

## 1.0 INTRODUCTION

### 1.1 OBJECTIVES

Under a Consent Decree with the Environmental Protection Agency (EPA) dated May 9, 2003, the City of Tacoma (City) completed remediation of marine sediments in the majority of the Thea Foss and Wheeler-Osgood Waterways in Tacoma, Washington in March 2006. Remediation of the southernmost 1,000 feet of the Thea Foss Waterway was completed by a group of private utilities under a separate Consent Decree with EPA in 2004. The waterways are narrow estuarine water bodies on the southeastern margin of Commencement Bay, with 13 municipal outfalls that discharge stormwater to the waterways as well as numerous private outfalls.

With the completion of cleanup action in Thea Foss and Wheeler-Osgood Waterways, it is necessary to continue monitoring source control activities to ensure sediment quality is protected in dredged and capped areas and to ensure that natural recovery is attained in areas where active remediation was not required. As part of the Consent Decree Statement of Work, a letter addendum dated November 1, 2001, (identified as Attachment 1 to the Consent Decree) provides a detailed schedule and work plan for the City's stormwater source control efforts for the Thea Foss and Wheeler-Osgood Waterways. This Stormwater Work Plan Addendum includes a description of stormwater monitoring efforts, studies, source control efforts and BMP assessments for municipal stormwater sources. Based upon these various efforts and evaluations, an approach for future stormwater source control decision-making identified as the Thea Foss post-remediation source control strategy, is also provided in the work plan. The approach and decision-making strategy are shown in Figure 1-1.

This report outlines the City's existing programs and studies completed in 2011, and the City's decision matrix for identifying additional source controls, if and when such controls are needed, to ensure protection of sediment quality in Thea Foss and Wheeler-Osgood Waterways. This report is specifically concerned with control of municipal stormwater sources. There are other sources which could also potentially affect sediment quality in the waterways, including groundwater seeps, marinas, aerial fallout, NPDES-permitted industrial discharges, and other private stormwater discharges. These sources are outside the scope of the City's Source Control Strategy for municipal stormwater, and largely outside the City's jurisdiction.

### 1.2 BACKGROUND

#### 1.2.1 Remedial Action Description

In 2006, the City of Tacoma completed remediation of marine sediments in the Thea Foss and Wheeler-Osgood Waterways. The remedy for the waterway included a combination of natural recovery, dredging, and capping. The dredged material was disposed of in a near-shore confined disposal facility (CDF) in the nearby St. Paul Waterway.

In general, the remedy included the following elements:

- No action at the mouth of the waterway, an area of clean sediments;
- Natural recovery north of East 11<sup>th</sup> Street, an area where low-level contamination is expected to recover to below the Sediment Quality Objectives (SQOs) within 10 years (2016), and which is currently below required navigational depths;
- Some combination of dredging (complete or partial) followed by capping over any residual contaminated sediment in the area from the East 11<sup>th</sup> Street bridge to just north of the State Route (SR) 509 bridge. Note that the authorized channel depth requirements are maintained in this area; and

- Capping (by others, referred to herein as the Utilities) from just north of the SR-509 bridge to the head of the waterway to maintain a depth of 10 feet Mean Low Low Water (MLLW). Deauthorization of the federal channel in this area was required, and was approved as part of the Water Resources Development Act (WRDA) Bill of 2007.

Other remedy features included:

- Construction of intertidal habitat as mitigation for construction impacts;
- Dredging to maintain authorized depths in the active navigation channel;
- Capping of about 20 acres of sediments in channel and harbor areas; and
- New slopes and erosion protection on about 10,000 feet of shoreline.

### 1.2.2 Drainage Basin Description

The Thea Foss and Wheeler-Osgood Waterways are estuarine waterways on the southeastern margin of Commencement Bay. In Commencement Bay and the waterways, average tidal fluctuations vary from 0 feet MLLW to 11 feet MLLW. Extreme tides, which occur in June and December, range from approximately -4.0 feet MLLW to 14.5 feet MLLW. The Thea Foss Waterway lies north-south along the City's downtown corridor. The Wheeler-Osgood Waterway lies west-east and connects to east side of the Thea Foss Waterway just south of the 11<sup>th</sup> Street bridge. The Thea Foss and Wheeler-Osgood Waterways are commonly referred to as the Thea Foss or Foss Waterway. The drainage area is commonly referred to as the Thea Foss or Foss Waterway Watershed or just Foss Watershed.

The Thea Foss Waterway Watershed is one of nine watersheds in the City of Tacoma (see Figure 1-2). This watershed covers approximately 5,751 acres and is comprised of drainage basins located in the south-central portion of Tacoma. The area borders the North Tacoma Watershed on the north, Lawrence Street on the west and East F to East K Streets on the east. The area extends as far south as 86<sup>th</sup> Street and also includes portions of the tideflats on the east side of the Thea Foss Waterway (see Figure 1-2).

The City's primary outfalls to the Thea Foss Waterway are 237A and 237B (the twin 96ers), 230, 245, 254, 218, 214, 225, 235, 243 and 248. There are also several small outfalls that discharge to the waterway. Primary land uses within the basins draining to each outfall is as follows:

<u>Outfall</u>	<u>Area</u>	<u>Land Use</u>
237A	2,794	residential, commercial and industrial
237B	1,821	residential
230	513.4	commercial and residential
245	36	industrial
254	51.3	industrial
218	4.15	industrial
214	4.36	industrial
225	10.34	business, commercial and light industrial
235	180.7	residential and commercial
243	52.6	industrial and commercial
248	19.8	industrial
207	7.71	industrial
223	21.4	industrial

Land use in the watershed is predominately residential, although most of the City's commercial businesses are also located in this watershed (see Figure 1-3). There are some industrial uses, concentrated mainly in the eastern tideflat areas and Nalley Valley portions of the watershed.

Several of the outfalls discharging to Thea Foss Waterway are tidally-influenced and portions of the pipe are inundated with marine water twice a day depending on the pipe elevations and the tide height. Continuous or tidal baseflow is also present in some of the outfalls. Baseflow in Outfalls 237A, 237B, 230, and 235 is continuous, and is derived from old creeks that were piped and/or infiltrating groundwater (only groundwater in 230 and 235). Baseflow in the other outfalls appears to be seasonal (flow rate higher in the winter and lower in the summer) as seen on the west side of the waterway, or is tidal as seen on the east side of the waterway.

The City has performed a significant amount of sampling and analysis in recent years of the storm drains entering the Thea Foss and Wheeler-Osgood Waterways. Over the last 10 years, 1,289 samples have been collected [baseflow (322), stormwater (709) and SSPM samples (62 outfall and 196 upline)]. The purpose of the sampling efforts was to evaluate the quality of stormwater discharges to the Thea Foss and Wheeler-Osgood Waterways and the effect of those discharges on sediment quality. The results of these efforts were used in an overall evaluation of source loadings to the waterway to predict whether municipal stormwater discharges would be protective of sediment quality following remediation.

### **1.2.3 Thea Foss Contaminants of Concern**

Contaminants of Concern (COCs) are those contaminants which have been identified through sediment monitoring and model predictions to have the greatest potential to compromise sediment quality in the waterways following remediation. They are, therefore, the primary target for source control activities for the municipal storm drains as well as other potential sources. Bis(2-ethylhexyl)phthalate (DEHP) and various polycyclic aromatic hydrocarbons (PAHs) are the primary COCs for the waterways and have therefore been the focus of source control activities to date. In addition, residual concentrations of other legacy COCs for which sources have largely been controlled through regulatory bans or restrictions are continuing to be monitored. These legacy COCs include mercury, PCBs, and pesticides.

## **1.3 THEA FOSS POST-REMEDATION SOURCE CONTROL STRATEGY**

For ongoing evaluation of the municipal stormwater discharges and their relation to future sediment conditions in the waterway, the City has established a source control strategy. This strategy is set forth in Figure 1-1.

The City is continuing to implement a comprehensive stormwater monitoring program and is also conducting several more specialized studies for the Thea Foss Watershed. The results of these projects will be used to focus source control efforts and assess the source control program's effectiveness. The various components of the post-remediation source control strategy are described in more detail below.

The City is committed to an ongoing program of stormwater source control to maintain and enhance stormwater quality. The City will implement all "reasonable and practicable" controls. "Reasonable and practicable" shall take into consideration effectiveness, maintenance, flood control and cost in comparison to the effectiveness achieved or expected in reducing contaminant loads to the Thea Foss Waterway.

The remainder of this report is as follows:

- Section 2 describes the source control activities in the Thea Foss Basin including an update on special studies.
- Section 3 presents the results of the Water Year 2001-2011 stormwater and storm sediment monitoring.
- Section 4 presents the results of the Thea Foss Waterway sediment monitoring and an update of the recontamination evaluation.
- Section 5 presents an evaluation of program effectiveness for the Thea Foss Source Control Strategy.
- Section 6 presents a summary of the conclusions and recommendations.