

# MWMC FACILITIES PLAN

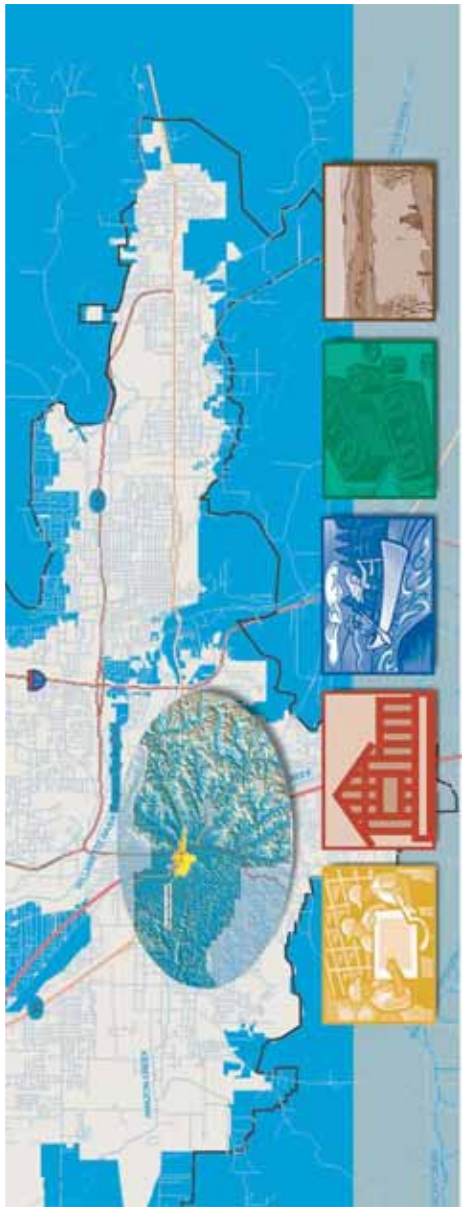
for the Eugene-Springfield Regional Wastewater Treatment Facilities

prepared for the  
Oregon Department of Environmental Quality

Volume  
1 of 2  
Facilities Plan

April 2004

Revised December 2004  
to incorporate Oregon  
Department of Environmental  
Quality comments



Volume 1 of 2  
Facilities Plan

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for the Eugene-Springfield Regional  
Wastewater Treatment Facilities



April | 2004

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to incorporate Oregon Department of  
Environmental Quality comments

Metropolitan Wastewater Management Commission



**CH2MHILL**

Volume 1 of 2  
Facilities Plan

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for the Eugene-Springfield Regional  
Wastewater Treatment Facilities



EXPIRES: 12/31/04

April | 2004

Revised December 2004  
to incorporate Oregon Department of  
Environmental Quality comments

Metropolitan Wastewater Management Commission



partners in wastewater management

**CH2MHILL**

# **DEQ Approval Documentation**

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# Oregon

Theodore R. Kulongoski, Governor

Department of Environmental Quality

Western Region

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Eugene, OR 97401

(541) 686-7838

Metropolitan Wastewater Management Commission

February 24, 2005

225 Fifth St.

Springfield, OR. 97477

Re: WQ-Metropolitan Wastewater Management Commission Wastewater Facilities Plan.

File # 55999

NPDES Permit # 102486

Lane County

Dear Commissioners,

On 2/14/2005 the Department issued a letter approving the final version of the Metropolitan Wastewater Management Commission Wastewater Facilities Plan (Volume 1 of 2), and the Technical Memorandums and Appendixes (Volume 2 of 2).

It has come to my attention that there is some confusion over the following paragraph contained in that letter:

“Should implementation of the facilities plan be delayed more than five years, we strongly recommend that you consult with DEQ staff to ensure that the issues identified in the facilities plan are still pertinent. It may be possible that preparation of a new document is warranted after five years.”

This paragraph was not included to diminish the urgency to move forward with the planned MWMC wastewater treatment facility upgrades. With the current facility approaching the end of its design life, we strongly support MWMC's effort to proactively plan for the future. The goal is to ensure that MWMC is able to provide for the communities wastewater treatment needs for the next 20 years without violating Oregon's water quality standards. The discharge location on the upper reaches of the Willamette River has many sensitive beneficial uses (recreation, fish, drinking water) and likewise the upper reaches of the river have limited capacity to assimilate wastewater. Those two factors make the consequences of inadequate treatment systems especially problematic.

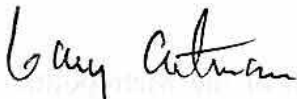
Our boiler plate language related to implementation of the facility plan has been included in recent facility plan approvals as a service to communities completing facility plans. State Revolving Fund and other public funding agencies require projects to be adequately sized to meet the community's needs over a 20 year period, starting from completion of construction. Population projections and therefore flow and load projections may change over time. Projects may also be phased. Therefore, to ensure that the design of all projects are based on the most up-to-date projections and information, we ask that communities consult with DEQ staff regarding

the need to update material in a previously approved facility plan if the design of the project is more than 5 years from approval of the facilities plan.

I want to emphasize the desire on the part of DEQ for the MWMC wastewater treatment facilities improvement projects to proceed as soon as possible. We recognize and appreciate all the work that has been done by MWMC and the community over the years to successfully protect water quality and public health. We strongly support the ongoing effort to undertake the upgrades now, before problems develop.

If you have any questions or concerns, please feel free to contact me at any time at the DEQ-Western Region, Eugene office at (541) 686-7838 ext. 256.

Sincerely,



Gary Artman  
CWSRF Project Officer  
Western Region

Cc: Troy McAllister - City of Springfield  
Matt Noesen, Shawn Clark - CH2M Hill  
Keith Andersen, Mike Wolf, Mike Kortenhof, Francis Dzata, Jon Gasik, Mark Hamlin - DEQ



# Oregon

Theodore R. Kulongoski, Governor

## Department of Environmental Quality

Western Region  
1102 Lincoln  
Suite 210  
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(541) 686-7838

Metropolitan Wastewater Management Commission  
225 Fifth St.  
Springfield, OR. 97477

February 14, 2005

Re: WQ-Metropolitan Wastewater Management Commission Wastewater Facilities Plan.  
File # 55999  
NPDES Permit # 102486  
Lane County

Dear Commissioners,

On 2/14/2005 the Department received a copy of the final version of the Metropolitan Wastewater Management Commission Wastewater Facilities Plan (Volume 1 of 2), and the Technical Memorandums and Appendixes (Volume 2 of 2).

The revisions included in both volumes address the review comments offered in our 11/18/2004 letter to you. Therefore, we are approving the final documents.

The next step is to start pre-design work. To avoid extra work and cost overruns, the Commission should not authorize final design until a pre-design report is reviewed and agreed to by DEQ staff.

Should implementation of the facilities plan be delayed more than five years, we strongly recommend that you consult with DEQ staff to ensure that the issues identified in the facilities plan are still pertinent. It may be possible that preparation of a new document is warranted after five years.

We look forward to working with you and moving this project forward to the pre-design phase. If you have any questions or concerns, please feel free to contact me at any time at the DEQ-Western Region, Eugene office at (541) 686-7838 ext. 256.

Sincerely,

Gary Artman  
CWSRF Project Officer  
Western Region

Cc: Troy McAllister - City of Springfield  
Matt Noesen, Shawn Clark - CH2M Hill  
Keith Andersen, Mike Wolf, Francis Dzata, Jon Gasik, Mark Hamlin - DEQ

# Acknowledgements

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Many thanks to the MWMC Commissioners and the staff who were involved in the development of this project or who assisted with the adoption process.

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# Acronyms and Abbreviations

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7Q10	seven-day, ten-year low flow
AFD	adjustable frequency drive
AWT	advanced wastewater treatment
BFP	belt filter press
BMF	Biosolids Management Facility
BMP	best management practices
BOD	biochemical oxygen demand
BOD <sub>5</sub>	5-day biochemical oxygen demand
BTU/hr	British thermal units per hour
CAC	Citizens Advisory Committee
CBOD	carbonaceous biochemical oxygen demand
CBOD <sub>5</sub>	5-day carbonaceous biochemical oxygen demand
CCI	Construction Cost Index
CFR	Code of Federal Regulations
cfs	cubic feet per second
CIP	capital improvement project
CO	carbon monoxide
CSZ	Cascadia Subduction Zone
DEQ	Oregon Department of Environmental Quality
DO	dissolved oxygen
DOGAMI	Department of Geology and Mineral Industries [Oregon]
DSL	Oregon Division of State Lands
DSMM	dry season maximum month
EBI	East Bank Interceptor
EDI	energy-dissipating inlet
ELA	engineering, legal, and administrative
ENR	<i>Engineering News-Record</i>
ESA	Endangered Species Act
EPA	U.S. Environmental Protection Agency
EQC	Environmental Quality Commission
ERU	equivalent residential unit
F	Fahrenheit
FEMA	Federal Emergency Management Agency
FRP	fiberglass reinforced plastic
FSL	facultative sludge lagoon
FTE	full-time equivalent
ft <sup>3</sup> /minute	cubic feet per minute

fpm	feet per minute
GBT	gravity belt thickener
g/day	grams per day
GFOA	Government Finance Officers Association
GIS	geographic information system
gpcpd	gallons per capita per day
gpd	gallons per day
gpm	gallons per minute
GVW	gross vehicular weight
HAP	hazardous air pollutant
hp	horsepower
HR	high-rate clarification
I&C	instrumentation and control
IDI	Infilco Degremont, Inc.
IGA	intergovernmental agreement
I&I	infiltration and inflow
I-5	Interstate 5
lb/hr/m	pounds per hour per meter
LRAPA	Lane Regional Air Pollution Authority
MECT	Metropolitan Endangered Species Act Coordinating Team
µg	microgram
µg/L	micrograms per liter
µg/m <sup>3</sup>	micrograms per cubic meter
MG	million gallon
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
mgd	million gallons per day
mL	milliliter
mm	millimeter
MM	Modified Mercalli
MPN	Mean Probable Number
MU	management unit
MWMC	Metropolitan Wastewater Management Commission
N/A	not applicable
N/D	not detected
NGVD	National Geodetic Vertical Datum
NO <sub>2</sub>	nitrogen oxide
NPDES	National Pollutant Discharge Elimination System
NTU	nephelometric turbidity unit
NWI	National Wetlands Inventory

O <sub>2</sub>	oxide
O <sub>s</sub>	ozone
OAR	Oregon Administrative Rule
ODOT-ADU	Oregon Department of Transportation - Accident Data Unit
OEA	Office of Economic Analysis [Oregon]
O&M	operations and maintenance
OSHA	Occupational Safety and Health Administration
PDAF	peak day average flow
PE	primary effluent
PFRP	process to further reduce pathogens
PGA	peak ground acceleration
PHA	process hazards analysis
PM <sub>10</sub>	particulate matter less than 10 micrometers in aerodynamic diameter
POTW	publicly owned treatment works
ppcd	pounds per capita per day
ppd	pounds per day
ppm	parts per million
PP/ST	parallel primary/secondary treatment
PSM	Process Safety Management [OSHA]
PSRP	process to significantly reduce pathogens
PTE	potential to emit
PWWF	peak wet weather flow
RAS	return activated sludge
RDII	rainfall-dependent infiltration and inflow
RM	river mile
RMP	Risk Management Program
RMZ	regulatory mixing zone
RS	raw sewage
RSR	rapid sludge removal
RWP	Regional Wastewater Program
RWM	reclaimed water main
scfm	standard cubic feet per minute
SDC	System development charge
SE	secondary effluent
SIU	significant industrial user
SIWF	Seasonal Industrial Waste Facility
SO <sub>2</sub>	sulfur dioxide
SOR	surface overflow rate
SPCC	spill prevention, control, and countermeasures
SRF	State Revolving Loan Fund
SRT	solids retention time
SSES	Sewer System Evaluation Study
SSO	sanitary sewer overflow

TMDL	total maximum daily load
TPAD	temperature-phased anaerobic digestion
tpy	tons per year
TSS	total suspended solids
UGB	urban growth boundary
USACE	U.S. Army Corps of Engineers
U.S.C.	U.S. Code
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UV	ultraviolet
VAR	vector attraction reduction
VSS	volatile suspended solids
WAS	waste activated sludge
WBI	West Bank Interceptor
WPCF	Eugene-Springfield Wastewater Pollution Control Facility
WSTP	Westside Sewage Treatment Plant
WWFMP	Wet Weather Flow Management Plan
WWTP	wastewater treatment plant
ZID	zone of immediate dilution

# Executive Summary

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This Facilities Plan, prepared for the Metropolitan Wastewater Management Commission (MWMC), is the result of a comprehensive evaluation of the regional wastewater treatment facilities serving the Eugene-Springfield metropolitan area [Eugene-Springfield Water Pollution Control Facility (E-S WPCF), major pump stations and interceptors, the Biosolids Management Facility, the Biocycle Farm, and the Seasonal Industrial Waste Facility]. This Facilities Plan is a comprehensive update to the original “208 Plan,” which was completed in 1977. The 208 Plan established the original projections, requirements, and projects needed to serve the Eugene-Springfield community through 2005. This Facilities Plan also builds on previous, targeted studies, including the 1997 Master Plan, 1997 Biosolids Management Plan, 2001 Wet Weather Flow Management Plan (WWFMP), and the 2003 Management Plan for a Dedicated Biosolids Land Application Site.

Both Eugene and Springfield have separate sewer systems that come together into a regional system of pipes. Over 800 miles of sewer pipes and 47 pump stations transport wastewater to the E-S WPCF. Most of the conveyance pipelines of 24 inches in diameter or greater and associated pumping facilities necessary to convey the region’s wastewater to the regional facility were included in the facilities’ original construction by regional and local resources.

This newly developed MWMC Facilities Plan is intended to identify facility enhancements and expansions that are needed to serve the community’s wastewater needs through 2025.

## Planning Criteria

Regulatory requirements, existing MWMC policies, adopted citizen advisory committee (CAC) recommendations, and direct Commission guidance provided the framework of objectives and planning criteria for development of the Facilities Plan. In order for the Facilities Plan to serve its intended purpose, implementation of the facilities improvements identified in the plan should enable MWMC and the partner agencies to have reasonable assurance that the following objectives will be met:

- Compliance with applicable local, state, and federal laws and regulations
- Protection of the health and safety of people and property from exposure to hazardous conditions such as exposure to untreated or inadequately treated wastewater
- Provision of adequate capacity to facilitate community growth in the Eugene-Springfield metropolitan area consistent with adopted land use plans
- Construction, operation, and management of MWMC facilities in a manner that is as cost-effective, efficient, and affordable to the community as possible in the short and long term
- Implementation of CAC recommendations, which represent diverse community interests, values and involvement, and that have been adopted by the Commission as MWMC plans and policies

- Mitigation of potential negative impacts of MVMC facilities on adjacent uses and surrounding neighborhoods (ensuring that MVMC facilities are “good neighbors” as judged by the community)

## Planning Assumptions

Listed below are the assumptions that were made regarding the future regulatory requirements for Eugene-Springfield, which are based on the current National Pollutant Discharge Elimination System (NPDES) wastewater discharge permit issued in May 2002. It should be noted that as water quality and fish concerns change over time, future discharge permits may contain different standards to protect the Willamette River’s defined beneficial uses. However, the current permit conditions are anticipated to remain in effect through 2025.

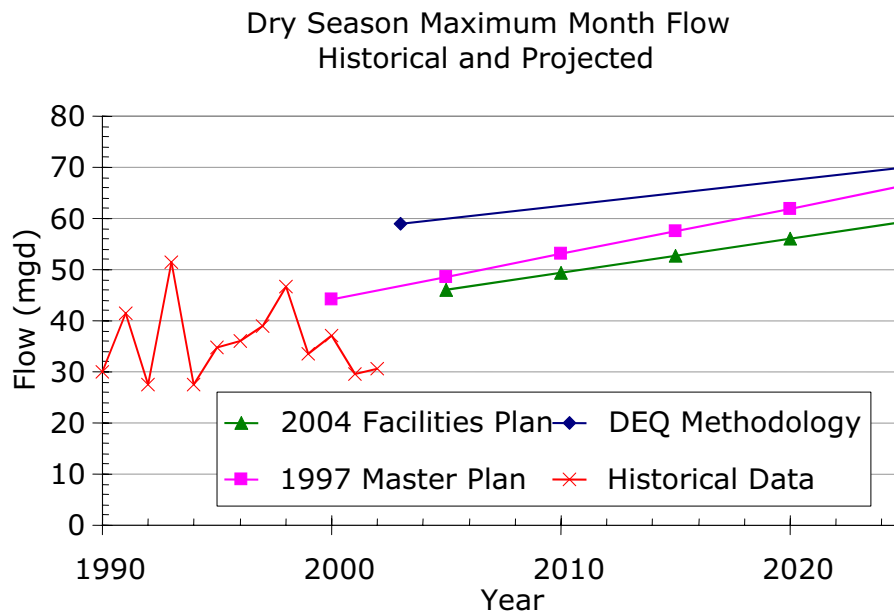
- Dry season concentration limits will be set to the current Willamette River basin standards of 10 mg/L for carbonaceous biochemical oxygen demand (CBOD) and total suspended solids (TSS) on a monthly average basis
- Dry season mass limits for CBOD and TSS will remain the same as in the existing discharge permit and will be based on the dry season flow
- Wet season concentration limits will remain the same as in the existing discharge permit
- Wet season mass limits for CBOD and TSS will remain the same as in the existing discharge permit and will be based on wet season flow
- Dry and wet season monthly average percent removal for CBOD and TSS will remain at 85 percent, the same as in the existing discharge permit
- Wet season maximum day mass limits will be suspended when the plant flow is equal to or greater than twice the dry season design rating of the plant, the same as in the existing discharge permit
- The dry season ammonia concentration limits will remain the same as in the existing discharge permit
- The excess thermal load limit in the dry season will remain the same as in the existing discharge permit
- The current limitation for effluent disinfection is based on *E. Coli*. It is assumed that the *E. Coli* limit will remain the same as in the existing discharge permit.
- The effluent pH limit will remain the same as in the existing discharge permit

## Projected Wastewater Flows and Capacity Needs

The Facilities Plan includes projections of wastewater flows and loads to the year 2025, at 5-year intervals, and for the build-out condition (estimated year 2050) for domestic and industrial sources. Average, maximum month, maximum week, and maximum day flow ranges and loads were determined for both dry and wet seasons. Domestic [residential and

commercial, and infiltration/inflow (I/I)] projections were estimated based on population projections and selected per capita and peaking factors.

Based on the method of projecting dry season flows, using historical data and statistical analysis, the projected flows during the wettest dry season month at 2025 are less than those projected using either the Oregon Department of Environmental Quality (DEQ) guidelines or the limited data that were used in the 1997 Master Plan (Figure ES-1).



**FIGURE ES-1**  
Flow Projections  
MWWC Facility Plan, Eugene-Springfield

A 2003-04 collection system modeling effort indicated that wet weather peak hour (WWPH) flows generated in the collection system associated with the 5-year, 24-hour winter storm event were comparable to those projected in the WWFMP. This is the flow that must be treated under DEQ guidelines without resulting in sanitary sewer overflows. The best current estimate of the 2025 wet weather peak hour flow at the E-S WPCF is 277 mgd. Based on this projection, the E-S WPCF faces a peak flow capacity deficit in a number of treatment process areas, which are summarized in Table ES-1.

Consistent with the WWFMP, the 2003-04 analysis showed that collection system capacity is limited primarily at the Willakenzie pump station and E-S WPCF influent screw pumps. Additional local (that is, city) collection system upgrades will be needed at several of the other major local pump stations prior to 2025 to meet DEQ capacity requirements. The need for these additional improvements has been identified as part of this Facilities Plan but are the responsibility of the individual cities.



**TABLE ES-1**

Peak Flow Capacity Deficit

*MVMC Facility Plan, Eugene-Springfield*

<b>Facility</b>	<b>Current Capacity (mgd)</b>	<b>Additional Capacity Through 2025 (mgd)</b>	<b>Total Capacity Required in 2025 (mgd)</b>
	<b>A</b>	<b>B</b>	<b>C = A + B</b>
Influent Pumping	175	102	277
Pretreatment	175	102	277
Primary Treatment	90-110	50-70	160
Secondary Treatment	100-110	50-60	160
Disinfection	175	102	277
Outfall	175	102	277

## Alternatives Evaluation

As shown in Table ES-1, the treatment plant faces a significant peak flow capacity deficit. The E-S WPCF currently has no additional peak flow capacity, and an additional 102 mgd of peak flow capacity is needed by 2025. The Facilities Plan analysis also concludes that in order to meet NPDES permit requirements for ammonia, thermal load, and total mass removal, significant improvements to the treatment plant's unit processes are needed.

To solve these projected capacity shortfalls, all available options known to staff and the consultants for resolving the regional treatment facilities capacity and performance constraints were identified. The regulatory requirements and other planning criteria discussed above were translated into a series of evaluation criteria. An evaluation matrix of treatment facility needs and potential solutions was developed and the criteria were applied, which resulted in a set of "preferred" and "acceptable" solutions. The solutions were further evaluated based on compatibility with existing treatment plant processes and on estimated costs, which resulted in the four systemwide alternatives presented in Table ES-2. (DEQ requires that a "no action" option be presented, so a total of five options are summarized.)

**TABLE ES-2**  
 Alternatives Selected for System Evaluation  
*MWMC Facility Plan, Eugene-Springfield*

<b>System Alternative</b>	<b>Estimated Cost (Millions of 2004 Dollars)</b>	<b>Meets Planning Objectives</b>
1 – No Action	-	No
2 – Full Primary and Secondary	\$233 million	Meets Most
3 – Full Primary	\$167 million	Meets Most
4 – High Rate Clarification	\$157 million	Meets All
5 – Parallel Primary Secondary	\$144 million	Meets All

## Recommended Plan

Alternative 5 is the recommended set of facilities improvements to meet all of the 2025 planning criteria. It is the least-cost set of facilities that can be constructed to meet the peak flow management and water quality requirements. The project phasing for the preferred system solution (Alternative 5) is shown in Figure ES-2, and represents thirteen project phases. Figure ES-2 does not show offsite projects, such as the improvements to conveyance pump stations, the Seasonal Industrial Waste Facility, the Biocycle Farm, and the Biosolids Management Facility.

Alternative 5 meets all planning criteria and requirements, and is the least-cost alternative, at \$144 million in 2004 dollars. Because this option involves parallel use of the existing primary and secondary treatment systems in peak wet weather events, it minimizes the need for new secondary treatment systems that would only be used in peak wet weather events (and thereby underutilized for most of the year), but it is untested from a regulatory standpoint.

There remains uncertainty surrounding future blending policy and it is possible that DEQ may not approve the proposed systemwide solution. Therefore, the next best systemwide alternative (Alternative 4), which includes the addition of High-Rate Clarification, may be implemented as a contingency plan. The alternative is identical to the preferred solution with the exception that High-Rate Clarification is provided in addition to conventional primary clarification, and parallel primary secondary peak flow management is eliminated. If the High-Rate Clarification alternative is required by DEQ for regulatory purposes, an additional \$13 million (2004 dollars) in project cost would be required in Phase 5.

## Financial Strategy

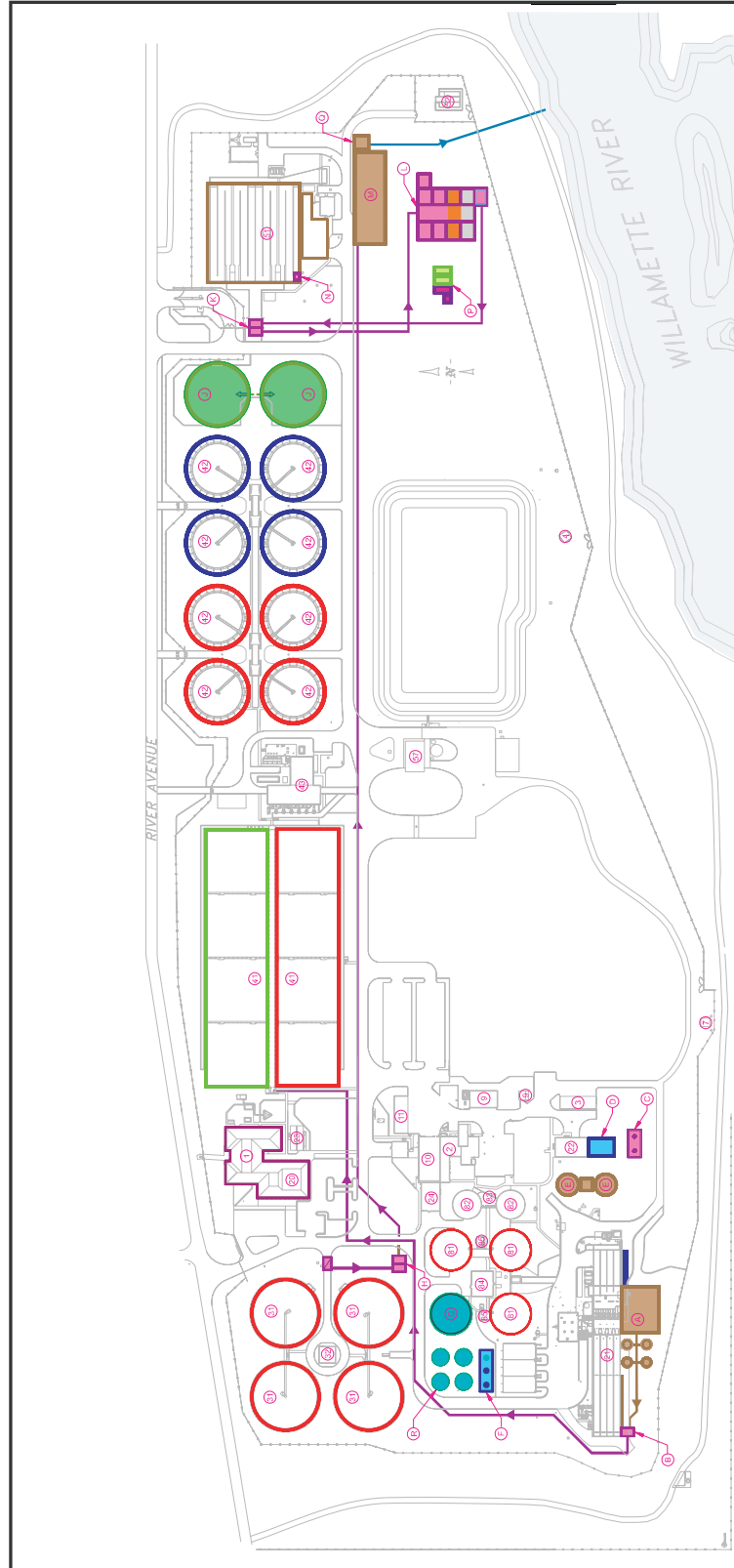
The preferred Alternative 5 – Parallel Primary/Secondary work program results in a 20-year project list with a total cost of \$144 million in 2004 dollars. If DEQ does not approve Alternative 5 – Parallel Primary/Secondary work program (\$144 million), and Alternative 4 – High Rate Clarification work program (\$157 million) is implemented instead, an additional \$13 million will have to be spent on capital investments. Funding for the 20-year project list will be provided by a combination of user rates and system development charges, with financing obtained through issuance of revenue bonds.

MWMC adopted an update to its Financial Plan in 2003. The MWMC Financial Plan contains an analysis and findings regarding MWMC's financial "fitness" to enable moving forward with a significant capital improvements program. It also includes an analysis of available financing and financial management tools. It provides policies and procedures that will position the utility well to manage the financial aspects of the Facility Plan in a manner that is fiscally responsible and cost-effective to the customers.

**Figure ES-2**  
**Alternative 5**  
**Project Phasing**  
**Diagram**  
 Eugene & Springfield

**Legend**

MODIFY EXISTING	NEW
Red square	PHASE 1 2004 - 2007
Blue square	PHASE 2 2005 - 2008
Green square	PHASE 3 2006 - 2008
Brown square	PHASE 4 2007 - 2010
Purple square	PHASE 5 2008 - 2010
Light blue square	PHASE 6 2009 - 2010
Teal square	PHASE 7 2010 - 2013
Dark purple square	PHASE 9 2012 - 2015
Orange square	PHASE 10 2013 - 2015
Light green square	PHASE 11 2015 - 2018
Pink square	PHASE 12 2017 - 2019
Black square	PHASE 13 2018 - 2020



**NEW STRUCTURES**

- ① PRETREATMENT EXPANSION AND GRIT REMOVAL
- ② PRELIMINARY TREATMENT DIVERSION PUMP STATION
- ③ BIOSCRUBBERS 1-2
- ④ GBT BUILDING EXPANSION
- ⑤ PRIMARY SLUDGE GRAVITY THICKENERS AND PUMP STATION
- ⑥ BIOSCRUBBERS 3-5
- ⑦ DIGESTER 4
- ⑧ PRIMARY TREATMENT DIVERSION PUMP STATION
- ⑨ SECONDARY CLARIFIERS 9-10
- ⑩ TERTIARY FILTRATION PUMP STATION
- ⑪ TERTIARY FILTERS
- ⑫ HIGH RATE DISINFECTION FACILITY
- ⑬ BACKWASH PUMP STATION
- ⑭ REUSE AND FUTURE SECONDARY EFFLUENT UV FACILITY
- ⑮ EFFLUENT BLENDING AND PARALLEL OUTFALL STRUCTURE
- ⑯ THERMOPHILIC DIGESTERS

**EXISTING STRUCTURES**

- ① SECONDARY CLARIFIERS
- ② SECONDARY CONTROL COMPLEX
- ③ FINAL TREATMENT FACILITY
- ④ OUTFALL CONTROL STRUCTURE AND DIFFUSER
- ⑤ SLUDGE DEWATERING FACILITIES
- ⑥ PRIMARY DIGESTERS
- ⑦ SLUDGE HOLDING TANKS
- ⑧ SLUDGE TRANSFER PUMP STATION
- ⑨ BOILER BUILDING
- ⑩ GAS MIXING BUILDINGS
- ⑪ AERATION BASINS
- ⑫ OPERATIONS BUILDING
- ⑬ MAINTENANCE BUILDINGS
- ⑭ COVERED STORAGE BUILDING
- ⑮ BYPASS STRUCTURE
- ⑯ EMERGENCY OVERFLOW WEIR STRUCTURE
- ⑰ STORAGE BUILDINGS
- ⑱ MAINTENANCE BUILDING
- ⑲ STEAM CLEANING BUILDING
- ⑳ LABORATORY FACILITY
- ㉑ PRETREATMENT FACILITY
- ㉒ GRAVITY THICKENER FACILITY
- ㉓ ADMINISTRATION EXPANSION
- ㉔ MAINTENANCE FACILITY STORE ROOM
- ㉕ PRIMARY CLARIFIERS
- ㉖ PRIMARY SLUDGE PUMP STATION