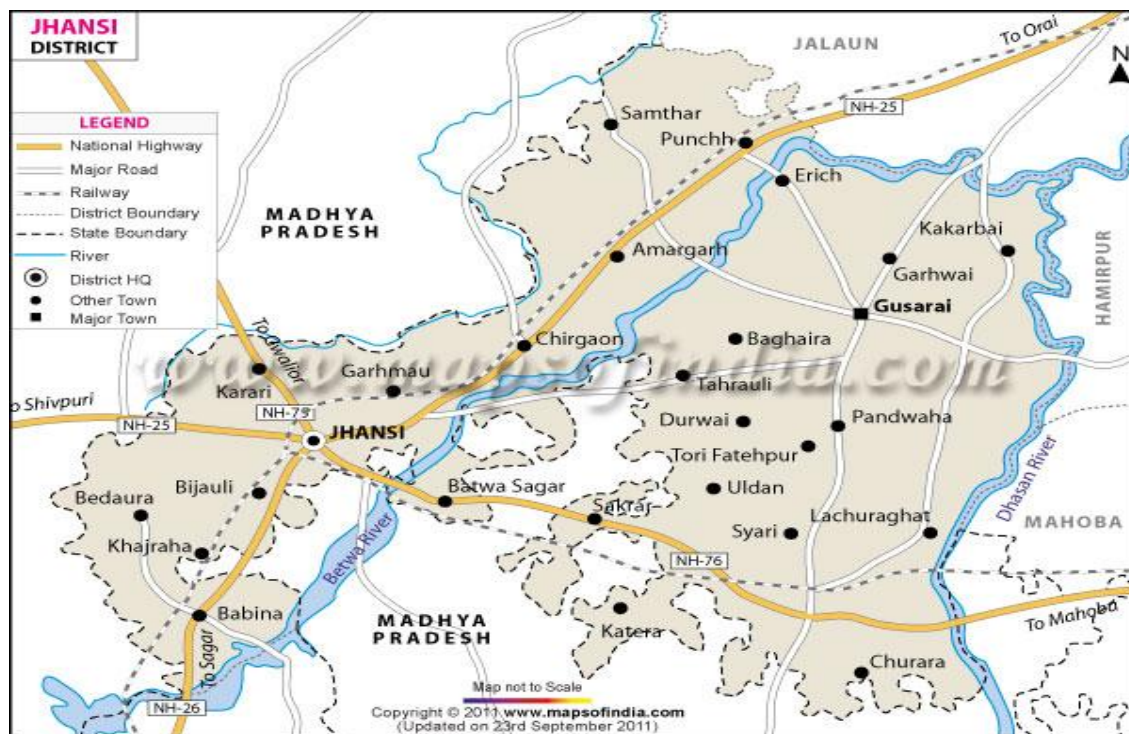


INTRODUCTION

1.1 GENERAL

Nagar Nigam Jhansi (NNJ) was set up for the development of city and civil social infrastructural services in the metropolis. Jhansi is the fastest growing commercial and industrial city in India. It is also a historical place of attention of many people from several parts of nation from very ancient days. The city is situated between the rivers Pahuj and Betwa between North longitudes 24°11' and 25°57' and East latitudes 78°10' and 79°25'. It has an average elevation of 284 metres (935 feet). It is about 415 kilometres (258 mi) from New Delhi and 292 kilometres (181 mi) from Lucknow, and is called the Gateway to Bundelkhand. Jhansi is well connected to all other major towns in Uttar Pradesh by road and railway networks. Due to the high population density and increasing number of tourists, the state government and international NGOs and institutions have expressed grave concern for the pollution and pressures on infrastructure in the city, mainly the sewage, sanitation and drainage components.



*In view of the poor hygienic condition of the existing slaughter house and due to manual slaughtering of animals in open area the subsequent nuisance being caused to the environment, Nagar Nigam Jhansi (NNJ), Jhansi, Uttar Pradesh has intended to modernise the existing slaughter house into a new modern mechanized slaughter house for Large Animals and Small Animals at **Bhagwantpura, Jhansi**. The setting up of the plant shall ensure availability of wholesome hygienic meat to the people of Jhansi and surrounding areas.*

*Nagar Nigam Jhansi has earmarked an area of about 990 square meters in **Bhagwantpura** where slaughtering of animals are taking place at present to set up a Service Oriented Modern Slaughter House equipped with standard facilities to slaughter 60 nos. Small Animals per day and 30 nos. Large Animals per day as per Halal Method followed by the required utilities and ETP facilities.*

*To implement the project NNJ has retained the services of **M/S G. K. Sen and Associates (GKSA)** having its office at UNIT NO.- 0222, UPOHAR TOWN CENTER. CHAK GARIA, KOLKATA – 700094 as consultants to prepare the Detailed Project Report (DPR) towards setting up the above mentioned Modernise Abattoir along with required utilities and ETP facilities.*

*The purpose of NNJ is to provide proper civic services and to protect, develop and maintain the properties owned by NNJ to its best possible manners as also to take steps for over all development of the complete Municipal Area in **Bhagwantpura, Jhansi**. The above includes providing hygienically prepared wholesome meat to local population by the modernization of the old existing Slaughter house.*

The main objective of implementation of such service abattoirs by local bodies through Govt. of India initiative are as follows:-

- 1. To stop illegal slaughtering and thereby to reduce pollution & environmental hazards in the locality.*
- 2. To provide hygienically prepared wholesome meat to local population to reduce health hazards.*
- 3. To benefit the animal farmers to receive remunerative prices for their farm produce.*

4. *The PIA/Local Bodies shall be benefitted due to more revenue earnings by way of collection of slaughter fees and other charges.*

As per Terms of Reference, a detailed study has been carried out to prepare the Detailed Project Report comprising market survey, availability of animals and other utilities, selection of plant & equipment, site layout, manpower schedule, project implementation schedule and project economics.

1.2 Govt. of India Rules & Supreme Court Orders regarding Abattoirs:

Govt. of India rules

Govt. of India vide their Notification bearing no. S.O 207(e) dated 26th march, 2001 published in the Gazette of India, 'Preventing of Cruelty to Animals (Slaughter House) Rules: 2001' which provided the guidelines of functioning in all the slaughter houses in India.

It is also mentioned in the above notification as follows:-

Inspection of Slaughter House:

- 1) The animal Welfare Board of India or any person or Animal Welfare Organization authorized by it may inspect any slaughter house without notice to its owner or the person in charge of it at any time during the working hours to ensure that the provisions of these rules are being complied with.*
- 2) The person or the Animal welfare organization authorized under sub rule(1) shall after inspection send its Report to Animal Welfare board of India as well as to the Municipal or Local Authority for appropriate action including initiation of legal proceedings if any, in the event of violation of any provisions of these rules.*

Supreme Court Orders:

- The Hon'ble Supreme Court is concerned about the poor sanitation and hygiene condition of abattoirs and in writ Petition, (Civil) No. (s) 309 of 2003 filed by Laxmi Narain Modi Versus Union of India and others, has directed the State Governments and UTs vide its order dated 23-08-2012 to constitute committees for slaughterhouses to fulfill the mandatory requirements under various legislation dealing with functioning of slaughter houses in the country.*
- The Hon'ble court has also directed Central Pollution Control Board (CPCB) to initiate action against all slaughter houses which are not meeting the norms*

- *In the same case, vide order dated 30-01-2014, Supreme Court has- Requested the Chief Justice of various High Courts to nominate a retired District Judge for the period of two years as a Convener of the State Committees.*
- *Quarterly reports to be submitted to the Supreme Court.*

1.3 SCOPE OF THE REPORT

The scope of the Report consists of the followings:-

The Background and basis/considerations to set up Modern Abattoir along with ETP are analyzed with respect to proposed conditions as well as local factors.

- *Study on availability of raw materials / livestock with cost of procurement*
- *Estimation of various utility services like electricity, water etc. and their sources, specifications and delivered cost.*
- *Plant description including list of major equipment with brief specification, source of supply and process flow diagram.*
- *Effluent treatment plant and the process of waste water treatment.*
- *Various norms and standards to be followed for quality assurance for local sale.*
- *Site layout indicating civil works for factory building and other utilities and off-sites.*
- *Total Manpower schedule along with organization chart with salaries and benefits.*
- *The project schedule covering all activities.*
- *Project economics based on quotations from leading suppliers of plant and equipment and offsite facilities and other assumptions and data available with the consultants.*

1.3 REPORT STRUCTURE

The complete report is presented in 11 chapters covering all major components.

Engineering drawings, showing detailed layout, process flow diagram, utility flow diagram, project schedule in the form of Bar Chart, organization structure, etc. are annexed in respective chapters.

Project economics in the format of Forms are prepared and provided in the chapter of Project Economics.

1.4 A Brief Idea about Meat industry

1.4.1 Introduction

Meat industry is one of the growing food industries globally. A slaughter house or abattoir is a facility where animals are killed for consumption as food products. In India, the rate of meat consumption is on an increasing trend and therefore there is a need to develop this poorly developed sector. The reasons for the meat industry not expanding to its full potential can be attributed to socio- religious factors. Lack of finance, poor private participation and environmental problems are some of the other constraints felt.

1.4.2 Status of meat industry in India

There are nearly 3,600 municipal slaughter houses in India, but most of them are very old and have already outlived their utility. They lack the essential amenities required such as water, light and drainage. Apart from these, there are numerous unauthorized slaughterhouses are also working in several cities of India. About 36.5% of Goat, 32.5% of Sheep, 28% of Pigs, 1.9% of Buffaloes and 0.9% cattle are slaughtered every year. The reported per capita availability of meat in India is about 1.4 kg per annum, which is rather low compared to 60-90 kg in European countries.

1.4.3 Components of a slaughter house.

A slaughter house generally includes a collection centre, main slaughtering and chilling chambers, storage room, packaging and processing centres. Some slaughter houses also have provision for a market to sell and purchase animals. Slaughter houses have been under the control of municipal authorities/local bodies but no systematic efforts have been made so far to make meat production a commercial activity. Barring a few export-oriented abattoirs, it has been in the hands of those who have no knowledge of slaughter house hygiene, sanitation, meat quality and animal rights. At present slaughter houses in rural areas are under the control of local bodies like Panchayats and Municipalities. The slaughterhouses maintained by them get least priority and no standards are being insisted on. Production of meat in them cannot be recognized as meat from organized sector.



Figure 1: A typical slaughter house and Meat Processing Plant for Large Animals.



Figure 2: A typical slaughter house Plant for Small Animals.

1.4.4 Process followed for slaughtering in India

A. Slaughtering

In India mostly slaughtering of animals is done either by way of Halal or Jhatka method. Halal is the method preferred by Muslims and Jhatka by the Hindus/Christians/Sikhs, etc. To slaughter the animals in a humane way stunning of the animals is prescribed, but in most of the cases stunning before slaughtering has yet not been adopted due to certain religious feelings.

B. Bleeding

In both the above methods of slaughtering, blood collection is not done immediately on slaughtering and most of the blood goes down into municipal drains causing pollution. Blood of the animals, which can be collected for making use in pharmaceutical industry, is thus by and large lost. Due to inadequate facilities at the slaughter houses and scattered illegal slaughtering of animals, a very few slaughter houses collect blood.

C. Dressing

Due to lack of means and tools, de-hiding of the carcasses is done on the floor itself, which causes contamination of the meat. The hides and skins are spread on the floor of the slaughtering area. Similarly legs, bones, hooves etc. are not removed immediately from the slaughtering area.

D. Evisceration

This particular process during slaughtering generates maximum amount of waste. The butchers who carry out illegal slaughtering of animals generally throw visceral material at the community bins and wash the small intestines at their shops itself and thus create pollution problem.

1.5 Classification of slaughter houses

At present there are no official norms for classification of slaughter houses. However, depending upon the type of animal to be slaughtered, the slaughter houses are classified into:

- *Large animal (i.e. cattle, buffalo etc.) slaughter house*

- *Goat and sheep slaughter house*
- *Pig slaughter house*
- *Poultry slaughter house*

In order to assess the variations in pollution load with respect to number of animals slaughtered, Bovines and Goat & Sheep slaughter houses are further classified into following categories:

- *Large Scale - More than 200 large animals i.e. Bovines per day or more than 1000 goat and sheep per day.*
- *Medium Scale - More than 50 and upto 200 large animals or more than 300 upto 1000 goat and sheep/day.*
- *Small Scale - Less than 50 Bovines and 300 goat and sheep per day*

Large scale slaughter houses are located mainly in big cities, medium slaughter houses in District/towns while the small scale slaughter houses are scattered all over the country.

1.6 METHODOLOGY ADOPTED

*The report is prepared by compilation of information and data collected from local authority, butchers community & our own database / expertise in addition to meeting other experts in local market of **Bhagwantpura, Jhansi** and for food and meat processing, relevant journals, directory, internal search and other secondary sources.*

A multi-disciplinary team of experienced engineers and marketing executives specified in meat processing were deployed. Strategic inputs and expertise are also given by key personnel in the related field. For estimation of project economics and working results, quotations are obtained from renowned suppliers of plant and equipment covering major sections. For miscellaneous small equipment / components, the prices are worked out from in-house database and telephonic enquiries with the suppliers.

For offsite facilities, quotations are obtained from leading indigenous manufacturers. The cost towards civil work / shed and technological structure are obtained mainly from fabricator / supplier of pre-fabricated shed and panel wall manufacturer. Some cases in-house estimation based on our experience in similar project have been considered.

To provide hygienically prepared wholesome meat to consumers without any contaminations, 4 nos. Modern meat shops and 4nos. small reefer vehicles to transport meat carcasses to the shops are included in the DPR.

Generation of revenue by NNJ has been worked out through realization of slaughter fees and through renting out the proposed modern meat shops as also through charges for hiring the reefer vehicles.

BACKGROUND OF THE PROJECT

The proposed Modernization of Existing Slaughter House comprising slaughtering facilities with a view to supply hygienic Large Animal Meat and Small Animal Meat to the local market.

In addition to the Slaughtering the project shall have Blood Coagulation Plant to convert blood into blood Coagulant.

The guidelines to achieve a status of Modern Slaughter House are required to be fulfilled up on implementation of followings:-

- *Transportation of Live Animals to the Abattoir by Trucks.*
- *Isolated point of entry of Raw Materials/Live animals and exit of Finished Product*
- *Adequate space for Lairage with ample of water supply for the animals, particularly for Large Animals.*
- *Ante-Mortem Inspection by qualified and experienced Govt. veterinarian doctors.*
- *Halal Ritual Killing Box with Raceway to slaughter animals at a single point in such a way that the slaughtering of one animal shall not be visible to other animals waiting for their turn.*
- *Collection of blood fraction in appropriate and hygienic manner in dedicated SS trough followed by gainful utilizing to produce Blood Meal thus reducing the load on Effluent Treatment Plant.*
- *Separation of Head & non edible offal and post mortem inspection.*
- *De-Hiding by hydraulically operated Hide Pullers*
- *Washing of Carcass by chlorinated water.*
- *Post Mortem Inspection by qualified veterinary officials of Carcass in accordance with relevant code and stamping.*
- *Sterilization of Knives and other cutting tools.*

- *handling of carcass and edible offal*
- *Dispatch of carcasses.*
- *Blood Coagulation Plant.*
- *Custom built Effluent Treatment Plant*
- *Refrigerated van facility for transportation of meat carcasses.*

*The proposed plant is located at **Bhagwantpura, Jhansi** on vacant area admeasuring **around 990.00 Sq.m** nearby area Jhansi Industrial Area is the largest and most economical industrial area in the division. The site is away under industrial Zone and has very good road connectivity for transportation of live animals as well as distribution of carcass which is adequate to build up the Modern Slaughter House equipped with all necessary facilities suitable for a Service purpose Unit.*

The installed capacity of the Large Animal Slaughter Line shall be 30 Heads per Day for service slaughtering for local meat sellers. The installed capacity of Small Animal slaughter line shall be 60 Heads per day for service slaughtering for local meat sellers.

The Project Implementation Schedule is estimated as 18 months from the Zero Date, i.e., the date of receipt of clearance from competent authority as well as start of civil work at site.

Under present scope, the project will generate direct employment of about 24 and the contractual labors of about 12 nos. In addition to the direct employment there will be involvement of indirect manpower towards transportation, animal trading etc.

AVAILABILITY OF RAW MATERIAL

3.1 INTRODUCTION

The feed stocks of the proposed Modernization of Existing Abattoir Plant are Large Animals and Small Animal. At 100% capacity utilization, the plant capacity is envisaged as 30 nos. Large Animal for local consumption. Considering 300 working days per year, the annual slaughtering of live Large Animal is estimated at 9000 nos. For Small Animal the plant capacity is envisaged as 60 nos. of Small Animal per day for local consumption only. Considering 300 working days per year, the annual slaughtering of live Small Animal is estimated at 18000 nos.

The livestock market in Jhansi and other markets in Uttar Pradesh can be considered as the source of animals for the proposed project. From other livestock market in adjacent states animals can be procured for slaughtering as the site is well connected with Roads and Railway. The animal transportation will be made by animal owners with their own means as animals should be received at plant should be in good health condition.

The animals to be slaughtered shall pass through Ante-mortem inspection by qualified and experienced veterinary surgeons after declaring the animals are fit for slaughtering. These must be disease free, not pregnant and over 14 years of age in case of large animal.

The population of animals in India starting from 1951 to 2012 and state wise availability of the same in the year 2012 is provided here. All the figures are based on Indian livestock census carried out by Government of India. Average weight of live animals and weight of meat and carcass thereof are also discussed in following sections. The price of procurement has been worked out based on present trend and norms applicable to similar modern abattoirs in India.

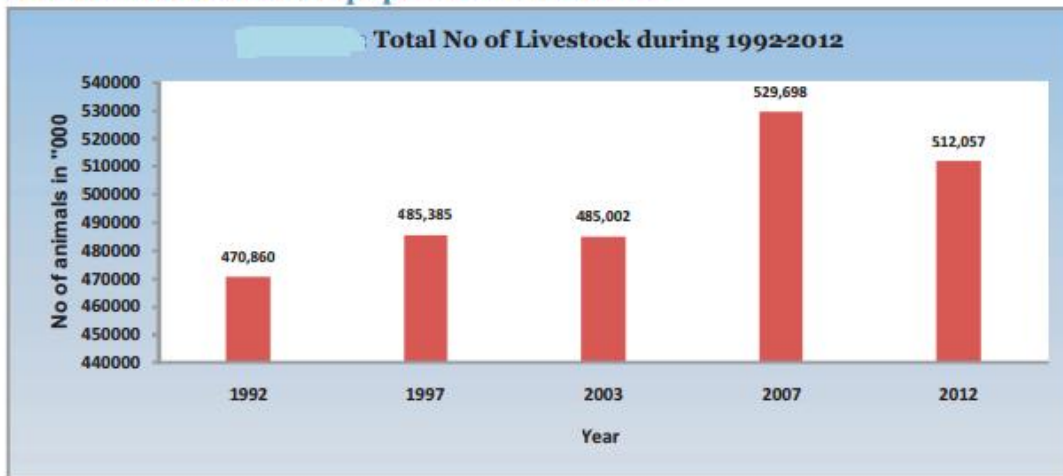
3.2 POPULATION OF ANIMALS IN INDIA

India has a considerable share of world livestock resources and emerged as number one (57% of world population) in case of buffaloes and number two (16% of world population) in case of goat and number three (6% of world population) in case of sheep population. The population of buffalo, goat and sheep recorded as per Indian Livestock Census carried out in the year 1992, 1997, 2003, 2007 & 2012 are presented below: -

TABLE – 3.1

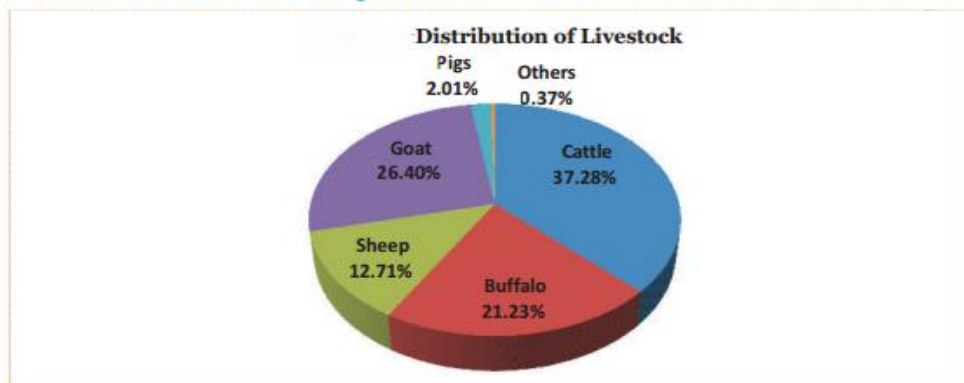
LIVESTOCK POPULATION DURING DIFFERENT CENSUS PERIOD

Trend of total Livestock population 1992-2012



19TH LIVESTOCK CENSUS-2012

Distribution of Livestock Population



Source: 19th (2012) Animal Census

The distribution of population of buffalo, goat and sheep in the 35 nos. of state and Union Territories of India according to livestock census, 2012 are provided in bellow :-

5.3 AVAILABILITY OF BUFFALOES

With reference to the latest census estimates (2012), the strength of animals of Uttar Pradesh along with its 6 adjacent states respect to all India bases are tabulated in Table 5.3.2

TABLE – 5.3.1

POPULATIONS OF BUFFALOES (2012)

19TH LIVESTOCK CENSUS-2012

: Details of Bovines by Sex

SNo	State/UT	Male			Female			Total Bovine		
		Rural	Urban	Total	Rural	Urban	Total	Rural	Urban	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	
1	ANDAMAN & NICOBAR ISLANDS	20388	116	20504	32183	801	32984	52571	917	53488
2	ANDHRA PRADESH	5261197	81700	5343097	14422795	452840	14875635	19684192	534540	20218732
3	ARUNACHAL PRADESH	307570	6642	314312	403649	14828	418477	711319	21470	732789
4	ASSAM	4432362	31801	4464163	6178259	100447	6278706	10610621	132248	10742869
5	BIHAR	4020098	93492	4113590	15125036	560130	15685166	19145134	653622	19798756
6	CHANDIGARH	534	1693	2227	7324	13445	20769	7658	15138	22996
7	CHHATTISGARH	5456564	185513	5642077	3241647	339729	3581372	10760211	305236	11065449
8	DADRA & NAGAR HAVELI	26381	2175	28556	14794	2582	17376	41175	4757	45932
9	DAMAN & DIU	1042	31	1073	1322	131	1453	2364	162	2526
10	GOA	23987	1477	25464	57261	6553	63814	81248	8030	89278
11	GUJARAT	3924793	128281	4053074	15483429	833024	16316453	19408222	961305	20369527
12	HARYANA	1318211	90800	1409011	6005075	479342	6484417	7323286	570142	7893428
13	HIMACHAL PRADESH	788003	3287	791290	2057107	20717	2077824	2845110	24004	2869114
14	JAMMU & KASHMIR	904254	29731	933985	2540900	116880	2657880	3445154	146711	3591865
15	JHARKHAND	5054766	53150	5107916	4606219	201890	4808109	9660985	255040	9916025
16	KARNATAKA	3232619	104811	3337430	9264444	385115	9649559	12497063	489926	12986989
17	KERALA	207312	12558	219870	1130072	80954	1211026	1337384	93512	1430896
18	LAKSHADWEEP	432	0	432	2667	0	2667	3099	0	3099
19	MADHYA PRADESH	9290271	217861	9508132	17408507	873716	18282223	26698778	1091577	27790355
20	MAHARASHTRA	7651877	168668	7820545	13647877	610787	14258664	20790640	778050	21568690
21	MANIPUR	118474	11268	129742	184154	26447	210601	302628	37715	340343
22	MEGHALAYA	369660	653	370313	546552	1194	547746	916212	1847	918059
23	MIZORAM	12126	1695	13821	22588	6625	29213	34714	8320	43034
24	NAGALAND	112597	7725	120322	166004	16239	182243	278601	23964	302565
25	NCT OF DELHI	32678	2190	34868	207118	6589	213707	239796	8779	248575
26	ODISHA	6066619	91240	6157859	5050725	238994	6189719	12017344	330234	12347578
27	PUDUCHERRY	6973	1577	8550	42927	10528	53455	49900	12105	62005
28	PUNJAB	925218	42877	968095	6279891	339462	6619353	7205109	382339	7587448
29	RAJASTHAN	4712417	124639	4837056	20691459	772042	21463501	25403876	896681	26300557
30	SIKKIM	44837	186	45023	99420	763	100183	144257	949	145206
31	TAMIL NADU	1565326	158346	1723672	7026516	844285	7870801	8591842	1002631	9594473
32	TRIPURA	346135	4241	350376	582301	26923	609224	928436	31164	959600
33	UTTAR PRADESH	9501720	520129	10021849	38524871	1835681	40360552	48026591	2155810	50182401
34	UTTARAKHAND	807234	10683	817917	2113651	62322	2175973	2920685	73005	2993890
35	WEST BENGAL	5575511	93628	5669139	11008450	435118	11443568	16583961	528746	17112707
	Total	82122438	2064764	84187200	206077139	9716814	215793953	288199575	11781578	299981153

TABLE – 5.3.2

POPULATIONS OF BUFFALOES (2012)

<i>Sl. No.</i>	<i>Name of the State</i>	<i>Million Nos.</i>
1.	<i>Uttar Pradesh</i>	<i>50.18</i>
2.	<i>Madhya Pradesh</i>	<i>27.79</i>
3.	<i>Chattisgarh</i>	<i>11.20</i>
4.	<i>Bihar</i>	<i>19.79</i>
5.	<i>Jharkhand</i>	<i>9.91</i>
6.	<i>Rajasthan</i>	<i>26.30</i>
7.	<i>Haryana</i>	<i>7.89</i>
	<i>Total</i>	<i>153.06</i>

Ref: 19th Indian Livestock Census, 2012

The total population of buffaloes in Uttar Pradesh and 6 nearby states from where the animals are likely to be procured amounts to be about 153.06 Million nos. i.e. about 51% of all India population as per 2012 livestock census. Based on average growth rate of 2 % per year, the population of buffalo in Uttar Pradesh and with 6 neighboring states is expected to reach about 162.42 Million nos. in the year 2015-16. Therefore procurement of 9000 nos. of buffalo for the unit would not pose any problem.

5.4 AVAILABILITY OF GOAT AND SHEEP.

With reference to the latest census estimates (2012), the strength of animals of Uttar Pradesh along with its 6 adjacent states and percentage with respect to all India bases are tabulated in Table 5.4.3

TABLE – 5.4.1
POPULATIONS OF GOAT (2012)

19th LIVESTOCK CENSUS-2012

: Details of Goats by Age, Sex and Use in Rural and Urban Combined

S.No.	State/ UT	Male			Female			Total	Total Goats	
		Under 1 Year	1 Year and Above	Total	1 Year and Above					
					In Milk	Dry	Not Calved Once			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	
1	ANDAMAN & NICOBAR ISLANDS	11928	11940	23868	13463	14320	11139	2534	49456	65324
2	ANDHRA PRADESH	1191660	1009120	2200780	1909268	2891237	1415738	654198	6670441	9071221
3	ARUNACHAL PRADESH	65114	60992	126106	64806	57837	33474	23315	179432	305538
4	ASSAM	958761	1641988	2600749	1027717	1136444	870665	533618	3568444	6169193
5	BIHAR	2072248	1450303	3522551	2269007	2969962	1888941	1503659	8630969	12153520
6	CHHATTISGARH	92	206	298	120	321	58	8	507	805
7	CHHATTISGARH	448379	499615	947994	561580	587988	751883	375862	2277313	3225307
8	DADRA & NAGAR HAVELI	908	757	1665	717	957	581	223	2508	4173
9	DAMAN & DIU	202	306	508	297	695	358	197	1547	2055
10	GOA	1895	2489	4384	2177	3491	2018	888	8574	12958
11	GUJARAT	615002	504442	1119444	891363	1702163	922851	323151	3839528	4958972
12	HARYANA	47634	24895	72529	73573	128543	81164	13307	286587	369116
13	HIMACHAL PRADESH	132251	177681	309932	176689	239931	327036	69923	809559	1119491
14	JAMMU & KASHMIR	232200	275449	507649	387168	599892	422476	100715	1510251	2017900
15	JHARKHAND	1039065	1172943	2212008	1207038	1573848	1046396	542159	4369441	6581449
16	KARNATAKA	576480	511723	1088203	964334	1442957	1055078	245575	3707944	4796147
17	KERALA	211670	83647	295317	407668	358297	155530	29285	960760	1246077
18	LAKSHADWEEP	7428	6735	14163	9431	8060	8383	6460	32334	46497
19	MADHYA PRADESH	1159474	859500	2018974	1527726	2187336	1893080	386820	5994962	8013936
20	MAHARASHTRA	1278924	620849	8997773	1717312	2641128	1871351	305743	6635534	8435307
21	MANIPUR	12578	13394	25972	13305	13270	6436	6375	39186	65158
22	MEGHALAYA	99661	89868	189529	91175	80826	65768	45772	283541	473070
23	MIZORAM	3859	4463	8322	3896	3436	3741	2811	13884	22206
24	NAGALAND	19167	19420	38587	17237	20199	12330	10997	60763	99350
25	NCT OF DELHI	5115	6744	11859	5503	7365	3055	2688	18611	30470
26	ODISHA	1077872	1224081	2301953	1169236	1309935	1313564	424399	4211134	6513087
27	PUDUCHERRY	7997	4439	12436	13411	17701	10020	1382	42514	54950
28	PUNJAB	39968	30672	70640	61888	115230	67983	12231	256632	327272
29	RAJASTHAN	2917310	1342826	4260136	4201700	7008860	4930805	1266438	17405803	21665939
30	SIKKIM	22208	30895	53103	20586	15545	19869	4261	60261	113364
31	TAMIL NADU	1216823	1091202	2308025	1834009	2190473	1247766	583068	5835316	8143341
32	TRIPURA	116380	79237	195617	132288	114308	105236	63473	415305	610922
33	UTTAR PRADESH	2346554	2037128	4383682	3222189	4242904	2664536	1072324	11201933	15585615
34	UTTARAKHAND	164140	208781	372921	231894	333789	340687	88122	994492	1367413
35	WEST BENGAL	2348021	2069423	4417444	2338144	2243694	1755164	751504	7088506	11505950
	Total	20448968	17168153	37617121	26545045	36252342	25305100	9453485	97555972	135173093

Goat

- ◆ The total Goat contributes around 26.40% of the total livestock population.
- ◆ The total number of Goat in the country as per 2012 Census is 135.17 million numbers.

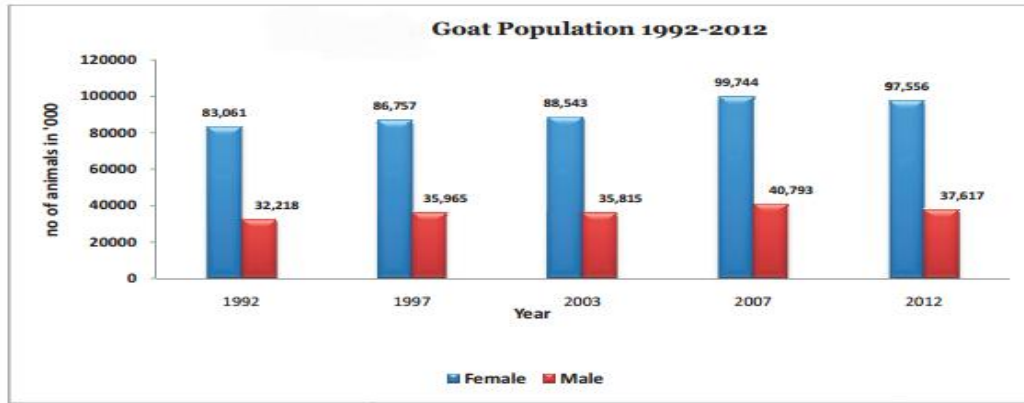


TABLE – 5.4.2
POPULATIONS OF SHEEP (2012)

19TH LIVESTOCK CENSUS-2012

. Details of Sheep by Age and Sex in Rural and Urban Combined for
Indigenous and Total Sheep

SNo.	State/ UT	Indigenous Sheep						Total Indigenous Sheep	Total Sheep
		Male			Female				
		Under 1 year	1 Year and Above	Total Indigenous Sheep	Under year	1 Year and Above	Total		
(1)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	
1	ANDAMAN & NICOBAR ISLANDS	0	2	2	0	1	1	3	3
2	ANDHRA PRADESH	3013781	2207610	5221391	5698607	15422246	21120853	26342244	26395583
3	ARUNACHAL PRADESH	1996	2970	4966	2668	4574	7242	12208	13549
4	ASSAM	98147	98461	196608	117681	194291	311972	508580	518067
5	BIHAR	37054	48527	85581	48192	89548	137740	223321	232467
6	CHANDIGARH	3	26	29	3	29	32	61	66
7	CHHATTISGARH	26630	30461	57091	35757	73572	109329	166420	168223
8	DADRA & NAGAR HAVELI	27	45	72	8	7	15	87	124
9	DAMAN & DIU	0	1	1	0	0	0	1	1
10	GOA	0	0	0	0	0	0	0	24
11	GUJARAT	165284	204208	369492	343199	968975	1312174	1681666	1707750
12	HARYANA	37892	26111	64003	64989	181925	246914	310917	362617
13	HIMACHAL PRADESH	56725	87075	143800	98996	256884	355880	499680	804871
14	JAMMU & KASHMIR	131322	188368	319690	234969	519363	754332	1074022	3389485
15	JHARKHAND	95482	125115	220597	113416	240532	353948	574545	582925
16	KARNATAKA	1019308	895964	1915272	1969820	5658389	7628209	9543481	9583761
17	KERALA	69	605	674	93	232	325	999	1446
18	LAKSHADWEEP	0	0	0	0	0	0	0	0
19	MADHYA PRADESH	45801	44831	90632	64482	139940	204422	295054	308953
20	MAHARASHTRA	270841	214377	485218	524401	1499140	2023541	2508759	2580381
21	MANIPUR	1558	2311	3869	1370	2275	3645	7514	11463
22	MEGHALAYA	3703	3465	7168	4850	7481	12331	19499	20096
23	MIZORAM	17	12	29	15	23	38	67	650
24	NAGALAND	705	817	1522	660	725	1385	2907	3838
25	NCT OF DELHI	86	79	165	47	66	113	278	932
26	ODISHA	218769	322569	541338	311928	717257	1029185	1570523	1581129
27	PUDUCHERRY	159	108	267	120	370	490	757	1601
28	PUNJAB	12507	10738	23245	20032	55650	75682	98927	128534
29	RAJASTHAN	1184106	847463	2031569	1940125	5016947	6957072	8988641	9079702
30	SIKKIM	289	328	617	314	616	930	1547	2634
31	TAMIL NADU	618468	598796	1217264	933888	2137246	3071134	4288398	4786680
32	TRIPURA	551	534	1085	621	1127	1748	2833	3110
33	UTTAR PRADESH	200488	239012	439500	271040	561034	832074	1271574	1353653
34	UTTARAKHAND	27884	36843	64727	48569	127953	176522	241249	368756
35	WEST BENGAL	207098	201202	408300	259704	383332	643036	1051336	1076115
	Total	7476750	6439034	13915784	13110564	34261750	47372314	61288098	65069189

Sheep

- ❖ The total Sheep contributes around 12.71% of the total livestock population.
- ❖ The total number of Sheep in the country as per 2012 Census is 65 million numbers.

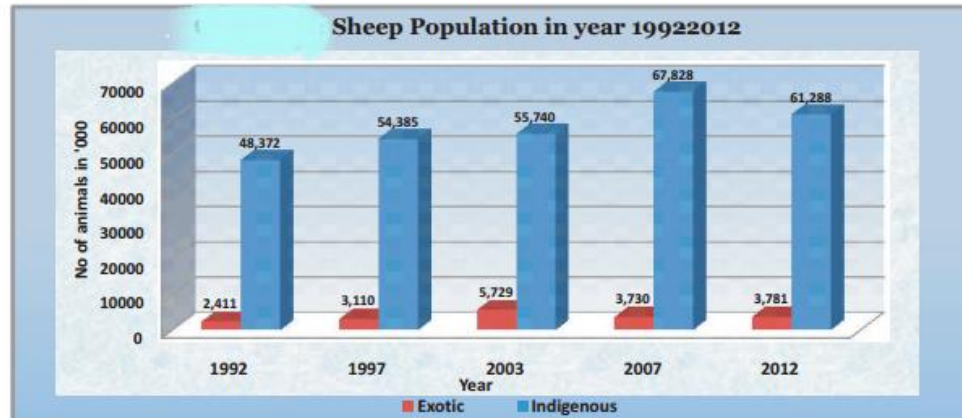


TABLE-5.4.3

POPULATION OF SHEEP AND GOAT (2012)

Sl. No.	Name of the State	Million Nos. Goat	Million Nos. Sheep
1.	Uttar Pradesh	15.58	1.35
2.	Madhya Pradesh	8.01	0.30
3.	Chattisgarh	3.22	0.16
4.	Bihar	12.15	0.23
5.	Jharkhand	6.58	0.58
6.	Rajasthan	21.66	9.07
7.	Uttarakhand	1.36	0.36
	Total	68.56	12.05

Ref: 19th Indian Livestock Census, 2012

The total population of Sheep and Goat in Uttar Pradesh and 6 nearby states from where the animals are likely to be procured amounts to be about 12.05 million nos. and 68.56 million nos. individually. Based on average growth rate of 2% per year, the population of Sheep and 3% per year the total population of goat in Uttar Pradesh and with 6 neighboring states is

expected to reach about 12.78 Million Nos. and 74.91 Million Nos. in the year 2015-16. Therefore procurement of 18000 nos. of Sheep and Goat for the unit would not pose any problem.

3.5 COST OF FEEDSTOCK

(a) Large Animal

Large Animal of weight 200 kg to 300 kg shall be available and carcass weight will be about 150 kg to 200 kg per Large Animal. The Slaughtering Charge is considered to be Rs. 150/- per Large Animal.

(b) Sheep/ Goats

Goats of weight 15kg to 20 kg shall be available and carcass weight will be about 10 kg to 16 kg per goat. Slaughtering Charge is considered to be Rs. 70/- per Sheep/Goat.

REQUIREMENT AND SPECIFICATION OF UTILITIES

4.1 INTRODUCTION

Electricity, hot water generation, HSD, compressed air and Municipal supply water are the utility services to be provided for the Large Animal and Small Animal Abattoir, Blood Coagulation 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 30 heads/day will operate for 5 hours/day for local supply. The Small Animal Abattoir having installed capacity 60 heads/day will be operated for 5 hours/ day for local supply. 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.

4.2 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 for Large Animal	10 KW	5	300
2.	Abattoir for Small Animal	10 KW	5	300
3.	Large Animal Liarage	5 KW	8	300
4.	Small Animal Liarage	5 KW	8	300
5.	ETP (15 KLD)	10 KW	24	365
6.	Pump System	5 KW	5	300
7.	Blood Coagulation Plant	10 KW	8	300
8.	Lighting Load of Plant	5 KW	8	365
Total Connected Load= 60 KW				

Based on load factor for equipments and respective operating hours and operating days, the yearly power consumption is estimated at about 187700 KWH. To augment the power at 415 V, 50 c/s, a plant substation of 100 KVA with primary voltage of 11 KV is considered. 1 nos. X 100 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 1 nos. 100 KVA sets have been considered to supply emergency power during failure of normal power grid.

In order to estimate the running hours of DG sets, on prime facie it is considered that these will run 30% of total hours for electricity to be generated.

The normal power supply shall be arranged from 11 KV grid of UPSEB 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. 7.50 per KWH. That from DG set has been considered as Rs. 9.00 per KWH.

4.6 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*
- *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 NNJ, 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.

Daily requirement of water by various sections as discussed above is estimated at about 9 KLD. The maximum usable water to be supplied by NNJ for the proposed Plant. The Bore well pump capacity will be around 5 HP (1 Nos).

PLANT DESCRIPTION

5.1 INTRODUCTION

The proposed Modernization of Existing Slaughter House project is subdivided into four (4) major sections. These are (a) Large Animal Abattoir of capacity 30 heads/day for 5 hours of operation, (b) Small Animal Abattoir of capacity of 60 heads/day for 5 hours of operation, (c) Blood Coagulation plant of 1KLD feed to convert blood into Blood Coagulant (d) Custom built Effluent treatment Plant of 15 KLD.

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 raceway
- Step IV - Abattoir, where slaughtering is carried out
- Step V - Post mortem inspection followed by removal of head, horn, hoof and de hiding
- Step VI - Splitting of the animals' abdomen to remove various organs/viscera/offal.
- Step VII - The products are dispatched by means of Refrigerated Containers.

5.2 *LARGE ANIMAL MEAT LINE*

5.2.1 *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.

5.2.2 *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.

5.2.3 *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.

5.2.4 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.

5.2.5 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.

5.2.6 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 trough on an inclined track.

5.2.7 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 spurge pipes for wash down purposes.

5.2.8 DE-HEADING AND SEPERATION 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 for 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.

5.2.9 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.

5.2.10 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.

5.2.11 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.

5.2.12 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.

5.2.13 OFFAL HANDLING

Offal handling is an important part because a substantial weight of Large Animal is discharged during de hiving 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.

5.2.14 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.

5.2.15 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.

5.2.16 **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, psychotrophs, staphylococcal counts and the presence of pathogens such as Salmonella etc.

The following tests are suggested: -

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

5.3 **SMALL ANIMAL LINE**

5.3.1 **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.

5.3.2 **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.

5.3.3 **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.

5.3.4 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 riling 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

5.3.5 EVISCERATION

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.

5.3.6 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.

5.3.7 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.

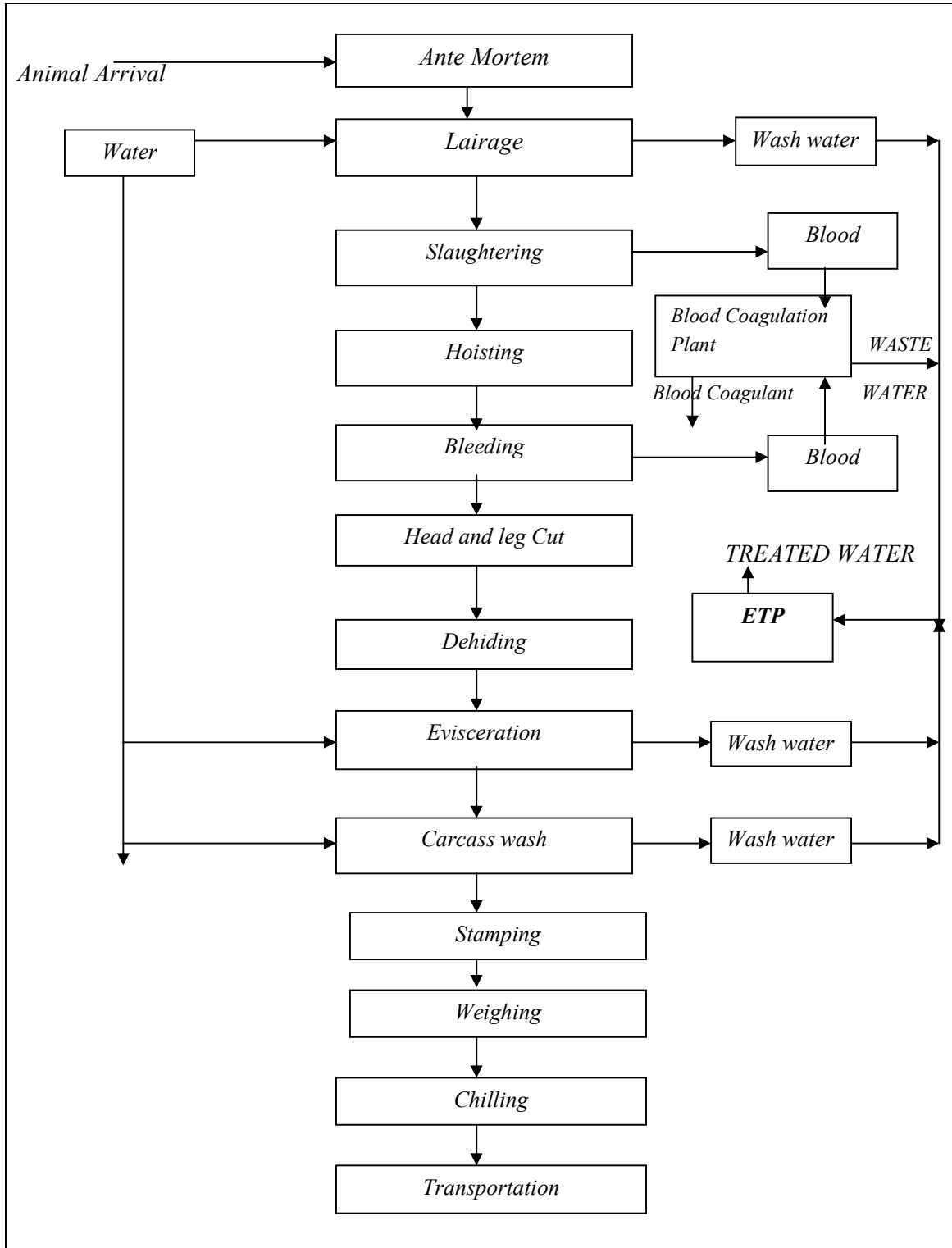
5.3.8 STAMPING

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.

5.3.9 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.

A Typical flow diagram of Plant Operation



5.4 BLOOD COAGULATION PLANT:

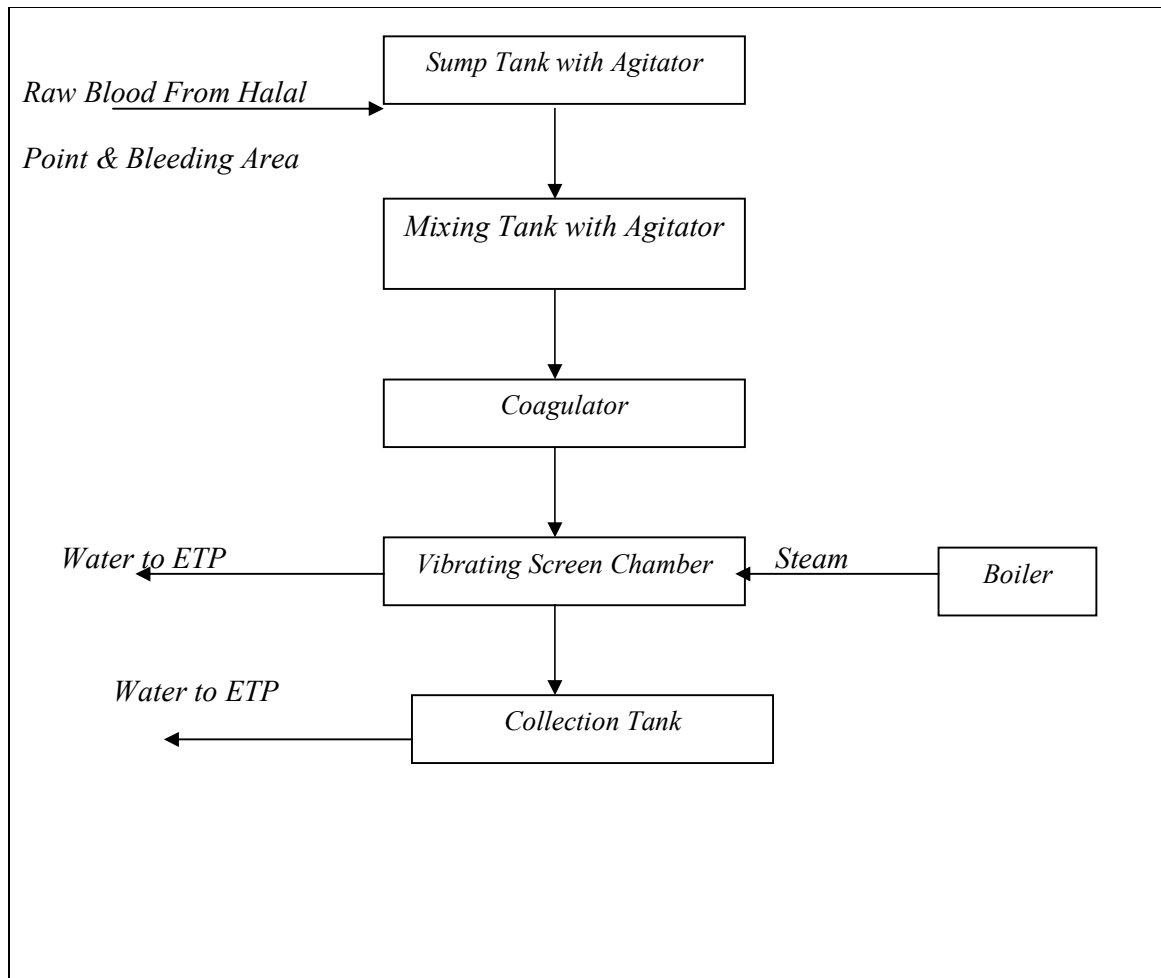
Capacity: 1 KLD

Process Description with Flow Chart.

The Coagulation 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 Coagulation 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°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°C. The coagulum / cooked blood cells from the vibrating screen will then be discharged to a collection tank.*

TYPICAL FLOW DIAGRAM OF PROPOSED BLOOD COAGULATION PLANT



5.5 EFFLUENT TREATMENT PLANT

Water Quality as every technologist knows, lies at the center of Industrial activity and at the heart of life. The effluent when left untreated from industry which plays havoc with ground water. Consequently water treatment Plant developed to manage water in a better way ensuring both customer and ecology profit. This process take into account a complex set of field conditions and propose water management approaches that make economical and technical sense.

This ETP shall be designed for handling 15 KLD of effluent generated from the Abattoir. Area required to construct this plant is approx 48 SQM. Biological system of treatment is envisaged with double Aeration & Double Clarification Stages.

The effluent after treatment can be discharged 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.

5.5.1 BASIS

Flow capacity

Total daily flow 15 KLD

Average hourly flow 2.0 M³/Hr

Peak hourly flow 5 M³/Hr

Raw Effluent characteristic

5.5.2 TYPICAL PARAMETERS OF RAW EFFLUENT

PH-----7.1

BOD : 2500 mg/lit

COD : 4000 mg/lit

Oil & grease : 50 mg/lit

Total Suspended Solids : 1200.00 mg/lit

5.5.3 PARAMETERS OF TREATED EFFLUENT

PH----- 5.5-7.0

BOD : 100.00 mg/lit

COD : 250 mg/lit

Oil & grease : 10 mg/lit

Total Suspended Solids : 100.0 mg/lit

5.5.4 REUSE OF TREATED EFFLUENT

The treated Effluent shall be disposed off suitably. It should meet the above stringent standards.

5.5.5 AVAILABILITY OF AREA

Sufficient area (48 SQM) is made available for the construction of the Effluent Treatment Plant.

5.6 TREATMENT CONCEPT

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

As can be seen from the design parameters, the untreated effluent BOD is 2500 mg / Liter. The desired 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 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.

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 trap.

In the Oil & Grease Trap, 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 of flocks. 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

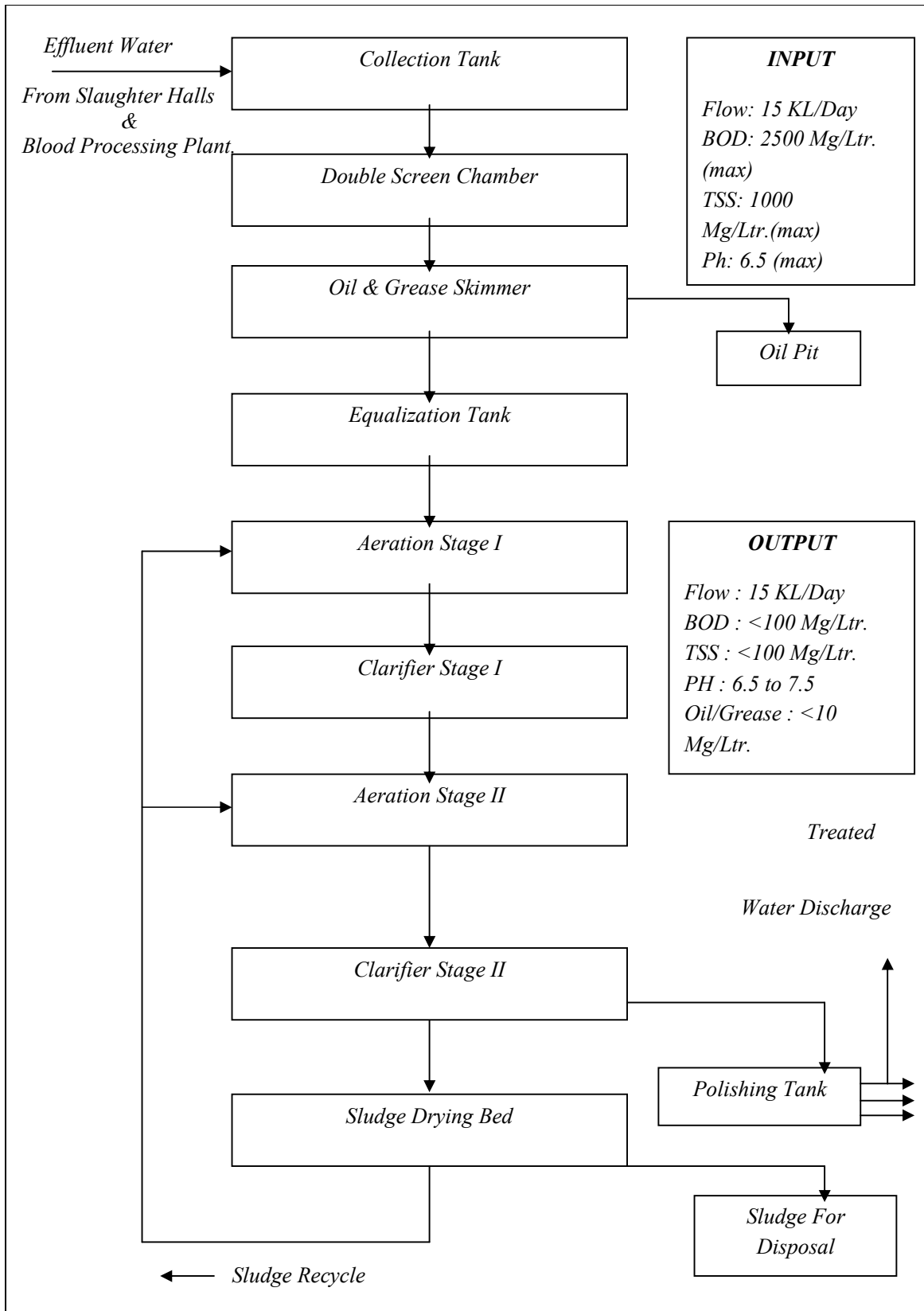
suitably.

From sludge sumps 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.

A typical flow diagram of ETP is attached below.



5.7 LIST OF EQUIPMENTS

COMPLETE SLAUGHTER HOUSE EQUIPMENTS & MACHINERIES

Slaughter Line and Slaughter Hall Machineries Complete

Capacity -30 Nos. Large animals per day

Sl. No	Items	Quantity
1	<i>Killing Box(manual type)</i>	<i>1 no</i>
2	<i>Bleeding grating (trough)- SS-304</i>	<i>1 no</i>
3	<i>Electric hoist-0.5 Ton cap</i>	<i>2 nos</i>
4	<i>Shackles hooks (SS-304)</i>	<i>50 nos</i>
5	<i>Bleeding Rail (manual - 12 mtr</i>	<i>1 set</i>
6	<i>Hooks return line(manual)-12 mtr</i>	<i>1 set</i>
7	<i>Fixed dressing Platform (Railings of SS 304)- 4.5 mtr length</i>	<i>2 nos</i>
8	<i>Fixed de-hiding platform(railings of SS-304) -4.5 mtr length</i>	<i>2 nos</i>
9	<i>Dressing rail (Manual)-12 mtr</i>	<i>1 lot</i>
10	<i>Dressing Hooks(SS-304)</i>	<i>50 nos.</i>
11	<i>Stoppers (SS-304)</i>	<i>5 nos.</i>
12	<i>Brisket cutter (Electric)(Imported)</i>	<i>1 no</i>
13	<i>Brisket Cutter Platform (Railing of SS-304)</i>	<i>1 no</i>
14	<i>Despatch Rail(manual)-9 mtr</i>	<i>1 lot</i>
15	<i>Trolley (galvanized-wheel type)(SS-304)</i>	<i>5 nos.</i>
16	<i>Hand wash Basin with electric knife sterilizers (SS304)</i>	<i>4 nos.</i>
17	<i>Electrical control panel(MCCB/MCB) for slaughter house</i>	<i>1 no</i>
18	<i>High Pressure Jet pumps</i>	<i>1 no</i>
19	<i>Hose rack with Hose</i>	<i>1 no</i>
20	<i>Insect Killer(Pesto flash)</i>	<i>1 lot</i>
21	<i>Cleaning tables (SS-304)</i>	<i>1 no</i>
22	<i>Hot & Cold Water pipe Line</i>	<i>1 set</i>
23	<i>Electrical Cable works</i>	<i>1 set</i>
24	<i>Support Steel Structure</i>	<i>1 set</i>
	Sub Total	

Slaughter Line and Slaughter Hall Machineries Complete

Capacity -60 Nos. Small animals per day

Sl. No	Items	Quantity
1	<i>Killing Box(manual type)</i>	<i>1 no</i>
2	<i>Bleeding grating (trough)- SS-304</i>	<i>1 no</i>
3	<i>Electric hoist-0.5 Ton cap</i>	<i>2 no</i>
4	<i>Shackles hooks (SS-304)</i>	<i>50 nos</i>
5	<i>Bleeding Rail (manual - 12 mtr</i>	<i>1 set</i>
6	<i>Hooks return line(manual)-12 mtr</i>	<i>1 set</i>
7	<i>Fixed dressing Platform (Railings of SS 304)- 4.5 mtr length</i>	<i>2 no</i>
8	<i>Fixed de-hiding platform(railings of SS-304) -4.5 mtr length</i>	<i>2 no</i>
9	<i>Dressing rail (Manual)-12 mtr</i>	<i>1 lot</i>
10	<i>Dressing Hooks(SS-304)</i>	<i>100 nos.</i>
11	<i>Stoppers (SS-304)</i>	<i>5 nos.</i>
12	<i>Despatch Rail(manual)-9 mtr</i>	<i>1 lot</i>
13	<i>Trolley (galvanized-wheel type)(SS-304)</i>	<i>5 nos.</i>
14	<i>Hand wash Basin with electric knife sterilizers (SS304)</i>	<i>4 nos.</i>
15	<i>Electrical control panel(MCCB/MCB) for slaughter house</i>	<i>1 no</i>
16	<i>High Pressure Jet pumps</i>	<i>1 no</i>
17	<i>Hose rack with Hose</i>	<i>1 no</i>
18	<i>Insect Killer(Pesto flash)</i>	<i>1 lot</i>
19	<i>Cleaning tables (SS-304)</i>	<i>1 no</i>
20	<i>Hot and Cold Water pipe Line</i>	<i>1 set</i>
21	<i>Electrical Cable works</i>	<i>1 set</i>
22	<i>Support Steel Structure</i>	<i>1 set</i>
	Sub Total	

COMMON EQUIPMENTS/WORKS

Sl No.	Items	Quantity
1	ETP-15 KLD a. Bar Screen b. Solid Separator c. Grease Trap d. Aerator tank and motors e. Clarification tank & motors f. Sludge circulation pump g. Sludge drying beds h. sludge pumps i. Chlorine pump j. Blower	1 set
2	Silent D G Set(100 KVA)	1 no
3	Exhaust fans, tube lights and other electrical fittings	1 set
4	Blood Coagulation Plant (capacity: 1000 Ltr/day) 1. PROGRESSIVE FEED PUMP FOR BLOOD 2. S.S.BLOOD TANK 3. VIBRATING SCREEN FOR BLOOD 4. BLOOD COAGULATER 5. DRYER (1t/Batch) 6. PIPE & FITTINGS 7. ELECTRIC PANNAL	1 set
5	Gumboots, Aprons, caps, face Mask 9 made of cloth	25 set
6	Service connection (S.C.) charges payable to UPSEB where running load is less than 100 KVA	1 Job
7	Permanent electrification which includes internal and external electrification.	1 Job
8	Small transportation vehicle	1 No
9	Drainage System	1 Job
10	Pressurized Potable Water Pipe Lines & Pumps for All Working Stations	1 Job

LARGE ANIMAL CIVIL WORK (AS PER DRAWING)

S.NO.	DESCRIPTION	AREA
1	Covered Liarage	42 M ²
2	Slaughter Hall	160M ²
3	Dirty Area	40 M ²
4	Utility Block	16 M ²

SMALL ANIMAL CIVIL WORK (AS PER DRAWING)

S.NO.	DESCRIPTION	AREA
1	Covered Liarage	30 M ²
2	Slaughter Hall	120 M ²
3	Dirty Area	30 M ²
4	Utility Block	12 M ²

COMMON AREAS

1	Doctor Room (2 nos.)	25 M ²
2	Electrical & Machine Room (2 nos.)	25 M ²
3	Blood Coagulation Plant	32 M ²
4	ETP	48 M ³
5	Internal Road	406M ²

REQUIREMENT OF CIVIL WORKS AND TECHNOLOGICAL STRUCTURES

6.1 INTRODUCTION

The product of the plant will be used for consumption of local market in Jhansi Municipal Corporation Area and surroundings. The standards to be used while designing the plant are the Codex Alimentarius, the EU standards and USDA standards. Therefore a lot of cares are essential in civil and construction aspects to protect the above mentioned standards from the design stage itself. Broad guidelines for general layout and designing of the buildings are discussed hereunder.

6.2 LAYOUT

The Layout of the plant has been prepared based on Plot Dimensions as worked out from the land map provided by JMC. The plot area is found to be quite adequate and an optimum layout of buildings/structures with internal roads have been developed and enclosed.

The plant boundary will have two (2) numbers of main gates with 3 M wide internal road. One Gate (Entry) termed as BLACK GATE, through which trucks/vehicles carrying animals and other industrial inputs like LDO, HSD / Chemicals will enter the plant premises. The second gate (Exit) termed as WHITE GATE, which is away from the black gates, shall be used for movement of finished products carrying transports and entry for office staff and visitors.

The layout of the modern abattoir will be such that the raw materials i.e. animals are received at one end and the finished products are dispatched from other end of the building.

The surroundings of the buildings and sheds will be paved by PCC to avoid growth of vegetation, etc.

While placing the abattoir, it is kept in mind that the Ritual Killing Box orientation will be such that the head of the animals are placed towards Geographically West Direction prior to slaughter to protect the religious belief of the butchers.

6.3 BUILDINGS / SHEDS

During detailed design and engineering following factors shall be taken in to account.

The entire plant building will be built using grid of RCC columns, using insulated roof and brick walls. The floor should have a slope of 0.5% leading into floor gutters which will require to be built in all the process. Finished floor surface is best achieved with Kota stone. For using meat processing machinery of global standards in the building, the clear height in the processing plant area from finished floor level to eave's level should be 5M or more. Except where the insulated performed panels used, the walls will be glazed up to around 2.5M and have plastic emulsion paint above the glazing. Avoid the use of paper lining, cloth, wood and asbestos in construction of process area. The plinth level shall be constructed up to height of floor of refrigerated container truck for ease of loading.

The construction standards do not permit the existence of underground gutters in the process area or refrigeration area. All gutters need to be open with steel grid covers in sections of 1 meter or so convenient lengths. These are removable, for easy cleaning. All gutters are either of 300mm width and slope at 0.5% towards the offal pit.

6.4 EFFLUENT TREATMENT PLANT (ETP) AREA

The meat processing requires large quantity of water, which is finally sent to ETP for treatment and part/reuse in gardening/discharge. An area of about 48 sq. m. is earmarked at one corner of the plot to set up the ETP. Water streams from various sections of the plant are sent to ETP through underground piping. The ETP plant is mainly consisting of civil construction of basins, reservoirs, thickeners and lagoons.

6.5 BLOOD COAGULATION PLANT

The Blood Coagulation Plant is proposed to be constructed using steel columns, pre-coated corrugated sheet roofing and side cladding with glass glazing. The floor shall be constructed as anti-skidding type using Ironite components. The head room of the building/shed is to be maintained as 5 M.

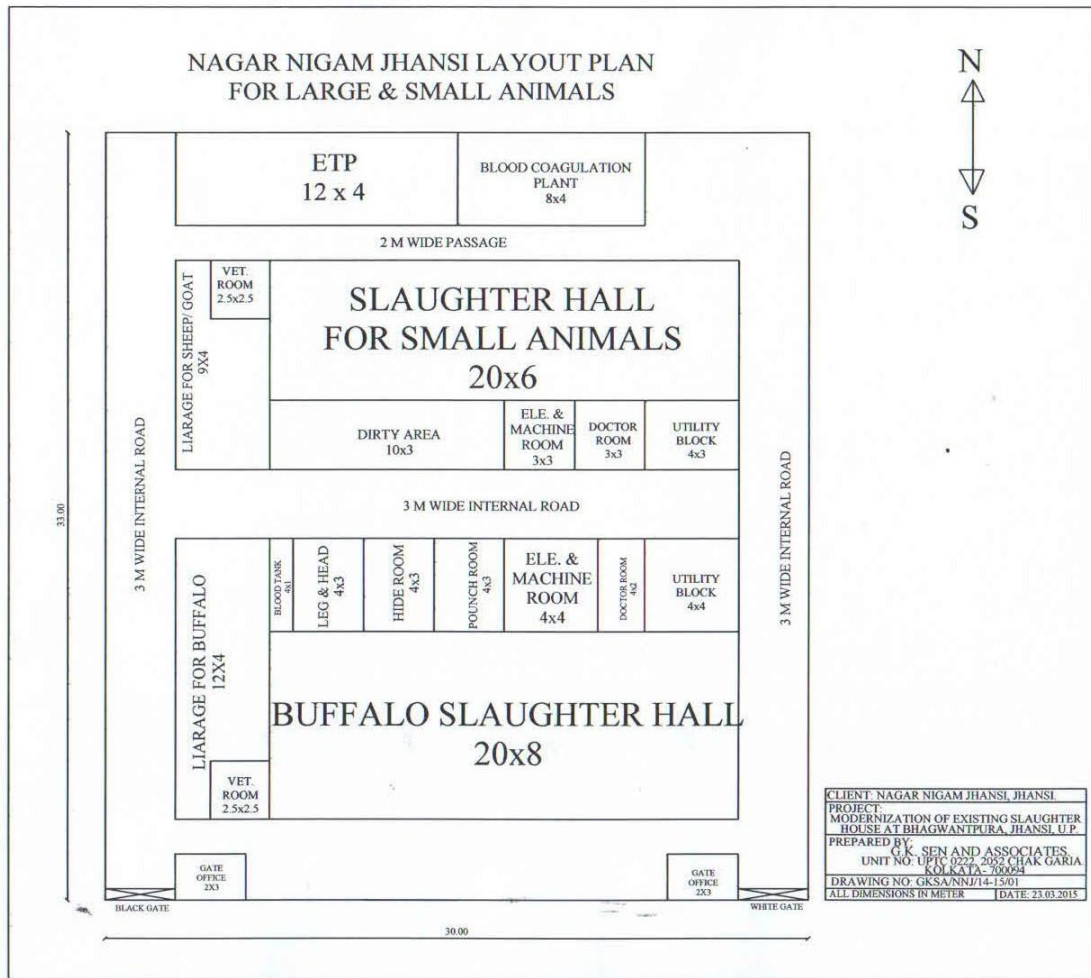
6.6 OFFSITE BUILDINGS

Various offsite buildings as per economics are proposed to be constructed of RCC columns, steel truss with galvanized corrugated sheet. The panel room shall be constructed of RCC column, brick wall and RCC roof.

6.7 NON FACTORY BUILDINGS

Non factory buildings include, gate office, toilets/change room are to be constructed of RCC columns, brick wall and RCC roof. The dimensions are worked out based on preliminary engineering done.

A proposed typical layout plan is given as follows. All the measurements are in mtr.



PROJECT BENEFITS SWOT ANALYSIS

7.1 PROJECT BENEFITS:

The benefits of the proposed Modernization of Existing Slaughter House Project are as under:

7.1.1 Financial benefits

- *To the farmer-producer who will receive a better price for his animals from the local butchers and other meat exporters as the proposed facility will generate demand for livestock. As the income improves, the farmer will take interest in rearing of animals for more body weights and body conformation. This will also encourage the farmer to take to improved breeding, feeding, animal health control measures and ram-lamb or goat-kid fattening schemes for which bank loans are available.*
- *The consumer of meat will get a better quality wholesome meat and meat products and an assured supply of the product.*

7.1.2 Employment generation

- *The direct employment generation of skilled and unskilled manpower in the proposed project will be about 24.*
- *The backward linkage established through the project will generate large employment (indirect) in rural area through involvement and participation of more animal producers. It will also increase income and employment for a large number of service providers for transport of animals, feed, fodder, animal products, animal byproducts etc.*

7.1.3 Social benefits

Overall improvement in rural income through the project will have positive socio-economic effects on improving literacy, capacity building and decision making ability of the rural backward community rearing sheep and goats, buffalo and more particularly the rural women who are normally engaged in livestock rearing.

7.1.4 Environmental benefits

At present, the animals are mostly slaughtered in unhygienic and unsanitary conditions. Animal wastes are not disposed off properly, thereby causing a serious threat to the environment and causing air and water pollution. These pollution problem will be overcome by establishing a modern abattoir where ETP along with Blood Plant are to be provided and all precautions are to be taken to prevent environment pollution.

*This Plant has been conceived with **Zero Discharge Concepts** where all polluting elements will be handled by the following means:*

- **Effluent Treatment Plant** : *Waste water from main Plant complex will be treated as per CPCB norms.*
- **Blood Coagulation Plant** : *Collected blood after slaughtering of Animals will be Coagulated.*

7.2 SWOT ANALYSIS

7.2.1 Strengths:

- *The Promoter of the Project - Nagar Nigam Jhansi, Jhansi is having very good strength and background for the project.*
- *Good domestic demand for meat from sheep/ goat as well as Large Animal.*
- *Nearness of the project to the one of the Industrial Areas of Jhansi.*
- *Availability of large number of farmer-producers and livestock in Uttar Pradesh, particularly in districts adjoining the project location.*
- *Large number of existing private meat processors and exporters in Uttar Pradesh.*

7.2.2 Weaknesses:

- *The farmer producers have very small sheep/goat and buffalo units. They lack financial resources and have no suitable outlet to sell their animals. Unless they get proper help, the overall benefits of the project will not be available to them.*

7.2.3 Opportunities

- *India is having largest livestock population. There is vast scope to utilize and further develop these resources as per the requirement of the project.*
- *The domestic and export demand for meat is increasing. Meat produced under clean and hygienic conditions has a special preference and priority by consumers.*

- *In India, skilled labour is cheaper than in other developed countries.*
- *There is a very large untapped potential in India in utilizing the animal-wastes into useful and high quality by-products. This opportunity needs to be exploited.*
- *The farmers who rear the livestock are poor and in rural areas. This project can provide immense opportunity for increasing employment and income for these farmers and has several social and environmental benefits.*

7.2.4 Threats

- *If the project is not managed professionally, it can pose a serious threat to the project.*
- *Any objection from local people to start the project on the proposed site can withhold the construction and progress of the scheme.*

7.3 OUTSTANDING ISSUES

The important issues to be considered for success of the project are as under:

- *Proper training should be provided to the abattoir staff for day to day monitoring and regularize management of the project.*
- *Ensuring Quality of meat/ meat products to cater and meet the demands of the domestic market.*
- *Proper disposal of effluents from the abattoir to prevent environmental pollution and possible public outrage.*

SELECTION OF SITE

8.1 INTRODUCTION

The proposed Modernization of Existing Slaughter House project will be installed in the 990 Sq.m plot of free hold land by NNJ at Bhagwantpura, Jhansi, Uttar Pradesh. All the major factors, which are essential towards selection of a most suitable site for setting up similar project, are analyzed with respect to the existing location and taken in to consideration. The factors are close proximity to NH/SH and Railways for procurement of raw materials, accessibility of local market/proximity and availability of socio-industrial infrastructures, which is one of the most important criteria in setting up of this type of industry.

The above points/factors as regards the selected site are discussed here.

8.2 PROXIMITY TO RAW MATERIALS

*The raw materials of the proposed project are live animals and the daily requirements by the Plant is meant for service purpose are to the extent of 30 nos. of Large Animals and 60 nos. of Small Animals. In order to run the units smoothly, at any point of time, there should be a regular supply of animals from the local butchers and farmers. Therefore to ensure the regular inflow of animals to the plant, the site must have close proximity to areas having higher density of animals. In Chapter-III – Availability of Raw Materials, it is estimated that as regards availability of buffaloes (based on 2012 census), assuming **2% growth rate**, in Uttar Pradesh State only in the year 2015-2016 stands at more than **51.18 million nos.** and that of considering adjoining 6 states is about **156.12 million nos.** For the Sheep and Goat the figure will be **1.37 million nos. and 16.04 million nos.** respectively only for Uttar Pradesh State and for adjoining 6 states it will be **12.29 million nos. for sheep and 70.61 million no. for goat** in consideration of growth rate of 3% for goat and 2% for sheep. The site is not much far from these adjoining states and well connected by state Highway so that animals are not required to be transported from far away.*

8.3 PROXIMITY TO MARKET

The products from the Slaughtering plant will be supplied to local markets of Nagar Nigam Jhansi area and surroundings. The products are chilled, fresh one and required to be transported to these markets as quick as possible. Therefore close proximity of NH/Roadways is most vital to achieve faster movement by means of refrigerated containers. The products from the proposed unit will be transported from Plant through State Highway. The product from service slaughtering for local consumption are required to be transported quickly as fresh meat.

8.4 AVAILABILITY OF SOCIO-INDUSTRIAL INFRASTRUCTURE

Since the site is located very adjacent to National Highway and other state roadways all socio-industrial infrastructures are readily available at the selected site. Therefore travel and stay of personnel connected with plant as well as plant and equipment suppliers; there would not be any difficulties.

As the site is located within municipality limits of a big city as well as industrial towns, availability of skilled workers are also assured.

MAN POWER SCHEDULE

9.1 INTRODUCTION

The proposed project is a manpower intensive unit, requires direct involvement of manpower. Because of its type the selection of proper manpower is a critical factor towards successful operation, maintenance and dispatch of the products. A detailed manpower schedule has been prepared based on hands on experience with similar plants.

Both the Large Animal as well as Small Animal Slaughter House will operate for 5 hrs for service purpose. It is proposed to run all the plants for 300 days a year and the manpower allocation is planned accordingly.

In addition to staff/workers under project's master roll, some essential operations in the abattoir will involve skilled laborers in specialized trade to be obtained from Labor Contractors. These include butchers, slaughtering process workers and cleaning workers.

*The proposed Modern Slaughter House Plant will have total employment of **24 heads** under its master roll. Out of which Administrative staffs are **10 heads**, Production and Maintenance staffs are **14 heads**. The Contractor's laborers are estimated as **12 heads**. The details regarding departments, grades and numbers thereof are tabulated below.*

*The total manpower requirement of the unit has been thus estimated as **36** out of which contractors' labors are about **12** and **24** are under direct master roll.*

9.2 MANPOWER IN ADMINISTRATIVE SECTION

<i>Sl.No.</i>	<i>Designation</i>	<i>Nos.</i>
1	Manager	1
2	Accountant	1
3	Security Guards	4
4	Refrigerated Van driver	4
	Total	10

9.3 MANPOWER IN PRODUCTION AND MAINTENANCE SECTION

<i>Sl.No.</i>	<i>Designation</i>	<i>Nos.</i>
1	Veterinarian – Lairage	2
2	Supervisor – Abattoir	2
3	Veterinarian – Abattoir	2
4	Supervisor – Dispatch	2
5	Operator– Blood	1
6	Electrician	1
7	Mech. Engineer - Abattoir Operation	1
8	ETP – Operator	1
9	Helper (General)	1
10	DG Set operator	1
	Total	14

The salaries of the above staff are worked out and presented in the Form VI – Project Economics. The salaries considered against individual are at par with similar units running in India. The Gross Salaries are estimated.

9.4 LABOURERS TO BE OBTAINED FROM LABOUR CONTRACTORS

<i>Sl.No.</i>	<i>Particulars</i>	<i>No. of Manpower</i>
<i>1</i>	<i>Animal slaughtering / dressing – Large</i>	<i>3</i>
<i>2</i>	<i>Animal slaughtering / dressing – Small</i>	<i>3</i>
<i>3</i>	<i>Plant cleaning</i>	<i>2</i>
<i>4</i>	<i>Lairage cleaning</i>	<i>2</i>
<i>5</i>	<i>General Cleaning (drainage, roads, garden, toilets, Adm. Building)</i>	<i>2</i>
<i>Total</i>		<i>12</i>

The payments to be made for the above are estimated and considered in the Project Economics. It is assumed that the rate will be revised upward after every 3 years.

PROJECT IMPLEMENTATION SCHEDULE

The project construction activities will be taken up in phase wise to keep the existing slaughter house running at a moderate level. The complete project schedule is estimated as 18 months from the zero date, when clearance is obtained from the competent authority to set up the project. The first phase of the project shall be completed by 10 months period, while the second phase is estimated to take about 5 months after the first phase is over. The final phase of the project will be completed by another 3 months time from the end of second phase.

The Phase wise distributions as proposed are provided below (Refer the Plant layout Drawing):

PHASE- I

- 1 *Lairage for Small Animal.*
- 2 *Slaughtering hall for Small Animal.*
- 3 *Lairage for Large Animal.*
- 4 *Slaughtering Hall for Large Animal.*
- 5 *Utility Block*

PHASE- II

- 1 *Effluent Treatment Plant*
- 2 *Blood Plant Building*
- 3 *Service road.*
- 4 *Installation of Electrical Equipment*

PHASE- III.

- 1 *Other Non Factory Buildings and construction.*
- 2 *Administrative Building.*

The above activities under each phase shall be taken up in a manner so that minimum hindrance takes place to existing activities of the slaughter house.

Bar charts are prepared for all the three (3) phases simultaneously covering all major activities and enclosed as Project Implementation Schedule. The duration of activities like delivery of plant & equipment are considered based on the quotations/offers received from the plant & equipment suppliers.

The site development activities of the proposed project will not be a major one as because the existing installation is already a developed site. Construction of approach road and internal road, repair of Boundary wall, landscaping etc are continuous process and will spread over major part of the schedule.

As regards construction of civil works & buildings, the activity is of maximum duration. The total Plant area is about 990 square meters, out of which the main plant area is about 890 square meters, i.e., more than 89% of the total area.

The durations of procurement activity of plant and equipment are estimated with due consideration on detailed design and engineering, preparation of tender enquiry, floating of tender, clarifications to vendors, selection and placement of orders and delivery of the items.

The delivery period of Indigenous suppliers are estimated on the basis of consultant experience on similar items and offers received from the suppliers.

The time required for erection & installation of Plant & Equipments have been estimated based on the type of equipment and experience of the consultant under normal operating condition.

The promoter of the project has to recruit personnel for project work and operation & maintenance of the plant in different phases.

Towards pre commissioning test & checks and commissioning of individual plant, adequate time period has been provided.

The Activity wise duration as estimated are given below:-

SL.NO...	CONSTRUCTION ACTIVITIES	DURATION
PHASE – I		<i>(Months)</i>
1.	<i>Lairage for Small Animal</i>	3
2.	<i>Slaughtering hall for Small Animal</i>	7
3.	<i>Lairage for Large Animal</i>	3
4.	<i>Slaughtering Hall for Large Animal</i>	8
5.	<i>Utility Block</i>	3
PHASE -II		
1.	<i>Blood Plant Building</i>	5
2.	<i>ETP Civil construction</i>	5
3.	<i>Service Road</i>	2
PHASE –III		
1.	<i>Administrative Block</i>	3
2.	<i>Other Non-Factory Buildings</i>	2
SL.No.	PROCUREMENT/ERECTION/COMMISSIONING	DURATION
		<i>(Months)</i>
1.	<i>Procurement of Small Animal Lines</i>	6
2.	<i>Procurement of Large Animal Line</i>	8
3.	<i>Procurement of Blood Coagulation Plant & Eqpt.</i>	6
4.	<i>Procurement of Electrical Substation Eqpt.</i>	4
5.	<i>Procurement of other Electrical Items</i>	4
6.	<i>Procurement of Balance Offsite Eqpt.</i>	5
7.	<i>Erection of Small Animal Slaughtering Line</i>	4
8.	<i>Erection of Large Animal Slaughtering Line</i>	6
9.	<i>Erection of Electrical Equipment</i>	8
10.	<i>Erection of Offsite Equipments & Electricals</i>	8
11.	<i>Pre-Commissioning Checks & Test</i>	3
12.	<i>Commissioning of Off-site & Main Plant</i>	2

Some of the activities as listed above under each phase of the project shall be carried out simultaneously to achieve the target dates of completion. The enclosed Bar Chart/Schedule is a preliminary one and Micro scheduling shall be carried out during project implementation stage. Mobilization of manpower and project fund in proper sequence & schedule are vital factors to maintain the progress of the project in right direction.

The project implementation schedule has been shown in bar chart as following.

PROJECT ECONOMICS

11.1 BASIS AND ASSUMPTIONS

The project economics presented here for establishment of Modernization of Existing Abattoir for Nagar Nigam Jhansi, Jhansi, Uttar Pradesh. It includes the estimate of Estimate of Civil Cost, Cost of Raw Materials & Utilities, Project Cost, Means of Finance, Cost of Production, Total Revenue Earning and Profitability analysis.

The complete project shall be implemented in 18 months time starting from zero date, the date of receipt of Sanction/Clearance of the project from competent authority. Various basis and assumptions considered for working out the Project Economics are provided below:

A) Installed Capacity of the Plant :

Large Animal Slaughtering Line: Capacity of 30 heads/day for 5 hours operation.

Small Animal Slaughtering Line: Capacity of 60 heads/day for 5 hours operation.

Effluent Treatment plant : 15 KL/ day

Electrical substation : 100 KVA, 11KV/415V

DG Set Supply System (Emergency Power): 100 KVA X 1, 415V.

B) Source of Procurement of Plant & Equipment :

The Main Plant and Equipment for both the slaughtering lines are considered to be sourced from reputed Indian Plant Manufacturers/ Suppliers.

D) Means of Finance:

Towards financing the project **Rs. 564.92 Lacs** is expected to be granted by MOFPI and the rest of the expenses will be financed by the Project Implementing Agency (NNJ).

All calculations are considered on commencement of commercial production and the gestation period is considered at the bare minimum of 15 months period.

Revenue prices have been considered most conservatively analyzing the current market rates. Moreover the effect of increasing prices over the years is not taken into account.

11.2 PROJECT COST

*The project cost including Pre- Operative expenses of Rs.127.73 Lacs and contingency of Rs. 21.24 Lacs has been estimated as **Rs. 1129.83 Lacs**. The various elements of project cost are discussed below.*

11.2.1 LAND & SITE DEVELOPMENT

*The total area of the land is about 990 square meter the cost of the landscaping will be Rs.5.00 lacs. Construction of boundary with two gates at a cost of Rs. 10.00 Lacs and cost of Demolition and Roofing will be Rs. 50.00 lacs. So total cost for this purpose Land & Site development will be **Rs. 65.00 Lacs**.*

11.2.2 BUILDINGS AND CIVIL WORKS

*The civil construction involves construction of foundations, flooring, brick wall, RCC roof and other offsite, administrative and non-factory buildings. The details of civil construction are provided. The sizes of the buildings in meat processing complex are worked out based on the information received from the equipment/machinery suppliers and past experience of the project consultants for similar project. The cost of structures, corrugated roof and erection thereof has been estimated based on unit rates applicable to similar type of construction. The total built up area is estimated as 1385 Sq.M. The total cost of civil works has been estimated as **Rs. 223.48 Lacs**.*

11.2.3 MAIN PLANT & EQUIPMENT

The cost of plants and equipment of abattoirs and that of Coagulation plant has been proposed to be installed have been estimated based on quotations received from reputed manufacturers. The details of the cost are given. The cost of supply is estimated based on similar projects.

The cost of packing & forwarding, taxes and duties and that of freight and transit insurance have been considered in estimating the delivered cost of the equipments. The cost of foundation and erection and stores & spares has been estimated separately.

The total cost for main plant and equipment in erected condition along with stores and spares have been estimated as **Rs 412.68 Lacs.**

11.2.4 PROJECT MANAGEMENT AND CONSULTANCY (PMC) SERVICES

The fees to be paid for PMC services @ 5 % of the Fixed Capital Cost including Service tax. The fees to be paid for PMC services towards basic Engineering preparation of Layout, RFQ/ RFP documentation etc for finalization of turnkey Contractor. Complete with Bid Process Management & periodic supervision & Monitoring of the Project for its implementation within schedule & budget.

11.2.5 MISCELLANEOUS FIXED ASSETS

The miscellaneous fixed assets are various offsite/utilities and other fixed assets required to be set up for the project other than buildings and main plant & equipment. It consists furniture, office equipment/machinery, electrical substation equipment (DP structure, switchgear unit, transformers, cables etc.), DG sets and control panel, lighting, cables, deep tube wells, hot water unit, refrigerated vans, pump and piping, fire fighting, drainage system, CCTV camera, hygiene equipments, quality control laboratory. The total cost against Miscellaneous Fixed Assets has been estimated as **Rs.233.00 Lacs.**

11.2.6 PRE-OPERATIVE EXPENSES

It includes Cost of Establishment (Rs. 20.00 lacs), Cost of Preparation of DPR and preliminary engineering (Rs. 5.62 lacs including ST), Cost of Insurance (Rs. 8.69 Lacs) With Cost of Escalation of 10% of fixed assets (Rs. 93.42 lacs). All total it costs **Rs. 127.73 Lacs.**

11.2.6.1 ESTABLISHMENT

Various pre-operative expenses to be incurred from the inception of the project to commissioning stage have been estimated and considered here. The establishment cost is the expenses to be incurred for paying salaries to project personnel and security staff during project implementation schedule. Based on 18 months project schedule and Rs. 1.11 Lacs per month, an amount of Rs.20.00 Lacs has been allocated for this head.

11.2.6.2 CONTINGENCY

Contingency @ 2% of Fixed Cost has been provided to cover unpredictable price escalation, currency exchange rate variation or any other changes for the cost of fixed assets.

11.3 MEANS OF FINANCE

The means of finance for funding the proposed project is proposed considering the grant from MOFPI, Govt. of India. The breakup of sources of fund is as below:

Total project cost : Rs. 1129.83 lacs

NNJ Contribution : Rs. 564.92 lacs

Grant from MoFPI, GOI : Rs. 564.92 lacs

11.4 OPERATING RESULTS

11.4.1 SCHEDULE OF PRODUCTION

The project implementation schedule of plant is estimated to be 18 months from the zero date.

Estimates of cost of production, sales realization and salaries & wages are presented respectively.

11.4.2 ESTIMATE OF COST OF PRODUCTION

The estimate of cost of production is presented as per standard pro forma.

Raw Materials: *The cost of feedstock for the proposed plant is not considered as the Plant will be for Service slaughtering purpose. The live stocks will be procured to the plant by the individual licensee butchers of local market. From the Plant they will have the service of modernize and hygienic slaughtered and fresh meat carcasses. By the means of plant's refrigerated vans the meat carcasses for local market will be delivered to individual butchers or meat sellers.*

Electricity is the main input for the proposed project. The plant will receive power at 11 KV from UPSEB power grid and same will be transformed to 415V in plant substation. The average unit rate of electricity to be obtained from UPSEB is considered as Rs. 7.50/KWH and that from DG sets at Rs.9.00/KWH. For estimating the cost towards electricity, 30% of total power requirement is considered to be generated by DG sets.

Total salary and wages for factory staff and labour contractors are also considered here.

Other plant overhead of repair and maintenance cost plus cost of insurance is considered also.

In this Total Cost of Production head Rs. 35.11 lacs per annum has been considered. It is presented in FORM-V.

11.4.3 TOTAL REVENUE EARNING

The annual sales from products and by-products have been calculated as Rs. 48.48 lacs per annum. It is presented in FORM-VII.

11.4.4 TOTAL PROFIT

The total profit has been calculated as the difference between the annual revenue earning and total cost of production.

Project economics are analyzed in form format as follows: