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Management\Technical ALTERNATIVES

March, 1978

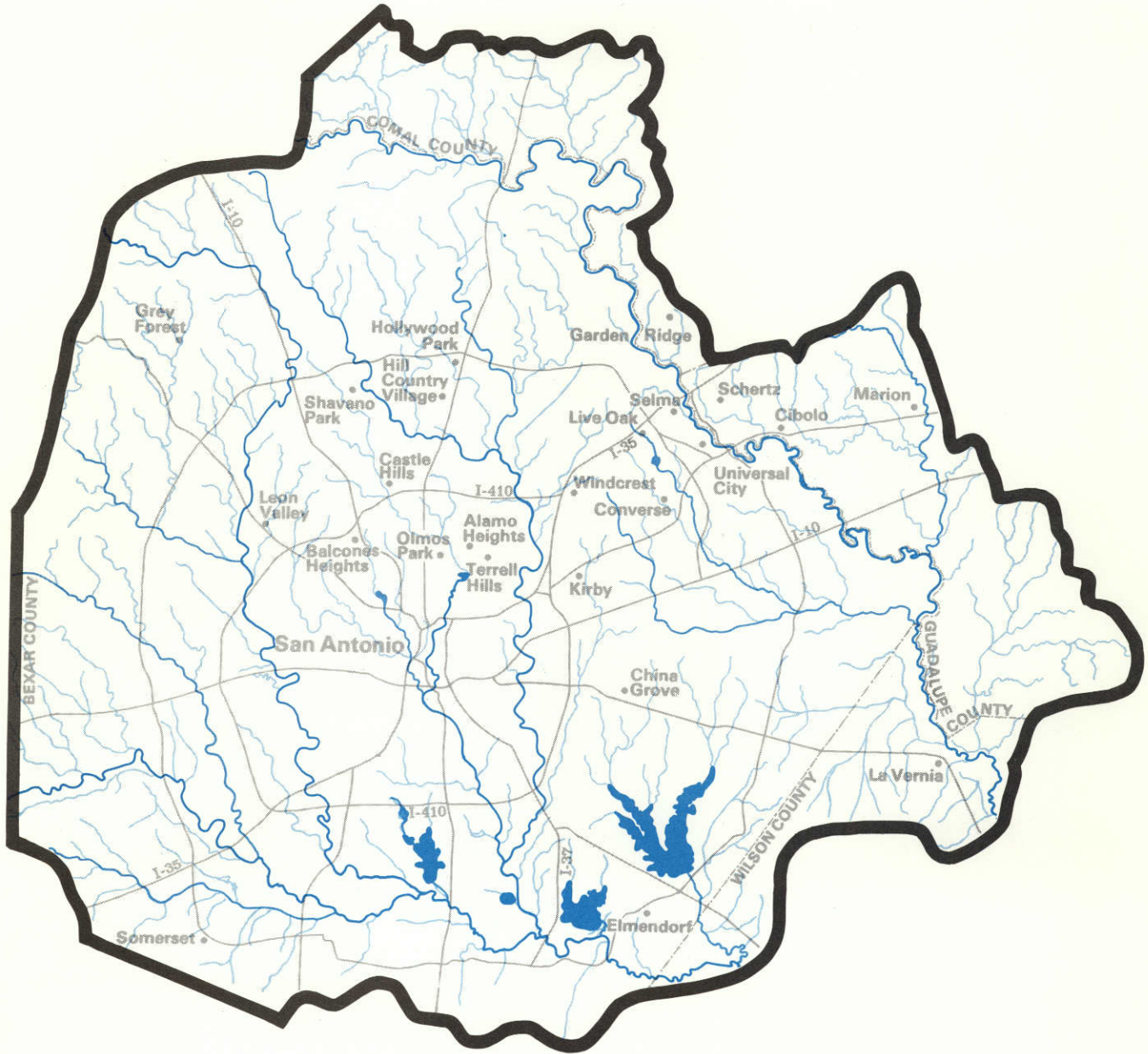


208 Areawide Waste Treatment Management Plan




The preparation of this report was financed through a planning grant from the United States Environmental Protection Agency under provisions of Section 208 of the Federal Water Pollution Control Act Amendments of 1972, as amended.

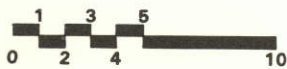
Alamo Area Council
of Governments
San Antonio, Texas

208 Planning—Water within the region



LEGEND

-  Principal Water Bodies
-  Secondary Water Bodies
-  Stream Reaches



Summary of Management\ Technical Alternatives

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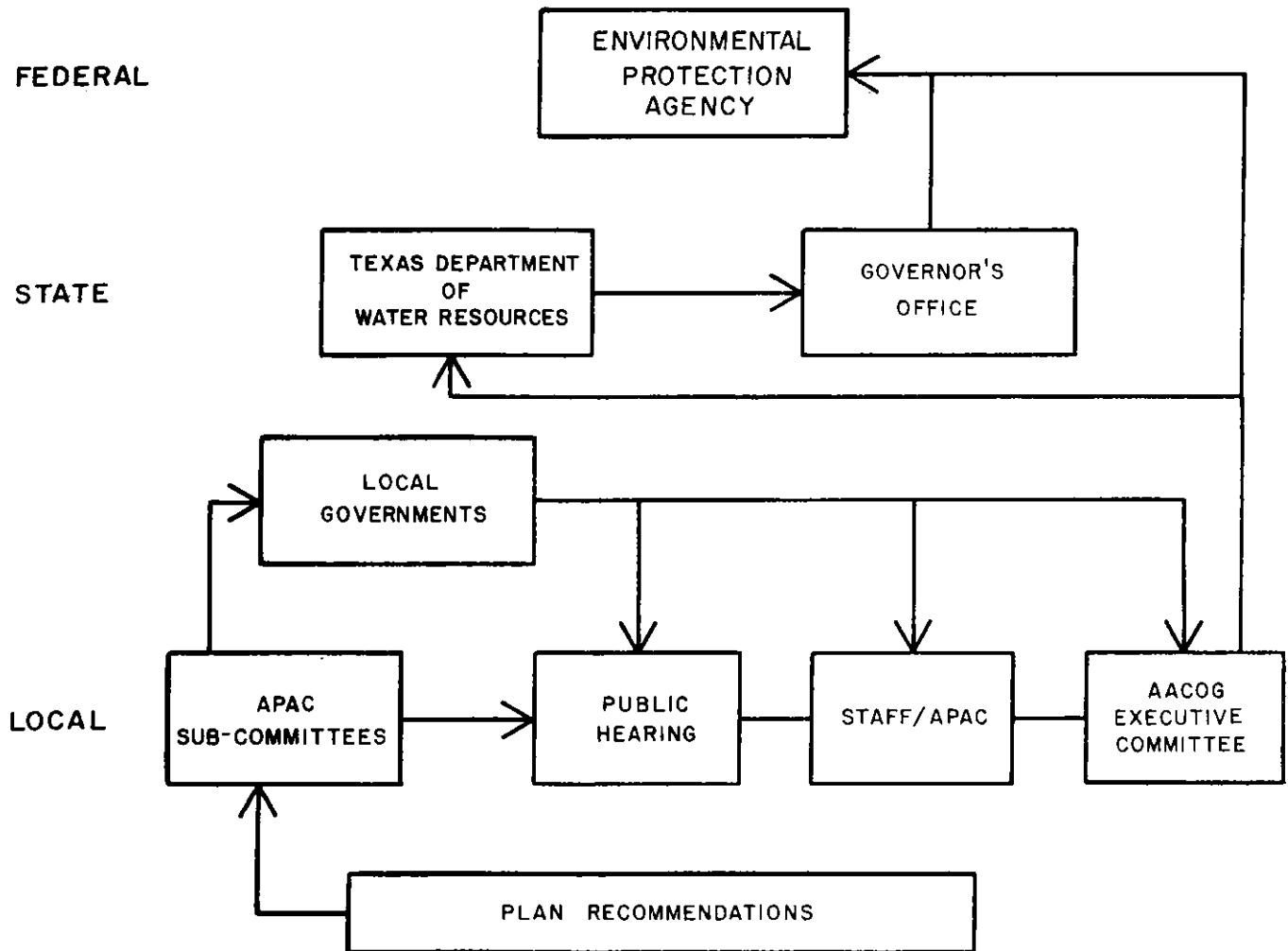
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The Alamo Area Council of Governments is a voluntary association of 90 members, consisting of cities, counties, school districts and special districts within the 12 county Alamo State Planning Region. AACOG was established to assist local governments in planning for common needs, cooperating for mutual benefit and coordinating for sound regional development.

THE REVIEW AND APPROVAL PROCESS



A Word About...

THIS ALTERNATIVES REPORT ...

This report summarizes the results to date of the 208 planning effort in the San Antonio Study Area. The program was funded by the Environmental Protection Agency under the provisions of Section 208 of the Federal Water Pollution Control Act Amendments of 1972 (Public Law 92-500).

Planning programs under Section 208 are being conducted nationwide. There are eight designated programs in Texas earmarked by the Governor for special examination due to substantial water quality problems in urban areas. In the San Antonio area, the Alamo Area Council of Governments is the designated planning agency. For areas not specially designated, the State has the primary planning responsibility.

The 208 Waste Treatment Management Plan will be an on-going, continuing system. Findings and recommendations will be revised and updated yearly as new information becomes available. Until that time, the results of this initial 208 plan will provide a basis for making informed decisions regarding the water quality in the San Antonio area.

Additional technical information is provided to acquaint the reader with background details for pollution abatement programs. All citizens have a voice in 208 planning, and it is hoped that this information will enable the public to offer input to the plan. The full volumes of the plan upon which this summary is based are also available for review during normal business hours at the offices of the Alamo Area Council of Governments, 118 Broadway, in San Antonio.

208 Planning ...

The United States Congress enacted P.L. 92-500, the Federal Water Pollution Control Act Amendments of 1972. The objectives of the law are to "restore and maintain the chemical, physical and biological integrity of the Nation's waters."

GOAL The law calls for the achievement of fishable, swimmable streams across the country by July 1, 1983.

SECTION 208 Section 208 of the Act provides for areawide treatment management planning. The purpose of 208 is to establish state and local government decision-making systems to implement water quality management on a continuing basis.

PUBLIC PARTICIPATION All citizens are encouraged to participate in every aspect of the development and implementation of the 208 plan. Community workshops designed to inform the public are being held throughout the planning period on topics ranging from pollution controls, demographic projections to management alternatives.

WHY 208 IN SAN ANTONIO? The San Antonio area is one of several in the State recommended for 208 planning because it has substantial water quality control problems. Even using the best technology available, these areas will have difficulty meeting the 1983 standards.

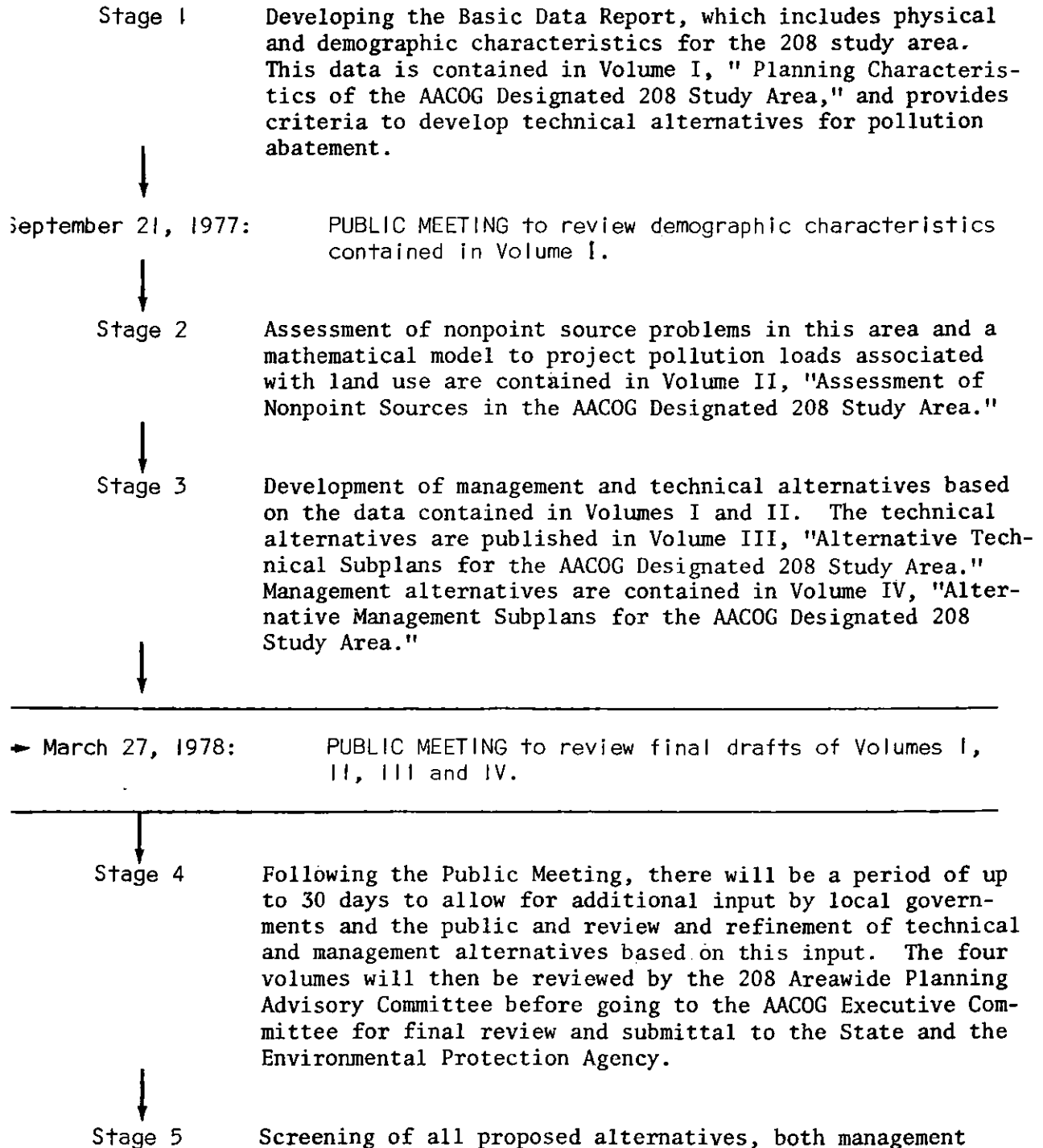
In the San Antonio designated area, the major water quality problems occur in the upper portion of the San Antonio River from its headwaters to the area boundary in Wilson County, and in Leon Creek from its headwaters to the confluence with the Medina River. During dry periods, the only flow in these streams is the treated effluent from wastewater treatment plants, both municipal and industrial, augmented by urban stormwater runoff during wet weather. The quality of the waters in these streams has been degraded to the point where it is no longer suitable for contact recreation and, if degradation continues, some or all of the other desired uses may be impaired or precluded.

By designating the San Antonio area for 208 planning, the State and EPA provided for a comprehensive study of the strategies and alternative management plans for achieving the 1983 objectives. This study is to result in the development of the most readily achievable management plan on the basis of cost-effectiveness, technical feasibility and existing institutional relationships.

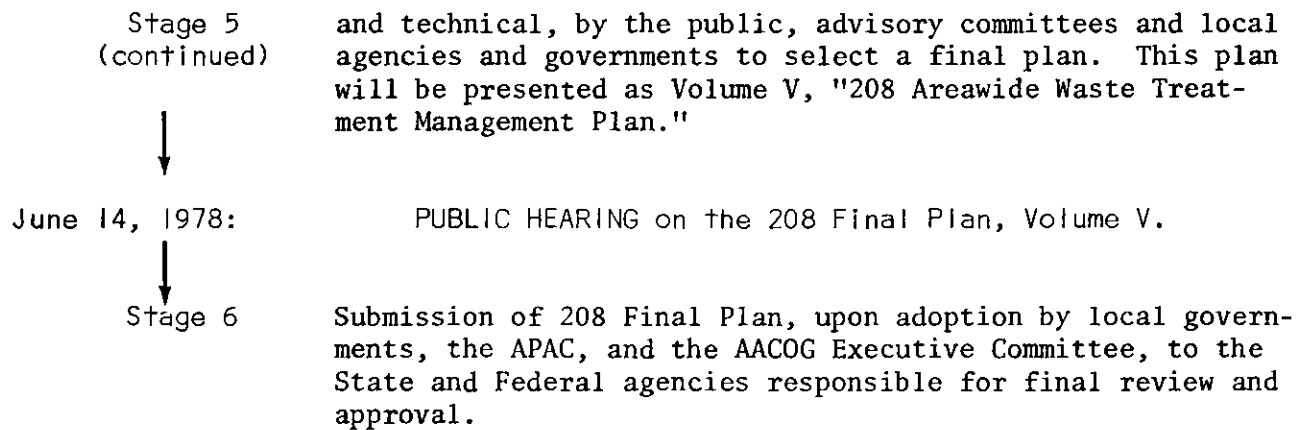
Where We Are in the 208 Process...

PLANNING OUTLINE

Activity



PLANNING OUTLINE - continued



WHERE THIS ALTERNATIVES REPORT FITS INTO 208:

This Alternatives report, which summarizes the management and technical alternatives contained in Volumes III and IV, will assist the reader in evaluating the alternatives -- a necessary step as the 208 planning process moves from Stage 3 to Stage 4 in the Planning Outline shown above.

SELECTING THE 208 MANAGEMENT SYSTEM

Summary of Draft Report:

*Volume IV,
"Alternative Management Subplans
for the
AACOG Designated 208 Study Area"*

A vital requirement of Section 208 is the identification of a management system for the continuing planning phase. This management system must be designed to promote attainment of water quality objectives -- fishable, swimmable streams and lakes by 1983.

The management system will utilize both structural (Sewage Treatment Plants) and non-structural (Best Management Practices) tools and will have the authority and resources necessary to achieve the desired levels of water quality.

Public Law 92-500 and ensuing regulations emphasize the requirements in assigning management responsibilities. The final 208 Plan must identify a system to coordinate and implement regional wastewater management which distinguishes this planning program from previous efforts. Who will be responsible and how and when it will be accomplished are primary points in the law.

The recommended management system will address four major continuing functions necessary to meet the broad requirements of the law. These are: Regulatory/Compliance Functions; Operational Functions; Nonpoint Source Control Functions; and Planning/Coordination Functions.

Continuing Functions of the 208 Management System

Following is a listing of the four major continuing functions necessary to the 208 management system, along with the responsibilities vested in each function and the recommended or possible alternative(s) for carrying out that portion of the system.

Based on existing laws and consultant recommendations, the first three of these functions should continue to be vested in the present responsible agencies:

I. REGULATORY/COMPLIANCE

Responsibilities include:

Set water quality standards; monitor streams; enforce standards; permit

Regulatory/Compliance (cont'd.)

and regulate point sources of pollution.

<u>Recommended Agency:</u>	TEXAS DEPARTMENT OF WATER RESOURCES
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2. OPERATIONAL

Responsibilities include:

Design and construct wastewater treatment facilities; operate and maintain the facilities; finance treatment facilities by various means.

<u>Recommended Agencies:</u>	WASTEWATER TREATMENT OPERATORS: City of San Antonio San Antonio River Authority Cibolo Creek Municipal Authority Other Independent Operators
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3. NONPOINT POLLUTION CONTROL

Responsibilities include:

Monitor and regulate nonpoint sources of pollution.

<u>Recommended Alternative:</u>	TEXAS DEPARTMENT OF WATER RESOURCES, with additional input from local governments and other agencies.
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Section 208 of P.L. 92-500 requires that the areawide wastewater continuing planning process be updated regularly to reflect the actual growth and development of the area or other changes that would impact water quality management systems. Among the vital decisions to be made in the design of the management system is the selection of the entity to be responsible for the fourth major function of the 208 system, that of Planning/Coordination, which involves the organization and operation of the continuing planning process.

4. PLANNING/COORDINATION

Responsibilities include:

Plan for wastewater control pollution from a comprehensive viewpoint; coordinate implementation of the 208 Plan.

<u>Suggested Alternatives:</u>	A. TEXAS DEPARTMENT OF WATER RESOURCES B. TEXAS DEPARTMENT OF WATER RESOURCES with the SAN ANTONIO RIVER AUTHORITY C. ENVIRONMENTAL PLANNING ORGANIZATION D. ALAMO AREA COUNCIL OF GOVERNMENTS with WATER QUALITY COUNCIL
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Because of the importance of the Planning/Coordination function to the ultimate success of the entire 208 program, the various alternatives to carry out this function have undergone extensive study and discussion. The con-

sulting firm of Peat, Marwick, Mitchell & Co. prepared a series of reports suggesting five possible planning/coordination options. The AACOG Executive Committee, the 208 Areawide Planning Advisory Committee and a Management Task Force named by the APAC reviewed and refined these to four alternatives that could be selected to carry out the continuing planning and coordination role. Following that action, Peat, Marwick, Mitchell, which had already done an extensive analysis of the legal responsibilities of the continuing planning agency and had developed criteria based on the requirements of P.L. 92-500 and EPA regulations, prepared a report evaluating the four alternatives using those criteria. This same evaluation can also be applied to any other alternatives that may be recommended during local review. The analysis of the four suggested alternatives is:

OPTIONS FOR CONTINUING PLANNING/COORDINATION

*Report by Peat, Marwick, Mitchell & Co.
208 Management Agencies Consultant*

Eight criteria have been identified, based on P.L. 92-500 and the EPA guidelines for Section 208 planning, that must be considered in the design of a continuing planning program. These criteria, and a brief explanation of each, are:

Local Control: Local control insures greater local and areawide access to decisions, and decisions which will be based on a sound and thorough knowledge of the planning area and its requirements.

Public Accountability: The continuing planning function should be controlled by an agency responsible to elected officials to assure public accountability for planning decisions.

Financial Independence: Financial independence from State or federal funds would strengthen local and areawide decisions while insuring the continuity of the policy planning process.

Organizational Capacity: The planning role should be designated in an organization with proven capacity to perform complex planning functions in an intergovernmental environment.

Policy Comprehensiveness: The continuing planning function should be carried out by an agency with the capacity to relate water quality goals and data requirements to those of other areawide programs, such as transportation, air pollution control, water development, open space and solid waste disposal.

Legal Authority: The planning responsibility must be vested in an agency with legal authority and jurisdiction to perform water quality planning throughout the 208 area, and the designation must be consistent with federal law and regulations.

Political Acceptability: The organization of the continuing planning process should be acceptable to the major institutional interests involved and to the general public.

Equity: The organization of the continuing planning process must be equitable. The distribution of control and the concurrent responsibility

shared by several jurisdictions should be related to the relative sewage treatment problems of those jurisdictions.

Comparative Analysis

In analyzing the extent to which alternatives conform to the eight criteria, the consultants made no attempt to weigh the criteria, although some of the considerations (e.g. legality) are, in fact, more important than others. The matrix in the illustration simply indicates which criteria appear to be met by each alternative; it is intended as a framework for evaluating the alternatives that have been discussed by the Management Task Force, the APAC and the AACOG Executive Committee. Each alternative is discussed following the illustration.

Matrix Comparing Alternatives for Organization
of the Continuing Planning Process

<u>CRITERIA</u>	<u>ALTERNATIVES</u>			
	TDWR	TDWR/ SARA	Environmental Planning Organization	AACOG with WQ Council
Local Control	3	2	1	1
Public Accountability	3	2	1	1
Financial Independence	3	3	3	1
Organizational Capacity	1	1	3	1
Policy Comprehensiveness	3	3	3	1
Legal Authority	1	1	3	1
Political Acceptability	2	2	2	2
Equity	3	2	1	1
TOTALS	19	16	17	9
MEAN AVERAGE	2.4	2.0	2.1	1.1

SCALE: 1 = High conformance to criterion
2 = Medium conformance to criterion
3 = Low conformance to criterion

PLANNING/COORDINATION ALTERNATIVE A:

TEXAS DEPARTMENT OF WATER RESOURCES

The continuing planning responsibility would be vested in the State with the possibility of intergovernmental contracts between the State and selected local agencies for performance of selected planning functions.

The Texas Department of Water Resources is the State agency designated by the Governor to examine the State's 208 planning responsibilities. If the area-wide planning agency fails to successfully complete the planning process, or elects to relinquish it, the State must assume the responsibility. This is the only reference in P.L. 92-500 or the accompanying regulations authorizing any agency other than the designated areawide planning agency to assume the continuing planning responsibility. The law recognizes that the State has the organizational capacity to undertake the continuing planning role. Thus, the State alternative scores high on legal authority and organizational capacity.

None of the alternatives has unanimous political support; the State alternative appears to be preferred by none, except as a second choice. Thus, this alternative was judged to be in medium conformance with the criterion of political acceptability.

The State alternative is in low conformance to the remaining criteria. Local governments and public officials in the San Antonio area would lose local control of the planning process and, by definition, financial control and independence. To the extent that local elected officials are not responsible for the planning process, public accountability is impaired. Finally, as a limited-purpose agency, the TDWR would not be in position to consider air quality, transportation, land use, and related environmental factors in the continuing water-quality planning program.

PLANNING/COORDINATION ALTERNATIVE B:

TEXAS DEPARTMENT OF WATER RESOURCES
with the SAN ANTONIO RIVER AUTHORITY

The continuing planning responsibility would be vested in the State which would contract with the San Antonio River Authority for performance of planning responsibilities.

This option vests continuing planning responsibility in the State, but requires the State to contract with the San Antonio River Authority for carrying out planning activities. This ranks high on criteria of legal authority and organizational capacity. The State has authority to contract with any local agency for performance of water quality functions, and SARA is an established agency with a successful record in water quality planning and management.

While legal authority to prepare and submit plans would be vested solely in TDWR, because SARA is representative of Bexar and neighboring counties this alternative is given a medium ranking for local control. It is also given medium ranking on public accountability, political acceptability and equity. While SARA's board is elected, it is not representative of the populations primarily impacted by the 208 process; the City of San Antonio, which bears 90 percent of the effluent, has no representation on SARA's board. Moreover, SARA would be placed in a potential conflict of interest as an operating agency with continuing planning responsibilities for its own programs and those of other major operators. To some extent, these limitations could be offset by the composition of special committees appointed by SARA to assist in the planning process.

This alternative ranked low on the criteria of policy comprehensiveness and financial independence. SARA, a limited-purpose agency, would be dependent upon the State for financial support of the continuing planning process.

PLANNING/COORDINATION ALTERNATIVE C:

ENVIRONMENTAL PLANNING ORGANIZATION

The continuing planning responsibility would be vested in a special independent council created solely to govern the planning process.

The Environmental Planning Organization would be a free-standing environmental organization modeled on the Metropolitan Planning Organization for transportation serving the San Antonio area. This ranks high on criteria of local control, public accountability and equity, assuming membership on the governing body was fairly representative of the jurisdictions with operating responsibility for wastewater treatment and was controlled by local elected officials. (A self-selecting board dominated by private interests would score low on each of these same criteria.) This alternative appears to have substantial political support and opposition.

The EPO ranks comparatively low on all other standards. As discussed by the APAC, the EPO would have one professional staff person and a secretary and would rely on the major operators for all technical assistance. Its legal standing is unclear. The APAC did not discuss the legal organization of the EPO. As a free-standing association or a non-profit, private corporation, the EPO could not receive federal or State funds except under contract for performance of specific functions. (For example, TDWR could contract with the EPO for planning functions, but legal responsibility for the planning would be vested in the State.) Also, P.L. 92-500 makes no provision for any agency to perform the continuing planning function other than the State or the designated areawide planning agency. Finally, as a single-purpose agency, the EPO would not have a comprehensive perspective of related environmental concerns.

PLANNING/COORDINATION ALTERNATIVE D:

ALAMO AREA COUNCIL OF GOVERNMENTS
with WATER QUALITY COUNCIL

The continuing planning responsibility would be vested in AACOG but primary policy control would be the responsibility of a special Water Quality Council, separate and in addition to the AACOG Executive Committee. Recommendations of the WQC could be overruled only by a 3/4 or greater vote of the Executive Committee.

The intent of P.L. 92-500 is to establish a continuing areawide water quality planning program operated by organizations established in law for planning purposes and governed by local elected officials representative of the planning area. AACOG is the only organization in the San Antonio area meeting these requirements. This alternative would involve appointment of a Water Quality Council by local governments and agencies to govern the operation of the planning program and formulate recommendations for AACOG's consideration.

This alternative ranks high on all but one criteria. It insures local control and public accountability because AACOG is governed by local elected officials. AACOG is an established organization and it has the multiple planning focus necessary to insure orderly, comprehensive consideration of environmental issues. Finally, as the designated areawide planning agency, AACOG has the standing to negotiate and contract directly with the U.S. Environmental Protection Agency for financing the continuing planning process. Moreover, AACOG has the financial strength in its member organizations to finance the continuing planning process without State or federal funds. However, this alternative, like the previous ones, has both substantial political support and opposition.

SELECTING THE 208 TECHNICAL ALTERNATIVES

Summary of Draft Report:

*Volume III,
"Alternative Technical Subplans
for the
AACOG Designated 208 Study Area"*

PART ONE: HOW THE TECHNICAL POINT SOURCE SUBPLANS WERE DEVELOPED

Areawide planning of wastewater treatment facilities should provide for implementable, cost-effective, and environmentally sound treatment works to meet the present needs of the residents of the region, and a program to phase facilities development to meet future needs as projected in the areawide land use projections, population projections and point source waste load projections.

The initial planning for facilities systems in the San Antonio 208 area involved a systematic comparison of many subplans, as well as system options. For each wastewater treatment system, subsystem options were identified. Compatible options were then combined into alternative treatment systems at an area level where generally independent point source abatement decisions can be made.

The process in the San Antonio 208 involved bringing together and coordinating three separate planning approaches or efforts:

- (1) The 208 program's management information system and data management programs.
- (2) The Alternative Evaluation Consultants' analyses and evaluations.
- (3) The ongoing Section 201 facility planning studies and their independent planning efforts.

Generalized Decision Options

The existing wastewater treatment systems within the San Antonio 208 area were reviewed and it was determined that, at any given location and for any planning horizon year, the following generalized decision options are available:

Process Decisions

- o Continue as is
- o Increase Capacity and/or Upgrade Level of Treatment
- o Abandon Flows to Another System

Discharge Location Decisions

- o Discharge Flows
- o Transfer Flows for Further Treatment
- o Transfer Flows for Discharge

Disposal Method Decisions

- o Discharge to Water
- o Reuse - Water
- o Reuse - Land Application

System Configurations Analyzed

A total of 37 separate potential system configurations were analyzed in the initial phase of the 208 program. The following system configurations by major existing wastewater treatment facility or category were analyzed:

Rilling Road Treatment Plant

- Upgrade to tertiary treatment
- Continue and transfer secondary effluent to Salado Creek Plant
- Continue and transfer secondary effluent to new regional plant
- Continue and transfer secondary effluent to Mitchell Lake for reuse
- Continue and discharge through Mitchell Lake to new regional plant
- Abandon, transfer raw wastes to Salado Creek plant
- Abandon, transfer raw wastes to new regional facility

Leon Creek Treatment Plant

- Upgrade to tertiary treatment
- Continue and transfer secondary effluent to Salado Creek Plant
- Continue and transfer secondary effluent to new regional facility
- Continue and discharge through Mitchell Lake to new regional facility
- Continue and transfer secondary effluent to Mitchell Lake for reuse

Salado Creek Treatment Plant

- Upgrade to tertiary treatment
- Upgrade and expand capacity to receive raw wastes from Rilling Road service area

- Upgrade and expand to receive secondary effluent from Rilling Road Plant
- Upgrade and expand to receive secondary effluent from Leon Creek Plant
- Continue and transfer secondary effluent to new regional facility

Medio Vicinity Facilities: Hunt Lane Medio Creek #1, Medio Creek #2, Lackland A.F.B., Bexar

- Continue individual facilities, improve and expand
- Construct new consolidated plant to replace facilities
- Abandon the facilities and connect into the Leon Creek system

SARA Salatrillo Creek

- Future expansion of facility
 - Staging alternatives

SARA Upper Martinez

- Future expansion of facility
 - Staging alternatives

SA MUD #1

- Continue existing system
- Construct 1985 facility
- Connect into Leon Creek Service Area
- Connect in with Grey Forest 201

CCMA Schertz Complex

- Future expansion, with effluent set 2
- Future expansion, with land application
- Possible 201 application on expansion of service area to north and east

City of Marion

- Upgrade existing primary facility and expand capacity

La Vernia

- Future expansion of facility
 - Staging alternatives

Somerset

- Continuation of system currently being designed

Hollywood Park

- Continue with 201 project to convey wastes to Salado Creek system

Grey Forest

- Continue with 201 project to convey wastes to Leon Creek system
- Connect in MUD #1
- With MUD #1, connect into Leon Creek system

Decision Areas for Point Source Abatement Planning

In order to group together areas appropriate for analysis of alternatives, point source decision areas for the San Antonio 208 program were derived. These areas represent vicinities where point source decisions more or less independent of decisions for other areas can be made. The criteria for delineation of decision areas included:

- o The existing 201 facility planning areas
- o Other jurisdictional boundaries
- o Common interdependence of system configurations
- o Natural drainage and physical features
- o Existing service areas and potential service areas

Eight decision areas, designated with Roman numerals I through VIII, were identified for point source alternative evaluation within the 208 area:

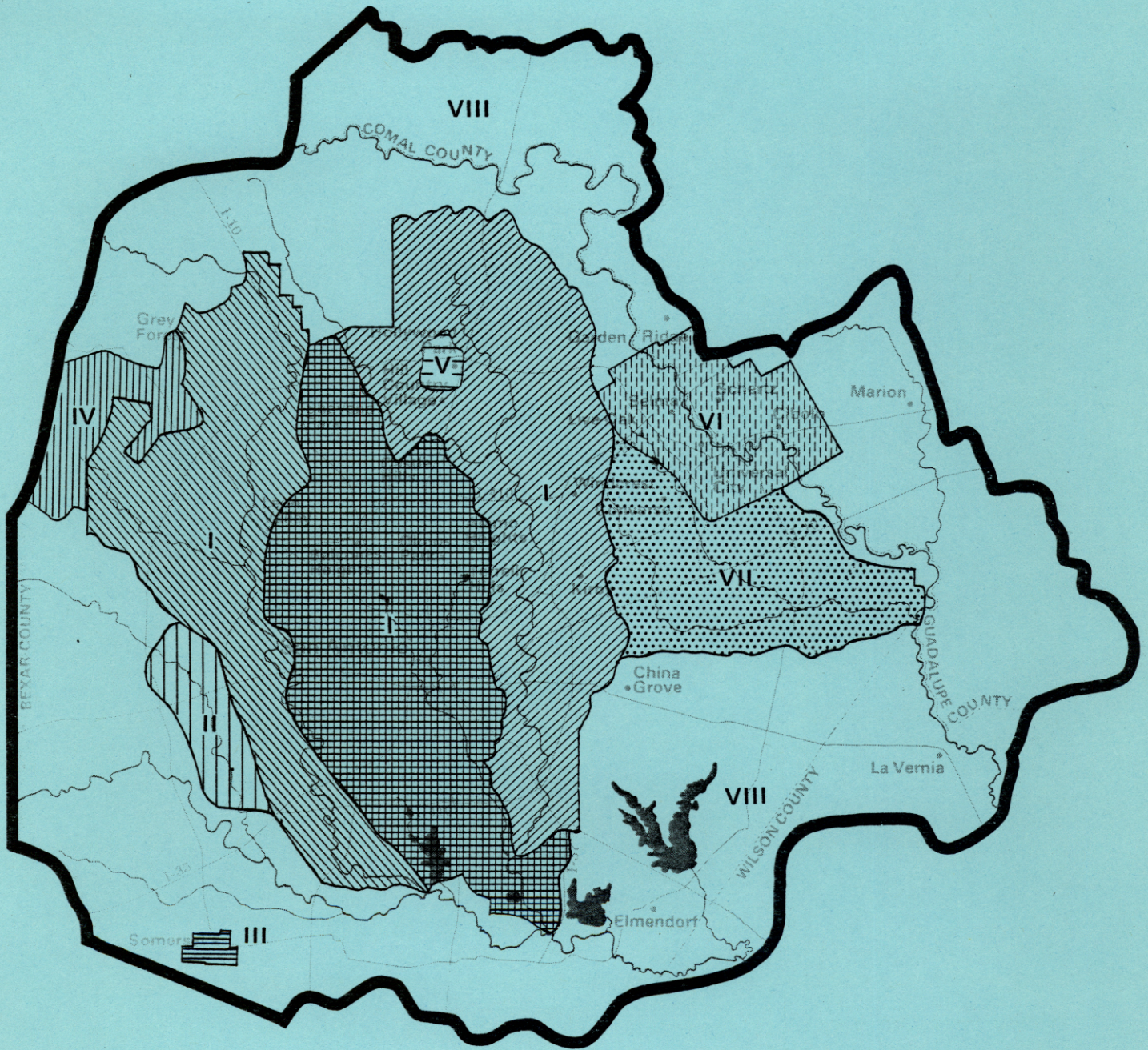
- I City of San Antonio Service Area
- II Medio Vicinity
- III Somerset
- IV Northwest
- V Hollywood Park
- VI Cibolo Creek Municipal Authority
- VII San Antonio River Authority
- VIII Remaining Area

These decision areas are depicted in Figure 5-1 and are the basis for discussion of alternatives in Part Two of this Summary.

Designation of Alternatives Within Decision Areas

Alternatives within decision areas are identified in the following manner:

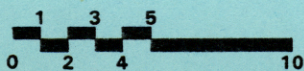
- o Each alternative is designated with a Roman numeral corresponding to its decision area



LEGEND

- I City of San Antonio
 - Rilling Road
 - Leon Creek
 - Salado Creek
- II Medio Vicinity

- III Somerset
- IV Northwest
- V Hollywood Park
- VI Cibolo Creek Municipal Authority
- VII San Antonio River Authority
- VIII Remaining Area



**Figure 5-1
Decision Areas
(Generally Following 201 Areas)**

- o An Arabic number identifies each alternative within the decision area having a separate effect on water quality (i.e., location of outfall and size of pollutant load)
- o Where appropriate, a letter following a dash identifies different options to obtain the same water quality effect (considerations which may be important for cost-effectiveness comparisons)

Decision Area I, the City of San Antonio Service Area, contains numerous alternatives. In many locations, though, only one viable configuration alternative could be identified. Decisions in these areas were thus in terms of timing, upgrading or expansion.

PART TWO: DESCRIPTION OF THE ALTERNATIVES

DECISION AREA I:

CITY OF SAN ANTONIO SERVICE AREA

Description of Alternative Technical Plans

The San Antonio 201 Study, which was executed simultaneously with the 208 Study, defined 17 Alternatives for the three regional treatment plants: Rilling Road, Leon Creek and Salado Creek Treatment Plants. The San Antonio 201 Alternatives were developed to meet "effluent set 4-N" standards, as defined by the Texas Department of Water Resources. In order to meet these effluent standards, 15 Alternatives for treatment of wastes and direct discharge to streams and two Alternatives for irrigation and land application were initially analyzed. These Alternatives were evaluated and incorporated into the 208 Study. Additional possible system configurations were also studied and an additional Alternative for the City of San Antonio was developed for the 208 Study.

Selection of Alternative Technical Plans

To reduce the Alternatives to a meaningful and manageable number for community input and decision, five Alternative technical plans were selected to receive further community response and more detailed consideration. These Alternatives will be identified by their designated number in the following narrative, but each Alternative is described briefly below:

Alternative No.	I1	Upgrade Rilling Road, Salado and Leon Creek Treatment Plants
Alternative No.	I2-B	Relocate Rilling Road flows to Salado, upgrade Salado and Leon Plants
Alternative No.	I3	Relocate Rilling Road flows to Salado, upgrade Salado and staged upgrading of Leon Plant

Alternative No.	I6	Relocate Rilling Road flows to Confluence of Medina/San Antonio Rivers; secondary effluent from Leon and Salado to Confluence Plant
Alternative No.	I12-B	Irrigation with Secondary Effluent at Rilling Road and Leon Plants; upgrade Salado Plant.

Alternative I3, the most cost-effective Alternative analyzed, is selected as an Alternative Plan. Alternative I2-B is also selected in order to provide further examination of the staging ramifications and because this Alternative represents the most cost-effective, non-staged plan, which abandons the Rilling Road Sewage Treatment Plant. Alternative I1, which maintains the Rilling Road STP, has the potential for staging savings at Leon Creek and therefore could be more cost-effective than Alternative I3.

Although the 201 Study process eliminated the irrigation alternative for final consideration, continued investigation of a direct-reuse plan in the 208 Study is advisable. An important consideration in including Alternative I12-B as an alternative plan for this potentially water short area is to promote further discussion concerning the possibilities of wastewater reuse for all the Alternatives.

Because of the additional objective of constructing a regional plant (for all Rilling Road loads and for "polishing" of effluent from Leon Creek and Salado Creek Plants), an alternative numbered I11-A would ordinarily be included for further consideration (See Volume III for listing of alternatives). The San Antonio 201 Study, however, has selected Alternative I6 as the regional configuration for final consideration. The present worth of Alternative I6 is evaluated at \$144.3 million, or \$5 million more than Alternative I11-A, which would involve use of Mitchell Lake. However, locational, regulatory and other supplemental considerations in addition to cost-effectiveness are present. Since the 201 Study is well in progress and the selection of a "super" regional alternative is influenced for reasons in addition to cost-effectiveness, Alternative I6 is continued for analysis of a regional configuration.

Based on the foregoing screening process, which included a computer analysis of projected effectiveness and a comparative evaluation of associated costs and related considerations, the five Alternatives shown in Figures 6-2 through 6-6 (following) were selected as Alternative Technical Plans. The principal rationale for the selection of each is:

Alternative I1	Potentially most cost-effective.
Alternative I2-B	Most cost-effective in abandoning Rilling Road and providing 4-N treatment.
Alternative I3	Cost savings in staging Leon Creek treatment.
Alternative I6	Regional configuration.
Alternative I12-B	Directly incorporates reuse.



LEGEND

- R - Rilling Road Plant
- L - Leon Creek Plant
- S - Salado Creek Plant
- - Proposed Tertiary Treatment

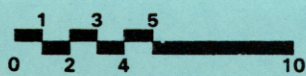
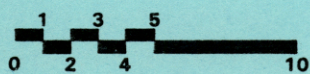
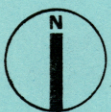


Figure 6-2
Decision Area I: Plan I1



LEGEND

- R - Rilling Road Plant
- L - Leon Creek Plant
- S - Salado Creek Plant
- △ - Abandoned Treatment Plant
- - Proposed Tertiary Treatment
- - Untreated Sewage



**Figure 6-3
Decision Area I: Plan I2-B**



LEGEND

- R - Rilling Road Plant
- L - Leon Creek Plant
- S - Salado Creek Plant
- △ - Abandoned Treatment Plant
- - Proposed Tertiary Treatment
- - Untreated Sewage
- ⊙ - Staged Nitrification and Filtration

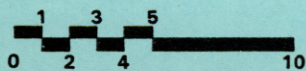
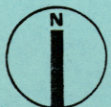
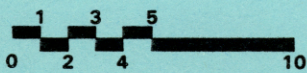
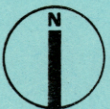


Figure 6-4
Decision Area I: Plan I3



LEGEND

- R - Rilling Road Plant
- L - Leon Creek Plant
- S - Salado Creek Plant
- N - New Treatment Plant
- - Secondary Treatment
- - Proposed Tertiary Treatment
- - Untreated Sewage
- - -> - Secondary Effluent
- △ - Abandoned Treatment Plant



**Figure 6-5
Decision Area I: Plan I6**



LEGEND

- R - Rilling Road Plant
- L - Leon Creek Plant
- S - Salado Creek Plant
- - Secondary Treatment
- - Proposed Tertiary Treatment
- > Secondary Effluent
- ← Proposed Pipeline to Irrigation Area

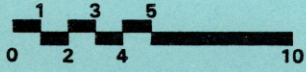
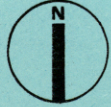


Figure 6-6
Decision Area I: Plan I12-B

Discussion of Costs of Alternative Technical Plans

The Table on the following page details selected aspects of the alternative technical plans. The capital costs indicated for the City of San Antonio assume 75 percent funding of the entire capital cost plan. No outside funding is available for operation and maintenance (O & M). Although Plan I2-B is slightly more expensive than Plan I1, City costs are lower as a result of accrued O & M savings even though the City would initially outlay \$1.5 million more in capital. Staging of advanced treatment at Leon Creek (Plan I3) is most advantageous for the City, also as a result of O & M savings and delay in capital expenditures. The Confluence Plan (I6) would cost the City \$2.5 million more in initial capital outlays than Plan I2-B, but has some slight O & M savings as a result of the achievable economies of scale.

Since Plan I6 is the least cost-effective of the three final alternatives the 201 program is considering, the U.S. Environmental Protection Agency may not fund the entire project cost if ultimately implemented and has been reported to be considering the Salado and Leon Creek effluent outfalls as ineligible costs. If this potential policy is adopted, costs to the City for Plan I6 would be millions of dollars higher. The San Antonio 201 agency has been made aware of these cost differences and their implications to the program.

Plan I12-B is the least cost-effective of the five presented technical plans. However, several considerations should be weighed in evaluating the figures. First, no economic value for reuse was assigned to the irrigant in deriving the costs. In addition, a consideration which was not evaluated was that if the objective is merely to meet stream standards, advanced treatment may not be necessary at the Salado Creek location - the only outfall in this configuration - because a significant amount of wasteflow has been diverted from the river system.

Summary of Decision Area I Alternatives

Five principal alternatives, all of which also involve various advantages, risks and other considerations, should be considered by the community:

Alternative I1

- o Upgrade Rilling Road, Salado Creek and Leon Creek facilities to tertiary treatment.
- o Meets 4-N treatment requirements.
- o Most cost-effective plan which meets 4-N requirements (\$134.1M).

Alternative I2-B

- o Abandon Rilling Road STP flows to Salado Creek STP
- o Expand and upgrade Salado Creek STP

TABLE

DECISION AREA I ALTERNATIVE PLANS
ANALYSIS OF COSTS AND COMPONENTS

Alter- native No.	Description	Present Worth Costs (\$ Millions)				
		Capital City	Total	City O&M	Total	Total Cost
I1	Upgrade R, S & L	14.8	59.2	74.9	89.7	134.1
I2-B	Relocate R to S. Upgrade S & L.	16.3	65.2	70.0	86.3	135.2
I3	Relocate R to S. Upgrade S and staged upgrade of L.	15.7	62.8	67.2	82.9	130.0
I6	Relocate R to C. Eff (L & S) to C.	18.7	74.7	69.6	88.3	144.3
I12-B	Irrigation with Eff (R & L). Upgrade S.	21.1	84.5	75.0	96.1	159.5

CODE: R = Rilling Road Treatment Plant
L = Leon Creek Treatment Plant
S = Salado Creek Treatment Plant
C = Confluence of Medina/San Antonio Rivers
Eff = Secondary Effluent
Tert. = Tertiary Treatment Plant

COSTS: Present worth figures are based on cost estimates,
December, 1976

SOURCE: Adapted from San Antonio 201 Study, "Cost
Methodology." (1977)

- o Upgrade Leon Creek STP
- o Most cost-effective in abandoning Rilling Road and providing 4-N treatment (\$135.2M)

Alternative I3

- o Abandon Rilling Road STP flows to Salado Creek STP
- o Expand and upgrade Salado Creek STP
- o Staged upgrading of Leon Creek STP (meets effluent Set 2)
- o Cost savings in staging Leon Creek treatment; most potentially cost-effective plan (\$130.0M)

Alternative I6

- o Abandon Rilling Road STP
- o Construct new facility near confluence of San Antonio and Medina Rivers
- o Transfer Salado Creek and Leon Creek secondary effluent to Confluence STP
- o Regional configuration with new facilities (\$144.3M)

Alternative I12-B

- o Continue Rilling Road STP, irrigation with effluent
- o Continue Leon Creek STP, irrigation with effluent
- o Upgrade Salado Creek STP
- o Smallest discharge to streams; directly incorporates reuse (\$159.3M)

Additionally, the Alternative Plans have various aspects which may be regarded as advantageous or disadvantageous by various viewpoints within the community, each has varying risks involved in its successful development and different reuse possibilities.

Regardless of which alternative is selected, consideration should be given to options of phasing advanced treatment, infiltration/inflow correction, and sewer system treatment.

While Decision Area I contains the overwhelming proportion of the population of the study area, there are important decisions regarding the future of the remaining areas of the 208 region. At any given location, the identification of feasible alternatives for the attainment of program objectives is properly based on a systematic evaluation of:

- o existing facilities
- o existing wastewater flows
- o projected wastewater flows (and the phasing of growth)

Required decisions occur when a facility or system does not have the capacity to treat the projected quantity of flows or cannot produce the level of environmental protection required, or when other options are more cost-effective or otherwise preferable.

Following is a discussion of three point source decision areas to the west of the San Antonio 208 study area. Decision Area II, the Medio Vicinity, contains five waste treatment plants in close proximity to one another, and potentially this area shares common solutions. Decision Area III, Somerset, is in the process of constructing a new waste treatment plant and is a self-contained 201 area. Decision Area IV, Northwest, contains the Grey Forest 201 area and the San Antonio Municipal Utility District #1.

Four additional decision areas for alternatives analysis are also present within the 208 study area. These areas were depicted in Figure 5-1 and are also discussed in the following narrative. They are: Decision Area V, Hollywood Park; Decision Area VI, Cibolo Creek Municipal Authority; Decision Area VII, San Antonio River Authority; and Decision Area VIII, Remaining Area.

DECISION AREA II:

MEDIO VICINITY

Decision Area II, to the southwest of the study area, is shown in Figure 7-1. The five facilities located in the area, their flow and the subwatersheds served are presented below:

<u>FACILITY</u>	<u>FLOW (MGD)</u>	<u>SUBWATERSHEDS SERVED</u>
Hunt Lane Medio Creek #1	0.135	64-02, 6402-00
Medio Creek #2	0.161	64-02, 6402-00
Lackland A.F.B.	0.29*	64-00
Bexar County WCID 16	0.297	6402-00, 64-00
Lackland City	<u>0.41</u>	64-00
TOTAL	1.293	

*Average Design Permit Flow



LEGEND

- 1 - Bexar County WCID I6
- 2 - Hunt Lane Medio Creek I
- 3 - Medio Creek 2
- 4 - Lackland City Water Company I
- 5 - Lackland Air Force Base

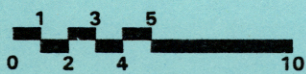


Figure 7-1
Decision Area II: Medio Vicinity Facilities

The overall projections for the basin as determined by the modular processor are:

<u>PROJECTED SEWERED FLOWS (MGD)</u>				
<u>1975</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>	<u>1995</u>
1.66	1.66	1.79	2.16	2.16

Since the scope of the study is limited to analysis of data on the subwatershed level, and since the service areas of each plant take in only small portions of a subwatershed, a detailed breakdown of flow projections for each Medio facility (if it is to continue operating or be allowed to expand as needed) is not possible.

The boundary of the San Antonio 201 excluded the Medio basin from its study area. In the Medio, four of the above five plants are within very close proximity to each other and to a proposed force main connecting to the Leon Creek System. Essentially, the alternatives available for the Medio are:

- III Continue with existing facilities.
- II2 Construct a new plant in the Medio Basin to replace the existing facilities.
- II3 Abandon the plants and regionalize the flows into the Leon Creek system.

The overall Medio flows were projected not to exceed 2.2 MGD within the planning period, an amount less than eight percent of the projected flows at the Leon Creek plant. Since the Medio flows are so small in comparison to those at Leon Creek, the Medio question is not significant in terms of analyzing the major alternative plans for the three principal San Antonio plants and, therefore, can be developed as a separable issue.

Discharges in the Medio were not modeled by the TDWR since, for the scale of discharges considered, field investigations showed that a small impoundment on the stream has a stabilizing effect on the sewage loads and therefore the plants will not interfere with downstream water quality. One computer run with QUAL-II was made for Plan I2-B to document the impact of combining the Medio flows into the Leon system. An extremely small impact was predicted -- a depression 0.02 mg/l in the minimum dissolved oxygen level relative to computer run.

The Medio alternatives outlined above have the following present worth (detailed in Consultants Report No. 18 of the 208 project):

<u>ALTERNATIVE</u>	<u>PRESENT WORTH</u> <u>(\$ MILLION)</u>
o III Continue with small plants	4.9
o II2 Regional Medio plant	6.3
o II3 Hookup to Leon Creek system*	1.4

* Includes allocated incremental costs for secondary, nitrification and

filtration levels of treatment.

Hookup to the Leon Creek system appears most economical; however, one should interpret the figures with caution since they were not calculated with the same precision as the previous costs discussed for the San Antonio 201.

A regional Medio plant (II2) makes little sense, even as a temporary measure, since continuation of the smaller plants is significantly more economical. The other two options outlined above for analysis as alternative technical plans are connection into the Leon Creek system (II3) and continuation of the small plants (III1). This latter plan would be consistent with the progress to date of the 201 study and would reflect the current status of facilities in the Medio Basin. Plan II3 would reflect the recent trends for facilities in this portion of the study area.

DECISION AREA III:

SOMERSET

The City of Somerset is a separate 201 area and is depicted on Figure 7-2. The 201 project is in the process of constructing a 0.18 MGD sewerage system for its service area.

Using an aeration process, the system is projected to meet secondary treatment requirements. Previously, residents in the area relied on individual septic tank systems. The only viable alternative for this area (III1) is a continuation of the system currently being planned.

DECISION AREA IV:

NORTHWEST

Decision Area IV is located in the northwest portion of the 208 area and contains the Grey Forest 201, the San Antonio Municipal District #1, and a portion of the surrounding area. Decision Area IV is shown on Figure 7-3.

The Grey Forest 201's service area is the Helotes and Grey Forest area. The area includes the populated part of Helotes Creek watershed down to Braun Road, and a small part of French Creek watershed.

The main focus of the 201 has been a collection system and an outfall line down Highway No. 16, discharging into the City of San Antonio's Leon Creek outfall line. The project area has been on a septic tank system.

The San Antonio Municipal Utility District #1, as shown in 208 Consultants Report No. 8, would be serviced by a treatment plant located to the south of the development in subwatershed 601109-00. At the present time the development is very small and sewage is removed by trunk from a central location.

A significant amount of population growth has been projected in subwatersheds

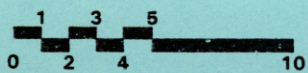


Figure 7-2
Decision Area III: Somerset

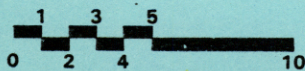
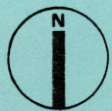


Figure 7-3
Decision Area IV: Northwest

60110403-00 and 6011-12. By 1985, the data processing system indicates there will be enough growth to accommodate an individual sewerage system and treatment facility. Task 2.65, Consultants Report 18, estimates the present worth of a 0.51 MGD system for MUD #1 as \$900,000.

Based on the geographical proximity of SA MUD #1 and the Grey Forest 201 to the Leon Creek service area and each other, these are the following alternative plans:

- IV1-A SA MUD #1 and Grey Forest 201 independently connect into the city system.
- IV-B SA MUD #1 connection with Grey Forest 201 to the city system.
- IV2 Continue separate systems, SA MUD constructs Facility 1985, Grey Forest hooks into city system.
- IV3 Grey Forest and MUD #1 construct a joint sewage treatment facility.

Because of differences brought about by the phasing of growth, these possibilities are not exhaustive, but rather are meant for discussions about alternatives.

DECISION AREA V:

HOLLYWOOD PARK

Hollywood Park is a separate 201 area located in northern Bexar County on the Edwards Aquifer Recharge Zone. The service area is the Town of Hollywood Park. Decision Area V, Hollywood Park, is depicted in Figure 8-1.

The focus of the 201 project has been a collection and conveyance system to convey collected wastewater via the Salado Creek outfall to the Salado Creek regional system. The continuation of the system begun under the 201 program is the only identified alternative. Coordination with the City of San Antonio (Decision Area I) with regards to priorities for Lawrence Creek outfall line is required.

DECISION AREA VI:

CIBOLO CREEK MUNICIPAL AUTHORITY

Decision Area VI is located in the northeast portion of the 208 area and is depicted in Figure 8-2. In addition to the former Cibolo Creek Municipal Authority (CCMA) 201 boundary, the decision area includes Randolph Air Force Base, which recently connected into the CCMA system.

Two alternatives, each involving expansion, were developed in the 208 planning:

VII Expand and meet effluent Set 2.

VI2 Expand land application.

Alternative VII provides for expansion by year 1985 for a total capacity of 5.82 MGD. This expansion is necessary to meet the growth projected in the area by the 208 program's DOT files. The estimated cost (present worth) of this alternative is approximately \$4,700,000.

A land application alternative, Alternative VI2, was also evaluated for CCMA. The land application alternative, based on information provided by CCMA, was estimated to have a cost (present worth) of \$11,300,000. This figure is significantly higher than the \$4,700,000 cost for direct discharge of secondary effluent. Therefore, this alternative should logically be considered only if there is a proven justification for zero discharge.

DECISION AREA VII:

SAN ANTONIO RIVER AUTHORITY

The San Antonio River Authority (SARA) in addition to having jurisdiction over the San Antonio Non-Designated Area 208, also operates two plants within the Martinez subarea of this 208. The treatment plants and Decision Area VII are shown on Figure 8-3.

The Salatrillo and Upper Martinez plants were both projected for expansion in capacity for the year 1990. Their expanded total capacity would be 3.2 and 2.0 MGD, respectively. The derived present worth values are \$3,000,000 and \$2,100,000, respectively.

DECISION AREA VIII:

REMAINING AREA

Decision Area VIII, as depicted in Figure 8-4, includes all of the area outside Decision Areas I through VII. The area is principally rural and contains two notable sewage treatment plants:

- o La Vernia STP
- o City of Marion STP

The La Vernia plant is expected to require expansion by 1990 to a total capacity of 0.16 MGD. The present worth of this expansion is \$350,000.

The City of Marion Plant, which is currently providing only primary treatment, requires action in the initial planning period. This includes an expansion in

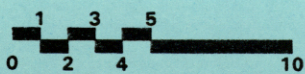


Figure 8-1
Decision Area V: Hollywood Park

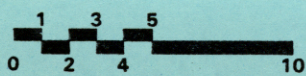
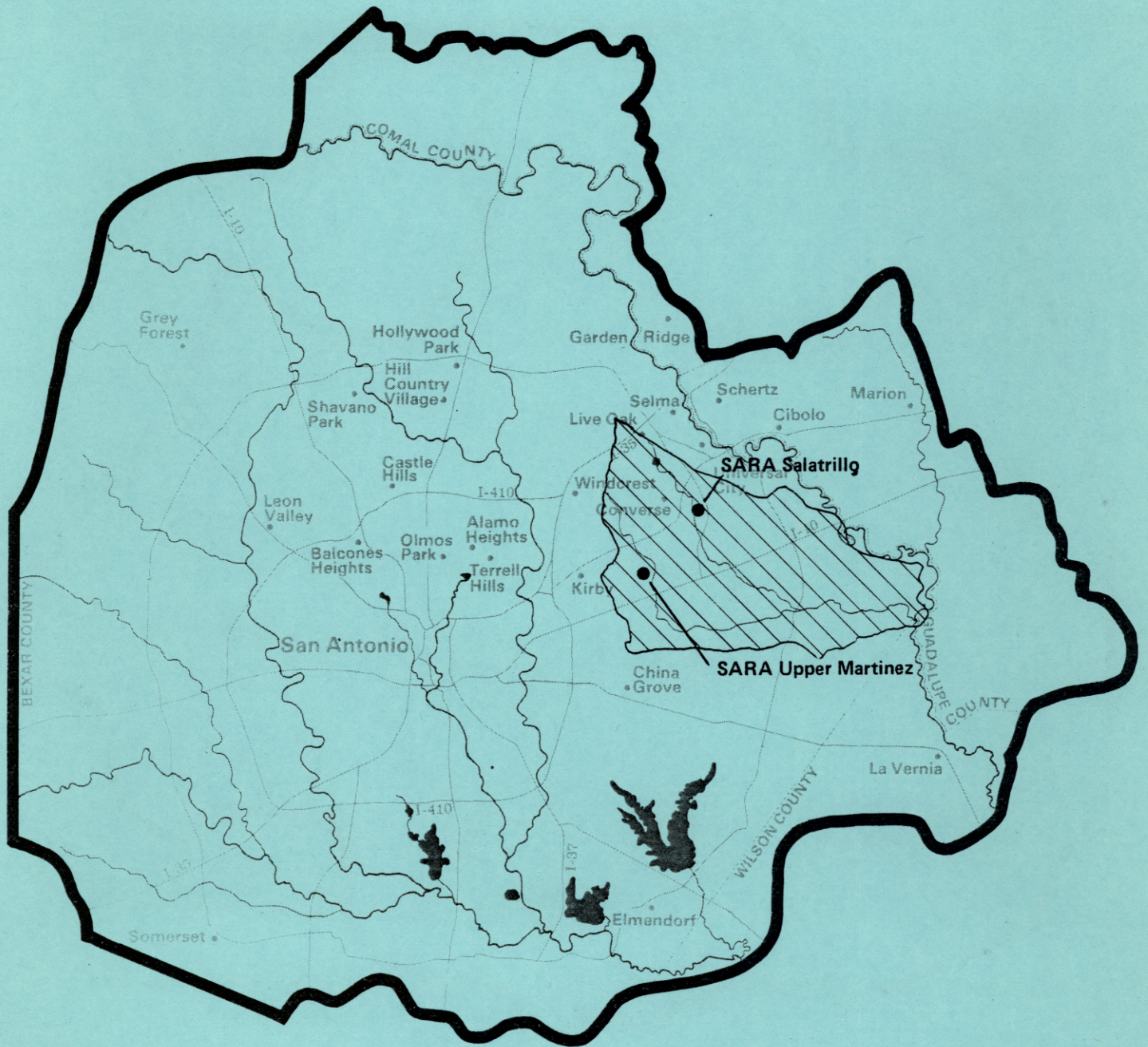


Figure 8-3
Decision Area VII: San Antonio River Authority

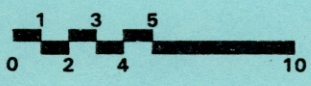
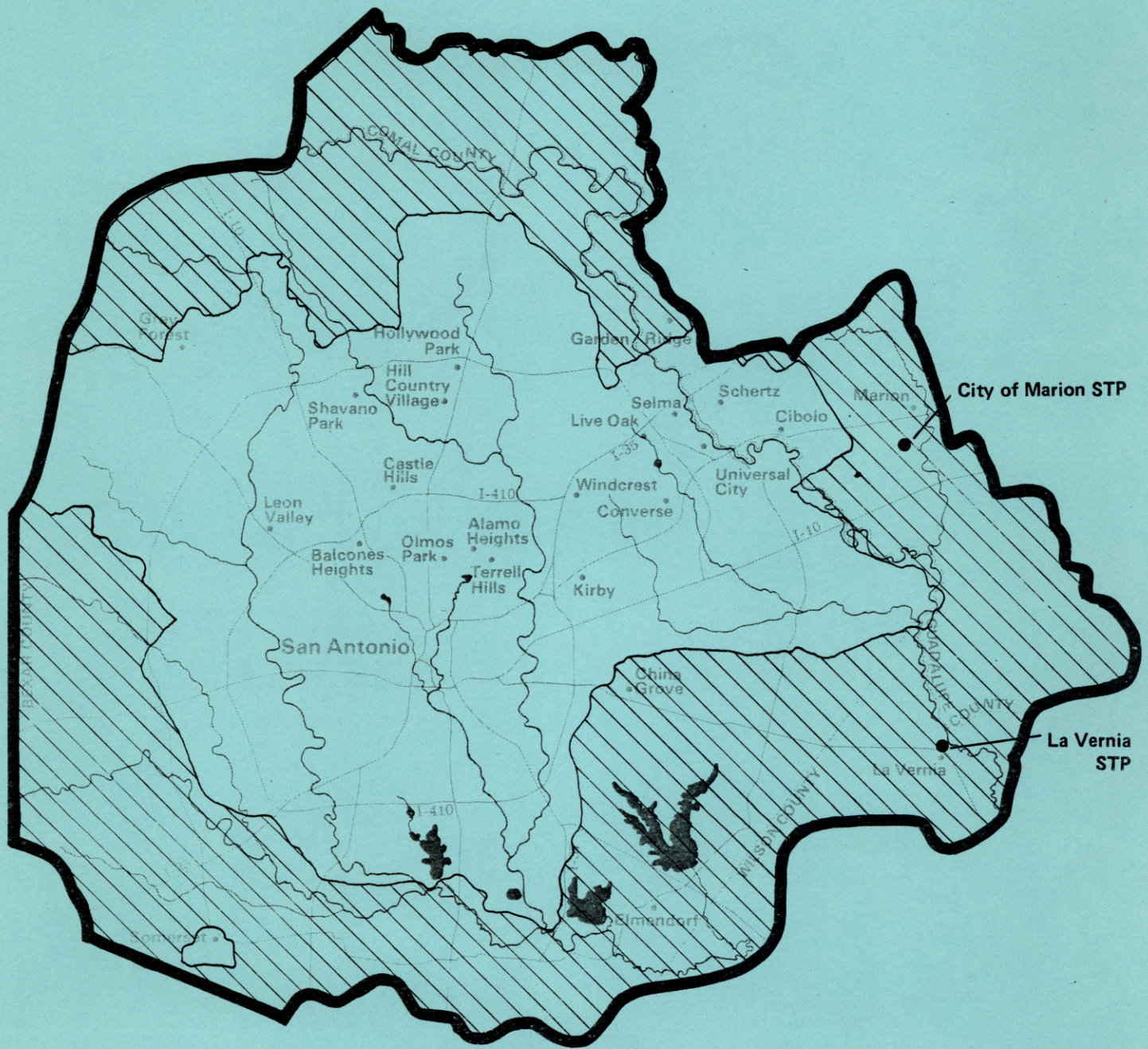


Figure 8-4
Decision Area VIII: Remaining Area

capacity and an upgrading in treatment level. The 208 program has estimated, based on national average costs, the present worth of these changes to be approximately \$640,000.

The portion of the Remaining Area not served by these plants is rural and is provided with individual septic tank systems. These systems, as well as other potential nonpoint problems, are discussed in Part Three of this chapter.

PART THREE: NONPOINT SOURCE ALTERNATIVES

Because of the patterns of flow within the region, the greatest benefits resulting from expenditures for point source abatement inside the study area accrue to the south of the study area boundaries. The improvement and use of water resources within the study area can be, potentially, more affected by nonpoint considerations.

Any nonpoint source plan which emerges for the efforts of the 208 program will have as its starting point the existing controls in the area. The study area is not without nonpoint source controls, though they were not developed in this context (comprehensive water quality planning) and are not presently thought about in this light.

The study area is already doing a substantial amount of work to control nonpoint source pollution. For the most part these controls are required under the authority of the following governments or agencies.

- a. Bexar County; Comal, Guadalupe and Wilson Counties
- b. Edwards Underground Water District
- c. Department of Public Works, City of San Antonio
- d. Texas Department of Water Resources
- e. Texas Railroad Commission
- f. Texas Department of Health Resources

For the most part, documentation and quantification of the problems was limited due to lack of data. Based on existing data and observations made by local, State, regional and federal officials, current or potential nonpoint sources were identified in the following six categories:

- o Urban runoff
- o Agricultural runoff
- o Construction
- o Surface mining and hydrocarbon production/transmission

- o Solid waste disposal
- o Septic systems

An inventory and analysis of control alternatives was undertaken. The inventory and analysis is found in the Appendix of Volume III, "Alternative Technical Subplans for the AACOG Designated 208 Study Area." The discussion includes the type of control measure, applicability, potential cost and relative effectiveness.

Once potential problems, current practices and available control measures were inventoried, an evaluation and screening process identified candidate alternative subplans for nonpoint source control.

Subarea Nonpoint Source Control Plans

The main thrust of the nonpoint source control subplans is to:

1. Suggest expansion and continuation of the ongoing monitoring program initiated as a work element of 208, specifically for the streams that flow across the Edwards Recharge Zone (Figure 9-2).
2. Indicate a set of subplans for nonpoint source pollution control which will provide guidance for work elements in future phases of the 208 program and direction for local authorities. The planning area was divided into 17 planning subareas. Each subarea's critical physical characteristics (Table 9-3, following) were then matched to the potential pollution sources (Table 9-4). Appropriate control measures are then indicated for each of the 17 planning subareas, as shown in Table 9-5.



● Recharge Basin

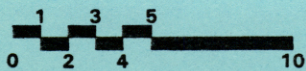


Figure 9-2
Edwards Aquifer Recharge Zone in Relation
to Streams and Recharge Basins

TABLE 9-3

SAN ANTONIO 208 STUDY AREA

SUB-AREA CRITICAL PHYSICAL CHARACTERISTICS

SUBAREA	Size (acres)	Land Use Class*	Length of Stream Reaches (in miles)	Number of Impoundments	Aquifer Recharge Zone	Soil Limitations
Calaveras	60,129	open	83.6	8		X
Culebra	52,051	open	79.6	-	X	X
Elm Creek	41,126	crop/open	68.0	4		X
Lower Cibolo	92,626	open	157.6	-		X
Lower Leon	50,031	urban/open	68.3	1		X
Lower San Antonio	77,387	crop/open	101.4	7		X
Lower Salado	60,496	urban/open	90.3	2		X
Martinez	57,375	open	91.4	6		X
Medina	60,863	crop/open	118.3	2		X
Medio Creek	32,314	open	43.7	3		X
Middle Cibolo	36,353	crop/open	54.6	-	X	X
Mud Creek	33,084	open	50.1	2	X	X
Santa Clara	39,933	crop/open	61.8	-		X
Upper Cibolo	86,567	open	144.2	-	X	X
Upper Leon	47,920	open	84.1	-	X	X
Upper San Antonio	80,417	urban	99.2	4	X	X
Upper Salado	47,828	open	74.2	2	X	X

*Land Use Class:

- o Open Includes open space, parks, pastureland, rangeland
(and military, where indicated in Table 2-3, Summary of Land
Use by Grids-1975)
- o Crop Includes farmland only
- o Urban includes residential, mixed, commercial (and military, where
indicated in Table 2-3, Summary of Land Use by Grids-1975).

TABLE 9-4

SAN ANTONIO 208 STUDY AREA

EXISTING OR POTENTIAL NONPOINT
SOURCE CONCENTRATIONS BY SUBAREA

SUBAREA	Runoff		Landfills		Septic Areas	New Construction (1975-1995)	Surface Mines		Oil Fields
	Urban	Agricultural	Closed	Active			In Recharge Zone	Other	
Calaveras				X					X
Culebra			X				X	X	
Elm Creek		X	X	X					X
Lower Cibolo				X					
Lower Leon			X	X	X	X		X	
Lower San Antonio	X	X	X	X	X			X	
Lower Salado	X		X	X	X	X		X	X
Martínez			X	X	X	X		X	
Medina		X						X	X
Medio Creek			X	X	X				X
Middle Cibolo		X	X	X		X	X		
Mud Creek							X		
Santa Clara		X							
Upper Cibolo									
Upper Leon			X	X	X	X	X		
Upper San Antonio	X		X	X	X	X	X	X	
Upper Salado			X	X	X	X	X	X	

TABLE 9-5

CANDIDATE ALTERNATIVES BY SUBAREA

CONTROL MEASURES	Cala- veras	Cule- bra	Elm Creek	Lower Cibo.	Lower Leon	Lower S.A.	Lower Sala.	Mar- tinez	Me- dina	Medio Creek	Mid. Cibo.	Mud Creek	Santa Clara	Upper Cibo.	Upper Leon	Upper S.A.	Upper Sala.
1. Construct reg. storm/sed. basins for exist. development					X		X										X
2. Require storm/sed. basins for new dev. over 5 acres					X		X	X			X				X	X	X
3. Chem. treat. to control algal blooms	X		X		X	X	X	X	X	X							X
4. Institute reg. vacuum st. sweeping					X		X										X
5. Reaerate where thermal strat./oxygen depletion are problems	X						X										
6. Cons. 100' buffer zone near receiving waters	X	X	X		X	X	X		X	X			X	X	X	X	X
7. Conduct maint. progs. for streams/impoundments	X		X		X	X	X	X	X	X							X
8. Encourage agri. cons. techniques per SCS			X		X	X	X		X		X		X		X	X	X

NOTE: All odd numbers (1, 3, 5 etc.) refer to use of Structural Control Measures.
All even numbers (2, 4, 6 etc.) refer to use of Non-Structural Control Measures.

TABLE 9-5 (cont'd.)
Candidate Alternatives by Subarea

CONTROL MEASURES	Cala- veras bra	Cule- bra	Elm Creek	Lower Cibo.	Lower Leon	Lower S.A.	Lower Sala.	Mar- tinez	Me- dina	Medio Creek	Mid. Cibo.	Mud Creek	Santa Clara	Upper Cibo.	Upper Leon	Upper S.A.	Upper Sala.
9. Collect/ treat/disp. of runoff accum. from surf. mines in Rech. Zone		X			X	X	X	X	X		X	X			X	X	X
10. Prov. ed. prog. on use of fert., pest., herbicides			X		X	X	X		X		X		X		X	X	X
11. Collect, treat, disp. of leachate from imp. func. landfills	X	X	X	X	X	X	X	X		X	X				X	X	X
12. Require labeling of fert., pest. containers			X		X	X	X		X		X		X		X	X	X
13. Require adv. offsite waste- water disp. syst. for new dev. in Edw. Rech. Zone															X	X	X
14. Establish erosion/sedi. cont. on new priv./public const.					X		X	X							X	X	X
15. Repair/sewer areas w/malfunc. septic systems					X	X	X	X		X					X	X	X
16. Classify polluting surf. mines for NPDES permit		X			X	X	X	X	X							X	X

TABLE 9-5 (cont'd.)
Candidate Alternatives by Subarea

CONTROL	Cala- veras bra	Cule- bra	Elm Creek	Lower Cibo.	Lower Leon	Lower S.A.	Lower Sala.	Mar- tinez	Me- dina	Medio Creek	Mid. Cibo.	Mud Creek	Santa Clara	Upper Cibo.	Upper Leon	Upper S.A.	Upper Sala.
17. Collect/ treat leachate from malfunc. septic syst.					X	X	X	X		X					X	X	X
18. Prohibit const. of new landfill in Rechg. Zone		X									X	X		X	X	X	X
19. Construct watertight sewers in Rechg. Zone											X				X	X	X
20. Prohibit new sept. syst. in sensitive areas		X			X	X	X	X		X	X	X		X	X	X	X
21. Construct new surface water impound.						X											
22. Continue prohibition of privies, cess- pools, etc. in Rechg. Zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
24. Regu./proh. const. of pipe- lines in R.Zone		X									X	X		X	X	X	X
26. Contine TDWR controls on haz. materials in Rechg. Zone		X									X	X		X	X	X	X
28. Require perm. for diversions of groundwater		X									X	X		X	X	X	X
30. Insp./clean SCS rech. basins												X				X	X
32. Buffer zones near crit. rechg./ pumping areas		X									X	X		X	X	X	X

The purpose of Public Law 92-500, in addition to making streams fishable and swimmable, is to make them usable. The San Antonio study area is unique and offers unique opportunities for water quality planning. In the San Antonio area, a system of providing public access and downtown community use of the river area has developed and has become a symbolic portion of the San Antonio area itself. This commitment of the region to water-related planning provides the opportunity to relate the 208 program with the provision of parks and other efforts to provide water-related recreational opportunities in outlying areas and to improve community centers.

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