

digital signature of the Designer	digital signature of the Revision
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INVESTOR:

**MINISTRY OF CAPITAL INVESTMENTS
OF MONTENEGRO**

OBJECT:

Port of Virpazar

LOCATION:

**Cadastral parcels no. 219, 220, 221, 222, 223, 224,
225, 226, 227 CM Virpazar, zone F, SLS "Virpazar"**

**TYPE OF TECHNICAL
DOCUMENTATION:**

MAIN DESIGN

DESIGNER:

**Građevinski nadzor i laboratorijska
ispitivanja AD Podgorica**
Ul. Zetskih Vladara bb
GeoT d.o.o. Podgorica
Đoka Miraševića br.6, Podgorica

LIAISON PERSON:

Radomir Vuksanović, executive director

LEAD ENGINEER:

PhD Zvonko Tomanović, civ.eng.
License no. UPI 107/7 – 1295/2 dated 14.05.2018.

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INVESTOR:

**MINISTRY OF CAPITAL INVESTMENTS
OF MONTENEGRO**

OBJECT:

Port of Virpazar

LOCATION:

**Cadastral parcels no. 219, 220, 221, 222, 223, 224,
225, 226, 227 CM Virpazar, zone F, SLS "Virpazar"**

**PART OF TECHNICAL
DOCUMENTATION:**

STUDY OF THE CONSTRUCTION STAGES

DESIGNER:

**Građevinski nadzor i laboratorijska
ispitivanja AD Podgorica**
Ul. Zetskih Vladara bb
GeoT d.o.o. Podgorica
Đoka Miraševića br.6, Podgorica

LIAISON PERSON:

Radomir Vuksanović, executive director

RESPONSIBLE ENGINEER:

PhD Zvonko Tomanović, civ.eng.
License no. UPI 107/7 – 1295/2 dated 14.05.2018.

CONTENT OF THE DESIGN

**Main design of the Port of Virpazar,
cadastral parcels no. 219, 220, 221, 222, 223, 224, 225, 226, 227
CM Virpazar, zone F, SLS "Virpazar"**

- BOOK 1: General documentation**
- BOOK 2: Main design of road**
- BOOK 3: Main design of architecture**
- BOOK 4: Main design of structure**
- BOOK 5: Main design of high voltage electrical installations**
- BOOK 6: Main design of low voltage electrical installations**
- BOOK 7: Main design of water supply and sewerage - hydrotechnical installations**
- BOOK 8: Main design of mechanical installations**
- BOOK 9: Main design of traffic signalization**
- BOOK 10: Main design of monitoring of soil and structures during construction and usage**
- BOOK 11: Fire safety study**
- BOOK 12: Occupational health and safety study**
- BOOK 13: Main design of organization and technology**
- BOOK 14: Study of the construction stages**

1. TEXTUAL DOCUMENTATION

1.1 TECHNICAL REPORT

STUDY OF THE CONSTRUCTION STAGES

PORT OF “VIRPAZAR”

1. INTRODUCTION

After update of Terms of Reference, and after it was established that there is regional water supply and high voltage cable 35kW on the location of the port, The Ministry of Capital Investments made a decision on the Study of the construction stages of the Port of "Virpazar" (for which the Main Design in all segments was already prepared and revised). Within this study, the construction of the port is divided into two stages: stage 1A and stage 1B. Stage 1A is performed first (according to the current tender) and covers an area that can be built without relocating of the regional water supply.

Stage 1B is not performed according to the current tender, and the construction of this stage is postponed until the relocation of the regional water supply system. Appendix 1 shows the scopes of stages 1A and 1B. Stage 1B includes works on docks and installations that will not be performed until the regional water supply system is relocated.

2. SCOPE OF STAGE 1A WORKS

Stage 1A is performed entirely according to the Main Design of the port, with a small number of additional works/items, which have a temporary character (they will be removed after the end of stage 1B), which need to be performed in order for the port to function until its completed (by the end of stage 1B). Individual special works/segments of the port that should be performed in stage 1A and temporary works or structures will be described in the following text (see Appendix 1 in graphical documentation).

Structure

In Appendix 2 in graphical documentation the part of the structure performed in stage 1B is shown in gray color, while the other solid colors show the part performed in stage 1A. RC dock is divided at the contact of two prefabricated RC boxes (before the stairs). Pontoons are performed only within the area of stage 1A.

Appendix 3 in graphical documentation shows stage 1A without stage 1B, i.e. the layout of the port that will be performed according to the current tender.

Wall made of sheet piles type LARSEN 604 n (or equivalent from another manufacturer) is a temporary protection of the regional water supply pipeline and represents an additional item in regard to the Main Design. This is an item that is new and is given in additional bill of quantities/bill of costs within this study. The sheet piles are shown in Annex 2 and Annex 3 (layouts and in cross-sections), as well as in Annexes 4 in graphical documentation.

Excavations are performed to the elevation 3.0m above sea level in the entire area of the port (lined with the docks and sheet piles) and in the area in front of the newly formed entrance to the port - as shown in Annex 1. The quantities of excavations are given in the Main Design of the port.

Floating barrier for closing of the port in case of spillage of petroleum derivatives within the port is shown in Annex 4. The floating barrier and fixing system is the same as in the Main Design, except that the length of the floating barrier is slightly longer. The length of the floating barrier is defined in the bill of quantities/bill of costs within this study.

Pontoons

The pontoons are performed according to the layout given in the Appendix 3 in graphical documentation. The bollards on the pontoons should be arranged according to the ship layout and the description given in the Main Design.

Lighthouses

The same lighthouses planned and designed in the Main Design are being constructed. The red lighthouse is moved to a new position (Appendix 3) on the RC dock. The green lighthouse is fixed by welding at the end of the sheet pile wall. If necessary, a special base welded to the sheet piles is made (in order to achieve full stability).

Lighthouses are powered by photocells and batteries, so they do not require relocation of electrical installations.

Electrical installations

High voltage and low voltage electrical installations are shown in Appendices 5, 6 and 7. Electrical installations that will be performed during stage 1A are shown in color, while the installations that will be performed later within stage 1B are shown in gray.

Hydrotechnical installations

At the northern dock of the port, stage 1A intersects the water supply and hydrant network (Appendix 8). These two pipes should be routed to the end of the concrete dock. Plugs and threads should be provided at the end of these pipes, which will be removed so that the pipe can be continued when stage 1B starts. All plugs and threads should be protected against corrosion in accordance with the standard for this type of installation.

Monitoring of structure

Monitoring is performed only for stage 1A as shown in graphical Appendices 9 and 10.

Relocation of the high voltage cable 35kW

An underground high voltage cable 35kW passes through the port's waters. The cable in Appendix 1 is shown in the position according to its main design. Given that there were some deviations during the works (which were not registered geodetically), it is not reliable that the cable is actually in this position.

Having this in mind, the Contractor's obligation is to locate the actual position of the cable and perform its relocation according to a special design made at his own expense.

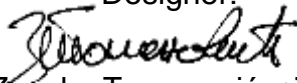
The possible direction of cable relocation is to the right along the road leading to the collector, under the sidewalk, further over the installation bridge which is part of this design and further to the connection point outside the port area (mostly together in the trench of supply cables from the substation). Other routes are possible in accordance with the technical requirements of the cable manager (owner) and CEDIS, which will be obtained by the Investor.

3. BILL OF QUANTITIES AND BILL OF COSTS

This study defines additional works conditioned by the construction stages of the port. Bidders should include new items in this bill of quantities/bill of costs in the price of port and show unit prices for their construction.

Due to the reduction or increase of the quantity of works or materials, i.e. certain items from the bill of quantities/bill of costs conditioned by construction stages, the Contractor has no right to make additional payments or increase the offered unit prices.

Podgorica,
January 2022..

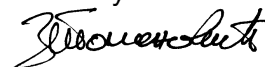
Designer:

PhD Zvonko Tomanović, civ.eng.

1.2. BILL OF QUANTITIES (additional works)

No.	Description of works	Measuring unit	Quantity
1	Driving and pulling of sheet piles LARSEN 604n (or equivalent), 15m long.	m2	1,100.00
2	Protective coating in green color RAL 6001 with the addition of epoxy resin for sheet piles.	m2	1,105.00
3	Additional quantity of the floating barrier to prevent spillage of petroleum derivatives from the port into the lake in the case of an incident, additional length 10m (other fitting and fixing equipment is provided in Main Design of the port).	pieces	1.00
4	Plug and thread on hydrant network pipe, that will enable adjustment of the pipe during the construction stage 1B.	pieces	1.00
5	Plug and thread on water supply pipe, that will enable adjustment of the pipe during the construction stage 1B.	pieces	1.00
6	Relocation design and relocation of 35kW high voltage cable in the length of cca 700m.	lump sum	1.00

Podgorica, January 2022.

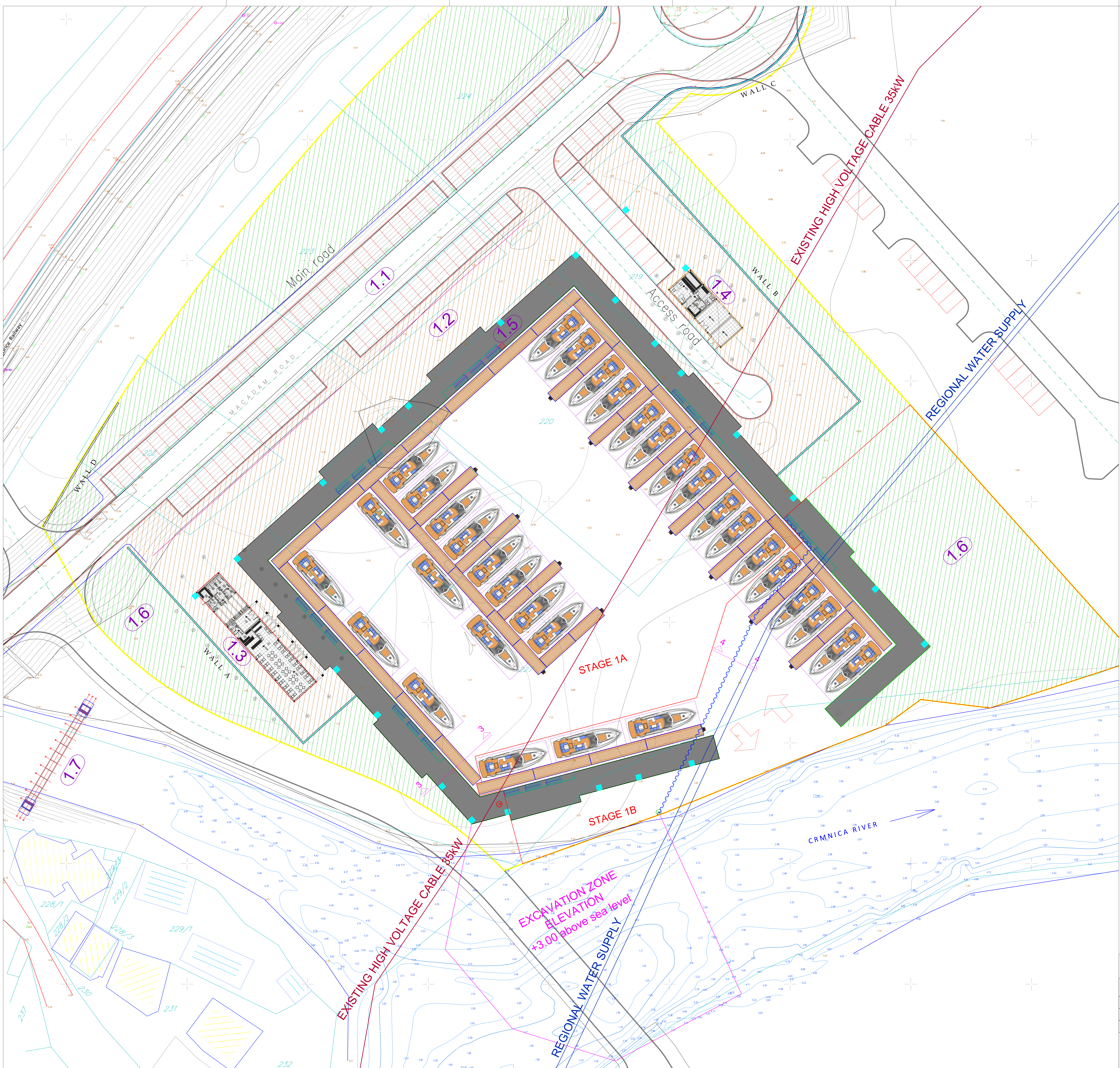
By:



PhD Zvonko Tomanović, civ.eng.

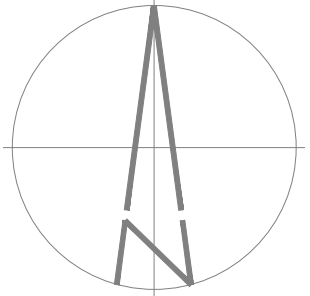
2. GRAPHICAL DOCUMENTATION

STRUCTURE

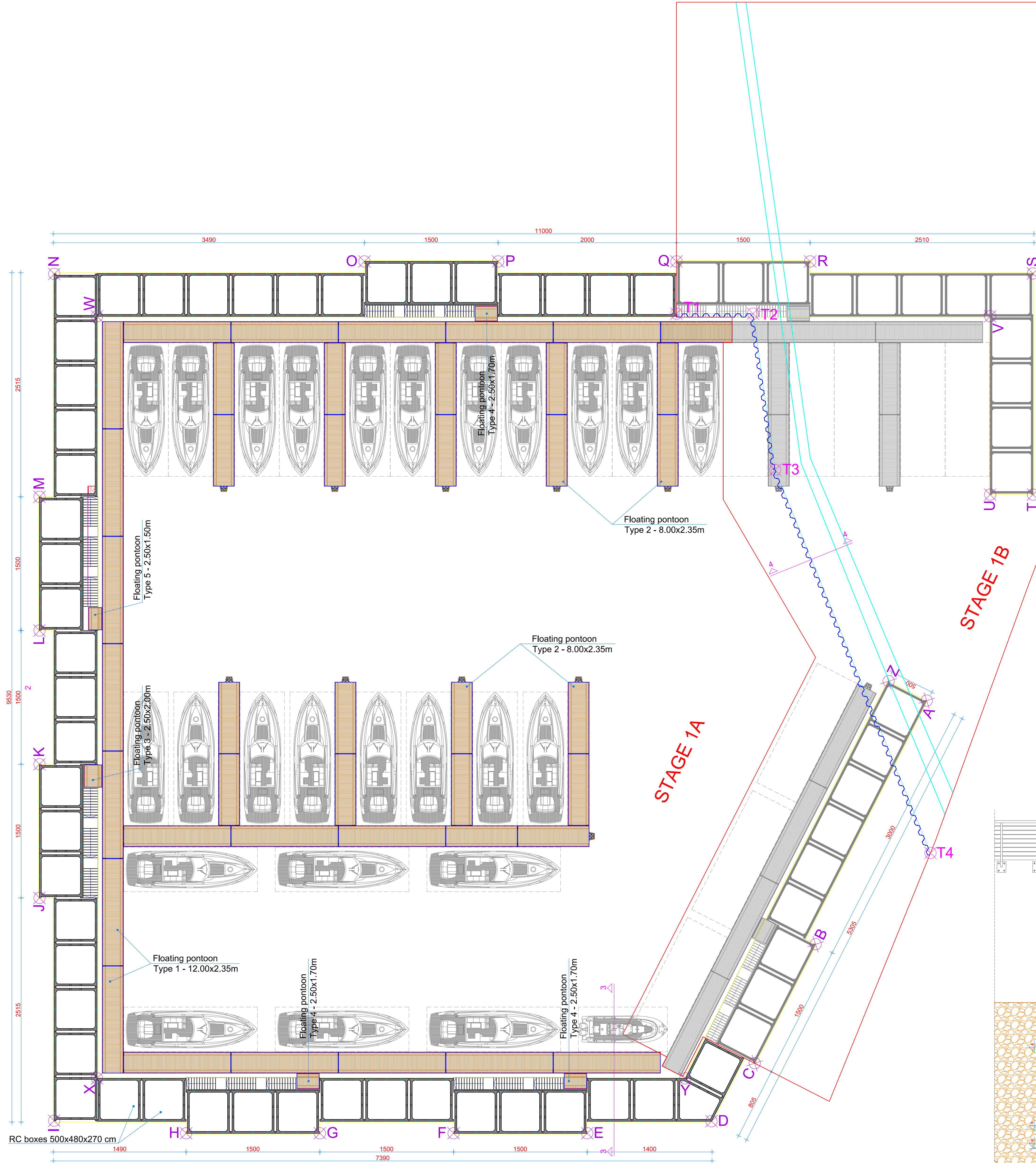


LEGEND:

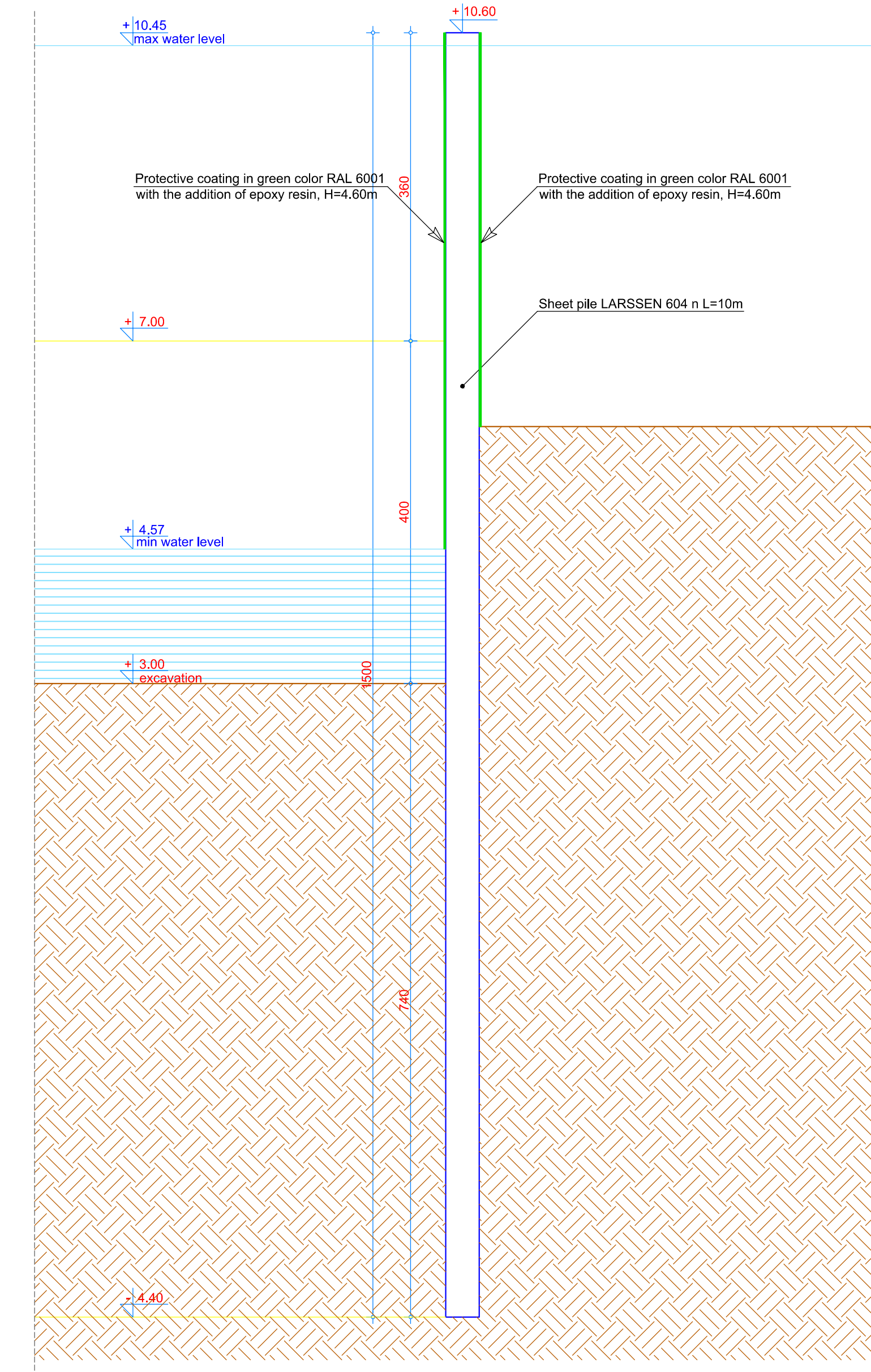
- 1.1 Access roads and parking lots
- 1.2 Plateau for pedestrian access to the port
- 1.3 Tourist facility and toilets
- 1.4 Technical facility
- 1.5 Port dock
- 1.6 Green areas
- 1.7 Bridge for installation crossing
- Regional water supply
- Existing high voltage cable 35kW



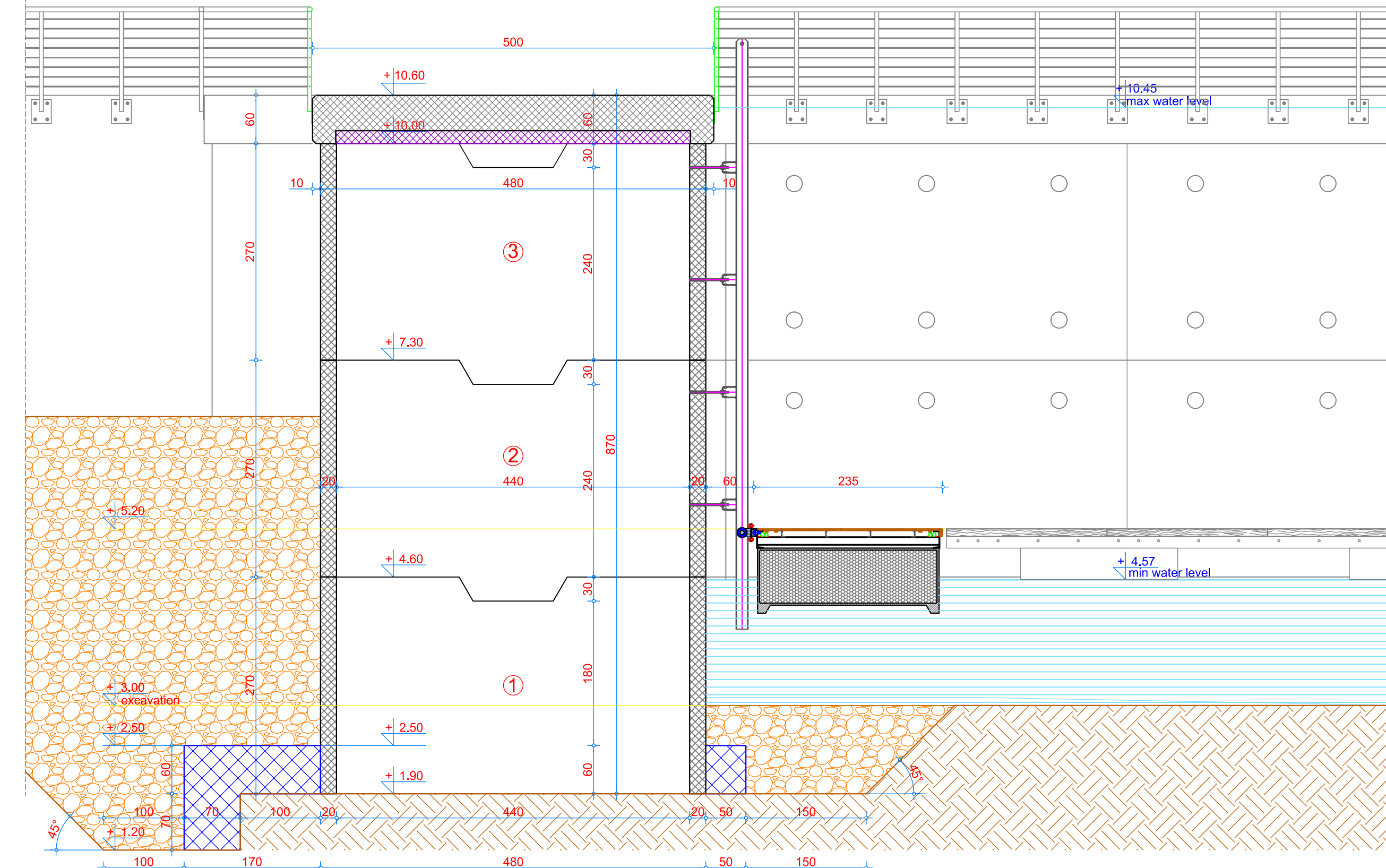
DESIGNER: GRAĐEVINSKI NADZOR I LABORATORIJSKA ISPITIVANJA GEOT POSREDOVANJE U PROMETU NEPOKRETNOSTI		INVESTOR: MINISTRY OF CAPITAL INVESTMENTS OF MONTENEGRO	
Object: Port of Virpazar		Location: Cadastral parcels No. 219, 220, 221, 222, 223, 224, 225, 226, 227 CM Virpazar, zone F: SLS "Virpazar"	
Lead Engineer: PHD Zvonko Tomanović, civ. eng.		Type of technical documentation: Main Design	
Responsible Engineer: PHD Zvonko Tomanović, civ. eng.		Part of technical documentation: Study of the construction stages	
Associate: Milica Drobjick, spec.sci.civ.eng.		Annex: Plan overview of the port	Page No.: 15
Designer - date and stamp:		Revision - date and stamp:	
January, 2022		SCALE: 1:250	



Cross section 4-4 S=1:50



Cross section 3-3 S=1:50



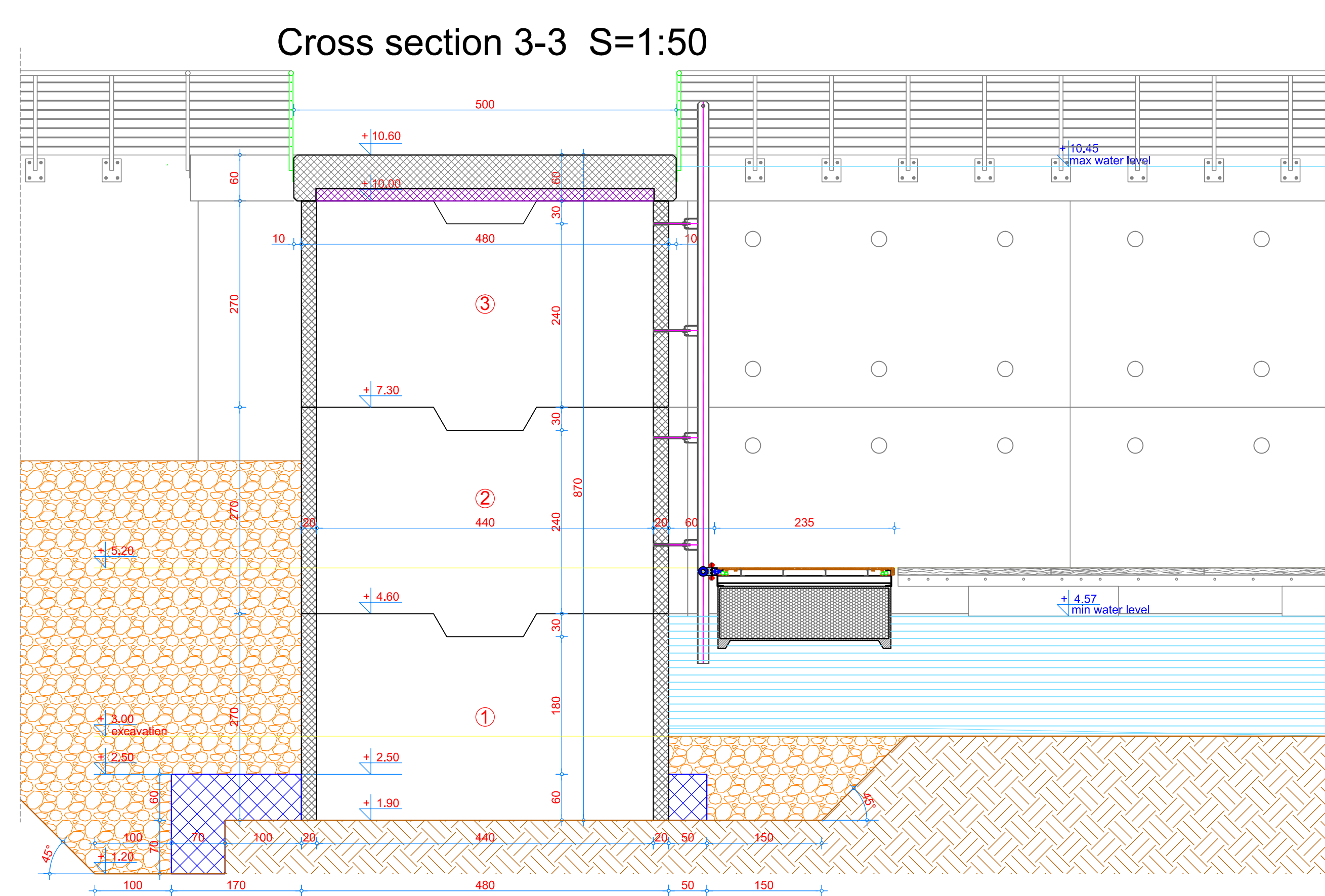
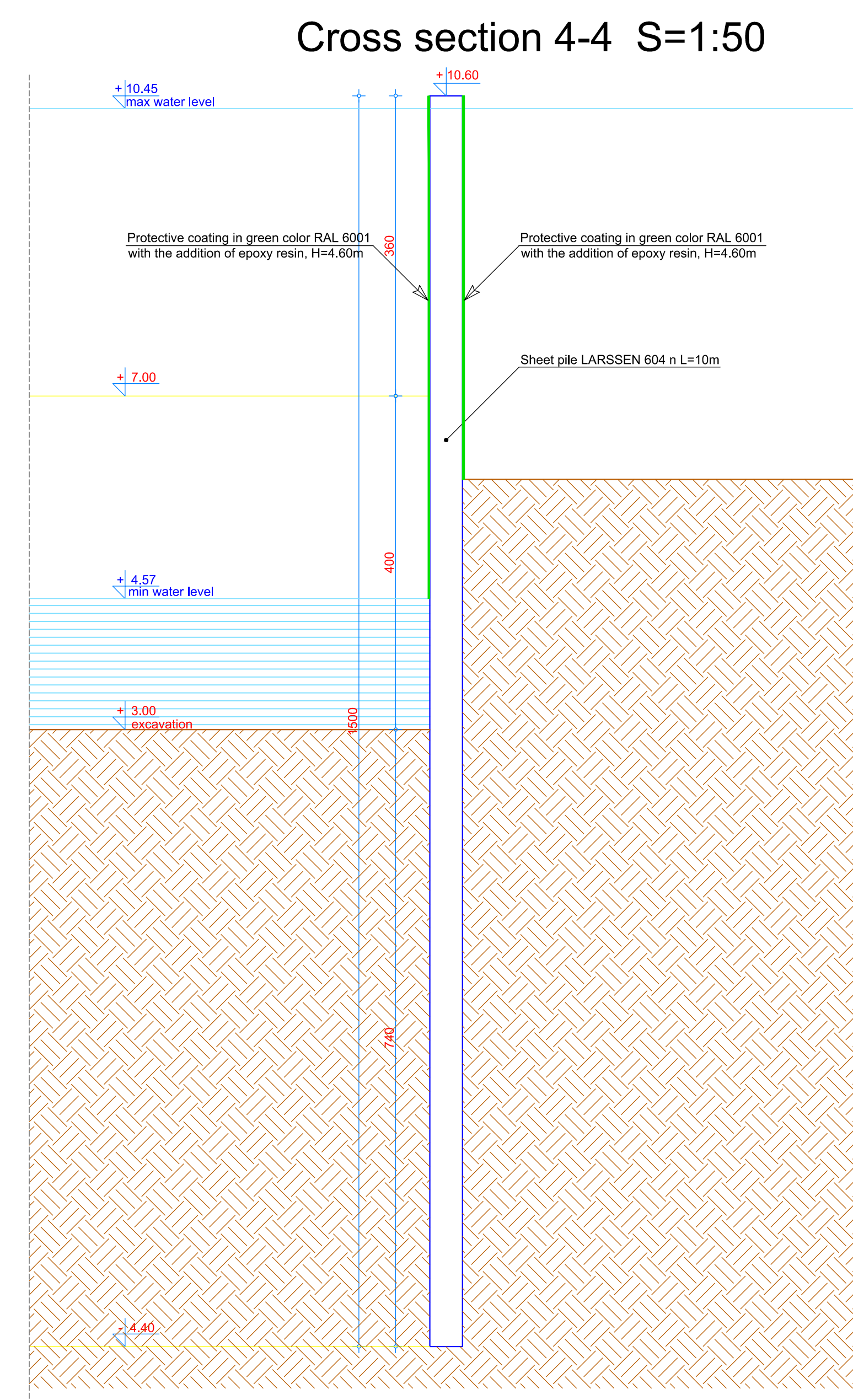
CHARACTERISTIC COORDINATES OF RC BOXES

A	X=6590535.290	Y=4678696.850
B	X=6590506.631	Y=4678687.876
C	X=6590492.130	Y=4678684.041
D	X=6590484.053	Y=4678683.302
E	X=6590473.742	Y=4678692.771
F	X=6590463.723	Y=4678703.930
G	X=6590453.704	Y=4678715.098
H	X=6590443.681	Y=4678726.258
I	X=6590434.842	Y=4678738.211
J	X=6590452.346	Y=4678756.137
K	X=6590463.509	Y=4678766.156
L	X=6590474.673	Y=4678776.175
M	X=6590485.836	Y=4678786.193
N	X=6590505.544	Y=4678801.663
O	X=6590529.830	Y=4678776.699
P	X=6590539.849	Y=4678765.536
Q	X=6590553.207	Y=4678750.651
R	X=6590563.226	Y=4678739.487
S	X=6590578.919	Y=4678719.980
T	X=6590560.462	Y=4678703.415
U	X=6590557.256	Y=4678706.988
V	X=6590572.141	Y=4678720.346
W	X=6590505.215	Y=4678794.918
X	X=6590441.583	Y=4678737.811
Y	X=6590485.665	Y=4678688.693
Z	X=6590534.063	Y=4678701.490

CHARACTERISTIC COORDINATES OF WALL MADE OF SHEET PILES

T1	X=6590548.846	Y=4678746.737
T2	X=6590554.585	Y=4678740.342
T3	X=6590543.194	Y=4678726.794
T4	X=6590522.855	Y=4678685.121

Sheet piles LARSEN 604 n L=15m



CHARACTERISTIC COORDINATES OF RC DOCK SLAB			
D	X=6590484.020	Y=4678683.190	
E	X=6590473.667	Y=4678692.704	
F	X=6590463.648	Y=4678703.868	
G	X=6590453.630	Y=4678715.031	
H	X=6590443.611	Y=4678726.195	
I	X=6590434.664	Y=4678738.185	
J	X=6590452.279	Y=4678756.211	
K	X=6590463.443	Y=4678766.230	
L	X=6590474.606	Y=4678776.249	
M	X=6590485.770	Y=4678786.268	
N	X=6590505.589	Y=4678801.838	
O	X=6590529.904	Y=4678776.766	
P	X=6590539.923	Y=4678765.602	
W	X=6590505.208	Y=4678794.777	
X	X=6590441.724	Y=4678737.804	
Y	X=6590485.698	Y=4678688.805	
Z	X=6590534.037	Y=4678701.587	

CHARACTERISTIC COORDINATES OF WALL MADE OF SHEET PILES			
T1	X=6590548.846	Y=4678746.737	
T2	X=6590554.585	Y=4678740.342	
T3	X=6590543.194	Y=4678726.794	
T4	X=6590522.855	Y=4678685.121	

- Sheet piles LARSEN 604 n L=15m
- SERVICE MODULES
- MANHOLE COVER 1000x1000mm

DESIGNER:

GRAĐEVINSKI NADZOR

LABORATORIJSKA ISPIITVANJA

INVESTOR:

MINISTRY OF CAPITAL INVESTMENTS OF MONTENEGRO

Object:

Port of Virpazar

Location:

Cadastral parcels No. 219, 220, 221, 222, 223, 224, 225, 226, 227 CM Virpazar, zone F, SLS "Virpazar"

Lead Engineer:

PhD Zvonko Tomanović, civ. eng.

Responsible Engineer:

PhD Zvonko Tomanović, civ. eng.

Associate:

Milica Drobnjak, spec.sci.civ.eng.

Designer - date and stamp:

January, 2022.

Type of technical documentation:

Main Design

Part of technical documentation:

Study of the construction stages

Annex:

Port layout at level +10.60

Annex No.:

3

Page No.:

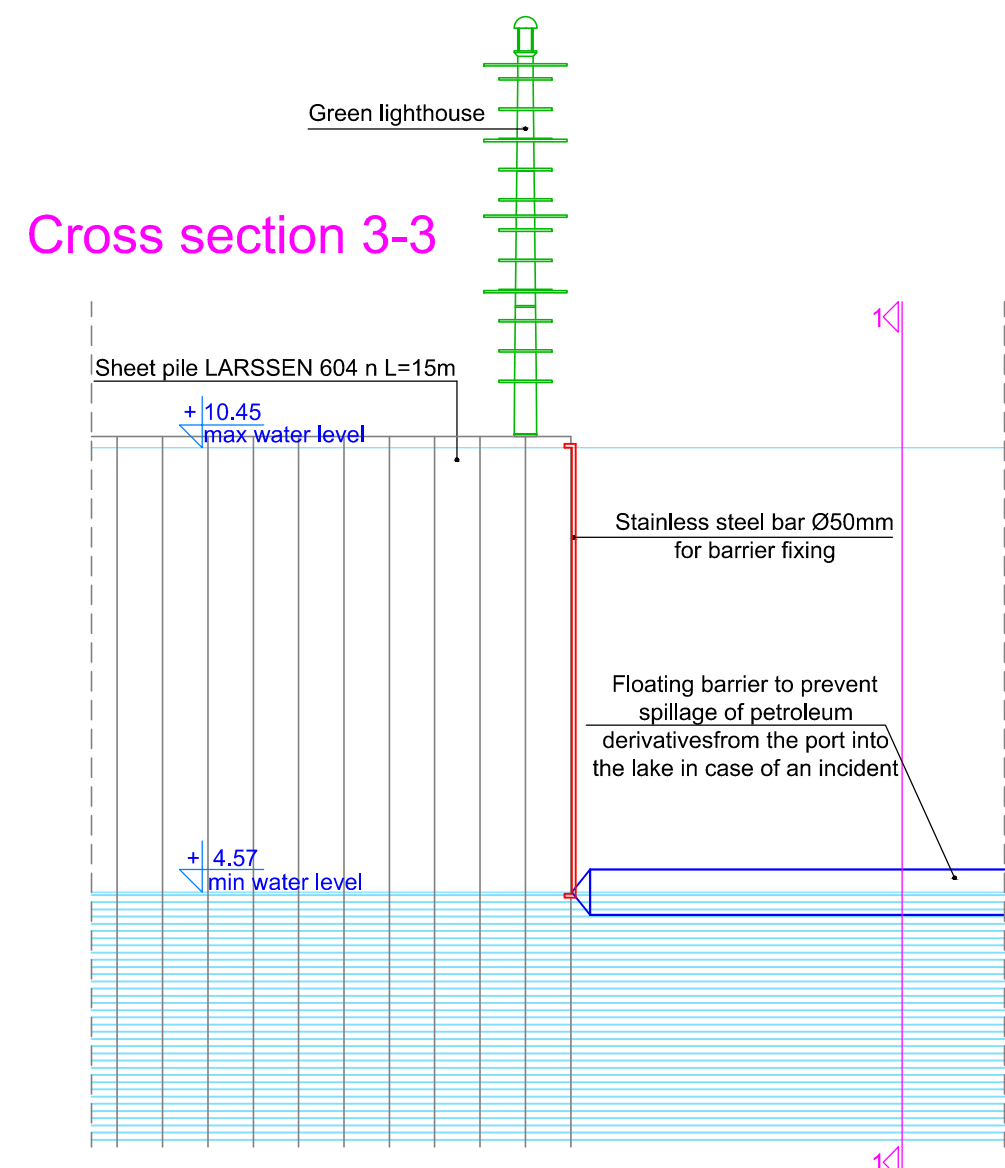
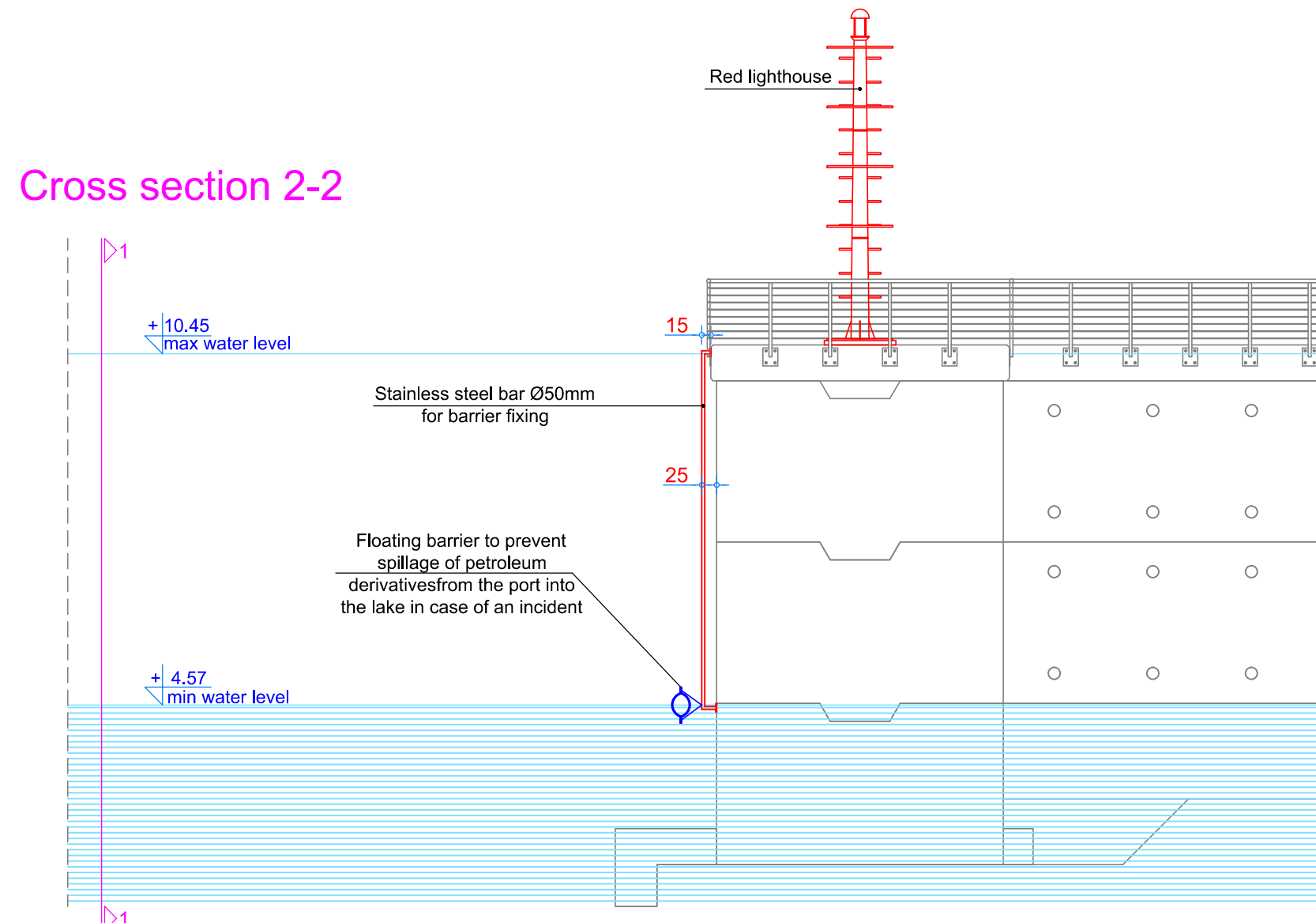
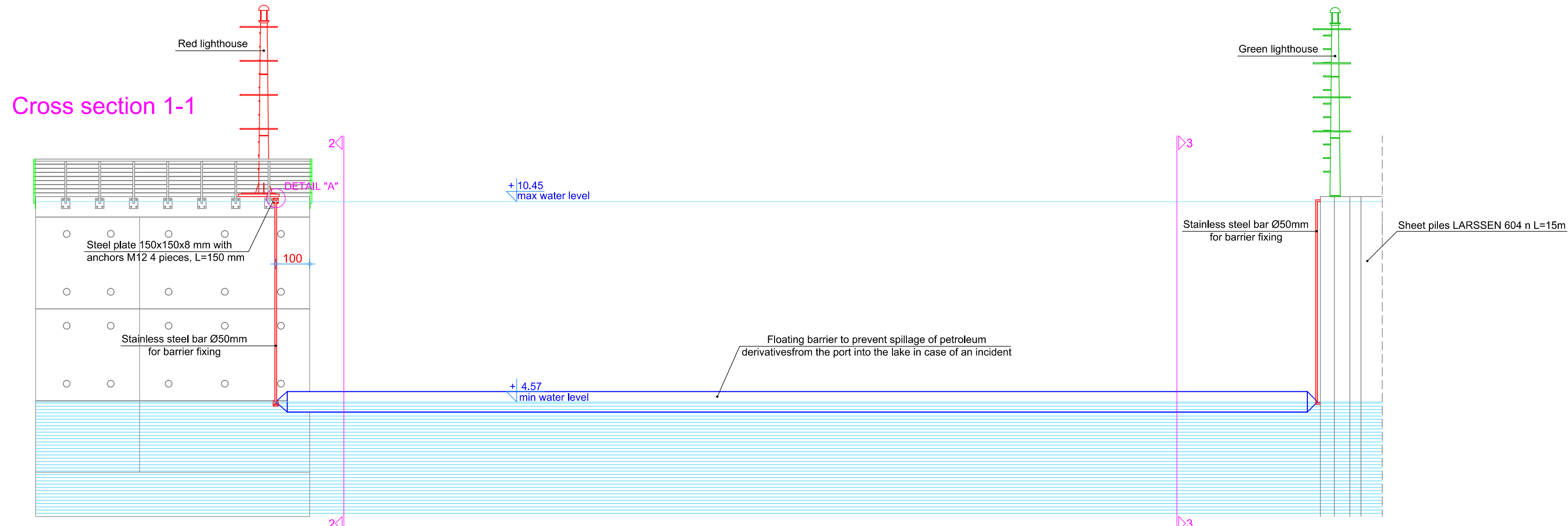
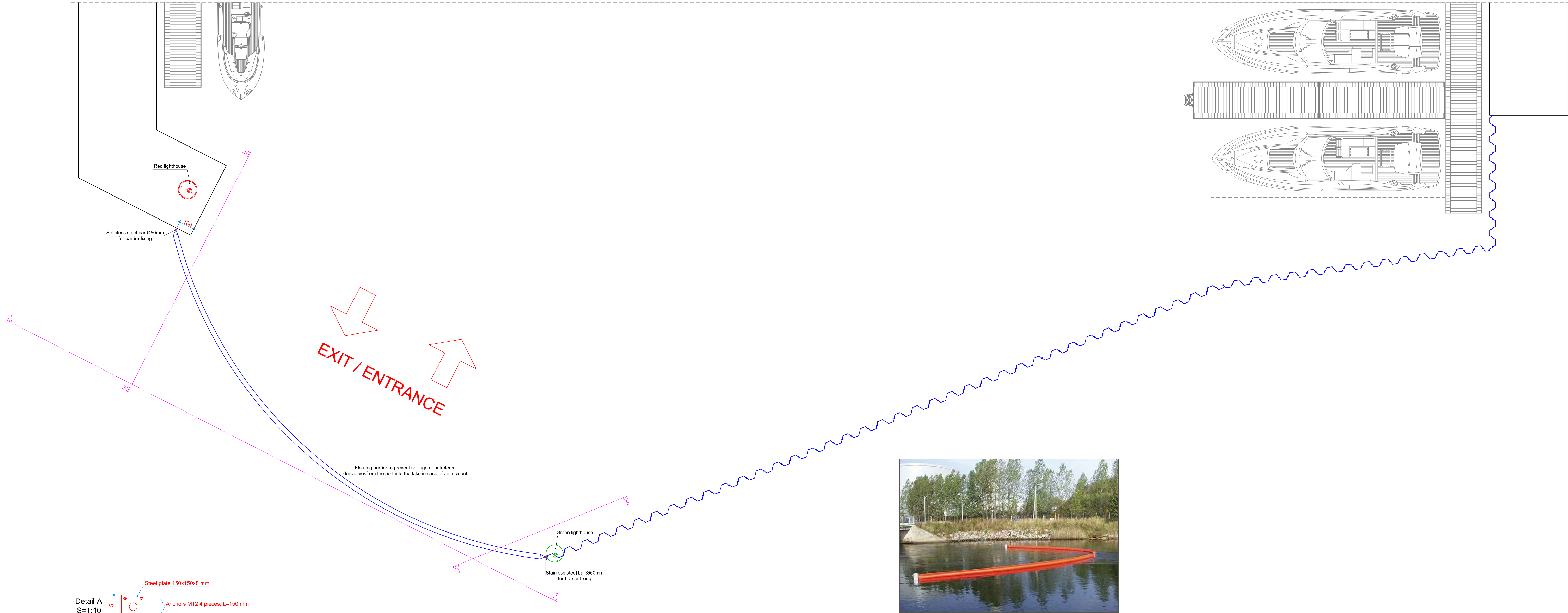
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Revision - date and stamp:

SCALE:

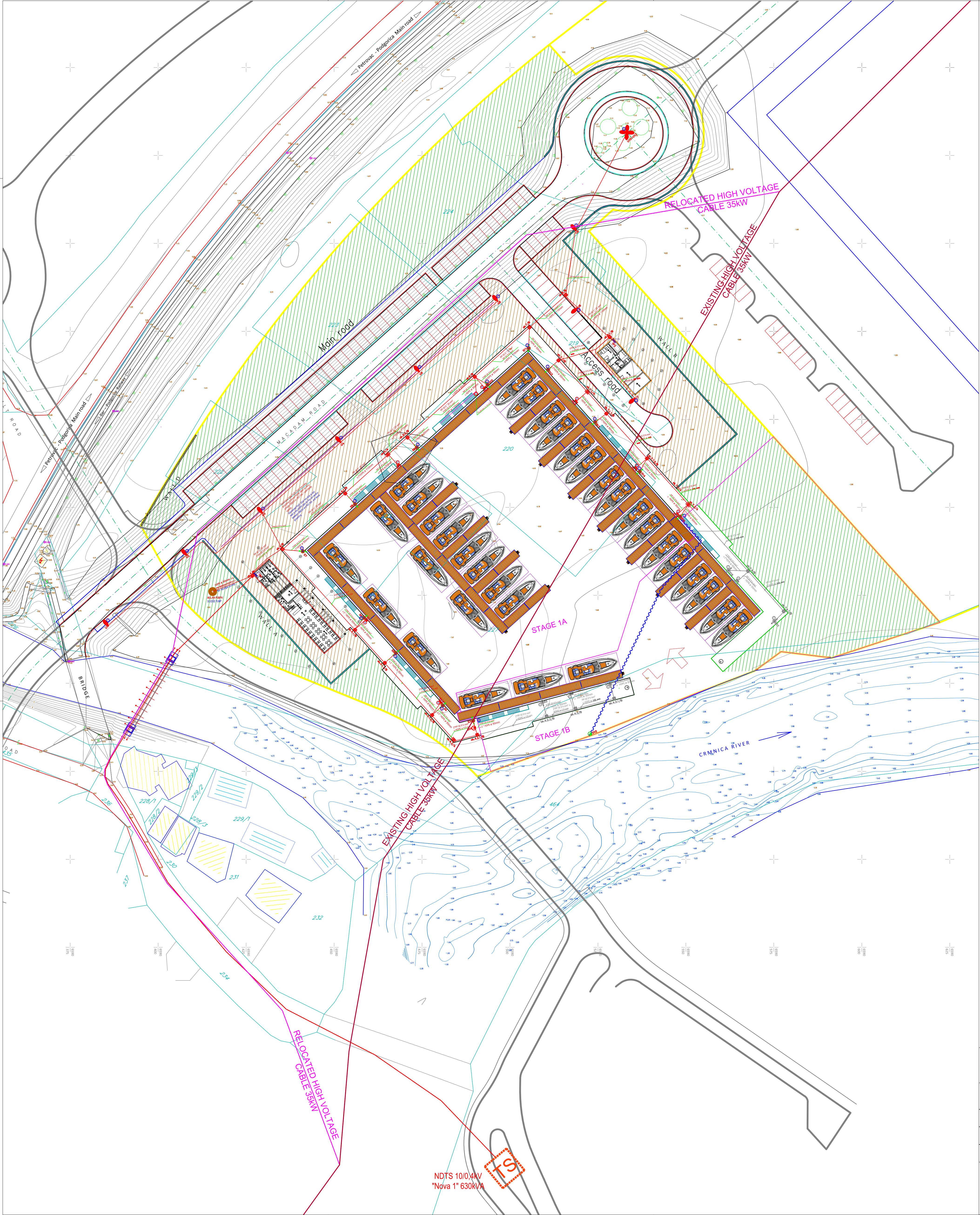
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Geot



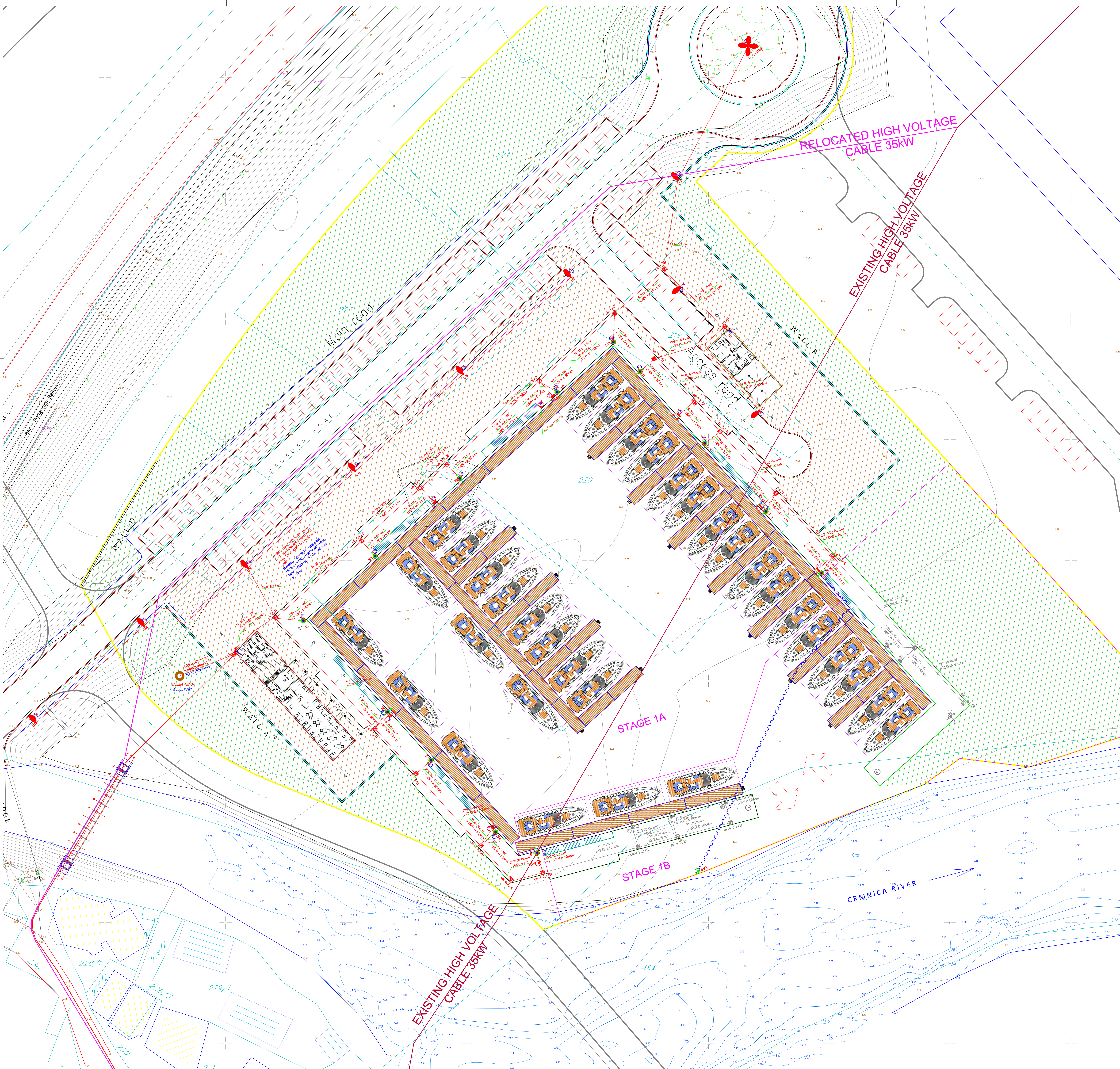
DESIGNER: GRAĐEVINSKI NADZOR I LABORATORIJSKA ISPITIVANJA GEOT POSREDOVANJE U PROMETU NEPOKRETNOSTI		INVESTOR: MINISTRY OF CAPITAL INVESTMENTS OF MONTENEGRO	
Object: Port of Virpazar		Location: Cadastral parcels No. 219, 220, 221, 222, 223, 224, 225, 226, 227 CM Virpazar, zone F, SLS "Virpazar"	
Lead Engineer: PhD Zvonko Tomanović, civ. eng.		Type of technical documentation: Main Design	
Responsible Engineer: PhD Zvonko Tomanović, civ. eng.		Part of technical documentation: Study of the construction stages	SCALE: 1:100/10
Associate: Milica Drobnjak, spec. sci. civ. eng.		Annex: Floating barrier to prevent spillage of petroleum derivatives from the port into the lake in case of an incident	Annex No.: 4 Page No.: 18
Designer - date and stamp: January, 2022. 		Revision - date and stamp:	

***HIGH VOLTAGE
ELECTRICAL INSTALLATIONS***

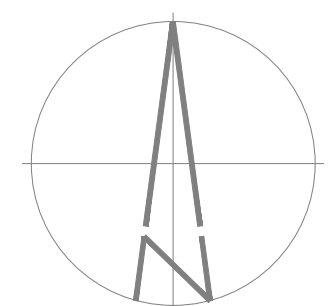


- POSTOJEĆI VISOKONAPONSKI KABAL 35kW
EXISTING HIGH VOLTAGE CABLE 35kW
- IZMJESTENI VISOKONAPONSKI KABAL 35kW (NOVA TRASA)
RELOCATED HIGH VOLTAGE CABLE 35kW (NEW CABLE RUN)
- HIDRANTSKI ORMAR (120x100x30cm)
HIDRANTSKI SAHT (40x40cm)
HYDRANT CABINET (120x100x30cm)
HYDRANT MANHOLE (40x40cm)
- SERVISNI ORMAR JAKE I SLABE STRUJE
SERVICE CABINET OF HIGH AND LOW VOLTAGE
- SVJETILJKA PILZEO 24 LEDs; 700 mA; 53.5W S1 - S17
LAMP PILZEO 24 LEDs; 700 mA; 53.5W S1 - S17
- ULIČNA RASVJETA - IZYLUM 3 50 LEDs; 700 mA; 104.4 W U1 - U13
STREET LIGHTING - IZYLUM 3 50 LEDs; 700 mA; 104.4 W U1 - U13
- RASVJETA SVETIONIKA SV1 - SV2
solarne LED svetiljke tip SL-C 310 Compact,
LIGHTHOUSE LIGHTING SV1 - SV2
solar LED lamps type SL-C 310 Compact,
- SERVISNO ORMARIC T01 - T09
SERVICE CABINET T01 - T09
- JAKA STRUJA
HIGH VOLTAGE
- ok.n/A
- KABLOVSKO OKNO TIP A unutr. dim. 1,20x0,80x0,80m
CABLE SHAFT TYPE A int. dim. 1,20x0,80x0,80m
- ok.n/B
- KABLOVSKO OKNO TIP B unutr. dim. 0,80x0,80x0,80m
CABLE SHAFT TYPE B int. dim. 0,80x0,80x0,80m

DESIGNER:  GEOT MINISTARSTVO GRAĐEVINARSTVA I VEŠTAČENJE		INVESTOR: MINISTRY OF CAPITAL INVESTMENTS OF MONTENEGRO	
Object: Port of Virpazar		Location: Cadastral parcels No. 219, 220, 221, 222, 223, 224, 225, 226, 227 CM Virpazar, zone F, SLS "Virpazar"	
Lead Engineer: PhD Zvonko Tomanović, civ.eng.		Type of technical documentation: Main Design	
Responsible Engineer: Mica Nikitović, el.eng.		Part of technical documentation: Study of the construction stages	SCALE: 1:500
Associate: Milica Drobniak, spec.sci.civ.eng.		Annex: Plan overview - High voltage electrical installations	Annex No.: 5 Page No.: 20
Designer - date and stamp: January, 2022.		Revision - date and stamp: 	

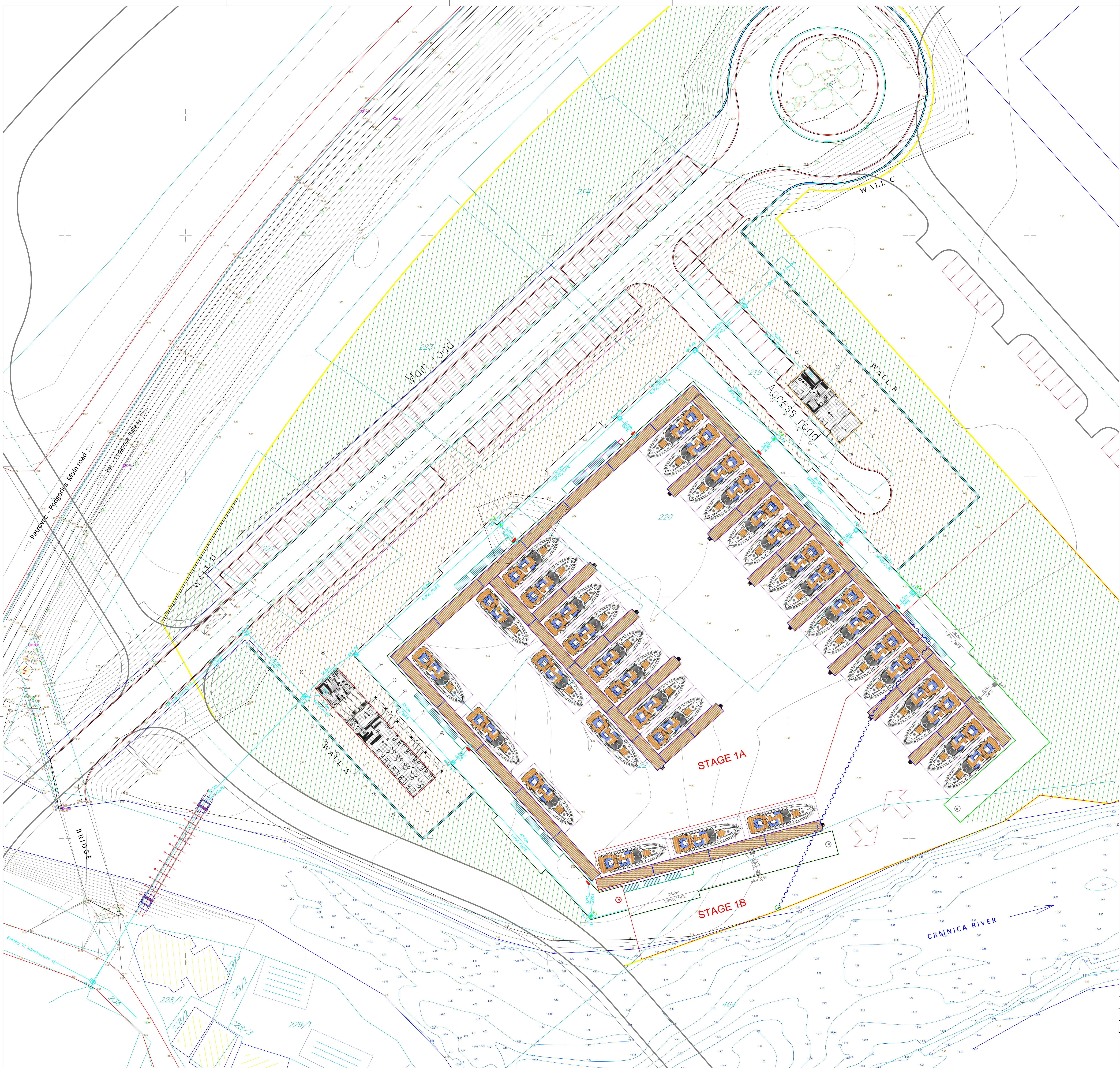


- POSTOJEĆI VISOKONAPONSKI KABAL 35kW
EXISTING HIGH VOLTAGE CABLE 35kW
IZMJEŠTENI VISOKONAPONSKI KABAL 35kW (NOVA TRASA)
RELOCATED HIGH VOLTAGE CABLE 35kW (NEW CABLE RUN)
- HIDRANTSKI ORMAR (120x100x30cm)
HIDRANTSKI SAHT (40x40cm)
HYDRANT CABINET (120x100x30cm)
HYDRANT MANHOLE (40x40cm)
- SERVISNI ORMAR JAKE I SLABE STRUJE
SERVICE CABINET OF HIGH AND LOW VOLTAGE
- SVJETILJKA PULZEO 24 LEDs 700 mA, 53.5W S1 - S17
LAMP PULZEO 24 LEDs 700 mA, 53.5W S1 - S17
STREET LIGHTING - IZYLUM 3 50 LEDs 700 mA, 104.4 W U1 - U13
RASVIJETA SVETIONIKA SV1 - SV2
solarni LED svetiljke tip SL-C 310 Compact,
LIGHTHOUSE LIGHTING SV1 - SV2
solar LED lamps type SL-C 310 Compact,
SERVISNO ORMARIC T01 - T09
SERVICE CABINET T01 - T09
- JAKA STRUJA
HIGH VOLTAGE
- ok.n/A
KABLOVSKO OKNO TIP A unutr. dim. 1.20x0.80x0.80m
CABLE SHAFT TYPE A int. dim. 1.20x0.80x0.80m
- ok.n/B
KABLOVSKO OKNO TIP B unutr. dim. 0.80x0.80x0.80m
CABLE SHAFT TYPE B int. dim. 0.80x0.80x0.80m



DESIGNER: GRAĐEVINSKI NADZOR I LABORATORIJSKA ISPITIVANJA GEOT IZ OBLASTI GRAĐEVINARSTVA I POSREDOVANJE U PROMETU NEPOKRETNOSTI		INVESTOR: MINISTRY OF CAPITAL INVESTMENTS OF MONTENEGRO	
Object: Port of Virpazar		Location: Cadastral parcels No. 219, 220, 221, 222, 223, 224, 225, 226, 227 CM Virpazar, zone F, SLS "Virpazar"	
Lead Engineer: PHD Zvonko Tomanović, el. eng.		Type of technical documentation: Main Design	
Responsible Engineer: Mićun Niklović, el. eng.		Part of technical documentation: Study of the construction stages	
Associate: Milića Dobrić, spec.sci.el. eng.		Ames: Layout - High voltage electrical installations	SCALE: 1:250
Designer - date and stamp:		Revision - date and stamp:	Page No.: 21
January, 2022			

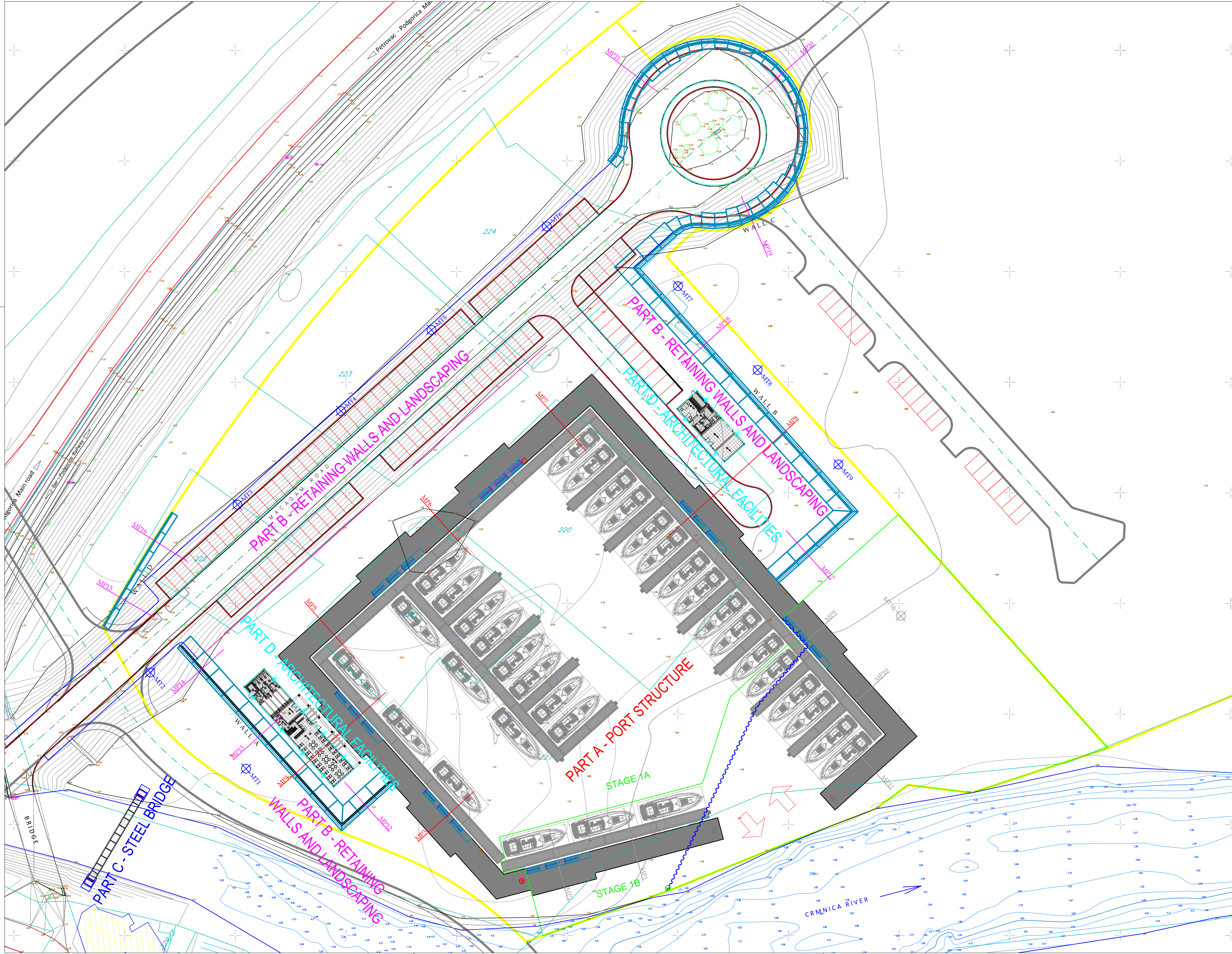
***LOW VOLTAGE
ELECTRICAL INSTALLATIONS***



DESIGNER: GRAĐEVINSKI NADZOR I LABORATORIJSKA ISPITIVANJA GEOT POSREDOVANJE U PROMETU NEPOKRETNOSTI		INVESTOR: MINISTRY OF CAPITAL INVESTMENTS OF MONTENEGRO	
Object: Port of Virpazar		Location: Cadastral parcels No. 219, 220, 221, 222, 223, 224, 225, 226, 227 CM Virpazar, zone F: SLS "Virpazar"	
Lead Engineer: PHD Zvonko Tomanović, civ. eng.		Type of technical documentation: Main Design	
Responsible Engineer: Vladimir Slavnić, el. eng.		Part of technical documentation: Study of the construction stages	
Associate: Milica Drobnyak, spec.sci.civ.eng.		Annex: Layout - Low voltage electrical installations	Annex No.: 7
Designer - date and stamp:		Revision - date and stamp:	
January, 2022		23	

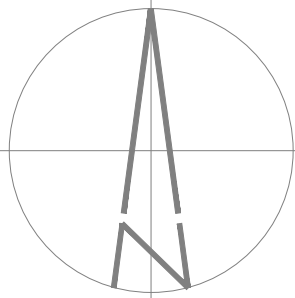
HYDROTECHNICAL INSTALLATIONS

***MONITORING OF SOIL AND STRUCTURES
DURING CONSTRUCTION AND USAGE***

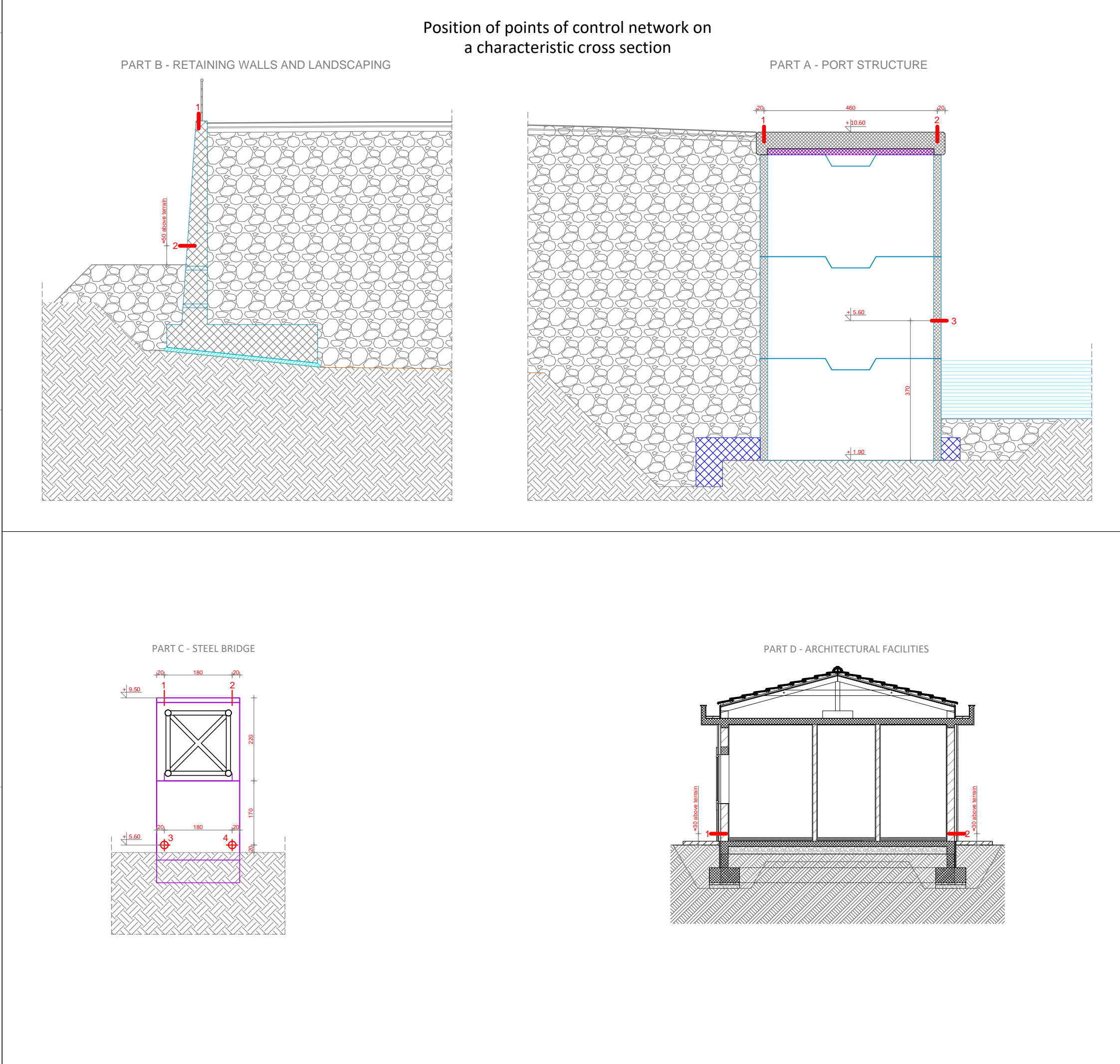
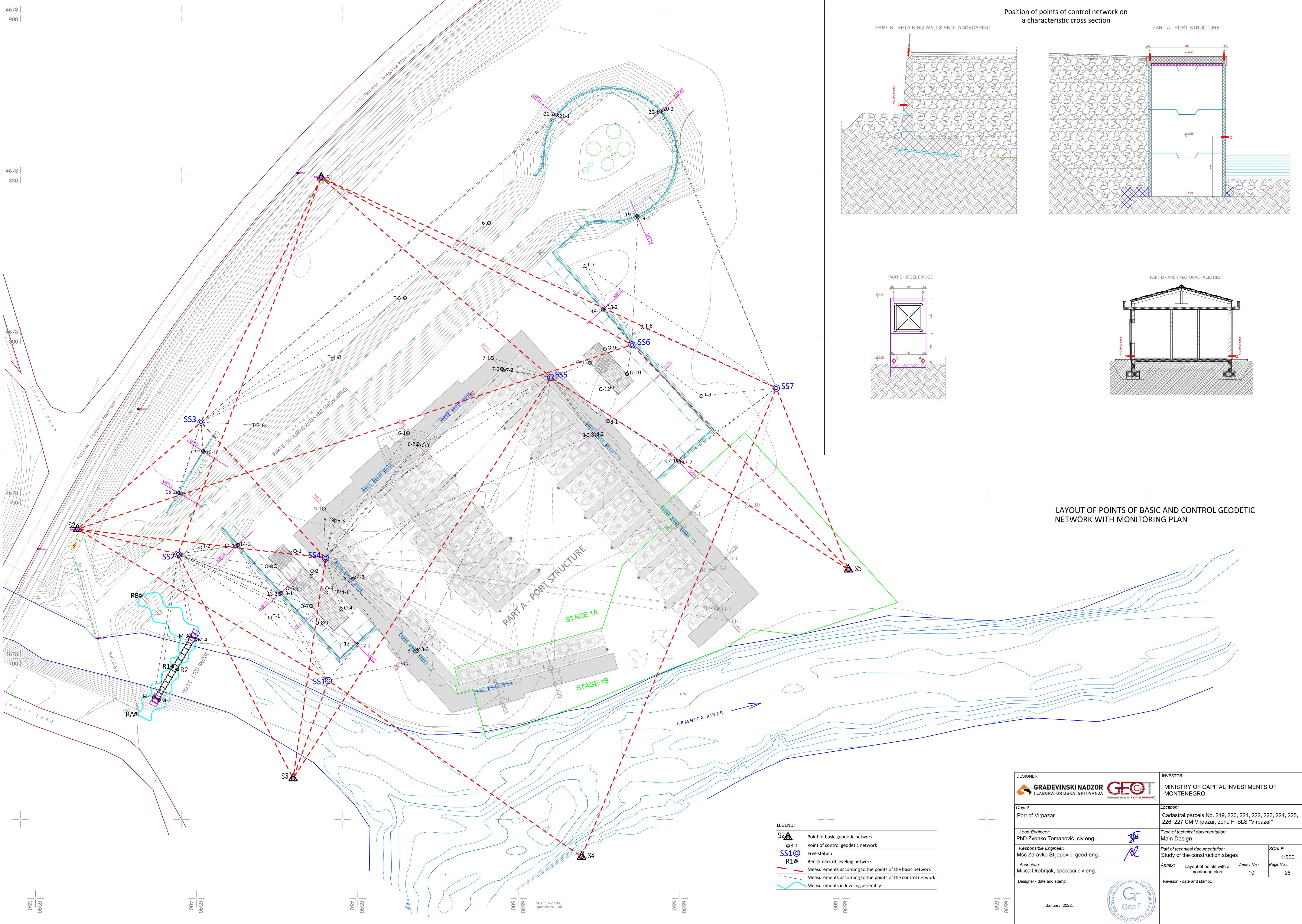


COORDINATES OF MONITORING
POINTS FOR SOIL

MT1	X=6590427.41	Y=4678712.66
MT2	X=6590405.78	Y=4678734.40
MT3	X=6590425.50	Y=4678772.32
MT4	X=6590448.91	Y=4678793.45
MT5	X=6590469.35	Y=4678811.80
MT6	X=6590495.40	Y=4678835.18
MT7	X=6590525.05	Y=4678821.72
MT8	X=6590543.05	Y=4678802.76
MT9	X=6590561.30	Y=4678781.40
MT10	X=6590575.42	Y=4678747.19



DESIGNER: 		INVESTOR: MINISTRY OF CAPITAL INVESTMENTS OF MONTENEGRO	
Object: Port of Virpazar		Location: Cadastral parcels No. 219, 220, 221, 222, 223, 224, 225, 226, 227 CM Virpazar, zone F, SLS "Virpazar"	
Lead Engineer: PhD Zvonko Tomanović, civ.eng.		Type of technical documentation: Main Design	
Responsible Engineer: PhD Zvonko Tomanović, civ.eng.		Part of technical documentation: Study of the construction stages	SCALE: 1:500
Associate: Milica Drobnjak, spec.sci.civ.eng.		Annex: Measuring profiles and monitoring points	Annex No.: 9
Designer - date and stamp: January, 2022.		Revision - date and stamp:	
		Page No.: 27	



LAYOUT OF POINTS OF BASIC AND CONTROL GEODETIC NETWORK WITH MONITORING PLAN

DESIGNER: GRABEVINSKI NADZOR I LABORATORIJSKA ISPITIVANJA GEOT IZ OBLASTI GRAĐEVINARSTVA I GEODEZIJE		INVESTOR: MINISTRY OF CAPITAL INVESTMENTS OF MONTENEGRO	
Object: Port of Virpazar		Location: Cadastral parcels No. 219, 220, 221, 222, 223, 224, 225, 226, 227 CM Virpazar, zone F, SLS "Virpazar"	
Lead Engineer: PhD Zvonko Tomanović, civ.eng.		Type of technical documentation: Main Design	
Responsible Engineer: Msc Zdravko Stijepović, geod.eng.		Part of technical documentation: Study of the construction stages	SCALE: 1:500
Associate: Milica Drobnjak, spec.sci.civ.eng.		Annex: Layout of points with a monitoring plan	Annex No.: 10 Page No.: 28
Designer - date and stamp: January, 2022.		Revision - date and stamp:.	