BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL

(PRINCIPAL BENCH)

Original Application No. 225 of 2022

In the matter of

Nitin Dhiman, 1203, Princeton Tower, Omaxe, Pakhowal Road, Ludhiana

.....Applicant

V/s

1. State of Punjab through Chief Secretary, Govt. of Punjab
2. State Pollution Control Board, Vatavaran Bhawan, Nabha Road, Patiala
3. Municipal Corporation, Ludhiana
4. District Magistrate, Ludhiana
5. Secretary Industries & Commerce, Punjab, Udyog Bhawan, Sector 17, Chandigarh.
6. Secretary Science & Technology, Punjab, Civil Secretariat -2, Sector 9-A, Chandigarh.
7. Punjab Dyers Association (for CETP Tajpur Road), 24, Navrattan Complex, Cheema Chowk, Ludhiana.
8. M/s. Bahadur Ke Textile & Knitwear Association Ltd., c/o Jain Shawls, Bahadur Ke Road, Industrial Zone, Ludhiana.
9. Punjab Dyers Association (for CETP Focal Points), SFC 36 (First Floor) Commercial Site, Phase-V, Focal Point, Ludhiana.

.....Respondent

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Submitted by

Monika

(Monika Sahni)
Deputy Secretary to Govt. of Punjab
Department of Industries & Commerce

Place: Chandigarh
Date: 30.01.2024

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.....Respondent

Reply on behalf of Principal Secretary, Department of Industries & Commerce, Punjab as Respondent No. 5 by Monika Sahni, Deputy Secretary to Govt. of Punjab, Department of Industries & Commerce in compliance to order dated 24.01.2023 of Hon'ble National Green Tribunal, New Delhi.

RESPECTFULLY SHOWETH

1. That the above captioned matter came up for hearing on 24.01.2023 before Hon'ble National Green Tribunal and the Hon'ble Tribunal was

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pleased to pass an orders, relevant portion of which is reproduced here as under:-

"In view of the averments made in the application and report of the Joint Committee we consider the presence of Principal Secretary, Industries Department and Principal Secretary, Environment and Forest, Government of Punjab to be essential for just and proper decision of the questions involved in the case and accordingly, Principal Secretary, Industries Department and Principal Secretary, Environment and Forest, Government of Punjab are ordered to be impleaded as respondents No. 5 and 6."

2. That in compliance to the above orders, it is submitted that three Common Effluent Treatment Plants (CETPs) for Textiles Dyeing Industry have been installed for treatment of effluent of the dyeing clusters located at Bahadurke Road (CETP 15 MLD), Focal Point (CETP 40 MLD) and Tajpur Road (CETP 50 MLD). About 198 member units are connected to these CETPs. All the CETPs are in operation and discharging their treated waste water into Budha Nallah. These CETPs are being monitored by the Punjab Pollution Control Board.

3. That 32 acres land of Central Jail, Ludhiana was provided on lease rent for a period of 33 years to Punjab Dyers Association with the approval of the Department of Home Affairs and Justice, Punjab for setting up of CETPs. This land was notified as Industrial Area by the Department of Industries and Commerce for facilitation of Environment Impact Assessment for setting up of CETPs. Subsequently, Punjab Dyer Association surrendered about 14 acre land out of 32 acre land to the Central Jail, Ludhiana. Later on, this 14

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acre land was allotted to the PSIEC for development of Focal Point for shifting of scattered Dyeing units.

4. That a meeting was organized with Prof. S.P. Gautam, Chairman, Central Pollution Control Board, on 25/11/2010 at 11.00 a.m. in his office at Parivesh Bhawan, East Arjun Nagar, New Delhi to sort out the issue regarding fixing up of the values of parameters namely Sodium Absorption Ration (SAR), Electric Conductivity (EC) & Residual Sodium Carbonate (RSC) for discharge of treated waste water of CETPs of dyeing Industries of Ludhiana for irrigation purposes. Minutes of meeting are annexed as **Annexure- R5-I**. In this meeting Executive Engineer, Sidhwan Canal Division, Ludhiana had submitted that they have adequate land measuring 80,000 acres which is sufficient to handle the volume of treated waste water during paddy crop cultivation period. He further informed that excess effluent during no demand period particularly in wheat season would be released into 6R distributary and would be sufficiently diluted for irrigation purposes. After detailed deliberations it was decided in the meeting that the following standards for discharge of treated waste water of CETPs are to be achieved.

Sr. No.	Parameters	Concentration in mg/l except pH, SAR, RSC & Bio-assay
1	pH	6.5-8.5
2	TSS	20
3	BOD (3 Days at 27°C	10
4	COD	50

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5	TDS	2100
6	Oil & Grease	Nil
7	Total Chromium	Nil
8	Phenolic Compounds	Nil
9	Sulfide	0.01
10	Bio-assay	90% survival of fish after 96 hours of 100% effluent.
11	SAR	7
12	RSC (meq/litre)	3

However, the following parameters as mentioned below shall be maintained after mixing of treated wastewater of the CETPs and treated domestic wastewater of STPs of Ludhiana. The Municipal Corporation, Ludhiana shall ensure that enough dilution through treated domestic wastewater is always made available so that the values of SAR, EC and RSC as mentioned below is achieved at all the times. The said Corporation shall provide necessary laboratory facilities at the confluence point of treated domestic sewage and treated CETP effluent to ensure the achievement of the parameters namely SAR and RSC at all the times.

Sr. No.	Parameters	Concentration
1	Sodium absorption ratio (SAR)	3.5
2	Residual Sodium Carbonate (RSC) meq/litre	2.5

5. That on the recommendations of Joint Committee constituted by this Hon'ble Tribunal, the consolidated reply of PPCB and Secretary Science, Technology and Environment are reproduced here as under:-

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S. No.	Recommendations of the Joint Committee	Consolidated reply of PPCB	Consolidated reply of SSTE
1.	As per the term & condition of the approval of the proposal for 15 MLD CETP by MoEF&CC, M/s Bahadurke Textile and Knitwear Association Ltd. shall undertake implementation of the second phase of the proposal to achieve Zero Liquid Discharge and shall submit the complete proposal alongwith timelines for necessary approval from MoEF&CC within three months.	The SPV, Bahadurke Road, Ludhiana is being persuaded to achieve the prescribed parameters notified by the MoEFCC and PPCB. The letter has been written to the SPV, CETP 15 MLD Bahadurke Road, Ludhiana with direction to adopt the ZLD scheme after getting necessary permissions/approvals from the MoEF&CC.	Punjab Pollution Control Board is being directed by the deponent to coordinate with the Special Purpose Vehicle of 15 MLD CETP for providing the timelines to implement second phase of the proposal to achieve Zero Liquid Discharge.
2.	As the CETPs of capacity 40 MLD and 50 MLD have now been installed by M/s Punjab Dyers Association; as a next step, the SPVs shall explore the possibility for utilizing the treated effluent onto land for plantation and irrigation and submit the complete proposal along with timelines, within 03 months.	The high concentration of the TDS parameter is the challenge in reusing the treated effluent of CETP directly for onto land for irrigation. The possibilities are being explored to reuse the treated effluent of CETP onto land for irrigation after mixing with the treated effluent of STP 225 MLD so as to have a Techno-Economical feasible solution for the disposal of CETP effluent. The SPV of CETP 50 MLD & CETP 40 MLD have been directed explore the possibility for utilizing the treated effluent onto land for plantation and irrigation and submit the complete proposal along with timelines.	Punjab Pollution Control Board is being directed by the deponent to coordinate with the Special Purpose Vehicle of 40 MLD & 50 MLD CETP for providing the timelines to explore the possibility of utilizing the treated effluent for onto land for irrigation within 3 months.
3.	The Department of Local Government, Punjab shall provide necessary facilitation to the Municipal Corporation, Ludhiana, so as to complete the installation of Sewage Treatment Plant (STP) 225 MLD at Jamalpur and STP 60 MLD at Balloke along with rehabilitation of existing STPs as per the timelines.	Report was sought from the Department of Local Government in this regard. As per the report, the Department of Local Government is already facilitating the Municipal Corporation, Ludhiana for the completion of STP 225 MLD at Jamalpur and STP 60 MLD at Balloke along with rehabilitation of existing STPs as per the timelines.	The STP of 225 MLD capacity at Jamalpur has already been commissioned. Further, the Department of Local Government is being requested by the deponent to facilitate the Municipal Corporation, Ludhiana for the completion of STP 60 MLD at Balloke along with rehabilitation of existing STPs as per the timelines.
4.	Government of Punjab shall issue necessary directions to Water Resources Department and Department of Soil & Water Conservation to explore the possibility and submit the complete time bound plan within 06 months for utilizing	• Report was sought from the Municipal Corporation, Ludhiana. As per the report, the project to reuse partially of the treated effluent of STPs is already under consideration under	Department of Soil & Water Conservation is being requested by the deponent to explore the possibility and submit the comprehensive plan for utilizing the treated wastewater of STPs, falling

	the treated wastewater of STPs for the purpose of irrigation and plantation, so that there shall be zero liquid discharge in the Budha Nallah.	Amrut Scheme by Municipal Corporation, Ludhiana. • The matter has been also under consideration of the Department of Soil Conservation to reuse the treated effluent of STPs for irrigation. • A letter has been written to the Department of Water Resources and Department of Soil Conservation to provide the scheme to reuse the treated effluent of STPs for onto land for irrigation.	in the catchment area of Budha Nallah for plantation & irrigation along with timeline.

6. That the recommendations No. 1 and 3 of Joint Committee do not relate to the Department of Industries & Commerce.

7. That as far as recommendation No. 2 and 4 of Joint Committee is concerned, in this regard, it is submitted that during the year 2010-11 it was decided by the State Govt. after consulting with Central Pollution Control Board, Punjab Pollution Control Board and Punjab Agriculture University that the following parameters as mentioned below shall be maintained after mixing the treated waste water of CETPs and treated domestic waste water of STPs of Ludhiana installed by the Municipal Corporation, Ludhiana so that value of SAR, EC and RSC of discharged treated waste water of CETPs is achieved at all the time and whole treated waste water of CETPs and STPs could be used for irrigation purpose through Budha Nallah and 6 R Distributary.

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Sr. No.	Parameters	Concentration
1.	Sodium absorption ratio (SAR)	3.5
2.	Electrical Conductivity (EC) µS/cm	2000
3.	Residual Sodium Carbonate (RSC) meq/litre	2.5

8. That in this regard, the Executive Engineer, Sidhwan Canal Division, Ludhiana had submitted that they have adequate land measuring 80,000 acres which is sufficient to handle the volume of treated waste water during paddy crop cultivation period. He further informed that excess effluent during no demand period particularly in wheat season would be released into 6R Distributary and would be sufficiently diluted for irrigation purposes. On 18.01.2010 the then Hon'ble Chief Minister, Punjab directed the Chief Engineer Canal, drainages of Department of irrigation and Chief Soil Conservator to submit a complete proposal within 30 days for utilization of treated waste water of CETPs for irrigation purposes and also a committee consisting of following members was constituted which shall supervise the standards of treated water to be supplied to the farmers for irrigation purposes.

(i) Chairman, Small Industries Development Board.

(ii) Chairman, Punjab Pollution Control Board or his representative.

(iii) Director of Industries & Commerce or his representative.

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9. That Department of irrigation (now Water Resources) had submitted the proposal/project report for using the treated waste water of CETPs and STPs for irrigation for grant of Environment Impact Assessment (EIA) for setting up of the CETPs at Tajpur Road to the PPCB. Copy of the report is annexed as **Annexure-R5-II.**

10. It is respectfully prayed that for use of the treated wastewater of CETPs and STPs for irrigation purpose through Budha Nallah and 6R Distributary, the proposal submitted by the Department of Irrigation in the month of May, 2012 shall be explored by PPCB, Secretary Science, Technology and Environment in consultation with Local Govt., Commissioner, Municipal Corporation, Department of Irrigation and Chief Conservator Soil and Water Punjab.

Certified that the Affidavit/SPA/GPA has been read over & Explained to the Deponent/Executant who seemed directly to understand the same at the time of making & signing the document.

Submitted by

Monika

(Monika Sahni)
Deputy Secretary to Govt. of Punjab
Department of Industries & Commerce

Place: Chandigarh
Date: 30.01.2024

VERIFICATION:

Verified that the contents of Para No. 1 to 10 of the above reply are true and correct to my knowledge as derived from the official record. No part of the above reply is false and nothing material has been kept concealed therein.

The Contents of this Affidavit/Document have been explained to the deponent/executants ... correct ... the Register at Sr. No. 1730 No. 117 dated 30.01.24

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Submitted by

Monika

(Monika Sahni)
Deputy Secretary to Govt. of Punjab
Department of Industries & Commerce

Place: Chandigarh
Date: 30.01.2024

ATTESTED AS IDENTIFIED
NOTARY PUBLIC, CHANDIGARH

Minutes of the meeting organized with Prof. S.P. Gautam, Chairman, Central Pollution Control Board, on 25/11/2010 at 11.00 a.m. in his office at Parivesh Bhawan, East Arjun Nagar, New Delhi to sort out the issue regarding fixing up of the values of parameters namely Sodium Absorption Ratio (SAR), Electric Conductivity (EC) & Residual Sodium Carbonate (RSC) for discharge of treated wastewater of CETP of dyeing industries of Ludhiana for irrigation purposes.

Following were present:

1. Sh. S.S. Channy, Principal Secretary to Govt. of Punjab Deptt. of Industries & Commerce, Chandigarh
2. Sh. J.S. Kaymotra, Member Secretary, Central Pollution Control Board, New Delhi
3. Dr. Babu Ram, Member Secretary, Punjab Pollution Control Board, Patiala
4. Sh. Vinod Chaudhary, Chief Engineer (Drainage), Punjab
5. Dr. O.P. Choudhary, Sr. Soil Chemist, Punjab Agricultural University, Ludhiana
6. Sh. S.P. Singh, OSD, Department of Industries & Commerce, Punjab, Chandigarh.
7. Sh. V.P. Singh, Superintending Engineer, (O & M) Municipal Corporation, Ludhiana
8. Sh. R.S. Walia, Executive Engineer, Sidhwan Canal Division, Ludhiana
9. Sh. G.S. Majithia, SEE, Punjab Pollution Control Board, Zonal Office-2, Ludhiana
10. Sh. Harsh Bhanwala, Sr. Vice President, M/s IL & FS Water Ltd., Jaipur
11. Sh. Sudhir Mathur, Manager, M/s IL & FS Water Ltd., Jaipur
12. Sh. Ashok Kumar Makkar, Managing Director, Punjab Dyers Association, Ludhiana
13. Sh. Vivek Kumar Jindal, Secretary, Punjab Dyers Association, Ludhiana

At the outset, Dr. Babu Ram, Member Secretary, Punjab Pollution Control Board apprised that earlier, Punjab Pollution Control Board in consultation with Central Pollution Control Board on 26/11/2009 had prescribed the following standards to be achieved at the outlet of CETP:

Sr. No.	Parameters	Concentration (mg/l except pH, SAR & Bio-assay)
1.	pH	6.5-8.5
2.	TSS	20
3.	BOD (3 DAYS AT 27°C)	10
4.	COD	50
5.	TDS	2100
6.	Oil & Grease	Nil
7.	Total Chromium	Nil
8.	Phenolic Compounds	Nil
9.	Sulfide	0.01
10.	Bio-assay	90% survival of fish after 96 hours of 100% effluent.
11.	Sodium Absorption Ratio (SAR)	5

He added that Punjab Dyers Association (PDA), Ludhiana vide its office letter no. 32/PDA/CETP/LDH dated 28/9/2010 informed that the value of SAR is more stringent than required for irrigation and it will have huge impact on the treatment technology and in order to attain this value of 3, much expensive equipments/ treatment systems are required to be installed. Thus, the revised standards as prescribed for general standards for discharge into in land surface water/ discharge of irrigation may be fixed at the outlet of CETP. The matter was also discussed by PDA in the meeting held under the Chairmanship of Principal Secretary to Hon'ble Chief Minister, Punjab on 27/10/2010 at 5.00 p.m., wherein, the issue regarding relaxation of value of SAR to 18 was also raised by Sh. Harsh Bhanwala, Senior Vide President, M/s IL & FS Water Ltd. However, in the meeting, it was apprised that the value of SAR must be maintained 3 because no treated water having SAR more than 3 can be allowed to discharge into Budha Nallah further leading to River Sutlej whose water is used for irrigation and drinking purposes in the South-Western District of State of Punjab. Therefore, in the said meeting, it was decided that Hon'ble Chief Minister, Punjab shall hold a meeting with Chairman, Central Pollution Control Board in this regard very shortly, where the issue of SAR shall be discussed. Accordingly, Hon'ble Chief Minister, Punjab convened a meeting on 2/11/2010 with Chairman, Central Pollution Control Board with regard to setting of CETP by PDA. In the said meeting, it was decided that another meeting may be convened with expert of PAU, Ludhiana on 10/11/2010 under the Chairmanship of Hon'ble Chief Minister, Punjab as the Chairman, Central Pollution Control Board desired to know a report of Agricultrual Department on the issue that for how long the soil can be irrigated with the discharge water coming out from the CETP.

Thus, during the meeting held on 10/11/2010 under the Chairmanship of Hon'ble Chief Minister, Punjab, Dr. O.P. Chaudhary, an expert in water quality from Punjab Agricultural University, Ludhiana informed that the standard for SAR fixed as 3 is acceptable value in view of end use of treated wastewater on to land for irrigation for about 50 years and also its discharge into River Sutlej. He further opined that the TDS parameter may be repiaced with Electrical Conductivity (EC) to be equivalent to 2000 µS/ cm for making the water useable for irrigation. He further added that one more parameter namely Residual Sodium Carbonate (RSC) to assess the alkalinity hazard of the effluent may also be introduced, the limit of which may be 2.5 meq/litre. He further felt that the limit of irrigable land measuring 40,000 acres in catchment area of River Sutlej, can be doubled for wheat crop. During the said meeting it was informed by Sh. Amarjit Singh Dullt, Chief Engineer (Canals), that they have got adequate land measuring approximately 80,000 acres which include 18000 acres in the upstream of Budha Nallah and 22000 acres in catchment area besides 40,000 acres already available for irrigation. But excess treated effluent during no demand period particularly in

wheat season would be released into 6R distributary and would be sufficiently diluted for irrigation purpose. After detailed deliberations following decisions were taken:-

1. Department of Industries and Commerce shall go ahead for finalization of DPR by Project Management Consultant (PMC) and further implementation of the project.

2. PAU and PPCB shall collect and analyze the dyeing effluent samples for studying the value of SAR, EC, and RSC parameters and shall submit its report within one week. In this regard PAU, PPCB and Irrigation Department shall sit together and work out the modalities of dilution of treated waste water and adequacy of land available in the command area in view of the standards fixed above for utilizing the treated wastewater for irrigation as well as for its release (if any) into River Sutlej during monsoon season.

Accordingly, Punjab Pollution Control Board and Punjab Agricultural University, Ludhiana have collected the effluent samples of 32 industries on 12/11/2010 and their analysis results in terms of SAR, EC and RSC are as under:

Sr. no.	Name and Address of the Industry	Industrial process	Type of sample collected	Colour of the samples	Parameters Tested			
					Effluent dish. (KLD)	SAR	EC (µS/cm)	RSC (me/L)
1.	M/s Modern Processors, 24-A, Industiral Area-A (Extn),	Dyeing of acrylic yarn/ polyester	un-treated	Light blue	100	1.84	1118	-2
2.	M/s Pritam Scientific Dyers, 16-A, Industrial Area-A, (Extn), Ludhiana	Dyeing of acrylic	un-treated	Light green	250	1.64	1400	3.5
3.	M/s Sunshine Dyeing Pvt. Ltd, 261-A, Industrial Area-A, Ludhiana	Cotton/ PC	un-treated	Violet	500	135.54	16710	36.5
4.	M/s R.P. Processors,	PC/ cotton mix	un-treated	Light violet	450	18.44	4520	12

	848/11, Industrial Area-A, Ludhiana							
5.	M/s Rajneesh Dyeing House, 17-B, Industrial Area-A (Extn), Ludhiana	Acrylic/ wool	un-treated	Light blue	**100**	**12.56**	**3800**	**2.5**
6.	M/s Madan Dyeing and Finishing Factory, Textile Colony, Ludhiana	Acrylic yarn/ polyester	un-treated	Dark black	**450**	**2.13**	**984**	**2**
	Average Industrial Area-A				**308**	**28.7**	**47.55**	**9.08**
	Average Industiral Area-A excluding Sunshine Industry mentioned as at Sr. no. 3				**270**	**7.33**	**2364**	**3.6**
	Weighted average					**8.23**	**2458**	**5.35**
7.	M/s A.K. Dyeing House, Geeta Nagar, Tajpur Road,	Acrylic	un-treated	Slight pink	**370**	**2.02**	**687**	**2.5**
8.	M/s K.B. Dyeing, Geeta Nagar, Tajpur Road, Ludhiana	Acrylic	un-treated	Brown	**100**	**1.56**	**1325**	**0.5**
9.	M/s R.S. Dyeing, Geeta Nagar, Tajpur Road, Ludhiana	Acrylic yarn	un-treated	Light violet	**200**	**1.89**	**853**	**3.5**
10.	M/s Woolco Dyers, St. no. 6, Geeta Nagar, Tajpur Road, Ludhiana	Acrylic yarn	un-treated	Brownish violet	**100**	**1.50**	**802**	**5**
11.	M/s M.R. Dyeing and Finishing Mill, Geeta Nagar, Tajpur Road, Ludhiana	Acrylic/ polyester	un-treated	Violet	**400**	**1.39**	**898**	**5.5**

12.	M/s G.P. Dyeing, Geeta Nagar, Tajpur Road, Ludhiana	Acrylic	un-treated	Grey	150	1.45	962	7
13.	M/s Master Art Processors, Mata Karam Kaur Colony, Tajpur Road, Ludhiana	Cotton garments	un-treated	Grey	60	2.30	1165	6.5
14.	M/s Lovely Industries, Tajpur Road, Ludhiana	Acrylic/ polyester	un-treated	Light black	400	3.1	1370	4
15.	M/s New Amba Dye, Tajpur Road, Ludhiana	Acrylic yarn	un-treated	Light green	120	2.32	1156	10
16.	M/s N.V. Processors, 117, Mahavir Jain Colony, Tajpur Road,	Acrylic/ polyester, PC	un-treated	Violet	400	15.93	3690	6
17.	M/s Madhok Scientific Dyers, Tajpur Road, Ludhiana	Acrylic yarn/ polyester	un-treated	Brownish	120	3.08	1035	7
18.	M/s Kairvi Processors, Tajpur Road, Ludhiana	Acrylic yarn/ polyester	un-treated	Dark violet	150	2.24	726	8.5
19.	M/s Yogi Dyeing, Tajpur Road, Ludhiana	Polyester cotton	un-treated	Light pink.	600	12.17	1683	9
	Average Tajpur Road				244	3.92	1258	5.77
	Weighted average					5.75	1456	5.84
20.	M/s Marvel dyers and Processors Ltd., Rahon Road, Ludhiana	Polyester / cotton	un-treated	Blackish	1000	12.06	1860	20
21.	M/s B.L. Malhotra Dyeing Works, Rahon Road, Ludhiana	Acrylic/ polyester	un-treated	Light violet	300	8.77	3040	2.5
22.	M/s Bhandari Hosiery, Rahon Road, Ludhiana	Cotton	un-treated	Light blue	400	3.71	1076	5
	Average Rahon Road				567	8.19	1992	9.17

	Weighted average					9.52	1883	13.38
23.	M/s BM Processors, Focal Point, Phase-8, Ludhiana	Acrylic	un-treated	Light pink	350	1.50	835	3.5
24.	M/s Ramal Dyeing House, Focal Point, Phase-8, Ludhiana	Acrylic/ polyester mix	un-treated	Greyish	600	5.69	1854	9
25.	-do-	Acrylic/ polyester mix	un-treated	Light blue	600	5.60	1800	15.5
26.	M/s Rubby Dyeing and Finishing Mills, D-277-A, Focal Point, Phase-8, Ludhiana	Acrylic/ polyester	un-treated	Light grey	400	1.33	840	6
27	M/s S.K. Kohli Textile Industry, E-664, Focal Point, Phase-8, Ludhiana	Acrylic	un-treated	Dark grey	250	2.29	1024	6.5
28	M/s PVM Enterprises, Focal Point, Phase-8, Ludhiana	Cotton polyester mix	un-treated	Yellowish	600	1.46	1115	3
29	M/s Amar Industries Ltd., Plot no. C-258, Focal Point, Phase-8, Ludhiana	Polyester	un-treated	Light grey	800	2.81	975	16.5
30	M/s Mahesh Dyeing House, 287, Focal Point, Phase-8, Ludhiana	Acrylic	un-treated	Light pink	350	1.80	792	6
31	M/s VH Scientific Dyers, Focal Point, Phase-8, Ludhiana	Acrylic/ polyester	un-treated	Grey	400	12.67	3340	14
32	M/s Dhawan Processors, E-670, Focal Point, Phase-8, Ludhiana	Acrylic/ polyester	un-treated	Dark grey	250	1.57	754	7.5
	Average Phase-8, Focal				460	3.68	1333	8.75

	Point, Ludhiana							
	Weighted average					**3.83**	**1375**	**9.67**
AVERAGE of Total Samples Excluding Sunshine Industry mentioned at Sr. no. 3						**4.74**	**1538**	**7.18**

The above analysis results indicate that 6 effluent samples collected from Industrial Area-A had average discharge of 308 KLD, the values of SAR = 28.7, EC = 4755 µS/cm and RSC= 9.1 meq/litre. Effluent of the one industry namely M/s Sunshine Dyeing Pvt. Ltd. had abnormally high values of all the parameters (SAR=135, EC=16710, RSC = 36.5). Excluding these parameter the average of effluent from Industrial Area-A comes to SAR = 7.33, EC = 2364 and RSC = 3.6.

Thirteen samples collected from Tajpur Road area had the average of discharge of 244 KLD, the values of SAR = 3.92, EC = 1683 µS/cm and RSC= 5.8 meq/litre.

Rahon Road effluents (3 samples) had average discharge of 567 KLD, the values of SAR = 8.2, EC = 1992 µS/cm and RSC= 9.2 meq/litre.

Ten samples from Focal Point, Ludhiana had average discharge of 460 KLD, the values of SAR = 3.68, EC = 1333 µS/cm and RSC= 8.75 meq/litre.

- **Overall average of Results**

1) SAR = 4.74
2) EC = 1538 µS/cm
3) RSC = 7.2 meq/litre

- **Weighted Average Value of SAR**

Sr. no.	Name of Cluster	SAR Values of IL & FS Water Ltd.	SAR Values as per analysis of PPCB and PAU
1.	Industrial Area-A	61.27	8.23
2.	Tajpur Road	6.13	5.75
3.	Rahon Road	23.04	9.52
4.	Focal Point	10.36	3.83
	Weighted average	**17.36**	**5.46**

- **Weighted Average of other parameter as per analysis of PPCB and PAU**

Sr. no.	Name of Cluster	EC (µS/cm)	RSC (meq/litre)
1.	Industrial Area-A	2458	5.35
2.	Tajpur Road	1456	5.84
3.	Rahon Road	1883	13.38
4.	Focal Point	1375	9.67
	Weighted average	**1593**	**8.11**

- **Availability of dilution**

The wastewater of STP Bhattian, which is being presently discharged into River Sutlej, is required to be diverted back to Budha Nallah in order to have sufficient dilution.

- **Availability of land**

Total land available for disposal as reported by CE (Canal) = 80,000 acres

1) For paddy crops, about 40,000 acres is sufficient
2) For wheat crops = 80,000 acres + excess effluent to be released into 6R distributary
3) Requirement of land during paddy crops = 1500 acres/day

- **ANALYSIS RESULTS OF TREATED WASTEWATER OF STP BHATTIAN AND BALLOKE, LUDHIANA**

Sr. no.	Name of STP	Type of Effluent	Type of sample collected	Colour of the effluent	Parameters Tested			
					Effluent discharge (KLD)	SAR	EC (µS/cm)	RSC (me/L)
1.	STP Bhattian, Ludhiana	Domestic effluent	treated	Almost clear	**111000**	**5.14**	**1867**	**5**
2.	STP Balloke, Ludhiana	Domestic effluent	treated	Light greyish	**152000**	**2.43**	**1415**	**3**

The analysis results of the treated wastewater of STP Bhattian and Balloke reveal that there is higher value of SAR in the treated sewage of STP Bhattian as compared to STP Balloke, which may probably due to mixing of untreated industrial effluent into the domestic sewage. The parameters from STP Balloke reveal that the domestic effluent can sufficiently dilute the treated effluent from CETP in terms of SAR and EC.

On the basis of the above data, the estimates of the parameters after mixing un-treated industrial effluent (without CETP) and treated domestic effluent (through STP) are:

i) SAR = 4.0

ii) EC = 1500 µS/cm

iii) RSC = 5.0 meq/litre

Thus, the standards proposed by PPCB and PAU, Ludhiana are achievable after treatment of the industrial effluent through CETP.

The Member Secretary, PPCB further apprised that the said analysis results were discussed in the meeting taken by the Hon'ble Chief Minister, Punjab on 16/11/2010, wherein, members of SPV contended that the analysis results given by M/s IL & FS indicated the value of SAR as 18 and as such, it will not be possible for the SPV to achieve the standard of SAR = 3 even with the level of dilution available from the treated sewage of STPs. The representative of M/s IL & FS, further expressed that in order to bring SAR = 3, expensive equipments like RO system is required to be installed which will not be economically viable for SPV. He requested that the standard of SAR as proposed by PPCB as 7 at the outlet of CETP may be relaxed. The detailed deliberation in the matter was made and it was decided that a joint team consisting of officers of PPCB, PAU, M/s IL & FS and PDA shall collect the composite samples of the raw effluent of dyeing industries and these may be analyzed by PAU in the presence of representative of M/s IL & FS.

Accordingly, the team consisting of officers of the said departments jointly conducted the composite sampling of raw effluents on 18/11/2010 and 22/11/2010. The analysis results of these samples in terms of SAR, EC and RSC are given as under:

Sr. no	Name & Address of the Industry	Type of Product	Dis. (KLD)	Parameters		
				SAR	EC (µS/cm)	RSC (me/L)
1.	Jain Uday Ind. (P) Ltd.D-43,44 & 57,58 Focal Point, Phase-5	Polyester Cotton	300	25.11	4940	6
2.	Maharaj Processors, C-39, Focal Point, Phase-5	Polyester Cotton/ Polyester	550	5.96	3300	0
3.	Sailopal Dyeing Works, d-96, Focal Point, Phase-5	Woolen Yarn/ Fabric	50	10.47	4320	0
4.	Saachi Processors (P) Ltd, 3-A, Focal Point, Phase-5	Polyester Cotton/ Acrylic	700	42.63	7900	15.5
5.	Kudu Knit Process, C-	Polyester	530	5.31	1558	12

	219, Focal Point, Phase-8	Cotton				
6.	P.V.M Enterprises, #342 D, Focal Point, Phase-8	Polyester Cotton	400	7.22	2480	1
7.	Ruby Dyeing & Finishing Mills, D-277A, Focal Point, Phase-8	Acrylic Yarn/ Polyester	320	4.60	1598	0
8.	Dhawan Processors, # E-670, Focal Point, Phase -8	Acrylic Yarn/ Polyester	400	1.92	1015	0
9.	R.P. Processors, 848/11 Ind. Area-'A'	Polyester Cotton	410	20.09	4170	4
10.	Pritam Scientific Dyers, 6-A Ind. Area-'A'	Acrylic Yarn	250	2.30	1047	0
11.	Berry Scientific Dyers, Tajpur Road	Acrylic/ Polyester	85	2.05	1052	0
12.	Maharaja Dyeing and finishing Mills, Tajpur Road	Polyester	560	3.44	1590	0
13.	New Amba Dyeing Mahaveer Colony, Tajpur Road	Acrylic Yarn	577	2.22	1125	0
14.	Lovely Industries, Tajpur road	Acrylic/ Polyester	246	2.19	986	1
15.	Balak International, Jawal Complex, Tajpur Road	Polyester/ Cotton	300	7.04	2530	0
16.	Golden Processors, Vill Bhamian, Tajpur Road	Polyester/ Cotton	200	4.49	858	2.5
17.	Prem International, Shiv Mandir Gali, Tajpur Road	Polyester Cotton/ Cotton/ Acrylic yarn	300	17.90	3030	5
18.	Oriental Knitfeb Pvt. Ltd, 278, Ind. Area-A	Polyester/ Cotton	557	11.70	5560	2
19.	Madan Dyeing Finishing works, J-1, Ind. Area-'A'	Polyester/ Wool Top/ Acrylic yarn	507	2.57	1069	1
20.	Gian Chand Dyeing Works Vill Bajra, Rahon Road	Polyester Cotton	371	2.66	2680	1
21.	Barkat Dyeing Works, seera Road, Vill. Meharban	Polyester Fibre/ Acrylic yarn	468	2.66	1340	0
22.	Pawan Dyeing & fiishing Mills, Vill Bajra	Acrylic Yarn/ Polyester Cotton/ Cotton Fibre	414	14.72	5730	2

23.	M/s Rampal Scientific Dyers 216, Industrial Area-A, Ludhiana	Acrylic/ polyester yarn	300	4.06	1332	4
24.	M/s Punjabi Dyeing, Industrial Area-A, Ludhiana	Cotton/ Polyester Cotton	200	4.49	1592	0
25.	M/s Satyam Scientific Dyers, Industrial Area-A, Ludhiana	Acrylic	150	2.19	1342	0
26.	M/s OM Processors, K-3, Textile Colony, Industrial Area-A	Polyester Cotton	300	81.35	12700	0
27.	M/s Deluxe Fabrics, Focal Point, Phase-6, Ludhiana	Cotton / Polyester Cotton	600	6.47	2920	0
28.	M/s Raghav Woolen Mills, Focal Point, Phase-6, Ludhiana	Acrylic/ wool Top	550	9.43	2390	3.5
29.	M/s Golden Enterprises, Focal Point, Phase-6	PC/ Cotton	550	16.26	4070	0
30.	M/s V.H. Scientific Dyers, Focal Point, Phase-8, Ludhiana	Acrylic/ polyester	300	6.63	2550	0
31.	M/s Super Tex Processors, A-3, Focal Point-5,	Dyed Fabric, PC/Cotton	600	20.76	4850	7.5
32.	M/s Navyug Laminates, C-124, Focal Pont, Phase-5	Dyed Polyester & Acrylic	100	1.63	789	0
33.	M/s Gulab Dyeing, D-83, Focal Point, Phase-5, Ludhiana.	Dyed Fabrics, PC/ Cotton and Polyester	500	16.27	3890	0
34.	M/s Shaan Dyeing Company, Vill. Seera Rahon Road	Acrylic Yarn	335	1.69	924	0
35.	M/s Marbel Dyers & Processor (P) Ltd., Meharban (Rahon Road	Polyester Cotton	390	20.62	4130	0
36.	M/s G.P. Dyeing. Geeta Nagar, Tajpur Road, Ludhiana	Acrylic yarn/ Polyester Yarn	120	1.35	929	0
37.	M/s Anmol Dyeing, Geeta Nagar, Tajpur Road, Ludhiana	Polyester	300	1.82	834	1
38.	M/s Yogita Collection, Tajpur Road	Polyester/ Cotton	500	4.43	1605	4.5
39.	M/s N.V Processors, Tajpur Road,	Polyester/ Polyester	415	4.94	1369	2.5

	Ludhiana	Cotton				
40.	M/s Mahavir Dyeing and Finishing Mills, Tajpur Road, Ludhiana	Cotton/ Polyester	300	24.98	4950	10
41.	M/s Aman Processor, Shiv Mandir Gali, Tajpur Road,	Acrylic/ Polyester	100	1.77	847	1.5
42.	M/s Sangam Dyeing House, Textile Colony, Ind. Area-A	Acrylic/ Polyester	290	5.36	1706	3

Averaged over the above results, the weighted values of 3 parameters are given below:

i) SAR = 11.0
ii) EC = 3031 µS/cm
iii) RSC = 2.7 meq/litre

After mixing of industrial effluent (117 MLD) without CETP and treated domestic effluent (239 MLD), the weighted average of the above 3 parameters shall be as under:

i) SAR = 5.25
ii) EC = 1946 µS/cm
iii) RSC = 2.9 meq/litre

If the treated of STP Bhattian (111 MLD) is diverted to Budha Nallah, the value of the 3 parameters after mixing of industrial effluent (117 MLD) without CETP and treated domestic effluent (350 MLD), the weighted average of the above 3 parameters shall be as under:

i) SAR = 4.58
ii) EC = 1819 µS/cm
iii) RSC = 2.92 meq/litre

It is further mentioned here that out of these 42 samples, there are 2 industries (Sr. no. 4 and 26), which are having exceptionally high value of these parameters. If these industries are excluded for computing, the values the weighted average of the parameters are as under:

i) SAR = 8.3
ii) EC = 2597 µS/cm
iii) RSC = 2.1 meq/litre

After mixing of industrial effluent (117 MLD) without CETP and treated domestic effluent (239 MLD), the weighted average of the above 3 parameters shall be as under:

i) SAR = 4.36
ii) EC = 1803 µS/cm
iii) RSC = 2.7 meq/litre

If the treated of STP Bhattian (111 MLD) is diverted to Budha Nallah, the value of the 3 parameters after mixing of industrial effluent (117 MLD) without CETP and treated domestic effluent (350 MLD), the weighted average of the above 3 parameters shall be as under:

iv) SAR = 3.90
v) EC = 1711 µS/cm
vi) RSC = 2.77 meq/litre

In view of the above, the following revised standards are proposed:

Sr. No.	Parameters	Concentration in mg/l except pH, SAR, RSC & Bio-assay
1.	pH	6.5-8.5
2.	TSS	20
3.	BOD (3 Days at 27°C)	10
4.	COD	50
5.	TDS	2100
6.	Oil & Grease	Nil
7.	Total Chromium	Nil
8.	Phenolic Compounds	Nil
9.	Sulfide	0.01
10.	Bio-assay	90% survival of fish after 96 hours of 100% effluent.
11.	SAR	7
12.	RSC (meq/litre)	3

However, the following parameters as mentioned below shall be maintained after mixing of treated wastewater from the CETP and treated domestic wastewater of STPs of Ludhiana and Municipal Corporation, Ludhiana shall ensure that enough dilution through treated domestic wastewater is made available so that the values of SAR, EC and RSC as mentioned below is achieved at all the times:

Sr. No.	Parameters	Concentration
1.	Sodium absorption ratio (SAR)	3.5

2.	Electrical Conductivity (EC) µS/cm	2000
3.	Residual Sodium Carbonate (RSC) meq/litre	2.5

During the meeting, the Chairman, Central Pollution Control Board asked the representatives of M/s IL & FS Water Ltd., as to whether they have done the chemical analysis of all effluents and what simulation they have performed to have fingerprinting of analysis of all effluents with them. Sh. Harsh Banwal, Senior Vice President, M/s IL & FS, Water Ltd. informed that they have carried out the simulation modeling for the analysis of all the effluents and stated that they are convinced with the analysis results of effluent samples(collected jointly by the team consisting of PAU, Ludhiana; Punjab Pollution Control Board; M/s IL & FS Water Ltd. and PDA, Ludhiana) analyzed by PAU, Ludhiana. Sh. Banwala further shared that they have calculated the value of SAR after dilution of untreated wastewater without the CETP and treated domestic wastewater which comes out to be 4.0.

The Chairman, Central Pollution Control Board asked Dr. O.P. Choudhary as to whether he is satisfied with the fixation of revised standards as proposed above for i.e. for SAR = 7, RSC = 3 meq/litre and TDS = 2100 mg/l at the outlet of CETP. Dr. O.P. Choudhary explained that the above standards are very well achievable at the outlet of the CETP keeping in view of the analysis of 42 composite samples carried out by the team. He stressed that the RSC which is more important parameter to be kept in mind for using effluent for agricultural purposes and it should not be greater than 2.5 meq/litre at the confluence point of the treated wastewater from CETP and treated domestic wastewater. Dr. O.P. Choudhary further suggested that some dyeing industries processing cotton/ polyester cotton, which have exceptionally higher SAR values (>25) in the raw effluent, should make appropriate changes in their chemicals and/ or processes so that the value of SAR shall not be high. In fact, some of their counterparts are processing cotton/ polyester cotton but have relatively lower values of SAR and EC in their raw effluents.

The Principal Secretary to Govt. of Punjab, Deptt. of Industries & Commerce, Chandigarh submitted that the value of available land at Tajpur Road is already high and the Govt. cannot allow additional land for proposed CETP at Tajpur Road and therefore, the consultants shall give such a technology which may be sufficient enough to meet with the standards at the outlet of CETP.

Sh. Vivek Kumar Jindal, Secretary, Punjab Dyers Association, Ludhiana submitted that M/s IL & FS should recommend such a design for CETP, which should be

capable to achieve the proposed CETP standards within the proposed cost of setting up of CETP. Sh. Harsh Bhanwala, Senior Vice President, M/s IL & FS Water Ltd., submitted that they have no objection for fixation of value of TDS = 2100 mg/l, SAR = 7 and RSC = 3 meq/litre in addition to other parameters as prescribed at the outlet of CETP. The project management consultant (Sh. Harsh Bhanwala) further submitted that they are confident and will give proper design of CETP which shall meet with the outlet wastewater quality standards at the outlet of CETP as proposed above.

Sh. R.S. Walia, Executive Engineer, Sidhwan Canal Division, Ludhiana also submitted that they have adequate land measuring 80,000 acres which is sufficient to handle the volume of treated wastewater during paddy crop cultivation period. He further informed that excess effluent during no demand period particularly in wheat season would be released into 6R distributary and would be sufficiently diluted for irrigation purposes.

After detailed deliberations, it was decided in the meeting that the following standards are fixed for the treated effluents at the outlet of CETP:

Sr. No.	Parameters	Concentration in mg/l except pH, SAR, RSC & Bio-assay
1.	pH	6.5-8.5
2.	TSS	20
3.	BOD (3 Days at 27°C)	10
4.	COD	50
5.	TDS	2100
6.	Oil & Grease	Nil
7.	Total Chromium	Nil
8.	Phenolic Compounds	Nil
9.	Sulfide	0.01
10.	Bio-assay	90% survival of fish after 96 hours of 100% effluent.
11.	SAR	7
12.	RSC (meq/litre)	3

However, the following parameters as mentioned below shall be maintained after mixing of treated wastewater from the CETP and treated domestic wastewater of STPs of Ludhiana. The Municipal Corporation, Ludhiana shall ensure that enough dilution through treated domestic wastewater is always made available so that the values of SAR, EC and RSC as mentioned below is achieved at all the times. **The said corporation shall provide necessary laboratory facilities at the confluence point of treated domestic sewage and treated CETP effluent**

to ensure the achievement of the parameters namely SAR, and RSC at all the times:

Sr. No.	Parameters	Concentration
1	Sodium absorption ratio (SAR)	3.5
2	Residual Sodium Carbonate (RSC) meq/litre	2.5

However, the Electrical Conductivity (EC) shall be maintained 2,000 µS/cm as discussed earlier.

The meeting ended with vote of thanks to the Chair.

ਪੰਜਾਬ ਪ੍ਰਦੂਸ਼ਣ ਰੋਕਥਾਮ ਬੋਰਡ

PUNJAB POLLUTION CONTROL BOARD

Zonal Office-II, 3rd Floor, Savitri Complex-I, Dholewal Chowk, G.T. Road, Ludhiana.

Ph. 0161-2533350 E-Mail: seezo2ldhppcb@yahoo.com

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No. 7083 Date 03/9/12

ANNEXURE R5-2

To

The General Secretary,
Punjab Dyers Association,
24, Navrattan Complex,
Cheema Chowk,
Ludhiana.

Sub: **100% Treatment of Wastewater at Ludhiana *(Project estimate for the domestic sewer of Ludhiana City after treatment at sewage treatment plant through Budha Nallah and by constructing net work of distributing / water courses)*.**

It is intimated that the Government of Punjab, Dept. of Science, Technology & Environment, Chandigarh has forwarded a scheme on the subject cited matter as prepared by Department of Irrigation, Punjab.

A copy of the said report is enclosed for your record and further necessary action in the matter relating to Environmental Clearance of the proposed CETP.

DA/As above

Ludhiana 3/9/12

Environmental Engineer
Senior Environmental Engineer

PART-1 (PAGE NO.1 TO 170)

GOVT. OF PUNJAB

DEPARTMENT OF IRRIGATION

PROJECT ESTIMATE

FOR

THE DOMESTIC SEWERAGE OF LUDHIANA CITY AFTER TREATEMENT AT S.T.P. THROUGH BUDHA NALLA AND BY CONSTRUCTING NET WORK OF DISTRIBUTORY/WATER COURSES.

Estimated Cost

137.67 Crores

MAY.2012

Chief Engineer/ Canals
Irrigation Works/Punjab
Chandigarh

PROJECT ESTIMATE FOR THE DOMESTIC SEWERAGE OF LUDHIANA CITY AFTER TREATMENT AT STP THROUGH BUDHA NALLAHA AND BY CONSTRUCTING NET WORK OF DISTRIBUTARY/WATER COURSE.

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CHECK LIST FOR PREPARATION FOR DETAILED PROJECT REPORT TO BE SUBMITTED FOR LOANS UNDER RIDF

1	**IRRIGATION PROJECTS**	
i	**Name of Project**	PROJECT ESTIMATE FOR THE DOMESTIC SEWERAGE OF LUDHIANA CITY AFTER TREATMENT AT STP THROUGH BUDHA NALLAHA AND BY CONSTRUCTING NET WORK OF DISTRIBUTORY/WATER COURSE.
ii	**Districts covered**	Ludhiana, Moga
iii	**Project Outlay (Rs.Crore)**	Rs.137.67 Crores

S.No.	Item	Remarks	Furnished (Yes /No)
1	**Genral**		
i	Whether the project is prioritized by the State Govt.	The Govt. of Punjab has decided to prevent the direct discharge of polluted water of Sewerage System and Industrial discharge into the Rivers passing through the Territory of State.	No
ii	Whether the project submitted through the Nodal Dept.	Through PID	No.
iii	Whether the project included in the State Plan	It is proposed to be funded by the Nabard.	No
2	**Clarence from (Wherever applicable)**		
i	Ministry of welfare (involving rehabilitation & resettlement)	No rehabilitation & resettlement is involved	No
ii	Administrative Approval	Yes, required	No
iii	Technical Sanction	Yes, Required	No
iv	Land Acquistion-Extent,status and time frame	Land required= 82.23 Acre approximately, Land Acquisition process will be started after Technical and financial sanction of the project. This disty. is proposed to be constructed primarily on the surplus abandoned land	Yes (Calculations for land require attached)

		of the Grey Canal System and Budha Nalla along its present alignment. If the land is further required for the smooth running of the channel and to straighten up its alignment at later stage. the same will be assessed and acquired after wards.	
3	**General Profile**		
i	Objectives of the Project	To prevent the direct discharge of polluted water of Sewerage System and Industrial discharge of Ludhiana city into the River Sutlej. The present condition of Budha Nalla is causing acute health problems to the people of Ludhiana city & these districts. Beside this, the water habitation of River Sutlej is being affected to the large extent due to this highly polluted water. Even the density of trees is decreasing alongside the the Budha Nalla due to this highly polluted water. **All these factories have necessitated to treat the highly polluted water of Budha Nalla and utilize this for irrigation purposes for approximately 13543 Ha CCA and to increase the production of State.**	Yes
ii	Salient features of Project Area	• Land Classification:- Based on soil survey- sandy clay. • Topographical features:-Low lying belt in between Budha Nalla and River Sutlej. , • Drainage:- Good , • Soil Characteristics:- Sandy Clay.	Yes
4	**Agro-economic survey**		
i	Demographic and social characteristics	• Population:- Low density • Farm size:- Average • Land use:- Agriculture but not utilized to its full potential due to lack of irrigation facilities. • Land holding pattern/farm size distribution:- Average Size Land holding.	No
ii	Cropping Pattern	Existing and proposed cropping pattern and yields-as per detailed attached in T-9 & T-8	Yes

iii	Agricultural support services	Extension services and supply of inputs, marketing, credit arrangement:- Poor	No
5	**Technical Aspects**		
i	Surface Water Projects		
a	Location and suitability of the project area	This project proposal falling in District Ludhiana and Moga in the low lying belt running parallel to the left side of the River Sutlej. There is lack of irrigation facility for the said area at present as the area does not fall within the irrigation 'Chakk' area of Sirhind canal system.	Yes
b	Source of water	The sewage /effluent of Ludhiana city and Industry after treatment by 4 No. STP /CETP	Yes
c	Catchment Area	152.60 Sq. Miles as per information collected from Drainage Department..	No
d	Rainfall	Data Attached	Yes
e	Hydrology	As per hydrological studies of the three Rivers (Sutlej , Ravi , Beas) conducted prior to the construction of Ropar Head Works, based on the flow series of 1921-60, the average flow in the rivers has been assessed as 34 MAF, which comprises 14 MAF, 13 MAF , 7 MAF for river Sutlej , beas and Ravi respectively.	Yes
f	Design of dam, weir, barrage etc.	N.A.	No
g	Design of main canal ,branch canals, distributaries	Typical drawing attached	Yes
h	Any other relevant detail	Attached at suitable places.	Yes
i	Status of land acquisition	Land required= 82.23 Acre approximately, Land Acquisition process will be started after Technical and financial sanction of the project. This disty. is proposed to be constructed mainly on the surplus abandoned land of the Grey Canal System and Budha Nalla along its present alignment. If the land is further required for the smooth running of the channel and to straighten up its alignment at later stage. the same will be assessed and acquired after wards.	No
j	Submergence area	N.A.	No

	under reservoir and canals/distribution system.		
ii	**Ground water porjects**		
a	Location	N.A.	
b	Geological formation	N.A.	
c	Hydrogeolgy	N.A.	
d	Ground Water avilability	N.A.	
e	Design of wells	N.A.	
f	Specification of Pumping machinaery	N.A.	
g	Available discharge from the	N.A.	
h	Srtructures	N.A.	
i	I command area of structures any other relevant detail.	N.A.	
6	**Financial Aspects**		
i	Schedule of rates adopted (Whether updated to current costs)	The analysis of rates of various items have been prepared and attached. Rates provided are as per common schedule of rates 2010 plus sanctioned zonal premium operative w.e.f. 5.12.2011.	Yes
ii	If, not whether cost proposed will be sufficient to create the assets.	N.A.	No
iii	**Cost Estimate**		
a	Item-wise cost of project	As per detailed attached	Yes
b	Item wise expenditure incurred	Nil	No
c	Item wise cost of balance works	This is a new project and execution of work for this project will be started after receipt of funds.	No
d	Item wise RIDF loan	95% of the project cost	No
e	Item wise State Govt. Contribution year wise phasing of RIDF loan and	Three year phasing schedule.	Yes
f	State Govt.Contribution	5% of the project cost	No
g	Bar/PERT/CPM charts.	N.A.	No

h	Specific justification for high cost of development	The sewage /effluent of Ludhiana city and Industry after treatment by STP /CETP will be utilized for irrigation purpose. To construct the New Disty in the existing abandoned land of the Gray Canal system of the Budha Nalla parallel to River Sutlej in the low lying area. Huge Number of pucca structures e.g bridges, syphon crossing, aqueducts ,escapes, Cross regulator, heavy earth work filling to construct the proposed disty and paralle drains are required to be constructed. Hence high cost involved.	Yes
7	**Benefits and justification**		
	Overall impact of the project need to be assessed and detailed	The project provided to prevent the direct discharge of polluted water of Sewerage System and Industrial discharge into the River Sutlej. At present, the highly polluted water containing many harmful contents due to direct discharge of Sewerage of Ludhiana city and Industrial discharge of dying industry passing through Buddha Nalla is being discharge into River Sutlej at the out skirts of Ludhiana city. Due to usage of River Sutlej water for drinking purposes in the Eastern & Southern part of Punjab including District Bathinda, Ferozepur, Faridkot, Mukatsar Sahib etc., and the present condition of Budha Nalla is causing acute health problems to the people of these districts. Beside this the water habitation of River Sutlej is being affected to the large extent due to this highly polluted water. Even the density of trees is decreasing alongside the the Budha Nalla due to this highly polluted water. All these factors have necessitated the treatment of this highly polluted water of Budha Nalla and utilize this for	Yes

		irrigation purposes for approximately 13543 Ha CCA and to increase the agricultural production of Punjab State. After the completion the project SOCIO-ECOLOGICAL AND ENVIRONMENTAL condition of the people of the State living long side the proposed disty. and Budha Nalla will be improved considerably besides the increase in production of the agricultural land thus improving the financial position of the small farmers of the area.	
8	**Operation and Maintenance**		
	Arrangements for O/M inc.involverment of water user's Association/User Groups,Water charges.	After the construction of disty the operation and maintenance cost to be borne by the PID. Water Charges will be applicable as per Government Policy from time to time.	No
9	**Infrastructure Facilities**		
i	Organizational structure of the implementing Dept.	Attached (Annexure B)	Yes
ii	Capacity and preparedness of the implementing Dept. and status of implementation of earlier sanctioned projects.	The Punjab Irrigation Department is fully equipped with necessary establishment and infrastructure for implementation of the said project.	No
iii	Quality control infrastructure and mechanism	Attached (Annexure C)	Yes
iv	Availability of labour	The work will be executed on the contract basis as per departmental norms and the required labour will be arranged by the contractor. However, the labour is easily available in the said region.	No
v	Budget provision		
a	For contribution to State share	As per State Government Policy	No
b	For subsequent O&M	As per State Government Policy	No
c	For repayment of loans-Principal and interest.	As per State Government Policy	No
10	**Project Risks**		

i	Land acquisition	No problem anticipated at present.	No
ii	Rehabilitation and resettlement	Not required.	No
iii	Forest clearance	Will be obtained, if required at the time of execution.	No
iv	Railway/road crossings	Not involved.	No
v	Construction hazards	No problem anticipated	No
vi	Any other risk.	No.	No
11	**Convergence with any other programme.**	No.	No

PROJECT ESTIMATE FOR THE DOMESTIC SEWERAGE OF LUHDIANA CITY AFTER TREATMENT AT STP THROUGH BUDHA NALLAHA AND BY CONSTRUCTING NET WORK OF DISTRIBUTORY/WATER COURSE.

SALIENT FEATURES

1	Total Cost of the Project	=	Rs. 137.67 Crores
2	Location of the Project Area	=	In the Districts Ludhiana , Moga and Ferozepur
3	Name of the Village Benifited	=	Walipur Kalan, Banjawal, Ghamneweal,Talwandi Nauabad, walipur Khurd, Allwal, Bhundri, Gorsian Kadar Bakhsh Talwara, Shekh Kutab, Bhani Ariyan , Salempura, Sidhwan Bet, Shafipura,Madepura, Abupura, Perjian, Kaniyan , Flusani, Gidder Wirdi, Kekar Partti, Mund Tihera, Munnaberpura, Terf Kotli , Patti, Multani, Shahbazur Kanian Kalan, Chak Kanian Kalan, Kanian Khurd, Chak Fatehpur, Fatehpur, Kanian , Jindra, Thoothgarh , Doburji, Badduwal, Dhamkot.
4	Total Length of Proposed Disty.	=	53.54 KMs.
5	GA to be covered	=	38472 Acres /15755 Ha.
6	CCA to be covered		33454 Acres/ 13544 Ha.
6	Type of Canal	=	Unlined
7	Benefited Area	=	30109 Acres./12190 Ha
8	Benefit Cost Ratio (B.C.Ratio)	=	1.52:1

Sub Divisional officer
Sidhwan Canal Sub Division
Ludhiana.

Sub Divisional officer
Zira Canal Sub Division
Zira

Sub Divisional officer
Moga Canal Sub Division
Moga.

Executive Engineer
Sidhwan Canal Division
Ludhiana.

PROJECT ESTIMATE FOR THE DOMESTIC SEWERAGE OF LUHDIANA CITY AFTER TREATMENT AT STP THROUGH BUDHA NALLAHA AND BY CONSTRUCTING NET WORK OF DISTRIBUTORY/WATER COURSE.

BENEFIT COST RATIO

1	Name of Scheme	=	PROJECT ESTIMATE FOR THE DOMESTIC SEWERAGE OF LUHDIANA CITY AFTER TREATMENT AT STP THROUGH BUDHA NALLAHA AND BY CONSTRUCTING NET WORK OF DISTRIBUTORY/WATER COURSE.
2	Length of Scheme	=	53.54 Kms
3	Total cost of Project	=	137.67 Crore
4	G.A.	=	15755 Ha
5	CCA	=	13544 Ha
6	Existing Irrigation	=	1354 Ha
	BENEFITTED AREA		
	Additional irrigation potential created (13544-1354) = 12190	=	12190 Ha
	Total	=	12190 Ha

INCOME FOR 100 HA.

Before Project

Value of production (In Lacs)		Cost of Cultivation (In Lacs	Benefit (In Lacs	See Table T-13	
139.67		50.57	89.1		

After Project

Value of production (In Lacs)		Cost of Cultivation (In Lacs	Benefit (In Lacs	See Table T-13	
154.29		50.57	103.72		

Increase in income per 100 Ha

TOTAL INCOME

1.Income in benefit of crops

103.72-89.10=14.62/100 Ha

121.90 x 14.62 = 1782.18

MAINTENANCE COST

	Saving in annual Maintenance cost after Lining			Nil
	As per previous studies @ 39.23% of unlined expenditure			Nil
	Total Benefit per Ha			Rs. 1782.18 Lacs
	EXPENDITURE			
1	PROJECT COST			13767 Lacs
2	Annual interest @ 6.5%			894.86
3	Depreciation charges @2%			275.34
	TOTAL			1170.2
	Economics of the project/benefits cost ratio 1782.18/1170.20			1.52:1
	Required benefit cost ratio			1.5:1

PROJECT ESTIMATE FOR THE DOMESTIC SEWERAGE OF LUDHIANA CITY AFTER TREATMENT AT STP THROUGH BUDHA NALLAH AND BY CONSTRUCTING NET WORK OF DISTRIBUTORY/WATER COURSE.

MAIN ABSTRACT OF COST

Part-I

	DIRECT CHARGES	AMOUNT IN RS.LACS
A	A-Preliminary	43.00
B	Land	2878.03
C	Works	19.95
D	Regulator	633.40
E	Falls	19.25
F	Cross Drainage Works	1767.00
G	Bridges	942.00
H	Escapes	402.88
I	Navigation works	0.00
K	Building	51.92
L-1	Earth Work	66.50
L-2	Lining	0.00
M	Plantation	0.00
N	Tanks & Reservoirs	0.00
O	Misc.	18.76
P	Maintenance	105.06
Q	Special T& P	1.58
R	Communication	0.00
S	Power Plant & Electrical System	0.00
T	Water supply works	0.00
U	Distributaries, Minors & Sub Minors	0.00
V	Water Courses and field channels	0.00
W	Drainage	0.00
X	Environment & Ecology	0.00
Y	Losses & Stock and Unforeseen	26.26
	Total Direct Charges	6975.59
	Indirect Charges.	207.83
	Total	7183.42
	Say	**137.67 Cr.**

Executive Engineer
Sidhwan Canal Division
Ludhiana.

Superintending Engineer
Sirhind Canal Cirlce
Ludhiana.

CHAPTER 1
INTRODUCTION

Part-1

i. GENERAL INTRODUCTION

The State of Punjab has sub-tropical climate and is located in the North western Part of India between 29-32 N and 32-31 N latitude and between 73-52' E and 76-55' E Longitude. It is bounded by Jammu & Kashmir in the North, Himachal Pradesh in the north-east, Haryana in the south and Rajasthan in south west and has a long border with Pakistan in the west.

The Punjab State economy is agriculture based with 70% of its population depending upon farming or agriculture based industries. The Irrigation water is the most important input for agriculture sector and in addition to this the improved varieties of seeds and adequate amount of fertilizer for further boosting agriculture production. Since both surface and ground water sources have been fully utilized, Govt. of Punjab recognized that increase of production would depend entirely upon improved efficiency of water use. It is pertinently brought out that Punjab having a geographical area of only 1.5% of the country, contributes more than 50% of the food stock of the central pool owing to untiring efforts of hard working farming community of the state and making the best use of available land and water resources of the state.

The growth in the agriculture sector remained in the vicinity of 2% for the last many years against an overall growth rate of about 8%.The wheat-paddy cropping pattern which is highly water intensive, thrive to a large extent on under ground water resources on account of inadequate availability of surface waters. The ever decreasing levels of water table require pumping of water from comparatively deeper aquifers which require greater consumption of fuel/electricity which is not abundantly available. The sluggish growth rate in agriculture is attributed mainly to increasing cost of agricultural inputs which is putting a tremendous strain on the socio-economic condition of the farmers. Agriculture production is directly linked to availability of water for irrigation and upkeep of its infrastructure. Punjab is the major contributor of wheat and rice to the national kitty and faced with a huge resource-crunch, finds it difficult to fund the schemes.

Punjab is an agrarian economy and most of the people are dependent on agriculture as their source of income. The state has been able to meet substantial food requirement of the country with unprecedented agriculture growth after the green revolution. The total cultivable area of Punjab is 42.90 lac hectare out of which 30.88 lac hectare has been brought under canal command. As such canal network of the state is of prime importance to sustain the agriculture.

Owing to the consecutive lowering of the ground water table with passing time the dependence on canal water for agrarian needs has substantially increased. So the canal system needs extension, improvement & up-gradation. If it is achieved it will help to reduce the pressure on ground water and increase optimal utilization of surface water. The underground water in south western Punjab is alkaline and is not fit for irrigation and drinking purpose. This cause extra stress on demand of canal water.

ii. INTRODUCTION OF PROPOSED DISTRIBUTARY (LUDHIANA CITY STP)

After studying the topography of the area it is found that only the belt of the area falling between the Budha Nalla and the River Sutlej can be irrigated with the treated water of STPs/CETPs, by constructing and open channel connected with the network of water courses at suitable points. Under this scheme, sewage of Ludhiana city and highly polluted water discharge from the industry in general and dying industry in particular will be utilized for irrigation after treatment by STP/CETP plants at Balloke, Jamall pur, Tajpur and Bahadar ke villages . This proposed distributary will be construed by utilizing Govt. land lying surplus due to abandoning of Grey Canal System for the last more than 50 years. At present the capacity of Balloke STP is 152 MLD, which is proposed to be increased by 105 MLD, the total capacity of this STP will be 257MLD (102.80 Cs.), similarly the capacity of Jamallpur STP will be increased from 48 MLD (19.20 Cs.) to 96 MLD ie 40 Cs. Apart from that 112 MLD and 38 MLD discharge of CETP Tajpur and Bhaderke respectably will be treated . The discharge of all STP's & CETP's will be 503 MLD (201 Cs.). The proposed Distributary has been designed for 220 Cs. discharge, keeping in view the present discharge of existing Budha Nallaha at R.D 150000 feet which is off take of the proposed distributary. The total length of proposed Disty. is 175600 feet Approx. out falling into 6-R Disty. at R.D. 2300 feet . The capacity statement has been prepared accordingly. At present the effluent water of STP is directly being discharged through Budha Nallaha into River Sutlej. After construction of proposed distributary, 33454 acres G.A/C.C.A. of 35 nos villages falling under Ludhiana and Moga Distt. will be irrigated .The water allowance has been proposed @ 5.5 Cs per thousand acres. However, during periods of lean/no demand or during flood season the treated effluent will be directly discharged into the river Sutlej. It is pertinent to brought out here that the water for irrigation will be supplied through the treatment plants under the control of Sewerage Board/ Municipal Corporation and the acceptability of the water by the farmers will entirely depend upon the treatment of water as per norms set by the Pollution Control Department/ any other relevant

department for the same. Therefore if the farmers refuse to consume the said water, the onus of this will be entirely of the department responsible for carrying out operation/supervision of the treatment plants. This scheme will be published under the IMO Para No. 4.2 and implemented under the Canal & Drainage Act 8 of 1873.

iii. EFFECTS OF PROPOSED DISTRIBUTARY.

At present, the highly polluted water containing many harmful contents due to direct discharge of Sewerage of Ludhiana city and Industrial discharge of dying factories carried by Buddha Nalla is being discharge into River Sutlej at the out skirts of Ludhiana city. Due to usage of River Sutlej water for drinking purposes in the Southern part of Punjab including District Bathinda, Ferozepur, Faridkot, Mukatsar etc., This present condition of Budha Nalla is causing acute health problems to the people of Ludhiana city & these districts. Beside this the water habitation of River Sutlej is being affected severly due to this highly polluted water. Even the density of trees is decreasing alongside the the Budha Nalla due to this highly polluted water. All these factories have necessitated the treatment of the highly polluted water of Budha Nalla and utilize this for irrigation purposes

iv. SUB HEAD WISE PROVISIONS MADE IN THE PROJECT ESTIMATE ARE DISCUSSED BELOW :-

A-Preliminary

A provision of Rs. 43.50 Lac has been made under this sub-head for the work of leveling, survey, observing X-Sections etc.

B-Land

A provision of 19.28 Acre for Disty, 22.95 acre land for drain, 40 Acre land for compensation for disputed to be required has beem made in the estimate . A total provision of Rs..2878.03 Lac has been made under sub head..

C-Works

Construction of 57 Nos. outlets /Tail Cluster has been made in this project. A provison of Rs. 19.95 Lac has been made under this Sub Head.

D-Regulator

A provison of Head Regulator and Cross Regulator At RD 0 of New proposed Disty and Budha Nalla , in take structure at RD 2300 of 6-R Disty and tail RD 175600 of proposed disty has been made in the estimate . A total provision of Rs.633.40 Lac has been made under this sub-head.

E-Fall

A provision of Construction of 1 No. fall at RD 132200 of proposed disty . A provision of Rs.19.25 Lac has been made under this sub-head.

F-Cross Drainage Works

A provision of construction of 11 Nos Syphon crossing , 3 Nos Syphon aqueduct crossing and 1 No. Syphon crossing cum Bridge has also been made in the Project Estimate. A total provision of Rs.1767.00 Lac has been made in this sub head.

G-Bridges

A provision of construction of 47 Nos. bridges has been made in the Project Estimate. A total provision of Rs.942.40 Lac has been made in this sub head.

H-Escape

A provision of 1 No Escape cum regulator at RD 11000 of proposed disty.has been made in the project estimat. A total provision of 502.88 Lacs has been made under sub head..

I-Navigation Works

No provision has been made under this sub-head.

K-Building

A provision of construction of 6 Residential required for employees has been made in the project estimate. A total provision of Rs. 51.92 Lac has been made in this sub head.

L-(i) Earth Work

Provision of Rs.6650 Lac has been made under this sub head.

L-(ii) Lining

No provision has been made under this sub-head.

M-Plantation

No provision has been made under this sub-head.

N-Tanks & Reservoir

No provision has been made under this sub-head.

O-Miscellaneous

A Provision of running of vehcial, Distance marks and Boundry pills, Sign Boards/Indification boards, inaugural ceremonies, technical reords, photographs and inaugural ceremonies etc. has been made in the project estimate A total provision of Rs. 18.76 Lac has been made under this sub head.

P-Maintenance

A Provision of Rs.105.06 Lac has been made under this sub head.

Q-Special T & P

A Provision of Rs.1.58 Lac has been made under this sub head for purchase of. computers, Fax machines, photostat machines etc.

R-Communication

No provision has been made under this sub-head.

S-Power Plant & Electrical System

No provision has been made under this sub-head.

T - Water Supply Works

No provision has been made under this sub-head.

U - Disty, Minor & Sub Minors

No provision has been made under this sub-head.

V - Water Course & Field Channel

No provision has been made under this sub-head.

W - Drainage

No provision has been made under this sub-head.

X-environment and ecolocy

No provision has been made under this sub-head.

Y - Losses Stock & Unforeseen

Provision of Rs. 26.26 Lac has been made under this Sub head.

Indirect & Escalation Charges

A provision of Rs.207.82 Lac under the sub head has been made.

The analysis of rates of various items have been prepared and attached. Rates provided are as per common schedule of rates 2010 plus sanctioned zonal premium operative w.e.f. 5.12.2011.

The total cost of this Project Estimate has been worked out to be Rs 137.67 Crores.

Sub Divisional officer
Sidhwan Canal Sub
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Ludhiana.

Sub Divisional officer
Moga Canal Sub
Division
Moga

Sub Divisional officer
Zira Canal Sub
Division
Zira.

Executive Engineer
Sidhwan Canal Division
Ludhiana.

Superintending Engineer
Sirhind Canal Circle
Ludhiana.

CHAPTER 2

THE PROJECT AREA

2.1 GENERAL

The project of unlined proposed distributary R.D. 0 to R.D. 175600 is a new peroject. The water allowance of the area falling under this distributary is 5.5 Cusecs per thousand Acres at outlet head. The water used for this project is a treated effluent from 4 No. STP's/CETP's of Ludhiana area.

2.2 TOPOGRAPHY AND SOILS

This project proposal falls in District Ludhiana and Moga in the low lying belt running parallel to the the River Sutlej on its left side. The topography of the area is gently graded having low lying area patches at several places.
The soil in the project area is generally sandy having contents of silt and loam. The soil in general has good drainage characteristics.

2.3 CLIMATE AND RAINFALL

The climate of this area i.e.(of District Ludhiana, Moga and Ferozepur) is of sub-tropical monsoon type having wet hot summers and cold dry winters. Temperature in the area can rise as high as 47^0 C in summer months and as low as 5^0 C in the winters. About 85% rain fall occur during Kharif season. Mean Rainfall, Mean wind speed, Mean Temperature and mean Relative Humidity are given in table T-2

This area is quite suitable for irrigation but due to lack of good irrigation facility the yield per acre is very low. The proposed canal will help in enhancement of yield capacity per acre substantially.

2.4 EXISTING CROPPING PATTERN

There are two crop seasons in Punjab, Kharif season from April to October and Rabi seasons from November to March. Paddy, maize, pulses etc. are grown during Kharif seasons. Wheat rape seed and mustard are the main crop of rabi season. However fodder crops such as jowar during kharif and barseem during rabi season are also grown. Paddy-wheat is the main crop rotation of this area. The existing cropping pattern is given in Table-3.

2.5 HYDROLOGY

As per hydrological studies of the three Rivers (Sutlej , Ravi , Beas) conducted prior to the construction of Ropar Head Works, based on the flow series of 1921-60, the average flow in the rivers has been assessed as 34 MAF, which comprises 14

MAF, 13 MAF , 7 MAF for river Sutlej , beas and Ravi respectively.

2.6 SOCIO- ECOLOGICAL AND ENVIRONMENTAL ASPECTS.

At present, the highly polluted water containing may harmful contents due to direct discharge of Sewerage of Ludhiana city and Industrial discharge of dying industry carried through Buddha Nalla is being discharged into River Sutlej at the out skirts of Ludhiana city. Due to usage of River Sutlej water for drinking purposes in the Southern part of Punjab including Distict Bathinda, Ferozepur, Faridkot, Mukatsar etc., This present condition of Budha Nalla is causing acute health problems to the people of Ludhiana city & these districts. Besides this the water habitation of River Sutlej is being affected severly due to this highly polluted water. Even the density of trees is decreasing alongside the Budha Nalla due to this highly polluted water. All these factors have necessitated the treatment of highly polluted water of Budha Nalla and utilize this for irrigation purposes.

CHAPTER 3

THE PROJECT

3.1 PROJECT OBJECTIVES

The pressure of increasing population has led to the necessity of finding all possible means of increasing the production of food grain. Improved and extensive irrigation facilities are therefore required to meet with the growing demand of irrigators and good crops for increasing production.

The project has been drawn up with the following objectives:-

1. To reduce the pressure on underground water table.
2. To utilize the treated effluent for irrigation purpose.
3. To prevent the direct discharge of polluted effluent of Ludhiana city into the River Sutlej.
4. To increase the production of agriculture in the state.
5. To improve the socio- ecological and environmental condition.

3.2 SURVEYS AND INVESTIGATION

Hydraulic surveys of the proposed new channel shall be undertaken for its proper designing. Full data in regard to the existing structures, foundations and soils shall be observed for detailed designing of works.

3.3 EARTHWORK

The quantities of earthwork of proposed disty. have been estimated from R.D. 0 to 175600 feet, abstract of quantities is as under:-

Sr. No.	Item of Work	Unit	Quantity
1	Earthwork	1000cum	2876.87
2	Compaction of Earthwork	1000cum	1716.52
3	Dressing of Earthwork	1000 sqm	806.42

3.4 DESIGN AND CONSTRUCTION METHOD

The proposed channel shall be constructed as unlined as per methodology adopted for unlined section.

Complete hydraulic survey of the new proposed unlined distributary shall be under taken and Longitudinal Section prepared after double leveling. Cross sections shall be observed at suitable intervals to work out the details of earthwork and L-section shall be prepared after thorough consideration in respect of economy and operational efficiency of every defined reach after proper techno-economic survey. The average lead of 5.0 Km for earthwork have been taken for preparing analysis of rates. Detail estimate shall be prepared for this distributary before the starting of work. This is necessary to have proper control over the execution and expenditure.

DESIGN PARAMETER

This disty. proposed to be constructed as un- lined in the first phase, which will be lined subsequently at later stage. The design section of the unlined disty. is proposed by keeping the berm 2xD, where D is Full Supply Depth of the Distributary (Typical drawing attached), by keeping in view the topography of the field. The banks have been proposed as per C.D.O instructions and site requirements. The value of regeosity coefficient 'N' is 0.0225 for unlined channel. The design calculations for sections of disty. are enclosed. The parallel drains on right/ left side from R.D 10000 feet to 110000 feet and from R.D 140000 feet to R.D 160000 feet respectively have been proposed to maintain the existing drainage system . The alignment of proposed disty. is running parallel to the River Sutlej on its left side, hence siphon crossings have been proposed at suitable interval to safe guard the nearby area and disty. from flood water. The alignment of proposed channel is kept as already existing alignment of old disty. & old Budha Nalah to minimize the requirement of new land acquisition. .

3.5 CONSTRUCTION METHOD

This unlined channel is proposed to be constructed in the land of existing old Budha Nala and old Grey Canal System. As the proposed distributary is a new channel so the work for execution shall be carried out continuously from the start of work.The work will be executed by the 3 No's Sub-Divisions of the Sidhwan Canal Division. The quality of work shall be cross checked by the CTE Patiala and other research wings of the department. The pucca structures shall be constructed after the drawing/ design is approved by the competent authority.

The earthwork shall be executed through labour intensive method. The compaction of earthwork, which is of paramount importance for safety of the channel, shall be got done using a sheep footed rollers. Special compactors driven by compressed air

may also be used to compact the earth in pockets or where sheep footed roller can not work. A dry bulk density of 90% of the maximum dry density of the natural soil shall be attained in each layer of compacted earth (The maximum dry density of soil generally ranges between 1.6-2.7 g/cm^3 for soil and checked at site after compaction of each layer.

The earthwork and structures shall be undertaken through labour intensive method. Machines shall however be used for compaction of earthwork, concrete mixing, dewatering and for transportation of men and material. The work shall be got done through contractor employed through competitive bidding as per departmental codal rules.

CHAPTER 4

COST ESTIMATE

4.1 GENERAL

Cost estimate are in general based on the prevailing Common Schedule of Rates 2010 with Latest prevailing Sanctioned Premium 6/12/2011. The total cost of the project works out to Rs. 137.67 Croroes

4.2 ESTIMATE OF QUANTITIES

The project includes about 53.54 KM length of proposed unlined channel. The quantity of earthwork has been worked out from typical cross-section observed for different reaches at suitable interval.

4.3 RATES

The project cost has been computed as per prevailing rates as per Common Schedule of Rates 2010 with Latest prevailing Sanctioned Premium 5/12/2011. The labour and carriage rates applied are as provided in the departmental schedule of rates + SP (6/12/2011). The rates for most of pucca works has been taken as per estimate of similar type of structures. For the new structures for which similar type estimates are not available, the provision for these are taken on lump sum basis. However, the detailed estimate shall be prepared after proper design and drawing approved by the competent authority before the time of execution.

4.4 COSTS

The costs are worked out at the prevailing rates in 6/12/2011. the total cost of the project works out to be 137.67 Crores. Analyses of rates for various items of work have also been attached as annexures. Detail abstract of cost is depicted in Annexure A-1.

CHAPTER 5

ORGANIZATIONAL SETUP AND NEEDS

The present Sidhwan Canal Division comprising of 3 Sub Divisions is under Sirhind Canal Circle, Ludhiana which is further under the Chief Engineer/Canals, Irrigation works Punjab, Chandigarh. One No. Asstt. Research officer (Together with supporting staff) will attached with the Division for maintaining the quality check. The chart showing the organizational setup is attached.

5.1 IMPLEMENTATION OF THE WORKS SCHEDULE

As the proposed distributary is a new channel so the work for execution shall be carried out continuously from the start of work. The work will be executed by the 3 No's Sub-Divisions of the Sidhwan Canal Division, Ludhiana. The works shall be executed by equally distributing among the 3 No. sub Divisions names Sidhwan Canal Sub Division, Ludhiana, Moga Canal Sub Division Moga and Zira Canal Sub Division, Zira. The Superintending Engineer, Sirhind Canal Circle, Ludhiana & Executive Engineer, Sidhwan Canal Division Ludhiana shall ensure proper control both over quality and quantity and proper implementation of work schedule. In addition to this an independent research cell comprising of 1 No. ARO (Together with supporting staff) will conduct field tests by setting up their own testing laboratory at site.

The initial work like Surveying preparation of estimate and L-Section, Tendering and getting sanctions from the competent authority etc. shall be completed much prior to the actual execution of the work.

5.2 PROCUREMENT OF MATERIAL AND EQUIPMENT

The key material for the said project such as earth, cement, sand, steel, bricks etc. shall procured by the contractor themselves. However proper checks for maintaining the quality of the material shall be applied by the deputed departmental representatives.

5.3 EXECUTION OF CIVIL WORKS

The civil works such as earthwork and pucca structures would be carried out through labour intensive method. The work will be carried out continuously from the start of work throughout the year except for minor interruption during monsson.

The works shall be got executed at competitive rates received against e- tendering bids from registered agencies.

5.4 OPERATION AND MAINTENANCE

The operation and maintenance of this channel will be carried out by the Punjab Irrigation Department. As far as works under the project are involved, their maintenance during construction period will adequately be provided as per norms.

5.5 MONITORING AND EVALUATION

Monitoring and evaluation of irrigation projects completed/ under execution is presently being done by 2 directorates of monitoring and evaluation under chief engineer. Each directorate is headed by on Superintending Engineer who is assisted by executive engineers and assistant engineers.

5.6 QUALITY CONTROL MECHANISM

The quality of the work executed at site is continuously monitored and checked by the J.E. incharge of the site who will be present at site daily. He also records the measurements in Measurement books at site. The measurement book is regularly checked by the Sub Divisional officer In charge and Executive Engineer as per codal rules.

Proper quality control setup already exists in the department and is shown at Annexure 7. In addition to this an independent research cell comprising of 1 No. ARO (Together with supporting staff) will conduct field tests by setting up their own testing laboratory at site.

An independent agency working under the Administrative control of Chief Technical Examiner shall also exercise the various field tests during the construction of the project.

CHAPTER 6

BENEFITS AND ECONOMIC ANALYSIS

6.1 PROJECT BENEFITS

The project derives its main benefits from assured water supply on account of treated water from the 4 STP's/CETP's. The area under the different crops will be as under:-

Paddy	5417 Ha
Wheat	6772 Ha
Oil Seed	1354 Ha
Total	13543 Ha

6.2 INTANGIBLE BENEFITS

The project shall give following intangible benefits:-

1. Reduction in the pressure on underground water table.
2. Utilization of the treated effluent for irrigation purpose.
3. Prevention of the direct discharge of polluted effluent of Ludhiana city into the River Sutlej.
4. Increase the production of agriculture in the state.
5. Improvement in the socio- ecological and environmental condition.

6.3 INCREMENTAL AGRICULTURAL PRODUCTION

The annual incremental production of crops on full development shall be as under :-

The total production of crop (in 100 Ha) without project	:	31956 Qtls.
The total production of crop (in 100 Ha) with project	:	36017 Qtls

The incremental Agricultural Production in 100 Ha = 36017- 31956	:	4061 Qtls
Total incremental Agricultural Production = 4061x (12190/100)	:	495036 Qtls

6.4 CROP BUDGETS

The present day crop yields in respect of irrigated/ unirrigated crops and summary of latest prices of agriculture produce are given in Table T-5

Average crop cultivation costs for irrigated/ un-irrigated crops in Punjab for the year 2011-2012 are indicated in Table T-6 & T-7 respectively. Crop budgets for the amin crops proposed to be raised on incremental irrigated areas and existi9ng un-irrigated areas have been darwn based on the data given in Table T-5, T-6 & T-7 and indicated in Table T-8 and T-9 respectively. net value of the proposed irrigated/ un-irrigated crops per hectare shall be as under :-

A. Irrigated Crops		
Paddy	:	Rs.47801 /Ha
Wheat	:	Rs.47422 /Ha
Oil Seed	:	Rs.32845 /Ha
B. Un-Irrigated Crops		
Paddy	:	Rs. 40591 /Ha
Wheat	:	Rs. 40997 /Ha
Oil Seed	:	Rs. 30420 /Ha

6.5 CROP BENEFITS

The development of net crop benefits from the additional crops are worked out in Table T-4. On full development, net crop benefits shall amount to Rs. 7186.55 lacs per Annum.

The net crop benefits from the existing un-irrigated crops have been worked out in Table T-10 which amounts to Rs. 2916.86 Lacs per annum.

6.7 BENEFITS COST ANALYSIS

Benefit Cost analysis of the project has been worked out as per guidelines of the Central Water Commission, Government of India.

6.8 ASSUMPTIONS FOR B.C. ANALYSIS.

The following set of assumptions have been adopted for calculations of B.C. ratio:

a) Prices for inputs and outputs remained constant.

b) The latest prices of the year 2011-12 are applicable.

c) The crop yields do not improve in future with or without project condition.

d) Interest rate is considered at 6.5 % per annum.

6.9 BENEFIT COST ANALYSIS WITH CWC METHOD

The values of the main produce in the project area, both in the pre-project and post-project stages have been worked out in the standard performa of CWC vide Table T-10 and T-4 and Net values vide Table T-12 and T-11 respectively.

6.10 INCREASE IN RURAL EMPLOYMENT

Farm activities would be increased due to cultivation of additional land in future. It will boost the rural employment on full development of the project. Opportunities for employment of skilled/ semi-skilled personnel on supporting services shall also open up.

Sub Divisional officer
Sidhwan Canal Sub Division
Ludhiana.

Sub Divisional officer
Moga Canal Sub Division
Moga

Sub Divisional officer
Zira Canal Sub Division
Zira.

Executive Engineer
Sidhwan Canal Division
Ludhiana

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IRRIGATION WORKS PUNJA
HEAD OFFICE

To

Superintending Engineers :-

1) Sirhind Canal Circle, Ludhiana
2) U.B.D.C. Circle, Amritsar.
3) Director/Water Cell I.B.H.O. Pb, Chandigarh.

Memo No.2009/( )[illegible] Dated 25 / 11/09.

Sub:- **Cleaning of rivers –laying of Irrigation network from the STP's.**

Hon'ble Chief Minister Punjab, took a meeting on 24/11/2009 on the subject. Kindly find enclosed list of towns alongwith the Sewerage Discharge in MLD where Irrigation Schemes are proposed . The concerned Executive Engineer may be directed to contact his counterpart in Water Supply Sewerage Board to know the location of proposed STP and prepare the Irrigation network Scheme alongwith rough cost estimate and submit the same within six days i.e 1//12/2009 . The Hon'ble Chief Minister is very serious about the issue and has directed that the Schemes and rough cost estimate be submitted within seven days . He will hold a review meeting after seven days to consider these schemes. An early action is requested.

[signature]

Executive Engineer/Canals,
For Chief Engineer, Irrigation Works, Punjab,
Chandigarh.

ਨੰ.9432-36/ [illegible]-3 ਮਿਤੀ 25/11/09

[illegible]

ਨਿਗਰਾਨ ਇੰਜੀਨੀਅਰ
ਸਰਹੰਦ ਕੈਨਾਲ ਸਰਕਲ ਲੁਧਿਆਣਾ।

[illegible]

29

tTEND CANAL E FAX NO. :01722724079

Project: Cleaning of Rivers- laying of Irrigation network from the STP's

List of Towns with sewerage discharge (MLD)

1 cusec= 1MLD/2.5

Sr.No.	Name of Town	District	Discharge as on 2025 (in MLD)
1.	Bholath	Kapurthala	4
2.	Begowal	Kapurthala	2.50
3.	Phagwara	Kapurthala	38
4.	Dhilwan	Kapurthala	2
5.	Sultanpur Lodhi	Kapurthala	2.60
6.	Kapurthala	Kapurthala	25
7.	Nawanshahar	Shaheed Bhagat Singh Nagar	6
8.	Banga	Shaheed Bhagat Singh Nagar	3
9.	Mukerian	Hoshiarpur	5
10.	Dasuya	Hoshiarpur	5
11.	Tanda urmur	Hoshiarpur	4
12.	Shamchurasi	Hoshiarpur	1
13.	Hoshiarpur	Hoshiarpur	35
14.	Makhu	Moga (Ferozpur)	3
15.	Dharamkot	Moga (Faridkot)	3
16.	Zira	Moga (Ferozpur)	8
17.	Talwandi Bhai	Moga (Ferozpur)	3
18.	Moga	Moga	27
19.	Machiwara	Ludhiana	3.5
20.	Balloke	Ludhiana	257
21.	Bhattian	Ludhiana	161
22.	Jamalpur	Ludhiana	48
23.	Jalandhar	Jalandhar	185
24.	Pathankot	Gurdaspur	20
25.	Nangal	Ropar	5
26.	Ropar – Thermal Plant (STP)	Ropar	14.50
27.	Kurali	Ropar	5

Jalandhar . 100 MLD
1.5 MLD
5 MLD
– STP under construct

21.84 crore
8000 acres

Dasuya = 26.47 lac received and utilised work in progress.
7.5 MLD
400 acre = 160 ha

Table T

PROJECT COST AND PROPOSED PHASING OF FUCNTIONING

The total cost of the project proposed to be funded out of RIDF- XVIII works out of the Rs 137.67 Crores as per guidelines of NABARD bank. New schemes would be provided loan assitence to the extent 95% of the total financial outlay. whereas the balance 5% of the cost would be state share.

Total Financial Outlay (TFO)		:	Rs .137.67 Crores
Loan From NABARD	(i.e. 95% of TFO under RIDF XVIII	:	Rs. 130.79 Crores
5% States Share of new scheme		:	Rs. 6.88 Crores.
Time required to complete the project		:	3.0 Years (Subjected to availability of funds)

IMPLEMENTATION OF SCHEDULE

The work included in the project will be completed within 3 years from the date of receipt of funds.

The cost of this project works out to Rs. 137.67 Crores. As the work is of Public interest so an early approval of the scheme is requested please.

Table T-1

PROJECT ESTIMATE FOR THE DOMESTIC SEWERAGE OF LUDHIANA CITY AFTER TREATMENT AT STP THROUGH BUDHA NALLAH AND BY CONSTRUCTING NET WORK OF DISTRIBUTORY/WATER COURSE.

METEROLOGICAL DATA

Average of 10 Years (From 1998-2008)

District	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
MEAN RAINFALL (MM)												
LUDHIANA	30.48	38.66	33.92	17.8	32.17	88.49	99.26	187.3	98.04	23.11	3.49	16.11
MEAN WIND SPEED (KM/HOUR)												
LUDHIANA	3.71	4.1	4.6	4.92	6.08	6.41	5.27	4.41	3.45	2.57	2.48	2.07
MEAN TEMPERATURE (DEGREE CENTIGRADE)												
LUDHIANA	12.68	15.14	19.99	26.88	31.06	31.57	30.05	29.8	28.06	24.5	19.3	13.68
MEAN RELATIVE HUMIDITY (%)												
LUDHIANA	79.18	75.34	66.26	45.09	41.7	58.6	76.7	80.01	75.1	65.3	64.1	75

Table T-2

PROJECT ESTIMATE FOR THE DOMESTIC SEWERAGE OF LUDHIANA CITY AFTER TREATMENT AT STP THROUGH BUDHA NALLAH AND BY CONSTRUCTING NET WORK OF DISTRIBUTORY/WATER COURSE.

PUNJAB IRRIGATION PROJECT

CROP CALENDER

S.No.	Name of Crop	Optimum Time for		Days of Maturity
		Sowing	Harvesting	
A	Kharif Crop			
1	Paddy	10-20 Jan	Oct	115
2	Cotton	April-May	Dec	180
3	Maize	May-June	Sept	90
4	Pulses (Moong Mash)	June-July	Oct	90
5	Ground Nuts	25 May-10June	Nov	120
6	Fodder (Jawar)	Mid June-Mid July	Mid Sept-Mid Oct	90
B	Rabi Crops			
1	Wheat	Oct-Nov	15-Apr	145
2	Oilseed	Oct	March	150
3	Grams	10-25 Oct	March End	160
4	Barley	Oct-Nov	March End	130
5	Pulses (Masur)	Oct-Nov	March	155
6	Fodder (Barseem)	15 Sept.	15-May	240
7	Sugar cane	March	Nov-Dec	280

Table T-3 (P-1)

PROJECT ESTIMATE FOR THE DOMESTIC SEWERAGE OF LUDHIANA CITY AFTER TREATMENT AT STP THROUGH BUDHA NALLAH AND BY CONSTRUCTING NET WORK OF DISTRIBUTORY/WATER COURSE.

ASTRACT OF CANAL STRUCTURE TO BE CONSTRUCTED

S.No.	Description	Unit	Number of structures
1	Bridges	Nos	47
2	Syphon Crossings	Nos	11
3	Syphon Aquaduct	Nos	4
4	Escape	No.	1
5	Fall	No.	1
6	Head Regulator	Nos	2

Table-3
(P-2)

PROJECT ESTIMATE FOR THE DOMESTIC SEWERAGE OF LUDHIANA CITY AFTER TREATMENT AT STP THROUGH BUDHA NALLAH AND BY CONSTRUCTING NET WORK OF DISTRIBUTORY/WATER COURSE.

LIST OF PUCCA STRUCTURE

BRDIGES

1	SINGLE V.R. BRIDGE AT RD	=	4492
2	SINGLE V.R. BRIDGE AT RD	=	6692
3	SINGLE V.R. BRIDGE AT RD	=	112545
4	SINGLE V.R. BRIDGE AT RD	=	114530
5	SINGLE V.R. BRIDGE AT RD	=	117650
6	SINGLE V.R. BRIDGE AT RD	=	122244
7	SINGLE V.R. BRIDGE AT RD	=	123989
8	SINGLE V.R. BRIDGE AT RD	=	128105
9	SINGLE V.R. BRIDGE AT RD	=	130655

10	SINGLE V.R. BRIDGE AT RD	=	132000
11	SINGLE V.R. BRIDGE AT RD	=	134800
12	SINGLE V.R. BRIDGE AT RD	=	135234
13	SINGLE V.R. BRIDGE AT RD	=	138400
14	SINGLE V.R. BRIDGE AT RD	=	164265
15	SINGLE V.R. BRIDGE AT RD	=	166645
16	SINGLE V.R. BRIDGE AT RD	=	173375
17	COMBINED V.R. BRIDGE AT RD	=	14380
18	COMBINED V.R. BRIDGE AT RD	=	17285
19	COMBINED V.R. BRIDGE AT RD	=	19978
20	COMBINED V.R. BRIDGE AT RD	=	22948
21	COMBINED V.R. BRIDGE AT RD	=	34390
22	COMBINED V.R. BRIDGE AT RD	=	35285
23	COMBINED V.R. BRIDGE AT RD	=	37723
24	COMBINED V.R. BRIDGE AT RD	=	41205
25	COMBINED V.R. BRIDGE AT RD	=	45485
26	COMBINED V.R. BRIDGE AT RD	=	47330
27	COMBINED V.R. BRIDGE AT RD	=	52030
28	COMBINED V.R. BRIDGE AT RD	=	53123
29	COMBINED V.R. BRIDGE AT RD	=	54800
30	COMBINED V.R. BRIDGE AT RD	=	58766
31	COMBINED V.R. BRIDGE AT RD	=	60510
32	COMBINED V.R. BRIDGE AT RD	=	63989
33	COMBINED V.R. BRIDGE AT RD	=	66452
34	COMBINED V.R. BRIDGE AT RD	=	69477
35	COMBINED V.R. BRIDGE AT RD	=	73251
36	COMBINED V.R. BRIDGE AT RD	=	80389
37	COMBINED V.R. BRIDGE AT RD	=	85110
38	COMBINED V.R. BRIDGE AT RD	=	86600
39	COMBINED V.R. BRIDGE AT RD	=	89291
40	COMBINED V.R. BRIDGE AT RD	=	93000
41	COMBINED V.R. BRIDGE AT RD	=	97850
42	COMBINED V.R. BRIDGE AT RD	=	98731
43	COMBINED V.R. BRIDGE AT RD	=	104838
44	COMBINED V.R. BRIDGE AT RD	=	145430
45	COMBINED V.R. BRIDGE AT RD	=	148875
46	COMBINED V.R. BRIDGE AT RD	=	151840
47	COMBINED V.R. BRIDGE AT RD	=	152930

SYPHON CROSSING

1	SYPHON CROSSING AT RD	=	21000
2	SYPHON CROSSING AT RD	=	30000
3	SYPHON CROSSING AT RD	=	40000
4	SYPHON CROSSING AT RD	=	58000
5	SYPHON CROSSING AT RD	=	67500
6	SYPHON CROSSING AT RD	=	70000
7	SYPHON CROSSING AT RD	=	75500
8	SYPHON CROSSING AT RD	=	93300
9	SYPHON CROSSING AT RD	=	102000
10	SYPHON CROSSING AT RD	=	112000
11	SYPHON CROSSING AT RD	=	118000

SYPHON AQUEDUCT CROSSING

1 Syhon Aqwueduet at RD 45285 crossing Pijrian Drain
2 Syhon Aqueduct crossing Jassowal Drain at RD 110000
3 Syhon Aqueduct Cum Bridge at RD 156305 crossing Kishan pura disty
4 Syhon Aqueduct at RD 159750 crossing of Kishan pura Drain.

ESCAPE

1 Escape Regulators at RD 110000 Proposed Disty.

FALLS

1 Fall at RD 132200

HEAD REGULATOR

1 R.D. 150000 oF Budha Nala/ R.D. 0 of Proposed Channel
2 R.D. 2300 of 6-R Distributory/ R.D. 175600 of Proposed Channel

Table T-4

PROJECT ESTIMATE FOR THE DOMESTIC SEWERAGE OF LUDHIANA CITY AFTER TREATMENT AT STP THROUGH BUDHA NALLAH AND BY CONSTRUCTING NET WORK OF DISTRIBUTORY/WATER COURSE.

ESTIMATED VALUE OF PRODUCE AND COST OF CULTIVATION POST PROJECT AND NET CROP BENEFITS

		PRODUCE				INPUTS VALUE		
Crop	Area Ha	Yield per ha(Qtl)	Total Yield (Qtl)	Rate Rs./Qtl.	Total (Rs. Lac) Col 4 x 5	Rate Rs.Ha refer Table T-15	Total Value Rs.Lac Col.2 x 7	Net Crop benefits (Col 6-8) (In Lac)
1	2	3	4	5	6	7	8	9
Paddy	5417	74	400858.00	1030	4128.8374	28419	1539.45723	2589.38017
Pwheat	6772	57	386004.00	1285	4960.1514	25823	1748.73356	3211.41784
Oil Seeds	1354	21	28434.00	2425	689.5245	18080	244.8032	444.7213
Total	**13543**		**815296**		0		3532.99399	**6245.51931**
BY PRODUCT								
Paddy	0	0	0	0	0	0	0	0
wheat	6772	54	365688.00	250	914.22			914.22
Oil Seeds	1354	18	24372.00	110	26.8092			26.8092
Total			**390060**		0			**941.0292**
G.Total			1205356		0		3532.99399	7186.54851

TABLE-T-5

PROJECT ESTIMATE FOR THE DOMESTIC SEWERAGE OF LUDHIANA CITY AFTER TREATMENT AT STP THROUGH BUDHA NALLAHA AND BY CONSTRUCTING NET WORK OF DISTRIBUTORY/WATER COURSE

LATEST CROP YIELDS IN PUNJAB FOR MAIN CROPS AND THEIR PRICES IN 2018

S.No.	Crop	Type	Crop yield qtls ha.Main Product	Price per Qtl.Rs.
1	Paddy	Irrigated	74	1030
2	Paddy	Un-Irrigated	67	1030
3	Wheat	Irrigated	57	1285
4	Wheat	Un-Irrigated	52	1285
5	Oil Seeds.	Irrigated	21	2425
6	Oil Seeds.	Un-Irrigated	20	2425
7	By product of wheat	Irrigated	54	250
8	By product of wheat	Un-Irrigated	49	250
9	By product of Oil seeds.	Irrigated	18	110
10	By product of Oil seeds.	Un-Irrigated	8	110
11	P:ulses	Irrigated	12	2800
12	Pulses	Un-Irrigated	11	2800

Table -6

PROJECT ESTIMATE FOR THE DOMESTIC SEWERAGE OF LUDHIANA CITY AFTER TREATMENT AT STP THROUGH BUDHA NALLAHA AND BY CONSTRUCTING NET WORK OF DISTRIBUTORY/WATER COURSE

Average Crop cultivation costs per Hectare in Punjab for the Year 2011-12 (Irrigation)

(PRE-Project)

S.No.	Name of crop and type	Seeds	Human labour & bullock charges Rs./Ha	Farm Yard manure & fertillizers Rs./Ha	Chemicals (insecticides & pesticides Rs./Ha)	Other Charges Rs./Ha	Total Charges (Col.3 to 7) Rs./Ha
1	2	3	4	5	6	7	8
1	Paddy	1013	6941	5064	2347	13054	28419
2	Wheat	2099	7682	5940	2099	8003	25823
2	Oil Seeds	840	4792	2519	1210	8719	18080

Table -7

PROJECT ESTIMATE FOR THE DOMESTIC SEWERAGE OF LUDHIANA CITY AFTER TREATMENT AT STP THROUGH BUDHA NALLAHA AND BY CONSTRUCTING NET WORK OF DISTRIBUTORY/WATER COURSE

Average Crop cultivation costs per Hectare in Punjab for the Year 2011-12 (Irrigation)

(Post-Project)

S.No.	Name of crop and type	Seeds	Human labour & bullock charges Rs./Ha	Farm Yard manure & fertillizers Rs./Ha	Chemicals (insecticides & pesticides Rs./Ha)	Other Charges Rs./Ha	Total Charges (Col.3 to 7) Rs./Ha
1	2	3	4	5	6	7	8
1	Paddy	1013	6941	5064	2347	13054	28419
2	Wheat	2099	7682	5940	2099	8003	25823
2	Oil Seeds	840	4792	2519	1210	8719	18080

Table -8

PROJECT ESTIMATE FOR THE DOMESTIC SEWERAGE OF LUDHIANA CITY AFTER TREATMENT AT STP THROUGH BUDHA NALLAHA AND BY CONSTRUCTING NET WORK OF DISTRIBUTORY/WATER COURSE

CROP BUDGET FOR IRRIGATED POST PROJECT CROPS

S.No.	Name of crop and type	Yield/hectare in Qtl.	Rate for qtl	Gross Value Rs	Total inputs/ha Refer table 15	Net value col (5-6 Rs.ha
1	2	3	4	5	6	7
1	Paddy	74	1030	76220	28419	47801
2	Wheat	57	1285	73245	25823	47422
2	Oil Seeds	21	2425	50925	18080	32845
BY PRODUCTS						
1	Paddy	0	0	0	0	0
2	Wheat	54	250	13500	0	13500
2	Oil Seeds	18	110	1980	0	1980

Table T-9

PROJECT ESTIMATE FOR THE DOMESTIC SEWERAGE OF LUDHIANA CITY AFTER TREATMENT AT STP THROUGH BUDHA NALLAHA AND BY CONSTRUCTING NET WORK OF DISTRIBUTORY/WATER COURSE

CROP BUDGET FOR UNIRRIGATED /RAINFED PRE PROJECT CROPS

S.No.	Name of crop and type	Yield/hectare in Qtl.	Rate for qtl	Gross Value Rs	Total inputs/ha Refer table 15	Net value col (5-6 Rs.ha
1	2	3	4	5	6	7
1	Paddy	67	1030	69010	28419	40591
2	Wheat	52	1285	66820	25823	40997
2	Oil Seeds	20	2425	48500	18080	30420
BY PRODUCTS						
1	Paddy	0	0	0	0	0
2	Wheat	25	250	6250	0	6250
2	Oil Seeds	8	110	880	0	880

Table-10

PROJECT ESTIMATE FOR THE DOMESTIC SEWERAGE OF LUDHIANA CITY AFTER TREATMENT AT STP THROUGH BUDHA NALLAH AND BY CONSTRUCTING NET WORK OF DISTRIBUTORY/WATER COURSE.

ESTIMATED VALUE OF PRODUCE AND COST OF CULTIVATION PRE PROJECT AND NET CROP BENEFIT

			PRODUCE				INPUTS VALUE		
S.No.	Crop	Area(Ha)	Yield per ha (QTL)	Total Yield(QTL)	Rate Rs./QTL	Total (Rs.Lac)	Rate Rs.Ha	Total Value (Rs.Lc)	Net crop benefits (Col.6-8) Rs.Lacs.
	1	2	3	4	5	6	7	8	9
1	Paddy	2708	67	181436	1030	1868.7908	28419	769.58652	1099.204
2	Wheat	3386	52	176072	1285	2262.5252	25823	874.36678	1388.158
2	Oil Seeds	677	20	13540	2425	328.345	18080	122.4016	205.9434
	Total	3385.5	139	371048	4740	4459.661	72322	1766.3549	2693.306
	BY PRODUCT								
1	Paddy	0	0	0	0	0	0	0	0
2	Wheat	3386	25	84650	250	211.625	0	0	211.625
2	Oil Seeds	1354	8	10832	110	11.9152	0	0	11.9152
	Total			95482		223.5402	0	0	223.5402
	G.Total			466530		4683.2012		1766.3549	2916.846

Table 11

PROJECT ESTIMATE FOR THE DOMESTIC SEWERAGE OF LUDHIANA CITY AFTER TREATMENT AT STP THROUGH BUDHA NALLAHA AND BY CONSTRUCTING NET WORK OF DISTRIBUTORY/WATER COURSE

POST PROJECT NET VALUE OF FARM PRODUCE
(IRRIGATED)

S.No.	GROSS RECEIPTS (From table T-12)	(Rs.in lac)
i	Gross value of farm produce	9778.51
	Gross value of by products receipt	941.03
	Total receipts	10719.5
ii	**EXPENSES**	
3	Total cost of cultivation	3532.97
4	Depreciation of implements @ 2.70% of Gross value of peroduce.	289.43
5	Share and cash rent @ 5% total gross produce.	535.98
6	Land revenue @ 2% gross value of farm produce	195.57
	Total	4553.95
iii)	NET VALUE OF PRODUCE	

	RECEIPTS		**EXPENSES**				
	10719.54		**4553.97**				**6165.57**

Table 12

PROJECT ESTIMATE FOR THE DOMESTIC SEWERAGE OF LUDHIANA CITY AFTER TREATMENT AT STP THROUGH BUDHA NALLAHA AND BY CONSTRUCTING NET WORK OF DISTRIBUTORY/WATER COURSE

PRE PROJECT NET VALUE OF FARM PRODUCE (UN-IRRIGATED)

S.No.	GROSS RECEIPTS (From table T-18)	(Rs.in lac)
i	Gross value of farm produce	4460
	Gross value of by products receipt	223.55
	Total receipts	4683.22
ii	**EXPENSES**	
3	Total cost of cultivation	1766.36
4	Depreciation of implements @ 2.70% of Gross value of peroduce.	126.45
5	Share and cash rent @ 5% total gross produce.	234.16
6	Land revenue @ 2% gross value of farm produce	89.19
	Total	2216.16
iii)	NET VALUE OF PRODUCE	

	RECEIPTS		**EXPENSES**				
	4683.22		**2216.16**				**2467.06**

TABLE-13 (P-1)

PROJECT ESTIMATE FOR THE DOMESTIC SEWERAGE OF LUDHIANA CITY AFTER TREATMENT AT STP THROUGH BUDHA NALLAH AND BY CONSTRUCTING NET WORK OF DISTRIBUTORY/WATER COURSE.

ECONOMICS IN CROP PRODUCTION (100 Ha MODEL)

S. No.	Crop	Without Project							With Project						
	Kharif	Yield Qtl Ha	Area in Ha	Production in Qtl	Value of Production		Cost of Cultivation		Yield Qtl	Area in Ha	Production in Qtl	Value of Production		Cost of Cultivation	
					Rate	Amount	Rate/Ha	Amount				Rate	Amount	Rate/Ha	Amount
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	Paddy	67.00	80.00	5360.00	1030.00	55.21	28419.00	22.74	74.00	80.00	5920.00	1030.00	60.98	28419.00	22.74
2	Fodder	700.00	12.00	8400.00	70.00	5.88	14000.00	1.68	800.00	12.00	9600.00	70.00	6.72	14000.00	1.68
3	Repeseed/Oil Seedds	20.00	1.00	20.00	2425.00	0.49	18080.00	0.18	21.00	1.00	21.00	2425.00	0.51	18080.00	0.18
4	Vegetables	60.00	0.50	30.00	1000.00	0.30	15000.00	0.08	70.00	0.50	35.00	1000.00	0.35	15000.00	0.08
5	Cotton	28.00	2.50	70.00	2800.00	1.96	32826.00	0.82	31.00	2.50	78.00	2800.00	2.18	32826.00	0.82
6	Sugar Cane	803.00	1.50	1204.50	139.12	1.68	53227.00	0.80	880.00	1.50	1320.00	139.12	1.84	53227.00	0.80
7	Maize	49.00	0.50	24.50	960.00	0.24	15437.00	0.08	54.00	0.50	27.00	960.00	0.26	15437.00	0.08
8	Puises	11.00	2.00	22.00	2800.00	0.62	19192.00	0.38	12.00	2.00	24.00	2800.00	0.67	19192.00	0.38
	Total	**1738.00**	**100.00**	**15131.00**	**11224.12**	66.36	**196181.00**	**26.75**	**1942.00**	**100.00**	**17025.00**	**11224.12**	**73.51**	**196181.00**	**26.75**

1314

75

TABLE-13 (P-2)

S. No.	Crop	Without Project							With Project						
	Rabi	Yield Qtl Ha	Area in Ha	Production in Qtl	Value of Production		Cost of Cultivation		Yield Qtl	Area in Ha	Production in Qtl	Value of Production		Cost of Cultivation	
					Rate	Amount	Rate/Ha	Amount				Rate	Amount	Rate/Ha	Amount
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	Wheat	52.00	84.00	4368.00	1285.00	56.13	25823.00	21.69	57.00	84.00	4788.00	1285.00	61.53	25823.00	21.69
2	Rabi Fodder	690.00	12.00	8280.00	70.00	5.80	14000.00	1.68	800.00	12.00	9600.00	70.00	6.72	14000.00	1.68
3	Rapesseed/Oil Seeds	20.00	1.00	20.00	2425.00	0.49	18080.00	0.18	21.00	1.00	21.00	2425.00	0.51	18080.00	0.18
4	Vegetables	60.00	0.50	30.00	1000.00	0.30	15000.00	0.08	70.00	0.50	35.00	1000.00	0.35	15000.00	0.08
5	Sugar Cane	0.00	1.50	0.00	0.00	0.00	0.00	0.00	0.00	1.50	0.00	0.00	0.00	0.00	0.00
6	Pulses	11.00	1.00	11.00	2800.00	0.31	19192.00	0.19	12.00	1.00	12.00	2800.00	0.34	19192.00	0.19
7	By product of wheat	49.00	84.00	4116.00	250.00	10.29	0.00	0.00	54.00	84.00	4536.00	250.00	11.34	0.00	0.00
	Total	882.00	184.00	16825.00	7830.00	73.31	92095.00	23.82	1014.00	184.00	18992.00	7830.00	80.78	92095.00	23.82
	G.Total			31956.00		139.67		50.57			36017.00		154.29		50.57

139.67-5057 = 89.10 Lacs

154.29-50.57 = 103.72 Lacs.

Incremental Agricultural production/100 Ha

36017-31956 = 4061/Qtl

Net Benefit /100 Ha

103.72-89.10 = 14.62/Ha

47

1315

76

Table T-14

PROJECT ESTIMATE FOR THE DOMESTIC SEWERAGE OF LUDHIANA CITY AFTER TREATMENT AT STP THROUGH BUDHA NALLAH AND BY CONSTRUCTING NET WORK OF DISTRIBUTORY/WATER COURSE.

DESCRIPTIVE STATEMENT OF NEW PROPOSED STP DISTY.

Name of Channel	Off taking channel	Off taking RD	Discharge of Channel at Head in cs.	Tail RD	Length in KM	Comminded Area Ha		Benified Area Ha 90% of CCA			Additional Irrigation Potential created in Ha
						GA	CCA	Kharif	Rabi	Avg.	
1	2	3	4	5	6	7	8	9	10	11	12
New propsed STP Disty	Budha Nalla 150000	150000	220 Cs	175600	53.54	15575	13544	12190	12190	12190	12190

PROJECT ESTIMATE FOR THE DOMESTIC SEWERAGE OF LUDHIANA CITY AFTER TREATMENT AT STP THROUGH BUDHA NALLAH AND BY CONSTRUCTING NET WORK OF DISTRIBUTORY/WATER COURSE.

MAIN ABSTRACT OF COST

Part-I

	DIRECT CHARGES	AMOUNT IN RS.LACS
A	A-Preliminary	43.00
B	Land	2878.03
C	Works	19.95
D	Regulator	633.40
E	Falls	19.25
F	Cross Drainage Works	1767.00
G	Bridges	942.00
H	Escapes	402.88
I	Navigation works	0.00
K	Building	51.92
L-1	Earth Work	66.50
L-2	Lining	0.00
M	Plantation	0.00
N	Tanks & Reservoirs	0.00
O	Misc.	18.76
P	Maintenance	105.06
Q	Special T& P	1.58
R	Communication	0.00
S	Power Plant & Electrical System	0.00
T	Water supply works	0.00
U	Distributaries, Minors & Sub Minors	0.00
V	Water Courses and field channels	0.00
W	Drainage	0.00
X	Environment & Ecology	0.00
Y	Losses & Stock and Unforeseen	26.26
	Total Direct Charges	6975.59
	Indirect Charges	207.83
	Total	7183.42
	Say	**137.67 Cr.**

Executive Engineer
Sidhwan Canal Division
Ludhiana.

Superintending Engineer
Sirhind Canal Cirlce
Ludhiana.

Annexure A1

PROJECT ESTIMATE FOR THE DOMESTIC SEWERAGE OF LUDHIANA CITY AFTER TREATMENT AT STP THROUGH BUDHA NALLAH AND BY CONSTRUCTING NET WORK OF DISTRIBUTORY/WATER COURSE.

DETAIL ABSTRACT OF COST

S.NO.	DESCRIPTION		AMOUNT (IN Lac)
	DIRECT CHARGES		
	I-WORK		
1	**A-PRELIMINARY**		
	Detailed Surveying,Levelling & observing Cross Section (L.S)	=	5.50
	Prepration & Printing of Project Reports (LS)	=	1.50
	Establishing & Fixing Bench Marks (LS)	=	2.50
	Cosultancy Charges (LS)	=	11.00
	Field Tests & Soil Classification (L.S)	=	2.50
	54 Km Havey Jungle Celearance	=	20.00
	Total	=	**43.00**
2	**B-LAND**		
I)	For straightening the alignement (7000x120/43560) =19.28 Acres		
ii)	For Drain		
	50000 x 20/ 43560 = 22.95 Acre		
	For disputed Land (L.S.) 40 Acre		
	Total Land = 82.23 Acre		
	Cost of 82.23 Acre land @ 25.00 Lac per Acre	=	2055.75
	Add 30% of compulsory Acquistion charges	=	616.72
	Add 5% of Crop Compensation Charges	=	102.78
	Add 5% for compensation of Buildigns	=	102.78
	Total	=	**2878.03**
3	**C-WORKS.**		
	57 No. Constructing outlets/Tail Clusters@ 35000/each.	=	19.95

4	**D-REGULATOR**		
i)	Providing Head Regulator and Cross regulator of proposed disty. And cross regulator of proposed disty. And Budha Nala at RD 0 cost of civil works including protection works	=	600.00
	Cost of Gatges and Gearing		
	Gate Sizes (18 x 5.00) = 90 Sqft. @ 6000/per Sqft.		5.40
	Gate Sizes (65 x 5.00) = 325 Sqft. @ 6000/per Sqft.		19.50
ii	Intake Structure at RD 2500 of 6-R Disty and RD 175600 of propsed disty		
	Cost of Civil Works	=	5.50
	Cost of Gates & Gearing	=	3.00
	Total		633.40
5	**E-FALLS at RD**		
	Discharge upto 100 cs. @ 19.25		
	1 Nos Constructing falls at RD 132200		19.25
6	**F-CROSS DRAINAGE WORKS**		
	Syphon crossing at RD		
	11 No.21000, 30000, 40000, 58000, 67500, 70000, 75500, 93300, 102000,112000, 118000		242.00
	@ Rs. 22.00 Lacs each		
	1 No.Syphone Acqueduct at RD 45285 crossing Purain Drain 350/-		350.00
	1 N. Symphon Aqueduct crossing Jaisowal Drain at RD 110000		
	@ 800/- Lac		800.00
	1 N. Symphon Aqueduct cum Bridge at RD 156305 crossing Kishanpura		
	distributory		
	@ Rs.200.00		200.00
	Syphon Aqueduct at RD 159750 crossing Kishanpura Drain		
	@ Rs. 175.00		175.00
	Total		1767.00
7	**G.Bridges.**		
	Discharge above 100 cs.		
	7 No. construction of Single V.R.Bridges at RD 4492,6692,112545,		
	114530,117650,122244,123989,@ 13.15		

			92.05
	27 Nos Construction of Double V.R.Bridges at RD 14380,17285,19978		
	22948,34390,35285,37723,41205,45485,47330,52030,53123,54800,		
	58766,60510,63989,66452,69477,73251,80389,85110,86600,89291,		710.10
	93000,97850,98731,104838,		
	Rs. 26.30 Lac each		
ii)	Discharge upto 100 cs.		
	9 Nos. Cosnstruction of Single V.R.Bridge at RD 128105,130665,		74.25
	132000,134800,135234,138400,164265,166645,173375,		
	Rs. 8.25		
	4 Nos. construction of Combind disty /drain V.R.Bridges at RD 145430,		
	148875,151840,152980,		
	Rs. 16.50 lac each		66.00
	Total		942.40
8	**H-Escapes**		
	1 No. Escape Regulator At RD 110000 of proposed distributory		
	Cost of Civil Works.		400.00
	Cost of gates & gearing Gate size 16 x 3 = 48 ft. @ 6000 per Sft.		2.88
	Total		402.88
9	**I-NAVIGATION WORKS**		Nil
10	**K-BUILDINGS**		
	6 Nos. (2700Sqft.) Construction of Residential Quarters		
	Required for the employees of Sidhwan Canal Division, Ludhiana.		
	Rs.1923 per Sq.ft of the covered Area.		51.92
11	**L-I EARTH WORK**		
	As per detasils attached.		6650
	L-II LINING		

	GRAND TOTAL OF E/W & LINING		
12	**M-PLANTATION**		Nil
13	**N-TANKS AND RESERVOIRS**		Nil
14	**O-MISCELLANEOUS**		
	28800 Km (24 x 1200) running of Vehicies for inspection purpose during implementation of the project @ 13.70/K.M.		3.95
ii)	351 Nos. (175600/500) Fixing of Distance Marks & Boundary Pillars.Rs. 2680/-each (For cost refer Page No.		9.41
iii)	70 Nos. (175600/2500) Sign Boards/indentification Boards @ Rs.3000/each (M.R.)		2.10
iv	Visit of Dignitaries (L.S.)		1.10
v)	Technical Records/Photographic Records (LS)		1.10
vi)	Inaugural Ceremonies (L.S.)		1.10
	Total		18.76
15	**P-MAINTENANCE**		
	1% of the cost of I-works except the cost of A-Preliminary B-Land ,		105.06
	Q Special T& P		
	1% of (19.95 +633.40+19.25+1767+942.40+402.88+51.92+6650+18.76) 10505.56		
16	**Q-SPECIAL T & P**		
I)	1 No. purchase of computer with printer		0.38
	Rs. 37700/each (M.R.)		
ii)	1 No. purchase of Fax. Machine		0.10
	Rs. 10000/- each (M.R.)		
iii)	1 No. purchase of Photostate Machine		1.10
	rs. 55000/-		
	Total		1.58
17	**R-Communication**		
18	**S-POWER PLANT & ELECT. SYSTEM.**		
19	**T-WATER SUPPLY WORKS**		
20	**U-DISTY, MINORS & SUB MINORS.**		
21	**V-WATER COURSES & FIELD CHARGES.**		

22	**W-DRAINAGE**		
23	**X-ENVIRONMENT AND ECOLOCY**		
24	**Y-LOSSES ON STOCK AND UNFORESSEN ITEMS**		
	0.25 % of the cost of 1-works except the cost of A-preliminary, B-land		
	Q-Special		
	0.25% of 10505.56	=	26.26
25	**ESTABLISHMENT CHARGES**		
	TOTAL DIRECT CHARGES	=	13559.49
	INDIRECT CHARGES		
	Capitalization of abutment of Land revenue & 5% of 2055.75 lacs.	=	102.78
	Audit & Account Charges @ 1% on 10Works 10505.56	=	105.05
	TOTAL INDIRECT CHARGES	=	207.83
	TOTAL INDIRECT AND DIRECT CHARGES.	=	13767.32
	Total Cost in Crores	=	137.67

Sub Divisional officer
Sidhwan Canal Sub Division
Ludhiana.

Sub Divisional officer
Moga Canal Sub Division
Moga.

Sub Divisional officer
Zira Canal Sub Division
Zira

Executive Engineer
Sidhwan Canal Division
Ludhiana.

Annexure-A2

PROJECT ESTIMATE FOR THE DOMESTIC SEWERAGE OF LUDHIANA CITY AFTER TREATMENT AT STP THROUGH BUDHA NALLAH AND BY CONSTRUCTING NET WORK OF DISTRIBUTORY/WATER COURSE.

ABSTRACT OF COST FOR L-I EARTH WORK

Qty.	Unit	Description	AMOUNT IN LACS
266850	cum	Earth work undressed combind lead 45 Meter including breaking of clods @ (39.77 +4 x 1.66) +12% = 51.98	138.71
1716521	cum	Earth work undressed for combind with avg. lead 5 KM including Ist Km and Last 2 Km Katcha including loading and unloading Complete in all respects. @ (142.50 + 20% 75 +20% 32.25)+15% 4.33 +4.15 +36.50 +12% +15.22 +15% = 256.11	4396.18
827187	cum	Earth work undressed with Avg. lead 5 KM including Ist KM and Last 2 KM Katcha including Loading and unloading Complete in all respects @ 142.50+20% of 75 +20% 32.25+15% 15.22 +15% = 205.74	1701.85
743250	sqm	Dressing of Earth work. @ 0.50 +12% = 0.56/Sqm	4.16
		Add 5% for water charges and contingency	6240.9
		Add cost as per detail attached	312.04
		G.Total	6552.84

Sub Divisional officer
Sidhwan Canal Sub Division
Ludhiana.

Sub Divisional officer
Zira Canal Sub Division
Zira

Sub Divisional officer
Moga Canal Sub Division
Moga.

Executive Engineer
Sidhwan Canal Division
Ludhiana.

PROJECT ESTIMATE FOR THE DOMESTIC SEWERAGE OF LUDHIANA CITY AFTER TREATMENT AT STP THROUGH BUDHA NALLAH AND BY CONSTRUCTING NET WORK OF DISTRIBUTORY/WATER COURSE.

ABSTRACT OF COST FOR L-I EARTH WORK

Qty.	Unit	Description	AMOUNT IN LACS
28853	cum	Earth work undressed combind lead 45 Meter including breaking of clods @ (39.77 +4 x 1.66) +12% = 51.98	15.00
37468	cum	Earth work undressed for combind with avg. lead 5 KM including Ist Km and Last 2 Km Katcha including loading and unloading Complete in all respects. @ (142.50 + 20% 75 +20% 32.25)+15% 4.33 +4.15 +36.50 +12% +15.22 +10% = 256.11	77.09
63172	Sqm	Dressing of Earth work @ 0.50 +12% = 0.56/ Sqm	0.35
			92.44
		Add 5% for water charges and contingency	4.62
		G.Total	97.06

Sub Divisional officer
Sidhwan Canal Sub Division
Ludhiana.

Sub Divisional officer
Zira Canal Sub Division
Zira

Sub Divisional officer
Moga Canal Sub Division
Moga.

Executive Engineer
Sidhwan Canal Division
Ludhiana.

PROJECT ESTIMATE FOR THE DOMESTIC SEWERAGE OF LUDHIANA CITY AFTER TREATMENT AT STP THROUGH BUDHA NALLAH AND BY CONSTRUCTING NET WORK OF DISTRIBUTORY/WATER COURSE.

EARTH WORK STATEMENT RD 0-60000

S.No	X-Section RD	Length	Earth work Excavation			Earth work Puddling			Earth work Dressed		
			Area	Mean Area	Contents	Area	Mean Area	Contents	Area	Mean Area	Contents
1	2	3	4	5	6	7	8	9	10	11	12
1	150	150	0	0	0	123.22	61.61	9242	45.43	0	0
2	10000	9850	86.25	43.12	424732	295.13	209.18	2060423	42.74	44.08	434188
3	20000	10000	58.96	72.6	726000	158.32	226.72	2267200	41.02	41.88	418800
4	30000	10000	33.04	46	460000	319.76	240.04	2400400	40.37	40.69	406900
5	40000	10000	50.7	41.87	418700	0	341.47	3414700	43.47	41.92	419200
6	50000	10000	135.04	92.87	928700	370.95	365.86	3658600	42.24	42.86	428600
7	60000	10000	116.77	125.9	1259000	327.14	348.85	3488500	44.42	43.33	433300
8	70000	10000	87.03	101.9	1019000	399.63	363.38	3633800	41.75	43.08	430800
9	80000	10000	88	84.51	845100	393.59	396.61	3966100	43.16	42.45	424500

1325

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57

10	90000	10000	148.69	118.34	1183400	86.65	240.12	2401200	33.83	38.5	385000
11	100000	10000	25.59	87.14	871400	378.78	232.71	2327100	45.52	39.67	396700
12	110000/109850	10000	0	12.79	127900	657.99	518.38	5183800	53.63	49.57	495700
13	120000	10000	0	0	0	321.1	489.55	4895500	48.8	51.21	512100
14	130000	10000	0	0	0	446.82	383.96	3839600	52.43	50.6	506000
15	140500	10500	28	7.85	82425	450.76	448.79	4712295	52.43	52.43	550515
16	150000	9500	0	32.15	305425	401.95	426.355	4050372.5	51.39	51.91	493145
17	159750	9750	56	46.155	450011	306.25	354.1	3452475	48.95	50.17	489157.5
18	175600	15850	0	28	443800	301.82	304.05	4819192.5	48.47	48.71	772053.5
					9545593.25			60580499.5			7996659 Sqft
				Or	268856 cum			1716521 cum			743250 Sqm

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1. Earth work undressed combind lead 45 Metre
2. Earth work undressed for combind lead 5 KM
3. Earth work Dressed with Avg. Lead 5 KM

= 268856 cum
= 1716521 cum
= 743250 Sqm

Sub Divisional officer Sidhwan Canal Sub Division Ludhiana.	Sub Divisional officer Moga Canal Sub Division Moga.	Sub Divisional officer Zira Canal Sub Division Zira	Executive Engineer Sidhwan Canal Division Ludhiana.

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PROJECT ESTIMATE FOR THE DOMESTIC SEWERAGE OF LUDHIANA CITY AFTER TREATMENT AT STP THROUGH BUDHA NALLAH AND BY CONSTRUCTING NET WORK OF DISTRIBUTORY/WATER COURSE.

EARTH WORK STATEMENT RD 140000-150000

S.No	X-Section RD	Length	Earth work Excavation			Earth work Puddling			Earth work Dressed		
			Area	Mean Area	Contents	Area	Mean Area	Contents	Area	Mean Area	Contents
1	2	3	4	5	6	7	8	9	10	11	12
1.	140000-150000	10000	101.88	0	1018800	234.18	0	2341800	0	0	0
					1018800 cft			2341800 cft			
				or							

1. Earth work Long lead 5 KM 66321 - 28853 = 37468
2. Earth work Local available = 28853
3. Earth work Dressed (2x25+2x5x1.80) x 10000 = 680000 Sft = 63172 Sqm

Sub Divisional officer Sidhwan Canal Sub Division Ludhiana.	Sub Divisional officer Moga Canal Sub Division Moga.	Sub Divisional officer Zira Canal Sub Division Zira	Executive Engineer Sidhwan Canal Division Ludhiana.

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Annexture A-4
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PROJECT ESTIMATE FOR THE DOMESTIC SEWERAGE OF LUDHIANA CITY AFTER TREATMENT AT STP THROUGH BUDHA NALLAHA AND BY CONSTRUCTING NET WORK OF DISTRIBUTORY/WATER COURSE.

ANALYSIS OF RATE

Carriage of materials

1.	C/o of Cement with avg. lead 15 km pucca including loading & unloading complete in all respect.(CSR Item 5.2 ii) @ (72+5x8.25+5x6.75)x15%(1.68+1.68)+13% = 169.05/Tone +20+3.80=12.25 Bag	**12.25 / Bag**
2.	C/o of Bricks with avg. lead 10 km pucca.(CSR Item 5.2 ii) @ (288.75x5x27.75)+15%+(39.20+39.20)+13% = 580.22/%	**580.22 /%**
3.	C/o of sand with avg. lead 60 km @(142.50+5x11.25+10x7.50+20x4.50)+15%+(20x3.35)+10% (15.80+9.80)=26.60+13% = 522.07/cum	**522.07/cum**
4.	C/o of course sand with avg. lead 225 Km including loading & unloading @(142.50+5x11.25+10x7.50+20x4.50)+15%+(20x3.35)+10% +(9.0x1.70)+8%+(75x1.10)+5%(16.80+9.80)+13% = 773.94/cum	**773.94/cum**
5.	C/o shingle with avg.lead 225 Km including loading & unloading @ 773.94-11.07=762.87 / cum	**762.87/cum**
6.	C/o of Brick bats with avg.lead 25 Km including loading & unloading @(142.50+5x11.25)+15%+26.60+13% = 258.62/cum	**258.62/cum**
7.	C/o of steel with avg.lead 50 Km including loading & unloading @(101.25+6x5x5.62x5)+15%+(56.0+44.80)+13% = 297.16/Ton or 29.72/ Qtl	**29.72 / Qtl**

ANALYSIS OF RATES

1.	E/work excavation undressed with avg. lead 15 mtr a combined lead up to 15 mtr including breaking of clouds complete in all respect.(CSR Item 6.2 b) @ 39.77+12%=44.54/ cum	44.54/ cum
a)	Extra E/work excavation undressed for every 7.5 additional lead behind 15 mtr but only 300 mtr i/c breaking of clouds complete in all respect.(CSR Item 6.2 b(i) @ 1.66+12% = 1.86 cum	1.86/ cum
2.	E/work excavation undressed with an av. lead 1.00 km. Katcha including loading & unloading complete in all respect.(CSR Item 5.2 (i)) @ (75+20%of 75) +15%+16.80 + 13%= 122.48/cum	122.48/ cum
3.	E/work excavation undressed with an av. lead 2.00 km. Katcha including loading & unloading complete in all respect.(CSR Item 5.2 (i)) @(93+20%of 93)+15%+16.80+13%=147.32/cum	147.32/cum
4.	E/work excavation undressed with an av. lead 3.00 km. Katcha including loading & unloading complete in all respect.(CSR Item 5.2 (i)) @(110.25+20%of 110.25)+15%+16.80 +13%=171.13/cum	171.13/cum
5.	E/work excavation undressed with an av. lead 4.00 km. Katcha including loading & unloading complete in all respect.(CSR Item 5.2 (i)) @(126.75+20%of 126.75)+15%+16.80 + 13%=193.90/cum	193.90/cum
6.	E/work excavation undressed with an av. lead 5.00 km. Katcha including loading & unloading complete in all respect.(CSR Item 5.2 (i)) @(142.50+20%of 142.50)+15%+16.80 + 13%=215.63/cum	215.63/cum
7.	E/work excavation undressed with an av. lead 6.00 km.	

	Katcha including loading & unloading complete in all respect.(CSR Item 5.2 (i)) @(142.50+11.25+1.50x1+20%of 153.75)+15%+16.80 + 13% =231.16/cum	231.16/cum
8.	Extra for laying E/w in 20 cm layers,watering & rolling to specifications complete in all respect.(CSR Item6.2(i toiii) (4.33+4.15+36.50)+12%=50.38/ cum	50.38/ cum
9.	Dressing of E/work complete in all respect(CSR Item 6.3(i) @ Rs. 0.50+12%=0.56/ sqm	0.56/sqm
10.	Extra Dressing of E/work complete in all respect. @ Rs. 1.69+12%=1.89/cum (CSR Item 6.12)	1.89/cum
11.	Compaction for earth taken from private land @ 25+12%%=28/cum (CSR Item 6.4)	28.00/cum
12.	E/w Excavation in foundation and trenches etc in all kinds of soil where pick-jumper work is not involved and not exceeding 2mtr depth i.c dressing of bottom and sides of trenches,stacking of excavated soil clear from the edge of excavation and subsequence filling around masonry in 15 cm layers with compaction in doing disposal of all surplus soil as directed with lead of 30 mtrs. (CSR item 6.6) @ 66.28+12% = 74.23/cum	74.23/cum
13.	Laying cement sand mortar1:5 including supply & carriage of all material and loading & unloading complete in all respect.	
	5.75 bags S/o & C/o Cement including loading & unloading @ (295+12.25)=307.25/bag	1766.69
	1.15 cum S/o & C/o sand including loading & unloading @ (52.75+522.07)=574.82	661.04
	1.00 cum Labour charges @ 425.19+12% = 476.21/cum	476.21
	Total =	**Rs.2903.94**

14.	E/work for Lip cutting for lining of Irrigation channels inclusive of all allowances leads and dressing Upto 1.50 mtr. height (CSR 19.23(a)) @ Rs. 68.78+12% = 77.03/cum		77.03/cum
15.	Extra E/work for Lip cutting for lining of Irrigation channels inclusive of all allowances leads and dressing Exceeding 1.50 mtr. but upto 3.00 mtr.height @ Rs.72.10+12% = 80.75/cum (CSR 19.23(b)		80.75/cum
16.	Laying brick lining 7.5 cm thick laid in 1:3 C.S.M. over first layer of 12.5 mm thick cement plaster on subgrade and second layer of 10mm thick cement plaster 1:3 including supply, carriage and loading & unloading of cement, sand & bricks complete in all respect. (For side lining)		
	364 Nos.	S/o brick @ Rs. 4418.18/%o Nos.	1608.22
	364 Nos.	C/o bricks from nearest kiln with an av. lead 25 km including loading & unloading @ Rs. 580.22/% Nos.	211.20
	0.47 cum	S/o Sand @ Rs. 52.75 /cum	24.79
	0.47 cum	C/o Sand from to site of work with an av. lead 60 km pucca including loading & unloading @ Rs.522.07/cum	245.37
	3.89 bags	S/o Cement @ Rs. 295/bag	245.37
	3.89 bags	C/o Cement with lead 15 km. including loading & unloading @ Rs.12.25/bag	47.65
	10 sqm	Labour charges @ Rs. 82.06+12%=91.91/sqm	919.10
		Total	**4203.88 Or 420.39/sqm**
17.	**Laying brick lining 7.5 cm thick laid in 1:3 C.S.M. over first layer of 12.5 mm thick cement plaster on subgrade and second layer of 10mm thick cement plaster 1:3 including supply, carriage and loading & unloading of cement, sand & bricks complete in all respect.(For Bed)**		

	364 Nos.	S/o brick @ Rs. 4418.18%o Nos.	1608.22
	364 Nos.	C/o bricks from nearest kiln with an av. lead 10 km including loading & unloading @ Rs. 580.22/%o Nos.	211.20
	0.47 cum	S/o Sand @ Rs. 52.75 /cum	24.79
	0.47 cum	C/o Sand from to site of work with an av. lead 60 km pucca including loading & unloading @ Rs.522.07/cum.	245.37
	3.89 bags	S/o Cement @ Rs. 295/bag	1147.55
	3.89 bags	C/o Cement with lead 15 km. including loading & unloading @ Rs. 12.25/bag	47.65
	10 sqm	Labour charges @ Rs.(82.06-10%)+12%=82.71/sqm	827.10
		Total =	**4111.88 Or 411.19/sqm**
18.	Dressing Bed and preparation of sub grade for lining @ 4.05 + 12% = 4.54/sqm (CSR item 19.1)		4.54/sqm
19.	Dressing of side slopes & preparation of sub grade for lining @ 6.60 + 12% = 7.39/sqm(CSR item 19.2)		7.39/sqm
20.	Extra allowances for producing templates in curved position. (CSR itm19.14) @ 6.89 + 12% = 7.72 sqm		7.72/sqm
21.	Extra allowances for scaffolding in tiles & concrete lining. (CSR itm19.16) @ 10.62 + 12% = 11.89 sqm		11.89/sqm
22.	Curing lining for 28 days in bed (CSR item 19.13 a) @ 3.05 + 12% = 3.42 Sqm		3.42/sqm
23.	Curing lining for 28 days in side slopes @ Rs. 11.05 + 12% = 12.38 Sqm		12.38/sqm
		Total	
24.	**Cement Brick masonry 1:3 Foundation and plinth**		

	480 Nos	S/o & C/o loading and unloading of Bricks @ Rs. 4418+580.22=4998.40/ % 0 Nos.	2399.23
	2.40 Bags	Supply, Carriage, loading and unloading of Cement @ Rs.295+12.25=307.25 per Bag	737.40
	0.25 cum	Supply, Carriage, loading and unloading of Sand @ Rs.52.75+522.07=576.82 per cum	143.71
	1.00 cum	Labour charges @ Rs.(355.18+12% = 397.80 (CSR Item No.11.9)	397.80
		Total	**3678.14**
25.	**Cement Brick masonry 1:3 Super Structure**		
	480 Nos	S/o & C/o loading and unloading of Bricks @ Rs. 4418+580.22=4998.40/ % 0 Nos.	2399.23
	2.40 Bags	Supply, Carriage, loading and unloading of Cement @ Rs.295+12.25=307.25 per Bag	737.40
	0.25 cum	Supply, Carriage, loading and unloading of Sand @ Rs.52.75+522.07=576.82 per cum	576.82
	1.00 cum	Labour charges @ Rs.537.78+12% = 602.31/cum	602.31
		Total	**4315.76**
26.	**Cement Brick masonry 1:3 Foundation and plinth**		
	480 Nos	S/o & C/o loading and unloading of Bricks @ Rs. 4418+580.22=4998.40/ % 0 Nos.	2399.23
	1.75 Bags	Supply, Carriage, loading and unloading of Cement @ Rs.295+12.25=307.25 per Bag	537.69
	0.25 cum	Supply, Carriage, loading and unloading of Sand @ Rs.52.75+522.07=576.82 per cum	144.21
	1.00 cum	Labour charges @ Rs.355+18+12% = 397.80/cum	397.80
		Total	**3478.93**

27.	**Laying 1st class brick masonry in cement sand mortar 1:4 in super structure including supply & carriage loading and unloading of cement sand and brick complete in all respects**		
		Same as per Item No. 26 above except Labor Charges =3478.93-397.80= 3081.13	3081.13
		Labour Charges (587.78+12% =602.31	602.31
		Total	**3683.44**
28.	**350mm wide brick on edge coping laid with cement sand mortar 1:3 and filling triangular portion with over 10 mm thick CP 1:4 over 12.50 mm thick CP i.c prepration of sub-grades.(unit 10 Mtrs)**		
	2.00 sqm	Prepration of sub-grades@ 4.05+12% = 4.54 Sqmtr	9.08
	1.00 sqm	10mm thick cement plaster 1:3 @ 3.14+12% = 40.48 sqm	40.48
	1.00 sqm	12.5 mm thick cement plaster 1:5 @45.18+12% = 50.60 sqm	50.60
	2.00 sqm	cement plaster 12.50 mm thick 1:3 @45.18+12% = 50.60 sqm	101.20
	195 nos	S/o brick @ Rs. 4418/%o Nos.	861.55
	195 nos	C/o bricks including loading & unloading @ 580.22/% Nos.	113.14
	1.71 Bag	S/o & C/o of cement @ 295+12.25 =307.25 / Bag	525.40
	0.20 cum	S/O sand @ 52.75 / Cum	10.55
	0.20 cum	C/o ,Loading & Unloading charges @522.07/ Cum	104.41
	0.41 cum	Labour charges for brick masnry 1:3 Cement sand mortor @ 397.80/cum	163.10
	0.036	Labour charges for cement sand mortor1:3	17.14

		@476.21	
		Total =	**1996.65 or 199.67/mtr**
29.	**Brick on edge coping 9" wide $4^{1/2}$ thick cement sand mortar 1:3,10 mm thick CP 1:4 over 12.50 mm thick CP 1:5 and preparation of sub-grades.(unit 10 Mtrs)**		
	0.91 sqm	Prepration of sub-grades @ 4.05+12% = 4.54 Sqmtr	4.13
	0.76 sqm	10mm thick cement plaster 1:3 @ 36.14+12% = 40.48 sqm	30.76
	0.76 sqm	12.5 mm thick cement plaster 1:5 @45.18+12% = 50.60 sqm	38.46
	0.91 sqm	cement plaster 12.50 mm thick 1:3 @45.18+12% = 50.60 sqm	46.05
	130 nos	S/o brick @ Rs. 4418/%o Nos.	574.36
	130 nos	C/o bricks including loading & unloading @ 580.22/% Nos.	754.29
	1.15 Bag	S/o & C/o of cement @ 295+12.25 =307.25 / Bag	353.34
	0.13 cum	S/O, Loading & Unloading sand @ 52.75+522.07=574.82 / Cum	74.73
	0.25 cum	Labour charges for brick masnry 1:3 Cement sand mortor @ 397.80/cum	99.45
	0.036 cum	Cement sand mortor 1:3 @ 476.21/cum	17.14
		Total =	**1992.7 or 199.27/mtr**
30.	**Deep Variety in Cement Sand Mortor 1:3 (unit 1 Sq/mtr)**		
	0.015 bag	S/o & C/o of cement bags @ 307.25	4.61
	0.0014 cum	S/o & C/o of sand i.c loading & Unloding @574.82/cum	0.80

	1.00 Sqm	Labour Charges (CSR item 15.60) @ 46.15+12%=51.69/sqmtr	51.69
		Total	**57.10**
31.	**Deep Variety in Cement Sand Mortor 1:2 (unit 1 Sq/mtr)**		
	0.044 bag	S/o & C/o of cement bags @ 307.25	13.52
	0.003 cum	S/o & C/o of sand i.c loading & Unloding @574.82/cum	1.72
	1.00 Sqm	Labour Charges (CSR item 15.59) @ 46.15+12%=51.69/sqmtr	51.69
		Total	**66.93**
32.	**Laying cement concrete1:4:8 with 40mm brick ballast hand mixed for foundation(unit 1 cum)**		
	1.04 cum.	S/o brick bats @ Rs. 41+15%=307.50	319.80
	1.04 cum	Breaking of Brick Bats into brick Ballast 40 mm @ 82.50	85.80
	0.96 cum.	C/o brick bats from nearest kiln with an av. lead 10 km including loading & unloading @ Rs. 358.62/cum.	248.28
	0.48 cum	S/o & C/o of Sand @ 574.82 /cum	275.91
	3.50 bags	S/o & C/o Cement bags@ Rs. 307.25/bag	1075.38
	1.00 cum	Labour charges@ Rs.330.21+12% = 369.84cum	369.84
		Total =	**Rs. 2375.01**
33.	**Reinforced cement cons. M-20 with shingle machine mixed including materials at site,curing using of vibrator & shuttering etc. complete in all respects. (For Main Slab)**		**(Unit per cum)**
	7.5 Bags	Supply of cement @ 295/bag	2212.50
	7.5 Bags	Carriage, loading and unloading of Cement with avg lead 15 km pucca @ 12.25 per Bag	91.88
	0.43 cum	Supply of course Sand @ 182.56 per cum	78.50

	0.43 cum	Carriage, loading and unloading of coarse Sand with avg lead 225 km pucca @ 773.94 per cum	332.79
	0.85 cum	Supply of Shingle @ Rs.281.66/- per cum	239.41
	0.85 cum	Carriage, loading, unloading & washing of Shingle with avg. lead of 225 Km pucca @ Rs.762.87/- per cum	648.44
	8.25 sqm	Centering & shuttering @ 162.80+12% =182.34 sqmtr	1504.30
	1 cum	Labour charges RCC(M-20) @ Rs.(1271.86+12%=1424.48 per cum	1424.48
		TOTAL	**6532.30**
34.	**Reinforced cement cons. M-20(1:1$^{1/2}$:3) with shingle machine mixed including materials at site,curing using of vibrator & shuttering etc. complete in all respects. (For Approach Slab)**		**(unit per cum)**
	7.5 Bags	Supply of cement @ 295/bag	2212.50
	7.5 Bags	Carriage, loading and unloading of Cement with avg lead 15 km pucca @ 12.25 per Bag	91.88
	0.343 cum	Supply of course Sand @ 182.56 per cum	78.50
	0.343 cum	Carriage, loading and unloading of coarse Sand with avg lead 225 km pucca @ 773.94 per cum	332.79
	0.665 cum	Supply of Shingle @ Rs.281.66/- per cum	239.41
	0.665	Carriage, loading, unloading & washing of Shingle with avg. lead of 225 Km pucca @ Rs.762.87/- per cum	648.44
	1 cum	Labour charges RCC(M-20) @ Rs.(921.39+12%=1031.96 per cum	1031.96
		TOTAL	**6139.78**
35.	**Cement concrete M-15(1:2:4) with shingle machine mixed including materials at site,curing using of vibrator centering & shuttering etc. complete in all respects.**		**(unit per cum)**

	6.50 Bags	Supply,Carriage, loading and unloading of Cement with avg lead 10 km pucca @ 307.25 per Bag	1997.12
	0.45 cum	Supply,Carriage, loading and unloading of coarse Sand with avg lead 150 km pucca @ 773.94+182.56= 956.50 per cum	430.43
	0.90 cum	Supply of Shingle @ Rs. 281.66 per cum	253.49
	0.90 cum	Carriage, loading, unloading & washing of Shingle with avg. lead of 150 Km pucca @ Rs.762.87 per cum	686.58
	1 cum	Labour charges RCC(M-20)(CSR Item22.90) @ 686.92+12% = 769.35 per cum	769.35
		TOTAL	**4136.97**
36	**Reinforced Cement concrete M-15(1:2:4) with shingle machine mixed including materials at site, curing using of vibrator centering & shuttering etc. excluding S/o & C/o of steel.**		
		Same as per item no. 35 except labour charges @(4136.97-769.35)	3367.62
		Labour charges for RCC,M-15 @869.29+12% = 973.60 (CSR 21.32)	973.60
		Total	**4341.22**
37.	**S/o & C/o and fixing for steel up to 20mm dia**		
	1 Qtl	S/o Steel @ Rs. 4300 per Qtl.	4300.00
	1Qtl	C/o Steel from with Avg. lead 50 Km. pucca i.c loading & unloading @ 29.72 qtl	29.72
		Labour Charges (C.S.R. Item 18.18) @ 358.23 + 12% = 401.22	401.22
		Total	**4730.94**
38.	**S/o & C/o structural steel and fixing**		

		Same as per item no.37 except labor charges (4730.94-401.22)+200= 4529.72	4529.72
		Labour Charges (C.S.R. Item 18.30) @ 1970.81 + 12% = 2207.31/-qtl	2207.31
		Total	**6737.03**
39.	**Cement concrete M-15(1:3:6) with shingle machine mixed including materials at site, including using of vibrator centering & shuttering etc. complete in all respect**		
	4.50 Bags	Supply of cement @295/bag	1327.50
	4.50 Bags	Carriage, loading and unloading of Cement with avg lead 15 km pucca @ 12.25per Bag	55.13
	0.47 cum	Supply of course Sand @ 182.56 per cum	85.80
	0.47 cum	Carriage, loading and unloading of coarse Sand with avg lead 150 km pucca @ 773.94 per cum	363.75
	0.94 cum	Supply of Shingle @ 281.66/- per cum	264.76
	0.94 cum	Supply of Shingle @ 762.87/- per cum	717.10
	1 cum	Labour charges cement concrete(CSR 21.40) @ Rs.519.19+12% = 581.49 per cum	581.49
		TOTAL	**3395.53**
40.	**Filling Sand Behind wing walls & abutments (compacted)**		Unit cum
	1 cum	S/o sand @ 52.75/cum	52.75
	1 cum	C/o sand @ 522.07 /cum	522.07
	1 cum	Sand filling @ 155.63+12% = 174.31	174.31
		TOTAL	**749.13**
41.	**Dry brick on edge paving over 25mm thick mud mortar grouted with sand**		Unit 10 sqmt
	575 no.	S/o Bricks @ 4418 / %	2540.00
	575 no.	C/o including loading & unloading Bricks @ 580.22 / %	333.63

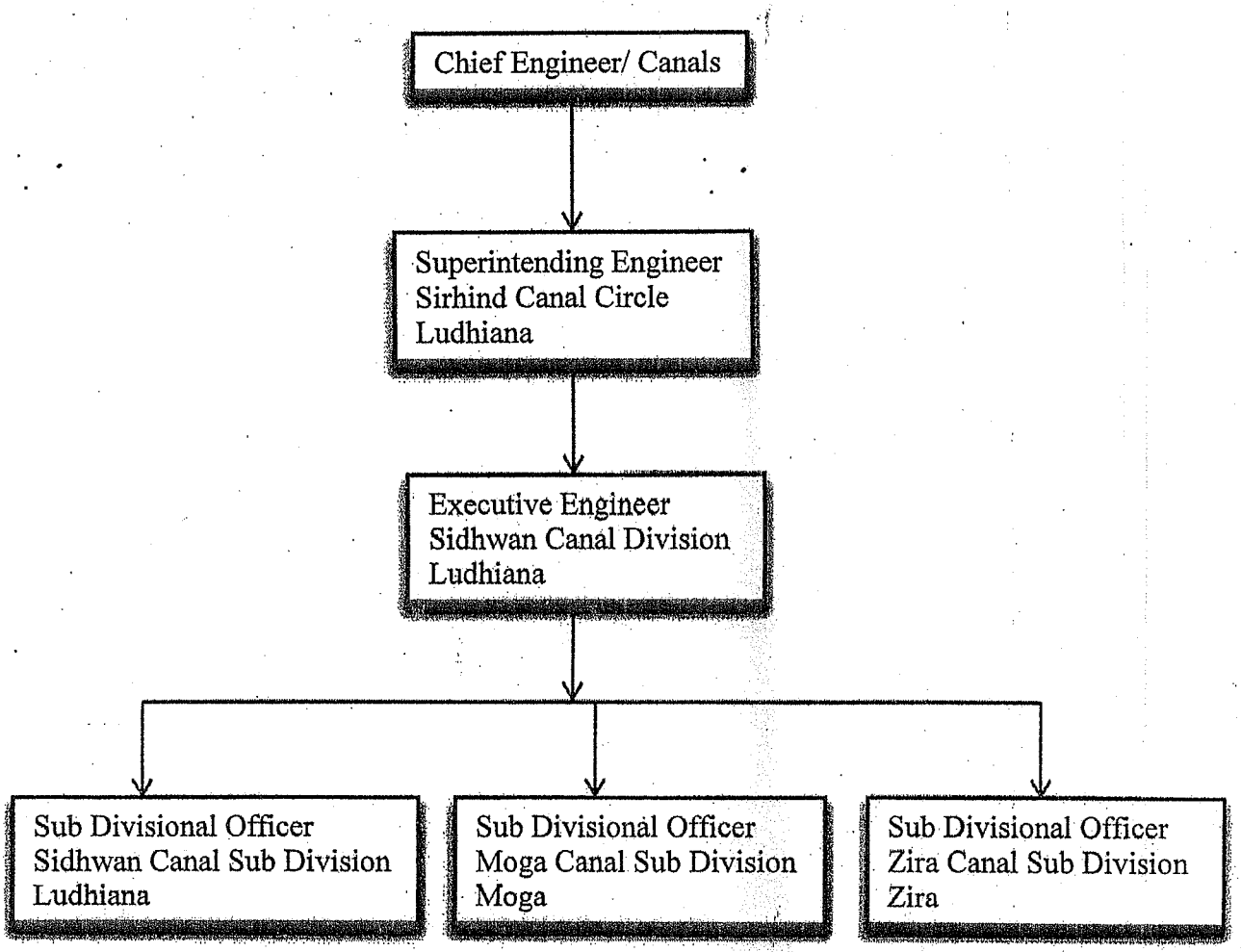
	0.15 cum	S/o sand @ 52.75	7.91
	0.15 cum	C/o including loading & unloading sand @ 522.07	78.31
	10 sqmtr	Labour Charges 30.07 + 12% = 33.68/- sqmt	336.80
		TOTAL	**3296.65**
42.	**Laying 200mm (0.65') thick brick masonry cement mortar 1:4 over 150mm (0.50') thick M-10 in-foundation and plinth.**		
	96 Nos.	S/o Brick @ Rs. 4418/- % Nos.	424.15
	96 Nos.	C/o & Loading & Unloading of bricks @ Rs. 580.22 % Nos.	55.70
	1.046 Bags	S/o Cement @ Rs. 295/- per Bag.	308.57
	1.046 Bags	C/o and Loading & Unloading of Cement @ Rs. 12.25 per Bag	12.81
	0.104 Cum	S/o Sand @ Rs. 52.75 per Cum	5.49
	0.104 Cum	C/0 and Loading & Unloading of Sand @ Rs. 522.07 per Cum	54.30
	0.128 Cum	S/o Shingle Size 12mm @ Rs. 281.66 per Cum	36.05
	0.128 cum	C/o and Loading & Unloading of Shingle @ Rs. 762.87 per Cum	97.65
	0.150 Cum	For Labour Charges of conc. @ 769.35 (CSR 22.90)	115.43
	0.200 Cum	Labour Charges for brick masonary 1:4 @ 355.18+12%	79.56
		Total	**1189.71**
43.	**Laying stone in wire creates including supply and carriage. Loading & Unloading of stone complete in all respects as per drawing, design and specifications.**		
	1.0 Cum	S/o Stone @ Rs. 344.31/- per Cum	344.31

	1.0 Cum	C/o ,Loading & Unloading @ Rs. 762.87/ Cum	762.87
	1.0 Cum	Labour Charges @ 104.26 + 12% = 116.77	116.77
		Total	**1223.95**
44.	**Weaving wire of requisite mesh including cost of supply and carriage.**		
	2.20 kg	Anniled wire @ 41340 Mt.	90.95
	1 Sq. Mtr.	Weaving Charges@ 2373+12% = 26.56/sqmtr	26.56
		Total	**121.63**
45.	**Extra for smooth surface with steel shuttering exposed surface (CSR 9.16)** @ 102.12+12%=114.24		**114.24**
46.	**Providing & fixing 18mm vide pre-moulded bituminous filling for expansion joint including cost of ceiling compound and primer coat 20mm vide** @ 1+12% =1.12 (C.S.R. Item 24.40)		11.20 Mtr/ Depth
47.	**Rubbing top surface for abutments and piers rubbed with coir bore natum stone.**		25 Sq. Mtr. / Market Rate
48.	**10 mm thick cement plaster 1:3 including supply, carriage, loading and unloading of all materials at site, complete in all respect.**		(Unit per Sqm.)
	0.12 bags	Supply,carriage,loading & unloading of cement @ Rs. (295+12.25)= 307.25 per bag	36.87
	0.012 cum	Supply, carriage, loading and unloading of sand @ Rs. 574.82per cum	6.90
	1.00 sqm	Labour charges @ 36.14+12% = 40.48 per sqm	40.48
		TOTAL	**84.25**
49.	**Laying Dry Brick bats including breaking, stacking, supply, carriage, loading and unloading of brick bats etc. at site, complete in all respect.**		(Unit per cum)
	1.00 cum	Supply, Carriage, loading and unloading of brick	566.12

		bats @ Rs.307.50+258.62=566.12 per cum	
	1.00 cum	Labour charges @ Rs.(155.63+12%)= 174.31 per cum	174.31
		TOTAL	**744.43**
50.	Preparation, watering and raming of surface for laying concrete (C.S.R. Item 10.34) @ 5.17+12% = 5.79		**5.79**
51.	Dismantling brick work and cement hydraulic work complete in all respects. @ (241.54+50%)+12% = 405.79		405.79 Cum
52.	Dismantling brick work in cement non hydraulic work complete in all respects. @ (241.54+12%)		270.52 Cum
53.	Dismantling cement concrete 1:3:6 hydraulic work complete in all respects. @ (340.54+50%) + 12% = 580.51		580.51 cum
54.	**Making Sikri Sarkanda temporary godown 3m x3m with 2 m height 1.1/2 brick thick burnt laid dry excluding cost of bricks but including the cost of other material** @ 2400+15%= 2760 each		**2760.00**
55.	**Dismantling RCC 1:1 ½ :3 =779.99+15%**		**896.99 Cum**
56.	**Dismantling RCC 1:3 :6 = 345.54 + 15%**		**397.37**
57. (a)	**Ordinary jungle clearance of both banks of running disty./ Minor & drains with discharge upto 1.5 cums $\frac{(1248+1920.01)}{2}$+15%**		**1821.60 KM**
(b)	**1.5 cums but upto 4.5 cums $\frac{(1920+2496.01)}{2}$+15%**		**2539.20 Km**
(c)	**Discharge exceeding 4.5 cums $\frac{(2496+3168.01)}{2}$+15%**		**3256.81 KM**

Annexure 104

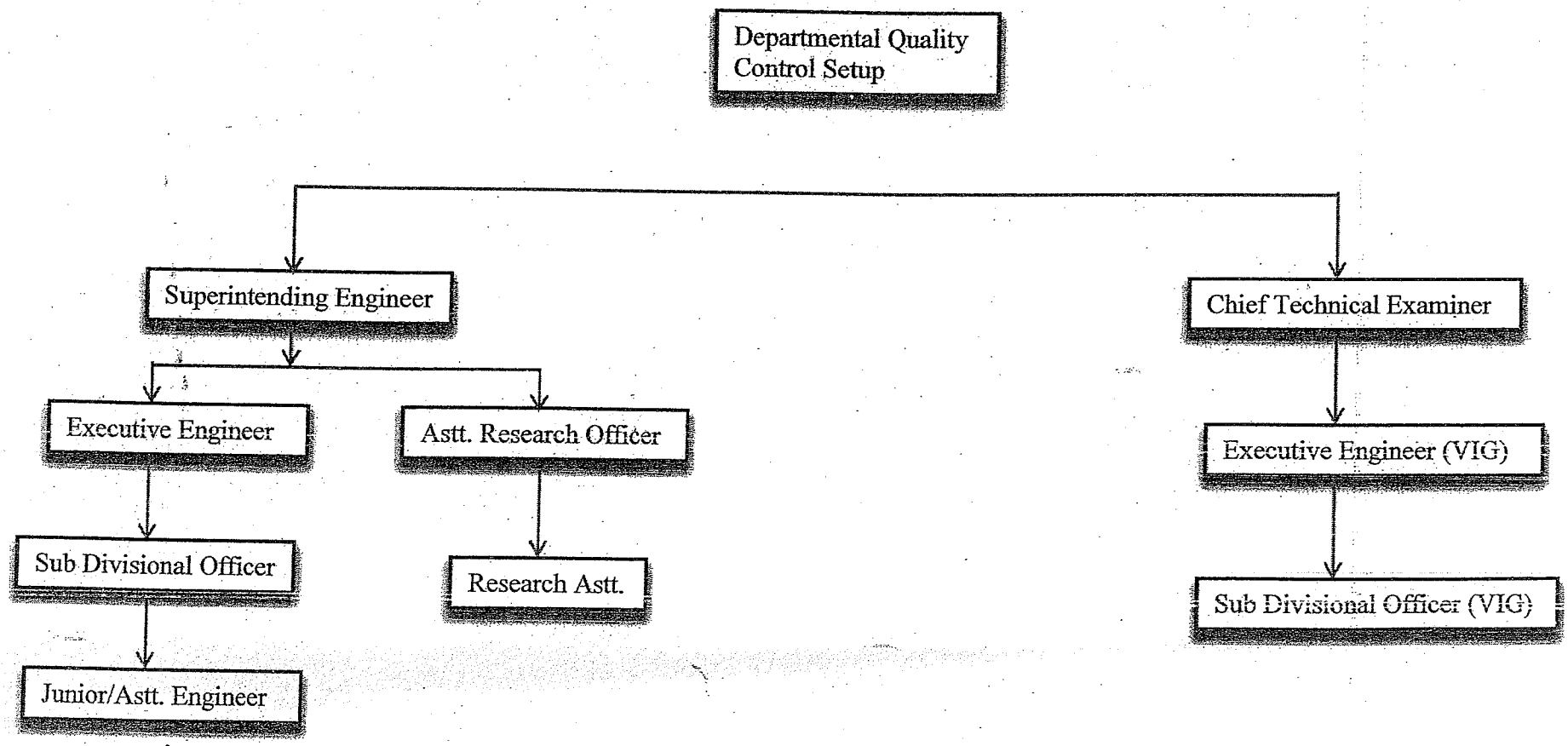
PROJECT ESTIMATE FOR THE DOMESTIC SEWERAGE OF LUDHIANA CITY AFTER TREATMENT AT STP THROUGH BUDHA NALLAHA AND BY CONSTRUCTING NET WORK OF DISTRIBUTORY/WATER COURSE.



Annexure C

Annexure A/5

QUALITY CONTROL MANAGEMENT SETUP



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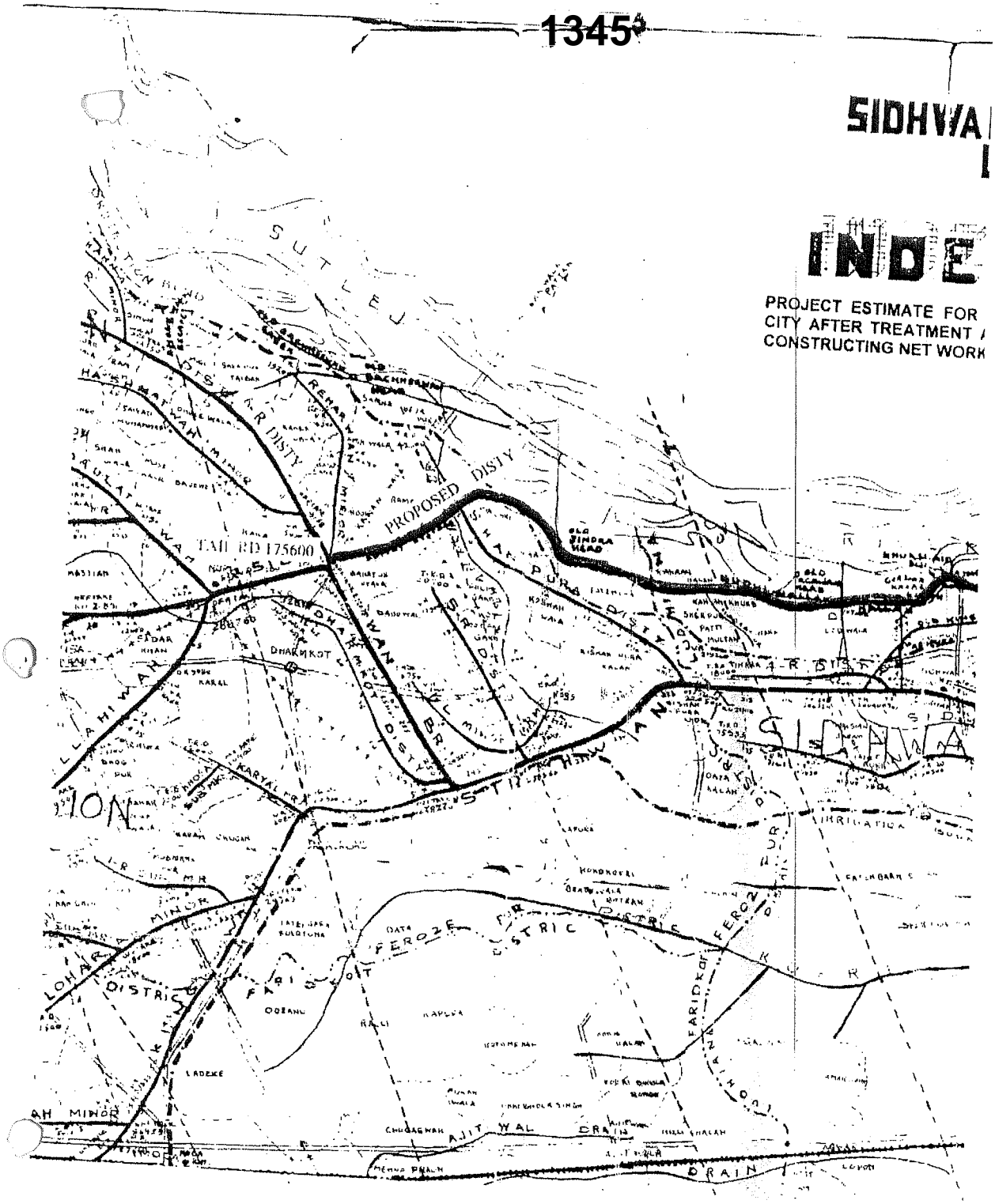
SIDHWA 106

INDE

PROJECT ESTIMATE FOR
CITY AFTER TREATMENT
CONSTRUCTING NET WORK



DIVISION
UDHIANA

PLAN

E DOMESTIC SEDWERAGE OF LUHDIANA
STP THROUGH BUDHA NALLAHA AND BY
F DISTRIBUTORY/WATER COURSE.

SALIENT FEATURE

1	Total Cost of the estimate	Rs. 120.28 Lac
2	Location of Project Area	In the Districts Ludhiana, Moga & Ferozepur
3	Benifited Vilalges in Nos.	35 Nos.
4	Total GA/CCA under Project	38472/33454 Acres
5	Type of Canal	Un-Lined
6	Benifited Area	33454 Acres
7	Length of Channel	53.54 KM.
8	Benifited Cost Ratio	2.74:1