

Memorandum

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Subject **Town of Orleans, MA
Water Quality and Wastewater Planning
Task Number 1.b – Downtown Planning
Technical Memorandum on Downtown Future Growth Scenarios, Strategies to
Limit Growth, Draft Regulations to Obtain Zero Interest Financing, and
Implications for Wastewater Loading Impacts and Other Community Impacts in
the Downtown – 50 percent Rough Draft**

Project Number 60476644

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

Date March 29, 2016

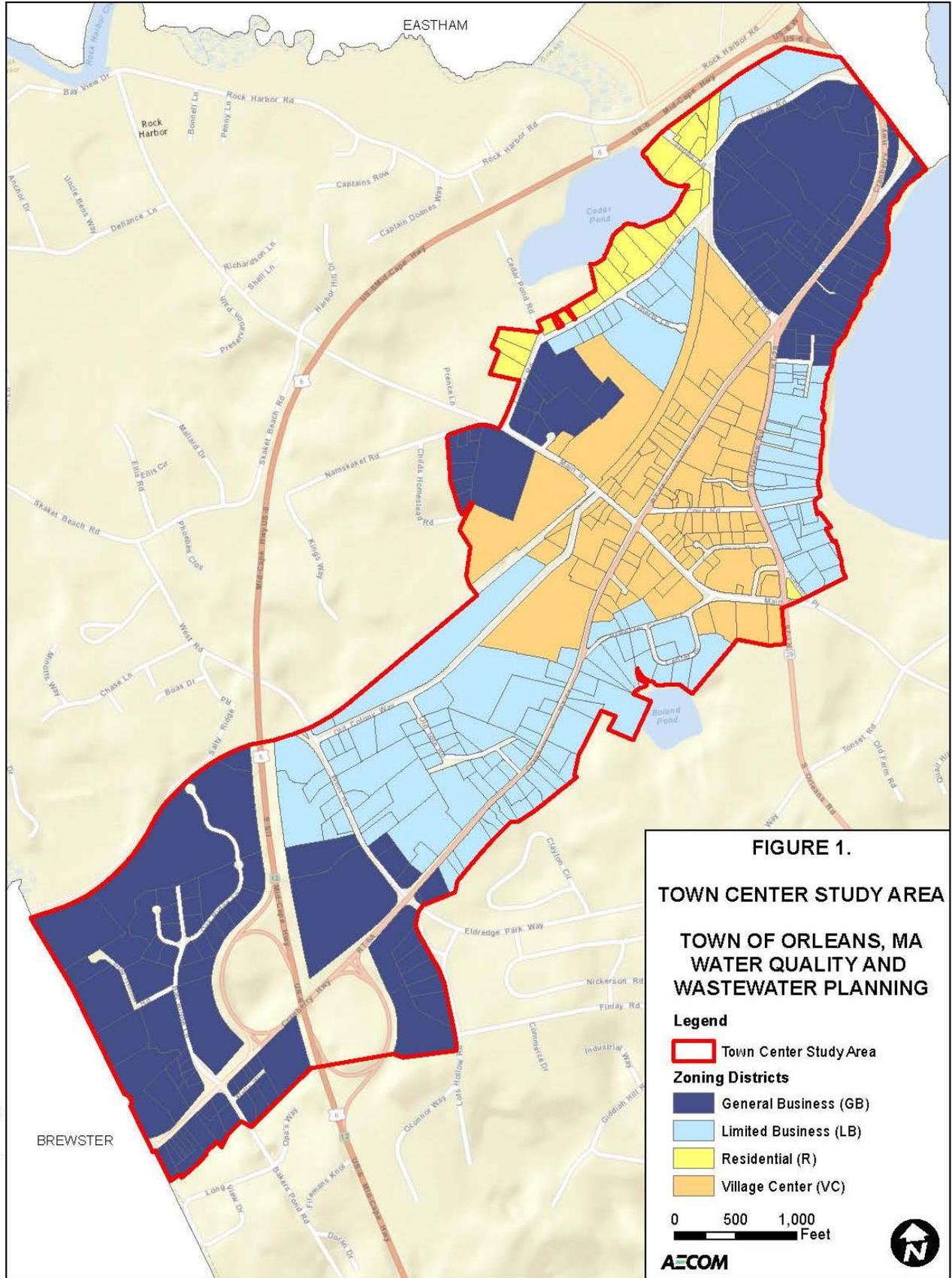
1. Background

This Technical Memorandum presents the methodology and results of future build-out scenarios for the Town Center Study Area, as well as strategies to manage growth, draft regulations to obtain zero interest financing through the Massachusetts Department of Environmental Protection Clean Water State Revolving Fund (MassDEP CWSRF) program, and implications for wastewater loading impacts and other community impacts in the Town Center Study Area.

2. Introduction

The goal of the Downtown Planning task of the Town of Orleans Water Quality and Wastewater Planning project is to conduct planning and engineering services for development of a Town Center plan that will support water quality and wastewater planning on a sub-watershed basis. The area addressed in this task is the Town Center Study Area, which includes the business districts along the Route 6A corridor as well as some residential use (see Figure 1).

This Technical Memorandum presents the results of the following subtasks: (a) future buildout scenarios for the Town Center Study Area; (b) wastewater flows and loads associated with the future build-out scenarios; (c) discussion of coordination of growth in a manner consistent with the Orleans Comprehensive Plan, and (d) draft regulations and guidance to obtain zero interest financing through the MassDEP CWSRF program.



3. Future Build-out Scenarios

A range of future build-out scenarios for the Town Center Study Area was developed based on input received from the two Downtown Planning Workshops held on December 15, 2015 and February 4, 2016; consideration of market demand conditions; and coordination with the Town. Five future build-out scenarios were developed over the course of the project. Ultimately, the following three scenarios were selected for water quality and wastewater planning purposes:

- Scenario 1 – Full Build-out Under Current Zoning without Wastewater Limitation;
- Scenario 2 – Growth Scenario to Reflect Vision to Increase Residential Density in the Town Center; and
- Scenario 3 – 2050 Planning Horizon.

All of the future build-out and planning horizon scenarios utilized the same underlying approach and assumptions as used for “Scenario 0 – Town Center Study Area Updated Build-out” as a starting point. Please refer to *Water Quality and Wastewater Planning Task Number 1.b – Downtown Planning Technical Memorandum on Updated Downtown Build-Out Analysis and Land Use/Market Conditions and Development Constraints* (March 13, 2016) for detail on Scenario 0, as well as summary information for the two Downtown Planning Workshops.

A description of each future build-out scenario, including additional assumptions that were used, is provided below. The residential and non-residential results for all future build-out scenarios are presented in Table 1.

a. Scenario 1 – Full Build-out Under Current Zoning without Wastewater Limitation

Scenario 1 utilizes the same underlying approach and assumptions as used for Scenario 0, except the on-site wastewater limitation (e.g. Title 5 sizing and setback requirements, Title 5 and the Town’s Nutrient Management Regulations wastewater flow limits) that was applied for Scenario 0 is eliminated due to the assumed future provision of sewer to the Town Center Study Area. As a result, additional land area is available for future development and higher densities can be achieved.

b. Scenario 2 – Growth Scenario to Reflect Vision to Increase Residential Density in the Town Center

Scenario 2 utilizes results from Scenario 1 as a starting point and incorporates changes to increase residential density in the Town Center. In addition to a currently proposed large-scale mixed use development in the Village Center, several trends – low vacancy rates, high housing costs, decreasing household size and aging population – point to the need to expand the variety of housing options in the community. It appears there may be a need for maintenance-free homes in close proximity to services that could serve an older population looking for smaller units, less maintenance, and less driving. There also appears to be a need for lower-priced homes that could serve a young workforce population. The Downtown Planning Workshops also indicated strong support to expand the variety of housing in the town center. The following additional assumptions were applied to reflect increased mixed use and residential density in portions of the Town Center Study Area and a modest decrease in maximum non-residential development, which aligns with the key takeaways from the Downtown Planning Workshops.

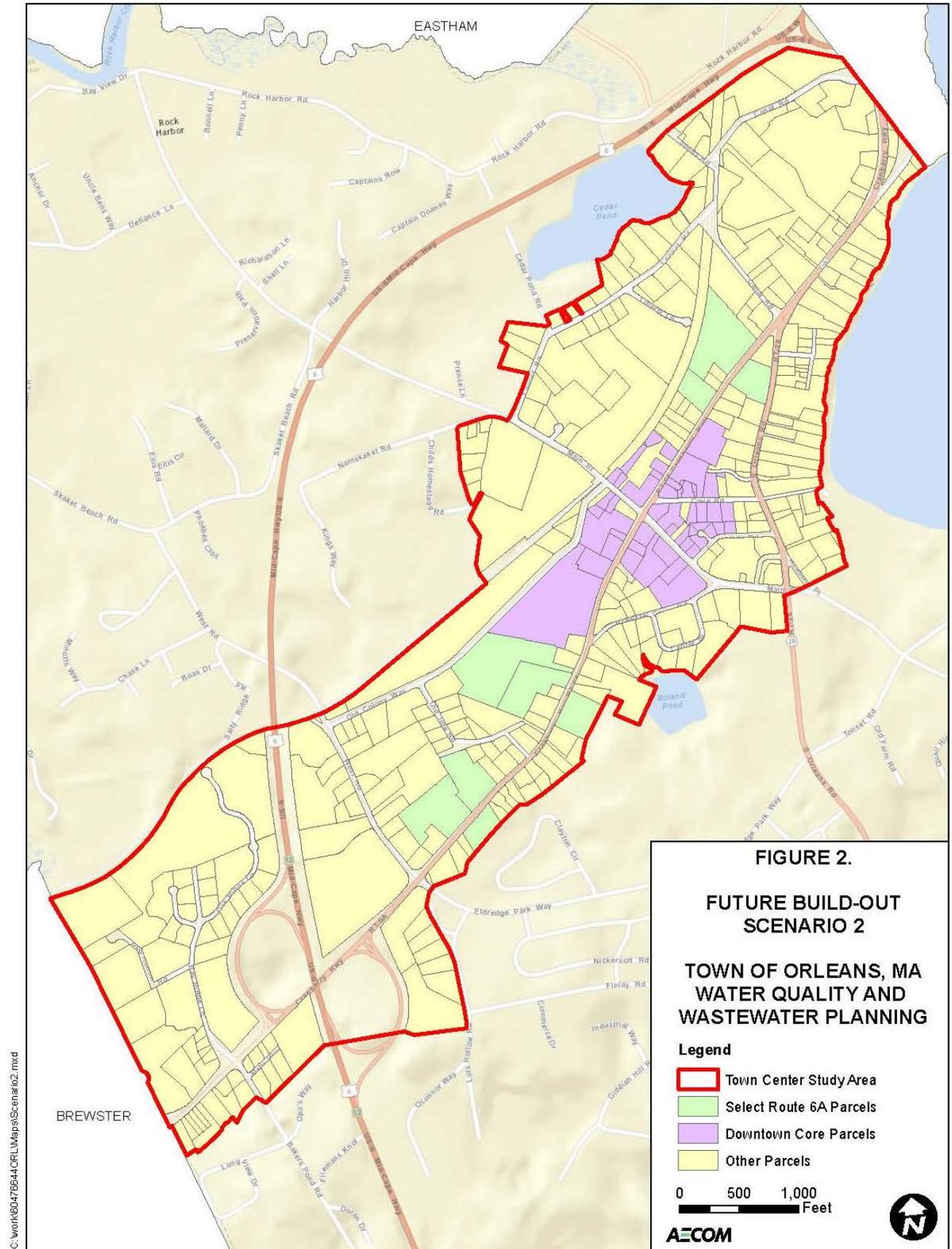
Table 1. Orleans Town Center Study Area Future Build-out Scenario Results by Sub-watershed

Sub-watershed	Scenario 1		Scenario 2		Scenario 3 ¹			
	Residential (dwelling units)	Non- Residential (s.f.)	Residential (dwelling units)	Non- Residential (s.f.)	Option 3a		Option 3b	
					Residential (dwelling units)	Non- Residential (s.f.)	Residential (dwelling units)	Non- Residential (s.f.)
Town Cove	448	1,328,796	545	806,195				
Boat Meadow River	8	-	8	-				
Rock Harbor Stream	2	-	2	-				
Cedar Pond	181	987,366	276	410,836				
Rock Harbor Main	390	191,769	436	83,439				
Boland Pond	5	34,635	24	20,594				
Little Namskaket	163	635,984	163	285,762				
Namskaket Main	22	217,306	22	95,000				
Namskaket Stream	26	169,582	26	58,445				
<i>Total</i>	<i>1,245</i>	<i>3,565,437</i>	<i>1,502</i>	<i>1,760,271</i>	<i>1,021</i>	<i>1,660,078</i>	<i>1,073</i>	<i>1,707,800</i>

1. Scenario 3 reflects a 2050 planning horizon. The planning horizon growth rates for this scenario are applied at the study area-wide level and not by individual parcel. Consequently, the residential (dwelling units) and non-residential (s.f.) results for Scenario 3 are available at the Town Center Study Area level only and not by sub-watershed, as done for the build-out scenarios

- Downtown Core Parcels
 - Assume 48 parcels in the “Downtown Core” area (i.e. vicinity of the Main Street / Route 6A intersection) could support a future mixed use based on application of the following ratios, which were derived from values provided by the Town for a proposed large-scale mixed use development in the Village Center district:
 - Residential use: 9 dwelling units / acre; and
 - Non-residential: 9,000 square feet (s.f.) / acre.
 - The Downtown Core parcels were selected in coordination with the Town as an area desired to support increased residential density and are identified in Figure 2.
 - Assume a zoning change is made for the Downtown Core parcels to eliminate the minimum lot area requirement of 60,000 s.f. of buildable upland for apartment development.
- Select Route 6A Parcels
 - Assume 15 parcels with frontage on Route 6A between West Road and Canal Road and a lot size of 40,000 s.f. or greater of buildable upland could support a future residential use with a density of up to 9 units / acre. The Route 6A parcels are identified in Figure 2.
 - Assume zoning changes are made for the select Route 6A parcels to reduce the minimum lot area requirement from 60,000 s.f. to 40,000 s.f. of buildable upland for apartment development and increase the allowable density from 6 units / acre to 9 units / acre.
 - Assume up to 1,500 s.f. of non-residential use on each parcel to help maintain continuity in the Town Center and avoid creating dead spots with no non-residential use.
- Other Town Center Study Area Parcels (i.e. excluding Downtown Core and select Route 6A parcels)
 - Residential dwelling unit values from Scenario 1 are used for each parcel.
 - Apply a non-residential density cap of 7,000 s.f. / acre to reflect a decrease in overall non-residential development compared to Scenario 1 and to reflect implementation of land use controls as described in the MassDEP CWSRF Zero Percent Financing section in this Technical Memorandum.

For all study area parcels with existing residential and non-residential densities that exceed the build-out ratios reported above, it is assumed those densities are grandfathered / remain in the future.



c. Scenario 3 – 2050 Planning Horizon

Scenario 3 utilizes the 2015 Existing Conditions results for the Town Center Study Area (as presented in *Water Quality and Wastewater Planning Task Number 1.b – Downtown Planning Technical Memorandum on Updated Downtown Build-Out Analysis and Land Use/Market Conditions and Development Constraints, March 2016*) as a starting point and applies residential and non-residential growth rates for a 2050 planning horizon. The growth rates are applied at the study area-wide level and not by individual parcel. Consequently, the residential (dwelling units) and non-residential (s.f.) results reported in Table 1 for Scenario 3 are at the Town Center Study Area level only and not by sub-watershed, as done for the other scenarios. The planning horizon was determined based on an assumed 2020 construction date of a new wastewater facility and a 30 year estimated useful life. This scenario includes two options:

- Scenario Option 3a: Historical Growth Rate; and
- Scenario Option 3b: Modified Growth Rate with Consideration of Vision, Market Conditions, and Provision of Sewer.

Each scenario option is described below.

Scenario Option 3a: Historical Growth Rate

An annual compounded historical growth rate of 0.34 percent is applied to residential (dwelling units) development from the year 2015 through 2050. This historical growth rate was determined using U.S. Census 2000 and 2010 Decennial Census data on housing units for the Orleans Census Designated Place geography. An estimated 120 dwelling units associated with a currently proposed large-scale development in the Village Center district are also added to account for the assumed implementation of the development by 2050.

An annual compounded historical growth rate of 0.34 percent is applied to non-residential (s.f.) development from the year 2015 through 2050. This historical growth rate was determined using net leasable area (i.e. actual square-unit of a building that may be leased or rented to a tenant) data for Fiscal Year 2006 and 2016 for the Town of Orleans, as provided by the Town Assessor.

Scenario Option 3b: Modified Growth Rate with Consideration of Vision, Market Conditions, and Provision of Sewer

An annual compounded historical growth rate of 0.50 percent is applied to residential (dwelling units) development from the year 2015 through 2050. This higher growth rate (compared to the 0.34 percent for Scenario Option 3a) is applied to account for anticipated accelerated growth due to provision of sewer in the Town Center Study Area and to reflect market conditions and the Town Center Vision for increased residential density. An estimated 120 dwelling units associated with a currently proposed large-scale development in the Village Center district are also added to account for the assumed implementation of the development by 2050.

For non-residential (s.f.) development, it is expected that the demand for non-residential space would run in a similar trajectory to the growth of the year-round and seasonal housing units in the Orleans Primary Trade Area, as defined in the *Orleans Town Center Economic Analysis Primer* (included as an appendix in *Water Quality and Wastewater Planning Task Number 1.b – Downtown Planning Technical Memorandum on Updated Downtown Build-Out Analysis and Land Use/Market Conditions and Development Constraints, March 2016*). With a vacancy rate of 4 percent, there is no evidence of an over-supply of non-residential space; however, there does not seem to be a large deficit either.

There appears to be only quite modest market opportunity under current conditions. As noted in the *Economic Analysis Primer*, there are no large, glaring retail gaps and there does not appear to be any sales leakage in the restaurant category. Supply seems close to meeting demand in most categories. There may be some additional opportunity for medical and other professional services, especially if some seasonal homeowners convert to year-round residents or spend more time at their Cape home.

Based on housing unit information for the Primary Trade Area communities included in the Cape Cod Commission's 2012 *Cape Wide Buildout Analysis to Support Regional Wastewater Planning*, and assuming buildout conditions would be reached by 2050, it was determined there would be approximately a 16 percent increase in Primary Trade Area housing units by 2050. This 16 percent increase is applied to the 2015 existing conditions non-residential (s.f.) value for the Town Center Study Area to arrive at an estimated non-residential (s.f.) value for 2050.

4. Build-out Scenario to Reflect Proposed Amendment to the Town of Orleans Zoning By-Laws

In February 2016, the Orleans Planning Board drafted a proposed Village Center District-wide amendment to Section 164-31 Apartment Development of the Zoning By-laws. The proposed amendment would do the following:

- Allow apartment density of 12 units per acre in the Village Center District without the current requirement of also providing a similar amount of commercial space;
- Reduce the minimum lot area requirement in the Village Center District from 60,000 s.f. of contiguous buildable upland to 20,000 s.f.;
- Make the Planning Board the Special Permit Granting Authority for apartment development and parking relief;
- Set forth a set of criteria for granting approval of an apartment project; and
- Require Architectural and Site Plan approval prior to granting a Special Permit.

This proposed amendment is included in Appendix A.

To account for this proposed amendment, AECOM conducted an assessment of a new scenario that reflects the proposed zoning changes in the Village Center District. The following assumptions were applied to estimate a dwelling unit buildout value for this scenario:

- For parcels in the Village Center District with at least 20,000 s.f. contiguous buildable upland (i.e. proposed minimum lot size requirement for apartment development):
 - Deduct area for existing building footprint/s;
 - Deduct area needed for required parking (1 space per each 250 s.f. of gross floor area; 300 s.f. per space);
 - Apply 3,500 s.f. / unit density to the remaining net usable area to arrive at the number of new dwelling units;
 - Assume no future additional non-residential development (i.e. all remaining net usable area used for dwelling units); and
 - Maintain the assumption that non-conforming Village Center District uses (e.g. single family homes) and tax-exempt properties would not support future dwelling units.

The following two non-residential Village Center District parcels were excluded, since they are viewed as providing unique services: Snows Home and Garden (22 Main Street) and Mid-Cape Home Centers (15 Main Street). It was assumed there would continue to be a demand for these services in the future, and that the land use for each parcel would not support future residential use.

- For parcels in the Village Center District with less than 20,000 s.f. contiguous buildable upland (i.e. cannot support apartment development) and parcels located outside the Village Center District:
 - Proceed with results used for “Scenario 1 – Full Buildout Under Current Zoning without Wastewater Limitation”

This approach results in a buildout value of 1,485 dwelling units for the Town Center Study Area, compared to 1,502 dwelling units for “Scenario 2 – Growth Scenario to Reflect Vision to Increase Residential Density in the Town Center”. Consequently, it was determined that Scenario 2 conservatively reflects the intent of the proposed zoning amendment to increase residential density in the Village Center District, and the results for Scenario 2 can be referenced when considering what the proposed zoning amendment (or a variation of it) could allow.

5. Selection of Preferred Future Build-out Scenario

The Orleans Planning Board issued a memorandum to the Orleans Board of Selectmen on February 26, 2016 regarding downtown growth and development. In the memorandum, the Planning Board states that based on the outcome of the Downtown Planning Workshops, it is their opinion that there is general consensus regarding the future of the downtown area as expressed in the Town Center and Village Center Vision Statements that were reviewed. The memorandum includes the following guiding principles:

- The Town currently is zoned for more commercial space than is necessary to meet current or future needs;
- More housing units are needed to support a diverse workforce and provide housing alternatives for older residents;
- Future commercial development or redevelopment should be focused in commercial nodes generally defined as Skaket Corners, the Village Center, and the area near the Orleans Rotary;
- Areas between nodes of development should contain mixed uses, with greater emphasis on housing than commercial activity;
- Additional density allowances for dwelling units may be needed in order to obtain the desired housing units; and
- A healthy local economy is vitally important to the overall community.

The memorandum also states that the Planning Board agrees that the future needs of the Town are best met under the future build-out Scenario Option 3.b, which reflects higher residential density in the Village Center. This memorandum is included in Appendix B.

6. Wastewater Flows and Loads Associated with Future Build-out Scenarios

a. Future Build-out Scenario Wastewater Flow and Loads

Wastewater flows associated with the future build-out scenarios are developed for Scenario 1 and Scenario 2 using the following approach:

- Residential dwelling unit wastewater flows are generated by applying a conservatively high 110 gpd per bedroom (based on Title 5's design flow standard for most residential uses, which is also used to support the design of new sewer systems). Accessory dwelling units and apartments are assumed to have one bedroom within parcels with residential only state class codes (i.e. single family, condominiums, etc.) and an average of 1.5 bedrooms within parcels with mixed use state class codes (i.e. commercial condominiums, small retail, and other mixed-residential/commercial). If a mixed use parcel could only support a maximum of a one bedroom unit due to site constraints, this value is used to generate wastewater flows; and
- Non-residential wastewater flows are generated based on the existing average wastewater generation rate (gpd/non-residential square foot) for the individual parcel, which was derived using historic parcel water use data for 2014 and 2015.

For Scenario 3 (Options 3a and 3b), wastewater flow is developed using the following approach:

- The number of additional dwelling units and the additional non-residential square footage determined in the Scenario 3 build-out are compared to the respective build-out results from Scenario 2 in order to develop a residential and a non-residential percentage difference. These percentages represent the proportion of the Scenario 2 full build-out that is expected to occur within the 2050 planning horizon represented by Scenario 3.

The residential and non-residential percentages are applied to their respective wastewater flows developed for Scenario 2, in order to generate total Scenario 3 wastewater flows.

Septage and infiltration/inflow (I/I) flows are then added to arrive at a total flow value for each future build-out scenario. *Detail will be added to explain how the septage and I/I flow values (16,000 gpd and 22,501 gpd, respectively) were derived.*

Influent pollutant loadings are a function of concentration and flow. Septage flows assume some (approximately 33 percent) loss of market share relative to historical Tri-Town Septage Treatment Facility receiving rates to reflect the sewerage of some portions of town, and some permanent loss of market share as Yarmouth-Dennis and possibly new facilities expand operations to fill the void in the period between Tri-Town's closure and the commissioning of new facilities in Orleans. In the absence of actual sewage data, the pollutant concentrations of raw sewerage were based on the higher end of textbook ranges to reflect that this will be a new collection system with a higher component of commercial wastewater. Septage concentrations were based on data obtained from Tri-Town Septage Treatment Facility. Blended pollutant concentrations for the combined sewage and septage filtrate stream were based on flow weighted averages of the two sources.

WWTF effluent loads, again a function of flow and concentration, were based on a worst case scenario of effluent concentrations being at expected permit requirements. The expected permit limits are 30 milligram/liter (mg/l) for biochemical oxygen demand (BOD) and total suspended solids (TSS), and 10 mg/l for total nitrogen (TN).

The wastewater flows and loads results for each future build-out scenario are presented in Table 2.

Table 2. Orleans Town Center Study Area Future Wastewater Flows and Loads

Parameter	Scenario 1	Scenario 2	Scenario 3	
			Option 3a	Option 3b
Wastewater Flow (gpd)	374,445	284,492	196,768	211,499
Septage Flow (gpd)	16,000	16,000	16,000	16,000
I/I Flow (gpd)	22,501	22,501	22,501	22,501
<i>Total Flow (gpd)</i>	412,946	322,993	235,269	250,000
BOD Loading (lbs/d)	1,102	862	628	667
TSS Loading (lbs/d)	1,033	808	589	625
TN Loading (lbs/d)	207	162	118	125
Effluent BOD Load (lbs/d)	103	81	59	63
Effluent TSS Load (lbs/d)	103	81	59	63
Effluent TN Load (lbs/d)	34	27	20	21
Waste Biosolids (lbs/d)	1,074	939	808	830

b. Timing of Future Flows and Loads

This section is under development

7. Coordination of Future Growth with the Orleans Comprehensive Plan

This entire section is a work in progress

a. Strategies to Manage Growth Consistent with the Orleans Comprehensive Plan

As noted in the 2006 Orleans Comprehensive Plan, growth and development continue to create challenges for the Town, including increased traffic congestion and nitrogen pollution of local waters. Per the Comprehensive plan, the Town’s growth policy is to “ensure that future growth is at a level and in such a manner that will have no or minimal adverse effect upon semi-rural character and environmental integrity of the Town. The Comprehensive Plan also states that future business activities should be oriented primarily in village areas and strip commercial development prevented. This approach is consistent with the growth policy of the 2012 Cape Cod Commission Regional Policy Plan, which is to “guide growth toward areas that are adequately supported by infrastructure and away from areas that must be protected for ecological, historical, or other reasons.”

High septic system replacement costs and Title 5 restrictions currently limit the ability of the Town to direct future growth to the Village Center and the two major commercial nodes (Skaket Corners and the Orleans Rotary area). Also, businesses with high sewage volume are severely constrained from locating in the downtown area, as any business generating in excess of 15,000 gpd of wastewater would require an advanced septic treatment facility, which comes with additional costs and regulatory requirements.

The proposed sewerage of the Town Center Planning Study Area will aid in attainment of the Town’s growth policy by eliminating current on-site wastewater limitations and enabling denser development and redevelopment within the three commercial nodes targeted to receive future growth. The sewerage will also eliminate nitrogen loading from wastewater in the Study Area and aid in restoring the health of local water bodies.

b. Improvements Needed to Support the Preferred Build-out Scenario

The primary infrastructure improvement in the Town Center Study Area required to support the preferred build-out scenario is provision of a wastewater collection system and treatment facility. Without this wastewater infrastructure in place, the desired density and type of development in the Study area as reflected in the preferred build-out scenario (Scenario Option 3b) could not be achieved. Also, it is important to plan for the water demand associated with the future development and provide a sufficient water supply.

Implementation of recommendations included in the 2015 Route 6A Orleans RESET report prepared by the Cape Cod Commission could also support attainment of the preferred build-out scenario and Town Center and Village Center Visions that were confirmed during the Downtown Planning task. One relevant recommendation is to update the Town's parking and circulation study to identify areas of need. Demand for parking in the future could change as a result of redevelopment and increased density in the Village Center. Also, increased traffic associated with future growth could lead to greater traffic congestion issues in the Town.

c. Zoning and Regulatory Changes Needed to Achieve Strategies and Objectives

Focusing development in the specified nodes in the Town Center Study Area will reduce the potential for undesired strip commercial development and other types of development sprawl. Implementation of the Town's proposed amendment to Section 164-31 Apartment Development of the Zoning By-laws (described above) would allow for and encourage the higher residential density that is desired in the Village Center. The Town could also consider implementing a zoning amendment that requires all (or selected types) new housing developments to contribute to the Town's affordable housing stock.

Also, in order for the Town to be eligible to receive zero percent financing through the MassDEP CWSRF program, the Town must adopt land use controls as described in the following section.

8. MassDEP CWSRF Zero Percent Financing**a. Background on MassDEP CWSRF Program and Zero Percent Financing Requirements**

The CWSRF is a federal-state financing mechanism that subsidizes water quality improvement projects that are undertaken by local governments. Many municipalities have utilized this program since its inception in 1991 to finance wastewater management planning. CWSRF loans have a standard term of 20 years and a below-market interest rate of 2 percent. The CWSRF is administered by MassDEP, which conducts a competitive annual project solicitation.

The Massachusetts Legislature has also directed MassDEP, pursuant to M.G.L. c. 29C, § 6, to provide zero percent interest financing to projects that meet the following criteria:

- 1) The project is primarily intended to remediate or prevent nutrient enrichment of a surface water body or a source of water supply;
- 2) The applicant is not currently subject, due a violation of a nutrient-related total maximum daily load standard or other nutrient based standard, to a MassDEP enforcement order, administrative consent order or unilateral administrative order, enforcement action by the United States Environmental Protection Agency or subject to a state or federal court order relative to the proposed project;
- 3) The applicant has a Comprehensive Wastewater Management Plan (CWMP) approved pursuant to regulations adopted by MassDEP;

- 4) The project has been deemed consistent with the regional water resources management plans if one exists; and
- 5) The applicant has adopted land use controls, subject to the review and approval of MassDEP in consultation with the Department of Housing and Economic Development and, where applicable, any regional land use regulatory entity, intended to limit wastewater flows to the amount authorized under the land use controls that were in effect as of the date of the Secretary of the Executive Office of Energy and Environmental Affairs approval of the CWMP.

b. Draft Regulations to Obtain Zero Percent Financing

This section is under development

9. Next Steps

The final Downtown Planning deliverable will be prepared, which is a Technical Memorandum on Management of Future Downtown Wastewater Flows and Biosolids.

Appendix A
Proposed Zoning By-law Amendment

Appendix B

February 26, 2016 Planning Board Memorandum