DELAY ON THE ZONE ESTABLISHMENT WORK PROCESS IN NON-REVENUE WATER REDUCTION PROJECT

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To my beloved mother, father, brothers, sisters and fiancée.

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ABSTRACT

The difference between amount of water put into the distribution system and the amount of water billed to consumers is termed as Non-Revenue Water (NRW). It is a major issue effecting water utilities in developing countries nowadays. NRW project in Selangor is outsourced so that it could be managed in a more effective manner. Zone establishment is the main scope of work to be done for NRW Phase 2 Project in Selangor. Delay that occurs during the process of zone establishment makes the entire organization to be unorganized due to last minute work preparation and drop in quality of work. This process consists of several activities done by different departments in an organization. This study is done to identify the delay activities, factors that cause the delay and finally a new improved zone establishment work process will be recommended. The main aim of this study is to improve the current zone establishment work process so that delay can be minimized. There will be two stages of data collection and analysis. The first stage will be to identify the delay activities by studying the flow of activities for ten different zones. Identifying the factors that cause delay by interviewing the head of department and personal responsible for the delay will be the second stage of data collection and analysis. Overall there were three main activities that cause the major delay in the work process. Outcome from the interview done to the head of departments and personal responsible of those delay activities has shown indirectly the factors that causes the delay. There are four factors that have been identified and three strong strategies to minimize the problems are suggested. Finally a new improved zone establishment work process has been recommended.

ABSTRAK

Perbezaan diantara air yang disalurkan ke dalam paip retikulasi dan caj yang dikenakan melalui meter pengguna juga disebut sebagai air tidak berhasil. Isu air tidak berhasil sudah menjadi satu isu yang hangat dan serius dikebanyakkan negara membangun. Projek air tidak berhasil di Selangor telah dipertanggungjawabkan kepada syarikat sawasta supaya projek ini boleh diuruskan dengan lebih cekap. Pengistiharan zon adalah salah satu skop utama dalam projek fasa dua air tidak berhasil di Selangor. Kelewatan dalam menjalankan kerja pengistiharan zon ini telah mengakibatkan kerja menjadi tidak teratur dan kualiti kerja menurun. Proses pengistiharan zon ini melibatkan beberapa aktiviti yang dijalankan oleh jabatan yang berlainan dalam organisasi tersebut. Kajian ini dijalankan dengan tujuan untuk mengesan aktiviti yang bermasalah, fakto-faktor yang menyebabkan kelewatan dan satu proses pengistiharan zon yang lebih baik akan dicadangkan di penghujung kajian. Misi utama kajian ini adalah untuk memperbaiki proses pengistiharan zon yang sedia ada. Kajian ini melibatkan dua tahap pengumpulan data dan analisis. Tahap pertama adalah bertujuan untuk mengenal pasti aktiviti yang bermasalah dan tahap kedua pula bertujuan untuk mendapatkan faktor-faktor yang menyebabkan kelewatan tersebut. Pengumpulan data dan analisis tahap kedua dijalankan melalui temuramah bersama ketua jabatan dan pegawai bertanggungjawab yang mengakibatkan kelewatan pada proses tersebut. Hasil kajian menunjukkan terdapat tiga aktiviti yang bermasalah kerana lewat. Hasil daripada temuduga yang dijalankan, secara tidak langsung dikenal pasti empat faktor yang menyebabkan kelewatan pada proses tersebut. Tiga stategi telah dicadangkan bagi mengatasi sebab-sebab kelewatan tersebut. Akhirnya, satu proses pengistiharan zon yang lebih baik dan cekap telah dicadangkan.

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NRW	-	Non-Revenue Water
ZE	-	Zone Establishment
HQ	-	Headquarters
SYABAS	-	Syarikat Bekalan Air Selangor Sdn Bhd
DMZ	-	District Meter Zoning
PRV	-	Pressure Reducing Valve
M&M	-	Monitoring and Maintenance Team
CPD	-	Contract and Procurement Department

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CHAPTER 1

INTRODUCTION

1.1 Definition of NRW and Zone Establishment

Twenty years ago, leakage management was based on a process of *'guesstimation'* and not precise science. This has changed dramatically, kick-started by the regulatory pressure on local water authorities to cut down on leakage. Significant advances have been made in the understanding followed by modeling of water loss components and on defining the economic level of leakage for individual systems. Despite some encouraging success stories, most water supply systems worldwide continue to have high levels of water losses.

One of the major issues affecting water utilities in these developing countries is the considerable difference between the amount of water put into the distribution system and the amount of water billed to consumers. It is also called Non Revenue Water (NRW). High levels of NRW reflect huge volumes of water being lost through leaks, not being invoiced to customers or both. It seriously affects the financial viability of water

utilities through lost revenues and increased operational costs. A high NRW level is normally a surrogate for a poorly run water utility that lacks the governance, autonomy, accountability, technical and managerial skills which are necessary to provide reliable service to their population.

District Meter Zoning (DMZ) is a technique used in reducing NRW water level in most of the developing countries. This technique is becoming more prevalent with the increasingly urgent necessity to better manage water networks and to reduce the relatively high levels on NRW. Although the majority of these District Meter Zoning projects are proven to be successful in the short term, unfortunately some are perceived as less than successful in the long term due to a lack of District Meter Zoning continuity and sustainability.

Zone Establishment (ZE) is a process in this DMZ technique. The basic principle for this process is to install a Bulk Meter and Pressure Reducing Valve (PRV) at a strategic point in the distribution system. Each meter records the flow into the discrete zone that has been set up with a defined and permanent boundary. This enables night flows into the zone to be regularly monitored for calculation of leakage level. Previously unreported leaks are then identified, accurately located and repaired. The water pressure in each zone is also controlled trough the PRV that has been fixed. By this way, background and future leakage could be minimized.

1.2 Background of Study

The key to developing a strategy for management of non-revenue water (NRW) is to gain a better understanding of the reasons for NRW and the factors which influence its components. Techniques and procedures can be developed and tailored to the specific characteristic of the network and local influencing factor. This is to tackle each of the components in a prioritized manner. This diagnostic approach, followed by the practical implementation of solutions which are practicable and achievable can be applied to any water company located in any part of the world to develop a strategy for NRW management.

Non-revenue water is the difference between water produced and water sold. The level of NRW has reached unacceptable levels in the majority of water utilities all around the world. Outsourcing of NRW reduction activities is often the only feasible solution. In the year 2000, the world largest NRW reduction contract at that time was the Selangor NRW reduction project. The estimated cost for the whole project was RM 398 Million . Phase 1 project for non-revenue water in Syabas was done by Premier Ayer Sdn Bhd. Phase 2 is a continuous project works from phase 1.The second phase was awarded to Jalur Cahaya Sdn Bhd which is a new face in water industry around klang valley. Duration for phase 2 project is from Mac 2006 to April 2009 with a contract value of RM 163 Million. The contract will be extended by the client depending on the performance of the company during the existing contract period. The job scope of this project is to maintain the existing 222 zones that had been setup during phase 1 project. Besides the maintenance work, the main task of this project is to setup new additional zones and achieve the targeted water savings during the project period. Setting up new zones is also called Zone Establishment. Zones here mean dividing the distribution system into small discrete sectors so that the leakage and pressure management can be done effectively.

There are few stages involved in zone establishment process before a zone could be setup completely and verified as a successful zone by the client. This zone will be maintained all the time during the contract period. Delay occurs during the process of zone establishment that makes the entire organization to be unorganized, last minute work preparation and drop in quality of work. Project delays cause the client to be unhappy with the contractor involved.

1.3 Justification of Study

Zone Establishment is the main scope of work to be done for the NRW Project in Selangor. The delay that occurs during the process of Zone Establishment makes the target of the project more complicated and difficult to be achieved.

This study is being done to identify the delays and problems that cause these delays. This identification can be very useful to improve the zone establishment process by making it more efficient and systematic to produce a high quality outcome. A new improved Zone Establishment work process will be recommended at the end of the study. The study can also give a helping hand to the organization to extend its current contract period to a longer duration as zone establishment work process is a main job scope of the project.

1.4 Aim and Objectives

This study has targeted three objectives to achieve at the end of the study period. The objectives are:

1. To identify the delay that occurs in current Zone Establishment Work Process.
2. To identify the factors that causes the delay in current Zone Establishment Work Process.
3. To propose new strategies to improved Zone Establishment Work Process.

These three objectives are the specific goals that undertake the responsibilities to achieve the aim of the study. The main aim of this study is to improve the current zone establishment work process so that delay can be minimized.

1.5 Scope of Study

Five zones that are going to be established during the study period will be selected and focused. The first process or activity will be the trial hole work. The purpose of this work is to identify the pipe size, overall site condition including the underground cabling services and to gather all other related information. The final activity in Zone Establishment process will be the handing over the zone to the Monitoring and Maintenance Team (M&M) and preparing a white folder file. M&M team will take after the over the zone and maintain it over the contract period. White folder that has been prepared will be submitted to the client for zone recognition. This

white folder would contain all detailed information of that particular zone including the maps, test results and all other important documents. The focus will be on the duration of all activity involved in Zone Establishment work process.

The duration from the activity for all five zones will be compared with the targeted duration set by the organization. If there is a very obvious delay in most of the zones, study will be done to identify the problems that cause the delay. This includes discussions with the head of department or person responsible who causes the delay.

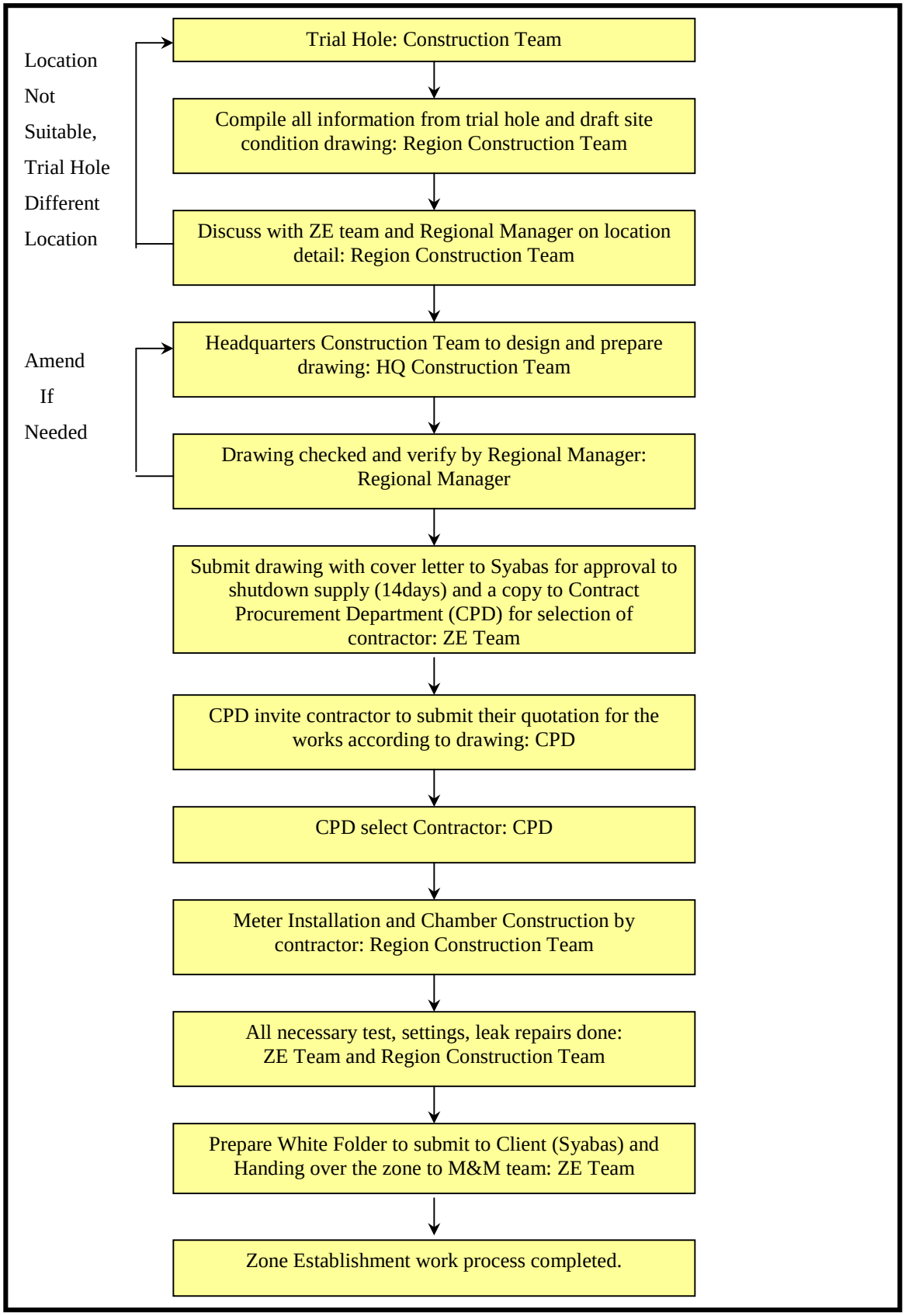

Figure 1.1: Scope of Work

1.6 Research Methodology

This study will be done by identifying the duration taken by each activity from the overall Zone Establishment Work Process. The duration taken will be compared with the standard time duration set by the organization. If there is a common delay at the same activity for most of the zones, a study will be done to identify the problems that cause the delay. The problems will be identified by discussing with the head of department or person responsible that caused the delay. *Diagram 1.2* below describes the flow of study.

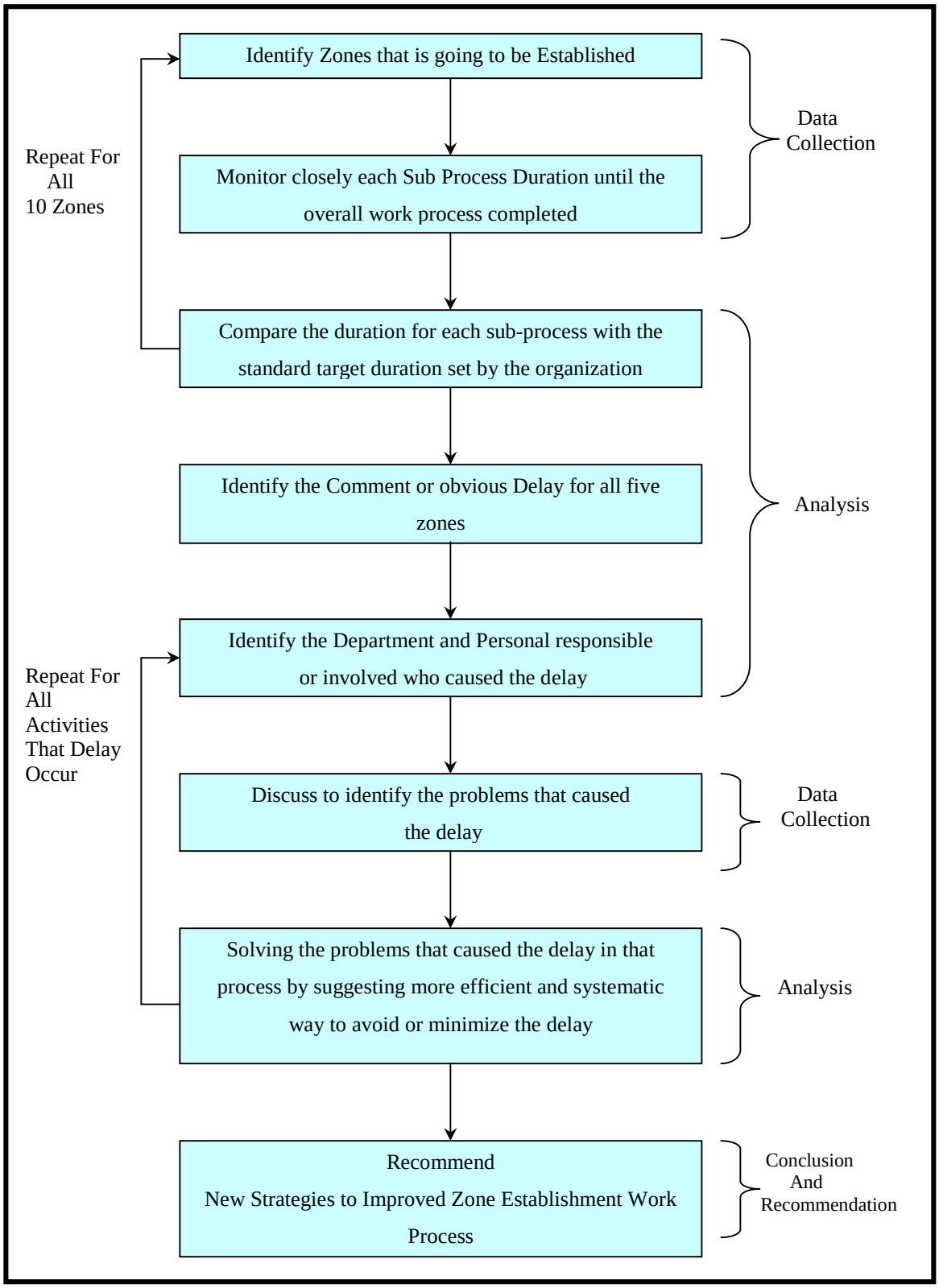

Figure 1.2: Research Methodology

1.7 Expected Outcomes

The main target is to achieve the objectives by making the Zone Establishment work process more efficient trough reducing delays. The processes or activities that cause the delay can be identified and this automatically will also identify the department or person responsible for the delay. Meting and discussing with the department head and person responsible for the delay will identify problems that cause the delay to occur.

Overall the weakness in the current Zone Establishment work process that causes the overall delay can be identified. The weakness will be reduced and the process can be strengthened by using the outcome of the study as a base referred to recommend a new improved work process.