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Wastewater Facility Plan City of Windom, Minnesota

Presentation to City Council

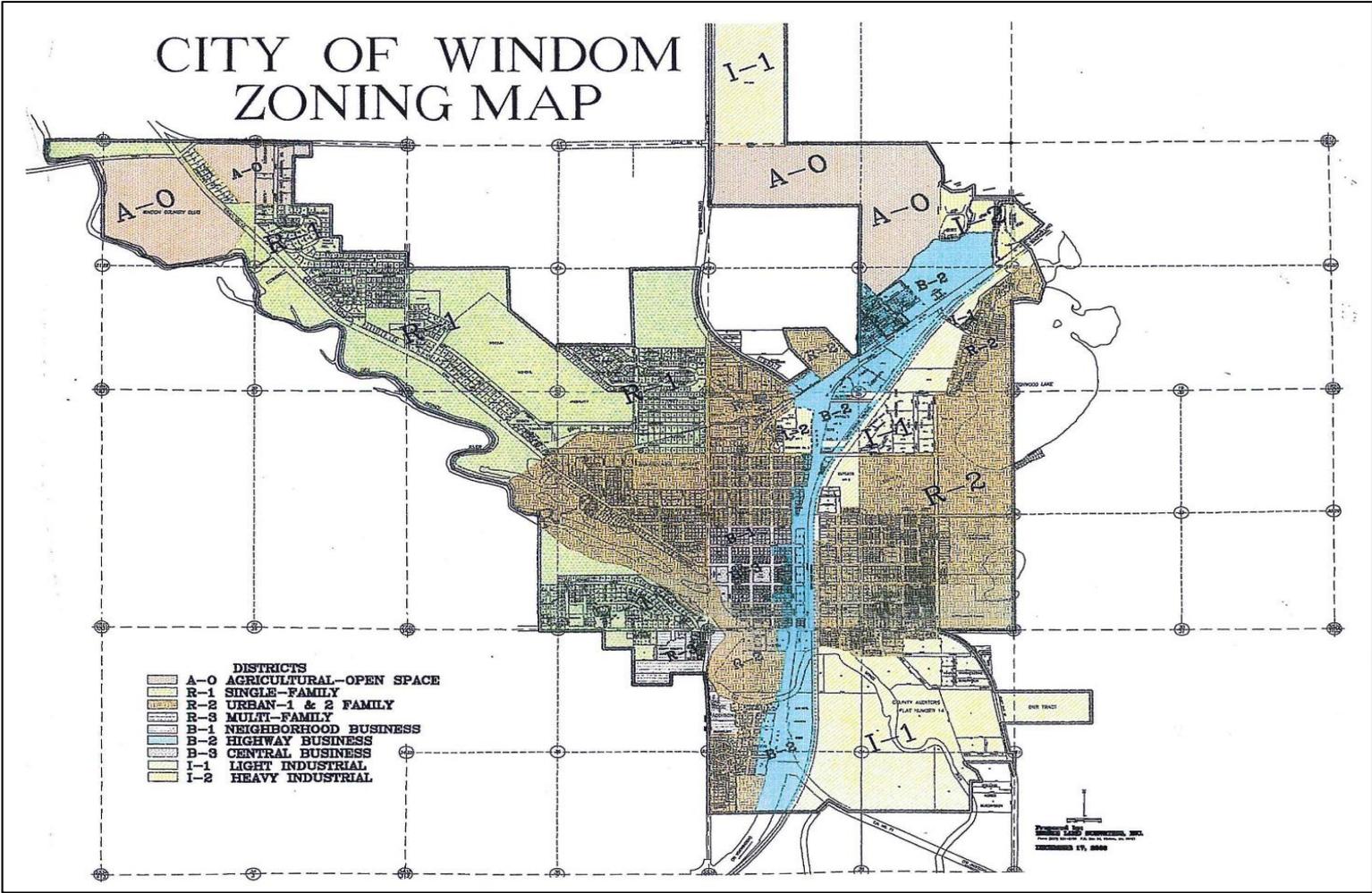
February 7, 2017

Bolton & Menk, Inc. Project No. T22.112172

Reason for Facility Plan

- City of Windom's NPDES Permit Expired in 2015
- City has been conducting a study since 2010 due to failing effluent toxicity tests
- MPCA reviewing limits for Total Nitrogen and Total Phosphorous
- City has requested a Regulatory Certainty (20 year freeze) for the following Effluent Limits:
 - Total Nitrogen of 10 mg/l
 - Total Phosphorous of 1 mg/l
- Accepting the Regulatory Certainty also allows the City to request a Point Source Implementation Grant (PSIG)

City of Windom Planning Area



Population Projections

Year	City of Windom (3)	Cottonwood County
1990	4,513	12,652
1995	4,508	12,563
2000	4,504	12,135
2005	4,352	11,643
2010	4,637	11,694
2013	4,577	11,616
2015	4,637	11,880 (2)
2020	4,805 (1)	12,020 (2)
2025	4,919 (1)	12,184 (2)
2030	5,028 (1)	12,317 (2)
2035	5,133 (1)	12,429 (2)
2036	5,159 (1)	12,469 (2)

(1) Based on both historical population trends and County projections
 (2) Projected by MN State Demographic Center (March 2014)
 (3) Historic population by MN State Demographic Center (July 2016)

Historical Domestic/Commercial Flows

	Domestic Flow (MGD)	Domestic GPCD
Minimum Month Average Flow	0.434	93
Average Daily Flow	0.564	122 (1)
Max. Month Average Flow	0.860	185
Max. Day Flow	1.330	286 (2)
(1) Exceeds the recommended 120 GPCD		
(2) Exceeds the recommended 275 GPCD		

Permitted Industrial Flows (SIU)

Parameter	Prime Pork	Windom Wash
SIU Agreement (gpd)		
Maximum Monthly Average	900,000	75,000
Maximum Daily	1,200,000	125,000

Summary of Allocated Design Flows

Parameter	Existing Facility Design	Existing Residential/ Commercial	Future Residential/ Commercial	Prime Pork (MGD)	Windom Wash (MGD)	Design Flow (MGD)
Average Dry Weather Flow (mgd)	1.13	0.50	0.56	0.78	0.045	1.385
Average Wet Weather Flow (mgd)	1.83	0.86	0.96	0.90	0.075	1.93
Peak Hourly Wet Weather Flow (mgd)	4.37	3.40	3.50	1.20	0.075	4.77
Peak Instantaneous Wet Weather Flow (mgd)	4.95	3.98	3.95	1.2	0.075	5.22

Design Loadings

Loadings	Residential/ Commercial
CBOD – Average Day (lbs/day)	588
CBOD – Max. Month (lbs/day)	824
CBOD – Peak Day (lbs/day)	1,628
TSS – Average Day (lbs/day)	687
TSS – Max. Month (lbs/day)	953
TSS – Peak Day (lbs/day)	2,902
TKN – Average Day (lbs/day)	137
TKN – Max. Month (lbs/day)	170
TKN – Peak Day (lbs/day)	548
P – Average Day (lbs/day)	43

Permitted SIU Loading

Parameter	SIU Agreement	
	Maximum Monthly Average	Maximum Daily
Prime Pork		
CBOD ₅ (lbs/day)	500	1,251
TSS (lbs/day)	600	1,168
TKN (lbs/day)	500	500
TP (lbs/day)	8.34	8.34
Windom Wash		
CBOD ₅ (lbs/day)	87	94
TSS (lbs/day)	54	125
TKN (lbs/day)	16	25
TP (lbs/day)	3	3

Existing and Projected Future Loadings

Parameter	Existing Residential/ Commercial	Future Residential/ Commercial	Prime Pork	Windom Wash	@ Design Flow
CBOD – Average Day (lbs/day)	588	692	350	52	1,094
CBOD – Max. Month (lbs/day)	824	970	500	87	1,557
CBOD – Peak Day (lbs/day)	1,628	1,811	1,251	94	3,156
TSS – Average Day (lbs/day)	687	802	350	32	1,184
TSS – Max. Month (lbs/day)	953	1,112	600	54	1,766
TSS – Peak Day (lbs/day)	2,902	3,229	2,004	125	5,358
TKN – Average Day (lbs/day)	137	161	194	10	365
TKN – Max. Month (lbs/day)	170	200	500	16	716
TKN – Peak Day (lbs/day)	548	610	607	25	1,242
P – Average Day (lbs/day)	43	47	8.34	3	59

Existing NPDES Limits

Parameter	Season	Limit Type	Limits
CBOD ₅	Dec-Mar	Monthly Ave.	5 mg/L (34 kg/day)
	Dec-Mar	Max. Week Ave.	10 mg/L (69 kg/day)
	Apr-Nov	Monthly Ave.	25 mg/L (173 kg/day)
	Apr-Nov	Max. Week Ave.	40 mg/L (277 kg/day)
	Jan-Dec	Min. Month Ave.	85% removal
Total Residual Chlorine	Jan-Dec	Daily Max.	0.038 mg/L
Chronic Toxicity Testing	Jan-Dec	Annual WET Testing	1 TUc
	Jan-Dec	Quarterly WET Testing	1 TUc
Chlorine, Total Residual	Jan-Dec	Daily Maximum	0.038 mg/L
	Apr-Oct	Monthly Ave.	200 #/100 mL
NH ₃ -N (as N)	Dec-Mar	Monthly Ave.	8.2 mg/L (57 kg/day)
	Apr-May	Monthly Ave.	7.2 mg/L (50 kg/day)
	Jun-Sep	Monthly Ave.	1.0 mg/L (7 kg/day)
	Oct-Nov	Monthly Ave.	3.3 mg/L (23 kg/day)
Dissolved Oxygen	Dec-Mar	Monthly Min.	10.0 mg/L
	Apr-Nov	Monthly Min.	6.0 mg/L
pH	Jan-Dec	Monthly Max.	9
	Jan-Dec	Monthly Min.	6
TSS	Jan-Dec	Monthly Ave.	30 mg/L (208 kg/day)
	Jan-Dec	Max. Week Ave.	45 mg/L (311 kg/day)
	Jan-Dec	Min. Month Ave.	85% removal

Projected Capital Costs

Item	Alternative 1 Two Stage Activated Sludge System	Alternative 2 Denitrification Filter
Mobilization	\$600,000	\$900,000
Collection System Interceptor and Manhole Lining	\$500,000	\$500,000
Site Work/Landscaping	\$600,000	\$600,000
Site Piping/Valves	\$300,000	\$200,000
New Preliminary Treatment Facilities	\$1,300,000	\$1,300,000
Anoxic Selector Basin	\$200,000	\$200,000
Aeration Basins Modification	\$40,000	\$40,000
Post Anoxic and Re-aeration Tanks	\$1,000,000	---
Mixed Liquor Return and Anaerobic Return Pumps	\$100,000	\$100,000
Replacement of Final Clarifiers Mechanisms	\$475,000	\$475,000
Replace Aeration Blowers	\$500,000	\$500,000
RAS+ WAS + Sludge Transfer Pump Replacement	\$250,000	\$250,000
New Disinfection System	\$400,000	\$400,000
Biosolids Holding Tank	\$2,000,000	\$2,000,000
Heated Aerobic Digester -Replace Heat Exchanger, Recirculation Pump and Diffusers	\$150,000	\$150,000
Existing Tertiary Filter Rehabilitation	\$900,000	\$900,000
Intermediate Pump Station- Denitrification	---	\$500,000
Additional Building for UV Disinfection and Sludge Transfer Pumps	\$750,000	---
Denitrification Filters Includes Building for UV Disinfection and Sludge Transfer Pumps	---	\$4,500,000
Electrical/Controls	\$1,000,000	\$1,000,000
Subtotal	\$11,065,000	\$14,515,000
Contingencies (10%)	\$1,106,000	\$1,451,000
Engineering/Administration/Legal (15%)	\$1,659,000	\$2,177,000
TOTAL	\$13,830,000	\$18,143,000

OM & R Costs for the Alternatives

Item	Alternative 1 Two Stage Activated Sludge System	Alternative 2 Denitrification Filter
Operations Staff Salaries and Benefits	\$400,000	400,000
Energy Costs	\$220,000	230,000
Bio-solids Disposal Costs	\$45,000	40,000
Chemical Costs	\$500,000	400,000
Professional Services	\$60,000	60,000
Equipment Replacement	\$120,000	100,000
Total OM&R Annual Costs	\$1,345,000	\$1,230,000



Present Worth Analysis of the Two Alternatives

Item	Alternative 1 Two Stage Activated Sludge System	Alternative 2 Denitrification Filter
Capital Total	\$13,830,000	\$18,143,000
OM & R Annual Costs	\$1,345,000	\$1,230,000
OM & R Present Worth Cost at 20 Years 3%	\$20,010,237	\$18,299,325
Total Present Worth Cost	\$33,840,237	\$36,442,325

Project Financing

- Project will be financed by the Minnesota Public Facilities Authority:
 - Can receive a loan for 20 years at an interest rate of 1.5% to 2.5%
 - Maybe eligible the PISG grant:
 - Currently at 50% of eligible component costs up to \$3,000,000
 - Expected to change to 80% of eligible component costs up to \$7,000,000
- Other Possible Grants Investigated:
 - EPA State and Tribal Assistance Grants (STAG) Program – EPA provides grant money to MN for the PISG grant program
 - Minnesota Department of Employment and Economic Development (DEED)
 - Affordability Grant Money (Rural Development and PFA):
 - For residential users only
 - Residential rates not high enough for current project without the PSIG

Potential Impact on User Rates

	Existing	Loan	Loan	Grant + Loan
		at 2.5%	at 1.5%	at 1.5%
Capital Cost		\$13,830,000		
Grant (PSIG)		0	0	\$7,000,000
Net Cost		\$13,830,000	\$13,830,000	\$6,830,000
20-Year Annual Cost		\$887,155	\$805,539	\$397,818
Annual Operating Cost		\$1,345,000		
Existing Annual Debt Service Cost	\$71,500	\$71,500	\$71,500	\$71,500
Total Annual Debt Service + OM&R Costs		\$2,303,655	\$2,222,039	\$1,814,318
Per 1000 Gallon Cost		\$5.22	\$4.94	\$3.58
5,000 Gal/Month User	\$34.03	\$56.09	\$54.72	\$47.88
7,500 Gal/Month User	\$37.51	\$69.13	\$67.08	\$56.82
15,000 Gal/Month User	\$45.19	\$108.26	\$104.16	\$83.63

Note:

1. **Prime Pork and Windom Wash paying their share of the Construction and Operations Costs**
 - **Prime Pork @ 40%**
 - **Windom Wash @ 5%**
2. **Grants Assumed to be \$7,000,000**

Project Compliance / Implementation Schedule

Item	Date
Review with City / Finalize Report	January 2017
Public Utility Board Presentation	January 26, 2017
City Council Presentation	February 7, 2017
Public Hearing / Council Approval of Facility Plan	February - March 2017
Submit Facility Plan to MPCA	March 3, 2017 (no later)
Design Period	April 2017 - August 2017
Bid Project	August 2017
Construction Period	October 2017 - May 2019
Meet Final NPDES Limits	May 2020

QUESTIONS?/ COMMENTS!

