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Flood Control Using Polders

Case Study: Watershed of Sadar River, Mojokerto, Indonesia

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***Abstract*—Flooding is a problem experienced in area. In the Sadar river watershed are urban areas and mountainous areas. Sadar river has many tributaries. The flow characteristics have a large flow velocity. Sadar river passes through urban areas and empties into the Brantas river. Floods often occur in the Mojokerto area. Flooding occurred due to changes in land use, increased erosion of land in the Sadar river watershed. To overcome flooding in the area, temporary storage (polder) is used. Polders are a low plot of land, surrounded by embankments or embankments that function to avoid contact with water from outside areas other than those manually flowed to control flooding. From the channel capacity analysis using the HEC-RAS 4.0. Sadar river in the existing condition is unable to accommodate flood discharge with return period 25 years. Polders on the Sadar river are planned to use an alternative experiment 6 with the discharge entering the retention pool by 95%. The planned retention pool is 5 pieces.**

Keywords—flood; polder; river; watershed

I. INTRODUCTION

Water is source of life for humans. Besides being beneficial for humans. Water can also bring disaster to humans. One of them that gives disaster to humans. One of them that gives disaster to humans is flood. Flooding can occur due to human activity, or because of nature. Losses will be experienced in the event of a flood.

Sungai Sadar is one of the tributaries of the Brantas River. Sadar River flows across urban residential areas, namely Mojokerto. From the results of interviews in the field, the city of Mojokerto often experiences flooding, almost every year. To overcome flooding, in addition to normalization of rivers, embankments, can also use polders.

Polders are very effective in cutting the flood peak and can reduce the risk of flooding [1]. Oleh karena itu dalam studi ini untuk mengendalikan banjir daerah Kali Sadar menggunakan Polder.

II. METHOD

Sadar river is a river located in Puri, Mojokerto, which has a watershed area of 409.09 km2 with a river length of 23.21 km.

The method used in this study is the collection of hydrological data, data analysis, simulating the system with several alternative volume that will be accommodated in the polder. Alternatives made 40%, 50%, 60%, 70%, 80%, and 95% of the flood discharge plan for a 25 year return period (Q25). From several alternatives, the flow does not exceed the capacity of Sadar river.

Hydrological analysis to determine the planned flood discharge, divided into segments. The flood discharge plan used with a 25-year return period. Regional map of Sadar river can be seen in Figure 1.

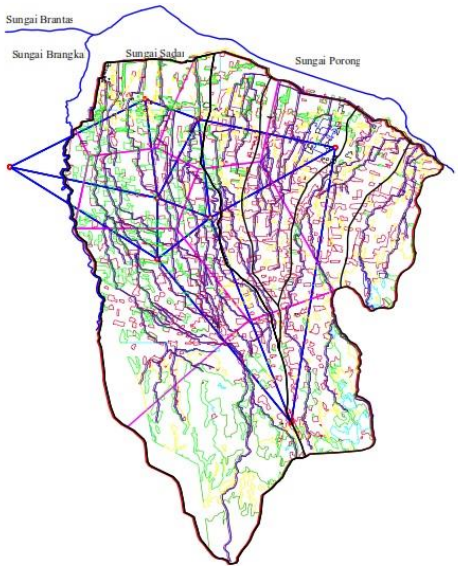

Fig. 1. Watershed Sadar River

III. RESULT AND DISCUSSION

The analysis of Sadar River flood control system using with HEC-RAS 4.0 software. The simulation result, can be seen Figure 2-4.

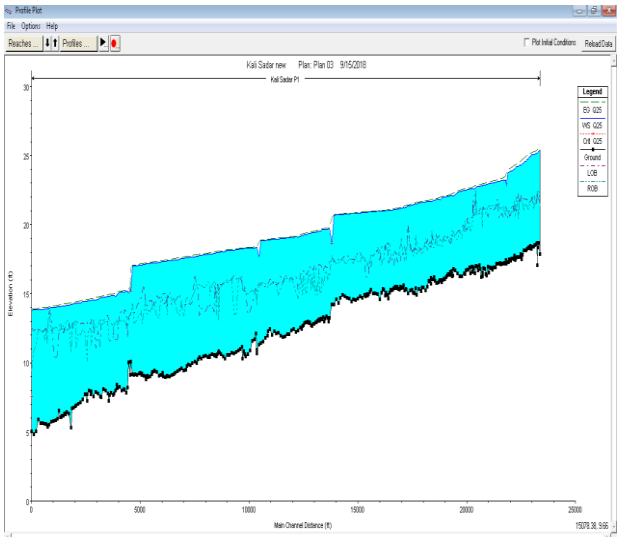

Fig. 2. Running result for existing condition before with polders

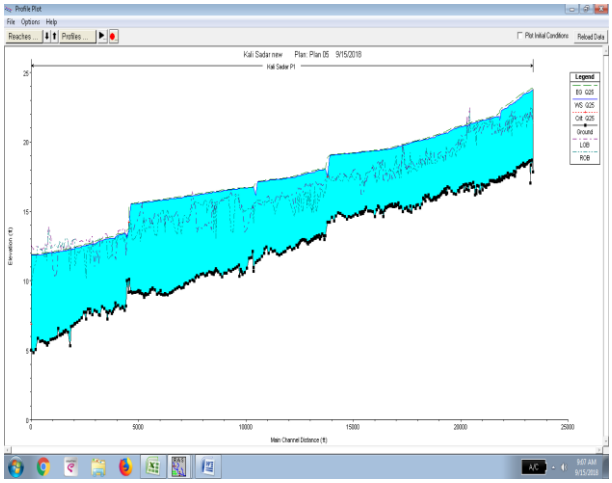

Fig. 3. Running result with volume of polder 40% Q25.

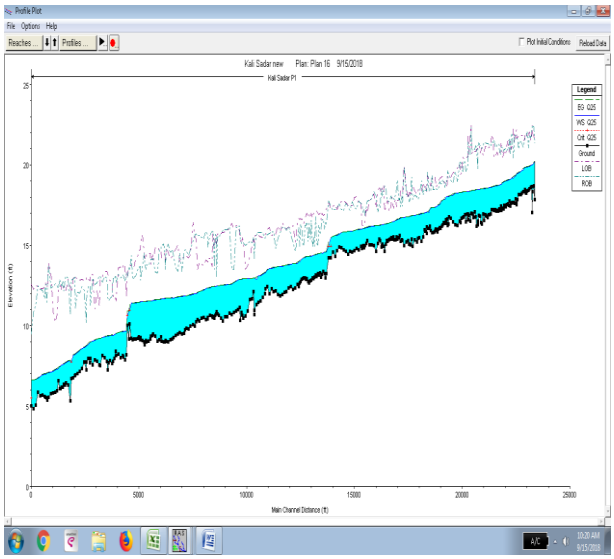

Fig. 4. Running result with volume of polder 95% dari Q25

The figure 4, can see that no water exceed left and right margin of cross section river. This means, this condition show the flood in area.

IV. CONCLUSION

Polders to control floods can be carried out in Sadar river watershed. From the analysis of the system, it was found that the polder can control flooding in the Sadar River area by accommodating 95% of the discharge plan (Q25).

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