OLVER ASSOCIATES INC.

ENVIRONMENTAL

ENGINEERS

290 MAIN STREET

WINTERPORT, MAINE

PROJECT PLANNING MEETING

OVERVIEW OF WISCASSET'S WASTEWATER INFRASTRUCTURE CHALLENGES

DECEMBER 5, 2022

OVERVIEW OF WISCASSET'S WASTEWATER INFRASTRUCTURE SYSTEMS

- Contains 15 miles of sewer pipe
- Includes 18 wastewater pump stations
- Ties into activated sludge secondary wastewater treatment plant
- Treatment plant was first built in 1964 (58 years ago)
- Plant was upgraded in 1982 with new aeration and sludge storage (40 years ago)
- Plant was upgraded again in 1992 with new Operations Building, final clarifiers, disinfection contact tank, and sludge dewatering press (30 years ago)
- Present system serves about 810 connected customers
- Represents about 2800 population equivalent (about 75% of Town)

WASTEWATER INFRASTRUCTURE SYSTEM ISSUES OF CONCERN

- Sewer system is subject to high peak hourly flows during wet weather events
- Sewer system projects may be needed to reduce peak flows
- Age of pump stations varies from 20 to 58 years
- Some pump stations are in poor condition and undersized with obsolete equipment
- Some pump stations may need upgrade or replacement
- Age of treatment plant equipment varies from 30 to 58 years
- Some treatment equipment is in poor condition, inoperable or obsolete
- Treatment plant equipment is at age where upgrade may be needed
- Typical useful life of pumping and treatment plant equipment is 20 years
- Climate change concerns of rising sea levels and storm surges at plant and PS locations
- Long term resiliency measures versus relocation of treatment plant

TOWN COMMISSIONED FOUR WASTEWATER INFRASTRUCTURE STUDIES

- 1. Sewer System Excess Flow Evaluation
- 2. Wastewater Pumping Stations Evaluation
- 3. Wastewater Treatment Plant Process Evaluation
- 4. Wastewater Infrastructure Climate Adaptation Plan

Purpose of today's meeting is to discuss:

- Conclusions of each study
- Best path forward to implement study recommendations
- Estimated costs of recommended infrastructure improvements
- Impact of climate change resiliency on various options
- Potential funding sources to assist Town in making improvements
- Priorities and phasing of improvements

OBSERVED PLANT FLOWS AS COMPARED TO STATED CAPACITY

PARAMETER	STATED DESIGN FLOW	OBSERVED 1	MODIFIED* FLOW
Average daily flow Maximum monthly flow Maximum daily flow	0.62 MGD 0.62 MGD 0.62 MGD	0.21 MGD 0.36 MGD 1.09 MGD	0.30 MGD 0.51 MGD
Peak hourly flow (dry weather) Observed wet weather peaks	2.18 MGD 2.18 MGD	0.43 MGD 0.44 MGD/inch of rainfall	0.61 MGD

^{*}NOTE: Flow meter's primary device was a 6' long rectangular weir which had limited accuracy at low flows, but reasonable accuracy at high flows. The weir was replaced by a V-notch during the study. Historical low flow data was calibrated to correlate with predicted readings from the new V-notch.

AREAS OF MEASURED SEWER SYSTEM INFLOW

MEASURED INFLOW

LOCATION	(GPD/inch of rain)	TARGET AREA (ft)
Federal Street	110,000	3,800
Water/Fore Streets	110,000	2,400
Danforth Street	63,000	1,100
Lee Street	38,000	1,500
Ward Brook Area near PS 3	37,000	3,400
Union/Warren Streets	30,000	800
Bath Road/US 1 near PS 2	30,000	3,000
Bath Road/US 1 near PS 1	20,000	2,100
Birch Point Road/PS 7/PS 8	16,000	6,500
Hodge Street	15,000	950
Gardner Road/PS 4	8,000	4,800
Main Street Downtown (2 lines)	7,000	2,000
Churchill Street	6,000	1,350
Beechnut Hill Road	3,000	2,000
Summer Street (near Lee)	3,000	500
Old Bath Road (near Route One)	2,000	2,800
TOTAL	0.50 MGD/inch of rain*	
47 G 1 C	5.5 5 1.1.5 15/11/OII OI Talli	39,000 LF

^{*}Inflow data for two measured events are reasonably close to historical average of 0.44/inch

GENERAL CONCLUSIONS OF SEWER STUDY

- Majority of Wiscasset sewer system is relatively new in terms of expected 100 year useful life of sewers
- Sewer system has had ongoing excess flow issues since its initial implementation
- Some manholes required rehabilitation when only 25 years old
- Previous sections of sewer lines have been relined
- Private excess flow sources are present but difficult to remove
- Significant defects are still present in public sections of sewer and allow excess flow entry
- Leaking manhole brick risers and joints are major source of excess flows
- Some targeted areas of sewer system contribute excess flows and may need rehabilitation

PROPOSED PRIORITIES FOR SEWER REMEDIATION PROJECT

PRIORITY	PROJECT
1	Conduct television inspection of high flow areas
2	Address deficiencies in waterfront interceptor sewers to treatment plant site
3	Address Downtown Area sewer problems
4	Address Bath Road/Route One/Ward Brook Road sewer problem areas
5	Address Birch Point Road sewer problem areas
6	Address Gardner Road sewer problem areas
7	Address remaining miscellaneous sewer problem areas

PLANNING LEVEL COST ESTIMATES FOR SEWER REMEDIATION WORK

PRIORITY	DESCRIPTION		ESTIMATE
1	Sewer television inspection	\$	160,000
2	Interceptor sewer remediation	\$	805,000
3	Downtown area manhole rehabilitation	\$	765,000
4	Bath Road/Ward Brook manhole remediation	\$	65,000
5	Birch Point Road manhole remediation	\$	290,000
6	Gardner Road manhole remediation	\$	195,000
7	Miscellaneous manhole remediation Estimate	\$	365,000
	~~~~~~	<u> </u>	2,645,000

### WISCASSET'S WASTEWATER PUMPING STATIONS

	THE CLERK
TIME	FLOW
PS NO. LOCATION STYLE CAPACITY (hrs/day)	(GPD)
1 Bath Rd/US 1 S&L Wet/Dry Well 480 GPM/EA 4.4	127,000
2 Bath Rd/US 1 S&L Wet/Dry Well 390 GPM/EA 4.3	101,000
3 Bath Rd/US 1 GR Wet Well Mount 250 GPM/EA 4.8	72,000
4 Gardiner Road S&L Wet/Dry Well 90 GPM/EA 1.9	11,000
5 Old Bath Road GR Wet Well Mount 125 GPM/EA 1.2	9,000
6 Waterfront Park Flygt Submersible 140 GPM/EA 0.06 (seasonal)	500
7 Birch Point Rd Flygt Submersible 200 GPM/EA 4.7	56,000
8 Birch Point Rd Flygt Submersible 300 GPM/EA 2.2	40,000
9 Birch Point Rd S&L Wet Well Mount 190 GPM/EA 1.9	22,000
10 Federal Street Flygt Wet/Dry Well 120 GPM/EA 1.3	10,000
11 Old Bath Road Flygt Wet/Dry Well 185 GPM/EA 0.6	7,000
12 Willow Lane Flygt Wet/Dry Well 200 GPM/EA 0.09	1,100
13 Bradford Road S&L Wet/Dry Well 245 GPM/EA 0.2	3,000
14 Birch Point Rd S&L Wet/Dry Well 240 GPM/EA 1.1	16,000
15 Birch Point Rd Flygt Submersible 145 GPM/EA 0.7	6,000
16 Bath Rd/US 1 S&L Wet/Dry Well 140 GPM/EA 4.2	36,000
17 Bath Rd/US 1 Flygt Submersible 200 GPM/EA 1.2	14,000
18 Point East Flygt Submersible 120 GPM/EA 0.04	300

### GENERAL CONCLUSIONS FROM PUMP STATION EVALUATION

- Eighteen pump stations are critical infrastructure component to convey sewage to treatment plant
- Age and condition of pump stations is major concern
- Typical useful life of pump station equipment and electronics is twenty years
- Wiscasset pump stations have been in place for 20 to 50 years
- Some stations are undersized for current flows
- Some stations lack emergency power generators
- Town is currently implementing program of generator installation at most critical stations
- Pump stations will need to be upgraded over next 20 year study period

### Three priorities of pump station upgrade were suggested

- 1. High Priority next five years
- 2. Medium Priority next five to ten years
- 3. Low Priority next ten to fifteen years

### RECOMMENDED PUMP STATION UPGRADE PRIORITIES

PRIORITY	DESCRIPTION		ESTIMATE (\$)
HIGH PRIORITY	<u>7</u>		
	Upgrade Pump Station No. 1		740,000
	Upgrade Pump Station No. 2		740,000
	Upgrade Pump Station No. 3		945,000
	Upgrade Pump Station No. 4		740,000
	Upgrade Pump Station No. 7		625,000
	Upgrade Pump Station No. 9		1,110,000
	Upgrade Pump Station No. 10		940,000
	Upgrade Pump Station No. 11		940,000
	Upgrade Pump Station No. 16		645,000
	Subtotal High Priority Projects	\$	7,425,000
MEDIUM PRIOR	<u>TTY</u>		
	Upgrade Pump Station No. 6		50,000
	Upgrade Pump Station No. 13		365,000
	Upgrade Pump Station No. 14		365,000
	Upgrade Pump Station No. 17		140,000
	Subtotal Medium Priority Projects	\$	920,000
LOW PRIORITY			
	Upgrade Pump Station No. 5		865,000 -
	Upgrade Pump Station No. 8		4,000
	Upgrade Pump Station No. 12		365,000
	Subtotal Low Priority Projects	\$	1,235,000
Total Estimate		\$	9,580,000*
*Note: Cost estimates	s presented in 2022 dollars	<u> </u>	

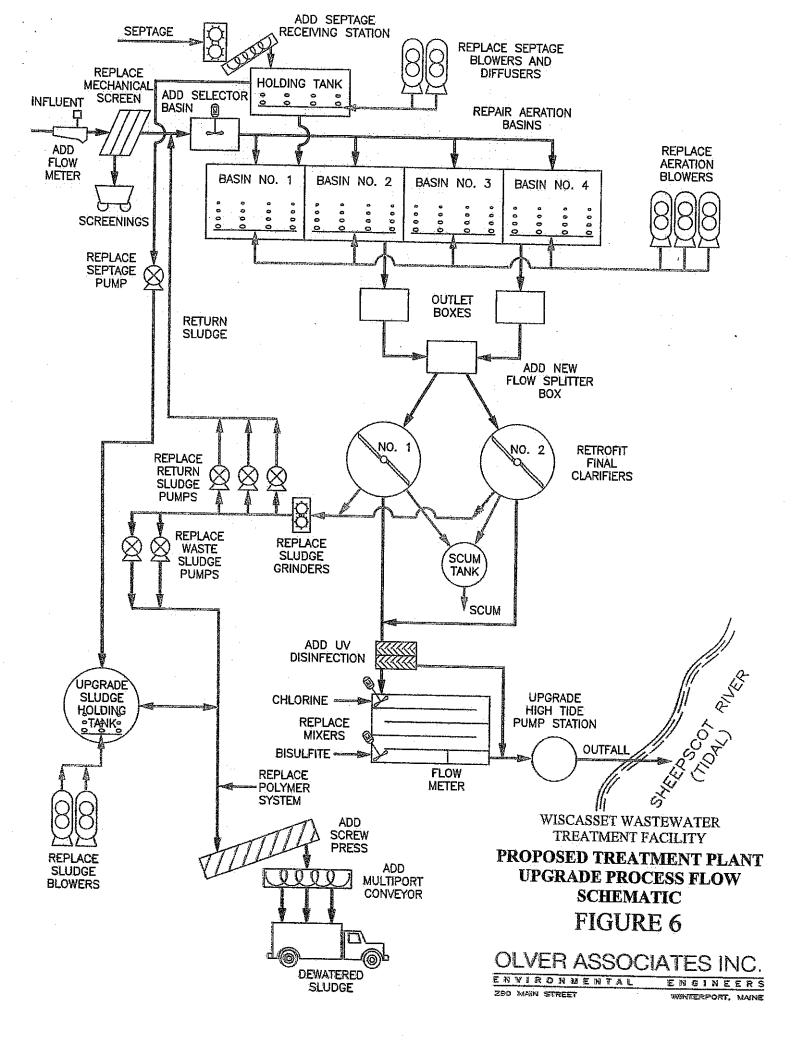
## GENERAL OBSERVATIONS OF WASTEWATER TREATMENT PLANT EVALUATION

- Overall, existing treatment plant is generally sound and in good condition for its age
- Some equipment is obsolete, inoperable or well beyond its useful life
- Treatment plant equipment typically needs upgrade every 20 years
- Plant is at an age where it would benefit of upgrade to continue reliable service
- Specific systems and equipment should be upgraded

# TABLE 10: PRELIMINARY ORDER-OF-MAGNITUDE PLANNING LEVEL COMPARATIVE COST ESTIMATE FOR WISCASSET WASTEWATER TREATMENT PLANT UPGRADE AT PRESENT LOCATION

COST CATEGORY	E	STIMATE
Headworks screen	\$	195,000
Refrigerated influent composite sampler		8,000
Influent flow meter/recorder	,	5,000
Septage receiving station equipment		150,000
Septage tank blower equipment		30,000
Septage transfer pump		45,000
Selector basin mixers		60,000
Aeration basin blowers/VFD's	-	80,000
Aeration basin diffuser improvements		15,000
Dissolved oxygen feedback system		20,000
Final clarifier sludge/scum rakes		370,000
Return sludge pumps/VFDs		105,000
UV disinfection equipment		285,000
Effluent flow meter/recorder		5,000
Refrigerated effluent composite sampler		8,000
Contact tank mixer replacement		20,000
Effluent high tide pumps		160,000
Waste activated sludge pumps/VFDs	•	60,000
Inline sludge grinders		60,000
Aerobic sludge storage blowers/VFD		180,000
Aerobic sludge storage coarse bubble diffusers		30,000
Aerobic sludge storage level control		15,000
Sludge dewatering screw press		350,000
Polymer feed system		30,000
Dewatered sludge distribution conveyor		60,000
Process water pumps		20,000
Yard hydrants		10,000
MCC/control upgrades		150,000
SCADA system		150,000
Equipment installation	2	2,140,000
Headworks building modifications		50,000
Anoxic selector basin		200,000
Aeration basins concrete repairs		100,000
Clarifier flow splitter box		100,000
Disinfection tank UV modifications		50,000
Door/window replacements		50,000
Operations Building roof replacement		50,000
Operations Building brick repointing		10,000

Operations Building interior/exterior painting	100,000
Plant lighting fixture modification allowance	25,000
Emergency generator	100,000
Site pavement overlay	90,000
Outfall pipe repair	100,000
Demolition	200,000
Sitework	700,000
Piping	920,000
Valves/gates	520,000
Electrical	1,300,000
Plumbing	20,000
HVAC	575,000
General conditions	1,000,000
Subtotal	\$ 11,076,000
Geotechnical exploration allowance	5,000
Design allowance	750,000
Contract administration allowance	150,000
Construction inspection allowance	725,000
Ledge removal allowance	14,000
Laboratory fixtures allowance	50,000
Contingency allowance	1,100,000
Estimate	\$ 13,870,000



### IMPACT OF INCREASED RIVER WATER ELEVATIONS ON PLANT

PLANT	ELEVATION	100-YR FLO	OOD ELEVA	TIONS (FT)	STORM SU	RGE ELEVA	TIONS (FT)
COMPONENT	(FT)	2022	2045	2070	2022	2045	2070
Headworks Floor	9.71	10.17	11.02	12.38	14.15	15.00	16.36
Garage Slab Floor	9.42	10.17	11.02	12.38	14.15	15.00	16.36
Top Aeration Basins	9.31	10.17	11.02	12,38	14.15	15.00	16.36
Blower Building Floor	9.31	10.17	11.02	12.38	14:15	15.00	16.36
Top of Sludge Tank Wall	21.18	10.17	11.02	12.38	14.15	15.00	16.36
Ops Building Floor	13.20	10.17	11.02	12.38	14.15	15.00	16.36
Top of Clarifier Walls	11.19	10.17	11.02	12,38	14.15	15.00	16.36
Top of Chorine Tank	11.05	10.17	11.02	12.38	14.15	15.00	16.36
Storage Shed Floor	9.57	10.17	11:02	12.38	14.15	15.00	16.36
Top of Splitter Box	11.76	10.17	11.02	12.38	14.15	15.00	16.36
Top of Scum Tank	11.44	10.17	11.02	12.38	14.15	15.00	16,36

NOTES: Areas shaded blue were determined to be vulnerable to inundation.

### MODELED LEVELS OF PLANT INUNDATION BY 2070

PLANT COMPONENT	<b>KEY ELEVATION</b>	WITH RESPECT TO 100 YR FLOOD
Storage garage floor slab	9.42	-2.96 feet submerged
Storage shed floor slab	9.57	-2.81 feet submerged
Headworks building floor slab	9.71	-2.67 feet submerged
Top of aeration basin walls	9.31	-3.07 feet submerged
Blower room floor slab	9.31	-3.07 feet submerged
Top of splitter box slab	11.76	-0.62 feet submerged
Top of final clarifier walls	11.19	-1.19 feet submerged
Top of chlorine tank walls	11.05	-1.33 feet submerged
Top of scum tank	11.44	-0.94 feet submerged
Operations Building garage slab	13.20	+0.82 feet above flooding
Top of sludge storage tank	21.18	+8.80 feet above flooding
Plant yard and access road	Varies 13.00 to 9.50 +/-	Varies +0.62 above to -2.88 below

# ADDITIONAL RESILIENCY MEASURES AT EXISTING PLANT

·	TING I DAINI
COST COMPONENT	
	ESTIMATE
New Headworks Building	
Modified selector basin	\$ 350,000
Modified aeration basins	50,000
Modified flow splitter hox	175,000
Modified final clarifiers	20,000
Modified scum tank	120,000
Modified chlorine contact tank	10,000
New Blower Building	60,000
Modified RAS/WAS pump room	500,000
inew storage sheds	300,000
Storm surge retaining wall	150,000
Demolition	1,700,000
Sitework	150,000
Piping	850,000
Electrical	200,000
HVAC	250,000
General conditions	250,000
Subtotal	500,000
Geotechnical allowance	5,635,000
Design allowance	15,000
Contract administration allowance	400,000
Inspection allowance	100,000
Ledge removal allowance	350,000
Contingency allowance	10,000
Estimate	565,000
	\$ 7,075,000

# PLANNING LEVEL PRELIMINARY ORDER-OF-MAGNITUDE COST ESTIMATE OF NEW CENTRAL PUMP STATION

COST CATEGORY	ESTIMATE	
Raw wastewater pumps	\$ 225,000	
Control panel	50,000	
Grinder	50,000	
Flow meter	5,000	
Generator	100,000	
Hoist/trolley	35,000	
Equipment installation	375,000	
Concrete wet well/dry well	400,000	
Pump station building	200,000	
Aluminum wet well stairs	45,000	
Sitework	285,000	
Piping	240,000	
Valves	100,000	
Electrical	340,000	
HVAC	120,000	
General conditions	250,000	
Subtotal	2,820,000	
Geotechnical allowance	15,000	
Design allowance	195,000	
Construction administration allowance	50,000	
Inspection allowance	225,000	
Land acquisition allowance	100,000	
Ledge removal allowance	100,000	
Contingency allowance	280,000	
Preliminary planning level estimate	\$ 3,785,000	

## PRELIMINARY PLANNING LEVEL ORDER-OF-MAGNITUDE COST ESTIMATE FOR FORCE MAIN TO A FEDERAL STREET SITE

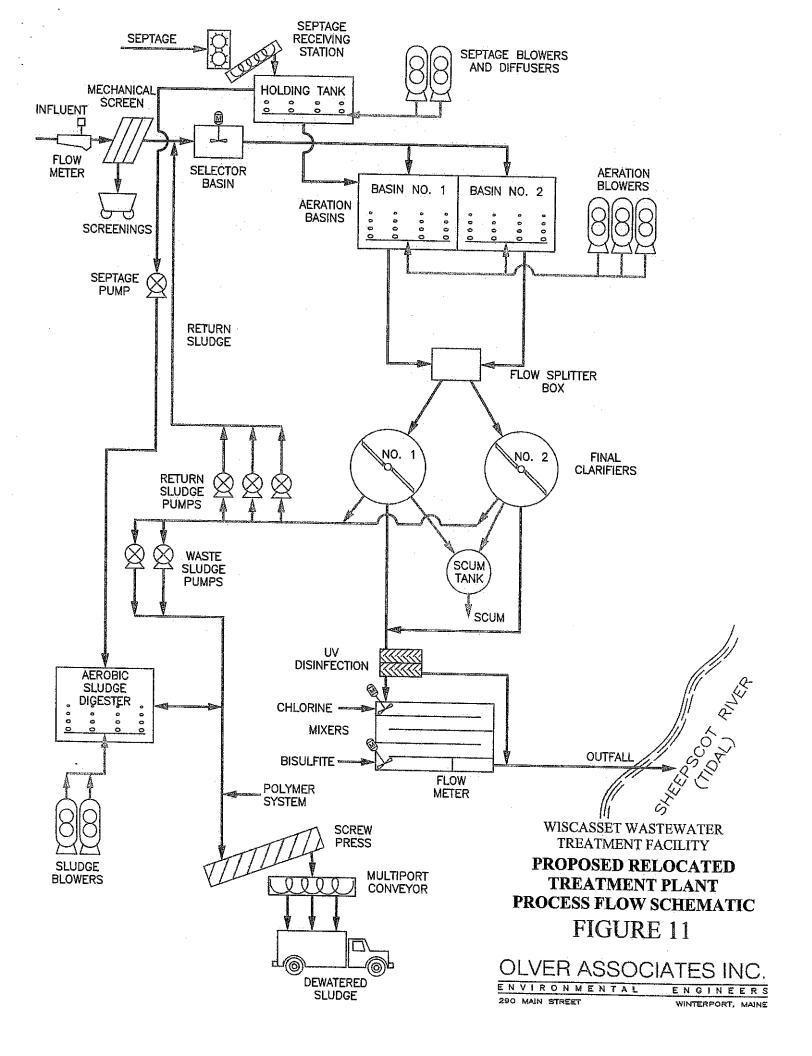
COST CATEGORY	ESTIMATE
Underwater force main section	\$ 550,000
Concrete pipe collars	115,000
Rip-rap stabilization	125,000
Land force main section	70,000
Manholes	40,000
Loam & seed	10,000
Owners testing allowance	10,000
General conditions	90,000
Subtotal	1,010,000
Geotechnical allowance/barge mobilization	50,000
Design allowance	70,000
Contract administration allowance	10,000
Inspection allowance	80,000
Permitting allowance	20,000
Ledge removal allowance	20,000
Contingency allowance	100,000
Preliminary planning level estimate	\$ 1,360,000

## PRELIMINARY PLANNING LEVEL ORDER-OF-MAGNITUDE COST ESTIMATE FOR UNDERWATER FORCE MAIN TO MASON STATION SITE

COST CATEGORY	ESTIMATE
Underwater force main section	\$ 3,800,000
Concrete pipe collars	750,000
Rip-rap stabilization	925,000
Land force main section	110,000
Manholes	40,000
Loam & seed	10,000
Owners testing allowance	50,000
General conditions	550,000
Subtotal	6,235,000
Geotechnical allowance/barge mobilization	200,000
Design allowance	430,000
Contract administration allowance	50,000
Inspection allowance	495,000
Permitting allowance	30,000
Ledge removal allowance	50,000
Contingency allowance	625,000
Preliminary planning level estimate	\$ 8,115,000

# TABLE 17: PRELIMINARY PLANNING LEVEL ORDER-OF-MAGNITUDE COST ESTIMATE FOR FORCE MAIN TO MASON STATION USING LAND ROUTE

COST CATEGORY	ESTIMATE
First force main section	\$ 985,000
Intermediate gravity sewer section	335,000
Manholes	48,000
Second force main section	1,600,000
Trench pavement	1,350,000
Traffic control	250,000
Erosion control	100,000
Loam & seed	100,000
Owners testing allowance	50,000
General conditions	480,000
Subtotal	5,298,000
Geotechnical allowance	20,000
Design allowance	370,000
Construction administration allowance	100,000
Inspection allowance	425,000
Ledge removal allowance	102,000
Contingency allowance	530,000
Preliminary planning level estimate	\$ 6,845,000



## PRELIMINARY PLANNING LEVEL COST ESTIMATE FOR NEW TREATMENT PLANT AT DIFFERENT SITE

COMPONENT	E	STIMATE
Influent mechanical screen	\$	195,000
Influent refrigerated composite sampler		8,000
Influent flow meter		5,000
Septage receiving station		150,000
Septage tank blowers		30,000
Septage tank diffusers		10,000
Septage transfer pump		45,000
Selector basin mixers		60,000
Aeration basin blowers		80,000
Aeration basin diffusers		60,000
Dissolved oxygen feedback system		20,000
Final clarifier drives/rakes		370,000
RAS pumps	·	105,000
WAS pumps		60,000
Sludge flow meters		20,000
Disinfection tank mixers		20,000
UV disinfection equipment		285,000
Effluent flow meter		5,000
Effluent refrigerated composite sampler		8,000
Sludge digester blowers		80,000
Sludge digester diffusers		50,000
Sludge digester level control		15,000
Sludge dewatering press		350,000
Polymer makedown system		30,000
Sludge multiport conveyor		60,000
Process water pumps		20,000
Yard hydrants		10,000
Equipment installation		1,720,000
Headworks building		250,000
Septage holding tank		105,000
Selector basin		215,000
Aeration basins		700,000
Secondary splitter box		100,000
Final clarifiers		1,400,000
Disinfection reactor		575,000
Sludge processing/blower building/digester		1,935,000
Maintenance garage		680,000
Operations Building/Lab/Office		710,000
Effluent outfall		1,000,000

Lab equipment	50,000
SCADA system	150,000
MCC equipment	250,000
Demolition	360,000
Sitework	2,280,000
Piping	1,920,000
Valves	600,000
Electrical	2,750,000
HVAC	960,000
General conditions	 2,100,000
Subtotal	\$ 22,961,000
Geotechnical exploration	100,000
Design allowance	1,600,000
Construction administration allowance	250,000
Inspection allowance	1,600,000
Ledge removal allowance	100,000
Contingency allowance	 3,000,000
Estimate	\$ 29,611,000

## SUMMARY OF COMPARATIVE CAPITAL COST ESTIMATES FOR DIFFERENT WASTEWATER TREATMENT PLANT UPGRADE OPTIONS

<b>OPTION</b>	DESCRIPTION	COMPONENTS	ESTIMATE
1	Upgrade Existing Treatment Plant a	nt Present Site	
, year	Upgrade/modernize existing		\$ 13,870,000
	Modify plant elevations for a		7,075,000
	Option One Planning Level Estimat		\$ 20,945,000
	Rounded Option One	•	(\$21,000,000)
	•		(Ψ21,000,000)
2	Relocate Treatment Plant to Federa	l Street Site	
	Central Pump Station		\$ 3,785,000
	Force Main to new site		1,360,000
	New wastewater treatment p		29,611,000
	Option Two Planning Level Estima	te	\$ 34,756,000
	Rounded Option Two		(\$35,000,000)
•			
3	Relocate Treatment Plant to Mason	Station with river route	
	Central Pump Station		\$ 3,785,000
	Force Main to new site		8,115,000
	New wastewater treatment p		29,611,000
	Option Three Planning Level Estim	ate	\$ 41,511,000
	Rounded Option Three		(\$43,000,000)
4	Delegate T. ( N. )		
4	Relocate Treatment Plant to Mason	Station with land route	
	Central Pump Stations (2)		\$ 7,570,000
•	Force Main/Sewer route to n		6,845,000
	New wastewater treatment pl		29,611,000
	Option Four Planning Level Estima	te	\$ 44,026,000
	Rounded Option Four		(\$44,000,000)

### SUMMARY OF CAPITAL COST CHALLENGES FACING WISCASSET

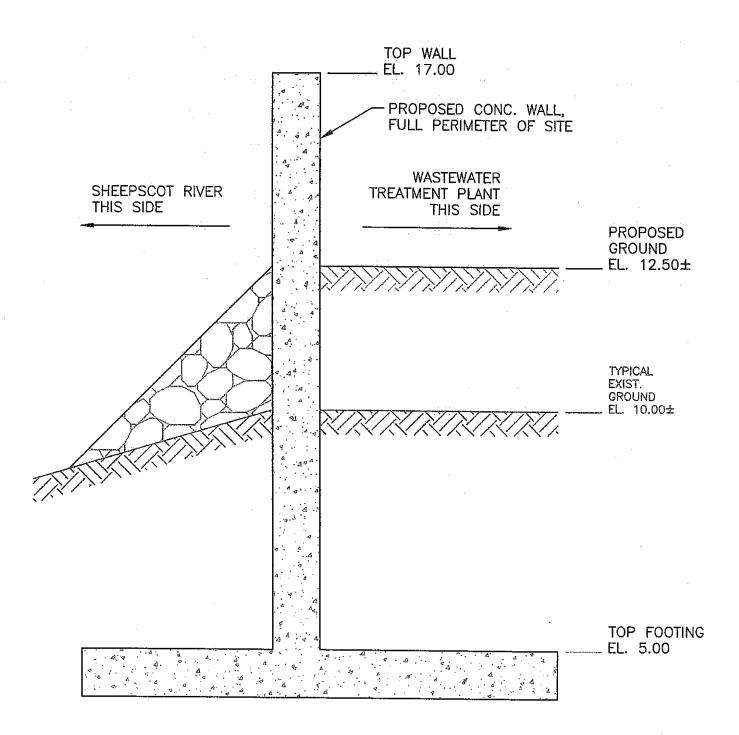
	TIDOD ADE EVICENTO	RELOCATE PLANT	RELOCATE PLANT
COOR CARROODS	UPGRADE EXISTING	TO FEDERAL	TO MASON
COST CATEGORY	PLANT	STREET	STATION
Sewer system remediation	\$3,645,000	\$3,645,000	\$3,645,000
Pump station remediation	\$7,425,000	\$7,425,000	\$7,425,000
Treatment plant improvements	\$21,000,000	\$35,000,000	\$44,000,000
Estimates	\$32,070,000	\$46,070,000	\$55,070,000

### **FINANCIAL CAPACITY CONSIDERATIONS**

- Wiscasset has 810 connected sewer users
- MHI of community at-large is \$ 55,131
- Income survey of sewered area may be beneficial

#### **NEXT STEPS FORWARD**

- The Town must work with all regulatory agencies to determine if upgrading the
  present plant with added resiliency will be allowed, or if the plant must be
  relocated. This will help to place the project within the required category for
  funding.
- The Town must work with the funding agencies to determine the maximum sewer user rate that will be expected in Wiscasset in order to qualify for grant funding.
- The Town must decide through public hearings the extent to which it will contribute to debt service in the future in a manner similar to what it has done in the past.
- The Town must work with Congressional resources, and Federal and State funding agencies to determine the availability of special climate change/resiliency funding sources that may be available to Wiscasset given its unique challenges.
- The Town must work with all traditional funding agencies such as DEP, RD, and CDBG to determine its eligibility for traditional funding sources.
- Given past enforcement concerns, the Town must work with DEP to develop an agreeable schedule upon which past or current issues at the Town's wastewater treatment facilities are addressed.



WISCASSET WASTEWATER TREATMENT FACILITY

PROPOSED CONCRETE FLOOD WALL

FIGURE 8

OLVER ASSOCIATES INC.

ENVIRONMENTAL

ENGINEER

Z90 MAIN STREET

WINTERPORT, MAINE