

# Alternative to Cooke City Sewer Board Proposed Solution

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Alternative = Treatment Plant Tank System (TPT)

November 1, 2022

# Treatment Plant Tank System Alternative: Topics in this Presentation

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- What is a Treatment Plant Tank System (TPT)?
- Benefits of a Treatment Plant Tank System over the C3-T6 conventional gravity system that requires a 3+ mile pipeline to community drain field
- Show a Treatment Plant Tank System and its components -- that meets the needs, fulfills necessary requirements, can be permitted, cheaper, and that solves the current problem + avoids future problems
- Cost comparisons of the TPT System Alternative to the C3-T6 conventional system using estimates from a TPT System already in service
- Where to learn more from one of the resources we found

# This is Part of the Treatment Plant Tank System (a self-contained treatment tank underground)

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(Digestion / Settling Tank)



(Treatment Plant Tank)

# TPT System -Alternative Solution Benefits

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- Lower initial cost by 50% or more
- Lower Operations + Maintenance costs – requires approximately 3 hours a week for sample testing. Failures will be repaired by system manufacturer
- Doesn't require a pipeline pumping effluent 3+ miles to conventional drain field
- Much cleaner solution for environment and meets and / or exceeds DEQ requirements for wastewater discharge; DEQ can permit this
- Discharge can be used for plant irrigation or put into drain field – which is a 10X+ cleaner solution than current proposed system
- If Septic Tank Effluent Pump (STEP) Solution is used it can replace every septic system in Cooke City with a STEP tank system within current estimated hookup cost for current system.

# TPT System Alternative Solution Benefits (con't)

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- TPT System would require only 2- or 3-inch PVC pipe for the entire system
- TPT System cost estimates shown below include pump capacity to pump wastewater 1.5 miles or uphill to drain field next to water tank at no extra cost.
- TPT System price shown below includes all settling / digestion tanks, treatment plant, controls, & training of operator.
- Additional cost savings could be achieved if Septic Tank Effluent Pump (STEP) systems were used instead of the currently proposed C3 gravity system. The smaller STEP pipes result in lower pipe cost and smaller trenching to complete the system.
- Additionally, all road crossings would be bored and not dug up for pipe installation. Overall, less disruptive to install during the short construction season.
- Rationale used to eliminate the STEP system in the Apr-2022 PER appears biased and fails to objectively consider or present all the facts on the same level playing field for each alternative considered.



# TPT System Alternative Solution = Treatment Plant Tank

- Treatment Plant Tank Sized for 50,000 GPD
- Updated Apr-2022 PER used Max GPD of 50,000
- Average GPD of 33,000 significantly less
- Obtained price quote of \$770,000 for above ground system (shown). The above ground system is more expensive because of the insulation required for our cold weather.
- In ground systems are about 10% less so about \$700,000
- Additional \$700,000 added for installation (\$300,000 higher than manufacturer's estimate to be conservative in estimating cost)
- System cost includes settling / digestion tank sized for 50,000+ GPD
- Estimated costs presented below



# Alternative Solution: Treatment Plant Tank System

(TPT System here shown above ground,  
actual size)

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# Treatment Plant Tank System Alternative Solution – TPT In Ground (buried)

- Shown: installation of two Treatment Plant Tanks in ground
- Cooke City system would require only 1 Treatment Plant (only 1 TPT)
- In ground/buried Treatment Plant Tank System (TPT) is cheaper than above ground because insulation required for above ground units in cold climates
- Any added cost to bury treatment plant tank and site prep probably offsets advantage in cost but significantly better for cold weather environments.





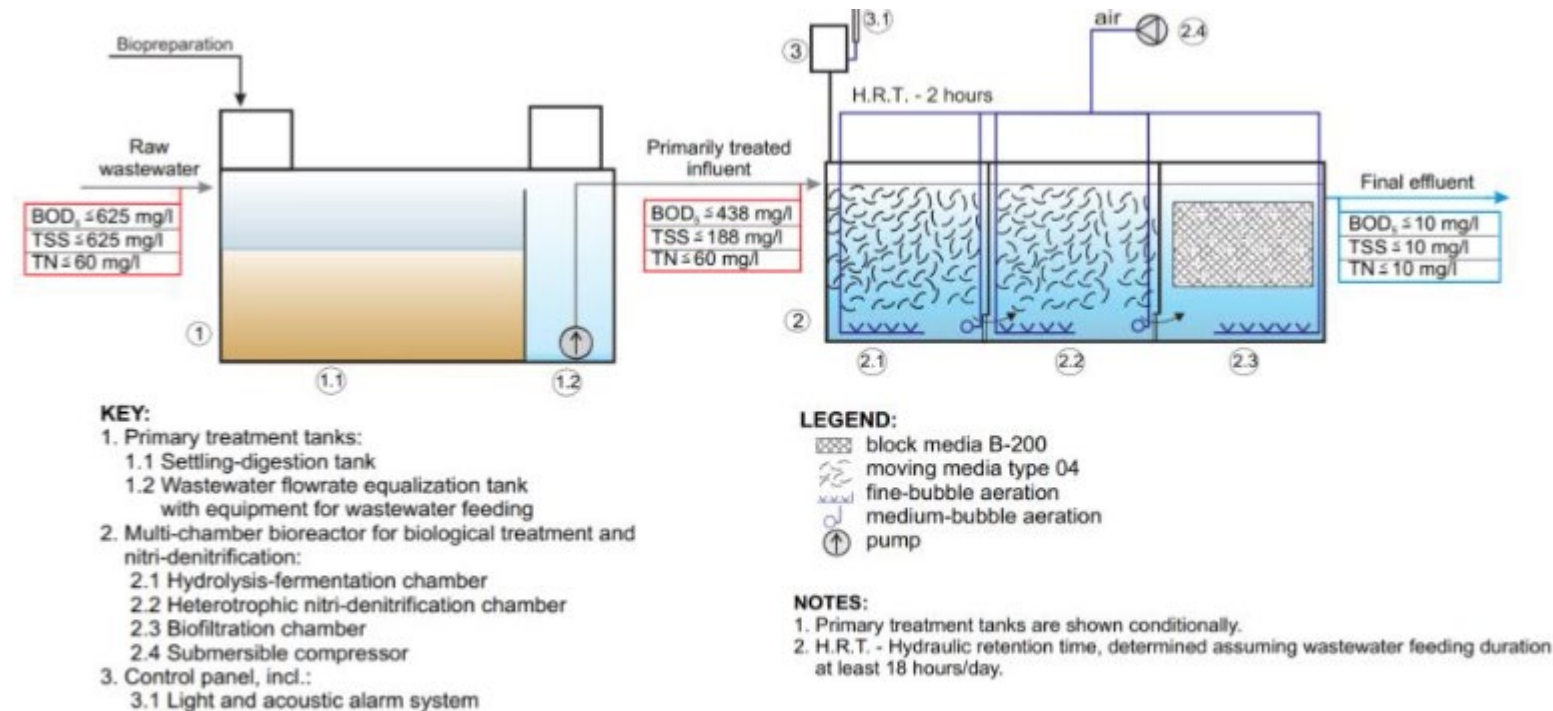
# TPT System Alternative Solution – Tank Installed In Ground

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- Picture of finished installation -- Treatment Plant Tank System in the ground
- Landscaping and other site features can visually hide it so not offensive and would not detract from views



# Diagram Showing TPT System Alternative With High Strength Wastewater Treatment Results

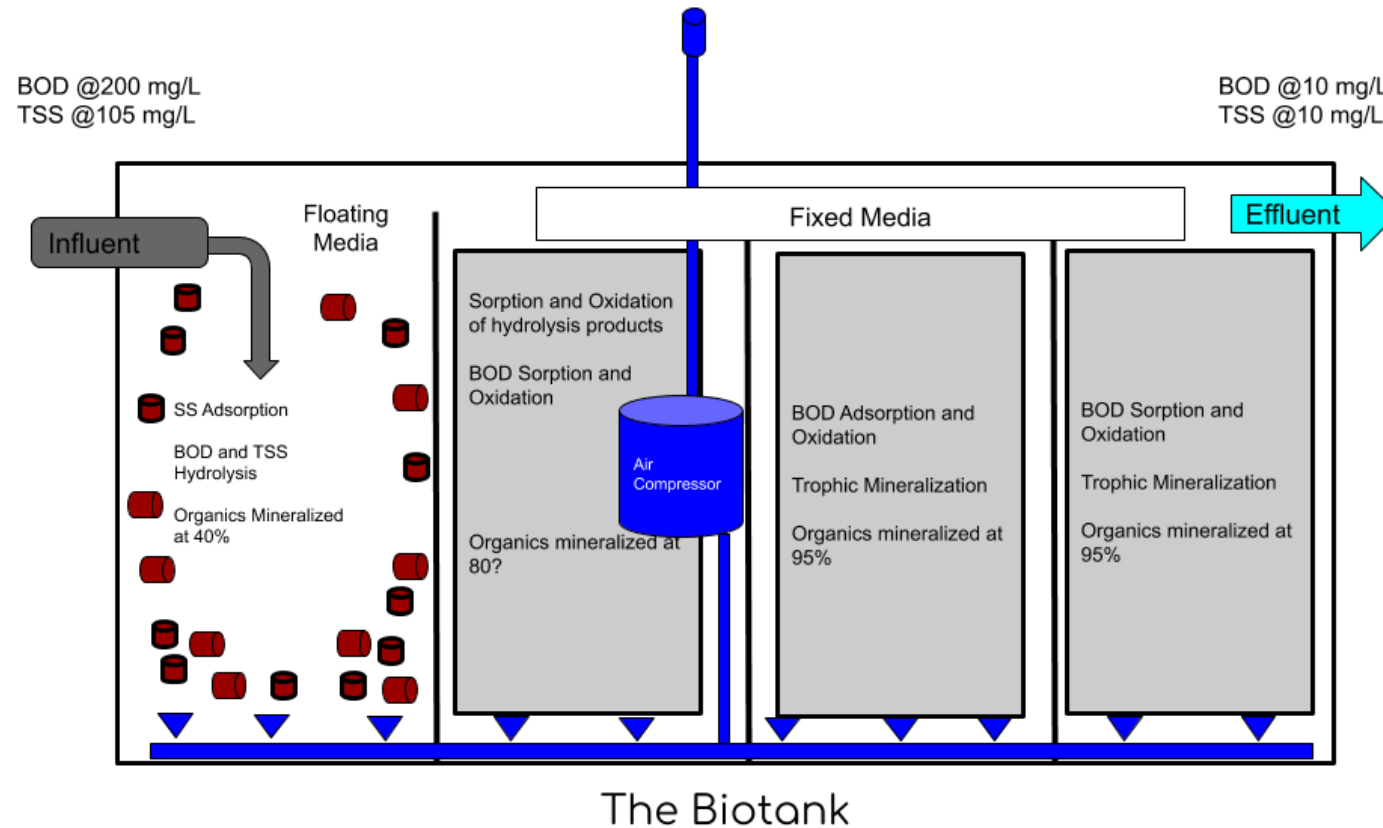


System shown is of a treatment plant tank (TPT) using the STEP system septic tanks at home and businesses

Using the STEP system would reduce Treatment Plant (TPT) cost with fewer tanks required than the proposed conventional gravity system

*Diagram for a commercial or mixed-use system treating very contaminated influent to a high standard.*

# Treatment Plant Tank System Alternative: How a TPT Works



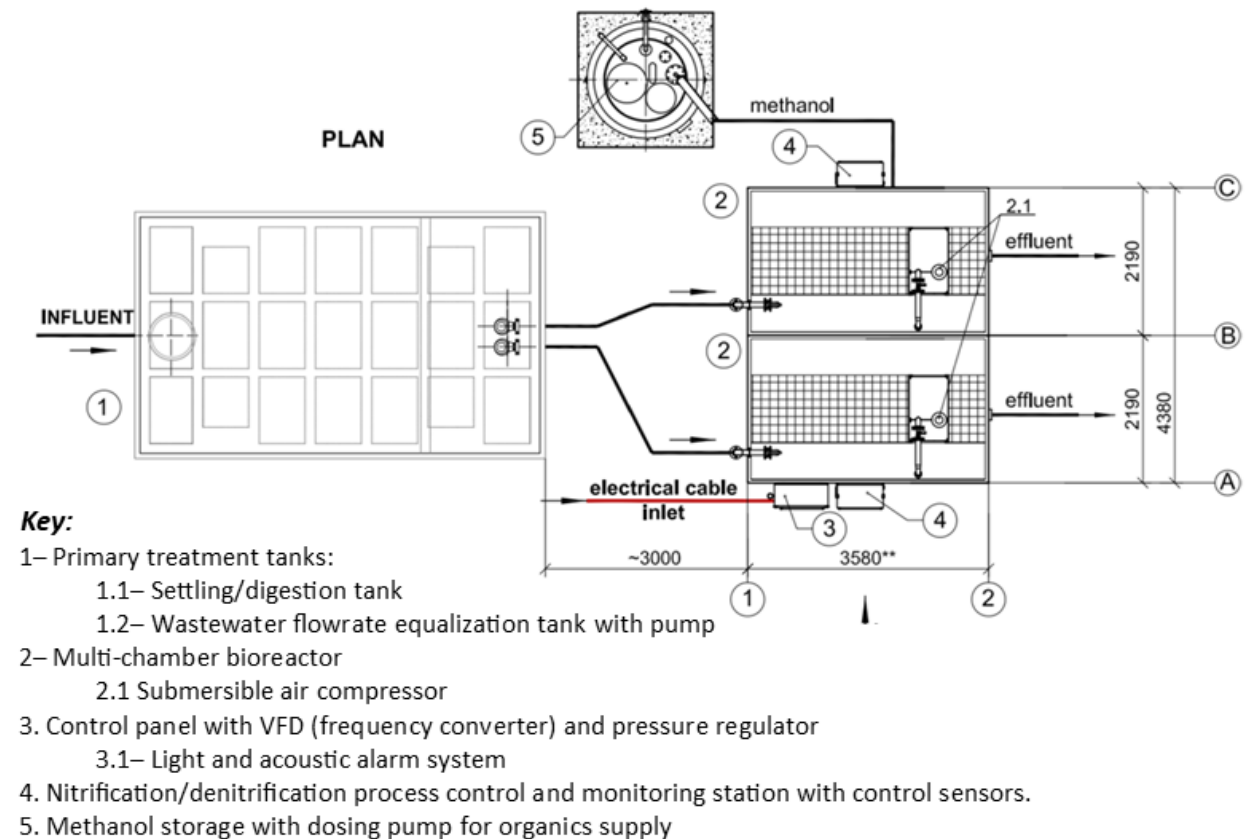
This exceeds DEQ  
requirements by 10X+

Is much better for the  
environment and will  
exceed any requirements by  
YNP



# Diagram of TPT System Alternative without a Drip / Drain Field

- Diagram shows 2 treatment plants
- Cooke City only requires 1 treatment plant (1 TPT)
- But Cooke City growth and increased YNP visitation can be accommodated by adding another treatment tank

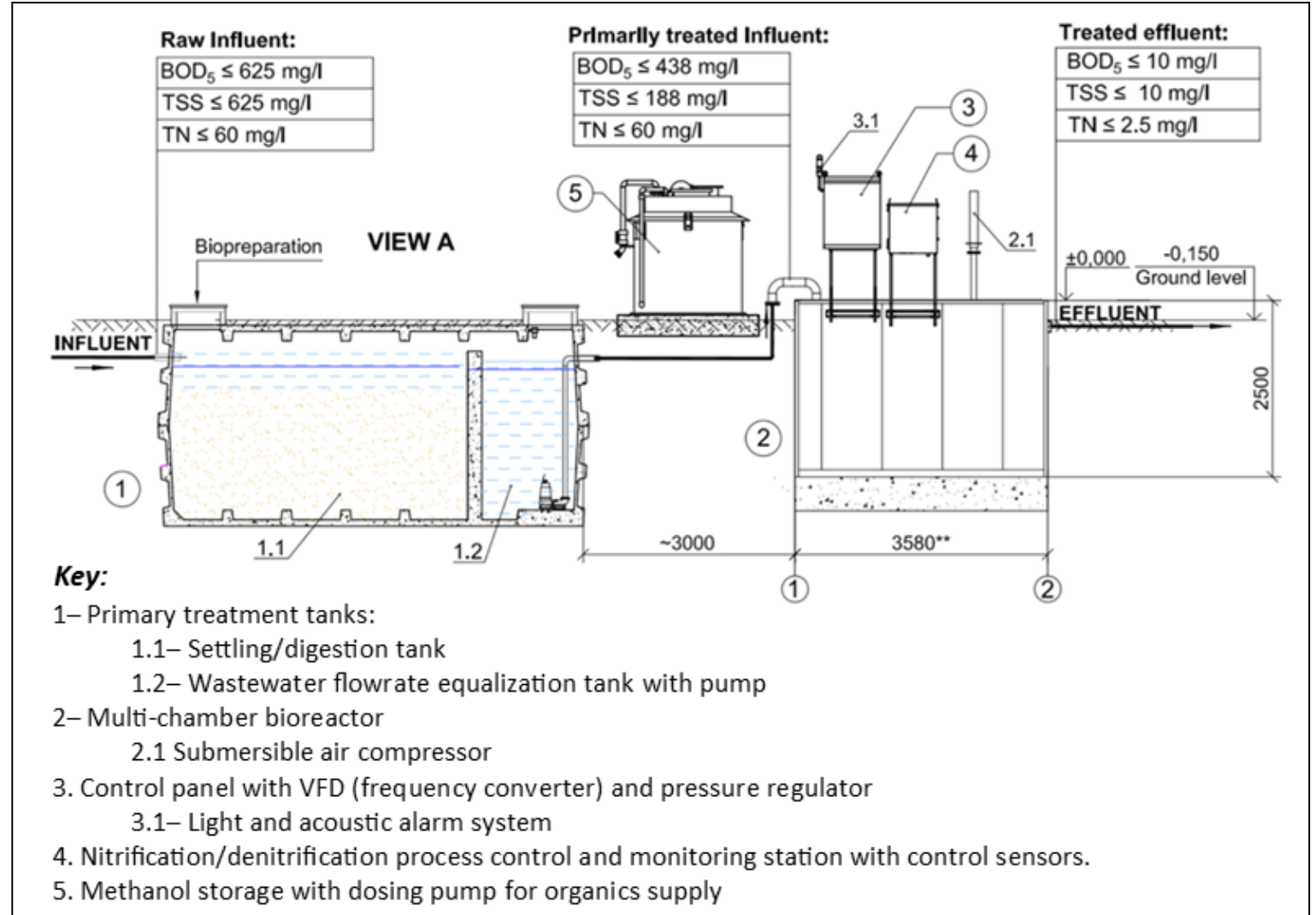


# Side View:

## Diagram of Treatment Plant Tank System

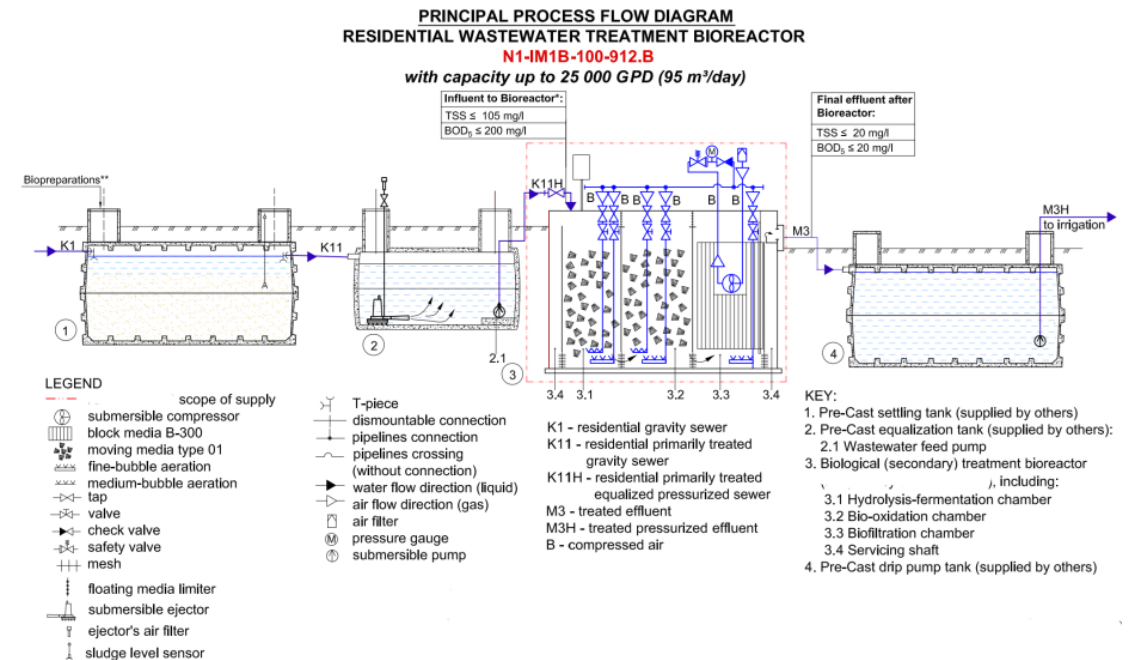
System shown is with a STEP pressure system

STEP System would require only one settling tank for lower cost



# TPT System Alternative Diagram: a Gravity Flow System (C3, the current plan) to a Treatment Plant instead (not the T6 conventional drain field)

- Because Board chose a gravity system instead of the Low Pressure STEP system, estimated price of the diagram (a gravity flow to a treatment plant tank) is included below for comparison
- The only difference in system is the addition of an additional Precast Settling Tank
- This would allow all the estimates currently used by the Sewer Board for hooking up current users to remain the same.
- Because of treatment rate of the plant, settling tank can be much smaller than required to pump though a 4-inch pipe to a drain field 3+ miles away.
- Less Cost for Sewer District
- Lower Fees and Lower Taxes



All shown components are included in system price



# TPT System Alternative: Settling / Digestion Precast Tank Installation

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- All tank prices are included in Treatment Plant Tank System price
- Precast and not concrete
- Lower cost of tank
- Less cost for site prep
- Lower cost to Sewer District
- Lower Fees and Lower Taxes



# TPT System Alternative- STEP System Septic Tank

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- Could replace all current septic tanks
- Pressure system allows small (2 or 3 inch) PVC Schedule 40 pipes to be used to move effluent to treatment plant tank
- Pressure system allows pipes to be buried in same depth trench but much narrower trench
- Cost \$3400 per system
- Replacement cost for all known 161 septic systems in Cooke City estimated \$547,400. Does not include installation at site. Would go into same hole the old tank came out of so cost would be minimal
- Uses existing pipes from business / home to septic system
- Every existing user would have a new septic system installed



# TPT System Alternative: STEP System Pump

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- This pump goes into previously pictured Septic Tank on individual property
- STEP systems stands for Septic Tank Effluent Pump
- Price is included in Complete STEP system cost of \$3400 per system per unit
- Would need 161 units for a cost of \$547,400 for every system in Cooke City to have a new septic system.





# Stated Cost of C3-T6 System Proposed in Updated Apr-2022 PER

(Page 8 and 9 of Updated April-2022 PER)

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- The recommended preferred alternatives are Alternative C3 – Conventional Gravity Sewer Collection and Alternative T6 – Community Drain Field & Localized On-lot Pretreatment: total estimated cost is \$8,147,183
- \$8.14 million estimate is as of April, 2022. Some costs probably not fully represented or unknown at this time. Final costs likely higher.
- Phase 1 – Currently Underway - \$400,000 Budget – to be completed by December 2023
- Phase 2 – Schedule Depends on Funding - \$3,813,996 Budget - to be completed by July 2025
- Phase 3 – Schedule Depends on Funding - \$3,933,186 Budget - to be completed by September 2026

# C3-T6 Cost as Shown in Updated Apr-2022 PER

*Table 7 – Alternative T6 Cost Estimate*

Item	Quantity	Units	Unit Cost	Total
Select On-Lot Septic Tank Replacement	31	EA	\$1,500.00	\$46,500
Select Commercial Lot Pretreatment	11	EA	\$5,000.00	\$55,000
Pump Station	1	LS	\$400,000.00	\$400,000
4" Dia HDPE Forcemain	17,000	LF	\$30.00	\$510,000
Forcemain 2-Way Cleanout & Air Release	9	EA	\$15,000.00	\$135,000
Dosing Tanks W/ Pump	26,000	GAL	\$2.90	\$75,400
Community Drainfield	93,750	SF	\$17.00	\$1,593,750
Power Installation	1	LS	\$240,000.00	\$240,000
USDA Forest Service Land	30	AC	\$10,938.00	\$328,140
<b>Alternate T6 Construction Cost (2022)</b>				<b>\$3,383,790</b>
Increase in Yearly O&M	Quantity	Units	Unit Cost	Total
Pump Station	20141	kWh	\$0.12	\$2,417
Dosing Pump Station	665	kWh	\$0.12	\$80
Drainfield Maintenance	1	LS	\$2,500.00	\$2,500
Short Lived Asset Reserves	1	LS	\$4,133.00	\$4,133
Operator, Repairs, & Maintenance	1	LS	\$28,000.00	\$28,000
O&M Subtotal				\$37,130
Present Worth for 40 Years @ 2.0%				\$1,015,683

Yes, possible cost reduction with Treatment Plant Tank System (TPT) Alternative Solution

TPT System Alternative - Worksheet shown on next slide

Must point out this construction cost number is not the same as shown on Page 8 & 9

Planned septic pumping by Sewer District is not priced in either solution and estimated at about \$25,000 per year for all 161 estimated systems on a 4 year pump cycle

Estimated Cost Worksheet for Alternative Sewer System											
Componet	Cost		Remarks								
Treatment plant	\$	770,000.00	Above ground Insulated palnt								
Settling Tank	Included in Plant cost		Sized to handle 50,000 GPD								
Installaron	\$	700,000.00									
Drain Field	\$	1,593,750.00	Used Estimate by PER but anticipate significant savings Does not include land Purchase						\$	4,333,030.00	Cost of Treatment facility using all the other current assumptions for hookiing up and buying only the land needed for the drain field.
Land Purchase 5.0 acres vice 32 acres	\$	54,690.00	Land Purchase for 32 acres = \$350,016 using PER cost						\$	372,000.00	If Site D is used instead of Site F cost savings in pipe alone
STEP system for all current users		\$547,400	Cost does not include removing old system. Can use the existing site / hole to place new septic tank with pump						\$	3,961,030.00	Total cost just using site D instead of site F
									\$	140,000.00	Cost savings from running Power to site D instead of Site F
Using the gravity system as Priced by Triple Tree	\$	1,214,590.00							\$	3,821,030.00	
									\$	3,383,790.00	TT Construction estimate page 48 of PER
									\$	1,214,590.00	TT hookup estimate
									\$	8,147,183.00	Recommend appraoch cost as presented by TT
									\$	3,821,030.00	Alternate Solution cost
									\$	4,326,153.00	\$ Cost Savings using Alternate Solution
									53%	% Savings to Total cost on Page 8 of PER	

# Savings Worksheet For TPT System Alternative

## TPT System: Actual Annual Operations & Maintenance Costs based on a Similar Sized TPT System already in operation

- Estimated Operation & Maintenance (O&M) cost shown in Apr-2022 PER does not show this level of detail
- If the cost of mowing of Drip/Drain field is removed, TPT alternative is 28% cheaper to operate than C3-T6 system in Apr-2022 PER
- This is actual cost example of the TPT alternative we are proposing (i.e., this is not an estimate for an undesigned system not actually in operation)

	Units/Year	Unit Cost	Annual Cost
<b>Operating Expenses</b>			
Operating Labor <sup>2</sup>	12	660.00	7920.00
Electricity <sup>3</sup>	12	246.00	2952.00
Supplies & Chemicals	2	125.00	250.00
Analytical Testing	12	102.00	1224.00
Other: Mowing drip field	8	500.00	4000.00
<b>Maintenance Expenses</b>			
Maintenance labor	Included with operating Labor		
Parts & Supplies			500.00
Other: SLUDGE REMOVAL	1	1000.00	1000.00
<b>Administrative Expenses</b>			
Administration Labor	12	500.00	6000.00
Interest Expenses	0		
Property Taxes	0		
Permit Fees	1		750.00
<b>Other Miscellaneous Expenses</b>			
Management Fee	1	500.00	6000.00
<b>TOTAL</b>			30,596.00



- None of these sites were selected
- Best is Site A – lowest cost, flattest terrain as stated in Apr-2022 PER. Less Permitting and all roads and access are in place. Apr -2022 PER says soil is not ideal for typical T6 drain field.
- But with the TPT System solution, Site A would be acceptable for a drain field since it is 10X cleaner coming out of the tanks *before* going into the ground
- Next best: Site C for reasons stated in Apr-2022 PER.
- Acceptable Site: Site D – it's ¼ of the distance from Cooke City than Selected Site E at 3.2 miles away
- Both C and D Sites much closer to Cooke City; easier to monitor and maintain
- We compared the TPT System Alternative to the C3-T6 system in our estimates using Site D
- Even more savings could be recognized if Site A or Site C were selected for many reasons

## The Drain Field Areas Considered in Apr-2022 PER near Cooke City

Figure 3 – USFS Available Lands in the Cooke City Area



# Conclusions

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- Using a Sewer Treatment Plant Tank System (TPT) is > 50% cheaper than C3-T6 Proposed System
- Treatment Plant Tank System exceeds DEQ wastewater quality standards
- Treatment Plant Tank System solution allows unlimited growth potential by just adding another Plant in parallel (just add another tank)
- Selecting Site D (Campground) of the potential sites saves significant \$\$\$ (system and for people)
- Rationale for NOT selecting Site D in Apr-2022 PER is not supported by the facts stated.
- TPT System Alternative offers even more possible savings in construction and operating costs
- TPT System Alternative demonstrated 28% lower O&M costs than C3-T6 proposed system
- TPT System Alternative saves approx \$4.3M over Proposed C3-T6 proposed system
- TPT System Alternative results in significantly lower sewer fees and lower tax assessments, freeing up more money for people to invest in their properties and local businesses

# Recommendation: pause and then select a TPT System

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- Install Packaged Wastewater Treatment Plant Tank System in the ground, with STEP
- Utilize Site D (Campground) or Site A
- Save significant cost in just pipe alone
- Save on power installation – powerline already on the property
- Exceeds all state requirements by 10X or more
- Expandable for near unlimited growth by just adding another treatment plant
- Better for the environment
- Reduced Installation and Maintenance cost resulting in lower fees and tax assessments

One of the sources we found,  
but there are others:

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- Schedule conflicts prevented AquaTech Systems representative from a site visit to Cooke City and attending the November Board meeting

- Brochure:

<https://communitysewer.com/wp-content/uploads/2022/01/BioTank-Brochure.pdf>

- Articles:

<https://communitysewer.com/wp-content/uploads/2021/11/EcoWorld-002.pdf>

<https://communitysewer.com/wp-content/uploads/2020/12/Cave-springs.pdf>



# More info from AquaTech Systems

<https://communitysewer.com/>



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- <https://communitysewer.com/>
  - <https://communitysewer.com/wastewater-for-rural-communities/>
  - <https://communitysewer.com/wastewater-treatment-package-plants/>
  - <https://communitysewer.com/commercial/>
  - <https://communitysewer.com/wastewater-treatment-residential-development/>
  - <https://communitysewer.com/septic-alternatives-for-developers-and-small-towns/>
  - <https://communitysewer.com/2020/12/16/a-step-in-the-right-direction/>