

**WASTELOAD ANALYSIS [WLA]  
Addendum: Statement of Basis  
SUMMARY**

**Discharging Facility:** Timpanogos WWTP  
 UPDES No: 0023639  
 Current Flow: 30.00 MGD Design Flow  
 Design Flow 30.00 MGD

**Receiving Water:** Utah Lake  
 Lake Classification: 2B, 3B, 3D, 4

TDS (mg/l)	1034.00	Average
Hardness (mg/l)	300.00	Average
pH	8.00	Average
Temp (C)	9.93	Average

<b>Selected Effluent Limit Summary:</b>		<b>WQ Standard:</b>
Flow, MGD:	30.00 MGD	Design Flow
BOD, mg/l:	25.0 All Season	5 Indicator
Dissolved Oxygen, mg/l:	5.00 All Season	5.50 30 Day Average
TNH3, Chronic, mg/l:	21.66 All Season	Varies Function of pH and Temperature
TDS, mg/l:	1853.49 All Season	1200
Zinc, ug/l	1743.30 All Season	Varies Function of Hardness
Copper, ug/l	123.42 All Season	Varies Function of Hardness

**Modeling Parameters:**

Acute Dilution Ratio 2.47 to 1  
 Chronic Dilution Ratio: 14.10 to 1

**Level 1 Antidegradation Level Completed: Level II Review required - Increase in permitted flow.**

Date: 2/18/2015

Permit Writer:

WLA by:

WQM Sec. Approval:

TMDL Sec. Approval:



2-18-15

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**Wasteload Analysis - Total Maximum Daily Load (Lake TMDL)**

2/18/2015 17:35

**Facility:** Timpanogos WWTP  
**Discharging to:** Utah Lake

**UPDES No:** UT- 0023639

**I. Introduction**

Wasteload analyses are performed to determine point source effluent limitations necessary to maintain designated beneficial uses by evaluating projected effects of discharge concentrations on lake water quality. The wasteload analysis does not take into account downstream designated uses [R317-2-8, UAC]. Projected concentrations are compared to numeric water quality standards to determine acceptability. The anti-degradation policy and procedures are also considered. The primary water quality parameters of concern may include metals (as a function of hardness), total dissolved solids (TDS), total residual chlorine (TRC), unionized ammonia (as a function of pH and temperature, measured and evaluated in terms of total ammonia), and dissolved oxygen.

Mathematical water quality modeling is employed to determine water quality response to point source discharges. Models aid in the effort of anticipating water quality at future effluent flows at critical environmental conditions (e.g., high temperature, high pH, etc).

The numeric criteria in this wasteload analysis may be modified by narrative criteria and other conditions as determined by staff of the Division of Water Quality.

**II. Receiving Water and Lake / Reservoir Classification**

Utah Lake 2B, 3B, 3D, 4

**III. Numeric Water Quality Standards for Protection of Aquatic Wildlife**

Total Ammonia (TNH3)	Function of Temperature and pH	pH	Temp
	1.53 mg/l as N (4 Day Average)	8.41	20.2
	5.53 mg/l as N (1 Hour Average)	8.22	16.5
Chronic Total Residual Chlorine (TRC)	0.011 mg/l (4 Day Average)		
	0.019 mg/l (1 Hour Average)		
Chronic Dissolved Oxygen (DO)	5.50 mg/l (30 Day Average)		
	4.00 mg/l (7Day Average)		
	3.00 mg/l (1 Day Average)		
Maximum Total Dissolved Solids [Class 4 Ag]	1200 mg/l		
Maximum Boron [Class 4 Ag]	750 mg/l		

**Acute and Chronic Heavy Metals (Dissolved)**

Parameter	4 Day Average (Chronic) Standard Concentration	1 Hour Average (Acute) Standard Concentration	
Aluminum	87.000 ug/l	750	ug/l
Antimony	ug/l		ug/l
Arsenic	190.000 ug/l	360.00	ug/l

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Asbestos	ug/l		ug/l
Barium	ug/l	1000.00	ug/l
Beryllium	ug/l		ug/l
Cadmium	0.750 ug/l	7.87	ug/l
Chromium III	265.854 ug/l	5562.19	ug/l
Chromium VI	11.000 ug/l	16.00	ug/l
Copper	30.219 ug/l	51.16	ug/l
Cyanide	5.200 ug/l	22.00	ug/l
Iron	ug/l	1000.00	ug/l
Lead	18.327 ug/l	470.30	ug/l
Mercury	0.012 ug/l	2.40	ug/l
Nickel	282.49 ug/l	1502.11	ug/l
Selenium	5.000 ug/l	20.00	ug/l
Silver	ug/l	40.31	ug/l
Thallium			
Zinc	384.291 ug/l	384.29	ug/l

Based upon a Hardness of 395.7 mg/l as CaCO<sub>3</sub>

Based upon 361.27 mg/l as CaCO<sub>3</sub>

**Organics [Pesticides]**

Parameter	4 Day Average (Chronic) Standard		1 Hour Average (Acute) Standard	
	Concentration		Concentration	
Aldrin			1.500	ug/l
Chlordane	0.0043 ug/l		1.200	ug/l
DDT, DDE	0.001 ug/l		0.550	ug/l
Dieldrin	0.0056 ug/l		0.240	ug/l
Endosulfan, a & b	0.056 ug/l		0.110	ug/l
Endrin	0.036 ug/l		0.086	ug/l
Guthion				
Heptachlor & H. epoxide	0.0038 ug/l		0.260	ug/l
Lindane	0.08 ug/l		1.000	ug/l
Methoxychlor			0.030	ug/l
Mirex			0.001	ug/l
Parathion	0.0130 ug/l		0.066	ug/l
PCB's	0.014 ug/l			
Pentachlorophenol	15.00 ug/l		19.000	ug/l
Toxephene	0.0002 ug/l		0.730	ug/l

**IV. Numeric Water Quality Standards for Protection of Agriculture**

TDS	1200	mg/l
Arsenic	100	ug/l
Boron	750	ug/l
Cadmium	10	ug/l
Chromium	100	ug/l
Copper	200	ug/l
Lead	100	ug/l
Selenium	50	ug/l

**V. Numeric Water Quality Standards for Protection of Human Health (Class 1C Waters)**

**Metals**  
 Arsenic  
 Barium

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Cadmium  
 Chromium  
 Lead  
 Mercury  
 Selenium  
 Silver  
 Fluoride (3)  
 to  
 Nitrates as N

**Chlorophenoxy Herbicides**

2,4-D  
 2,4,5-TP  
 Methoxychlor

**VI. Numeric Water Quality Standards the Protection of Human Health from Water & Fish Consumption [Toxics]**

	Maximum Conc., ug/l - Acute Standards	
	Class 1C [2 Liters/Day for 70 Kg Person over 70 Yr.]	Class 3A, 3B, 3C, 3D [6.5 g for 70 Kg Person over 70 Yr.]
Antimony	5.6 ug/l	640 ug/l
Arsenic	A	A
Beryllium	C	C
Cadmium	C	C
Chromium III	C	C
Chromium VI	C	C
Copper	1,300 ug/l	
Lead	C	C
Mercury	A	A
Nickel	100 ug/l	4,600 ug/l
Selenium	A	4,200 ug/l
Silver		
Thallium	0.24 ug/l	6.3 ug/l
Zinc	7400 ug/l	26,000 ug/l
Cyanide	140 ug/l	220,000 ug/l
Asbestos	7.00E+06 Fibers/L	
2,3,7,8-TCDD Dioxin	5.0 E-9 ug/l	5.1 E-9 ug/l
Acrolein	190 ug/l	290 ug/l
Acrylonitrile	0.051 ug/l	0.25 ug/l
Alachlor	2 ug/l	
Benzene	2.2 ug/l	51 B ug/l
Bromoform	4.3 ug/l	140.00 ug/l
Carbofuran	40	
Carbon Tetrachloride	0.23 ug/l	1.60 ug/l
Chlorobenzene	100 ug/l	21,000 ug/l
Chlorodibromomethane	0.4 ug/l	13.00 ug/l
Chloroethane		
2-Chloroethylvinyl Ether		
Chloroform	5.7 ug/l	470.00 ug/l
Dalapon	200 ug/l	
Di(2ethylhexyl)adipate	400 ug/l	
Dichlorobromopropane	0.2	

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Dichlorobromomethane	0.55 ug/l	17.00 ug/l
1,1-Dichloroethane		
1,2-Dichloroethane	0.38 ug/l	37.00 ug/l
1,1-Dichloroethylene	7 ug/l	3.20 ug/l
Dichloroethylene (cis-1,2)	70	
Dinoseb	7	
Diquat	20	
1,2-Dichloropropane	0.5 ug/l	15.00 ug/l
1,3-Dichloropropene	0.34 ug/l	1,700 ug/l
Endothall	100	
Ethylbenzene	530 ug/l	29,000 ug/l
Ethylidibromide	0.05 ug/l	
Glyphosate	700 ug/l	
Haloacetic acids	60 ug/l E	
Methyl Bromide	47 ug/l	1,500 ug/l
Methyl Chloride	F	F
Methylene Chloride	4.6 ug/l	590.00 ug/l
Ocamyl (vidate)	200 ug/l	
Picloram	500 ug/l	
Simazine	4 ug/l	
Styrene	100 ug/l	
1,1,2,2-Tetrachloroethane	0.17 ug/l	4.00 ug/l
Tetrachloroethylene	0.69 ug/l	3.30 ug/l
Toluene	1000 ug/l	200,000 ug/l
1,2 -Trans-Dichloroethylene	100 ug/l	140,000 ug/l
1,1,1-Trichloroethane	200 ug/l	F
1,1,2-Trichloroethane	0.59 ug/l	16.00 ug/l
Trichloroethylene	2.5 ug/l	30.00 ug/l
Vinyl Chloride	0.025 ug/l	530.00 ug/l
Xylenes	10000 ug/l	
2-Chlorophenol	81 ug/l	150 ug/l
2,4-Dichlorophenol	77 ug/l	290 ug/l
2,4-Dimethylphenol	380 ug/l	850 ug/l
2-Methyl-4,6-Dinitrophenol	13 ug/l	280 ug/l
2,4-Dinitrophenol	69 ug/l	5,300 ug/l
2-Nitrophenol		
4-Nitrophenol		
3-Methyl-4-Chlorophenol		
Penetachlorophenol	0.27 ug/l	3.00 ug/l
Phenol	21000 ug/l	1,700,000 ug/l
2,4,6-Trichlorophenol	1.4 ug/l	2.40 ug/l
Acenaphthene	670 ug/l	990 ug/l
Acenaphthylene	ug/l	ug/l
Anthracene	8300 ug/l	40,000 ug/l
Benzidine	0.000086 ug/l	0.00 ug/l
BenzoaAnthracene	0.0038 ug/l	0.02 ug/l
BenzoaPyrene	0.0038 ug/l	0.02 ug/l
BenzobFluoranthene	0.0038 ug/l	0.02 ug/l
BenzoghiPerylene	ug/l	
BenzokFluoranthene	0.0038 ug/l	0.02 ug/l
Bis2-ChloroethoxyMethane	ug/l	
Bis2-ChloroethylEther	0.03 ug/l	0.53 ug/l
Bis2-ChloroisopropylEther	1400 ug/l	65,000 ug/l
Bis2-EthylhexylPhthalate	1.2 ug/l	2.20 ug/l

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4-Bromophenyl Phenyl Ether	ug/l		
Butylbenzyl Phthalate	1500 ug/l		1,900 ug/l
2-Chloronaphthalene	1000 ug/l		1,600 ug/l
4-Chlorophenyl Phenyl Ether	ug/l		
Chrysene	0.0038 ug/l		0.02 ug/l
Dibenzo(a, h)Anthracene	0.0038 ug/l		0.02 ug/l
1,2-Dichlorobenzene	420 ug/l		17,000 ug/l
1,3-Dichlorobenzene	320 ug/l		960 ug/l
1,4-Dichlorobenzene	63 ug/l		2,600 ug/l
3,3-Dichlorobenzidine	0.021 ug/l		0.03 ug/l
Diethyl Phthalate	17000 ug/l		44,000 ug/l
Dimethyl Phthalate	270000 ug/l		1,100,000 ug/l
Di-n-Butyl Phthalate	2000 ug/l		4,500 ug/l
2,4-Dinitrotoluene	0.11 ug/l		3.40 ug/l
2,6-Dinitrotoluene	ug/l		
Di-n-Octyl Phthalate	ug/l		
1,2-Diphenylhydrazine	0.036 ug/l		0.20 ug/l
Fluoranthene	130 ug/l		140.00 ug/l
Fluorene	1100 ug/l		5,300 ug/l
Hexachlorobenzene	0.00028 ug/l		0.00029 B ug/l
Hexachlorobutenedine	0.44 ug/l		18.00 ug/l
Hexachloroethane	1.4 ug/l		3.30 ug/l
Hexachlorocyclopentadiene	40 ug/l		17,000 ug/l
Ideno 1,2,3-cdPyrene	0.0038 ug/l		0.02 ug/l
Isophorone	35 ug/l	B	960.00 ug/l
Naphthalene			
Nitrobenzene	17 ug/l		690 ug/l
N-Nitrosodimethylamine	0.00069 ug/l		3.00 ug/l
N-Nitrosodi-n-Propylamine	0.005 ug/l		0.51 ug/l
N-Nitrosodiphenylamine	3.3 ug/l		6.00 ug/l
Phenanthrene			
Pyrene	830 ug/l		4,000 ug/l
1,2,4-Trichlorobenzene	260 ug/l		940 ug/l
Aldrin	0.000049 ug/l		0.000050 ug/l
alpha-BHC	0.0026 ug/l		0.00 ug/l
beta-BHC	0.0091 ug/l		0.02 ug/l
gamma-BHC (Lindane)	0.2 ug/l		0.06 ug/l
delta-BHC			
Chlordane	0.0008 ug/l		0.00 ug/l
4,4-DDT	0.00022 ug/l		0.00 ug/l
4,4-DDE	0.00022 ug/l		0.00 ug/l
4,4-DDD	0.00031 ug/l		0.00 ug/l
Dieldrin	0.000052 ug/l	B	0.000054 ug/l
alpha-Endosulfan	62 ug/l		89 ug/l
beta-Endosulfan	62 ug/l		89 ug/l
Endosulfan Sulfate	62 ug/l		89 ug/l
Endrin	0.059 ug/l		0.81 ug/l
Endrin Aldehyde	0.29 ug/l		0.30 ug/l
Heptachlor	0.000079 ug/l	B	0.000079 ug/l
Heptachlor Epoxide	0.000039 ug/l	B	0.000039 ug/l
Polychlorinated Biphenyls	0.000064 ug/l	B,D	0.000064 ug/l
Toxaphene	0.00028 ug/l		0.00028 ug/l

There are additional standards that apply to this receiving water, but were not considered in this modeling/waste load allocation analysis.

## VII. Mathematical Modeling of Water Quality Quality

Model configuration was accomplished utilizing standard modeling procedures. Data points were plotted and coefficients adjusted as required to match observed data as closely as possible.

The modeling approach used in this analysis included one or a combination of the following models.

(1) The Utah River Model, Utah Division of Water Quality, 1992. Based upon STREAMDO IV (Region VIII) and Supplemental Ammonia Toxicity Models; EPA Region VIII, Sept. 1990 and

QUAL2E (EPA, Athens, GA).

(2) Utah Ammonia/Chlorine Model, Utah Division of Water Quality, 1992.

(3) Principles of Surface Water Quality Modeling and Control. Robert V. Thomann, et.al. Harper Collins Publisher, Inc. 1987, pp. 644.

Coefficients used in the model were based, in part, upon the following references:

(1) Rates, Constants, and Kinetics Formulations in Surface Water Quality Modeling. Environmental Research Laboratory, Office of Research and Development, U.S. Environmental Protection Agency, Athens Georgia. EPA/600/3-85/040 June 1985.

(2) Principles of Surface Water Quality Modeling and Control. Robert V. Thomann, et.al. Harper Collins Publisher, Inc. 1987, pp. 644.

The Utah Reservoir and Lake Model is a simple round jet model which was received from EPA Region 8. It assumes a discharge expands into the receiving water as a 1/2 cone from the point of discharge with the appropriate dilution.

The dilution ratios for this wasteload analysis are as follows:

Acute Dilution Ratio:	2.5 to 1
Chronic Dilution Ratio:	14.1 to 1

## VIII. Modeling Information

The required information for the model may include the following information for both the lake and effluent conditions:

Temperature, Deg. C.	Total Residual Chlorine (TRC), mg/l
pH	Total NH <sub>3</sub> -N, mg/l
BOD <sub>5</sub> , mg/l	Total Dissolved Solids (TDS), mg/l
Metals, ug/l	Toxic Organics of Concern, ug/l

D.O. mg/l

**Other Conditions**

In addition to the lake and effluent conditions, the models require a variety of physical and biological coefficients and other technical information. In the process of actually establishing the permit limits for an effluent, values are used based upon the available data, model calibration, literature values, site visits and best professional judgement.

**Model Inputs**

Lake Information	Temp. Deg. C	pH	T-NH3 mg/l as N	BOD mg/l	DO mg/l	TRC mg/l	TDS mg/l	Metals ug/l
	21.0	8.5	0.00	N/A	N/A	0.00	1034.0	0.0

Discharge Information	Season	Flow,	Temp.
	All Seasons	30.0	9.9

**IX. Effluent Limitations based upon Water Quality Standards**

**Effluent Limitation for Flow**

All Seasons		
Not to Exceed:	30.00 MGD	Daily Average
	46.41 cfs	Daily Average
WET Requirements	As determined by Permits & Compliance Branch	

**Effluent Limitation for Biological Oxygen Demand (BOD)**

	Concentration
30 Day Average	25.0 mg/l as BOD5
30 Day Average	20.0 mg/l as CBOD5

**Effluent Limitation for Dissolved Oxygen (DO)**

	Concentration
	<b>1 Day Average (Acute)</b>
30 Day Average	5.00 mg/l

**Effluent Limitation for Total Ammonia**

4 Day Average [Chronic]	Load
Concentration	

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All Seasons	21.66 mg/l as N	5418.4 lbs/day
	<b>1 Hour Average [Acute] Concentration</b>	<b>Load</b>
	13.7 mg/l as N	3416.4 lbs/day

**Effluent Limitation for Total Residual Chlorine**

	<b>4 Day Average [Chronic] Concentration</b>	<b>Load</b>
All Seasons	0.155 mg/l	38.8 lbs/day
	<b>1 Hour Average [Acute] Concentration</b>	<b>Load</b>
	0.047 mg/l	11.7 lbs/day

**Effluent Limitations for Metals**

	<b>4 Day Average (Chronic)</b>		<b>1 Hour Average (Acute)</b>	
	<b>Concentration</b>	<b>Load</b>	<b>Concentration</b>	<b>Load</b>
Aluminum	2027.04 ug/l*	327.8 lbs/day	3640.69 ug/l	588.7 lbs/day
Arsenic	4177.82 ug/l	675.6 lbs/day	1670.71 ug/l*	270.2 lbs/day
Barium			2468.33 ug/l	399.1 lbs/day
Cadmium	12.99 ug/l*	2.1 lbs/day	35.79 ug/l	5.8 lbs/day
Chromium III	4676.29 ug/l*	756.2 lbs/day	8169.03 ug/l	1,320.9 lbs/day
Chromium VI	235.48 ug/l	38.1 lbs/day	68.16 ug/l*	11.0 lbs/day
Copper	630.26 ug/l	101.9 lbs/day	206.48 ug/l*	33.4 lbs/day
Cyanide	12.84		54.30	
Iron			86.95 ug/l	14.1 lbs/day
Lead	185.44 ug/l*	30.0 lbs/day	1304.64 ug/l	211.0 lbs/day
Mercury	0.26 ug/l*	0.042 lbs/day	11.84 ug/l	1.9 lbs/day
Nickel	4379.94 ug/l*	708.2 lbs/day	7134.27 ug/l	1,153.6 lbs/day
Selenium	114.80 ug/l	18.6 lbs/day	88.67 ug/l*	14.3 lbs/day
Silver			159.32 ug/l	25.8 lbs/day
Zinc	46235.39 ug/l	7,476.3 lbs/day	1743.30 ug/l*	281.9

\* Most stringent between Chronic & Acute Effluent Limitations

**Effluent Limitations for Organics [Pesticides]**

Pesticide	<b>4 Day Average</b>		<b>1 Hour Average</b>	
	<b>Concentration</b>	<b>Load</b>	<b>Concentration</b>	<b>Load</b>
Aldrin			3.7025 ug/l	0.599 lbs/day
Chlordane	0.0607 ug/l*	0.010 lbs/day	2.9620 ug/l	0.479 lbs/day
DDT, DDE	0.0141 ug/l*	0.002 lbs/day	1.3576 ug/l	0.220 lbs/day
Dieldrin	0.0790 ug/l*	0.013 lbs/day	0.5924 ug/l	0.096 lbs/day
Endosulfan	0.7899 ug/l	0.128 lbs/day	0.2715 ug/l*	0.044 lbs/day

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Endrin	0.5078 ug/l	0.082 lbs/day	0.2123 ug/l*	0.034 lbs/day
Guthion			0.0000 ug/l	0.000 lbs/day
Heptachlor	0.0536 ug/l*	0.009 lbs/day	0.6418 ug/l	0.104 lbs/day
Lindane	1.1284 ug/l*	0.182 lbs/day	2.4683 ug/l	0.399 lbs/day
Methoxychlor			0.0740 ug/l	0.012 lbs/day
Mirex			0.0025 ug/l	0.000 lbs/day
Parathion			0.1629 ug/l	0.026 lbs/day
PCB's	0.1975 ug/l	0.032 lbs/day	0.0000 ug/l*	0.000 lbs/day
Pentachlorophenol	211.5711 ug/l	34.211 lbs/day	46.8983 ug/l*	7.583 lbs/day
Toxephene	0.0028 ug/l*	0.000 lbs/day	1.8019 ug/l	0.291 lbs/day

**Effluent Limitations for Protection of Human Health (Class 1C Waters)**

<b>Metals</b>	<b>1 Hour Average (Acute) Standard</b>	
	<b>Concentration</b>	<b>Load</b>
Arsenic		
Barium		
Cadmium		
Chromium		
Lead		
Mercury		
Selenium		
Silver		
Fluoride		
to		
Nitrates as N		
<b>Pesticides</b>		
2,4-D		
2,4,5-TP		
Methoxychlor		

**Effluent Limitations for Protection of Human Health [Toxics Rule]**

Based upon Water Quality Standards (Most stringent of 1C or 3A & 3B as appropriate.)

<b>Toxics Rule Parameters</b>	<b>Maximum Conc., ug/l - Acute Standards</b>	
	<b>Class 1C</b> [2 Liters/Day for 70 Kg Person over 70 Yr.]	<b>Class 3A, 3B</b> [6.5 g for 70 Kg Person over 70 Yr. Period]
Antimony		13.82 ug/l      2.2 lbs/day
Arsenic		
Beryllium		
Cadmium		
Chromium III		
Chromium VI		
Copper		3208.83 ug/l      518.9 lbs/day
Lead		
Mercury		246.83 ug/l      39.9 lbs/day
Nickel		
Selenium		18265.64 ug/l      2953.6 lbs/day
Silver		345.57 ug/l      55.9 lbs/day
Thallium		

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Zinc	468.98 ug/l	75.8 lbs/day
Cyanide	0.13 ug/l	0.0 lbs/day
Asbestos	10.61 ug/l	1.7 lbs/day
0		
2,3,7,8-TCDD Dioxin	246.83 ug/l	39.9 lbs/day
Acrolein	0.99 ug/l	0.2 lbs/day
Acrylonitrile		
Benzene		
Bromoform	14.07 ug/l	2.3 lbs/day
Carbon Tetrachloride		
Chlorobenzene		
Chlorodibromomethane	0.94 ug/l	0.2 lbs/day
Chloroethane	17.28 ug/l	2.8 lbs/day
2-Chloroethylvinyl Ether	1.23 ug/l	0.2 lbs/day
Chloroform	0.84 ug/l	0.1 lbs/day
Dichlorobromomethane	116.01 ug/l	18.8 lbs/day
1,1-Dichloroethane		
1,2-Dichloroethane	11.35 ug/l	1.8 lbs/day
1,1-Dichloroethylene	0.42 ug/l	0.1 lbs/day
1,2-Dichloropropane	2468.33 ug/l	399.1 lbs/day
1,3-Dichloropropene	1.46 ug/l	0.2 lbs/day
Ethylbenzene	6.17 ug/l	1.0 lbs/day
Methyl Bromide	0.06 ug/l	0.0 lbs/day
Methyl Chloride	199.93 ug/l	32.3 lbs/day
Methylene Chloride	190.06 ug/l	30.7 lbs/day
1,1,2,2-Tetrachloroethane	937.97 ug/l	151.7 lbs/day
Tetrachloroethylene	32.09 ug/l	5.2 lbs/day
Toluene		
1,2 -Trans-Dichloroethylene		
1,1,1-Trichloroethane	0.67 ug/l	0.1 lbs/day
1,1,2-Trichloroethane	51834.92 ug/l	8381.7 lbs/day
Trichloroethylene	3.46 ug/l	0.6 lbs/day
Vinyl Chloride	1653.78 ug/l	267.4 lbs/day
2-Chlorophenol		
2,4-Dichlorophenol	20487.13 ug/l	3312.8 lbs/day
2,4-Dimethylphenol		
2-Methyl-4,6-Dinitrophenol	0.01 ug/l	0.0 lbs/day
2,4-Dinitrophenol	0.01 ug/l	0.0 lbs/day
2-Nitrophenol	0.01 ug/l	0.0 lbs/day
4-Nitrophenol		
3-Methyl-4-Chlorophenol	0.01 ug/l	0.002 lbs/day
Penetachlorophenol		
Phenol	0.07 ug/l	0.012 lbs/day
2,4,6-Trichlorophenol	3455.66 ug/l	558.780 lbs/day
Acenaphthene		
Acenaphthylene	3702.49 ug/l	598.7 lbs/day
Anthracene	2468.33 ug/l	399.1 lbs/day
Benzidine		
BenzoaAnthracene	0.01 ug/l	0.0 lbs/day
BenzoaPyrene	0.0 ug/l	0.0 lbs/day
BenzobFluoranthene	1036.70 ug/l	167.6 lbs/day
BenzoghiPerylene	789.87 ug/l	127.7 lbs/day
BenzokFluoranthene		
Bis2-ChloroethoxyMethane		

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Bis2-ChloroethylEther	4.20E+04 ug/l	6.79E+03 lbs/day
Bis2-Chloroisopropyl Ether	6.66E+05 ug/l	1.08E+05 lbs/day
Bis2-EthylhexylPhthalate	##### ug/l	798.25774 lbs/day
4-Bromophenyl Phenyl Ether	0.27152 ug/l	0.04390 lbs/day
Butylbenzyl Phthalate		
2-Chloronaphthalene		
4-Chlorophenyl Phenyl Ether	0.08886 ug/l	0.01437 lbs/day
Chrysene	320.88283 ug/l	51.88675 lbs/day
Dibenzo, hAnthracene	##### ug/l	439.04176 lbs/day
1,2-Dichlorobenzene	0.00069 ug/l	0.00011 lbs/day
1,3-Dichlorobenzene	1.08606 ug/l	0.17562 lbs/day
1,4-Dichlorobenzene	3.45566 ug/l	0.55878 lbs/day
3,3-Dichlorobenzidine		
Diethyl Phthalate		
Dimethyl Phthalate		
Di-n-Butyl Phthalate		
2,4-Dinitrotoluene	41.961600 ug/l	6.785191 lbs/day
2,6-Dinitrotoluene	0.001703 ug/l	0.000275 lbs/day
Di-n-Octyl Phthalate	0.012342 ug/l	0.001996 lbs/day
1,2-Diphenylhydrazine	8.145487 ug/l	1.317125 lbs/day
Fluoranthene		
Fluorene	2.05E+03 ug/l	3.31E+02 lbs/day
Hexachlorobenzene		
Hexachlorobutenedine		
Hexachloroethane		
Hexachlorocyclopentadiene		
Ideno 1,2,3-cdPyrene		
Isophorone		
Naphthalene		
Nitrobenzene		
N-Nitrosodimethylamine		
N-Nitrosodi-n-Propylamine	0.00 ug/l	0.0 lbs/day
N-Nitrosodiphenylamine		
Phenanthrene	153.04 ug/l	24.7 lbs/day
Pyrene		
1,2,4-Trichlorobenzene	153.04 ug/l	24.7 lbs/day
Aldrin	0.15 ug/l	0.0 lbs/day
alpha-BHC		
beta-BHC		
gamma-BHC (Lindane)		
delta-BHC		
Chlordane		
4,4-DDT		
4,4-DDE		
4,4-DDD		
Dieldrin		
alpha-Endosulfan		
beta-Endosulfan		
Endosulfan Sulfate		

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Endrin  
 Endrin Aldehyde  
 Heptachlor  
 Heptachlor Epoxide  
 Polychlorinated Biphenyls  
 0  
 Toxaphene

Specific Parameter: TDS

0

1853.49 mg/l

299.7 tons / day

**Effluent Limitations for the Protection of Agriculture**

**1 Hour Average (Acute) Standard  
 Concentration Load**

	Concentration	Load
Arsenic	246.83 ug/l	39.91 lbs / day
Boron	1851.25 ug/l	299.35 lbs / day
Cadmium	24.68 ug/l	3.99 lbs / day
Chromium	246.83 ug/l	39.91 lbs / day
Copper	123.42 ug/l	19.96 lbs / day
Lead	246.83 ug/l	39.91 lbs / day
Selenium	123.42 ug/l	19.96 lbs / day

**Metals Effluent Limitations for Protection of All Beneficial Uses  
 Based upon Water Quality Standards and Toxics Rules**

	Class 4 Acute Agricultural ug/l	Class 3 Acute Aquatic Wildlife ug/l	Acute Toxics Drinking Water Source ug/l	Acute Toxics Wildlife ug/l	IC Acute Health Criteria ug/l	Acute Most Stringent ug/l	Class 3 Chronic Aquatic Wildlife ug/l
Aluminum		3640.69				3640.69	2027.04
Antimony						0.00	
Arsenic	246.83	1670.71				246.83	4177.82
Asbestos							
Barium		2468.33				2468.33	
Boron							
Cadmium	24.68	35.79				24.68	12.99
Chromium (III)		8169.0				8169.03	4676.29
Chromium (VI)	246.83	68.16				68.16	235.48
Copper	123.42	206.48				123.42	630.26
Cyanide		54.30				54.30	12.84
Iron		86.95				86.95	
Lead	246.83	1304.64				246.83	185.44
Mercury		11.8362				11.84	0.2569
Nickel		7134.27				7134.27	4379.94
Selenium	123.42	88.67				88.67	114.80
Silver		159.32				159.32	
Thallium						0.00	
Zinc		1743.30				1743.30	46235.39

## Summary Effluent Limitations for Metals [Wasteload Allocation, TMDL]

	ug/l	Acute		Chronic	
		lbs/day	ug/l	lbs/day	
Aluminum	3640.69	910.7	2027.04	507.1	
Antimony					
Arsenic	246.83	61.7	4177.82	1045.1	
Asbestos					
Cadmium	24.68	6.2	12.99	3.2	
Chromium (III)	8169.03	2043.5	4676.29	1169.8	
Chromium (VI)	68.16	17.1	235.48	58.9	
Copper	123.42	30.9	630.26	157.7	
Cyanide	54.30	13.6	12.84	3.2	
Iron	86.95	21.8			
Lead	246.83	61.7	185.44	46.4	
Mercury	11.84	3.0	0.26	0.1	
Nickel	7134.27	1784.6	4379.94	1095.6	
Selenium	88.67	22.2	114.80	28.7	
Silver	159.32	39.9			
Zinc	1743.30	436.1	46235.39	11565.8	

## Effluent Indicators / Targets for Pollution Indicators

Water quality targets for pollution Indicators will be met with an effluent limit as follows:

	Indicator / Target mg/l	Target	
		mg/l	lbs/day
Gross Beta (pCi/l)	50.0 pCi/L		
BOD	5.0	12.34	938.27
Nitrates as N	4.0	9.87	750.61
Total Phosphorus as P	0.05	0.12	9.38
Total Suspended Solids	90.0	222.15	16888.83

Other Effluent Limitations are based upon R317-1.

## X. Antidegradation Considerations

The Utah Antidegradation Policy allows for degradation of existing quality where it is determined that such lowering of water quality is necessary to accommodate important economic or social development in the area in which the waters are protected [R317-2-3]. It has been determined that development in the area in which the waters are protected [R317-2-3]. It has been determined that certain chemical parameters introduced by this discharge will cause an increase of the concentration of said parameters in the receiving waters. Under no conditions will the increase in concentration be allowed to interfere with existing water users.

Category III waters fall under special rules for the determination of effluent limits. These rules allow more stringent effluent limitations based upon additional factors, including: "blue-ribbon" fisheries, special recreation areas, and drinking water sources.

#### **XI. Colorado River Salinity Forum Considerations**

Discharges in the Colorado River Basin are required to have their discharge at a TDS loading of less than 1.00 tons/day unless shown that this is not attainable. Refer to the Forum's Guidelines for additional information.

The permit writers may utilize other information to adjust these limits and/or to determine other limits based upon best available technology and other considerations.

#### **XII. Summary Comments**

The mathematical modeling and best professional judgement indicate that violations of receiving water beneficial uses with their associated water quality standards, including important downstream segments, will not occur for the evaluated parameters of concern as discussed above if the effluent limitations indicated above are met.

The permit writers may utilize other information to adjust these limits or to determine other limits based upon best available technology and other considerations. Under no circumstances however, may those alterations allow for the violation of water quality standards by the permittee.

#### **XIII. Notice of UPDES Requirement**

This Addendum to the Statement of Basis does not authorize any entity or party to discharge to the waters of the State of Utah. That authority is granted through a UPDES permit issued by the Utah Division of Water Quality. The numbers presented here may be changed as a function of other factors. Dischargers are strongly urged to contact the Permits Section for further information.

#### **XIV. Notice of Availability of Information**

All model numerical inputs, intermediate calculations, outputs and graphs are available for discussion, inspection and copy at the Division of Water Quality.

Prepared by:  
David Wham  
Utah Division of Water Quality  
801-536-4337

TimpanogosSSD\_WLA\_12-11-14



## Antidegradation Review Form

### Part A: Applicant Information

**Facility Name:** Timpanogos Special Service District

**Facility Owner:** Timpanogos Special Service District

**Facility Location:** 6400 North 5050 West Utah County, UT 84003

**Form Prepared By:** Jon Adams, General Manager

**Outfall Number:** 001

**Receiving Water:** Utah Lake

**What Are the Designated Uses of the Receiving Water (R317-2-6)?**

Domestic Water Supply: None

Recreation: 2B - Secondary Contact

Aquatic Life: 3B - Warm Water Aquatic Life

Agricultural Water Supply: 4

Great Salt Lake: None

**Category of Receiving Water (R317-2-3.2, -3.3, and -3.4):** Category 3

**UPDES Permit Number (if applicable):** UT0023639

**Effluent Flow Reviewed:** 19.10

Typically, this should be the maximum daily discharge at the design capacity of the facility. Exceptions should be noted.

**What is the application for? (check all that apply)**

- A UPDES permit for a new facility, project, or outfall.
- A UPDES permit renewal with an expansion or modification of an existing wastewater treatment works.
- A UPDES permit renewal requiring limits for a pollutant not covered by the previous permit and/or an increase to existing permit limits.
- A UPDES permit renewal with no changes in facility operations.

**Part B. Is a Level II ADR required?**

*This section of the form is intended to help applicants determine if a Level II ADR is required for specific permitted activities. In addition, the Executive Secretary may require a Level II ADR for an activity with the potential for major impact on the quality of waters of the state (R317-2-3.5a.1).*

**B1. The receiving water or downstream water is a Class 1C drinking water source.**

**Yes** A Level II ADR is required (Proceed to Part C of the Form)

**No** (Proceed to Part B2 of the Form)

**B2. The UPDES permit is new or is being renewed and the proposed effluent concentration and loading limits are higher than the concentration and loading limits in the previous permit and any previous antidegradation review(s).**

**Yes** (Proceed to Part B3 of the Form)

**No** No Level II ADR is required and there is no need to proceed further with review questions.

**B3. Will any pollutants use assimilative capacity of the receiving water, i.e. do the pollutant concentrations in the effluent exceed those in the receiving waters at critical conditions? For most pollutants, effluent concentrations that are higher than the ambient concentrations require an antidegradation review? For a few pollutants such as dissolved oxygen, an antidegradation review is required if the effluent concentrations are less than the ambient concentrations in the receiving water. (Section 3.3.3 of Implementation Guidance)**

**Yes** (Proceed to Part B4 of the Form)

**No** No Level II ADR is required and there is no need to proceed further with review questions.

**B4. Are water quality impacts of the proposed project temporary and limited (Section 3.3.4 of Implementation Guidance)?** Proposed projects that will have temporary and limited effects on water quality can be exempted from a Level II ADR.

**Yes** Identify the reasons used to justify this determination in Part B4.1 and proceed to Part G. No Level II ADR is required.

**No** A Level II ADR is required (Proceed to Part C)

**B4.1 Complete this question only if the applicant is requesting a Level II review exclusion for temporary and limited projects (see R317-2-3.5(b)(3) and R317-2-3.5(b)(4)). For projects requesting a temporary and limited exclusion please indicate the factor(s) used to justify this determination (check all that apply and provide details as appropriate) (Section 3.3.4 of Implementation Guidance):**

Water quality impacts will be temporary and related exclusively to sediment or turbidity and fish spawning will not be impaired.

**Factors to be considered in determining whether water quality impacts will be temporary and limited:**

- a) The length of time during which water quality will be lowered:
- b) The percent change in ambient concentrations of pollutants:
- c) Pollutants affected:
- d) Likelihood for long-term water quality benefits:
- e) Potential for any residual long-term influences on existing uses:
- f) Impairment of fish spawning, survival and development of aquatic fauna excluding fish removal efforts:

Additional justification, as needed:

## Level II ADR

Part C, D, E, and F of the form constitute the Level II ADR Review. The applicant must provide as much detail as necessary for DWQ to perform the antidegradation review. Questions are provided for the convenience of applicants; however, for more complex permits it may be more effective to provide the required information in a separate report. Applicants that prefer a separate report should record the report name here and proceed to Part G of the form.

Optional Report Name: Timpanogos Special Service District

**Part C. Is the degradation from the project socially and economically necessary to accommodate important social or economic development in the area in which the waters are located?** *The applicant must provide as much detail as necessary for DWQ to concur that the project is socially and economically necessary when answering the questions in this section. More information is available in Section 6.2 of the Implementation Guidance.*

**C1. Describe the social and economic benefits that would be realized through the proposed project, including the number and nature of jobs created and anticipated tax revenues.**

Facility is an existing Wastewater Treatment Plant which provides sewer treatment services for multiple municipalities.

**C2. Describe any environmental benefits to be realized through implementation of the proposed project.**

POTW treats wastewater to water quality standards in existing permit.

**C3. Describe any social and economic losses that may result from the project, including impacts to recreation or commercial development.**

None known.

**C4. Summarize any supporting information from the affected communities on preserving assimilative capacity to support future growth and development.**

Recent facility upgrade performed to meet community needs and growth.

**C5. Please describe any structures or equipment associated with the project that will be placed within or adjacent to the receiving water.**

Wastewater facility equipment and structures located on POTW footprint.

**Part D. Identify and rank (from increasing to decreasing potential threat to designated uses) the parameters of concern.** *Parameters of concern are parameters in the effluent at concentrations greater than ambient concentrations in the receiving water. The applicant is responsible for identifying parameter concentrations in the effluent and DWQ will provide parameter concentrations for the receiving water. More information is available in Section 3.3.3 of the Implementation Guidance.*

**Parameters of Concern:**

<b>Rank</b>	<b>Pollutant</b>	<b>Ambient Concentration</b>	<b>Effluent Concentration</b>
1	Ammonia	0.074 mg/L	0.24 mg/L
2	Nitrates/Nitrites*	0.0875 mg/L	6.53/0.18 mg/L
3	Phosphorus*	0.060 mg/L	2.3 mg/L
4			
5	*Pollutants provided ranked 2-3 are not on existing permits or statement of basis and have been monitored only by request of DWQ.	Data provided from AWQMS Utah Lake 2009-2012, 2013. Sample locations 4917310, 4917320, and 4917380. All available sample results were averaged. Nitrates/Nitrites as total N.	

**Pollutants Evaluated that are not Considered Parameters of Concern:**

<b>Pollutant</b>	<b>Ambient Concentration</b>	<b>Effluent Concentration</b>	<b>Justification</b>

**Part E. Alternative Analysis Requirements of a Level II**

**Antidegradation Review.** *Level II ADRs require the applicant to determine whether there are feasible less-degrading alternatives to the proposed project. More information is available in Section 5.5 and 5.6 of the Implementation Guidance.*

**E1. The UPDES permit is being renewed without any changes to flow or concentrations. Alternative treatment and discharge options including changes to operations and maintenance were considered and compared to the current processes. No economically feasible treatment or discharge alternatives were identified that were not previously considered for any previous antidegradation review(s).**

**Yes** (Proceed to Part F)

**No or Does Not Apply** (Proceed to E2)

**E2. Attach as an appendix to this form a report that describes the following factors for all alternative treatment options (see 1) a technical description of the treatment process, including construction costs and continued operation and maintenance expenses, 2) the mass and concentration of discharge constituents, and 3) a description of the reliability of the system, including the frequency where recurring operation and maintenance may lead to temporary increases in discharged pollutants. Most of this information is typically available from a Facility Plan, if available.**

**Report Name:** BioWin Process Model Summary Report, TSSD

**E3. Describe the proposed method and cost of the baseline treatment alternative. The baseline treatment alternative is the minimum treatment required to meet water quality based effluent limits (WQBEL) as determined by the preliminary or final wasteload analysis (WLA) and any secondary or categorical effluent limits.**