

**Combined Sewer System
Long Term Control Plan
Update**

LTCPU Work Plan

**City of Alexandria
Department of Transportation and Environmental Services**

FINAL – May 2014



GREELEY AND HANSEN

Abbreviations	AB-1
Section 1 Background	1-1
Section 2 Regulatory Requirements	2-1
2.1 General	2-1
2.2 VPDES Permit.....	2-2
2.3 Hunting Creek TMDL	2-2
2.3.1 TMDL Considerations for the LTCPU.....	2-2
2.3.1.1 Waste Load Allocations.....	2-2
2.3.1.2 TMDL LTCPU Guidance	2-4
2.3.1.3 TMDL Assumptions.....	2-5
2.4 Federal Clean Water Act.....	2-6
2.4.1 Presumption Approach.....	2-6
2.4.2 Demonstration Approach	2-6
2.5 Virginia Water Quality Standards	2-7
2.6 Use Attainability Analysis	2-7
2.7 Alternative Development and Evaluation	2-8
Section 3 Public Participation Plan	3-1
3.1 Overview	3-1
3.2 Stakeholders	3-3
3.3 Messaging.....	3-5
3.4 Phases of Outreach	3-5
3.4.1 Phase 1 – Information	3-5
3.4.2 Phase 2 – Present and Discuss Options.....	3-6
3.4.3 Phase 3 – Review Recommended Alternative	3-6
3.5 Tools for Outreach	3-6
3.6 Evaluation	3-7
Section 4 Existing System	4-1
4.1 Combined Sewer System (CSS) Characterization	4-1
4.1.1 Sewer System Overview	4-1

4.1.2	Combined Sewer Overflow (CSO) Areas and Regulators.....	4-1
4.1.3	Land Use and Development.....	4-3
4.2	Approved Long Term Control Plan (LTCP)	4-3
Section 5	Future Planning Considerations.....	5-1
5.1	Changes to Combined Sewer System Sewershed	5-1
5.1.1	Future Separation Projects.....	5-1
5.1.2	Future Development.....	5-1
5.2	Flow Projections.....	5-1
5.2.1	Current Flows.....	5-1
5.2.2	Future Flows	5-1
Section 6	Assessment Years	6-1
6.1	Introduction	6-1
6.2	Typical Year	6-1
6.2.1	Rainfall Data.....	6-1
6.2.2	Rainfall Characteristics	6-1
6.2.3	Characteristics Weighting.....	6-2
6.3	Evaluation of TMDL Years	6-2
6.4	Design Storms.....	6-2
Section 7	Modeling Plan.....	7-1
7.1	Existing Models and Monitoring	7-1
7.2	XPSWMM Model.....	7-1
7.3	TMDL Models.....	7-1
7.4	Model Application.....	7-1
7.4.1	Alternatives Evaluation.....	7-1
7.4.2	Validation	7-2
Section 8	Alternatives Analysis.....	8-1
8.1	Approaches for Meeting the TMDL	8-1
8.1.1	TMDL CSO Control Assumption (80%-99% Control).....	8-1
8.1.2	Presumptive Approach (typical year basis)	8-1
8.1.3	Demonstration Approach	8-1

8.1.3.1	VDEQ TMDL Implementation Plan.....	8-2
8.1.3.2	Collective Consistency	8-2
8.1.3.3	UAA.....	8-2
8.1.3.4	TMDL Revision.....	8-2
8.2	Evaluation Criteria	8-2
8.2.1	Example Criteria.....	8-3
8.3	Infrastructure Alternatives	8-3
8.4	Preliminary CSO Technologies Screening	8-3
8.5	Evaluation of Alternatives.....	8-3
8.6	Selection of Recommended Alternative	8-2
Section 9	Implementation Plan	9-1
9.1	Schedule	9-1
9.1.1	Phasing	9-1
9.2	Financial Plan.....	9-1
9.3	Asset Ownership and Operation Agreements	9-1
9.4	VPDES Permit Conditions.....	9-1
Section 10	Post Construction Monitoring.....	10-1
Section 11	Submittals and Schedule	11-1

List of Tables

Table 2-1 E. Coli Wasteload Allocation for AlexRenew Water Resources Recovery Facility.....	2-4
Table 2-2 Wasteload Allocation for COA Combined Sewer System	2-4

List of Figures

Figure 1-1 Separate Sewer Systems	1-1
Figure 1-2 Combined Sewer Systems	1-2
Figure 2-1 LTCPU Flow Chart.....	2-1
Figure 2-2 Relevant Local Watersheds.....	2-3
Figure 2-3 Required Reductions	2-3
Figure 4-1 Sewer System Overview.....	4-2
Figure 4-2 CSS Schematic.....	4-3
Figure 6-1 Ronald Reagan National Airport Location.....	6-3

Abbreviations

ADF	Average Daily Flow
AlexRenew.....	Alexandria Renew Enterprises
ARP	Area Reduction Plan
ASA	Alexandria Sanitation Authority
COA.....	City of Alexandria
CFU.....	Colony Forming Units
CSO.....	Combined Sewer Overflow
CSO-001	Pendleton Street Outfall
CSO-002	Royal Street Outfall
CSO-003	Duke Street Outfall
CSO-004	Hooffs Run Outfall
CSS	Combined Sewer System
CWA	Clean Water Act
D.....	Disinfection
ELCIRC	Euler-Lagrangian Circulation
EPA.....	Environmental Protection Agency
GI	Green Infrastructure
GIS	Geographic Information System
HSPF.....	Hydrologic Simulation Program FORTTRAN
HY	Hybrid
I/I.....	Inflow and Infiltration
in	inch
LTCP.....	Long Term Control Plan
LTCPU.....	Long Term Control Plan Update
MGD	Million Gallons per Day
mL	Milliliters
MWCOG.....	Metropolitan Washington Council of Governments
NMC	Nine Minimum Control
NPDES.....	Nation Pollution Discharge Elimination System
NOAA	National Oceanic and Atmospheric Administration
PER	Preliminary Engineering Report
POTW	Publicly Owned Treatment Works
RTC.....	Real Time Control
SOM.....	Sewer Overflow Model
SP	Separation
ST.....	Storage
SWMM	Storm Water Management Model
T&ES	Department of Transportation and Environmental Services
TMDL	Total Maximum Daily Load
TR	Treatment
TU	Tunnels
UAA.....	Use Attainability Analysis
USEPA.....	United States Environmental Protection Agency
VDEQ	Virginia Department of Environmental Quality

LTCPU Work Plan

Abbreviations



VIMS	Virginia Institute of Marine Science
VPDES	Virginia Pollutant Discharge Elimination System
WLA	Waste Load Allocation
WPCP	Water Pollution Control Plant
WQS	Water Quality Standards
WRRF	Water Resources Recovery Facility
WWTP	Wastewater Treatment Plant
XPSWMM	XP Solutions Storm Water Management Model

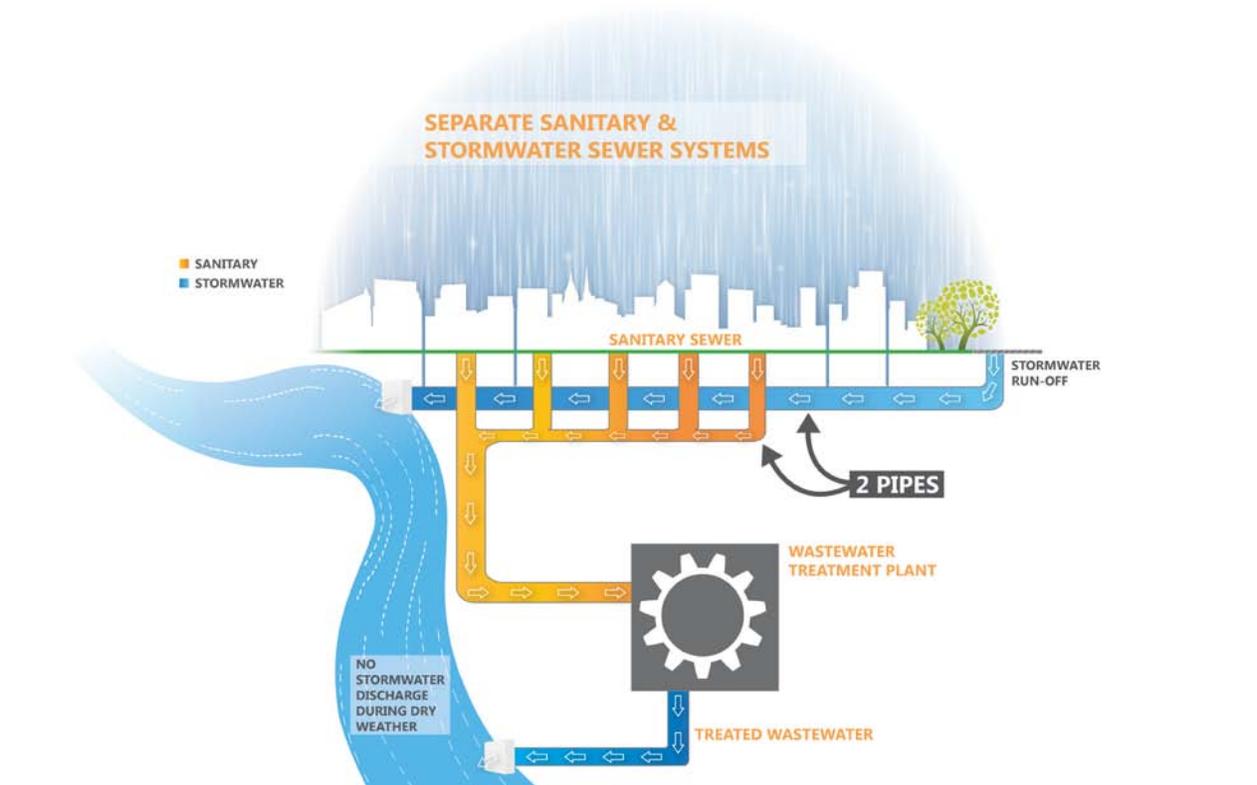
Section 1 Background

There are two types of sewer systems in the City of Alexandria – a combined sewer system, and a separate sewer system. Separate sewer systems consist of two pipes. One pipe conveys stormwater runoff from storm drains to local waterways. The other pipe conveys sanitary sewage to a local wastewater treatment plant as shown in Figure 1-1.

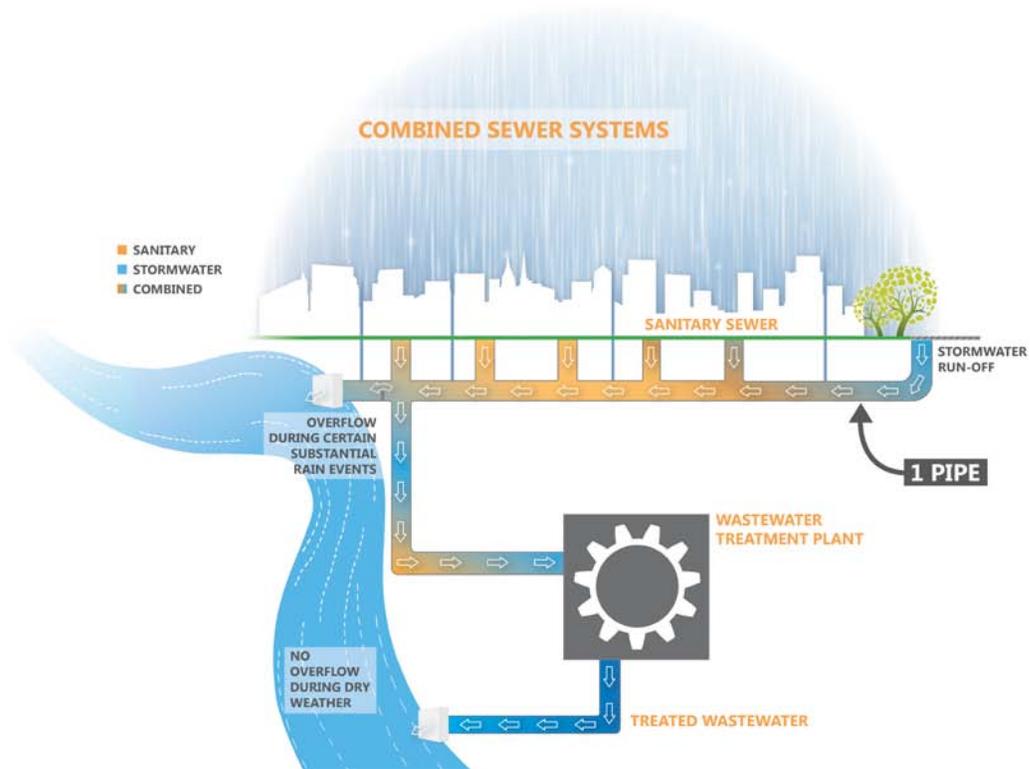
Combined sewer systems (CSS) have only one pipe which conveys both sewage and stormwater to a wastewater treatment plant as shown in Figure 1-2. Many older cities in the United States are served by combined sewers. During wet weather and snow melt events, the sewage collection system and/or wastewater treatment plant may be unable to handle the combined flows. During these conditions, Alexandria’s combined sewers discharge excess flows into the waterways.

Over time, the City has diligently reduced the impact of combined sewers pursuant to a Long Term Control Plan (LTCP) approved by the Virginia Department of Environmental Quality in 1999. This work plan outlines the steps which the City will take to update its 1999 LTCP in order to address new bacteria waste load allocations for Combined Sewer Overflow (CSO) discharges to Hunting Creek.

Figure 1-1
Separate Sewer Systems



**Figure 1-2
Combined Sewer Systems**



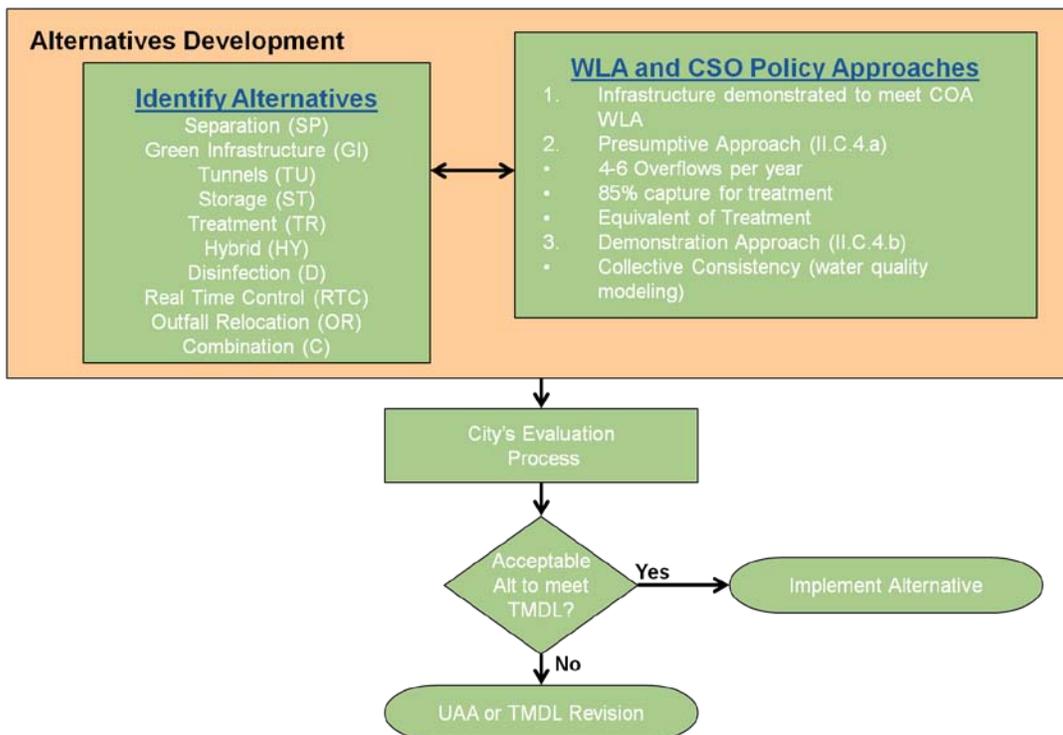
Section 2 Regulatory Requirements

2.1 General

Regulatory requirements as well as a desire to improve the environment of the City, drive the development of the Long Term Control Plan Update (LTCPU). A flow chart outlining the CSO control alternative development and evaluation options which the City will consider is included in Figure 2-1. This section discusses regulatory requirements and issues that will be, or potentially will be, addressed in the LTCPU. Regulatory issues include the following:

- The City’s VPDES Permit for the CSS;
- The Hunting Creek Bacteria TMDL;
- The Federal Clean Water Act; and
- Virginia Water Quality Standards; and
- Use Attainability Analysis.

**Figure 2-1
 LTCPU Flow Chart**



2.2 VPDES Permit

The Virginia Department of Environmental Quality (VDEQ) issued VPDES permit No. VA0087068 (the Permit) for the Alexandria Combined Sewer System (CSS) on August 23, 2013. The Permit requires an update to the City's approved CSO Long Term Control Plan to address the Hunting Creek TMDL. The Permit calls for a LTCPU that is consistent with State Water Control Law and Clean Water Act (CWA) Section 402(q) and EPA Guidance. Section 402(q) incorporated by reference the 1994 USEPA CSO policy into the Clean Water Act (CWA).

2.3 Hunting Creek TMDL

2.3.1 TMDL Considerations for the LTCPU

The November 2010 Hunting Creek TMDL includes a number of provisions to guide the development of the LTCPU including:

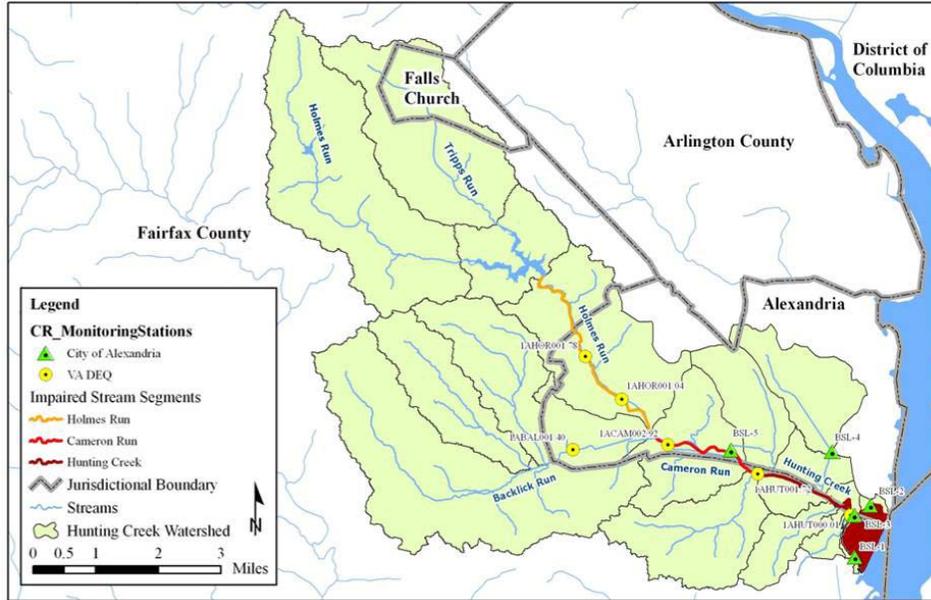
- Waste Load Allocations (Table 2-1);
- TMDL LTCPU Guidance; and
- TMDL Assumptions.

It is the City's opinion that many of the assumptions in the TMDL incorrectly represent the actual CSO conditions. The City documented these concerns in a letter to VDEQ dated August 18, 2010. The City asserts that these concerns continue to be valid. Some of the concerns are discussed herein.

2.3.1.1 Waste Load Allocations

On November 2, 2010, VDEQ issued Bacteria TMDLs for the Hunting Creek, Cameron Run, and Holmes Run Watersheds. These watersheds are shown on Figure 2-2. Figure 2-3 shows the percent reductions required under the TMDL. Actual WLAs in CFUs/year are shown on Table 2-1 and Table 2-2. The LTCPU will be developed to address the WLAs in Table 2-2. One area to be addressed is the expected long term growth and the best use of the long term need for the growth allocation.

**Figure 2-2
 Relevant Local Watersheds**



**Figure 2-3
 Required Reductions**

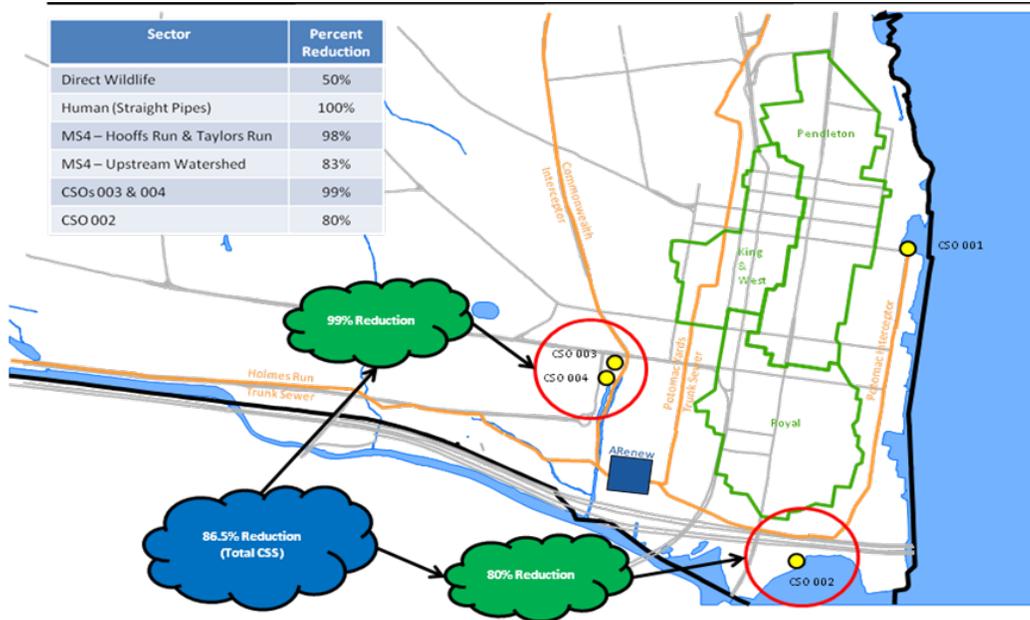


Table 2-1

E. Coli Wasteload Allocation for AlexRenew Water Resources Recovery Facility

Permit Number	Permit Type	Design Flow (MGD)	Permit Concentration (cfu/100mL)	Wasteload Allocation (cfu/year)
VA0025160	Municipal	54	126	9.40E+13
*Allocation for the Future Growth of Point Sources:				2.10E+13
Total:				1.15E+14

*Future allocation is based on an additional 12 mgd (66 mgd total)

Table 2-2

Wasteload Allocation for COA Combined Sewer System

Permit Number	Outfall	Wasteload Allocation (cfu/year)	Permit Reduction (%)
VA0087068	002	6.26E+13	80%
	003	7.68E+11	99%
	004	8.52E+11	99%
	Total	6.42E+13	86%

2.3.1.2 TMDL LTCPU Guidance

The following TMDL statements are important to the development of the LTCPU and will be used in the development and evaluation of alternatives:

- “...the Long Term CSO Control Plan (LTCP) is the mechanism for developing and implementing plans that will achieve compliance with Water Quality Standards (WQS). The current, approved LTCP of the City will need to be updated to address the TMDL. (Section 6.3.4)
- The WLA associated with the combined sewer system will be addressed through the performance standards for the facilities in a revised approved Long Term Control Plan (LTCP). (Table 5-5)
- Percent reduction (as shown in Table 2-1) is based on average annual WLA, and is computed as a reduction from baseline loadings. (Table 5-5)
- ...average daily values are not intended to represent maximum allowable daily loads. Rather, they represent the average daily loadings that may be expected to occur over the long term. (Section 5.2.4)

The TMDL indicates the LTCPU may have a number of outcomes consistent with the flexibility of the CSO Control Policy including the following:

- WQS adapted to reflect site-specific conditions;
- TMDL Update;
- Use Attainability Analysis “*If water quality standards are not being met, a use attainability analysis (UAA) may be initiated to reflect the presence of naturally high bacteria levels due to uncontrollable sources.*” (Section 6.4.2). We note that other factors also may support a UAA per 40 CFR Part 131.10(g).

2.3.1.3 TMDL Assumptions

The Hunting Creek TMDL includes multiple assumptions to develop the WLA assigned to the City’s CSO discharges. Some of these are listed as follows:

“In tidal Hunting Creek, two additional conservative assumptions were made. First, the concentration of the source responsible for the largest volume of water entering tidal Hunting Creek, ASA’s WWTP, was set at the fecal coliform equivalent of its monthly E. coli permit limit, 126 cfu/100 ml, which is also the geometric mean water quality criterion. Second... TMDL scenarios for tidal Hunting Creek were developed based on the principle that the tidal drainage to Hunting Creek had to meet water quality standards without significant dilution from the Potomac River.” (Section 5.1)

“The concentrations at the boundaries of the model domain in the Potomac River were held at the fecal coliform equivalent of the E. coli geometric mean standard of 126 cfu/100 ml” (Section 5.1)

“Reductions in CSO bacteria loads were simulated by keeping the simulated bacteria concentration at the outfall’s baseline level, but proportionately reducing flows on each day an overflow occurs. In other words, a 50% reduction in CSO loads was implemented by reducing flows by 50% for each overflow event.” (Section 5.2.2)

As can be seen in the following figures, the simulation ... uses a decay rate of 0.1/day (Section 4.3.6)

In addition, there were inconsistencies in how the non-tidal model and the tidal model were run and utilized.

These assumptions do not necessarily represent the actual nature of the system or CSO impacts. While it may be possible to address the TMDL as required without correcting all these assumptions, each will be examined for correction, consistency with the intent of the TMDL, documented, and discussed in the LTCPU.

2.4 Federal Clean Water Act

USEPA issued its CSO policy in 1994. The policy was later adopted into the Federal Clean Water Act. The City of Alexandria obtained approval for its LTCP in 1999. As discussed in the current Permit, the LTCPU is needed to address water quality E. coli issues identified in the Hunting Creek TMDL. The USEPA Policy and Guidance indicate the following with respect to LTCP updates addressing conditions where water quality standards (WQS) are not being met after implementation of an approved LTCP:

“...if adequately supported with data and analysis, Agency regulation and guidance provide states with the flexibility to adopt their WQS, and implementation procedures to reflect site-specific conditions including those related to CSOs.”

The USEPA Policy and Guidance are reflected in the Hunting Creek TMDL with the discussion of regulatory alternatives repeated here from above:

- WQS adapted to reflect site-specific conditions;
- TMDL Update; and
- Use Attainability Analysis.

Prior to investigating any of these regulatory alternatives, alternatives that meet the Table 2-1 and Table 2-2 WLAs will be developed and evaluated. An alternative will be developed with infrastructure to meet the Table 2-2 City of Alexandria WLA including the assumption that each storm for CSOs 003 and 004 must be controlled to 99% and each storm for CSO 002 must be controlled to 80%. Note that the current level of control under the approved LTCP is approximately 65%. As described above the TMDL control levels are applied to the existing loads. The resulting control level comparable to CSO Policy Option ii discussed below is 99.65% control of CSOs 003 and 004 and 93% control for CSO 002. The 99.65% level of control is well beyond what most CSO systems have had to achieve nationally.

EPA’s CSO policy provides four performance standards under two approaches for the development of alternatives as follows:

2.4.1 Presumption Approach

The Presumption approach provides three paths to an acceptable CSO plan:

- Presumption Option i – Up to 6 overflows in a typical year;
- Presumption Option ii – Capture for treatment of 85% of the CSS flow in a typical year. A minimum of primary treatment is required with disinfection where required; and
- Presumption Option iii – The removal of a load equivalent to what would be removed under Option ii.

2.4.2 Demonstration Approach

Under the EPA CSO policy, a control level less than called for by the presumption approach can be selected if it can be demonstrated that *“the CSO discharges remaining after implementation of the*

planned control program will not preclude the attainment of WQS or the receiving waters' designated uses or contribute to their impairment.” The demonstration approach alternative will evaluate the following potential approaches:

- Collective Consistency for all WLAs in Table 2-1 and Table 2-2, including conservatively accounting for unused load from other contributing sources based on historic performance; and
- If necessary, a demonstration that the CSO loads do not cause or interfere with designated use using the WLA shown in Figure 2-3 and the VDEQ WQS for bacteria. If possible, this demonstration will be done with the water quality models utilized in the development of the Hunting Creek TMDL.

2.5 Virginia Water Quality Standards

This LTCPU is being conducted to address the E.coli WQS issue identified in the Hunting Creek TMDL. The WLAs shown in Table 2-1 and Table 2-2 indicate the load that if attained, will address the City of Alexandria obligation to meet WQS. That total WLA is based on the VDEQ WQSs. Since the issuance of the Hunting Creek TMDL, a change has been made to the VDEQ WQS to reflect updated guidance from EPA. The regulation applicable to Hunting Creek is now stated as follows:

9VAC25-260-170. Bacteria; other recreational waters.

A. The following bacteria criteria (colony forming units (CFU/100 ml)) shall apply to protect primary contact recreational uses in surface waters, except waters identified in subsection B of this section:

E.coli bacteria shall not exceed a monthly geometric mean of 126 CFU/100 ml in freshwater.

Enterococci bacteria shall not exceed a monthly geometric mean of 35 CFU/100 ml in transition and saltwater.

1. See 9VAC25-260-140 C for boundary delineations for freshwater, transition and saltwater.

2. Geometric means shall be calculated using all data collected during any calendar month with a minimum of four weekly samples.

3. If there are insufficient data to calculate monthly geometric means in freshwater, no more than 10% of the total samples in the assessment period shall exceed 235 E.coli CFU/100 ml.

2.6 Use Attainability Analysis

As indicated in the USEPA CSO Policy and Guidance, a use attainability analysis (UAA) may be considered in a LTCPU. There are six criteria under which the Virginia State Water Control Board may modify the use and standard (9VAC25-260-170). Of the six, the following are applicable to the LTCPU if an acceptable alternative for meeting the TMDL cannot be approved by VDEQ:

- Natural occurring pollutants prevent the use – this may include wildlife;
- Natural water levels prevent the use – this may include unsafe conditions in-stream for recreation during high flow conditions;
- Human caused conditions where remedies would cause more environmental damage to correct than to leave in place – this could apply to storm water controls and CSO controls; and/or
- Widespread socio-economic impacts.

2.7 Alternative Development and Evaluation

Alternative development is discussed in detail in Section 8. An alternative development and evaluation flow chart is shown on Figure 2-1. The selection process is anticipated to include the following steps:

- The City will use its evaluation criteria to evaluate and select for implementation a recommended alternative that meets at least one of the following:
 - A level of control that will meet the TMDL WLA;
 - A presumptive level of control; AND
 - A demonstration level of control using collective consistency.
- If the level of control is approved by VDEQ, the City will implement.
- If not approved, the City will pursue a UAA and/or TMDL revision.

Section 3 Public Participation Plan

3.1 Overview

The purpose of the Public Participation Plan (PPP) is to inform and educate the public about the LTCPU. Additionally, the PPP actively involves the affected public in the decision making process. The PPP will comply with guidance from several sources, including the EPA, the State, and the City of Alexandria.

EPA policy for public participation in this context is found in a September 1995 publication, Combined Sewer Overflows: Guidance for Long-Term Control Plan¹:

Establishing early communication with both the public and regulatory agencies is an important first step in the long-term planning approach and crucial to the success of a CSO control program. The importance of public participation is stressed in the CSO Control Policy: *“In developing its long-term CSO control plan, the permittee will employ a public participation process that actively involves the affected public in the decision-making to select the long-term CSO controls”* (II, C .2). Given the potential for significant expenditures of public funds for CSO control, public support is key to CSO program success. By informing the public early in the planning process about the scope and goals of the program and continuing public involvement during development, evaluation, and selection of the control strategy, issues and potential conflicts can be identified and addressed more expeditiously, minimizing the potential for prolonged delay or additional cost.

Citizen Advisory Committees (CACs) can serve as liaisons among municipal officials, NPDES permitting agencies, and the general public. Public meetings and public hearings can provide an effective forum to present technical information and obtain input from interested individuals and organizations. It is worthwhile to gauge public acceptance of potential CSO alternatives before completing the engineering evaluation of each alternative and to incorporate input from the public meetings into the selection of a recommended plan. Impacts on user fees and tax rates are also important to communicate as early as possible in the LTCP development.

After the municipality has selected a recommended plan, public involvement will continue to be useful. Particular attention should be given to informing residents and businesses that would be affected by any construction associated with project implementation.

The cited regulations describe objectives for public participation carried out under the Resource Conservation and Recovery Act, the Safe Drinking Water Act and the Clean Water Act²:

(c) The following are the objectives of EPA, State, interstate, and substate agencies in carrying out activities covered by this part:

¹ U.S. Environmental Protection Agency, Office of Water, "Combined Sewer Overflows: Guidance for Long-Term Control Plan," EPA 832-B-95-002, September 1995, Section 1.6.2, Public Participation and Agency Interaction.

² Title 40, Code Of Federal Regulations, Part 25, Protection Of Environment: Public Participation in Programs Under the Resource Conservation and Recovery Act, the Safe Drinking Water Act, and the Clean Water Act, Subpart 25.3, Policy and objectives.

- (1) To assure that the public has the opportunity to understand official programs and proposed actions, and that the government fully considers the public's concerns;
- (2) To assure that the government does not make any significant decision on any activity covered by this part without consulting interested and affected segments of the public;
- (3) To assure that government action is as responsive as possible to public concerns;
- (4) To encourage public involvement in implementing environmental laws;
- (5) To keep the public informed about significant issues and proposed project or program changes as they arise;
- (6) To foster a spirit of openness and mutual trust among EPA, States, substate agencies and the public; and
- (7) To use all feasible means to create opportunities for public participation, and to stimulate and support participation.

The PPP will also reflect the requirements contained in the August 2013 VDEQ permit for Alexandria's CSS³:

The permittee shall conduct public informational meetings during the development of the LTCPU and prior to submitting the final update for VDEQ approval. These meetings shall be conducted on or before 23 February 2015 and 23 August 2016, respectively. These meetings shall, at a minimum, explain combined sewer systems, the impacts on surface waters, progress to date on minimizing the impacts, the proposed LTCPU milestones/schedule to comply with the Hunting Creek TMDL and shall allow for public comments and inquiries. The permittee shall conduct the meetings at such times as to maximize attendance and shall utilize at least three (3) forms of media to inform the public concerning the place, time and purpose for these meetings.

In addition, the PPP will follow the guidance provided in the City's *What's Next Alexandria* Handbook for Civic Engagement. Indeed, it will be one of the first projects/programs implemented under this new engagement strategy. The value of engaging people effectively using this framework as the City works to create the LTCPU will accrue important benefits to Alexandria in both the short- and long-terms. As the Handbook notes⁴:

We know that collaboration between community members and city government leads to better results than either working in a vacuum. One without the other misses out on a whole range of good ideas. More importantly, public decisions that are developed collaboratively produce better results and better stand the test of time. The *What's Next Alexandria* initiative focused on understanding how to use civic engagement to improve this kind of collaborative give-and-take that will always be more effective than community members or City staff working alone.

Throughout the LTCPU project, the City will satisfy the statutory/regulatory requirements for public participation through outreach that reaches a broad and inclusive range of stakeholders. In so doing, the City also seeks to arrive at the best possible alternative for the LTCPU.

³ Virginia Department of Environmental Quality, VPDES Permit No. VA0087068, Alexandria Combined Sewer System, August 22, 2013, Section E(6).

⁴ *What's Next Alexandria* Handbook, December 2013 Revised Draft, page 1.

In support of these overall objectives, the City's draft project goals⁵ for participation include:

- 1) Increased public awareness of the LTCPU project and opportunities for public participation;
- 2) Developing basic knowledge or understanding of the LTCPU project and the potential effects of decision alternatives among stakeholders; and
- 3) Awareness, consideration, and responsiveness on the part of the City about stakeholders' views on the project.

The following sections provide a general overview of the Public Participation Work Plan. A subsequent Public Participation Plan Technical Memorandum will develop the public participation tasks described in this Work Plan.

3.2 Stakeholders

Federal regulations⁶ provide a definition of stakeholders that guides the City in implementing this work plan and the subsequent PPP:

EPA, State, interstate, and substate agencies carrying out activities described in §25.2(a) shall provide for, encourage, and assist the participation of the public. The term, "the public" in the broadest sense means the people as a whole, the general populace. There are a number of identifiable "segments of the public" which may have a particular interest in a given program or decision. Interested and affected segments of the public may be affected directly by a decision, either beneficially or adversely; they may be affected indirectly; or they may have some other concern about the decision. In addition to private citizens, the public may include, among others, representatives of consumer, environmental, and minority associations; trade, industrial, agricultural, and labor organizations; public health, scientific, and professional societies; civic associations; public officials; and governmental and educational associations.

Based on this definition, stakeholders for this project are defined as members of the public, especially those who potentially may be directly or indirectly affected by the LTCPU or who may have concerns about the project.

Emphasis will be placed on outreach to individuals, community groups, agencies/nonprofits, and businesses (including ratepayers) that are served within the CSS. The City will also seek to broadly inform and educate members of the public in Alexandria. *See Section 3.5 for an overview of the outreach tactics for communicating with these audiences.*

The stakeholders the City has identified to date include the following categories:

⁵ Using the goals of participation as a guide, there are many ways to consider the effectiveness of public participation plans (Laurien and Shaw, 2009). *Process-based goals* include mutual learning, increased public awareness, and increased awareness on the part of the agency about public views on an issue. *Democratic goals* such as inclusiveness, transparency, fairness and power sharing also are important. *Outcome-based goals* include issue-based outcomes (for example, meeting statutory or regulatory requirements), governance outcomes (e.g., increased agency legitimacy), and social outcomes (e.g., improving project outcomes for people who are more disenfranchised). There also are *user goals* (e.g., participants are satisfied with the decision or process). See Laurien, Lucie and M. M. Shaw, Evaluation of Public Participation: The Practices of Certified Planners, *Journal of Planning Education and Research*, 28:293-309 (2009).

⁶40 CFR 25.3(a).

External

- General Public
 - Agenda Alexandria
 - Federation of Civic Associations
 - Alexandria Chamber of Commerce
 - Northern Virginia Building Industry Association
 - National Association of Industrial and Office Properties Northern Virginia Chapter
 - Alexandria Economic Development Partnership
- Public Specifically or Potentially Impacted
 - Ratepayers (residential and commercial)
 - Robinson Terminal Ownership
 - North Old Town Independent Citizens Civic Association (NOTICE)
 - Old Town West Citizens Association
 - Friends of Dyke Marsh
 - Hunting Terrace and Hunting Point
 - Alexandria Boards and Commissions
 - ◆ City of Alexandria Environmental Policy Commission
 - ◆ City of Alexandria Waterfront Development Commission
 - ◆ City of Alexandria Park and Recreation Commission
- Utility Partners
 - Alexandria Renew Enterprises technical staff
 - Fairfax County technical staff
- Regulatory Agencies
 - Virginia Department of Environmental Quality
- Public Agencies
 - National Park Service
 - Virginia Department of Transportation (VDOT)

Internal

- Elected Decision Makers
 - Alexandria City Council
- Alexandria City Manager and Departments
 - Planning and Zoning
 - Transportation and Environmental Services
 - Project Implementation

- Parks and Recreation
- Communications and Public Information
- Stormwater Steering Committee

Additionally, the City recognizes that homeowners/condominium associations, civic associations, and business groups in the City that are not directly affected may be interested in learning about the LTCP and the PPP will include strategies for communicating with those groups..

3.3 Messaging

Key messages will be developed for inclusion in the PPP and incorporated in all tools the City uses to communicate about the project for its duration. The PPP will also reflect the City's Strategic Plan.

3.4 Phases of Outreach

Public participation for the LTCP will occur in three phases and mirror those described in the *What's Next Alexandria* handbook (page 19). City Council will be briefed before any of the phases below are performed. VDEQ also will be updated on the City's public participation efforts as part of updates throughout the project. The phases and timeline will be described in more detail in the PPP.

3.4.1 Phase 1 – Information

The goals of this phase are informational and educational. The City seeks to establish the context for the project and the project need (including general information about the CSS and the LTCP Work Plan, along with overall scope and goals), discuss the inclusion criteria for potential projects and a wide range of alternatives, highlight how the public can be involved, and review the project timeline.

Because the City's Environmental Policy Commission (EPC) includes diverse representation of interests across all stakeholder categories described above, the City anticipates working closely with the EPC during all phases of the public participation process to serve as an Advisory Group for the project (as required by 40 CFR 25) and the regulation intends that these groups complement other engagement efforts. 40 CFR 25.7, *Advisory groups*, will be reviewed to ensure this approach is in concert with federal regulations.

If this is feasible, opportunities to use the EPC as an advisory group for the City's plan and to engage community groups they represent across the City throughout the process will be explored. EPC meetings will be open to the public and stakeholder groups (particularly those impacted by the LTCP) will be invited to the meetings. Opportunities for the EPC to assign designees to carry the messages out also will be considered.

Also, as part of this phase, stakeholder groups will be asked how the City can best engage them throughout the duration of the LTCP project. The City will also ask if there are any other stakeholder groups affected by the LTCP that have not been contacted and that the City should reach out to during the project.

3.4.2 Phase 2 – Present and Discuss Options

The second phase will present a shortlist of LTCPU alternatives and seek input about them. As in Phase 1, discussing the context and project need as well as reviewing the selection criteria will be important for educating the public about the LTCPU, especially members of the public who may be not be familiar with topics related to managing environmental quality and current regulatory requirements.

3.4.3 Phase 3 – Review Recommended Alternative

Phase 3 will present the recommended alternative for review with stakeholders. As with Phases 1 and 2, this is an opportunity to re-emphasize key educational messages about the project and elaborate how the selected alternative fulfills environmental quality, regulatory requirements, and other portions of the City's selection criteria.

The City will present the alternative at an EPC meeting to which stakeholder groups are invited and also provide updates directly to stakeholder groups (particularly those impacted by the LTCPU). Additional outreach methods will be used to inform and educate stakeholders in the City and in the Alexandria portion of Fairfax County about the recommended alternative.

3.5 Tools for Outreach

The PPP will provide a specific menu of outreach tools that will be used to engage the public. The tools suggested below have been used effectively by the City and team members for public participation in the past. Outreach tools being considered at this time include:

- **Presentations to civic and business groups**, with business cards that include the PowerPoint presentation URL to share with the public.
- **City website updates** will provide a vital means of sharing information with the public throughout the project. Materials will include general information about sewers and the CSS as well as information about the LTCPU.
- **eNews articles** that are pushed out to subscribers will inform and educate the community about the overall project and provide regular updates on the City's progress.
- **Social media** channels that the City maintains (Facebook and Twitter) will be used to promote LTCPU meetings and other pertinent information.
- **A qualitative survey** will ask Environmental Policy Commission representatives to share feedback about LTCPU alternatives.
- **Video updates on the City's public access channel, Channel 70, and interviews on the Mayor's Show.**
- **Updates to the City Council from the City Manager** (Work sessions, Manager's Report, docket items, informational memo).
- **Newspaper inserts into local newspapers**, such as the *Alexandria Gazette-Packet* and/or *Alexandria Times*.

- **Print informational materials (e.g., fact sheets, flyers, brochures and mailers).** It also may be possible to include a mailer with the Alexandria Renew sewer bill.
- **Articles to be submitted for publication in civic, condo/HOA and business associations' newsletters** and/or on websites.

3.6 Evaluation

The Public Participation Plan will include recommendations for assessing progress on the City's public participation goals (*see Section 3.1 Overview and Scope*) as the project proceeds. For example, meeting evaluation forms may tell the City that people are unclear about some aspect of the LTCPU and that additional educational information is needed in the community presentations.

This kind of feedback as the project continues will guide the City in fulfilling the overall objective of inclusive and broad outreach that meets the LTCPU regulatory/statutory intent while also supporting the best project alternative. It also will be essential (under 40 CFR 25) to document the feedback the City receives and show that it has been considered:

Public participation includes providing access to the decision-making process, seeking input from and conducting dialogue with the public, assimilating public viewpoints and preferences, and demonstrating that those viewpoints and preferences have been considered by the decision-making official.⁷

The feedback received also can be used by the City as it periodically assesses the civic engagement principles noted in the *What's Next Alexandria* handbook.⁸

⁷ 40 CFR 25.3(b) Policy and objectives. See also subpart 25.8, Responsiveness summaries.

⁸ "The City will work in partnership with the community to periodically assess the application of civic engagement principles. The evaluation will quantify participant feedback, document lessons learned, and identify strategies for refinement." *What's Next Alexandria Handbook*, December 2013 Revised Draft, page 16.

Section 4 Existing System

4.1 Combined Sewer System (CSS) Characterization

4.1.1 Sewer System Overview

The City's wastewater collection system covers approximately 15.4 square miles. Wastewater treatment services are provided by Alexandria Renew Enterprises (AlexRenew) and Arlington County. Approximately 1.2 square miles (7.8 %) is serviced by the Arlington County Water Pollution Control Plant (WPCP). The rest of the City is served by the AlexRenew Water Resources Recovery Facility (WRRF); AlexRenew also accepts flows from Fairfax County.

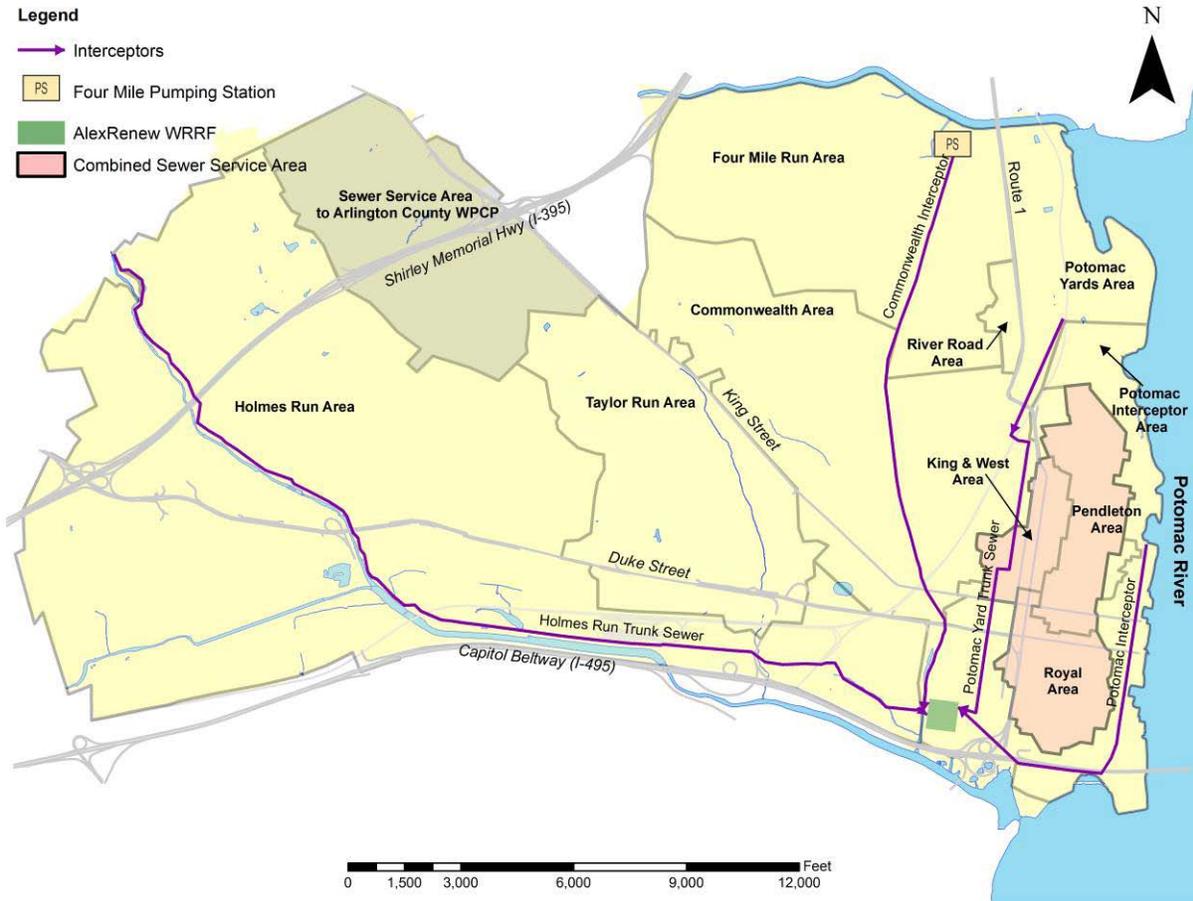
There are four AlexRenew operated interceptors in the City including the Holmes Run Trunk Sewer, the Commonwealth Interceptor, the Potomac Interceptor, and the Potomac Yards Trunk Sewer. The Holmes Run Trunk Sewer is a joint use interceptor shared by the City and Fairfax County. The dry weather flows from the four interceptors, which are owned by AlexRenew terminate at the WRRF. The sewer system and its flows will be characterized in greater detail in the LTCPU.

4.1.2 Combined Sewer Overflow (CSO) Areas and Regulators

The City has three CSS areas and four permitted CSO outfalls. The three areas, which are generally located in the Old Town area and areas east of U.S. Route 1 are composed of the Pendleton area, the Royal area, and the King and West area. The areas being served by combined sewers comprises approximately 0.84 square miles (5.5%) of the City. The four permitted CSO outfalls are the Pendleton Street CSO (CSO 001), which outfalls to the Potomac River in Oronoco Bay, the Royal Street CSO (CSO 002), which outfalls to Hunting Creek, and the Duke Street CSO (CSO 003) and Hooffs Run CSO (CSO 004), which both outfall to Hooffs Run.

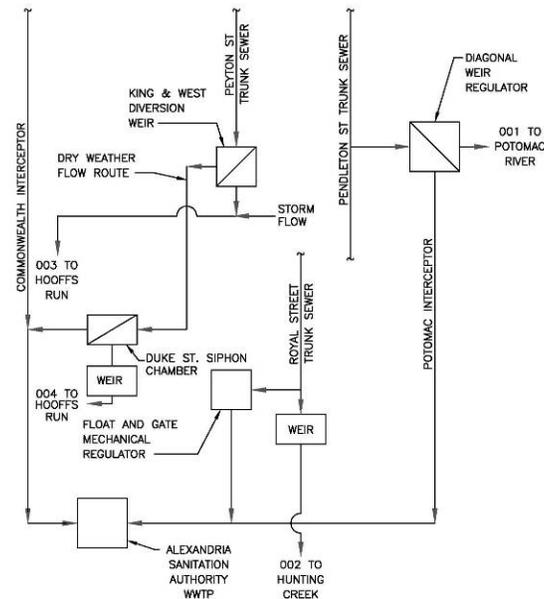
The LTCPU will describe the details of how the regulator structures handle flow. An overview of the system and the major sewers and sewersheds can be seen in Figure 4-1.

Figure 4-1
Sewer System Overview



A CSS schematic diagram is shown in Figure 4-2. The CSS will be described in detail in the LTCPU.

**Figure 4-2
CSS Schematic**



4.1.3 Land Use and Development

Existing geographic information system (GIS) data and design drawings will be used to determine relevant surface conditions within the City. Any land use changes and new development that may impact the amount of stormwater entering the CSS will be documented.

4.2 Approved Long Term Control Plan (LTCP)

The LTCPU is an update to the approved LTCP to address the Hunting Creek TMDL. The City's current LTCP consists of implementing the Nine Minimum Controls (NMCs). The NMCs are as follows:

1. Conduct Proper Operations and Regular Maintenance Programs;
2. Maximize Use of the Collection System for Storage;
3. Control of Non-domestic Discharges;
4. Maximize Flow to the Publicly Owned Treatment Works (POTW);
5. Prohibit Combined Sewer Overflows during Dry Weather;
6. Control Solid and Floatable Materials;
7. Develop and Implement Pollution Prevention Program;
8. Public Notification; and
9. CSO Monitoring.

The City has documented its implementation of the NMCs in its annual CSS reports. Impacts of the LTCPU on the approved LTCP, and associated NMCs, will be documented, if any.

The LTCP requires post construction monitoring programs for the CSS and an annual report on overflows and inspection and maintenance of the CSS. Post construction monitoring results, based on the performance criterion established in the LTCP are provided with the City's annual CSS reports.

Section 5 Future Planning Considerations

5.1 Changes to Combined Sewer System Sewershed

As part of the LTCPU development, the City will consider and incorporate anticipated and future changes to the sewershed so that the CSO controls will continue to meet their intended goals. In the City of Alexandria most of the sewershed is built out, however there are redevelopment projects anticipated. As part of the requirements for redevelopment the City has implemented the Area Reduction Plan (ARP). This plan requires developers to separate storm and/or sanitary sewers during new and redevelopment projects within the CSS sewershed, whenever practicable. The City will summarize planned future development within the CSS as part of this effort.

5.1.1 Future Separation Projects

In addition to development-led separation, the City has budgeted money for City-led separation projects. Generally these projects occur independent of redevelopment. The LTCPU will take into account future City-led separation projects when evaluating the alternatives.

5.1.2 Future Development

Several redevelopment plans are currently under review with the City and many more redevelopment projects are in the pipeline. These redevelopment projects and any sewer separation associated with them will be taken into account when evaluating the alternatives for the LTCPU.

5.2 Flow Projections

To adequately plan and design CSO controls it is important that the City evaluate future flows so that that the CSO controls continue to operate as intended and the alternatives are properly evaluated. The City will include future flow conditions as part of the LTCPU.

5.2.1 Current Flows

While the City has evaluated the flows in the CSS in the past, it is important that the City reevaluate these flows to ensure that they are still appropriate for planning and design. The City will gather information from past reports and studies, flow metering data that has been performed throughout the CSS, and an evaluation of the latest census data for the area. All of this information will be utilized to determine the current flows in the CSS in order to have a good baseline to evaluate alternatives.

5.2.2 Future Flows

The City has also been proactive on planning for growth and development throughout the area using forecasts development from the City's Planning and Zoning Department. A number of studies have been performed projecting flow conditions to 2040 and beyond. In addition the City has used these flow projections in modeling efforts to determine where infrastructure may need to be rehabilitated or upgraded. During the evaluation of alternatives the City will utilize current and future flow conditions to size potential CSO controls.

Section 6 Assessment Years

6.1 Introduction

An important aspect of planning and design of CSO controls is to analyze historical data and select appropriate meteorological conditions. The City will review historical rainfall records and determine the appropriate conditions that will be utilized for evaluating and selecting the components of the LTCPU.

6.2 Typical Year

6.2.1 Rainfall Data

In accordance with CSO Policy, the City intends to use a typical year to represent long-term average design conditions for evaluating the alternatives and selecting a proposed approach for the LTCPU. In determining the typical year the City will look at the entire rainfall record for rain gauges within the City and the surrounding areas. The primary data source will be the gauge located at Ronald Reagan National Airport shown in Figure 6-1. This rain gauge has nearly continuous hourly precipitation from May 1948 to the present. In addition to this, several rain gauges have been located within the City intermittently over the years. This data will be used to supplement the Reagan National Airport data and to help determine if adjustments need to be made to the data due to proximity of the rain gauge in relation to the City. Other rain gauges in the region may be used to determine if a spatial variation of the data is necessary for City planning and hydrologic modeling.

6.2.2 Rainfall Characteristics

Below are the criteria that may be used to evaluate the rainfall for the typical year:

- **Rainfall Volume** –It is necessary to understand how much rainfall there is in order to determine the volume of any potential future storage facilities. This metric represents the total rainfall for the timeframe.
- **Back-to-Back Events** – This metric is the number of storms that occur within 24 hours. This criterion addresses the time needed to drain a storage facility. If one storm fills up the storage and another event occurs within 24 hours (presumably before the storage can be emptied), this second storm will be assessed for the potential to cause an overflow. Due to back-to-back events, it could be possible for small rainfall events (less than 0.10 in) may cause combined sewer overflows.
- **# of Events >0.10 in.** – This is the number of rainfall events in a given timeframe that have a total rainfall of more than 0.10 inches. Typically storms smaller than this do not cause overflows and the associated stormwater can be conveyed and treated at the plant.
- **# of Events >0.25 in.** – This is the number of rainfall events in a given timeframe that have a total rainfall of more than 0.25 inches. This count represents the number of events during a given timeframe that may be needed to be stored to prevent overflow.
- **Average Rainfall Duration** – This is the average duration of each rainfall event for a given timeframe.

- **Average Rainfall Intensity** – This is the average rainfall intensity for each rainfall event during a given timeframe.
- **Maximum Peak Intensity** – This is the maximum peak intensity of rainfall for an entire timeframe. This is important because storms with high intensity tend to send a larger amount of flow into the sewer system. The sewer system usually cannot handle such high flows and it tends to overflow.
- **Maximum Storm Volume** – This represents the storm event with the greatest total rainfall volume, measured in inches, for a given time frame. CSOs are more likely to occur the greater the rainfall volume of a storm event since high rainfall volumes deliver a great deal of flow into the sewer system

6.2.3 Characteristics Weighting

The City will determine how closely each calendar year represents the typical year. The developed characteristics will be assigned a weighting by the City depending on the influence it has on the resulting CSOs. Once these weightings are applied to each of the characteristics the City will select a year most closely represents the rainfall for a typical year in Alexandria. In a number of LTCPs, a modified typical year, average (of several years) typical year or even a “synthetic” typical year has been used.

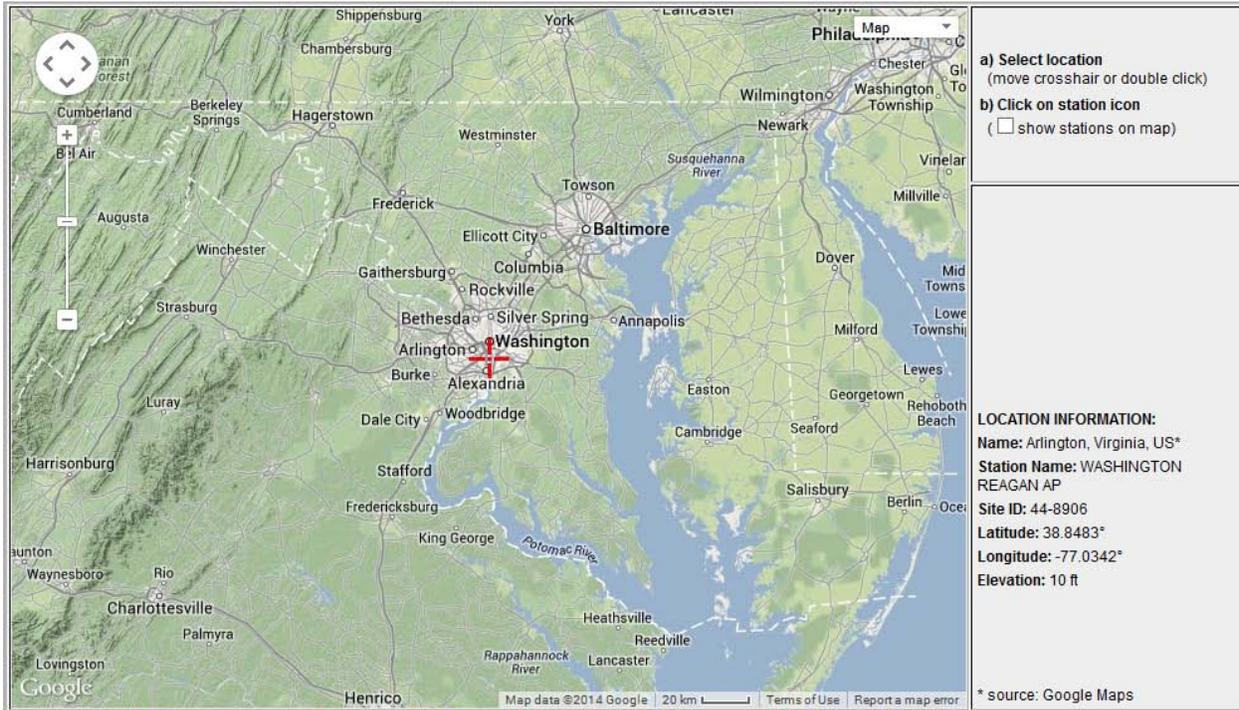
6.3 Evaluation of TMDL Years

In 2010 VDEQ issued the Bacteria TMDLs for the Hunting Creek, Cameron Run, and Holmes Run Watersheds. This report evaluated the impact that the CSOs had on the receiving waters utilizing hydrologic, hydraulic, and water quality models. Rainfall for the years 2004 and 2005 was used to determine the volume of overflow from each of the CSOs. The City will compare how closely 2004 and 2005 represent the typical two year rainfall, however, as stated above, the City intends to use the typical year for evaluating the alternatives and selecting a proposed approach for the LTCPU. The method of evaluating the TMDL years will be consistent with the methods used above to determine the typical year.

6.4 Design Storms

While the City is committed to meeting the goals of the TMDL, it must also ensure that it is providing an adequate level of service for its residents. Part of this is evaluating basement backups, and other City specific criteria, against particular storm sizes. The City will utilize this opportunity to develop design storms of differing durations and frequencies that will be utilized to assess the level of service CSO controls provide.

Figure 6-1
Ronald Reagan National Airport Location



Section 7 Modeling Plan

7.1 Existing Models and Monitoring

Over the years the City of Alexandria has proactively utilized hydrologic and hydraulic modeling to help with the planning and maintenance of its sewer system. The City developed the first version of its Combined Sewer System (CSS) model in the early 1990's utilizing the Sewer Overflow Model (SOM). As the City began developing its Long Term Control Plan (LTCP), it needed a model that had more functionality. From 1996 to 2003 the City developed and refined the EPA SWMM 4.4h model. This model was utilized for planning and regulatory reporting purposes from 1998 to 2009. In 2010, through a coordinated effort with AlexRenew and Fairfax County, the City integrated its CSS model with the AlexRenew Interceptor model to produce one unified model that could be used by all jurisdictions. The new XPSWMM model has additional functionality that was previously unavailable and produces more useful information. This model has been used for planning and reporting purposes since 2011.

7.2 XPSWMM Model

In order to evaluate the CSO control alternatives, the City will use XPSWMM 2011 for hydrologic and hydraulic modeling and may use the same VIMS model that was used in the development of the Hunting Creek TMDL for water quality modeling.

7.3 TMDL Models

Contractors to VDEQ utilized two models to assist VDEQ in developing the Hunting Creek TMDL. These models include the Hydrological Simulation Program FORTRAN (HSPF) model for the non-tidal portions of the TMDL and the Euler-Lagrangian Circulation (ELCIRC) model for the tidal portions to evaluate water quality. The City may, at its discretion, use one or both of these models to evaluate the water quality impacts of selected CSO control alternatives. It is not known at this time if these models can be used to address all the potential issues of CSO control. If additional modeling approaches are proposed, these will be discussed with VDEQ before proceeding.

7.4 Model Application

Both the XPSWMM model and the VIMS models may be used in the planning, development, and evaluation of alternatives.

7.4.1 Alternatives Evaluation

The XPSWMM model will be utilized to evaluate the flows entering each of the CSO regulators. This information will then be used in the development of alternatives. The model will then be used to evaluate the hydraulic performance of each alternative and will be used as part of the City's criteria for determining if an alternative is feasible.

7.4.2 Validation

At the discretion of the City the VIMS models may be used to validate the impacts of each alternative on water quality. Depending on the outcome of the hydraulic modeling of CSO control alternatives it may be necessary to evaluate the impact on water quality.

Section 8 Alternatives Analysis

8.1 Approaches for Meeting the TMDL

The goal of the LTCP is to update the Long Term Control Plan to address the Hunting Creek TMDL. The TMDL assigns Waste Load Allocations (WLAs) to each of the CSO-002, 003, and 004 to meet WQS. CSO-002 requires an 80% reduction in bacteria load to meet the TMDL allocation while CSO-003 and 004 require a 99% reduction. Based on the Hunting Creek TMDL, if the CSOs meet their WLA, then the City's obligations for addressing WQS are met. While meeting the loads in the TMDL is one way to meet the WQS, there are alternative methods presented in the EPA CSO Control Policy that allow for meeting WQS.

8.1.1 TMDL CSO Control Assumption (80%-99% Control)

The City will develop and evaluate alternatives to meet the WLAs presented in the Hunting Creek TMDL. These alternatives will meet the 80% reduction at CSO-002 and the 99% reduction at CSO-003 and 004. These alternatives will be evaluated against and compared to other alternatives that meet WQS through other approaches.

8.1.2 Presumptive Approach (typical year basis)

The EPA CSO Control Policy provides alternate methods to meet the WQS for Hunting Creek. One such method is the presumption approach. Through this method *“a program that meets any of the criteria listed below would be presumed to provide an adequate level of control to meet the water quality-based requirements of the CWA...”* These criteria are:

- 4-6 Overflows per Typical Year – the City will evaluate alternatives that will allow up to 6 overflows per year per the CSO Policy based on the presumptive approach.
- 85% Capture for Treatment – the City will evaluate alternatives that capture 85% of the flow entering a CSO regulator and sending it to the AlexRenew WRRF for, at a minimum, primary treatment.
- Equivalent of Treatment – the City will develop and evaluate alternatives that reduce the bacteria load entering the receiving waters by an amount equivalent to sending 85% of the flow to the AlexRenew WRRF. This alternative is being called Collective Consistency.

8.1.3 Demonstration Approach

In addition to the presumption alternatives described above, the City will develop and evaluate one or more alternatives via the demonstration approach. The EPA CSO Control Policy demonstration approach allows controls less than those described in the presumption approach if the City can demonstrate the planned control program will not preclude the attainment of WQS or the receiving waters' designated uses or contribute to their impairment. In addition to the presumption alternatives described above, the City will develop and evaluate alternatives via the demonstration approach. The demonstration approach will use water quality models described above to determine the impact on water uses according to the EPA CSO Control Policy and Virginia DEQ WQS.

8.1.3.1 VDEQ TMDL Implementation Plan

The City's tentative plan is to develop a reasonable CSO control infrastructure project, implement the Area Reduction Plan, and incorporate green infrastructure and solutions throughout the City in order to meet WQS. The infrastructure project will be one of the alternatives developed and selected by the City as part of the LTCPU.

8.1.3.2 Collective Consistency

In addition to the alternatives described in the TMDL CSO Control Assumption section above, the City will evaluate alternatives meeting the TMDL requirements through collective consistency. The collective consistency approach will evaluate the WLAs shown in Table 2-1 and Table 2-2 as a whole rather than individually. The term "collective consistency" comes from the federal requirements that VPDES permits must be consistent with the assumptions and requirements of TMDLs. The difference between the AlexRenew WLA and current WRRF performance may allow for an opportunity to offset a portion of the City's CSS loads, the City's MS4 loads, and/or the County's MS4 loads. Under a collective consistency approach the City will evaluate offset loads for the presumption and demonstration approach alternatives. It is anticipated that this may include levels of control over a range from 4-12 overflows per year. Over time, as long as those assumptions are reasonable (an approach directly paralleling the presumption approach in the CSO Policy) the implementation would continue. If at any time the assumption about AlexRenew's loadings became invalid then the City would further update its LTCPU to identify another approach (additional CSO controls, UAA, TMDL revisions, TMDL load reallocation, etc.). The use of collective consistency may result in a single structural solution, or may be a part of a long term implementation plan. Such a long term implementation plan may include Collective Consistency as a first phase, followed by addressing stormwater WLA, a continuing Area Reduction plan, and green infrastructure if needed.

8.1.3.3 UAA

If the City's LTCPU is not acceptable to VDEQ, it reserves the right to have a Use Attainability Analysis performed on the receiving waters from the TMDL. This is not an option that the City wishes to pursue but will do so if an acceptable alternative cannot be found. The City also reserves the right to couple a presumptive program with a future UAA to ensure the presumption of WQS compliance at this time will be reasonable.

8.1.3.4 TMDL Revision

The City has previously expressed concerns with the development of the TMDL. The City will evaluate the option of requesting a revision to the TMDL based on prior concerns. This option would only be pursued if a control alternative acceptable to the City cannot be found.

8.2 Evaluation Criteria

The City will develop specific criteria to evaluate each CSO control alternative. The criteria will be developed with the goal of meeting WQS while meeting the goals of the City as well.

8.2.1 Example Criteria

While this is by no means a completed or finalized list, some of the criteria may include:

- Cost
- Regulatory compliance
- CSO reduction
- Implementation
- Practicality
- Public acceptance
- Expandability
- Net environmental benefit
- Impact to businesses/public
- Nutrient Credits for the Chesapeake Bay TMDL
- Permitting Issues

8.3 Infrastructure Alternatives

As shown in Figure 2-1 there are several types of infrastructure that could be implemented to help achieve the goals of the LTCPU. The City will evaluate the following types of infrastructure:

- Separation
- Green Infrastructure
- Tunnels
- Storage
- Treatment
- Hybrid
- Disinfection
- Real Time Controls
- Outfall Relocation

Each of these will be considered individually as well as in combination with the others. This is by no means a comprehensive list, and other alternatives may be developed and considered with input from the public.

8.4 Preliminary CSO Technologies Screening

Initially CSO technologies will be researched to determine what types of technologies may be suitable for use in the City of Alexandria. It may be possible to eliminate some technologies initially as they may be impractical for the City's combined sewer system.

8.5 Evaluation of Alternatives

Once CSO technologies are screened, the remaining alternatives will further developed and evaluated. These alternatives could include gray infrastructure alternatives, green infrastructure alternatives, or some combination of both. All the alternatives will be evaluated against the criteria that the City determines is relevant to this process. Alternatives will not be completely designed but will be developed enough so that all of the criteria can be evaluated fully. Conceptual cost estimates will be developed for the alternatives evaluated.

8.6 Selection of Recommended Alternative

After choosing and defining the evaluation criteria, a relative importance will be assigned to each. Alternatives will be assigned values for each of the criteria and weighted as necessary. The recommended alternative will be selected based on the overall weighted values.

Section 9 Implementation Plan

9.1 Schedule

A schedule for the LTCP program will be developed. The schedule will be driven by providing adequate time for the following:

- Development and calibration of models;
- Development, evaluation and selection of the LTCPU;
- Implementation of a public participation program with adequate time for public consideration, input and review; and
- Regulatory agency input and review.

9.1.1 Phasing

The schedule will likely reflect a phased approach to implementation. The phasing could be due to construction/implementation sequencing, financial capability, other CSS projects, or other external factors such as the need to pilot controls, community acceptance and the like.

9.2 Financial Plan

The responsibility for any construction and operations and maintenance costs associated with the selected plan will be agreed upon between the jurisdictions involved. Funding will be based upon the use agreements developed with the selected plan.

9.3 Asset Ownership and Operation Agreements

Any changes to existing asset ownership and operation agreements will be documented in the LTCPU. Should the selected plan include the construction of any joint use facilities, ownership, and operation agreements will be established based on criteria agreed upon between all entities involved.

9.4 VPDES Permit Conditions

The City's current permit was issued with an effective date of August 23, 2013 and an expiration date of August 22, 2018. The LTCPU will discuss the implications of the selected plan on the content of the current VPDES permits. Topics to be considered include permit conditions, compliance criteria, and compliance schedules.

Section 10 Post Construction Monitoring

A program will be required to monitor performance of the LTCP. This program would commence as usable (and, possibly, discrete) components of the final LTCP are placed in operation. The monitoring program may comprise elements as follows:

- Flow monitoring and sampling at representative CSO outfalls.
- Flow monitoring on representative facilities that transfer flow from CSO outfalls to storage and a system to measure the degree to which storage facilities are filled.

An instream monitoring program to periodically obtain information on water quality may be developed. This program may be scheduled to coincide with other aspects of the TMDL implementation plan.

Section 11 Submittals and Schedule

The City will initially approach the LTCPU through a series of technical memoranda, which will cover the items discussed in this Work Plan and will include:

- TM: Regulatory Requirements
- TM: Public Participation Plan
- TM: CSS Characterization
- TM: Flow Projections
- TM: Changes to the Sewershed
- TM: Assessment Years
- TM: Modeling Plan
- TM: Evaluation Criteria
- TM: Basis for Cost Estimating
- TM: Preliminary CSO Technologies Screening
- TM: Alternatives Development and Evaluation
- TM: Conceptual Cost Estimate
- TM: Water Quality Standards Evaluation and Modeling

At the completion of the technical memoranda the City anticipates having a preferred alternative, or alternatives. At the City's discretion, additional feasibility investigations may be undertaken for the preferred alternative(s). The information developed through the technical memoranda, as well as the additional feasibility investigations, will be consolidated, summarized, and refined in the LTCPU.

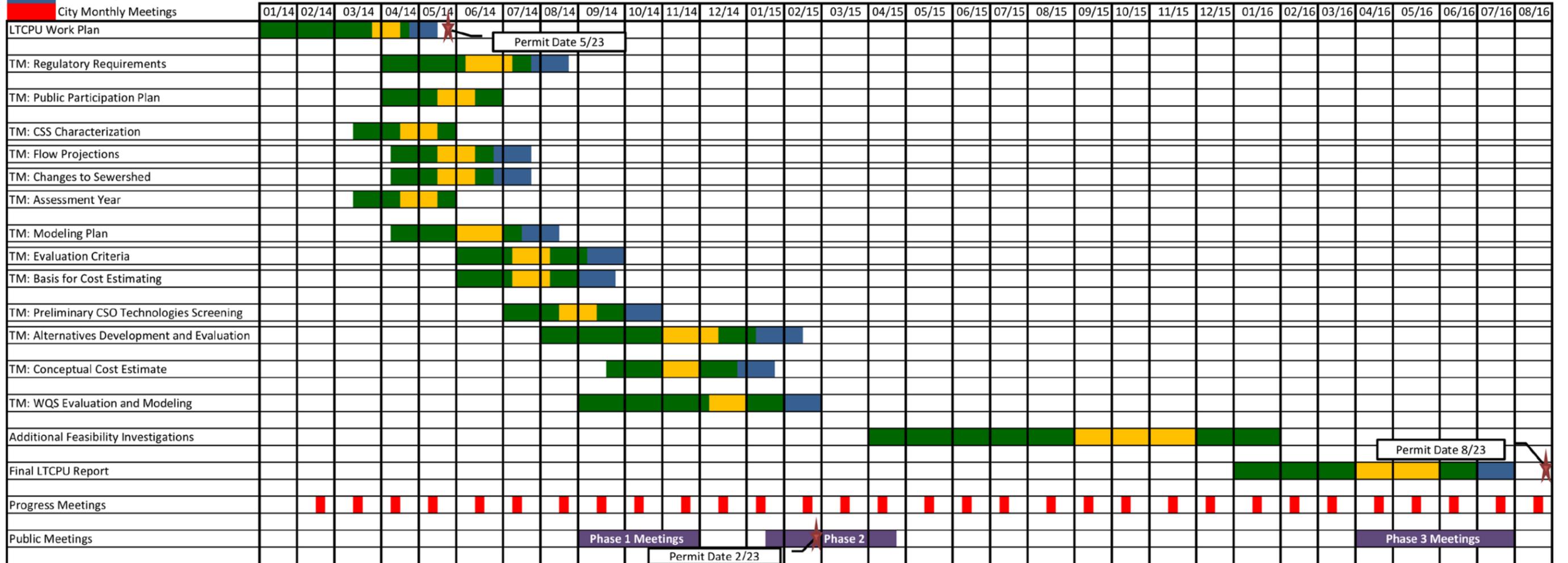
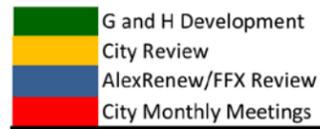
Technical memoranda will be provided to VDEQ for informational purposes, and/or review and comment. The development of the individual technical memoranda allows for a stepwise and progressive approach to the LTCPU. By providing the technical memoranda to VDEQ the City will convey the progress, as well as the key technical assumptions, decisions, and findings as they become available. The stepwise and progressive approach of the technical memoranda also is also integral to the City's PPP, it terms of educating and actively involving the affected public in the decision making process.

A preliminary schedule for developing the technical memoranda, additional feasibility investigations, and the LTCPU is provided in Attachment A. This list of technical memoranda and schedule are subject to change as the project progresses.

Attachment A

Preliminary LTCPU Schedule





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