ANTAPAN VILLAGE BRIDGE DEVELOPMENT PLANNING TOWARDS SULANGAI VILLAGE IN TABANAN REGENCY

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ABSTRACT

Antapan Village is a tourist village mapped through Tabanan Regent Decree Number 180/332/03 / Hk & HAM / 2016. In the context of developing tourist villages, opening access to areas that can facilitate the distribution of agricultural products, plantations, social opening, relations economic and cultural, the planned bridge construction between Antapan Village and Sulangai Village. This study aims to identify bridge topology / terrain conditions, estimate costs and plan drawing designs and analyze the impact of bridge construction. Data collection methods are observation, interview, documentation, questionnaire and literature study. The analysis method consists of quantitative descriptive analysis, Geographic Information Systems, Autocad, Unit Price Analysis (AHSP). The results of this study are the identification of topological conditions / terrain where bridge construction plans are located on hills and mountains. The design plan for bridge construction is the length of the bridge plan is 14 meters with a width of 6 meters. The design of the upper building in the form of a bridge floor, longitudinal and transverse girder and backrest / reling. Underwater building design in the form of foundation and support. The total cost of bridge construction is Rp. 1,546,171,000.00 or Rp. 110,440,785.71 per meter. The socio-economic impact on bridge construction is that bridge construction can open access closer between Antapan and Sulangai villages, increase the economic value of the land around the bridge area, facilitate / facilitate the distribution of agricultural and plantation products and develop the tourism sector.

Keywords: planning, bridge, antapan, sulangai

I. INTRODUCTION

In realizing national development goals, the government deems it necessary to carry out development from the smallest scope of territory, namely villages. The village as the smallest legal community unit that has territorial boundaries is the smallest node of development, so that dynamics of development in the village will have a stimulant impact on development on a broader scope of territory. Development in villages should be encouraged in the perspective of the region, so that development acceleration can be more quickly realized given the potential and problems of villages can be mapped and resolved in a more comprehensive perspective (Kemendes, 2017).

In development theory, the utilization of the results of the village's physical development is by building and improving village road infrastructure. Road is a path that connects a place with other places that are on the surface of the land, above the surface of the land, below the surface
of the land and / or water and above the surface of the water, except railroad roads, lorries and cable roads (PP No. 34 in 2016). The development of road and bridge accessibility in rural areas is currently prioritized by the Central Government in villages that have potential and have been designated as tourist villages and National Priority Rural Areas (KPPN). Rural area development is inter-village development carried out in an effort to accelerate and improve the quality of services and empowerment of rural communities through a participatory approach (Kepbut Tabanan No.72 of 2017).

Antapan Village is a village that is administratively located in the Baturiti subdistrict, Tabanan Regency which is designated as a tourism village through Tabanan Regent Decree Number 180/332/03 / Hk & HAM / 2016. The village has an agricultural area with panoramic views of the often beautiful rice terraces, protected forest areas, waterfalls, strawberry and mangosteen plantations, cultural attractions, culinary food and more. Tourists who visit can see, pick and enjoy first hand the durian and mangosteen fruit typical of the village of Antapan. In addition, there are trekking activities as attractions that complement the attractions. Potential villages in the village of Antapan are local products that will be processed, packaged and maintained with integrity.

There is a plan to open access between Antapan villages to Sulangai village. With the opening of these accesses can provide smooth distribution of agricultural products, plantations, support the tourism sector and become the development of the tourist village of Antapan which began to be visited by tourists. Considering roads and bridges are infrastructures that will accelerate the growth and development of an area and will open social, economic and cultural relations between villages. In the construction of roads and bridges, we must pay attention to the slope of the land or its topology. In general, the slope of land in Tabanan Regency is on a slope of 15-40%, which is an area of 365.67 km² (43.57%), spread widely, especially in the western region. Land with a slope of 2-15% with an area of 249.61 km² (29.74%) is widespread, especially in the eastern region. Land with a slope above 40% covering an area of 136.53 km² (16.27%) is located in the northern mountainous regions and partly on the western side of the border with Jembrana Regency while land with 0-2% slope is 10.43 km² (10.43 %) dominates the coast (Tabanan Regency Profile, 2017).

In order to facilitate access in distributing agricultural and plantation products, in order to open up access between the Antapan village and Sulangai village and to be an access in developing the Antapan tourism village, the planning to build a connecting bridge between the Antapan village to Sulangai village needs to be carried out. So the purpose of this research is to identify the condition of the topology / terrain of the bridge location, estimate the cost and plan the design of the drawing and analyze the impact of the construction of the Antapan village bridge towards Sulangai Village in Tabanan Regency.

II. LITERATURE REVIEW

The difference with previous research is the research of I Made Avadhuta Austinov Mahagana and Cahya Buana (2013) with the title "Feasibility Study of the New Ploso Bridge Access Road in Jombang-East Java". The results of this study are that the access road is feasible to be built with the existing BOK value of Rp. 6,283,079, while the BOK if the bridge access road is built is (BOK plan) Rp. 4,006,538, NPV value of Rp. 216,903,808,587 and a BCR value of 4.92. Research from Lina Sarasdevi Santosa, P. Alit Suthanaya, I B. Rai Adnyana (2016) with the title "Economic Feasibility Study of Underpass Development at Intersection Jl. Gatot Subroto-Jl. Ahmad Yani in Denpasar City ". The results of the study are economically feasible underpass development. In scenario II where the interest rate of 15% gets the results of the analysis in the form of NPV, BCR and IRR values respectively Rp. 233,462,340,102; 1,948 and 30.81%. Research from Anggel Purwati (2013) with the title "Arrangement and Improvement of Infrastructure as One of the Communication Strategies of the Batam City Tourism and Culture Office in Visit Batam". The results of the study are the improvement and structuring of tourism infrastructure that supports national and international standards as a communication strategy of the Office of Tourism and Culture in the Batam visit activities in 2010. Infrastructure development must be carried out evenly, but the infrastructure carried out in order to visit Batam 2010 is still not optimal. Research from Aisyah, Abdul and Khairul (2012) "The title of West Outer Ring Road Development Planning in the City of Surabaya is planned to overcome the level of congestion in
the city of Surabaya which is centralized in the downtown corridor". The results of the study: (1) the budget to realize the plan is almost 1.4 trillion (2) the internal factors are its strengths; There is a mature planning concept, adequate supporting resources and the support of the regional head. Its weaknesses; the ability of the Surabaya government's government budget is doubtful to complete land acquisition in a timely manner. Research from Fauzi Budi Setiawan (2012) with the title "Community Participation in the Development of Village Axle Roads in Panceng District, Gresik Regency". The results of the study are the different forms and levels of participation between the two categories of villages. In the first category villages there is a form of full control participation (High Control) with a high level of participation and in the second category villages a form of participation participation is shared control with a moderate level of participation.

III. RESEARCH METHOD

The study was conducted in Antapan Village, Baturiti Subdistrict, Tabanan Regency at the initial coordinates of 8°19'58" LS, 115°20'00" BT and final coordinates 8°19'45.5" LS, 115°19'98" BT towards Sulangai Village from August to October 2019. The study population is the total population in the Antapan Village of 23,364 people with 1,066 households (Antapan Village Profile, 2019). The research sample was taken using proportional random sampling technique with a level of significance of 10%, namely 98 people. Methods of data collection by observation, interviews, documentation, questionnaires and literature studies. The data obtained in the form of primary and secondary data. Primary data is data obtained through field surveys, namely topology / terrain measurements of bridge locations and questionnaire scoring data. Secondary data is additional data obtained by citing existing data, namely the profile data of the Antapan Village and the map of the Antapan Village. The analysis method consists of Geographic Information System analysis, quantitative descriptive analysis, autocad analysis and unit price analysis (AHSP).

IV. RESEARCH RESULT

Result

Identification of topological conditions / terrain location of the bridge construction plan of the Antapan Village towards Sulangai Village

Road slope to determine the condition of the road topology / terrain according to the Director General of Highways of the Ministry of Public Works (1997) includes flat terrain of <3%, hilly terrain of 3-25% and mountainous terrain of> 25%. The length of the route for the planned construction of the Antapan Village bridge to Sulangai Village is 100 meters with a width of 6 meters. Based on the results of the Geographic Information System analysis in table 1 shows that the condition of the topology / terrain of the bridge construction plan is stationing 0 + 000 to 0 + 050 and 0 + 070 to 0 + 100 is the hilly terrain while 0 + 050 to 0 +070.

Bridge design drawing plan

Based on the results of the analysis of the strength of the structure and components related to the planned load on the bridge loading, it is found that the design of the building in the form of a bridge floor, longitudinal and transverse girder and the backing / reling refers to the design standards of the Ministry of Public Works namely SNI T-02-2005 for its span 14 meters and 6 meters wide. For underground buildings, soil testing is done in the form of a sondir test (cone penetration test) to determine the soil profile, soil characteristics, determine the carrying capacity of the foundation, know the depth of hard soil layers and carrying capacity as well as the adherence of each depth and provide a description of the type of soil. Based on these data, the type of foundation and the form of abutment from bridge construction is designed. The bridge design plan can be seen in Figure 1.

Bridge construction costs

The results of the analysis of the work unit price (AHSP) in table 2 are calculated based on the 14-meter span bridge design plan, the total cost of the bridge construction is Rp. 1,546,171,000.00 or Rp.110,440,785.71 per meter.
Figure 1. Design picture of a 14 meter span bridge

Socioeconomic impact of bridge construction
Analysis of community perception and participation in the construction of the Antapan Village bridge to Sulangai Village using quantitative descriptive analysis. The questionnaire data consisted of 20 questions given to respondents totaling 98 people. The results of community analysis of the socioeconomic impact of bridge construction show that all communities agreed. This shows that the construction of the bridge has a positive impact on society both socially, economically and environmentally. From the social aspect, the construction of the bridge can open access closer between Antapan Village and Sulangai Village. From the economic aspect, the development can increase the economic value of the land around the bridge area, facilitate distribution of agricultural and plantation products and develop the tourism sector which is starting to grow and develop in both villages.

Discussion

Based on the slope of the land most of the Tabanan Regency is on a slope of 15-40%, which is an area of 365.67 km² (43.57%), spread widely, especially in the western region. Land with a slope of 2-15% with an area of 249.61 Km² (29.74%) is widespread, especially in the eastern region. Land with a slope above 40% covering an area of 136.53 Km² (16.27%) is located in the northern mountainous regions and partly on the western side of the border with Jembrana Regency while land with 0-2% slope is 10.43 Km² (10.43 %) dominates the coast. The results of the Geographic Information System analysis resulted in the location of the coordinates of the planned bridge construction of the Antapan Village towards Sulangai Village. From the map the plan is connected to the slope map which will get the type of terrain. The slope of the bridge construction plan shows the slope is in the hilly and mountainous areas so that the bridge construction plan will have excavation and embankment work that requires a large enough budget.

In planning a bridge design must meet the main planning points namely strength, structural stability, comfort, safety, economical, durability, long-term viability, convenience, aesthetics, considering environmental, social and road safety aspects. So in planning a bridge design must use standards that refer to regulations or guidelines from the Department of Public Works. The design of the connecting bridge plan of bangbang Village and Mambang Village is that the length of the bridge plan is 14 meters with a width of 6 meters. The planned bridge life is 50 years. The geometric vertical design is a 2% transverse slope on the bridge floor and a maximum length of 5% slope. Bridge building planning takes precedence over a reinforced concrete girder system. Upper structure planning uses limit states or boundary state plans in the form of ultimate limit states (ULS) and serviceability limit states (SLS). Deformation, deflection opponents and deflection of the structure of the bridge have been calculated so that it does not exceed the permitted boundary values namely simple beam (SLS) <L / 800 and L / 400 level. Paying attention to the long-term behavior of the material and the environmental conditions of the bridge which are applied to the planned bridge structure components, especially concrete covers,
Antapan said that Sulangai villages, they agreed to build the bridge. According to the people in the village of Antapan and Sulangai, the government is promoting the “green construction” program, which is an environmentally friendly development or concept. The government is also promoting a program to use recycled materials.

In the construction of this bridge, the Ministry of Public Works has issued many decisions, regulations and NSPM (norms, standards, guidelines and manuals) for bridge construction that is environmentally sound. These rules have been made part of the contract documents as outlined in the contract terms and in the technical specifications, so the rules are binding on the parties involved in the implementation of the bridge construction contract both the project and the service provider (contractor). In addition, the government is promoting the “green construction” program, which is an environmentally friendly development or construction activity. In bridge infrastructure development activities, the government is promoting a program to use recycled materials.

The construction of the connecting bridge of Antapan Village to Sulangai Village can be calculated. The cost calculation certainly uses a cost estimate analysis that refers to the Regulation of the Minister of Public Works and Public Housing of the Republic of Indonesia Number 28 / PRT / M / 2016. The calculation of each work item on the bridge construction must be accurately calculated which is then multiplied by the unit price of each work so that the total work price is obtained which is then added to the value added tax by 10%.

Based on the results of the analysis, the magnitude of the cost of building the bridge of Antapan Village towards Mambang Village is Rp. 1,546,171,000.00 or Rp. 110,440,785.71 per meter. The magnitude of the cost of building the bridge is a consideration for the village government, given the limited budget owned by the village government. For this reason, it is necessary to approach the regional government, especially the parties concerned. Besides that, there needs to be support from the whole community in order to realize the construction of the bridge connecting Antapan Village to Sulangai Village.

Development is a process of change planned to improve the standard of living of people, which is characterized by economic growth, industrialization and modernization. But in the implementation, especially in physical development, often the parties involved ignore social, economic and environmental problems. Likewise, the construction of bridge infrastructure, namely social, economic and environmental issues, is not given much attention, both during planning and when operating, this is because the parties involved in the development activities prioritize the results or products of the development itself, while the impact social, economic and environmental are still ignored.

Under bridge building planning has been using limit states or boundary state plans in the form of ultimate limit states (ULS) and serviceability limit states (SLS). For heights > 4 meters, the abutment design uses the full wall type. The bottom structure is planned based on the long-term behavior of the material and environmental conditions including a concrete blanket used at least 50 mm. Foundation planning uses working stress design (WDS) with the type of foundation, namely steel pipe piles.

Referring to the bridge design drawings made, the amount of the construction cost of the Antapan Village bridge to the Sulangai Village can be calculated. The cost calculation certainly uses a cost estimate analysis that refers to the Regulation of the Minister of Public Works and Public Housing of the Republic of Indonesia Number 28 / PRT / M / 2016. The calculation of each work item on the bridge construction must be accurately calculated which is then multiplied by the unit price of each work so that the total work price is obtained which is then added to the value added tax by 10%.

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Bridge infrastructure development carried out must pay attention to social, economic and environmental aspects so as not to cause harm or at least minimize these impacts. From the social aspect, the development that will be carried out must be disseminated, supported and can be beneficial to all members of the community. From an economic point of view, the construction of this bridge must be planned to a minimum without reducing the strength of the bridge structure itself. The economic impact on the community certainly along the path of the bridge construction will indirectly increase the value of the land, the smooth distribution of agricultural and plantation products and the development of tourism that is currently developing. From an environmental point of view the development must be environmentally sound. An environmentally friendly development is a good development from an ecological or environmental perspective, in other words there is harmony with nature. To be able to realize bridge infrastructure development that is environmentally sound, every stage of the development must take into account the impact on the environment. Environmentally friendly development will automatically create sustainable development.

The government as a policy maker in bridge infrastructure development activities, in this case the Ministry of Public Works has issued many decisions, regulations and NSPM (norms, standards, guidelines and manuals) for bridge construction that is environmentally sound. These rules have been made part of the contract documents as outlined in the contract terms and in the technical specifications, so the rules are binding on the parties involved in the implementation of the bridge construction contract both the project and the service provider (contractor). In addition, the government is promoting the "green construction" program, which is an environmentally friendly development or construction activity. In bridge infrastructure development activities, the government is promoting a program to use recycled materials.

The construction of the connecting bridge of Antapan Village to Sulangai Village in terms of social, economic and environmental aspects was supported by all members of the community. From the questionnaire given to the respondents or community members in Antapan and Sulangai villages, they agreed to build the bridge. According to the people in the village of Antapan said that agreed in the construction of this bridge. With this bridge, of course it can...
facilitate the distribution of agricultural or plantation products. Besides that, it can open access areas between Antapan Village and Sulangai Village. The development of tourism in the village today of course this access can be supporting tourism, especially this area is close to Bedugul attractions. The construction of this bridge will certainly shorten the travel time between the two villages. Planning the construction of this bridge requires a more in-depth study of both technical and environmental aspects and will require ongoing maintenance.

V. CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The conclusion that can be drawn from this research is

1. Identification of topological conditions / terrain location of the bridge construction plan of the Antapan Village towards Sulangai Village is in the hills and mountains.
2. The design plan for the construction of the Antapan Village bridge to Sulangai Village, which is the length of the bridge plan, is 14 meters with a width of 6 meters. The design of the upper building in the form of bridge floors, longitudinal and transverse girder and backrest / reling. Underwater building design in the form of foundation and abutments.
3. The amount of the construction cost of the Antapan Village bridge to Sulangai Village is Rp. 1,546,171,000.00 or Rp.110,440,785.71 per meter.
4. The socioeconomic impact on the construction of the Antapan Village bridge towards Sulangai Village in Tabanan Regency is that the construction of the bridge can open access closer between Antapan Village and Sulangai Village, increase the economic value of the land around the bridge area, facilitate / facilitate distribution of agricultural and plantation products and develop tourism sector which is starting to grow and develop.

Recommendations

Based on the results of research, discussion and conclusions, the writer can suggest the following:

1. So that the planned bridge construction takes into account the environmental impacts where the location of the bridge will be built.
2. In order to carry out further research related to economic feasibility analysis, bearing in mind the costs involved in building bridges in this study are enormous.

REFFERENCES


Keputusan Bupati Tabanan Nomor 180/332/03/Hk & HAM/2016 Tentang Penetapan Desa Antapan sebagai Desa Wisata Di Kabupaten Tabanan


Pemerintah Kabupaten Tabanan. Profil Desa Antapan 2019

Peraturan Menteri Pekerjaan Umum dan Perumahan Rakyat Republik Indonesia Nomor 28/PRT/M/2016 Tentang Pedoman Analisis Harga Satuan Pekerjaan Bidang Pekerjaan Umum