FAST DANUBE

Technical Assistance for Revising and Complementing the Feasibility Study Regarding the Improvement of Navigation Conditions on the Romanian-Bulgarian Common Sector of the Danube and Complementary Studies

Co-financed by the European Union
Connecting Europe Facility

FAST DANUBE

Project presentation and status – **Dan Tarara, Deputy Project Manager, Halcrow Romanaia CH2M HILL Company**

05-06 December 2017, Ruse

Agenda

- Project Introduction and Status
  - Project context & Project history
  - Consortium
  - Critical areas, Project objectives and activities
  - Project status: calendar, field activities, technical solutions and Modelling
- Major environmental issues and communication
- EIA/AA Approach including data availability
- Publicity and Communication Orgchart
- Discussion (Q&A).

Project context and Project history

Project Context

- **Danube Commission recommends:** a navigation channel width of 180m with minimum depth of 2.5m for the Romanian-Bulgarian sector, with reduction to 150m width where the minimum depths cannot be ensured.
- **Responsibility:** maintaining adequate navigation conditions from km 863 to km 610 and from km 610 to km 375, between AFDJ Galati of Romania and IAPPD Ruse of Bulgaria respectively.
- **Project objective:** update the recommendations of the 2011 Feasibility Study, and **to identify a longer-term solution and package of management measures which are technically, environmentally and financially acceptable and sustainable.**

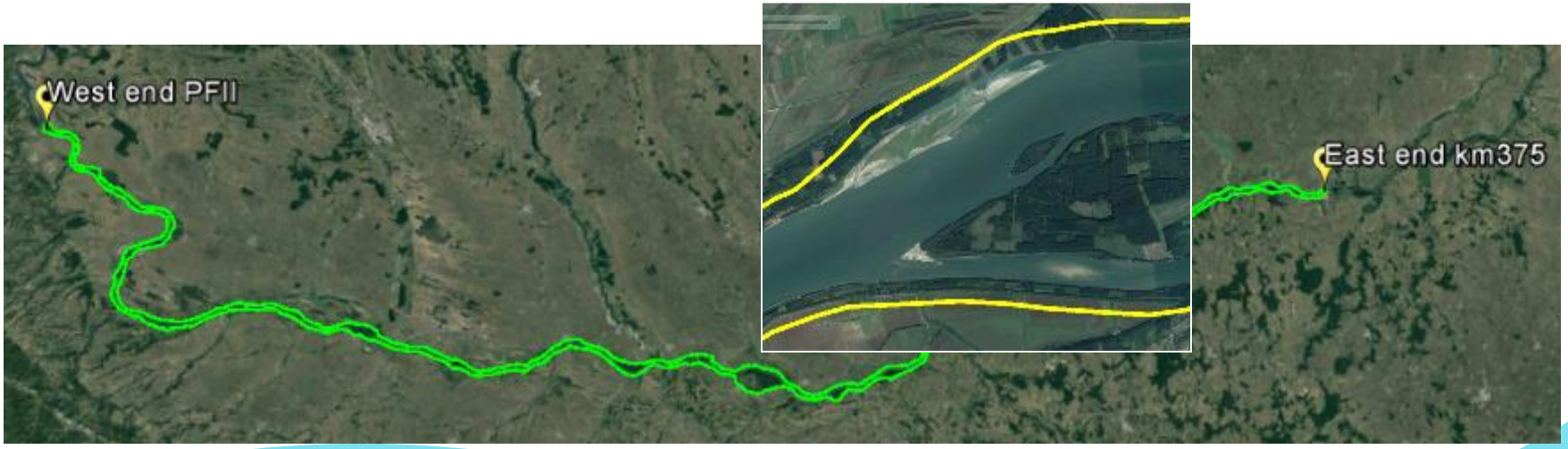
Project History

- 2007 – Preparatory work for the Project started in 2007, when Romanian Ministry of Transport contracted technical assistance for the preparation of a Feasibility Study.
- 2011 – Final draft Feasibility Study report was completed in November 2011. **Existing information from the preliminary study**: Environmental Impact Assessment (EIA). Appropriate Assessment (AA) on Natura 2000 sites. The preliminary Feasibility Study defined and analyzed 6 alternatives for improvement of navigation conditions.
- 2011 – "Optimised Alternative" was selected in 2011 on the basis of the recommendations of the Consultant; uncertainties on the Appropriate Assessment conclusions still remained. Romanian and the Bulgarian environmental authorities considered the report on impact on the Natura 2000 sites as incomplete. **Needs for reviewing solutions.**
- 2014 – AFDJ Galati - leader (empowered by APPD – Bulgarian partner) and INNOVATION AND NETWORKS EXECUTIVE AGENCY (the European Commission has delegated to INEA this task) signed a new contract: *''Technical Assistance for Revising and Complementing the Feasibility Study Regarding the Improvement of Navigation Conditions on the Romanian-Bulgarian Common Sector of the Danube and Complementary Studies – FAST DANUBE''* (Beneficiary: AFDJ Galati; Project duration: 1st November 2014 – 31st December 2018; Total Budget: EUR 5.252.000; Financing EU – 85 % and Romanian Government – 15 %; Contract activities: **Feasibility Study**, **the Environmental Impact Assessment**, **Preparing the Public Procurement Procedure for Design and Construction**, Project Management and **Communication**).
- 2017 – AFDJ Galati and Halcrow signed the contract: *"Technical Assistance for Revising and Complementing the Feasibility Study regarding the Improvement of Navigation Conditions on the Romanian-Bulgarian Common Sector of the Danube and Complementary Studies"* (the bidding process started in 2015). The contract was signed by both parties on **7th March 2017** and it was registered by AFDJ under the registration no. 19/07.03.2017 and by Halcrow under the registration no. 943/HRO/07.03.2017.

Consortium

Consortium

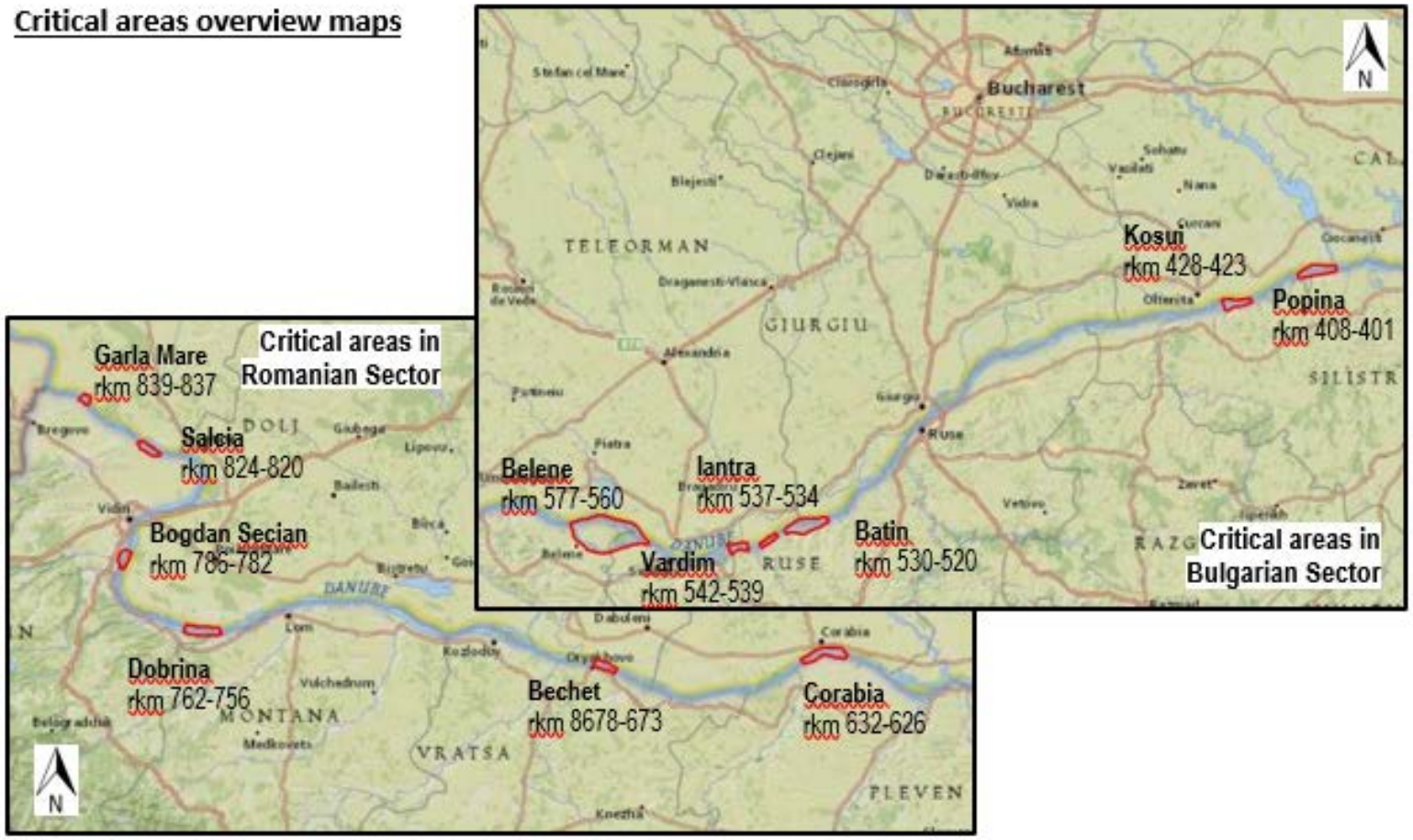
- Halcrow Romania S.R.L. (a CH2M HILL Company)
- Marine Research S.R.L. (hydrography, hydrodynamics and sediment surveys)
- iC Consuleten (hydrography surveys)
- Ingeo Proiect S.R.L. (topographical surveys – LiDAR scanning)
- Geosond S.R.L. (geotechnical surveys)
- Marin Erika P.F.A. (financial expert)
- Support for EIA and AA from Dicon – Bulgaria and EPC Consulting - Romania



Critical areas, Project objectives and Project activities

Critical Areas

Critical areas overview maps



Project Objectives

- Undertake a **Feasibility Study** presenting **sustainable technical options to improve navigation** at each identified critical location.
- Conduct **surveys, investigations** and **data collection**
- **Verified simulation and analytical models**
- **Permits** to support promotion and allow adoption of the preferred option(s).
- **Tender Documents** and **plans to implement** the project

Project Activities

- **Field investigations**: hydrography, topography, hydrology, hydrodynamics and sediment sampling and analysis
- **Mathematical models** – identification of the alternative solutions (min. 2)
- **Traffic study**
- **General estimations** and **Cost – Benefit Analysis** (CBA)
- **Environmental Impact Assessment** (EIA) for the project, including **Appropriate Assessment** (AA)
- Preparness of the **Feasibility Study** (including all approvals and permitts)
- Developing the **Terms of References** (ToR) – services and works (Yellow FIDIC)
- **Project publicity**

Calendar

GRAFIC DE EXECUTIE SUMAR
SUMMARY WORK SCHEDULE

ACTIVITATI CHEIE SI LIVRABILE KEY ACTIVITIES AND DELIVERABLES	Anul 1/ Year 1												Anul 2/ Year 2											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Faza de inceput/ Planul managementului riscurilor Inception/ Risk management plan																								
Masuratori, investigatii de teren, procesare date/analize/cartare: Campania 1 Surveys, site investigations, data processing/analyses/mapping: Stage 1																								
Masuratori, investigatii de teren, procesare date/analize/cartare: Campania 2 Surveys, site investigations, data processing/analyses/mapping: Stage 2																								
Studii complementare de evaluare Complementary assessment studies																								
Evaluarea morfologica a fluviuliu/ identificarea optiunilor/ evaluarea optiunilor Fluvial morphology assessment/options identification/options appraisal																								
Dezvoltarea modelului (lor), calibrarea, verificarea Model(s) development, calibration, verification																								
Raport initial al optiunilor modelate Report of Modeling initial options																								
Modelarea optiunilor: detaliat/revizuire; Proiect preliminar Modelling of options: detailed/review; Preliminary Designs																								
Raportul Studiului de fezabilitate (inclusiv ACB) - versiune preliminara Feasibility Study Report (CBA included) - draft version																								
EIM: EIM si EA (aprobat si optiunea selectata) EIA: EIA & AA Report (approved and option selected)																								
EIM: Raport final EIM (include Evaluarea adecvata) EIA: Final EIA Report (Appropriate assessment included)																								
Raportul Studiului de fezabilitate (versiune finala) Feasibility Study Report (final version)																								
Documentatie de atribuire (servicii si lucrari) Tender Documents (services and works)																								
Consultare si Documentare Consultation and Documentation																								

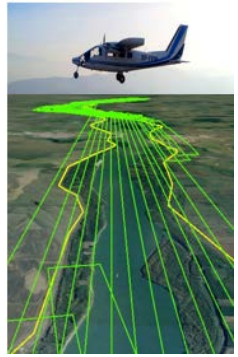
Field activities (finalized)

Measurement Campaigns 1 & 2

Both campaigns finalized and results delivered to AFDJ

First campaign (Apr-May 2017)

Second campaign (Jul-Aug 2017).



- Bathymetry data collected – *river bed surveying*
- Hydrodynamics data – *water velocity measurements*
- Sediment – *riverbed and suspended sediment sampling*
- Topography data – *field surveying by aerial LiDAR scanning*
- Geotechnical (erodibility of banks) – *60 drillings at 15m*
- Bank Inventory (including activities) – *photo evidence*

Note: Geotechnical campaign has been performed only once (first campaign).

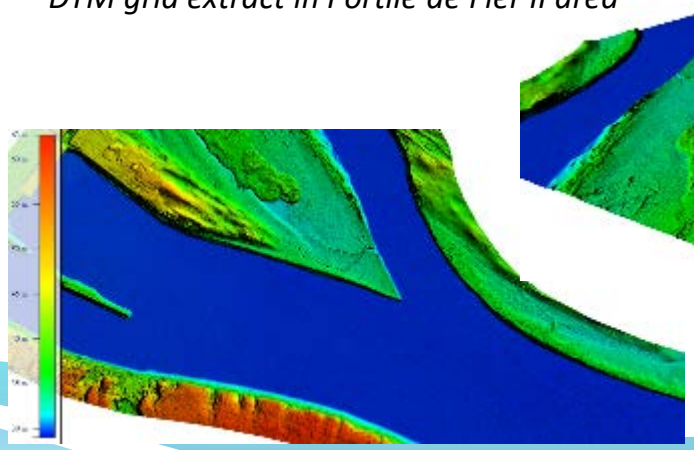
Field surveying by aerial LiDAR scanning

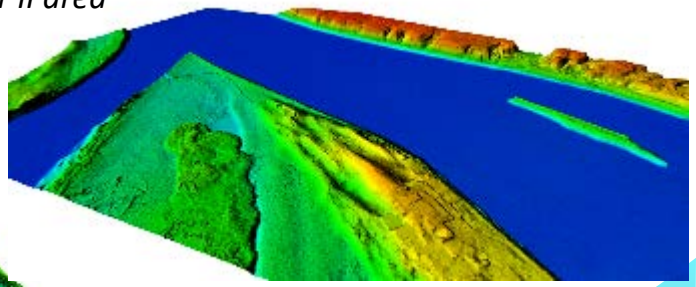
Cessna T206H

Piper Navajo PA-31

LiteMapper 6800i LiDAR system installed inside the plane

DTM grid extract in Portile de Fier II area





Sediment measurements

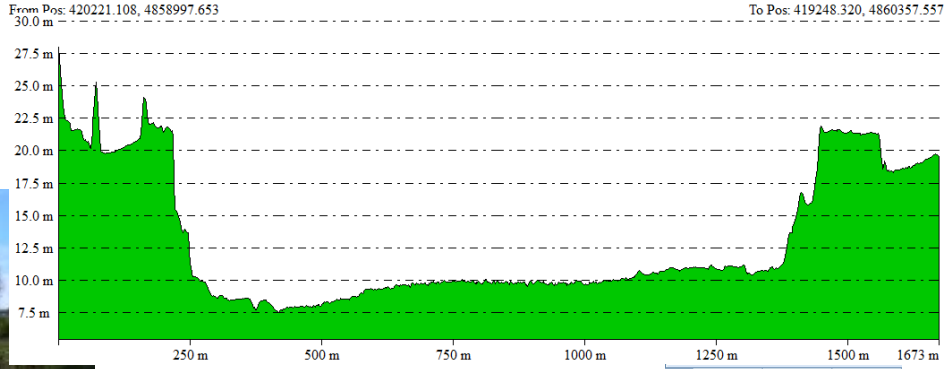
Hydrographical survey

SHADOW 1 (MR)

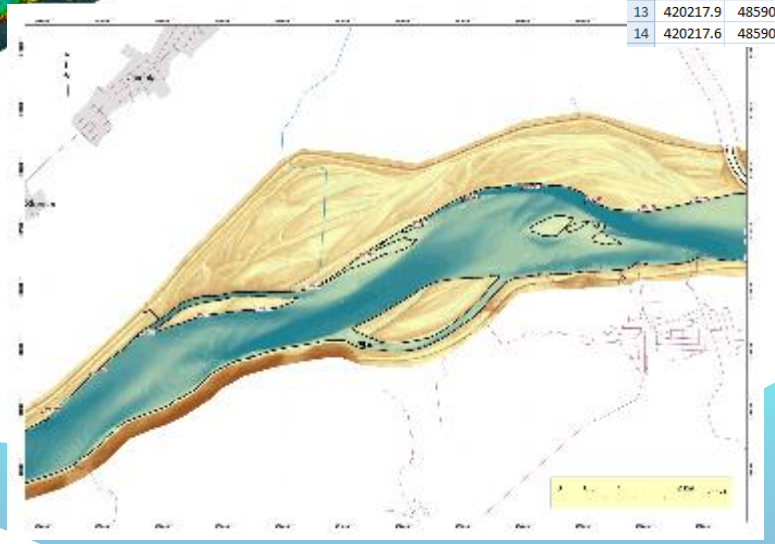
ZOPEDA (iC)

Buster XL (MR)

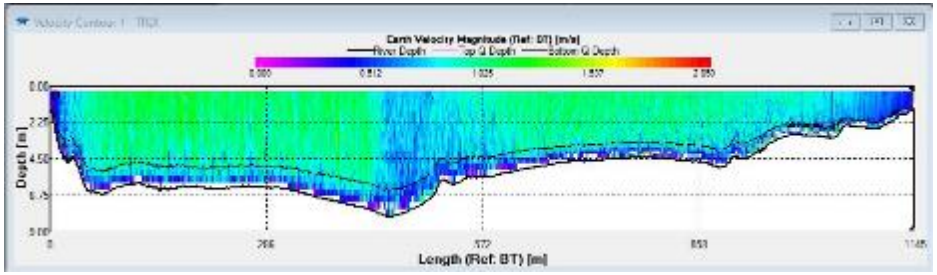
Km 489.5

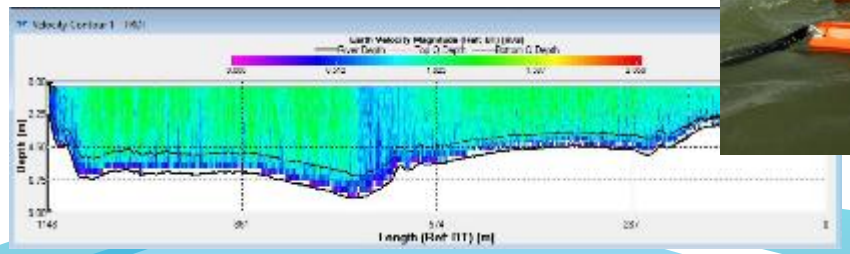


	A	B	C
1	X	Y	ELEV
2	420221.1	4858998	27.993
3	420220.8	4858998	27.728
4	420220.5	4858998	27.457
5	420220.2	4858999	27.192
6	420219.9	4858999	26.909
7	420219.7	4859000	26.658
8	420219.4	4859000	26.355
9	420219.1	4859000	26.039
10	420218.8	4859001	25.769
11	420218.5	4859001	25.461
12	420218.2	4859002	25.149
13	420217.9	4859002	24.864
14	420217.6	4859003	24.601

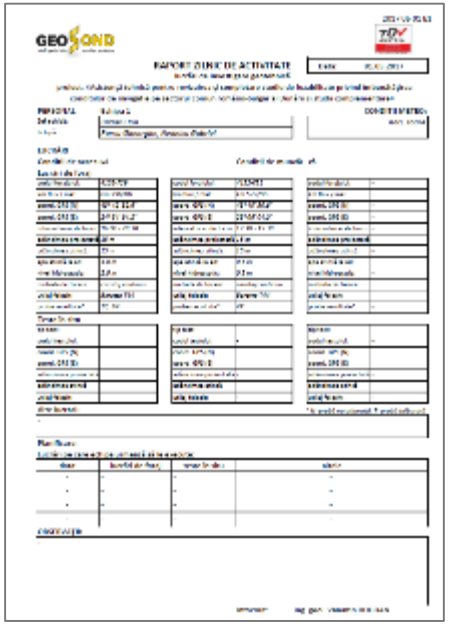


Hydrodynamics (ADCP) survey





Geotechnical Survey



Technical Solutions

Topics to be covered:

- Technical solutions scope
- Technical solutions from morphological perspective
- Best practice on other major rivers
- Lower Danube options (incl. original feasibility study)
- Options appraisal (work in progress)

Technical Solutions
Scope

Types of options for navigation improvements:

- **Capital dredging**: enlargement and/or realignment of navigation fairways
- **Rigid engineering structures**: groynes, chevrons bendway weirs, longitudinal dykes
- **Morphological engineering:** to support natural river processes

Preferred solution - integrated package of the above plus future maintenance dredging applicable – river engineering works aim to minimise this.

Concept of '**intelligent dredging**'

Groynes lowered/removed
and replaced with longitudinal dyke

Technical solutions from morphological perspective

Technical Assistance for Revising and Complementing the Feasibility Study regarding the Improvement of Navigation Conditions on the Romanian-Bulgarian Common Sector of the Danube and Complementary Studies - FAST DANUBE

Preliminary Report

Prepared for

Galati Lower Danube River Administration, A. A.

Report number: HRO/025/R/20171012

Oct'17

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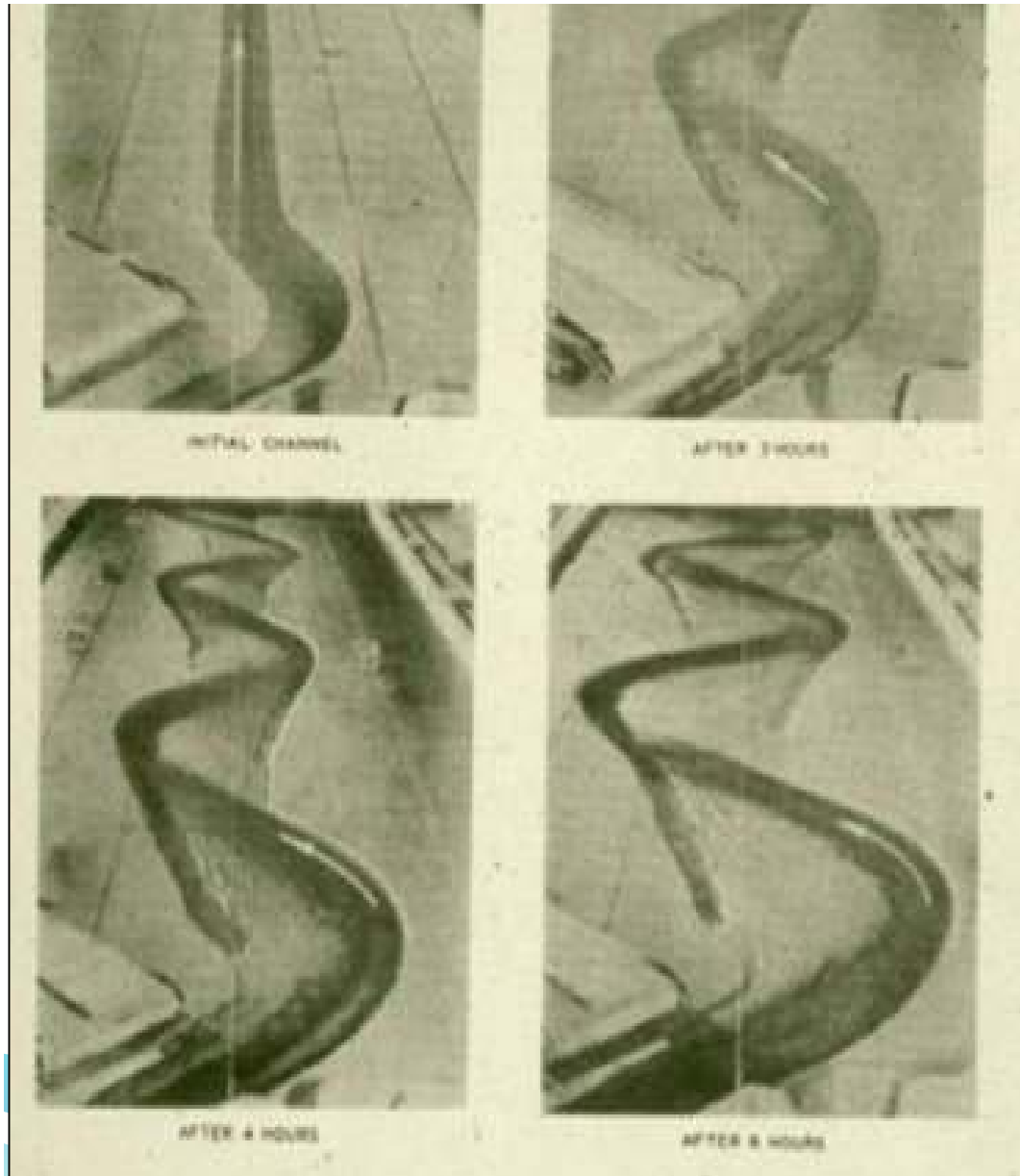

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Technical Solutions

Best practice on major rivers

- **Lower Columbia River, Portland District, US**
- **Kootenai River – tributary to Columbia River, US**
- **Mississippi River, US**
- **River Rhine, Netherlands**
- **River Danube, Wachau Valley, Austria**
- **River Danube, Vienna to Bratislava**

Typical dredging / disposal activities

Source: images courtesy of USCE Lower Columbia River maintenance plan

Typical dredging / disposal activities

Source: images courtesy of USCE Lower Columbia River maintenance plan

Annual maintenance plan of dredging and disposal to maintain navigation channel and dispose dredged material in morphologically appropriate and environmentally beneficial locations

Typical dredging / disposal activities - advantages versus disadvantages

- Cost effective as it targets specific problem areas as they emerge
- Short-term environmental impacts
- Potential for major long-term gains
- Requires provision of sustained technical / financial resources
- Key element of morphological engineering approach

Typical rigid engineering structures

Detached groyne – allows fish passage close to shoreline

Typical rigid engineering structures

Attached groynes – interrupt fish passage but create wetlands and local islands

Typical rigid engineering structures

Chevrons – located in shall water, aligned with river and island away from river banks: funnels low flows towards navigation channel, encourages island creation

Typical rigid engineering structures

Longitudinal dyke/training dam – separates navigation channel and environmental/recreation function; allows fish passage

Typical rigid engineering structures

L-shaped groynes/wing dykes – interrupt fish passage
but create wetlands and local islands

Typical rigid engineering structures - advantages versus disadvantages

- Technically most proven approach, but risk of unexpected river response
- Resource intensive and costly if subsequent modifications are needed
- Potentially creates need to progressively engineer more and more river
- Still dependent long-term on a certain level of dredging commitment
- Potential for significant adverse environmental impacts
- Only modest opportunities to mitigate

Typical morphological engineering

Navigation channel alignment: identify potentially long-term most stable morphological alignment for navigation channel, and corresponding island and bar features to reinforce sinuous alignment

Typical morphological engineering

Island building to reinforce navigation channel alignment: shoreline replenishment by lagooning pipeline dredged material; courtesy Lower Columbia River navigation channel maintenance plan

Typical morphological engineering

Island stabilisation and building, using pipeline dredged material:
courtesy Lower Columbia River navigation channel maintenance plan

Typical morphological engineering

Island building for training navigation channel alignments, with major opportunity to create habitat diversity: courtesy Lower Meander Project, Kootenai River

Typical morphological engineering

Wooden pile structures; filled with coarse sand and woody material as local spurs to influence navigation channel alignment and create habitat diversity; courtesy Lower Meander Project, Kootenai River

Typical morphological engineering

Large wood debris structures in back channels: to increase roughness and reduce back-channel flows, develop bed-form diversity and hence aquatic and terrestrial habitat diversity; courtesy Lower Meander Project, Kootenai River

Typical morphological engineering

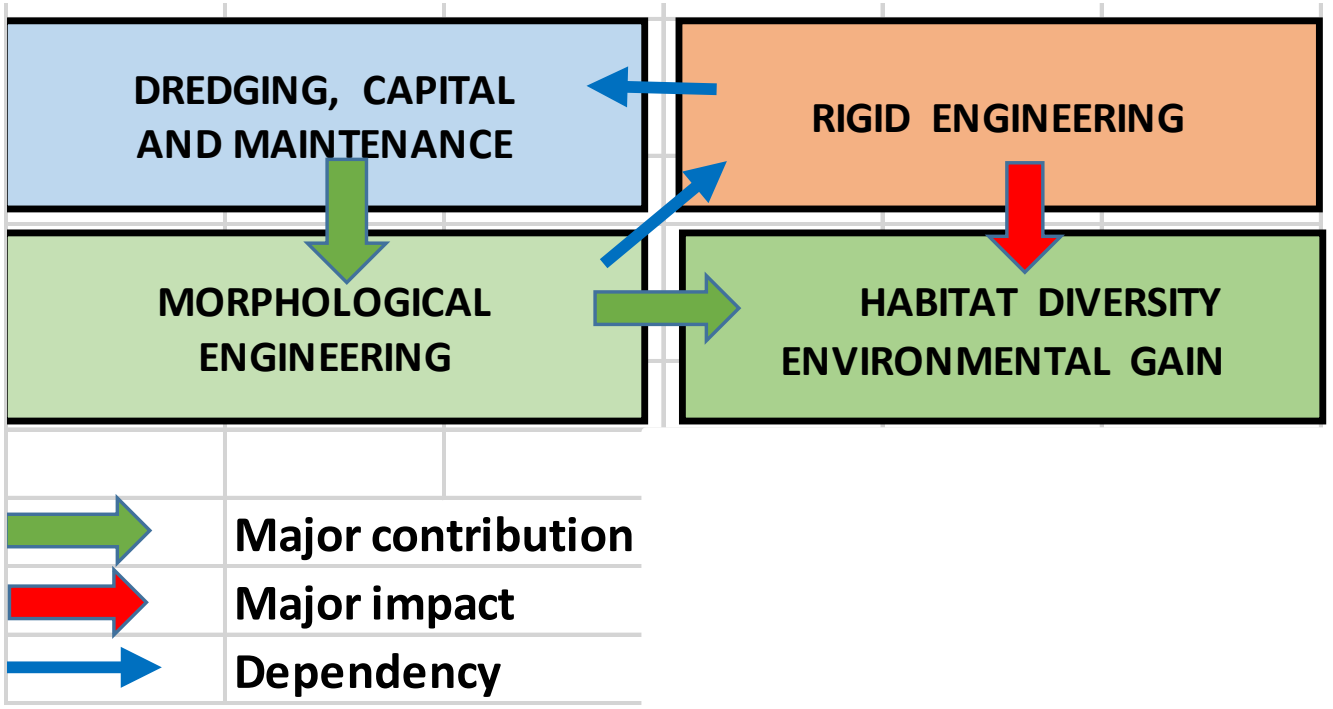
Vegetated brush bank revetment, to protect banks and for river training: layered brush and logs on small rip-rap foundation, with dead brush and live cuttings at water table level; bank protection and creation of habitat diversity; courtesy Lower Meander Project, Kootenai River

Typical morphological engineering - advantages versus disadvantages

- Technically most experimental approach
- Requires adaptive management capability
- Potentially with major environmental benefits
- Intelligent dredging a key component
- Some rigid engineering to promote planform and morphological features
- Strategic disposal of dredged material

Technical Solutions
Lower Danube options

What will final technical solutions look like?
Can only be an integrated package of all 3 types of options:
- least risk
- cost effective
- environmentally best



Technical Solutions
Options appraisal

Option 1: more dredging / morphological, some rigid engineering
Option 2: more rigid engineering structures

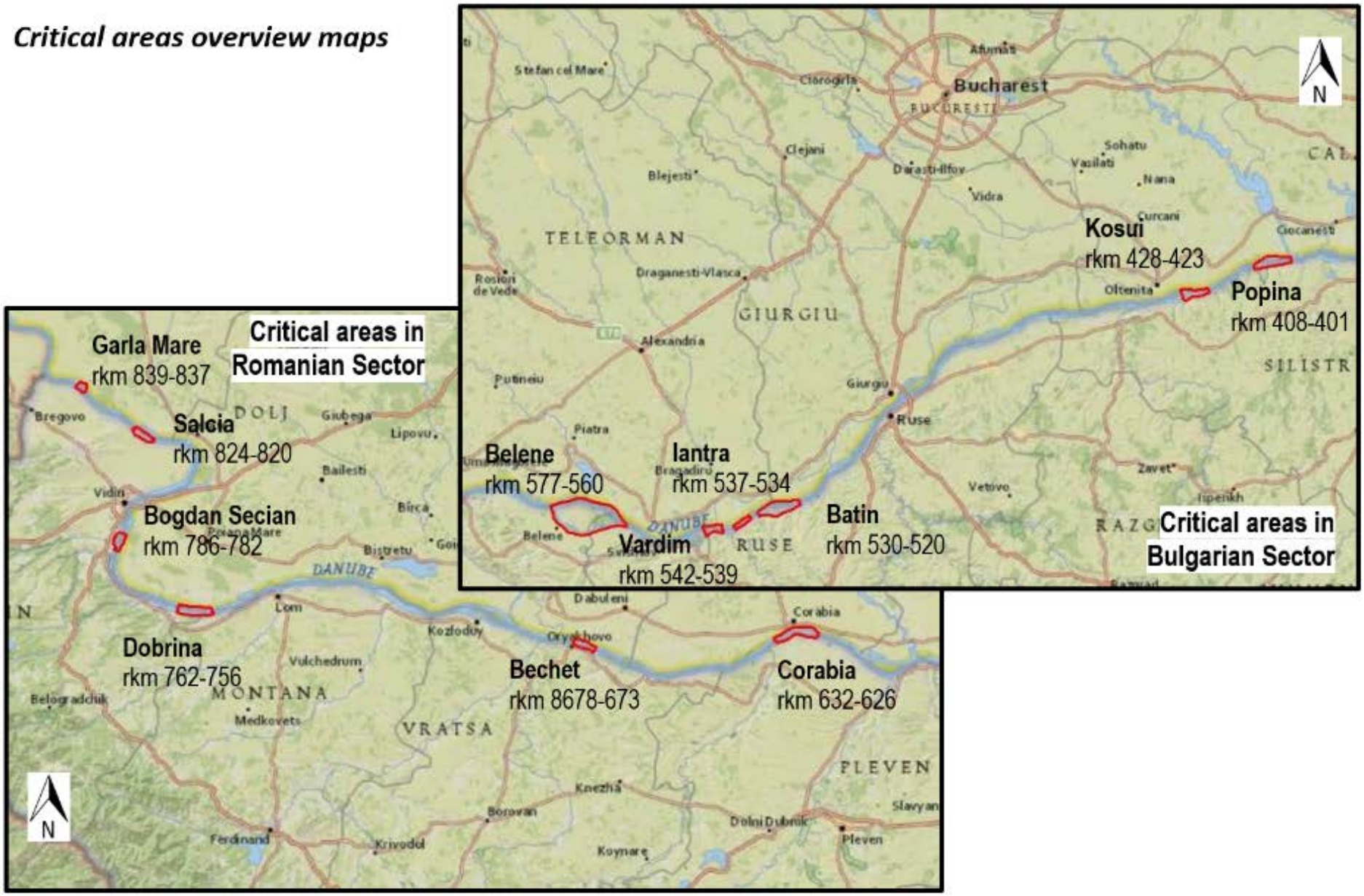
Principal trade-offs

- Option 1: highly adaptive, more experimental
- Option 2: potentially more significant environmental issues

Fundability

- Option 1: balance towards recurrent cost
- Option 2: balance towards up-front capital investment cost

Critical areas overview maps



Technical Solutions
Lower Danube options

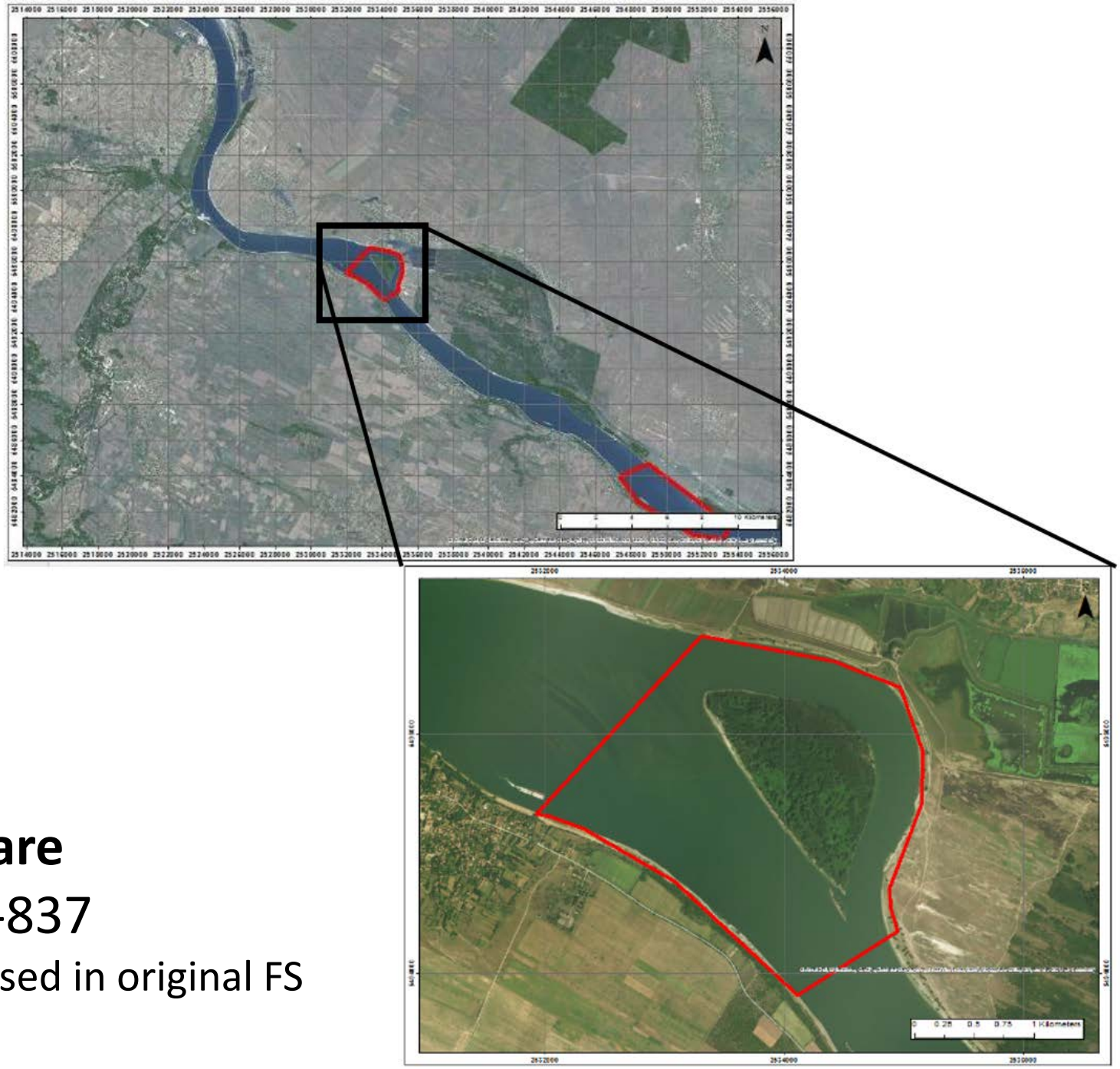
Critical Site	Location	Feasibility Study, 2011 Optimised Alternative (OA)	FAST-Danube, 2017 Long-List Options Appraisal									
					Morphological			Rigid engineering				
			Capital dredge	Realign fairway	Island building	Side channel roughen	Flow diverter	Chevrons	Dikes, spur	Dikes, longitudinal	Bendway weirs	Bed sill
Gârla Mare	rkm 839-837	not assessed	√	√	√		√		√	√		
Salcia	rkm 824-820	dredge only	√		√			√	√		√	
Bogdan Secian	rkm 786-782	chevron	√		√			√		√		
Dobrina	rkm 762-756	chevron	√	√	√	√			√			
Bechet	rkm 678-673	realign fairway, spur dike, chevron	√	√	√			√	√			
Corabia	rkm 632-626	spur dike, chevrons	√		√			√	√		√	
Belene	rkm 577-560	spur dikes, chevrons, bed sill	√	√	√		√	√	√			
Vardim/Iantra	rkm 542-539 and 537-534	dredge only	√	√	√			√	√			
Batin	rkm 530-520	realign fairway, spur dikes, chevron, bed sill	√	√	√		√	√	√			
Kosui	rkm 428-423	spur dikes	√		√	√	√	√	√			
Popina	rkm 408-401	realign fairway, spur dikes	√	√	√				√			

Technical Solutions
Lower Danube options

Option 1: Substantially dredging based option with adequate rigid engineering measures in support of a morphological engineering approach to navigation channel maintenance:

- Risks: sizeable but reducing technical risks in short-term
- Needs: short-medium term funding
- Needs: institutional strengthening for dertake dredging and adaptive maintenance requirements

Opportunity for effective environmental mitigation in short term, and substantial environmental gains in long term



Garla Mare

rkm 839-837

– not assessed in original FS

N
842,0
841,0
840,0
839,0
838,0
837,0
836,0
835,0
834,0
CAPITAL DREDGE
LOCATIONS. DREDGE
VOLUME 16,000m³
0 100 200 300 400 500 600 700 800 900 1000

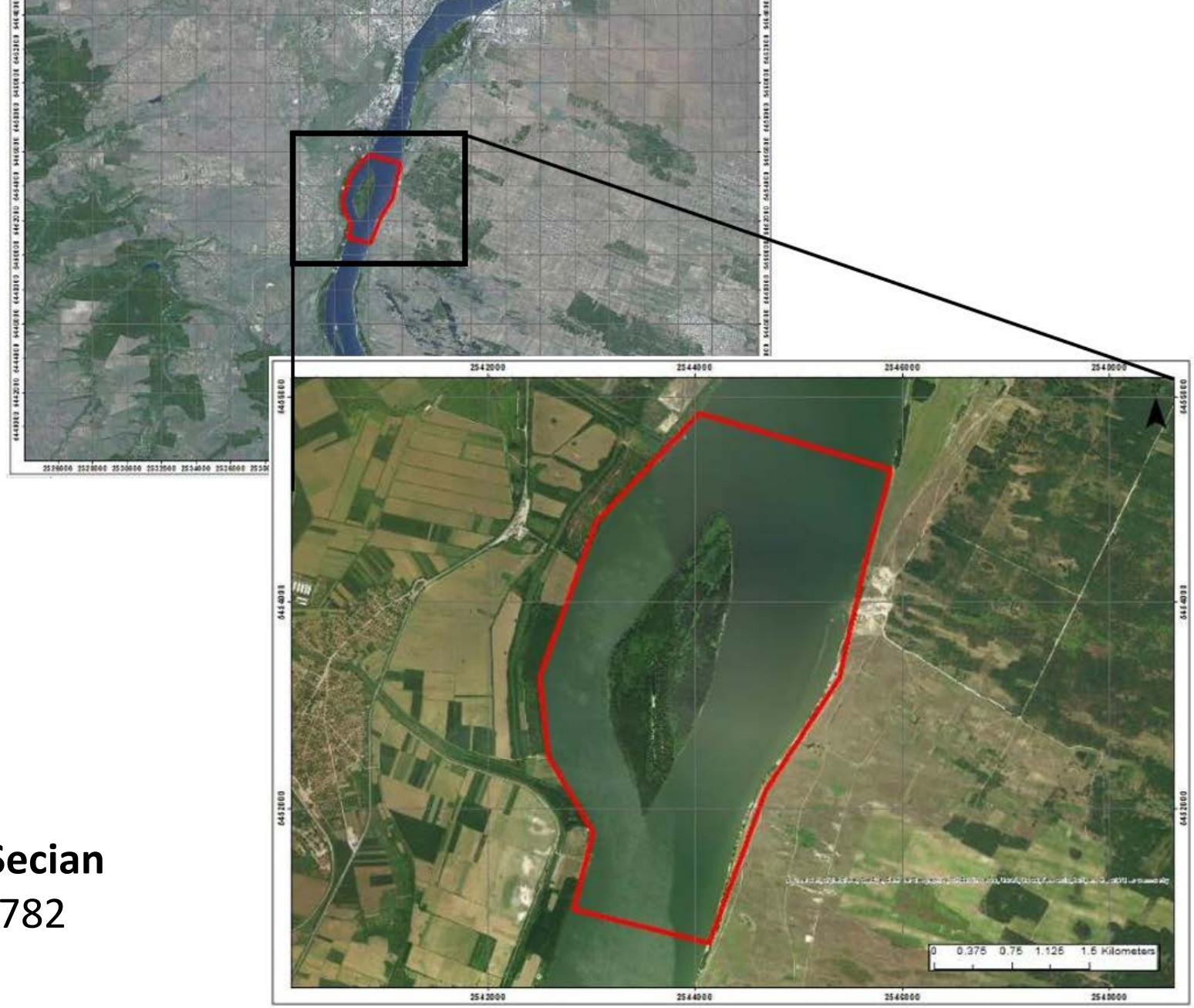
DREDGE ONLY

EXAMPLE ISLAND CREATION

ISLAND CREATION AND FAIRWAY REALIGMENT

EXAMPLE ISLAND CREATION

ISLAND CREATION



Bogdan Secian
rkm 786-782

N
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782,0
CAPITAL DREDGE
LOCATIONS. DREDGE
VOLUME 8,000m³
0 100 200 300 400 500 600 700 800 900 1000
METRES
SCALE 1:10000 (A1)
SCALE 1:20000 (A3)

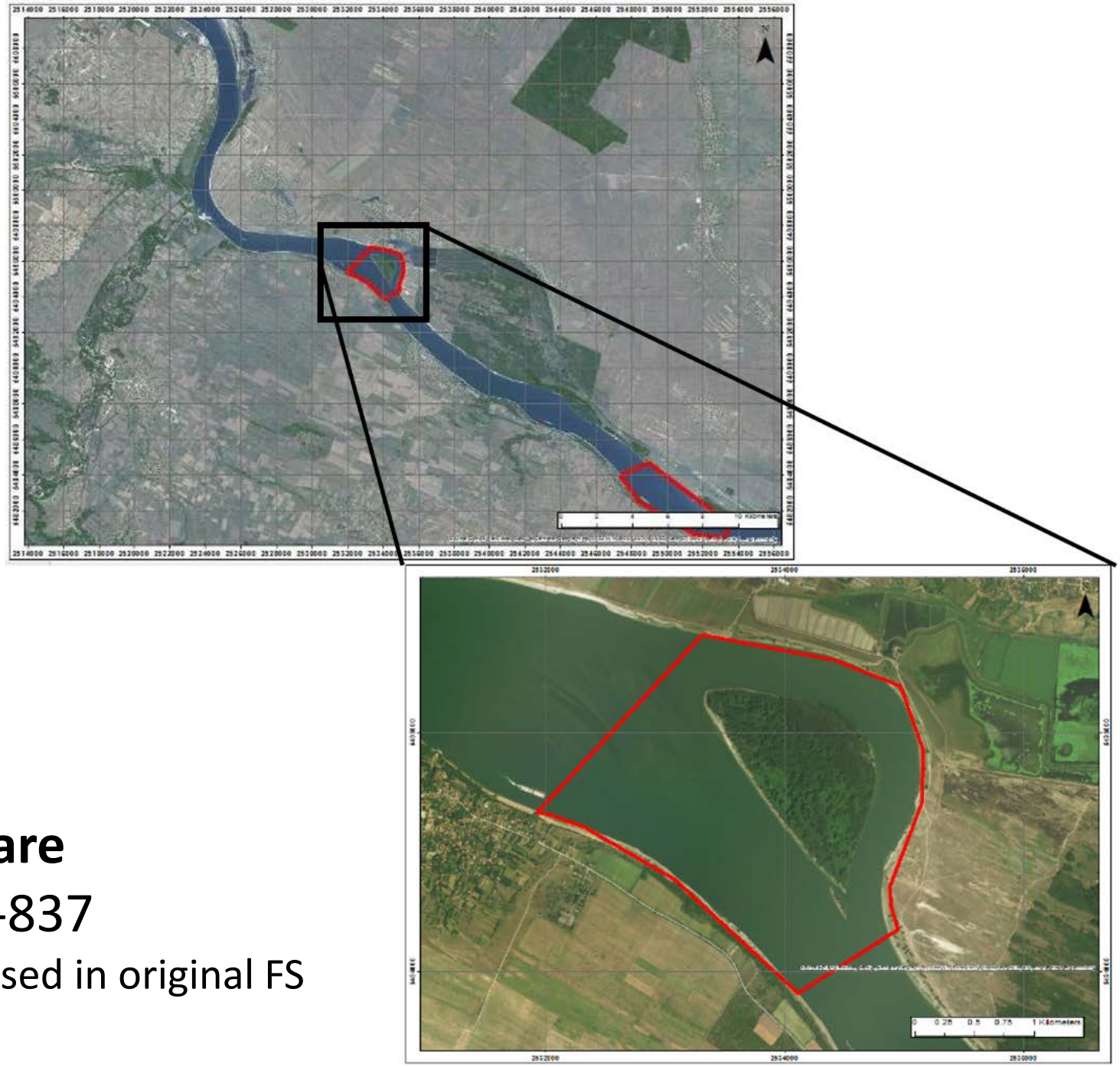
DREDGE ONLY

ISLAND CREATION

Technical Solutions
Lower Danube options

Option 2: Predominantly rigid engineering option supported by an adequate dredging commitment to maintain navigation channels

- Risks: modest but reducing in short-medium term
- Needs:
  - short-medium term funding
  - institutional strengthening for future dredging / adaptive mgt
- EIA: potentially significant in short / medium / long term
- Future works: risk of progressing engineering along Danube



Garla Mare

rkm 839-837

– not assessed in original FS

EXAMPLE LONGITUDINAL DIKE

FLOW DIVERTER FORMED USING DREDGED MATERIAL AND PROTECTED WITH TIMBER PILES OR RIP RAP

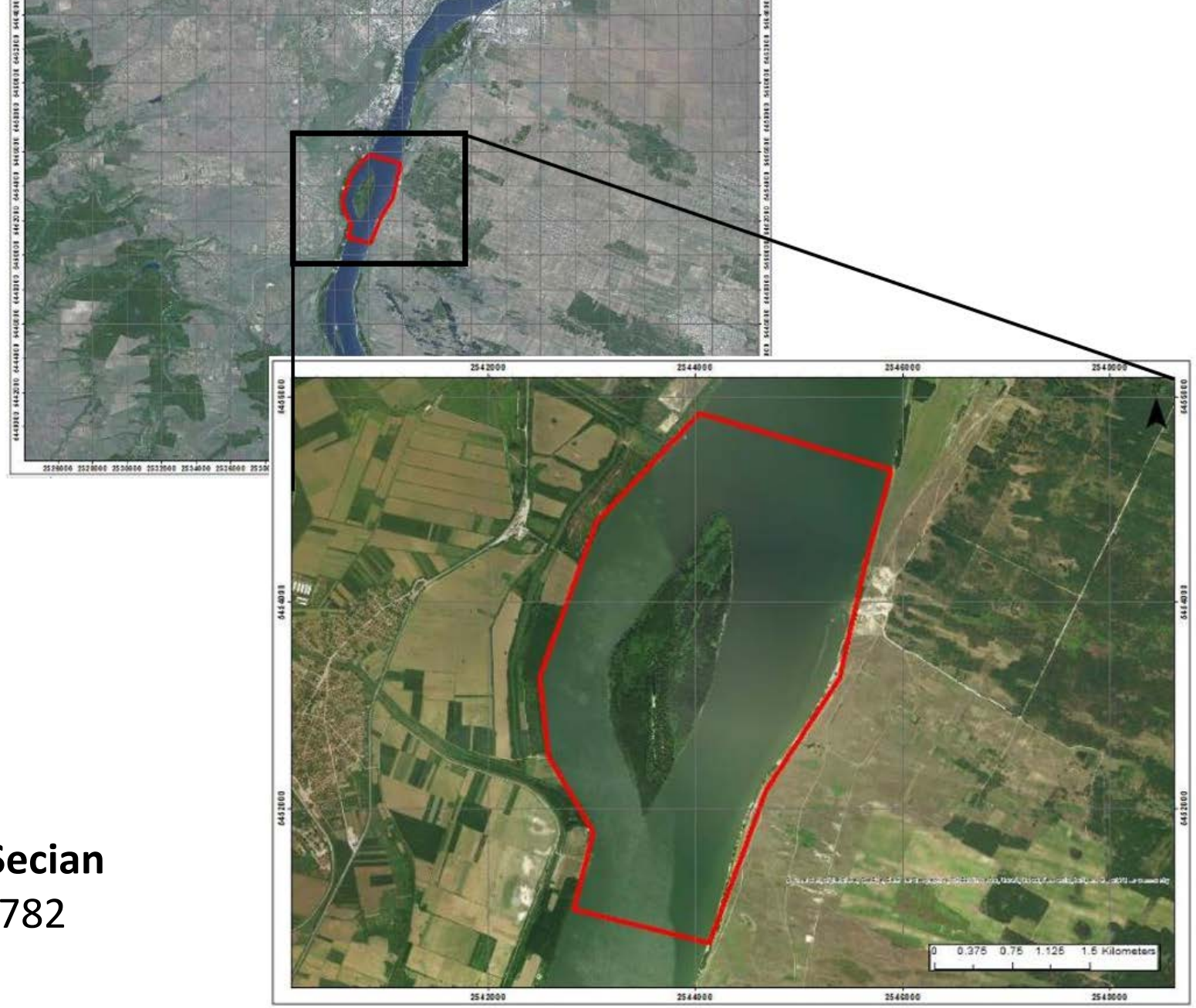
LONGITUDINAL DIKE WITH GAPS. DIKE TO HAVE EARTH CORE WITH RIP RAP COVER LAYER, 1 IN 3 SIDE SLOPES, 5m WIDE CREST. DIKE CREST LEVEL 1m ABOVE Q93 WATER LEVEL

EXAMPLE FLOW DIVERTER

LONGITUDINAL DIKES

SPUR DIKE

EXAMPLE SPUR DIKE



Bogdan Secian
rkm 786-782

LONGITUDINAL DIKE WITH GAPS. DIKE TO HAVE EARTH CORE WITH RIP RAP COVER LAYER. 1 IN 3 SIDE SLOPES. 5m WIDE CREST. DIKE CREST LEVEL 26.5m (1m ABOVE Q93 WATER LEVEL)
N
786,0
785,0
784,0
783,0
782,0
LONGITUDINAL DIKE
0 100 200 300 400 500 600 700 800 900 1000
METRES

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784,0
783,0
782,0
CHEVRON: CHEVRON TO HAVE EARTH CORE WITH RIP RAP COVER LAYER. 1 IN 3 SIDE SLOPES, 5m WIDE CREST. CREST LEVEL 26.5m (1m ABOVE Q93 WATER LEVEL)
0 100 200 300 400 500 600 700 800 900 1000
SCALE 1:10000 (A1)
SCALE 1:20000 (A3)
METRES

CHEVRONS

Technical Solutions

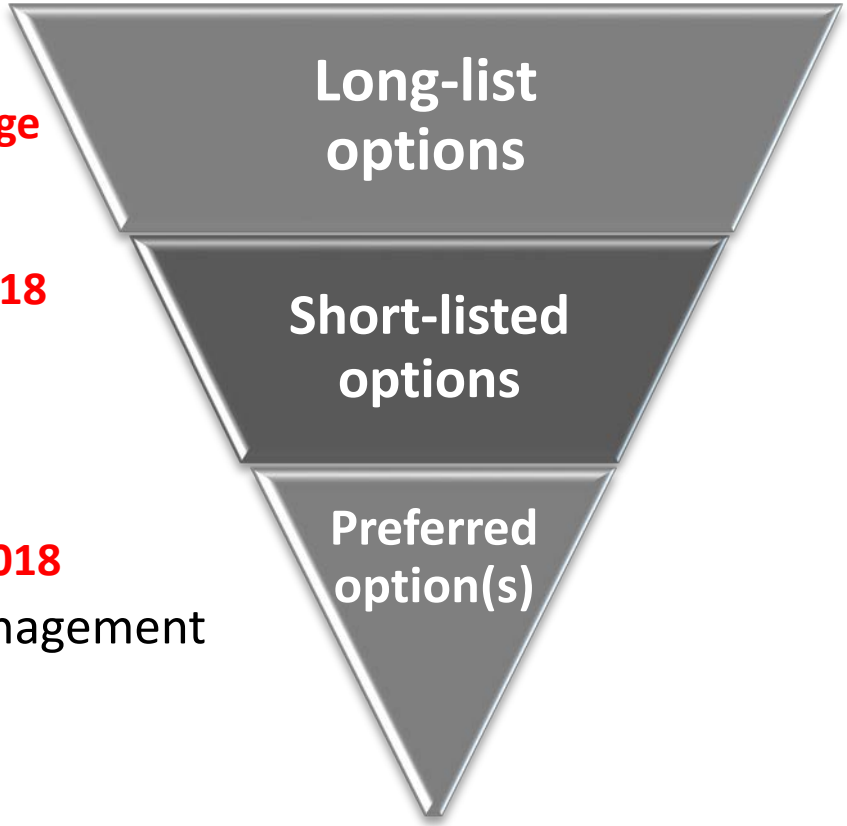
Options appraisal (work in progress)

Long-list options appraisal:
- high level MCA / screening
- stakeholder consultation

Current project stage

Short-list options appraisal: **January 2018**
- detailed MCA
- modelling, environmental assessment
- stakeholder consultation

Preferred options: **Summer 2018**
- tender design, framework for adaptive management
- EU-compliant, EIA/AA, permitting
- stakeholder consultation.



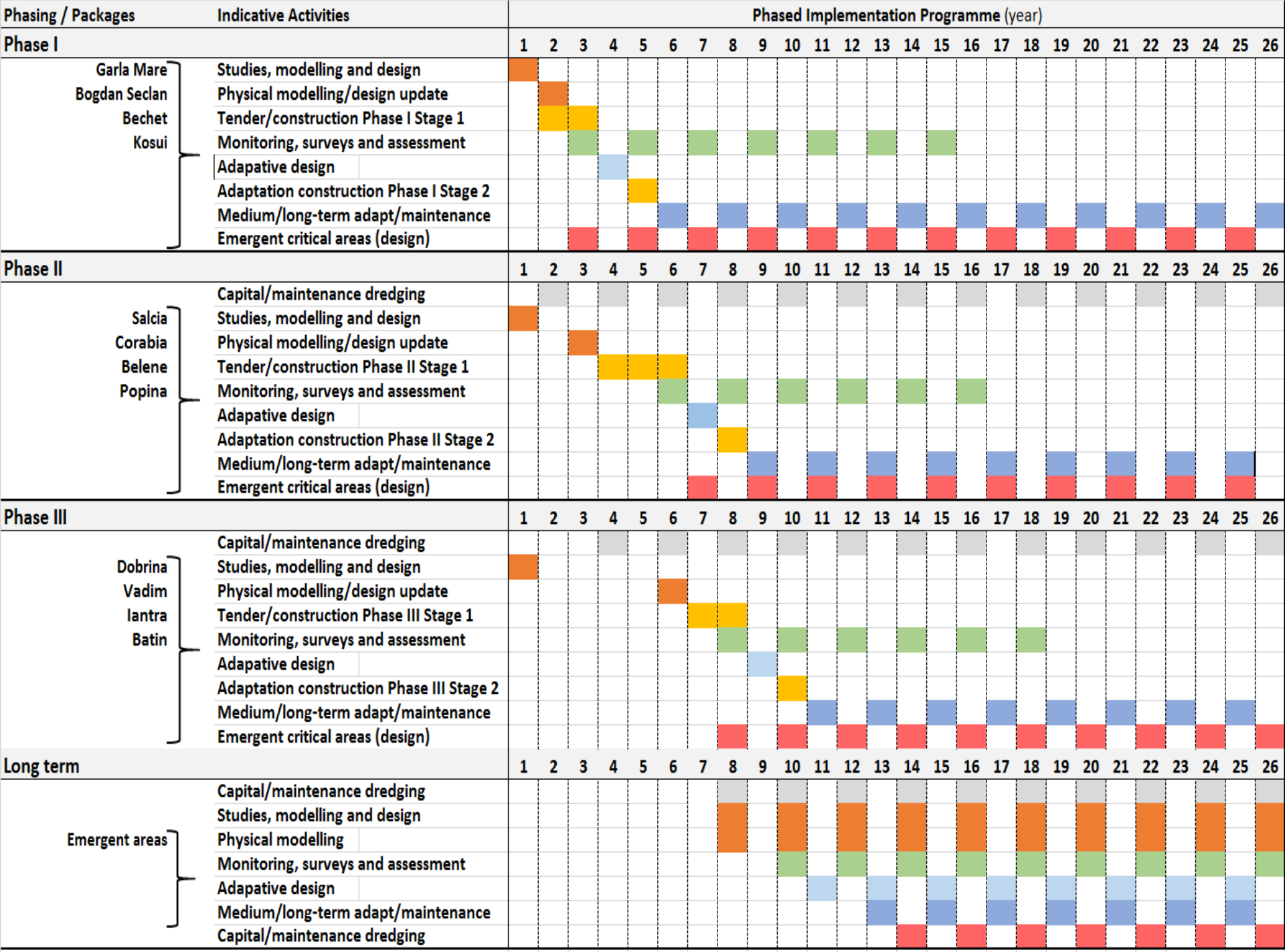
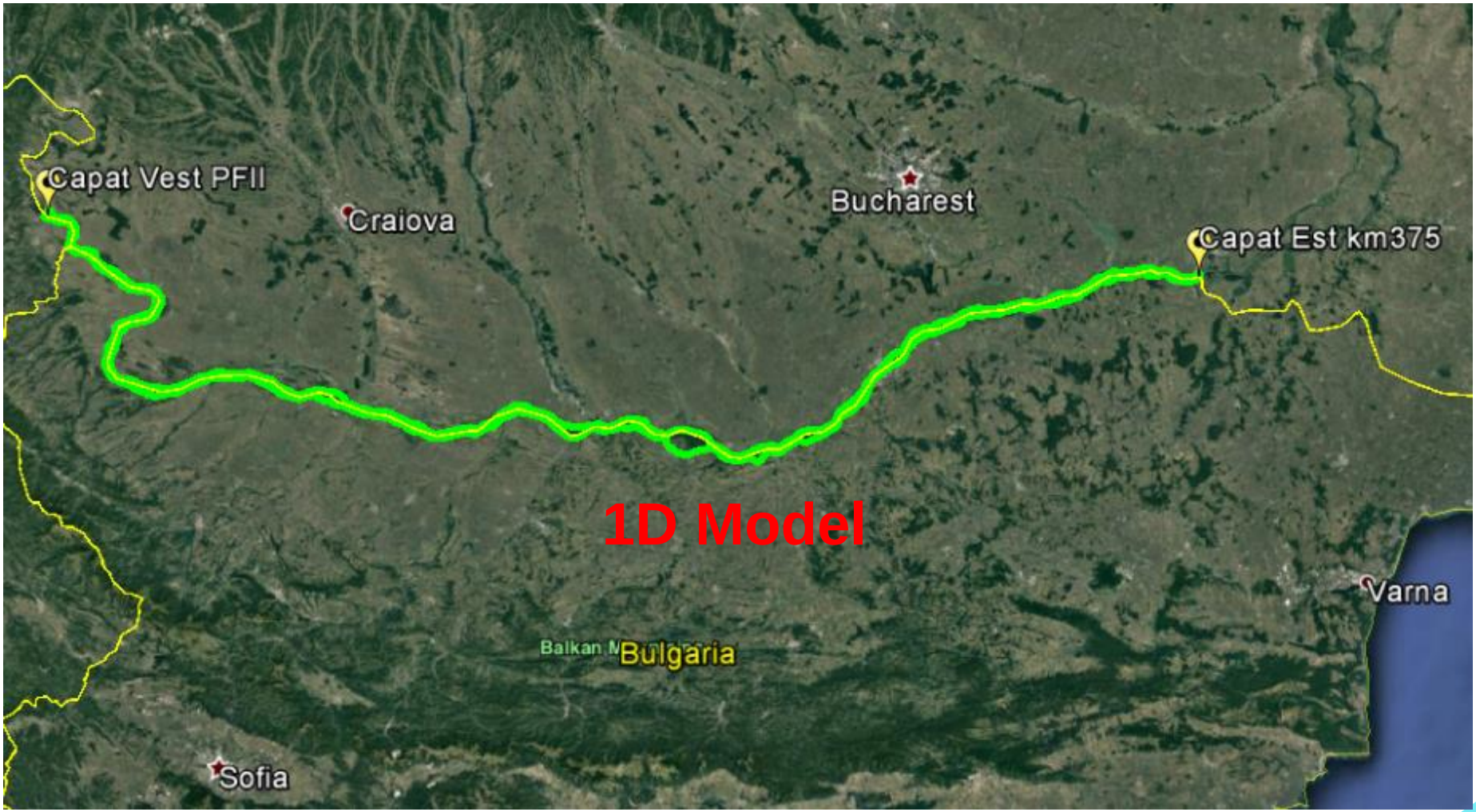


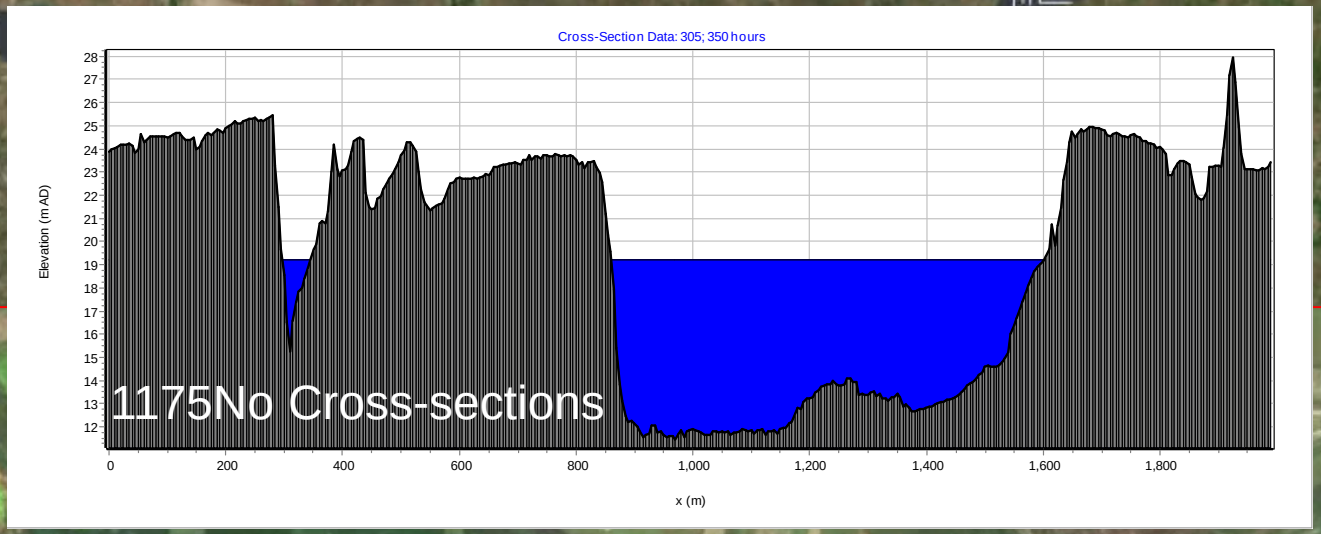
Figure 6.2 Indicative Phased Implementation Programme

Modelling

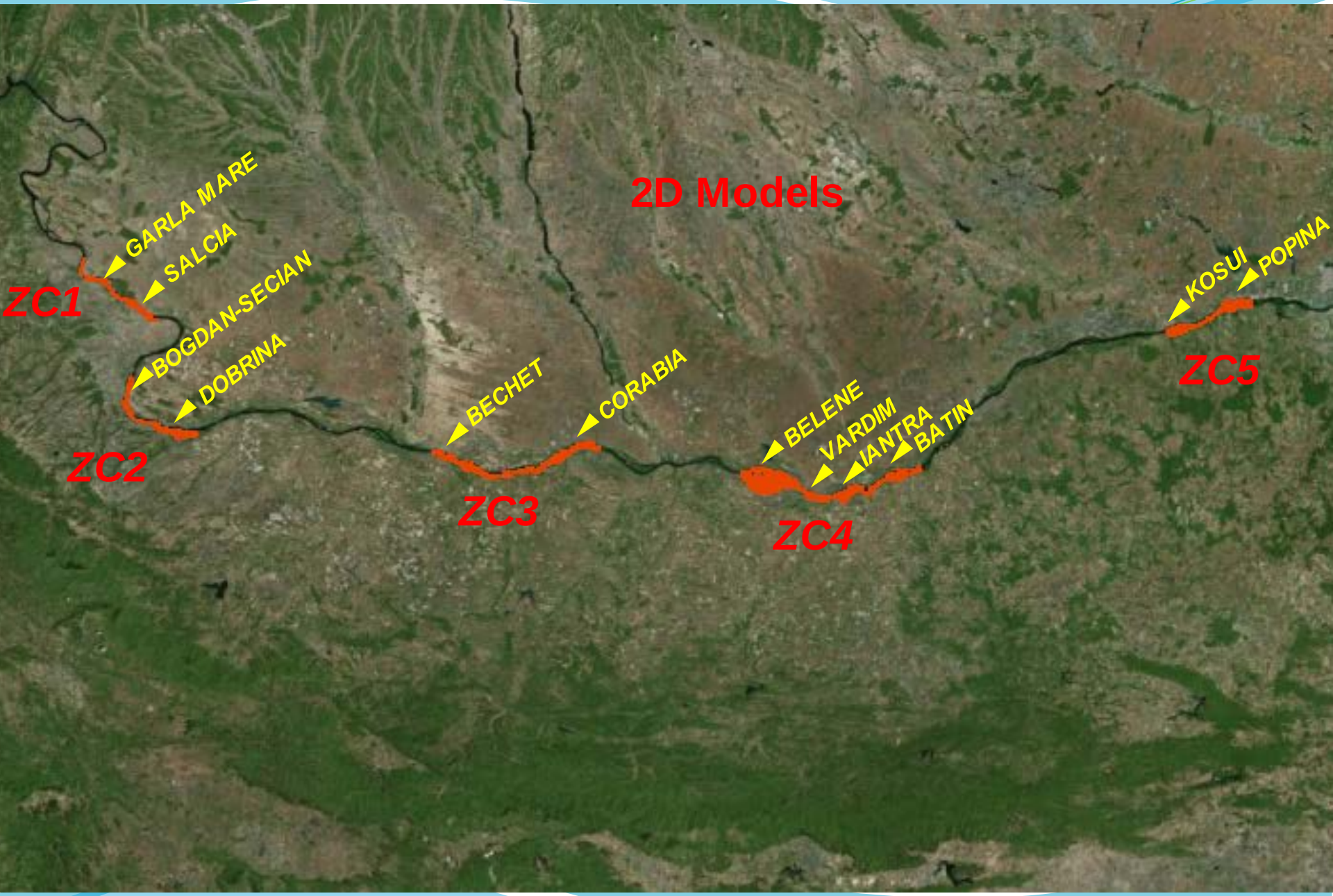
Overview of approach

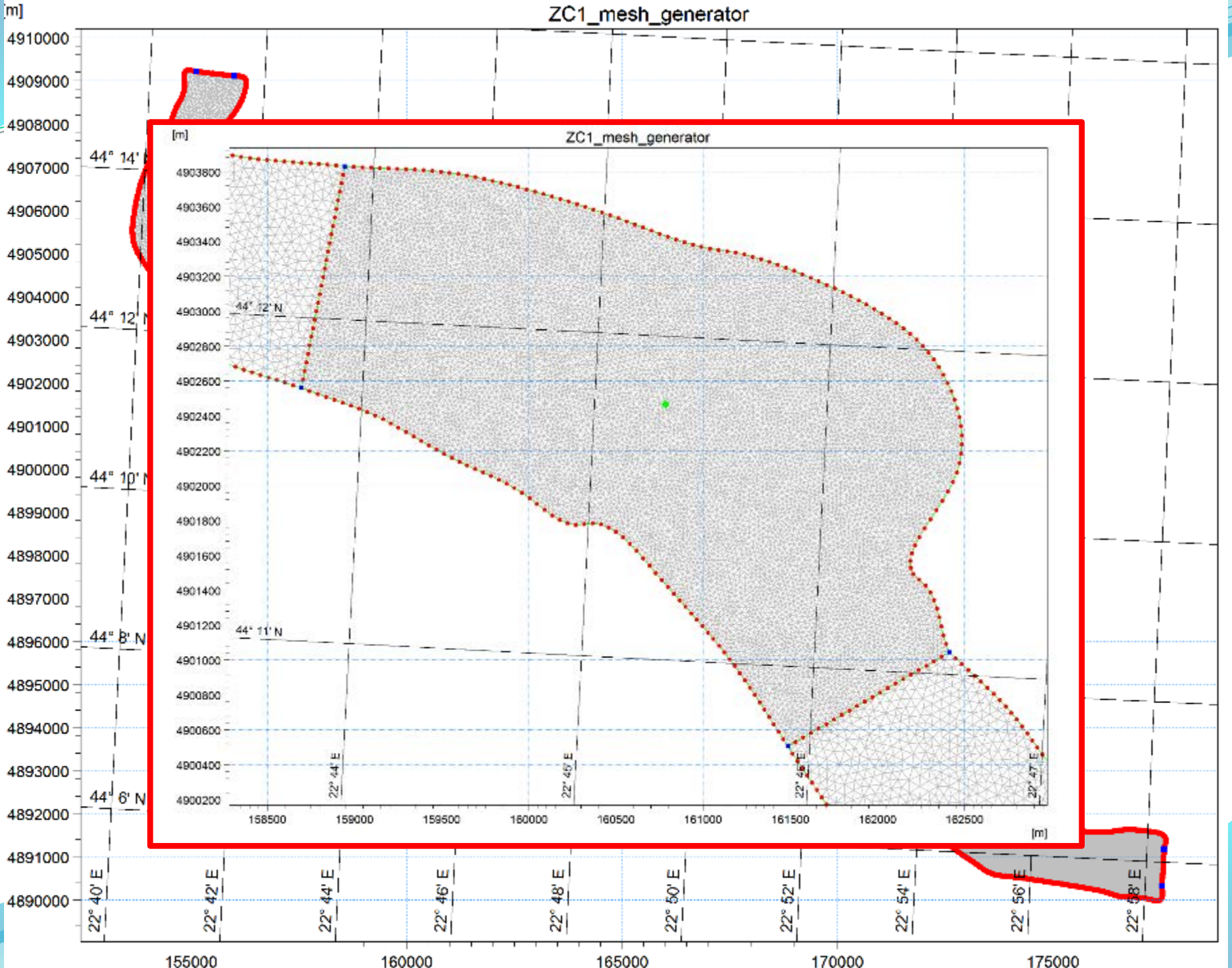
- "1D" model of entire study reach (Km863 to Km375)
  - Provides information for whole study area
  - Provides boundary data for local models of critical locations
- "2D" models of each of 5 critical zones containing the 12 critical locations
  - More detailed analysis of behaviour in the critical zones
  - Testing of options


Capat Vest PFII
Craiova
Bucharest
Capat Est km375
1D Model
Varna
Balkan M
Bulgaria
Sofia



Tributary river flows


2D Models
GARLA MARE
SALCIA
BOGDAN-SECIAN
DOBRINA
BECHET
CORABIA
BELENE
VARDIM
IANTRA
BATIN
KOSUI
POPINA
ZC1
ZC2
ZC3
ZC4
ZC5


ZC1_mesh_generator
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4910000
4909000
4908000
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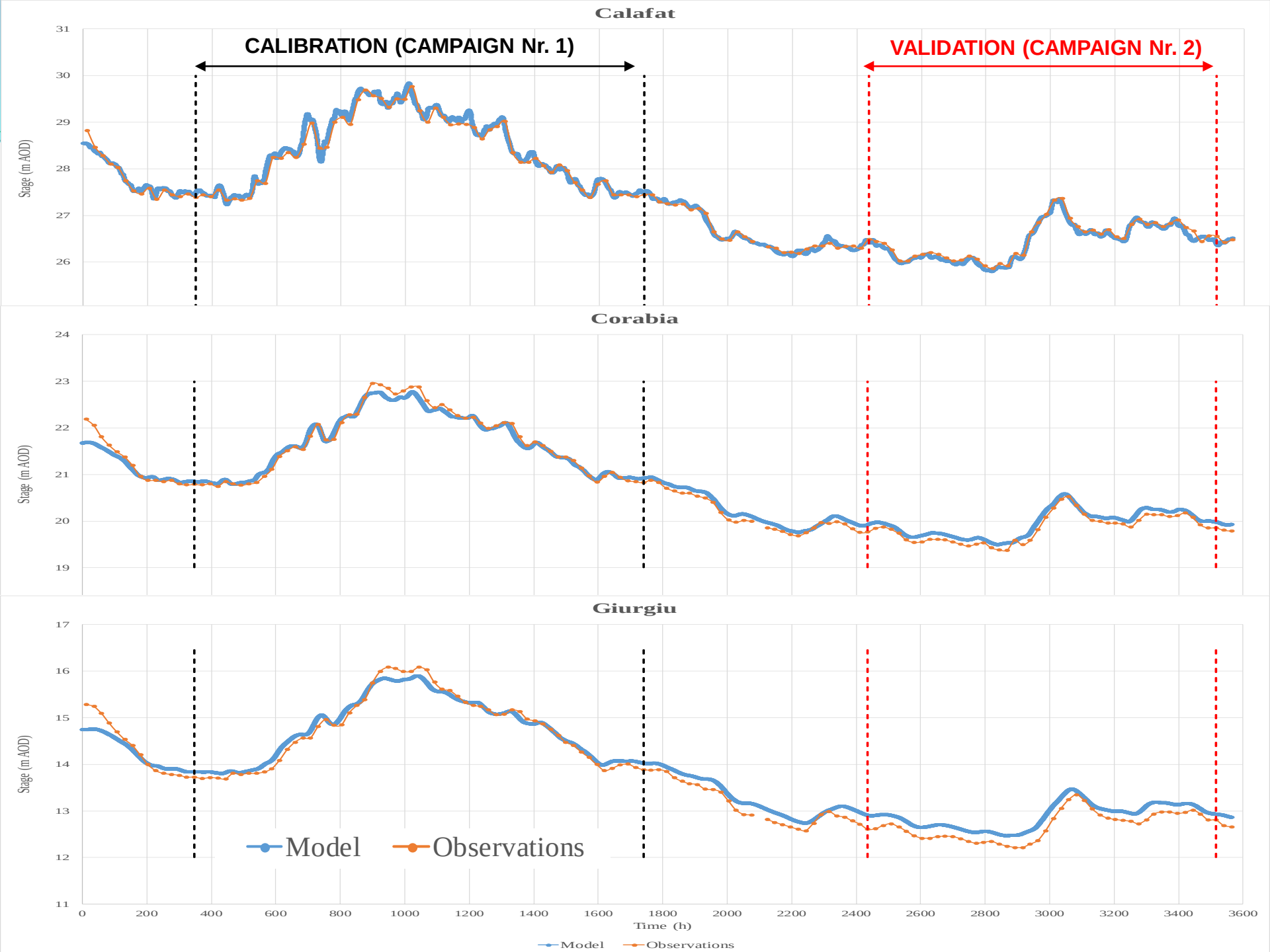
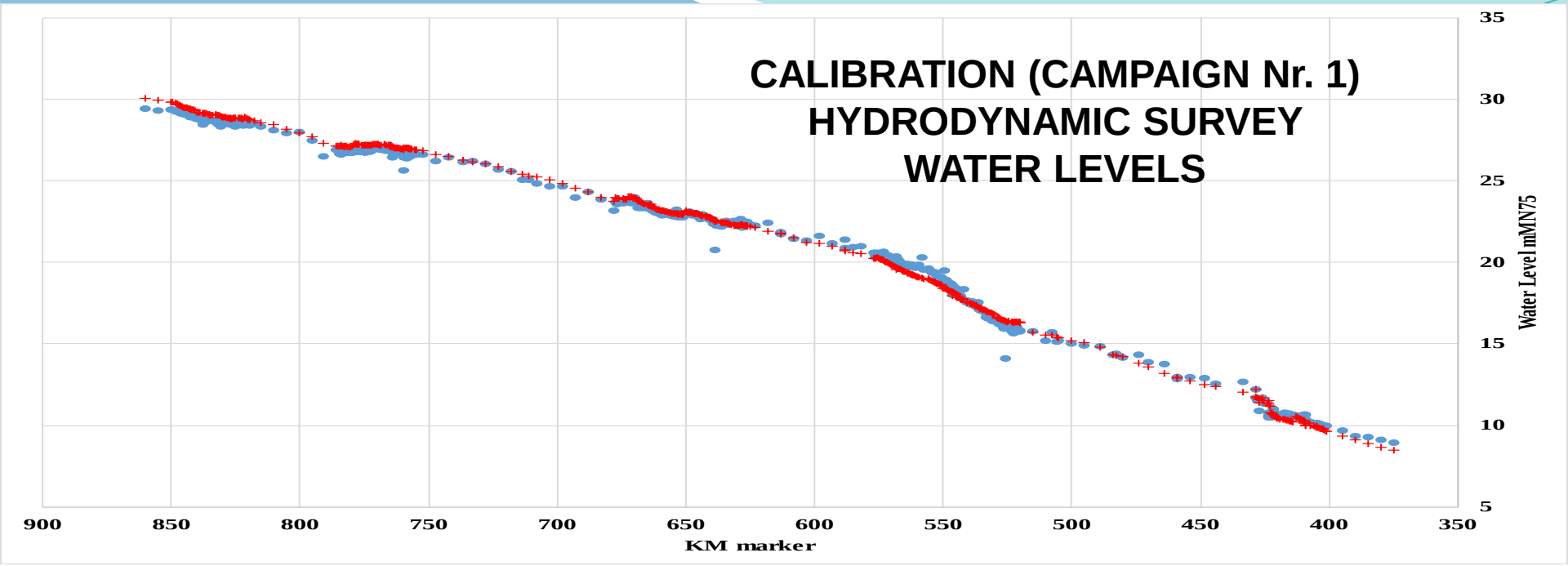
4904000
4903000
4902000
4901000
4900000
4899000
4898000
4897000
4896000
4895000
4894000
4893000
4892000
4891000
4890000
44° 14' N
44° 12' N
44° 10' N
44° 8' N
44° 6' N
22° 40' E
22° 42' E
22° 44' E
22° 46' E
22° 48' E
22° 50' E
22° 52' E
22° 54' E
22° 56' E
22° 58' E
155000
160000
165000
170000
175000
ZC1_mesh_generator
[m]
4903800
4903600
4903400
4903200
4903000
4902800
4902600
4902400
4902200
4902000
4901800
4901600
4901400
4901200
4901000
4900800
4900600
4900400
4900200
44° 12' N
44° 11' N
22° 44' E
22° 45' E
22° 46' E
22° 47' E
158500
159000
159500
160000
160500
161000
161500
162000
162500
[m]

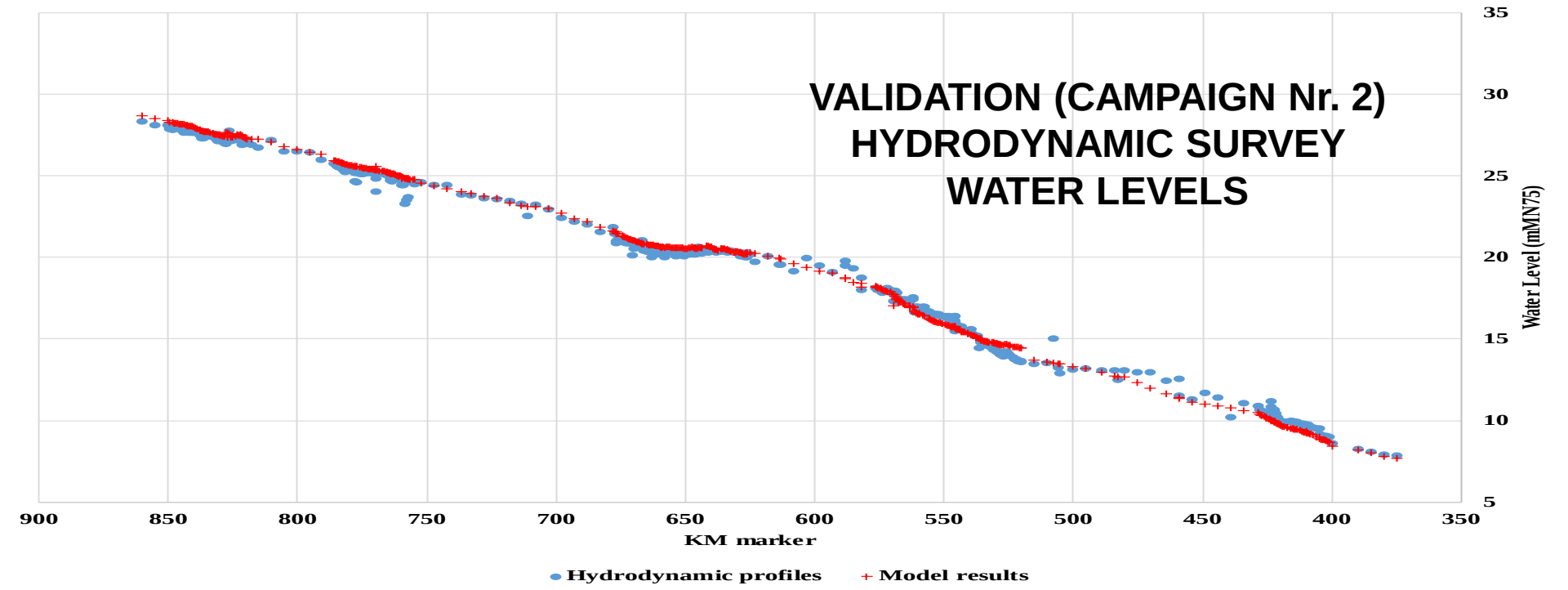
Overview of approach

- Models built using bathymetry, LIDAR and bed sediment samples from Survey Campaign Nr. 1
- Models calibrated using:
  - Water level, flow, velocity and suspended sediment measurements from Survey Campaign Nr. 1 (hydrodynamic + sediments) & gauge station records
- Models validated using:
  - Measurements from Survey Campaign Nr. 2
  - Bed differences between Survey Campaigns

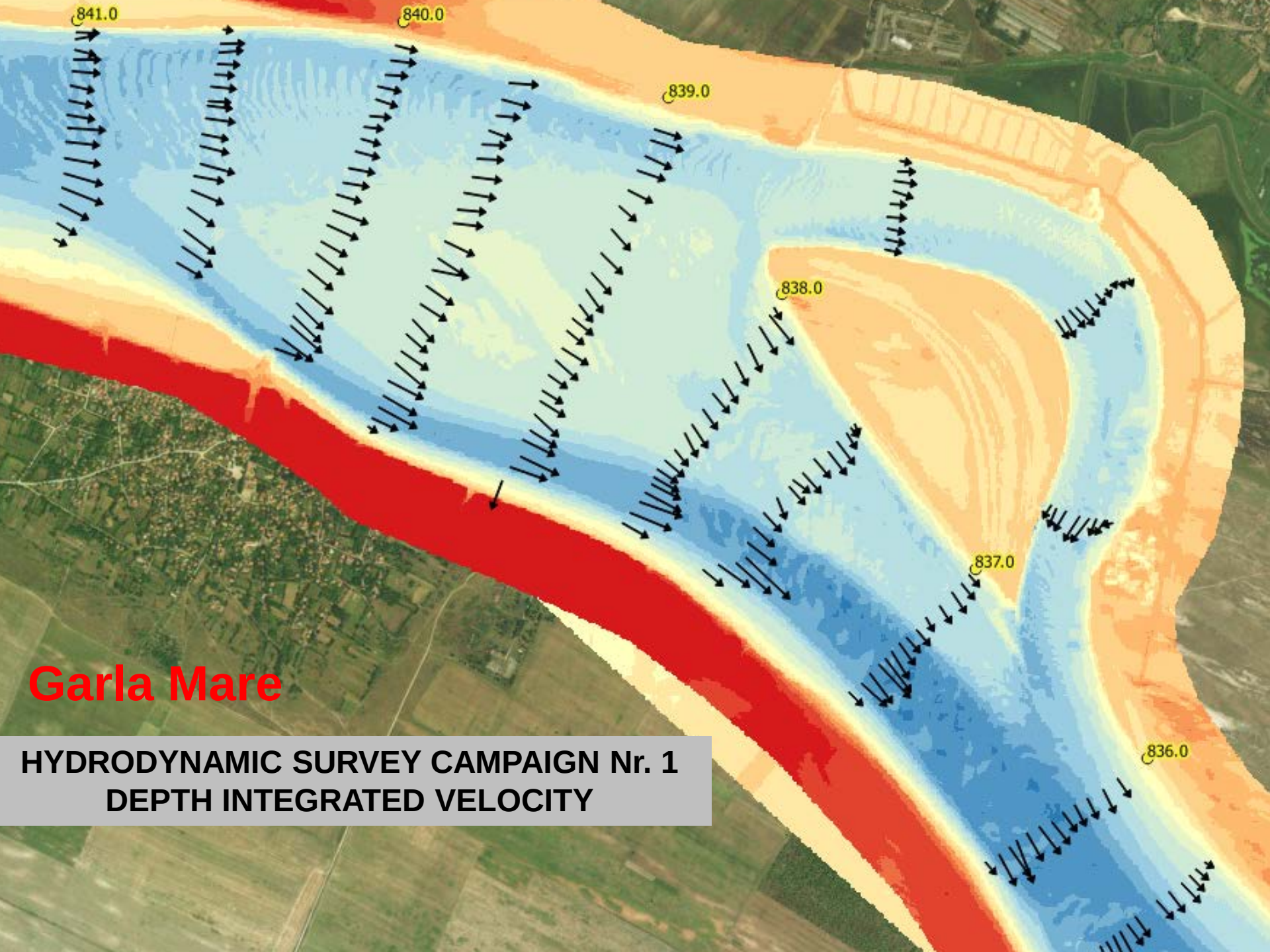
1D Model calibration and validation


Calafat
CALIBRATION (CAMPAIGN Nr. 1)
VALIDATION (CAMPAIGN Nr. 2)
Stage (m AOD)
31
30
29
28
27
26
Corabia
Stage (m AOD)
24
23
22
21
20
19
Giurgiu
Stage (m AOD)
17
16
15
14
13
12
11
Model
Observations
0
200
400
600
800
1000
1200
1400
1600
1800
2000
2200
2400
2600
2800
3000
3200
3400
3600
Time (h)
Model
Observations

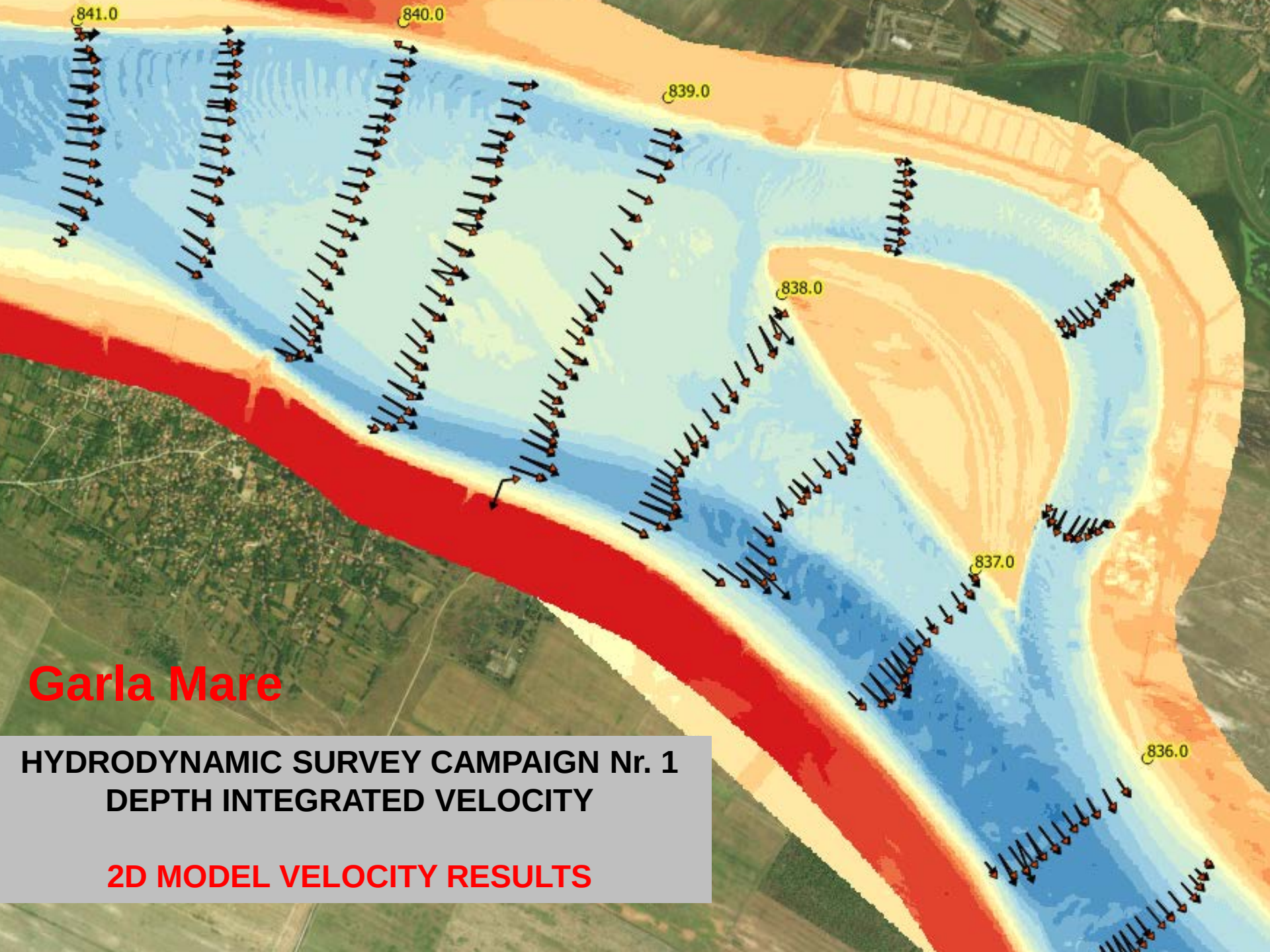

CALIBRATION (CAMPAIGN Nr. 1)
HYDRODYNAMIC SURVEY
WATER LEVELS
35
30
25
20
15
10
5
Water Level mMN75
900
850
800
750
700
650
600
550
500
450
400
350
KM marker


VALIDATION (CAMPAIGN Nr. 2)
HYDRODYNAMIC SURVEY
WATER LEVELS
35
30
25
20
15
10
5
Water Level (mMN75)
900
850
800
750
700
650
600
550
500
450
400
350
KM marker
Hydrodynamic profiles
Model results

2D Model calibration and validation



HYDRODYNAMIC SURVEY CAMPAIGN Nr. 1
DEPTH INTEGRATED VELOCITY



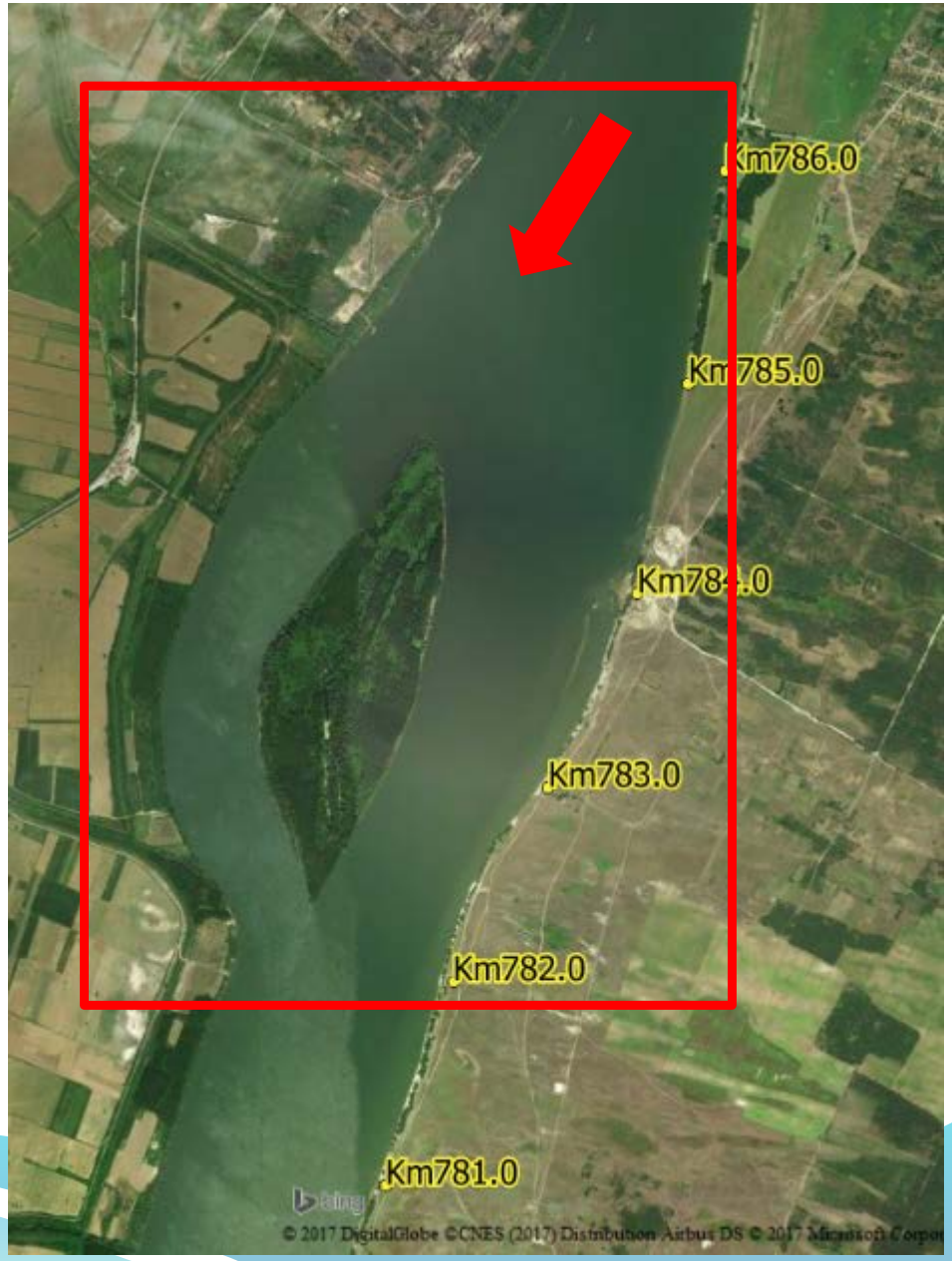
HYDRODYNAMIC SURVEY CAMPAIGN Nr. 1
DEPTH INTEGRATED VELOCITY

2D MODEL VELOCITY RESULTS

Model calibration and validation

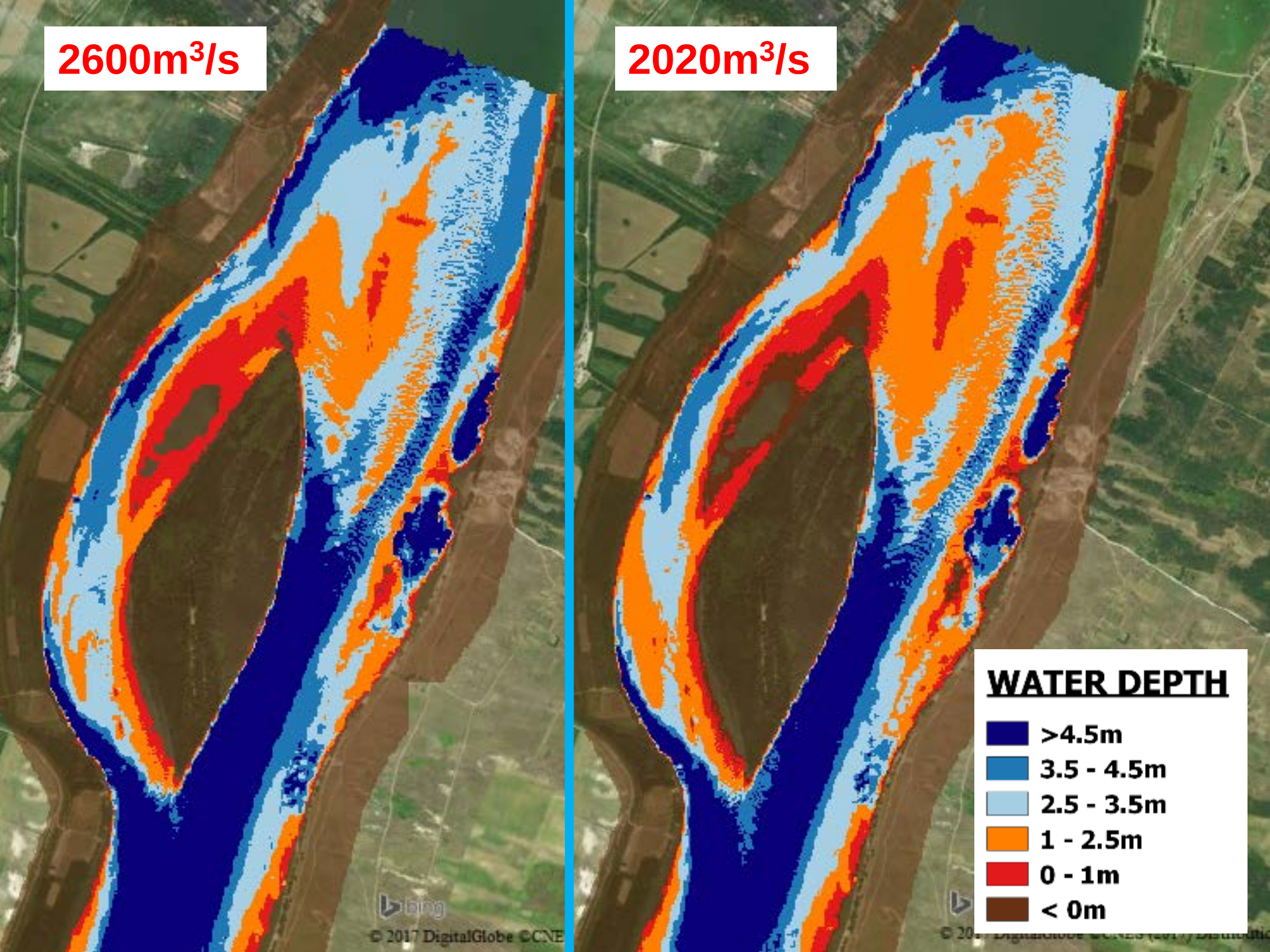
- 1D and 2D hydrodynamic model calibration and validation substantially complete
- 1D sediment transport model calibration and validation substantially complete
- 2D sediment transport model calibration and validation in progress

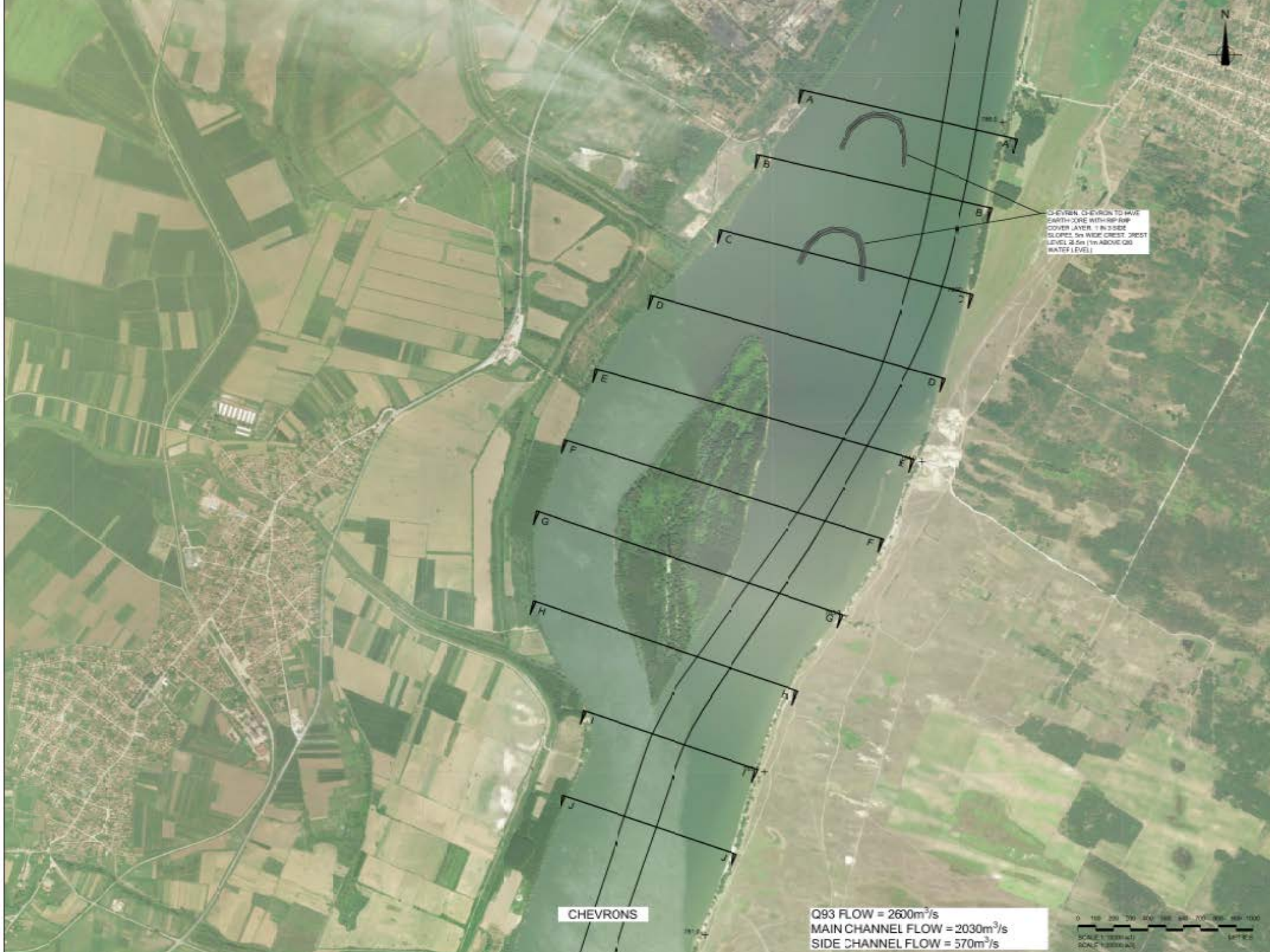
Morphology Bogdan-Secian

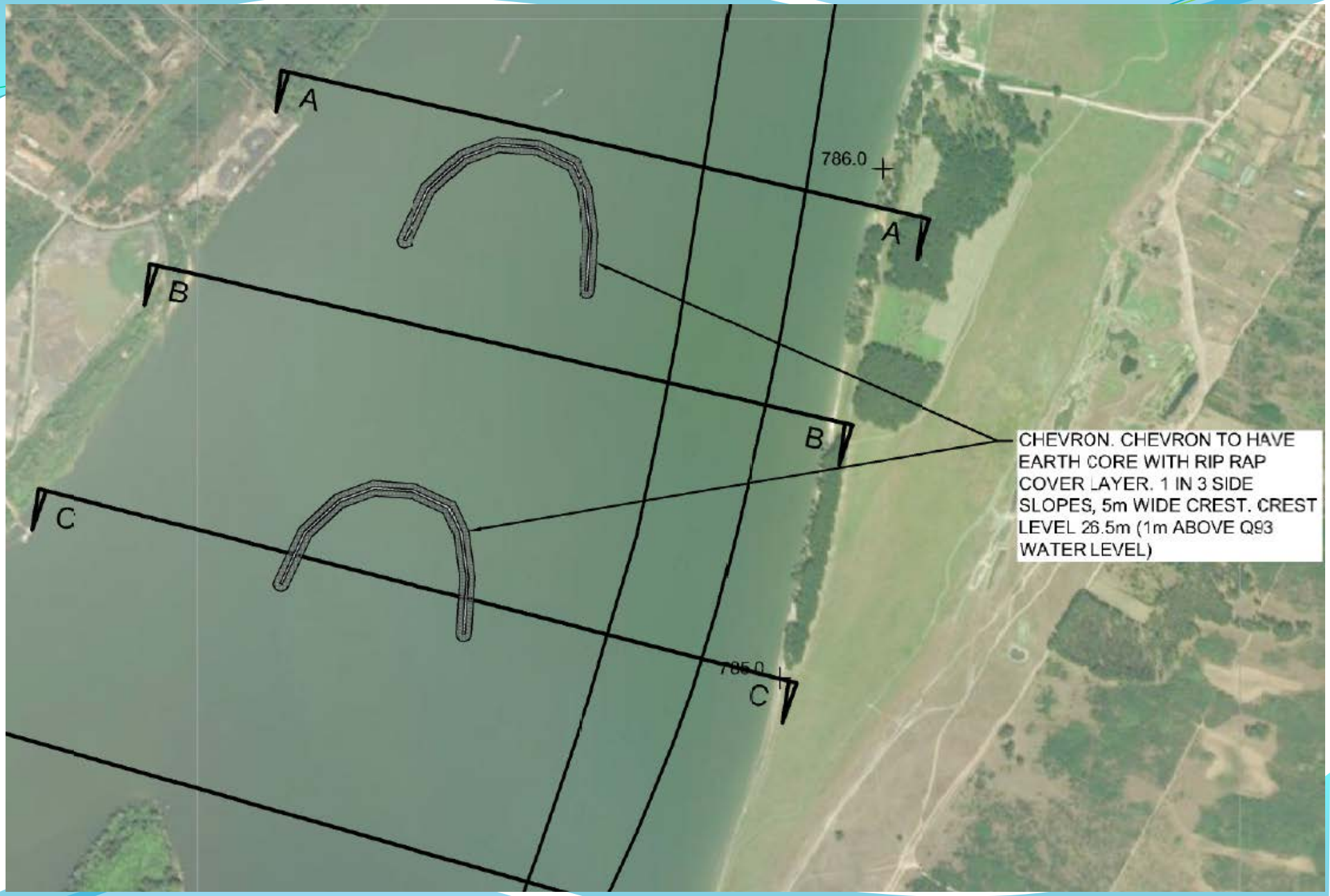


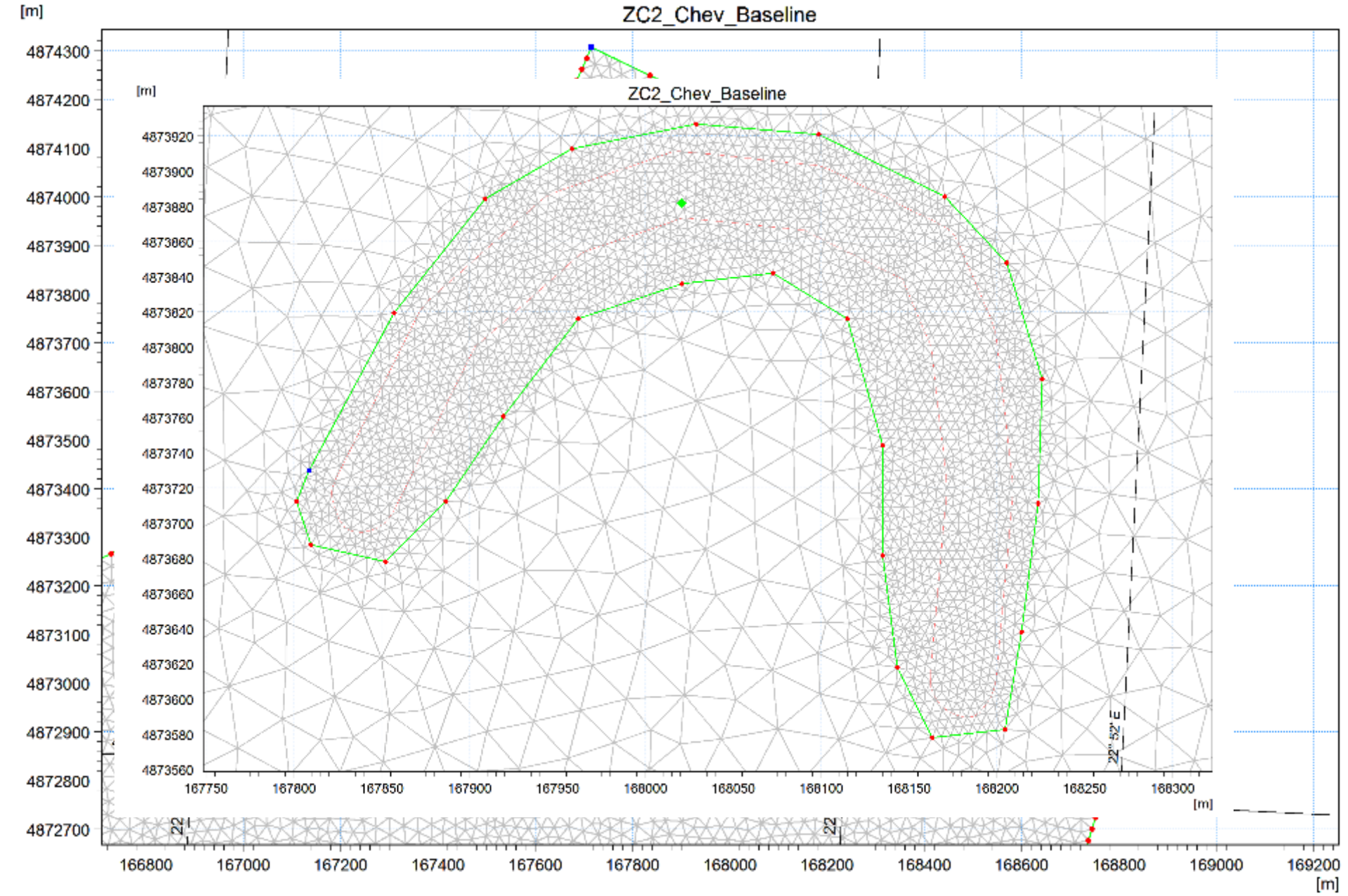
Technical solutions modelling

- Preliminary testing with 2D model (hydrodynamic)
- Example :
  - Chevron structures for Bogdan-Secian critical location


2600m³/s
2020m³/s
WATER DEPTH
>4.5m
3.5 - 4.5m
2.5 - 3.5m
1 - 2.5m
0 - 1m
< 0m
© 2017 DigitalGlobe ©CNE


A
A
B
B
C
C
D
D
E
E
F
F
G
G
H
H
J
J
CHEVRONS
Q93 FLOW = 2600m³/s
MAIN CHANNEL FLOW = 2030m³/s
SIDE CHANNEL FLOW = 570m³/s
N


A
786.0
A
B
B
C
C
CHEVRON. CHEVRON TO HAVE EARTH CORE WITH RIP RAP COVER LAYER. 1 IN 3 SIDE SLOPES, 5m WIDE CREST. CREST LEVEL 26.5m (1m ABOVE Q93 WATER LEVEL)


ZC2_Chev_Baseline
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ZC2_Chev_Baseline
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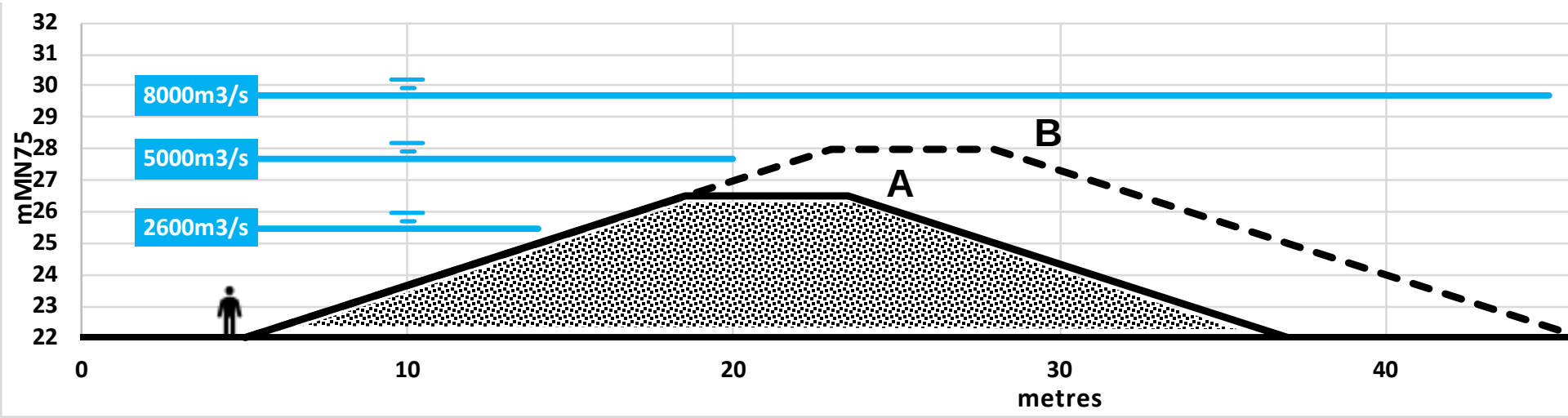
4873580
4873560
167750
167800
167850
167900
167950
168000
168050
168100
168150
168200
168250
168300
[m]
22° 52' E

Technical solutions modelling

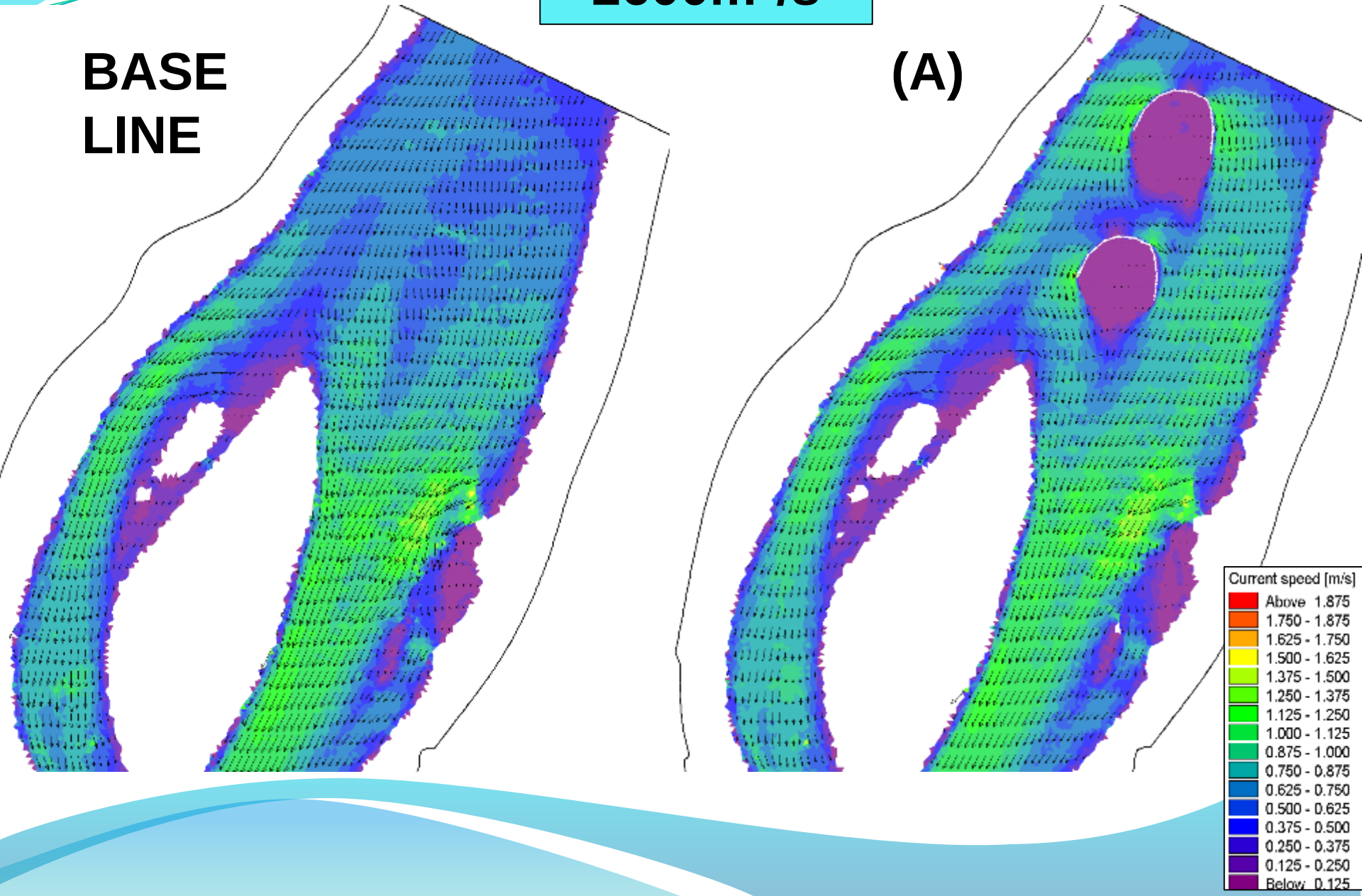
- Initial tests:
  - 2 Crest levels : (A) Q93% + 1m, (B) Q93% + 2.5m
  - 3 Flows:
    - 2600m^3/s (Q93%);
    - 5000m^3/s (~Mean Annual Flow);
    - 8000m^3/s (~Effective Discharge)



2600m^3/s

BASE LINE

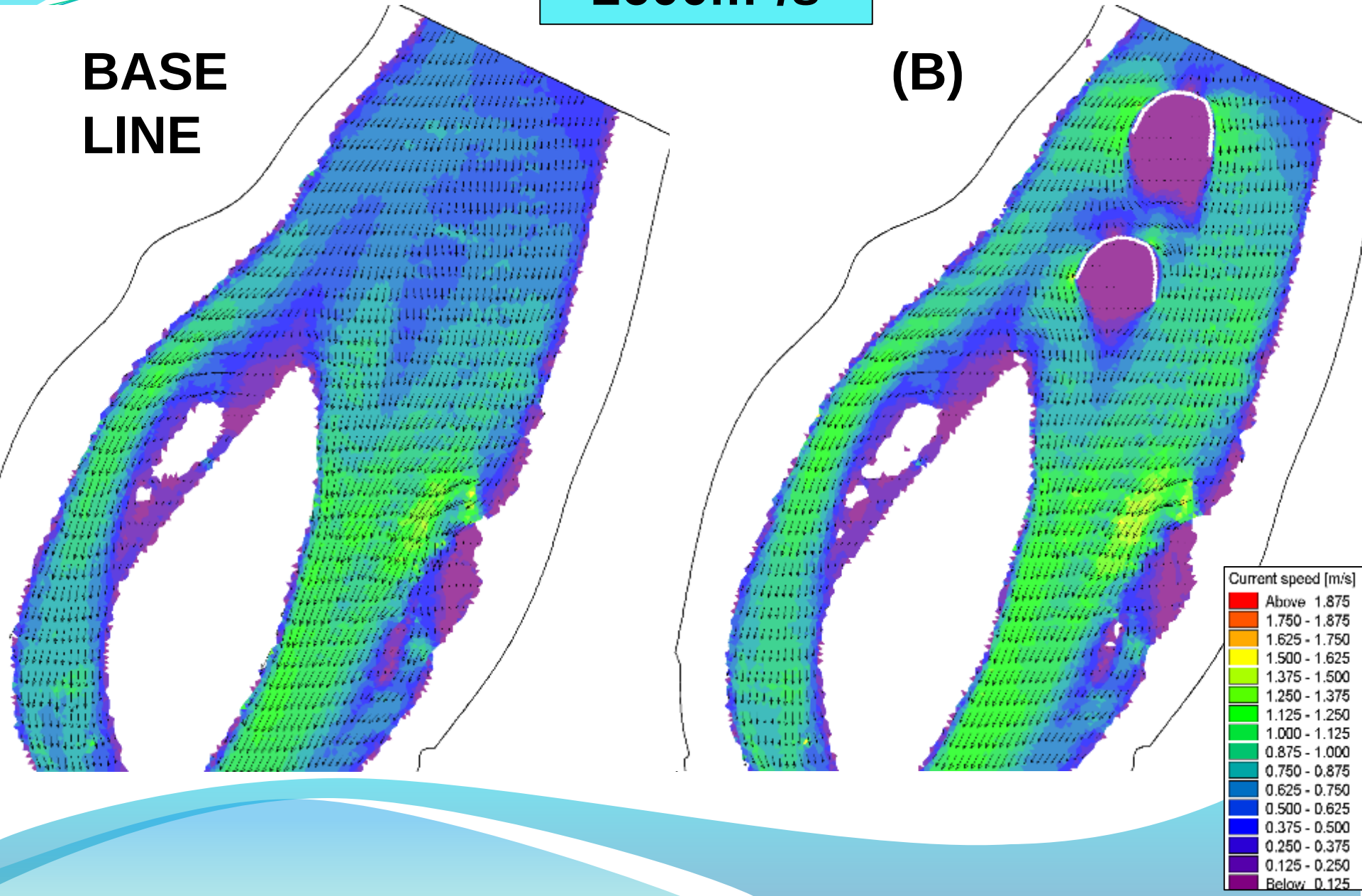
(A)



2600m^3/s

BASE LINE

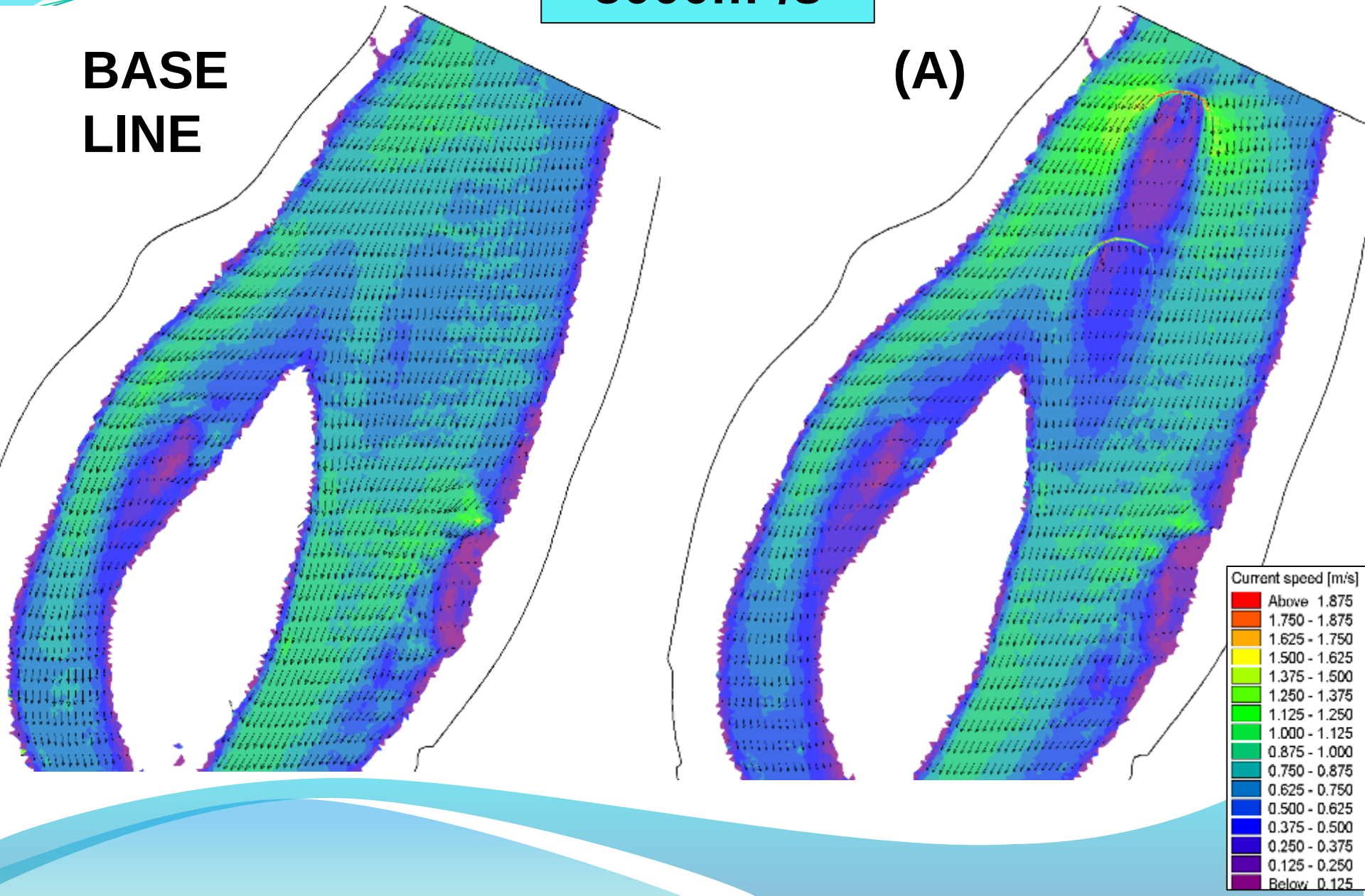
(B)



5000m^3/s

BASE LINE

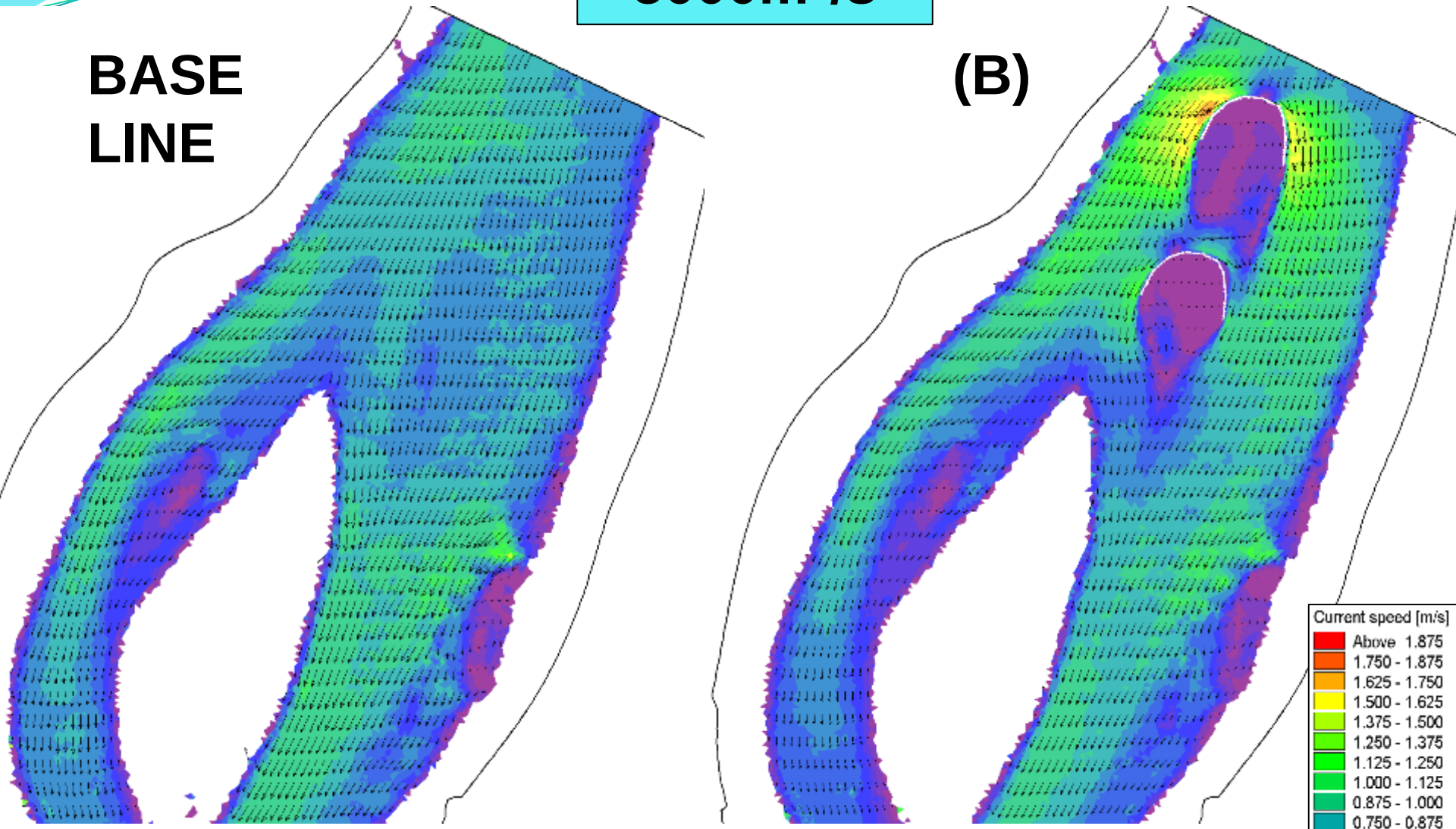
(A)



5000m^3/s

BASE LINE

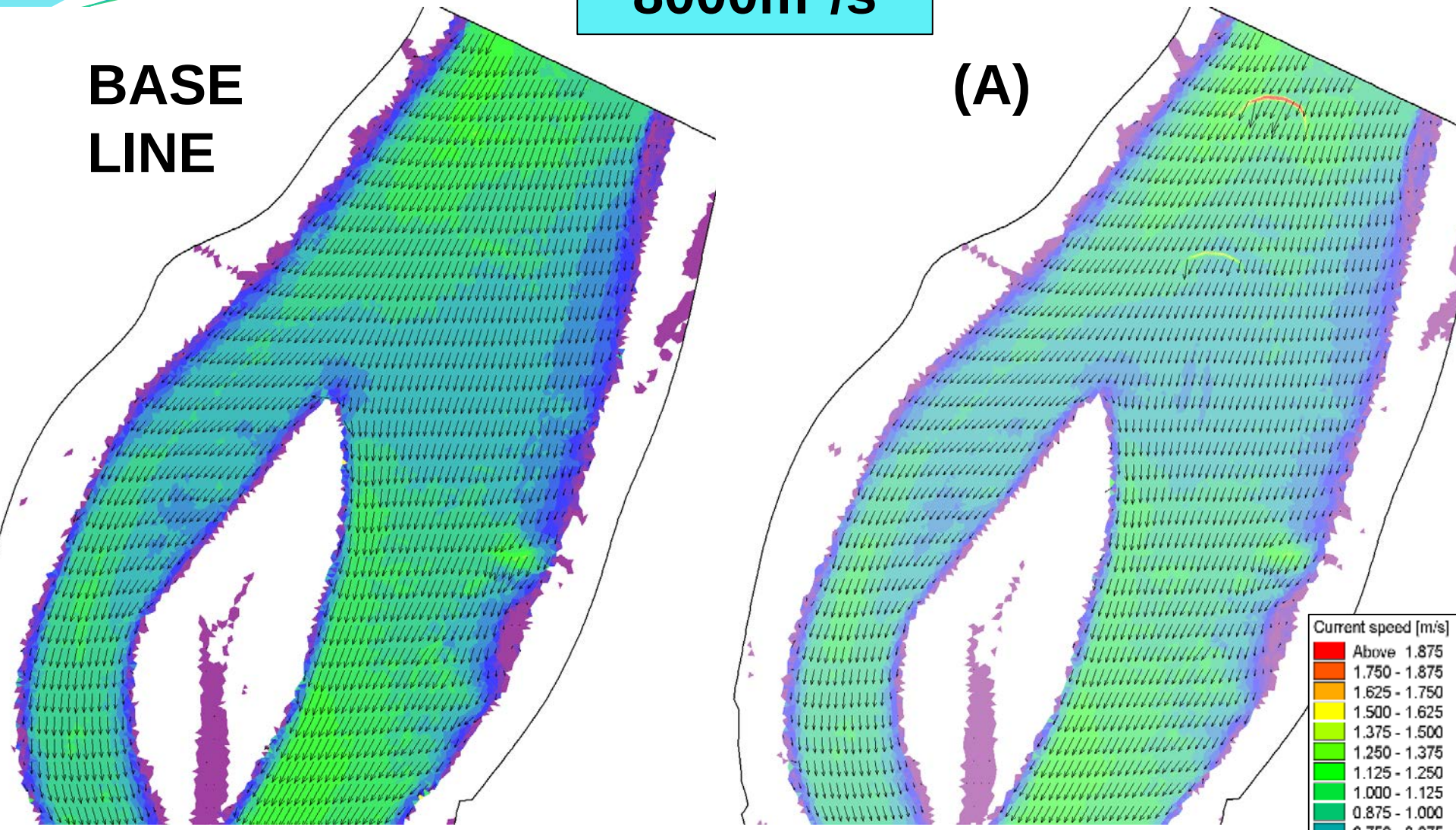
(B)



8000m^3/s

BASE LINE

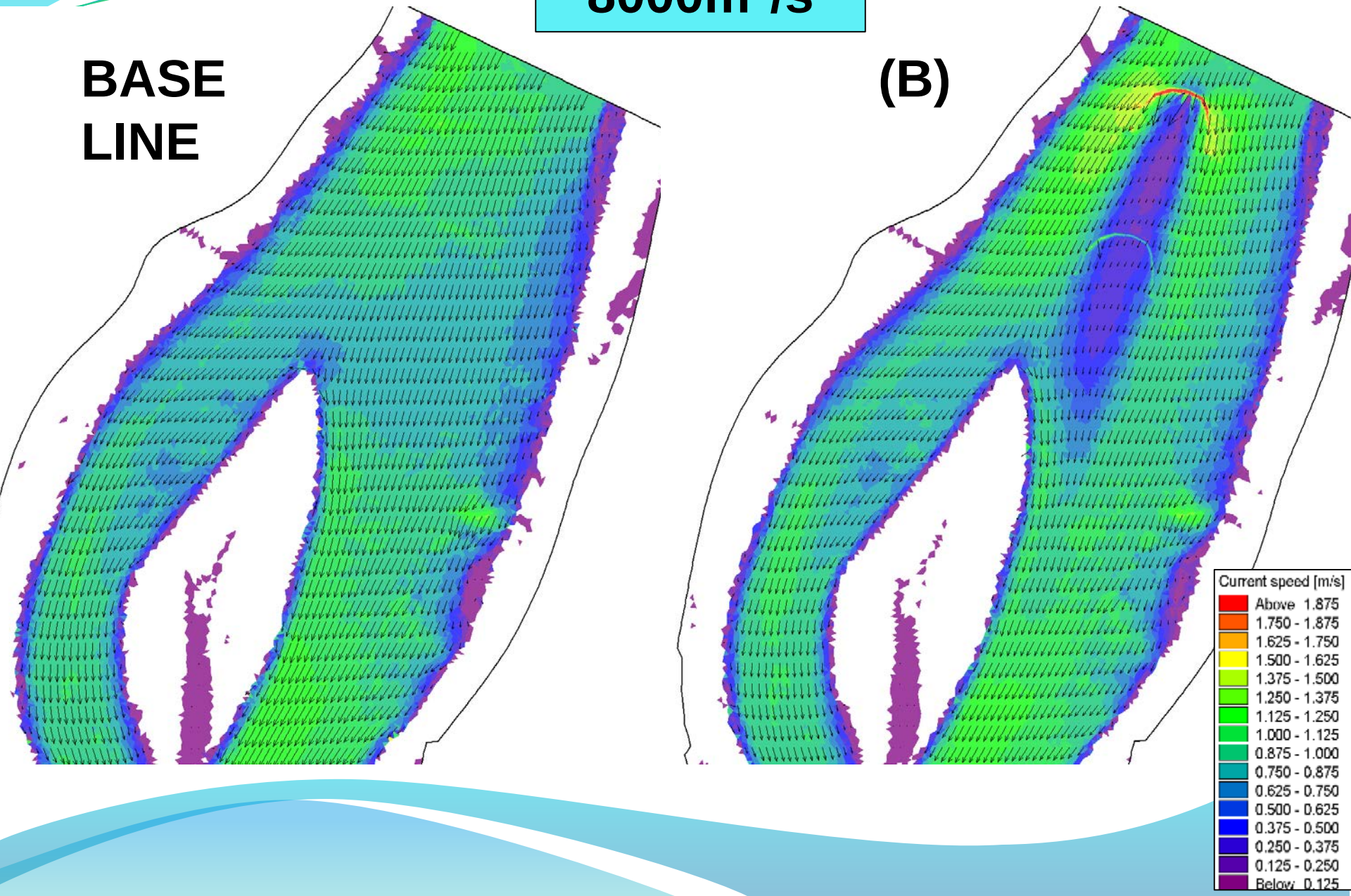
(A)



8000m^3/s

BASE LINE

(B)



Modelling - Summary

- **Purpose**
  - build technical tools needed to decide the optimal technical solutions to improve navigation and to better understand the river morphological implications
  - Provide AFDJ & APPD with model tools to improve future river management (including training, Part 1 delivered this week)
- **Programme**
  - Complete and report model build, calibration and validation by end 2017
  - Then progress modelling options for navigation improvement
- **Quality**
  - Engaging with DHI to provide technical oversight of the modelling studies on behalf of AFDJ

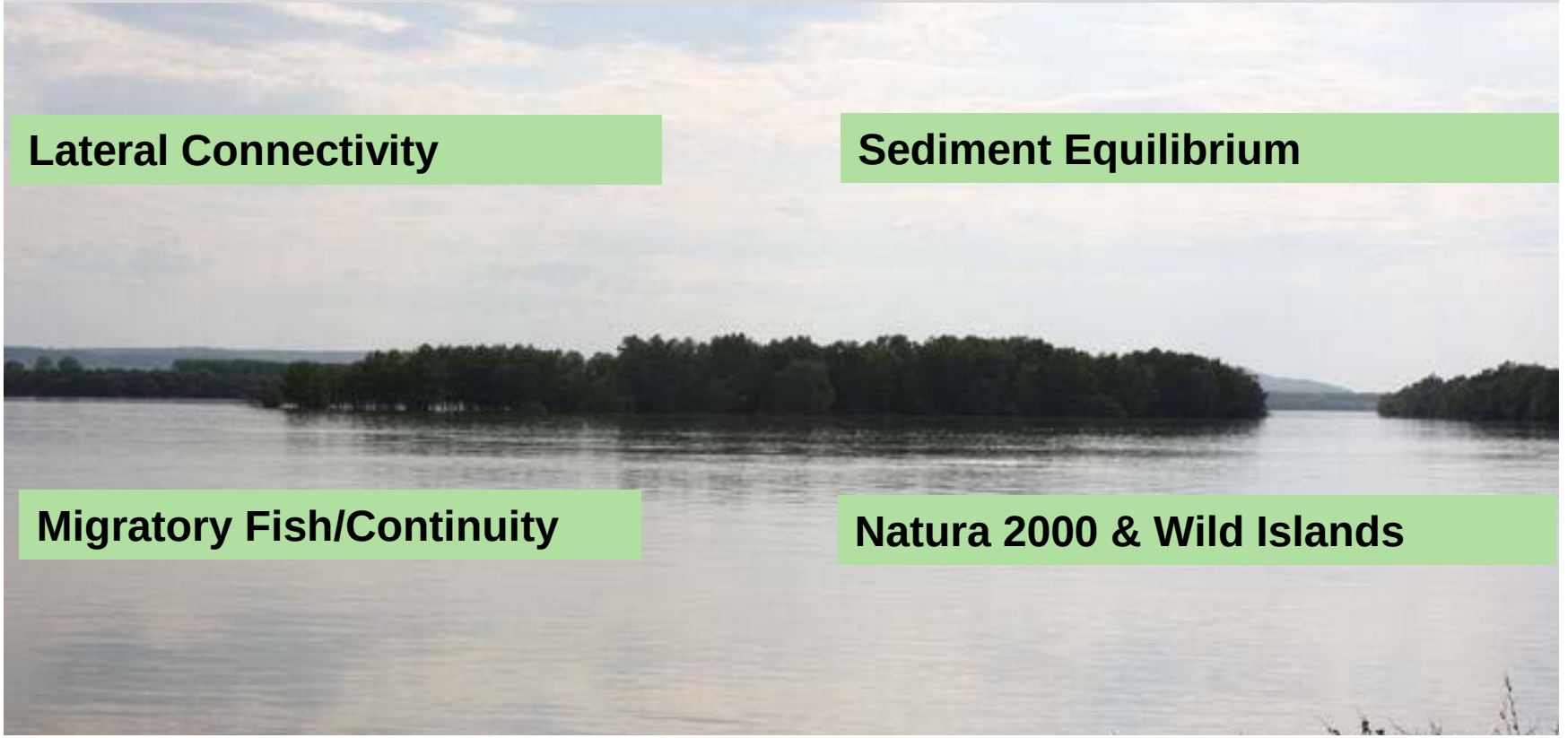
Environmental Impact Assessment (EIA) and Appropriate Assessment (AA)

Environmental Impact Assessment Stakeholder Involvement

- **Workshops** – *to present/discuss project milestones*
- **Natura 2000 Forums** - *to receive advice and note concerns regarding environmental impact of design*
- **Subject–specific Working Groups** - *to bring together subject matter experts from various stakeholders in reaching conclusions and contribute to the conceptual design of potential solutions*
  - *morphology / modelling*
  - *sturgeon / fish*
  - *environmental / social*
  - *engineering / technical solutions*
- **Procedural (EIA and AA) Public Debates** *in Romania and Bulgaria*
- **Project Publicity** – *to gain public support*
- **Advisory Council Meetings** - *to receive advice on the development of the Project*

Major environmental issues

Sustainable navigation conditions must be achieved while protecting:



Major environmental issues

Lateral Connectivity	Lateral connectivity – water connects the river to floodplain water bodies, moving nutrients, sediments and species
Migratory Fish/Continuity	Longitudinal continuity – unhindered flow of water and the related fish migration
Sediment Equilibrium	• Barriers may results in erosive processes, also lowering water table; • Sediment extraction - also alter the sediment balance
Natura 2000 & Wild Island	Hydro-morphological processes lead to repeated habitat changes or seasonal, species depend on these changes

Environmental Impact Assessment
Ongoing Activities

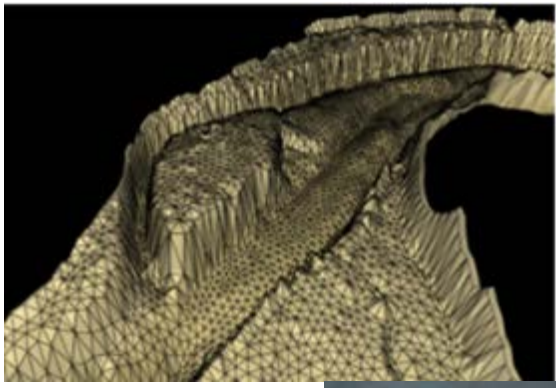
- Evaluate **results** of technical field measurements for updated information on **water and land habitat area modifications**
  - Topography
  - Hydro-morphological
  - Geotechnical (erodibility)

based on the above, and ***the potential technical solutions (location of works)***

- Plan and collect **biodiversity field data in areas of intervention**
  - Land species - habitats
  - Water species - habitats

Environmental Impact Assessment Follow-up Activities

- Evaluate **results** of preliminary modeling in terms of
  - morphological changes
  - hydro-dynamics changes



based on the above,

- Plan and collect additional environmental field data in the **areas potentially impacted according to modeling results.**
  - Land species - habitats
  - Water species - habitats

What's next?

- Issuing the report: 1D, 2D and Sediment transport
  - **Flood Modeller Pro** software package
  - **MIKE 21 Flow FM** software
- Navigation simulation modelling
  - **SHIPMA (v7)** software
- Environmental Impact Assessment (EIA) and Appropriate Assessment (AA) – ongoing activity
- Preparing the Feasibility Study
- Tender documents (design & works supervision)

Publicity

Publicity
Project communication

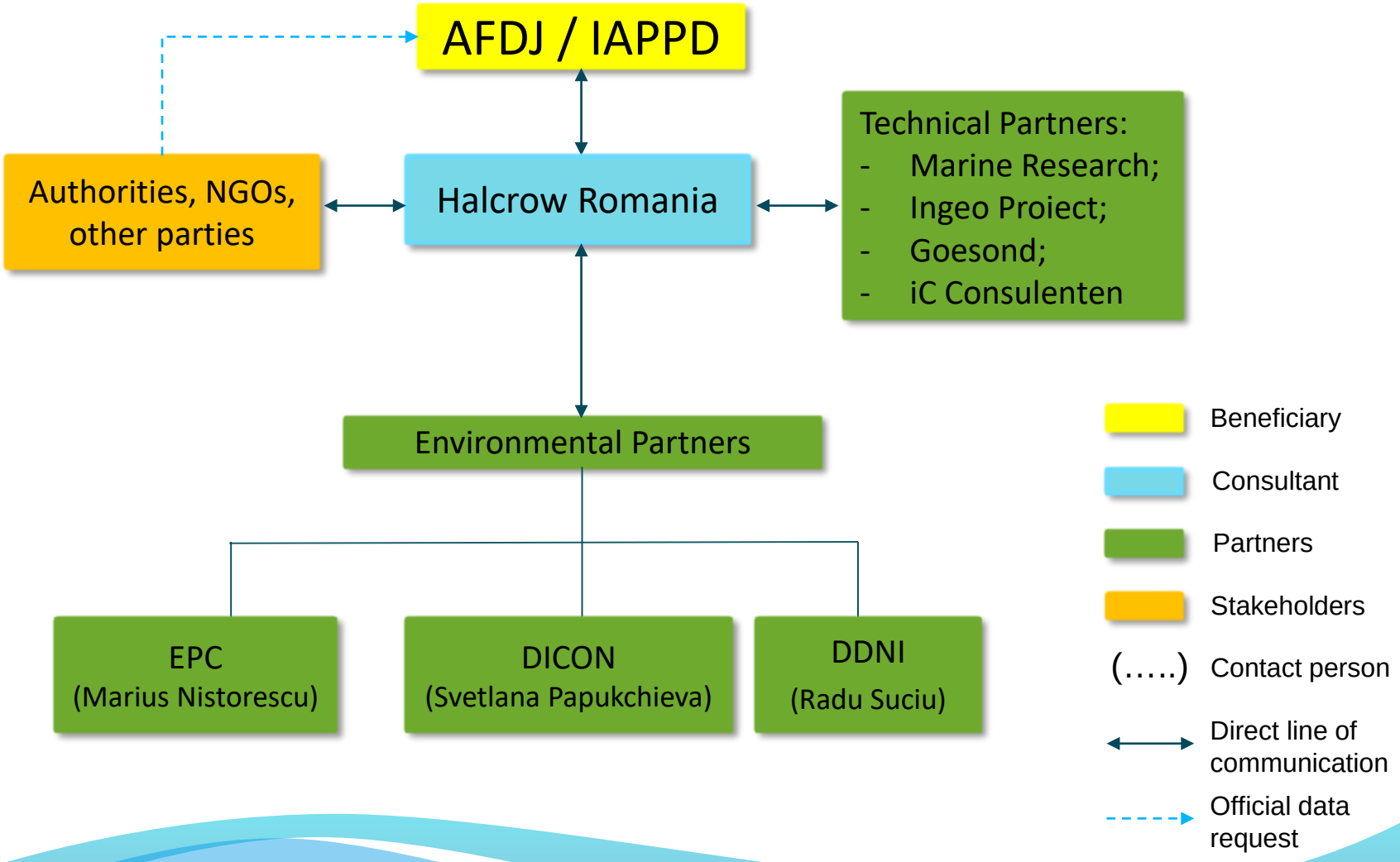
COMMUNICATION STRATEGY

COMMUNICATION PLAN

•AIM OF COMMUNICATION PLAN

- Plan information and **communication activities**
- Target audience with information it is interested in
- Disseminate information about the project and its results

Communication Orgchart



Publicity
Communication activities

Stakeholders Natura 2000 Forum

Working Groups

Workshops / Presentations

Publicity
Natura 2000 Forum

- **OBJECTIVE/VISION** - *To support the long-term orientation of the Danube navigation authorities towards implementing the modern concept of integrated inland waterways management in line with best practice*

- **FORUM MEETINGS**
  - *Will be organized and chaired by Consultant*
  - *Participants will nominate one regular member and one deputy*
  - *Will be fully documented – agenda, list of participants, minutes*
- **FORUM WEBSITE** - *Members login by credentials.* ***Active Topics*** *on the Forum:*
  - *1_Studies, Investigations and Survey*
  - *2_Hydrodynamic Mathematical Model*
  - *3_River Morphology Study and Sediment Transport*
  - *4_Environmental Impact Assesment*
  - *5_Appropriate Assessment*

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Publicity

Working Groups and Workshops

- **SUBJECT – SPECIFIC WORKING GROUPS** - *to bring together subject matter experts from various stakeholders in reaching conclusions and contribute to the conceptual design of potential solutions*
  - *morphology / modelling*
  - *sturgeon / fish*
  - *environmental / social*
  - *engineering / technical solutions*

- **WORKSHOPS** - *to present/discuss project milestones*
  - *Inception Report*
  - *Risk Workshop*
  - *Measurements Report, including associated data files*
  - *Hydrodynamic mathematical modeling reports*
  - *Feasibility Study Reports Modelling Report*
  - *Morphology Report*
  - *Alternative Solutions Report*
  - *EIA and AA*
  - *Final Project Report for Feasibility Study and associated studies*

Publicity
What's next?

- Project communication activities and publicity measures:
  - Workshops
  - Natura 2000 Forum
  - Subject–specific Working Groups
  - A documentary movie

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Discussion
(Q&A)

Dan Tarara, Deputy Project Manager
dan.Tarara@ch2m.com
Tel. +40 722 835 887

Thank you!

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