City of Chattanooga
Mayor Andy Berke

November 18, 2014

VIA CERTIFIED MAIL

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

Subject: ***United States of America et. al. v. City of Chattanooga, No. 1:12-cv-00245***
Process Controls Program

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 submitting to both the Environmental Protection Agency ("EPA") and the Tennessee Department of Environment and Conservation ("TDEC") the Process Controls Program.

As set forth in Section VI of the Consent Decree ("CD"), Chattanooga is to provide copies of the Process Controls Program within nineteen (19) months after the effective date of the CD to EPA and TDEC for review, comment, and approval. The purpose of the Process Controls Program is to establish a program designed to minimize the frequency, duration, and volume of wet-weather discharges; the frequency, duration and volume of overflows and bypasses; and comply with an applicable National Pollutant Discharge Elimination System ("NPDES") permit condition for the Moccassin Bend Wastewater Treatment Plant ("MBWWTP"). The goals of this Process Controls Program are to achieve consistency in wet-weather plant operations and related decision-making using appropriate data and recordkeeping, maximize flow through the plan to minimize the frequency and volume of overflows upstream from the plant, including other outfalls covered by the NPDES permit, and other system overflows, maximize the amount of flow that receives full secondary treatment and disinfection prior to discharge through Outfall 001, meet NPDES permit conditions for plant operations and for all flows discharged through Outfall 001, and provide sufficient staffing during wet-weather conditions to consistently implement the Process Controls Program and to meet the plant performance goals.

The City provided a copy of the Process Controls Program to the Public Document Repository ("PDR") for a period of thirty (30) days starting on October 17, 2014 and ending November 17, 2014. For your reference, the PDR document can be found using the following link:

http://www.chattanooga.gov/public-works/waste-resources/consent-decree/44-public-works/1050-consent-decree-document-repository

> *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 Process Controls Program. In the meantime, please let me know if you have any questions regarding our submittal.

Sincerely,

Alice L. Cannella, P.E.
Director, Waste Resources Division

Enclosure

cc: Karl Fingerhood, Esq., US DOJ
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Process Controls Program

Prepared for

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

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

Prepared by

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Submitted by

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Consent Decree Program Manager

Chattanooga, Tennessee

November 18, 2014

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Acronyms and Abbreviations

$CBOD_5$	5-Day Carbonaceous Biological Oxygen Demand
City	City of Chattanooga
CSOTF	Combined Sewer Overflow Treatment Facility
EPA	U.S. Environmental Protection Agency (Region 4)
EQ	Equalization
ft	Feet
hr	Hour
in	Inches
MBWWTP	Moccasin Bend Wastewater Treatment Plant
mg/L	Milligrams Per Liter
mgd	Million Gallons Per Day
MLSS	Mixed Liquor Suspended Solids
N/A	Not Applicable
NH_3-N	Ammonia Nitrogen
NPDES	National Pollutant Discharge Elimination System
PCP	Process Controls Program
PS	Pump Station
RAS	Return Activated Sludge
SCADA	Supervisory Control and Data Acquisition System
SSO	Sanitary Sewer Overflow
TDEC	Tennessee Department of Environment and Conservation
TSS	Total Suspended Solids
UNOX	Oxygen Activated Sludge Process
WAS	Waste Activated Sludge
WCTS	Wastewater Collection and Transmission System
WRD	Waste Resources Division

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, 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 Process Controls Program (PCP) for the Moccasin Bend Wastewater Treatment Plant (MBWWTP) for review and approval by the United States Environmental Protection Agency (EPA) and the Tennessee Department of Environment and Conservation (TDEC), as a condition (paragraph 25) of the CD.

The purpose of this PCP is to establish a program designed to minimize the frequency, duration, and volume of wet-weather discharges; the frequency, duration, and volume of overflows and bypasses; and comply with an applicable National Pollutant Discharge Elimination System (NPDES) permit condition for the MBWWTP. This document presents the developed PCP and the associated management, operation, and maintenance controls established as part of the PCP.

1.2 MBWWTP Overview

The MBWWTP treats wastewater generated in the Chattanooga metropolitan area that includes both separate sanitary sewer service areas and combined sewer service areas. The plant provides full secondary treatment and disinfection for dry-weather and a portion of wet-weather flows, and it provides the equivalent of primary treatment and disinfection of excess wet-weather flows. Treated flows are discharged through Outfall 001 which, along with other offsite outfalls, are covered by NPDES Permit No. TN0024210 (effective from December 1, 2013 to December 31, 2014).

A simplified schematic of the liquids treatment train is provided in **Figure 1-1** along with maximum sustained operational capacities. Hydraulic and operational capacities are discussed further in Section 2. Figure 1-1 also shows flow measurement and on-line monitoring locations, as well as sidestreams.

Planned upgrades that will enhance process train capacity and treatment performance include:

- A plant headworks upgrade,
- The addition of two secondary clarifiers, and
- An additional chlorine contact basin.

These upgrades may impact plant operations during construction, and the PCP standard operating procedures will need to be revised to address the operation of these facilities once they are complete.

1.3 Description of the 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, force mains, CSOTFs, and associated appurtenances that transport wastewater from homes, businesses, and industries to the MBWWTP. All of this infrastructure is part of the Wastewater Collection and Transmission System (WCTS), as defined in the CD and herein, and managed by the WRD. The City has historically classified the WRD, MPWWTP and the WCTS as part of the Interceptor Sewer System (ISS). With the advent of the CD and recent reorganizations within the City, the term ISS is not recognized by all stakeholders and therefore the City will refer to WCTS and MBWWTP as the infrastructure and WRD as the organization to manage this infrastructure going forward. 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 pump stations;
- 53 miles of force main;
- Eight (8) CSOTFs;
- One (1) Combined Sewer Storage Facility;
- 192 (approximate) residential/grinder pumps; and
- One (1) Moccasin Bend WWTP

An organizational chart for the WRD is provided in Appendix B.

1.4 PCP Goals

The goals of the PCP for the MBWWTP are to:

1. Achieve consistency in wet-weather plant operations and related decision-making using appropriate data and recordkeeping.
2. Maximize flow through the plant to minimize the frequency and volume of overflows upstream from the plant, including other outfalls covered by the NPDES permit, and other system overflows.
3. Maximize the amount of flow that receives full secondary treatment and disinfection prior to discharge through Outfall 001.

4. Meet NPDES permit conditions for plant operations and for all flows discharged through Outfall 001.
5. Provide sufficient staffing during wet-weather conditions to consistently implement the PCP and to meet the plant performance goals.

1.5 NPDES Permit Overview

1.5.1 General

The current NPDES permit provides seasonal limits for conventional pollutants (carbonaceous oxygen demand, total suspended solids, and ammonia-nitrogen) for Outfall 001. Average daily flows applicable to this outfall have been established for the purpose of establishing loadings, as indicated in **Table 1-1**. These flows, along with the monthly concentration limits, are used to establish maximum monthly mass loading limits and residual chlorine concentration limits. These maximum daily average flows include base dry-weather flows and a significant wet-weather flow component (average dry-weather flows are currently less than 70 million gallons per day [mgd]).

Table 1-1
Summary of NPDES Permit Maximum Seasonal Average Daily Flows

Period	Maximum Average Daily Flows (mgd)
November 1 through April 30	140
May 1-31 and September 1-30	130
June 1 through August 31	100
October 1-31	114

1.5.2 Effluent Limits

Effluent concentration limits for critical parameters, along with minimum percent removal requirements, are the same for all seasonal periods. These requirements are summarized in **Table 1-2**.

Table 1-2
Summary of NPDES Permit Effluent Limits

Limit Category	Pollutant Limit		
	$CBOD_5$	NH_3-N	TSS
Monthly Average Concentration (mg/L)	25	15	30
Weekly Average Concentration (mg/L)	35	20	40
Daily Maximum Concentration (mg/L)	40*	30*	45*
Daily Minimum Percent Removal (%)	40*	--	40*
Minimum Monthly Average Removal (%)	79	--	80

* These limits do not apply for flows above the maximum seasonal average daily flow (Table 1-1).

1.5.3 Overflow and Bypass

Other relevant portions of the NPDES permit that impact the PCP address Overflow and Bypass conditions. Excerpts from the permit are provided below:

2.3.3 Overflow

a. "**Overflow**" means any release of sewage from any portion of the collection, transmission, or treatment system other than through permitted outfalls. The West Bank CS Outfall is an overflow from the designed hydraulic relief point in the combined sewer system.

b. Overflows are prohibited.

c. The permittee shall operate the collection system so as to avoid overflows. No new or additional flows shall be added upstream of any point in the collection system, which experiences chronic overflows (greater than 5 events per year) or would otherwise overload any portion of the system.

d. Unless there is specific enforcement action to the contrary, the permittee is relieved of this requirement after: 1) an authorized representative of the Commissioner of the Department of Environment and Conservation has approved an engineering report and construction plans and specifications prepared in accordance with accepted engineering practices for correction of the problem; 2) the correction work is underway; and 3) the cumulative, peak-design, flows potentially added from new connections and line extensions upstream of any chronic overflow point are less than or proportional to the amount of inflow and infiltration removal documented upstream of that point. The inflow and infiltration reduction must be measured by the permittee using practices that are customary in the environmental engineering field and reported in an attachment to a Monthly Operating Report submitted to the local TDEC Environmental Field Office. The data measurement period shall be sufficient to account for seasonal rainfall patterns and seasonal groundwater table elevations.

e. In the event that more than 5 overflows have occurred from a single point in the collection system for reasons that may not warrant the self-imposed moratorium or completion of the actions identified in this paragraph, the permittee may request a meeting with the Division of Water Resources EFO staff to petition for a waiver based on mitigating evidence.

2.3.6 Bypass

a. "***Bypass***" is the intentional diversion of wastewater away from any portion of a treatment facility other than through peak excess flow treatment facilities or permitted outfalls in accordance with both the long-term control plan and the nine minimum technology-based effluent controls for combined sewer systems. "Severe property damage" means substantial physical damage to property, damage to the treatment facilities that would cause them to become inoperable or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

b. Bypasses are prohibited unless all of the following three conditions are met:

   i. The bypass is unavoidable to prevent loss of life, personal injury, or severe property damage;

   ii. There are no feasible alternatives to bypass, such as the construction and use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass, which occurred during normal periods of equipment downtime or preventative maintenance;

   iii. The permittee submits notice of an unanticipated bypass to the Division of Water Resources in the appropriate Environmental Field Office within 24 hours of becoming aware of the bypass (if this information is provided orally, a written submission must be provided within five days). When the need for the bypass is foreseeable, prior notification shall be submitted to the director, if possible, at least 10 days before the date of the bypass.

c. Bypasses not exceeding permit limitations are allowed only if the bypass is necessary for essential maintenance to assure efficient operation. All other bypasses are prohibited. Allowable bypasses not exceeding limitations are not subject to the reporting requirements of 2.3.6.b.iii, above.

Per the permit definition, the outfalls at East Bank and West Bank are considered overflows. Bypasses are rare and limited to intentional diversions not through a peak excess flow treatment facility or permitted outfall. When wet-weather events result in large increases in incoming flow to the MBWWTP, a portion of total incoming plant flow will occasionally be routed through a peak excess flow treatment facility (referred to as the wet-weather treatment system) and diverted away from equalization. Under these conditions, the diverted flow does not receive secondary treatment through the oxygen activated sludge process (referred to as a UNOX system in this document) and the secondary clarifiers. This flow is disinfected, combined with disinfected secondary treatment effluent prior to discharge, and is subject to NPDES permit effluent limits. Diverting flow away from equalization and secondary treatment is not a bypass per the NPDES permit definition and is referred to as a wet-weather discharge in the remainder of this document.

1.6 Wet-Weather Operational Issues

Under normal dry-weather conditions, flows are typically less than 75 mgd, the MBWWTP has more than adequate capacity to meet NPDES permit conditions. Under these conditions, and particularly during the dry season (e.g., summer), some UNOX basins are removed from service to reduce nitrite production and associated chlorine use for disinfection.

Prior to and during wet-weather conditions, when plant influent flows can rise rapidly, the following strategies currently used to accommodate the high flows include:

Initial Preparation

1. Wet-weather clarifiers are emptied.
2. Equalization basins are partially emptied.
3. All process units are confirmed available for service.

Headworks Adjustments

1. As flow rises above 80 mgd, hydraulic controls are adjusted to provide sufficient influent pumping, screening, and grit removal capacity for flows up to 205 mgd (does not include sidestreams). This total flow is based on the sustained operational capacity, which is discussed further in Section 2.

UNOX Basins

1. Additional UNOX basins are brought on line to achieve capacity of up to 135 mgd (sustained operational capacity).

Wet-Weather Treatment

1. Wet-weather treatment is brought on line when the relief pump station wet well reaches 6.2 feet (influent flow of approximately 120 mgd, which is the sustained operational capacity of the preliminary treatment system).

Wet-Weather Discharge Initiation

1. Wet-weather discharge and chlorine feed to wet-weather discharge flow are initiated once wet-weather clarifiers and equalization basins are nearly full.

Wet-Weather Discharge Closure and Return to Normal Operations

1. Wet-weather discharge and chlorine feed are stopped once flow drops below UNOX capacity.
2. As flows continue to drop, wet-weather treatment is taken out of service and headworks operation is returned to normal.

The PCP checklist introduced in Section 3 formalizes and enhances these activities to achieve the goals of the PCP. Wet-weather operational issues that have been reported and/or observed are summarized below.

1. The hydraulic capacity of the screening and grit removal facilities is adversely impacted during rapid flow increases and associated first flush of debris. This can result in an overflow of a plant structure or through one of the offsite outfalls. A plant upgrade to address this problem is currently underway.
2. Rapid flow increases can result in filling the equalization basins and/or prematurely using available storage prior to the UNOX system achieving full capacity. However, full capacity of flow through UNOX cannot be achieved until the equalization basin levels reach approximately 13 feet and provide sufficient head. Once equalization is nearly full and flows exceed the pumping rate to UNOX, the wet-weather discharge process is initiated.

1. When the equalization basin levels rise above 15 feet, this causes water to back up over the primary clarifier weirs at higher flows. High basin levels also reduce the pumping capacity of the influent pump station pumps due to increased back pressure.
2. The secondary clarifiers are adversely impacted during rapid flow increases, resulting in submergence of the effluent weirs. Two additional clarifiers are planned to address this issue.
3. Chlorination of flow in the wet-weather treatment facility discharge pipe does not provide sufficient contact time at peak flows. An additional contact basin for wet-weather discharge flow is planned to address this issue.
4. Treatment performance occasionally results in effluent violations.

These operational issues and the current approach to wet-weather operation are addressed in the remainder of the PCP. Opportunities for improvement exist and have been incorporated into the PCP flowchart and checklist to help achieve the PCP objectives.

2.0 PCP Rationale

2.1 Hydraulic, Process Treatment, and Operational Assessment

Developing the rationale for the PCP requires an evaluation of existing facilities and conditions related to the following limiting factors:

- Hydraulic Capacities
- Process Treatment Capacities
- Process and Hydraulic Controls Operability

Previous studies, site visits and observation of operations, communication with plant staff, and analyses of existing facilities were used to establish baseline operating conditions to achieve consistent, reliable plant performance under wet-weather conditions. Each limiting factor is further addressed below. The analysis presented in this section is based on current conditions. As mentioned in Section 1.2, upgrades are currently planned or already being designed that will improve hydraulic and process treatment capacities.

2.1.1 Hydraulic Capacities

A hydraulic analysis of the MBWWTP was recently completed and is summarized in the Moccasin Bend WWTP Hydraulic Profile Model Report (Hazen and Sawyer, March 2014). As reported by Hazen and Sawyer, and not factoring in process treatment capacities or operational/maintenance issues, the plant should be able to pass a total influent flow of 220 mgd along with an additional 10 mgd of sidestreams through primary treatment. The hydraulic limitations for primary treatment are 140 mgd for the influent pump station and 90 mgd for the influent relief pump station. Hazen and Sawyer reports that 124 mgd can be passed through secondary treatment, not including Return Activated Sludge (RAS) flow, without experiencing hydraulic issues. The hydraulic capacity of the secondary treatment system is limited by the secondary clarifiers.

2.1.2 Process Treatment Capacities

The secondary treatment process was evaluated by CDM Smith at the maximum permitted average daily flow condition of 140 mgd. The analysis indicates that there should be no process performance problems under the peak hydraulic capacity of the system, even if the entire 140 mgd was dry-weather influent flow. The average day secondary treatment capacity is approximately the same as the secondary treatment hydraulic capacity. Therefore, secondary treatment capacity (and disinfection) is hydraulically limited. Maximizing use of UNOX prior to a wet-weather discharge is a challenge due to plant operability as described below.

2.1.3 Process and Hydraulic Controls Operability

Based on observations of plant operations, discussions with plant staff, and review of plant operations documents, the following operability issues were identified:

- Blinding of the fine screens during wet-weather flows can reduce the sustained operational capacity of the preliminary treatment system to 120 mgd (not including sidestreams).
- Manual control of headworks gates, valves, and process equipment is time consuming, cumbersome, and requires experience to understand the impact of actions on capacity and performance. This can result in spillage from channels or structures, or cause a discharge from one of the outfalls.
- Ramping up the UNOX flow too quickly can result in turnover of solids in the secondary clarifiers. However, if UNOX cannot be ramped up at a rate similar to influent flow increases, storage in the wet-weather clarifiers and equalization basins will be used prematurely, and on rare occasions, flow through UNOX and secondary treatment will not be maximized prior to a wet-weather discharge.
- The flow split to the secondary clarifier banks at high flow conditions can cause hydraulic problems (spillage) and uneven flow splits, which adversely impact clarifier performance.
- While rated for 90 mgd, the influent relief pump station pumps can pump a maximum of 85 mgd.
- The water levels in the equalization basins have a direct impact on both influent pump station capacity as well as the capacity of the equalization pump station. The lower the level in the basins, the more flow can be pumped through the influent pump station. Conversely, low levels in the basins limit the total capacity of the equalization pump station pumps.
  - Approximately 134 mgd can be pumped through the influent pump station when basin levels are 11 feet or less and assuming no blinding of the fine screens. This total drops to approximately 115 mgd when basin levels reach 15 feet.
  - Maximum flow of 135 mgd through the equalization pump station cannot be achieved until equalization basins levels reach at least 13 feet.

Factoring in both hydraulic and process capacities, and as shown on Figure 1-1, the plant should be able to pass a maximum influent flow of 219 mgd along with an additional 10 mgd of sidestreams. This maximum is prior to a wet-weather discharge and is dependent on the following:

- The volume of water in the equalization basins being 11 feet or less.
- The sustainable capacity (85 mgd) of the influent relief pump station.
- Whether blinding of the fine screens has occurred.

Once the equalization basin levels are full (15 feet) and/or blinding of the fine screens has occurred, the maximum influent flow that can be moved through the plant is approximately 200 mgd (85 mgd [capacity of the influent relief pump station] + 115 mgd [capacity of the influent pump station]). Flows above 200 mgd (not including sidestreams) directly impact whether overflows occur at East Bank and West Bank.

The need to discharge wet-weather flow without secondary treatment and the timing of a wet-weather discharge are controlled by a separate set of criteria, specifically:

- The sustainable capacity (135 mgd) for the UNOX and secondary treatment systems;
- The rate at which the UNOX system can be ramped up from normal, dry-weather operation relative to influent flow increases; and
- The available storage within the plant and whether this storage fills prior to the end of a wet-weather event.

To maximize flow through the plant and avoid unnecessary wet-weather discharges and overflows at East Bank and West Bank, it is critical to maximize flow through the UNOX and secondary treatment systems. The quicker flow is ramped up to the UNOX system, the more available storage within the plant can be reserved for wet-weather treatment system effluent, thus extending the time before a wet-weather discharge or overflow occurs.

Available storage within the equalization basins is currently limited to approximately 46.9 million gallons. This total is based on a minimum level of 5 feet to ensure submergence of the air diffusers and a maximum level of 15 feet, which is the level when flow will back up over the primary clarifier weirs.

2.2 Flow Regimes

As summarized here in **Table 2-1** and graphically presented in **Figure 2-1**, the rationale for maximizing flow through the plant is based on incoming flow conditions.

Table 2-1
Flow Conditions Dictating PCP Actions

Flow	Actions
Up to 75 mgd	Normal, dry-weather flow operation with both primary and secondary treatment
Between 75 and 125 mgd	Activities completed in preparation for wet-weather treatment and flow maximization, including ramp up for the UNOX system Flow is initiated to the wet-weather system around 120 mgd
Greater than 125 mgd	Flow through the preliminary, primary, and secondary systems has been maximized The need to discharge wet-weather flow without secondary treatment depends on whether available storage fills up prior to flows dropping back below 125 mgd

This table and Figure 2-1 are based on the maximum sustained capacities discussed previously. If these capacities cannot be achieved due to equipment being out of service or other operational issues, the logic is the same but the flow numbers will be different.

Management of flow expectations is addressed as part of the PCP Wet-Weather Checklist presented in Section 3.

2.3 PCP Flowchart

The flowchart presented in **Figure 2-2** provides the basis for a detailed PCP checklist to guide operational readiness and operational decisions during wet-weather conditions. The junction boxes, valves, and gates referenced in the flowchart are shown on the schematic in **Figure 2-3**. **Figure 2-4** presents the relationship between plant flows and time remaining to fill the equalization basins.

2.4 Laboratory and Online Instrumentation Data

Considering that the need to discharge wet-weather flow without secondary treatment and the overflows at East Bank and West Bank are controlled in large part by the hydraulic capacities of the plant, the most critical data for PCP decision making are flows and equalization basin levels. These data are available through instrumentation already installed and monitored through the Supervisory Control and Data Acquisition System (SCADA). Laboratory data are not as critical except with respect to verifying chlorine residual for the wet-weather disinfection system prior to a wet-weather discharge.

Figure 1-1 and the PCP Wet-Weather Checklist introduced in Section 3 include specific instrument IDs and trigger levels that will be used to support the PCP and associated decisions. The checklist also includes recording/verifying critical laboratory data. The following laboratory and online instrument data are critical to the PCP:

- Influent pump station flow
- Influent relief pump station flow
- UNOX system flow
- Equalization basin levels
- Mixed liquor suspended solids (MLSS) concentrations
- Wet-weather chlorine residual prior to wet-weather discharge

The MBWWTP operators currently obtain one daily MLSS concentration, which is measured by collecting a grab sample and analyzing at an onsite laboratory. Results are typically received back within 24 to 48 hours. Considering the rapid rate at which incoming plant flow can increase and the delay in receipt of MLSS concentrations, going forward biomass levels during a wet-weather event will be monitored using online TSS measurements.

3.0 PCP Checklist

The primary operations tool of the PCP is the detailed checklist that will be used during wet-weather events to guide decisions regarding plant operation, document decisions and plant conditions, and assess actions taken to determine what future improvements should be made to the program. The detailed Wet-Weather Checklist for the MBWWTP is presented in **Appendix A**. The primary goals of the checklist are to achieve consistency in:

- Preparing the plant to receive wet-weather flows;
- Maximizing flow through the plant headworks and secondary treatment system;
- Ramping UNOX up to hydraulic capacity as quickly as possible without adversely affecting biomass levels or final clarifier performance;
- Optimizing the use of available storage;
- Making decisions regarding plant operation during a wet-weather event;
- Documenting critical data and process control decisions; and
- Evaluating plant operation improvements following each event.

The checklist shall be completed by plant staff for all wet-weather events, regardless of whether a wet-weather discharge occurs or not. For the purposes of this PCP, a wet-weather event is defined as any precipitation event that results in an increase of incoming flow to the plant above 75 mgd and necessitates operational adjustments (e.g., UNOX ramp up) in preparations for wet-weather flows.

4.0 Staffing

4.1 Staffing Overview

The MBWWTP operates two, 12-hours shifts per day with shift changes at 7:00 AM and 7:00 PM. Each shift includes five dedicated operators:

1. Chief Operator
    a. Oversees all operations and makes final decisions on his or her shift.
    b. Can perform all other operator duties identified below and will support these positions as necessary.
2. Control Room Operator (also referred to as Operator 3)
    a. Monitors the SCADA system in the Control Room, including various data screens, plant conditions, pump status, etc.
    b. Enters data from logs, notes, etc. into electronic data management systems.
    c. Monitors plant cameras.
    d. Receives / makes calls after hours.
    e. Supports the oxygen plant operator as necessary.
3. Plant Operator 1
    a. Monitors the primary and wet-weather treatment systems. This includes the Influent Building, Influent Relief Station, and Detritor area.
    b. Collects various grab samples for analysis.
    c. Measures blanket levels for the primary clarifiers.
    d. Monitors and adjusts the chemical feed system for the wet-weather treatment process.
4. Plant Operator 2
    a. Monitors the secondary treatment system, including secondary clarifiers 1 through 4 and the chlorination system.
    b. Measures blanket levels for secondary clarifiers 1 through 4.
    c. Collects various grab samples and performs tests, including chlorine residual (during wet weather), TSS, settling tests, bug counts, and pH.
5. Oxygen Plant Operator
    a. Monitors operation of the oxygen plant, equalization basins, equalization pump station, UNOX system, and secondary clarifiers 5 through 14.
    b. Measures blanket levels for secondary clarifiers 5 through 14.

c. Collect various measurements, including dissolved oxygen, temperatures, and basin levels.

d. Adjusts Waste Activated Sludge (WAS) and RAS pumping rates.

e. Operates the equalization bypass valves and MOG-8 during wet-weather events.

In addition to these five operators, the day shift will typically include the Liquids Handling Operation Supervisor, Solids Handling Operation Supervisor, Plant Manager, Deputy Director, and Director. These staff members are available to support operations as needed and assist with decision making during wet-weather events.

4.2 PCP Impact on Staffing

The current staffing level is considered sufficient to handle all responsibilities during a wet-weather event. Responsibilities will not change significantly with implementation of the PCP as roles will remain the same. PCP implementation will modify and improve how certain processes are operated, when certain actions are taken, and how wet-weather decisions and data are documented. Completion of the Wet-Weather Checklist will be the joint responsibility of the Chief Operator and Control Room Operator. Approval must be obtained from the Liquids Handling Operation Supervisor prior to initiating a wet-weather discharge. If the Liquids Handling Operation Supervisor is not available, approval must be obtained from the Plant Manager, Deputy Director, or Director.

4.3 Training

Initial PCP training and implementation will consist of a 4-hour workshop, conducted at multiple times to ensure that all current operators, management, and appropriate support staff receive the training. This training will consist of reviewing the PCP objectives and PCP flowchart along with a detailed review of the PCP checklist and expectations for completion. At least two follow-up sessions will be held during the first year of implementation to evaluate PCP success and reinforce operator training. When new operators are added to staff, PCP training will be the responsibility of the current operators.

5.0 Data Management and Recordkeeping

5.1 Data Management

The MBWWTP operators use several mechanisms for recording plant data and conditions, including logs, activity reports, and electronic data management systems. These systems effectively capture the data required to operate, monitor, and evaluate the MBWWTP processes. Modification of these processes is not part of the PCP.

The Wet-Weather Checklist is part of the PCP and was developed to consolidate critical data, decisions, and documentation for wet-weather events on one form. This form shall be completed for all wet-weather events, as defined in Section 3 and on the checklist, filed in a dedicated file on site, and maintained for at least five years.

5.2 Semi-Annual Evaluations

In addition to the individual checklists, the effectiveness of the PCP shall be evaluated semi-annually by the WRD. This evaluation should include:

- Reviewing the number of wet-weather discharges during the previous six months and determining whether alternative actions could have reduced the number and/or volume of wet-weather discharges;
- Reviewing the Consent Decree criteria for the PCP to evaluate whether all criteria continue to be addressed;
- Assessing maintenance practices and plant readiness to confirm that treatment capacities are maximized for each wet-weather event;
- Discussing, identifying, and evaluating any modifications to the PCP that are expected to improve the PCP; and
- Identifying any recent upgrades, instrumentation additions, etc. that affect the PCP.

The discussions and results of each semi-annual review shall be documented in a summary memo and placed in the dedicated PCP files.

6.0 PCP Update Plan

The PCP, and specifically the flowchart and checklist, are living documents and should be updated whenever significant plant changes are implemented that affect the PCP. At a minimum, the PCP should be updated whenever:

- An upgrade is completed that affects the hydraulic or process treatment capacities, or that affects operability during a wet-weather event;
- Online instrumentation is added that could affect decision making during a wet-weather event;
- Staff positions and/or responsibilities are modified;
- Significant changes are implemented that affect how quickly and/or over what duration flows are routed to the plant headworks during a wet-weather event; and
- Post wet-weather event evaluations or semi-annual evaluations reveal that the PCP is not as effective as it could be in reducing wet-weather discharges or avoiding violations of NPDES permit criteria.

For major upgrade projects, it is recommended that PCP updates are finished before construction is complete so that a revised PCP can be used immediately following start-up and training. Within three months of construction completion, unless an alternative timeline has been established based on the nature of the upgrades, it should be verified that the upgrades and PCP revisions are functioning as intended. For the other items noted above, PCP revisions should be initiated within one month following the change or identified issue.

Depending on the nature of the change, revisions can be as simple as a memo filed with the PCP until the next major PCP revision occurs. Any material change to the PCP that affects the wet-weather discharge triggers will be documented in a revised PCP submitted to EPA. Minor changes will not be submitted to EPA. A copy of the latest PCP revision and addendums shall be included in the dedicated file and at least one copy should be immediately available to operations staff.

Appendix A
Wet-Weather Checklist

Wet-Weather Checklist

Process Controls Program for the MBWWTP

Event Date(s): ____________________

Chief Operator at Start: ____________________

Chief Operators through End: ____________________

____

Instructions:

All lines on this form shall be completed at the start of any wet-weather event, during the event, or at the conclusion of the event, as noted below. A wet-weather event is not limited to events where a wet-weather discharge occurred and shall include events that result in an increase of incoming flow to the plant above 75 mgd and that necessitate operational adjustments (e.g., UNOX ramp up) in preparation for wet-weather flows. If an item or section does not apply (e.g., a wet-weather discharge was not initiated), mark with "N/A". "If" fields do not need to be marked "N/A" if they do not apply.

Weather Conditions

Completed By (initial):

Approximate start time of precipitation: __________ ☐ Predicted ☐ Actual

Forecasted amount of precipitation (range): __________ in Actual: __________ in

Forecasted duration (range): __________ hr Actual: __________ hr

To be completed at conclusion of the event

Source of Data: ____________________

General qualification of soil moisture conditions:

☐ High / Wet
☐ Normal / Average
☐ Low / Dry

Conditions do not need to be based on scientific measurement; simply the operator's opinion based on the amount of recent rain, cloud cover, temperature, etc.

Plant Readiness

Completed By (initial):

Are the wet-weather clarifiers empty? ☐ Yes ☐ No If no, explain: ____________________

		Time
Report EQ Basin 1 level:	__________ ft	__________
Report EQ Basin 2 level:	__________ ft	__________

If either basin level is greater than 5 feet, explain below:

____

No. of influent pumps in service:	out of 4	No. of UNOX basins currently online:	out of 4
No. of relief station pumps in service:	out of 5	No. of UNOX basins available for service:	out of 4
No. of EQ PS pumps in service:	out of 4	No. of primary clarifiers in service:	out of 8
No. of coarse screens in service:	out of 4	No. of secondary clarifiers in service:	out of 14
No. of fine screens in service:	out of 6	No. of chlorine contact basins in service:	out of 5
No. of detritors in service:	out of 3	No. of wet-weather grit basins available:	out of 5
No. of communitors in service:	out of 2	No. of wet-weather clarifiers available:	out of 3

"In Service" shall mean available for use and not down for maintenance or other issues. It does not necessarily mean that a pump is on, a screen is currently being used, etc.

Wet-Weather Checklist

Process Controls Program for the MBWWTP

Assessment of Maximum Treatment Capacities for this Event

Completed By (initial):

Please identify the operator's best estimate for the maximum treatment capacity of each system listed below based on plant readiness:

				Target
Influent pump station:	______	mgd	*start of event*	*134*
	______	mgd	*end of event*	*115*
Influent relief pump station:	______	mgd		*85*
Preliminary / primary treatment system:	______	mgd	*start of event*	*134 (not including sidestreams)*
	______	mgd	*end of event*	*115 (not including sidestreams)*
UNOX system:	______	mgd		*135 (including sidestreams)*
Secondary treatment system:	______	mgd		*135*
Disinfection system:	______	mgd		*135 (not including wet weather)*
Wet-weather system:	______	mgd		*85*

If the assessed treatment capacities for this event are less than the target treatment capacities, state reason(s):

____

____

Wet-Weather Event Goals:

Maximize flow through the headworks, preliminary treatment system, and primary treatment system to avoid West Bank and East Bank overflows.

Maximize ramp up rate and flow through UNOX to avoid premature use of available storage.

Maximize available storage prior to initiating a wet-weather discharge.

Avoid conditions that could result in an NPDES permit violation or loss of excess biomass.

NOTE: *NPDES daily maximum concentrations and daily minimum percent removal limits for CBOD5, NH3-N, and TSS do not apply when maximum seasonal average daily flows are exceeded. Refer to Tables 1-1 and 1-2.*

Refer to Figure 2-2 of the PCP for the rationale and order of priority.

Influent Flow Increases Above and Maintains 75 mgd

Completed By (initial):

	Time	Influent Flow		Target
☐ Valve in EQ-A opened to EQ Basin 1	______	______	mgd	*80 mgd (1st valve)*
☐ Valve in EQ-A opened to EQ Basin 2	______	______	mgd	
☐ PS gate opened to equalize flow between basins	______	______	mgd	
☐ Flow to Communitor #6 is opened	______	______	mgd	*90 mgd*

Wet-Weather Checklist

Process Controls Program for the MBWWTP

UNOX System Ramp Up

Completed By (initial):

Baseline influent flow: __________ mgd

Baseline UNOX flow: __________ mgd

Approximate start time of influent flow increases: __________

Use these values to calculate initial influent flow and UNOX flow ramp up rates

Attach additional sheets as necessary

Time	Influent PS Flow (mgd)	Influent Relief PS Flow (mgd)	Total Influent Flow (mgd)	Influent Flow Ramp Up Rate (mgd/hr)	UNOX Flow (mgd)	UNOX Ramp Up Rate (mgd/hr)	UNOX Effluent TSS (mg/L)	EQ Basin 1 Level (ft)	EQ Basin 2 Level (ft)
Instrument ID:	FT2250	FT2100	Influent PS + Relief PS	See Calculation	FT1019 through FT1022	See Calcualtion	AT0896	LT0246	LT0247

Include an entry whenever UNOX flow is adjusted by the operator, up to the point where flow is maximized through UNOX (target = 135 mgd).

UNOX ramp up rate is controlled by adjusting Equalization Pump Station pump speeds.

UNOX ramp up rate = (New UNOX Flow - Old UNOX Flow) / (Current Time - Time of Previous UNOX Flow Measurement)

Influent ramp up rate = (New Total Influent Flow - Last Total Influent Flow) / (Current Time - Previous Flow Reading Time)

NOTE:

Up to the point where incoming flow exceeds the capacity of the secondary system, the UNOX units shall be ramped up at a rate similar to influent flow increases to the extent possible without adversely affecting biomass levels or secondary clarifier performance. To maximize system storage, the EQ basins levels should be kept as low as possible until influent flow exceeds the capacity of the secondary system.

Wet-Weather Checklist

Process Controls Program for the MBWWTP

Biomass Monitoring

Completed By (initial):

Considering how fast incoming plant flow can increase and the 24-48 hour delay in receipt of laboratory MLSS concentration data, approximate biomass loss during a wet-weather event shall be monitored using the TSS meter in the mixed liquor channel.

No. of Basins in Service: ________ *start of event*

________ *end of event*

Pre-event UNOX effluent TSS reading: ________ mg/L

TSS reading at 20% biomass loss: ________ mg/L *= pre-event reading * 0.8*

TSS reading at 30% biomass loss: ________ mg/L *= pre-event reading * 0.7*

TSS reading at 40% biomass loss: ________ mg/L *= pre-event reading * 0.6*

TSS readings are monitored via the online measurement displayed in SCADA and recorded on Page 3 of the checklist during UNOX ramp up. Once flow is maximized through the UNOX system, TSS shall be monitored at least hourly.

NOTE: If a basin is added into service during a wet-weather event, sufficient time shall be allowed for TSS readings to stabilize prior to evaluating biomass loss.

NOTE: When TSS readings drop by 20% or more compared to the pre-event reading, notify the Liquids Handling Operation Supervisor

Did approximate biomass loss exceed 20% this event?: ☐ Yes ☐ No If yes, state date and time: ________

If yes, supervisor notified: ☐ Yes ☐ No

Flow Maximized through Preliminary and Primary Systems

Completed By (initial):

Was flow initiated to the wet-weather system this event? ☐ Yes ☐ No

If yes, note date and time: ________ *If no, leave remainder of this section blank*

Corresponding total incoming plant flow: ________ mgd *Target = Max Primary Treatment Capacity (this event)*
Total = sum of Influent PS and Relief PS flows

Wet-weather clarifiers are full: ________ *Note date and time*

To be completed at the conclusion of the event

Max flow achieved through wet-weather: ________ mgd *Target = Max Wet-Weather Treatment Capacity (this event)*

Total wet-weather system runtime: ________ hr

Wet-Weather Checklist

Process Controls Program for the MBWWTP

Wet-Weather Discharge Initiation

Completed By (initial):

Was a wet-weather discharge initiated this event? ☐ Yes ☐ No *If no, leave remainder of this section blank*

Conditions:

Flow maximized through primary system: ☐ Yes ☐ No

Flow maximized through wet-weather system: ☐ Yes ☐ No

Flow maximized through secondary system: ☐ Yes ☐ No

Use of available storage maximized: ☐ Yes ☐ No

Date and Time: ____________

Influent Flow (mgd): ________

Primary Flow (mgd): ________

Wet-Weather Flow (mgd): ________

UNOX Flow (mgd): ________

EQ Basin 1 Level (ft): ________

EQ Basin 2 Level (ft): ________

If an answer to any of the above questions is "No", indicate reasoning:

____

____

Authorization to Initiate Wet-Weather Discharge: ______________________ ____________

*Signature of Liquids Operation Supervisor** *Date and Time*

* If the Liquids Operation Supervisor is not available, approval shall be obtained from the Plant Manager, Deputy Director, or Director.

	Approx. Time
☐ EQ-A bypass valve is closed	________
☐ Wet-weather chlorine injection initiated	________
☐ Chlorine residual reaches at least 3 ppm	________
☐ Valve MOG-4 is opened approximately 25%	________
☐ Gates M315 and M316 are closed	________
☐ Valve MOG-8 is opened	________

	Date
☐ TDEC notified of wet-weather discharge	________
☐ Report filed with TDEC	________

Influent Pump Station Flow Throttling

Completed By (initial):

☐ Approval obtained from Liquids Operation Supervisor

NOTE: Throttling of influent flow below the sustainable capacity of the preliminary and primary treatment systems is only acceptable once EQ basin levels have reached at least 15 feet and a wet-weather discharge has been initiated.

Time of initial throttling: ________

Influent Flow (mgd): ________

EQ Basin 1 Level (ft): ________

EQ Basin 2 Level (ft): ________

Wet-Weather Checklist

Process Controls Program for the MBWWTP

Ramp Down: Flow Sustained Below Secondary Treatment Capacity

Completed By (initial):

Complete this section only if a wet-weather discharge occurred

	Approx. Time	Influent Flow
☐ Valve MOG-8 is closed	______	________ mgd
☐ Wet-weather chlorine injection ceased	______	________ mgd
☐ Valve MOG-4 is closed	______	________ mgd
☐ Gates M315 and M316 are opened	______	________ mgd
☐ EQ-A bypass valve is opened	______	________ mgd
☐ Influent flow no longer throttled	______	________ mgd

NOTE: If influent flow begins to increase after wet-weather discharge has been stopped and there is a potential that another wet-weather discharge will need to be initiated, a new Wet-Weather Checklist shall be started.

NOTE: Flow through UNOX shall be maintained as high as possible without adversely affecting biomass levels or secondary clarifier performance so that the EQ basins and wet-weather clarifiers are pumped down quickly. UNOX flow shall be monitored using the existing flow readings forms used daily (and completed approximately hourly) by the treatment plant operators.

Post Event Review

Completed By (initial):

Max total influent flow during the event: ________ mgd *Total = sum of Influent PS and Relief PS flows*

Reduced total influent flow (if applicable): ________ mgd *Due to screen blinding or high EQ basin levels or other*

Any significant changes in secondary clarifier blanket levels? ☐ Yes ☐ No If yes, reason: ____________

Any NPDES permit effluent limit violations? ☐ Yes ☐ No If yes, state: ____________

Did total influent flow exceed the capacity of the primary, secondary, or wet-weather systems? ☐ Yes ☐ No

If yes, please answer the following questions:

Did a wet-weather discharge occur? ☐ Yes ☐ No If yes, duration and volume: ______ hrs ______ mg

Did West Bank overflow? ☐ Yes ☐ No If yes, duration and volume: ______ hrs ______ mg

Did East Bank overflow? ☐ Yes ☐ No If yes, duration and volume: ______ hrs ______ mg

Were applicable target flows achieved? ☐ Yes ☐ No

If no, indicate reasons for variances from target flows:

____

____

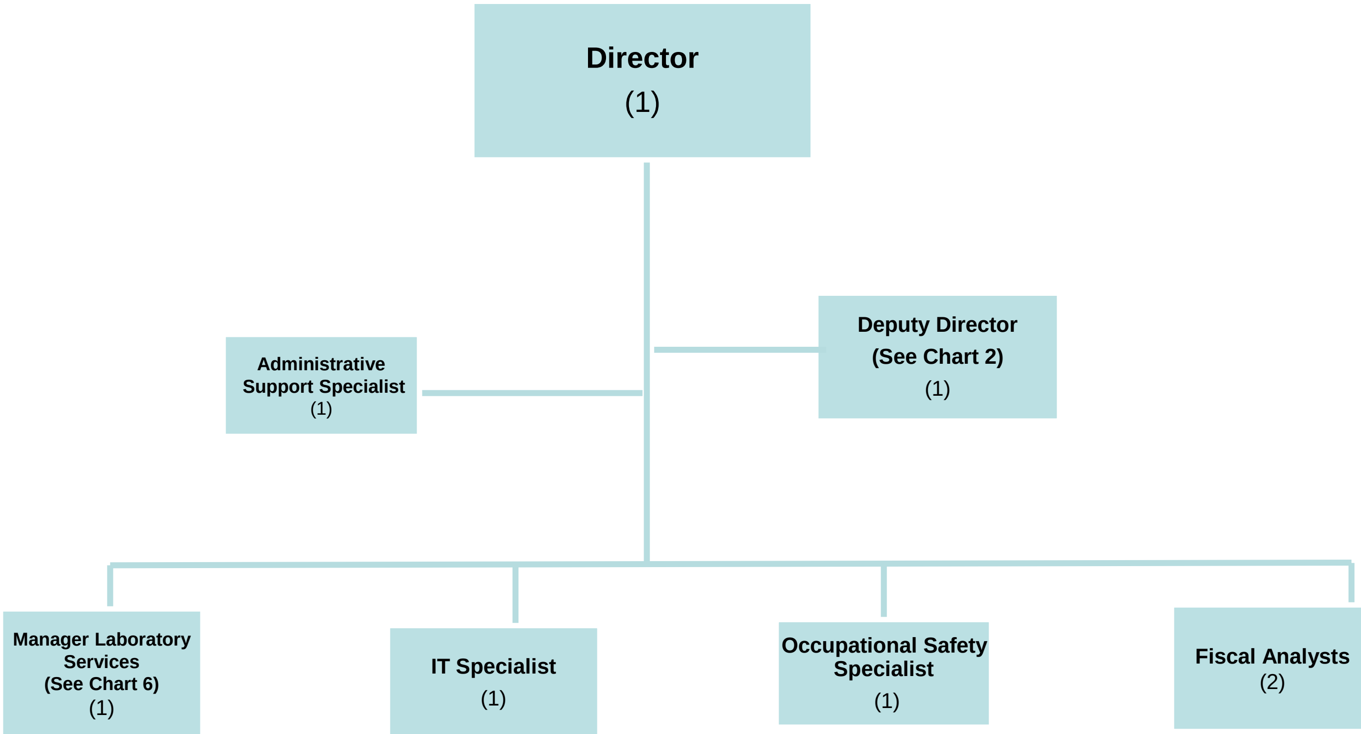
Certification

I have reviewed this checklist and the actions taken, and approve it for filing: ______________________________ ____________

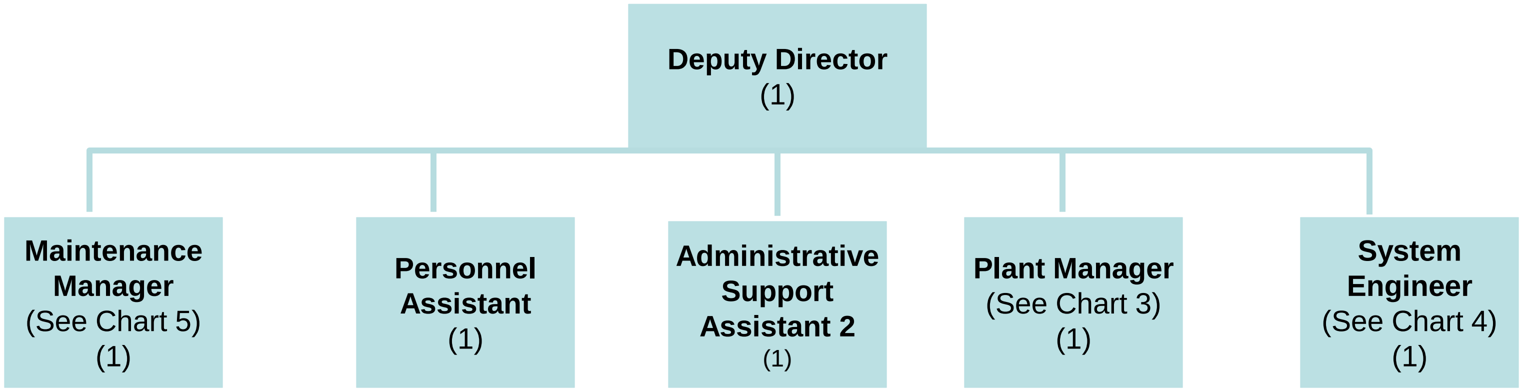
Signature of Liquids Operation Supervisor, Plant Manager, Deputy Director, or Director *Date*

Appendix B
Waste Resources Division Organizational Chart

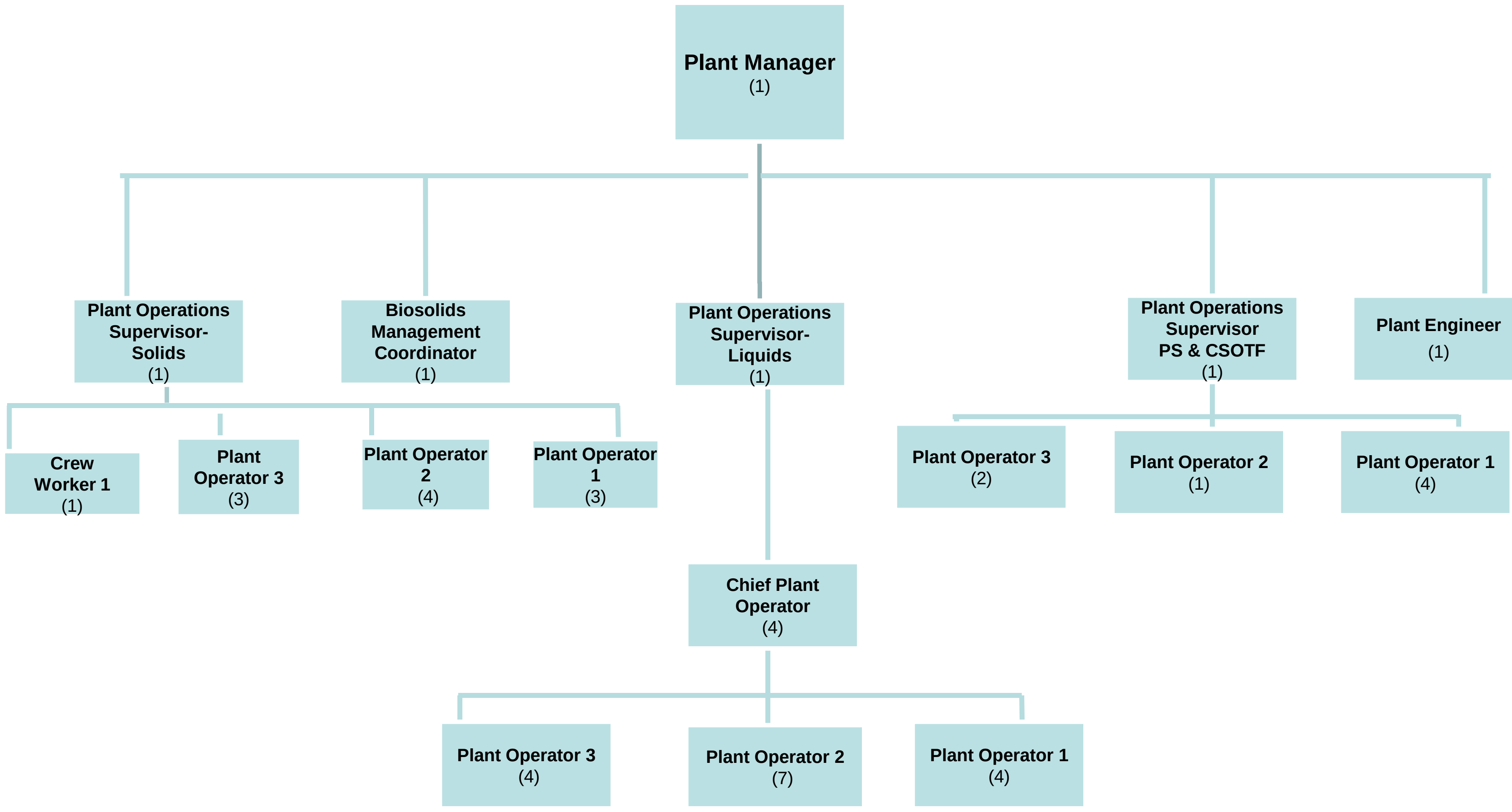
WASTE RESOURCES DIVISION
ORGANIZATIONAL CHART
(September, 2014)



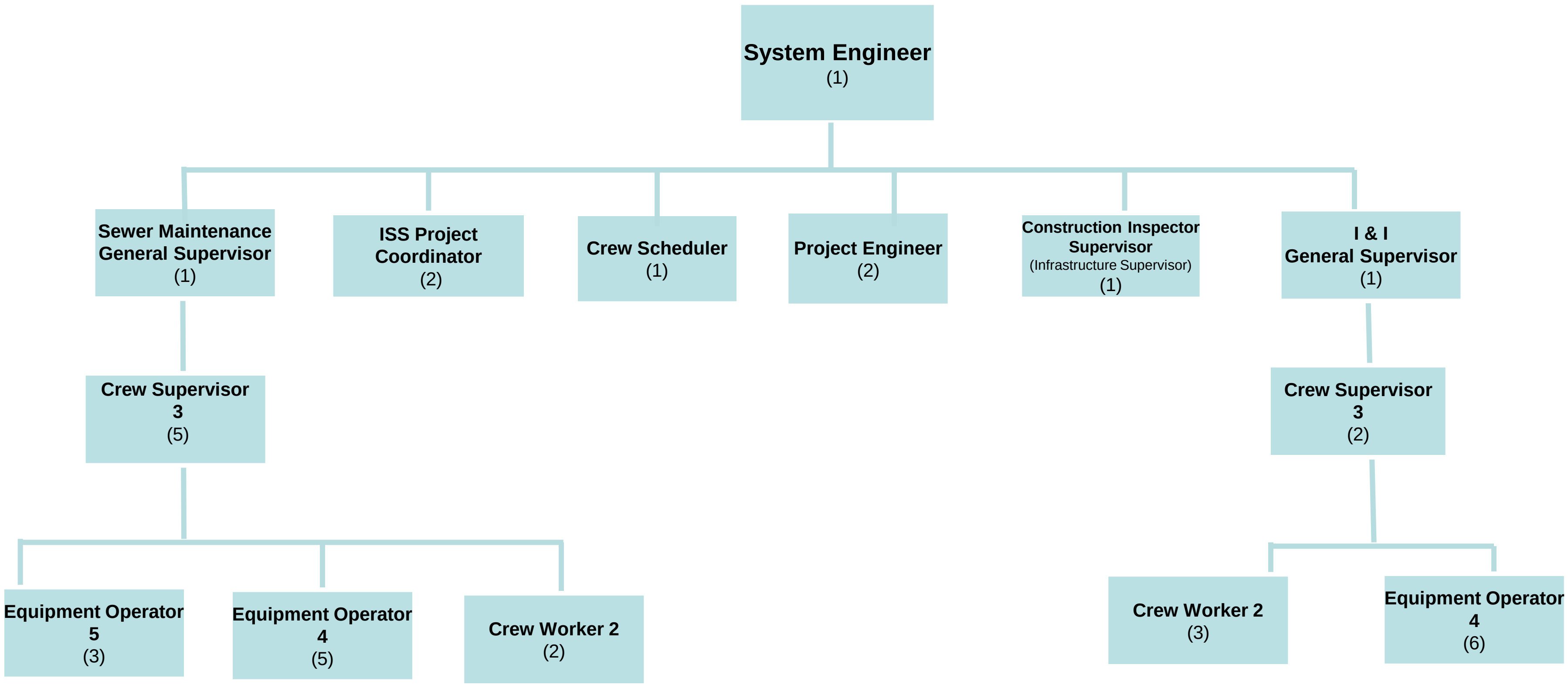
WASTE RESOURCES DIVISION
ORGANIZATIONAL CHART
Chart 2
(September, 2014)



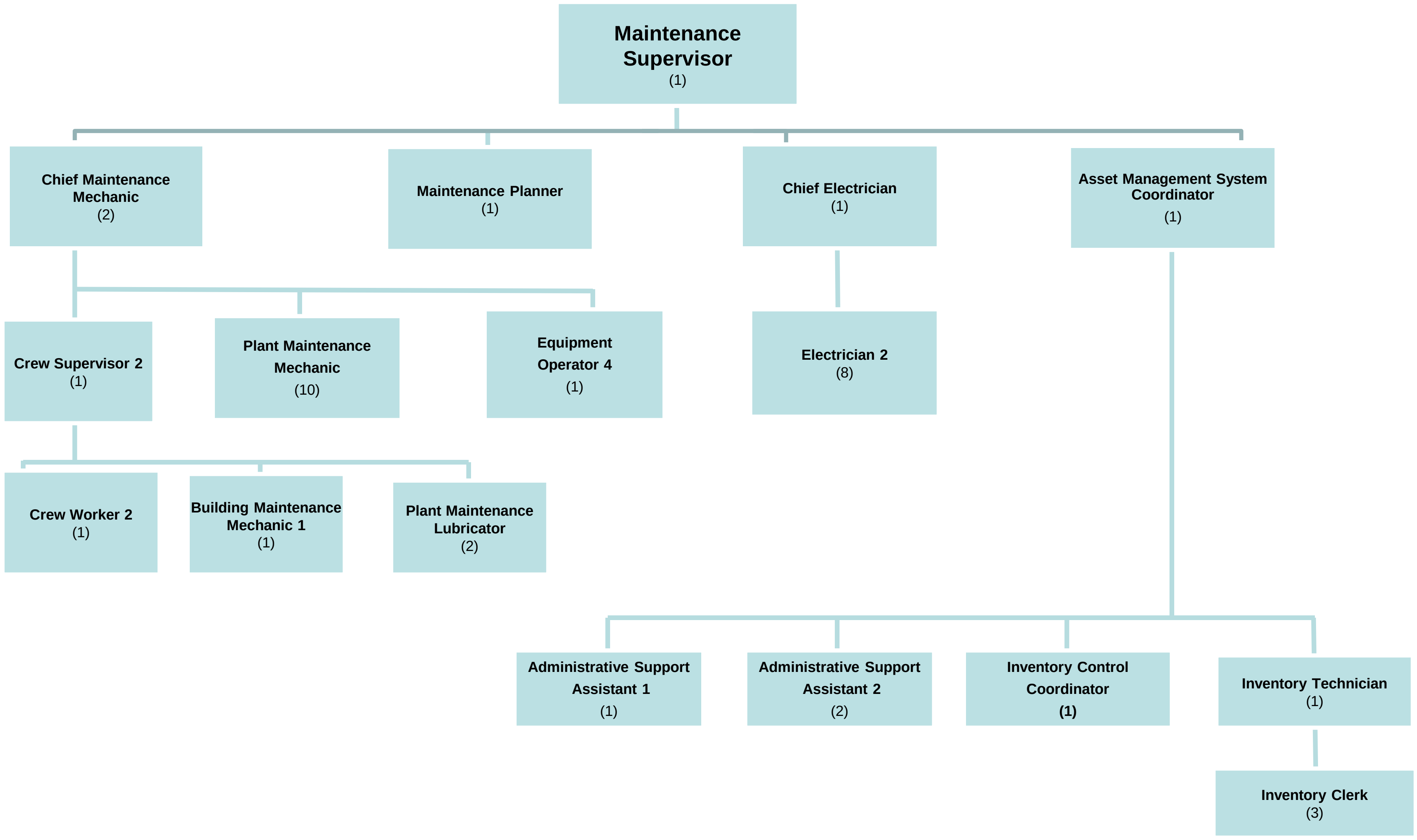
WASTE RESOURCES DIVISION
ORGANIZATIONAL CHART
Chart 3
(September, 2014)



WASTE RESOURCES DIVISION
ORGANIZATIONAL CHART
Chart 4
(September, 2014)



WASTE RESOURCES DIVISION
ORGANIZATIONAL CHART
Chart 5
(September, 2014)



WASTE RESOURCES DIVISION
ORGANIZATIONAL CHART
Chart 6

(September, 2014)