



THE GLOBAL ENGINEERING CONFERENCE ON SUSTAINABLE  
DEVELOPMENT AND WORLD FEDERATION OF ENGINEERING  
ORGANISATIONS EXECUTIVE COMMITTEE MEETINGS.

15<sup>th</sup> - 18<sup>th</sup> October 2024, Kigali, Rwanda

# Theme: Engineering Innovations for a Sustainable Future

@RwandaEngineers

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15<sup>th</sup> - 18<sup>th</sup> October 2024, Kigali, Rwanda

# A tangible solution for affordable, clean and sustainable energy for the Great Lakes Region – Experience from Ruzizi III Regional Hydropower Project".

## “Value Engineering of the Project - Key Technical Aspects”

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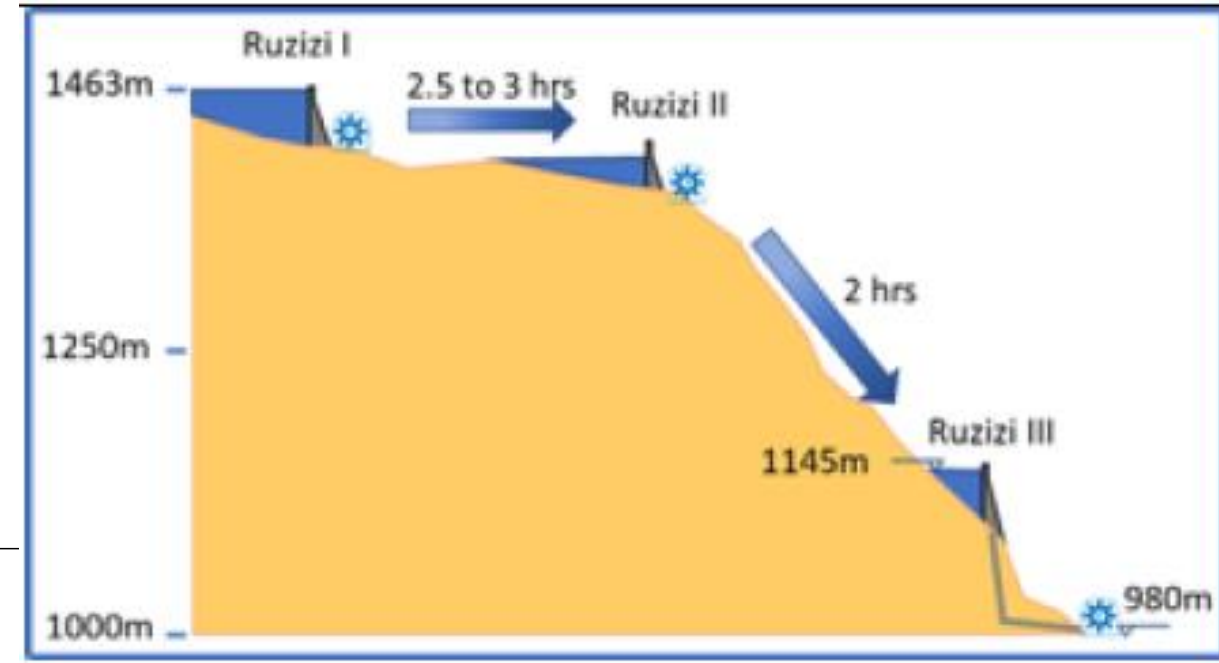
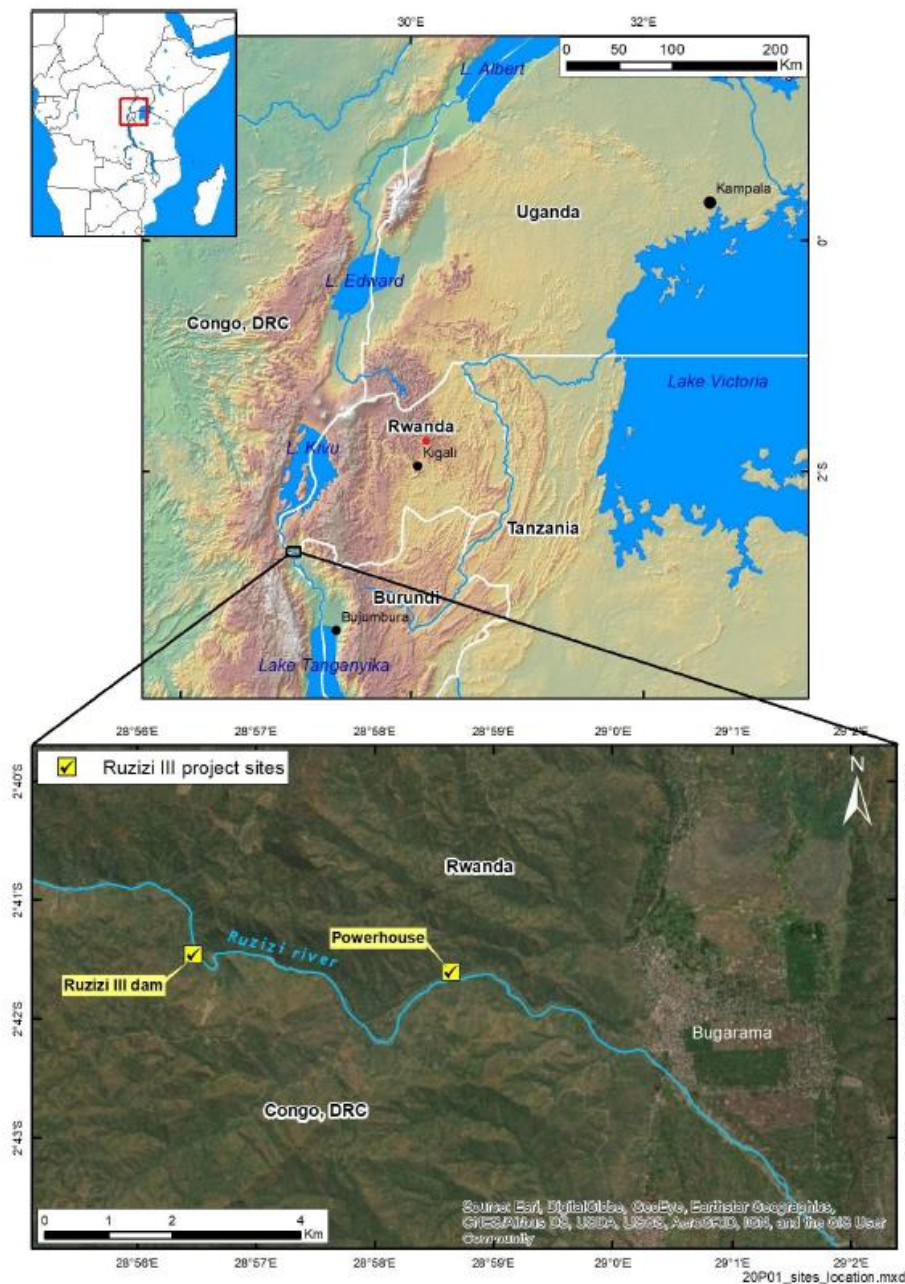


## **Key Content of Presentation**

- What is Value Engineering?
- Investigations Campaign and Designs
- Results of Value Engineering Efforts



# Project Site Location



# WHAT IS VALUE ENGINEERING?

Value engineering in construction is the process of determining how to improve the value of your construction project.



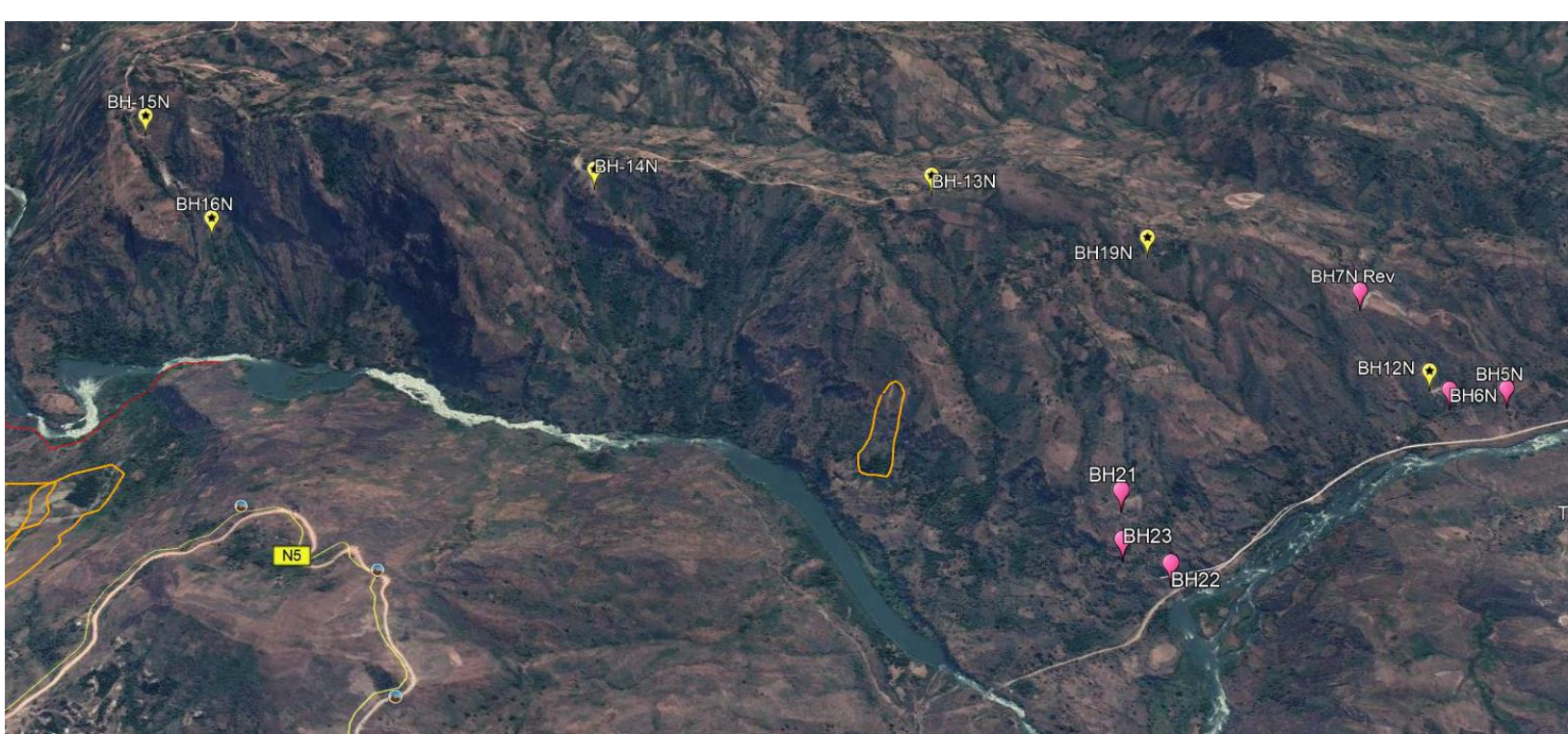
Camp site DRC side

Alternative dam axis

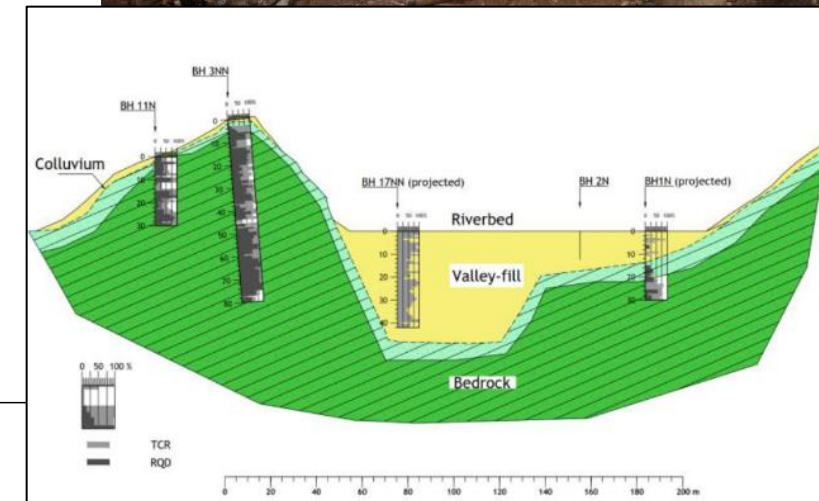
Original dam axis



# Investigations Campaign 2020-2022



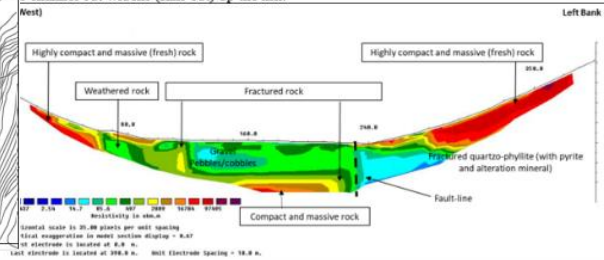
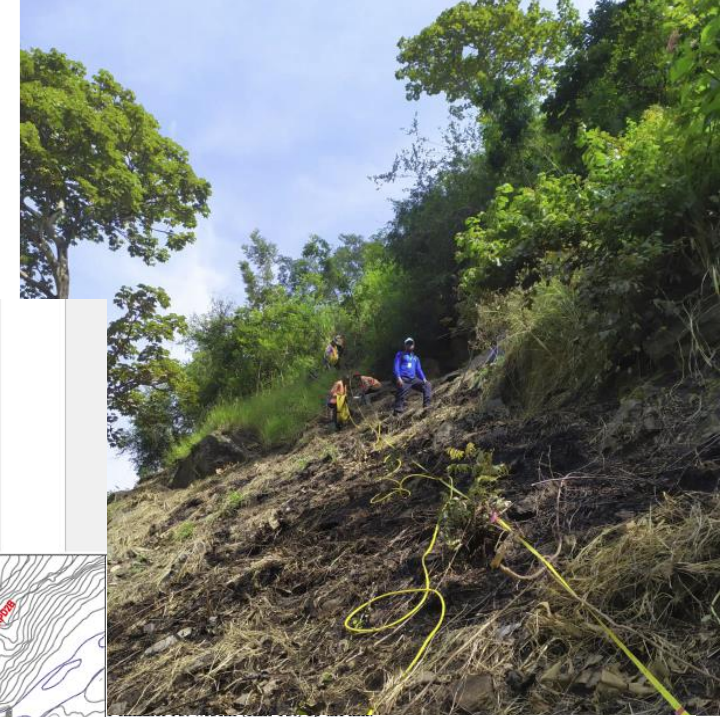
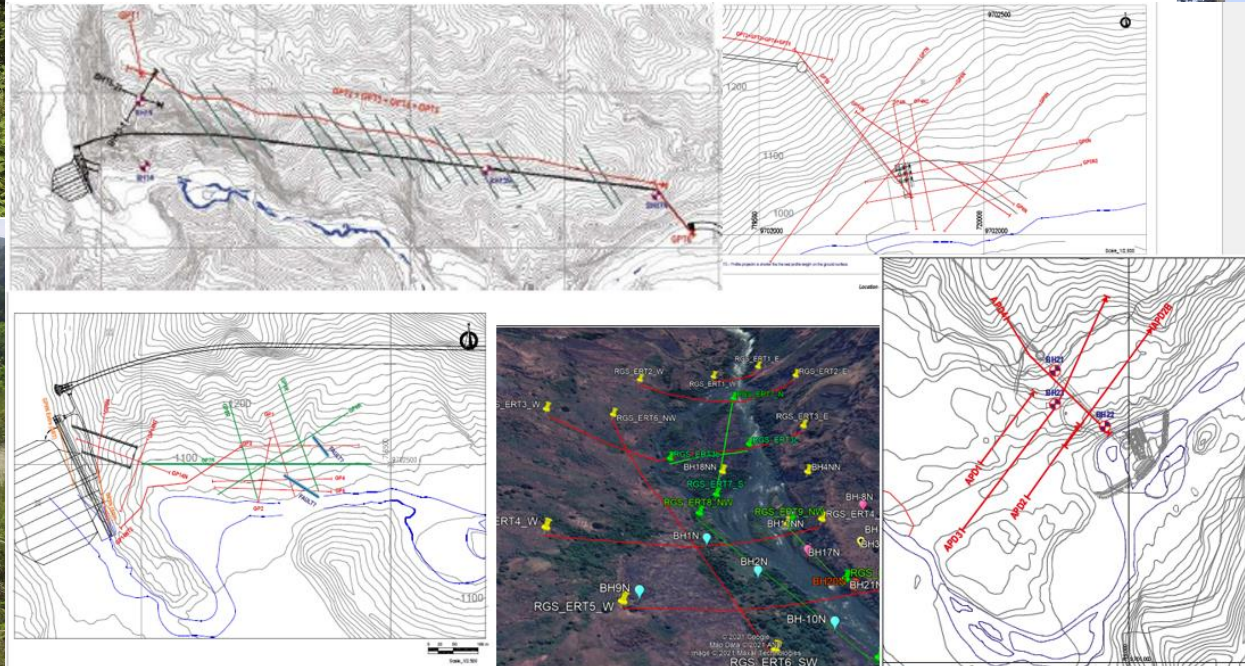
- Extensive Geological Mapping
- Topo surveys and Drone Surveys
- ~1,800 m drilled for Geotechnical Investigations since 2020
- Comprehensive Insitu Tests and Lab investigations





# Investigations Campaign 2020-2022

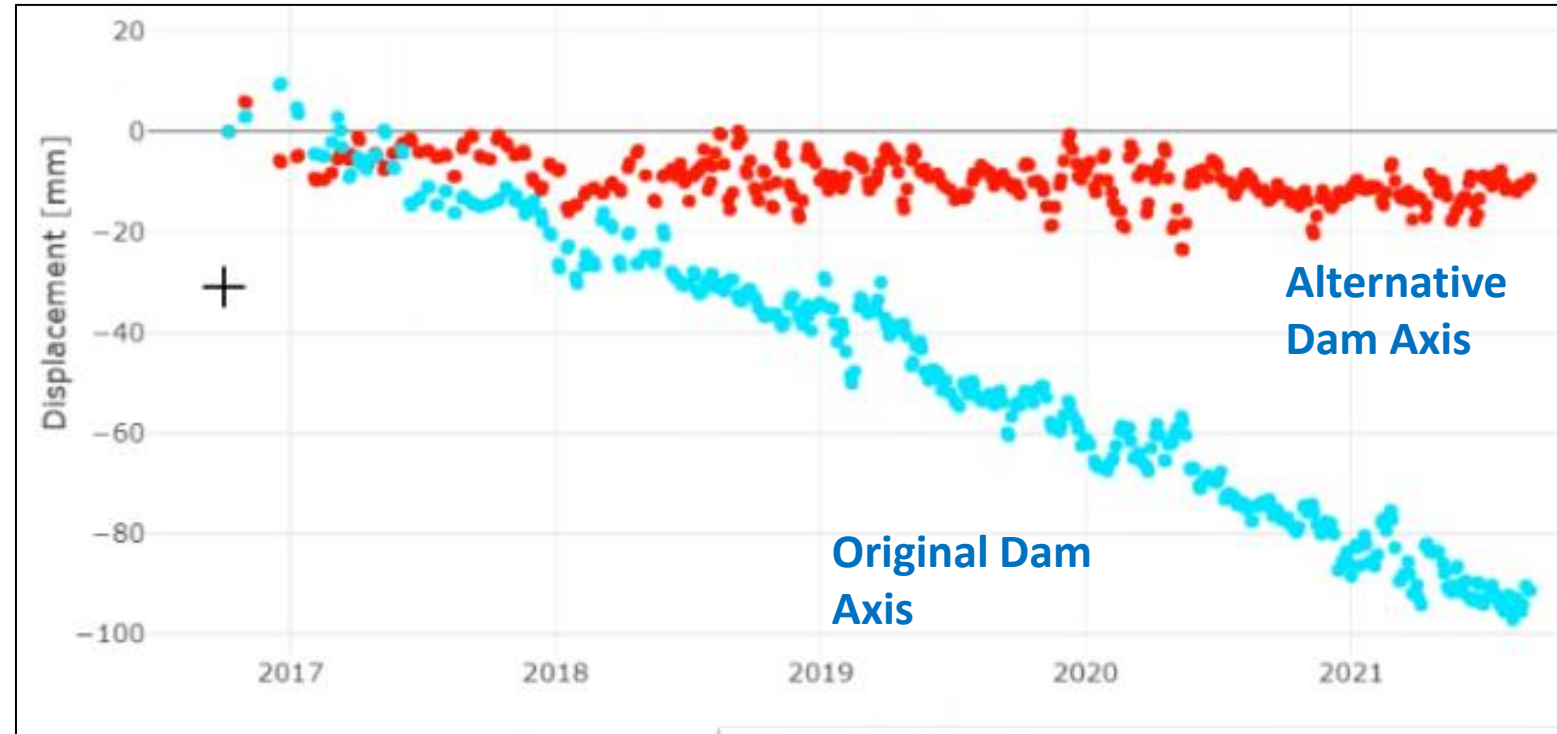
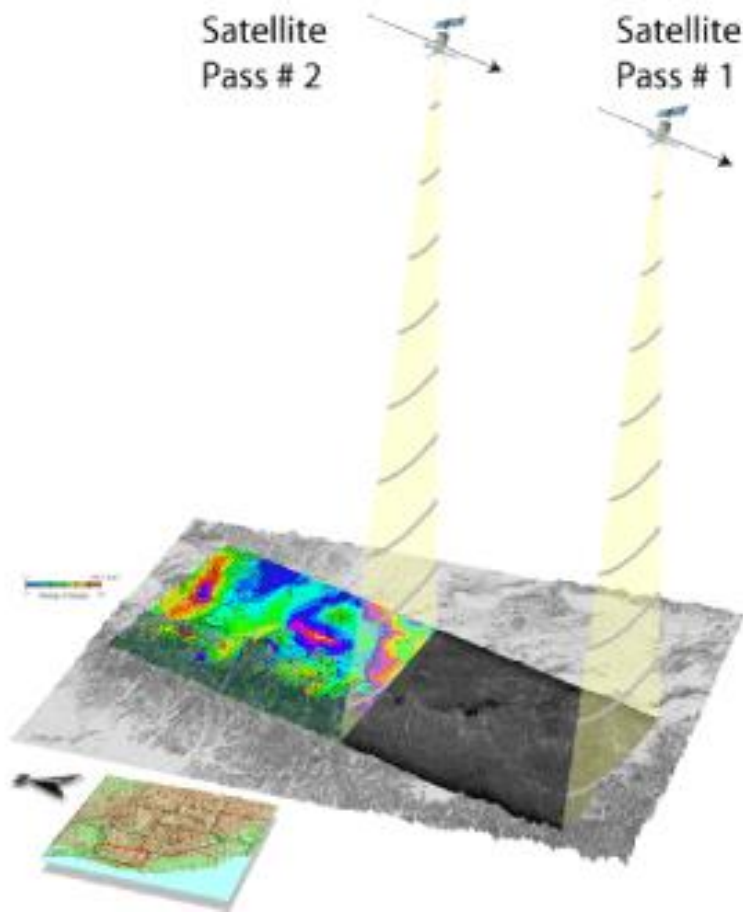
39+ km of  
Geophysical surveys (ERT/SRT)  
completed





# Investigations Campaign 2020-2022

InSAR (Interferometric Synthetic Aperture Radar) is a technique for mapping ground **deformation** using radar images of the Earth's surface that are collected from orbiting satellites





# Investigations Campaign 2020-2022

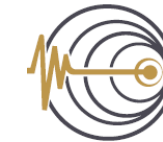


**36+ months** of River Sediment Sampling and Load Assessment



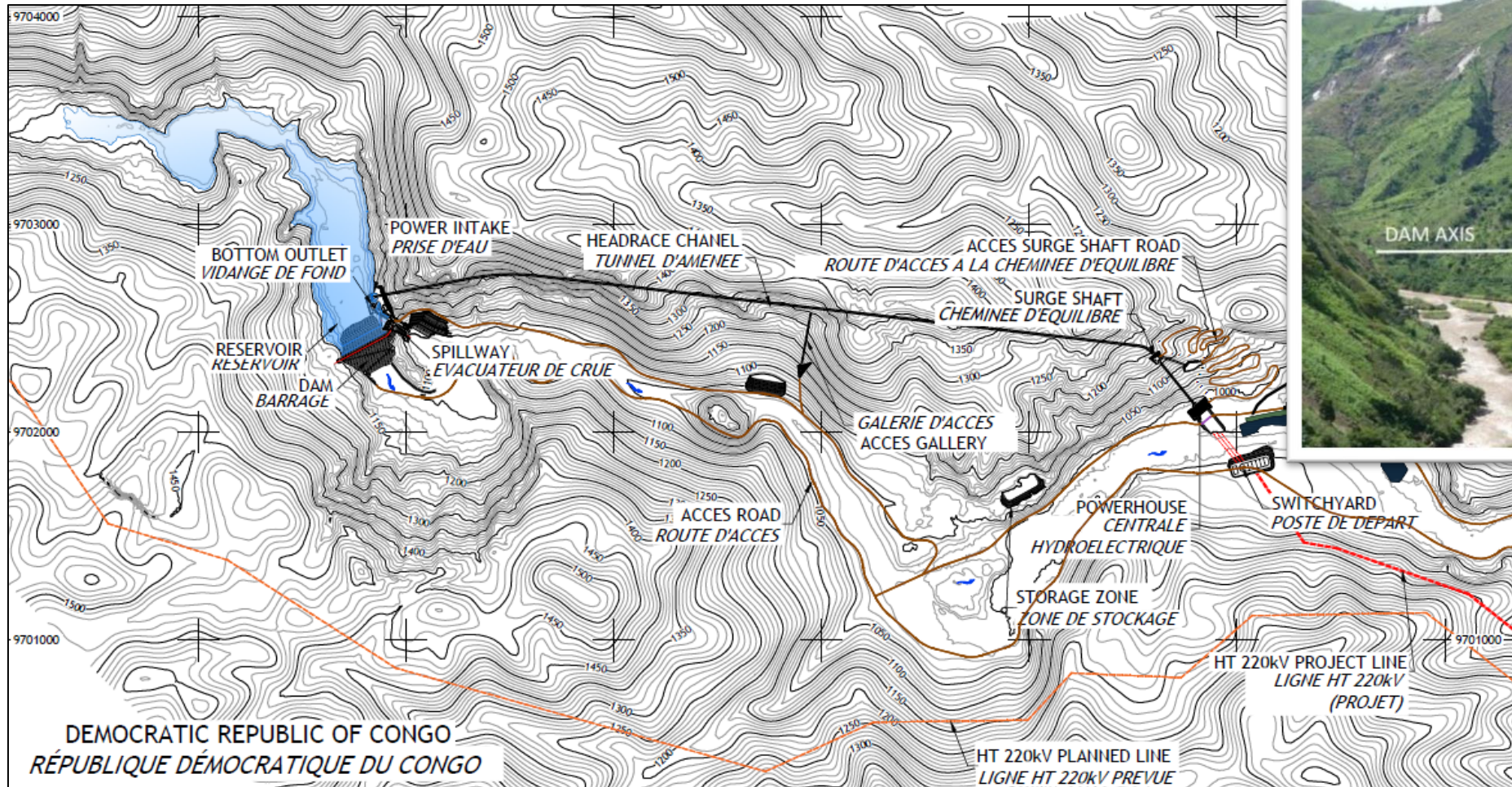
# Investigations Campaign 2020-2022

Top national and international investigations contractors and consultants:



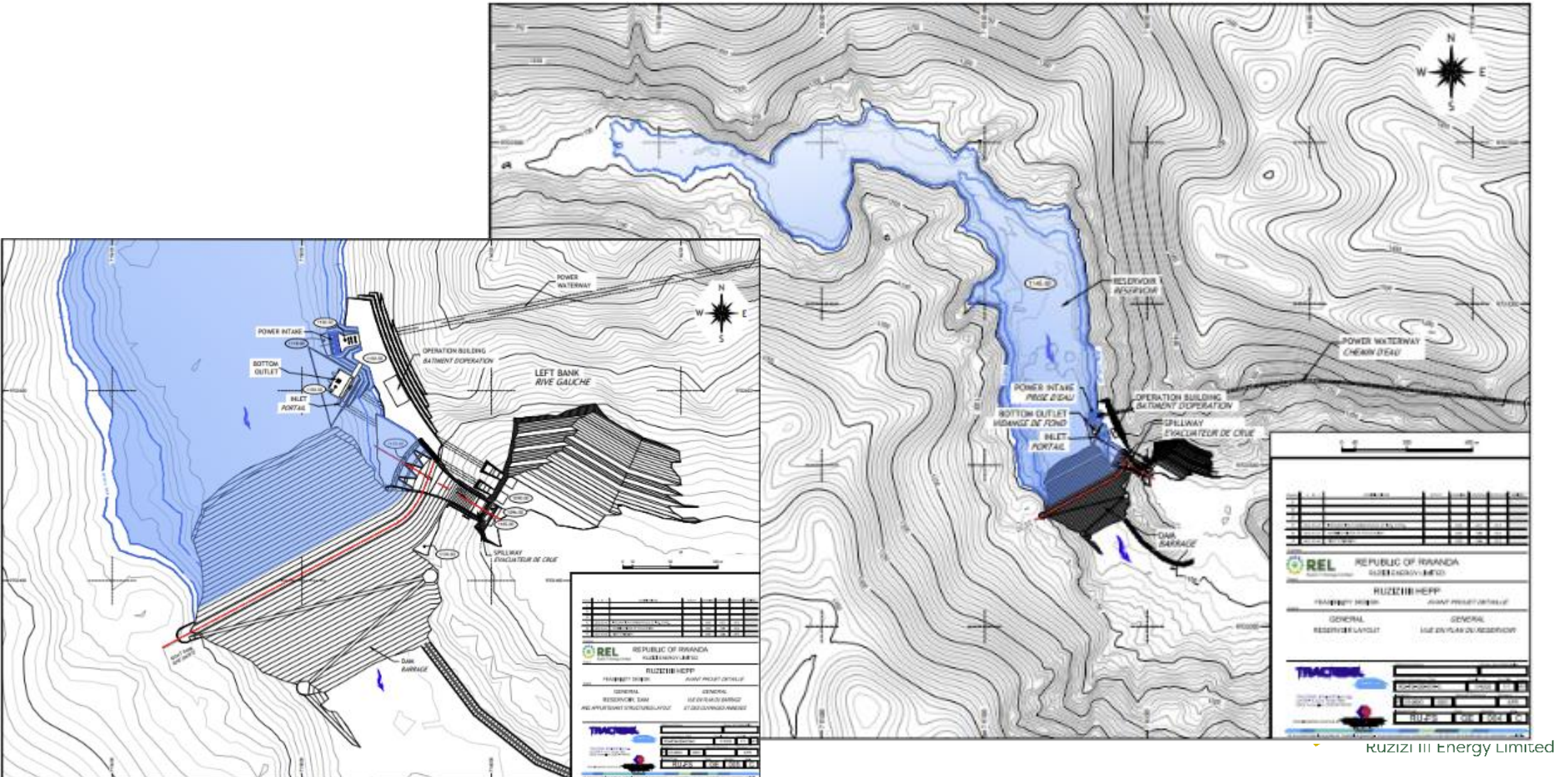


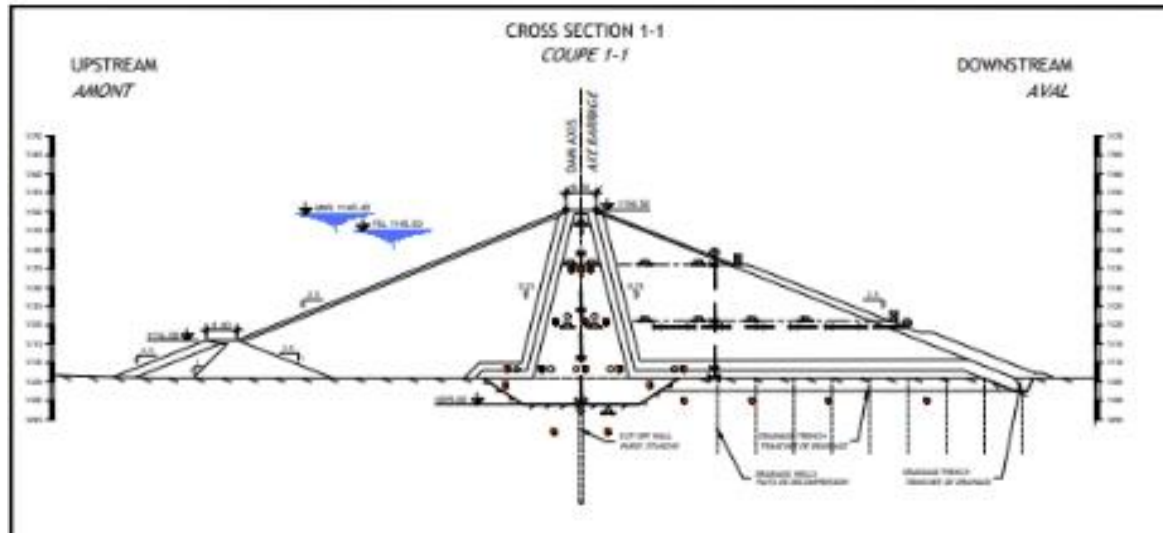
# New Approved Project Layout



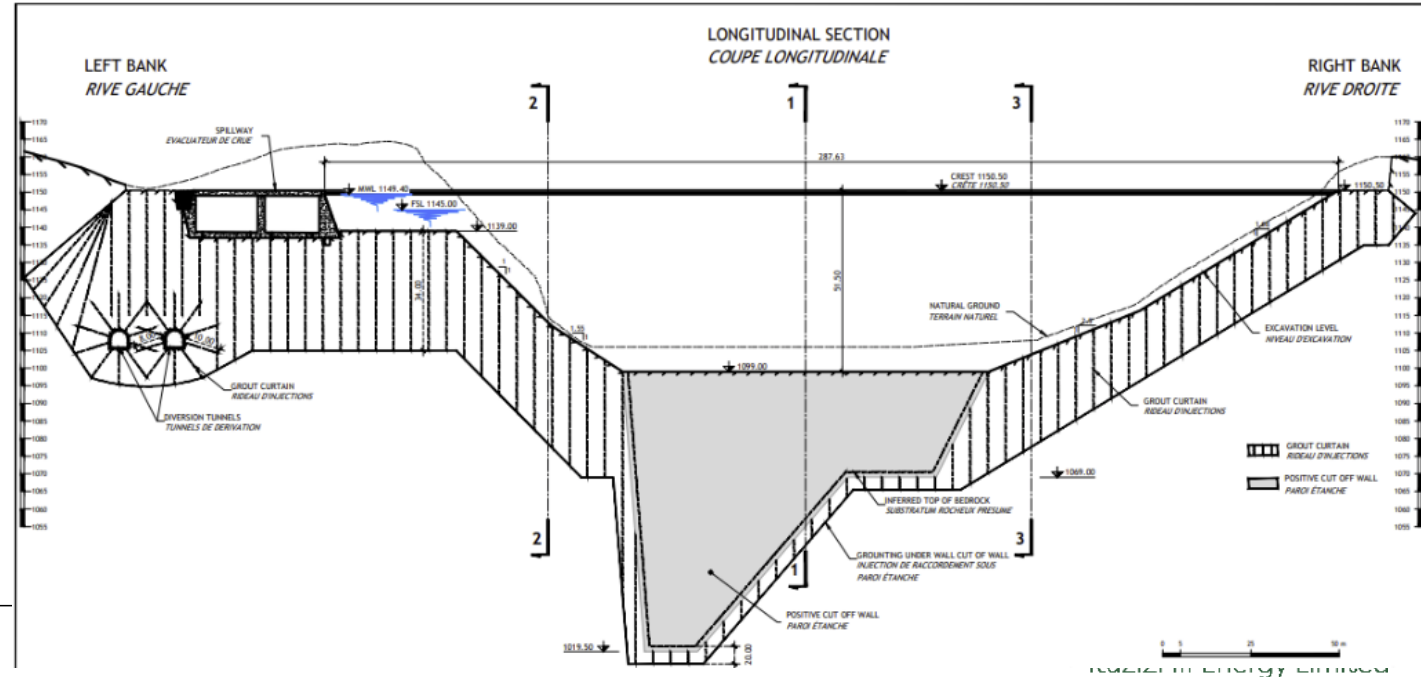


# RESERVOIR & DAM - General Arrangement



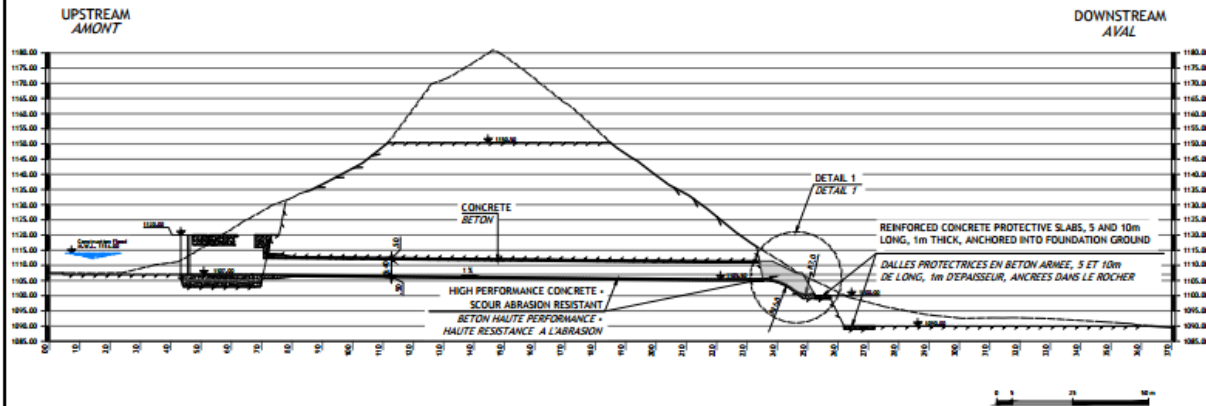
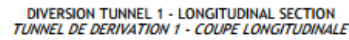


## DAM FOUNDATION TREATMENT - LONGITUDINAL SECTION

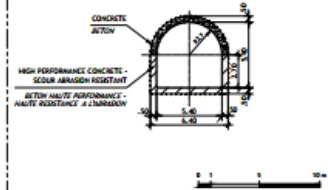




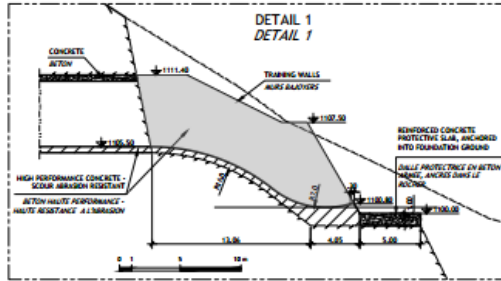
# Diversion Tunnel 1&2



## DIVERSION TUNNEL 1 - CROSS SECTION TUNNEL DE DERIVATION 1 - COUPE TRANSVERSALE



DETAIL 1  
DETAIL 1



NO	DESCRIPTION	UNIT	QTY	AMOUNT
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**REL**  
Rural Enterprise Limited

**REPUBLIC OF RWANDA**  
RUBA INZANGANYE

**RUZIZI III HEPP**

**FABRICITY DESIGN**

DEVIATION TUNNEL 1

LONGITUDINAL PROFILE

CROSS SECTION

**AVANT PROJET DETAILLE**

TUNNEL DE DERIVATION 1

COUPE LONGITUDINALE

COUPE-TYPE



**TUNNEL**

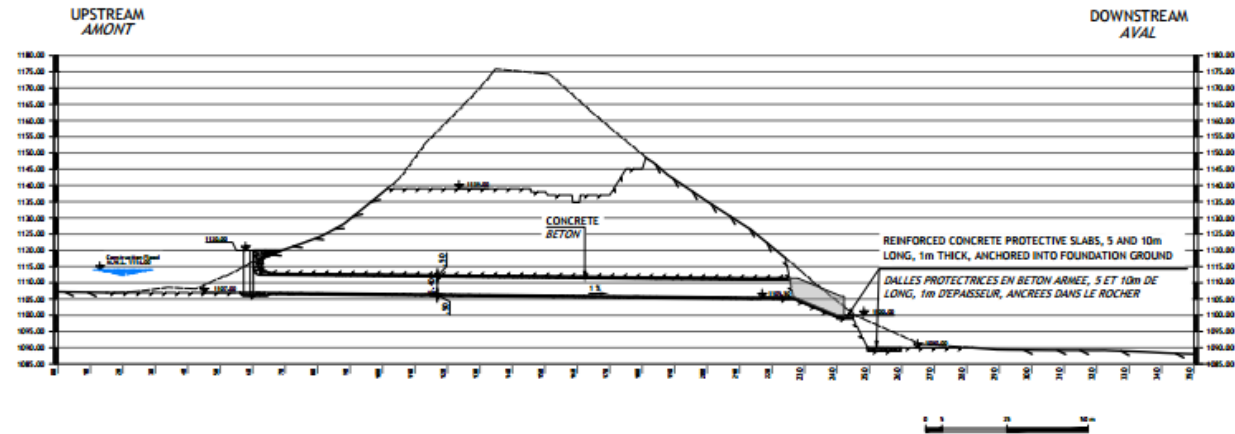
10 Avenue de la République  
10000 Kinshasa  
Congo (Kinshasa)

00253 97 77 77 77  
00253 97 77 77 77

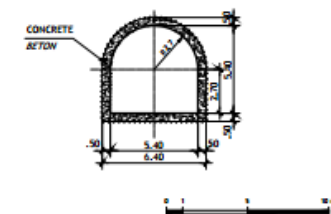
www.tunnel.com

NO	DESCRIPTION	UNIT	QTY	AMOUNT
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## DIVERSION TUNNEL 2 - LONGITUDINAL SECTION TUNNEL DE DERIVATION 2 - COUPE LONGITUDINALE

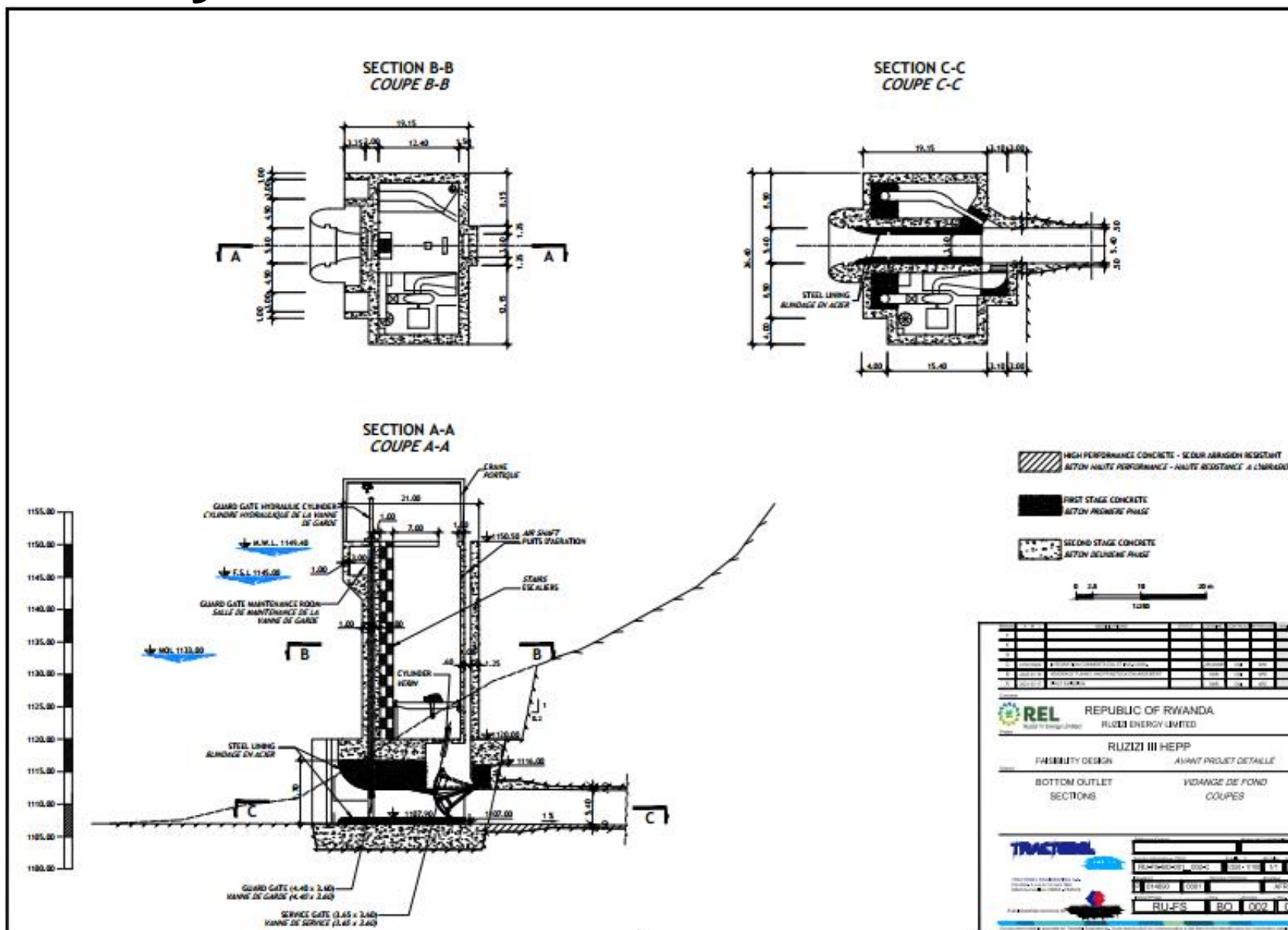


## DIVERSION TUNNEL 2 - CROSS SECTION TUNNEL DE DERIVATION 2 - COUPE TRANSVERSALE

[illegible]



# MINI Hydro and bottom outlet

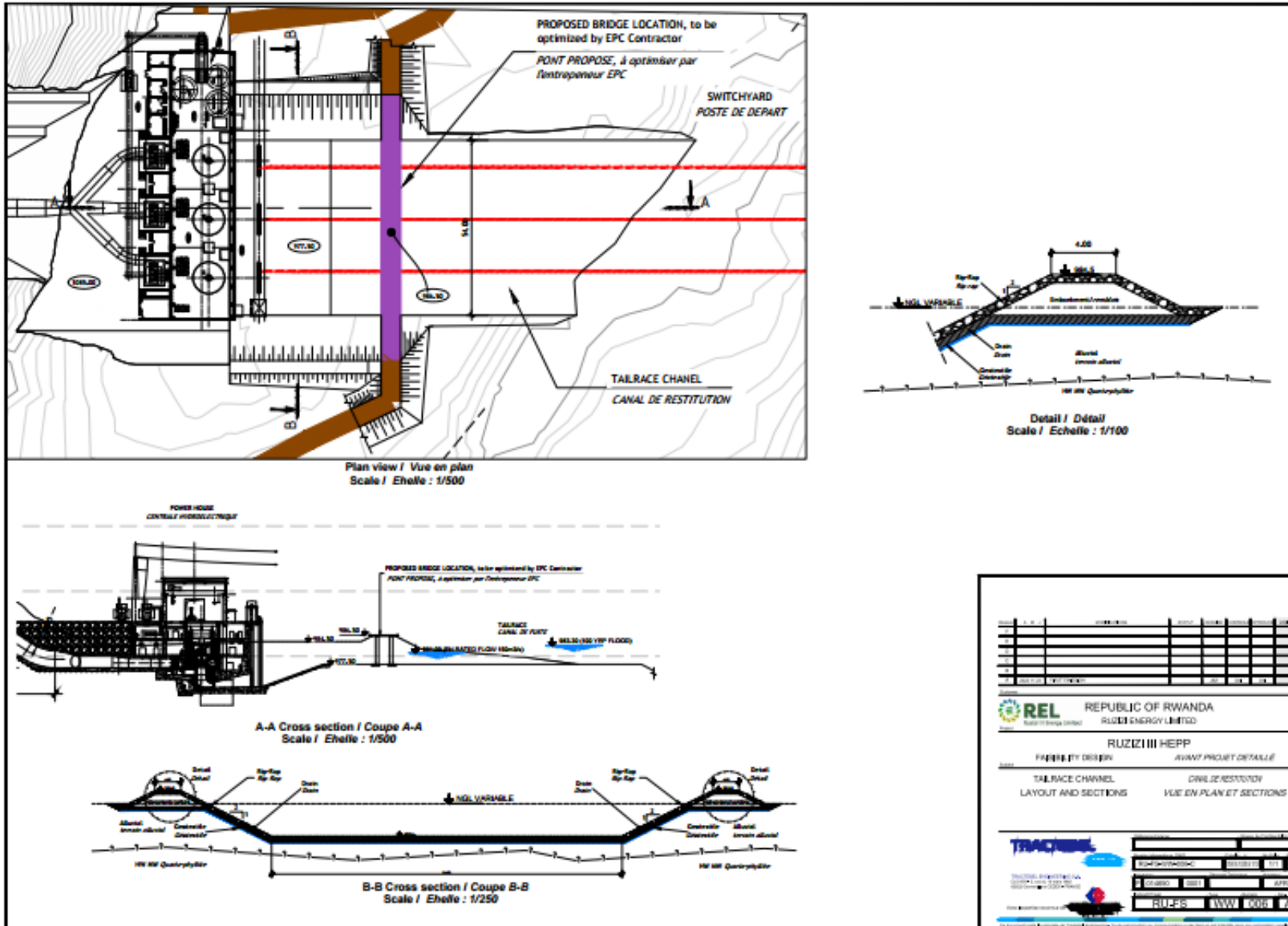








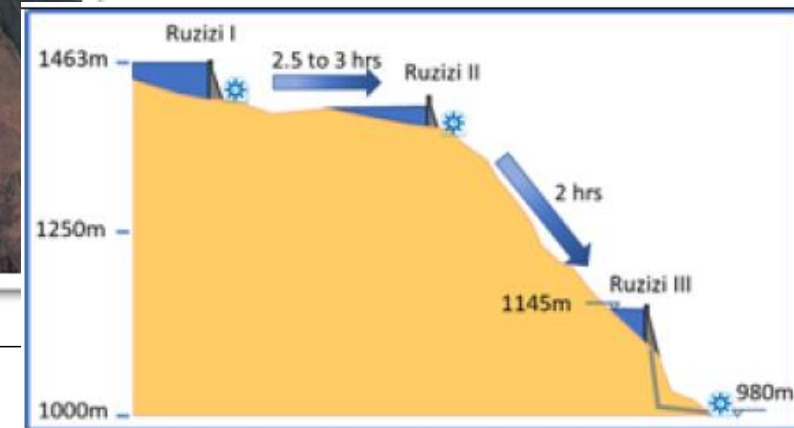
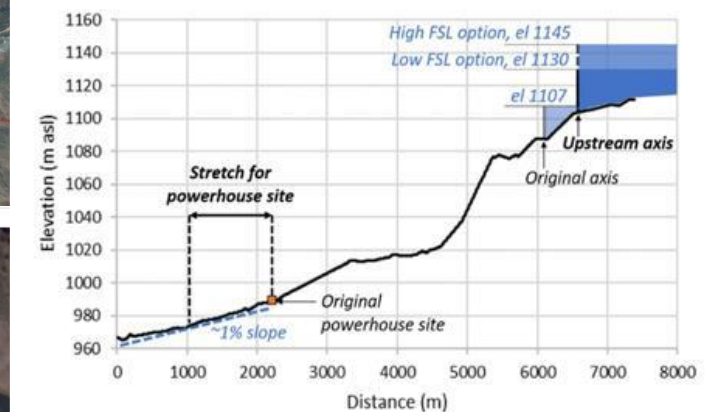
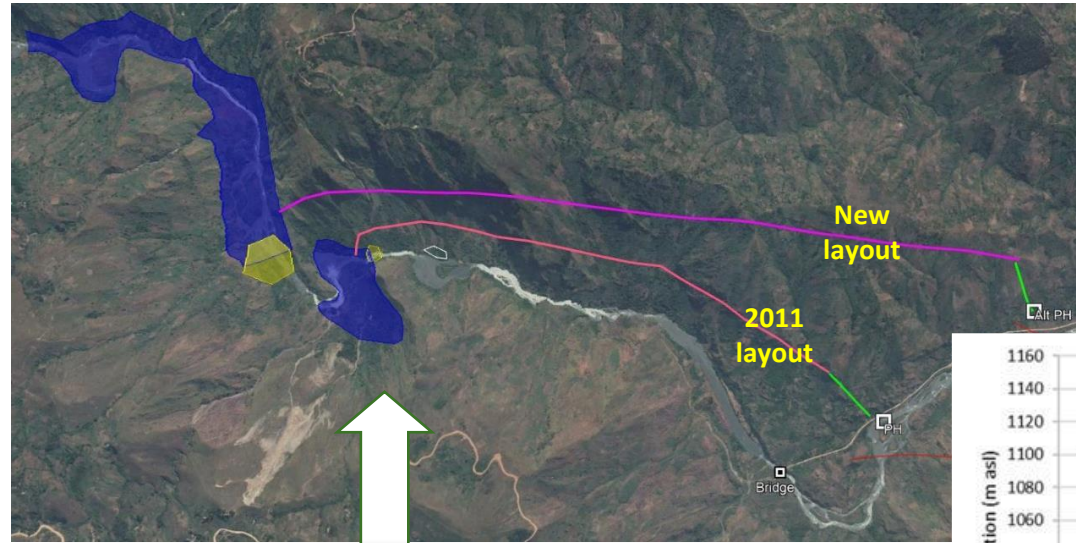
# TRIFURCATION/POWERHOUSE ARRANGEMENT



+ Switchyard  
+ 7.3km of Double  
Circuit 220kV T/L

# What are Results of our Value Engineering Efforts ?

1. Increased reservoir from **1.84 Mm<sup>3</sup>** to **7.44 Mm<sup>3</sup>** storage. This enabled daily regulation and peaking ability of up to **8 hrs**.
2. With more than **8 hours of storage capacity**, the Project will be able to peak at the same time as Ruzizi I and II, this is a crucial benefit that RIII can bring to the Cascade system.
3. **Increased dead storage capacity hence long life span for the reservoir**
4. Increased output capacity from 147 MW → **206 MW** including 2.9MW generated thru 10m<sup>3</sup>/s ecoflow
5. Increased energy from 710 GWh → **1,210 GWh/year** -> **~41% increase** – enhancing energy security
6. Lower energy cost, up to **35% of original tariff** has been reduced - **affordability**.
7. Reduced geological risk – **enhancing dam safety and sustainability aspects**





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16 Oct 2024

Thank you