DRAWING LIST
TASK 4

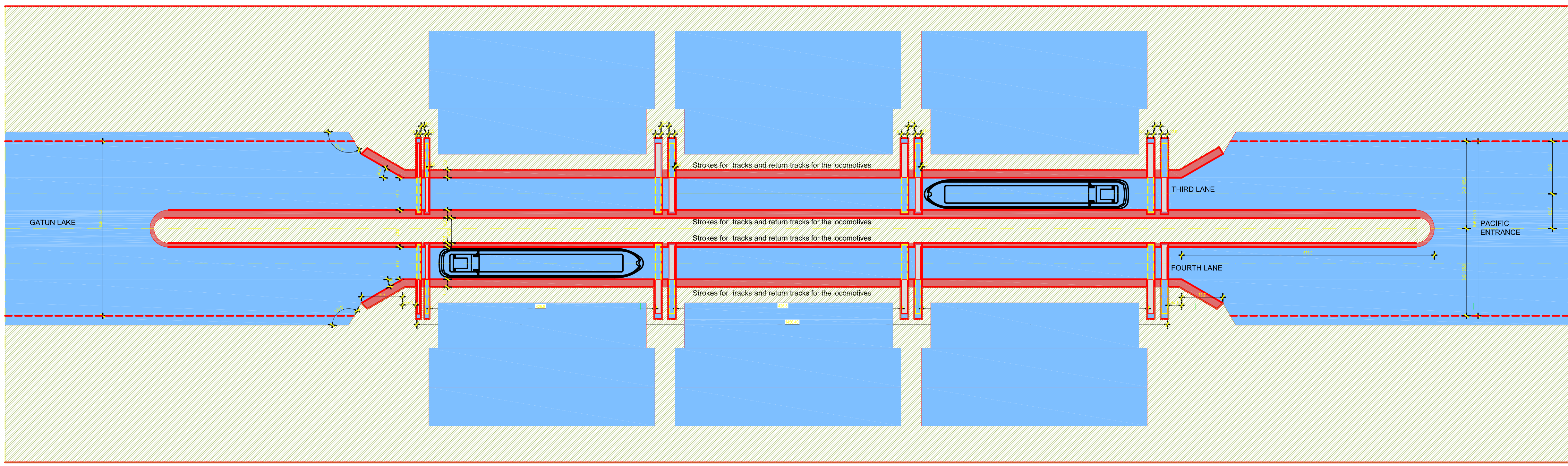
2/22/2006

x			Rev.	Title
				LAY-OUT
D4-	A	-001	E	Proposal of general layout : triple lift configuration using rolling gates and locomotives
		-002	C	Rolling gate versus miter gate
		-003	C	General plan view
		-004	B	General cross sections
		-005	B	Longitudinal sections
				Lock Walls
D4-	B	-001	C	Eastern Lock Wall : longitudinal view
		-002	D	Western Lock Wall : longitudinal view
		-003	E	Plan view on lock chamber 1
		-004	C	Plan view on lock chamber 2
		-005	E	Plan view on lock chamber 3
		-006	C	Cross sections lock walls
		-007	B	Lock head 2 : plan view
		-008	B	Lock head 2 : longitudinal section
		-009	B	Lock head 2 : cross section
		-010	A	Lock head 1 : plan view
		-011	A	Lock head 1 : longitudinal section
		-012	A	Lock head 1 : cross section
		-013	A	Lock head 3 : plan view
		-014	A	Lock head 3 : longitudinal section
		-015	A	Lock head 3 : cross section
		-016	A	Lock head 4 : plan view
		-017	A	Lock head 4 : longitudinal section
		-018	A	Lock head 4 : cross section
		-019	B	Lock wall segment
		-020	A	Lock head 4 : arrangement with pumping basin
				Filling and Emptying System
D4-	C	-001	C	WSB filling and emptying system : 3D-model
		-002	C	WSB filling and emptying system

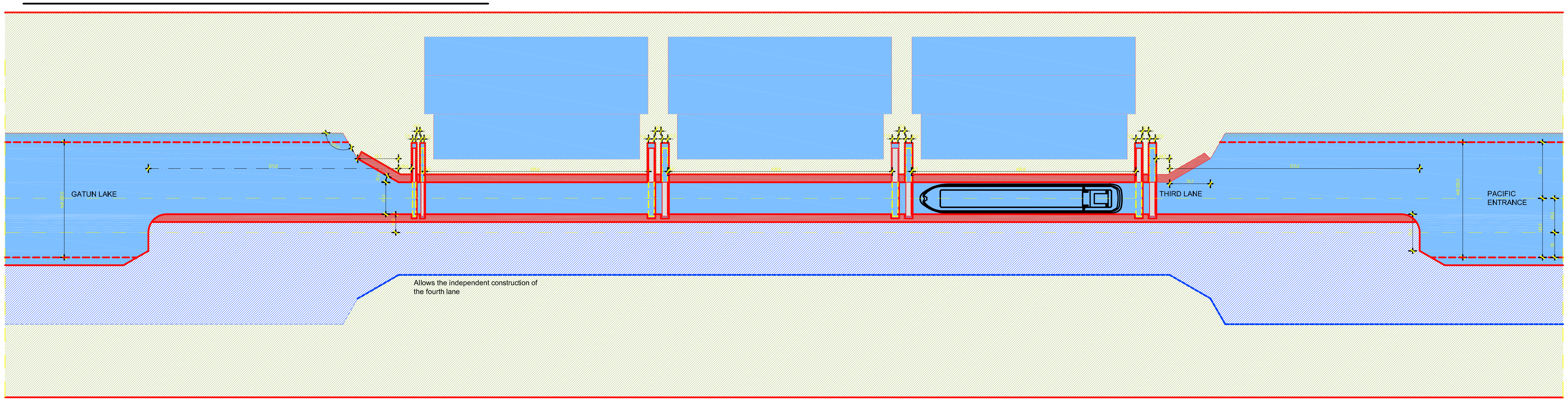
DRAWING LIST
TASK 4

2/22/2006

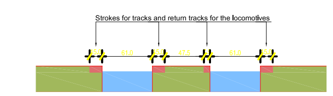
				Lock operating GATES
D4-	D	-100	B	Rolling gates 1/2/3/4 - sections
		-101	B	Rolling gate 2/3 - side view
		-102	B	Rolling gate 2/3 - top view + air chambers
		-103	B	Rolling gate - details
		-104	B	Rolling gate - details
				Operating Machinery
D4-	F	-001	A	Control system
		-002	B	Layout central control room (2sheets)
		-003	B	Control system architecture basic configuration
		-004	B	Control system architecture final configuration proposition
		-005	B	Control Room planview
				Lighting
D4-	G	-002	B	Lock Walls Lighting - LED's solution
		-003	A	Lock Walls Lighting - SPOT's solution
				Electrical power and power requirements
D4-	H	-004	B	High-voltage one-line diagram alternative 4
		-006	B	High-voltage one-line diagram alternative 5
		-007	A	Distribution system for positioning system
				Entrance walls
D4-	I	-001	C	Cross sections entrance walls
				operating structures
D4-	J	-001	A	Rolling Gates Techical Room Layout
				Construction

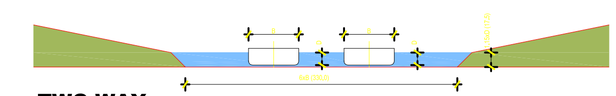


ROLLING GATES LAY - OUT THIRD AND IDENTICAL FOURTH LANE

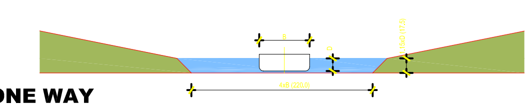


ROLLING GATES LAY - OUT THIRD LANE





TWO WAY



ONE WAY

ALL DIMENSIONS ARE ON THE LEVEL OF CONCEPT DESIGN AND HAVE TO BE CHECKED AND VALIDATED DURING FURTHER AND DETAILED DESIGN

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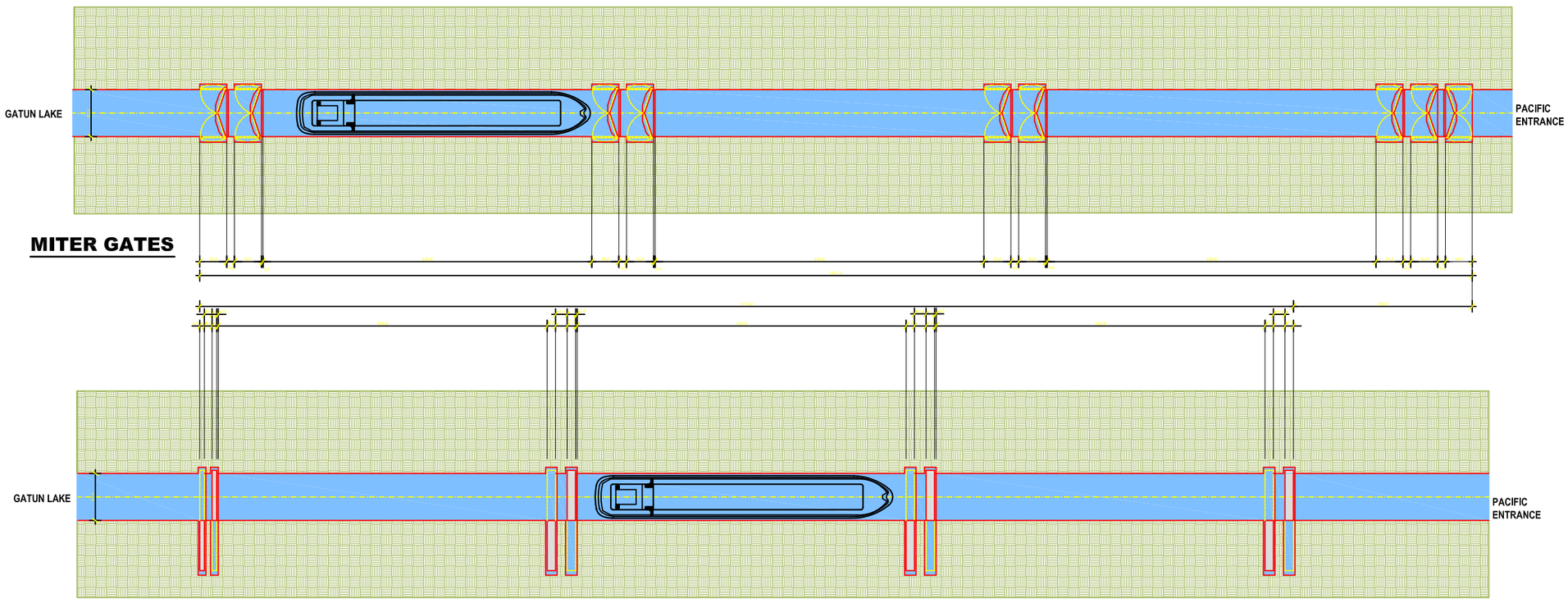
Diseño Conceptual de las Esclusas Post Panamax
Concept Design of New Lock Structure

TRIPLE LIFT CONFIGURATION
PROPOSAL OF GENERAL LAY OUT USING ROLLING GATES & LOCOMOTIVES

REV.	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
F					
E	[illegible]	FINAL REPORT	BME	JDR	JDR
D	[illegible]	DRAFT FINAL REPORT	BME	JDR	JDR
C	[illegible]	FOURTH EDITION	JDV	TD	RT
B	[illegible]	THIRD EDITION	JDV	TD	RT
A	[illegible]	SECOND EDITION	JDV	TD	RT
–	[illegible]	FIRST EDITION	JDV	TD	RT

Contract	Scale:	Drawing n°:	Rev.:	Folio
SAA-97462	1/250	D4 – A – 001	E	1/1



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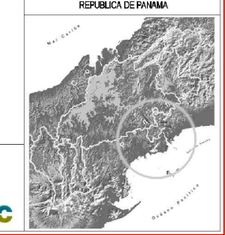

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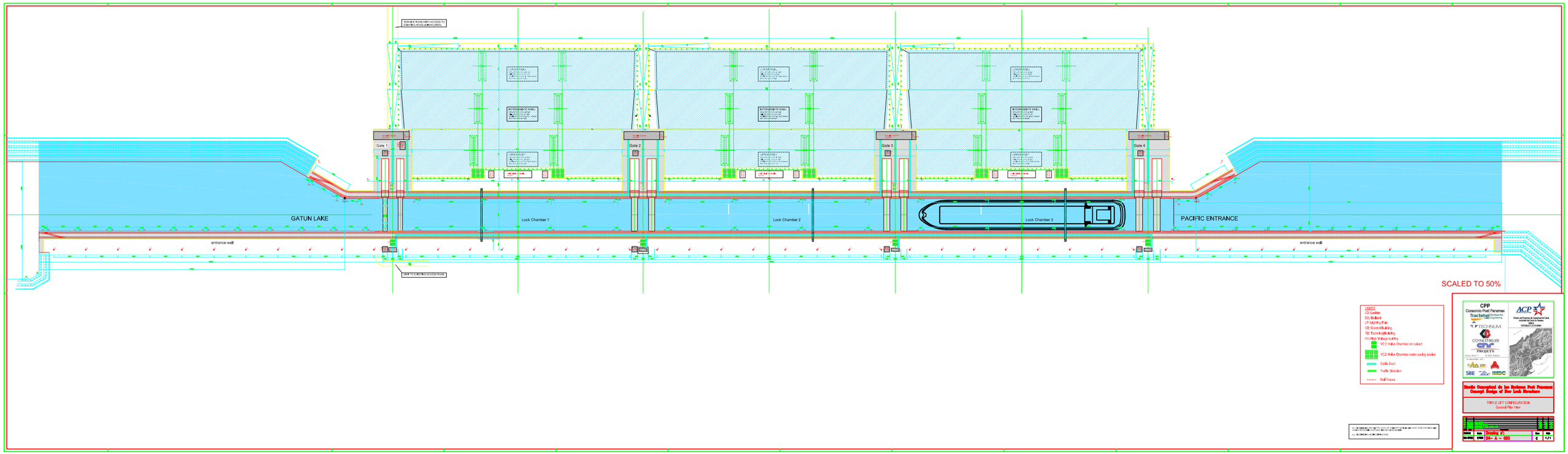
Concept Design of New Lock Structure

TRIPLE LIFT CONFIGURATION
ROLLING GATE VERSUS MITER GATE

REV.	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
F					
E					
D					
C	12/11/02	FINAL REPORT	BME	JDR	JDR
B	15/08/02	DRAFT FINAL REPORT	BME	JDR	JDR
A	12/08/02	SECOND EDITION	JEV	TO	RT
–	23/05/02	FIRST EDITION	JEV	TO	RT

Contract	Scale:	Drawing n°:	Rev.:	Folio
SAA-97462	1/250	D4 – A – 002	C	1/1


SERVICE ROAD WITH ACCESS TO EXISTING ROAD (WIRVPLUMES)
Gate 1
Gate 2
Gate 3
Gate 4
GATUN LAKE
Lock Chamber 1
Lock Chamber 2
Lock Chamber 3
PACIFIC ENTRANCE
entrance wall
entrance wall
SCALED TO 50%
LEGEND
LD: Ladder
BO: Bollard
LP: Lighting Pole
CB: Control Building
TB: Technical Building
HV: High Voltage building
VC1: Valve Chamber on culvert
VC2: Valve Chamber water saving basins
Cable Duct
Traffic Direction
Rail Tracks
CPP
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Concept Design of New Lock Structure
TRIPLE LIFT CONFIGURATION
General Plan View
Drawing #:
04- A - 003
C
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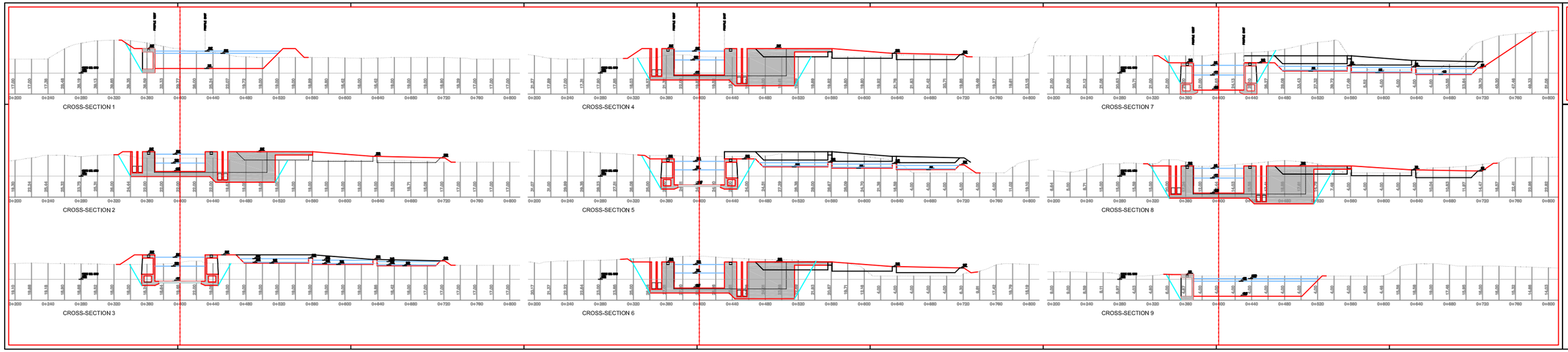

NOTE : LONGITUDINAL PROFILES SEE D4-A-005

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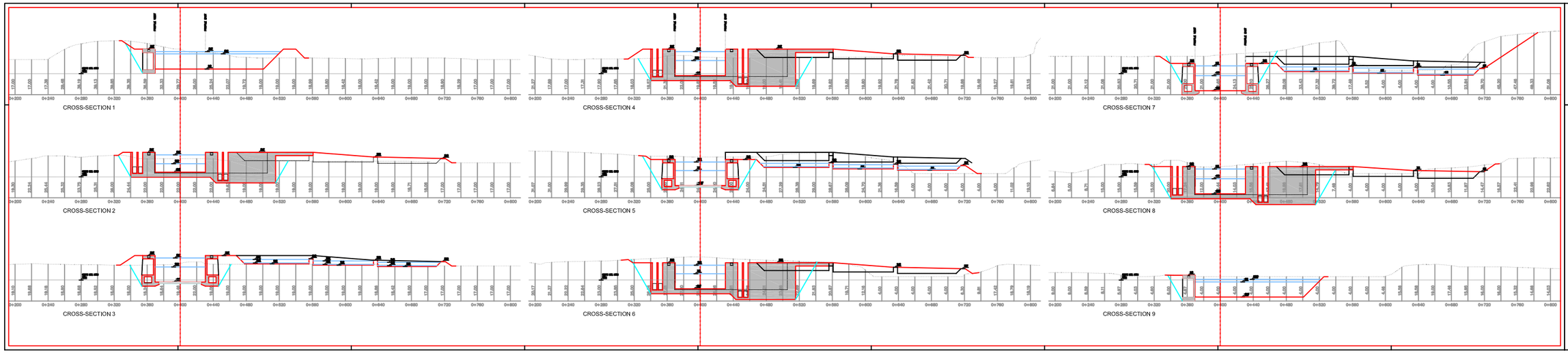
Concept Design of New Lock Structure

TRIPLE LIFT CONFIGURATION
GENERAL CROSS SECTIONS

Contract	Scale	Drawing n°:	Rev.	Folio
004-07/03	1/1000	D4- A - 004	0	1 / 1



NOTE : LONGITUDINAL PROFILES SEE D4-A-005

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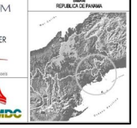
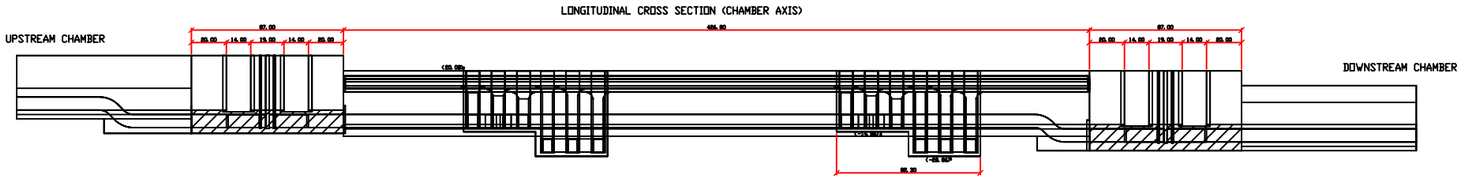
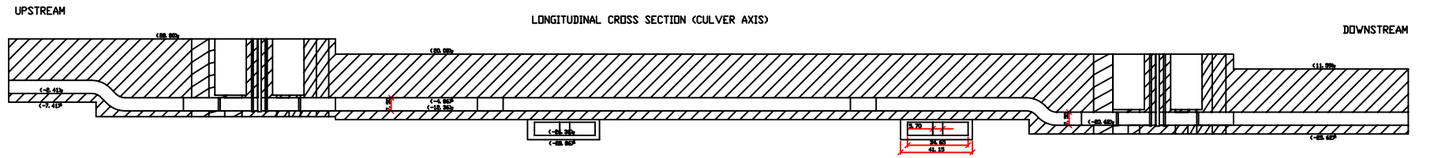


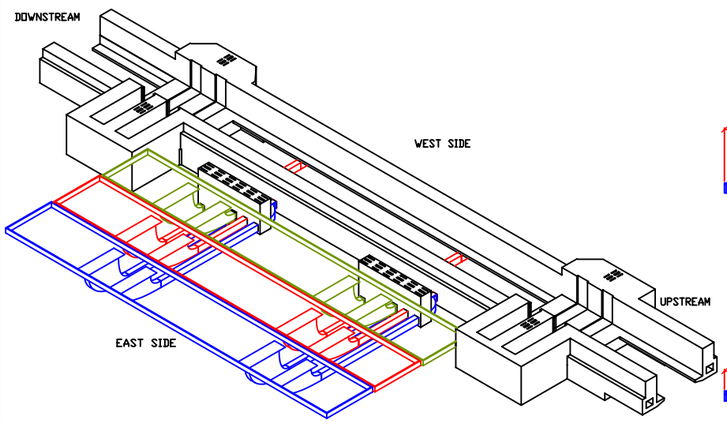
Diseño Conceptual de las Esclusas Post Panamax
Concept Design of New Lock Structure

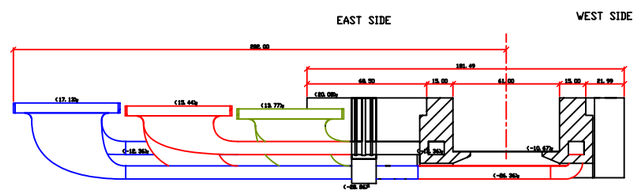
TRIPLE LIFT CONFIGURATION
GENERAL CROSS SECTIONS

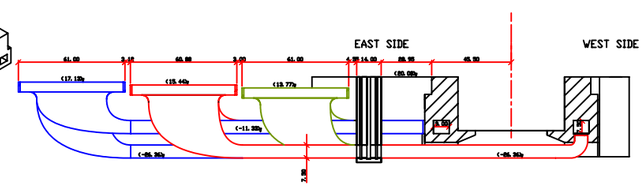
Contract	Scale	Drawing n°:	Rev.	Folio
004-07/03	1/1000	D4- A - 004	0	1 / 1

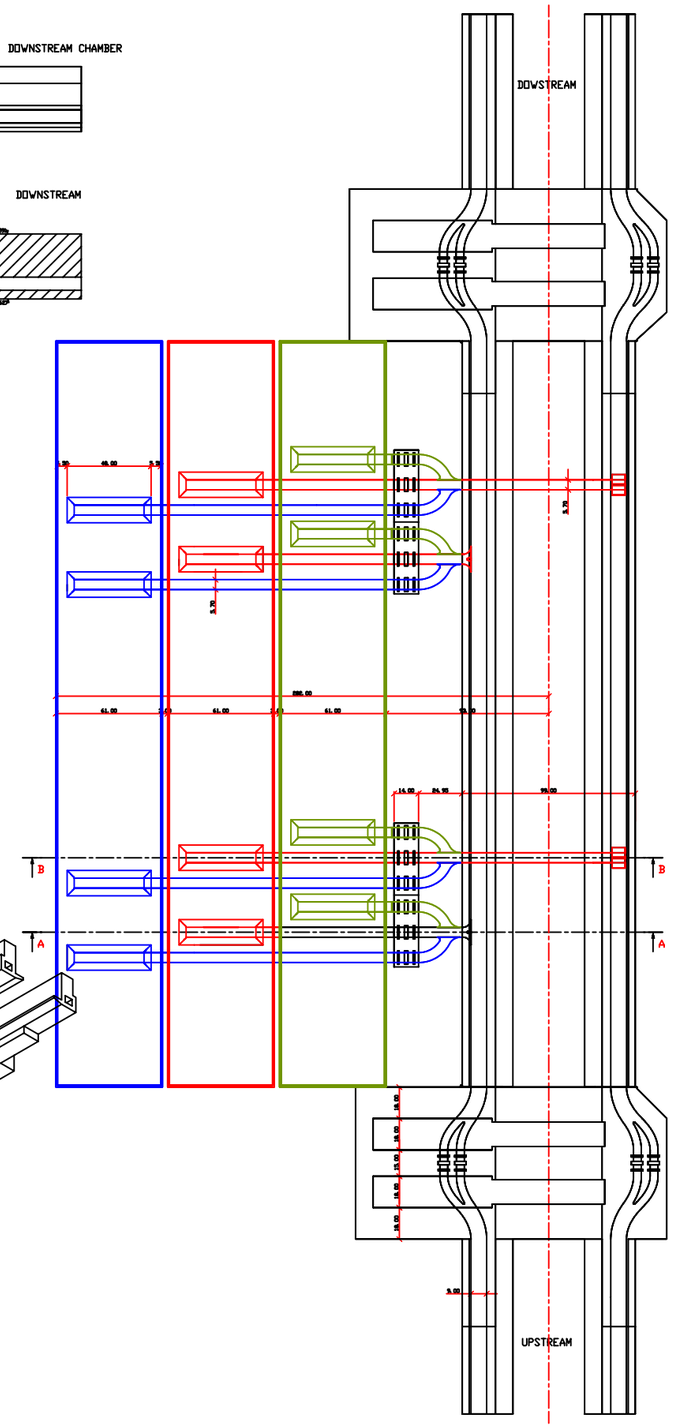


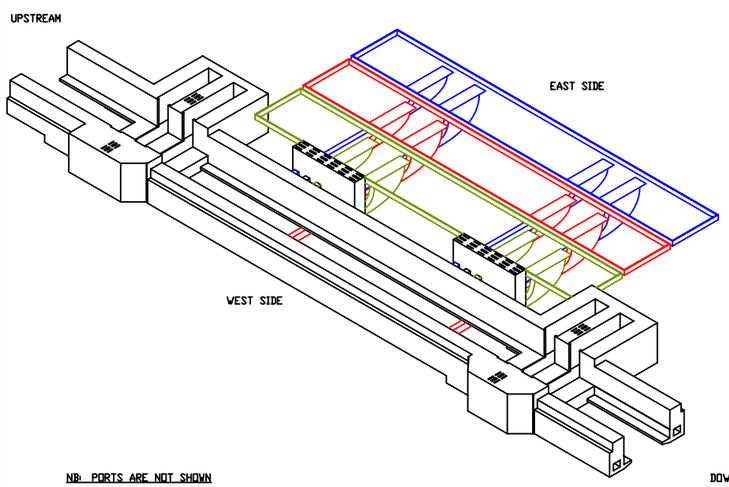


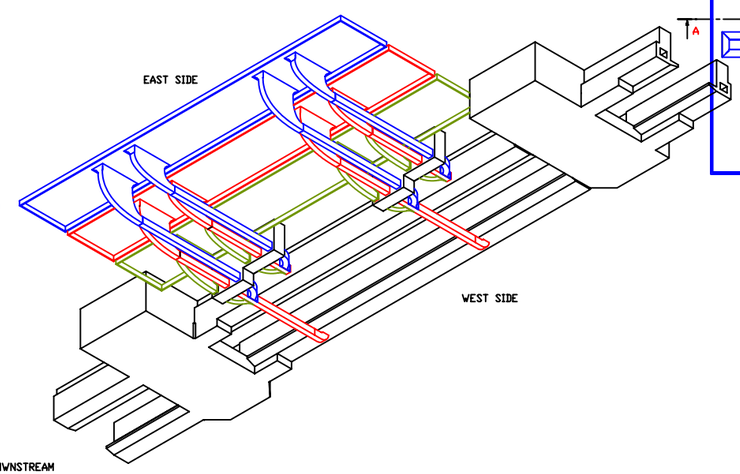












NB: PORTS ARE NOT SHOWN

THIS DRAWING SHOWS THE HYDRAULIC CONFIGURATION OF THE FILLING / EMPTYING AND THE WSB - SYSTEM.
FOR STRUCTURAL CONCEPT SEE DRAWING D4-C-002

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Diseño Conceptual de las Esclusas Post Panamax
Concept Design of New Lock Structure

TRIPLE LIFT CONFIGURATION
3D-MODEL WSB FILLING AND EMPTYING SYSTEM
HYDRAULIC DESIGN

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SM-97402	1/1000	D4- C - 001	C	1 / 1

1 and 4: MAINTENANCE BULKHEADS (each of them is composed of 3 elements on top of each other)
2 and 3 : WSB-VALVES
5 : MAINTENANCE SHAFT TO REACH THE SPACE BETWEEN BULKHEAD 1 AND VALVE 3 AT LEVEL -37.62
6 : MAINTENANCE SHAFT TO REACH THE SPACE BETWEEN BULKHEAD 3 AND VALVE 4 AT LEVEL -37.62

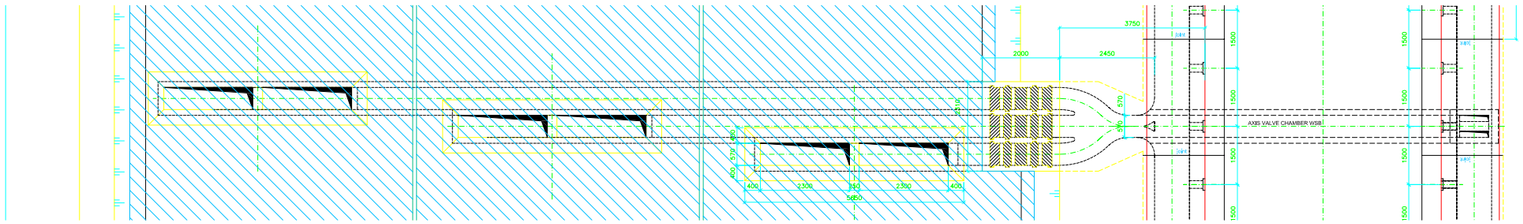
In normal operation, a WSB can be isolated from the lock chamber by closing the 2x2=4 valves (there are 2x2 conduits connecting a WSB to the lock chamber).

By keeping the 4 conduit valves in closed position, it is possible to empty one (or several) WSB by pumping. This can be done without interruption of the ship traffic through the locks. However, the hydraulic cylinders of the conduit valves are not designed to move the valves under such a head of water.

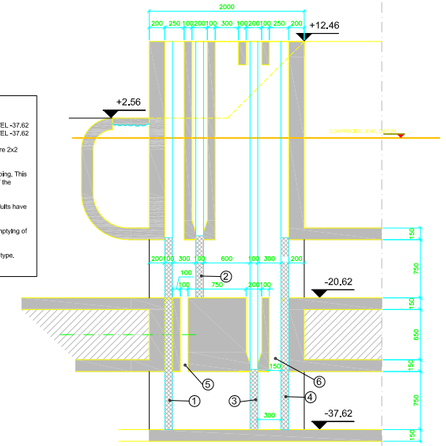
In case of trouble on one of the conduit valves, the bulkheads 1 and 4 must be lowered. Two WSB conduits have to be closed. Operation of the corresponding WSB can still go on by using the 2 remaining conduits.

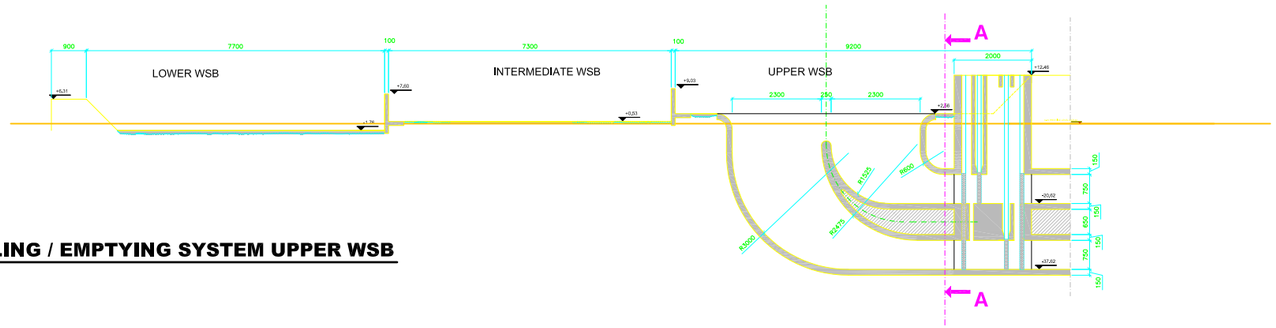
During maintenance, access on both sides of the valves is possible by using bulkheads 1 and 4 after emptying of the space between them.

Conduit valves and bulkheads are equipped with rubber / PTFE seals of the upstream and downstream type.

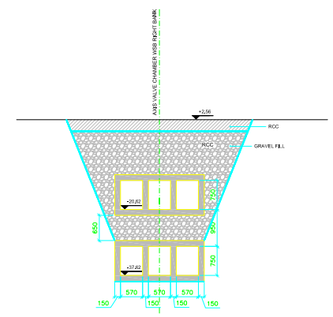


PLAN VIEW FILLING / EMPTYING SYSTEM

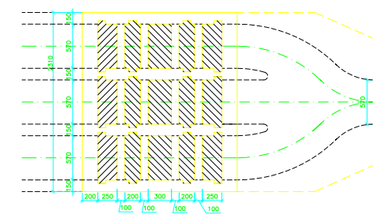




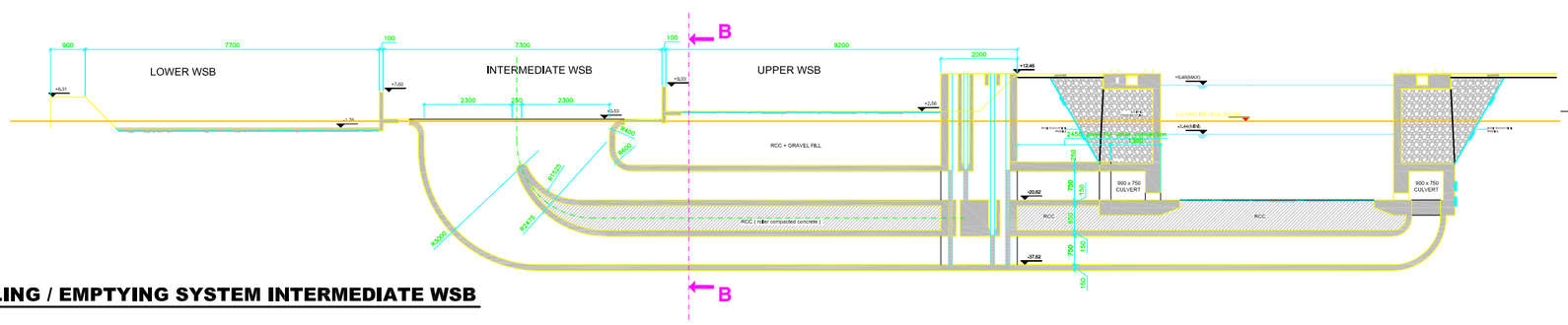
FILLING / EMPTYING SYSTEM UPPER WSB



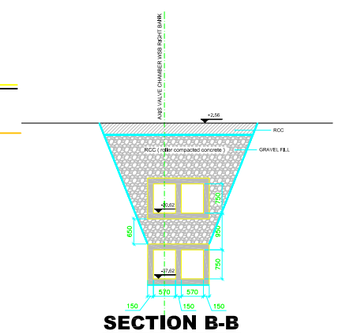
SECTION A-A



VALVE AND BULKHEAD DIMENSIONS (1/250)



FILLING / EMPTYING SYSTEM INTERMEDIATE WSB



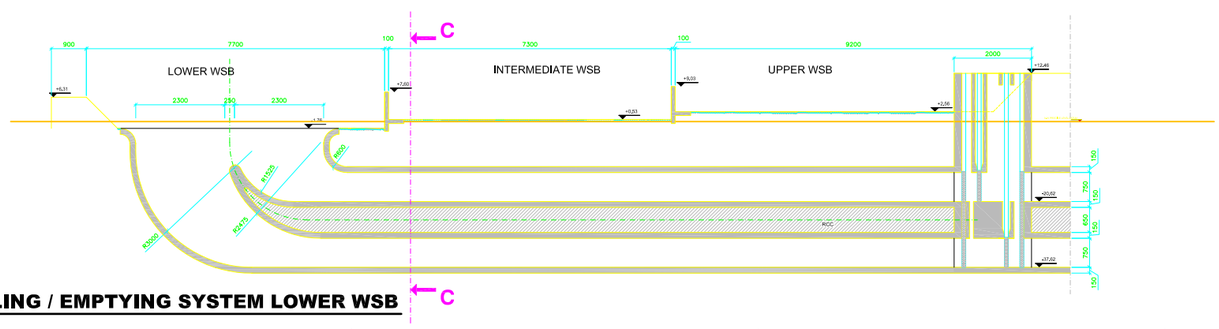
SECTION B-B

NOTE :

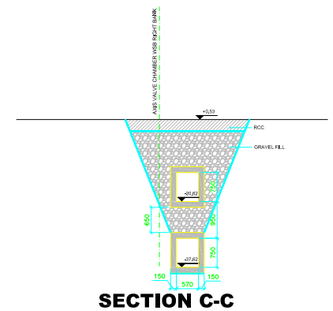
THE FILLING AND EMPTYING SYSTEM IS SHOWN WITH LEVELS FOR CHAMBER 3

ALL DIMENSIONS ARE ON THE LEVEL OF CONCEPT DESIGN AND HAVE TO BE CHECKED AND VALIDATED DURING FURTHER AND DETAILED DESIGN

ALL DIMENSIONS ARE IN CENTIMETERS



FILLING / EMPTYING SYSTEM LOWER WSB



SECTION C-C

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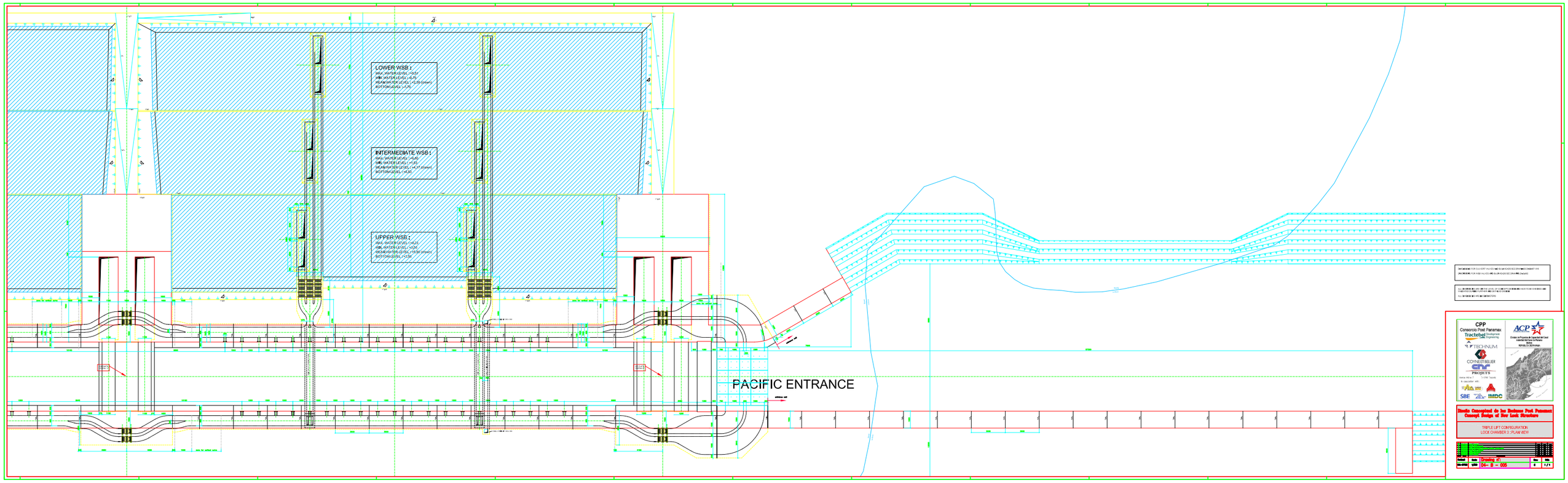
Diseño Conceptual de las Esclusas Post Panamax
Concept Design of New Lock Structure

TRIPLE LIFT CONFIGURATION
WATER SAVING BASINS - FILLING AND EMPTYING SYSTEM
STRUCTURAL DESIGN

Rev.	Date	Description	Drawn	Chkd	Appd
1	17.12.2010	Issued for review			
2	17.12.2010	Issued for review			
3	17.12.2010	Issued for review			
4	17.12.2010	Issued for review			

Contract:	Scale:	Drawing n°:	Rev.:	Folio
SM–97462	1/500	D4– C – 002	C	1 / 1


LOWER WSB :
MAX. WATER LEVEL : +9.51
MIN. WATER LEVEL : +8.79
MEAN WATER LEVEL : +2.55 (stream)
BOTTOM LEVEL : -1.75
INTERMEDIATE WSB :
MAX. WATER LEVEL : +8.85
MIN. WATER LEVEL : +1.33
MEAN WATER LEVEL : +4.17 (stream)
BOTTOM LEVEL : +5.33
UPPER WSB :
MAX. WATER LEVEL : +8.23
MIN. WATER LEVEL : +2.26
MEAN WATER LEVEL : +5.30 (stream)
BOTTOM LEVEL : +7.26
PACIFIC ENTRANCE
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Autoridad del Canal de Panamá
Estudio Conceptual de las Esclusas Post Panamax
Concept Design of New Lock Structure
TRIPLE LIFT CONFIGURATION
LOCK CHAMBER 3 : PLAN VIEW
Drawing n°:
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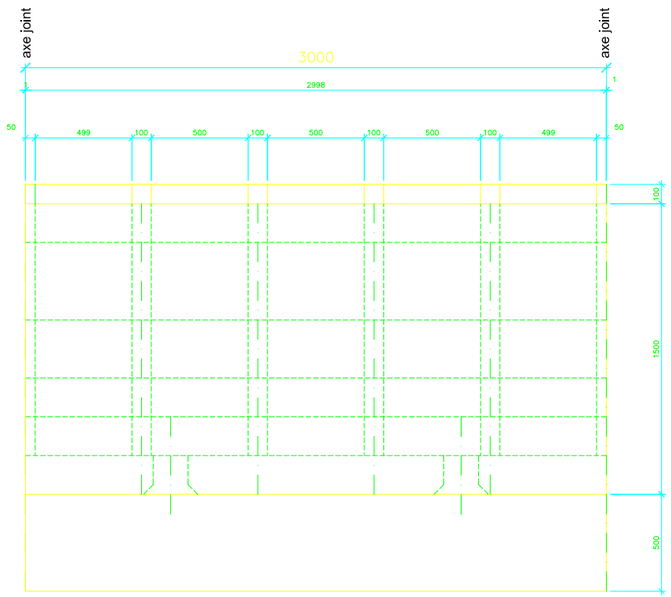
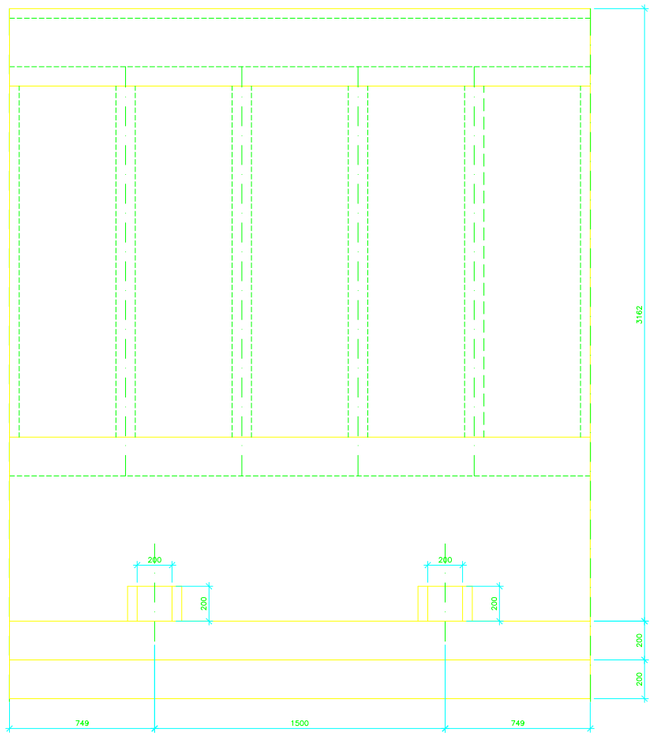
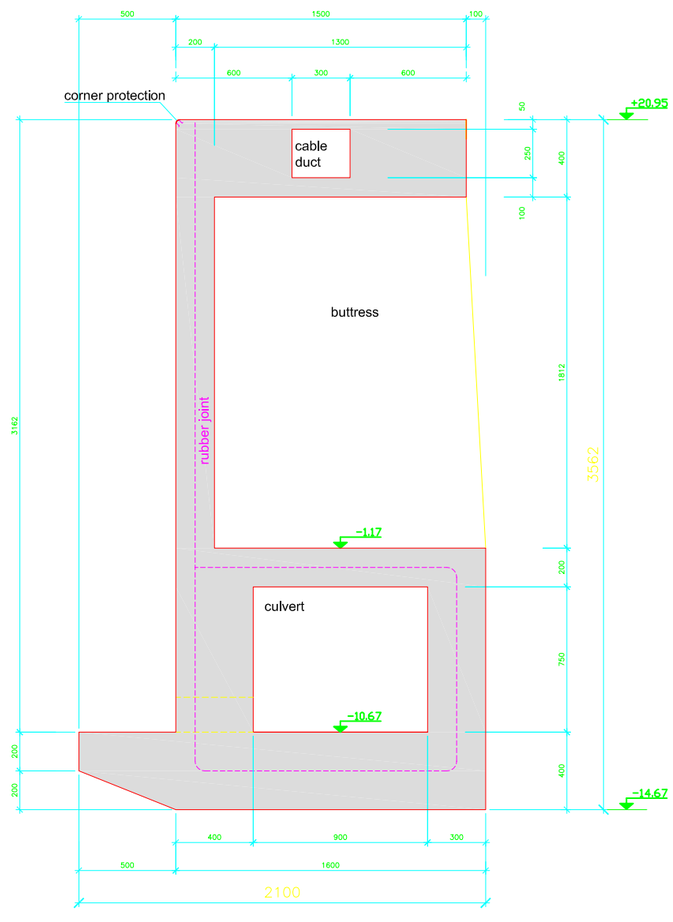


lock chamber 2: lock wall type 1b (basalt - RC)

plan view



front view



cross section

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ALL DIMENSIONS ARE IN CENTIMETERS

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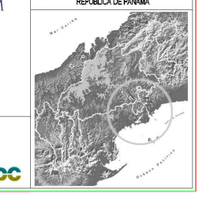
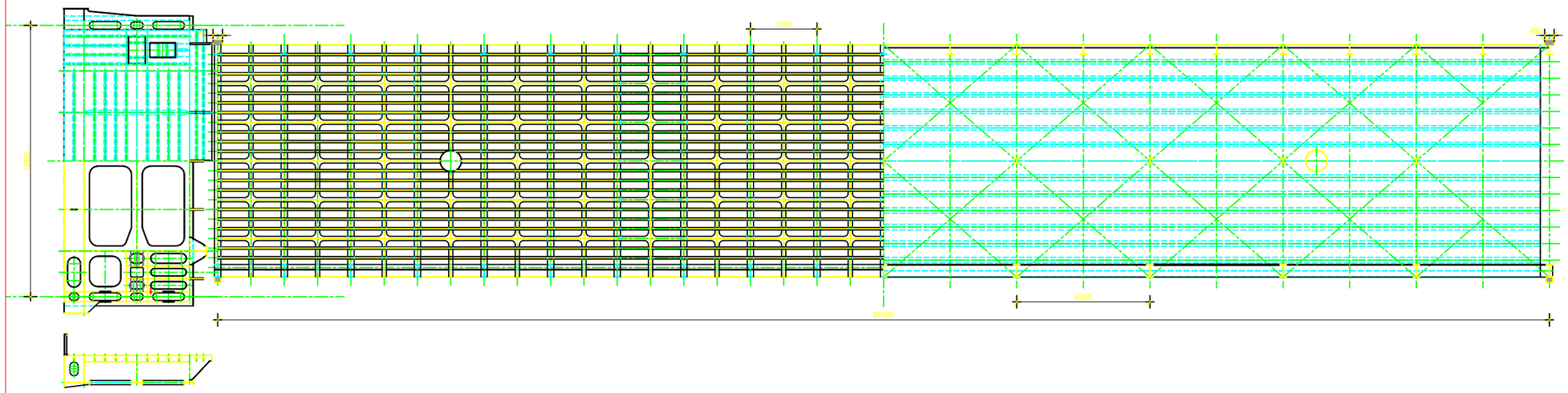


Diseño Conceptual de las Esclusas Post Panamax
Concept Design of New Lock Structure

TRIPLE LIFT CONFIGURATION
Segment of Lock Walls

No.	Date	DESCRIPTION	DRAWN	CHECKED	APPROVED
1	07/12/07	[illegible]	[illegible]		
2	10/12/07	[illegible]	[illegible]		
3	17/12/07	[illegible]	[illegible]		

Contract:	Scale:	Drawing n°:	Rev.:	Folio
SAA-07462	1/100	D4- B - 019	B	1 / 1

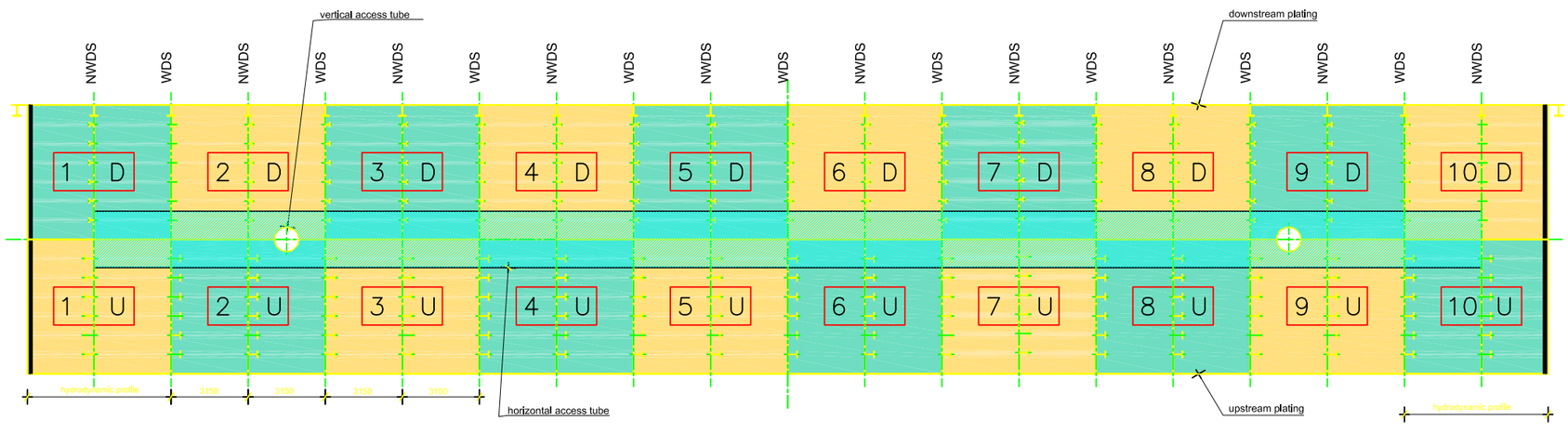


Rolling gate 2/3 top view

All dimensions are on the level of concept design and have to be checked and validated during further and detailed design.

All dimensions are in mm.

All levels are in meter and refered to PLD.



Arrangement of watertight compartments in air chamber

(Horizontal section through air chamber)
WDS: watertight vertical separation wall
NWDS: non-watertight vertical separation wall

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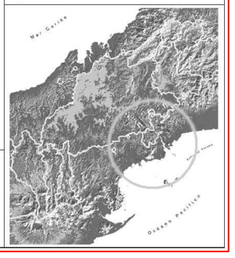

Diseño Conceptual de las Esclusas Post Panamax
Concept Design of New Lock Structure

TRIPLE LIFT CONFIGURATION
ROLLING GATE 2/3
TOP VIEW AIR CHAMBERS

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E					
D					
C					
B	13/11/02	FINAL REPORT	BME	JDR	JDR
A	12/09/02	SECOND EDITION	SR	TD	RT
–	12/08/02	FIRST EDITION	JDV	TD	RT

Contract	Scale:	Drawing n°:	Rev.:	Folio
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gate support

SECTION A-A

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springs

SUPPORT MAINTENANCE WAGON : DETAILS

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SUPPORT MAINTENANCE WAGON

SECTION A-A

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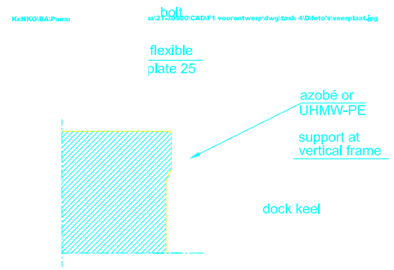
BULK HEAD



SEALS AND BOTTOM SUPPORT

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SUPPORT MAINTENANCE WAGON

All dimensions are on the level of concept design and have to be checked and validated during further and detailed design.

All dimensions are in mm.

All levels are in meter and refered to PLD.

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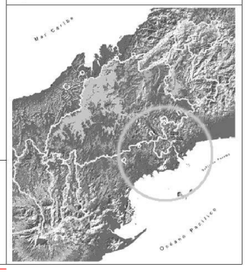

Diseño Conceptual de las Esclusas Post Panamax
Concept Design of New Lock Structure

TRIPLE LIFT CONFIGURATION
ROLLING GATE
DETAILS 2/2

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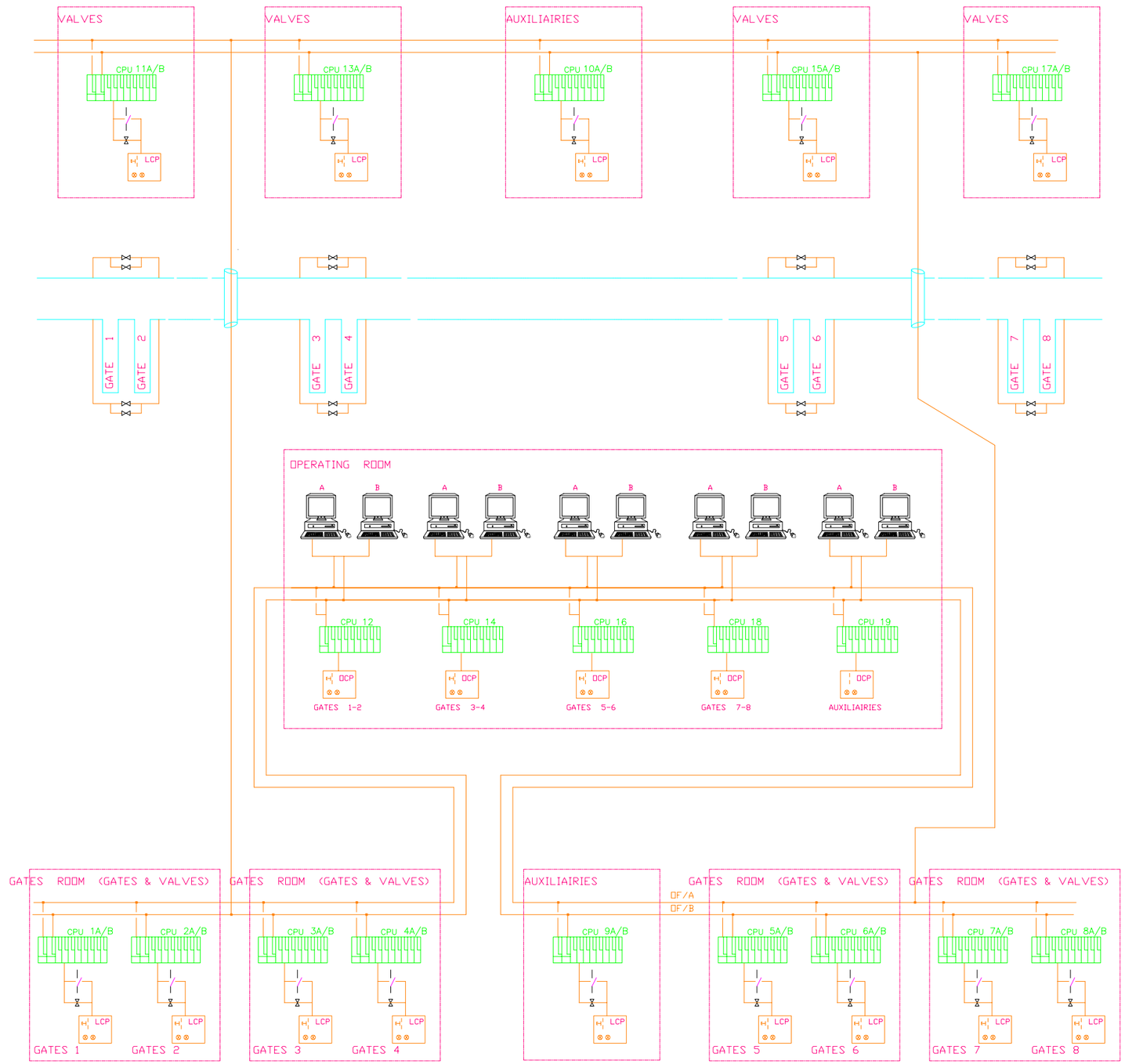
D					
C					
B	12/11/02	FINAL REPORT	BME	JDR	JDR
A	12/09/02	SECOND EDITION	SR	TD	RT
-	12/06/02	FIRST EDITION	JDV	TD	RT

Contract	Scale:	Drawing n°:	Rev.:	Folio
SAA-97462	1/-	D4-D-104	B	1/1



OF OPTICAL FIBRE (REDUNDANT : A/B)

CPU CONTROL PROCESS UNIT (REDUNDANT : A/B)

LCP LOCAL CONTROL PANEL (IN CASE OF DOUBLE CPU FAILURE)

OCP OPERATING CONTROL PANEL (IN CASE OF DOUBLE MONITOR FAILURE)

EQUIPMENT (SWITCHBOARD, VALVES, ...)

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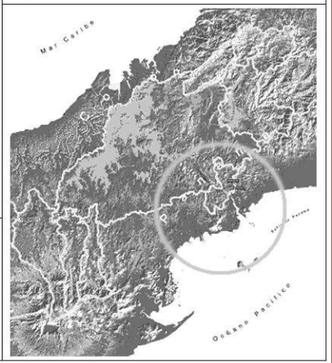

Diseño Conceptual de las Esclusas Post Panamax
Concept Design of New Lock Structure

TRIPLE LIFT CONFIGURATION
CONTROL SYSTEM ARCHITECTURE
PROPOSAL

REV.	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
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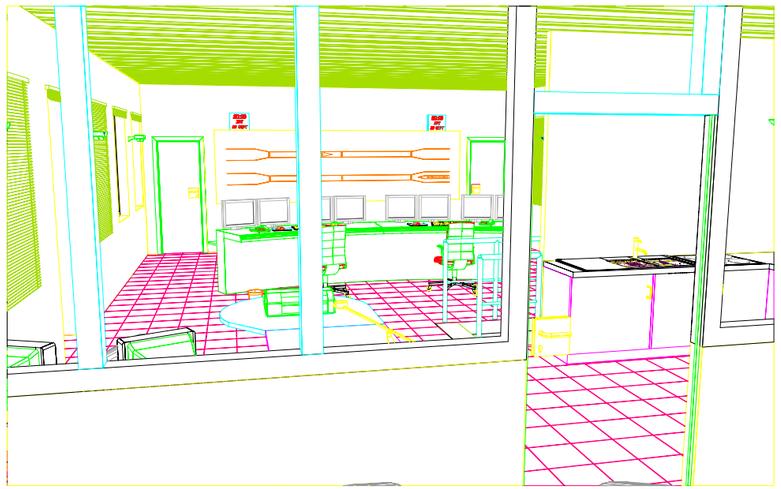
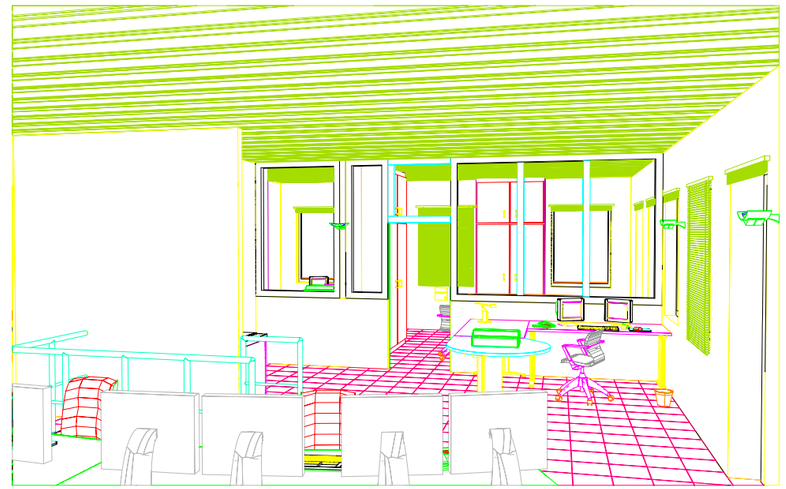
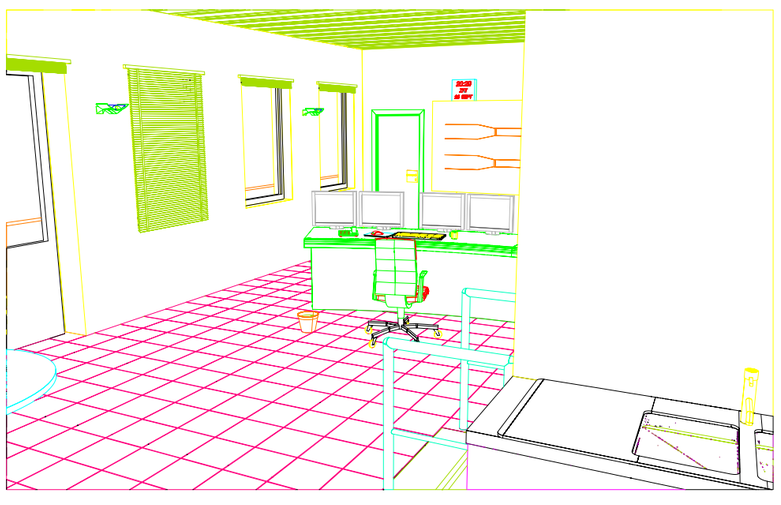
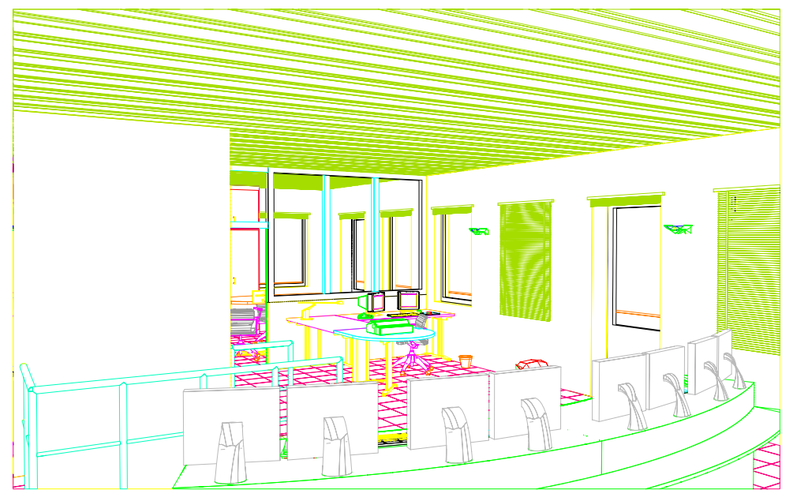
E					
D					
C					
B					
A	12/11/02	FINAL REPORT	BME	JDR	JDR
–	31/05/02	FIRST EDITION	VEM	VP	VPS

Contract	Scale:	Drawing n°:	Rev.:	Folio
SAA-97462	–	D4– F – 001	A	1 / 1









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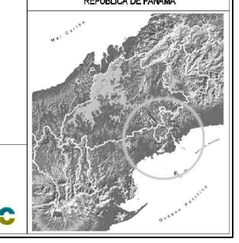
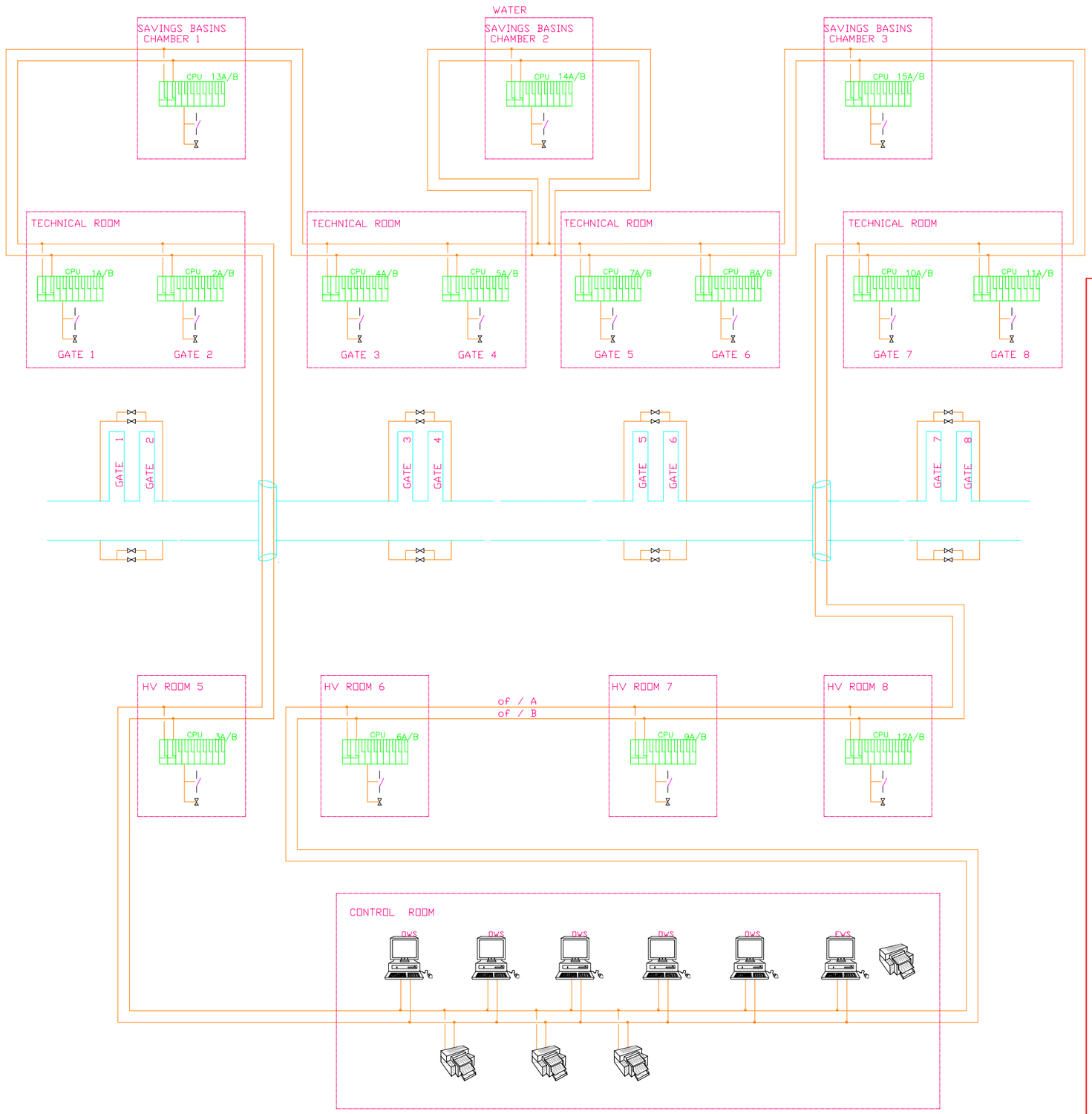


Diseño Conceptual de las Esclusas Post Panamax
Concept Design of New Lock Structure

TRIPLE LIFT CONFIGURATION
LAYOUT CENTRAL CONTROL ROOM

REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
F					
E					
D					
C					
B	13/11/03	FINAL REPORT	BMC	JDR	JDR
A	11/03/03	INTEGRATION STAIRS CONTROL ROOM	VEM	FCL	WPS
–	19/07/02	FIRST EDITION	VEM	FCL	WPS

Contract	Scale:	Drawing n°:	Rev.:	Folio
SAA-97462	–	D4- F – 002	B	1 / 2



OWS	OPERATING WORKSTATION
EWS	ENGINEERING WORKSTATION
OF	OPTICAL FIBRE (REDUNDANT : A/B)
CPU	CONTROL PROCESS UNIT (REDUNDANT : A/B)
LCP	LOCAL CONTROL PANEL (IN CASE OF DOUBLE CPU FAILURE)
	EQUIPMENT (SWITCHBOARD, VALVES, ...)

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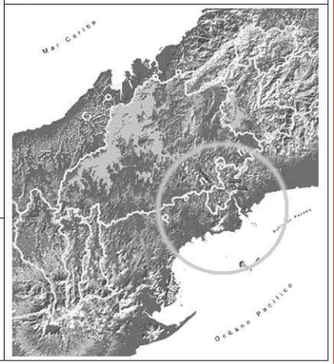

Diseño Conceptual de las Esclusas Post Panamax
Concept Design of New Lock Structure

TRIPLE LIFT CONFIGURATION
CONTROL SYSTEM ARCHITECTURE
BASIC CONFIGURATION

REV.	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
F					
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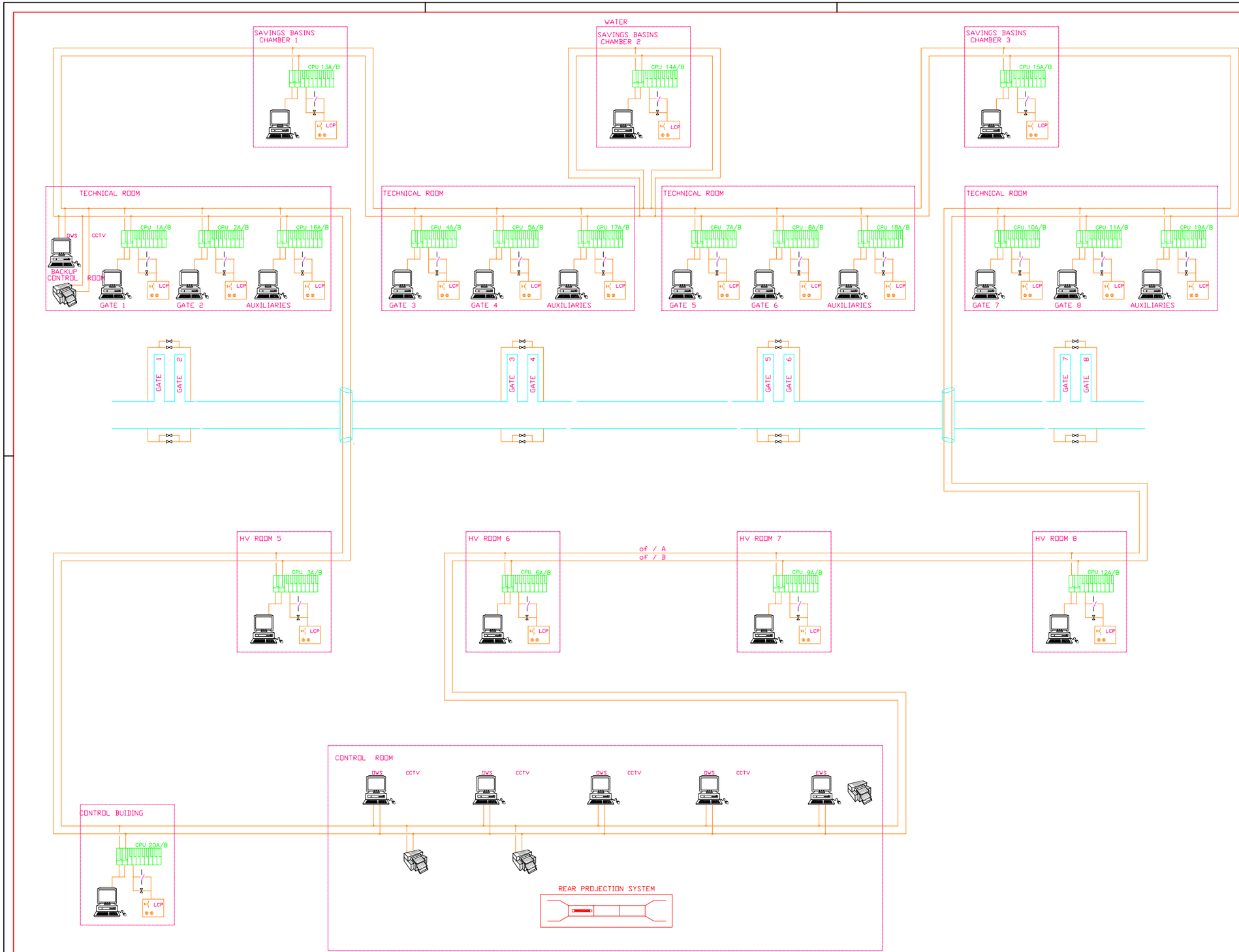
D					
C					
B	12/11/02	FINAL REPORT	BME	JDR	JDR
A	09/09/02	REMARK OF MEETING 19/08/02	VEM	VP	VPS
–	29/07/02	FIRST EDITION	VEM	VP	VPS

Contract	Scale:	Drawing n°:	Rev.:	Folio
SAA-97462	–	D4- F - 003	B	1 / 1



OWS OPERATING WORKSTATION

EWS ENGINEERING WORKSTATION

OF OPTICAL FIBRE (REDUNDANT : A/B)

CPU CONTROL PROCESS UNIT (REDUNDANT : A/B)

LCP LOCAL CONTROL PANEL (IN CASE OF DOUBLE CPU FAILURE)

EQUIPMENT (SWITCHBOARD, VALVES, ...)

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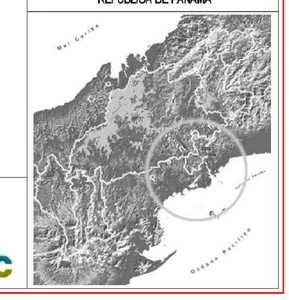
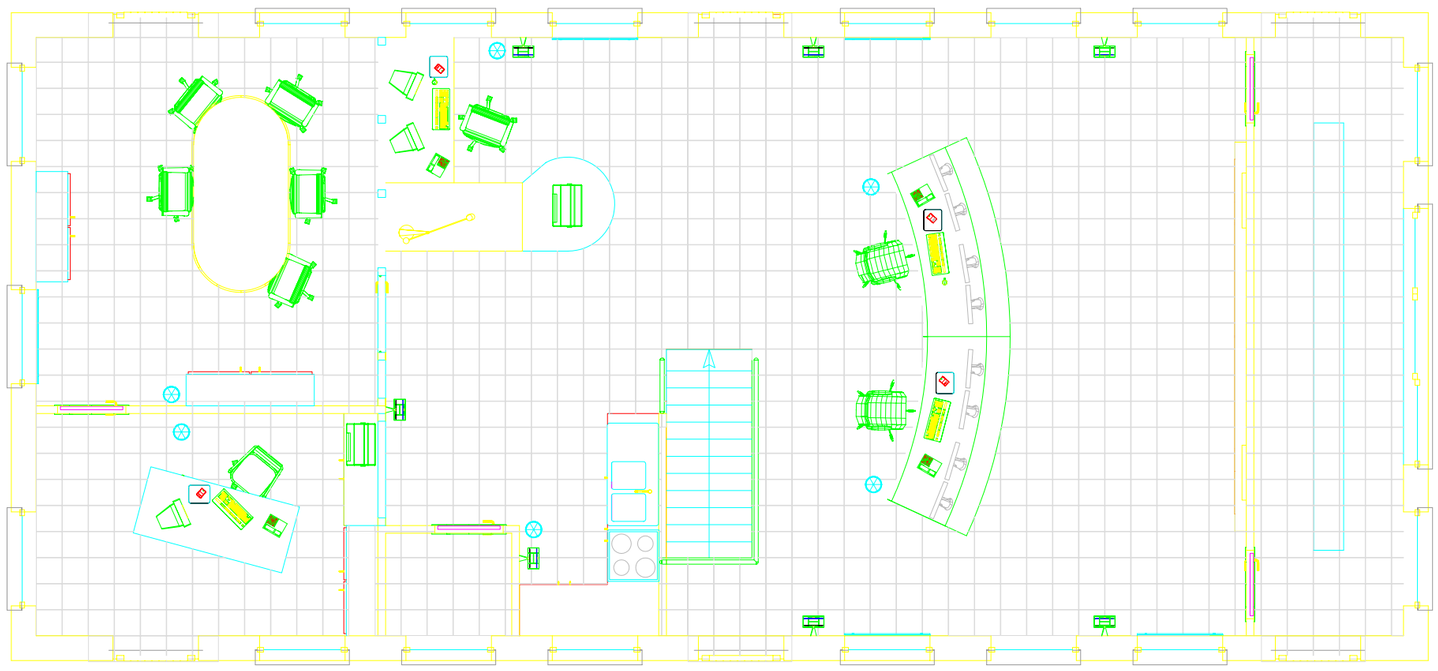


Diseño Conceptual de las Esclusas Post Panamax
Concept Design of New Lock Structure

TRIPLE LIFT CONFIGURATION
CONTROL SYSTEM ARCHITECTURE
FINAL CONFIGURATION PROPOSAL

REV.	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
F					
E					
D					
C					
B	12/11/02	FINAL REPORT	BME	JDR	JDR
A	06/09/02	REMARK OF MEETING 19/08/02	VEM	VP	VPS
–	29/07/02	FIRST EDITION	VEM	VP	VPS

Contract	Scale:	Drawing n°:	Rev.:	Folio
SAA-97462	–	D4- F - 004	B	1 / 1



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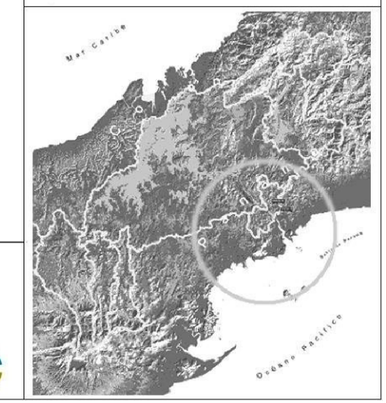
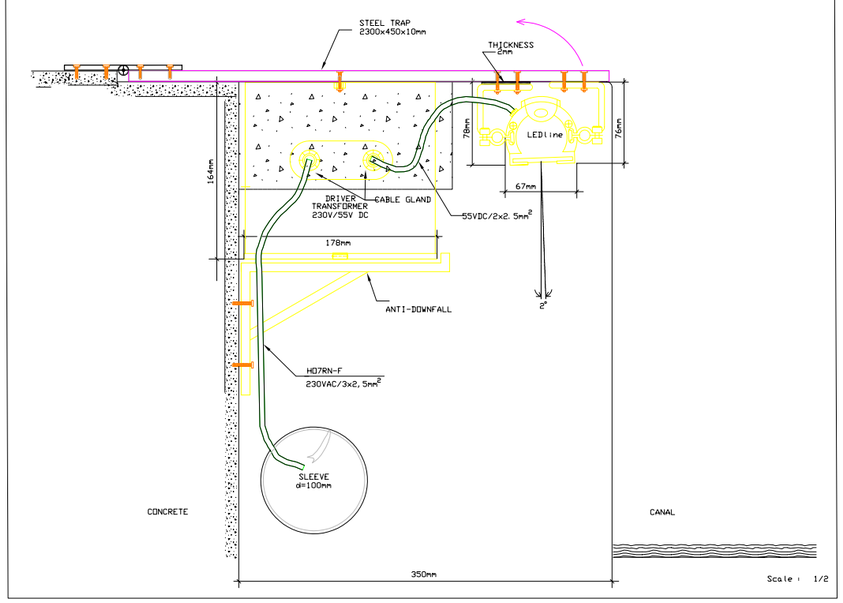


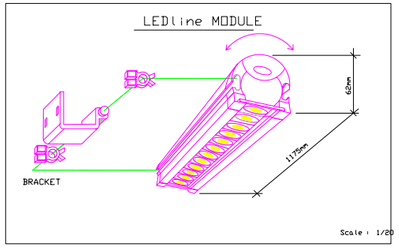
Diseño Conceptual de las Esclusas Post Panamax
Concept Design of New Lock Structure

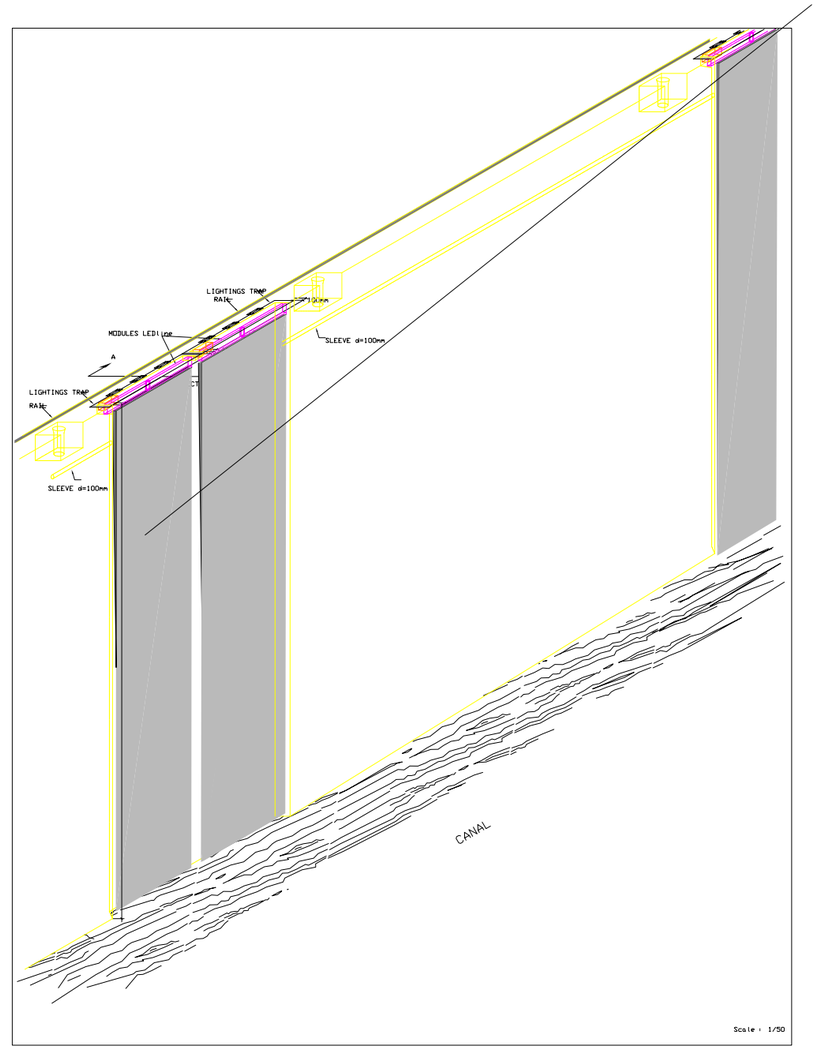
TRIPLE LIFT CONFIGURATION
CONTROL ROOM
VIEW

REV.	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
F					
E					
D					
C					
B	12/11/02	FINAL REPORT	BME	JDR	JDR
A	12/09/02	INTEGRATION STAIRS CONTROL ROOM	VEM	FCL	VPS
–	29/07/02	FIRST EDITION	VEM	FCL	VPS

Contract	Scale:	Drawing n°:	Rev.:	Folio
SAA-97462	–	D4– F – 005	B	1 / 1







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Diseño Conceptual de las Esclusas Post Panamax
Concept Design of New Lock Structure

TRIPLE LIFT CONFIGURATION
LOCK WALLS LIGHTING
LEDS SOLUTION

REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
F					
E					
D					
C					
B	13/11/02	FINAL REPORT	BNE	JER	JER
A	02/08/02	LIGHTING TRAP			
—	05/06/02	FIRST EDITION			

Contract	Scale:	Drawing n°:	Rev.:	Folio
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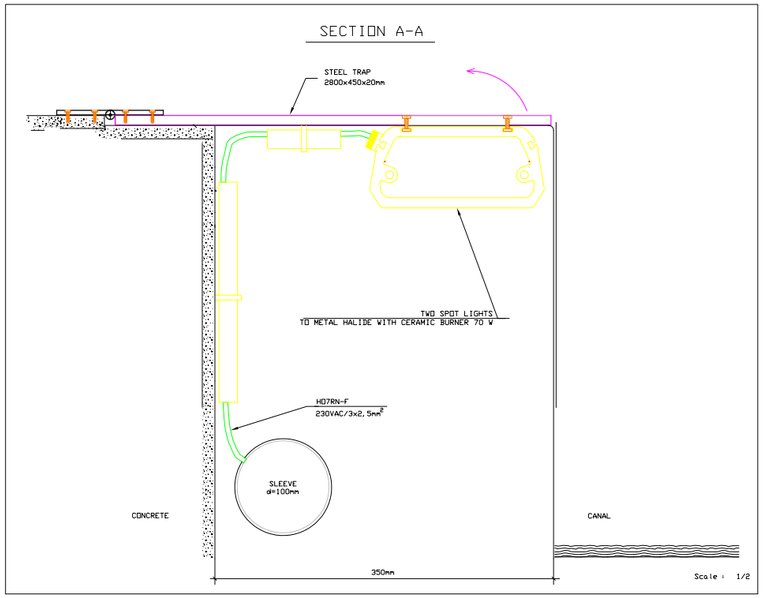
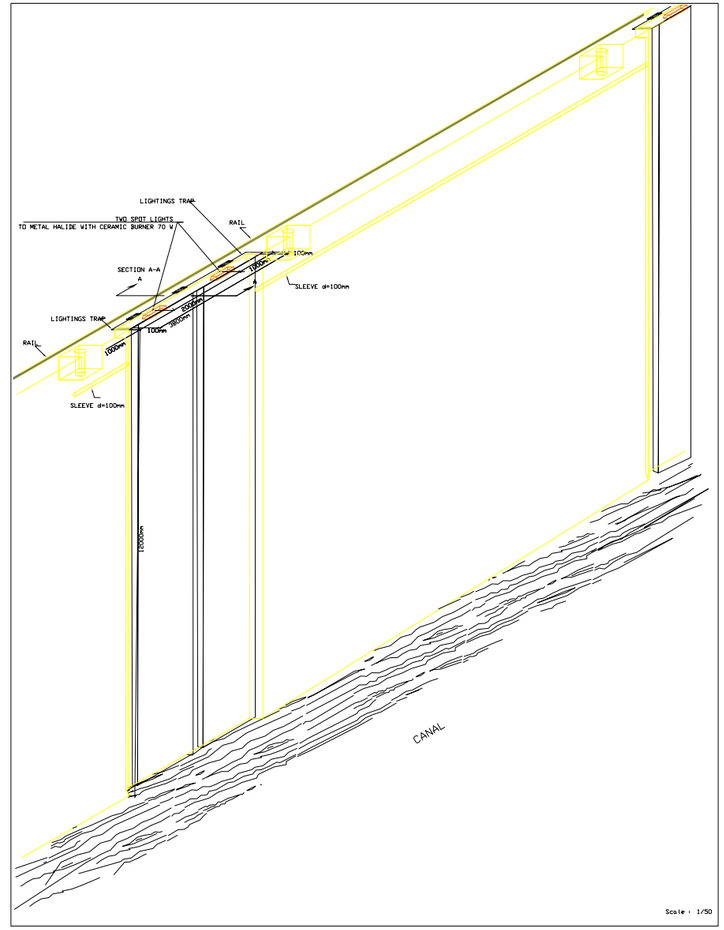
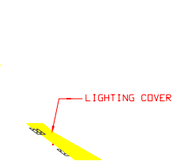
SECTION A-A







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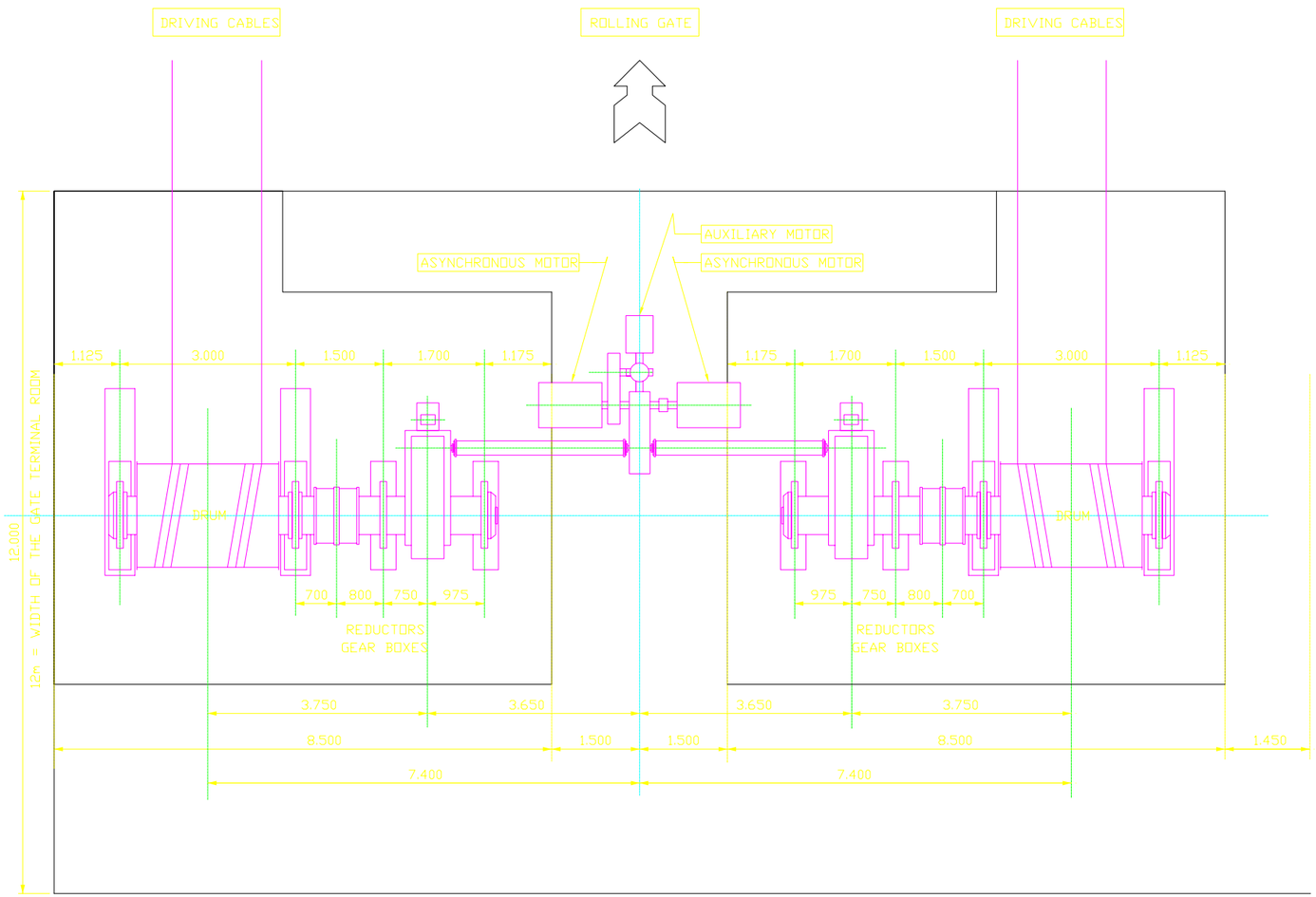
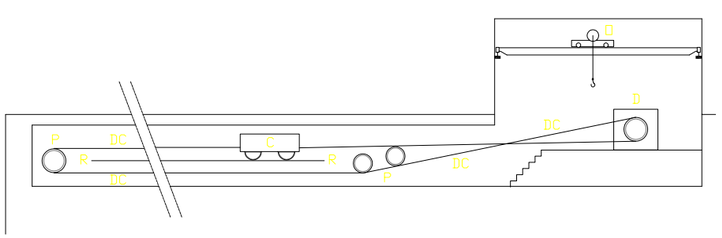
Diseño Conceptual de las Esclusas Post Panamax
Concept Design of New Lock Structure

TRIPLE LIFT CONFIGURATION
LOCK WALLS LIGHTING
SPOTS SOLUTION

NO.	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
A		FOLLOW UP			
B		FOLLOW UP FINAL REVISION			

Contract:	Scale:	Drawing n°:	Rev.:	Folio
SM-97462	1/50-1/20 1/2	D4- G - 003	A	1 / 1





C = UPPER ROLLING CARRIAGE (FIXED ON TOP OF THE ROLLING GATE)
D = DRIVING SYSTEM (DRUM, GEAR BOXES, ASYNCHRONOUS MOTOR OF ROLLING GATE - SEE ABOVE)
DC = DRIVING CABLE
D = OVERHEAD CRANE
P = PULLEYS
R = RAILLWAY

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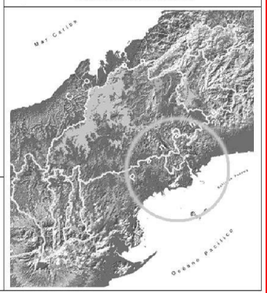

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Concept Design of New Lock Structure

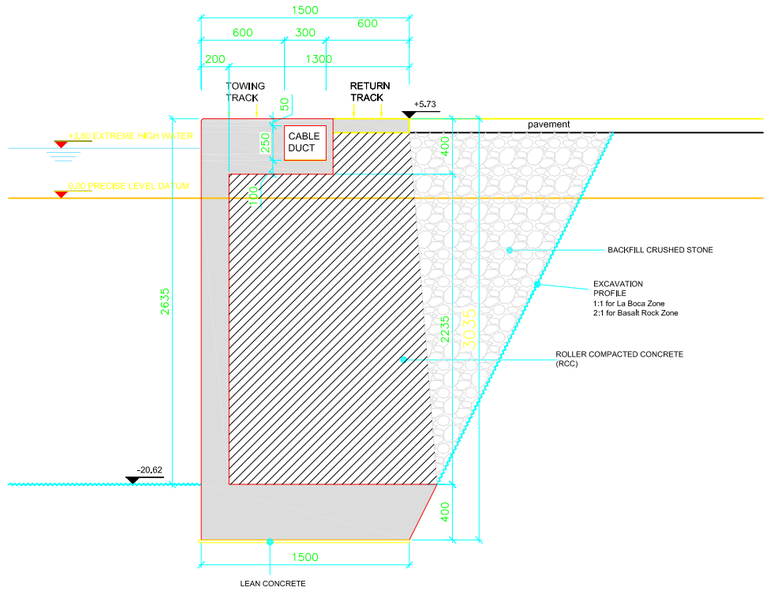
TRIPLE LIFT CONFIGURATION
ROLLING GATES TECHNICAL ROOM
LAYOUT

REV.	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
F					
E					
D					
C					
B					
A	12/11/02	FINAL REPORT	BME	JDR	JDR
–	12/06/02	FIRST EDITION	VEM	VP	VPS

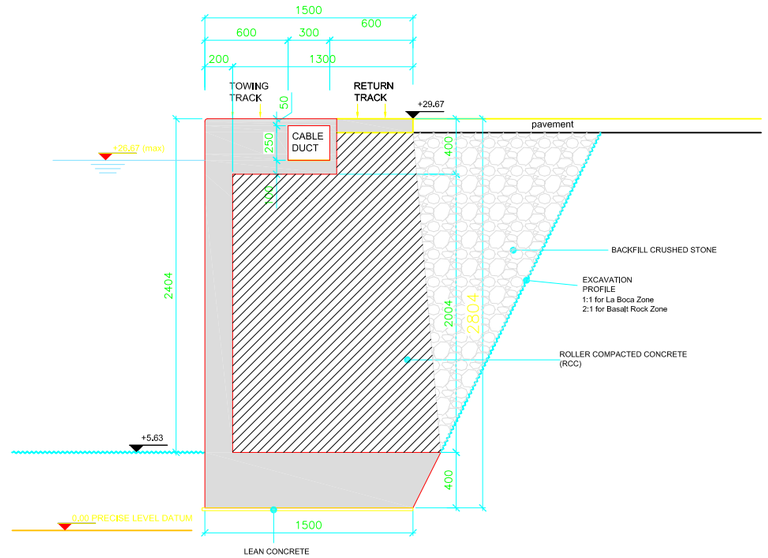
Contract	Scale:	Drawing n°:	Rev.:	Folio
SAA-97462	–	D4- J - 001	A	1 / 1

type a (RC+RCC)

Pacific entrance

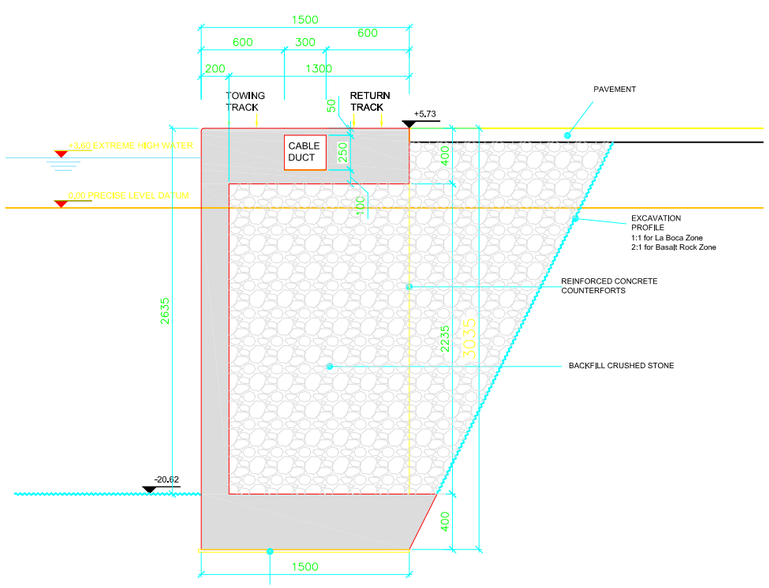


Gatun Lake side

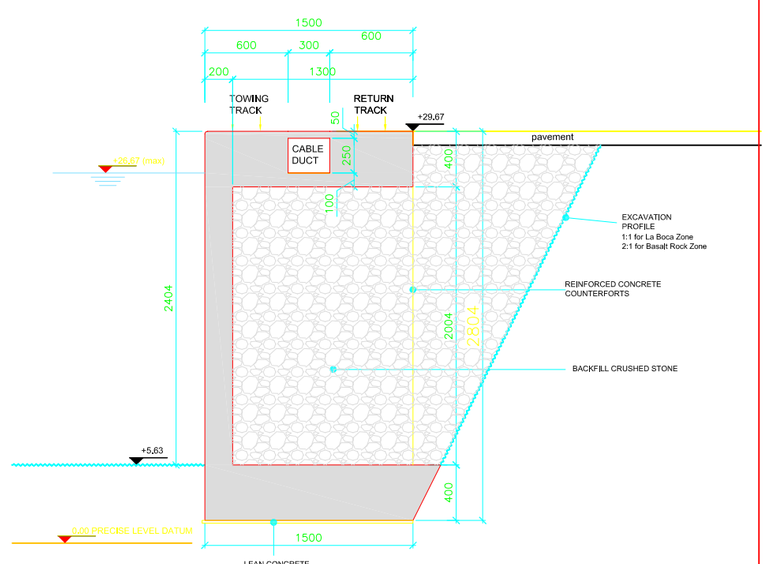


type b (RC)

Pacific entrance



Gatun Lake side



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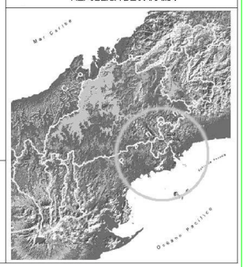
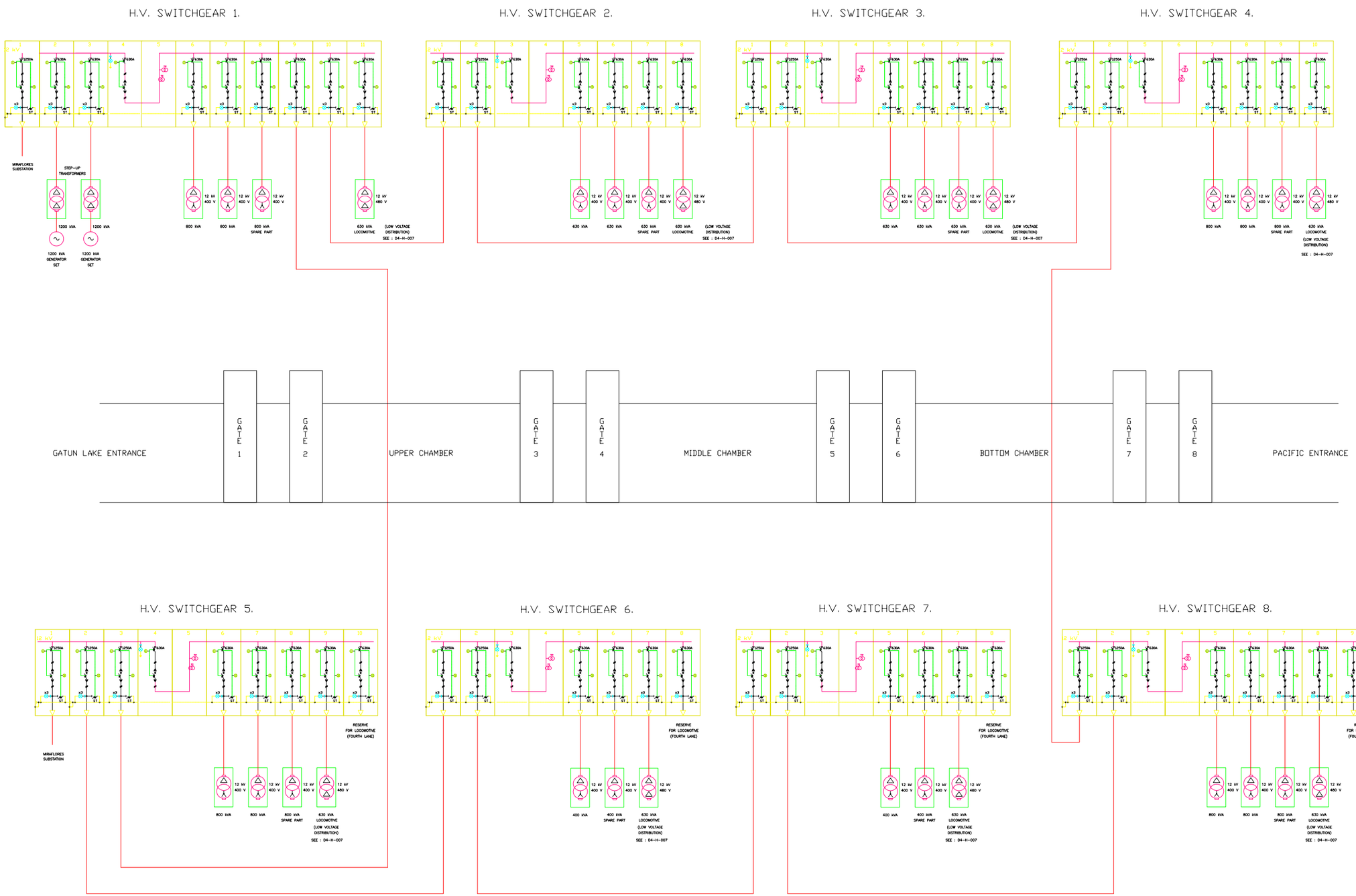


Diseño Conceptual de las Esclusas Post Panamax
Concept Design of New Lock Structure

TRIPLE LIFT CONFIGURATION
CROSS SECTIONS ENTRANCE WALLS

REV.	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
F					
E					
D					
C	12/11/02	FINAL REPORT	BME	JDR	JDR
B	15/09/02	DRAFT FINAL REPORT	BME	JDR	JDR
A	02/09/02	DRAFT FINAL REPORT	FMI	JDR	JDR
–	13/08/02	FIRST EDITION	BME	JDR	JDR

Contract	Scale:	Drawing n°:	Rev.:	Folio
SAA-97462	1/200	D4- I - 001	C	1 / 1



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Diseño Conceptual de las Esclusas Post Panamax
Concept Design of New Lock Structure

TRIPLE LIFT CONFIGURATION
HIGH VOLTAGE ONE-LINE DIAGRAM
ALTERNATIVE 4

NR.	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
F					
E					
D					
C					
B	13.11.2007	FINAL REPORT	SBE	JDB	JDB
A	12.10.2007	SUBMISSION OF MEETING REVIEWS	SBE	JDB	JDB
–	07.09.2007	FIRST ISSUE	SBE	JDB	JDB

Contract	Scale:	Drawing nº:	Rev.:	Folio
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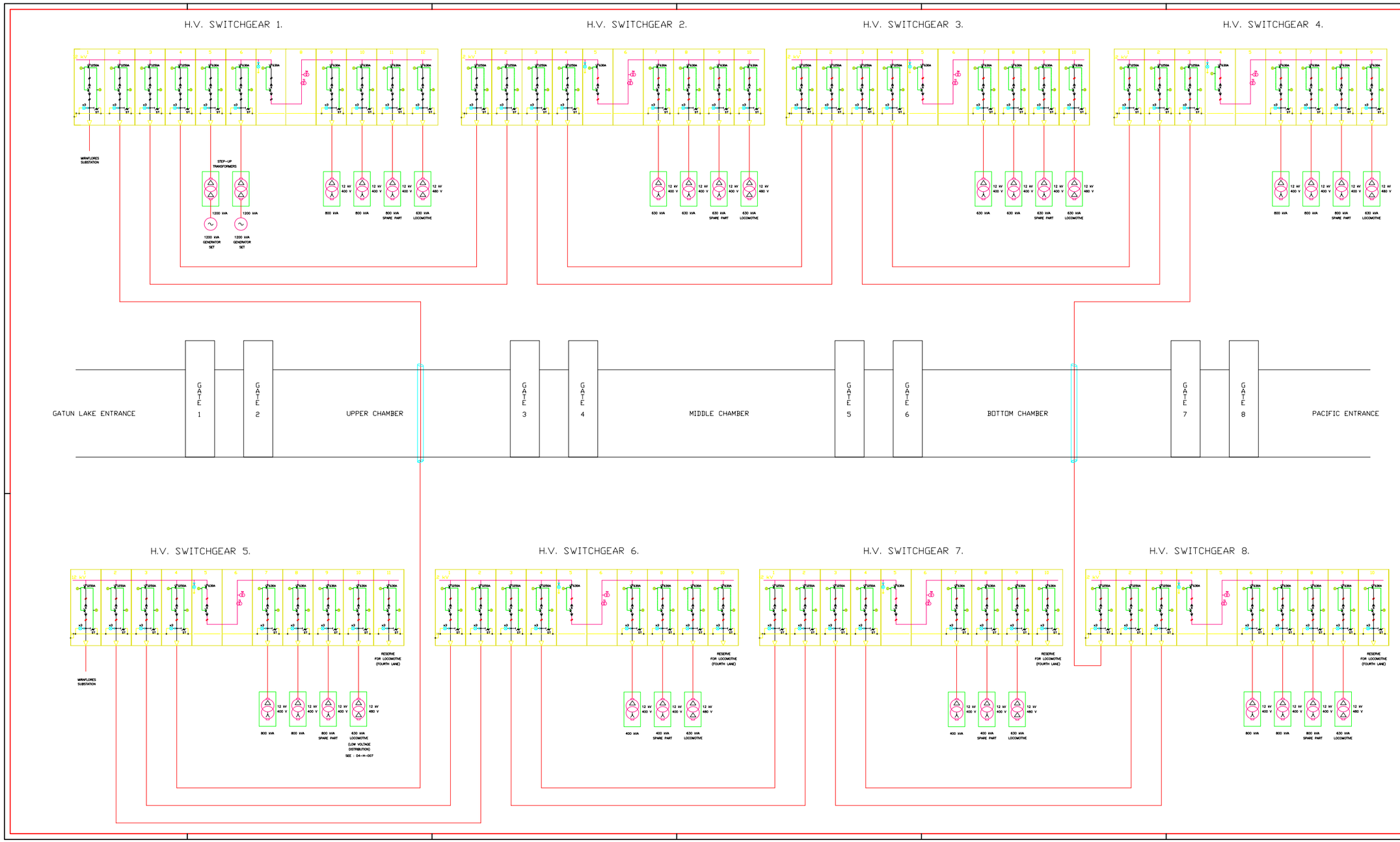

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Diseño Conceptual de las Esclusas Post Panamax
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TRIPLE LIFT CONFIGURATION
HIGH VOLTAGE ONE-LINE DIAGRAM
ALTERNATIVE 5

Contract	Scale:	Drawing n°:	Rev.:	Folio
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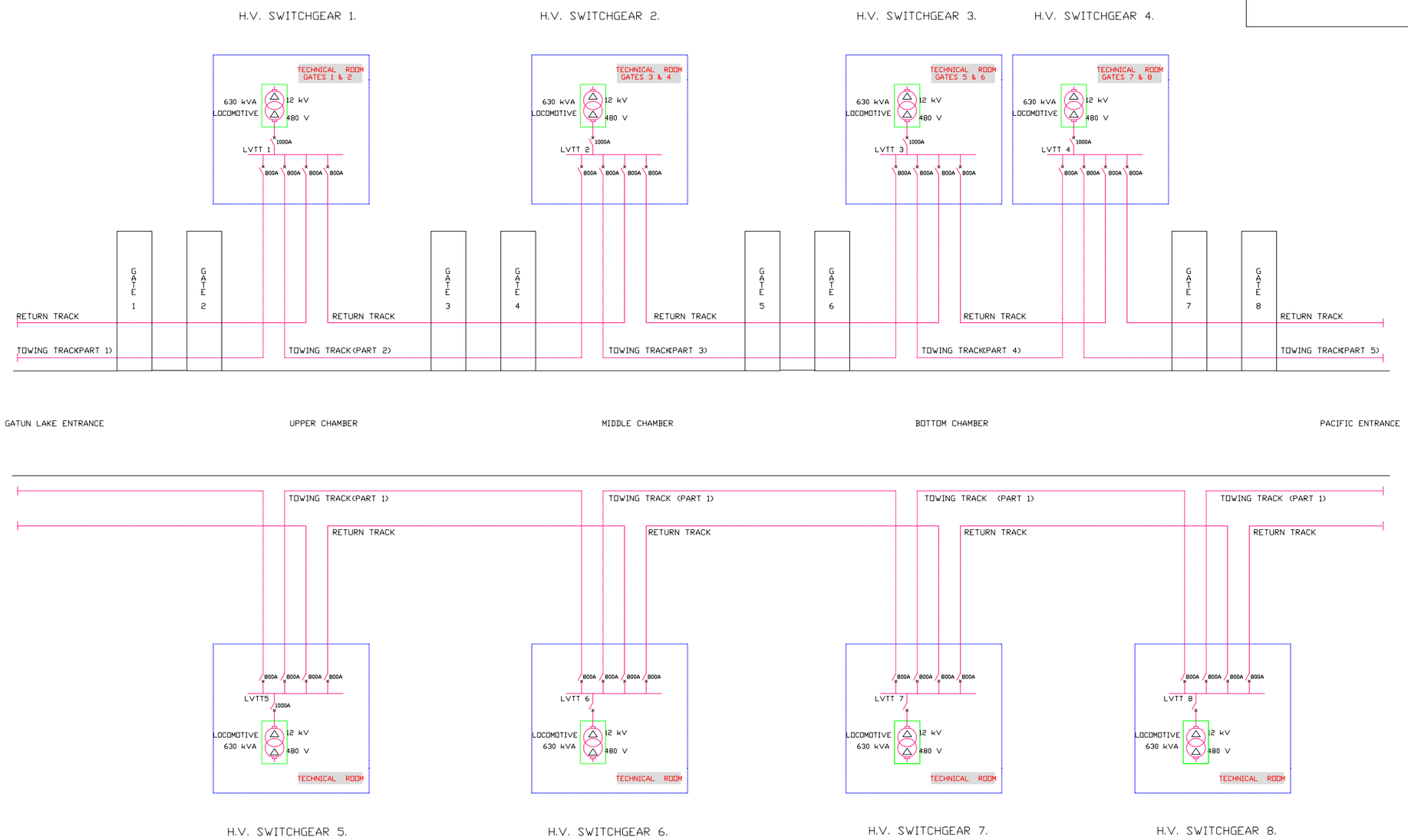
SEE PLAN :

D4-H-004	HIGH VOLTAGE ONE-LINE DIAGRAM	ALTERNATIVE 4
D4-H-006	HIGH VOLTAGE ONE-LINE DIAGRAM	ALTERNATIVE 5



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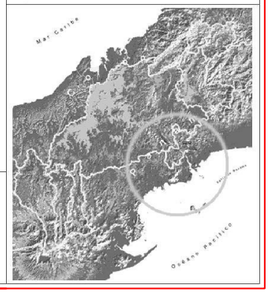

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Concept Design of New Lock Structure

TRIPLE LIFT CONFIGURATION
DISTRIBUTION SYSTEM FOR POSITIONING SYSTEM

REV.	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
F					
E					
D					
C					
B					
A	12/11/02	FINAL REPORT	BME	JDR	JDR
–	30/10/02	FIRST EDITION	VEM	VEP	VEP

Contract	Scale:	Drawing n°:	Rev.:	Folio
SAA-97462	–	D4- H – 007	A	1 / 1