TESI Wandendale 3.0 MGD Facility
PROCESS ANALYSIS AND EXPECTED PERFORMANCE
FOR PROJECTED FLOWS AND LOADINGS

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Parameter	Unit	Wastewater Temp. = 20 Deg. C			
		ADF	MMF	MDF	PHF
Flows & Influent Characteristics					
Flow	MGD	3.000	5.100	7.500	5.100
Influent CBOD5 Concentration	mg/L	350	350	350	---
Influent TSS Concentration	mg/L	200	200	200	---
Influent TKN Concentration	mg/L	55	55	55	---
Influent TP Concentration	mg/L	10	10	10	---
Process Input Parameters					
First Anoxic Volume	MG	0.400	0.400	0.400	---
Aerobic Volume	MG	1.000	1.000	1.000	---
Second Anoxic Volume	MG	0.400	0.400	0.400	---
Reaeration Volume	MG	0.100	0.100	0.100	---
MLSS	mg/L	4,000	4,000	4,000	---
Volatile Fraction Of MLSS	Percent	70	70	70	---
RAS TSS Concentration	mg/L	10,000	10,000	10,000	---
Internal Recycle Flow As Percent Of Influent Flow	Percent	600	600	600	---
Internal Recycle Flow	MGD	18.000	30.600	45.000	---
Refractory Organic Nitrogen Concentration	mg/L	2.0	2.0	2.0	---
Nitrogen Content Of WAS Solids	Percent	5.00	5.00	5.00	---
HRT, SRT,Yield, Effluent CBOD5, & Effluent Ammonia					
RAS Flow Rate	MGD	2.000	3.400	5.000	---
First Anoxic HRT	Hours	3.2	1.9	1.3	---
Aerobic HRT	Hours	8.0	4.7	3.2	---
Second Anoxic HRT	Hours	3.2	1.9	1.3	---
Reaeration HRT	Hours	0.8	0.5	0.3	---
Total HRT	Hours	15.2	8.9	6.1	---
Aerobic SRT	Days	4.1	2.3	1.6	---
Total System SRT	Days	7.8	4.4	3.0	---
Yield Coefficient	Lb./Lb.	0.94	1.00	1.03	---
Solids Production	PPD	8,111	14,392	21,323	---
WAS Flow	GPD	97,257	172,564	255,674	---
Effluent Soluble CBOD5 Concentration	mg/L	6.7	11.8	18.2	---
Effluent Ammonia Concentration	mg/L	0.6	2.0	36.0	---
Nitrification Analysis					
Influent TKN	PPD	1,376	2,339	3,440	---
Less Nitrogen Required For Cell Synthesis	PPD	406	720	1,066	---
Less Effluent Ammonia	PPD	15	84	2,249	---
Less Refractory Organic Nitrogen	PPD	50	85	125	---
TKN To Be Nitrified	PPD	906	1,451	0	---
Denitrification Potentials					
First Anoxic Stage Denitrification Potential	PPD	650	834	1,044	---
Second Anoxic Stage Denitrification Potential	PPD	375	562	742	---
Total Denitrification Potential	PPD	1,025	1,396	1,786	---
Nitrate Removals @ Specified IR Flow					
First Anoxic Stage Nitrate Removal	PPD	650	834	0	---
Second Anoxic Stage Nitrate Removal	PPD	256	562	0	---
Total Nitrate Removal	PPD	906	1,396	0	---

ATTACHMENT J

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Parameter	Unit	Wastewater Temp. = 20 Deg. C			
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Final Nitrogen Balance					
Influent TKN	PPD	1,376	2,339	3,440	---
Less Nitrogen Required For Cell Synthesis	PPD	406	720	1,066	---
Less Effluent Ammonia	PPD	15	84	2,249	---
Less Refractory Organic Nitrogen	PPD	50	85	125	---
TKN Converted To Nitrate	PPD	906	1,451	0	---
Less Nitrate Removed	PPD	906	1,396	0	---
Effluent Nitrate	PPD	0	55	0	---
Effluent TN (Ammonia + Ref Org N + Nitrate)	PPD	65	224	2,374	---
Effluent Ammonia Concentration	mg/L	0.6	2.0	36.0	---
Refractory Organic Nitrogen Concentration	mg/L	2.0	2.0	2.0	---
Effluent TKN Concentration	mg/L	2.6	4.0	38.0	---
Effluent Nitrate Concentration	mg/L	0.0	1.3	0.0	---
Effluent TN Concentration (Ammonia + Ref Org N + Nitrate)	mg/L	2.6	5.3	38.0	---
Phosphorus Removal Analysis					
Influent TP Concentration	mg/L	10.0	10.0	10.0	---
Excess Phosphorus Removal Propensity Factor	---	0.00	0.00	0.00	---
Phosphorus Removal Potential	mg/L	6.8	8.9	10.3	---
Phosphorus Removal	mg/L	6.8	8.9	10.0	---
Effluent TP Concentration	mg/L	3.2	1.1	0.0	---
Anoxic Basin Mixing Analysis					
Number Of First Anoxic Mixers	Each	2	2	2	---
First Anoxic Mixer Horsepower, Each	HP	25.0	25.0	25.0	---
First Anoxic Basin Mixing Intensity	HP/MG	125.0	125.0	125.0	---
Number Of Second Anoxic Mixers	Each	2	2	2	---
Second Anoxic Mixer Horsepower, Each	HP	15.0	15.0	15.0	---
Second Anoxic Basin Mixing Intensity	HP/MG	75.0	75.0	75.0	---
Alkalinity Balance					
Alkalinity Coefficient For Nitrification	Lb./Lb.	7.14	7.14	7.14	---
Alkalinity Coefficient For Denitrification	Lb./Lb.	3.00	3.00	3.00	---
Alkalinity Required For Nitrification	PPD	6,466	10,358	0	---
Alkalinity Credit For Denitrification	PPD	2,717	4,187	0	---
Net Alkalinity Required	PPD	3,749	6,171	0	---
Oxygen Requirements					
Influent $CBOD_5$	PPD	8,757	14,887	21,893	---
Effluent $CBOD_5$	PPD	169	500	1,140	---
$CBOD_5$ Removed	PPD	8,588	14,387	20,752	---
Oxygen Coefficient For $CBOD_5$ Removal	Lb./Lb.	1.50	1.50	1.50	---
Oxygen Required For $CBOD_5$ Removal	PPD	12,882	21,580	31,128	---
Oxygen Coefficient For Nitrification	Lb./Lb.	4.60	4.60	4.60	---
TKN Converted To Nitrate	PPD	906	1,451	0	---
Oxygen Required For Nitrification	PPD	4,166	6,674	0	---
Oxygen Coefficient For Denitrification Credit	Lb./Lb.	2.86	2.86	2.86	---
Denitrification Credit	PPD	2,590	3,992	0	---
Net Oxygen Requirement	PPD	14,458	24,262	31,128	---

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Parameter	Unit	Wastewater Temp. = 20 Deg. C			
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Diffused Aeration System Analysis					
Actual Oxygenation Rate (AOR)	PPD	14,458	24,262	31,128	---
Aerobic SRT	Days	4.1	2.3	1.6	---
Alpha	---	0.65	0.65	0.65	---
Beta	---	0.96	0.95	0.95	---
DO Saturation In Clean Water @ 20 Deg. C & 100% RH	mg/L	9.09	9.09	9.09	---
DO Saturation In Clean Water @ Specified Temp. & 100% RH	mg/L	9.09	9.09	9.09	---
Tau	---	1.00	1.00	1.00	---
Standard Atmospheric Pressure	psi	14.70	14.70	14.70	---
Barometric Pressure	psi	14.70	14.70	14.70	---
Saturated Vapor Pressure of Water @ 20 Deg. C	psi	0.34	0.34	0.34	---
Saturated Vapor Pressure of Water @ Specified Temperature	psi	0.34	0.34	0.34	---
Effective Saturation Depth	Feet	10.80	10.80	10.80	---
Omega	---	1.00	1.00	1.00	---
Corrected DO Saturation In Clean Water @ 20 Deg. C & 100% RH	mg/L	12.05	12.05	12.05	---
Operating DO	mg/L	2.00	2.00	1.00	---
OTRf/SOTR	---	0.51	0.51	0.56	---
Standard Oxygen Transfer Efficiency	Percent	35.00	35.00	35.00	---
Field Oxygen Transfer Efficiency	Percent	18.00	17.87	19.68	---
Air Flow Required For Biological Process	SCFM	3,206	5,418	6,314	---