

CITY OF KEIZER MISSION STATEMENT
KEEP CITY GOVERNMENT COSTS AND SERVICES TO A MINIMUM BY PROVIDING CITY SERVICES TO
THE COMMUNITY IN A COORDINATED, EFFICIENT AND LEAST COST FASHION

AGENDA

KEIZER CITY COUNCIL

WORK SESSION

Monday, October 28, 1996

5:30 p.m.

Robert L. Simon Council Chambers
Keizer City Hall, Keizer, Oregon 97303

1. **CALL TO ORDER**

2. **ROLL CALL**

3. **DISCUSSION**

- a. Salem Wastewater Master Plan

4. **OTHER BUSINESS**

This time is provided to allow Council members the opportunity to bring matters before the Council which are not on tonight's agenda.

5. **WRITTEN COMMUNICATIONS**

To inform the Council of significant written communications and petitions.

6. **ADJOURN**

Upon request, auxiliary aids and/or special services will be provided to participants with disabilities. To request services, please contact us at 390-3700 at least two working days (48 hours) in advance.



City Council Work Session

AGENDA ITEM 3a

SALEM WASTEWATER MASTER PLAN

TO: MAYOR KOHO AND CITY COUNCIL MEMBERS

FROM: DOTTY TRYK *Dotty*
CITY MANAGER

SUBJECT: SALEM WASTEWATER MASTER PLAN

BACKGROUND:

The Council heard a presentation on the Salem Area Wastewater Draft Master Plan at your September 16 meeting. The presentation was made by Floyd Collins, Assistant Public Works Director for the City of Salem, assisted by members of the city's consulting engineers, CH2M Hill. The presentation was thorough and a good discussion followed during which the Council and Keizer citizens asked many comprehensive questions and raised important issues.

For some additional information, I have included a copy of questions and answers provided to "Concerned Businesses" of Salem who are also reviewing the master plan.

The Salem City Council is expected to call a public hearing and act on this master plan at their November 12 meeting.

The purpose of tonight's workshop is to develop an official position to present at the public hearing.

In reviewing the plan document and the discussion at that meeting it appears that there are a number of questions and issues that directly affect Keizer as a community and as a major utility customer of the City of Salem. I will organize them in those terms.

Community Questions:

1. How will the aquifer near the plant be protected from effluent treated through the natural treatment system?
2. How will the investment in wetlands and poplars be protected from regularly occurring flood damage?
3. What is the feasibility of moving the natural treatment system to the west of the river, thereby protecting the aquifer and the investment in the system?

4. How will this plan eliminate sewage overflow from manholes polluting Keizer creeks and streets?

Customer Issues:

1. Although the City of Keizer was invited to be an observer to the advisory committee, as a major customer of the system we believe that we should have an appointed representative on the committee.
2. Similarly, the City of Keizer should have an official seat on the committee advising the development of the Cost of Service Analysis (COSA) as this report will allocate the costs of the plan to customer categories and will determine the rates each customer classification will pay.
3. Since this is a single system serving several customers, a clear definition should be adopted that defines transmission lines by size to determine the appropriate responsibilities for system improvements, the larger being system responsibilities and smaller being the customers' responsibility.
4. Since it appears that as much as \$45 million will be spent on improvements to reduce and treat water inflows due to old leaking pipes and the City of Keizer's system is new and built with more durable materials, a credit should be given to Keizer customers as pipes located in Keizer are not contributing to the Infiltration and Inflow problem.

RECOMMENDATION:

Staff recommends the Council review the master plan and related issues and direct staff to prepare an official position to present to the Salem City Council.



October 18, 1996

*Received 10-18-96
4pm*

Ms. Keeta Lauderdale
Concerned Business
PO Box 4090
Salem OR 97302

SUBJECT: **DRAFT WASTEWATER MASTER PLAN**

Dear Ms. Lauderdale:

This is written in response to your correspondence dated October 15, 1996, in which your organization posed 17 questions (Attachment A). Attachment B is a staff-prepared response to each of your questions.

I appreciate the level of interest your organization has shown in reviewing this essential program which will set the direction of wastewater collection and treatment systems for the next several decades.

During our brief telephone conversation of October 15, 1996, we spoke of the upcoming Public Hearings before the Salem Planning Commission and City of Salem, respectively. As you know, the Planning Commission will hold their hearing on October 22, 1996. The principle focus of their hearing will be the relationship of the Draft Plan to the Salem Area Comprehensive Plan. Staff will address such issues as:

"Does the Plan support development of the community consistent with the goals of the Comprehensive Plan?"

"Are the growth projections consistent with those in the Comprehensive Plan?"

"Does the Plan provide wastewater service to the various land use designations within the Urban Growth Boundary?"

I am sure some folks will want to speak to the technical merits and costs associated with the Plan. However, those issues are more appropriately heard by the City Council. It is anticipated the Council hearing will be in November 1996. The exact date will not be known until we know the recommendation of the Planning Commission following their hearing.

PUBLIC WORKS DEPARTMENT

555 Liberty St. SE / Rm. 325 • Salem, OR 97301-3503 • Phone (503) 588-6211 Fax (503) 588-6025 TTY (503) 588-6292

Ms. Keeta Lauderdale
October 18, 1996
Page 2

Should you have any additional questions following review of Attachment B, please feel free to contact Paul Eckley (588-6211). I will be out of the office from October 21-28, 1996.

Again, thanks for the interest. I hope Concerned Business will be able to take a supportive position on this Plan as we move through review and adoption.

Sincerely,

A handwritten signature in black ink, appearing to read 'Floyd W. Collins', with a long horizontal flourish extending to the right.

Floyd W. Collins
Assistant Public Works Director

P:\PERSONAL\LLNELSON\COR96\KLAUDER.LTR
Attachments:

- A - Letter dated October 15, 1996
- B - Staff Response

cc: Larry Wacker, City Manager
Frank Mauldin, Public Works Director
Paul Eckley, Chief Utilities Engineer

CONCERNED BUSINESSSES ATTACHMENT A

Promoting A Healthy Community Through Teamwork



P.O. Box 4090 • Salem, Oregon 97302 503-378-0436 • FAX 503-378-0782

October 15, 1996

FOR: FLOYD COLLINS

FROM: KEETA LAUDERDALE

As you know several of our members have been meeting to become as informed as possible about the City's Wastewater Master Plan. We appreciate yours and Paul's help in answering our questions, and we understand the Planning Commission Public Hearing is scheduled for October 22nd. Before we can arrive at our conclusion and/or recommendation, we have the additional questions listed below. May we have your responses in writing?

- 1 - Is it possible to build a second, less sophisticated plant that would handle only overflow rain water? Was this explored at all?
- 2 - May we have copies of the DEQ specific demands of the City of Salem regarding wastewater overflows into the Willamette?
- 3 - Does the City have a record, by past years, of gallons in overflow dumped into the Willamette and Salem streams?
- 4 - How much would it cost to do steel and concrete instead of poplars?
- 5 - Can wastewater be taken to Polk County farms in need?
 - What treatment would this wastewater receive?
- 6 - Will the proposed system eliminate contamination of the aquifer?
- 7 - Does the City adopt this plan and accompanying costs before cost of services allocation is known?
- 8 - At some point in time, lines built 50 years ago have to be replaced. When?
- 9 - Which private lines in Salem are leaking?
- 10 - Who is contributing the most to Salem's sewer problems?
- 11 - I and I dollars already spent have reduced the flow by how much?
- 12 - Can only interceptor and major trunks at \$45 million be done in a Phase I without authorization of the whole plan?
- 13 - If canneries and Cherry Growers leave or do their own systems, how will loss of dollars they now pay affect the overall finances?
- 14 - How much do canneries really pay now? What's their COSA?
- 15 - What percentage of this proposed Master Plan corrects Salem's leaky sewers?
- 16 - What percentage of this proposed Master Plan corrects problems associated with surge in canneries' use during their peak times?
- 17 - What percentage of this proposed Master Plan corrects overflows caused by heavy rains?

Again, thank you very much for your help.

Keeta Lauderdale

STAFF RESPONSE TO
CONCERNED BUSINESS QUESTIONS
October 15, 1996

QUESTION 1

Is it possible to build a second, less sophisticated plant that would handle only overflow rain water? Was this explored at all?

RESPONSE *It is "possible" to build such a facility. However, it is not practical nor would it be cost effective. In addition, the "sophistication" of the facility would not be reduced. We would still have to meet regulatory standards for the Willamette Basin which would require a secondary wastewater treatment plant. In addition, since treatment plants are based upon biological treatment of waste, a base level of operations must be maintained on a constant basis in order to respond to fluctuation flows, in our case, rainfall related. Such a facility would have a separate discharge permit from the Department of Environmental Quality(DEQ). In addition, the facility would have its own operating cost as opposed to incremental increases to the operating cost of Willow Lake. The larger, single facility does generate economy of scale savings in operating cost.*

The issue of a separate treatment facility to be used in conjunction with Willow Lake Treatment Plant was reviewed during the alternative screening process. In fact, 27 alternatives were screened. The capital cost of a dual plant system was more expensive than expanding the Willow Lake facility as proposed. Where coupled with the reduction in regulatory issues and lower operating cost, that alternative was screened out of further review.

QUESTION 2

May we have copies of the DEQ specific demands of the City of Salem regarding wastewater overflows into the Willamette?

RESPONSE *Enclosed as Attachment B-1 is a copy of the applicable sections of our current permit issued by DEQ. Please note Conditions C.3 and C.4 which relate to the development of the Plan, the required standard, and the requirement to prioritize the elimination of the overflows to the Willamette River tributaries.*

QUESTION 3

Does the City have a record, by past years, of gallons in overflow dumped into the Willamette and Salem streams?

RESPONSE *Yes. Condition C.1 (Attachment B-1) requires the City to file an annual report identifying overflows. Copies of the annual reports are on file in our office as well as with DEQ. Detailed below, in summary form, is the frequency and magnitude of the overflows to the mainstem of the Willamette River:*

<u>FY</u>	<u>NUMBER OF EVENTS</u>	<u>VOLUME (MG)</u>
1990/91	2	12
1991/92	1	21
1992/93	4	50
1993/94	2	11
1994/95	6	207
1995/96	11	1305

Attachment B-2 is a graphic representation reflecting the reduction in the number of overflow points in the system from 54 in 1997-78 to 3 in 1991-92. It also reflects volume of overflows from 1987-88 to 1991-92. During the 1980s, the City also focussed on replacing the majority of pipes in downtown Salem. During this period, we were investing approximately \$2.0 million per year in replacements financed by sewer rates.

Attachment B-3 is a complete report which covers much more detail than just overflows, but is our response to Permit Condition C.1.

QUESTION 4

How much would it cost to do steel and concrete instead of poplars?

RESPONSE *In responding to the question, I am making the assumption the question references the Poplar Plantation associated with the food processing water.*

Should the four facilities not be separated for treatment at the proposed poplar plantation and remain in the system with all waste going to Willow Lake, the capital cost increase would be on the order of \$34 million¹.

However, perhaps even as important as the magnitude of the expense is the timing of the expense. Should all dischargers remain in the system, the organic capacity of Willow Lake would be exceeded and the expansion would need to be financed and constructed within the next few years, resulting in larger rate increases than currently proposed.

QUESTION 5

Can wastewater be taken to Polk County farms in need?

- What treatment would this wastewater receive?

RESPONSE *In responding to the question, I am making the assumption that the question references the effluent from Willow Lake as opposed to the raw wastewater. As such, the answer is yes.*

¹ Screening Alternative Case 19 vs. Case 1.

The current draft plan suggests utilization of lands around the existing Willow Lake Plant as a "natural treatment system." It appears that such a system could also be constructed in Polk County. However, the cost of the facility would increase due to the need for additional pipes, pumps, and river crossing. Our Consultant is currently preparing an incremental cost estimate for consideration. In addition, due to logistics of a separate site, annual operating costs are also expected to increase.

As to the treatment of this water, it would be the same as if the natural system was located in Marion County, i.e., Willow Lake effluent and/or disinfected primary treated effluent.

QUESTION 6

Will the proposed system eliminate contamination of the aquifer?

RESPONSE *In responding to the question, I am unsure of the reference to "contamination" of the aquifer. To my knowledge, we are not dealing with an aquifer which is contaminated. Some concern has been expressed that the proposed natural treatment system adjacent to the Willow Lake Treatment Plant "might" contaminate the existing aquifer in that area.*

To be explicit, neither the City of Salem nor any of the State permitting agencies would desire or allow implementation of a plan or element of a plan which would contaminate the aquifer. In part, that's exactly why we are proposing a demonstration project related to the natural treatment system, so we have site-specific design values as opposed to "text book" values.

QUESTION 7

Does the City adopt this plan and accompanying costs before cost of services allocation is known?

RESPONSE *It is proposed that the Plan be adopted before the Cost of Services Analysis (COSA) is conducted. The last COSA was completed in the late 1980s and is in need of review. In order to develop the COSA, we must have determined which projects are required, the estimated cost, and the timing of the required investments. To my knowledge, to try and reverse the process won't work.*

QUESTION 8

At some point in time, lines built 50 years ago have to be replaced. When?

RESPONSE *The draft Plan recommends adoption of a "perpetual life program" relative to sewer line replacements. The City has approximately 650 miles of sewer pipes. Assuming an average life of 75 years, the program would need to replace 8.67 miles per year. Depending on line size, replacements run between approximately*

\$500,000 per mile for six-inch to \$1.25 million per mile for a 24-inch line. Each project is independently estimated and bid for construction by private contractors.

While the City has not been replacing pipes on the perpetual life level, we have been doing some replacements over the past 15-20 years. Generally, the sewers have been prioritized based upon structural deficiencies as well as I/I problems. We have an active program of flow monitoring, television inspection, and smoke testing to assist us in gathering appropriate data to further prioritize our annual expenditure of sewer revenues. This is done in conjunction with the development of the Capital Improvement Program each year.

QUESTION 9

Which private lines in Salem are leaking?

RESPONSE *In gathering the data in evaluating the wastewater collection system, we did so on a drainage basin approach. In doing so, we found that all basins are contributing flows in excess of the desired level, some more than others. Evaluation of each of the basins becomes an additional evaluation step which helps us identify the source of the excess water. For instance, if we have a basin with excessive flows, are they coming from direct connection to the sewer system (catch basins), from service lateral to individual lots or from leaks in the public pipes. Depending on the results of the evaluation, the technique for addressing the source would be different. If flows are from catch basins, we simply disconnect them and reattach them to the storm sewer (inexpensive option). On the other hand, if the flows are found to be coming from the entire area, we must evaluate system replacement or portions thereof versus upsizing the pipes.*

As a note of interest, it is the current policy of the City to replace the service laterals up to the property owner's clean out in conjunction with replacement of the public sewer subject to obtaining permission of the property owner. Should permission be withheld, the service line is tested for water tightness and should it fail, the owner is directed to repair or replace the service line at their personal expense.

QUESTION 10

Who is contributing the most to Salem's sewer problems?

RESPONSE *There is not a simple answer to this question. As previously stated, the City uses a variety of evaluation techniques to identify excessive flow by basin. With each basin is a complex mix of customer classification. To date, we have dealt with the problem on a "system basis," and not user-specific. Delineation to that level would be a complex, time consuming process if it could even be done at all. Given the complexity of the mixes of land uses within each basin, it may be impractical to even attempt delineation to this level.*

QUESTION 11

I and I dollars already spent have reduced the flow by how much?

RESPONSE *Please refer to Question 3. In addition, the Plan projects that implementation of the perpetual life program will allow the total peak flows to hold at the approximate level they are today. That is to say, the gains we achieve with the improvements are offset by increased I/I from the balance of the aging system and increases in the service area (full UGB buildout).*

In my personal opinion, we will not see a significant reduction in peak flows within the planning period based upon the level of effort recommended. To achieve a significant reduction in peak flows would take a massive investment in the system in a very short period of time. I don't believe this is either reasonable or practical.

QUESTION 12

Can only interceptor and major trunks at \$45 million be done in a Phase I without authorization of the whole plan?

RESPONSE *In my opinion, no. This goes back to the permit requirement for Salem to submit a plan to eliminate bypassing to Willamette except for a 5-year 24-hour storm or greater. Simply building the interceptor and trunk improvements would not eliminate the bypasses to the Willamette. While it would meet the requirements associated with tributaries, treatment of the transported volumes would still be required.*

The Plan deals with these issues by timing the new interceptor (Union Street, North River Road to Willow Lake) with the expanded Willow Lake facility. In that manner, we have a way to treat the waste we collect.

QUESTION 13

If canneries and Cherry Growers leave or do their own systems, how will loss of dollars they now pay affect the overall finances?

RESPONSE *The short answer would be, should four major users of the system leave and as a result revenues dropped to the extent expenses did not drop proportionately, the fixed cost would need to be borne by the remaining users.*

As you are aware, staff has been attempting to identify a method of obtaining a long-term assurance from the four facilities identified that, should they cease operation or contribution to the system, they would continue to be responsible for the portion of the expense associated with the debt service for the alternative treatment system. To date, we have not identified a viable technique.

QUESTION 14

How much do canneries really pay now? What's their COSA?

RESPONSE *Detailed below in summary form is a table reflecting the sewer bill for each of the "industrial" users of the system proposed to be a portion of the "offload" for Fiscal 1995/96. In total, the identified industrial users contributed \$1,816,915.19 or 8.8 percent of the total sewer rate revenues for that period.*

TABLE 14-1

<u>1995/96 INDUSTRIAL REVENUE</u>	
AgriPac 1	\$640,710.85
AgriPac 2	\$551,355.18
Truitt Brothers	\$229,813.42
Oregon Cherry	\$395,035.74
	\$1,816,915.19

I am not clear as to the portion of the question dealing with "What is their COSA?" Detailed below is an excerpt from the existing rate resolution which defines the various portions of the industrial/institutional sewer bills.

TABLE 14-2

	<i>Charge Per Bill</i>	<i>(\$) Collect Per D-I-M/Yr</i>	<i>Flow Per Million Gallons (\$)</i>	<i>BOD Per 1,000 lbs (\$)</i>	<i>SS Per 1,000 lbs (\$)</i>
<i>Salem</i>	2.05	1,723.29	550.25	200.11	155.83
<i>ESSD*</i>	1.80	1,854.77	508.29	188.03	135.47
		<i>Monitoring Per Sample</i>		<i>Minimum Bi-monthly Bill</i>	
<i>Salem</i>		39.45		23.80	
<i>ESSD</i>		33.75		27.65	

*ESSD = East Salem Sewer District

Each facility is monitored to determine their specific flow, BOD, and TSS. A monthly bill is then calculated using the values established in the resolution. The values contained within the Resolution are based upon the relationships to use and other users as defined in the previous COSA. The new COSA will revisit all

of these relationships such that we can update the relationship based upon today's information. The core approach to the COSA is based upon the concept is the "user pays." That philosophy stems from the original requirements established by EPA following receipt of Federal money to fund the 1978 expansions. Basically, since we took Federal money, we have to play by Federal rules.

QUESTION 15

What percentage of the proposed Master Plan corrects Salem's leaky sewers?

RESPONSE *In responding to this question, I am making the assumption the question relates to "dealing with the leaky sewers as opposed to "corrects."*

Staff has not segregated the \$245 million into categories which would provide a direct answer. This level of effort will occur in the development of the COSA. However, it is safe to say, that if we only proceed to build facilities to address the current daily peak flow of as opposed to future peak flow, the majority of the cost shown in Table 8-1 of the Draft Plan would still be required. The projects would still be required, only at a lesser magnitude.

I know there has been a 70 percent value tossed about. I would not be surprised to find the final answer to be in that range. However, without additional work, a specific value cannot be projected at this time. Again, that level of assessment will be done in conjunction with the COSA.

QUESTION 16

What percentage of the proposed Master Plan corrects problems associated with surge in canneries' use during their peak times?

RESPONSE *In responding to the question, I am assuming "surge" relates to the increased organic loads during the summer months.*

Specifically in Table 8-1 of the Draft Plan, the two projects, Food Process Water - Phase I and Phase II, total \$15.3 million in 1995 dollars. In addition, some portions of the \$160 million related to the "Willow Lake Conventional Treatment" are associated with plant capacity for future growth of the existing industries and provisions for capacity for new industrial customers. As with Question 15, a detailed allocation of these estimated costs will be developed in conjunction with the COSA.

QUESTION 17

What percentage of this proposed Master Plan corrects overflows caused by heavy rains?

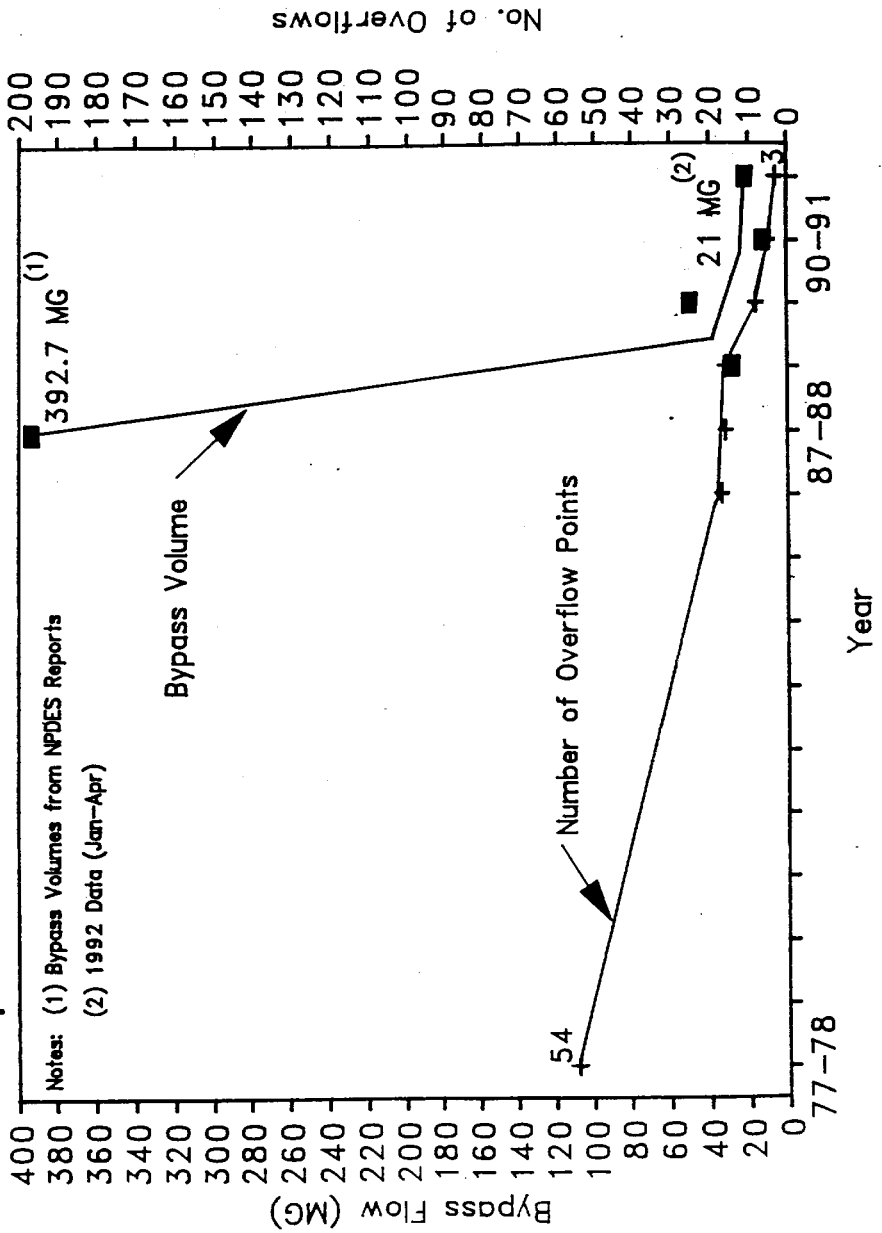
RESPONSE *See response to Question 15.*

SCHEDULE C

Compliance Schedules and Conditions

1. The permittee shall have in place a program to identify and reduce inflow and infiltration into the sewage collection system. An annual report shall be submitted to the Department by September 1 each year which details sewer collection maintenance activities that have been done in the previous year and outlines those activities planned for the following year.
2. No later than July 1, 1992, the permittee shall submit a study plan and schedule for conducting and reporting on a mixing zone analysis. The study and report shall be completed by no later than November 1, 1992. It shall include a characterization of the zone of initial dilution and mixing zone boundary. Dilution within the mixing zone and at its boundary and at the edge of the zone of initial dilution will be expressed using dilution factors determined through a dye study or through an approved verified mathematical model. Dilution will be evaluated in terms of conditions at low river flow and peak daily design flow rate. Included with the mixing zone study shall be an evaluation of the ability of the discharge to comply with water quality standards for total chlorine residual. If the evaluation concludes that water quality standards cannot be met for total chlorine residual, the permittee shall include with the submittal of the evaluation:
 - a. A plan and time schedule for upgrading or modifying wastewater control facilities to achieve compliance with water quality standards for total chlorine residual.
 - b. A proposed chlorine residual limitation to be inserted into the permit that assures compliance with water quality standards.The Department will reopen this permit to include an appropriate total residual chlorine limit if necessary to achieve compliance with water quality standards.
3. No later than January 1, 1996, the permittee shall submit a plan and schedule for eliminating all bypassing to the Willamette River except in a storm event equaling or exceeding the 24 hour, five year storm event.
4. By no later than January 1, 1996, the permittee shall eliminate all bypassing to tributary streams except in a storm event equaling or exceeding the 24 hour, five year storm event.
5. Bioassay
 - a. No later than May 1, 1992, the permittee shall submit proposed bioassay test procedures for the Department's review and approval. The proposal shall include at least the following:

Graph 6: Bypass & Overflow Points



August 30, 1996



Hand Delivered
8-30-96
RECEIVED

Mr. Mark Hamlin
 Department of Environmental Quality
 Willamette Valley Region
 750 Front Street, Suite 120
 Salem OR 97310

SEP 05 1996

DEPARTMENT OF PUBLIC WORKS
 DIRECTOR'S OFFICE

**SUBJECT: CITY OF SALEM NPDES PERMIT NUMBER 100783
 ANNUAL COMPLIANCE REPORT
 SCHEDULE C, CONDITION 1**

Dear Mr. Hamlin:

Attached is the City's annual report demonstrating compliance with Schedule C, Condition 1 of the subject permit. The annual report is comprised of the following sections:

Section I:	Overview
Section II:	Sanitary Sewer Maintenance Activities
Section III:	Overflow Events at Permitted Discharge Sites
Section IV:	FY 95/96 Capital Improvements Projects
Section V:	FY 96/97 - FY 00/01 Capital Improvements Projects

The City of Salem continues to make gains in the reduction of infiltration/inflow (I/I) to the sanitary sewer system. We will continue with our program to reduce I/I and operate our system in the most cost effective manner while at the same time being responsive to the environment.

If you have any questions concerning this report, please do not hesitate to give me a call.

Sincerely,

Ken Roley, P.E.
 Facilities Engineer

KLR:klr Persdir\Krole\Hamlin.let

Attachments: Annual Compliance Report FY 95/96

cc: ☒ Floyd Collins, Assistant Public Works Director
 Rollie Baxter, Operations Services Manager
 Diane Taniguchi-Dennis, Wastewater Services Manager
 Paul Eckley, Chief Utilities Engineer
 Randy Pecor, Sewer Superintendent

CITY OF SALEM, OREGON

Annual Compliance Report for FY 95/96 August 30, 1996

This report is submitted in compliance with the City of Salem's National Pollution Discharge Elimination System (NPDES) Permit No. 100783, Schedule C, Condition 1. The report is divided into five sections. The first section provides an overview of the City's continuing efforts to reduce infiltration/inflow (I/I) and properly manage the sewage collection system. The second section discusses sanitary sewer maintenance activities. Section three describes the overflow events that took place during FY 95/96 at the permitted and non-permitted discharge points. Sections four and five list the rehabilitation and replacement projects that have been initiated since the last report and planned projects for this fiscal year.

SECTION I: OVERVIEW

During FY 95/96 the City of Salem continued efforts in several areas to reduce I/I in the sewage collection system and reduce the number overflow events. This includes maintenance improvements, completing a Draft Sewer Master Plan, hydraulic modeling, flow monitoring, and new construction. The winter of 95/96 was particularly harsh with several very large storms sweeping across our area. A total of 11 overflow events occurred, including the storm of February 5 - 11, 1996, which exceeded a 50 year storm event. As a comparison, between 1990 and 1995, the City averaged two to four overflow events each year. The City of Salem continues to use a proactive approach to monitor flows while minimizing overflows and basement flooding on private property.

Supervisory Control and Data Acquisition (SCADA) System

The City of Salem invested in a new SCADA system in 1993. This system allows the City to monitor all 30 sewer pump stations from the City Shops. It also allows remote control of the diversion gates at Airport and North River Road.

The SCADA system has greatly improved our ability to prevent overflows at lift stations and minimize overflows due to storm events at permitted discharge points. During FY 95/96 no overflows occurred at the City's lift stations due to a malfunction of the SCADA system.

Sewer Master Plan

During FY 95/96 the City of Salem completed a comprehensive Draft Sewer Master Plan. This study was conducted in accordance with the planning requirements of the City's NPDES permit. The City hired CH2M Hill in 1993 to assist us with this major planning and evaluation effort.

The Sewer Master Plan evaluated several alternatives for upgrading the sewer collection system and treatment plant in order to convey a five year, 24 hour storm event. The plan identifies several improvement projects for the sewer collection system and the wastewater treatment plant

which are needed to increase the capacity of the system to convey and treat the projected wastewater flows. Approximately \$245 million (1995 costs) of improvements have been identified, which would be completed over the next 15 years.

A copy of the Sewer Master Plan was previously submitted to the DEQ for review. The plan is currently going through the formal adoption process by City Council which should be completed this fall.

Sewer Hydraulic Model

A hydraulic model of the wastewater collection system using SWMM-XT was completed by CH2M Hill during FY 94/95. The model was field verified in FY 95/96 by matching the predicted results with actual flow measurements at selected locations. This model is now being used in designing improvements to the collection system. In the future it may also be used for evaluating the impact of growth. The computer model has been very useful in scoping projects needed to eliminate overflows to tributary streams.

Telemetered Rain Gauges

The City installed nine telemetered rain gauges in various locations throughout the City in 1994. Data collected from these rain gauges define the variability of rainfall during the storm events described in this report.

Sewer Lift Stations

The City completed an inventory of all sewer lift stations and equipment in 1995. This inventory was entered into the City's Infrastructure Management System (IMS), a computerized maintenance management tool. Preventative maintenance activities have been identified for each lift station which are tasked through scheduled work orders from IMS. The system also maintains a history of work performed at each lift station. The City hired an additional two person crew during FY 95/96 to provide additional resources needed to conduct an effective lift station maintenance management program.

During FY 95/96 the City continued an ongoing program to improve the reliability and redundancy of the sewer pump stations. This includes the installation of pressure transducers to replace the less reliable, and older, bubbler system used in monitoring the level of the wet wells. It also includes the installation of redundant motor controllers, testing motors and bearings for wear, replacing worn impellers, and making other improvements that will increase the reliability of the existing facilities. These programs have improved the efficiency and effectiveness of the sewer pump stations and has further reduced the likelihood of overflows to the environment.

In August 1996, two of the City's older lift stations, Musgrave and Taybin, were taken off line with the completion of the West Salem Trunk Sewer project. The Taybin Lift Station will be abandoned. The Musgrave Sewer Pump Station was undersize, had a force main that was in

poor condition, and had a history of overflows. It is now in a standby status and could be placed back in service, if needed. Several additional sewer pump stations are scheduled for replacement or upgrade over the next five years.

Pringle and Clark Creek Basins

During the winter of FY 94/95 a number of manholes overflowed in the Pringle Creek and Clark Creek Basins. These overflows were predicted by the SWMM model for the design storm event (five year, 24 hour storm). The hydraulic model was used to define projects needed to increase conveyance in these basins and eliminate the overflow at these points for all events less than the design storm. These projects have now been identified and are currently in the design phase.

Basement Flooding near 18th and Madison

Approximately 30 basements were flooded in the area around 18th and Madison in NE Salem in December, 1993. Since that time, the City has continuously monitored flows in this area during each winter storm. During FY 95/96 bypass pumping was needed during several storm events to prevent basement flooding in the region. This resulted in a crew being stationed on-site and pumping sewage from a manhole on Madison to a large storm drain which extends to the Willamette River.

The City completed an analysis of the flows in this region with the help of the hydraulic model. An improvements project has been identified which will result in a bypass sewer being constructed which will divert a large portion of the flow to the north, to another sanitary sewer, eliminating basement flooding for all events less than a 25 year storm. This project will be bid this fall and completion scheduled for the spring of 1997.

SECTION II: SANITARY SEWER MAINTENANCE ACTIVITIES

Sanitary sewer maintenance activities are conducted each year to maintain the life of the existing sanitary sewer and to ensure that no new I/I is introduced into the system. Maintenance activities for FY 95/96 consisted of the following:

TV Inspection

During FY 95/96 a total of 475,975 feet of sewer collection system was inspected by the City's three TV crews. This includes inspection of existing sewer lines and all new sewer lines that were added to the system. A written evaluation for each inspection is recorded in the Infrastructure Management System (IMS). Defects that are found in the collection system are reported and prioritized. This results in serious problems either being repaired or included in the list of Capital Improvement Projects (CIP).

Service Tap Repairs

A total of 25 service taps were repaired during FY 95/96. A total of 157 new sanitary taps were installed throughout the collection system.

Mainline Structural Repairs

A total of 177 mainline repairs were made in FY 95/96. This resulted in the replacement of approximately 1,470 feet of sewer line. This activity directly decreases inflow and infiltration into the collection system.

Sanitary Manhole Repairs

During FY 95/96 the City's maintenance crews repaired 29 manholes and two cleanouts. In addition, 12 manholes were replaced.

Sewer Line Cleaning

All sewer lines within the collection system are cleaned on a varying basis, depending on need, from weekly to once every six years. The cleaning schedule and requests are part of the City's computerized maintenance management system. During FY 95/96 a total of 1,416,732 feet of the sewer collection system was cleaned by four City hydro crews.

Flow Monitoring Program

The City collected flow monitoring data from 21 permanent flow monitors, 13 rain gauges, and 30 portable flow meters. These meters are used to collect flow data needed for designing system upgrades, monitoring overflow events, calibrating the hydraulic model, and evaluating the condition of the collection system.

Inspection Program

The City continued to inspect all new and repaired sanitary sewer service lines during 1995/96 resulting in approximately 2,000 inspections being performed. All sanitary sewer hookups are required to pass a 15-minute no-loss air test or hydrostatic test in conformance with the Uniform Plumbing Code (UPC) before they are accepted. No loss requirements are strictly enforced to prevent I/I from entering the collection system from new sanitary sewer service lines.

Storm drainage connections were also inspected to ensure that no illicit connections were made to the sanitary system and that the drains are properly installed. Approximately 2,500 inspections on storm drains were made during FY 95/96.

Chemical Grouting

The City of Salem had an extensive sewer grouting program during the past several decades. However, the City elected to greatly reduce this program in exchange for more permanent solutions, such as sewer line replacement, where an I/I problem exists. Grouting is still used where appropriate and the City still maintains and operates their own grouting equipment.

SECTION III: OVERFLOW EVENTS AT PERMITTED DISCHARGE SITES

All overflow events from permitted bypass points, pump stations, and non-permitted locations were properly reported to DEQ. All posting, water quality testing and notification procedures listed in the department approved "City of Salem Emergency Sewer Bypass Plan" were followed as required in schedule D, Condition 3.

Table 1 contains a summary of overflow events that occurred from permitted discharge points during FY 95/96. Table 2 contains a summary of overflow events from sewer pump stations, and Tables 3, 4, and 5 contain a list of overflows from manholes and cleanouts. The following is a summary of the 11 storm events which resulted in overflows during FY 95/96.

Storm Event No. 1 (11/11/95)

Heavy rain began falling during the early morning hours of November 11, 1995 and continued until 14:00 November 11, 1995. The total rainfall during this time period was 1.98 inches, as recorded by the U.S. Weather Service located at the Salem Airport. Heavier amounts were recorded by the City's rain gauges in the South and West Salem hills.

Storm Event No. 2 (11/27/95)

Rain began falling at 03:45 November 27, 1995 and continued until 22:00 November 27, 1995. The total rainfall during this period was 1.35 inches, as recorded by the tipping bucket rain gauge located at the City of Salem Shops building.

The City of Salem's PW/Operations Division maintains a network of 9 tipping bucket rain gauges strategically located City wide. These rain gauges reported amounts ranging from a high of 1.69 inches in the West Salem hills, to a low of 1.15 inches in East Central Salem.

Storm Event No. 3 (11/29 - 12/01/95)

Rain began falling at 09:15 November 29, 1995 and continued intermittently until 19:45 December 1, 1995. The total rain during this period was 2.21 inches, as recorded by the tipping bucket rain gauge located at the City Shops.

Storm Event No 4 (12/10 - 12/15/95)

Rain began falling at 06:45 December 10, 1995 and continued intermittently until 18:45 December 14, 1995. The total rain during this period ranged from 5.64 inches in the South Salem hills to 4.57 inches as recorded at the City Shops.

A wind storm struck the City of Salem on December 12, 1995 causing power outages to occur at 10 of the City sewer pump stations. As a result of the power outage, overflows occurred at both the Airport and Musgrave pump stations. Sewer to sewer bypass pumping and standby power

generation prevented overflows at the other eight pump stations affected by the power outage.

Storm Event No. 5 (01/20 - 01/21/95)

Intermittent rainfall occurred during the five days prior to January 20, 1996. The total rain during this period was 2.16 inches. During January 20 and 21, 1996, an additional 1.77 inches of rainfall was recorded. Rainfall totals were recorded by the tipping bucket rain gauge located at City Hall, 555 Liberty Street, SE.

Storm Event No. 6 (01/24/96)

During the six day period prior to January 24, 1996, a total of 3.64 inches of rainfall was recorded. On January 24, 1996, an additional 0.41 inches of rain was received. Rainfall totals were recorded by the rain gauge located at the City Shops.

Storm Event No. 7 (01/27/96)

Stormy weather for the seven days preceding the overflow event on January 27, 1996 resulted in 2.77 inches of rain falling on the City of Salem. On January 27, an additional 0.68 inches was recorded. The rainfall totals were recorded by the tipping bucket rain gauge located at the North River Road Diversion Structure, 3100 North River Road.

Storm Event No. 8 (02/05 - 02/11/96)

Steady rain began falling on the City of Salem at 07:00 February 5, 1996 and continued at approximately 0.10 inches per hour until 24:00 February 9, 1996. Total rainfall for this period was 8.54 inches.

The greatest 24 hour total rainfall during this period was 2.82 inches recorded from 16:00 February 6, 1996, to 15:59 February 7, 1996. This amount is in excess of a five year, 24 hour storm. Rainfall totals for 48, 72, and 96 hour intervals were well in excess of a 50 year storm event.

Total rainfall for this storm event was averaged, based on the amounts recorded at the nine rain gauge locations within the City of Salem.

Storm Event No. 9 (02/18 - 02/19/96)

Rain began falling at 20:30 February 16, 1996 and continued intermittently until 06:30 February 19, 1996. The total volume of rainfall during this 58 hour period was 2.29 inches. The greatest 24 hour rainfall amount recorded this period was 1.65 inches between the hours of 17:30 February 17, and 17:29 on February 18, 1996.

Total rainfall for this event is an average of the nine rain gauging stations located throughout the City of Salem.

Storm Event No. 10 (02/23 - 02/24/96)

Rain began falling at 18:00 February 22, 1996 and continued until 18:00 February 23, 1996. The total rain during this period was 1.32 inches, as recorded by the rain gauge located at the City Shops building. Only a trace of rainfall occurred on February 24, 1996. Rainfall amounts varied depending on location and ranged from 0.76 inches in East Salem and 1.44 inches in the South Salem hills.

Storm Event No. 11 (04/23 - 04/24/96)

During the period from April 18 through April 23, 1996, soaking rain fell over the entire Salem area. The total rain during this period was 3.08 inches, as recorded by the rain gauge located at Salem City Hall. The rain gauging network recorded rainfall amounts ranging from 3.62 inches in the South Salem hills to 2.57 inches in northeast Salem.

TABLE 1. FY 95/96 OVERFLOW SUMMARY

Storm Event	Date	Permitted Discharge Sites			Non-Permitted Discharge Sites (1) (MG)	Comments
		001 Claggett Cr. (MG)	002 N River Rd. (MG)	003 Union Street (MG)		
1	11/11/95	0.0	6.71	3.29	0.056	A total of 1.98" of rainfall was recorded in less than 24 hours prior to this overflow event.
2	11/27/95	0.0	7.60	3.10	0.266	1.35" of rainfall in 18 hours.
3	11/29-12/01/95	0.0	30.71 (2)	3.46	0.103	A total of 2.21" of rainfall was recorded during this overflow event.
4	12/10-12/15/95	0.056	139.52 (2)	14.59	8.440	A total of 4.57" of rainfall was recorded between 12/10 and 12/14. Wind storm on 12/12 resulted in the loss of power to 10 sewer pump stations.
5	01/20-01/21/96	0.0	40.01 (2)	12.09	0.856	2.16" of rainfall was recorded during the five days preceding this event.
6	01/24/96	0.0	4.03	0.0	0.0	3.64" of rainfall for the 6 days prior to this overflow event.
7	01/27/96	0.0	2.90	0.0	0.0	2.77" of rainfall during the week preceding this event.
8	02/05-02/11/96	0.0	301.74 (3)	240.65	419.04	A total of 8.54" of rainfall was recorded for the 4 days preceding this overflow event. This storm has a return rate greater than 50 years.
9	02/18-02/19/96	0.0	42.27 (2)	0.0	0.0	2.29" of rainfall recorded over a 3 day period.
10	02/23-02/24/96	0.0	47.65	3.24	0.469	1.25" of rainfall in 24 hours.
11	04/23-04/24/96	0.0	20.81	0.114	0.0	3.08" of rainfall was recorded for the 5 days preceding this overflow event.
Totals		0.056	643.95	280.534	429.23	

Note: (1) Includes flow from Lift Stations listed in Table 2.

(2) High water levels in the Willamette River prevented the flow meter used to measure the amount of overflow volume from making accurate estimates. Reported volume is calculated based on a similar storm event which occurred on November 27, 1995.

Notes for Table 1 (cont.)

(3) High water levels in the Willamette River prevented the flow monitoring equipment from being used to determine the total volume of sewerage that overflowed for this event. Reported value is calculated based on the measured flow rate on February 6, prior to the time river levels impacted the flow monitor in the discharge line.

TABLE 2. OVERFLOWS AT LIFT STATIONS (STORM RELATED)			
Location: Musgrave Lift Station (Wallace Rd.) SP-27			
Receiving Stream: Willamette River			
Storm Event	Date	Duration (Hrs)	Volume (Gal)
2	11/27/95	5.0	266,000
3	11/29 - 12/01/95	46.75	99,000
4	12/10 - 12/15/95	0.28	7,446
5	01/20 - 01/21/96	21.5	629,000
8	02/05 - 02/11/96	118.25	70,762,000
10	02/23 - 02/24/96	8.75	469,000
Location: Battle creek Pump Station			
Receiving Stream: Battle Creek			
Storm Event	Date	Duration (Hrs)	Volume (Gal)
1	11/11/95	1.55	55,800
8	02/05 - 02/11/96	113.04	48,503,000
Location: Airport Pump Station (1)			
Receiving Stream: Clark Creek			
Storm Event	Date	Duration (Hrs)	Volume (Gal)
4	12/10 - 12/15/95	4.85	4,365,000
Location: West Salem Sewer Pump Station			
Receiving Stream: Willamette River			
Storm Event	Date	Duration (Hrs)	Volume (Gal)
8	02/05 - 02/11/96	67.92	61,519,200
Total Overflows at Sewer Lift Stations FY 95/96			186,675,446

- Notes:
1. The overflow at the Airport Sewer Pump Station was caused by a power outage occurring on 12/12/95. A new Airport Pump Station is currently being designed. The new station will have greater pumping capacity and be served by power from two separate substations.
 2. A replacement Battlecreek Sewer Pump Station is currently being designed. The new station will provide additional pumping capacity, reducing the likelihood of future overflows at this location.
 3. The Musgrave Lift Station, which was undersized and routinely overflowed, was taken off line in August, 1996, with the installation of the new West Salem sewer trunk line.
 4. During the February 5 storm event, several lift stations were taken off line to prevent them from being inundated with the flood waters. The estimated volume of sewerage which overflowed at these lift stations is included in Table 1.

TABLE 3. BYPASS PUMPING AT MANHOLES (STORM RELATED)

Location: Madison Street NE between 18th and 19th NE (MH 48-478081)
 Receiving Stream: Willamette River

Storm Event	Date	Total Pump Time (Hrs)	Volume (Gal)
3	11/29 - 12/01/95	0.87	3,957
4	12/10 - 12/15/96	7.91	36,148
8	02/05 - 02/11/96	81.17	370,607
Total Bypass Pumping at Manholes			410,712

TABLE 4. OVERFLOWS AT MANHOLES AND OTHER RELIEFS (STORM RELATED)

Storm Event No. 5 (01/20 - 01/21/96)

Location	Basin	Receiving Stream	Estimated Volume (Gal)
4997 Arrowood Court SE CO 63-468004	Market Street	Little Pudding	148
3646 Turnbridge Wells SE MH 39-460033	Clark Creek	Clark Creek	18,000
209 Harvard Court SE MH 39-460034	Clark Creek	Clark Creek	55,800
325 Ewald Avenue SE MH 39-460063	Clark Creek	Clark Creek	18,000
350 Ewald Avenue SE MH 39-360062	Clark Creek	Clark Creek	18,000
375 Ewald Avenue SE MH 39-460061	Clark Creek	Clark Creek	63,000

Storm Event No. 8 (02/05 - 02/11/96)

Location	Basin	Receiving Stream	Estimated Volume (Gal)
10 Inch relief valve on west side of Church Street Bridge	Pringle Creek	Pringle Creek	3,882,000
Numerous locations throughout the City of Salem	Various	Various	234,000,000 (See Note 1.)
Total Overflows at Manholes (Storm Related)			238,054,948

Notes: 1. During this large storm event and accompanying flooding, numerous manholes overflowed throughout the City of Salem. The volume which overflowed is estimated based on the amount of sewerage not treated by the Willow Lake Treatment Plant during this event.

**TABLE 5. OVERFLOWS AT MANHOLES AND PUMP STATIONS
(NON-STORM RELATED)**

Location	Receiving Stream	Date	Estimated Flow (Gals)	Notes
4766 Drew Street NE	None	08/20/95	100	(1)
Musgrave Pump Station	Willamette River	10/02/95	8,000	(2)
5245 Lone Oak SE	None	10/07/95	Unknown	(3)
4333 47th Avenue NE	Upper Claggett	11/07/95	100	(4)
5444 Compton Lane SE	Battle Creek	12/24/95	690	(5)
Mission Street Pump Station	Willamette River	05/03/96	816	(6)
838 Indian Court SE	Little Pudding	06/30/96	930	(7)

- Notes:
1. Overflow at manhole caused by a blockage in the sewer line. City crews responded immediately and unplugged the blockage.
 2. A drive shaft broke on one of the three pumps. In the process of repairing the station an overflow occurred at the wet well. This station was taken out of service in August, 1996, with the completion of the West Salem trunk sewer line.
 3. A blockage in the sewer line caused an overflow to occur at this location. City crews responded immediately and relieved the blockage.
 4. Overflow at manhole caused by a grease blockage in the sewer line. City crews responded to the call and relieved the blockage.
 5. A blocked sewer line caused an overflow to occur at this location. City crews responded immediately and opened up the line with the hydro cleaner.
 6. A spill occurred at the Mission Street Pump Station while crews were removing a temporary sewer force main.
 7. A grease blockage in the sewer main caused an overflow to occur at this location. City crews responded to the reported problem and relieved the blockage with the hydro cleaner.

SECTION IV: FY 95/96 CAPITAL IMPROVEMENTS PROJECTS

The following is a status update of improvement projects identified for the collection system that are currently in the planning stage, being designed, or are under construction.

1. Project #920223, Wallace Road Trunk Sewer. This project provides for the construction of 2,495 feet of 48 inch and 9,205 feet of 36 inch trunk sewer. This new trunk sewer will result in the Musgrave (Wallace) Road Pump Station and force main across the Marion Street bridge being "mothballed". It will also result in the abandonment of the Taybin Lift Station. The project will also result in an upgrade to the West Salem Sewer Pump Station to increase its pumping capacity. The trunk sewer project was completed in August 1996.
2. Project #1008, Pipe Replacement - Portland Road, Pine Street South 672 feet. This project will replace and relocate an existing 6 inch pipe with 672 feet of new 8 inch sewer line. Project is scheduled to be completed in September, 1996.
3. Project #920227, Alley East of Fairgrounds and North of Jefferson. This project will result in the replacement of 240 feet of failing 8-inch sewer main with a new 8-inch line.
4. Project #940217, Leslie Street SE, Church to High. This work provides for the replacement of 1,010 feet of failing 6-inch sewer main with new 8-inch pipe. In the past, some homes in this area have been subject to basement flooding due to backups in the sewer system.
5. Project # 1020, Battlecreek Sewage Pump Station. This project consists of replacing the existing undersized pump station with a new facility adequate to support build out of the basin. The work also includes construction of a new 16-inch force main parallel to the existing 14 inch force main. This project is currently in design and will be constructed concurrent with the South Airport Pump Station.
6. Project #1022, South Airport Pump Station. This project will increase the pump station capacity and allow more flow to be transferred to the East Salem trunk sewer. The new station is currently under designed and will have a dry well/ wet well configuration. Redundant power from a separate substation is planned for the site. Construction of the new station is scheduled to start during the spring of 1997.
7. Project #960213, West Salem Sewage Pump Station Upgrade. This project is needed to increase the capacity of the West Salem Sewage Pump Station as a result completing the new Wallace Road Trunk sewer line.
8. Project #960214, Ferry Sewage Pump station Rehabilitation. The project provides for the rehabilitation of the existing 40-year-old sewage pump station. Work includes new pumps, motors, controls, power system, standby power, and other related items.

9. Project #960215, Church Sewage Pump Station Rehabilitation. This project provides for the rehabilitation of the existing 42-year-old sewage pump station. Work includes new pumps, motors, controls, power system, standby power, and other related work.
10. Project #940235, Middle Grove Pump Station and Force Main. This projects provides for the replacement of the existing 26-year-old sewage pump station and force main with a history of equipment failures. This project will eliminate the potential of overflows during wet weather.
11. Project #950231, Hayesville Sewage Pump Station Replacement. This project provides for the replacement of the existing 30-year-old undersized sewage pump station and force main to provide increased capacity for developing residential areas and new schools. The design also includes standby power to eliminate the potential of overflows during loss of station power.
12. Project 950230, Madison Street Bypass Sewer. This project will result in the construction of 5,800 feet of new 18-inch and 24-inch sewer line. Project is designed to eliminate basement flooding in the area of 18th and Madison for all events less than a 25 year storm. Design of the project is completed with construction scheduled for FY 96/97.
13. Project 950224, Pringle Creek Trunk. This project will provide for the replacement of approximately 6,950 feet of existing 12-inch and 15-inch trunk sewer with new 18-inch and 21-inch sewer lines. The area served by this trunk sewer has experienced sewer overflows to streets and basements.
14. Project 950227, Clark Creek Trunk. This project provides for the replacement of approximately 9,820 feet of existing 10-inch, 12-inch, and 15-inch trunk sewer with new 18-inch and 21-inch pipe. The area served by this trunks sewer has experience sanitary sewer overflows to streets and basements.
15. Project 950228, Fairmount/Nob Hill Trunk Replacement. This project will result in the replacement of approximately 1,350 feet of existing undersized 10-inch, 12-inch, and 15-inch trunk sewer with new 15-inch, 18-inch, and 21-inch pipe.

The City is continuing with its policy of replacing service laterals whenever trunk lines are replaced or rehabilitated.

SECTION V: FY 96/97 - FY 00/01 CAPITAL IMPROVEMENTS PROJECTS

The current Capital Improvements Program (CIP) spans from FY 96/97 to FY 00/01. Several sewer pump stations are scheduled for upgrades or replacements during the next five years. In addition, several major improvements projects have been identified in the Sewer Master Plan needed to eliminate overflows to tributary streams for all events less than the design storm (5 year, 24 hour storm).

Funding for CIP projects originates from users fees and from revenue bonds. The City has budgeted \$9,226,400 for sanitary sewer system projects during FY 96/97. A listing of the projects planned for the next 5-year window is attached.

**SANITARY SEWER SYSTEM
FUNDED PROJECTS**

**CAPITAL IMPROVEMENT PROGRAM
FY 1996-97 THROUGH FY 2000-01**

Given the Council's guidance, this CIP provides a five-year capital program funded by sewer rates and revenue bonds at the annual levels shown below. The selection of projects is consistent with Public Works' adopted Water and Sewer Utility 20-Year Capital Plan FY 1993/94-2012/13.

The annual expenditures will be used as follows: 1. Projects, generally by drainage basin, which address compliance with National Pollutant Discharge Elimination System (NPDES) Permit which requires elimination of five-year storm event sewage overflows to the Willamette River and its tributaries, and the provision of redundancy pumping capacity; 2. Those projects necessary to avoid conflicts with approved street bond projects, Federal Aid Urban projects, and I-5 widening; 3. Those projects necessary to address major structural problems; 4. Those projects addressing elimination of inflow to the sewer system and/or reduction of infiltration, may also have moderate structural problems; 5. Those projects addressing minor infiltration/inflow correction; 6. Wild card projects, i.e. health hazards, capacity issues, industrial development.

Documented separately in this CIP is an unfunded backlog of sewer CIP projects. These projects will be integrated into the five-year CIP as projects are constructed and additional funding becomes available in later years.

Project costs in this report are forecast for the year in which the project is planned to be budgeted.

FUND SOURCE SUMMARY

	<u>FY 1996-97</u>	<u>FY 1997-98</u>	<u>FY 1998-99</u>	<u>FY 1999-00</u>	<u>FY 2000-01</u>	<u>Total</u>
Revenue Bonds (RBD):	\$9,017,000 ¹	\$9,786,000 ²	\$ -0-	\$ -0-	\$ -0-	\$18,803,000
Sewer Rates (SR):	<u>209,400</u>	<u>\$271,490</u>	<u>\$2,482,660</u>	<u>\$2,581,970</u>	<u>\$2,685,260</u>	<u>\$8,230,780</u>
Total:	\$9,226,400	\$10,057,490	\$2,482,660	\$2,581,970	\$2,685,260	\$27,033,780

1 Sewer Revenue Bond Package E

2 Sewer Revenue Bond Package F

PROJECT DETAIL

PLANNED YEAR	ID#	PROJECT	FUTURE AMOUNT \$ (000 \$)	FUND SOURCE	WARD	NEIGHBORHOOD	BUDGET IMPACT
				RB/E	OUTSIDE	ESSD	DECREASE
1996-97	1001	HAYESVILLE SEWAGE PUMP STATION - REPLACEMENT REPLACE EXISTING UNDERSIZE PUMP STATION AND FORCE MAIN WITH NEW FACILITY INCLUDING STANDBY POWER. WILL PROVIDE CAPACITY FOR DEVELOPING RESIDENTIAL AREAS.	423.				
1996-97	1014	UNION SEWAGE PUMP STATION - REHABILITATION REHABILITATION OF EXISTING FACILITY INCLUDING NEW PUMPS, MOTORS, CONTROLS, POWER SYSTEMS, STANDBY POWER, AND OTHER RELATED WORK.	246.	RB/E	3	CANDO;	DECREASE
1996-97	1016	FERRY SEWAGE PUMP STATION - REHABILITATION REHABILITATION OF EXISTING FACILITY INCLUDING NEW PUMPS, MOTORS, CONTROLS, POWER SYSTEMS, STANDBY POWER, AND OTHER RELATED WORK.	342.	RB/E	3	CANDO;	DECREASE
1996-97	1018	CHURCH SEWAGE PUMP STATION - REHABILITATION REHABILITATION OF EXISTING FACILITY INCLUDING NEW PUMPS, MOTORS, CONTROLS, POWER SYSTEMS, STANDBY POWER, AND OTHER RELATED WORK.	360.	RB/E	3	CANDO;	DECREASE
1996-97	1029B	SSES PRIORITY PROJECTS AND STREET R & R AVOIDANCE PROJECTS	3842.	1747 RB/E, 95 SR	ALL	ALL	DECREASE
1996-97	1075A	SEWER SYSTEM - 1994 SEWER BOND PACKAGE "E", SALE EXPENSE FUNDING FOR LEGAL SERVICES, FINANCIAL SERVICES, AND PRINTING COSTS OF THE BOND SALE.	245.	RB/E	ALL	ALL	-0-
1996-97	1075B	SEWER SYSTEM - 1996 SEWER BOND PACKAGE "E", DEBT RESERVE THESE FUNDS ARE USED TO MEET THE DEBT SERVICE RESERVE COVENANT FOR THE BOND SALE UNDER THE TERMS OF THE MASTER RESOLUTION AUTHORIZING THE ISSUANCE OF THE BONDS. THESE FUNDS ARE A REQUIREMENT OF SELLING REVENUE BONDS.	841.	RB/E	ALL	ALL	-0-

CATEGORY: SANITARY SEWER

PLANNED YEAR	ID#	PROJECT	FUTURE AMOUNT \$(000'S)	FUND SOURCE	WARD	NEIGHBORHOOD	BUDGET IMPACT
1996-97	1075C	SEWER SYSTEM - 1996 SEWER BOND PACKAGE "E", MANAGEMENT AND CONTINGENCY THESE FUNDS ARE USED FOR THE FOLLOWING: 1. GENERAL MANAGEMENT AND SUPERVISION OF THE BOND CIP BUDGET AND PROVIDES FOR THE ANNUAL APPROPRIATED CITY ADMINISTRATIVE OVERHEAD CHARGE TO THIS CONSTRUCTION BOND FUND. 2. CONTINGENCY FOR ANY IDENTIFIED BOND PROJECT WHOSE COST EXCEEDS THE BUDGETED ESTIMATE.	352.	RB/E	ALL	ALL	-0-
1996-97	1075D	SEWER SYSTEM OVERSIZE AGREEMENTS MASTER PLAN REQUIRES SOME LINES TO BE OVERSIZED FOR TRUNK SEWER PURPOSES. WHEN DEVELOPERS INSTALL THESE LINES WITHIN THE CDA, THEY PAY COST EQUAL TO THE STANDARD SIZED LINE TO SERVE THEIR PROPERTY. BALANCE OF THAT OVERSIZING IS BORNE BY CITY. FUNDS ARE USED TO COVER CONSTR COST OF THE OVERSIZE PORTION OF SEWER LINE INSTALLATION INSIDE THE CDA.	114.4	SR	ALL	ALL	-0-
1996-97	1093	SOUTH AIRPORT PUMP STATION EXPANSION PHASE II CONVERT EXISTING PUMP STATION FROM A SUBMERSIBLE TYPE STATION TO A TRADITIONAL WET WELL/DRY WELL TYPE STATION. THIS PROJECT TO BE CONSTRUCTED CONCURRENT WITH PROJECT NUMBER 950214 - SOUTH AIRPORT SEWAGE PUMP STATION EXPANSION PHASE I.	1238.	RB/E	2	SEWCA, EJANA	DECREASE
1996-97	905C1	SEWER INTERCEPTOR - WILLOW LAKE WTP TO CENTRAL BUS. DIST. - DESIGN/ROW PROJECT DESIGN AND RIGHT-OF-WAY ACQUISITION FOR A LARGE DIAMETER SEWER INTERCEPTOR CONNECTING THE WILLOW LAKE WASTEWATER TREATMENT PLANT TO THE CITY SEWER SYSTEM AT A POINT IN THE VICINITY OF CENTRAL BUSINESS DISTRICT.	851.	RB/E	ALL	ALL	-0-
1996-97	948	PIPE REPLACEMENT - CRESTVIEW DR. GARLOCK TO NORMANDY REPLACE 871 FEET OF FAILING PIPE WITH 8-INCH PIPE. EXISTING PIPE IS CONTRIBUTING EXCESSIVE I/I. CLARK CREEK BASIN	149.	RB/E	7	SOUTH SALEM	DECREASE
1996-97	980	PIPE REPLACEMENT - COURT ST E/O 18TH TO MILL CREEK ALLEY S/O COURT TO STATE ABANDON EXISTING LINE IN COURT ST. BUILD 660 FEET OF 8-INCH DIAMETER SEWER WITH SERVICES IN COURT AND ALLEY S/O COURT. DESIGN AND COORDINATE THIS PROJECT WITH COURT-CHEMEXETA PROJECT.	221.	RB/E	1	NEN	DECREASE
1997-98	1013	CONSTRUCT SALTER TRUNK SEWER ABANDON EXISTING PUMP STATION AND CONSTRUCT 2665 FEET OF NEW 24-INCH TRUNK SEWER.	1111.	RB/F	OUTSIDE	ESSD	DECREASE

CATEGORY: SANITARY SEWER

PLANNED YEAR	ID#	PROJECT	FUTURE AMOUNT \$(000'S)	FUND SOURCE	HARD	NEIGHBORHOOD	BUDGET IMPACT
1996-97	1075C	SEWER SYSTEM - 1996 SEWER BOND PACKAGE "E", MANAGEMENT AND CONTINGENCY THESE FUNDS ARE USED FOR THE FOLLOWING: 1. GENERAL MANAGEMENT AND SUPERVISION OF THE BOND CIP BUDGET AND PROVIDES FOR THE ANNUAL APPROPRIATED CITY ADMINISTRATIVE OVERHEAD CHARGE TO THIS CONSTRUCTION BOND FUND. 2. CONTINGENCY FOR ANY IDENTIFIED BOND PROJECT WHOSE COST EXCEEDS THE BUDGETED ESTIMATE.	352.	RB/E	ALL	ALL	-0-
1996-97	1079D	SEWER SYSTEM OVERSIZE AGREEMENTS MASTER PLAN REQUIRES SOME LINES TO BE OVERSIZED FOR TRUNK SEWER PURPOSES. WHEN DEVELOPERS INSTALL THESE LINES WITHIN THE CDA, THEY PAY COST EQUAL TO THE STANDARD SIZED LINE TO SERVE THEIR PROPERTY. BALANCE OF THAT OVERSIZING IS BORNE BY CITY. FUNDS ARE USED TO COVER CONSTR COST OF THE OVERSIZE PORTION OF SEWER LINE INSTALLATION INSIDE THE CDA.	114.4	SR	ALL	ALL	-0-
1996-97	1093	SOUTH AIRPORT PUMP STATION EXPANSION PHASE II CONVERT EXISTING PUMP STATION FROM A SUBMERGIBLE TYPE STATION TO A TRADITIONAL WET WELL/DRY WELL TYPE STATION. THIS PROJECT TO BE CONSTRUCTED CONCURRENT WITH PROJECT NUMBER 950214 - SOUTH AIRPORT SEWAGE PUMP STATION EXPANSION PHASE I.	1238.	RB/E	2	SEWCA, ELNA	DECREASE
1996-97	905C1	SEWER INTERCEPTOR - WILLOW LAKE WTP TO CENTRAL BUS. DIST. - DESIGN/ROW PROJECT DESIGN AND RIGHT-OF-WAY ACQUISITION FOR A LARGE DIAMETER SEWER INTERCEPTOR CONNECTING THE WILLOW LAKE WASTEWATER TREATMENT PLANT TO THE CITY SEWER SYSTEM AT A POINT IN THE VICINITY OF CENTRAL BUSINESS DISTRICT.	851.	RB/E	ALL	ALL	-0-
1996-97	948	PIPE REPLACEMENT - CRESTVIEW DR, GARLOCK TO NORMANDY REPLACE 971 FEET OF FAILING PIPE WITH 8-INCH PIPE. EXISTING PIPE IS CONTRIBUTING EXCESSIVE I/I. CLARK CREEK BASIN	149.	RB/E	7	SOUTH SALEM	DECREASE
1996-97	980	PIPE REPLACEMENT - COURT ST E/O 18TH TO MILL CREEK ALLEY S/O COURT TO STATE ABANDON EXISTING LINE IN COURT ST. BUILD 660 FEET OF 8-INCH DIAMETER SEWER WITH SERVICES IN COURT AND ALLEY S/O COURT. DESIGN AND COORDINATE THIS PROJECT WITH COURT-CHEMEXETA PROJECT.	221.	RB/E	1	NEN	DECREASE
1997-98	1013	CONSTRUCT SATTER TRUNK SEWER ABANDON EXISTING PUMP STATION AND CONSTRUCT 2665 FEET OF NEW 24-INCH TRUNK SEWER.	1111.	RB/P	OUTSIDE	ESSD	DECREASE

CATEGORY: SANITARY SEWER

PLANNED YEAR	ID#	PROJECT	FUTURE AMOUNT \$(000'S)	FUND SOURCE	HARD	NEIGHBORHOOD	BUDGET IMPACT
				RB/F	OUTSIDE	KEITZER	DECREASE
1997-98	1017	DEARBORN SEWAGE PUMP STATION - REPLACEMENT REPLACE EXISTING UNDERSIDE PUMP STATION AND FORCE MAIN WITH NEW FACILITY INCLUDING STANDBY POWER.	408.				
1997-98	1029C	SSS PRIORITY PROJECTS AND STREET R & R AVOIDANCE PROJECTS PIPE REPLACEMENT PROJECTS TO BE IDENTIFIED DURING THE SEWER SYSTEM EVALUATION STUDY (SSES) SCHEDULED FOR FY 1993-94 AND FY 1994-95, AND PROJECTS TO REPLACE DETERIORATED SEWERS UNDER STREET RESTORATION AND RESURFACING PROJECTS.	6108.	RB/F	ALL	ALL	DECREASE
1997-98	1015	WTP EFFLUENT DIFFUSER THIS PROJECT WILL CONSTRUCT AN EFFLUENT DIFFUSER PIPE TO MEET DEQ REQUIREMENTS RELATING TO COMPLIANCE WITH INSTREAM WATER QUALITY STANDARDS. THE DIFFUSER WILL BE SIZED TO MEET SUMMER SEASON FLOW LEVELS.	638.	RB/F	ALL	ALL	INCREASE
1997-98	1076A	SEWER SYSTEM - 1997 BOND PACKAGE "F", SALE EXPENSE FUNDING FOR LEGAL SERVICES, FINANCIAL SERVICES, AND PRINTING COSTS OF THE BOND SALE.	259.	RB/F	ALL	ALL	-0-
1997-98	1076B	SEWER SYSTEM -1997 SEWER BOND PACKAGE "F", DEBT SERVICE THESE FUNDS ARE USED TO MEET THE DEBT SERVICE RESERVE COVENANT FOR THE BOND SALE UNDER THE TERMS OF THE MASTER RESOLUTION AUTHORIZING THE ISSUANCE OF THE BONDS. THESE FUNDS ARE A REQUIREMENT OF SELLING THE REVENUE BONDS.	890.	RB/F	ALL	ALL	-0-
1997-98	1076C	SEWER SYSTEM - 1997 SEWER BOND PACKAGE "F", MANAGEMENT AND CONTINGENCY THESE FUNDS ARE USED FOR THE FOLLOWING: 1. GENERAL MANAGEMENT AND SUPERVISION OF THE BOND CIP BUDGET AND PROVIDES FOR THE ANNUAL APPORTIONED CITY ADMINISTRATIVE OVERHEAD CHARGE TO THIS CONSTRUCTION BOND FUND. 2. CONTINGENCY FOR ANY IDENTIFIED BOND PROJECT WHOSE COST EXCEEDS THE BUDGETED ESTIMATE.	372.	RB/F	ALL	ALL	-0-
1997-98	1079E	SEWER SYSTEM OVERSIZE AGREEMENTS MASTER PLAN REQUIRES SOME LINES TO BE OVERSIZED FOR TRUNK SEWER PURPOSES. WHEN DEVELOPERS INSTALL THESE LINES WITHIN THE CDA, THEY PAY COST EQUAL TO THE STANDARD SIZED LINE TO SERVE THEIR PROPERTY. BALANCE OF THAT OVERSIZING IS BORNE BY CITY. FUNDS ARE USED TO COVER CONSTR. COST OF THE OVERSIZE PORTION OF SEWER LINE INSTALLATION INSIDE THE CDA.	118.98	SR	ALL	ALL	-0-

PLANNED YEAR	ID#	PROJECT	FUTURE AMOUNT \$(000'S)	FUND SOURCE	WARD	NEIGHBORHOOD	BUDGET IMPACT
1997-98	1087	SANITARY SEWER RELOCAT - WALLACE RD NW, MICHIGAN CITY LN TO ORCHARD HTS RD RELOCATES CITY SANITARY SEWER PIPE TO ACCOMMODATE ODOT PROJECT WHICH IS WIDENING WALLACE ROAD.	152.51	SR	8	WEST SALEM	-0-
1998-99	1029D	SSES PRIORITY PROJECTS AND STREET R & R AVOIDANCE PROJECTS PIPE REPLACEMENT PROJECTS TO BE IDENTIFIED DURING THE SEWER SYSTEM EVALUATION STUDY (SSES) SCHEDULED FOR FY 1993-94 AND FY 1994-95, AND PROJECTS TO REPLACE DETERIORATED SEWERS UNDER STREET RESTORATION AND RESURFACING PROJECTS.	2358.92	SR	ALL	ALL	DECREASE
1998-99	1079F	SEWER SYSTEM OVERSIZE AGREEMENTS MASTER PLAN REQUIRES SOME LINES TO BE OVERSIZED FOR TRUNK SEWER PURPOSES. WHEN DEVELOPERS INSTALL THESE LINES WITHIN THE CDA, THEY PAY A COST EQUAL TO THAT OF THE STANDARD SIZED LINE TO SERVE THEIR PROPERTY. BALANCE OF COST OF OVERSIZING IS BORNE BY CITY. FUNDS ARE USED TO COVER CONSTRUCTION COST OF THE OVERSIZE PORTION OF SEWER LINE INSTALLATION.	123.74	SR	ALL	ALL	-0-
1999-00	1023E	SSES PRIORITY PROJECTS AND STREET R & R AVOIDANCE PROJECTS PIPE REPLACEMENT PROJECTS TO BE IDENTIFIED DURING THE SEWER SYSTEM EVALUATION STUDY (SSES) SCHEDULED FOR FY 1993-94 AND FY 1994-95, AND PROJECTS TO REPLACE DETERIORATED SEWERS UNDER STREET RESTORATION AND RESURFACING PROJECTS.	2453.28	SR	ALL	ALL	DECREASE
1999-00	1079G	SEWER SYSTEM OVERSIZE AGREEMENTS MASTER PLAN REQUIRES SOME LINES BE OVERSIZED FOR TRUNK SEWER PURPOSES. WHEN DEVELOPERS INSTALL THE LINES WITHIN THE CDA, THEY PAY A COST EQUAL TO THAT OF THE STANDARD SIZED LINE TO SERVE THE PROPERTY. BALANCE OF COST OF OVERSIZING IS BORNE BY CITY. FUNDS ARE USED TO COVER CONSTR COST OF THE OVERSIZE PART OF SEWER LINE INSTALLATION INSIDE THE CDA.	128.69	SR	ALL	ALL	-0-
2000-01	1029F	SSES PRIORITY PROJECTS AND STREET R & R AVOIDANCE PROJECTS PIPE REPLACEMENT PROJECTS TO BE IDENTIFIED DURING THE SEWER SYSTEM EVALUATION STUDY (SSES) SCHEDULED FOR FY 1993-94 AND FY 1994-95, AND PROJECTS TO REPLACE DETERIORATED SEWERS UNDER STREET RESTORATION AND RESURFACING PROJECTS.	2551.42	SR	ALL	ALL	DECREASE

PLANNED YEAR	ID#	PROJECT	FUTURE AMOUNT \$(000'S)	FUND SOURCE	WARD	NEIGHBORHOOD	BUDGET - IMPACT
2000-01	1079H	SEWER SYSTEM OVERSIZE AGREEMENTS	133.84	SR	ALL	ALL	-0-

SEWER SYSTEM OVERSIZE AGREEMENTS
 MASTER PLAN REQUIRES SOME LINES TO BE OVERSIZED FOR TRUNK SEWER
 PURPOSES. WHEN DEVELOPERS INSTALL THESE LINES WITHIN THE CDA, THEY PAY
 COST EQUAL TO THE STANDARD SIZED LINE TO SERVE THEIR PROPERTY. BALANCE
 OF THAT OVERSIZING IS BORNE BY CITY. FUNDS ARE USED TO COVER CONSTR
 COST OF THE OVERSIZE PORTION OF SEWER LINE INSTALLATION INSIDE THE CDA.



PUBLIC NOTICE

KEIZER CITY COUNCIL WORK SESSION

There will be a work session of the Keizer City Council on Monday October 28, 1996 at 5:30 p.m. This meeting will be held at Keizer City Hall, 930 Chemawa Road NE, Keizer, Oregon. The Council will be discussing the Salem Wastewater Master Plan.

This location is accessible to the disabled. Please contact City Hall at least 48 hours prior to the meeting if special arrangements are necessary. Questions regarding this meeting may be directed to Dotty Tryk, City Manager, at 390-3700, extension 112.

DATED this 25th day of October, 1996.

Tracy L. Davis
City Recorder

NOTICE FOR INFORMATION ONLY

MANATEE-SARASOTA COUNTY PROJECT FOR SUSTAINABLE WATER RESOURCES

Manatee and Sarasota Counties, two counties on Florida's Southwest Gulf Coast and their municipalities, have entered into a unique partnership to address the treatment of municipal wastewater, preserve scarce groundwater resources and put treated wastewater to work in growing produce and citrus in the eastern agricultural sectors of Manatee County.

With a combined population in excess of 500,000, the two counties and three major municipalities within the counties have agreed to interconnect their wastewater discharge produced at eight regional wastewater treatment plants along the western Gulf Coast population centers and pump the effluent up to 20 miles eastward to agricultural areas in Manatee County for application on farms which currently are drafting from the deep Floridian Aquifer to meet irrigation needs.

All counties, municipalities, agricultural, and industrial sectors in the community are being required to implement conservation practices to reduce the demands placed on the regions freshwater aquifer. Recent scientific modeling has determined that withdraw water withdrawals from the Floridian Aquifer are exceeding the aquifer's natural ability for replenishment. Heavy seasonal withdrawals for irrigation have resulted in historic declines in freshwater aquifer levels, at times creating saltwater intrusion from the Gulf of Mexico into these aquifers. In 1994, the Southwest Florida Water Management District, one of five legislatively established districts which regulates the reasonable and beneficial use of the state's water resources, adopted a rule to prohibit new withdrawals from the freshwater aquifer to abate the saltwater intrusion which will eventually render those aquifers unsuitable for irrigation use. The District also set new standards of efficiency for municipal drinking water systems drawing from ground and surface waters at 110 gallons/day/person to be implemented by 2001. The District has called upon agricultural users to reduce irrigation pumping from the aquifer to existing fields by 30-40%. The District also adopted a grant program to assist municipal governments and agricultural users in finding alternative water supplies to use in place of freshwater aquifer withdrawals. Alternative water supplies include sources such as treated wastewater (reclaimed water) and stormwater runoff, which can be collected and reapplied to meet irrigation needs otherwise supplied from the aquifer.

Wastewater treatment and effluent discharge over irrigation lands is rapidly becoming the effluent disposal option of choice in many Florida communities. However, periods of wet weather during summer seasons, when rainfall averages 10-15 inches/month over a 3-4 month period, requires municipal treatment plants to back up their land irrigation systems with surface discharges or deep well injection of excess effluent, posing a regulatory burden and liability upon the municipal operations to stay within permitted treatment requirements for discharge during these wet weather

File
10-28
City Council

Principles of Sustainable Development

The Manatee-Sarasota County agricultural reuse project using reclaimed wastewater is part of a water resource program which exemplifies the principles of sustainable development. The reuse system works in concert with the implementation of consumer conservation practices and efficiency of use measures which are being implemented by all public and private sector water users in the community.

Traditionally discharged as a controlled pollutant to surface waters, treated municipal wastewater is redistributed to urban open space and agricultural users to satisfy irrigation needs to sustain scarce groundwater supplies supporting these same municipalities, industry, and agriculture users.

Residents of the community, once facing the dire prospect of competing for the same source of water in roles played out as agriculturalist or urban dweller are now cooperating in constructing wastewater reuse systems which serve both the needs of wastewater discharge and agricultural irrigation. Two county governments and the major municipalities within them have set aside traditional and narrowly defined roles of responsibility and permit liability for treated wastewater disposal, and chosen instead to build a multi-jurisdictional effluent reuse system which removes a pollutant source from surface receiving waters and provides a much needed source of water for agricultural irrigation.

The two counties have worked in a collaborative effort to address wastewater treatment and reuse. With financial support from the State's Water Management District and USEPA, the counties have responded to a recommendation of the Sarasota Bay National Estuary Program, to which they both belong, to reuse and recycle wastewater. By substituting reclaimed water for irrigation supplies, wastewater reuse carries a triple benefit which 1) conserves groundwater otherwise used for irrigation, 2) provides a recycling outlet for reclaimed water, and 3) removes a potential pollutant load of phosphorous and nitrogen carried in the reclaimed water from reaching Sarasota Bay.

These decisions to couple wastewater reuse to the area's agricultural economy and environmental protection underscores the interdependence of these actions and the collaboration among the counties and financial stakeholders which is needed to address a mutual wastewater disposal problem. In seeking an effluent disposal solution which develops alternative water resources to relieve water shortage for all groundwater users, the two counties are practicing stewardship of water resources in a manner which promotes community division and instability, linking agricultural needs for irrigation water to municipal needs to discharge reclaimed water. These effective actions demonstrate to individual consumers the benefits of working together when mutual problems can be solved with the same solution and educate citizens of the needs and long term responsibilities to protect a scarce water resource.

SWFWMD studies show that movement of the saltwater interface over the next 50 years could affect water quality in wells as much as three miles farther inland under current pumping conditions.

The SWUCA Management Plan ... A Search For Alternative Water Supplies

In response to serious concerns about declining groundwater levels, saltwater intrusion, and lake level declines, the SWFWMD developed the Southern Water Use Cautious Area Management Plan. The plan's objective is to stabilize the saltwater interface and lake level declines within the SWUCA. To accomplish this, the plan recommends limiting groundwater withdrawals to 760 mgd in the SWUCA; 160 mgd in the Eastern Tampa Bay area and 350 mgd in the remaining SWUCA (figure 3).

Groundwater use in the SWUCA was estimated at 786 mgd in 1980.

The District has proposed a number of incentives to encourage the development of alternative sources,

including future groundwater credits and economic assistance such as the Basin Cooperative funding programs and now the New Water Source Initiative, the District's \$10 million fund dedicated to supporting conservation and alternative supply projects.

The first recommendation in the SWUCA plan for stabilizing groundwater withdrawals is the development of alternative sources. The plan states: "An important component of the plan is the development of alternative sources of water to substitute for the use of groundwater and to extend the use of surface water sources. New alternative water sources will play a major role in meeting the current and future water demands within the SWUCA. The primary objective of developing new water sources is to offset the current and future water needs in the SWUCA.

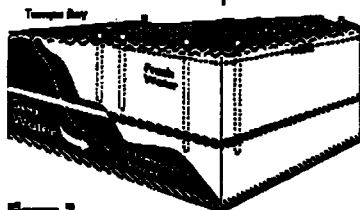


Figure 3

Schematic diagram of saline water interface in the Eastern Tampa Bay area

Source: Southwest Florida Water Management District

"An important component of the Plan is the development of alternative sources of water to substitute for the use of groundwater and to extend the use of surface water sources."

— Southern Water Use Cautious Area Draft Management Plan
Sept. 1, 1993

Manatee County ... The Logical Alternative For Alternative Water Sources

The regional drawdown map (figure 2) provides an excellent means to identify priority target areas for alternative sources. As indicated by the extent and severity of drawdowns, it is clear that Manatee County is an area of priority concern.

The development of alternative water sources in Manatee County, importantly, will have a region-wide impact and benefit the entire SWUCA. Water, of course, does not recognize political boundaries. Manatee County's deep groundwater sources share an entire groundwater basin called the Southern West-Central Florida Groundwater Basin. The basin comprises nearly the entire SWUCA (figure 3). The SWUCA plan states that "depressed groundwater levels resulting from pumping within the entire Southern Basin contributes to several problems:

- The saltwater intrusion problem in the coastal region of the basin;
- Reduced well efficiencies as a result of pumps being required to lift groundwater from lower depths;
- Reductions in spring flow and stream flow;
- Wetlands impacts; and;
- Lowered lake levels in Highlands and Polk Counties."

Full implementation of the MARS Project would substantially accomplish the first objective of the SWUCA Management Plan

and help mitigate all of the above problems for Manatee County and the entire SWUCA.

Geographically, Manatee County is one of the largest agricultural regions in the state, ranking 7th of all 67 Florida counties in total cash receipts. About 67 percent of all groundwater pumping in the county is used for agricultural irrigation. Manatee County, consequently, is ideally positioned with a large and ready existing demand for alternative water supplies.

Manatee County, through the MARS project, is capable of providing a significant amount of alternative water supply. This is possible because of the highly developed state of the county's wastewater systems. Expedient planning and development will be necessary for the MARS project and the NWSI to be effective over the short term.

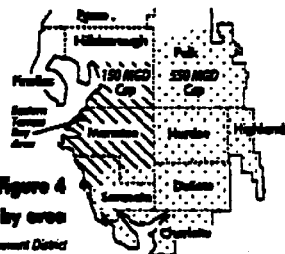


Figure 4

Capped quantities by area

Source: Southwest Florida Water Management District

SWFWMD has consistently supported Manatee County's vigorous efforts to reuse reclaimed water. The county has received continuing financial support from the District through the Manasota Basin Board cooperative funding program.

"It is concluded that unless groundwater withdrawals from the Eastern Tampa Bay area are limited to approximately 150 mgd, on an average annual basis, and unless groundwater pumpage from the remaining SWUCA is limited to approximately 550 mgd, saltwater intrusion will continue unabated."

— SWUCA Plan

The MARS Project Manatee Agricultural Reuse Supply

The Manatee Agricultural Reuse Supply project is designed to maximize the reuse of reclaimed wastewater, demonstrate the reuse of stormwater, and utilize surface water storage for agricultural irrigation in eastern Manatee County.

The SWUCA plan states "alternative supplies would be addressed by requiring reuse of treated wastewater where feasible, encouraging use of surface water, stormwater, and the surficial aquifer, and exploring the feasibility of artificially recharging the confined aquifers." Significantly, MARS incorporates four of these alternative water sources in its plan: Wastewater reuse, stormwater reuse, and surface water use and reclaimed water aquifer storage and recovery.

The MARS project will interconnect the three regional treatment plants, construct a stormwater reuse facility, and provide 10.25 mgd of reclaimed water for agricultural use. To significantly reduce ground-water withdrawals, it was determined that additional water is needed to supplement flows from the North and Southeast treatment plants. Potential sources that were considered include: the City of Bradenton WWTP, and the proposed Frog Creek Stormwater Reuse Facility.

The City of Bradenton, which discharged approximately 4.8 mgd of reclaimed water to the Manatee River in 1994 has, to date, declined to participate in the project and is reviewing its option to either continue with urban reuse or connect to the County system. The City of Palmetto, which discharged approximately 0.6 mgd to Tampa Bay in 1994, plans to connect to the MARS system.

The MARS project has been divided into three phases to allow for better administrative control of design and construction. Phase 1 is subdivided into two parts. Part 1 of Phase 1 is the design and construction of the Frog Creek Stormwater Reuse Facility. The facility will have 800 acre-feet of storage with a water yield of 1.6 mgd. The project will include a diversion structure, high service pumps, filters, chlorination, and a 16-inch transmission connection to the North Wastewater Facility. The site is located at a previous borrow pit, east of US 41 at the intersection with I-75. Part 2 of Phase 1 is the construction of a 24-inch reuse transmission line from an existing line at McClure Farms along Macassan Wetland Road east through Parrish and along SR 62 to turn approximately 1.5 miles east of Redfield Road. The extension is approximately 12.16 miles in length and traverses an agricultural area. In Phase II, a 24-inch transmission line will be constructed to interconnect the North and Southeast Reuse Systems. The transmission line is approximately 9.8 miles in length and will

enable transfer of flows between the two systems. In Phase III, a 24-inch transmission line will be constructed to interconnect the Southeast and Southwest Reuse Systems. The transmission line is approximately 6.8 miles in length.

Total project costs are estimated at \$14,024,724. The project received a Federal Grant from the Environmental Protection Agency for \$4,145,000. The District will fund up to fifty percent of the remaining eligible cost up to a maximum of \$4,668,470. Funding for this project is being provided over FY 95 through FY 98. Manatee County will provide the remaining project costs of \$5,211,254.

All phases are under design. Preparations are under way to apply for a permit from the District and FDEP for the Frog Creek Stormwater Reuse Facility. Potential agricultural customers are being contacted and agreements are being worked out to receive reuse water. Discussions are ongoing with Florida Power & Light for possible supply of reclaimed water at the Parrish Facility. The proposed layout of the MARS system is shown in Figure 6.

Reclaimed Water Aquifer Storage and Recovery

To be fully successful, the MARS project must accommodate wet weather flows, crucial to any successful reuse project, by making wet weather water available for potential reservoir augmentation at FPL's Lake Parrish and in the Tatum Sewage treatment area. The SWUCA plan states: "A main objective of the development of these systems is to find wet weather uses for reclaimed water, such as aquifer recharge, reservoir augmentation or minimum flow augmentation."

At Manatee County's Southwest Regional Wastewater Facility, approximately 330 million gallons of storage is needed to fully utilize the future plant flow of 18 mgd. Current storage at the site is limited to approximately 170 million gallons. Failure to develop a cost-effective means to temporarily store reclaimed water will mean a continued dependence on the wasteful practice of deepwell injection of reclaimed water during the wet season.

Manatee County has proposed the development of a reclaimed water aquifer and storage (RASR) system. The RASR system would tie into the MARS project. Success of the project would make an additional 8 mgd of reclaimed water available annually by reducing the use of deep well injection and increasing wet weather storage capacity. Currently there are no permitted reclaimed ASR systems in the state of Florida, so such the Manatee County project would be in the forefront of the effort to develop this type of system.

Alternative Water Supply Development for Industry, Agriculture and Public Supply in Manatee County, Florida

Charles A. Hunsicker, *Ecosystems Manager*

Robert J. Schoenleber, *Public Communications Manager*

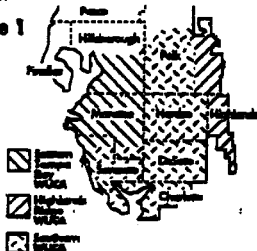
The MARS Project

The Manatee Agricultural Reuse Supply (MARS) project has been developed in response to the New Water Source Initiative (NWSI) of the Southwest Florida Water Management District (SWFWMD). The MARS project was also designed to fully demonstrate the effectiveness of the Alternative Sources recommendations in the Draft Southern Water Use Caution Area Management Plan (SWUCA Plan).

Area's Groundwater Under Siege

The NWSI and the SWUCA Plan were established to address recent severe groundwater level declines occurring in the Upper Floridan aquifer system throughout the SWUCA, an eight county area shown in figure 1.

Figure 1



Location of the Southern Water Use Caution Area

Source: Southwest Florida Water Management District

The stressed state of groundwater in the SWUCA and its deleterious impact upon the region is clearly evident. Since the 1930s, groundwater levels in central Manatee County and portions of east-central Hillsborough and central Polk Counties have declined by up to 50 feet (figure 2).

Our groundwater aquifers are not the only resource threatened by continuing withdrawals, surface water resources are also threatened. Numerous lakes throughout the SWUCA, particularly along the Highlands Ridge, have been dramatically lowered because of groundwater pumping.

Groundwater in the region is used primarily for agricultural irrigation. Irrigated citrus acreage increased from 115,000 acres to 250,000 since 1966, associated water use was estimated to increase from 150 mgd to approximately 330 mgd. The estimated increase in tomato acreage during this period was from 5,000 acres to over 15,000 acres,

with water use estimated to increase from 15 mgd to over 45 mgd.

Meanwhile, while groundwater used for irrigation continues to rise, estimated industrial and mining water use has declined from 233 mgd in 1977, to 162 mgd in 1990, according to the draft management plan. The reduction, primarily, comes from increased recycling of previous wastewater as implemented by phosphate mines during the late 1970s. Recycling or re-use of reclaimed domestic wastewater, irrigation tailwater, and stormwater can reduce groundwater demands in much the same way for agricultural irrigation.

The Southwest Florida Water Management District Needs and Sources Plan, 1992, projected total groundwater use in the Southern Water Use Caution Area (SWUCA) could increase to approximately 1,300 million gallons per day (mgd) by 2020, up from the 1990 total of 796 mgd. The SWUCA draft management plan stated, "if realized, this projected increase in water use would cause further water level declines in the Upper Floridan aquifer system across the entire SWUCA."

The SWUCA plan described the potential changes that can occur with the saltwater interface under current pumping conditions and those predicted for 2020 demands. For the coastal counties within the Eastern Tampa Bay Water Use Caution Area (Manatee, Hillsborough, Sarasota) the studies show that movement of the saltwater interface over the next 50 years could affect water quality in wells as much as three miles farther inland under current pumping conditions. The extent of intrusion during the same period is projected to increase to as much as seven miles inland if pumpage increases to levels projected for 2020 (figure 3).

Remedial action to reduce groundwater withdrawals through alternative water supplies is critical ... especially in an area so dependent on groundwater. More than 98 percent of the non-public water supply in the SWUCA is derived from groundwater sources. Many of the public water supplies in the SWUCA, including Manatee County, use surface water reservoirs.

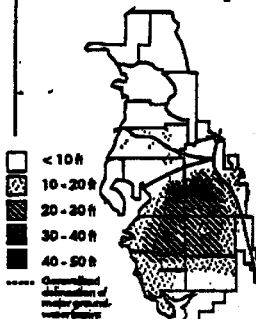
"When the well's dry, we know the worth of water."

— Benjamin Franklin

Figure 2

Decline in the Florida aquifer potentiometric supply from predevelopment to 1991

Source: Southwest Florida Water Management District



Use It Again! Reuse ... Manatee County's Alternative Water Source

Reuse of reclaimed water involves taking what we once considered to be wastewater, giving it a high degree of treatment, and using the resulting high-quality reclaimed water for a new, beneficial use. Extensive treatment and disinfection ensure that public health and environmental quality are protected.

Manatee's. Reuse will greatly help the state and SWFWMD meet the water supply and wastewater management needs of a growing population. The State of Florida, SWFWMD, EPA, and the National Estuary Program all promote and support the reuse of reclaimed water as major water management objectives.

"Reuse of highly treated wastewater, i.e. reclaimed water, continues to be a viable method to replace or reduce demand for groundwater."

— SWUCA Plan

With limited opportunities to discharge reclaimed water into surface waters, reuse of reclaimed water is now an integral part of many water management programs, including

Reuse simply makes sense for the SWUCA and Manatee County. It:

- Reduces demands on the highly stressed but invaluable groundwater resource.
- Eliminates surface water discharges that may detrimentally impact surface aquatic systems.
- Postpones costly investment for development of new water sources and supplies.
- Recharges groundwater and prevents salt water intrusion.
- Allows multiple uses of land for agriculture and reuse of urban reclaimed water.
- Can provide aesthetic value.

Manatee County ... A Leader in the Reuse of Reclaimed Water

Manatee County's Regional Wastewater Treatment System was designed and built and is operated on the principle of reclaiming wastewater for beneficial reuse. The county receives multiple benefits including, improved surface water quality by eliminating wastewater discharges, a high quality source for irrigation, reduced groundwater withdrawals, reduced demand on the public drinking water supply, and a nutrient rich soil conditioner for agriculture.

Indeed, the Sarasota Bay National Estuary Program wrote in *Framework For Action*, "Meanwhile, concerted action on wastewater treatment by local governments led to noticeable improvements in the bay. In 1990, both the City of Sarasota and Manatee County significantly improved wastewater treatment operations, resulting in a 43-percent reduction in nitrogen loads to the central bay and a 25-percent reduction in baywide nitrogen loads. These actions improved water quality in the northern and central parts of the bay and increased fishery habitat by at least 20 percent."

Manatee County Public Works Department operates three regional treatment facilities providing reclaimed water to large agricultural and recreational water users near the plants. Traditionally, these users fully consumed the available supply of reclaimed wastewater. However, in the late 1980s a reclaimed surplus developed in the urban Southwest service area as a result of diminishing agricultural use and a growing urban base. This surplus

was and is disposed of through deep well injection.

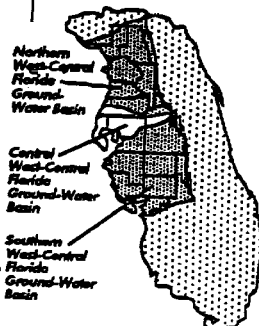
In 1990, the Public Works Department and SWFWMD completed the "Effluent Reuse Feasibility Study and Master Plan for Urban Reuse." This study and master plan provided the blueprint for an urban reuse system in the southwest service area, which is the cornerstone of the county's Urban Water Conservation Program. However, not all of the wastewater produced at the Southwest Treatment Plant can be utilized in an urban system as planned. Therefore an expected surplus of up to 8 mgd is available for alternative uses such as agricultural irrigation or industrial cooling. The master plan also recognized a continuing commitment of the North and Southeast Regional Wastewater Treatment Plants to agricultural reuse.

With the North and Southeast WWTP's committed to agricultural reuse and a surplus of water available at the Southwest WWTP, these three sites were chosen as cornerstones in the development of a new water source initiative for agricultural reuse supply in Manatee County ... the MARS project.

Figure 5

Location of Floridan aquifer ground-water basins in the SWFWMD.

Source: Southwest Florida Water Management District



Hydrological, geological, and geographic conditions make Manatee County one of the leading areas in the Southern Water Use Caution Area for the development of alternative water sources.

"Reuse of reclaimed water and water conservation are integral parts of Florida's long-term water resources management strategy. We can conserve water supplies, recharge aquifers, and postpone expensive development of new water supply sources by reusing reclaimed water."

— Carol M. Browner
Former Secretary, Dept. of
Environmental Regulation,
current Administrator,
U.S. Environmental
Protection Agency.

RASR Project Description

The project consists of permitting, design, construction and cycle testing of a reclaimed water Aquifer Storage and Recovery (RASR) well and associated monitor wells at the Manatee County Southwest Regional Wastewater Treatment Facility. This project is intended to answer the question of whether RASR can be employed in this area of Manatee County.

The first work element of the project will be a feasibility study to evaluate several issues pertaining to RASR. The feasibility study will evaluate permitting requirements that must be considered in storing and recovering reclaimed water in subsurface aquifers of various water qualities. Some or all of the following permits will need to be obtained: a Class V Injection Well Construction Permit, Manatee County Well Construction Permit, FDEP Water Quality Criteria Exemption, FDEP Class V Injection Well Operation Permit, and SWFWMD Water Use Permit Modification. The study will also address potential Aquifer Exemptions or Water Quality Exemptions that may be required for the RASR system. The feasibility study report will be used to support permitting and subsequent design and construction tasks.

Geophysical logging, specific capacity tests, and visual inspection of drilling cuttings will be used to determine a favorable storage zone at the site. Once the storage zone has been determined and the necessary wells have been installed, a series of cycle tests will be performed to assess the storage zone's capacity to store reclaimed water. The purpose of these tests is to determine what percentage of the stored water can be recovered before either water quality deteriorates or aquifer drawdowns become great enough to require shutting down the recovery

system. An additional purpose of the testing is to ensure that the stored water doesn't migrate an appreciable distance prior to recovery. More than one cycle test is generally necessary to determine if the percentage of recovered water increases as residual water from previous cycles accumulates.

Details of the well drilling and cycle testing program have not been finalized at this time. Final plans will be contingent on FDEP requirements.

However, it is anticipated that at a minimum of one monitoring well in the storage zone, one in the aquifer below the confining unit of the storage zone, and one in the aquifer above the confining unit of the storage zone will be necessary. The scope of work includes the design and construction of the necessary piping, recovery pumps, electrical systems, and wellhead valve assemblies. A 30-inch reclaimed water supply main is located nearby and will be utilized to supply the necessary water for injection.

Project Benefits:

- Demonstrate the feasibility of reclaimed water ASR in the state of Florida
- Provide the means to fully utilize reclaimed water throughout the year
- Allow storage of excess wet season reclaimed water for use during the dry season
- Increase utilization of reclaimed water at the Southwest WWTP from an annual rate of 4 mgd to 12 mgd

"It is anticipated that 50 mgd (Eastern Tampa Bay Area) and 25 mgd (remaining SWUCA) of existing permitted groundwater withdrawals will be replaced with alternative sources."

— SWUCA Plan

The MARS Project ... The Right Alternative

The Manatee Agricultural Reuse Supply project is, without question, the right alternative for the development of alternative water sources in the Southern Water Use Caution Area.

Here's Why:

- Reuse of reclaimed water will reduce demand for groundwater, reduce surface water pollution, preserve potable water supplies, and prevent salt water intrusion.
- Manatee County is a recognized leader in reuse and has demonstrated success in previous projects supported by the Manasota Basin Board and SWFWMD.
- Manatee's geography and agricultural base is ideal for reuse.
- In addition to reuse of reclaimed water, the MARS Project also demonstrates the viability of stormwater reuse projects to reduce pollution loads on our bays, improve flood control and make alternative

water available for beneficial reuse.

- The MARS Project will incorporate alternative source considerations into future reclamation plans for the IMCF NE Manatee Tract making additional surface water available for beneficial use by 2020.

• The impact of the MARS Project will be regional in scope. The District is working with Manatee and Sarasota Counties to consider an interconnection between reclaimed water distribution systems being developed in both counties.

• The MARS Project will reduce existing groundwater withdrawals in the Eastern Tampa Bay Water Use Caution Area.

• The MARS Project can be effectively implemented in a relatively short period of time. Future phases to extend reclaimed water lines to additional agricultural acreage and incorporate additional surface water impoundments are under study (See figure 7).



**Manatee County
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