# 2006
# Metropolitan Area Facility Plan Update

## Pima County Wastewater Management Department

Pima County Wastewater Management Department

Brown and Caldwell

# Foreword

The Draft Pima County Metropolitan Area Facility Plan Update was initially published in May 2005. The Facility Plan documents the long-range facility planning process for Pima County Wastewater Management Department (PCWMD) which establishes the capital improvement needs for the next 20 years based on the regulatory, expansion and rehabilitation requirements of the Metropolitan Area Facilities. This final draft is called the 2006 Pima County Metropolitan Area Facility Plan Update (Facility Plan).

## Presentations and Comments

After publication of the draft Metropolitan Area Facility Plan Update, PCWMD staff initiated a comprehensive outreach program to present the contents and findings of the Facility Plan to all Pima County jurisdictions and other major stakeholders receiving sewer service from the Department. Presentations were made to:

- City of South Tucson.
- City of Tucson Department of Urban Planning and Design.
- City of Tucson Rio Nuevo Project.
- Coalition for Sonoran Desert Protection.
- Cortaro/Marana Irrigation District.
- Flowing Wells Irrigation District.
- Marana Water Utility.
- Metropolitan Domestic Water Improvement District.
- Oro Valley Water Utility.
- PAG Environmental Planning Advisory Committee.
- PAG Watershed Planning.
- Pima County Public Works Department Heads.
- Southern Arizona Home Builders Association (SAHBA).
- Town of Marana.
- Town of Sahuarita.
- Tucson Audubon Society.
- Tucson Regional Economic Organization (TREO).
- Tucson Water.

PCWMD requested comments and suggestions for improvements to the Facility Plan from all interested parties. The Department received comments both during the presentations and afterward. Most significant in this process were comments about:

- The Facility Plan's relationship to the other regional water and water quality plans being developed at the same time such as the Revised Pima County Association of Governments (PAG) 208 Plan and the City of Tucson's *Water Plan: 2000 - 2050*.
- The relationship of the population and flow data assumptions in the Facility Plan Update with those in the Revised PAG 208 Plan and Tucson's *Water Plan: 2000 - 2050*.
- The discussion of effluent in Chapter Six.
- Future plans for wastewater conveyance and treatment capacity in the HAMP and Southlands area.

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The PCWMD followed up on these comments with a combination of joint work sessions and discussions with interested parties to produce the responses outlined in the following sections.

### *Comments on the Facility Plan's Relationship to the Revised PAG 208 Plan and Tucson's Water Plan: 2000 - 2050*

PAG is currently completing a multi-year process to update and consolidate in one document the original 1978 PAG 208 and the subsequent 26 Amendments, Updates and related Regional Council actions. This update is supported by the involvement of PCWMD staff. The City of Tucson Water Department has developed Tucson's *Water Plan: 2000 - 2050*; and has embarked on a multi-year advanced planning process to use the water Plan to educate the community on the choices and issues which lie ahead for Tucson Water and its customers. These issues and choices include the alternative water sources available and the treatment and distribution issues associated with those sources. Comments were made on the need for some relationship and coordination with this entire advance planning for water resources, area-wide water quality planning and future wastewater infrastructure.

#### PCWMD's Response

- Scheduled presentations and small working group sessions with both PAG and Tucson Water on these planning efforts, which resulted in better mutual understanding of water/wastewater planning processes and specific issues/constraints for each agency.
- Exchanged comments and suggestions for changes in these Plans with PAG and Tucson Water staff and arranged with PAG and Tucson Water for presentations of these plans to the Wastewater Management Advisory Committees.
- Established a joint schedule with PAG for review of final drafts, parallel community outreach efforts and institutional approvals for the Facility Plan and PAG 208 Plan Revision documents Tucson's *Water Plan: 2000 - 2050* is on a much longer review and comment schedule.

In addition, a number of specific comments and suggestions for changes were made which are detailed, along with PCWMD's responses, in the following sections.

### *Specific Comments on Population and Flow Data Relationships throughout the Plan*

Comments were received on the population and flow data in the Facility Plan such as:

- Population and flow projections should be consistent with Tucson's *Water Plan: 2000 - 2050.*
- Plan for a new treatment facility for Houghton Area (HAMP).
- Coordinate Facility Plan Update data with the PAG 208 Plan.
- Provide information on the present and future volume of effluent that more closely matches Tucson's *Water Plan: 2000 - 2050* and the PAG 208 Plan.

#### PCWMD's Response

- Included PAG and Tucson Water in a three-way reconciliation of population and flow data.
- PAG, Tucson Water and PCWMD have agreed to use the latest TAZ data.
- Established common basis for gallons per capita per day (GPCD), return flow and effluent volume calculations.
- Identified logical sewer basin boundaries for future septic system utilization forecasts.
- Extended the population/flow projection time-span for the Facility Plan to 2030 consistent with the TAZ data sets and Tucson's *Water Plan: 2000 - 2050*.

- Established a memorandum of agreement with Tucson Water so all current (PAG 208 Plan Revision, Tucson's *Water Plan: 2000 - 2050* and the Facility Plan) and future long range water/wastewater planning will utilize a common population data set and common assumptions.

These changes are reflected in sub-chapters 3.4, 4.2, 5.2, 5.3 and 5.4.

### *Discussion of Effluent in Chapter 6 of the Facility Plan*

Comments were received regarding the discussion of effluent in Chapter 6 such as:

- Lack of agreement with Tucson's *Water Plan: 2000 - 2050*.
- Uncertainty regarding Arizona's Assured Water Supply (AWS) rules.
- Need for clarification on the division of effluent among the Federal Government, Tucson Water, other Metropolitan Area water suppliers, the Conservation Effluent Pool, the Upper Santa Cruz Managed Recharge Project, the Lower Santa Cruz Recharge Project and the allocations set forth in the 1979 IGA and the 2000 Supplemental IGA.
- Reclaimed water delivery clarification.
- Differences in effluent quantity predictions need to be reconciled which is a similar issue raised in other comments.
- Tucson Water's issues with the water policy language throughout the Chapter but specifically on page 6-9.

#### PCWMD's Response

- Jointly working with Tucson Water staff to reach agreement on the population, portion of the population connected treatment facilities, the per capita generation of sewerage and the resultant quantities of effluent collected in 5 year increments in the period from 2005 to 2030.
- Meeting with Tucson Water's staff and jointly agreeing on the Facility Plan text which references Tucson Water planning issues and the *Water Plan: 2000 - 2050*.
- Meeting with Tucson Water's staff and jointly agreeing on the text referenced to the division of effluent among those entitled to a portion of the effluent.
- Agreeing with Tucson Water's staff on the language describing reclaimed water issues and Tucson Water's plans for reclaimed water utilization.
- Reviewing other language issues and resolving these issues to each party's mutual satisfaction.

These changes are reflected in Chapter 6.

### *Future Plans for Wastewater Conveyance and Treatment Capacity*

In response to comments on the future plans for wastewater conveyance and treatment capacity particularly in the HAMP and Southlands area, the Department has:

#### PCWMD's Response

- Added a map reference to potential wastewater treatment facility site for the HAMP area.
- Used the updated TAZ population forecasts to revise wastewater flows in the HAMP and Southlands areas.
- Clarified that the Southlands is a device to determine wastewater quantities in the area and that the terminus of the Southlands is a "Collection Point" and not the location of a future Treatment Plant.

- Initiated joint planning with Tucson Water and City of Tucson Planning for water/wastewater infrastructure for HAMP area.

These changes are reflected in sub-chapter sections 5.2, 5.3 and 5.4.

### *Revised and Updated Narrative*

PCWMD also updated several narrative sections of the Facility Plan to account for recent developments and events since the initial publication in May 2005:

- Chapter 3.1 (Regulatory) – updated to reflect the current issues and status of the ADEQ Triennial Review and resolution of the 2002 Speedway Sinkhole Incident and resulting Consent Decree.
- Chapter 7 (Biosolids) – updated to reflect PCWMD's involvement with the National Biosolids Partnership.
- Chapter 8 (CIP) – updated to reflect the revised five-year CIP prepared for the 2006-07 Financial Plan.
- Chapter 9 (Funding) – updated to reflect the revised five-year CIP prepared for the 2006-07 Financial Plan.

### *Other Department Initiatives in Response to the Plan*

PCWMD has developed individual strategy documents for the Avra Valley, Marana and Corona Wastewater Treatment Facilities to define and establish the coordination and funding needed over the next three to five years to maintain and expand treatment capacity to provide service to the rapidly expanding population in these areas. In addition, once the Facility Plan is adopted, the Department will then proceed to an in-depth study of each Outlying Treatment Facility for the same 20 year advance planning period.

In addition, PCWMD's internal response to the Facility Plan projections and findings prompted the implementation of several major studies including a comprehensive look at the nitrification/denitrification (NdN) requirements of the new AZPDES permits for the Ina Road WPCF and the Roger Road WWTP, the rehabilitation needs of the aging Roger Road WWTP and the system-wide detection and prevention of odors from both conveyance and treatment facilities, with a special focus on the long-standing odor issue at the Roger Road WWTP.

### *2005 Black and Veatch Rate Study*

In FY2004/05, PCWMD commissioned Black & Veatch to conduct a comprehensive study of rates and charges and cost of service. In July 2005, the Board of Supervisors approved significant increases in rates and charges to support required basic PCWMD O&M costs, address the increased treatment plant expansion costs, fund 2004 Bond Authorization Projects and initiate a proactive rehabilitation program.

### *Capital Planning Estimates*

The ranges of estimated costs for the 2008 Authorization Bond projects are the best professional judgment of these costs available at this time. The results of the two major studies begun this year, the regionalization and NdN for the major Metropolitan Treatment Facilities and the system-wide Odor Control Evaluation, will significantly impact the cost estimates for these projects. Other project scopes depend upon the determinations made in these studies. As project scoping and cost data are defined, the Proposed 2008 Bond Authorization Program will be adjusted accordingly.

## Going Forward

As is noted in the Executive Summary, this Facility Plan Update is envisioned as a "living document." What this means to PCWMD is the creation and maintenance of a continuous forward planning process wherein the facts and assumptions in the Facility Plan are reviewed every two years. This would allow for the preparation of an "update" document which would reflect changes in conditions on the ground and planning assumptions with a projection of how these changes would advance, delay or revise the projects noted in this draft of the Facility Plan.

## In Closing

PCWMD wishes to thank all those agencies and individuals who attended our presentations and submitted so many thoughtful, helpful comments about the Facility Plan contents, findings and processes. Your assistance has been gratefully appreciated.

Pima County Wastewater Management Department
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# Acknowledgements


1. Pima County

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3. Pima Association of Governments

- Greg Hess, Andy Gunning and Claire Zucker.

4. Local Jurisdictions

- City of Tucson.
- Town of Oro Valley.
- Town of Marana.
- City of South Tucson.
- Town of Sahuarita.

5. Additional Information

- Camp, Dresser & McKee - Richard Meyerhoff.
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## LIST OF ACRONYMS

| | |
|---|---|
| A&W | AQUATIC AND WILDLIFE PROTECTED USE |
| AAC | ARIZONA ADMINISTRATIVE CODE |
| ABF | ACTIVATED BIOFILTER |
| ABS | ACRYLONITRILE BUTADIENE STYRENE |
| ACOE | ARMY CORPS OF ENGINEERS |
| ACP | ASBESTOS CONCRETE PIPE |
| ACSC | AVIATION CORRIDOR TO SANTA CRUZ INTERCEPTOR |
| ACSE | AVIATION CORRIDOR TO SOUTHEAST INTERCEPTOR |
| ADEQ | ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY |
| ADF | AVERAGE DAILY FLOW |
| ADHS | ARIZONA DEPARTMENT OF HEALTH SERVICES |
| ADOT | ARIZONA DEPARTMENT OF TRANSPORTATION |
| ADWF | AVERAGE DRY WEATHER FLOW |
| ADWR | ARIZONA DEPARTMENT OF WATER RESOURCES |
| AF | ACRE FEET |
| AGI | AGRICULTURAL IRRIGATION PROTECTED USE |
| AGL | AGRICULTURAL LIVESTOCK WATERING PROTECTED USE |
| AMA | ACTIVE MANAGEMENT AREA |
| AMSA | ASSOCIATION OF METROPOLITAN SEWERAGE AGENCIES |
| APO | ADMINISTRATIVE PENALTY ORDERS |
| APP | AQUIFER PROTECTION PERMIT |
| AS | ARSENIC |
| AWWQRP | ARID WEST WATER QUALITY RESEARCH PROJECT |
| AWS | ASSURED WATER SUPPLIER |
| AZPDES | ARIZONA POLLUTANT DISCHARGE ELIMINATION SYSTEM |
| BADCT | BEST AVAILABLE DEMONSTRATED CONTROL TECHNOLOGY |
| BF/AS | BIOFILTER/ACTIVATED SLUDGE |
| BF/SC | BIOFILTER/SOLIDS CONTACT PROCESS |
| BER | BIOSOLIDS ENRICHMENT AND RECYCLING |
| BLM | BUREAU OF LAND MANAGEMENT (US DEPARTMENT OF INTERIOR) |
| BMPs | BEST MANAGEMENT PRACTICES |
| BNR | BIOLOGICAL NUTRIENT REMOVAL |
| BNRAS | BIOLOGICAL NUTRIENT REMOVAL ACTIVATED SLUDGE |
| BNROD | BIOLOGICAL NUTRIENT REMOVAL OXIDATION DITCH |
| BOD | BIOCHEMICAL OXYGEN DEMAND |

## LIST OF ACRONYMS (CONTINUED)

| | |
|---|---|
| BTU/lb | BRITISH THERMAL UNIT/POUND |
| CAP | CENTRAL ARIZONA PROJECT |
| CCTV | CLOSED CIRCUIT TELEVISION |
| CDO | CANADA DEL ORO |
| CEC | CATION EXCHANGE CAPACITY |
| CEP | CONSERVATION EFFLUENT POOL |
| CERCLA | COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION AND LIABILITY ACT |
| CFM | CUBIC FEET PER MINUTE |
| CFR | CODE OF FEDERAL REGULATIONS |
| CG-85 | CONSTRUCTION GRANTS 1985 |
| CIP | CAPITAL IMPROVEMENT PROGRAM |
| CIPP | CURED IN PLACE PIPE |
| CMID | CORTARO-MARANA IRRIGATION DISTRICT |
| CMMS | COMPUTERIZED MAINTENANCE MANAGEMENT SYSTEM |
| CMOM | CAPACITY, MANAGEMENT, OPERATIONS AND MAINTENANCE |
| CRWWPS | CONTINENTAL RANCH WASTEWATER PUMP STATION |
| CWA | CLEAN WATER ACT |
| DAF | DISSOLVED AIR FLOTATION |
| DI | DUCTILE IRON |
| DIP | DUCTILE IRON PIPE |
| DMA | DESIGNATED MANAGEMENT AGENCY |
| DPA | DESIGNATED PLANNING AGENCY |
| EDW | EFFLUENT DEPENDANT WATER |
| EIS | ENVIRONMENTAL IMPACT STATEMENT |
| ENR | ENGINEERING NEWS RECORD |
| EPA | U.S. ENVIRONMENTAL PROTECTION AGENCY |
| EQA | ENVIRONMENTAL QUALITY ACT |
| ER | EMERGENCY RESPONSE |
| ESA | ENDANGERED SPECIES ACT |
| FBC | FULL BODY CONTACT PROTECTED USE |
| FEP | FACULATIVE/EVAPORATION PONDS |
| FOIA | FREEDOM OF INFORMATION ACT |
| FPS | FEET PER SECOND |

## LIST OF ACRONYMS (CONTINUED)

| | |
|---|---|
| GAO | GENERAL ACCOUNTING OFFICE |
| GASB | GENERAL ACCOUNTING STANDARDS BOARD |
| GIS | GEOGRAPHIC INFORMATION SYSTEM |
| GPCD | GALLONS PER CAPITA PER DAY |
| GPD | GALLONS PER DAY |
| GPM | GALLONS PER MINUTE |
| GPM/SF | GALLONS PER MINUTE PER SQUARE FOOT |
| HAMP | HOUGHTON AREA MASTER PLAN |
| HDPE | HIGH DENSITY POLYETHYLENE |
| hP | HORSEPOWER |
| HPO | HIGH PURITY OXYGEN |
| HPI | HARRISON-PANTANO INTERCEPTOR |
| HUC | HYDROLOGIC UNIT CODE |
| IGA | INTERGOVERNMENTAL AGREEMENT |
| IHC | INCIDENTAL HUMAN CONTACT PROTECTED USE |
| IWC | INDUSTRIAL WASTEWATER CONTROL |
| KERP | KINO ENVIRONMENTAL RESTORATION PROJECT |
| LSCMRP | LOWER SANTA CRUZ MANAGED RECHARGE PROJECT |
| MADF | MAXIMUM AVERAGE DAILY FLOW |
| MBR | MEMBRANE BIOREACTOR |
| MBBR | MOVING BED BIOREACTOR |
| MBTA | MIGRATORY BIRD TREATY ACT |
| MCL | MAXIMUM CONTAMINANT LEVEL |
| MGD | MILLION GALLONS PER DAY |
| MG/L | MILLIGRAMS PER LITER |
| MLE | MODIFIED-LUDZACK ETTINGER |
| MLR | MIXED LIQUOR RECYCLE |
| MSGP | MULTI-SECTOR GENERAL PERMIT |
| MSL | MEAN SEA LEVEL |
| NAAQS | NATIONAL AMBIENT AIR QUALITY STANDARDS |
| NASSCO | NATIONAL ASSOCIATION OF SEWER SERVICE COMPANIES |
| NdeN | NITRIFICATION/DENITRIFICATION |
| NEPA | NATIONAL ENVIRONMENTAL POLICY ACT |

## LIST OF ACRONYMS (CONTINUED)

| | |
|---|---|
| NPDES | NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM |
| NPPO | NATIVE PLANT PROTECTION ORDINANCE |
| NRI | NORTH RILLITO INTERCEPTOR |
| NTU | NEPHELOMETRIC TURBIDITY UNITS |
| NWI | NORTHWEST INTERCEPTOR |
| NWO | NORTHWEST OUTFALL |
| O&M | OPERATION AND MAINTENANCE |
| ONH | OLD NOGALES HIGHWAY |
| OSHA | OCCUPATIONAL SAFETY AND HEALTH ACT |
| PAG | PIMA ASSOCIATION OF GOVERNMENTS |
| PCFCD | PIMA COUNTY FLOOD CONTROL DISTRICT |
| PCWMD | PIMA COUNTY WASTEWATER MANAGEMENT DEPARTMENT |
| PDWF | PEAK DRY WEATHER FLOW |
| PF | PEAKING FACTOR |
| PHF | PEAK HOURLY FLOW |
| PSA | PRESSURE SWING ADSORPTION SYSTEM |
| PSI | POUNDS PER SQUARE INCH |
| PTI | PANTANO INTERCEPTOR |
| PVC | POLYVINYL CHLORIDE |
| PWWF | PEAK WET WEATHER FLOW |
| RAS | RETURN ACTIVATED SLUDGE |
| RBC | ROTATING BIOLOGICAL CONTRACTOR |
| RCP | REINFORCED CONCRETE PIPE |
| RCRA | RESOURCE CONSERVATION AND RECOVERY ACT |
| SARA | SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT |
| SAWRSA | SOUTHERN ARIZONA WATER RIGHTS SETTLEMENT ACT |
| SCADA | SUPERVISORY CONTROL AND DATA ACQUISITION |
| SCC | SANTA CRUZ-CENTRAL INTERCEPTOR |
| SCE | SANTA CRUZ-EAST INTERCEPTOR |
| SCI | SANTA CRUZ INTERCEPTOR |
| SDF | SYSTEM DEVELOPMENT FUND |
| SDWA | SAFE DRINKING WATER ACT |
| SEI | SOUTHEAST INTERCEPTOR |

## LIST OF ACRONYMS (CONTINUED)

| | |
|---|---|
| SRC | SOUTH RILLITO INTERCEPTOR-CENTRAL |
| SRF | STATE REVOLVING FUND |
| SRI | SOUTH RILLITO INTERCEPTOR |
| SRWC | SOUTH RILLITO INTERCEPTOR-WEST, CENTRAL LINE |
| SRWN | SOUTH RILLITO INTERCEPTOR-WEST, NORTH LINE |
| SRWS | SOUTH RILLITO INTERCEPTOR-WEST, SOUTH LINE |
| SSO | SANITARY SEWER OVERFLOW |
| SSIIP | SANITARY SEWER INSPECTION AND INVENTORY PROJECT |
| SWI | SOUTHWEST INTERCEPTOR |
| TAZ | TRAFFIC ANALYSIS ZONES |
| TBFMS | TUCSON BOULEVARD FLOW MANAGEMENT STRUCTURE |
| TDS | TOTAL DISSOLVED SOLIDS |
| TEP | TUCSON ELECTRIC POWER COMPANY |
| TMDL | TOTAL MAXIMUM DAILY LOADS |
| TPD | TONS PER DAY |
| TSCA | TOXIC SUBSTANCES CONTROL ACT |
| TSP | TOTAL SUSPENDED PARTICLES |
| TSS | TOTAL SUSPENDED SOLIDS |
| TVI | TANQUE VERDE INTERCEPTOR |
| TWAS | THICKENED WASTE ACTIVATED SLUDGE |
| USCMRP | UPPER SANTA CRUZ MANAGED RECHARGE PROJECT |
| VCP | VITRIFIED CLAY PIPE |
| VFD | VARIABLE FREQUENCY DRIVE |
| WAS | WASTE ACTIVATED SLUDGE |
| WET | WHOLE EFFLUENT TOXICITY |
| WIFA | WASTEWATER INFRASTRUCTURE PROJECTS |
| WMAC | WASTEWATER MANAGEMENT ADVISORY COMMITTEE |
| WPCF | WATER POLLUTION CONTROL FACILITY |
| WRF | WATER RECLAMATION FACILITY |
| WWPS | WASTEWATER PUMP STATION |
| WWTF | WASTEWATER TREATMENT FACILITY |
| WWTP | WASTEWATER TREATMENT PLANT |

# Executive Summary

The 2006 Pima County Metropolitan Area Facility Plan Update (Facility Plan) is Pima County Wastewater Management Department's (PCWMD) guide for continued development of the metropolitan area of the regional wastewater system. The Facility Plan evaluates the metropolitan area wastewater management needs for the 20-year planning period from 2006 to the year 2026 and recommends capital improvements to the interceptor sewer system and the three metropolitan treatment plants in order to meet these projected needs. The most recent Facility Plan for this area is the Metropolitan Area 201 Facility Plan Update prepared in June 1990, which covered the period from 1990 to 2010. Due to the rapid population growth and wastewater demand over the first decade of this period, PCWMD determined a Facility Plan Update was necessary earlier than originally scheduled.

PCWMD owns and operates a regional wastewater collection, conveyance, and treatment system serving Eastern Pima County as shown in Figure ES.1. The regional system consists of over 3,300 miles of sewer lines (of which 230 miles are major trunk lines or interceptors), 34 conveyance system lift stations, two major wastewater treatment facilities, a water reclamation facility, and eight smaller outlying treatment facilities. In order to protect the public health and meet its customers' short and long-term needs for wastewater collection, conveyance, treatment, and disposal, PCWMD has an ongoing program of wastewater facility planning and capital construction for the regional system. The Metropolitan Wastewater Planning Area (Planning Area) is the portion of the system tributary to the Metropolitan Treatment Facilities and will be the focus of this Facility Plan. However, brief descriptions and discussions of the Outlying Treatment Facilities are included for regional context. This executive summary briefly presents the major findings, conclusions, and recommendations of the Facility Plan.

## PLAN GOALS

The Facility Plan goals are discussed in Chapter 1. The ultimate goal is to effectively serve the health and welfare of residents of Pima County and maintain this valuable asset which has been created over the years by the citizens of Pima County. The planning effort was designed to answer these questions:

- **How will growth affect the system?** Significant population growth is anticipated in the metropolitan area over the next 25 years. However, the amount, distribution and timing of growth within the metropolitan area will affect the extension of the collection system, the location of new treatment facilities, and improvements to existing treatment plants.
- **How will future regulatory changes impact the effluent quality requirements and the operations and maintenance of the treatment and conveyance systems?** Federal and State regulations and facilities permits are constantly changing and evolving based on local conditions and national/regional initiatives. The Facility Plan discusses these anticipated changes and the potential impacts on the conveyance and treatment operations of the Metropolitan Area system.

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- **How can the treatment and conveyance system be continuously rehabilitated?** As wastewater treatment and conveyance infrastructure across the nation has begun to age, the asset management concept has been a primary driver at many wastewater agencies to develop a systematic approach to identifying and rehabilitating the physical facilities. As part of this report, extensive condition assessments were conducted at the major treatment facilities. These evaluations, together with assessments of the conveyance systems, identify treatment and conveyance rehabilitation needs for the next twenty years. In addition, State and Federal regulations will place higher demands on inspection, maintenance and replacement/rehabilitation of the conveyance system as a means of reducing Sanitary Sewer Overflows (SSOs) and odors, while preserving the value and functionality of the assets. Immediate and long-term rehabilitation programs for both conveyance and treatment facilities are included in the Plan.
- **How will the growth, regulatory and rehabilitation requirements be funded?** The financing of wastewater projects can no longer rely on Federal grants to meet a portion of their funding requirements. The use of voter-approved funds for capital projects is very critical in making system improvements in a timely and cost-effective manner. Additionally, user and connection fees must reflect the total costs of operation and expansion of the system, respectively.

In summary, this Facility Plan is organized to describe the wastewater system in Pima County, to forecast growth within the Planning Area, to identify the regulatory and institutional drivers that impact the collection, treatment and disposal of effluent and biosolids, to describe the current status and proposed future of the conveyance and treatment systems, and to identify the proposed long-range Capital Improvement Program (CIP) for the metropolitan area over the 20-year planning period and funding source. The long-range CIP projects include treatment plant expansions/rehabilitations, major conveyance system improvements, and related activities. Based on the long-range CIP in the Facility Plan, PCWMD staff annually revises and publishes a 5-Year CIP, which identifies immediate capital improvement needs, associated costs, and schedules for implementation. Additionally, the Facility Plan is utilized with PCWMD's Annual Financial Plans.

## *PLANNING AREA*

The Facility Plan focuses on the Metropolitan Area of Eastern Pima County. The Planning Area is described in Chapter 2 and is defined for this Facility Plan as the sewer system tributary to Ina Road Water Pollution Control Facility (WPCF), Roger Road Wastewater Treatment Plant (WWTP) and the Randolph Park Water Reclamation Facility (WRF). Chapter 2 includes discussion of the physical and environmental characteristics of the Planning Area as they relate to the conveyance and treatment of wastewater.

Located in Eastern Pima County, the Planning Area is constrained by mountains on most sides. Surface runoff generally flows northward and westward through the basin. The Santa Cruz River is the major surface drainage channel in the Planning Area and flows northward to the Planning Area's western boundary. The two major treatment plants, Roger Road WWTP and Ina Road WPCF, are located in low-lying areas on the western edge of the basin. The effluent from these two treatment facilities is:

- Discharged to the Santa Cruz River.
- Reused through PCWMD and the City of Tucson Reclaimed Water Systems.
- Recharged to the aquifer.

Area soils, outside of stream channels, have, at best, moderate infiltration rates. The effects of the infiltration characteristics are low natural groundwater recharge rates and relatively high volumes

of surface runoff. There may be other areas in Planning Area that may prove highly conductive for recharge using surface spreading methodologies, dependent on local site conditions. The infiltration rates in the area impact land requirements for effluent to recharge groundwater.

Conducting detailed archaeological surveys of proposed conveyance system routes or new wastewater treatment plants prior to construction will aid in the preservation of archaeological resources.

## PROJECT DRIVERS

Chapter 3 discusses the four primary external drivers impacting the Facility Plan. They include: regulatory drivers, institutional drivers, asset management, and population effects. PCWMD recognizes these drivers have a significant individual and grouped influence on the direction of planning for the future.

### Regulatory Drivers

Major regulatory areas impacting Facility Plan are Federal, State and local regulatory programs for water quality including surface water discharges, groundwater discharges, and reuse activities; Federal and State regulatory programs for biosolids production and disposal; and Federal, State and local regulatory programs for air quality regulations.

All these regulatory program mandates, as well as specific facility permits issued under these programs, impact the future regulatory requirements of the metropolitan wastewater system. These potential impacts include: ammonia and total nitrogen removal requirements at the treatment plants, future regulations for effluent-dependent waters, Capacity Management and Operations Maintenance (CMOM) regulations for the conveyance system, and biosolids regulations. Thus, regulatory requirements will be significant drivers for new CIP projects and CIP implementation schedules.

### Asset Management

Pima County has an ongoing asset management program. Asset management is gaining importance in effective management of wastewater facilities as new CMOM regulations are being formulated at the State and Federal levels. With the adoption of General Accounting Standards Board (GASB) 34, wastewater utilities have to follow mandatory financial standards when reporting on the financial health of an agency. PCWMD maintains and preserves its wastewater assets through scheduled maintenance, replacement and/or rehabilitation projects.

### Institutional Drivers

Pima County has many institutional constraints, including: Statutory Authority, Intergovernmental Agreements (IGAs), Bonding and Covenants, and Litigation and Settlements. As authorized by the Arizona Legislature, Pima County owns and operates a sewer system. Pima County, as the designated management agency (DMA) by the Pima Association of Governments (PAG), has adopted wastewater ordinances and entered into IGAs with the local jurisdictions in support of the 208 Plan mandate to provide for the regionalization of wastewater services in Pima County. Under the 1979 IGA with the City of Tucson, Pima County retains 10 percent of the effluent from its treatment facilities and 90 percent is owned by the City of Tucson. The total effluent available from the treatment plants to the City and County is subjected to settlements with the Federal government. The City's share is further divided among other local water providers. Details of these divisions are found in Chapter 6. This agreement also requires Pima County to maintain the effluent quality in accordance with the Federal National Pollutant Discharge Elimination System (NPDES) and the State of Arizona Pollutant Discharge Elimination System (AZPDES) discharge standards.

In addition, PCWMD operates as an enterprise fund to devote all its revenues to the operation, maintenance, rehabilitation/replacement and expansion of the regional wastewater system. PCWMD charges new users for connecting to the system and collects sewer fees from users. PCWMD has secured funding for large projects both through selling bonds and obtaining public infrastructure loans. As a result, PCWMD is required to maintain its operations in compliance with covenants to the bond purchasers and the public financing authorities.

In summary, PCWMD operates within the institutional framework established by PAG, by way of the DMA designation and 208 Plans, as well as the State enabling legislation, including the bonding authorization, and IGAs with local jurisdictions.

### Population Effects

The population in the Planning Area is growing at a rate of 2.2 percent per year. This Facility Plan uses population forecasts developed by PAG to predict growth. Officially adopted PAG population projections for Pima County were utilized for developing Planning Area population and wastewater flow projections. The Facility Plan Model, a GIS and Excel spreadsheet model, was developed as part of this Facility Plan to predict future population trends and their effects upon PCWMD's conveyance and treatment systems. The Planning Area population is projected to grow by about 11 percent between 2005 and 2010, 10 percent between 2010 and 2015, 9 percent between 2015 and 2020, 8 percent between 2020 and 2025, and 8 percent between 2025 and 2030. A summary of the Planning Area's population in 5-year increments from 2005 through 2030 is presented in Table ES.1. The Pima County population is expected to grow from 916,026 in 2005 to 1,496,045 in 2030. This equates to wastewater collection and treatment

*Table ES.1 Planning Area Population Projections*

| Year | PAG Eastern[3] Pima County Population | Total[1] Population in PCWMD Sewer Basins | Roger Road WWTP Sewer Basin Population | Ina Road WPCF Sewer Basin Population | Total[2] Population in the Outlying Sewer Basin |
|---|---|---|---|---|---|
| 2000 | | 767,855 | 489,399 | 243,238 | 35,218 |
| 2005 | 916,026 | 837,571 | 520,536 | 256,164 | 60,871 |
| 2010 | 1,023,332 | 928,849 | 563,158 | 269,565 | 96,125 |
| 2015 | 1,141,690 | 1,031,142 | 607,065 | 283,032 | 141,046 |
| 2020 | 1,259,689 | 1,133,129 | 650,791 | 296,398 | 185,940 |
| 2025 | 1,378,155 | 1,235,513 | 694,750 | 309,895 | 230,868 |
| 2030 | 1,496,045 | 1,337,400 | 738,416 | 323,233 | 275,750 |

1. Roger Road, Ina Road, Avra Valley and Marana Treatment Plants and Southlands Area.
2. Avra Valley and Maran Treatment Plants and Southlands Area
3. PAG Data - November 22, 2005 (for Pima County)

improvements to handle a total of 85.05 MGD Average Daily Weather Flow (ADWF) in 2030. Based on the PCWMD (for Pima County) planning criteria of 85 gallons per capita per day, the wastewater conveyance and treatment facilities will need to handle an additional 1 MGD ADWF for every 11,765 new residents served. The flow projections from Chapter 3 are compared to PCWMD's treatment and conveyance system capacity in Chapters 4 and 5. These comparisons allow effective management of the wastewater flow and planning for the conveyance and treatment system improvements based on capacity requirements needed to address planned growth.

## CONVEYANCE SYSTEM

Chapter 4 focuses on PCWMD's conveyance system, including sewer lines, manholes, diversion structures and lift stations. These systems service the Pima County Metropolitan Area and the outlying facilities. Portions of the system date back to 1900 and include nine different pipe materials. The Drivers, discussed in Chapter 3, with the biggest impact on the conveyance system are asset management, regulatory requirements and population effects. The asset management driver relates to rehabilitation and replacement projects to maintain the integrity of the system. The regulatory driver for conveyance relates to the CMOM requirements. The population growth in the Planning Area dictates the capacity expansion needs. The institutional framework driver has negligible impact on the future conveyance system.

In 2003, PCWMD commissioned a conveyance condition assessment as part of its on-going asset management program to evaluate 230 miles of trunk and interceptor sewers 15 inches or greater in diameter. This assessment was performed utilizing the National Association of Sewer Service Companies (NASSCO) condition codes ranging from "excellent" (Class 1) to "immediate attention required" (Class 5). The resulting list of prioritized rehabilitations and replacements derived from this condition assessment are summarized in Chapter 4 Conveyance and in Chapter 8 CIP.

The major area of concern is the unlined reinforced concrete pipe. While only constituting 2 percent of the entire conveyance system, this pipe material is prone to failure in arid conditions with long wastewater travel times in the sewers. Hydrogen sulfide gas is released and causes significant corrosion of the concrete ranging from three to five inches within the pipeline. Segments of the conveyance system were rated as "poor" (Class 4) or "immediate attention required" (Class 5). The portions of the conveyance system with these ratings include Aviation Corridor, Canyon del Oro, Old Nogales Highway, Pantano, Santa Cruz, South East, South Rillito, Southwest and the Tanque Verde Interceptors. Those segments rated Class 5 have been, or are being, immediately repaired as they are identified. Class 4 segments are scheduled to be rehabilitated with the $15 million 2004 Bond Project for Conveyance System Rehabilitation or with System Development Funds as needed. All other segments were rated at a "fair" or "good" condition and recommended for re-evaluation on an ongoing basis. Additional rehabilitation/replacement needs for the conveyance system include 1,500 manholes, several siphon boxes, and many of the lift station wet-wells.

In addition, future conditions were analyzed based on the population effects driver. The capacity limitations involving the metropolitan area conveyance system's large diameter pipe (greater than 15 inches in diameter) identified by the Facility Plan Model are surprisingly few. Most growth is currently in the areas on the edges of the metropolitan area, in areas served by the (satellite) Outlying Treatment Facilities or basins on the extreme upstream reaches of the Metropolitan Conveyance System. The conveyance systems in the outlying areas were not initially included in this Facility Plan scope of work; however, a brief description and discussion of current and future conditions is included for context with the metropolitan area system.

### Conveyance System Recommendations

- CCTV and condition assessment for over 3,100 miles of sewer lines on an on-going basis
- Develop comprehensive CMOM program, including an asset management program
- Rehabilitate 1,500 manholes
- Rehabilitate portions of the collection system with Grade 4 "Poor" and higher
- Perform engineering studies on interceptors identified by the model as having potential capacity issues

The Facility Plan Model identifies two classes of capacity problems, Red and Orange, as shown in Figure ES.3 and ES.4. The Orange classification identifies sections of the interceptor that may have a capacity problem and suggests an engineering study be commissioned to determine the severity of the problem. A Red classification indicates the sewer is forecasted to be flowing at higher than 85 percent of its capacity and corrective action should be instituted immediately. Only a few Red or Orange conditions were found for the 2005-2010 period. Those segments will be upgraded through the $25 million 2004 Bond Authorization Project for the construction of the Santa Cruz Interceptor: Prince to Franklin. The early identification of potential capacity problems for the years 2010 and beyond will allow PCWMD to institute corrective actions on a priority basis.

## TREATMENT SYSTEMS

The Metropolitan Tucson Planning Area is defined for the Facility Plan as the sewer system that is tributary to the metropolitan area facilities. However, since PCWMD treats wastewater flows at three facilities in the Metropolitan Area and at eight smaller facilities in outlying communities within Pima County, the Facility Plan includes a brief description and discussion of the eight outlying treatment facilities for context with the metropolitan area. Chapter 5 is divided into current and future conditions for the Metropolitan Area Treatment Facilities, current and future conditions for the Outlying Treatment Facilities and Treatment Modeling.

### Metropolitan Area Treatment Facilities – Current Conditions

The Metropolitan Tucson wastewater treatment facilities are the Roger Road WWTP, the Ina Road WPCF and the Randolph Park WRF. The Roger Road WWTP is a trickling filter and activated sludge facility with a capacity of 41 MGD average dry weather flow (ADWF). Ina Road WPCF is a 25 MGD high purity oxygen activated sludge system and a new 12.5 MGD biological nutrient removal activated sludge facility capable of nitrification/denitrification. The Randolph Park WRF is a 3 MGD Membrane Bioreactor facility capable of producing denitrified Class A reuse water for discharge into the Tucson Water Reclaimed Water System.

Condition assessments were performed at the Roger Road WWTP and Ina Road WPCF to identify deficiencies. The Roger Road WWTP, because it is the older facility, had the most deficiencies identified for improvement. Corrections to the existing Ina Road WPCF were less significant.

### Metropolitan Area Treatment Facilities – Future Conditions

Capacity expansion of any of the Metropolitan Area Treatment Facilities is not anticipated until the later stages of the planning period. Population growth is projected to be the greatest in the Roger Road WWTP Tributary Area; therefore, addressing the treatment concerns in this area is a high priority. To achieve this, the Plant Interconnect project, funded in the 2004 Bond Authorization Project, will allow increased flows to the Roger Road WWTP to be transported and treated at the Ina Road WPCF. This is demonstrated by the “Managed Flows” in Table ES.2 which depicts wastewater flow balancing between the metropolitan area wastewater treatment facilities.

Nitrification/denitrification of the original 25 MGD Ina Road WPCF is a significant project in this planning period and will need to be followed by nitrification/denitrification at the Roger Road WWTP during the same period.

A wastewater treatment/water reclamation facility in southeastern Tucson is also identified and anticipated sometime between 2010 and 2020. Until adequate wastewater flow is available in the area, initial flows will be transported through the Pantano and/or Southeast Interceptors.

*Table ES.2 Managed Flows*

| Wastewater Managed Flows to the Roger and Ina Treatment Plants | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Roger Road WWTP System | | | | | | Ina Road WPCF System | | | | |
| | Roger Rd WWTP Tributary System Total Population on Sewer | Randolph WRP | Plant Interconnect | Tucson Blvd Flow Management to Ina | Total Flow Treated at Roger Road WWTP MGD | Total Home Flow in Roger System MGD | Ina Rd WPCF Tributary System Total Population on Sewer | Plant Interconnect | Tucson Blvd Flow Management from Roger | Total Flow Treated at Ina WPCF MGD | Total Roger and Ina MGD |
| | (Estimate for 2000) | | | | | | (Estimate for 2000) | | | | |
| **2000** | 459,598 | 0.00 | 0.00 | 0.00 | 42.72[1] | 42.72[1] | 198,821 | 0.00 | 0.00 | 18.58[1] | 61.3[1] |
| **2005** | 503,037 | 0.00 | 0.00 | -5.35 | 39.36 | 44.71 | 225,142 | 0.00 | 5.35 | 22.74 | 62.1 |
| **2010** | 529,568 | 3.00 | 0.00 | -5.35 | 38.60 | 46.95 | 233,150 | 0.00 | 5.35 | 23.39 | 65.0 |
| **2015** | 569,202 | 3.00 | -18.66 | 0.00 | 28.63 | 50.29 | 243,099 | 18.66 | 0.00 | 37.50 | 69.1 |
| **2020** | 604,536 | 3.00 | -17.85 | 0.00 | 32.42 | 53.27 | 253,056 | 17.85 | 0.00 | 37.50 | 72.9 |
| **2025** | 640,506 | 3.00 | -17.07 | 0.00 | 36.24 | 56.31 | 262,811 | 17.07 | 0.00 | 37.50 | 76.7 |
| **2030** | 714,919 | 3.00 | -27.67 | 0.00 | 32.05 | 62.72 | 284,957 | 27.67 | 0.00 | 50.00[2] | 85.05 |

1. Flows taken from plant records for the year 2000.
2. Following the 2026/9 12.5 MGD expansion of Ina Road WPCF to 50 MGD capacity.

Based on evaluation of flows to the metropolitan area treatment facilities, PCWMD currently does not anticipate beginning to plan for treatment expansions at the Ina Road WPCF before 2020. Figures ES.5 and ES.6 graphically depict the metropolitan area treatment system current operations (2005) and future operations (2030), respectively.

PCWMD will consider moving all the biosolids treatment at the two metropolitan facilities to the Ina Road WPCF and evaluating the potential for producing Class A Biosolids treatment. It is anticipated PCWMD will prepare an assessment of the most effective biosolids treatment options for the Ina Road WPCF in conjunction with consolidation of biosolids treatment from the Roger Road WWTP.

### Outlying Treatment Facilities – Current Conditions

The Outlying Treatment Facilities are smaller capacity plants located throughout eastern Pima County. A condition assessment was performed at each of these facilities to determine the short and long-term deficiencies at the Avra Valley, Corona de Tucson, Fairgrounds, Green Valley, Marana, Rillito Vista, Arivaca Junction and Mount Lemmon WWTFs.

### Outlying Treatment Facilities – Future Conditions

Population is the critical driver for improvements at the eight Outlying Treatment Facilities. Numerous large residential developments are being proposed throughout the PCWMD service area. This population growth is of greater concern at the smaller capacity treatment facilities, ranging from less than 0.01 MGD to 4.1 MGD, due to the greater capacity impacts from increasing populations. Capacity expansions and upgrades to facilities are recommended to improve capacity and operational performance, especially at the Avra Valley, Corona de Tucson and Marana WWTFs.

*Figure ES.5 Metropolitan Treatment System Status as of March 2005*

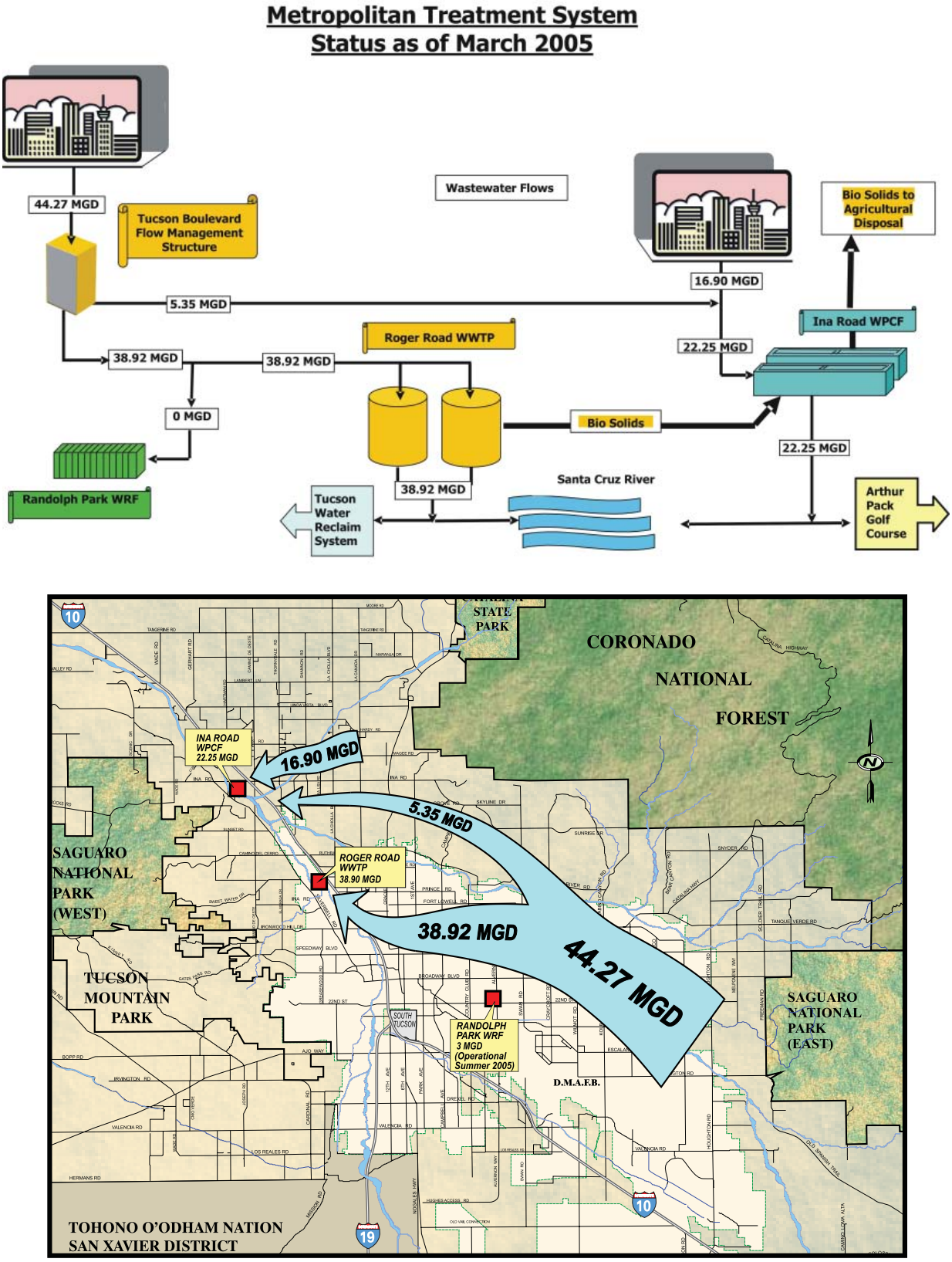
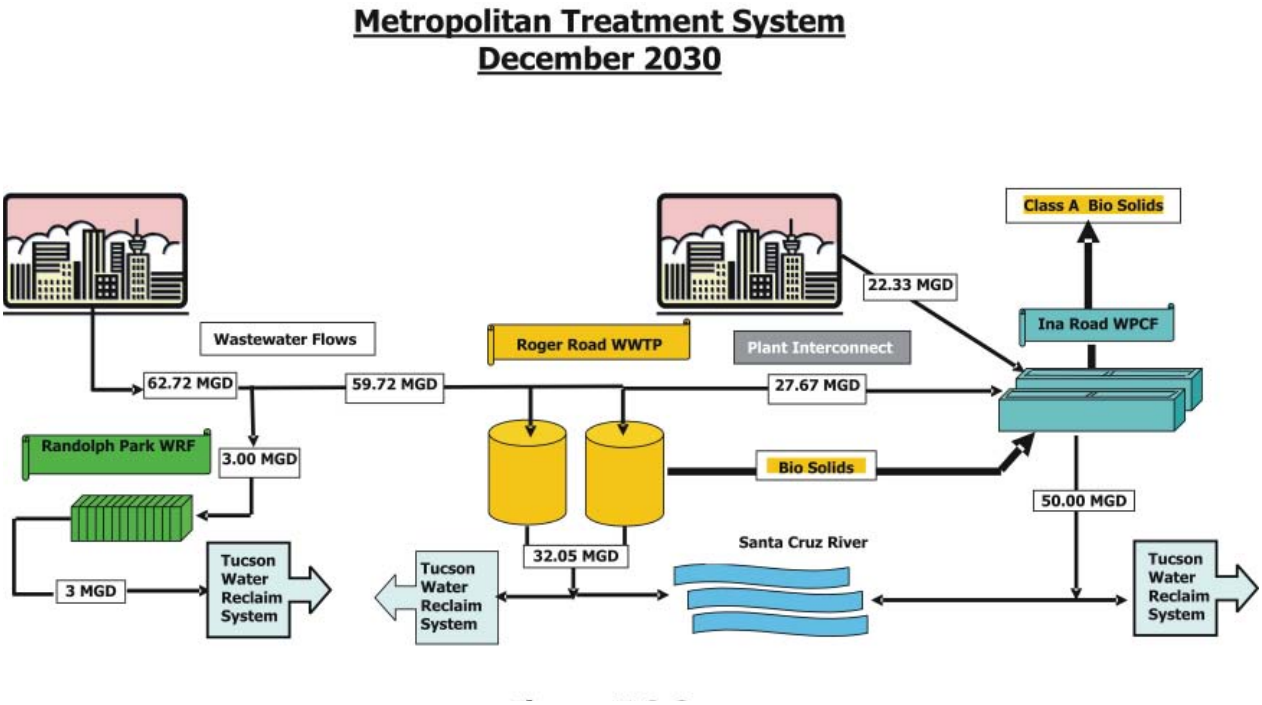
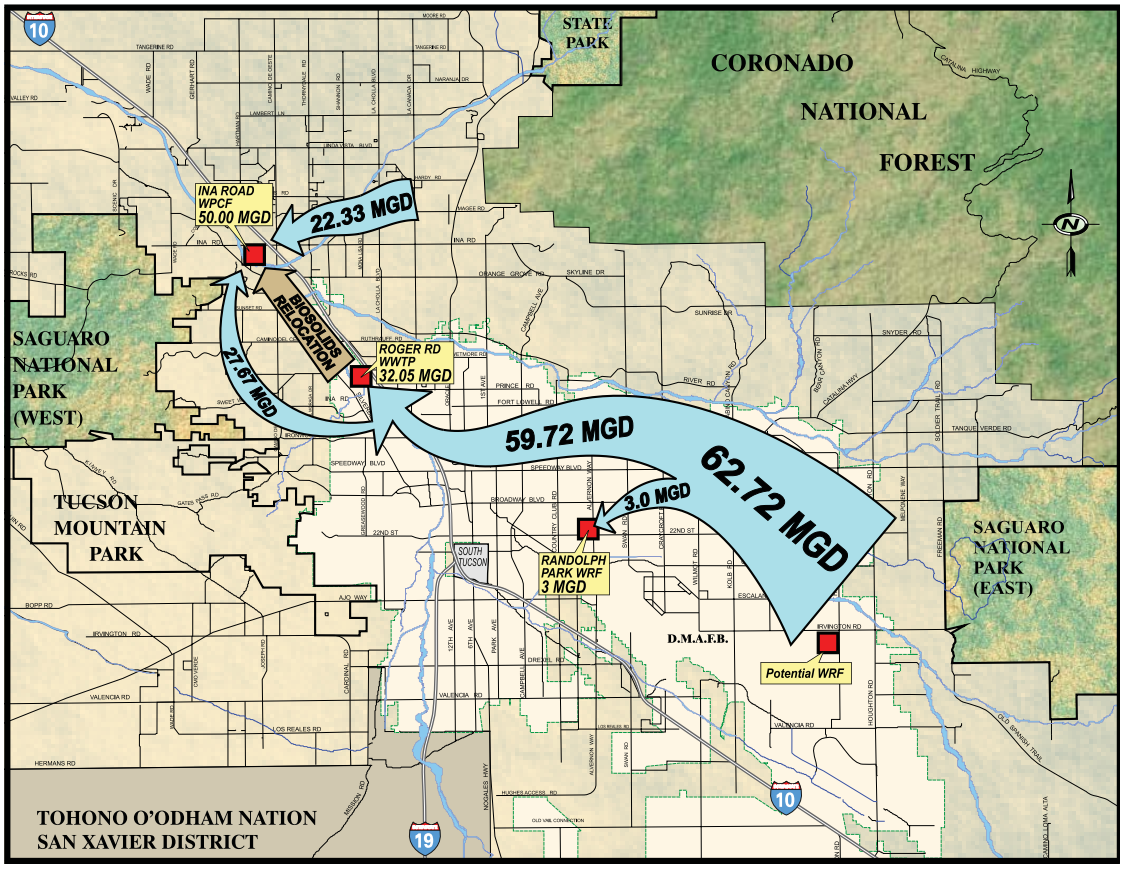


*Figure ES.6 Metropolitan Treatment System December 2030*



Going forward, PCWMD will review the Pima Association of Governments population forecasts as they are issued. The Facility Plan Model will be updated with this information to assess impacts on the conveyance system and treatment capacity. PCWMD will work closely with the jurisdictions and area developers to anticipate growth for the outlying areas and update the Facility Plan, as necessary, to facilitate the schedule and funding for these capacity expansions.

### Treatment Modeling

To evaluate the wastewater treatment processes and potential capacity at the Roger Road WWTP and Ina Road WPCF, PCWMD commissioned a process modeling effort utilizing Hydromantis, Inc. using their GPS-X model. This process model was developed and calibrated to simulate process functioning and facility capacity. It also simulates the treatment capacity under a range of regulatory effluent quality requirements. Seven different capacity scenarios were developed focusing on process modifications at the metropolitan facilities. Each of the scenarios was evaluated against performance indicators and cost-effectiveness of the treatment process modifications. Results of the analysis will be used to guide operational strategies and investigations at the facilities.

### Treatment System Recommendations

- Place the new 3 MGD Randolph Park WRF and 12.5 MGD Ina Road WPCF in service in 2005.
- Rehabilitate Ina Road WPCF in accordance with Chapter 5.1 recommendations.
- Construct the Plant Interconnect between Roger Road WWTP and the Ina Road WPCF expeditiously to relieve flow at the Roger Road WWTP.
- Initially transport flow tributary to the Roger Road WWTP for treatment at the expanded Ina Road WPCF.
- Convert the main electrical transformer at the Roger Road WWTP from a Delta to a Wye system.
- Convert the Roger Road WWTP away from plant generated gas to electric driven motors.
- Modify the Roger Road WWTP so half the facility can be taken out of service to facilitate rehabilitation and upgrade.
- Rehabilitate/upgrade the portion of the Roger Road WWTP that is off-line following the Chapter 5.1 recommendations.
- Upgrade the powerhouse to total methane gas turbine generators to utilize gas generated by the Ina Road WPCF.
- Rehabilitate/upgrade of the first half of the Roger Road WWTP and then the remaining half.
- In 2020, begin engineering to expand the Ina Road WPCF to 50 MGD.
- Initiate the 2004 bond project, Ina Road WPCF Denitrification, and determine necessity of additional funds to nitrify/denitrify the 25 MGD HPOAS train.
- Evaluate/implement nitrification/denitrification at the Roger Road WWTP.

## EFFLUENT REUSE

Effluent reuse, as discussed in Chapter 6, will play a significant role in water and environmental policies and practices in Pima County during the planning period. As the major producer of effluent in Eastern Pima County, PCWMD will have a major role in these issues. While PCWMD is the major producer of effluent, the 1979 IGA with the City of Tucson dictates that after the allocations in the Southern Arizona Water Rights Settlement Act (SAWRSA), which provides the United States with the first 28,200 acre feet (AF) of effluent, the remaining effluent is then allocated to Tucson Water and PCWMD. In recent years, Tucson Water received 90 percent of the remaining effluent; currently equaling 36,000 AF. PCWMD receives the remaining ten percent, which is currently around 4,000 AF. Tucson Water shares approximately eight percent of its allotment with the Metropolitan Domestic Water Improvement District (Metro Water), and five percent with Oro Valley Water Utility. PCWMD receives the remaining ten percent, which is currently around 4,000 AF. Under the 2000 Supplemental IGA, up to 10,000 AF of effluent is available in a Conservation Effluent Pool for environmental restoration projects.

The Tucson Water's *Water Plan: 2000 - 2050* will also play a significant role in development of effluent policy in the greater Tucson area. PCWMD will continue to work toward the goal of using its effluent in the most beneficial manner possible and collaboration with Tucson Water in areas of mutual benefit. Pima County is presently using its allotment or participating in projects such as:

- Ed Pastor Kino Environmental Restoration Project.
- County Parks (including Arthur Pack Golf Course).
- High Plains Project.
- Lower Santa Cruz Managed Recharge Project.

Other environmental restoration projects are envisioned to help make beneficial use of the remainder of Pima County's allotment of effluent including:

- Tres Rios del Norte Project.
- Paseo de Las Iglesias.
- Canoa Ranch.
- Black Wash.

### Effluent Reuse Recommendations

- Collaborate with Tucson Water's Water Plan: 2000 - 2050 in areas of mutual benefit.
- Collaborate with the other water providers and local citizens groups on recharge, reuse and water conservation activities.
- Develop regional reclaimed water policy and effluent utilization practices.
- Work closely with the other Pima County agencies to identify and coordinate existing and potential effluent utilization opportunities.

## BIOSOLIDS

Biosolids management is discussed in Chapter 7. The PCWMD biosolids management program involves anaerobic digestion at the Roger Road WWTP and Ina Road WPCF and conveyance to the centralized biosolids handling facility (Regional Biosolids Facility), for moisture reduction, storage, handling and disposal. The recommended future biosolids improvements include off-loading all solids treatment to Ina Road WPCF. This will include pumping undigested solids from Roger Road WWTP to Ina Road WPCF. In addition, the Facility Plan recommends conversion of anaerobic digestion facilities to produce Class A biosolids.

For an effective biosolids management program, PCWMD should explore and plan for establishing Class A biosolids production facilities. It should also diversify the land application/disposal program to include mine tailings in addition to agricultural lands. In the future, as the need for urban land increases, and farmland is converted to residential areas, land application sites will become increasingly scarce. To enhance reuse options, it is recommended that the biosolids facilities be upgraded to allow production of Class A biosolids.

A comprehensive study to determine the most cost-effective methods for processing of biosolids, as well as the best option for the processing location(s), is recommended. This study will evaluate:

- Types of solids handling facilities which should remain at Roger Road WWTP.
- Solids pumping facilities from Roger Road WWTP to the Ina Road WPCF.
- Odor control in and around both the Roger Road WWTP, Ina Road WPCF and the Regional Sludge Management Facility.
- Upgrades at the Ina Road WPCF to enhance solids content as well as produce Class A biosolids.
- Available local uses for Class A biosolids in various disposal forms.
- Options for solids handling at Outlying Treatment Facilities.

### Biosolids Recommendations

- Perform a comprehensive biosolids management study
- Rehabilitate the existing biosolids facility at the Ina Road WPCF
- Relocate the biosolids handling at Roger Road WWTP to the Ina Road WPCF and centralize the biosolids processing at the Ina Road WPCF
- Upgrade the treatment process for biosolids to produce Class A pathogen-free biosolids.
- Develop an increased diversity of biosolids disposal systems, including land application and mine tailings
- Participate in the National Biosolids Partnership Environmental Management System (best practices) program.

## CAPITAL IMPROVEMENT PROGRAM

The long-range Capital Improvement Program (CIP) for PCWMD is described in Chapter 8 and reflects an overall integrated vision of the future of the system. The immediate goals of the long-range CIP are to complete the 1997 bond projects, begin implementation of the 2004 Bond Authorization funds, and initiate planning for the proposed 2008 Bond Authorization for future projects. The major goals of the long-range CIP are to plan, design and construct the following projects between 2006 and 2026:

- Redistribute flows to the major metropolitan facilities through design and construction of the Plant Interconnect from the 2004 Bond Authorization Project. The three metropolitan area treatment facilities will have a combined capacity of 94.0 MGD ADWF with projected flows of 76. MGD by 2025.
- Initiate improvements at the Roger Road WWTP which include significant process improvements, building and structural upgrades, denitrification, odor reductions and relocation of solids handling to the Ina Road WPCF.
- Initiate improvements at the Ina Road WPCF, which include denitrification of the original 25 MGD plant (funded with 2004 Bond Authorization and augmented by another allocation in the 2008 Bond Authorization), a new lab/administration building, an electrical upgrade, significant miscellaneous rehabilitation, upgrading, and the addition of 12.5 MGD of treatment capacity at the end of the planning period.
- Address major conveyance needs in the Santa Cruz (funded with 2004 Bonds) and the Park/18th Street Interceptors (future bonding).
- Develop conveyance system rehabilitation and a proactive CMOM program (partially funded by the Miscellaneous Conveyance Rehabilitation project in the 2004 Bond Authorization).
- Address capacity and treatment issues in the outlying facilities including Marana, Corona de Tucson and Avra Valley WWTFs.

Detailed CIP project schedules and proposed funding, in 5-year increments, are included in Chapter 8 and a comprehensive fold-out chart for the entire 20 year period is included at the end of Chapter 8.

## FUNDING

Chapter 9 details the various funding sources for PCWMD to operate the wastewater system, perform preventative maintenance, provide for capital rehabilitation, and construct capacity and facilities process improvements. PCWMD was established as an enterprise fund in the County financial structure – a utility operation funded by the revenue it generates from fees charged for its services. Revenues are collected and transferred to Pima County's Finance Department where they are organized and allocated according to the flow of funds adopted in the Board of Supervisors Resolution 1991-138. The principal sources of revenue are Sewer User Fees and Sewer Connection Fees paid by customers of the system as established and modified by ordinances authorized by the Board of Supervisors. Major capital improvements to the system are generally funded by Sewer Revenue Bonds through bond sales or WIFA loan following authorization by the voters.

Preliminary benchmarking reports indicate some common factors regarding PCWMD's fees:

In 2005, the Black & Veatch evaluated the cost of service for existing users and new connections to the wastewater system and made two significant findings:

- **User Fee Rates:** Pima County's user fees show up consistently among the lowest in any of the surveys for agencies of similar size and mission nationwide.
- **Connection Fee Rates:** Pima County is now collecting a reasonable amount of funding from the development industry for growth related expenses.

## *FACILITY PLAN AS A LIVING DOCUMENT*

PCWMD's Facility Plan was developed with multiple assumptions regarding the need and schedule for rehabilitation, replacement and capacity management. PCWMD performed an extensive evaluation of the existing treatment and conveyance systems to document these assumptions and has a program to continuously review new data and re-examine the validity of the assumptions.

Going forward, the Facility Plan will be revised on a periodic basis to incorporate changes, validate these assumptions and conduct a "reality check" on projected conditions. The Facility Plan is a living document to guide PCWMD through the expected growth and regulatory environment over the next 20 years. The ultimate goal is to effectively serve the health and welfare of residents of Pima County and maintain this valuable asset which has been created over the years by the citizens of Pima County.

### Funding Recommendations

- Continue User/Connection Fees as the major revenue sources.
- Other fees and charges should augment revenue.
- Accounting/fund structure should be transparent to source and uses of funds.
- Fund debt service for rehabilitation capital projects through User Fees.
- Develop contingency plans for connection fee shortfalls.
- Adopt modified Raftelis Financial Benchmarks as part of PCWMD's financial goals.
- Incorporate financial goals and forecasts (Capital and O&M) into PCWMD's business plan.
- Implement automation and cost-saving capital construction and treatment process concepts should be an important part of the business plan.
- Implement $150 million 2004 Bond Authorization.
- Obtain Bond authorizations for 2008 ($245 to $355 million), 2012 ($225 to $275 million) and 2016/20 ($325 to $400 million) for a total of $795 to $1,030 million, assuming $10 million annually for capital rehabilitation funded from operating revenue to fund an approximate $1.4 billion 20-year CIP.
- Emphasize capital replacement and rehabilitation to drive approximately 37 percent of the total 20-year $1.4 billion CIP.
- Regulatory upgrades will generate approximately 22 percent of the total expenditures.
- Treatment and conveyance capacity increases will account for approximately 41 percent of the remaining expenditures.

METRO-REGION.CDR

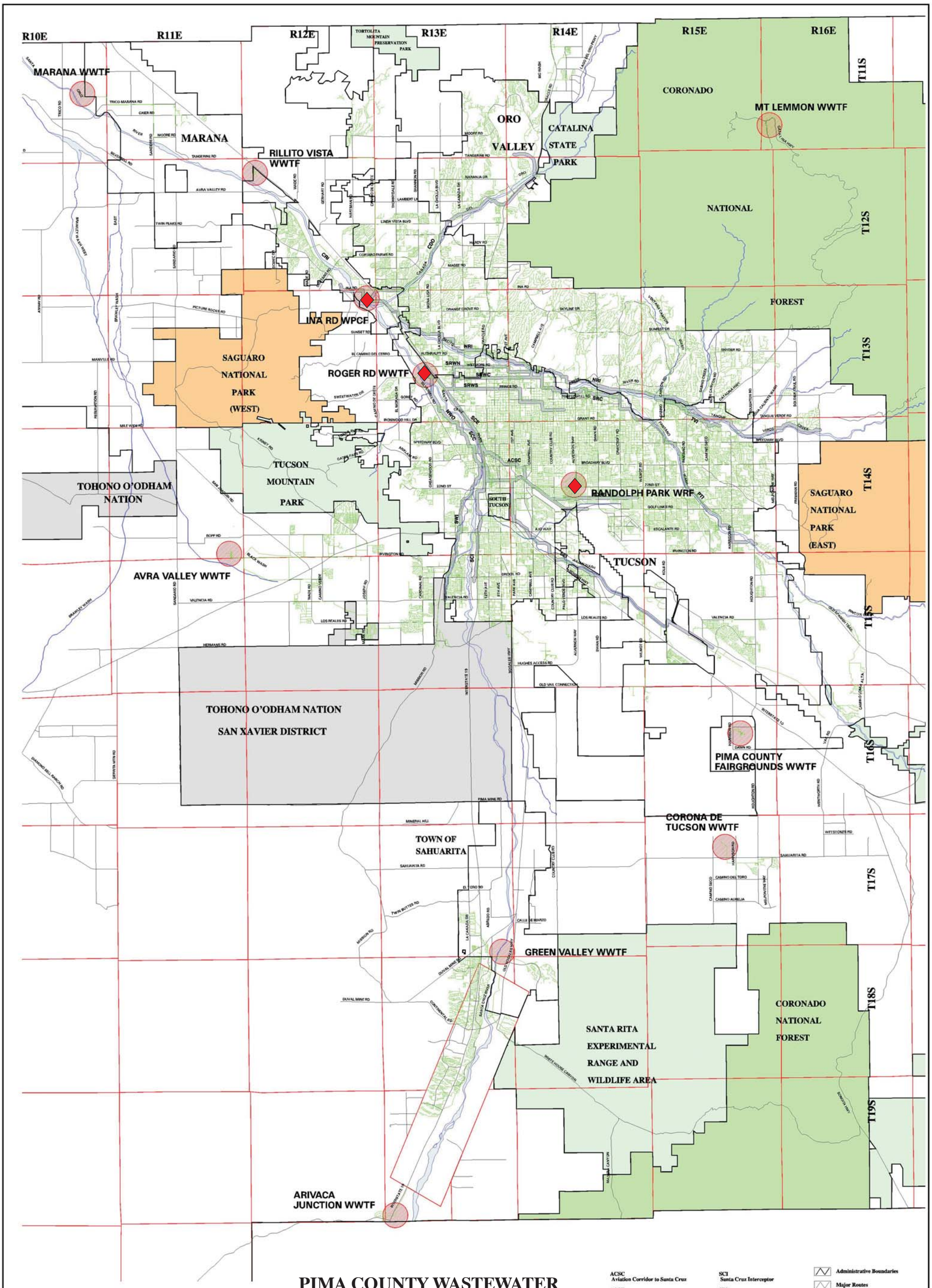



Figure ES.1

**PIMA COUNTY WASTEWATER MANAGEMENT DEPARTMENT**
**SANITARY SEWER COLLECTION SYSTEM AND TREATMENT FACILITIES**

◆ **Metropolitan Treatment Facilities**

ACSC Aviation Corridor to Santa Cruz
ACSE Aviation Corridor to Southeast
CDO Canada Del Oro
CRI Continental Ranch Interceptor
NRI North Rillito Interceptor
NWO Northwest Outfall
PTI Pantano Interceptor
SCC Santa Cruz - Central
SCE Santa Cruz - East
SCI Santa Cruz Interceptor
SEI Southeast Interceptor
SRC South Rillito - Central
SRWC South Rillito - West (Central Line)
SRWN South Rillito - West (North Line)
SRWS South Rillito - West (South Line)
SWI Southwest Interceptor
TVI Tanque Verde Interceptor
Regional Treatment Facilities

Administrative Boundaries
Major Routes
Township/Range Lines
Major Washes
Sewer Lines

PIMA COUNTY WASTEWATER MANAGEMENT DEPARTMENT

JAN 2004 SCALE 1:78000

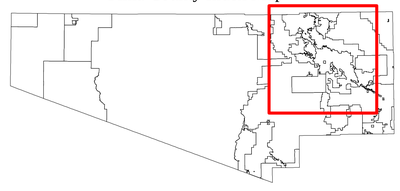
# Population Increase By Sewer Basin For Years 2005 - 2030

2005 TAZ Data

- Basins
- Major Streets
- > 1000% Increase
- 500 - 1000% Increase
- 100 - 500% Increase
- 50 - 100% Increase
- 10 - 50% Increase
- < 10% Increase

# Figure ES.2

Pima County Index Map



Index Map Scale 1:1,500,000



Scale 1:90,000

**Pima County Department of Transportation**

TECHNICAL SERVICES

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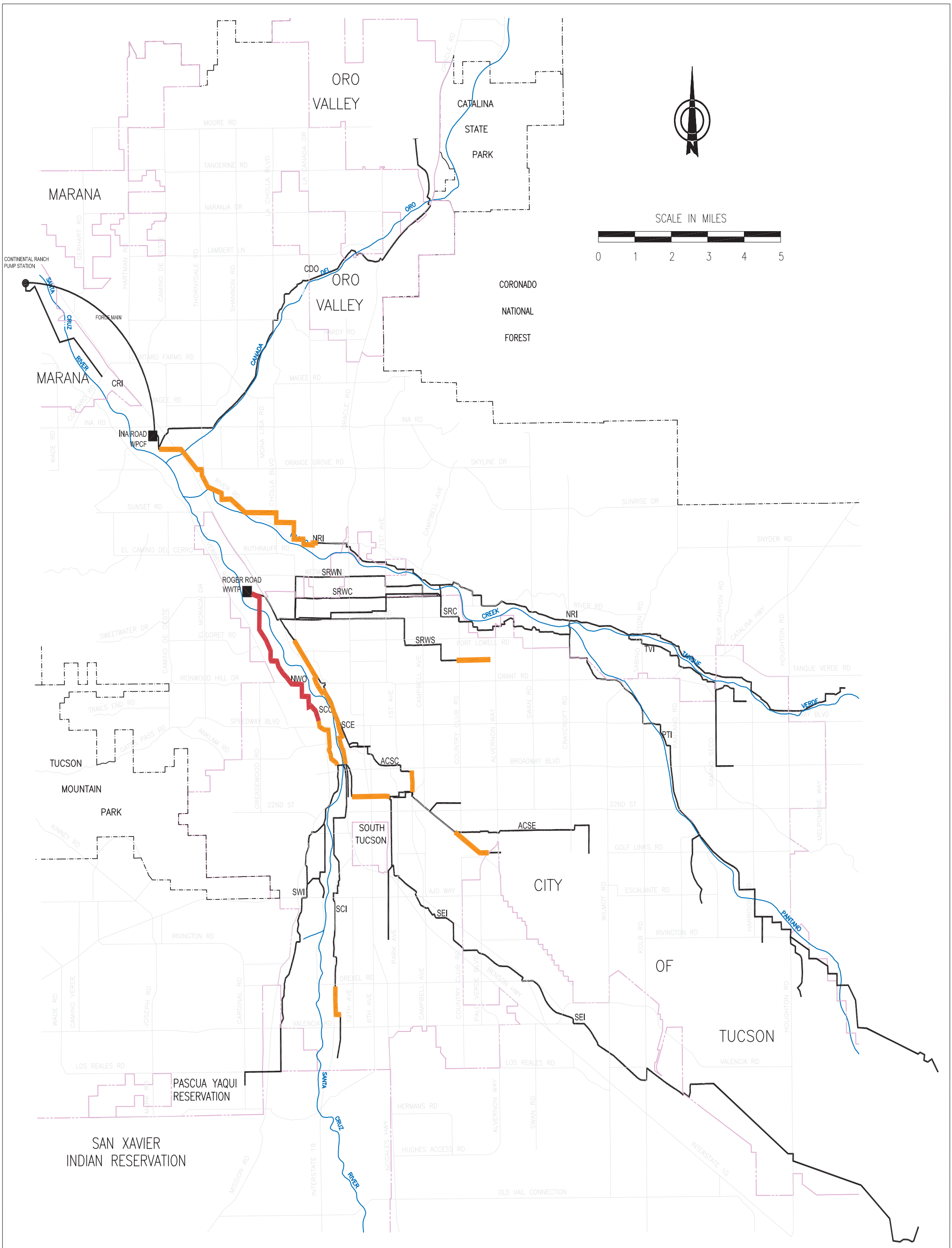
http://www.dot.co.pima.az.us

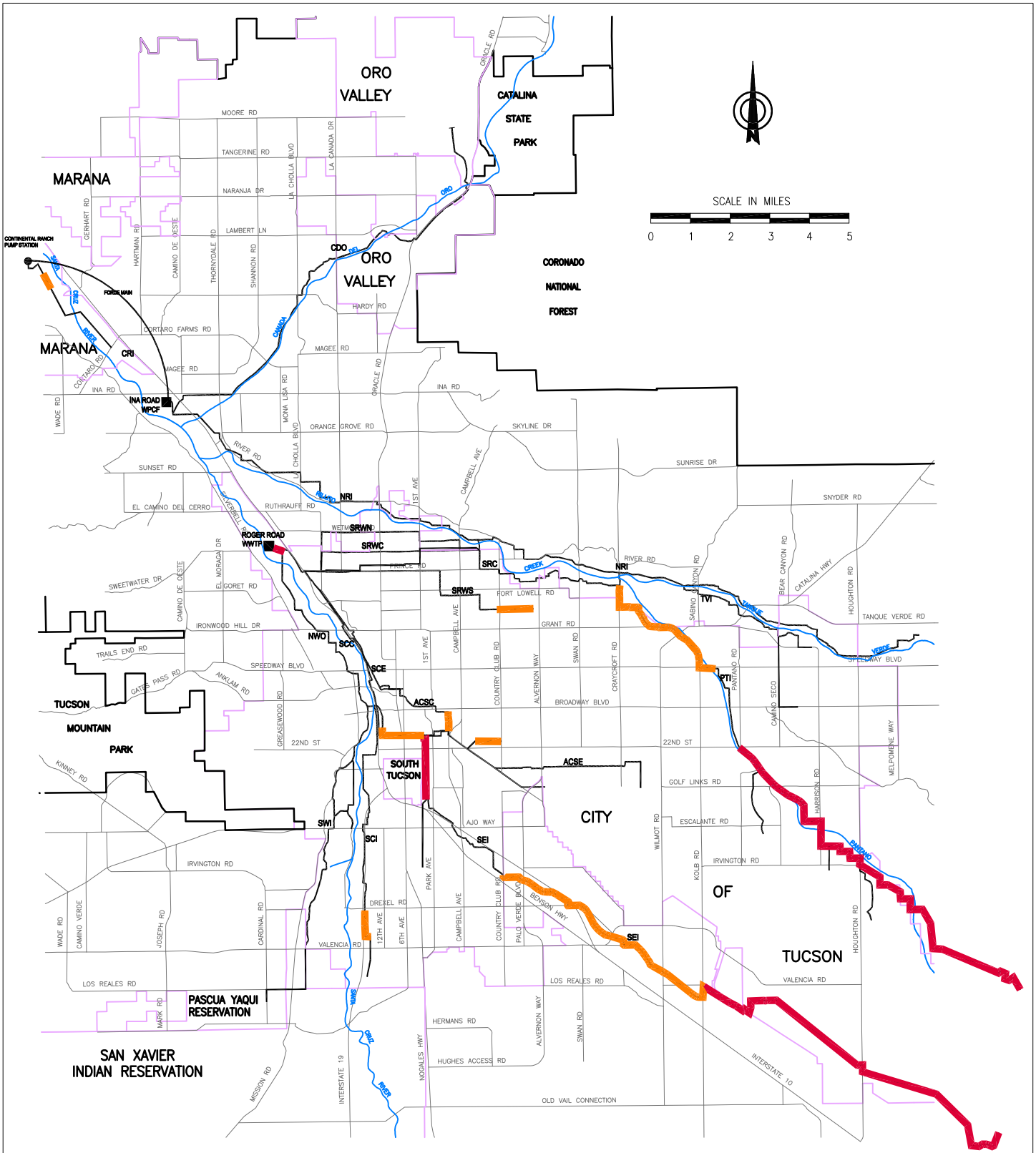
pygmyowl4/projects/wwm8/mxds/pop_increase.mxd mp

11/23/2005




Pima County Wastewater Management Department
Facility Plan Update

# Figure ES.3
Interceptor Issues 2005




**LEGEND**

- **DEFICIENT** (Calculated Basin Exit Flow is Greater Than 85% of Full Pipe Capacity at the Basin Exit)
- **FURTHER** (Calculated Basin Inlet Flow is Greater Than 85% of Full Pipe Capacity Somewhere Within the Basin)

Pima County Wastewater Management Department
Facility Plan Update

# Figure ES.4

# Interceptor Issues 2030

**MAR 2005**

***FIG. ES-5***

***INA ROAD WPCF 22.25 MGD***

***ROGER ROAD WWTP 38.90 MGD***

***RANDOLPH PARK WRF 3 MGD (Operational Summer 2005)***

**16.90 MGD**

**5.35 MGD**

**38.92 MGD**

**44.27 MGD**

CATALINA STATE PARK

CORONADO NATIONAL FOREST

SAGUARO NATIONAL PARK (WEST)

TUCSON MOUNTAIN PARK

SAGUARO NATIONAL PARK (EAST)

D.M.A.F.B.

TOHONO O'ODHAM NATION SAN XAVIER DISTRICT

SOUTH TUCSON

INTERSTATE 10

INTERSTATE 19

MOORE RD
TANGERINE RD
WADE RD
GERHART RD
CAMINO DE OESTE
THORNYDALE RD
SHANNON RD
LA CHOLLA BLVD
LA CANADA DR
NARANJA DR
LAMBERT LN
HARTMAN RD
LINDA VISTA BLVD
HARDY RD
MAGEE RD
INA RD
SCENIC DR
SUNSET RD
CAMINO DEL CERRO
SWEET WATER DR
IRONWOOD HILL DR
SPEEDWAY BLVD
GREASEWOOD RD
KINNEY RD
GATES PASS RD
BROADWAY BLVD
22ND ST
COUNTRY CLUB RD
ALVERNON WAY
SWAN RD
CRAYCROFT RD
WILMOT RD
ESCALANTE
AJO WAY
BOPP RD
IRVINGTON RD
VALENCIA RD
LOS REALES RD
HERMANS RD
MISSION RD
NOGALES HWY
HUGHES ACCESS RD
OLD VAIL CONNECTION
DREXEL RD
CAMPBELL AVE
12TH AVE
6TH AVE
PARK AVE
CARDINAL RD
JOSEPH RD
CMO VERDE
GROVE RD
SKYLINE DR
SUNRISE DR
RIVER RD
SNYDER RD
BEAR CANYON RD
CATALINA HWY
SOLDIER TRAIL RD
TANQUE VERDE RD
PRINCE RD
FORT LOWELL RD
1ST AVE
ORACLE RD
SILVERBELL RD
HOUGHTON RD
MELPOMENE WAY
FREEMAN RD
OLD SPANISH TRAIL
CAMINO LOMA ALTA

**DEC 2030**

***FIG. ES-6***

INTERSTATE 10

INA ROAD WPCF 50.00 MGD

22.33 MGD

BIOSOLIDS RELOCATION

27.67 MGD

ROGER RD WWTP 32.05 MGD

59.72 MGD

62.72 MGD

3.0 MGD

RANDOLPH PARK WRF 3 MGD

Potential WRF

CORONADO NATIONAL FOREST

STATE PARK

SAGUARO NATIONAL PARK (WEST)

TUCSON MOUNTAIN PARK

SAGUARO NATIONAL PARK (EAST)

D.M.A.F.B.

SOUTH TUCSON

TOHONO O'ODHAM NATION SAN XAVIER DISTRICT

MOORE RD

TANGERINE RD

NARANJA DR

LAMBERT LN

LINDA VISTA BLVD

HARDY RD

MAGEE RD

INA RD

ORANGE GROVE RD

SKYLINE DR

SUNRISE DR

SNYDER RD

RUTHRAUFF RD

RIVER RD

PRINCE RD

FORT LOWELL RD

SPEEDWAY BLVD

BROADWAY BLVD

22ND ST

TANQUE VERDE RD

IRVINGTON RD

DREXEL RD

VALENCIA RD

AJO WAY

BOPP RD

LOS REALES RD

HERMANS RD

HUGHES ACCESS RD

OLD VAIL CONNECTION

ESCALANTE

KINNEY RD

GATES PASS RD

SUNSET RD

ROCKS RD

WADE RD

GERHART RD

CAMINO DE OESTE

THORNYDALE RD

SHANNON RD

LA CHOLLA BLVD

LA CANADA DR

HARTMAN RD

SCENIC DR

MONA LISA RD

CAMPBELL AVE

BEAR CANYON RD

CATALINA HWY

SOLDIER TRAIL RD

MELPOMENE WAY

FREEMAN RD

OLD SPANISH TRAIL

CAMINO LOMA ALTA

HOUGHTON RD

WILMOT RD

KOLB RD

CRAYCROFT RD

SWAN RD

COUNTRY CLUB RD

ALVERNON WAY

GREASEWOOD RD

NOGALES HWY

MISSION RD

CARDINAL RD

JOSEPH RD

CMO VERDE

12TH AVE

6TH AVE

PARK AVE

1ST AVE

ORACLE

MIRAGA DR

SILVERBELL

INTERSTATE 19