

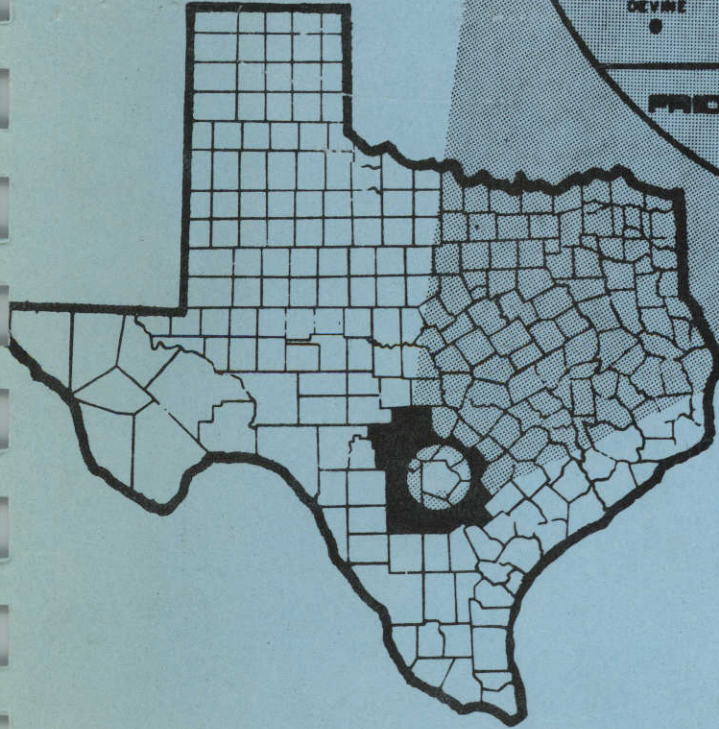
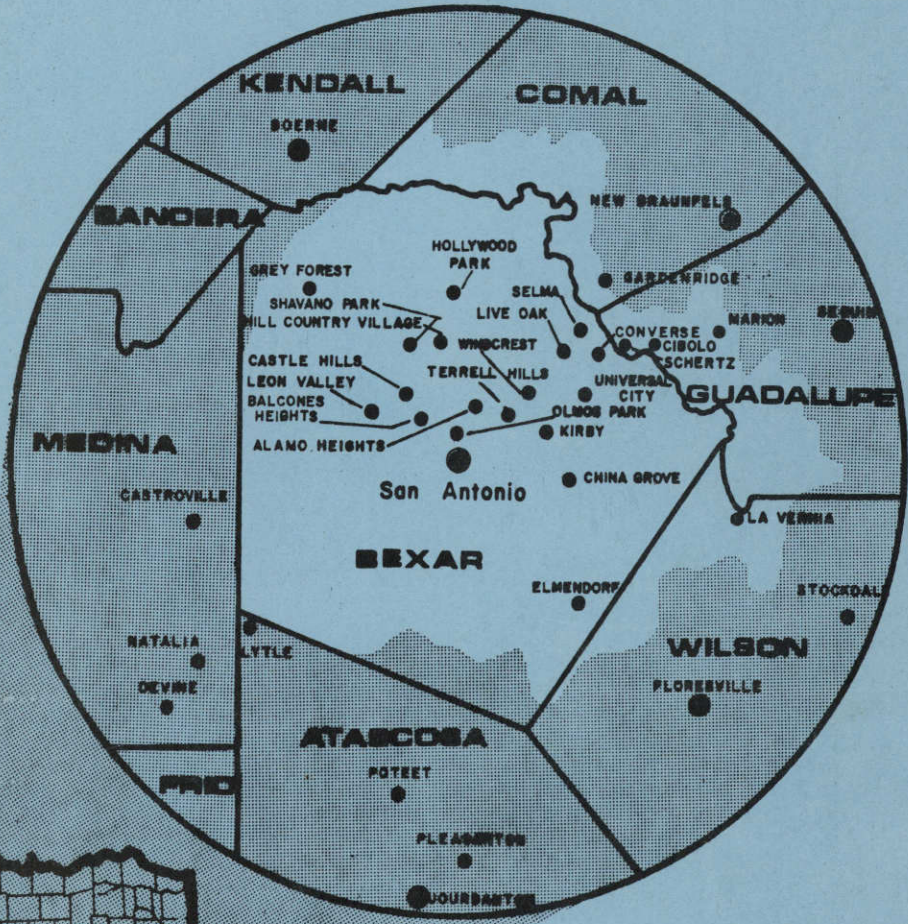
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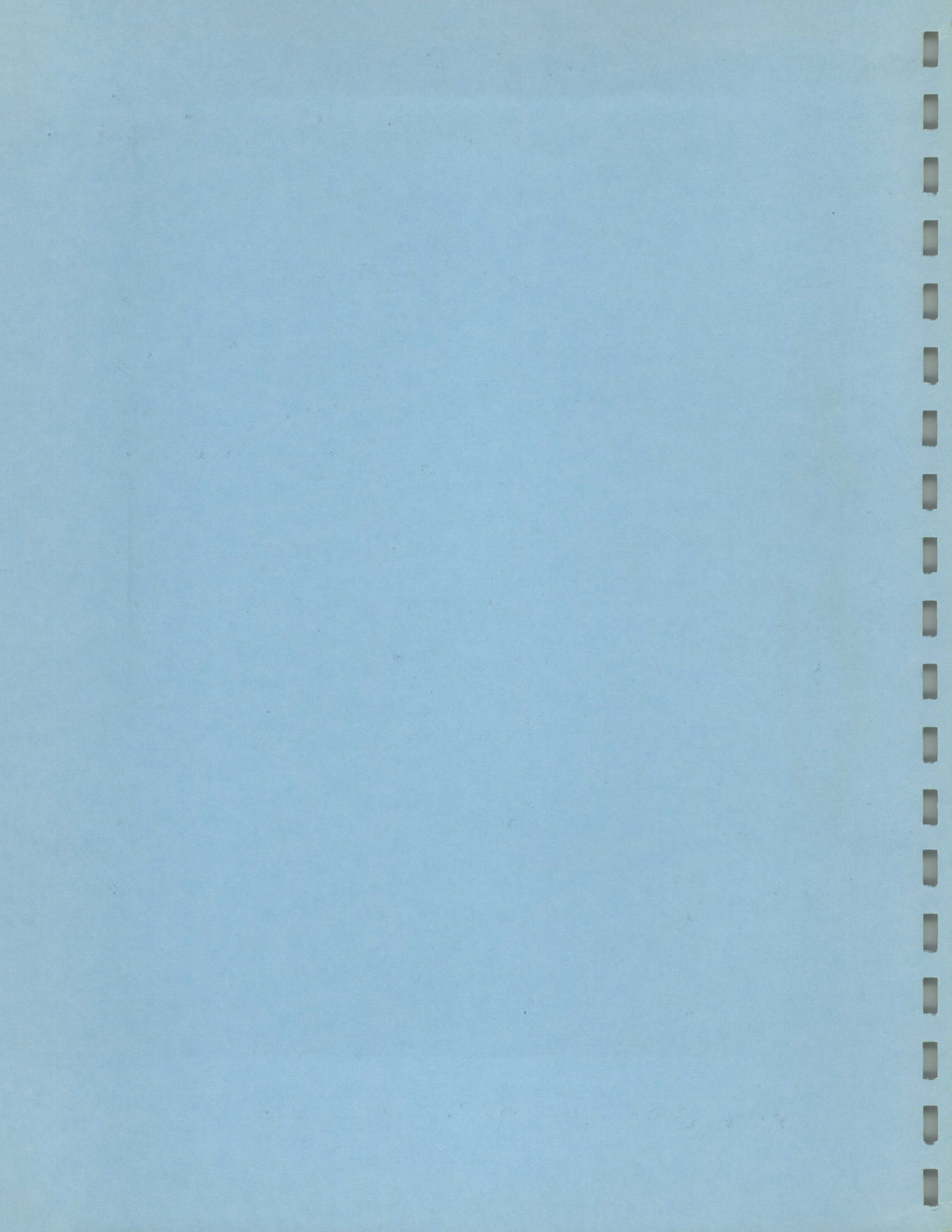
# 208 PLANNING

# DETAILED WORK PROGRAM

## APRIL 1976



alamo area council of governments



## WORK PLAN CONTENTS

A.	SCOPE OF PLAN .....	1
B.	Publications Relevant to 208 Planning.....	4
C.	Co-ordination with other Environmental Activities.....	9
D.	Compatibility with other Plans.....	10
E.	Work Plan Tasks and CPM Chart.....	12
F.	Program for Public Participation.....	164
G.	Disbursement and Milestones.....	168
H.	General Content of Reports.....	176

## A. SCOPE OF PLAN

The scope of the work plan is to detail the analyses and investigations needed over a two year period, to formulate operable alternative subplans for the management of water quality, and to resolve environmental problems throughout the AACOG 208 Region. The plan will integrate both the technology for pollution control and the management structure needed for implementing these controls. Emphasis will be placed on municipal and industrial wastewater, stormwater runoff, non-point sources and pollutants, plus land use as it relates to water quality and in so doing the work plan is designed to address the 1983 goals of the Act.

In striving to meet the 1983 standards already set forth at the national level the 208 plan has these broad objectives:

- a. Develop an areawide plan for wastewater control and treatment facilities, setting forth specific priorities for the first five years.
- b. Develop a management plan that recommends to local governments and to the Governor those management entities that have operational and other authority as required to implement the 208 plan.
- c. Recommend if necessary legislation and/or regulatory programs to provide for the needed insitutional and/or management systems developed in the plan.
- d. Assess the impact of the following problems associated with wastewater management:
  - 1) Non-point source pollution, including agricultural, silvicultural, mining, construction, hydrographic modification, injection activities, and stormwater runoff.
  - 2) Solid waste utilization and/or disposal.
- e. Investigate the use of innovative or advanced technology, e.g., wastewater reclamation, land application of effluent and other possible solutions.
- f. Develop the areawide planning process that can assist designated management agencies in implementing the 208 plan.

The overall contents of the 208 areawide management plan are set forth in section 208, PL. 92-500. Consistent with these proposed regulations and based on a systematic comparison of the major alternatives in terms of costs, environmental, social

and economic impacts, implementation and feasibility, the plan will serve a population of approximately one million based on the 1970 census.

The 208 plan will include the following outputs:

- a. Identification of anticipated municipal and industrial treatment works construction over a 20 year period.
- b. Identification of any required urban stormwater runoff control systems.
- c. Establishment of construction priorities over five, ten, and twenty year periods.
- d. Recommendation of a regulatory system to: 1) provide for a system of waste treatment management on an areawide basis and for identification, evaluation, and control or treatment of all point and non-point pollution sources; 2) regulate the location, modification, and construction of waste-discharging facilities; and 3) assure that industrial or commercial wastes discharged into publicly owned treatment works meet applicable pretreatment requirements.
- e. Identification of agencies necessary to construct, operate, and maintain facilities required by the plan and otherwise carry out the plan.
- f. Identification of non-point sources of pollution control methods and procedures, i.e. agriculture, mining, construction and salt water intrusion.
- g. Recommendation of processes to control disposition of residual wastes and land disposal of pollutants in such a manner so as to protect groundwater and surfacewater.
- h. Selection of management agencies to implement the 208 plan and identify the major management alternatives which include enforcement, financing, land use, and other regulatory measures and associated management authorities and practices.
- i. A schedule for implementing all elements of the plan, including identification of the costs.
- j. Resolutions by appropriate governmental entities indicating local support of the plan pending state certification and EPA approval.

A unique feature of the AACOG work plan is a proposed computer software package capable of simulating natural stream and water course systems in the San Antonio 208 study area. The purpose of the software system shall be to perform a thorough analysis of the social, economic, physical, chemical, hydrological,

hydraulic and life system characteristics of the study area. The software package, i.e., modular processor will enable the users to vary physical, biological and chemical properties of point and non-point sources of pollution with the result being a determination of the quantitative effects on water quality. Thus, it will enable professional planning staff and managers of existing sewage systems to evaluate the impact of new developments.

As such, the software package shall incorporate or interface with existing water quality and cost analysis models, with existing data files and utility management policies, and with existing or proposed land use. To be an effective management tool, the software system shall not only enable water quality managers to select best feasible control strategies, but also aid them in final plan implementation, and provide them a mechanism for continuous monitoring and update of the plan.

An additional unique feature of the AACOG work plan is the decision analysis evaluation process incorporated into the planning effort. With the proposed software package the user may determine at his command the best alternative courses of action for areawide water quality management. These alternatives can in turn be evaluated through formal decision procedures on the basis of the recommendations of the Water Quality Management Committee and the consensus of the Executive Committee taken together with public response. This consensus of opinion shall then be weighted into various preferential and utility independent attributes measuring the consequences resulting from these management decisions.

In its entirety the AACOG 208 work plan proposes a framework for the design of an Areawide Waste Treatment Management Plan which will be considered as an integral part in planning and optimizing the development of human and physical resources in the San Antonio region.

## B. Publications Relevant to 208 Planning

Numerous publications useful to the section 208, P.L. 92-500, planning mandate and philosophy have been prepared by the Alamo Area Council of Governments. In addition to the completed documents, others are currently in draft. Directly related references useful to the San Antonio 208 effort have also been prepared by the City of San Antonio and the San Antonio River Authority. Additionally, there is a broad spectrum of published works by numerous Federal and state agencies along with institutional and local sources that can be used in the 208 effort. This will be part of the input to the 208 planning effort by AACOG.

A summary of publications available from AACOG follows:

<u>SOURCE</u>	<u>TITLE</u>
AACOG,	<u>Land-Use Information System</u> , August, 1973.
AACOG,	<u>Patterns of Population Change for the Alamo Region, Historical Trends and Estimates for the Future</u> , June, 1973.
AACOG,	<u>Regional Open Space Plan</u> , March, 1973.
AACOG,	<u>Alternative Growth Patterns, 1973-1990</u> , October, 1973.
AACOG,	<u>Comprehensive Water and Sewer Plan</u> , FHA Grant, January, 1973.
AACOG,	<u>Forecast of Selected Economic and Demographic Indicators for the Alamo Region, by County, 1965-1983</u> , January, 1973.
AACOG,	<u>Handbook on Land-Use Classification and Base Mapping in the AACOG Region</u> , December, 1972.
AACOG,	<u>San Antonio River Basin Water Quality Management Plan; Social and Economic Analysis, Part II - Documentation Volumes I and II</u> , 1972.
AACOG,	<u>Preliminary Analysis of Required Waste Treatment Facilities</u> , 1972.
AACOG,	<u>Water Resource Management Plan</u> , Vols. I, II, and III, December, 1971.

- AACOG, Open Space Planning of the Alamo Area Council of Governments. Phase One, September, 1971.
- AACOG, Financial Study Phase I, II, III - Regional Wastewater Plan, San Antonio Regional System, August, 1971.
- AACOG, Regional Wastewater Development Plan, Detailed Plan of Development, Technical Description of Methodology. Two Reports: Methodology, Computer Program, (3 Vols.), April, 1971.
- AACOG, Effects of Terrain Factor on Rainfall Runoff Characteristics, 1971.
- AACOG, Environmental Analysis, April, 1970.
- AACOG, Alternative Growth Patterns, Background Paper No. 3, November, 1969.
- AACOG, Environmental Analysis, June, 1969.
- AACOG, Consideration for a Macro Design of a Comprehensive Research and Information System, March, 1969.
- AACOG, Wilson, W. F., The Edwards Aquifer, 1970.
- AACOG, Koenig, L., Basin Management for Water Reuse, July, 1971.

AACOG REFERENCE PAPERS:

Bexar County Employment, June, 1972.

Effects of Agricultural Land Use on Farm Income.

Status Report of Basin Description Programs, May, 1972.

An Analysis of Stream Flow Data in the San Antonio River Basin, May, 1972.

A Comparison of 1967 Employment Data in AACOG Planning Region with 1970 Employment Information, April 26, 1972.

Use of the United Computing Systems Time Sharing Service for Water Resources Planning, April 10, 1972.

A Status Report on Water Resources Planning in the San Antonio Area, March 8, 1972.



The Generalized Methodology of Interrelating County, Regional, and River Basin Water Resource Management Systems used by Agencies in the San Antonio Region, March 8, 1972.

Water Quality Monitoring in the San Antonio River Basin, February, 1972.

Relationship of Soil Dryness to Soil Moisture for Soils in San Antonio Planning Region.

Utilization of Total Vegetative Cover Response to Forecast Production Potential.

Review of SARA Methodology for Data Capture, Storage and Retrieval, January, 1972.

Effect of Terrain Factor on Rainfall-Runoff Characteristics, October 31, 1971.

Estimation of Potential Plant Growth in the AACOG Region.

Predictability of Stream Flows from Rainfall in the San Antonio River Basin Area, September 30, 1971.

Suitability of soils for Crop Production in the San Antonio Region.

A Methodology for Water Resources Management.

San Antonio River Authority Comprehensive Basin Planning Project, August 30, 1971.

Effects of Water Application on the Agricultural Economy, July, 1971.

Proposed Procedure for Collecting, Storing and Retrieving SARA Water Quality Monitoring Information, June, 1971.

A Guide to Decision Making for Water Resources Management in the San Antonio Region, February 22, 1971.

Water Usage Patterns in San Antonio River Basin, December 18, 1970.

Natural Influx of Conservative Pollutants in San Antonio River Basin, November 30, 1970.

Rainfall Runoff Relations - San Antonio River Basin, October, 1970.

Rainfall Frequency - San Antonio River Valley, October 14, 1970.

CITY OF SAN ANTONIO (CSA)

- CSA, San Antonio River Walk Policy Manual
- CSA, San Antonio Regional Wastewater Treatment Plants, Including the Salado Creek Wastewater Treatment Plant.

SAN ANTONIO METROPOLITAN HEALTH DISTRICT

- SMHD, Municipal Water Pollution Control and Abatement Program for CSA, 1975.

SAN ANTONIO RIVER AUTHORITY (SARA)

- SARA, San Antonio River Basin, Water Quality Management Plan, June, 1973.
- SARA, Comprehensive Planning Project, Interim Project, No. 10, 1971.
- SARA, San Antonio River Authority Monitoring Program, 1970.
- SARA, Report of the Stream Quality Standards Committee of the Board of Directors, 1966.
- SARA, Work Underway, Problems and Objectives, 1965.
- SARA, San Antonio River Authority Waste Treatment Report, 1964.
- SARA, Hunter, H.A., Waste Treatment Report for SARA, 1964.
- SARA, Statutory Permit Investigation, S.A Sewage Effluents and S.A. River, 1962.

SARA, Gloyna, E.F., Report on the Water-Quality of the San Antonio River, 1956.

Publications, statistical data, water analysis and other information pertinent to the 208 Areawide Waste Treatment Management Planning effort have been generated by the Texas Water Quality Board, the Texas Water Development Board, the Environmental Protection Agency and the United States Geological Survey. The AACOG library contains a relatively complete suite of the publications of these agencies and the information may be examined in AACOG's headquarters. The 208 staff will also be able to direct consultants to the sources of agency information. The staff will continue to assist the consultants as additional information becomes available.

## C. Coordination with other Environmental Activities

### 1. 208 and Air Quality Programs

Sections 107, 108, 109, and 110 of the Clean Air Act provide for the establishment of ambient air quality standards. During the 208 planning process, reference will be made to the requirements of the applicable SIP for the Air Quality Control Region or Regions within AACOG's designated 208 area.

If any portion of AACOG's 208 area is located within an Air Quality Maintenance area identified pursuant to CFR 51.12(f), our 208 planning efforts will be coordinated with Air Quality Maintenance Plan development and implementation processes.

### 2. 208 and Solid Waste Programs

Section 208(b) calls for regulatory programs over all discharges as well as processes to control disposition of residual waste and disposal of pollutants on land or in subsurface excavations. Solid waste and sludge disposal regulations will be addressed in AACOG's 208 program.

### 3. Relationship Between 208 and other Areawide Management Programs

The land use aspects of 208 planning provide a direct linkage with other areawide planning efforts within the AACOG 208 area including those supported under the HUD 701, flood insurance and disaster programs, transportation plans under DOT, and planning under NOAA. The 208 planning will provide the water quality component for the comprehensive plan for the area. Such consideration will also facilitate the development of a coordinated relationship between 208 agencies and related agencies which should be carried over the 208 implementation phase.

## D. Compatibility with other Plans

### 1. Relationship Between 208 and 303(e) Basin Plans

303(e) Basin Plans constitute the overall framework within which 208 plans are developed for specific portions of a basin characterized by complex pollution control problems. Basin plans: (1) provide water quality standards and goals, (2) define critical water quality conditions and (3) provide waste load constraints.

The Alamo Area Council of Governments and the San Antonio River Authority completed a Water Quality Management Plan in June, 1973, under section 3(c) of the Federal Water Pollution Act, as amended in 1965, which included the presently designated section 208 planning area.

The Texas Water Quality Board also has completed their basin planning effort under Part 131 of the State's section 303(e) requirements.

Section 208 planning will, therefore, continue where the 3(c), state 303(e) Part 131, and the AACOG Water Resource Management Plans left off. The Section 208 planning program will augment and improve these plans.

### 2. Relationship Between 208 and 201 Plans

Facilities plans cover the planning and preliminary design portions of plans and studies (Step 1 elements) related to construction of publicly owned waste treatment works. Facilities plans, through systematic evaluation of alternatives, are intended to assure development of cost effective and environmentally sound municipal waste treatment systems.

201 plans may be completed or in progress when the 208 areawide planning is undertaken, therefore AACOG is working closely with designated 201 agencies within their 208 area boundaries. Such planning should be construed as a step forward and supplementary to the 208 plan, however, due to time scheduling section 208 will not impede the progress of 201 plans.

3. Relationship Between 208 and 402 Permit Program

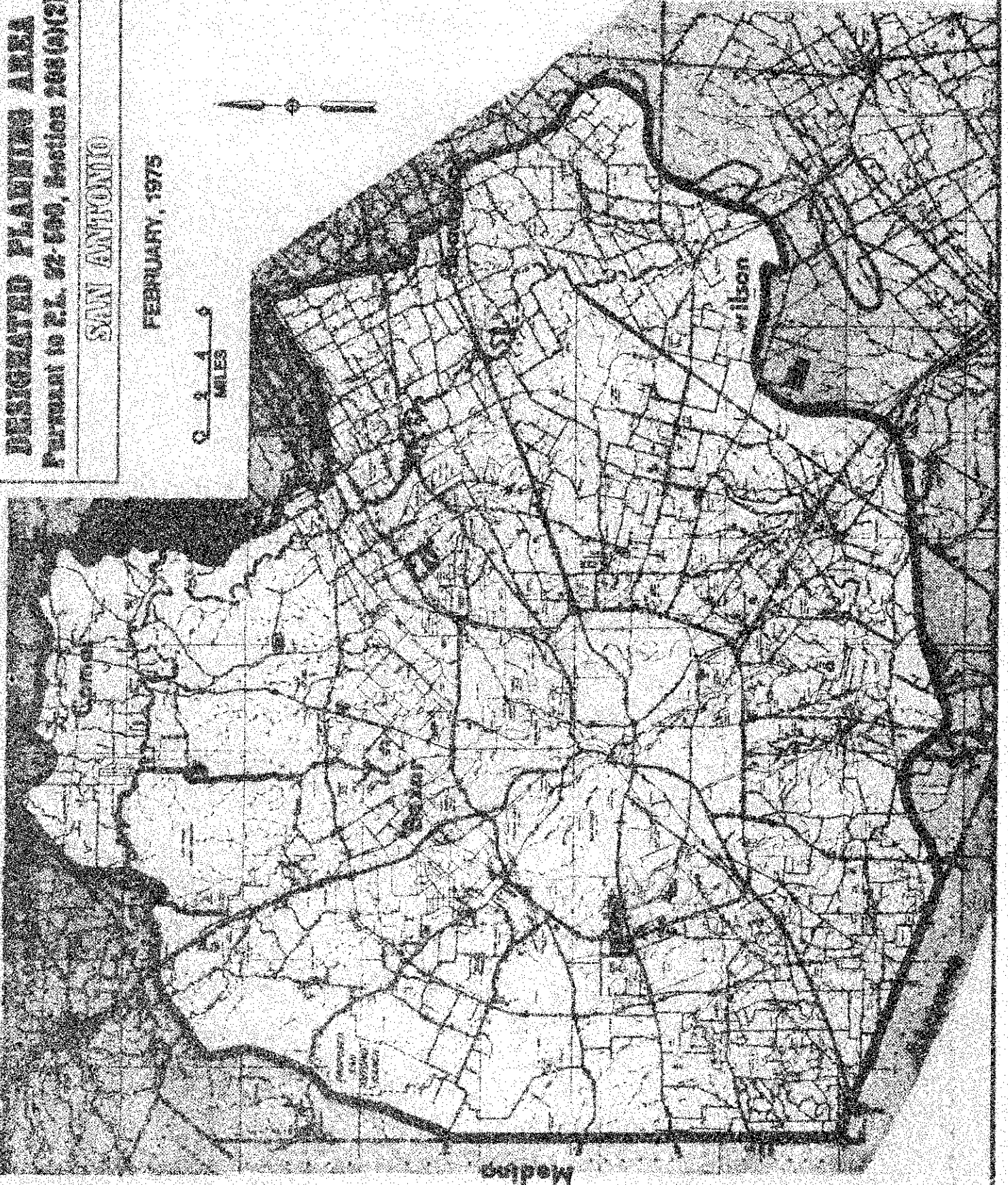
The 402 National Pollutant Discharge Elimination System Permit Program is designed to ensure that pollutant discharges will not exceed prescribed levels. The permit system provides an essential tool for implementation of the framework of the 303(e) basin plans. No permits may be issued for a point source if that point source conflicts with any relevant element of an approved section 208 plan.

**DESIGNATED PLANNING AREA**  
Pursuant to P.L. 92-193, Section 201(a)(2)

**SAN ANTONIO**

FEBRUARY, 1975

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MILES



#### E. Work Plan Tasks and CPM Chart

The tasks to be performed in order to formulate an Areawide Waste Treatment Management Plan are defined in the following section of this work plan.

The duration of the tasks, their interdependence, and their target completion dates are shown on the CPM Chart and the accompanying computer printout.



**TASK:**            Recruit 208 Staff and Define Responsibilities

**TASK SERIES:** 1.11

**Purpose of Task:**

Recruit and define the responsibilities of the "208" area-wide program staff.

**Methodology:**

1. Recruit staff:
  - a. Outline personnel policies.
  - b. Outline staff responsibilities and personnel tasks, also define interface linkage for "208" areawide program.
2. Advertise positions in news media, in-house bulletins, and public notices; call for resumes.
3. Screen job applicants' resumes.
4. Interview job candidates.
5. Follow Affirmative Actions Guidelines.
6. Hire staff.

**Input:**

1. AACOG:  
Section 208 of Public Law 92-500.
2. Consultant:

**Output:**

1. AACOG:
  - a. A "208" staff.
  - b. Establishment of priorities and responsibilities

to guide staff planning and management activities.

**2. Consultant:**

**TASK:** Design Detailed Work Program

**TASK SERIES:** 1.12

**Purpose of Task:**

To develop a detailed work program for the "208" planning process.

**Methodology:**

1. Evaluate EPA, state and local guidelines for "208" Planning.
2. Review task definition to project the overall scope and objectives of each task.
3. Develop overall plan for coordination of all agencies, federal, state, and local.
4. Develop project management.
5. Provide budget breakdown.
6. Provide time performance for each task.

**Input:**

1. AACOG:
  - a. Federal guidelines concerning 208 Planning.
  - b. PL 92-500 Section 208. .
  - c. AACOG "208" Grant Application.
2. Consultant:

**Output:**

1. AACOG:
  - a. Evaluation of EPA, state, and local guidelines for "208" planning.

- b. Development of management policies for the project.
- c. Summary of budget.
- d. Time schedule for performance of each task.
- e. Detail work unit plan for the "208" areawide plan.

2. Consultant:

**TASK:**            Prepare Contracts

**TASK SERIES:**  1.13

**Purpose of Task:**

Develop the methodology for soliciting proposals, selecting consultants and executing contracts.

**Methodology:**

1.    Prepare standard format for Request for Proposal (R.F.P.'s) which should include:
  - a.    Introduction
  - b.    Scope
  - c.    Objective
  - d.    Methodology
  - e.    Budget
  - f.    Time schedule
2.    Establish criteria for evaluating, ranking, and selecting consultants.
3.    Prepare standard format for contracts.

**Input:**

1.    AACOG:
  - a.    40 CFR Parts 33 and 35 as outlined in the Federal Register.
  - b.    EPA Guidelines as amended.
2.    Consultant:

**Output:**

1.    AACOG:
  - a.    Standard format for R.F.P.'s.
  - b.    Standard contract format.

c. Criteria for selection of consultants.

TASK: Establish San Antonio 208 "Areawide Planning Advisory Committee (APAC)"

TASK SERIES: 1.14

Purpose of Task:

To establish a committee to advise the AACOG Executive Committee on matters related to 208 planning.

Methodology:

1. Confirm members proposed by the Governor's Office in accordance with Executive Order 18.
2. APAC will function according to the state guidelines for the "Preparation of Areawide Waste Treatment Management Plans", June, 1975 prepared by TWQB, and in keeping with the "Guidelines for Public Participation" as established by the AACOG Executive Committee.
3. Establish APAC bylaws and receive approval of AACOG Executive Committee for bylaws and membership.
4. Schedule and organize monthly meetings.
5. Provide full support to committee functions.

Input:

1. AACOG:
2. Consultant:

Output:

1. AACOG:  
The development of the Areawide Planning Advisory Committee.
2. Consultant:

TASK: Public Participation/Education

TASK SERIES: 1.15

Purpose of Task:

To involve elected officials and the general public within the "208" planning area in the planning process from the beginning.

To develop tools to inform the public of plan costs and alternatives as this information is developed during the planning process.

To publicize and encourage broad participation in public hearings at critical stages of planning and to insure effective communications between planners and public.

To develop tools (graphics and written materials) for use in final stages of planning when selected plan and implementation procedures are presented to public bodies and, in turn, when elected officials must present the plan to their constituencies.

To develop a mechanism for providing technical assistance by agencies having water quality management responsibilities.

Methodology:

1. Establishment of Public Participation Subcommittee by Areawide Planning Advisory Committee, to work with AACOG Public Information staff and consultants in establishing and monitoring public participation program.
2. Establish a mechanism for providing technical assistance by agencies having water quality management responsibilities.
3. Circulation of Requests for Proposals for public participation/education and selection of consultant for Public Participation. Scope of work for Public Participation consultant will include:
  - a. Design and implement public participation process that will carry information activities through the planning period, public hearings and selection process, and will include, at a minimum, the following elements:



1. Coordination through AACOG staff and Public Participation Subcommittee of each stage of program, to insure proper direction and timing of public participation effort.
  2. Coordination of format of reports, maps, graphics, etc. called for as products of other consulting contracts.
  3. Production of minimum of three different flyer/brochures at various decision points.
  4. Develop material for use by speakers before public groups.
  5. Production and distribution throughout contract period of news releases and feature stories for use by daily newspapers, newsletters, and for circulation by AACOG to its members and others.
  6. Development of news feature and general interest spots, public service announcements, and other means of encouraging broadest possible television and radio coverage.
  7. Full production of one audio-visual presentation for use by involved agencies and governments in explaining alternatives of 208 plan.
- b. Input to Tasks 3.42 and 5.18, Public Hearings.
  - c. Other items as determined by approved design of public participation program.
4. Involvement of AACOG "indirect" staffs as follows:
    - a. Public Information:
      1. Supervision and coordination of work of Public Participation consultant, if contracted.

2. Liaison between Public Participation consultant and Public Participation Subcommittee.
3. Publication of articles and feature stories on 208 planning and related issues in AACOG newsletter.
4. Initial contact point for public and news media to insure adequate information is made available.
5. Circulation of agendas and minutes of meetings, along with news releases, as appropriate to area newspapers.
6. With Public Participation consultant, schedule and carry out press briefings and conferences.
7. Input to Tasks 3.42 and 5.18.
8. Other activities as determined in course of program.

b. Regional Services:

1. Coordination of County/RC&D Committees and member governments with "208" program to insure adequate flow of information.
2. Establishment of core group of speakers on "208" program and scheduling their appearances before member governments, committees, organizations, etc. Coordinate this activity through Public Information staff with Public Participation consultant.
3. Input to Tasks 3.42 and 5.18, Public Hearings especially as relates to three rural counties.

Input:

1. AACOG:
  - a. Public Information program coordination and activities.

- b. Regional Services staff activities.
- c. "208" staff for technical program input.
- d. Requests for proposals.
- e. Coordination with Public Participation Sub-Committee of APAC.

Output:

- 1. AACOG:
  - a. Published articles, newsletters.
  - b. Input to Tasks 3.42 and 5.18.
- 2. Consultant:
  - a. Program Design for Public Participation
  - b. All products called for in Methodology to include but not limited to:
    - 1. brochures, flyers,
    - 2. news articles,
    - 3. radio and T.V. spot broadcasts,
    - 4. AACOG staff briefings.
  - c. Input to Tasks 3.42 and 5.18.

TASK: Inventory, Collect and Review Basic Data

TASK SERIES: 2.11

Purpose of Task:

To develop an environmental data base for the San Antonio area for use in planning, implementing and updating the areawide "208" objectives. Basic to this purpose is:

- a. Characterization of the basic data required for the planning process,
- b. Collection and review of baseline data, and
- c. Providing a description on the structure of the data management to be used for "208" work.

Methodology:

1. Define and characterize the basic data and information required to examine regional water quality by subwatershed in the San Antonio "208" region.
2. Perform a data inventory to determine the information available, its location, and existing format.
3. Survey baseline data sources to include but not limited to:
  - a. United States Geological Survey
  - b. Army Corp of Engineers
  - c. National Oceanic and Atmospheric Administration
  - d. DOD
  - e. Texas Water Quality Board
  - f. Texas Water Development Board
  - g. Texas State Department of Health
  - h. Texas Air Control Board
  - i. Texas Parks and Wildlife Department
  - j. Texas Water Rights Commission
  - k. Texas Employment Commission
  - l. Texas Department of Agriculture
  - m. Bureau of Census
  - n. San Antonio River Authority

- o. Edwards Underground Water District
  - p. City of San Antonio
  - q. AACOG
  - r. City Public Service
  - s. City Water Board
  - t. Soil Conservation Service
  - u. Cibolo Creek Municipal Authority
4. Formally coordinate with the agencies that develop and maintain water resources oriented data to insure a uniform method of data acquisition that can be continued throughout the project.
  5. Collect and review existing baseline data in the areas of:
    - a. Water Quality
    - b. Hydrology and Hydraulics
    - c. Meteorology and Climatology
    - d. Systems maps and physical facilities breakdown
    - e. Land Use
    - f. Census and Economic Development
    - g. Legal, legislative and/or regulatory policies related to water resources, and
    - h. Existing point and nonpoint sources in the San Antonio River Basin.
  6. Develop a method so that as the baseline data is surveyed and compiled, it can be formatted, using a common sequence, (i.e., AACOG modified STORET number) and stored for easy access.
  7. Develop a San Antonio "208" areawide base map for use throughout the planning process.

Input:

1. AACOG:
2. Consultant:

Output:

1. AACOG:
  - a. San Antonio "208" Areawide Base Map.
  - b. Input to tasks 2.12, 2.13, 2.14, 2.21, 2.31, 2.61 and 2.62.
  
2. Consultant:
  - a. An identification of the specific data required for representing the characteristics of subwatersheds for areawide planning.
  - b. A list of the baseline data sources and the data compiled.
  - c. Printout of all old and newly acquired data located in the baseline files if it is available by computer, and
  - d. Instructions concerning how to store access, and use this data readily, i.e., a "208" information system manual.
  - e. Report entitled, "Description of Management Information System for Water Quality in San Antonio 208 area."

TASK: Identification of Existing Water Quality Problem Areas

TASK SERIES: 2.12

Purpose of Task:

Identification of the most critical water quality problem areas within the "208" area.

Identification shall be based on pollution sources, stream segments, and extreme environmental conditions by subwatershed and using the AACOG Modified STORET numbering system.

Identification of the critical stream segments possessing abnormal nutrient concentrations.

Methodology:

1. Utilizing the data assembled in Task 2.11, the information defining water quality in both streams and impoundments can be retrieved and the statistical distribution of this historical information at specific points along the river or in the lakes can be developed. Specifically the critical stream segments in the "208" region may be identified based on this data.

All the pollutant measurements, parameters for both conservative and nonconservative wastes shall be used; BOD<sub>5</sub> (five day), total suspended solids, total dissolved solids, organic nitrogen, ammonia nitrogen, chlorine demand, fecal coliform, total coliform, fecal streptococci, total phosphate, total hardness, and the heavy metals, etc.

2. If available, collect any information on the buildup of solids and other adverse environmental effects associated with the water quality in lakes used for cooling purposes in electrical power generation.
3. Identify the water quality problems resulting from the development of water-based recreation. This includes but is not limited to such developments as river walk expansion, riverside park development, and recreational lake construction, example, San Antonio Zoo, and

4. The water quality problems associated with temporary package wastewater treatment facilities and different types of private wastewater treatment facilities, including septic tanks in different subwatersheds of the planning area should be described from available data.

Input:

1. AACOG:
  - a. Historical data assembled in Task 2.11.
  - b. Assistance in retrieval of pertinent water quality information.
2. Consultant:

Retrieval of information defining water quality in streams and impoundments within the "208" planning area from all available data sources.

Output:

1. AACOG:

Input to Task 2.14 and 2.21.
2. Consultant:
  - a. The statistical distribution of historical water quality data including separate documentation on wet and dry weather conditions by specified points along "208" area streams and lakes.
  - b. Identification of critical stream segments.
  - c. Existing stream pollution and wasteload profiles including wet and dry conditions, nutrient concentrations and the phenomena of diurnal fluctuation.
  - d. Identification of documented environmental effects to water quality associated with Lake Calaveras and Lake Braunig as cooling lakes for electrical generation.



- e. Identification from available data of water quality problems resulting from development of water based recreation.
- f. Identification of known water quality problems in the planning area associated with temporary and private wastewater treatment facilities, to include septic tanks.
- g. Identification of data requirements not presently available.
- h. Report entitled, "Identification of Existing Water Quality Problem Areas."

TASK:                    Analysis of Water Uses

TASK SERIES:    2.13

Purpose of Task:

To determine the uses of surfacewater and groundwater in the San Antonio region.

To inventory the existing water rights regarding surfacewater in the San Antonio River drainage basin.

To inventory and assess the existent utilization of waste effluent (municipal and industrial) in the Section 208 area. This inventory will include usage for agricultural, municipal and industrial activities (cooling, etc.). The location magnitude and operational details of such usage shall be addressed.

Methodology:

1. Characterize current fresh water (surface and groundwater) use with respect to quantity and quality regarding municipal, and industrial use. Address irretrievable losses, including consumptive if possible, by subwatershed.
2. Assess the current extent of usage of wastewater for any type of intended beneficial use. This is to involve application method, crop type and land use if agricultural.
3. Address projected water demands over 5, 10 and 20 years. Forecast should include consumptive, non-consumptive, and evaporative.
4. Assess the availability of surfacewater and groundwater resources to meet future demand.
5. Analyze conjunctive use strategies of surfacewater and groundwater resources to satisfy future water requirements for the planning region.

Input:

1. AACOG:
2. Consultant:

Output:

1. AACOG:  
Input to Tasks 2.14 and 2.21.
2. Consultant:
  - a. An inventory of uses of surface and groundwater in "208" planning area.
  - b. An inventory of the existing water rights on surfacewater in S.A.R. drainage basin.
  - c. A projection of water demands (5, 10 and 20 years) for different sectors of regional economy, including quantification of consumptive requirements.
  - d. A description of the present extent of wastewater reuse in the San Antonio area comparing water demand versus water availability.
  - e. A report entitled, "Water Reuse Versus Water Availability in the "208" Region."

TASK: Water Quality Management Data System

TASK SERIES 2.14

Purpose of Task:

To develop the information storage and data retrieval mechanisms, and related computer programs for data integration and manipulation for areawide waste treatment management planning.

To organize existing regional files by subwatershed on the basis of the AACOG Modified STORET numbering convention.

To link the locally developed information system to the Texas Water Oriented Data Bank.

To characterize the subwatersheds by existing physical and manmade boundaries.

To develop and verify a special computer module for data manipulation and allocation by subwatershed.

Methodology:

1. Aggregate the local data files identified in Task 2.11 into a data system compatible with areawide waste treatment planning efforts.
2. Develop the necessary information storage and retrieval mechanisms to provide immediate storage, updating, correction, and retrieval capacities.
3. Group all the subwatersheds within the "208" planning area into a finite number of larger subareas to provide a ready interface between the local and state data banks. The following larger subplanning areas should be considered:
  - a. Medina River above Leon Creek,
  - b. Leon Creek,
  - c. San Antonio River above Salado Creek,
  - d. Salado Creek,
  - e. San Antonio River below Salado Creek,
  - f. Cibolo Creek above the City of Bracken,

- g. Cibolo Creek below the City of Bracken and Martinez Creek,
  - h. Martinez Creek,
  - i. Cibolo Creek below Martinez Creek and a proposed Cibolo reservoir site,
  - j. Cibolo Creek below the proposed reservoir site,
  - k. Inflows to Calaveras Lake,
  - l. Inflows to Braunig Lake, and
  - m. Medina River above the confluence with the San Antonio River to the confluence with Leon Creek.
4. Develop computerized interfacing with the Texas Water Oriented Data Bank interrelating the local subwatershed numbers to the key identification numbers of each file in the bank. The information to be contained in Texas Water-Oriented Data Bank should be organized into but not limited to:
- a. geographical information,
  - b. meteorological and climatological data,
  - c. biological resources,
  - d. surface and groundwater resources,
  - e. geological information,
  - f. socio-economic information including census and economic development data,
  - g. water quality information,
  - h. the existing wastewater discharge inventory,
  - i. the land use information, and
  - j. the unit cost information.
5. Characterize the subwatersheds by existing manmade and physical boundaries. Map all information and physical data defined by the boundaries and located in local files by subwatershed, and place in the Water Quality Data System. Although this data allocation and information mapping may be done initially by hand, computer programs are to be developed to carry out the process.
6. All computer programs, and printouts of the data system developed will be verified and documented.

Input:

- 1. AACOG:

From Task 2.11 a description of the management information system required in achieving 1983 Water Quality standards in the San Antonio area. Report will be as

submitted to AACOG from a consultant as required by 2.11.

2. Consultant:

Output:

1. AACOG:

- a. Review and analysis of information in local data files as presented by consultant and staff.
- b. Report on integration and allocation system and its use.
- c. Inventory of existing physical and manmade parameters related to defining subwatersheds.
- d. Input to 2.23, 2.61, 2.63, 2.71, 2.51, 2.52, 2.53, 2.54, and 2.32.

2. Consultant:

- a. An operable data management system for "208" areawide planning in the San Antonio region.
- b. A report describing the subwatersheds as grouped into larger zone files and the integration of these files with the Texas Water Oriented Data Bank.
- c. An analysis of all physical data and water quality information in local files by subwatershed.
- d. Instructions on how to use the data system and the information storage and retrieval mechanism.
- e. Documentation, disk and/or tape of the integration and mapping methods for information files as developed for the data system.
- f. A report indicating logical updating and processing procedures for data system and relating these procedures to the TWODB.
- g. Computer printouts of the data and programs stored and developed upon request.

TASK: Inventory of Point Sources

TASK SERIES: 2.21

Purpose of Task:

Complete the inventory of existing point sources.

Identify each continuous and intermittent point source in terms of physical characteristics, effluent quality and pollution potential.

Methodology:

1. Complete the inventory of existing point sources.  
List all point source discharges from 303(e) Basin Plan.
  - a. Using TQCB data, compile a list of municipal point source loadings.
  - b. Identify discharge permit holders designated after completion of the 303(e) Basin Plan.
  - c. Identify the location of discharges and plants for municipal, industrial, military (domestic and industrial) and privately owned.
2. Map Point Sources.
  - a. 208 area loading to show service areas;
    1. Existing service areas
    2. Unserved areas
    3. Trunks and interceptors
    4. Industrial discharges into municipal systems
    5. Continuous and intermittent point sources
      - a. Municipal
      - b. Industrial

b. Possible overlay combination for the above 208 maps:

Example A. Map 1;

Map showing continuous point sources

1. Municipal continuous point source,
2. Industrial continuous point source,
3. Map showing intermittent point source.

Example B. Map 2;

Map showing continuous point sources

1. Existing service areas,
2. Unserved areas,
3. Trunks, interceptors, lift stations,
4. Industrial discharges into municipal systems. and
5. Waste treatment plants.

3. Characterization of Municipal Point Sources:

a. Analyze the existing municipal point sources for;

1. Location of plant and discharge,
2. Service areas, existing and unserved,
3. Treatment system design;
  - a. Capacity,
  - b. Treatment process (i.e., primary/secondary, size, age, and condition of major units), and
  - c. Operational data (i.e., volume-flow average and maximum (mgd)).
  - d. Treatment process due to wet weather inflow (i.e., by-pass).

b. Analyze quality of effluent for municipal point sources in terms of but not necessarily limited to:

1. Nutrient loads, BOD<sub>5</sub>, COD, pH, alkalinity, chlorides and total dissolved solids, pesticides, trace minerals, heavy metals, and toxicants.



2. Present disposal location, sludge volume, type and location of the disposal site.
4. Characterization of industrial continuous and intermittent sources:
    - a. Analyze the industrial point sources for;
      1. Location of plant and discharge, and
      2. Treatment system design;
        - a. Capacity,
        - b. Process of treatment.
    - b. Analyze quality of effluent for;
      1. BOD<sub>5</sub>
      2. COD
      3. pH
      4. nutrient loads
      5. presence of toxic materials, i.e., (trace minerals, heavy metals)
        - a. type
        - b. volume,
      6. present disposal location of residual waste.

Input:

1. AACOG:
 

Readily available data and information from AACOG files.
2. Consultant:

Output:

1. AACOG:
 

Input into Tasks 2.22, 2.64, and 2.65.
2. Consultant:
 

A report entitled, "Inventory of Point Sources" and a bibliography of data sources is to be included in an appendix.

**TASK:**            Define Point Source Control Alternatives

**TASK SERIES:**    2.22

**Purpose of Task:**

Identify the available control strategies for point and intermittent point sources.

Characterize the pollutants which can be removed by a particular process or operation.

Quantify the pollutant ranges that can be removed by a particular process or operation.

Quantify the resources other than costs, (energy, chemicals, volume of structure, etc.) required for a given amount of pollutant removal.

Analyze the types and amounts of by-products resulting from using the process or operation to remove a given pollutant.

Identify the methods used to control the disposition of residual wastes and the land disposal of process-generated pollutants, i.e., effluent, sludge, etc., in such a manner as to protect both surfacewater and groundwater.

Address the impact of utilizing treated wastewater to recharge selected groundwater aquifers. Include evaluation of effects of natural improvement, i.e., denitrification, sediment absorption, phosphate reduction by algae, and biological improvement.

**Methodology:**

1. Based on literature and historical information define and evaluate alternative controls.
2. Compile a list of alternative controls by categories to include the following, but not limited to:
  - a. Technical Treatment Alternatives
    1. Biological
    2. Physical/Chemical
    3. Sludge utilization
    4. Effluent utilization.

- b. Economic incentives to influence the quantity/quality of wastes that are generated and discharged to public sewer systems.
    1. User fees based on the quantity/quality/types of pollutant discharge into the public sewer system.
    2. Marginal cost pricing for the use of sewer systems.
  - c. Regulations of discharges to public sewer systems.
3. Analyze the type and amounts of by-products (sludge and effluent) resulting from using the process or operation designed to remove a given pollutant.

Input:

1. AACOG:  
Output from Task 2.21.
2. Consultant:

Output:

1. AACOG:  
Input into Task 2.23.
2. Consultant:
  - a. Identification of the available control strategies for point and intermittent point sources.
  - b. An analysis and definition of the various alternative methods to control continuous and intermittent point sources of pollution. This analysis should:
    1. Characterize and quantify the pollutants that can be removed by each control alternative.
    2. Quantify the resources other than cost required for each control alternative.

- c. An analysis of the types and amounts of by-products resulting from using the processes or operation to remove a given pollutant. Assign the constraints on the use of each particular process.
- d. A literature survey of the natural treatment capabilities of aquifer recharge zones and the impact of recharging selected aquifers with wastewater.
- e. A report entitled, "Alternative Systems for Point Source Control". A bibliography of data sources is to be included in an appendix.

TASK: Cost of Point Source Alternatives

TASK SERIES: 2.23

Purpose of Task:

To develop unit costs for each of the point and intermittent point source control alternatives. These unit costs will be used to assess the cost of the technical subplan alternatives. In addition, the task should include a description of a methodology for adjusting the cost data to a national price index, such as the appropriate Engineering News Record Cost Index.

Methodology:

1. Determine the requisite initial capital expenses and the applicable O & M costs for each control alternative.
2. Analyze the operating costs for each treatment method versus the degree of efficiency of the process or the percent removal of the pollutant.
3. Analyze the cost sensitivity of each treatment process versus the design criteria.
4. Analyze the cost constraints imposed by local material supply conditions.
5. Analyze the cost of each treatment process in terms of expendable resource requirements, (chemicals, sands, filters, etc.)
6. Develop a costing model utilizing the above cost variables for the point source control alternatives.

Input:

1. AACOG:
  - a. Point and intermittent point source control alternatives from Task 2.22.

- b. Costing information contained in the data integration system from Task 2.14 to at least include the EPA costing analysis of point and nonpoint sources.

2. Consultant:

Output:

1. AACOG:

Input into Task 2.24.

2. Consultant:

- a. The contractor shall prepare a computer program including documentation for a cost analysis model for point source controls.
- b. The design of this program will be coordinated with Data Systems consultant and AACOG staff.

TASK: Environmental Assessment of Point Source Control Alternatives

TASK SERIES: 2.24

Purpose of Task:

The purpose of this task is to assess the environmental impact of the point source control strategies applicable to the San Antonio "208" area. The assessment statement should examine the social and economic externalities, indirect benefits and the economic tradeoffs for each point source category.

Methodology:

Each of the point source alternatives must be discussed in light of the topics outlined in the National Environmental Policy Act; description of the proposed alternative, the environmental effects, relationship between local short-term productivity, and irreversible and irretrievable commitments of resources. The primary and secondary impacts, both beneficial and adverse, anticipated from each alternative on the existing environmental settings must be discussed. Also, the tradeoffs, benefits and cost of each alternative will be quantified.

1. Description of the Proposed Action:

This section should provide a summarization of the alternatives.

2. Environmental Impact of the Proposed Action:

The primary and secondary beneficial and adverse environmental impacts of the chosen alternatives should be discussed along with socio-economic externalities.

3. Adverse Environmental Impacts:

Discuss the adverse impacts of project implementation and the measures to be used to lessen these adverse impacts.

4. Relationship between Local Short-Term Use of the Environment and Maintenance and Enhancement of Long-Term Productivity:

Describe the cumulative and long-term effects of the proposed action which either significantly enhance or adversely impact the environment for future generations. The desirability of the proposed action should be weighed to guard against short-sighted foreclosure of future options or needs. Particular consideration should be given to the following points;

- a. construction and operation
- b. influences on growth and land value.

5. Irreversible and Irretrievable Commitments of Resources:

Describe the extent to which the proposed action limits the diversity and range of the beneficial uses of the environment. This action should include the following:

- a. land use commitments
- b. energy commitments
- c. water resources
- d. labor and material commitments
- e. scientific resource commitments
- f. historical and archeological resource commitments
- g. biological resource commitments
- h. other commitments unique to the project or AACOG "208" area.

6. Assist AACOG in a Public Participation Program designed to identify sensitive areas, develop priorities and identify impact problems.

7. Develop a Modular Computer data retrieval program which is self-contained. This module should provide a summary of impacts versus a given control alternative for point sources.

Input:

1. AACOG:

Point source control alternatives from Task 2.22.

2. Consultant:



Output:

1. AACOG:

Input into Task 2.65.

2. Consultant:

- a. Assist AACOG in a Public Participation Program to to identify sensitive areas, develop priorities and identify impact problems.
- b. Develop a modular computer data retrieval program which is self-contained. This module should provide a summary of impacts versus a given control alternative for point sources.
- c. Prepare and submit an Environmental Assessment according to N.E.P.A. guidelines for each point source alternative which shall enable the preparation of an Environmental Impact Statement should one be required.

TASK: Population, Employment, and Land Use Projections

TASK SERIES: 2.31

Purpose of Task:

Population and employment, by affecting land use, have interlocking relationships with wastewater treatment management. Comprehensive land use plans funded by HUD, transportation network plans funded by DOT, air quality plans funded by EPA, other land related plans developed by state and local agencies, as well as current developmental trends modified by policy decisions of local governmental units will be incorporated into five land use scenarios. These scenarios will include, at a minimum, projections of population, employment, and land use for the following five trends:

1. Existing trends.
2. Existing trends with minimal growth over the Edwards Aquifer recharge area.
3. Emphasis on downtown redevelopment.
4. Emphasis on southwest and southeast development.
5. That scenario chosen as preferred for the San Antonio Comprehensive Plan.

The projection years will be 1983, 1990, and 1995 while the geographical units of analysis will be the man-made divisions in the 208 planning region.

Methodology:

1. Population:
  - a. Estimate current population by man-made boundaries by using current residential acreage, housing density estimates, and persons per dwelling unit estimates.
  - b. Obtain expected total new dwelling units by using expected population growth and persons per dwelling unit estimates. Calculate expected total new residential acreage by using total new dwelling units and dwelling units per acre estimates.

- c. Distribute new residential acreage based on comprehensive city/county plans, current and expected zoning, and current developmental trends, with holding capacity of the man-made boundaries used as a control. Holding capacity in different years will be based on select land use policy criteria as well as physical limitations.
- d. Projected population by man-made subareas using dwelling unit per acre estimates, distributed residential acres, and persons per dwelling unit estimates.

2. Employment:

Forecast total employment by major industry group\* using TEC and BEA historical data. Analyze trends in historical data and modify them by examining labor force projections and economic development plans in the AACOG region.

\*Major industry groups will include agriculture, mining, construction, manufacturing, government, proprietors, services, trade, communications, and public utilities, finance and real estate, and smaller categories if determined necessary.

3. Land Use:

- a. Use the total employment and population projections above to calculate projections of new industrial and commercial acreage required in the 208 area in the forecast years.
- b. Allocate, to man-made subareas, the industrial and commercial acreage based on current and expected zoning, studies of industrial and commercial site location, residential distribution, and select land use policy criteria.
- c. Use state and local highway and street plans, AACOG Open Space Plan, Soil Conservation Service, and other state and local agency plans to project the location and acreage of bodies of water, channels, open space, irrigated and dry cropland, pastureland, and rangeland by man-made subareas.

Input:

1. AACOG:
  - a. 208 area population projection totals.
  - b. 208 area current land use acreages from Task 2.11.
  - c. Comprehensive city/county plans.
  - d. Current and expected zoning in 208 area outside Bexar County.
  - e. Land use policy criteria.
  - f. TEC and BEA historical data.
  - g. Labor force projections.
  - h. Economic development plans for the AACOG region.
  - i. Information from Soil Conservation Service maps.
2. Consultant:
  - a. Housing density estimates.
  - b. Persons per dwelling unit estimates.
  - c. Current and expected zoning in Bexar County
  - d. Physical limitations to development.
  - e. Studies of industrial and commercial site location.
  - f. State and local highway and street plans.
  - g. Local utility expansion plans.

Output:

1. AACOG:
2. Consultant:
  - a. Current population by man-made geographical subareas.

- b. Total new residential acres needed (low, medium, and high density) in projection years.
- c. Projected residential acres distributed by man-made subareas.
- d. Projected population by man-made subareas.
- e. Total 208 area employment in projection years by major industry group.
- f. Total 208 area new industrial and commercial acreage in the forecast years.
- g. Projected industrial and commercial acreage distributed by man-made subareas.
- h. Projected water, open space, dry and irrigated cropland, pastureland, and rangeland acreages by man-made subareas.
- i. Report entitled, "Population, Employment, and Land Use Projections in the 208 Planning Region."

TASK: Automation of Land Use Projection Process

TASK SERIES: 2.32

Purpose of Task:

In order for updated information to be quickly incorporated into the land use scenarios, an automated projection process is needed. This process will also allow for growth scenarios to be produced so that the impacts of policy decisions on land use can readily be determined. This capability will provide a useful tool for policy makers in evaluating the results of their actions.

Methodology:

1. If feasible, develop a computerized land use model to automate the total to small area distribution process for residential, industrial, and commercial acreages developed in 2.31.
2. Input to the model should include control totals for population and employment, the current land use distribution, projected distribution of open space, water, major roads and farmland, and holding capacities based on physical limitations as well as select land use policy criteria.

Input:

1. AACOG:
  - a. Water Quality Management Data System from Task 2.14.
  - b. Land use scenarios, prediction methodologies and results developed in Task 2.31.
2. Consultant:

Output:

1. AACOG:

Input to Task 5.16.

**2. Consultant:**

- a. Interactive land use model with documentation on how to use the model as well as how it works internally.**
- b. Report entitled, "User's Manual on the Land Use Model Developed for 208 Waste Treatment Management Planning in the AACOG Region."**

**TASK:** Identify data requirements to adapt models to high flow conditions, improve parametric coverage, and improve accuracy of existing models.

**TASK SERIES:** 2.41

**Purpose of Task:**

To identify the data needs of the mathematical models of dissolved oxygen, biochemical oxygen demand, and coliform bacteria to be developed for the San Antonio River (1901), Cibolo Creek (1902), Medina River (1903), Leon Creek (1906), and Salado Creek. Models are to be prepared for each segment to include a calibrated and verified steady state model and a preliminary stormwater model capable of predicting time variable stream response to dynamic stormwater loading. These models will be utilized to evaluate various wastewater management alternatives developed in Task 5.12.

**Methodology:**

1. Collect and evaluate all pertinent historical data (quality and hydraulic) for the area if not done during original modeling effort.
2. Assess the currently available data to determine its adequacy for use in the new modeling effort and identify additional data which is required to improve the calibration and verification of the model.
3. Develop a sampling program which describes in detail the location, frequency, and parametric coverage of the sampling. One of the goals of the data gathering program should be the identification of areas affected by photosynthesis and benthic demand.
4. A short report will be produced which will describe the required data collection program. Included in the report will be a map or series of maps which will show the location of the sampling points.
5. The sampling program at each sample point will be described in detail and this description will include a definition of the frequency of samples and the parameters to be covered. Meanwhile, recommendations concerning sampling techniques will also be made.



Input:

1. AACOG:
2. Consultant:

Output:

1. AACOG:  
Input into Task 2.42.
2. Consultant:
  - a. Documentation of historical pertinent data and areas which require more data.
  - b. Documentation of a sampling program which will provide the necessary data to verify and calibrate existing models.
  - c. Report entitled, "Water Quality Modeling Sampling Program."

TASK: Collect Data to Improve Models

TASK SERIES: 2.42

Purpose of Task:

The purpose of this task is to collect samples at strategic sampling locations to determine basic quality parameters according to the recommendations from Task 2.41.

Methodology:

1. Location of Sampling Stations

One or more stations located above any significant dischargers to determine background quality parameters should be installed. Assuming there is one major sag zone, one station should be established at a point downstream from the discharges to insure sufficient mixing. Two or more additional stations are required within the sag zone in order to define the shape well enough that rate coefficients in the model can be adjusted accordingly. Some of the strategic sampling locations are recommended as follows:

a. Segment 1901 - San Antonio

Approximately 6 to 8 stream sampling stations will be needed for the calibration and verification of a water quality model of Segment 1901. The basic data set should be sufficient. The following stations should be established;

1. Two stations above the Rilling Road Wastewater Treatment Plant,
2. Two stations, one above and one below the Medina River confluence, and
3. One or more stations, as needed, to characterize the major sag zone.

b. Salado Creek

Approximately six stations will be needed. The basic data set should be sufficient.

c. Segment 1902 - Cibolo Creek

Approximately six stations will be needed. They should be located at and below Highway 78 in

Universal City since this includes all flowing portions of Cibolo Creek during drought periods. In addition to the basic data set, the following parameters should be determined:

1. Additions to Nitrogen Series (Nitrate, Nitrite),
2. Phosphorous (Total and Ortho), and Total Organic Carbon.

d. Segment 1903 - Medina River

Approximately six stations will be needed, with the emphasis on the area below the Leon Creek confluence. The basic data set will be sufficient.

e. Segment 1906 - Leon Creek

Approximately six stations will be needed. The basic data set should be sufficient.

2. Data Requirements at each station.

General;

- a. Characterize the general nature and appearance of the stream in descriptive terms. Include land use, weather, flow, vegetation, composition of streambed, etc.
- b. Measure the cross-section properties.
- c. Measure the flow.

Field Measurements;

Determine the following every 4 hours for 16 hours (5 samples, beginning 6:00 a.m.). Take measurement at depth of 1.0 feet when stream depth is less than 5.0 feet, and at 1.0 feet plus increments of 5.0 feet for depths over 5.0 feet:

- a. Dissolved Oxygen,
- b. Temperature,
- c. Conductivity, and
- d. pH.

Input:

1. AACOG:  
Output from Task 2.41.
2. Consultant:
  - a. Coordination of the modeling data collection (sampling) project.
  - b. Inputs from part 2 of the methodology sampling, from Modeling Data Collection Proposal by the San Antonio River Authority.

Output:

1. AACOG:  
Input into Task 2.43.
2. Consultant:
  - a. The required sampling data as set out by TWQB in Task 2.41 for model verification.
  - b. Assessment of the data requirements at each station.
  - c. A characterization of the nature and appearance of stream; weather flow, vegetation, measure cross-section, and measure flows.
  - d. Report entitled, "Survey Results for Stream Characteristics - San Antonio Area."

TASK:                    Revise Coefficients for Existing Models.

TASK SERIES:        2.43

Purpose of Task:

The purpose of this task is to incorporate the data obtained through Task 2.42 into existing steady-state stream models to improve the models' predictive capability. These models will be used to evaluate alternate water quality management plans. In addition, preliminary nonsteady-state models are also to be developed (by adapting existing programs).

Methodology:

1. Calibrate and verify the steady-state model, if possible, by two steady-state flow conditions and corresponding water quality data sets.
2. Preliminary nonsteady-state model should be developed to predict the impact on water quality of time variable wasteloads due to stormwater runoff. Existing stormwater models will be utilized in this task and tailored to the following five segments within the study area:

<u>Stream Segment</u>	<u>Parameters Modeled</u>
Segment 1901: San Antonio River--that portion impacted by the 208 Designated Area	BOD, DO, Fecal Coliform
Unclassified: San Antonio River--Salado Creek Tributary	BOD, DO, Fecal Coliform
Segment 1902: Cibolo Creek that portion impacted by the 208 Designated Area	BOD, DO, Fecal Coliform NO <sub>3</sub> , NO <sub>2</sub> , Organic N, phosphorus
Segment 1903: Medina River--that portion with the 208 Designated Area	BOD, DO, Fecal Coliform
Segment 1906: Leon Creek	BOD, DO, Fecal Coliform

This model should utilize the flow and quality estimates developed in Task 2.51, 2.52, 2.53, and 2.54.

3. Evaluate data (all available data and data from Task 2.42) to establish model segmentation required to define the major gradients of BOD, DO, and coliform, as well as problem areas of benthic demand and photosynthesis.
4. Analyze all data to determine hydraulic coefficients, decay rates and reaeration rates.
5. Input all point source wasteloads into the model and calibrate/verify with the data from Task 2.42.
6. Adjust the model to the 7 day-2 year low flow condition.
7. Finally, a more nearly calibrated and verified version of a steady-state stream model should be developed for the prediction of concentrations of dissolved oxygen (DO), biochemical oxygen demand (BOD), and coliform bacterial for Stream Segment 1901 (San Antonio River), 1902 (Cibolo Creek), 1903 (Medina River), 1906 (Leon Creek), Salado Creek and also for the prediction of concentrations of  $\text{NH}_4$ ,  $\text{NO}_3$ ,  $\text{NO}_2$ , Organic N, and Phosphorus for Cibolo Creek. A total of 50 computer runs shall be provided.
8. Meanwhile, a nutrient assessment should be conducted for Cibolo Creek utilizing a steady-state model to predict and account for the major interactions of the nutrient cycles, algae production, benthic oxygen demand, carbonaceous oxygen uptake and capability should also be utilized to assess the impact on water quality of nutrient removal through wastewater treatment or nutrient reduction through nonpoint controls.
9. The models developed should be documented in a final report which will indicate the manner in which the data from Task 2.42 was utilized. Calculations of coefficients along with assumptions should be documented. The documentation report should also include an extensive sensitivity analysis of the models such that the planning agency can be aware of the limitations and characteristics peculiar to the models. In addition the required format for model input for the alternative subplans in Task 2.72 should be developed in this report.
10. Simplified mathematical modeling should be incorporated to develop a predictive capability for those streams which are not specified above. These simplified models should comply with the EPA's simplified analysis for stream quality.

Input:

1. AACOG:  
Output from Task 2.42.
2. Consultant:

Output:

1. AACOG:  
Input into Task 2.64, 2.58, 4.12, and 5.16.
2. Consultant:
  - a. Sampling data as input into existing models and calibration and verification of the steady state models for both high and low flow conditions. All data from Tasks 2.51, 2.52, 2.53, and 2.54 should also be loaded as well as hydraulic coefficients, decay rates, and reaeration rates.
  - b. Adjustment of the model to reflect 7 day-2 year low flow conditions.
  - c. From the models, predictions of DO, BOD, and fecal coliform for segments 1901, 1902, 1903, 1906 and Salado Creek. Also, nitrates and phosphates should be predicted for 1902.
  - d. Predictive capability for those streams which are not specified above.
  - e. Clean up models and check their validity against known factual conditions.
  - f. Report entitled, "Refined Water Quality Simulation for the San Antonio "208" Planning Area."

TASK: Magnitude of Nonpoint Source Urban Runoff

TASK SERIES: 2.51

Purpose of Task:

To estimate the existing and projected magnitude of urban runoff on the stream segments in the "208" study area.

To estimate the magnitude of daily solid loading rates\* of pollutants, including total and fecal coliform from existing (historical) data in each subwatershed, utilizing climate, land use and average daily traffic.

To assess urban runoff quantity and quality characteristics using rainfall patterns, historical droughts, antecedent precipitation amount, type and variance of vegetative cover, soil moisture and other pertinent factors.

To characterize the composition of urban runoff based upon land use, pavement type, traffic-related pollutants, airborne pollutants, street sweeping methods, litter effects, roofed areas, etc.

To determine the effects of the use of fertilizers, pesticides, herbicides, toxic and hazardous substances, and other chemicals on the quality of urban runoff.

To document the reliability of data used to determine individual pollutant solids loading rates.

Methodology:

1. Estimate the magnitude of urban runoff on the stream segments in the study area based on the existing land use and distribution utilizing historical data.

\*Solids loading rates are defined as the quantity of pollutant discharges to surfacewater or groundwater per unit of time, Ex., solids loading rates = lbs/curb mile/day. Solids loading rates can also be readily expressed in acres of street surface by applying an equivalence factor. Street length data are available from local public works departments, street departments or by measurement or aerial photographs or topographic maps. Daily total loading of coliform should be expressed in terms of numbers/gram of solids.



2. Estimate the magnitude of urban runoff discharges in terms of runoff polluttional solids loading rates and coliform loads in individual subwatersheds within the 208 planning area.
3. Characterize the hydrological and meteorological relations of urban runoff parameters both qualitatively and quantitatively, i.e., rainfall intensity, rainfall variation, antecedent dry weather period.
4. Define the study (subwatershed) area in terms of land use\*\*, climate and average daily traffic.
5. Determine pollutant loading rates and pollutant composition, based on existing data.

Input:

1. AACOG:
  - a. Historical data from Task 2.11 to supplement results.
  - b. Summation of pertinent literature.
  - c. Land use map.

Output:

1. AACOG:

Input into Tasks 2.55, 2.58, 2.64, 2.71 and 5.16.
2. Consultant:
  - a. Estimate magnitude of urban runoff solids load by subwatershed. The estimate will be based upon existing data.
  - b. Estimate individual pollutant loading rates by subwatershed.

\*\*Open space, residential, commercial, light industry, heavy industry, parks. (These data will be supplied by AACOG).

- c. Provide all data necessary to adequately predict wasteloads per subwatershed, i.e., data in terms of solids loading (micrograms/gram of dry solids); data in terms of total and fecal coliform (numbers/gram of dry solids); runoff rates of a storm of specified intensity. Consultant will choose the storm of specified intensity--or critical storm--(that which has the most severe impact upon water quality). The critical storm may vary with antecedent conditions, seasons, etc.
- d. Coordinate definition of critical storm with TWQB modeler developing non-steady state predictive model.
- e. The solids loadings rates referenced in 2.(c) will be reported by land use categories, i.e., (open space, residential, commercial, light industrial, heavy industrial, parks, etc.).
- f. Determine origin of known nonpoint sources of pollution and indicate the areas on a map. Emphasis should be placed upon:
  - 1. Priority areas of high nonpoint pollution potential.
  - 2. Land use correlation
  - 3. If possible, indicate point of discharge of catchment to the stream or watercourse.
- g. The following historical or existing data is required for input to the Texas Water Quality Board non-steady state (time variable) model for calibration purposes in Task 2.43:
  - 1. Estimate the critical storms used to predict loadings; i.e., those storms which have the most severe impact on water quality. The critical storm may vary with antecedent conditions, seasons, etc.
  - 2. Determine and identify the major sources of nonpoint pollution by specific locations on the following segments:

- a. 1901 - San Antonio River
- b. 1902 - Cibolo Creek
- c. 1903 - Medina River
- d. 1906 - Leon Creek
- e. Unclassified - Salado Creek

The sources may be storm sewers, canals, tributaries, etc.

Time variable flow and pollutant loading for BOD<sub>5</sub> (in lbs/day) and fecal coliform (in MPN/minute) at each source as it enters the main segment is required.

**TASK:**           **Assess Magnitude of Solid Waste Disposal as a Nonpoint Source of Pollution.**

**TASK SERIES:**   **2.52**

**Purpose of Task:**

Determine the sources, amounts, and types of pollution generated from solid waste disposal areas.

Locate and determine the pollution potential of existing sites per subwatershed in the San Antonio 208 planning area.

Assess the leachate produced by each disposal site in terms of toxic pollutants from existing data.

Assess the availability of usable land for proposed new sites.

Evaluate the extent of nonpoint waste subwatershed loading for solid waste disposal sites based on municipal and industrial sources within the 208 planning area.

**Methodology:**

1. Literature surveys will be done and the results correlated with the known conditions in the San Antonio 208 planning area.
2. Solid waste disposal sites, active, inactive, and defunct should be related to their respective subwatershed and point sources discharges if any.
3. Existing land use practices, trends, and soil classifications will be reviewed by subwatershed. Excellent detailed soil classification maps covering the San Antonio 208 area are available from the Soil Conservation Service, USDA.
4. Amounts, range of concentration and types of pollution generated from solid waste disposal areas will be documented if possible. Pollutant types to be investigated (from existing data) will include, but not be limited to biologics, pathogens, viruses, heavy metals, organic and inorganic chemicals, toxic substances and nutrients.

5. A description of landfill practices, techniques, etc. with respect to their influence on the generation of subsurface pollution should be carried out.
6. Each subwatershed should be assessed in terms of its ability to support acceptable solid waste sites which will maintain water quality in the groundwater aquifer or standards in the receiving stream.

Input:

1. AACOG:  
San Antonio 208 Area Base Map.
2. Consultant:

Output:

1. AACOG:
  - a. Literature survey of solids waste disposal by landfills.
  - b. Input into Tasks 2.55, 2.58, 2.64, 4.12 and 5.16.
2. Consultant:
  - a. Inventory of all solid waste disposal (existing and proposed) sites and key to a map. Sites within their respective subwatersheds and relationship to the nearest point of discharge will be noted. In conjunction with this inventory, land use practices, trends, and soil characteristics will be provided.
  - b. Analyze character of solid waste disposal sites and land fill practices indicating the sources, types, and amounts of pollutants leaching from the sites (from available data). Provide, if possible, average loading rate of pollutant (at-site emission rate).
  - c. Evaluate landfill practices, techniques and alternatives (corrective measures) for subsurface pollution resulting from abandoned open garbage dumps and other abandoned solid waste disposal sites.

d. The following historical or existing data is required for input to the Texas Water Quality Board non-steady state (time variable) model for calibration purposes in Task 2.43:

1. Estimate the critical storm used to predict loadings; i.e., those storms which have the most severe impact on water quality. The critical storm may vary with antecedent conditions, seasons, etc..
2. Determine and identify the major sources of nonpoint pollution by specific locations on the following segments:
  - a. 1901 - San Antonio River
  - b. 1902 - Cibolo Creek
  - c. 1903 - Medina River
  - d. 1906 - Leon Creek
  - e. Unclassified - Salado Creek

The sources may be storm sewers, canals, tributaries, etc.

Time variable flow and pollutant loading for BOD<sub>5</sub> (in lbs/day) and fecal coliform (in MPN/minute) at each source as it enters the main segment is required.

- e. Report entitled, "Assesment of Nonpoint Source Loading by Watersheds Associated with Solid Waste Disposal."

TASK: Assess Septic Tank Impacts

TASK SERIES: 2.53

Purpose of Task:

To assess the impact of septic tank, cesspool and privy operation on water quality and to determine the areas where these facilities contribute to water quality problems.

Methodology:

1. Determine the areas by subwatershed where standard septic tank, cesspool and privy operation could result in water quality problems. This would involve evaluation of:
  - a. soil type\* and thickness
  - b. depth to bedrock,
  - c. geology of bedrock,
  - d. effective drainage field area
  - e. depth to groundwater table
  - f. flood plain hazard
2. Determine the types of pollution resulting from septic tank, and cesspool operation in terms of both surface-water pollution and groundwater pollution. This information may be obtained from the Texas Department of Health Resources.
3. Evaluate the magnitude and nature of septic tank operations involving elements other than pollution, i.e., odors, nuisance factors, insects, etc.

Input:

1. AACOG:

Land use and related base map from Tasks, 2.11, 2.31, and 2.32.

\* From Soil Conservation Service, USDA.

2. Consultant:

Output:

1. AACOG:

Input into Task 2.55, 2.58, 2.64, 4.12 and 5.16.

2. Consultant:

- a. A literature survey relating septic tanks to land use and potential wasteloads.
- b. Pollution loading rates, if possible, resulting from septic tank and cesspool operation in terms of both surface and groundwater pollution.
- c. Restrictive conditions which would prohibit septic tank use. Define the restrictions, i.e., soil type and thickness, depth to aquifer, flood plain hazard, etc.
- d. Identification of areas where septic tanks would pose water quality problems and evaluate the effects of these problems. Also identify those areas where septic tanks are faced with serious technical constraints but generate no significant water quality problems.
- e. Assess septic tank problems, aside from those which are water quality related, that create nuisances due to malfunctioning, odors, insects, surface seepage, etc.
- f. Maps showing location of septic tank concentration, and where septic tanks are ineffective in protecting water quality.
- g. Report entitled, "Assessment of Nonpoint Source Loading by Subwatersheds Resulting from Septic Tank Operations."



TASK: Assess the Magnitude of Agricultural, Mining Construction and Hydrologic Modification Activities

TASK SERIES: 2.54

Purpose of Task:

To estimate the existing magnitude of agricultural, mining, construction and hydrologic modification activities on the stream segments in the San Antonio "208" planning area.

To estimate the magnitude of daily solids loading rates of pollutants including BOD<sub>5</sub> and total and fecal coliform, from existing data, in each subwatershed in the San Antonio "208" planning area.

To assess agricultural, mining and construction runoff quantity and quality characteristics using rainfall patterns historical droughts, antecedent precipitation, vegetative cover characteristics, and other pertinent factors.

To characterize the composition of agricultural runoff based upon use of fertilizers, pesticides, herbicides, on-land application of wastewater and sludge. Characterize the composition of runoff due to construction, mining and hydrologic modification activities with particular attention paid sedimentation.

To evaluate the effects of the Subject activities upon both surfacewater and groundwater in the San Antonio "208" planning area.

To document the reliability of data used to determine individual pollutant solids loading rates.

Methodology:

1. Perform a literature survey to identify established techniques for determining and quantifying wasteloads generated by agricultural, construction, mining and hydrologic modification activities.
2. Assess the existing magnitude of pollutant runoff from agricultural, mining and construction activities on the "208" study area stream segments based upon existing land use and historical data.

3. Identify the types of pollutants resulting from the subject activities. These should include but not be limited to:
  - a. sediment
  - b. total solids
  - c. pesticides
  - d. herbicides
  - e. nutrients
  - f. solid wastes
  - g. organic debris
  - h. industrial chemicals
  - i. total and fecal coliform
  
4. Estimate the magnitude of runoff discharges from agricultural, mining and construction activities in terms of runoff pollutional solids rates and coliform in individual San Antonio "208" subwatersheds.

Input:

1. AACOG:
  - a. Historical data from Task 2.11.
  - b. Summation of pertinent literature.
  - c. Land use map.

Output:

1. AACOG:

Input into Tasks 2.55, 2.58, 2.64, 2.71 and 5.16.
  
2. Consultant:
  - a. Estimate magnitude of agricultural, mining and construction activity runoff solids loads by subwatershed. The estimate will be based upon existing data.
  
  - b. Estimate individual pollutant solids loading rates by subwatershed.

- c. Provide all data necessary to adequately predict waste loads per subwatershed, i.e., data in terms of solids loading (micrograms/gram of dry solids); data in terms of total and fecal coliform (numbers/gram of dry solids); runoff rates of a storm of specified intensity. Consultant will choose the storm of specified intensity--- or critical storm (that which has the most severe impact upon water quality and which will be characterized by its duration, average intensity, and frequency of occurrence). The critical storm may vary with antecedent conditions, seasons, topography, vegetative cover, etc.
- d. Coordinate definition of critical storm with TWQB modeler developing non-steady state predictive model.
- e. The solids loading rates references in 2.(c) will be reported by categories, i.e., land use (cropland, rangeland, pastureland, active construction sites, mines, etc.).
- f. Determine origin of known nonpoint agricultural, mining and construction sources of pollution and indicate the areas on a map. Emphasis should be placed upon:
  - 1. Priority areas of high nonpoint pollution potential.
  - 2. Land use correlation.
  - 3. Point of discharge of catchment to the stream or watercourse, if available.
- g. The following historical or existing data is required for input to the Texas Water Quality Board non-steady state (time variable) model for calibration purposes in Task 2.43:
  - 1. Estimate the critical storm used to predict loading; i.e., those storms which have the most severe impact on water quality. The critical storm may vary with antecedent conditions, seasons, etc.

2. Determine and indentify the major sources of nonpoint pollution by specific locations on the following segments:

- a. 1901 - San Antonio River
- b. 1902 - Cibolo Creek
- c. 1903 - Medina River
- d. 1906 - Leon Creek
- e. Unclassified - Salado Creek

The sources may be storm drains, canals, tributaries, etc.

Time variable flow and pollutant loading for BOD<sub>5</sub> (in lbs/day) and fecal coliform (in MPN/minute) at each source as it enters the main segment is required.

- h. Report entitled, "Assessment of Magnitude of Agricultural, Mining, Construction and Hydrologic Modification Activity Nonpoint Pollution Sources." A bibliography of data sources will be included in an appendix.

TASK: Define Control Strategies for Non Point Source  
Pollution Categories

TASK SERIES: 2.55

Purpose of Task:

To define possible alternative control strategies for the different categories of nonpoint source pollution and their effect upon reduction of pollutant solids loading rates.

To identify the type and quantitative range of pollutants that can be removed or controlled by a given process or control strategy.

To assess the amounts of inputs of different resources, other than costs, (energy, chemicals, etc.) required in a given operation or control strategy to remove a given pollutant.

To outline the constraints on a nonpoint source by a particular process or control strategy.

Methodology:

1. The following list of nonpoint source control alternatives considered in this task may include the following:
  - a. Pollution Resulting from Urban Runoff; consider
    1. Treatment of stormwater
    2. Retention of stormwater
    3. Combinations of stormwater retention and treatment facilities
    4. Recharge of groundwater by stormwater. This alternative would include an analysis or retaining urban runoff indepressions, impoundments, etc., for recharge of local groundwater sources or other beneficial use.

5. Pervious pavements. Assess the effects of using pervious pavements for roads, parking lots, etc., on groundwater and surfacewater quality.
  6. Land drainage (hydrologic) modifications designed specifically for urban runoff pollution control. Consider the effects of urban drainage modifications on the quantity/quality of urban runoff, or on the groundwater regimen.
  7. Street sweeping. This alternative should include the evaluation of the effects of sweeping frequency, sweeping techniques (brush or vacuum), etc., on the quality of runoff from swept areas.
  8. Litter (waste) control. This task would consider the effects of litter control on the quality of urban runoff.
  9. Other methods (e.g., deicing, housekeeping techniques, etc.) to control sources of urban runoff pollution in the San Antonio 208 area.
  10. The effects of ordinances regulating solid wastes and litter and their effect upon the amount of solid waste or litter deposited in the urban catchment.
  11. The effects of air pollution and potential air pollution control programs on the quality of rainfall in the urban area.
  12. The effects of ordinances regulating land use and varying categories of land use on urban runoff quality.
- b. Solid Waste Disposal Pollution; consider
1. Subsurface pollution resulting from solid waste disposal areas - technical system alternatives.
  2. Subsurface pollution resulting from solid waste disposal - non structural alternatives.

3. Surface runoff pollution from solid waste disposal sites - technical alternatives.
  4. Surface runoff pollution from solid waste disposal sites - non structural alternatives.
- c. Pollution Created by Septic Tank, Cesspool and Privy Operation:
1. Define possible alternatives and construction improvements for waste disposal systems of this nature, i.e., absorption field, evapotranspiration devices, on-land disposal, other.
  2. Evaluate the effect of ordinances and/or "orders" (Ex. TWQB Order No. 75-0128-20) regulating septic tank construction and operation on surfacewater and groundwater quality.
- d. Pollution Created by Agriculture, Mining, Construction and Hydrologic Modification Activities:
1. Evaluate effects of structural control alternative practices designed to reduce abate or eliminate agricultural nonpoint pollutants with respect to cropland, pastureland and rangeland. These alternatives should include, but not be limited to, terracing, contouring, diversions, drop spillways, pipe drop inlets, debris basin, wind barriers, shelter belts, etc.
  2. Evaluate effects of non-structural agricultural erosion and water pollution alternatives, e.g., tillage practices, soil moisture control, nutrient and pesticide application, grazing practices, burning, regrassing, cropping, etc.
  3. Define alternatives to control and abate pollution created by mining performed by open pit or stripping methods (quarrying). Address mine drainage containing dissolved, suspended or other solid mineral wastes and debris, and its effect on the subwatershed and groundwater system. Control alternatives should include at-the-source abatement and treatment along with control methods including discarded overburden, slope control, spoil control, water infiltration control, water diversion systems, etc.

4. Define alternatives to control pollution resulting from construction activities. Controls should address structural, non-structural, along with temporary and permanent alternatives. They should include, but not be limited to, diversion and interception structures, i.e., dikes, terraces, ditches, benches, downdrains, flumes, level spreaders, gabions, wet basins, gravel and rock filters, sediment traps and other technical controls. Control consideration in the non-structural area should include practices such as grass seeding, mulching, netting, chemical binding, planting of herbaceous plants, shrubs, and trees, etc.

The effect of regulations and ordinances controlling construction activity should be addressed as an alternative.

5. Define hydrologic modification alternatives concerning water pollution aggravated by in-channel modification developed of floodways. Emphasis should be placed on the type of pollutant generated by stormwater overflow.

Input:

1. AACOG:

Information from Tasks 2.51, 2.52, 2.53 and 2.54 to aid in evaluating or defining alternative controls.

2. Consultant:

Output:

1. AACOG:

Input into Tasks 2.56 and 2.57.

2. Consultant:

- a. List alternative control strategies for the following nonpoint source pollution categories:



1. Urban runoff;
  - a. Technical and/or structural systems control alternatives
  - b. Non-structural control alternatives
  - c. Temporary and long term control alternatives.
2. Solid waste disposal;
  - a. Sources, amounts, and types of pollution generated from solid waste disposal areas.
  - b. Subsurface pollution resulting from solid waste disposal; non-structural and technical and/or structural alternatives.
  - c. Surface runoff pollution from solid waste disposal sites; technical and/or structural and non-structural alternatives.
3. Septic tank, cesspool and privy operation;
  - a. Description of alternatives for septic tank disposal, i.e., density, absorption fields, evapotranspiration beds, etc. Discuss the impact of alternative systems on water quality.
  - b. Assess the effect of regulations, ordinances and legislative orders, re septic tank construction and operation on both surfacewater and groundwater in terms of potential hazard to potable or otherwise beneficial water supplies.
4. Agriculture, mining, construction and hydrologic modification;
  - a. Pollution control alternatives applicable to the four Subject activities primarily involve sedimentation and its attendant or secondary effects on pollution loading. Address effects involving:
    1. Sediment loading per se
    2. Absorbed pollutants, i.e., nutrients, pesticides, toxic materials, heavy metals, etc.

- b. Control alternatives for agriculture in particular should address BOD<sub>5</sub> and coliform (total and fecal).
- c. Construction activities should specifically address;
  - 1. Pollution sources resulting from active construction projects
  - 2. Technical and/or structural alternatives
  - 3. Non-structural alternatives
- d. Alternative control strategies should also consider rules, regulations, ordinances and other institutional constraints imposed by Federal, State and local agencies.
- e. Report entitled, "Define Control Strategies for Nonpoint Source Pollution Categories."

TASK: Cost of Non Point Source Control Alternatives

TASK SERIES: 2.56

Purpose of Task:

To develop a set of unit costs data (including capital, operating and maintenance costs) for each alternative control strategy identified for the non point source pollution categories.

To develop costs data for alternatives with the appropriate degree of accuracy keyed to short term (5 years) planning.

To develop a methodology for adjusting the unit costs data to reflect local conditions so that it can be applied to San Antonio "208" planning areas; i.e., Engineering News Record Cost Index.

Methodology:

1. Determine unit cost data for specific treatment alternatives based on the process and engineering design data.
2. Develop if possible the following costs functions:
  - a. Costs vs. efficiency of pollutant removal.
  - b. Costs vs. size or design capacities.
  - c. Costs vs. reliability.
  - d. Sensitivity of cost estimates vs. design criteria.
3. Reflect local conditions affecting the costs estimation such as;
  - a. material supply,
  - b. skilled labor availability, and
  - c. institutional factors, etc.
4. Define cost of process or control alternative in terms of;
  - a. Makeup of cost figure, i.e., equipment costs (depreciation, interest taxes, insurance, fuel maintenance and repairs); labor (operators, others); materials; supervision; design.
  - b. The procedure, measure(s), operation(s), or practice to which it applies.

- c. The time period for performing the work.
- d. The conditions (physical, climatic, etc.) under which the facility or process is to be developed.

Input:

1. AACOG:
  - a. Unit cost developed in Task 2.23 for unit operations and processes for control alternatives, including capital maintenance, operating, etc., common to point source and non point sources.
  - b. Literature output from Task 2.55.
2. Consultant:

Output:

1. AACOG:

Input into Task 2.71.
2. Consultant:
  - a. Costs functions for non point sources to include:
    1. Cost vs. efficiency of pollutant removal.
    2. Cost vs. sizes or design capacities.
    3. Cost vs. reliability.
  - b. Costs estimation reflecting local conditions such as material and labor availability, institutional factors, etc.
  - c. Description and examples of how to apply unit costs data and methodology for the generation of costs of alternative controls for non point source pollution.
  - d. Definition of cost of process in terms of makeup of cost figure; procedure or measure to which it applies; period of performance, and, conditions under which facility will be developed.
  - e. Report entitled, "Costing Analysis of Non-Point Source Controls."

TASK: Environmental Assessment of Nonpoint Sources  
Strategies

TASK SERIES: 2.57

Purpose of Task:

The purpose of this task is to assess the environmental impact of the nonpoint source control strategies applicable to the San Antonio "208" area. The assessment statement should examine the social and economic externalities, indirect and direct benefits and the economic tradeoffs for each nonpoint source category.

Methodology:

Each of the nonpoint source alternatives must be discussed in the light of the topics outlined in the National Environmental Policy Act; description of the proposed alternative, the environmental impacts of the proposed action, adverse environmental effects, relationship between local short-term use of the environment and maintenance and enhancement of long-term productivity, and irreversible and irretrievable commitments or resources. The primary and secondary impacts, both beneficial and adverse, anticipated settings must be discussed. Also, the tradeoffs, benefits and cost of each alternative will be quantified.

1. Description of the Proposed Action -

This section should provide a summarization of the alternatives chosen.

2. Environmental Impact of the Proposed Action -

The primary and secondary beneficial and adverse environmental impacts of the chosen alternatives should be discussed.

3. Adverse Environmental Impacts -

Discuss the adverse impacts of project implementation and the measures to be used to lessen these adverse impacts.

4. Relationship between Local Short-term Use of the Environment and Maintenance and Enhancement of Long-term Productivity -

Describe the cumulative and long-term effects of the proposed action which either significantly enhance or adversely impact the environment for future generations. The desirability of the proposed action should be weighed to guard against short-sighted foreclosure of future options or needs. Particular consideration should be given to the following points:

- a. construction and operation
- b. influences on growth and land value

5. Irreversible and Irretrievable Commitment of Resources -

Describe the extent to which the proposed action limits the diversity and range of the beneficial uses of the environment. This action should include the following:

- a. land use commitments
- b. energy commitments
- c. water resources
- d. labor and material commitments
- e. scientific resource commitments
- f. historical and archeological resource commitments
- g. biological resource commitments
- h. other commitments unique to the project or AACOG "208" area.

Input:

1. AACOG:

- a. Control alternatives for nonpoint sources from 2.55.
- b. Land use maps of the 208 study areas from each city to supplement results.
- c. Pollutant loadings from Tasks 2.51, 2.52, 2.53, and 2.54.
- d. Costing models from Task 2.56.

2. Consultant:

Output:

1. AACOG:

2. Consultant:

- a. Assist AACOG in a public participation program designed to identify sensitive areas, develop priorities and identify impact problems.
- b. Develop a modular computer data retrieval program which is self-contained;

This module should provide a summary of impacts versus a given control alternative for nonpoint sources.

- c. The contractor shall prepare and submit an Environmental Assessment according to N.E.P.A. guidelines for each nonpoint source alternative which shall enable the preparation of an Environmental Impact Statement should one be required.

TASK: Develop Sampling Program to Determine Location and Magnitude of Non Point Wasteloads

TASK SERIES: 2.58

Purpose of Task:

To develop a non point source sampling program for implementation of the projected plan;

1. To facilitate the estimates of location, variation and magnitude of non point source wasteloads.
2. To assess the effectiveness of non point source controls when implemented.

Select sampling site and analytical methods for maximum efficiency regarding data procurement in San Antonio 208 area.

For enforcement of future controls, demonstrate monitoring procedures that will verify non point source control methods.

Methodology:

1. Develop a non point source sampling program designed:  
To determine location and magnitude of non point source wasteloads.
2. Design sampling program will include:
  - a. Sampling site selection and sampling device design developed to produce maximum information on both short and long term basis. Sites will be established to guarantee representative and meaningful samples to adequately delineate pollution from non point sources. Both automated and grab sample stations will be considered.
  - b. Sampling techniques and stream analyses procedures should follow those recommended by EPA.



- c. Test procedures for the analysis of pollutants should follow "standard methods", "ASTM", or "EPA Methods". See Title 40, Subchapter D, Part 136, "Guidelines Establishing Test Procedures for the Analysis of Pollutants", Fed. Reg. Vol. II, No. 199, Part II, October 16, 1973.
3. Sampling should recognize established and statistical parameters.
4. Design sampling program which will utilize historical data base.
5. Consider the factors of urban runoff, solid waste disposal, septic tanks and agricultural, silvicultural mining and construction activities in the design of the sampling program.
6. Review the overall drainage patterns and total watersheds when considering the potential sites of sample locations, consider the following;
  - a. size of drainage area,
  - b. accessibility of the collection point,
  - c. the quantity of non point source, and
  - d. the land mix of the surface development.
7. Institutional factors should relate to the sampling site selection and construction. Factors to be considered will include:
  - a. permits required for each site,
  - b. construction and documental procedures for the installation should be identified and assessed.
8. Develop procedure for incorporating data into the update process including responsibility and financing for the implementation of the program during the update phase.

Input:

1. AACOG:

Baseline data from Task 2.11, 2.14 and the results of Task 2.71.

2. Consultant:

Output:

1. AACOG:

Input into Task 2.59.

2. Consultant:

a. Selection of sampling sites to include the following;

1. size of drainage area,
2. accessibility at the collection point,
3. quantity of non point source,
4. land mix of the surface development,
5. potential of vandalism as well as public disruption,
6. permits required for each site,
7. construction and documentation procedures required for the installation,
8. total time required for construction of sampling site.

b. Selection of sampling design program that will reflect pollution potential of 208 area. Integration may be pertinent.

c. Design of sampling program must address the following:

1. The critical storm used to predict loadings.
2. Identification of major sources of nonpoint pollution (eg., storm sewers, tributaries and canals) by segments.

d. Sampling device design methods for the quantitative flow measurements, should take into consideration;

1. the dynamic nature of the stormwater runoff,

2. method should provide facilities for analyzing organic, inorganic and pathogenic constituents.
- e. Summarize procedure for incorporating data for the update process including responsibility and financing for the implementation of the program during the update phase.
- f. Map of non point source sampling sites.
- g. Report entitled, "Design of Non-Point Source Monitoring Program for the San Antonio 208 Area."

TASK: Demonstrate Sampling Program

TASK SERIES: 2.59

Purpose of Task:

Demonstrate the feasibility, reliability and utility of the proposed non point sampling program for urban runoff, solid waste disposal, septic tanks, agricultural, mining and construction activities within the "208" study area.

Coordinate meteorological data collection with water quality and quantity data collection.

Verify non point source wasteloads to be used in the update phase.

Analyze and compile data based on sampling program model design.

Recommend for future sampling programs requirements and site location in terms of the sampling network operations and in terms of the optimal utilization of limited resources for both sampling and analysis.

Methodology:

1. Demonstrate the feasibility, reliability and utility of the proposed non point sampling program for each category of non point sources in the San Antonio "208" area.
  - a. Maintain appropriate monitoring equipment; i.e., periodic calibration. Coordinate sampling and flow measurements with rainfall measurements through the entire wet weather period.
  - b. Relate instrument data to physical and chemical parameters, i.e., specific conductivity and its relation to salinity.
  - c. Sampling site locations should take into consideration the following criteria:
    1. The drainage area should be of optimum size. This is interpreted as large enough to provide representative information but small enough to be monitored economically.

2. Population density and land use within a monitored basin should be representative of the entire combined sewer area. Industrial, and in some instances residential or agricultural land, is distributed throughout the San Antonio 208 planning area.
  3. Sample site must be accessible by vehicle.
  4. Traffic conditions and public utility disruption should be considered.
2. Analyze parameters qualitatively and quantitatively for;
    - a. BOD (5 day, biochemical oxygen demand),
    - b. chemical oxygen demand,
    - c. settleable solids,
    - d. total solids (salinity or TDS),
    - e. volatile solids (VS),
    - f. suspended solids (SS),
    - g. volatile suspended solids (VSS),
    - h. total coliform,
    - i. fecal coliform,
    - j. fecal streptococci,
    - k. pesticides,
    - l. herbicides,
    - m. nutrients, and
    - n. pH
  3. Analyze and compile data based on sampling program model design and quantify non point source wasteloads to be used in update process.
  4. Recommend for future sampling programs, requirements and site locations in terms of the sampling network and in terms of optimal utilization of limited resources.

Input:

1. AACOG:
  - a. Non point source problem areas as defined in 2.51, 2.52, 2.53 and 2.54.
  - b. Output from Task 2.58.
2. Consultant:

Output:

1. AACOG:

Input into Task 5.16.

2. Consultant:

- a. Demonstration of the feasibility, reliability and utility of the proposed non point sampling program for urban runoff, solid waste disposal, septic tanks, etc.
- b. Coordination of meteorological data collection with the collection of water quality and quantity data.
- c. Recommendation of future sampling program(s) based upon estimated future land use program(s).
- d. Quantification of non point source waste-loads for update phase including time variable flow, pollutant loadings for BOD<sub>5</sub> in lbs/day, DO in mg/L, and fecal coliform in no./ml.
- e. An analysis of the parameters and compilation of data based on sampling program model.
- f. Demonstration of monitoring program for non point sources.
- g. A map of the monitoring station locations.
- h. Report entitled, "Monitoring Program Demonstration for Non Point Sources in the San Antonio 208 Area."

TASK: Introduction to Operations Analysis

TASK SERIES: 2.60 through 2.72

Purpose of Task:

The contractor shall prepare a computer software system which shall consist of one or more models capable of simulating the natural stream and water course systems in the "208" study area, as related to water quality and waste treatment. The system will enable users to vary physical, biological and chemical properties of point and nonpoint sources of pollution with the result being a determination of the quantitative effects on regional water quality. It will also enable the managers of existing sewage systems and water courses to evaluate the physical and economic impacts of new developments on these systems.

Scheduled for completion within the third quarter of the two year planning process it will incorporate a data management system, the water quality simulation and cost analysis models, selected management and utility requirements, and eventually if determined feasible the appropriate land use forecasting mechanism.

The purpose of the system shall be to perform a thorough analysis of the social, economic, physical, chemical, hydrological, hydraulic, and life system characteristics of the land and water bodies of the study area.

The characteristics and capacity of the software package shall be determined by the contractor and AACOG in conjunction with the "208" technical advisors and systems consultant. In other words, the experts in water quality and utility management shall define the elements considered essential to the planning process and these shall be included in the computer package.

To be an effective management tool this software system, i.e., modular processor should at least enable professional staff and managers to select the best feasible control strategies, as well as assist them in final plan implementation, and provide them a mechanism for continual monitoring and updating upon completion of the initial planning process.

The contractor shall also produce complete documentation, provide training manuals and conduct training seminars illustrating the development, logic, and uses of this strategic analysis, modular processing, software system.

2.61 Modular Processor

Modular processor, i.e., computer software system for simulating natural stream and water course systems and which will enable managers of existing sewage systems and waste treatment programs to evaluate the physical and economic impacts of new developments on said systems.

2.62 Adaptability of San Antonio River Basin Water Quality Management Plan

Review basin plan recommendations, evaluate the projections and assess future utilization of plan. Likewise, assess "303" planning in the light of "208" planning.

2.63 Subwatershed Document

Using the automated data manipulation process from Task 2.14 and the population forecasts and growth scenarios from Task 2.31, systematically define and categorize the characteristics of each subwatershed in the "208" planning area.

2.64 Project Point and Nonpoint Source Wasteloads

Characterize point source wasteloads by subwatershed. Project wasteloads by subwatershed and point of discharge for point and nonpoint sources. Utilize population and employment scenarios from Task 2.63 for those projections.

2.65 Define Alternative Systems Configurations

Aggregate subwatershed wasteloads, and to determine total wasteloads by discharge point and stream segment for the next 5, 10 and 20 years. Determine the alternative configurations for pipelines and projected sewer discharges in terms of cost, land use, and technical feasibility.

2.71 Segment Analysis

Determine the carrying capacity of selected subwatersheds and the classified segments. For any feasible control configuration check the water quality in the streams against the carrying capacity. From this initial analysis develop candidate technical subplans.



## 2.72 Alternative Point and Nonpoint Plans

Using calibrate models perform a refined analysis on the critical stream segments to check and document water quality versus carrying capacity given a candidate subplan. Screen and select the final subplans based on costs, implement ability, flexibility and manageability.

TASK: Development of a Modular Processor

TASK SERIES: 2.61

Purpose of Task:

Incorporating management, technical, and social policies into a sound workable water quality management plan responsive to the needs and desires of the "208" region, requires some type of a comprehensive strategic analysis, decision-making system. The overall purpose of this task is to design and develop a computer software package capable of providing such analysis. This processing package shall incorporate individual engineering, costing, managerial, social, economic and environmental analysis into an interactive, multioptional, broad based, and user-oriented software system.

To interface all the packages with the user's commands, the processor shall contain an interactive driver's segment. The user may be either professional staff or managers involved in the planning and future implementation of the "208" areawide project. At the planning state prior to final plan selection, this processor will be used to project the consequences of each potential alternative. Through the processor, the policy makers can then assess the impact of these different technical and management alternatives and make their selections accordingly. This will entail various loopings being built into the system for the reevaluation and adjustment of input data, design criteria, environmental constraints, management policies, and legal implications upon the user's command. Likewise the system must also be designed, if feasible, to readily incorporate new and refined analytical modules into its framework.

Methodology:

1. Develop the logic flow chart and complete documentation illustrating the structure and function of the modular processor system for comprehensive "208" areawide waste treatment management planning. The processor must consist of the following phases: orientation, data preparation, system manipulation and termination. In the orientation phase the nebulous and painstaking data input process should be minimized and the preparation of the input information adaptable to the processor operation should be automatically

accomplished. In the data preparation phase the processor should be designed to be able to accept the data input through various modes of data entry, including terminal mode, batch mode, direct access through tapes and disc, and to revise them for further analysis. An automatic revision/mechanism for specific data inputs should be designed in this phase in order to facilitate the processor with automatic screening, revision, and storage capabilities, plans generations and evaluation analysis. The system manipulation phase will be contained in multiple modules with one module serving for one specific independent analysis. The termination phase entails only the printout of the results of analysis. The module processor should be able to handle different variations of printout including remote job printout and piecemeal output options.

2. A Driver's segment program should be developed in the data preparation phase. The Driver's segment is essentially the basic coordination program of all the modules and all the computation systems for the modular processor. It will not only direct the input and output systems based on the user's command, but also provide the introductory descriptions and instructions for the processor's operation. It should also be designed for different input formats including character input, choice input, and numerical input in its interactive query process. The data entry options should also be built in this Driver's segment to facilitate the multiple choices of data entry. Through this driver segment, all data can be inputted through interactive query or the access of preorganized data sets and converted to regular card image for subsequent evaluation and analysis by regular batch computer programs. The data listing, the input revision, and the information storage functions can all be included in this driver's segment.
3. All the mathematical and numerical manipulations involved in each specific analysis needed for the alternative subplans will be computerized through the use of existing water-oriented routines or development of small individual programs. It can be developed as such that these analyses will be conducted individually and independently. In other words each of the modules can be independent programs by itself. Any relationship between the output of one module to the input of another module shall be developed in the processor.

4. The features of the processor to be developed are:
- a. Multiple option arrangements. The module processor should include or be able to incorporate the many different analysis packages developed for the different tasks involved in this areawide waste treatment management planning process.
  - b. Instant responsiveness. The comments and recommendations for input values should be able to be printed out immediately upon request through the computer system and terminal operation device. The printed manual for input information can thus be integrated in the introductory remarks of this processor.
  - c. Streamlining mechanism. All the input variables should be organized and categorized into one integrated sequential format. Thus the managers or the professional staff can be freed from the painstaking process of the coding and formatting of the input data.
  - d. Office procedures. Through the computer terminals this processor should enable the planners, the managers, and the policy makers to work in their own quarter without battling the inheritant confusions in computer centers.
  - e. Interactive training. The processor should also be able to serve as an educational tool for both professionals and decision makers. The full instructions should be obtainable through a single signal over the terminal.
  - f. Open-ended design. If feasible this modular processor should be able to hold more components as the new analysis requirements arises in the future.
  - g. Modular Independence. All the analysis and manipulation programs included in this processor must be in modular form. For each of the individual programs, the special interest and unique analysis can be retained as they were before being integrated in the processor.

- h. Data reevaluation and readjustment. After entry of input data, the user may request a list of input variables, code numbers and values and may also be able to modify the data file as he desires.
- 5. The language utilized in this processor development should be selected without bias. Though FORTRAN has been used in water quality and other mathematical models that will be included in this processor, it should not preempt other language choices.
- 6. Appropriate communication terminals shall be investigated and recommended for the utilization of the processor for both alternative plan selection and future implementation. In the recommendation of terminal selections, the type of the output device, the maximum display rate, the length of lines, the portability, the noise, the hard copy availability, and the costs of purchasing or renting should all be included in the consideration.
- 7. After the development of the modular processor and the satisfied demonstration of the operation of this processor, the design and utilization of the processor should be well documented. Any future extension and/or revisions can easily be incorporated without disturbing the individual modules besides the driver's segments. Meanwhile, the revision required for any addition of the module or the refinements of the processor should be clearly documented. Illustrated examples should be generously programmed for the utilization and refinements of the processor. Duplication of the listing of the programs included in the processor and illustrative example for the utilization of the processor shall be distributed among the participating agencies.

Input:

- 1. AACOG:
  - a. Local management agencies inputs for the development of a utility management systems.
  - b. Data management system and program documentation from Task Series 2.10.
  - c. Existing computer programs related to water quality, management policy, and land use from local existing management agencies to at least include SARA, CPSB, CSA, CWB, and CCMA.

2. Consultant:

Output:

1. AACOG:

Operations management of "208" processor.

2. Consultant:

- a. List of operational and proposed computer programs and subroutines to be incorporated in the processor from existing storage.
- b. Strategic analysis computer software package for areawide wastewater management planning and evaluation. The package should be able to include or combine the following capabilities as determined by work plan methodologies:
  1. environmental policy analysis
  2. nonpoint source analysis
  3. costing;
    - a. pipeline and treatment
    - b. operations, and
    - c. capital expenditures.
  4. monitoring;
    - a. plat monitoring
    - b. utility extension monitoring
    - c. forecasting systems for
      1. population, and
      2. municipal and industrial loads.
  5. water quality projections
  6. alternative plans evaluation and selection
  7. future implementing uses.

The software package should also contain a computerized driver's segment to coordinate all programs and computation systems for the processor.

- c. Flow chart and complete documentation illustrating structure and function of modular system processing to include at least the following phases;
  - 1. orientation
  - 2. data preparation
  - 3. systems manipulation, and
  - 4. termination.
  
- d. Duplicate lists and documentation of the programs in the processor and the user instructions including illustrated examples of its use for distribution among participating agencies.
  
- e. Professional staff and manager training sessions on use, update and development of proposed software system.
  
- f. Report entitled, "Workbook for the San Antonio Areawide Plan Including Documentation for the Computer Programs."

TASK: Assess the Adaptability of the San Antonio River Basin Water Quality Management Plan

TASK SERIES: 2.62

Purpose of Task:

To review and evaluate the SARA Basin Plan recommendations in terms of implemented systems and actual growth. To provide a future utilization schedule for the "303" Basin Plan and coordinate its integration with "208" planning.

Methodology:

1. Review the recommendations set forth in the SARA Basin Plan to determine those that have been carried out and verify those that are outdated.
2. Evaluate the costing data and projection figures to determine their validity.
3. Assess the validity and feasibility of the recommendations set out in the Basin Plan.
4. Based upon the current equipment and technology development, assess the future utilization of the Plan.
5. Provide a future utilization schedule for the "208" Plan and coordinate it with "208" planning.

Input:

1. AACOG:
  - a. San Antonio River Basin Water Quality Management Plan, 303(e), prepared by TWQB.
  - b. San Antonio River Basin Water Quality Management Plan prepared by San Antonio River Authority.
  - c. Maps and reports completed for other water planning projects from Task 2.11.
2. Consultant:



Output:

1. AACOG:

Input into Tasks 2.58, 2.64, 4.12, and 5.16.

2. Consultant:

- a. A review and assessment of the SARA Basin Plan, to include a comparison of the implemented systems versus the recommended systems and the actual growth in the basin versus the original projected growth.
- b. A future utilization schedule of the SARA Basin Plan.
- c. A future utilization schedule for the "303" Basin Plan and its integration into the "208" planning process.
- d. Report entitled, "An Assessment of the San Antonio River Basin Plans."

TASK: Subwatershed Computation Document

TASK SERIES: 2.63

Purpose of Task:

For the planning effort the socio-economic parameters organized based on man made boundaries and the physical and environmental parameters organized by natural boundaries shall be mapped together according to subwatersheds. By using the data management system developed in Task 2.14, and the population forecasts and growth scenarios from Task 2.31 the characteristics of each individual subwatershed within the "208" planning area can be systematically defined, and categorized. This information is then input into the software package for use in projecting wasteloads by subwatersheds.

Methodology:

1. Systematically define, categorize, and document the socio-economic and physical characteristics of each subwatershed in the "208" planning area.
2. Refine the needed computer programs, or module if necessary, to carry out the computation and data management process described.
3. Document the entire subwatershed characteristic process thoroughly. Besides the definition and description of variables and logic used in each program or file, simple examples should be used to illustrate the computation and data allocation process involved.

Input:

1. AACOG:
  - a. Data management system, and the data files organized by subwatershed from Task 2.14.
  - b. Socio-economic, physical and environmental characteristics identified and quantified in 2.31.

- c. Interim report on the design and function of the modular processor, and computer software available to date.

2. Consultant:

Orientation to concepts and development of modular analysis systems for water quality.

Output:

1. AACOG:

- a. Review and comment on subwatershed computation document developed by this task.
- b. Progress report on project operations analysis to include work on processor and subwatershed documentation.

2. Consultant:

- a. Comparison of data files with subwatershed boundaries and documentation of all new information and/or forecasts organized by subwatershed and identified by AACOG Modified STORET numbers.
- b. Refinement of the programs used to carry out the required computation and data manipulation process.
- c. Documentation of the entire subwatershed characteristic process including the variables, logic and numerical examples.
- d. Report entitled, "Planning Characteristics of the Subwatersheds in the San Antonio "208" Area."

TASK:                Project Point and Nonpoint Source Wasteload  
                         Projection

TASK SERIES:    2.64

Purpose of Task:

To transform the characteristics of the streams and the development scenarios by subwatershed into projections of wasteloads.

To project the point and nonpoint source wasteloads for 5, 10, and 20 years by existing points of discharge and by subwatershed.

Methodology:

1.    Develop graphical representations (i.e., pollutographs loadographs) of the quantity and quality characteristics of runoff originating from the subwatersheds.
2.    Convert population allocations, industrial and land use forecasts and projected employment figures into wasteloads generated by point and nonpoint sources.
3.    Given the subwatershed documentation from Task 2.63 and the modular processor from Package I a systematic approach can be used to aggregate information as you move downstream through a subwatershed toward a decision point, i.e., an AACOG Modified STORET numbered point.
4.    Once the loading graphs and related characteristics of the streams and development forecasts have been aggregated, wasteloads by subwatershed and major stream segment shall be projected for point and nonpoint sources.

Input:

1.    AACOG:  
  
      Tasks 2.21, 2.43, 2.51, 2.52, 2.53, 2.54, 2.61 and 2.63.
2.    Consultant:

Output:

1. AACOG:
2. Consultant:
  - a. Description of all point sources in terms of subwatersheds, service areas and effluent quality both raw and treated, existing and projected.
  - b. Estimates of the magnitude of wasteloads from industries discharging into municipal systems.
  - c. Nonpoint source loading by location and magnitude of pollutants.
  - d. Population projections and industrial production converted to waste generated by point source.
  - e. Documentation of the systematic tracking of point and nonpoint pollution and the accumulation of these results in a downstream path.
  - f. Report entitled, "Point and Nonpoint Source Wasteload Projections for the San Antonio "208" Area."

TASK:                   Alternative Systems Configurations

TASK SERIES:   2.65

Purpose of Task:

Given wasteload projections by subwatershed and point of discharge determine the conceptual alternative systems configurations for pipelines and the location of projected sewer discharges which are economically and technically feasible.

To identify the possible locations of major waste treatment facilities for each stream segment for the next 5, 10 and 20 years.

Methodology:

1.   Retrieve the wasteloads identified in Task 2.64 and aggregate to define the loading by discharge point for each stream segment 5, 10 and 20 year increments.
2.   Use the AACOG Modified STORET numbering system to identify all wasteloading points and decision points within a segment.
3.   Define and map the alternative control system configurations for all point sources to include existing or proposed treatment facilities and any alternate discharge points within a segment.
4.   Analyze the cost and associated effects on land use of each alternative system.
5.   Define and analyze the technical feasibility of each alternative as it relates to water quality and geographic location.

Input:

1. AACOG:
  - a. Data documentation from Task 2.63.
  - b. Wasteload projections by subwatershed and existing points of discharge from 2.64.
  - c. Point source inventory and control strategies, related cost analysis programs and impact assessment from the 2.20 Task Series.
  - d. Nonpoint source inventory and control strategies, related cost analysis programs and impact assessment from Tasks 2.51 through 2.57 respectively.
2. Consultant:

Output:

1. AACOG:

Input to Task 2.71 and 4.11.
2. Consultant:
  - a. Wasteloads for 5, 10 and 20 year increments for each stream segment.
  - b. Identification of wasteloading points and stream decision points by AACOG STORET Number.
  - c. Identification and map of the alternative control system configurations for existing and proposed treatment facilities and for alternate discharge points within a segment.
  - d. Analysis of costs and effects on land use of each alternative system.
  - e. Analysis of the technical feasibility of each alternative.
  - f. Report entitled, "Alternative Systems Configurations and Analysis."

TASK: Segment Analysis

TASK SERIES: 2.71

Purpose of Task:

To determine the carrying capacity of selected subwatersheds and the classified stream segments within the San Antonio "208" Region.

To check the resultant water quality in the "208" area streams against their carrying capacity given a feasible control configuration.

To develop candidate technical subplans from this initial analysis.

Methodology:

1. Based on the alternative configurations for pipelines and discharge points from Task 2.65, and the recommendations of the AACOG staff determine the subwatersheds with significant wasteload contributions.
2. By using stream flow quantity and quality during the critical season of the year calculate the limits of the carrying capacities for these significant subwatersheds and the classified stream segments in the "208" area.
3. Based again on the feasible configurations and resultant point source discharges and potential nonpoint sources from Task 2.65 develop and analyze stream quality profiles for the following crucial segments:
  - a. San Antonio River;
    1. Segment - between the confluence point with Medina River and "208" planning boundary.
    2. Segment - between Salado Creek and Medina River.
    3. Segment - Olmos Creek tributary.
    4. Segment - Apache Creek tributary.



b. Salado Creek:

1. Segment - Segment downstream from the confluence point with Perrin-Beitel Creek.
2. Segment - Perrin-Beital Creek tributary.
3. Segment - Elm Creek Tributary.
4. Segment - Upstream from the confluence point with Perrin-Beitel Creek.

c. Medina River:

1. Segment - Downstream from the confluence point with Leon Creek.
2. Segment - Between Medio Creek and Leon Creek.
3. Segment - Above Medio Creek.
4. Segment - Medio Creek tributary.

d. Leon Creek:

1. Segment - Downstream from the confluence point with Culebra Creek.
2. Segment - Culebra Creek tributary.
3. Segment - Upstream from the confluence point with Culebra Creek.
4. Segment - French Creek tributary.

e. Cibolo Creek:

1. Segment - Elm Creek tributary.
2. Segment - Between Martinez Creek and "208" boundary.

3. Segment - Martinez Creek upstream of the confluence point with Saltrillo Creek.
  4. Segment - Saltrillo Creek tributary of Martinez Creek.
  5. Segment - Santa Clara Creek tributary.
  6. Segment - Cibolo Creek upstream of Martinez Creek and downstream of the City of Bracken.
  7. Segment - Between the City of Bulverde and the City of Bracken.
  8. Segment - Upstream of the City of Bulverde.
4. For the classified stream segments the Texas Water Quality Board will perform the initial stream quality profile analysis using the appropriate calibrated models. For the significant "208" area subwatersheds this operation may be readily accomplished through application of the modular processor and simplified water quality prediction models for the San Antonio area.
  5. Given finite variations of the quality in the upper reach of the stream segments, compute the quality variation patterns at the lower reach of each stream using the stream analysis procedures recommended by the EPA and the TWQB.
  6. From this initial water quality analysis develop candidate technical subplans that are combinations of proposed point and nonpoint source control alternatives.
  7. Document all the assumptions, coefficients, constraints and functional relationships used in determining the significant subwatersheds, the carrying capacities of the streams, the simulation models, the resultant water quality profiles by segment, and the proposed candidate technical subplans.
  8. Identify the significant discharge points by AACOG Modified STORET number and provide a map illustrating feasible configurations based on the candidate subplans and indicating any effluent limitations based on the segment analysis.

Input:

1. AACOG:
  - a. Water quality data and the data management system from Task 2.14.
  - b. Modular processing analysis system from Task 2.61.
  - c. Feasible alternative systems configurations from Task 2.65.

Consultant:

Report describing stream analysis procedures as recommended by the EPA and TWQB.

Output:

1. AACOG:

Input into Tasks 2.58, 2.72 and 4.11.
2. Consultant:
  - a. Report documenting the carrying capacity for each significant subwatershed and classified stream segment within the San Antonio "208" area.
  - b. For any given configuration, complete stream quality profiles for each of the crucial streams and segments listed in the task methodology.
  - c. Documentation describing stream quality transition patterns and possible relationships between upper and lower reaches for each classified segment given a feasible system configuration.
  - d. Documentation of all assumptions, coefficients, constraints and functional relationships used for determining the significant subwatersheds, the appropriate water quality simulation models, the resultant quality relationships given a feasible configuration, and the functional candidate technical subplans.

- e. Identification of significant discharges by AACOG Modified STORET number and a map indicating the possible configurations of each candidate technical subplan.
- f. Report entitled, "Stream Segment Analysis and Water Quality Profiles for the San Antonio "208" Area."

TASK:            Develop Alternative Point and Non Point Subplans

TASK SERIES: 2.72

Purpose of Task:

To perform a refined analysis on the critical stream segments to check and document projected water quality versus existing stream carrying capacity given a candidate subplan.

To apply screening tests and feasibility assessments to the documented subplans and then select the final technical subplans based on costs, implementability, flexibility and manageability.

Methodology:

1.    Given the preliminary candidate subplans from Task 2.71 perform a refined simulation analyses on selected stream segments to check and document their projected water quality in reference to the assimilative capacity and the present stream quality standards.
2.    Inputs and format for the water quality simulations shall follow the instructions of the Texas Water Quality Board.
3.    The actual simulations and resultant documentation will be completed upon request by the Texas Water Quality Board using calibrated steady state and time-variable flow models from Task 2.43.
4.    Based on the output of the refined simulation runs and the alternatives used, assess the overall risk for the achievement of "208" waste treatment management goals.
5.    Select the final technical subplans on the basis of the water quality profile in a given segment, the total costs, and the flexibility, manageability and implementability of a given candidate subplan.

6. Describe in detail, and map the distribution of significant point and nonpoint sources and the design of control alternatives for each of the subplans finally selected. All the locations shall be identified by AACOG Modified STORET numbers and labeled on an areawide waste treatment management planning base map.

Input:

1. AACOG:

- a. The simplified analyses by subwatershed and stream segment from Task 2.71.
- b. Preliminary candidate subplans from 2.71.
- c. Modular processor system.
- d. Stream quality transition relationships from 2.71.

2. Consultant:

Input and formal instructions for the water quality simulation runs from the Texas Water Quality Board.

Output:

1. AACOG:

Alternative subplan selection outputs to include:

- a. possible management type policies, and
- b. the possible implications of the subplans.

2. Consultant:

- a. Documentation of the input information utilized by the TWQB for running their simulation models.
- b. Assessment of the overall risk for the achievement of the "208" goals given the results of the water quality simulations.
- c. Analyses and selection of the finalized technical subplans.

- d. Detailed description and map of significant point and nonpoint sources and the design of related controls for each of the finalized subplans.
- e. Report entitled, "Alternative Technical Plans for Waste Treatment Management in the San Antonio "208" Area.

TASK: Inventory of all Agencies Having Water Quality Responsibilities within the San Antonio "208" Planning Area.

TASK SERIES: 3.11

Purpose of Task:

To inventory all the existing governmental and local private agencies having responsibilities for protecting or regulating water quality regardless of the degree of responsibility.

Analyze the water quality management structure and capabilities of each agency.

Identify the degree of responsibility for water quality management of each agency.

Analyze the needs of these agencies in light of their water quality responsibilities.

Methodology:

1. Identify all existing agencies or branches thereof of the following with respect to water quality;
  - a. Federal,
  - b. State,
  - c. Local,
  - d. Regional, and
  - e. Local Private.
  
2. Determine and define the following for each agency identified in step 1;
  - a. legal authority,
  - b. area of jurisdiction,
  - c. financial capability,
  - d. past experience,
  - e. present capability,
  - f. present and future requirements.



Input:

1. AACOG:

Transmission of information collected by "208" staff which is appropriate or necessary from Task 2.11.

2. Consultant:

Public Law 92-500, section 208, Paragraph C.

Output:

1. AACOG:

Input into Task 3.12.

2. Consultant:

- a. Identification of Federal, State, local, regional and private agencies having water or wastewater quality related responsibilities within the "208" planning area.
- b. A chart showing the hierarchy or chain of command of these agencies from federal through local level.
- c. An evaluation of these agencies with respect to
  1. legal authority
  2. jurisdiction
  3. financial capability
  4. past experience
  5. present capabilities
  6. present and future requirements.
- d. An analysis of the water and wastewater quality management structure of each agency.
- e. A specific analysis of the existing agencies with respect to Section 208(c) requirements for implementing or management agencies.
- f. A report entitled, "Management Inventory of Governmental and Private Agencies."

TASK: Intergovernmental Devices

TASK SERIES: 3.12

Purpose of Task:

To identify and analyze existing intergovernmental devices that are used to manage and administrate water quality planning.

Evaluate the effectiveness of the devices as well as the potential for change in the existing structure.

Assess the frequency of the use of the devices.

Methodology:

1. Identify all intergovernmental contracts presently in force and also the past contracts between the agencies that might have an affect on water quality.
2. Identify all intergovernmental agreements between the agencies that might have an effect on water quality.
3. Identify and explain any committee structure involving intra-agency functions.
4. Categorize each of the devices as to their frequency of use.
5. Evaluate the effectiveness of the devices and identify the potential for change in the system.

Input:

1. AACOG:  
Agency inventory analysis from Task 3.11 output to consultant.
2. Consultant:

Output:

1. AACOG:
  - a. A preliminary list of types of intergovernmental devices to be analyzed.
  - b. Input into Task 3.13.
2. Consultant:
  - a. An analysis of the existing intergovernmental devices that have been used to manage and administer water quality planning.
  - b. An evaluation of the effectiveness of these devices as well as the potential for change in the structure.
  - c. A report entitled, "Intergovernmental Communications and Cooperation."

TASK: Analyze Existing Water Quality Management Programs within the San Antonio 208 Planning Area

TASK SERIES: 3.13

Purpose of Task:

Identify and analyze all existing water quality management programs that relate to water quality management and the requirements of section "208" of PL. 92-500.

Methodology:

1. Develop a comprehensive list of existing water quality programs in the designated area by a thorough literature search.
2. Evaluate water quality programs and relate those programs to the requirements of section "208" of PL. 92-500.
3. Identify and evaluate the sections of the plans which must be incorporated into the "208" Plan.
4. Assess the financial, legal and overall areas covered by each program in regards to water quality management.
5. Identify any overlapping among agency areawide programs.
6. Assess the potential for change in the programs.

Input:

1. AACOG:  
The analysis as developed in Task 3.11 and 3.12.
2. Consultant:

Output:

1. AACOG:
  - a. A list of the types of programs that are to be identified and analyzed.
  - b. Input into Task 3.14.

2. Consultant:

- a. A comprehensive list of existing water quality programs by a thorough literature search.
- b. An evaluation of each water quality program and the relationship with the requirements of section "208" of PL. 92-500.
- c. Identification and evaluation of the sections of the program which must be incorporated into the "208" Plan.
- d. Report entitled, "Overview of Areawide Water Quality Management Programs in the San Antonio "208" Area."

TASK: Institutional Changes

TASK SERIES: 3.14

Purpose of Task:

To assess the receptivity of local officials and the general public to changes in local ordinances, laws, procedures, municipal authority, jurisdiction of local agencies, management structure of local agencies, etc.

Methodology:

1. Collect and review literature on local laws, ordinances, regulations, board orders, etc., governing water quality management.
2. Conduct opinion surveys.
3. Identification and overlaps or gaps that may exist between the agencies with water quality responsibilities.
4. Research the appropriate control strategy for the deficiency in the institutional structure.
5. Summarize any institutional changes of the past and their relationship with possible future changes.
6. Conduct interviews with key personnel of agencies having water quality management responsibility.
7. Conduct a public meeting in order to receive citizen input.
8. Assess the information collected with regard to the public's receptivity to future institutional changes.

Input:

1. AACOG:
  - a. Participation in public meeting and coordination of opinion surveys.

- b. Reports and analyses as developed in Tasks 3.11, 3.12 and 3.13.

2. Consultant:

Output:

1. AACOG:

- a. An assessment of the receptivity of local officials and general public to future management changes.
- b. Input into Task 3.21.

2. Consultant:

- a. A summary of literature on local laws, ordinance, regulations, board orders, etc., governing water quality management.
- b. Documented results of opinion surveys.
- c. Identification of any overlaps or gaps that may exist between the agencies with water quality responsibilities.
- d. Identification of the appropriate control strategy the deficiency in the institutional structure.
- e. Documented interview with key personnel within each agency having water quality management responsibility.
- f. Document results of the public meeting.
- g. Summary of previous institutional changes and their relationship to possible future changes.
- h. An assessment of the receptivity of local officials and the general public to changes in local ordinances, laws, procedures, authority, jurisdiction, management structure, etc.
- i. Report entitled, "Opinion Survey of Institutional Modifications."

TASK: Development of Conceptual Approaches

TASK SERIES: 3.21

Purpose of Task:

To develop several conceptual approaches to areawide waste treatment management within the "208" study area. The conceptual approaches developed will identify all the different aspects of each management alternative, such as; structure, jurisdiction, authority, effectiveness, financial stability and capability, legal ramifications and functions.

1. Describe and define the criteria, goals, regulations and structure of the conceptual approaches to be considered.
2. Assess the overall receptivity of local officials and the general public to the conceptual approaches.
3. Provide the quantitative and qualitative information necessary for structuring alternative conceptual approaches in water quality management.
4. Develop several conceptual approaches to areawide water quality management within designated "208" area.

Input:

1. AACOG:

Data and information as developed by Tasks 3.11, 3.12, 3.13 and 3.14.

2. Consultant:

Existing management approaches to waste treatment management.



Output:

1. AACOG:

Input into Task 3.13.

2. Consultant:

- a. Coordination with existing management agencies in the development of local conceptual management approaches.
- b. Description and definition of the criteria, goals, regulations and structure of the conceptual approaches to be considered.
- c. An assessment of the overall receptivity of each of the alternatives to local officials and the general public.
- d. The quantitative and qualitative information necessary for structuring alternative conceptual approaches in water quality management
- e. Report entitled, "Alternative Conceptual Management Approaches."

TASK: Critical Comparison of Existing Management Options

TASK SERIES: 3.31

Purpose of Task:

To compile the previous reports in the 300 Series concerning the Management Considerations into one overall report which will be an assessment of the existing agencies and their authority with the future requirements of the federal, state, and local guidelines.

Methodology:

1. Develop the management criteria for the assessment of the options.
2. Objectively assess the input effectiveness against the criteria for each agency.
3. Develop a comprehensive list of management options using information derived from all the 300 series previous reports.
4. Identify the different options with each agency.
5. Define these options and agencies with respect to their present authority and assess the impact of future requirements on the federal, state and local level and what effect they will have on these management agencies.

Input:

1. AACOG:
  - a. Management devices, programs, changes, and feasibility studies from Task Series 3.1.
  - b. Conceptual approaches as developed in Task 3.21.
2. Consultant:

Output:

1. AACOG:  
Input into Task 3.41.

2. Consultant:

- a. A comprehensive list of management options using information derived from all the output in the previous 300 series reports.
- b. The criteria for the assessment of the option.
- c. Identification of the different options with each agency.
- d. Definition of the options and agencies with respect to their present authority and assess the impact of future requirements on the federal, state and local level and what effect they will have on these management agencies.
- e. Report entitled, "Critical Comparison of Existing Management Options."

TASK:                   Alternative Organization Subplans for Areawide  
Waste Treatment Management

TASK SERIES:   3.41

Purpose of Task:

To develop several alternative management subplans (systems) capable of implementing the control plans developed in the Technical Planning Segment (Task 200) of the San Antonio "208" Areawide Plan.

Methodology:

1.   Develop institutional arrangements, i.e., identification of agencies responsible for the construction, operation and maintenance of facilities, for administration and financing, for carrying out point and non point source programs for updating the areawide plan, and for overall coordination of the implementation of the Plan (includes mechanisms as well as agencies).
2.   Develop financial arrangements, i.e., identification of financial measures necessary to meet capital construction costs, operational costs, and overhead costs (including the costs of updating the areawide plan).
3.   Develop a detailed schedule of implementation.
4.   Prepare draft legislation if necessary, for any legislative changes which may be recommended.
5.   Prepare a draft of any interagency contracts or agreements which may be required.

Input:

1.   AACOG:  
  
Information from Tasks 2.72 and 3.31 to consultant.
2.   Consultant:

Output:

1. AACOG:

Input into Task 3.42.

2. Consultant:

- a. Institutional arrangements, i.e., identification of agencies responsible for the construction, operation and maintenance of facilities, for administration and financing, for carrying out point and non point source programs, for incorporating modifications into land use plans, for updating the area-wide plan, and for overall coordination of the implementation of the plan (includes mechanisms as well as agencies).
- b. Financial arrangements, i.e., identification of financial measures necessary to meet capital construction costs, operational costs, and overhead costs (including the costs of updating the areawide plan).
- c. A detailed schedule of implementation.
- d. Draft of legislation for any legislative changes which may be required.
- e. A draft of any interagency contracts or agreements which may be required.
- f. Report entitled, "Managerial Procedures for Implementing the Areawide Waste Treatment Management Plan in the San Antonio Area."

TASK:            Public Meetings

TASK SERIES:   3.42

Purpose of Task:

To conduct public meetings for the purpose of presenting the findings of the planning effort to date and to receive comment from the public preparatory to the development of 208 management systems alternatives. Public responses from the meetings will be utilized in the development of alternative management systems wherever possible and/or practical.

Methodology:

1. Prepare information hand-outs addressing 208 planning efforts and stressing desire for public inputs into decision processes.
2. Designate membership of public hearing panel in terms of required qualifications, and determine those responsible for presentations. Designations should be weighted on ability to respond to questions on all phases of 208 planning process.
3. Advertise meetings and their purposes extensively in all the media to include public notices, newspaper releases and T.V. and radio broadcasts.
4. Issue personal invitations to local elected and appointed officials having water quality management responsibilities.
5. Conduct the public meetings and record presentations for official documentation.
6. Publish summary report of each public meeting emphasizing public response to technical and management proposals. Provide copies to all interested parties upon request.
7. Present technical and management alternatives to public as developed by Tasks 2.72 and 3.41.

Input:

1. AACOG:  
Technical and management subplans as developed in Task Series 2.7, 3.21, 3.31 and 3.41.
2. Consultant:

Ouput :

1. AACOG:
  - a. Staff evaluation of public response to alternative subplans presented.
  - b. Presentation of subplans to public.
  - c. Input into Tasks 4.11, 5.12 and 5.18.
2. Consultant:
  - a. Summary of public meeting.
  - b. Evaluation and documented assessment of public response to subplans as generated by tasks and to proposed management plan configurations.
  - c. Critique of each public meeting, with suggestions as to future direction of plan based on public response to technical and management considerations.
  - d. Preliminary list and review of criteria the public deemed crucial in the evaluation of planning options based on responses from hearing.
  - e. Record of public hearings related to formulation and adoption of the 208 plan.

**TASK:**           **Assessment of the Impacts of Waste Treatment Alternatives on Water Resource Development in the San Antonio "208" Planning Area.**

**TASK SERIES:** 4.11

**Purpose of Task:**

The utility of proposed waste treatment management alternatives will be largely effected by the 208 region's available water resource development options. The purpose of this task is to assess the impact of its various "208" waste treatment alternatives on future water resources in the San Antonio region. To be useful in the selection of an optimal plan, these impacts should be addressed in terms of both existing and future development programs for groundwater and surfacewater.

**Methodology:**

1. Analyze existing programs or projects related to surfacewater development and groundwater withdrawal within and adjacent to the "208" study area in terms of the "208" technical subplans.
2. Review the 300 Task Series to determine the effects of management considerations on regional water resources development.

**Input:**

1. AACOG:  
  
Information from Tasks 2.13, 2.72 and the entire 300 series.
2. Consultant:

**Output:**

1. AACOG:  
  
Input into Task 4.12.



2. Consultant:

- a. Assessment of the impacts of the "208" Alternative Subplans on water resource options in the AACOG Region in terms of but not limited to:
  1. Recharge dam structures
  2. Reservoir construction
  3. Water reclamation and reuse
  4. Various management practices designed to decrease domestic water demands.
  
- b. Report entitled, "Assessment of the Impacts of the "208" Alternative Subplans on Water Resources Development in the AACOG Region."

TASK: Decision Analysis Criteria and Assessment for  
"208" Planning in San Antonio.

TASK SERIES: 4.12

Purpose of Task:

In the final decision-making process for areawide waste treatment management planning, the economic, technological, political, social, environmental and resource requirements of each possible plan should be considered. With that in mind, the main purpose of this work element is to design the necessary decision framework and to identify the appropriate decision criteria for use in quantification and evaluation of the "208" waste treatment candidate subplans.

Upon identification, these criteria shall then be characterized or categorized into independent decision attributes. Given these attributes, then each candidate subplan may be evaluated according to the consensus of the Executive Committee, responses from the public, and the recommendations of the advisory committees.

Methodology:

1. To fulfill the purpose of this task the following procedures are required:
  - a. Design and institute procedures suitable for polling representative groups in the "208" Planning Region.
  - b. Identify the decision criteria.
  - c. Group the decision criteria into attributes.
  - d. Identify the preferentially independent decision attributes and further search for utility independence.
  - e. Establish explicit units of measure for each attribute for assessment of expert preferences.

- f. Develop cardinal ratings for each attribute and form weighted utility models.
  - g. Investigate participant attitudes towards risk and search for transitivity of preferences and consistency.
  - h. Fit the models to the cardinal ratings and based on the relative significance of the independent preference factors as decision criteria refine and evaluate each candidate subplan from Tasks 2.72 and 3.41 for the existence of an optimal combination of independent preferential factors, i.e., attributes.
2. For gathering, compiling and evaluating unbiased subjective data and the opinions of the "208" representative groups the Delphi Method as it applies to groups decision-making shall be used.
  3. Multi-attribute utility theory shall be used to provide the applicable models and techniques for integrating tangible and intangible considerations into cardinal valued preference ratings.

Input:

1. AACOG:
  - a. Candidate management plans from Task 3.41.
  - b. Public responses from Tasks 1.15 and 3.42.
  - c. Recommendations of the advisory committees.
2. Consultant:
  - a. Delphi Method as it applies to group decision-making.
  - b. Multi-attribute utility theory models, principles and techniques.
  - c. Bayesian decision analysis capabilities.

Output:

1. AACOG:
  - a. Recommendations of the Executive Committee.
  - b. Recommendations of the advisory committees.
  - c. Evaluation of public response.
  
2. Consultant:
  - a. Decision analysis criteria for "208" Water Quality Management identified and documented as preferentially and utility independent.
  - b. Explicit units of measure for assessment of preferences.
  - c. Utility analysis of preferences.
  - d. Representative "208" group attitudes toward risk as quantified by utility analysis.
  - e. Evaluation of each candidate subplan from Tasks 2.72 and 3.41 and documentation defining existence of optimal combination of independent preferential factors.
  - f. List and/or model illustrating integration of tangible and intangible considerations identified in the "208" Waste Treatment Management plan selection process.
  - g. Report entitled, "Decision Attribute Analysis for San Antonio "208" Areawide Waste Treatment Management."

TASK: Selection of an Optimal Plan for San Antonio  
"208" Waste Treatment Management

TASK SERIES: 5.11

Purpose of Task:

To select an optimal "208" plan for Areawide Waste Treatment Management in the San Antonio area. With the many uncertainties and intangibles involved in the technical, as well as management planning, the method of evaluation shall ideally be Bayesian Decision Analysis. Such analysis allows for systematically examining any candidate plan and/or any of its component parts under uncertainty. In addition to considering the uncertainties Bayesian Analysis also contains and documents the rationale for choosing a course of action and serves as a learning process for the decision-makers.

Methodology:

To satisfy the conditions implicit in Bayesian Analysis, and to appropriately examine the overall waste treatment management plan under uncertainty the contractor shall:

1. Develop the chronological sequence of decisions involved in alternative selection.
2. Delineate all possible alternative courses of action.
3. Develop scenarios of the consequences of any particular course of action, preferences for consequences shall be scaled in terms of utility values.
4. Identify and assess the uncertainties probabilistic in nature associated with each potential event or consequence. Judgements about uncertainties shall thus be scaled in terms of probabilities.
5. Determine the best waste treatment management plan by averaging out and folding back along the decision flow diagram and choosing the strategy with the highest expected utility.

6. Document the most preferred course of actions through consensus of expert opinions using sensitivity analysis.

Input:

1. AACOG:
  - a. Decision analysis attributes developed and tested in Task 4.12 to include at least the following general areas:
    1. economics, i.e., cost criteria,
    2. environmental impacts and/or constraints, and
    3. political and/or social acceptance.
  - b. Utility curves as developed in Task 4.12 reflecting the consensus of the "208" representative groups and advisory committees.
  - c. Candidate waste treatment management options from Task 3.41.
  - d. Public response from Tasks 1.15 and 3.42.
  - e. Executive summary of "208" operations analysis to date.
2. Consultant:

Understanding and working knowledge of Delphi Method, multi-attribute utility assessment, and Bayesian Decision Analysis.

Output:

1. AACOG:

Input into Tasks 5.12, 5.13, 5.14, 5.15, 5.17, 5.18, and 6.11.
2. Consultant:
  - a. List of all subplan events that may possibly occur.
  - b. Chronological ordering, i.e., decision flowchart, of the choices of courses of action, i.e., subplans that must be made with time.

- c. Assessment of preferences for consequences of courses of action, or subplans.
- d. Assignment of probabilities to the uncertainties which could result from a course of action.
- e. Evaluation of all consequences of each alternative.
- f. Multi-attribute utility assessment of each alternative plan flowcharted.
- g. Selection of an optimal strategy for San Antonio "208" area water quality management.
- h. Sensitivity analysis documenting the preferred course of actions as determined by the attribute assessment and Bayesian Decision procedures.
- i. Report entitled, "Selection of an Optimal Plan for San Antonio "208" Waste Treatment Management."

TASK: Prepare the Proposed Physical Facilities Plan Elements

TASK SERIES: 5.12

Purpose of Task:

Given the preferred choice of waste treatment management plans for the designated "208" area, the physical facilities may then be conceptualized. The major objective of this task is to design and analyze the physical elements of the preferred plan for the entire 20-year study period.

Although location and configuration of all proposed facilities must be indicated, detailed engineering design and construction drawings will not be developed in this plan.

Methodology:

1. Describe the planning area, and identify the physical facilities.
2. Delineate the service areas.
3. Describe the overall treatment systems, including location, capacity and configuration of all facilities, treatment levels, and preliminary identification of type of treatment and method of disposal of residual wastes.
4. Analyze the selections in 2 and 3 based on identification, evaluation, and cost-effectiveness comparison of alternatives.
5. Identify the phasing requirements for the 20-year planning period for each configuration.

Input:

1. AACOG:
  - a. Preferred planning option from Task 5.11.
  - b. San Antonio "208" base map.



c. Configuration maps from 2.65.

2. Consultant:

Output:

1. AACOG:

Input to Tasks 5.13, 5.14, and 5.16.

2. Consultant:

- a. A map and description of the planning area with physical facilities identified and service areas delineated.
- b. An analysis supporting the selection of the plan based on identification, evaluation and cost-effectiveness comparison of alternatives.
- c. Documentation of all 201 facility plans incorporated into the plan.
- d. Report entitled, "Facilities Layout for the Most Preferred Areawide Waste Treatment Management Plan."

TASK: Management Agency or Agencies Recommendations

TASK SERIES: 5.13

Purpose of Task:

To recommend the form of management agency or agencies which will be responsible for the implementation of the 208 Plan when completed. The institutional requirements will be identified which will include financing needs and methods, number and size of the agency/agencies, jurisdiction, function, and functional responsibility, transition schedule techniques, legal and legislative needs, and other elements that might be required to implement the 208 Plan.

Methodology:

1. Review and analyze the information in the reports from Tasks 3.21, 3.41 and 5.10 which will help in formulating a recommendation for the structure of a water quality management agency/agencies.
2. Define the form and structure of the agency/agencies.
3. Define the type of financing that will be required and the methods and processes by which this will occur.
4. Define the size of the agency/agencies in terms of jurisdiction, number of governmental agencies inside the boundaries, population of area, number of employees, etc.
5. Define the functional responsibility in terms of increase or decrease in responsibility, authority, etc.
6. Define the necessary transition from the present status to the proposed situation, if any, in terms of the time required to make the transition, the actual transition process, and the techniques and mechanisms involved.
7. Define the legal requirements for the agency to be effective and define the type of legislation that will be required in order to obtain these legal tools.
8. Analyze each of the management agency/agencies in terms of public reception, local official reception, legality, economies, practicality, and general compatibility with the 208 Plan.

Input:

1. AACOG:

The information in the reports from Tasks 3.21, 3.41 and 5.10 which will help in formulating a recommendation for the structure of a water quality management agency/agencies.

2. Consultant:

Output

1. AACOG:

a. Review and analysis of consultant recommendations.

b. AACOG recommendations as to management agencies form and functions.

c. Input into 5.15 and 5.17.

2. Consultant:

a. Review and analysis of the information in Tasks 3.21, 3.41 and 5.10 which was used in formulating recommendations for the structure of waste-water quality management agency/agencies.

b. Definition of the format and structure of the agency/agencies.

c. Definition of the type of financing that will be required and the methods and processes by which this will occur.

d. Definition of the size of the agency/agencies in terms of jurisdiction, number of governments, agencies inside the boundaries, population of area, number of employees, etc.

e. Definition of the functional responsibility in terms of increase or decrease in responsibility, authority, etc.

f. Definition of the necessary transition from the present status to the proposed situation, if any, in terms of the time required to make the transition, the actual transition process, and the techniques and mechanisms involved.

- g. Definition of the legal requirements which allow for the agency to be effective and define the type of legislation that will be required in order to obtain these legal tools.
- h. Analysis of each of the management agency/agencies in terms of public reception, local official reception, legality, economies, practicality, and general compatability with the 208 Plan.
- i. Report entitled, "Institutional Structure for the Areawide Waste Treatment Management."

TASK: Environmental Impact Assessment

TASK SERIES: 5.14

Purpose of Task:

Given the preferred plan from 5.11, a preliminary environmental impact assessment can be started. With the completion of the physical facilities proposals in Task 5.12 a finalized environmental impact assessment for the San Antonio "208" Areawide Waste Treatment Management Plan may be completed. For planning purposes, this assessment should provide the basis for an E.P.A. environmental impact statement.

Methodology:

1. By analyzing data generated from the earlier tasks, and the Pollution Sources contract, an environmental impact assessment of the final areawide plan will be made.
2. The format shall conform to that presented in the most recent update of EPA's "Manual for Preparation of Environmental Impact Statements for Wastewater Treatment Works, Facilities Plan, and "208" Areawide Waste Treatment Management Plans."

Input:

1. AACOG:
  - a. Reports from Takss 2.24, 2.57, 2.71, 2.72, 3.21, 3.41, 4.11, 4.12, 5.11, 5.12 and 5.13.
  - b. Additional data generated by "201" or "208" planning that exists at other involved agencies.
  - c. Management directives dealing with the scope of the E.I.A.
2. Consultant:

Output:

1. AACOG:

Input into Tasks 5.16 and 5.17.

2. Consultant:

a. Detailed impact analysis for the Areawide Waste Treatment Management Plan to include the following:

1. Background:

- a. identification of grant applicants and/or planners,
- b. description of the proposed action,
- c. general and specific location of the proposed actions,
- d. water quality and quantity problems,
- e. water quality and quantity objectives, other than solutions to preceding problems, and
- f. history of the application.

2. The environment without the proposed action;

- a. general, and
- b. detailed.

3. Alternatives;

- a. general, and
- b. analysis of alternatives.

4. Descriptions of the proposed actions;

- a. general,
- b. subsystem, and
- c. additional alternatives.

5. Environmental effects of the proposed actions;

- a. general,
- b. environmental impacts,
- c. additional impacts,
- d. "no-action" alternative, and
- e. summary.

6. Federal/State agency comments and public participation.

b. Report entitled, "Detailed Environmental Impact Assessment."

TASK: Preparation of Legislative and Regulatory Programs

TASK SERIES: 5.15

Purpose of Task:

Prepare the legislative and regulatory programs, if necessary, for the implementation of the 208 plan. Identify each of the programs proposed with the appropriate local, state, federal or regional entity.

Methodology:

1. Define the necessary requirements for ensuring facilitation and implementation of the 208 plan.
2. Identify and detail both regulatory and legislative programs which should be used by local, state, federal, and regional entities.
3. Assess and evaluate the possible impacts of the legislative and regulatory programs as identified on the San Antonio 208 area.
4. Draft the required legislation and/or regulatory programs and documents.

Inout:

1. AACOG:
  - a. Optimal plan as determined from Task 5.11.
  - b. Recommendations as to management agency/agencies from Task 5.13.
2. Consultant:

Output:

1. AACOG:
  - a. Recommendations as to the legislative and regulatory programs if determined necessary for the implementation of the 208 plan.
  - b. Input into Task 5.17.



2. **Consultant:**

- a. Definition of the necessary requirements for ensuring facilitation and implementation of the 208 plan.
- b. Identification and detail of both regulatory and legislative programs which should be used by local, state, federal, and regional entities.
- c. Assessment and evaluation of the possible impacts of the legislative and regulatory programs proposed.
- d. Draft of the required legislation and/or regulatory programs.
- e. Report entitled, "Legislative Requirements for the Implementation of the 208 Plan."

TASK: Preparation of Implementing, Amending and Updating Procedures

TASK SERIES: 5.16

Purpose of Task:

To propose, develop, and document the procedures for implementing, monitoring, updating, and amending the approved "208" plan.

Using the basic concepts developed in the 303(e) plan and the outputs from the alternatives evaluation and management agency packages, the contractor with the AACOG will propose and develop a water quality surveillance system for continuous, coordinated monitoring of the adopted "208" management plan for the San Antonio area.

Methodology:

1. Propose and develop the procedures and processes necessary for implementing, monitoring, updating, and amending the "208" plan incorporating the concepts outlined within the 303(e) plan, the strategic analysis modular processing system, the selected management plan, the proposed physical facilities and the recommendations as to the management/implementing agency.
2. Augment the A-95 review process and the AACOG Plan Amendment Procedures to ensure that sufficient information and procedures are available to review, evaluate, and decide upon proposed changes essential to and for the maintenance of the plan.
3. Refine existing software modules and design or propose new ones to meet the continuing strategic analysis and decision-making requirements of participating, planning, management, and implementing agencies upon selection and adoption of the plan.

Input:

1. AACOG:
  - a. A-95 review process.
  - b. AACOG Plan Amendment Procedures.
  - c. Interim reports from the 2.00 technical planning series.
  - d. Output from Tasks 3.41, 4.12, 5.11, 5.12, 5.13, and 5.14.
2. Consultant:

Output:

1. AACOG:
  - a. AACOG recommendations as to the appropriate procedures and processes for implementing, amending and updating the plan.
  - b. Proposed AACOG amendments to plan amendment procedures.
2. Consultant:
  - a. The specific procedures and processes determined necessary for implementing, monitoring, updating and amending the plan.
  - b. Documentation describing the proposed water quality surveillance system for the plan.
  - c. Final recommendations to all responsible agencies as to the implementation, update, and amendment of adopted plan.
  - d. Refinement of existing modular processor to meet specified decision-making needs of recommended management agencies.
  - e. Report entitled, "Implementing, Updating, and Amending Procedures for the San Antonio "208" Plan."

TASK: Prepare Final Draft of Plan

TASK SERIES: 5.17

Purpose of Task:

Integrate all previous tasks, and prepare the Final Draft for (a) state and federal agency distribution, (b) local agencies, and (c) the general public.

Document all findings, conclusions, proposals and recommendations in the Final Report.

Methodology:

1. Compile all reports and data from previous tasks in preparing the Final Report.
2. Document all findings, conclusions, proposals and recommendations in the Final Report.
3. Print and Distribute the Final Report to:
  - a. State and Federal agencies.
  - b. Local agencies.
  - c. General Public.

Input:

1. AACOG:
  - a. All reports and analyses from previous tasks.
  - b. All findings, conclusions, proposals and recommendations for the Final Report.
  - c. Recommendations as specified in 5.00 series.
2. Consultant:

Output:

1. AACOG:
  - a. Final report for distribution.
  - b. Have report printed and distributed to the following:
    1. State and Federal agencies.
    2. Local agencies.
    3. General Public.
  - c. Input into 6.13.
2. Consultant:
  - a. Assist in the preparation of the Final Report.
  - b. Report entitled, "Final Draft, Project Report for the "208" Areawide Waste Treatment Management Plan."

TASK: Public Hearing

TASK SERIES: 5.18

Purpose of Task:

To conduct a public hearing for the purposes of presenting the findings of the planning effort to date and to receive comment from the public preparatory to the adoption of the 208 water quality management system. Public responses from and as a result of the hearing will be incorporated in the adoption of the management system wherever possible and/or practical.

Methodology:

1. Prepare information hand-outs addressing 208 planning efforts and stressing desire for public inputs into the adoption process.
2. Designate membership of public hearing panel in terms of required qualifications, and determine those responsible for presentations. Designations should be weighted on ability to respond to questions on all phases of 208 planning process.
3. Advertise hearing and its purpose extensively in all the media to include public notices newspaper releases and T.V. and radio broadcasts.
4. Issue personal invitations to local elected and appointed officials having water quality management responsibilities.
5. Conduct the public hearing, and record presentations for official documentation.
6. Publish summary report of the public hearing emphasizing public response to technical management proposals. Provide copies to all interested parties upon request.

Input:

1. AACOG:  
Final Draft of Plan as developed in Task Series 5.00.
2. Consultant:

Output:

1. AACOG:
  - a. Staff evaluation of public response to final draft plan presented.
  - b. Presentation of plan to public.
  - c. Input into 6.13.
2. Consultant:
  - a. Summary of public hearing.
  - b. Evaluation and documented assessment of public response to proposed management plan configurations.
  - c. Critique of public hearing, with suggestions as to future direction of plan based on public response to final draft plan.
  - d. Preliminary list and review of criteria the public deemed crucial in the adoption of planning options based on responses from adoption hearing.
  - e. Record of public hearing related to formulation and adoption of the 208 plan.

TASK: Review and Approval of Proposed Plan by all  
Local Governmental Entities Required by Section  
208 of PL 92-500

TASK SERIES: 6.11

Purpose of Task:

To provide the mechanism and processes by which the local cities, counties, special districts, etc., will review and approve the Plan before its submission to the state for approval.

Methodology:

1. A presentation will be made to each entity on 208 by the staff upon request.
2. Make record of each entities' recommendations and comments.
3. Present the recommendation and changes to the APAC for consideration.

Input:

1. AACOG:  
Draft of Final Report from Task 5.17 and 5.18.
2. Consultant:

Output:

1. AACOG:
  - a. A summary and analysis of each entities' comments and recommendations to be kept as official record and used by the APAC in their approval process.
  - b. Input into Task 6.12.
2. Consultant:  
The design of a presentation of the Final Report to be used by the 208 staff, suitable for explaining the Draft.



TASK: AACOG Adoption of 208 Plan

TASK SERIES: 6.12

Purpose of Task:

Adoption of the recommended 208 Areawide Waste Treatment Management Plan by the AACOG Executive Committee.

Methodology:

1. AACOG staff drafts, documents and presents the optimal, i.e., most preferred plan as determined by APAC to the AACOG Executive Director for review and comment.
2. Executive Director presents optimal wastewater management plan as determined through Task Series 5.00, and the response from Task 6.11, along with his review and recommendations to the AACOG Executive Committee.
3. AACOG Executive Committee shall review the recommendations of Executive Director and Public Response from Task 6.11 and the most preferred plan in its entirety.
4. Executive Committee shall formulate and present its recommendation and comments as to the adoption of the plan in regularly scheduled meeting. Committee shall recommend approval or denial of adoption of final plan.
5. If the committee approves adoption of the plan, they shall then forward it to TWQB for state review and approval.
6. If committee denies approval for adoption of plan, the plan shall be returned with explicit instructions and recommendations regarding modifications or additions required for committee approval and AACOG adoption. If proposed changes warrant public response - a public hearing will be scheduled prior to resubmission of revised draft plan to Executive Committee. Upon completion of hearing and the changes, the procedures previously outlined for adoption shall be reinstated beginning with Step 1 in this methodology.

Input:

1. AACOG:
  - a. Public response and APAC comments regarding proposed plan and its adoption from Task 6.11.
  - b. Comments from TWQB, Governor's Office, and EPA from Task 6.11.
2. Consultant:

Output:

1. AACOG:
  - a. Delivery of final draft of the plan.
  - b. Recommendations for adoption.
  - c. Executive Director's presentation.
  - d. Adoption of plan.
2. Consultant:

Coordination and assistance in assembling draft and making revisions as required.

TASK: Adoption of the 208 Plan by TWQB, Governor's Office and Designation of Management Agency/Agencies.

TASK SERIES: 6.13

Purpose of Task:

Final Adoption and Approval of the San Antonio 208 Areawide Wastewater Treatment Management Plan by the TWQB and the Governor.

A designation of the management agency/agencies by the Governor before submittal of the Plan to the EPA.

Methodology:

1. Submit final draft of AACOG adopted Plan to TWQB for approval.
2. Make a presentation to the TWQB regarding the optimal plan if requested.
3. Make the appropriate revisions to the Plan as requested by TWQB pending approval.
4. Approval of the Plan by TWQB.
5. Submit the Plan to the Governor and through the Office of Budget and Planning any recommendations concerning certification by the Governor.
6. The Governor's certification of the Plan.
7. Recommendations as to designation of the management agency/agencies will be provided to the Governor through the joint efforts of the TWQB and Office of Budget and Planning.
8. The Governor, after consultation with appropriate areawide planning organizations, local officials, and TWQB, will designate a waste treatment management agency/agencies within the San Antonio 208 Area.

Input:

1. AACOG:

Draft of San Antonio 208 Plan as approved and adopted by the AACOG Executive Committee.

2. Consultant:

Coordination with TWQB, and the Office of Budget and Planning, in seeking approval of the San Antonio 208 Plan.

Output:

1. AACOG:

a. Revisions in Plan as approved.

b. The San Antonio 208 Areawide Waste Treatment Management Plan as approved by Governor's office.

2. Consultant:

Assistance in approval of plan.

TASK: Approval of Plan by EPA

Task Series: 7.10

Purpose of Task:

Approval of the San Antonio "208" Areawide Waste Treatment Management Plan by the EPA.

Methodology:

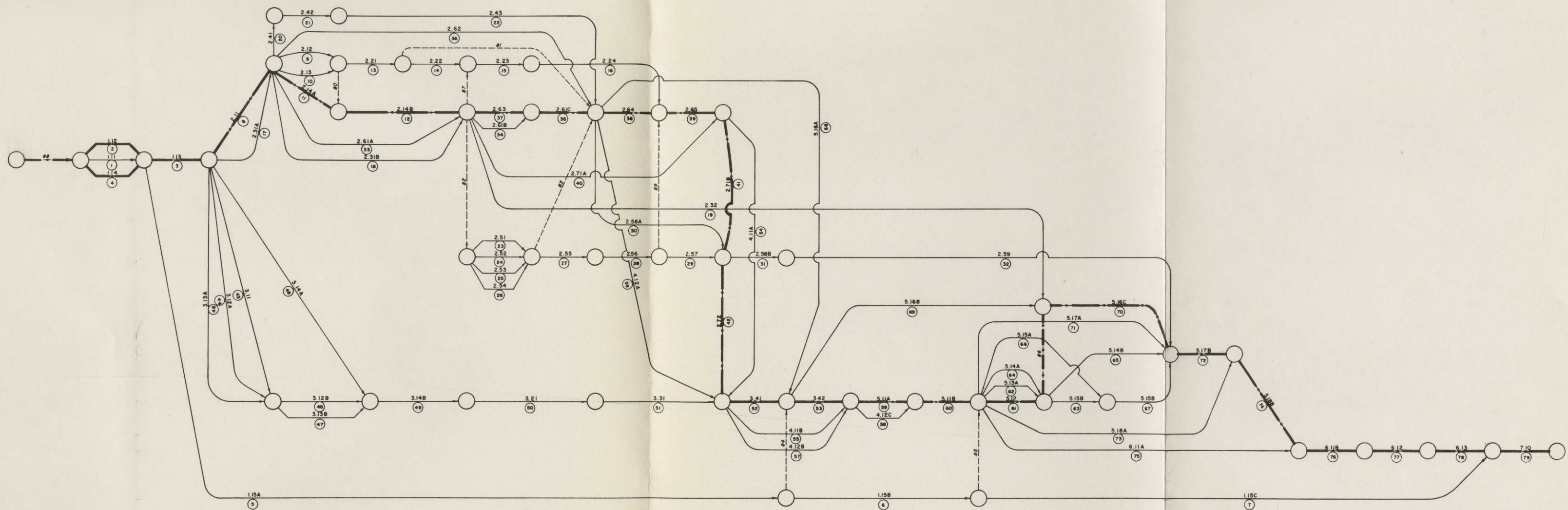
1. Notification of gubernatorial approval and designation shall be forwarded to the EPA and the San Antonio planning agency by the Governor's Office.
2. Acceptance and review of the "208" plan by the Administrator of the U.S. Environmental Protection Agency.
3. Administrator approval of plan.
4. Notification of approval or other administrative action sent to TWQB, Office of Budget and Planning, AACOG and the implementing agency/agencies.
5. Implementation of San Antonio "208" plan.

Input:

1. AACOG:
2. Consultant:  
Draft of San Antonio "208" Plan as approved by governor.

Output:

1. AACOG:
2. Consultant:  
Coordination in seeking EPA acceptance of State approved San Antonio "208" plan.



**PERT/CPM**

208 AREAWIDE WASTE TREATMENT  
MANAGEMENT PLANNING

prepared by: Alamo Area Council Of Governments  
date: February 27, 1976

	NODE	DUR	ES	EF	LS	LF	TF	FF
	1.11	01	000	001	000	001	***	***
	1.12	02	000	001	000	001	***	***
	1.13	03	001	002	001	002	***	***
	1.14	04	000	001	000	001	***	***
	1.15A	05	001	181	265	445	264	***
	1.15B	06	181	211	476	506	295	***
	1.15C	07	211	391	539	719	328	328
	2.11	08	002	047	002	047	***	***
	2.12	09	047	077	048	078	001	***
	2.13	10	047	077	048	078	001	***
	2.14A	11	047	078	047	078	***	***
	2.14B	12	078	114	078	114	***	***
	2.21	13	077	122	099	144	022	***
	2.22	14	122	167	144	189	022	***
	2.23	15	167	212	189	234	022	***
	2.24	16	212	272	234	294	022	022
	2.31A	17	002	032	017	047	015	015
	2.31B	18	047	107	054	114	007	***
	2.32	19	107	471	188	552	081	081
	2.41	20	047	048	203	204	156	***
	2.42	21	048	078	204	234	156	***
	2.43	22	078	108	234	264	156	156
	2.51	23	107	167	159	219	052	***
	2.52	24	107	152	174	219	067	015
	2.53	25	107	137	189	219	082	030
	2.54	26	107	137	189	219	082	030
	2.55	27	167	212	219	264	052	***
	2.56	28	212	242	264	294	052	***
	2.57	29	242	302	294	354	052	052
	2.58A	30	264	309	309	354	045	045
	2.58B	31	354	384	372	402	018	***
	2.59	32	384	564	402	582	018	018
	2.61A	33	047	107	054	114	007	***
	2.61B	34	107	167	144	204	037	037
	2.61C	35	204	264	204	264	***	***
	2.62	36	047	107	204	264	157	157
	2.63	37	114	204	114	204	***	***
	2.64	38	264	294	264	294	***	***
	2.65	39	294	324	294	324	***	***
	2.71A	40	107	167	264	324	157	157
	2.71B	41	324	354	324	354	***	***
	2.72	42	354	385	354	385	***	***
	3.11	43	002	062	055	115	053	030
	3.12A	44	002	032	085	115	083	060
	3.12B	45	092	122	115	145	023	***
	3.13A	46	002	092	025	115	023	***
	3.13B	47	092	122	115	145	023	***
	3.14A	48	002	062	085	145	083	060
	3.14B	49	122	182	145	205	023	***
	3.21	50	182	272	205	295	023	***
	3.31	51	272	362	295	385	023	023
	3.41	52	385	445	385	445	***	***
	3.42	53	445	446	445	446	***	***
	4.11A	54	324	384	325	385	001	001
	4.11B	55	385	415	416	446	031	031
	4.12A	56	264	324	325	385	061	061
	4.12B	57	385	415	416	446	031	031
	4.12C	58	446	477	460	491	014	014
	5.11A	59	446	491	446	491	***	***
	5.11B	60	491	506	491	506	***	***
	5.12	61	506	552	506	552	***	***
	5.13A	62	506	541	517	552	011	011
	5.13B	63	552	562	557	567	005	***
	5.14A	64	506	551	507	552	001	001
	5.14B	65	552	567	567	582	015	015
	5.15A	66	506	551	522	567	016	011
	5.15B	67	562	577	567	582	005	005
	5.16A	68	264	324	385	445	121	121
	5.16B	69	445	535	462	552	017	017
	5.16C	70	552	582	552	582	***	***
	5.17A	71	506	581	507	582	001	001
	5.17B	72	582	612	582	612	***	***
	5.18A	73	506	566	552	612	046	046
	5.18B	74	612	614	612	614	***	***
	6.11A	75	506	566	554	614	048	048
	6.11B	76	614	629	614	629	***	***
	6.12	77	629	659	629	659	***	***
	6.13	78	659	719	659	719	***	***
	7.10	79	719	720	719	720	***	***
	80	000	077	077	078	078	001	001
	81	000	122	122	264	264	142	142
	82	000	107	107	159	159	052	***
	83	000	167	167	264	264	097	097
	84	000	181	181	445	445	264	264
	85	000	211	211	506	506	295	295
	86	000	552	552	552	552	***	***
	87	000	114	114	189	189	075	053
	88	000	000	000	000	000	***	***
	89	000	242	242	294	294	052	***

## PERT / CPM MATRIX

### LEGEND :

DUR = DURATION ( PERFORMANCE TIME )  
 NODE = TASK  
 ES = EARLIEST START  
 EF = EARLIEST FINISH  
 LS = LATEST START  
 LF = LATEST FINISH  
 TF = TOTAL FLOAT TIME  
 FF = FREE FLOAT

AACOG  
 FEB. 27, 1976

## F. Program for Public Participation

Output of 208 Public Participation Activities: The following elements have been set out by EPA as ingredients of a successful public participation effort in the 208 program. All of these will be incorporated into the AACOG program to be designed by the Public Participation Committee and will be reflected as outputs of that portion of the work plan:

1. Depositories: Readily accessible depositories of all general information, publications, reports, etc. pertaining to the AACOG 208 plan. Copying facilities will be available for public use. At a minimum, the depositories will include offices of AACOG, SARA, City Municipal Information Center, CCMA, Main Library.
2. Exhibits: Maps, graphics and other material available for display at meetings, public hearings, and in AACOG offices to illustrate 208 area, planning process, other essential elements such as facilities plan, suggested management structure.
3. Mailings: Mailing list of meeting notices, agendas, notices of hearings, and for distribution of newsletters, publications, etc. will be used as follows:
  - a. AACOG Master Mailing List for Newsletters, articles, general hearing notices, etc. publishable in Newsletter, including applications for review.
  - b. Water Quality list developed from Management and Public Participation Committees, supplemented with names of other interested persons for agendas, formal notices of hearings, etc.
  - c. Specialized 208 mailing list, to be developed from news media, radio, TV, organization newsletters, other publications, etc. for distribution of news releases, 208 articles and certain specialized feature material.
4. Newletters: AACOG Newsletter, "The Region," with 208 related articles used regularly and in prominent positions.
5. News Media: Regular contact with print and electronic media, not just for coverage of meetings but to promote in-depth coverage of plans, encourage news features, editorials and other types of coverage where possible. Not only major newspapers, but weeklies in 208 area and newsletters of area organizations or groups will



get regular information on 208. A comprehensive list of these will be developed for regular use.

6. Speeches: Speakers will be advertised as available to organizations or governments. Speakers will be supplied with outline for speech, publications to distribute and exhibits as possible.
7. Publications: Flyer/brochures to be developed at several stages of 208 plan with current information, especially when decision points are due. These will be available through AACOG, all participating agencies, and for distribution at speeches and meetings.
8. Workshops/seminars : To train citizen leaders in 208 activities and to stimulate public interest in the various elements of the 208 plan will be developed. The seminars will be an important element in the public participation program. The Public Participation Committee will determine the scope, subjects and number of seminars and, along with Public Information staff, will direct consultants activities in carrying out the work element.
9. Information Solicitations: To encourage citizens to make suggestions and report violations of water quality management regulations. These should come to Public Information Officer and suggestions should be placed on agenda of next committee meeting along with report of action taken. Person providing information should be advised of action.
10. Public Hearings: Two are built into work plan at decision points and will probably include all topics EPA lists as requiring Public Hearings.
11. Surveys and Evaluation of Public Participation Program: Public Participation staff consultant(s) will report quarterly on evaluation of previous work, including any substantive changes resulting from public participation, and recommend changes in future actions as a result of public reaction.
12. Advisory Group Meetings (Monthly): The Areawide Planning Advisory Committee and the Public Participation Committee will both be part of the major element. Committee actions will be included as part of quarterly reporting as to affect on program direction, where

citizens are heard, etc., and meetings might also provide form for some seminars or workshops where major briefings are on agenda. Committee memberships will be publicized so public can contact individual members. Members representing organizations that publish newsletters will be provided with information for publication and encouraged to publicize 208 to their audience. Other advisory committees will also contribute to public participation element for 208.

13. Correspondences: Insuring that all inquiries from the public are responded to properly and in timely manner. Liaison between 208 staff and public participation personnel will be established for answering general inquiries.
14. Informal Contacts: Responsibility for handling telephone calls, responses to articles, Public Service Announcements, etc. will be determined so that public has one point of contact at AACOG. System of listing calls and how they are handled for record-keeping purposes will be instituted. All persons making inquiries will be asked if they wish to be on mailing list and added to appropriate list(s).
15. Interviews: The media will be encouraged to interview persons on 208 plan. Interview subjects will include committee chairman, director, coordinator, etc.
16. Liaisons with Groups: Contacts with organizations, agencies or groups, either initiated by AACOG or made in response to an inquiry, will be documented for the files as part of the Public Participation effort. Where possible and practical, such liaisons will be formalized so that each group will have a contact point in the 208 program (probably the Public Information Officer), and can be used to provide input to various stages of the plan and to react to various alternatives to indicate possible public responses. Those citizen and business groups on the Areawide Planning Advisory Committee and Public Participation Committee will be contacted through their own representative and encouraged to play an active role in the 208 process.
17. List Developments: This is covered under "Mailings," and is primarily a method of insuring that adequate notice, both formal and informal, is given of all 208 public hearings, meetings, actions, seminars, etc. There will be several lists developed for specific purposes, along with a comprehensive list for general 208 mailings. This will be in addition to Master Mailing List used for distribution of "The Region."

18. Public Meetings: All Areawide Planning Advisory Committee meetings qualify in this respect, as do other advisory committees when receiving 208 briefings, the Executive Committee, county committees, Semi-Annual Meetings and Public Hearings. Any seminars or workshops can be open to public. Each such occurrence should be entered into the record of Public Participation activities, along with briefings of groups, city councils, agency boards, etc. Where possible, they should also be publicized in advance.
  
19. Task Forces: These are shown only as a suggested mechanism by EPA but whenever a subcommittee is established with a special 208 assignment - whether a part of the Public Participation Committee or the Areawide Planning Advisory Committee or others - it will be listed as a part of Public Participation.

## G. Disbursement and Milestones

In order to properly coordinate the progress of the program the milestones are defined as the completion of work tasks within each quarter.

The Plan Implementation Budget will be realized in eight equal quarters and will total \$470,442.

The Plan Implementation Budget includes all Staff costs, Printing Costs, Travel costs, Legal costs, and other as outlined in the revised budget.

The contractual disbursements are shown in Table I by Task and in Table II Task completion is shown by quarters.\*

In summary the Budget is as follows:

Contractual	\$ 669,000
TWQB (Co-ordination)	22,670
Plan Implementation	<u>470,442</u>
Total Grant	\$1,162,112

\*Graph I shows the cumulative disbursements by quarters.

PROPOSED BUDGET REVISION

PERSONNEL.....	\$ 219,420
FRINGE BENEFITS.....	58,278
TRAVEL.....	9,500
EQUIPMENT.....	5,000
SUPPLIES.....	3,000
CONTRACTUAL PERSONAL SERVICES.....	691,670
OTHER (printing, Rent, etc.).....	56,000
TOTAL DIRECT COSTS.....	1,042,868
INDIRECT COSTS (42.94%).....	<u>119,244</u>
TOTAL GRANT.....	<u><u>\$1,162,112</u></u>

TABLE I

PROPOSED DISBURSEMENT SCHEDULE

1st Quarter

<u>Quarter</u>	<u>Project Tasks</u>	<u>Contract</u>
I	1.11	-
	1.12	-
	1.13	-
	1.14	-
	1.15	51,000
	2.11	7,000
	2.12	4,000
	2.13	4,000
	2.14A	9,000
	2.31A	<u>5,000</u>
	Total 1st Quarter.....	

2nd Quarter

<u>Quarter</u>	<u>Project Tasks</u>	<u>Contract</u>
II	2.14B	9,000
	2.21	12,000
	2.31B	3,000
	2.61A	20,000
	3.11	5,000
	3.12A	2,500
	3.12B	2,500
	3.13A	2,500
	3.13B	2,500
	3.14A	<u>4,500</u>
Total 2nd Quarter.....		\$63,000

3rd Quarter

<u>Quarter</u>	<u>Project Tasks</u>	<u>Contract</u>
III	2.22	12,000
	2.23	10,000
	2.41	17,000
	2.42	31,000
	2.43	-
	2.51	6,000
	2.52	6,000
	2.53	8,000
	2.54	10,000
	2.55	12,000
	2.61B	10,000
	2.61C	20,000
	2.62	10,000
	2.63	12,000
	3.14B	<u>4,500</u>
Total 3rd Quarter.....		\$168,500

4th Quarter

<u>Quarter</u>	<u>Project Tasks</u>	<u>Contract</u>
IV	2.24	20,000
	2.56	6,000
	2.57	11,000
	2.58A	3,000
	2.64	6,000
	2.65	6,000
	2.71A	13,000
	2.71B	20,000
	3.21	<u>10,000</u>
Total 4th Quarter.....		\$95,000

5th Quarter

<u>Quarter</u>	<u>Project Tasks</u>	<u>Contract</u>
V	2.58B	5,000
	2.72	30,000
	3.31	10,000
	3.41	40,000
	3.42	17,000
	4.11A	4,000
	4.11B	2,000
	4.12A	4,000
	4.12B	4,000
	5.16A	<u>3,000</u>
	Total 5th Quarter.....	

6th Quarter

<u>Quarter</u>	<u>Project Tasks</u>	<u>Contract</u>
VI	4.12C	4,000
	5.11A	8,000
	5.11B	<u>8,000</u>
Total 6th Quarter.....		\$20,000

7th Quarter

<u>Quarter</u>	<u>Project Tasks</u>	<u>Contract</u>
VII	2.32	6,000
	2.59	35,000
	5.12	20,000
	5.13A	4,000
	5.13B	4,000
	5.14A	4,000
	5.14B	4,000
	5.15A	6,000
	5.15B	6,000
	5.16B	3,500
	5.16C	1,500
	5.17A	3,000
	5.17B	3,000
	5.18A	5,000
	5.18B	5,000
	6.11A	2,000
	6.11B	<u>2,000</u>
Total 7th Quarter.....		\$114,000



8th Quarter

<u>Quarter</u>	<u>Project Tasks</u>	<u>Contract</u>
IIX	6.12	2,000
	6.13	5,000
	7.10	<u>9,000</u>
Total 8th Quarter.....		\$9,000

SUMMARY:

1st Year Total	\$407,000
2nd Year Total	262,000
TWQB Coordination	<u>22,670</u>
<b>TOTAL CONTRACTUAL BUDGET</b>	<b>\$691,670</b>

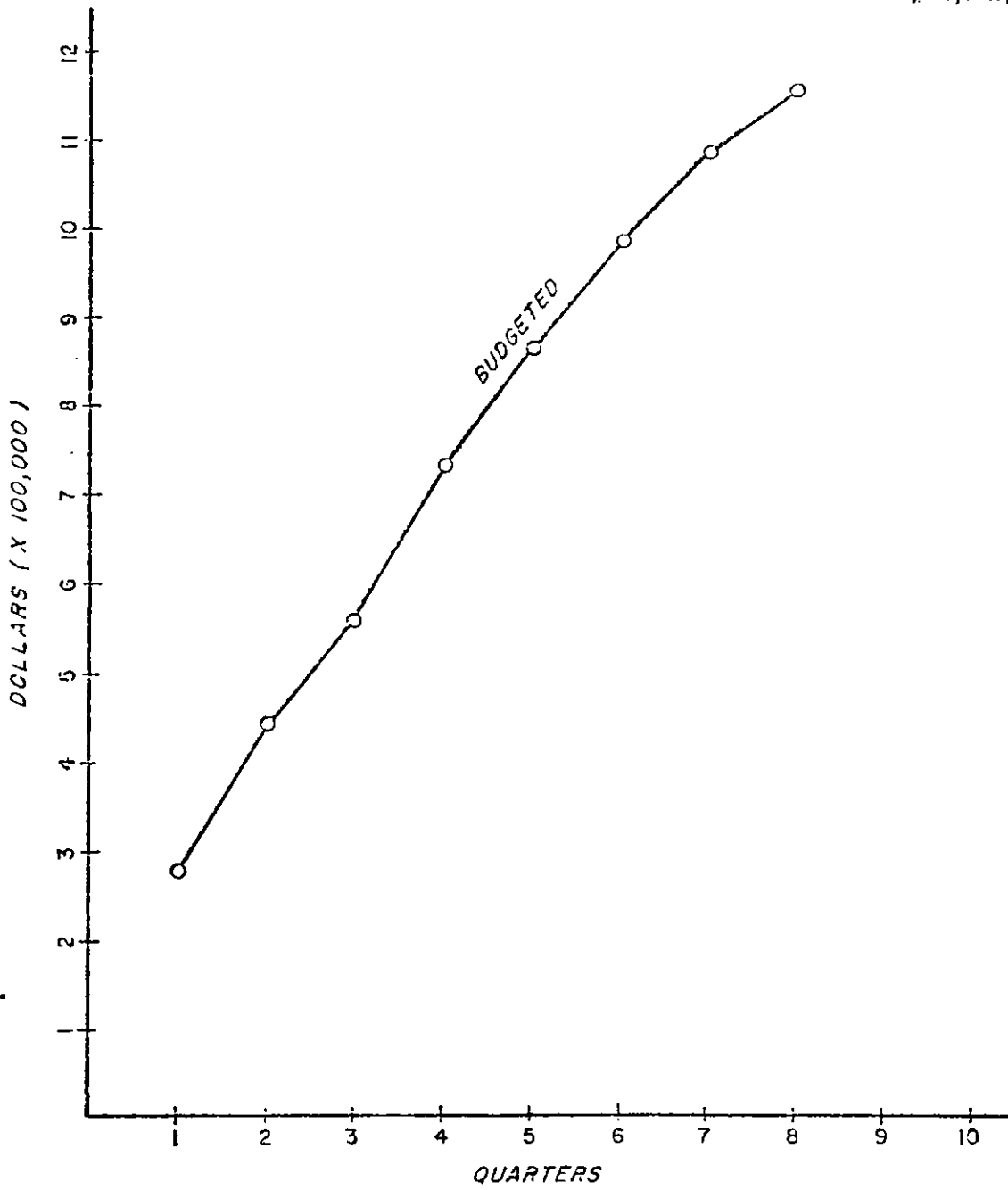
TABLE II

COMPLETION OF TASKS BY QUARTERS

<u>QUARTER:</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>
<b>TASKS:</b>	2.11	2.14B	2.22	2.24	2.58B	4.12C	2.32	6.12
	2.12	2.21	2.23	2.56	2.72	5.11A	2.59	6.13
	2.13	2.31B	2.41	2.57	3.31	5.11B	5.12	7.10
	2.14A	2.61A	2.42	2.58A	3.41		5.13A	
	2.31A	3.11	2.43	2.64	3.42		5.13B	
		3.12A	2.51	2.65	4.11A		5.14A	
		3.12B	2.51	2.65	4.11A		5.14B	
		3.13A	2.53	2.71A	4.11B		5.15A	
		3.13B	2.54	3.21	4.12A		5.15B	
		3.14A	2.55		5.16A		5.16B	
			2.61B				5.16C	
			2.61C				5.17A	
			2.62				5.17B	
			2.63				5.18A	
			3.14B				5.18B	
							6.11A	
							6.11B	

# CUMULATIVE DISBURSEMENT BY QUARTERS

TOTAL GRANT = \$ 1,162,112



GRAPH I

## H. General Content of Reports

Throughout the duration of the project we will be submitting interim reports, final reports, and executive summary reports.

Each of these reports will summarize the results of all the tasks which are needed either to perform work or to make a decision which significantly impacts the composition of the final plan. The reports will be a narrative of how the contents of the reports will affect the work plan, what decisions will be made, and will reference the technical reports which will substantiate the decisions being made.

For example, the report "Population, Employment, and Land Use Projections in the 208 Planning Region", will be the result of population, land use, and employment projections. The report will indicate what methodology was used to make the projections and how land use policies were determined.

Some of the other interim reports will be the following:

1. Public Participation - Task 1.15
2. Waste Load Projection - Task 2.65
3. Service Area Delineation - Task 2.21
4. Technical Sub-Plan Alternatives - Task 2.72
5. Management Plan Alternatives - Task 3.41
6. Optimal Plan Selection - Task 5.11
7. Plan Implementation and Updating Procedures - Task 5.16

In summary, the reports will serve to monitor the project's progress and to inform all the interested parties what direction the plan is taking. In order to prepare these reports each consultant will be asked to prepare 50 copies of the technical report and one executive summary. AACOG will print the executive summary for areawide distribution.



MAY 26 1978

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