MINISTÉRIO DAS OBRAS PUBLICAS
DIREÇÃO GERAL DE ÁGUA E SANEAMENTO
DIREÇÃO NACIONAL DE SANEAMENTO BÁSICO (DNSB)

DÍLI DRAINAGE INFRASTRUCTURE UPGRADING PROJECT (DDIUP) - PHASE II

ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

EIS/EMP PUBLIC CONSULTATION

CRISTO-REI, AUGUST 4

DDIUP – Phase II | EIA - Public Consultation

Presentation Summary

1. Public Consultation Framework and Objectives
2. General Project Overview and Background
3. Project Description
4. Environmental Description
5. Potential environmental and social impacts and measures
6. Environmental Management Plan (EMP)

1. PUBLIC CONSULTATION FRAMEWORK AND OBJECTIVES

- Inform and enlighten the Stakeholders and public about the project characteristics, including potential environmental impacts and mitigation measures;
- Promote discussion on EIS and EMP;
- Collect Stakeholder contributions and integration into the EIS and EMP

1. What are we proposing?

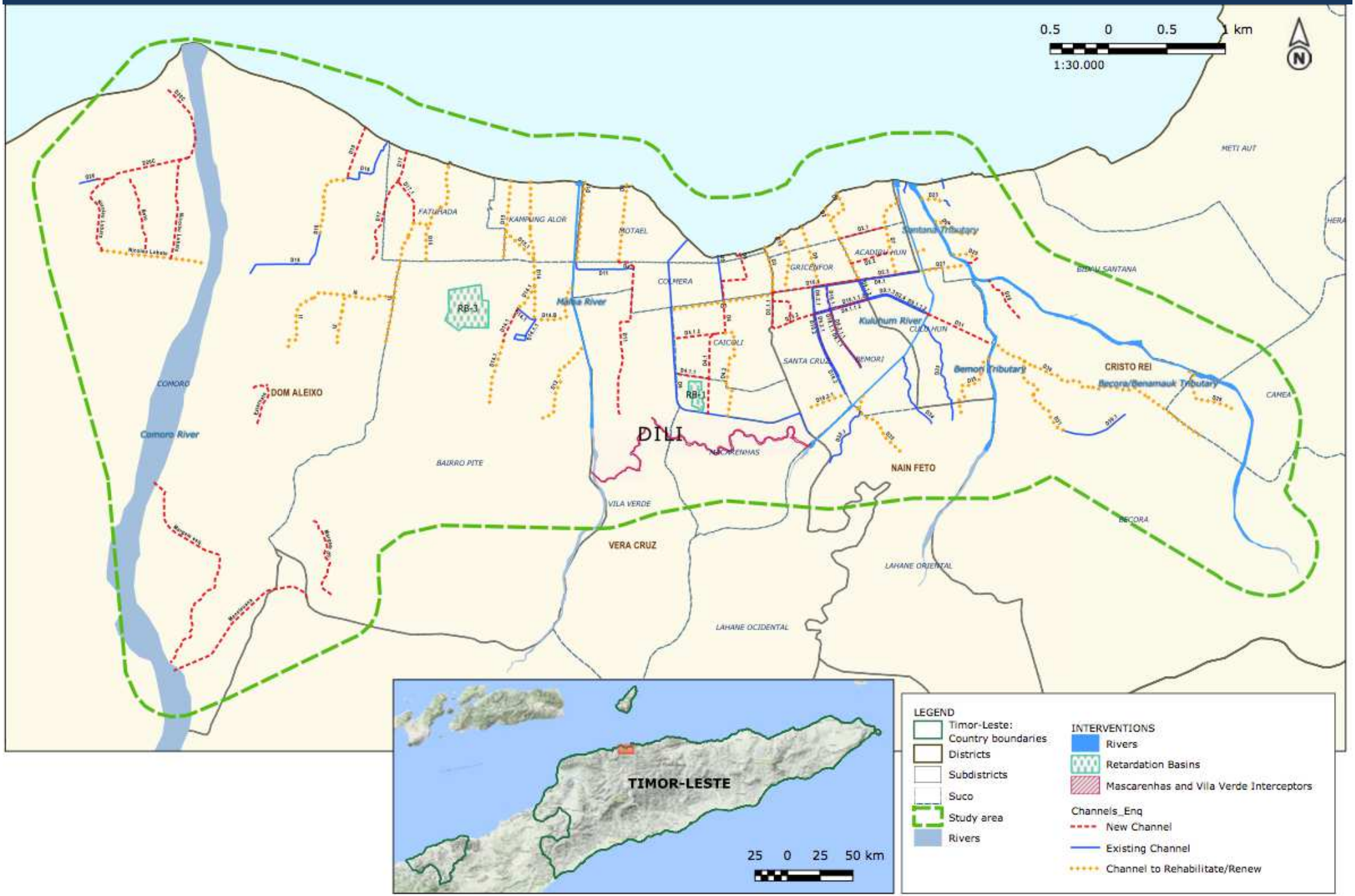
What are we proposing?

The Ministry of Public Works of the Government of Timor-Leste (GoTL) is seeking approval **to:**

- **construct and operate the Díli Drainage Infrastructure Upgrading Project (DDIUP)**;
- a critical project of **rehabilitation of approximately 70Km length of drainage channels**

  in the city of Dili

General Map of Interventions



Project History

- 2011 – Strategic Development Plan (SDP) 2011-2030: *improvement of operation and maintenance of the Dili drainage system = cleaner city and reduced flooding*
- 2010 to 2012 – Phase 1 - Dili Sanitation and Drainage Master Plan DESIGN (2011-2030) [Approved by the Council of Ministers]
    1. Upgrade/increase the capacity of existing drainage infrastructures in Dili to reduce flooding in the City
    2. Construct flood retarding basins at strategic places to regulate floodwater during heavy rains;
    3. Construct drainage structures to prolong the life of other public facilities (i.e. Roads)
- 2014 to 2018 – Phase 2 – DDIUP Detailed Engineering Design (DED)
    1. DSDMP review and update of scale and data
    2. Update of network records, mapping and design of new sections built between 2012 and 2014
    3. Preparation of Detailed Engineering Designs (DEDs)
- 2018 to 2020 – Phase 2 – DED – Environmental Impact Assessment

FUTURE

2021 onwards – Resettlement Action Implementation by Government (DNSB)

2021 to 2025 – 5 year Construction and/or Rehabilitation of the City Drainage

2. Why do we need the project?

Problems Increasing Flood Risk in Díli

- Under-designed existing channels
- Less drainage capacity due to blockages and sedimentation
- High rate of uncontrolled urban development, increasing the impervious area in the city
- Limited drainage infrastructure for roads and general residential areas
- Obstruction to flow caused by infrastructure (i.e. bridges, roads and buildings (i.e. houses) on top of drainage) and agriculture (i.e. Kangkung)
- Blockages caused by pedestrian passages and roads over the channels, reducing the channel's cross-section
- Difficult maintenance of litter traps systems (urban waste blocks drainage channels)

Expected Project Outcomes

- Reduction of Frequent Flood Risk due to the River System Improvement, retardation basins and drainage channels
- Improvement of General public health in the long-term , in Dili
- Direct and indirect medium-to-long- term employment and job-opportunity generation due to the construction and operation activities of the drainage system
- Improved of city Urban design and planning

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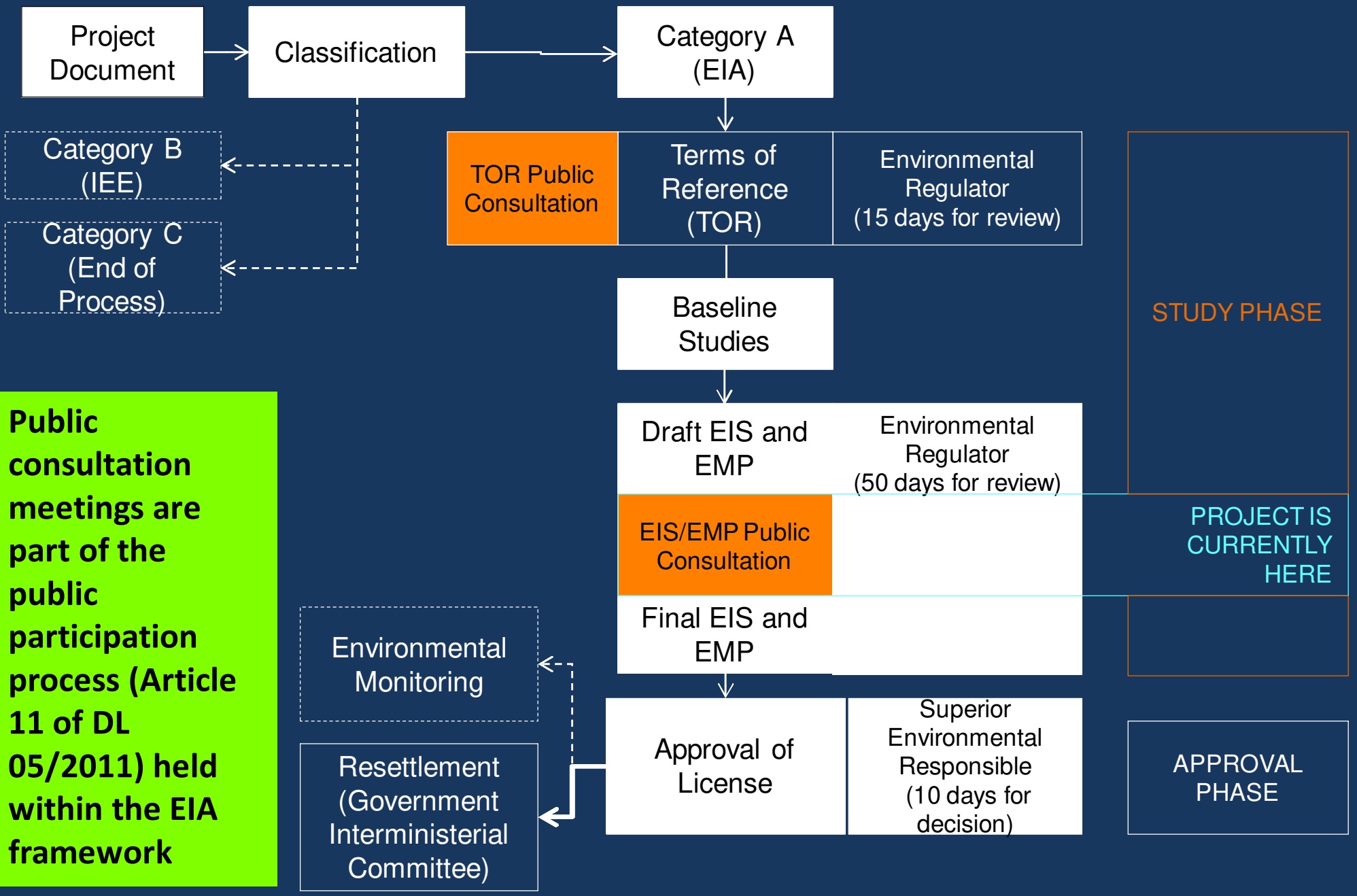
3. Why do we need an EIA for DDIUP?

This DDIUP Project needs Government environmental licensing and approval under Timorese Law.

The Project has been classified by ANLA as Category A (Environmental Impact Assessment [EIA]) according to Decree-Law no.05/2011 – Environmental Licensing under Sector XII: Location Factor, item 4 – Densely Populated Areas – Resettlements > 300 persons.

4. What is an EIA process?

EIA Process Summary



Public consultation meetings are part of the public participation process (Article 11 of DL 05/2011) held within the EIA framework

Seven Steps:

1. Screening (Project Document): the first stage where the Environmental Regulator [ANLA] decide if EIA is required.
2. Scoping (Terms of Reference): define what to assess and report in the Environmental Impact Statement (EIS) and a Public Consultation is carried out;
3. Baseline Assessment: collect relevant information on the environmental conditions (baseline) in the project
4. Impact Assessment: formal assessment process of the proposed project to define the significant impacts for the design, construction and operation phases and written in the EIS
5. Impact Management and Monitoring: Where significant adverse impacts cannot be minimised, mitigation measures are considered and put into an Environmental Management Plan (EMP)
6. Draft EIS/EMP to Environmental Regulator: Once the EIA is completed, the EIS and the EMP are submitted to the ANLA for review and another Public Consultation is carried out to receive comments on the EIS/EMP. WE ARE AT THIS PHASE
7. ANLA Decision on the Licensing

Subsequent Step: Government Team will carry out updated review of impacted households and the necessary Resettlement Plan

5. Who is the Project Proponent and Assessment Team?

1. DDIUP PROPONENT and PROJECT TEAM

Proponent

1. Ministry for Public Works
2. General Directorate for Water and Sanitation (DGAS)
3. National Directorate for Basic Sanitation (NDBS)
4. Responsible Person: João Nazareth de Piedade Brás (National Director)

Lead DDIUP Consultant

AdP-TL (Águas de Portugal – Timor-Leste)

Environmental Consultant

OASIS – Sustainable Projects (Timor-Leste), supported by JGP-Nvist (Portugal)

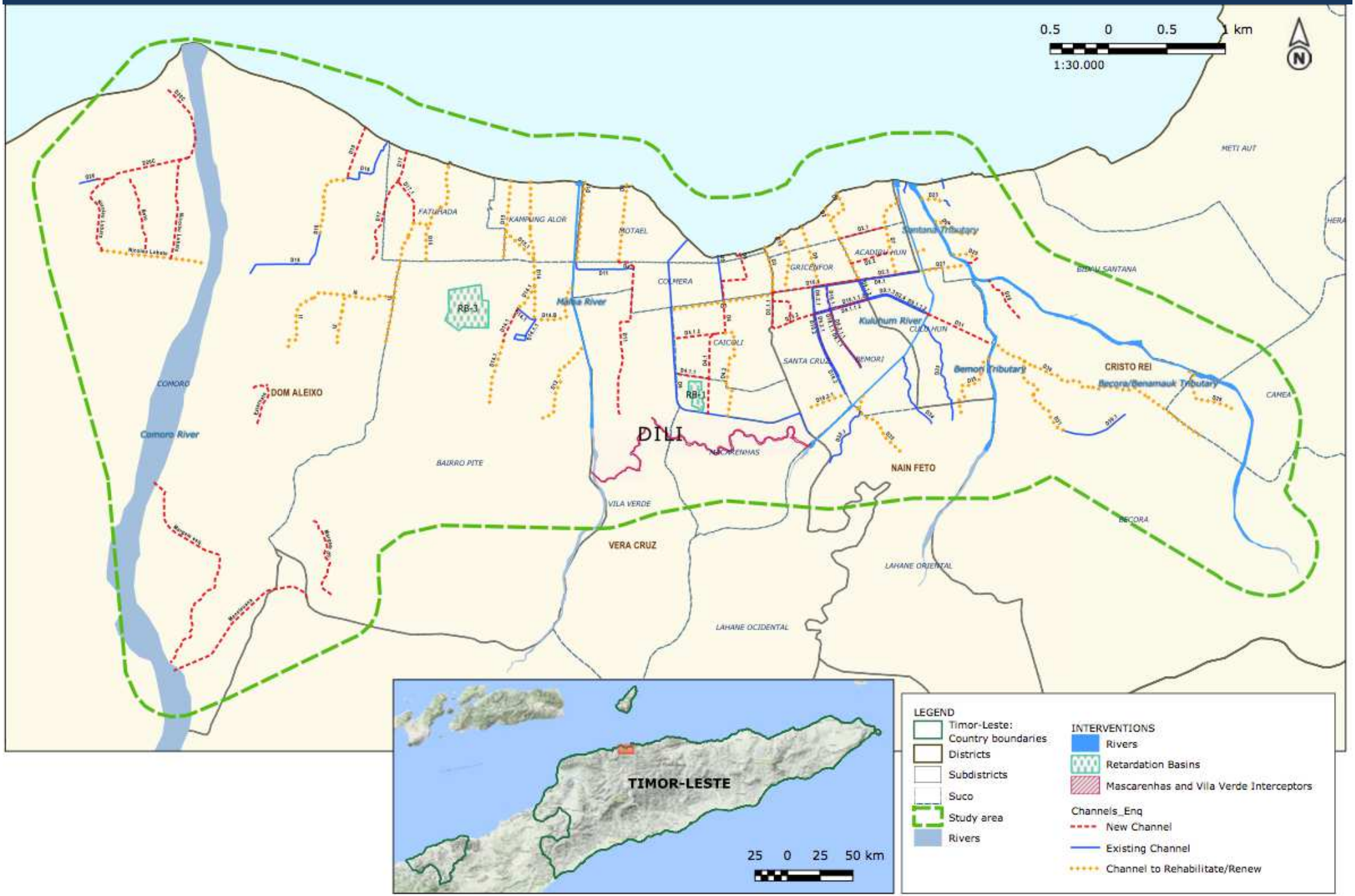
Component	Name	Academic/Professional
General and Local Coordination	Vasco Leitão	Environmental Engineer and Master in International Urban and Environmental Management
Co-Coordination	Paulo Pereira	Environmental Engineer
Local Coordination Assistant	Ricardo Florindo	Environmental Technician
Geology and Geomorphology	Sérgio Rosa	Geological Engineer
Air Quality	Paulo Pereira	Environmental Engineer
Noise	Inês Paulino	Environmental Engineer / DFA Acoustic Engineering
Biodiversity (Terrestrial)	Nuno Vilela	Biologist, Master in Ecological Economy
Hydrology and Water Resources	Paulo Pereira	Environmental Engineer
Soils, Land use, Planning and Zoning	Elisabete Rodrigues	Geographer
Water, Waste and Wastewater Management	Monica Patel	Environmental Technology Expert
Socioeconomic Plan	João José Martins	Sociologist and Specialist in City, Territory and Rehabilitation
Heritage (Architecture and Archaeology)	João Albergaria	Archaeologist
Technical Design and GIS	João Valado	Design, Map and GIS technician

6. What is our Project?

Rehabilitation and/or New Construction of Drainage Channels (Rivers and 1st and 2nd level Drainage Channels) in Díli City urban Area

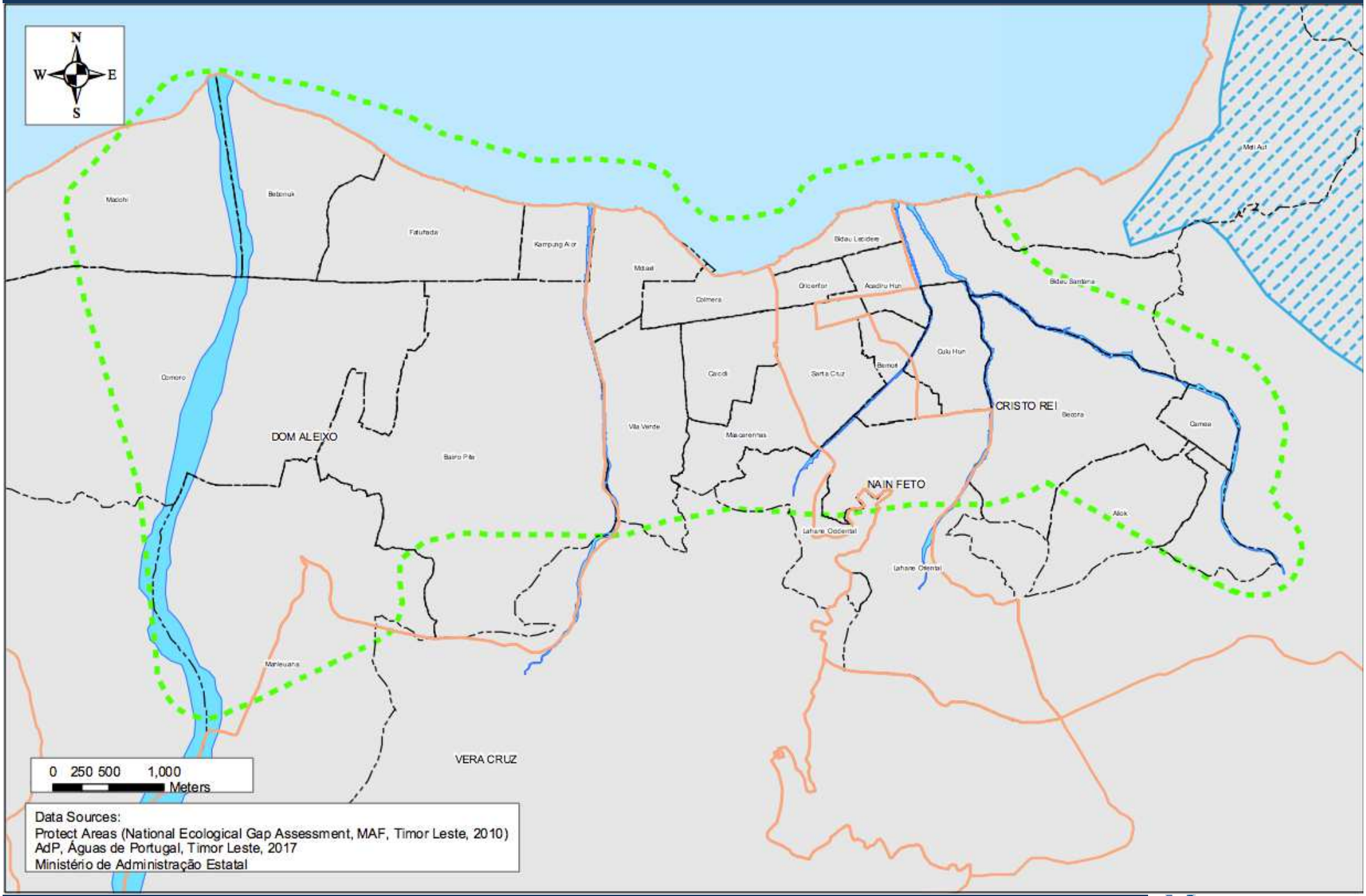
- TOTAL Intervention Lenght: 70,453 m;
- TOTAL no. Interventions: 55
- Latest Estimated Construction Period: 2021 to 2025

DDIUP Interventions



6.1. Where will it be implemented?

DDIUP STUDY AREA and APs



DDDIUP with Administrative Posts and Sucos

TOTAL Intervention Lenght: 70,453 m;
TOTAL no. Interventions: 55

Latest Estimated Construction Period:
2021 to 2025

Main Project Components		Length (m)	CRISTO REI	DOM ALEIXO	VERA CRUZ	NAIN FETO
Group 1 Channel System	D1	307				Bidau Lecidere
	D2	2608	Kuluhun			Bidau Lecidere, Akadiruhun
	D3	4406			Colmera, Caicoli	Bidau Lecidere, Gricenfor Santa Cruz
	D4	219			Colmera, Caicoli, Mascarenhas	
	D5	397			Motael, Colmera	
	D6	2112			Motael, Colmera, Mascarenhas	Santa Cruz
	D7	730				Bidau Lecidere, Akadiruhun
	D8	667			Motael, Colmera	
	D9	5554	Kuluhun, Bidau Lecidere			Bemori, Bidau Lecidere, Gricenfor
	D10	2088	Kuluhun			Gricenfor, Bidau Lecidere, Santa Cruz, Bemori
	D11	2213			Motael, Colmera, Vila Verde	

Note: river Systems not included in this table

DDDIUP with Administrative Posts and Sucos

Main Project Components		Length (m)	CRISTO REI	DOM ALEIXO	VERA CRUZ	NAIN FETO
Group 2 Channel System	D12	795		Bairro Pité		
	D14	2492		Kampung Alor, Bairro Pité		
	D15	996		Kampung Alor, Fatuhada		
	D18	2083		Fatuhada, Comoro		
	D19	462		Fatuhada, Comoro		
	D21	300	Bidau Santana			
	D22	79	Bidau Santana			
	D23	218	Bidau Santana			
	D24	415	Bidau Santana			
	D25	294	Bidau Santana			
	D26	69	Bidau Santana			
	D27	999	Bidau Santana, Kuluhun			
	D28	427	Becora			
	D29	640	Camea			
	D30	2903	Becora			
	D31	559	Becora, Kuluhun			
	D32	672				Lahane Oriental
	D33	918	Kuluhun			Lahane Oriental
	D34	676				Lahane Oriental, Bemori
	D35	1237				Lahane Oriental, Bemori

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6.3. When do we propose to do it?

DDDIUP Planned Schedule

TOTAL LENGTH OF PROJECT CHANELS	70453m	Estimated Construction Period					Estimated Approximate Cost w/general elements (USD$)
Main Project Components	Length (m)	2020	2021	2022	2023	2024	145,800,000
D1	307	X					3,600,000
D2	2607.38	X					2,712,000
D3	4405.79	X					5,162,000
D4	218.86	X					450,000
D5	396.62	X					1,448,000
D6	2111.87	X					96,000
D7	730	X					204,000
D8	667.31	X					1,515,000
D11	2213.13	X					3,180,000
Av. Nicolau Lobato Channel	2425	PD					291,000
Airport Channel	700	PD					
30 de Agosto School Channel	665	PD					4,295,000
Beto Channel	840	PD					
D20 - Airport	1653	PD					1,873,000
Manleuana Externato	400	PD					
D18	2083.39	X	X				1,382,000
D9	5553.62	X	X				1,264,000
D10	2087.62	X	X				1,887,000
D28	427.51		X				124,000
D29	640.34		X				278,000
D30	2902.68		X				1,887,000
D35	1236.92		X				406,000
Mascarenhas Interceptor Channel	2047.95		X				2,380,000
Kuluhun River System	3000		X	X			20,536,000
Maloa River System	2450		X	X			25,145,000
RB-1	22000m^2			X			2,002,000
RB-3	100000m^2			PD			

TOTAL LENGTH OF PROJECT CHANELS	70453m	Estimated Construction Period					Estimated Approximate Cost w/general elements (USD$)
Main Project Components	Length (m)	2020	2021	2022	2023	2024	145,800,000
Manleuana Right River Bank	1385			PD			2,746,000
Manleuana Left River Bank	1986			PD			
Vila Verde Interceptor Channel	925			PD			2,428,000
Manleuana River Training	1400			PD	PD		6,425,000
D19	462				X		1,038,000
D31	559.66				X		802,000
D32	671.35				X		224,000
D33	918.23				X		114,000
D34	676.49				X		144,000
D16	929				X		419,000
I0	433				X		241,000
I1	838				X		230,000
I2	412				X		168,000
I3	1188				X		433,000
D17&17.1	1448				X		1,343,000
D12	795					X	2,411,000
D14	2491.96					X	630,000
D15	996					X	82,000
D21	300					X	264,000
D22	79.71					X	260,000
D23	217.61					X	23,000
D24	415					X	29,000
D25	294.11					X	145,000
D26	69.34					X	60,000
D27	999.69					X	416,000
Santana River System						X	
SRS - Santana	1062					X	21,009,000
SRS - Becora / Benamauk	4134.44					X	14,514,000
SRS - Bemori	1594.93					X	7,074,000

6.4. How do we propose to do it?

To reduce the flooding risk, the DDIUP – Phase II has designed the urban drainage system with more capacity for extreme events:

Before: Existing network with return period = 5 years

Future : Network system return period of 25 years and the diversion channel and river regularization for a return period of 100 years

What Construction activities?

1) Rehabilitation of existing and/or Construction of New Drainage Channel;
2) Important Drainage Diversion Channels (Interceptors) (Caicoli and Vila Verde) to divert flow to the river systems (kuluhun and maloa) and ease risk of flooding from the city center.
3) Major River Improvements to drain the runoff from the mountain to the sea more easily;
4) Flood Retention Basins to help control of the flow in the middle of the city; and

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HOW?

1) Rehabilitate or Construct New Main Network

MAIN Channels

The drainage channel system can be divided based on the size of the channel or its use, usually into:

a) minor drain network (secondary and tertiary types) :

- A roadside drain or channel from a residential or government facilities;

b) Main drain network (primary types) **PROJECT OBJECTIVE:**

- Larger open channels (rectangle or trapezoid shaped)
- Buried collector channels. (i.e:) an underground channel in the center of a city avenue.

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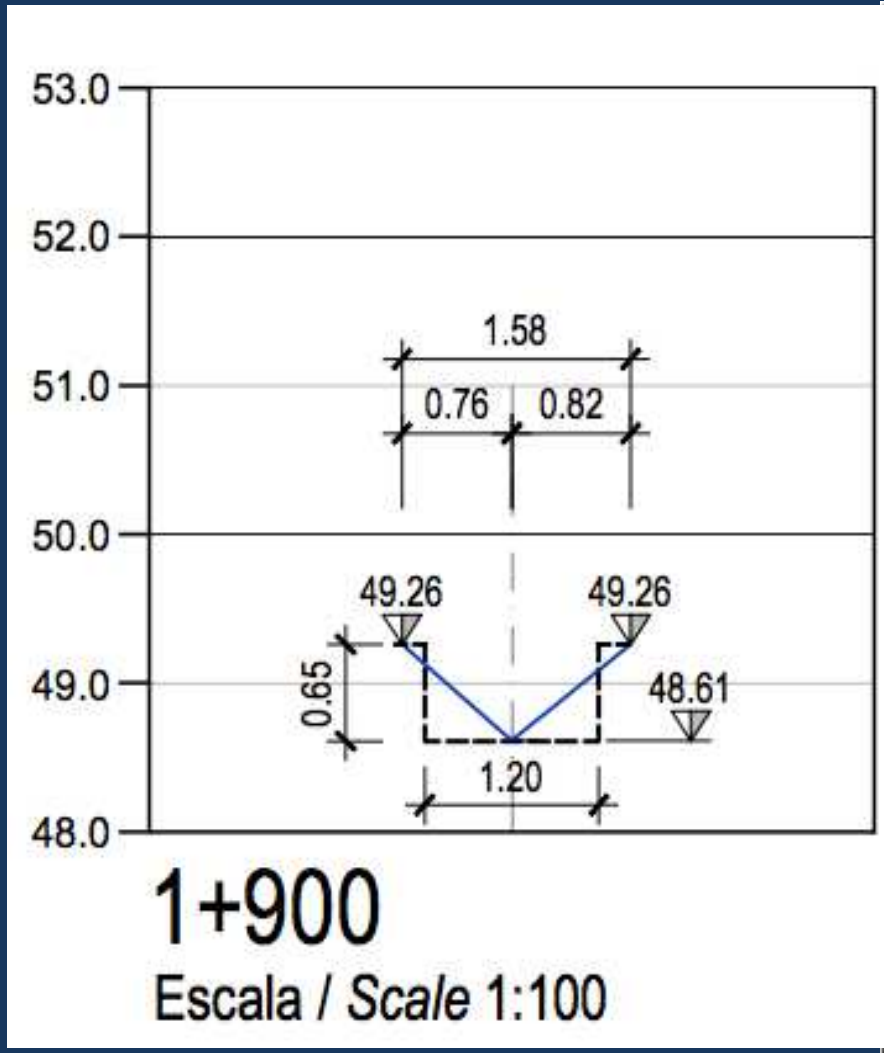
HOW?

1.1) Rehabilitated Channels

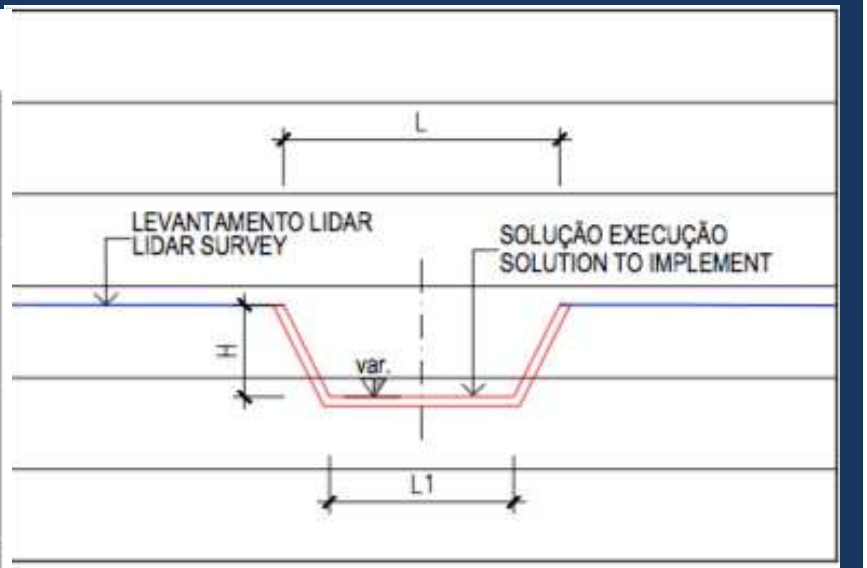
Depending on access or existing urban housing, rehabilitation in the form of:

a) Cleaning and grubbing of channels to: i) remove solids; ii) clear the cross section; iii)reduce resistance of water flow;

Before



After

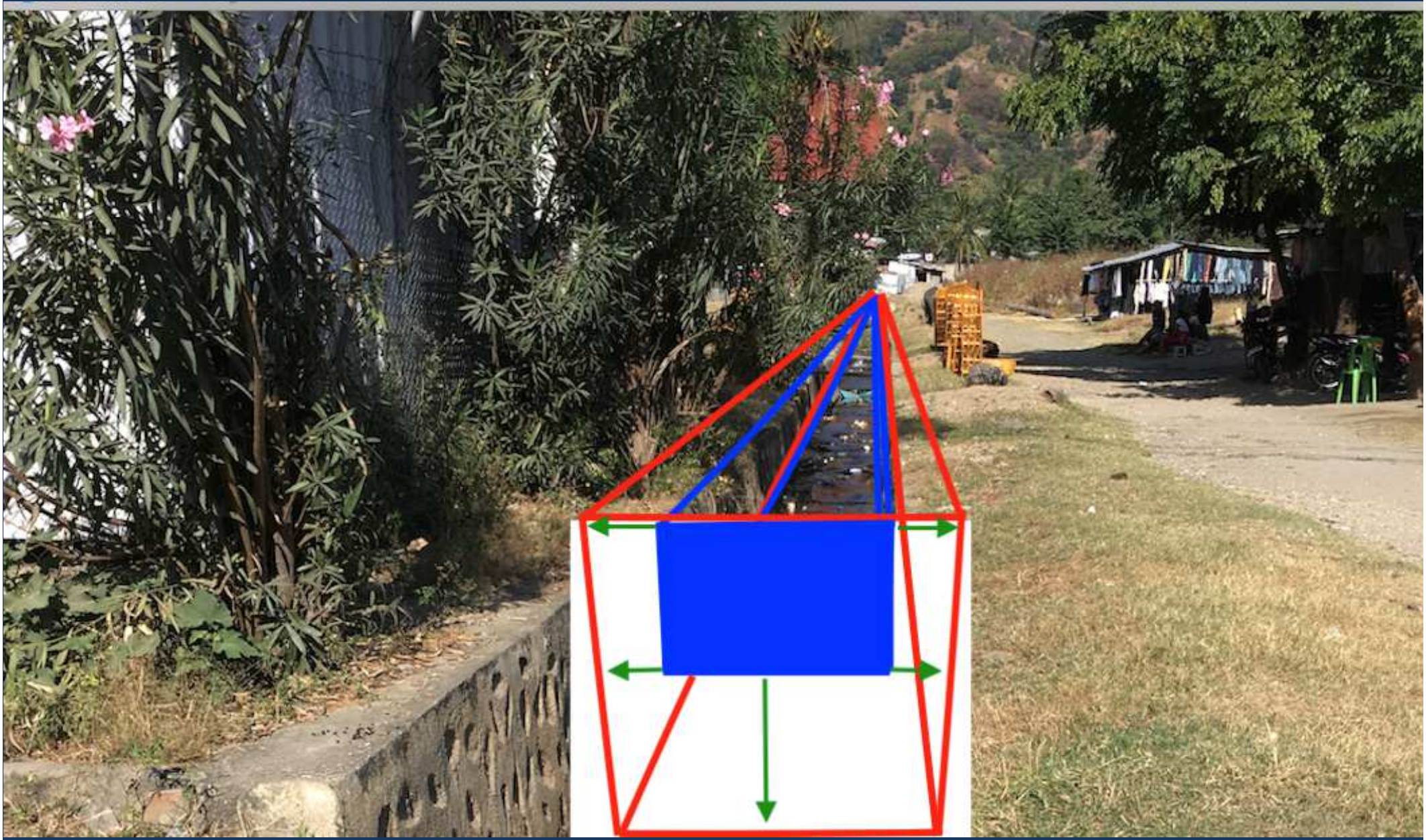


Pk	H (m)	L (m)	L1 (m)
0+000 a 0+200.00	2.00	4.00	3.00
0+200.00 a 0+733.30	1.50	3.30	2.80
0+733.30 a 1+500.00	EXISTENTE, A MANTER		
1+500.00 a 2+071.99	1.50	2.00	1.60

b) Change of channel dimensions and profile: re-shaping and re-sloping of cross section to a steeper and deeper or larger channel to cause faster flow;

HOW?

1.1) Rehabilitated Channels

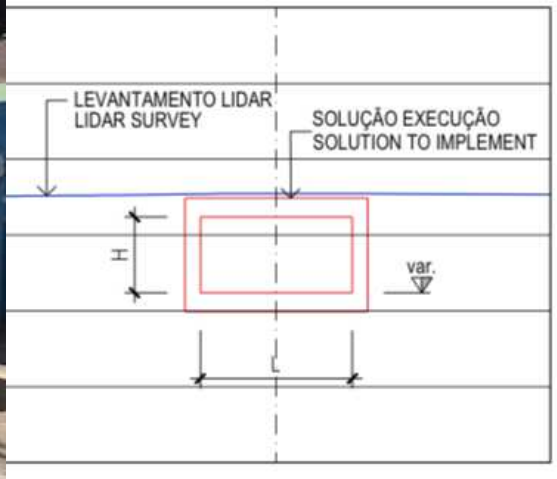


HOW?

1.2) New Channels

Secção Transversal Tipo
Cross section Type

Escala / *Scale* 1:100

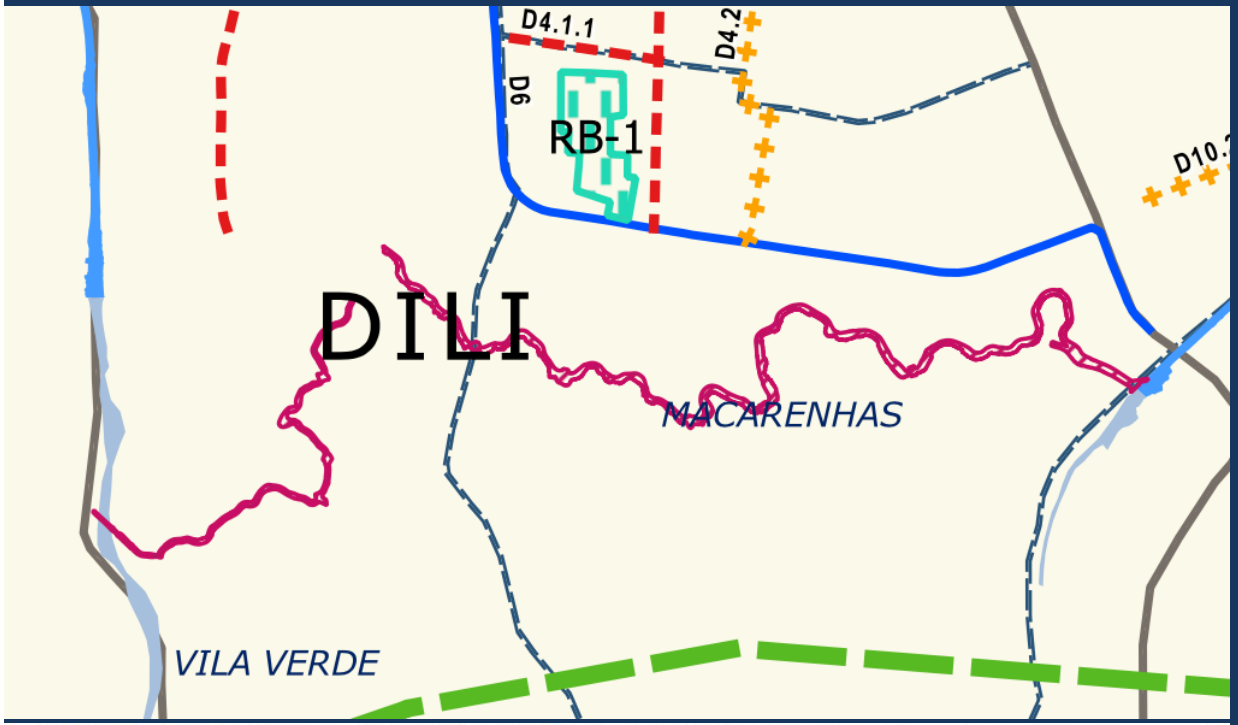


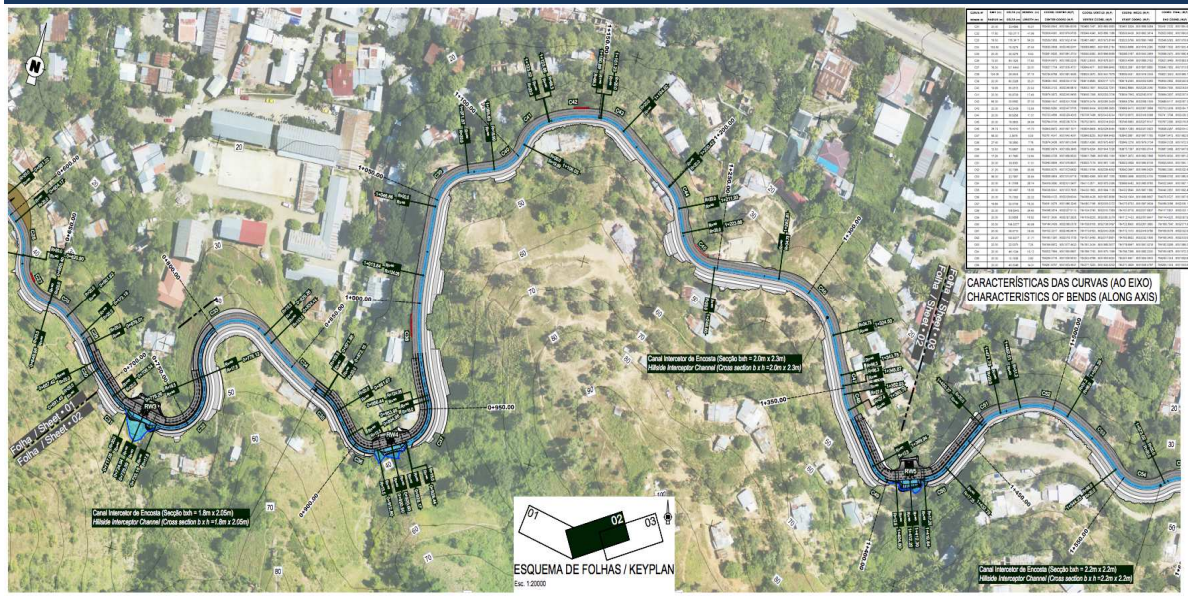
Pk	H (m)	L (m)
0+000 a 0+355.56	1.00	2.00

Construction of new Channel under the road and connection to the existing road drainage to increase the drainage capacity from Upstream to downstream. Other construction may occur along existing natural drainage (but no constructed Drainage) between houses

HOW?

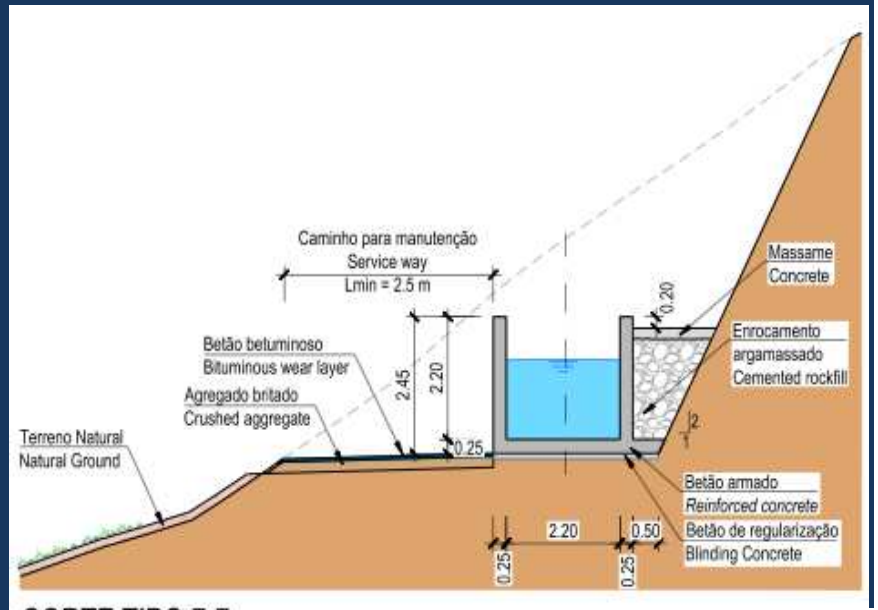
2) Diversion Channels





Example: Mascarenhas TOTAL Lenght: 2048 m;
(Connected to Kuluhun System)
Vila Verde TOTAL Lenght: 925 m;
(Connected to Maloa System)

Objective – Alleviate Caicoli and downtown area where not a lot of new intervention can occur



CORTE TIPO 7-7
TYPICAL CROSS SECTION 7-7
(Km 1+420 to 1+875)
Escala / Scale 1:100

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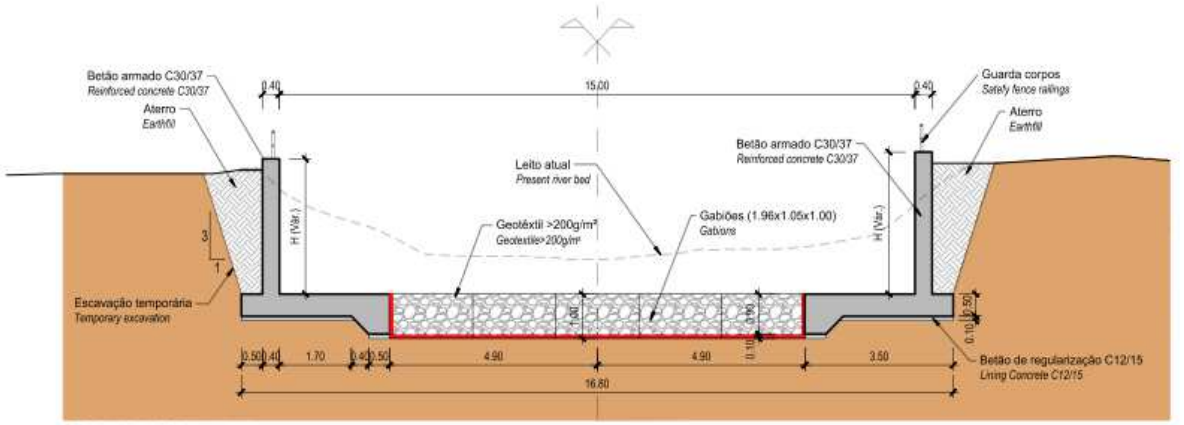
HOW?

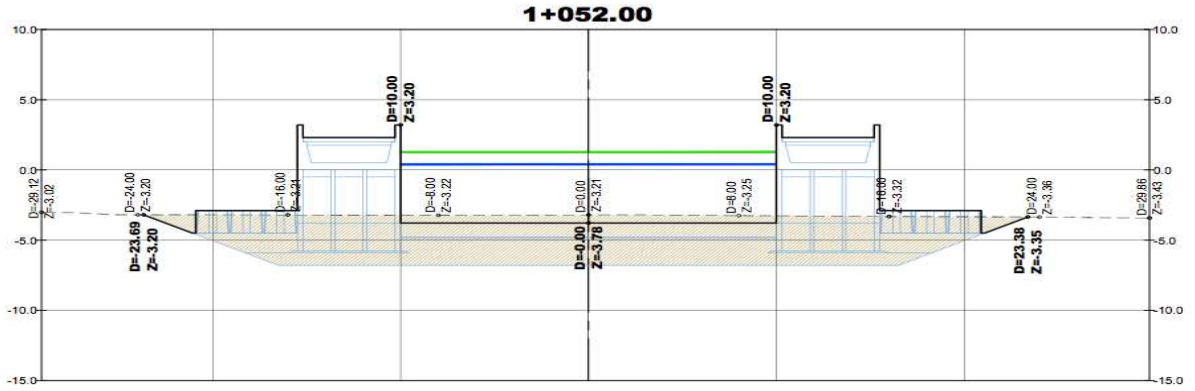
3) River Improvements

River System	Length (m)	Design ARI, Year
Kuluhun	3000	100
Maloa River	2450	100
Santana River		
Santana River	1062	100
Becora/Benamauk Tributary	4135	100
Bemori Tributary	1595	100

- Widening and deepening of the river bed by means of bottom excavation;
- Adjustment of river alignment, smoothing all the bends and bottom re-lining;
- Construction of new and higher concrete side retaining walls along the river banks (bank stabilization);
- Replacement of the existing bridges or bridge/weir;
- Levee construction;
- Fencing the river with the wall.



CORTE TIPO H ≤4.00
CROSS SECTION TYPE H≤4.00
Escala / *Scale*: 1/100



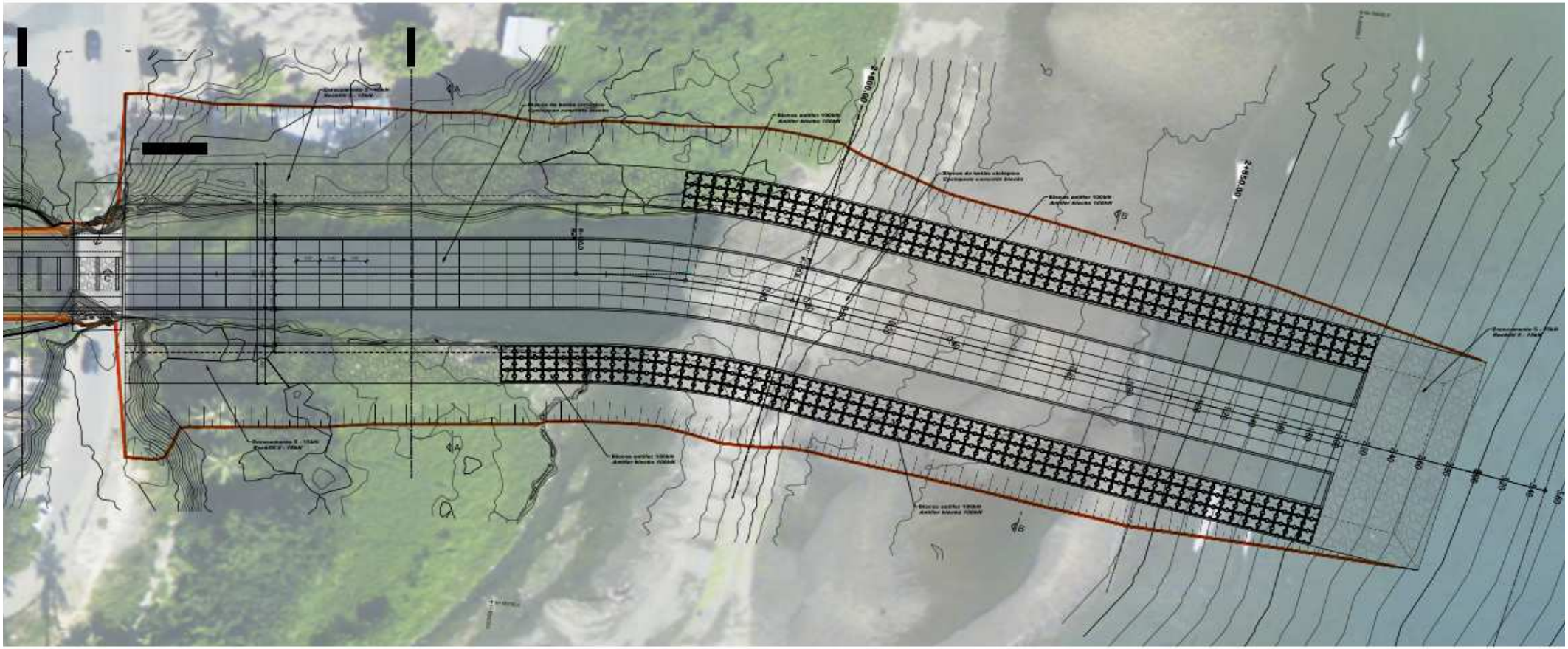
LEGENDA
KEY

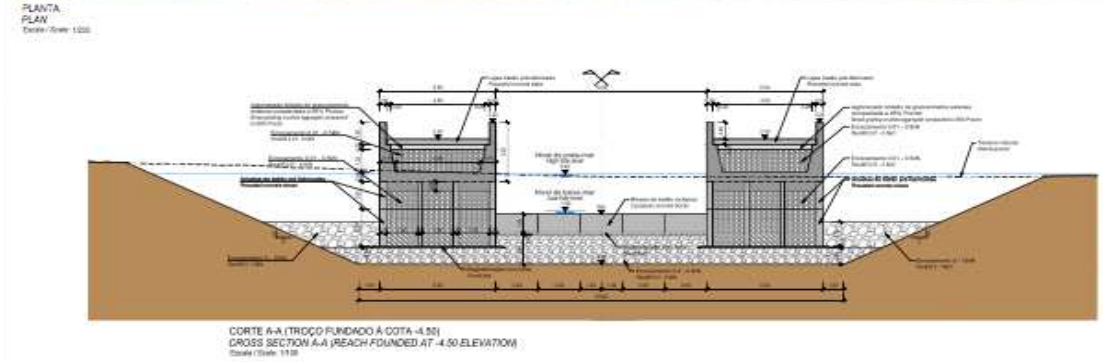
- SUPERFÍCIE DO ESCOAMENTO + FOLGA PARA AGITAÇÃO (CHEIA CENTENÁRIA) / *WATERSURFACE + FREEBOARD (CENTENNIAL FLOOD)*
- SUPERFÍCIE DO ESCOAMENTO (CHEIA CENTENÁRIA) / *WATERSURFACE (CENTENNIAL FLOOD)*
- SUPERFÍCIE RESULTANTE DA REGULARIZAÇÃO / *FINISHED SURFACE AFTER RIVER TRAINING*
- ESCAVAÇÃO / *EXCAVATION*
- TERRENO NATURAL / LEITO ATUAL / *NATURAL GROUND / PRESENT RIVER BED*

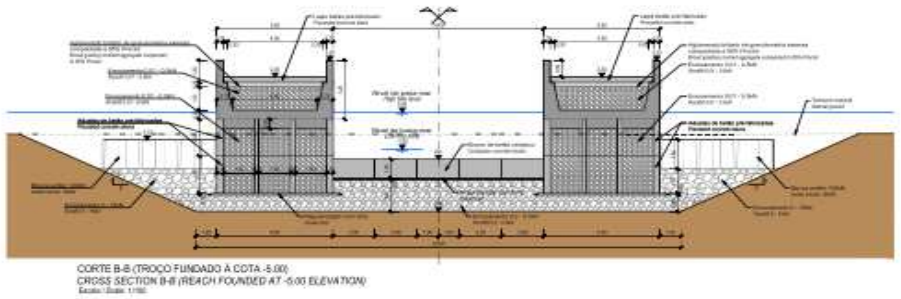
HOW?

3) River Improvements

- Construction of sea outlet structures to facilitate water drainage out to sea







HOW?

4) Flood Retention Basins

Retention Basin	Area, Ha	Design ARI, Year
RB-1 (Caicoli)	2.2	25
RB-3 (Aimutin)	4	50

- help reduce long-term flooding and take the excess flow from the adjacent urban drainage system, including road drainages
- help control the runoff pressure downstream.