

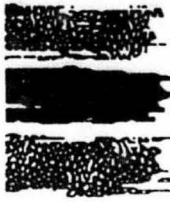
EDWARDS UNDERGROUND
WATER DISTRICT

Report 93-13

**LEAK DETECTION / LOCATION SURVEY REPORT
FOR THE
CITY OF CIBOLO, TEXAS**

November 2, 1993 - December 2, 1993





EDWARDS UNDERGROUND
WATER DISTRICT

6.25-7.5

January 18, 1994

OFFICERS

ANN S. DE HOYOS
CHAIR
ERRI W. MARTIN
VICE CHAIR
ARRY BISHOP
SECRETARY
ENNETH G. IKELS
TREASURER

Mr. Keith Gilbreath
City of Cibolo
P. O. Box 88
Cibolo, Texas 78108

Dear Mr. Gilbreath:

DIRECTORS

TEXAS COUNTY

ESSE ZÚÑIGA, JR.
COUNTY AREA CHAIR
ENE L. AMES, III
ANN S. DE HOYOS
ANS R. F. HELLAND
UENTER KRELLWITZ
AROL G. PATTERSON

We are pleased to submit this final report of the leak detection survey performed on the City of Cibolo water system. A summary of findings is reported in separate categories for your convenience.

The Edwards Underground Water District (District) appreciates the cooperation and assistance you have provided during the leak detection survey. The District hopes that the information provided herein will be beneficial to the City in identifying and targeting areas of water loss and potential loss.

COMAL COUNTY

ACK R. OHLRICH
COUNTY AREA CHAIR
CRAIG HOLLMIG
ENNETH G. IKELS

The Edwards Underground Water District would appreciate the opportunity to recheck the remaining 3 leak sites after repairs are completed.

MAYS COUNTY

RANCES D. EMERY
COUNTY AREA CHAIR
ARRY BISHOP
ERRI W. MARTIN

This survey has demonstrated the water saving potential of the Leak Detection/Location Program. Maintaining the best possible program is vital in order to continue the successes that have been realized. For this reason, the District is soliciting your comments, both positive and negative, and any suggestions you may have on how to improve our program.

RUSSELL L. MASTERS
GENERAL MANAGER

Please respond to this request candidly, as the District cannot improve on deficiencies or support positive measures without the knowledge of such conditions.

Mr. Keith Gilbreath
January 18, 1994 - Page 2

Enclosed is a water audit form. The District requests that this form be completed and returned to the District six months after all detected leaks have been repaired. This information will assist the District in our continued assessment of the Leak Detection Program.

Should you require additional information regarding this report or have any water related questions, please do not hesitate to call.

Sincerely,



Charles E. Ahrens
Water Resources Planner III



James R. Shipley
Leak Detection Technician II

CEA:JRS/bmc
Enclosures

001jrs



EDWARDS UNDERGROUND
WATER DISTRICT

**LEAK DETECTION/LOCATION SURVEY REPORT
FOR THE
CITY OF CIBOLO, TEXAS**

NOVEMBER 2, 1993 - DECEMBER 2, 1993

PREPARED BY:

**Division of Planning and Environmental Management
Leak Detection Program**

January, 1994

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- C. Valve Stacks Needing Cleaning
- D. Valves and Fire Hydrants That Could
Not Be Located
- E. Added To Master Water Plats

ENCLOSURES TO REPORT

- A. Revised Master Water System Distribution Plats
- B. Blank Follow-up Water Audit Forms

SUMMARY

On August 29, 1991, the Edwards Underground Water District (EUWD) received a completed application form from the City of Cibolo requesting a leak detection/location survey on its water distribution system. A pre-survey conference was held October 19, 1993 at the City of Cibolo City Hall to discuss the work to be performed. It was agreed that EUWD would perform sonic leak detection on all available access points, computerized leak location as needed, record any unusual system conditions found, and submit to the City a revised master water plat with the final report.

John E. Gapinski of EUWD began the survey on November 2, 1993, and the survey was concluded on December 2, 1993. Over the course of the survey, EUWD staff surveyed a total of 985 access points including 639 customer service connections, 88 fire hydrants, 241 main line valves, and 17 other access points covering 15.52 miles of distribution mains. Computer leak sound correlation was performed on two locations.

EUWD technicians detected a total of 22 leaks. This total included 1 meter box leak, 2 fire hydrant leaks, 3 service line leaks, 3 valve leaks, and 13 customer side leaks. EUWD staff estimates 38,483 gallons of water per day has been saved by the repair of 6 detected leaks as of December 17, 1993. The leaks discovered during the survey range from 36,720 gallons per day to numerous small customer side leaks.

As part of the survey, EUWD staff located 72 main line valves, 14 blow-off valves, 27 fire hydrants, 225 services, and 3.66 miles of distribution main not shown on the master water plats. EUWD staff was unable to locate 14 main line valves, 2 services, and 2 fire hydrants. An additional 22 valve stacks need cleaning and/or repair. EUWD noted 3 meter boxes and 3 valve boxes needing lid replacement.

JRS/bmc
001jrs

DISCUSSION

A. Total Access Points Surveyed..... 985

The following number of access points were used during the survey:

1. Customer service connections: 639
2. Main Valves: 241
3. Fire Hydrants: 88
4. Others: 17

B. Total Miles of Distribution Main Surveyed..... 15.52

C. Total Number of Suspected Leak Sounds Rechecked..... 36

D. Total Leaks Detected..... 22

Main line, service line, fire hydrant, and valve leaks were located by computer correlation of leak sounds or by visual inspection. Meter box leaks and customer side leaks were located through house to house surveying.

E. Total Estimated Water Saved by Repair of Detected
Leaks in Gallons per day as of December 17, 1993..... 38,483 GPD

Leakage estimates for main line, service line, fire hydrants, and valve leaks are based on hole size and system pressure in P.S.I.. This information was furnished by City personnel when EUWD was not on site at the time of repair. Totals are only recorded for leaks repaired as of December 17, 1993, with leakage estimates.

EUWD would appreciate a list of leakage estimates for all detected leaks repaired after December 17, 1993 for our records.

1. Meter Box Leaks..... 1

I. 104 Santa Clara

Leakage estimates of repaired leaks..... 43.2 GPD

Leaks repaired..... 1

2. Fire Hydrant Leaks..... 2

I. Schlather St. @ N. Main St.

II. FM 1103 @ Schneider Dr.

Leakage estimate of repaired hydrants..... 820 GPD

Fire hydrants repaired..... 2

3. Service Line Leaks..... 3
 - I. 108 Bramblewood
 - II. 120 Bramblewood
 - III. 602 N. Main

Leakage estimates of repaired services..... 36,720 GPD
 Service leaks repaired..... 1

4. Valve Leaks..... 3
 - I. N. Main @ railroad tracks - Main Valve
 - II. Sioux @ Buffalo Trail - Main Valve
 - III. N. Main @ Borgfeld Rd. - Blow-Off Valve

Leakage estimates of repaired leaks..... 900 GPD
 Valve leaks repaired..... 2

5. Customer Side Leaks..... 13

Customer side leaks were generally small. EUWD was unable to estimate this leakage. Many meters are registering slow and are not registering this usage. Customers were notified by door tag or in person when possible or will be notified by City personnel.

A list of these leaks is included in Appendix A.

- F. Unresolved Leak Sounds..... 1

- I. FM 1103 @ Buffalo Trail

G. General Maintenance Needed

1. Valve Stacks Needing Repair..... 12

The majority of these valve stacks need to be raised to grade.

A list of these stacks is included in Appendix B.

2. Valve Stacks Needing Cleaning..... 10

The condition of these valve stacks make them unusable at this time.

A list of these stacks is included in Appendix C.

3. Replacement Lids Needed..... 6

Valve Box

Meter Box

- I. Pfeil @ Weiderstein
- II. FM 78 @ Trailer Park
- III. Borgfeld Rd. @ Main to Tank

- I. F and L Motors on FM 78
- II. 103 Dobie
- III. 106 Tide

4. Broken Curb Stops..... 2
- I. 201 Pecan
 - II. Schlather Feed Store

5. Valves and fire hydrants that could not be surveyed..... 16

Suspected locations were surveyed by EUWD with a ferromagnetic detector to locate buried main valves. When successful, these locations were marked. It is conceivable that additional valves remain unlocated within the system. All valve box lids located were painted blue.

A list of these valves is included in Appendix D.

6. Services that could not be surveyed..... 2

- I. 210 Weiderstein
- II. 201 Pecan

7. Fire Hydrant Repair Needed..... 1

- I. Thistle Creek Dr. - 3rd fire hydrant north of Borgfeld Rd.

H. Survey Findings Vs. Master Water Plats

1. Fire hydrants, main line valves, services, and feet of distribution system main located but not shown on master water plats.

- A. Fire Hydrants: 27
- B. Main Line Valves: 72
- C. Blow Off Valves: 14
- D. Main Footage: 19,320
- E. Services: 225

Service locations have been recorded on the revised water system plats included with this report.

A breakdown of items A thru D is included in Appendix E.

I. Revised master water plats included with this report:

1. Master water plats were revised by EUWD using the City of Cibolo overall map as a guide. The water distribution system was divided into 4 separate plats. ("As built" plans were used where available).

Main size and type of material was furnished by City of Cibolo personnel.

2. All mains were surveyed from all available access points. When the spacing of access points was too great to survey properly, a ground microphone was used in combination.

3. Color codes used on revised master water plats:

Yellow indicates mains and services were surveyed with a ground microphone and from access points.

Blue indicates unable to survey.

4. All valves located were surveyed. When direct contact could not be made on a valve, a probe rod was used.
5. Fire hydrants labeled on the plat as fire hydrants without lead valves are hydrants where the lead valve could not be located or does not exist.
6. Any item circled on the plat indicates that it was added, could not be located, or needs repair.
7. Abbreviations Used on Revised Master Plats:

- UTL - Unable to Locate
- UTS - Unable to Survey
- NC - Needs Cleaning
- RTG - Raise to Grade
- CCNH - Curb Cock not Holding
- FHWV - Fire Hydrant with Valve
- FH - Fire Hydrant Without Valve
- ARV - Air Relief Valve
- PCV - Pressure Control Valve

8. All mains, fire hydrants, water services, blow-offs, and main line valves hand drawn on the plats are for access point accounting. The location and placement of these items on the plat is intended to indicate what was actually found during the field survey. Placement of hand drawn main valves on the plat is the technicians best guess of what they control. Every effort was made to ensure the accuracy of these plats, but EUWD does not guarantee their accuracy.

JRS/bmc
002jrs

RECOMMENDATIONS

- I. Revise master water distribution plats from "As Built" plans, EUWD plat, and utilizing the knowledge and expertise of long term field employees. Master plats should show locations of all main valves, fire hydrants, blow offs, drain or flush valves, air relief valves, and pressure regulating valves. Revised plats should be made available to field maintenance supervisor for use in the operation and maintenance of the water distribution system.
- II. Utilizing the revised master distribution plats, all distribution system main line valves should be located, adjusted, marked, cleaned, tested, and repaired or replaced as needed. The use of valve marker posts are recommended on main line valves that are subject to being lost or buried. Time spent searching for lost or buried main valves and flushing fire hydrants to reduce pressure and volume for leak repair is a major source of water loss.
- III. During the course of the survey, EUWD noted numerous meters in need of replacement. We recommend the initiation of a systemwide customer meter maintenance program. System meters should be upgraded through an ongoing meter change out program. This program would involve replacing a specified number of meters each period with new or rebuilt meters, until all system meters have been replaced.

All meter installations should be reviewed to determine whether the meter is properly sized and the correct type for the current use and flow-demand.

Water meters are designed to deliver a maximum flow for short periods and a lower flow for long periods without sustaining damage or above normal wear. If a meter is operating outside its intended range, it cannot register all flow, even though it may be calibrated. We recommend that a percentage of large commercial meters be tested in place yearly for accuracy.

- IV. Consider the following water distribution system improvements:
 - o Tie together the two 2" mains on Lamar St.
 - o Install main along Werner St. from W. Schlather to S.P.R.R. tracks. Tie in dead end mains from Short St., Rawe Ave., and main along S.P.R.R. tracks.
 - o Install main along Pfeil Rd. from Weiderstein Rd. to FM 78. Tie in dead end mains from Pecan St., South St., and main in the alley east of Rhea St.
 - o Replacement of existing 2" main along N. Main St. south of FM 1103 with 6" main or larger. Main should tie in to the existing 16" main along FM 1103 and the 6" main on N. Main.

Looping existing dead end mains can improve system flow characteristics, improve water quality, reduce air problems and surging, equalize system pressure and volume, improve fire protection, and decrease the need for system flushing.

- V. Consider ductile iron pipe for the primary main line material used for new installation and main replacement. As the production costs of water increase, the need for routine systemwide leak detection surveys will also increase. Leak sounds generated in metallic pipe are louder and have a tendency to travel further than those developed in non-metallic pipe.

Ductile iron pipe has a proven history of long service life and its sound carrying characteristics for leak detection are far superior to any other type of pipe material.

JRS/bmc
003jrs

COMMENTS

We wish to express our personal appreciation for the assistance and cooperation we received from the management and staff of the City of Cibolo. All personnel we worked with were highly trained, meticulous in the performance of their duties, and had a very positive attitude about their jobs and the customers they serve.

The active participation of Lee Perry and Bob Arenas in this survey is greatly appreciated. Their knowledge, experience, and professional work habits contributed to its success.


Your efforts and timely repair of the leaks discovered in this survey have saved a significant amount of precious water. Our thanks to all the staff for your efforts in helping to conserve the Edwards Aquifer.

Sincerely,



John E. Gapinski

Leak Detection Technician I



James R. Shipley

Leak Detection Technician II

MLM:JRS/bmc

004jrs

APPENDIX A
Edwards Underground Water District
Customer Side Leaks
1993

System: City of Cibolo

Page 1 of 1

Line #	Date #	Plat	Address	Comments
1	11/9/93	1	215 S. Main	Notified
2	11/3/93	1	300 N. Main	Notified
3	11/9/93	1	205 Meek	
4	11/9/93	1	209 Weiderstein	
5	11/3/93	1	114 Elm	Notified
6	11/4/93	1	204 Lieck	
7	11/4/93	1	209 N. Main	Front Faucet
8	11/12/93	2	116 Navajo	Notified
9	11/12/93	2	107 Indian Circle	Notified
10	11/22/93	3	325 Burkwood	Notified
11	11/22/93	3	329 Burkwood	Notified
12	11/22/93	3	322 Sunrose	Notified
13	11/22/93	4	175A Town Creek	

APPENDIX B

Edwards Underground Water District Valve Stacks Needing Repair 1993

System: City of Cibolo

Page 1 of 1

Line #	Plat #	Location	Comments
1	1	Comanche Circle	Valve and Blow Off Raise to Grade
2	2	Mohawk @ Buffalo Tr.	F.H. Valve Raise to Grade
3	2	End of Guadalupe	12" Valve Raise to Grade
4	3	Notch Leaf @ Sweet Leaf	Valve - Raise to Grade
5	3	Scotch Rose @ Thistle Creek	3 Valves Raise to Grade
6	3	341 Scotch Rose	F.H. Valve Raise to Grade
7	3	Notch Leaf @ Thistle Creek	F.H. Valve Raise to Grade
8	3	Thistle Creek @ 5th Street	Valve - Raise to Grade
9	2	Guadalupe north of Industrial	F.H. Valve Needs Repair

APPENDIX C

Edwards Underground Water District Valve Stacks Needing Cleaning 1993

System: City of Cibolo

Page 1 of 1

Line #	Plat #	Location	Comments
1	1	Pfeil @ Weiderstein	Main Valve
2	1	Comanche Circle	F.H. Valve
3	2	FM 1103 @ Buffalo Tr.	Main Valve
4	2	End of Schneider	F.H. Valve
5	2	Industrial @ Guadalupe	F.H. Valve
6	2	Industrial North of Guadalupe	F.H. Valve
7	2	End of Industrial	Main Valve
8	3	325 Scotch Rose	Main Valve
9	3	245 Notch Leaf	F. H. Valve
10	3	Thistle Creek Dr. R.O.W.	Main Valve

APPENDIX D

Edwards Underground Water District Valves and Fire Hydrants That Could Not Be Located 1993

System: City of Cibolo

Page 1 of 1

Line #	Plat #	Location	Comments
1	1	201 Pecan	2" Valve
2	1	Schlather @ N. Main	2 Valves & F.H. Valve
3	1	Santa Clara @ Lamar	2" Valve
4	2	N. Main @ FM 1103	1½" Valve
5	2	Guadalupe North of FM 1103	Service Valve
6	2	Guadalupe North of Industrial	Blow Off Valve
7	2	End of Industrial	Blow Off Valve
8	2	Between Industrial and Borgfeld Rd.	Fire Hydrant & Blow Off
9	2	Borgfeld Rd. west of Dobie Blvd.	1 Valve & Fire Hydrant with Valve
10	3	Scotch Rose @ Brasewood	Valve
11	4	117 Indian Blanket	Blow Off

APPENDIX E

Edwards Underground Water District Added to Master Water Plats 1993

System: City of Cibolo

Page 1 of 3

Line #	Plat #	Location	Comments
1	1	Main to Pat's Place	2 Valves
2	1	FM 78 North of Rhea	1 Valve
3	1	N. Main @ bowling alley	1 Valve
4	1	S. Main	2 Valves
5	1	Schneider Dr.	1 Valve
6	2	Guadalupe @ FM 1103	2 Valves
7	2	Guadalupe	1 Valve
8	2	FM 1103 to Post Office	1 Valve
9	2	End of Mohawk	2 Valves
10	2	Dobie @ Borgfeld	2 Valves
11	2	N. Main @ Borgfeld Rd.	1 Valve
12	2	Borgfeld Rd. to tank	3 Valves
13	2	Borgfeld Rd. between transmission main and N. Main	1 Valve
14	2	Borgfeld Rd. @ Dietz Rd.	1 Service Valve
15	2	Thistle Creek Main	4 Valves
16	2	Schneider Rd.	1 Valve
17	3	Thistle Creek Subdivision	20 Valves
18	3	Thistle Creek Dr. between Scotch Rose and Borgfeld	20 Valves
19	3	16" transmission valve to tank	1 Valve
20	3	12" main from tank to Thistle Creek Subdivision	1 Valve

APPENDIX E

Edwards Underground Water District Added to Master Water Plats 1993

System: City of Cibolo

Page 2 of 3

Line #	Plat #	Location	Comments
21	4	Sunflower	2 Valves
22	4	Green Valley @ Town Creek	2 Valves
1	1	Main to Pat's Place	2 Fire Hydrants
2	1	Pfeil @ Rhea	1 Fire Hydrant
3	1	Lowe Ave.	1 2" Fire Hydrant
4	1	S. Main	2 Fire Hydrants
5	2	Guadalupe	2 Fire Hydrants
6	2	FM 1103 to Post Office	1 Fire Hydrant
7	2	End of Mohawk	1 Fire Hydrant
8	2	Dobie @ Borgfeld	1 Fire Hydrant
9	2	Dobie Blvd.	1 Fire Hydrant
10	3	Thistle Creek Subdivision	11 Fire Hydrants
11	3	Thistle Creek Dr. between Scotch Rose and Borgfeld	4 Fire Hydrants
1	1	Commanche Circle	1 Blow Off Valve
2	1	Main to Pat's Place	1 Post Indicator Valve and 2 Blow Off Valves
3	2	FM 1103 to Post Office	2 Blow Off Valves
4	2	End of Mohawk	1 Blow Off Valve
5	2	N. Main @ Borgfeld	1 Blow Off Valve

APPENDIX E

Edwards Underground Water District Added to Master Water Plats 1993

System: City of Cibolo

Page 3 of 3

Line #	Plat #	Location	Comments
6	2	Borgfeld Rd. @ Dietz Rd.	1 Blow Off Valve
7	2	Schneider Rd.	1 Blow Off Valve
8	3	Thistle Creek Subdivision	2 Blow Off Valves
9	3	12" @ Tank	1 Pressure Regulator Valve
10	4	Green Valley @ Town Creek	1 Blow Off
1	1	Main to Pat's Place	670' 6" main
2	1	Bee Alley	250' 2" main
3	2	Guadalupe	1000' main
4	2	FM 1103 to Post Office	900' main
5	2	Mohawk	200' main
6	2	To Thistle Creek from Borgfeld Rd.	700' main
7	3	Thistle Creek Subdivision	6,800' main
8	3	To Thistle Creek from Borgfeld Rd.	2,300' main
9	3	To Thistle Creek from the tank	5,000' main
10	4	Sun Flower	1,300' 12" main
11	4	Green Valley @ Town Creek	200' 2" main