1.0 INTRODUCTION

This Chapter provides a summary of relevant background information, the scope of work and objectives for the Phase 1 Part 2 Combined Sewer Overflow (CSO) Control Plan for the Wellington Avenue CSO Treatment Facility.

1.1 BACKGROUND

Construction of the City of Newport's wastewater collection system dates back to the late 1800s and early 1900s. The system functioned as a combined sewer system until the 1970s, when the City undertook an extensive sewer separation program to reduce combined sewer overflows discharging to Newport Harbor. Under this program, the majority of the existing catch basins were disconnected from the combined sewer system and reconnected to new separate storm drains. However, the combined sewer was left in place to serve as the sanitary sewer, but the roof drains, sump pumps, basement drains, and area drains were not disconnected. Flows from these sources continue to be conveyed by the sanitary sewer system in either new sanitary sewers or converted combined sewers. In addition, in 1978, the City constructed the Wellington Avenue CSO Treatment Facility to screen and disinfect combined sewer overflows from the southern portion of the City

Presently, during dry weather, the Wellington Avenue CSO Treatment Facility provides screening, some minor amount of storage, and pumping of wastewater flows to the Long Wharf Pump Station via the Thames Street Interceptor. The facility was designed to provide screening and pumping of wastewater flows up to 1.44 mgd during dry weather, and 25 mgd of treatment using micro-strainers, and chlorination of CSOs during wet weather events. The microstrainers are presently inoperative. In 2003, the facility was improved to replace the coarse bar screens with fine (0.25-inch clear openings) screens and provide disinfection of screened effluent prior to discharge.

The Thames Street Interceptor is the major interceptor sewer serving Newport. It is a brick, egg shaped, 3-foot by 4-foot sewer that flows from south to north parallel to the Newport Harbor shoreline. At its upstream location, flow enters the Thames Street Interceptor from the eastern portion of the City at Narragansett Avenue. An 84-inch storage conduit is located on Narragansett Avenue to provide approximately 0.55 million gallons of storage of wastewater flows during wet weather. The upstream end of the interceptor also receives flow from the

southern portion of the City at Morton Avenue and the southeastern portion of the City at Wellington Avenue. The Thames Street Interceptor also receives flow from Middletown's Wave Avenue Pump Station at Memorial Boulevard and Bellevue Avenue. The interceptor receives flow from many direct connections from collector streets between Wellington Avenue and its downstream terminus at Americas Cup Avenue. During wet weather, combined sewage that exceeds the capacity of the interceptor is diverted to the Wellington Avenue CSO Treatment Facility via a diversion structure at the intersection of Thames Street and Wellington Avenue. CSOs from the facility are discharged into Newport Harbor, east of Ida Lewis Rock at King's Park Beach.

The project study area comprises the Newport tributary catchments to the Wellington Avenue CSO Treatment Facility, including the flow discharged to the City's system from Middletown through the Wave Avenue Pump Station. Figure 1.1 depicts the Wellington Avenue CSO Facility study area.

1.2 SUMMARY OF PREVIOUS PHASE 1 PART 1 CSO CONTROL PLAN

In 2004, Earth Tech was awarded a contract to implement the long term control plan. The initial phase of the enhanced sewer separation project, the Phase 1 Part 1 CSO Control Plan for the Wellington Avenue CSO Treatment Facility, was completed by Earth Tech in 2005. That phase of work included preliminary field investigations, consisting of flow metering, to quantify the inflow and infiltration flows being generated by the tributary catchments within the Wellington Avenue CSO Facility service area, manhole inspections to assess the condition of the Thames Street Interceptor, data review of the frequency and volume of CSO events at the Wellington Avenue Facility, preliminary analysis of potential CSO control alternatives including sewer separation, storage and treatment, and conveyance and treatment at the Newport Wastewater Control Plant, and an evaluation of the influence of flows discharging to the City's system from Middletown's Wave Avenue Pump Station.

The primary objective of Phase 1 Part 1 was to identify the priority catchments in the facility service area where more detailed field investigations and analysis would be performed in this Phase 1 Part 2 project. Based on the flow metering performed in Phase 1 Part 1, the following catchments were identified for detailed sewer system evaluation surveys (SSES) to identify inflow and infiltration sources to be performed in Phase 1 Part 2:

N

NEWPORT HARBOR

WELLINGTON AVE CSO FACILITY OUTFALL

PRIVATE

Easton Pond

Lily Pond, Newport

Almy Pond

1

2

3

4

6

7

m:\work\newport_ri\maps\cso_phase\fig1.1_Tributary_Catchments.mxd

DECEMBER 2006

0 500 1,000

Feet

EarthTech

A tyco International Ltd. Company

Note:
"Catchment Area" 5 consists of the flow contribution to Newport's system from the Wave Avenue pump station in Middletown.

LEGEND:

- Priority Catchments for Infiltration/Inflow Investigation
- Buildings
- Docks
- Paved Roads and Parking
- Unpaved Roads and Parking

FIGURE 1.1
WELLINGTON AVENUE CSO TREATMENT FACILITY TRIBUTARY CATCHMENTS
PHASE I PART 2 CSO CONTROL PLAN

- Inflow SSES investigations: Catchments 1, 3 and 4; and,
- Infiltration SSES investigations: Catchments 3, 4 and 7.

These catchments are presented in Figure 1.1. In addition, the Phase 1 Part 1 report included recommendations to perform in Phase 1 Part 2 including closed circuit television inspection of the Thames Street interceptor, a hydraulic model software evaluation, collection of additional sanitary system information to update the City's Geographic Information System (GIS) sanitary sewer system mapping, and windshield survey field work to identify locations where catch basins were suspected to be connected to the sanitary sewer such that conceptual separation plans could be developed. Each of these work activities are summarized in the next section.

1.3 SCOPE OF WORK OF PHASE 1 PART 2 CONTROL PLAN

A brief summary of the Scope of Services of the Phase 1 Part 2 activities is presented in the following sections.

1.3.1 Field Activities

The sewer system evaluation survey that was conducted in Catchment Areas 1, 3, 4 and 7 to locate sources of infiltration and inflow included the following tasks:

- Flow isolation and follow-up closed circuit television (CCTV) inspection;
- Manhole inspections;
- Smoke testing;
- House to house surveys; and,
- Dye testing

Additional field activities included closed circuit television inspection of the Thames Street Interceptor and flow metering in Catchment Area 6. The CCTV of the Thames Street Interceptor was performed to identify any defects within the sewer, infiltration sources, and to develop both short-term and long-term rehabilitation recommendations.

Flow metering was performed in Catchment Area 6 to provide flow data to estimate the quantities of infiltration and inflow being generated in this catchment to determine if follow-up SSES investigations in that catchment were warranted. This Catchment Area required additional isolated metering to estimate the inflow and infiltration generated with in the Catchment Area. No quantification of extraneous flows with in the area could be estimated from the flow metering data collected in Phase 1 Part 1.

For each of these field activities, a technical memorandum summarizing the methodologies and results of the investigations was prepared and submitted to the City for review and comment and several were provided to RIDEM.

1.3.2 Model Evaluation and Selection

An evaluation of the EPASWMM, XP-SWMM, INFOWORKS and DHI MOUSE/MIKEURBAN hydraulic/hydrologic models was performed to determine which would be an appropriate model for the City to utilize to evaluate the behavior of the system under existing conditions and the effectiveness of proposed CSO control alternatives. A technical memorandum was prepared and submitted to the City that summarized each of the model's capabilities, advantages and disadvantages, compatibility with the City's existing GIS database, hardware and software requirements, and licensing and purchase costs. The results of this evaluation are presented in Chapter 10.

1.3.3 GIS Update

An update of the Geographic Information System (GIS) mapping of the City's sanitary sewer system was performed as part of this phase of work. The GIS database was updated based on the results of approximately 800 manhole inspections performed in Catchment Areas 1, 2, 3, 4, 6 and 7 as well as some locations in the northern part of the City. The GIS update is presented in Chapter 11.

1.3.4 Windshield Surveys and Development of Public Inflow Source Conceptual Separation Recommendations

Based on the results of the review of existing information, discussions with the City's collection system operations staff, windshield surveys conducted in the tributary catchments, and the detailed SSES field investigations in Catchments 1, 3 and 4, twenty eight (28) public sources consisting of catch basins, cross connections, drain manholes/lines, and "unknown" (i.e., smoke observed rising from the ground within the street right of way which are possible cracked pipes or abandoned service connections) were identified as connected to the sanitary sewer. As part of this phase of work, each location was evaluated to identify design issues and constraints. The results of this work are presented in Chapter 12.

1.4 PHASE 1 PART 2 CSO CONTROL PLAN OBJECTIVES

This Phase 1 Part 2 Control Plan has been developed to address CSO discharges at the Wellington Avenue CSO Facility. The objectives of this Phase 1 Part 2 report include the following:

- Evaluation of the results of the SSES field activities and development of recommendations, prioritization, and cost estimates for collection system rehabilitation;

- Development of recommendations for the removal of inflow sources identified on private property;

- Development of conceptual recommendations for the separation of inflow sources identified on public property;

- Update of the evaluation of CSO activations at the Wellington Avenue CSO Facility and the control alternatives that were developed in the Phase 1 Part 1 Report;

- Development of Recommendations, Scope of Work, and Schedule for the Phase 2 CSO Control Plan for the Wellington Avenue CSO Facility.

This work is described in detail in the following chapters.