JABATAN KERJA RAYA MALAYSIA

KERJA - KERJA PEMBAIKAN DAN MENAIKTARAF LOJI KUMBAHAN BERPUSAT SERTA KERJA - KERJA BERKAITAN DI UIAM KAMPUS KUANTAN

SENARAI KUANTITI

Kami seperti nama syarikat di bawah mengesahkan tawaran harga yang tersenarai di dalam senarai kuantiti ini adalah sama sepertimana di dalam Borang Tender yang dihasilkan di dalam sistem dan sebarang percanggahan akan menyebabkan tawaran kami ditolak.

A. Nama Syarikat: **Nama Petender**

B. CIDB/UPKJ/PUKONSA No.: **No.Pendaftaran Petender**

C. Harga Tawaran: **Harga Tawaran Petender**

D. No. Siri Tender: **F/PHG/M/DMT/951/2024**

E. Tarikh Cipta Senarai Kuantiti: **9/10/2024**

Senarai kuantiti ini dikeluarkan oleh JKR CAWANGAN KEJURUTERAAN MEKANIKAL. Sebarang pertanyaan boleh berhubung dengan pegawai yang menyediakan tender dan maklumat pegawai untuk dihubungi boleh didapati di laman iklan.

JABATAN KERJA RAYA MALAYSIA

KERJA - KERJA PEMBAIKAN DAN MENAIKTARAF LOJI KUMBAHAN BERPUSAT SERTA KERJA - KERJA BERKAITAN DI UIAM KAMPUS KUANTAN

SENARAI KUANTITI

No. Tender: F/PHG/M/DMT/951/2024

RINGKASAN TENDER

KERJA - KERJA PEMBAIKAN DAN MENAIKTARAF LOJI KUMBAHAN BERPUSAT SERTA KERJA - KERJA BERKAITAN DI UIAM KAMPUS KUANTAN

ITEM	DESCRIPTION
	PRELIMINARIES
A	**GENERAL INFORMATION TO BILL OF QUANTITIES**
1.0	**GENERAL**
1.1	The Works contained in the Contract shall include the provision of all labour, materials, constructional plant, temporary or permanent works as required in the Contract.
1.2	The Bill of Quantities shall be read in conjunction with the Conditions of Contract, the Specification and the Drawings in the Contract Documents.
1.3	The items as set out in the Bill of Quantities shall apply to the mentioned of the Works contained in the document and the Contractor shall allow for compliance with the same and for any cost incurred in connection therewith.
1.4	Headings are not comprehensive and do not necessarily reflect or modify the meaning of the items in the B.Q. The exact nature and extent of the work to be carried out shall be ascertained by reference to the Contract as a whole, in particular the Conditions of Contract, the Specification and the Drawings. It shall be read together with the relevant “Method of Payment”.
1.5	The amounts inserted by the Contractor for such items shall be deemed to apply to the whole of the Works carried out under this Contract.
1.6	Each item shall be individually priced. Bulk pricing for sections, trades, groups or pages of items shall not be allowed and no subsequent claims for loss or expense and/or profit shall be entertained for failure to comply with this clause.
1.7	The rates and prices inserted in the Bill of Quantities shall include cost of the works described, all risks, liabilities and obligations set forth or implied in the Contract Document and shall be deemed to include the following, unless expressly stated otherwise: (a) the provision of labour and all costs in connection therewith; (b) the supply of materials, goods, equipment and storage thereof including delivery to site and all costs in connection therewith; (c) taking delivery of materials, goods and equipment necessary for the Works and including those supplied by others, loading and unloading, storage and all costs in connection therewith; (d) the usage of plants and machineries and all costs in connection therewith;

ITEM	DESCRIPTION
	PRELIMINARIES (CONT'D)
	(e) the fixing, erecting and installing or placing in position of materials, goods and equipment including around obstruction, tolerances, penetration, working space, over-breaks etc. and all costs in connection therewith;
	(f) the provision of all temporary works and all costs in connection therewith unless separately provided for in the Bill of Quantities;
	(g) the phasing requirements of the Works including the effect on the programming of the Works of all traffic and drainage diversions, special structural requirements, earthwork restrictions, alterations to services and street lighting (executed under the Contract or in conjunction with it) and all other requirements of the Contract and all costs in connection therewith;
	(h) all cost of testing to show proof of compliance with the Specification on materials and workmanship inclusive of samples of materials and submission of tests results. Should the frequency of testing and sampling not specified, then it shall be in accordance with the relevant Malaysian/British Standards and Codes of Practice. Where there is no such relevant Standards and Codes of Practice for reference, it shall then be as instructed by the S.O.;
	(i) all royalties and dues which the Contractor may be required to pay;
	(j) wastage;
	(k) establishment charges, overheads and profit;
	(l) whatsoever method of construction the Contractor may adopt**.**
1.8	Where any priced item in the B.Q. but has not been executed on site by the Contractor, the cost of such priced item shall accordingly be deducted from the Contract Sum.
1.9	All items priced shall be deemed to include compliance with the provisions of the contract, statutes, regulation, by-laws or any order or directive issued by public authority or public service company and other related legislation currently in force.
1.10	Notwithstanding the above clauses, the S.O. reserves the right to request from the Contractor the detailed breakdown of the pricing for items or rates in the B.Q. for his perusal. The detailed breakdown pricing may be used as a basis for the administration of the Contract

ITEM	DESCRIPTION
	PRELIMINARIES (CONT'D)
2.0	**MEASUREMENT**
2.1	Quantities in the Bills of Quantities are measured in accordance with the Malaysian Standard Method of Measurement of Building Works (2nd Edition Metric 2000). Where departures have been made from the standards mentioned, the method adopted in the Bills shall be adhered to for the purposes of ascertaining the value of all variations and measurements**.**
3.0	**UNPRICED ITEMS**
3.1	Where any item is left unpriced, it shall be deemed that the cost of such item has been allowed for elsewhere within this document. No subsequent claims arising out of expense and/or loss incurred against such unpriced item shall be entertained.
4.0	**GENERAL ATTENDANCE FOR NOMINATED SUB-CONTRACTORS AND NOMINATED SUPPLIERS**
4.1	~~Attendance and facilities for Nominated Sub-contractors and nominated suppliers shall include:~~ ~~(a) in the case of works or services executed : for allowing the use of existing working space, access, temporary roads, erected scaffolding, sanitary, welfare and other facilities existing on Site and the provision of protection, water, electricity for lighting and clearing away rubbish and debris arising from the work;~~ ~~(b) in the case of goods, materials or services supplied: for taking delivery, unloading, storing, protection and returning crates, cartons and packing materials,~~ ~~all as specified in the specification~~
5.0	**PHASING SEQUENCE OF OPERATIONS AND METHODS OF CONSTRUCTION**
5.1	The rates and prices shall, unless otherwise stated, include for the costs of compliance with any restrictions imposed on the programming of the Works by the Government and Local Authorities and other relevant authorities dealing with phasing sequence of operations, method of construction, safety and health and liaison and access.
6.0	**TRIALS, SAMPLES, TESTS AND INSPECTION**
6.1	The rates and prices shall include for a testing laboratory or an accredited laboratory approved by SIRIM, equipment and staff for carrying out the tests, tests and the effects on the progress of the Works for the carrying out of all trials, sampling and tests whether specified in the Contract Document or otherwise in order to ensure compliance with the requirements of the Specification except where separately itemised in the Bill of Quantities.

ITEM	DESCRIPTION
	PRELIMINARIES (CONT'D)
7.0	**EXISTING SERVICES AND MAINS**
7.1	The Contractor shall include in his rates and prices for taking measures to locate the actual position and provide support and full protection of existing services and mains and other equipment and machineries during the progress of the Works. The Contractor shall inform the S.O. of all arrangements with all Statutory and Public Utility Authorities.
8.0	**WORK UNDER WATER**
8.1	The rates shall include any costs arising from and in connection with the execution of work under water wherever required unless otherwise stated**.**
9.0	**PHRASEOLOGY**
9.1	Differences in the method of billing and in phraseology used in various parts of the Bill of Quantities and/or Schedule of Rates shall not be a basis of any claim for an increase in the rates and prices.
10.0	**PROVISIONAL SUMS**
10.1	All provisional sums included in the Bill of Quantities are intended to be approximate indications only of the amounts to be expended in respect of the work described and may be omitted entirely or substantially varied without entitling the Contractor to any claim for compensation. No part of the Contractor's overhead, expenses or profit should be included in these sums when the bill is priced unless items for profit and attendance are specifically allowed for.
11.0	**CURRENCY OF PAYMENT**
11.1	Pricing of the Contract shall be in Malaysian Ringgit to two decimal place. Payment to the Contractor under the Contract shall be in Malaysian Ringgit.
12.0	**TEMPORARY DIVERSIONS**
12.1	Work in connection with the temporary diversion and relocation of existing overhead and underground services, whether detailed in the Contract or not shall be covered by the appropriate Lump Sum Items in Bill No. 1 : Preliminaries and General Conditions unless separately measured in other parts of the Bill of Quantities.

ITEM	DESCRIPTION
	PRELIMINARIES (CONT'D)
13.0	**ABBREVIATIONS**
13.1	The following abbreviations or symbols are generally used in the Contract Document and shall be read as follows: a) mm : millimetre b) m : metre c) m2 : square metre d) m3 : cubic metre e) kg : kilogramme f) tonne : metric tonne g) No. : Number h) L.S. : Lump Sum i) P.C. Sum : Prime Cost Sum j) P.S. : Provisional Sum k) RM : Ringgit Malaysia
14.0	**SCOPE OF WORKS**
14.1	The works included under this Contract comprises : a) Mechanical Works b) Electrical Works c) Earth Works d) Provisional Sums
15.0	**LOCATION OF SITE**
15.1	The site for the proposed Works is located at Sewage Treatment Plant, Remote Pumping Station 1 and Remote Pumping Station 2, Universiti Antarabangsa Islam Malaysia, Kuantan, Pahang Darul Makmur.

ITEM	DESCRIPTION	AMOUNT (RM)
	PRELIMINARIES (CONT'D)	
	Project Signboard	
A	The Contractor shall provide, erect, and maintain a project signboard as specified by S.O	
	~~Site Survey and Setting Out~~	
B	~~The Contractor shall employ a licensed surveyor to carry out site surveys before commencement and setting out of the Works~~.	
	~~Temporary Diversion And Relocation Of Existing Overhead And Underground Services~~	
C	~~The Contractor shall enquire from the various authorities and make arrangements for the disconnection, removal, relocation and reconnection of services and pay all necessary cost and fees in connection therewith and make good all damage as specified~~.	
	Construction Plan	
D	The Contractor shall submit to the S.O. for his approval the following as specified : a) Programme of Works b) Method statements c) Contractor's organisation chart d) Schedules e) ~~Quality Assurance Plan for Works Contract worth RM10 Million and above~~ i) To appoint Site Safety Supervisor as specified in Section 8 —Schedule of Prices item 8.2 (19)(d): Employment of a Site Safety Supervisor (SSS) of more than two (2) years experience and to the satisfaction of the S.O. for the entire duration of the construction period in compliance with Building Operations and Works of Engineering Construction (BOWEC (Safety) Regulations 1986) to be stationed minimum 15 hours a week at the site. The SSS must be appointed within fourteen (14) days from the date of acceptance of tender.	
	TO COLLECTION	

ITEM	DESCRIPTION	AMOUNT (RM)
	PRELIMINARIES (CONT'D)	
	Contractor's Plant	
A	The Contractor shall provide, erect, keep insured, maintain and remove on completion all requisite scaffolding, hoist, cranage, construction plant, ladder, staging, tarpaulins, et cetera (excluding piling and pile testing equipment), as necessary for the execution of the Works.	
	Temporary Water And Power Supplies For The Works	
B	The Contractor shall provide adequate power and water supplies for the execution of the works including paying all associated costs and fees as specified as per S.O. instruction.The Contractor shall install water meter and electrical power meter for monthly consumption measurement.	
	Site Security	
C	The Contractor shall provide all necessary personnel and lighting for the security of the site at all times until completion of the whole Works as specified. The contractor may only appoint Personnel Security who has been through a security screening by the Authorities	
	Temporary Access And Maintenance Of Existing Roads	
D	The Contractor shall provide and maintain all necessary temporary roads, culverts, tracks, bridges, et cetera for access to and within the Site as specified.	
E	The Contractor shall maintain all access including existing roads, drains, culverts, and all other appurtenances and services on such roads throughout the construction period. The Contractor shall make good any above mentioned item damaged by any work carried out by him.	
	TO COLLECTION	

ITEM	DESCRIPTION	AMOUNT (RM)
	PRELIMINARIES (CONT'D)	
	Control Of Workmen, Plant And Machinery At Site	
A	The Contractor shall ensure the safety, health and welfare at work of all his workmen as specified.	
	The Contractor shall ensure all the workmen wear uniform and name tag all the time.	
	~~**Contractor's Temporary Accommodation And Facilities For Workmen Living On Site.**~~	
B	~~The Contractor shall provide and maintain all temporary accommodation and facilities including temporary lighting, plumbing, water storage, sanitary and sewerage for his labour and staff living on Site as specified.~~	
	Contractor's Office And Storage	
C	The Contractor shall provide and maintain Contractor's office and storage on the Site in positions as approved by the S.O. and as specified.	
	Care And Protection Of Materials And Works	
D	The Contractor shall provide and maintain everything necessary for proper protection of materials and Works from any damage by weather.	
	Shop Drawings and Samples And Mock-ups	
E	The Contractor shall submit shop drawings, samples of materials or workmanship and mock-ups units as specified for the S.O.'s approval.	
	Progress Report and Photographs	
F	The Contractor shall prepare the monthly progress report including photographs before and after the construction, and submit to the S.O. as specified.	
	~~**Material Testing Laboratory And Staff(Effluent Class Determination)**~~	
G	~~The Contractor shall provide/erect a testing laboratory within the site or rent a premise or propose an accredited laboratory approved by SIRIM as specified. The Laboratory shall be equipped with the necessary equipment and staff required to carry out the tests as identified in APPENDIX (List of Laboratory Equipment).~~	
	TO COLLECTION	

ITEM	DESCRIPTION	AMOUNT (RM)
	PRELIMINARIES (CONT'D)	
	Office Accommodation For S.O.	
A	The Contractor shall provide and maintain a site office or relocatable site office or rent a premise for the use of the JKR supervisory staff which shall meet the requirement of the JKR design as specified. (APPENDIX A/1)	
	~~**Telephone For S.O.**~~	
B	~~The Contractor shall provide a permanent telephone at the S.O.'s site office for the sole use of the S.O. and his representatives as specified.~~	
	~~**Survey Instruments And Personnel**~~	
C	~~The Contractor shall provide all such instruments, equipment and survey personnel as specified throughout the duration of the original Contract Period until 6 months after the issuance of the Certificate of Practical completion as per SO required.~~	
	Site Items For S.O./Office Equipment And Facilities	
D	The Contractor shall provide all Personal Protective Equipment required for the use of the S.O. and his supervisory staff complete as specified and complying with DOSH requirements.(APPENDIX A/2) a)Safety Helmet - 5 nos b)Safety Shoes - 5 nos c)Safety Harness -5 nos d)Tyvek Suits -15 nos	
E	The Contractor shall provide two (2) no.9 kg of portable dry powder fire extinguisher at the site during the contract period. The location of the fire extinguisher to be advised by the Site Safety Supervisor.	
F	~~The Contractor shall provide the equipment and facilities as listed as specified in APPENDIX A/3 for the use of the S.O., his representatives and staff throughout the duration of the original Contract Period.~~	
G	~~The Contractor shall provide suitable transportation service by means of vehicle(s) including licensed and competent driver(s) as specified throughout the duration of the original Contract Period~~.	
	TO COLLECTION	

ITEM	DESCRIPTION	AMOUNT (RM)
	PRELIMINARIES (CONT'D)	
	Safe Working Area	
A	The Contractor shall supply, erect, maintain and remove upon completion of the works, items such as sinage, safety nettings, catch platforms, safety barricades, fencing, railing, screen wire netting and toe board, guardrails or board fences and sufficient illuminations, all as specified.	
	Safety, Health And Welfare	
D	The Contractor shall ensure the safety, health and welfare at work site as specified including but not limited to : a) Provision of First Aid Kit b) Pest control including keeping the site clean and dry to prevent breeding of mosquitoes, rodents, insects and vermin of any kind. c) Fogging at regular intervals	
	TO COLLECTION	

ITEM	DESCRIPTION	AMOUNT (RM)
	PRELIMINARIES (CONT'D)	
A	**Requirement for Occupational Safety and Health Management**	
	a. Preparation of five (5) copies of site safety and health plan (S-Plan) as per JKR requirement and it shall include among others (shall submit within Three (3) months after the receipt of Letter of Acceptance)	
	i) Safety and Health Policy	
	ii) Emergency Response Plan (ERP)	
	iii) Chemical Safety Data Sheet (CSDS)	
	b. Preparation of Hazard Identification Risk Assessment and Risk Control (HIRARC) for the activities carried out at site. (To be sequent submitted before commencement of each works throughout the contract period).	
	c. Safety Report: Prepare and submit to the S.O. of 5 copies monthly safety & health report describing the occurences of accidents, near misses, injuries and deaths and the actions taken. The report may be incorporated in in the Progress Report for the entire duration of the contract. It shall also include: -	
	i) Schedule of safety & health committee meetings,	
	ii) Site safety & health toolbox meetings,	
	iii) Safety & health audit reports,	
A	iv) Safety & health inspection reports	
	Keeping The Site Tidy The Contractor shall make every effort to keep the Site in a reasonably clean and tidy condition for the duration of the Works as specified. All debris must be cleared away from the site immedietly after the working day.	
F		
	TO COLLECTION	

ITEM	DESCRIPTION	AMOUNT (RM)
	PRELIMINARIES (CONT'D)	
	As-built Drawings	
B	The Contractor shall provide Six (6) sets of the approved As-built for	
C	i) Mechanical Works. ii) Electrical Works iii) Civil works	
	Clearing, Cleaning And Making Good On Completion	
	The Contractor shall clear and clean the Works including existing roads, drains bounding the Site of any debris, earth, et cetera, and make good all damages upon completion as specified.	
	Form of Contract	
	The Contractor shall refer to the Standard Form of Contract for further	
	Clause No. 13 **Performance Bond**	
	For due observance and performance of this contract the Contractor shall have to provide:	
	Cost to provide Performance Bond in the form of an approved Bank or Insurance Guarantee equal to five percent (5%) of the contract sum to be deposited with the Government as a condition precedent to the commencement of any work under this contract.	
	Clause No.15 Insurance Against Personal Injuries And Damage To Property	
	Clause No.16 Indemnities to Government in Respect of Claim by Workmen	
	TO COLLECTION	

ITEM	DESCRIPTION	AMOUNT (RM)
	PRELIMINARIES (CONT'D)	
	Clause No.17 Employees' Social Security Act, 1969	
	Clause No.18 Insurance of Works.	
D	**Clause No.22** Design, Sub-clause No. 22.2 - Design Guarantee Bond	
E	**Clause No.35** Materials, Goods And Workmanship - Opening up of work for inspection or testing of materials or goods	
	Clause No. 59 - Site Agent And Assistants The Contractor shall keep constantly on the Site for the full duration of the Contract a competent, efficient, suitably qualified, experienced and good character Site Agent and his assistants in each trade as may be necessary, who must be capable of receiving instructions in Bahasa Malaysia, and in default it shall be the responsibility of the Contractor to provide replacement for them and all wages and other expenses in connection with the employment of such replacement site agent and assistants. Any directions, explanations or instructions given to such site agent by the S.O. shall be deemed to have been given to the Contractor under this contract. provide all necessary superintending order	
	Inspection, Testing and Commissioning For Electrical Works Allow for the cost of carrying out inspection and tests before and after electrical installation (complete with test report, relevant data, coloured photographs etc.), testing and commissioning of the installation and the equipment of the Works as required in the relevant Specifications including providing all necessary labour, materials, transportation, appliance or equipment, electricity and fuels, and paying all fees and charges for tests carried out by others.	
	TO COLLECTION	

ITEM	DESCRIPTION	AMOUNT (RM)
C	**PRELIMINARIES (CONT'D)** **~~Application to and Testing by Authorities For Electrical Works~~** **~~Allow for cost and fee incurred in the process of submission of applications, inspections, tests and approvals including the registration of the installation and endorsement of documents by~~** **Electrical Protection Scheme** Allow for fees and charges for the employment of an Electrical Services Contractor registered under Electricity Regulations 1994 to study and submit proposal (with relevant data and calculations) for the electrical protection scheme for the whole electrical installation in the Works. Thereafter, if the proposal is agreeable by the S.O.'s Representative, he shall check, test and calibrate accordingly all protective relays and device provided in the Works to the requirements of the Electricity Regulations 1994. He shall also prepare, duly sign and submit all certification as required under Electricity Regulations 1994 **Service and Maintenance** The Contractor shall give One Year Warranty and Comprehensive Maintenance During Defect Liability Period (12 times with minimum once a month) for system or components replaced/retrofitted under the contract.	
	TO COLLECTION	

ITEM	DESCRIPTION	AMOUNT (RM)
B	**PRELIMINARIES (CONT'D)** **Electrical Competent Person** The Electrical Contractor shall give or appoint a Competent Person or Competent Persons in compliance with the Electricity Regulations 1994 to provide necessary superintendence over the whole site operation for the full duration of the Sub-Contract Works and as long there after as the S.O.'s Representative may consider necessary for the proper fulfilment the Electrical Contractor's obligation under this Contractor. The qualification of the Competent Persons (PW4 wireman and A1 Chargeman) shall be in compliance with the Electricity Regulations 1994 and approved by the S.O.'s Representative, and he shall be constantly on the Site and shall devote his whole time to the superintendence of the Works. He shall take responsibility for the construction, installation, testing, commissioning and operation of the whole Contract Works in compliance with the Electricity Regulations 1994 and any other laws having jurisdiction over the Works. The S.O.'s Representative will be at liberty to object to and requires the Electrical Contractor to remove forthwith from the Site such Competent Person, who in the opinion of the S.O.'s Representative, misconducts himself or is incompetent or negligent in the proper considered by the S.O.'s Representative to be undesirable. The Electrical Contractor shall, upon the removal of such person, there after replaced as soon as possible a new Competent Person in compliance with the requirement of this section. **Mechanical Project Documentation** i. Four (4) sets of Mechanical Inspection and Testing Plan (ITP) ii. Four (4) sets of Mechanical Inspection and Testing Methodology iii. Four (4) sets of Mechanical Installation Methodology iv. Four (4) sets of Mechanical Shop Drawings	
	TO COLLECTION	
	SUB-TOTAL TO BE CARRIED TO SUMMARY OF PRICES	

8.1

All equipment must comply with the specifications and must be from the approved vendor list of the Department of Sewage Services (JPP). For those equipment whch are not in the JPP Approved Vendor, these equipment SHALL need to be approved by JPP prior to purchase of the equipment/product.

Supply, handle and delver to site the following plant and equipment including all other items necessary for a complete and proper design, manufacture, surface treatment, inspection and testing at the manufacturer's works, off-loading, storing and installation is as follow:

All item in BQ from preliminaries to item 8.21 (**All Provisional**)

NO.	DESCRIPTION	No		UNIT PRICE (RM)	PRICE (RM)
8.1	**GENERAL WORKS**				
1.0	**CONTRACTOR REPORT BEFORE START WORK:-**				
	The Contractor shall familiarize with existing STP installation and identify equipments installed. The Contractor shall provide support and full protection of existing services and mains during the progress of the Works. The Contractor shall inform the S.O. of all arrangements with the various authorities. (Full Existing System in Sewage Treatment Plant including Remote Pumping Station 1 and Remote Pumping Station 2- To S.O. Approval)	1	lot		
2.0	To inspect for the routes of the pipeline according to the existing drawing ARM/UIA/STP/M&E/STP-4/05 inside pipe condition with boroscopic video submersible camera c/w video recording with 360° view and submit all the reports in CD form to the S.O :-	1	lot		
	a. Main Air piping (u1) : blower to distribution air pipe				
	b. Secondary air(u2) : distribution air pipe to dropper pipe				
	c. Sewage Influent (f2): distribution chamber to anoxic tank (future tank)				
	d. MLSS (g): aeration tank to anoxic tank				
	e. Sewage Effluent (h): aeration collection chamber No.4 & 4A to Aeration Collection Chamber No.5 & 5A				
	f. Sewage Effluent (h1): aeration collection chamber No.5 & 5A to influent distribution chamber				
	g. Sewage Effluent (k): influent distrbution chamber to clarifier tank				
	h. Sludge Draw-Off (l): clarifier tank to activated pump chamber				
	i. RAS (m): activated pump chamber to anoxic tank				
	j. Transfer (n1): gravity thickener to pump chamber				
	k. Thickener (n): gravity thickener aerobic digested sludge holding tank				
	l. WAS (o1): activated pump chamber to gravity thickener				
	m. Digested (p): aerobic digested sludge holding tank to sludge drying bed				
	n. Supernatant (s): all supernatant chamber start from Sc1 toSc4				
	o. Effluent (x1): Efc 1,2,3 and Efc 4				
3.0	Liaison with Authorities				
	Liase with Indah Water Berhad,JKKP(DOSH),JAS(DOE) and any relevant authority including all submission,inspection, testing, including all necessary referring to the project needs and connection fees for completing installation of the system.	1	lot		
4.0	Provide Practical Training of Employer's Personnel (refer to section 6.0)	1	lot		
5.0	Complete painting, labelling, signages and notices work to S.O. and authorities approval	1	lot		
6.0	All civil works necessary for complete system of the above systems include coring, cutting, digging, excavating, drilling, cart away debris, etc and making good to the satisfaction of the S.O. .	1	lot		
7.0	To supply,deliver and temporary installed dewatering pump for cleaning purposes (cart away all the debris with high pressure water during desludging process) including installing 1000 gallon of temporary HDPE water storage tank at site c/w incoming water connection, hose, nozzle and etc. necessary prior to the execution of the mentioned work.	1	lot		

8.0	To conduct sampling test at the registered/authorised laboratories according to the relevant authorities standard for the effluent as specified:- a) Total Suspended Solid, TSS b) Chemical Oxygen Demand. COD c) Biochemical Oxygen Demand, BOD d) Nitrogen Ammonia e) Oil and Grease Note: All the lab result must be submitted in hardcopy to the S.O. for his approval. The Contractor shall propose an accredited laboratory approved by relevant authorities and the S.O as specified.	1	lot		
9.0	Road reinstatement works for underground piping and wiring with proper backfill compaction and materials as per drawing Trench in road requirement: Any requirement of pipe and cable laying across the road shall comply to below requirements :				
	a)The edge of existing road shall be cut with rotary disc road cutter to obtain smooth finishes at the cut surface and the new premix surface	12	m run		
	b) Trenches shall be of minimum 0.3 m width x 1 m deep from road finished level	6	m run		
	Notes: i. Excavation of road shall be done in absolute caution by checking the existing underground cable/pipe routing prior to excavation, avoiding any accidental damages to the existing services. ii. Should be any damage occurs during excavation, the contractor shall immediately notify the S.O and the building owner, and repair works shall be executed immediately to avoid interruption iii. The repair method shall be in compliance to MS/BS standard or approved repair method by the S.O. for cable jointing or pipe jointing or other road furniture damaged by the act of the contractor iv. Safety of works, providing enough signages, barricades and cones at site	-	-		
	c) To fill the pipe trench with earth soil. Contractor to supply lorry and backhoe for the purpose of filling and transporting the earth	7	m3		
	d) Compacting the filled earth at every 1 ft of filling depth with hand compactor	7	m3		
	e) Supply, spread and compact 450 mm thick approved crusherun granite not exceeding 75 mm size. Rate to include all necessary stop end and application of bituminous prime coat.	6	m2		
	f) Supply, spread and compact first bituminous macadam binder course consisting of 130 mm thick and wearing course of 50 mm thick made up to 14 mm BS seive size aggregate to be levelled and well roled.	6	m2		
	REINSTATEMENT OF EXISTING ROAD				
10.0	Supply, spread and compact 450 mm thick approved crusherun granite not exceeding 75 mm size. Rate to include all necessary stop end and application of bituminous prime coat.	100	m2		
11.0	Supply, spread and compact first bituminous macadam binder course consisting of 130 mm thick and wearing course of 50 mm thick made up to 14 mm BS seive size aggregate to be levelled and well roled.	600	m2		
12.0	To deliver,supply and install 8 m height of hot dipped galvanized lamp post of 300 Watt LED flood light with 2 pole contactor for each flood light c/w wiring and stainless steel wall plug at lamp post base and concrete base where required as per S.O. approval. Notes: Flood light must be equipped with light sensor for functioning. Location of the lamp post shall be as below:- i. 4 nos at aeration tank ii. 2 nos at clarifier tank iii. 1 nos in between gravity thickener and activated sludge holding tank iv. 1 nos at the end of the sludge drying bed	8	lot		
13.0	To supply, deliver and install 4C x 4 mm2 PVC/SWA/PVC power cable to each post c/w excavation works.	1000	m		

14.0	To supply, deliver and install flood lighting new control panel c/w MCCB, MCB, ELCB,switches, contactors, auto (photoelectric sensor)/manual (push button), earthing and etc. as necessary.	1	lot		
15.0	Excavation works for pipe repair, pipe inspection, and other reinstatement purposes c/w shoring and anchoring and reinstate to the original condition.	400	m3		
	JUMLAH				
SUB-TOTAL TO BE CARRIED TO SUMMARY OF PRICES					

NO.	DESCRIPTION	No		UNIT PRICE (RM)	PRICE (RM)
8.2	**Testing, Adjusting, Balancing and Commisioning**				
1.0	To conduct Testing, Adjusting, Balancing and Commisioning Remote Pumping Station pump installation consist of:-				
	a) Factory Acceptance Test for Drypit Pump Note: The FAT shall be conducted at the manufacturer/authorized dealer premises. The pump shall be tested on contract flow/ head at contract efficiency. The pump shall be tested according to the MS ISO/IEC 17025:2017 and ISO 9906:2012 (EN) Rotor Dynamic Pump-Motor Performace Acceptance Test Grades 1, 2 and 3.				
	Performance Verification:The testing shall confirms the pump operates at the specified flow rates and pressure levels as per contract and design specifications. Efficiency Assessment: The testing shall determines the pump's efficiency by comparing the actual performance to the theoretical performance. Reliability Check: The simulation of real-world operation conditions to test for potential issues and weaknesses that may lead to pump failures or malfunctions. Quality Assurance: The pump testing shall focus on quality assessment to ensure pumps meet the required performance standards and specifications. These shall include winding performance test, all seals pressure test, paint thickness test and etc. Safety Evaluation: The test shall be conducted for safety aspects of pumps such as winding thermister functioning, moisture protection sensor, water jacket function for cooling efficiency, vibration test and etc.				
	Hydraulic Performance Testing: The test shall be conducted to measure the flow rate, pressure, and power consumption of the pump across its operational range. Cavitation Testing:The cavitation tests shall be conducted under cavitation condition (high flow low head). NPSH (Net Positive Suction Head) Testing: The NPSH tests shall be conducted for the minimum suction pressure and verification of NPSH curve. Efficiency Testing: The Efficiency testing shall compare the pump's actual performance (flow rate and head), power input with published pump curve. Vibration and Noise Testing: Vibration and noise levels shall be measured to ensure the pump operates without excessive vibrations or noise that could indicate mechanical issues.				
2.0	At site testing:-				
	All pumps shall be tested on the following items prior to its operations				
	a.Pump Head, Flow, Efficiency and Power - to plot with manufacturer's pump curve				
	b. Pump Motor rotation, running amp and motor temperature				
	c. Pump Vibration and adjust/remedy as required				
	d. Pump Leakage and its auxillaries equipment - zero leakage shall be allowed				
	e. Pump control function for safety interlock, auto/manual interlock, emergency/stop switch interlock, starting amp, cable temperature, contactors, relays, overload, power factor regulator fuctioning				
	f. All cable shall be test for continuity and insulation resistance				
	g. All control panel insulation shall be tested for earthing performance less than 7 Ohm.				
	h. To conduct air blower testing for running amp, power, pressure and air flow. The air flow shall be verified by plotting power/pressure point against manufacturer's performance curve.				

	i. To conduct aeration diffuser/nozzle testing by visual monitoring of fine bubble formation evenly distributed across the aeration tank including verification of nozzle intact placement at the bottom of the tank.				
	j. To conduct flow test at underground pipe to confirm no blockage via the contractor's proposed method.				
	k. To conduct pumping line pressure test 1.5 times of working pressure for 24 hours with 5% tolerance of pressure drop due to temperature difference.				
	Notes: The contractor shall submit the testing plan for S.O. verification and approval. The list above is not exhaustive, the contractor shall proposed any suitable or related method of testing including the test of mixer, scrapper and stirrer.				
3.0	The contractor shall provide the S.O. sample board/mock up/catalogue for:-				
	a. pump equipment, control panel equipment,cables				
	b. mixers including valves				
	c. blowers, blower's performance curve, control panel,silencer, filters, pressure safety release valve				
	d. trash screw conveyor, control panel, cable				
	e. clarifier, scrapper, and others components design of clarifier, material				
	f. all related piping above and underground including tees, elbows and fittings				
	g. Lifting davit design				
	JUMLAH				
SUB-TOTAL TO BE CARRIED TO SUMMARY OF PRICES					

NO.	DESCRIPTION	No		UNIT PRICE (RM)	PRICE (RM)
8.3	**REMOTE PUMPING STATION 1**				
1.0	Mechanical Motorised Primary Coarse Screen as per spesification Capacity :100kgf Power: 0.75kw Length approx: 40 ft Screen Width: 950 mm Material: Stainless Steel **for screen and frame** Drive: Motor spocket and chain stainless steel type Refer drawing ARM /UIA/STP /M&E/PS-3/06, ARM /UIA/STP /M&E/PS-3/07 The screen shall be installed at the existing location of the empty bay.	1	nos		
1.1	To supply, deliver and install **primary screen weather proof control panel** located outside near the screen conveyor c/w incoming power cable 4C X 4mm2 PVC/SWA/PVC +E, from the new pump control panel. Out going cable to trash screen conveyor and screw conveyor with 4Cx 2.5mm2 PVC/SWA/PVC +E MCB, RCCB , terminal block , interlocking relays, cable gland, emergency stop switch and all necessary for the complete functioning system. Contractor shall propose and design accordingly to the complete power and control system of the primary screen conveyor and for the trash screw conveyor	1	lot		
1.2	Collection waste /trash bin To fabricate supply deliver and install mild steel collection waste bin c/w castor wheel Bin size : 2 m width x 1m height x 1m depth Material : Mild steel 4 mm thk with angle iron stiffener.	1	lot		
1.3	To fabricate, deliver, supply and install stainless steel trash screw conveyor c/w motor connected to existing panel (approx length 10 ft) to suit as per site conditions. wiring: 2.5 mm^2 x 3C +E PVC/SWA/PVC to new panel (approx 10 meter)	1	lot		
2.0	Dry pit raw sewage pump (Pump 1 and Pump 2) To supply deliver and install , Dry Pit/Submersible Centrifugal Pumps, c/w **submersible cables, cooling jacket, DI duct foot 90° elbows, anchor block concrete/plinth** base 0.5 m3 c/w Y16 rebar and starter bar Note : Cement grouting for **starter bar** installation suitable for waste water environment. Method statemet shall be submitted to S.O for approval. **Capacity : 78.70 l/s @ 19.30 m** Power:24.5 kW Impeller material: Stainless steel 4 series Efficiency: min 70% Mechanical seal: SIC/SIC (silicone carbide) Thermister at motor winding Moisture sensor at terminal chamber Speed of pump: 1450 rpm (pump curve and catalogue shall be submitted by contractor) Submersible cable length for motor power, thermistor and moisture indicator: 10m Refer drawing ARM /UIA/STP /M&E/PS-3/06, ARM /UIA/STP /M&E/PS-3/07	2	nos		
3.0	Pump Suction/ Delivery Header Pipe All pumping pipe shall be of flanged ended ductile iron material , to suite existing site condition. Installation of pumping delivery side header consist of:				

	a) Ductile iron PN16 Ø350xØ150 flange ended off take tee c/w blank flange (1no),moulded NBR gasket connected to the existing delivery pipe, 100mm x100mmX 6mm thk hot dipped galvanized I-beam header pipe supports including HDG pipe flat bar strap securing pipe to support brackets . HDG bolts washer and nuts shall be inclusive. Refer drawing ARM /UIA/STP /M&E/PS-3/06	2	nos		
	b) Ductile iron (DI) flange ended short piece PN16 Ø350 straight pipe c/w ,molded NBR gasket connecting the new Ø350 tee delivery header pipe to the existing delivery header pipe (approx pipe length 2 m,actual dimension to be measured at site) HDG bolts washer and nuts shall be inclusive. Refer drawing ARM /UIA/STP /M&E/PS-3/06	1	lot		
	c) PN16 Ø350 Blank flange for pipe delivery header end. HDG bolts washer and nuts shall be inclusive. Refer drawing ARM /UIA/STP /M&E/PS-3/06	1	lot		
	d) D.I flange ended short piece straight pipe PN16 Ø150 mm for pumping delivery side and suction side conecting all valves, and pumps to header c/w flanges,molded HDG hot dipped galvanized fasteners(bolts and nuts) NBR gasket, Estimated total short piece length : 6m for each pump x 2 pump system (actual dimension to be measured at site) HDG bolts washer and nuts shall be inclusive. Refer drawing ARM /UIA/STP /M&E/PS-3/06	2	lot		
	e) D.I flange ended eblow PN16 Ø150 mm for pumping delivery side conecting c/w flanges,molded HDG hot dipped galvanized fasteners(bolts and nuts) NBR gasket, HDG bolts washer and nuts shall be inclusive. Refer drawing ARM /UIA/STP /M&E/PS-3/06 (actual dimension to be measured at site)	2	nos		
	f)SPAN approved PN16 Ø150 mm metal seated disc gate valves for pump suction and delivery side c/w flanges,NBR gasket, HDG bolts washer and nuts Material : SS Disc and SS spindle & CI body Refer drawing ARM /UIA/STP /M&E/PS-3/06	4	nos		
	g)SPAN approved PN 16 Ø150 mm swing (SS metal disc) check valve c/w flanges,NBR gasket, HDG bolts washer and nuts Refer drawing ARM /UIA/STP /M&E/PS-3/06	2	nos		
	h) SPAN approved PN 16 Ø150 mm flexible couplings c/w flanges, HDG bolts washer and nuts , Refer drawing ARM /UIA/STP /M&E/PS-3/06	2	nos		
	i) 75mm x75mmX 4mm thk hot dipped galvanized angle iron Ø150mm pipe supports c/w HDG base angle and floor securing plugs covered with concrete, HDG pipe flat bar strap securing pipe to support brackets Refer drawing ARM /UIA/STP /M&E/PS-3/06	4	lot		
4.0	1 inch SCH40 SS304 air release pipe to sump approx 3 meter c/w oil filled type pressure gauges,PN16 stainless steel ball valves and stainless steel fittings.	2	lot		
5.0	**Sewage Pump Control Panel**				

5.1	To supply deliver and install main **incoming power floor standing distribution switchboard** for the existing pump control panel and new pump control panel consist of 200A incoming MCCB c/w ELR /OC/IDMT, , busbars,Outgoing MCCB 120A x 2 nos(1 no for existing CP and 1 no for new CP) cable connection to the existing control panel and the new control panel. Outgoing cable size : 4X50mm2 PVC/XLPE Cable + E	1	lot		
5.2	To supply deliver and install new floor standing pump switchboard for the new pump control panel consist of 120A incoming MCCB c/w ELR /OC/IDMT, busbars, 60A MCCB for duty pump x 2 nos 20A MCCB for mechanical motorized screen x 1 nos 60A Soft Starter x 2 nos (Pump) 80A Rating Overloads 60A Bypass DOL contactors x 2 nos Push Button(pump 1 and pump 2) , Temperature Controllers/Display(pump 1 and pump 2) ,Single Phasing Relay , floatless relay(pump 1 and pump 2) , relays(pump 1 and pump 2) ,control timers, bus bars , control wiring , indication lighting , selector switches , Auto manual selector switch(pump 1 and pump 2) , ammeter(pump 1 and pump 2) , voltmeter(pump 1 and pump 2) , running hour meter (pump 1 and pump 2), push button (pump 1 and pump 2) 24 hours operational timer, Pump, mechanical motorized screen, power terminal block , control terminal block, lightning surge protector, earthing connection less than 7 Ohm or refer to ST. Notes: The mechanical screen shall be interlocking with pump running. Pump running shall be based on incoming sewage water level at primary screen channel ,i.e.first level- normal 1 pump run, second level- normal 1 pump run , warning level- 2 pump run. Single pump shall run at first level and second level, should warning level is reached, two pumps shall run simultaneously)	1	lot		
5.3	To construct earth chamber c/w earthing rod, 2 inch aluminium earth strip, concrete chamber, to obtain less than 7 Ohm resistance or refer to ST requirements.	1	lot		
5.4	To supply, deliver and install Stainless Steel Pump cable terminal box located near pump **(above flooding level)** c/w terminal block, cable gland, emergency stop switch and all necessary for the complete functioning system.	1	lot		
5.5	**Pump power cable**				
5.6	To deliver,supply and install submersible pump power cable from panel to terminal box approx 8m for each pump - 3C X 10 mm2 + E.	16	m		
5.7	**Pump intsrumentation/thermister cable** To deliver,supply and install submersible pump signal cable from panel to terminal box approx 8m for each pump - 7C X 1.5 mm2	16	m		
6.0	**<u>Building Automation System (BAS)/Programmable Logic Controller (PLC)</u>** Building Automation System (BAS)/Programmable Logic Controller (PLC) Installation of BAS/PLC module, HMI touch screen panel,network module, relays, auxillary contact, cablings, CT transformers, earthing, and programming for IO point requirements but not limited to as below: a. pump 1/2 run, pump 1/2 stop, pump 1/2 trip(status and remote capability) b. pump 1/2 volt and amp c. New panel 120A incoming MCCB status(ON/OFF/TRIP) d. New incoming Volt and ampere , power , power factor through Power meter.(high level interface) d. mechanical screen status(ON/OFF/TRIP) e. sewage incoming level (cut off level,first level, second level, warning level) f. exhaust fan 1 and 2 status(ON/OFF/TRIP) g. Trash conveyor status(ON/OFF/TRIP) h. Dewatering pump chamber/sump electrode level status (Normal , High) j. Dewatering pump status (ON/OFF /Trip) **Note:** Contractor shall propose and design accordingly to the complete remote monitoring and controling of Remote Pumping Station.)	35	I/O points		
7.0	To deliver,supply and install **float switches for low level,medium level, high level, high high level (4 nos) ,** SS terminal block panel cable length approx 40ft as per site requirement.	4	nos		

7.1	To deliver,supply and install dewatering pump sump **electrode for low level,high level, (1 nos) ,** c/w floatless relay, ss angle bracket, wiring: 3C x 1.5mm2 PVC/PVC cable to pump control panel Cable length approx 40ft as per site requirement.	4	nos		
8.0	To fabricate, deliver, supply and **install staircase handrail o**f hot dipped galvanized iron pipe Ø 1,1/2 inch handrail approx total length 80ft to suit as per site conditions.	80	ft		
9.0	To fabricate, deliver, supply and install galvanized ducting of 600 mm x 600 mm painted with 2 layer anti corrosion paint approx total length 40 ft c/w 600 mm x 400 mm aluminium epoxy coated air grilles (2 nos), hangers,supports, to suit as per site conditions. (Thickness of ducting 1 mm)	1280	ft2		
10.0	**Intake fresh air fan :**				
	To fabricate, deliver, supply and install 10 ach propeller type 3 phase exhaust fan to suit as per site conditions c/w wiring 2.5 mm2 x 3C + E to existing panel. (Thickness of ducting 1mm) 0.5 inch water gauge Air flow : 4000 cfm	1	lot		
11.0	**Exhaust fresh air fan:**				
	To fabricate, deliver, supply and install 10 ach propeller type 3 phase exhaust fan to suit as per site conditions c/w wiring 2.5 mm2 x 3C + E to existing panel. (Thickness of ducting 1mm) f.a.d Air flow : 4000 cfm	1	lot		
	JUMLAH				
SUB-TOTAL TO BE CARRIED TO SUMMARY OF PRICES					

NO.	DESCRIPTION	No		UNIT PRICE (RM)	PRICE (RM)
8.4	**REMOTE PUMPING STATION 2**				
1.0	Mechanical Motorised Primary Coarse Screen as per spesification Capacity :100kgf Power: 0.75kw Length approx: 40 ft Screen Width: 950 mm Material: Stainless Steel **for screen and frame** Drive: Motor spocket and chain stainless steel type Refer drawing ARM /UIA/STP /M&E/PS-3/06, ARM /UIA/STP /M&E/PS-3/07 The screen shall be installed at the existing location of the empty bay.	1	nos		
1.1	To supply, deliver and install **primary screen weather proof control panel** located outside near the screen conveyor c/w incoming power cable 4C X 4mm2 PVC/SWA/PVC +E, from the new pump control panel. Out going cable to trash screen conveyor and screw conveyor with 4Cx 2.5mm2 PVC/SWA/PVC +E MCB, RCCB , terminal block , interlocking relays, cable gland, emergency stop switch and all necessary for the complete functioning system. Contractor shall propose and design accordingly to the complete power and control system of the primary screen conveyor and for the trash screw conveyor	1	lot		
1.2	Collection waste /trash bin To fabricate supply deliver and install mild steel collection waste bin c/w castor wheel Bin size : 2 m width x 1m height x 1m depth Material : Mild steel 4 mm thk with angle iron stiffener.	1	lot		
1.3	To fabricate, deliver, supply and install stainless steel trash screw conveyor c/w motor connected to existing panel (approx length 10 ft) to suit as per site conditions. wiring: 2.5 mm^2 x 3C +E PVC/SWA/PVC to new panel (approx 10 meter)	1	lot		
2.0	Dry pit raw sewage pump (Pump 1 and Pump 2) To supply deliver and install , Dry Pit/Submersible Centrifugal Pumps, c/w **submersible cables, cooling jacket, DI duct foot 90° elbows, anchor block concrete/plinth** base 0.5 m3 c/w Y16 rebar and starter bar Note : Cement grouting for **starter bar** installation suitable for waste water environment. Method statemet shall be submitted to S.O for approval. **Capacity : 78.70 l/s @ 19.30 m** Power:24.5 kW Impeller material: Stainless steel 4 series Efficiency: min 70% Mechanical seal: SIC/SIC (silicone carbide) Thermister at motor winding Moisture sensor at terminal chamber Speed of pump: 1450 rpm (pump curve and catalogue shall be submitted by contractor) Submersible cable length for motor power, thermistor and moisture indicator: 10m Refer drawing ARM /UIA/STP /M&E/PS-3/06, ARM /UIA/STP /M&E/PS-3/07	2	nos		
3.0	Pump Suction/ Delivery Header Pipe All pumping pipe shall be of flanged ended ductile iron material , to suite existing site condition. Installation of pumping delivery side header consist of:				

	a) Ductile iron PN16 Ø350xØ150 flange ended off take tee c/w blank flange (1no),moulded NBR gasket connected to the existing delivery pipe, 100mm x100mmX 6mm thk hot dipped galvanized I-beam header pipe supports including HDG pipe flat bar strap securing pipe to support brackets . HDG bolts washer and nuts shall be inclusive. Refer drawing ARM /UIA/STP /M&E/PS-3/06	2	nos		
	b) Ductile iron (DI) flange ended short piece PN16 Ø350 straight pipe c/w ,molded NBR gasket connecting the new Ø350 tee delivery header pipe to the existing delivery header pipe (approx pipe length 2 m,actual dimension to be measured at site) HDG bolts washer and nuts shall be inclusive. Refer drawing ARM /UIA/STP /M&E/PS-3/06	1	lot		
	c) PN16 Ø350 Blank flange for pipe delivery header end. HDG bolts washer and nuts shall be inclusive. Refer drawing ARM /UIA/STP /M&E/PS-3/06	1	lot		
	d) D.I flange ended short piece straight pipe PN16 Ø150 mm for pumping delivery side and suction side conecting all valves, and pumps to header c/w flanges,molded HDG hot dipped galvanized fasteners(bolts and nuts) NBR gasket, Estimated total short piece length : 6m for each pump x 2 pump system (actual dimension to be measured at site) HDG bolts washer and nuts shall be inclusive. Refer drawing ARM /UIA/STP /M&E/PS-3/06	2	lot		
	e) D.I flange ended eblow PN16 Ø150 mm for pumping delivery side conecting c/w flanges,molded HDG hot dipped galvanized fasteners(bolts and nuts) NBR gasket, HDG bolts washer and nuts shall be inclusive. Refer drawing ARM /UIA/STP /M&E/PS-3/06 (actual dimension to be measured at site)	2	nos		
	f)SPAN approved PN16 Ø150 mm metal seated disc gate valves for pump suction and delivery side c/w flanges,NBR gasket, HDG bolts washer and nuts Material : SS Disc and SS spindle & CI body Refer drawing ARM /UIA/STP /M&E/PS-3/06	4	nos		
	g)SPAN approved PN 16 Ø150 mm swing (SS metal disc) check valve c/w flanges,NBR gasket, HDG bolts washer and nuts Refer drawing ARM /UIA/STP /M&E/PS-3/06	2	nos		
	h) SPAN approved PN 16 Ø150 mm flexible couplings c/w flanges, HDG bolts washer and nuts , Refer drawing ARM /UIA/STP /M&E/PS-3/06	2	nos		
	i) 75mm x75mmX 4mm thk hot dipped galvanized angle iron Ø150mm pipe supports c/w HDG base angle and floor securing plugs covered with concrete, HDG pipe flat bar strap securing pipe to support brackets Refer drawing ARM /UIA/STP /M&E/PS-3/06	4	lot		

4.0	1 inch SCH40 SS304 air release pipe to sump approx 3 meter c/w oil filled type pressure gauges,PN16 stainless steel ball valves and stainless steel fittings.	2	lot		
5.0	**Sewage Pump Control Panel**				
5.1	To supply deliver and install main **incoming power floor standing distribution switchboard** for the existing pump control panel and new pump control panel consist of 200A incoming MCCB c/w ELR /OC/IDMT, , busbars,Outgoing MCCB 120A x 2 nos(1 no for existing CP and 1 no for new CP) cable connection to the existing control panel and the new control panel. Outgoing cable size : 4X50mm2 PVC/XLPE Cable + E	1	lot		
5.2	To supply deliver and install new floor standing pump switchboard for the new pump control panel consist of 120A incoming MCCB c/w ELR /OC/IDMT, busbars, 60A MCCB for duty pump x 2 nos 20A MCCB for mechanical motorized screen x 1 nos 60A Soft Starter x 2 nos (Pump) 80A Rating Overloads 60A Bypass DOL contactors x 2 nos Push Button(pump 1 and pump 2) , Temperature Controllers/Display(pump 1 and pump 2) ,Single Phasing Relay , floatless relay(pump 1 and pump 2) , relays(pump 1 and pump 2) ,control timers, bus bars , control wiring , indication lighting , selector switches , Auto manual selector switch(pump 1 and pump 2) , ammeter(pump 1 and pump 2) , voltmeter(pump 1 and pump 2) , running hour meter (pump 1 and pump 2), push button (pump 1 and pump 2) 24 hours operational timer, Pump, mechanical motorized screen, power terminal block , control terminal block, lightning surge protector, earthing connection less than 7 Ohm or refer to ST. Notes: The mechanical screen shall be interlocking with pump running. Pump running shall be based on incoming sewage water level at primary screen channel ,i.e.first level- normal 1 pump run, second level- normal 1 pump run , warning level- 2 pump run. Single pump shall run at first level and second level, should warning level is reached, two pumps shall run simultaneously)	1	lot		
5.3	To construct earth chamber c/w earthing rod, 2 inch aluminium earth strip, concrete chamber, to obtain less than 7 Ohm resistance or refer to ST requirements.	1	lot		
5.4	To supply, deliver and install Stainless Steel Pump cable terminal box located near pump (above flooding level) c/w terminal block, cable gland, emergency stop switch and all necessary for the complete functioning system.	1	lot		
5.5	**Pump power cable**				
5.6	To deliver,supply and install submersible pump power cable from panel to terminal box approx 8m for each pump - 3C X 10 mm2 + E.	16	m		
5.7	**Pump intsrumentation/thermister cable** To deliver,supply and install submersible pump signal cable from panel to terminal box approx 8m for each pump - 7C X 1.5 mm2	16	m		

6.0	**Building Automation System (BAS)/Programmable Logic Controller (PLC)** Building Automation System (BAS)/Programmable Logic Controller (PLC) Installation of BAS/PLC module, HMI touch screen panel,network module, relays, auxillary contact, cablings, CT transformers, earthing, and programming for IO point requirements but not limited to as below: a. pump 1/2 run, pump 1/2 stop, pump 1/2 trip(status and remote capability) b. pump 1/2 volt and amp c. New panel 120A incoming MCCB status(ON/OFF/TRIP) d. New incoming Volt and ampere , power , power factor through Power meter.(high level interface) d. mechanical screen status(ON/OFF/TRIP) e. sewage incoming level (cut off level,first level, second level, warning level) f. exhaust fan 1 and 2 status(ON/OFF/TRIP) g. Trash conveyor status(ON/OFF/TRIP) h. Dewatering pump chamber/sump electrode level status (Normal , High) j. Dewatering pump status (ON/OFF /Trip) **Note:** Contractor shall propose and design accordingly to the complete remote monitoring and controling of Remote Pumping Station.)	35	I/O points		
7.0	To deliver,supply and install **float switches for low level,medium level, high level, high high level (4 nos) ,** SS terminal block panel cable length approx 40ft as per site requirement.	4	nos		
7.1	To deliver,supply and install dewatering pump sump **electrode for low level,high level, (1 nos) ,** c/w floatless relay, ss angle bracket, wiring: 3C x 1.5mm2 PVC/PVC cable to pump control panel Cable length approx 40ft as per site requirement.	4	nos		
8.0	To fabricate, deliver, supply and **install staircase handrail o**f hot dipped galvanized iron pipe Ø 1,1/2 inch handrail approx total length 80ft to suit as per site conditions.	80	ft		
9.0	To fabricate, deliver, supply and install galvanized ducting of 600 mm x 600 mm painted with 2 layer anti corrosion paint approx total length 40 ft c/w 600 mm x 400 mm aluminium epoxy coated air grilles (2 nos), hangers,supports, to suit as per site conditions. (Thickness of ducting 1 mm)	1280	ft2		
10.0	**Intake fresh air fan :**				
	To fabricate, deliver, supply and install 10 ach propeller type 3 phase exhaust fan to suit as per site conditions c/w wiring 2.5 mm2 x 3C + E to existing panel. (Thickness of ducting 1mm) 0.5 inch water gauge Air flow : 4000 cfm	1	lot		
11.0	**Exhaust fresh air fan:**				
	To fabricate, deliver, supply and install 10 ach propeller type 3 phase exhaust fan to suit as per site conditions c/w wiring 2.5 mm2 x 3C + E to existing panel. (Thickness of ducting 1mm) f.a.d Air flow : 4000 cfm	1	lot		
	JUMLAH				
SUB-TOTAL TO BE CARRIED TO SUMMARY OF PRICES					

NO.	DESCRIPTION	No		UNIT PRICE (RM)	PRICE (RM)
8.5	**COLLECTION CHAMBER**				
	Supply and install Mechanical Motorised Fine Screen as per spesification Capacity :0.18 m3 rake volume Power: 0.55kw Length approx: 2.5 m Screen Width: 950 mm Material: Stainless Steel **for screen and frame** Drive: Motor spocket and chain stainless steel type Refer drawing ARM /UIA/STP /M&E/HW-4/09B The screen shall be installed at the existing location of the empty bay.	1	nos		
	a. Collection waste /trash bin To fabricate supply deliver and install mild steel collection waste bin c/w castor wheel Bin size : 2 m width x 1m height x 1m depth Material : Mild steel 4 mm thk with angle iron stiffener.	1	lot		
	b. To fabricate, deliver, supply and install stainless steel trash screw conveyor c/w motor connected to suit as per site conditions. Conveyor length : Approx length 2.4m Screw material : Stainless steel Screw diameter : 9 inch Shaft : Stainless steel Width of screw channel : 15 inch Wiring: 2.5 mm^2 x 3C +E PVC/SWA/PVC to new panel (approx 10 meter)	1	lot		
	c. To supply deliver and install new ultrsonic level sensor at Collection Chamber to be connected to BAS/PLC system for monitoring purpose c/w stainless steel brackets , wiring in GI conduit to Control Room BAS panel Wiring: 0.75 mm^2 x 5C + shielded cable to controller (approximate length 30m)	1	lot		
	d.To supply, deliver and install weather proof **Mechanical Motorised Fine Screen control panel and trash screw conveyor** located outside near the collection chamber c/w: Incoming power cable 4C X 4mm2 PVC/SWA/PVC +E, from the new pump control panel.(approx 30m) Out going cable to trash screen conveyor and screw conveyor with 4Cx 2.5mm2 PVC/SWA/PVC +E Outgoing cable to Mechanical motorised fine screen conveyor and screw conveyor with 4Cx 2.5mm2 PVC/SWA/PVC +E MCBs, RCCB , terminal block , interlocking relays, cable gland, emergency stop switches and all necessary for the complete functioning system. Contractor shall propose and design accordingly to the complete power and control system of the mechanical motorised fine screen conveyors and for the trash screw conveyor	1	lot		
	Supply and install Mechanical Motorised Fine Screen as per spesification Capacity :0.18 m3 rake volume Power: 0.55kw Length approx: 2.5 m Screen Width: 950 mm Material: Stainless Steel **for screen and frame** Drive: Motor spocket and chain stainless steel type Refer drawing ARM /UIA/STP /M&E/HW-4/09B The screen shall be installed at the existing location of the empty bay.	1	nos		
	SUB-TOTAL TO BE CARRIED TO SUMMARY OF PRICES				
8.6	**BLOWER ROOM**				
1.0	To supply, deliver and install low noise helical port roots-type rotary blower c/w v-pulley,v-belt,suction silencer,v-belt cover,common base,safety valve (with short pipe), pressure gauge, discharge silencer,gate valve, check valve, rubber vibration isolator and flexible joint c/w **Ø150mm GI Class C connection piping to new dia. 350 mm header pipe** Capacity ; 33.67 m3/min @ 5.5m TDH 3-LOBES ROOTS TYPE BLOWER Power: 45KW c/w a) Check Valves - Dia: 200mm (2 nos) b) Gate Valves c/w actuator - Dia: 200mm (2 nos) c) Safety Valves - Dia: 200mm (2 nos) The contractor shall submit the relavant catalogue and installation drawing/method statement of blower for S.O. evaluation.	2	nos		

2.0	To fabricate, supply, deliver and install **Ø350 mm G.I. Class 'C' air header pipe** c/w concrete anchor, painting etc. Approx length 4 m	1	lot		
	JUMLAH				
SUB-TOTAL TO BE CARRIED TO SUMMARY OF PRICES					
8.7	**SEWAGE DISTRIBUTION CHAMBER**				
1.0	To desludge, clean and remove all debris inside chamber c/w flushing with clean water Flushing from sewage dist. Chamber to anoxic tank (D.I pipe dia 300 mm).	1	lot		
	JUMLAH				
SUB-TOTAL TO BE CARRIED TO SUMMARY OF PRICES					
8.8	**ANOXIC TANK**				
1.0	To desludge, clean and remove all debris inside chamber c/w flushing with clean water Flushing from anoxic tank to aeration tank (D.I pipe dia 300 mm).	1	lot		
2.0	To supply,deliver and install stainless steel submersible mixer c/w hot dipped galvanized hoisting equipment permanently installed. Refer to drawing ARM/UIA/STP/M&E/BT-5/16 Capacity ; 0.12 m3/s (Mixing Flow) Power: 1.5kW Body/Impeller: Stainless steel Guiderails: Stainless steel,SS clamp, SS bolts and nuts, Stainless steel anchor Cable: Submersible type Hoisting chain: Stainless steel manual hoist Maximum depth: 10 m Note: The contractor shall submit catalogue for the S.O. approval for evaluation.	2	nos		
3.0	To supply, deliver and install Stainless Steel Mixer terminal box from control panel to the mechanical system complete with junction box,hot dipped galvanized stand, terminal block, cable gland, emergency stop switch and all necessary for the complete functioning system.	1	lot		
	JUMLAH				
SUB-TOTAL TO BE CARRIED TO SUMMARY OF PRICES					
8.9	**AERATION TANK 1 (Refer to the drawing ARM/UIA/STP/M&E/BT-5/14~17)**				
1.0	To desludge, dewatering, clean and remove all debris inside tank c/w flushing with clean water. Flushing from aeration tank to aeration distribution Chamber (D.I pipe dia 300 mm). Note: Tank volume 1640 m3	1	lot		
2.0	To supply, deliver and install Mixed Liqor Suspended Solid (MLSS) Pump- Desludging Pump Capacity ; 10.4 L/s @ 8 m TDH Power: 2.0KW Pump number: 2 nos (1 duty 1 standby) Type: Submersible Centrifugal Sewage Pump Accesories: Stainless steel chain, guide rail, duck foot, SS swing type PN16 check valve dia. 100 mm SS 304 Sch 40 riser pipe c/w stainless steel bracket, ss flange, ss bolts and nuts connected to D.I MLSS header pipe. D.I header pipe dia. 100 mm Isolation gate valve: D.I body ,PN16 dia 100 mm in aeration tank Impeller material: Stainless steel 4 series Efficiency: min 70% Mechanical seal: SIC/SIC (silicone carbide) Thermister at motor winding Moisture sensor at terminal chamber Speed of pump: 1450 rpm (pump curve and catalogue shall be submitted by contractor) Cable terminal casing IP54 weatherproof stainless steel c/w emergency STOP switch terminal block, cable gland Submersible pump cable length approx 8 m Pump duckfoot plinth. Y16 Starter bar, re-bar A10, concrete at least 35 A, grouting to support pump duck foot,starter bar (grouting , starter bar suitable for waste water environment) .	1	lot tank		

3.0	To supply, deliver and install SS IP54 Pump terminal box from control panel to the mechanical system complete with junction box, terminal block, cable gland, emergency stop switch and all necessary for the complete functioning system.	1	Lot		
4.0	To fabricate, deliver, supply and install Hot dipped galvanized steel Lifting davit beam SWL 500kg for MLSS Submersible Pump c/w SS manual hoist chain I-beam : 100mm x 100mm x 6mm thick as per dwg	1	nos		
5.0	To supply, deliver and install Stainless Steel Pump cable terminal box located near pump c/w terminal block, cable gland, emergency stop switch and all necessary for the complete functioning system.	1	lot		
6.0	**SEWAGE TRANSFER PIPING**				
	MLSS D.I transfer pipe (g) to Aeration Tank 1 to the anoxic tank chamber dia 100 mm flange joint. Refer to the drawing ARM/UIA/STP/M&E/STP-4/05	50	m		
	Aeration Tank 1 Dewatering Pipe To erect new dia. 100 mm D.I flange ended dewatering pipe from MLSS Pump header pipe to the Aeration Collection Chamber (CC-5) c/w elbow, brackets, HDG bolts and nuts and etc for complete installation.	6	m		
	To install 100 mm PN16 flange type gate valve at MLSS pipe header for effluent diversion to the Aeration Collection Chamber (CC-5) during dewatering of aeration tank.	2	nos		
	JUMLAH				
SUB-TOTAL TO BE CARRIED TO SUMMARY OF PRICES					
8.10	**AERATION TANK 2**				
1.0	To desludge, dewatering, clean and remove all debris inside tank c/w flushing with clean water. Flushing from aeration tank to aeration distribution Chamber (D.I pipe dia 300 mm). Note: Tank volume 1640 m3	1	lot		
2.0	To supply, deliver and install Mixed Liqor Suspended Solid (MLSS) Pump- Desludging Pump Capacity ; 10.4 L/s @ 8 m TDH Power: 2.0KW Pump number: 2 nos (1 duty 1 standby) Type: Submersible Centrifugal Sewage Pump Accesories: Stainless steel chain, guide rail, duck foot, SS swing type PN16 check valve dia. 100 mm SS 304 Sch 40 riser pipe c/w stainless steel bracket, ss flange, ss bolts and nuts connected to D.I MLSS header pipe. D.I header pipe dia. 100 mm Isolation gate valve: D.I body ,PN16 dia 100 mm in aeration tank Impeller material: Stainless steel 4 series Efficiency: min 70% Mechanical seal: SIC/SIC (silicone carbide) Thermister at motor winding Moisture sensor at terminal chamber Speed of pump: 1450 rpm (pump curve and catalogue shall be submitted by contractor) Cable terminal casing IP54 weatherproof stainless steel c/w emergency STOP switch terminal block, cable gland Submersible pump cable length approx 8 m Pump duckfoot plinth. Y16 Starter bar, re-bar A10, concrete at least 35 A, grouting to support pump duck foot,starter bar (grouting , starter bar suitable for waste water environment) .	1	lot tank		
3.0	To supply, deliver and install SS IP54 Pump terminal box from control panel to the mechanical system complete with junction box, terminal block, cable gland, emergency stop switch and all necessary for the complete functioning system.	1	Lot		
4.0	To fabricate, deliver, supply and install Hot dipped galvanized steel Lifting davit beam SWL 500kg for MLSS Submersible Pump c/w SS manual hoist chain I-beam : 100mm x 100mm x 6mm thick as per dwg	1	nos		
5.0	To supply, deliver and install Stainless Steel Pump cable terminal box located near pump c/w terminal block, cable gland, emergency stop switch and all necessary for the complete functioning system.	1	lot		
6.0	**SEWAGE TRANSFER PIPING**				

	MLSS D.I transfer pipe (g) to Aeration Tank 2 to the anoxic tank chamber dia 100 mm flange joint. Refer to the drawing ARM/UIA/STP/M&E/STP-4/05	50	m		
	Aeration Tank 2 Dewatering Pipe To erect new dia. 100 mm D.I flange ended dewatering pipe from MLSS Pump header pipe to the Aeration Collection Chamber (CC-4) c/w elbow, brackets, HDG bolts and nuts and etc for complete installation.	6	m		
	To install 100 mm PN16 flange type gate valve at MLSS pipe header for effluent diversion to the Aeration Collection Chamber (CC-4) during dewatering of aeration tank.	2	nos		
	JUMLAH				
SUB-TOTAL TO BE CARRIED TO SUMMARY OF PRICES					
8.11	**AERATION TANK** **MAIN AIR PIPE (u1)**				
1.0	To erect underground new G.I Class 'C' dia. 200 mm (u1) main air pipe c/w elbow, connection fittings, concrete anchor block and etc. Dia: 200mm Pipe protection: Bituminous coating and bituminous tape or equivalent	35	m		
2.0	To erect underground new G.I Class 'C' dia. 100 mm (u2) main air pipe c/w elbow, connection fittings, concrete anchor block and etc. Dia: 100mm Pipe protection: Bituminous coating and bituminous tape or equivalent	80	m		
3.0	To erect above ground new dia. 100 mm SS 304 Sch 40 air dropper pipe (6 dropper to SS bottom header), air syphon pipe c/w flange connection to (u2) pipe, elbows, tees, concrete anchor block, SS brackets and SS bolts and nuts etc. Dia: 100mm Refer to the drawing ARM/UIA/STP/M&E/BT-6/17, ARM/UIA/STP/M&E/STP-4/05 and ARM/UIA/STP/M&E/BT-1/12	60	m		
4.0	To erect inside aeration tank bottom dia. 100 mm SS 304 Sch 40 air header pipe (6 nos header) c/w tees (40 tees for air distribution), flange connection to dropper pipe, elbows (20 elbows), concrete anchor block, SS brackets and SS bolts and nuts etc. Dia: 100mm Refer to the drawing ARM/UIA/STP/M&E/BT-6/17, ARM/UIA/STP/M&E/STP-4/05 and ARM/UIA/STP/M&E/BT-1/12 Note: The contractor shall propose of pipe anchoring at bottom aeration tank for S.O. approval.	40	m		
5.0	To supply, deliver and install SS Ball Valves PN 16 for Air Isolation c/w connection fittings and SS brackets Dia: 100mm	6	nos		
6.0	To supply, deliver and install uPVC Class 7 100 mm air distribution pipe for bubble diffusers at tank bottom c/w uPVC threaded tees, uPVC nipples, SS anchor bracket, SS support bracket Dia: 100 mm Total length: 530 m Note: The contractor shall propose of pipe anchoring at bottom aeration tank for S.O. approval.	530	m		
7.0	To supply, deliver and install Fine Bubble/ Microscopic Bubble Air Diffuser located on horizontal air headers which are evenly spaced along or across the floor of aeration tank:- Material: ABS Pressure loss: 20 - 80 mm H2O Pipe fitting: Wedge piece 3" (80 mm/OD) Air flow rate: 1-10 m3/hr Bubble size: 1-3 mm Diffuser density: 2 -25 % Notes:The fine bubble diffusers consist of main cap, membrane, seal,check valve membrane, check valve socket, separator plate and special tee 80mm. Refer to the drawing ARM/UIA/STP/M&E/BT-5/16.	500	nos		
	JUMLAH				
SUB-TOTAL TO BE CARRIED TO SUMMARY OF PRICES					
8.12	**AERATION COLLECTION CHAMBER**				

1.0	To desludge, clean and remove all debris inside chamber c/w flushing with clean water from aeration tank through the aeration pipe Flushing from aeration collection chamber CC5 to aeration distribution chamber CC4 (HDPE pipe dia 450 mm).	1	lot		
2.0	To erect new underground pipe dia. 450 mm gravity flow HDPE pipe (h) fusion joint connection from Aeration Collection Chamber (CC-4 to CC-5). Refer to the drawing ARM/UIA/STP/M&E/BT-1/12.	15	m		
3.0	To erect new underground pipe dia. 450 mm gravity flow HDPE pipe (h1) with fusion joint connection from Aeration Collection Chamber (CC-4 and CC-5) to Aeration Distribution Chamber (DC-4). Refer to the drawing ARM/UIA/STP/M&E/STP-4/05 and ARM/UIA/STP/M&E/BT-1/12.	35	m		
	JUMLAH				
SUB-TOTAL TO BE CARRIED TO SUMMARY OF PRICES					
8.13	**AERATION DISTRIBUTION CHAMBER**				
1.0	To desludge, clean and remove all debris inside chamber c/w flushing with clean water from aeration tank through the aeration pipe Flushing from aeration collection chamber CC5 to aeration distribution chamber CC4 (HDPE pipe dia 450 mm).	1	lot		
2.0	To desludge, clean and remove all debris inside influent distribution chamber to clarifier tank pipe (k) for clarifier Tank 1 and clarifier Tank 2 dia. 200 mm D.I pipe c/w flushing with clean water.	2	lot		
	JUMLAH				
SUB-TOTAL TO BE CARRIED TO SUMMARY OF PRICES					

NO.	DESCRIPTION	No		UNIT PRICE (RM)	PRICE (RM)
8.14	**CLARIFIER TANK NO 1**				
1.0	To desludge, clean and remove all debris inside the tank c/w flushing with clean water . Flushing from aeration dist. chamber to activated pump chamber (D.I 200 dia. mm pipe).	1	lot		
2.0	To supply, deliver,install sludge scrapper c/w drive unit,weir plate,drive cage, center pier, sludge remover,scum collector and all ancillary equipment. Refer to the drawing ARM/UIA/STP/M&E/BT-9/20:- Speed: 2.0 RPM Power: 0.37KW Mild steel w/ painting drive unit Mild steel hot dip galvanized walkway bridge: 9995mm(L) x 1000mm (W) Stainless steel 304 stilling well c/w 600 mm opening door w/ thickness 2mm, 2330mm dia.,1250mm width Mild steel hot dip galvanized scrapper arm, 4 nos of 50mm dia. within interval app. height of tank 4700mm depth Mild steel hot dip galvanized of sludge scrapper app. length 6930mm Stainless Steel 304 V-Notch/weir plate with thickness 2mm and width 200mm at the inside launder perimeter of the tank approx 55 m length Stainless steel 304 baffle plate with thickness 2mm and width 300mm at the outside launder perimeter of the tank approx 55 m length Stainless steel 304 3 mm thick scum box with 650mm width and 400 mm height The sludge scrapper unit dimension shall be checked agains existing clarifier structure dimension. Note: The contractor shall smoothen the roller surface for effective roller contact.	1	lot		
3.0	To supply, deliver and install SS cable terminal box for wiring termination and emergency STOP button c/w junction box, terminal block, cable gland, emergency stop switch and all necessary for the complete functioning system.	1	lot		
4.0	To supply, deliver and install dia. 150 mm D.I discharge pipe c/w SS bolts and nuts, D.I elbow for the scum box to the existing scum pipe at the wall of clarifier tank. Refer to the drawing ARM/UIA/STP/M&E/BT-9/20.	1	lot		
5.0	To conduct existing cable integrity test (continuity, insulation and resistance test) to verify the condition of the existing test. The report must be submitted to the S.O. for verification and approval of usage.	1	lot		
6.0	To hack circular clarifier tank for cable wiring trench at inside wall and center pier for scraper motor power supply as specified: Note: The cable shall be buried inside the trench (at centre wall, side wall, and bottom floor). The trench shall be filled with special waterproof cement grout suitable for underwater and corrosive environment. Method statement shall be submitter for S.O. verification and approval.	1	tank		
	4C x 4 mm2 submersible cable	40	m		
7.0	To supply, deliver and install SS IP54 terminal box for cable wiring termination and emergency STOP button at circular clarifier c/w junction box, terminal block, cable gland, emergency stop switch and all necessary for the complete functioning system.	1	nos		
8.0	To supply, deliver and install uPVC underground drainage/sewerage pipe (s) comply with MS979 MS1063 with dia. 250 mm connecting from Sc1 to Sc 2 to Sc3 to Sc4 c/w excavation, pipe concrete based at every 3 m and install according to the set invert level at site. Refer to the drawing ARM/UIA/STP/M&E/STP-4/05.	55	m		
9.0	To supply, deliver and install HDPE underground drainage/sewerage pipe (x1) comply with SPAN approved with dia. 300 mm connecting from Efc 1 to Efc 2 to Efc 4 c/w excavation, pipe concrete based at every 3 m and install according to the set invert level at site. Refer to the drawing ARM/UIA/STP/M&E/STP-4/05. Note: The pipe joint shall be fusion joint.	55	m		
	JUMLAH				
SUB-TOTAL TO BE CARRIED TO SUMMARY OF PRICES					
8.15	**CLARIFIER TANK NO 2**				

	To desludge, clean and remove all debris inside the tank c/w flushing with clean water . Flushing from aeration dist. chamber to activated pump chamber (D.I 200 dia. mm pipe).				
	To supply, deliver,install sludge scrapper c/w drive unit,weir plate,drive cage, center pier, sludge remover,scum collector and all ancillary equipment:- Capacity ; 2.0 RPM Power: 0.37KW Mild steel w/ painting drive unit Mild steel hot dip galvanized walkway bridge: 9995mm(L) x 1000mm (W) Stainless steel 304 stilling well c/w 600 mm opening door w/ thickness 2mm, 2330mm dia.,1250mm width Mild steel hot dip galvanized scrapper arm, 4 nos of 50mm dia. within interval app. height of tank 4700mm depth Mild steel hot dip galvanized of sludge scrapper app. length 6930mm Stainless Steel 304 V-Notch with thickness 2mm and width 200mm Stainless steel 304 baffle plate with thickness 2mm and width 300mm Mild steel hot dip galvanized scum box with 650mm width and 400 mm height TL:33.06, TWL: 32.56m,BL: 29.35	1			
3.0	To supply, deliver and install SS cable terminal box for wiring termination and emergency STOP button c/w junction box, terminal block, cable gland, emergency stop switch and all necessary for the complete functioning system.	1	lot		
4.0	To supply, deliver and install dia. 150 mm D.I discharge pipe c/w SS bolts and nuts, D.I elbow for the scum box to the existing scum pipe at the wall of clarifier tank. Refer to the drawing ARM/UIA/STP/M&E/BT-9/20.	1	lot		
5.0	To conduct existing cable integrity test (continuity, insulation and resistance test) to verify the condition of the existing test. The report must be submitted to the S.O. for verification and approval of usage.	1	lot		
6.0	To hack circular clarifier tank for cable wiring trench at inside wall and center pier for scraper motor power supply as specified: Note: The cable shall be buried inside the trench (at centre wall, side wall, and bottom floor). The trench shall be filled with special waterproof cement grout suitable for underwater and corrosive environment. Method statement shall be submitter for S.O. verification and approval.	1	tank		
	4C x 4 mm2 submersible cable	40	m		
7.0	To supply, deliver and install SS IP54 terminal box for cable wiring termination and emergency STOP button at circular clarifier c/w junction box, terminal block, cable gland, emergency stop switch and all necessary for the complete functioning system.	1	nos		
8.0	To supply, deliver and install uPVC underground drainage/sewerage pipe (s) comply with MS979 MS1063 with dia. 250 mm connecting from Sc1 to Sc 2 to Sc3 to Sc4 c/w excavation, pipe concrete based at every 3 m and install according to the set invert level at site. Refer to the drawing ARM/UIA/STP/M&E/STP-4/05.	55	m		
9.0	To supply, deliver and install HDPE underground drainage/sewerage pipe (x1) comply with SPAN approved with dia. 300 mm connecting from Efc 1 to Efc 2 to Efc 4 c/w excavation, pipe concrete based at every 3 m and install according to the set invert level at site. Refer to the drawing ARM/UIA/STP/M&E/STP-4/05. Note: The pipe joint shall be fusion joint.	55	m		
	JUMLAH				
	SUB-TOTAL TO BE CARRIED TO SUMMARY OF PRICES				
8.16	**ACTIVATED PUMP CHAMBER NO. 1**				
1.0	To desludge, clean and remove all debris inside the activated pump chamber c/w flushing with clean water. Flushing from clarifier tank to activated pump chamber (D.I 200 dia. mm pipe).				
2.0	**RAS Pump pipeline (m) Refer to the drawing ARM/UIA/STP/M&E/STP-4/05** To supply, deliver and install D.I underground drainage/sewerage pipe (m) comply with SPAN approved with dia. 100 mm connecting from activated pump chamber to anoxic tank c/w excavation, pipe concrete based at every 3 m and install according to the set invert level at site.	75	m		

3.0	To supply, deliver and install Mixed Liqor Suspended Solid (MLSS) Pump- RAS Pump Capacity ; 28.7 L/s @ 8 m TDH Power: 4.0 kW Riser pipe:125 mm dia. Pump number: 2 nos (1 duty 1 standby) Type: Submersible Centrifugal Sewage Pump Accesories: Stainless steel chain, guide rail, duck foot, SS swing type PN16 check valve dia. 100 mm SS 304 Sch 40 riser pipe c/w stainless steel bracket, ss flange, ss bolts and nuts connected to D.I MLSS header pipe. D.I header pipe dia. 100 mm Isolation gate valve: D.I body ,PN16 dia 100 mm in activated pump chamber Impeller material: Stainless steel 4 series Efficiency: min 70% Mechanical seal: SIC/SIC (silicone carbide) Thermister at motor winding Moisture sensor at terminal chamber Speed of pump: 1450 rpm (pump curve and catalogue shall be submitted by contractor) Cable terminal casing IP54 weatherproof stainless steel c/w emergency STOP switch terminal block, cable gland Submersible pump cable length approx 8 m Pump duckfoot plinth. Y16 Starter bar, re-bar A10, concrete at least 35 A, grouting to support pump duck foot,starter bar (grouting , starter bar suitable for waste water environment) .	1	lot tank		
4.0	To supply, deliver and install SS IP54 Pump terminal box from control panel to the mechanical system complete with junction box, terminal block, cable gland, emergency stop switch and all necessary for the complete functioning system.	1	Lot		
5.0	To fabricate, deliver, supply and install Hot dipped galvanized steel Lifting davit beam SWL 500kg for MLSS Submersible Pump c/w SS manual hoist chain I-beam : 100mm x 100mm x 6mm thick as per dwg	1	nos		
6.0	To supply, deliver and install Stainless Steel Pump cable terminal box located near pump c/w terminal block, cable gland, emergency stop switch and all necessary for the complete functioning system.	1	lot		
7.0	**WAS Pump pipeline (o1) Refer to the drawing ARM/UIA/STP/M&E/STP-4/05** To supply, deliver and install D.I underground drainage/sewerage pipe (o1) comply with SPAN approved with dia. 80 mm connecting from activated pump chamber to gravity thickener c/w excavation, pipe concrete based at every 3 m and install according to the set invert level at site.	50	m		
8.0	To supply, deliver and install Mixed Liqor Suspended Solid (MLSS) Pump- WAS Pump Capacity ; 5.85 L/s @ 8 m TDH Power: 1.0 kW Riser pipe:125 mm dia. Pump number: 2 nos (1 duty 1 standby) Type: Submersible Centrifugal Sewage Pump Accesories: Stainless steel chain, guide rail, duck foot, SS swing type PN16 check valve dia. 80 mm SS 304 Sch 40 riser pipe c/w stainless steel bracket, ss flange, ss bolts and nuts connected to D.I MLSS header pipe. D.I header pipe dia. 80 mm Isolation gate valve: D.I body ,PN16 dia 80 mm in activated pump chamber Impeller material: Stainless steel 4 series Efficiency: min 70% Mechanical seal: SIC/SIC (silicone carbide) Thermister at motor winding Moisture sensor at terminal chamber Speed of pump: 1450 rpm (pump curve and catalogue shall be submitted by contractor) Cable terminal casing IP54 weatherproof stainless steel c/w emergency STOP switch terminal block, cable gland Submersible pump cable length approx 8 m Pump duckfoot plinth. Y16 Starter bar, re-bar A10, concrete at least 35 A, grouting to support pump duck foot,starter bar (grouting , starter bar suitable for waste water environment) .	2	lot		

9.0	To supply,deliver and install WAS Pump Capacity ; 5.85 L/s @ 8 m TDH Power: 1.5KW c/w Check Valve - Dia 80mm (1 no) & Gate Valve - 80 mm (3 nos) Riser pipe:80 mm dia. Pump number: 2 nos (1 duty 1 standby) Type: Submersible Centrifugal Sewage Pump D.I riser pipe c/w stainless steel bracket : dia 80 mm Accessories: Stainless steel chain, guide rail, duck foot, D.I riser pumping pipe approx 5m, SS swing type PN 16 check valve dia 80mm Isolation gate valve: D.I body ,PN16 dia 80mm Impeller material: Stainless steel 4 series Efficiency: min 70% Mechanical seal: SIC/SIC (silicone carbide) Thermister at motor winding Moisture sensor at terminal chamber Speed of pump: 1450 rpm (pump curve and catalogue shall be submitted by contractor) Cable terminal casing stainless steel Submersible pump cable length approx 8 m Pump duckfoot plinth. Y16 Starter bar, re-bar A10, concrete at least 35 A, grouting to support pump duck foot,starter bar (grouting , starter bar suitable for waste water environment) .	2			
10.0	To supply, deliver and install SS IP54 Pump terminal box from control panel to the mechanical system complete with junction box, terminal block, cable gland, emergency stop switch and all necessary for the complete functioning system.	1	Lot		
11.0	To fabricate, deliver, supply and install Hot dipped galvanized steel Lifting davit beam SWL 500kg for MLSS Submersible Pump c/w SS manual hoist chain I-beam : 100mm x 100mm x 6mm thick as per dwg	1	nos		
12.0	To supply, deliver and install Stainless Steel Pump cable terminal box located near pump c/w terminal block, cable gland, emergency stop switch and all necessary for the complete functioning system.	1	lot		
	JUMLAH				
TOTAL (TO BE CARRIED OUT TO FORM OF TENDER/ SEBUTHARGA)					
8.17	**GRAVITY THICKENER**				
1.0	To desludge, clean and remove all debris inside the activated pump chamber c/w flushing with clean water. Flushing from activated pump chamber to gravity thickener (D.I 80 dia. mm pipe).	1	lot		
2.0	To supply,deliver and install sludge thickening stirrer c/w drive unit and all necessary equipments Capacity ; 0.07 RPM Power: 0.37KW ~~c/w Sluice Valve - Dia 150mm (1 no) & Gate Valve - 150 mm (2 nos)~~ Mild steel w/ painting drive unit API SS centre shaft with 100mm dia. Mild steel hot dip galvanized walkway bridge: app. 4640mm(L) x 1000mm (W) Stainless steel 304 stilling well c/w 600 mm opening door w/ thickness 2mm, app. 780mm dia., 900mm width SS scrapper arm, 8 nos of 50mm dia. within interval app. height of tank app. 2200mm depth, app. 1800mm radius SS sludge scrapper app. length 6930mm Stainless Steel 304 V-Notch with thickness 2mm and width 200mm SS sludge mixer	1	lot		
3.0	To supply, deliver and install SS IP54 Pump terminal box from control panel to the mechanical system complete with junction box, terminal block, cable gland, emergency stop switch and all necessary for the complete functioning system.	1	Lot		

4.0	To supply,deliver and install Sludge Thickenner Pump (@ Transfer Pump) Capacity ; 4.55 L/s @ 9.6m TDH Power: 1.5 kW c/w Check Valve - Dia 80mm (1 no) & Gate Valve - 80 mm (1 nos) Riser pipe:80 mm dia. Pump number: 2 nos (1 duty 1 standby) Type: Submersible Centrifugal Sewage Pump D.I riser pipe c/w stainless steel bracket : dia 80 mm Accessories: Stainless steel chain, guide rail, duck foot, D.I riser pumping pipe approx 5m, SS swing type PN 16 check valve dia 80mm Isolation gate valve: D.I body ,PN16 dia 80mm Impeller material: Stainless steel 4 series Efficiency: min 70% Mechanical seal: SIC/SIC (silicone carbide) Thermister at motor winding Moisture sensor at terminal chamber Speed of pump: 1450 rpm (pump curve and catalogue shall be submitted by contractor) Cable terminal casing stainless steel Submersible pump cable length approx 8 m Pump duckfoot plinth. Y16 Starter bar, re-bar A10, concrete at least 35 A, grouting to support pump duck foot,starter bar (grouting , starter bar suitable for waste water environment) .	2	nos		
5.0	To supply, deliver and install SS IP54 Pump terminal box from control panel to the mechanical system complete with junction box, terminal block, cable gland, emergency stop switch and all necessary for the complete functioning system.	1	Lot		
6.0	**Refer to the drawing ARM/UIA/STP/M&E/STP-4/05 ,ARM/UIA/STP/M&E/ST-1/24, ARM/UIA/STP/M&E/ST-3/26** To supply, deliver and install D.I underground transfer pipe (n) and riser /dropper pipe inside chamber comply with SPAN approved with dia. 80 mm connecting from gravity thickener tank to activated digested sludge holding tank c/w excavation, pipe concrete based at every 3 m and install according to the set invert level at site, tees, elbows, flanges, SS bolts and nuts.	25	m		
7.0	**Refer to the drawing ARM/UIA/STP/M&E/STP-4/05 ,ARM/UIA/STP/M&E/ST-1/24, ARM/UIA/STP/M&E/ST-3/26** To supply, deliver and install D.I header pipe, D.I check valve PN16 80 mm c/w SS gate disc (2 nos), D.I gate valve PN16 80 mm c/w SS gate disc (2 nos) for sludge thickener transfer pump system.	1	lot		
	JUMLAH				
	SUB-TOTAL TO BE CARRIED TO SUMMARY OF PRICES				
8.18	**ACTIVATED DIGESTED HOLDING TANK**				
	To desludge, clean and remove all debris inside the aerobic digested holding tank c/w flushing with clean water. Flushing from gravity thickener to aerobic digested holding tank (D.I 80 dia. mm pipe).	1	lot		
	To supply,deliver and install Sludge Digested Pump Capacity ; 5.0 L/s @ 5.0 m TDH Power: 1.0 kW c/w Check Valve - Dia 80mm (1 no) & Gate Valve - 80 mm (1 nos) Riser pipe:80 mm dia. Pump number: 2 nos (1 duty 1 standby) Type: Submersible Centrifugal Sewage Pump D.I riser pipe c/w stainless steel bracket : dia 80 mm Accessories: Stainless steel chain, guide rail, duck foot, D.I riser pumping pipe approx 5m, SS swing type PN 16 check valve dia 80mm Isolation gate valve: D.I body ,PN16 dia 80mm Impeller material: Stainless steel 4 series Efficiency: min 70% Mechanical seal: SIC/SIC (silicone carbide) Thermister at motor winding Moisture sensor at terminal chamber Speed of pump: 1450 rpm (pump curve and catalogue shall be submitted by contractor) Cable terminal casing stainless steel Submersible pump cable length approx 8 m Pump duckfoot plinth. Y16 Starter bar, re-bar A10, concrete at least 35 A, grouting to support pump duck foot,starter bar (grouting , starter bar suitable for waste water environment) .	2	nos		
3.0	To supply, deliver and install SS IP54 Pump terminal box from control panel to the mechanical system complete with junction box, terminal block, cable gland, emergency stop switch and all necessary for the complete functioning system of sludge digested pump (duty and standby) and mixer.	1	Lot		

	To supply,deliver and install stainless steel submersible mixer c/w stainless steel hoisting equipment permanently installed. Capacity ; 0.12 m3/s (Mixing Flow) Power: 1.5KW	2	nos		
	Refer to the drawing ARM/UIA/STP/M&E/STP-4/05 ,ARM/UIA/STP/M&E/ST-1/24, ARM/UIA/STP/M&E/ST-3/26 To supply, deliver and install D.I underground transfer pipe and riser /dropper pipe inside chamber comply with SPAN approved with dia. 80 mm connecting from activated digested sludge holding tank to sludge drying bed c/w excavation, pipe concrete based at every 3 m and install according to the set invert level at site, tees, elbows, flanges, SS bolts and nuts.	40	m		
	Refer to the drawing ARM/UIA/STP/M&E/STP-4/05 ,ARM/UIA/STP/M&E/ST-1/24, ARM/UIA/STP/M&E/ST-3/26 To supply, deliver and install D.I header pipe, D.I check valve PN16 80 mm c/w SS gate disc (2 nos), D.I gate valve PN16 80 mm c/w SS gate disc (2 nos) for activated digested sludge holding tank system.	1	lot		
	To supply,deliver and install all necessary pipework, tapers, bends,tees, tied flange adaptors, fittings and supporting steelworks.	1	lot		
	JUMLAH				
SUB-TOTAL TO BE CARRIED TO SUMMARY OF PRICES					
8.19	**SLUDGE DRYING BED**				
	To desludge, clean and remove all the debris from the drying bed chamber c/w flushing with clean water.	4	nos		
	To remove existing filtering material for drying bed and discard form site.	200	m2		
	To supply, deliver and spread:-				
	a) 260 mm thick coarse sand	200	m2		
	b) 255 mm thick aggregate dia. 28 up to dia. 40	200	m2		
	c) to replace uPVC dia. 200 mm soil pipe perforated pipe	40	m run		
	To supply, deliver and install of D.I PN16 80 mm supernatant discharge valve . Refer to the drawing ARM/UIA/STP/M&E/ST-6/29	4	nos		
	To supply and install FRP transparent roof 0.8 mm thick for sludge drying bed (22 m x11 m) c/w light weight blue batteen/purlain and c channel	242	m2		
	a) batten (0.43 mm thick)	160	m run		
	b) C purlins (0.7 mm thick)	100	m run		
	Cost to remove the existing polycarbonate roof and discard from site.	1	lot		
	Cost of painting the existing structure which include:- a) scraping and removing old paint and grind off/sanding off rusted parts b) applying 1 layer anti-rust iron oxide/zinc rich paint c) applying 2 layer of weatherproof gloss finish paint	1	lot		
	JUMLAH				
SUB-TOTAL TO BE CARRIED TO SUMMARY OF PRICES					

NO.	DESCRIPTION	No		UNIT PRICE (RM)	PRICE (RM)
8.20	**CENTRALISED CONTROL ROOM**				
1.0	To supply, deliver and install , floor standing **new process control panel** c/w Incoming 250 A MCCB, ELR , OC/IDMT , MCBs,Busbar , Push button, Ammeter , Voltmeter, consist of the following starter item :	1	lot		
	Blower No 3 - Autotransformer (AT) - 45KW - Blower Room Blower No 4 - Autotransformer (AT) - 45KW - Blower Room Submersible Mixer 1 - Anoxic Tank - DOL 1.5 KW 3P Submersible Mixer 2 - Anoxic Tank - DOL 1.5 KW 3P MLSS Pump 1 - DOL -2KW - Aeration Tank 1 MLSS Pump 2 - DOL -2KW - Aeration Tank 1 MLSS Pump 1 - DOL -2KW - Aeration Tank 2 MLSS Pump 2 - DOL -2KW - Aeration Tank 2 Sludge Mixer - Gravity Thickner Stirrer - 1.5 hp - DOL 3P - Activated Digested Holding Tank ADSHT Gravity Thickener Sludge Pump - 1.5 kW - DOL 3P - duty pump Gravity Thickener Sludge Pump - 1.5 kW - DOL 3P - standby pump Sludge Pump - 1.0 kW - DOL 3P- Aerobic Digested Holding Tank ADSHT - duty Sludge Pump - 1.0 kW - DOL 3P- Aerobic Digested Holding Tank ADSHT - standby RAS Pump No 1 - 4 KW DOL 3P - Activated Sludge Chamber RAS Pump No 2 - 4 KW DOL 3P - Activated Sludge Chamber WAS Pump No 1 - 1 KW DOL 3P - Activated Sludge Chamber WAS Pump No 2 - 1 KW DOL 3P - Activated Sludge Chamber Supernatant Pump 1-3KW DOL - Sludge Drying Bed Supernatant Pump 2-3KW DOL - Sludge Drying Bed Secondary Fine Screen 2 -0.75 KW - DOL 3P- Scondary Screen Channel Secondary Fine Screen 1 -0.75 KW - DOL 3P- Scondary Screen Channel ~~Grit Pump No 1 - 2 KW - Collection Chamber -DOL~~ ~~Grit Pump No 2 - 2 KW - Collection Chamber -DOL~~ ~~Grid Classifier -Collection chamber -1.0 Kw -DOL 3P~~ Submersible Mixer 1 - Anoxic Tank - DOL 1.5 KW 3P Submersible Mixer 2 - Anoxic Tank - DOL 1.5 KW 3P SubmersibleSludge Mixer 1 - ADSHT - DOL 1.5 KW 3P Submersible Sludge Mixer 2 -ADST - DOL 1.5 KW 3P Circular Clarifier No 1 (stirrer) - DOL , Clarifier tank -0.4 KW 3P Circular Clarifier No 2(stirrer) - DOL , Clarifier tank -0.4 KW 3P ~~Circular Clarifier 1 -0.37KW -DOL 3P~~ Thickened Sludge No 1 (Pump) - DOL - 4 KW 3P (Run) Thickened Sludge No2 (PUmp) - DOL - 4 KW 3P (Standby) Gravity Thickener Stirer (Duty) - 0.37 KW -DOL 3P(Duty) Gravity Thickener Stirer (Standby) - 0.37 KW -DOL 3P(Standby) Desludging PUmp 1 -2.0 KW -DOL 3P Digested Holding Tank Desludging PUmp 2 -2.0 KW -DOL 3P Digested Holding Tank Spot Light 0.3 KW X 8 nos MCB 16 A 1 P - DOL Incoming Power supply MCCB 4 Pole 40 A to Dewatering Pump Control **Max Current load 125 KW** **Note: The contractor shall design the control circuit including interlocking of equipment for complete treatment process. For duty and standby equipment, only one quipment shall run at a time except for blower 45 kW that shall run 2 unit. Should timer is required for process control, it shall be inclusive in the design. The contractor shall provide dedicated earthing for this panel less than 7 Ohm to be tested and verified by S.O..**				

2.0	**Building Automation System (BAS)/Programmable Logic Controller (PLC)** Building Automation System (BAS)/Programmable Logic Controller (PLC) Installation of BAS/PLC module, HMI touch screen panel,network module, relays, auxillary contact, cablings, CT transformers, earthing, and programming for IO point requirements but not limited to as below: Collection chamber water level (ultrasonic level sensor) _ Analog input Blower No 3 - Autotransformer (AT) - 45KW - Aeration tank Blower No 4 - Autotransformer (AT) - 45KW - Aeration tank MLSS Pump 1 - AT -5KW - Aeration Tank 1 MLSS Pump 2 - AT -5KW - Aeration Tank 1 MLSS Pump 1 - AT -5KW - Aeration Tank 2 MLSS Pump 2 - AT -5KW - Aeration Tank 2 Sludge Mixer - Gravity Thickner Stirrer - 1.5 hp - DOL 3P - Aerobic Digested Holding Tank ADSHT Sludge Mixer - Gravity Thickner Sludge Pump - 4kw - DOL 3P Aerobic Digested Holding Tank RAS Pump No 1 - 4 KW DOL 3P - Activated Sludge Chamber RAS Pump No 2 - 4 KW DOL 3P - Activated Sludge Chamber WAS Pump No 1 - 2 KW DOL 3P - Activated Sludge Chamber WAS Pump No 2 - 2 KW DOL 3P - Activated Sludge Chamber Supernatant Pump 1-3KW DOL - Sludge Drying Bed Supernatant Pump 2-3KW DOL - Sludge Drying Bed Secondary Fine Screen 2 -0.75 KW - DOL 3P- Scondary Screen Channel Secondary Fine Screen 1 -0.75 KW - DOL 3P- Scondary Screen Channel Grit Pump No 1 - 2 KW - Collection Chamber -DOL Grit Pump No 2 - 2 KW - Collection Chamber -DOL Grid Classifier -Collection chamber -1.0 Kw -DOL 3P Submersible Mixer 1 - Anoxic Tank - DOL 1.5 KW 3P Submersible Mixer 2 - Anoxic Tank - DOL 1.5 KW 3P SubmersibleSludge Mixer 1 - ADSHT - DOL 1.5 KW 3P Submersible Sludge Mixer 2 -ADST - DOL 1.5 KW 3P Circular Clarifier No 1 (stirrer) - DOL , Clarifier tank -0.4 KW 3P Circular Clarifier No 2(stirrer) - DOL , Clarifier tank -0.4 KW 3P Circular Clarifier 1 -0.37KW -DOL 3P Thickened Sludge No 1 (Pump) - DOL - 4 KW 3P (Run) Thickened Sludge No2 (PUmp) - DOL - 4 KW 3P (Standby) Gravity Thickener Stirer (Duty) - 0.37 KW -DOL 3P(Duty) Gravity Thickener Stirer (Standby) - 0.37 KW -DOL 3P(Standby) Desludging PUmp 1 -2.0 KW -DOL 3P Digested Holding Tank Desludging PUmp 2 -2.0 KW -DOL 3P Digested Holding Tank Spot Light 0.3 KW X 8 nos MCB 16 A 1 P - DOL **Note:** Contractor shall propose and design accordingly to the complete remote monitoring and controling of Remote Pumping Station.)	102	I/O points		
3.0	To tap power supply and earthing to new control panel main bus bar from existing control panel 300 A MCCB with 4 x 95 mm2 PVC/XLPE cable+ E c/w cable lug , SS cable gland , cable insulation protection	5	m		
	Note: All process equipments shall capable of running in automatic and manual mode where : Automatic : Via level sensor control, timer ontrol , Manual By Push Button All Process equipments shall be design according to its function with automatic /manual run capability . The contractor shall design and submit to the S.O for approval prior to installation				
4.0	To supply, deliver and install capacitor bank control panel c/w MCCB 300 A, Contactors, power factor regulator, MCCBs, and contactor. Note: The capacitor bank shall be designed and sized by the competent electrical engineer and submit to the S.O. for approval prior to fabrication and installation..	1	lot		

	Cable Erection				
5.0	To erect power wiring from process control panel to each equipment , c/w excavation, compaction, sand bedding,cable marker and cable protection				
	3c x 4 mm2 PVC/ SWA/PVC	1650	m		
	3c x 2.5 mm2 PVC/ SWA/PVC	2700	m		
	3c x 6 mm2 PVC/ SWA/PVC	60	m		
	3c x 25 mm2 PVC/ SWA/PVC +E	50	m		
6.0	**Control Cable** To erect control cable from centralised control room to each remote terminal/junction box, c/w excavation, compaction, sand bedding,cable marker and cable protection Note: Control cable is required for pump thermister, pump moisture sensor, mixer thermister, mixer moisture sensor, emergency switches. The control cable intended to cut off/cut in the designated control contactor of the equipments.				
	7cx 1.5 mm2 PVC/ SWA/PVC	2000	m		
	3cx 1.5 mm2 PVC/ SWA/PVC	500	m		
	2cx 1.5 mm2 PVC/ SWA/PVC	500	m		
	9cx 1.5 mm2 PVC/ SWA/PVC	1000	m		
	JUMLAH				
SUB-TOTAL TO BE CARRIED TO SUMMARY OF PRICES					
8.21	**DEWATERING PUMP CONTROL PANEL**				
1.0	To supply deliver and install , weatherproof outdoor floor standing dewatering pump control panel c/w concrete base, sand fill trench, incoming 40 A MCCB, ELR , OC/IDMT , MCBs,Busbar , Push button, Ammeter , Volt Meter, selector switch (phase ampere/volt), hour meter 5 nos., earthing copper strip to new earth chamber consist of the following starter item :	1	lot		
2.0	-DOL 3 P 2 kW starter c/w overload , terminal block,MCB 13 A for Dewatering Pump 1 at Aeration Tank 1 - duty -DOL 3 P 2 kW starter c/w overload , terminal block,MCB 13 A for Dewatering Pump 1 at Aeration Tank 1 - standby -DOL 3 P 2 kW starter c/w overload , terminal block,MCB 13 A for Dewatering Pump 2 at Aeration Tank 2-duty DOL 3 P 2 kW starter c/w overload , terminal block,MCB 13 A for Dewatering Pump 2 at Aeration Tank 2-standby -DOL 3 P 2 kW starter c/w overload , terminal block,MCB 13 A for Dewatering Pump Gravity Thickener-duty -DOL 3 P 2 kW starter c/w overload , terminal block,MCB 13 A for Dewatering Pump Gravity Thickener-standby -DOL 3 P 2 kW starter c/w overload , terminal block,MCB 13 A for Dewatering Pump Activated Sludge Holding Tank-duty -DOL 3 P 2 kW starter c/w overload , terminal block,MCB 13 A for Dewatering Pump Activated Sludge Holding Tank -standby -DOL 3 P 2 kW starter c/w overload , terminal block,MCB 13 A for spare				
	Note: All process equipments shall capable of running in manual mode All Process equipments shall be design according to its function with manual run capability The contractor shall design the control circuit including interlocking of equipment for complete treatment process. For duty and standby equipment, only one quipment shall run at a time. Should timer is required for process control, it shall be inclusive in the design. The contractor shall provide dedicated earthing for this panel less than 7 Ohm to be tested and verified by S.O..				

	Cable Erection				
3.0	To erect power wiring from process control panel to each equipment , c/w excavation , compaction ,sand bedding , cable marker and cable protection				
	3c x 4 mm2 PVC/ SWA/PVC	400	m		
	2c x 1.5 mm2 PVC/ SWA/PVC	400	m		
	7c x 2.5 mm2 PVC/PVC -control cable	400	m		
4.0	To erect power wiring from process control panel at control panel room to dewatering control panel , c/w excavation , compaction ,sand bedding , cable marker and cable protection				
	4c x 16 mm2 PVC/ SWA/PVC	130	m		
	JUMLAH				
SUB-TOTAL TO BE CARRIED TO SUMMARY OF PRICES					

8.23 SCHEDULE OF DELIVERY, INSTALLATION & COMMISSIONING

The tenderer shall submit the following information ascertaining his capability to complete the work by the stipulated date:

NO.	DESCRIPTION	Weeks
1	Delivery period of equipments from award of tender	
2	Installation period required	
3	Testing, Adjusting, Balancing and Commissioning (TABC)	
Total weeks as indicated in the Form of Tender		

Notes: The whole work shall be completed before_____, which is the date of completion of the Main Contractor

Tandatangan Petender :

Nama Petender

Nama Syarikat dan Alamat :

(Dengan Cop)

Tarikh : :

Tandatangan Saksi :

Nama dan Alamat :

(Dengan Cop)

Tarikh : :

8.24 SCHEDULE OF RATES FOR THE COMPREHENSIVE SERVICE AND MAINTENANCE

The tenderer is to note that **the cost quoted for this shall not be included in the tender price** but quoted separately in the table below and it will be binding in the event that the Government decides to accept them immediately after the guarantee period.

These rates should not be subjected to variation for the period of 3 years after the free maintenance period

The Specification for the Comprehensive Service and Maintenance is in **Section 5**.

RATES BASED ON CONTRACT PERIOD OF THREE YEARS ONLY

	Charge Per Year (RM)
For Service and Maintenance Air conditioning system at the above premises in strict accordance with the Tender Specifications and for supply of all consumable materials as and whenever required and to provide emergency repair service during normal working hours and overtime hours as required.	

Tandatangan Pentender : _____

Nama Dan Alamat : _____
(Dengan Cop)

_____

Tarikh : _____

Tandatangan Saksi : _____

Nama Dan Alamat : _____
(Dengan Cop)

_____

Tarikh : _____

---------- END OF SECTION 8.0 ----------