

## **Town of Orleans, Massachusetts**

### **CWSRF - 2016 Project Evaluation Form**

#### **PART III - PROJECT NARRATIVE**

##### **Section A - Project Summary**

###### **A. Background**

The population of the Town of Orleans has risen five-fold over the last four decades. The town also experiences an increased seasonal population influx that is roughly four times the off-season population. Because the Town is service only by on-site systems, the nutrient load to the groundwater aquifers of the town has increased proportional to the population growth. This increase in nutrient loads has produced severe eutrophication resulting in violation of numeric and narrative water quality standards including dissolved oxygen deficits, severe turbidity, loss of eelgrass, elimination of shellfish habitats, anoxic benthic conditions and noxious algae and plant growth.

Numerous studies have been completed over the last 15 years documenting in detail the needs described below.

###### **B. Wastewater and Septage Needs**

With over 70 miles of shoreline, the vitality of the Town depends on the quality of its estuaries and ponds. The water quality of these resources has been severely degraded by the increased phosphorus loads to the freshwater ponds and the nitrogen loads to the salt water estuaries and terminal ponds, in addition to other wastewater and septage needs of the Town.

These needs are documented in the Comprehensive Wastewater Management Plan (CWMP) completed by the Town in 2010. They are summarized in the Wastewater Management Needs section of that report as shown in Figure 3-9 of the report:

[http://www.town.orleans.ma.us/sites/orleansma/files/file/file/section3\\_0.pdf](http://www.town.orleans.ma.us/sites/orleansma/files/file/file/section3_0.pdf)

The following is a summary of Orleans wastewater and septage needs:

###### **Nitrogen-Induced Impairments**

The nitrogen sources, impacts and required load reduction have been documented over the last 15 years in the following reports of the Massachusetts Estuary Project (MEP), funded by the Massachusetts DEP, for the three principle salt water systems in Orleans - the Nauset, Pleasant Bay and Rock Harbor Creek systems:

[http://www.town.orleans.ma.us/sites/orleansma/files/file/file/nauset\\_mep\\_revised\\_draft.pdf](http://www.town.orleans.ma.us/sites/orleansma/files/file/file/nauset_mep_revised_draft.pdf)

Figure 1-1 on Page 2 of the MEP Report is an aerial map of the Nauset system, including the salt ponds, land uses and other information.

[http://www.town.orleans.ma.us/sites/orleansma/files/file/file/pleasantbay\\_mep\\_final.pdf](http://www.town.orleans.ma.us/sites/orleansma/files/file/file/pleasantbay_mep_final.pdf)

Figure 1-1 on Page 4 of the MEP Report is an aerial map of the Pleasant Bay system, including the terminal salt ponds, land uses, the monitoring stations and other information.

[http://www.oceanscience.net/estuaries/report/Orleans/Rock\\_Harbor\\_MEPrpt\\_final.pdf](http://www.oceanscience.net/estuaries/report/Orleans/Rock_Harbor_MEPrpt_final.pdf)

Figure 4-8 on Page 50 of the MEP Report is an aerial map of the Rock Harbor Creek system, including the land uses, the monitoring stations and other information.

The water quality impairments due to excessive nitrogen loads include exceedances of numeric and narrative criteria for DO, turbidity, visual and odor impairments, habitat conditions and other criteria. The MEP reports indicate that land-side controllable nitrogen inputs to these water bodies and their sub-embayments must be reduced between 55 and 100%, depending on the water body.

### **Phosphorus Induced Impairments**

As shown in the following reports by the Cape Cod Commission and confirmed in the above MEP reports, the freshwater ponds of Orleans have been seriously impacted by phosphorus load increases. The following Commission report indicates the average trophic stats of the freshwater ponds.

<http://www.town.orleans.ma.us/sites/orleansma/files/freshwater-ponds-final-report.pdf>

The report concludes that, as shown in Figure I-V:

1. All of the ponds are impacted to some degree by increased phosphorus loads
2. Ten of the ponds are eutrophic
3. One of the ponds is hypereutrophic

In addition, the CWMP completed a further assessment of eight of the most important ponds in the Town. Table 3-4 of the CWMP indicates that several are eutrophic and are “first priority” with respect to control of the phosphorus load to these ponds.

### **Other Wastewater Needs**

The CWMP and subsequent studies have also shown that there are needs in addition to nutrient management that must be addressed. They include:

1. Sanitary system failure and non-compliance
2. Aesthetic and convenience, and
3. Economic development

The above needs are summarized in the Wastewater Management Needs section of that report as shown in Figure 3-9 of the report:

[http://www.town.orleans.ma.us/sites/orleansma/files/file/file/section3\\_0.pdf](http://www.town.orleans.ma.us/sites/orleansma/files/file/file/section3_0.pdf)

### **Septage Receiving and Treatment Need**

In addition, the Tri-Town Septage treatment Facility, constructed in 1985, has passed its design life and is in critical need of major upgrade or replacement, as documented in the following reports.

<http://www.town.orleans.ma.us/sites/orleansma/files/file/file/ttreport.pdf>

[http://www.town.orleans.ma.us/sites/orleansma/files/file/file/tri-towndecom\\_report\\_final\\_10-18-13.pdf](http://www.town.orleans.ma.us/sites/orleansma/files/file/file/tri-towndecom_report_final_10-18-13.pdf)

These reports list extensive repair and replacement requirements for both short-term and intermediate-term rehabilitation of the facility, including cost estimates for each option. The short-term option assumes that the plant would be abandoned and demolished at the end of the current permit in December 2016. The intermediate option assumes that the plant would be rehabilitated for use during an extended five-year period, while a long-term plan for management of wastewater in Orleans is developed, approved and funded by the Town. This intermediate-term option was approved by the Town at the May 2015 Town Meeting and is being integrated into an amended CWMP as discussed below.

The long-term resolution of the septage treatment needs for Orleans is that outlined in the CWMP, which recommends that the new WWTF, to be built at the site of the current WWTF, be designed to receive and treat septage from Orleans, Brewster and Eastham, the present members of the Tri-Town Septage Plant Board, but also to continue to serve the septage needs from all the other Lower and Outer Cape Towns.

This is a critical requirement to meet the regional septage needs as the only other year-round option for septage management for Lower and Outer Cape towns is hauling off-Cape for treatment and disposal at a substantially higher cost.

### **Treated Effluent Disposal Site Need Requirement**

Subsequent to completion of the CWMP and its approval by the Commission and MEPA (subject to conditions), concerns related to the substantial increase in the discharge of treated fresh water to the Namskaket Marsh groundwater system (from about 30,000 gpd presently to about 640,000 gpd with full implementation of the sewerage plan included in the CWMP, emerged. These concerns were focused on the perceived inability to fully characterize the flow paths of the effluent into the marsh system downgradient of the point of discharge, the designation of the Namskaket Marsh as an ACEC and ORW, and the possible impacts (past and future) of alteration of the salt water/fresh water balance of the marsh.

After evaluation of options to resolve the above issues, it was decided by the Town that it was most cost- and time-effective to identify, study and permit an alternative location for the groundwater discharge from the plant. This is an additional, critical need for wastewater planning going forward.

### **C. Current Wastewater Management Plan**

The wastewater and water quality management plan outlined in the CWMP as revised by the Amended CWMP includes:

1. Replacement of the existing Tri-Town Septage Treatment Facility with a new 100,000 gpd MBR or SBR wastewater and septage treatment plant with nitrogen reduction. The new plant would receive wastewater from the downtown commercial area of Orleans, and possible in the future from the Town of Eastham. It would receive and treat septage from Orleans and the other lower and outer Cape towns from Brewster to Provincetown. The sewered area for Downtown Orleans (purple area) and the location of the new WWTF are shown on the Consensus Plan Map, Figure 1.
2. Location, permitting and construction of a new groundwater recharge system to receive treated effluent from the new WWTF.
3. Location, permitting and construction of a new 50,000 gpd, satellite WWTF and effluent disposal area to serve the Meetinghouse Pond area of Orleans. This area is primarily residential, requires 100% nitrogen removal to restore Meetinghouse Pond. Solids from this plant and septage from the area served by the plant would be transported to the Downtown WWTF for treatment and disposal. The sewered area for Meetinghouse Pond area (pink area) is shown on the Consensus Plan Map, Figure 1. The plant site will be determined in the next group of studies that define the Amended CWMP.
4. Planning, permitting and implementation of three non-traditional, “green” technologies for other areas of Orleans including:
  - a. Two permeable reactive barriers
  - b. Several floating constructed wetlands
  - c. Several areas of shellfish/aquaculture propagation

The nitrogen removal target percentage for each of these non-traditional technologies is shown on Figure 1 in the call-out box in each nitrogen sensitive embayment. The actual locations of the technologies will be determined in the siting studies performed in the next group of

5. Financial planning to develop for financing options, cost allocation formulae, affordability analyses, user rates and other financing details.
6. Performance and compliance monitoring and modeling

This application is a request for SRF funding support needed to complete the planning for each of the tasks above and integrate the components, along with new cost estimates and schedules, into an Amended CWMP for review and re-approval by DEP, the Cape Cod Commission, MEPA and other agencies.

## **Section B - Public Health Criteria**

### **I. What Is the Cause of the Public Health Problem or Nuisance?**

#### **Item 4 – Widespread Septic System Failure**

As described in Part 1, sanitary remediation of needs is a significant requirement of the wastewater management program. Table 1 is an inventory of the on-site wastewater disposal systems in the Downtown area of Orleans. This is essentially the area proposed for sewerage and central treatment at the new WWTF in the current plan. This table indicates that approximately 135, or about 45%, of the 298 non-vacant developed parcels in Orleans are served by failing or non-compliant systems or by aged systems for which no information is available. A significant number of the systems are unlined cesspools with direct discharge to groundwater.

As shown on the map of Orleans, many of these systems are very close to water bodies such as Town Cove and Bakers Pond which provide secondary contact recreation during much of the year.

A similar situation exists in the Meetinghouse Pond area. However, a similar level of documentation is not available as the Downtown area was planned for sewerage in the Phase I stage of the CWMP and, more importantly, the critical pollutant for the meetinghouse Pond area is nitrogen.

#### **Item 9 – POTW Malfunction**

As stated above, the Tri-Town Septage Treatment Facility is in serious need of major upgrade or replacement. Several reports have documented the capital repair and replacement requirements of the plant, including:

<http://www.town.orleans.ma.us/sites/orleansma/files/file/file/ttreport.pdf>

[http://www.town.orleans.ma.us/sites/orleansma/files/file/file/tri-towndecom\\_report\\_final\\_10-18-13.pdf](http://www.town.orleans.ma.us/sites/orleansma/files/file/file/tri-towndecom_report_final_10-18-13.pdf)

This chronic condition has led to substantial equipment and process malfunctions. The causes of this problem include:

- Suppressed rates for septage hauling due to the very competitive septage hauler market on the Cape
- Lack of an asset management program with adequate budgets

- Design of the plant that relied on equipment specifications from foreign supplies that are no longer in business.

These causes will be corrected with the implementation of the Amended CWMP through the institution of an asset management plan, creation of an enterprise financing system and a wastewater management department for the Town, in addition to replacement of the existing facility with the new WWTF.

## **II. What Is the Nature of the Water Resources Affected**

### **Item 12 – Private Drinking Water Supplies**

While the town of Orleans has a public water system serving the downtown, there are several private wells still in existence. The impact of septic systems on these wells is presently unknown.

### **Item 16 – Boating Areas**

As shown on Figure 1, boating areas, including marinas, are prevalent in Town Cove and in Meetinghouse Pond.

## **Section C – Environmental Criteria**

### **I. What Is the Nature of the Environmental Problem Encountered?**

The major reason for the problems in the Orleans fresh and salt water bodies is dramatic increase nutrient loads from on-site wastewater systems to the water bodies over the last 60 years as the population Cape Cod and the Town of Orleans has quadrupled.

[http://www.statscapecod.org/benchmarks/balanced/population\\_trends.php](http://www.statscapecod.org/benchmarks/balanced/population_trends.php)

The impacts of the increased nutrient loads are visually obvious, empirically documented and technically confirmed and evaluated in the MEP Reports developed by SMAST over the last 12 years for the embayments in Orleans. As stated above these MEP reports, referenced below, indicate that nitrogen reductions between 45 and 100% must be achieved to restore the water quality and associated natural habitats in the Nauset, Pleasant Bay and Rock Harbor Creek systems.

#### **Nauset System Nitrogen Reductions**

[http://www.town.orleans.ma.us/sites/orleansma/files/file/file/nauset\\_mep\\_revised\\_draft.pdf](http://www.town.orleans.ma.us/sites/orleansma/files/file/file/nauset_mep_revised_draft.pdf)

For the Nauset system, Table ES-2, page ES-10, is a summary of the percent watershed nitrogen reductions that must be achieved in the Nauset sub-embayments. In summary, the reductions range from 83% in Salt Pond to 62% in Town Cove, with an average of 45% for the system. These percentages will be confirmed and revised as the more recent data is input to the MEP model to adjust that estimates. For the Nauset system the change in the configuration of the inlet

from the Atlantic Ocean that defines the boundary condition for the estuary model has been naturally altered to be more constricted, which may also alter the required nitrogen reduction percentages.

### **Pleasant Bay System Nitrogen Reductions**

[http://www.town.orleans.ma.us/sites/orleansma/files/file/file/pleasantbay\\_mep\\_final.pdf](http://www.town.orleans.ma.us/sites/orleansma/files/file/file/pleasantbay_mep_final.pdf)

For the Pleasant Bay system, Table VIII-3, page 212, is a summary of the percent watershed nitrogen reductions that must be achieved in the Pleasant Bay sub-embayments. In summary, the reductions range from 100% in Meetinghouse Pond to 50% in a number of sub-embayments in Orleans, with an average of 52% for the entire Pleasant Bay system. Again, these percentages will be confirmed or revised based on reanalysis of the system using data collected since the initial MEP study.

### **Rock Harbor Creek Nitrogen Reductions**

[http://www.oceanscience.net/estuaries/report/Orleans/Rock\\_Harbor\\_MEPrpt\\_final.pdf](http://www.oceanscience.net/estuaries/report/Orleans/Rock_Harbor_MEPrpt_final.pdf)

For the Rock Harbor Creek system, Table VIII-2, page 104, is a summary of the percent watershed nitrogen reductions that must be achieved. In summary, the reductions range from 79% for Rock Harbor Creek to 0% for Cedar Pond, with an average of 69% for the entire Rock Harbor system. The reduction for Cedar Pond is based on the assumption that the pond will remain as a fresh water (or brackish) pond, thus contributing to the nitrogen attenuation from the upper Rock Harbor watershed. Again, these percentages will be confirmed or revised based on reanalysis of the system using data collected since the initial MEP study.

Each of the above studies and their results included an extended and intensive water quality monitoring program upon which the model and model results in terms of required nitrogen reductions are based. For each of these nitrogen impaired systems consequences of the eutrophication process include most of the check list criteria outlined in this section of the PEF including:

#### **Item 21 - Aquatic Toxicity**

In numerous locations, including especially benthos and lower water column segments of the terminal salt and fresh water ponds, anoxic conditions exist due to the eutrophication process, eliminating destroying habitats and shellfish populations.

#### **Items 22 – Nutrients**

As documented above excessive nutrient concentrations produce eutrophication, reducing DO concentrations, causing deposition of decayed material thus lessening the depth of the water body, increasing water temperatures and turbidity, decreasing shellfish nitrogen uptake, which all, in turn, exacerbates the eutrophication process.

### **Item 23, 24 – Dissolved Oxygen**

As mentioned above, DO concentrations in portions of the affected water bodies reach zero during the summer months, resulting in increased eutrophication and resulting aesthetic impairments, in addition to DO water quality standards violations.

### **Item 25 – Bacteria**

Bacteria exceedances are a major problem on Cedar Pond, where cormorants sitting on Eversource power lines are the primary cause. This issue is being addressed with Eversource outside of the wastewater planning process.

### **Item 26 – Turbidity**

Turbidity in all three estuarine systems is severely impaired due to the eutrophication process. Secchi disk readings of less than one meter in open waters of water bodies with six or more meters total depth are not uncommon. This, in turn, increases temperature of the water body and magnifies the resulting eutrophication process.

### **Item 27 - Noxious Aquatic Plants**

Floating algal mats and detached plants are increasingly common in the impacted waters.

### **Item 28 - Aesthetics**

In addition to the visual impact of turbidity and floating algal mats, odor problems due to the decay of organic benthic muck at low tides is also a significant problem.

### **Item 29 - Other**

While not a water quality impairment in itself, the combined impact of the above water quality conditions is particularly serious in a community like Orleans where the economic vitality with respect to both the commercial sector and the residential property values relies on its water resources. In that regard, as well as the necessity of meeting regulatory water quality, this project is critical to the Town of Orleans.

## **II. What Environmental Resources Are Affected?**

### **Items 32, 33 – Outstanding Resource Water (ORW) and Areas of Critical Environmental Concern (ACEC)**

As shown on the following map of Outstanding Resource Waters of the Commonwealth (See link), the three impaired water resource systems in Orleans are included in either Areas of Critical Environmental Concern (ACECs) or the Cape Cod National Seashore.

<http://www.mass.gov/anf/images/itd/massgis/datalayers/orw.jpg>

### **Item 36 – Commercial Fishery/Shellfish Area**

There are numerous DMF “Approved” shellfish areas within the Orleans boundaries of the Nauset and Pleasant Bay estuaries. The following links show the approved DMF areas. Virtually all of these areas are impaired for shellfish growing due to water column nitrogen concentrations and benthic conditions conducive to predators, anoxia and other factors.

<http://www.massmarinesfisheries.net/shellfish/dsga/OC2.pdf>

<http://www.massmarinesfisheries.net/shellfish/dsga/OC3.pdf>

<http://www.massmarinesfisheries.net/shellfish/dsga/OC4.pdf>

<http://www.massmarinesfisheries.net/shellfish/dsga/OC5.pdf>

<http://www.massmarinesfisheries.net/shellfish/dsga/SC61.pdf>

<http://www.massmarinesfisheries.net/shellfish/dsga/SC60.pdf>

<http://www.massmarinesfisheries.net/shellfish/dsga/SC53.pdf>

<http://www.massmarinesfisheries.net/shellfish/dsga/SC62.pdf>

<http://www.massmarinesfisheries.net/shellfish/dsga/SC63.pdf>

A major objective of the Town in the water quality and wastewater planning program is the restoration designated shellfish growing areas and the expansion of the limited grants now operating in Pleasant Bay. The following report and plan was recently completed by the Town to complement the wastewater management planning with a pro-active shellfish expansion and rejuvenation program.

[http://www.town.orleans.ma.us/sites/orleansma/files/file/file/shellfish\\_tm\\_final.pdf](http://www.town.orleans.ma.us/sites/orleansma/files/file/file/shellfish_tm_final.pdf)

[http://www.town.orleans.ma.us/sites/orleansma/files/file/file/shellfish\\_report\\_-\\_appendices.pdf](http://www.town.orleans.ma.us/sites/orleansma/files/file/file/shellfish_report_-_appendices.pdf)

### **Item 37 – Endangered Species Habitat**

The following map highlights areas within Orleans in which there may be Endangered Species issues.

[http://maps.massgis.state.ma.us/map\\_ol/oliver.php?lyrs=NHESP%20Priority%20Habitats%20of%20Rare%20Species~massgis:GISDATA.PRIHAB\\_POLY~GISDATA.PRIHAB\\_POLY::Default|NHESP%20Estimated%20Habitats%20of%20Rare%20Wildlife~massgis:GISDATA.ESTHAB\\_POLY~GISDATA.ESTHAB\\_POLY::Default|Massachusetts%20Towns~massgis:GISDATA.TOWNS\\_POLY~GISDATA.TOWNS\\_POLY::Default|Major%20MassDOT%20Routes~massgis:GISDATA.EOTMAJROADS\\_RTE\\_MAJOR~GISDATA.EOTMAJROADS\\_RTE\\_MAJOR::De](http://maps.massgis.state.ma.us/map_ol/oliver.php?lyrs=NHESP%20Priority%20Habitats%20of%20Rare%20Species~massgis:GISDATA.PRIHAB_POLY~GISDATA.PRIHAB_POLY::Default|NHESP%20Estimated%20Habitats%20of%20Rare%20Wildlife~massgis:GISDATA.ESTHAB_POLY~GISDATA.ESTHAB_POLY::Default|Massachusetts%20Towns~massgis:GISDATA.TOWNS_POLY~GISDATA.TOWNS_POLY::Default|Major%20MassDOT%20Routes~massgis:GISDATA.EOTMAJROADS_RTE_MAJOR~GISDATA.EOTMAJROADS_RTE_MAJOR::De)

[fault|NavTeq%20MA%20Other%20Streets%20Names~massgis:GISDATA.NAVTEQRDS\\_ARC~GISDATA.NAVTEQRDS\\_ARC::Labels&bbox=-75.11728672221857,40.80966683309101,-68.00363926227124,43.23721404065962&coordUnit=m&measureUnit=m&base=googleSatellite&center=-7966074.3012276,5166228.0982071&zoom=8&opacity=1,1,1,1,1&baseO=1](http://fault|NavTeq%20MA%20Other%20Streets%20Names~massgis:GISDATA.NAVTEQRDS_ARC~GISDATA.NAVTEQRDS_ARC::Labels&bbox=-75.11728672221857,40.80966683309101,-68.00363926227124,43.23721404065962&coordUnit=m&measureUnit=m&base=googleSatellite&center=-7966074.3012276,5166228.0982071&zoom=8&opacity=1,1,1,1,1&baseO=1)

The Natural Heritage and Endangered Species Program (NHESP) has been engaged in the assessment of endangered species with respect to facilities and projects included in the original CWMP. The habitat of the Eastern Box Turtle has been identified as an issue related to the siting of the WWTF at the Tri-Town site. The NHESP will be contacted again as siting for various additional treatment and disposal facilities, as well as non-traditional technologies, proceeds.

### **Item 39 – Ocean Sanctuary**

The impacted estuaries within the Orleans area are connected to either the Cape Cod Bay Ocean Sanctuary or the Cape Cod Ocean Sanctuary. The implications of these designations are not completely clear at this time. The designations would be important should an ocean discharge become the recommended (or only satisfactory) method of final disposal of treated effluent. However, such determination has not been considered as a viable option to date.

### **Item 40 – Recreational Fisheries/Shellfish Area**

As illustrated for Item 36 above, the Nauset and Pleasant Bay salt water estuaries have traditionally been used as recreational shellfishing and fishing resources. The primary goal of the water quality and wastewater program is to restore and protect these waters for future shellfishing and fishing uses.

## **Section D – Project Effectiveness**

### **Item 43 – How and To What Extent Will the Project Eliminate or Mitigate the Problems**

The following projects and activities, as amended in the revised CWMP, have been recommended through engineering studies and validated through an intense stakeholder involvement program to meet the water quality, public health and environmental goals listed in Items a – g of Item 43 of section D.

These activities and projects will be further defined through additional planning and regulatory review to be done from August 2016 through May of 2016, to be documented in the Amended CWMP.

- 1) **New WWTF** – Receive and treat wastewater from Downtown and Meetinghouse Pond areas of Orleans to comply with groundwater discharge standards.
- 2) **Collection System** – The collection system will eliminate discharge from on-site systems within the Downtown and Meetinghouse Pond areas to the level necessary to meet required MEP nitrogen or phosphorus reductions with a factor of safety.

- 3) **Green/Non-Traditional Technologies** – Pending confirmation with Pilot Testing, the PRBs, floating constructed wetlands and aquaculture/shellfish projects will be designed with an adequate factor of safety to remove required loads of nutrients in unsewered areas of Orleans to meet MEP thresholds and TMDLs. Should the non-traditional projects prove ineffective or not cost-effective in nutrient reduction, traditional collection and treatment projects will be implemented in their place.
- 4) **Septage Receiving and Treatment** - Provide septage receiving and treatment for unsewered properties in Orleans and the Lower and Outer Cape.
- 5) **Stormwater Management** - The water quality and wastewater management program will be linked with the on-going stormwater management program to meet MEP and TMDL nutrient reduction requirements.
- 6) **Fertilizer Management** - The water quality and wastewater management program will be linked with the on-going fertilizer management program, including implementation of the Town's fertilizer bylaw, to meet MEP and TMDL nutrient reduction requirements.
- 7) **Discharge Elimination** – Locating and permitting of a new treated effluent discharge site for the new WWTF for Downtown will eliminate discharge to the Namskaket Marsh system, protecting the marsh from potential impacts from increased freshwater discharges.

Attachment A is the request for Statements of Qualifications (RFQ) issued by the Town in July 2015 to select an engineering consultant to perform the additional planning and analyses tasks. The Scope of Services that defines the additional studies to be completed is included as Attachment A to the RFQ.

## **Section E – Program and Implementation Criteria**

### **Item 44 – Consistency with EOEEA/MADEP Watershed Management Plans or Priorities**

The Orleans Water Quality and Wastewater Management Program has been developed hand-in-hand and consistent with guidance, procedures and priorities of the EPA-Region 1, the MADEP, the Cape Cod Commission and other regulatory and permitting agencies. The planning has been nutrient focused for both fresh and salt water resources, watershed-based and emphasizing green and emerging technologies in conjunction with traditional technologies. The following is a summary of the planning and regulatory framework and key criteria that have directed the town to the current plan:

1. **MEP Studies and Reports** – The CWMP work plan and recommendations were based on the requirements defined by the Stat through the MEP and associated TMDL process. The Amended CWMP will continue to be consistent with the MEP and TMDL requirements. Part of the Orleans program is to continue to implement, in close cooperation, an extensive water quality monitoring program that will support continued MEP evaluation of threshold requirements, implementation plans and compliance.

2. **DEP CWMP & Watershed Planning Requirements** – The 2010 CWMP and the Amended CWMP (ACWMP) will both be consistent with the MADEP guidance for watershed-based planning and management. The Orleans program has been defined exclusively by watersheds as outlined in the previous sections of this application. Consequently, the CWMP, and we anticipate the Amended CWMP, were approved by the DEP, MEPA and the Cape Cod Commission as consistent with those requirements. A DEP representative participated in all 13 of the workshops conducted by the Orleans Water Quality Advisory Panel over the last year.
  
3. **Cape Cod Commission** - The CWMP and ACWMP will be consistent with the Commission’s Regional Planning requirements, as well as the policies and protocols of the recent 208 Plan Water Quality Management Plan Update. The Consensus Plan developed by the OWQAP over the last year was developed hand-in-hand with the Commission staff, using the tools, analyses and review of the technical resources at the Commission. Attachment B contains the Statement of Consistency provided by the Commission regarding the Consensus Plan and reflecting agreement between the parties on the development, direction and content of the plan.
  
4. **EOEEA** - The CWMP, and we envision the ACWMP, was approved through the MEPA process. We expect that a Notice of Project Change for the ACWMP will reflect the changes made to the CWMP and be approvable by EOEEA.

**Item 45 – Compliance and Enforcement**

The following permits, TMDLs, Regulatory approval conditions and other regulatory requirements pertain to the water bodies that are the subject of the Orleans water quality and wastewater management program:

<b>Type of Action</b>	<b>Subject</b>	<b>Reference #</b>	<b>Section &amp; Page</b>	<b>Compliance Deadline</b>
DEP Groundwater Discharge Permit	Tri-Town Septage Treatment Facility	DEP Permit #: 2-187	Entire	Expiration: 12/31/2106
NPDES Permit	Part II Stormwater Permit	MAR-041146	Entire	Annual
208 WQMP	Wastewater & Water Quality Management	Cape Cod Commission 2015	Entire	N/A
Tri-Town Septage Treatment Plant – Intermunicipal Agreement	Intermunicipal Agreement: Orleans, Eastham, Brewster	MGL. Section A200	<a href="http://ecode360.com/14203632">http://ecode360.com/14203632</a>	Expiration: 12/31/2106
Nutrient Management Regulations	Nutrient Management: Town of	Town of Orleans	<a href="http://ecode360.com/14923908">http://ecode360.com/14923908</a>	On-going

	Orleans			
EOEEA – MEPA	MEPA Review	MEPA #: 14414	<a href="http://web1.env.state.ma.us/EEA/emepa/pdf/files/certificates/071009/14414eef.pdf">http://web1.env.state.ma.us/EEA/emepa/pdf/files/certificates/071009/14414eef.pdf</a>	On-going
MA DEP Integrated List of Waters	Category 5 Waters; Nauset Harbor	MA 96-28	<a href="http://www.mass.gov/eea/docs/dep/water/resources/07v5/14iwlistp.pdf">http://www.mass.gov/eea/docs/dep/water/resources/07v5/14iwlistp.pdf</a>	On-going
MA DEP TMDL – Rock Harbor Creek	Rock Harbor Creek TMDL – Draft		<a href="http://www.epa.gov/region1/npdes/stormwater/ma/305b303dMaps/Orleans_MA.pdf">http://www.epa.gov/region1/npdes/stormwater/ma/305b303dMaps/Orleans_MA.pdf</a>	Pending Cedar Pond resolution
MA DEP TMDL – Pleasant Bay	Pleasant Bay TMDL	96-TMDL-12; Control #244	<a href="http://www.mass.gov/eea/docs/dep/water/resources/n-thru-y/pbtmdl.pdf">http://www.mass.gov/eea/docs/dep/water/resources/n-thru-y/pbtmdl.pdf</a>	On-going
MA DEP TMDL – Nauset Harbor	Nauset Harbor TMDL – Draft		<a href="http://www.epa.gov/region1/npdes/stormwater/ma/305b303dMaps/Orleans_MA.pdf">http://www.epa.gov/region1/npdes/stormwater/ma/305b303dMaps/Orleans_MA.pdf</a>	Pending issuance
MD DEP Pathogen TMDL	Rock Harbor Creek; Namskaket Creek; Little Namskaket Creek	DEP CN-252	<a href="http://www.mass.gov/eea/docs/dep/water/resources/a-thru-m/capecod1.pdf">http://www.mass.gov/eea/docs/dep/water/resources/a-thru-m/capecod1.pdf</a>	On-going

The above regulatory and compliance requirements are the bases for continuing wastewater and water quality management planning in Orleans. Implementation of the CWMP and Amended CWMP will restore and protect the fresh and salt water resources through the management of on-site systems, septage management wastewater collection and treatment and restoration of shellfish and aquaculture resources.

#### **Item 46 – Multi-Community and Regional Solution**

**Septage** - The Orleans water quality and wastewater management plan will include a new wastewater and septage treatment facility that will provide continued septage treatment and disposal for the seven towns on the Lower and Outer Cape. This service is critical to Lower and Outer Cape residents and businesses as the other septage receiving facilities on the Cape either do not have excess capacity, are not designed for septage receiving/treatment or have chosen not to receive out-of-town septage. The new Orleans facility will be located is located very close to the intersection of Route 6 and 6a, providing excellent access.

**Water Reuse** – Orleans and Brewster have been discussing options for beneficial reuse of treated effluent from the new Orleans WWTF on golf courses and other open space in the towns. The additional planning in 2015-2016 will provide more detail and evaluation of this option.

**Wastewater** - Through the CWMP process and through the reassessment of options over the last year, the towns of Orleans and Eastham have shared technical and cost information and discussed options for potential design of the Orleans WWTF to accept flow from the residents and businesses in south Eastham. These discussions and evaluations are continuing.

**Aquaculture** - In addition, the Orleans has been working with the towns of Eastham, Brewster, Harwich and Chatham to develop shellfish and aquaculture initiatives that will provide regional nitrogen reduction benefits to the Pleasant Bay and Nauset systems. The Town is a member of and actively engaged with the Pleasant Bay Alliance in the planning and implementation of joint projects using

#### **Item 47 – Innovative Technology**

The current Consensus Plan and the Amended Orleans CWMP includes projects for demonstration and implementation of non-traditional technologies including:

- Floating constructed wetlands
- Permeable reactive barriers
- Aquaculture and shellfish propagation

These technologies survived the feasibility, environmental and cost screening conducted over the last year in response to the wide range of technologies proposed for consideration by the Cape Cod Commission in its 208 Plan. In addition, Orleans will be conducting over the next year further study of the feasibility of energy generation and beneficial reuse of solids from the new WWTF in conjunction with potential public-private partnerships.

#### **Item 48 – Pricing System under MGL c.40, s.39j**

The nature of the Orleans program, combining traditional collection and treatment systems with a high percentage of non-traditional (no collection and treatment) technologies that distinguishes between commercial and residential users, requires a more complex revenue pricing system that considers alternative methods of valuation of water quality program benefits among non-traditional categories of “customers”.

While the details of this pricing system will not be defined until the design stage of the program, the town has developed a financial model that allows the assessment of various cost allocation formulae, financing mechanisms (including PPPs) and other factors to develop a fair and equitable pricing system. A copy of this model can be provided to the CWSRF if requested. The town will adopt the resulting pricing system, in conjunction with an enterprise accounting system, at the appropriate time before project construction.

#### **Energy Efficiency**

#### **Item 49 — Relative Benefit of the Project**

While the Orleans program has not been the subject of a third party energy audit, the plan to evaluate energy generation as part of a potential public – private partnership for the new WWTF

will subject the facility to such a study. Energy efficiency and energy consumption will be evaluated along with energy generation to optimize the financial pro-forma of the facility.

### **Item 50 – Renewable Energy – Relative Benefit of the Project**

As stated above, the potential for use of renewable energy, such as bio-gas generation and use, will be studied in detail during the project pre-design phase.

## **Section F - Threshold Criteria**

### **Item 51 – Does the capacity to be provided by the project duplicate existing treatment or disposal capacity already available at an economic cost within the relevant region.**

No. There is not wastewater collection and treatment capacity in the town of Orleans or neighboring towns. Nor is does redundant cost-effective septage treatment capacity exist in the relevant region.

### **Item 52 - Identify and describe the extent of any potential negative impacts to water quality, water quantity or to the public health directly attributable to the project, and assess whether and to what extent any such negative impacts outweigh the project's environmental or public health benefits.**

No. There are no identified negative impacts to water quality, water quantity or public health attendant to the project. All of the project components are intended and designed to rectify existing severe impacts to fresh and marine water bodies, resolve non-compliance and failure of existing on-site systems, promote ecosystem and habitat restoration and support planned economic development in Orleans. The main intent of the program is to protect and restore natural water resources systems in compliance with existing and proposed Clean Water Act and state regulations and water quality standards.

## **Section G - Qualifying Green Projects**

### **Item 53 – Qualifying EPA Green Projects**

- a. List the project item codes from the checklist that qualify as green:

As the project is still in the planning phase, the green components listed in Item 53 that relate to the wastewater treatment plant facilities and equipment have not been addressed at this time. The consideration of a public-private partnership will result in detailed evaluation of these measures and selection of those that are cost-effective and environmentally beneficial. There are a number of green components outside of the WWTF and pump stations that are already incorporated into the plan, including:

- WE13 - Development of an Integrated Water Resources Management Plan
- WE16 - Public education
- SW3 - Implement water reuse program
- SW10 – Constructed wetlands

- E12 – Decentralized treatment solutions to deficient of failing on-site systems
- E13 – Water reuse programs for groundwater recharge, reduction of treatment costs
- E15 – Projects that use water balance approaches that preserve site, local and regional hydrology
- E16 – Projects that facilitate adaptation of clean water programs and practices
- E18 – Projects that identify and evaluate the benefits of using integrated water resources management approaches
- E19 – Projects that incorporate differential uses of water based on the level of treatment to reduce costs of treating all water to potable standards
- E110 – Development of Comprehensive Water Resources Management Plans
- E111 – Development of Water resources Management Plan and likely to result in a capital project (e.g. System Master Plan)

b. List the total value of the green items:

Of the planning funding requested approximately 80%, or \$1,900,000 of the defined planning budget of \$2,405,000, is associated with development of the green components of the plan. The traditional collection and treatment component was developed adequately in the 2010 CWMP and is ready to proceed to design. The non-traditional green components including the site studies, technology evaluation, development of design criteria and other pre-design tasks for the floating constructed wetlands, PRBs, aquaculture, and water reuse/recharge systems are the “adaptive” new components of the plan that must be moved forward.

c. The percentage of Green on the project is:

Planning (remaining): 80% (Planning costs for CWMP paid 100% by Town)  
 Construction: 35%