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RISK MITIGATION IN THE LAUSIMEME DAM CONSTRUCTION PROJECT

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Abstract

The construction of the Simeme Dam is a part of efforts to support the development of the agricultural sector and to meet the needs of water in North Sumatra. The Lausimeme Dam construction project has been delayed from its planned schedule. The potential risks that will hinder the completion of the project when viewed from the internal, external and project sources and how to mitigate risks to obtain factors which influence the risk mitigation of the Lau Simeme Dam project in order to determine risk mitigation strategies. This study uses observation, interviews and field surveys compiled by a questionnaire based on a literature study that has been conducted on respondents related to the Lausimeme Dam Development Project and uses a causal descriptive method with a quantitative approach by identifying risks and risk indicators related to what possibilities may arise and will occur in the Lausimeme Dam Development Project. There are 77 risks that are relevant or likely to occur to the Lausimeme Dam Development Project and it is concluded that 68 risks are classified as high and 9 risks are classified as moderate in terms of influence level. Of the 68 risks that are classified as high, there are 15 top risks (largest ranking) that have the highest possibility to occur (probability) and the largest impact based on an assessment of the Lausimeme Dam construction project, therefore mitigation of these possible risks is needed. Mitigation that will be implemented to minimize the possibility of these risks to accour, including: socializing, fulfilling documents and licensing documents, obtaining BMKG data, involving the community and non-governmental organizations, making resource estimates based on analysis, carrying out cross-functional coordination, and preparing CAR.

Keywords: ***construction of the Simeme, related to the Lausimeme, CAR***

1. INTRODUCTION

Currently, infrastructure development is being actively implemented in order to accelerate national development. Infrastructure development that is being accelerated includes the construction of roads, bridges and dams. One of the implementations of infrastructure development that is being initiated by the Central Government which is one form of the President's Nawacita targets is the construction of the PSN (National Strategic Project) project, in this case through the Ministry of Public Works and Public Housing, Directorate General of Water Resources, Sumatra II River Basin Office. , namely the construction of the Lausimeme Paket Dam (MYC) in Deli Serdang Regency. This project is a national strategic project (PSN). The Lausimeme Dam Development Project initiated by the Ministry of Public Works and Public Housing (PUPR) is currently under construction in Deli Serdang Regency, North Sumatra Province (North Sumatra). Dam construction is a series of activities that must be completed in accordance with the work contract and also with a pre-agreed fee. Time and cost are important elements in project management control. Of course all contractors who get project work hope that the project they are working on is in accordance with the estimated time. In addition to fulfilling the work contract, this will also have an impact on projected profits for contractors.

The next problem that is often faced by contractors as project implementers is the non-identification and handling of risk factors in the implementation of the project, resulting in obstacles in achieving project objectives in the fields of time, cost and quality. The project carries out two kinds of risk management actions, namely preventing and correcting. Risk management is a system that is used to view a risk and determine whether there is a treatment for that risk. This is one of the efforts to be able to identify where the source of the risk comes from and what uncertainties follow, in order to be able to estimate the impact that will arise from the risk and develop all responses that must be made in responding to this risk. As a risk countermeasure on every project within the PT. Wijaya Karya (Persero) Tbk, it is necessary to implement an Early Warning System with the aim that the significant impact of risks that will occur can be mitigated in advance or detected as early as possible. Phenomena that lately often occur in the projects of PT. Wijaya Karya (Persero), Tbk is the completion of projects that are not in accordance with the Initial Project Work Plan (RKAP), based on data on the performance evaluation of PT. Wijaya Karya (Persero), Tbk.

2. IMPLEMENTATION METHOD

2.1 Types of Research

This research was conducted using a causal descriptive method with a quantitative approach. This is intended to be able to provide a proper, accurate and systematic description of the relationship that occurs between the variables to be studied.

2.2 Research Locations

This research will be conducted at the location of the Lausimeme Dam Development Project in Sibiru-biru District, Deli Serdang, North Sumatra.

2.3 Data Collection Methodology

In terms of data collection methodology, this research uses observation, interviews and field surveys using a questionnaire based on a literature study that has been conducted on respondents related to the Lausimeme Dam Development Project. This is intended to obtain an overview of the risks that may occur in the implementation of the Lausimeme Dam Development Project.

2.4 Data Collection Techniques

Data collection was carried out using observation, interview and survey methods by distributing questionnaires to respondents who were competent, experienced or because of their position so that they could be used as a source of information. The distribution of the questionnaire was carried out in two stages, namely the distribution of the first questionnaire to determine the relevance of the risk indicators and the distribution of the second questionnaire to assess the risk variables.

2.5 Risk Ranking

According to Pusjatan (2005) quoted by Rustandi (2017), Risk ranking is the result of data processing based on time and costs carried out at the data analysis stage using the risk factor equation which is defined as the multiplication between the magnitude of each impact and the probability of a risk event calculated from the following equation this is:

$$\mathbf{FR = (L+I) – (LxI)}$$

with:

FR	=	Risk factors, with a scale of 0-1,
L	=	Probability of risk event (0 – 100%),
I	=	The size of the risk impact

2.6 Risk Matrix

The next analysis carried out is the Probability Impact Matrix. It is used to express the level of importance of a risk by looking at the combination of the probability of occurrence of the risk and the impact of the risk, then including both in a probability and impact scale.

Markrisk is the multiplication of the probability score and the impact score. The risk score is obtained from the respondents. To measure risk, you can use the following formula:

$$\mathbf{R = P \times I}$$

Where:

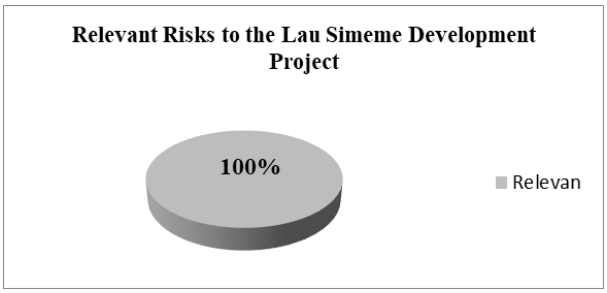
R = Risk Level

P = Likelihood (Probability) risks that occur,

I = Level of impact of risks that occur (Impact)

3. RESULTS AND DISCUSSION

This research was conducted to determine the risks relevant to the Lausimeme Dam Development Project. After obtaining the relevant risks, an assessment is then carried out to find out what risks can potentially occur in the Lausimeme Dam Development Project. After knowing which risks are included in the high category based on the assessment carried out, an evaluation is carried out to determine the appropriate action to deal with the risks that might occur in the project. Based on the results of the relevance calculation it is known that the 77 initial risks that were asked to respondents through distributing questionnaires, all of them are relevant to the Lausimeme Dam Development Project.



Source: Data Processing (2021)

Figure 1 Risk Relevance

3.1 Descriptive Analysis Results

Based on the results of the calculation and analysis of the Risk Factor (FR) on the impact and based on the risk level category, 68 risks are classified as high and 9 risks are classified as moderate. Of the 68 risks that are classified as high, the top 15 risks will be further evaluated (*rank*largest) that has the greatest probability of occurrence (probability) and the greatest impact based on the assessment of the Lausimeme Dam construction project.

Table 1 Ranking of the Top 15 Risk Factors for Impacts on the Lausimeme Dam Development Project

Risk Classification	Code	Risk Factors	Total Rating			Risk Rating
			L (Probability)	I (Impact)	FR	
J. Time Risk	J5	Delays in land acquisition	0.98	0.98	0.99	1
O. Political Risk	O2	Complexity in licensing issues	0.87	0.81	0.98	2
R. Risk of Weather Conditions	R2	High rainfall	0.71	0.85	0.96	3
R. Risk of Weather Conditions	R3	Unpredictable weather	0.71	0.85	0.96	4
F. Contractor and Sub-Contractor Risk	F1	Weather conditions that do not support the continuity of the development project	0.71	0.83	0.95	5
H. Field Work Risks	H3	Security disturbances at construction project sites	0.71	0.79	0.94	6
D. Contractual Risk	D1	Articles in the contract contain ambiguity	0.63	0.81	0.93	7
Q. Social Risk	Q2	Social problems around the development project site	0.69	0.77	0.93	8
E. Planning Risk	E2	Time estimation error	0.62	0.81	0.93	9
H. Field Work Risks	H4	Changes in the schedule for the implementation of work	0.71	0.73	0.92	10

Table 2 Top 15 Ranking of Risk Factors Against Impacts on the Lausimeme Dam Development Project (Continued)

Risk Classification	Code	Risk Factors	Total Rating			Risk Rating
			L (Probability)	I (Impact)	FR	
K. Cost Risk	K4	Increase in material prices	0.65	0.77	0.92	11
Q. Social Risk	Q1	Differences in work culture around the construction project site	0.67	0.75	0.92	12
Q. Social Risk	Q3	Safety issues around the construction project site	0.65	0.73	0.91	13
O. Political Risk	O3	Changes in government regulations	0.58	0.77	0.91	14
R. Risk of Weather Conditions	R1	Natural disasters	0.48	0.81	0.91	15

Source: Data Processing (2021)

If the results of the calculation of the Risk Factor (FR) have the same result, then the risk factor with the larger impact value is chosen. Based on these results, it is followed by mitigation and these risk factors.

3.2 Risk Allocation

In this discussion, risk allocation will be carried out. The risk that will be allocated is a risk with a high level of risk because it has the potential to occur in the Lausimeme Dam Development Project. These risks will be allocated to the parties involved who are able to manage these risks, namely service users and service providers on the project. The purpose of this risk allocation is to control losses due to the occurrence of these risks in the Lausimeme Dam Development Project.

Table 3 Allocation of Risk Factors for Impacts on the Lausimeme Dam Development Project

Risk Classification	Code	Risk Factors	FR	Risk Allocation	
				Service Provider	Service User
J. Time Risk	J5	Delays in land acquisition	0.99		√
O. Political Risk	O2	Complexity in licensing issues	0.98		√
R. Risk of Weather Conditions	R2	High rainfall	0.96	√	√
R. Risk of Weather Conditions	R3	Unpredictable weather	0.96	√	√
F. Contractor and Sub-Contractor Risk	F1	Weather conditions that do not support the continuity of the development project	0.95	√	√
H. Field Work Risks	H3	Security disturbances at construction project sites	0.94	√	
D. Contractual Risk	D1	Articles in the contract contain ambiguity	0.93	√	√
Q. Social Risk	Q2	Social problems around the development project site	0.93	√	
E. Planning Risk	E2	Time estimation error	0.93	√	
H. Field Work Risks	H4	Changes in the schedule for the implementation of work	0.92	√	
K. Cost Risk	K4	Increase in material prices	0.92	√	√
Q. Social Risk	Q1	Differences in work culture around the construction project site	0.92	√	
Q. Social Risk	Q3	Safety issues around the construction project site	0.91	√	
O. Political Risk	O3	Changes in government regulations	0.91	√	√
R. Risk of Weather Conditions	R1	Natural disasters	0.91	√	√

Source: Data Processing (2021)

3.3 Risk Mitigation

After all relevant risks have been identified and calculated, it will be followed by taking appropriate actions to manage these risks if they occur in the Lausimeme Dam Development Project. Based on calculations and analysis, it is found that the risk level in the Lausimeme Dam Development Project consists of high risk and medium risk. Risks that are classified as high risks need to get the right action in handling them because it is likely that these risks will have a significant impact on project implementation. Based on this, a series of appropriate mitigation measures is needed in an effort to reduce these risks.

Based on the research results, it was found that 82% of high risk comes from internal risk and project risk. From these results, the Lausimeme Dam Development Project should focus more on project planning, monitoring and implementation. After calculating the risk factors and analyzing them, the next step is to take appropriate actions in managing these risks if they are likely to occur. From the top 15 based on risk ranking, the risks that may occur in the Lausimeme Dam

Development Project are time risk, political risk, weather condition risk, contractor and sub-contractor risk, field work risk, contractual risk, social risk, planning risk, and cost risk. Therefore, the risk mitigation efforts that will be carried out can be seen below.

3.4 Delay in Land Acquisition (J5)

Delay in land acquisition is included in the risk of time. Time risk is included in project risk which is the focus of handling in this study. This risk is included in the allocation of service users. The impact that might occur if this risk occurs is that the scheduling of the implementation of development projects that have been mutually agreed upon will be disrupted due to land that has not been acquired. This will result in a delay in the schedule for other activities so that the target for completion of this project will also be disrupted.

Risk mitigation efforts carried out in an effort to control the impact on the risk of delays in land acquisition, namely:

1. Service Provider namely PT. Wijaya Karya (Persero), Tbk provides a list of land locations that have not been acquired to be immediately followed up by service users because it will be related to the agreed schedule with service users.
2. Checking the status of existing land from employers, related agencies and local governments, ensuring overlapping land status and land ownership status.
3. Dissemination of the Lausimeme Dam construction plan to the community around the construction site.
4. Make an agreement on the compensation process so that it does not harm each other and can anticipate the pattern of community around the construction site.
5. Calculating the impact of delays due to land acquisition related to the impact of costs and also the processing time.

3.5 Complexity in Licensing Issues (O2)

The complexity of licensing issues is included in the political risk. Political risk is included in the external risk which is one of the risks in this study. This risk is included in the allocation of service users. The impact that might occur if this risk occurs is the disruption of the schedule that has been prepared and mutually agreed upon which will result in the planned target completion for project work. Another impact that may also occur is the addition of project operational costs related to the licensing process with interested parties.

Risk mitigation efforts carried out in an effort to control the impact on the risk of complexity in licensing issues, namely:

1. Service providers ensure service users that the supporting documents related to licensing issues are complete and meet the requirements for each relevant agency.
2. Good coordination between service providers and service users regarding the process of managing licensing issues.
3. Service providers and service users take a persuasive approach to the parties involved.
4. Collect data on the obstacles encountered along with an implementation schedule so that they can be followed up immediately.

3.6 High Rainfall (R2) and Uncertain Weather (R3)

High rainfall and erratic weather are included in the risk of weather conditions. The risk of weather conditions is included in the external risk which is one of the risks in this study. This risk

is included in the allocation of service providers and service users. The impact that might occur if this risk occurs is the increase in the operational costs of implementing the project, namely the costs for the team of workers and the rental of the tools needed due to work delays. This is due to the large amount of idle time due to high rainfall. Another impact that may occur is the delay in the project work schedule that has been prepared and mutually agreed upon.

Risk mitigation efforts undertaken in an effort to control the impact on the risk of high rainfall and erratic weather are:

1. Obtain data from BMKG regarding weather conditions at the project location so that service providers can estimate weather conditions.
2. Prepare project insurance related to cost impacts due to weather conditions.
3. Prepare several relevant alternatives so that some work can still be carried out by project workers during conditions of high rainfall and when weather conditions are uncertain.

3.7 Weather Conditions That Do Not Support the Sustainability of Development Projects (F1)

Weather conditions that do not support the continuity of the development projectincluded in the risk of contractors and sub contractors. Contractor and sub-contractor risks are included in internal risks which are the focus of handling in this study. This risk is included in the allocation of service providers and service users. The impact that may occur if this risk occurs is not too different from the impact on the risk of weather conditions. The impact is that the project work schedule is disrupted due to weather conditions that do not support the sustainability of the development project. In addition, the impact that may occur is the addition of operational costs for project workers and the cost of renting tools and equipment due to work delays. This will also have an impact on the availability of funds for this project.

Risk mitigation efforts carried out in an effort to control the impact on risk kWeather conditions that do not support the sustainability of development projects are not too different from the risk of weather conditionsthat is:

1. Contractors and sub-contractors need to prepare daily data from BMKG regarding weather conditions at the project site so that service providers can estimate weather conditions.
2. Prepare project insurance related to cost impacts due to weather conditions.
3. Prepare several relevant alternatives so that some work can still be carried out by contractors and sub-contractors when weather conditions do not support the sustainability of the development project.
4. Create a storage warehouse for the materials used to protect them from weather conditions that do not support the sustainability of the development project so that additional material costs due to damage can be avoided.

3.8 Disturbances and Security Issues at Development Project Sites (H3 and Q3)

Disturbances and security issues at construction project sitesincluded in field work risks and also included in social risks. Field work risks are included in internal risks and social risks are included in external risks. Based on this, security at the construction project site is a matter that needs to be considered in the Lausimeme Dam Development Project. Both types of risk are included in the allocation of service providers. The impact that might occur if this risk occurs is discomfort in work which results in the ineffectiveness of project work being carried out. This also has an impact on the progress of work implementation in the field.

Risk mitigation efforts carried out in an effort to control the impact on risksafety at construction project sitesthat is:

1. There is a disturbance permit granted by the local regional government involving the approval of the community around the project site prior to the commencement of the construction project.
2. Increasing work opportunities for the community around the project site to prevent social jealousy which will impact on security disturbances at the construction project site.
3. Identify all security risks that have the potential to occur at the construction project site so that preventive and security measures can be taken.
4. There is a clear SOP (Standard Operating Procedure) to prevent the level of work accidents during the implementation of development projects so that they can go to zero accidents.
5. There is a penalty clause in the contract if there is a violation of occupational health and safety (K3).

3.9 Articles in the Contract Contain Obscurity (D1)

Articles in the contract contain ambiguityincluded in contractual risk. Contractual risk is included in internal risk which is the focus of handling in this study. This risk is included in the allocation of service providers and service users. The impact that might occur if this risk occurs is that it can cause ambiguity so that it can pose a risk to the service provider. This will affect the terms of the bill of work relating to the quality, quantity and method of work to be carried out.

Risk mitigation efforts undertaken in an effort to control the impact on risk porigin in the contract contains ambiguitythat is:

1. Observing the contents of the contract both for service providers and service users. This is because contracts are legally binding documents and have consequences for both service providers and service users to regulate rights and obligations.
2. In observingIf the clause in the contract contains ambiguity, it must be carefully examined if there is confusion, errors and unclear definitions of each article contained in the contract to prevent misunderstandings.
3. There is equality in the contract to achieve fair and equal conditions based on the applicable construction services laws and regulations. In this section, you can use the services of someone who is an expert in the related field to provide assistance to both parties.
4. Examine every aspect contained in the contract related to technical aspects, legal aspects, socio-economic aspects, administrative aspects, financial aspects and aspects regarding insurance.

3.10 Social Problems Around Development Project Sites (Q2) and Differences in Work Culture Around Development Project Sites (Q1)

Social problems around the construction project site and differences in work culture around the development project siteincluded in social risk. Social risk is included in external risk which is one of the risks in this study. This risk is included in the allocation of service providers. The risk of social problems arises because the culture or social conditions around the development project location are not taken into account. The impact that might occur if this risk occurs is that the team

of project workers cannot work effectively because they feel uncomfortable. This can affect the schedule that has been prepared and mutually agreed upon and also have an impact on the progress of work implementation in the field. If a solution to this risk is not immediately sought, it will have an impact on the disruption of the project implementation process and can cause tension between the community around the project site and the project team.

Risk mitigation efforts carried out in an effort to control the impact on riskSocial problems around the construction project site and differences in work culture around the development project sitethat is:

1. Implementing people-oriented programs (community development programs around the project site to prevent social jealousy). One of the things that can be done is to increase work opportunities for the community around the project site to prevent social jealousy which will impact work in the field.
2. Identify all risks of social problems that have the potential to occur at the location of the development project so that steps can be taken to prevent and protect them.
3. There has been a permit from the local regional government which has gone through the approval of the community around the project site so that there will be no social problems in the future.
4. There are clear regulations accompanied by making directions for the entire team of project workers so that there is a common perception in carrying out the work. This is to minimize differences in work culture around the construction project site

3.11 Time Estimation Error (E2)

Time estimation errorincluded in planning risk. Planning risk is included in internal risk which is the focus of handling in this study. This risk is included in the allocation of service providers. This risk occurs due to erratic weather changes, design changes, unfinished and approved designs and inaccuracies in the arrangement of activity sequences in development projects. The impact that might occur if this risk occurs is that the project implementation schedule will be disrupted, the project operational costs will increase, and the project completion will change from the schedule that has been determined jointly between the service provider and the service user.

Risk mitigation efforts carried out in an effort to control the impact on risktime estimation errorthat is:

1. In preparing the development project implementation schedule, the time allocation for each work must be clear.
2. Identify project activities so that inaccuracies in the arrangement of project activity sequences can be minimized.
3. Supervise the schedule of development project activities
4. Make estimates of project resources along with estimates of the duration of project activities based on an analysis of previous data so that estimates can be made for the same type of work.
5. Supervise and re-check the work that has been done and will be done in order to monitor any discrepancies that might occur.

3.12 Schedule Changes in Work Implementation (H4)

Changes in the schedule for the implementation of workincluded in the risk of field work. Field work risks are included in internal risks which are the focus of handling in this study. This risk is included in the allocation of service providers. The impact that might occur if this risk occurs is that the project implementation schedule will be disrupted, the project operational costs will increase, and the project completion will change from the schedule that has been determined jointly between the service provider and the service user.

Risk mitigation efforts carried out in an effort to control the impact on riskschedule changes to the execution of workthat is:

1. Rescheduling and monitoring changes to implementation schedules in the field as well as monitoring the types of work that experience changes to the schedule.
2. Handle incentives for any work that experiences schedule changes in the implementation of work in the field.
3. Identify any type of work that can still be done that is not affected by changes in the schedule of work execution.

3.13 Increase in Material Prices (K4)

Increase in material pricesincluded in the cost risk. Cost risk is included in project risk which is the focus of handling in this study. This risk is included in the allocation of service providers and service users. The impact that might occur if this risk occurs is an increase in operational costs in carrying out the project which can result in serious losses due to changes in plans at the beginning of the agreement. In addition, the impact of increasing material prices is not achieving the predetermined profit margins.

Risk mitigation efforts carried out in an effort to control the impact on riskincrease in material pricesthat is:

1. Determine the calculation of price escalation in the mutually agreed contract.
2. Establish good relations with suppliers and increase alternative suppliers so that they are ready to supply materials.
3. Make an agreement on price change approval procedures and set change thresholds.
4. Order materials early and according to the schedule set for each field work.

3.14 Amendments to Government Regulations (O3)

Changes in government regulationsincluded in the political risk. Political risk is included in the external risk which is one of the risks in this study. This risk is included in the allocation of service providers and service users. The impact that might occur if this risk occurs is that the field work schedule will be disrupted due to changes in regulations made by the government. This will result in a delay in the schedule for other activities because of these changes which can cause a delay in the target of completing project work.

Risk mitigation efforts carried out in an effort to control the impact on riskchanges in government regulationsthat is:

1. Carry out coordination meetings between service providers and service users to determine further actions related to regulatory changes made by the government
2. Reviewing the project work schedule and making alternative actions related to the schedule.

3.15 Natural disasters (R1)

Natural disastersincluded in the risk of weather conditions. The risk of weather conditions is included in the external risk which is one of the risks in this study. This risk is included in the allocation of service providers and service users. The impact that might occur if this risk occurs is an increase in operational costs in project work due to delays in work. This risk also has an impact on delaying the work schedule that has been mutually agreed upon.

Risk mitigation efforts carried out in an effort to control the impact on natural disaster risks, namely:

1. Prepare project insurance related to the cost impact due to the natural disaster conditions.
2. Prepare several relevant alternatives so that some work can still be carried out by project workers when these conditions occur.

4. MANAGERIAL IMPLICATIONS

From the results of the processing and analysis that has been carried out, the highest risk both in terms of the probability of its occurrence and the impact on the development project is the risk of delays in land acquisition which will have an impact on the timing of the development project. This risk is included in the project risk classification. In addition to project risk, risks that have an impact on construction project work are internal risks. One of the internal risks with the highest ranking of the 15 risks that have been selected is the risk of security disturbances at construction project sites and clauses in contracts that contain ambiguity. Conditions like these, if not handled from the start, will create difficulties for service users and service providers in working on development projects.

1. The service user (Owner) and service provider (project team) conduct outreach to the community around the construction site so that they are aware of the positive and negative impacts of the Lausimeme Dam Development Project such as to meet raw water needs in North Sumatra Province and to support the development of the agricultural sector. In addition, this dam can be used as a source of irrigation for agricultural land and also as a flood control infrastructure in Deli Serdang Regency and also Medan City.
2. The service user (Owner) and the service provider (project team) make an agreement regarding the compensation process to the local community so that they do not harm each other and the community is willing to give up their land so thatthe risk of delays in land acquisition can be minimized.
3. Make clear SOPs (Standard Operating Procedures) to prevent work accident rates during construction projects so that they can go to zero accidents.
4. Providing opportunities to work for the community around the project site to prevent social jealousy from occurring which will impact on security disturbances at the construction project site.
5. The service user (Owner) and service provider (project team) involve the community around the project location with regard to project implementation permits so that security disturbances can be minimized.
6. For contractual issues related to clauses in the contract that contain ambiguityservice user (owner) and service provider (project team) canusing expert services in related fields to provide assistance to both parties.

5. CONCLUSION

Conclusions based on the results of this study, among others:

1. The risks that were declared relevant to the conditions of the Lausimeme Dam Development Project based on a survey of 77 respondents were risks.
2. Of the 77 risks relevant to the Lausimeme Dam Development Project, 88% are classified as high risks (68 risks) and 12% are classified as moderate risks (9 risks).
3. Based on the results of calculations and analysis, it is found that the 15 biggest risk factors are likely to occur (probability) and their impact is based on the calculation of the risk factor value (FR). These risks are delays in land acquisition (0.99), complexity in licensing issues (0.98), high rainfall (0.96), erratic weather (0.96), unfavorable weather conditions progress of the development project (0.95), Security disturbances at the construction project site (0.94), Articles in the contract contain ambiguity (0.93), Social problems around the construction project site (0.93), Time estimation errors (0 .93), Changes in work schedule (0.92), Increase in material prices (0.92), Differences in work culture around the construction project site (0.92), Security issues around the construction project site (0.91).
4. Some of the risk mitigation that can be done to control the occurrence of risks, namely Disseminating the Lausimeme Dam construction plan to the community around the construction site, Service providers ensure to service users that supporting documents related to licensing issues are complete and meet the requirements for each relevant agency , Obtain data from the BMKG regarding weather conditions at the project site so that there are forecasts of weather conditions for service providers, Increase work opportunities for communities around the project site to prevent social jealousy which will impact security disturbances at the construction project site,Make estimates of project resources along with estimates of the duration of project activities based on analysis of previous data so that estimates can be made for the same type of work, Establish price escalation calculations in contracts that have been mutually agreed upon, Carry out coordination meetings between service providers and service users to determine further actions related to regulatory changes made by the government, and Prepare project insurance related to the impact of costs due to the natural disaster conditions.and Prepare project insurance related to the impact of costs due to the natural disaster conditions.and Prepare project insurance related to the impact of costs due to the natural disaster conditions.

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