



**MWD**

METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

9-16

January 20, 1998

**To:** Board of Directors (Engineering and Operations Committee--Information)

**From:** *for* General Manager

**Submitted by:** Chief Engineer

**Subject:** Executive Summary of Inland Feeder Quarterly Status Report for October through December 1997

*Edward J. McCoy*  
*Gary M. Snyder*

## **RECOMMENDATION(S)**

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For information only.

## **EXECUTIVE SUMMARY**

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This report summarizes progress and provides program highlights for the Inland Feeder Program for the quarter ending December 1997.

## **DETAILED REPORT**

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The Inland Feeder Program continues on schedule to support an on-line date of early 2004. The program estimate remains unchanged at \$1.188 billion of which \$410.53 million has been appropriated by your Board. During the reporting period several significant milestones were achieved. Design was completed on the Arrowhead West and Riverside Badlands tunnels and both are scheduled to be advertised for bids in January. In early December, a notice-to-proceed was issued to the contractors for both the Riverside North and South pipelines. Pre-construction activities are underway with excavation expected to begin in February.

Construction continued in the City Creek portal site area on the Arrowhead East tunnel. Installation of approximately 1,300 feet of pipe south of the portal area, including an undercrossing of Highway 330, is essentially complete. Construction offices were installed at the City Creek portal site and the contractor and construction management teams have been relocated to the site. Components for the tunnel boring machine have begun being delivered and assembly remains scheduled for completion in late February to support the start of tunnel excavation in March.

Substantial progress was made on the Mentone-RUSD pipeline as construction is nearing completion. Installation of the remaining 145-inch-diameter pipe was completed at the north end of the project and mortar lining operations are underway. The remaining street improvements on Opal Avenue are scheduled to be completed in February.

Environmental efforts also continued to support program milestones and comply with requirements of the Final Environmental Impact Report. Mitigation monitoring activities continued at the Arrowhead East tunnel and Mentone pipeline construction sites and implementation of an extensive cultural and archeological resource management plan is on schedule for the Riverside pipelines.

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Attachment(s)

## BACKGROUND

The Inland Feeder alignment, which will extend from the foothills of the San Bernardino Mountains to the Colorado River Aqueduct in the Riverside community of San Jacinto, will be a vital link in Southern California's water delivery system. This 43.7-mile, 12-foot-diameter tunnel and pipeline system will traverse rugged terrain and involve construction of complicated crossings as a part of the system's infrastructure. Refer to Figure 1 for a general map of the Project.

Beginning at the Devil Canyon Power Plant's second afterbay in the San Bernardino Mountains, the first leg of the Inland Feeder will be an approximately .5-mile buried pipeline through Devil Canyon followed by a 3.8-mile tunnel through the San Bernardino Mountains to Waterman Canyon and Highway 18. Passing through Waterman Canyon is an .8-mile buried pipeline; the line will then enter another deep tunnel for 5.2 miles, 2,000 feet below the ridge line, and exit the mountains at a portal adjacent to Highway 330 north of the city of Highland.

From this portal site, the alignment will proceed as a 6.5-mile-long buried pipeline that will extend in a generally southeastern direction along City Creek, Boulder Avenue, and Abbey Way, before turning south on Cone Camp Road on the north edge of the Santa Ana River Wash.

The Inland Feeder will then be tunneled for .7 miles under the Santa Ana River Wash near Redlands Municipal Airport, and continue south for 2.5 miles as a buried pipeline along Opal Avenue in the community of Mentone. The alignment will then enter another tunnel and proceed for 8.2 miles in a southerly direction under the Crafton Hills and San Timoteo Badlands areas, exiting as a buried pipeline near Highway 60 and Gilman Springs Road in Riverside county.

The pipeline will resume through open lands for 15.7 miles in the eastern portion of the city of Moreno Valley. It will pass the eastern edge of Lake Perris, and tunnel under the Ramona Expressway, continuing in a southeasterly direction to end at the junction of the Casa Loma and San Diego Canals, and connects to the Eastside pipeline - currently under construction - near the city of San Jacinto.

When the Inland Feeder is completed, it will nearly double the water delivery capability of the East Branch of the State Water Project. The Inland Feeder will also help replenish local groundwater basins, improve the quality of Southern California's drinking water, and provide a continuous source of water to supply Metropolitan's reservoirs.

Careful planning and analysis of the alignment requirements has enabled Metropolitan to minimize the Program's environmental impact. In addition to developing appropriate mitigation measures, such as setting aside and cultivating revegetation areas to compensate for construction impacts, Metropolitan has purchased a parcel of

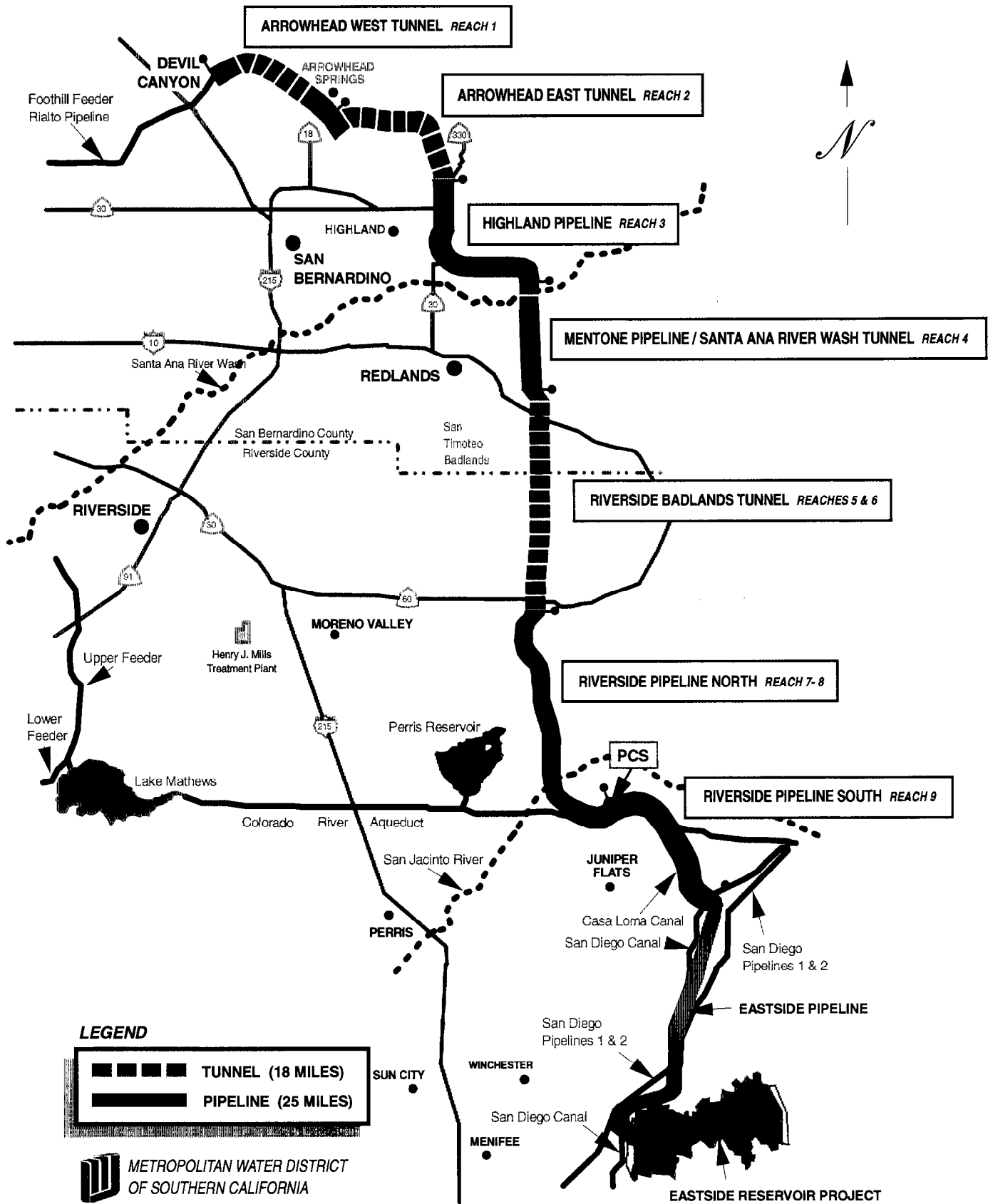
approximately 75-acres that is partially surrounded by the California Department of Fish and Game's San Jacinto Wildlife Reserve, in southwestern Riverside county; this land will complement and enhance the overall wildlife habitat.

These land purchases and mitigation measures are part of the overall Inland Feeder Mitigation Monitoring Plan to ensure that the Program will avoid or reduce significant impacts to the environment and historical landmarks.

The Project has been broken into eight specific geographical reach areas for planning, management, and control purposes. For summary reporting, these reaches are grouped together as follows. Reaches 1 and 2 comprise the San Bernardino tunnels. Reaches 3 and 4 refer to the San Bernardino pipelines. Reaches 5 and 6 define the Riverside tunnels. Reaches 7- 8 and 9 involve the Riverside pipelines. (The reaches' limits are also depicted in Figure 1.) Figure 2, the Inland Feeder Program Characteristics Matrix, describes the length, size, project number, reach area and design consultant for each of the Project segments.

Specific Project activities have been divided into three execution phases that represent different timing elements and required activities in the performance of the Program. Phase I represents the preliminary planning, funding, and engineering portions of the Program and is effectively complete. Phase II, which began October 1994, and is scheduled through mid-1998, relates to the detailed engineering and all activities up to award of construction. As currently planned, the Program will be 100% complete in the year 2004.

This Quarterly Report discusses the issues and accomplishments for the months of October, November and December 1997. Future reports will provide the reader with progress updates, as well as the projected goals for the upcoming periods.



**FIGURE 1 - MAP OF PROJECT**



REACH	DESCRIPTION	PROJECT	LENGTH (IN MILES)	DESIGN CONSULTANT
<b>SAN BERNARDINO TUNNELS</b>				
1	Arrowhead West Pipeline #1: Devil Canyon 2nd afterbay to Devil Canyon Portal.	100620-21	0.47	MWD
1	Arrowhead West Tunnel: Devil Canyon portal to west Waterman Canyon portal.		3.76	Bechtel Corp.
1	Arrowhead West Pipeline #2: Waterman Canyon portal to Strawberry Creek portal.		0.77	MWD
2	Arrowhead East Tunnel Pipeline.		0.21	MWD
2	Arrowhead East Tunnel: Strawberry Creek portal to City Creek portal.		5.18	Bechtel Corp.
2	Arrowhead East Tunnel Pipeline.		0.38	MWD
<b>SAN BERNARDINO PIPELINES</b>				
3	Highland Pipeline: Pipeline parallel to Highway 330, City Creek Levee, and Boulder Ave.	100622	5.84	MWD
4T	Santa Ana Wash Tunnel: Soft ground tunnel under Santa Ana Wash.	100623	0.72	Parsons Brinckerhoff Quade & Douglas
4	Mentone Pipeline: Santa Ana Wash to Opal Ave. portal.	100623	2.49	MWD
<b>RIVERSIDE TUNNELS</b>				
5 & 6	Riverside Badlands Tunnel: Opal Ave. portal to Gilman Springs portal, with potential access shafts located in Live Oak & San Timoteo Canyons.	100624-25	8.19	Daniel, Mann Johnson & Mendenhall
<b>RIVERSIDE PIPELINES</b>				
7- 8	Riverside Pipelines - North: Pipeline through San Jacinto Valley and parallel to Davis Road, through the city of Lakeview and including connection to PC-1 Facility.  PC-1 facility and connecting pipeline.	100626	8.37	MWD
9	Riverside Pipelines - South: Pipeline parallel to Colorado River Aqueduct and Casa Loma Canal with connections at the Colorado River Aqueduct and the Eastside Pipeline.	100628	6.7	MWD

FIGURE 2 - PROGRAM CHARACTERISTICS MATRIX



## EXECUTIVE SUMMARY

During the quarter ending December, the Inland Feeder Program continued the design and construction effort necessary to support the 2004 Program completion date (see Figure 3 for Program Schedule). Right of Way, Environmental and Public Awareness efforts also continued in parallel with engineering and field construction.

The Program estimate remains unchanged at \$1,188,000,000. During the reporting period, the Board of Directors appropriated \$8,300,000 for post-design construction support and groundwater monitoring services on the Riverside Badlands Tunnel (Reach 5-6). This brings the Board appropriations for the Program to a total of \$410,527,000. Program expenditures through December are \$127,435,600 or approximately 11% of the Program estimate. Please refer to Figure 4 for Program Financial Profile and Figure 5 for Program Capital Estimate.

The Program's anticipated levels of participation for Minority Business Enterprises (MBE) and Women Business Enterprises (WBE) for Board authorized design and consulting contracts are 15.2% and 7.0%, respectively. The program has exceeded these goals with actual participation levels through December of 15.3% MBE and 9.2% WBE (See Figure 6).

Construction continued on the Mentone Pipeline-Redlands Unified School District (RUSD) segment (Reach 4). The Site 1 work, adjacent to the new Redlands East Valley High School, has been complete since September. Work in Site 2 continues with street improvements, curbs and gutters representing the bulk of the remaining work. Mortar lining of the entire 3,400 linear feet of 145-inch pipe is approximately 25% complete. Hydrotesting is scheduled for February 1998 which will complete the project.

Construction on the Arrowhead East Tunnel (Reach 2) segment continues with work in and around the City Creek Portal site. Approximately 1,000 of the required 1,300 linear feet of pipe has been installed south of the Highway 330 undercrossing with approximately 70% of the pipe joint welding completed. Excavation under Highway 330 is complete with ribs placed and rails installed to facilitate the installation of pipe. Final grading at the portal site is complete with stabilization work continuing with the installation of rock bolts, wire mesh and shotcrete. Fabrication of the tunnel boring machine continues with delivery and assembly of components. Tunneling is expected to commence in March 1998.

Notices-to-Proceed were issued in December 1997 for the Riverside Pipelines North and South (Reaches 7-8 and 9). Coordination and Partnering Meetings were held with both contractors and included the topics of Owner Controlled Insurance Program, Project Labor Agreement, Environmental, and Right-of-Way restrictions and requirements and coordination with Metropolitan staff. Field work was limited to the erection of some Stephen Kagaroo Rat and temporary construction fencing.

The following provides an update for each of the Program areas:

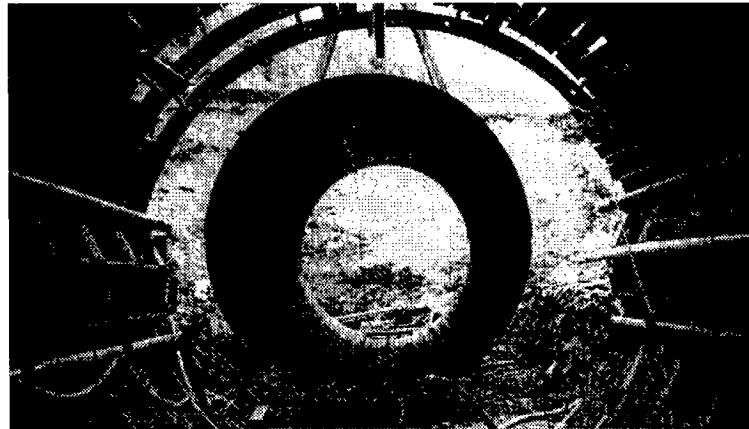
## **SAN BERNARDINO TUNNELS**

### **ARROWHEAD WEST**

- Design was completed and advertisement for construction bids is scheduled for January 1998.
- Advertised pipe fabrication contract for property segment in Waterman Canyon traversing Campus Crusade for Christ property. Approximately 3,400 feet of 145-inch steel pipe will be required.
- Continued in the acquisition of Stubblefield, Campus Crusade, Arrowhead Springs Partners, San Bernardino County Flood Control District (SBCFCD), and City of San Bernardino properties.

### **ARROWHEAD EAST**

- Completed excavation of the Highway 330 undercrossing. Ribs were placed and rails were installed to facilitate installation of pipe.

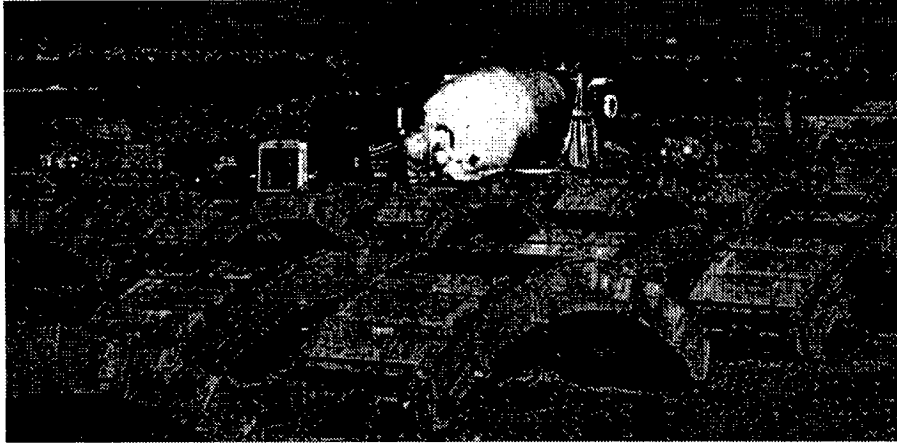


*Steel pipe being installed in Highway 330 undercrossing*

- Approximately 1,000 of the required 1,300 feet of pipe has been installed south of Highway 330 undercrossing. Welding of the pipe joints is approximately 70% complete.
- Final grading is complete with work continuing on stabilization of the portal face with the installation of rock bolts, wire mesh and shotcrete at the City Creek portal.
- Delivery of components for the TBM is continuing and will be ready to begin assembly in late January. Tunneling is expected to commence in March.



- Steel forms for the approximately 30,00 precast concrete segments used for the initial tunnel support are complete. Concrete placement began in November and approximately 1,000 of the required 30,000 segments are complete.



*Production of concrete segments for Arrowhead East tunnel*

## SAN BERNARDINO PIPELINES

### HIGHLAND/MENTONE PIPELINE

- Design is approximately 80% complete and is scheduled to advertise for construction bids in mid-1998.

### MENTONE PIPELINE - RUSD

- Completed construction including road improvements in area adjacent to school property (Site 1) prior to the September opening of the new Redlands East Valley High School as requested by the RUSD and the San Bernardino Traffic and Flood Control Department.
- Installation of the 145-inch diameter steel pipe is complete. Mortar lining in sites 1 & 2 is approximately 25% complete. Street improvements and hydrotesting (to be completed in February) will complete the Project.



*Pipe installation in Site 2 of Mentone - RUSD pipeline*

## RIVERSIDE TUNNEL

- Design was completed in December and advertisement for construction bids is scheduled for January.
- RFP 286 for Construction Management Support Services has been advertised. Proposals were received and reviewed; short listed respondents interviewed and recommendation made.

## RIVERSIDE PIPELINES

### RIVERSIDE PIPELINE - NORTH

- A Notice-to-Proceed for construction was issued to L. H. Woods & Sons, Inc. in December.
- Site work is limited to construction of temporary construction and Stephens Kangaroo Rat fencing.
- Mobilization is scheduled to be completed in February.
- Contractor submitted a preliminary project schedule and began transmitting submittals.

### RIVERSIDE PIPELINE - SOUTH

- Notice-to-Proceed for construction was issued to Steve P. Rados, Inc. in December.
- Mobilization is scheduled to be completed in February.
- Contractor submitted a preliminary project schedule and began transmitting submittals.

## RIGHT OF WAY

- Acquisition of Right-of-Way is on schedule to support construction activities. A total of 103 parcels have been procured to date.
- All entry permits have been obtained from property owners to allow access to private wells for monitoring during the construction phase in the Riverside Badlands Tunnel area.
- All properties required for the Riverside Pipeline - North (Reach 7-8) construction have been procured.

## ENVIRONMENTAL

Environmental efforts continued in parallel with engineering and construction activities to support Program milestones and comply with the requirements of the Final Environmental Impact Report (FEIR). Significant environmental activities accomplished during the quarter ending September are:

- Extended Phase III Excavations at CA-RIV-399 within the Riverside Pipeline South (Reach 9) area have been completed.
- Completed Phase II of cultural resources investigations for the Bear Valley Canal in the Mentone pipeline area.
- Prepared draft First Amendment to the Memorandum of Understanding (MOU) between CDFG and Metropolitan regarding impacts to Stephens' Kangaroo Rats.
- Prepared draft "Construction Phase Cultural Resources Monitoring and Treatment Plan" which describes protocol for archaeological discoveries during construction and Buried Site Testing.

## OCIP/SAFETY

A comprehensive safety program has been implemented on the Inland Feeder Program that will facilitate a safe working environment and promote a successful Owner Controlled Insurance Program (OCIP). The safety program is organized and directed by representatives from Sedgwick/Dickerson, the OCIP administrator. During this quarter, monthly safety audits were performed for the on-going construction at the Arrowhead East Tunnel (Reach 2) and Mentone-RUSD Pipeline (Reach 4) sites to ensure compliance with established safety policies and procedures. Site inspections are also performed on a daily basis. Daily inspections will also be initiated on the Riverside North (Reaches 7-8) and South (Reach 9) pipelines as the work commences. Significant activities during this quarter include:

- Participated in the OCIP/PLA Preconstruction meeting with Steve P. Rados, contractor for the Riverside Pipeline - South (Reach 9).
- Participated in the OCIP/PLA Preconstruction meeting with L. H. Woods, contractor for the Riverside Pipeline - North (Reach 7-8).
- Participated in the Partnering Session with Metropolitan and L. H. Woods.
- Inland Feeder OCIP staff met with Eastside Reservoir Project OCIP staff to discuss common concerns and procedures to maintain uniformity.
- The Inland Feeder Safety Manager started December 15, 1997.

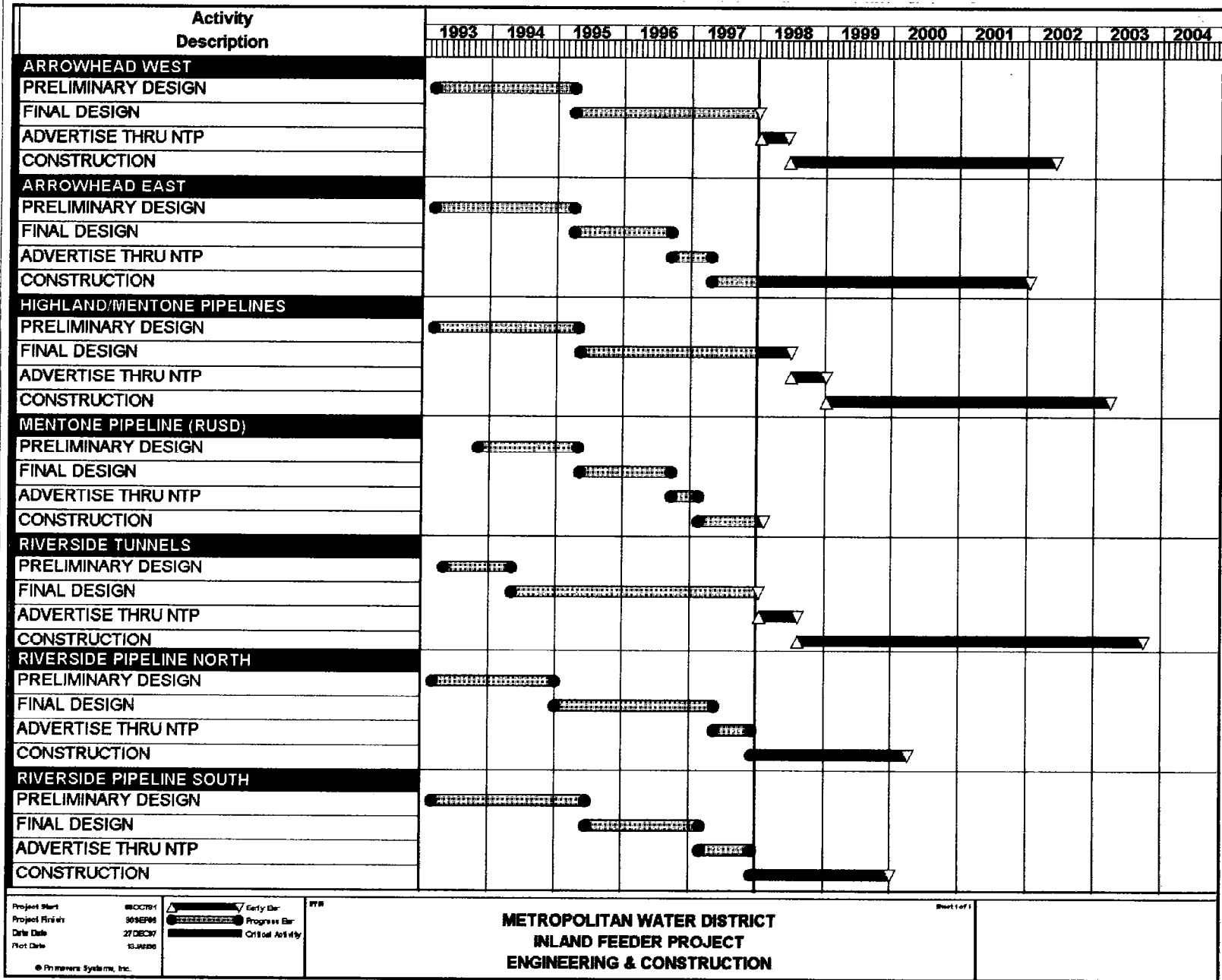


FIGURE 3 - PROGRAM SCHEDULE

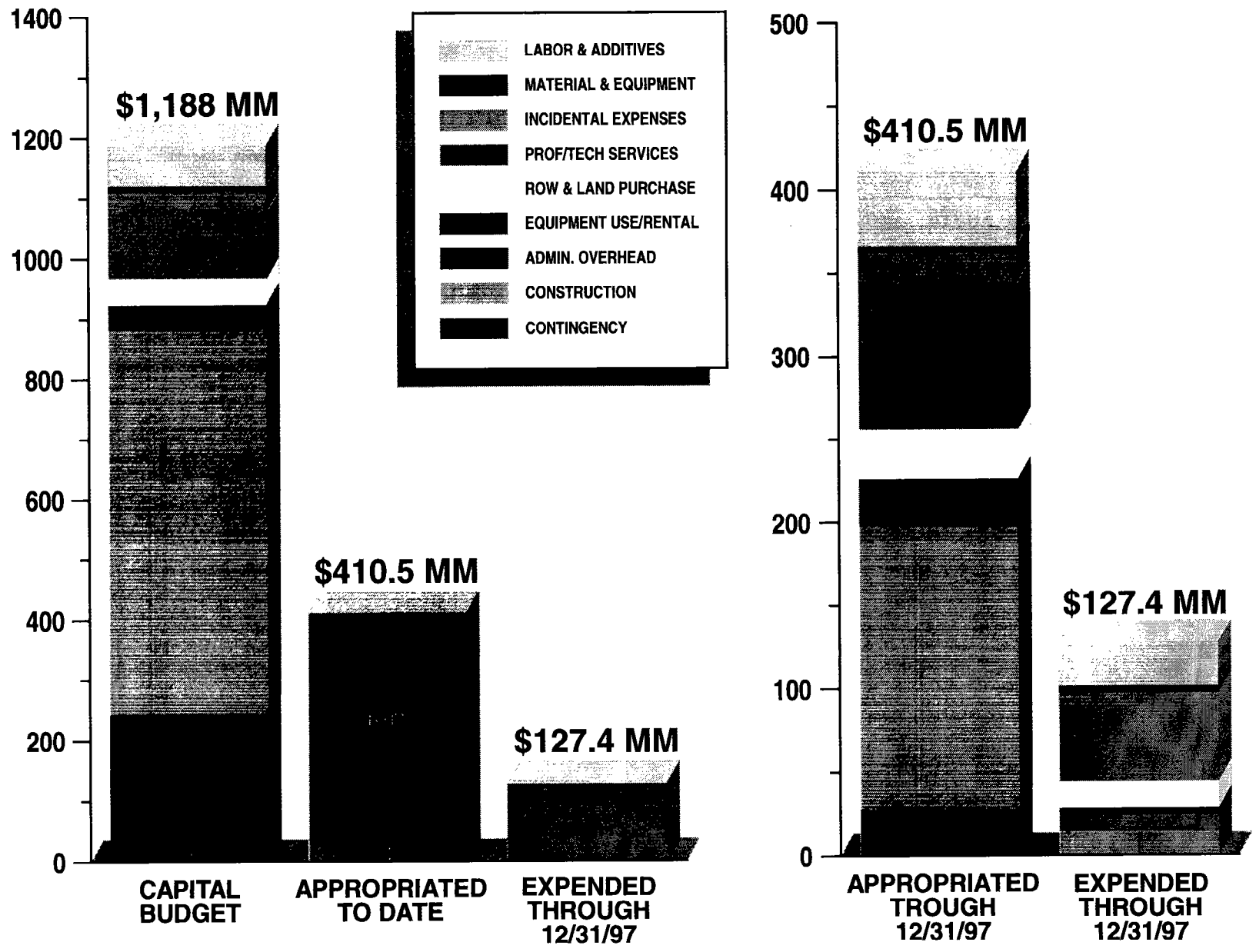


FIGURE 4- PROGRAM FINANCIAL PROFILE

**CAPITAL BUDGET VS ACTUAL COST**  
ALL PROJECTS

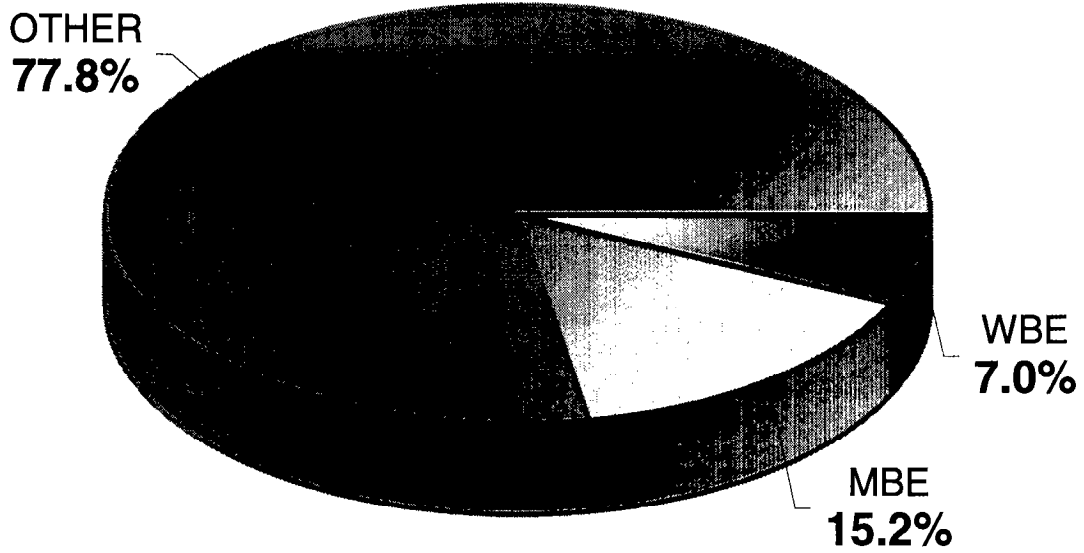
ACCOUNT CATEGORY	PROGRAM ESTIMATE	BUDGET	ACTUAL COST
LABOR AND ADDITIVES	69,380	46,964	26,926
MWD-FURNISHED EQUIP & MATERIALS	3,100	1,583	435
INCIDENTAL EXPENSES	37,330	19,110	8,746
PROFESSIONAL/TECHNICAL SERVICES	112,130	89,367	47,242
RIGHT OF WAY & LAND PURCHASES	44,250	30,300	16,220
OPERATING EQUIPMENT	2,120	924	139
ADMINISTRATIVE CHARGES	33,830	24,352	11,187
CONSTRUCTION CONTRACTS	639,360	170,802	16,498
CONTINGENCY	246,500	27,125	-
<b>TOTALS</b>	<b>1,188,000</b>	<b>410,527</b>	<b>127,393</b>

**NOTES:**

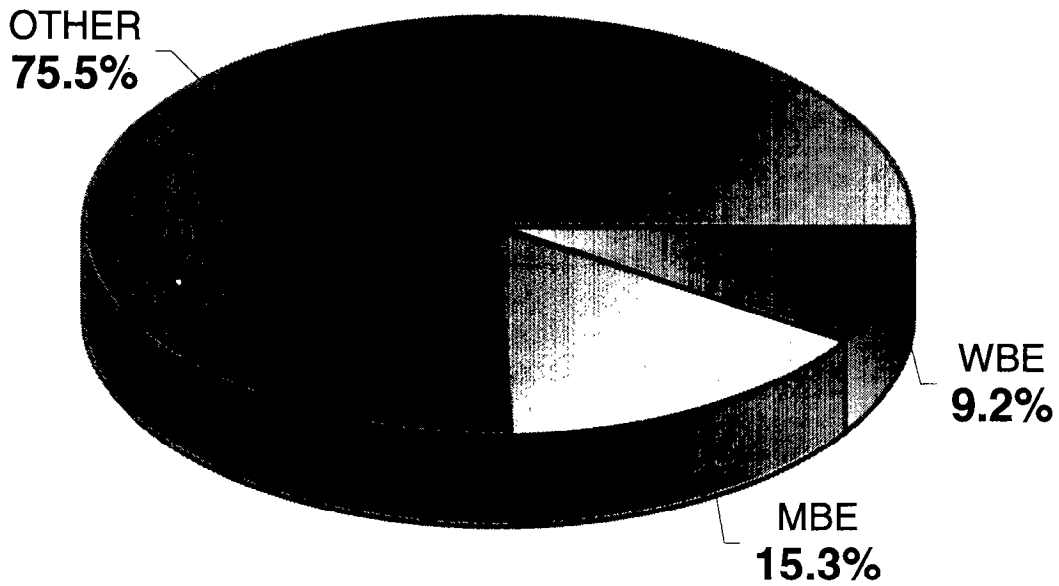
- 1 BASED ON PMIS REPORTS RPRJC205 AND RPRJC004 EFFECTIVE FOR 12/31/97.
- 2 ALL NUMBERS IN THOUSANDS

**FIGURE 5 - PROGRAM CAPITAL ESTIMATE**

**Anticipated Levels  
of Participation**



**Actuals To Date**



**FIGURE 6 - MBE/WBE PARTICIPATION**