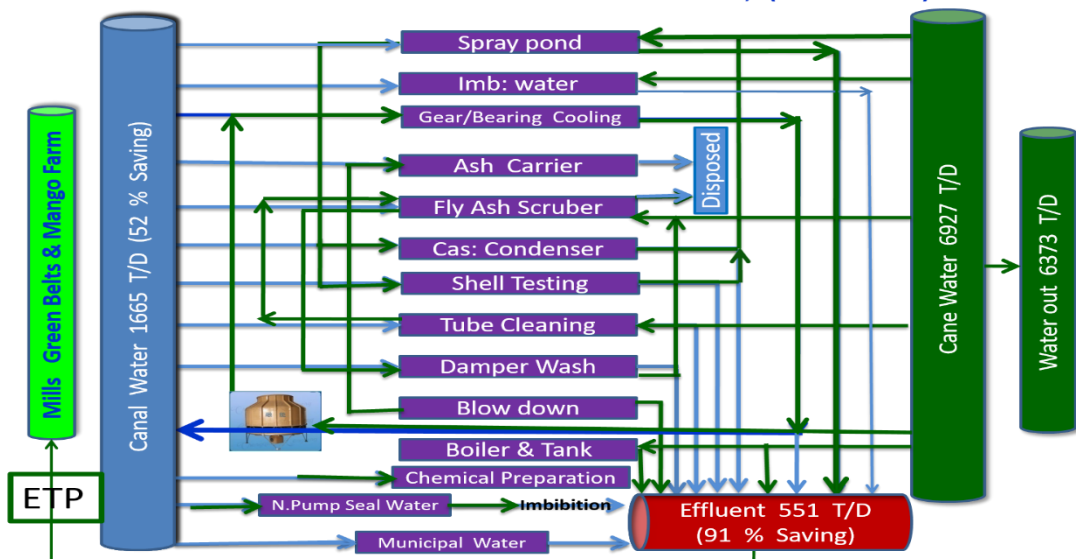


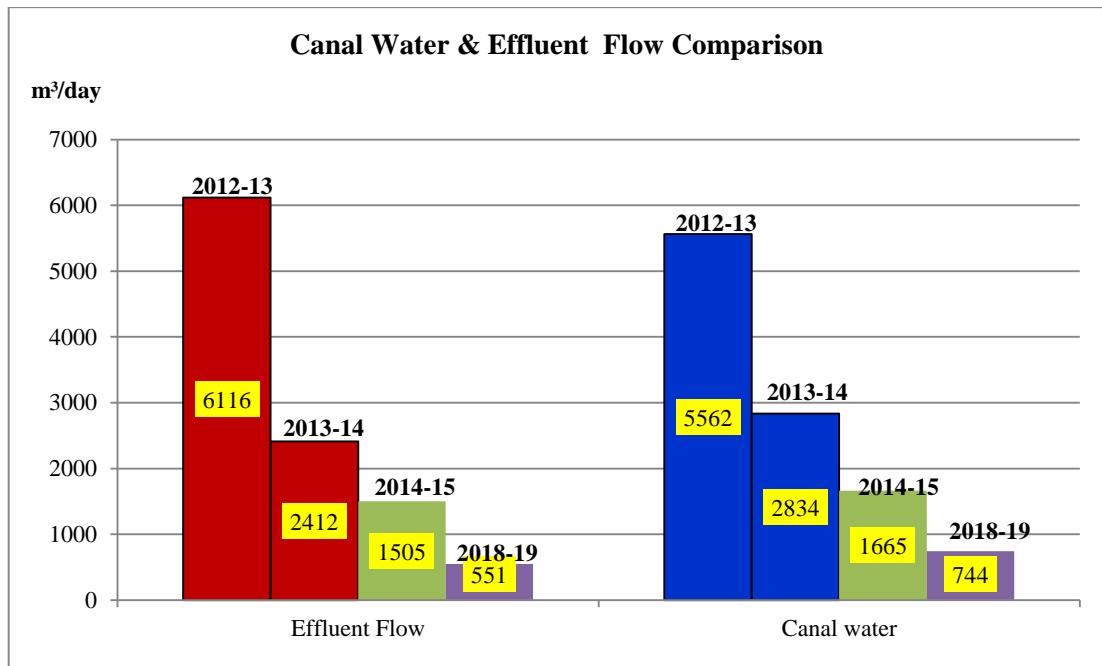
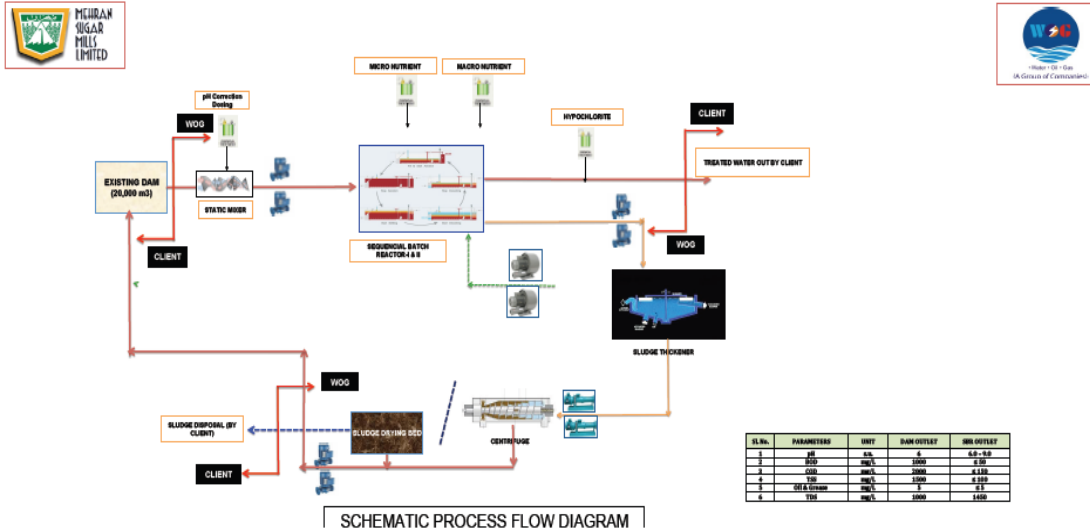
- Tube cleaning of all the evaporators, pans and juice heater was done with cold condensate. This scale-containing water is reused in the boiler flue gas-scrubbing system as makeup water. The scale is then removed from boiler scrubbing system along with boiler ash. These residues were disposed of into cane fields along with mill mud as a fertilizer.
- Vacuum filter cascade condenser water. Previously, canal water was used for this condenser and drained to the main drain. It was replaced with spray pond water and recycled.
 - Shell testing of vessels. Previously, shell testing of all the vessels was done with canal water and drained to the main drain. This was replaced with spray pond water and recycled. These vessels were then rinsed with hot condensate and also drained to the spray pond.
 - All the unwanted water taps of the process house were plugged, as they were sources of effluents.
 - Caustic soda solution used for evaporator chemical cleaning was reused. Exhausted soda solution was then collected in a neutralization tank where it was neutralized with acid solution that had been used for first-effect chemical cleaning. This neutralized salt solution was drained to the effluent.
 - Water addition to various magmas in the raw and refining houses was replaced with clear juice and fine liquor.

Effluent Status After Phase-III & IV, (2017-18)



- ETP design was based on SBR (Sequential Batch Reactor). An aeration based system.

Flow Diagram of ETP, based on SBR technology.



RESULTS & DISCUSSIONS

- The project of EMP started in the year 2012 and ended by 2018, resulting in the remarkable reduction of effluent water by 90 %
- Figure 1 shows the average effluent and canal water flow comparison of the base case season 2012-13 with EMP seasons.

	2018-2019		
	Waste	Canal	
16-Feb-19	212	413	
17-Feb-19	265	753	
18-Feb-19	284	496	
19-Feb-19	359	854	
20-Feb-19	284	691	
21-Feb-19	272	704	
22-Feb-19	256	1260	
23-Feb-19	647	1007	
24-Feb-19	860	781	Dam Level Low
25-Feb-19	348	902	Shut Down
26-Feb-19	245	549	Shut Down
27-Feb-19	784	887	Dam Level Low
28-Feb-19	709	879	
1-Mar-19	320	1322	
2-Mar-19	214	997	
3-Mar-19	205	1195	
4-Mar-19	275	1641	
5-Mar-19	472	1328	TA Washing after cl
6-Mar-19	351	1202	
7-Mar-19	371	1128	
8-Mar-19	435	1215	
9-Mar-19	565	1153	
10-Mar-19	530	1577	
11-Mar-19	528	1452	
12-Mar-19	259	771	
13-Mar-19			
14-Mar-19			
AYG:	551	744	from December 30

- The results of EMP implementation, over the years can be summarized as:
 - ✓ Effluent flow was reduced from 6116 m³/day to 551 m³/day or 0.046 tons/tons cane against industries average of 0.5 – 0.7. A reduction of 91.0 % was achieved against the target of 83.7%.
 - ✓ Canal water was reduced from 5562 m³/day to 744 m³/day, or over the 105 days of mill operation, 506,000 m³/year. This saved canal water is now available for the inhabitants at the tail end of the canal. In Pakistan where per capita water availability is less than 1000 m³, the quantity of this saved water is sufficient for a village of 506 inhabitants.
 - ✓ COD loading was reduced by 88% against the target of 95%.
 - ✓ All other pollutant parameters were reduced significantly.
 - ✓ The cost of the proposed ETP reduced from USD 1.7 million to USD 0.6 million, due to the reduction of effluent flow and pollutant loadings.
 - ✓ After operation of ETP factory achieved the NEQS.

- ✓ COD loading of treated effluent remained less than 100 ppm and all other parameters well within the NEQS range.
- ✓ Mehran Sugar Mills is now “The Only Sugar Factory of Pakistan discharging its Environment Friendly Effluent as per NEQS”.

Cost of ETP & EMP Phases

- ✓ Cost of ETP, base case (before EMP) and modified case (after EMP)
 - Base Case Cost = 178.50 million PKR
 - Modified Case Cost = 63.00 million PKR
- ✓ Cost of EMP Phases = 30.00 million PKR

FUTURE WORK

- The major source of effluent and pollutant is the overflow of spray pond water. This water becomes heavily polluted due to the exhaustive recirculation and entrainment from the pans. If a factory has enough water to pass through the pans and evaporator condenser only once, then the pollutant overflow of spray pond could be avoided. Fortunately, Mehran Sugar Mill is located very adjacent to an irrigation water canal and if the local authorities and SEPA allows a one pass of canal water from the condenser, i.e. pumping water from the canal for a single passage through the condensers and discharging it back into the canal, then not only power for spray pond water could be saved but also about 30% of the cane water from condensed vapors would be available for irrigation. For 1.0 million ton cane crushing, this cane water comes to 300,000 tons of water annually.

CONCLUSION

- ✓ Sugar mills, which are typically considered to be a source of pollutant effluents, are Environment Friendly Industries, unless we pollute it.
- ✓ We can significantly reduce the effluent flow, to a reasonably low limit, by improved manufacturing practices and innovative solutions, suitable for their own operating conditions.
- ✓ MSM reduced its effluent flows from 6100 to 551 m³/day, i.e. 91 % of base case.
- ✓ Preparation and then implementation of an Effluent Management Plan (EMP) is the key for success.

- ✓ Any reduction of effluent flow, saves clean canal water by the same amount, which then becomes available for other useful purposes.

Table-2. List of Water consumption & Effluent generation points with recommendations

S.#	House/Equipment	Existing Water Source	Existing Disposal	Recommended Water Source	Recommended Disposal
1	Evaporator Tube cleaning water	Canal Water	Main drain.	Surplus condensate to be used after cooling	To be collected separately and re-used at FARS as make-up water.
2	Raw Pan Tube cleaning water	Canal Water	Main drain.	Surplus condensate to be used after cooling	
3	Refine Pan Tube cleaning water	Canal Water	Main drain.	Surplus condensate to be used after cooling	
4	Spray Channel Overflow drain water	Canal Water	Main drain.		To be treated through ETP and used as irrigation water.
5	V.Filter Cascade condenser water	Canal Water	Main drain.	Spray pond water to be used	Canal water to be replaced with spray pond water and recycled.
6	Nash pumps No.1 Bearing cooling water	Canal Water	Main drain.	Surplus condensate to be used after cooling	To be collected and pumped to mills for imbibition.
7	Nash pumps No.2 Bearing cooling water	Canal Water	Main drain.	Surplus condensate to be used after cooling	
8	Nash pumps No.3 Bearing cooling water	Canal Water	Main drain.	Surplus condensate to be used after cooling	
9	Power House Turbine No.1 Cooling water	Canal Water	Sservice water circulation tank.	Surplus cold condensate to be used as makeup water.	Recycled after cooling through Pre fabricated cooling towers.
10	Power House Turbine No.1 Cooling water	Canal Water	Sservice water circulation tank.		
11	Power House Turbine No.2 Cooling water	Canal Water	Sservice water circulation tank.		
12	Power House Turbine No.2 Cooling water	Canal Water	Sservice water circulation tank.		
13	Power House Turbine No.3 Cooling water	Canal Water	Sservice water circulation tank.		
14	Power House Turbine No.3 Cooling water	Canal Water	Sservice water circulation tank.		
15	Power House Turbine No.4 Cooling water	Canal Water	Sservice water circulation tank.		
16	Power House Turbine No.4 Cooling water	Canal Water	Sservice water circulation tank.		
17	Power House Turbine No.5 Cooling water	Canal Water	Sservice water circulation tank.		
18	Power House Turbine No.5 Cooling water	Canal Water	Sservice water circulation tank.		
19	T.B Mill No.1 Floor washing	condensate & Canal water	Main drain.	Good house keeping to be improved for reducing cleaning	Good house keeping to be improved for reducing cleaning frequency. Only
20	T.B Mill No.2	condensate &	Main drain.		

	Floor washing	Canal water		frequency. Only hot condensate to be used.	hot condensate to be used.
21	T.B Mill No.3 Floor washing	condensate & Canal water	Main drain.		
22	T.B Mill No.4 Floor washing	condensate & Canal water	Main drain.		
23	T.A Mill No.1 Floor washing	condensate & Canal water	Main drain.		
24	T.A Mill No.2 Floor washing	condensate & Canal water	Main drain.		
25	T.A Mill No.5 Floor washing	condensate & Canal water	Main drain.		
26	T.B Fibrizer driving side bearing Cooling water	Canal Water	Main drain.	Canal water	To be collected and recycled through service water tank.
27	T.B Fibrizer Off side bearing cooling water Cooling water	Canal Water	Main drain.		
28	T.B Fibrizer Gear Cooling water	Canal Water	Main drain.		
29	Raw Juice Pumps Floor washing	condensate & Canal water	Main drain.	Good house keeping to be improved for reducing cleaning frequency. Only hot condensate to be used.	Good house keeping to be improved for reducing cleaning frequency. Only hot condensate to be used.
30	T.B Imbibation Tank overflow	condensate & Canal water	Main drain.	Hot Condensate after heating juice to be used.	Mechanical float valve or electronic auto control to be provided to stop tank overflow.
31	T.A Plateform washing	condensate & Canal water	Main drain	Good house keeping to be improved for reducing cleaning frequency. Only hot condensate to be used.	Good house keeping to be improved for reducing cleaning frequency. Only hot condensate to be used.
32	T.B 4th Mill Plateform washing	condensate & Canal water	Main drain.		
33	M.Turbine No.1 Bearing cooling water	Canal Water	Main drain/service water tank	Surplus cold condensate to be used as makeup water.	Recycled after cooling through Pre fabricated cooling towers.
34	M.Turbine No.2 Bearing cooling water	Canal Water	Main drain/service water tank		
35	M.Turbine No.3 Bearing cooling water	Canal Water	Main drain/service water tank		
36	M.Turbine No.3 Bearing cooling water	Canal Water	Main drain/service water tank		
37	M.Turbine No.4 Bearing cooling water	Canal Water	Main drain/service water tank		
38	M.Turbine No.4 Bearing cooling water	Canal Water	Main drain/service water tank		
39	Mill Max Drive side Bearing cooling water	Canal Water	Main drain/service water tank		
40	Mill Max Off side Bearing cooling water	Canal Water	Main drain/service water tank		
41	Mill Max, Nozle plate washing water.	Canal Water	Mixed with juice		
42	Mil Max Gear	Canal Water	Main Drain		

	Bearing cooling water				
43	T.B. Mill No.1 Drive side Bearing cooling water	Canal Water	Main drain/service water tank	Surplus cold condensate to be used as makeup water.	Recycled after cooling through Pre fabricated cooling towers.
44	T.B. Mill No.1 Off side Bearing cooling water	Canal Water	Main drain/service water tank		
45	T.B. Mill No.2 Drive side Bearing cooling water	Canal Water	Main drain/service water tank		
46	T.B. Mill No.2 Off side Bearing cooling water	Canal Water	Main drain/service water tank		
47	T.B. Mill No.3 Drive side Bearing cooling water	Canal Water	Main drain/service water tank		
48	T.B. Mill No.3 Off side Bearing cooling water	Canal Water	Main drain/service water tank		
49	T.B. Mill No.4 Drive side Bearing cooling water	Canal Water	Main drain/service water tank		
50	T.B. Mill No.4 Off side Bearing cooling water	Canal Water	Main drain/service water tank		
51	T.A Fibrizer Drive side Bearing cooling water	Canal Water	Main drain.	Surplus cold condensate to be used as makeup water.	Recycled after cooling through Pre fabricated cooling towers.
52	T.A Fibrizer Off side Bearing cooling water	Canal Water	Main drain.		
53	T.A Fibrizer Gear Bearing cooling water	Canal Water	Main drain.		
54	T.A Imbibation Tank overflow	Condensate + Canal Water	Main drain.	Hot Condensate after heating juice to be used.	Mechanical float valve or electronic auto control to be provided to stop tank overflow.
55	T.A M.Turbine No.1 Bearing cooling water	Canal Water	Service water tank	Surplus cold condensate to be used as makeup water.	Recycled after cooling through Pre fabricated cooling towers.
56	T.A M.Turbine No.2 Bearing cooling water	Canal Water	Service water tank		
57	T.A M.Turbine No.3 Bearing cooling water	Canal Water	Service water tank		
58	T.A M.Turbine No.4 Bearing cooling water	Canal Water	Service water tank		
59	T.A M.Turbine No.5 Bearing cooling water	Canal Water	Service water tank		
60	T.A M.Turbine No.6 Bearing cooling water	Canal Water	Service water tank		
61	T.A. Mill No.1 Drive side Bearing cooling water	Canal Water	Main drain/service water tank	Surplus cold condensate to be used as makeup water.	Recycled after cooling through Pre fabricated cooling towers.
62	T.A. Mill No.1 Off side Bearing cooling water	Canal Water	Main drain/service water tank		
63	T.A. Mill No.2 Drive side Bearing cooling water	Canal Water	Main drain/service water tank		
64	T.A. Mill No.2 Off side Bearing cooling water	Canal Water	Main drain/service water tank		
65	T.A. Mill No.3 Drive side Bearing cooling water	Canal Water	Main drain/service water tank		
66	T.A. Mill No.3 Off side	Canal Water	Main drain/service		

	Bearing cooling water		water tank		
67	T.A. Mill No.4 Drive side Bearing cooling water	Canal Water	Main drain/service water tank		
68	T.A. Mill No.4 Off side Bearing cooling water	Canal Water	Main drain/service water tank		
69	T.A. Mill No.5 Drive side Bearing cooling water	Canal Water	Main drain/service water tank		
70	T.A. Mill No.5 Off side Bearing cooling water	Canal Water	Main drain/service water tank		
71	T.A. Mill No.6 Drive side Bearing cooling water	Canal Water	Main drain/service water tank		
72	T.A. Mill No.6 Off side Cooling water	Canal Water	Main drain/service water tank		
73	Boiler No.1 ID fan Cooling water	Canal Water	Main Drain	Surplus cold condensate to be used as makeup water.	Recycled after cooling through Pre fabricated cooling towers.
74	Boiler No.2 ID fan Cooling water	Canal Water	Main Drain		
75	Boiler No.3 ID fan Bearing cooling water	Canal Water	Main Drain		
76	Boiler No.4 ID fan Bearing cooling water	Canal Water	Main Drain		
77	Boiler No.4 Sec: fan Bearing cooling water	Canal Water	Main Drain		
78	Feed Pump No.1 Bearing cooling water	Canal Water	Main Drain		
79	Feed Pump No.2 Bearing cooling water	Canal Water	Main Drain		
80	Feed Pump No.3 Bearing cooling water	Canal Water	Main Drain		
81	Feed Pump No.4 Bearing cooling water	Canal Water	Main Drain		
82	Feed Pump No.5 Bearing cooling water	Canal Water	Main Drain		
83	Feed turbo Bearing cooling water	Canal Water	Main Drain		
84	Boiler No.3 Cold water tap For Ash carrier spray	Canal Water	Carried along with Ash	Boiler blowdown water to be used for spraying on Ash.	Carried along with Ash
85	Boiler No.4 Cold water tap For Ash carrier spray	Canal Water	Carried along with Ash		
86	Boiler No.5 Cold water tap For Ash carrier spray	Canal Water	Carried along with Ash		
87	Boiler No.5 Cold water tap For Ash carrier spray	Canal Water	Carried along with Ash		
88	Boiler No.1 Cold water tap For Ash carrier spray	Canal Water	Carried along with Ash		
89	Boiler feed water sample point	Condensate Water	Main Drain	-	To be closed after sample.
90	Boiler No.1, 2, 3, 4 & 5 Continuous blowdown	Condensate Water	Main Drain	-	As it contains high TDS, it should be used as sprinkler water for Ash.

	Laboratory Waste				
91	Laboratory Bathroom	Canal Water	Main drain.	Canal water	To be discharged in separate approved municipal drain.
92	Laboratory Bathroom washbasin	Canal Water	Main drain.		
93	Laboratory sample basin 1	Sugar containing water.	Main drain.	-	All the sample material should be collected separately and recycled at defecated juice tank.
94	Laboratory sample basin 2	Sugar containing water.	Main drain.		
95	Laboratory sample basin 3	Sugar containing water.	Main drain.		
96	Laboratory Condensate sample water	Condensate	Main drain.	-	It should be diverted to spray pond.
	Ground water (Rooter)				
97	Tech: Mosque Bathroom No.1, 2 & 3	Ground Water	Main drain.	-	To be discharged in separate approved municipal drain.
98	Tech: Mosque Bathroom No.2	Ground Water	Main drain.		
99	Tech: Mosque Bathroom No.3	Ground Water	Main drain.		
100	Tech: Mosque Wazoo	Ground Water	Main drain.		
101	Tech: Mosque Floor washing	Ground Water	Main drain.		
102	workshop Hand wash	Ground Water	Main drain.		
103	Condensate / Hot Water				
104	Vapour Line Juice Heater A	Condensate	Main drain		To be collected in under vacuum condensate tank of evaporators and used for process.
105	Vapour Line Juice Heater B	Condensate	Main drain		
106	Exhaust Condensate tank drain	Condensate	Main drain.		This should be used at A-Sugar remelter as it is near to this utility.
107	1st Vapour Condensate tank drain	Condensate	Main drain.		
108	Liquor Heater Condensate drain	Condensate	Main drain		
109	Vertical Cryst Colorifier No.1 drain	Condensate	Main drain.		
110	Vertical Cryst Colorifier No.2 drain	Condensate	Main drain.		
111	Vertical Cryst Colorifier No.2 condensate drain	Condensate	Main drain.		This should be used at A-Sugar remelter as it is near to this utility.
112	Vertical Cryst Colorifier No.1 condensate drain	Condensate	Main drain.		
113	Refine Centrifugal Colorifier condensate drain	Condensate	Main drain.		This should be discharged in Run-off receiving tank for dilution purpose till we install molasses

					conditioners.
114	Feed Water storage tanks Overflow	Condensate	Main Drain		Simple automation has stopped this overflow.
115	Process House Hot water tank overflow	Condensate	Main Drain		Overflow to be drained in spray pond

MEHRAN SUGAR MILLS LIMITED TANDO ALLAHYAR

List of Water consumption & Effluent generation points with recommendations

S.#	House/Equipm ent	Source			Discharg e Flow (tons/h)	Tem p (°C)	Oil & Grease	Frequenc y	Existing Disposal	Recommended Disposal
		Canalwa ter /Conden sate	Size (Inch)	N o :						
	<u>Municipal Waste</u>									
1	Cane Office, Tap of Bathroom No.1	Canal Water	0.5	2					Main drain.	To be discharged in separate approved municipal drain.
2	Cane Office Bathroom No.2	Canal Water	0.5	2					Main drain.	
3	Cane Office Wash Basin	Canal Water	0.5	1					Main drain.	
4	Main Gate Bathroom No.1, 2, 3	Canal Water	0.5	4					Main drain.	
5	Main Gate Wash Basin	Canal Water	0.5	1					Main drain.	
6	Main Gate Kitchen	Canal Water	0.5	1					Main drain.	
7	Sugar Go down Bathroom No.1 to 8	Canal Water	0.5	9					Main drain.	
8	Sugar Go down Wash Basin	Canal Water	0.5	1					Main drain.	
9	Account office Bathroom No.1,2	Canal Water	0.5	4					Main drain.	
10	Account office Kitchen	Canal Water	0.5	1					Main drain.	
11	Admin office Bathroom No.1,2	Canal Water	0.5	4					Main drain.	
12	Admin office Washbasin	Canal Water	0.5	1					Main drain.	
13	RD Office Bathroom	Canal Water	0.5	3					Main drain.	

14	RD Office Kitchen	Canal Water	0.5	1					Main drain.	
15	Fly Ash Car Wash	Canal Water	0.5	1					Main drain.	
16	Fly Ash Trolley wash	Canal Water	0.5	1					Main drain.	
17	Fly Ash Sedimentation tank	Canal Water	3	1					Evaporated through FARS Chimney	Canal water could be replaced with surplus condensate if available.
18	Admin Park Irrigation	Canal Water	0.5	3					Irrigation use	Treated effluent after ETP should be used for irrigation.
19	Carpenter Bathroom	Canal Water	0.5	2					Main drain.	To be discharged in separate approved municipal drain.
20	Water Filter Driking Plant	Canal Water	0.5	6					Drinking use	
21	Water Filter Hand wash	Canal Water	0.5	1					Main drain.	To be discharged in separate approved municipal drain.
22	Inqlabi Park Irrigation	Canal Water	0.5	1					Irrigation use	Treated effluent after ETP should be used for irrigation.
23	Canteen Kitchen	Canal Water	0.5	2					Main drain.	To be discharged in separate approved municipal drain.
24	Canteen Hand wash	Canal Water	0.5	4					Main drain.	
25	Cane Testing Wash Basin	Canal Water	0.5	3					Main drain.	
26	Bio laboratory washing	Canal Water	0.5	1					Main drain.	
27	Bio Laboratory Bathroom	Canal Water	0.5	3					Main drain.	
28	Bio laboratory wash Basin No.1,2,3	Canal Water	0.5	3					Main drain.	
29	Cane Yard Bathroom No.1,2	Canal Water	0.5	3					Main drain.	

30	Main Store Bathroom	Canal Water	0.5	2					Main drain.	
31	Main Store Washbasin	Canal Water	0.5	1					Main drain.	
32	Foundry Shop Hand wash	Canal Water	0.5	1					Main drain.	
33	Technical Block Bathroom No.1,2	Canal Water	0.5	9					Main drain.	
34	Refine Pan Hand wash	Canal Water	0.5	1					Main drain.	A separate area to be designated for hand wash basin and to be discharged in municipal effluent stream.
35	Evaporator Hand wash	Canal Water	0.5	1					Main drain.	
36	Raw Pan Hand wash	Canal Water	0.5	1					Main drain.	
37	Refine Pan Hand wash	Canal Water	0.5	1					Main drain.	
38	Raw Cryst:No.1 Hand wash	Canal Water	1	1					Main drain.	
39	Raw Cryst:No.16 Floor washing	Canal Water	1	1					Main drain.	Dry cleaning is to be preferred, weekly/fortnightly high pressure water washing is recommended.
40	Talo Clarifer Tank Floor washing	Canal Water	1	2					Main drain.	
41	Defecation pumps Floor washing	Canal Water	1	1					Main drain.	
42	Runoff pumps Floor washing	Canal Water	1	1					Main drain.	
43	C-Vertical Floor washing	Canal Water	1	1					Main drain.	
44	B-Centrifugal Floor washing	Canal Water	1	1					Main drain.	
45	A-Centrifugal Hand wash	Canal Water	0.5	1					Main drain.	A separate area to be designated for hand wash basin and to be discharged in municipal effluent stream.
46	C-Centrifugal Hand wash	Canal Water	0.5	1					Main drain.	
47	A-Remelter Hand wash	Canal Water	1	1					Main drain.	
48	Talo Clarifer 1+2 Hand wash	Canal Water	0.5	2					Main drain.	
49	Refine Centrifugal Hand wash	Canal Water	0.5	1					Main drain.	

50	Vacuum Filter Hand wash	Canal Water	1	1					Main drain.	
51	Juice Clarifer B Hand wash	Canal Water	0.5	1					Main drain.	
52	Juice Clarifer C Hand wash	Canal Water	0.5	1					Main drain.	
53	Lime Slaker pump Hand wash	Canal Water	1	1				Continue	Main drain.	
54	Lime Slaker Bathroom No.1,2,3,4	Canal Water	0.5	4					Main drain.	
55	Instrument Office Kitchen	Canal Water	0.5	1					Main drain.	
56	Instrument Office Bathroom	Canal Water	0.5	2					Main drain.	
57	Instrument Office washbasin	Canal Water	0.5	1					Main drain.	
58	M.Turbine No.1 Hand wash	Canal Water	0.5	1					Main drain.	
59	Power House Hand wash	Canal Water	0.5	1					Main drain.	
	<u>Industrial Waste</u>									
60	Evaporator Tube cleaning water	Canal Water	1	1 0					Main drain.	To be collected separately and re-used at FARS as nake-up water.
61	Raw Pan Tube cleaning water	Canal Water	1	1 2					Main drain.	
62	Refine Pan Tube cleaning water	Canal Water	1	4					Main drain.	
63	Spray Channel Overflow drain water	Canal Water	6	1				Regular	Main drain.	To betreated through ETP and used as irrigation water.
64	V.Filter Cascade condenser water	Canal Water	6	1				Regular	Main drain.	fresh water to be replaced with injection water and recycled.
65	Nash pumps No.1 Bearing cooling water	Canal Water	1	1				Regular	Main drain.	To be collected and recycled through service water tank.

66	Nash pumps No.2 Bearing cooling water	Canal Water	1	1				Regular	Main drain.	
67	Nash pumps No.3 Bearing cooling water	Canal Water	1	1				Regular	Main drain.	
68	Power House Turbine No.1 Cooling water	Canal Water	4	1		30		Regular	Turbine side. Boiler service tank.	Already recycled through service water tank.
69	Power House Turbine No.1 Cooling water	Canal Water	4	1		25		Regular	Generator side.boiler service tank.	
70	Power House Turbine No.2 Cooling water	Canal Water	2	1				Regular	Turbine side.Boiler service tank.	
71	Power House Turbine No.2 Cooling water	Canal Water	3	1				Regular	Generator side.Boiler service tank.	
72	Power House Turbine No.3 Cooling water	Canal Water	2	1				Regular	Turbine side.Boiler service tank.	
73	Power House Turbine No.3 Cooling water	Canal Water	3	1				Regular	Generator side.Boiler service tank.	
74	Power House Turbine No.4 Cooling water	Canal Water	3	1				Regular	Boiler service tank.	
75	Power House Turbine No.4 Cooling water	Canal Water	3	1				Regular	Boiler service tank.	
76	Power House Turbine No.5 Cooling water	Canal Water	3	1				Regular	Boiler service tank.	
77	Power House Turbine No.5 Cooling water	Canal Water	3	1				Regular	Boiler service tank.	
78	TB Mill No.1 Floor washing	condensa te & Canal water	1	1			YES		Main drain.	Dry cleaning to be prefered with minimum frequency of water washing.
79	TB Mill No.2 Floor washing	condensa te & Canal water	1	1			YES		Main drain.	
80	TB Mill No.3 Floor washing	condensa te & Canal water	1	1			YES		Main drain.	

81	TB Mill No.4 Floor washing	condensate & Canal water	1	1			YES		Main drain.	
82	TA Mill No.1 Floor washing	condensate & Canal water	1	1			YES		Main drain.	
83	TA Mill No.2 Floor washing	condensate & Canal water	1	1			YES		Main drain.	
84	TA Mill No.5 Floor washing	condensate & Canal water	1	1			YES		Main drain.	
85	TB Fibrizer driving side Cooling water	Canal Water	0.5	2				Regular	Main drain.	To be collected and recycled through service water tank.
86	TB Fibrizer Off side Cooling water	Canal Water	0.5	2				Regular	Main drain.	
87	TB Fibrizer Gear Cooling water	Canal Water	2	1				Regular	Main drain.	
88	Raw Juice Pumps Floor washing	condensate & Canal water	1	1			YES		Main drain.	Dry cleaning to be preferred.
89	T.B Imbibation Tank overflow	condensate & Canal water	6	1					Main drain.	Mechanical float valve or electronic auto control to be provided. Canal water usage to be avoided.
90	TA Platform washing	condensate & Canal water	1	1			YES		Main drain	Dry cleaning to be preferred with minimum frequency of water washing.
91	TB 4th Mill Platform washing	condensate & Canal water	1	2			YES		Main drain.	
92	M.Turbine No.1 Bearing cooling water	Canal Water	0.5	1		25		Regular	Fresh water pit /Main Drain	Already recycled through service water tank, discharge in main drain to be
93	M.Turbine No.2 Bearing cooling water	Canal Water	0.5	1		26		Regular	Fresh water pit /Main Drain	

94	M.Turbine No.3 Bearing cooling water	Canal Water	0.5	1		25		Regular	Fresh water pit /Main Drain	strictly prohabited.
95	M.Turbine No.3 Bearing cooling water	Canal Water	0.5	1		28		Regular	Fresh water pit /Main Drain	
96	M.Turbine No.4 Bearing cooling water	Canal Water	0.5	1		25		Regular	Fresh water pit /Main Drain	
97	M.Turbine No.4 Bearing cooling water	Canal Water	0.5	1		30		Regular	Fresh water pit /Main Drain	
98	Mill Max Drive side Bearing cooling water	Canal Water	1	2		25		Regular	Fresh water pit /Main Drain	
99	Mill Max Off side Bearing cooling water	Canal Water	1	2				Regular	Fresh water pit /Main Drain	
100	Mill Max, Nozle plate washing water.	Canal Water	1	1				Regular	Mixed with juice	Canal water to be replaced with screened mixed juice as per original design.
101	Mil Max Gear Bearing cooling water	Canal Water	1.5	1				Regular	Main Drain	To be collected and recycled through service water tank.
102	T.B. Mill No.1 Drive side Bearing cooling water	Canal Water	2	2		24	YES	Regular	Fresh water pit /Main Drain	Already recycled through service water tank, discharge in main drain to be strictly monitored.
103	T.B. Mill No.1 Off side Bearing cooling water	Canal Water	2	2		24	YES	Regular	Fresh water pit /Main Drain	
104	T.B. Mill No.2 Drive side Bearing cooling water	Canal Water	2	2		23	YES	Regular	Fresh water pit /Main Drain	
105	T.B. Mill No.2 Off side Bearing cooling water	Canal Water	2	2		23	YES	Regular	Fresh water pit /Main Drain	
106	T.B. Mill No.3 Drive side Bearing cooling water	Canal Water	2	2		24	YES	Regular	Fresh water pit /Main Drain	

107	T.B. Mill No.3 Off side Bearing cooling water	Canal Water	2	2		24	YES	Regular	Fresh water pit /Main Drain	
108	T.B. Mill No.4 Drive side Bearing cooling water	Canal Water	2	2		23	YES	Regular	Fresh water pit /Main Drain	
109	T.B. Mill No.4 Off side Bearing cooling water	Canal Water	2	2		24	YES	Regular	Fresh water pit /Main Drain	
110	T.A Fibrizer Drive side Bearing cooling water	Canal Water	0.5	2				Regular	Main drain.	To be collected and recycled through service water tank.
111	T.A Fibrizer Off side Bearing cooling water	Canal Water	0.5	2				Regular	Main drain.	
112	T.A Fibrizer Gear Bearing cooling water	Canal Water	2	1				Regular	Main drain.	
113	T.A Imbibation Tank overflow	Condens ate + Canal Water	5	1					Main drain.	
114	T.A M.Turbine No.1 Bearing cooling water	Canal Water	2	1				Regular	Service water tank	Already recycled through service water tank.
115	T.A M.Turbine No.2 Bearing cooling water	Canal Water	2	1				Regular	Service water tank	
116	T.A M.Turbine No.3 Bearing cooling water	Canal Water	2	1				Regular	Service water tank	
117	T.A M.Turbine No.4 Bearing cooling water	Canal Water	2	1				Regular	Service water tank	
118	T.A M.Turbine No.5 Bearing cooling	Canal Water	2	1				Regular	Service water tank	

	water									
119	T.A M.Turbine No.6 Bearing cooling water	Canal Water	2	1				Regular	Service water tank	
120	T.A. Mill No.1 Drive side Bearing cooling water	Canal Water	0.5	3			YES	Regular	Fresh water pit /Main Drain	Already recycled through service water tank, discharge in main drain to be strictly monitored.
121	T.A. Mill No.1 Off side Bearing cooling water	Canal Water	0.5	3			YES	Regular	Fresh water pit /Main Drain	
122	T.A. Mill No.2 Drive side Bearing cooling water	Canal Water	0.5	3			YES	Regular	Fresh water pit /Main Drain	
123	T.A. Mill No.2 Off side Bearing cooling water	Canal Water	0.5	3			YES	Regular	Fresh water pit /Main Drain	
124	T.A. Mill No.3 Drive side Bearing cooling water	Canal Water	0.5	3			YES	Regular	Fresh water pit /Main Drain	
125	T.A. Mill No.3 Off side Bearing cooling water	Canal Water	0.5	3			YES	Regular	Fresh water pit /Main Drain	
126	T.A. Mill No.4 Drive side Bearing cooling water	Canal Water	0.5	3			YES	Regular	Fresh water pit /Main Drain	
127	T.A. Mill No.4 Off side Bearing cooling water	Canal Water	0.5	3			YES	Regular	Fresh water pit /Main Drain	
128	T.A. Mill No.5 Drive side Bearing cooling water	Canal Water	0.5	3			YES	Regular	Fresh water pit /Main Drain	
129	T.A. Mill No.5 Off side Bearing cooling water	Canal Water	0.5	3			YES	Regular	Fresh water pit /Main Drain	
130	T.A. Mill No.6 Drive side Bearing cooling water	Canal Water	0.5	3			YES	Regular	Fresh water pit /Main Drain	

131	T.A. Mill No.6 Off side Cooling water	Canal Water	0.5	3			YES	Regular	Fresh water pit /Main Drain	
132	Boiler No.1 ID fan Cooling water	Canal Water	0.5	2				Regular	Main Drain	To be collected and recycled through service water tank.
133	Boiler No.2 ID fan Cooling water	Canal Water	0.5	2				Regular	Main Drain	
134	Boiler No.3 ID fan Bearing cooling water	Canal Water	0.75	2				Regular	Main Drain	
135	Boiler No.4 ID fan Bearing cooling water	Canal Water	0.5	2				Regular	Main Drain	
136	Boiler No.4 Sec: fan Bearing cooling water	Canal Water	0.5	2				Regular	Main Drain	
137	Feed Pump No.1 Bearing cooling water	Canal Water	0.25	2				Regular	Main Drain	
138	Feed Pump No.2 Bearing cooling water	Canal Water	0.25	2				Regular	Main Drain	
139	Feed Pump No.3 Bearing cooling water	Canal Water	0.25	2				Regular	Main Drain	
140	Feed Pump No.4 Bearing cooling water	Canal Water	0.25	2				Regular	Main Drain	
141	Feed Pump No.5 Bearing cooling water	Canal Water	0.25	2				Regular	Main Drain	
142	Feed turbo Bearing cooling water	Canal Water	1.5	1		32		Regular	Main Drain	
143	Boiler No.3 Cold water tap For Ash carrier spray	Canal Water	0.5	1					Carried along with Ash	Boiler blowdown water could be used for spraying on Ash.
144	Boiler No.4 Cold water tap For Ash carrier spray	Canal Water	0.5	1					Carried along with Ash	
145	Boiler No.5 Cold water tap For Ash carrier	Canal Water	0.5	1					Carried along with Ash	

	spray									
146	Boiler No.5 Cold water tap For Ash carrier spray	Canal Water	0.5	1				Regular	Carried along with Ash	
147	Boiler No.1 Cold water tap For Ash carrier spray	Canal Water	0.5	1					Carried along with Ash	
148	Boiler feed water Deairtion tank, sample point	Condensa ate Water	0.5	1		70		Regular	Main Drain	To be closed after sample.
149	Boiler No.1, 2, 3, 4 & 5 Continuous blowdown					87			Main Drain	As it contains high TDS, it could be used as sprinkler water for Ash.
150	Laboratory Waste									
151	Laboratory Bathroom	Canal Water	0.5	3					Main drain.	To be discharged in separate approved municipal drain.
154	Laboratory Bathroom washbasin	Canal Water	0.5	1					Main drain.	
155	Laboratory sample basin 1	condensa te & Canal water	0.5	1					Main drain.	All the sample material should be collected separately and recycled at appropriate stage of process. Effluent with minimum pollutant concentration should be discharge for treatment.
156	Laboratory sample basin 2	condensa te & Canal water	0.5	1					Main drain.	
157	Laboratory sample basin 3	condensa te & Canal water	0.5	1					Main drain.	
158	Laboratory Condensate sample water	Condensa ate	0.5	1				Regular	Main drain.	It should be recycled.
	Ground water (Rooter)									
159	Tech: Mosque Bathroom No.1, 2 & 3	Ground Water	0.5	1					Main drain.	To be discharged in separate approved municipal drain.
160	Tech: Mosque Bathroom No.2	Ground Water	0.5	1					Main drain.	

161	Tech: Mosque Bathroom No.3	Ground Water	0.5	1					Main drain.	
162	Tech: Mosque Wazoo	Ground Water	0.5	1 6					Main drain.	
163	Tech: Mosque Floor washing	Ground Water	0.5	1					Main drain.	
164	workshop Hand wash	Ground Water	0.5	1					Main drain.	
	Condensate / Hot Water									
165	Vapour Line Juice Heater A	Condensate	4	1	4-8	50-60		Regular	Main drain/condensate tank	To be collected in condensate tank and used for process.
166	Vapour Line Juice Heater B	Condensate	6	1	4-10	50-60		Regular	Main drain/condensate tank	
167	Exhaust Condensate tank drain	Condensate	5	1		100			Main drain.	Emergency drain in main drain, no effect on pollutant concentration.
168	1st Vapour Condensate tank drain	Condensate	5	3		100			Main drain.	
169	Liquor Heater Condensate drain	Condensate	3	1	1-3	100		Regular	Main drain/sugar remelter	
170	Vertical Cryst Colorifier No.1 drain	Water drain	2	1		60-80			Main drain.	
171	Vertical Cryst Colorifier No.2 drain	Water drain	2	1		60-80			Main drain.	
172	Vertical Cryst Colorifier No.2 condensate drain	Condensate	1.5	1	0.2-0.4	80-90			Main drain.	This should be used at A-Sugar remelter as it is near to this utility.
173	Vertical Cryst Colorifier No.1 condensate drain	Condensate	1	1	0.2-0.4	80-90		Regular	Main drain.	
174	Refine Centrifugal Colorifier condensate drain	Condensate				100			Main drain.	This should be discharged in Run-off receiving tank for dilution purpose till we install molasses conditioners.

175	Feed Water storage tanks Overflow	Condensate						Regular	Main Drain	Simple automation can stop this overflow and this highly pure water could be used for heating of juice and imbibition purpose.
176	Process House Hot water tank overflow	Condensate	6	1					Main Drain	Overflow to be drained in injection channel.

MEHRAN SUGAR MILLS LIMITED TANDO ALLAHYAR

List of Water consumption & Effluent generation points

S.#	House/Equipment	Source			Discharge Flow (tons/h)	Temp (°C)	Oil & Grease	Sugar	pH	Frequency	T.D.S	Existing Disposal (Recycle / Discharge)
		Location/Purpose	Size (Inch)	No :								
	<u>Municipal Waste</u>											
1	Cane Office	Bathroom No.1	0.5	1								Main drain.
2	Cane Office	Flash	0.5	1								Main drain.
3	Cane Office	Bathroom No.2	0.5	1								Main drain.
4	Cane Office	Flash	0.5	1								Main drain.
5	Cane Office	Wash Basin	0.5	1								Main drain.
6	Main Gate	Bathroom No.1	0.5	1								Main drain.
7	Main Gate	Bathroom No.2	0.5	1								Main drain.
8	Main Gate	Bathroom No.3	0.5	1								Main drain.
9	Main Gate	Flash	0.5	1								Main drain.
10	Main Gate	Wash Basin	0.5	1								Main drain.
11	Main Gate	Kitchen	0.5	1								Main drain.
12	Sugar Go down	Bathroom No.1	0.5	1								Main drain.
13	Sugar Go down	Bathroom No.2	0.5	1								Main drain.
14	Sugar Go down	Bathroom No.3	0.5	1								Main drain.
15	Sugar Go down	Bathroom No.4	0.5	1								Main drain.
16	Sugar Go down	Bathroom	0.5	1								Main drain.

		m No.5										
17	Sugar Go down	Bathroom No.6	0.5	1								Main drain.
18	Sugar Go down	Bathroom No.7	0.5	1								Main drain.
19	Sugar Go down	Bathroom No.8	0.5	1								Main drain.
20	Sugar Go down	Wash Basin	0.5	1								Main drain.
21	Account office	Bathroom No.1	0.5	1								Main drain.
22	Account office	Flash	0.5	1								Main drain.
23	Account office	Bathroom No.2	0.5	1								Main drain.
24	Account office	Wash Basin	0.5	1								Main drain.
25	Account office	Kitchen	0.5	1								Main drain.
26	Admin office	Bathroom No.1	0.5	1								Main drain.
27	Admin office	Flash	0.5	1								Main drain.
28	Admin office	Bathroom No.2	0.5	1								Main drain.
29	Admin office	Flash	0.5	1								Main drain.
30	Admin office	Wash Basin	0.5	1								Main drain.
31	RD Office	Bathroom	0.5	2								Main drain.
32	RD Office	Flash	0.5	1								Main drain.
33	RD Office	Kitchen	0.5	1								Main drain.
34	Fly Ash	Car Wash	0.5	1								Main drain.
35	Fly Ash	Trolley wash	0.5	1								Main drain.
36	Fly Ash	Sedimentation	3	1								Evaporated through FARS Chimney
37	Admin	Park	0.5	3								Irrigation use
38	Carpenter	Bathroom	0.5	2								Main drain.
39	Water Filter	Drinking Plant	0.5	6								Drinking use
40	Water Filter	Hand wash	0.5	1								Main drain.
41	Inqilabi Park	Irrigation	0.5	1								Irrigation use
42	Canteen	Kitchen	0.5	2								Main drain.
43	Canteen	Hand wash	0.5	4								Main drain.

44	Cane Testing	Wash Basin	0.5	3																Main drain.
45	Bio laboratory	washing	0.5	1																Main drain.
46	Bio Laboratory	Bathroom	0.5	2																Main drain.
47	Bio Laboratory	Flash	0.5	1																
48	Bio laboratory	wash Basin No.1	0.5	1																Main drain.
49	Bio laboratory	wash Basin No.2	0.5	1																Main drain.
50	Bio laboratory	wash Basin No.3	0.5	1																Main drain.
51	Cane Yard	Bathroom No.1	0.5	1																Main drain.
52	Cane Yard	Bathroom No.2	0.5	2																Main drain.
53	Main Store	Bathroom	0.5	2																Main drain.
54	Foundry Shop	Hand wash	0.5	1																Main drain.
55	Technical Block	Bathroom No.1	0.5	2																Main drain.
56	Technical Block	Flash No.1	0.5	1																Main drain.
57	Technical Block	Flash No.2	0.5	1																Main drain.
58	Technical Block	washbasin	0.5	1																Main drain.
59	Technical Block	Flash hand wash	0.5	1																Main drain.
60	Technical Block	Bathroom No.2	0.5	3																Main drain.
61	Technical Block	flash	0.5	1																Main drain.
62	Technical Block	Flash hand wash	0.5	1																Main drain.
63	Refine Pan	Hand wash	0.5	1																Main drain.
64	Evaporator	Hand wash	0.5	1																Main drain.
65	Raw Pan	Hand wash	0.5	1																Main drain.
66	Refine Pan	Hand wash	0.5	1																Main drain.
67	Raw Cryst:No.1	Hand wash	1	1																Main drain.

68	Raw Cryst:No.16	Floor washing	1	1																Main drain.
69	Talo Clarifer Tank	Floor washing	1	2																Main drain.
70	Defecation pumps	Floor washing	1	1																Main drain.
71	A-Centrifugal	Hand wash	0.5	1																Main drain.
72	B-Centrifugal	Floor washing	1	1																Main drain.
73	C-Centrifugal	Hand wash	0.5	1																Main drain.
74	A-Remelter	Hand wash	1	1																Main drain.
75	Talo Clarifer 1+2	Hand wash	0.5	2																Main drain.
76	C-Vertical	Floor washing	1	1																Main drain.
77	Runoff pumps	Floor washing	1	1																Main drain.
78	Refine Centrifugal	Hand wash	0.5	1																Main drain.
79	Vacuum Filter	Hand wash	1	1																Main drain.
80	Juice Clarifer B	Hand wash	0.5	1																Main drain.
81	Juice Clarifer C	Hand wash	0.5	1																Main drain.
82	Lime Slaker pump	Hand wash	1	1															Continue	Main drain.
83	Lime Slaker	Bathroom No.1	0.5	1																Main drain.
84	Lime Slaker	Bathroom No.2	0.5	1																Main drain.
85	Lime Slaker	Bathroom No.3	0.5	1																Main drain.
86	Lime Slaker	Bathroom No.4	0.5	1																Main drain.
87	Instrument Office	Kitchen	0.5	1																Main drain.
88	Instrument Office	Bathroom	0.5	1																Main drain.
89	Instrument Office	flash	0.5	1																Main drain.
90	Instrument Office	washbasin	0.5	1																Main drain.
91	M.Turbine No.1	Hand wash	0.5	1																Main drain.
92	Power House	Hand wash	0.5	1																Main drain.
	Industrial Waste																			
93	Evaporator	Tube	1	1																Main drain.

		cleaning		0							
94	Raw Pan	Tube cleaning	1	1 2							Main drain.
95	Refine Pan	Tube cleaning	1	4							Main drain.
96	Spray Channel	Overflow drain	6	1					Regular		Main drain.
97	V.Filter Cascade condenser	Condensers	6	1					Regular		Main drain.
98	Nash pumps No.1	Bearing cooling	1	1					Regular		Main drain.
99	Nash pumps No.2	Bearing cooling	1	1					Regular		Main drain.
100	Nash pumps No.3	Bearing cooling	1	1					Regular		Main drain.
101	Power House Turbine No.1	Cooling	4	1		30			Regular		Turbine side. Boiler service tank.
102	Power House Turbine No.1	Cooling	4	1		25			Regular		Generator side.boiler service tank.
103	Power House Turbine No.2	Cooling	2	1					Regular		Turbine side.Boiler service tank.
104	Power House Turbine No.2	Cooling	3	1					Regular		Generator side.Boiler service tank.
105	Power House Turbine No.3	Cooling	2	1					Regular		Turbine side.Boiler service tank.
106	Power House Turbine No.3	Cooling	3	1					Regular		Generator side.Boiler service tank.
107	Power House Turbine No.4	Cooling	3	1					Regular		Boiler service tank.
108	Power House Turbine No.4	Cooling	3	1					Regular		Boiler service tank.
109	Power House Turbine No.5	Cooling	3	1					Regular		Boiler service tank.
110	Power House Turbine No.5	Cooling	3	1					Regular		Boiler service tank.
111	TB Mill No.1	Floor washing	1	1			YES	YES			Main drain.
112	TB Mill No.2	Floor washing	1	1			YES	YES			Main drain.
113	TB Mill No.3	Floor washing	1	1			YES	YES			Main drain.
114	TB Mill No.4	Floor washing	1	1			YES	YES			Main drain.
115	TA Mill No.1	Floor	1	1			YES	YES			Main drain.

		washing									
116	TA Mill No.2	Floor washing	1	1			YES	YES			Main drain.
117	TA Mill No.5	Floor washing	1	1			YES	YES			Main drain.
118	TB Fibrizer driving side	Cooling	0.5	2					Regular		Main drain.
119	TB Fibrizer Off side	Cooling	0.5	2					Regular		Main drain.
120	TB Fibrizer Gear	Cooling	2	1					Regular		Main drain.
121	Raw Juice Pumps	Floor washing	1	1			YES	YES			Main drain.
122	T.B Imbibation Tank	Tank overflow	6	1							Main drain.
123	TA	Platform washing	1	1			YES	YES			Main drain
124	TB 4th Mill	Platform washing	1	2			YES	YES			Main drain.
125	M.Turbine No.1	Cooler+turbine	0.5	1		25			Regular		Fresh water pit /Main Drain
126	M.Turbine No.2	Cooler+turbine	0.5	1		26			Regular		Fresh water pit /Main Drain
127	M.Turbine No.3	cooler	0.5	1		25			Regular		Fresh water pit /Main Drain
128	M.Turbine No.3	turbine	0.5	1		28			Regular		Fresh water pit /Main Drain
129	M.Turbine No.4	cooler	0.5	1		25			Regular		Fresh water pit /Main Drain
130	M.Turbine No.4	turbine	0.5	1		30			Regular		Fresh water pit /Main Drain
131	Mill Max	Drive side	1	2		25			Regular		Fresh water pit /Main Drain
132	Mill Max	off side	1	2					Regular		Fresh water pit /Main Drain
133	Mill Max	house pipe Noze plate	1	1					Regular		Mixed with juice
134	Mil Max	Gearing	1.5	1					Regular		Main Drain

		cooling									
135	Mill No.1	turbine side	2	2		24	YES			Regular	Fresh water pit /Main Drain
136	Mill No.1	off side	2	2		24	YES			Regular	Fresh water pit /Main Drain
137	Mill No.2	turbine side	2	2		23	YES			Regular	Fresh water pit /Main Drain
138	Mill No.2	off side	2	2		23	YES			Regular	Fresh water pit /Main Drain
139	Mill No.3	turbine side	2	2		24	YES			Regular	Fresh water pit /Main Drain
140	Mill No.3	off side	2	2		24	YES			Regular	Fresh water pit /Main Drain
141	Mill No.4	turbine side	2	2		23	YES			Regular	Fresh water pit /Main Drain
142	Mill No.4	off side	2	2		24	YES			Regular	Fresh water pit /Main Drain
143	T.A Fibrizer driving side	Cooling	0.5	2						Regular	Main drain.
144	T.A Fibrizer Off side	Cooling	0.5	2						Regular	Main drain.
145	T.A Fibrizer Gear	Cooling	2	1						Regular	Main drain.
146	T.A Imbibation Tank	Tank overflow	5	1							Main drain.
147	T.A M.Turbine No.1	cooler+turbine	2	1						Regular	Fresh water Pit
148	T.A M.Turbine No.2	cooler+turbine	2	1						Regular	Fresh water Pit
149	T.A M.Turbine No.3	cooler+turbine	2	1						Regular	Fresh water Pit
150	T.A M.Turbine No.4	cooler+turbine	2	1						Regular	Fresh water Pit
151	T.A M.Turbine No.5	cooler+turbine	2	1						Regular	Fresh water Pit
152	T.A M.Turbine No.6	cooler+turbine	2	1						Regular	Fresh water Pit
153	Mill No.1 Bearing cooling	turbine side	0.5	3			YES			Regular	Fresh water pit /Main Drain
154	Mill No.1 Bearing cooling	off side	0.5	3			YES			Regular	Fresh water pit /Main

											Drain
155	Mill No.2 Bearing cooling	turbine side	0.5	3			YES			Regular	Fresh water pit /Main Drain
156	Mill No.2 Bearing cooling	off side	0.5	3			YES			Regular	Fresh water pit /Main Drain
157	Mill No.3 Bearing cooling	turbine side	0.5	3			YES			Regular	Fresh water pit /Main Drain
158	Mill No.3 Bearing cooling	off side	0.5	3			YES			Regular	Fresh water pit /Main Drain
159	Mill No.4 Bearing cooling	turbine side	0.5	3			YES			Regular	Fresh water pit /Main Drain
160	Mill No.4 Bearing cooling	off side	0.5	3			YES			Regular	Fresh water pit /Main Drain
161	Mill No.5 Bearing cooling	turbine side	0.5	3			YES			Regular	Fresh water pit /Main Drain
162	Mill No.5 Bearing cooling	off side	0.5	3			YES			Regular	Fresh water pit /Main Drain
163	Mill No.6 Bearing cooling	turbine side	0.5	3			YES			Regular	Fresh water pit /Main Drain
164	Mill No.6 Bearing cooling	off side	0.5	3			YES			Regular	Fresh water pit /Main Drain
165	Boiler No.1	ID fan	0.5	2						Regular	Main Drain
166	Boiler No.1	Ash	0.5	1							Main Drain
167	Boiler No.2	ID fan	0.5	2						Regular	Main Drain
168	Boiler No.3	ID fan	0.75	2						Regular	Main Drain
169	Boiler No.3	Ash Carrier	0.5	1							Main Drain
170	Boiler No.4	ID fan	0.5	2						Regular	Main Drain
171	Boiler No.4	Ash	0.5	1							Main Drain
172	Boiler No.4	Sec:fan	0.5	2						Regular	Main Drain
173	Boiler No.5	Ash	0.5	1							Main Drain
174	Boiler No.5	Ash Carrier	0.5	1						Regular	Main Drain
175	Feed Pump No.1	bearing cooling	0.25	2						Regular	Main Drain
176	Feed Pump No.2	bearing cooling	0.25	2						Regular	Main Drain
177	Feed Pump No.3	bearing cooling	0.25	2						Regular	Main Drain
178	Feed Pump No.4	bearing	0.25	2						Regular	Main Drain

		cooling									
179	Feed Pump No.5	bearing cooling	0.25	2					Regular		Main Drain
180	Feed turbo	bearing cooling	1.5	1		32			Regular		Continous drain
181	Boiler feed water Deairtion tank	Overflo w drain	0.5	1		70			Regular		Continous drain
182	Boiler No.3	conti blowdo wn				87		9.4		127 0	Main Drain
183	Boiler No.5	conti blowdo wn				85		10. 2		160 7	Main Drain
	Laboratory Waste										
184	Laboratory	Bathroo m	0.5	1							Main drain.
185	Laboratory	flash	0.5	1							Main drain.
186	Laboratory	Bathroo m	0.5	1							Main drain.
187	Laboratory	washbas in	0.5	1							Main drain.
188	Laboratory	sample basin 1	0.5	1				YES			Main drain.
189	Laboratory	sample basin 2	0.5	1				YES			Main drain.
190	Laboratory	sample basin 3	0.5	1				YES			Main drain.
191	Laboratory	Condens ate	0.5	1					Regular		Main drain.
	Ground water (Rooteer)										
192	Tech: Mosque	Bathroo m No.1	0.5	1							Main drain.
193	Tech: Mosque	Bathroo m No.2	0.5	1							Main drain.
194	Tech: Mosque	Bathroo m No.3	0.5	1							Main drain.
195	Tech: Mosque	Wazoo	0.5	1 6							Main drain.
196	Tech: Mosque	Floor washing	0.5	1							Main drain.
197	workshop	Hand wash	0.5	1							Main drain.
	Condensate / Hot Water										
196	Vapour Line Juice Heater A	Condens ate drain	4	1	4-8	50- 60			Regular		Main drain/conden

												sate tank
197	Vapour Line Juice Heater B	Condensate drain	6	1	4-10	50-60				Regular		Main drain/condensate tank
198	Exhaust Condensate tank	Condensate drain	5	1		100						Main drain.
199	1st Vapour Condensate tank	Condensate drain	5	2		100						Main drain.
200	Liquor Heater Condensate	Condensate drain	3	1	1-3	100				Regular		Main drain/sugar remilter
201	Vertical Cryst Colorifier No.1 condensate drain	Condensate drain	1	1	0.2-0.4	80-90				Regular		Main drain.
202	Vertical Cryst Colorifier No.1 drain	Water drain	2	1		60-80						Main drain.
203	Vertical Cryst Colorifier No.2 condensate drain	Condensate drain	1.5	1	0.2-0.4	80-90						Main drain.
204	Vertical Cryst Colorifier No.2 drain	Water drain	2	1		60-80						Main drain.
205	Refine Centrifugal Colorifier drain					100						Main drain.
206	Feed Water storage tanks	Overflow drain								Regular		Main Drain