

Lessons Learnt From Communal Waste Water Treatment Plant (WWTP) At Kampung Polehan, Malang City

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Abstract- Kampung Polehan is appointed as one of slums in Malang City. This is inseparable from the problems of sanitation services faced. To overcome sanitation problems, Kampung Polehan, especially RW 1, has received assistance in the construction of WWTP. However, this still causes environmental problems, especially related to its operations and maintenance. Therefore the purpose of this study is to describe the performance of WWTP management in Kampung Polehan, especially its operations and maintenance. The method is descriptive using a case study approach. Problems related to WWTP in the study area tend to be due to lack of maintenance carried out by users and managers.

Keywords— WWTP, sanitation, management, operations, maintenance

I. INTRODUCTION

Urban is a service center, center of population concentration, and an economic center [1]. This is the main attraction for the population so that urbanization becomes inevitable. Along with the growth of the city population will also be followed by various problems [2]. The problem that is often faced by urban communities regarding the environment is sanitation problems. Along with the pressure of population growth, the level of household waste is also increasing and requires special handling.

Malang is a city that is growing quite rapidly with a high rate of population growth and physical development. Sanitation issues are also still unresolved agenda [3], one of them is in Kampung Polehan. Based on the Decree of the Mayor of Malang City No. 188.45 / 35.75.112 / 2015, Kampung Polehan is one of the slums in Malang City. This shows that in Kampung Polehan there has been a decline in environmental quality. Where one focus of the problem is in Kampung Polehan, in this case devoted to RW 01 especially wastewater or sanitation.

Wastewater settlement is all waste water that comes from bathrooms, kitchens, washing and latrines as well as household industrial wastewater that does not contain toxic and hazardous substances (B3) from settlements [4]. Settlement wastewater management that does not meet the requirements can be a source of transmission of diseases that

threaten public health. Therefore, residential wastewater needs to be handled carefully. Adequate residential wastewater management system are one physical (technical) and non-physical (non-technical) system in the form of a local processing unit (septic tank / communal MCK) and / or in the form of a centralized treatment system (drainage of wastewater from home connections through the network piping which is then processed in a wastewater treatment plant both on a regional and city / regional scale) [4].

The RW 01, Kampung Polehan area has a high population density. There is 447 people/ha with a house density of 106 houses/Ha. High building density and locations around the Brantas River cause residents to experience difficulties and limitations in having septic tanks to meet the requirements of healthy sanitation and environmentally friendly. Some even throw stool waste into the Brantas River. To overcome this problem in 2012 the USRI program built 1 unit of Waste Water Treatment Plant (WWTP) located in RT 11. In 2015 a unit of WWTP was built by Malang City Government at RT 10. However, sanitation problems did not solve even though there was already two WWTP. The WWTP function does not run in accordance with the wishes of stakeholders and the community. What happened initially was a blockage in the WWTP pipe so that the residual waste could not flow properly. The second problem is WWTP leakage in RT 11. The leakage of the WWTP was quite disturbing to the community, specifically the presence of a pungent odor that disrupted and polluted the water. It is known that the leakage then seeped into the soil and Brantas River. Regarding the above, the purpose of this study is to know the performance of WWTP management in Kampung Polehan.

II. METHODOLOGY

The method used is descriptive method using a case study approach. The location of the study was conducted at RW 01 Kampung Polehan, Blimbing District, Malang City. The research location was chosen as a place of research because it had been established as a slum and had received the WWTP program from USRI and Malang Government in 2015. In

addition, the management of WWTP in Kampung Polehan was handed over to the surrounding community.

The research data collected included the number of WWTP users, problems related to WWTPs, participation conditions user community, as well as institutional conditions for the management of WWTP and the actual conditions of the research area. The collection of beneficiary respondents used purposive method as many as 55 families while the management respondent were 3 people. Data analysis was carried out descriptively by describing the field data that had been obtained with the aim to describe the condition of WWTP management especially operations and maintenance of WWTP at Kampung Polehan.

III. RESULT

Settlement wastewater treatment facilities used in RW 01 Kampung Polehan are the local processing units in the form of septic tanks, communal toilet, and a centralized treatment system in the form of WWTP. Where 421 houses use septic tanks, 122 houses use WWTP, 5 family use communal toilet, and 47 houses do not have adequate wastewater management facilities.

There are 2 units of WWTP in RW 01 that located at RT 11 and RT 10, each dimension 15 m x 3 m x 2.5 m. The WWTP that located at RT 11 was built in 2012 through the Community Based Urban Program (SPBM), which is one component of the Urban Sanitation and Rural Infrastructure Program (USRI) which was held as a supporting program for PNPB-Mandiri. Whereas the WWTP at RT 10 was built by the Malang City Government. The WWTP in RT 10 is share used by user at RW 04 too.

In 2017 the number of WWTP users in RW 01 was 122 houses, there are 6 houses at RT 01, 3 houses at RT 07, 72 houses at RT 10, and 41 houses at RT 11 (Figure 1). Operations and maintenance of WWTP at RW 01 were managed by the community, with the source of funds derived from user contributions is Rp. 2,000, - every month.

But the WWTP function does not work in accordance with the wishes of the community. What happened initially was a blockage in the WWTP pipeline and the second problem is the occurrence of WWTP leakage in RT 11. The leakage of the WWTP caused an impact that was quite disturbing to the community, especially pungent odor that disrupted and polluted the water. It's disturb the residents whose houses were close to the WWTP. It is known that the leakage then seeped into the soil, although until now there have been no action regarding water pollution due to WWTP waste, but the water that seeps can contaminate surface and ground water.

There is no proper action to deal with the leakage of the WWTP by the community or the government. This certainly creates anxiety for residents who live around the location of the IPAL pipe leak related to environmental health. Management and maintenance of a good WWTP should not

only rely on the community but must also be supported by institutional aspects between each management device.

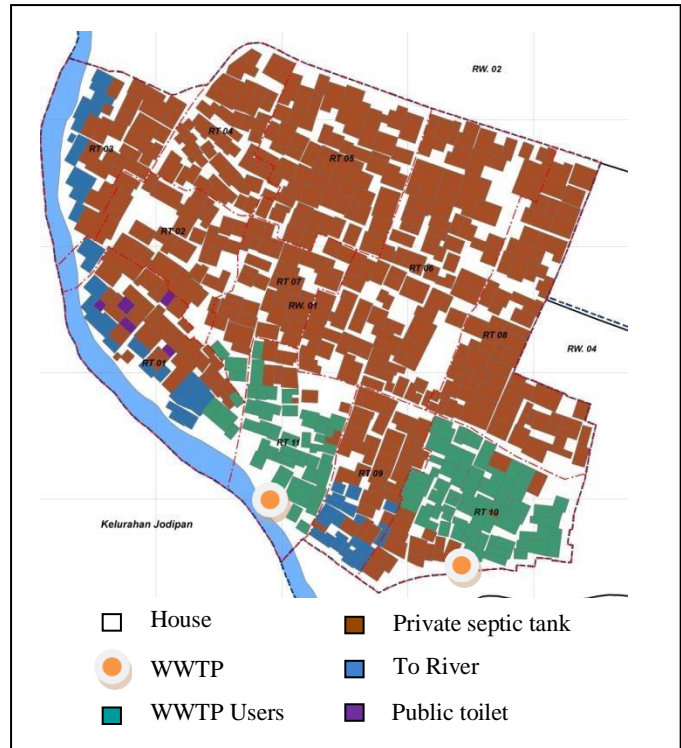


Figure 1. Sanitation at RW 1 Kampung Polehan

There is operations and maintenance instructions for communal system users [5]:

1. Don't throw oil into the kitchen drain
2. Don't put solid waste into the toilet
3. Don't throw chemicals into the channel
4. Don't plant trees near the pipeline and WWTP
5. Use enough laundry soap and cleanser because it is good for processing systems and saves
6. Take the floating dirt from the fat catcher tub every 3 days
7. Dispose of only liquid waste from the bathroom and kitchen, and give filters to separate solid waste
8. Check the control tub at home every 3 (three) days
9. Dispose of solid waste, sand / mud, and collect in a plastic bag and take it to a dump

Referring to the operation and maintenance instructions for the users of the communal system in the study area the user never checks the control tub at home every 3 days, the inspection is carried out only when there is a channel bottleneck.

There is operations and Maintenance Instructions for Communal System Managers that are carried out once a week [5]:

1. Check each control tub in the piping system
2. Dispose of solid waste and floats
3. If there is no water flow in the control tub, the pipe may be blocked or damaged

- Stop activities at house sanitation
 - Open the piping, ask the repairman to repair the damage
4. If there is an overflow of water from the control tub, the pipe may be clogged
 - Stop the activity at house sanitation, immediately repair if there is damage to the pipe
 - Poke from the control tub to another control tub
 - Ask the repairman to repair the damage as soon as possible
 5. Dispose of solid waste and floats from the inlet tub
 6. All WWTP control tubs and manhole covers must be opened to facilitate operation and maintenance
 7. Collect all the dirt, put it in a plastic bag. Dispose of it

There is operations and maintenance instructions for communal system managers, which are carried out once every 2 weeks [5]:

1. Starting from the inlet tub, proceed to the next tub
2. Take dirt right under the manhole
3. Use the T tool to collect dirt just under the manhole
4. Remove all the dirt collected until nothing is left

In the research, weekly and 2-week maintenance areas were not carried out. Examination is only carried out at any time (not periodically), especially when a blockage occurs. There is operations and maintenance instructions for the communal system manager, which is carried out every 6 months, a wastewater quality test [5]:

1. Call service related WWTP
2. Take 2 samples of wastewater from the inlet and outlet tubs, 2 liters each in a separate bottle
3. Bring 2 bottles of sample to the referred laboratory, ask for an examination of pH, BOD5, COD, TSS and fat

At Kampung Polehan, to 2017 wastewater quality tests have never been carried out. Then the function of WWTP unidentified.

There is instructions for implementing Communal WWTP drainage: One time every 2 years, draining with feces trucks [5] :

1. Call the stool dewatering company
 2. Open all manhole caps on the WWTP
 3. Lift the dirt to float and throw it in the trash
 4. Insert the suction pipe from the stool truck to the bottom of the tub, suction starting from the first tub.
 5. The suction sludge is black mud
 6. Stop draining if the slurry that is aspirated is fresh mud
- Up to 2017 in the study area, WWTP has never been carried out.

From the aspect of community role, it was found that the enthusiasm of the community to be involved in waste water management was very large but not accompanied by sufficient knowledge of operational procedures so that continuous socialization was needed.

Based on the conditions above, it can be seen that the management of WWTPs by the community has not been optimal. This also seems to occur in several other study locations.

Based on research on community-based WWTP in Ngijo Sub-District, Gunung Pati District, Semarang City, which was carried out by Ulum (2015), shows that the quality of wastewater coming out into the environment is still below environmental quality standards. In addition, the IPAL management institution has not been optimal, and the participation of the community in operations is also not optimal [6].

IV. CONCLUSIONS

Based on the existing conditions and maintenance instructions mentioned above, it can be seen that routine maintenance that should be carried out by both users and managers is lacking. Operations carried out tend to wait for problems to occur rather than prevent problems. The leak that occurred in the WWTP also had no further solving by both the manager and the local government (in this case the complaint reported by the community had not received a response). This illustrates that the condition of the management of WWTP that has not been maximized can result in a decrease in WWTP function and environmental quality too. Coaching and training is needed for managers and users (community) related to the operation and maintenance of WWTPs so that they can function optimally and in accordance with standards.

Based on this conclusion, the people of Kampung Polehan should further increase participation in the maintenance of facilities for the Communal Wastewater Treatment Plant, by not disposing solid waste into the installation network, periodically controlling and cleaning or draining and repairing or replacing damaged facilities so that the existing facilities can function properly and can be used for a long time. Communal WWTP Managers along with community leaders should always provide an understanding of the importance of household waste water managed so as not to pollute the environment and disturb comfort.

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