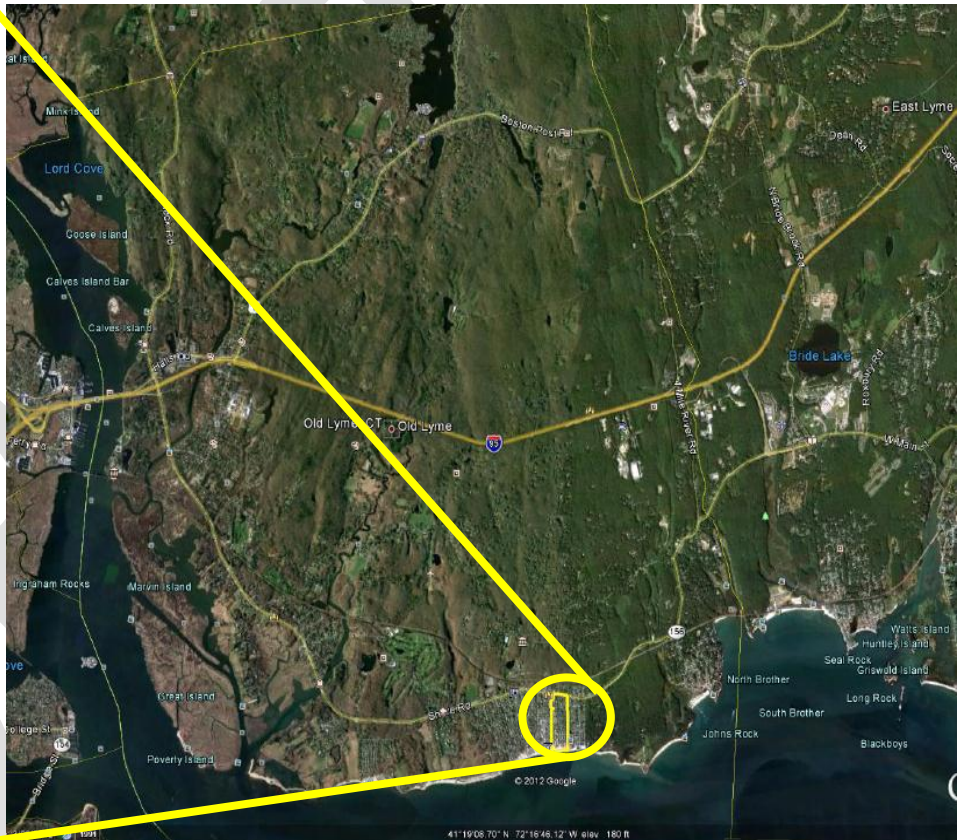
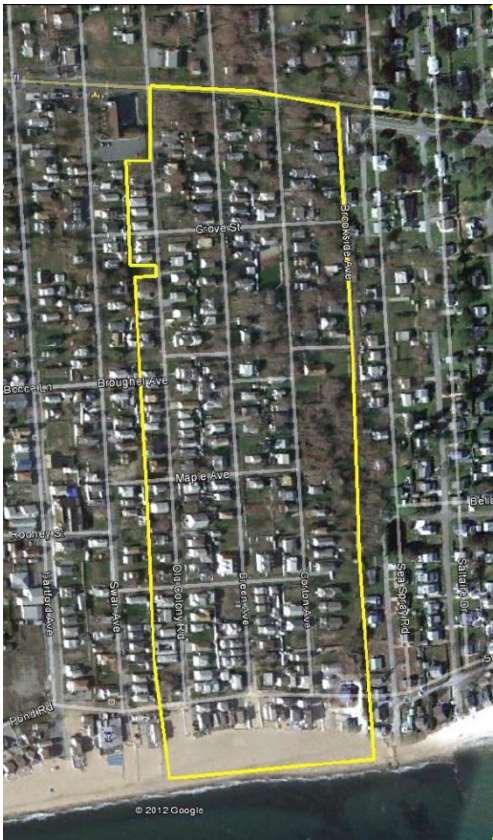


**WASTEWATER COLLECTION, TREATMENT AND
DISPERSAL ALTERNATIVES ANALYSIS
OLD COLONY BEACH CLUB ASSOCIATION
OLD LYME, CT
WORKING DRAFT – AUGUST 28, 2012**



Submitted to:

**Ms. Bonnie Reemsnyder
First Selectwoman,
Town of Old Lyme
52 Lyme Street
Old Lyme, CT 06371**

SUBMITTED BY:

**Environmental Engineers/ Consultants
LOMBARDO ASSOCIATES, INC.**

188 Church Street
Newton, Massachusetts 02458
www.LombardoAssociates.com
Tel: 617-964-2924
Fax: 617-332-5477
Pio@LombardoAssociates.com

TABLE OF CONTENTS

1.	Introduction and Purpose	3
1.1	<i>Proposed Wastewater Project Description.....</i>	4
1.2	<i>Proposed Project Costs</i>	8
1.3	<i>Issues and Recommended Additional Cost Allowances with Recommended Plan</i>	10
1.3.1	Financial	10
1.3.2	East Lyme Capacity Limitations	10
1.3.3	Pump Station and Conveyance System Upgrades.....	10
1.3.4	New London Treatment Plant Costs	11
1.3.5	Operations & Maintenance (O&M) Costs	11
2.	OCBCA Alternatives Considered Technically Viable.....	13
2.1	<i>Alternative # 1 - Neighborhood Collection System with Off-Site Treatment & Disposal/Reuse</i>	13
2.2	<i>Alternative # 2 - Neighborhood Collection, Treatment and Disposal within OCBCA ...</i>	16
2.3	<i>Alternative # 3 - Hybrid On-Site and Small Cluster Systems</i>	17
2.3.1	Individual On-Site Systems	17
2.3.2	Small Cluster On-Site Systems.....	17
2.3.3	Large Cluster On-Site Systems.....	19
2.3.4	Combination of Individual and Cluster Wastewater Systems.....	19
3.	Cost Analysis of Existing and Proposed Alternatives	20
3.1	<i>Proposed Plan Costs.....</i>	20
3.2	<i>Alternative #1 Costs.....</i>	20
3.3	<i>Alternative #2 Costs.....</i>	21
3.4	<i>Alternative #3 Costs.....</i>	23
3.5	<i>Cost Comparison.....</i>	24
4.	Conclusions and Recommendations	26
4.1	<i>Conclusions.....</i>	26
4.2	<i>Recommendations.....</i>	27

Table of Figures

Figure 1-2	Proposed Wastewater Solution for OCBCA and OLSBA (F&O, 2012)	5
Figure 1-1	Proposed OCBCA/OLSBA collection system (F&O, 2012).....	5
Figure 1-3	Proposed OCBCA/OLSBA Force Main Route (F&O, 2012).....	7
Figure 1-4:	Aerial Photo of OCBC Study Area.....	8
Figure 2-1:	Potential Treatment and Dispersal Sites	14
Figure 2-2:	Potential Treatment and Dispersal Sites Within OCBC	16
Figure 2-3:	Individual Property Wastewater System producing Effluent TN < 10 mg/l	17
Figure 2-4:	Small Cluster Wastewater System producing Effluent TN < 10 mg/l	18
Figure 2-5:	Small Cluster Wastewater System under Paved Area.....	18

Table of Tables

Table 1-1	OCBCA & OLSBA Wastewater Collection System	4
Table 1-2	OCBCA Wastewater System F&O Opinion on Costs	9
Table 1-3	F&O 2012 Estimated Annual O&M Costs	12
Table 3-1	Alternative # 1 Collection System Construction Costs	20
Table 3-2	Alternative # 1 Force Main System Construction Costs	20
Table 3-3:	Alternative #1 Treatment Plant Construction Costs	21
Table 3-4:	Alternative #1& 2 Annual O&M Costs.....	21

Table 3-6 Alternative # 2 Force Main System Construction Costs.....21
Table 3-5 Alternative #1 Opinion of Probable Costs.....22
Table 3-7: Alternative #2 Opinion of Probable Costs.....23
Table 3-8: Alternative #3 Opinion of Probable Costs per EDU24
Table 3-8: Summary of Probable Project Costs.....25

DRAFT

1. INTRODUCTION AND PURPOSE

Lombardo Associates, Inc. (LAI) has been retained by the Town of Old Lyme to provide an executive level assessment to determine if there are technically viable and cost-effective alternatives that can satisfactorily address the wastewater challenges in the OCBCA area. The Town is interested in being a contributing partner with OCBCA, and neighboring areas, to address the wastewater management challenges of the Town's residents.

The Old Colony Beach Club Association (OCBCA) has entered into Consent Order # CO WR MU 12 001, dated August 14, 2012 that amongst other matters:

- Concluded that on-site wastewater solutions are not technically and economically viable for numerous areas within the boundaries of the OCBCA;
- Refers to the OCBCA Wastewater Management Plan, as described in the July 2012 Fuss & O'Neill (F&O) Addendum to the Wastewater Facilities Planning Reports for the Old Lyme Shores Beach Association (OLSBA) and Old Colony Beach Club Association, which proposes a wastewater system to serve the OCBCA and OLSBA via:
 - i. Conventional gravity wastewater collection system to pump stations within each of the Beach Associations;
 - ii. Force Main to a termination manhole in East Lyme;
 - iii. Treatment & disposal by the Picenti New London Wastewater Treatment Facility (WWTF) which discharges to the Thames River;
 - iv. Through Agreements with East Lyme, Waterford and New London WWTF.
 - Requires that by October 13, 2012, OCBCA retain one or more qualified consultants, acceptable to the CT DEEP Commissioner, to prepare the documents and implement or oversee the actions required by the Order;
 - Within 850 days of approval of the Wastewater Management Plan prepared by RFP Engineering dated October 25, 2011, revised by January 20, 2012, and amended by F&O on June 2012 (Plan) – (it is understood that date should be stated as July 2012), OCBCA shall submit contract documents, schedule and related materials for implementation of the wastewater system as described in the Plan;
 - Complete implementation of the Plan's wastewater system by June 30, 2016.

The F&O July 2012 Addendum proposes combining the OCBCA and OLSBA wastewater system solutions to achieve economies of scale by sharing costs for the force main connection costs to the New London WWTF, along with engineering, legal and administrative costs.

1.1 Proposed Wastewater Project Description

The Old Colony Beach Club Association consists of 225 lots with the Old Lyme Shores Beach Association consisting of 192 lots. Wastewater flows and collection systems within OCBCA and OLSBA are presented on Table 1-1. Figure 1-1 illustrates the proposed gravity sewer system layout. Figure 1-2, from the F&A July 2012 Addendum, illustrates the proposed sewer route and treatment plant, with Figure 1-3, also from the F&O Addendum, illustrates the proposed shared force main from OCBCA/OLSBA to the East Lyme connection. Figure 1-4 is the Google Earth aerial photograph of the OCBCA area and illustrates the development density.

TABLE 1-1 OCBCA & OLSBA WASTEWATER COLLECTION SYSTEM

OCBCA & OLBCA Wastewater Collection System					
			Old Colony Beach Association	Old Lyme Shores Beach Association	Total
		No. Lots	225	192	417
		Gravity Pipe (lf)	7,100	11,000	18,100
		Gravity Pipe (lf)/lot	32	57	
		No. PS	1	1	
		People/house	2.39	2.39	
		Flow (gpd)/person	75	75	
		Flow (gpd)	40,331	34,416	74,747
		I/I (gpd)	8,669	10,584	19,253
		Avg (gpd)	49,000	45,000	94,000
2		Max Summer (gpd)	98,000	90,000	188,000
2		Peak Hour (gpm)	136	125	261
		Pump Rate (gpm)	275	275	
		TDH	225	229	

FIGURE 1-2 PROPOSED WASTEWATER SOLUTION FOR OCBCA AND OLSBA (F&O, 2012)
Regional Wastewater Map

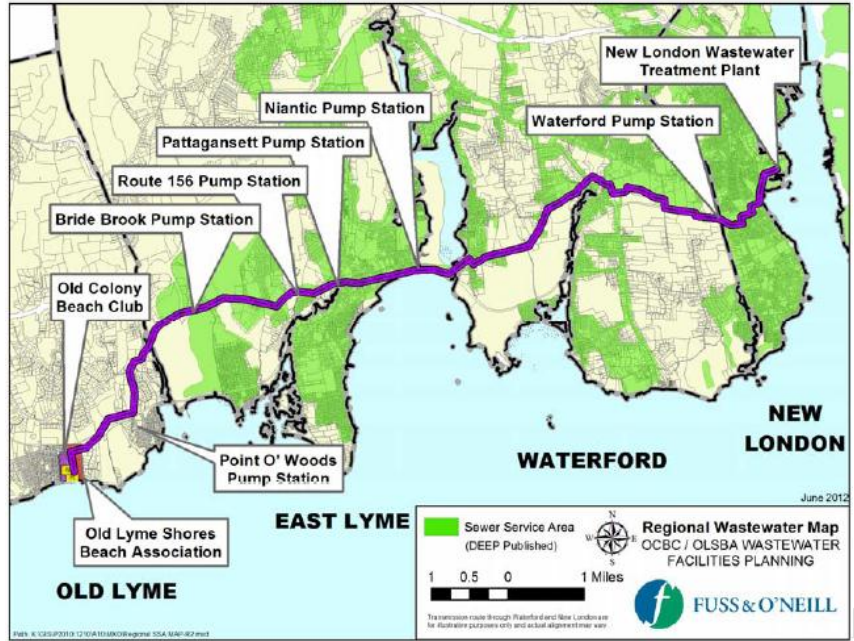


FIGURE 1-1 PROPOSED OCBCA/OLSBA COLLECTION SYSTEM (F&O, 2012)

DRAFT

Conceptual Gravity Sewer Collection System Mapping

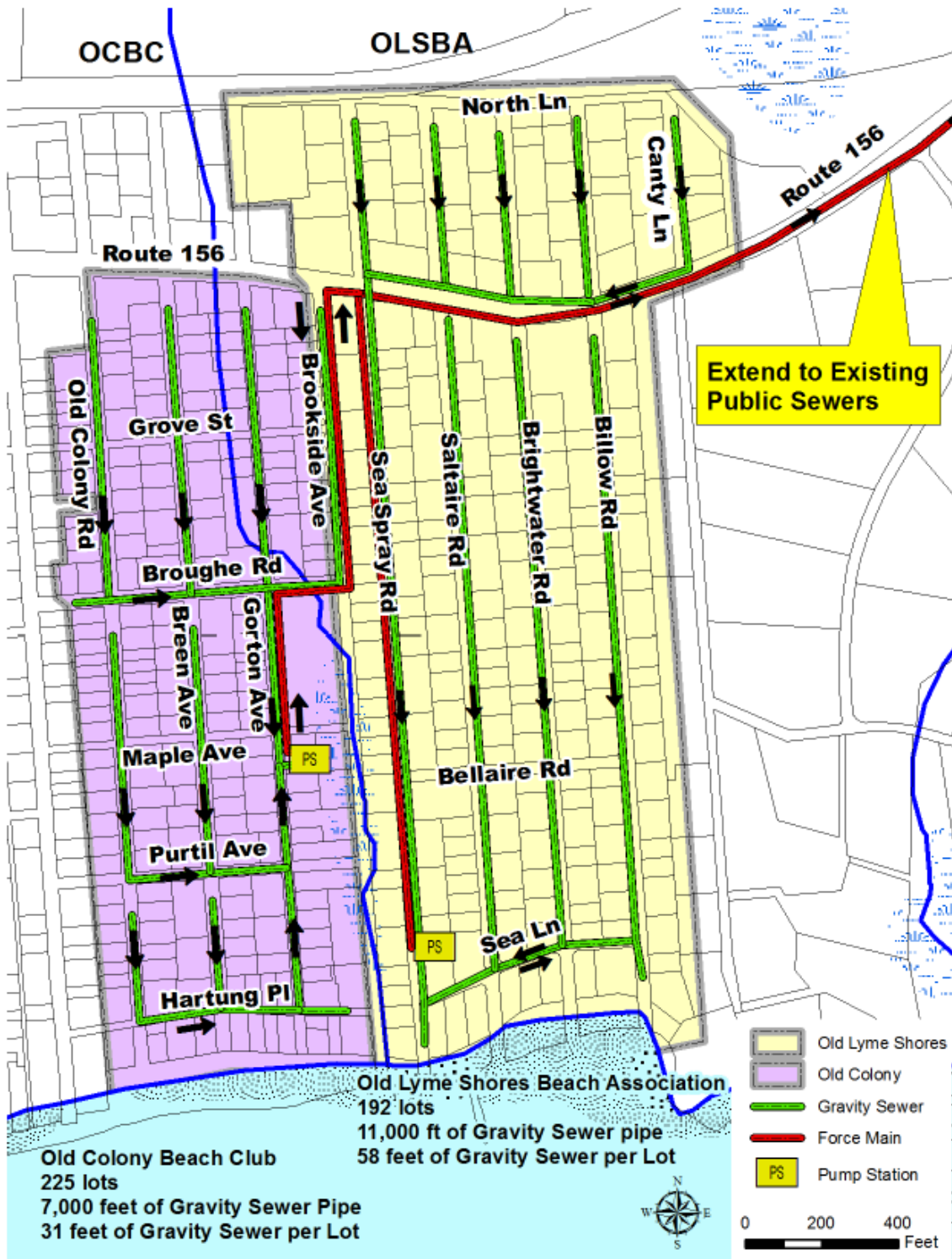


FIGURE 1-3 PROPOSED OCBCA/OLSBA FORCE MAIN ROUTE (F&O, 2012)

Shared Force Main from OCBC/OLSBA to East Lyme

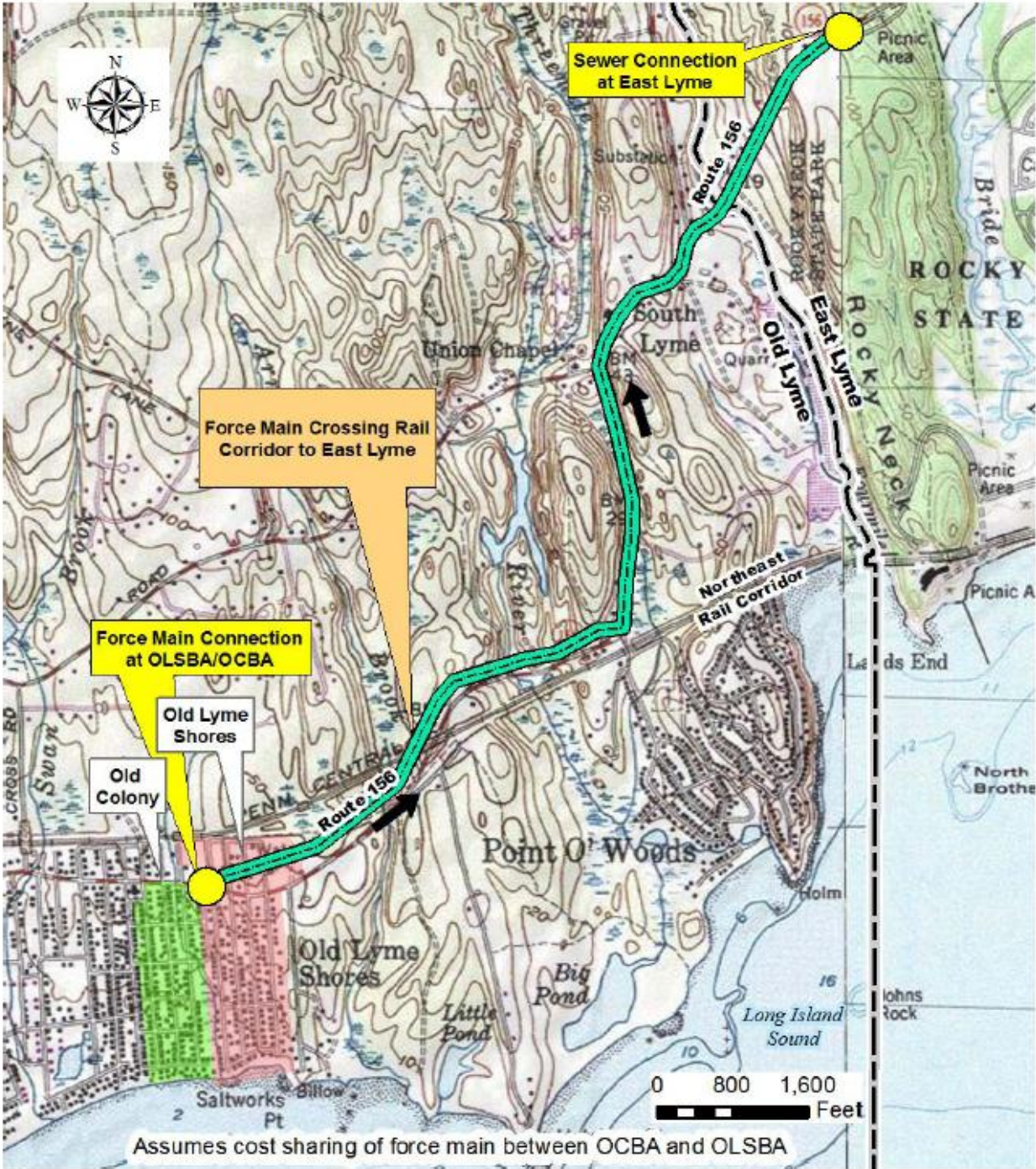


FIGURE 1-4: AERIAL PHOTO OF OCBC STUDY AREA



1.2 Proposed Project Costs

Table 1-2 presents a condensed version of the F&O(2012) estimated project costs for the OCBCA project area. Lombardo Associates, Inc. (LAI) has computed the estimated project costs from the F&O 2012 Addendum, which provided a range of -15% and +30% of the estimated costs. LAI has condensed the information solely for ease of viewing, without any comment on the veracity of the estimates at this time. In Section 1.3, LAI provides its opinion on “issues” associated with the F&O 2012 estimates for which, in LAI’s opinion, project cost allowances/adjustments need to be made. The purpose of these proposed allowances/adjustments is to enable a proper/correct comparison with alternative approaches that are described and whose costs are estimated herein.

TABLE 1-2 OCBCA WASTEWATER SYSTEM F&O OPINION ON COSTS

I. Base Plan:	Est. Cost	Subtotal
Procure Agreements for Recommended Plan		
1. Technical Services to Procure Stakeholder Agreements	\$25,000	
2. Legal and Administrative Services to Procure Stakeholder Agreements (2)	\$40,000	
3. Total - Procure Agreements for Recommended Plan (rounded)		\$65,000
Project Construction		
4. Construction Cost - Gravity Sewer w/Central Pump Station	\$1,980,000	
5. Construction Cost - Force Main Along Route 156 to East Lyme	\$2,880,000	
6. Construction Cost - Cost-Sharing Along Route 156	\$0	
7. Buy-In Fee to East Lyme / Waterford / New London	\$1,000,000	
8. Technical Services - Design, Permitting & Construction Administration	\$972,000	
9. Legal & Administrative	\$243,000	
10. Total - Project Construction Costs (Rounded)		\$7,075,000
DEEP CWF Eligible Design & Construction Costs		
11. Procure Agreements for Recommended Plan (excluding Legal & Admin)	\$25,000	
12. Project Construction Costs (Excluding Legal & Admin)	\$6,832,000	
13. Total - DEEP CWF Loan Eligible Costs (Rounded)		\$6,857,000
DEEP Ineligible Costs		
14. Short Term Financing at 1.5%	\$0	
15a. Legal and Administrative Fees (Table Line Items #2, #9)	\$283,000	
16. Total - DEEP Ineligible Costs (Rounded)		\$283,000
Estimated Local Share		
17. DEEP CWF Loan Eligible Costs	\$6,857,000	
18. DEEP Ineligible Costs	\$283,000	
19. Estimated Local Cost Share (Total Capital Cost)		\$7,140,000
20. DEEP CWF 25% Design & Construction (Small Community) Grant Amount		\$1,714,250
	Grand Total	\$5,425,750

II. Additional Association Improvements:		
Additional Association Improvements (Ineligible Costs)		
21. Storm Drainage Improvements	\$235,000	
22. Extensive Road Reconstruction	\$1,030,000	
23. Fire Hydrants	\$0	
24. Drinking Water System Improvements	\$0	
25. Technical Services - Design, Permitting & Construction Administration	\$253,000	
26. Total - Additional Association Improvements		\$1,518,000

III. Savings with Cost Sharing		
Savings with Cost Sharing		
27. Force Main Along Route 156	\$1,440,000	
28. Buy-in Fee to East Lyme / Waterford / New London	\$500,000	
29. Technical Services - Procure Agreements, Design, Permitting, Const. Admin.	\$300,500	
30. Legal and Administrative	\$92,000	
31. Less Grant Savings (25% of eligible savings)	-\$560,125	
32. Total Cost Sharing Savings		\$1,772,375

I. - Base Plan w/Grant	Capital	O&M	Total
Project Costs - With CT DEEP Grant, No Association Improvements, No Cost Sharing	\$5,426,000	n/a	\$5,426,000
Gross Cost per EDU (213)	\$25,500	\$73,500	\$99,000
Annual Capital Cost per EDU (20-yr. Term, 2%)	\$1,600	\$345	\$1,945

II. - Base Plan w/Grant and Association Improvements	F&O	LAI - 4.5%, 20 Years on Ineligible Costs			O&M	Total
		Eligible	Ineligible	Total		
Project Costs - With Association Improvements, With CT DEEP Grant, No Cost Sharing	\$6,943,750	\$5,142,750	\$1,801,000	\$6,943,750	n/a	\$6,943,750
Gross Cost per EDU (213)	\$32,600	\$24,100	\$8,500	\$32,600	\$73,500	\$106,100
Annual Capital Cost per EDU (20-yr. Term, 2%)	\$2,000	\$1,500	\$650	\$2,150	\$345	\$2,495

III. - Base Plan w/Grant, Association Improvements and Cost Sharing	F&O	LAI - 4.5%, 20 Years on Ineligible Costs			O&M	Total
		Eligible	Ineligible	Total		
Project Costs - With Association Improvements, With CT DEEP Grant, With Cost Sharing	\$5,171,375	\$3,462,375	\$1,709,000	\$5,171,375	n/a	\$5,171,375
Gross Cost per EDU (213)	\$24,300	\$16,300	\$8,000	\$24,300	\$73,500	\$97,800
Annual Capital Cost per EDU (20-yr. Term, 2%)	\$1,500	\$1,000	\$620	\$1,620	\$345	\$1,965

1.3 Issues and Recommended Additional Cost Allowances with Recommended Plan

During our review of the Plan documents, LAI observed the following issues that we believe need to be addressed and cost allowances provided for a transparent and thorough understanding of project capital and on-going O&M cost so that a comparison with any alternates can be fairly performed.

1.3.1 Financial

1.3.1.1 Interest Rate on Project Ineligible Costs

In computing the annual capital cost per user in the F&O Report, all financing was assumed to be 2% for 20 years, which are the CT DEEP State Revolving Fund (SRF) loan terms. It is understood that ineligible costs are not funded by the SRF loan program. Therefore the OCBCA will need to obtain bond funding at hopefully municipal rates of ~ 4+% for 20 years. This will increase the annual capital cost per user by \$100+/- and is only applicable for the option whereby road and stormwater work would be performed.

1.3.2 East Lyme Capacity Limitations

According to the Fuss & O'Neill December 2011 Old Lyme Shores Beach Association Wastewater Facilities Planning Report, on page 98 and as pasted below, there appears to be no additional capacity in the East Lyme wastewater conveyance system. Clarification/resolution of this critical matter needs to be addressed.

Please note below 3rd paragraph, which states, "East Lyme does not appear to have additional unallocated capacity for sewer extensions to neighboring communities west of the Bridle Brook Pump Station." As can be seen from Figure 1-2, OCBCA and OLSBA are west of the Bridle Book Pump Station.

1.3.3 Pump Station and Conveyance System Upgrades

The various RFP Engineering and F&O Engineering Plans identified a number of issues associated with pump stations and conveyance systems in East Lyme and Waterford that appear to need to have budget allowances provided for required studies and likely required improvements. These include:

East Lyme	Evaluate hydraulic capacity of infrastructure Assess Bride Brook & Route 156 PS
Waterford	Corrosion & Odor Study

The following pump stations will need to be evaluated to determine their capacity to accept the proposed wastewater flows and any needed improvements to accept the proposed pumping rate of 275 gpm.

East Lyme	Bride Brook Pump Station Route 156 PS Pattagansett PS Niantic PS
-----------	---

Waterford	Waterford PS
-----------	--------------

8.6.1 East Lyme Capacity Remaining

Obtaining capacity in East Lyme's sewer system will require negotiation with the Town of East Lyme, and potentially the Department of Corrections. There is currently unused flow allocation from the former Gates correctional facility in East Lyme that OLSBA may be able to obtain. Table 8-10 lists the flow allocations from East Lyme to the State of Connecticut.

**Table 8-10:
State of Connecticut Total Wastewater Flow Allocation from East Lyme**

Type	Flow Allocation (GPD)	Capacity Used in 2004
Rocky Neck State Park	169,000	0%
Governor's Camp	58,000	21.4%
Gates Correctional Facility	250,000	94.6%
York Correctional Facility		

With Gates Correctional Facility's capacity, any addition of wastewater flow from OLSBA would be offset by the reserved capacity from the Gates correctional facility. OLSBA may be required to purchase the reserved capacity from the Department of Corrections, but a buy-in to East Lyme's sewer system is not anticipated since DOC has reportedly already paid for the capacity in the East Lyme system.

East Lyme does not appear to have additional, unallocated capacity for sewer extensions to neighboring municipalities west of the Bride Brook Pump Station. The Town of East Lyme has an Intermunicipal agreement with Waterford and New London for an average daily flow rate of 1.5 million gallons per day. Projections of future build-out (based on zoning) over a 20 year planning horizon indicates that the Town will approach 3,472,000 MGD and exceed its negotiated Intermunicipal Agreement limits with Waterford and New London. These findings were presented in the September 2007 Wastewater collection System Capacity Analysis Planning Report for the Town of east Lyme prepared for the CT DEEP by Fuss & O'Neill, Inc.

It should be noted that the City of New London is reportedly in the process of evaluating opportunities to provide improvements which could rerate the capacity of the WWTP. Should this occur, East Lyme will be provided 15% of the increased capacity pursuant to their Intermunicipal agreement.

1.3.4 New London Treatment Plant Costs

The F&O 2012 Plan provides a \$1,000,000 connect fee for OCBCA only, and states that the fee would be the same with the addition of OLSBA wastewater resulting in each paying \$500,000. No basis has been provided for these fees. The New London Wastewater Treatment Plant fee remaining the same with the flow doubling is counterintuitive and not normal practice.

An official statement from New London for the connect fee should be obtained.

1.3.5 Operations & Maintenance (O&M) Costs

The F&O 2012 Addendum O&M costs are presented as Table 1-3.

TABLE 1-3 F&O 2012 ESTIMATED ANNUAL O&M COSTS

Estimated Annual O&M Cost for Centralized Sewer System to East Lyme

O&M COSTS (2012)	Gravity Sewers
Contract Operation Fee	\$10,000
Annual Payment to East Lyme for flow treatment at New London WPCF ⁽¹⁾	\$25,000
Annual Payment to Point O' Woods for shared pump station cost ⁽²⁾	\$0
Grinder pump equipment short lived asset account ⁽⁴⁾	\$0
Gas and oil for generator(s)	\$200
General Engineering/Legal	\$2,000
Audit	\$500
Discretionary Fund	\$500
Odor Control	\$20,000
Short lived asset account (Reserve for capital non-reoccurring)	\$10,000
State fees	\$300
Billing & Collection	\$5,000
Annual O&M Cost (Rounded)	\$74,000

1) Based on an assumed \$5/1000 gallons of wastewater

2) Based on an assumed \$5/1000 gallons of wastewater

3) Based on i=4%, t=20 years, PV=\$100,000

4) Based on \$40 per Grinder Pump per year

Comments on the O&M costs are:

- a. The annual payment to East Lyme for treatment plant costs at \$5,000 / 1,000 gallons appears to be at odds with the \$25/1,00 gallons as stated in the July 10, 2012 news article at <http://newlondon.patch.com/articles/water-sewer-rate-hike-dies-in-committee>
- b. It appears that the annual payment to East Lyme for treatment plant costs assumes flow at 33% of design flow – which should be stated in the footnotes as costs will increase with more full time use at the properties.
- c. No electricity costs are included in Annual O&M costs. Electricity costs of \$2,500+ will be incurred for the force main pump station. Additional electricity costs will be incurred at each of the OCBCA and OLSBA pump stations as well as electricity for pumping the wastewater through the 5 pump stations in East Lyme and Waterford.
- d. Pump stations and collection system O&M costs should be provided.

2. OCBCA ALTERNATIVES CONSIDERED TECHNICALLY VIABLE

The following alternatives to the proposed connection to New London Wastewater Treatment Facility (WWTF) are considered technically viable and will be discussed in this Section after which a cost effectiveness analysis will be performed.

Proposed Plan - OCBCA Neighborhood Collection, Transmission for 3+/- miles to East Lyme and treatment/disposal by the New London WWTF.

- a. Alternative #1 – OCBCA Neighborhood Collection, Local Treatment and Nearby Off-Site Disposal/Reuse
- b. Alternative #2 – OCBCA Neighborhood Collection, Treatment and Disposal with treatment and disposal system located within OCBCA
 -
- c. Alternative #3 – OCBCA Hybrid Combination of local Small Cluster Systems

Due to complexities associated with the lot by lot analysis of Alternative #3 and identification of sufficient land with proper soils and groundwater characteristics for Alternatives # 2 and 3 and limited time and budget, LAI has provided preliminary opinions on the costs and technical viability of Alternatives # 2 and # 3. As Alternative # 1 has the capability to serve all beach communities and OCBCA property owners may prefer an off-site solution, LAI recommends public review of the options to determine the locally preferred option, as the costs are similar – see Section 3.

The wastewater system technical approach that in LAI's 40 years of experience can be the least costly option for Alternatives # 1, # 2 and cluster solutions of # 3 is:

Wastewater Collection	Septic tank effluent collection system
Treatment	Recirculating media filters with nitrogen removal to achieve Total Nitrogen < 10 mg/l, typically TN 3+/- mg/l. Nitrogen and phosphorus would displace fertilizer demand and not be removed when treated effluent is used for landscape irrigation and fertilization. Treatment system is modular and can easily respond to changes in wastewater flow.
Disposal/reuse	Subsurface drip irrigation for golf course / landscape irrigation with effluent disposal during periods of no irrigation demand. Leaching chambers or equivalent for disposal

2.1 Alternative # 1 - Neighborhood Collection System with Off-Site Treatment & Disposal/Reuse

This alternative utilizes a Septic Tank Effluent Gravity (STEG) collection system to convey wastewater from OCBC to a central pump station. While opportunities for an optimized layout exist, LAI did not alter the Fuss & O'Neil layout shown previously on Figure 1-1. The proposed

STEG system would combine two homes on one new septic tank, with a common effluent pipe connecting to the sewer line in the street. It is noted that due to the high development density and good quality of roads, STEG lines may be placed on both sides of roads and thereby avoiding a significant amount of road excavation and repairs. Existing septic tanks in good condition would be retained.

STEG systems have the following cost-saving advantages:

1. Small diameter pipes & less slope required
2. Cleanouts instead of manholes

Alternative #1 proposes to use of one of the treatment and dispersal sites presented in Figure 2-1. It is possible that the treatment site would be within OCBC or at another site with a force main conveying treated effluent to the dispersal/reuse site.

The primary cost savings associated with this alternative comes from the STEG collection system and the reduced length of the force main – reduced from 15,000 feet to 4,000+/- feet. This alternative also reduces the number of negotiated agreements that will be necessary for implementation as all properties of interest are in the Town of Old Lyme.

FIGURE 2-1: POTENTIAL TREATMENT AND DISPERSAL SITES



The approximate net area requirements for treatment and dispersal are:

- Treatment Area – 12,000 ft²
- Dispersal / Reuse Area – 50,000 ft²
- Gross area requirements will depend on site specifics and are expected to be a minimum of 8 +/- acres

The critical path issue for any OCBCA neighborhood system will be the availability of technically viable land for disposal and/or reuse of the treated wastewater within an economically competitive distance from wastewater generation. A number of properties have been identified within 4,000 – 10,000 feet of OCBCA that, based upon USDA NRCS soils and a review of Town of Old Lyme files, have suitable soils and have sufficient depth to groundwater and hydraulic characteristics to be able to be successfully used for treated wastewater effluent disposal/reuse.

These candidate sites include:

Reuse/Disposal

1. Cherrystone's Driving Range - approx. 3,500 feet from OCBCA, 1 stream crossing
 - 218 Shore Road
 - Appears to be 29 +/- acres, Zoned C-30, Assessed Valuation \$300,000.
 -

Cherrystone's Driving Range
218 Shore Road
Old Lyme, Connecticut [06371](http://www.06371.com)
(860)434-1721

2. Black Hall Golf Club - approximately 5,500 feet from OCBCA, 2 stream crossings
Buttonball Road. Area of property 125-150 acres, turf area 50-75 acres

- Barbara Handy, Club Administrator
Phone: 860-434-5171
Email: office@blackhallclub.com

Philip Neaton, Black Hall Golf Club Superintendent
bhsuper@sbcglobal.net
(860) 434-2051

Based upon meeting with Club Superintendent Philip Neaton on August 24, 2012, an easement exists from Route 156 to the golf course.

Disposal Only

3. Land west of White Sands Beach area - approx. 8,500 feet from OCBCA, 3+/- stream crossings
 -
4. Land west of Farm Lane - - approx. 5,500 feet from OCBCA, 2 stream crossings

2.2 Alternative # 2 - Neighborhood Collection, Treatment and Disposal within OCBCA

This alternative is similar to Alternative # 1 with treatment and disposal to occur on properties within OCBCA. A very preliminary identification of potential candidate sites within OCBC is shown on Figure 2-2. Sites along the eastern border may be eliminated due to proximity to the brook. Also, additional properties appear available just outside of OCBCA.

FIGURE 2-2: POTENTIAL TREATMENT AND DISPERSAL SITES WITHIN OCBC



2.3 Alternative # 3 - Hybrid On-Site and Small Cluster Systems

This alternative consists of a combination of on-site and small cluster systems. The primary technical constraints on this approach are:

- shallow depth to groundwater and
- space limitations

As the OCBCA area is located in a potentially drinking water aquifer and due to the limited rainfall dilution available to achieve drinking water standard of Total Nitrate-Nitrogen (TN) of <10 mg/l, it is assumed that wastewater systems will be required to produce effluent with TN < 10 mg/l.

2.3.1 Individual On-Site Systems

Space requirements for a wastewater system producing TN < 10 mg/l for an individual property are:

- | | |
|----------------------------------|-------------------------------------|
| ▪ Septic tank & treatment system | 200 square feet (sf) |
| ▪ Disposal system | <u>200 sf</u> |
| ▪ Total | 400 sf or an area 20 feet x 20 feet |

Figure 2-3 illustrates such a treatment system for an individual property. Please note the pre-treatment system can be located on top or to the side of the septic tank.

FIGURE 2-3: INDIVIDUAL PROPERTY WASTEWATER SYSTEM PRODUCING EFFLUENT TN < 10 MG/L



2.3.2 Small Cluster On-Site Systems

This technical approach consists of combing a small number of properties on one system to address space limitations and achieve economies of scale. Figure 2-4 illustrates the potential layout of a small cluster system serving four (4) properties. The number of properties on a small

cluster system would be dictated by local site conditions. It is noted that the treatment and even disposal systems could be located under paved areas, such as parking lots and/or roads, as illustrated on Figure 2-5.

FIGURE 2-4: SMALL CLUSTER WASTEWATER SYSTEM PRODUCING EFFLUENT TN < 10 MG/L

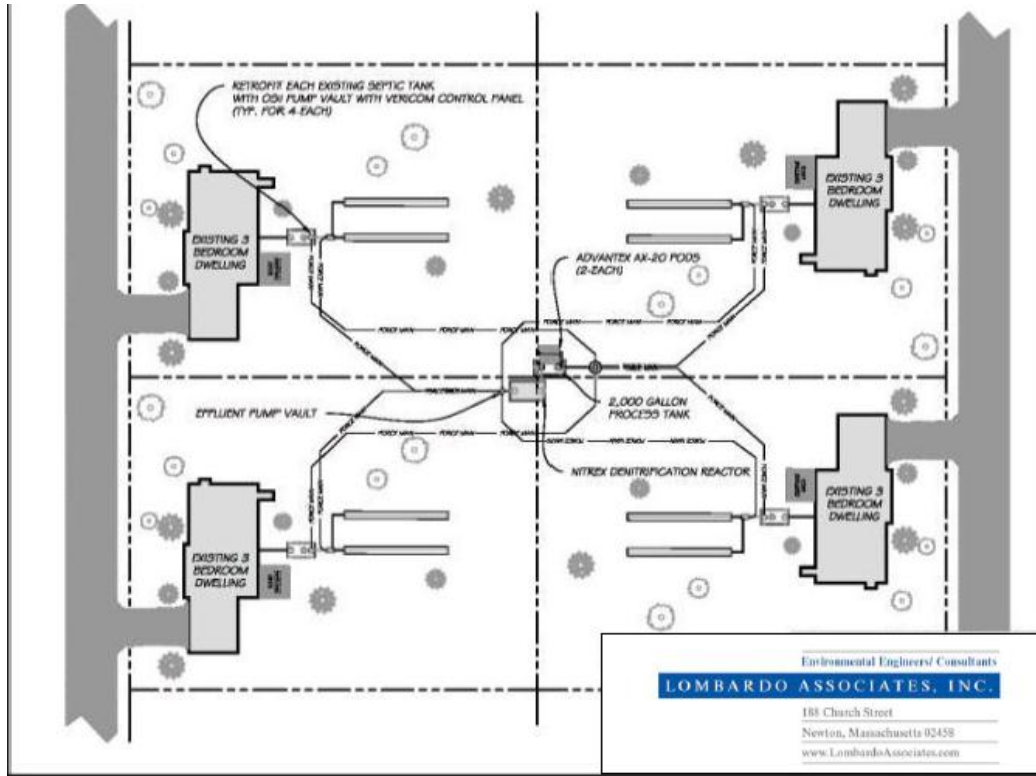


FIGURE 2-5: SMALL CLUSTER WASTEWATER SYSTEM UNDER PAVED AREA



2.3.3 Large Cluster On-Site Systems

Due to space limitations and depth to groundwater limitations, large cluster wastewater system(s) may be necessary and as it expands it will resemble parts of Alternatives # 1 and # 2.

2.3.4 Combination of Individual and Cluster Wastewater Systems

The Alternative # 3 combination of individual and cluster systems will require numerous setback variances. Also given that all properties cannot be served by individual systems, either OCBCA or Town will need to assume ownership for properties without individual systems.

It is not possible at this juncture to determine the optimal technical combination of individual and cluster wastewater systems. In addition to technical issues, property owner preferences should be considered. It is noted that Alternative # 3 will require dedication of lands to wastewater systems whereas Alternatives # 1 and # 2 would not. This land use impact and property owner management of the wastewater system, especially for the small lots, needs to be a factor in decision making.

To address the attractiveness of the individual and cluster system approach without a detailed technical viability assessment, LAI will render an opinion on the economic competitiveness of this option in Section 3.

3. COST ANALYSIS OF EXISTING AND PROPOSED ALTERNATIVES

3.1 Proposed Plan Costs

Section 1 presents the Proposed Plan project costs as developed by F&O.

3.2 Alternative #1 Costs

The Capital and Annual O&M costs for Alternative # 1 are presented on Tables 3-1 through 3-4. In developing these cost estimates LAI has focused primarily on collection system technology change and force main length options, without altering many of the assumptions used in the F&O analysis. It is LAI's opinion that additional cost savings can be achieved by value engineering – in particular minimizing road repair/restoration costs.

TABLE 3-1 ALTERNATIVE # 1 COLLECTION SYSTEM CONSTRUCTION COSTS

Septic Tank Effluent Gravity Sewer Collection in OCBCA Study Area					
		Units	No. Units	Unit Cost	Total Cost
1	4 inch gravity sewer	FT	7,600	\$ 40	\$ 304,000
2	4 inch force main, cleanouts & Valve chambers	FT	1,800	\$ 40	\$ 72,000
3	4 inch service connections	FT	1,125	\$ 40	\$ 45,000
4	Cleanouts	EA	25	\$ 1,000	\$ 25,000
5	OCBA Pump Station	EA	1	\$ 250,000	\$ 250,000
6	Pump Station Land easement	EA	1	\$ 25,000	\$ 25,000
7	Rock Excavation	CY	-	\$ 90	\$ -
8	Construction Mobilization	LS	1	\$ 50,000	\$ 50,000
9	Temporary Bituminous Pavement Repair (Association R	LF	9,200	\$ 13	\$ 119,600
10	Mill and Overlay (Association Road)	SY	10,200	\$ 17	\$ 173,400
11	Temporary Bituminous Pavement Repair (State R	LF	-	\$ 15	\$ -
12	Permanent Bituminous Pavement Repair (State R	LF	-	\$ 20	\$ -
13	Mill and Overlay (State Road)	SY	-	\$ 50	\$ -
14	Septic Tanks	EA	120	\$ 2,000	\$ 240,000
					\$ 1,304,000

TABLE 3-2 ALTERNATIVE # 1 FORCE MAIN SYSTEM CONSTRUCTION COSTS

Force Main From OCBCA to Cherrystone's Driving Range					
	Force Main Component	Units	# of Units	\$ / Unit	Total Cost
1	6-inch Force Main, Clenouts and Valve Chambers	FT	4,200	\$ 85	\$ 357,000
2	OLSBA Pump Station Pump Size Increase	EA	-	\$ 60,000	\$ -
3	Rock Excavation	CY	233	\$ 90	\$ 20,994
4	Temporary Bituminous Pavement Repair (State R	LF	4,200	\$ 15	\$ 63,000
5	Permanent Bituminous Pavement Repair (State R	LF	4,200	\$ 20	\$ 84,000
6	Mill & Overlay (State Road)	SY	5,622	\$ 50	\$ 281,077
7	Stream Crossing	EA	2	\$ 30,000	\$ 60,000
8	East Lyme Sewer Connection Fee	ALL	-	\$ 100,000	\$ -
9	Railroad Bridge Crossing Premium	ALL	-	\$ 200,000	\$ -
	Total Common Force Main Construction Cost				\$866,070

TABLE 3-3: ALTERNATIVE #1 TREATMENT PLANT CONSTRUCTION COSTS

OCBCA Only WWTF + Disposal Field Construction Costs		
1	Equalization Tank	\$ 248,300
2	Treatment System	\$ 1,571,790
3	Dispersal System	\$ 141,174
4	Emergency Gen. / Control Bldg	\$ 42,500
5	Site Work	\$ 57,300
	Subtotal	\$ 2,061,064
6	Land	\$ 300,000
	Grand Total	\$ 2,361,064

TABLE 3-4: ALTERNATIVE #1& 2 ANNUAL O&M COSTS

Annual O&M Cost - Alternatives 1-2		
1	Contract Operations	\$39,000
2	Sampling	\$10,400
3	Electricity	\$3,380
4	Phone Service	\$480
5	Sludge Pumping and Disposal	\$1,930
6	Engineering Oversight / Fees	\$4,200
7	Equipment Replace Asset Account	\$11,600
8	Bilings & Collection & Misc	\$6,000
	Annual O&M Cost	\$77,000

Table 3-5 presents a summary of Alternative # 1 project costs in the same format as the F&O July 2012 Report.

3.3 Alternative #2 Costs

The Capital and Annual O&M costs for Alternative # 2 are virtually identical to Alternative # 1 except that the force main would be to local/nearby in OCBCA sites, with the Alternative # 2 force main construction costs presented on Table 3-6. Table 3-7 presents a summary of Alternative # 2 project costs in the same format as the F&O July 2012 Report.

TABLE 3-6 ALTERNATIVE # 2 FORCE MAIN SYSTEM CONSTRUCTION COSTS

Force Main to Treatment and Dispersal Sites - in Same Trench as Sewers					
	Force Main Component	Units	# of Units	\$ / Unit	Total Cost
1	6-inch Force Main, Clenouts and Valve Chambers	FT	8,000	\$ 20	\$ 160,000
2	OLSBA Pump Station Pump Size Increase	EA	-	\$ 60,000	\$ -
3	Rock Excavation	CY	-	\$ 90	\$ -
4	Temporary Bituminous Pavement Repair (State R	LF	-	\$ 15	\$ -
5	Permanent Bituminous Pavement Repair (State R	LF	-	\$ 20	\$ -
6	Mill & Overlay (State Road)	SY	-	\$ 50	\$ -
7	Stream Crossing	EA	-	\$ 30,000	\$ -
8	East Lyme Sewer Connection Fee	ALL	-	\$ 100,000	\$ -
9	Railroad Bridge Crossing Premium	ALL	-	\$ 200,000	\$ -
	Total Common Force Main Construction Cost				\$160,000

TABLE 3-5 ALTERNATIVE #1 OPINION OF PROBABLE COSTS

I. Treatment & Disposal Off of OCBCA property - initially Driving Range Property		Est. Cost	Subtotal			Construction	Eng. Legal-Admin	Total
Procure Agreements for Recommended Plan					Collection	\$1,304,000	\$335,000	\$1,639,000
1. Technical Services to Procure Stakeholder Agreements		\$12,000			Transmission	\$867,000	\$223,000	\$1,090,000
2. Legal and Administrative Services to Procure Stakeholder Agreements		\$20,000			Treatment	\$1,863,000	\$479,000	\$2,342,000
3. Total - Procure Agreements for Recommended Plan (rounded)			\$32,000		Dispersal	\$498,000	\$128,000	\$626,000
Project Construction					Total	\$4,532,000	\$1,165,000	\$5,697,000
4. Construction Cost - Gravity Sewer w/Central Pump Station		\$1,304,000			Engineering, Legal & Admin	\$1,166,000		
5. Construction Cost - Force Main Along Route 156 to East Lyme		\$867,000						
6. Treatment System		\$1,862,590						
7. Dispersal System		\$498,000						
8. Technical Services - Design, Permitting & Construction Administration		\$907,000						
9. Legal & Administrative		\$227,000						
10. Total - Project Construction Costs (Rounded)			\$5,666,000					
DEEP CWF Eligible Design & Construction Costs								
11. Procure Agreements for Recommended Plan (excluding Legal & Admin)		\$12,000						
12. Project Construction Costs (Excluding Legal & Admin)		\$5,439,000						
13. Total - DEEP CWF Loan Eligible Costs (Rounded)			\$5,451,000					
DEEP Ineligible Costs								
14. Short Term Financing at 1.5%		\$0						
15a. Legal and Administrative Fees (Table Line Items #2, #9)		\$247,000						
16. Total - DEEP Ineligible Costs (Rounded)			\$247,000					
Estimated Local Share								
17. DEEP CWF Loan Eligible Costs		\$5,451,000						
18. DEEP Ineligible Costs		\$247,000						
19. Estimated Local Cost Share (Total Capital Cost)			\$5,698,000					
20. DEEP CWF 25% Design & Construction (Small Community) Grant Amount			\$1,362,750					
			Grand Total	\$4,335,250				
II. Additional Association Improvements:								
Additional Association Improvements (Ineligible Costs)								
21. Storm Drainage Improvements		\$235,000						
22. Extensive Road Reconstruction		\$1,030,000						
23. Fire Hydrants		\$0						
24. Drinking Water System Improvements		\$0						
25. Technical Services - Design, Permitting & Construction Administration		\$253,000						
26. Total - Additional Association Improvements			\$1,518,000					
III. Savings with Cost Sharing								
Savings with Cost Sharing								
27. Force Main Along Route 156		\$433,500						
28. Land Costs		\$150,000						
29. Technical Services - Procure Agreements, Design, Permitting, Const. Admin.		\$227,000						
30. Legal and Administrative		\$61,750						
31. Less Grant Savings (25% of eligible savings)		-\$202,625						
32. Total Cost Sharing Savings			\$669,625					
I. - Alternative #1 w/Grant								
			Capital	O&M	Total			
Project Costs - With CT DEEP Grant, No Association Improvements, No Cost Sharing		\$4,335,000		n/a	\$4,335,000			
Gross Cost per EDU (213)		\$20,400		\$77,000	\$97,400			
Annual Capital Cost per EDU (20-yr. Term, 2%)		\$1,200		\$362	\$1,562			
II. - Alternative #1 w/Grant and Association Improvements								
			Capital Costs	4.5%, 20 Years on Ineligible Costs			O&M	Total
				Eligible	Ineligible	Total		
Project Costs - With Association Improvements, With CT DEEP Grant, No Cost Sharing		\$5,853,250	\$4,088,250	\$1,765,000	\$5,853,250	n/a	\$5,853,250	
Gross Cost per EDU (213)		\$27,500	\$19,200	\$8,300	\$27,500	\$77,000	\$104,500	
Annual Capital Cost per EDU (20-yr. Term, 2% for eligible costs only)			\$1,200	\$640	\$1,840	\$362	\$2,202	
III. - Alternative #1 w/Grant, Association Improvements and Cost Sharing								
			Capital Costs	4.5%, 20 Years on Ineligible Costs			O&M	Total
				Eligible	Ineligible	Total		
Project Costs - With Association Improvements, With CT DEEP Grant, With Cost Sharing		\$5,183,625	\$3,480,375	\$1,703,250	\$5,183,625	n/a	\$5,183,625	
Gross Cost per EDU (213)		\$24,300	\$16,300	\$8,000	\$24,300	\$77,000	\$101,300	
Annual Capital Cost per EDU (20-yr. Term, 2% for eligible costs only)			\$1,000	\$620	\$1,620	\$362	\$1,982	

TABLE 3-7: ALTERNATIVE #2 OPINION OF PROBABLE COSTS

I. Alternative #2 - Treatment-Disposal within OCBCA Area		Est. Cost	Subtotal			Construction	Eng. Legal-Admin	Total	
Procure Agreements for Recommended Plan									
	1. Technical Services to Procure Stakeholder Agreements	\$10,000				Collection	\$1,304,000	\$307,200	\$1,611,200
	2. Legal and Administrative Services to Procure Stakeholder Agreements	\$10,000				Transmission	\$160,000	\$37,700	\$197,700
	3. Total - Procure Agreements for Recommended Plan (rounded)		\$20,000			Treatment	\$1,863,000	\$438,800	\$2,301,800
Project Construction						Dispersal	\$498,000	\$117,300	\$615,300
	4. Construction Cost - Gravity Sewer w/Central Pump Station	\$1,304,000				Total	\$3,825,000	\$901,000	\$4,726,000
	5. Construction Cost - Force Main to Treatment and Dispersal Sites (common trench as se	\$160,000				Engineering, Legal & Admin		\$901,000	
	6. Treatment System	\$1,862,590							
	7. Dispersal System	\$498,474							
	8. Technical Services - Design, Permitting & Construction Administration	\$766,000							
	9. Legal & Administrative	\$115,000							
	10. Total - Project Construction Costs (Rounded)		\$4,706,000						
DEEP CWF Eligible Design & Construction Costs									
	11. Procure Agreements for Recommended Plan (excluding Legal & Admin)	\$10,000							
	12. Project Construction Costs (Excluding Legal & Admin)	\$4,591,000							
	13. Total - DEEP CWF Loan Eligible Costs (Rounded)		\$4,601,000						
DEEP Ineligible Costs									
	14. Short Term Financing at 1.5%	\$0							
	15a. Legal and Administrative Fees (Table Line Items #2, #9)	\$125,000							
	16. Total - DEEP Ineligible Costs (Rounded)		\$125,000						
Estimated Local Share									
	17. DEEP CWF Loan Eligible Costs	\$4,601,000							
	18. DEEP Ineligible Costs	\$125,000							
	19. Estimated Local Cost Share (Total Capital Cost)		\$4,726,000						
	20. DEEP CWF 25% Design & Construction (Small Community) Grant Amount		\$1,150,250						
	Grand Total		\$3,575,750						
II. Additional Association Improvements:									
Additional Association Improvements (Ineligible Costs)									
	21. Storm Drainage Improvements	\$235,000							
	22. Extensive Road Reconstruction	\$1,030,000							
	23. Fire Hydrants	\$0							
	24. Drinking Water System Improvements	\$0							
	25. Technical Services - Design, Permitting & Construction Administration	\$253,000							
	26. Total - Additional Association Improvements		\$1,518,000						
III. Savings with Cost Sharing									
Savings with Cost Sharing									
	27. Force Main Along Route 156								
	28. Buy-in Fee to East Lyme / Waterford / New London								
	29. Technical Services - Procure Agreements, Design, Permitting, Const. Admin.								
	30. Legal and Administrative								
	31. Less Grant Savings (25% of eligible savings)	\$0							
	32. Total Cost Sharing Savings		\$0						
I. - Alternative #2 w/Grant				Capital	O&M	Total			
	Project Costs - With CT DEEP Grant, No Association Improvements, No Cost Sharing	\$3,576,000		n/a		\$3,576,000			
	Gross Cost per EDU (213)	\$16,800		\$71,000		\$87,800			
	Annual Capital Cost per EDU (20-yr. Term, 2%)	\$1,000		\$333		\$1,333			
II. - Alternative #2 w/Grant and Association Improvements				Capital Costs	4.5%, 20 Years on Ineligible Costs			O&M	Total
	Project Costs - With Association Improvements, With CT DEEP Grant, No Cost Sharing	\$5,093,750	\$3,450,750	\$1,643,000	\$5,093,750	n/a	\$5,093,750		
	Gross Cost per EDU (213)	\$23,900	\$16,200	\$7,700	\$23,900	\$71,000	\$94,900		
	Annual Capital Cost per EDU (20-yr. Term, 2% for eligible costs only)		\$1,000	\$590	\$1,590	\$333	\$1,923		
III. - Alternative #2 w/Grant, Association Improvements and Cost Sharing				Capital Costs	4.5%, 20 Years on Ineligible Costs			O&M	Total
	Project Costs - With Association Improvements, With CT DEEP Grant, With Cost Sharing	\$5,093,750	\$3,450,750	\$1,643,000	\$5,093,750	n/a	\$5,093,750		
	Gross Cost per EDU (213)	\$23,900	\$16,200	\$7,700	\$23,900	\$71,000	\$94,900		
	Annual Capital Cost per EDU (20-yr. Term, 2% for eligible costs only)		\$1,000	\$590	\$1,590	\$333	\$1,923		

3.4 Alternative #3 Costs

Based upon Lombardo Associates, Inc. experience, Table 3-8 presents LAI's opinion of capital and annual O&M costs for representative individual and cluster systems that achieve TN < 10 mg/l. As can be seen from a comparison of the Table 3-8 Alternative # 3 costs to the per EDU

costs of Alternatives # 1 and # 2 on Table 3-9, there is no economic incentive to pursue Alternative # 3.

TABLE 3-8: ALTERNATIVE #3 OPINION OF PROBABLE COSTS PER EDU

OCBCA - Individual and Cluster Systems Alternative		
	Capital Costs	Annual O&M Costs
Individual On-Site System	\$ 28,000	\$ 800
Small Cluster System	\$ 27,000	\$ 600
Large Cluster System	\$ 27,000	\$ 800
Annual O&M Costs significantly influenced by site conditions and CT DEEP requirements		

3.5 Cost Comparison

Table 3-9 presents a Summary of the Project Capital Costs of the various options.

TABLE 3-8: SUMMARY OF PROBABLE PROJECT COSTS

Old Colony Beach Club Association Wastewater Management Alternatives Analysis				
Number Properties	213	Alternatives		
Major System Component	Proposed Plan	# 1	# 2	# 3
		STE Collection, Off-Site Disposal (Dreiving Range Property)	STE Collection, with Trt / Disposal within OCBCA Neighborhood	Mixed Indiv. Onsite / Cluster Systems
Collection System Cost	\$2,412,500	\$1,639,000	\$1,612,000	
Transmission Costs	\$3,509,100	\$1,090,000	\$198,000	
Treatment Costs	\$1,218,400	\$2,342,000	\$2,302,000	
Disposal Costs (includes Land)		\$626,000	\$616,000	
Total Cost	\$7,140,000	\$5,697,000	\$4,728,000	
Cost Savings vs Proposed Plan		\$1,443,000	\$2,412,000	
% Cost Savings vs Proposed Plan		20%	34%	
Net Capital Costs				
Cost Sharing with Old Lyme Shores Beach Association	-\$1,772,375	-\$669,625	\$0	
Additional Improvements	\$1,518,000	\$1,518,000	\$1,518,000	
Projected CT DEEP Grant	\$ (1,714,250)	\$ (1,362,750)	\$ (1,150,250)	
Net Cost w/Grant	\$ 5,171,375	\$ 5,182,625	\$ 5,095,750	
Savings to Old Lyme Shores Beach Association Costs Share		\$1,102,750		
Capital Cost Per EDU				
Gross Sewer Only Cost / EDU	\$ 33,521	\$ 26,746	\$ 22,197	
Gross Sewer w/improve Cost / EDU	\$ 40,648	\$ 33,873	\$ 29,324	
Net Cost w/improve (w/cost share & grant) / EDU	\$ 24,300	\$ 24,300	\$ 23,900	
Annual O&M Costs				
Total	\$ 73,500	\$ 77,000	\$ 77,000	
Cost /EDU	\$ 345	\$ 362	\$ 362	
Capital Amortization & O&M Costs				
Total Annual	\$ 1,965	\$ 1,982	\$ 1,952	
Total Monthly	\$ 164	\$ 165	\$ 163	
Notes:				
1. Eligible costs amortized at 2% for 20 years. Ineligible costs amortized at 4.5% for 20 years				
2. Does not include house connection cost - estimated by others at \$2,000 - \$2,500. Alternatives 1 - 3 would have lower house connection cost.				
3. Costs are opinions of probable costs based upon F&O estimates. Range of probable costs are -15% and +30% of above costs				
4. LAI estimates additional project cost savings of \$500,000 with value engineering				

4. CONCLUSIONS AND RECOMMENDATIONS

4.1 Conclusions

Based upon the analysis presented herein, the following conclusions can be drawn.

1. A local Town of Old Lyme wastewater system for OCBCA is technically viable, with available technically viable lands nearby, and cost-competitive with the proposed Plan on connection to the New London WWTF.
2. With value engineering efforts, additional cost savings are anticipated for an OCBCA wastewater system.
3. The local Town of Old Lyme alternatives identified herein can be easily configured to address all of the wastewater issues in the 1,500 +/- properties in the Old Lyme beach communities. Sufficient lands are available for treatment and disposal/reuse. Additional cost savings beyond those identified in this Report can be achieved by inclusion of beach communities in addition to OCBCA and OLSBCA.
4. The proposed Plan for connection to New London has many implementation challenges and unaccounted for costs that could significantly impede its implementation and increase its cost. As an example agreements will be needed with East Lyme, Westford and New London. A previous F&O study states that there is no current capacity for Old Lyme for connection to the New London wastewater system – which includes the East Lyme and Waterford pump stations and transmission systems.
5. Realization of the cost savings and environmental benefits described in this Report will require the Town of Old Lyme deciding and making a commitment to be the lead for establishment of a wastewater management district to serve the OCBCA and OLSBCA, and others as desired/needed.
 - a. Such a district would be financially self-sufficient with all capital and annual O&M costs paid by the users – i.e. district participants.
 - b. The Town can achieve economies of scale and provide financing for ineligible costs at a lower rate than the individual beach associations.
 - c. The Town can readily acquire needed lands and easements. The legal ability of OCBCA to obtain easements from an unwilling property owner is questioned needs to be determined.
 - d. Given the Consent Order described in Section 1, the Town will need to commit to taking a lead role on the Consent Order's compliance and enter into discussions with CT DEEP regarding the Town replacing OCBCA as the responsible party for the Consent Order. Given the strict deadline requirements of the Consent Order, time is of the essence. It is LAI's opinion that the Consent Order's overall schedule for an operational wastewater system serving OCBCA by June 30, 2016 is readily achievable with a Town wastewater solution.

4.2 Recommendations

The following recommendations are submitted by Lombardo Associates, Inc. for the Town of Old Lyme's consideration.

a. Decision on Pursuit of Old Lyme Beaches Wastewater District

Town leaders reach consensus/decision to pursue establishment of an Old Lyme Beaches Wastewater District to serve at least the OCBCA and OLSBCA. In addition to the various Town Boards reviewing and opining on the proposed District, a public information program should be performed as soon as possible to inform the public of the issues and to solicit public feedback.

b. OCBCA – CT DEEP Consent Order – Assumption by Town

Once the Town has decided to pursue implementation of a Beaches Wastewater District, the Town should meet with Old Colony Beach Club Association and CT DEEP to discuss the Town being responsible for the actions required by the Consent Order with a revised Wastewater Management Plan. This document with updates, including CT DEEP requirements, would be the revised Wastewater Management Plan for the Consent Order.

c. Treatment & Disposal Site(s) Testing & Procurement

Concurrent with the above activities, the Town should initiate discussions with property owner(s) for acquisition of lands that would be used for treatment and disposal/reuse. The Cherrystone's Driving range property and Black Hall Golf Club should be approached as the top priority properties. It is understood that 15+/- soli borings on the Driving Range indicated sand and gravel soils and groundwater deeper than 15 feet. Upon its review and preliminary hydrogeologic mounding analysis and fate/transport analysis for buildout wastewater flows, this data may be sufficient for site suitability determination. Additional site testing/analysis will be necessary to confirm site suitability. Data on the Black Hall Golf Club property needs to be acquired – either from past efforts or new efforts.

Table 4-1 is a Gantt chart of an initial listing of the required activities for the Town of Old Lyme to decide to pursue and implement an Old Lyme Beaches Wastewater District and assumption of the OCBCA Consent Order.