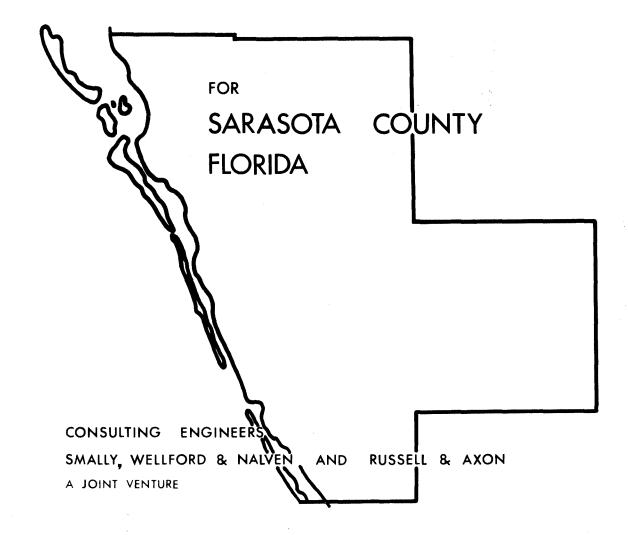
WATER AND WASTEWATER SYSTEMS MASTER PLAN



JUNE 1971

BOARD OF COUNTY COMMISSIONERS OF SARASOTA COUNTY, FLORIDA

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Kenneth D. Brumbaugh, P.E.

Larry Rhodes

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WATER AND WASTEWATER SYSTEMS MASTER PLAN

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FOR
SARASOTA COUNTY
FLORIDA

CONSULTING ENGINEERS
SMALLY, WELLFORD & NALVEN AND RUSSELL & AXON
A JOINT VENTURE

JUNE 1971

A 40-year master plan should not be considered to be fixed or final. Planning must be a continuous process to meet the needs of our changing society and expanding technologies. This plan should be subject to periodic review for adjustments in the implementation of its objectives. Even the goals may have to be refined someday, if it is to retain its usefulness as a living tool responsive to the will of the citizens of Sarasota County.

Smally, Wellford & Nalven, Inc.



Russell & Axon, Incorporated

CONSULTING ENGINEERS

CONSULTING ENGINEERS

P. O. BOX 2411 SARASOTA, FLORIDA 33578

June 15, 1971

Board of County Commissioners of Sarasota County, Florida Sarasota County Courthouse Sarasota, Florida

Gentlemen:

We are pleased to submit this MASTER PLAN FOR WATER AND WASTEWATER SYSTEMS, as authorized by the Board. The prior reports for Service Areas A and B, and supplementary steps related thereto, will fall into place as implementations of this master plan.

This is a true regional plan to serve the needs of Sarasota County for the next 40 years, through 2010. Although initially the systems would serve the urbanized areas outside of the municipalities, a water district and a utility authority, ultimately a consolidated countywide system would best serve the regional needs of the public. Existing jurisdictional boundaries would give way in an orderly and mutually agreeable program to pollution control zones that are designed for maximum effectiveness not only to serve the people but to conserve water resources and to protect the environment.

The findings of the master plan culminate in a program for putting it into effect. This appears under the title "Guidelines for Action", starting on Page 117 of the report.

The scope of a plan as broad as this master plan required assembling information from innumerable sources, including officials of Sarasota County, and public agencies and departments of cities, the region, the state and the federal government, as well as from private sources of many kinds. The unfailing cooperation we received is gratefully acknowledged.

Respectfully submitted,

Donald J. Smally, P.E.

For Smally, Wellford & Nalven

Frank J. Osleenfi.

Frank T. Osteen, Jr., P.E. For Russell & Axon, Inc.

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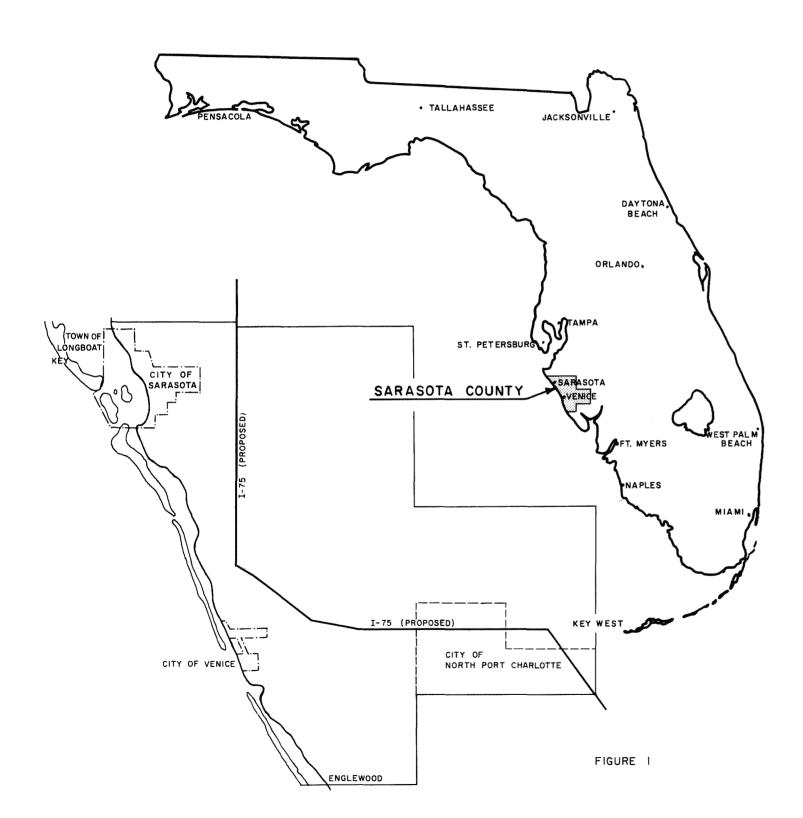
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INTRODUCTION TO SARASOTA COUNTY

ABSTRACT OF SECTION I

Sarasota County is in the southwestern part of peninsular Florida. Once a part of Manatee County, it became a separate entity as a county in 1921, and since World War II, has experienced one of the most rapid growth rates in the nation. The climate is subtropical, with a mean annual temperature of 71.2°. Lying within the coastal lowlands, the topography is generally flat with a scenic waterfront forming the focal point for a thriving tourist industry. It is one of the wealthiest areas in the state, with service industries a major source of employment.

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SECTION I INTRODUCTION TO SARASOTA COUNTY

A. Location of Sarasota County

Sarasota County is located in the southwestern part of peninsular Florida, on the Gulf of Mexico. The City of Sarasota, in the northwest corner of the county, is the county seat. It is approximately 219 miles northwest of Miami, 55 miles south of Tampa, and 250 miles southwest of Jacksonville.

The county extends approximately 27 miles from east to west at its widest point, and some 30 miles from north to south. The present population is approximately 120,000. About 40 percent of the people live in the City of Sarasota, 8 percent in the City of Venice, 3 percent in the City of North Port Charlotte and 3 percent in the Town of Longboat Key.

Sarasota County's location in the state and the portions of the county dealt with in this report are shown in Figure 1.

B. <u>History</u>

At the time of the first government land survey in 1843, Sarasota was a Seminole village of about 30 or 40 persons. The village of Myakka, on the lower Myakka River, was first inhabited by stockmen about 1850. The first permanent homesteader in the Sarasota area was William H. Whitaker, who was granted a homestead of some 145 acres by the government in 1851.

The year 1867 saw the coming of the area's first "manufacturing plant": a sugar refinery, and the first winter resort. The first appearance of a settlement in what is now Sarasota began in the 1870's. In 1878 it was given a post office and a name: "Sara Sota". The first school was established in 1878. The economy of the area was principally cattle grazing, agriculture and fishing.

By the end of 1883, land speculators had obtained nearly 700,000 acres in the area, and a colonization attempt replaced the homestead movement of the pioneers. In 1885, a group of Scots immigrated to Sara Sota to occupy 60,000 acres owned by the Florida Mortgage and Investment Company of Edinburgh. The colonization was a failure, with only three to four families remaining after 18 months. During this period John W. Gillespie laid out the first practice golf course in America.

The years 1894 and 1895 saw continued expansion of citrus-growing and fishing. Additional prosperity was brought to the fishing and cattle industries by providing food for the soldiers in the Spanish-American War of 1898.

Sarasota continued to grow, and in 1899 received its first newspaper and its first telephone service. It was incorporated as a town on October 14, 1902, and rail service began in 1903. Development was now accelerating, and the first decade of this century also saw the advent of a second newspaper, a golf course, a yacht club, a theater, municipal water and sewerage systems, an electric plant and a town beautification program.

In the second decade of this century, the area began to achieve fame as a winter resort. At the close of World War I, the influx of tourists accelerated greatly. Sarasota became a city in 1913, and Sarasota County was created in 1921 from a portion of Manatee County.

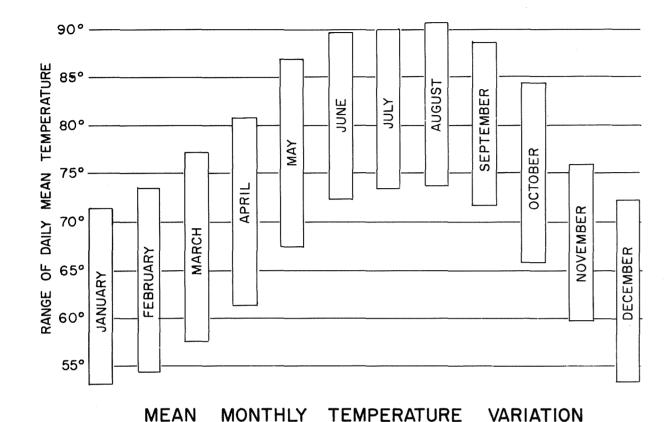
The City and County of Sarasota were successful in surviving the crash of 1929, and made several public improvements through Federal Works Progress Administration projects during the Thirties. During the years of World War II, the area was host to two military air bases. Since World War II, the area has experienced one of the most rapid growth rates in the nation.

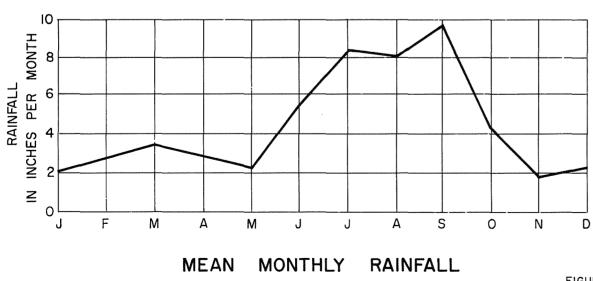
C. Climate

Sarasota County is in the subtropical zone, with a climate moderated by the presence of the Gulf of Mexico. Observations of weather for a twenty-year period provide the following data:

Mean Annual Temperature: 71.2°
Highest Recorded Temperature: 98°
Lowest Recorded Temperature: 23°
Average Yearly Rainfall: 52.9 Inches

The mean monthly temperature and rainfall are graphically shown in Figure 2.





Although the county is in an area which experiences an exceptionally high number of electrical storms in the summer months, little damage results. The lightning is commonly in the form of horizontal discharges which seldom strike the ground.

The county is also in the so-called "hurricane belt". With a few exceptions, however, the area has suffered little damage from tropical storms.

The climate is one of Sarasota County's major assets, and is a major factor in the flourishing tourism and agriculture.

D. <u>Topography</u>

Sarasota County lies within the coastal lowlands of Florida, consisting of several marine terraces constructed by the ocean during prehistoric inundations. These terraces are at elevations of approximately 100 feet, 80 feet, 40 feet and 20 feet. More than three-fourths of the county is below the 40-foot elevation. A topographic map of the county is shown in Figure 3.

The topography is generally flat. Except where deepened by man, the sloughs which serve as tributaries to the creeks are seldom more than a few feet deep. Numerous wet-weather ponds dot the broad, flat landscape inland, and the water table is usually within a few feet of the ground surface.

Most of the area has a mantle of marine quartz sand deposited during sea

in natural fertility. The subtropical climate produces a great variety of natural tropical and temperate vegetation. Flat, wooded areas are typified by pines, with an undergrowth of palmetto and wire-grass. Scrub oaks are found on the drier sand ridges. Oaks, gums, elm, hickory, maple and cabbage palmettos grow in the vicinity of ponds and sloughs.

The most notable topographic feature of Sarasota County is its waterfront. The numerous keys, shallow bays and estuaries form a scenic focal point for the thriving tourist industry. Shallow bays, averaging about six feet in depth, form the western boundary of most of the county. The protection of the ecosystems and natural beauty of these bays is of great concern to local residents.

E. Economy

Indices of per capita wealth continue to place Sarasota County at the top of the state, at \$10,255. The county's financial institutions rank with the strongest in Florida. Reflecting the impact of tourism, resort activities and retirement living, trading and service industries are the largest employers.

Agriculture and commercial fishing were the original backbones of the local economy, but fishing has declined as an industry. Agriculture remains fairly stable and prosperous, although subject to the vagaries of weather and market demand. Vegetables, especially winter crops, and citrus are

the leading activities, with cattle raising also of major importance.

Others of note are dairy products, poultry and horticultural specialties.

Industry can be grouped into two classes. One group constitutes industry that serves the local needs, notably building and road construction. Related to these are concrete plants, concrete block and concrete pipe manufacturing, and others of this kind. Mobile home manufacturers serve the local area but also ship many units to other places.

The other industrial group is comprised of manufacturers of specialized products. Although over 1,500 acres are zoned for industrial use, those that are welcomed are of the "light" type not representing a burden to the community nor a threat to the environment. Presently there are manufacturers and processors for electronic and electrical equipment, telemetry, missile components, hydraulic valves, plastic, metal and paper products, specialized chemicals, contact lenses, wood products, and vending machines. Printing and publishing are actively pursued.

Electricity is supplied by Florida Power & Light Company, and telephone service by General Telephone Company of Florida. Transportation services are available by land, air and sea.

Two federal highways pass through the county, supplemented by a network of state roads. Interstate 4 is less than an hour's driving distance, and Interstate 75 will be extended through the entire county within a few years.

The Sarasota-Bradenton Airport straddles the north county line and provides scheduled jet flights via Eastern and National Airlines. Executive Airlines,

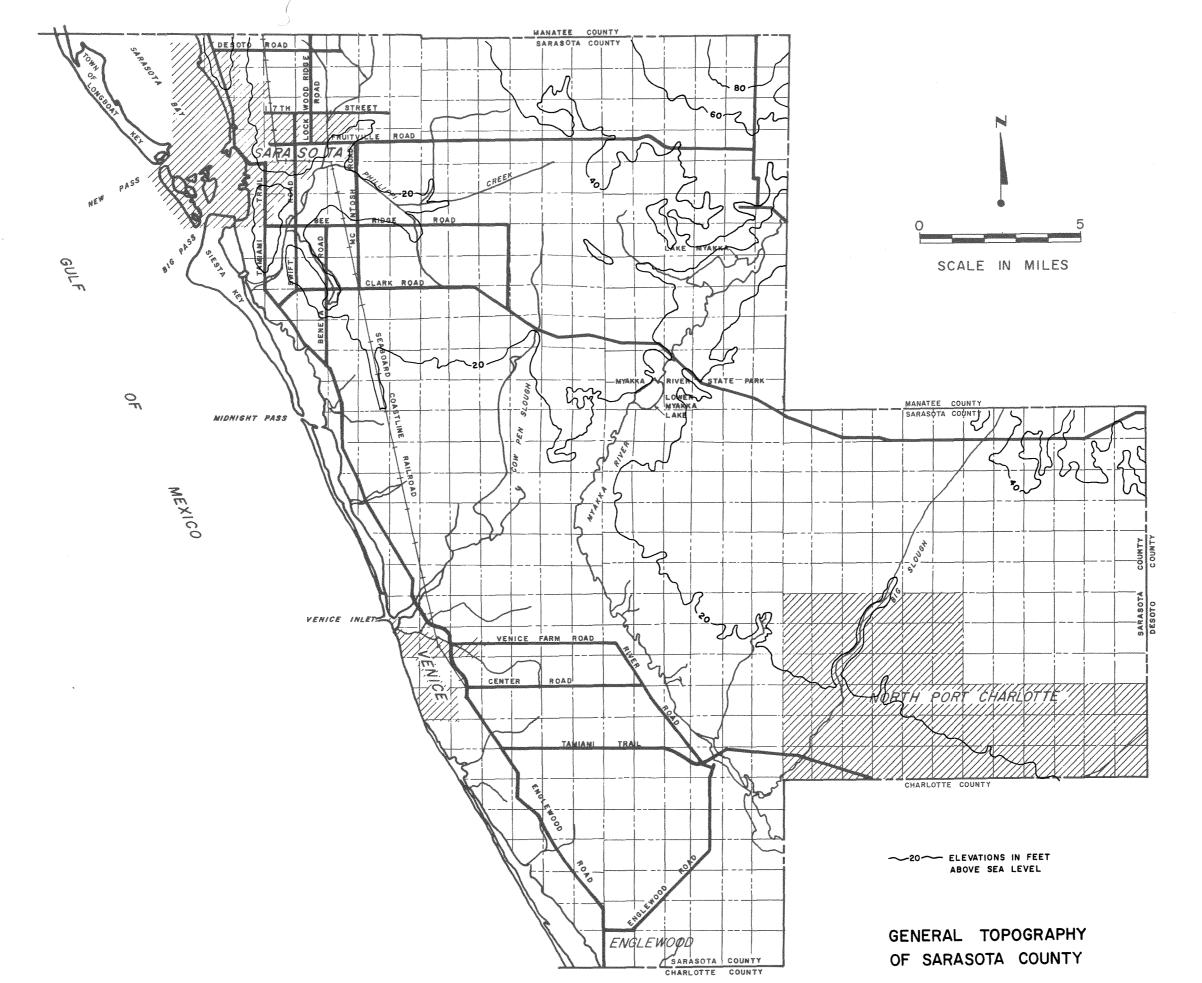
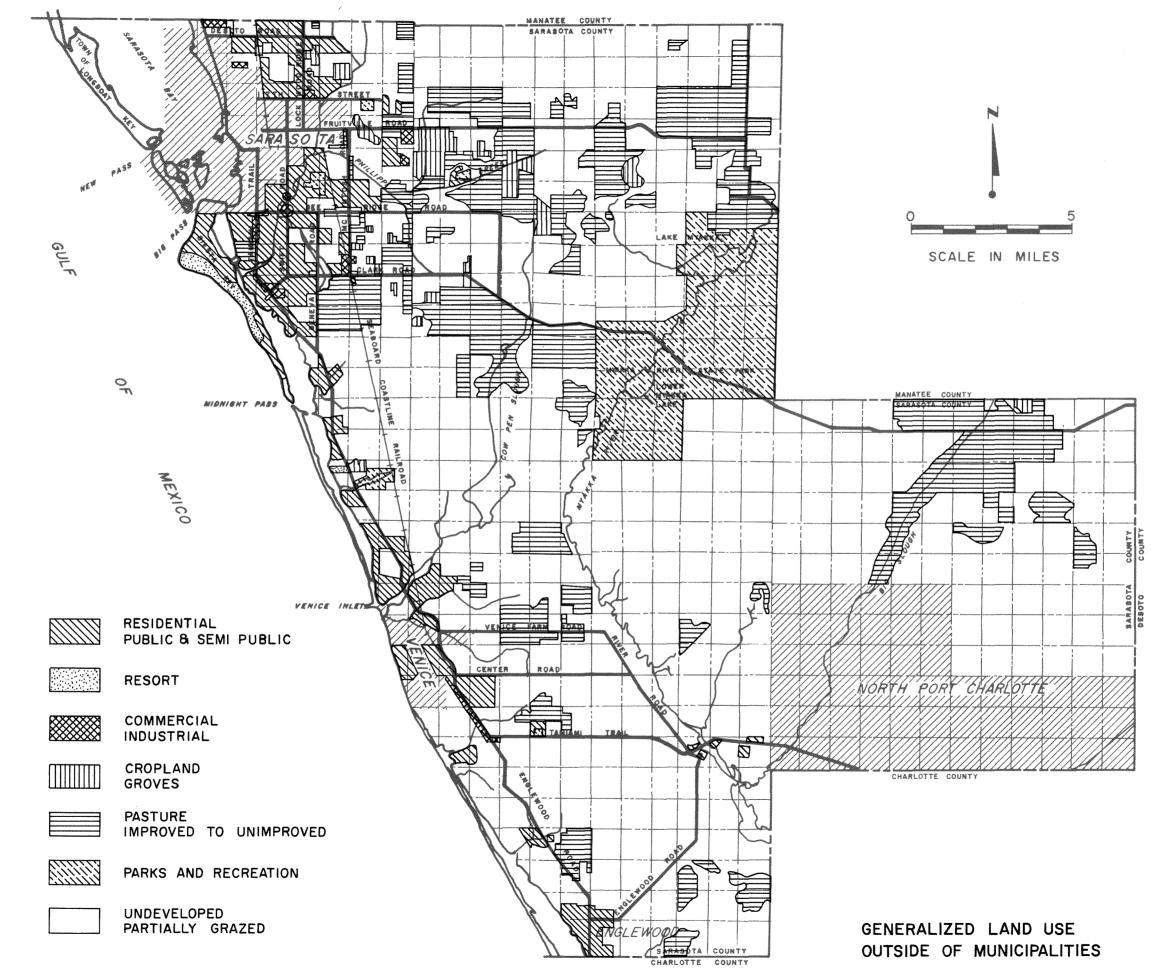


FIGURE 3



a major intrastate and charter carrier, has its headquarters here.

Rail service is provided by the Seaboard Coastline Railroad. Two interstate bus companies have local terminals.

Sarasota County is a cultural and recreational center of a ranking far above what its numbers of people alone would ordinarily represent. Its beaches and bays are renowned, as are some of its commercial attractions, but beyond these are the Ringling Museum of Art, art schools and centers, musical institutions, legitimate theaters and New College. The Chicago White Sox train here, and there are year round baseball activities. Numerous fine golf courses and other recreational facilities are available.

The county has a leading school system and outstanding hospital facilities, with broad medical support.

F. <u>Land Use</u>

Figure 4 illustrates the general land use within Sarasota County. The greatest concentrations of people, commerce and industry are located along the county's westerly edge, reflecting the water orientation of the population influx over many years. Agricultural uses have been displaced inland, where they tend to be dispersed. The remaining land masses are generally open and unimproved.

Land uses within the municipalities are not identified in the figure. These consist of urban concentrations of the usual kinds.

"The 1970s must be the years when America pays its debt to the past by reclaiming the purity of its air, its waters and our living environment.

"It is literally now or never."

Richard M. Nixon

January 1, 1970

AUTHORIZATION, PURPOSE AND SCOPE

ABSTRACT OF SECTION II

The authority for preparation of the report is presented, citing the contract for professional services between Sarasota County and the Joint Venture Engineers. The necessity for creating central water and wastewater systems to alleviate the present environmental deterioration and provide for future growth in an orderly manner is amplified, and the basic sources of information to accomplish this objective are outlined.

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SECTION II
AUTHORIZATION, PURPOSE AND SCOPE

A. <u>Authorization</u>

This report has been prepared in accordance with the terms of the "Contract for Professional Services between the County of Sarasota, Florida, and Smally, Wellford & Nalven, Inc. and Russell & Axon, Inc.", as a joint venture, dated June 17, 1969.

The portions of the contract having specific reference to the production of a Master Plan are cited below:

1.2 Master Plan

1.2.1 The Engineers will proceed without delay with all necessary studies and investigations for the preparation of a Master Plan for the development and acquisition of public water and sewer facilities for the County. Said services

shall include all those customarily required and provided by consulting engineers in connection with a Master Plan study and those as may be required in order to meet the standards and criteria of the Federal and State Government and shall be used as supporting data in connection with the obtaining of research, development and construction grants or loans for the purpose of accomplishing the Project, or any phase or part thereof, and shall include but not be limited to the following services:

- (a) Population and economic studies and projections, including investigation and preparation of population analysis and studies of future growth of the County, including present and future growth, based on projections to the year 2010, in order to demonstrate from an engineering standpoint the general fiscal feasibility for the purpose of planning sequential Service Area selection.
- (b) Investigate and determine present and future water

 demands based on projected growth studies with analysis of the growth impact on quality and quantity

 of water by potential residential, commercial and
 industrial users;
- (c) Investigate and report possible sources of available water supply, including surface and underground,

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- and potential purchase from adjacent governmental units; correlate same with drainage basin studies and other studies prepared and in the process of being prepared for the County;
- (d) Analyze and recommend water sources for each Service

 Area and furnish data in support of such recommendations;
- (e) Determine quality of water source from existing data by preliminary biological, bacteriological, chemical and physical sampling and analysis of proposed water source;
- (f) Analyze from existing data general and preliminary topographical, hydrographical and meteorological features; same to be accomplished and correlated with studies for drainage basins and flood control studies;
- (g) Determine storage requirements and capacities in order to meet demands of future population growth as projected.
- (h) Locate holding basins, recharge areas, dams and water control structures where applicable and correlate same with drainage studies performed or in process by the County;

- (i) Study, analyze and recommend the acquisition of well fields from existing data including determination of the quality and quantity of water and projections of same with regard to future use;
- (j) Study and analyze various methods of disposition of sewerage effluent including methods which would eliminate effluent disposition into the waterways, bays, and the Gulf of Mexico, such studies to include cost analysis and estimate of the various alternative methods of effluent disposition, such study and analysis to include a review and recommendation regarding all available federal programs dealing with the subject.
- (k) Establish basic design criteria, including a statement as to basis of design assumptions and estimates;
- (1) Consultation with the Florida State Board of Health and the Florida Air and Water Pollution Control Commission in order to ascertain and assure that the recommendations outlined in the Master Plan are consistent with policies and regulations of the State Board of Health.
- 1.2.2 Provide consultation and advice to the County in connection with all phases of the Project upon request of the County.

- 1.2.3 Advise the County as to the availability of Federal and State aid in connection with any phase of the Project and prepare on behalf of or cooperate with the County in the preparation of all applications for Federal and State aid or loans, as well as consult with the appropriate Federal officials and assist in the processing of any such applications in connection with Federal or State aid or loans.
- 1.2.4 Cooperate and consult with the County's fiscal advisors in connection with any phase of the Project.
- 1.2.5 The Engineers agree to proceed diligently with the preparation of the Master Plan, and to complete same on or before two (2) years from the date of this contract.
- 1.2.6 It is mutually agreed that the completion time may be extended in the event the Engineers experience delays which are beyond their control.
- 1.2.7 Quarter annual reports will be made by the Engineers unto the County as to the status of completion of the Master Plan at regular Board meetings of the County.
- 1.2.8 Upon completion and acceptance of the Master Plan, furnish twenty-five (25) copies of the same; furnish additional copies as may be required with the cost of same to be reimbursed by the County.

B. Purpose of Report

Sarasota County, in common with much of the State of Florida, has experienced an influx of new residents that has put a strain on the capacity of its community to absorb them. Many of these people create urban concentrations outside of existing municipalities, and are turning to county government for help in obtaining the kinds of services they need.

A good water supply is a primary requirement. A safe means of disposing of wastewater is another. Individual well-water systems and individual septic tank systems could provide adequate solutions for a rural homestead, but their intimate proliferation in urban concentrations becomes a menace to the general health and welfare. Thousands of these are still in existence in Sarasota County.

Even the functioning of these individual systems is unreliable. During the recent winter season many people experienced well failures, and the county has had to invoke an emergency ordinance to restrict water use. Septic tanks and drain fields are notorious for failures, especially in the rainy season.

The franchised water and wastewater systems in the county were initiated by large developers in response to county regulations which sought to cope with the concentrations of individual systems. These systems have served their purpose to a degree, but they have proven to be burdened with limitations. Extensions of service, quality and reliability of the water supplied, and the completeness of the treatment of wastewater and the method of disposing

of the effluent are major problems inadequately met. There are other problems. As the problems have mounted, the county has found it increasingly difficult to regulate these utilities in behalf of the public.

Simultaneously, the public awareness of dangers to the environment and its ecosystems, nationwide but especially in Sarasota County, has become phenomenal. It is no longer enough, for instance, to remove wastewater from its place of origin; it must be treated and rendered harmless, perhaps even reused. A scattering of utility systems, none of which is in business for the purpose, cannot be expected to provide the attention to the environment that a county system can.

The purpose of this Master Plan is to lay the foundation for regional water and wastewater systems to be operated by the county. The water system must supply an ample and reliable quantity of good quality water. The wastewater system must unobtrusively remove wastewater and safely conduct it to a place of treatment, with a method of disposal not harmful to the environment, preferably reuse of some kind. Moreover, everyone who lives in an urban community should be served.

Meeting these requirements requires careful planning, because in solving the problems of the present the needs of the future should not be neglected.

A master plan by its nature cannot be a precise blueprint. It must allow some room for flexibility and adjustments. This Master Plan is intended to be a vehicle of decision-making, to implement the succeeding phases of providing water and wastewater utilities in an economical and orderly manner.

C. Scope of Report

The scope of this report constitutes a realistic translation of the requirements of the contract between the county and the engineers as excerpted above. In summary, an intensive exploration has been completed of the total concept of regional water and wastewater systems to serve all portions of the county likely to have need for such systems by the year 2010, or some 40 years ahead.

A study of this kind encompasses unusual breadth. From the point of time, elements of the past, present and future must be covered. Many diverse groups and agencies have to be considered for a successful and economical program. Locally these include the characteristics of the populace and other interests, and how they are changing, the functioning of various county departments and county agencies and relationships with the four incorporated municipalities. Beyond local aspects, the roles, jurisdictions and possible support of various kinds by state and federal agencies are of vital importance, sometimes with the force of law.

It would be impracticable to detail here the entire spectrum of investigation, analysis and computation, and the innumerable pathways explored. The following list is intended to reveal the general outlines:

- A detailed review was made of the many references cited in the Appendix. These include specific studies related to the project or preceding it.
- 2. Aerial photographs of the coastal areas of the county served as

the basis of a detailed examination of land use, population concentrations and physical characteristics. These influenced the regional planning concepts.

- 3. Research of Sarasota County records and investigation of the franchised utilities established the extent and adequacy of existing water and wastewater services to provide for the present and projected population.
- 4. Exchange of information and conferences with representatives of the United States Geological Survey and the Florida Board of Conservation, Division of Geology, provided available data as to water resources in Sarasota County, and their conservation and use as water supplies.
- 5. Continued monitoring of current research in water supply and wastewater treatment was carried through, to insure technical accuracy.
- 6. Continuing contacts were maintained with federal and state agencies having direct or indirect control or interest in engineering or financing aspects.
- 7. Intensive and continuing detailed internal reviews were carried on jointly within the firms of the Joint Venture Engineers, making maximum use of the available breadth of experience to explore, test and check all concepts and engineering features.
- 8. Careful consideration was given to all comprehensive planning which

has been done or in the progress by other consultants or agencies for cities, the county and the Tampa Bay region.

- 9. There were numerous conferences with
 - (a) The Board of County Commissioners
 - (b) County officials
 - (c) The county's financial advisors
 - (d) The county's legal advisors
 - (e) City of Sarasota officials
 - (f) Other officials, others in general

A population analysis revealed the locations and numbers of people now living in the county, and trends were determined for a projection of the population increase to be expected within the design period. The population concentrations, together with the physical features of the land itself, provided the framework for the selection of pollution control zones. Criteria for water and wastewater systems best meeting the needs of Sarasota County were developed, and the means of adjusting these to regional utility concepts were explored. The costs that will accrue to the county system, which exclude collection and distribution components to be paid for by developers, over the 40-year period studied have been estimated.

The Master Plan sets guidelines for subsequent steps in the county program to provide water and wastewater systems for each pollution control zone. In this context, the reports completed in 1970 for Service Area A and Service Area B, and supplementary engineering, fiscal and legal steps related thereto, will fall into place as implementations of the Master Plan.

The "Preliminary Report on Wastewater Renovation and/or Reuse" (February, 1971) prepared under this program by Dr. Werner N. Grune, is considered to be an integral part of the Master Plan. Appropriate references are made herein, without undue repetition.

POLLUTION CONTROL ZONES

ABSTRACT OF SECTION III

Sarasota County has been divided into four Pollution Control Zones, which provide the framework for advance planning of wastewater service for all of the county's populated areas. Each zone would be inherently limited to its own wastewater treatment facility. The greater flexibility of water systems permits interconnection of all of the zones, as well as with the systems of adjacent counties.

Effective countywide abatement of pollution requires that no zone defer its own needs in favor of the completion of systems in another zone, since population needs will occur along the entire coastal strip of the county. A simultaneous attack on the problems of all zones is necessary to restore the environment.

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Sarasota County's planning policies, which are designed to limit urban development to the west of I-75 and thereby preserve the rural nature of the county's heartland. Water and wastewater systems benefit from this kind of planning.

Water systems are less restricted by physical considerations, and would not have to be limited to the same pollution control zone boundaries. For practical reasons of financing stages of construction, and administration, however, the growth of the water systems should be closely parallel that of the wastewater systems. Ultimately, all of the water systems, including those in Manatee and Charlotte Counties, should be interconnected as emergency protection, and perhaps to take advantage of surplus surface supplies in the wet season.

Piecemeal planning is inadequate for Sarasota's future. The distinctive feature of the regional approach is that the entire area of the county subject to urban population growth during the next 40 years is established within logical pollution control zones now, rather than attempting to cope with the problems later, after the fact. The means are thereby made available for achieving the following aims:

- 1. Incorporating all franchised water and wastewater systems into the larger regional systems, assuring a uniformly high quality of water and wastewater treatment.
- 2. Eliminating the diverse existing treatment plants, many of which are failing to provide satisfactorily for the needs of the public

- and none of which meet the increasingly stringent standards necessary to protect the environment.
- 3. Expanding service to all developed areas, as needed, to serve the public with potable water in ample supply and high quality, and to remove wastewater safely for proper treatment and disposal.
- 4. Eliminating the thousands of individual septic tanks and well systems which pose a threat to the general health and welfare.
- 5. Reestablishing the bays and waterways of Sarasota County as safe and aesthetically satisfying for marine life and recreational activities.

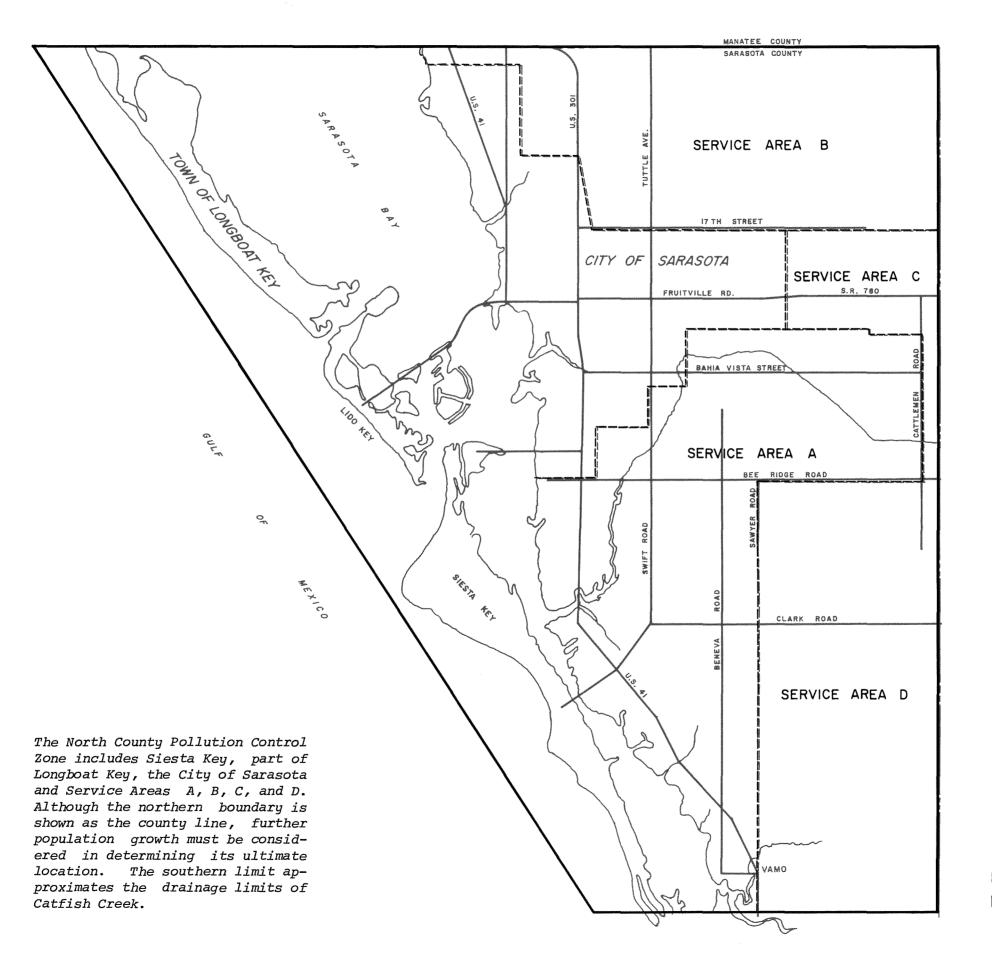
The effectiveness of the regional approach would be jeopardized if any pollution control zones should be considered of greater importance or be assigned a higher priority than any other zone. For example, if the Central County Pollution Control Zone were to receive no attention until the needs of the North County Pollution Control Zone were met, the Central Zone's problems would have grown by then into the serious proportions now faced in the North zone; the impact would have simply been moved further south, and the overall polluting effects would have remained.

In order to accomplish the desired ends, implementing specific studies for each pollution control zone should proceed as soon as possible, simultaneously and in parallel.

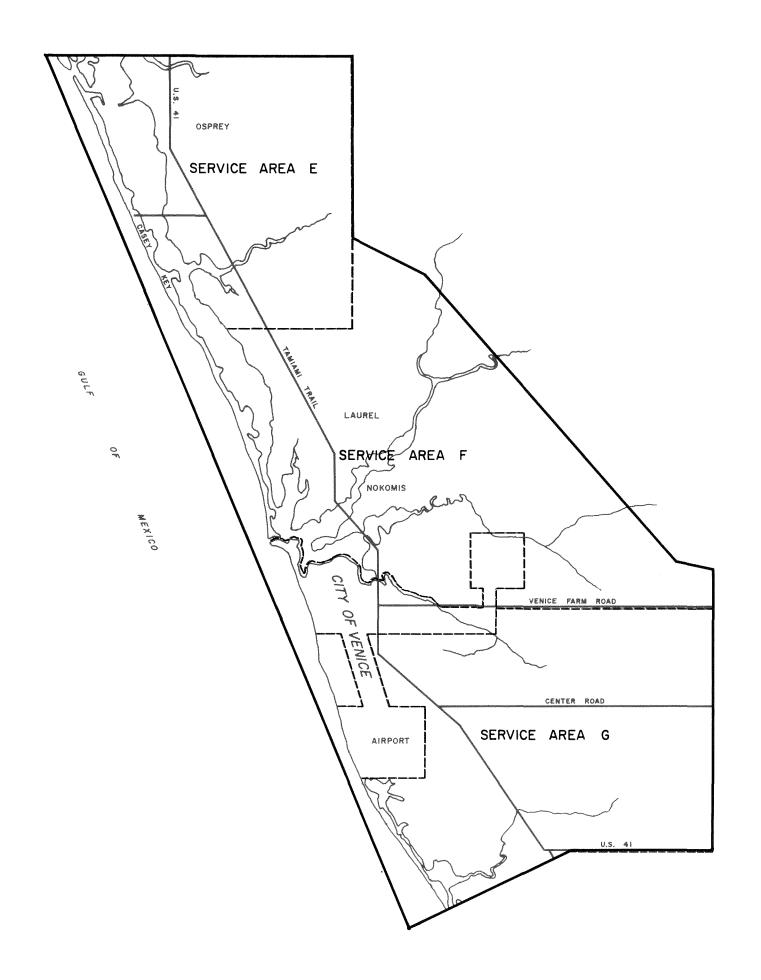
B. <u>Service Areas</u>

Service area divisions have been drawn within each of the pollution control zones, and are shown in Figures 6 through 9. Generally, these are associated with population, drainage basins or units of undeveloped areas, all of which are factors that tend to sort the service areas into design units.

An element of judgement has been necessary for these preliminary divisions. Engineering analyses defining the limits should precede the production of future service area reports.



NORTH COUNTY
POLLUTION CONTROL ZONE

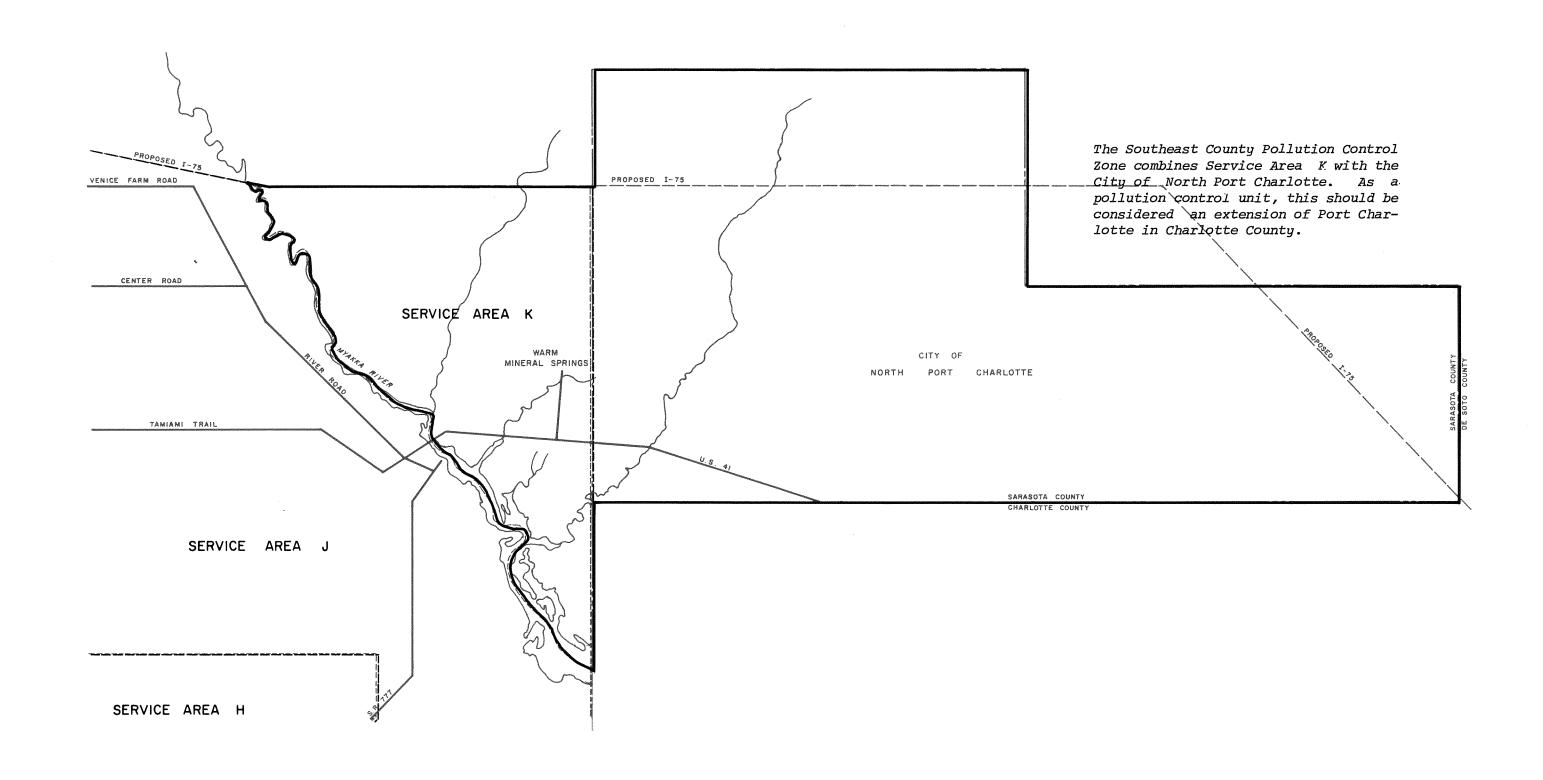


The Central County Pollution Control Zone is the combination of Service Areas E, F, and G, together with the City of Venice and Casey Key. The most populous portion is centered in the Venice-Nokomis area. The northerly and southerly limits are associated with the limits of the local drainage areas.

CENTRAL COUNTY
POLLUTION CONTROL ZONE

VENICE FARM ROAD The South County Pollution Control Zone is the combination of Service Areas H, J, and K, together with Manasota Key. There is no incorporated urban area in this zone. CENTER ROAD Most of the populated portion is SERVICE AREA K in the Englewood area, and extends contiguously into Charlotte County which portion should be considered WARM MINERAL SPRINGS as a part of the South County Pollution Control Zone in providing water and wastewater services. TAMIAMI TRAIL SERVICE AREA J SERVICE AREA H ENGLEWOOD SARASOTA COUNTY CHARLOTTE COUNTY

SOUTH COUNTY
POLLUTION CONTROL ZONE



SOUTHEAST COUNTY
POLLUTION CONTROL ZONE

POPULATION

IV

ABSTRACT OF SECTION IV

Population projections reveal the measure of utility services which must be provided if the future is not to repeat the problems of the past, and continue to degrade the environment.

Trends already demonstrated here, together with experience in comparable Florida counties, indicate that the population of Sarasota County may double by 1980, from the present 120,000 people to more than 260,000. Within the 40-year time span covered by this report, the number of people living here may be more than five times as many as there are now.

SECTION IV POPULATION

A. <u>Introduction</u>

Population studies analyzing the location and numbers of people now living in Sarasota County are the beginning point in planning for the future. Growth patterns, which tend to radiate from existing communities, become predictable and growth rates extrapolated from the histories of this and other communities indicate the rate at which new facilities must be provided.

The projection of anticipated numbers of people into an uncertain future must remain an art rather than a science. This does not invalidate the theory of population projection, nor detract from its usefulness.

Studies of actual growth rates are a part of the county's continuing studies.

Periodic comparison of these figures with the populations predicted in

this report will indicate whether scheduling of new facilities needs to be accelerated or may be delayed.

B. Population Growth Patterns in Sarasota County

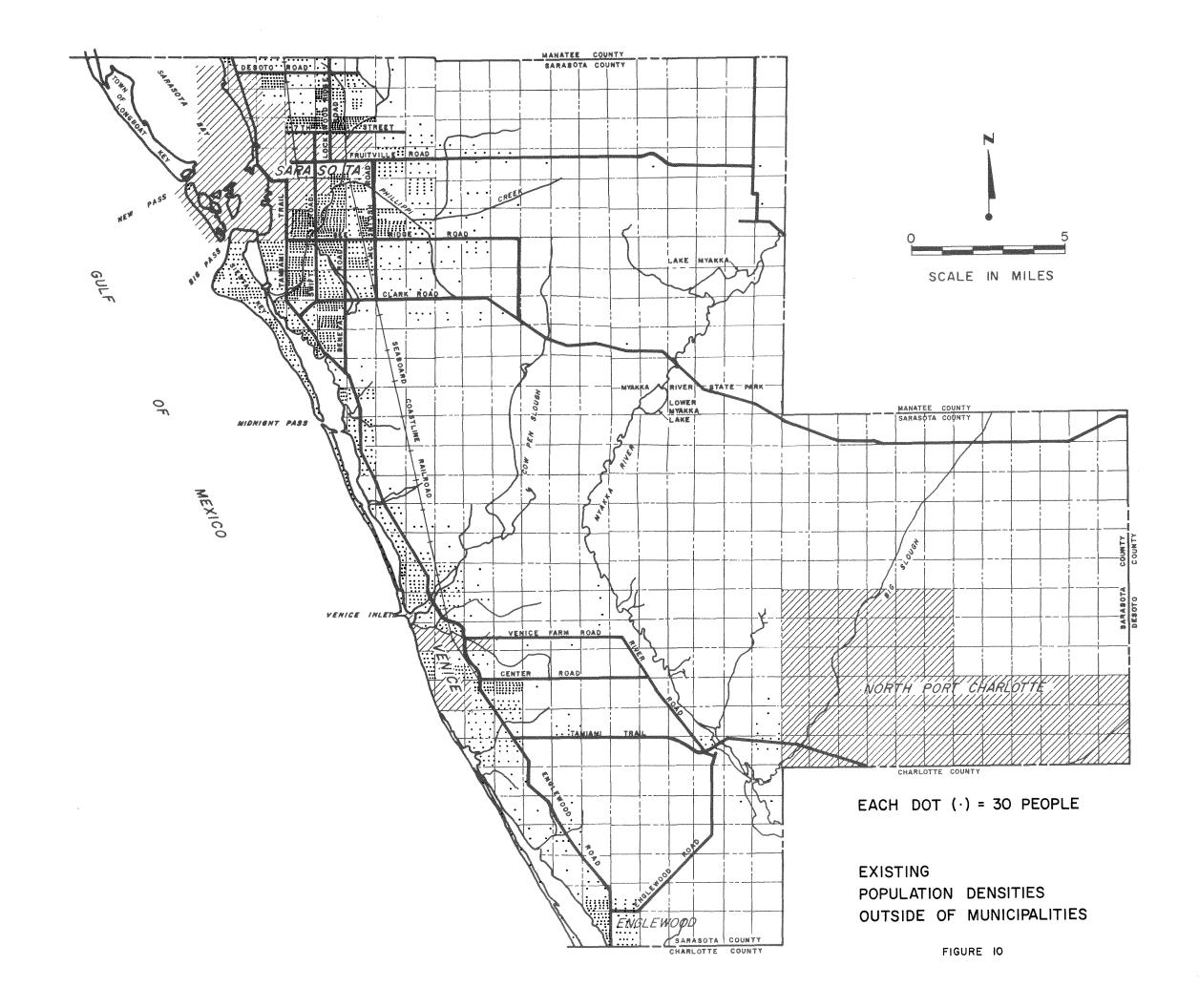
The following tabulation, extracted from U.S. Census Bureau records, indicates the trend of population increases that is making Sarasota County one of the major communities in Florida:

SARASOTA COUNTY POPULATION GROWTH - 1930-1970

<u>Year</u>	Total Population	Increase Over Previous Census, Percent	Average Annual Growth Rate, Percent
1930	12,440		
1940	16,106	30	2.6
1950	28,827	79	6.0
1960	76,895	167	10.3
1970	120,414	56	4.6

During the past 20 years, which represent the greatest period of growth for the State of Florida, the growth rate of Sarasota County has been almost double that of the state as a whole.

The numbers above do not show where people have chosen to settle within the county. Figure 10, which was prepared from county records, reveals the distribution of the population as it now exists. Settlement has been in a longitudinal pattern parallel to the coast, with little development



toward the inland sections of the county. Exceptions are where major access roads lead east. It is expected that this pattern of development will continue, since the Planning Commission is trying to discourage intensive development east of the route for Interstate 75.

Figure 10 was prepared from updated figures used in the preparation of the report entitled, "Population 1967", and was confirmed by an examination of recent aerial photographs of the coastal strip. The units of record were half-sections, of which there are 1,058 in the county. 15 half-sections in the unincorporated areas contain over 1,000 persons, with the highest density in the South Gate area (1,550 persons). The largest area of concentrated population is the Phillippi Creek basin. Other areas of high density (more than 1,000 persons per half-section) are the Kensington Park area, Siesta Key, Gulf Gate and Venice Gardens.

A further breakdown of population by pollution control zones is tabulated on the following page, constituting the basic units for planning. This table provides the necessary information to predict growth patterns in localized areas. Less than half of the people live within the county's municipalities.

C. Population Projection

Experience has shown that past records of growth, coupled with a generally accepted method of projection, will yield results that are sufficiently accurate for planning purposes. The U.S. Census Bureau records cited above

were augmented with current data from the Tampa Bay Regional Planning Council and the County Planning Commission in preparing the table below:

PROJECTED	POPULATION	FOR SAR	ASOTA	COUNTY
<u>Year</u>		Tota	l Popi	<u>ulation</u>
1970		1:	20,40	0
1975		18	82,40	0
1980		20	54,300	0
1985		34	44,30	0
1990		4	17,20	0
1995		4	87,40	0
2000		5	36,60	0
2005		5	88,30	0
2010		6	36,90	0

The method used consists of applying rate-of-growth curves of counties of greater maturity which one or more decades ago reached the population of Sarasota County and have similar social and economic characteristics.

Pinellas, Palm Beach and Broward Counties were selected for this purpose.

Comparison was also made with the Tampa Bay Regional Planning Council's projection to the year 1985. The results are shown graphically in Figure 11. Projections for each of the pollution control zones are shown in Figure 12.

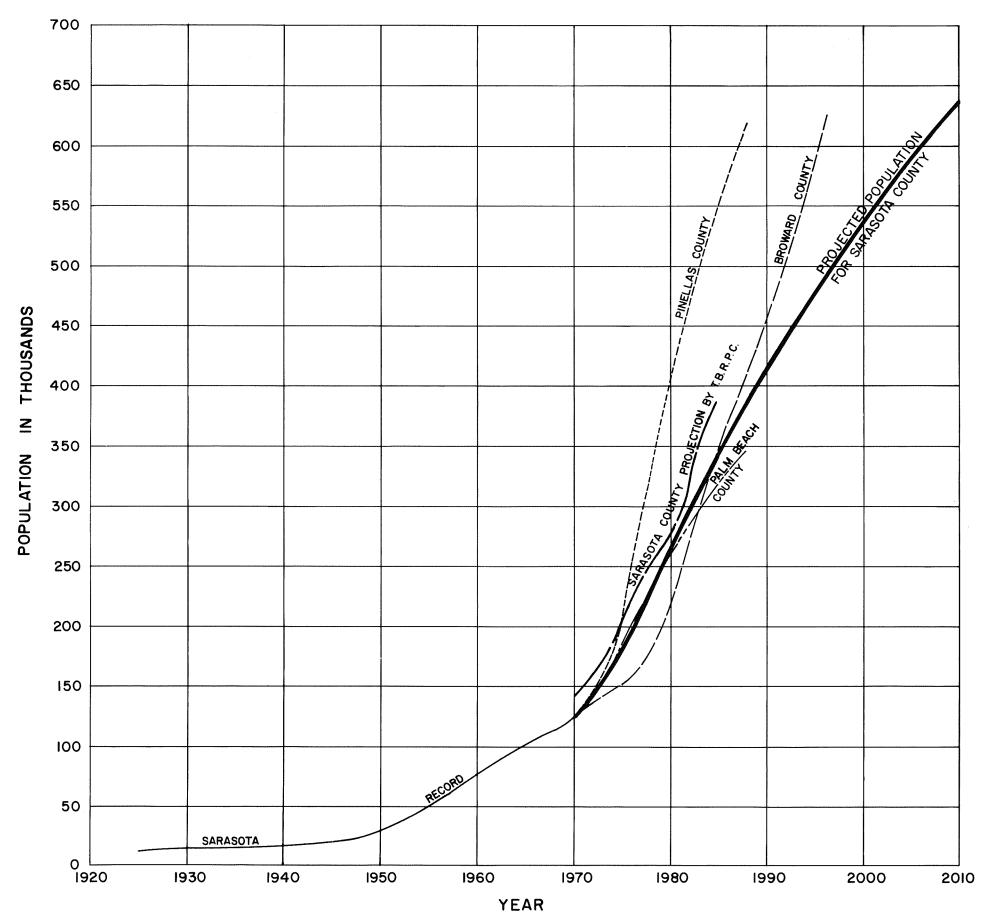
The population saturation limit for each zone and the entire county was set at 5.4 persons per acre. Only two zones (North and Central) are expected

to reach saturation prior to the year 2010.

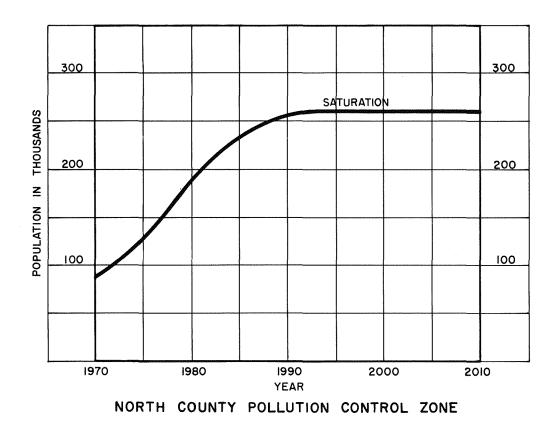
These projections are based on continuation of existing area characteristics and trends. Population densities will be greater if Sarasota County relaxes its restrictions regarding the construction of high-rise apartments and other dwelling units. Urban development guidelines indicate that multiple dwelling units will be limited to areas served by arterial streets adequately buffered from other high intensity uses and low-density residential areas.

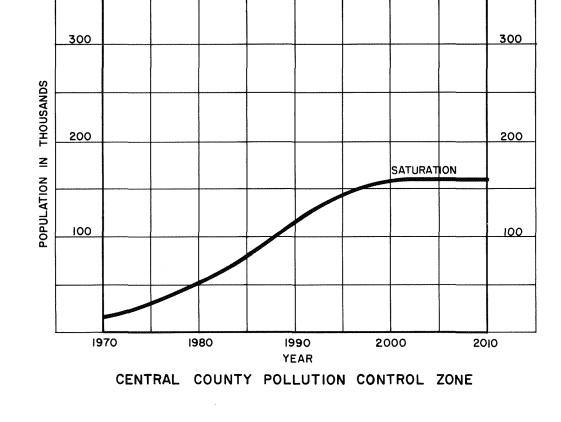
PRESENT ESTIMATED POPULATION - POLLUTION CONTROL ZONES

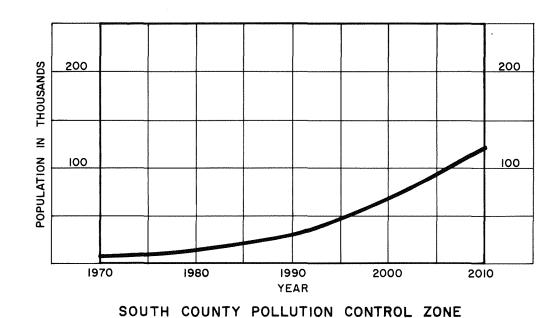
		nt Estimated oulation
North County Pollution Control Zone:		
City of Sarasota	40,200)
Longboat Key (Sarasota County only)	1,500)
Unincorporated Area	49,700	<u>)</u>
		91,400
Central County Pollution Control Zone:		
City of Venice	6,600)
Unincorporated Area	12,000	<u>)</u>
		18,600
South County Pollution Control Zone:		6,700
<u>Southeast County Pollution Control Zone</u> :		
North Port Charlotte	2,200)
Unincorporated Area	600	<u>)</u>
		2,800
Balance of County:		1,400
	Total County	120,400

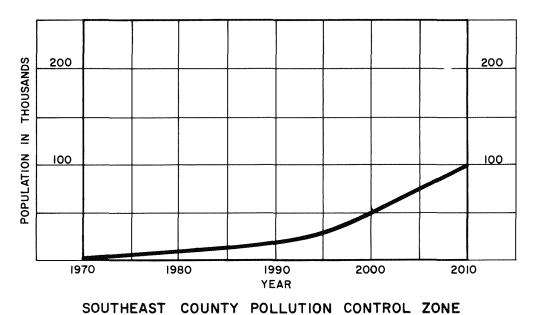


SARASOTA COUNTY POPULATION PROJECTION 35









POPULATION PROJECTIONS
FOR POLLUTION CONTROL
ZONES

WASTEWATER TREATMENT AND DISPOSAL

ABSTRACT OF SECTION V

The treatment of wastewater and management of the effluent from the process is one of the major environmental problems now facing Sarasota County. A part of this report, by reference, is the "Preliminary Report on Wastewater Renovation and/or Reuse", by Dr. Werner N. Grune, which explores the available processes and established the framework for further research and development programs that are needed.

Immediate environmental improvement can be effected, however, by the construction of countywide wastewater collection systems and advanced treatment plants. These will eliminate septic tanks and the many small inadequate plants as polluting sources while research is proceeding toward the ultimate best method of effluent management for Sarasota County.

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SECTION V WASTEWATER TREATMENT AND DISPOSAL

A. General

Wastewater is the used water supply of a community, together with such industrial wastes, ground water and surface runoff as may be mixed with it.

Normal wastewater contains a small amount of solids in a proportionally tremendous amount of water. In normal domestic wastes, it may be expected that fiteen hundred or more pounds of water will be required to carry one pound of solids of which three-fifths is in solution (dissolved), one-fifth is in suspension (not dissolved, but held by water), and one-fifth will settle out of the water.

A large proportion of the solids is organic in nature, and is attacked and decomposed by saprophytic organisms. The decomposition processes are accompanied by the production of offensive odors and other objectionable features, having an adverse effect on the environment. The inorganic

solids may also be objectionable and in some cases may be deadly to the receiving ecosystem. Wastewater treatment aims at removal of the solid matter from the water, and rendering it harmless or possibly useful.

To evaluate the effectiveness of any treatment process, it is necessary to have an adequate measurement of the strength of the wastewater. The most common yardstick used is the Biochemical Oxygen Demand (BOD), expressed in parts per million by weight. The test for BOD measures the loss of dissolved oxygen that accompanies the processes of decomposition induced and maintained by saprophytic organisms in the wastewater. The BOD, therefore, is a measure of the amount of decomposable matter and also of the oxygen demand exerted by the living organisms that are responsible for decomposition.

In recent years, two other characteristics have assumed significant recognition: phosphate and nitrate content. Both are usually expressed in parts per million by weight.

Until recent years, so called complete treatment processes were those which reduced the BOD of normal wastewater by 90 percent. Now it is realized that BOD reduction must be of a much higher order, even where almost unlimited dilution is available. In addition, phosphates and nitrates are known to be harmful to the environment in many cases. Therefore, the complete treatment process of today must be redefined to mean a process or processes which renovates wastewater to a degree of total compatibility with the environment. Sarasota County's long-range plan for wastewater treatment and disposal has as its goal development of complete treatment facilities as so defined.

B. Effluent Disposal

Because of public awareness of degradation of the environment, how wastewater is treated and what is done with the effluent have become matters of great public interest. However, the truth must not be obscured that the first priority of a wastewater system is to safely remove liquid waste products from every house or other source.

What to do with the wastewater that has been removed and collected is a separate matter, a kind of byproduct function. The combined effect of an expanding population and increased per capita usage have had an impact on our environment and its ecosystems ranging from adverse to disastrous. Consequently, the question of wastewater treatment and disposal deserves the public recognition that it has gained.

Sarasota County cannot afford to pollute its environment. The special nature of this problem has been recognized in the engineering procedures being followed in behalf of the county. An authorized study on wastewater renovation and reuse has been completed, with a corresponding report by Werner N. Grune, Dr. Eng. Sci., P.E. submitted to the Board in February, 1971. The report constitutes part of this Master Plan, by reference.

Dr. Grune's report reveals the enormous amount of work now going on all over the world toward solving wastewater treatment and disposal problems. Much of the work is still experimental, but there are some pilot projects and a number of full-scale plants in operation. Not all of the lessons learned will be applicable to all locations, because of significant differences and

the effects of variables such as changing climatic conditions throughout the seasons of the year. Direct reuse is most likely to develop first in arid places short of water of any kind.

Although the shape of the future cannot be mapped precisely, logic leads to significant observations at the outset. It can be expected that there will be a number of successful methods, or variations of methods, that would satisfy environmental and ecological needs, and each approach will have its own advantages. Conceivably, a combination of methods might be desirable for particular circumstances; for instance, to compensate for seasonal variations if effluent should be used for agricultural purposes. It is certain that experience will lead to adjustments in design parameters even for successful systems. Consequently, the pioneering installations will tend toward early obsolescence.

Current progress is so rapid that even a brief deferral of a final commitment will gain valuable knowledge. There are communities elsewhere in the United States and around the world whose desperate circumstances give them no choice except to pay the price for being first. In fact, the citizens of Sarasota County have an investment in the form of tax dollars supporting federal programs that have been made available to such communities. In the Grune report and in this master plan report, it is proposed that Sarasota County also obtain federal aid to establish pilot programs, but tailored to local conditions.

On the other hand, it must be emphasized that the kind of deferral referred to in this discussion relates to long-range methods of treatment and disposal. The primary need of serving people must be met promptly. In this context, the answer is a suitable interim method that would not cause pollution. For the four pollution control zones of Sarasota County covered by this master plan, there may be some differences in these interim measures. Moreover, the interim measures selected for this purpose that appear herein should be subject to modification up until the time of construction design, in order to take advantage of the latest available information. With the foresight from recognizing that changes lie ahead, interim measures and even later steps can be planned toward being compatible as much as possible with alternatives for long-range solutions, although the future retains its unpredictability.

The Sarasota environment, however, cannot be sacrificed for expediency of even short duration. In order to be assured that any phased program does not in fact represent a pollution threat, it is essential that the waters of the county be monitored comprehensively. It now appears that such a monitoring program will be instituted shortly. Its importance cannot be overemphasized. Monitoring should reveal, for instance, whether a high degree of conventional treatment by the City of Sarasota might provide a short breathing spell for the orderly planning and financing of additional or alternative treatment and disposal methods, considering that Sarasota has not had for a number of years until now a satisfactorily efficient wastewater treatment plant even of a conventional type.

The current status of wastewater treatment and disposal presented by the Grune report is utilized herein for the presentation of interim methods and costs. It is contemplated that detailed updating of this special subject will be provided in the form of separate supplements to the Grune report from time to time.

C. Objectives of Wastewater Program

An important purpose of a Master Plan like this is to identify the major objectives. Adjustments must be made in the approach to actual implementation, which will vary somewhat for each pollution control zone, but the goals should remain consistent.

Objective No. 1

Extend service to all urbanizing areas of unincorporated Sarasota County, thereby eliminating the public health hazard represented by thousands of existing septic tanks, which are in close proximity to each other and to individual wells.

Objective No. 2

Arrest environmental degradation by eliminating the numerous inefficient treatment systems now existing, with their deleterious effluent effects.

Objective No. 3

Provide treatment of wastewater that effectively reduces undesirable constituents to acceptable levels and destroys dangerous pathogens, all in a reliable way under expert 24-hour control.

Objective No. 4

Pursue an immediate intensive program of research and development in effluent disposal that will protect and enhance the environment and be compatible with the method of wastewater treatment.

Objective No. 5

Reuse the effluent in the manner best suited to the needs of Sarasota County, probably by ultimate recycling of completely renovated wastewater into the public water supply.

Wastewater treatment technology is approaching the capability of producing an effluent of any quality desired, including one which meets standards of purity for drinking water. However, the price escalates rapidly. A large increment in capital investment may be needed for a small increment in improvement, unless further advances in technology, through research, can find ways to reduce costs as well.

Although Sarasota's water resources are still ample, future demand will cause the time to come when the wastewater process will become one phase of the water system. Wastes will be removed and the water recycled into the community's supply of fresh water. Although public psychology may not be ready to accept this concept at the moment, as a practical matter it has been occurring quietly for a long time. Repeatedly a series of cities along a river taps the river below its upstream neighbor and discharges its waste into the same river for its downstream neighbor to reuse.

The high investment in advanced treatment will tend to make it economically

unsound to waste the high quality effluent which has been produced. This factor alone may precipitate acceptance of recycled wastewater before the time of need. By the time Sarasota needs to face this decision there should be ample awareness and acceptance in the United States and abroad, providing conditioning of the local populace to this possible eventuality here.

Figure 13 diagrams schematically the kind of modern wastewater facility which would provide the basic wastewater treatment that would accomplish the initial objectives, subject to the research and development program leading to the method of effluent disposal to be selected.

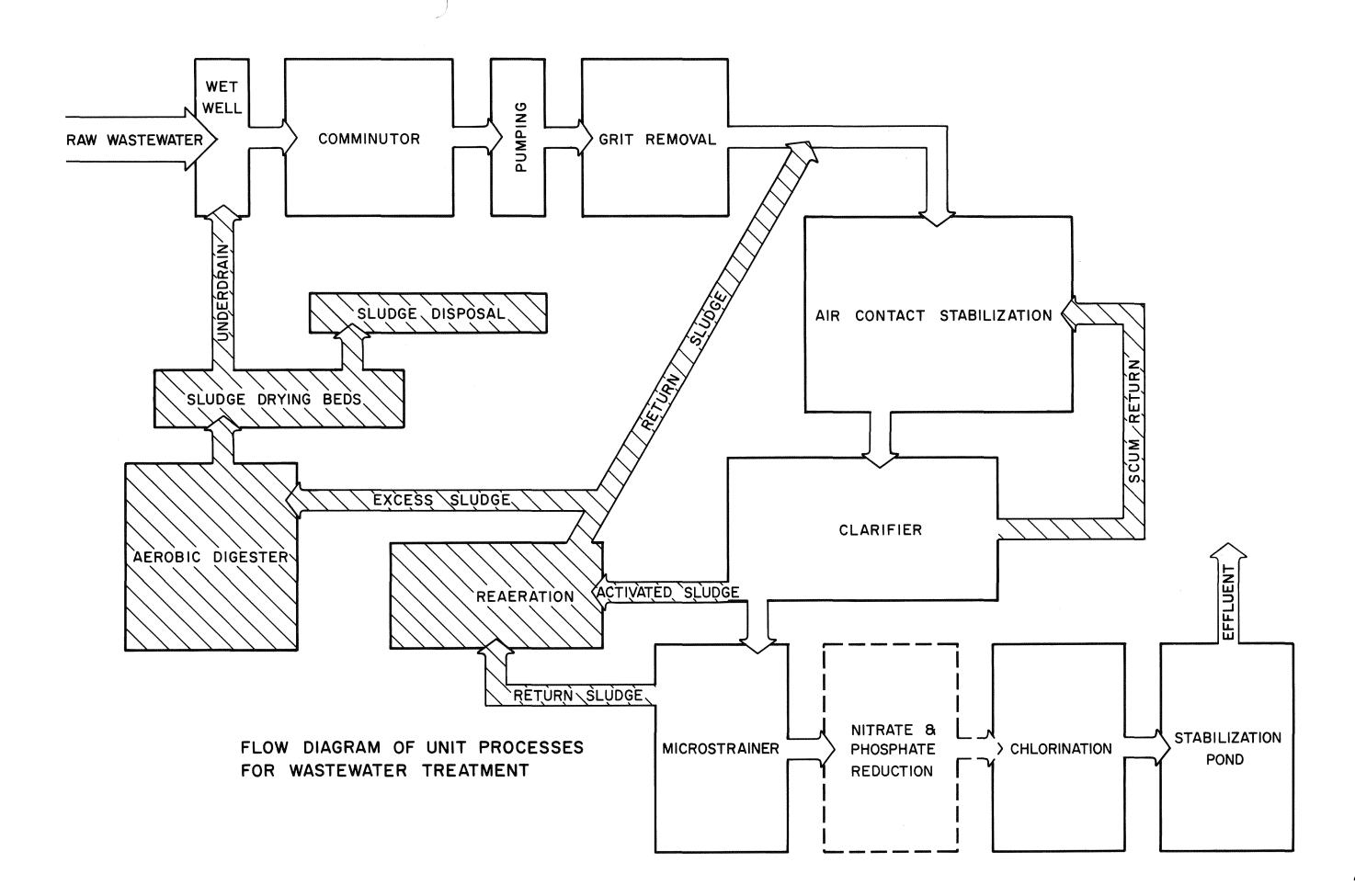


TABLE 1

FORECAST OF WASTEWATER TREATMENT DEMANDS (MGD)

	YEAR								
POLLUTION CONTROL ZONE	1970	1975	1980	1985	1990	1995	2000	2005	2010
North County	9	13	19	23	25	26	26	26	26
Central County	3	4	5	8	12	14	16	16	16
South County	. 1	1	1	2	3	5	7	9	12
Southeast County	1	1	1	1	2	3	5	8	10
TOTAL	14	19	27	34	42	48	54	59	64

(Note: Design basis of 100 Gal/Day/Capita)

WASTEWATER SYSTEMS

V

ABSTRACT OF SECTION VI

The franchised systems serving unincorporated urban areas have not kept pace with the wastewater needs of Sarasota County. A publicly-owned, countywide system can be responsive to the requirements for the quality of wastewater treatment and effluent management that will preserve the county's quality of living.

Analyses are made of the effective general location of a treatment site and major interceptors for each pollution control zone which will serve the population to the year 2010.

Pilot studies are recommended for effluent management programs to determine that which will best serve the county.

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SECTION VI WASTEWATER SYSTEMS

A. Existing Systems

Sarasota County has been living with overlapping stages of development in disposing of its domestic wastes. For many years it was the responsibility of the individual property owner to provide for himself. With the advent of modern plumbing, septic tanks and drain fields replaced the ancient pit privy. About 18,000 septic tanks are still in existence in Sarasota County, serving as the only waste treatment for 40,000 persons. The magnitude can be grasped by equating it to the population of the entire City of Sarasota.

When the impact of urban concentrations outside of the limits of the municipalities made itself felt, the county reacted with an attempt to establish control in behalf of the public. Amendments to the subdivision regulations established a requirement for wastewater systems. In 1958, the

county began to issue franchises. The franchises are for a term of 20 years. Fifteen of these are now in existence, providing wastewater treatment for approximately 21,000 persons. A number will expire in less than 10 years, if not renewed.

In addition to the franchised treatment plants, some 127 systems have been approved by the public health authorities to provide for schools, mobile home parks, private clubs, condominiums, motels, parks, restaurants, and commercial establishments. Of these 127 systems, 65 are installations of septic tanks, with the remaining 62 consisting of some form of biological treatment, such as extended aeration, trickling filters, etc. With a few exceptions, effluent is discharged into surface waters and either directly or indirectly into the bay.

The preponderance consists of small plants. Outside of the municipalities, capacities range from 2,000 gallons per day to the 1.35-million-gallon-per-day system serving Siesta Key.

Of the estimated 70,000 persons now living in urbanizing but unincorporated areas of Sarasota County requiring wastewater facilities, only about one-fourth are served by franchised systems. Another one-fourth are served by small treatment facilities, and one-half still rely on septic tanks. Data for all of the authorized existing treatment plants are listed in the appendix.

Although the franchise concept has been a logical advance beyond the prior septic tank concentrations, it has failed to keep pace with needs or to protect the environment. Expansion of franchised systems has lagged far behind

the population growth rate. The majority of the treatment plants are rapidly reaching, sometimes exceeding, their design capacities. Furthermore, no existing plant or treatment process meets the standards of treatment or effluent disposal which are explicitly set forth in a stated policy of the Board of County Commissioners of Sarasota County.

The fragmentation of the area among multiple franchises does not serve the public interest well, and is probably not financially rewarding to the franchise holders. Expansion of service to areas where it is needed has been hampered by the irregular shapes of populated areas outside of the franchises. Only a large, consolidated system, responsive to the public demand for better service and protection of the environment, can provide the high level of treatment and operation that is needed now and in the future.

B. Regional Wastewater Systems

To assure a future free from the deleterious effects of minimal treatment processes, of scattered and diverse treatment plants, and of poorly controlled and inexpert operation and maintenance, it is in the best interests of the community to establish and maintain a regional wastewater collection, treatment and disposal program. The existing franchised systems should be acquired for effective and economical viability.

Some of the advantages of the regional approach in lieu of the existing random pattern in Sarasota County are:

- The cost per unit of service decreases as plant sizes are increased. Thus, the cost increase needed to pay for advanced treatment and effluent disposal will be less of a burden on each customer.
- 2. Personnel requirements for administration, operation and maintenance are lower for a centralized plant than the total number required for many small plants.
- 3. A large central system can afford to attract and pay the highly skilled specialists needed for operation and maintenance of advanced treatment processes. Only a large system can maintain around-the-clock supervision to maintain operating efficiency and to cope with emergencies.
- 4. Advanced treatment processes will require a continuing educational program for all personnel, as new processes become available. Education of personnel can be dependably administered under a central agency.
- 5. Orderly growth to provide for future needs is more effectively planned by a central agency, responsive to community needs. Readiness to serve the public is not solely dependent on profits, and service can be extended to marginal areas where public health justifies it.
- An ample parts and equipment inventory to keep the system functioning at all times can be maintained readily by a central authority.

C. Proposed System

Improved wastewater systems are needed to serve both the existing population and future growth. If the population reaches 670,000 in the year 2010, nearly 70,000,000 gallons will be treated each day, and the effluent must be managed in the way best suited to protect the environment and the public health. There are suggestions for discouraging population growth, but the question is largely academic in today's context. Planning will allow the ultimate needs to be met by orderly stages, at whatever rate the future may actually reveal. Each stage can be self-financed out of revenues, so that the growth may be made to pay its own way.

Each pollution control zone has a population concentration now which will justify the consolidation and construction of an initial wastewater collection system, with provisions for later expansion. These zones can also be provided with wastewater treatment plants with the same potential for expansion. Construction should be limited to immediate needs, avoiding an undue burden on present users.

Each of the pollution control zones has problems to be solved which are unique to the zone. A brief description of these problems follows, together with the approach recommended to integrating the initial program into the larger goals to be met.

North County Pollution Control Zone

The North County Pollution Control Zone has already been advanced by reports which have been completed for Service Areas A and B. Initial steps

toward implementation have been taken, the essential features being:

- The county will deliver to the existing treatment plant of the City of Sarasota the collected wastewater from unincorporated areas within the North County Pollution Control Zone which are in need of service.
- 2. The City of Sarasota will expand the capacity and improve the quality of treatment in its treatment plant to accommodate the projected flows for a period of time to be determined, perhaps 5 to 10 years. At the end of this period, it is anticipated that one of three alternatives will occur as to processing of the collected wastewater:

Alternative No. 1

The county might construct new treatment facilities on another site, making full use of technological advances available at that time for the treatment of wastewater and the management of effluent. Further to this alternative, the city's treatment plant would be judged obsolete and would be phased out.

Alternative No. 2

The county might construct new treatment facilities for the expanding population in the unincorporated areas of this pollution control zone, with advanced effluent management methods.

The city would continue to operate its own treatment plant,

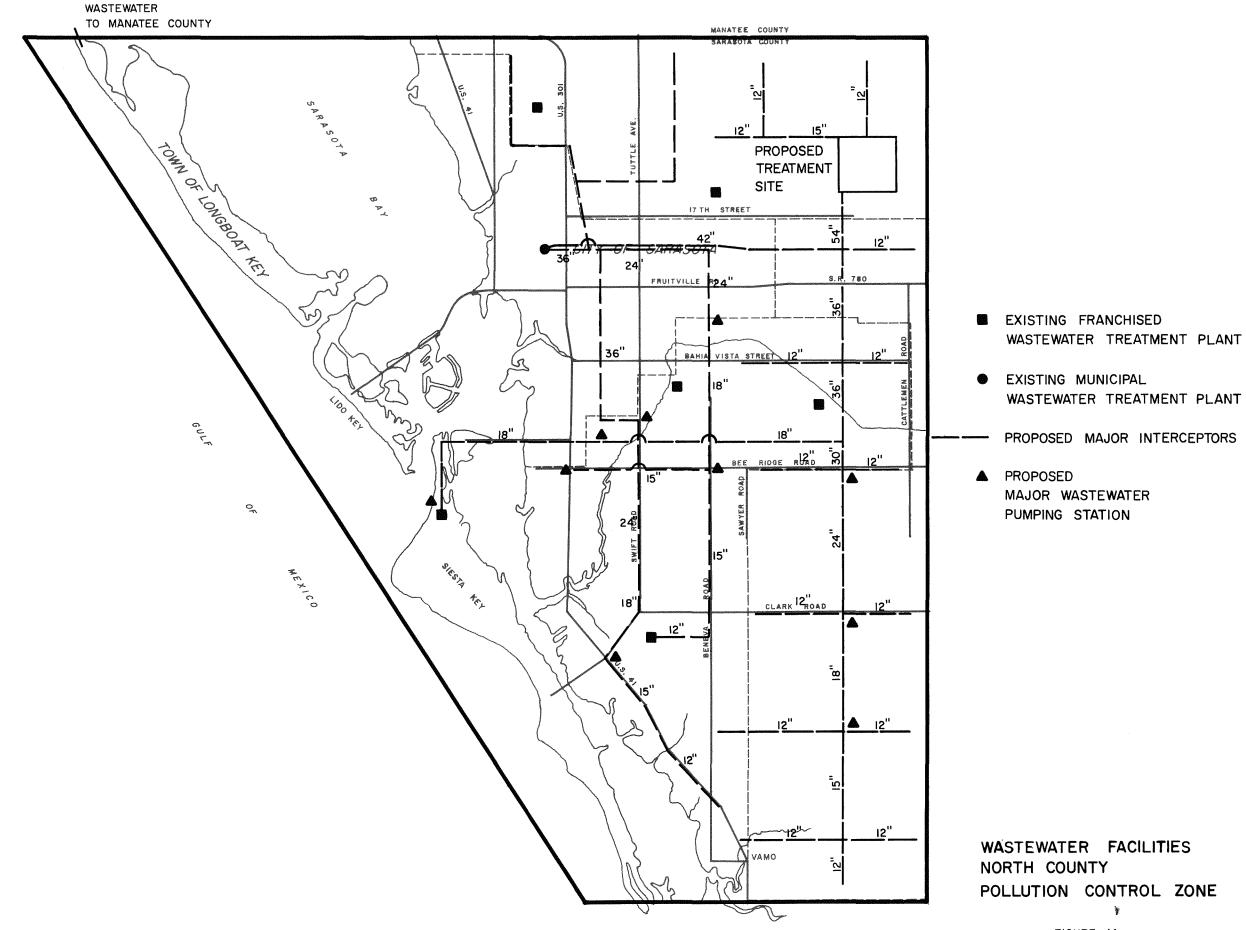
but would pipe its effluent to the county's plant for processing in common.

Alternative No. 3

The city might continue to treat wastewater for the entire North County Pollution Control Zone, expanding and improving its processes. This alternative would be contingent upon evidence from further studies that it would be practicable, economically sound and fully compatible with the protection of public health and the environment.

- 3. In any event, the county will construct and maintain a wastewater collection system in the unincorporated areas of the zone. The construction program will be in three phases, with the priority favoring service to the most densely populated areas. Subsequent expansion into the remainder of the areas would depend upon need.
- 4. The financing program provides for the acquisition of the franchised utilities in the zone now serving the public. Their collection facilities will be utilized, with improvements as required, but the obsolete treatment plants will be retired.

Figure 14 shows the locations of the existing franchised wastewater treatment plants, the basic interceptors and force mains required to transport wastewater to the City of Sarasota's treatment plant, and the general location of an effluent management site.



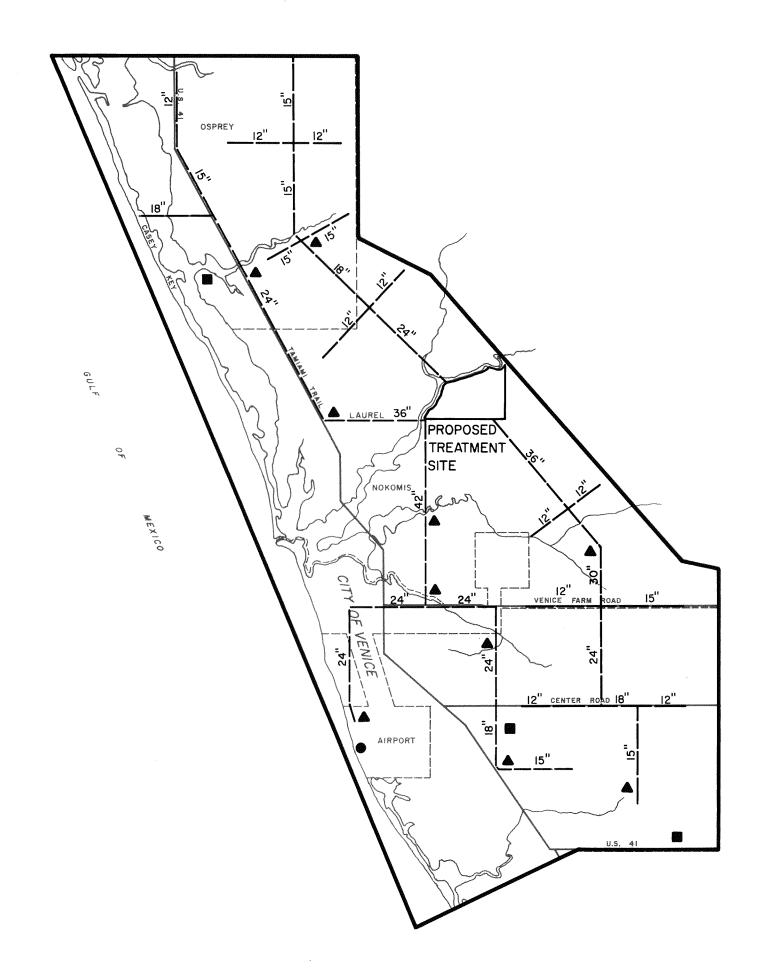
Central County Pollution Control Zone

The Venice-Nokomis area is the area next most in need of wastewater collection and treatment services. Immediate service area studies need to be undertaken toward the goal of expanded service to people needing it and toward pollution abatement.

County, to establish the kind and extent of their common problems, and the solutions that would be mutually acceptable. Expansion of wastewater treatment processes are now required by the City of Venice. Joint planning to alleviate the needs of Nokomis and the South Venice area would be a long first step toward solving the problems of this pollution control zone.

Anticipating the future, it is recommended that land be acquired for wastewater treatment facilities before the inevitable development pressures create high land costs, and to preclude neighborhood objections. A site located approximately as shown on Figure 15 of approximately 600 acres would be a worthwhile investment for this purpose. Figure 15 also shows the locations of the existing franchised treatment plants in the zone, and the basic interceptor system to transport wastewater to the proposed wastewater treatment and effluent management site.

There appears to be special urgency for investigation of the problems of Service Area F in this zone, and construction of the basic system to serve the area as soon as possible. A treatment plant with a capacity of 12 million gallons per day would probably be needed to serve the projected population to the year 1990, with an ultimate capacity of 16 million gallons per day for the year 2010.



- EXISTING FRANCHISED
 WASTEWATER TREATMENT PLANT
- EXISTING MUNICIPAL
 WASTEWATER TREATMENT PLANT
- - ♠ PROPOSED MAJOR WASTEWATER PUMPING STATION

WASTEWATER FACILITIES
CENTRAL COUNTY
POLLUTION CONTROL ZONE

South County Pollution Control Zone

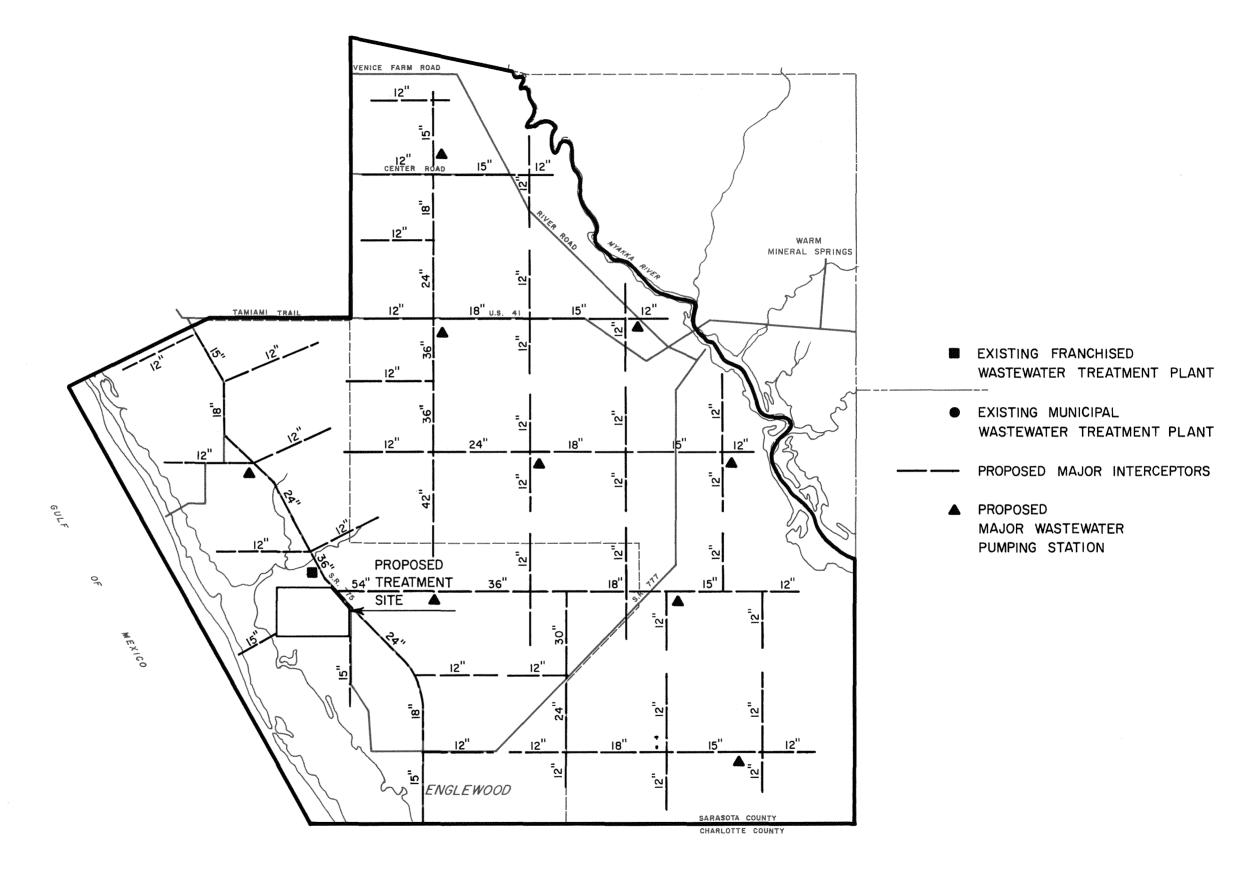
The bulk of the concentrated population in the South County Pollution Control Zone lies in the Englewood area, which extends into Charlotte County. Service area studies are now warranted to determine what needs are to be met to preserve the waters of Lemon Bay for shellfishing and to prevent further environmental deterioration. Charlotte County and Sarasota County governments should both work toward this common objective if the efforts of either are to be effective.

A wastewater treatment plant site has tentatively been selected to serve this zone and is shown in Figure 16. It is the present site of the Buchan Airport, which is already owned by the county. Judicious planning can permit the simultaneous use of the site for both purposes. It may be wise, however, to acquire additional land so that a buffer between this and adjacent land uses can be preserved, a total of approximately 600 acres being adequate.

Also shown in Figure 16 are the existing major treatment plants and the basic interceptors to transport wastewater to the proposed management site.

A preliminary report for Service Area H of this zone should assemble the engineering data needed for construction of wastewater facilities.

A treatment plant of 3 million gallons per day should provide for the anticipated population growth to the year 1990, with an ultimate capacity of 12 million gallons per day for 2010.



WASTEWATER FACILITIES
SOUTH COUNTY
POLLUTION CONTROL ZONE

Southeast County Pollution Control Zone

The huge area comprising the City of North Port Charlotte, mostly remaining to be developed, dominates the Southeast County Pollution Control Zone. Service Area K is the relatively small portion representing the unincorporated areas. Within Service Area K, only a mobile home park and the Warm Mineral Springs development now have a significant population.

The City of North Port Charlotte and the Port Charlotte areas in Charlotte County might practicably constitute a single pollution control zone, with the basis for wastewater systems already established by General Development Corporation, as developers of the entire region. A service area report could provide a firm foundation for cooperative efforts and negotiations between the county and these interests, with the approval of the City of North Port Charlotte.

Figure 17 shows the existing franchised wastewater facilities and the principal interceptors for serving the area. The master plan indicates a plant capacity of 10 MGD for the Sarasota County portion of the zone, including the City of North Port Charlotte.

C. Proposed Effluent Management Program

Reuse of treated wastewater is an objective. Preparatory to this day, wastewater treatment and effluent management methods should be explored. Federal funds might be available for research and development programs sponsored by the Water Quality Office of the Environmental Protection Agency.

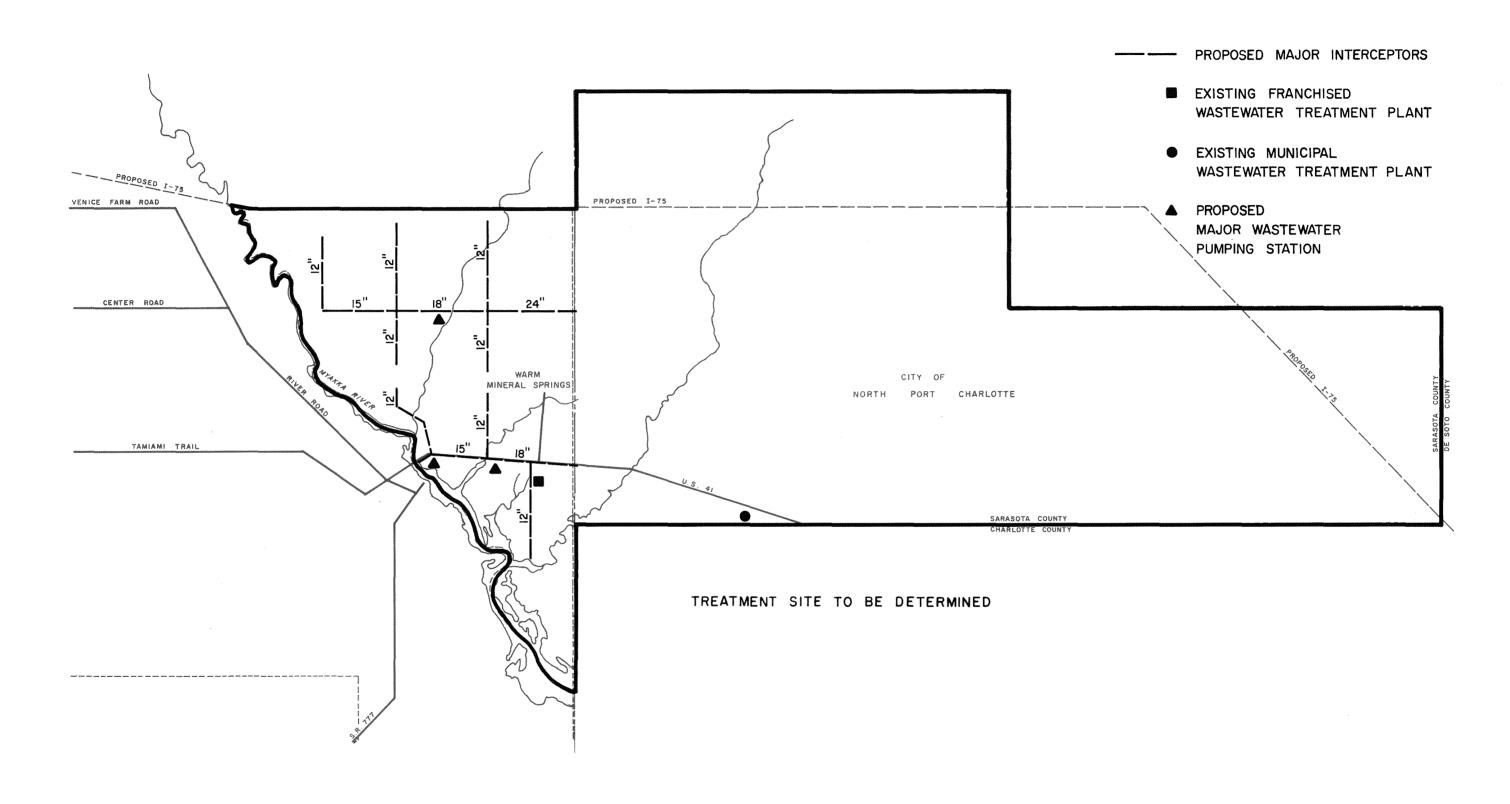
The Grune report, which constitutes a part of this Master Plan, recommends renovation of wastewater by a series of processes. Pilot plants and other steps toward implementation should proceed accordingly. The possibilities should not be overlooked of other processes continuing to appear that would be compatible and offer advantages.

Pilot plant experiments would be attached to existing treatment plants, which combines practicality with the opportunity to test theories under actual field conditions. Acquisition by the county of the various franchised plants should expedite the start of pilot studies. Alternatively, arrangements might be made with private plant operators to conduct investigations and make pilot studies on their properties. In either event, acquisition of land for construction of pilot facilities probably will be necessary.

Applying the findings of the Grune report to conditions in Sarasota County leads to tentative selection of the following specific processes for pilot investigations:

1. Advanced Wastewater Treatment, followed by Closed Impoundments

The intent would be to use evaporation and percolation to prevent
overflow to surface waters. It will be necessary to determine rates
of evaporation and percolation for soil and climate conditions in
Sarasota County. Prior work has been too generalized for this
purpose. Studies are needed as to build-ups and effects of various
substances in the impoundments. Public acceptance of the impoundments as recreational areas might be important. Visual and aesthetic
considerations will be significant to reuse, and especially if it



WASTEWATER FACILITIES
SOUTHEAST COUNTY
POLLUTION CONTROL ZONE

might lead to recycling into water supplies.

2. Conventional Treatment, followed by Use of the "Living Filter" An investigation would determine whether or not the local soils can act as an advanced treatment device to reduce concentrations of nutrients such as phosphates and nitrates from conventionally treated wastewater. The effluent produced by the living filter would be available for further alternative study, as to irrigation, additional treatment to produce potable water, or recreational uses in impoundments, or combinations of these.

3. <u>Conventional Treatment, followed by Microscreening and Electrodialysis or Reverse Osmosis</u>

This plan calls for the direct production of potable water from plant effluent. A variation might be the introduction of chemical treatment in lieu of the foregoing processes. The high cost of all these processes could probably only be justified by the production of potable water.

4. Advanced Treatment, followed by Deep Well Injection

This program would endeavor to determine whether deep well injection could serve as an underground storage reservoir for treated wastewater. Storage would be on a seasonal basis. An interesting further possibility might be expansion to store storm runoff from rainfall in the wet season for recovery during the dry season. It appears that an extensive and costly monitoring test well system would be necessary to insure the safe operation of a program like this.

5. Variations and Modifications to all Programs

Each of these pilot programs has possible variations and combinations. Other possibilities include:

- (a) Variations in impoundment shapes so as to affect acreage requirements, such as serpentine or parallel canals.
- (b) The recharge of shallow aquifers by special pumping and/or dewatering devices.
- (c) Nutrient reduction by controlled aquatic growth, including production of fertilizer or stock feed by-products.

Meanwhile, advances in technology will continue all over the world, ranging from pure research to practical efforts of communities of all sizes to solve their problems. Monitoring of these developments should continue without interruption, seeking new or economical solutions that might be suitable here.

WATER RESOURCES

VII

ABSTRACT OF SECTION VII

Sarasota County has an abundant supply of fresh water for the future if conservation measures are imposed to prevent its misuse. Surface water sources will not provide a significant quantity. Reliance must be placed upon the ground water supplies which increase in availability with increased depths. Unfortunately, the need for treatment also increases with the depth of the source, and an economic balance must be found to provide ample quantities at reasonable cost.

Studies should be instituted to provide the technical background for source, location, quantity and quality, to support the necessary economic and conservation decisions.

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SECTION VII WATER RESOURCES

A. <u>Introduction</u>

Water is required to sustain life and must be properly managed in order that man and all life within his environment be allowed their needed amounts. To accomplish this, a program of water resources management must be developed that considers the water needs for an entire area.

Consideration must be given to the available quantities of natural surface and subsurface water, its movement through, on and from the earth. This will allow for the proper selection of a water supply and its continued availability through conservation.

B. <u>Hydrologic Cycle</u>

Hydrology is the science involved with the study of water, its properties,

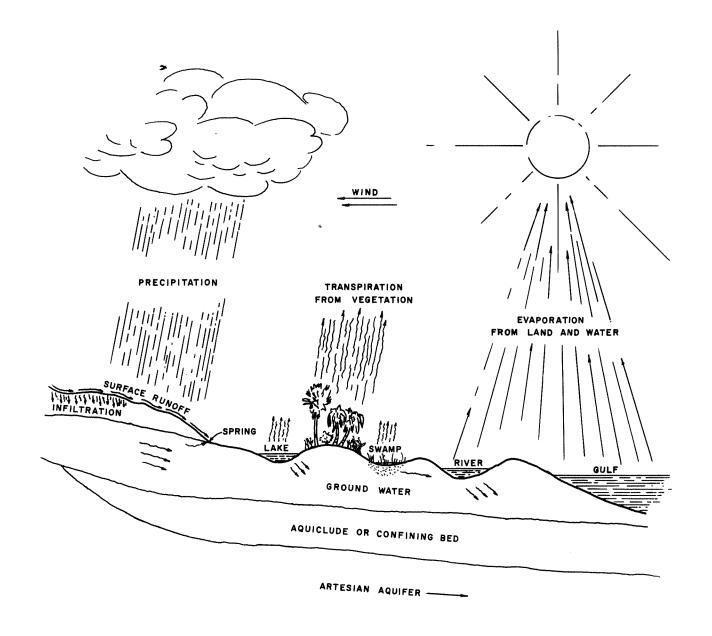
phenomena and distribution. The endless cycling of water through, on and above the earth is termed the hydrologic cycle, as shown in Figure 18.

Moisture exists in the atmosphere in the form of invisible vapor, clouds and fog. As the atmosphere cools and becomes laden with excessive moisture, condensation occurs, leading to precipitation as rain, hail or snow. Because of some evaporation in transit or interception by vegetation, some of this water never reaches the ground. Water falling to the ground tends to infiltrate into the soil. The collection of water within the earth's mantle is termed subsurface or ground water. The upper level of the saturated subsurface water is the ground water table.

When rainfall exceeds the rate of infiltration, surface runoff occurs. The water from this runoff collects in various surface depressions and channels, creating lakes and streams. During the time when the surface runoff finds its way to the sea, a portion of it may evaporate and return to the atmosphere. Plants also return copious water to the atmosphere by evaporation, the process being termed transpiration.

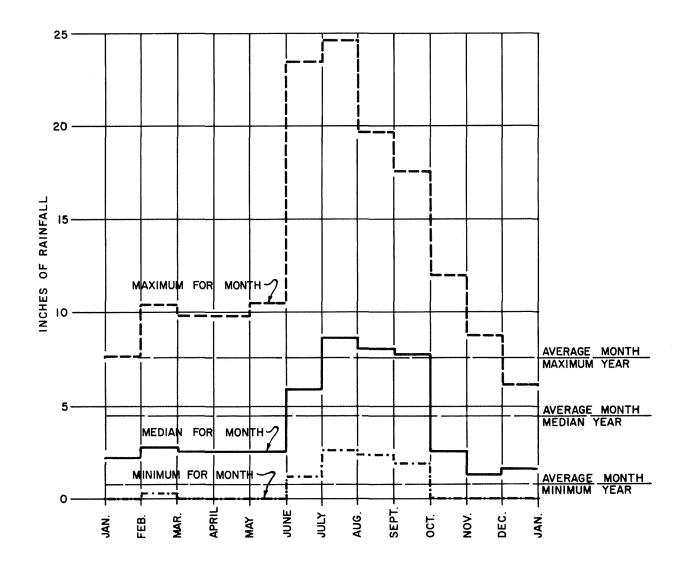
C. <u>Precipitation</u>

The average annual rainfall for Sarasota County is 54 inches. Half of the total falls in the four to five months bracketing the summer season. This rainfall is generally in the form of intermittent rainshowers, with occasional tropical storms. Figure 19 illustrates the occurrence of rainfall over the county.



THE HYDROLOGIC CYCLE

FIGURE 18



SEASONAL RAINFALL VARIATIONS

FROM RECORDS OF BRADENTON RAINFALL STATION

FIGURE 19

D. Evapotranspiration

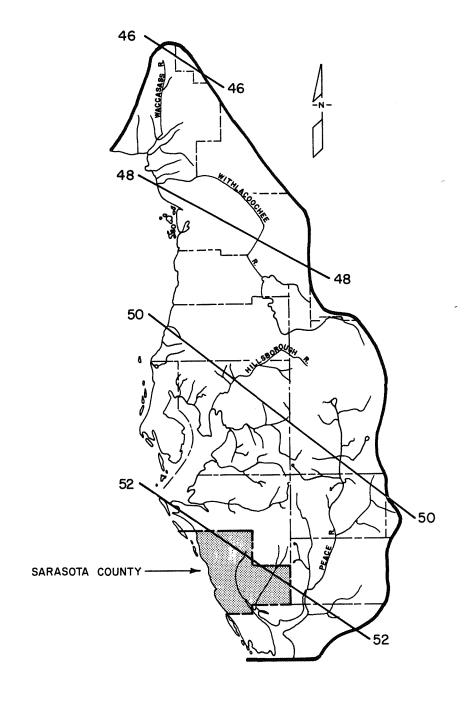
Evapotranspiration is a combination term to incorporate both kinds of evaporation, the evaporation directly from surface waters and transpiration from plants. Transpiration accounts for the largest water loss in this area, returning more rainfall to the atmosphere than infiltration and surface runoff combined. In Sarasota County the average yearly rate is estimated to be 38 inches of water. The U.S. Weather Bureau has reported that the annual evaporation directly from lake surfaces in the Sarasota County area amounts to 52 inches of water. Figures 20 and 21 illustrate the rates of evaporation in southern Florida.

Records indicate that close to 60 percent of evapotranspiration occurs during the six-month period of May through October, which is also the rainy season.

During the months of May and June it reaches a maximum, sometimes amounting to as much as 75 percent of the yearly total.

E. <u>Water Quality</u>

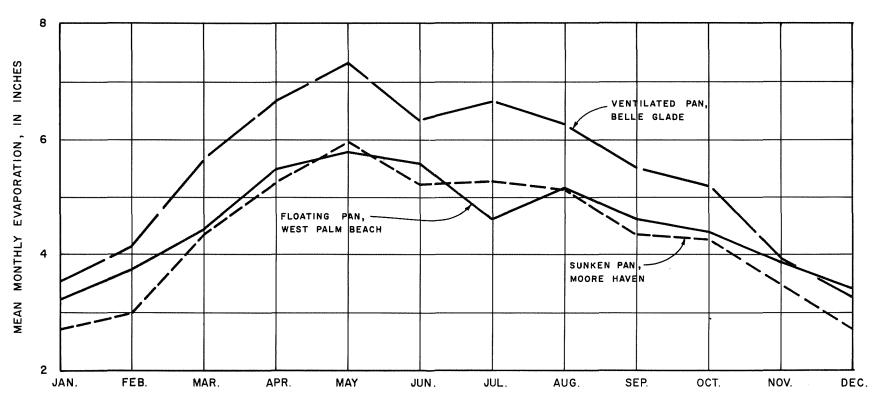
For value as a source, water should be of acceptable quality. This may include water that is somewhat substandard in its natural state, provided it may be readily improved by economical methods of treatment; even then the cost of treatment is greater than for a raw water of high quality.



AVERAGE ANNUAL LAKE EVAPORATION IN INCHES (1946 - 1955)
SOURCE: FLORIDA BOARD OF CONSERVATION, FLORIDA LAND AND WATER RESOURCES SOUTHWEST FLORIDA

FIGURE 20

63



SOURCE: FLORIDA GEOLOGICAL SURVEY, "WATER RESOURCES OF SOUTHEASTERN FLORIDA", PAPER NUMBER 1255

EVAPORATION IN SOUTHERN FLORIDA

FIGURE 21

Drinking water standards are the objective of a public water system. The main criteria and guidelines for this purpose are those established by the U.S. Public Health Service, which are applied by health authorities throughout the State of Florida. The most important physical and chemical characteristics are set out in Table 2.

The troublesome characteristics of local water sources that are not readily reduced to acceptable limits by conventional and economical treatment are most generally the total dissolved solids, sulfates and fluorides, although a significant reduction in the fluorides can be achieved. In Sarasota County, therefore, exploration for water sources and their evaluation are guided largely by these features, although other objectionable qualities may be involved in samples from various locations.

F. Surface Water

Surface water is that water which accumulates on the surface of the earth.

It eventually collects in various depressions creating ponds, lakes, streams and rivers. Additional water is continually being added by rainfall, runoff from drainage basins and exfiltration from the ground water.

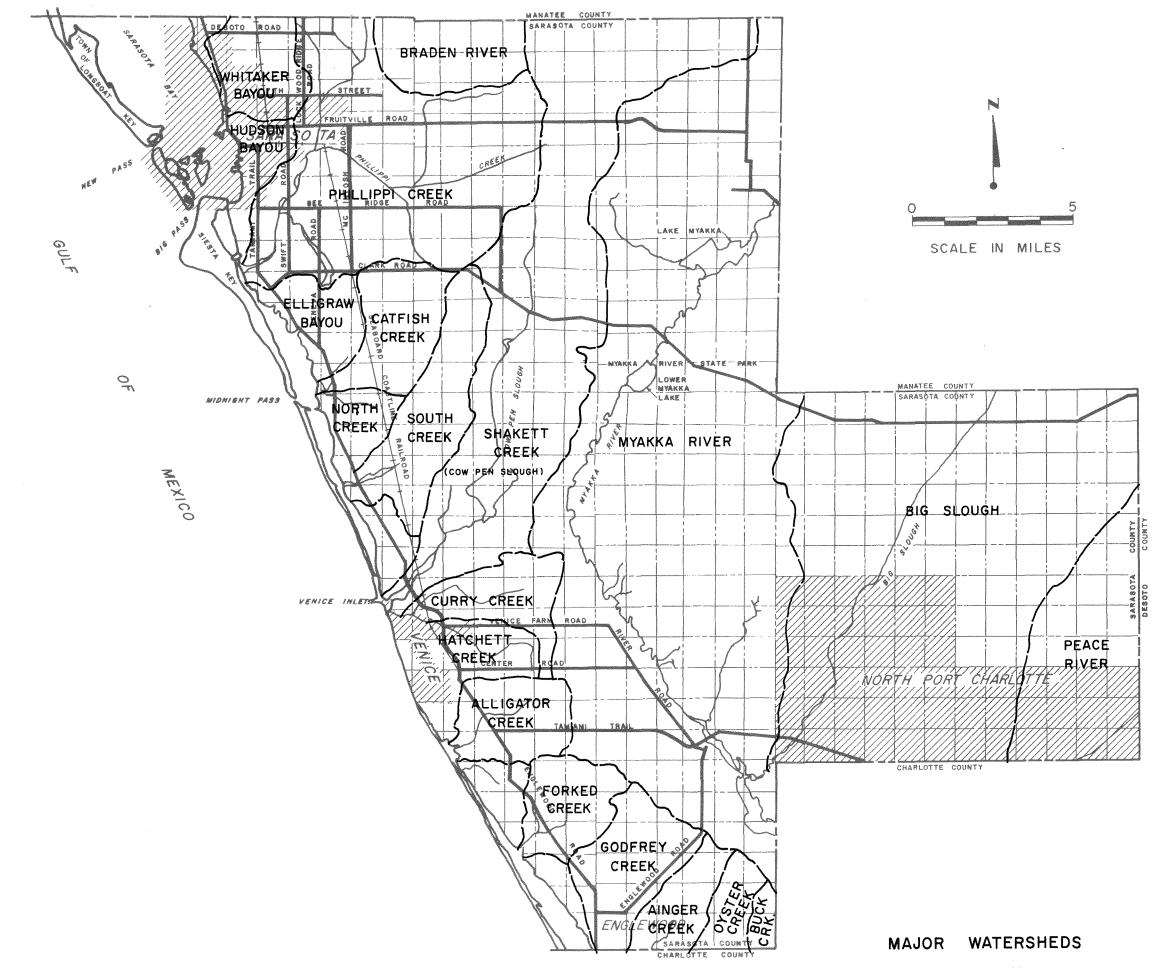
TABLE 2

U.S. PUBLIC HEALTH SERVICE STANDARDS FOR DRINKING WATER

Physical Characteristics	LIMITS
Turbidity	 5 Units
Color	 15 Units
Threshold Odor Number	3

<u>Chemical Characteristics</u> <u>Substance</u> :		LIMITS Concentration in mg/l*
Total Dissolved Solids		500.0
Chloride [Cl]		250.0
Copper [Cu]		1.0
Carbon Chloroform Extract [CCE]		0.2
Cyanide [CN]	***************	0.01
Fluoride [F]	~~***	0.8
Iron [Fe]		0.3
Manganese [Mn]		0.05
Nitrate [NO ₃]		45.0
Pheno1s		0.001
Sulfate [SO ₄]		250.0
Zinc [Zn]		5.0

^{*}mg/l = ppm (approximately)



Water in contact with the earth's surface becomes colored from organic materials, turbid from suspended mmaterials, and acquires odor and taste from soil bacteria and algae. As it moves from place to place it picks up residues from man-made biocides and fertilizers. All of these increase the need for treatment prior to use as a potable water.

G. Available Surface Water in Sarasota County

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For Sarasota County, the annual surface runoff is estimated to average 15 inches per year.

There are 25 different watersheds in Sarasota County. The largest of these is the Myakka River basin, which is approximately 235 square miles in area. Peak monthly flows exceed a billion gallons per day, with annual averages ranging from a wet year of 375 million gallons per day to a dry year low of 48 million gallons per day. However, there are months during the summer where the flow is almost zero. The Upper and Lower Myakka Lakes in this basin are the only two lakes of significant size in Sarasota County. Their combined storage capacity is approximately 8,100 acre-feet.

There are only three other watersheds in the county that are of major area. They are the 88-square-mile Big Slough basin, the 90-square-mile Cow Pen Slough-Shakett Creek basin, and the 58-square mile Phillippi Creek basin.

The 20 other small coastal streams rise within only a few miles of the coast and are tidal to a degree throughout most of their reaches.

H. Quality of Surface Waters

The U.S. Geological Survey reports that above the outlet to the Lower Myakka Lake, the water in the Myakka River has a carbonate hardness of less than 60 mg/l, which is moderately soft. Water temperatures sometime exceed 90°F. and the color may exceed 220, on the standard platinum-cobalt index. During high runoff, other objectionable characteristics were identified, such as dissolved iron concentrations of about 0.3 mg/l and suspended organic matter, along with algae.

Table 3 lists the various constituents found from chemical analyses by the U.S. Geological Survey for different surface waters in Sarasota County. Those streams that have high total dissolved solids usually derive their water from wells for irrigation and watering stock that tap highly mineralized sources, and it is noted that an increase in concentration occurs during periods of low stream flow.

During periods of high flow, water contributed through surface runoff from rainfall dilutes and decreases the mineral concentrations.

I. Current Utilization of Surface Water for Public Water Supplies

The only public water system in Sarasota County that is presently wasing surface water for its water supply is the City of North Port Charlotte. In

TABLE 3

REPRESENTATIVE WATER QUALITY CHARACTERISTICS OF SURFACE WATERS DURING LOW FLOW PERIODS

(Analyses are in Parts Per Million)

Area						Dissolved Solids	Hardness, as CaCo ₃			
	Iron (Fe)	Sulfate (SO ₄)					Calcium Magnesium	Non- Carbonate	Color	Field Temp. (°F.)
Myakka River, above Upper Myakka Lake, near Sarasota	.07	33	17	.6	2.5	115	80	45	70	80
Myakka River, below Upper Myakka Lake, near Sarasota	.11	8.4	16	.4	.7	58	32	15	100	83
Myakka River, near Sarasota	.05- .15	10- 25	9- 29	.3- .4	.0- .7	47 - 98	28- 58	16- 37	80 - 220	75- 91
Myakka River, below Lower Myakka Lake, near Sarasota	.27	8.4	10	.4	.1	53	32	12	200	82
Myakka River, near Venice	.04- .06	30- 450	27- 2320	.5- .7	.0- 1.1	138- 4600	92- 1040	44- 900	50- 100	77 - 83
Big Slough Canal at Dam, at North Port Charlotte	.02	66	70	.6	.0	379	264	88	40	65
Oyster Creek, near Englewood	.02- .04	483- 603	3800- 5080	1.2- 1.4	.4- .8	7059- 8950	1980- 2550	1850- 2410	50	75- 76
Alligator Creek, near Venice	.04- .12	130- 225	122 - 185	.2- .5	.0	595 - 881	396- 568	183 - 312	50- 85	88
Cow Pen Slough, near Bee Ridge	.00- .02	56- 371	33 - 70	.7- 1.2	.5- .7	268- 638	192 - 466	78- 376	15 - 20	72 - 85
Phillippi Creek, near Sarasota	.01- .08	346- 360	35- 60	1.0- 1.2	.0- .1	680- 757	502- 562	355 - 380	30- 45	71 - 84

1965, this city withdrew approximately 200,000 gallons per day from Big Slough. The point of withdrawal is an impoundment behind a low-head dam located just north of the county line. Big Slough, near Murdock, is highly mineralized and contains fluoride concentrations of about 1.4 mg/l.

J. Potential Utilization of Surface Water

The potential for development of surface water sources in Sarasota County is limited. Stream flow data for the Myakka River Basin indicates that natural flows ceased altogether during at least five droughts since 1938. Even for normal years, many of these non-tidal reaches often go virtually dry during the late spring. Practicable utilization of streamflow is restricted by these low flows and limited storage potential.

A U.S. Geological Survey report entitled, "Low Streamflow in the Myakka River Basin Area in Florida", Report of Investigation No. 53, published by the State Board of Conservation in 1968, studied the factors affecting the possible use of streams in the area as sources of fresh water. It was concluded that the smaller streams, canals and sloughs are not reliable sources of water, due to their intermittency and low annual yields.

The only watercourse in Sarasota County capable of development into a source of fresh water is the Myakka River. Upper and Lower Myakka Lakes, through which the Myakka River flows, occupy two of the largest natural depressions in the area. The maximum practicable utilization of these lake basins would result in approximately 8,100 acre-feet of storage, of which about 7,350

acre-feet would be usable. If lake levels were not permitted to fall lower than the minimum levels recorded in the severe drought of 1943-44, the usable storage for water supply would be about 3,800 acre-feet.

A mass curve has been plotted to determine the draft rate which could be supplied during a drought with a 30-year recurrence interval. If all 7,350 acre-feet of usable storage were used, a continuous draft of about 11.6 million gallons per day could be provided. If 3,800 acre-feet of storage were used, a draft of about 6.5 million gallons per day could be provided.

However, there is a question of availability. Upper and Lower Myakka Lakes lie within Myakka River State Park, and are used extensively for recreational purposes. Their limited size may preclude combination usage. Consequently, any development as a water supply should be deferred until such time as the need for water becomes so great as to outweigh the recreational value of the lakes. This would be many years in the future, if ever.

It is possible that a surface water supply could be developed by damming lower reaches of the Myakka River, but previous engineering studies have indicated that the cost would be prohibitive because of the large land areas required, since there is no deep gorge for economical storage.

K. Subsurface Waters

Subsurface waters are classified by their locations below the earth's surface. Moisture that is relatively close to the surface and is available to

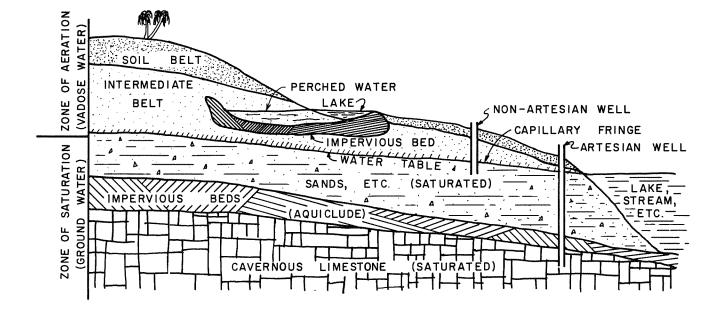
plant roots is termed vadose water. The term ground water applies to water that has saturated the lower strata, a kind of submerged lake. The upper surface of the ground water is the water table. Locations and classifications of subsurface water are illustrated in Figure 23.

Ground water is stored in voids between soil particles and in porous rock. Porosity is the ability to absorb water, and is a measure of its storage capability. Permeability is that property which allows transmission of water, and does not always correspond to porosity. Clay, for example, is highly porous but impermeable, thus yielding low flows to wells. Limestone, sands and shells are highly permeable and are suitable for well flows.

The principle of an artesian well is a simple matter of water seeking its own level. A permeable layer underground, called an aquifer, may be confined above by an impervious bed, an aquiclude, of rock or clay. If water at a higher elevation is connected to this permeable layer, even though the source may be some distance away, its head will superimpose a pressure on the confined aquifer. A well drilled through the confining bed will release the water, which will rise to a level corresponding to the pressure. Whether or not the pressure is sufficient to force the water to the ground surface, the well is artesian; in the latter event the well is called a free-flowing artesian well. What is usually called a spring may be described as nature's free-flowing well, a passageway through the confining bed to the surface.

The pressure at any point depends on the elevation below the water source and the frictional effect resulting from percolation through the ground.

The piezometric surface is a fictitious level corresponding to the heights



CLASSIFICATION OF SUBSURFACE WATER

FIGURE 23

to which columns of water would rise if encased. For the deep Floridan aquifer, this surface is about 50 feet above mean sea level in the northeast county, sloping to about 20 feet at the coast. Artesian wells tapping this aquifer at the coast thus may be free-flowing, but the land surface slopes more steeply upward than the piezometric surface and eventually overtakes it, and artesian wells no longer will flow freely at the land surface. Seaward, the artesian aquifers eventually connect with the gulf, where water is discharged and lost.

Non-artesian wells are those that tap the ground water lying above the uppermost impervious layer. Thus they are shallower than the artesian wells in this particular location, although fairly shallow artesian conditions can and do exist, even at 100 feet deep or less, because of local beds of hardpan, clay and limestone above them. Non-artesian wells are recharged by local rainfall, whereas artesian wells may be recharged by rainfall many miles distant.

L. Ground Water in Sarasota County

The various investigations made to date, although not quantitatively definitive, indicate that Sarasota County has adequate water resources, probably sufficient to supply the water needs foreseen in this report, if properly managed. The economics of quality and treatment may introduce recycling, as noted elsewhere in the report.

The Floridan aquifer generally includes, from bottom to top, parts or all of the Avon Park limestone, Ocala limestone, Suwannee limestone, Tampa

limestone and permeable parts of the Hawthorn formation that are in hydrologic contact. However, the Avon Park formation is the only formation in hydrologic contact with the Floridan aquifer in Sarasota County, the Ocala limestone formation being impermeable and acting as an aquiclude, separating the Avon Park formation from the remaining upper formations. The presence of aquicludes and layers of phosphytic rock, which act as aquitards, reduce intermixing and cause the water to move independently through the various formations. Thus, the Floridan aquifer in its normally accepted sense does not exist in Sarasota County. Figure 24 illustrates the various formations located below Sarasota County. Table 4 lists the development of the various formations and their composition.

Nearly all of the recharge for the deeper, high-yield aquifers in Sarasota County originates in the lake and marshy regions of Polk and Highland Counties, known as the "Green Swamp" area. As the water moves horizontally through the aquifers, it becomes increasingly mineralized. Thus, water along the coast is of poorer quality chemically than inland, within the same aquifer.

For the most part, wells in the upper portions of the local strata are of more limited capacity than are the deeper wells. Typical wells of 100 to 200 feet in depth may be expected to have capacities up to 200 gallons per minute, while those of 500 to 600 foot depths commonly have capacities of 350 gallons per minute or more. There are great variations beyond these examples.

GEOLOGIC UNITS

WATER TABLE	Annal that has been also been a	SURFACE SAND, TERRACE SAND CALOOSAHATCHEE FORMATION	EPOCH
AQUICLUDE			
ZONE I		TAMIAMI FORMATION	
ZONE 2		UPPER HAWTHORN FORMATION	
		-	MIOCENE
•		LOWER HAWTHORN FORMATION	
ZONE 3			
	Therender	TAMPA FORMATION	
ZONE 4			
20NE 4			
		SUWANNEE LIMESTONE	OLIGOCENE
40111011105		OCALA LIMESTONE	
AQUICLUDE		21112010112	
	一种出出工工工		
	可以与学生是社会		
	THE FIRE		
	THE HATE		EOCENE
			3332 2
ZONE 5	1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-		
	The state of the s	AVON PARK FORMATION	
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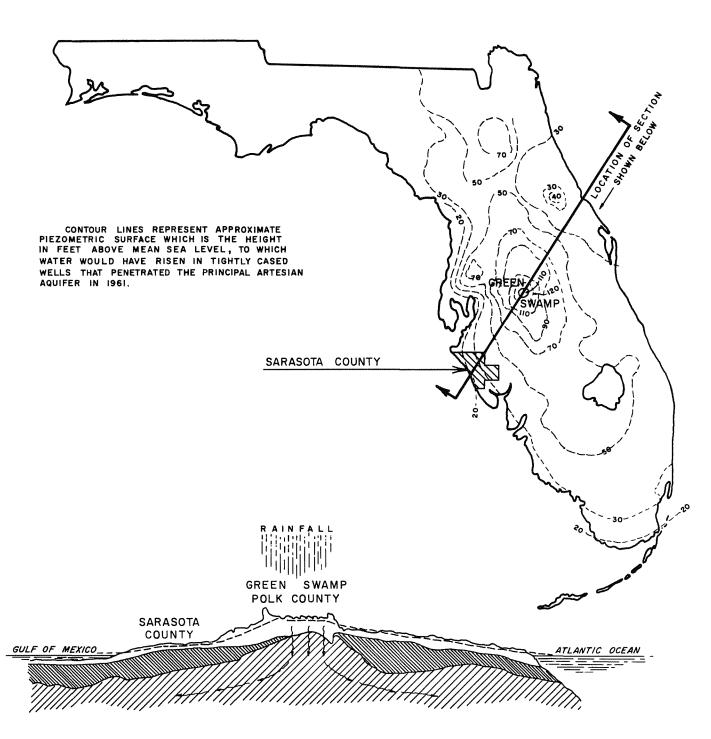
FIGURE 24

TABLE 4

GENERALIZED HYDROGEOLOGIC COLUMN FOR SARASOTA COUNTY

AQUIFER	HYDROGEOLOGIC UNITS	DEVELOPMENT
Water Table	Undifferentiated deposits including Caloosahatchee Marl	Domestic wells along the coast, lawn irrigation, stock wells, yields variable.
Zone 1	Green clay confining layer, Tamiami formation and marker bed	Domestic and irrigation wells will yield up to 200 gallons per minute from limestone beds in this formation. Mostly developed for irrigation in the eastern part of the county.
Zone 2	Upper Hawthorn formation	Domestic and light irrigation, highly developed in the populated areas. Yields 20 to 200 gallons per minute; water contained is saline to the west of Charlotte Harbor.
Zone 3	Lower Hawthorn formation ———————— Tampa formation	Irrigation use only. Yields usually increase with depth; the zone at the contact between the Hawthorn and Tampa formations provides most of the water to wells
Zone 4	Suwannee limestone Ocala group	This unit consists of the permeable zones at the contact between the Tampa and Suwannee formations and the zone at the contact between the Suwannee and Ocala formations. Generally the upper zone will yield as much as 1,000 gallons per minute and the lower zone even more. The balance of the Ocala acts as a confining layer.
Zone 5	Avon Park formation	Not used as a source of water in Sarasota County.

CROSS SECTION THRU GREEN SWAMP-SARASOTA COUNTY



LEGEND

PERMEABLE SURFACE SOILS

CONFINING LAYER (HAWTHORN FORMATION)

FLORIDAN AQUIFER (ARTESIAN)

PIEZOMETRIC SURFACE

M. Quality of Ground Water

The quality of the ground water in Sarasota County is variable. For reference, the mineral analyses of water from several representative well supplies are shown in Table 5. Most of the potentially productive ground water in the area is characterized by high total dissolved solids, sulfates and fluorides, and is hard in its natural state.

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In Sarasota County generally, the deeper the source of well water the poorer the chemical quality becomes. Unfortunately, the productive capacities here are likewise deeper. Economics enter an evaluation in a number of respects. To meet the required demand, a relatively large number of shallow wells could be used with higher collection costs, or fewer wells of greater depth with higher treatment costs. For a definitive evaluation, a comparison of specific alternatives would be needed, with comprehensive data for each of the possible water supply sources. A well exploration program would be needed, the goal of which would be the determination of the optimum locations, numbers, and depths of wells to produce the required volume of water of quality which can be treated most economically, on balance, by the proposed methods.

N. Availability of Ground Water Supply

The valuable records accumulated to date, which have been reviewed with Mr. Horace Sutcliffe, Geologist with the U.S. Geological Survey, permit some generalizations useful to this report. It is anticipated that an adequate

TABLE 5

C O M P A R A T I V E W E L L D A T A

(Reported Analyses are in Parts Per Million)

LOCATION OR SOURCE OF SAMPLE	DATE OF ANALYSIS (CHEMICAL)	TOTAL DISSOLVED SOLIDS @ 103° C.	TOTAL HARDNESS, AS CaCo ₃	SULFATES, AS So ₄	CHLORIDES, AS C1	IRON, AS Fe	COLOR (PT-CO SCALE)	FLUORIDES, AS F
NORTH COUNTY								
Brentwood Gulf Gate Utilities, Well #14 Kensington Park Comp., All Wells City of Sarasota Comp. SKUA Wells #8, #9, #10 Dolomite Industrial Park South Gate Well #11	10-23-69 2- 8-68 6-21-69 8-30-68 9- 9-69 10-27-64 5- 7-69	532 497 700 630 1120 770 440	220 270 438 570 870 612 300	58 53 356 625 316 45	66 78 60 21 120 69 30	0.34 0.08 0.05 0.04 0.02 0.13 0.05	20 15 2 5 5 10	3.4 0.8 0.5 1.56 1.6 0.6
NORTHWEST COUNTY								
Longboat Utilities	8-18-67	1080	610	240	88	0.15	5	2.7
NORTHEAST COUNTY								
Myakka River State Park	7-25-67	1235	786	336	55	0.1	5	1.7
CENTRAL COUNTY								
Venice Well #39 Osprey Well # 9	3-14-63 1-19-66 1-21-66 1-24-66 2- 1-66 8-25-66	357 532 894 1190 385 2430	213 356 617 836 244 1788	27 122 340 588 14 1540	48 85 90 95 62 110	0.48 	35 10 10 10 5 0	0.48 0.5 0.8 0.8 2.0
SOUTHEAST COUNTY								
N. Port Charl. Comp., 14 Wells B & B Utilities	9-16-61 5-16-65	650 840	428 540	0 92	140 84	0.7 1.16	55 30	0.5 0.8

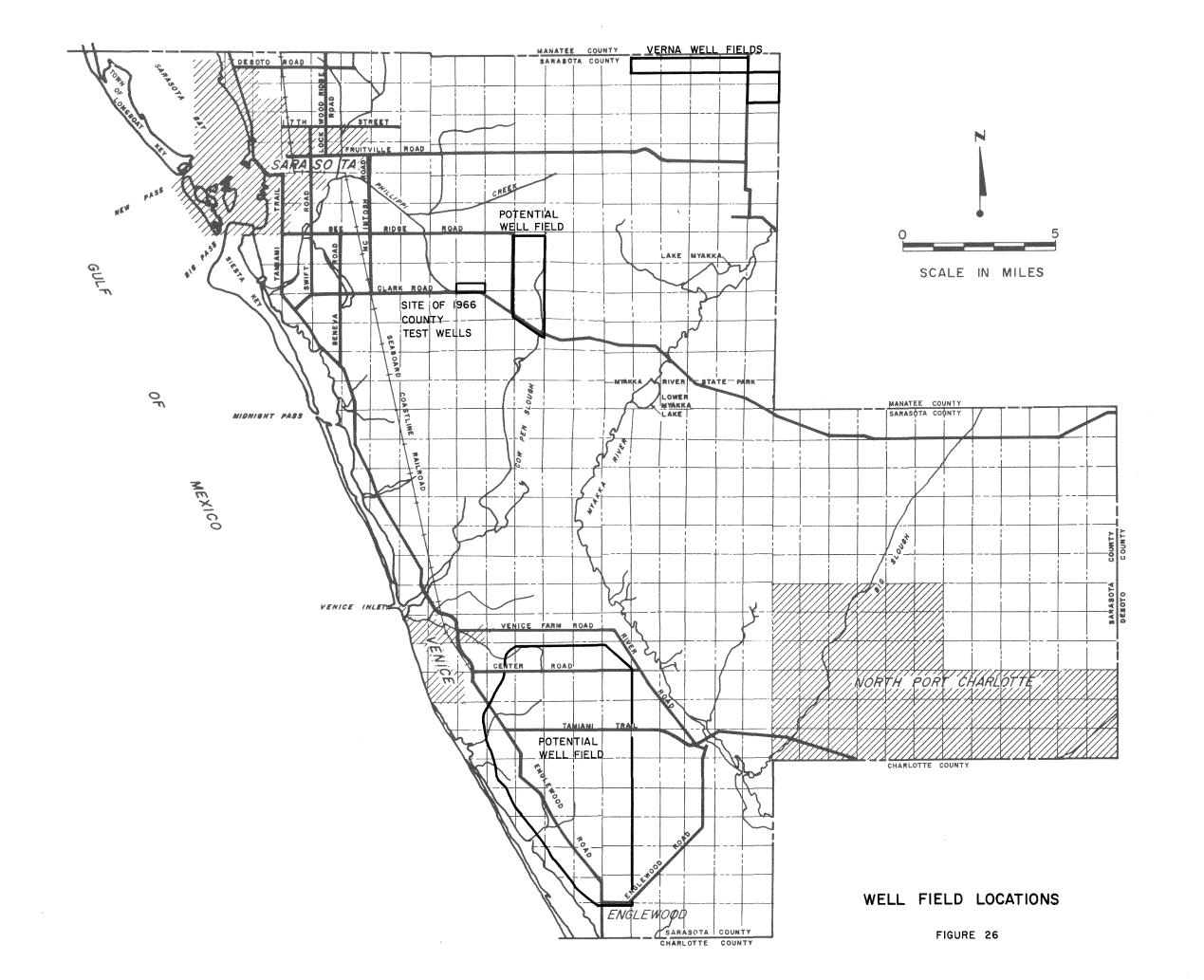


TABLE 6

VERNA WELL FIELD WATER ANALYSIS

Verna Well No.	Depth (Ft.)	Pumping Rate (GPM)	Date of Analysis	Total Dissolved Solids	Total Hardness (Ca CO ₃)	Sulfates	Chlorides	Color	Fluoride
1	521	122	2-10-66	315	204	5-	33	10	1.6
3	500	144	2-10-66	374	239	5-	72	5	1.8
4	500	254	2-11-66	380	204	5-	39	5	2.36
6	500	122	2-11-66	360	264	5-	54	5	2.16
12	450	105	11-16-65	340	327	5-	48	10	2.2
13	520	626	1-28-66	585	620	282	24	5	2.0
15	500	575	1-25-66	553	570	298	24	5	2.0
20	500	454	1-25-66	440	410	220	18	5	1.5
22	505	407	12- 7-65	700	758	422	21	5	1.82
25	500	634	11-23-65	770	830	450	21	5	1.2
31	600	575	3- 9-66	700	760	455	18	5	1.24
35	600	631	3-10-66	525	570	268	18	5	1.08

supply of usable ground water can be developed for each pollution control zone.

Investigations to date indicate that the areas which may have the greatest potential for well fields are located in the northeast part of the county; an area identified as the Berlin tract, located in the north-central part of Township 37 South; and an area in the southeast region of the county. Figure 26 indicates these locations within the county.

The City of Sarasota's Verna well field is located in the northeast part of the county. The water obtained is from the Hawthorne and Tampa formations. The quality varies more than anticipated, and the city is planning further exploration for improved selectivity. For most of the wells the total dissolved solids and sulfates are high. Table 6 lists the results of water analyses for 12 wells in the Verna well field.

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In contrast to the foregoing high-yield relatively deep wells, in 1966 the Board of County Commissioners authorized an exploratory well drilling program at shallower depth, in an area approximately 5 miles southeast of the City of Sarasota, north of Clark Road. The wells were about 180 feet deep, penetrating the upper part of the non-uniform Hawthorn formation. Two wells were drilled and tested. Chemical analysis reports are shown in Table 7. The quality of this raw well water complies with the standards of the U.S. Public Health Service, except for fluoride, which is slightly high. It is anticipated that the treatment for softening could simultaneously reduce the fluoride to an acceptable level.

In 1968, Florida Cities Water Company made preliminary investigations for a

TABLE 7

EXPLORATORY TEST WELLS - SARASOTA COUNTY

	Test Well No. 1	Test Well No. 2
Date of Test -	11/10/66	11/8/66
Sample No	1236	1234
Total Dissolved Solids, @ 105°C. Total Hardness, as CaCo3 Calcium Hardness, as CaCo3 Magnesium Hardness, as CaCo3 Calcium, as Ca Magnesium, as Mg Alkalinity (Phenolphthalein), as CaCo3 Alkalinity, (Total), as CaCo3 Carbonate Alkalinity, as CaCo3 Bicarbonate Alkalinity, as CaCo3 Hydroxides, as OH Carbon Dioxide, as CO2 Carbonates, as CO3 Bicarbonates, as HCO3 Chlorides, as Cl Iron, as Fe Manganese, as Mn Sulfate, as SO4 Fluorides, as Fl Silica, as SiO2 Copper, as Cu Phosphate (Total), as PO4	310 ppm 242 140 102 56 43 0 234 0 15 0 140 73 0 0 10 1.45 16 0 0	350 ppm 260 170 90 68 22 0 230 0 230 0 70 0 138 75 0 0 7 1.75 15 0 1.75
Color, Standard Platinum Cobalt Scale Odor pH (Laboratory) pHs Stability Index Saturation Index Turbidity, Silica Scale	0 None 7.5 7.1 6.7 0.4 0	0 None 6.8 7.0 7.2 0.2

new water supply, drilling a series of test wells approximately eight miles southeast of Sarasota, near Myakka River State Park. The test wells extracted water from the bottom of the Hawthorn formation and the Tampa limestone formation. The results of their investigations, as indicated in Table 7, indicated that their needs could be met, the quality of the water from their test wells being relatively good.

The U.S. Geological Survey investigations point to an area located in the southeast corner of the county as a potential source of well water for public consumption. Presently, General Development Corporation is conducting an investigation in this area. The results are not yet available, but are expected to be in the near future.

0. Further Investigations of Ground Water Supply

The scattered investigations to date are encouraging but limited. It is of prime importance that they be continued and expanded, so that the quantities and qualities of ground water resources within Sarasota County may be comprehensively mapped.

Since the collection of reliable data involves a minimum of several years of careful observations and analysis, it is recommended that such a program be pressed. Not only the county's program, but other activities of public and private concern, including conservation practices and the wise use of natural resources, will benefit greatly thereby.

In order to protect and reserve the higher quality water sources for public

water supplies, the subsurface waters located within the county should be classified. The classification system should direct allocations for special uses, such as irrigation or other processes that do not require as high a quality of water.

Presently there are many irrigation wells within Sarasota County that are not cased to the high volume aquifer which they are intended to tap, resulting in needless extraction of good quality water from the shallower formations that might be needed for a nearby public water supply well field. Wells used for irrigation, commercial or industrial use generally should be restricted to the deeper aquifers, and cased to those depths. All wells should be regulated for casing depth and construction, spacing to avoid undue interference and rates of pumping that will not deplete the aquifer.

P. Controlled Storage in Aquifers

The natural recharge to the deep high-volume aquifers within Sarasota County originates mainly outside of the county in the Green Swamp area. Some natural recharge occurs within the surface sands down to the ground water table, but it does not penetrate to the underlying aquifer unless the surface elevation is 40 feet or more above sea level. A concept may be advanced of controlled recharge. Selectively withdrawing ground water in areas determined to be suitable for the purpose might allow natural recharge with good quality water for public consumption, and reduce surface runoff by the same measure. There is the further possibility of allowing for potential wastewater reuse by applying highly treated wastewater to the areas from which the ground

water is being withdrawn. In time, with natural percolation and biodegradation, this water could be reused, provided bacteriological and viral safety had been confirmed conclusively.

Q. Regional Water Resources

Satisfying the water requirements of a county should not be handicapped by its political boundaries. All water resources within economical reach should be considered in the long view.

The regional concept at the heart of this report has been outlined in the section entitled, "Pollution Control Zones". Portions of Manatee and Charlotte Counties should be considered to be elements of the water and wastewater master plan for Sarasota County, with potential advantages that could result from cooperation among the respective counties and the municipalities thereof.

In order to develop the optimum water management program for Sarasota County, an inventory of water demand versus water supply, both surface and subsurface, should be developed for these adjacent areas of concern, including also the effects of population growth and the quantity and quality of surface and subsurface waters. The results would make it possible to develop a comprehensive water budget for each zone.

R. <u>Water Demand in Sarasota County</u>

Water demand for any area is generally composed of three separate classes of use: public water use, industrial water use, and water for agricultural irrigation. In Sarasota County, almost all of the water now used by each of these classes is from subsurface sources. It has been estimated by the U.S. Geological Survey that for 1970 the total demand was in the order of 66 million gallons per day. They found that almost all of the industrial and all of the irrigation demands were self-supplied by private interests.

The following table lists the estimated usage by the three different classes for the year 1970:

ESTIMATED SARASOTA COUNTY WATER USE - 1970

(In Millions of Gallons per Day)

<u>Use</u>		Quantity
Public Industrial Irrigation		11.3 8.4 46.1
	Total	65.8

Source: U.S. Geological Survey

For public usage, which is the main concern of this report, a forecast has been prepared for the 40-year period from 1970 to 2010, at 5-year increments. This appears as Table 8. The currently accepted average usage of 100 gallons per capita per day has been applied, a figure approximately confirmed by the record of systems in this area. The 1970 base for the entire county is 12.4 MGD

TABLE 8

FORECAST OF DEMANDS UPON PUBLIC WATER SYSTEMS

(In Millions of Gallons per Day)

POLLUTION	CONTROL ZONE	1970	1975	1980	1985	1990	1995	2000	2005	2010
NODTH	Average Day	8.9	13	18.8	23.3	25.4	25.9	25.9	25.9	25.9
<u>NORTH</u>	Maximum Day	16	23.4	33.8	41.9	45.7	46.6	46.6	46.6	46.6
CENTDAL	Average Day	2.5	3.6	5.3	7.8	11.5	14.3	15.9	15.9	15.9
CENTRAL	Maximum Day	4.5	6.5	9.5	14	20.7	25.7	28.6	28.6	28.6
COUTU	Average Day	0.6	0.9	1.3	1.9	2.8	4.5	6.8	9.4	11.7
<u>SOUTH</u>	Maximum Day	1.1	1.6	2.3	3.4	5	8.1	12.2	16.9	21.1
SOUTHEAST	Average Day	0.4	0.6	0.9	1.3	1.9	2.9	4.9	7.5	10
SOUTHEAST	Maximum Day	0.7	1.1	1.6	2.3	3.4	5.2	8.8	13.5	18
BAL. OF	Average Day	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
COUNTY	Maximum Day	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
TOTAL	Average Day	12.4	18.3	26.5	34.5	41.8	47.8	53.7	58.9	63.7
TOTAL	Maximum Day	22.6	53.3	47.5	61.9	75.1	85.9	96.5	105.9	114.6

Based on 100 gallons per day per capita. Excludes major industrial and agricultural irrigation requirements, which are assumed to be self-supplied.

average (22.6 MGD maximum), which conforms fairly closely to the corresponding U.S. Geological Survey estimate in the above tabulation, increasing to 63.7 MGD average (114.6 MGD maximum) in 2010.

When the huge requirements of agricultural irrigation and a significant quantity for industrial needs are added to the future needs for public water systems, an enormous total demand appears to be inevitable. The importance of a comprehensive water management program to conserve and allocate the water resources of Sarasota County can hardly be overstated.

S. <u>Water Budget</u>

For a particular area and period of time, the water entering must either go into storage, be consumed, evaporate, or flow out either on the surface or underground. In general terms, this movement of water can be expressed using the hydrologic equation, where:

Total Gain Items = Total Loss Items

Although the county's potential water resources are sufficient at this time, ultimately a quantitative water budget will be needed, so that excessive demand does not inadvertently exceed the supply. Considerably more and sophisticated measurements than are now available would be needed for accurate results, among them being subsurface gradients, permeabilities of various formations, and the volumes of subsurface water removed per day, both naturally and artificially.

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WATER SYSTEMS

VIII

ABSTRACT OF SECTION VIII

Most of Sarasota County is using water that fails to meet modern standards of quality. The reliability of service is questionable and few areas are supplied with the necessary quantities for fire protection. A countywide system planned for the future, with supply, treatment and storage facilities for each pollution control zone, will correct this situation and insure against its recurrence.

Schematic plans are included to show the locations and the magnitude of major components of such a system which will meet the needs of the county to the year 2010.

All of the pollution control zones should be interconnected, as should the water systems of portions of adjacent counties, if maximum reliability and the best use of available resources is to be achieved.

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SECTION VIII WATER SYSTEMS

A. Introduction

The function of a public water system is to deliver an ample supply of safe water of acceptable quality. It should be bacteriologically safe, clear and pleasing in appearance, free from objectionable tastes and odors and within the recommended standards established by the U.S. Public Health Service, but containing minerals of long-accepted character to conform to the usual norms of tastes and nutrition.

Beyond these basic requirements, the water supplied to users should be softened if necessary, to reduce hardness that interferes with washing efficiency and shortens—the life of fabrics. A hardness of 85 to 120 ppm is considered to be satisfactory. The cost per customer for the large-scale softening process employed by a central water system is only a fraction of the cost of an individual softening unit in the home. Hardness is also related to scale forming. Water that is highly scaleforming or corrosive causes costly failures of plumbing and heating equipment.

The well waters that are used for practically all of the water systems in Sarasota County require treatment in a number of respects. However, much of the treated water now piped to consumers remains substandard, although safe to use, either because of characteristics of the raw water which are not economically treatable or because the treatment facilities are inadequate to cope with correctible deficiencies.

B. Existing Water Systems

A public water system is defined as such because of the public being served, and it can be owned either publicly or privately. There are 131 such public water systems now existing in Sarasota County. Information concerning these systems is tabulated in the appendix.

These systems fall into three groups:

- Only four systems are owned and operated by public agencies or authorities: the City of Sarasota, the City of Venice, the Englewood Water District and the Siesta Key Utility Authority.
 A fifth is under construction for the Town of Longboat Key.
- 2. 13 are privately owned and operated systems, franchised to serve customers within legally defined boundaries.

3. The remaining 114 systems are very small and are mostly privately owned and operated. They serve individual entities like apartment projects, motels, mobile home parks, commercial enterprises and parks.

Size is a problem for all but the largest. A small system suffers from disproportionate overhead expense. The problem is especially severe as to plant facilities, the cost per person served being inversely proportional to size. In view of these economic factors, it is not surprising to find that minimal treatment facilities are usually provided. Usually, public health regulations are barely met in either initial installation or in maintenance and operation upon which the public convenience and safety depend.

Extension of service to all populated areas in the franchises is subject solely to financial prospects, with the result that many people are not served. The franchised water systems should provide a measure of dependability and safety from pollution since they are regulated by the county, but enforcement has often proved to be difficult. Because of minimal treatment in most cases, the water quality is little better than that from private wells.

Approximately 73 percent of the systems supply water which has received no treatment other than aeration, settling, sterilization and addition of a polyphosphate for stabilization. These processes are capable of removing the limited amounts of bacteria normally present in well waters, and reducing the iron, color, taste and odors to acceptable levels. They are completely ineffective in reducing the sulfates, fluorides and total dissolved solids, or of softening the hard water.

A general description of the systems in each of the pollution control zones, as defined in this report, follows:

1. North County Pollution Control Zone

There are 81 public water suppliers in the North County Pollution Control Zone. One is owned by the City of Sarasota, one by the Airport Authority, eight are franchised systems and 71 are smaller privately-owned systems.

The largest system is owned by the City of Sarasota, and utilizes a water treatment plant of the zeolite softening type. Most of the water is derived from a well field in the northeast corner of the county. It has been estimated that this well field can be developed to a total capacity of 14 million gallons per day. The raw water quality varies somewhat with well location and depth. Most of the wells are generally high in total dissolved solids, sulfates, and fluorides, but the city hopes to improve future wells. The wells are selectively pumped to control the qualities. The water is softened to acceptable levels in the treatment process.

The Sarasota-Bradenton Airport Authority operates a water distribution system which serves the airport. Water is purchased from the Manatee County Utilities System, which supplies water of good quality in every respect.

A publicly owned water system is presently under construction in the Town of Longboat Key. This system also will be supplied with water

from the Manatee County Utilities system.

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The Siesta Key Utility Authority owns and operates a franchised system serving customers on Siesta Key. The raw water is derived from five local wells varying in depth from 465 to 520 feet. The raw water is very high in total dissolved solids, hardness, sulfates, chlorides and fluorides. The water is treated by an advanced electrodialysis plant of 1.8 million gallon per day capacity which was dedicated in December, 1969. Recent analyses indicate that the treated water is greatly improved in quality, but is handicapped by the raw water quality. However, it is still above accepted hardness and exceeds the U.S. Public Health Service recommended standards for total dissolved solids.

Of the seven franchised systems in the North County Pollution Control Zone, records indicate that none supplies soft water or meets all of the recommended standards of the U.S. Public Health Service. Hard water is provided in six cases, high total dissolved solids in five, high fluorides in four, and high sulfates in two. All derive their raw water from wells.

The 71 remaining systems are all small and localized. Less than one-fourth provide water which has received treatment other than aeration, sterilization and stabilization. All the others supply hard water, and most are high in total dissolved solids, sulfates or fluorides. Some of the softened waters are also high in one or more of the above. All derive water from their own wells or by purchase from other systems using wells.

2. Central County Pollution Control Zone

There are 32 water systems in the Central County Pollution Control Zone. One is publicly owned, three are franchised and 28 are small local systems.

The City of Venice owns and operates a system which serves approximately 2,000 customers. Water is derived from shallow wells and is treated by aeration, lime softening, filtration and sterilization. The treated water is soft and good in most respects, but is somewhat high in total dissolved solids.

All three franchised systems use wells for supply, treat the water by aeration and sterilization, and provide treated water which is high in hardness and total dissolved solids.

The 28 small privately-owned systems derive water from wells. Records indicate that less than one-fourth of these systems provide water which has received any treatment other than aeration, sterilization and stabilization. All the others supply hard water, and most are high in total dissolved solids, sulfates or fluorides. Some of the softened waters are also high in one or more of these qualities.

3. South County Pollution Control Zone

The South County Pollution Control Zone presently contains 10 water systems, one of which is owned and operated by the Englewood Water District. Water for the Englewood Water District is derived from

some 30 relatively shallow wells and is aerated, chlorinated, softened and filtered. Records indicate that the treated water is of good quality in every respect.

Of the nine other systems, seven obtain water from the Englewood Water District. The two remaining systems derive their water from wells. The water is high in hardness and total dissolved solids. One of these two systems softens the water, the other provides aeration and chlorination only.

4. Southeast County Pollution Control Zone

There are three water systems in the Southeast County Pollution Control Zone, all of which are privately owned. The largest is owned by General Development Corporation and operates under a franchise to serve the City of North Port Charlotte.

Water for the North Port Charlotte system is derived from Big Slough, supplemented during low flow periods by flow from an artesian well. The water is treated in a lime softening and filtration plant with a capacity of one million gallons per day. Available records indicate that the treated water meets all accepted standards for quality.

The system which serves the Myakka River Manor Mobile Home Park was originally owned and operated by B and B Utilities under a franchise from the county. Water is derived from shallow wells, and is high in hardness and total dissolved solids. Negotiations are in process to purchase treated water for this system from the North Port

Charlotte system.

The Warm Mineral Springs water system is privately owned and operated. Drinking water is supplied from shallow wells, and is aerated and chlorinated. It is high in hardness.

5. Balance of County Area

There are five public water supply systems in the balance of the county area, all small. Four are privately owned. The fifth serves Myakka River State Park, and is owned and operated by the state. All derive water from wells. The water is hard and high in total dissolved solids. No treatment is provided except aeration and chlorination in four of the systems; softening is provided in the fifth.

C. Required Supply - General

The foregoing findings, together with those in Section VII, lead to significant conclusions regarding the long-range needs of Sarasota County:

- If the projected water needs in Sarasota County are to be met, careful water management must be practiced to conserve the available quantities of relatively good quality water.
- A program of reclamation and reuse of wastewater could be of major assistance in maintaining the balance between supply and demand.
 There should be sufficient time to develop the best approach if long-

range pilot studies and demonstration programs are initiated now.

3. The highest quality water resources should be reserved for use by water systems for public consumption.

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- 4. An enlarged program of subsurface exploration and analysis is needed to better define the ultimate capacity of aquifers in the county, the best locations for well fields, and other requirements for maximum safe utilization of the subsurface waters.
- 5. A management program is needed to assure maximum conservation and beneficial usage of the county's water resources.
- 6. For maximum public benefit, the needed programs of exploration, analysis and management can be most effectively undertaken by a public agency operating on a countywide scale, and cooperating beyond the county boundaries as appropriate.
- 7. Few existing public water supply systems in the county provide water meeting accepted standards of quality.
- 8. Continued population growth will necessitate increased use of more highly mineralized waters, requiring in turn special treatment to deliver high quality water to the public.
- 9. For whatever delivered quality is established, the cost of the water will be the lowest when provided by large treatment plants.

The long-range needs of the public will best be met if planning for develop-

ment of water supply and treatment facilities in Sarasota County is directed toward consolidation, with the ultimate goal of centralization of such facilities in area-wide systems. Each supply and treatment facility should be planned to serve an area of the maximum practicable size. It is recommended that each pollution control zone which has been delineated herein be designated as the area ultimately to be served by one water supply and treatment facility. Although some adjustment should be allowed for, practical considerations favor these sizes for the following reasons.

- 1. Larger areas would require increasingly burdensome capital expenditures for water transmission facilities.
- 2. The principles of ground water hydrology dictate that the required large withdrawals of subsurface water be distributed.
- 3. The pollution control zones are so related to contiguous population centers and major existing water supply facilities that they are mutually adapted to progressive stages of development.
- 4. With each pollution control zone also being served by one wastewater treatment facility, the development of a water supply facility in each zone would appear to lend itself to the future possibility of reclamation and reuse of treated wastewater.

D. The County Water System

The optimum arrangement would be that ultimately all water systems within

Sarasota County be incorporated into one county-owned system, with a single water supply and treatment facility in each pollution control zone. However, the wishes and prerogatives of cities and public districts must be recognized, and problems of jurisdiction and fiscal encumbrances would be involved. In this connection, the system serving the City of North Port Charlotte is considered to be a municipal system, in that its purpose is to serve that city under arrangements between the city and the system, which is owned and operated by General Development Corporation.

As the immediate goal envisoned by this Master Plan, it is recommended that the county acquire all of the franchised water systems in the county's unincorporated areas, and become the sole supplier of water for domestic use outside the corporate limits or present service areas of cities or water districts. It is further recommended that the county initiate discussions with the cities and water districts, seeking approval of the concepts presented herein. The county's future water plants could supplement or replace the existing facilities, as mutually agreeable.

E. Water Supply and Treatment Procedures - Overall

In recent years considerable progress has been made in methods of treating highly mineralized waters. Some of these processes, such as electrodialysis and reverse osmosis, would appear to be applicable to treatment of the subsurface waters which are available in copious volumes in deeper aquifers of Sarasota County. At present, costs of these processes are relatively high, but strong federal participation in further research and development may be expected to point the way to reductions.

For the present, the most economical procedure is to seek out the best raw water quality available in sufficient volume. Lime-soda treatment, or some close variant of it, may be utilized for as long as acceptable quality water can be produced in this manner. Thereafter, a mineral reduction unit of the type proven best by that time, would be added to each treatment plant as needed to reduce the sulfates, chlorides or other undesirable qualities.

Subject to the definitive findings of further investigation, it appears that wells penetrating the Tampa and Suwannee formations may become the primary source. Presently available information indicates that such wells properly spaced and constructed might be expected to produce about 0.75 million gallons per day each. A program of exploration and evaluation will be required to confirm this, and to define the optimum location for well fields. Each supply facility should consist of sufficient wells for plant capacity plus at least 10 percent for emergencies and down-time.

Based on the above, it is possible to make a preliminary estimate of the cost of water supply and treatment facilities for each pollution control zone.

These estimates appear in Section X.

F. Requirements for Each Pollution Control Zone

A discussion of the recommended facilities for each pollution control zone follows:

1. North County Pollution Control Zone

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The treated water now supplied to the water system serving the Sarasota-Bradenton Airport and soon the Town of Longboat Key is of good quality. It is recommended that these arrangements be continued.

For the remainder of this zone, it is estimated that the maximum day demand will be approximately 42 million gallons in the year 2010. The best prospects for well fields, from present knowledge, appear to be in the northeast corner of the county and in the area called the Berlin tract, which lies in the north-central part of Township 37 South, Range 19 East. A program of exploratory drilling and testing should be conducted to better define the well locations.

2. Central County Pollution Control Zone

It is recommended that the City of Venice cooperate with the county toward provisions for supplying the public water needs for this zone. It is estimated that the maximum day demand will be approximately 29 million gallons in the year 2010. It is recommended that a program of exploratory drilling and testing be initiated at an early date to provide needed information as to the best locations for well fields.

3. South County Pollution Control Zone

It is recommended that the Englewood Water District cooperate with

the county toward provisions for supplying the public water needs of this zone. It is estimated that the maximum day demand for this zone will be approximately 21 million gallons in the year 2010. It is recommended that a program of exploratory drilling and testing be initiated at an early date to provide needed information as to the best locations for well fields.

There is a portion of Charlotte County that is geographically identified with this region, being the peninsula extending south of Englewood which is isolated from the balance of Charlotte County. This area could be included in the planning for the South County Pollution Control Zone. Discussions between officials of Sarasota County and Charlotte County should be initiated at an early date to define the extent of future participation so as to make the most efficient use of planning. The estimates for this zone do not include any allowance for capacity to serve Charlotte County, and it is reasonable to assume that the cost increment therefor would be borne by that county. Details of such an arrangement are beyond the scope of this study.

4. Southeast County Pollution Control Zone

It is recommended that General Development Corporation, owner of the North Port Charlotte water system, cooperate with the county toward provisions for supplying the public water needs of this zone, subject also in this case to the consent of the City of North Port Charlotte. It is estimated that the maximum day demand for this zone will be approximately 18 million gallons in the year 2010.

Insufficient information is presently available to indicate where well fields should be located, but General Development Corporation is presently conducting a program of exploratory drilling and testing to develop this information. The results should be reviewed for long-range adequacy. The cost estimate for this zone includes funds for additional exploration or for participation in further exploration as may be found necessary.

Portions of Charlotte County should also be considered in the planning for area water supplies in this region. That portion of Charlotte County lying between the Myakka and Peace Rivers should be included in the planning for the Southeast County Pollution Control Zone. Discussions among officials of Sarasota County, Charlotte County, the City of North Port Charlotte and General Development Corporation should be initiated at an early date to define the extent of future participation, so as to make the most efficient use of planning. The estimates for this zone do not include any allowance for capacity to serve Charlotte County, and it is reasonable to assume that the cost increment therefor would be assigned in an appropriate manner. Details of such arrangements are beyond the scope of this study.

G. Water Distribution Requirements

Water demand to be supplied by a public water system comprises residential, commercial and industrial uses, with fire protection capacity added. In Sarasota County there are no industrial users of sufficient size to require

separate consideration, and none are anticipated under present plans for county development. Therefore, daily and hourly variations in demand for ordinary uses are expected to conform to normal patterns in primarily residential areas.

The criteria for fire flow capacity are established by the National Fire Protection Association, and the total fire flow to be provided by a water supply system is a function of the total population served. Required fire flow in any location is dependent upon the types of structures in that area, the degree of exposure to fire hazards, the degree of risk to human life and property, and a number of other factors. Fire flow capacity must be superimposed on normal consumption.

Daily variations in demand must be met by both water source and treatment plant facilities. This is accomplished by designing them to meet the maximum day demand. Hourly variations and fire flows must be taken into consideration in the design of distribution and storage facilities.

H. <u>Design Criteria</u>

The design criteria recommended for use in planning of water distribution and storage facilities in Sarasota County are as follows:

Design Criteria

Ultimate Population Density (Average):

5.4 Persons per Acre

Water Demand Factors:

(Including losses and unaccounted for)	<u>Per Capita</u>	Per Acre
Average Day (Gallons)	100	540
Maximum Day (Gallons)	180	972
Peak Hour (Gallons per Minute)	0.25	1.35

Fire Protection Flow, Single Location:

High Value Area	1,500	Gallons	per	Minute
Medium Value Area		Gallons	per	Minute
Single Family Residential Area	500	Gallons	per	Minute

Fire Protection Flow, Total Zone:

P = Population in Thousands

To be computed by the formula	$Q = 1,020 P^{\frac{1}{2}} (1-0.01 P^{\frac{1}{2}})$
Where Q = Required Flow in GPD	

Fire flows are additive to the average demand on the maximum day. Fire hydrant spacing should be such that any part of any structure can be reached with not more than 500 feet of fire hose from the nearest fire hydrant.

I. Existing Distribution and Storage

Only the large municipal systems generally conform to the foregoing criteria.

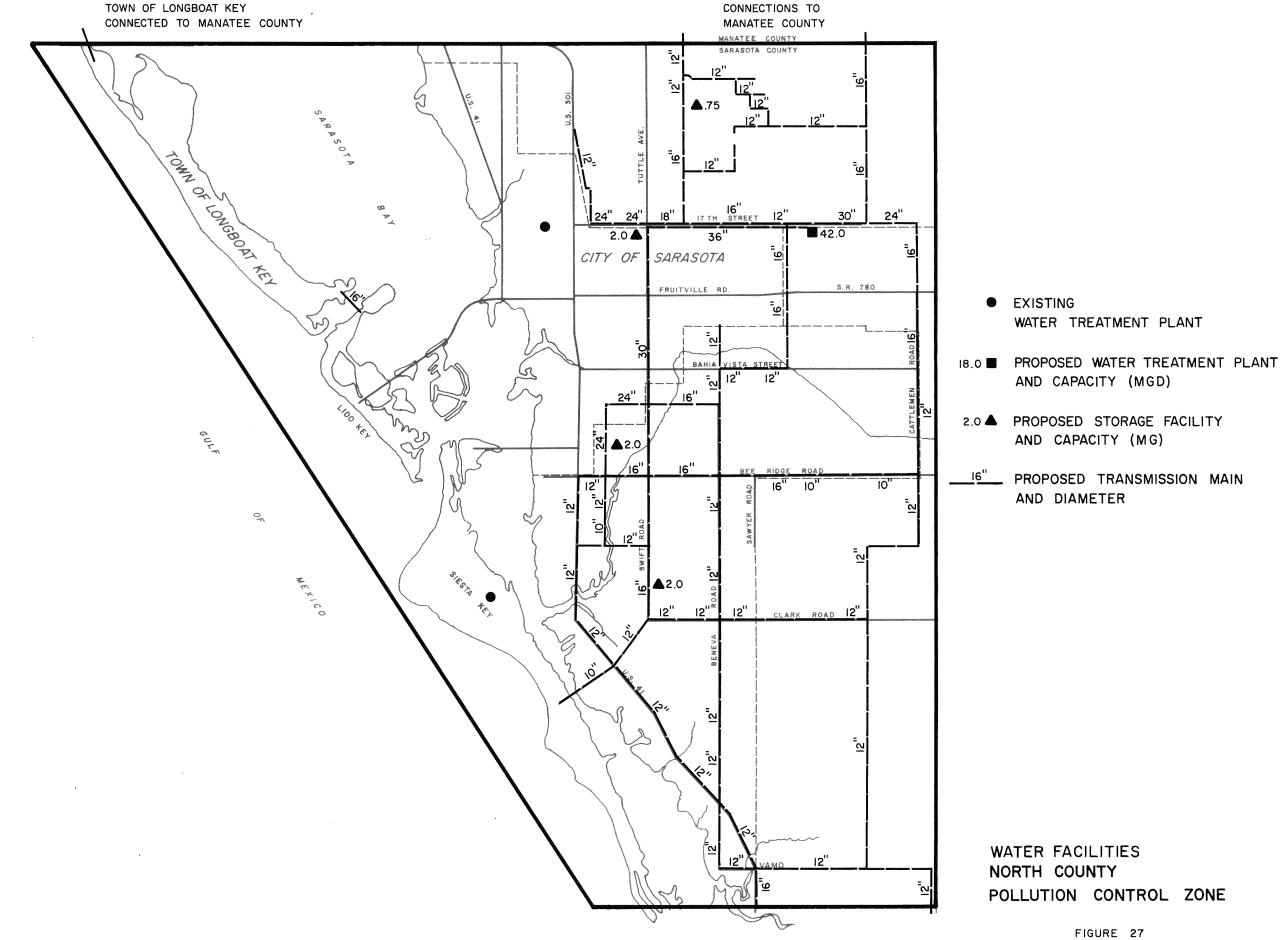
Most of the distribution and storage facilities in the franchised systems are marginal or inadequate when so evaluated. In many cases, fire hydrants are lacking. In others, they are too widely spaced. Capacities are often inadequate to supply the recommended fire flows, and storage facilities are generally too small for this purpose, considering the population to be served.

J. Required Storage and Distribution

The construction of a water system in each pollution control zone will require distribution facilities which may be grouped into two categories: large transmission mains and local distribution facilities. Preliminary layouts of transmission mains and storage facilities are shown in Figures 27 through 30.

Final locations and sizing of transmission mains can only be accomplished after locations are selected for water source and transmission facilities. Therefore, the recommended exploratory well drilling program and discussions with owners of the municipal water systems and political bodies involved should be initiated at an early date.

Interconnections of the transmission mains should be provided for the outlying keys within each zone, and between adjacent zones and adjacent counties, for mutual reliability in emergencies. Lido Key has already been connected to Siesta Key and Siesta Key to Casey Key. All proposed interconnections are illustrated in Figure 27. Such interconnections may also be exploited



to take advantage of surplus surface waters, if any, in the rainy season.

Unincorporated areas to be served by local distribution facilities can be classified in three categories:

- (1) Areas where water mains now exist
- (2) Presently developed areas where no water mains now exist
- (3) Areas which are now undeveloped

The existing franchised systems were designed to serve limited areas, and they contain few mains which can be utilized as parts of the major transmission network needed for the zones. Their water mains are suitable for local distribution only, and are often deficient even for this purpose. When these systems are evaluated for acquisition, the distribution facilities must be analyzed, and funds allocated for needed improvements. In most cases, it appears that the existing facilities can be modified to meet recommended standards by the addition of reinforcing mains and fire hydrants in certain locations.

Where unincorporated areas are presently developed but no water mains exist, local distribution facilities should be provided by the county, under appropriate financing procedures. In this instance, there are no conversion problems because all construction will be new, and the design can readily conform to the established criteria. The relationship between distribution facilities and major transmission mains also can be economically designed for the same reason.

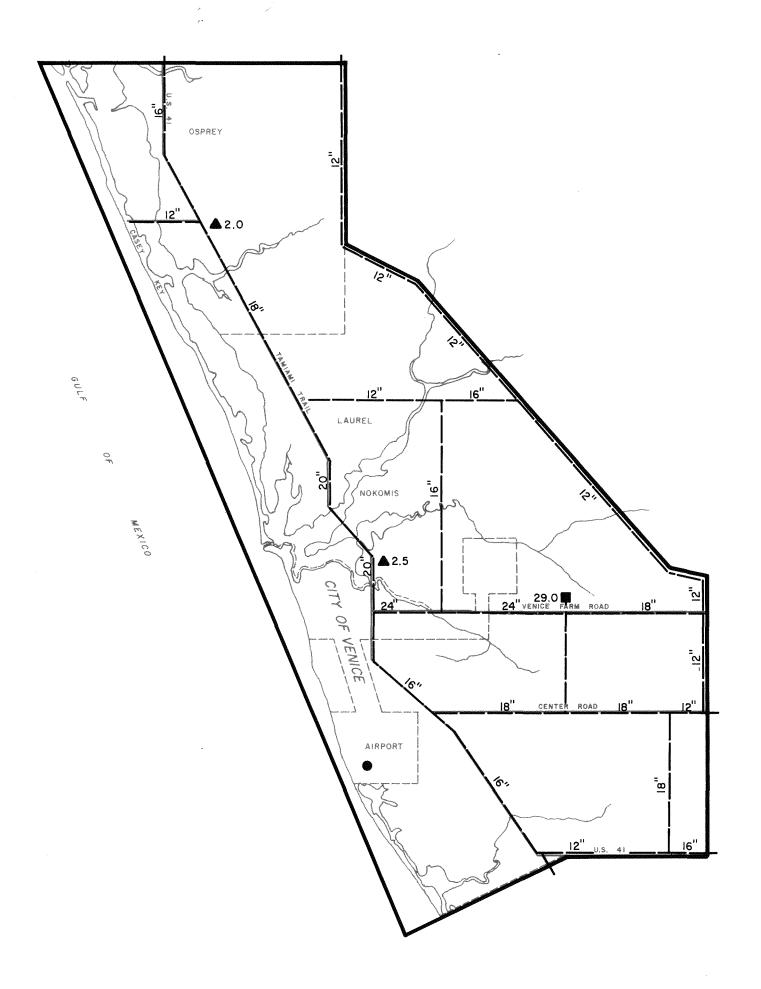
In unincorporated areas presently undeveloped, it is proposed that local

water distribution facilities be installed by the developer, as a component of development cost, as now required by the subdivision regulations. After completion of construction, the system should be deeded to the county for future ownership and operation. Adequate standards for the design and construction of these facilities should be established by the county, to insure conformity to the requirements of the county system and efficient integration into it.

It has been recommended herein that water source and treatment facilities be designed for the maximum day flows. Peak hour flows and fire flows exceed these maximum day flow rates. Therefore, treated water storage facilities must be provided. In systems of the size proposed for the county pollution control zones, it can be shown that the required storage capacity is approximately equal to one-third of the maximum day flow, or whichever is greater. The required storage volume for each zone is given below, based upon this concept.

K. Water Storage

Many of the water systems recommended for acquisition include some kind of treated water storage facilities. However, many of these should be retired from service, because continued use of scattered small storage tanks would not be economical. Exceptions to this general observation are enumerated in the following discussion of storage requirements for each zone.



- EXISTING
 WATER TREATMENT PLANT
- 18.0 PROPOSED WATER TREATMENT PLANT AND CAPACITY (MGD)
- 2.0 PROPOSED STORAGE FACILITY
 AND CAPACITY (MG)
- ______PROPOSED TRANSMISSION MAIN AND DIAMETER

WATER FACILITIES
CENTRAL COUNTY
POLLUTION CONTROL ZONE

1. Storage for North County Pollution Control Zone

It is estimated that treated water storage requirements for the portion of this zone to be served by the county system will be approximately 11,000,000 gallons in the year 2010. In the franchised water systems recommended for acquisition in this zone, there are four treated water storage facilities which can probably be effectively utilized. They are:

	<u>Location</u> <u>Owner</u>		Type	Capacity (Gals)
1.	Gulf Gate	Florida Cities Water Co.	Elevated	250,000
2.	Kensington Park	Kensington Park, Inc.	Ground	300,000
3.	South Gate	South Gate Water & Sewer	Elevated	100,000
4.	South Gate	South Gate Water & Sewer	Ground	500,000
			Total	1,150,000

It is recommended that the remaining 9,850,000 gallons of storage volume be provided in the form of ground storage tanks and booster pumping stations located generally as follows:

Vicinity of Additional Storage	Approximate Capacity <u>(Gals)</u>
Clearwell at Water Treatment Plant	3,100,000
Lockwood Ridge Road and 49th Street	750,000
Tuttle Avenue and 17th Street	2,000,000
Webber Street and Shade Avenue	2,000,000
Swift Road, near Ashton Road	2,000,000

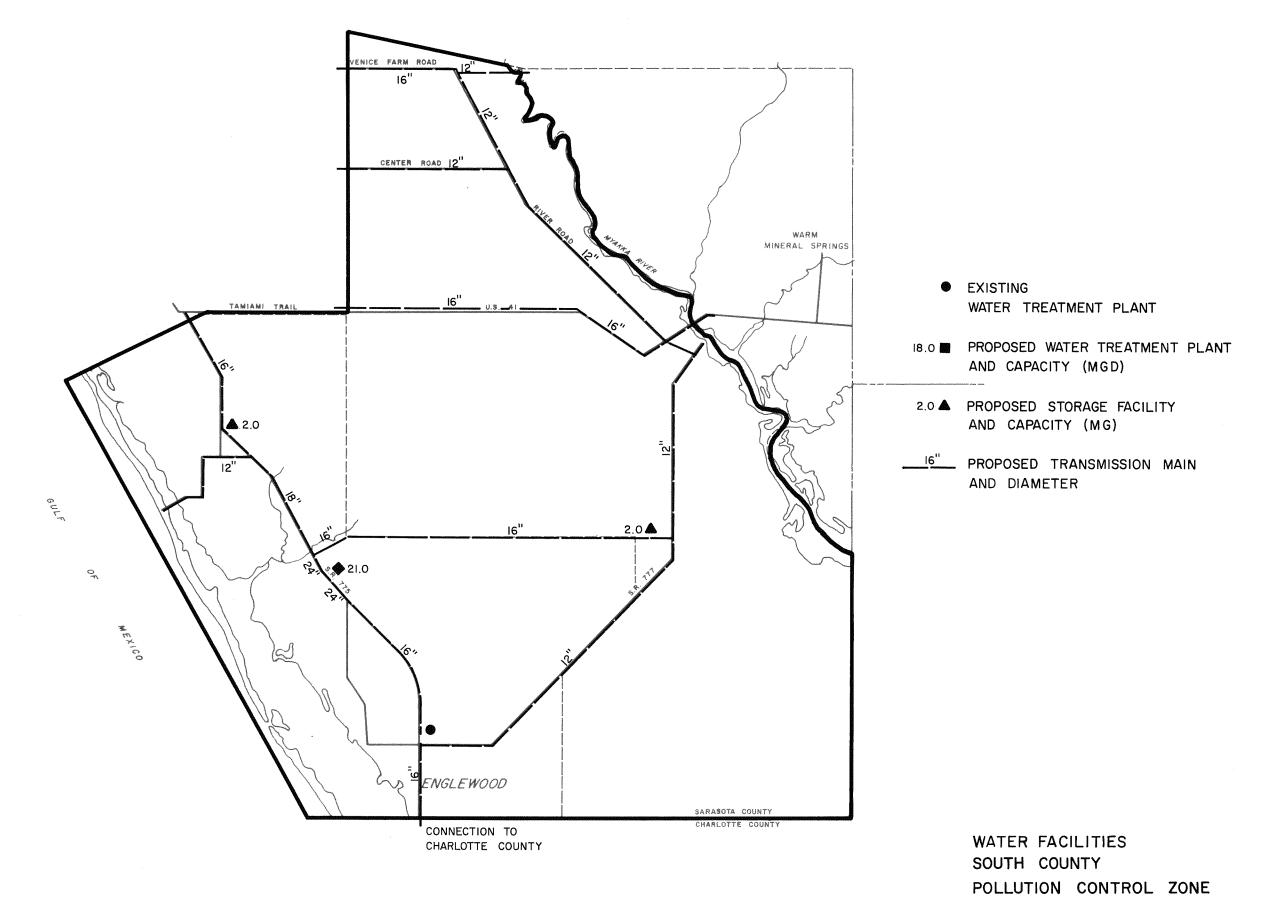
A preliminary estimate of cost of these facilities, based upon present construction costs, is presented in Section X.

2. Storage for Central County Pollution Control Zone

It is estimated that treated water storage requirements for the portion of this zone to be served by the county will be approximately 7,750,000 gallons in the year 2010. In the franchised water systems recommended for acquisition, there is one water sotrage facility which appears to be large enough to be utilized in the county system. This is the 250,000-gallon ground storage tank in the Sorrento Shores utility system. It is recommended that additional storage be provided in the form of ground storage. It is probable that three million gallons of storage can be located at the water treatment plant, with the remaining 4.5 million gallons of storage and appurtenant booster pumping stations in outlying portions of the zone, as shown in Figure 28. A preliminary estimate of cost is presented in Section X, and is based upon this assumption and present construction costs.

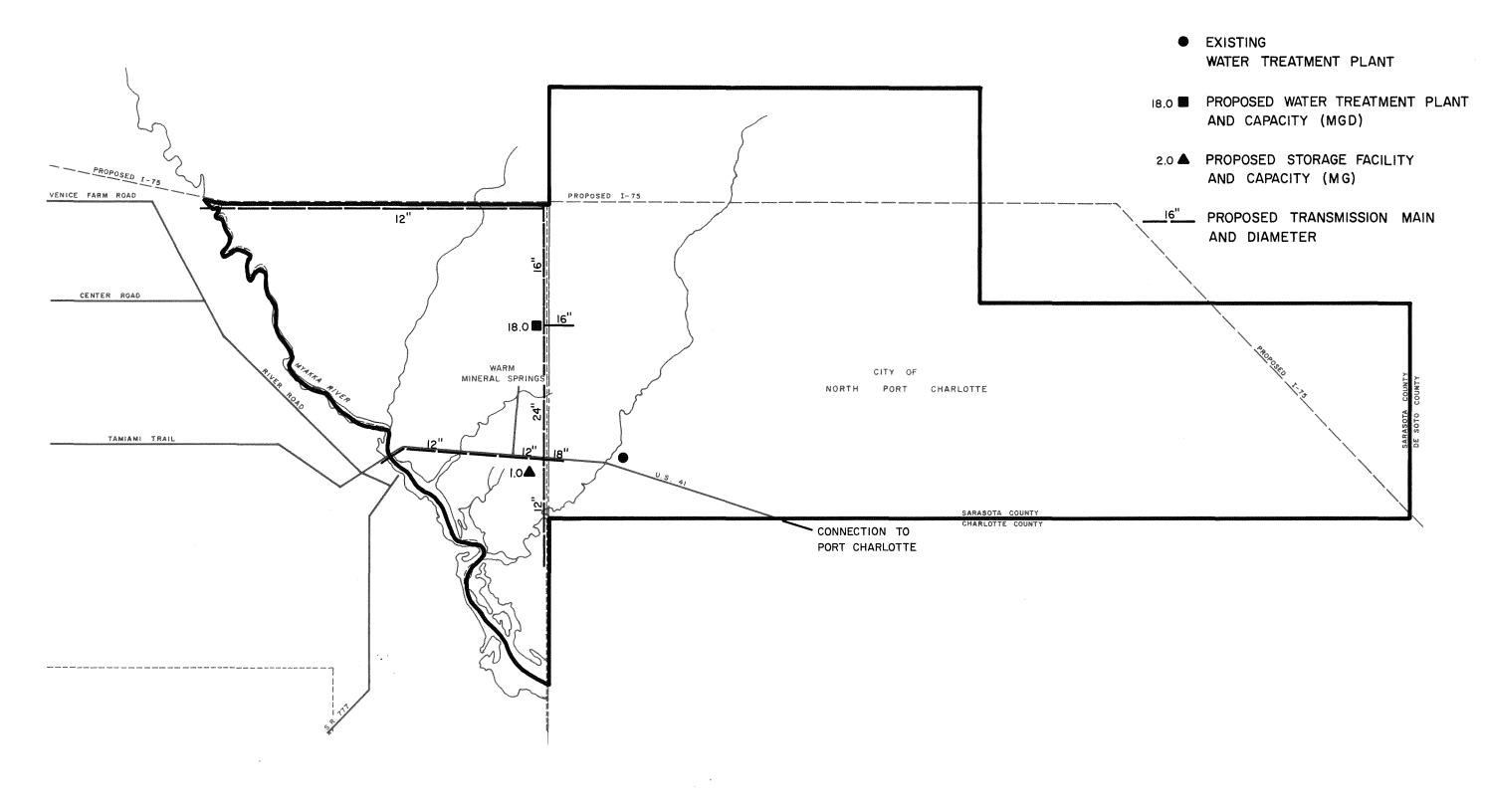
3. Storage for South County Pollution Control Zone

It is estimated that treated water storage requirements for the portion of this zone to be served by the county system will be approximately 7,000,000 gallons in the year 2010. It is recommended that storage be provided in the form of ground storage. It is probable that 3 million gallons of storage can be located at the water treatment plant, with the remaining 4 million gallons of storage and appurtenant booster pumping stations in outlying portions of the zone, as shown in Figure 29. A preliminary estimate of cost is presented in Section X.



4. Storage for Southeast County Pollution Control Zone

It is estimated that treated water storage requirements for the portion of this zone to be served by the county system will be approximately 2,500,000 gallons in the year 2010. In the franchised water system recommended for acquisition, there is no water storage facility which appears to be large enough to be utilized by the county system. It is recommended that storage be provided in the form of ground storage. It is probable that the 1.5 million gallons of storage can be located at the water treatment plant, with the remaining one million gallons of storage located as shown on Figure 30. A preliminary estimate of cost is presented in Section X.



WATER FACILITIES
SOUTHEAST COUNTY
POLLUTION CONTROL ZONE

IX

ORGANIZATION AND POLICIES

ABSTRACT OF SECTION IX

The implementation of water and wastewater systems for a growing population will require expanded responsibilities for their management by the county. The Utility Department can form the nucleus for building an organization with the multifarious skills required.

Regulatory policies for new construction must be established which will be consistent with the demands of a major utility system, together with administrative procedures for control. Future expansions will be provided largely by subdivision developments, which must be coordinated, starting at the planning stage.

SECTION IX
ORGANIZATION AND POLICIES

A. Establishment

The establishment of a county water and wastewater utility will require a corresponding governmental structure for administration and operation. In addition, controls and regulations for collateral functions will have to be realized for effective coordination with the program. The overall lines of authority and policy making must be clearly defined.

B. Organization

The county has established a Utilities Department which already is responsible for a number of regulatory aspects, and represents a means of getting ready for the operation of the county's system. This farsighted approach should make implementation of the master plan a much smoother task than it

would be otherwise. The logical procedure would be to enlarge the scope of the Utilities Department and restructure it into mainly an operating agency, with its present purely regulatory role reverting to collateral functions.

The Utilities Department, or whatever it might be renamed when restructured, must have direction from above. The Board of County Commissioners is now the ultimate policy-making body. Because of the many governmental decisions lying ahead, it would be appropriate for control to remain vested in the Board, with its responsibility to the public, at least until the program is well established.

Alternatively, and perhaps for the final structuring of the program, consideration could be given to creating a separate agency partly or fully independent of the Board of County Commissioners, such as a special district or an authority under a state statute. If desirable, the Board could maintain control even then by being automatically the governing body of the district or authority. At this time, an agency of this kind does not appear to offer special advantages, and therefore might be an unnecessary encumbrance. Under existing legislation, a district can levy or collect taxes for financing of the program, but this type of financing is not proposed.

C. <u>Utilities Department</u>

The direct tasks of the Utilities Department will encompass the following:

1. Administration and Management

- 2. Treatment plant operation and maintenance
- Distribution and collection system operation and maintenance
- 4. Installation of service connections
- 5. Construction of minor extensions
- 6. Meter reading
- 7. Billing and collection

In addition, the department will arrange for major construction by utility contractors, under bids on detailed plans and specifications, and will provide such inspection that may be needed.

The following is a preliminary list of the types of personnel which may be required in the department:

Director
Managers and Supervisors
Chemist
Biologist
Laboratory Technicians
Water Treatment Plant Operators
Wastewater Treatment Plant Operators
Mechanics

Pipe Fitters
Construction Equipment Operators
Laborers
Truck Drivers
Clerks
Bookkeepers
Inspectors
Meter Readers

The regulatory function of the department would be to review and coordinate the plans of developers for effective integration into the county system. In this connection, the county should have the right to require changes and enlargements of construction features for the benefit of the overall county system and beyond those legitimately needed by the development itself, in which event the county would pay only for the incremental cost. The City of Sarasota has employed this concept successfully for some years.

The department would have to collaborate with other county departments having interests or jurisdiction related to aspects of the utility system design, construction and operation. Cooperation with federal and state agencies will be needed in a number of respects, especially as to compliance with grants and other programs. If the county is successful in obtaining federal grants for the pilot programs for effluent management, further responsibilities for coordination would be needed.

The staff personnel needed for the regulation and coordination would depend largely upon how many of the services were performed by consultants, but might include the following:

Engineers Inspectors Research specialists Technical specialists

D. Solid Wastes

Although it is beyond the scope of this master plan, it is observed that the possibility might be considered of assigning to the Utilities Department the functions and responsibilities of the county as to solid waste management and control. This concept is neither proposed nor recommended at this time, beyond the thought that such an arrangement might be a logical supplementary realignment of certain county procedures, and therefore might merit consideration.

In such event, the department might be renamed appropriately. It might be

called something like the "Department of Water and Waste Control".

E. Regulatory Policies

The acquisition of franchises will eliminate the host of regulatory problems which now confront the Utilities Department and other county departments, as well as the Board of County Commissioners. Other current regulatory responsibilities will continue, however. The advent of the county utility system will necessitate new and additional regulatory policies and their implementation. The main categories are outlined below.

1. Mandatory Connections

Mandatory connection to the system is recommended.

How will the public health and the environment be protected, which is the purpose of the system, if large numbers of people in urban concentrations continue to use their septic tanks for wastewater disposal and their individual wells for drinking water?

2. Policies Pertaining to Use of Facilities

Policies must be established for the conditions of service, in order to protect both the user and the system. Rates and charges must be developed with great care, so that sufficient revenues are generated while insuring equitable balance between classes of users.

The regulations should also define the standards to be observed in

connecting the the public systems, ownership of service connection facilities, size of connection, connection charges, access to property for inspection and meter reading, limits of liability of the county utility systems, classes of service, deposits, provisions covering non-payment of charges, requirements for pretreatment of industrial or other non-domestic wastewaters, and other related

3. Subdivision Regulations

The present subdivision regulations, together with their interpretation and enforcement, have led to the installation of water and wastewater mains, together with appurtenances like pumping stations, within new subdivisions of urban lot sizes. However, the requirements are not sufficiently explicit nor are they designed for fitting into the physical and administrative requirements of a county utility system.

The most important principle to be clearly enunciated is that it is the developer's responsibility to provide for the mains and appurtenances within the proposed subdivision, without cost to the county, as a normal cost of development. The system must be designed to comply with the requirements of all public agencies having jurisdiction, most particularly the Florida Division of Health and Rehabilitative Services, the County Health Department, the County Engineering Department, the County Department of Regulatory Services,

and, of course, the County Utilities Department. The Utilities
Department will review the proposed design for comprehensive planning in relation to the overall county system and determine if
any changes are desirable; for those changes of benefit to the
county system rather than the subdivisions, the county would pay
the incremental cost.

The construction of these facilities must be properly inspected to insure compliance and avoid saddling the county system with trouble-some maintenance problems. Finally, the completed facilities must be deeded to the county for permanent incorporation into the utility system.

More particularly, the administrative portion of the regulation should contain a statement as to purpose; definition of procedures; documents to be submitted for approval; procedures for review and approval; permit fees; authority of county officers, reviewing officers and inspectors; requirements for conformance to the county's development plan and design standards; requirements for approval by other agencies; requirements for the facilities to be deeded to the county; provisions for possible payment to the developer for certain portions of the facilities; and enforcement provisions.

The standards portion of the regulations should define acceptable standards and details to be observed in the design and construction of the facilities, and should incorporate, by reference, the standards of all federal, state and local regulatory agencies having

jurisdiction. Included as required, if not adequately incorporated in the foregoing, should be requirements for materials and methods of construction; design flows, peak factors and fire flows; limiting requirements for pipe sizes, slopes, valve spacing, fire hydrant spacing, manhole sizes and manhole spacing; limiting velocities of flow, friction losses and pressures; locations and alignment of pipe lines; special requirements for pumping and treatment facilities; provisions for access for maintenance and repair; provisions for emergency operation; and related matters.

F. <u>Development of Policies and Regulations</u>

The development of the policies and regulations outlined in this section, together with creation of the administrative structure, standards and ordinances to carry them out, will require the intensive joint efforts of many. The Board of County Commissioners will retain the overall responsibility and make the final decisions, assisted by county department heads and other county officials, and by legal, financial and engineering advisors.

X

FINANCING AND COSTS

ABSTRACT OF SECTION X

The costs of utilities systems, which include construction costs as well as the expenses of maintenance and operation, must be borne by the public they serve. An equitable distribution of this burden can be made through various forms of financing, such as assessments, service charges and revenue bonds.

Based upon 1971 prices, the ultimate investment by all sources in water and wastewater systems to the year 2010 will total more than 500 million dollars. None of this amount will be raised by taxes on the general public. Much will be paid for by those who develop the land for its various uses, and substantial contributions are anticipated from federal sources.

SECTION X FINANCING AND COSTS

A. General

The costs of a program to provide water and wastewater services include capital investment in the system, whether by purchase or construction, and the expenses of operating and maintaining it. The method of paying these costs must be equitable.

Increasingly for many years, the principle has gained acceptance that those who benefit should bear the burden. When applied to a system designed to serve unincorporated areas of a large county, this principle cannot be disputed, because the taxpayers living in the extensive, thinly populated regions cannot be expected to subsidize the needs of their fellow citizens who have chosen to settle in areas of urban concentrations.

A major new element of cost has recently entered the picture, in the form

of advanced treatment of wastewater and effluent disposal, which has been found necessary to protect the environment and to conserve water resources for reuse. The appreciable incremental cost is not so much a benefit as the price that must be paid for maintaining the balance of nature. The test of equity in this case is that the need for such measures has been created solely by the same urban concentrations, and those who live in sparsely settled regions should not have to contribute to the payment when they did not contribute to the problem.

On the other side of the situation are the municipalities within the county which have financed their own water and wastewater facilities without any burden upon the county at large. City taxpayers are also county taxpayers, and hardly can be expected to subsidize such utility systems outside of the city limits. They should share equitably in the costs for combined elements of the systems and of ultimate consolidated systems, but not until mergers take place.

B. Benefit to Properties

The value of property is enhanced when water and wastewater mains are laid in the street on which it fronts. Whether there is a dwelling or the land is vacant does not affect this principle. Therefore, it is equitable to assign a corresponding payment obligation to properties that previously lacked these facilities.

On the other hand, in locations where water and wastewater mains exist,

the property owners have already paid for them, even if indirectly, for their value has been inherent in the price they paid to the previous owners or to the developer who installed the facilities. Consequently, this group of owners should not have this cost obligation assigned to their properties.

C. Assessments

The simplest and fairest way to differentiate between the foregoing classes of owners is by means of a special assessment. Only properties benefiting by the installation of mains where there had been none would be assessed. There should be separate assessments for water and wastewater, because some neighborhoods have one kind of service without the other.

Special assessments reach properties that would be exempt from service charges. Such properties otherwise would get a free boost in value at the expense of users paying for service. In addition, special assessments tend to be paid off rapidly, even if paid in installments, and thereby bring in revenue when it is most needed, during the early years of the bond issue required to finance the system.

A fair assessment formula is not computed in terms of the pipe and appurtenances laid in front of a particular property. Variation in pipe sizes, locations of hydrants and the like depend on overall considerations for the area. The formula should divide the total area cost in a simple and equitable manner, applying advice of experienced financial advisors.

D. Capital Costs Not Benefiting Properties

There are capital costs which do not directly add to the value of properties served by the system. The value of a vacant lot, for example, is not enhanced by a treatment plant several miles away. The owner of this vacant lot has not contributed to the need for such a plant, nor to the need for special effluent management facilities. Hence, those who actually make use of the system should pay as part of their service charges for the capital costs of construction or acquisition of such facilities, which include water supply, water treatment, storage and major transmission mains; and major interceptor sewers, pumping stations, wastewater treatment plants and effluent management facilities.

E. Operation and Maintenance Costs

The costs of operating and maintaining the system are obviously related to its use. This principle applies to all elements of the system. The service charges should equitably relate these costs to use.

F. Service Charges

It will be noted from the foregoing analysis that user service charges should be formulated to cover the capital costs not related to benefits, and all of the operation and maintenance costs. The actual rates should be developed with the assistance of financial advisors, and must reflect

a number of practical factors, including the requirements of the bond issue.

G. Future Expansion

If the foregoing principles are applied consistently, future expansions of service will not be a burden either on the system or on the existing users.

- 1. Assessments should continue to be applied as before, when service is extended into previously subdivided areas that do not have water or wastewater mains.
- Developers will be expected to install all necessary facilities within new or enlarged subdivisions, at no charge to the system, as has been outlined earlier in the report.
- 3. Service charges paid by the new users should defray the capital costs of treatment plant expansion and the like, as well as incremental operation and maintenance costs.

H. Bond Financing

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The bond issues proposed by the financial advisors for financing the system are of two kinds, revenue bonds and special assessment bonds. Both are fully chargeable to the users and beneficiaries, and not to the taxpayers

at large. In order to obtain a more attractive interest rate, excise taxes, such as cigarette or utility taxes, are frequently pledged, but the system should not actually have to tap these sources of collateral.

An alternative to the revenue bonds would be general obligation bonds. Their use has declined in the financing of water and wastewater systems, because they must be supported by an ad valorem tax if necessary. Even if the system pays its own way, the legal tax base is generally limited and is usually reserved for other needs which do not produce their own revenues, such as schools, law enforcement and general government purposes.

Revenue bonds are issued to finance a particular revenue-producing project, and both principal and interest are payable exclusively from earnings, which is their outstanding characteristic. They have no claim on the general credit or taxing power of the governmental unit which issues them.

Special assessment bonds would be issued to correspond to the amount of assessment payments deferred by those owners who elect to pay their assessments in installments over a number of years. The principal and interest would be fully covered by the payments and the bonds therefore would be self-liquidating.

I. <u>Capital Costs</u>

The scale of the county's water and wastewater program over the 40-year period of this master plan can be measured by establishing its ultimate value

in terms of capital costs.

The formula for allocation of these costs cannot be derived at this time, because there would be variations among all of the service areas. Federal and state aid and the contribution of developers through construction of facilities within subdivisions represent major capital improvements which would not have to be financed by the system. Their values nonetheless are part of the measure of the county system.

Accordingly, a cost estimate has been prepared which summarizes all of the capital investments that will be included in the county system by the year 2010. Elements of these costs have been identified throughout the text of the report. Figures in the report show the features and locations of major components, such as treatment plants, transmission mains and interceptors. Allowance has been made for existing facilities that are suitable for continued service and for the development of water sources.

The water distribution and wastewater collection facilities to serve developed neighborhoods have had to be approximated, because their development and growth patterns will be random to a degree. Their total effects correspond to the population estimates and applicable criteria in the report.

The costs are all based on 1971 dollars, since these figures are not for specific application but for the purpose of grasping the scale of what the future portends. It would be impossible to predict what the dollar will be worth in the year 2010, and revenue dollars will be influenced by the same inflation as cost dollars, as an offsetting effect.

Cost estimates have been assembled separately for each of the pollution control zones, and are presented in summary form in the tabulation that follows. It will be noted that the cumulative capital cost is estimated to reach \$518 million in the year 2010. The majority of the investment will not have to be financed by the system, being contributed by developers and others. That portion that is financed by the system will be self-liquidated out of system revenues.

For implementation of the program, detailed cost estimates will be made for the initial requirements in each service area. Subsequent estimates of the same kind would correspond to actual design development, by stages.

(In Millions of Dollars)

		WATER		WAS	STEWATER		
Pollu. Control Zone	Constr.	<u>Land</u>	Sub- Total	Constr.	Land	Sub- Total	<u>Tota</u> l
North	72	2	74	108	1	109	183
Central	54	1	55	76	1	77	132
South	46	1	47	70	1	71	118
Southeast	_36	1	<u>37</u>	47	1	48	_85
Totals	208	5	213	301	4	305	518

FEDERAL AND STATE PARTICIPATION

XI

ABSTRACT OF SECTION XI

Since environmental protection is more than a local responsibility, several programs of federal and state participation are available to share the costs. The master plan itself increases the amount of available grants and is a factor in the acceptance of all agencies.

Several grant sources are listed herein, and application has already been made for grants to implement plans for the North County Pollution Control Zone.

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SECTION XI FEDERAL AND STATE PARTICIPATION

A. General

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Federal and state governments have long been committed to helping communities solve water supply and wastewater disposal problems, and the scale of this commitment is accelerating. It is recognized that protection of the environment is more than a local responsibility.

There are a number of programs that may be available to Sarasota County for assistance in constructing water and wastewater systems. State programs are designed to complement federal programs and in some cases state support is a prerequisite to obtaining federal aid. Both grant and loan assistance is available. A summary of the presently active programs follows:

1. <u>Federal Public Law 84-660 Wastewater Construction Grants</u>
Under this law, grants are available for the construction of pollution

control facilities, certain pumping stations, force mains and interceptor sewers. Project eligibility is based upon specific guidelines. The program is administered by the Environmental Protection Agency of the Federal Water Quality Administration, and on the state level by the Florida Department of Air and Water Pollution Ccontrol.

Under a new ruling, a grant in the proportion of 50 percent of all grant-eligible facilities may be obtained. An additional 5 percent bonus grant may be obtained on projects conforming to regional or area-wide programs. Sarasota County appears to have a good opportunity to be classified as eligible for a total of 55 percent federal grant participation on eligible portions.

2. State Supplemental Assistance - Pollution Control Projects

The new Florida constitutional pollution control bond program, implemented under Florida Statute 70-270, applies to federal PL 660 granteligible projects.

New guidelines set forth on April 1, 1971 by the Florida Department of Air and Water Pollution Control stipulate that an applicant requesting PL 660 grant participation must also apply and qualify for Florida Supplemental Assistance.

The applicant must apply for at least 25 percent financial participation by the state on federal PL 660 grant-eligible portions of a project, through either loan or lease-purchase provisions of the

state pollution control bond program, in accordance with the provisions of Florida Statute 70-270.

- 3. Federal Public Law 89-117 Grants for Water and Wastewater Systems
 This is a federal grant program administered by the Metropolitan Development Office of the Department of Housing and Urban Development.

 Outright construction grants are available for the construction of water supply, treatment and distribution facilities, and certain portions of sewer facilities not funded through the PL-660 construction grant program outlined above. To be eligible, projects must conform to regional and area-wide programs on the state and local level.
- 4. Federal Public Law 560 Advances for Public Works Planning
 Under this law federal funds are loaned to communities for the preparation of plans. Loans must be repaid as soon as the project, or any portion of it, gets underway. A loan under this program was received by Sarasota County for the preparation of the engineering feasibility study for Service Area B of the North County Pollution Control Zone.

Steps have been initiated by the county to secure grants and loans under all of the above plans for the North County Pollution Control Zone. Applications are currently being processed and all guidelines set forth by the agencies are being followed. Subsequent applications for grants and loans for other

pollution control zones also will require that these guidelines, as well as any future directives, be adhered to.

It is likely that opportunities for both federal and state aid will continue for many years, in parallel with the expansion by stages of the county system. During this period, the scope of the programs and the requirements will probably be modified from time to time.

XII

GUIDELINES FOR ACTION

ABSTRACT OF SECTION XI

Because of the recognized impact of water and wastewater problems on the public health and the environment, federal and state aid has become available in increasing amounts. Prior programs have been expanded and new programs have been added. In order to encourage regional solutions for regional problems, a master plan like this increases the eligibility both in participation and in the amount of funds that may be granted.

Applications have been made for grants to implement the plans in the North County Pollution Control Zone. A planning loan has already been received for an area of the zone.

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GUIDELINES FOR ACTION

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The qualities of Sarasota County have attracted an influx of people with an unusual degree of community awareness and concern about its future. Although not a metropolis nor seeking to become one, population patterns have reached urban concentrations in many areas outside of the municipalities. Civilization brings problems as well as benefits, and no problems are more basic than water supply and wastewater disposal.

Ironically, the solutions have themselves become problems. An individual well and septic tank are valid for a rural homestead, but thousands upon thousands of such wells mated to equal numbers of septic tanks convert a solution into a menace to health and welfare.

In turn, the franchised water and wastewater systems that came into being little more than a decade ago have compounded the problem. They have failed to serve all urban residents and most of them are inadequate in the services that they do provide. The practices of the majority have not protected our resources and have contributed to the deterioration of the environment.

The problems are inherent in the nature of the franchised systems and their fragmentation. Any alleviation that may be forced upon them would be another piecemeal attack that would only postpone the day of reckoning with problems that may have grown by then into monumental proportions. There will never be an easier or less costly time for a permanent solution than now.

A regional water and wastewater system will for the first time serve all, not merely a portion, of the people in urban areas, and at a superior level of reliability and quality. Such a system can restore the environment, while conserving our resources.

The hallmark of the regional approach, and its greatest reward, is that today's

kinds of problems need never recur. The needs of the future will be planned for in advance, and can be met by straightforward routines under the control of an agency directly responsible to the public. Once the system comes into being, no additions will be built and no funds will be spent until justified by need and by the people who will pay for the investment.

The regional principle undergirds the entire structure advanced by this master plan. The proposed pollution control zones are designed to function effectively not only now but 40 years and more from now, no matter how slowly or rapidly the zones achieve maturity.

For practical considerations, this system would be created as a county operation, but it should be recognized from the start as a true regional system. The important roles of the existing municipal systems need to be meshed into the regional plan for the ultimate benefit of all. Initially there should be mutual planning, which would lead to sharing of facilities and eventually to complete consolidation. All planning, engineering and financing, even while independent, should be geared toward keeping the future's options open, and toward this end advance information should be exchanged and suggestions welcomed.

There is a unifying picture that emerges from all of the diverse observations and findings collated and analyzed herein. It is that the regional plan essential for a permanent solution must be advanced simultaneously on all fronts, starting with the acquisition of all franchised systems outside of the municipalities. If ever an approach deserves the name of "master plan", this is it.

A series of guidelines for action have been prepared toward putting this fundamental recommendation into effect.

regional

OBJECTIVE

I. WATER RESOURCE CONSERVATION AND MANAGEMENT

II. WASTEWATER EFFLUENT MANAGEMENT

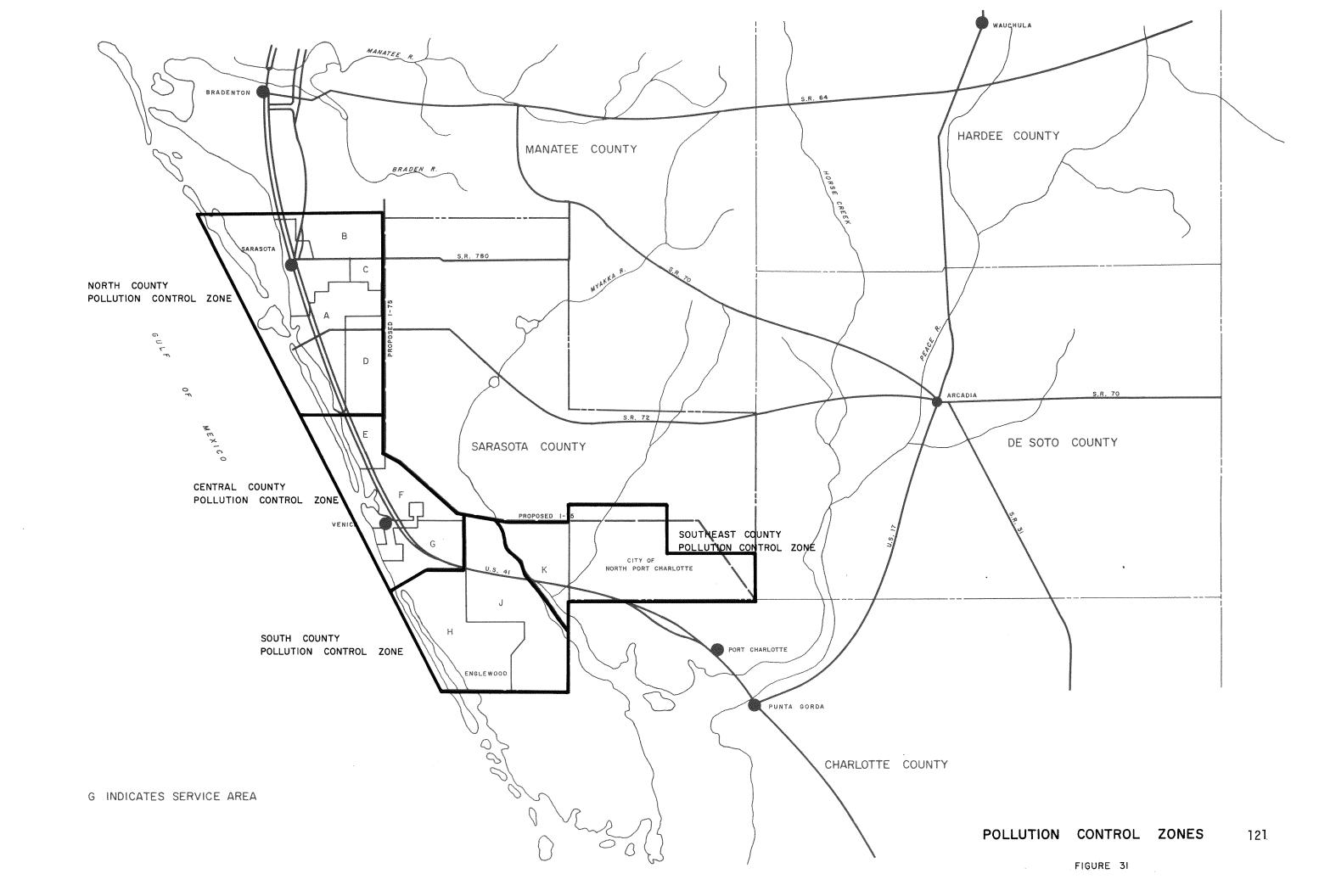
III. ORGANIZATIONAL STRUCTURE

- IV. DESIGN AND CONSTRUCTION POLICIES
- V. INTERCONNECTIONS WITH ADJACENT COUNTIES

VI. LIAISON WITH PUBLIC AGENCIES

ACTION TO BE TAKEN

- A. Instruct the Engineers, with the advice of the Florida Division of Geology and the U.S. Geological Survey, to outline a program of water resource exploration on a comprehensive scale.
- B. Investigate the availability of federal and state assistance for this program.
- C. Instruct the Engineers to relate current and future water demands to the available water resources, as determined by the foregoing investigation, and to present a program for water conservation and management that would control usage and priorities in the public interest.
- D. Sustain the program into the long-range future by adjustments that may be found appropriate by actual experience.
- A. Instruct the Engineers to prepare specific proposals to implement a program of research and development for the management and possible reuse of wastewater that might be suitable for Sarasota County.
- B. Investigate the availability of federal and state assistance to fund and support this program.
- C. Utilizing the results of the research and development programs, instruct the Engineers to prepare an analysis of the technical, ecological and financial alternatives, making use of the services of experts in the latter specialties.
- D. After instituting an effluent management program in each of the pollution control zones, as outlined hereinafter, monitor the results over the years, toward future improvements in keeping with advances in this field.
- A. Instruct the Engineers, with the advice of the Utilities Department and legal counsel, to prepare a table of organization suitable for all aspects of system management.
- B. Instruct the Engineers to prepare an outline of regulatory policies to be carried out by the Utilities Department.
- A. Instruct the Engineers to define the design policies for new construction, whether implemented by the system or by subdivision developers.or by others.
- A. Explore with Charlotte County and other officials the future water requirements for the peninular portion south of Englewood and other adjacent areas of Charlotte County; and the potential for interconnections of water systems for the common benefit.
- B. Explore with Manatee County officials the potential for interconnection of water systems that can maximize the use of surface water resources in Manatee County for the common benefit.
- A. Maintain continuing liaison with public agencies at all levels, local, regional, state and federal, which may be involved with aspects of water and wastewater management.



north county pollution control zone

OBJECTIVE

- I. FRANCHISE ACQUISITION
- II. CONSTRUCTION OF WATER AND WASTEWATER SYSTEM IN SERVICE AREAS

- III. LAND ACQUISITION
- IV. WATER SUPPLY
- V. WASTEWATER AND EFFLUENT MANAGEMENT

VI. SIESTA KEY UTILITY AUTHORITY

ACTION TO BE TAKEN

- A. Pursue to completion the franchise acquisition program already authorized, applying the approach recommended by the county's Financial Advisors.
- A. Authorize the Engineers to proceed with the design for Phase I construction.
- B. Authorize subsequent phases, as required.
- C. Proceed with financing to correspond with the construction phases as authorized, in accordance with the recommendations of the Financial Advisors.
- A. Instruct the Engineers to define explicitly the lands needed for water supply and treatment, and for wastewater management; and purchase these lands.
- A. Proceed with arrangements to obtain treated water from the City of Sarasota, or alternatively from Manatee County.
- B. Institute mutual planning with the City of Sarasota toward sharing of water facilities and ultimate system consolidation.
- A. Proceed with arrangements to discharge wastewater into the City of Sarasota's wastewater system.
- B. Institute mutual planning with the City of Sarasota toward sharing and ultimate consolidation of treatment and effluent management facilities.
- C. Apply the method of effluent management and reuse determined to be the best for this zone, as a result of the research and development program.
- A. At an appropriate time, explore the means of absorbing the Siesta Key Utility System into the county system.



NORTH COUNTY
POLLUTION CONTROL ZONE

central county pollution control zone

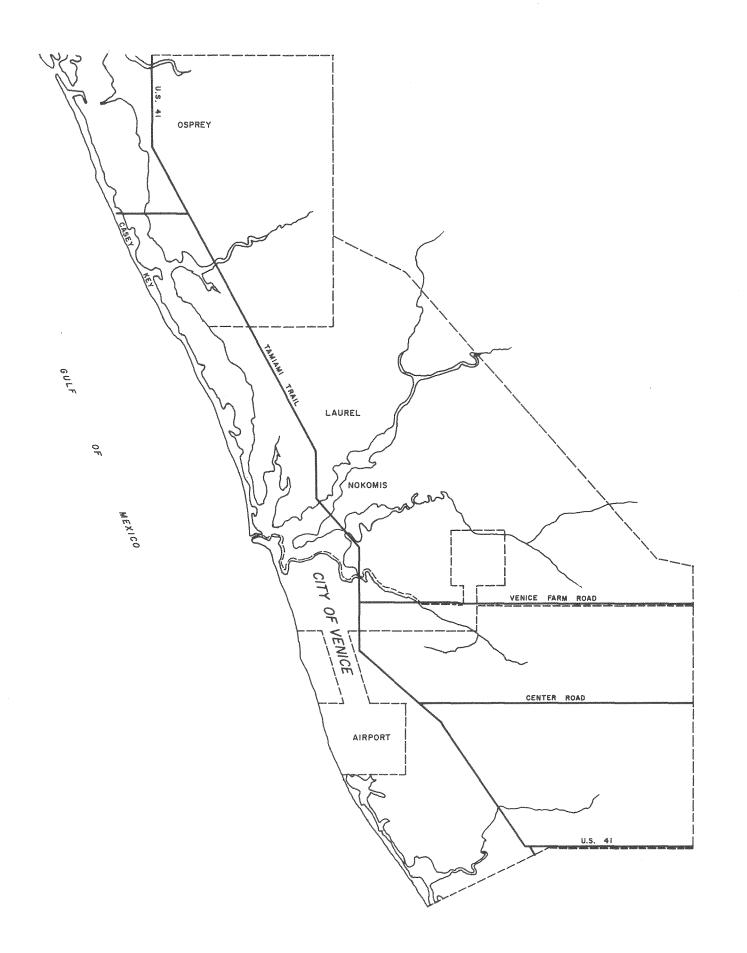
OBJECTIVE

- I. FRANCHISE ACQUISITION
- II. SERVICE AREAS

- III. LAND ACQUISITION
- IV. WATER SUPPLY
- V. WASTEWATER AND EFFLUENT MANAGEMENT

ACTION TO BE TAKEN

- A. Instruct the Engineers to make fiscal and physical appraisals of the existing franchises.
- B. Instruct the Financial and Legal Advisors to develop programs for acquisition.
- C. Authorize acquisition of the franchises.
- A. Instruct the Engineers to define the service areas of Phase I for implementation of the master plan.
- B. Make application for federal planning grants.
- C. Instruct the Engineers to prepare reports for service areas.
- D. Instruct the Financial Advisors to develop a financing program.
- E. Instruct the Engineers to proceed with the design of Phase I construction.
- F. Authorize the foregoing procedures for subsequent phases, as required.
- A. Instruct the Engineers to define explicitly the lands needed for water supply and treatment, and for wastewater management; and purchase these lands.
- A. Instruct the Engineers to establish the best means of providing a water supply in this zone.
- B. Institute mutual planning with the City of Venice toward sharing of water facilities and ultimate system consolidation.
- A. Instruct the Engineers to establish the best interim means of wastewater and effluent management.
- B. Institute mutual planning with the City of Venice toward sharing of facilities and ultimate system consolidation.
- C. Apply the method of effluent management and reuse determined to be the best for this zone, as a result of the research and development program.



CENTRAL COUNTY
POLLUTION CONTROL ZONE

south county pollution control zone

OBJECTIVE

I. SERVICE AREAS

II. LAND ACQUISITION

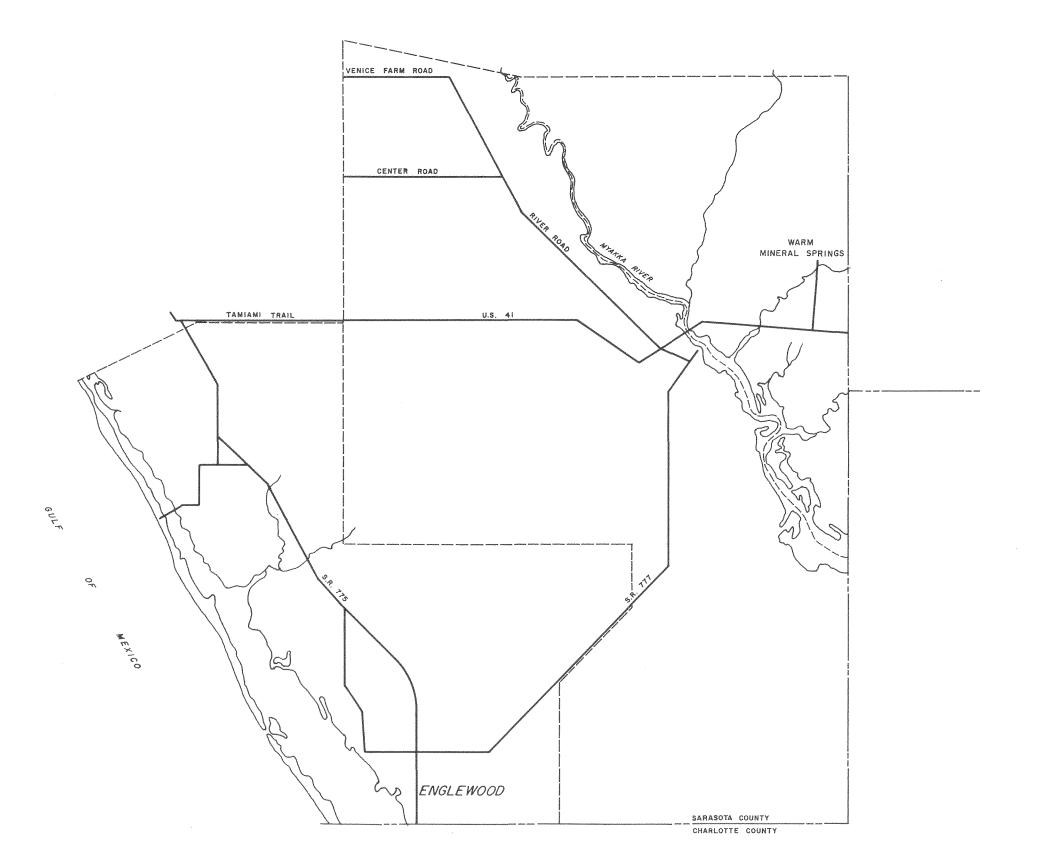
III. WATER SUPPLY

IV. WASTEWATER AND EFFLUENT MANAGEMENT

V. CHARLOTTE COUNTY SERVICE

ACTION TO BE TAKEN

- A. Instruct the Engineers to define the limits of Service Area "H" of Phase I, for implementation of the master plan.
- B. Make application for a federal planning grant.
- C. Instruct the Engineers to prepare a report for Service Area "H".
- D. Instruct the Financial Advisors to develop a financing program.
- E. Instruct the Engineers to proceed with design of Phase I construction.
- F. Authorize the foregoing procedures for subsequent phases, as required.
- A. Instruct the Engineers to define explicitly the land needed for water supply and treatment, and wastewater management; and purchase the lands.
- A. Instruct the Engineers to establish the best means of providing a water supply in this zone.
- B. Institute mutual planning with the Englewood Water District toward sharing of facilities and ultimate system consolidation.
- A. Instruct the Engineers to establish the best interim means of wastewater and effluent management.
- B. Apply the method of effluent management and reuse determined to be best for this zone, as a result of the research and development program.
- A. For the peninsular area of Charlotte County lying south of Englewood, explore with Charlotte County officials cooperative means of providing water and wastewater services.



SOUTH COUNTY
POLLUTION CONTROL ZONE

southeast county pollution control zone

OBJECTIVE

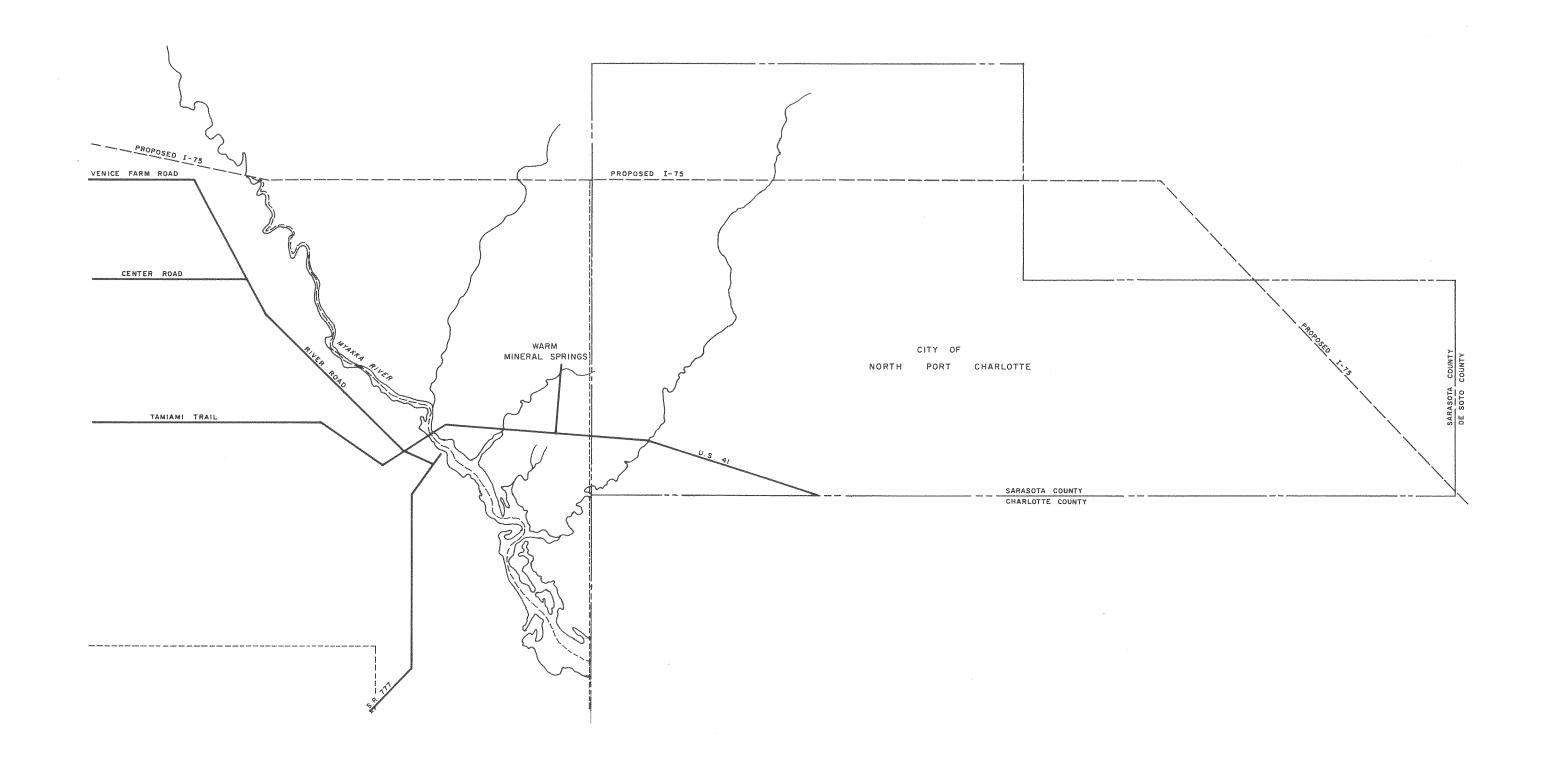
I. FRANCHISE ACQUISITION

II. SERVICE AREAS

- III. ESTABLISH SERVICE AREA "K", NORTH PORT CHARLOTTE AND PORT CHARLOTTE AS A UNIFIED POLLUTION CONTROL ZONE
- IV. FUTURE IMPLEMENTATION

ACTION TO BE TAKEN

- A. Instruct the Engineers to make a fiscal and physical appraisal of the B & B Utilities franchise.
- B. Instruct the Financial and Legal Advisors to develop a program for acquisition.
- C. Authorize acquisition of the franchise.
- A. Instruct the Engineers to define the limits of Service Area "K" of Phase I.
- B. Make application for a federal planning grant.
- C. Instruct the Engineers to prepare a report for Service Area "K".
- D. Instruct the Financial Advisors to develop a financing program.
- E. Instruct the Engineers to proceed with design of Phase I construction.
- F. Authorize the foregoing procedures for subsequent phases, as required.
- A. Explore with Charlotte County, City of North Port Charlotte and Port Charlotte development officials the potential of providing water and wastewater systems on an area-wide basis.
- A. As growth continues, provide cooperation and take other steps necessary to protect the public health and environment in this zone, in keeping with the criteria and procedures applied in the other zones.

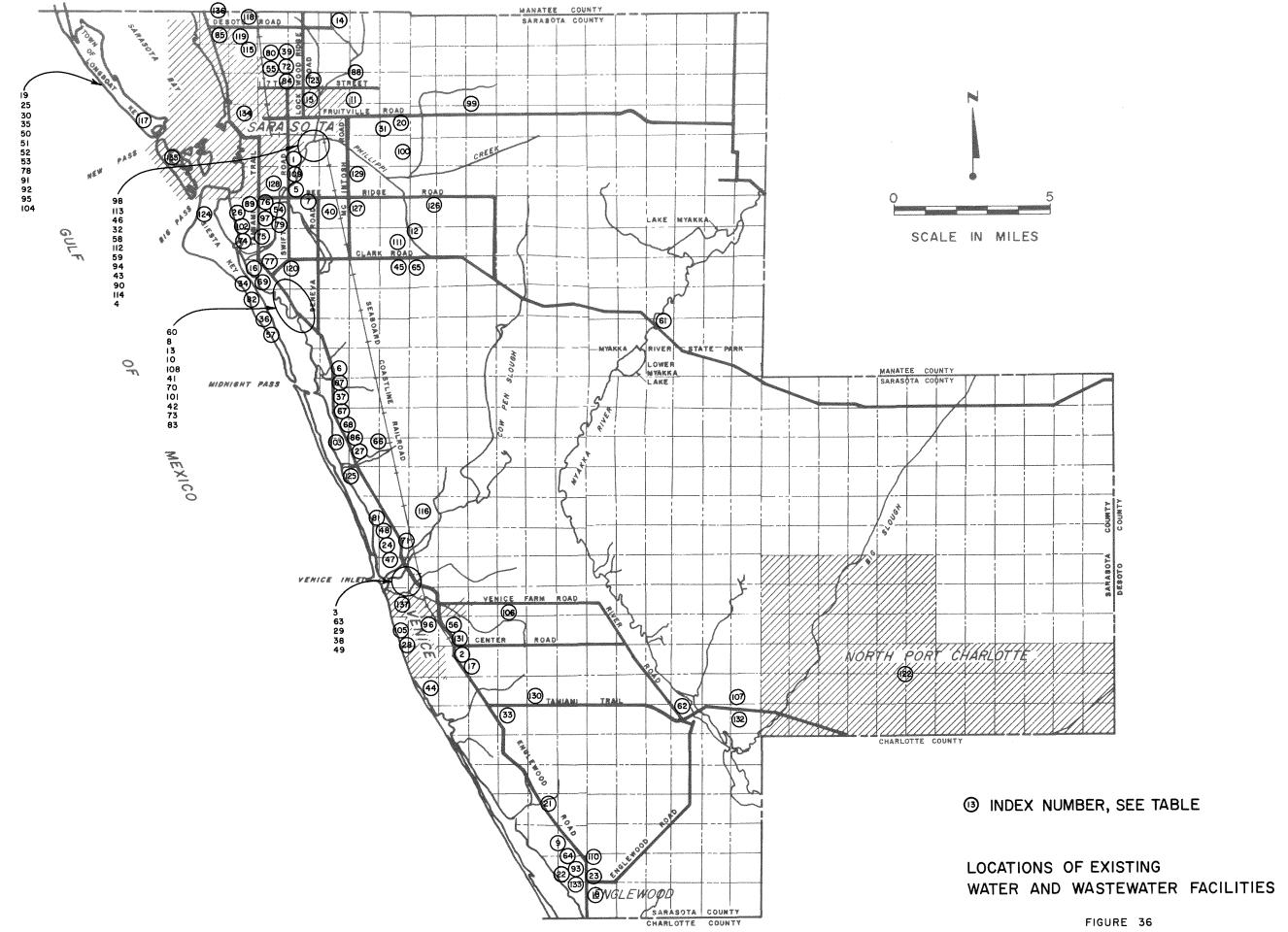


SOUTHEAST COUNTY
POLLUTION CONTROL ZONE

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APPENDIX XIII

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EXISTING WATER & WASTEWATER SYSTEMS

WATER SYSTEMS

	FACILITY	ADDRESS	OWNER	NO. OF EXIST. BLDGS.	PRESENT POPULA.	EST. ULT. POPULA.	WELLS: NO., SIZE AND DEPTH	TDS	HARD- NESS	CHLOR- I DE	SUL- FATE	FLUOR- IDE	IRON	COLOR
1.	Aloha Trailer City	3100 Hawthorne St., Sar.	Margola, Incorporated	285	360	450	1-8"x800'						****	
2.	Alston's Cottages	2183 S. Tamiami Tr., Ven.	L. Earl Alston	21	40	50	2-3"							
3.	Aristocrat Trailer Ct.	P.O. Box 1420, Nokomis	Frank A. Tessmer	29	55	65								
4.	Bahia Vista Estates MHP	3901 Bahia Vista, Sar.	Broadacre Trailer Lodges	248	500	960	7-1½"x22' 1-4"x150'	979	406	295	107	4.0	12.0	5
5.	Barclay House	3900 S. Lock.Rdg.Rd., Sar.	Wohl Industries	48 Ap	pts 80	80	All apartment	s conne	cted to	South Ga	ate Wat	er Compa	any	
6.	Bay Front Trailer Park	P.O. Box 187, Osprey	A. L. Pugh	34	48	70	OPEN AND AND THE							
7.	Bee Ridge Drive-In	3900 Bee Ridge Rd., Sar.	Bee Ridge Drive-In	1	600 Car	'S ====	Connected to	South G	ate Wate	er Compar	ıy			
8.	Blue Skies Trailer Pk.	6914 Tamiami Tr., Sar.	A & O Schwertfeger	8	16	20	1-3"	2000 2000 2000		and the main				West Mary that
9.	Brook to Bay Tr. Pk.	1891 Englewood Rd., Engl.	Abe Namey	174	300	350	1-3"x120' 1-4"x120'	542	344	195	5	1.0	.05	10
10.	Buckingham Club Tr.Pk.	1919 Buccaneer Dr., Sar.	L.N. Duncan & Assoc.	108	200	200	2-4"x114'	945	632	123	230	1.22	.09	20
11.	Burzenski Nursing Home	4450-8th St., Sar.	Winona Burzenski	1	50	80				404 abs min				400 Min 140
12.	Camp Hamilton - YMCA	Proctor Rd., Sarasota	YMCA	5	125	200	1-3"					1010 AND 1010	T-100 2000	day and allo
13.	Cedar Cove Trailer Ct.	7020 Capt. Kidd, Sar.	Cedar Cove Corporation	76	50	100	Laundry Only	989	788	84	432	2.7	.01	5
14.	Childrens' Haven	4405 DeSoto Rd., Sar.	S-M ARC	24	50	110	1-4"x153'	400	154	35	6	1.1	0	5
15.	Circus City Tr. Pk.	930 Oriente Ave., Sar.	Jose Palacious	33	60	60					404 MM 444	226 MP 0160		
16.	Crescent Beach Cottages	1306 Stickney Pt., Sar.	W. L. Crall	8	30	30	2-4"				time and one	·		
17.	Cyro's Venetian Moon	2224 S. Trail, Venice	Cyril Stone	1		\$40 MM EM	1- "x77'	532	367	87	25	. 32	.11	20
18.	Deer Creek Tr. Pk.	Horton & Mich., Engl.	J & H Holding, Inc.	99	235	235	3-Irrig.	6467	1664	1875	424	. 35	.06	5
19.	Diplomat Apartments	3155 Gulf Mex. Dr., LBK	Anaconda Trust	54	110	110	5-2"x12' 1-6"x294'	1122	570	405	144	4.4	.09	8
20.	Electro-Mech. Research	Packinghouse Rd., Sar.	Electro-Mech. Research	1	600	1000	4-4"x200' 1-16"x800'	525	380	45	220	1.08	1.44	10

WASTEWATER SYSTEMS

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	NUMBER OF CONNECTIONS	POPULATION SERVED	PLANT CAPACITY (MGD)	AVERAGE CONSUMPTION (MGD)	STORAGE (GALLONS)	FIRE HYDRANTS	TYPE OF TREATMENT	NUMBER O CONNECTIO		PRESENT VOLUME (MGD)	PLANT CAPACITY (MGD)	TYPE OF TREATMENT	PERCENT BOD REMOVAL	EFFLUENT DISPOSAL
	285	360		.030	30,900	None	Aer-Chlor	All un	its are on sep	tic tanks	es en us en			
	21	065. STO 265		and the same same	240	None	Softening	All un	its are on sep	tic tanks	en as mt m.	,	nome with	1 or 2 Trlers/Tank
	29		man data asse		ette ann ess	man white does which	404 4m pas	All un	its are on sep	tic tanks	v		N/A 400	
	248	500	WW NAP	.031	13,000	None	Soft.,Aer, Chlor.,Color	248	500	.282	.50	Imhoff T.F.	96	Phil.Crk. to Lit.Sar.Bay
	All apar	tments connec	ted to South	n Gate Water Co	ompany			48	80	.0145		Seco Ext.Aer. Polish.Pond	97	Polish.Pond Total Reten.
Providence of the Control of the Con	34	48	arro tink qua.	.008	80 PS. 66	QUA 850 QUE. 650	Chlor.	All un	its are on sep	tic tanks	440 Mar 200 Mar		-	
	Connected	d to South Ga	te Water Cor	mpany		AND LABOUR DOCUMENTS OF THE STATE OF THE STA		7	1200- 1800	.0048	.004	Defiance Ext. Aer., Pol.Pond	98	Cnty.Rd.Ditch to Phil.Crk.
	*** ***	NOT SEED SEED	NING 5005		COL COM CANA	None	None	All un	its are on sep	tic tanks			2002 5000	2 Trailers/Tank
1	174	300		and the sale	2,700	None	Aer-Chlor	174	300	used trees plays films	.02	Ext.Aer. Sand Filter	86	Stream to Forked Creek to Lemon Bay
hymnum	108	200	100 505 aug	.014	11,000	None	Aer-Chlor	108	200	.014	.0162	Yeomans Ext.Aer	. 92	Math.Crk. to Lit.Sar.Bay
<u> </u>	1	50	.008	.001		None	Chlor.	1	50	.0045	.008	Marolf Ext.Aer.	93	Polish.Pond Total Reten.
<u>p-total-constitution</u>	5	125		wit wit sin	1,100	None	Soft-Chlor	All un	its are on sep	tic tanks	and the same same		April 400A	Sand Filters
	76	50	Florida	Cities Water	Company	7		All un	its are on sep	tic tanks		THE SHE SHE SHE SHE SHE SHE SHE SHE SHE S		2 Trailers/Tank
***************************************	24	50	500 CM CM	.002	5,000	None	Chlor.	24	50	Night State object cache	.0033	Defiance Ext.Ae	r	Absorption Pond
*	33	60	City of	Sarasota Wate	r	1		All un	its are on sep	tic tanks			- com sego	1 or 2 Trlrs/Tank
<u> </u>	8	30	NAME AND ASSESS.	State April, Grain, Galai	1,100	None	Aer-Chlor	All un	its are on sep	tic tanks			spinis 440%	2 Trailers/Tank
(d 1888)	1	400, 600 Min.		.006		200 MA 405 MA	Aer-Chlor		****	400 Nor 400 1805	.006	Marolf Ext.Aer.	96	Drainfield
	99	235	Englewoo	od Water Distr	ict	7		99	235	.004	.018	Defiance Ext.Ae	r. 83	Drainfield
*	54	110	.117	.003	500	None	Aer-Chlor	All Un	its are on sep	tic tanks	DOS 1000 MOS 0000			<
	1	600	.043	.024	17,000	Sprinklers	Aer-Chlor	1	600	.009	.020	Imhoff T.F., Pol.Pond,Clar.	98	Sprayed on Pine Grove
-							ALL THE RESIDENCE OF THE PROPERTY OF THE PROPE	· · · · · · · · · · · · · · · · · · ·			***************************************			

WATER SYSTEMS

	FACILITY	ADDRESS	OWNER		PRESENT POPULA.	EST. ULT. POPULA.	WELLS: NO., SIZE AND DEPTH	TDS	HARD- NESS	CHLOR- I DE	SUL- FATE	FLUOR- IDE	I RON	COLOR
21.	Englewood Isles	Forked Cr. at 775, Engl.	Interstate Development	150 (Un	der Constr	ruction)	No. 200 MAR AND ESS SUP SEED STOP	****					AND MICH WHO.	COS SAN. COS.
22.	Englewood School	250 W. Perry St., Engl.	Bd. Public Instruction	1	570	550	main note away made upon about order	464	306	81	10	. 30	.3	50
23.	Englewood Shop. Cntr.	Indiana Ave., Englewood	Wesley Silvian	24 Sto	res	904 VAN 905	tion to the sea and their sea com	400 EU- 400	1000 WILL WAR	soo siis ma			Mar 810. edis	ess ess
24.	Fair Winds Condominium	Albee Rd., Nokomis	Ra-Mac Land Company	34	120	270	1-4"x65'	1860 5500 Nee		9755 ATRIA STAR		any link tink	NAME AND DROP	800 ON 999
25.	Far Horizons Motel	2401 Gulf.Mex.Dr., LBK	Far Horizons Corp.	72 Unit	ts 140	THE RES	20 104 402 602 104 206 607 500	2275	1060	472	792	1.0	.14	15
26.	Field Club	1400 Field Rd., Sar.	Field Club, Inc.	1	75	150	1-3",1-8"	new time and	MAC MINE AND	****	WI MIN 850		Mar Sant 1989	
27.	Floridaland West	S. Tamiami Tr., Osprey	Sky-Trans Industries	2	1300	2000	4-4"	1400	50	114	720	2.0	.02	5
28.	Florida Pines MHP	150 Satula Circle, Ven.	Larry Alumbaugh	100	200	200	1-3"x63'	420	264	60	5	.68	.01	5
29.	Fords Ohio Inn Tr. Pk.	S. Tamiami Tr., Nokomis	Thomas R. Ford	29	60	5000 MIN 1000	1-3"	2194	1995	232	1440	.6	.46	15
30.	Four Winds Apartments	2605 Gulf Mex. Dr., LBK	George Koch	52 Apts	s 124	200	5-2"x10'		, may sigh 1869		point substantial		2003 DAMP 6230	
31.	Fruitville Elem. Sch.	601 Honore Ave., Sar.	Bd. Public Instruction	1	545	675	1-4"	490	530	112	288	2.0	.08	5
32.	Gehman Trailer Park	Kauffman St., Sar.	Silas G. Gehman	2		Opera, count, count,	OTTO, SEETIN, SEPTIN, SEPTIN, SEETIN,			SURE COTE, ASIA,	400, 400 Mm.			
33.	Graf's Riverside Resort	10,001 S. Trail, Ven.	B.W. and A. Graf	12	***	mara, aprila, mina.	600- 600, pap- 4pp, 600, 600, 600,	em 155. 44.				manda, ministra	600, 600, 100s.	
34.	Gulf and Bay Club	5800 Mid.Pass Rd., Sar.	Edward St. Philips	10	200	200	1-10"x135'	910	915	63	412	2.56	.08	5
35.	Gulf Shore Trailer City	3710 Gulf Mex.Dr., LBK	Jerkins, Webber & Garman	155	360	360	1-6" & 1-4"x418'	2310	1547	660	770	1.5	.09	5
36.	Gulf to Bay Mobile Homes	6415 Mid.Pass Rd., Sar.	Gulf to Bay MH, Inc.	85	170	170		BM 805 504				ANGEL TRANS ASSET		5000 4075 40M
37.	Happy Haven MHP	S. Tamiami Tr., Osprey	Wade Walker	65	150	150	AND DATE WAS THE DATE OF THE PARTY.	530	467	75	8	. 3	. 34	17
38.	Harbor Lights MH's	617 N. Tamiami Tr., Ven.	Edward Maslanka	153		ma one one	and their state own case death, from lated	910	500	255	150	.2	.66	15
39.	Hayes Trailer Park	4015 N. Lockwood Rdg., Sar.	Vernon & Dorothy Hayes	4	8	8	1-2"				Chief 100% 100%			aup aus aus
40.	Higgins Trailer Park	4205 Sawyer Rd., Sar.	Elva E. Higgins	2	3	4	1-2"x150'	·		000 min 000	P07 NO. 1889	\$100 MAG	spen mark hidd	MA NO ME
41.	Holiday Trailer Park	6900 S. Tamiami Tr., Sar.	J. H. Gadey	36	60	80	2-				245 SOS WO			
42.	Intnat'l. Kings Table	7260 S. Tamiami Tr., Sar.	John Traber	7	500	1200	1-4"	425 YM 104	AND 2000 0000		500 SEEL 1994		1005 EVA 400.	100 Me MA
43.	Jantzi Trailer Park	1060 Graber St., Sar.	Rev. A. Jantzi	4	8	8		000 MM			400 Mars. 1600.		425 MA 100	

WASTEWATER SYSTEMS

NUMBER OF CONNECTIONS	POPULATION SERVED	PLANT CAPACITY (MGD)	AVERAGE CONSUMPTION (MGD)	STORAGE (GALLONS)	FIRE HYDRANTS	TYPE OF TREATMENT	NUMBER OF CONNECTIONS	POPULATION SERVED	PRESENT VOLUME (MGD)	PLANT CAPACITY (MGD)		PERCENT BOD REMOVAL	EFFLUENT DISPOSAL
150		Englewoo	od Water Distr	ict			150		50% Note 402 60%	.075	Mod.Cont.Stab.	man upos.	Percolation-Evap.Pond
1	570	Englewoo	od Water Distr	ict	1	NAMES OF THE PROPERTY OF THE P	All units	are on sept	tic tanks	and and	in		
	and the same	Englewo	od Water Distr	ict			998 800 998	aper samp salan	900 AND MAL UM	.010	Marolf Ext.Aer. Sand Filter	98	Pipe to Lemon Bay
34	120	.0075	.006	10,000	None	Aer-Chlor	34	120	.006	.0075	Defiance Ext.Ae	r. 95	Percolation-Evap.Pond
72 Units	140		and the Min	550	None	Chlor.	72 Units	140	.0035	.006	Marolf Ext.Aer.	60 - 90	Drainfield
1	75	.008	.003	8,000	4	Aer-Chlor	1	75	.003	.006	Defiance Ext.Ae		Little Sar. Bay
2	1300	ent 100 mg 110	.041	15,000	None	Soft-Aer-Chlor	2	1 300	.018	.0182	Defiance Ext.Aen Polish.Pond	r. 96	So.Crk. to Blackburn Bay
100	200	.0125	.002	5,000	None	Aer-Chlor	100	200		.0105	Marolf Ext.Aer. Polish.Pond	98	Percolation-Evap.Pond
29	60		and the sale sale	240	None	Chlor-Filter	All units	are on sept	tic tanks			***	
52	124	COLD. SOUR COLD.	.0025	1,400	None	Aer-Chlor-Clar	100	124	.002	.0065	Defiance Ext.Ae	r. 96	Drainfield
7	545	.008	.0078	3,800		Aer-Chlor	. 1	545		.0085	Marolf Ext.Aer.	90	Sand filters to absorp- tion beds
2					None		All units	are on sept	tic tanks				
12					None		All units	are on sept	tic tanks	unit days start ents			
10	200	No. 400 and 400	and the day was	40,000	None	Aer-Chlor-Soft	10	200	.003	.020	Imhoff T.F. Polish.Pond	91-98	Ditch to Little Sar. Bay
155	360	5000 WH 1000 MM	.010	19,000	None	Aer-Chlor	All units	are on sept	tic tanks			NAME, STATE	en de 40 en
85	170	and the same was	.008	12,850	None	Aer-Chlor	All units	are on sept	tic tanks			***	
65	150	APPL SEE SEE	.0065	sees man obse	None	Aer-Chlor	65	150	.005	.009	-Marolf Ext.Aer. Polish.Pond		Evap.Beds; Not Chlor.
155		.036	ands town drifts bridge	DOTS STOP 2655	400 and 500 000		All units	are on sept	tic tanks	Name 2016 2017			ms tall and mb
4	8	MA THE AM MO	wa en en	300	None	None	All units	are on sept	tic tanks		M = M = M = M = M = M = M = M = M = M =	260 SWS.	
2	min data sint		MAI NO 650 MA	NAS ANY WAS	None	None	All units	are on sept	tic tanks				l Trailer/Tank
36	60	Florida	Cities Water	Company			All units	are on sept	tic tanks	600 EVA 100 FEFS		phy 1004	2 Trailers/Tank
1	500-1200	.0032	.0025	200	None	Chlor-Filt	1	500- 1200	.0025	.0032	Defiance Ext.Ae	r. 76	Drainfield
4	8	TOTAL TANKS AND AND AND		ann seo ess	None	MA CO CO FOR POR TO THE SEC OF CO CO CO	All units	are on sep	tic tanks			5000 NUM	

WATER SYSTEMS

FACILITY	ADDRESS	OWNER	NO. OF EXIST. BLDGS.	PRESENT POPULA.	EST. ULT. POPULA.	WELLS: NO., SIZE AND DEPTH	TDS	HARD- NESS	CHLOR- I DE	SUL- FATE	FLUOR- IDE	IRON	COLOR
44. Jap. Gardens of Ven.	Belvidere Rd., Venice	Jap. Gardens of Ven.	113	200	1000	4-4"x90'		CHE WAR SES	MAN. MAR. 4945				MIS 404 MM
45. Kan.City Royal Baseball	Hawkins & Clark, Sar.	Kansas City Royals	3	200	200	2-2",2-4"	660	424	69	169	.78	.10	15
46. L and L Trailer Park	Kaufman Ave., Sar.	Henry L. Mullett	15		white later	with and upon and byte tone own, and	****	1000 AUG. 1000		****	400, 400, 444	## 4# 4#K	
47. Lake Village MHP	S. Tamiami Tr., Nokomis	E.J. & O.C. Ratcliff	202	400	600	2-4"x80'	610	350	75	96	.68	.08	10
48. Laurel Vocational Sch.	1251 N. Tamiami Tr., Nok.	Bd. Public Instruction	1	60	60	1-6"x96'		***	EM. WO 404		AND THE COS.	M25 ECO. 1000	was eras sum.
49. Lone Oak Corporation	617 N. Tamiami Tr., Ven.	Electra-Tronics, Inc.	155	ilm. 049 500		(flowing)	910	500	255	150	.2	.66	15
50. Longboat Arms Condomin.	3200 Gulf Mex.Dr., LBK	Longboat Arms, Inc.	000 mm 400	der den ben	600	UNI AND THE WAS AND THE AND	1540	610	390	500	3.0	.04	5
51. Longboat Inn Restaurant	4000 Gulf Mex.Dr., LBK	R.L. & L.M. Dennison	1			400 MM MIL MAN 460 MM ANN	MARK MADE STREET	COMP 1000		500 NO. 000			NIS NA ME
52. Longboat Key Beach Club	2111 Gulf Mex.Dr., LBK	Arvida Corporation	1	100	300	5-1½"x12'	910	540	200	73	.1	.06	10
53. Longboat Marina Rest.	4120 Gulf Mex.Dr., LBK	L. M. Smith	1	125	200	2-1½"x15'		spt min min					
54. Lucayan Country Club	4444 Swift Rd., Sarasota	Gordon A. Elferdink	46	70	115	2-4"x107'	448	310	42	75	.48	.04	20
55. Lud Maschino Trailer Pk.	3216 Henrietta Pl., Sar.	Ludwig Maschino	24	48	48	1-4"x446'	No se es				444 Min 440	oth page spin	
56. Meadows Trailer Park	1071 S. Tamiami Tr., Ven.	L. & T. Meadows	31	dan suo mes	CALL CASE 2000	*	and one sup		'		Work of the same.		Land 400
57. Midnight Pass Tr. Pk.	8862 Mid.Pass Rd., Sar.	M. Thomas Finn	46	90	90		ET 45, 45.						
58. Millers Trailer Park	1109 Kaufman Ave., Sar.	N.D. & C.J. Miller	2	8	8]-		****					
59. Millers Trailer Park	3300 Bahia Vista, Sar.	C. C. Miller	9			400 min 400 ma ipin 400 400		with 4000, 6000.		PAR 10% 10%		-	***
60. Mobile Estates Tr.Pk.	6741 S. Tamiami Tr., Sar.	Norlo Corporation	265	500	600		284	264	35	11	. 25	.89	10
61. Myakka River State Pk.	SR 72, Sarasota	Fla. Bd. of Parks	31	650	800	4-	945	750	51	557	1.6	.18	5
62. Myakka Trailer Park	9051 S. Tamiami Tr., Ven.	Vincent Petrucci	20			40° (and and april 1014, 1015, 1015, 1015)		400 500			en en en		Audio, mode more.
63. Nokomis School	Nippino Trail, Nokomis	Bd. Public Instruction	1	400	500	1-	880	570	75	300	0	0	5
64. Oak Grove Trailer Pk.	1800 Englewood Rd., Engl.	A. C. Kennedy	138	240	350		461	292	78	15	.4	.24	8
65. Orange Acres MHP	Clark Rd., Sarasota	H. Monroe and S. A. Warrington	100	300	450	1-4",1-6"	630	516	69	220	1.08	.12	69
66. Oscar Scherer State Pk.	1843 S. Tamiami Tr., Osprey	Fla. Bd. of Parks	100 Sit	es 300	600	1-4"x51'	840	560	102	210	.56	.14	15

WASTEWATER SYSTEMS

NUMBER CONNECT		JLATION RVED	PLANT CAPACITY (MGD)	ÄVERAGE CONSUMPTION (MGD)	STORAGE (GALLONS)	FIRE HYDRANTS	TYPE OF TREATMENT	NUMBER OF CONNECTIONS	POPULATION SERVED	PRESENT VOLUME (MGD)	PLANT CAPACITY (MGD)	TYPE OF	PERCENT BOD REMOVAL	EFFLUENT DISPOSAL
113	3 2	200	.010		2,600	None	Chlor.	113	200		.047	Marolf Ext.Aer. Polish.Pond	85	Evap Percolation Pond
3	3 2	200				None	Aer-Chlor	3	200	** *** ***	.015		Not in opera.	Irrigating Grounds
15	<u> </u>				***	None	Aer-Chlor	All units	are on sep	tic tanks				
202	? 4	-00		.018	16,500	None	Aer-Chl-Filt	202	400	.010	.050	Defiance Cont.St	. 98	Polish.Pond to Evap.Pond
1		60			750	None	Chlor.					Septic tanks	am em	
155	•	-	.036		16,800		Aer-Chlor	All units	are on sep	tic tanks				
7	•	14	.010		15,000	None	Rev.Osmosis Aer-Chlor	7	14		.050	Cont.Stab.	****	Absorption Field
140 to the total	_		an an an	400 MM MM MM				1			.0033	Defiance Ext.Aer	. 91	Canal to Sarasota Bay
1	1	00		200 de 000 de	50	None	Chlor	All units	are on sep	tic tanks				
1	1	25			780	None	Aer-Chlor- Filt-Soft		** ** **			Septic Tanks		
46		70	*** *** ***	. 200 200 200	600	None	Aer-Chl-Soft	All units	are on sep	tic tanks			min ton	
24		48			400	None	None	All units	are on sep	tic tanks				
31		65 m	900 age mai		***************************************			All units	are on sep	tic tanks	** ** **			
46	enter en	90	Siesta K	ey Utility Aut	thority	48 (Virginia) (1904) (1904) (1904) (1904) (1904) (1904) (1904) (1904) (1904) (1904)		All units	are on sep	tic tanks				
2		8			500 See one one		Soft. No Chl.	All units	are on sep	tic tanks				
9	_		***					All units	are on sep	tic tanks				
265	5	00	Florida	Cities Water (Company	1		265	500	.028	.038	Defiance Ext.Aer Polish.Pond	91	Ditch - Matheney Creek - — Little Sarasota Bay
31	6	50	2006 2009 quin 2006	.010		None	Aer-Chlor	All units	are on sep	tic tanks				— — · · · · · · · · · · · · · · · · · ·
20	-			.002			Aer-Chlor	All units	are on sep	tic tanks				
. 1	4	00		.005	2,400	None	Aer-Chlor	1	400	.0048	.005	Marolf Ext.Aer.	90	Polishing and Absorp.Field
138	2	40	Englewoo	d Water Distri	ct			138	240	.012	.022	Marolf Ext.Aer.	88	Forked Crk. to Lemon Bay
100	3	00	.072	.025	8,800	None	Aer-Chlor	100	300	.011	.027	Imhoff T.F.,Clar Polish.Pond	95	Polish.Pond and Ditch, Cat- fish Crk Lit.Sar. Bay
100	Sites 3	00	.012		10,000	2	Aer-Chlor	100 Sites	300	.015	.015	Marolf Ext.Aer.	95	Absorption Beds
` 								L						

WATER SYSTEMS

	FACILITY	ADDRESS	OWNER	NO. OF EXIST. BLDGS.	PRESENT POPULA.	EST. ULT. POPULA.	WELLS: NO., SIZE AND DEPTH	TDS	HARD- NESS	CHLOR- I DE	SUL- FATE	FLUOR- IDE	IRON	COLOR
67.	Osprey School	S. Tamiami Tr., Osprey	Bd. Public Instruction	1	250	250	1-4"x65'	1175	1223	73	865	. 36	.23	15
68.	Osprey Trailer Ct.	S. Tamiami Tr., Osprey	Ira Jones	49	90	90] ***	and the same		WA 100 TO			444 404 404	
69.	Oyster Bar - Sar. Marina	1550 Stick.Pt.Rd., Sar.	Rbt. & Ann Wymer	1	300	900	2-	700	440	111	39	.6	. 7	20
70.	Oyster Bar - Coral Cove	7250 S. Tamiami Tr., Sar.	Austin Smythers	7	400 401 WA	wine blast 4600	400 MO MOS GAP AND 4000 AND 4000	686	522	107	44	.92	.3	25
71.	Palm & Pines Tr. Pk.	225 N. Tamiami Tr., Nok.	Bento Henriques	100	90	200	2-	2259	1486	53	316	.75	0	5
72.	Palm Terrace MHP	3223 N. Lockwood Rd., Sar.	Rogers MHP, Inc.	160	210	400	1-4"x100 '	380	742	335	20	.8	.01	12
73.	Park East MHP	8333 S. Tamiami Tr., Sar.	John Wilbanks	9	18	1000	5-4"x100'	525	300	90	58	.7	. 34	20
74.	Phillippi Shores Sch.	4747 S. Tamiami Tr., Sar.	Bd. Public Instruction	1	800	AND 4000 EVE	600, Not wife 600, 600 and 600 NO. 400	and and the	about depth 60ml	NAME AND ADDRESS OF THE PARTY O	****			
75.	Phillippi Shores TP	5200 S. Tamiami Tr., Sar.	Freeman of Sarasota	143	250	300	1-	1238	1151	189	575	1.5	. 7	5
76.	Pine Ridge Court	2320 Bee Ridge Rd., Sar.	N. W. Black	155	300	300	3-4"x32'	595	550	87	210	. 32	.16	15
77.	Pine Shores Tr. Pk.	6450 S. Tamiami Tr., Sar.	Pine Shores Investment	330	600	650	1-3" & 1-4"x80'	384	288	61	36	.45	1.14	5
78.	Ponderosa Motel	2509 Gulf Mex.Dr., LBK	Sadler Corporation	32	70	70	1-		***			min 600 600	*** ***	oran shall visit
79.	Riverview High Sch.	4850 Lords Lane, Sar.	Bd. Public Instruction	1	1700		1-6"	308	307	211			.9	0
80.	Rolling Green Golf Cl.	4501 N. Tuttle Ave., Sar.	Rolling Green Golf Club	7	60	120	1-6"x450'	405	270	18	5	1.36	.6	5
81.	Royal Coachman Resort	Laurel Rd., Venice	A. Dona Bay, Inc.	168	200	400	1-4"x26'	505	300	60	30	.4	.04	5
82.	Royal Palm Harbor Assoc.	Mid. Pass Rd., Sar.	Royal Palm Harbor Assoc.	19	000 Ent. 000	***		404, 404, 400		Sprin calco ments				
83.	Royal Palms Trailer Pk.	8705 S. Tamiami Tr., Sar.	Royal Palms MHP, Inc.	148	300	300	2-4" Flowing				special special special		0000. aparis, aparis,	
84.	Rusty Trailer Park	2911 Lockwood Rdg., Sar.	R. Parent & F. Holding	20	40	40	1-3"	*** ***						larit, gran della,
85.	Sally's Trailer Park	1201-59th St., Sar.	Harry Bunch	4		and third block			- m m					
86.	Sara-Bay Trailer Park	718 S. Tamiami Tr., Osp.	David Devroy	24	48	48	2-3"	444 444				and out too.		
87.	Sarasota Bay MHP	42 W. Oak St., Osprey	Everett Knapp	60	120	120	1-	1470	1845	60	1150	. 4	.12	10
88.	SarCo Juv.Det. Home	4750-17th St., Sar.	Bd.Cnty.Commrs. of SarCo.	7	37	910 PM								max 500 500
89.	Sarasota Health Club	1803 Glengary St., Sar.	Hugh Humphrey	7	120	150	1-4"x34'				***			

WASTEWATER SYSTEMS

	NUMBER OF CONNECTIONS	POPULATION SERVED	PLANT CAPACITY (MGD)	AVERAGE CONSUMPTION (MGD)	STORAGE (GALLONS)	FIRE HYDRANTS	TYPE OF TREATMENT	NUMBER OF CONNECTIONS	POPULATION SERVED	PRESENT VOLUME (MGD)	PLANT CAPACITY (MGD)	TYPE OF	PERCENT BOD REMOVAL	EFFLUENT DISPOSAL
	1	250	.003	.003	1,500	None	Aer-Chlor	1	250			Septic Tanks		
	49	90	1000 FERS SALE CASE	.0058	1,500	None	Aer-Chlor	All units	are on sept	tic tanks	pag ents ents table		Name 2000	2 or 4 trlrs/Tank
1	1	300	1000 AND 0400 AND	water mades and		None	Aer-Chl-Soft	7	300	.0013	.0024	Defiance Ext.Aer	·. 91	Little Sarasota Bay
	7	500 Sps		.0062		***		7	uve data unio	.006	.015	Defiance Ext.Aer	·. 96	Math.Crk Lit.Sar.Bay
-	100	90		.009	500	None	Aer-Chl-Soft,	100	90	.010	.014	-Marolf Ext.Aer. Polish.Pond	96	Roberts Bay
	150	210		.015	10,500	None	Aer-Chlor	150		.127	To Kens	ington Park	mant block	
-	9	18		.001	10,000	None	Aer-Chl-Sed	9	18	.0006	.025	Defiance Ext.Aer	·	Evaporation-Percolation Pond
	7	800		turn SUA fair SW			Chlor.	7	800			Septic Tanks		
	143	250	500 DOS 500 APR	.015	16,500	None	Aer-Chl-Filt	All units	are on sept	tic tanks	400 400 400		une sini	
	155	300	.024		5,000	None	Aer-Chlor	All units	are on sep	tic tanks	45 44 44			l Trailer/Tank
	330	600		.019	21,000	None	Aer-Chlor	All units	are on sep	tic tanks	desti tion and ever		695 595	2 Trailers/Tank
	32	70	SHIR SHIP THE SHIP	.003	750	1	Aer-Chl-Filt	All units	are on sep	tic tanks	NO. 400 400		-	l or 2 Trlrs/Tank
	7	1,700	AND 400 Eds			None	Chlor	Under con	nstruction to	o Florida	Cities Gu	lf Gate Plant		
	7	60	.020	.001	500	None	Chlor-Soft		aline state	DATE STOP NAME AND	and that there are	Septic Tank	an an	
**************************************	168	200	.030	.015	14,000	None	Aer-Chlor	100	150	.003	.010	Marolf Ext.Aer.	98	Evaporation-Percolation —— to Shakett Creek
	19		60/0 100/0 tapp may	.006	449 849 849 849	Mind Mine cost Man	Aer-Chlor	All units	are on sep	tic tanks	ANA CAS 500 500		***	
	148	300		.015	525	None	Aer-Chlor	148	300	.009	.018	Defiance Ext.Aer Polish.Pond	^	Catfish Crk.to Lit.Sar.Bay
	20	40	999 699 tom coo	.002	200	None	Chlor	All units	are on sep	tic tanks	600 600 700 MP		-	2 Trailers/Tank
	4		time and and and	cu =	600 600 000 000	809 400 000 004		All units	are on sep	tic tanks				
	24	48			200	None	Chlor	All units	are on sep	tic tanks				2 Trailers/Tank
	60	120	200 MB core core.	.006	700	None	Aer-Chlor	All units	are on sep	tic tanks				1 or 2 Trlrs/Tank
	7	37	the the top top			NOne	100 MD 400 MD 101 MD 407 MD 408	1	37		.0037	Ext.Aer.,Pol.Por	nd 90	Ditch to Phil.Creek
	7	120		and the same	200	None	Chlor		Page - min - 0004			Septic Tanks		

WATER SYSTEMS

	FACILITY	ADDRESS	OWNER	NO. OF EXIST. BLDGS.	PRESENT POPULA.	EST. ULT. POPULA.	WELLS: NO., SIZE AND DEPTH	TDS	HARD- NESS	CHLOR- I DE	SUL- FATE	FLUOR- IDE	I RON	COLOR
90.	Schrocks Trailer Pk.	Estrada St., Sarasota	Corliss & Edna Schrock	8			1000 and Ann Spill spill skip that \$500	1000 WW WW			400, DOS 1000	0000 END 000E		NOA 6450 6550
91.	Sea Bird Apartments	3465 Gulf Mex. Dr., LBK	James Price	14	30	30	1- "x400' (flowing)	1024	590	258	154	. 32	.19	35
92.	Seahorse Beach & Yacht Cl.	3452 Gulf Mex. Dr., LBK	Seahorse Beach & Yacht	46	100	125	3-	2550	1522	720	635	1.7	.03	5
93.	Shady Haven Trailer Pk.	150 Englewood Rd., Engl.	Dominic Stone	98	80	190	nest note start from 1900-1900, next ment ment	2671	848	978	235	. 45	1.5	100
94.	Shady Oaks Trailer Pk.	File & Carter St., Sar.	Mary J. Miller	7	000 200 min	dies nion man	NAME AND ADDRESS OFFI AND THAT AND	***	2005 1000 1000	NDES NOOF ASMA	-	took some some	MONE SHOWN MINES	and the Ma
95.	Silver Beach Apartments	4131 Gulf Mex. Dr., LBK	Howard E. Frega	48	120	120	1-4"	2019	1247	306	665	1.52	.08	5
96.	South Cnty. Courthouse	400 S. Tamiami Tr., Ven.	Bd.Cnty.Commrs. of SarCo	1	chain edeat sales	MAN AGAIN NATION	_ = = = = = =	330	239	51	13	1.04	.2	10
97.	Soward Trailer Park	3919 Dearborn Ave., Sar.	James Soward	3	NAME OF MICH	440 min 440	200 200 plan 200 000 000 mat 600 500			anth- tends total		AUGO 1800 1800.	2000 TOTAL DESIGN	400 Min 400
98.	Stewry Trailer Park	Kaufman Ave., Sar.	Victor Stewry	2	THIS MOST SAID.	and with along	Marie 2000 date house onto 2000 fitted water owner	1000 Miles 4000	2000 1000 GUD		color acces today	1900 MIO 8190	NO. 450 MM	w == a=
99.	Sun 'N Fun Club	Fruitville Rd., Sar.	Playtime Partnership	280	300	1000	1-3",1-4"	532	442	60	192	1.2	.09	10
100.	Sunnyside Rest Home	5201 Bahia Vista, Sar.	W. J. Overholt	1	69	75	1-6"x200'	660 Mile 869		es es us		bein Men store	ness dans men	
101.	Sunny South Trailer Pk.	2100 Doud St., Sar.	Earl E. Houseborg	58	120	120	1-4"	044 WO 109	terms mayor plants	2000 2000 3300	1505 BUSS 8880	ANNA 1995 WAR		min etcs film
102.	Trail-Vue Motel	4131 S. Tamiami Tr., Sar.	Charles Lacy	5	10	10	Open state date date and date saper when	(45 No. 194			2555 0225 1225	ome was eas	2007 EAST 600m	NA WH W-
103.	Tri-State Trailer Ct.	S. Tamiami Tr., Osprey	Gladys Senevy	40	80	120	1-2"	679	568	45	254	.78	1.45	10
104.	Twin Shores Resort TP	3740 Gulf Mex. Dr., LBK	Douglas Wray	128	250	570	2-4"	WA 100	6000 1000 5000			0000 MCG 0000	MAN 450 MAN	nn so m
105.	Venice Bay Tr.Pk.	26 Erskine Dr., Ven.	Leroy DeRoche	110	BACK 4000 8000		DIES 1000 DIES 6000 DIES 1000 DIES					APPER SHARED SHARES	MANA STATE STATE	AND THE COLUMN
106.	Venice Ranch MHP	999 E. Venice Ave., Ven.	Lewis Ellis	88	150	1200	1-3"	525	310	93	92	.4	.03	10
107.	Warm Mineral Springs	San Servando Ave.	Sam Herron		600 Aug 640	ann ann ann	8-2"x15'	5093	1575	2400	440	1.3	.02	5
108.	Whispering Pines Tr. Ct.	7042 S. Tamiami Tr., Sar.	Roy Heiser	50	100	100	1-2"					***	and that does	Mink glock CES.
109.	Wilhelms Nursing Home	1507 S. Tuttle, Sarasota	Ruth Wilhelm	1	120	150	600 000 MIN SIN SIN SIN SIN SIN		- 00 00	OUR WAS STR	AR 800 100	aces sace	prost 6000 Major	MAD ASST 950h
110.	Willow Lane Tr. Pk.	250 N. McCall Rd., Engle.	Sherman & Wanda Curtis	30	ANN. 4440 STOP		cop page and that the page and the		100 CM	300 MM	***		100 to 100	
111.	Windward Isle MHP	ClarkRd. at Gantt, Sar.	Windward Corporation	13	26	1200	2-4"x120"	615	430	57	220	1.32	.06	5
112.	Yoder Trailer Park	Garber Ave., Sarasota	Clarence Yoder	3	6	6	AND MAN COME COME COME COME COME	****	NOW 1870 1870				900 CO SOL	

WASTEWATER SYSTEMS

	NUMBER OF CONNECTIONS	POPULATION SERVED	PLANT CAPACITY (MGD)	AVERAGE CONSUMPTION (MGD)	STORAGE (GALLONS)	FIRE HYDRANTS	TYPE OF TREATMENT	NUMBER O		PULATION SERVED	PRESENT VOLUME (MGD)	PLANT CAPACITY (MGD)	TYPE OF TREATMENT	PERCENT BOD REMOVAL	EFFLUENT DISPOSAL
	8				MA NO LE NO			All un	nits ar	re on sept	ic tanks				
	14	30	990 Cirk San 989	.0013	300	None	Aer-Chlor	All un	nits ar	e on sept	ic tanks			-	·
ž .	46	100	MADE SALES STATE	.004		None	Aer-Chlor	All un	nits ar	re on sept	ic tanks				
r -	98	Englewood	d Water Dis	trict				98		80	.003	.006	Marolf Ext.Aer.	91	Lemon Bay
٤ .	7	NOT SIRK OWN		*** *** ***			****	A11 un	nits ar	re on sept	ic tanks			2005 (calls	
e	48	120		.0036	1,000	None	Aer-Chl-Filt	All ur	nits ar	re on sept	ic tanks				
	1	WE SHE MA		.0005			Aer-Chlor				.0005	.004	Defiance Ext.Aer Polish.Pond	r	Alligator CrkLemon Bay
	3	46. 645. 746	400 tab TTP gag	** ***		None		All un	nits ar	re on sept	ic tanks			Top 444	
ş	2					None		All un	nits ar	re on sept	ic tanks				
÷ .	280	300			5,000	None	Aer-Chlor	280		300	.020	.060	Marolf&Defiance	99	Canal to Phil. Crk. to Sarasota Bay
ą.	1	69	and 40% and 500		300	None	Aer-Chl-Soft	1		69	.005	.010	Defiance Ext.Aer Polish.Pond	^• 96	Ditch to swamp area, used to irrigate
	58	120	um est es un	.006	500	None	Aer-Chlor	All un	nits ar	re on sept	ic tanks			* ***	
-	5	10	and the same	.002		None	Aer-Chlor	All un	nits ar	re on sept	ic tanks				
-	40	80		.006	2,000	None	Aer-Chlor	40		80			Defiance Ext.Aer Polish.Pond	r	County Roadside Ditch
	128	250	.060		5,000	None	Aer-Chlor	128		250	.010	.060 .0325	Ext. Aer.	91- 99	Sarasota Bay
	110		City of	Venice				All un	nits ar	re on sept	ic tanks			599 NEW	
1 	88	150	.015	.008	15,000	2	Aer-Chlor	88		150	.0075	.015	Marolf Ext.Aer.	90	Ditch to Roberts Bay
			.008			None	Aer-Chlor	All ur	nits ar	re on sept	ic tanks			A104 A104	
-	50	100		*** es es es	200	None	Chlor-Filt	All un	nits ar	re on sept	ic tanks	age 500 (min		SU2- SI20	2 Trailers/Tank
	1	120	City of	Sarasota	**************************************			1		120	.010	.015	Defiance Ext.Aer Sand Filter	r. 96	Ditch-Phil.CrkSar.Bay
	30	We say say	Englewo	od Water Distr	ter District			All ur	nits ar	re on sept	ic tanks			600 PAR	20 St. 40 St.
***************************************	13	26		.003	30,000	None	Aer-Chlor	13		26		.045	Marolf Ext.Aer.	-	Evap-Percola Pond to Ditch
***************************************	3	6	494 MA 100 MA					All ur	nits ar	re on sept	ic tanks		M. M. On	top en	

WATER SYSTEMS

	FACILITY	ADDRESS	OWNER	NO. OF EXIST. BLDGS.	PRESENT POPULA.	EST. ULT. POPULA.	WELLS: NO., SIZE AND DEPTH	TDS	HARD- NESS	CHLOR- I DE	SUL- FATE	FLUOR- IDE	IRON	COLOR
113.	Yoder Trailer Pk.	Gardenia St., Sarasota	J. S. Yoder	2	4	4	400 No. 400 NO. 400 NO. 400 NO.		AVE 100. AVE	000 MW 000		MIS. WIR. SHIP.		
114.	Zimmerman's Trailer Pk.	3471 Bahia Vista St., Sar.	Mahlon Zimmerman	21	40	40	*** *** *** *** *** ***			GARDA. DOOR. DAVID	MAR. 1999. 1996			
115.	Buresch Lobster House	5445 N. Wash.Blvd., Sar.	R. D. Buresch		eige som mis.	come days. Alies	1000 1000 April Gall, Ga	630	440	60	288	2.4	.2	5
116.	Mission Valley Golf/CC	Rt. 2, Box 1573, Nokomis	Mission Valley Golf/CC	COSA 64479 64447		500	1-4"x82'	700	430	84	155	.6	.14	10
117.	Longboat Utility Co.	501 Cutter Lane, LBK	Longboat Utility Co.		1500	5000	1-4" & 1-6"x340'	1360	100	96	450	1.24	.02	5
118.	Dolomite Indust. Pk.	1616 Presidio St., Sar.	Dolomite Utilities	10	MATA. NOTE ANY		1-4"x385'	770	612	69	316	1.6	.13	5
119.	Tri Par Estates	1616 Presidio St., Sar.	Dolomite Utilities	659	1 350	2000	2-6"x450'	700	510	63	394	1.84	.08	5
120.	Gulf Gate Utilities	2112 Gulf Gate Drive	Fla. Cities Water Co.	****	size here sign		16-6",1-4"	700	430	109	178	1.4	.08	15
121.	Gulf Gate Sewers	2112 Gulf Gate Drive	Fla. Cities Water Co.	un au	PERM SAPE SCOP	G230 SG09 S1091		Made 4000 4000			GIVA. 4000.	444 444 576	410 410 516	
122.	North Port Charlotte	P.O.Box 2465, Port Char.	Gen.Development-Utilities	1268	short stope space	22,000	Myakkahatchee Creek	368	104	58	52	.5	. 7	5
123.	Kensington Pk. Utilities	3214-17th St., Sarasota	Kensington Park, Inc.		40.00		10-4",2-6"x210	700	438	60	104	.5	.05	2
124.	Siesta Key Utility Auth.	5211 Shadow Lawn Dr., Sar.	Siesta Key Utility Auth.				5	525	330	30	307	. 4	.02	5
125.	Sorrento Shores Utility	Rt. 2, Box 966, Nokomis	Sorrento Shores Utility	163	490	98A 880 EDS	7-3"&4"	790	530	90	345	.9	.04	5
126.	Berkshire Estates	7056 Bee Ridge Rd., Sar.	Southeastern Develop.	74	150	752	and disk, and ages, spec that such data and	735	430	114	192	1.3	.44	5
127.	SE Plaza & Strath.Villas	P.O.Box 2078, Sarasota	Strathmore Realty	3000 0000 0001	250	6000. 1000- GHA,	1-6"x116'	420	252	57	0	0	.07	0
128.	South Gate Water	2746 Siesta Dr., Sar.	South Gate Water&Sewer	5000	100 GR 000		11-6"	390	330	45	70	.6	.05	10
129.	Southern Gulf Utilities	4851 Webber St., Sar.	Ecological Science Corp.	and days were			2-6"x150'	532	220	66	58	3.4	. 34	20
130.	Venice East	77 Venice E.Blvd., Ven.	Fla.West Coast Utilities		*****		500- 500 too que ant, que sue ant	637	370	114	154	.64	.18	5
131.	Venice Gardens Utils.	1729 S. Tamiami Tr., Ven.	Venice Gardens Utilities	man aper ann				569	346	108	10	.62	.3	20
132.	B & B Utilities	Myakka River Manor	Sarasota County Receivership	246	480	2500	4-2"x20'-67'	910	500	216	97	. 25	.14	10
133.	Engl. Water Dist.	446 W. Dearborn St., Engl.	Engle. Water Dist.			and and and	30-6"x38-80'	290	120	105	33	.92	.02	5
134.	City of Sarasota	1130 Gillespie St., Sar.	City of Sarasota	****				840	60	64	356	1.28	.03	5
135.	St. Armands Water Plant	55 N. Adams Dr., Sar.	City of Sarasota		MAN 0000 DAG		Mile film ball only date and the ball	680	56	43	326	1.8	.1	5
136.	Sar-Man Airport Auth.	Airport Gate, Sar.	Sar-Man Airport Auth.		9900 PANE BAN		COT COT DISC COS- COM DATE COST DISC	400 400		400 Unit pile			000 0 00 000	con core con
137.	City of Venice	Venice Air Base, Ven.	City of Ven.	_		30,000		638	80	225	200	.6	. 0	0

WASTEWATER SYSTEMS

	NUMBER OF CONNECTIONS	POPULATION SERVED	PLANT CAPACITY (MGD)	AVERAGE CONSUMPTION (MGD)	STORAGE (GALLONS)	FIRE HYDRANTS	TYPE OF TREATMENT	NUMBER OF CONNECTIONS	POPULATION SERVED	PRESENT VOLUME (MGD)	PLANT CAPACITY (MGD)	TYPE OF	PERCENT BOD REMOVAL	EFFLUENT DISPOSAL	
	2	4						All units	are on sept	tic tanks	ana ano ano				
	21	40		April 6405 Abril 6406	MA	COURT WANT STOPL - 44440		All units	are on sept	tic tanks	-				_
3	con with one	WW 400 DW		000, que, com 600	and direct some south	date tides only most	CON 100 CON CON CON SON SON SON	To Tri Pa	r Estates						_
7		500	50 GPM	one upo enn des	1,000	None	Aer-Chlor	60% daw 4 00	500	26A 200 44A 200	.005	Defiance Ext.Aer		Sprayed on Land	
*	460	1500	.40	. 352	125,000	6 @ 500'	Aer-Chlor- Soft-Filt	3	1500	.013	.040	Ext.AerPol.Pnd		Ditch to Sarasota Bay	_
٠.	11	nim one dis		.007	3,000	None	Aer-Chlor	12	331	.002	.0026	Defiance Ext.Aer Polish.Pond	. 89	Canal to Whitaker Bayou	_
2	669	1350	.910	.062	160,000	23	Aer-Chlor	669	1 350	.073	.200	Imhoff T.F. Polish.Pond	94	Canal to Whitaker Bayou	-
ē	1711	tion state	.300		450,000	39	Aer-Chlor	1246	3400	.352	.425	Cont.Stab.,P.Pon	d 99	Matheney Crk Sar. Bay	_
:	600 S40 S40	NAME (1980)		ma tun ann me		some time time		1187	3200	. 35	.490	Act. Sludge	98	Canal-Phil.CrkSar.Bay	-
<i>i</i> -	1268		1.0	.226		depth date spine	Soft-Chlor	1254	3400	. 300	. 350	Cont.Stab.,P.Pon	d 96	Myakkahatchee Creek - Charlotte Harbor	-
2	1495	3720	.420	.286	350,000	1000'Ctrs	Aer-Chlor	1538	3900	. 342	.560	Mod.Aer., T.F. Polish.Pond	95	Canal-Phil.CrkSar.Bay	-
ģ ·	1466	<u></u>	1.8	.890		phys data (past Sold		892	2400	-	1.35	Cont.Stab.	96	Grand Canal-Lit.Sar.Bay	-
a .	164	490	.100	.055	270,000	None	Aer-Chlor	40	80	.005	.015	Ext.Aer.,S.Filte	r 93	Little Sarasota Bay	-
÷	104	150	** *** ***		*** *** ***	3	Electrodialysis	103	150	.040	.050	Defiance Cont. S Polish.Pond	t. 98	Phil.Crk. to Litl.Sar.Bay	-
3	104	250	.065	.037	68,000	2	Aer-Chlor	104	250	.044	.0456	Ext.Aer.	90	Ditch-Phil.CrkSar. Bay	Name
	2876	400 NV VIII	.600	.500	700,000	70	Aer-Chlor	400 MM 44A	PHIS 1000-	2000 SING (Mg)					-
	699	and took map	. 720	.160	120,000	27	Aer-Chlor	659	1800	NAME SPEED WILLS SPEED	.127	Imhoff T.F, Polish.Pond	em 14a	Canal-Phil.CrkSar.Bay	-
	126	265	AND SOM MOD DEAL	.043		700'Ctrs	Aer-Chlor	131	275	.0458	.1265	Imhoff T.F. Polish.Pond	96	Alligator Crk Lemon Bay	-
	1218	3800		.275	EN 110 ME 600		Aer-Chlor	888	2950	.4	.3	Cont.Stab.,P.Pon	d 23	Alligator Crk Lemon Bay	
	246	480	.129	.05	26,390	None	Aer-Chl-Filt	241	1000	.075	.129	Imhoff	37	Canal - Myakka River - Charlotte Harbor	•
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