 2020

To ensure sustainable depths when bottlenecks occur, dredging was performed in the following areas:

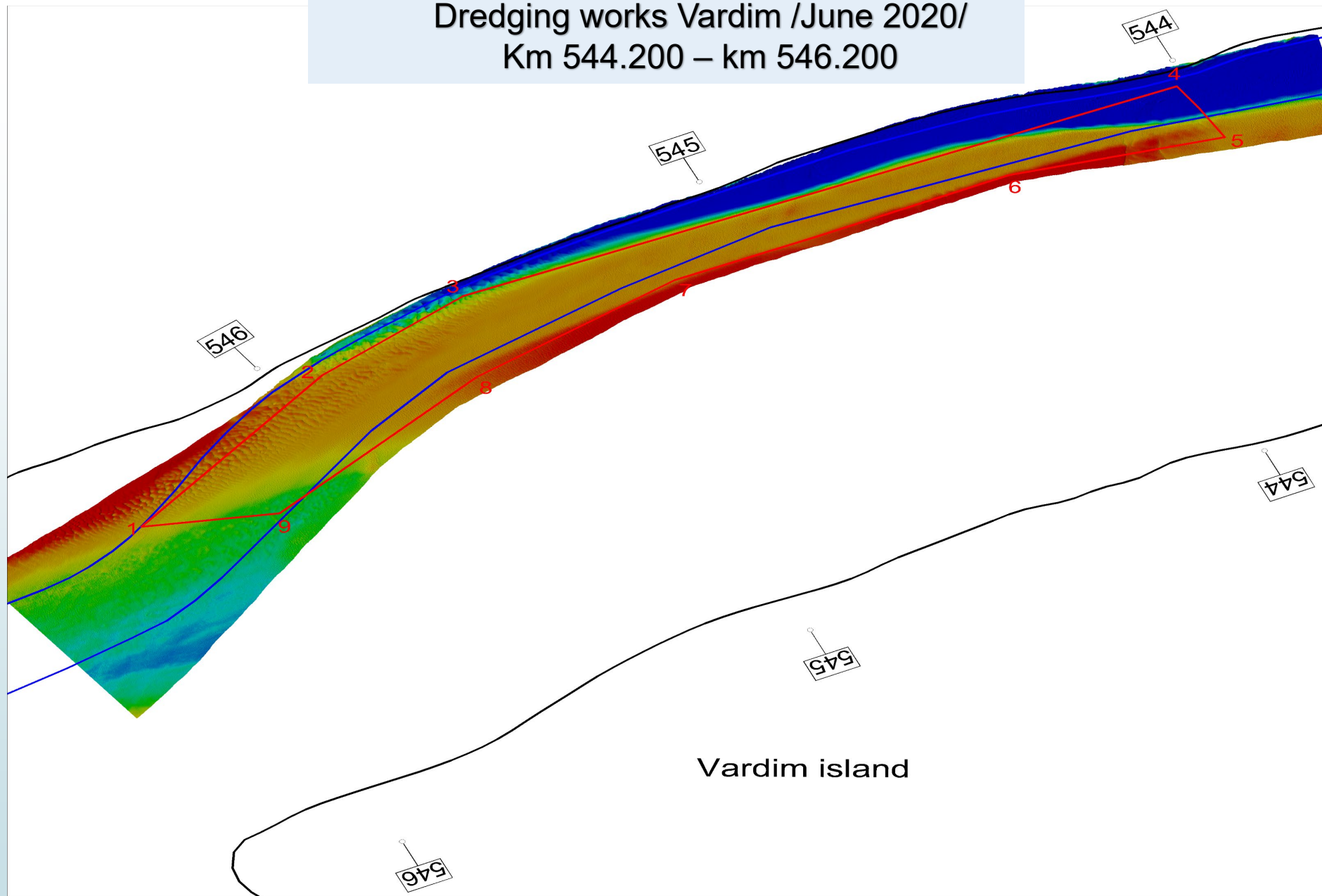
- Belene Island area/ May 2020 /
 - km 562.900 – km 565.000
 - dredged volume: 71 095m³
- Vardim Island area/ June 2020 /
 - km 544.200 – km 546.200
 - dredged volume: 138 780m³
- Belene Island area/ August 2020 /
 - km 574.500 – km 576.500
 - dredged volume: 47 637m³
- Vardim Island area / September 2020 /
 - km 544.200 – km 546.200
 - dredged volume: 39 777m³

Total dredged volume: 297 289 m³

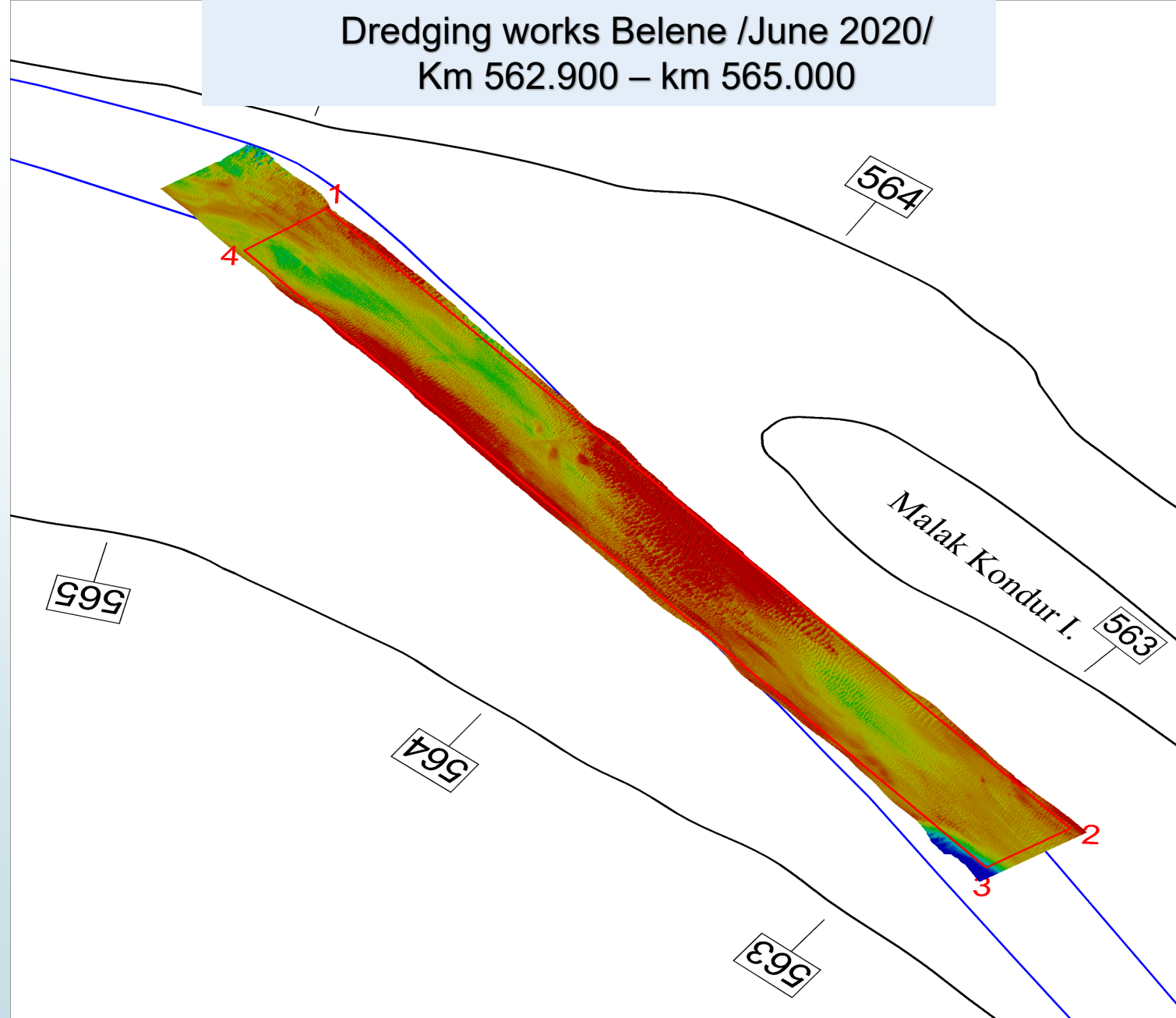
Dredging works Vardim /June 2020/
Km 544.200 – km 546.200



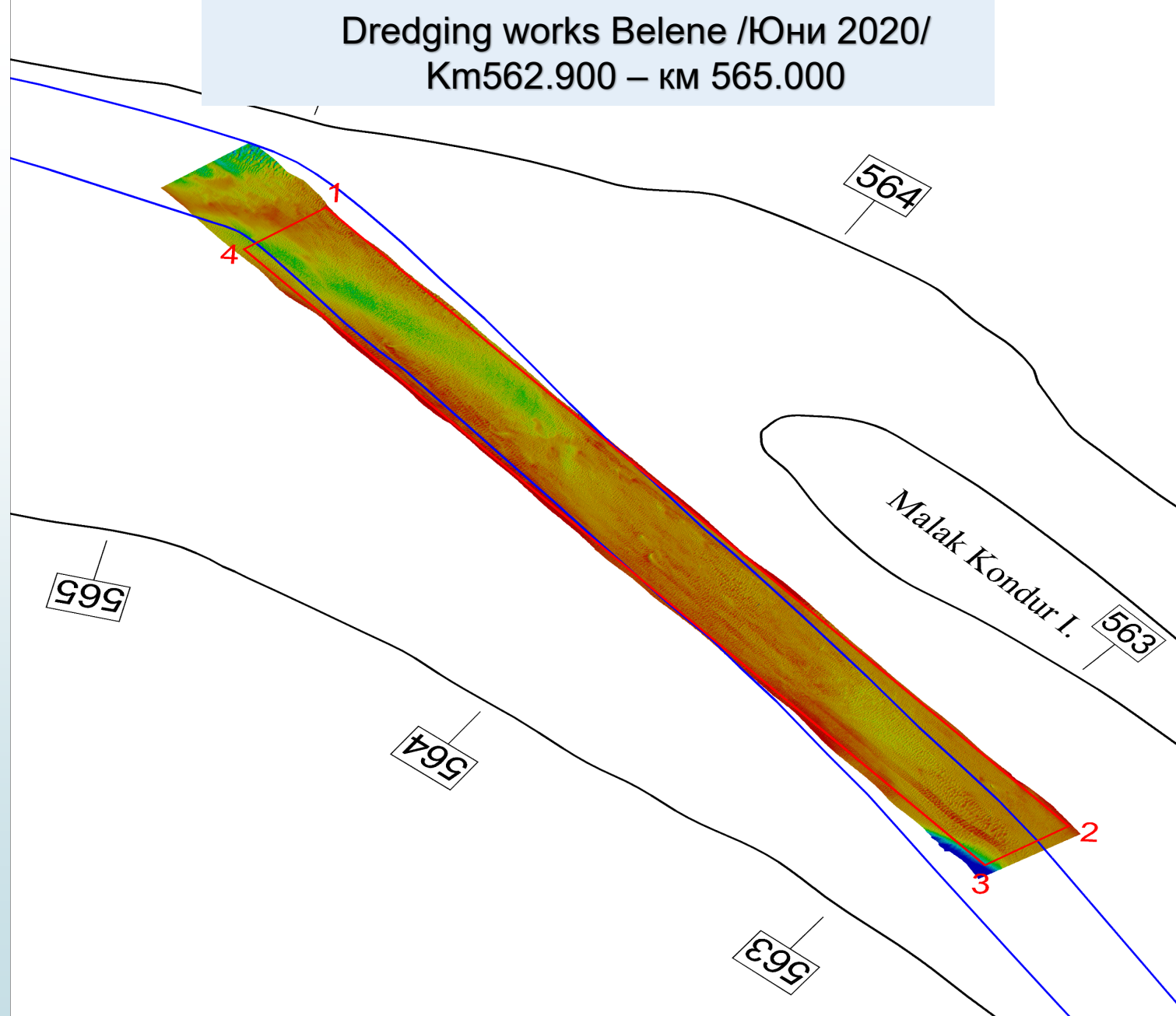
Dredging works Vardim /June 2020/
Km 544.200 – km 546.200



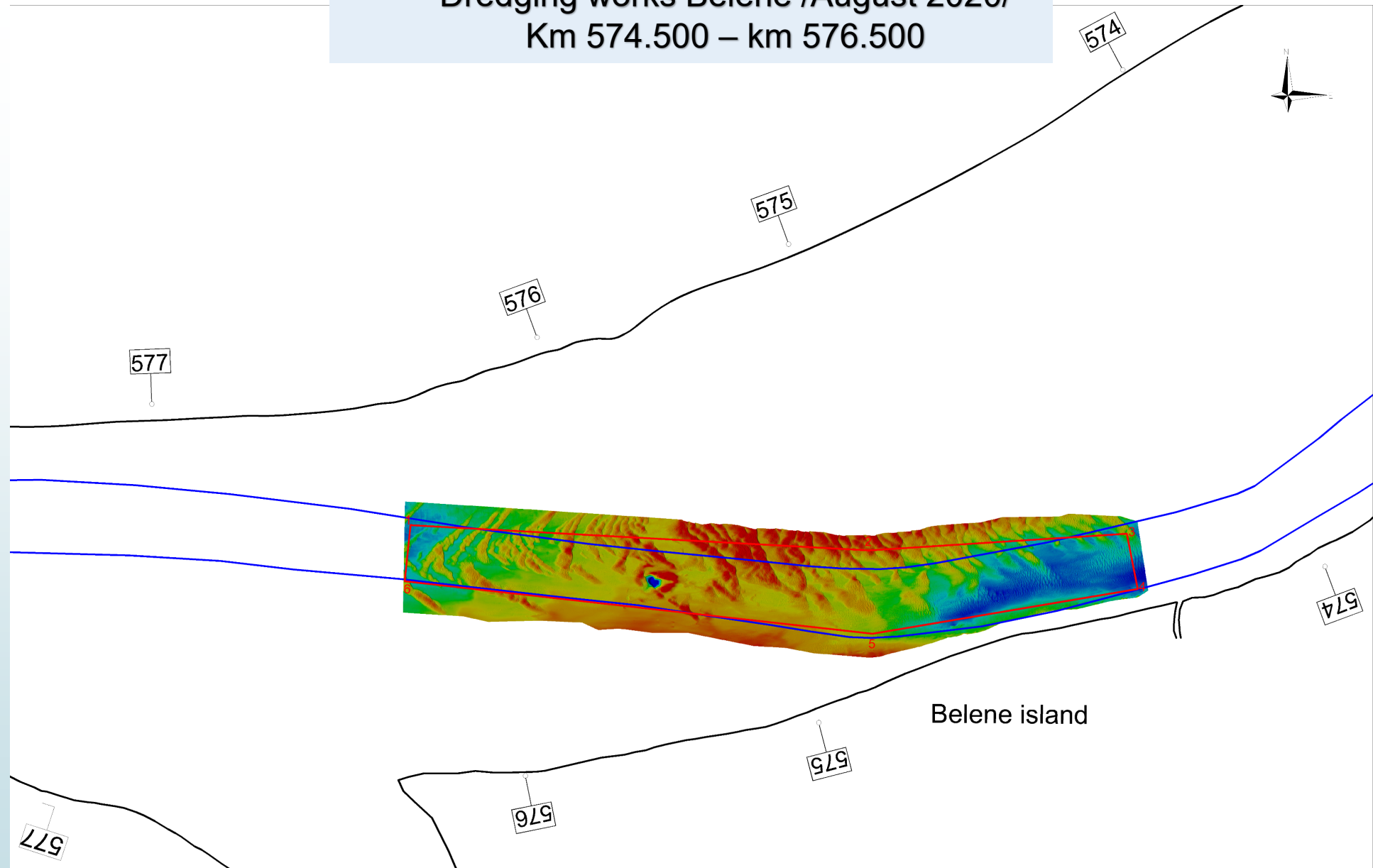
Dredging works Belene /June 2020/
Km 562.900 – km 565.000



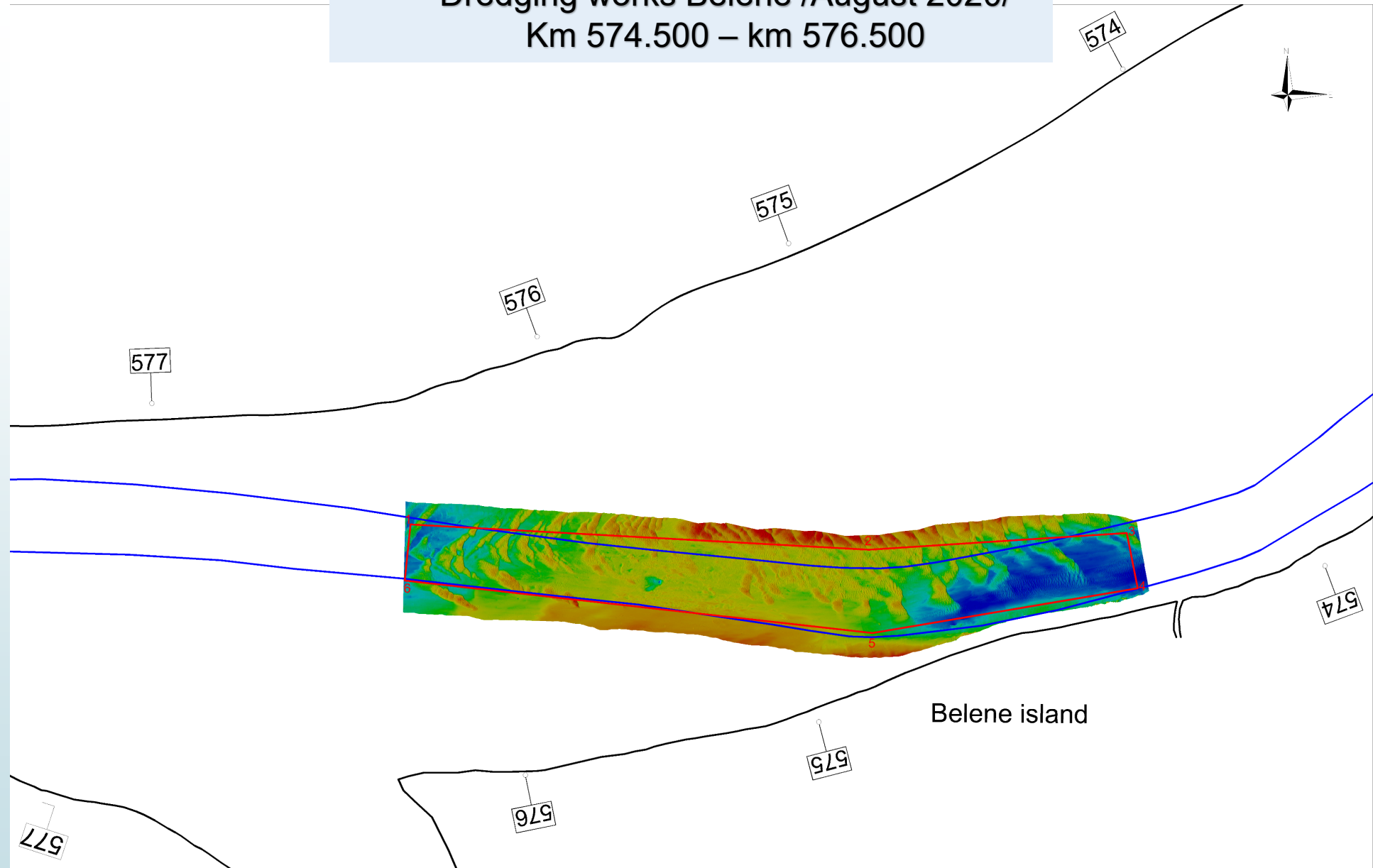
Dredging works Belene /Юни 2020/
Km562.900 – км 565.000



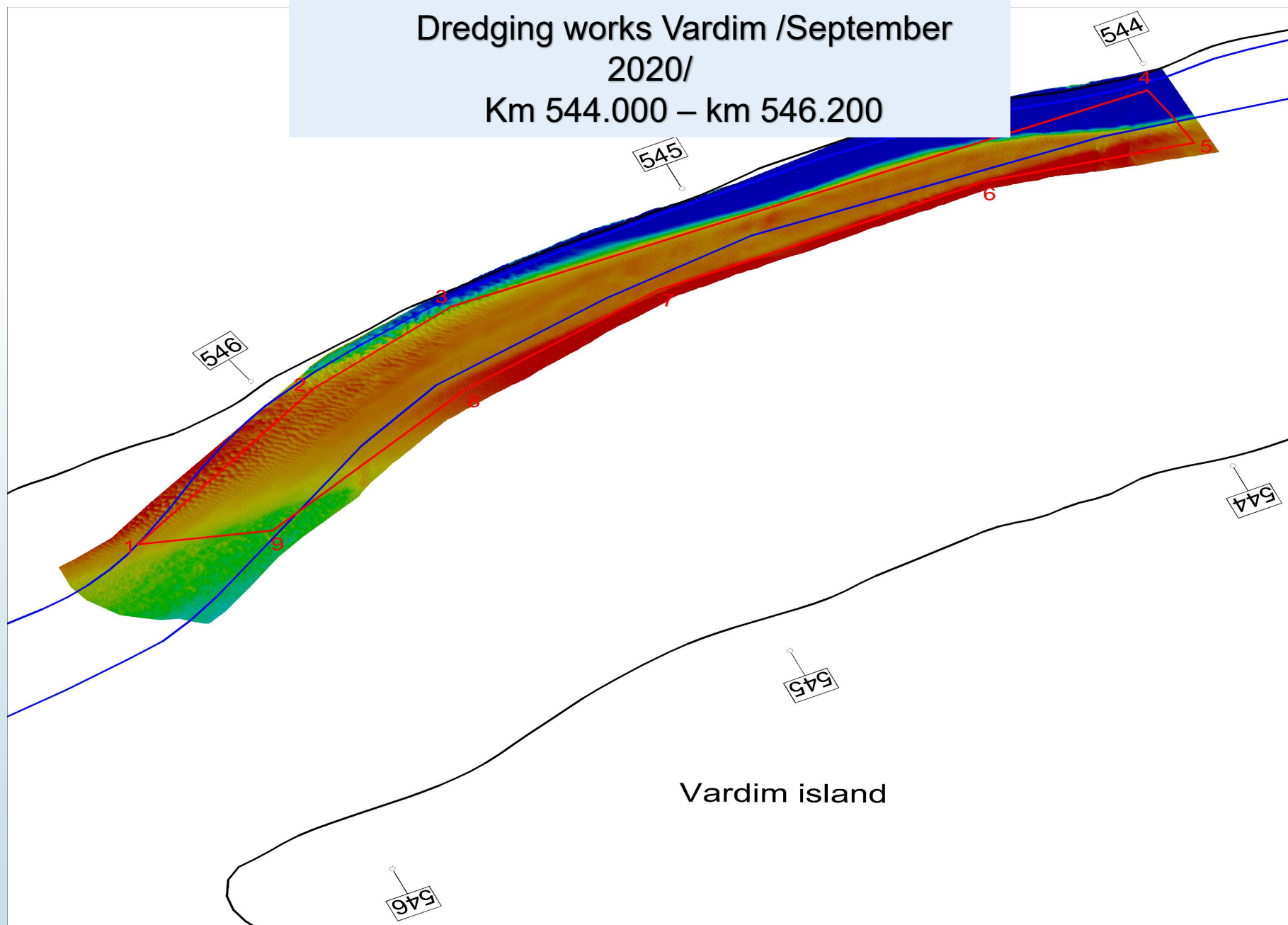
Dredging works Belene /August 2020/
Km 574.500 – km 576.500



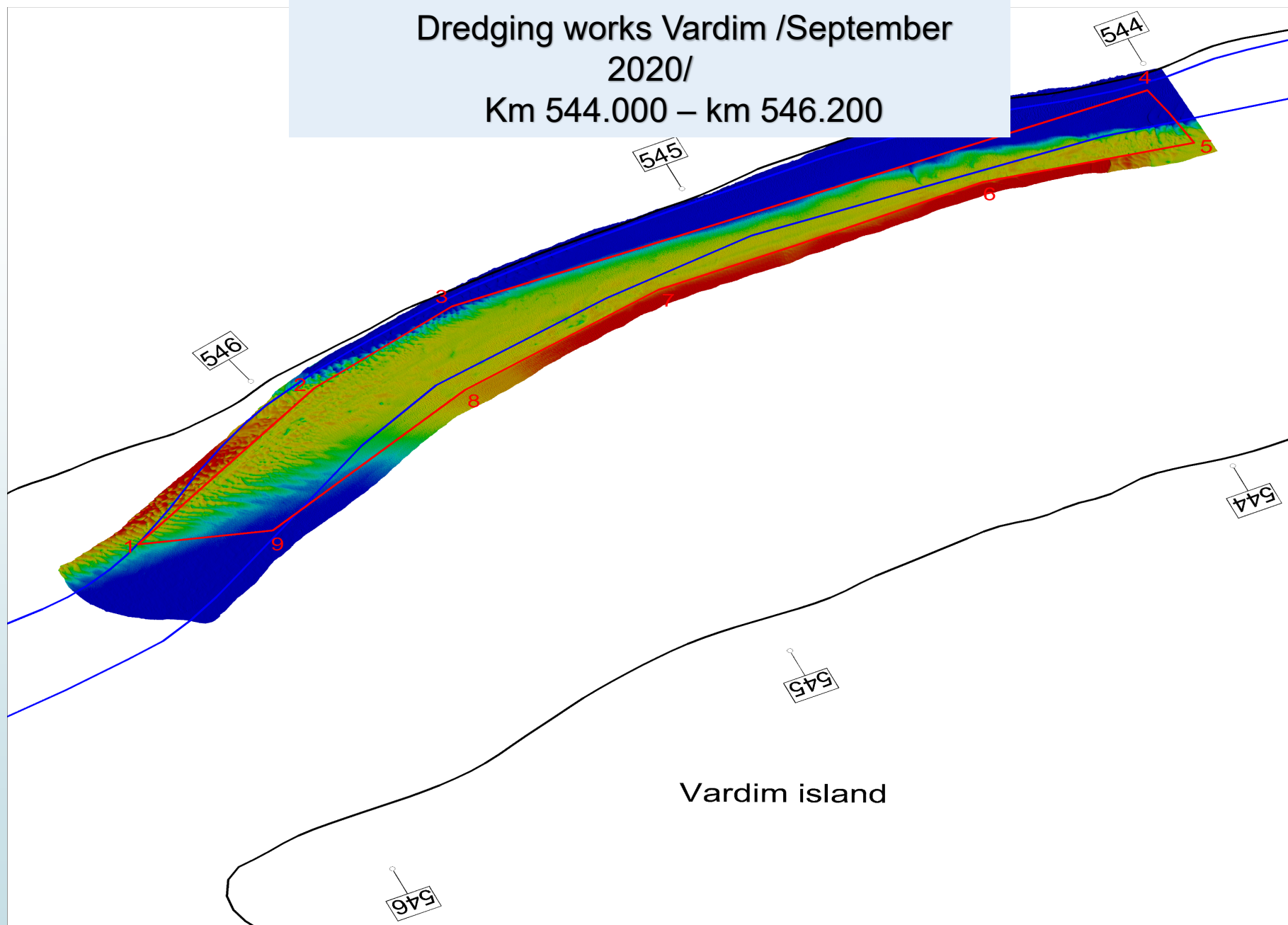
Dredging works Belene /August 2020/ Km 574.500 – km 576.500



Dredging works Vardim /September
2020/
Km 544.000 – km 546.200



Dredging works Vardim /September
2020/
Km 544.000 – km 546.200



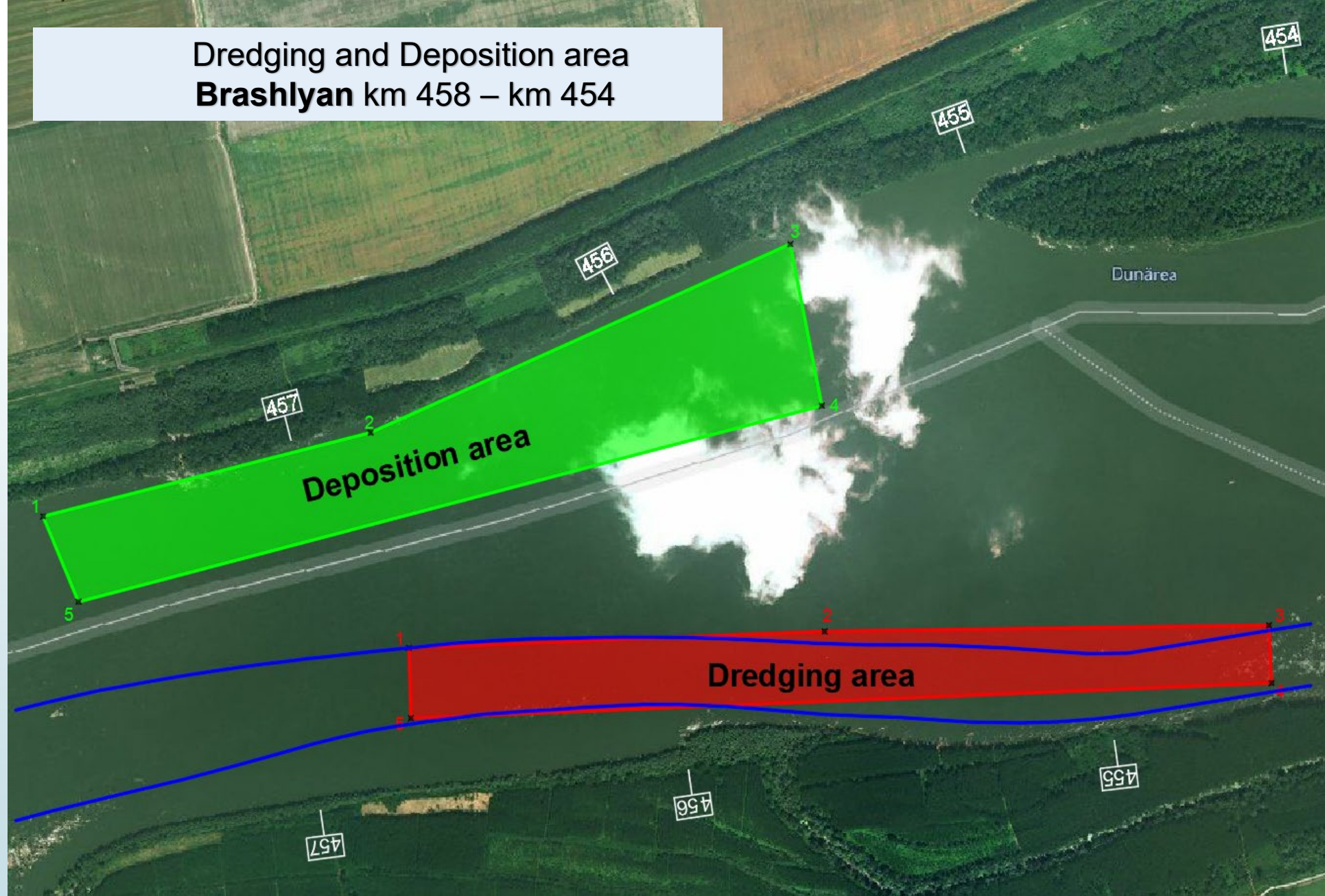
Dredging works - 2021

Dredging works were assigned in the following critical sections in order to guarantee sustainable depths:

- Brashlyan Island Area /May 2021/
 - km 456.800 – km 454.500
 - dredged volume: 94596 m³
- Yantra/June 2021/
 - km 538.500 – km 536.900
 - dredged volume: 92144 m³
- Vardim Island Area / June 2021/
 - km 545.500 – km 544.800
 - dredged volume: 57077m³
- Belene Islannd Area
 - km 564.200 – km 563.400
 - dredged volume: 22057 m³

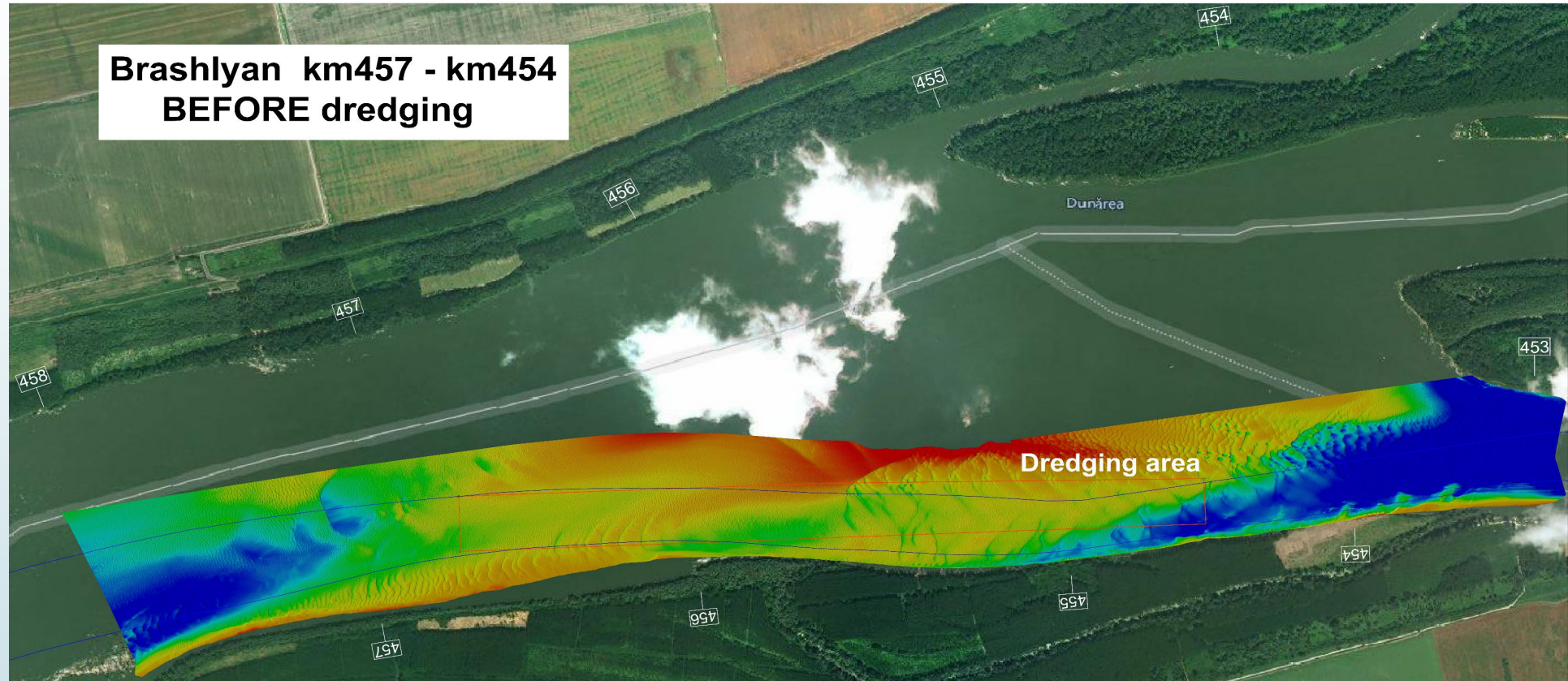
Total dredged volume: 265841 m³

Dredging and Deposition area
Brashlyan km 458 – km 454



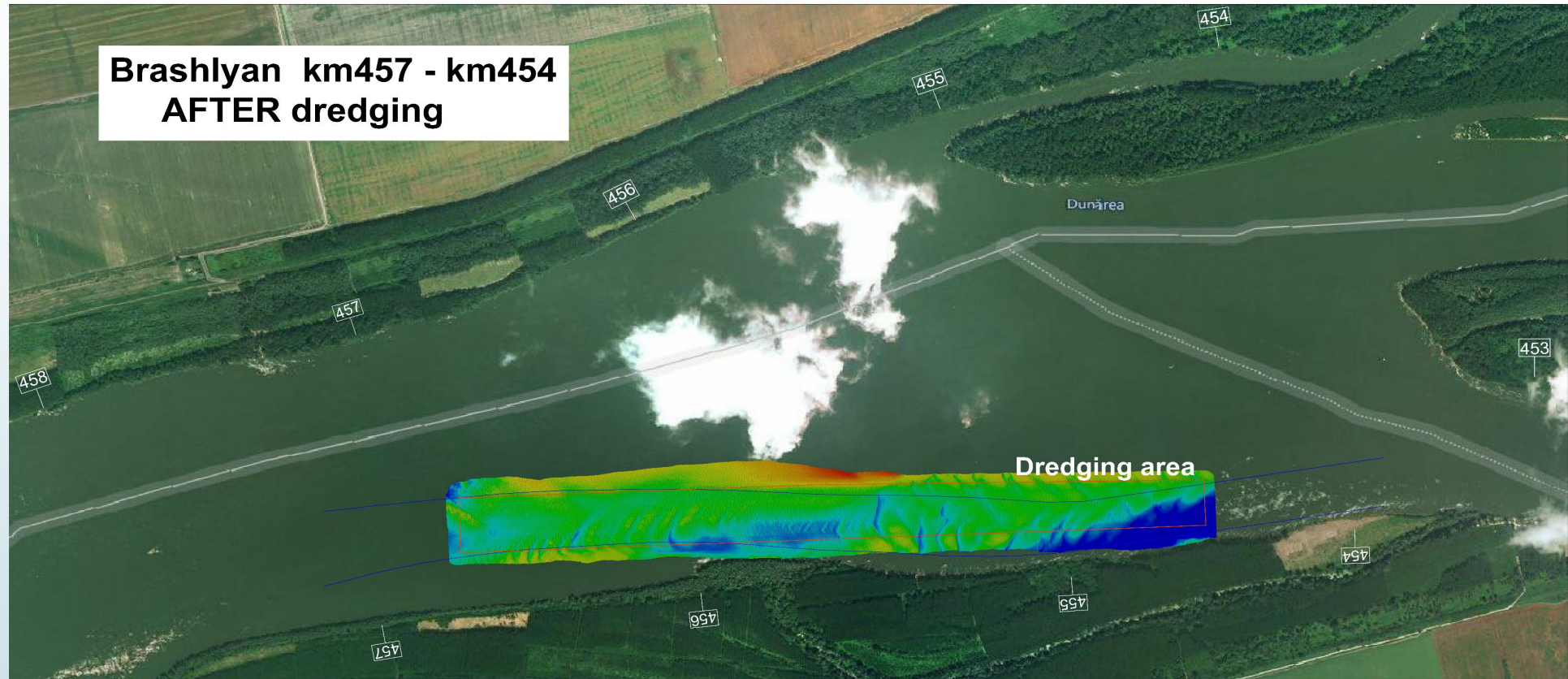
Dredging works Brashlyan Island /May 2021/

**Brashlyan km457 - km454
BEFORE dredging**

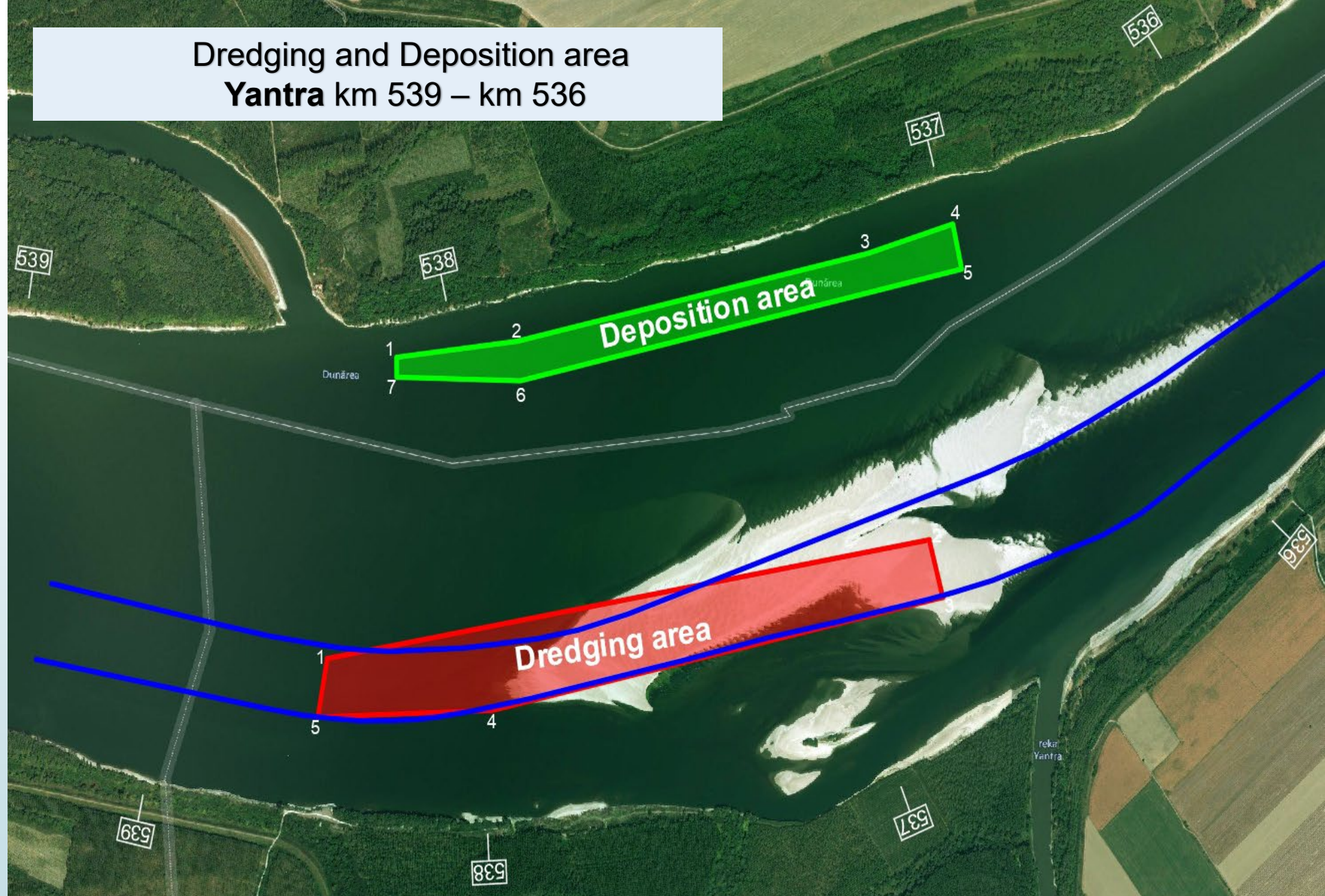


Dredging works Brashlyan Island /June 2021/

**Brashlyan km457 - km454
AFTER dredging**

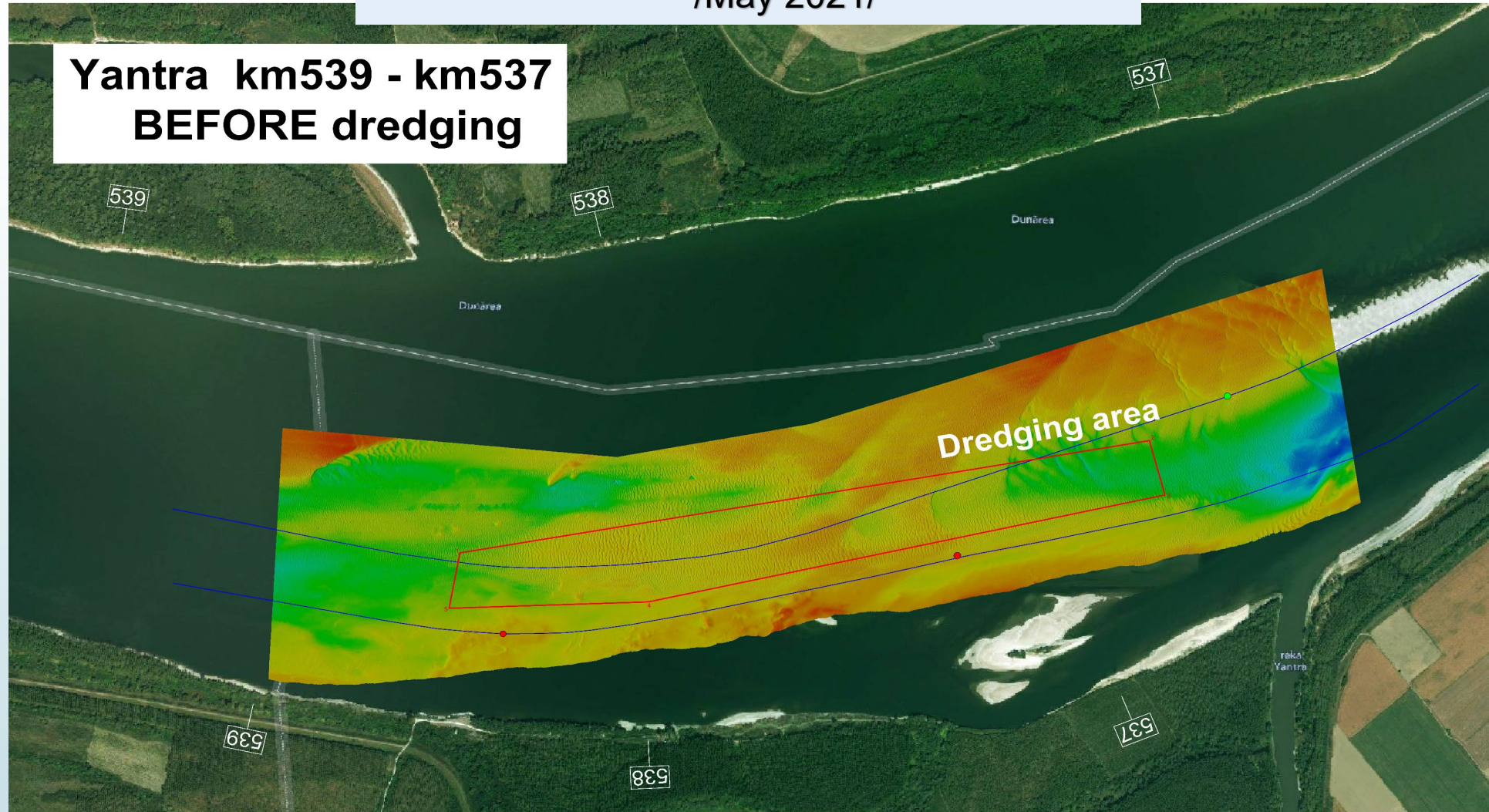


Dredging and Deposition area
Yantra km 539 – km 536



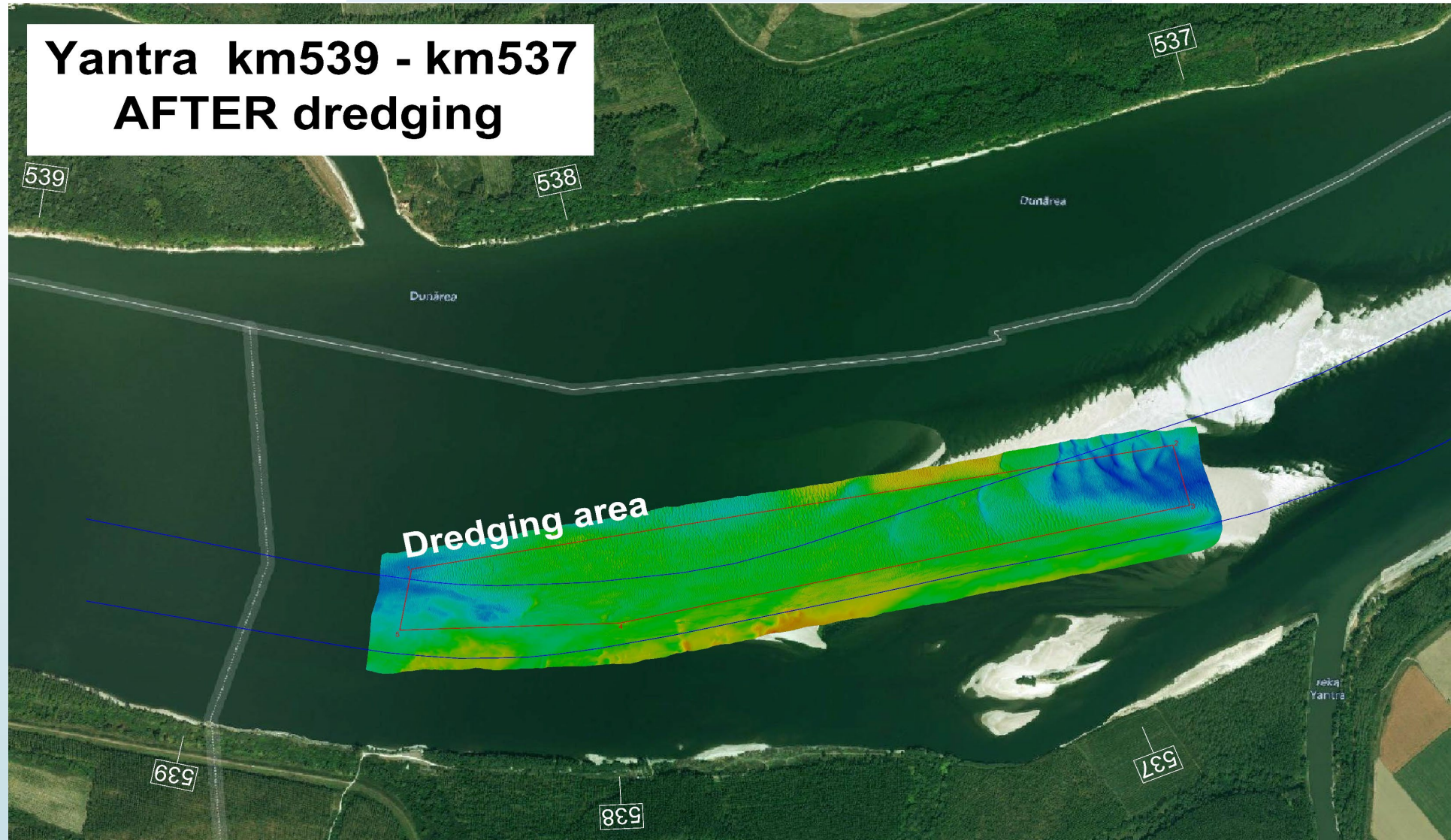
Dredging works Yantra /May 2021/

**Yantra km539 - km537
BEFORE dredging**



Dredging works Yantra
/June 2021/

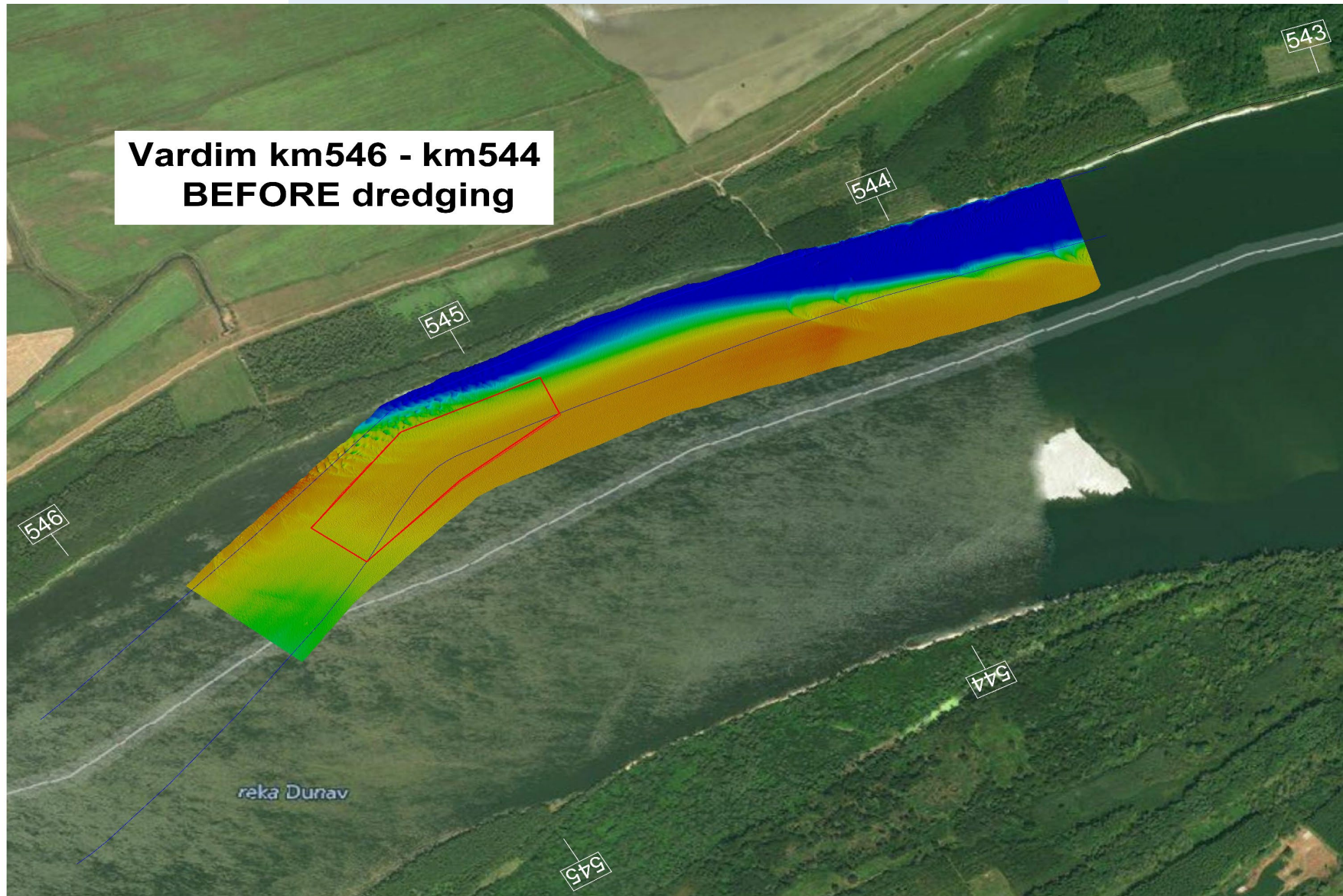
Yantra km539 - km537
AFTER dredging



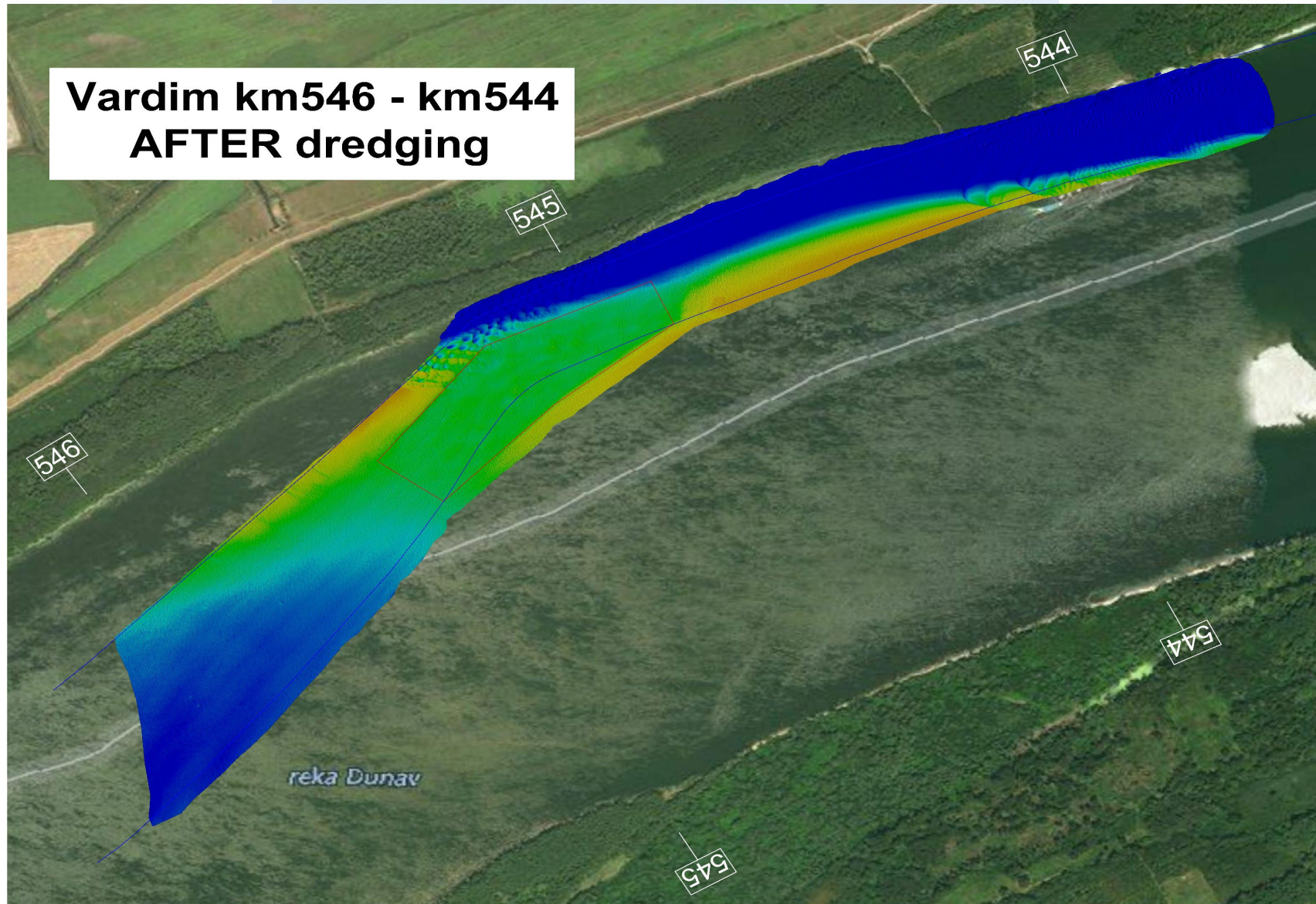
Dredging and Deposition area
Vardim km 548 – km 545



Dredging works Vardim /June 2021/



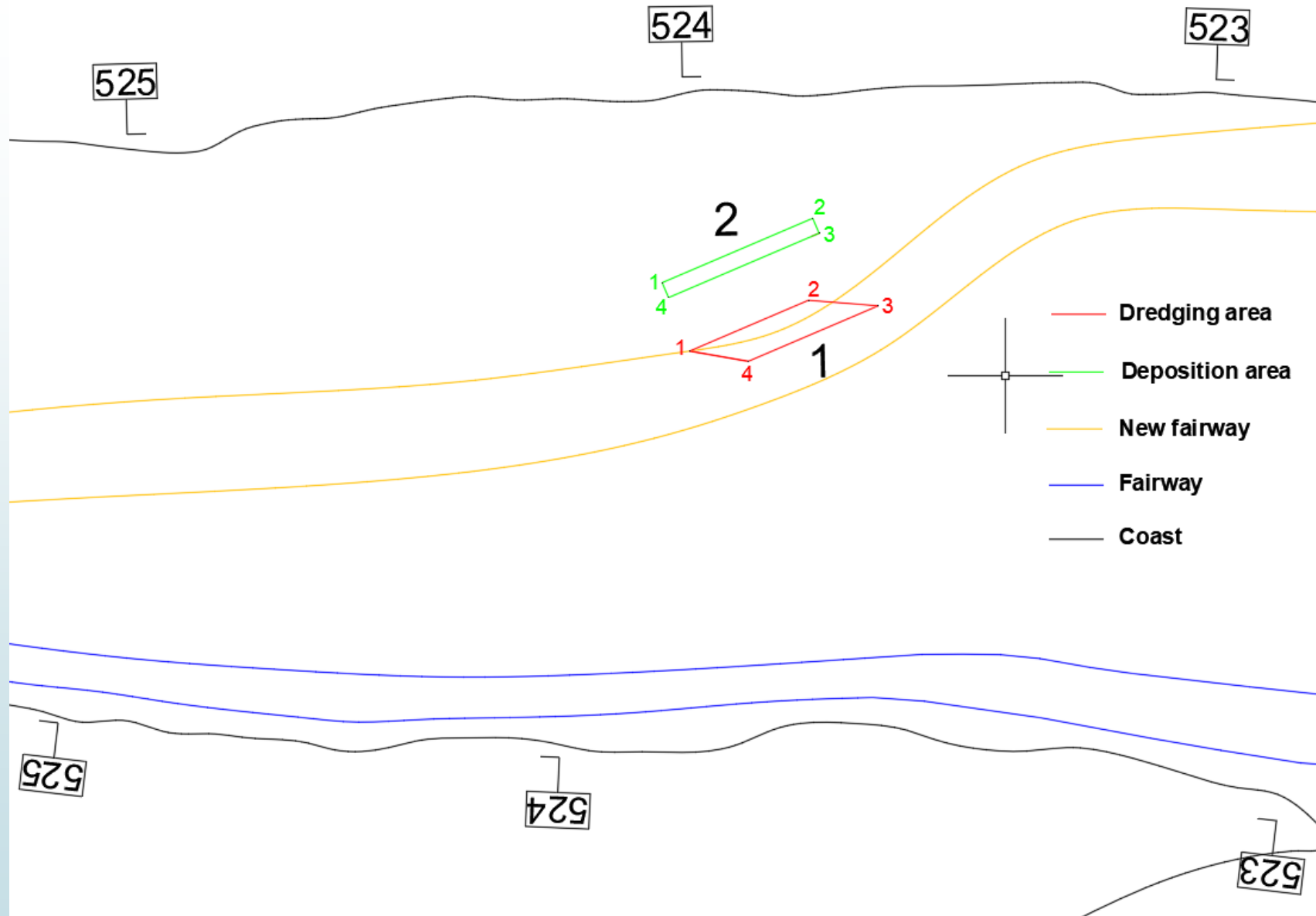
Dredging works **Vardim**
/July 2021/



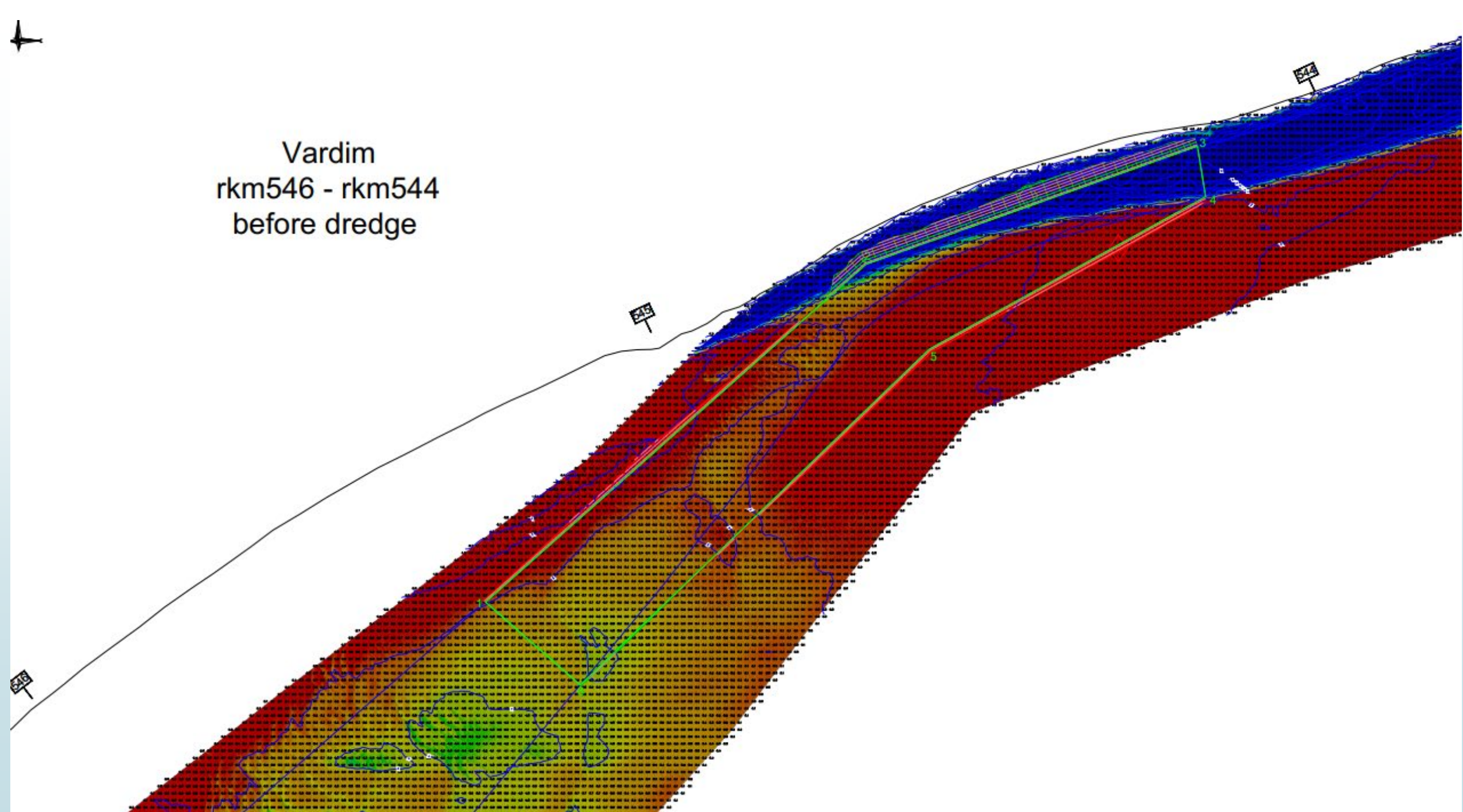
Dredging activities performed by EAEMDR

Dredging activities performed by EAEMDR on the fairway from km 610 to km 375			
Year	quantity, m³	location, rkm	Total
2012	45400	562	45400
2018	101011	546	256650
2018	155639	565	
2019	69992	565	300220
2019	116059	545	
2019	114169	521	
2020	71095	564	297289
2020	138780	545	
2020	47637	575	
2020	39777	545	
2021	94596	455	265841
2021	92144	537	
2021	57077	545	
2021	22024	564	
2022	50000	564	199453
2022	20000	524	
2022	92677	545	
2022	36776	524	

Dredging works in Batin Island area /October 2022/

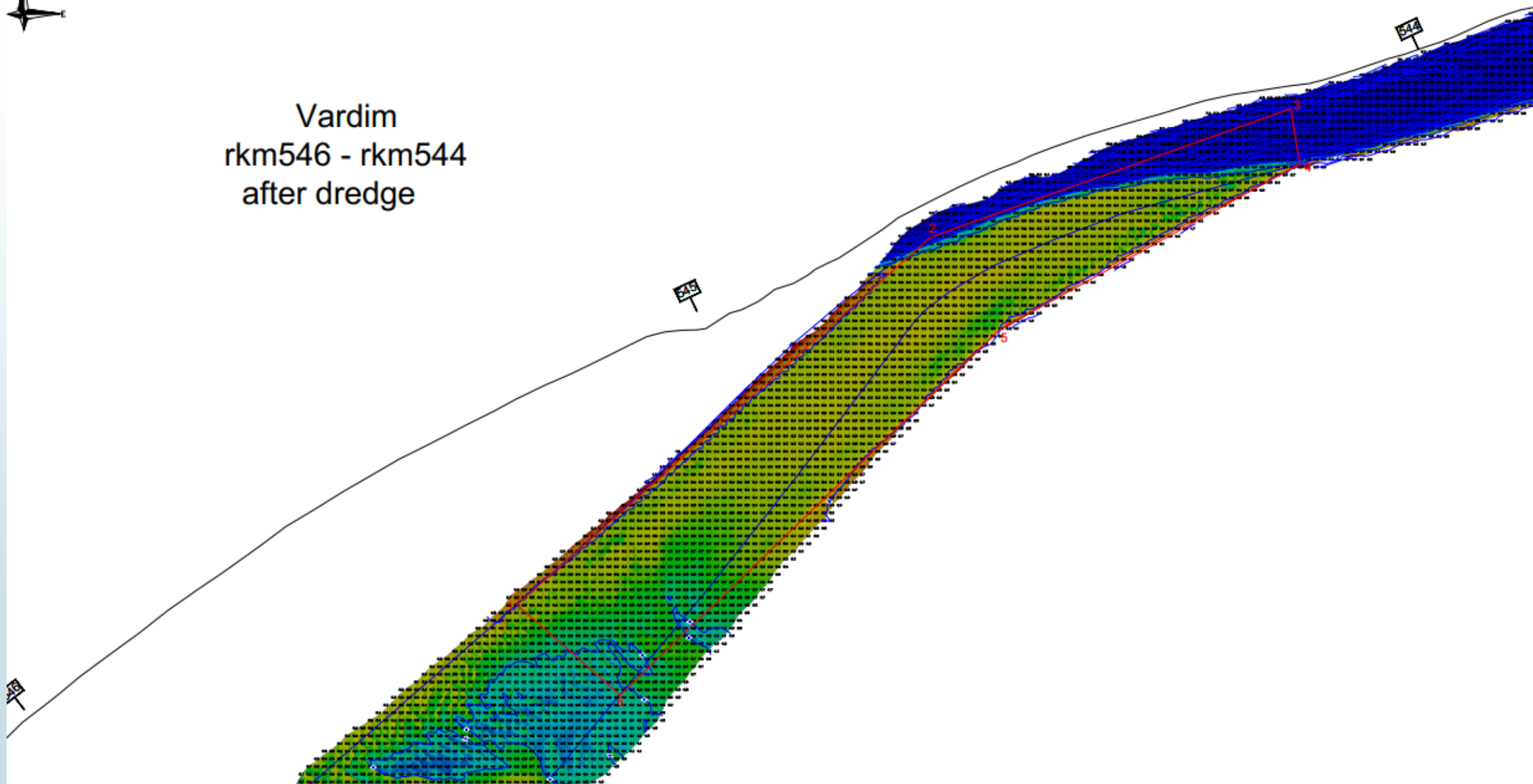


Vardim
rkm546 - rkm544
before dredge





Vardim
rkm546 - rkm544
after dredge

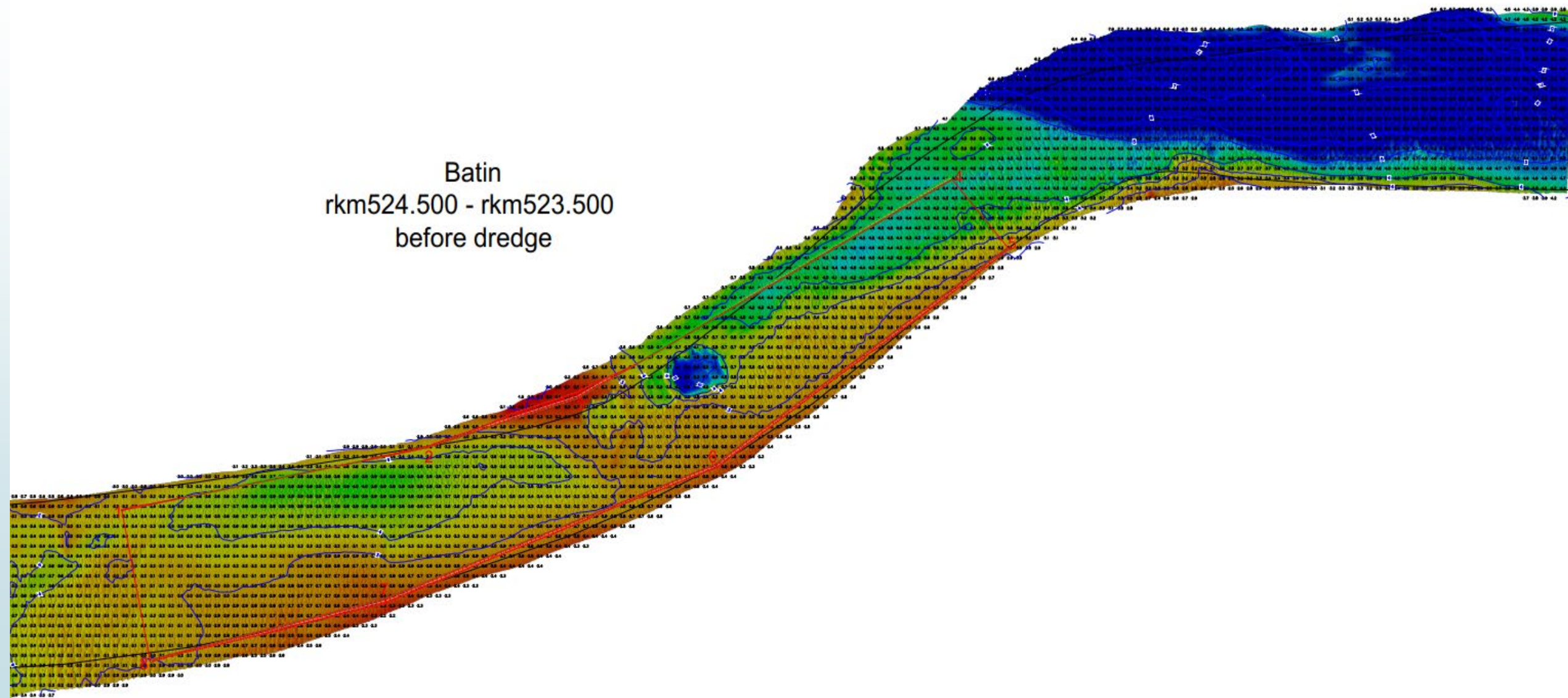


524

523

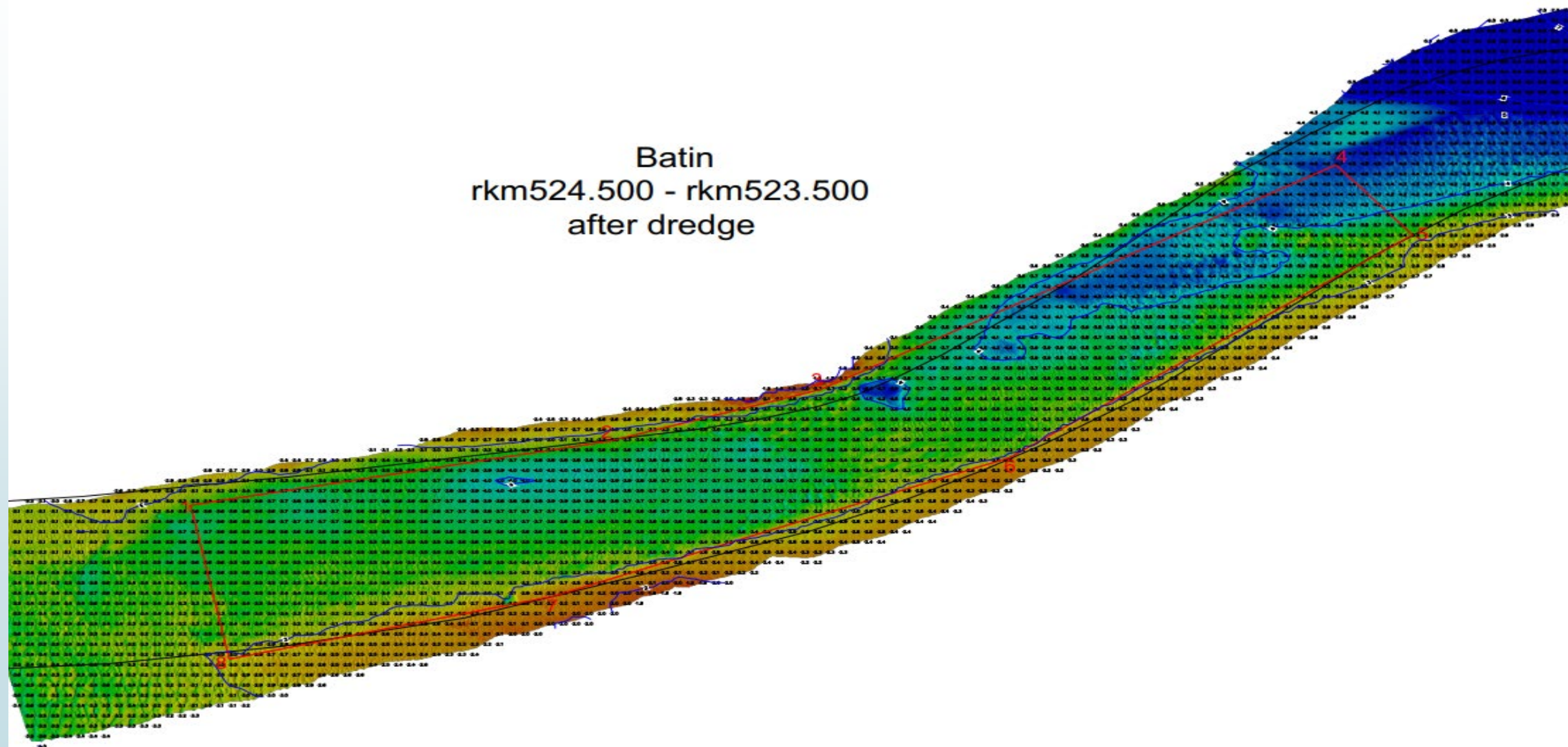


Batin
rkm524.500 - rkm523.500
before dredge



524

Batin
rkm524.500 - rkm523.500
after dredge



Results

► Based on the hydrographic surveys, the following results were achieved at the dredging sites:

- depths above 3 m reached at the LNWL;
- width of the fairway - more than 150 m;
- radius of the curve - 1000 m and more.

► In connection with the abovementioned facts and taking into account the statistical data from the hydro meteorological situation in the Bulgarian section of the Danube, we can summarize that to maintain a functioning navigational way in the critical areas and to prevent stopping and hampering of the navigation, it is necessary to dredge annually an average amount of not less than 250 000 – 300 000 m³.

Surveying activities

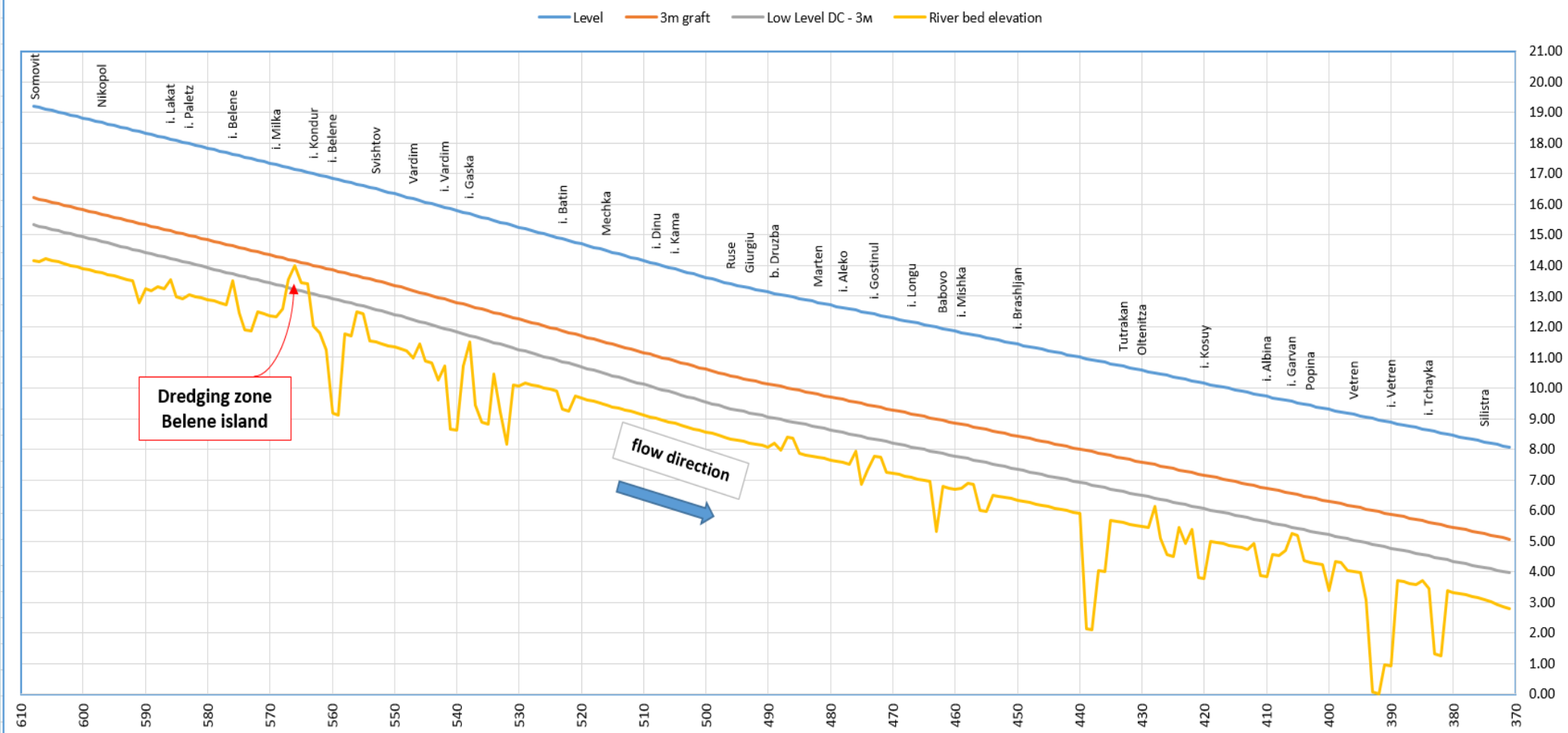
Multi-beam Surveys:

- 2022 – 38 sites with total area approximately 31 821 874 m²;
- 2021 – 59 sites with total area approximately 55 039 626 m²;
- 2020 – 51 sites with total area approximately 45 987 863 m²;
- 2019 r. – 36 sites with total area approximately 33 658 225 m²;
- 2018 r. – 48 sites with total area approximately 50 283 513 m²;
- 2017 r. – 25 sites with total area approximately 11 070 000 m²;

Detailed Single-beam Surveys:

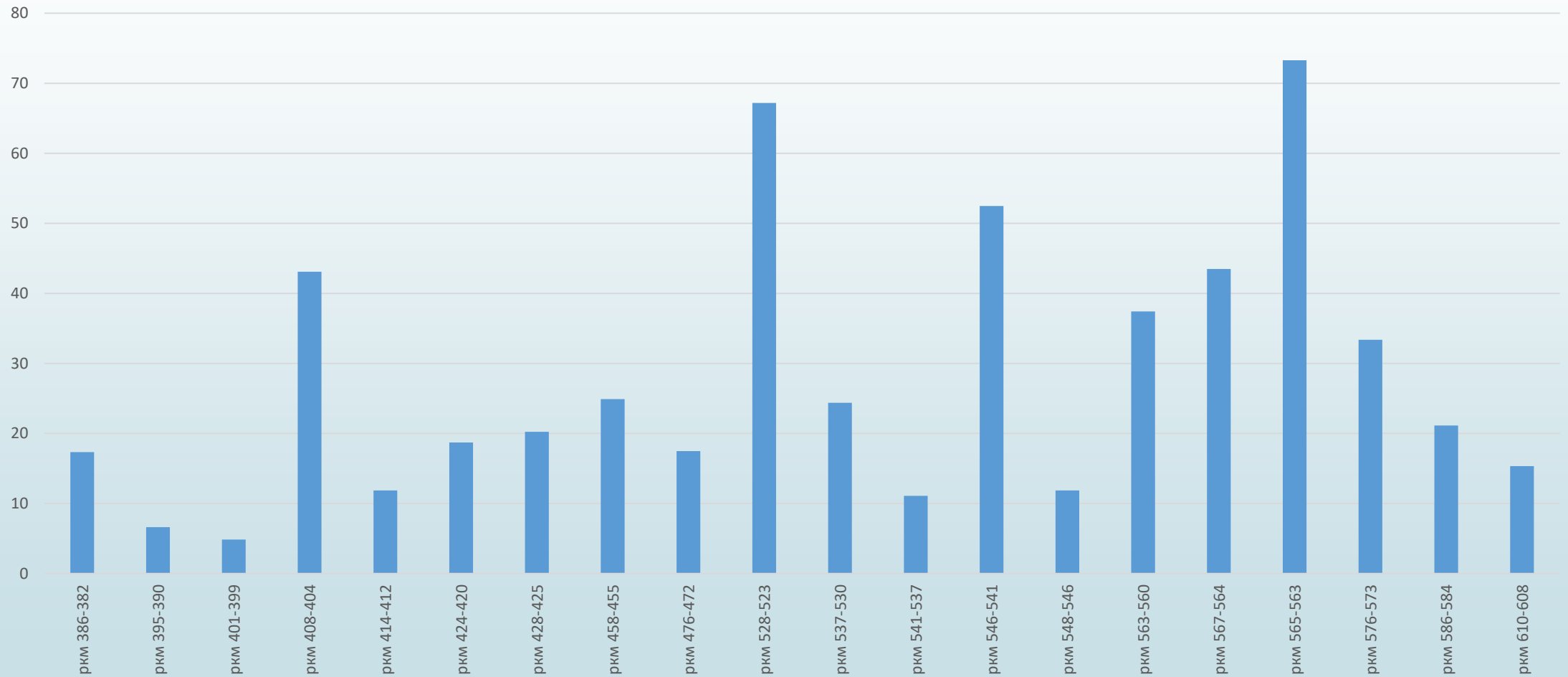
- 2016 r. - 10 sites – 190 profiles with length 616.31 km;
- 2015 r. - 11 sites – 628 profiles with length 552 km;
- 2014 r. - 16 sites – 1 988 profiles with length 2 227.27 km;
- 2013 r. - 4 sites – 103 profiles with length 100 km.

LEVELS AND RIVER BED ELEVATIONS DANUBE 17.07-2019, BALTIC SYSTEM

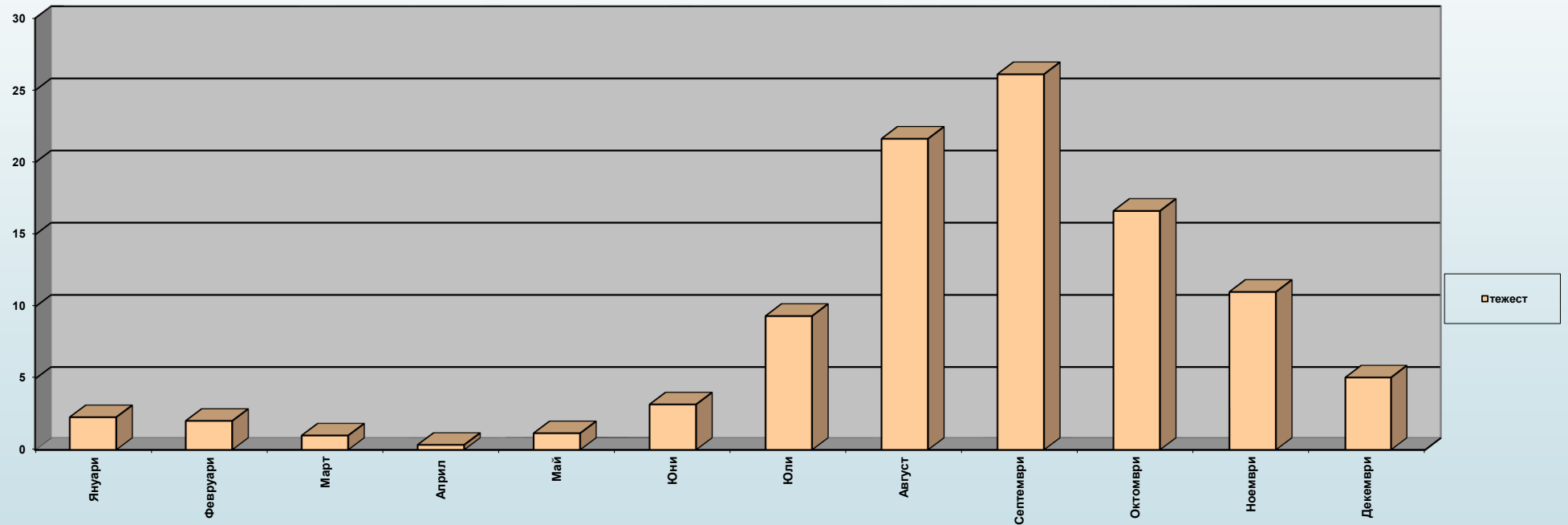


Measures planned to secure navigation in 2023

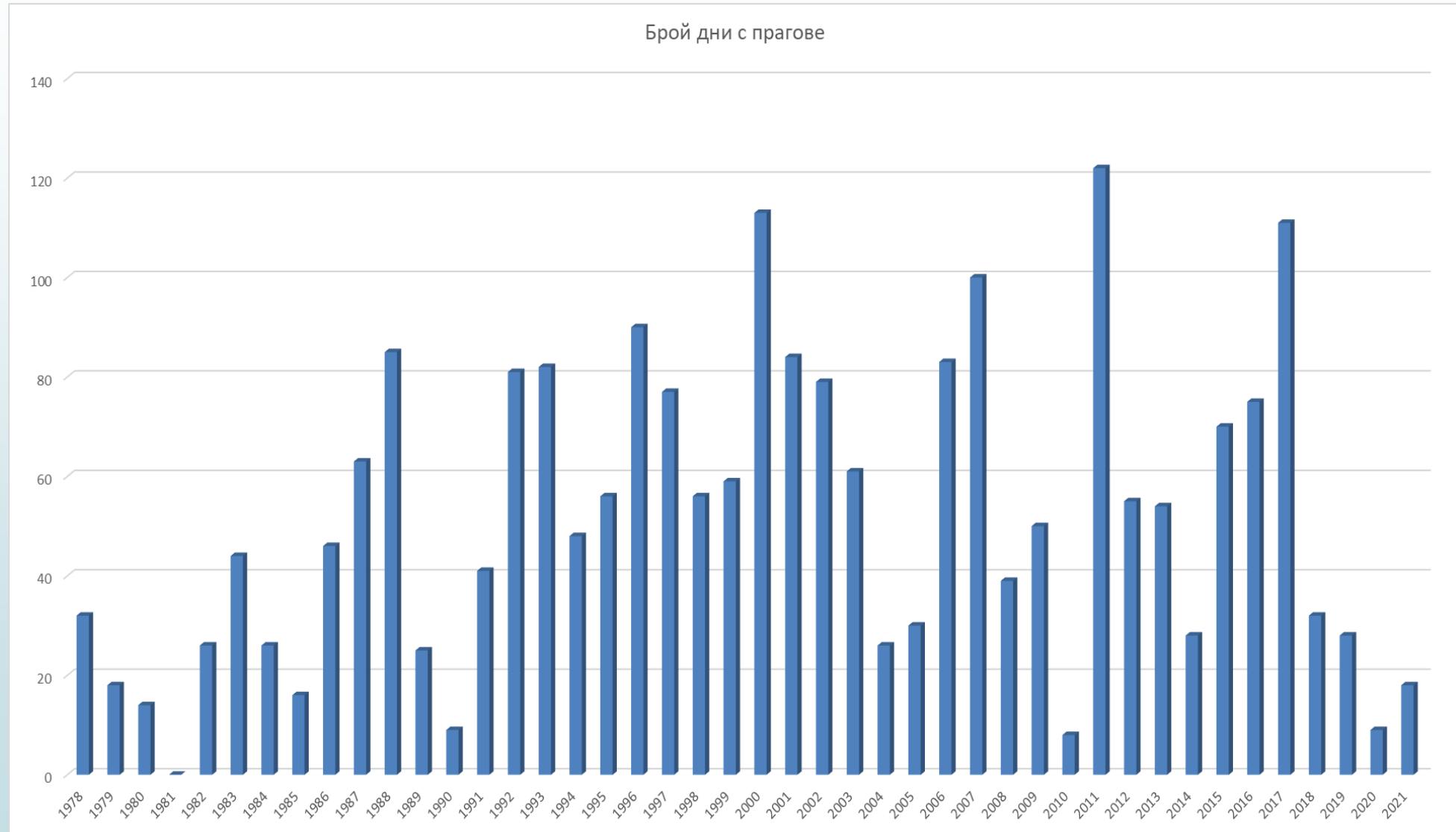
Frequency of bottlenecks occurrence



Weight of the months with bottlenecks, %



Frequency of bottlenecks occurrence on an annual basis, 1978 - 2021



Operating costs of the activity in 2022
and estimated budget for 2023

Need areas	Operational expenditures 2022	Operational budget 2023
Minimum fairway parameters (width/depth)	1 214 369	2 359 960
Surveying of the riverbed	92 202	105 000
Water level gauges, Information on water levels and forecasts, Meteorological information	83 347	85 000
Marking of the fairway	311 653	341 300
Other needs	20 000	20 000
Total (Euro):	1 721 571	2 911 260



THANK YOU FOR YOUR ATTENTION

Ivelin Zanev

Executive Director, EAEMDR Bulgaria