THE CONCEPT OF LOMAYA AND PILOHYANGA WEIR REHABILITATION BASED ON TECHNICAL AND ECONOMIC ASPECTS

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Introduction

The Destruction of Pilohayanga Weir

Inability to function as a supplier of irrigation water for farming and also rendered it unable to meet daily domestic water needs

Resulted in many agricultural lands being converted into residential areas.

Introduction

The purpose of this research:

- The selection of the appropriate design from several alternatives, so as to support irrigation infrastructure services in Pilohayanga irrigation area.
- To obtain the optimal design concept which would be implemented using hydraulic engineering principles and within economical limits

Theory and Methodology

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Definition of weir

A weir is a water structure that is built across a river or river channel to primarily raise the water level so that river water can be trapped, thereby allowing it to flow by gravity into the area in need of water

The primary function of weirs

To raise and maintain the minimum flow of water upstream in order to meet the water requirements for irrigation

Main Component of Weir

The main components of a weir are the weir body, intake, flushing buildings, and complementary buildings

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Technical analysis

In this case, refers to the hydraulic analysis which aims to determine the elevation of the water level and the height difference, as well as the basic design of the complementary building which includes: intake and sandtrap buildings, the syphon, and the carrier channel to the Pilohayanga irrigation area. The determination of the elevation and height difference in the supplementary buildings is to ensure that water flows to the Pilohayanga irrigation area,

Economic analysis

Aims to determine the costs which will be incurred from each design alternatives, this will, therefore, enable proper planning and execution.

Theory and Methodology

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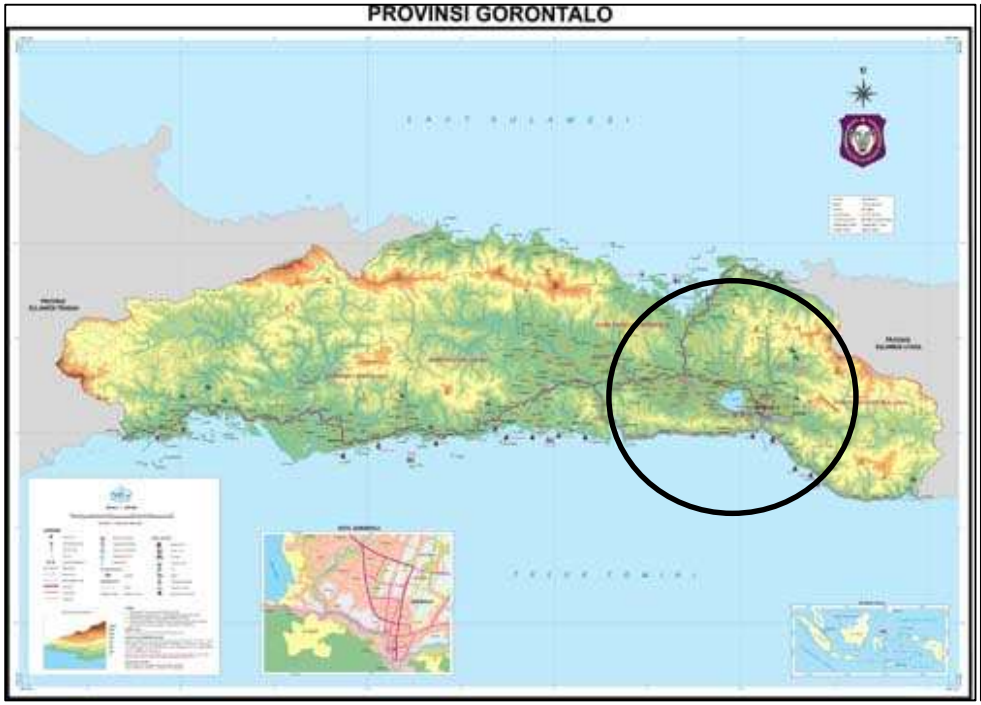

LOCATION: The Lomaya and Pilohayanga weir are located on the Bone-Bolango River. Gorontalo Province.

Theory and Methodology

This research requires data, such as:

a) The Earth Map with the scale of 1:25,000,
b) Location situation map of Lomaya and Pilohayanga Weirs,
c) Material price, wage and tool price, topographic analysis, and
d) Hydrology analysis data (flood data, cropping pattern and irrigation area).

The data analysis begins by determining

a) alternative basic design concepts to ensure water supply in Pilohayanga;
b) hydraulic technical analysis;
c) Budget Cost Plan analysis; and
d) Selection of optimal solutions alternative design concepts.

Discussion

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Several alternative designs were arranged to supply the water needs of Pilohayanga irrigation area.

The first alternative is the situation where the water supply for Pilohayanga is taken from the left intake of the existing Lomaya Weir.

The second alternative involves the making of a right intake at Lomaya Weir. The water supply to Pilohayanga irrigation area is then distributed through the right channel of the river.

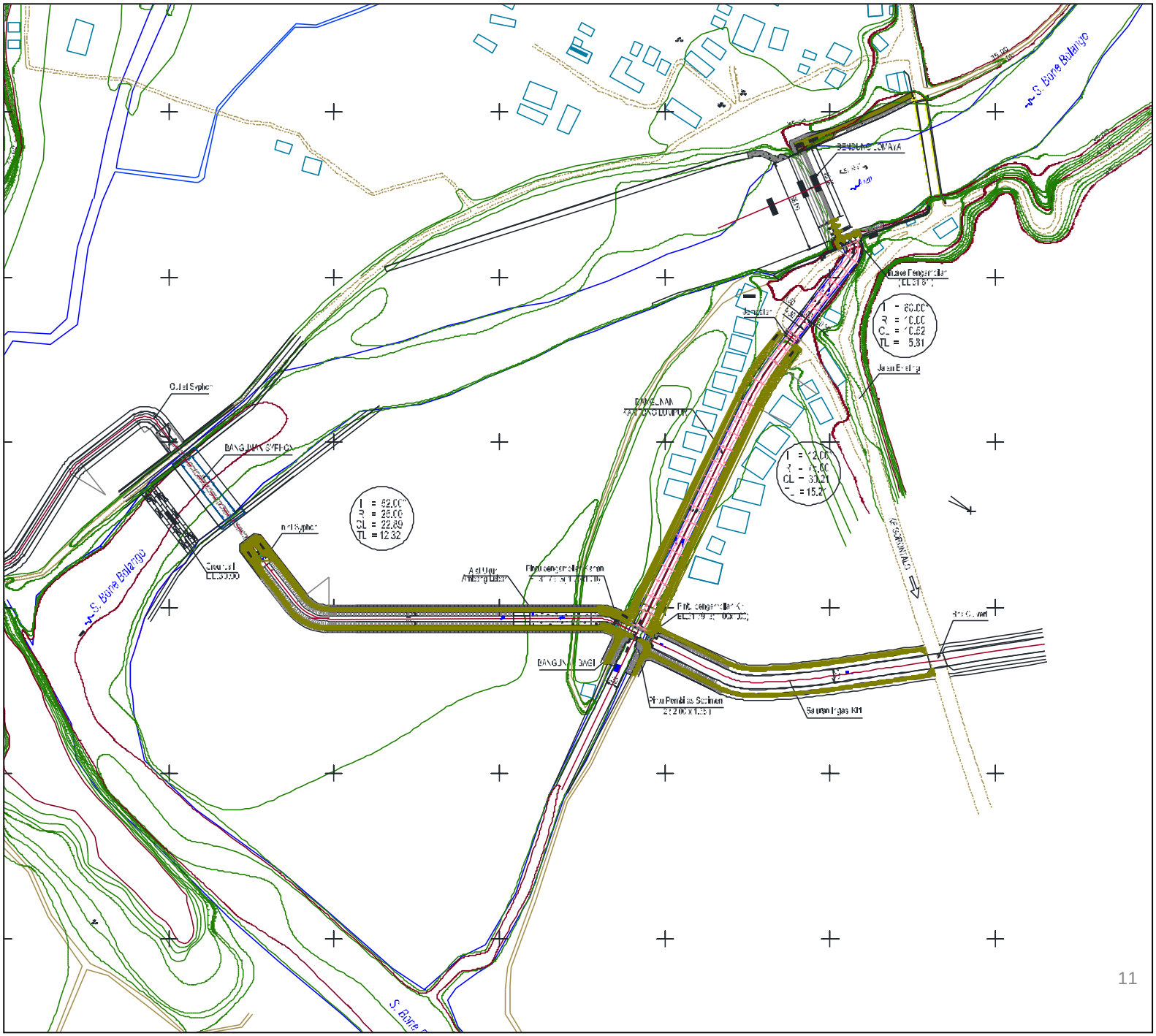
Discussion

The first alternative is the situation where the water supply for Pilohayanga is taken from the left intake of the existing Lomaya Weir.

This first alternative needed several designs, these include:

a) the addition of the left intake door, 1 piece with the width of 1.50 meters which is then followed by widening the sand trap by 9.00 meters;
b) carrier channeling to the syphon along ±300 meters;
c) construction of new syphons which crosses over the Bolango River;
d) making of a carrier channel to the Pilohayanga Irrigation Area of ±1,000 meters. The calculations of the technical hydraulics also consider the loss of energy in each complementary buildings, so that water can be ascertained to the location of the Pilohayanga irrigation area.

The First Alternative



Discussion

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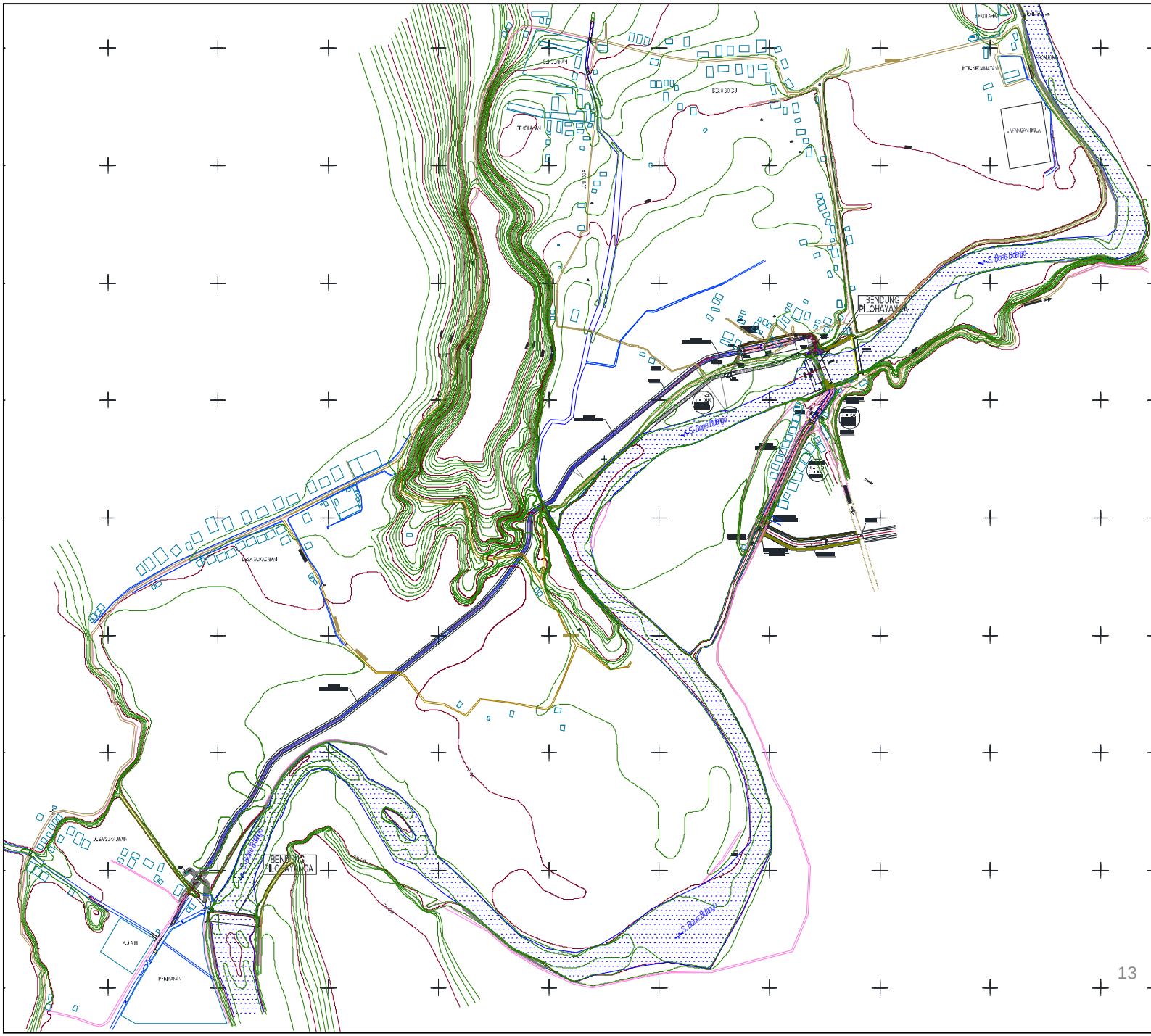
The second alternative involves the making of a right intake at Lomaya Weir. The water supply to Pilohayanga irrigation area is then distributed through the right channel of the river.

The second alternative also needed several designs. Such as:

a) making of a new intake area in the right side with two 2 doors;
b) the addition of channel flushing sediment at Lomaya Weir;
c) making of the sand trap, and
d) making of a carrier channel to Pilohayanga irrigation area along ±1,400 meters.

The Second Alternative



Discussion

The first alternative

No.	Type of Works	Budget	
1	Preparation works	Rp.	965,436,962.00
2	Diversion Channel and Dewatering Works	Rp.	932,876,977.54
3	Lomaya Weir Rehabilitation Works	Rp.	14,365,836,172.59
4	Pilohayanga Channel Works	Rp.	6,517,534,561.14
5	Pilohayanga Syphon Works	Rp.	2,401,804,162.39
Total		Rp.	25,183,488,835.66
10% Tax		Rp.	2,518,348,883.57
Total		Rp.	27,701,837,719.23
Rounded		Rp.	27,701,838,000.00
Regarded as: Twenty-seven billion, seven hundred and one million, eight hundred and thirty-eight thousand rupiah..			

Discussion

The second alternative

No.	Type of Works	Budget	
1	Preparation works	Rp.	436,480,318.50
2	Diversion Channel and Dewatering Works	Rp.	277,035,396.22
3	Lomaya Weir Rehabilitation Works	Rp.	6,494,546,783.16
4	Pilohayanga Channel Works	Rp.	8,986,098,804.13
Total		Rp.	16,194,161,302,01
10% Tax		Rp.	161,916,130,20
Total		Rp.	17,813,577,432.21
Rounded		Rp.	17,813,577,000.00
Regarded as: Seventeen billion, eight hundred and thirteen million, five hundred and seventy-seven thousand rupiahs.			

Conclusions

- The second alternative costs lower than the first, and also from the technical point of view, the second alternative has a less loss of energy, which makes it safer to get to the Irrigation Area. Therefore, the second alternative is relatively easier to implement.
- The required design for supplying water to Pilohayanga irrigation area is thus the making of Lomaya Weir right intake. The water supply is then distributed through the carrier channel at the right side of the river. The alternative designs also need to be integrated as follow:
  a) creating of a new intake area in the right side with 2 doors;
  b) the addition of channel flushing sediment from the Lomaya Weir;
  c) making of sand trap; and
  d) creating of a carrier channel to Pilohayanga irrigation area along $\pm$ 1,400 meters.

Recomendation

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- The recommendation is to maintain the existence of the Pilohayanga Weir. Although it is no longer able to meet the water needs in both irrigation and domestic water supply, it is still used as the groundsill of Lomaya Weir.

Thank You