

Section 1. Introduction and Overview

1.0 Technical Services Requirement

This report, prepared by Cashin Associates, P.C. (CA), presents the findings and recommendations for the Grand Canal Analysis and Assessment Services project requested by Suffolk County Department of Health Services (SCDHS), Division of Environmental Quality (Suffolk County Contract No. 525-5200-1180-00-0001). It has been prepared in accordance with the Technical Specifications and Description of Services for the project.

The main tasks completed included: start-up meeting and monthly progress meetings (Task 1); review of existing data (Task 2); data collection and analysis (Task 3); public health problem evaluation and report (Task 4); ecological health evaluation and report (Task 5); and final project report (Task 6). The findings of these tasks have been presented in interim reports which have been reviewed by the County during the course of the study, and these interim reports have been revised by CA based on County review.

This project report (Task 6) specifically includes: an executive summary; data findings from Tasks 2 and 3; reports generated in Tasks 4 and 5; and a proposed methodology for assessment of whether dredging and integrated marsh management (IMM) will alleviate problems identified with the Grand Canal (identified as part of Tasks 2, 3, 4 and 5). These proposed methods were applied to determine the potential for dredging and IMM to alleviate public and ecological health problems within the Grand Canal and adjacent wetlands.

1.1 Study Overview

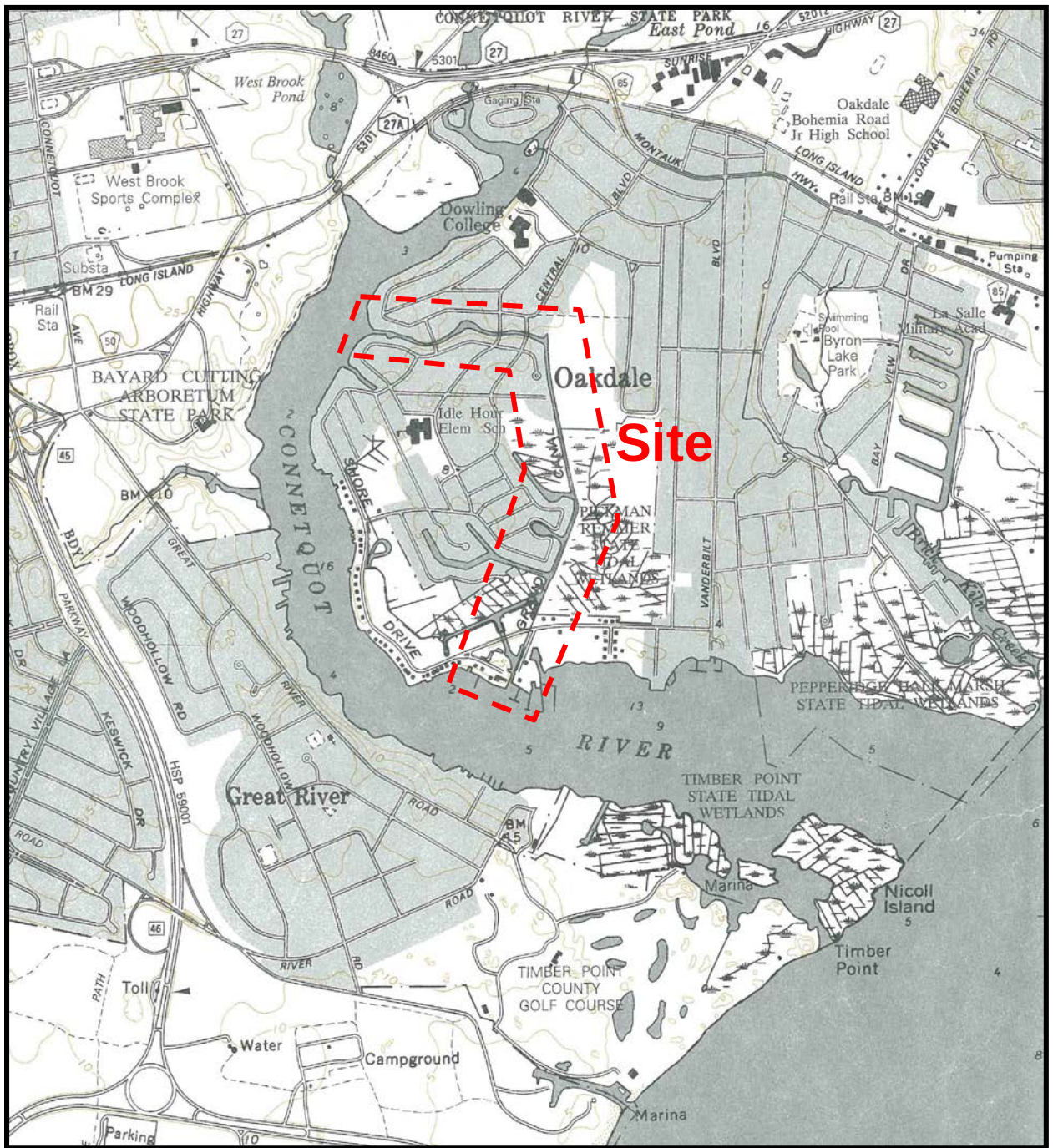
The report presents the findings of a detailed study assessing the ecological and public health of the Grand Canal and adjacent wetlands, located in Oakdale, New York. In addition, the report proposes procedures and methodologies for assessing whether dredging combined with integrated marsh management (IMM) actions can alleviate any public health problems or improve the

ecological health of the canal and adjacent wetlands. These proposed procedures and methodologies are used to evaluate potential courses of action to improve the Grand Canal and associated wetlands. Specific recommendations resulting from this analysis are presented in this project report.

Specific tasks and subtasks performed as part of the study included: collecting and analyzing sediment cores for grain size distribution and possible contamination; collecting and analyzing surface water samples for various water quality parameters and for possible contamination; conducting a bathymetric survey of the canal system; evaluating tidal flow into the canal system and adjacent wetlands; characterizing adjacent wetlands; documenting the flora and fauna present; and defining specific potential health problems associated with the system, including those related to mosquitos.

1.2 Site Description

The Grand Canal is a man-made waterway consisting of a series of shallow, interconnected canals, located on the east side of the Connetquot River in Oakdale, Town of Islip, New York (Map 1). According to the ‘Grand Canal Environmental Assessment Report’ (2005) published by Suffolk County Department of Health Services (SCDHS) and Suffolk County Department of Public Works (SCDPW), the canal was built sometime prior to 1920 to serve the former ‘Idle Hour’ estate of William K. Vanderbilt. The canal system includes a main channel with two openings to the Connetquot River. This main channel, which is the primary subject of this study, is approximately 8,000 feet in length and 20 feet wide and variable in depth. The Grand Canal system also includes several inner finger canals extending into residential areas; these inner canals are connected to the main channel. The Grand Canal is unique in that it has two interfaces that open into the Connetquot River. One opening is in the midsection of the tidal portion of the Connetquot River and the second opening is in the southern section of the tidal portion of the river. This enables the river flow to potentially have an influence on the currents and tidal flow in the Grand Canal.



New York State Department of Transportation
 Bay Shore East Quadrangle, New York-Suffolk Co
 7.5 Minute Series, 1991, Digital Edition
 Scale 1:24000

MAP 1

Grand Canal Study Area

The Grand Canal is also integral to a wetland system. The canal's northern opening is surrounded by residential properties and the southern opening is bordered on both sides by commercial properties, including a marina and restaurant. The land area surrounding the northern section of the main canal, that runs east-west, is residential. For the north-south section of the main channel, the land to the west is a mixture of residential properties and tidal wetlands. The adjacent land area to the east is dominated by an extensive tidal and freshwater wetland complex, known as the Pickman-Remmer Wetlands. This wetland complex is owned by the State of New York and is managed by the New York State Department of Environmental Conservation (NYSDEC).

The surrounding area is highly developed predominantly with single family homes that utilize on-site sanitary systems which discharge directly to groundwater. In addition, Dowling College is located immediately up-gradient from the northeastern region of the canal system. Dowling College operates an advanced wastewater treatment plant which discharges to groundwater. The Dowling College wastewater treatment plant was subject to a consent order issued by the County in 2014. In addition to the high-density residential housing and the nearby college, a waterfront restaurant and commercial marina are also located on the banks of the Grand Canal.

1.3 Background Information

For over a decade, the Grand Canal has been the subject of complaints by area residents concerned with potential ecological and public health problems associated with the canal system. Specific issues raised include the potential for mosquito breeding and epizootic activity, possible contamination of the canal system with pesticides, reductions in water quality, shoaling, and reduced tidal flushing. These issues prompted a formal investigation into the potential issues associated with the Grand Canal system by Suffolk County.

In June 2004, a multi-agency strategy was developed to assess the environmental conditions of the Grand Canal. The agencies included in the taskforce were the Suffolk County Executive's Office, Suffolk County Department of Health Services (SCDHS), and Suffolk County Department of Public Works (SCDPW). The study's objective was to document existing ecological conditions in the Grand Canal, to determine whether a risk to public health exists, and to determine if dredging the canal would reduce that risk. Specific tasks carried out for the study included: water quality monitoring to measure dissolved oxygen, salinity and turbidity, and sampling for bacteria, nutrients, and contaminants; mosquito larval surveillance in the canal; and an overview of potential solutions, particularly dredging and integrated marsh management, that may alleviate ecological and environmental problems associated with the canal system.

In 2005, the results of the Suffolk County study were presented by the SCDHS and SCDPW in the 'Grand Canal Environmental Assessment Report'. The report concluded that the water quality in the canal was significantly impacted by nutrient enrichment, and potentially, by pathogen contamination. The excessive levels of nitrogen found in the canal suggested that algal blooms, and the consequential reduction in water clarity and depleted levels of dissolved oxygen, were a common occurrence. Potential sources of contamination included storm water runoff from fertilized lawns and roadways, area wildlife, and perhaps, improperly functioning residential septic systems. The study determined that the effect of these sources may be exacerbated by the canal's low tidal exchange and lack of flushing. The 2005 report concluded that dredging the canal in conjunction with a comprehensive Open Marsh Water Management (OMWM) strategy would provide greater water flows to wetlands, thus potentially reducing mosquito breeding and decreasing the need for annual larviciding, and may enhance the ecology of the canal system.

The suggestion that conditions in the Grand Canal system may collectively represent a public health risk has prompted the need for a more detailed examination of these conditions in order to determine the sources of the impacts and the extent of the health risks. Furthermore, the 2005 study indicated the need for a more detailed analysis of ecological conditions in the canal system and adjacent wetlands. The present study serves to fulfill these needs and presents a critical analysis of possible remediation actions to mitigate the issues identified in the Grand Canal system.