

MASTER PLAN FOR REGULATORY ISSUES, COMPLIANCE ISSUES, SUBMITTALS, AND DOCUMENTATION

REGULATORY ISSUES

The Following is a synopsis of the City of Cornelia's current treatment processes at the Water Pollution Control Plant. The synopsis will take you through the treatment process from the influent until discharge into South Fork of Mud Creek.

PRELIMINARY TREATMENT: The City's wastewater comes into the plant from the City's collection system to a flow diversion box. The City has the ability to divert flow to two different structures. One is a holding pond that holds in excess of 3 million gallons and the second is a concrete equalization tank that holds approximately 1 million gallons. Flow is only diverted in emergency situations or if maintenance needs to be performed in the plant. After the flow leaves the splitter box it then goes into a parabolic two channel grit chamber. This design ensures that the flow does not change during fluctuations of high or low level influent so that the grit settles out at less than 2ft/sec. Next the flow goes through a stepscreen bar screen where all the rags and other debris is taken out to prevent pump damage. This is where we have our influent flow proportional sampler set up. After our sampler we have all process or filtrate water entering our influent to be recycled through the remainder of the process. We also have a backup generator that supplies emergency power to the upper end of the plant.

PRIMARY TREATMENT: The flow enters into our primary clarifier next where the heavier solids are settled out. The solids are removed by using head pressure to pump the solids into a box where we have two pumps that pump the solids to our digester. All the floatable solids and grease is skimmed off the top and flow into this same box to be pumped to the digester.

SECONDARY TREATMENT: The flow leaves the primary clarifier and flows into our activated sludge basin. We have 8 basins connected together and the flow worms through them like a snake. We have the capability to use them in series or to split the flow in half and run 4 each in parallel. We try to run higher mixed liquors in our aeration basin than normal due to treating high strength poultry waste. Approximately 70% of our daily flow comes from poultry waste. The process we use is very similar to a plug flow aeration system. Next the flow leaves the aeration basin and splits into two secondary clarifiers. Return rates are set so that approximately 75% of the solids are returned. Solids are pumped from the bottom of the clarifiers with a wasting pump to the digester. Wasting rates are determined by MLSS, RAS, and MCRT values. The MCRT value is usually set between 60 and 80 days. We like to run a 4,000 to 4,500 MLSS in the winter with a RAS of 8,000 to 9,000. In the summer months a 3,000 to 3,500 MLSS and a RAS of 6,000 to 7,000 is desirable. Our BOD's leaving the plant on average is around 1.5mg/l or 99.0% removal. We are currently under construction to add four more cells or halve of a mirror image of our existing aeration basin. The new aeration basin will utilize a fine bubble diffused air system and the existing basins will be upgraded with the same fine bubble diffused air system. We will install mixers in the first cell of each of the three four cell basins in order to provide an anoxic zone for biological phosphorous removal. We will have the capability to cut the air off to these three cells for bio P removal or keep the air on for excess nitrogen loading removal. We have a chemical feed system for chemical precipitation of the

phosphorous coming off the final clarifiers removing it in our sand filters in case we need to polish up the phosphorous or put the entire aeration basin into nitrogen removal.

DISINFECTION: The flow travels next through a pipe into a box where it is then pumped to our sand filters. We chlorinate the flow as it leaves the pipe before entering into the sand filter pump tank. We use sodium hypochlorite 12.5% for our disinfectant. We chlorinate before the flow enters the filters to help keep algae from building up in our filters and to give a longer detention time for the chlorine to inactivate the organisms. We feed approximately 20gal/d to 25gal/d of chlorine depending on the flow. Typically we rarely see fecal above 25/100ml leaving the plant.

Tertiary Treatment: The flow after being chlorinated goes into a tank where it is pumped equally into three separate sand filters. The filters are backwashed according to flow or time based on which one is reached first. The backwash water is sent back to the head of the aeration basin. On average our TSS leaving the plant is around 1.5mg/l or 98.5% removal.

DECHLORINATION: After the flow leaves the filters it is then carried through the chlorine contact chamber. After working its way through the chamber the water is de-chlorinated using sodium bisulfate. We typically feed 10gals/d to 15gals/d sodium bisulfate for chlorine removal. We typically record BDL measurements of residual not to exceed .013mg/l of residual. This is where our effluent sampler is set up to collect our flow proportional samples.

POST AERATION: The flow after leaving the chlorine contact chamber is then cascaded down a series of steps helping to add dissolved oxygen back into the water before entering the receiving stream. We typically see dissolved oxygen in the range of 7.5mg/l in the summer and 8.5mg/l in the winter. Typical ph range for the treated effluent water leaving the plant is 7.0 - 8.0 S.U.'s going into the receiving stream.

DIGESTERS: The sludge that is wasted from the primary and secondary clarifiers collects into two 55' wide by 36' deep digesters. The digester holds a maximum of 575,000 gallons of sludge each. The City waste primary and secondary sludge to the digester five days a week based on the MCRT values for that day. The city averages 10,000 gallons of primary sludge per week and about 100,000 to 125,000 gallons of secondary sludge per week. The digesters have coarse bubble dissolved oxygen feed system in the bottom. Both digesters are equipped with retractable decant valves for removing supernatant. The solids concentration for the digester is around 2.0 to 2.5%.

BELT PRESS: The City operates a 2.2 meter belt press currently for solids removal from the digesters. The belt press typically runs 150gpm to 250gpm 20 to 30 hours per month. The City averages processing about 400,000 to 500,000 gallons of sludge per month. The belt press averages about a 18 to 20 percent cake solid per truck load. The city averages 50,000 to 60,000 pounds of dry solids removal per month or around 1,800 to 2,000 pounds per day.

COMPLIANCE ISSUES

The following is a set of charts that contain the City of Cornelia's Water Pollution Control Plant's NPDES effluent limitations. It also contains the data reported to the Georgia Department of Natural Resource's Environmental Protection Division. The data is for the previous 12 months of reporting including the annual averages of each parameter. The City of Cornelia received a Gold Award from the Georgia Association of Water professional for the calendar year 2009 for meeting compliance without any violations.

	Monthly Avg Flow, MGD	Max Wkly Flow, MGD	Inf BOD, Kg/d, Avg	Inf BOD, Kg/d, Max	Inf BOD, mg/l, Avg	Inf BOD, mg/l, Max	Fecals, Avg	Fecals, Max
January	1.918	2.238	2095	2669	252	323	19	59
February	1.791	2.010	2372	3137	296	392	4	13
March	1.984	2.134	2331	2424	276	291	4	5
April	1.828	1.879	2176	2291	276	294	6	17
May	1.785	1.899	2491	2759	299	331	7	17
June	1.936	2.001	2985	3226	340	379	23	54
July	2.014	2.109	2946	3036	335	362	10	14
August	1.972	2.059	2949	3383	333	404	3	6
September	2.294	2.964	2968	3299	323	423	5	8
October	2.293	2.373	2741	3072	262	320	3	4
November	2.085	2.524	2240	2488	217	248	6	10
December	2.170	2.313	2330	2983	244	271	4	6
Avg's:	2.006	2.209	2552	2897	288	337	8	18

	Tot. Res Cl ₂ , mg/l, Max	Minimum D.O., mg/l	Eff BOD, Kg/d, Avg	Eff BOD, Kg/d, Max	Eff BOD, mg/l, Avg	Eff BOD, mg/l, Max	Eff Ph, Minimum	Eff Ph, Maximum
January	BDL	8.4	15.8	21.4	1.9	2.3	7.0	7.9
February	BDL	8.7	13.4	14.4	1.7	1.8	7.3	8.0
March	BDL	8.4	16.8	22.2	2.0	2.5	6.9	7.9
April	BDL	7.8	12.1	14.7	1.5	1.8	7.1	8.0
May	BDL	7.0	11.0	12.7	1.3	1.5	7.2	7.9
June	BDL	6.6	12.3	20.6	1.4	2.4	7.3	7.9
July	BDL	7.1	10.7	11.6	1.2	1.3	7.3	8.0
August	BDL	6.4	12.2	16.0	1.3	1.8	7.0	7.8
September	BDL	7.0	12.0	13.7	1.3	1.6	7.2	7.9
October	BDL	7.5	14.0	15.0	1.3	1.4	7.2	7.8
November	BDL	7.6	11.0	16.0	1.1	1.7	7.0	8.0
December	BDL	7.9	12.5	15.6	1.3	1.4	6.8	7.9
Avg's:	#DIV/0!	7.5	12.8	16.2	1.4	1.8	7.1	7.9

	Inf TSS, Kg/d, Avg	Inf TSS, Kg/d, Max	Inf TSS, mg/l, Avg	Inf TSS, mg/l, Max	Eff TSS, Kg/d, Avg	Eff TSS, Kg/d, Max	Eff TSS, mg/l, Avg	Eff TSS, mg/l, Max
January	1202	2091	146	256	32.8	59.9	3.8	6.7
February	1074	1338	134	168	21.9	31.0	2.7	3.7
March	1175	1332	140	155	57.0	68.0	6.8	7.6
April	1098	1863	136	229	26.7	35.5	3.4	4.3
May	1176	1332	141	161	20.8	30.3	2.5	3.6
June	2630	3302	306	393	37.7	53.8	4.3	6.2
July	2697	3203	315	397	42.0	95.0	4.5	9.6
August	2875	5827	315	635	43.6	71.2	4.8	7.9
September	2609	5080	354	881	51.0	65.0	5.7	7.6
October	2152	3647	215	389	43.0	53.0	4.1	5.2
November	878	952	86	99	49.0	64.0	4.5	5.4
December	920	1170	94	108	25.0	35.0	2.6	3.6
Avg's:	1707	2595	199	323	37.5	55.1	4.1	6.0

	Eff Phos, Kg/d, Avg.	Eff Phos, Kg/d, Max.	Eff Phos, mg/l, Avg.	Eff Phos, mg/l, Max.	Eff NH ₃ -N, Avg, Kg/d	Eff NH ₃ -N, Max, Kg/d	Eff NH ₃ - N, Avg, mg/l	Eff NH ₃ - N, Max, mg/l
January	14.1	18.0	1.7	2.0	3.7	7.4	0.5	1.1
February	18.2	20.4	2.3	2.5	3.5	7.2	0.5	0.9
March	15.4	18.1	1.2	2.1	1.1	2.5	0.1	0.3
April	11.0	14.1	1.2	1.5	0.6	0.8	0.1	0.1
May	16.1	21.4	1.9	2.5	0.6	0.9	0.1	0.1
June	10.3	13.4	1.2	1.5	1.5	4.5	0.2	0.5
July	11.0	12.6	1.3	1.5	2.1	3.7	0.3	0.5
August	7.9	12.4	0.9	1.4	4.9	13.7	0.6	1.5
September	5.8	7.2	0.6	0.7	3.2	12.3	0.4	1.7
October	6.2	7.7	0.6	0.7	1.6	3.1	0.1	0.3
November	9.9	13.4	0.9	1.3	5.7	16.7	0.5	1.2
December	6.7	12.8	0.7	1.2	0.7	3.0	0.1	0.2
Avg's:	11.1	14.3	1.2	1.6	2.4	6.3	0.3	0.7

	% BOD Removal, Min	% TSS Removal, Min	NPDES EFFLUENT PERMIT PARAMETERS				
				Monthly	Weekly	Mo Mass	WK Mass
January	99.2%	96.5%	AMMONIA	1.5	2.3	17	22
February	99.4%	97.8%	PHOSPHOROUS	Effective Date 8/10/09			
March	99.3%	94.8%	BOD	25	38	284	360
April	99.4%	96.4%	TSS	20	30	227	284
May	99.5%	98.1%	BOD % REMOVAL	85%			
June	99.5%	97.5%	TSS % REMOVAL	85%			
July	99.6%	97.1%	TRC	<.013			
August	99.6%	98.0%	FLOW	3.0 MGD	3.75 MGD		
September	99.6%	97.3%	FECAL	200/100ml	400/100ml		
October	99.5%	97.1%	DO	> 6.0	Daily		
November	99.5%	94.6%	PH	6.0 – 8.5	Daily		
December	99.5%	97.3%					
Avg's:	99.5%	96.9%					