



The potential of fairway information services and active traffic management to cope with low water conditions

Plans for 2024

REGULATIONS

According to §7 (1) of the 17/2002 **KöViM Regulation in force in Hungary**: In order to ensure the operation of water traffic on waterways the dimensions and design of the fairway **shall be determined considering the relevant recommendations of the DC** as regards the Danube.

UN

Danube Commission

Convention



94% durability

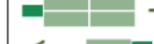
240 navigable day

Recommendation

- a water level of the low discharge of 94% durability
- ENR calculated from the data of 30 years
- from ice-free periods
- Safety distance depending on the quality of the riverbed -> 27/28 dm depth

according to the current recommendation of the DC 2012: between Vienna and Belgrade: VI/C - 120-150 m width

1-2. táblázat: VI/B osztályú vízút esetén (4 darabos tolt kötélméret)

Kanyarulati sugár	Egyirányú forgalomban 4 egységből álló tolt kötélek völgymenetben	4 egységből álló völgymenő tolt kötélek és hegymenő magányos hajó találkozása	4 egységből álló tolt kötélek találkozása
	1. szint	2. szint	3. szint
			
≤ 1,000 m	80 m	120 m	160 m
1,000-1,500 m	60 m	100 m	120 m
> 1,500 m	40 m	80 m	100 m

A „NEWADA Duo” projekt alapján a VI/C osztályú vízút esetén (6 darabos tolt kötélméret 3) a javasolt értékek a következők:

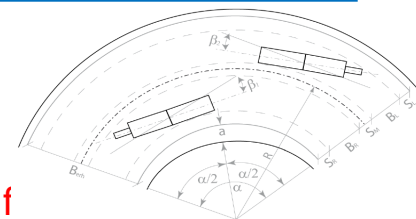
1-2. táblázat: VI/C osztályú vízút esetén (6 darabos tolt kötélméret)

Kanyarulati sugár	Egyirányú forgalomban 6 egységből álló tolt kötélek völgymenetben	6 egységből álló völgymenő tolt kötélek és hegymenő magányos hajó találkozása	6 egységből álló tolt kötélek találkozása
	1. szint	2. szint	3. szint
			
≤ 1,000 m	100 m	150 m	180 m
1,000-1,500 m	80 m	120 m	150 m
> 1,500 m	60 m	100 m	120 m



CHARACTERISTICS

Szap – southern international border: 433 rkm



EDUVIZIG:

- Bottleneck above ENR: 8 pcs
- Shallow section above ENR: 1 pcs
- Bottleneck under ENR: 9 pcs
- Shallow section under ENR: 1 pcs

KDVVIZIG:

- Bottleneck above ENR: 9 pcs
- Shallow section above ENR: 11 pcs

ADUVIZIG:

- Bottleneck above ENR: 4 pcs
- Shallow section above ENR: 0 pcs
- Bottleneck under ENR: 4 pcs
- Shallow section under ENR: 2 pcs
- 1 dm safety distance
- And ADN couldn't use the deep chanel -> 123/Du/2022

19 rkm bottlenecks -> pdf

10,7 rkm shallow sections -> pdf

And:

7,9 rkm bottlenecks under ENR -> pdf

1,3 rkm shallow sections under ENR -> pdf

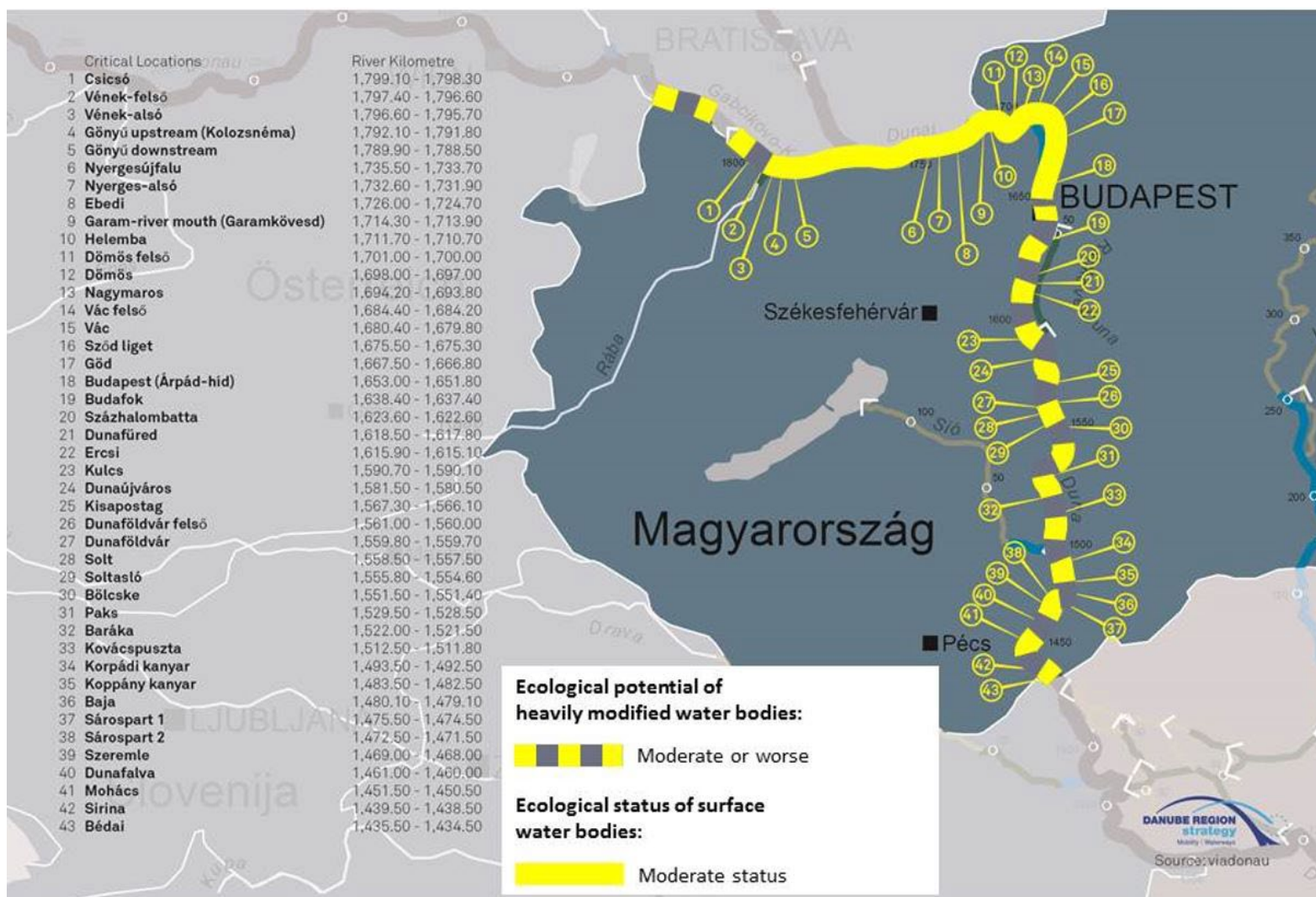
IFAF webservice & hydroinfo too below ENR

- Only free-flowing sections
- Riverbed subsidence – Gönyű area & between Kisapostag and Paks
- Fairway curve difficulties – Dömös (Dunakanyar) & Gönyű & Vének & Nyerges & Vác & Dunaföldvár
- Sediment problems – longitudinal & cross-sectional
- Varied riverbed material: rocky bed, gravel, sand ...

CHARACTERISTICS

International border: 103 rkm – EDUVIZIG

National sections – KDVVIZIG & ADUVIZIG: 148 +127 rkm



WITHOUT INTERVENTIONS

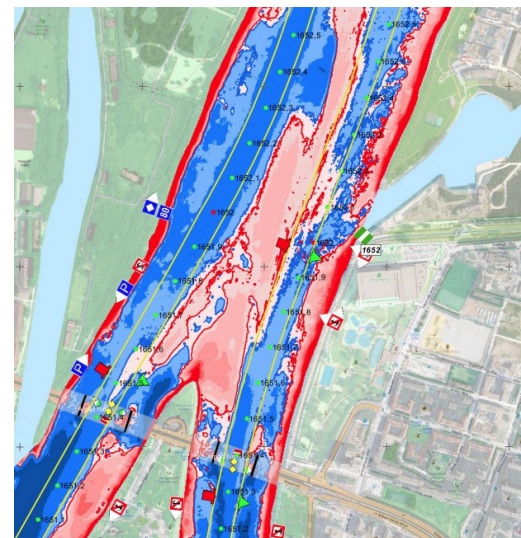
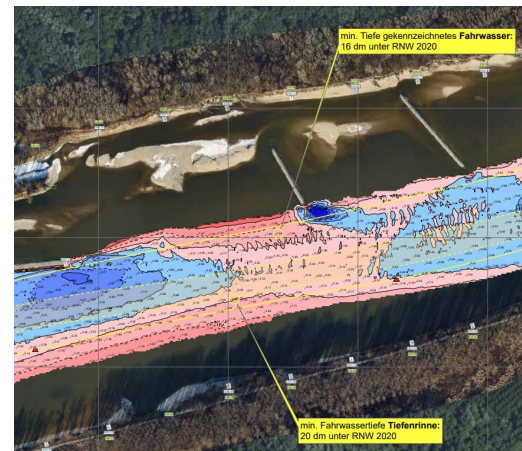
Alternative beaconing (fairway designation)

- Bottleneck (100 - 60 m)
- Alternative path lines
- Deep channel -> regulatory issues

Regulatory Issues:

1. A deeper part of bottleneck is marked - if its width is at **least 50 m at or above the ENR, and at least 30 m below the ENR**. For bottleneck marked with two depth values, the deeper area is defined by its width and its reference line (e.g. 40 m wide by red bouy, or 50 m wide in the middle [always], or 60 m wide by left bank.)
 2. bottleneck norm depend by direction: upstream or downstream
- Not everywhere is deep channel
 - We can't display in iENC the deep channel – only one bottleneck area

One measurement per year – all critical sectors





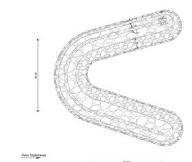
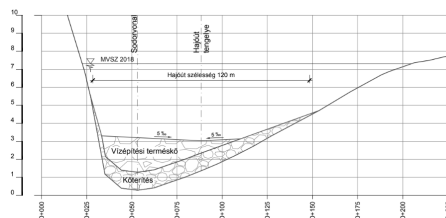
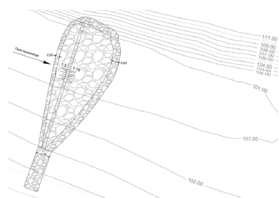
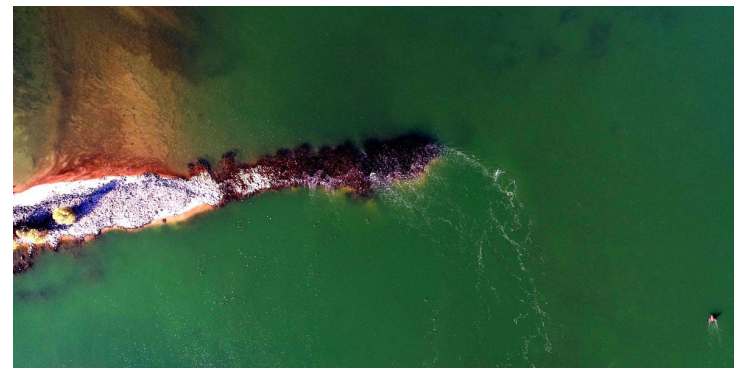
TECHNOLOGICAL INTERVENTIONS -> PERMISSION

Hydraulic structures (quarystone) -> increasing water level

- Submerged weir
- Chevron dike
- Groin
- Bank (erosion) protection
- Guide bank

Removal -> Dredging

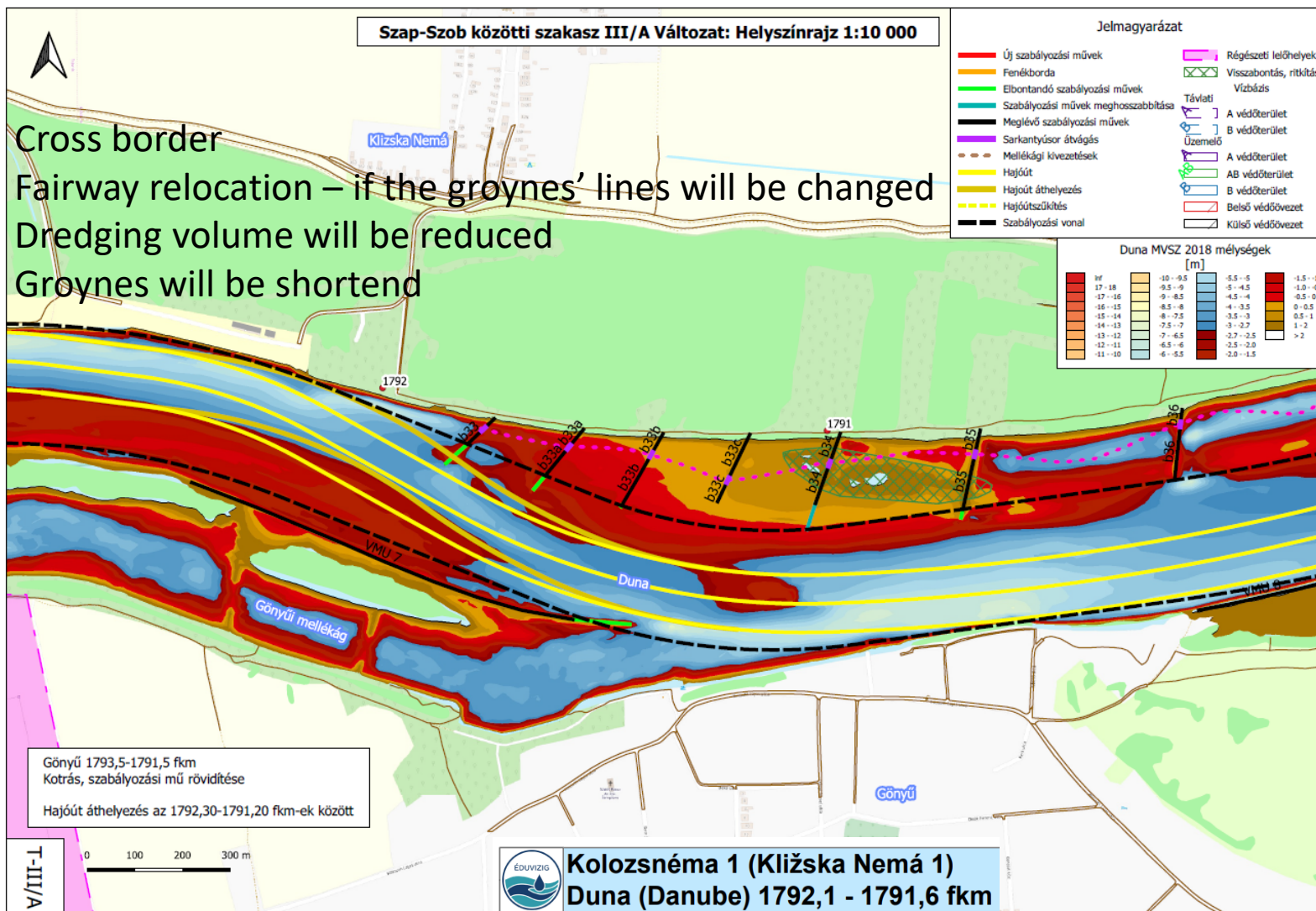
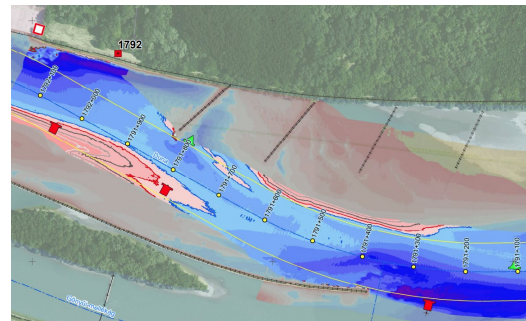
- River bed dredging
- Sediment dredging between groins





Intervention plan for 2024

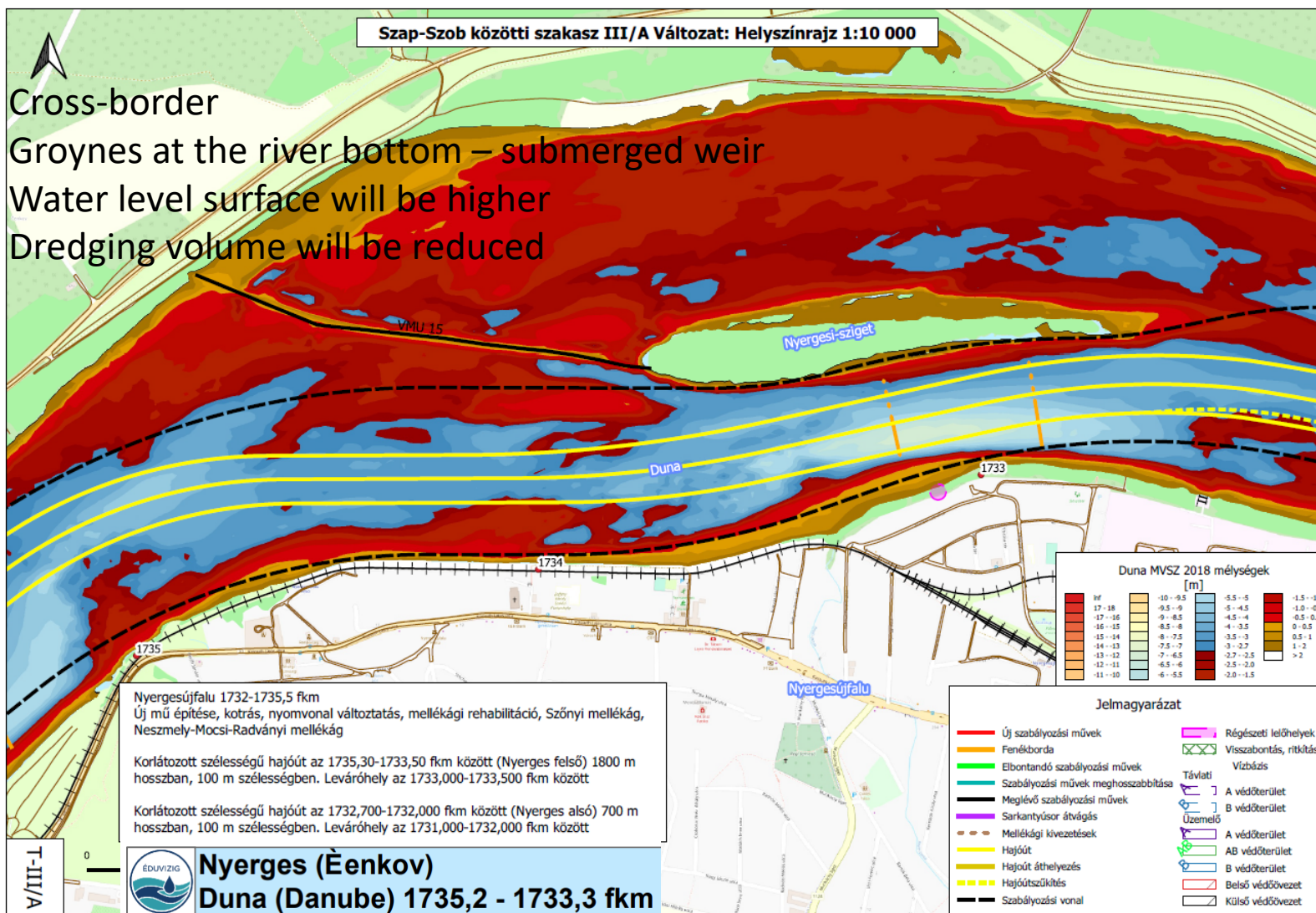
Mélység LHKV: 23 dm 100 méter szélességben (25 dm 60 méterben a zöld úszók mellett)
Depth at ENR: 23 dm in 100 m (25 dm in 60 m along green buoys)
LKHV vizállás (ENR WL): Gönyű 5 cm





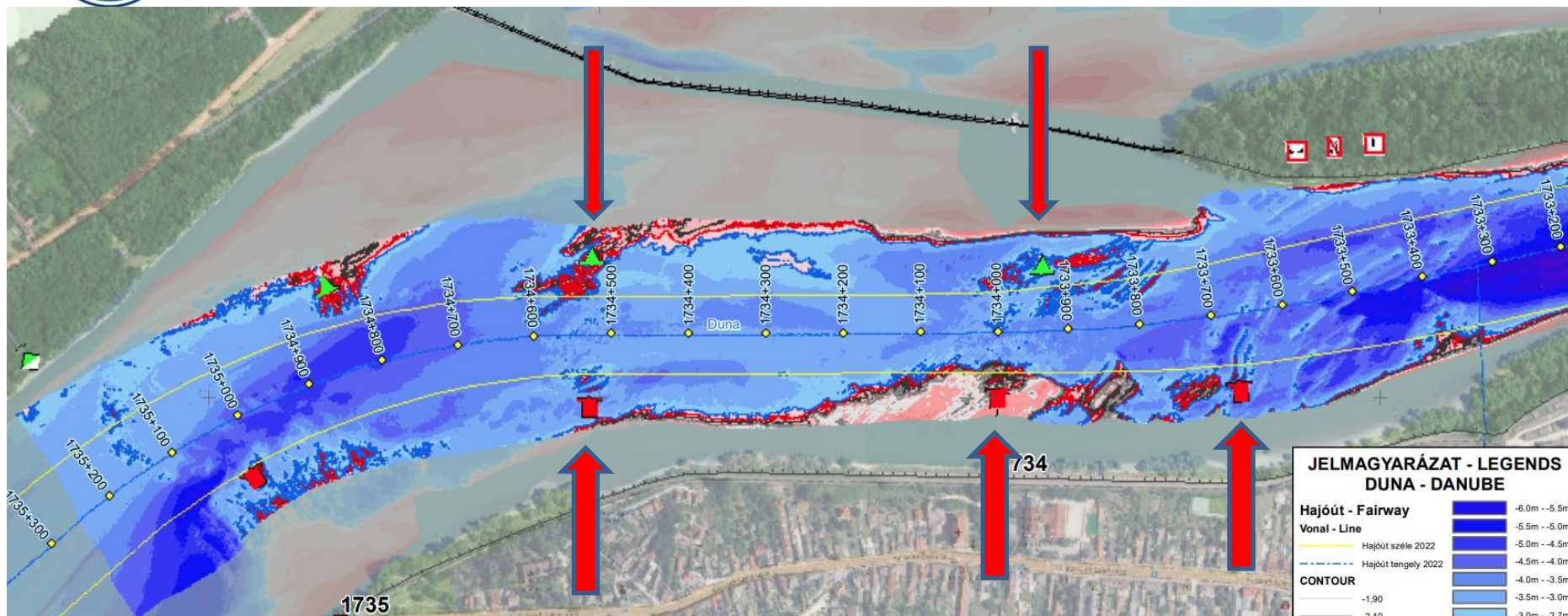
Intervention Nyerges for 2024 option No.1

Mélység LHKV: 20 dm 100 méter szélességben (22 dm 60 méterben a vörös úszók mellett)
Depth at ENR: 20 dm in 100 m (22 dm in 60 m along red buoys)
LHKV vízállás (ENR WL): Stúrovó 47 cm





Intervention Nyerges for 2024 option No.2



A MI VÍZÜGYÜNK

Cross-border – Slovak must agree

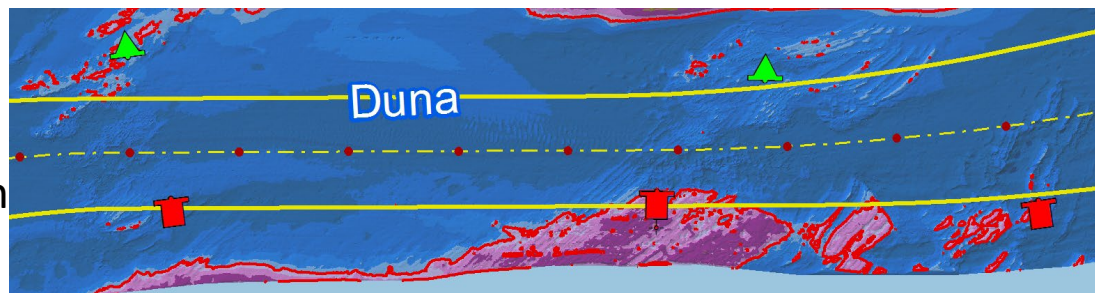
Bouys relocation

Fairway width will be reduced: ~ 80 m

Next to red bouys will be the deep channel: 50 m appr. 22 dm will be improved

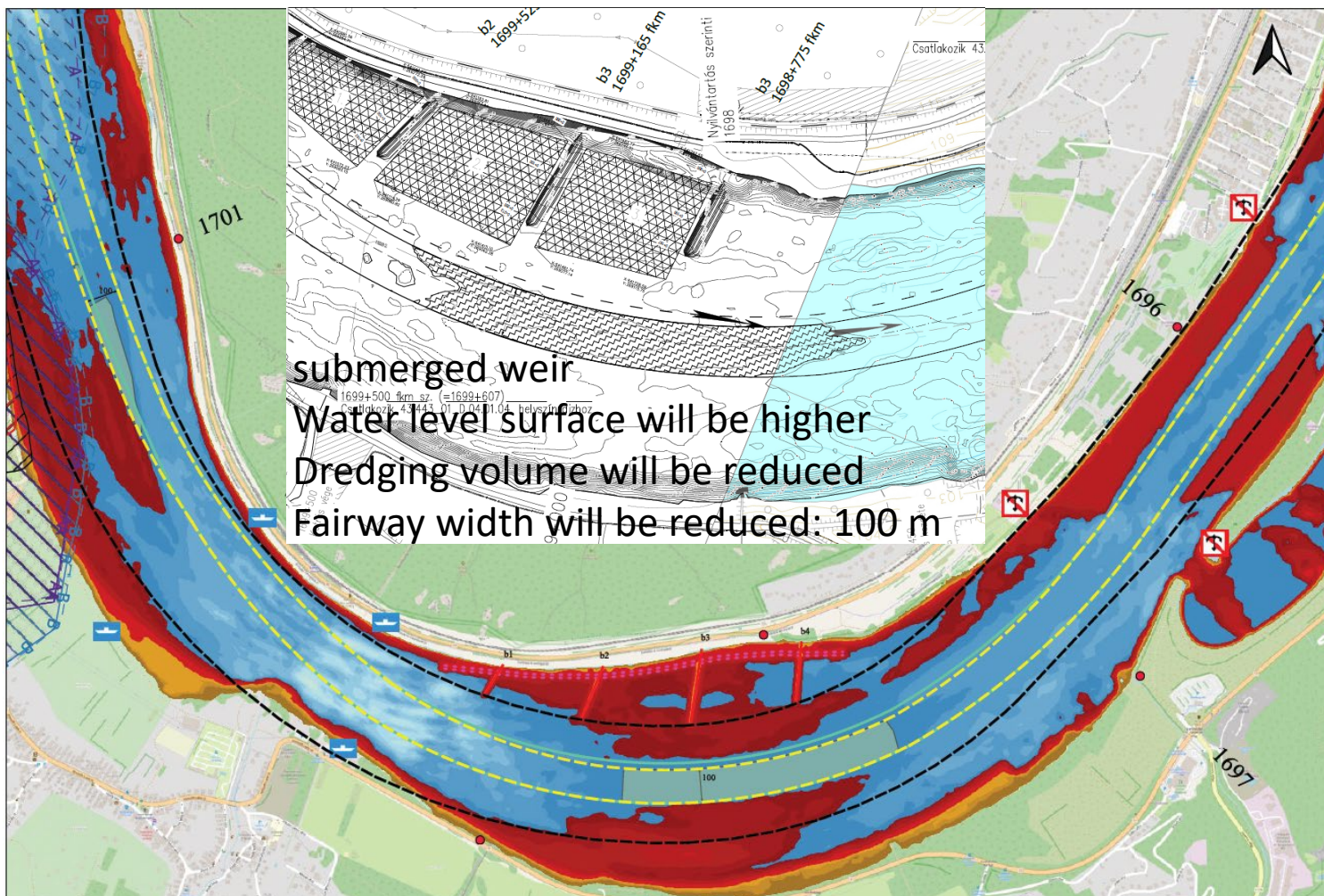
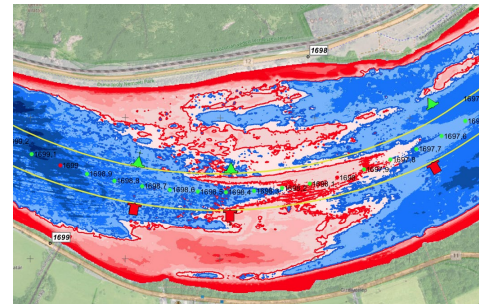
One way traffic – authority decision

3 conditions





LKHV vízállás (ENR WL): Nagymaros -15 cm (1694.60 fkm)



A MI VÍZÜGYÜNK

Dömös alsó gázló (Lower Dömös shallow section)



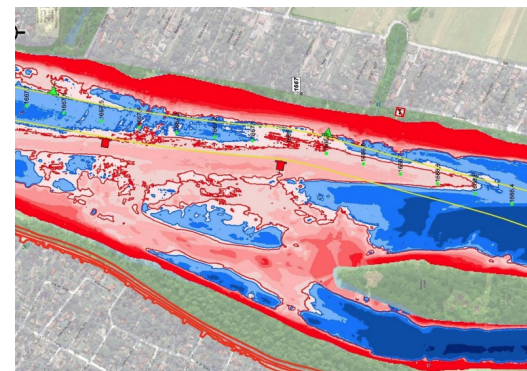
Intervention plan 2024

Mélység LKHV-nál: 19 dm 80 m szélességben

Depth at ENR: 19 dm in 80 m

LKHV vízállás (ENR WL): Göd +19 cm (1671.00 fkm)

Érvényes (Valid): 2022.12.23.



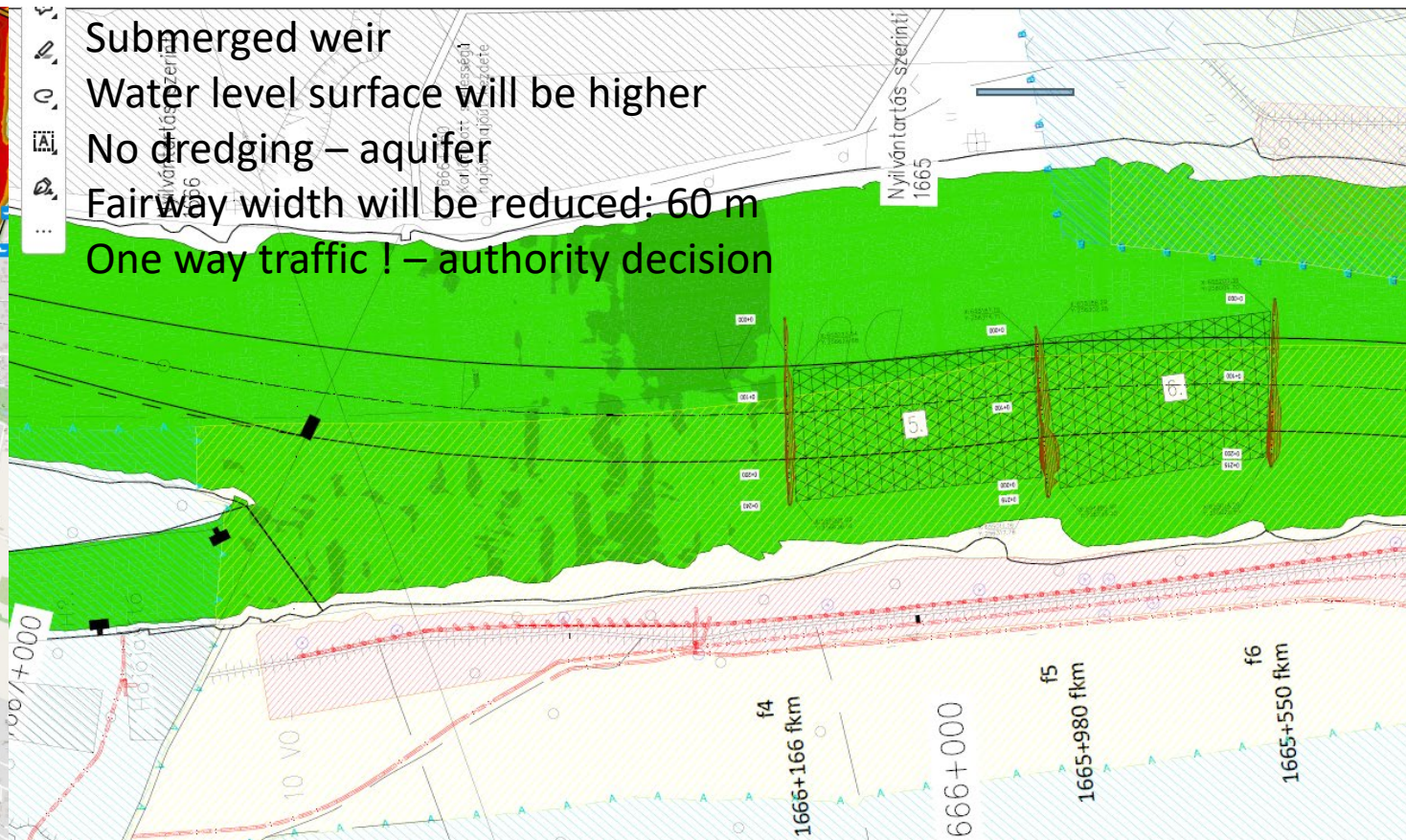
Submerged weir

Water level surface will be higher

No dredging – aquifer

Fairway width will be reduced: 60 m

One way traffic ! – authority decision



Göd gázló (Göd shallow section)

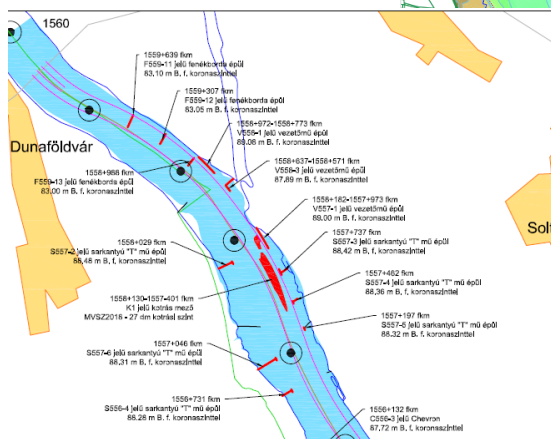
Duna (Danube) 1667.80 - 1666.40 fkm



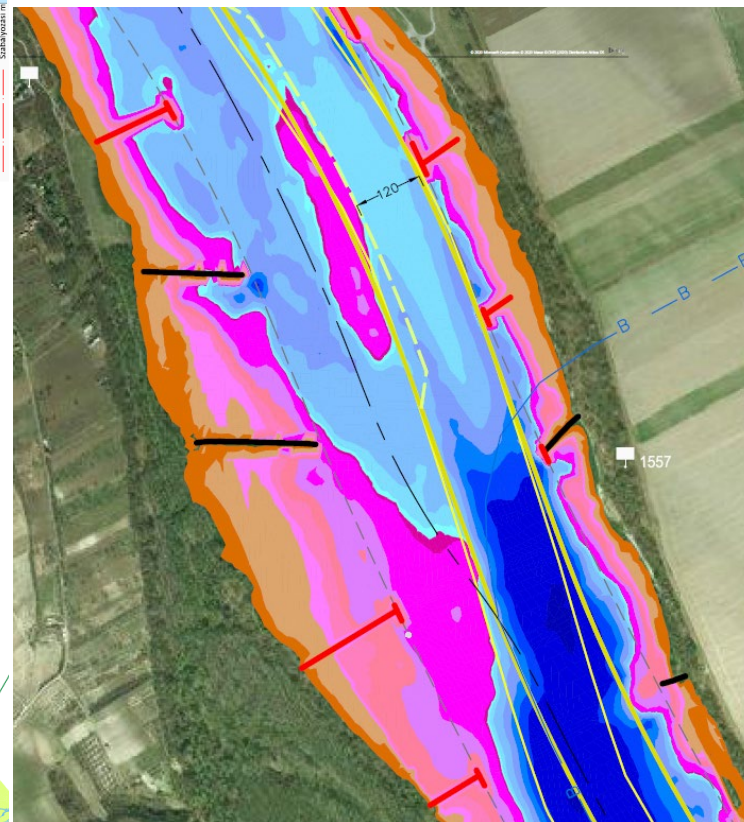
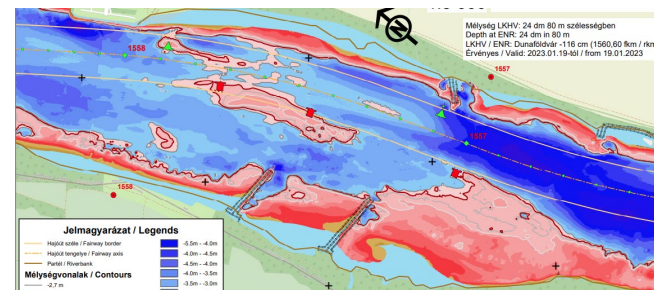
Intervention plan 2024

Mélység LKHV: 26 dm 140 m szélességben (Bal part mellett 29 dm 60 m szélességben)
Depth at ENR: 26 dm in 140 m (29 dm in 60 m along left bank)
LKHV / ENR: Dunaföldvár -116 cm (1560,60 fkm / rkm)
Érvényes / Valid: 2022.09.30-tól / from 30.09.2022

Dunaföldvár gázló és szűkület / Dunaföldvár shallow and narrow section Duna / Danube 1559,7-1559,4 fkm / rkm



- A:**
- Fairway width will be reduced: 120 m
 - Groynes will be changed & new
 - Dredging volume will be reduced
- B:**
- Submerged weirs & new groynes
 - Water level surface will be higher in Dunaföldvár & Dunaföldvár-felső

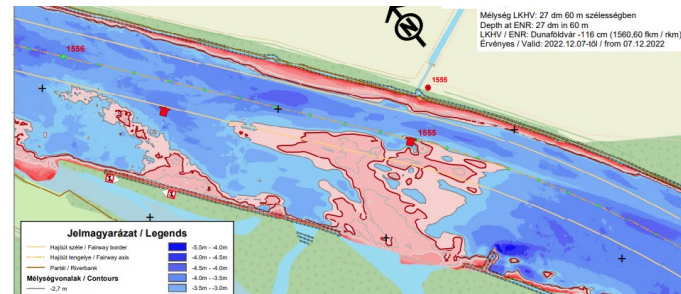


Solt gázló és szűkület / Solt shallow and narrow section Duna / Danube 1558,0-1557,2 fkm / rkm

Mélység LKHV: 24 dm 80 m szélességben
Depth at ENR: 24 dm in 80 m
LKHV / ENR: Dunaföldvár -116 cm (1560,60 fkm / rkm)
Érvényes / Valid: 2023.01.19-től / from 19.01.2023



Intervention plan 2024



A:

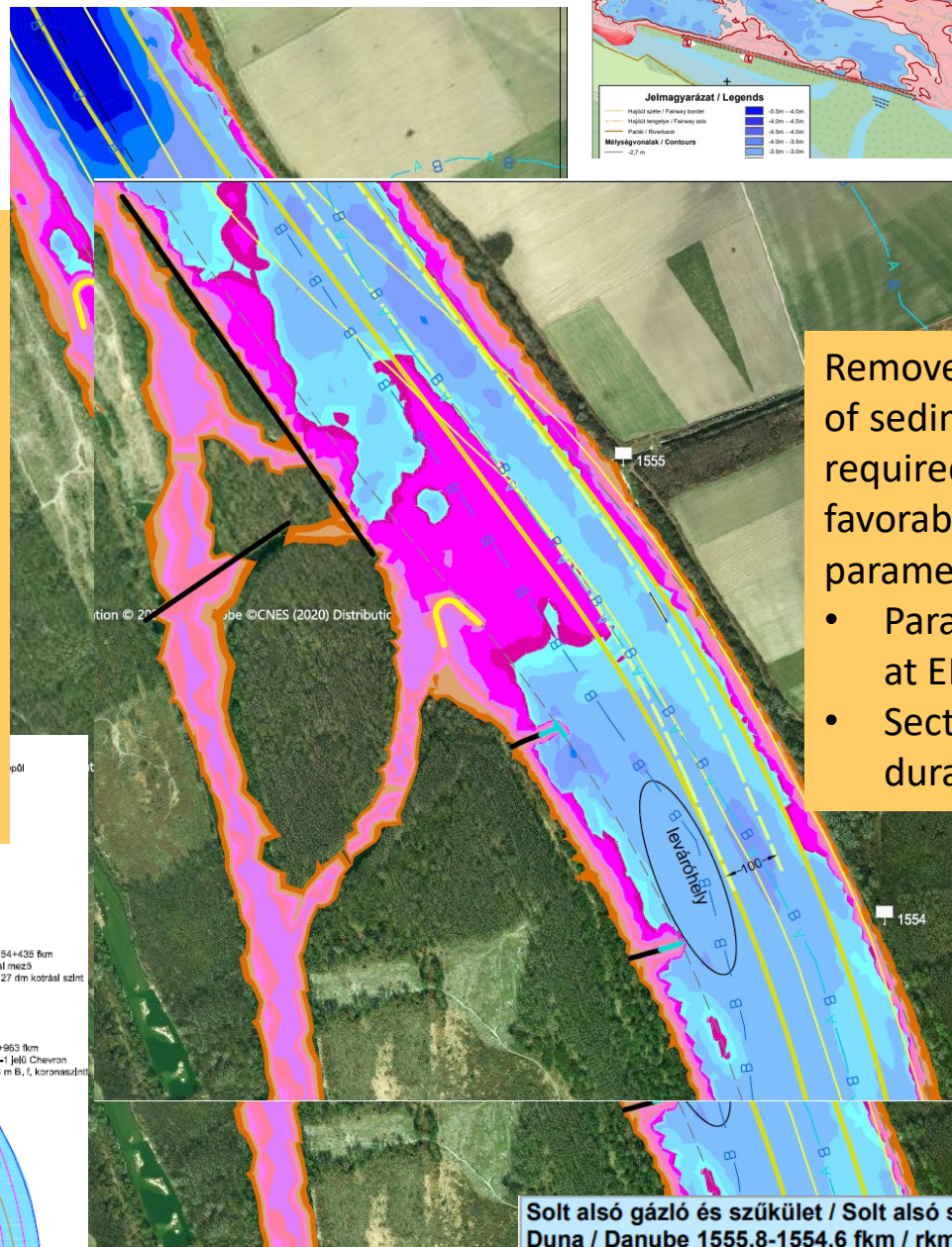
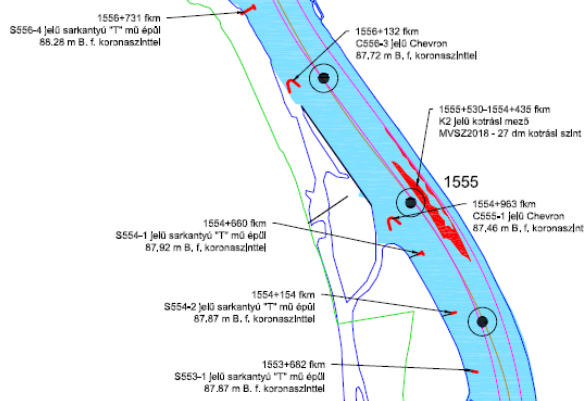
- Fairway width will be reduced: 100 m
- Groynes will be reduced
- Dredging volume will be reduced
- Waiting Berth- authority decision

B:

- Chevrons – ecological need
- Water level surface will be higher in sidearm

Remove only the quantity of sediment what is required to reach favorable fairway parameter

- Parameters are critical at ENR
- Section' water level durability is very low

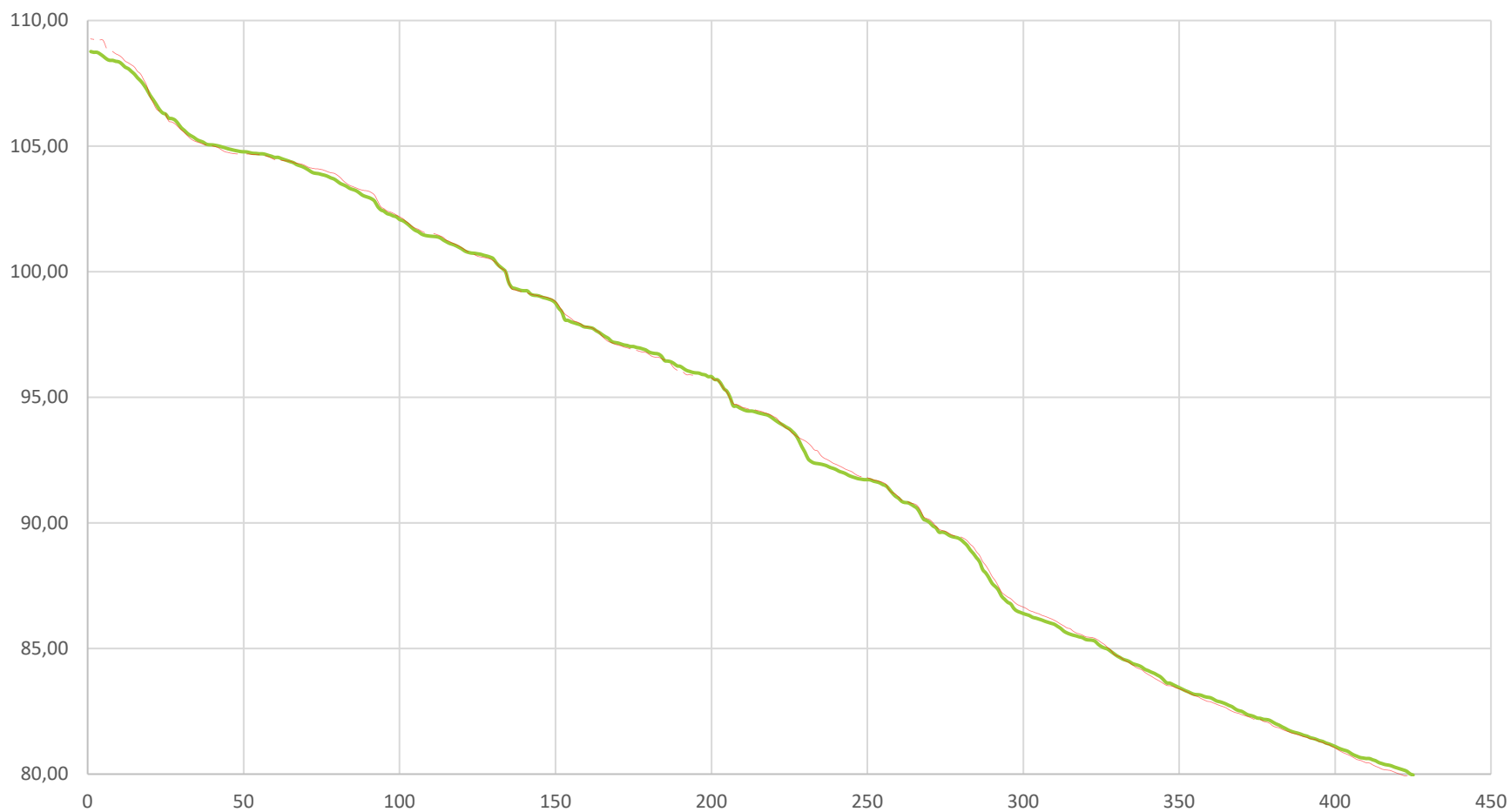


Solt alsó gázló és szűkület / Solt alsó shallow and narrow section
Duna / Danube 1555,8-1554,6 fkm / rkm



ENR 2020

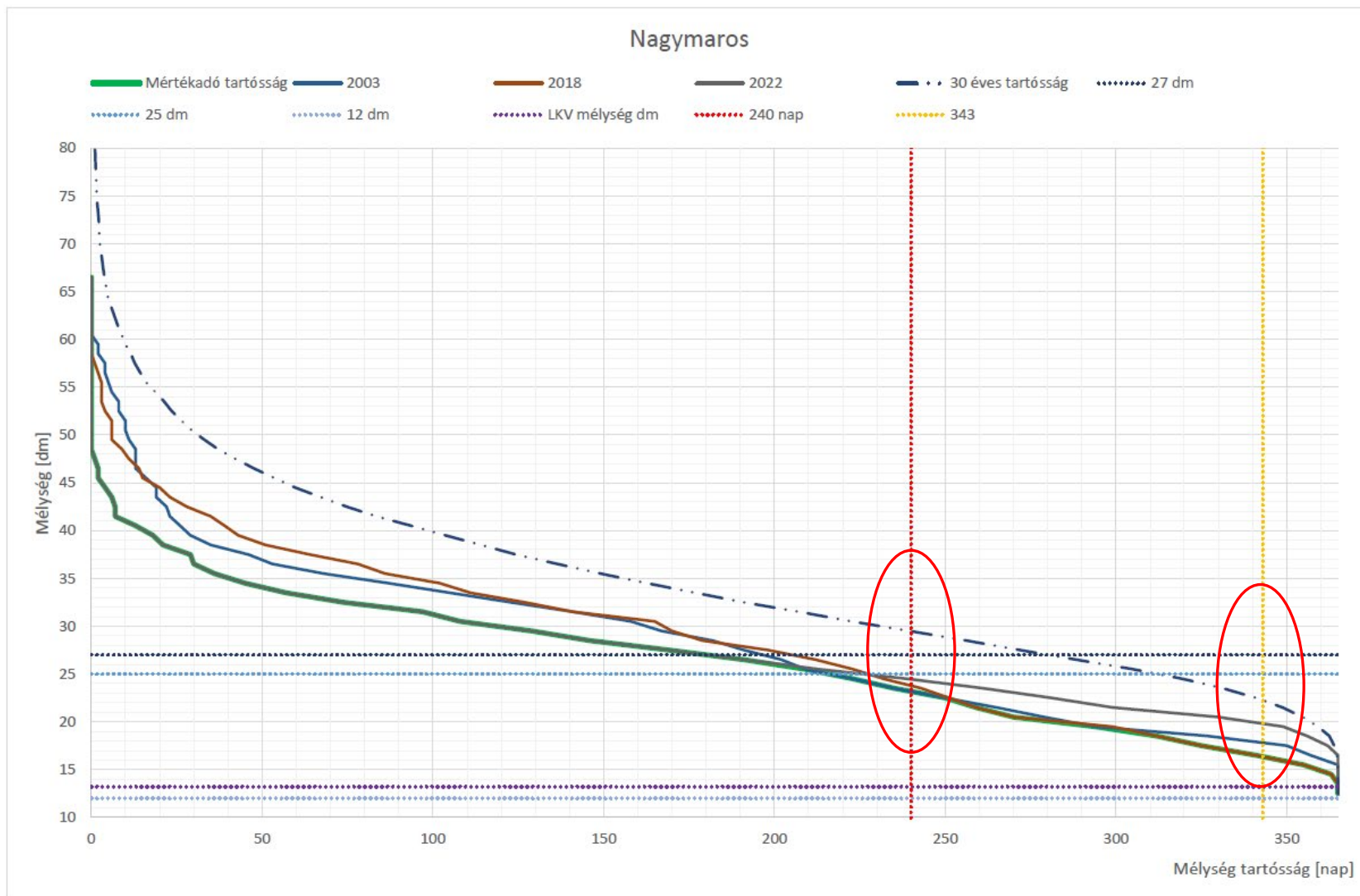
A MI VÍZÜGYÜNK



Section	DC 2020	Discharge Q _{94%}	Water Level Gauge Station	"0,, point of Gauge	Water Level Value of Gauge for DC 2020	Change of DC Value
fkm	mBf	m ³ /s		mBf	cm	m
1809.97	108.73	1000	Szap	108.10	63	-
1806.40	108.41	1000	Medve	107.38	103	-
1805.60	108.35	1000	Vámosszabadi	108.40	-5	-
1801.00	107.86	1000	Nagybajcs	107.40	46	-0.14
1792.37	106.32	1075	Kolozsnéma	104.65	167	-
1790.61	106.09	1075	Gönyű	106.04	5	0.10
1779.10	105.05		Aranyos	103.92	113	-
1768.30	104.71	1075	Komárom	103.88	83	0.00
1767.88	104.69	1075	Komarno	103.40	129	-
1763.96	104.55	1200	Izsa	103.58	97	-
1751.80	103.90	1200	Dunaalmás	103.12	78	-
1748.25	103.73	1200	Radvány	102.92	81	-
1718.60	101.41	1200	Párkány	100.94	47	-
1718.50	101.40	1200	Esztergom	100.92	48	-0.11
1707.20	100.74	1200	Szob	100.98	-24	-
1694.60	99.33	1200	Nagymaros	99.43	-10	0.05
1679.50	98.06	1200	Vác	98.12	-6	-0.17
1671.00	97.65		Göd	97.48	17	-0.02
1646.50	96.03		Budapest	94.97	106	0.13
1642.20	95.71		Kvassay-zsilip	94.82	89	0.02
1636.90	94.65		Budafo	94.39	26	-0.07
1613.20	92.38		Ercsi	92.56	-18	-0.53
1598.11	91.72		Adony	91.68	4	-
1586.20	90.81		Tass	89.24	157	-
1580.60	90.09		Dunaújváros	90.30	-21	-0.09
1571.70	89.40		Pentele híd	90.30		-
1560.60	87.47		Dunaföldvár & Beszédes József híd	88.86	-139	-0.23
1531.30	85.34		Paks	85.38	-4	-0.11
1506.80	83.62		Dombori	83.52	10	0.10
1478.70	82.17		Baja	80.99	118	0.10
1460.00	81.24		Dunaszekcső	79.92	132	0.04
1446.90	80.62		Mohács	79.20	143	0.18



RELEVANT HYDROLOGICAL SITUATION



Thank you for your attention!

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