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**IJMAA – ODOR CONTROL SYSTEM**

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JEBB JENNINE SOLID WASTE TREATMENT FACILITY

TENDER DOCUMENTS

Preamble to Bill of Quantities

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# 1 GENERAL

## 1.1 GENERAL

The bill of quantities does not purport to be either exhaustive or explanatory of all the obligations and duties of the Contractor who shall be deemed to have satisfied himself as to the correctness and sufficiency of the rates and prices entered by him in the bill of quantities all of which shall cover all his obligations under the Contract (including those in respect of the supply of work, goods, materials, equipment, services or contingencies) and all matters and things necessary for the proper execution and completion of the works and the remedying of any defects therein and which may reasonably be inferred to be necessary for the works as described in the Contract Documents whether expressly mentioned therein or not.

The price shall include all necessary for completion of the works and shall include the prices for all necessary building work, temporary and permanent supports, plinths, trenches and the like and all necessary safety and access measures including guardrails, handrails, fire fighting equipment and the like.

The Contractor is requested to check the number of each page and if any are missing or duplicated or if any writing or figures are indistinct, at once notify the Engineer. No subsequent claim for loss consequent upon the Contractor's failure to comply with this article will be entertained.

Every item in the bill of quantities should be priced. It shall be deemed that the value of any item left unpriced in any of the Bills is either included in the rates for other items or that the Contractor required no payment in respect thereof.

All other items which do not appear in the bill of quantities Volume 4 shall be considered as included in the rates of other items.

In the event of an error in the extension of a unit price by the item quantity, the total cost of the particular item in error shall be corrected utilizing the unit rate for that particular item. The total tender price shall then be adjusted in accordance with the corrected total cost of that item.

Works in the present bill of quantities will be re-measured on completion and valued at the rates inserted by the Contractor hereinafter in accordance with the Contract Documents.

The Contractor shall be deemed to have visited the Site and taken into account all local and existing conditions.

The Contractor shall be responsible for carrying out any complementary design and construction documents, as well as any necessary associated design changes, which shall be submitted to the approval of the Engineer and shall be at no extra cost to the Employer.

The unit prices are to be fully inclusive of the works described in the specifications, in the drawings, in the bill of quantities or ordered by the Engineer for proper execution of the Works and Contract and inclusive works that are not clearly stated in the above documents or by the Engineer, but implicitly required to bring to a satisfactory completion all Works under the scope of this contract.

The rates entered against the items defined in this bill of quantities shall cover the construction of all the works that shall include but not be limited to the supply of material, labor, tools, equipment, consumables and transport to the various parts of the project (easy to access or not) and all costs, services, taxes, overheads and profits required for the proper completion of all the works (structures, pipelines, etc.) under this Contract without any exception and without any reservation. All the works shall be executed as described in and according to the Conditions of Contract, Specifications, Bill of Quantities, Drawings, rules of the trade and the Engineer's requirements. All material used in construction shall be of best quality and in compliance with the specifications and internationally recognized standards and shall be approved by the Engineer prior to the beginning of the works. The rates shall also include but not be limited to the following:

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- 1) Installation and maintenance of site equipment and temporary facilities, dismantling and removal of site equipment and temporary facilities after completion of the works.
- 2) Construction and maintenance of all access roads including safety measures and traffic signaling.
- 3) Supply of material, labor, tools, equipment, consumables, machinery and all the required items for the completion of the works and for the subsequent operation, maintenance and repair. All goods, materials, equipment and accessories shall be submitted to the Engineer for approval.
- 4) Performing all kinds of testing during construction in conformity with the specifications and as directed by the Engineer.
- 5) Providing site security.
- 6) Preparation of drawings, reports, submittals and all other required office work in order to complete the works with their related expenses.
- 7) Protection of public and private properties, preservation of the existing utilities and indemnification against all damages caused by the construction activities,
- 8) All necessary precautions to avoid damaging services and where they are interrupted to reconnect them immediately. Any underground utility structure related to any local authority shall be properly disconnected, disposed, relocated and/or diverted under the Engineer's supervision and under the control of the relevant authority at no additional cost. No separate payment shall be made and the rates in the Bill of Quantities shall be deemed to cover adequately all costs. The Tenderer's attention is drawn to the fact that the service authorities may impose, in addition to the cost of repair, statutory penalties. Details of these requirements may be obtained from the respective authorities.
- 9) Providing all necessary safety measures as barriers, signs, lightings, etc ... to ensure the safety of the workers, people and traffic and to delineate the boundaries of the work zone day and night.
- 10) Providing traffic control in areas of construction including the construction of roads and pathways, the erection of signs, barriers and lighting.
- 11) Insurance for all works, equipment and personnel.
- 12) All costs pertaining to the Contractor work area (stores, workshops, repair zones),
- 13) All duties, taxes (income taxes, stamp duties, etc.) (except the VAT and custom duties)
- 14) Supply of water and power including piping and wiring to all parts of the project and all related costs,
- 15) Supply of fuel, oil, spare parts, etc..... for all the vehicles and equipment involved in the construction works related to this Contract.
- 16) Providing qualified personnel, technicians, workmen, etc. needed for the proper execution of all works and their related charges (salaries, pensions, etc. ),
- 17) Execution of all survey works to position structures, monitor the progress and verify the locations (X,Y,Z) of all constructions and prepare topographic layouts to be submitted to the Engineer on paper and electronic copy.
- 18) Preparation of all kinds of submittals, reports and studies required by the Conditions of Contract, the specifications, the drawings and the Engineer.
- 19) Providing all required guarantees and bonds
- 20) Providing all required insurances and the like
- 21) All necessary temporary work and services associated with the Works
- 22) Establishing, furnishing and maintaining the facilities and site offices of the Employer and Engineer including the various consumables, electricity, water, etc.
- 23) Providing until handing over, clean and uncontaminated water and all necessary adequate electrical power required for the works
- 24) Daily site cleaning during execution of the Works and final cleaning after completion of the works including removing all waste, scrap and resulting materials to approved dumping areas
- 25) Protecting all Works against damage by whatever method deemed necessary and approved. Any work damaged before the Works are handed over shall be replaced or made good at the Tenderer's expense and to Engineer's satisfaction.

## 26) Overhead and profit

### 1.2 ITEMS DESCRIPTION

The various sections within this document are preambles to the sections of the Bill of Quantities. They give a detailed description of the work involved and of the conditions under which and the manner in which the work is to be done and measured, for each item of the Bill of Quantities. Reference should be made to this Preamble to Bill of Quantities and all other documents forming the Contract.

The Bills of Quantities are to be read in conjunction with other Contract Documents, which shall be taken as mutually explanatory.

The general directions and descriptions of work given in the specifications and the drawings are not necessarily repeated in the bill of quantities. Reference must be made to the specification and the drawings for such information, which shall be deemed to be included in the bill of quantities.

### 1.3 RATES AND PRICES

The Contractor shall be deemed to have inserted against each item in the bills such rates and prices as he may deem necessary to cover the requirements of the contract. Where neither price nor rate is entered against an item it shall be deemed to be "nil" and measured accordingly. The term "included" or any such similar term shall be deemed to be nil.

Rates and prices shall be inserted in the rate column of the bill of quantities. Each part of the bill of quantities shall be totalled and the totals carried to the summary and grand total.

The whole cost of complying with the provisions of the Contract shall be included in the Items provided in the priced Bill of Quantities, and where no Items are provided, the cost shall be deemed to be distributed among the rates and prices entered for the related Items of Work.

### 1.4 MEASUREMENT

All measurements in the bill of quantities are strictly net. The principle of net measurements shall apply to all works executed. All quantities measured for payment shall be measured by the Engineer on the basis of actual net quantities installed.

Net measurements shall be done according to net dimensions. The net dimensions are the dimensions shown on the contract drawings. In case of lack of details on some drawings and in case of design changes approved by the Engineer, the Contractor shall prepare and submit to the approval of the Engineer any necessary associated drawings. Accordingly, the net dimensions shown on the above drawings and approved by the Engineer shall be the base for the measurements.

Lump Sum items shall not be subject to re-measurement and shall include the prices of all necessary equipment, construction, installation, testing and commissioning among others. The lump Sum entered in the bill of quantities shall include the price for a complete installation as described in the bill of quantities, specifications and other documents forming this Contract.

All Works shall be measured net as installed with no allowance made for laps or waste, and irrespective of any trade, general or local customs. Measurement shall be applicable to finished work only as completed and no allowance shall be made for wastage, working spaces, bulking, shrinkage, overlaps, etc.; the principle of net measurement shall be applied to all Works under this Contract. All measurement shall be rounded up or down to the nearest integer number and exact half units shall be rounded up. Any thickness stated in this Document, shall be the finished and specified thickness. The unit of measurement for each item shall be as indicated in the Bill of Quantities.

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The quantities given in the bill of quantities are only estimations. In no sense shall such quantities be considered as limiting or extending the amount of the work to be done by the Contractor and of the materials to be supplied by him. The Contractor shall be responsible for checking quantities and for making any necessary surveys and investigations prior to submitting his tender and eventually placing any order for materials.

## 1.5 ITEMS TO BE FULLY INCLUSIVE

Unless otherwise stated, all items shall be fully inclusive of all that is necessary to fulfil the liabilities and obligations arising out of the contract and shall include but will not be limited to:

- Design where expressly required by the contract
  - Labor and all associated costs
  - Materials, goods and all associated costs including waste of materials
  - Provision of plant
  - Transportation of materials to site and onsite
  - Temporary works
  - Establishment charges, overheads and profit
  - All bonds and insurances
  - Facilities of the Employer and the Engineer
  - Site security
  - Compliance with CDR health and environmental regulations
  - Site administration
  - As built drawings
  - Water for the works
  - Supplying of water, drainage, electricity, telephone and internet
  - Lighting and power for the works
  - Temporary accommodation for the use of the Contractor
  - Temporary telephones for the use of the Contractor and the cost of calls
  - Temporary roads, hardstandings, crossings and the like
  - Temporary fencing, hoardings, screens, fans, foot-ways, guardrails, gantries and the like.
  - Safety, health and welfare of workpeople
  - Compliance with traffic regulations
  - Maintenance of public and private roads, services an adjoining property
  - Control of noise and pollution, prevention of fire and compliance with all other statutory and general obligations
  - Removing rubbish, protective casings and coverings and cleaning the works on completion
  - Drying the works, and dealing with flows and keeping the works free of water.
  - Any necessary diversion, such as diversion of river etc.
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- ✓ Testing and commissioning of service installations including providing fuel, chemicals, etc
- ✓ Repair of the works during the maintenance period.
- ✓ Samples of materials and testing of materials, including providing equipment for testing
- ✓ Provision of technical standards
- ✓ Design, co-ordination, installation and as-built drawings and the like
- ✓ Reports, records, certificates, notices, proposals, designs, details, calculations, drawings, documents and other information required by the Specification.
- ✓ Obtaining statutory working permits and permissions
- ✓ Dealing with existing flows
- ✓ The prices of the pipes include all fittings.
- ✓ Any hand working in zones not accessible for machinery (such as watercourses, footpaths, stairs, along irrigation channels, etc.);
- ✓ Compliance with all other conditions of contract

In pricing the items of the bill of quantities the Contractor shall cover himself and will be deemed to have covered himself for:

- ✓ All work, services and materials which according to the true intent and meaning of the contract may be reasonably inferred as necessary for completion of the works as described in the drawings, specifications, schedules and bills whether expressly mentioned therein or not.
- ✓ All duties, obligations, liabilities and responsibilities which the contract places upon the Contractor in connection with or in relation to the Contract.
- ✓ All costs of detailed survey, royalties and supply to the Engineer of all necessary drawings and documents.

## 1.6 ABBREVIATIONS

The following abbreviations are used in the Bill of Quantities:

Sq.	Square	mm	Millimetre
Cu.	cubic	m	Metre
Nr	Number	km	Kilometre
Hr	hour	%	per cent
Kg	Kilogram	dia.	Diameter
Prov. Sum	Provisional sum	ha	Hectare
DN	Nominal diameter	lin.	Linear
PN	Pressure rating	Extra Over	EO
L.S.	LumpSum	PI	Provisional Item
KW	Kilowatt	CDR	Council for Development and Reconstruction
SWTF	Solid Waste Treatment Facility		

## **1.7 COVERAGE**

Where the bill of quantities does not include separate items for Contractor's equipment, temporary works, temporary site facilities of all kind and the like, the Contractor shall be deemed to have covered his obligations in these respects in the unit rates of the B.O.Q.

## **1.8 BIDDER TO PRICE EACH ITEM**

The Contractor shall be deemed to have inserted against each item in the bill of quantities such rates and prices as he may deem necessary to cover the requirements of the Contract. Where neither price nor rate is entered against an item it shall be deemed to be "nil" and measured accordingly. The term "included" or any such similar term shall be deemed to be nil. Rates and prices shall be inserted in the unit price and total prices columns of the bill of quantities. However not pricing an item of the B.O.Q does not relieve the Contractor from fulfilling the complete requirements set out in the Contract documents related to this project.

## **1.9 DISCREPANCIES BETWEEN RATES**

In case of a discrepancy between unit rates and total prices unit rates shall govern. In case of a discrepancy between the price of an item and a sub-total or total, the item price shall govern.

## **1.10 ALTERNATIVE STANDARDS OF EQUIPMENT**

If alternative equipment of equal or better standard is proposed by the Contractor and accepted by the Engineer the Contract Price shall be deemed to include for such alternative equipment and no additional payment will be made.

## **1.11 WATER AND ELECTRICITY**

Unless otherwise explicitly stated in the Contract, water and electricity for the purpose of constructing, cleaning, testing, commissioning the works and human consumption shall be provided by the Contractor at his own expense, and shall not be measured separately.

## **1.12 DISPOSAL SITES**

All disposal sites shall be provided by the Contractor in accordance with the local authorities and shall not be used by the Contractor prior to the approval of the Engineer. All costs related to such sites and the preparatory works involved are deemed to have been included in the priced items of the Bill of Quantities.

## **1.13 TRANSPORT OF MATERIAL**

All materials shall be transported at the Contractor's expense from and to all works sites (including Contractor work area, storage areas, etc . . . ) whether these sites are accessible or not. The Contractor shall bear all charges related to access roads construction unless a separate item for access roads construction is included in the bill of quantities.

## **1.14 SOME DEFINITIONS**

The following definitions shall apply to items in the bill of quantities

### Extra-Over

Any "Extra-Over" (EO) item shall be measured and paid in addition to the measurement of the basic item to which it relates.

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Included

Where the term included is used in the Preamble to Bill of Quantities or in the bills any items stated to be included within another item shall not be subject to measurement and their costs shall be deemed to be included within the rates of the billed item.

Provisional Items

Provisional Items shall be used at the discretion of the Engineer and only if ordered or required by the Engineer in writing.

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## **2 SECTION 1: PRELIMINARIES AND GENERAL REQUIREMENTS**

### **2.1 ITEM 1.1 - MOBILIZATION / DEMOBILIZATION**

This item shall include but not be limited to:

Supplying all resources, equipment, vehicles, etc.... necessary for the execution and completion of the works; preliminary site survey visits and necessary measures and stakes to locate structures on the ground;

Construction, operation and maintenance (other than those included in other items of BOQ) of equipped offices (including all essential/necessary services, utilities, furniture and communications facilities including internet) for the Contractor, the Engineer as well as the Employer, stores, workshops, clinics, labor living quarters and all other facilities required for the completion of the works under this Contract, removing all above stated equipment and facilities at the end of the contract period or when requested by the Engineer and returning the site to its original conditions all as shown on the drawings, required by the specifications and / or deemed necessary by the Engineer;

The Engineer's Site Offices includes offices, a kitchen, a WC, etc. The minimum area of the Engineer's Site Office required is 25 m<sup>2</sup>, fully equipped (furniture, computer and printing facilities, air conditioning, etc.). The costs of operation of these offices shall be at the charge of the Contractor.

Provision, erection and maintenance of signboard at the site giving information on the Project, Employer's name, Engineer's name, Contractor's name, project duration and all other details prescribed by the Engineer complete with all necessary instructed alterations to the signboard (1 signboard), all as specified, shown on the drawings and to the satisfaction of the Engineer.

The price for this item "mobilization / demobilization" shall be paid as a lump sum.

### **2.2 ITEM 1.2 – COMPLEMENTARY DESIGN DOCUMENTS, CONSTRUCTION DOCUMENTS, SHOP DRAWINGS AND AS-BUILT DRAWINGS**

This item shall include but not be limited to:

- Revision and Verification of all conceptual design drawings and other Contract document, gathering of data, site topographical survey, preparation and submission of complementary design documents, construction documents and shop drawings (three copies on paper, one sepia, and one electronic copy) including all design data, details and calculations necessary for the execution of the works, modifications to drawings, making copies of the shop drawings permanently available on site and all other necessary work for the proper execution of this item all as required by the specifications and / or deemed necessary by the Engineer.
- Final survey of the executed works, preparation of As-built drawings and submissions (three copies on paper, and one electronic copy), modifications to as built drawings, making copies of the shop drawings permanently available on site and all other necessary work for the proper execution of this item all as required by the specifications and / or deemed necessary by the Engineer.
- Preparation of operation and maintenance manuals defining all equipments and showing all necessary instructions for the control and maintenance of these equipments; collecting details and catalogues, gathering data sheets and manufacturer's catalogues, all as required by the specifications and / or deemed necessary by the Engineer.

Operation and Maintenance manuals shall be supplied written in English language except where instructed otherwise by the Engineer.

The price for this item shall be paid as a lump sum.

### **2.3 ITEM 1.3 - PROVISIONAL SUMS**

Provisional Sums have been included in the Contract at the amounts as stated in the Bill of Quantities.

Provisional Items or Provisional Sums shall be used at the discretion of the Engineer and only if ordered or required by the Engineer in writing.

The existence of the Provisional Sums does in no way entitle the Contractor to any claim and/or additional payment for fulfilling his obligations described in the Contract.

The Contractor shall carry out at his expenses, the coordination and follow up of the execution of the works with the concerned authorities.

### **2.4 NOTE REGARDING GEOTECHNICAL SITE INVESTIGATION SURVEY FOR SWTF SITE**

During the execution of the works, any additional geotechnical survey or testing or other site investigation survey required or judged necessary shall be also carried out by the contractor at his own expenses, and shall not be measured for direct payment, but shall be considered as subsidiary Works, the cost of which will be deemed to be included in the Contract prices for the Pay Items. The Contractor must satisfy himself as to the nature of the soil through which excavations and foundations are to be made or which are to be used in the construction of embankments. No claim from the contractor for additional payment will be considered. Costs for executing such trial excavation and trial trenching required by the Engineer for particular purposes, and ordered by him shall not be measured for direct payment, but shall be considered as subsidiary Works, the cost of which will be deemed to be included in the Contract prices for the Pay Items.

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### 3 SECTION 2: EXCAVATION AND EARTHWORKS

#### 3.1.1 EXCAVATION

Excavation, if included in another item, shall not be measured for direct payment, but shall be considered as subsidiary Works, the cost of which will be deemed to be included in the Contract Price for the corresponding item.

Excavation whether included in another item or separately measured shall include for excavation and disposal of surplus material, including:

- Cutting and disposal off site of existing asphalt or concrete pavement layer, etc. (if applicable);
  - Excavating in any type of soil and to the required depth;
  - Survey and setting out;
  - Preparation of profiles;
  - Preparation and compaction of the subgrade finished surface
  - Preserving the bottoms of excavations and for filling any over-excavated volumes or disturbed areas to the net dimensions;
  - Grading or levelling and compacting or trimming bottom of excavation;
  - Provision for working space;
  - Dealing with water, maintaining excavations in a dry condition, including dewatering and excavation and refilling of any surfaces allowed to deteriorate;
  - Dealing with rivers and water courses, maintaining excavations in a dry condition, including water course diversion;
  - Multiple handling of materials and transporting around the site, provision of storage areas and storage of any material required for backfilling;
  - Selection of excavated material
  - Filling to structures and trenches, compaction, moisture content control, testing;
  - Disposal of surplus excavated material on the site itself at the locations indicated by the Engineer.
  - Supporting excavations;
  - Planking, strutting and supporting sides of excavation;
  - Providing all temporary cofferdams, supports, bailing, drainage, pumping, sheeting and all other temporary works;
  - Unauthorized over depth/width trenching and the backfill material including lean concrete required in such cases, no allowance shall be made for any working space or subsequent variation in trenching;
  - Over excavating as a result of Contractor's failure to protect and preserve the trenches and formations;
  - Any necessary trial holes or other necessary means to locate existing services;
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- Locating existing services and any temporary diversion of mains or services;
- Temporary protection and support to all existing pipes, cables and services, chambers, culverts, gullies, foundations and the like, repair or replacement to them should they become damaged;
- Protection of existing service utilities and provision of all necessary temporary works to maintain utilities in use during and until completion of works;
- Any hand working close to or below existing services;
- Any hand excavation and working in zones not accessible for machinery (such as watercourses, footpaths, stairs, along irrigation channels, sewer lines in private properties, etc.);
- Excavation and reinstatement of topsoil its separate handling and storage;
- Barriers, lighting, warning signs, traffic controls and all other measures necessary to ensure the safety of the works;
- Restoration and reinstatement of surfaces except where separate items are included;
- Hand work working close to or below existing services;
- Disposal of surplus and unsuitable material to any distance;
- Temporary access roads or tracks.
- Execution of the approved fill material required to fill the excavations exceeding the dimensions shown on the drawings (as directed by the Engineer).

### 3.1.2 FILLING AND BACKFILLING

Filling and backfilling (including borrow fill material), if included in another item, shall not be measured for direct payment, but shall be considered as subsidiary Works, the cost of which will be deemed to be included in the Contract Price for the corresponding item.

Filling and backfilling (including borrow fill material; i.e. borrow fill material shall not be measured separately) whether included in another item or separately measured shall include for:

- Selection of fill material
  - Fill supplied and provided on the fill site by the Contractor from sources outside the Site, including all associated costs for borrow pit acquisition, excavation and earthworks, transportation of material from the borrow pit to the fill site, etc.
  - Selection of material of stated and suitable types and transporting and layering or depositing in locations indicated on Drawings or directed by the Engineer for the fill.
  - The rehabilitation of the borrow pit and in particular the levelling of a layer of agricultural soil over the whole borrow surface.
  - Compaction of fill.
  - Moisture content control
  - Testing
  - Foundation preparation and compaction
  - Trimming and shaping to required levels and contours
  - Complying with requirements for the equalisation of earth pressures or the sequence or rate of filling.
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- ✓ Depositing fill to slope away from vertical drainage layers and providing temporary drainage to prevent surface water from entering such drainage layers.
  - ✓ Keeping the earthworks free of water.
  - ✓ Taking precautions to avoid damage to property, structures, sewers, drains and services.
  - ✓ Suitable material required for the protection of the sub-grade and its subsequent removal.
  - ✓ Replacing suitable material rendered unsuitable.
  - ✓ Fill resulting from the settlement of or penetration into the underlying material beneath the fill.
  - ✓ Trial sections and samples.
  - ✓ Testing (laboratory and in-situ)
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## 3.2 SECTION 3: CONCRETE WORKS

### 3.2.1 PLAIN CONCRETE, REINFORCED CONCRETE,

Concrete works, if included in another item, shall not be measured for direct payment, but shall be considered as subsidiary Works, the cost of which will be deemed to be included in the Contract Price for the corresponding item.

Concrete shall be executed complete including, but not limited to, for both concrete and formwork.

If not included in another item, concrete shall be measured by net volume. No deduction shall be made for holes or voids of less than 0.5 m<sup>3</sup>.

Concrete shall include for:

- / Design and testing
  - / Forming of chamfers (25 mm x 25 mm) to all exposed external angles
  - / Building in of all pipes and fittings, bolts, frames, iron and steelwork and the like.
  - / Finishing of surfaces.
  - / Trial mixes
  - / Mixing, placing in or against any surface, including soil faces where required, compaction and surface finishing.
  - / Curing protection
  - / Test samples and trial panels
  - / Materials and attendance for sampling and testing carried out by the Engineer.
  - / Falls, cambers and shaped profiles.
  - / Weep pipes, pipe sleeves and the like.
  - / Construction joints (construction, expansion, contraction, etc.), skewbacks, stunt ends, steppings, bonding chases and the like including formwork, joint, joint filler, joint sealant, backing rod, water bars, waterstops, angles and accessories, treatment of reinforcement crossing the joint, treatment of concrete joint faces, preparation of surfaces, cleaners, primers, sealers, backing strips and bond breakers, dowel bars for expansion joints (whether shown or not on the Drawings or in the specifications, or directed by the Engineer, or judged necessary during the execution of the works).
  - / Holes, ducts, pockets, sockets mortices and the like.
  - / Concrete to fill overbreak and working space.
  - / Vibrating.
  - / Curing, sprinkling, Admixtures (superplasticisers, waterproofing (particularly for liquid retaining structures (wastewater, leachate and water) and structures such as the biofilter structure, etc.) and placing in cold weather.
  - / Work at any cross-sectional area.
  - / Horizontal, vertical or sloping works.
  - / Work in any location.
  - / Work at any height.
  - / Work lay in bays.
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- ✓ Packing around steelworks and reinforcement and between formwork.
- ✓ Forming channels grooves, holes and chases in the surface of unset concrete.
- ✓ Grading, tamping and floating. .
- ✓ Grouting in mortises, holes pockets and the like.
- ✓ Execution of a smooth surface finish using mechanical steel trowel for the horizontal surfaces

Rates for concrete shall include also for all shuttering and formwork works as required. Formwork shall include without being limited to, for the following:

- ✓ Falsework, centering, fabricating, assembling, cutting, fitting and fixing in position and taking measures to produce the required shapes of concrete.
- ✓ Forming cambers and falls.
- ✓ Linings and taking measures to produce the required finish to the surfaces of the concrete.
- ✓ Cutting and fitting around projecting members, pipes reinforcement and the like.
- ✓ Individual fillets, chamfers, splays, drips, rebates, recesses, grooves and the like.
- ✓ Rain water strip.
- ✓ Maintaining in place until it is struck and allowing for any variation from the minimum period for striking arising from prevailing weather conditions.
- ✓ Striking, taking down and removing.
- ✓ Concrete provided in lieu of formwork to fill overbreak and working space.
- ✓ Any width or area.
- ✓ Work in any location.
- ✓ Work at any height.
- ✓ Curved, conical spherical and elliptical work.
- ✓ Battens, struts, bolting, wedging, easing, striking and removing.
- ✓ Straight, raking and curved cutting.
- ✓ Forming grooves, throats, channels, chases, rebates, chamfers, splayed angles, moldings and the like.
- ✓ Forming mortices, holes, pockets, notches and the like.
- ✓ Mould oil.
- ✓ Making good exposed faces of concrete after removal of formwork under the direction of the Engineer.
- ✓ Fair-face Grade A appearance shall be executed for internal, external and exposed face of all structures and shall be formed by wrought formwork (Fair-face Grade A appearance).
- ✓ Execution of a smooth surface finish using mechanical steel trowel for the horizontal surfaces

Concrete will be divided in the categories stated in the Bill of Quantities.

Blinding concrete shall in addition include for excavation below the underside of the structural formation level and preparation and compaction and trimming of surfaces.



### **3.2.2 STEEL REINFORCEMENT (FOR REINFORCED CONCRETE WORKS)**

Reinforcement works, if included in another item, shall not be measured for direct payment, but shall be considered as subsidiary Works, the cost of which will be deemed to be included in the Contract Price for the corresponding item.

Reinforcement shall be measured by net weight without addition for any rolling margin, supports, spacers or tying wire.

Reinforcement shall include for preparing detailed drawings and bending schedules.

The price shall include the supply, transportation and installation of the items of works which shall be executed complete including all necessary accessories.

Rates for reinforcement shall include for:

- Bending.
- Tying wires.
- Distance pieces, spacers and supports.
- Bars of any location or number.

If not included in another item, reinforcement shall be paid for per net ton of steel bars in place which weight shall be computed according to the bar diameter and unit weight of steel considered at 7.850 tones per cubic meter. No allowance shall be made for:

- Rolling margin.
  - Additional steel used for laps other than those specified.
-

### 3.3 SECTION 6: BLOCKWORKS

#### 3.3.1 BLOCKWORK

Each kind of block is given separately.

Thickness is stated.

Thickness stated is the nominal thickness unless otherwise specified.

Walls are given in square metres measured on the centre line of the material. No deduction is made for voids not exceeding 0.10m<sup>2</sup>. Deductions for lintels, sills, and the like are measured as regards height to the extent only of the full block courses displaced, and as regards depth to the extent only of the full block thickness displaced.

Work is deemed to include without being limited to:

- Mortar for bedding and jointing.
- Type of bond and method of pointing.
- Raking out joints or leaving rough joints to form key.
- Battering work (i.e. sloping with parallel sides).
- Extra materials for curved work, tapering work and for work bonded at back to other work.
- Building against or tying to other work (i.e. not bonded), including extra materials.
- Joint reinforcement in reinforced work.
- Building overhand.
- Bonding ends of walls to other work including providing ties and anchors or other fixings and extra material in bonding.
- Pinning up load bearing walls to structural soffits and filling solid with mortar.
- Reveals, angles and intersections.
- Rough and fair cutting.
- Grooves, throats, mortices, chases, rebates, holes, stops, mitres and the like.
- Weather fillets, angle fillets and the like and pointing in flashings including cutting grooves or chases.
- Labours in returns, ends and angles.
- Building in or cutting and pinning ends of lintels, sills, bearing bars, steps, timbers, steel sections and the like.
- Templates for forming openings and lift shafts, centering, and temporary support and protection to built-in frames.
- Joints, fillers, sealants, concreting

The price shall include the supply, transportation and installation of the items of works which shall be executed complete including all necessary accessories.

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### **3.4 SECTION 7: JOINERY AND IRONMENGARY**

#### **3.4.1 JOINERY AND IRONMENGARY**

Each kind of work is given separately.

Doors and the like shall be measured by number.

Doors shall be executed complete, including, among others, steel gate, panels, reinforcement, painting, accessories and all required works.

The price shall include the supply, transportation and installation of the items of work which shall be executed complete including all necessary accessories.

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### **3.5 SECTION 8: METAL WORK**

No particular requirements.

### **3.6 SECTION 9: FLOOR, WALL AND CEILING FINISHES**

#### **3.6.1 RENDER**

Each kind of render is given separately.

Work is measured in area in contact with the base.

Work is deemed to include without being limited to:

- ✓ Work at any, height above floor level.
- ✓ Work, of any width, height or girth.
- ✓ Extra work involved in patterned work and work in multi-colours.
- ✓ Work laid to falls and crossfalls, and intersections on sloping work.
- ✓ Raking and vertical work, to skirtings, strings, aprons, saddles and the like.
- ✓ Working over and around obstructions, pipes and the like and into recesses and shallow channels.
- ✓ Overhand working.
- ✓ Keying mixes, bonding, agents, bedding mortars, adhesives and other fixing materials.
- ✓ Metal mesh strips and fabric reinforcement across dissimilar backgrounds, service chases, conduits and the like.
- ✓ Dividing strips, anti-crack strips, cover strips and movement joints, except designed expansion joints.
- ✓ Fair joints, edges, internal and external angles, coves, intersections, ends, ramps, wreaths and outlets.
- ✓ Preparatory works for the base surface.
- ✓ Preparatory works.
- ✓ Work required to be carried out before fixing, whether on or off site.
- ✓ Metal angle beads, stop beads and the like including working thereto.
- ✓ Dubbing out.

The price shall include the supply, transportation and installation of the items of works which shall be executed complete including all necessary accessories.

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### 3.7 SECTION 10: PAINTING AND DECORATING

#### 3.7.1 ITEM - PAINTING

#### 3.7.2 ITEM - PROTECTIVE COATINGS AND WATERPROOFING

Painting, protective coatings and waterproofing are given in square metres measured the area covered and measured flat. No deduction is made for voids not exceeding 0.50 m<sup>2</sup>.

Work is deemed to include without being limited to:

- ✓ Internal and external work.
  - ✓ Work of any girth.
  - ✓ Work at any height above floor level.
  - ✓ Preparatory work.
  - ✓ Preparatory works for the base surface.
  - ✓ Filler layers.
  - ✓ Executing a smooth surface finish using mechanical steel trowel for the horizontal surfaces. The surface finish shall be compatible with the coating to be applied.
  - ✓ Method of application.
  - ✓ Rubbing down between coats.
  - ✓ Work required to be carried out before fixing, whether on or off site.
  - ✓ Priming backs of frames, edges of rebates and beads and bottoms of doors.
  - ✓ Work in multi-colours, defused as the application of more than one colour on an individual surface or in one room.
  - ✓ Extra girth of edges, mouldings, panels, sinkings, corrugations, flutings, carvings, enrichments and the like.
  - ✓ Panes of any size in work to glazed surfaces
  - ✓ Work to edges of opening lights and surrounding frame caused by opening cutting in next to glass, work on beads, hinges and fastenings in work to glazed surfaces
  - ✓ Work on hinges and fastening to doors, frames and like in work to general surfaces.
  - ✓ Work to attached hookbolts, cops and the like in work to surfaces of structural steelwork.
  - ✓ Removing ironmongery from surfaces to be decorated and refixing.
  - ✓ Masking adjacent surfaces
  - ✓ "Rain water" strips
  - ✓ Avoiding damages of paint and coatings on exterior surfaces of structures below ground level (walls and foundations)
  - ✓ Covering up and protection of floor finishes during the course of the works, and cleaning off and leaving sound, true and level upon completion
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The price shall include the supply, transportation and installation of the items of works which shall be executed complete including all necessary accessories.

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### **3.8 SECTION 15: ELECTRICAL WORKS**

The electrical works shall include fabrication, factory testing, supply, transportation, storage, installation, site testing, commissioning, O&M manuals, also supplying and installation of all corresponding controls, fittings, supports, accessories and civil works required to complete installation of the equipment.

The electrical works include all the requirements in the specifications and everything shown on the drawings, and the directions of the Engineer, to achieve fully functional systems as required under the Contract.

The contractor must submit the catalogues for all the electrical and instrumentation equipment to the approval of the Engineer before the purchase order.

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### **3.9 SECTION 18: MECHANICAL WORKS**

#### **3.9.1 GENERAL**

The mechanical works shall include fabrication, factory testing, supply, transportation, storage, installation, site testing, commissioning, O&M manuals, also supplying and installation of all corresponding control panel, fittings, supports, accessories and civil works required to complete installation of the equipment.

The mechanical works include all the requirements in the specifications and everything shown on the drawings, and the directions of the Engineer, to achieve fully functional systems as required under the Contract.

The contractor must submit the catalogues for all the mechanical works equipment to the approval of the Engineer before the purchase order.

The unit price also includes, among others:

- Labelling, tagging of valves, equipment with their related control panel and components as specified.
- Painting and identification of pipes, valves, etc.
- Intumescent seals for all pipes penetrating shaft walls and/or two different fire compartments.
- All necessary civil works and builders works related to plumbing, drainage and mechanical works (Including excavation and filling works, concrete works, pipe protection and bedding (granular bedding or concrete surround as applicable, necessary and directed by the Engineer, depending on the type of pipe and the cover depth above the top of pipe.), fittings, supports, steel works, covers, surface preparation and treatment, cleaning, testing, and all necessary accessories, etc)

#### **3.9.2 Item– DRAINAGE & VENT SYSTEMS**

This item shall include but not be limited to:

Procuring, transporting, storing, installing, painting, remedying of all defects that may appear while testing, of polyethylene 100 pipes with all necessary accessories for drainage pipes running underground,

UPVC pipes as per European Standard for drainage soil and waste and vent systems with elastomer joint socket,

Pressure UPVC pipes as per European Standard for condensate systems with insulation,

UPVC pressure pipes as per European Standard for waste systems

Pressure polyethylene 100 Pipes with all necessary accessories for drainage pipes running underground,

Perforated polyethylene pipes with all necessary accessories for drainage pipes running underground,

Pipes are all complete including fittings, expansion fittings, antivibration hangers and supports similar to MUPRO or equivalent with accessories and all other necessary works for the proper execution of this item as shown on the drawings, required by the specifications and / or deemed necessary by the Engineer.

#### **3.9.3 Item – manholes & chambers & sump pits**

This item shall include but not be limited to:

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Supply all required materials, equipment and accessories, and construct reinforced concrete manholes and chambers, complete including, but not limited to, breaking out and reinstatement of existing paved surfaces as specified, site clearing and all necessary excavation in any type of soil; keeping excavation free from all water sources; Cast-in-place concrete using Sulphate Resistant Cement to ASTM C 150, Type V, 14 MPa (tested on cylinder) for blinding, and 30 MPa for reinforced concrete works (tested on cylinder), including all necessary formwork of any type and any shape, reinforcement and accessories; Concrete benching; Protective coating of external surfaces in contact with soil (bituminous coating in 2 layers); Protective coating of internal surfaces (coal tar epoxy coating in 2 layers, total thickness 300 microns minimum); Breaking into pipes; Backfilling with selected excavated or borrow fill materials; Compacting in layers to required density; Removing and disposing off resulting and surplus materials to approved dumping area; Covers and frames, steps, and all necessary accessories, covers and frames and all other necessary works for the proper execution of this item as shown on the drawings, required by the specifications and / or deemed necessary by the Engineer.

### **3.9.4 Item – SUBMERSIBLE SEWAGE PUMPS**

This item shall include but not be limited to:

Procuring, transporting, storing, installing, painting, remedying of all defects that may appear while testing of Submersible pump set for sump pit, complete with complete with civil works, platform, sliding bars, float valves control, alarm signal to control room, factory preassembled control panel, controls for duplex running system and all valves and accessories,

Each pump set shall include factor preassembled control panel. And the supply and installation of control wiring from water level controller, and all other needed control items to CP, (control panel shall include contractors AC-3, thermal and magnetic protection to coordination type 2), (numbered control cable), thermostatic rubber, round or flat flexible cable. Also include the electrical connections with power cable to the related disconnect switch, all as specified (electrical and mechanical) and as shown on the drawings.

Pump sets shall be complete with all other accessories necessary for the proper execution of this item as shown on the drawings, required by the specifications and / or deemed necessary by the Engineer.

### **3.9.5 Item – WATER DISTRIBUTION PUMPS**

This item shall include but not be limited to:

Procuring, transporting, storing, installing, painting, remedying of all defects that may appear while testing of water distribution pump set complete with all valves and accessories,

Each pump set shall include factory preassembled control panel. And the supply and installation of control wiring from float valves, motorized valve, water level controller, differential pressure switch and all other needed control items to CP, (control panel shall include contractors AC-3, thermal and magnetic protection to coordination type 2), (numbered control cable Cu/PVC/PVC-600/1000V). Also include the electrical connections with power cable to the related disconnect switch, all as specified (electrical and mechanical) and as shown on the drawings.

Pump sets shall be complete with all other accessories necessary for the proper execution of this item as shown on the drawings, required by the specifications and / or deemed necessary by the Engineer.

### **3.9.6 Item 18.17 – diffusers registers & grills**

This item shall include but not be limited to:

Procuring, transporting, storing, installing, painting, remedying of all defects that may appear while testing of extruded aluminium slot diffusers, squares diffusers, registers, grilles and linear grilles, complete with opposed blade volume dampers, wooden frames, fixings, with painting and all other accessories necessary for the proper execution of this item as shown on the drawings, required by the specifications and / or deemed necessary by the Engineer.

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### 3.10 SECTION 19: MISCELLANEOUS WORKS

#### 3.10.1 ITEM 19.1 - BIOFILTER ODOR CONTROL SYSTEM

The price includes the complete execution of the Biofilter odour control system according to the requirements of the Tender Documents, notably the Particular Technical Specifications and the Bill of Quantities.

- Preparation of detailed execution drawings and shop drawings
- Site preparation
- Supply, transportation and installation of biofilter equipment with all associated units and accessories (including suction/extraction fans, prescrubber system, dosing station, extraction ducts inside the composting (fermentation) hangar, extraction pipes between the composting hangar and the biofilter, water tank and distribution pipes, miscellaneous piping, water supply networks, equipment and accessories, drainage networks, manholes, equipment and accessories, humidity sensors, pumps, etc. as specified elsewhere in these Tender Documents)
- Supply, transportation and installation of Biofilter media
- Fumigation for the biofilter media before transport to Lebanon and the project area including addition of 0.7 Kg/m<sup>3</sup> of urea (at 46%), as well as composting, overcasting and post-fermentation of the material for 4-5 weeks
- All associated civil works including excavations and earthworks (including the execution of the elevated platform below the Biofilter odour control system), including, among others, site clearance and excavation, filling and backfilling, sub-base course layers and base course layers, damp proof membrane, blinding concrete, foundations, reinforced concrete works, manholes, surface coating and protection, etc., complete for the complete execution of the biofilter system
- All associated electrical works including power supply, electrical panels, cables, cable protection, earthing, necessary for the execution and operation of the biofilter odor treatment system and its various associated equipment and accessories till the connection of the complete biofilter system to the main control panel, etc.
- All necessary accessories
- Testing and commissioning
- All other related works, all as specified, and to the satisfaction of the Engineer

The price for this item, completely executed and tested, shall be paid as a lump sum.

Note: the works related to the various execution of the elevated platform (to prevent flooding) is included within the price of the Biofilter odour control system.

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