TABLE 7-5

PRELIMINARY OPINION OF PROBABLE COSTS
ALTERNATIVE 4 - SEQUENCING BATCH REACTOR
1999 COST BASIS

ESTIMATE OF PROJECT COST					
ITEM	QUANTITY	UNITS	UNIT COST	AMOUNT	TOTALS
CAPITAL IMPROVEMENT COSTS					
COLLECTION SYSTEM				$287,000	
INFLUENT PUMP STATION				$300,000	
HEADWORKS				$516,000	
SECONDARY TREATMENT (SBR)				$1,737,500	
EFFLUENT FILTRATION				$439,000	
DISINFECTION				$130,000	
EFFLUENT DISPOSAL				$448,000	
BIOSOLIDS				$200,000	
TOTAL 1997 CONSTRUCTION COST =					$4,057,500
INDIRECT COSTS					
Construction Contingencies	15.00%			$608,625	
Engineering and Construction Management	20.00%			$811,500	
Legal & Administration	5.00%			$202,875	
TOTAL INDIRECT COST =					$1,623,000
LAND ACQUISITION					$320,000
TOTAL PROJECT COST =					**$6,000,500**
ANNUAL OPERATIONS AND MAINTENANCE COSTS					
Personal Services	1	Annual	$121,650	$121,650	
Materials and Services	1	Annual	$202,400	$202,400	
Capital Outlay	1	Annual	$37,280	$37,280	
Operating Contingency	1	Annual	$22,261	$22,261	
TOTAL ANNUAL OPERATIONS & MAINTENANCE				$383,591	
PRESENT WORTH (8%/yr, 20 yrs)					$3,766,153
SALVAGE VALUE					
Collection	1	ls	$200,000	$200,000	
Treatment Plant	1	ls	$500,000	$500,000	
Land Disposal (tree harvest)	1	ls	$50,000	$50,000	
TOTAL SALVAGE VALUE				$750,000	
PRESENT WORTH (8%/yr, 20 yrs)					($160,911)
TOTAL PRESENT WORTH =					**$9,605,742**

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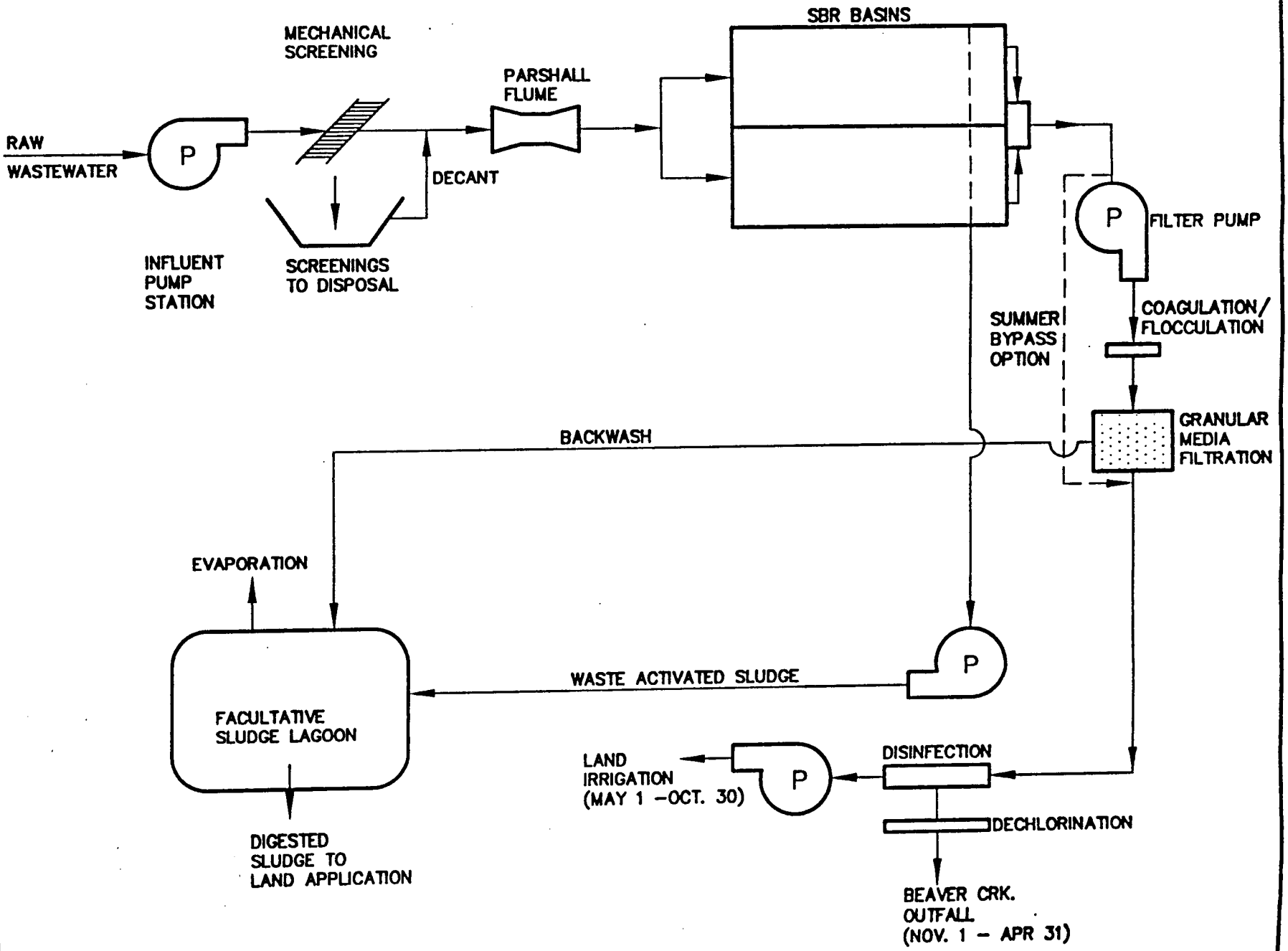
AUMSVILLE WASTEWATER FACILITIES PLAN

FIGURE 7-3
SEQUENCING BATCH REACTOR WWTP
SCHEMATIC DIAGRAM



Cost-Effectiveness Analysis of Treatment Alternatives - Table 7-6 provides a summary of the cost estimates for Alternatives 1 through 4. These cost opinions are considered to be in the range of -20% to +35% accurate. A present worth (PW) value for O&M costs was obtained by multiplying annual O&M costs by a PW factor based on an interest rate of 8% and a time period of twenty (20) years.

Table 7-6: Total Cost Summary

Treatment Alternative	Construction Cost	Present Worth
Alt 1- No Action	$0	$0
Alt 2 - Aerated Lagoon	$4,865,800	$7,972,280
Alt 3 - Earthen Basin Extended Aeration	$5,700,900	$9,196,179
Alt 4 - Sequencing Batch Reactor	$6,000,500	$9,605,742

In addition to cost, there are other factors which should be considered in selecting the final alternative. Table 7-7 provides an evaluation matrix of the four (4) alternatives, considering technical factors other than cost. The table shows the ratings given to each of the alternatives based on this selected technical criteria. The following ratings were used:

10 = good
5 = fair
0 = poor

An overall score for each alternative is obtained by adding all the assigned ratings for each alternative. The technical criteria are as follows.

Implementation Capability:

Implementation capability depends on factors such as ability to obtain required permits, ability to obtain adequate sites, legal constraints, staffing, and institutional and financial constraints. The difficulty of combining new facilities with existing ones and any process or operational compromises associated with upgrading the existing facility is also an implementation factor.

Operability:

Operability refers to the ability of the plant staff to operate the proposed facility to meet the treatment and effluent requirements. Factors associated with Operability include the number of and level of staff experience required to operate the facility. Staffing and other resources required for operation and maintenance associated with the proposed alternative are reflected in Operability ratings.

Performance Reliability:

Performance reliability is the ability to consistently meet the effluent requirements. Performance reliability is higher for a new plant than for upgrading the existing plant. Because of the age of the existing facilities, there is more potential for operational problems that may affect treatment capability.

Flexibility:

Flexibility is the ability to respond or adapt to future growth, regulatory requirement changes, and new technologies. Flexibility also deals with the ability to use various operating modes in order to optimize treatment.

Table 7-7: Technical Evaluation Alternative Matrix

	Alternatives			
Evaluation Criteria	**1 No Action**	**2 Aerated Lagoon**	**3 Earthen Basin Extended Aeration**	**4 Sequencing Batch Reactor**
Implementation Capability	0	10	5	5
O&M Characteristics	0	10	6	5
Performance Reliability	0	7	10	10
Flexibility	0	8	8	10
Energy Use and Resource Recovery	0	8	7	7
Ability to Address Future Regulations	0	9	9	10
Total Points	0	52	45	47
Ranking	4	1	3	2

Note: This Evaluation Table shows the relative ranking of the projects without cost as an evaluation factor. Project cost will be considered independently of this matrix.

Energy Use and Resource Recovery:

Energy use and resource recovery refers to minimization of energy consumption and providing a beneficial use of the treatment system by-products.

Ability to Address Future Regulatory Requirements:

The flexibility of the alternative is related to its ability to meet more stringent future regulatory requirements.

7.5.3 Preferred Alternative

Based on the technical and cost evaluations performed, the preferred alternative for the City's consideration is Alternative #2 - Aerated Lagoons WWTP.

CHAPTER 8 - CAPITAL IMPROVEMENT PLAN

8.1 RECOMMENDED IMPROVEMENTS

In completing this wastewater facilities plan, a number of system deficiencies have been identified that inhibit the City's ability to comply with the existing and projected future wastewater discharge permit requirements. Based on the evaluations presented herein, the following projects have been developed for upgrading the wastewater collection and treatment system to address the deficiencies and allow the City to meet the anticipated future treatment requirements while accommodating growth.

Collection System: A new 24-inch diameter trunk line to be constructed from manhole A-3 to the influent lift station.

Influent Pump Station: A new influent pump station to convey the forecast peak flow for the year 2022.

Headworks: The headworks will be upgraded, including a self-cleaning mechanical screen, a new parshall flume, and new or upgraded sampling equipment. A new building would be constructed to house the electrical controls, samplers, and influent pump station generator. The building would be insulated to minimize past electrical problems during the warmer summer months.

Primary/Secondary Treatment: Two aerated lagoons constructed within the existing primary lagoons. The existing tertiary lagoon will be utilized as a final settling lagoon. The existing secondary lagoon would not be specifically used in this upgrade, however, it could serve as a surge basin, a storage basin for effluent irrigation, or as a sludge lagoon. With the lagoon modifications, additional rip-rap would be placed around the perimeter. Transfer piping would be constructed to allow for flexibility in system operations, and staff gauges would be installed to monitor pond depth.

Tertiary Treatment: A filtration system will be constructed to remove excess TSS, including algae, to meet the year 2022 effluent TSS requirements. A filtration system is typically designed to treat peak hourly flows. In this case, the equalization through the lagoons will buffer peak flows. The proposed filtration system will be sized to treat the MMWWF in the year 2022.

Disinfection: The existing disinfectant will be upgraded to liquid chlorine. In addition, the flash mixer must be upgraded and contact basin expanded. The effluent will need to be de-chlorinated prior to discharge to Beaver Creek.

Winter Effluent Disposal: The treated effluent will continue to be discharged to Beaver Creek during the winter. A new gravity outfall pipeline with a diffuser will be constructed to Beaver Creek.

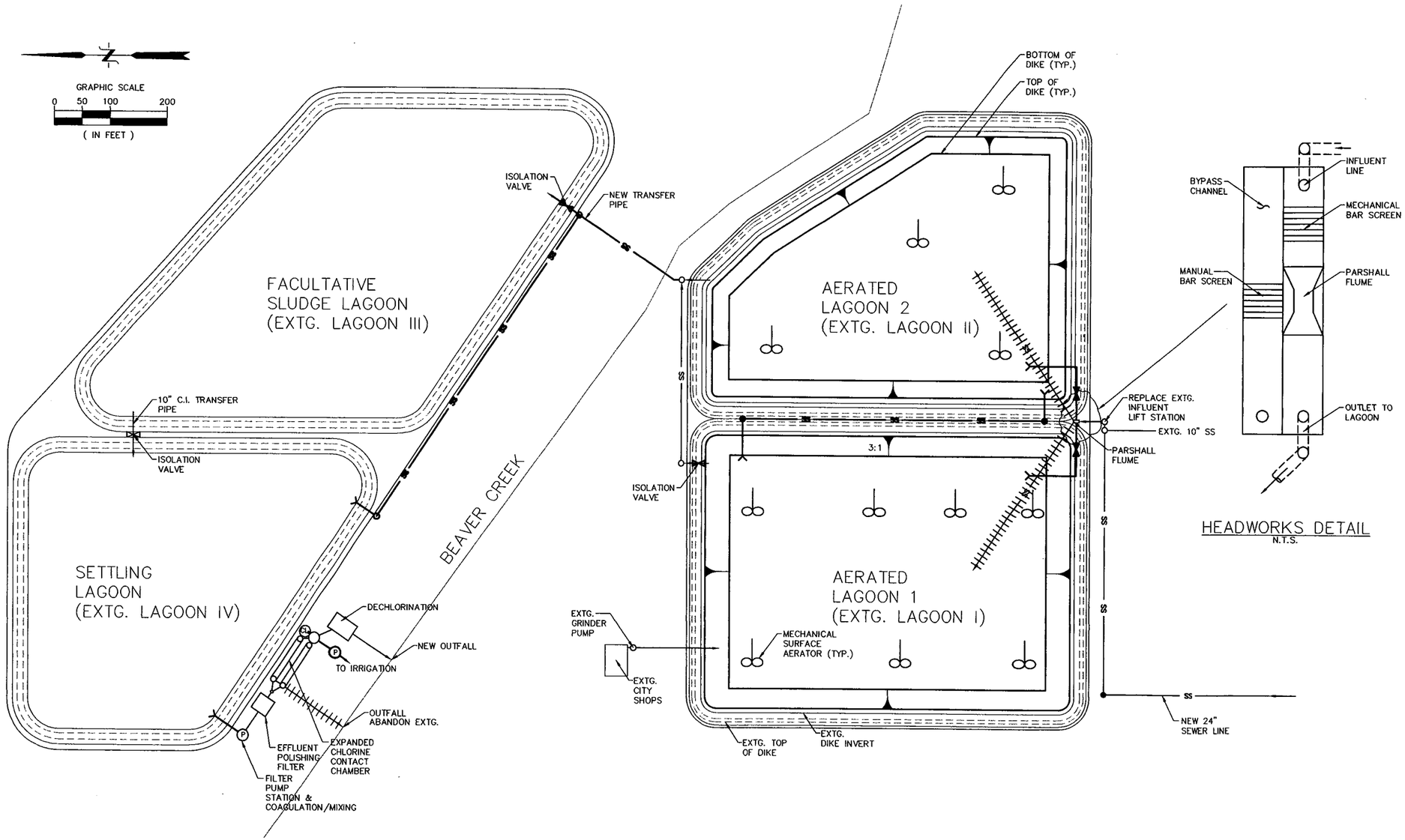
Summer Effluent Disposal: To alleviate hydraulic pressures on the wastewater treatment plan, a new land application system for a poplar tree crop will be constructed to dispose of wastewater during the summer. Poplar trees are the recommended crop. A new effluent pumping station and forcemain will be designed to deliver the treated effluent to the irrigation site.

Existing Biosolids Removal: The existing lagoons have never been cleaned of biosolids, which will need to be removed prior to construction of the lagoon upgrades.

Biosolids Treatment and Disposal: Biosolids will settle and be treated within the upgraded lagoons. The City will need to remove the accumulated sludge periodically. The time frame will be determined through periodic sludge inventories.

Miscellaneous: With any major upgrade to the WWTP, there are ancillary improvements that are necessary. Included would be additional lab equipment, general improvements to the maintenance facilities and buildings (such as shop lighting, a washer and dryer, more efficient HVAC, etc.), and building expansions to house control and electrical equipment.

Figure 8-1 presents a conceptual layout of the preferred treatment alternative and Table 8-1 summarizes the design criteria. Specific implementation recommendations are covered at the end of this chapter, following the discussion on financing.



JDT 1/8/98

Z:\140\01\ACAD\FIG-8-1.DWG

REVISIONS:			
REV. NO.	DATE	DESCRIPTION	APPV'D

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DATE:
DESIGN:
DRAWN: JDT
APPV'D: ERC

WASTEWATER TREATMENT
CITY OF AUMSVILLE, OREGON

FIGURE 8-1
CONCEPTUAL LAYOUT FOR RECOMMENDED IMPROVEMENTS
PREFFERED ALTERNATIVE: AERATED LAGOON WWTP

JOB NO: 140.01

SHEET 1 / 1

Table 8-1: Preliminary Design Data - Aerated Lagoon WWTP

Parameter	Design Factor
Design Flow, mgd	
MMDWF/MMWWF/PIF	0.641/1.246/6.475
Design Mass Load, lb/day	
BOD_5, average/maximum month	772/1740
TSS, average/maximum month	674/1644
Collection System: 24-inch gravity sewer line, lineal feet	
Mechanical Screen/Parshall Flume Capacity, mgd	6.475
Primary/Secondary Treatment - Aerated Lagoons	
Aerated Lagoon #1	
BOD_5 reduction required, lb/day	1370
Aeration required, hp	100
Aerated Lagoon #2	
BOD_5 reduction required, lb/day	292
Aeration required, hp	20
Tertiary Treatment - Sand Filtration	
Design Flowrates, mgd	1.246
Design Filtration Rate, gpm/sq. foot	4.0
Filter Surface Area, sq. feet	220
Liquid Chlorine Disinfection/Sodium Bisulfite Dechlorination	
Capacity, mgd	1.246
Summer Effluent Disposal Area, acres	15-50
WWTP Winter Effluent Quality	
BOD_5, mg/l	7.1
TSS, mg/l	11.9

8.2 PROJECT FINANCING

Most communities are unable to finance major wastewater system improvements without some form of governmental funding assistance, such as low interest loans or grants. In the following sections, the major Federal/State funding programs and local funding mechanisms that are appropriate for the recommended improvements will be discussed. A recommended financing strategy for the proposed wastewater system improvements is also presented and discussed in detail below.

8.2.1 Grant and Loan Programs

Some level of outside funding assistance in the form of grants or low interest loans will help assure that the proposed improvement project is affordable to residents of the City of Aumsville. The amount and types of outside funding will dictate the amount of local funding that the City will have to secure. In evaluating grant and loan programs, the major objective is to select a program, or a combination of programs, which are most applicable and available to the intended project.

A brief description of the major Federal and State funding programs, which are typically utilized to assist qualifying communities in the financing of improvement programs, is given below. Each of the government assistance programs has its own particular prerequisites and requirements. These assistance programs promote such goals as aiding economic development, benefitting areas of low to moderate income families, and providing for specific community improvement projects. Not all communities or projects may qualify for all programs. For example, President Clinton's Timber Initiative identifies certain timber dependent counties which receive priority in the award of funding under some programs.

Rural Development (RD) Water and Waste Disposal Loans and Grants:
This program was previously called Rural Economic and Community Development (RECD), and prior to October 1992, was administered by the Department of Agriculture's Farmers Home Administration (FmHA). This federal agency makes low interest loans and grants available to rural communities under 10,000 in population and with average household incomes that are less than the national average.

RD has the authority to make loans to public bodies and non-profit corporations to construct or improve essential community facilities, including wastewater systems. Grants are also available to applicants who meet the median household income (MHI) requirements. While eligible applicants must have a population less than 10,000, priority is given to public entities in areas smaller than 5,500 people to restore a deteriorating sewage conveyance system, or to improve, enlarge, or modify a wastewater facility. Preference is also given to requests which involve the merging of small facilities and those serving low-income communities, as well as communities that have existing violations.

In addition, borrowers must meet the following stipulations:

- Be unable to obtain needed funds from other sources at reasonable rates and terms.
- Have legal capacity to borrow and repay loans, to pledge security for loans, and to operate and maintain the facilities or services.
- Be financially sound and able to manage the facility effectively.
- Have a financially sound facility based on taxes, assessments, revenues, fees, or other satisfactory sources of income to pay all facility costs including O&M, and to retire the indebtedness and maintain a reserve.

Loan and grant funds may be used for the following types of improvements:

- Construction, repair, improve, expand, or otherwise modify waste collection, pumping treatment, or other disposal facilities. Facilities that may be financed may include such items as sewer lines, treatment plants, storm drainage facilities, sanitary landfills, incinerators, and necessary equipment.
- Legal and engineering costs connected with the development of facilities.
- Other costs related to the development of the facility including the acquisition of right-of-way and easements, and the relocation of roads and utilities.
- Finance facilities in conjunction with funds from other agencies or those provided by the applicant.

The loans have a 40-year term with no pre-payment penalties and the reserve can be funded at 10 percent per year over a ten year period. Interest rates are set quarterly and are based on current market yields for municipal obligations. The following rates apply to these loans, effective January 1, 1998.

Market Rate:

The market rate is paid by those applicants whose median household income (MHI) of the service area is more than the $27,756 Oregon non-metropolitan MHI. The market rate is 5.25%.

Intermediate Rate:

The intermediate rate is paid by those applicants whose MHI of the service area is less than $27,756. The current interest rate for qualified applicants is 4.875%.

Poverty Line Rate:

The lowest rate is paid by those applicants whose MHI of the service area is below $22,205 (80 percent of the non-metropolitan MHI) and the project is needed to meet the regulatory agency health and sanitary standards. The poverty rate is currently 4.5%.

Maximum grant amounts, based on MHI, are provided in Table 8-2. The grants are calculated on the basis of eligible costs which do not include the costs attributable to reserve capacity or interim financing. In addition, grant funds cannot be used to reduce total user costs below that of comparable communities funded by RD, currently about $34 per month.

Table 8-2: Maximum RD Grant Funds Based on Median Household Income

Median Household Income (MHI)	Maximum Grant
< $22,205	75%
$22,205 to $27,756	45%
> $27,756	0%

Aumsville qualifies for this assistance; however, more cities apply for assistance than Congress appropriates funds. Eligibility for the Rural Water and Waste Disposal grants and loans are currently based on 1990 Census data. The MHI for households in Aumsville, based on 1990 Census data, is $23,103. At this MHI, the City could be eligible for a maximum grant of up to 45%. The City is also eligible for a RD loan at the intermediate rate of approximately 4.875 %. Final grant amounts are based on repayment ability and fund availability, and typically consist of a 50/50 mix of grants and loans.

There are other restrictions and requirements associated with these loans and grants. If the City becomes eligible for grant assistance, the grant will apply only to eligible project costs. Grant funds are only available after the City has incurred long-term debt resulting in an annual debt service obligation equal to one-half percent of the MHI. In addition, the RD funds are limited by an annual funding allocation. To receive a RD loan, they City must secure bonding authority, usually in the form of general obligation or revenue bonds.

Oregon Community Development Block Grant (OCDBG) Program:

The OCDBG Program is administered by the Community Development Program section of the Oregon Economic Development Department (OEDD). Funds for the program come from the U.S. Department of Housing and Urban Development. OCDBG funds under the Public Works category are targeted to water and wastewater systems. Projects must be needed to resolve a non-compliance

issue with the Safe Drinking Water Act, Clean Water Act or other permits issued by the Department of Environmental Quality. OCDBG contributed in part to the development of this facility plan.

OCDBG grants are available for each of three (3) phases necessary to complete water and/or wastewater system improvements.

- Phase 1: Technical assistance grants for planning and grant applications.
- Phase 2: Grants for engineering, financial analysis, and environmental assessment.
- Phase 3: Grants for construction.

Grants to a city are limited to $750,000 for the combined total of all phases. To qualify for a grant, the projected user rates at construction completion must be at or above the statewide average at the time the applicant applies for financing. Currently, the statewide average for a wastewater system is $35.00 per month per residential user.

Applications may now be submitted year round for Public Works grants under the OCDBG Program. Only cities and counties may apply. To be eligible, a city must be primarily (permanent) residential in nature and the wastewater or water treatment facilities must be used for primarily residential purposes, as determined by flows. The permanent residents must be primarily low and moderate income (over 51%) based upon 1990 Census data or an approved local survey. As Aumsville is primarily residential, the wastewater treatment facilities will be used for primarily residential purposes (well over 50% as determined by flows), and has a low/moderate income level of 56.1 %, it therefore qualifies for financing under this program.

Economic Development Administration (EDA) Public Works Grant Program:

The EDA Public Works Grant Program, administered by the U.S. Department of Commerce, is aimed at projects which directly create permanent jobs or remove impediments to job creation in the project area. To be eligible for this grant a community must be able to demonstrate the potential to create jobs from the project. Potential job creation is assessed with a survey of businesses to demonstrate the prospective number of jobs that might be created if the proposed project was completed.

Proposed projects must be located within an EDA-designated Economic Development District. Priority consideration is given to projects that improve opportunities for the establishment or expansion of industry and that create or retain private sector jobs in both the near-term and long-term. Communities, which can demonstrate that the existing system is at capacity (i.e., moratorium on new connections), have a greater chance of being awarded this type of grant. EDA grants usually

cover the portion of a project over and above what the loan process can reasonably be expected to cover.

Oregon Special Public Works Fund:

The Special Public Works Fund (SPWF) Program provides financing to local governments to construct, improve and repair infrastructure in order to support local economic development and create new jobs locally, especially family wage jobs. To be eligible, the following conditions must be satisfied.

- The existing infrastructure must be insufficient to support current or future industrial or eligible commercial development.

- There must be a high probability that family wage jobs will be created or retained within: 1) the boundary to be served by the proposed infrastructure project or 2) industrial or eligible commercial development of the properties served by the proposed infrastructure project.

The SPWF program is capitalized through biennial appropriations from the Oregon Lottery Economic Development Fund by the Oregon State Legislature, through bond sales for dedicated project funds, through loan repayments and other interest earnings. The fund is administered by the Oregon Economic Development Department (OEDD)Community Development Programs Section.

Eligible activities include wastewater treatment facilities and facilities necessary for collecting, pumping, treatment and disposal of sanitary sewage and storm drainage. The following criteria are used to demonstrate project eligibility.

- Firm Business Commitment: In addition to creating or retaining of permanent jobs as a result of the project, there must be private and/or public investment in the project equal to at least twice the SPWF funding.

- Capacity Building: The applicant is required to document: 1) recent interest benefitted by the project, 2) there are ongoing efforts to market the area, and 3) the project will promote future economic development and creation of jobs.

All projects must principally benefit industrial or eligible commercial users.

The Department will structure a financing package that may include loans and/or grants. Determination of the final amount of financing and the loan/grant/bond mix will be based on the financial feasibility of the project, the individual credit strength of an applicant, the ability to assess specially benefitted property owners, the ability of the applicant to afford annual payment on loans

from enterprise funds or other sources, future beneficiaries of the project, and six other applicable issues.

Maximum SPWF loan per project is $10 million, if funded from SPWF revenue bond proceeds. Projects financed directly from the SPWF may receive up to $1 million. Interest rates are no less than 6.5 percent and are set quarterly the Department; loan terms cannot exceed twenty-five (25) years. The maximum SPWF grant is $500,000 for a construction project and is not to exceed 85 percent of the total project cost. Grants are made only when loans are not feasible.

Water/Wastewater Financing Program:

The Water/Wastewater Financing Program was created to assist communities that must meet Federal and State mandates to provide safe drinking water and adequate treatment and disposal of wastewater. The legislation was intended to assist local governments meet the Safe Drinking Water Act and the Clean Water Act.

The funding for the program is capitalized through a biennial appropriation from the Oregon Lottery Economic Development Fund by the Oregon State Legislature. The program is administered by the Oregon Economic Development Department (OEDD), Community Development Programs Section.

Program eligibility is limited to projects necessary to ensure compliance with the applicable State regulatory agency standards or rules.

While loans and grants may be awarded, grant funding must be accompanied by loans from the Community Development Program. Loans are based on a municipality's ability to repay. Grant funding is available only if a loan is not feasible. OEDD will structure a financing package that may include direct loans, bond loans, and/or grants and may include funds from other Community Development programs for which the project is eligible. The mix of loan/grant/bond financing will depend on the financial feasibility of the project and will consider utility rates, per capita income, existing debt, and other factors.

Financing limits are as follows:

- Projects financed with bond funds
  Loans- max. $10 million
  Grant - max. $500,000

- Projects financed with Water/Wastewater Funds
  Loan - max. $500,000
  Grant - max $500,000

- Technical Assistance (for eligible applicants under 5,000 population)
  Loan - max. $20,000
  Grant - max. $10,000

Interested applicants should contact OEDD prior to submitting an application. Applications are accepted year-round.

Department of Environmental Quality, State Revolving Fund (SRF).
The SRF Program is administered by the Department of Environmental quality (DEQ) and was developed to replace the EPA Construction Grants Program. The SRF is a loan program which provides low interest rate loans, instead of grants, for the planning, design, and construction of water pollution control facilities.

Interest rates on all design and/or construction loans are two-thirds of the current municipal bond rate during the quarter that the loan agreement is signed. An initiation fee (1.5 percent of the loan amount) and a servicing fee (0.5 percent of the outstanding balance) are also assessed to cover program administration by DEQ. Loans can be in the form of general obligation bonds or other rated debt obligations, revenue secured loan, or a discretionary loan.

An applicant must follow three (3) steps in applying for an SRF Loan.

1. Submit a preliminary application within thirty (30) days of receipt of the application from DEQ.

2. Secure placement on the Intended Use Plan Priority list. Prospective projects are ranked, and only those on the Priority List are eligible for loans.

3. Submit a final application.

SRF funds are allocated based on a prioritization process. Based on the preliminary applications, projects are assigned points and ranked in priority order based on 10 severity of water quality/health hazard problem; 2) receiving water body sensitivity; and 3) population served by the project.

The Intended Use Plan is one part of Oregon's annual SRF capitalization grant application. This plan includes lists of eligible projects ranked in priority order. Project allocated funds are placed on the Funded List. Unfunded projects are on the Planning List to receive funds if any of the Funded List projects do not complete the loan process. Projects identified on the Funded List from prior years, which have not been initiated, are placed on a Supplemental List.

8.2.2 Local Funding Sources

The amount and type of local funding obligations for wastewater system improvements will depend, in part, on the amount of grant funding anticipated and the requirements of potential loan funding. Local revenue sources for capital expenditures include ad valorem taxes, various types of bonds, wastewater service charges, connection fees, and system development charges. Local revenue sources for operating costs include ad valorem taxes, and wastewater service charges. The following sections identify those local funding sources and financing mechanisms that are most common and appropriate for the improvements in this study.

General obligation (G.O.) bonds are backed by the City's full faith and credit, as the City must pledges to assess property taxes sufficient to pay the annual debt service. This tax is beyond the State's constitutional limit of $10/$1,000 of assessed value. The City may, at its discretion, use any other source of revenue, including sewer rate revenues, to repay the bonds. If it uses these other sources, it then reduces the amount to be collected from taxes.

The municipal bond market is the source of most loans for municipalities in the United States, including Oregon. The municipal bond market will purchase one of two types of bonds from the City — a general obligation bond or a revenue bond. The two types of bonds differ in how the City chooses to repay the loan, and are discussed in more detail below.

General Obligation Bonds:
General obligation (G.O.) bonds are backed by the City's full faith and credit, as the City must pledges to assess property taxes sufficient to pay the annual debt service. This tax is beyond the State's constitutional limit of $10/$1,000 of assessed value. The City may, at its discretion, use any other source of revenue, including sewer rate revenues, to repay the bonds. If it uses these other sources, it then reduces the amount to be collected from taxes.

The lender requires the City to provide two additional securities for the revenue bonds that are not required by a G.O. bond. First, the City must establish a bond reserve fund equal to the lesser of maximum annual debt service or 10% of the bond amount. Second, the City must increase user fees such that net the cash flow from operations plus interest earnings are equal to or greater than 125% of annual debt service, known as a 1.25 debt coverage ratio.

Oregon Revised statutes limit the maximum term to forty (40) years for cities. Except in the event that RD will purchase the bonds, the realistic term for which G.O. bonds should be issued is fifteen (15) to twenty (20) years. Under the present economic climate, the lower interest rates will be associated with the shorter terms.

Financing of wastewater system improvements by G.O. bonds is usually accomplished by the following procedure:

1. Determination of the capital costs required for the improvement.

2. An election by the voters to authorize the sale of bonds.

3. The bonds are offered for sale.

4. The revenue from the bond sale is used to pay the capital costs associated with the project(s).

General Obligation bonds are preferable to revenue bonds in matters of simplicity and cost of issuance. Since the bonds are secured by the power to tax, these bonds usually command a lower interest rate than other types of bonds. General obligation bonds lend themselves readily to competitive public sale at a reasonable interest rate because of their high degree of security, their tax exempt status, and public acceptance.

These bonds can be revenue-supported wherein a portion of the user fee is pledged toward payment of the debt service. Using this method, the need to collect additional property taxes to retire the bonds is eliminated. Such revenue-supported G.O. bonds have most of the advantages of revenue bonds, plus lower interest rate and ready marketability.

General obligation bonds are normally associated with the financing of facilities which benefit an entire community and must be approved by a majority vote.

The disadvantage of G.O. bond debt is that it is often added to the debt ratios of the underlying municipality, thereby restricting the flexibility of the municipality to issue debt for other purposes. Furthermore, G.O. bond authorizations must be approved by a majority vote and often necessitate extensive public information programs.

Revenue Bonds:

For revenue bonds, the City pledges the net operating revenue of the sewer utility to repay the bonds. The primary source of the net revenue is user fees, and the primary security is the City's pledge to charge user fees sufficient to pay all operating costs and debt service.

The general shift away from ad valorem property taxes and toward a greater reliance on user fees makes revenue bonds a frequently used option for payment of long term debt. Many communities prefer revenue bonding, because it insures that no tax will be levied. In addition, debt obligation will be limited to system users since repayment is derived from user fees. An advantage with revenue bonds is that they do not count against a municipality's direct debt, but instead are considered "overlapping debt". This feature can be a crucial advantage for a municipality near its debt limit. Rating agencies evaluate closely the amount of direct debt when assigning credit ratings. Revenue bonds also may be used in financing projects extending beyond normal municipal boundaries. These

bonds may be supported by a pledge of revenues received in any legitimate and ongoing area of operation, within or without the geographical boundaries of the issuer.

Successful issuance of revenue bonds depends on the bond market evaluation of the revenue pledged. Revenue bonds are most commonly retired with revenue from user fees. Recent legislation has eliminated the requirement that the revenues pledged to bond payment have a direct relationship to the services financed by revenue bonds. Revenue bonds may be paid with all or any portion of revenues derived by a public body or any other legally available monies. If additional security to finance revenue bonds is needed, a public body may mortgage grant security and interests in facilities, projects, utilities or systems owned or operated by a public body.

Normally, there are no legal limitations on the amount of revenue bonds to be issued, but excessive issue amounts are generally unattractive to bond buyers because they represent high investment risks. In rating revenue bonds, buyers consider the economic justification for the project, reputation of the borrower, methods and effectiveness for billing and collecting, rate structures, a provision for rate increases as needed to meet debt service requirements, track record in obtaining rate increases historically, adequacy of reserve funds provided in the bond documents, supporting covenants to protect projected revenues, and the degree to which forecasts of net revenues are considered sound and economical.

Municipalities may elect to issue revenue bonds for revenue producing facilities without a vote of the electorate (ORS 288.805-288.945). Certain notice and posting requirements must be met and a sixty (60) day waiting period is mandatory. A petition signed by five percent of the municipality's registered voters may cause the issue to be referred to an election.

Improvement Bonds:

Improvement (Bancroft) bonds can be issued under an Oregon law called the Bancroft Act. Thee bonds are an intermediate form of financing that is less than full-fledged G.O. or revenue bonds, but is quite useful especially for smaller issuers or for limited purposes.

An improvement bond is payable only from the receipts of special benefit assessments, not from general tax revenues. Such bonds are issued only where certain properties are recipients of special benefits not occurring to other properties. For a specific improvement, all property within the improvement area is assessed on an equal basis, regardless of whether it is developed or undeveloped. The assessment is designed to apportion the cost of improvements, approximately in proportion to the afforded direct or indirect benefits, among the benefitted property owners. This assessment becomes a direct lien against the property, and owners have the option of either paying the assessment in cash or applying for improvement bonds. If the improvement bond option is taken, the city sells Bancroft improvement bonds to finance the construction, and the assessment is paid over 20 years in 40 semi-annual installments with interest. Cities and special districts are limited to improvement bonds not exceeding three percent of true cash value.

With improvement bond financing, an improvement district is formed, the boundaries are established, and the benefitted properties and property owners are determined. The engineer usually determines an approximate assessment, either on a square foot or a front-foot basis. Property owners are then given an opportunity to object against the project assessments. The assessments against the properties are usually not levied until the actual cost of the project is determined. Since this determination is normally not possible until the project is completed, funds are not available from assessments for the purpose of making monthly payments to the contractor. Therefore, some method of interim financing must be arranged, or a pre-assessment program, based on the estimated total costs, must be adopted. Commonly, warrants are issued to cover debts, with the warrants to be paid when the project is complete.

The primary disadvantage tot his source of revenue is that the property to be assessed must have a true cash value at least equal to 50 percent of the total assessments to be levied. As a result, a substantial cash payment is usually required by owners of undeveloped property. In addition, the development of an assessment district is very cumbersome and expensive when facilities for an entire community are contemplated. In comparison, G.O. bonds can be issued in lieu of improvement bonds, and are usually more favorable.

Capital Construction (Sinking) Fund:

Sinking funds are often established by budget for a particular construction purpose. Budgeted amounts from each annual budget are carried in a sinking fund until sufficient revenues are available for the needed project. Such funds can also be developed with revenue derived from system development charges or serial levies. Implementation of this alternative is too late for Aumsville for this cycle. The council may want to consider building reserves for the upgrades required in twenty (20) years.

Connection Fees:

Most cities charge connection fees to cover the cost of connecting new development to wastewater systems. Based on recent legislation, connection fees can no longer be programmed to cover a portion of capital improvement costs.

System Development Charges:

A system development charge (SDC) is a fee collected as each piece of property is developed. The SDC is used to finance the necessary capital improvements and municipal services required by the development. Such a fee can be used to recover the capital costs of infrastructure. Operating, maintenance, and replacement costs cannot be financed through SDC's.

The Oregon Systems Development Charges Act was passed by the 1989 Legislature (HB 3224) and governs the requirements for systems development charges effective July 1, 1991. Two types of charges are permitted under this act: 1) improvement fees, and 2) reimbursement fees. SDCs charged before construction are considered improvement fees and are used to finance capital

improvements to be constructed. After construction, SDCs are considered reimbursement fees and are collected to recapture the costs associated with capital improvements already constructed or under construction. A reimbursement fee represents a charge for utilizing excess capacity in an existing facility paid for by others. The revenue generated by this fee is typically used to pay back existing loans for improvements.

Under the Oregon Systems Development Charges Act, methodologies for deriving improvement and reimbursement fees must be documented and available for review by the public. A capital improvement plan must also be prepared which list the capital improvements that may be funded with improvement fee revenues, and the estimated cost and timing of each improvement. Thus, revenue from the collection of SDCs can only be used to finance specific items listed in a capital improvement plan. SDCs cannot be assessed on portions of the project paid for with grant funding. Examples of SDCs charged by nearby communities are shown in Table 8-3:

Table 8-3: Local Area Sewer System Development Charges

COMMUNITY	SEWER SDC
Aumsville	$470
Beaverton	$2,200
Canby	$1,020
Clackamas County SD #1	$2,200
Corvallis	$503
Eugene	$892
Gladstone	$2,207
Gresham	$1,900
Lake Oswego	$1,282
McMinnville	$2,400
Milwaukie	$893
Oak Lodge	$1,657
Oregon City	$3,125
Portland	$1,390
Salem	$435
Tigard	$2,200
Tualatin	$2,200
Washington County	$2,200
West Linn	$2,440
Wilsonville	$1,260
Woodburn	$2,977

Ad Valorem Taxes:

Ad valorem property taxes are often used as a revenue source for utility improvements. Property taxes may be levied on real estate, personal property or both. Historically, ad valorem taxes were the traditional means of obtaining revenue to support all local governmental functions.

A marked advantage of these taxes is the simplicity of the system; it requires no monitoring program for developing charges, additional accounting and billing work is minimal, and default on payments is rare. In addition, ad valorem taxation provides a means of financing that reaches all property owners that benefit from a wastewater system, whether a property is developed or not. The construction costs for the project are shared proportionally among all property owners based on the assessed value of each property.

Ad valorem taxation, however, is less likely to result in individual users paying their proportionate share of the costs as compared to their benefits.

User Fees:

User fees can be used to retire G.O. bonds. They are commonly the sole source of revenue to retire revenue bonds and to finance O & M. User fees represent monthly charges of all residences, businesses, and other users that are connected to the wastewater system. These fees are established by resolution and can be modified, as needed, to account for increased or decreased operating and maintenance costs. The monthly charges are usually based on the class of user (e.g. single family dwelling, multiple family dwelling, schools, etc.) And the quantity of wastewater through a user's connection.

Assessments:

Under special circumstances, the beneficiary of a public works improvement may be assessed for the cost of a project. For example, the city may provide some improvements or services that directly benefit a particular development. The city may choose to assess the industrial or commercial developer to provide up-front capital to pay for the administered improvements.

8.2.3 Financing Strategy

A financing strategy must provide a mechanism to generate capital funds in sufficient amounts to pay for the proposed improvements over the relatively short duration for design and construction, generally two (2) years. The financing strategy must also identify the manner in which annual revenue will be generated to cover the expense for long-term debt repayment and the on-going operation and maintenance of the system.

The objectives of a financing plan include the following:

- Identify the capital improvement cost for the Project and the estimated expense for operation and maintenance.
- Evaluate the potential funding sources and select the most viable program.
- Determine the availability of outside funding sources and identify the local cost share.
- Determine the cost to system users to finance the local share and the annual cost for operation and maintenance.

The following financing plan addresses the Recommended Plan. As outlined in Chapter 7, the estimated costs for the project are summarized as follows:

- Capital Improvement Cost $4,865,800
- Annual O & M Cost $332,791

8.2.4 Phased Implementation Plan

Due to the overall magnitude of the proposed improvements, a phased implementation plan was developed at the City Council's request to break the project down into smaller pieces. The following is a brief summary of the major phases, based on the priority of need.

Phase 1 - Effluent Irrigation/I&I Reduction

Primary efforts should focus on effluent irrigation to reduce the storage capacity problems at the lagoons, which have caused the permit compliance problems. Implementation will increase the plant's hydraulic capacity and possibly allow for a small amount of growth to occur. In addition, infiltration and inflow rehabilitation should be performed on the collection system to reduce immediate flows as much as possible.

Implementation of the long-term effluent irrigation system will require securing a large amount of land (by lease or acquisition), preparation of a Reclaimed Water Use Plan and an irrigation system design (both requiring DEQ approval), and construction of significant capital improvements (pump station, force main, and irrigation system). Implementation of Phase 1 is recommended immediately.

Phase 2 - Disinfection System Upgrade

The second priority is the effluent disinfection system. The overall disinfection system should be upgraded to provide improved mixing and longer contact time, and a safe and reliable chlorine gas storage and injection system. The effluent flow metering system would also be replaced with this upgrade.

Implementation of Phase 2 is recommended immediately. This project will need to be funded primarily through loans, user rates, and existing system development charge funds. To accomplish this, planning and funding activities for design and construction need to begin very soon.

Phase 3 - Short Term Wastewater Treatment Plant Upgrade

The next priority is a major upgrade of the WWTP, including expansion of the trunk line and influent pump station, upgrading the head works, removal of biosolids, lagoon expansion, and addition of lagoon aeration equipment. These improvements will provide additional hydraulic capacity, improve treatment efficiency, and bring other unit processes into compliance with current and anticipated permit requirements.

Implementation of Phase 3 is recommended immediately in order to improve effluent quality. The March 31, 1999 Notice of Noncompliance noted effluent violations for percent removal of BOD and violations for pounds loading for BOD and Total Suspended Solids (TSS). These improvements will need to be funded through a combination of loans, grants, user rates, and system development charges.

Phase 4 - Long Term Wastewater Treatment Plant Upgrade

The last priority is a second WWTP upgrade, including the completion of the aeration system, addition of a polishing filter, and addition of a dechlorination system. These improvements will increase the plant's overall design capacity and allow for the remaining growth throughout the 20-year planning period.

As these improvements are primarily related to future growth, funding should be through system development charges, and the actual timing of construction should be determined by the City's actual growth. We recommend planning for implementation to begin in the year 2003. Time for the actual construction will depend on the mass load limits that will be established when the current permit is rewritten.

Table 8-4 is a preliminary opinion of probable costs for the preferred alternative under a phased capital improvement plan.

TABLE 8-4: PHASED CAPITAL IMPROVEMENT PLAN

PRELIMINARY OPINION OF PROBABLE COSTS
PREFERRED ALTERNATIVE - AERATED LAGOONS
1999 COST BASIS

ITEM	Phase 1 Irrigation/I&I	Phase 2 Disinfection	Phase 3 S.T. Upgrade	Phase 4 L.T. Upgrade	Total
CAPITAL IMPROVEMENT COSTS					
REPLACE TRUNK LINE			$150,000		$150,000
I&I REHABILITATION	$137,000				$137,000
INFLUENT PUMP STATION			$300,000		$300,000
HEADWORKS			$344,000		$344,000
SECONDARY TREATMENT			$1,000,000	$99,000	$1,099,000
EFFLUENT FILTRATION				$439,000	$439,000
DISINFECTION		$130,000			$130,000
IRRIGATION SYSTEM	$418,000				$418,000
EFFLUENT PIPELINE TO BEAVER CREEK			$30,000		$30,000
BIOSOLIDS			$200,000		$200,000
TOTAL CONSTRUCTION COST =	***$555,000***	***$130,000***	***$2,024,000***	***$538,000***	***$3,247,000***
INDIRECT COSTS					
Construction Contingencies	$83,250	$19,500	$303,600	$80,700	$487,050
Engineering and Construction Management	$111,000	$26,000	$404,800	$107,600	$649,400
Legal & Administration	$27,750	$6,500	$101,200	$26,900	$162,350
	$222,000	*$52,000*	*$809,600*	*$215,200*	*$1,298,800*
LAND ACQUISITION (80 acres @ $4,000/acre	*$320,000*				$320,000
TOTAL PROJECT COST =	**$1,097,000** (137,000 + 11,000)	**$182,000**	**$2,833,600**	**$753,200**	**$4,865,800**

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Phase 1 1,097,000.00 +
less I&I 137,000.00 −
less I&I Ams 11,000.00 −
Aeration ~~70,000.00~~ 96,000
Disinfection 182,000.00 +
Total ~~1,201,000.00~~ *
DEQ Requirements.

1,227,000

To

8.2.5 Financial Evaluation

In order to qualify for grants and low interest loans, state and federal funding agencies require that both historical information and future estimates be made for various factors so that the city's needs can be evaluated against other grant applicants on a comparable basis.

Table 8-5 is a sewer system budget analysis developed from information provided by the City Administrator. Information was developed from the actual FY 97-98 budget, as well as updated year-end projections from the current FY98-99 budget and the proposed FY 99-00 budget, which is going through approval with the City's budget committee. Future estimated budgets are also presented through the anticipated construction period and start-up of operations, estimated at FY01-02 for financial planning purposes. Near the bottom of this table is a summary of the Operations, Maintenance (OM) costs, and capitol long-term system Replacement (OMR) for the preferred alternative on an Equivalent Dwelling Unit (EDU) basis.

The City currently has two outstanding bonds for its sewer system. The first is a $180,000 general obligation bond for sewer construction issued on October 17, 1970 , having a 5% interest rate and 40 year duration. The second is a $136,000 refunding general obligation bond for sewer issued on May 12, 1987, also with a 5% interest rate and 40 year duration. As both are general obligation bonds and are not accounted for in the City's sewer funds, they are not included in the sewer system budget analysis table.

Monthly sewer rates were recently raised from $15.00 to $20.00 per single family residence, effective May 1, 1999, following a user rate study conducted for the City by the Oregon Association of Water Utilities (OAWU). User fee revenue projections for the FY 99-00 proposed budget are based on this recent rate increase.

The City will need to raise its rates to the statewide average (currently $35/month) before it will be available for any grants, which was indicated by all funding agencies that attended a One Stop Funding meeting on May 12, 1998. Prior to that meeting, it was believed that only Phases 1 and 2 were needed to resolve current compliance issues. However, with a third Notice of Noncompliance dated March 31, 1999, Phase 3 (Short Term Wastewater Treatment Plant Upgrade) will also be needed for compliance reasons.

For financial planning purposes, it is assumed that Phases 1-3 will be done together, although the design and construction may actually be done sequentially over a period of a few years. The estimated cost of Phases 1-3 is $4,122,600. Depending on effluent limits that will not be known until the City's permit is rewritten, Phase 4 may need to be done a few years later.

Table 8-5: Sewer System Budget Analysis

Revenue and Expense Description	Actual Budget FY'97-98	Current Budget FY'98-99	Proposed Budget FY'99-00	Estimated Budget FY'00-01	Estimated Budget FY'01-02
Sewer Fund (13)					
Revenue:					
User Fee Revenue (Collections)	$180,482	$188,000	$249,550	$395,266	$472,811
Interest Income	$6,887	$8,000	$7,500	$7,500	$7,500
Inspection Fees	$675	$300	$300	$300	$300
Miscellaneous Income	$1,036	$10	$0	$0	$0
Insurance Reimbursement	$1,343	$0	$0	$0	$0
Total Revenue:	$190,423	$196,310	$257,350	$403,066	$480,611
Expenses:					
Operation, Maintenance (OM) Costs					
Personal Services	$63,858	$80,741	$98,151	$103,059	$108,211
Materials and Services	$37,038	$93,564	$138,115	$108,021	$113,422
Capital Outlay	$2,189	$2,330	$15,370	$16,139	$16,945
Debt Service	$0	$0	$0	$0	$297,145
Operating Contingency	$0	$0	$38,839	$59,290	$70,922
Transfers Out	$7,000	$9,200	$13,000	$10,000	$10,000
Total O&M Expenses	$110,085	$185,835	$303,475	$296,508	$616,646
Capital Replacement (R)					
Transfer to Sewer Improvement Fund	$62,000	$35,000	$48,000	$50,000	$50,000
Total OMR Costs:	$172,085	$220,835	$351,475	$346,508	$666,646
Income From Operations:	$18,338	($24,525)	($94,125)	$56,559	($186,035)
Number of EDU's	985	1044	1071	1098	1126
Monthly OM per EDU	$9	$15	$24	$23	$46
Monthly OMR per EDU	$15	$18	$27	$26	$49
Monthly Sewer Rate	$15	$15	$20	$30	$35
FUND BALANCE SUMMARY					
SEWER FUND (13)					
Beginning Fund Balance	$100,313	$118,650	$94,125	$0	$56,559
Income From Operations:	$18,338	($24,525)	($94,125)	$56,559	($186,035)
Ending Fund Balance	$118,651	$94,125	$0	$56,559	($129,476)

The City has been accumulating funds for future upgrades in two separate funds, a Sewer Improvement Fund and a Sewer SDC Fund. The combined estimated balance of these two funds will be approximately $400,000 at the end of FY 98-99. Subtracting this amount from the estimated cost of Phases 1-3, the net capital required would be reduced to approximately $3,700,000. Assuming the net amount is funded entirely by loans at 5% interest and a 20 year term, the debt service required would be nearly $300,000. As shown in Table 8-6, this additional operational expense would increase the monthly OMR per EDU to $49/month.

Planning for implementation of Phases 1-3 needs to begin immediately. We recommend that the City plan to raise its rates to at least $30/month by FY 00-01 and $35/month by FY 01-02 to meet the projected OMR costs per EDU and continue building a local matching fund. Once rates are raised to these levels, the City will also be eligible for state and federal grant and loan programs such as OCDBG and Rural Development.

While Phase 3 improvements are needed to enhance treatment capabilities and address compliance issues, it will also provide additional capacity that will allow for growth. System development charges (SDCs) should be used as much as possible to help finance the project. SDC revenues should be used entirely to finance Phase 4, and to pay off some of the debt of the project which will lessen the need for long-term rate increases. An SDC study is currently in progress by another consultant and the City anticipates a significant rate increase once complete.

Short term rate impacts will be the greatest immediately following implementation of Phases 1-3. Debt service will remain constant if Phase 4 is funded with SDC's, enabling long-term user rates to remain relatively stable as long as inflation remains benign.

8.3 PROJECT IMPLEMENTATION SCHEDULE

The City received its third notice of noncompliance (NONs) by the DEQ on March 31, 1999 for violating its permit between June 1998 and January 1999. The June 1998 violations were for discharging out of the permitted season, and is a Class I violation. In December 1998 and January 1999, the DEQ cited three Class II and three Class III violations for exceeding BOD and TSS limits. These most recent violations document that the facility is not just experiencing capacity problems, but also currently has treatment problems that must be addressed in the very near future.

As a result of the Class I violation, the DEQ will be referring the City to its enforcement section with the recommendation to issue a Notice of Permit Violation (NPV), which is a formal enforcement action requiring a response within 5 working days of receipt. If the facility is not operating in compliance with its permit, the City will be required to submit a written proposal to bring the facility into compliance with the permit and all applicable regulations which include:

- A detailed plan and time schedule for achieving compliance in the shortest practicable time.
- A description of the interim steps that will be taken to reduce the impact of the permit violations until the permitted facility is in compliance with the permit.

DEQ has suggested that the City consider a Mutual Agreement and Order (MAO), which would allow certain violations to continue until modified or new facilities are constructed pursuant to a negotiated schedule contained in the MAO. **BCI** recommends that the City enter into a MAO as suggested by the DEQ, and negotiate an acceptable implementation schedule the and reduce the chances of fines and other enforcement action.

The following is a proposed implementation schedule for planning purposes.

Phase I - Effluent Irrigation

DEQ Approval of Facilities Plan	May 1999
Submit Funding Application	June 1999
Conduct Funding Meeting	June 1999
Start Reclaimed Water Use Plan	August 1999
Submit Reclaimed Water Use Plan for Approval	December 1999
DEQ Approves Reclaimed Water Use Plan	February 2000
Acquire Land and Easements (Reclaimed Water System)	March 2000
Start Detailed Design of Reclaimed Water System	April 2000
Submit 50% Complete Design of Reclaimed Water System to DEQ	August 2000
Meet with DEQ Regarding 50% Submission	August 2000
Complete Detailed Design of Reclaimed Water System	December 2000
DEQ Approval of Reclaimed Water System	February 2001
Advertise For Construction Bids (Reclaimed Water System)	February 2001

▸ Receive Construction Bids (Reclaimed Water System)	April 2001
▸ Award Contracts (Reclaimed Water System)	April 2001
▸ Start Construction (Reclaimed Water System)	May 2001
▸ Submit Draft O&M Manual	July 2001
▸ Approval of O&M Manual	August 2001
▸ Complete Construction (Reclaimed Water System)	September 2001

Phase II - Disinfection System

▸ Start Detailed Design of WWTP Improvements	October 1999
▸ Submit 50% Complete Design of Disinfection System	May 2000
▸ Complete WWTP Design	December 2000
▸ DEQ Approval of WWTP Plans & Specifications	March 2001
▸ Advertise for WWTP Construction Bids	March 2001
▸ Receive WWTP Construction Bids	April 2001
▸ Award Contracts	May 2001
▸ Start WWTP Construction	July 2001
▸ Submit Draft O&M Manual	March 2002
▸ Approval of O&M Manual	May 2002
▸ Complete Construction	July 2002
▸ Performance Certification	July 2003

Phase III - Short Term Treatment Plant Upgrade

▸ Begin Mixing Zone Study	July 1999
▸ Begin Sludge Management Plan	September 1999
▸ Submit Sludge Management Plan	May 2000
▸ Submit Draft Mixing Zone Study	May 2000
▸ Meet with DEQ on Above Item	June 2000
▸ Approval of Sludge Management Plan	August 2000
▸ Begin Re-phased Design Work	September 2000
▸ Submit Completed Mixing Zone Study	October 2000
▸ DEQ Approval of Mixing Zone Study	December 2000
▸ Submit 50% Completed Detailed Plans	December 2000
▸ Submit 100% Completed Detailed Plans	February 2001
▸ Advertise/Receive Construction Bids	April 2001
▸ Start Construction	June 2001
▸ Submit Draft O&M Manual	February 2002
▸ Approval of O&M Manual	May 2002
▸ Complete Construction	July 2002
▸ Performance Certification	July 2003

Phase IV - Long Term Treatment Plant Upgrade

▸ Begin Detailed Design Work	January 2003
▸ Submit 50% Complete Detailed Plan	June 2003
▸ Meet with DEQ	June 2003
▸ Submit 100% Complete Detailed Design	January 2004
▸ DEQ Approval of Detailed Design	March 2004
▸ Advertise for Construction Bids	April 2004
▸ Receive Construction Bids	May 2004
▸ Start Construction	July 2004
▸ Submit Draft O&M Manual	March 2005
▸ Approval of O&M Manual	May 2005
▸ Complete Construction	July 2005
▸ Performance Certification	July 2006

Phase V - Infiltration and Inflow Work

- On Going Activity

CHAPTER 9 - REFERENCES

1. City of Aumsville Ordinance No. 436. An Ordinance Amending the Aumsville Comprehensive Plan.

2. Design and Construction of Sanitary and Storm Sewers, American Society of Civil Engineers, Manual No. 37, 1969.

3. Design of Municipal Wastewater Treatment Plants, Manual of Practice No. 8, Water Environment Federation, 1992.

4. Operation of Municipal Wastewater Treatment Plants, Manual of Practice No. 11, 5th Edition, Water Environment Federation, 1996.

5. Pumping Station Design, Sanks et. al., 1989.

6. Standard Methods for the Examination of Water and Wastewater, 19th Edition, Water Environment Federation, 1995.

7. Wastewater Engineering: Treatment, Disposal and Reuse, 3rd Edition, Metcalf and Eddy, Inc.

8. Water Quality Management, Krenkel and Novotny, 1980.

9. Water Measurement Manual, 2nd Edition, U. S. Department of the Interior, Bureau of Reclamation, 1984.

10. Water Supply and Pollution Control, 4th Edition, Viessman and Hammer, 1985.

APPENDIX A -
DEQ NOTICES OF NON-COMPLIANCE

C: [handwritten initials]

Oregon

DEPARTMENT OF ENVIRONMENTAL QUALITY

Western Region - Salem Office

January 11, 1996

Mary Anne Hills, City Administrator
City of Aumsville
Post Office Box 227
Aumsville, OR 97325

Re: NOTICE OF NONCOMPLIANCE
ENF-WQ-WRS-96-012
NPDES Permit No. 100881
File No. 4475
Marion County
Discharge Outside Permit Period

Dear Ms. Hills:

The Department has reviewed the Discharge Monitoring Reports (DMRs) submitted for The City of Aumsville Wastewater Treatment Facility for July 1995, through November 1995. During our review, the following National Pollutant Discharge Elimination System (NPDES) General Permit violation was noted:

> The October 1995, Discharge Monitoring Report indicated that the facility had to release an early discharge of treated wastewater via the approved outfall in order to lower the water level in the lagoon cells to protect the integrity of the entire facility.

Between May 1 and October 31, no discharge to State waters is permitted as per Schedule A. 1. a. (1), of the City's NPDES permit.

The above violation is a Class II violation of your permit. Oregon Administrative Rule 340-12-041 (2) (c) provides that a permittee shall not receive more than three NONs for Class II violations of the same permit within a thirty-six (36) month period without being issued a more formal enforcement action called a Notice of Permit Violation (NPV). The Department may, however, issue a NPV prior to the third NON. The Department requests your cooperation in ensuring that this violation does not recur.

750 Front St. NE
Suite 120
Salem, OR 97310
(503) 378-8240
(503) 378-3684 TDD

The above violation may be a result of the City not having the sufficient capacity in the lagoon treatment cells to accommodate the sewage flow to the facility during the non-discharge period. If flow meter recordings are indicating that the facility is experiencing an increase in sewage flow and consequently a capacity problem, then the City should perform an engineering evaluation to study alternatives for present and future capacity problems. Some alternatives may be adding another lagoon treatment cell or adding a summer spray irrigation program. This will add storage capacity or help lower the water levels in the existing lagoon cells prior to the winter discharge period. The evaluation should also consider changes to the operational and manipulation of lagoon levels to increase storage capacity.

If you have any questions, please call me at (503) 378-8240, extension 246.

Sincerely,

Robert A. Dicksa
Environmental Specialist
Western Region-Salem Office

RAD:klt
X:\rdicksa\aumsvill.non

cc: Water Quality Division - HQ
Enforcement Section - DEQ
Freeman Fulton, Operator

Oregon
John A. Kitzhaber, M.D., Governor

Department of Environmental Quality
Western Region
Salem Office
750 Front St. NE
Suite 120
Salem, OR 97310
(503) 378-8240
(503) 378-3684 TTY

July 7, 1998

Mary Anne Hills
City Administrator
City of Aumsville
Post Office Box 227
Aumsville, OR 97325

Re: NOTICE OF NONCOMPLIANCE
ENF-WQ/M-WRS-98-195
NPDES Permit No. 100881
File No. 4475
Marion County
Permit Limit Violations

Dear Ms. Hills:

The Department of Environmental Quality (Department) has reviewed the Discharge Monitoring Reports (DMRs) submitted for the City of Aumsville Wastewater Treatment Facility located East of Hwy. 22, Aumsville, Oregon for January, 1998, through April, 1998. During our review, the following violations of Schedule A, Condition 1.a.(2), of your National Pollutant Discharge Elimination System (NPDES) Permit were noted:

Date	Parameter	Permit Limit	Reported Value	Class Violation
February 1998	lbs. BOD_5 Monthly Average	84 lbs.	107 lbs.	Class II

This is your second Class II violation of your permit. Oregon Administrative Rule 340-12-041 (2) (c) provides that a permittee shall not receive more than three NONs for Class II violations of the same permit within a thirty-six (36) month period without being issued a Notice of Permit Violation (NPV). If additional Class II violations occur, we will be referring these violations to the Department's Enforcement Section for the issuance of a NPV. The NPV is a formal enforcement action that requires you to submit one of the following, within five working days of its receipt: (1) a certification of full compliance with all permit conditions; or (2) a detailed plan and time schedule demonstrating what steps will be taken to gain compliance, together with interim measures taken to reduce the impact of

the violations, and a statement that the permittee has reviewed all of the conditions and limitations of the permit and is in compliance with all other provisions.

The above violation appears to be a result of discharging excessive effluent flow while treatment efficiency remains adequate for a lagoon system. The Department is aware of the City's wastewater capacity problems and is in the process of reviewing the wastewater facility planning document. However, the City needs to continue to operate the facility as effectively as possible. It is important to optimize treatment and produce a high quality effluent, but avoid dumping the contents of the lagoon when the water level may get to high. This can be accomplished with good calculation and planning throughout the discharge period.

If you have any questions, please call me at (503) 378-8240, extension 246.

Sincerely,

Robert A. Dicksa

Robert A. Dicksa
Natural Resource Specialist
Western Region-Salem Office

RAD:sms
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cc: Water Quality File - Salem
Enforcement Section, DEQ
Barbara Burton, DEQ - Salem
Steve Oslie, Director of Public Works
City of Aumsville
Post Office Box 227
Aumsville, OR 97325

cc: Dalton, Dalie & ACC

Oregon
John A. Kitzhaber, M.D., Governor

Department of Environmental Quality
Western Region
Salem Office
750 Front St. NE
Suite 120
Salem, OR 97310
(503) 378-8240
(503) 378-3684 TTY

March 31, 1999

Ms. Mary Anne Hills
City Administrator
City of Aumsville
Post Office Box 227
Aumsville, OR 97325

RE: **NOTICE OF NONCOMPLIANCE**
ENF-WQ/M -WRS-99-093
NPDES Permit No. 100881
File No. 4475
Marion County
Permit Limit Violations

Dear Ms. Hills:

The Department of Environmental Quality (Department) has reviewed the Discharge Monitoring Reports (DMRs) submitted for the City of Aumsville Wastewater Treatment Facility located East of Hwy. 22, Aumsville, Oregon for September 1998, through January 1999. During our review, the following violations of Schedule A, Condition 1.a.(2) of your National Pollutant Discharge Elimination System (NPDES) Permit were noted:

Date	Parameter	Permit Limit	Reported Value	Class Violation
December 1998	BOD_5 Monthly % Removal Efficiency	85 %	83 %	Class III
	lbs. BOD_5 Monthly average	84 lbs.	118 lbs.	Class II
12/13/1998 thru 12/19/1998	lbs. BOD_5 Weekly average	126 lbs.	130 lbs.	Class III
12/27/1998 thru 12/31/1998	lbs. BOD_5 weekly average	126 lbs.	150 lbs.	Class II (greater than 10 % above limit)
January 1999	lbs. TSS Monthly average	140 lbs.	212 lbs.	Class II

Date	Parameter	Permit Limit	Reported Value	Class Violation
1/10/1999 thru 1/16/1999	lbs. TSS weekly average	224 lbs.	237 lbs.	Class III

In addition, the City discharged wastewater to Beaver Creek out of the permitted discharge season (November 1 - April 30) for 14 days during June 1998. Discharging out of the permitted season is a Class I violation.

As a result of the above documented Class I violation, we are referring your file to the Department's Enforcement Section with a recommendation to issue a Notice of Permit Violation (NPV). The NPV is a formal enforcement action, which will require that you submit one of the following to the Department within 5 working days of its receipt:

1. A written response certifying that the permitted facility is complying with all terms and conditions of the permit. This certification shall include a sufficient description of the information on which you are certifying compliance; or
2. If the permitted facility is not operating in compliance with the permit, you will be required to submit a written proposal to bring the facility into compliance with the permit and all applicable regulations which shall include at least the following:

    a. A detailed plan and time schedule for achieving compliance in the shortest practicable time;
    b. A description of the interim steps that will be taken to reduce the impact of the permit violation(s) until the permitted facility is in compliance with the permit; and,
    c. A statement that you have reviewed all other conditions and limitations of the permit and no other violations of the permit were discovered.

The purpose of the NPV is to ensure that the permitted facility is operating in compliance with all conditions and limitations of the permit, or to bring the permitted facility into compliance. We recommend that you begin preparations now to respond to the NPV. If you fail to respond to the NPV in the five day time frame, you will be assessed a civil penalty for one or more violation(s) cited in the NPV.

The Department is aware that the above violations may be recurring because the facility lacks capacity as a result of Inflow and Infiltration (I/I) in the collection system and there has been an increase in population utilizing the system. The Department is also aware of the City's recent wastewater facility plan, which addresses the problems and provides solutions for the City through upgrades and modifications to the current facility.

However, if the City anticipates further recurring violations then the City may want to consider a Mutual Agreement and Order (MAO). A MAO is a legal contract that is negotiated and signed by the Department of Environmental Quality and the City of Aumsville. The Director signs the MAO on behalf of the Department and the Environmental Quality Commission (EQC), after the source signs the MAO.

The MAO is used to address violations and allows certain violations to continue until modified or new facilities are constructed pursuant to the compliance schedule contained in the MAO. The Order would include facts of the situation, a schedule for the City of Aumsville to do certain actions to bring an end to the permit violations, interim discharge limits, and agreement by the Department not to take enforcement action, penalties for violating the Order, and a procedural section.

If you have any questions, please call me at (503) 378-8240, extension 246.

Sincerely,

Robert A. Dicksa

Robert A. Dicksa
Natural Resource Specialist
Western Region-Salem Office

RAD:clp
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cc: Water Quality File - Salem
Pauline Harms, DEQ, Salem

APPENDIX B -
NPDES PERMIT

July 1st

Expiration Date: 3-31-97
Permit Number: 100881
File Number: 4475
Page 1 of 7 Pages

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
WASTE DISCHARGE PERMIT

Department of Environmental Quality
811 S.W. Sixth Avenue, Portland, OR 97204
Telephone: (503) 229-5696

Issued pursuant to ORS 468.740 and The Federal Clean Water Act

ISSUED TO:

City of Aumsville
P. O. Box 227
Aumsville, OR 97325

PLANT TYPE AND LOCATION:

Stabilization Lagoons
Aumsville, OR 97325

Treatment System Class: I
Collection System Class: II

SOURCES COVERED BY THIS PERMIT:

Type of Waste	Outfall Number	Outfall Location
Domestic Sewage	001	R.M. 2.5

RECEIVING SYSTEM INFORMATION:

Basin: Willamette
Sub-Basin: Middle Willamette
Stream: Beaver Creek
Hydro Code: 22H-BEAV 2.5 D
County: Marion

EPA REFERENCE NO: OR-002272-1

Issued in response to Application No. 997735 received October 24, 1991.

This permit is issued based on the land use findings in the permit record.

Lydia R. Taylor
Lydia R. Taylor, Administrator

APR 16 1992
Date

PERMITTED ACTIVITIES

Until this permit expires or is modified or revoked, the permittee is authorized to construct, install, modify, or operate a wastewater collection, treatment, control and disposal system and discharge to public waters adequately treated wastewaters only from the authorized discharge point or points established in Schedule A and only in conformance with all the requirements, limitations, and conditions set forth in the attached schedules as follows:

Each other direct and indirect discharge to public waters is prohibited.

This permit does not relieve the permittee from responsibility for compliance with any other applicable federal, state, or local law, rule, standard, ordinance, order, judgment, or decree.

SCHEDULE A

1. Waste Discharge Limitations not to be Exceeded After Permit Issuance.

a. Outfall Number 001 (Sewage Treatment Plant Discharge)

(1) May 1 - October 31: No discharge to state waters is permitted.

(2) November 1 - April 30:

	Average Effluent Concentrations		Mass Load Limits *		
			Monthly	Weekly	Daily
			Average	Average	Maximum
Parameter	Monthly	Weekly	lb/day	lb/day	lbs
BOD_5	30 mg/l	45 mg/l	84	126	168
TSS	50 mg/l	80 mg/l	140	224	280
FC per 100 ml	200	400			

Other Parameters	Limitations
pH	Shall be within the range 6.0-9.0.
BOD_5 percent removal efficiency	Shall not be less than 85 percent monthly average.
TSS percent removal efficiency	Shall not be less than 75 percent monthly average.
Total Residual Chlorine	Shall not exceed a daily average of 0.6 mg/l.

* Mass load limits based on the average dry weather design flow to the facility of 0.335 MGD.

(3) Not withstanding the effluent limitations established by this permit, no wastes shall be discharged and no activities shall be conducted which violate Water Quality Standards as adopted in OAR 340-41-445 except in the defined mixing zone:

That portion of Beaver Creek within a radius of 100 feet from the point of discharge.

SCHEDULE B

1. Minimum Monitoring and Reporting Requirements.
(unless otherwise approved in writing by the Department)

a. Influent

Item or Parameter	Minimum Frequency	Type of Sample
Total Flow (MGD)	Daily	Measurement
Flow Meter Calibration	Annual	Verification
BOD_5	Once every 2 weeks	Composite
TSS	Once every 2 weeks	Composite
pH	3/week	Grab

b. Outfall Number 001 (Discharge from the Lagoon)

Item or Parameter	Minimum Frequency	Type of Sample
Total Flow (MGD)	Daily	Measurement
Flow Meter Calibration	Annual	Verification — on start up
BOD_5	Once every 2 weeks	Composite
TSS	Once every 2 weeks	Composite
pH	3/week	Grab
Fecal Coliform	Once every 2 weeks	Grab
Quantity Chlorine Used	Daily	Measurement
Chlorine Residual	Daily	Grab
Average Percent Removed (BOD_5 and TSS)	Monthly	Calculation

c. Bypass flows shall be maintained as low as practicable to minimize discharge to waters of the state. The permittee shall submit a report to the Department in accordance with Schedule C, Condition 1, detailing plans for the elimination of all bypass locations, or certifying that there are no bypasses.

2. Reporting Procedures

Monitoring results shall be reported on approved forms. The reporting period is the calendar month. Reports must be submitted to the Department by the 15th day of the following month.

State monitoring reports shall identify the name, certificate classification and grade level of each principal operator designated by the permittee as responsible for supervising the wastewater collection and treatment systems during the reporting period. Monitoring reports shall also identify each system classification as found on page one of this permit.

Monitoring reports shall also include a record of the quantity and method of use of all sludge removed from the treatment facility and a record of all applicable equipment breakdowns and bypassing.

SCHEDULE C

Compliance Schedules and Conditions

1. By no later than December 31, 1992, the permittee shall submit to the Department a report which either identifies known sewage bypass locations and a plan for estimating the frequency, duration and quantity of sewage bypassing treatment, or confirms that there are no bypass points.

2. 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 January 15 of 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.

3. By no later than January 31, 1994, the permittee shall submit to the Department a complete Sanitary Sewer Evaluation Study (SSES). The study shall include an evaluation on the extent of inflow and infiltration impacting the collection and the treatment systems.

4. Should the Department determine that significant impacts to the sewage system are caused by inflow and infiltration, the permittee shall be notified in writing by the Department and be required to make necessary improvements and/or upgrade the sewage collection facilities in order to reduce inflow/infiltration (I/I) in accordance with the following:

   a. By no later than July 31, 1994, the permittee shall submit to the Department engineering plans and specifications for construction of the necessary I/I reduction improvements.

   b. Semi-annual reports outlining the improvements to the collection system shall be submitted to the Department. The reports are due every six months from the date of approval of the SSES by the Department until completion of the necessary improvements.

   c. By no later than July 31, 1996, the permittee shall complete construction of the necessary improvements.

5. By no later than December 1, 1992, the permittee shall conduct a leak test on each lagoon and submit to the Department the results of the leak tests.

6. Should the results of the leak tests (as required by Compliance Condition 5 above) show that the seepage rate from any lagoon is greater than or equal to 1/4 inch per day, the permittee shall conduct and submit a groundwater characterization report. The permittee shall perform a Minimum Hydrologic Characterization and Preliminary Groundwater Monitoring according to the following schedule:

a. As soon as practicable, but by no later than July 31, 1993, the permittee shall submit to the Groundwater Section of the Department approvable plans for a Minimum Hydrogeologic Characterization and Preliminary Groundwater Monitoring. Upon written approval by the Department, the permittee shall implement the plan.

b. As soon as practicable, but by no later than July 31, 1995, the permittee shall submit to the Groundwater Section of the Department the results of the Minimum Hydrogeologic Characterization using Department approved format, install the approved monitoring well system, and initiate the Preliminary Groundwater Monitoring Program.

c. After initiating the Groundwater Monitoring Program, water samples from the designated monitoring wells shall be:

(1) Collected quarterly, unless otherwise authorized in writing by the Department.

(2) Analyzed by a laboratory approved by the Oregon State Health Division for Drinking Water Analysis; and

(3) Reported to the Department with an analysis of the meaning of the results on a quarterly basis within one month of each sampling event.

d. The need for permit specific concentration limits, on-going groundwater monitoring, and/or treatment and disposal system improvements shall be evaluated by the Department. Should the data suggest that the discharge to groundwater poses a significant threat, any corrective action and/or additional monitoring requirements shall be incorporated into the permit by addendum.

7. The permittee is expected to meet the compliance dates which have been established in this schedule. Either prior to or no later than 14 days following any lapsed compliance date, the permittee shall submit to the Department a notice of compliance or noncompliance with the established schedule. The Director may revise a schedule of compliance if he determines good and valid cause resulting from events over which the permittee has little or no control.

SCHEDULE D

Special Conditions

1. In the event the permittee finds it necessary to remove accumulated sludge solids from the lagoons, the permittee shall submit and obtain Department approval of a sludge management plan developed in accordance with Administrative Rule, Chapter 340, Division 50, "Land Application and Disposal of Sewage Treatment Plant Sludge and Sludge Derived Products Including Septage" prior to removing sludge.

2. The permittee shall comply with Oregon Administrative Rules (OAR), Chapter 340, Division 49, "Regulations Pertaining To Certification of Wastewater System Operator Personnel" and accordingly:

   a. The permittee shall have its wastewater system supervised by one or more operators who are certified in a classification and grade level (equal to or greater) that corresponds with the classification (collection and/or treatment) of the system to be supervised as specified on page one of this permit.

      Note: A "supervisor" is defined as the person exercising authority for establishing and executing the specific practice and procedures of operating the system in accordance with the policies of the permittee and requirements of the waste discharge permit. "Supervise" means responsible for the technical operation of a system, which may affect its performance or the quality of the effluent produced. Supervisors are not required to be on-site at all times.

   b. The permittee's wastewater system may not be without supervision (as required by Special Condition 2.a. above) for more than thirty (30) days. During this period, and at any time that the supervisor is not available to respond on-site (i.e. vacation, sick leave or off-call), the permittee must make available another person who is certified in the proper classification and at grade level I or higher.

   c. The permittee is responsible for ensuring the wastewater system has a properly certified supervisor available at all times to respond on-site at the request of the permittee and to any other operator.

   d. The permittee shall notify the Department of Environmental Quality in writing within thirty (30) days of replacement or redesignation of certified operators responsible for supervising wastewater system operation. The notice shall be filed with the Water Quality Division, Operator Certification Program (see address on page one). This requirement is in addition to the reporting requirements contained under Schedule B of this permit.

3. The permittee shall notify the DEQ Salem Office (phone: 378-8240) of any malfunction so that corrective action can be coordinated between the permittee and the Department.

P4475W (2-11-92)

NPDES GENERAL CONDITIONS

SECTION A. STANDARD CONDITIONS

1. Duty to Comply

The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of Oregon Revised Statutes (ORS) 468.720 and is grounds for enforcement action; for permit termination; suspension, or modification; or for denial of a permit renewal application.

2. Penalties for Violations of Permit Conditions

Oregon Law (ORS 468.990) classifies a willful or negligent violation of the terms of a permit or failure to get a permit as a misdemeanor and a person convicted thereof shall be punishable by a fine of no more than $25,000 or by imprisonment for not more than one year, or by both. Each day of violation constitutes a separate offense.

In addition to the criminal penalties specified above, Oregon Law (ORS 468.140) also allows the Director to impose civil penalties up to $10,000 per day for violation of the terms or conditions of a permit.

3. Duty to Mitigate

The permittee shall take all reasonable steps to minimize or correct any adverse impact on the environment or human health resulting from noncompliance with this permit, including such accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying discharge.

4. Duty to Reapply

If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and have the permit renewed. The application should be submitted at least 180 days before the expiration date of this permit.

The Director may grant permission to submit an application less than 180 days in advance but no later than the permit expiration date.

5. Permit Actions

This permit may be modified, suspended, or terminated for cause including, but not limited to, the following:

a. Violation of any terms or conditions of this permit, rule, or statute;

b. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts; or

c. A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge.

The filing of a request by the permittee for a permit modification or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

6. Toxic Pollutants

The permittee shall comply with any applicable effluent standards or prohibitions established under Section 307(a) of the Clean Water Act for toxic pollutants within the time provided in the regulations that establish those standards or prohibitions, even if the permit has not yet been modified to incorporate the requirement.

7. Property Rights

The issuance of this permit does not convey any property rights of any sort, or any exclusive privileges, nor does it authorize anyinjury to private property or any invasion of personal rights, nor any violation of federal, state or local laws or regulations.

SECTION B. OPERATION AND MAINTENANCE OF POLLUTION CONTROLS

1. Proper Operation and Maintenance

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls, including appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems only when necessary to achieve compliance with the conditions of the permit.

2. Duty to Halt or Reduce Activity

Upon reduction, loss, or failure of the treatment facility, the permittee shall, to the extent necessary to maintain compliance with its permit, control production or all discharges or both until the facility is restored or an alternative method of treatment is provided. This requirement applies, for example, when the primary source of power of the treatment facility fails or is reduced or lost. It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

3. Bypass of Treatment Facilities

a. Definitions

(1) "Bypass" means diversion of waste streams from any portion of the conveyance system or treatment facility.

(2) "Severe property damage" means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

b. Prohibition of bypass.

(1) Bypass is prohibited and the Director may take enforcement action against a permittee for bypass, unless:

(a) Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

(b) There were no feasible alternatives to the bypass, such as the use of auxiliary pumping, conveyance, or treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if the permittee could have installed adequate backup equipment to prevent a bypass which occurred during normal periods of equipment downtime or preventative maintenance; and

(c) The permittee submitted notices and requests as required under paragraph c of this section.

(2) The Director may approve an anticipated bypass, after considering its adverse effects, when the Director determines that it will meet the three conditions listed above in paragraph b(1) of this section.

c. Notice and request for bypass.

(1) Anticipated bypass. If the permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible at least ten days before the date of the bypass.

(2) Unanticipated bypass. The permittee shall submit notice of an unanticipated bypass as required in Section D, Paragraph D-5 (24-hour notice).

d. Bypass not exceeding limitations.

The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of paragraphs b and c of this section.

4. Removed Substances

Solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of wastewaters shall be disposed of in such a manner as to prevent any pollutant from such materials from entering public waters, causing nuisance conditions, or creating a public health hazard.

SECTION C. MONITORING AND RECORDS

1. Representative Sampling

Sampling and measurements taken as required herein shall be representative of the volume and nature of the monitored discharge. All samples shall be taken at the monitoring points specified in this permit and shall be taken, unless otherwise specified, before the effluent joins or is diluted by any other waste stream, body of water, or substance. Monitoring points shall not be changed without notification to and the approval of the Director.

2. Flow Measurements

Appropriate flow measurement devices and methods consistent with accepted scientific practices shall be selected and used to insure the accuracy and reliability of measurements of the volume of monitored discharges. The devices shall be installed, calibrated and maintained to insure that the accuracy of the measurements is consistent with the accepted capability of that type of device. Devices selected shall be capable of measuring flows with a maximum deviation of less than $\pm$ 10% from true discharge rates throughout the range of expected discharge volumes.

3. Monitoring Procedures

Monitoring must be conducted according to test procedures approved under 40 CFR Part 136, unless other test procedures have been specified in this permit.

4. Penalties of Tampering

The Clean Water Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate, any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than 6 months per violation, or by both.

5. Reporting of Monitoring Results

Monitoring results shall be summarized each month on a Discharge Monitoring Report form approved by the Department. The reports shall be submitted monthly and are to be postmarked by the 14th day of the following month unless specifically approved otherwise in Schedule B of this permit.

6. Additional Monitoring by the Permittee

If the permittee monitors any pollutant more frequently than required by this permit, using test procedures approved under 40 CFR 136 or as specified in this permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR. Such increased frequency shall also be indicated.

7. Averaging of Measurements

Calculations for all limitations which require averaging of measurements shall utilize an arithmetic mean, except for coliform and fecal coliform bacteria which shall be averaged based on a geometric or log mean.

8. Retention of Records

The permittee shall retain records of all monitoring information, including all calibration and maintenance records of all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least 3 years from the date of the sample, measurement, or report of application. This period may be extended by request of the Director at any time.

9. Records Contents

Records of monitoring information shall include:

a. The date, exact place, time and methods of sampling or measurements;

b. The individual(s) who performed the sampling or measurements;

c. The date(s) analyses were performed;

d. The individual(s) who performed the analyses;

e. The analytical techniques or methods used; and

f. The results of such analyses.

10. Inspection and Entry

The permittee shall allow the Director, or an authorized representative upon the presentation of credentials to:

a. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;

b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;

c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit, and

d. Sample or monitor at reasonable times, for the purpose of assuring permit compliance or as otherwise authorized by state law, any substances or parameters at any location.

SECTION D. REPORTING REQUIREMENTS

1. Planned Changes

The permittee shall give notice to the Director as soon as possible of any planned physical alterations or additions to the permitted facility which will result in a change in the character of pollutants to be discharged or which will result in a new or increased discharge of pollutants.

2. Anticipated Noncompliance

The permittee shall give advance notice to the Director of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

3. Transfers

This permit may be transferred to a new permittee provided the transferee acquires a property interest in the permitted activity and agrees in writing to fully comply with all the terms and conditions of the permit and the rules of the Commission. No permit shall be transferred to a third party without prior written approval from the Director. The permittee shall notify the Department when a transfer of property interest takes place.

4. Compliance Schedule

Reports of compliance or noncompliance with, or any progress reports on interim and final requirements contained in any compliance schedule of this permit shall be submitted no later than 14 days following each schedule date. Any reports of noncompliance shall include the cause of noncompliance, any remedial actions taken, and the probability of meeting the next scheduled requirements.

9. Falsification of Reports

State law provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance shall, upon conviction be punished by a fine of not more than $1,000 per violation, or by imprisonment for not more than six months per violation, or by both.

SECTION E. DEFINITIONS AND ACRONYMS

1. BOD means five-day biochemical oxygen demand.

2. TSS means total suspended solids (non-filterable residue).

3. mg/l means milligrams per liter.

4. kg means kilograms.

5. m^3/d means cubic meters per day.

4. MGD means million gallons per day.

5. Composite sample means a combination of samples collected, generally at equal intervals over a 24-hour period, and apportioned according to the volume of the flow at the time of the sampling.

6. FC means fecal coliform bacteria.

APPENDIX C -
WATER QUALITY MODELING

BALFOUR
CONSULTING, INC.

18605 WILLAMETTE DRIVE
WEST LINN, OR 97068
(503) 635-9293
FAX: (503) 635-9294

PROJECT Aumsville WWFP
TITLE Mixing Zone - Determine 7Q10
CALCULATED BY RPL DATE 11/18/97
CHECKED BY DATE
SCALE SHEET NO. 1 OF 6

Problem

DEQ has specified that the 7Q10 flowrate shall be used in mixing zone evaluations of WWTP effluent receiving bodies. The 7Q10 is the low-flow condition for a 7-day average with a recurrence interval of 10 years. Since discharge to Beaver Creek only occurs during the wet weather period of November through April, the 7Q10 from this period will be used.

BALFOUR CONSULTING, INC.
18605 WILLAMETTE DRIVE
WEST LINN, OR 97068
(503) 635-9293
FAX: (503) 635-9294

PROJECT Aumsville WWFP
TITLE 7Q10
CALCULATED BY RPL DATE 11/18/97
CHECKED BY DATE
SCALE SHEET NO. 2 OF 6

Solution

A field survey was conducted on 9/26/97 to get cross-section and velocity data for Beaver Creek. There is no flow data available for Beaver Creek, so DEQ has suggested that the estimated flow resulting from the field survey evaluation be used for the 7Q10.

Five cross-sections were taken, and velocity measurements were taken at two of these cross-sections. Velocities were measured with a propeller-driven Swoffer velocity meter with digital readout, and each cross-section has 3 measurements taken at quarter-sections of the stream, at approximately 1/3 of the water column depth from the surface.

Flowrates were estimated by multiplying each velocity by its area of influence, and summing the partial-area flowrates for each cross-section.

BALFOUR CONSULTING, INC.
18605 WILLAMETTE DRIVE
WEST LINN, OR 97068
(503) 635-9293
FAX: (503) 635-9294

PROJECT Amsville WWFP
TITLE 7Q10
CALCULATED BY RPL DATE 11/18/97
CHECKED BY DATE
SCALE SHEET NO. 3 OF 6

Solution (cont)

Cross-Section #1 (see sht 4)
Station 0+50

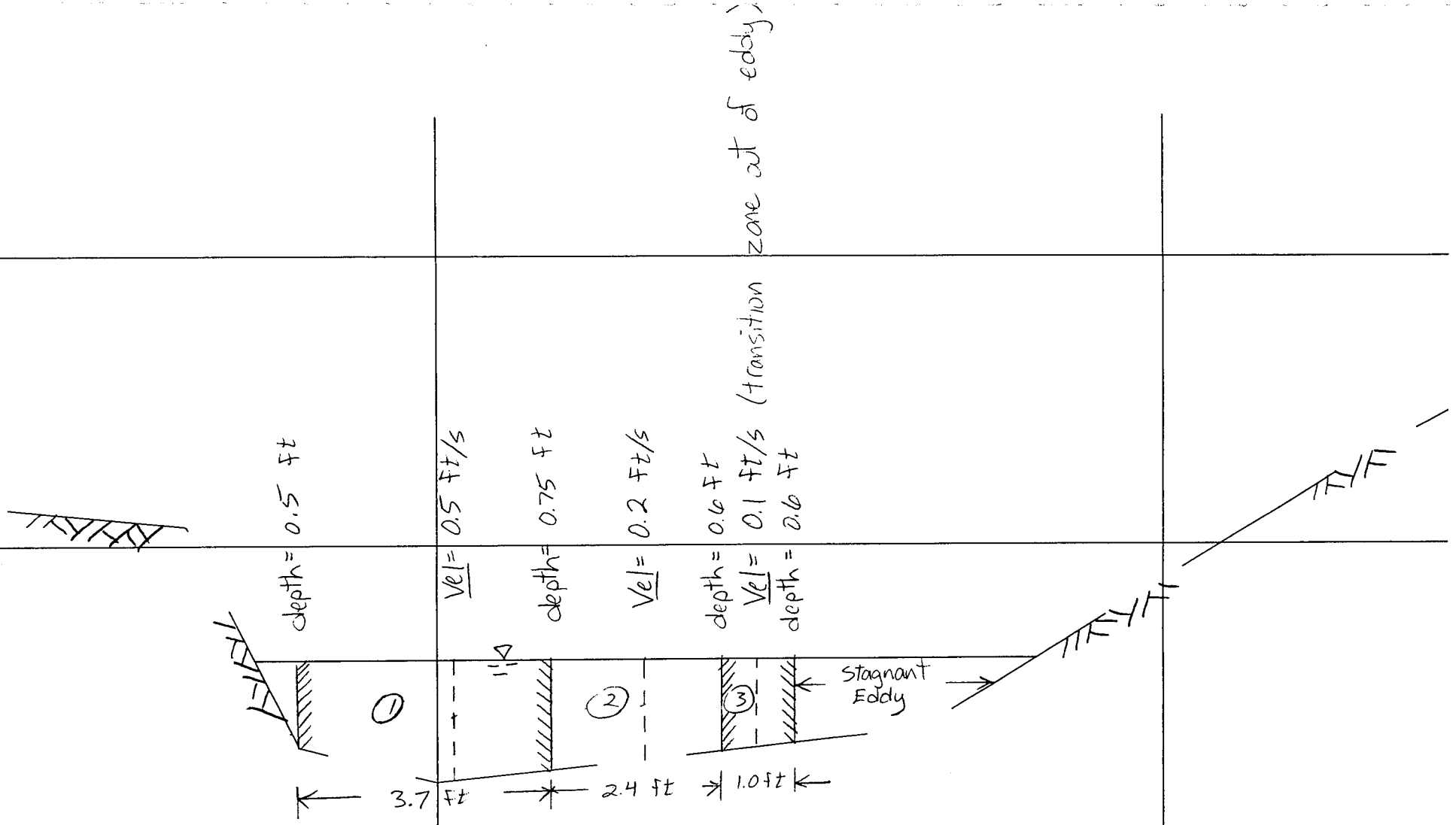
	Partial Area (ft^2)		Vel. (ft/s)	Q (ft^3/s)
①	(3.7 ft)(0.75 ft + 0.5 ft)/2 =	2.3	0.5	1.2
②	(2.4 ft)(0.6 ft + 0.75 ft)/2 =	1.6	0.2	0.3
③	(1.0 ft)(0.6 ft + 0.6 ft)/2 =	0.6	0.1	0.1

Σ = 1.6 ft^3/s

Cross-Section #2 (see sht 5)
Station 0+00

	Partial Area (ft^2)		Vel (ft/s)	Q (ft^3/s)
①	(2.8 ft)(0.5 ft + 0.7 ft)/2 =	1.7	0.38	0.6
②	(1.9 ft)(0.7 ft + 0.6 ft)/2 =	1.2	0.4	0.5
③	(2.8 ft)(0.6 ft + 0.35 ft)/2 =	1.3	0.3	0.4

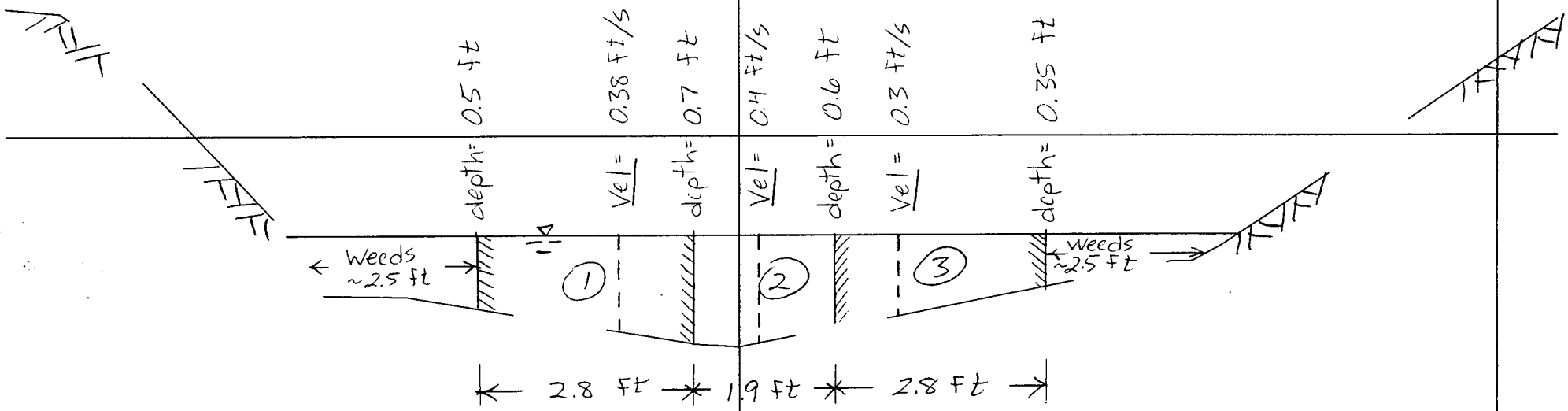
Σ = 1.5 ft^3/s



1 inch = 2 ft HZ
1 inch = 1 ft VERT

City of Aumsville WWFP
Cross-Section of Beaver Creek, #1
Station 0+50 (50 ft downstream from discharge)
City of Aumsville WWTP
9/26/97 survey

9/4



1 inch = 2 feet HZ
1 inch = 1 foot VERT

City of Aumsville WWFP
Cross-Section of Beaver Creek, #2
Station 0+00 (location of discharge)
City of Aumsville WWTP
9/26/97 survey

5/6

BALFOUR CONSULTING, INC.

18605 WILLAMETTE DRIVE
WEST LINN, OR 97068

(503) 635-9293
FAX: (503) 635-9294

PROJECT Aumsville WWFP
TITLE 7Q10
CALCULATED BY RPL DATE 11/18/97
CHECKED BY DATE
SCALE SHEET NO. 6 OF 6

Solution (cont)

Averaging the estimated flowrates:

$$\frac{1.6\ ft^3/s + 1.5\ ft^3/s}{2} = 1.55\ ft^3/s = 1.6\ ft^3/s$$

$\therefore$ Average flowrate $= 1.6\ ft^3/s$

$$= 1.6\ ft^3/s \left(\frac{1\ m^3}{35.31\ ft^3}\right) = 0.045\ m^3/s$$

Per DEQ recommendation, double the estimated flowrate to more closely approximate a wet-weather-period 7Q10:

use $2 \times 0.04\ m^3/s = \underline{0.08\ m^3/s}$

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PROJECT Aumsville WWFP
TITLE CORMIX Data Input
CALCULATED BY RPL DATE 12/29/97
CHECKED BY DATE
SCALE SHEET NO. 1 OF 6

Problem

Summarize the values that were input for the CORMIX variables and document their origin.

Given

Surveyed cross-section of Beaver Creek at discharge location
(see sht 5)

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TITLE CORMIX Data Input
CALCULATED BY RPL DATE 12/29/97
CHECKED BY DATE
SCALE SHEET NO. 2 OF 6

Solution

Ambient Data

Channel width = 2.3 m (see sht 5)

Channel regularity = 2 ("Moderately winding..." – subjective evaluation based on a site visit, 9/26/97.)

Average depth = 0.2 m (see sht 5)

Depth near discharge location = 0.2 m (CORMIX 3 = same as average)

Ambient flowrate = 0.05 m^3/s (see sht 5)

Manning's n = 0.033 (see sht 6, based on site visit)

Ambient temperature = 10°C, assumed uniform through entire depth
(ambient temperature assumed, based on surface water temp's from similar watersheds)

Wind speed = 2 m/s (model recommendation as a conservative value for mixing purposes)

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PROJECT Aumsville WWFP
TITLE CORMIX Data Input
CALCULATED BY RPL DATE 1/5/98
CHECKED BY DATE
SCALE SHEET NO. 3 OF 6

Solution (cont)

Discharge Data

(Since the outfall is not submerged, the discharge was modeled as an open channel with an approximated rectangular cross-section.)

Horizontal discharge angle = 90° (based on site visit)

Depth near discharge outlet = 0.2 m (model recommends using the average ambient depth)

Bottom slope at discharge = 0° (cross-section channel bottom is essentially flat (Beaver Creek)

Discharge cross-section: area = 0.05 m^2 (calculated)
width = 1 m (assumed)
depth = 0.05 m (assumed)

Discharge flowrate = 0.032 m^3/s (average effluent discharge for November, 1993-1996)

Discharge temperature = 10 °C (based on City of Amity, OR WWTP influent flow data)

Pollutant discharge concentration = 0.14 mg/l
(average chlorine concentration in effluent during discharge period)
= 5.04 mg/l (ammonia, based on lab analysis 12/3/97)

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PROJECT Aumsville WWFP
TITLE CORMIX Data Input
CALCULATED BY RPL DATE 1/5/98
CHECKED BY DATE
SCALE SHEET NO. 4 OF 6

Solution (cont)

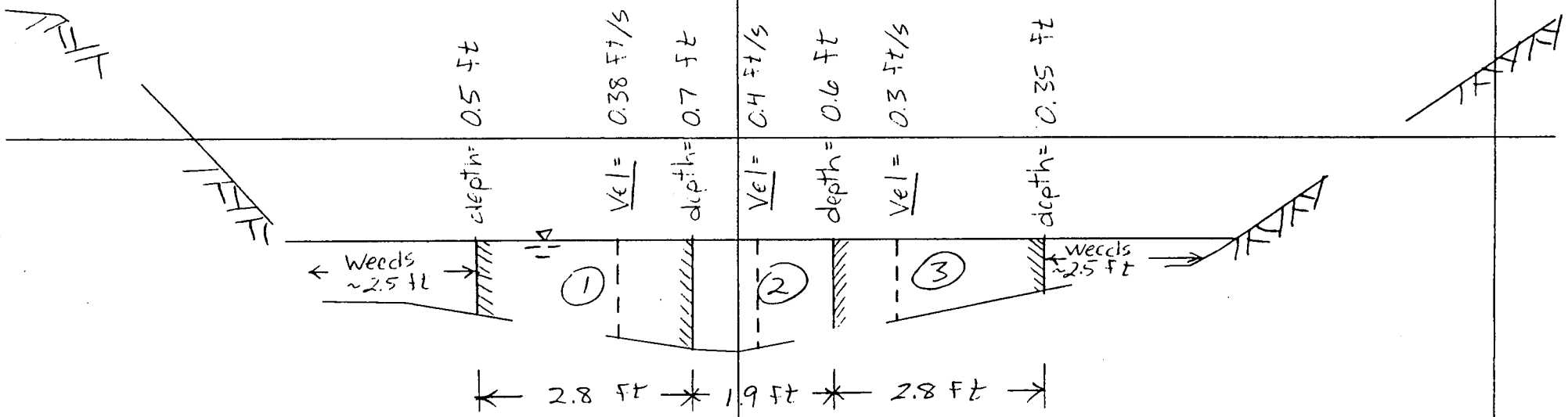
Regulatory Data

Distance for Regulatory Mixing Zone = 30.5 m (based on a 100 ft mixing zone)

	Area	Vel	Q
①	$(2.8)\left(\frac{0.35+0.6}{2}\right) = 1.33\ ft^2$	0.3 ft/s	0.4 ft^3/s
②	$(1.9)\left(\frac{0.6+0.7}{2}\right) = 1.24\ ft^2$	0.4 ft/s	0.5 ft^3/s
③	$(2.8)\left(\frac{0.7+0.5}{2}\right) = 1.68\ ft^2$	0.4 ft/s	0.7 ft^3/s
	$\Sigma = 4.25\ ft^2$		$\Sigma = 1.6\ ft^3/s$

Average depth = $\frac{4.25\ ft^2}{(2.8+1.9+2.8\ ft)} = 0.6\ ft = \underline{0.2\ m}$

Width = $2.8 + 1.9 + 2.8 = 7.5\ ft = \underline{2.3\ m}$



1 inch = 2 feet HZ

1 inch = 1 foot VERT

City of Aumsville WWFP
Cross-Section of Beaver Creek
Station 0+00 (location of discharge)
City of Aumsville WWTP
9/26/97 survey

6/5

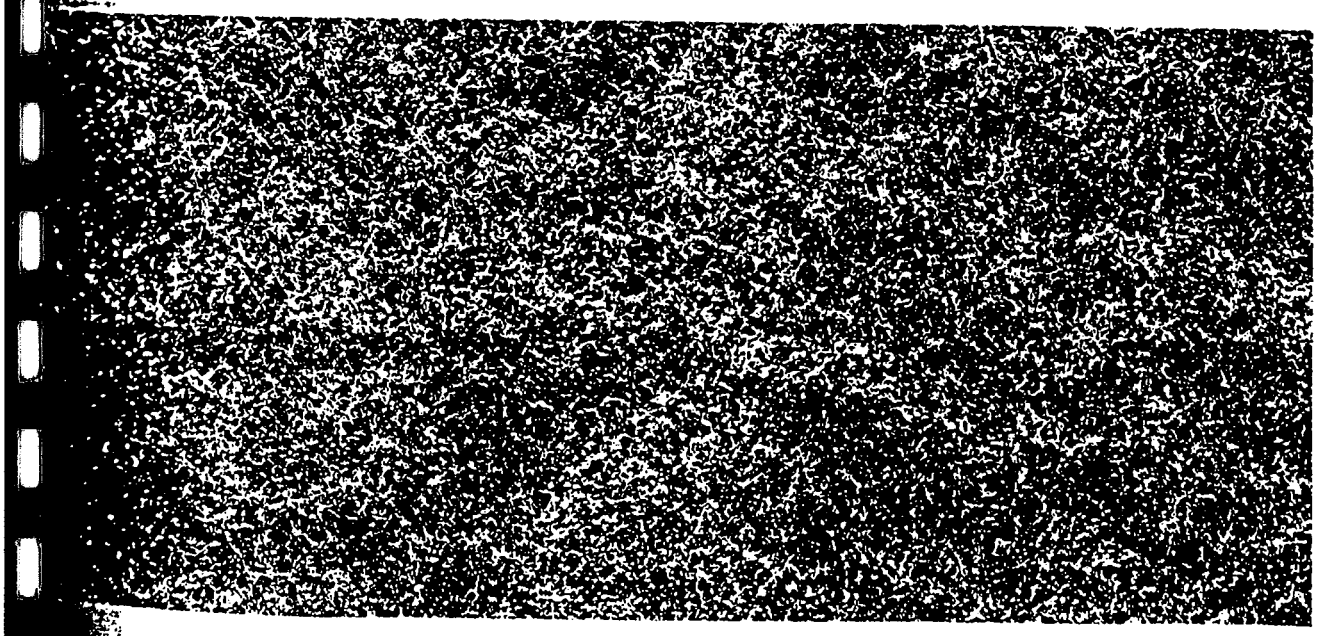
6/6

Appendix A: Design Use values of Manning's n

channel material	n
clean, uncoated cast iron	0.013–0.015
clean, coated cast iron	0.012–0.014
dirty, tuberculated cast iron	0.015–0.035
riveted steel	0.015–0.017
lock-bar and welded	0.012–0.013
galvanized iron	0.015–0.017
brass and glass	0.009–0.013
wood stave	
small diameter	0.011–0.012
large diameter	0.012–0.013
concrete	
with rough joints	0.016–0.017
dry mix, rough forms	0.015–0.016
wet mix, steel forms	0.012–0.014
very smooth, finished	0.011–0.012
vitrified sewer	0.013–0.015
common-clay drainage tile	0.012–0.014
asbestos	0.011
planed timber	0.011
canvas	0.012
unplaned timber	0.014
brick	0.016
rubble masonry	0.017
smooth earth	0.018
firm gravel	0.023
corrugated metal pipe	0.022
natural channels, good condition	0.025
natural channels with stones and weeds	0.035
very poor natural channels	0.060

REFERENCE: Civil Engineering Reference Manual
Michael R. Lindberg, author

OPEN CHANNEL



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PROJECT Aumsville WWFP
TITLE Mixing Zone Analysis - CORMIX Output
CALCULATED BY RPL DATE 1/6/98
CHECKED BY DATE
SCALE SHEET NO. 1 OF 22

Problem

The DEQ requires that a mixing zone analysis be conducted as part of this Facilities Plan. The computer program CORMIX will be used to model the mixing zone in Beaver Creek from the WWTP point-of-discharge on downstream.

Given

Length of Regulatory Mixing Zone (RMZ) = 100 ft = 30.5 m
Effluent chlorine concentration = 0.14 mg/l
Effluent ammonia concentration = 5.04 mg/l
Cross-Section of Beaver Creek @ WWTP discharge
Criterion Maximum Concentration (CMC) for chlorine = 0.019 mg/l
Criterion Chronic Concentration (CCC) for chlorine = 0.011 mg/l
CMC for ammonia = N/A (ammonia is not considered toxic)
CCC for ammonia = 1 mg/l

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PROJECT Aumsville WWFP
TITLE Mixing Zone Analysis - CORMIX Output
CALCULATED BY RPL DATE 1/6/98
CHECKED BY DATE
SCALE SHEET NO. 2 OF 22

Solution

Due to the effluent-dominated nature of the discharge mixing zone in Beaver Creek, CORMIX is not capable of determining the distance downstream required to achieve sufficient dilution of the wastewater effluent. (see sheets 4, 9, 14 - 19)

3/22

```
CORMIX SESSION REPORT:
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
                   CORMIX: CORNELL MIXING ZONE EXPERT SYSTEM
                       CORMIX v.3.20     September 1996
SITE NAME/LABEL:                 Aumsville WWTP Discharge to Beaver Creek
  ORIGINAL design case:          Existing conds for 7Q10 from hydro survey
  ORIGINAL file name:            AUMSVIL1
  Start of main session:         11/21/97--14:30:19

DESIGN ITERATION number:         2
  NEW DESIGN CASE:               Double ambient Q to 3 cfs for use as 7Q10
  NEW FILE NAME:                 AUMSVIL5
Using subsystem CORMIX3:         Buoyant Surface Discharges
  Start of iteration session:    01/05/98--17:56:34
*****************************************************************************
SUMMARY OF INPUT DATA:
-----------------------------------------------------------------------------
AMBIENT PARAMETERS:
  Cross-section                          = bounded
  Width                          BS      =           3.4 m
  Channel regularity             ICHREG  = 2
  Ambient flowrate               QA      =           .08 m^3/s
  Average depth                  HA      =            .3 m
  Depth at discharge             HD      =            .3 m
  Ambient velocity               UA      =        0.0784 m/s
  Darcy-Weisbach friction factor F       =        0.1275
    Calculated from Manning's n          =          .033
  Wind velocity                  UW      =             2 m/s
Stratification Type              STRCND  = U
  Surface temperature                    =            10 degC
  Bottom temperature                     =            10 degC
  Calculated FRESH-WATER DENSITY values:
  Surface density                RHOAS   =      999.7019 kg/m^3
  Bottom density                 RHOAB   =      999.7019 kg/m^3
-----------------------------------------------------------------------------
DISCHARGE PARAMETERS:            Buoyant Surface Discharge
  Discharge located on                   = right bank/shoreline
  Discharge configuration                = flush discharge
  Distance from bank to outlet   DISTB   =           0.0 m
  Discharge angle                SIGMA   =            90 deg
  Depth near discharge outlet    HD0     =            .3 m
  Bottom slope at discharge      SLOPE   =             0 deg
  Rectangular discharge:
    Discharge cross-section area A0      =        0.0500 m^2
    Discharge channel width      B0      =             1 m
    Discharge channel depth      H0      =           .05 m
    Discharge aspect ratio       AR      =       0.05
  Discharge flowrate             Q0      =      0.032000 m^3/s
  Discharge velocity             U0      =          0.64 m/s
  Discharge temperature (freshwater)     =            10 degC
    Corresponding density        RHO0    =      999.7019 kg/m^3
  Density difference             DRHO    =             0 kg/m^3
  Buoyant acceleration           GP0     =         .0000 m/s^2
  Discharge concentration        C0      =               .14 mg-per-liter
  Surface heat exchange coeff.   KS      =             0 m/s
  Coefficient of decay           KD      =             0 /s
-----------------------------------------------------------------------------
DISCHARGE/ENVIRONMENT LENGTH SCALES:
  LQ  =       0.22 m        Lm   =        1.82 m          Lb   =          0.0 m
  LM  =    99999.0 m
```

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NON-DIMENSIONAL PARAMETERS:

Densimetric Froude number	FR0	=	99999.0 (based on LQ)
Channel densimetric Froude no.	FRCH	=	99999.0 (based on H0)
Velocity ratio	R	=	8.16

MIXING ZONE / TOXIC DILUTION ZONE / AREA OF INTEREST PARAMETERS:

Toxic discharge		=	yes
CMC concentration	CMC	=	.019 mg-per-liter
CCC concentration	CCC	=	.011 mg-per-liter
Water quality standard		=	given by CCC value
Regulatory mixing zone		=	yes
Regulatory mixing zone specification		=	distance
Regulatory mixing zone value		=	30.5 m (m^2 if area)
Region of interest		=	100.00 m

****

HYDRODYNAMIC CLASSIFICATION:

FLOW CLASS = SA2

****

MIXING ZONE EVALUATION (hydrodynamic and regulatory summary):

X-Y-Z Coordinate system:
Origin is located at water surface and at centerline of discharge channel:
0.0 m from the right bank/shore.
Number of display steps NSTEP = 5 per module.

NEAR-FIELD REGION (NFR) CONDITIONS :
Note: The NFR is the zone of strong initial mixing. It has no regulatory implication. However, this information may be useful for the discharge designer because the mixing in the NFR is usually sensitive to the discharge design conditions.

Pollutant concentration at edge of NFR		=	.0343 mg-per-liter
Dilution at edge of NFR		=	4.0
NFR Location:	x	=	7.19 m
(centerline coordinates)	y	=	1.57 m
	z	=	.00 m
NFR plume dimensions:	half-width	=	1.00 m
	thickness	=	.30 m

Buoyancy assessment:
The effluent density is equal or about about equal to the surrounding ambient water density at the discharge level.
Therefore, the effluent behaves essentially as NEUTRALLY BUOYANT.

FAR-FIELD MIXING SUMMARY:
Plume becomes vertically fully mixed ALREADY IN NEAR-FIELD at .00 m downstream and continues as vertically mixed into the far-field

********** TOXIC DILUTION ZONE SUMMARY **********

Criterion maximum concentration (CMC)		=	.019 mg-per-liter
Corresponding dilution		=	.0

The CMC value was not encountered within the specified simulation distance.
Plume dilution values are too low to meet CMC.

********** REGULATORY MIXING ZONE SUMMARY **********

An RMZ was specified but its boundary was not encountered within the predicted plume region.
In a subsequent analysis, use an ROI that extends further downstream.
Also, the CCC for the toxic pollutant was not encountered within the predicted

plume region.

********************* FINAL DESIGN ADVICE AND COMMENTS **********************

REMINDER: The user must take note that HYDRODYNAMIC MODELING by any known technique is NOT AN EXACT SCIENCE.

Extensive comparison with field and laboratory data has shown that the CORMIX predictions on dilutions and concentrations (with associated plume geometries) are reliable for the majority of cases and are accurate to within about +-50% (standard deviation).

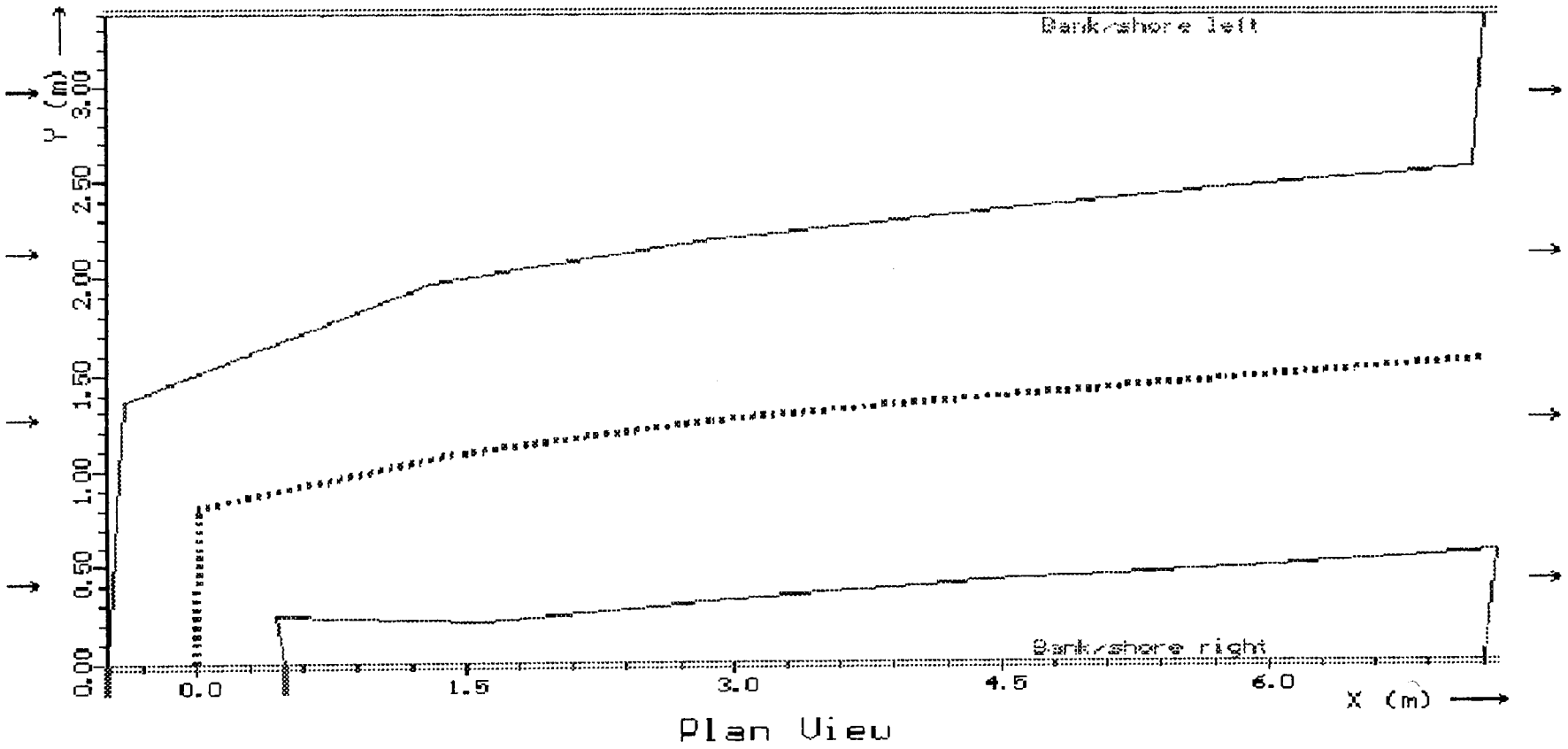
As a further safeguard, CORMIX will not give predictions whenever it judges the design configuration as highly complex and uncertain for prediction.

****

DESIGN CASE: Double ambient Q to 3 cfs for use as 7Q10
FILE NAME: AUMSVIL5
Subsystem CORMIX3: Buoyant Surface Discharges
END OF SESSION/ITERATION: 01/05/98--18:00:04

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

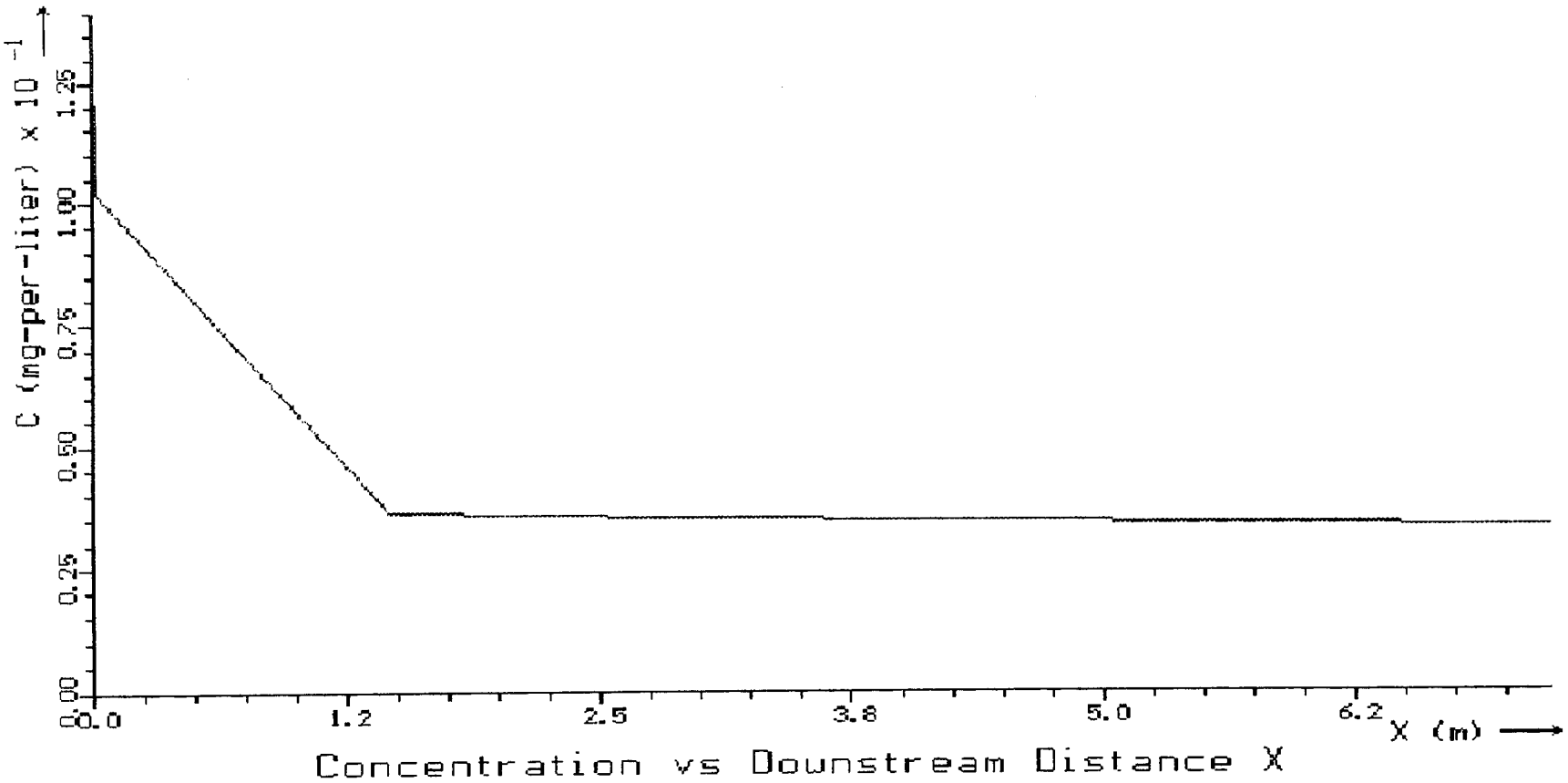
Aumsville^WWTP^Discharge^to^Beaver^Creek CORMIX3 Prediction
Double^ambient^Q^to^3^cfs^for^use^as^701 File: sim\AUMSVIL5.cx3



Plan View

Distortion = 1.255

Aumsville^WWTP^Discharge^to^Beaver^Creek CORMIX3 Prediction
Double^ambient^Q^to^3^cfs^for^use^as^7Q1 File: sim\AUMSV1L5.cx3



Concentration vs Downstream Distance X

8/22

```
CORMIX SESSION REPORT:
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
                    CORMIX: CORNELL MIXING ZONE EXPERT SYSTEM
                        CORMIX v.3.20     September 1996
SITE NAME/LABEL:                Aumsville WWTP Discharge to Beaver Creek
  ORIGINAL design case:         Ambient Q- 3 cfs: extend RMZ
  ORIGINAL file name:           aumsvil6
  Start of main session:        01/05/98--18:01:11

DESIGN ITERATION number:        1
  NEW DESIGN CASE:              Ambient Q is 3 cfs: extend ROI
  NEW FILE NAME:                AUMSVIL6
Using subsystem CORMIX3:        Buoyant Surface Discharges
  Start of iteration session:   01/05/98--18:19:31
*****************************************************************************
SUMMARY OF INPUT DATA:
-----------------------------------------------------------------------------
AMBIENT PARAMETERS:
  Cross-section                          = bounded
  Width                         BS       =          3.4 m
  Channel regularity            ICHREG   = 2
  Ambient flowrate              QA       =          .08 m^3/s
  Average depth                 HA       =           .3 m
  Depth at discharge            HD       =           .3 m
  Ambient velocity              UA       =       0.0784 m/s
  Darcy-Weisbach friction factor F       =       0.1275
    Calculated from Manning's n          =         .033
  Wind velocity                 UW       =            2 m/s
  Stratification Type           STRCND   = U
  Surface temperature                    =           10 degC
  Bottom temperature                     =           10 degC
  Calculated FRESH-WATER DENSITY values:
  Surface density               RHOAS    =     999.7019 kg/m^3
  Bottom density                RHOAB    =     999.7019 kg/m^3
-----------------------------------------------------------------------------
DISCHARGE PARAMETERS:           Buoyant Surface Discharge
  Discharge located on                   = right bank/shoreline
  Discharge configuration                = flush discharge
  Distance from bank to outlet  DISTB    =          0.0 m
  Discharge angle               SIGMA    =           90 deg
  Depth near discharge outlet   HD0      =           .3 m
  Bottom slope at discharge     SLOPE    =            0 deg
  Rectangular discharge:
    Discharge cross-section area A0      =       0.0500 m^2
    Discharge channel width     B0       =            1 m
    Discharge channel depth     H0       =          .05 m
    Discharge aspect ratio      AR       =         0.05
  Discharge flowrate            Q0       =     0.032000 m^3/s
  Discharge velocity            U0       =         0.64 m/s
  Discharge temperature (freshwater)     =           10 degC
    Corresponding density       RHO0     =     999.7019 kg/m^3
  Density difference            DRHO     =            0 kg/m^3
  Buoyant acceleration          GP0      =        .0000 m/s^2
  Discharge concentration       C0       =                .14 mg-per-liter
  Surface heat exchange coeff.  KS       =            0 m/s
  Coefficient of decay          KD       =            0 /s
-----------------------------------------------------------------------------
DISCHARGE/ENVIRONMENT LENGTH SCALES:
  LQ  =       0.22 m        Lm  =       1.82 m        Lb  =        0.0 m
```

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```
  LM  =     99999.0 m
-------------------------------------------------------------------------------
 ON-DIMENSIONAL PARAMETERS:
  Densimetric Froude number        FR0    =    99999.0 (based on LQ)
  Channel densimetric Froude no.   FRCH   =    99999.0 (based on H0)
  Velocity ratio                   R      =       8.16
-------------------------------------------------------------------------------
MIXING ZONE / TOXIC DILUTION ZONE / AREA OF INTEREST PARAMETERS:
  Toxic discharge                         = yes
  CMC concentration                CMC    =              .019 mg-per-liter
  CCC concentration                CCC    =              .011 mg-per-liter
  Water quality standard                  = given by CCC value
  Regulatory mixing zone                  = yes
  Regulatory mixing zone specification    = distance
  Regulatory mixing zone value            =         30.5 m (m^2 if area)
  Region of interest                      =    100000.00 m
*******************************************************************************
HYDRODYNAMIC CLASSIFICATION:
  *-------------------------*
  | FLOW CLASS   =     SA2 |
  *-------------------------*
*******************************************************************************
 IXING ZONE EVALUATION (hydrodynamic and regulatory summary):
-------------------------------------------------------------------------------
X-Y-Z Coordinate system:
  Origin is located at water surface and at centerline of discharge channel:
            0.0 m from the right bank/shore.
  Number of display steps NSTEP = 5 per module.
-------------------------------------------------------------------------------
 EAR-FIELD REGION (NFR) CONDITIONS :
Note: The NFR is the zone of strong initial mixing.  It has no regulatory
  implication.  However, this information may be useful for the discharge
  designer because the mixing in the NFR is usually sensitive to the
  discharge design conditions.
  Pollutant concentration at edge of NFR =           .0343 mg-per-liter
  Dilution at edge of NFR                =         4.0
  NFR Location:                        x =        7.19 m
    (centerline coordinates)           y =        1.57 m
                                       z =         .00 m
  NFR plume dimensions:       half-width =        1.00 m
                               thickness =         .30 m
-------------------------------------------------------------------------------
 uoyancy assessment:
  The effluent density is equal or about about equal to the surrounding
  ambient water density at the discharge level.
  Therefore, the effluent behaves essentially as NEUTRALLY BUOYANT.
-------------------------------------------------------------------------------
FAR-FIELD MIXING SUMMARY:
  Plume becomes vertically fully mixed ALREADY IN NEAR-FIELD at          .00 m
  downstream and continues as vertically mixed into the far-field.
********************* TOXIC DILUTION ZONE SUMMARY ***********************
Criterion maximum concentration (CMC)  =           .019 mg-per-liter
 orresponding dilution                 =          .0

The CMC value was not encountered within the specified simulation distance.
  Plume dilution values are too low to meet CMC.
******************** REGULATORY MIXING ZONE SUMMARY *********************
An RMZ was specified but its boundary was not encountered within the
  predicted plume region.
 n a subsequent analysis, use an ROI that extends further downstream.
```

Also, the CCC for the toxic pollutant was not encountered within the predicted plume region.

******************** FINAL DESIGN ADVICE AND COMMENTS **********************

REMINDER: The user must take note that HYDRODYNAMIC MODELING by any known technique is NOT AN EXACT SCIENCE.

Extensive comparison with field and laboratory data has shown that the CORMIX predictions on dilutions and concentrations (with associated plume geometries) are reliable for the majority of cases and are accurate to within about +-50% (standard deviation).

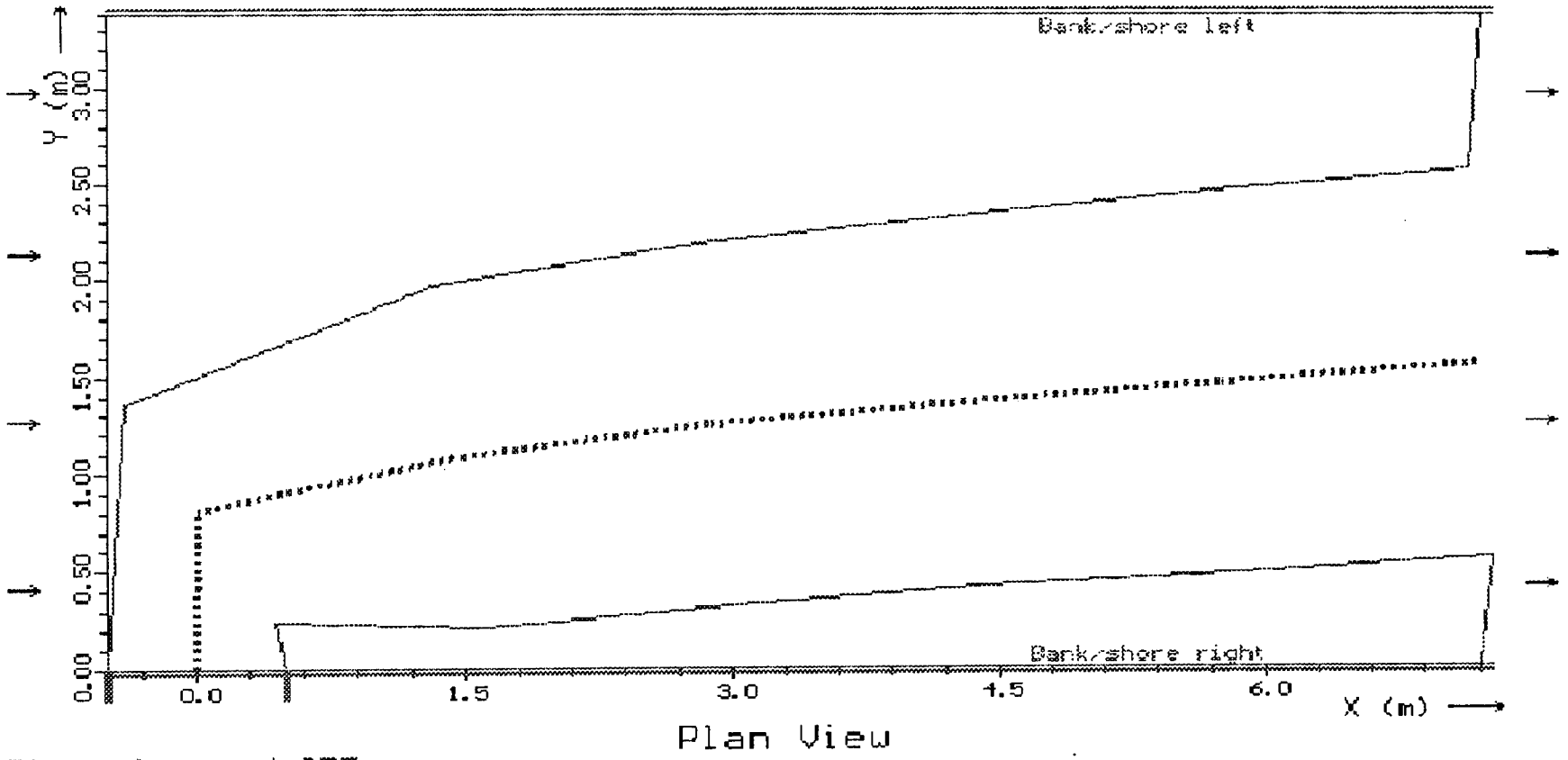
As a further safeguard, CORMIX will not give predictions whenever it judges the design configuration as highly complex and uncertain for prediction.

****

DESIGN CASE:	Ambient Q is 3 cfs: extend ROI
FILE NAME:	AUMSVIL6
Subsystem CORMIX3:	Buoyant Surface Discharges
END OF SESSION/ITERATION:	01/05/98--18:21:06

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

Aumsville^WWTP^Discharge^to^Beaver^Creek CORMIX3 Prediction
Ambient^Q^is^3^cfs:^extend^ROI File: sim\AUMSVIL6.cx3

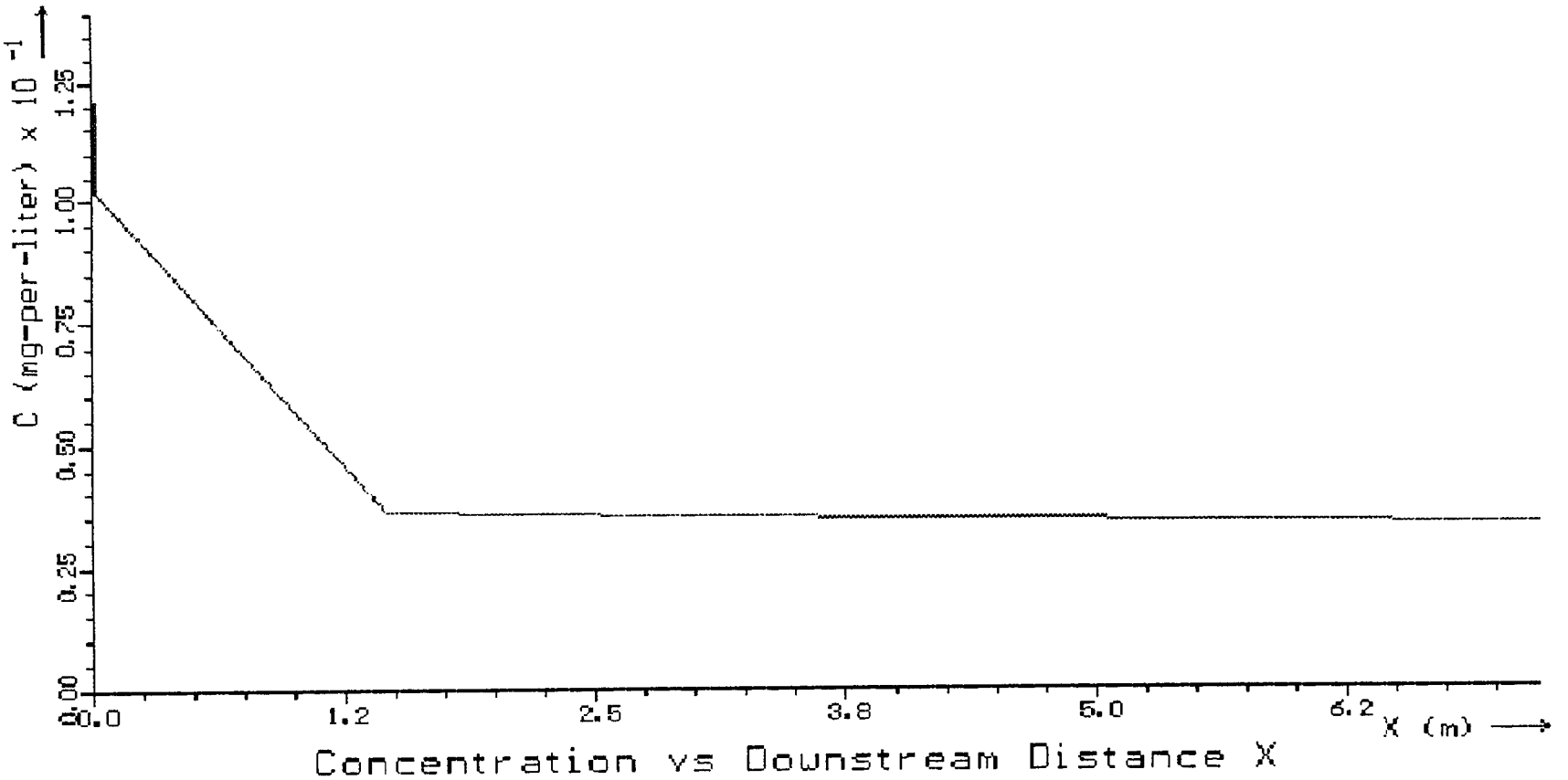


Plan View

Distortion = 1.255

11/22

Aumsville^WWTP^Discharge^to^Beaver^Creek CORMIX3 Prediction
Ambient^Q^is^3^cfs:^extend^ROI File: sim\AUMSUIL6.cx3



Concentration vs Downstream Distance X

12/22

13/22

```
CORMIX SESSION REPORT:
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
                   CORMIX: CORNELL MIXING ZONE EXPERT SYSTEM
                       CORMIX v.3.20     September 1996
SITE NAME/LABEL:                   Aumsville WWTP Discharge to Beaver Creek
  ORIGINAL design case:            Double ambient Q to 3 cfs for use as 7Q10
  ORIGINAL file name:              AUMSVIL5
  Start of main session:           01/05/98--17:56:34

DESIGN ITERATION number:           2
  NEW DESIGN CASE:                 Ambient Q is 3 cfs: ammonia @ 5.04 ppm
  NEW FILE NAME:                   AUMSVIL7
Using subsystem CORMIX3:           Buoyant Surface Discharges
  Start of iteration session:      01/05/98--18:09:43
****************************************************************************
SUMMARY OF INPUT DATA:
----------------------------------------------------------------------------
AMBIENT PARAMETERS:
  Cross-section                             = bounded
  Width                          BS         =            3.4 m
  Channel regularity             ICHREG     = 2
  Ambient flowrate               QA         =            .08 m^3/s
  Average depth                  HA         =             .3 m
  Depth at discharge             HD         =             .3 m
  Ambient velocity               UA         =         0.0784 m/s
  Darcy-Weisbach friction factor F          =         0.1275
    Calculated from Manning's n             =           .033
  Wind velocity                  UW         =              2 m/s
Stratification Type              STRCND     = U
  Surface temperature                       =             10 degC
  Bottom temperature                        =             10 degC
  Calculated FRESH-WATER DENSITY values:
  Surface density                RHOAS      =       999.7019 kg/m^3
  Bottom density                 RHOAB      =       999.7019 kg/m^3
----------------------------------------------------------------------------
DISCHARGE PARAMETERS:            Buoyant Surface Discharge
  Discharge located on                      = right bank/shoreline
  Discharge configuration                   = flush discharge
  Distance from bank to outlet   DISTB      =            0.0 m
  Discharge angle                SIGMA      =             90 deg
  Depth near discharge outlet    HD0        =             .3 m
  Bottom slope at discharge      SLOPE      =              0 deg
  Rectangular discharge:
    Discharge cross-section area A0         =         0.0500 m^2
    Discharge channel width      B0         =              1 m
    Discharge channel depth      H0         =            .05 m
    Discharge aspect ratio       AR         =           0.05
  Discharge flowrate             Q0         =       0.032000 m^3/s
  Discharge velocity             U0         =           0.64 m/s
  Discharge temperature (freshwater)        =             10 degC
    Corresponding density        RHO0       =       999.7019 kg/m^3
  Density difference             DRHO       =              0 kg/m^3
  Buoyant acceleration           GP0        =          .0000 m/s^2
  Discharge concentration        C0         =               5.04 mg-per-liter
  Surface heat exchange coeff.   KS         =              0 m/s
  Coefficient of decay           KD         =              0 /s
----------------------------------------------------------------------------
DISCHARGE/ENVIRONMENT LENGTH SCALES:
  LQ  =       0.22 m        Lm  =       1.82 m         Lb  =         0.0 m
```

```
  LM  =     99999.0 m
-------------------------------------------------------------------------------
N N-DIMENSIONAL PARAMETERS:
  Densimetric Froude number        FR0    =    99999.0 (based on LQ)
  Channel densimetric Froude no.   FRCH   =    99999.0 (based on H0)
  Velocity ratio                   R      =       8.16
-------------------------------------------------------------------------------
MIXING ZONE / TOXIC DILUTION ZONE / AREA OF INTEREST PARAMETERS:
  Toxic discharge                          = no
  Water quality standard specified         = yes
  Water quality standard           CSTD    =                1 mg-per-liter
  Regulatory mixing zone                   = yes
  Regulatory mixing zone specification     = distance
  Regulatory mixing zone value             =         30.5 m (m^2 if area)
  Region of interest                       =       150.00 m
*******************************************************************************
H DRODYNAMIC CLASSIFICATION:
  *-------------------------*
  | FLOW CLASS   =     SA2  |
  *-------------------------*
*******************************************************************************
MIXING ZONE EVALUATION (hydrodynamic and regulatory summary):
-------------------------------------------------------------------------------
X Y-Z Coordinate system:
  Origin is located at water surface and at centerline of discharge channel:
          0.0 m from the right bank/shore.
  Number of display steps NSTEP = 5 per module.
-------------------------------------------------------------------------------
NEAR-FIELD REGION (NFR) CONDITIONS :
N te: The NFR is the zone of strong initial mixing.  It has no regulatory
  implication.  However, this information may be useful for the discharge
  designer because the mixing in the NFR is usually sensitive to the
  discharge design conditions.
  Pollutant concentration at edge of NFR =          1.2337 mg-per-liter
  Dilution at edge of NFR                =        4.0
  NFR Location:                        x =        7.19 m
    (centerline coordinates)           y =        1.57 m
                                       z =         .00 m
  NFR plume dimensions:       half-width =        1.00 m
                               thickness =         .30 m
-------------------------------------------------------------------------------
Buoyancy assessment:
  The effluent density is equal or about about equal to the surrounding
  ambient water density at the discharge level.
  Therefore, the effluent behaves essentially as NEUTRALLY BUOYANT.
-------------------------------------------------------------------------------
N AR-FIELD MIXING SUMMARY:
  Plume becomes vertically fully mixed ALREADY IN NEAR-FIELD at        .00 m
  downstream and continues as vertically mixed into the far-field.
********** TOXIC DILUTION ZONE SUMMARY **********
No TDZ was specified for this simulation.
********** REGULATORY MIXING ZONE SUMMARY **********
A RMZ was specified but its boundary was not encountered within the
  predicted plume region.
In a subsequent analysis, use an ROI that extends further downstream.
Also, the specified ambient water quality standard was not encountered within
  the predicted plume region.
********** FINAL DESIGN ADVICE AND COMMENTS **********
REMINDER:  The user must take note that HYDRODYNAMIC MODELING by any known
  technique is NOT AN EXACT SCIENCE.
```

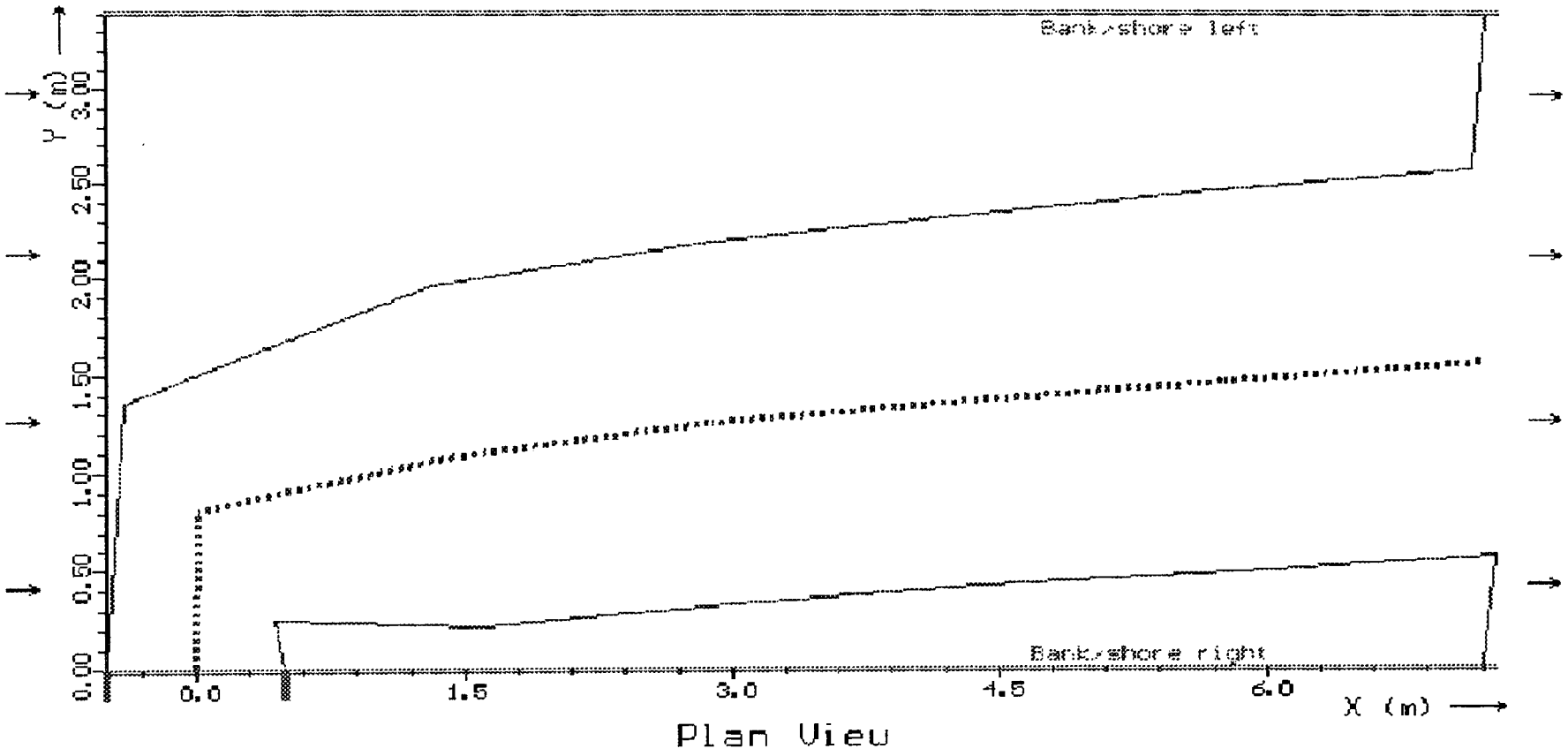
Extensive comparison with field and laboratory data has shown that the CORMIX predictions on dilutions and concentrations (with associated plume geometries) are reliable for the majority of cases and are accurate to within about +-50% (standard deviation).
As a further safeguard, CORMIX will not give predictions whenever it judges the design configuration as highly complex and uncertain for prediction.

****

DESIGN CASE: Ambient Q is 3 cfs: ammonia @ 5.04 ppm
FILE NAME: AUMSVIL7
Subsystem CORMIX3: Buoyant Surface Discharges
END OF SESSION/ITERATION: 01/05/98--18:15:26

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

Aumsville^WWTP^Discharge^to^Beaver^Creek CORMIX3 Prediction
Ambient^Q^is^3^cfs:^ammonia^@^5.04^ppm File: sim\AUMSVIL7.cx3

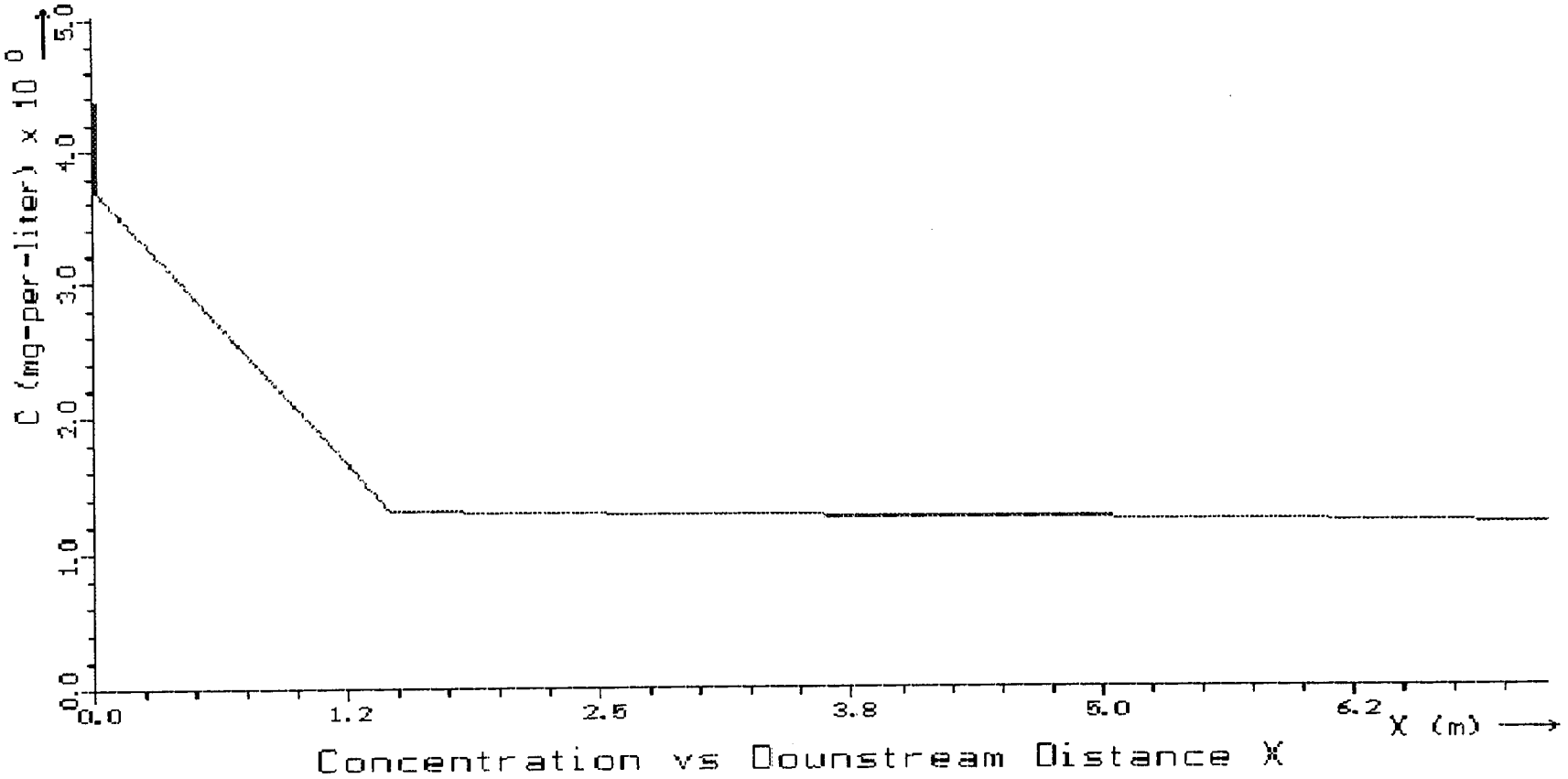


Plan View

Distortion = 1.255

16/22

Aumsville^WWTP^Discharge^to^Beaver^Creek CORMIX3 Prediction
Ambient^Q^is^3^cfs:^ammonia^@^5.04^ppm File: sim\AUMSVIL7.cx3



Concentration vs Downstream Distance X

7/22

18/22

```
CORMIX SESSION REPORT:
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
                 CORMIX: CORNELL MIXING ZONE EXPERT SYSTEM
                     CORMIX v.3.20     September 1996
SITE NAME/LABEL:              Aumsville WWTP Discharge to Beaver Creek
 ORIGINAL design case:        Double ambient Q to 3 cfs for use as 7Q10
 ORIGINAL file name:          AUMSVIL5
 Start of main session:       01/05/98--17:56:34

DESIGN ITERATION number:      3
 NEW DESIGN CASE:             Amb Q 3 cfs: ammonia 5.04 ppm: ROI 100 km
 NEW FILE NAME:               aumsvil8
Using subsystem CORMIX3:      Buoyant Surface Discharges
 Start of iteration session:  01/05/98--18:17:30
***************************************************************************
SUMMARY OF INPUT DATA:
---------------------------------------------------------------------------
AMBIENT PARAMETERS:
 Cross-section                         = bounded
 Width                        BS       =          3.4 m
 Channel regularity           ICHREG   = 2
 Ambient flowrate             QA       =          .08 m^3/s
 Average depth                HA       =           .3 m
 Depth at discharge           HD       =           .3 m
 Ambient velocity             UA       =       0.0784 m/s
 Darcy-Weisbach friction factor F      =       0.1275
   Calculated from Manning's n         =         .033
 Wind velocity                UW       =            2 m/s
 Stratification Type          STRCND   = U
 Surface temperature                   =           10 degC
 Bottom temperature                    =           10 degC
 Calculated FRESH-WATER DENSITY values:
 Surface density              RHOAS    =     999.7019 kg/m^3
 Bottom density               RHOAB    =     999.7019 kg/m^3
---------------------------------------------------------------------------
DISCHARGE PARAMETERS:         Buoyant Surface Discharge
 Discharge located on                  = right bank/shoreline
 Discharge configuration               = flush discharge
 Distance from bank to outlet DISTB    =          0.0 m
 Discharge angle              SIGMA    =           90 deg
 Depth near discharge outlet  HD0      =           .3 m
 Bottom slope at discharge    SLOPE    =            0 deg
 Rectangular discharge:
   Discharge cross-section area A0     =       0.0500 m^2
   Discharge channel width    B0       =            1 m
   Discharge channel depth    H0       =          .05 m
   Discharge aspect ratio     AR       =         0.05
 Discharge flowrate           Q0       =     0.032000 m^3/s
 Discharge velocity           U0       =         0.64 m/s
 Discharge temperature (freshwater)    =           10 degC
   Corresponding density      RHO0     =     999.7019 kg/m^3
 Density difference           DRHO     =            0 kg/m^3
 Buoyant acceleration         GP0      =        .0000 m/s^2
 Discharge concentration      C0       =             5.04 mg-per-liter
 Surface heat exchange coeff. KS       =            0 m/s
 Coefficient of decay         KD       =            0 /s
---------------------------------------------------------------------------
DISCHARGE/ENVIRONMENT LENGTH SCALES:
 LQ  =       0.22 m       Lm  =       1.82 m        Lb  =          0.0 m
```

LM = 99999.0 m

N-DIMENSIONAL PARAMETERS:

Densimetric Froude number	FR0	=	99999.0 (based on LQ)
Channel densimetric Froude no.	FRCH	=	99999.0 (based on H0)
Velocity ratio	R	=	8.16

MIXING ZONE / TOXIC DILUTION ZONE / AREA OF INTEREST PARAMETERS:

Toxic discharge		=	no
Water quality standard specified		=	yes
Water quality standard	CSTD	=	1 mg-per-liter
Regulatory mixing zone		=	yes
Regulatory mixing zone specification		=	distance
Regulatory mixing zone value		=	30.5 m (m^2 if area)
Region of interest		=	100000.00 m

****

DRODYNAMIC CLASSIFICATION:

FLOW CLASS = SA2

****

MIXING ZONE EVALUATION (hydrodynamic and regulatory summary):

Y-Z Coordinate system:
Origin is located at water surface and at centerline of discharge channel:
0.0 m from the right bank/shore.
Number of display steps NSTEP = 5 per module.

EAR-FIELD REGION (NFR) CONDITIONS :

ote: The NFR is the zone of strong initial mixing. It has no regulatory implication. However, this information may be useful for the discharge designer because the mixing in the NFR is usually sensitive to the discharge design conditions.

Pollutant concentration at edge of NFR		=	1.2337 mg-per-liter
Dilution at edge of NFR		=	4.0
NFR Location:	x	=	7.19 m
(centerline coordinates)	y	=	1.57 m
	z	=	.00 m
NFR plume dimensions:	half-width	=	1.00 m
	thickness	=	.30 m

Buoyancy assessment:
The effluent density is equal or about about equal to the surrounding ambient water density at the discharge level.
Therefore, the effluent behaves essentially as NEUTRALLY BUOYANT.

AR-FIELD MIXING SUMMARY:
Plume becomes vertically fully mixed ALREADY IN NEAR-FIELD at .00 m downstream and continues as vertically mixed into the far-field.

********** TOXIC DILUTION ZONE SUMMARY **********

o TDZ was specified for this simulation.

********** REGULATORY MIXING ZONE SUMMARY **********

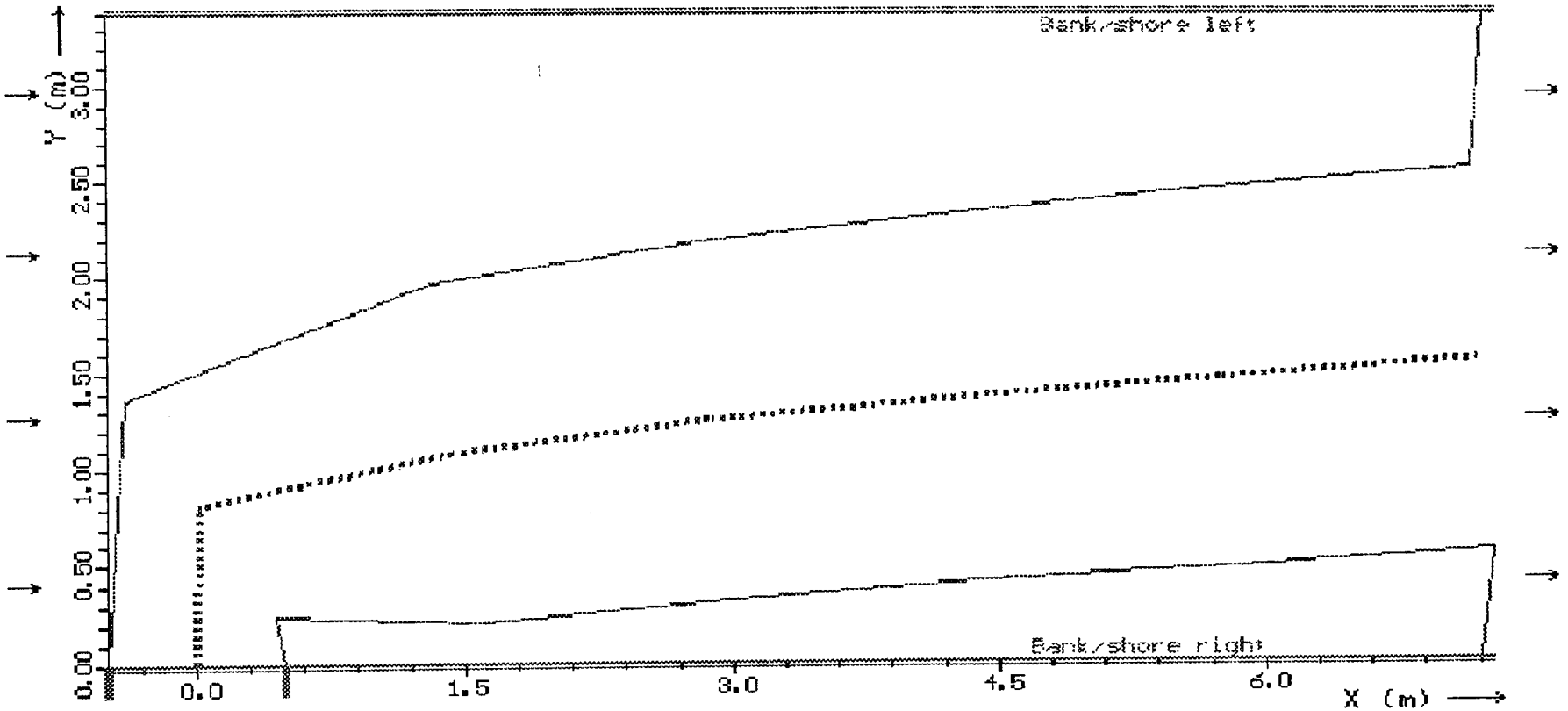
n RMZ was specified but its boundary was not encountered within the predicted plume region.
In a subsequent analysis, use an ROI that extends further downstream.
lso, the specified ambient water quality standard was not encountered within the predicted plume region.

********** FINAL DESIGN ADVICE AND COMMENTS **********

REMINDER: The user must take note that HYDRODYNAMIC MODELING by any known technique is NOT AN EXACT SCIENCE.

Extensive comparison with field and laboratory data has shown that the
CORMIX predictions on dilutions and concentrations (with associated
plume geometries) are reliable for the majority of cases and are accurate
to within about +-50% (standard deviation).
As a further safeguard, CORMIX will not give predictions whenever it judges
the design configuration as highly complex and uncertain for prediction.
****
DESIGN CASE: Amb Q 3 cfs: ammonia 5.04 ppm: ROI 100 km
FILE NAME: aumsvil8
Subsystem CORMIX3: Buoyant Surface Discharges
END OF SESSION/ITERATION: 01/05/98--18:18:56
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

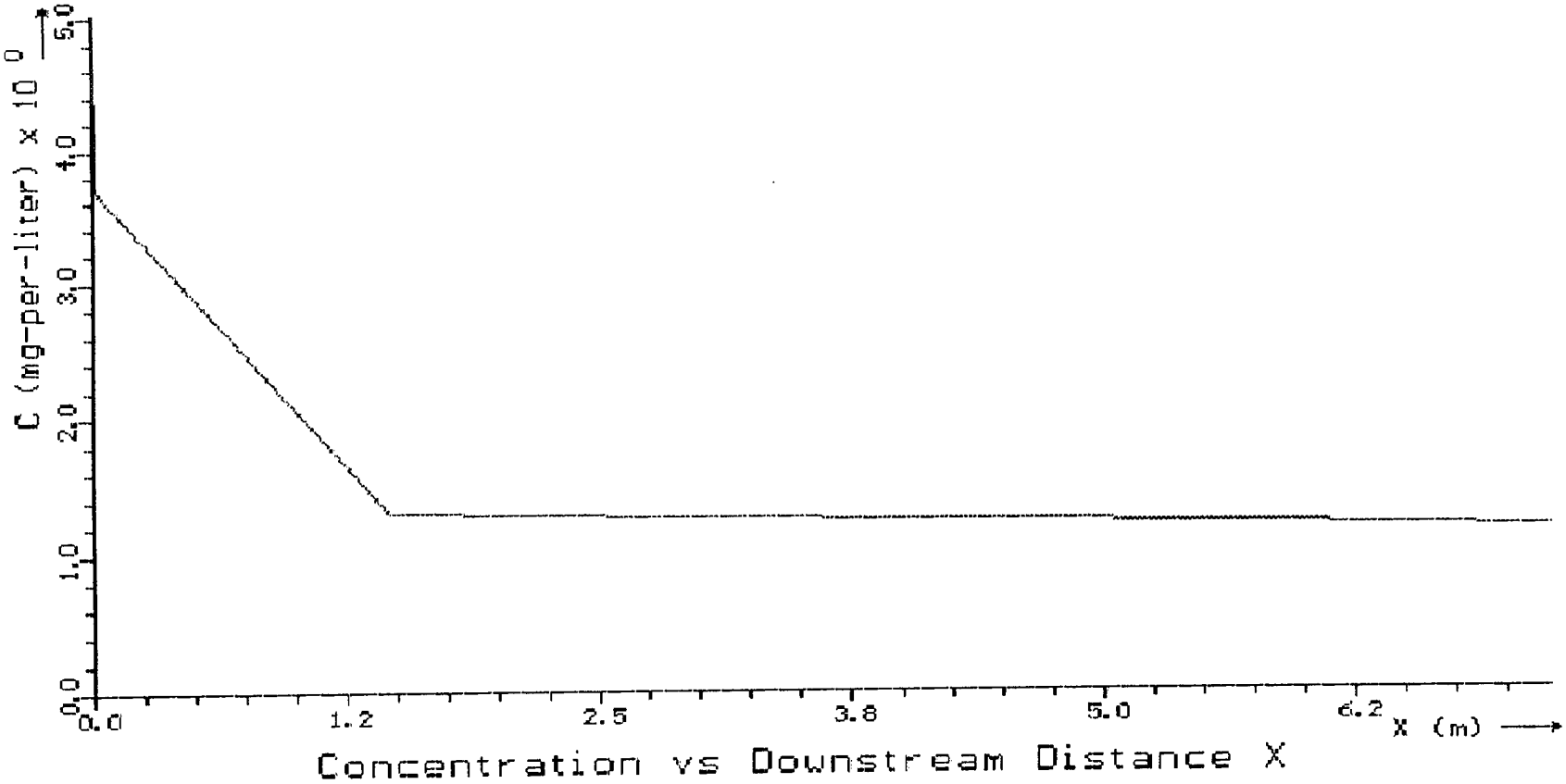
Aumsville^WWTP^Discharge^to^Beaver^Creek CORMIX3 Prediction
Amb^Q^3^cfs:^ammonia^5.04^ppm:^ROI^100^k File: sim\aumsvil8.cx3



Plan View

Distortion = 1.255

Aumsville^WWTP^Discharge^to^Beaver^Creek CORMIX3 Prediction
Amb^0^3^cfs:^ammonia^5.04^ppm:^ROI^100^k File: sim\aumsvil8.cx3



Concentration vs Downstream Distance X

STREETER - PHELPS DISSOLVED OXYGEN MODEL 11:56:28 01-06-1998

** Beaver Creek **

Data output file: aums2.doc

STREAM INPUT PARAMETERS

Site Elevation (ft) = 150

Streamflow in (CFS) = 3

Stream Velocity After Mixing (ft/s) = .8

Stream Background Dissolved Oxygen (mg/L) = 11.3

Stream Background 5-Day CBOD (mg/L) = 1.0

Stream Reaeration Constant @ 20 deg. C (1/day) = .3

Stream CBOD Reaction Rate @ 20 deg. C (1/day) = .1

Stream Background Temperature (C) = 10.0

Stream Background Ammonia as N (mg/L) = 0.10

EFFLUENT INPUT PARAMETERS

Effluent Flow (MGD) = .72

Effluent Dissolved Oxygen (mg/L) = 5.0

Effluent 5-Day CBOD (mg/L) = 6.1

Effluent Temperature (C) = 10.0

Effluent Ammonia as N (mg/L) = 5.00

The DO deficit = 3.8 mg/L

This condition will occur at a distance of 77.2 miles downstream

City of Aumsville, Oregon
Lagoon Annual Water Balance
Total Lagoon Area = 29.49 Acres

No. of Cells = 4

January 1993 through February 1997

Month	Sewage Flow	Precip.		Average Monthly Evap. (1)		Discharged		Stored (2)	
						Stream	Land	This Month	Cumulative
	(mg)	(in)	(mg)	(in)	(mg)	(mg)	(mg)	(mg)	(mg)
Jan-93	31.531	5.330	4.27	2.08	1.67	39.710	0	-5.576	0.000
Feb-93	19.580	2.49	1.99	2.08	1.67	15.590	0	4.318	4.318
Mar-93	29.959	5.65	4.52	2.08	1.67	29.060	0	3.758	8.076
Apr-93	35.946	10.48	8.39	2.08	1.67	34.030	0	8.643	16.719
May-93	20.940	5.08	4.07	2.08	1.67	13.220	0	10.122	26.841
Jun-93	23.524	5.23	4.19	2.08	1.67	7.330	0	18.716	45.557
Jul-93	11.500	1.58	1.27	2.08	1.67	0.000	0	11.100	56.657
Aug-93	9.720	1.54	1.23	2.08	1.67	0.000	0	9.288	65.945
Sep-93	8.620	0.04	0.03	2.08	1.67	0.000	0	6.987	72.931
Oct-93	8.630	2.07	1.66	2.08	1.67	0.000	0	8.622	81.553
Nov-93	7.240	1.680	1.35	2.08	1.67	15.495	0	-8.575	72.978
Dec-93	11.260	8.25	6.61	2.08	1.67	17.860	0	-1.660	71.318
Jan-94	15.680	6.54	5.24	2.08	1.67	13.900	0	5.351	76.669
Feb-94	12.830	6.13	4.91	2.08	1.67	10.470	0	5.603	82.272
Mar-94	12.850	4.23	3.39	2.08	1.67	13.580	0	0.992	83.264
Apr-94	11.490	3.49	2.79	2.08	1.67	10.040	0	2.579	85.843
May-94	6.890	1.98	1.59	2.08	1.67	0.000	0	6.810	92.653
Jun-94	6.170	2.52	2.02	2.08	1.67	0.000	0	6.522	99.175
Jul-94	5.110	0.13	0.10	2.08	1.67	0.000	0	3.549	102.724
Aug-94	5.000	0.00	0.00	2.08	1.67	0.000	0	3.334	106.058
Sep-94	4.810	1.54	1.23	2.08	1.67	0.000	0	4.378	110.436
Oct-94	5.920	6.13	4.91	2.08	1.67	0.000	0	9.163	119.599
Nov-94	18.430	12.600	10.09	2.08	1.67	32.900	0	-6.046	113.552
Dec-94	20.270	8.08	6.47	2.08	1.67	34.120	0	-9.046	104.507
Jan-95	20.350	10.10	8.09	2.08	1.67	43.570	0	-16.798	87.709
Feb-95	16.840	5.47	4.38	2.08	1.67	24.810	0	-5.256	82.453
Mar-95	14.310	5.52	4.42	2.08	1.67	33.640	0	-16.576	65.878
Apr-95	12.270	5.84	4.68	2.08	1.67	33.100	0	-17.819	48.058
May-95	10.380	2.21	1.77	2.08	1.67	0.000	0	10.484	58.542
Jun-95	7.050	3.20	2.56	2.08	1.67	0.000	0	7.947	66.489
Jul-95	6.450	0.62	0.50	2.08	1.67	0.000	0	5.281	71.770
Aug-95	5.860	3.09	2.47	2.08	1.67	0.000	0	6.669	78.439
Sep-95	5.510	3.33	2.67	2.08	1.67	0.000	0	6.511	84.950
Oct-95	9.910	5.78	4.63	2.08	1.67	9.520	0	3.353	88.302
Nov-95	18.650	9.560	7.65	2.08	1.67	17.210	0	7.429	95.732
Dec-95	24.120	9.66	7.73	2.08	1.67	31.760	0	-1.571	94.161
Jan-96	25.100	12.97	10.39	2.08	1.67	26.300	0	7.520	101.681
Feb-96	25.230	14.19	11.36	2.08	1.67	32.580	0	2.347	104.028
Mar-96	14.020	5.64	4.52	2.08	1.67	26.220	0	-9.349	94.679
Apr-96	15.480	6.74	5.40	2.08	1.67	8.840	0	10.371	105.050
May-96	14.290	5.50	4.40	2.08	1.67	17.630	0	-0.602	104.448
Jun-96	7.560	1.20	0.96	2.08	1.67	0.000	0	6.855	111.304
Jul-96	6.800	1.23	0.98	2.08	1.67	0.000	0	6.119	117.423
Aug-96	6.220	0.36	0.29	2.08	1.67	0.000	0	4.843	122.266
Sep-96	6.330	3.04	2.43	2.08	1.67	0.000	0	7.099	129.365
Oct-96	9.070	7.80	6.25	2.08	1.67	0.000	0	13.650	143.015
Nov-96	19.660	10.600	8.49	2.08	1.67	20.830	0	5.652	148.667
Dec-96	31.090	17.83	14.28	2.08	1.67	42.560	0	1.141	149.808
Jan-97	24.790	9.94	7.96	2.08	1.67	37.420	0	-6.336	143.472
Feb-97	16.300	4.68	3.75	2.08	1.67	18.900	0	-0.518	142.954

Notes:

(1) Average monthly evaporation was approximated from the annual evaporation graph of the United States produced by the U.S. National Weather Service.

(2) Since discharge is greater than inflow for Jan-93, there must have been net storage at the beginning of the mont It was assumed that the lagoons were completely drained over the course of Jan-93, resulting in net zero storage for the month.

APPENDIX E -
CITY SEWER BUDGET

FORM LB-20

RESOURCES

SEWER FUND-13

CITY OF AUMSVILLE

	Historical Data				Budget for Next Year 1998/99			
	Actual		Adopted Budget	RESOURCE DESCRIPTION	Projected Budget	Proposed by	Approved by	
	Second Preceding FY 95/96	First Preceding FY 96/97	This Year FY 97/98		FY 97/98	Budget Officer	Budget Committee	
				Beginning Fund Balance:				
1	101,485	93,814	97,016	1 Available Cash on Hand	100,299.89			1
2				2 Net Working Capital (Accrual Basis)				2
3				3 Previously Levied Taxes				3
4	5,108	5,116	5,000	4 Interest				4
5				5 Other Resources				5
6	54	549	50	6 Miscellaneous				6
7	1,107	2,650	1,350	7 Insurance Reimbursement				7
8	146,450	168,406	178,000	8 Collections	176,000			8
9	1175	300	375	9 Inspection Fees				9
10				10				10
11				11				11
12				12				12
13				13				13
14	148,786	171,905	179,775	14 TOTAL OTHER RESOURCES	0	0	0	14
15				15				15
16				16 TRANSFERS				16
17				17	0	0	0	17
18				18				18
19				19				19
20				20				20
21	0	0	0	21 TOTAL TRANSFERS	0	0	0	21
22				22				22
23				23				23
24				24				24
25				25				25
26				26				26
27				27				27
28				28				28
29	255,379	270,835	281,791	29 Total Resources Except Taxes to be Levied	0	0	0	29
30			0	30 Taxes Necessary to Balance Budget	0	0	0	30
31	0	0		31 Taxes Collected in Year Levied				31
32	255,379	270,835	281,791	32 TOTAL RESOURCES	0	0	0	32

FORM LB-31

DETAILED EXPENDITURES
SEWER FUND-13

CITY OF AUMSVILLE

	Historical Data			EXPENDITURE DESCRIPTION	Budget for Next Year 1998/99			
	Actual		Adopted Budget					
	Second Preceding FY 95/96	First Preceding FY 96/97	This Year FY 97/98		Projected Budget FY 97/98	Proposed by Budget Officer	Approved by Budget Committee	
1				1 PERSONAL SERVICES:				1
2	5,741	9,226	9,644	2 Administrator/Recorder (30%)				2
3	10,045	10,200	9,257	3 City Clerk (40%)				3
4	0	3,390	3,565	4 Records Clerk (35%)				4
5	14,936	13,313	12,367	5 Public Works Superintendent (40%)				5
6	10,851	0	0	6 Public Works II (45%)				6
7	0	7,540	7,679	7 Utility Worker (40%)				7
8	2,260	466	2,494	8 Labor (40%)				8
9	14,972	14,589	19,313	9 Payroll Benefits (41%)				9
10	0	0	811	10 Unemployment				10
11	0	0	1,520	11 City Council Stipend				11
12				12				12
13	58,805	58,724	66,650	13 **TOTAL PERSONAL SERVICES**	0	0	0	13
14				14				14
15				15				15
16				16 MATERIALS & SERVICES				16
17	1,345	2,210	2,700	17 Office Supplies				17
18	1,450	1,490	1,500	18 Audit				18
19	1,869	1,624	2,000	19 Insurance				19
20	4,233	4,224	5,000	20 Power				20
21	440	981	2,100	21 Education & Training				21
22	552	939	1,300	22 Miscellaneous				22
23	808	874	1,000	23 Telephone				23
24	5,000	18,063	51,935	24 Sewer Lines-I&I Control/Repair				24
25	288	343	350	25 Gas				25
26	290	351	1,000	26 Motor Vehicle Expense				26
27	7,072	12,927	35,000	27 Repairs & Maintenance				27
28	185	0	500	28 Instrument Calibration				28
29	1,254	1,885	3,550	29 Engineering				29
30	831	1,114	2,000	30 Weed Spray				30
31	580	381	500	31 Tools				31
32	761	1,561	765	32 DEQ Permit Fees				32

CONTINUED ON NEXT PAGE

FORM LB-31

DETAILED EXPENDITURES
SEWER FUND-13

CITY OF AUMSVILLE

	Historical Data				Budget for Next Year 1998/99			
	Actual		Adopted Budget	EXPENDITURE DESCRIPTION	Projected Budget	Proposed by	Approved by	
	Second Preceding FY 95/96	First Preceding FY 96/97	This Year FY 97/98	MATERIALS & SERVICES CONT.	FY 97/98	Budget Officer	Budget Committee	
1	577	0	0	1 Interest Expense				1
2				2				2
3				3				3
4				4				4
5				5				5
6	27,535	48,967	111,200	6 **TOTAL MATERIALS & SERVICES**	0	0	0	6
7				7				7
8				8 CAPITAL OUTLAY				8
9	4,022	4,686	5,230	9 Purchase of Equipment				9
10	594	0	4,000	10 Replacement of Equipment				10
11	4,290	0	0	11 Pole Barn				11
12	0	1,650	9,550	12 Extension of Sewer Line				12
13	0	6,605	0	13 Flow Monitor & Alarm System				13
14	872	590	0	14 Fuel Tank				14
15	0	0	3,500	15 Emergency Generator				15
16				16				16
17				17				17
18	9,778	13,531	22,280	18 **TOTAL CAPITAL OUTLAY**	0	0	0	18
19				19				19
20				20 TRANSFERS				20
21	7,000	3,000	3,000	21 To Vehicle Replacement Fund				21
22	5,000	2,000	3,000	22 To Public Works Equipment Fund				22
23	51,311	43,800	62,000	23 To Sewer Improvements Fund				23
24	1,000	500	1,400	24 To Computer Reserve Fund				24
25				25				25
26	64,311	49,300	69,400	26 **TOTAL TRANSFERS**	0	0	0	26
27	0	0	12,261	27 OPERATING CONTINGENCY				27
28				28				28
29	1,136	0	0	29 PAYROLL WITHHOLDING ADJUSTM			0	29
30				30				30
31	161,565	170,522	281,791	31 **TOTAL EXPENDITURES**	0	0	0	31
32	93,814	100,313	0	32 Unappropriated Ending Fund Balance	0	0	0	32
	255,379	270,835	281,791	**TOTAL**	0	0	0	

APPENDIX F -
CITY SEWER ORDINANCE

ORDINANCE NO. 402

AN ORDINANCE DEFINING CERTAIN TERMS; ESTABLISHING SEWER USER CHARGES; PROVIDING FOR REVIEW OF RATES ON A PERIODIC BASIS; IDENTIFYING THOSE RESPONSIBLE FOR PAYMENT; REQUIRING A DEPOSIT FEE; REQUIRING A DEPOSIT FEE FOR SENIOR CITIZENS; REQUIRING A DEPOSIT FEE FOR THOSE RESIDING OUTSIDE THE CITY LIMITS BUT WISHING TO HOOK UP TO THE CITY SEWER SYSTEM; PROVIDING FOR COLLECTION OF USER CHARGES; SETTING FORTH PENALTIES; REPEALING ORDINANCE 389, AND DECLARING AN EMERGENCY.

THE CITY OF AUMSVILLE, OREGON, ORDAINS AS FOLLOWS:

ARTICLE I

Definitions

Section 1. "Collection System" shall mean the system of public sewers to be operated by the City designed for the collection of sanitary sewage.

Section 2. "Commercial User" shall mean any premises used for commercial or business purposes which is not an industry.

Section 3. "Domestic Waste" shall mean any wastewater emanating from dwellings or from domestic activities which are performed outside the home in lieu of a home activity directly by or for private citizens.

Section 4. "Industrial Waste" shall mean that portion of the wastewater emanating from an industrial user which is not domestic waste or water from sanitary conveniences.

Section 5. "Operation and Maintenance" shall mean all activites, goods and services which are necessary to maintain the proper capacity and performance of the treatment works for which such works were designed and constructed. The term "operation and maintenance" shall include replacement as directed hereinafter.

Section 6. "Person" shall mean any individual, firm, company, association, society, corporation, or group.

Section 7. "Replacement" shall mean acquisition and installation of equipment, accessories, or appurtances which are necessary during the service life of the treatment works to maintain the capacity and performance for which such works were designed and constructed.

Section 8. "Service Area" shall mean all the area served by the treatment works and for which there in one uniform user charge.

Section 9. "Sewage" shall mean a combination of water-carried wastes from residences, business building, institutions, and industrial establishments, together with such ground, surface, and storm water as may be present.

Section 10. "Shall" is mandatory; "May" is permissive.

Section 11. "Treatment Works" shall mean all facilities for collecting, pumping, treatment, and disposing of sewage.

Section 12. "User" shall mean every person using any part of the public treatment system of the City of Aumsville.

Section 13. "User Charge" shall mean the periodic charges levied on all users of the public treatment works, and shall, at a minimum, cover each user's proportionate share of the cost of operation and maintenance.

FAX TRANSMITTAL # of Pages 5
TO: Patrick Smith FROM: Maryann
CO: Balfour Consulting AUMSVILLE CITY HALL
DEPT. _____ PHONE: (503) 749-2030
FAX # 503-635-9294 FAX # (503) 749-1852
COMMENTS Per your request. ::

ARTICLE II

Sewer User Charges

Section 1. User charges shall be levied on all users of the public treatment works which shall cover the cost of operation and maintenance, debt service, taxes, and other administrative costs of such treatment works. The user charge shall distribute these costs in proportion to each user's contribution to the wastewater loading of the treatment works.

Section 2. There shall be established classes of users such that all members of a class discharge approximately the same volume of wastewater per residence, facility, seat or other appropriate unit.

Section 3. The flat charge per appropriate unit shall be established in proportion to the volume of waste discharged from that unit so that each user pays his/her proportionate share of the treatment costs.

Section 4. Appeal. Should any user believe that he/she has been incorrectly assigned to a particular user class, that user may apply for review of his/her user charge as provided in Article VII of this ordinance.

Section 5. Reassignment of a User. Should the City Engineer determine that a user is incorrectly assigned to a user class, he/she shall reassign a more appropriate user class to the user and shall notify that user of such reassignment.

Section 6. Records. Records of all assigned rates and any assigned wastewater volume to user and user classes shall be kept on file with the City Recorder and shall be open for public inspection.

Section 7.

User Class	Rate per Month
Single Family Residence	$15.00
Multiple Dwellings	$15.00 per unit
Apartments combined with businesses	$15.00 per unit
A business	$20.00
Churches	$15.00
Aumsville Elementary School 25 units for students, plus 3 units for staff = 28 x $15.00	$420.00
Commercial & Industrial First 9,000 gallons of water For each 1,000 gallons of water used over the original 9,000	$20.00 $.30 per thousand

Section 8. New Users and Vacancies. The sewer user charge for all occupied property shall begin the day that connection is made to the public sewer. The sewer user charge for all unoccupied property shall begin on the first day of occupancy. Once the sewer charge has commenced, no credit shall be given unless it can be demonstrated that water service to the property from any and all sources had been discontinued. The regular user charge shall be reinstated as soon as water service to that property from any source has begun. If the dates upon which the user charge is commenced or altered does not fall on the first day of the billing period, the rates shall be appropriately pro-rated.

ARTICLE III

Deposit fees, Deposit fees for Senior citizens, Deposit fees for those users living outside the corporation city limits.

Section 1. The deposit fee for those living within the City of Aumsville shall be $45.00.

Section 2. The deposit fee for Senior citizens shall be half of what regular users are required to deposit.

Section 3. Anyone outside the city limits of the City of Aumsville shall pay twice the amount of the deposit of regular customers.

ARTICLE IV

Responsibility, Payment, Delinquencies and Penalties

Section 1. The users of the sewerage system shall be billed on a monthly basis for services rendered in accordance with the rate schedule as set forth in Article II of this ordinance.

Section 2. The date of billing shall be the 1st day of the month for which the sewer user charge is calculated as provided in Article II of this ordinance.

Section 3. In the event of failure to pay sewer charges after they become delinquent, the City shall have the right to remove or close sewer connections and enter upon the property for accomplishing such purposes. The expense of such discontinuance, removal, or closing, as well as the expense of restoring service shall be a debt due to the City. Said debt shall become a lien upon the person occupying the property and may be recovered in civil action in the name of the City.

Section 4. Sewer service shall not be restored until all charges, including interest accured and the expense of removal, closure, and restoration have been paid.

Section 5. Change of ownership or occupancy of premises found delinquent shall not be cause for reducing or eliminating these penalties.

ARTICLE V

Handling of Funds

Section 1. Bills for sewer user charges shall be mailed to the person specified in the application for permit to make the connection unless or until a different owner or user of the property is reported to the City Recorder.

Section 2. All collections of sewer user charges shall be made by the City Recorder by and through the Department of Public Works. Sewer user charges shall be computed as provided in Article II of this ordinance and shall be payable as provided by Article IV of this ordinance.

Section 3. The City Recorder is hereby directed to deposit in the Sewer Fund all of the gross revenues received from charges, rates, and penalties collected for the use of the sewerage system as provided herein.

Section 4. The revenues thus deposited in the Sewer Fund shall be used exclusively for the operation, maintenance, and repair of the sewerage system, reasonable administrative costs, expenses or collection of charges imposed by this ordinance, and payments of the principle and interest of any debts of the sewerage system of the City.

ARTICLE VI

Hookup of property outside the city limits

Section 1. A person requesting sewer service to a property outside the city limits of Aumsville shall make application to the Aumsville City Council. The applicant shall have the burden of proving to the City Council the following:

a. That the proposed connection is compatible with projected future growth of the City of Aumsville and that the property that will be served will logically and harmoniously become incorporated into the city at a future date.

b. That the proposed connection will not unduly burden the existing ability of the city to provide sewer service to the citizens of Aumsville.

c. That the applicant has acquired all necessary licenses, permits and easements to put in the connecting line to the city's main line.

d. That the proposed line connecting the property to the city's main line will meet or exceed city specifications.

Section 2. Regardless if the applicant meets the requirements set forth in Article VI, a-d, each applicant shall be decided on a case by case basis and approval of the application is at the sole discretion of the Council.

Section 3. Upon approval of the application the following are the sole and exclusive responsibility of the applicant:

a. All construction and costs associated with the installation of the line or lines from the applicant's property to and including the connection to the city's main line.

b. That the connection will be a single hookup and serve only one household or business.

c. Maintenance and repair of the connecting lines from the property to and including the connection to the city's main shall be the sole and exclusive responsibility of the property owner being served.

d. All lines that are to be connected to the city system shall be approved and inspected by the City Public Works Department prior to connection.

Section 4. The City Council, at its sole discretion, may allow a hookup to property that is not directly adjacent to the existing city limits. If an application is made for such property the city may impose additional criteria including but not limited to requesting a connecting line that would be sufficient to serve other users that may hook up to the city system at a later date.

Section 5. If for any reason whatsoever the City is required to maintain or make repairs upon connecting lines outside the city limits, the owners of the property service shall be responsible for all costs and materials plus 25% and shall pay said amount within 30 days of being presented a bill by the city. Any bill not paid after 30 days shall automatically become a lien upon said property and may be foreclosed upon pursuant to existing state laws and municipal ordinances.

Section 6. The monthly sewer fee shall be double the monthly fee charged for single hookups inside the city, for all connections outside the city limits.

ARTICLE VII

Appeals

Section 1. Any sewer user who feels his/her user charge is unjust and inequitable as applied to his premises with the intent of the foregoing provisions, may make written application to the City Council requesting a review of his/her user charge.

Section 2. Review of the request shall be made by the City Council and City Engineer and shall determine if it is substantiated or not, including recommending further study of the matter by the City Engineer or other professional engineer.

Section 3. If the request is determined to be substantiated the user charges for that user shall be recomputed based on the approved revised flow and/or strength data and the new charges thus recomputed shall be applicable retroactively up to six months.

ARTICLE VIII

Change in Rate Structure

Section 1. Any change in the rate structure shall be by two readings of an ordinance with approval of the majority of the City Council present at the meeting.

ARTICLE IX

Validity

Section 1. If any part or parts of this ordinance are for any reason held to be invalid, such decision shall not affect the validity of the remaining portions of this ordinance.

ARTICLE X

Repeal

Section 1. Ordinance 389 is hereby repealed.

ARTICLE XI

Penalties

Section 1. Any violation of this ordinance is hereby declared to be a public nuisance and any person found guilty thereof shall be punishable by a fine of not more than $250.00. A violation of this ordinance shall be considered a separate offense for each day the violation occurs.

ARTICLE XII

Emergency Clause

Section 1. Whereas, it is necessary for the immediate preservation of the public health, peace and safety of the citizens of the City of Aumsville that this ordinance become effective at the earliest time possible, and the additional monies are needed for the current budget process, which began July 1, 1993. Therefore, this ordinance shall become effective immediately upon it's passage by the Council and signature of the Mayor.

PASSED BY THE City Council this 13 day of September, 1993.

SIGNED by the Mayor this 14 day of September, 1993.

Harold L. White, Mayor

ATTEST:

Mary Sarvis, City Recorder

BALFOUR CONSULTING, INC.

18605 WILLAMETTE DRIVE
WEST LINN, OR 97068
(503) 635-9293
FAX: (503) 635-9294

June 2, 1999

Maryann Hills, City Administrator
City of Aumsville
P.O. Box 227
Aumsville, OR 97325

Dear Maryann:

BCI has reviewed Aumsville's current sewer ordinance and recommends adding the following additional articles:

Article _____
Use of the Public Sewers

Section 1. No person shall discharge or cause to be discharged any storm water, surface water, ground water, roof runoff, subsurface drainage, cooling water or unpolluted industrial process waters to any sanitary sewer. Storm water and all other unpolluted drainage shall be discharged to such sewers as are specifically designated as storm sewers, or to a natural outlet approved by the City Engineer. Industrial cooling water or unpolluted process waters may be discharged, upon approval of the City Engineer, to a storm sewer or natural outlet.

Section 2. No person shall discharge or cause to be discharged any of the following described waters or wastes to any public sewer:

A. Any liquid or vapor having a temperature higher than 150°F.
B. Any water or waste which may contain more than 100 parts per million , by weight, or fat, oil, or grease.
C. Any gasoline, benzene, naphtha, fuel oil, or other flammable or explosive liquid, solid or gas.
D. Any garbage that has not been properly shredded.
E. Any ashes, cinders, sand, mud, straw, shavings, metal glass, rags, feathers, tar, plastics, wood, paunch manure, or any other solid or viscous substance capable of causing obstruction to the flow in sewers or other interference with the proper operation of the sewerage works.
F. Any waters or wastes having a pH lower than 5.5 or higher than 9.0 or having any other corrosive property capable of causing damage or hazard to structures, equipment, and personnel of the sewage works.
G. Any waters or wastes containing a toxic or poisonous substance in sufficient quantity to injure or interfere with any sewage treatment process, constitute a hazard to humans or animals, or create any hazard in the receiving waters of the sewage treatment plant.
H. Any waters or wastes containing suspended solids of such character and quantity that unusual attention or expense is required to handle such materials at the

sewage treatment plant.

I. Any noxious or malodorous gas or substance capable of creating a public nuisance.

J. Any water or waste having a five-day biochemical oxygen demand greater than 300 parts per million by weight, or containing more than 350 parts per million by weight of suspended solids.

Section 3. Grease, oil and sand interceptors shall be provided by hotels, restaurants, filling and service stations, laundries, meat packing plants, woolen mills, milk processing plants, metal fabrication plants, government or residential facilities with central kitchens and other places when it shall be shown by the City Engineer that they are necessary for the proper handling of liquid wastes containing grease in excessive amounts, or any flammable wastes, sand, and other harmful ingredients; except that such interceptors shall not be required for private living quarters or dwelling units. All interceptors shall be of a type and capacity approved by the City Engineer and shall be located so as to be readily and easily accessible for cleaning and inspection.

Grease and oil interceptors shall comply with the Uniform Plumbing Code and be constructed of impervious materials capable of withstanding abrupt and extreme changes in temperature. They shall be of substantial construction, watertight, and equipped with easily removable covers which, when bolted in place, shall be watertight.

Where installed, all grease, oil and sand interceptors shall be maintained by the owner, at his expense, in continuously efficient operation at all times.

Section 4. No person shall break, damage, destroy, uncover, deface or tamper with any structure, appurtenance or equipment which is a part of the municipal sewage works.

Article ____
Preliminary Treatment Facilities

Section 1. Where preliminary treatment or flow-equalizing facilities are provided for any waters or wastes, they shall be maintained continuously in satisfactory and effective operation by the owner at his expense.

Section 2. When required by the superintendents, the owner of any property serviced by a building sewer carrying industrial wastes shall install a suitable control manhole together with such necessary meters and other appurtenances in the building sewer to facilitate observation, sampling, and measurement of the wastes. Such manhole, when required, shall be accessible and safely located, and shall be constructed in accordance with plans approved by the superintendent. The manhole shall be installed by the owner at his expense, and shall be maintained by him so as to be safe and accessible at all times.

Section 3. All measurements, tests, and analyses of the characteristics of waters and wastes to which reference is made in this ordinance shall be determined in accordance with the latest edition of "Standard Methods for the Examination of Water and Wastewater," published by the American Public Health Association, and shall be determined at the control manhole provided, or upon suitable samples taken at said control manhole. In the event that no special manhole has been required, the control manhole shall be considered to be the nearest downstream manhole in the public sewer to the point at which the building sewer is connected. Sampling shall be carried out by customarily accepted methods to reflect the effect of constituents upon the sewage works and to determine the existence of hazards to life, limb and property. The particular analyses involved will determine whether a twenty-four (24) hour composite of all outfalls of a premise is appropriate or whether a grab sample or samples should be taken. Normally, but not always, BOD and suspended solids analyses are obtained from 24-hour composites of all outfalls whereas pH's are determined from periodic grab samples.

Section 4. No Statement contained in this article shall be construed as preventing any special agreement or arrangement between the city and any industrial concern whereby an industrial waste of unusual strength or character may be accepted by the city for treatment, subject to payment therefore, by the industrial concern.

Article ____
Infiltration and Inflow

Section 1. All property owners identified by the city as contributors to excessive or improper infiltration of inflow into the sewage works, shall be advised of their infiltration and inflow problems.

Section 2. All such situated properties shall be provided a 60-day grace period in which to correct the infiltration and inflow problems as identified at owner's expense and at no cost to the city. Said 60-day grace period shall extend from the date of written notification.

Section 3. By the end of the 60-day grace period, each property owner shall notify the city that corrective actions reasonably calculated to abate the specified excessive or improper infiltration or inflow problems referenced in the city's written notice to user have been taken or are in progress. The specific actions taken shall be specified in the notification to the city.

Section 4. A property owner failing to notify the city of corrective action prior to the end of the 60-day grace period shall be subject to termination of water service, without further notice until the violation shall have been corrected in accordance with federal, state and city regulations.

Section 5. In the event any instance of excessive or improper infiltration or inflow into the treatment works of the city shall continue beyond the 60-day grace period, it is hereby declared that such continuing infiltration or inflow is a public nuisance, and to enter upon any private property within the city for such purpose, and shall assess the cost of such abatement as a lien against the property upon which such continuing infiltration and inflow occurs. Such costs together with the description of the property or properties to be assessed, together with the names of the owner (s) thereof with the city recorder, whereupon the city recorder shall forthwith enter such assessment as a lien against such property in the city lien docket of the city. An administration fee of $50.00 or 15% of the cost, whichever is greater, shall be charged and collected by the city in addition to all costs of abatement.

Article ____
Powers and Authority of Inspectors

Section 1. The superintendent and/or the duly authorized employees of the city bearing proper credentials and identification shall be permitted to enter all properties for the purposes of inspection, observation, measurement, sampling, and testing in accordance with the provisions of this ordinance. The superintendent or his representatives shall have no authority to inquire into any processes including metallurgical, chemical, oil, refining, ceramic, paper, or other industries beyond that point having a direct bearing on the kind and source of discharge to the sewers or waterways of facilities for waste treatment.

Section 2. While performing the necessary work on private properties referred to in the section above, the superintendent or duly authorized employees of the city shall observe all safety rules applicable to the premises established by the company and the company shall be held harmless for injury or death to the city employees and the city shall indemnify the company against loss or damage to its property by city employees and against liability claims and demands for personal injury or property damage asserted against the company and growing out of the gauging and sampling operation, except as such may be caused by negligence or failure of the company to maintain safe conditions.

Section 3. The superintendent and other duly authorized employees of the city bearing proper credentials and identification shall be permitted to enter all private properties through which the city holds a duly negotiated easement for the purposes of, but not limited to, inspection, observation, measurement, sampling, repair, and maintenance of any portion of the sewage works lying within said easement. All entry and subsequent work, if any, on said easement, shall be done in full accordance with the terms of the duly negotiated easement pertaining to the private property involved.

Article ___
Penalties

Section 1. Any person found to be violation any provision of this ordinance shall be served by the city with written notice stating the nature of the violation and providing a reasonable time limit for the satisfactory correction thereof. The offender shall, within the period of time stated in such notice, permanently cease all violations.

Section 2. Any person who shall continue any violation beyond the time limit provided for in the above section, is subject to a civil fine in an amount not exceeding $250.00 dollars for each violation. Each day in which any such violation shall continue shall be deemed a separate violation offense.

Section 3. Any person violating any of the provisions of the ordinance shall become liable to the city for any expense, loss, or damage occasioned the city by reason of such violation, including reasonable attorney's fees.

Section 4. Nothing in the section shall in any way limit, alter or affect the potential criminal sanctions which can result from violation of state, county, or city criminal statues.

Because each city is unique in their particular regulations and ordinances, we recommend that you review the above additions to the sewer ordinance with your city attorney, before adopting them.

Sincerely,

BALFOUR CONSULTING, INC

Bryan Balfour, P.E.

cc: Bob Dicksa, DEQ
Mary Baker, OEDD

Z:\140 Aumsville\01\WP\Sewer Ordinance.wpd

LAGOON LEAKAGE TEST REPORT

CITY OF AUMSVILLE

J.O. 1699.300.0

Prepared by

Westech Engineering, Inc.
3421 25th Street SE
Salem, OR 97302
(503) 585-2474
(503) 585-3986 FAX

November 30, 1992

1. PURPOSE AND SCOPE

The City of Aumsville completed lagoon leakage tests as required by Compliance Condition 5 of Schedule C in the NPDES permit. This report is submitted to satisfy this requirement. Per Compliance Condition 6 of Schedule C, if the lagoon seepage rate exceeds 1/4 inch per day, a groundwater characterization will be required.

2. BACKGROUND INFORMATION

The City's wastewater treatment plant (WWTP) is a facultative lagoon facility with four lagoons that typically operate in series. Wastewater is pumped into the headworks and then flows by gravity through the plant. Following disinfection, treated wastewater is discharged into Beaver Creek on a seasonal basis at river mile 2.5.

Leakage tests were conducted at the WWTP from November 16 through November 27 of this year. The procedure used, data, results and conclusions are addressed in subsequent sections of this report.

3. PROCEDURE/METHODS

3.0 General Procedure

A leakage test was conducted for the lagoons during two separate test periods. Lagoon No.'s 2, 3, and 4 were tested November 16 - 21. The corresponding test period for lagoon No. 1 was November 21 - 27. In both cases, the test period was five days. Both inflow and outflow to the lagoons being tested was minimized in order to reduce the number of variables. Precipitation, evaporation, and lagoon water levels were measured daily during the test period. No outflow from the lagoons occurred during the test period. Because the testing occurred in the late fall when soil conditions are wet (i.e. little moisture is likely to soak into the soil), precipitation falling from approximately the centerline of the dike to the water level was assumed to have runoff into the lagoons and is, therefore, accounted for in the water balance.

Precipitation was measured using Weathertronics Model 6330-001 rain gauge. Evaporation was measured using a Class A evaporation pan with stilling well and hook gauge. Lagoon water levels were measured using metal rulers mounted to structures. Portable stilling wells were used when taking readings to minimize wave action impacts. The seepage rate of each lagoon was determined using a mass balance. Specific testing procedure for each lagoon are described below.

3.1 Lagoon No.'s 2, 3 and 4

Inflow and outflow to and from each lagoon was eliminated by preventing the transfer of water between the lagoons and by discharging no effluent to the creek during the test period. Transfer of water between the lagoons was prevented by raising the intake of the transfer pipes above the water surface. A standard sewer test plug was also placed in the transfer pipe between Lagoons No.'s 1 and 2 to prevent any water transfer to Lagoon No. 2 in the event the water level in Lagoon No. 1 increased significantly during the test period. All sewage to the WWTP during the test period was stored in Lagoon No. 1. Runoff from the exposed dike slopes which entered the lagoons was accounted for as described in Section 2.0. Daily readings were taken to account for: precipitation, evaporation, and change in lagoon water surface level. The data and results are summarized in Section 4.

3.2 Lagoon No. 1

Inflow to Lagoon No. 1 was eliminated during the test period by diverting raw sewage flow from the headworks into Lagoon No. 2. Outflow from Lagoon No. 1 to the other lagoons was prevented as described in Section 3.1 above. Runoff from the exposed dike slopes which entered the lagoons was accounted for as described in Section 3.0. Daily readings were taken to account for: precipitation, evaporation and change in lagoon water surface level. The data and test results are summarized in Section 4.

4. TEST RESULTS

Table 1 summarizes data and test results for Lagoon Nos. 2, 3 and 4. Table 2

summarizes data and test results for Lagoon No. 1.

5. DISCUSSION AND RECOMMENDATIONS

Review of Tables 1 and 2 show the average daily seepage rate during the test periods to be 0.001, -0.004, 0.072 and -0.049 inches/day for Lagoons No.'s 1, 2, 3 and 4 respectively. Lagoon No's 1 and 2 showed essentially no seepage during the test period. Lagoon No. 3 showed a seepage rate of 7/100 inch/day while Lagoon No. 4 actually showed a negative seepage rate of 5/100 inch/day. All of the seepage rates are well below DEQ's threshold value of 25/100 inch/day. Because the lagoon seepage rates are below the 25/100 inch/day value, no groundwater characterization should be required.

TABLE 1

AUMSVILLE WATER BALANCE - Lagoon No.s 2, 3, 4

DAY	DATE	PRECIP. (INCHES)	EVAP. (INCHES)	INFLOW DUE TO RUNOFF FROM DIKE SLOPES LAGOON NO. 2 (INCHES)	CHANGE IN LAGOON NO. 2 LEVEL (INCHES)	SEEPAGE DECREASE IN LAGOON NO. 2 LEVEL (INCHES)	INFLOW DUE TO RUNOFF FROM DIKE SLOPES LAGOON NO. 3 (INCHES)	CHANGE IN LAGOON NO. 3 LEVEL (INCHES)	SEEPAGE DECREASE IN LAGOON NO. 3 LEVEL (INCHES)	INFLOW DUE TO RUNOFF FROM DIKE SLOPES LAGOON NO. 4 (INCHES)	CHANGE IN LAGOON NO. 4 LEVEL (INCHES)	SEEPAGE DECREASE IN LAGOON NO. 4 LEVEL (INCHES)
MON	11/16/92	0.00	-	-	-	-	-	-	-	-	-	-
TUE	11/17/92	0.13	-0.006	0.012	0.125	0.023	0.012	0.125	0.023	0.013	0.250	-0.101
WED	11/18/92	0.04	0.030	0.004	0.000	0.014	0.004	0.000	0.014	0.004	0.000	0.014
THU	11/19/92	0.65	0.040	0.060	0.625	0.044	0.061	0.625	0.046	0.067	0.813	-0.136
FRI	11/20/92	0.34	0.021	0.031	0.250	0.100	0.032	0.250	0.101	0.035	0.188	0.167
SAT	11/21/92	0.84	0.117	0.077	1.000	-0.200	0.079	0.625	0.177	0.087	1.000	-0.190
Average Seepage =						-0.004	inches/day		0.072	inches/day		-0.049 inches/day

TABLE 2

AUMSVILLE WATER BALANCE - Lagoon No. 1

DAY	DATE	PRECIP. (INCHES)	EVAP. (INCHES)	INFLOW DUE TO RUNOFF FROM DIKE SLOPES LAGOON NO. 1 (INCHES)	CHANGE IN LAGOON NO. 1 LEVEL (INCHES)	SEEPAGE DECREASE IN LAGOON NO. 1 LEVEL (INCHES)
SAT	11/21/92	-	-	-	-	-
SUN	11/22/92	1.10	0.050	0.096	1.250	-0.103
MON	11/23/92	0.08	0.014	0.007	0.125	-0.051
TUE	11/24/92	0.00	0.015	0.000	-0.063	0.047
WED	11/25/92	0.00	0.010	0.000	-0.063	0.052
THU	11/26/92	0.00	0.004	0.000	-0.063	0.059

Average Seepage = 0.001 inches/day