

PERKHIDMATAN PENYELENGGARAAN BERJADUAL DAN PEMBAIKAN SISTEM LOJI RAWATAN KUMBAHAN, TANGKI SEPTIK, PERANGKAP LEMAK DAN SALURAN PEMBENTUNGAN UNTUK TEMPOH SATU (1) TAHUN DI UiTM SHAH ALAM, SELANGOR DARUL EHSAN

SCOPE OF WORKS

1.0 GENERAL

The works to be covered under these specifications is as listed hereunder:

- 1.1 To carryout the scheduled service and maintenance of the sewerage treatment plant system and equipment's.
- 1.2 To inspect and service all sewerage treatment plant system and equipments as listed in the Schedule of Inventory.
- 1.3 To carryout repair works inclusive spare parts during normal working hours/after office hour when required to do so by the S.O/S.O.R.
- 1.4 To provide sufficient manpower in order to carry out the above-mentioned works to monitor such that all systems are always in good working condition through out the contract period and shall consist of the following:
 - a) Supervisor,
 - b) Skill Foreman,
 - c) Qualified worker/serviceman with competent certificate from IWK Training Centre or another recognized accreditation agency.

Positions in this job are responsible for the operation and maintenance of a wastewater treatment plant and sewage disposal.

Typical Functions:

- Cleans and adjusts sewage filters; adjusts bar screens and mechanical devices for sewage reduction; operates and maintains sand filters and aeration tanks, sludge digestion pumps, motors and other sewage treatment plant equipment.
- Maintains records and prepares reports as required by regulatory agencies; performs as a liaison to regulatory agencies regarding sewage disposal and treatment.
- Adjusts plant flow rates as necessary to maintain adequate effluent perimeters.
- Review and utilize laboratory reports to make appropriate operational changes.

Knowledge, Skills, and Abilities:

Knowledge and ability in the maintenance and operation of equipment utilized in wastewater treatment plants according to the operation manual of every equipment, SOPs, capability to prepare and maintain records and reports; to communicate effectively, both orally and in writing; and to establish and maintain effective working relationships.

Education and Experience:

Minimum Qualifications: Preferably two (2) years of experience in wastewater/sewage plant operations. Mainly preferred to those familiar with the wastewater/sewage system in UiTM Shah Alam premises, with good track records.

- 1.5 For all Extended Aeration Plant which are equipped with Waste Desludging Activated Sludge pumps/sludge compactor/drying bed, the contractor shall conduct in-house desludging process every six (6) months unless otherwise directed by S.O/S.O.R in order to meet the designated condition/standard of the system requirements.

The dried sludge cake and scum collected are to be disposed at sludge disposal facility specified by the relevant authority. Care shall be taken to ensure that subsoil drain is free from blockage and approximately 150mm new sand aggregate layer is being replaced.
- 1.6 To conduct final effluent water sampling every month for all mechanical sewerage treatment plant system and submit to UiTM the executive comprehensive report inclusive test result from recognized laboratory.
- 1.7 To use necessary equipment and materials to manually clear away all the sludge, scum and other kind of floating materials accumulated in the basket screen and pump sum and to dispose it off in hygiene plastic bags, check and clean the basket screen and float switch.
- 1.8 Desludging of all other kind of materials accumulated in the pump sum and to dispose it off. To hoist, check and service the impeller of the submersible pumps for a smooth suction.
- 1.9 Desludging of all harden grease, sludge and the other kind of waste materials found accumulated in the entire grease trap and to dispose it off. Flushing and service the pipes serving from the kitchen to the grease trap.
- 1.10 Desilting of the sewer line and manholes serving from the building area to main sewerage treatment plant to prevent accumulation of silt, grease and other debris (as directed by S.O).
- 2.0 The contractor shall inspect and service all machinery and equipments comprising the complete Sewerage Treatment Plants, Septic Tanks, Imhoff Tanks, Grease Traps and Sewer Line at the UiTM premises.
- 3.0 The contractor shall carry out desludging works on all septic tanks and imhoff tanks as directed by S.O/S.O.R in order to meet the designated standard of the system requirements.
- 4.0 The successful contractor is required to submit the monthly progress report to the S.O/S.O.R every first weeks of the following month.
- 5.0 The contractor shall also provide repair services during normal working hours and after office hours if required to do so by S.O/S.O.R.

- 6.0 To inspect and check Final Effluent Quality for all mechanical STP and the contractor shall also produce complete report including recognized laboratory test result of the following requirements once a month:
- i. B.O.D - Biological Oxygen Demand
 - ii. C.O.D - Chemical Oxygen Demand (if necessary)
 - iii. S.S - Suspended Solid
 - iv. pH
 - v. Oil & Grease
- 6.1 The Environment Quality Act (EQA) 1974 specifies two standards for effluent discharge. Standard A for discharge upstream of any raw water intake and Standard B for discharge downstream of any raw water intake.
- 6.2 To ensure the compliance of absolute effluent standards set by **Environmental Quality Act 1974**, all sewage treatment plants shall be designed to produce final effluents having BOD and SS values less than or equal to the average values.

PARAMETER	STANDARD A		STANDARD B	
	Absolute	Design	Absolute	Design
BOD (mg/l)	20	10	50	20
SS (mg/l)	50	20	100	40

Table 1: Design Effluent Levels of BOD and SS

These reports must be submitted to Resident Engineer of UiTM within 21 days from the date of sample taken.

- 7.0 At each such inspection and service, the Contractor shall furnish all works as per detailed below:

7.1 Grease Traps

- a) Remove all grease, fats, rubbish etc., from grease traps.
- b) Clean grease trap using high pressure water jetting with a special self-propelling nozzle with pressure of 1,000~2,500 psi, or
- c) Flush and scale the pipeline of fat, sand, silt, and debris etc., using high pressure water jetting.
- d) All rubbish, grease, debris, sand etc., shall be placed in hygiene plastic bags and properly secured to prevent spillage and odors. These plastic bags shall be removed from site and disposed off.
- e) House keeping ~ to tidy up work area after completion of works.
- f) Grease Trap ~ desludging of all harden grease, sludge and the other kind of waste materials found accumulated in the entire grease trap and to dispose it off. Flushing and service the pipes serving from the kitchen to the grease trap

The cost of these grease/scum disposal shall not be charged separately by the contractor but shall be included in the price quoted by the contractor in the monthly service and maintenance of the complete Grease Trap equipment's.

7.2 Septic Tanks

- a) Cleaning of inlet and outlet chamber and disposal of solid collected as described for screening.
- b) Remove of floating solid from sedimentation compartments and disposed the collected solids.
- c) Roding of horizontal slot at the bottom of sedimentation compartments to prevent blockage from taking place.
- d) Carry-out desludging of sludge compartment as well as removal of scum from the scum compartment. The sludge and scum collected are to be disposed at sludge disposal facility specified by the relevant authority. Care shall be taken to ensure that approximately 150mm of sludge layer is left in the sludge compartment after desludging.

The cost of these sludge/scum disposal shall not be charged separately by the contractor but shall be included in the price quoted by the contractor in the periodically service and maintenance of the complete Septic and Imhoff Tank equipment's.

7.3 Imhoff Tanks

- a) Operate the sewage treatment works to conform to all legislative requirements.
- b) Cutting of grass, trimming of hedges, maintenance of plants and landscape within the boundary of sewage treatment works. The solid wastes collected are to be disposed by the contractor at a disposal facility specified by the relevant authority.
- c) Cleaning of screen, screen chamber and disposal of screenings (if applicable). The screenings shall be drained and stored in plastic bag and disposed solid waste.
- d) Cleaning of inlet and outlet chamber and disposal of solid collected as described for screening.
- e) Remove of floating solid from sedimentation compartments and disposed the collected solids.
- f) Roding of horizontal slot at the bottom of sedimentation compartments to prevent blockage from taking place.
- g) Check the height of sludge layer in the sludge compartment.
- h) Carry-out desludging of sludge compartment as well as removal of scum from the scum compartment. The sludge and scum collected are to be disposed at sludge disposal facility specified by the relevant authority. Care shall be taken to ensure that approximately 150mm of sludge layer is left in the sludge compartment after desludging.

The cost of these sludge/scum disposal shall be charged separately by the contractor base on price provided in the Schedule of Rate.

- i) Grease tipping mechanism (if applicable) and clean all distribution channels on top of the filter bed. Any solid collected shall be disposed.
- j) Flushing of filter bed and the under-drainage system with pressure hose. The slurry resulted from this activity shall be recycled to the filter bed and treated. It should not be discharged as effluent from the treatment works.

- k) Check the physical defect and damages to the structure of the filter bed as well as mechanical components. Any structural defect requiring civil works shall be reported to the Local Engineer. Any defects and damages shall be repaired or replaced by the contractor immediately.
- l) Carry-out remedial works needed to rectify any malfunction occur at the sewage treatment works.

7.4 Hi-Kleen

- a) To carry out general site cleaning (sweeping and cutting grass); remove all the rubbish working compound.
- b) To inspect and service the routine operation of Equalization Tank:
 - i. Tank ~ clear cover, flush interior of tank walls, piping etc.
 - ii. Sand Trap ~ clears sand and debris deposits.
 - iii. Coarse Screen ~ clear debris.
 - iv. Air Diffuser ~ disconnects and lifts up air diffusers, brush and flush with water.
 - v. Submersible Pump ~ disconnect and lift pump out, clean with brush and flush with water, check electrical system, check and top-up compressor oil, grease all relevant parts.
 - vi. Float Switch ~ lift up and clean.
- c) To inspect and service the routine operation of Control Box:
 - i. Fine Screen ~ detaches, brush and clean.
 - ii. Compartment ~ clear deposit, wall of baffle plates and gates.
 - iii. Control gates ~ adjust gates to obtain constant level at 'V' notch.
- d) To inspect and service the routine operation of Aeration Tank:
 - i. Piping ~ check sludge return pipe an inflow pipe from control box.
 - ii. Air Pipe System ~ checks and ensures all joints are tightened.
 - iii. Air Diffuser ~ adjusts gate valves, observe air bubble in tank, detach and clean.
- e) To inspect and service the routine operation of Sedimentation Tank:
 - i. Piping ~ observes flow from aeration tank and flow from sedimentation tank to discharge chamber.
 - ii. Sludge Return System ~ adjust gate valve and set sludge return into aeration tank.
 - iii. Scum Skimmer ~ adjust gate valve to operate scum skimmer.
 - iv. Centre well ~ observes scum formation and clear excess scum, flush and clean walls and pipe.
 - v. Overflow Trough ~ clear any scum, deposits and flush well.
 - vi. Sludge Return Control Valve ~ adjust FM ratio by SV30 method and regulate the sludge return flow into aeration tank.
- f) To inspect and service the routine operation of Sludge Concentration Tank:
 - i. Storage Chamber ~ checks sludge level and clear if necessary.
 - ii. Overflow Pipe ~ observe overflow into equalization tank.
 - iii. Sludge tank ~ to agitate and desludge all the sludges, scum and other kind of floating materials accumulated in the sludge concentration tank and to dispose it off. Carry-out desludging of sludge compartment as well as removal of scum from the scum

compartment. The sludge and scum collected are to be disposed at sludge disposal facility specified by the relevant authority. Care shall be taken to ensure that approximately 150mm of sludge layer is left in the sludge compartment after desludging.

The cost of these sludge/scum disposal shall be charged separately by the contractor base on price provided in the Schedule of Rate.

- g) To inspect and service the routine operation of M&E Equipments:
 - i. Air Blower ~ service, check hydraulic oil level, fan belt, clean air filter, change lubrication oil every six months, top-up lubrication oil every 1000 hours operation and general cleaning of casing.
 - ii. Submersible Pump ~ unscrew detachable socket and lift pump out from tank, flush and clean check and clear inlet to impeller, check electrical system, check and top-up compressor oil, grease all relevant parts.
- h) To inspect and service the routine operation of Electrical Panel:
 - i. Float Switch Panel ~ check fuses, auto trip alarm system, wiring and cable.
- i) To conduct physical check and performance test for:
 - i. Color and Odor Performance ~ Physical Check for:
 - Color of sewage in aeration tank
 - Scum formation in sedimentation tank
 - Forming in equalization and aeration tanks
 - Flow in piping system
 - Effluent at outlet
 - ii. Joints ~ check and ensure all joints are tightened.
 - iii. SV30 ~ check sludge settlement rate and volume.
 - iv. Collect sewage and effluent samples from the inlet and outlet of the tanks as well as outlet from the filter bed and carry-out analysis for the following parameters:
 - a. Bio-chemical Oxygen Demand (B.O.D)
 - b. Suspended Solid (S.S)
 - c. Chemical Oxygen Demand (if necessary) (C.O.D)
 - d. pH
 - e. Oil & Grease

The contractor shall maintain a proper record of the results of such analysis for each treatment works.

7.5 **Extended Aeration Plant System**

- a) To carry out general site cleaning (sweeping and cutting grass), remove all the rubbish and floating solids from the Sedimentation Compartment and Scum Chamber. Desludge all the sludges, scum and other kind of floating materials accumulated in the sludge concentration tank and to dispose it off.
- b) To inspect and service the routine operation of Control Panel Starter Board and others electrical apparatus:

- i. Check and clean all electrical contactors and relays or renew as necessary.
 - ii. Check and clean all cables
 - iii. Check and tighten all cables with special tools.
 - iv. Check all the electrical components and make it function properly.
 - v. Check the earthing reading
 - vi. Simulate the function of the Control Panel Board.
- c) To inspect and service the routine operation of Scraper:
- i. Check, adjust and clean drive unit.
 - ii. Check, adjust and lubricate all bearings and sprockets.
 - iii. Check and clean motor insulation.
 - iv. Check all the electrical components and make it function properly.
- d) To inspect and service the routine operation of Air Blower:
- i. Check all motors and blower bearings with SPM meter for impending failure and lubricate with grease as necessary.
 - ii. Check and lubrication oil and refill as necessary.
 - iii. Check and adjust tension of belting.
 - iv. Check the reading of operating temperature.
 - v. Check, adjust and lubricate all bearings and others moving parts as necessary.
 - vi. Check and realignment pulley system.
 - vii. Check, clean and test safety valve if necessary.
 - viii. Check and clean motor insulation.
 - ix. Check all the electrical components and make it function properly.
- e) To inspect and service the routine operation of Sewerage Sump Submersible Pumps:
- i. Lift up the pump ~ inspect/check, flush and clean from any particles.
 - ii. Check lubrication oil ~ refill or change as necessary.
 - iii. Check main cable ~ signal cable and other electrical components for proper function.
 - iv. Check, clean and test all Float Switch.
- f) To inspect and service the routine operation of Sludge Holding Tanks Submersible Pumps:
- i. Lift up, check, flush and clean the pump so that it free from any particles.
 - ii. Check lubrication oil, refill or change as necessary.
 - iii. Check main cable, signal cable and other electrical components and make it function properly.
 - iv. Check, clean and test all `Float Switch`.
- g) To inspect and service the routine operation of Ejector/Aerator Submersible Pumps:
- i. Lift up, check, flush and clean the pumps from any particles.
 - ii. Check lubrication oil, refill or change as necessary.
 - iii. Check main cable, signal cable and other electrical components and make it function properly.
 - iv. Check, clean and test all `Float Switch`.

- h) Blower room:
 - i. Check and tidy up the room every visit.
 - ii. Check all lighting is function as necessary.
 - iii. Check all sockets and exhaust fan is function as necessary.
- i) Others system/components might cause the STP is not working if not maintained is as followings:
 - i. To check/inspect, service and test all relating valves such as Check Valve, Gate Valve, all sewage and blower pipes.
 - ii. To inspect and clean all guide rails and the mounting for pumping system.
 - iii. To check and clean the stainless-steel chain.
- j) Collect sewage and effluent samples from the inlet and outlet of septic tanks as well as outlet from the filter bed and carry-out analysis for the following parameters:
 - a. Bio-chemical Oxygen Demand (B.O.D)
 - b. Suspended Solid (S.S)
 - c. Chemical Oxygen Demand (if necessary) (C.O.D)
 - d. pH
 - e. Oil & Grease

The contractor shall maintain a proper record of the results of such analysis for each treatment works. These records shall be submitted to the Local Engineer every month.

- k) Sludge tank ~ to agitate and desludge all the sludges, scum and other kind of floating materials accumulated in the sludge concentration tank and to dispose it off.

Carry-out desludging of sludge compartment as well as removal of scum from the scum compartment. The sludge and scum collected are to be disposed at sludge disposal facility specified by the relevant authority. Care shall be taken to ensure that approximately 150mm of sludge layer is left in the sludge compartment after desludging.

The cost of these sludge/scum disposal shall be charged separately by the contractor base on price provided in the Schedule of Rate.

7.6 Sanitary Sewer Maintenance Services

General Intent: The Contractor shall perform sanitary sewer maintenance services to designated areas within the existing UiTM limits as directed by S.O/S.O.R. Sanitary sewer maintenance services include the cleaning and maintenance of UiTM owned sanitary sewer pipelines and manholes as designated by the UiTM and the regular reporting to the UiTM for the work completed by the Contractor.

The Contractor shall comply with the detailed Sanitary Sewer Maintenance Services requirements as stated under the ~ Sewer Line Cleaning.

7.6.1 Sewer Line Cleaning

- a. Sewer lines to be cleaned are VCP, DIP, and PVC and range in sizes from 100 mm to 300 mm in diameter. Lengths shown are approximate.

100 mm dia. = 2,527 meter

150 mm dia. = 6,306 meter

225 mm dia. = 6,272 meter

300 mm dia. = 364 meter

Work crews shall be on site between 8:30 a.m. to 5:30 p.m., Monday through Friday.

The Contractor shall submit a sample DVD or CD and related documentation of a CCTV inspection to be used in determining the quality of the Contractor's work.

Cleaning Equipment

- i. Combination of high velocity hydro-cleaning and vacuum removal equipment shall be utilized and shall have the following features as a minimum:
- ii. A minimum of 150 feet of 1-inch diameter high-pressure hydro flushing hose.
- iii. Two or more high velocity nozzles capable of producing a scouring action from 15 degrees to 45 degrees in all size lines to be cleaned. Nozzle skids shall be used for the appropriate size of pipe being cleaned.
- iv. Nozzle jets will be considered worn if a 3/32" drill bit can be inserted into the jet orifice. The nozzle shall then be removed from service. For nozzles with replaceable jets, the oversize jets shall be replaced before the nozzle can be used again.
- v. At least one root cutter attachment for 6" through 12" pipe.
- vi. A high-pressure handgun for washing and scouring manhole walls, channels, shelves, and manhole cover frames.
- vii. A 1,500-gallon minimum water tank, pump and a hydraulically driven hose.
- viii. Equipment operational control located above ground.
- ix. Minimum working pressure of 1,500 pounds per square inch at 80 G.P.M. rate.
- x. Positive displacement blower vacuum equipment suitable to remove all debris at the downstream manhole while the hydro flushing is being performed.
- xi. Two (2) two-way handheld radios for communication in easements.

f. Cleaning Precautions

During sewer cleaning operations, satisfactory precautions shall be taken in the use of cleaning equipment to ensure that the water pressure or head created does not damage or cause flooding of public or private property being served by the sewer. Care shall be exercised in the selection and use of the cleaning tools to avoid pipe damage. Use of a nozzle skid is required to prevent accidental entry of nozzle into house connections.

f. Sewer Cleaning Procedures

- i. The designated sewer line segments will be cleaned using combination high-velocity jet with vacuum removal. The normal cleaning operation shall be to jet from the downstream manhole towards the upstream manhole thereby pulling any debris back to the downstream manhole. If no debris is present then a single pass shall be sufficient. If debris is encountered the entire run shall be made repeatedly until debris is no longer present, cleaning of all debris. At any sign of significant dirt and gravel the cleaning operation for that pipe shall cease and Facility Management Office shall be notified of a possible line break.
- ii. Once the appropriate traffic control has been placed the Contractor shall wash the upstream manhole with the high-pressure water gun while being cautious not to spray any surrounding vehicles or pedestrians. Any major defects in the manhole or the frame and cover shall be noted and brought to the attention of Facility Management Office.
- iii. Selection of the equipment used will be based on the conditions of the sewer lines at the time work commences. The equipment and methods selected must be satisfactory to Facility Management Office's representatives(s). The equipment shall be capable of removing dirt, grease, roots, calcium and other materials and obstructions from the sewer lines and manholes. If cleaning of an entire section cannot be successfully performed from the downstream manhole, the equipment will be set up on the upstream manhole and cleaning will again be attempted. If successful cleaning again cannot be performed or the equipment fails to traverse the entire manhole section, it will be assumed that a major blockage exists and the Contractor will notify Facility Management Office's representative(s) of this condition immediately for further instructions. Pullback rate on jetting shall not be greater than three feet per second.
- iv. The cleaning method shall be to jet from the upstream manhole down slope for washing purposes on pipeline segments with extremely steep slopes where the jitter nozzle fails to climb to the upstream manhole. Contractor would jet from the downstream manhole upslope so that the cleaning directions overlap. Water for cleaning will be from the closest available fire hydrant.

g. Permits and Access

Contractor shall acquire all required fees and licenses. For any encroachment permits required by the local authority when cleaning and inspections are necessary on their right-of-ways. Coordination of sewer

cleaning will be made through the Facility Management Office's representative. Facility Management Office shall be notified one week in advance of the Contractor's anticipated cleaning area.

h. Material Removed

The Contractor shall be responsible for the removal of debris from the pipeline and cleaning and/or relearning the pipe wall to Facility Management Office's satisfaction. All sludge, dirt, sand, rocks, roots, grease and other solid or semisolid material resulting from the cleaning operation shall be removed at the downstream manhole of the section being cleaned. Passing material from manhole section to manhole section, which may cause line stoppages, shall not be permitted.

i. Material Disposal

Liquids shall be decanted and drained back to the sewer. All solids or semisolid resulting from the cleaning operations will be removed from the work site and disposed of at no added cost to the Contractor, to the Indah Water Konsortium Sdn. Bhd. district's plant. All materials will be removed from the work site at the end of each workday. Under no circumstances will the Contractor be allowed to accumulate debris, etc. on the site of work beyond a single workday, except in totally enclosed leak and odor proof containers and as approved by Facility Management Office's representative(s).

j. Spill Reporting and Handling

Contractor shall immediately notify Facility Management Office's representative(s) of any manhole overflow or interruption/backup of customer service and Contractor shall be responsible for any fines levied by others as a result of the Contractor's work.

If the Contractor is involved with a spill, he must:

1. First and immediately notify Facility Management Office. Facility Management Office will then make the required notifications.
2. Secondly, the Contractor must attempt to contain the spill to isolate it from entry to any storm drain systems or waterways.
3. Thirdly, the Contractor must attempt to relieve the spill. Once the spill has been contained and relieved, the area must be cleaned up.
4. Lastly, follow-up reports must be made after spill has been stopped and cleaned up detailing amount of spill, amount of wash water used and final destination of the sewage.

Contractor shall be responsible for any fines levied by others, reimbursement of any agency incurred costs, damage, cleanup, restoration of flow, and any disruption of service costs to customers as of a result of Contractor's work. The customer in addition to any and all costs incurs this.

Contractor shall also notify Facility Management Office immediately of any apparent non-Contractor related spills and/or any abnormal conditions.

k. Confined Space Issues and Safety Issues

All manholes in this work are defined as Title 8 Permit Required Confined Spaces. The Contractor's attention is directed to the General Industry Safety Orders of the local authority. Contractor shall attend a safety meeting at Facility Management Office with the Safety and Emergency Response Division prior to award for the purpose of reviewing the Contractors safety manuals his knowledge to discuss all safety aspects of the job.

All work shall be conducted from above ground. Manhole entry, if required, shall be conducted in strict accordance with permit required confined space entry regulations. These regulations include, at a minimum: entry permit, trained authorized entrants(s), attendant(s), entry supervisor(s), full body harness (with life line), mechanical retrieval device, continued force air ventilation, continuous air monitoring, communication system (minimum two types), and all other protective equipment that may be required. Work shall be conducted in accordance with all Federal, State, and local laws and regulations.

l. Traffic Control

All traffic control shall be in accordance with the latest American Public Works Association WATCH handbook and Facility Management Office, Maintenance Work Traffic Control Manual and based on the speed limits posted in the work zones. Flagmen may be required in some locations. Additional local regulations shall have precedence. Contractor shall apply for all traffic control permits. Safe and adequate pedestrian and vehicular access shall be provided in accordance with the Standard Specifications for Public Works Construction.

NOTE – Inadequate or improper signing and delineation for traffic control may be cause for the penalty.

m. Work Plan

The Facility Management Office shall prepare a monthly work plan and submit it one (1) week in advance to Contractor representative for review and approval. The plan shall verify the cleaning sequence and identify all the line sections to be cleaned based on Facility Management Office maps and sequence data provided. Plan may be amended for weather or local road maintenance or construction issues discovered by either party.

n. Work Documentation

Monthly reports based on the work done shall be submitted for Facility Management Office review with the invoice for payment. Contractor's log sheets, with a section-by-section breakdown including comments, shall be maintained on site, in a legible manner, for review at all times. Comments on log sheets include notice of badly worn frames and covers and of badly deteriorated manhole concrete structures.

o. Crew Size

Contractor shall provide a minimum of a three-person crew at all times, one person shall witness the jetting nozzle reach the upstream manhole. A crew of three shall be utilized for all work in confined spaces. Additional personnel shall be utilized when needed for traffic control flagmen.

p. Emergency Response

Contractor shall be able to respond to an Emergency Call out within 1 hour from the time the call was placed. Failure to do so may be cause for the penalty.

8.0 Consumable Materials

The contractor shall supply the following consumable materials as when required :-

- a) All oils and grease required for lubrication of all bearings, bushes and other moving parts.
- b) All soap, detergent, compressed air, nitrogen and other cleaning materials require for flushing / cleaning purposes.

The cost of these consumable materials shall not be charged separately by the contractor but shall be included in the price quoted by the contractor for the periodically service and maintenance of the complete STP equipment's.

9.0 All workers and supervisors shall be easily identified in full uniforms as per UiTM design. The contractor shall ensure that his staffs were neatly and tidily attired at all times.

10.0 The contractor is permitted to store their belongings and tools meant for use within the campus area but UiTM nor do staff/personnel bear no responsibility regarding their safety in whatever respect at any time.

11.0 The contractor shall follow Standard Operating Procedure on Managing Works Order for Maintenance (refer to Attachment 2). All works, either general servicing or repair work shall be started only after permission given from the S.O/S.O.R or his officers.

12.0 All defective/worn parts have been replaced, must be forwarded to the S.O/S.O.R or his officers before further action are taken.

13.0 Commencing and completion of works will only be recognized as done if instructions and certifications are recorded in writing.

14.0 The contractor shall be deemed to have visited and examined all the designated buildings and satisfied himself as to the local conditions of equipment operation before pricing of this contract. No additional claim shall be entertained.

15.0 The contractor shall at all times have their employment sufficient numbers of competent employer in order to effectively perform this contract. The contractor shall employ only skilled workman to ensure the proper and efficient execution of the work.

The S.O/S.O.R shall be at liberty to object to and require the contractor to remove forth with from the buildings, compound or any site any person employed by the contractor, who in the opinion of the S.O/S.O.R as misbehaved himself/herself, or his incompetence or negligent in the proper performance of his/her resident engineer to be undesirable.

Any person so removed from the works shall be replaced as soon as possible and the acceptance of substitute approved by the S.O/S.O.R.

The contractor shall before the commencement of the contract, provide the S.O/S.O.R with a list of names of the engineering staff employed for the contract.

The contractor must encourage his staff to behave in the best manner and at all times maintain good relations with staff of the University.

16.0 The S.O/S.O.R reserves the absolute right to engage other contractors to execute works and/or services which in his opinion are specialized in nature or in which the contractor has failed to perform in accordance to the specification.

17.0 Water and electricity required for the works shall be provided free of charge. The contractor shall exercise every effort to prevent the abuse of this privilege and to economize in the use of water and electricity and to ensure that all rules and regulations applicable to the use of same are strictly complied by his technical staff.

The contractor must ensure that his staff switch off all lights and turn off taps as soon as their work is completed.

Proper connections must be made to power point accordance into the prevailing rules and safety precautions. The contractor shall be made liable for damages to electrical circuits and installations of designated building.

18.0 The contractor must remove all rubbish arising from the repair work all defective parts replaced.

19.0 The contractor shall at all time observe and comply with all prevailing laws and regulations relating to safety law and thereafter in force and shall bear all costs connected with the compliance of same.

20.0 The contractor shall be responsible to take all safety precautions to eliminate danger to his workmen, the general public and property of others.

The contractor must immediately notify the S.O/S.O.R of any damages or accident occurring in their areas of work. Any claims arising from such accidents, be it affecting person or properties or furniture will be responsibility of the contractor if such accidents can be ascertained to have caused through the negligence of the contractor.

21.0 Should the contractor be found to have committed any irregularities such as using inferior materials and workmanship or creating, nuisance in the buildings to the inconvenience of the S.O/S.O.R or the public, the S.O/S.O.R reserves the right to charge the contractor the cost of making good to any inconvenience caused, and for the investigation and administrative expenses incurred by the S.O/S.O.R.