



# PIMPRI CHINCHWAD MUNICIPAL CORPORATION

## ENVIRONMENT DEPARTMENT

Tender Notice No - 07/ENV/2015-16.

**NAME OF WORK:** Design, Construction Installation & Commissioning of Bovine (Big Animals and other small animals) meat processing plant on EPC Turnkey basis with Trial Run for 6 Months and Operation & Maintenance for 5 Years in PCMC Area.

The Pimpri Chinchwad Municipal Corporation (PCMC) invite request for proposal (RFP) for Design Construction Installation & Commissioning of Bovine (Big Animals and other small animals) meat processing plant on EPC Turnkey basis with Trial Run for 6 Months and Operation & Maintenance for 5 Years in PCMC Area. The bidder shall have sound financial and technical strength. The detailed terms of Reference, qualification criteria are provided in the Bid document.

Name of Work	Approximate cost of work Rs Lacs	Bid Security in Rs Lacs	Performance Security in Rs Lacs	Period	Cost of Bid document
Design Construction Installation & Commissioning of Bovine (Big Animals and other small animals) meat processing plant on EPC Turnkey basis with Trial Run for 6 Months and Operation & Maintenance for 5 Years in PCMC Area.	B-2 Tender	25.00/- (through gateway payment system)	Rs. 200.00	18 months including monsoon + O & M 60 Months	Rs. 25,000/- (through gateway payment system)

The detailed terms of references, technical, financial qualification criteria & detail scope of work are provided in Bid documents available on PCMC web site [www.pcmcindia.gov.in](http://www.pcmcindia.gov.in) to the bidders with registered key. To obtain the registration key the bidders are advised to contact office of the Add. Commissioner, 4<sup>th</sup> Floor, Main Building, PCMC or his duly authorized representative. This official will guide interested bidder to document the authorization process to obtain the registration key. The bidders are instructed to obtain the registration key upto 28/09/2015

1. The tender document in Prescribed format duly completed in all respects shall be uploaded on the web site from 15/09/2015 to 05/10/ 2015. Other details will be available on website "[www.pcmcindia.gov.in](http://www.pcmcindia.gov.in)" during the period of submission process.
2. Pre bid meeting will be held on 23/09/2015 at 3.00 pm at Additional Commissioner office, 4<sup>th</sup> Floor, Main Building, PCMC Pune - 18
3. Right to reject any or all the bids without giving any reasons is reserved by the Commissioner, PCMC
4. Last date of submission of bids is 05/10/ 2015
5. Opening of Technical bids on 05/10/2015 at 16.00 Hrs; if possible.

sd/-

**Commissioner**

Pimpri Chinchwad Municipal

Pimpri 411 018

Adv. No. 349

No. : PAK/01/WS/351/2015

Date : 14/09/2015

**विषय - पिंपरी चिंचवड मनपाच्या नियोजित कतलखाना प्रकल्पासाठी निविदा प्रसिध्द करणे बाबत....**  
**निविदेसाठी विशेष अटी शर्ती. (Special Terms & Conditions)**

1. The Bid documents are available on website "pcmcindia.gov.in" to the bidders with registered key. To obtain the registration key the bidders are advised to contact Additional Commissioner, PCMC or his duly authorized representative. This official will guide interested bidders to document the authorization process to obtain the registration key.
2. Bidder must be in the business of this kind for min 10 years and must have completed at least one similar type of Bovine processing plant in last 10 years in India and one globally with European standard equipment's for 100 Bovine large animals and 500 small animals with modern facilities including rendering, ETP with zero discharge & value added products on turnkey basis and same shall be in satisfactory working condition since last one year.
3. Bidders must be conversant with pollution control norms for similar meat processing plants and effluent treatment plant of highest standard to the approval of Maharashtra pollution control board.
4. Bidders must have obtained and familiar with International certification for Halal Box and other international certificates required for similar plants and submit documentary proof of the same.
5. Bidder must have key personnel with proven experience of Design and installation of meat processing plant of similar kind. The Bio Data of key personnel to be submitted.
6. Bidders must have experience of procurement of equipment from European countries and familiar with import export documentation. The documentary proof of the same should be submitted.
7. All equipment should be made of ST Grade 1,403 (AISI- No.304), DIN EN 10088-3. The stainless austenitic chromium-nickel Steel 1.4301 having good corrosion resistance (particularly in natural environmental media and in the absence of considerable chlorine and salt concentrations and sea water) and weldable. Fit for use in the food industry.
8. The Average annual turnover of the bidder shall not be less than Rs. 10 cr. During the immediate past three year.
9. The bidders must produce solvency certificate of Indian nationalized Bank for Rs. 5 Cr.
10. The bidders must submit performance Bank guarantee of Indian nationalized Bank for Rs. 2 Cr. Valid for contract period.

Sd/-  
**Commissioner**  
**PCMC**

## SCOPE OF WORK AND DELIVERABLES

### MEAT PROCESSING PLANT COMPLEX

#### **[A] INTRODUCTION**

The Pimpri Chinchwad Municipal Corporation (PCMC) has created high class infrastructure within the City for the benefit of the people in PCMC areas, and propose to construct a slaughter house on Survey No. 202/Part, Near HA company, Pimpri, Pune -18

The PCMC is a progressive institution committed to the welfare and hygiene of its population and therefore PCMC has decided to construct a meat processing plant of smaller animals as well as Bovine animals to cater hygienically certified meat to people of PCMC Area.

The meat processing plant will have highest standard of quality and hygiene according to international European standard. The meat processing plant equipments will be of European norms satisfying all the requirements of Maharashtra population control board and food standards of highest nature in the international export market of similar product.

The meat processing plant of PCMC will be the first of its kind meeting the highest international standard of hygiene, safety, environmental norms, and food standards and will make certified meat available to people of PCMC and surrounding Area beside this will prevent unauthorized sale of meat products in other unorganized slaughter houses working in unhygienic conditions causing health hazards to people of PCMC and surrounding area.

The Tender documents have been complied in details after careful preparation of detailed project report (DPR) by a specialist agency in this field

#### **[2] HIGHLIGHTS OF MEAT PROCESSING PLANT ABATTOIR & SALIENT FEATURES.**

[a] Built up area 2700 M<sup>2</sup> on plot No. 202/Part, CTS No. 2028, Gaon Pimpri

Waghile

[b] Capacity of the plant 200 large animals and 1000 small animals

[c] Equipped with chilling facility

[d] Provision of blood rendering plant

- [e] Effluent Treatment plant 200 KL per day capacity
- [f] Biogas plant
- [g] Effluents treated to Maharashtra pollution control board norms.
- [h] Hygienically slaughtering by halal method
- [i] Modern slaughtering equipments to European standard
- [j] Plant will protect environmental issues.
- [k] Plant meets all statutory conditions of Govt. of India
- [l] Detailed project report and feasibility studies are available with PCMC.

### **[3] SCOPE OF WORK UNDER THE CONTRACT**

The scope of work is highlighted is given but not limited to the following operations.

- [a] Study and interpretation of detailed project report (DPR) prepared by PCMC and incorporate the requirements of (DPR) report in the design of proposed meat processing plant.
- [b] Conduct detailed land survey by total station survey instrument by specialized survey agency approved by PCMC and submit topographic and contour survey drawings and make use of these drawings in the design of the plant.
- [c] Conduct detailed soil investigation by mechanical rig and submit soil testing and investigation report highlighting load bearing capacity of strata, depth of foundation, type of foundation and other recommendations as regards to most economical design of foundations, use of excavated soil for back filling, plinth filling, landscaping and road works and make use of this data in design and construction of this plant.
- [d] Study Tender drawings prepared by the Project consultant appointed by PCMC (M/s. Shashi Prabhu and Associates, Architects and Project Management Consultant) and make suitable recommendations as regards to layout plans, after taking into account the DPR, statutory requirements of Govt. of India and Maharashtra Govt. and Maharashtra Pollution control boards regarding construction and installation of meat processing plant equipments for its

operation and maintenance in most efficient manner. The project consultants will revise these drawings to the satisfaction of the PCMC and the bidder will make use of these drawings in the design and construction of meat processing abattoirs to the satisfactory design parameters approved by PCMC.

This is an engineering procuremene and construction (EPC) type of Tender and the finally selected contractor will be responsible for the design, engineering, detailed drawings, construction of the abattoir meat processing plant building and other ancillary structures within the battery limits of the contract along with all civil and other electromechanical and specialized services that may be necessary for smooth operation of the plant to its rated performance capacity. The contractor will be fully responsible for selection of equipment of meat processing plant to European norms.

- [5] The selected contractor will be responsible for planning and design of automated and mechanized meat processing plant, machinery and equipments capable of processing 200 Bovine large Animals and 1000 small animals per day using imported equipments of European union origin.
- [6] The effluent from the meat processing plant will be treated according to norms laid down by the Govt. of India and Maharashtra pollution control board in particular. The ET plant will have capacity of 200 M<sup>3</sup> per day of effluent. This plant will be of compact type with 100% recyclable output of highest standard.
- [7] Suitable size of Bio gas plant utilizing domestic sewage wet garbage, dung from animals, grass etc. The capacity of the bio gas plant will be approximately 180 m<sup>3</sup> / day to be confirmed in consultation with client.
- [8] The EPC contractor is also expected to design, procure, and install all MEP (Mechanical, HVAC, Electrical, plumbing, fire fighting, pumping) and specialized services like PA system, acoustics, landscaping, access control, solar and other services required for operation of plant in a professional manner.
- [9] The external development like compound wall, entrance gate, street lighting, concrete roads, storm water drainage system, car parks, substation, transformer yard, pumping stations, underground water tanks, watchmen cabins are included in the scope of work. While indicative sizes are given in the tender the contractor must design the requirements and construct the facility according to IS Code and his working and suitable dimensions to satisfy statutory requirements.
- [10] All the works included under the scope of this contract implies inclusion of Design and engineering cost, procurement cost, cost of all types of labour, materials, equipment, machinery, tools and tackles, testing and commissioning charges, erection and fabrication charges, all types of taxes duties, levies, custom duty, import duty, excise, Vat, service tax, port clearance, inland transport,

packing charges etc as required. The testing and commissioning of the plant and system, trial runs, performance tests, reliability of equipment tests, and obligatory operation of plant for a period of 3 months from the handing over to client.

- [11] This contract is in true sense EPC contact with Turnkey module. The end user will require just to turn the key of the plant to make it operational to its rated performance capacity. The EPC contractor will have to demonstrate consumption of 200 Bovine animals and 1000 small animal in the demonstration of performance test.
- [12] While part of the water and power requirement may be available from the municipal corporation in future EPC contractor will install permanent bore well and pump system to make water available for daily consumption and associated water treatment plant with it. Similarly stand by diesel generator shall be designed and installed in the responsibility of the contractor. The water and power for construction till handover will be contractor responsibility and No separate payment will be made to the contractor.
- [13] The project design and engineering shall exceed the norms of Indian standard code of practice and shall take into account norm pertaining earthquake forces, wind forces and impact loading during operation.
- [14] The contractor shall mitigate the risk by providing insurance for labour, plant building, all types of equipments, CAR policy. The EPC contractor is obliged to keep dedicated vehicle for emergency and accident at site.
- [15] The EPC contractor is obliged to arrange factory inspection of machinery and equipment at the country of origin of equipment all expenses for PCMC engineer and consultant shall be borne by the contractor including lodging and boarding, travel etc at the factory premises in foreign country.
- [16] The EPC contractor must ensure that the project estimate given in the DPR i.e. Rs. 1779.65 Lacs. is not exceeded and details and requirement given in DPR are complied and machinery and equipments procured accordingly.
- [17] It is understood that EPC contractor will develop this project from its inception to final commissioning. The PCMC will provide the technical and functional specifications for the project and the EPC contractor will study those input from PCMC and subsequently design, build procure, install, construct, test, commission, and performance test of plant and deliver the project in Turnkey operational state. The contractor of the project will receive the fixed fees. The EPC contractor will give performance test guarantee. The PCMC and consultant to retain project management control and quality assurance control.

[18] The contractor to complete the project in all respect within 15 months including monsoon from the date of acceptance of the proposal and work order issued by PCMC.

## TECHNICAL SPECIFICATION FOR CIVIL CONSTRUCTION

### **[1] Land Survey and Soil Investigation**

The contractor shall conduct land survey with total station instrument to establish topography of the site contours, gradient, slopes, bench marks shall be protected till handover. The soft and 5 hard copies shall be submitted for record and further use in the project.

The soil investigation shall be carried out by mechanical rig and standard tests such as SPT, shear test, CBR are noted to determine safe bearing capacity of strata for use in structural design. The soil investigation report shall give recommendations as regards to type of foundations, back fill material, and sub surface material useful in road construction or landscaping work.

The checking of the land survey and comments on soil testing report shall not absolve contractor of his responsibility regarding performance of the contract in every field. All these works are deemed in the project cost tendered by contractor.

### **[2] Design criteria**

The basic concept drawings of the meat processing plant have been issued along with tender documents. The contractor shall prepare detailed design and planning of the meat processing plant and its machinery as per design criteria specified forthwith as minimum requirement.

Any alteration in the design and its financial impact will be EPC contractors responsibility and the lump sum project cost quotation of the contractor remains unchanged. It is entirely the responsibility of the contractor to submit properly prepared, relevant, detailed, unambiguous drawings and design calculation referring to appropriate IS Code of practice within reasonable time.

The contractor shall keep watch on excavated quantity of material, back filled quantity, disposal of surplus earth, and murum procured from outside (if any) proper reconciliation statement shall be submitted for record similarly EPC contractor shall submit reconciliation statement shall be submitted for record similarly EPC contractor shall submit reconciliation statement of cement, structural steel, reinforcement steel using PWD consumption norms of material.

This is a EPC type of turnkey project. However for the sake of discipline the contract shall continue to operate as per PWD/PCMC method of item rate tender.

The Bill of quantity for all items of work has been prepared by the Architect and monthly running bill for the work done shall be prepared and measurements of work executed. However finally the lump sum quoted price shall be paid to the EPC contractor with authorized addition or deletion. The Bill of quantity is used to facilitate payment to contractor on monthly basis.

## **[A] External Development**

- [1] The boundary limit of the project is identified by the peripheral compound wall of having 3.00 m height RCC wall with 1.5 m GI sheet above RCC wall around the plant. The detail of the compound wall is given in the Tender drawing No. SPA/PCMC/MPP/T/02/R-3 There are three numbers of entry and exit gates which are 6m wide and 3m height with locking arrangement and a small entry for a person with lockable arrangement. There will be watchmen cabin for each gate of size 3m x 3m with 2.75m height complete with windows, door, Telephones, fan etc. there will be security lighting on the compound wall all round. Location of gates shall be decided during the layout.
- [2] The internal roads around the plant building shall be of concrete of grade M-30 as per MORTH specification. The roads will have appropriate slopes and concrete / steel gratings of heavy duty for disposal of storm water drainage. In addition UPVC pipes of 200mm shall be buried under the roads at 20m intervals to cater for future use to prevent digging of roads.

There will be at least 750mm gap between the road edge and compound wall for plantation of trees, shrubs, according to landscaping details.

The remaining area between the main plant building and the edge of the road shall also be of M-30 grade concrete according to MORTH specification and this concrete will serve purpose of plinth protection of all buildings. However spaces shall be left for underground water tanks, watchmen cabins, substation effluent treatment plant, biogas plant, Lairages areas, Tube well areas, manhole and covers, inspection chambers and buried electrical cables and water pipes. The EPC contractor to coordinate all the MEP and other specialized services before laying concrete roads. The concrete roads will have road markings, signage's as per requirement of the client. The boundary of the roads must be clearly visible by the painted curbs.

- [3] The Lairages shall be detailed according to the tender drawing No. SPA/PCMC/MPP/T/02/R-3. There will be shaded structures in structural steel and trusses and covered with G.I. roofing sheets. The colour of the roof shall be separate for Buffalo lairages and small animal lairages. The floor of the lairages will be 150mm raised concrete platform gradually sloped towards road. There will be Troughs of sufficient depths for water and grass storage for animals. There shall be at least one electric bulb giving 200 Lux illumination per lairage shed. There shall be at least one hose pipe connection for cleaning and washing of animals. The electrical cables and water and drainage pipes shall not be buried under road concrete. The patches of interlocking pavement shall be created under route of buried pipes.

- [4] The street light poles shall be installed along the route of the roads. These poles will be 6M height and 9m height according to lighting and safety requirement. The switching controls of the street lights will be near watchman cabin.
- [5] A curtain of tall trees shall be created along the compound wall for sound barrier creating cooling effect in the premises.
- [6] There shall be pits and trenches for tapping of the municipal water connection and the branching piping towards underground water tank. The Water meter and control valves, back flow preventer shall be installed in the water tight manholes chamber of sufficient size.
- [7] The external fire hydrant system shall run from 50000 ltr capacity fire water tank comprising of yard Hydrant and inlet breach in valve to the requirement of local fire officer department.

**[B] Details of construction plant building**

- [1] The total built up area of the plant building is 2770 M<sup>2</sup>
- [2] Total build up of lairage area is approx 700 M<sup>2</sup>
- [3] The plinth level of the building shall be around 1100mm suitable to come in line and level of the unloading trucks. (Height measured from concrete road)
- [4] There will be plinth protection of concrete around the plant building.
- [5] Only the animal Holding Area will be 150mm above road level which is connected to road by a concrete ramp.
- [6] The building of meat processing plant shall be the composite structure of structural steel and reinforced concrete.
- [7] The roof of the building will be of galalume sheets with raised seam to avoid water leakage. The roofing will have water collecting gutters all round with minimum 150mm down take pipes for rainwater disposal, these pipes are connected to external storm water drainage network. The colour of the roof shall be terracota or ocean blue as per client choice.
- [8] The roofs will support the grid work of perlines 1.20 Mtr c/c to c/c. The fabricated steel trusses supported on the steel plates will rest on the concrete pedestal 150mm above the plinth level. The pedestal of the columns will have foundation H.D. bolt for fixing steel columns. The Pedestal will continue towards the footing and plinth beams along the periphery. The concrete footings for each column shall be taken to strata having minimum load bearing capacity of 25T / M<sup>2</sup> with minimum depth of foundation as per IS Code.
- [10] The EPC contractor to design the structure of the plant building and prepare shop drawings for structural fabrications. The reinforced concrete will have M-30 grade concrete as minimum and structural steel and reinforcement Tor steel will comply IS Codes of respective subjects. The contractor will conduct necessary tests for welding, fabrication and other construction materials @frequencies given in PWD handbook.

All civil work shall done as per IS 456 and other code of practice as applicable necessary allowance for earthquake forces, wind forces, impact loads shall be made.
- [11] The openings in the wall, doors, and windows shall be left in the walls as shown in the drawings and according to the purpose of the rooms.
- [12] The concrete slabs beams are capable of taking loads of heavy machinery, water tanks, HVAC equipments panels, cable loads, etc. anticipated in similar

purpose buildings. Even the roof slab will be designed taking into account these loads.

- [13] The design of the RCC and steel construction shall take into account, future development, extensions, both in vertical and horizontal direction. The provisions for at least 2 more floor shall be kept in the design of buildings.
- [14] The grade slab on shop floor shall be heavy duty, reinforced installed on compacted plinth filing material having 100% proctor density and density and concrete shall be separated by vapour barrier polyethylene sheet.
- [15] The entire premises shall be provided with antitermite pre construction treatment from companies like pest control India with 10 years guarantee on stamp paper of Rs.100/-
- [16] The toilets, water retaining structures, and slabs on which water is used for cleaning shall be administered water proofing treatment of appropriate kind. The 10 year guarantee shall be given on Rs. 100/- Stamp paper against water leakage from members on which water proofing treatment is given.
- [17] The roof of the plant is provided with standing seam jointing method and thus make is water proofed in absence of any puncture in roofing sheets vulnerable to rains. The installer shall give 10 years guarantee for life of the roof and 10 years guarantee against water leakage from roof and gutters.
- [18] The slope, gradient cambers are important in this food related plant. There shall not be any water stagnation anywhere in the internal or external premises. All pipes work shall be tested against water leakage for 2 times working pressure.
- [19] The painting of walls, ceiling shall be done by antifungal paint recommended for food and pharmaceutical Industry. The manufacturer instruction shall be followed in this regard.
- [20] All material used in the plant building construction shall be branded and complying to I.S. Code of practice. The material list of approved brand is given in the tender and it must be followed strictly.
- [21] All door and windows shall be polymer coated Aluminium of heavy grade with heavy duty construction for long life and no doors and windows shall be fixed unless sample is approved by the consultant.

The door and window construction should be such that transmission of sound is not possible for obvious reasons. The glass used should be sound proof and heavy duty. Similarly all walls must be of bricks 230mm thick with internal type smooth plaster for easy application of paint. All iron mongary of door and window shall be heavy duty anticorrosive ad branded.

- [22] The structural work shall be painted by primer coat of Zinc primer and 2 coats of anticorrosive oil paint of approved make.
- [23] The painting, flooring, shall be done according to the finishing schedule given in drawing no. SPA/PCMC/MPP/T/02/R3.
- [24] All construction, RCC work, structural work finishing work shall be complied to IS Code of practice and as per manufacturer instruction where relevant IS Code is not available.
- [25] Submission of design and drawing

The EPC contractor is expected to submit design and drawing within 2 months of award of contract.

The working drawings shall be elaborate and full of useful information for easy understanding of the installation contractor. The issue of working drawings should be over within 1 month of submission of design drawing.

The client reserves its right to take strict action against the EPC contractor for failure to adhere to above timetable.

However any extra items cropped up during construction shall be completed within original contract period of the tender.

The Client may send the design submitted by the EPC contractor for proof checking with reputed institutions and contractor will bear the cost of proof checking. All drawings and calculations shall be on Auto Cad and type written formats.

- [26] QA/QC programme

Contractor must submit quality assurance and quality control programme manual as a part of mobilization process and adhere to this programme after its approval by client. This QA/QC programme will also include methodology of construction, project scheduling on Microsoft project software.

- [27] Order of precedence

- 1] Design criteria as specified in Tender
- 2] Special conditions of contractor.
- 3] Tender drawings
- 4] General conditions

**[28] Disputes**

The disputes, disagreement, resolution of gray areas shall be referred to commissioner PCMC. The Commissioner's decision will be final and binding to the contractor.

- [29] Water and power for construction, Trial run, Testing and commissioning shall be contractor's responsibility and no payment shall be made on this account. Contractor has to be made his own arrangement for water & power supply PCMC will provide necessary help to get the connection of same contractor has to bear the all expenditure.
- [30] Contractor shall follow safety rules at site according to CPWD rules and IS code of practice.
- [31] Contractor shall submit reconciliation statement of all construction material (mined) for paying of Royalty to Govt. of Maharashtra PWD consumption constants shall be used. The rates quoted are inclusive of Royalty payment and nothing extra can be claimed by contractor.
- [32] The rates quoted by the contractor are on all inclusive and delivered to site basis. All applicable taxes, levies, cess, VAT, Service Tax, Import Tax, Custom duty, port charges inland and out of land transport, loading and unloading etc are deemed to be included in the rates quoted and nothing extra shall be paid at any time of the project. Similarly rates are inclusive of labour, material, equipment, machinery, construction machinery, tools and plant etc and like.
- [33] Dewatering due to any reason is included in the project cost and no separate payment will be made.
- [34] Contractor to take into account diversion of utilities buried services that he may encountered during construction.
- [35] Contractor to carry out all testing as construction material as per PWD norms and the frequency stipulated by PWD. In case of failure of tests the PWD line of action must follow.
- [36] Contractor will be responsible for coordinating activities of all other sub contractor, vendors and equipment contractor.
- [37] Escalation clause is not applicable to this contract.

## **SEQUENCE OF OPERATION MEAT PROCESSING PLANT**

### **INTRODUCTION**

The proposed Integrated Abattoir project is subdivided into four (4) major sections. These are (a) Large Animal Abattoir including chiller of capacity 25 heads/hour for 8 hours of operation, (b) Small Animal Abattoir of capacity of 125 heads/hour for 8 hours of operation including chiller, (c) Blood Rendering plant of 18KLD feed to convert blood into Blood Meals (d) Custom built Effluent treatment Plant of 200 M<sup>3</sup> / day.

Both Large Animal and Small Animal will be slaughtered for bone-in-Carcasses meat. The process of producing finished product from live animals/goat/sheep is of intrinsic and takes place in series. Generally the steps are defined in following sequence: -

- Step I- Receiving and ante-mortem inspection of animals in open lairage.
- Step II - Checked and passed animals are put to covered lairage /holding pen with fasting
- Step III - Forwarding the animals to abattoir through Step raceway
- Sep IV - Abattoir, where slaughtering is carried out
- Step V - Post mortem inspection followed by removal of head, horn, hoof and deciding
- Step VI - Splitting of the animals' abdomen to remove various organs/viscera/offal.
- Step VII - Split carcass is kept in the chiller (0°C to 4°C).
- Step XII - The products are dispatched by means of Refrigerated Containers.

## **LARGE ANIMAL MEAT LINE SLAUGHTERING PROCESS**

An Abattoir is a building where a well defined systematically planned, sequence of operation carried out scientifically to produce hygienic, wholesome meat from an animal for consumption. The slaughtering process is carried out by knowledgeable and skillful operators. These operations are based on modern technology.

Meat for human consumption must come not only from disease free animal but also adopt such slaughter technique that during process, meat should be produced hygienically. All the operation should be carried in clean, sanitary place.

### **TRANSPORT TO SLAUGHTER HOUSE**

The animal should arrive well before the slaughter. The animals shouldn't be in strain/stress or in frightened condition. If the animals transported from long distance are slaughtered before sufficient rest the quality of meat will be affected. After the arrival at slaughter house complex all the animals must be unloaded on the unloading platform. The animals brought in by lorry or truck, must be unloaded gently slowly and quietly without rushing or frightening the animals.

Animals after a long journey are stiff and are in nervous condition, little rough handling may cause serious injuries like fracture, bruise, wound or even death. After the unloading the animal should be given sufficient water. The animals should be allowed to take rest. The local animals for slaughtering should come to slaughter house about 2-3 hours before slaughter so that the animals could take rest.

Proper recording of all the animals brought for slaughter should be made. The records should be made, owner wise, species, sex, region dealer wise through a computerized format.

### **ANTE-MORTEM EXAMINATION**

The ante-mortem examination for each animal brought to slaughter house for slaughtering will be done by qualified and experienced veterinarian. Any animals suffering from any disease or in febrile condition should be immediately rejected and quarantined and will be kept under observation for inspection. The pregnant animals as per law will not be allowed for slaughter. The injured or accidental animals if they are not suffering from diseases will be taken for immediate slaughtering.

All the animals cleared by qualified veterinarian after ante-mortem examination will be admitted to the covered lairage. Animals will be put under fasting for 2 hrs. prior to be processed in the Abattoir.

### **ABATTOIR**

After selection of animal for slaughter they should be moved to slaughter chamber. The animals will be cleaned before it reaches to slaughter chamber. All the dust on the skin will be properly washed.

### **STUNNING**

From the holding pen animal will be lead one by one through a narrow passage to a cradle or restraining trap, so that the animal can be stunned by stunning device.

### **SLAUGHTERING**

Slaughter of animal will be performed by Halal method. The animals will be numbered

before reaching to the slaughter chamber and number will be made to skin as well as to muscle. For example, if there are 500 animal brought by 20 individuals slaughter them the no. of animal will be SA-20 or GB-22 or BC-23. Here S, G or B are for sheep, goat or buffalo. A, B & C are the name of individual and 20, 22 or 23 are the numbers of animals. For Halal method the animals shall be positioned in such a way that its head is directed towards the 'Holy Qaba' and a Muslim butcher shall cut the throat with a sharp knife while severing the neck shall be stretched on its back and blood vessels, food pipe and wind pipe all, shall be cut in one stroke. Following this the animal will then be shackled by the hind leg to the overhead continuous runner and shackle conveyor and elevated over the stainless steel bleeding through on an inclined track.

### **BLEEDING**

After severing the neck the blood may be allowed to flow freely and then collected in an appropriate and hygienic manner. Sufficient time (5-10 minutes) is allowed for complete bleeding. The blood from the bleeding trough will flow into a collection tank under the trough and then be blown by pneumatics to the main blood storage tank. The trough will have two outlets, one for blood and one for wash down, either outlet can be plugged as required. It will also have purge pipes for wash down purposes. The blood collected shall be sold for bio-composting purpose and/or as blood meal in Blood Rendering Plant.

### **DE-HEADING AND SEPARATION OF TROTTERS**

At the top of the ascent at the end of bleeding trough, the animal will pass through a pair of self closing rubber doors into the slaughter hall. The head will then be removed and deposited into a chute. The skilled worker would properly assess the joints (elbow and hock) of both fore and hind legs and with a sharp knife (or hock-cutter) would cut off and separate the trotters.

The trotters shall be collected directly in a chute and conveyed it to cleaning section for onward transmission to respective butchers. The clean head and trotters would be examined (post-mortem) by qualified person along with the carcass and other organs.

### **SKINNING/DEHIDING**

The use of a craft conveyor in a modern automatic slaughter line allows the traditional craft method of skinning to be retained with following added benefits:-

1. Cleaner and better dressed carcasses
2. A less tiring operation for the slaughter which means that the quality of the carcass doesn't deteriorate towards the end of a shift.

Skinning or flay is highly skilled operation. The skinning should be carried out without inflicting any cuts or damages to the skin, slight damages by skin cuts or bruises would depreciate its value and usefulness, to a great extent. The skinning operation should also be carried out in such a way that the carcass is not damaged.

The quality of meat is mainly dependant on the meat surface and appearance, with subcutaneous tissue (fascia), fat, connective tissue etc. Left over of the skin tissue over on the carcass or damaging layers of meat surface would render the carcass to be judged as inferior quality. Skinning operation should start from hock point. To carryout de hiding an online de hiding machine will be operated to accomplish the de hiding of the animals.

After skinning process, each skin would immediately be collected and removed to the skin section, where following treatment should be done:-

- a. Washing
- b. Cleaning
- c. De fatting
- d. De fleshing
- e. Salting if advocated

Every carcass after removal of skin would be washed thoroughly with a suitable jet hose with adjustable hose pressure on the meat surface.

### **DRESSING LINE**

At the end of the craft conveyor the carcass will be gambrel led and lifted by elevator into the dressing line. Dressing is an important operation in the whole of slaughter process. Once the carcass is thoroughly washed after de-hiding operation, it is transferred to dressing area along the overhead rails. Carcass is cut open along the midline in abdomen and internal organs are carefully separated from the body attachments and taken out without soiling or contaminating the carcass or other visceral organs like ingesta, urine, blood, dung, etc.

The end portion of rectum, (large intestine) the anal structure would be carefully cut out and separated. In special cases a ligature must be tied. Abdominal cavity opened by cutting along midline. The whole intestine loop with stomach is separated out from the peritoneal attachment. Bladder and other uro-genital organs removed and separately collected. Further, intestinal-mesenteric-loop and stomach would be taken out, separating along with their attachments, without inflicting any cuts either in the intestine or in the stomach, and then the same would be transferred to tri party and gut units for further processing.

Next, thoracic cavity would be opened through diaphragm and the organs like liver, heart, lungs, etc. are removed along with their attachments. Damages, cuts or tearing or detaching pleural or peritoneal cover (of body cavities) would be avoided. Thoracic organs (pluck) would be washed and lined up for P.M. inspection along with carcass and the head.

### **WASHING**

All the thoracic organs and carcass are flushed with chlorinated water through a hose and the carcass is moved forward and the pluck is put on hooks along with the head of the respective animal's kidney, however remains in the carcass.

### **POST MORTEM INSPECTION**

Qualified Veterinarian or trained meat inspector would carry out the post mortem inspection of the carcass meat and of all the organs, in accordance with the procedure laid-down and conforming to the code of inspection. The carcass meat would be inspected for wholesomeness, free from diseases, lesions, maturity, age, sex, species, and for proper bleeding, discoloration, grade, quality and conformation, etc.

General skeletal, systemic and specific lymph-glands to be examined as per procedure. Specific muscles and organs to be palpated and incised where necessary, for the detection of lesions or infestation (of parasites) etc. Depending upon the type and extend of affections, part or whole carcass or the organs would be rejected or condemned. Condemned parts would be dealt with as per regulation. Wholesome parts are judged fit for consumption, would be passed on further.

A record of the statement of findings along with judgment, stating causes for the judgment is to be maintained by the meat inspector.

### **OFFAL HANDLING**

Offal handling is an important part because a substantial weight of buffalos is discharged during de hiding and evisceration. The foot rail and sit -stand stool are designed in such a way that workers can vary their position while working and workflow system are redesign as that the masses are automatically transferred from the end of the viscera table to respective offal conveyor.

### **STAMPING**

The wholesome carcass-meat and the organs and parts thereof would be stamped with the specific Meat Inspection stamps provided for, with the specific ink. Stamping mark or impressions would be applied properly and legibly at the specific region or parts of the carcass-meat and organs, as per stamping process in vogue or as per International Meat Industry Concept, practice and procedure followed would be as laid down in the code of regulations in this regard.

### **WEIGHTMENT**

The record of weight of carcass would be maintained for the benefit of the butchers or the administration as the case may be, for statistical purpose.

Carcass meat and edible organs would then be passed on to the chilling hall for cooling down.

### **LABORATORY ANALYSIS**

Fully and well equipped laboratory would be operated for various tests and analytical work and the findings and results would be properly maintained for future reference and other informative uses. Meat and meat products are generally examined to assess the state of freshness, the conditions under which meat is processed, shelf-life and the presence of pathogens. Meat is examined for standard plate count; coli form count, psychographs, staphylococcal counts and the presence of pathogens such as *Salmonella* etc.

The following tests are suggested: -

<b>Test</b>	<b>Medium</b>	<b>Incubation temperature and time</b>
Standard plate count	Plate count agar	30 <sup>0</sup> C for 48-72 hrs.
Coli form Plate count	Violet red biled agar	37 <sup>0</sup> C for 18-24
Staphylococcal count	Baird-Parkar medium	37 <sup>0</sup> C for 24-48 hrs.
Enterobacteriaceac	Violet red bile	37 <sup>0</sup> C for 18-24 hrs.
Count	Glucose agar	

## **SMALL ANIMAL LINE ARRIVAL AND INSPECTION**

Trucks/tempo bringing live sheep and goats from the farms are carefully scheduled to ensure steady supply, with movement commencing very early in the morning till the relatively cooler hours of the day. Here Sheep and goat are held before slaughtering for 24 hours and no feed is provided to them to keep the internal system clear.

Before taking the animals to slaughter house, Anti mortem inspection of animals is done to check the diseased and unhealthy animal form slaughtering. The animals are inspected from various angles such as presence of all the body parts, normal salivation and digestive system.

After inspections animals become ready for stunning

### **STUNNING**

The modern mechanical of stunning is by shooting, consisting of two forms:

- Use of a captive bolt pistol which delivers a force (concussion) into the head of the animal to make it unconscious.
- Use of a penetrating free-bullet gun of firearm. Compression stunners with or without penetrating heads, using air (not cartridges) are also employed in immobilizing animal. Older method in which a knocking or striking hammer was wielded on the head of the animal is now disallowed in humane practices in some countries, but in extreme and needy cases the hammer can be used to stun small ruminants by a quick blow at the back of the neck.

The simplest mechanism consists of electrodes or probes built in the form of tongs with insulated handles and applied between the ear and eye of the animal for 1-4 seconds. About 5-7 seconds must elapse before the animal starts bleeding. The level of voltage used for sheep and goats is between 60 and 70 volts/AC 50-60 cycles.

In strict Halal practice, stunning is ruled out since technically it puts the animal in a state of unconsciousness before bleeding. Nevertheless some Islamic communities accept electrical stunning as cattle, for instance, are known to recover from this application and lead normal lives-an indication that they still remain alive after stunning. Other Islamic groups in parts of Africa and Asia employ the hammer method of stunning.

### **SHACKLING AND BLEEDING**

Stunned animal are then positioned for shackling. A vertical or hanging position is achieved by shackling below the hock of one hind leg and hoisting the animal (head down) to a convenient height. Alternatively, Animals are placed horizontally on a concrete slab or a sturdy plastic pallet for bleeding.

The actual bleeding operation is made by sticking or inserting the sticking knife through the neck behind the jaw bone and below the first neck bone. The objective is to sever the blood vessels of the neck and let the blood ooze out. If the knife is inserted is at a lower position than indicated, then the esophagus might be cut and the viscera may get contaminated.

The bleeding should be complete within the usual time for the animal and it is 2 minutes in case of sheep and goat. Insufficient bleeding and slow death could mean that the separation of the neck vessels is incomplete or specifically the arteries leading to the head have been missed, having only cut the veins during sticking.

Hoist bleeding is more hygienic and is recommended. It also facilitates collection of blood for further use.

## **SKINNING AND DEHIDING**

Legging: In removing the skin, Initial cutting of the skin is done around the leg to expose and loosen the tendon of the hock and using as a means of hanging the carcass. This process is called legging.

Pelting: A second step called pelting (after the term pelt normally applied to the skins of lambs and other wool or fur-bearing animals) involves the removal of the entire skin and preparation of the animal body for evisceration. Tropical sheep and goats have hair not wool on their bodies, thus the term skinning is more appropriate for them. Skinning, like stunning, can be done either in the horizontal or hanging position, the former being more suited to small slaughterhouses and the latter for larger premises with bigger orders and with facilities or equipment for railing the individual carcasses one after another.

- **Hoist Skinning**

With the animal body in the hoist position, using the skinning knife, legging is commenced at the back of the free (unsuspended) leg by removing the skin around the hock and working towards the toes. This exposes the tendon on the back leg and the smooth joint just above the toe. The foot is cut off at this joint and the tendon gets loosened. The animal is then hung on a hook to suspend the leg. The process is repeated for the other leg while the cuts are continued on the inside of both legs towards the naval region.

The next step involves removal of body skin. First an opening is made in the front legs, cutting towards the jaw and continuing over the brisket to the naval. Using the knife, the brisket is skinned, but from this stage onwards, the knife is normally not used further. This is to protect the 'fell', a fine membrane occurring between the skin and the carcass which helps to improve the appearance of the carcass and reduce surface shrinkage.

- **Horizontal Skinning**

The animal is placed on its back on a flat raised surface, such as sturdy plastic pallet or a concrete slab. Cutting and fisting then begin at the forelegs, working toward the belly and sides of the animal, ending at the hind legs. The tendon between the hock and the toes is exposed and loosened. At this point, feet, bung and head are cut at the designated points

## **EVISCIERATION**

With the external structures like skin, feet and head removed, the next step is to cut open the animal body to dislodge the contents and produce the carcass. To avoid contamination of the carcass through accidental cuts or punctures of the stomach and intestines, simple but well-directed steps are followed. For this, it is important that the carcass remains or is placed in the hanging position.

The first step in evisceration is to cut around the tied bung or rectum and free it completely from all attachments and drop it in the pelvic cavity.

The breastbone is cut or chopped along the midline up to its tip. Another cut is made from the cod or udder using the skinning knife down the midline into the breast cut. By practice, the pelvis (or lower part of the abdomen) is left uncut.

Then the body cavity is entered to separate the urethra connections from the kidneys. While the intestines are loosened up further, the stomach and intestinal mass are pushed slightly out of the midline opening. (In some countries, the kidneys and spleen are often left in the sheep carcass.). At this stage, liver is held out and detached of its connecting tissues then pulled out together with the freed contents of the abdominal cavity and dropped into an

intestinal mass truck. The gall-bladder is cut from the liver, taking care not to spill its bitter contents onto the carcass and spoil the taste of the meat.

The final stage in evisceration is the removal of the contents of the chest cavity. By cutting the thin muscle sheet or diaphragm separating this cavity from the belly, the pluck (i.e. heart, lungs, trachea and esophagus) can be pulled out as a unit. The fore shanks (i.e. the upper and lower arms) are fastened together using a tendon or a thick rubber band to plump the shoulders. The carcass is then washed and railed to the inspection bay.

### **POSTMORTEM INSPECTION**

Aside from the carcass, parts of the animal body which are assembled for inspection are the tongue, head, and pluck, liver and intestinal mass. The carcass is held still in the suspended position. However, the visceral organs including the head and tongue are placed on hooks in a separate bay while the stomach and intestines remain in the truck. Each carcass is identified with its set of organs for inspection.

Inspection is normally carried out by professional veterinarians but some parts of the world trained public health inspectors are employed. Their duty is to examine the slaughter products for evidence of disease and abnormality and eliminate them from the public meat supply.

### **OFFAL HANDLING**

Offal handling is an important part because a substantial weight of sheep's and goat are discharged during de hiding and evisceration. The foot rail and sit -stand stool are designed in such a way that workers can vary their position while working and workflow system are redesign as that the masses are automatically transferred from the end of the viscera table to respective offal conveyor.

### **STAMPING**

The wholesome carcass-meat and the organs and parts thereof would be stamped with the specific Meat Inspection stamps provided for, with the specific ink. Stamping mark or impressions would be applied properly and legibly at the specific region or parts of the carcass-meat and organs, as per stamping process in vogue or as per International Meat Industry Concept, practice and procedure followed would be as laid down in the code of regulations in this regard.

### **WEIGHTMENT**

The record of weight of carcass would be maintained for the benefit of the butchers or the administration as the case may be, for statistical purpose. Carcass meat and edible organs would then be passed on to the chilling hall for cooling down.

## TECHNICAL SPECIFICATION FOR MEAT PROCESSING PLANT

### MECHANICAL EQUIPMENTS

- [1] Technical conditions will form integral part of the contract. The provisions technical conditions shall supplement the other technical specification given in the tender.

The contractor proposal shall be based on the use of equipments and materials complying fully with the requirements specified in this section.

Minor variations in technical specification based on the manufacturers proprietary design and practice shall be accepted provided such variations meet the specified design standard, performance requirement, ease of operation and maintenance, and after sales services, subject to no objection by the client. The technical specifications shall not be diluted.

**[2] All inclusive supply**

The slaughter house equipments shall be complete in every respect with all mountings, fittings, fixtures, and standard accessories normally supplied with such equipments and needed for installation, completion, and safe operation and maintenance of the entire plant as applicable by codes of practice, though they may not have been specifically detailed in the technical specifications. All parts of similar standard equipments shall be interchangeable with each other.

**[3] Equipment performance guarantee**

Equipment performance guarantee shall supplement the general performance guarantee provisions under the terms and conditions of contract.

Liquidated damages for not meeting performance guarantee during performance, testing, commissioning, and guarantee tests shall be assessed and recovered from the contractor, as detailed in technical specifications. Such liquidated damage shall be over and above the other liquidated damages covered under the terms and conditions of contract.

**[4] Engineering data of equipments**

Contractor shall furnish engineering data of the equipments specified in the technical specification section. This data will support the Technical compliance statement submitted by the contractor in his tender documentation. This data must be exhaustive and inclusive of weight, dimensions, Electrical requirements, and special precautions etc. for installation and operation of equipments. However review and approval of the engineering Data by the client shall not be construed by the Contractor as limiting any of his responsibilities, liabilities, mistakes, and non compliance from technical specifications and also

this shall not absolve the contractor from supplying and operating equipments according to the rated performance specified in the contract.

**[5] Drawings**

All the drawings submitted by the contractor during bid process and during progress of the work shall be sufficiently detailed to indicate the type, size, arrangement, weight of each component, break up for packing and shipment, external connections, fixing arrangement required, the dimensions required for installation and interconnection with other equipments in manufacturing chain and other information requested in the technical specification.

All drawings should have name plate details in approved format. All dimensions should be in metric unit and in English language. Both soft and hard copies of drawings in PDF format be submitted. The contractor shall modify, rectify drawings as per requirement of contract however the delay in rectifying the drawings by the contractor shall not alter the contract period. The contractor shall submit 5 copies of all finally approved drawings for record.

All manufacturing and fabrication work in connection with equipment prior to approval by client shall be at his own risk. Approval of any drawing by client/ consultant shall not relieve the contractor of any of his contractual responsibilities and liabilities under the contract.

The contractor shall submit as built drawings along with operation and maintenance manual in 5 sets.

**[6] Instruction manuals**

The final instruction manual and catalogues and brochures of the product complete in all respect shall be submitted by the contractor 21 days before the first shipment of the equipment. The instruction manual shall contain full details and drawings and installation and operating instructions. These manuals will form a part of operation and maintenance manual. The contractor shall submit 5 sets of O & M manuals in approved format.

**[7] First fill of consumables, oil, lubricants**

All the first fill of consumables such as oil, lubricants, diesel, essential chemicals, spares required for testing and commissioning and trial operation shall be contractors responsibility (upto signing off testing and commissioning report as token of acceptance)

**[8] Manufacturing and delivery schedule**

The contractor shall submit their manufacturing and delivery schedule of his equipments within 21 days of the letter of acceptance of the tender, in line with his initial computerized project schedule on Microsoft project software. These delivery schedules shall be tracked and report submitted on fortnightly basis.

**[9] Reference standard**

All equipments shall be new, branded and conforming to Indian standard codes or country of origin of the manufacturer. Only latest codes and standard shall be referred. The consultant's decision in case of any dispute shall be final and binding on contractor.

**[10] Design improvement and extra items**

The consultants or contractor may propose upgradation of specification in the interest of the project and come to mutual agreement. The cost implication shall be agreed in writing after approval of client. The completion time of the project remains same even after extra work is mutually accepted.

**[11] Quality assurance documents**

The contractor will have to submit all documents pertaining to quality control and assurance after testing and commissioning work is over. In addition contractor will submit mill test reports, manufacturers test certificate, non destructive tests, X Ray tests, as required by standard practice.

**[12] Inspection and testing certification**

The contractor will arrange for factory visit and factory tests of equipments at the country of origin. The clients engineer and consultant shall accompany the contractor. The contractor will bear all expenses toward this visit. The inspection and approval by client and consultant shall no way limit or absolve contractor of his responsibility and contractual obligations in respect of rated performance, agreed quality assurance programme etc.

**[13] Testing and commissioning**

On completion of machinery installation and before start up, each component of the equipment shall be cleaned, tagged, lubricated and inspected jointly for correctness and completeness of the installation and acceptability for start up, leading to initial pre commissioning checks. The check list of pre commissioning tests shall be mutually agreed and included in quality assurance programme.

On completion of pre commissioning test each equipment shall be start up and operation parameters are recorded. After commissioning of each equipment of the system the plant shall be put on trial production during which period all necessary adjustments shall be made while operating over the full load conditions enabling the plant to be made ready for performance and guarantee tests.

The duration of trial operation shall be 14 days out of which at least 72 hours shall be continuous operation on full load as agreed upon. The trial run is considered successful provided that each item of the equipment can operate continuously at the specified operating and rated performance level during trial run operation. If there is any disturbance longer than 4 hours then trial run period shall be extended proportionately.

The contractor shall prepare exhaustive testing and commissioning report recording all observation, readings, start date, disruption period, and these records shall be signed by all jointly. The adjustments on eh machines shall be recorded. The photograph of testing be submitted. After all adjustments are satisfactory as per specification, consultant may accord permission to carryout performance tests and guarantee tests on the plant.

All performance and guarantee test shall be conducted only when all plants, civil work, electromechanically work, ETP, biogas plant have successfully passed trial runs.

#### **[14] Performance tests and guarantee tests**

The performance test and guarantee test shall be conducted within 1 month of trial run and successful commissioning of the plant. The tests are binding on both the parties of the contract to determine compliance of the equipments with the performance guarantee.

The calibrated instrumentation and control equipment shall be used for measurement and record of readings. The tests shall be conducted on specified loading conditions. All tools tackles and measuring instrument shall be provided by the contractor free of cost to client. If the equipments run to rated capacity without any undue over loading and heating the test may be considered as successful. However if equipments do not run to their rated capacity then contractor will adjust the equipments, machinery or modify it to run to full rated capacity. In such failure case the test may be repeated within 1 month. All the expenses towards this repeat exercise will be borne by the contractor. The duration of performance tests shall be 1 month out of which 6 days shall be in continuous operation to prove the reliability tests. The format of the performance test shall be coordinated with the manufacturer or equipments.

Indian code of practice or European union code shall be followed for performance test judgment.

**[15] Packing**

All equipments shall be suitably packed for International Transport in sturdy packing which is seaworthy. The packing shall be done in the country of origin and in the factory of manufacturer. The inland transport in India rules should be considered in limiting size of packing.

**[16] Protection of equipment**

It is contractor's responsibility to protect the equipments right from the manufacturer's factory, during transit in port of call, Inland transport till handing over of the machinery in running condition at the end of defect liability period and performance test period. Equipment parts which are likely to be rusted shall be suitably protected.

All moving equipment shall have protection guards to protect the operator during running condition.

**[17] Noise level**

The equivalent 'A' weighted sound level measured at a distance of 1.5 m above floor and 1m horizontally from the base of any equipment expressed in decibels to a reference of 0.0002 microbar shall not exceed 75 dBA.

**[18] Handing and taking over**

Upon successful completion of all tests the contractor shall be issued completion certificate and acceptance of the equipment however such acceptance certificate shall not relieve the contractor of his responsibility as per term and conditions of contract. Even after handing over to client the contractor will continue to assist and maintenance the entire plant in fully loaded condition till the end of defect liability period. The contractor will hand over all keys or rooms in properly tagged manner.

## TECHNICAL SPECIFICATION FOR MEP UTILITIES

### INTRODUCTION

Electricity, Solar System for hot water generation, steam, HSD, compressed air, rain water harvesting and Municipal supply water are the utility services to be provided for the Large Animal and Small Animal Abattoir, Blood Rendering Plant & other facilities. Requirement of these services with specification, source/arrangement to generate and delivered cost thereof are discussed in following sections. The Large Animal Abattoir having capacity of 25 heads/hour will operate for 4 hours/day for local supply of 100 animals/day and operation for further 4 hours/day for other processors of 100 animals per day. The Small Animal Abattoir having installed capacity 125 heads/hour will be operated for 8 hours/ day for local supply of 1000 animals/ day. The rendering plant will run for 8 hrs. per day keeping 2 hrs. for maintenance and cleaning. The ETP will be working 24 hrs. per day and 365 days per year.

Based on respective hours and days of working per year, the consumption of utilities and cost thereof are estimated and presented below.

### ELECTRICITY

Electricity is the major utility for the proposed project rather it can also be termed as one of the raw materials because of the extent of consumption and investment. The connected load of various sections as envisaged are given below

Sl. No.	Section	Connected load	Hrs/Day	Days/ Year
1.	Abattoir	80 KW	8	300
2.	Chiller system (Large animal)	20 KW	20	365
3.	Chiller system (Small animal)	20 KW	20	365
4.	Blood rendering plant (18 KLD)	75 KW	10	300
5.	ETP (200 KLD)	75 KW	24	365
6.	Abattoir (Small Animal)	50 KW	8	300
7.	Pump system	15 KW	8	300
8.	Large animal lairage	10 KW	10	300
9.	Small Animal Lairage	10 KW	10	300
10	Lighting load of plant	30 KW	10	365
	<b>TOTAL Load connected</b>	<b>385 KW</b>		

Based on 80% load factor for equipments and respective operating hours and operating days,

the yearly power consumption is estimated at about 1606750 KWH. With the proposed Solar System 50% of total electrical loads of Large Animal Lairage, Small Animal Lairage and Lighting Load of Plant i.e. 25KW load will be operated per day basis. Total 250 KWH electricity will be consumed from the solar electricity. To augment the power at 415 V, 50 c/s, a plant substation of 750 KVA with primary voltage of 11 KV is considered. 1 nos. X 750 KVA rating of 11KV/415V outdoor transformers has been proposed for the plant substation.

As Abattoir system is the heart of the plant and being a service oriented unit, complete back up to the abattoirs and other emergency sections has been considered during normal power supply failure. One DG set power station comprising 2 nos. 250 KVA sets have been considered to supply emergency power during failure of normal power grid. To run the DG sets, HSD storage and pumping facilities are considered to be installed as underground MS storage tanks conforming CCOE, Nagpur guidelines.

In order to estimate the running hours of DG sets, on prime facie it is considered that these will run 10% of total hours for electricity to be generated.

The normal power supply shall be arranged from 11 KV grid of MSEEDCL through suitable conductors and circuit breakers. The DG sets will run in parallel circuit as dedicated feed independently to each system. Therefore, no synchronizing panel has been considered.

The power tariff inclusive of duty and surcharge has been considered as Rs. 6.50 per KWH. That from DG set has been considered as Rs. 7.50 per KWH. Based on power consumption from respective sources, the annual cost has been estimated as Rs. 106.05 Lacs per year.

### **STEAM**

Steam is required for Blood Rendering Plant. This will be used for steam cooking of rendering mass, heating of pipelines and jacketed vessels and equipment.

The average hourly requirement of steam for Blood Rendering Plant is estimated as 4 kg/hr pressure. The peak demand is 6 Kg./Hr. Steam will be generated in HSD fired steam boiler of capacity 6 kg/hr and the same will be distributed by means of insulated piping network. Soft water shall be used as boiler feed water. Separate storage tanks for soft water are proposed.

HSD tanks with pump and piping has been considered to be installed as underground storage as per CCOE norms.

### **High Speed DIESEL OIL (HSD)**

HSD will be used as fuel for firing the boiler. The average hourly consumption of HSD for boilers is about 30 liters. Based on 8 hrs. per day operation HSD shall be made available at the rate of Rs. 55.00 per lit. The oil shall be procured from oil companies in public sector, like IOC/HPL/Bharat Petroleum. 15 days inventory has been considered for storage capacity inside the plant.

### **COMPRESSED AIR**

Dry compressed air at 6 kg/cm<sup>2</sup>g shall be generated in air compressor station for supplying compressed air to operate various pneumatic equipment and control valves/instruments. Non-lubricated reciprocating air compressors have been considered to be installed to supply required air to various consuming units.

### **WATER**

Water is another vital utility required for abattoir and meat producing units. Water is consumed in following areas:-

- Washing and showering of animals in lairage
- Washing of equipment and floors regularly
- Washing of utensils/knives etc.
- Washing of carcass
- Boiler feed water
- Cooling water in chiller system
- Water for hot water generation
- Water for hand & foot wash and other cleaning purposes
- Water for drinking and potable purpose
- Water of various qualities shall be used for different purposes.

Raw water without any treatment will be used for animals shower water and lairage wash water. Filtered water, to be supplied by PCMC, shall be used for washing of equipment, plant floor washing and water for hand and foot washing of personnel. Filtered & U.V. sterilized water is meant for utensils / knives washing and potable purpose. The carcasses are required to be washed using chlorinated filtered water before putting in the chiller room. One water softening plant of capacity  $30\text{ M}^3/\text{hr}$  is considered to supply soft water to boiler and hot water generation unit. Rain Water Harvesting System has been proposed to be installed in the plant area where the water from roof ceiling will be collected and stored in a bore well. From where water will be pumped out and utilized for different purpose after required treatment if required.

The cooling water to be circulated through condensers of Chiller is considered as filtered water with dosing of chemicals. Daily requirement of water by various sections as discussed above is estimated at about  $150\text{ M}^3/\text{day}$ . The maximum usable water to be supplied by PCMC for the proposed Plant. The Bore well pump capacity will be around 5 HP (1 Nos). For distributing PCMC water from a sump tank to various areas jet pumps will be used of approx Capacity 5 HP (2 Nos.).

**NOTE:** The requirement of various MEP utilities given above is for guidance only. The contractor shall workout his requirement of MEP utilities according to his design and equipments chosen for the Meat processing plant. The contractor shall decide requirement of any specialized services and includes the same in his design and cost of the project.

## **TECHNICAL SPECIFICATION FOR EFFLUENT TREATMENT PLANT**

This ETP shall be designed for handling 200 M<sup>3</sup>/day of effluent generated from the Meat Processing plant. Area required to construct this plant is approx 300 SQM. Biological system of treatment is envisaged with double Aeration & Double Clarification Stages.

The effluent after treatment can be disposed of into sewer line or can be used for irrigation purpose. Solids separated should finally be collected on sludge drying bed after using sand filter and can be utilized as manure. The quality of the effluent shall be according to MPCB norms and rules laid down by Govt. of India.

### **BASIS OF DESIGN**

Flow capacity

Total daily flow 200M<sup>3</sup>/Day Average hourly flow 20M<sup>3</sup>/Hr Peak hourly flow 50 M3/Hr.

### **TYPICAL PARAMETERS OF RAW EFFLUENT (INCOMING EFFLUENT)**

PH ----- 7.1	- 4.5
BOD : 2500 mg/lit	- 2500 to 1600
COD : 4000 mg/lit	- 4000 - 2000
Oil & grease : 50 mg/lit	- 50 - 20
Total Suspended Solids : 1200.00 mg/lit 1200 - 600	

### **PARAMETERS OF TREATED EFFLUENT**

PH -----5.5-7.0	- 6.5 to 7.5
BOD < 100.00 mg/lit	

COD < 250 mg/lit	
Oil & grease <10 mg/lit	
Total Suspended Solids <100.0 mg/lit	

### **REUSE OF TREATED EFFLUENT**

The treated Effluent shall be disposed off suitably. It should meet the above stringent standards. The treated effluent shall be recycled and used for irrigation purpose.

### **AVAILABILITY OF AREA**

Sufficient area (300 SQM) is made available for the construction of the Effluent Treatment Plant and the design and layout should be confined to this area.

## **TREATMENT CONCEPT**

The treatment should be decided keeping in mind the raw Effluent quality and desired treatment Effluent quality.

The Effluent produced in the slaughter house first shall be divided in two channels. These channels should be separated by two gates. Then effluent should go to the Screen Chamber.

As can be seen from the design parameters, the untreated effluent BOD is 2500 mg / Liter. The desire treated effluent BOD is less than 100 mg/Liter. It is not possible to reduce the BOD to the desire level without going in for two-stage aeration & clarification.

The Effluent produced first should pass through a screen chamber for the removal of large floatable and particles. Here, the solid particles etc. should be trapped and removed manually. Two chambers should be provided for screenings. The screening removal should be manual. This facility provided so that while one is being cleaned, the other can be used. The effluent then should flows to the Oils & Grease separator.

In the Oil & Grease separator, the gravity-based trap is proposed to separate oils & greases from the effluent. The animal fats should be trapped here. To help the grease to rise on top, mild diffused aeration should be incorporated. The effluent should go to Equalization Tank.

In the Equalization Tank, the quantity and quality fluctuation should be absorbed here. Since the effluent is highly biodegradable almost 24 hours storage in the tank should be considered, diffused aeration should be incorporated to prevent septic conditions and to keep the suspended matters in suspension. The Effluent should be pumped to the Primary settling tank.

The primary settling tank removal of suspended solid should be done by gravity settling. This should be achieved by providing adequate retention time in a quiescent state. Settling rate should be enhanced by addition of flocculent, a flocculation zone should also be provided after flocculent mixing and before sedimentation. Then effluent should be transferred to dissolved air flotation system. Here again suspended solids and oil & grease should be removed from the effluent. Outcome of this unit should be pumped to aeration tank - 1.

In the Aeration Tank - 1 the BOD/COD load reduction should take place. In this tank the bacterial culture should be added as returned activated sludge. There should be sufficient incorporation of air by floating/fix surface aerator. For balanced growth of microorganisms in a biological treatment reactor, the ratios BOD: N:P should be 100:5:1 for aerobic system. The urea and DAP tank should be able to accommodate one days requirements of the chemicals. Micro organism degrades the complex organic pollutant contained in the effluent and establishes a multiplication cycle. The mixed liquor should be then transferred to secondary clarifier-I for settling, separation and activation of flocks.

Secondary Clarifier-I should be circular tank having cone shaped bottom with central feed and peripheral treated effluent collection arrangement. There should also be a slow moving mechanical scrapper for scrapping the sludge and pushing it to the central pit. The sludge settles in the central pit and it shall be also partially de moisturized. In this first stage of Aeration cycle, the BOD reduction should be to the tune of 85-90%. The output BOD should be 190mg/L after first stage of Aeration Cycle.

In the Aeration Tank-2 the BOD/COD load reduction taken place. In this the bacterial culture is added as returned activated sludge. There is sufficient incorporation of air by floating surface aerators. For balanced growth of microorganism in a biological treatment reactor, the ratios BOD:N:P should be 100:5:1 for aerobic system. The urea and DAP tank included in the scope will be able to accommodate one days requirement of the chemicals. Micro organism degrades the complex organic pollutant contained in the effluent and establishes a multiplication cycle.

The continued growth of microorganism results into formation of flocks which have tendency to settle down when provided a quiescent settling zone. The mixed liquor (containing flocks of micro organism) here after transferred to secondary clarifier-II for settling, separation and activation off locks.

Secondary Clarifier-2 is a circular tank having cone shaped bottom with central feed and peripheral treated Effluent collection arrangement. There is also a slow moving mechanical scrapper for scrapping the sludge and pushing it to the central pit. The sludge settles in the central pit and it shall be transferred to sludge sump from sludge pit via sludge regulating valve. The Sludge shall be also partially de moisturized. In this second stage of Aeration cycle, we expect the BOD reduction is expected to the tune of 90-95%. The output BOD of <30 mg/L after second stage of Aeration Cycle is expected. The supernatant clarified water flows by gravity to treated water Tank.

The clarified waste water shall flow into the Chlorine Contact Tank. Chlorination shall be done here for disinfection in this tank. Suitable dosing system has been provided for Chlorination. The treated water then pumped to pressure sand filter and disposed off suitably.

From sludge sums about 50% of sludge is re circulated to aeration tanks. Only excess sludge is sent to the Sludge Drying Beds.

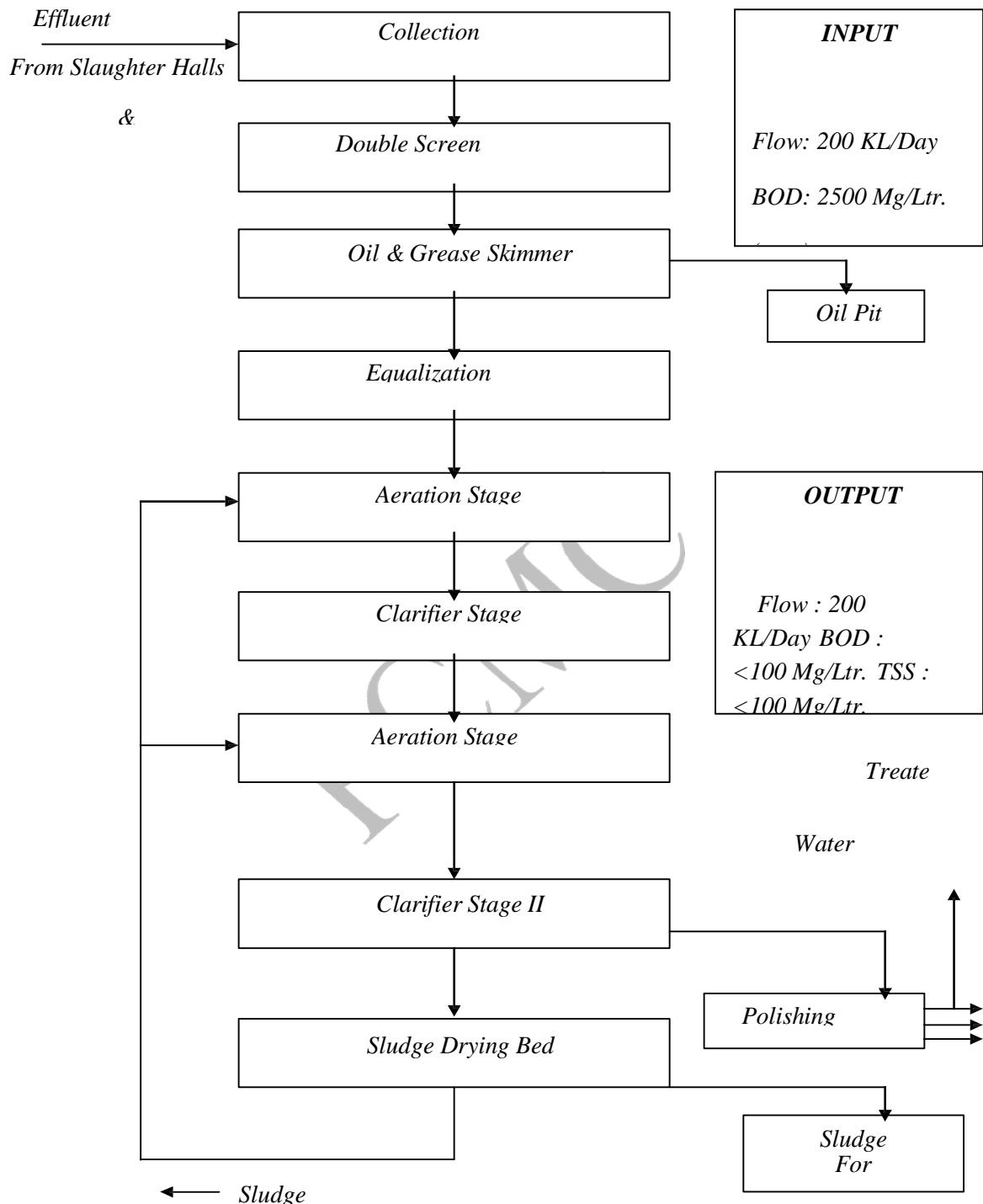
The Sludge Drying Beds further concentrate the sludge and converts it into sludge cakes. The sludge cakes are removed and are ideal for use in land filling material as well as manure. The filtrate water is transferred to the equalization tank.

The above description is given for guidance only. The minor variations and description of the component of the ETP will be allowed depending upon the proprietary design of the company; so long as all design parameters are meat and are according to MPCB norms. The contractor will have to obtain approval of design and NOC from MPCB. The bidders are expected to offer compact design for the ETP.

Contractor shall install online effluent quality monitoring systems for parameters Flow, pH, BOD, COD, TSS & O&G etc.

Contractor shall connect and upload the online monitoring data at PCMC server.

A typical flow diagram of ETP is attached below.



## **TECHNICAL SPECIFICATION BLOOD RENDERING PLANT:**

**Capacity: 18 KLD**

**Process Description with Flow Chart.**

The Rendering Process of Blood as envisaged is given below:

- The major blood from Halal point and bleeding area of the slaughter house to be stored in a sump tank. There will be mixing devise in the tank to keep the blood homogeneous. The above raw blood is to be transferred to a Rendering process.
- The above blood will be transferred through pump from blood collection tank/sump tank to a coagulator through a mixing tank fitted with agitators where high pressure steam through a boiler will be injected to create cyclonic motion for cooking the blood.
- The coagulator will cook the blood at minimum  $120^{\circ}\text{C}$  when coagulum will be formed and the coagulum will then be taken to a vibrating screen chamber. The water from the vibrating screen chamber will be discharged to ETP which will be having around 500mg/ltr. BOD concentration and temperature around  $80^{\circ}\text{C}$ . The coagulum / cooked blood cells from the vibrating screen will then be discharged to a collection tank.
- The above is then to be transferred to a decanter, which will further remove the moisture from the coagulum. The water discharged from the decanter will also be sent to ETP and the semi-dried coagulum will then be taken to a dryer.
- The dried material from the dryer i.e. blood meal will be having around 5% moisture and around 75% protein content, which will then be grinded as per the requirement for packaging / bagging in a bagging plant.

Air Pollution Control Measures to be adopted for the System:- To overcome the odor, all the fumes/gases / vapors evolved during drying process should be sucked into a shell and tube heat exchanger / condenser, where chilled water to be provided through a cooling tower for reduction of temperature of the above fumes/gases / vapors and then the same is to be sent to a bio-filter before discharge to atmosphere.

Sd/-

**Commissioner**

**PCMC**

## **GENERAL CONDITIONS OF CONTRACT**

- [1] The construction of meat processing plant will follow Govt. of India norms published in the Gazette of India vide notification No. S.O. 1165(E) dated 26<sup>th</sup> Dec. 2000 under part II section 3.
- [2] Resting Area for animal shall be provided. The ramp for unloading shall be provided and the rest area will have facility for watering and feeding.
- [3] Resting area shall have covered shelter.
- [4] Ante mortem and Pen Area shall have non skid surface of impervious material like concrete with drainage facility.
- [5] Lairage area of at least 2M<sup>2</sup> per large animal provided.
- [6] Design of plant be such that No animal is slaughtered in sight of other Animal.
- [7] A curbed in bleeding areas as per Govt. of India requirement be provided with blood drain and collection device.
- [8] A water point shall be provided for intermittent cleaning.
- [9] Dressing or skinning shall not be done on floor.
- [10] Floor wash point and adequate wash basins shall be provided in dressing area.
- [11] Areas with drainage shall have slope of 33mm per 1 meter drainage channel (1:33)
- [12] All construction material of plant building be impervious, easily cleansable, resistant to water, and anti corrosive, materials such as wood, plaster board, porous boards, absorbent material shall not be used.
- [13] The floors of plant building shall be non absorbent, non slippery and without deep joints. All floors shall have suitable slope for drainage.
- [14] Interior walls shall be smooth, flat, constructed of impervious material such as glazed tiles, non toxic, non absorbent material. The Interior wall shall have washable surface upto 2M height from floor and remaining upper surface to be of washable, non fungus, water resistant paint.

- [15] The junction of wall and floor be covered with coves of 100MM radius to promote sanitation and hygienic conditions.
- [16] All work areas will have ceiling height of 5 mtrs or more with proper structural design. The ceiling will be of non absorbent smooth and flat. The ceiling material will minimum condensations mould development, fungus creation, and should not accumulate dirt. All work rooms will have insulated panels with Aluminum foil on both side as roof cover at 5m height.
- [17] All window sills shall be 1200mm above floor.
- [18] Mechanical ventilation /room mounted working vents be provided.
- [19] All doors through which meat products are transported shall be at least 1.50 meter wide and 1.7 meter height.
- [20] Doors shall be of rust resistant metal construction.
- [21] All doors should be air tight.
- [22] All windows, doorways, and other openings shall be provided with insect screen, net, Rodent screens, and fly chaser fans and duct or air curtain.
- [23] Air curtain shall be provided to outer doors dispatching meat product.
- [24] Rodent proofing should be effectively done by approved methods.
- [25] Concrete paved areas with gradual slope shall be provided around the building for minimum distance of 6M where vehicles are loaded / unloaded.
- [26] Pressure washing jets/disinfection facilities provided at such points where animal is unloaded or meat product dispatched.
- [27] All floors shall be drained with open channel drains with grating with at least 1 drain for 37m<sup>2</sup> areas of floor. No ponding of water is allowed.
- [28] The drainage should be with deep triple water seal.
- [29] Drainage lines must be with rodent screen.

[30] Sanitary sewage line shall not be connected to plant workroom drain lines.

[31] All work rooms be provided with adequate lighting.

The day lighting is encouraged. The glass area of window be at least 25% of floor area plant room. The cold rooms shall be lighted by normal electric lighting.

The min lighting level of 200 Lux be provided in all plant, room, while all inspection of meat rooms shall have 500 lux illumination.

[32] Meat products are not exposed to direct sun light.

[33] Sufficient, safe potable water supply (assured) with adequate pressure be provided.

[34] For general purpose floor washing water pressure is 2 to 3 bar (50 PSI) is required. For washing of meat water pressure of 150 PSI to 170 PSI is required.

[35] Floor washing points shall be provided 1 point for 37M<sup>2</sup> Area.

[36] Hot water supply for sterilized equipment shall be at 82<sup>0</sup> C.

[37] All equipment must be self draining type.

[38] Copper and its alloys shall not be allowed for edible products.

[39] Equipments with painted surface in product zone not allowed.

[40] Lead, cadmium metal not allowed for product zones.

[41] All equipments shall be 300mm away from wall and 300mm above floor.

[42] Factory health inspector to visit plant for inspection.

[43] Street light shall be provided at 15m c/c on roads.

[44] Substation should be of adequate size and capacity.

[45] Bore wells shall be installed for plant water requirement.

[46] Electrical installation shall be according to Indian Electricity Act.

- [47] HVAC / Refrigeration shall be to Ashree Specifications.
- [48] ETP plant/ Bio gas plant of adequate capacities to be provided as per capacity mentioned in Tender.





## RAILWAY TRACK SIDE

PUBLIC ROAD 15.00 MT. WIDE

6M WIDE  
GATE FOR VEHICULAR ENTRY

BOUNDARY WALL 3.7 MT HT

15000.05

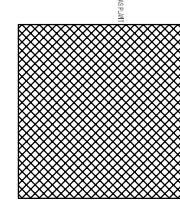
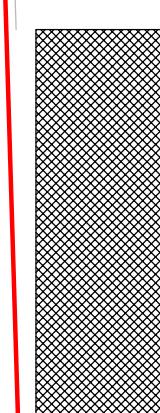
PUBLIC ROAD 15.00 MT. WIDE

15.00

GATE FOR VEHICULAR EXIT  
6M WIDE

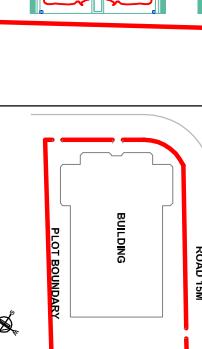
GATE FOR VEHICULAR EXIT  
6M WIDE

BUILT-UP AREA = 2770 SQ.MT.  
LAIRAGE 700 SQ.MT.



Type of Drawing : LAYOUT OF THE

COLUMN AND BEAM



REV. DATE DESCRIPTION

R3 25/04/15 DETAILS ADDED

Architect : SHASHI PRABHU AND ASSOCIATES

Drawn By : A.R.

Checked By : A.V.

Date : 25/04/16

Scale : 1:500

North :



Project : MEAT PROCESSING MUNICIPAL CORPORATION  
Client : PIMPRI CHINCHWAD CORPORATION  
1st Floor, Above Karpagamany, Wakadgaon, Sector 17, Road No. 14, Chinchwad, Mumbai - 400 080. Tel No.: 022 65199966.

SPA/PCMC/MPP/T/04/R1

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