

Memorandum

To George Meservey, Director of Planning & Community Development
Michael Domenica, PE, Program Manager

CC Betsy Shreve, AICP, AECOM Project Director
Jeff Reade, AECOM WW Treatment, Reuse and Biosolids Task Lead

Subject **Town of Orleans, MA**
Water Quality and Wastewater Planning
Task Number 2 – Tri-Town Transition Requirements
Deliverable 2.c.3 – Final Technical Memorandum on the Design for Demolition of the Facility

Project Number 60476644

From Thomas Parece, P.E., AECOM Project Manager

Date 01/15/16

1. Background

- a. A component of the Water Quality and Planning effort currently on-going with the Town of Orleans includes evaluating Transition options for the existing Tri-Town Septage Treatment Facility (“Tri-Town”). Task 2.c was originally intended to better define the design and specification requirements associated with the complete demolition of the facility. Town representatives have requested that this Task be expanded to include the evaluation of “mothballing” portions of the facility that are likely to have future value for a conventional WWTF, as well as the possibility of transitioning the existing facility to a septage transfer station.

2. Introduction

- a. AECOM has previously submitted Technical Memoranda on the costs associated with keeping the facility operational through December 2021; as well as the construction costs to decommission and demolish the facility at the end of the current permit cycle in December 2016. Recent discussions with Orleans officials indicate that the three towns the make up the District are not likely to approve the funding necessary to keep the facility operational. However in addition to the complete demolition option outlined in AECOM’s Task 2.a – Deliverable 2.2, two other variations have been identified which the Town has requested be explored.

- (1) Partial demolition with mothballing of structures likely to have value for a future sewage and septage treatment facility.

- (2) Partial demolition and conversion of remaining structures to a septage transfer station.

This TM addresses the construction costs and O&M costs associated with these two options, as well as the tipping fee that would be required to cover the incremental cost increase of Option 2 over Option 1.

3. Description and Discussion of Options

- a. Option 1: This option assumes that a combined sewage/septage treatment facility will be constructed on the current grounds of the Tri-Town facility at some point in the next 5 to 7 years. While the configuration of a new facility is not yet defined, there are some components of the existing facility that would likely have some value. These are essentially the structures associated with the Operations and Process Building, the Septage Receiving and Mixing Building, the Control Building Addition, and adjacent underground storage tanks.

Much of the process equipment within these areas is aging, as is the wooden façade on the buildings, however the buildings themselves are concrete block construction and appear to be perfectly sound structurally. While it will likely be necessary to gut the interior of these building during construction of a new WWTF, the structures themselves will continue to have value. Any new WWTF will need administrative and laboratory space which the Operations and Process Building could be retrofitted for. The Control Building Addition, if not used for biosolids processing, might be used for garage/storage space, while the Septage Receiving and Mixing Building could very well be rehabilitated and used for the same purpose in the future. Referring to Figure 1 on the following page, AECOM would recommend keeping/mothballing all buildings/roadways/walkways on the “project north¹” side of the Chemical Feed Building.

All tankage, structures, roadways and walkways to the project south side of, and including the Chemical Feed Building, would be demolished and the site restored. These components are all associated with the filtrate treatment process train. Any future sewage/septage treatment facility would likely treat septage filtrate in the same process train as the sewage. In addition to being aged and in need of significant repair/replacement, the existing filtrate treatment systems would all be significantly undersized for a combined filtrate/sewage process train.

The mothballing of some of the facility significantly reduces the demolition/restoration costs previously estimated and outlined in Deliverable 2.2. There are however capital costs associated with mothballing those buildings not to be demolished. In addition, discussions with both the Fire and Police Departments in town indicate that it would be desirable to maintain the sprinkler and alarm systems, which requires maintaining heat and electrical service to the remaining buildings. Specific details on the revised demolition costs are included in Appendix 1. Details on the mothballing and O&M costs are included in Appendix 2. A summary of costs for this option compared to the complete demolition/restoration of the facility is in Table 1. Assumptions made in the estimation of O&M costs were:

- Plant staffing will consist of 0.25 FTEs for daily rounds. Estimate \$65K/FTE, plus 50 percent overhead.
- Facility heat demand will be 70 percent of current demand through reduction in filtrate train structures. Most of the heat utilized is in the structures proposed to be kept under this option.
- Electrical demand will be significantly reduced due to no process equipment or routine lighting needs.

¹ “Project North” refers to the top side of the site plan, as oriented on the sheet, and is geographically northwest.

Table 1: Comparison of Lifecycle Costs for Partial Demo/Mothballing vs Complete Demo

Description	Complete Demolition	Option 1 - Partial Demolition/Mothballing of Some Structures
Demo/Restoration Cost	\$2,025,000	\$635,000
Mothballing Costs	\$0	\$200,000
Operating Costs (5 years at \$50K/year)	\$0	\$250,000
Totals	\$2,025,000	\$1,085,000

- b. Option 2: This option has many similarities with Option 1, in that it assumes that a combined septage/sewage treatment facility will eventually be constructed on the site and that some of the existing structures can be rehabilitated/repurposed at that time. Similarly, it assumes that those components of the filtrate treatment train located to the project south of and including the Chemical Feed Building will be demolished. The primary difference is that instead of mothballing the balance of the facility, it will be converted into a septage transfer station.

The option is born out of the concern that the loss of a local offloading option will drive smaller septage haulers on the lower/outer Cape out of the business because of the longer roundtrip to the Yarmouth-Dennis facility (“Y-D”) or even more distant locations off-Cape (e.g. - Wareham). In addition to the economic impact of losing these smaller businesses, it is feared that a reduction in competition will drive up septage pump-out rates to homeowners and businesses in the area. While avoiding the costs of mothballing the retained structures, there are some modification and repair costs necessary to convert the facility to a transfer station as well as some operating expenses to staff, and provide heat/utilities to the buildings. Lastly there will be some costs associated with transporting septage collected at the facility in larger tankers to other operational septage treatment facilities. In order to estimate transport costs and tipping fees, some assumptions needed to be made as to where the septage would be ultimately hauled. A previous report² prepared for the town identified a number of other facilities that treat septage on Cape and in SE Massachusetts. At that time, Y-D was not interested in taking on any new sources of septage, however Tri-Town staff report that they are now interested in taking up to 7 to 8 million more gallons per year. If applied against the standard M-F work week, that amounts to an average of 32,000 gals/day, however it is likely that Y-D’s peak septage receiving season is coincident with Tri-Town’s, so that this amount of capacity may not be fully available during peak months when needed. During this period, it is assumed that septage beyond Y-D’s receiving capacity will be taken to Wareham.

² “Task 2.0: Septage and Food Waste Market Study Technical Memorandum 2.0”, prepared by Stantec Consulting Services, Dec. 2014.

Figure 1: Existing Site Plan

(Ref: Tri-Town Septage Treatment Facility Decommissioning Action Plan, Stantec Consulting Services, Oct 2013)

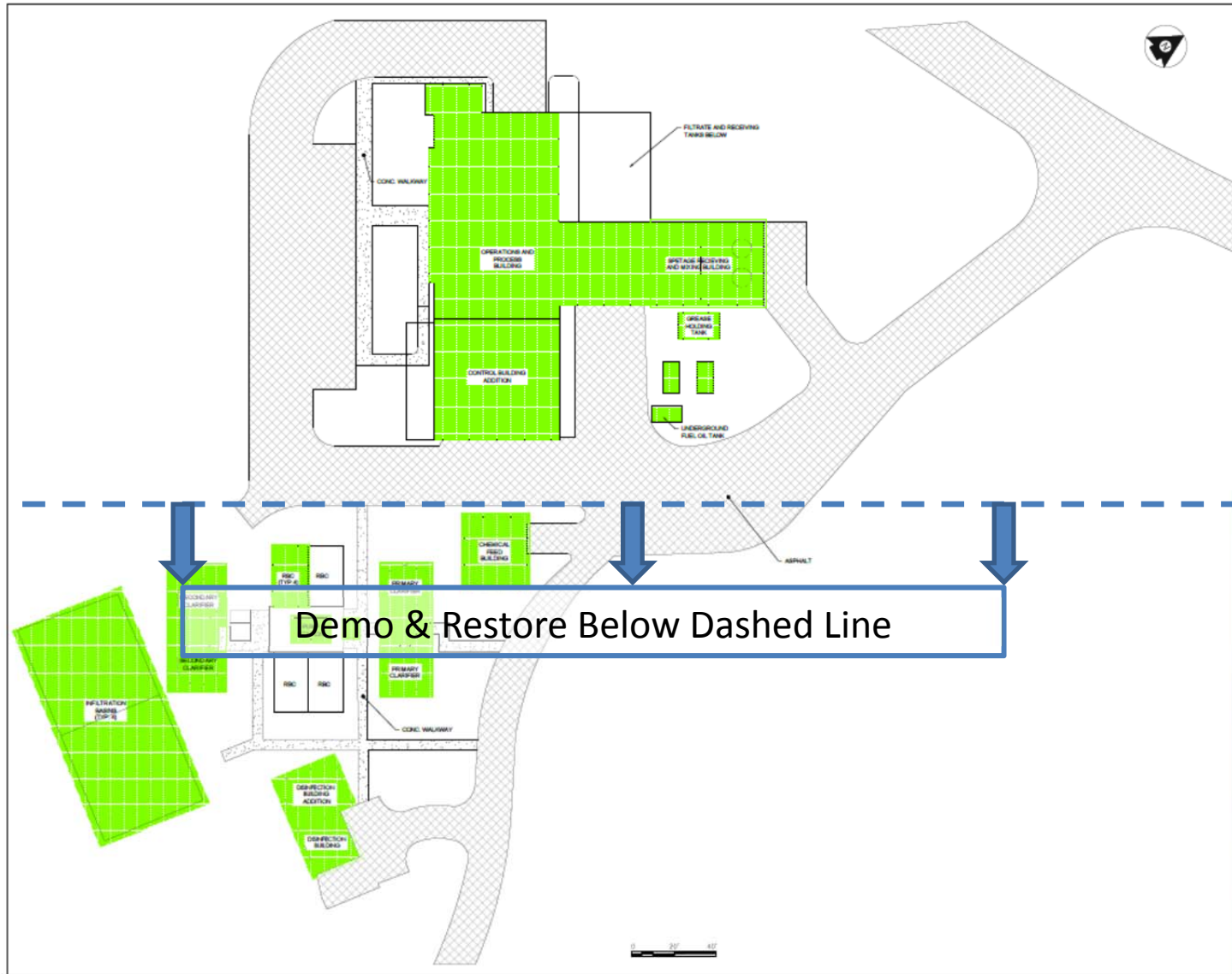


Table 2 shows Tri-Town’s monthly septage load, an estimate of Y-D’s monthly septage load, the amount of Tri-Town septage that Y-D could receive, and the capacity shortfall that would have to be taken off-Cape (i.e. Wareham). It is assumed that Y-Ds seasonal septage profile is somewhat similar to Tri-Town’s, and that total volumes will remain reasonably stable for the next 5 years. What Table 2 shows is that while on average Y-D should be able to take over 2/3rds of the septage currently received at Tri-Town, the available capacity during the summer months amounts to roughly 50 percent of Tri-Town’s historical septage receipts. As a result, the hauling/tipping costs were apportioned accordingly with Y-D receiving up to its capacity, and Wareham taking the balance.

Table 2: Monthly Capacity Analysis for Septage Receiving at Y-D

Month	Tri-Town Receiving gal/weekday	Percent of Annual Average	Y-D Current Receiving gal/weekday	Y-D Capacity Available gal/weekday	Shortfall gal/weekday
January	38,000	102%	66,259	30,907	(7,093)
February	40,000	108%	69,747	27,419	(12,581)
March	25,000	67%	43,592	25,000	-
April	35,500	96%	61,900	35,266	(234)
May	36,500	98%	63,644	33,522	(2,978)
June	40,500	109%	70,619	26,547	(13,953)
July	45,250	122%	78,901	18,265	(26,985)
August	43,000	116%	74,978	22,188	(20,812)
September	39,000	105%	68,003	29,163	(9,837)
October	44,000	118%	76,721	20,445	(23,555)
November	35,050	94%	61,116	35,050	-
December	24,000	65%	41,848	24,000	-
Average	37,150		64,777	27,314	(9,836)

Other O&M costs were estimated as shown in Appendix 2, and were based on the following assumptions.

- Plant staffing will consist of 2.5 FTEs. Estimate \$65K/FTE, plus 50 percent overhead.
- Facility heat demand will be 85 percent of current demand through reduction in filtrate train structures. Most of the heat utilized is in the structures proposed to be kept under this option.
- Electrical demand will be 67 percent of current demand though overall reduction in process equipment operation.

Capital repair and replacement costs to keep the entire facility operational were identified previously in Deliverable 2.1. For this option, only those items pertaining to equipment needed to keep the facility operational as a transfer station were included. Some minor revisions to the previous estimate included an allotment for HVAC repairs, piping and loadout pumping modifications, and additional storage tank cleaning.

Details of these costs are included in Appendix 2, however a summary of Capital and annual O&M costs are shown in Table 3 below with Option 1 shown for comparison purposes.

Table 3: Comparison of Costs for Option 1 and Option 2

Description	Option 1 - Partial Demolition/Mothballing of Some Structures	Option 2 - Partial Demolition/Conversion to Transfer Station
Demo/Restoration Cost	\$635,000	\$635,000
Mothballing/Retrofit Costs	\$200,000	\$605,000
Total Capital Costs	\$835,000	\$1,240,000
Annual Operating Costs, \$/year	\$50,000	\$1,386,000

Option 2 is considerably more expensive than Option 1, however this neglects the opportunity to offset these additional expenses through the collection of tipping fees. Table 4 assesses the tipping fee that would be required to be charged at Tri-Town to offset the incremental costs of Option 2 over Option 1. It is assumed that the incremental capital is amortized over a five year project term at a rate of 3.5 percent.

Table 4: Estimation of Required Tipping Fee to Recover Incremental Costs of Option 2

Description	Value
Incremental Capital Cost, \$	\$405,000
Annual Cost of Incremental Capital (5 years @ 3.5%), \$/year	\$90,000
Incremental O&M Cost, \$/year	\$1,336,000
Total Annual Costs, \$/year	\$1,426,000
Estimated Annual Deliveries, gal/year	9,176,050
Required Tipping Fee, \$/gal	\$0.155

When spread across projected septage receipts of 9.2 million gallons/year, the town would need to charge an average tipping fee of \$0.155/gal to cover the cost over Option 1 to convert the facility to a transfer station.

4. Summary and Recommendation

A summary of the two options discussed herein compared to the complete demolition and restoration of the site is shown in Table 5.

Table 5: Summary Comparison of Options

Description	Complete Demo & Restoration of the Site	Partial Demo & Mothball ("Option 1")	Partial Demo and Convert to Transfer Station ("Option 2")
Construction Costs, \$			
Demo/Restore Site	\$2,025,000	\$635,000	\$635,000
Mothball	\$0	\$200,000	\$0
Rehab to Transfer Station	\$0	\$0	\$605,000
Totals	\$2,025,000	\$835,000	\$1,240,000
Annual Operating Costs, \$/year	\$0	\$50,000	\$1,336,000

As one can see, there's a fairly substantial savings (approx. \$1.2M) to be realized if the structures and below grade tanks not associated with the filtrate treatment train are mothballed instead of demolished at this time. The costs for keeping the facility heated and maintaining the alarm systems for 5 years erodes this savings to a degree, but Option 1 is still considerably cheaper than complete demolition of the site. While the future use of mothballed structures cannot not be guaranteed, it is likely they could be incorporated into a future facility design. It is a reasonable risk to take if the construction of a new septage/sewage treatment facility is likely to occur on this site in the next 5 to 7 years.

The capital cost of partial demolition and converting the facility to a septage transfer station ("Option 2") is about 50 percent more than the mothballing option, although still 40 percent less than the cost of complete demolition and restoration of the site. It brings with it however more significant ongoing annual expenses, most of which result from transportation and tipping fees to dispose of septage at a combination of on-Cape and off-Cape facilities. AECOM estimates that the town would have to charge haulers approximately \$0.155/gallon, at current receiving volumes to recover the incremental costs of Option 2 over Option 1. This cost would go higher if local haulers that currently use the facility began to by-pass Tri-Town to go other existing or future facilities. Discussions with a local contractor/hauler indicate there is some interest within the private sector to construct transfer facilities in the event of a Tri-town closure.

In conclusion, AECOM believes that the conversion of the facility to a septage transfer station is not a cost-effective option either for the town or the businesses/residences using septic hauling services in the area. The tipping fee the town would have to charge to break-even on the operation is excessive, and would get worse if septage deliveries were to decrease due to high prices, which they likely would. Option 1 however appears to be far more promising. If the town believes a new septage/sewage treatment facility is likely to be constructed at the Tri-Town site sometime in the next 5 to 7 years, serious consideration should be given to retaining those structures likely to have future use as outlined in this TM.

Appendix 1: Revised Demolition Estimate

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JOB NO : 60476644.02.3
 DATE : January 8, 2016
 LOCATION : Orleans, MA
 PREPARED BY: R. Mastrogiacomo

AECOM
Construction Cost Estimate
10% Design Estimate
Demolition Scenarios

CLIENT : Orleans, MA
 PROJECT : Tri-City STP
 ACCURACY: ± 30 %
 ENR INDEX: 10133

GRAND SUMMARY

ACCOUNT	DESCRIPTION	MANHOURS	MATERIAL	LABOR	EQUIPMENT	TOTAL
1	GENERAL (Partial Demo)	219	\$3,351	\$16,312	\$137	\$19,800
2	SITE WORK (Partial Demo)	4,373	\$67,025	\$326,241	\$2,737	\$396,003
	SUBTOTAL DIRECT COSTS	4,592	\$70,377	\$342,553	\$2,873	\$415,803
	GENERAL CONTRACTOR OVERHEAD&PROFIT	17.00%				\$70,686
	SUBTOTAL GENERAL CONTRACTOR					\$486,000
	CONTINGENCY	30.00%				\$145,800
	SUB TOTAL CONSTRUCTION COST					\$631,800
	ESCALATION TO MID-POINT OF CONSTRUCTION**	2.5%	-	-		\$0
	ASSUMED AT: January 8, 2016	PER YEAR	YEARS	NON-COMPOUNDED RATE		
	TOTAL CONSTRUCTION COST PARTIAL DEMO					\$631,800

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10% Design Estimate

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PROJECT : Tri-City STP
ACCURACY: ± 30 %
ENR INDEX: 10133

ACCOUNT NO.	DESCRIPTION	QUANTITY	UN	MAN HOURS		MATERIAL		LABOR		EQUIPMENT		TOTAL DIRECT COST
				MHR/UNIT	TOTAL MH	UNIT COST	TOTAL MATL	WAGE RATE	TOTAL LABOR	UNIT RATE	TOTAL EQUIP	
	THIS CONSTRUCTION COST IS BASED ON:											
	1. INFORMATION PROVIDED IN THE 10% DESIGN											
	2. ASSUMED NO DEWATERING.											
	3. PRICING IS BASED ON FIRST QUARTER 2016											
	4. PRICING DOES NOT INCLUDE CONSIDERATIONS FOR HAZARDOUS MATERIALS OR CONTAMINATED GROUNDWATER											
	5. CONTINGENCY SHOWN IS CONTRACTOR CONTINGENCY BASED ON LEVEL OF DESIGN, OWNER CONTINGENCY NOT INCLUDED											
	6. IN PROVIDING OPINION OF PROBABLE CONSTRUCTION COST, THE CLIENT UNDERSTANDS THAT AECOM HAS NO CONTROL OVER THE COST OR AVAILABILITY OF LABOR, EQUIPMENT OR MATERIALS OR OVER MARKET CONDITIONS OR THE CONTRACTOR'S METHOD OF PRICING. AECOM MAKES NO WARRANTY, EXPRESS OR IMPLIED THAT THE BIDS WILL NOT VARY FROM THIS ESTIMATE.											
	7. Average wage rate calculated from 2016 Means Average Labor rates for Construction Industry (laborers, equip opers) (ENR 10,092). Used Brockton, MA (\$69.79) escalated at to time of estimate and added 27% for:											0.4%
	SS Tax	7.65%										
	Workers Comp Ins	11.60%										
	Builders Risk	0.44%										
	Other Negotiated fringe	1.60%										
	Federal UnEmployment Ins	0.14%										
	State UnEmployment Ins	2.93%										
	General Liability Insurance	1.57%										
	TOTAL	25.9%										
	UNION AVERAGE WAGE RATE --->	\$74.60										

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ACCOUNT NO.	DESCRIPTION	QUANTITY	UN	MAN HOURS		MATERIAL		LABOR		EQUIPMENT		TOTAL DIRECT COST
				MHR/UNIT	TOTAL MH	UNIT COST	TOTAL MATL	WAGE RATE	TOTAL LABOR	UNIT RATE	TOTAL EQUIP	
-1-	<u>GENERAL (Partial Demo)</u>											
	General Contractor Mobilization	3	%	4,373	131	67,025	2,011	\$74.60	9,787	2,737	82	\$11,880
	Insurance/Bonds	1	%	4,373	44	67,025	670	\$74.60	3,262	2,737	27	\$3,960
	Permits	1	%	4,373	44	67,025	670	\$74.60	3,262	2,737	27	\$3,960
	Surveys (Roadway/Structures)	0	HRs	1.00	0	0.00	0	\$100.00	0	0.00	0	\$0
	Photos	0	MO	5.00	0	50.00	0	\$74.60	0	0.00	0	\$0
	Project Signs	0	EA	8.00	0	2,500.00	0	\$74.60	0	0.00	0	\$0
	Site Supervision (Working Foreman)	0	MO	176.00	0	0.00	0	\$93.25	0	0.00	0	\$0
	Travel	0	TPS	8.00	0	0.00	0	\$74.60	0	1,000.00	0	\$0
	Office Trailer	0	MO	0.00	0	0.00	0	\$74.60	0	500.00	0	\$0
	Utilites	0	MO	0.00	0	0.00	0	\$74.60	0	750.00	0	\$0
	Security		AL	288.00	0	0.00	0	\$74.60	0	0.00	0	\$0
	Project Clean up	0	AL	40.00	0	0.00	0	\$74.60	0	2,000.00	0	\$0
	Snow Removal	0	MO	24.00	0	0.00	0	\$74.60	0	1,000.00	0	\$0
	Winter Heating Equip (1 Winter)	0	AL	24.00	0	0.00	0	\$100.00	0	0.00	0	\$0
	Demonstration	0	AL	24.00	0	0.00	0	\$100.00	0	0.00	0	\$0
	O&M Manuals	0	AL	40.00	0	500.00	0	\$100.00	0	0.00	0	\$0
	SUBTOTAL DIRECT COSTS				219		3,351		16,312		137	\$19,800

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ACCOUNT NO.	DESCRIPTION	QUANTITY	UN	MAN HOURS		MATERIAL		LABOR		EQUIPMENT		TOTAL DIRECT COST
				MHR/UNIT	TOTAL MH	UNIT COST	TOTAL MATL	WAGE RATE	TOTAL LABOR	UNIT RATE	TOTAL EQUIP	
-2-	SITE WORK (Partial Demo)											
	<u>Septage Receiving Building (40' x 52')</u>											
	MOTHBALL	1.0	AL	0.00	0	0.00	0	\$74.60	0	0.00	0	\$0
	<u>Filtrate & Receiving Tanks</u>											
	MOTHBALL	1.0	AL	0.00	0	0.00	0	\$74.60	0	0.00	0	\$0
	<u>Operation & Process Building (105' x 98', 2 story)</u>											
	MOTHBALL	1.0	AL	0.00	0	0.00	0	\$74.60	0	0.00	0	\$0
	<u>Control Building Addition (57' x 94')</u>											
	MOTHBALL	1.0	AL	0.00	0	0.00	0	\$74.60	0	0.00	0	\$0
	<u>Septage Receiving & Mixing Building (41' x 34')</u>											
	MOTHBALL	1.0	AL	0.00	0	0.00	0	\$74.60	0	0.00	0	\$0
	<u>Standby Outdoor Generators</u>											
	Remove Concrete Slab	154.0	SF	0.25	39	0.00	0	\$74.60	2,872	1.50	231	\$3,103
	Remove 400 KW Generator & Slab	1.0	EA	100.00	100	0.00	0	\$74.60	7,460	750.00	750	\$8,210
	Remove 110 KW Generator & Slab	1.0	EA	68.00	68	0.00	0	\$74.60	5,073	1,000.00	1,000	\$6,073
	<u>Grease Holding Tank (12' x 19')</u>											
	MOTHBALL	1.0	AL	0.00	0	0.00	0	\$74.60	0	0.00	0	\$0
	<u>Underground Fuel Oil Tank</u>											
	Remove Underground 500 gal FRP Tank	1.0	EA	40.00	40	0.00	0	\$74.60	2,984	300.00	300	\$3,284
	Dispose Concrete Wall	4.4	CY	1.00	4	0.00	0	\$74.60	332	100.00	444	\$776
	<u>Chemical Feed Building (34' x 29')</u>											
	Demo Masonry Wall	378.0	SF	0.10	38	0.00	0	\$74.60	2,820	1.00	378	\$3,198
	Demo Wood Structure (1 story)	986.0	SF	0.03	30	0.00	0	\$74.60	2,207	3.00	2,958	\$5,165
	Remove Concrete Slab	986.0	SF	0.25	247	0.00	0	\$74.60	18,389	1.50	1,479	\$19,868
	Dispose Concrete Slab	36.5	CY	0.10	4	0.00	0	\$74.60	272	11.00	402	\$674
	Equipment Removal Allowance	1.0	AL	300.00	300	0.00	0	\$74.60	22,380	3,000.00	3,000	\$25,380
	<u>Primary Clarifiers (2 @ 16' dia/ea)</u>											
	Remove Concrete Wall (5' high, 10" Thick)	502.4	SF	0.25	126	0.00	0	\$74.60	9,370	1.50	754	\$10,123
	Dispose Concrete Wall	22.3	CY	0.10	2	0.00	0	\$74.60	167	11.00	246	\$412
	Remove/Dispose Kal-wall and Roof	2.0	EA	60.00	120	0.00	0	\$74.60	8,952	250.00	500	\$9,452
	Remove/Dispose Mechanism/gratings/rails	2.0	EA	120.00	240	0.00	0	\$74.60	17,904	500.00	1,000	\$18,904

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ACCOUNT NO.	DESCRIPTION	QUANTITY	UN	MAN HOURS		MATERIAL		LABOR		EQUIPMENT		TOTAL DIRECT COST
				MHR/UNIT	TOTAL MH	UNIT COST	TOTAL MATL	WAGE RATE	TOTAL LABOR	UNIT RATE	TOTAL EQUIP	
	<u>RBC's (4 @ 27' x 13'/ea)</u>											
	Remove Concrete Slab	1,404.0	SF	0.25	351	0.00	0	\$74.60	26,185	1.50	2,106	\$28,291
	Dispose Concrete Slab	52.0	CY	0.10	5	0.00	0	\$74.60	388	11.00	572	\$960
	Remove Arched Covers	4.0	EA	40.00	160	0.00	0	\$74.60	11,936	100.00	400	\$12,336
	Remove RBC's	4.0	EA	60.00	240	0.00	0	\$74.60	17,904	500.00	2,000	\$19,904
	Remove RBC's Distribution box & Gate	1.0	EA	120.00	120	0.00	0	\$74.60	8,952	500.00	500	\$9,452
	<u>Pump Station (35' x 24')</u>											
	Remove Concrete Slab	840.0	SF	0.25	210	0.00	0	\$74.60	15,666	1.50	1,260	\$16,926
	Dispose Concrete Slab	31.1	CY	0.10	3	0.00	0	\$74.60	232	11.00	342	\$574
	Remove Superstructure	840.0	SF	0.03	25	0.00	0	\$74.60	1,880	3.00	2,520	\$4,400
	Remove Equipment	1.0	AL	120.00	120	0.00	0	\$74.60	8,952	500.00	500	\$9,452
	<u>Secondary Clarifier (2 @ 20' dia/ea)</u>											
	Remove Concrete Wall (5' high, 10" Thick)	628.0	SF	0.25	157	0.00	0	\$74.60	11,712	1.50	942	\$12,654
	Dispose Concrete Wall	27.9	CY	0.10	3	0.00	0	\$74.60	208	11.00	307	\$515
	Remove/Dispose Kal-wall and Roof	2.0	EA	60.00	120	0.00	0	\$74.60	8,952	250.00	500	\$9,452
	Remove/Dispose Mechanism/gratings/rails	2.0	EA	120.00	240	0.00	0	\$74.60	17,904	500.00	1,000	\$18,904
	<u>Disinfection Building (24' x 22')</u>											
	Demo Masonry Wall	276.0	SF	0.10	28	0.00	0	\$74.60	2,059	1.00	276	\$2,335
	Demo Wood Structure (1 story)	528.0	SF	0.03	16	0.00	0	\$74.60	1,182	3.00	1,584	\$2,766
	Remove Concrete Slab	528.0	SF	0.25	132	0.00	0	\$74.60	9,847	1.50	792	\$10,639
	Dispose Concrete Slab	19.6	CY	0.10	2	0.00	0	\$74.60	146	11.00	215	\$361
	Equipment Removal Allowance	1.0	AL	200.00	200	0.00	0	\$74.60	14,920	2,000.00	2,000	\$16,920
	<u>Disinfection Building Addition (28.50' x 24')</u>											
	Demo Masonry Wall	315.0	SF	0.10	32	0.00	0	\$74.60	2,350	1.00	315	\$2,665
	Demo Wood Structure (1 story)	684.0	SF	0.03	21	0.00	0	\$74.60	1,531	3.00	2,052	\$3,583
	Remove Concrete Slab	684.0	SF	0.25	171	0.00	0	\$74.60	12,757	1.50	1,026	\$13,783
	Dispose Concrete Slab	25.3	CY	0.10	3	0.00	0	\$74.60	189	11.00	279	\$468
	Equipment Removal Allowance	1.0	AL	100.00	100	0.00	0	\$74.60	7,460	1,000.00	1,000	\$8,460
	<u>Infiltration Basins (8 covering 46' x 46')</u>											
	Remove Mechanisms	8.0	EA	16.00	128	0.00	0	\$74.60	9,549	100.00	800	\$10,349
	<u>Roadway/Walkway</u>											
	Demo Asphalt (assume 18'w)	864.8	SY	0.10	86	0.00	0	\$74.60	6,451	3.50	3,027	\$9,478
	Concrete Walkways	100.0	SF	0.10	10	0.00	0	\$74.60	746	0.50	50	\$796

03:09 PM

JOB #: 60476644.02.3

DATE: January 8, 2016

LOCATION: Orleans, MA

PREPARED BY: R. Mastrogiacomio

AECOM
Construction Cost Estimate
10% Design Estimate

CLIENT : Orleans, MA

PROJECT : Tri-City STP

ACCURACY: ± 30 %

ENR INDEX: 10133

ACCOUNT NO.	DESCRIPTION	QUANTITY	UN	MAN HOURS		MATERIAL		LABOR		EQUIPMENT		TOTAL DIRECT COST
				MHR/UNIT	TOTAL MH	UNIT COST	TOTAL MATL	WAGE RATE	TOTAL LABOR	UNIT RATE	TOTAL EQUIP	
	<u>Landfill Disposal Fee</u>											
	Debris to be Disposed of											
	Concrete (4,050 lbs/cy) (Assumed 1/2 re-used)	443,886	LBS	0.00	0	0	0	\$74.60	0	0.045	19,975	\$19,975
	Interior Block Walls (8" = 55 lbs /sf)	38,225	LBS	0.00	0	0	0	\$74.60	0	0.045	1,720	\$1,720
	Roof (4,050 lbs/cy)	0	LBS	0.00	0	0	0	\$74.60	0	0.045	0	\$0
	<u>Site Restoration</u>											
	Landscape & Restore Site (includes 3' fill brought in)	1.1	AC	300.00	335	60,000.00	67,025	\$74.60	25,001	5,000.00	5,585	\$97,612
	<u>Credit (Stantec Estimate)</u>											
	Equipment & Salvage Value	(0.33)	AL	0.00	0	0.00	0	\$74.60	0	75,000.00	(24,750)	(\$24,750)
	Processed Concrete used as fill	(0.33)	AL	0.00	0	0.00	0	\$74.60	0	120,000.00	(39,600)	(\$39,600)
	<u>Compost Shed</u>											
	Not Demolished											
	SUBTOTAL DIRECT COSTS				4,373		67,025		326,241		2,737	\$396,003

Appendix 2: Mothballing and Transfer Station Conversion Costs

	Option - 1: Partial Demo w/mothballing of some structures		Option - 2: Partial Demo w/conversion to septage transfer station		Incremental Increase Between Options
Capital Costs					
Partial Demo Cost (includes 30% contingency)	\$ 635,000		\$ 635,000		
Mothball Costs					
Fencing	\$ 50,000		\$ -		
Building Roof (30' x 30' patch)	\$ 25,000		\$ -		
HVAC Retrofit	\$ 25,000		\$ -		
Receiving tank cleanout	\$ 50,000		\$ -		
Retrofit Costs					
General Facilities & Equipment:					
Building Roof (30' x 30' patch)	\$ -		\$ 25,000		
Lighting	\$ -		\$ 5,000		
Grit Pump Stairwell Replacement	\$ -		\$ 25,000		
Potable water piping	\$ -		\$ 6,500		
HVAC Retrofit	\$ -		\$ 25,000		
Receiving Area:					
New metering station	\$ -		\$ 25,000		
Odor Control Carbon	\$ -		\$ 30,000		
Odor Control Chem Circ Pump	\$ -		\$ 12,500		
Receiving tank cleanout	\$ -		\$ 50,000		
Receiving tank mixer	\$ -		\$ 30,000		
Screening	\$ -		\$ 20,000		
Degritter	\$ -		\$ 45,000		
Grit Feed Pumps	\$ -		\$ 45,000		
Truck Load Out Pumps	\$ -		\$ 45,000		
Plumbing Modifications	\$ -		\$ 75,000		
Mothball/Retrofit Contingency (30%)	\$ 50,000		\$ 140,000		
Total Capital Costs	\$ 835,000		\$ 1,240,000		\$ 405,000
Operating Costs					
On-Site Operating Costs:					
Plant Staff	\$ 25,000	(0.25 FTE)	\$ 244,000	(2.5 FTE)	
Building Heat	\$ 18,000		\$ 22,000		
Building Electrical	\$ 2,000		\$ 49,000		
Routine O&M Expenses	\$ -		\$ 50,000		
Fire/Burglar Alarm Services	\$ 5,000		\$ 5,000		
Sub-total	\$ 50,000		\$ 370,000		
Transportation & Tipping	\$ -		\$ 1,016,000		
Total Operating Costs	\$ 50,000		\$ 1,386,000		\$ 1,336,000
Tipping Fee for Break Even					
Amortized Cost of Capital:					
Term, yrs					5
Rate, %					3.5%
Annual Cost of Capital					\$90,000
Incremental Increase in Annual Costs (incl amortized Capital), \$/yr					\$ 1,426,000
Annual Deliveries gal/yr					9,176,050
Req'd Tipping Fee, \$/gal					\$ 0.155