CHAPTER 3

METHODOLOGY

3.1 RESEARCH METHODOLOGY

The research of inflow and infiltration in sewerage systems is done through field work. In this research, a sewer line connecting two manholes with no lateral branches in between is required and located within UMP Gambang Campus at the area near the sports complex and library. The two selected manholes are labeled as manhole 6 and manhole 7 (Refer to Appendix A & B). There are six sets and above of data are carried out in this research. Each set of sewage flow rate data and rainfall intensity data are collected respectively for two weeks. The below shows Figure 3.1 and Figure 3.2: Manhole 6 & Manhole 7 respectively. While Figure 3.3 shows an inflow and infiltration study of methodology flow chart.

Figure 3.1: Manhole 6
Figure 3.2: Manhole 7
3.1.1 FLOW CHART OF METHODOLOGY

Figure 3.3: Inflow and Infiltration Methodology Flow Chart

LEGEND:
- Begin or End of a Program
- Input or Output Operation
- Process to be Carried Out
- Direction of Flow in a Program


3.2 PRELIMINARY AND FEASIBILITY STUDY

Before starting the research in the field, it is required to study and collect information about the topic of inflow and infiltration from previous theses and books to have a proper understanding on the topic given. Arrangement for meeting and site visit with Jabatan Pembangunan and Pengurusan Harta (JPPH) mechanical unit staffs, hydrology lecturers, laboratory assistance and manhole contractors are also required and conducted to ease the works afterwards and to assess the situation of the selected places.

3.3 COLLECTION OF RELEVANT INFORMATION

The sources of information and case studies on the topic of inflow and infiltration in sewerage systems can be widely found from abroad compared to local case studies in Malaysia. This is due to the fact that the study of inflow and infiltration is still new in Malaysia and very few researches have been conducted on this aspect. Therefore the journals, articles as well as books that were referred to are mostly from abroad.

3.4 LIST OF EQUIPMENT AND MATERIALS

Several equipment and materials are required when conducting the research and they are listed as follows shows:

1. Area Velocity Flow-meter Isco 4250
2. Area Velocity Flow-meter Isco 2150
3. Batteries of Flow-meter Isco 4250 & Isco 2150
4. Sensors of Flow-meter Isco 4250 & Isco 2150
5. Rain Gauge
6. Digital Multimeter
7. Mounting Rings
8. Flow-meter Isco 4250 & Isco 2150 Adaptor