

Potential Financial Impact of EIA for Town of Barnstable

Enhanced Innovative/Alternative (EIA) Septic Systems/Onsite Wastewater Treatment Systems (OWTS)
 Model to remove interest and inflation from CWMP sewerage cost. Assume all figures are 2023.

KG Removal Calculations - Draft 1/15/24 - Half of Homes Using EIA with Parcel Avg. Cost @ \$100k

Assume CWMP total cost exclusively using sewerage is \$1.2b for 12,000 homes in 3 phases over 30 years (= \$100k/home)
 Do first half of homes with sewerage and second half with EIA. 2023 dollars.
 Adjust EIA homes count to match centralized performance
 Due to RME, EIA OM&M costs should be roughly equivalent to centralized O&M from CWMP.
 $kg/yr = mg/liter * 3.785 liter/gal * gals/day * 365 / 1000000 * homes$

At 26.25 mg/l Title 5 effluent N

MADEP modeling standard
 Per Cambareri, MEP used 227 GPD for Three Bays. Adjusted for irrigation @ 10%, adjusted volume is 204 Gals/day
 Per MASSTC, to adjust 26.25 mg/l Title 5 output to house effluent at 30-35% reduction = 40 mg/l influent to sewer or EIA

Centralized

	mg/liter	gals/day	homes	kg/yr
influent	40	204	6000	67,739
effluent	3	204	6000	5,080
kg removed				62,659 Centralized

Per Cambareri, centralized may process more influent, but it is still getting rid of this amount, not more.
 Impact is only the extra capital and O&M for handling the higher flow, not include here.

EIAs

influent	40	204	7400	83,545
effluent	10	204	7400	20,886
				62,659 To match centralized
influent	40	204	6810	76,884
effluent	7.4	204	6810	14,223
				62,660 To match centralized
influent	40	204	6343	71,611
effluent	5	204	6343	8,951
				62,660 To match centralized
influent	40	204	6000	67,739
effluent	3	204	6000	5,080
				62,659 To match centralized

Savings (\$m)

Assume cost for 6000 sewerage homes = \$600m (6k*\$100k=\$600m) 600

	Effluent level	EIAs	EIA cost	Total System Cost	Savings
At \$50k/EIA	10	7400	370.0	970.0	230.0 New EIA standard
	7.4	6810	340.5	940.5	259.5 5 year NitROE avg in MV
	5	6343	317.2	917.2	282.9
	3	6000	300.0	900.0	300.0 Nitrex 2001 performance

At 65 mg/l household effluent N

Observed average Shubael Pond value and Long Island, NY standard for modeling effluent N

Centralized

	mg/liter	gals/day	homes	kg/yr
influent	65	204	6000	110,076
effluent	3	204	6000	5,080
kg removed				104,995 Centralized

EIAs

influent	65	204	6764	124,092
effluent	10	204	6764	19,091
				105,001 To match centralized
influent	65	204	6459	118,497
effluent	7.4	204	6459	13,490
				105,006 To match centralized
influent	65	204	6200	113,745
effluent	5	204	6200	8,750
				104,995 To match centralized
influent	65	204	6000	110,076
effluent	3	204	6000	5,080
				104,995 To match centralized

Savings (\$m)

Assume cost for 6000 sewerred homes = \$600m (6000*100k=\$600m) 600

	Effluent level	EIAs	EIA cost	Total System Cost	Savings
At \$50k/EIA	10	6764	338.2	938.2	261.8 New EIA standard
	7.4	6459	323.0	923.0	277.1 5 year NitROE avg in MV
	5	6200	310.0	910.0	290.0
	3	6000	300.0	900.0	300.0 Nitrex 2001 performance

Conclusion: 50% EIA could save \$230m-\$280m, possibly more.