Clean Water Services

Watershed-based National Pollutant Discharge Elimination System Permit

Permit Evaluation Report and Fact Sheet

Issued February 2, 2004

File #108014

The permit addressed by this document was originally issued on February 26, 2004. Modifications to the permit were proposed on March 8, 2005. This document has not been changed and does not address the proposed modifications. Please see the supplemental evaluation report and fact sheet dated March 7, 2005, for an explanation of the proposed modifications.

FACT SHEET
And
NPDES WASTEWATER DISCHARGE PERMIT EVALUATION

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Northwest Region – Portland Office
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Telephone: (503) 229-5263

PERMITTEE: Clean Water Services (CWS)
2550 SW Hillsboro Highway
Hillsboro, OR 97123

and Washington County
Dept of Land Use and Transportation (DLUT)
1400 SW Walnut Street
Hillsboro, OR 97124

SOURCES: Durham Advanced Wastewater Treatment Facility (AWTF), 16580 SW 85th, Tigard
Forest Grove Wastewater Treatment Facility (WTF), 1345 Fernhill Road, Forest Grove
Hillsboro WTF, 770 South First Street, Hillsboro
Rock Creek AWTF, 3125 SE River Rd, Hillsboro
Washington County Municipal Separate Storm Sewer System (MS4)

SOURCE CONTACTS:

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PROPOSED ACTION: Issuance of a National Pollutant Discharge Elimination System (NPDES) watershed-based waste discharge permit which will cover the Durham, Forest Grove, Hillsboro and Rock Creek wastewater treatment facilities operated by CWS, the MS4 operated by CWS and Washington County, and storm water discharges from the Durham and Rock Creek AWTF sites.

SOURCE CATEGORY: Major municipal

TREATMENT SYSTEM CLASS: Level IV

COLLECTION SYSTEM CLASS: Level IV

PERMIT APPLICATION DATES: Wastewater Treatment Facilities: December 29, 1997, and revised December 18, 2001. MS4: June 1, 2000

PERMIT APPLICATION NUMBERS: 991614, 991615, 991616, 991617, and 989298

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1. Description of Proposed Action

1.1. Permittee and Permit Information

In 2001, the Unified Sewerage Agency of Washington County changed its name to Clean Water Services (CWS). The name change was intended to reflect the expanded responsibility of this agency as it addresses water quality issues within metropolitan Washington County. CWS operates four municipal wastewater treatment facilities. These facilities treat wastewater from domestic, industrial and commercial sources. At present, wastewater is treated and discharged to the Tualatin River or reused as reclaimed water in accordance with National Pollutant Discharge Elimination System (NPDES) Permit numbers 101141, 101142, 101143 and 101144. The Permits for these facilities were issued on August 25, 1993, and expired on June 30, 1998, and have been administratively extended. CWS also currently has in place general industrial NPDES storm water permits (1200Z) for the Durham and Rock Creek facilities

CWS has been a co-permittee on an NPDES permit for the **M**unicipal **S**eparate **S**torm **S**ewer **S**ystem(MS4) with Washington County (DLUT) and Oregon Department of Transportation (ODOT) that covers the urbanized area of Washington County. ODOT has been issued a statewide permit for storm water and will not be a co-permittee on this permit action.

The Oregon Department of Environmental Quality (DEQ) received renewal applications for the wastewater treatment facilities on December 29, 1997, and for the MS4 on June 1, 2000. The Total Maximum Daily Load (TMDL) for the Tualatin was revised in August 2001 and CWS submitted a revised NPDES application in December 2001. The DEQ is proposing to renew the permits for CWS facilities as a single watershed-based, integrated municipal permit covering all four facilities, the MS4, and two industrial storm water permits for the Rock Creek and Durham AWTFs. A significant feature of this permit will be the inclusion of provisions for water quality trading involving temperature, biochemical oxygen demand (BOD) and ammonia. A renewal permit is necessary to discharge to state waters pursuant to provisions of Oregon Revised Statutes (ORS) 468B.050 and the Federal Clean Water Act.

DLUT is listed on the proposed permit as a co-permittee only as it relates to the MS4 provisions of this permit. The parties are currently discussing the possibility of negotiating an intergovernmental agreement that would enable CWS to act on behalf of the DLUT regarding MS4 matters. If such an agreement is finalized during the term of this permit, then the permit may be modified to remove DLUT as a co- permittee.

The service population for CWS using a "per person" equivalent pollutant load on the treatment facilities places the current population of the area covered by this permit at over 500,000 persons for the service area. This population is based on a pollutant load estimate that takes the measured treatment plant influent BOD and assumes by using a Population Equivalency (PE) average of 0.20 lbs BOD/day/person, the population served can be calculated. Though not a census population, a treatment system with significant industrial and commercial input can use this calculation to provide a "best estimate" method for evaluating the treatment plant loading over time.

1.2. Watershed-Based Permit

For nearly a decade, the U.S Environmental Protection Agency (EPA) has been supporting and encouraging a watershed approach to addressing water quality issues. In December 2002 the EPA Office of Water issued a policy memorandum titled "Committing EPA's Water Program to Advancing the Watershed Approach" and in January 2003, the Office of Water released the "Watershed-Based NPDES Permitting Policy Statement" which discussed the benefits of

watershed-based permitting, presented an explanation of the process and options for implementation.

Watershed-based permitting is an approach to developing an NPDES permit for multiple point sources within a watershed. The primary difference between this approach and the classical approach to permitting (used for previous CWS permits) is that watershed goals and the impacts of multiple stressors can be considered.

The proposed permit integrates the previous CWS NPDES permits into one watershed-based, integrated municipal NPDES permit. This approach does not reduce any of the requirements that were contained in the previous separate permits, but it does provide a number of advantages and efficiencies, for both the DEQ and the permittee, such as:

- Enhanced opportunities for environmental results
- Targeted and maximized use of resources to achieve greatest environmental results
- Administrative efficiencies
- Opportunities for more effective watershed-wide monitoring programs
- Opportunities for water quality trading programs
- Achieving water quality goals in a more cost-effective and efficient manner

The proposed permit is the first watershed-based permit to be issued by the DEQ in the state of Oregon. The DEQ is supportive of this approach, and believes that this approach will result in more efficient and effective water resources management in the Tualatin subbasin.

1.3. Intergovernmental Cooperative Agreement

Because the watershed-based permitting approach used by the DEQ for this permit is new, an Intergovernmental Cooperative Agreement has been drafted between CWS and the DEQ in order to provide for the continuation of the development and implementation of a watershed based regulatory framework in the Tualatin River watershed. This agreement identifies a number of issues that were not developed enough to be included in this permit, and commits the parties to continue to work towards a resolution. Some of these issues may be resolved through a permit modification while others may be deferred until the next scheduled permit renewal.

2. Wastewater Treatment Facility Descriptions

2.1. Durham Advanced Wastewater Treatment Facility

The Durham AWTF was originally placed into operation in 1976. The facility has had a number of phases of expansion. The last major expansion to this facility included a fourth secondary treatment train and a new digester complex that was completed in 2001.

The major treatment process used is activated sludge. The average design dry weather flow was determined by the engineer who designed the facility. It is the estimated maximum flow during May 1 to October 31 (expressed as a daily average flow), at which the design engineer expects the treatment facility can still consistently meet all effluent limits.

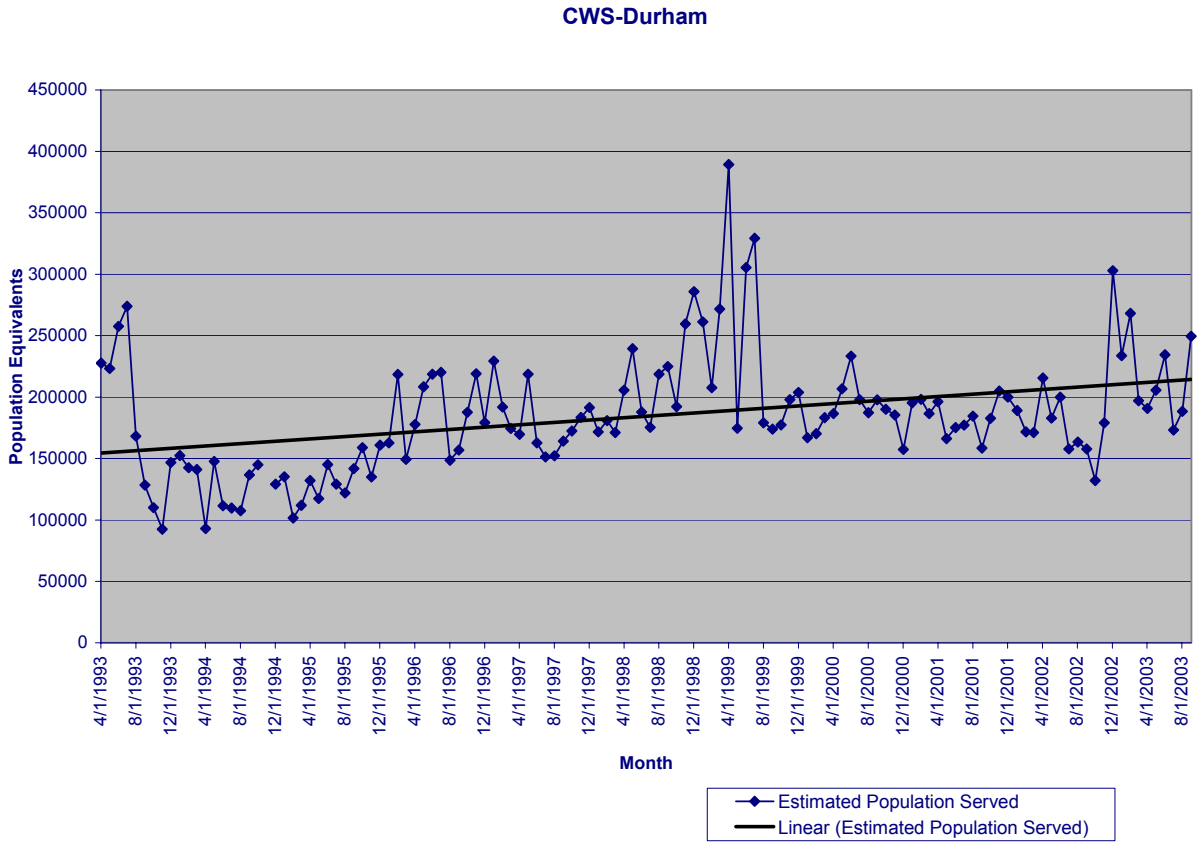
The dry weather flows do not include the high levels of infiltration and inflow that are associated with the winter in Oregon. Therefore, the design dry weather flows are used mostly to estimate how much treatment capacity there is for organic loads. For this facility, the average design dry weather flow is 22.6 million gallons/day (MGD). The current actual dry weather flow for June 1 to October 31, for the past five years, is about 17 MGD. Based on the current low flows compared to the design flows, and the lack of recurring effluent violations, no expansion of the facility is needed at this time. CWS expects continued growth within their service area and rather than wait until

effluent violations are occurring, plans to add a fifth secondary treatment train during this permit cycle.

The current average wet weather flow (November 1 through April 30), for the past five years, is about 32 MGD. The peak day flow over the past five years was 93.9 MGD. See the section on Inflow and Infiltration for a further discussion of winter flows and hydraulic capacity issues.

The permit identifies a number of new outfalls from the previous permit. These outfalls are primarily seen as the designed overflow points for pump stations within the Durham collection system. The permit includes limitations that define the design frequency for these overflow points in accordance with Oregon Administrative Rule.

A review of Population Equivalents (PE) loading at this facility since 1993 may provide a good indication of future increases to plant loading.



2.2. Forest Grove Wastewater Treatment Facility

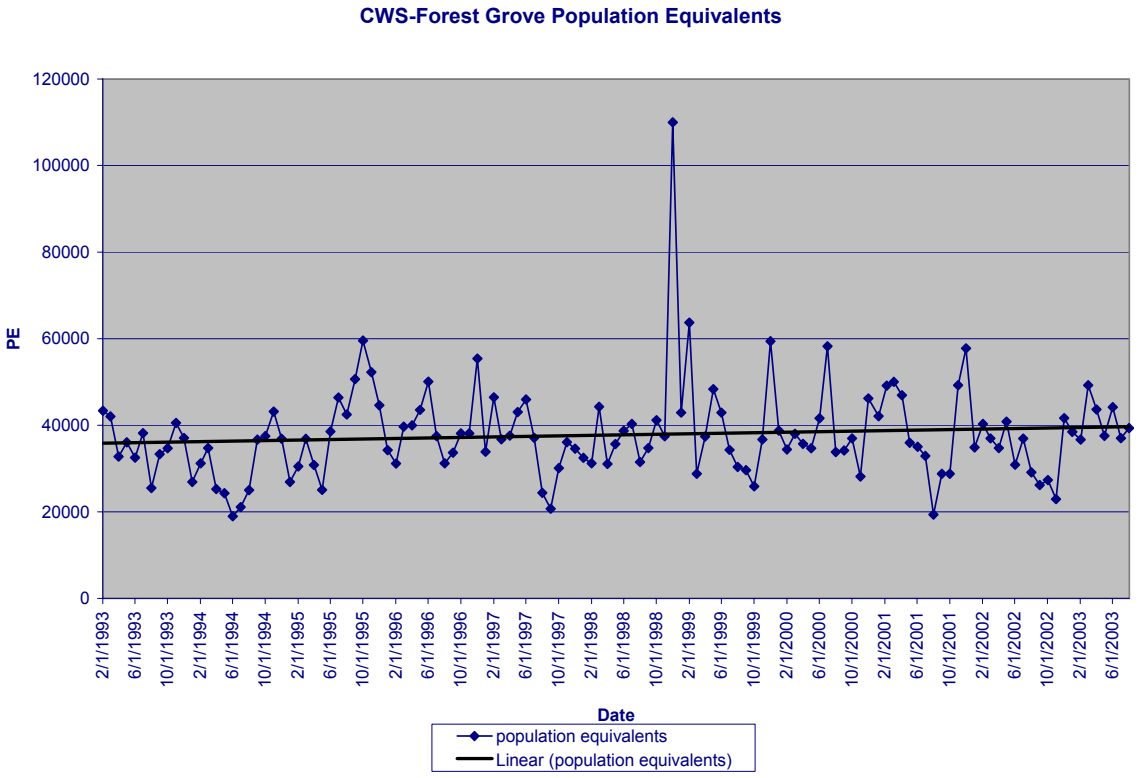
This wastewater treatment facility was originally placed into operation in 1951. In about 1975 the Unified Sewerage Agency was involved in the first major expansion/upgrade of the original facilities. The last major expansion occurred in 1997 when the aeration basin was modified to use fine bubble diffusers, the secondary clarifier was doubled in size, UV disinfection was installed and an effluent pump was added. Wastewater residual solids are transferred to the Rock Creek plant for processing into biosolids. This transfer is accommodated by the use of the twin 24-inch lines that interconnect the CWS facilities in Forest Grove and Hillsboro with the Rock Creek plant. To carry the wastewater solids requires about 1 MGD of transfer flow. With influent flows of around 2 MGD during the summer, since the installation of these lines, the Forest Grove plant has routinely shut down during the lower flow months shunting all flow to the Rock Creek facility. The facility has also used the twin 24-inch lines to shave off peak winter flows that might cause plant problems.

Flow not transferred to Rock Creek AWTF has been placed in the storage ponds. These treated wastewaters are required to meet discharge standards when placed into storage and are then either used for nursery stock irrigation as reclaimed water or released to the Tualatin River during the allowed discharge period.

The major treatment process used is activated sludge. The engineer who designed the facility determined the average design dry weather flow. It is the estimated maximum flow during May 1 to October 31 (expressed as a daily average flow), at which the design engineer expects the treatment facility can still consistently meet all effluent limits.

The dry weather flows do not include the high levels of infiltration and inflow that are associated with the winter in Oregon. Therefore, the design dry weather flows are used mostly to estimate how much treatment capacity there is for organic loads. For this facility, the average design dry weather flow is 5 million gallons/day (MGD). The current actual dry weather flow for May 1 to October 31, for the past three years, is 2.1 MGD. During wet weather (November 1 to April 30) for the past three years influent flow averaged 4.5 MGD. This facility does not discharge during the summer months, so effluent discharge limits are focused on the wet weather months. The average wet weather design flow for this facility is 8.0 MGD. As the plant is not near to approaching the design flows, the facility is not in need of expansion.

A review of the PE loading for this facility since 1993 indicates that loading has increased slightly.



2.3. Hillsboro Wastewater Treatment Facility

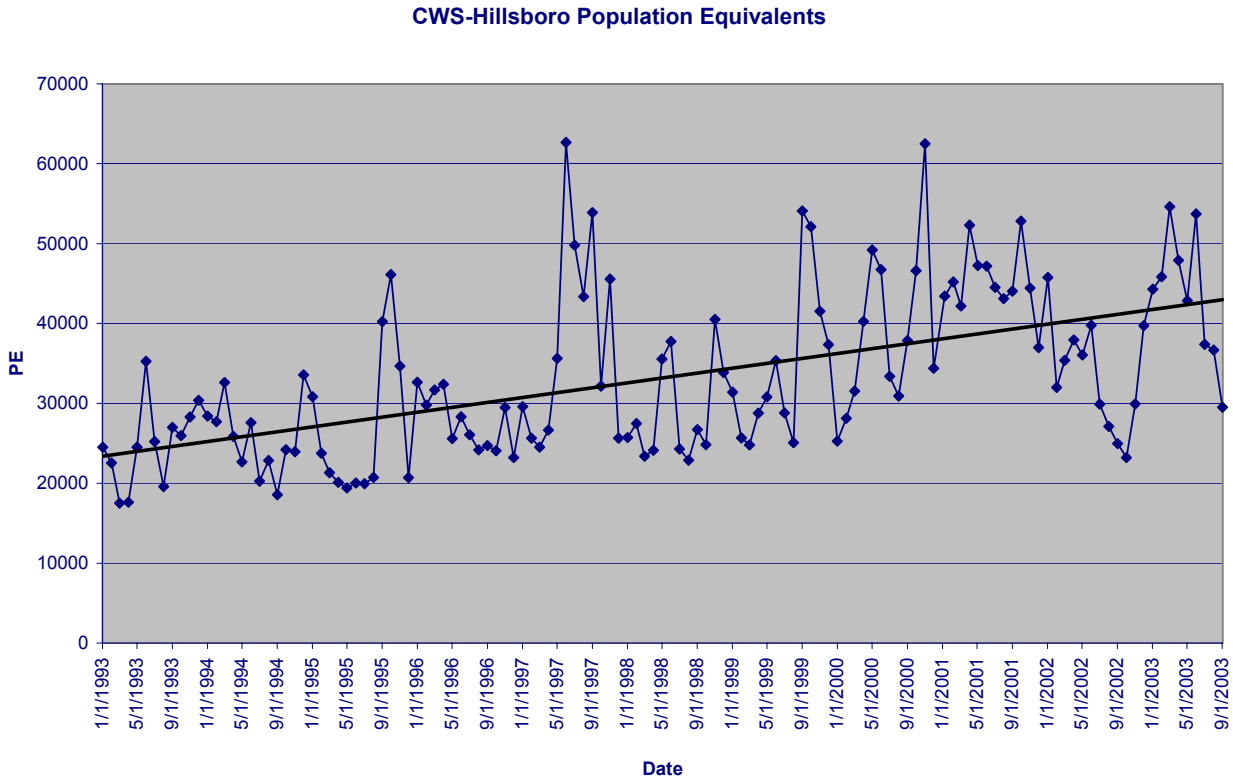
The Hillsboro WTF is also known as the Hillsboro-Westside WTF. This facility was originally placed into operation in 1971. The facility has been modified over the years with the last major change occurring in 1997 when the aeration basin was covered and modified to use fine bubble diffusers, a new secondary clarifier was added, UV disinfection was installed and an effluent pump

was added. Wastewater residual solids are transferred to the Rock Creek plant for processing into biosolids. This transfer is accommodated by the use of the twin 24-inch lines that interconnect the CWS facilities in Forest Grove and Hillsboro with the Rock Creek plant. To carry the wastewater solids requires less than 1 MGD of transfer flow. With influent flows of around 4 MGD during the summer, since the installation of these lines, the Hillsboro plant has often been shut down during the lower flow months shunting all flow to the Rock Creek facility. The facility has also used the twin 24-inch lines to shave off peak winter flows that might cause plant problems. Treated flow not transferred to Rock Creek has been placed in the storage ponds at Hillsboro and Forest Grove WTFs. These treated wastewaters are required to meet discharge standards when placed into storage and are then released to the Tualatin River during the allowed discharge period.

The major treatment process used is activated sludge. The engineer who designed the facility determined the average design dry weather flow. It is the estimated maximum flow during May 1 to October 31 (expressed as a daily average flow), at which the design engineer expects the treatment facility can still consistently meet all effluent limits.

The dry weather flows do not include the high levels of infiltration and inflow that are associated with the winter in Oregon. Therefore, the design dry weather flows are used mostly to estimate how much treatment capacity there is for organic loads. For this facility, the average design dry weather flow is 3.7 million gallons/day (MGD). The current actual dry weather flow for May 1 to October 31, for the past three years, is 4.0 MGD. During wet weather (November 1 to April 30) for the past three years influent flow averaged 5.5 MGD. This facility does not discharge during the summer months, so effluent discharge limits are focused on the wet weather months. The average wet weather design flow for this facility is 7.5 MGD. As the plant is not near to approaching the design flows, the facility is not in need of expansion.

However, a review of the PE loading for this facility since 1993 indicates that loading has increased substantially.



2.4. Rock Creek Advanced Wastewater Treatment Facility

This wastewater treatment facility was originally placed into operation in 1977. The most recent major construction phase was completed in 2003. This expansion provides adequate dry weather plant capacity through about the year 2010. Improvements in this expansion included renovation of the influent pump station, a new headworks and primary clarifiers, and improvements to the effluent filters and digester complex. The project also included a wet weather outfall to the Tualatin River.

The major treatment process used is activated sludge. The average design dry weather flow was determined by the engineer who designed the facility. It is the estimated maximum flow during May 1 to October 31 (expressed as a daily average flow), at which the design engineer expects the treatment facility can still consistently meet all effluent limits.

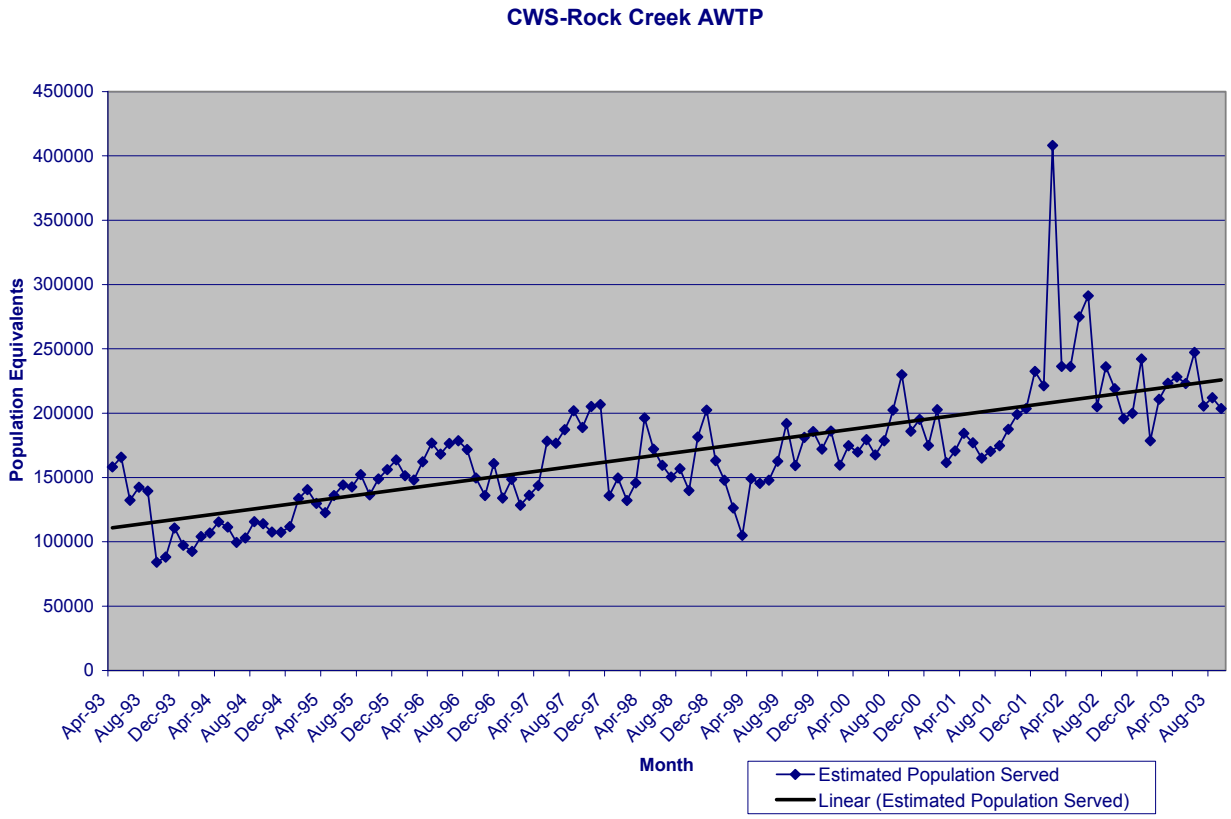
The dry weather flows do not include the high levels of infiltration and inflow that are associated with the winter in Oregon. Therefore, the design dry weather flows are used mostly to estimate how much treatment capacity there is for organic loads. For this facility, the average design dry weather flow is 39 million gallons/day (MGD). The current actual dry weather flow for June 1 to October 31, for the past five years, is 24.4 MGD.

The design average wet weather flow is 50 MGD. The current actual average wet weather flow (November 1 through April 30), for the past two years, is about 39 MGD. The peak day flow over the past two years is 119 MG. See the section on Inflow and Infiltration for a further discussion of winter flows and hydraulic capacity issues.

In 1994, the Rock Creek plant began processing solids from the Hillsboro-Westside and Forest Grove plants. Two 24-inch lines connect the three facilities allowing the transfer of solids and treated and untreated wastewater as necessary. This piping has allowed the complete treatment process shutdown

at times for the two smaller facilities during summer low flow months. This flexibility has been a benefit for construction and maintenance activities at these plant sites. The Rock Creek plant influent consists of three distinct components:
1) Base residential, commercial and light industrial flow from the Rock Creek service area.
2) Wet industry flow, consisting of dilute, high volume wastewater received from local industries year-round from the Rock Creek service area.
3) Sludge, carrier water and seasonal influent wastewater transfers from the Forest Grove and Hillsboro-Westside wastewater treatment plants.

Reviewing the population equivalent loading indicates that the facility has had almost steady growth for the past ten years. Facility expansion has continued to accommodate this growth.



2.5. Biosolids Management and Utilization

CWS has a DEQ-approved Biosolids Management Plan. The permittee thickens primary solids and return activated sludge prior to anaerobic digestion. Digested biosolids are dewatered and either sent to land application sites in the Willamette Valley or to the Madison Ranch in eastern Oregon.

No compliance issues related to biosolids have been raised during the current permit cycle.

Biosolids volatile solids reduction is the process used to demonstrate compliance with vector attraction reduction requirements. Monitoring of volatile solids reduction is proposed in the renewal permit.

Digestion of the biosolids is the process used to demonstrate compliance with pathogen reduction requirements. Monitoring the duration and temperature of biosolids digestion is proposed in the renewal permit.

In 2002 Durham AWTF reported production of 3709 dry metric tons of biosolids. CWS conducts chemical testing of biosolids to be land applied which includes analysis of metals. The latest metals monitoring data, from Durham samples taken in 2002 are found below:

Metal	As	Cd	Cu	Hg	Mo	Ni	Pb	Se	Zn
mg/kg dry weight	10.1	2.4	443	1.7	6.7	20.7	31.3	3.0	709

In 2002 Rock Creek AWTF reported production of 6426 dry metric tons of biosolids. CWS conducts chemical testing of biosolids to be land applied which includes analysis of metals. The latest monitoring data, from Rock Creek samples taken in 2002 are found below:

Metal	As	Cd	Cu	Hg	Mo	Ni	Pb	Se	Zn
mg/kg dry weight	11.3	1.3	334	1.3	1.3	20.4	23.5	2.9	552

2.6. Inflow and Infiltration (I/I)

CWS provides wastewater treatment for Washington County's metropolitan area including the cities of Banks, Beaverton, Cornelius, Forest Grove, Gaston, Hillsboro, North Plains, Tigard, Sherwood and Tualatin, the communities of Durham and King City and some unincorporated areas of Clackamas, Multnomah and Washington Counties. CWS has an ongoing I/I control program for the collection system under their control. Some cities within the CWS service area maintain the collection system within their boundaries. CWS has developed agreements with these cities to assure that maintenance and controls on the collection systems within the service area are continued. CWS has made a conscientious effort to assist the cities in reporting and addressing spills and overflows within the collection system (see the document titled "Reporting Procedures for Collection Systems Overflows or Spills" dated November 2001). Each month CWS submits reports from the communities of Beaverton, Cornelius, Forest Grove, Hillsboro, Sherwood, Tigard and Tualatin regarding the uncontrolled sewage releases from their collection systems. The permit includes a prohibition against discharges from the emergency overflow points identified within the permit unless those overflows occur under specified storms. During the winter months, the specified return frequency is a one-in-five-year, 24-hour duration storm. In the summer months the storm frequency is one-in-ten-years. It is also the Department's expectation that ongoing maintenance and operational practices will assure that the collection and treatment system s are operated with the highest and best available technology in place. The permit places the onus on the permittee to report overflow events and provide a summary of mitigation efforts taken to respond to the specific events. In addition the permit includes a reporting requirement to estimate duration and volume from each event.

At the Durham plant, the influent pump station has been identified as a hydraulic bottleneck. Even with a proactive I/I program in place, at times, peak flow conditions from the collection system have resulted in the use of an overflow structure on the Tualatin River (identified as Outfall D004). During this permit cycle, the CWS anticipates the construction of a new influent pump station to eliminate the need for raw sewage overflows. In preparation for the increased pump station capacity CWS constructed a new wet weather outfall to allow the controlled discharge of the peak hydraulic flows entering the plant. At present, the estimated peak capacity for the current outfall pipe is 104 MGD. The peak design flow of the new outfall allows for significantly increased flows to be pumped and treated through the plant.

CWS also recently upgraded the influent pump station at the Rock Creek AWTF to increase the ability to bring flow into the plant. At the same time the increased pump station capacity was constructed a new wet weather outfall to allow the controlled discharge of the peak hydraulic flows was added. The ultimate discharge from this facility with the new outfall pipe is now 278 MGD.

2.7. Industrial Pretreatment Program

CWS implements an industrial pretreatment program approved by the DEQ in 1983. Federal and state pretreatment requirements were included in the NPDES permits for these facilities when the previous permits were issued.

CWS currently permits 60 significant industrial users and 127 other industrial dischargers within their service boundary. A Pretreatment Compliance Inspection (PCI) of the industrial pretreatment program was conducted 1997. The primary focus of the PCI was to evaluate the accuracy of the information provided in previous annual reports and the adequacy of program implementation and industrial user compliance records and files. In 1999, a more comprehensive and thorough audit of the pretreatment program was completed. Following the audit, DEQ nominated CWS for EPA's National Pretreatment Award for the calendar year 2000. CWS won first place in their class and was presented the 2001 National Pretreatment Award.

2.8. Pollutants Discharged

The current permits allow Clean Water Services to discharge treated effluent year-round from the Durham and Rock Creek wastewater treatment facilities. The Forest Grove and Hillsboro facilities discharge seasonally to the Tualatin. The current permits set limits on the following pollutants: 5-day carbonaceous biochemical oxygen demand ($CBOD_5$) or 5-day biochemical oxygen demand (BOD_5), total suspended solids (TSS), fecal coliform, ammonia-nitrogen, total phosphorus, pH, dissolved oxygen and total residual chlorine.

Pollutants monitored in the municipal storm water system are listed in section 4.3 below.

The permit contains benchmarks for storm water runoff from the Durham and Rock Creek wastewater treatment facility sites for a number of pollutants, including bacteria and some metals. See section 7.6 for more information.

3. Wastewater Treatment Facility Outfalls

3.1. Durham AWTF

The Durham AWTF Outfall (D001) discharges to the Tualatin River at river mile 9.2, just upstream from the Fanno Creek tributary. The river channel at this point is described as being approximately 200 feet wide. Effluent is discharged through a 96-foot wide multi-port diffuser that was laid on the bottom of the river nearly in the center of the channel. The diffuser has twelve evenly spaced ports.

In order to address peak wet weather flow through the plant, Clean Water Services has added a wet weather outfall (Outfall D003) just downstream (35-feet) from the current outfall. The new wet weather outfall is a single port outfall from an 84-inch pipe on the north bank of the Tualatin.

The high levels of Inflow and Infiltration (I/I) in the collection system result in raw sewage overflows during some storm events. A designed overflow structure (Outfall 004) at the Tualatin River allows flows beyond the capacity of the influent pump station to overflow. Improvements to the influent pump station are being planned which will allow this plant to meet the design storm requirements established with the adoption OAR 340-41-0120. In the summer, raw sewage

overflows due to storm events less than the one-in-ten-year, 24-hour duration storm are prohibited. In the winter, raw sewage overflows due to storm events less than the one-in-five-year, 24-hour duration storm are prohibited.

3.2. Forest Grove WTF

The Forest Grove WTF discharges treated wastewater to Tualatin River at river mile 53.8 from Outfall F001. This location is near the intersection of Fernhill Road and Geiger Road about ¾ of a mile south of the treatment facility. This facility is not allowed to discharge during low flow periods in the Tualatin River. Historically the permit has limited discharge based on a calendar date. This renewal proposes to incorporate actual stream flow monitoring to determine the seasonal discharge time. Using a continuous stream gauge, it is required that the permittee discontinue discharging to the river when the seven day median value of daily mean flow is less than 250 cfs at the Tualatin River at Farmington (River Mile 33.3) or July 1st at the latest. Discharge to the stream may resume anytime after September 30th provided the seven day median of daily mean flow exceeds 350 cfs. This change is proposed because it has long been recognized that the wet weather season (which greatly influences the available stream flow) is not controlled by calendar dates and varies from one year to the next. The Department is confident that with adequate streamflow available the discharge from this facility will not contribute to or cause water quality standards violations.

3.3. Hillsboro WTF

The Hillsboro WTF discharged to Jackson Slough several hundred yards from the main river channel until outfall improvements were completed in about 1995. In 1994 a mixing zone study was completed for the Jackson Slough discharge. The study found Jackson Slough provided inadequate dilution and poor mixing for the effluent at its confluence with the river. The study recommended that effluent be piped to the Tualatin River. All flow is now piped from the plant to a splitter box at the effluent storage pond. The engineering resulted in two separate discharge pipes to the river out of the splitter box. Outfalls are about a third of a mile apart on the Tualatin River and are designated 001A at river mile 42.9 and 001B at river mile 43.3. A third pipe connection can send effluent to storage. The flow control structure determines the final destination of the treated effluent. This facility will continue to discharge to the river on a seasonal basis under the same stream flow restrictions as described previously for Forest Grove WTF.

3.4. Rock Creek AWTF

The Rock Creek AWTF (Outfall R001) is located at river mile 37.7 and is approximately 200 downstream of the confluence of Rock Creek. The diffuser pipe is located on the bottom of the river in the center of the channel. The Tualatin River is about 75 feet wide at this location. The diffuser takes up about 1/3 of the channel and consists of 12 ports spaced at 2.5 foot intervals along to outfall pipe. The new wet weather outfall pipe (Outfall R003) is a single port outfall from the 96-inch pipe on the north river bank about 50-feet downstream of Outfall R001.

4. Municipal Separate Storm Sewer System (MS4)

4.1. Description of Storm Sewer System

The MS4 operated by CWS and DLUT covers an area of approximately 75,000-acres (117 square miles). CWS and DLUT operate and maintain publicly owned storm and surface water facilities for water quality. Management practices include street sweeping, maintenance of drainage structures, storm drain pipes and their inlets, and culverts. CWS maintains over 400 miles of storm drains, and the 12 cities within the MS4 area maintain an additional 570 miles of storm drains.

4.2. Other Regulated Storm Water Activities

The DEQ and CWS entered into a Memorandum of Agreement (MOA) in 1998 which describes the responsibilities of the DEQ and CWS for the administration and regulation of storm water discharges from industrial sites. The permits that are administered for this program are general NPDES 1200-Z permits. DEQ administers the program, assigns the permits to industrial facilities, and provides first level enforcement. CWS provides technical assistance, site inspections, and reviews the facility Storm Water Pollution Control Plans (SWPCPs). Regulated industrial sites are required to monitor storm water discharges, and meet pollutant concentration benchmarks. If storm water runoff from a regulated facility exceeds a pollutant concentration benchmark, the permit required the facility to revise the SWPCP. In addition to this program, CWS also addresses industrial storm water discharges to its storm sewer system under the MS4 portion of the permit.

CWS acts as a DEQ permitting agent for urban area erosion control, receiving and reviewing permit applications and providing onsite inspection and compliance assistance. The 1200-C program covers erosion control on construction sites of 1 acre or more in size; CWS own erosion control program under the MS4 portion of the permit requires permits and erosion prevention measures for any activity that causes or is likely to cause erosion, regardless of the size of the site.

4.3. Pollutants Monitored

The CWS MS4 monitoring program includes sampling and analysis for the following pollutants:

- Biochemical Oxygen Demand
- Chemical Oxygen Demand
- pH
- Total Dissolved Solids
- Total Suspended Solids
- Soluble Ammonia Nitrogen
- Total Kjeldahl Nitrogen
- Nitrite/Nitrate Nitrogen
- Total Phosphate as Phosphorus
- Soluble Orthophosphate as Phosphorus
- Hardness as Calcium Carbonate
- Chloride
- Dissolved Cadmium
- Total Cadmium
- Dissolved Copper
- Total Copper
- Dissolved Lead
- Total Lead
- Dissolved Zinc
- Total Zinc
- *E. Coli* (bacteria)

4.4. Storm Water Management Plan

The MS4 Storm Water Management Plan (SWMP) was developed by the Unified Sewerage Agency of Washington County (USA) - now CWS - and DLUT. CWS and DLUT are currently co-permittees in an NPDES storm water permit that was issued by the DEQ in 1995. These entities have applied for a permit renewal and developed a MS4 Storm Water Management Plan to describe the programs they will use to meet their respective Federal Clean Water Act requirements for municipal separate storm sewer systems.

The MS4 SWMP provides important background information on the co-permittees, their respective organizations, their respective jurisdictions and responsibilities. Most importantly, the plan also describes how the co-permittees plan to reduce pollutants in storm water to the "maximum extent practicable" (MEP), effectively prohibit non-storm water discharges, and address water quality standards.

This permit requires the co-permittees to review their SWMP and propose revisions to those plans in the second annual report to ensure the above goals continue to be met. A public involvement process related to this review and revision shall be conducted and documented in that report.

4.5. Monitoring and Reporting

CWS currently conducts its monitoring at seven locations, representing commercial, residential, and mixed land use designations. This monitoring occurs three times during the permit year, which runs from July 1 to June 30. CWS and DLUT also conduct in-stream monitoring as part of the associated Total Maximum Daily Load (TMDL) compliance efforts. The results of the monitoring efforts, an overview of annual implementation efforts, and reporting on any required activities are to be reported on November 1 of each year.

The proposed permit will require CWS and DLUT to revise their monitoring programs to ensure specific goals (as outlined in the permit) are met. This is discussed below.

5. Water Quality Issues

5.1. Applicable Water Quality Standards

The water quality standards for the Willamette Basin (Oregon Administrative Rules 340-41-0445) are intended to be protective of the beneficial uses for the basin.

Beneficial uses occurring in the Tualatin River Subbasin *(OAR 340 – 41 – 442)*			
Beneficial Use	***Occurring***	***Beneficial Use***	***Occurring***
Public Domestic Water Supply	✓	Salmonid Fish Spawning (Trout)	✓
Private Domestic Water Supply	✓	Salmonid Fish Rearing (Trout)	✓
Industrial Water Supply	✓	Resident Fish and Aquatic Life	✓
Irrigation	✓	Anadromous Fish Passage	✓
Livestock Watering	✓	Wildlife and Hunting	✓
Boating	✓	Fishing	✓
Hydro Power		Water Contact Recreation	✓
Aesthetic Quality	✓		

The Tualatin River was identified as an impaired water body in the early 1980's which resulted in the establishment of one of the first TMDL in Oregon. In 1988 TMDLs were established for ammonia and phosphorous. In 2001, revisions were made to the ammonia and phosphorous TMDLs and new TMDLs were established for temperature, bacteria and volatile solids (to address low dissolved oxygen levels). These permits include effluent limits that are consistent with the assumptions and requirements of the wasteload allocations in the TMDLs.

5.2. Antidegradation

An antidegradation review must be made for an NPDES permit renewal. The proposed permit discharges to a water quality limited water body and incorporates permit requirements based on the assigned waste load allocations from the TMDL to maintain water quality standards. The proposed permit does not allow for an increase in mass load limits from the previous permit.

5.3. Temperature

The applicable temperature standard for the Tualatin River and tributaries, set to protect salmonid fish rearing, is "no measurable surface water temperature increase resulting from anthropogenic activities".

As part of the development of the temperature TMDL, system potential temperatures were developed for the various streams in the Tualatin. The system potential temperature is the temperature that modeling indicates would occur if riparian areas throughout the system consisted of site potential vegetation. For the Tualatin, the system potential temperature during the critical summer period at the discharge point for the Rock Creek AWTP is 58.5 degrees F, and for Durham it is 64.6 degrees F. The treatment facilities wasteload allocations were based on achieving "no measurable increase" in stream temperature at the edge of the mixing zones. A measurable increase is defined as greater than a 0.25^{o} F increase at the edge of the mixing zone using the

applicable stream temperature standard. The excess thermal loads for the plants were developed relative to these temperatures and the wasteload allocations.

Additionally, the discharges may not cause the receiving water within the mixing zone to exceed 77° F at any time. Temperatures above this are considered to be acutely harmful to salmonids.

CWS has developed a temperature management plan (attached to this report) to address temperature concerns at the wastewater treatment facilities. Conditions included in the permit will require effluent and stream temperature monitoring.

At times, the effluent will cause a measurable increase of temperature at the edge of the mixing zone. For this reason, the permittee has been assigned a wasteload allocation in the approved TMDL for the receiving stream. This allocation, modified as allowed by the TMDL document (see section 8.2), has been included in the proposed permit as a thermal load to be offset. The permit includes requirements for the permittee to revise the Temperature Management Plan (TMP) approved by the Department to include a number of watershed temperature management elements. These elements will describe and explain how the permittee will manage and implement its measures for offsetting the thermal load from the wastewater treatment facilities, including the following elements:

a. A description of the cooling benefits of flow augmentation.
b. A description of long range plans for increasing in-stream water supply within the watershed.
c. An explanation of how an increase in stream shade that will result from riparian re-vegetation will offset thermal load discharges from the permittee's facilities.
d. A description of how stream shade in existing high quality riparian areas will be protected to offset thermal load discharges from the permittee's facilities.
e. An explanation of how and when stream surface area shading via riparian revegetation will be accomplished. This information will be used to form the basis for compliance with the permit during the time it takes for shade to become established.
f. A methodology for prioritizing areas throughout the Tualatin Basin where riparian re-vegetation/protection could take place in order to maximize the benefits of the proposed projects for the protection of the most sensitive beneficial uses. It is understood that the receipt of credit for riparian re-vegetation/protection will not be affected by whether these actions occur in priority areas.
g. Criteria for plant selection and the plant list. The plants on the list must be appropriate given the native plant communities found in the Tualatin Basin.
h. An approach for working with potential growers and contractors involved in riparian restoration so that adequate plant materials are available, and contractors have adequate time to mobilize resources.
i. A description of the kinds of approaches that will be implemented to reach the target increase in stream shade.
j. A planting plan. The plan should include expected plant survival rates and justification for planting densities, and should reflect natural succession.
k. A monitoring plan to assess plant survival.
l. A monitoring plan to assess the amount of shade that is created; and
m. A maintenance plan that will promote plant survival and reduce the impact of invasive species.

The revised TMP will also include a Thermal Load Credit Trading Plan (TLCTP). This plan will describe the mechanisms for using water quality credit trading to offset thermal loads. Section 8 of this document contains more information on the water quality trading portions of the permit.

Provided the permittee complies with the schedule and other conditions of the approved Temperature Management Plan, the permittee is in compliance with this proposed permit and the applicable stream criteria for temperature.

5.4. Ammonia and Phosphorus

As a result of the original TMDL, CWS has been required to control the concentration of nutrients discharged to the Tualatin River. The TMDL was originally developed for phosphorus and ammonia by the DEQ in 1988, approved by EPA in 1994 and revised by the DEQ in 2001. Excessive phosphorus levels can contribute to excessive algal growth which affects aesthetics, reduces water clarity, may impact dissolved oxygen levels, and can restrict water contract recreation. Excessive ammonia reduces the level of dissolved oxygen in the river which stresses the aquatic organisms. This document does not intend to reopen the discussion of these parameters. To review these parameters more thoroughly please see the Tualatin TMDL document dated August, 2001. The ammonia and phosphorous permit limits proposed for this permit renewal are intended to reflect the revised TMDL.

5.5. Toxics

Effluent sampling along with bioassay (whole effluent toxicity or WET) testing has been used to evaluate these facilities potential for exceeding water quality standards for toxic components in their discharge. DEQ's review of this monitoring data indicates that there is no reasonable potential to exceed water quality standards with this discharge. Ongoing sampling requirements for toxics and WET testing are continued in this permit.

5.6. Groundwater

The Durham and Rock Creek AWTFs do not have unlined wastewater storage basins and are not expected to have any groundwater impacts at the treatment plant sites. Reclaimed water is applied at agronomic rates in accordance with the CWS reclaimed water use plan.

Treated wastewater is held in three wastewater impoundments adjacent to this Forest Grove WTF. These storage ponds are adjacent to the Fernhill wetlands and the Tualatin River. Wastewater is placed in these ponds during periods when flows cannot be irrigated, transferred or discharged to the river. The treated effluent remains in these ponds until high flows in the river allow them to be discharged. No assessment of groundwater impacts has been made for these impoundments.

At the Hillsboro WTF treated wastewater can be held in the 14-acre Jackson Bottom wastewater impoundment adjacent to the Tualatin River. Additional amounts of wastewater are used to maintain water levels in various wildlife ponds within Jackson Bottom. Wastewater is placed in these ponds during periods as necessary or when flows cannot be irrigated, transferred or discharged to the river. No assessment of groundwater impacts has been made for these impoundments.

5.7. Storm Water

Previous to this proposed permit, separate general NPDES permits addressed storm water runoff at the Durham and Rock Creek sites. These permit requirements have been included in this watershed-based permit. At Hillsboro and Forest Grove, all plant site storm water is captured and processed as part of the wastewater stream .

6. Permit History

6.1. Wastewater Treatment Facilities

This permit renewal proposes to retain the existing concentration and mass limits from the previous permits for CBOD and TSS. Because of a rule change, the standard for disinfection assessment was changed to *E. coli* from fecal coliform. As a result of the 2001 TMDL, changes to the permit have been included to reflect the new wasteload allocations assigned for phosphorus and ammonia. The 2001 TMDL also resulted in limitations for thermal load in this permit.

6.2. Municipal Separate Storm Sewer System (MS4) Permit

This MS4 permit was originally issued on July 26, 1995, and requires the implementation of a storm water management plan to control the discharge of pollutants from the municipal storm sewer system to the maximum extent practicable. DLUT and ODOT were co-permittees with CWS on this permit. The language for the MS4 permits in Oregon has recently been revised by the DEQ, and the MS4 language in this permit is based on that revision.

6.3. 1200-Z Industrial Storm water Permit

The DEQ assigned coverage to the Rock Creek and Durham AWTFs under the 1200-Z storm water permit for discharges of storm water from the treatment plant sites. The 1200-Z language for these two plants has been included in this watershed-based integrated municipal permit. Forest Grove and Hillsboro WTFs were previously assigned coverage under a 1200-Z permit for discharge of storm water. Storm water runoff at the Forest Grove and Hillsboro WTFs is now routed into the headworks of the plants, so no storm water permit is necessary for these facilities.

7. Permit Compliance History

7.1. Durham AWTF

The Durham AWTF was last inspected September 23, 2002, and was found to be operating in compliance. The monitoring reports for this facility were reviewed for the period since the current permit was issued, including any actions taken relating to effluent violations. The permit compliance conditions were reviewed and all inspection reports for the same period were reviewed. Notices of Noncompliance (NON) were issued for effluent violations noted in 1993 and in 1999. In 1993 the violations were the result of construction activities associated with treatment plant upgrades. A Notice of Permit Violation (WQMW-NWR-93-257) was issued in response to these violations. With the completion of those upgrades no further similar violations occurred. In 1999, effluent violations for total residual chlorine resulted in two NONs. These events occurred as the result of controller failures on the dechlorination system. In response to these events some disinfection system improvements were completed in 2000. In 2002, during maintenance work a discharge of highly chlorinated water to the storm sewer system occurred at this facility. A NON (WQ-NWR-02-0034) was issued followed by civil penalty assessment (WQ/M-NWR-02-107) as a result of this event. Later in 2002, a NON (WQ-NWR-02-0045) was issued for exceedence of a monthly median phosphorous limit. This violation was considered attributable to an upset condition at the facility and resulted in no further DEQ action.

7.2. Forest Grove WTF

The Forest Grove WTF was last inspected March 12, 2003, and was found to be operating in compliance. The monitoring reports for this facility were reviewed for the period since the current permit was issued, including any actions taken relating to effluent violations. The permit compliance conditions were reviewed and all inspection reports for the same period were reviewed. Based on this review, the following violations have been documented at this facility during the term of the current permit.

Date of Violation	Type of Enforcement Action	Description of Violation

October 23,1993	Notice of Noncompliance	effluent limit violations
March 6, 1995	Notice of Noncompliance	effluent limit violations
April 24, 1995	Notice of Permit Violation	previous effluent limit violations
May 16, 2001	Notice of Noncompliance	unpermitted discharge resulted from operational error
August 8, 2001	Civil penalty	unpermitted discharge due to operational error

The earlier violations were corrected through facility modification. The recent violations were the result of operator error. These type events are preventable. Action by the DEQ and CWS was taken to address these issues

7.3. Hillsboro WTF

The Hillsboro WTF was last inspected March 12, 2003 and was found to be operating in compliance. The monitoring reports for this facility were reviewed for the period since the current permit was issued, including any actions taken relating to effluent violations. The permit compliance conditions were reviewed and all inspection reports for the same period were reviewed. Based on this review, the following violations have been documented at this facility during the term of the current permit.

Date of Violation	Type of Enforcement Action	Description of Violation
September 29,1993	Notice of Noncompliance	effluent limit violations
October 22,1993	Notice of Noncompliance	effluent limit violations
February 11, 1997	Notice of Noncompliance	effluent limit violations
April 10, 1997	Notice of Noncompliance	effluent limit violations

These violations were corrected through a change in operation and/or facility modification.

7.4. Rock Creek AWTF

The Rock Creek AWTF was last inspected March 12, 2003, and was found to be operating in compliance. The monitoring reports for this facility were reviewed for the period since the current permit was issued, including any actions taken relating to effluent violations. The permit compliance conditions were reviewed and all inspection reports for the same period were reviewed. Since issuance of the permit in 1993, five Notices of Noncompliance and one Notice of Permit Violation (WQMW-NWR-95-019) have been issued for this facility. The most recent violation was in June 2000, when the effluent limit for total residual chlorine was exceeded. This violation was attributed more to a malfunction of the continuous monitoring equipment than to an actual effluent violation. Other violations have been addressed through facility upgrades and process improvements over the years

In 1998, a sewage overflow from the CWS conveyance system in the City of Beaverton resulted in a Notice of Noncompliance and a Notice of Permit Violation (WQ/M-NWR-98-77). In response to this enforcement action CWS expanded their efforts to assure that all the cities within their service area have a consistent and responsible approach to addressing sewage conveyance system problems. This effort resulted in the identification of some explicit preventative measures and improved notification and safety procedures. Included with the application materials from CWS was a document entitled “Reporting Procedures for Collection Systems Overflows or Spills” revised 12/11/2001.

In 2003, a NON (WQ-NWR-03-0049) was issued for a daily maximum effluent mass limitation violation. CWS provided the DEQ with an in-depth evaluation of this event and the DEQ took no further action based on the explanation.

The above violation or violations have been corrected. Therefore, the DEQ considers this permittee to be in substantial compliance with the terms of the current permits.

7.5. Municipal Separate Storm Sewer System (MS4)

In the life of the MS4 permit CWS and DLUT have maintained compliance with this permit and have received no violations.

7.6. Industrial Storm Water Permit (1200-Z) for Rock Creek and Durham AWTFs

Rock Creek AWTF 1200 Z

The Rock Creek AWTF has 4 storm water outfalls. These outfalls have met compliance with 7 of the 9 benchmarks for the past 10 years. Compliance parameters have been met for metals, pH, Oil & Grease, and visuals. Benchmarks were not achieved 4 times on 2 outfalls for total suspended solids (TSS). The SWPCP was reviewed for this facility and it was determined that construction practices were the cause of the elevated levels. Best Management Practices (BMPs) were adapted and benchmarks have been achieved since then. As for bacteria, 1 outfall has not achieved its benchmark 5 times for E. coli (fecal coliform).

Durham AWTF 1200 Z

The Durham AWTF has 2 storm water outfalls. These outfalls have met compliance with 7 of the 9 benchmarks for the past 10 years. Compliance parameters have been met for metals, pH, Oil & Grease, and visuals. Benchmarks were no achieved 3 times at both outfalls for TSS. CWS has reviewed the SWPCP for this facility and determined that construction practices were the cause of the elevated levels. BMPs were adapted and benchmarks have been achieved since then. The bacteria benchmark has not been achieved at one outfall a total of 4 times. The second outfall hasn't achieved its benchmark 5 times. There is a large population of geese that reside at this facility. Also the public walk pets in an area located above the discharge outfall. CWS is currently conducting studies to try to identify the bacteria sources.

8. Water Quality Trading in the Tualatin Watershed

8.1. Water Quality Trading Program

A water quality trading program is authorized by the permit. Details of the program are included in Schedules A, C, and D of the permit. In particular, the trading program has received a review for compliance with the antidegradation and antibacksliding provisions of the Oregon Administrative Rules and the Clean Water Act.

The DEQ has reviewed the water quality credit trading program authorized by the permit as required by OAR 340-041-0026 and has concluded the trading authorized under this schedule will not result in a degradation of existing water quality.

If the permittee reduces loadings of a pollutant at a wastewater treatment facility to levels below the waste discharge limitations applicable to the individual facility, as specified in Schedule A , for any purpose, including generating a tradable credit under the provisions of this schedule, then later discontinues the reduction in pollutant loadings, the discontinuation shall not invoke/constitute antibacksliding as defined under the provisions of Section 402(O) of the federal Clean Water Act.

All water quality credit trading for the pollutants authorized by the permit shall occur within the area established by the August 2001 Tualatin Subbasin TMDL (inclusive of the tributaries). In particular, the area covered by the TMDL corresponds to the fourth field hydrologic unit code (HUC) 170900.10 which includes all lands that drain to the Tualatin River. The TMDL area also includes the Lake Oswego Drainage Basin.

Water quality trading is a tool that can be used to achieve watershed goals in a more economical way. More detailed descriptions of concepts and benefits of trading can be found in recent guidance from the United States Environmental Protection Agency (USEPA), both national[1] and specific to the northwest region.[2]

Details of trading processes for two separate water quality parameters (1) temperature and (2) oxygen-demanding materials are presented below.

8.2. Temperature Trading

The 2001 TMDL for temperature requires CWS to reduce the temperature impact of its treatment plants on the Tualatin River. The technological control option that would be sufficient to completely eliminate the temperature impact would be to install refrigeration equipment to cool the effluent. This would not only be extremely expensive, but it would have negative consequences for the environment.

CWS has estimated that it would cost between $60 to $150 million to install the necessary refrigeration equipment at both treatment plants. Yearly operational costs would be between $2.5 and $6 million. Significant amounts of electricity would be required to power the refrigeration equipment. If the electricity came from hydroelectric dams, salmon migration would be impacted. Electricity from conventional power plants would increase air pollution and contribute to global warming. In addition, the water quality benefits of refrigeration would be limited to a very small part of the watershed, the part of the Tualatin River that lies directly downstream of the treatment plants.

Because of the expense associated with refrigeration, the environmental side effects and the limited environmental benefit, DEQ and CWS have decided to consider water quality trading for dealing with the excess thermal load from the CWS treatment plants.

CWS is proposing three methods to meet its permit requirements for temperature and is continuing to explore other opportunities. The proposed methods all involve trading in one form or another.

Effluent reuse in lieu of irrigation withdrawals is proposed for the irrigation of non-food crops. Under this approach, willing farmers would trade their water rights in local streams or their right to stored water in Scoggins Reservoir for effluent. This would maintain current flow levels in the Tualatin and its tributaries while reducing temperature. Effluent reuse is widely-practiced throughout the state.

Another proposed approach is **flow augmentation**. CWS owns flow augmentation water in Scoggins and Barney reservoirs that it currently releases during the low-flow summer months. The release of this water can be managed to partially offset its temperature impacts. This water is cooler than the Tualatin River up until sometime in August and has a direct cooling impact while this is the case. It also helps cool the river by increasing the amount of flow. Increased flow helps reduce warming from the sun because the water is deeper and moves faster. The impact of flow

[1] USEPA, Water Quality Trading Policy, January 2003

[2] USEPA Region 10, Water Quality Trading Assessment Handbook: EPA Region 10's Guide to Analyzing Your Watershed, July 2003

augmentation will have to be quantified to establish the appropriate level of credit. The TMDL report contains an example of how flow augmentation from Hagg Lake benefits the river in July.

Riparian shading, which basically means planting trees along streams, is also being proposed. When the surface of the river is shaded, the sun is not able to warm the water. There are many miles of stream in the Tualatin Sub-basin that lack adequate shade. Shading areas highest in the basin would be the most efficient strategy because it is easier to prevent water from heating up than to cool it after it has been heated. Increasing shade also provides ancillary benefits, such as reduced erosion and increased wildlife habitat.

Increases in stream shade will likely be a significant means of generating heat load credits. CWS will develop and implement programs that provide incentives for landowners to plant shade-producing vegetation along streams, and to retain existing shade-producing vegetation also. When possible, these programs will build upon existing programs, such as the USDA's Conservation Reserve Enhancement Program (CREP) and Environmental Quality Incentives Program (EQUIP). Most programs will be implemented through agreements with third parties.

Each program will contain incentives specifically tailored to the needs of one or more landowner groups, such as urban, agricultural and small woodland property owners. Incentives may include cost sharing assistance, free vegetation and related planting materials, program enrollment payments, land/easement acquisition, and the purchase of plant cuttings from landowners.

The heat load calculations included in the final Tualatin TMDL (Table 9 of the TMDL report) are subject to modification for permitting purposes per the footnote for Table 9. The DEQ has adjusted the following parameters with new or updated information, and has recalculated the heat load to offset for the Durham and Rock Creek treatment facilities, and these values are included in the permit as the heat load to offset for each facility.

- Effluent flows representative of the upcoming permit cycle (i.e., next five years);
- Effluent temperatures;
- River design flows; and
- River/effluent mixing/dilution factors.

Under the Thermal Load Credit Trading Plan (TLCTP) required to be developed by CWS under Schedule C of the permit, CWS will be expected to generate tradable thermal credits for: 1) release of stored water; and 2) establishment of effective stream surface area shading. Other mechanisms for generating thermal credits may also be proposed by the permittee, subject to DEQ approval.

It is anticipated that the number of thermal credits that CWS will be required to achieve via stream shading will be determined based on what they are able to achieve via other means. The duration of the credit for shading will be 20 years. This was established by the DEQ based on consideration of local conditions and other options available to CWS. In the Tualatin Sub-basin, areas with less-than-adequate shade are commonly dominated by Himalayan blackberry. Local experts on riparian vegetation agree that this forms an extremely stable monoculture and shade producing vegetation consisting of overstory trees will not develop in such areas unless there is active planting. One could argue that if this is the case, then CWS should get credit for the trees they plant for as long as they make sure the trees stay planted. However, to do so would be considered double-counting, that is, giving CWS credit for shade that should ultimately be the responsibility of nonpoint sources in the basin. In light of this, DEQ has decided to limit the duration of the credit to 20 years, which is approximately equal to the useful life of mechanical refrigeration equipment.

The magnitude of the credit will depend on the amount of shaded stream surface that CWS is able to achieve. DEQ has proposed the following methodology for evaluating the impact of shade:

Heat load offset by shade =
Area of Stream Shaded x Increase in Shade Density x Solar Insolation Rate

This calculation would have to be done for each riparian restoration project that CWS undertakes, and then a total for all the projects would have to be determined.

Here is some explanation of the terms in this equation.

Area of Stream Shaded = Average Stream Width x Stream Length

Increase in Shade Density = Current Shade Density – Initial Shade Density

Solar Insolation Rate. According to a map of solar insolation rates from the Department of Energy, the solar insolation rate during the critical period in the Tualatin Basin is 6 kwh/m^2day. This translates to 479 kcal/ft^2day

The TLCTP to be submitted by CWS as per schedule C in the permit may contain alternative approaches to evaluating shade. The TLCTP, which will be part of the TMP, will be subject to public review and comment.

To compensate for the fact that the heat load offset by shading will take years to establish, the Department has decided that at the end of the 20 years that the credit for shading is in effect, the offset heat load must be two times the actual thermal load to be offset.

The equation that gives the thermal credits that will be required from stream surface shading is as follows:

2 x [Thermal Load to be offset (Rock Creek) – Thermal Load associated with any Rock Creek Reuse - Thermal Credits from Stored Water release (as expressed at Rock Creek)] + 2 x [Thermal Load to be offset (Durham) – Thermal Load associated with any Durham Reuse - Thermal Credits from Stored Water release (as expressed at Durham)]

The TLCTP will provide a calculation of this area of stream surface for planning purposes.

8.3. Oxygen-Demanding Materials

Oxygen-demanding materials include carbonaceous biochemical oxygen demand (CBOD)[3] and nitrogenous oxygen demand[4] (mostly from ammonia). The Tualatin TMDL also set caps on ammonia discharges to ensure that there is ample dissolved oxygen in the river for fish and other aquatic life. Similar to temperature, oxygen-demanding materials can be traded between the AWTFs, and between CBOD and ammonia for a given AWTF, using computer models and/or mathematical formulas that account for the methods and rates by which these materials are naturally processed in the river. Oxygen-demanding materials trading is more complicated than temperature trading because CBOD and ammonia are processed in the river at different rates and also have different amounts of oxygen demand for each pound of material. However, these

[3] CBOD is a laboratory measurement of the amount of oxygen consumed by microorganisms as they decompose organic materials in a water sample over time, usually 5 days ($CBOD_5$); it also measures oxygen consumed by chemical reactions; it is measured as mass of dissolved oxygen (in milligrams) per volume of water (liters), or mg/L; the "carbonaceous" version of the test uses an additive that suppresses microorganisms that consume oxygen by decomposing nitrogen compounds

[4] NBOD is a measure of the mg/L of dissolved oxygen consumed by microorganisms that decompose nitrogen-containing materials; it is often determined indirectly by measuring nitrogen-containing materials such as ammonia.

processes are well understood for the Tualatin River based on extensive data and model development by the United States Geological Survey (USGS). The TMDL caps were based on these models and formulations.

The extensively-validated knowledge of these processes in the Tualatin River allow trades of equivalent oxygen-demand between and within the AWTFs while still ensuring that ample oxygen is available in the river at all locations. One way of understanding and managing this trading process is to calculate equivalence at a given point downstream (for example, at Oswego Dam). Rock Creek AWTF is further upstream than the Durham AWTF, thus, a pound of CBOD at Rock Creek AWTF will cause more oxygen-demand in the river between the discharge point and Oswego Dam than a pound of CBOD discharged at Durham AWTF. Ammonia is processed about twice as fast in the river as compared to CBOD, and uses about four times as much oxygen for each pound of CBOD.[5]

Schedule A of the permit contains a methodology for trading oxygen demanding parameters (CBOD and ammonia) between the Durham and Rock Creek AWTFs. This methodology is based on a combined Rock Creek and Durham oxygen demand load limitation expressed at Oswego Dam. This load limitation is calculated using a table containing information on the fraction of Durham and Rock Creek effluent CBOD and ammonia that is decayed at Oswego Dam for a series of river flows and temperatures. The actual combined discharge of CBOD and ammonia is compared with the load limitation to verify that a trade is allowable by the permit.

9. Discussion of NPDES Permit

9.1. Cover Pages

The permittee is authorized to:

- Construct, install, modify, or operate a wastewater collection, treatment, control and disposal system. Permits discharge of treated effluent to the Tualatin River and by spray irrigation within limits set by Schedule A and the following schedules. Lists emergency outfalls. All other wastewater discharges are prohibited.
- Construct, install, modify, or operate municipal storm water collection, treatment, control, and disposal system, and discharge storm water to public waters in accordance with all the requirements, limitations, and conditions set forth in the permit.
- Discharge storm water from the Rock Creek and Durham AWTF sites in accordance with all the requirements, limitations, and conditions set forth in the permit.

9.2. Schedule A – Waste Discharge Limitations

9.2.1. $CBOD_5$ and TSS Concentration and Mass Limits for Wastewater Treatment Facilities

Based on the Willamette Basin minimum design criteria, wastewater treatment resulting in a monthly average effluent concentration of 10 mg/L for BOD_5 and TSS must be provided during periods of low stream flow (summer). During periods of high stream flow (winter), a minimum of secondary treatment or equivalent control is required. Secondary treatment is defined as monthly average concentration limit of 30 mg/L for BOD_5 (or 25 mg/L for $CBOD_5$) and 30 mg/L for TSS.

For the Durham AWTF, the Department is proposing concentration limits at least as stringent as the basin minimum design criteria. The proposed monthly average summer $CBOD_5$ concentration limit is 5 mg/L with a weekly average limit of 8 mg/L. The proposed monthly average summer TSS concentration limit is 5 mg/L with a weekly average limit of 8 mg/L. The proposed monthly average winter $CBOD_5$ concentration limit is 10 mg/L with a weekly average limit of 15 mg/L. The

[5] Measured as ammonia rather than as nitrogenous oxygen demand

proposed monthly average winter TSS concentration limit is 10 mg/L with a weekly average limit of 15 mg/L.

For Forest Grove WTF and Hillsboro WTF, the proposed monthly average winter BOD_5 concentration limit is 20 mg/L with a weekly average limit of 30 mg/L. The proposed monthly average winter TSS concentration limit is a concentration limit of 20 mg/L with a weekly average of 30 mg/L.

For the Rock Creek AWTF, the proposed monthly average summer $CBOD_5$ concentration limit is 8 mg/L with a weekly average limit of 11 mg/L. The proposed monthly average summer TSS concentration limit is 8 mg/L with a weekly average limit of 11 mg/L. The proposed monthly average winter $CBOD_5$ concentration limit is 20 mg/L with a weekly average limit of 30 mg/L. The proposed monthly average winter TSS concentration limit is 20 mg/L with a weekly average limit of 30 mg/L.

All mass load limitations are based on the previous permit. Though the DEQ recognizes that these facilities have expanded treatment capacity in some cases to accommodate growth and development within its service area, EQC policy [OAR 340-041-0026(2)] requires that CWS accommodate this expansion through increased efficiency and effectiveness of waste treatment and control.

<u>$CBOD_5$ and TSS</u>
The limits are:

(1) Dry weather (summer):

Facility	Parameter	Average Effluent Concentrations		Monthly Average lb/day	Weekly Average lb/day	Daily Maximum Lbs
		Monthly	Weekly			
Durham	$CBOD_5$	5 mg/L	8 mg/L	830	1300	1900
	TSS	5 mg/L	8 mg/L	830	1300	1900
Rock Creek	$CBOD_5$	8 mg/L	11 mg/L	1300	1900	2500
	TSS	8 mg/L	11 mg/L	1300	1900	2500

(2) Wet weather (winter):

Facility	Parameter	Average Effluent Concentrations		Monthly Average lb/day	Weekly Average lb/day	Daily Maximum Lbs
		Monthly	Weekly			
Durham	$CBOD_5$	10 mg/L	15 mg/L	3500	5300	7000
	TSS	10 mg/L	15 mg/L	3500	5300	7000
Forest Grove	$CBOD_5$	20 mg/L	30 mg/L	1300	2000	2700
	TSS	20 mg/L	30 mg/L	1300	2000	2700
Hillsboro	$CBOD_5$	20 mg/L	30 mg/L	1300	2000	2600
	TSS	20 mg/L	30 mg/L	1300	2000	2600
Rock Creek	$CBOD_5$	20 mg/L	30 mg/L	7000	10500	14000
	TSS	20 mg/L	30 mg/L	7000	10500	14000

Example calculations:

(1) Summer $CBOD_5$

(a) 20 MGD x 8.34 lbs/gal x 5 mg/L monthly avg. = 834 lbs/day (rounded to 830 lbs/day)
(b) 834 lbs/day monthly avg. x 1.5 = 1252 lbs/day weekly avg. (rounded to 1250 lbs/day)
(c) 834 lbs/day monthly avg. x 2.0 = 1878 lbs/day daily max. (rounded to 1900 lbs/day)

(2) Summer TSS

(a) 20 MGD x 8.34 lbs/gal x 5 mg/L monthly avg. = 834 lbs/day (rounded to 830 lbs/day)
(b) 834 lbs/day monthly avg. x 1.5 = 1252 lbs/day weekly avg. (rounded to 1250 lbs/day)
(c) 834 lbs/day monthly avg. x 2.0 = 1878 lbs/day daily max. (rounded to 1900 lbs/day)

(3) Winter $CBOD_5$

(a) 42 MGD x 8.34 lbs/gal x 10 mg/L monthly avg. = 3500 lbs/day
(b) 3500 lbs/day monthly avg. x 1.5 = 5300 lbs/day weekly avg.
(c) 3500 lbs/day monthly avg. x 2.0 = 7000 lbs/day daily max.

(4) Winter TSS

(a) 42 MGD x 8.34 lbs/gal x 10 mg/L monthly avg. = 3500 lbs/day
(b) 3500 lbs/day monthly avg. x 1.5 = 5300 lbs/day weekly avg.
(c) 3500 lbs/day monthly avg. x 2.0 = 7000 lbs/day daily max.

A review of recent monitoring data (see Attachments #1-#4) indicates the permittee should be able to comply with the permit limits.

No changes from the previous wastewater treatment plant permits are proposed.

9.2.2. $CBOD_5$ and TSS Percent Removal Efficiency for Wastewater Treatment Facilities

A minimum level of percent removal for $CBOD_5$ and TSS for municipal dischargers is required by the Code of Federal Regulations (CFR) secondary treatment standards (40 CFR, Part 133). An 85 percent removal efficiency limit is included in the proposed permit to comply with federal requirements. An examination of the DMR data indicates the permittee will have little difficulty meeting the limit with the current facilities.

9.2.3. pH for Wastewater Treatment Facilities

The Willamette Basin Water Quality Standard for pH is found in OAR 340-41-0445(2) (d). The allowed range is 6.5 to 8.5. The proposed permit limits pH to the range 6.0 to 9.0. This limit is based on Federal wastewater treatment guidelines for sewage treatment facilities, and is applied to the majority of NPDES permittees in the state. Within the permittee's mixing zone, the water quality standard for pH does not have to be met. It is the Department's belief that mixing with ambient water within the mixing zone will ensure that the pH at the edge of the mixing zone meets the standard, and the Department considers the proposed permit limits to be protective of the water quality standard.

9.2.4. Bacteria for Wastewater Treatment Facilities

The proposed permit limits are based on an E. coli standard approved in January 1996. The proposed limits are a monthly geometric mean of 126 E. coli per 100 mL, with no single sample exceeding 406 E. coli per 100 mL. The new bacteria standard allows that if a single sample exceeds 406 E coli per 100 mL, then the permittee may take five consecutive re-samples. If the log mean of the five re-samples is less than or equal to 126, a violation is not triggered. The re-sampling must be taken at four-hour intervals beginning within 28 hours after the original sample was taken.

The proposed effluent limits are achievable through proper operation and maintenance.

9.2.5. Chlorine Residual for Wastewater Treatment Facilities

Disinfection of the effluent with chlorine is the process the permittee uses to comply with the waste discharge limitations for bacteria at the Durham and Rock Creek AWTFs. Chlorine is a known toxic substance and as such is subject to limitation under Oregon Administrative Rules. The rule (OAR 340-41-0445(2)(p)) states in part that toxic substances shall not be discharged to waters of the state at levels that adversely affect public health, aquatic life or other designated beneficial uses. In addition, levels of toxic substances shall not exceed the criteria listed in Table 20 which were based on criteria established by the EPA and published in Quality Criteria for Water (1986), unless otherwise noted.

However, OAR 340-41-445 (4) states that the DEQ may allow a designated portion of a receiving water to serve as a zone of dilution for wastewaters and receiving waters to mix thoroughly and this zone will be defined as a mixing zone. The DEQ may suspend all or part of the water quality standards, or set less restrictive standards, in the defined mixing zone, provided the water within the mixing zone is free of materials in concentrations that will cause acute toxicity to aquatic life as measured by the acute bioassay method and outside the boundary of the mixing zone is free of materials in concentrations that will cause chronic toxicity.

Furthermore, 40 CFR §122.44(d) states that permit limitations must control all pollutants or pollutant parameters which are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any state water quality standard, including state narrative criteria for water quality. The fresh water criteria for chlorine were used to calculate permit limitations. According to OAR 340-41, Table 20, chlorine concentrations of 11 µg/L can result in chronic toxicity in fresh waters while 19 µg/L can result in acute chlorine toxicity in fresh waters.

Compliance with acute toxicity criteria is required at the edge of the Zone of Immediate Dilution (ZID) and compliance with chronic toxicity criteria is required at the edge of the mixing zone. The existing permit contained the following total chlorine residual limit for the Durham AWTF:

Shall not exceed a 24 hr average of 0.026 mg/L and 0.038 mg/L for more than 60 continuous minutes of any given day.

The existing permit contained the following total chlorine residual limit for the Rock Creek AWTF:

Shall not exceed a 24 hr average of 0.032 mg/L and 0.048 mg/L for more than 60 continuous minutes of any given day.

The Department derived these previous permit limits after an evaluation of the dilution available within the mixing zone and ZID using a tracer dye study. The Department proposes to retain the existing residual chlorine limit.

The permittee uses bisulfite to dechlorinate the effluent prior to discharge to reduce potential toxic effects on the receiving stream and meet permit limits. The permittee should be able to meet the limits on a consistent basis with the facilities available.

9.2.6. Temperature for Wastewater Treatment Facilities

Schedule A,1.a.(5) of the permit includes maximum effluent temperature and allowable thermal loads for each of the summer-discharging treatment facilities. The maximum effluent temperature for both the Rock Creek and Durham treatment facilities are set at 77°F. This limit is established to protect salmonid species from acute temperature impacts within the mixing zone. The allowable thermal loads are based on the wasteload allocations presented in the TMDL. The values differ

from the TMDL due to the recalculation of the allocations per the footnote to Table 9 (on page 41) of the TMDL. These differences are detailed below.

The wasteload allocations, given in the form of allowable thermal loads, are given in Table 9 (page 41) of the TMDL. A footnote to this table explains that "as the permits are renewed, WLAs may be recalculated using the equations if flow rates, mixing zones, heat 'credits'... or effluent temperatures differ." A focused analysis of flow data, projected treatment facility discharge flows for the permit period and previous mixing zone studies provided differing values for certain parameters. These are presented in the table below, along with the original TMDL values.

	Durham AWTF		**Rock Creek AWTF**	
	TMDL	**Permit**	**TMDL**	**Permit**
Dilution Ratio	4.0:1	4.2:1	4.0:1	4.0:1
Q_{PS}	34.0	25.2	50.0	43.8
T_{PS}	71.0	71.0	71.0	71.0
Q_R	76	144	102.6	110

The TMDL presents the wasteload allocations in the form of "Allowable Point Source Heat Loadings in Zone of Dilution". The permit addresses these allocations through effluent limitations in the form of "Allowable Thermal Loads". The equation defining these loads is:

Allowable Thermal Load = $((Q_{ZOD} + Q_{PS}) \times (1000/35.3) \times 86400 \times \text{Max } \Delta T_{ZOD} \times 5/9)$ kcals/day

Where:

Q_{ZOD} = 7Q10 River Flow (cfs) / Dilution Ratio

Q_{PS} = Treatment plant effluent flow (cfs)

Max ΔT_{ZOD} = 0.25 degrees F

This equation, utilizing the "permit" values given in the table above, results in Allowable Thermal Loads of 2.0×10^7 (kcal/day) and 2.4×10^7 (kcal/day) for Durham AWWTF and Rock Creek AWWTF, respectively.

An explanation of how these loads compare to current loads is given in the discussion of Schedule D, below. As explained in the permit, the permittee is deemed to be in compliance if they are in compliance with the approved surface water temperature management plan.

9.2.7. Mixing Zone and Zone of Immediate Dilution for Wastewater Treatment Facilities

A mixing zone is a designated portion of the receiving stream where wastewaters and receiving waters mix. The DEQ may suspend all or part of the water quality standards, or set less restrictive standards in this zone. The Zone of Immediate Dilution (ZID) is a small area around the discharge which is within and smaller than the mixing zone where mixing and dilution are determined by the initial turbulence and buoyancy of the discharge and where acute toxicity due to non-persistent pollutants is allowed. The water quality standards for each basin as specified in the Oregon Administrative Rules (OAR) Chapter 340, Division 41 allow the DEQ to designate mixing zones. Mixing zones are designated to reduce excessive wastewater treatment costs and to limit areas of water quality degradation.

For the primary outfalls (D001, F001, H001A &B, R001), the allowable mixing zone is that portion of the Tualatin River within 100 (one hundred) feet of the diffusers. The ZID is defined as that portion of the allowable mixing zone that is within 10 (ten) feet of the point of discharge. For the wet weather outfalls(D003 and R003), because the outfall is within an existing primary outfall mixing zone, effluent mixing was evaluated at the edge of the existing mixing zone. For D003 the mixing zone boundary is 65 feet and for R003 the mixing zone is 50 feet.

The DEQ believes there will be no environmental impact from such mixing zones and that the defined mixing zones meet the criteria in the rule. With changes in design flow from the treatment facilities, the DEQ will require that the specified mixing zones be reevaluated during the next permit cycle to determine if they remain appropriately sized.

9.2.8. Ammonia and Phosphorus Limitations for Wastewater Treatment Facilities

The permit contains ammonia effluent limitations consistent with the assumptions and requirements of the wasteload allocations in the Tualatin TMDL. The limitations are generally effective from May 1 through November 15. However, as allowed for in the TMDL, the limitations do not apply between September 1 and November 15 when the seven-consecutive-day median of daily mean Tualatin River flow at the Farmington gauge is at least 350 cfs,

The ammonia limitations are expressed as a weekly median maximum load in lbs per day. The maximum load is calculated from a weekly median Tualatin River flow, and an ammonia concentration value that varies by month and according to the results of in-river dissolved oxygen monitoring. As allowed for in the TMDL, these weekly values are 1.3 times greater than the monthly values given in the TMDL. As shown in the table below, the ammonia concentration values used in the calculation of the maximum permitted load are expressed in two "tiers" and the trigger for moving between the two tiers is the actual measured Tualatin River dissolved oxygen concentration. This is consistent with the TMDL in setting more restrictive effluent limits at times where the dissolved oxygen levels have the potential to fall below the values set by the water quality standards. The trigger for setting the more restrictive ammonia effluent limitations includes margins of safety.

Outfall	Parameter	Weekly Median Maximum Load, lbs/day
Durham AWTF, Rock Creek AWTF	Ammonia - N	Weekly Median Maximum Ammonia Load = (Farmington Flow)(Concentration Variable) (5.39) lbs/day, where: Farmington Flow is the previous calendar weekly consecutive-day median of the daily mean flow at the Farmington gauge in cfs, and Concentration Variable is NH_3-N in mg/L during the applicable period as follows:

Concentration Variable (NH_3-N, mg/L) (The applicable tier is based on the instream dissolved oxygen concentration as described below)		Applicable Time Period
Tier 1	Tier 2	
1.4	1.4	May and June
1.4	0.8	July
1.4	0.3	August
0.8	0.21	September through November 15

The Tier 1 concentration variable is in effect for any week during the applicable period unless the following conditions occur, in which case the Tier 2 concentration variable is in effect.

- For Rock Creek AWTF: Either the weekly mean of the daily mean DO concentrations, with no credit for supersaturation, at RM 24.5 (Neals), for the ***previous*** week is less than 6.7 mg/L or the mean of the daily mean DO concentrations, with no credit for supersaturation, at RM 3.4 (Oswego Dam), for the ***previous*** week is less than 6.7 mg/L.

- For Durham: The weekly mean of the daily mean DO concentrations at RM 3.4 (Oswego Dam), with no credit for supersaturation, for the ***previous*** week is less than 6.7 mg/L.

The Tier 1 ammonia concentration values were chosen as the values that were in effect for the previous time period. This provides a maximum limit that steps down through the summer. The Tier 2 ammonia concentration values are based on the design concentration variables from the TMDL, but adjusted to weekly values as explained above.

The in-river dissolved oxygen trigger for moving between Tier 1 and Tier 2 is based on the results of a statistical analysis of hourly dissolved oxygen monitoring data (1991-2002 for Oswego Dam, 1997-2002 for RM 24.5). It was found that the mean dissolved oxygen of the previous calendar week was the best predictor of an exceedance of water quality standards, and was therefore chosen as the appropriate predictor variable. The 6.7 mg/L dissolved oxygen concentration was selected through a process of testing a series of values, and selecting a value that reduced the overall error rates of the prediction. The applicability of this trigger value was then checked using the historic data. The prediction based on the mean dissolved oxygen concentration of the previous week and the actual outcomes were statistically analyzed. In addition, each instance of a false negative error (failing to predict a water quality violation that actually occurred) was examined to determine if any unusual circumstances had occurred.

Maximum effluent ammonia concentrations have been calculated that would ensure no exceedance of water quality criteria for ammonia toxicity at the edge of the zone of immediate dilution. These calculated concentrations are far greater than the ammonia concentrations that have been observed or would be expected from the treatment facilities, and so were not included in the permit (i.e. there is no reasonable potential for the discharges to reach these values). The concentrations are included here for reference.

Month	Maximum Daily Ammonia Effluent Concentration (NH_3-N, mg/L)	Maximum Daily Ammonia Effluent Concentration (NH_3-N, mg/L)
	Rock Creek (Outfall R001)	Durham (Outfall D001)
May	35	26
June	33	22
July	30	19
August	30	19
September	34	24
October	35	28

Phosphorus in the Durham AWTF effluent is limited to a monthly median of 0.11 mg/L. The phosphorus limit for Rock Creek AWTF is a monthly median of 0.10 mg/L. These limits are consistent with the assumptions and requirements of the TMDL.[6] As detailed in the TMDL, phosphorous is not limited year round. The phosphorus control period begins May 1 and ends on October 31.

9.2.9. Reclaimed Water

The utilization of treated effluent for agricultural purposes is regulated under OAR 340-55. The facility produces Level IV reclaimed water and irrigates this water in accordance with a DEQ approved Recycled Wastewater Plan dated October 1993. As part of the permit renewal process a

[6] The TMDL contains an error in Table 50 for the Rock Creek WWTP wasteload allocation. The value was erroneously given as 0.08 mg/L. The actual value, following the assumptions, methodologies and data given in the TMDL (including Appendix C-5) is 0.10 mg/L.

new Reclaimed Water Use Plan was submitted to the DEQ in 2003. In 2002, CWS reported that 54 million gallons of reclaimed water from the Durham plant was reused off the plant site. In 2001 and 2002 the amount of reclaimed water was increased to over 85 million gallons each year. The primary use was on turf grass for golf courses and on nearby school grounds.

Prior to irrigation of the reclaimed water, the discharge must comply with total coliform limits based on protection of human health due to human pathogens. For Level IV reclaimed water, the limits include a weekly median of 2.2 total coliform per 100 mLs and no sample shall exceed 23 total coliform per 100 mLs.

The application of reclaimed water must be managed in accordance with the approved Recycled Wastewater Plan. All reclaimed water shall be distributed on land, for dissipation by evapotranspiration and controlled seepage by following sound irrigation practices so as to prevent:

a. Prolonged ponding of treated reclaimed water on the ground surface.
b. Surface runoff or subsurface drainage through drainage tile.
c. The creation of odors, fly and mosquito breeding or other nuisance conditions.
d. The overloading of land with nutrients, organics, or other pollutant parameters.
e. Impairment of existing or potential beneficial uses of groundwater.

The bacterial effluent limitations are achievable through proper operation and maintenance.

9.2.10. Wastewater Collection System Emergency Overflows

No waste may be discharged from these outfalls unless it is due to a storm event as allowed under OAR 340-41-120(13) and (14). In the summer, raw sewage overflows are prohibited except during a storm event greater than the one-in-ten-year, 24-hour duration storm. In the winter, overflows are prohibited except during a storm event greater than the one-in-five-year, 24-hour duration storm.

9.2.11. Groundwater Impacts from Wastewater Treatment Facilities

These facilities are not expected to have any groundwater impacts.

9.2.12. Municipal Separate Storm Sewer System

Schedule A provides a summary of the required controls and limitations for storm discharges from permitted sources. Additional requirements related to some of the controls and limitations discussed in this Schedule can be found in other schedules of the permit. For instance, it contains a condition that states the permittee will be in compliance with the maximum extent practicable standard (MEP) if they comply with the permit requirements and implement their storm water management plan (SWMP). The detailed requirements for SWMP development and implementation are found in Schedule D. The substantive information and requirements in most of Schedule A's conditions are consistent with what was included in the previous MS4 permit. The notable differences and additions are summarized below.

Implementation of Storm Water Management Plan: Schedule A contains a condition that defines the storm water management plan (SWMP) when referred to in requirements of the permit. The objective of this condition is to provide clarity regarding the Department's minimum expectations for the SWMP. This permit condition is in accordance with 40 CFR 122.26(d)(2). When referenced in the permit, the SWMP is defined as the SWMP submitted with the permit application, with subsequent additional changes made in response to specific permit requirements. Most notably, the permittee is required to augment the permit based on updated analysis of the SWMP relative to the maximum extent practicable (MEP) standard and a review of TMDL-related information outlined in Schedule D.

Non-Storm Water Discharges: Schedule A contains a condition that prohibits non-storm water discharges into the MS4 that are not otherwise authorized by an NPDES permit, or listed in this condition as discharges

that do not need to be addressed by the permittee's illicit discharge program. The objective of the condition is to adequately control the level and type of pollutants entering surface waters through the MS4. This permit condition is in accordance with 40 CFR 122.26(d)(2)(iv)(B)(1).

The types of discharges that are listed as allowable are largely derived from the standard list used by the U.S. Environmental Protection Agency (EPA). The one new type of allowable non-storm water discharge added by the Department relates to discharges from contaminated clean-up sites occurring under the authority of a state or federally-approved clean-up order. Currently, state and federal site clean up statutes provide such sites with permit waivers if they follow all substantive requirements of those permits. Therefore, clean-up orders issued by DEQ or EPA ensure that any discharges from these sites meet any limitations and controls that would otherwise be included in an NPDES permit prior to discharge into the MS4. The intent of referencing these types of discharges in the permit is to explicitly acknowledge the Department's acceptance of the legitimacy of the clean-up waivers.

The listed allowable discharges can only occur if appropriate control measures are implemented to minimize the potential for environmental impacts. Requirements related to providing the Department with information about these control measures can be found in Schedule B.

9.2.13. Storm Water Discharges from Durham and Rock Creek AWTFs

Schedule A contains requirements to prepare and implement a Storm Water Pollution Control Plan (SWPCP), providing information as detailed in Schedule A, including a site description, site controls (including best management practices, spill prevention and response procedures, preventative maintenance, and employee education.) Schedule A also includes benchmarks for storm water discharge pollutant concentrations. These benchmarks are guideline concentrations not limitations. They are designed to assist the permittee in determining if the implementation of their SWPCP is reducing pollutant concentrations to below levels of concern. Benchmark concentrations are listed in the permit for copper, lead, zinc, pH, suspended solids, oil and grease, and bacteria (*E. coli)*. If these benchmarks are not achieved, the permittee must investigate the source of the elevated pollutant levels and review and, if necessary, revise the SWPCP within 60 days of receiving sampling results.

9.3. Schedule B - Minimum Monitoring and Reporting Requirements

9.3.1. Wastewater Treatment Facilities

In 1988, the Department developed a monitoring matrix for commonly monitored parameters. Proposed monitoring frequencies for all parameters are based on this matrix and, in some cases, may have changed from the current permit. The proposed monitoring frequencies for all parameters correspond to those of facilities of similar size and complexity in the state.

The permittee is required to have a laboratory Quality Assurance/Quality Control program. The Department recognizes that some tests do not accurately reflect the performance of a treatment facility due to quality assurance/quality control problems. These tests should not be considered when evaluating the compliance of the facility with the permit limitations. Thus, the Department is also proposing to include in the opening paragraph of Schedule B a statement recognizing that some test results may be inaccurate, invalid, do not adequately represent the facility's performance and should not be used in calculations required by the permit.

Monitoring for *E. coli* must be performed in accordance with one of the methods approved by the Department. Monitoring for total coliform must be performed when irrigating reclaimed water.

Total chlorine residual must be monitored daily.

Monitoring for five-day Carbonaceous Biochemical Oxygen Demand ($CBOD_5$) has been substituted for BOD_5 monitoring. Whenever one or more permit limitations are based on $CBOD_5$, Department policy requires monitoring for ammonia concentration in the same sample.

In order to characterize the treatment facility's contribution of nutrients to the receiving stream during low flow periods, the proposed permit includes a requirement to monitor the treated effluent for certain nutrients. Ammonia monitoring is required each day. Five samples per week for Total Kjeldahl Nitrogen, nitrate plus nitrite, and total phosphorus is proposed for the period from May 1 through October 31 each year.

Temperature monitoring of the effluent is required. In addition, the permittee will be required to calculate the weekly average temperature of the effluent and the weekly thermal load discharged.

The streams in this basin are water quality limited for temperature and may not fully support the spawning and rearing of salmonid species. This discharge has a reasonable potential to contribute heat to the water quality limited sections. Therefore, the Department is proposing to include stream monitoring for temperature. Monitoring sites are to be located just upstream of the point of discharge, and downstream just outside of the mixing zone. If continuous monitors are installed for the stream monitoring, then the devices must be audited (field checked for accuracy of temperature readings) in June and September, and visually checked each month to insure that the devices are still in place, and are still submerged. An annual report summarizing the weekly averages of the maximum daily temperature readings is required for the temperature data, for the effluent and the two stream monitoring sites. These requirements are included in the CWS Temperature Management Plan. Monitoring for temperature is only required during the summer periods.

Because CWS has a pretreatment program and the treatment facilities are classified as major NPDES sources, the proposed permit includes a requirement to conduct quarterly bioassay tests using three species. Bioassay tests are to be conducted in accordance with EPA test methods and procedural requirements as defined in Schedule D.

In addition, CWS must regularly perform a scan for priority pollutant in the plant influent and effluent. Certain specific toxic pollutants (metals and cyanide) must be monitored more frequently.

Documentation of nutrient levels is critical for evaluation of compliance with the TMDL. The monitoring frequencies in the permit are intended to reflect this.

The proposed permit includes monitoring of the reclaimed water for flow, chlorine residual, pH, nutrients, turbidity and total coliform. The monitoring frequencies are in accordance with DEQ rules and guidance. An annual report describing the effectiveness of the reclaimed water system is required.

The estimated duration and volume of each overflow from the emergency outfalls must be recorded.

Gauged flow on the Tualatin River at the Farmington Road bridge is monitored and reported daily. During the period of time that the Farmington Road bridge is out of service, the flow meters at Rood Bridge at river mile 38.44 and the Rock Creek at river mile 1.2 and the effluent flow from the Rock Creek Treatment Plant will be used to estimate the Farmington flow values.

Discharge monitoring reports must be submitted to the DEQ monthly by the 15th day of the following month. The monitoring reports need to identify the principal operators designated by the City to

supervise the treatment and collection systems. The reports must also include records concerning application of biosolids and all applicable equipment breakdowns and bypassing.

Schedule B of the permit includes the requirement for the submittal of annual reports. The conditions are standard language requirements concerning:

Annual report on inflow and infiltration removal
Annual report on land application of biosolids
Annual report on the use of reclaimed water
Annual report covering the Temperature Management Plan
Annual Industrial Pretreatment Program report
Annual report on storm water discharges from Durham and Rock Creek
Annual report for the Municipal Separate Storm sewer System

9.3.2. Municipal Separate Storm Sewer System (MS4)

Monitoring Requirements

The permittee is required to monitor the effectiveness of its SWMP and the water quality impacts of storm water discharges from the MS4, with the objective of measuring the pollution reduction progress made by the permittee during the permit term. The condition is addressed by 40 CFR 122.26(d)(2)(iii), and is in accordance with EPA's Guidance Manual for the preparation of Part 2 of the NPDES Permit Applications for Discharges from Municipal Separate Storm Sewer Systems (11/1992).

The monitoring program component of the storm water management plan (SWMP) is generally designed to support the reporting requirements outlined in Schedule B. Thus, the data obtained from activities should assist the permittee to demonstrate the overall effectiveness of its SWMP, as well as providing assessments of receiving stream quality and storm water run-off discharges from the MS4.

The specific monitoring program objectives the permittee is required to address are described in Schedule B. The Department provides the permittee with flexibility in determining how it will obtain the information and data necessary to fulfill these objectives, as data collection methods are not prescribed. For instance this condition does not mandate outfall and in-stream water quality monitoring. However, these types of monitoring methods may be necessary to adequately address the program objectives. In evaluating long-term trends in water quality receiving waters, the permittee may use existing monitoring data collected by the Department or other entities, but this data, if it's available, may not be sufficient to meet the requirements of this condition. For example, existing in-stream monitoring data may not have been collected in locations that would be considered representative for characterizing stream quality within the MS4.

The permit also specifies that the monitoring program component must support the objective of assessing progress towards meeting pollutant load reduction benchmarks associated with TMDLs, as described in Schedule D. As with the overall monitoring program, the information and data collection methods for benchmark assessment are not prescribed. For instance BMP performance monitoring could be used to help estimate pollutant load reductions. However, the permittee may determine that some combination of environmental and performance monitoring may be necessary to meet reporting objectives.

The monitoring component of the SWMP entails two general types of monitoring: program monitoring and environmental monitoring. The permit outlines the specific elements that need to be defined and documented by the permittee for both types of monitoring. Program monitoring will primarily involve the use of activity measures to determine progress. Activity measures are

directly related to the BMPs implemented by the permittee, such as tons of material removed from storm drain catch basins and number of illicit discharge sources found and eliminated.

Environmental monitoring involves the chemical and biological analysis of water quality through sampling and laboratory testing methods. Environmental monitoring may be conducted on receiving streams, MS4 outfalls, storm water run-off entering catch basins, or other media. Most of the required elements of an environmental monitoring program were a part of the previous MS4 permit and SWMP. One addition is the documentation of protocols for quality assurance and quality control in sample collection and analysis. To ensure consistency in data quality across all MS4 permits, such QA/QC protocols are necessary. The permittee must provide the Department with documentation regarding the protocols that have been selected and used.

The permit requires the permittee to evaluate the monitoring component of the SWMP to ensure all of the requirements in Schedule B are met. Any adjustments made to the monitoring component that result from this assessment will be documented in the permittee's second annual report submittal. The sampling waiver condition of the permit is substantively the same as the one included in the previous MS4 permit.

Reporting Requirements

The permit requires the permittee to submit SWMP information and data to the DEQ at designated dates during the permit term, with the objective of communicating the environmental and programmatic results of SWMP evaluations and implementation activities. The condition is required by 40 CFR 122.42(c) [annual report requirements], and in accordance with 40 CFR 122.26(d)(2)(iii), 122.26(d)(2)(iv), 122.26(d)(1)(iii), and 122(d)(2)(ii).

The permit reporting requirements are divided into three distinct categories:

- reporting information submitted each year of the permit cycle
- assessment information and data submitted with the second annual report, and
- program evaluation information and data submitted with the permit renewal application

The annual reporting requirements are derived directly from the federal storm water regulations (40 CFR 122.42(c)). The information and data submitted annually relates primarily to SWMP implementation and monitoring results from the previous year, as well as proposed changes resulting from the on-going adaptive management process occurring during the previous year.

In addition to the information required for annual reports, the DEQ is requiring the submittal of specific information with the second annual report. The additional elements of this second annual report are discussed below.

The DEQ recognizes that the maximum extent practicable standard is not static. Source control technologies, BMP implementation opportunities, and data on the MS4's water quality impacts change over time. Therefore, the definition of what constitutes MEP for a particular permittee evolves over time, and may have changed since the permittee submitted its renewal application in 2000. As a result, the DEQ believes that to maintain conformance with the MEP standard, the permittee needs to conduct an evaluation of the SWMP and update the SWMP accordingly. This is the justification for requiring the initial SWMP evaluation and refinement described in Schedule B. This represents a one-time activity designed to ensure the SWMP continues to meet MEP, and is not expected to be included as requirement in the following permit cycle.

Since the source identification information was originally submitted with the original permit application in 2000, the DEQ believes that an update of this information is necessary to ensure the SWMP is focused on appropriate pollutant sources. Also, as outlined in Schedule A, the permittee does not need to address certain non-storm water discharges in its illicit discharge program if

appropriate control measures are in place for such discharges. The previous permit did not require a description of these control measures. The DEQ believes an inventory of the non-storm water discharges into the permittee's MS4, and a corresponding summary of required control measures for the discharges, allows the permittee to clearly differentiate between prohibited illicit discharges and ones the permittee deliberately does not address as illicit discharges because of existing controls that ensure no, or deminimis, water quality impacts.

Finally, for the storm water pollutants in waterbodies for which a TMDL has been approved prior to the issuance of this permit, the DEQ is requiring TMDL-related information and associated SWMP revisions to be submitted along with the second annual report. The types of information to be included in the report are outlined Schedule D.

The end of the permit cycle provides an opportunity for the permittee to evaluate trends in MS4 discharges and impacts, as well as changes in baseline conditions and assumptions. Some of this baseline data and information was submitted to the DEQ in the permittee's original "Part 2" application in 1994, as required by federal regulations. This application included an identification of sources of run-off to the MS4, an estimation of total pollutant loads, an estimate of storm water run-off from various land uses, and the volume and percentage of storm water run-off treated by structural and non-structural controls. Nearly 15 years will have elapsed between the date this information was originally submitted in the Part 2 application and the time the permittee will be conducting this evaluation. Given that these conditions and assumptions provided the basis for the original SWMP, the DEQ believes a periodic evaluation of relevant changes is essential in determining if the current SWMP is appropriately structured and focused. The DEQ is not requiring the permittee to re-do these original evaluations, but rather determine what changes have occurred (if any) in these baseline conditions since the time of the submittal of the original permit application. The results of this evaluation will be submitted with the permittee's next permit renewal application.

The other required elements of the permit renewal submittal relate primarily to an examination of data and program implementation results over the five-year permit cycle. The objective of this examination is to discern trends in BMP effectiveness, water quality changes, pollutant discharges, and progress towards TMDL-related benchmarks that generally cannot be observed on an annual basis. The results of this analysis of the previous five years should provide the permittee with insights and information that will lead to proposed revisions to the SWMP. These analysis results, along with proposed changes to the SWMP and the rationale for such changes, are to be included in the permit renewal application submittal.

9.3.3. Storm Water Discharges from Durham and Rock Creek AWTFs

Schedule B contains requirements to monitor stormwater discharges for the benchmark pollutants listed in Schedule A. The permittee is not required to conduct sampling if the benchmarks specified in Schedule A are met, or if the exceedance is due to natural or background conditions for at least four consecutive storm water monitoring events conducted by the permittee over 24 continuous months.

9.4. Schedule C - Compliance Conditions

The proposed permit includes the following compliance conditions with compliance deadlines. A Temperature Management Plan (TMP) has been submitted by the permittee. The DEQ recognizes that the TMP remains a malleable document. Schedule C of the Permit includes a compliance condition requiring that CWS resubmit the TMP within 90 days of permit issuance. The revisions to the TMP shall include a number of watershed temperature management elements which will describe and explain CWS' proposed measures to use river flow augmentation and stream surface shading to offset the thermal loads from the treatment facilities. These elements are listed above in section 5.3.

The TMP is expected to include a Thermal Load Trading Credit Plan. This plan will describe the mechanisms for using water quality trading to offset the thermal loads from the treatment facilities. In particular, this plan will include details of how the permittee will create thermal credits through river flow augmentation and stream surface shading, and will include the methodologies for calculating these credits.

CWS is expected to revise and implement the Durham and Rock Creek AWTP Storm Water Pollution Control Plans (SWPCP) within 90 days, if necessary to reflect any new permit requirements. The SWPCPs are required to be implemented no more than 90 days after revision.

CWS has been in the process of updating intergovernmental agreements (IGAs) with the cities in its MS4 area. Though these agreements have been in place for some time now and address implementation of the MS4 program, without them being current there may be some permit responsibilities not fully delegated. Because some issues were still under discussion at the time of permit completion and rather than delay this permit further, a condition has been added to the permit to assure that these agreements are completed and in place no later than 90-days after permit issuance.

A condition is included that states the permittee is expected to meet the compliance dates established in this schedule or notify the DEQ within 14 days following any lapsed compliance date.

9.5. Schedule D - Special Conditions

The proposed permit includes eleven special conditions. The requirements include:

Conditions requiring the permittee to manage the land application of biosolids in accordance with the approved biosolids management plan and a reopener to allow modification of this permit if the regulations pertaining to biosolids use and/or disposal are changed.

A condition specifying the necessary procedures for conducting whole effluent toxicity testing.

A condition requiring the permittee to comply with the rules concerning the use of reclaimed water and the Reclaimed Water Use Plan approved by the DEQ.

That the permittee must have the facilities supervised by personnel certified by the DEQ in the operation of treatment and/or collection systems.

Under certain peak flow conditions primary effluent is routed around the secondary portion of the treatment plant. The permit includes a condition recognizing this and identifying the conditions that must be met to allow this diversion.

A condition acknowledging that the permittee may add new pump stations to the wastewater collection system, and that new emergency overflows from these new stations may be approved by the DEQ and included in the permit without a permit modification.

The permittee is authorized to develop and implement a water quality trading plan for the purposes of complying with the permitted waste discharge limitations and the TMDL-related requirements of the permit. This condition contains information related to the following:

- Trading plans for oxygen-demanding parameters, temperature, and other parameters
- Amendments to the Water Quality Trading Plans
- Trading Baselines
- Definition of Water Quality Credit

- General Provisions for All Water Quality Credit Trades
- Applying Credits for Compliance
- Thermal Credit Trading Agreements
- Compliance and Enforcement

For the municipal separate storm sewer system, the following are included:

- A condition for the co-permittees to maintain adequate legal authority. This federal requirement was derived directly from the federal regulations (40 CFR 122.26(d)(2)(i)), with no additions or modifications. It requires the MS4s to maintain this adequate legal authority. This federal requirement relates to the submittal of the original "Part 2" application submitted by the permittee in 1994. The objective of this condition is to ensure the permittee can legally implement all components of the permit, and thus, reduce pollutants to the maximum extent practicable.

- A condition for storm water management plan (SWMP) evaluation and implementation activities. The objective of these requirements is to ensure optimal design and implementation of the SWMP, thereby resulting in the reduction of pollutants to the MEP. The conditions address 40 CFR 122.26(d)(2)(iv) sections (A) through (D). In addition, these conditions are in accordance with the Tualatin TMDL and Section 303(d) of the Clean Water Act.

- Acknowledgement that the adaptive management process is the established method for achieving the maximum extent practicable (MEP) standard. This section provides a more detailed description of the adaptive management process to be followed by the permittee. This permit requires several specific types of evaluations that are tied directly to on-going improvements to the SWMP to ensure MEP continues to be met. The adaptive management process summary explains how the link between these evaluations and subsequent improvements is to occur. One noteworthy enhancement is the reference to the TMDL part of the SWMP. Specifically, the pollutant load reduction benchmarks required in Schedule D are identified as triggers for the adaptive management process. Hence, if an evaluation at the end of the permit cycle shows that sufficient progress toward a benchmark is not achieved, the permittee would implement adaptive management steps designed to make adequate progress toward meeting the benchmark.

- A requirement that the co-permittees to evaluate the existing SWMP to ensure that the plan continues to meet the MEP standard. An essential part of this evaluation is to review the federal regulations [40 CFR122.26(d)(2) sections (A) through (D)] to ensure that each of the required SWMP components continues to be adequately addressed. The results of this review, along with any proposed changes to the SWMP, must be submitted with the permittee's second annual report as outlined in Schedule B. The evaluation results must also include the rationale for the conclusions of the MEP assessment for each SWMP component. Further, reasons for proposing particular changes, or for proposing no changes, must be explained in the submittal. The DEQ considers any proposed changes to the SWMP resulting from this evaluation to be a part of the on-going adaptive management process.

- A provision for a public involvement process. The federal regulations required MS4 permittees to establish a public involvement process for the development of their storm water management plan. However, there is no explicit public involvement requirement in these regulations regarding the on-going implementation and evaluation of the SWMP. The DEQ believes continued public involvement will assist the MS4 in maintaining a high quality SWMP that meets MEP. This condition of the permit specifies the requirements for this on-going public involvement, with additional emphasis placed on the key SWMP evaluation processes occurring within this permit cycle. The most comprehensive involvement requirements are focused on the SWMP revision that will be submitted along with the permit renewal

application. In the view of the Department, the most efficient and effective method obtaining public input on this revised SWMP is through a direct dialogue between the permittee and the public, rather than solely through the DEQ's formal public notice and comment period. The DEQ's process is best suited for comments on the permit requirements themselves, whereas public comments on the SWMP can be most effectively incorporated or addressed during the time the revision is being drafted.

Storm Water conditions specific to TMDLs, wasteload allocations, and 303(d) listings
These conditions require the permittee to address, within its SWMP, wasteload allocations (WLAs) assigned by the approved Total Maximum Daily Load (TMDL) for the surface water body to which storm water is discharged from the permittee's MS4. The objective of this condition is to reduce the contribution of pollutants from the MS4 that have been identified as causing impairment to this surface water body. The permit condition is in accordance with the Tualatin Subbasin TMDL.

The integration of storm water wasteload allocations (WLAs), assigned by approved TMDLs, into MS4 permits is, and has been, the subject of on-going policy discussions at the state and national level. The fundamental policy challenge is determining how a numerical WLA affects the requirements of an MS4 permit that relies on a non-numeric standard of reducing pollutants to the "maximum extent practicable." An EPA guidance memo on this subject, dated November 22, 2002, stated that "water quality based effluent limits for NPDES-regulated storm water discharges that implement WLAs in TMDLs may be expressed in the form of best management practices (BMPs) in certain circumstances." Further, the memo states that EPA expects most effluent limits for MS4s will be in the form of BMPs, and numeric limits for such permits will only be used in "rare instances."

For most point sources, TMDLs are implemented through water quality based NPDES permit limits. For MS4s, however, the compliance standard is, except in rare circumstances, the maximum extent practicable (MEP) standard established by the Clean Water Act. Therefore, the WLAs can be a part of the MS4 permit, but the standard by which MS4 is determined to be in compliance with the permit is MEP. WLAs should be used to guide an MS4's efforts in implementing BMPs to the maximum extent practicable. Schedule D of the proposed permit outlines the DEQ's expectations for addressing TMDLs.

The permit requires the MS4s to develop pollutant load reduction estimates, referred to as "benchmarks", for pollutants assigned storm water WLAs in the TMDL as part of the SWMP process. The benchmark would be based on the WLA and an estimate of what level of pollutant reduction is reasonable to achieve within the permit term if appropriate BMPs are implemented to the maximum extent practicable. Thus, the benchmarks allow the DEQ and the public to assess the overall effectiveness of the SWMP in making progress toward achieving the WLA. The Department will encourage MS4s to consult with the DEQ in developing the benchmarks. The SWMP must also be augmented to ensure that BMPs are designed to address the TMDL pollutants. An additional an additional set of tools included in the permit for measuring TMDL pollutant load reductions are performance measures. Performance measures are estimates of pollutant load reductions from various best management practices (BMPs) in the SWMP. The measures can be expressed in a number of different ways, and not all of them are easily quantifiable (e.g., public education). The DEQ views the performance measures as obvious precursors to the establishment of benchmarks. By analyzing the expected pollutant reductions from range of BMPs, the permittee can develop a reasonable collective estimate of the total pollutant load reduction for a particular pollutant of concern.

The benchmarks are not considered numeric effluent limits. Rather, an assessment of progress toward achieving the benchmarks is directly tied to the adaptive management process EPA has established as the approach MS4s should use to meet the MEP standard. If an MS4 discovers through its analysis that it is making insufficient progress towards reaching the benchmark, they

are expected to review their SWMP and determine how it should be further augmented to make adequate progress towards the benchmark. Thus, from the DEQ's perspective, the benchmarks provide a refined context for achievement of the MEP standard. Progress towards the benchmark would not be the only method of evaluating MEP, as the DEQ will also examine the permittee's selection and implementation of BMPs that target a wide range of pollutants – not just the TMDL pollutants.

In sum, the permit requires that BMPs be developed and implemented that address the WLA(s), and also contains monitoring requirements to assess the effectiveness of the SWMP. Therefore, with the inclusion of these requirements, the permit contains effluent limits and conditions consistent with the requirements and assumptions of the wasteload allocations in the TMDL.

Included in this schedule is a condition requiring the permittee to address the WLA(s) for a TMDL(s) approved after permit issuance in its permit renewal application if the TMDL is approved by a certain date. The objective of this condition is to ensure a timely pollutant reduction response to the TMDL. This condition is in accordance with the TMDL(s) issued during the permit term.

TMDLs may be updated and/or completed and approved by EPA during the term of this permit. While DEQ cannot legally include these TMDLs under the NPDES permit program until they are approved by EPA, the permit requires the MS4s to ensure a timely response to an approved TMDL in their permit renewal application submitted prior to the expiration of this permit. The actions outlined in this submittal would not be implemented until the next permit cycle.

Since the permittees must submit the renewal application 6 months prior to the expiration of this permit, they will likely need to begin developing their revised SWMP for this application one year prior to the submittal deadline. Therefore, the permit does not require the permittee to address TMDLs in their revised SWMP if the TMDL is approved after 3 years from the date of issuance of this permit. The TMDLs are issued as DEQ orders. Should the DEQ determine that other time frames are appropriate, they can be developed as part of the TMDL and the permit can be subsequently re-opened. Therefore, this permit acts to ensure that storm water allocations are addressed in a timely manner under any circumstance.

A condition is also included which outlines the required elements of the initial evaluation of the SWMP relative to TMDL wasteload allocations and proposed benchmarks. This evaluation, and proposed SWMP changes, will be included in the permittee's second annual report. Although the DEQ does not prescribe how the benchmarks will be established and measured, the rationale for the benchmark and the methods for measuring progress toward achieving the benchmarks must be identified and explained in its evaluation submittal.

303(d) Listed Pollutants

For receiving streams for which TMDLs have not yet been approved, the permittee must evaluate 303(d) listed pollutants for those streams and make appropriate changes to its SWMP if storm water discharges from the MS4 are determined to be a contributor of these pollutants. This condition ensures that MS4s will undertake actions to address pollutant of concerns in the short term for those waterbodies that are water quality limited. Many of the changes the permittees make to their SWMPs to address the pollutants may be similar to those made in response to the TMDL conditions of this permit. Moreover, the DEQ can provide the permittee "credit" for the reductions of 303(d) pollutants it makes prior to the completion of the TMDL. In this instance, the TMDL benchmarks established in the following permit cycle will reflect the reductions made in previous years. To ensure such credit is given, the permittee must establish some type of baseline pollutant loading by which it measures reductions of the 303(d) pollutants.

A condition detailing the requirements for the preparation and implementation of Storm water Pollution Control Plans for the Rock Creek and Durham wastewater treatment facilities.

A condition establishing the "Thermal Load to Offset" for each of the two summer-discharging treatment facilities. These thermal loads are defined to be the difference between the current excess load above system potential temperature (kcals/day) and the allowable thermal load (as defined in Schedule A, 1.a.(5)). The equations used to determine these loads are given in Schedule D, 10. of the permit. At this time, the thermal loads to offset have been calculated at 2.0×10^8 kcal/day for Durham and 7.2×10^8 kcal/day for Rock Creek. It should be noted that it was determined that the system potential temperatures used in the TMDL were inadvertently based on conditions which included CWS augmentation flows (at a rate of 30 cfs) released from Hagg Lake. Corrected system potential temperatures at each of the treatment facilities were used to determine the Thermal Load to Offset. These corrected system potential temperatures are 58.5°F for Rock Creek AWWTF and 64.6°F for Durham AWWTF.

Both environmental and administrative benefits result from including the NPDES facilities, the former MS4 permit, and the water quality credit trading matters in one combined permit. A special condition is proposed to explain how the different elements of this permit will be viewed if it becomes necessary to take enforcement action relating to this permit. The intent of this special condition is to ensure that unfavorable enforcement treatment does not result from the combination process.

9.6. Schedule E – Industrial Pretreatment Program

The proposed permit includes a Schedule E that requires implementation of the industrial pretreatment program.

9.7. Schedule F – NPDES General Conditions

Included in this schedule are additional requirements and information for the permittee under the following headings: Standard Conditions, Operation and Maintenance of Pollution Controls, Monitoring and Records, Reporting Requirements and Definitions. Schedule F for this permit contains a combination of the General Conditions form NPDES waste discharge permits and NPDES municipal stormwater permits.