Appendix F

Water Quality Monitoring Plan

Draft Water Quality Monitoring Plan

for Grand Canal, Oakdale, New York

Prepared for:
Suffolk County Department of Health Services
335 Yaphank Avenue
Yaphank, NY 11980

Prepared by:
Cashin Associates
1200 Veterans Memorial Highway
Hauppauge, NY 11788

June 2015

1. Introduction

In recent years the Grand Canal, Oakdale, NY has been the subject of complaints by area residents concerned with progressive shoaling and with conditions potentially associated with a reduction in tidal flushing. Some of the issues raised include the potential for mosquito breeding, potential West Nile virus and other epizootic activity, the possible contamination of canal waters with Vector Control pesticides, and general water quality deterioration. .

In June 2004 a meeting was held among representatives of the Suffolk County Executive's Office, Suffolk County Department of Health Services (SCDHS) and Suffolk County Department of Public Works (SCDPW) and as a result of this meeting, a multi-agency strategy was adopted to assess environmental conditions of the Grand Canal. The objective of this strategy was to document existing conditions and determine whether a risk to public health exists, and if dredging of the canal would reduce that risk. The SCDHS Office of Ecology was assigned the tasks of assessing water quality conditions, coordinating monitoring efforts, and compiling a draft report. The SCDHS Division of Public Health was to evaluate mosquito and viral epizootic activity and assess the potential for public health implications. The SCDPW was assigned to evaluate adjacent wetland and ditch conditions as they relate to mosquito breeding, in addition to determining sediment conditions for potential dredging.

In January 2005, a Grand Canal Environmental Assessment report was produced by the SCDHS and SCDPW concluding that the water quality in the canal is significantly impacted by nutrient enrichment and potentially, by pathogen contamination. The excessive levels of nitrogen found in the canal suggest that algal blooms, and the consequential reduction in water clarity and depleted levels of dissolved oxygen, are a common occurrence. Potential sources of contamination include stormwater runoff from fertilized lawns and roadways, area wildlife, and perhaps, improperly functioning residential septic systems. The effect of these sources is exacerbated by the canal's low tidal prism and lack of flushing. The suggestion that these conditions collectively may represent a public health risk has prompted the need for this plan.

This plan will review all existing water quality data for the Grand Canal and adjacent waters of the Connetquot River that may be useful in assessing the conditions contributing to the water quality issues of the canal. In conjunction with this review, a series of surface water sampling events will be conducted to augment, fill data gaps of existing data, and further investigate the issues identified in the 2005 report.

2. Site Description and History

The Grand Canal is a man-made waterway and is a tributary or branch of the Connetquot River, located in Oakdale, New York in the Town of Islip. According to the 2005 report the canal was built sometime prior to 1920 to serve the former "Idle Hour" estate of William K. Vanderbilt.

The main channel of the canal is approximately 8,000 feet in length and 20 feet wide and variable. The canal system also includes a number of branch channels that extend into residential areas, providing access 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 river and the second opening is in the southern section of the tidal portion of the river. This creates a situation where the river flow may have an influence on the currents and tidal flow in the canal. The Grand Canal is also integral to an extensive wetland system. The canal's northern opening is surrounded by residential properties and the southern opening is bordered on either side 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 and extensive tidal and freshwater wetland complex known as the Pickman-Remmer Wetlands owned by the State of New York and managed by the New York State Department of Environmental Conservation (Figure 1).

3. Plan Objectives

The primary objective of this document is provide a Water Quality Monitoring Plan in accordance with Subtask 3.e. of section 4C of the Suffolk County contract No. 525-5200-1180-00-00001. This plan will build upon existing water quality for Grand Canal and the surrounding area and further investigate the water quality issues identified in the Grand Canal Environmental Assessment Final Report (2005). Prior to executing this plan a draft will be provided to the Department's Division of Environmental Quality for review and approval. Below is a detailed description of existing water quality data, the new study design, the analytes of concern, and the sampling protocols pursuant to subtask 3.e. A-B.

a. Review of Existing Water Quality Data

Cashin Associates (CA) has reviewed the existing water quality data from the Grand Canal Environmental Assessment Final Report (2005). According to the 2005 report twelve locations throughout Grand Canal were analyzed for the following parameters: temperature, salinity, dissolved oxygen, water transparency, pesticides, herbicides, volatile organic compounds, semi-volatile organic compounds, coliform bacteria, and nutrients. Per the requirements of the aforementioned contract, all of the above listed parameters will be analyzed for during the Grand Canal Surface Water Assessment (GCSWA) and Storm Water Runoff Monitoring Study (SWRMS). In addition, the inclusion of hydrogen

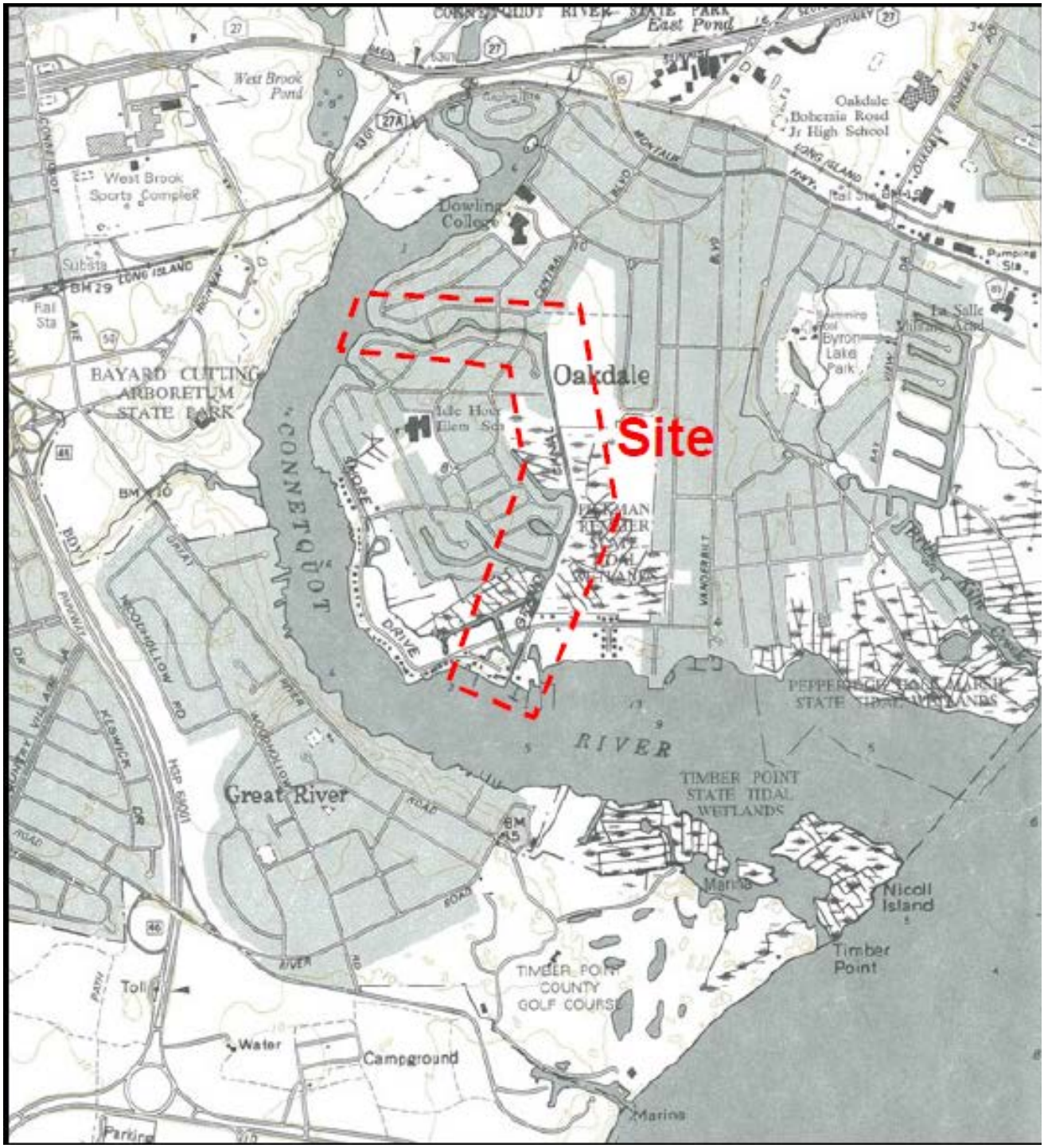

Figure 1. Site Location

sulfide as an analyte of concern will also be sampled and analyzed. During the 2005 report the only identified deficiency was a limited number of samples were taken for organics analysis. The report describes this deficiency to be related laboratory limitations. For the GCSWA, this limitation will be overcome with proper planning and identification of an appropriate analytical laboratory.

The water quality analyses conducted for the 2005 report provides a comprehensive and representative source of information that will aid in the GCSWA. To promote the most effective comparative use of this data the sampling locations for the GCSWA will mirror those location previously used for the 2005 study. The exception to this will be the removal of site GC 3, as illustrated in 2005 report (Figure 2), as a sampling location. The removal of this sampling site is due to its lack of utility in providing a unique representative location of the canal based on its close proximity to other sampling sites. The locations will be based on the GPS coordinates listed in Table 1.

Table 1. Depicts the GPS coordinates to be used for the water quality sampling.

Station	Latitude	Longitude
GC 1	40.72918333	73.14933333
GC-2	40.73046667	73.14691667
GC-3	40.73125	73.14966667
GC-4	40.73196667	73.15243333
GC-5	40.73208333	73.15043333
GC-6	40.7321	73.1473
GC-7	40.73323333	73.14573333
GC-8	40.73441667	73.1482
GC-9	40.73666667	73.14668333
GC-10	40.73838333	73.14693333
GC-11	40.73905	73.15063333
GC-12	40.73898333	73.15498333

Additional water quality data from the surrounding area (if available) will be evaluated during the analysis of the GCSWA. In addition, a "healthy" reference wetland will be identified in collaboration with department personnel. CA has identified one potential reference wetland located two miles to the east of Grand Canal along the western boundary of the Hard Estate-West Sayville County Park (the West Sayville Golf Course). However, consultation with department personnel and a site visit would be required to confirm if the site is appropriate for use.

b. Sampling Protocols

As discussed above, the following parameter will be sampled for both the GCSWA and SWRMS: temperature, salinity, dissolved oxygen, water transparency, pesticides,

herbicides, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), coliform bacteria (total coliform, fecal coliform, and Enterococcus), hydrogen sulfide and nutrients (nitrogen and phosphorus). All GCSWA samples will be analyzed by an approved NYS Department of Health laboratory with Environmental Lab Approval Program (ELAP) certification.

i. Procedure

Sampling methods for both the GCSWA and SWRMS will follow the same procedures differing and in sample locations listed in Table 1 and displayed in Figure 2.

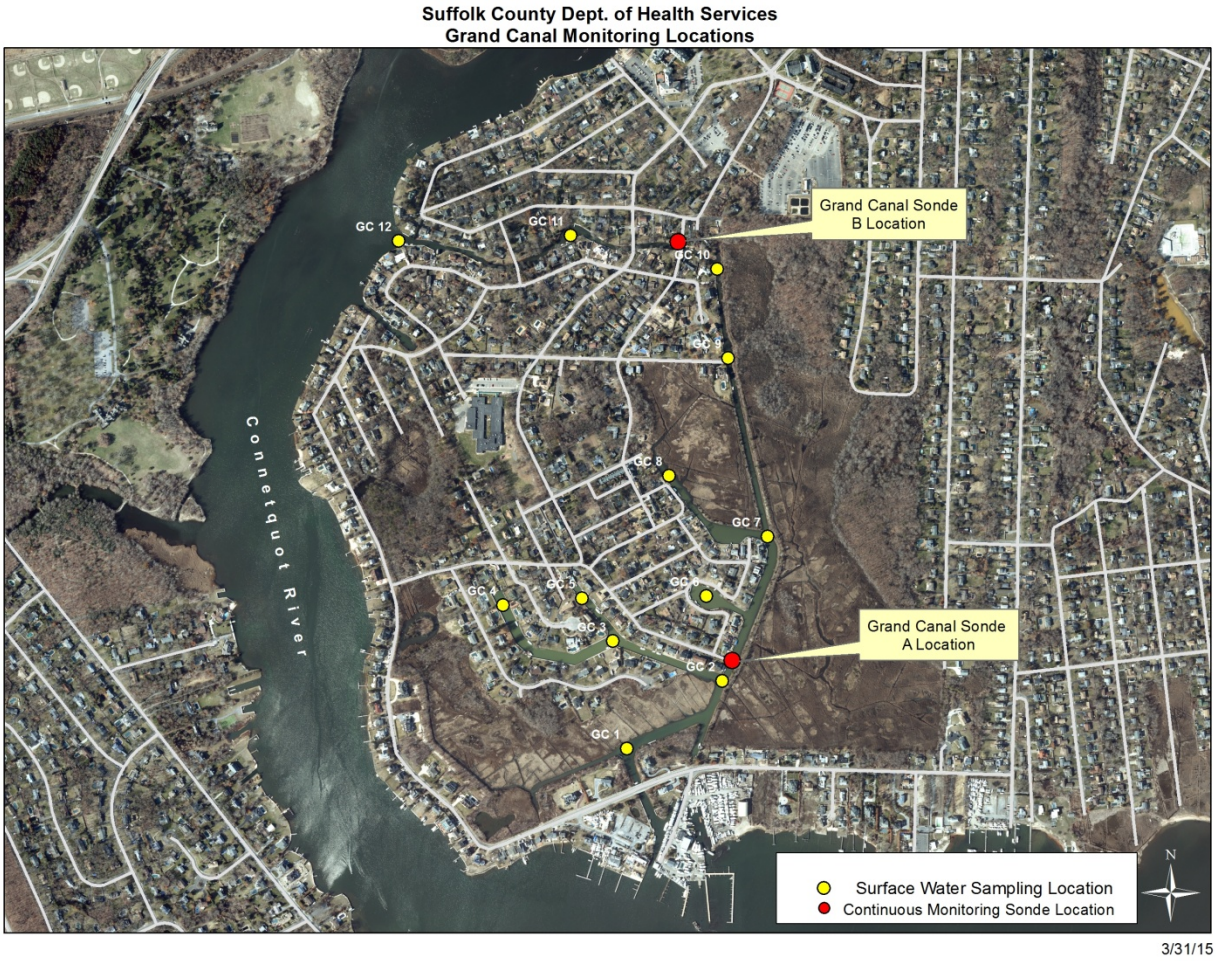

Figure 2. Existing sample locations provided by Suffolk County Department of Health Services.

a. At each location the following information must be recorded: GPS coordinates, depth, water temperature, salinity, dissolved oxygen, and water transparency or secchi.
b. In following the same sampling protocol used for the 2005 report, water samples will be collected from a depth approximately six inches below the surface. Samples must

be collected by submerging the sample containers to the six inch depth and carefully removing the cap to fill the container.

c. The sampler must wear a new pair of clean disposable powderless gloves for each sampling location.
d. Utilize the appropriate containers and preservatives for each parameter in accordance with table 1 of this document.
e. For samples collected for VOCs and SVOCs the containers should be slowly opened underwater on an angle to allow the container to fill slowly. The cap should be replaced prior to removing the bottle from the water.
f. For samples collected for VOCs it important that no headspace is present in the container. After the sample has been retrieved invert the bottle and tap the side to check for bubbles. If bubbles are present resample the location with a clean unused container.
g. To the extent feasible sampling locations should be approached from downstream to avoid disturbing bottom sediments that could contaminate water samples. In the event a downstream approach is not feasible careful attention must be given to minimize sediment disturbance.
h. For each sampling event trip blanks will be collected for VOCs and pesticides. One set of containers used for sampling VOCs and pesticides must be filled with distilled water and sealed prior to initiating the sampling event and must be present on the boat during the sampling event.
i. For each sampling event one replicate samples will be taken for each parameter analyzed at one sampling location.

c Grand Canal Surface Water Assessment

According to the aforementioned contract, sampling events must be taken during four distinct tidal conditions: low tide, midpoint of incoming tide, high tide and midpoint of outgoing tide. A minimum of ten locations must be sampled during the four distinct tidal conditions. Tidal conditions will be obtained from the National Oceanic and Atmospheric Administration Tide Prediction website and will be confirmed with onsite observations. During each sampling event, the tidal stage will be recorded by measuring the depth to water of a DPW reference point or other fixed land-based monument. The sampling locations will mirror those used for the 2005 report with the exception of site GC3 as previously discussed. Therefore a total of eleven location will be sampled as part of the GCSWA. The eleven sites will be sampled during four distinct tidal events for a total of 44 sample sets. This sampling convention will be conducted twice with at least fourteen days between events for a total of 88 samples sets for the GCSWA.

d Storm Water Runoff Monitoring Study

The purpose of this study is to determine the contaminant load from storm water runoff into Grand Canal. To properly characterize this contaminant loading to the canal a minimum of six locations will be identified for sampling prior to a significant rainfall event (baseline) and during a significant rainfall event (storm runoff) for a minimum total of twelve samples. The baseline sampling event will be conducted following a period of dry weather of at least 72 hours. The storm water runoff sampling event will take place within the first three hours of a significant rainfall event defined as being at least one-half inch of precipitation. Sampling equipment will be prepared prior to both events to allow for a rapid response once the "dry" and "wet" periods conditions have been met. Sampling events will be scheduled based on data from the National Weather Service and general observations. Pertinent weather data will be recorded and included in the field data.

e Continuous Monitoring

The physical water quality data collected by the Department at two locations within the canal will be included in the overall water quality analysis. At a minimum that data will be analyzed for tidal, diurnal, and seasonal trends. An attempt will also be made to couple the department's data with that obtained through the GCSWA and SWRMS.