

OCT 17 2016



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

OCT 13 2016

CERTIFIED MAIL 7015 1730 0002 0524 3730
RETURN RECEIPT REQUESTED

Mr. Michael Patrick, P.E.
Director, Waste Resources Division
City of Chattanooga
455 Moccasin Bend Road
Chattanooga, Tennessee 37405

Re: Approval of the Capacity Assurance Program
U.S. District Court Civil Action 1:12-cv-00245

Dear Mr. Patrick:

The U.S. Environmental Protection Agency Region 4 and the Tennessee Department of Environment and Conservation have reviewed and hereby approve the revised Capacity Assurance Program (CAP) for the City of Chattanooga (the City) submitted October 3, 2016, pursuant to Section VI.20.h of the subject Consent Decree above. The City shall implement the CAP in accordance with the submittal. In addition, the City shall certify the status of the implementation of the CAP, including its completion, in the Semi-Annual or Annual Work Progress Report pursuant to Section IX of the subject Consent Decree.

Please contact Ms. Sara Janovitz at (404) 562-9870 or via email at janovitz.sara@epa.gov if you have any questions.

Sincerely,

A handwritten signature in blue ink, appearing to read "Maurice L. Horsey, IV".

Maurice L. Horsey, IV, Chief
Municipal & Industrial Enforcement Section
NPDES Permitting and Enforcement Branch

cc: See Attached Mailing List

Mailing List:

Mr. Karl Fingerhood
U.S. Department of Justice, Washington, D.C.

Mr. Phillip Hilliard
Office of the Attorney General

Ms. Jessica Murphy
Tennessee Department of Environment and Conservation

Mr. Donald L. Norris
City of Chattanooga, Tennessee

Mr. Wade Hinton
City of Chattanooga, Tennessee

Mr. Adam Sowatzka
King & Spalding LLP

Ms. Shelby Ward
Tennessee Clean Water Network



City of Chattanooga

Mayor Andy Berke

September 21, 2016

VIA CERTIFIED MAIL

Ms. Sara Schiff Janovitz
Environmental Engineer
Clean Water Enforcement Branch
US EPA - Region 4
61 Forsyth Street, SW
Atlanta, GA 30303

**RE: *United States of America et. al. v. City of Chattanooga, No. 1:12-cv-00245*
Capacity Assurance Program – Resubmittal**

Dear Ms. Janovitz:

On behalf of the City of Chattanooga, Tennessee ("City"), and in accordance with the consent decree entered by the United States District Court for the Eastern District of Tennessee (Southern Division), on April 24, 2013, in the case styled the *United States of America et. al. v. City of Chattanooga, No. 1:12-cv-00245* ("Consent Decree"), we are resubmitting to both the Environmental Protection Agency ("EPA") and the Tennessee Department of Environment and Conservation ("TDEC") the Capacity Assurance Program ("CAP") in response to comments from the EPA dated June 21, 2016.

The comments received from the EPA and the responses and corrections made to the ERP are as follows:

1. EPA Comment Section 2.3: *The EPA and TDEC recommend adding the definition of "one hour peak flow" as detailed in Section VI.20.h.ii of the subject Consent Decree to the list of definitions in the CAP.*

City of Chattanooga Response: Section 2.3, Definitions, has been updated to include the above mentioned language.

2. EPA Comment Sections 3.2 and 3.3: *The EPA and TDEC recommend adding language to the Sections to clarify that if the Capacity Analysis Evaluation shows the City does not have adequate collection, transmission, or treatment capacity and/or the Chronic Overflow Evaluation shows the new connection or additional flow is in any part of a sewershed upstream of a chronic overflow location, the City will not authorize the new connection or additional flow unless specific conditions are met.*

City of Chattanooga Response: Section 3.5, Capacity Approval In-Lieu of Certification Process, clarifies how the City will address this situation.

Ms. Sara Schiff Janovitz
September 21, 2016
Page Two

3. EPA Comment Sections 3.4.1 and 6.2.1: *The City needs to ensure the Quarterly capacity analysis meets the requirements of Section VI.20.h.ii.(E) of the subject Consent Decree.*

City of Chattanooga Response: Section 6.2.1, Minor Connections, has been updated to include, "...to certify adequate capacity of the existing one hour peak flows and additional projected flows.." to clarify the quarterly minor sewer connection evaluation.

4. EPA Comment Section 3.6: *The EPA will not be involved in authorizing new service connections or additional flows from existing connections after the subject Consent Decree has been terminated. The EPA recommends changing the section to read, "...as agreed upon in writing by EPA prior to the termination of the Consent Decree, and in the cases...."*

City of Chattanooga Response: Section 3.6, Essential Services, has been updated to include the above mentioned language.

5. EPA Comment Section 3.8: *What is the timeline for modifying the City ordinance to require a capacity assessment as part of the building permit process?*

City of Chattanooga Response: Section 3.8, Issuance of Building Permits, has been updated to include, "This is estimated to be completed by September 1, 2018".

6. EPA Comment Section 5.1: *The definition for chronic overflow location is missing the word, "not". The first sentence of the section should read, "chronic overflow locations are locations within 500 yards of each other that have experienced collectively, within twelve months prior to the date of analysis, more than five (5) SSOs provided that they are not caused by a single rainfall event."*

City of Chattanooga Response: Section 5.1, Definition, has been updated to include the above mentioned language.

7. EPA Comment Section 6.1: *Section VI.20.h.iv.(H) of the subject Consent Decree requires the City to use the results of the annual review of the estimated flow reductions compared to the actual flow reductions to adjust future estimates as necessary.*

Sara Schiff Janovitz
September 21, 2016
Page Three

City of Chattanooga Response: Section 6.1, Deposits, has been updated to include, "...to adjust future estimates as necessary" as the purpose of comparing estimated and actual flow reductions during the annual review.

8. EPA Comment Section 6.2: *What is the timeline for establishing a list of all authorized new sewer service connections or increase in flow which have not yet been introduced into the wastewater collection and transmission system?*

City of Chattanooga Response: Section 6.2, Withdrawals, has been updated to include, "This is estimated to be completed by September 1, 2018".

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering such information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

We look forward to receiving EPA's and TDEC's approval of the Capacity Assurance Program. In the meantime, please let me know if you have any questions regarding our submittal.

Sincerely,



Michael C. Patrick, P.E.
Director, Waste Resources Division
Enclosure

cc: Karl Fingerhood, Esq., US DOJ
Chief, Environmental Enforcement Section, US DOJ
Chief, Clean Water Enforcement Branch, US EPA Region 4
Bill Bush, Esq., US EPA
Phillip Hilliard, Office of the Attorney General
Enforcement Coordinator, Water Pollution Control, TDEC
Shelby Ward, Esq., TCWN
Mike Marino, PE, Jacobs
Adam Sowatzka, Esq., King & Spalding



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JUN 21 2016

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RETURN RECEIPT REQUESTED

Mr. Michael Patrick, P.E.
Director, Waste Resources Division
City of Chattanooga
455 Moccasin Bend Road
Chattanooga, Tennessee 37405

Re: Review of the Capacity Assurance Program
U.S. District Court Civil Action 1:12-cv-00245

Dear Mr. Patrick:

The U.S. Environmental Protection Agency Region 4 and the Tennessee Department of Environment and Conservation (TDEC) have reviewed the Capacity Assurance Program (CAP) for the City of Chattanooga (the City) pursuant to Section VI.20.h of the subject Consent Decree above. The EPA and TDEC have identified the following questions and issues needing additional clarification.

CAP Questions and Comments:

1. Section 2.3: The EPA and TDEC recommend adding the definition of "one hour peak flow" as detailed in Section VI.20.h.ii of the subject Consent Decree to the list of definitions in the CAP.
2. Sections 3.2 and 3.3: The EPA and TDEC recommend adding language to the Sections to clarify that if the Capacity Analysis Evaluation shows the City does not have adequate collection, transmission, or treatment capacity and/or the Chronic Overflow Evaluation shows the new connection or additional flow is in any part of a sewer shed upstream of a chronic overflow location, the City will not authorize the new connection or additional flow unless specific conditions are met.
3. Sections 3.4.1 and 6.2.1: The City needs to ensure the Quarterly capacity analysis meets the requirements of Section VI.20.h.ii.(E) of the subject Consent Decree.
4. Section 3.6: The EPA will not be involved in authorizing new service connections or additional flows from existing connections after the subject Consent Decree has been terminated. The EPA recommends changing the section to read, "...as agreed upon in writing by EPA prior to the termination of the Consent Decree, and in the cases...."

5. Section 3.8: What is the timeline for modifying the City ordinance to require a capacity assessment as part of the building permit process?
6. Section 5.1: The definition for chronic overflow location is missing the word, “not.” The first sentence of the section should read, “chronic overflow locations are locations within 500 yards of each other that have experienced collectively, within twelve months prior to the date of analysis, more than five (5) SSOs provided that they are not caused by a single rainfall event.”
7. Section 6.1: Section VI.20.h.iv.(H) of the subject Consent Decree requires the City to use the results of the annual review of the estimated flow reductions compared to the actual flow reductions to adjust future estimates as necessary.
8. Section 6.2: What is the timeline for establishing a list of all authorized new sewer service connections or increases in flow which have not yet been introduced into the wastewater collection and transmission system?

Please contact Ms. Sara Janovitz at (404) 562-9870 or via email at janovitz.sara@epa.gov, within five days of receipt of this letter to schedule your attendance at a meeting either in person or via telephone conference.

Sincerely,



Alenda E. Johnson, Acting Chief
Municipal & Industrial Enforcement Section
NPDES Permitting and Enforcement Branch

cc: Mr. Karl Fingerhood
U.S. Department of Justice, Washington, D.C.

Mr. Phillip Hilliard
Office of the Attorney General

Ms. Jessica Murphy
Tennessee Department of Environment and Conservation

Mr. Donald L. Norris
City of Chattanooga

Mr. Wade Hinton
City of Chattanooga

Mr. Adam Sowatzka
King & Spalding LLP

Ms. Shelby Ward
Tennessee Clean Water Network



Capacity Assurance Program

Prepared for

**United States Environmental Protection Agency
Tennessee Department of Environment and
Conservation**

Prepared by

City of Chattanooga
Waste Resources Division
Consent Decree Program
Case No. 1:12-cv-00245

Submitted by

JACOBS®

Jacobs Engineering Group Inc.
Consent Decree Program Manager

Chattanooga, Tennessee

5/19/2016

Revised 7/21/2016

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Acronyms and Abbreviations

ADWF	Average Dry-Weather Flow
ASCE	American Society of Civil Engineers
CAP	Capacity Assurance Program
City	City of Chattanooga
CD	Consent Decree
CFR	Code of Federal Regulations
CMOM	Capacity, Management, Operations, and Maintenance
CSOTF	Combined Sewer Overflow Treatment Facility
EPA	United States Environmental Protection Agency
GIS	Geographic Information System
gpd	Gallons per Day
HGL	Hydraulic Grade Line
I&I	Infiltration and Inflow
ISS	Interceptor Sewer System
MBWWTP	Moccasin Bend Wastewater Treatment Plant
MGD	Million Gallons per Day
NPDES	National Pollution Discharge Elimination System
PS	Pump Station
SQL	Structured Query Language
SSO	Sanitary Sewer Overflow
SSS	Sanitary Sewer System
TCWN	Tennessee Clean Water Network
TDEC	Tennessee Department of Environment and Conservation
WCTS	Wastewater Collection and Transmission System
WEF	Water Environment Federation
WRD	Waste Resources Division
WWTP	Wastewater Treatment Plant

1.0 Introduction

1.1 Purpose

On April 24, 2013, the City of Chattanooga (“City”) entered into a consent decree with the United States and the State of Tennessee (“State”), in the case styled United States of America et. al. v. City of Chattanooga, No. 1:12-cv-00245 (“CD”). The City’s Waste Resources Division (“WRD”) has prepared a Capacity Assurance Program (“CAP”) for review and approval by the United States Environmental Protection Agency (“EPA”) and the Tennessee Department of Environment and Conservation (“TDEC”), pursuant to paragraph 21 of the CD.

As set forth in the CD, the purpose of this CAP is to analyze portions of the sanitary sewer system (“SSS”) that are hydraulically limited including: 1) identifying each sewershed or part of a sewershed with insufficient capacity under either one hour peak flows, or average conditions, or both; 2) analyzing the portions of the SSS that hydraulically impact all known weather-related sanitary sewer overflows (“SSOs”) and all portions of the wastewater treatment plant (“WWTP”) that may contribute to violations of the National Pollution Discharge Elimination System (“NPDES”) Permit; and 3) assessing the one hour peak flow capacity of all major system components for existing and proposed flows.

The CAP will also enable Chattanooga to authorize new sewer service connections, or increases in flow from existing sewer service connections, after certifying adequate treatment, transmission, and collection capacity based on the procedures set forth in this CAP. The CAP contains the following components:

- The technical information, methodology, and analytical techniques used by Chattanooga to calculate treatment, transmission, and collection capacity;
- The means by which Chattanooga will integrate its capacity certification with the issuance of building permits and the acquisition of new or existing sewers from other owners;
- A method for information management capable of tracking the chronic SSO locations;
- The technical information, methodology, and analytical techniques to calculate the net (cumulative) increase or decrease in volume of wastewater introduced to the SSS as a result of Chattanooga’s authorization of new sewer service connections and increases in flow from existing connections and the completion of: (a) specific projects that add or restore capacity to the SSS or the WWTP (“Capacity Enhancing Projects”), (b) specific projects that reduce peak flow through removal of inflow and infiltration (“I/I”) (“I/I Projects”), and (c) permanent removal of sewer connections (“Removal of Connections”); and
- A method for information management capable of tracking the accumulation of banked credits from completion of Capacity Enhancing Projects, I/I Projects, and Removal of Connections; the capacity-limited portion of the sewershed in which those credits were earned; and the expenditure of such credits.

1.2 Authority

The City's legal authority for the development and implementation of this CAP is:

- The U.S. Clean Water Act;
- NPDES Permit Number TN0024210;
- Tennessee Water Quality Control Act; and
- The CD.

1.3 Related City of Chattanooga Documents

The City has several documents that are critical to and referenced throughout this CAP. The documents and their locations are shown in Table 1-1 below.

Table 1-1
CAP Related Documents

Document	Location
City of Chattanooga Sanitary Sewer System Design and Construction Manual	City of Chattanooga Website
Hydraulic Model Report- Jacobs Engineering Group	City of Chattanooga Files
Hydraulic Model Report- Hazen and Sawyer	City of Chattanooga Files

1.4 Implementation Schedule

Chattanooga anticipates submitting the CAP to EPA by May 24, 2016 and will implement the CAP within twenty-five (25) months after approval by EPA.

2.0 Overview

2.1 Description of Wastewater Collection and Transmission System

As a regional wastewater utility, the City of Chattanooga, a Municipal Corporation, owns, operates, maintains, and manages a network of pipes, manholes, pump stations (“PSs”), force mains, combined sewer overflow treatment facilities (“CSOTFs”), and associated appurtenances that transport wastewater from homes, businesses, and industries to the Moccasin Bend Wastewater Treatment Plant (“MBWWTP”). All of this infrastructure is part of the Wastewater Collection and Transmission System (“WCTS”), as defined in the CD and herein. Property owners own the private service laterals from the served residential, commercial, and industrial structures to the public main line in the street or right-of-way, including the connection.

The City’s WCTS currently serves approximately 170,000 people with approximately 61,000 customers within the City including 80 permitted industries. It also provides treatment for eight (8) regional or satellite users comprised of approximately 25,000 customers. The WCTS is composed of:

- 1,263 miles of gravity sewers (approximate), including 70 miles of combined sewers;
- 30,000 manholes (approximate);
- 70 PSs;
- 53 miles of force main;
- Eight (8) CSOTFs;
- One (1) Combined Sewer Storage Facility;
- 192 (approximate) residential/grinder pumps; and
- One (1) MBWWTP.

An organizational chart of the WRD is provided in Appendix A.

A map of the City’s WCTS delineated by basin is provided in Appendix B.

2.2 Key Elements of the CAP

The key elements of the CAP are addressed individually as follows:

- Section 3.0 Capacity Certification Program
- Section 4.0 Capacity Analysis
- Section 5.0 Chronic Overflow Evaluation
- Section 6.0 Credit Tracking & Banking System

2.3 Definitions

City: The City of Chattanooga, Tennessee and its Department of Public Works, the Waste Resources Division (“WRD”), and the Interceptor Sewer System.

Director: The Director of the WRD is responsible for the oversight and management of the WRD of the Department of Public Works of the City.

Infiltration: Groundwater that infiltrates a sewer system through defective pipes, pipe joints, connections, or manholes. Infiltration does not include, and is distinguished from inflow. Infiltration is generally measured during seasonally high ground water conditions, during a dry period.

Inflow: Water other than sanitary flow that enters a sewer system from sources which include, but are not limited to, roof leaders, cellar drains, yard drains, area drains, drains from wet areas, cross connections between storm sewers and sanitary sewers, catch basins, cooling towers, stormwater, surface runoff (including leaking manhole covers), street wash-water, or drainage. Inflow does not include, and is distinguished from infiltration. Inflow is generally measured during wet weather.

I/I: The combination of inflow and infiltration.

Interceptor Sewer System (“ISS”) Department: The ISS Department is responsible for the planning, management, operation, and maintenance of the ISS, which consists of the WCTS and WWTP.

One Hour Peak Flow: Per Section VI.20.h.ii of the CD, the one hour peak flow is the greatest flow in a sewer averaged over a sixty minute period at a specific location expected to occur as a result of a representative 2 year-24 hour storm event.

User: Any person that contributes, causes, or permits the contribution or introduction of wastewater or pollutants into the WCTS, whether intentional or unintentional, and whether direct or indirect.

Wastewater Collection and Transmission System (“WCTS”): The WCTS is the wastewater collection, retention, and transmission systems, including all gravity sewer lines, force mains, PSs, manholes, and other related appurtenances designed to collect and convey domestic, commercial, industrial wastewaters and combined sewer to the WWTP or CSOTFs.

Wastewater Treatment Plant (“WWTP”): WWTP shall mean devices or systems used in the storage, treatment, recycling, and reclamation of municipal wastewater at the Moccasin Bend WWTP located at 455 Moccasin Bend Road, Chattanooga, TN 37405-4403

3.0 Capacity Certification Program

The CAP provides a process for Chattanooga to determine whether there is adequate treatment, transmission, and collection capacity before it authorizes a new sewer service connection in the SSS, or additional flow from an existing sewer service connection in the SSS, as set forth in this section.

Figure 3.1 in Appendix C provides an overview of the capacity certification process. The steps are further described throughout this section and the following sections of this document.

Certifications will be made by a Professional Engineer registered in the State and reviewed and approved by an authorized representative of Chattanooga.

3.1 Capacity Request Submittal

An entity requesting connection to the WCTS, or an increase in flow, will be required to submit a Capacity Certification Request Form. The request will be submitted through the Land Development Office at the beginning stages of design review. An example of the Capacity Certification Request Form is set forth in Appendix D.

3.1.1 Flow Estimates for Additional Flows

Flow estimates are to be determined and provided by the requestor and included in the Capacity Certification Request Form. All estimated flows are to be determined utilizing the procedures set forth in Section IV, 2.4 of the City of Chattanooga's Sanitary Sewer System Design & Construction Manual dated October 29, 2004 or utilizing the latest engineering standards as approved by the City. All calculations and supporting information is to be submitted with the application to be reviewed by WRD.

3.1.2 Other Required Information

Other information to be included on the Capacity Certification Request Form includes the following:

- Location Address;
- Owner Information;
- Type of Work;
- Property Use;
- Start and Completion Dates;
- Site layout with utilities;
- Location Map;
- Sanitary Sewer Sub-basin;
- Downstream PS (if applicable); and
- Review Fee;

3.2 Capacity Analysis Evaluation

WRD will perform the capacity analysis with the provided information from the Capacity Certification Request Form. The detailed process of performing this analysis is described in Section 4.0 of this document.

3.3 Chronic Overflow Evaluation

WRD will also perform a review to determine if any chronic overflow locations are found downstream of the requested connection point. This is accomplished utilizing the Chronic Overflow Evaluation procedure as described in Section 5.0 of this document.

3.4 Issuance of Certifications

Upon approval of new connection or additional flow request, the City will provide the requestor with a completed Capacity Certification Request Form stating approval for connection. The date will be documented and updated in the City's tracking system.

Approved capacity certifications are effective for a period not to exceed one year from the date of approval, unless the applicant requests an extension in writing within thirty (30) days of termination.

3.4.1 Minor Sewer Connections

Minor sewer connections are defined in this CAP as connections in which the average flow is not to exceed 2,500 gallons per day ("gpd"). Minor sewer connections may be approved by the City without performing a capacity analysis for the individual connection.

3.5 Capacity Approval In-Lieu of Certification Process

The City may authorize new sewer service connections or additional flow from an existing connection even if it cannot satisfy the requirements of Section 3.2 and 3.3 above if the following provisions are met:

- The City is in substantial compliance with the CD;
- The sewer lines which will convey the proposed additional flow from new or existing sewer service connections have not experienced dry weather SSOs due to inadequate capacity within the previous twelve months or the causes of any dry weather SSOs due to inadequate capacity have been eliminated;
- Chattanooga has identified the sewer line segment(s), PS(s) and/or wastewater treatment systems that do not meet the conditions for certification of adequate treatment, transmission, or collection capacity;
- Chattanooga has identified the sewer line segment(s) that constitute a chronic overflow location(s);
- Chattanooga has performed projects prior to the time of the proposed connection which will add sewer capacity or reduce peak flows to the system that are greater than or equal to the flows from the proposed connection. (The Credit Tracking system is described in Section 6.0 of this document); and

- Any new sewer connection or increase in flow to an existing connection may be authorized, but not prior to the completion of any projects related to deposits necessary for the connection's approval.

3.6 Essential Services

Notwithstanding the provisions of Section 3.2 and 3.3, the City may authorize a new sewer service connection, or additional flow from an existing sewer service connection, even if it cannot certify that it has adequate treatment, transmission, or collection capacity for health care facilities, public safety facilities, public schools, government facilities, and other facilities as agreed upon in writing by EPA prior to the termination of the CD, and in the cases where a pollution or sanitary nuisance condition exists, as determined by Chattanooga-Hamilton County Health Department or its regulatory successor, as the result of a discharge of untreated wastewater from an on-site septic tank. For all such new service connections, or additions to flow from an existing connection, the City will make the appropriate subtraction to the balance in the credit bank described in Section 6.

3.7 Existing Illicit Connections

Notwithstanding the provisions of Section 3 of this document, the City may authorize a new sewer service connection, or additional flow from an existing sewer service connection, even if it cannot certify that it has adequate treatment, transmission, or collection capacity for any illicit connections or discharge of wastewater to the stormwater system or to waters of the State. For all such new service connections or additions to flow from an existing connections, created before April 24, 2013 that result from the elimination of illicit connections or discharges, Chattanooga will not be required to make a subtraction from the balance in the credit bank described in Section 6. For all such new service connections or addition to flow from an existing connection created after April 24, 2013 that result from the elimination of illicit connections or discharges, the City will make a subtraction from the balance in the credit bank described in Section 6.

3.8 Issuance of Building Permits

According to City ordinance, a building permit will be required for a new development and for redevelopment of an existing property. The ordinance will be modified to require a capacity assessment as part of the building permit process. This is estimated to be completed by September 1, 2018.

4.0 Capacity Analysis

4.1 Analytical Techniques

4.1.1 Methodology

The WCTS is divided into 12 major sewer basins, which are further divided into 105 individual sewer sub-basins for analysis. A map of the sewer sub-basins can be found in Appendix E.

The WCTS is currently designed to treat up to 140 MGD of wastewater with a peak hydraulic capacity of 230 MGD. Pursuant to Section VI.20.(g) of the CD, the City developed a hydraulic model, which will be utilized to support the system's capacity analysis.

4.1.1.1 Hydraulic Model

A system-wide hydraulic model was developed using available collection system data which included: survey data, existing Geographic Information System ("GIS") databases, record drawings, site visits, and engineering judgement.

To calibrate the model, the City conducted a system-wide flow and precipitation monitoring. Model calibration consisted of comparing model simulated output to monitored output and adjusting model parameters until modeled data and the simulated data correlated with measured data.

The model will be re-validated and re-calibrated as necessary as the result of updates to the WCTS.

The model will be used to simulate system response to the 2-year 24-hour design event, and the results will be used to evaluate system capacity and provide a baseline for the credit banking system described in Section 6.0.

4.1.1.2 System Flows

Rainfall data, diurnal flow patterns, and boundary conditions were incorporated into the model. Based on flow monitoring results, dry and wet-weather periods were identified. Dry-weather days were extracted from the flow survey data to calculate the average dry-weather flow ("ADWF"), which represents the average sewage loading that occurs on a daily basis. Wet-weather events were analyzed based on the system response and hydrologic characteristics associated with precipitation and the resulting runoff. The design storm is a 2-year, 24-hour rainfall event (3.67 inches for Chattanooga).

The model was calibrated and validated for both dry and wet-weather flow periods for reliability under both conditions.

4.2 Collection Capacity Analysis

4.2.1 Procedure

Proposed increases in flow and additional connections to the existing WCTS will be entered into the hydraulic model to simulate the proposed flow scenario. A hydraulic model analysis will be performed through the IWCS software for the design storm and the hydraulic grade line (“HGL”) will be developed for the various flow conditions. The HGL will be compared to available system capacity to determine if the increase in flow will violate capacity assurance criteria. The model will predict the locations and sub-basins of any capacity deficits and the City can then address those areas.

4.2.2 Collection Capacity Definition

Adequate collection capacity will confirm that each gravity sewer line in the WCTS, through which the proposed additional flow from new or existing connections would pass, has the capacity to carry the existing one (1) hour peak flow passing through the gravity sewer line, plus the addition to the existing one (1) hour peak flow from the proposed connection, plus the addition to the existing one (1) hour peak flow predicted to occur from all other authorized sewer service connections which have not begun to discharge into the WCTS without causing a surcharge condition.

A surcharge condition shall mean the condition that exists when the supply of wastewater resulting from the one (1) hour peak flow is greater than the capacity of the pipes to carry it and the surface of the wastewater in manholes rises to an elevation greater than twenty-four (24) inches above the top of the pipe or within thirty-six (36) inches of the rim of the manhole, and the sewer is under pressure or head, rather than atmospheric pressure, unless the City has identified that pipe segment and manhole as designed to operate in that condition, in which case the identified level of surcharge will be used. The City will delineate the pipe segments and manholes that are identified as designed to operate under a surcharged condition.

4.3 Transmission Capacity Analysis

4.3.1 Procedure

The design hydraulic capacities of each PS in the system are represented in the hydraulic model. Confirmation of the effective PS capacities are determined utilizing flow monitoring data or performed through wet well drawdown tests in conformance with the Water Environment Federation (“WEF”) Manual of Practice FD-4, “Design of Wastewater and Stormwater Pumping Stations.” The hydraulic model will be used to assess capacity in the transmission system. A map depicting the sewer PSs and interceptors can be found in Appendix F.

4.3.2 Transmission Capacity Definition

Adequate Transmission capacity means that each PS, through which the proposed additional flow from new or existing sewer service connections would pass to the WWTP, has the capacity to transmit, with its largest pump out of service (except for those PSs with only one pump as of the April 24, 2013), the existing one (1) hour peak flow passing through the PS, plus the addition to the existing one (1) hour peak flow predicted to occur from the proposed connection, plus the

addition to the existing one (1) hour peak flow predicted to occur from all other authorized sewer service connections which have not begun to discharge into the WCTS.

4.4 Treatment Capacity Analysis

4.4.1 Procedure

The MBWWTP is currently based on a design flow of 140 MGD with an additional 90 MGD of wet weather flow for a current total flow of 230 MGD. The MBWWTP hydraulic model will be utilized to analyze treatment capacity.

4.4.2 Treatment Capacity Definition

Adequate treatment capacity means that, at the time the WWTP receives the flow from a proposed sewer service connection(s) or increased flow from an existing sewer service connection(s), when combined with the flow predicted to occur from all other authorized sewer service connections (including those which have not begun to discharge into the WCTS), the WWTP will not be in “non-compliance” for quarterly reporting, as defined in 40 C.F.R. Part 123.45, Appendix A of the CD. In addition, upon EPA approval of the Process Controls Program, Chattanooga’s certification of “Adequate Treatment Capacity” will confirm that the new or increased flow to the WWTP will not result in Prohibited Bypasses.

5.0 Chronic Overflow Evaluation

5.1 Definition

Chronic overflow locations are locations within 500 yards of each other that have experienced collectively, within twelve months prior to the date of analysis, more than five (5) SSOs provided that they are not caused by a single rainfall event. A single rainfall event is defined as any occurrence of rain preceded by ten hours without precipitation that results in an accumulation of 0.01 inches or more.

5.2 Information Management

The City maintains a database of SSOs throughout the WCTS that is tracked in a Structured Query Language (“SQL”) database. The detailed information recorded includes location, date, duration, cause, discharge location, estimated volume, and other supplemental information. Each SSO is georeferenced. These georeferenced locations are also available in the City’s web-based mapping system.

The City also will maintain a database of rainfall events in the database. Rainfall events will be used to categorize SSO events and determine if the SSO occurrences are separated by more than 10 hours without precipitation and if the events accumulate more than 0.01 inches of rain.

The SSO and rainfall databases are to be tracked and managed through the City’s Practical Information Management Solution (“PIMS”).

5.3 Evaluation

During the capacity analysis set forth in Section 4.0, the City will review the PIMS database for SSO locations that meet the definition of a chronic overflow location as described in Section 5.1. The City will follow the downstream piping of the requested connection or capacity increase and using the mapping system, verify that no chronic overflow locations are downstream. A map should accompany the evaluation that represents all chronic overflow locations on the date of the review.

6.0 Banking Credit System

Under the “Approval in Lieu of Adequate Capacity Certification” provision in the CD, the City may use a “banking credit system” for the sewer line segment(s), PS(s), WWTP, and/or chronic overflow locations for which the City is not able to certify adequate capacity.

The addition of sewer capacity and/or reduction in one (1) hour peak flows from the Capacity Enhancement Projects, I/I Projects, and Removal of Connections, completed after April 24, 2013, to the affected sewer line segment, PS, WWTP, or chronic overflow location may be accumulated in the form of credits in the banking credit system in accordance with the CD. These credits may then be used for authorization of future sewer service connections or increases in flow from existing connections to the affected sewer line segment, PS, WWTP, or chronic overflow location in the capacity-limited portion of the sewershed.

6.1 Deposits

A capacity improvement form will be filled out to deposit credits from projects described in this section into the Tracking and Banking System. The following guidelines shall be used in depositing credits into the system.

Within twelve (12) months of approval of the CAP, and annually thereafter, the City will perform a review of the estimated flow reductions and actual flow reductions to adjust future estimates as necessary.

6.1.1 Capacity Enhancing Projects

6.1.1.1 Off-Line Storage

Off-line storage projects that will add capacity credits equal to the volume of the storage constructed.

6.1.1.2 Removal of Connections

Removal of connections that will add capacity credits equal to the estimated flow that the connections have produced.

6.1.1.3 Gravity Sewer Line Improvements

Gravity sewer line improvements that will add a capacity credit equal to the volume of additional storage added into the system divided by a factor of 2 unless the project is related to a chronic overflow location in which the volume will be divided by a factor of 4.

6.1.1.4 PS Improvements

PS improvement projects that will add capacity credits equal to the volume of additional storage in the wet well. If the PS has been a restriction, then the City will analyze the PS capacity prior to including any additional system credits.

6.1.1.5 Treatment Facility Improvements

Treatment Facility improvement projects that will add capacity credits equal to the volume of additional storage available in the facility and/or equal to the additional discharged flow that meets the requirements of the current NPDES permit.

6.1.2 I&I Reduction Projects

6.1.2.1 Rehabilitation of Gravity Sewers

Gravity sewer rehabilitation projects, including those for private laterals will add capacity credits equal to the estimated amount of flow reduction divided by a factor of 2 unless the project is related to a chronic overflow location in which the volume will be divided by a factor of 4. The estimated volume of flow reduction will be determined based upon Table 6-1 or actual flow data and engineering analysis dependent on the actual work to be completed. Table 6-1 includes EPA approved values from the CAPs for Metropolitan Sewer District of Greater Cincinnati, Knoxville Utility Board, and Louisville Metropolitan Sewer District.

Table 6-1
Estimated Peak Flow Reductions for Gravity Sewer Rehabilitation

Rehabilitation Method	Earned Base Credits per inch-diameter-mile rehabilitated
Riparian Zone Sewer Rehabilitation – Piping is within 50 feet horizontally of a stream or water body.	34,000 gpd
Non-Riparian Area – Piping is not located within the Riparian Zone.	60 gpd

6.1.2.2 Storm Drain and Downspout Removal

This flow reduction will add capacity credits equal to the estimated amount of flow reduction divided by a factor of 2 unless the project is related to a chronic overflow location in which the volume will be divided by a factor of 4. Depending on the location and size of the drain, the flow estimation can be either calculated utilizing standard engineering practices or it can be estimated using Table 6-2.

Table 6-2
Estimated Peak Flow Reductions for Storm Drain and Downspout Removal

Drain	Earned Base Credits per Drain Removed
Storm Drain < 10” diameter	7,000 gpd
Storm Drain > 10” diameter	To be calculated
Downspout	5,000 gpd

6.1.2.3 Foundation Drain Pump Removal

This flow reduction will add capacity credits equal to the estimated amount of flow reduction divided by a factor of 2 unless the project is related to a chronic overflow location in which the

volume will be divided by a factor of 4. Disconnecting foundation drain sump pumps from the SSS is estimated to reduce peak flows by approximately 4,000 gpd per sump pump removed.

6.1.2.4 Replacement of Vented Manhole Lids

Replacement of vented manhole lids that will add capacity credits equal to the estimated amount of flow reduction divided by a factor of 2 unless the project is related to a chronic overflow location in which the volume will be divided by a factor of 4. Table 6-3 lists the base credits for vented manhole lid replacement prior to the factor reductions.

Table 6-3
Estimated Peak Flow Reductions for Vented Manhole Lid Replacement

Manhole Location	Earned Base Credits
Riparian Zone – Manhole is within 50-feet horizontally of a stream or water body. Manhole is assumed to be subject to one-inch of inundation if located within the riparian zone.	40,000 gpd
Paved Area – Manhole is located in a paved, curbed area at a distance from the curb that is less than one-fourth of the total roadway width. Manhole is assumed to be subject to one-eighth of an inch inundation if located within the paved area.	9,000 gpd
Non-Riparian Area – Manhole does not fall into one of the other categories listed above but are flush with the ground surface is assumed to be subject to “splash” conditions.	2,500 gpd

6.1.2.5 Repair of Manhole Defects

Repair of manhole defects that will add capacity credits equal to the estimated amount of flow reduction divided by a factor of 2 unless the project is related to a chronic overflow location in which the volume will be divided by a factor of 4. Table 6-4 provides the base credits for manhole defect repair prior to the factor reductions.

Table 6-4
Earned Credits for Repair of Manhole Defects

Base Credits (gpd)												
Manhole Component	Minor I/I			Moderate I/I			Heavy I/I			Severe I/I		
	R	P	N	R	P	N	R	P	N	R	P	N
Frame Seal	864	78	328	1,728	156	656	3,456	311	1,313	6,912	622	2,626
Chimney	864	78	328	1,728	156	656	3,456	311	1,313	6,912	622	2,626
Cone	864	78	328	1,728	156	656	3,456	311	1,313	6,912	622	2,626
Wall	432	39	164	864	75	328	1,728	156	656	3,456	311	1,313
Pipe Seal	432	39	164	864	75	328	1,728	156	656	3,456	311	1,313
Bench	432	39	164	864	75	328	1,728	156	656	3,456	311	1,313
Channel	432	39	164	864	75	328	1,728	156	656	3,456	311	1,313

Adapted from Table 4-1 of The American Society of Civil Engineers, Manual of Practice No. 92

Key:

R – Riparian
P – Paved
N – Non-Riparian

6.2 Withdrawals

The City will establish a list of all authorized new sewer service connections or increases in flow from existing connections which flows have not yet been introduced into the WCTS. This is estimated to be completed by September 1, 2018. The following information will be recorded for each authorized connection: street address, estimated average daily flow, estimated peak flow, sewershed, WWTP, date authorized, and estimated Calendar Quarter when the additional flow from the connection will begin. The City will update and maintain this list until full implementation of the CAP, as approved by EPA, and upon introduction into the WCTS, and such new sewer service connections or increases in flow from existing connections will be accumulated in the form of debits in the banking credit system.

6.2.1 Minor Connections

Minor connections as described in Section 3.4.1 of this document may be evaluated on a quarterly basis to certify adequate capacity of the existing one hour peak flows and additional projected flows at which point a proposed withdrawal would be set aside for the following quarter. This will be validated in the following quarter with actual minor connections approved.

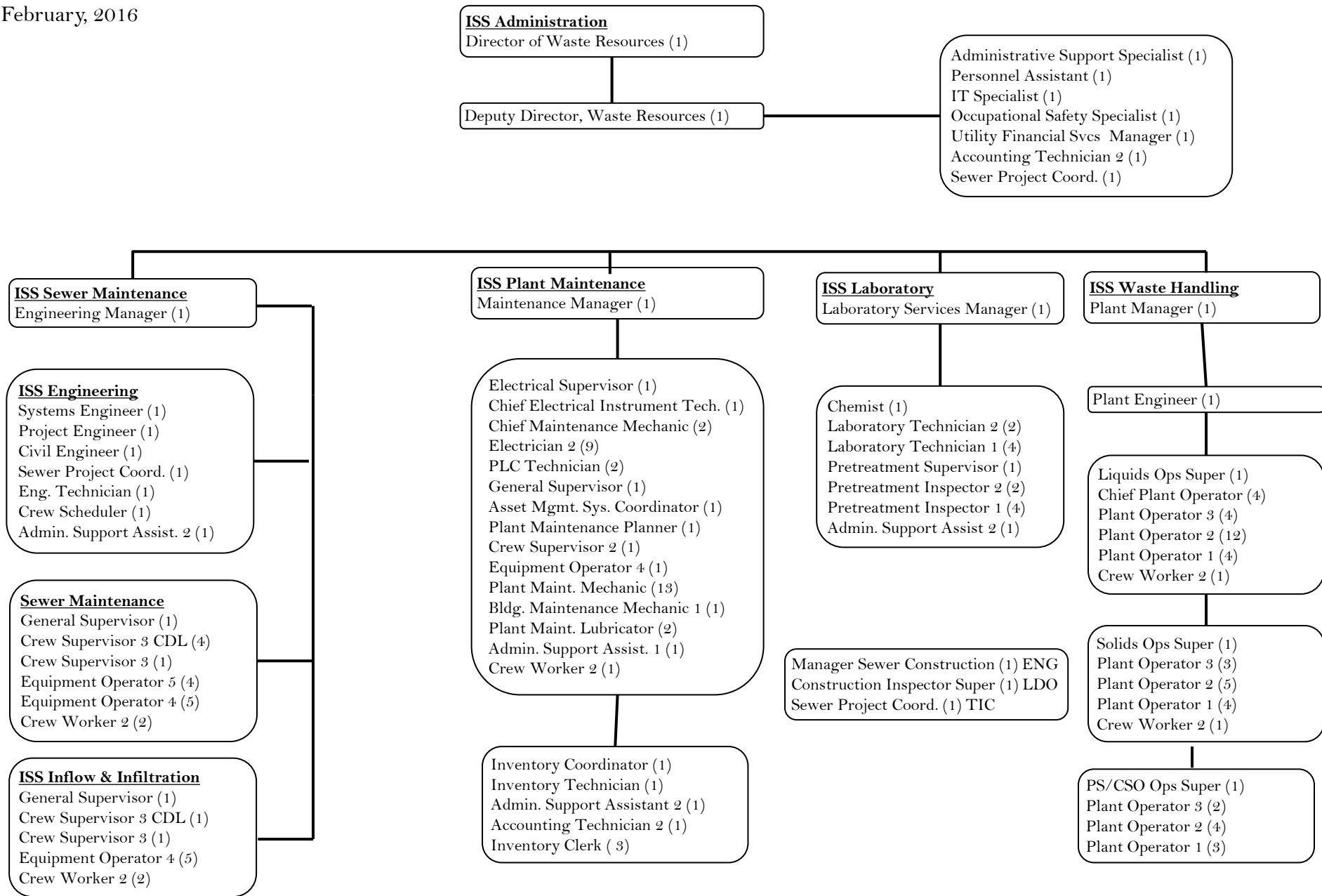
6.2.2 In Lieu of Capacity Certifications

In Lieu of Capacity Certifications that have been approved will be withdrawn from the current balance at the time of certification. The In Lieu of Capacity Certification process is further described in Section 3.5 of this document.

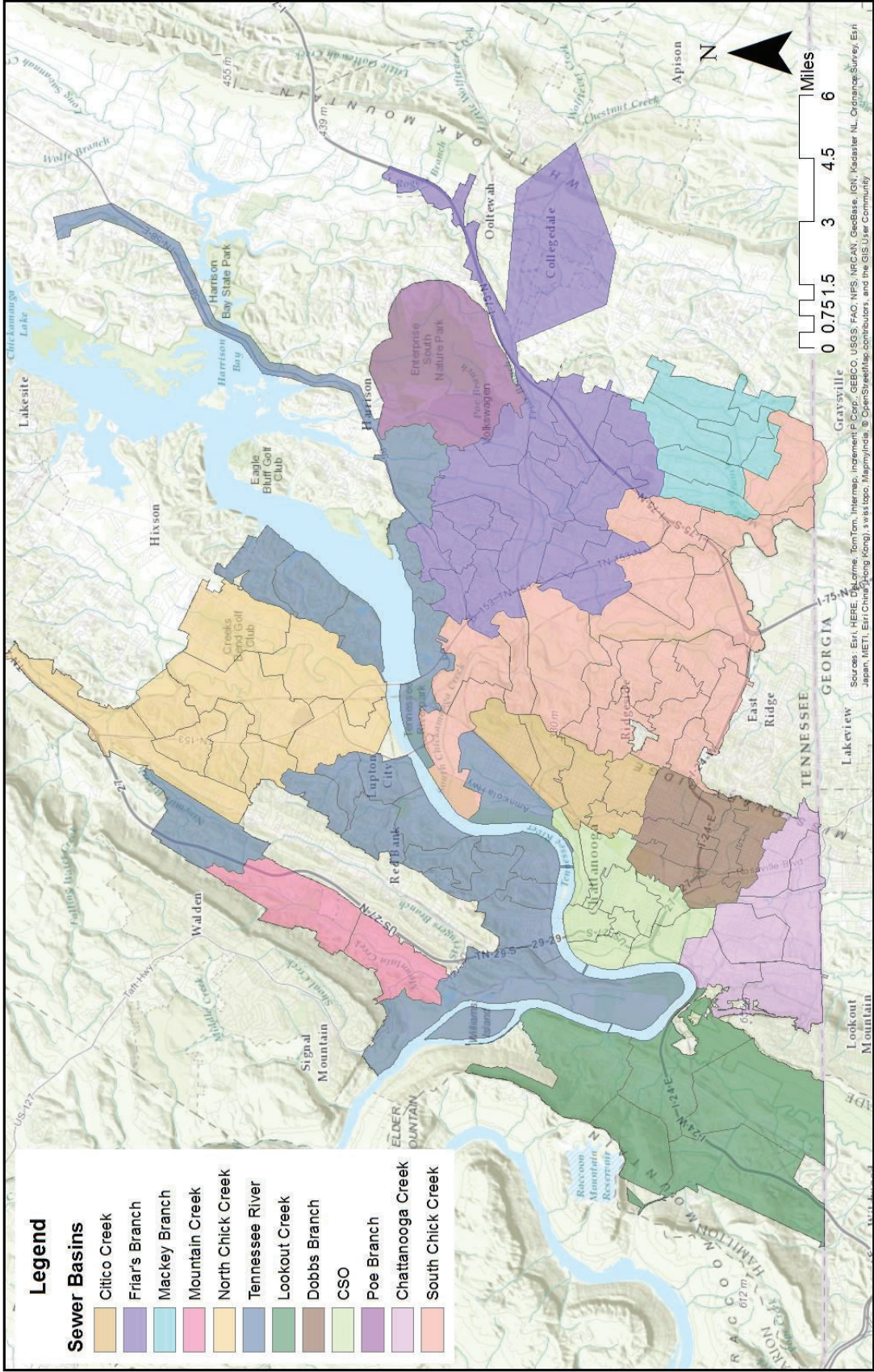
6.2.3 Reconnections

Any connection that is temporarily suspended as a result of Chattanooga's Private Lateral Program and is then reinstated due to completion of a replaced or repaired private lateral will not be deemed a new service connection or an additional flow and will not need to meet the Capacity Certification requirements of this document.

Appendix A
Waste Resources Division Organizational Chart



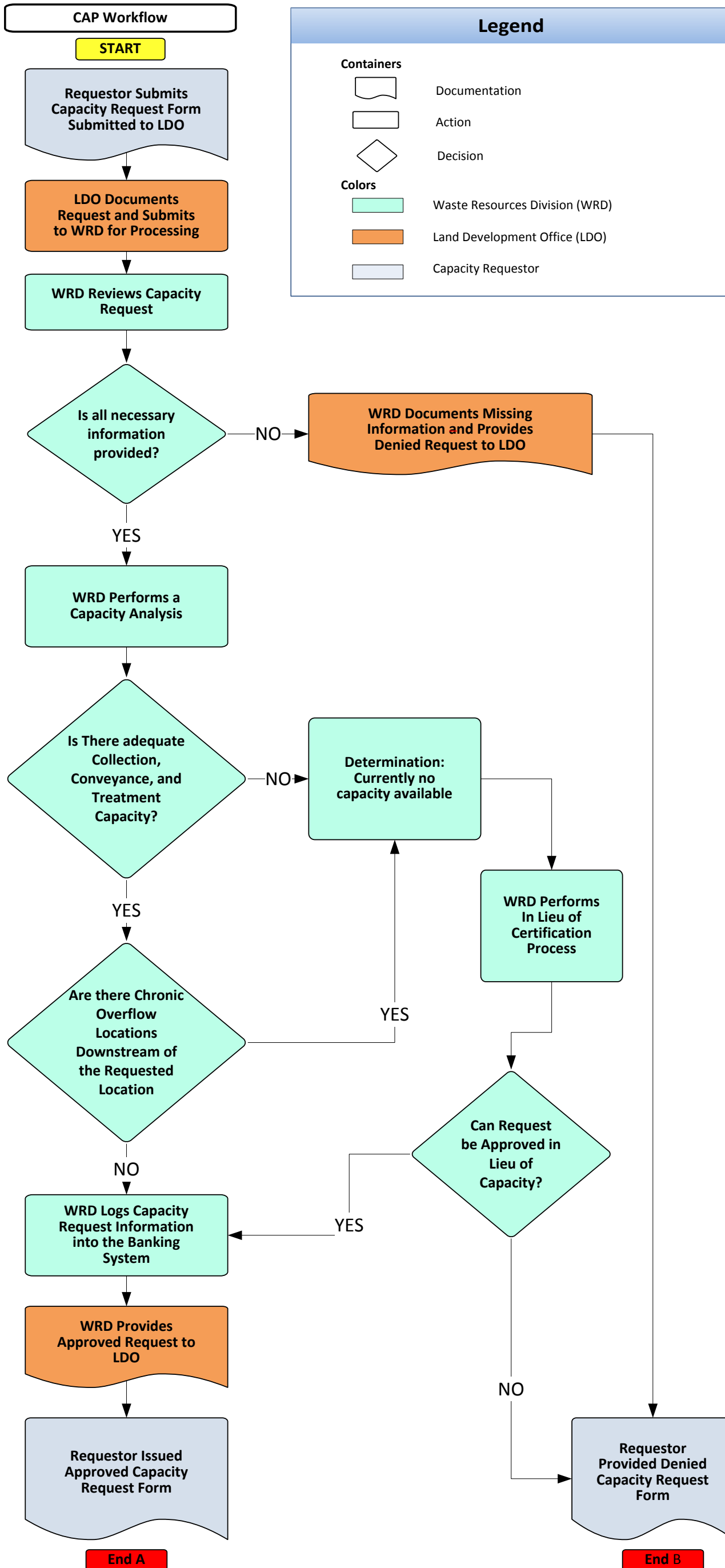
Appendix B
Sewer Basin Map



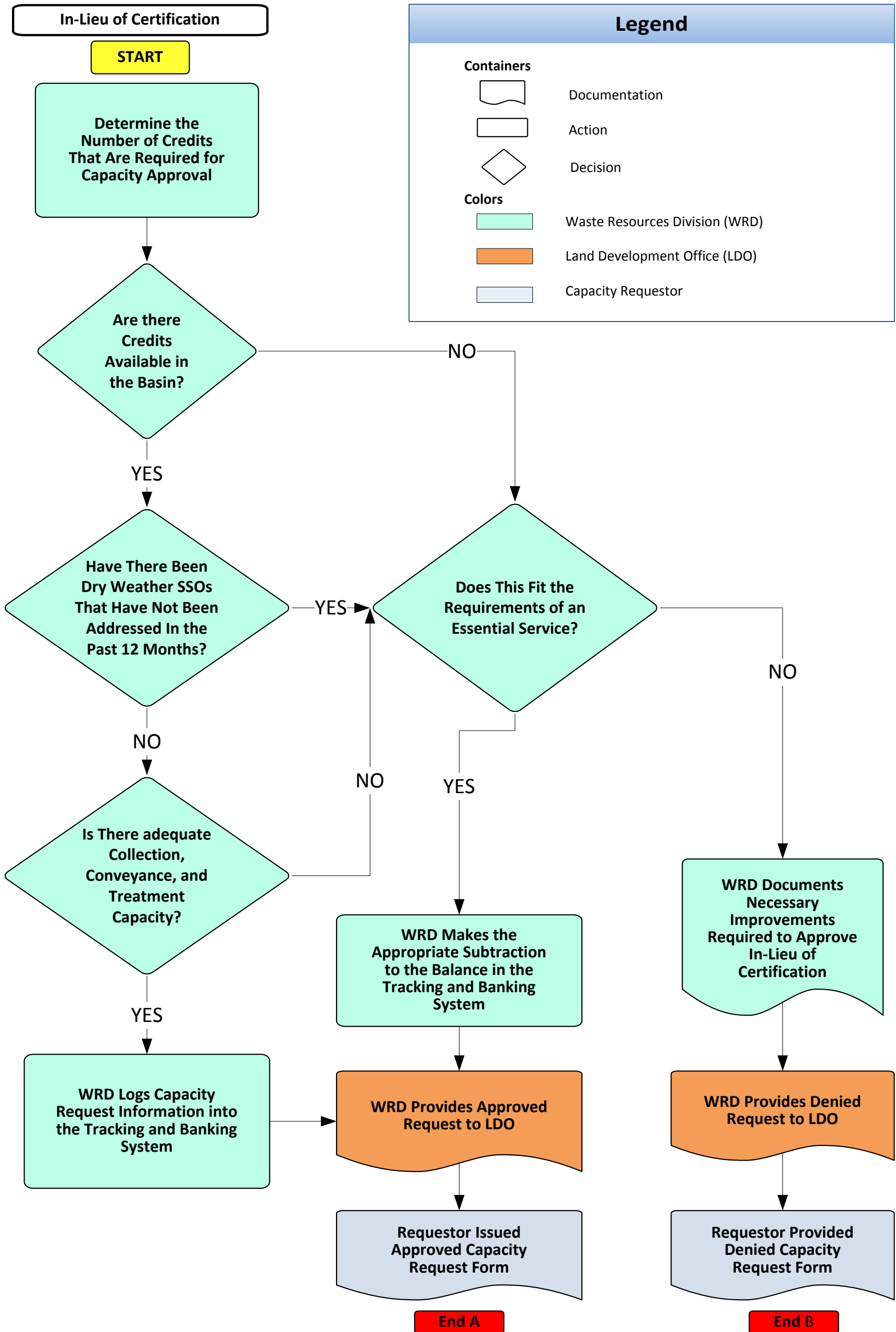
Appendix C

Capacity Certification Process Flowchart

Capacity Certification Process Flowchart



In-Lieu of Certification Process Flowchart



Appendix D
Capacity Certification Request Form



"Ekw\ "qh'Ej cweppqi c."VP "
 "Ncpf 'F gxgrqr o gpv'Qh'leg"
 "Rtcpu'T gxkgy "Ugtxlegu"
 3472'O ctngv'Utggv" ● "Uwkg'3222" ● Ej cweppqi c."VP '59624"
 Rj qpg<*645+865/7: 22*****Hz<*645+865/7: 6: "

Permit No. _____
 Project Name _____
 Tgs wguv'Hgg'&Z IEqppge'kq"/'8322'o loko wo +"&" _____
 Cfo lp0Ej cti g'&" _____
Not Refundable*****VQVCN'HGG'&" _____

SANITARY SEWER CAPACITY CERTIFICATION REQUEST FORM

Please Print Clearly or Type	Contract Value Of Work: \$		Fee Adjustment: \$		Approved by		
	PROPERTY ADDRESS						
	P wo dgt'cpf'Utggv'P co g"		Uwkg'I'Wplk'P wo dgt"		\ kr'Eaqf g"		
	Ucvg'Vcz'O cr'P wo dgt"		Nqv'P wo dgt"		Uwdf'kkk'kq'P co g"		
Qy pgtuj kr "ku<" <input type="checkbox"/> "Rtkcvg"..... <input type="checkbox"/> "Rwdrie" "I qxgtpo gpv+		Name		Mailing Address – Number, Street, City, ST & Zip Code		Telephone Number	
Qy pgt	Hktuv"	Ncuu" .....	.....		.....
	Eqo r cp {" .....		.....		G/o cki'Cf ftguu<"	
Eqp'tcevt	Hktuv"	Ncuu" .....	.....		.....
	Eqo r cp {"		Ucvg'Nle0%*****Eqwv'Nle0%*****Ekw\ 'Dwukp'guu'Nle0%"		Y qtrng'at'Eqo r A' [gu]*****Gzgo r v" <input type="checkbox"/>		
Gpi lpgt	Hktuv"	Ncuu" .....	.....		.....
	Eqo r cp {"		Ucvg'Nle0%*****Eqwv'Nle0%*****Ekw\ 'Dwukp'guu'Nle0%"		G/o cki'Cf ftguu<"		
Crr r'ncpv'I' Ci gpv'	Hktuv"	Ncuu" .....	.....		.....
	Eqo r cp {"qt'Tgr'v'kpuj kr "v'Crr r'f" .....		.....		G/o cki'Cf ftguu<"	
TYPE OF WORK		PROPERTY OCCUPIED/USED AS ZONED		Proposed Starting Date: _____			
<input type="checkbox"/> "P gy 'Eqputve'kq" <input type="checkbox"/> "Cf f'k'kq" <input type="checkbox"/> "Cngtc'v'kq" <input type="checkbox"/> "Tgr'ck'I'Tgr'w'eg"		<input type="checkbox"/> "k'p'w'w'k'p'cn" <input type="checkbox"/> "k'p'f'w'w'k'cn" <input type="checkbox"/> "T'g'k'f'gp'v'cn" <input type="checkbox"/> "Eqo o'gt'ek'cn"		Projected Completion Date: _____ *****Vj ku'r gto k'y kn'gzr k'g'q'p'y ku'f'cyg'k'ic'p" *****Gz'v'p'k'p'ku'p'v't'gs'w'g'ng'f'p'y'k's'k'p'i'y'k'j'k'p" *****S2/f'c'u'q'h'g'to'k'p'v'k'p"			
Rtqxk'g'y'g'h'm'y'k'p'i'k'p'k'q'k'p'q'w'u'wdo'k'w'cn'r'c'nc'i'g<'				SANITARY SEWER CAPACITY REQUESTS ISSUED ARE VALID FOR A PERIOD OF ONE-YEAR FROM THE DATE OF ISSUANCE. IN ADDITION, SPECIAL REGULATIONS APPLY. SEE CITY ORDINANCE 10708.			
<input type="checkbox"/> Rtqr'qu'f'I'ck'f'k'q'y'ec'w'w'k'p'u'k'p'w'f'k'p'i'c'f'g'v'k'k'f'ec'w'w'k'p'k'j'g'v'E'g't'k'k'f'k'g'f'k'c'							
<input type="checkbox"/> k'p'w'f'g'g'w'k'o'c'v'g'f'k'g'cn'l'q'w'h'm'y'u'c'p'f'k'p'w'v'p'g'q'w'u'r'g'cn'l'm'y'u'h'q't'c'm'l'k'f'w'w'k'k'ic'p'f'eqo o'gt'ek'cn'r't'q'l'g'v'u'd							
<input type="checkbox"/> Rtqr'qu'f'w'k'k'f'k'p'k'p'u							
<input type="checkbox"/> I'k'u'o'cr'f'g'r'k'v'k'p'i'c'm'f'eq'p'p'g'v'k'p'u'c'p'f'c'f'l'c'g'p'v'w'k'k'k'g'u'							
<input type="checkbox"/> U'c'p'k'c't'f'U'g'y'g't'U'w'd/d'c'k'p'<							
<input type="checkbox"/> F'g'y'p'ut'g'c'o'r'w'o'r'u'c'v'k'p'w'k'k'c'r'r'k'c'c'd'g'<							
K'eg't'k'k'f'w'p'f'g't'y'g'r'g'p'c'm'q'h'k'x'y'j'c'v'k'j'c'x'g'g'z'c'o'k'p'g'f'c'p'f'c'o'h'o'k'k'c't'y'k'j'j'g'k'p'k'q'to'c'v'k'p'u'd'o'k'w'g'f'c'p'f'd'g'n'g'x'g'y'g'u'd'o'k'w'g'f'k'p'k'q'to'c'v'k'p'k'q'd'g'v'g'c'p'f'c'c'w'w'c'g'f'VJ'G'I'TCP'V'P'I"QH'VJ'K'U'RGTO'K'V'FQGU'P'QV'CHG'EV'CP["TH'J'VU'VI'K'F"R'CT'V'GU'O'CI" "J'CXG'R'W'U'W'CP'V'VQ"FGGF"TG'U'V'T'k'v'k'p'U"EQ'X'G'P'V'U'T'W'P'P'k'P'I"Y'K'J'VJ'G'N'CP'F."QT'Q'VJ'G'T'R'T'K'X'V'G'C'T'T'CP'I'GO'GP'V'U"R'g't'u'q'p'u'r'g't'h'q'to'k'p'i'c'q'p'w'v'k'p'y'q't'n'w'p'f'g't'y'k'u'r'g'to'k'o'w'w'q'd'g't'x'g"V'g'p'p'0'N'c'y'0'w'w'd'0'E'j'c'r'04: ;'C'eu'u'q'h'i'3; 77+'t'q'x'k'f'k'p'i'h'q't'r'g'ec'w'k'p'u'v'q'd'g'c'ng'p'k'p'x'k'k'p'k'f'k'q'h'j'k'j'x'q'nc'i'g'y'k'g'u"							
aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa Rtr'gt'v'Qy'p'gt'q't'I'g'p'cn'Eqp'v'c'v'q'k'p'w'			Uli'pc'w't'g'		F'c'v'		
Eqo r cp'P co g"							

AVAILABLE RESOURCES:

Ekw\ 'qh'Ej cweppqi c'U'c'p'k'c't'f'U'g'y'g't'U'w'd/d'c'k'p'k'p'c'r"

Ekw\ 'qh'Ej cweppqi c'U'c'p'k'c't'f'U'g'y'g't'
 U'f'ug'o'R'w'o'r'U'c'v'k'p'k'p'c'r"

Ekw\ 'qh'Ej cweppqi c'U'c'p'k'c't'f'U'g'y'g't'F'g'k'p'v'Eq'p'w'v'k'p'k'p'c'p'w'c'n"



City of Chattanooga, TN
Land Development Office
 Plans Review Services

1250 Market Street ● Suite 1000 ● Chattanooga, TN 37402
 Phone: (423) 643-5800 Fax: (423) 643-5848

Capacity Certification Analysis Recommendations

- There is adequate capacity to accommodate the projected flows
- There is not adequate capacity to accommodate the projected flows. There are however projects under way to improve capacity and accommodate the projected flows. The following projects must be completed prior to introducing flow into the system:

Project:	Estimated Completion Date:
Project:	Estimated Completion Date:
Project:	Estimated Completion Date:

- There is not adequate capacity to accommodate the projected flows. The following upgrades are required:

- There was insufficient information submitted. Please submit the following information:

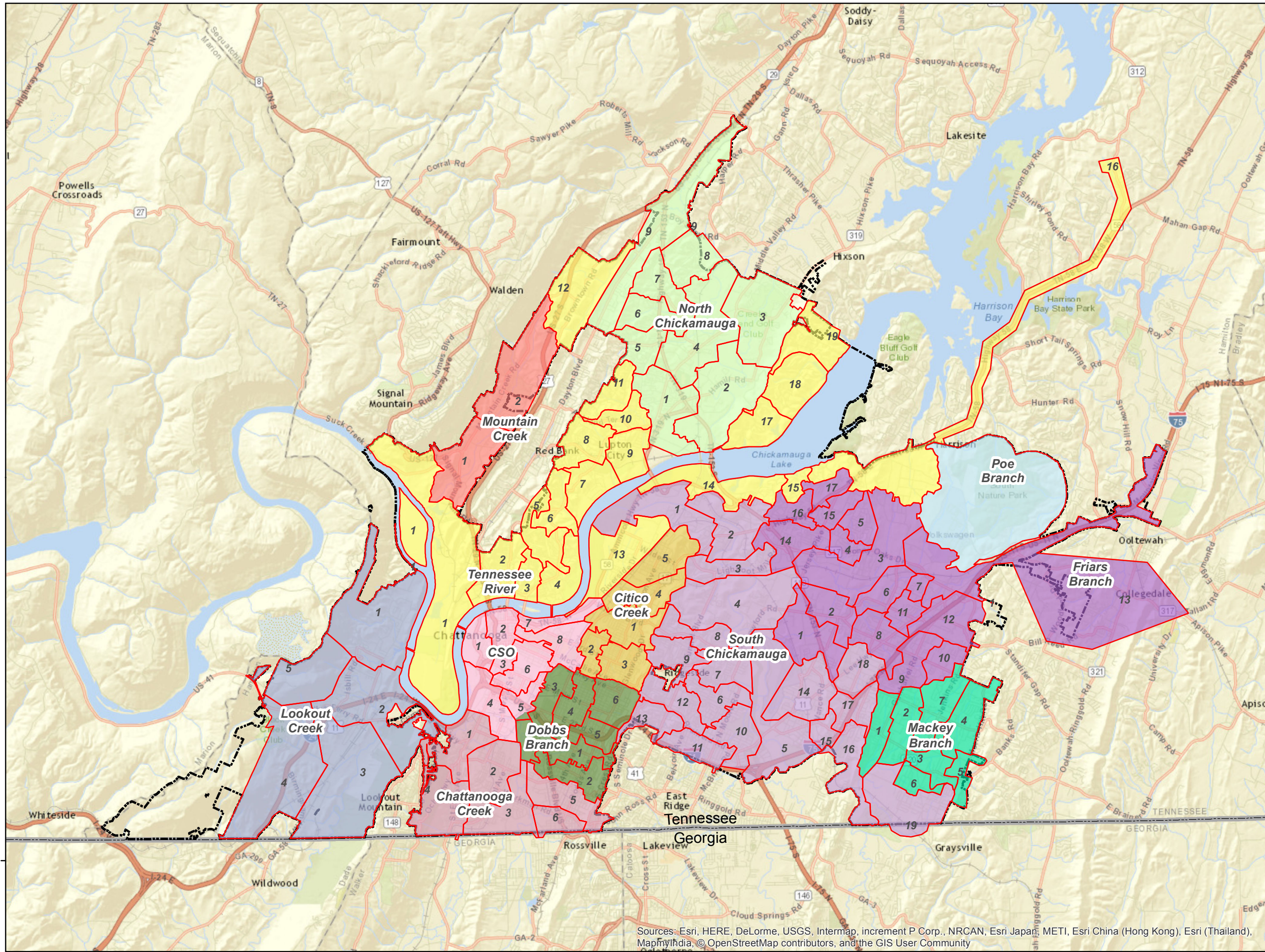
This document becomes the SANITARY SEWER CAPACITY CERTIFICATION when signed for or by the Waste Resources Department Official and purchase receipt is attached.

 By _____ Date _____

 Waste Resources Department Official

Appendix E

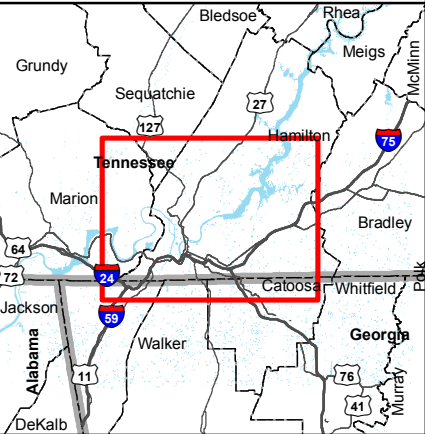
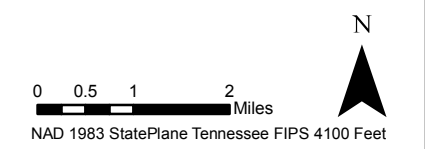
Sewer Sub-basin Map



Sewer Basins and Sub-basins

Legend

- Sewer Sub-basins
- CSO
- Chattanooga Creek
- Citico Creek
- Dobbs Branch
- Friars Branch
- Lookout Creek
- Mackey Branch
- Mountain Creek
- North Chickamauga
- Poe Branch
- South Chickamauga
- Tennessee River
- Chattanooga City Limits
- US State Boundaries



Map Created: 2/19/2016 9:43:20 AM
 Project #: C6A02300
 Author: Rogers, Jonathan



JACOBS

Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), MapmyIndia, © OpenStreetMap contributors, and the GIS User Community



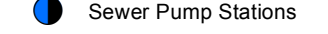


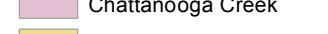
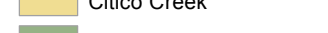
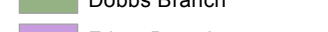
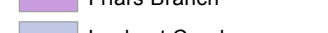
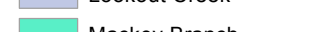
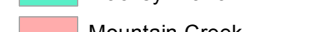


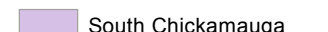

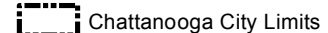
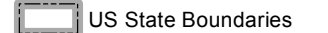

Appendix F

Sewer Pump Station and Interceptor Map

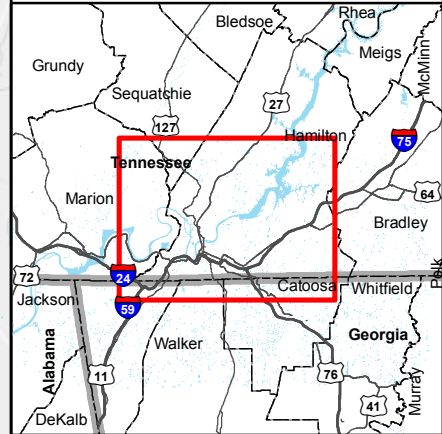
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Chattanooga Sewer Pump Stations

Legend

-  Sewer Pressurized Mains
-  Highways and Interstates
-  Sewer Pump Stations
-  Sewer Sub-basins
-  CSO
-  Chattanooga Creek
-  Citico Creek
-  Dobbs Branch
-  Friars Branch
-  Lookout Creek
-  Mackey Branch
-  Mountain Creek
-  North Chickamauga
-  Poe Branch
-  South Chickamauga
-  Tennessee River
-  Chattanooga City Limits
-  US State Boundaries

0 0.5 1 2 Miles
NAD 1983 StatePlane Tennessee FIPS 4100 Feet



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Appendix G
Capacity Assurance Program Compliance
Checklist

Item #	Capacity Assurance Program Compliance Checklist	Location
	At a minimum, the CAP shall contain all of the following components:	
1	(A) The technical information, methodology, and analytical techniques, including the model or software, to be used by Chattanooga to calculate collection, transmission, and treatment capacity;	4.0
2	(B) The means by which Chattanooga will integrate its certification of Adequate Treatment Capacity, Adequate Transmission Capacity, and Adequate Collection Capacity with the issuance of building permits, and Chattanooga's acquisition of new or existing sewers from other owners;	3.0, 3.8
3	(C) A method for information management capable of tracking the chronic overflow locations;	5.0
4	(D) The technical information, methodology, and analytical techniques, including the model or software, to be used by Chattanooga to calculate the net (cumulative) increase or decrease in volume of wastewater introduced to the SSS as a result of Chattanooga's authorization of new sewer service connections and increases in flow from existing connections and the completion of: (a) specific projects that add or restore capacity to the SSS or the WWTP ("Capacity Enhancing Projects"), (b) specific projects that reduce peak flow through removal of I/I ("I/I Projects"), and (c) permanent removal of sewer connections ("Removal of Connections");	4.0, 6.0
5	(E) A method for information management capable of tracking the accumulation of banked credits, earned pursuant to Paragraph 20.(h).iv. below, from completion of Capacity Enhancing Projects, I/I Projects, and Removal of Connections; the capacity-limited portion of the sewershed in which those credits were earned; and the expenditure of such credits on future increases in flow from new and existing sewer service connections in that capacity limited portion of the sewershed; and	6.0
6	(F) All evaluation protocols to be used to calculate collection, transmission, and treatment capacity including, but not limited to, standard design flow rate rules of thumb regarding pipe roughness, manhole head losses, as-built drawing accuracy (distance and slope), and water use (gallons per capita per day); projected flow impact calculation techniques; and metering of related existing one (1) hour peak flows (flows metered in support of analysis and/or manual observation of existing one (1) hour peak flows). Chattanooga may identify sewer line segments which have been specifically designed and constructed to operate under surcharge conditions (e.g., segments with welded or bolted joints) and identify the level of surcharge for those segments.	4.0
7	ii. Capacity Certifications. Except as provided in Paragraph 20.(h).iii. through vi. below, after twenty-five (25) Months of EPA's approval of the CAP, Chattanooga shall authorize a new sewer service connection in the SSS, or additional flow from an existing sewer service connection in the SSS, only after it certifies that the analysis procedures contained in the approved CAP have been used and that Chattanooga has determined, based on those procedures, that there is Adequate Treatment Capacity, Adequate Transmission Capacity, and Adequate Collection Capacity as set forth in Paragraph 20.(h).ii.(A) through (E) below.	3.0

8	<p>(A) Treatment Capacity Certifications. Chattanooga’s certification of “Adequate Treatment Capacity” shall confirm that, at the time the WWTP receives the flow from a proposed sewer service connection(s) or increased flow from an existing sewer service connection(s), when combined with the flow predicted to occur from all other authorized sewer service connections (including those which have not begun to discharge into the WCTS), the WWTP will not be in “non-compliance” for quarterly reporting as defined in 40 C.F.R. Part 123.45, Appendix A. In addition, upon EPA’s approval of the Process Controls Program (see Paragraph 25 below), Chattanooga’s certification of “Adequate Treatment Capacity” shall confirm that the new or increased flow to the WWTP will not result in Prohibited Bypasses.</p>	4.4.2
9	<p>(B) Transmission Capacity Certifications. Chattanooga’s certification of “Adequate Transmission Capacity” shall confirm that each PS, through which the proposed additional flow from new or existing sewer service connections would pass to the WWTP, has the capacity to transmit, with its largest pump out of service (except for those PSs with only one pump as of the Effective Date of the CD, the existing one (1) hour peak flow passing through the PS, plus the addition to the existing one (1) hour peak flow predicted to occur from the proposed connection, plus the addition to the existing one (1) hour peak flow predicted to occur from all other authorized sewer service connections which have not begun to discharge into the SSS.</p>	4.3.2
10	<p>(C) Collection Capacity Certifications. Chattanooga’s certification of “Adequate Collection Capacity” shall confirm that each Gravity Sewer Line in the SSS, through which the proposed additional flow from new or existing connections would pass, has the capacity to carry the existing one (1) hour peak flow passing through the Gravity Sewer Line, plus the addition to the existing one (1) hour peak flow from the proposed connection, plus the addition to the existing one (1) hour peak flow predicted to occur from all other authorized sewer service connections which have not begun to discharge into the SSS without causing a Surge Condition.</p>	4.5.2
11	<p>(D) Definition of “One (1) Hour Peak Flow” and “Surge Condition”. For purposes of this Paragraph 20.(h). only, the term “one (1) hour peak flow” shall mean the greatest flow in a sewer averaged over a sixty (60) minute period at a specific location expected to occur as a result of a representative 2 year-24 hour storm event. For purposes of this Paragraph 20.(h). only, the term “Surge Condition” shall mean the condition that exists when the supply of wastewater resulting from the one (1) hour peak flow is greater than the capacity of the pipes to carry it and the surface of the wastewater in manholes rises to an elevation greater than twenty-four (24) inches above the top of the pipe or within thirty-six (36) inches of the rim of the manhole, and the sewer is under pressure or head, rather than at atmospheric pressure, unless Chattanooga has, pursuant to Paragraph 20.(h).i.(F), above, identified that pipe segment and manhole as designed to operate in that condition, in which case the identified level of surge will be used. Notwithstanding the foregoing, no criteria contained in the CAP shall be construed as setting standards for the ultimate design or rehabilitation of Chattanooga’s SSS.</p>	4.2.2

12	<p>(E) Minor Sewer Connections. For minor sewer service connections, Chattanooga may elect to perform a Quarterly capacity analysis for each sewershed or part of a sewershed by certifying that the sewershed has adequate capacity, as defined in Paragraph 20.(h).ii.(A) through (C) above, to carry the existing one (1) hour peak flows and the additional flows generated by all such minor sewer service connections projected to be approved in the subsequent Quarter. For any sewershed or part of a sewershed which can be so certified, Chattanooga may approve these projected minor sewer service connections without performing individual certifications for each connection. For the purposes of this subparagraph, a “minor sewer service connection” is a connection with an average flow not to exceed 2,500 gallons per day.</p>	3.4.1, 6.2.1
13	<p>iii. Chronic Overflow Locations. Notwithstanding the provisions of Paragraph 20.(h).ii., Chattanooga shall not authorize a new sewer service connection or an increase in flow from an existing connection in any part of a sewershed up sewer from a chronic overflow location unless Chattanooga certifies that the cause(s) of the chronic overflow location has been or will be eliminated, or Chattanooga satisfies the requirements of Paragraph 20.(h).iv., v. or vi. below. Any new sewer service connection or increase in flow from an existing connection authorized prior to the elimination of such cause(s) of the chronic overflow location shall be conditioned upon the completion of any project eliminating such cause(s) prior to the time that the new sewer service connection or flow increase is introduced into the SSS. For purposes of this subparagraph, “chronic overflow location” shall mean those locations within 500 yards of each other that have experienced collectively, within the twelve (12) Months prior to the date of certification, more than five (5) SSOs; provided, however, for purposes of this definition only, SSOs occurring within 500 yards of each other that are caused by a Single Rainfall Event shall be counted as one (1) SSO at the location of the largest SSO. For purposes of this Section, "Single Rainfall Event" shall have the meaning as defined in Part 4 of Chattanooga’s NPDES Permit, which provides: “A ‘rainfall event’ is defined as any occurrence of rain, preceded by ten (10) hours without precipitation, that results in an accumulation of 0.01 inches or more. Instances of rainfall occurring within ten (10) hours of each other will be considered a single rainfall event.”</p>	5.0
14	<p>iv. Capacity for Treatment, Transmission and Collection in Lieu of Certification. Chattanooga may authorize a new sewer service connection, or additional flow from an existing sewer service connection, even if it cannot satisfy the requirements of Paragraph 20.(h).ii. and/or iii. above, provided Chattanooga certifies that all of the following provisions, where applicable, are satisfied:</p>	3.5
15	<p>(A) Chattanooga is in substantial compliance with this CD;</p>	3.5
16	<p>(B) The sewer lines which will convey the proposed additional flow from new or existing sewer service connections have not experienced dry weather SSOs due to inadequate capacity within the previous twelve (12) Months; or, in the alternative, the causes of any dry weather SSOs due to inadequate capacity have been eliminated;</p>	3.5

17	(C) Chattanooga has identified the sewer line segment(s), PS(s) and/or wastewater treatment systems that do not meet the conditions for certification of Adequate Treatment Capacity, Adequate Collection Capacity, and/or Adequate Transmission Capacity;	3.5
18	(D) Chattanooga has identified the sewer line segment(s) that constitute a chronic overflow location(s);	3.5
19	(E) Chattanooga shall complete, prior to the time the proposed additional flow from new or existing sewer service connections is introduced into the SSS, specific Capacity Enhancing Projects, I/I Projects, and/or Removal of Connections which will add sewer capacity or reduce peak flows to the identified sewer line segment(s), PS(s), wastewater treatment system(s), and/or chronic overflow location(s) in accordance with the factors set forth in subparagraphs (F) and (G) below;	3.5
20	(F) Where Chattanooga has undertaken specific Capacity Enhancing Projects that provide for additional off-line storage and/or specific Removal of Connections to satisfy the requirements of subparagraph (E) above, the estimated added capacity resulting from such projects must be equal to or greater than the estimated amount of any proposed additional flow;	3.5
21	(G) Where Chattanooga has undertaken specific I/I Projects or Capacity Enhancing Projects, other than those that provide for additional off-line storage, to satisfy the requirements of subparagraph (E) above, the estimated reduction in peak flows or added capacity resulting from such projects must exceed the estimated amount of any proposed additional flow by the following factors: (a) a factor of 4:1 for I/I Projects and such other Capacity Enhancing Projects related to a chronic overflow location; and (b) a factor of 2:1 for I/I Projects and such other Capacity Enhancing Projects not related to a chronic overflow location;	6.1
22	(H) Commencing twelve (12) Months after EPA approves the CAP and annually thereafter, Chattanooga has performed a review of specific Capacity Enhancing Projects and I/I Projects undertaken to determine if actual added capacity and one (1) hour peak flow reductions are in line with what Chattanooga originally estimated for such projects; and Chattanooga has used the results of this review to adjust future estimates as necessary;	6.1
23	(I) Any new sewer service connection or increase in flow to an existing connection authorized prior to the completion of a necessary added capacity or one (1) hour peak flow reduction project as set forth above shall be conditioned upon completion of such project prior to the time that the new sewer service connection or flow increase is introduced into the SSS;	3.5
24	(J) In implementing the provisions of this Paragraph 20.(h).iv., Chattanooga may use a "banking credit system" for the sewer line segment(s), PS(s), wastewater treatment systems, and/or chronic overflow locations for which Chattanooga is not able to satisfy the conditions set forth in Paragraph 20(h).ii. and iii. above. The addition of sewer capacity and/or reduction in one (1) hour peak flows from Capacity Enhancement Projects, I/I Projects, and Removal of Connections, completed after the Effective Date of this CD, to the affected sewer line segment, PS, wastewater treatment system, or chronic overflow location may be accumulated in the form of credits in the banking	6.0

	credit system in accordance with the factors set forth in subparagraphs (H) and (I) above, which may then be used for authorization of future sewer service connections or increases in flow from existing connections to the affected sewer line segment, PS, wastewater treatment system, or chronic overflow location in the capacity-limited portion of the Sewershed; and	
25	(K) Following EPA's approval of the CAP, Chattanooga shall also establish a list of all authorized new sewer service connections or increases in flow from existing connections which flows have not yet been introduced into the SSS. The following information shall be recorded for each authorized connection: street address, estimated average daily flow, estimated peak flow, Sewershed, WWTP, date authorized, and estimated Calendar Quarter when the additional flow from the connection will begin. Chattanooga shall update and maintain this list until full implementation of the CAP, as approved by EPA, and, upon introduction into the SSS, any such new sewer service connections or increases in flow from existing connections shall be accumulated in the form of debits in the banking credit system. v. Essential Services. Notwithstanding the provisions of Paragraph 20.(h).ii. and iii. above, Chattanooga may authorize a new sewer service connection, or additional flow from an existing sewer service connection, even if it cannot certify that it has Adequate Transmission Capacity, Adequate Collection Capacity, and/or Adequate Treatment Capacity as set forth in Paragraph 20.(h).ii.(A), (B) and (C) above for health care facilities, public safety facilities, public schools, government facilities, and other facilities as agreed upon in writing by EPA; and in those cases where a pollution or sanitary nuisance condition exists, as determined by Chattanooga-Hamilton County Health Department or its regulatory successor, as the result of a discharge of untreated wastewater from an on-site septic tank. For all such new service connections, or additions to flow from an existing connection, Chattanooga shall make the appropriate subtraction to the balance in the credit bank described in Paragraph 20.(h).iv. above.	3.6
26	vi. Existing Illicit Connections. Notwithstanding the provisions of Paragraph 20.(h).ii. and iii. above, Chattanooga may authorize a new sewer service connection, or additional flow from an existing sewer service connection, even if it cannot certify that it has Adequate Transmission Capacity, Adequate Collection Capacity, and/or Adequate Treatment Capacity as set forth in Paragraph 20.(h).ii.(A), (B) and (C) above for any illicit connections or discharge of wastewater to the stormwater system or to waters of the State. For all such new service connections or additions to flow from an existing connection, created before the Effective Date of the CD that result from the elimination of illicit connections or discharges, Chattanooga shall not be required to make a subtraction from the balance in the credit bank described in Paragraph 20.(h).iv. above. For all such new service connections or additions to flow from an existing connection created after the Effective Date of the CD that result from the elimination of illicit connections or discharges, Chattanooga shall make a subtraction from the balance in the credit bank described in Paragraph 20.(h).iv. above.	3.7
27	vii. Reconnections following Termination as a Result of Chattanooga's Private Lateral Program. Notwithstanding the provision of Paragraph 20(h)(ii)-(iv) above, in the event of a temporary suspension or interruption of a customer's service as a result of Chattanooga's Private Lateral program, any service that is resumed from a newly replaced or repaired Private Lateral shall not be deemed to be a new service connection or an addition to flow from an existing connection.	6.2.3

28	viii. Certifications. All certifications pursuant to this Paragraph 20.(h). shall be made by a professional engineer registered in the State of Tennessee and shall be approved by a responsible party of Chattanooga as defined by 40 C.F.R. § 122.22(b). Chattanooga shall maintain all such certifications, and all data on which the certifications are based, in its offices for inspection by EPA and TDEC. EPA, TDEC, and TCWN may request, and Chattanooga shall provide, any and all documentation necessary to support any certification made by Chattanooga pursuant to this Paragraph 20.(h)., and make available, to the extent possible, individuals providing such certifications to meet with EPA and TDEC.	3.0
29	ix. Upon its execution of this CD and until EPA approves the CAP as required by this Paragraph 20.(h), Chattanooga agrees to continue to implement its current capacity program, to ensure that new sewer service connections, or increases in flow from existing sewer service connections, are authorized only if there will be adequate treatment, transmission, and collection capacity prior to the time such proposed additional flow is introduced into the WCTS.	3.0

Appendix H

Reference Standards

Reference Standards

American Petroleum Institute (API) Standard 570, *Piping Inspection Code: In-service Inspection, Rating, Repair, and Alteration of Piping Systems* (2009)

American Society of Civil Engineers, *Manhole Inspection and Rehabilitation* (2009)

National Association of Corrosion Engineers (NACE) ANSI/NACE SP0502, *Pipeline External Corrosion Direct Assessment Methodology* (2010)

National Association of Sewer Service Companies (NASSCo) *Pipeline Assessment & Certification Program (PACP) v6.0.1* (2010)

Wastewater Committee of the Great Lakes--Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers (Ten States Standards) *Recommended Standards for Wastewater Facilities* (2004)

Tennessee Department of Environment & Conservation (TDEC), Division of Water Resources, *Design Criteria for Sewage Works*

Water Environment Federation (WEF) Manual of Practice FD-4 *Design of Wastewater and Stormwater Pumping Stations* (1993)

Water Environment Research Foundation (WERF) *Inspection Guidelines for Wastewater Force Mains 04-CTS-6URa* (2010)