Oronoco Wastewater System Phosphorous Trading

August 13, 2019
City of Oronoco

Presentation: Joe Palen, PE

ORONOCO Minnesota

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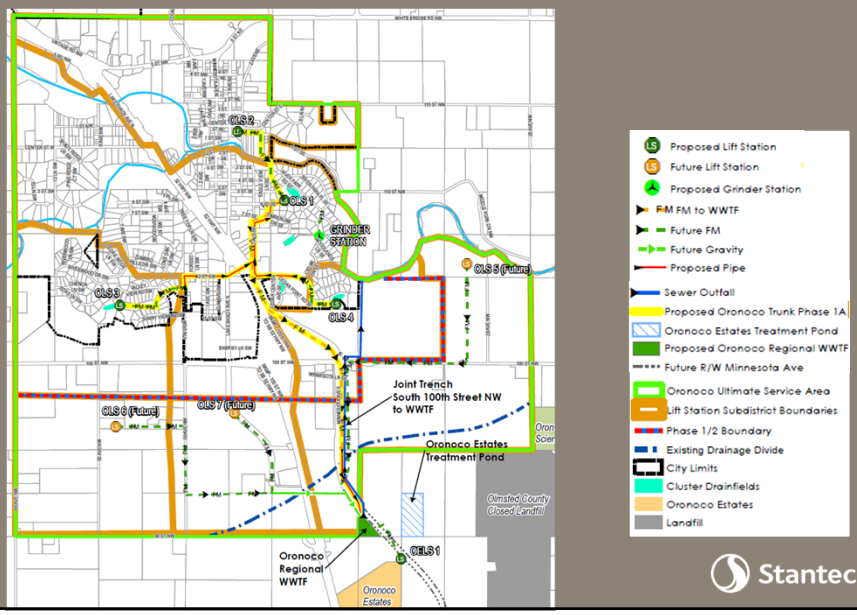
Trunk Sewer Layout & WWTF Location



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Proposed WWTF Outfall

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Background Information and Permit Requirements

- Proposed Oronoco Regional WWTF requires an NPDES Permit to discharge into the Middle Fork Zumbro River.
- MPCA has not provided Oronoco with a Wasteload Allocation for discharge into the river.
- Oronoco wasteload allocation is anticipated in 2021, but is dependent upon MPCA reassessment of Lake Zumbro SSS. If Lake Zumbro is not delisted as an Impaired Water a wasteload allocation would delayed until is developed TMDL and approved. This could be ~2024.
- Oronoco required to secure Total Phosphorous (TP) trading credits to receive an NPDES Discharge Permit to offset the TP amount to be discharged from the proposed WWTF due to the impairment designation for Lake Zumbro.

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Background Information and Permit Requirements

- Oronoco initially pursued (point to point) trading TP credits with Municipalities within Zumbro Watershed. Rochester, Pine Island, Byron and Kasson all declined to sell Oronoco TP credits for various reasons.
- Oronoco currently proposing (point to non-point TP Trading) to construct a Phosphorous Reduction Project to generate TP credits via Riverbank Stabilization

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Oronoco TP Credits Required from Riverbank Restoration Project in 2024

- **Table 1: Oronoco TP Credit Requirements from Non-Point Trade Project for the Year 2024**

Entity	Average Wet Weather Flow	Year	Facility Plan Table	TP Effluent Conc	TP Effluent Load	Offset SF	Total for NP Offset Required	Pounds Per Year
	(MGD)			mg/l	KG/Year	(2.6:1) Ratio	Kg/Year	lbs/Year
Oronoco w/o MHP	0.105	2024	3.4	0.4	58.04	2.6	**150.89**	**332.72**
Oronoco Estates Mobile Home Community	0.037	Estimated	3.3	0.4	20.45	2.6	**53.17**	**117.24**
Oronoco w/ OEMHC	0.142			0.4	78.49	2.6	**204.07**	**449.97**

Note: Assume NPDES Permit is issued in 2019 and Oronoco WWTF is Operational in Fall of 2022.

- Oronoco TP credit requirement from Non-Point Trade Project in 2043 is 1,555.61 lbs/year.

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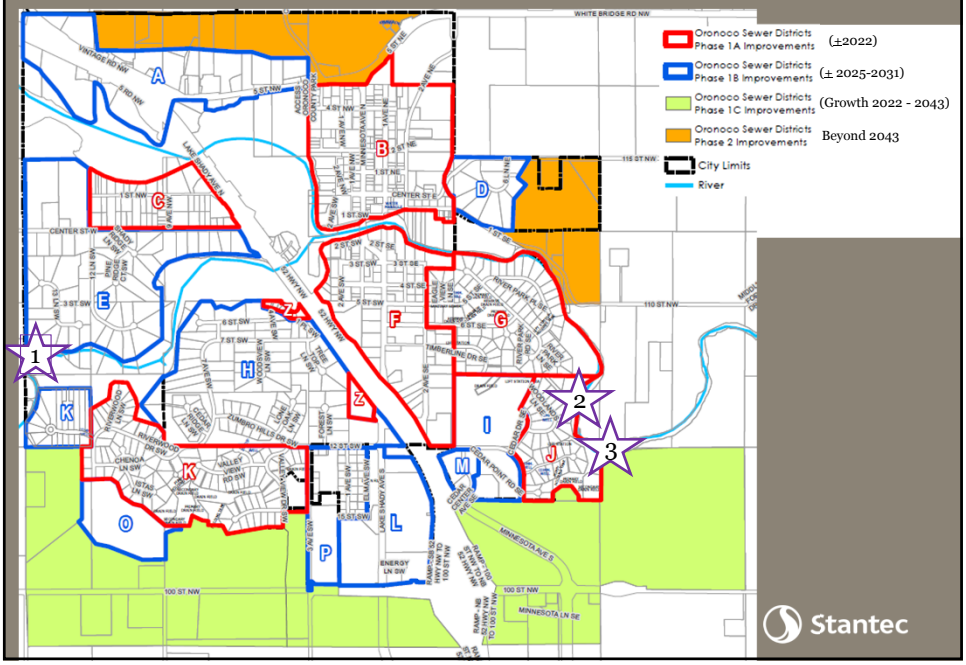
3 Candidate Riverbank Sites



Site 1 – North of River Bend Estates

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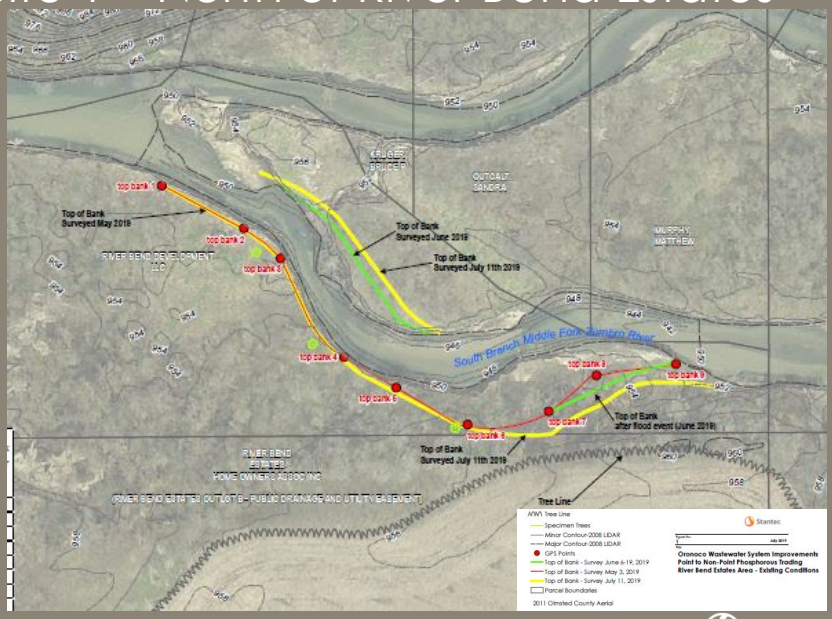

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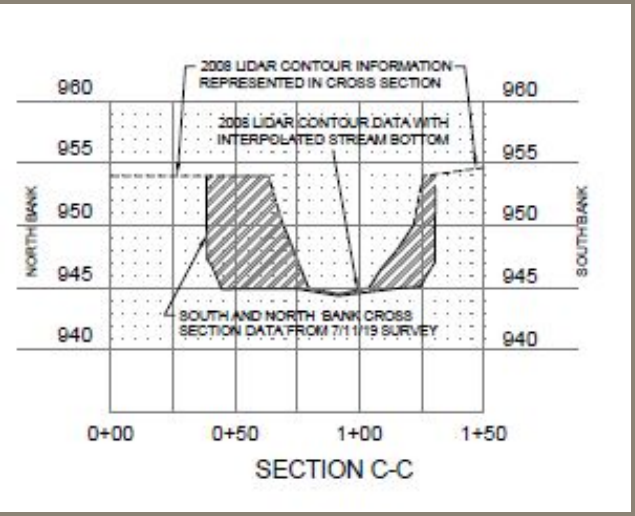
River Bend Estates – River cross-section



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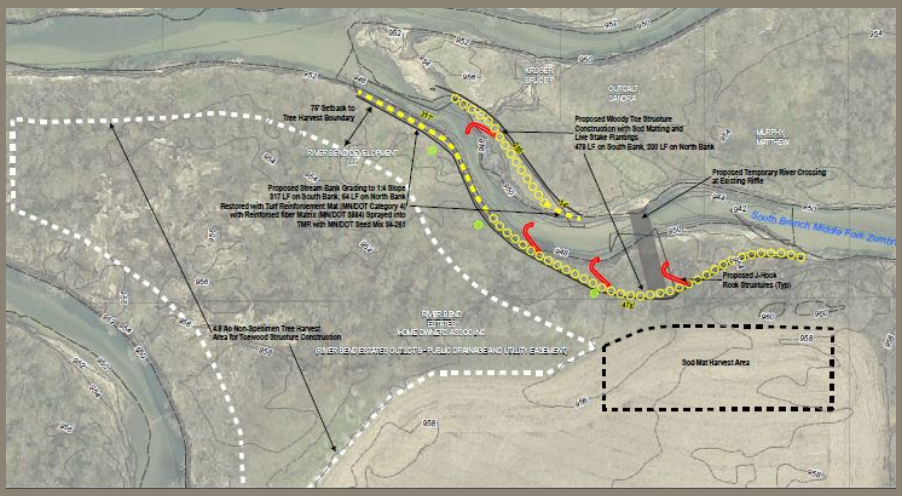
River Bend Estates - Stabilization



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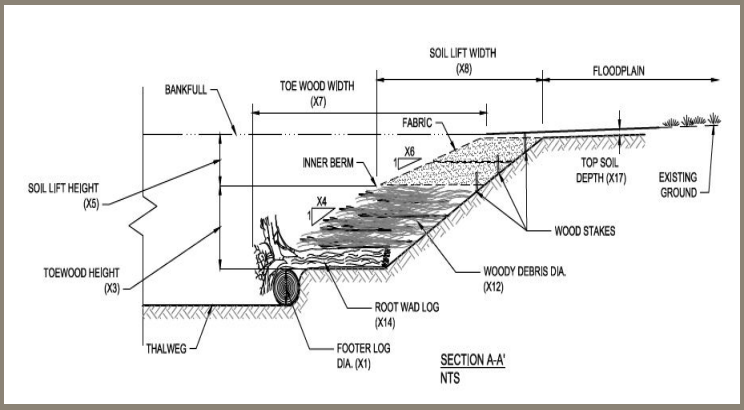
Woody Toe Structure Detail



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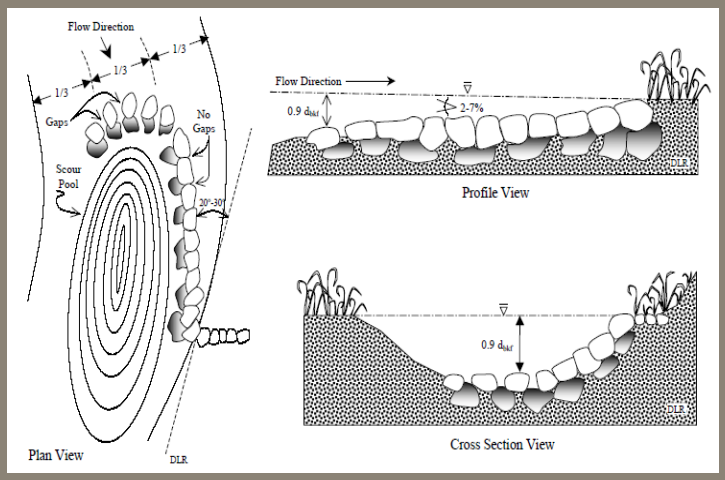
J-Hook Structure Detail



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Site 2 – Cedar Woodland Outlot B

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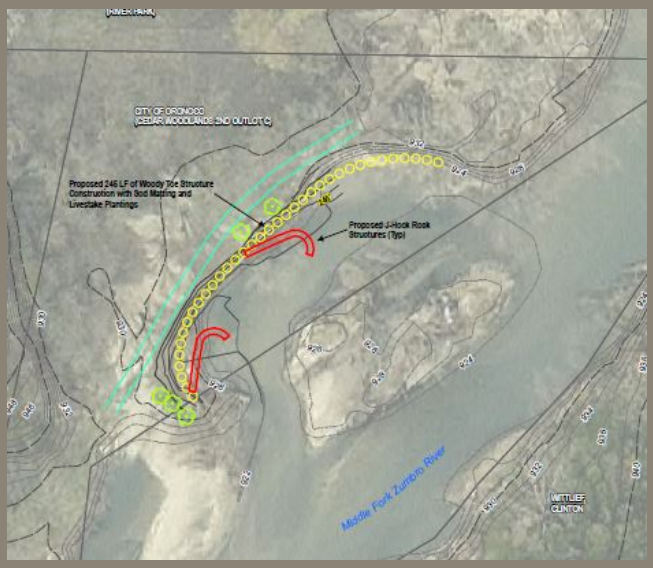

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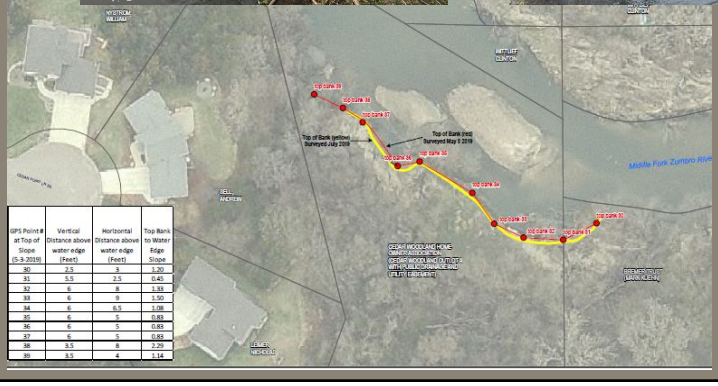
Site 3 – Cedar Woodland Outlot A



GPS Point # at Top of Slope (5-9-2019)	Vertical Distance above water edge (Feet)	Horizontal Distance above water edge (Feet)	Top Bank to Water Edge Slope
30	2.5	3	1.20
31	5.5	2.5	0.45
32	6	8	1.33
33	6	9	1.50
34	6	6.5	1.08
35	6	5	0.83
36	6	5	0.83
37	6	5	0.83
38	3.5	8	2.29
39	3.5	4	1.14

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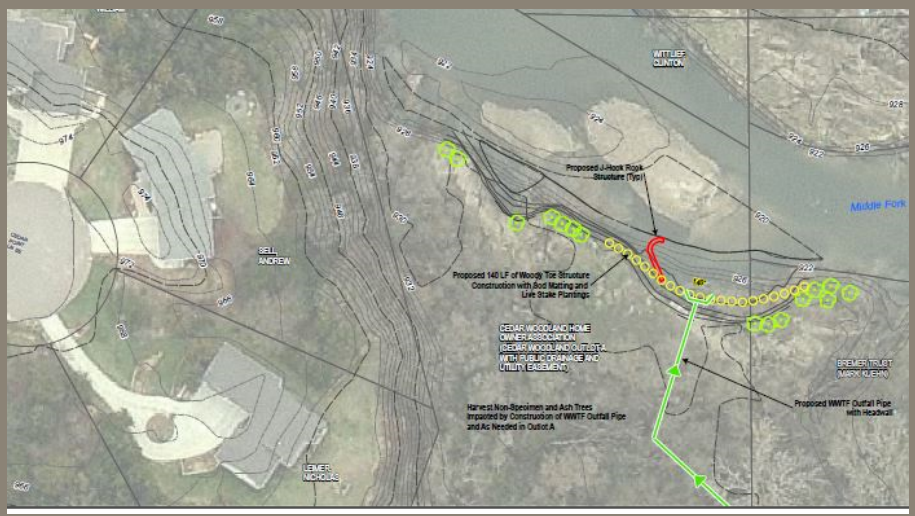
Site 3 – Cedar Woodland Outlot A



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Evaluation of TP Credit Production

Streambank Stabilization Areas	Difference in Volume from Civil 3D CAD comparison of DTM surfaces - Cut Volume - Cubic Yards	Volume in Cubic Feet (1 CY = 27 cu ft)	Conversion to Tons (0.0425 tons / cu ft per Note 2)	Lbs of TP in soil volume (Average from Soil Tests from each site used)	loading (lbs) over last 10.75 years (7/2019-11/2008)	Holding Capacity Correction Factor (assume 1.0)	Proposed for Construction by 2022
Cedar Woodlands Outlot A (Volume A - See Figure 3A)	274.00	7,398.00	314.42	419.12	38.99	38.99	
Cedar Woodlands Outlot A (1) (Volume B - See Figure 3A)	660.00	17,820.00	757.35	1,009.55	93.91	93.91	93.91
Cedar Woodlands 2nd Outlot B (3	484.00	13,068.00	555.39	607.60	56.52	56.52	
River Bend - South Bank	8,982.00	242,514.00	10,306.85	12,475.41	1,160.50	1,160.50	1,160.50
River Bend - North Bank	2,571.00	69,417.00	2,950.22	3,295.40	306.55	306.55	
Total	12,971.00	350,217.00	14,884.22	17,807.06	1,656.47	1,656.47	1,254.41
Total estimated annual TP loading reduction resulting from improvements in all four areas totals =					1,656.47	lbs / year	
Total estimated annual TP loading reduction resulting from improvements proposed for construction before 2022					1,254.41	lbs / year	
Notes:							
(1) Area will also house the proposed WWTF outfall pipe.							
(2) BWSR unit weight for Silty Loam materials is 85 LBS / CF or 0.0425 LBS / Ton.							
(3) Area adjacent to and can be accessed via River Park.							

- The total TP credits that would be developed from construction of the proposed riverbank stabilization improvements at the two proposed locations totals 1,254.41 lbs per year which is 278.8% more than would be required for the first NPDES permit cycle and is 80.6% of projected year 2043 TP discharge of 1,555.61 lbs.
- The total estimated project cost of the two proposed improvements riverbank stabilization improvements totals approximately $360,000

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Many Benefits of Improvements

- Reduced erosion and nutrient loading that is ultimately deposited into Lake Zumbro, which is currently being dredged to remove excessive sediment deposits and is an Impaired Water.
- The project will provide long term environmental benefits to control TP (and other nutrient loading), which is released by non-point source erosion and runoff as documented in the Total Maximum Daily Load Report by MPCA.
- Enhanced wildlife habitat and water quality through structural and vegetative riverbank stabilization.
- Protect public and private property (note $150,000 in damage to Lake Shady Avenue bridge from July storm events)

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Next Steps in TP Trading Credit Development

- Submit revised TP Trading Technical Memo to MPCA for review and approval.
- Develop and execute an agreement with the property owners of the land impacted by the proposed improvements as needed. Agreement would address:
  - Site access for construction of riverbank stabilization and harvesting of sod mat and trees for woody toe structure construction.
  - Restoration of turf, reseed and establishment of native grass in flood plan, replanting of some of the harvested trees.
  - Temporary easement (10-20 years) for riverbank maintenance by City of Oronoco or City could acquire the property in fee title.
  - Easement acquisition may not be required on all parcels as City holds blanket drainage and utility easements over most existing outlots.
  - City funds all construction and maintenance of riverbank restoration, but is the sole owner of the TP credits.
  - Time is of the essence to develop and execute these agreements!
- MPCA will develop formal TP Credit Trading Agreement with Oronoco. City can opt out of Agreement (not construct the riverbank stabilization) if MPCA provides a wasteload allocation.

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Questions?

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