



GUAM WATERWORKS AUTHORITY

Good Water Always

578 N. Marine Corps Drive, Tamuning, GU 96913-4111

Phone: (671) 647-2603 Fax: (671) 646-2335

GUAM WATERWORKS AUTHORITY
WATER LEAK DETECTION STUDY
ON ALL THREE PUBLIC WATER SYSTEM

WRMP Report

September 12, 2005

Appendix 2B



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September 12, 2005

Ben Machol
Manager, Pacific Islands Office (CMD-6)
U.S. Environmental Protection Agency, Region 9
75 Hawthorne Street
San Francisco, CA 94105

Dear Ben,

Pursuant to further compliance to the **STIPULATED ORDER FOR PRELIMINARY RELIEF CASE No. 02-00035**, The Guam Waterworks Authority herewith presents the reports required on or following this date as ordered, adjudged and decreed items numbered: **10 Water Resources Master Plan Task 1, and 13, Island Wide Leak Detection Survey.**

CERTIFICATIONS STATEMENT

I certify under penalty of law that I have examined and am familiar with the information submitted in this document and all attachments and that this document and its attachments were prepared either by me personally or under my direction or supervision in a manner designed to ensure that qualified and knowledgeable personnel properly gathered and presented the information contained therein. I further certify, based on my personal knowledge or on my inquiry of those individuals immediately responsible for obtaining the information, that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing and willful submission of a materially false statement.

Paul J. Kemp, M. S.

ODRC Level IV, Water & WW Treatment, Water Distribution and WW Collection
Acting Compliance Monitor.

September 12, 2005

Date

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CC: Barry Pollock, Region 9, USEPA
Michael Lee, Region 9, USEPA
Chris Lund, Guam EPA
Attorney General of Guam
Office of the Public Auditor
Consolidation Commission of Utilities
 Simon Sanchez
 Benigno M. Polomo
 Gloria Nelson
 Tom Ada
 Pauline J.S. Onedera
Randall V. Wiegand
Samuel Taylor
Chief Engineer
PUC
General Manager
P&T Manager
C&D Manager
File

Attachments:

Inter-office Memorandum
Leak Detection Survey Daily Log
Leak Detection Form
Perma-log form
Maps
Pictures
Illegal Connection

LEAK DETECTION STUDY

Executive Summary

The Guam Waterworks Authority (GWA) established the Leak Detection Program (LDP) as part of the compliance requirements of the U.S. EPA Stipulated Order. Leak detection equipment consisting of Fluid Conservation System Correlator, acoustical microphones and perma-log recorders were purchased under a lease to purchase option. Mr. Scott Wicklund of Fluid Conservations Systems, Inc. conducted training of sixteen (16) GWA employees. Training consisted of locating leaks using acoustical methods.

Confirmed leak sounds are identified during installation, calibration and pinpointing leaks using "time of flight" principles by means of a FCS Correlator computer system. Of the employees trained for leak detection, two (2) were selected to form the regular LDP. Employees are Mr. Franklin Nauta and Mr. Anthony Taitague.

Field investigation methodologies for the GWA program were based on the FCS training, present programs in Guam and Micronesia and the American Waterworks Association (AWWA) Manual of Practice (MOP). Mr. Nauta & Mr. Taitague were further trained on the use of internet for research purposes, e-mail for communications, Excel spreadsheets for analyses and Microsoft Word reporting formats, and this report so was produced with their assistance. Additional training was conducting on GWA's AS400 Computer system for purposes of obtaining service meter information and reporting leaks under the Customer Log Pending Reporting System.

INTRODUCTION:

The Guam Waterworks Authority (GWA) conducted and completed a water leak study on all three public water distribution, Northern, Central, and Southern Systems. The entire study was conducted during the working hours of 7:30 am to 4:00 pm on weekdays. The more heavily traveled roads in the Northern area such as Yigo Village, Dededo Village and in the center of main Marine Corps Drive (Route 1) were conducted on early morning in the hours of 11:00 pm and 7:00 am.

Acoustical method was used for locating leaks and for the purpose of the Leak Detection Study. This instrument is a self-contained instrument equipped with headphones, sensitivity and gain controls and a transducer ground pick-up. This instrument is very sensitive to sound and is capable of detecting water leakage.

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Water escaping from the orifice of a pipe has its own distinctive sound and can be heard by this instrument over other surrounding disturbances such as wind, automobiles and aircraft, and other underground utilities such as sewer flows, drainage flows. GWA used this instrument in locating water leak and determined to be excellent for this study.

Site visits were conducted to survey the study area. Central, Northern and Southern water system map were used to locate water transmission and gate valve in the system. Any and all suspected water leak that was found were reported immediately, such as hydrants leak, gate valve leaks and service line leaks. All leaks were reported to agency's Pressure Line Unit and dispatch at the end of each day of the survey.

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[WRMP Report]**

CENTRAL WATER SYSTEM RESULTS:

The Leak Detection Program Crew (LDPC) detected 36 underground water leaks and pinpointed. These leaks are recorded on the attached "Area Survey Report" (Attachment no. 1). Forms were also used (attachment no. 2) to report these leaks. Of the 30 leaks detected, 4 main leaks have been repaired, 1 hydrant has been replaced and the rest are being schedule by priority on a continual basis.

Turner Road Johnston Area, Nimitz Hill:

The area is being supplied by the United States Department of the Navy (U.S. Navy) water. Water loss was determined based on the actual customers individual water meters reading and compare the reading taken from the 2.0" in diameter U.S. Navy master meter. Water loss of 18,150 gallons per day included from booster pump, storage tank and service line leaks.

Cabras (Commercial Port) Area:

The area is similar from Turner Road Johnston area were the water source is coming from the U.S. Navy. Data for water loss are obtained from the 10.0" in diameter U.S. Navy master meter and individual water service meters. The different in water delivered and water consumed assumed to be 35, 858 gallons per day in water loss due to leaks, under registering meters, inoperative water meters, illegal connections or unauthorized water use.

Piti Village:

The Leak Detection Program Crew (LDPC) discovered 19 non-registering water meters, 4 foggy (unreadable) water meters, 7 water meters not listed needing to be removed, 7 service line water leaks and 7 buried (inaccessible) water meters. The discoveries were reported to the different sections within the agency for their immediate action. Forms were also use to report service line leaks. Approximately 38,000 gallons per day was the estimated loss due to unaccounted and water leaks.

LDPC also discovered an illegal water connection that is leaking due to improper connection. The illegally connected residence was reported to Revenue

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Protection Unit for fines and prosecution. Approximately 7,880 gallons per day was the estimated loss of water due to leak and illegal connection.

Leak Detection Permalogs contains data obtained from the following area:

Nimitz Hill Estate – 9 perma-log recorders were placed on different sections of the main water distribution line valve on the different streets of the area. One perma-log recorder number 12025078 showed water leak on the Fluid Conservation Systems Correlator. The leak was from a nearby fire hydrant that was reported by LDPC and was replaced by GWA's Pressure Line Unit Repair Crew. Approximately 14,400 gallons per day was the estimated leakage due to this leak.

Piti Main Village – 5 perma-log recorders were placed on the fire hydrant's valves on the different streets of the main village. A leak was detected on perma-log number 12025072. The leak was caused by a defective fire hydrant's valve inside a concrete valve box and the leak cannot be seen in the area. The defective valve was reported for repair. Approximately 28,000 gallons per day was the estimated water loss from this leak.

Main Highway of Piti – 4 perma-logs were placed on the fire hydrant's valve boxes along the main highway. None of the perma-logs recorded water leak.

Village of Santa Rita and surrounding area:

Sargeant E. Cruz Street – First house on the left - This was a visible three quarter inch service line leak just before the consumer water meter. Estimated leak rate – 90 gallons per day.

Pale Gill and Pale Duenas Haya – Across house no. 142 – There were two surface service line leaks next to each other. Estimated leak rate – 160 gallons per day.

Pale Ferdinan Way / San Isidro Way – This was a visible hydrant leak from a hydrant nozzle. The hydrant will require repair or replacement. Estimated leak rate – 360 gallons per day.

Pale Ferdinan Way / San Jose Street – Last house across house no. 444 - This was a surface service line leak. Estimated leak rate – 90 gallons per day.

Route 17 – Adjacent to house no. 1070 - This was a minor hydrant seat leak. Repair of the hydrant seat may be required to eliminate this leak.

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Estimated leak rate 144 gallons per day. The hydrant was repaired on February 08, 2005.

J.C. Diaz Street – This was an expose service line leak serving a 4-plex apartment. Estimated leak rate – 90 gallons per day.

Chalan Kindo – In the vicinity of house no. 180B - This was substantial main waterline valve leak that required to be excavated by a backhoe. Estimated leak rate 28,000 gallons per day.

F.T. Pangelinan Drive – Entrance on the left hand side next to a bus stop - This was a visible service line leak. Estimated leak rate 180 gallons per day.

Additional Leak Sounds:

Anonas Court – An isolated high frequency leak sound was detected on a main waterline sectional valve at this point. Need to schedule and revisit the area for observation.

Talisay Drive and Aga Drive – Adjacent to house no. 191 - A low frequency leak sound was detected on a main valve. Need to schedule and revisit the area for observation.

Asan Village:

Consolation Street – An intense high frequency leak sound was detected on a hydrant. Need to schedule and revisit the area.

Village of Agat and surrounding area:

RR Cruz Subdivision – Right hand side of house no. 227 – This was a visible service line leak. Estimated leak rate 90 gallons per day.

Entrance of Erskin Drive – Left hand side of the chapel/church – This was a visible service line leak. Estimated leak rate 360 gallons per day.

Cook Street – Old abandoned house no. 133 – This was a three quarter inch gate valve leak. Estimated leak rate 360 gallons per day.

San Rogue – Adjacent to Canan Store- This was a visible hydrant leak from a hydrant nozzle. The hydrant will require repair or replacement. Estimated leak rate 720 gallons per day.

San Vicente – House no. 285 – This was a substantial service line leak that was surfacing on the consumer front lawn and flowing on the main

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street of the above address. This leak was reported immediately to the Pressure Line Unit Repair Section. The leak was repaired on January 31, 2005. Estimated leak rate 72,000 gallons per day.

North Santa Cruz Street & Tomas Rivera Street – This was a main leak on a hydrant lateral. The leak sound was detected on the adjacent hydrant. The leak had cause a hole on the main street pavement. The site was marked for excavation. Estimated leak rate 72,000 gallons per day.

Calle de los Marteres Street – House no. 148 - This was a sizeable visible leak either on the old service line or main waterline break. A sunken area was noted on the side of the road and water was flowing at the drainage. Estimated leak rate 14,400 gallons per day.

North Kalachucha Street – Dirt Road on left hand side - This was a visible service line leak. Estimated leak rate 180 gallons per day.

Pass Nimitz Beach Park on Right Side South Bound – This was a small, visible service line leak. Estimated leak rate 90 gallons per day.

Tun Ben Chaco first Air Release - This was a visible service line leak. Estimated leak rate 180 gallons per day.

West Santa Ana – Across first tin house on the left – This was a visible service line leak. Estimated leak rate 180 gallons per day.

The remaining three are a smaller sound leak that need to schedule and revisited:

Babauta Road - Need leak to be observed.

Naou Street – House no. 272 white with blue trimming – Need leak to be observe.

Umang Drive – Right side to Chamorro Land Trust – Need leak to be observe.

RECOMMENDATION:

GWA's needs to abandoned the old 12" and 8" waterline in the Villages of Agat and Santa Rita and tying all associated services into the new 16" line. This would eliminate the service line that is tied-in to this old line that is now corroded and takes time for the leak to surface due to a clay soil in the area.

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PERMALOGS PITI MAIN VILLAGE AND ALONG MARINE DRIVE

| PERMALOG NUMBERS | AREAS/LOCATION OF LOGGERS | DATES WHEN PLACE DOWN/PICK UP | DATES OF READING |
|------------------|---|-------------------------------|-----------------------------------|
| 12025071 | MASSO COURT LAST HYDRANT VALVE BOX NEXT TO HOUSE NO. 173 | DOWN 12-2-04 UP 12-4-04 | 12-4-04 NO LEAK |
| 12025072 | EDWARD LANE HYDRANT VALVE BOX ACROSS HOUSE NO. 119 | DOWN 12-2-04 UP 12-4-04 | 12-4-04 LEAK HYDRANT VALVE BOX |
| 12025073 | ASSUMPTION DRIVE HOUSE NO. 222 HYDRANT VALVE BOX | DOWN 12-2-04 UP 12-4-04 | 12-4-04 NO LEAK |
| 12025074 | ASSUMPTION DRIVE NEXT TO BUS STOP MAIN LINE VALVE | DOWN 12-2-04 UP 12-4-04 | 12-4-04 NO LEAK |
| 12025075 | ASSUMPTION DRIVE ACROSS HOUSE NO. 305 HYDRANT VALVE BOX | DOWN 12-2-04 UP 12-4-04 | 12-4-04 NO LEAK |
| 12025076 | ALONG ROUTE 1 ADJACENT TO PITI J MARKET HYDRANT VALVE BOX | DOWN 12-03-04 UP 12-4-04 | 12-4-04 NO LEAK |
| 12025077 | ALONG ROUTE 1 BETWEEN SUZIES TAVERN & MOLINAS APARTMENT | DOWN 12-3-04 UP 12-4-04 | 12-4-04 NO LEAK |
| 12025078 | ALONG ROUTE 1 NEXT TO ABANDON TIN HOUSE ROOFING | DOWN 12-3-04 UP 12-4-04 | 12-4-04 NO LEAK |
| 12025079 | ALONG ROUTE 1 MDA SERVICE GATE VALVE | DOWN 12-3-04 UP 12-4-04 | 12-4-04 NO LEAK |

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PERMALOGS NIMITZ HILL ESTATE

| PERMALOCK NUMBERS | AREAS/LOCATION OF LOGGERS | DATES WHEN PLACE DOWN/PICK UP | DATES OF READING |
|----------------------|---|----------------------------------|---------------------|
| 12025071 | HOUSE NO 72 NIMITZ DRIVE & ANACOCO LANE | DOWN 12-1-04 UP 12-2-04 | 12-2-04 NO LEAK |
| 12025072 | HOUSE NO. 54 NIMITZ DRIVE EAST ANCHO | DOWN 12-1-04 UP 12-2-04 | 12-2-04 NO LEAK |
| 12025073 | OCEAN SUMMIT ENTRANCE HOUSE NO. 382 MAIN VALVE | DOWN 12-1-04 UP 12-2-04 | 12-2-04 NO LEAK |
| 12025074 | NIMITZ DRIVE ANACOCO TOP PART HOUSE NO. 317 | DOWN 12-1-04 UP 12-2-04 | 12-2-04 NO LEAK |
| 12025075 | ANACOCO LANE | DOWN 12-1-04 UP 12-2-04 | 12-2-04 NO LEAK |
| 12025076 | ANCHO CIRCLE HOUSE NO. 39 ON NIMITZ DRIVE | DOWN 12-1-04 UP 12-2-04 | 12-2-04 NO LEAK |
| 12025077 | MALACK AREA ON NIMITZ DRIVE HOUSE NO. 7 | DOWN 12-1-04 UP 12-2-04 | 12-2-04 NO LEAK |
| 12025078 | GUAIFON CIRLE ON NIMITZ DRIVE | DOWN 12-1-04 UP 12-2-04 | 12-2-04 LEAK |
| 12025079 | NIMITZ DRIVE ADJACENT TO NIMITZ TOWER | DOWN 12-1-04 UP 12-2-04 | 12-2-04 NO LEAK |

REMARK: FOLLOW-UP ON THE LEAKAGE THAT WAS REPORTED (TWO SERVICE LINE LEAK ALONG THE MAIN HIGHWAY OF ROUTE 6 IN NIMITZ AND A GOVERNMENT FIRE HYDRANT ADJACENT TO NIMITZ TOWERS CONDOMINIUM).

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GUAM WATERWORKS AUTHORITY

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PERMALOGS

LOCATION - Toto, Chalan R.S. Sanchez

| PERMALOGS NUMBBERS | AREAS/LOCATION OF LOGGERS | DATES WHEN PLACE DOWN/PICK UP | DATES OF READING |
|---------------------------|---|--------------------------------------|-------------------------|
| 12025071 | Main valve next to bus stop – Chalan R.S. Sanchez | 4-4-05 Place Down 4-7-05 Pick-up | 4-7-05 No reading |
| 12025072 | Hydrant valve - end of Petmanete Street - next to house no. 17 | 4-4-05 Place Down 4-7-05 Pick -up | 4-7-05 No leak |
| 12025073 | Sectional main valve – Between E. Malate St. and W. Malate St. | 4-4-05 Place Down 4-7-05 Pick -up | 4-7-05 No leak |
| 12025074 | Sectional main valve – Guosto Street | 4-4-05 Place Down 4-7-05 Pick -up | 4-7-05 No leak |
| 12025075 | Hydrant valve – Left side on Dischoso St. | 4-4-05 Place Down 4-7-05 Pick -up | 4-7-05 No leak |
| 12025076 | Sectional main valve – Depoto Street | 4-4-05 Place Down 4-7-05 Pick -up | 4-7-05 No leak |
| 12025077 | Sectional main valve – Cabayeros St. | 4-4-05 Place Down 4-7-05 Pick -up | 4-7-05 Leak |
| 12025078 | Main valve between Route 33 – Roy T. Damian and Chalan R.S. Sanchez St. | 4-4-05 Place Down 4-7-05 Pick -up | 4-7-05 Leak |
| 12025079 | | | |
| 12025080 | | | |

SOUTHERN WATER SYSTEM RESULTS:

The Leak Detection Plan crew detected 21 underground water leaks and pinpointed. These leaks are recorded on the attached "Area Survey Report". Of the 21 leaks detected, 2 main leaks have been repaired and the rest are being schedule by priority on a continual basis.

Village of Umatac and surrounding area:

Umatac Mayor Office – Across from Umatac Elementary School - This was an underground service line leak that was heard and detected through the water meter serving the playground area. Estimated leak rate – 14,400 gallons per day.

Umatac Subdivision located by the one million gallon reservoir – This was a leak at the bottom side of the reservoir. Estimated leak rate – 1,440 gallons per day.

Dono Street – Pigua Subdivision - This was small visible main valve leak. Estimated leak rate – 360 gallons per day.

Route 4 – Next to former Mobil Gas Station – This was a visible leak on an 8" cast iron line located beside the bridge. The leak is from a corporation stop that need to be replace by a ball valve to be use as an air release. Estimated leak rate - 14,400 gallons per day.

Additional Leak Sound:

Route 2 – Right hand side before Ishizaki Lane next to a bus stop – This was a non-surfacing main leak detected from a hydrant. Need to schedule and revisit the area for observation.

Village of Merizo and surrounding area:

Entrance of Espinosa – Geus Road – This was a visible hydrant leak from a mechanical flange and bolt. The hydrant will require repair or replacement. Estimated leak rate – 1,440 gallons per day.

Geus Road – Across house no. 363 on left hand side next to a bus stop - This was a minor hydrant seat leak. Repair of the hydrant seat may be required to eliminate this leak. Estimated leak rate 144 gallons per day.

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Off Route 4 – Across J Cruz house no. 130 - This was a main waterline leak that required to be excavated by a backhoe. Estimated leak rate 14,400 gallons per day.

Jaotan or Barcinas housing – This was a service line leak that required to be excavated by a backhoe and the use of a trash pump to pump out the water. Estimated leak rate – 14,400 gallons per day.

Aha'yan Way – Route 4 – This was a substantial service line leak at the shoulder of the road that is causing a hole on the ground. Repaired on February 19, 2005. Estimated leak rate 28,000 gallons per day.

Route 4 – In-front of house no. 1145 – Pass Buck Cruz house – Before sewer pump station - This was a substantial service line leak surfacing in the shoulder of the road. Estimated leak rate 36,000 gallons per day.

Route 4 – Before the bridge after J.C. Arriola Beach – This was an exposed main leak surfacing on a 12” PVC line along the bridge. Estimated leak rate 28,000 gallons per day.

Village of Inarajan and surrounding area:

Belen Booster Pump Station - This was a substantial main waterline leak surfacing at the side of the pump station. Estimated leak rate 72,000 gallons per day. The leak was repaired on February 19, 2005.

Chalan Atdo – Inarajan GHURA Housing – This was a visible leak from a defective gate valve. Estimated leak rate – 180 gallons per day.

Village of Talofoto and surrounding area:

Ugum 2 million gallon reservoir - In-front of the gate right hand side - This was a visible leak from a valve box. Estimated leak rate 720 gallons per day.

Ugum Dam – Pump no. 1 – This was a leak between the motor and pump. Repair of the pump's packing would eliminate this leak. Estimated leak rate – 540 gallons per day.

Enrique San Nicolas – Second hydrant on the right side - This was a visible hydrant leak from a dry barrel type hydrant nozzle. The hydrant will require repair or replacement. Estimated leak rate 1,440 gallons per day.

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Rancho Camacho Subdivision House no. 224 – This was a leak from the government side of the water meter. Estimated leak rate – 90 gallons per day.

Chalan Fena Road – This was a leak between Chalan Fena Road and TGC Golf Club on the left hand side. Estimated leak rate 360 gallons per day.

Laguina Estate Subdivision – Main Lada Court – House no. 154 - This was a leak reported by Mr. Leon Guererro to the Leak Detection Plan crew. The leak was repair on March 9, 2005. Estimated leak rate – 180 gallons per day.

Additional Leak Sound:

Entrance to Calvo Beach Road in Ipan – A throttle sound was heard on a main valve. Need to verify with transmission and distribution supervisor.

NORTHERN WATER SYSTEM RESULTS:

The Leak Detection Plan (LDP) crew detected 160 underground water leaks. These leaks are recorded on the attached "Area Survey Report". Of the 160 leaks detected, 15 main and 108 service line leaks have been repaired. The rest of the leaks are being schedule by priority on a continual basis.

LDP crew also discovered 5 illegally connected water lines.

Village of Yona and surrounding Area:

Fair Way lane – Next to hydrant - House no. 360 – This was a service line leak reported to Pressure Line Unit Repair Section with a control no. 23969. Estimated leak rate – 180 gallons per day.

Water Booster Pump Station 25 – This leak was reported to Pressure Line Unit Repair Section with a control no. 24150. Estimated leak rate 28,880 gallons per day.

Across Camachile Store – Route 17 - This was a service line leak reported to Pressure Line Unit Repair Section with a control no. 24159. Estimated leak rate – 360 gallons per day.

Toves Road – First Hydrant on Right – This was a leak detected from a hydrant. Need to go back for observation.

F.B. Pangelinan – Across House No. 105 – This was a service line leak that was repaired by the Leak Detection Plan crew on March 17, 2005. Estimated leak rate – 180 gallons per day.

Santos Road and Chalan Teleforo – This was a service line leak that was marked with blue arrow paint. Estimated leak rate – 180 gallons per day.

Jota Road – Across House No. 386 – This was a substantial main line leak that was coming out on the side of a power pole. Estimated leak rate - 56, 000 gallons per day.

Village of Chalan Pago/Ordot and surrounding area:

Access Road – 2 defected hydrant on left hand side toward Ordot – This was a hydrants that are leaking on the hydrants nozzles. The hydrants need to be repair or replace. Estimated leak rate – 1,440 gallons per day.

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Toves Road – Defected Valve - This was a minor $\frac{3}{4}$ " gate valve leak that was repaired by the Leak Detection Plan crew on March 17, 2005. Estimated leak rate – 90 gallons per day.

Justice Monissa Lujan Road – This was a Leak detected on the last hydrant of the proposed dead end road along Justice Monissa Lujan Road. The location of the leak was marked with blue arrow paint. Estimated leak rate – 1,440 gallons per day.

Entrance to Chalan Huego – Corner left hand side heading toward the baseball field – This was a service line leak that was marked with blue arrow paint. Estimated leak rate – 180 gallons per day.

Route 4 in-between Chalan Untalan and Chalan Lala – This was a substantial puddle of water around the area and by the hydrant. The water needs to be tested by GWA's laboratory technician for chlorine content.

Route 4 entrance to Chalan Asusana in-front of house no. 568 with block sign marking – This was a saturated water around the area and bubbling out of the ground. The location was marked with blue arrow paint. The leak detection crew needs to come back for observation during the early hour of 1:00 to 5:00 in the morning due to heavy traffic in the area.

Nakie Street – House No. 321 – This was a leak coming out of the consumer meter valve box and reported to Pressure Line Unit Repair Section with control number 24545. Estimated leak rate – 90 gallons per day.

Nakie Street – House No. 236B - This was a service line leak reported to Pressure Line Unit Repair Section with control number 23953. Estimated leak rate – 90 gallons per day.

End of Ramirez Drive - This was a 2" service line leak that was heard on a hydrant. Estimated leak rate – 180 gallons per day.

Corner of Tun Bihue and Ramirez Drive – This was a leak from a main line packing of the hydrant. Estimated leak rate – 1,440 gallons per day.

Main Road to Judge Sablan Street behind JM store - This was a high pitch sound that was heard on the last hydrant. Need to go back for observation. Estimated leak rate – 1,440 gallons per day.

Dero Road – Pass Ordot Dump – Dirt road on the left hand side close to house no. 626 – This was a 2" waterline leak that was flowing out of

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the ground. Location of the leak was marked with blue arrow paint. Estimated leak rate – 90 gallons per day.

Gogue Drive – Across house no. 188 – This was a service line leak that needed to go back for observation.

Additional Leak that was repaired by the Leak Detection Plan crew while doing the survey:

Ramirez Drive – House no. 280 – This was a service line leak before the water meter valve box. Estimated leak rate 90 gallons per day.

Tun Bihue Street – House no. 122 – This was a leak by the water meter tailpiece. Estimated leak rate 90 gallons per day.

Main Road Judge Sablan Street – First left turn on the left hand side of the JM Store – This was a damaged meter glass and not registering – Reported to customer service unit.

Village of Sinajana and surrounding area:

Fensu Court by house no. 115 right hand side hydrant – This was a service line leak that was heard from a hydrant valve. Estimated leak rate – 90 gallons per day.

Kufu Court across house no. 111 - This was a service line leak that heard from a hydrant valve. Estimated leak rate – 90 gallons per day.

Afame Road fronting house no. 278 – This was a service line leak that was heard from a main valve. Estimated leak rate – 90 gallons per day.

Afame Road house numbers 472 and 862 - This was a service line leak. Estimated leak rate – 90 gallons per day.

Chalan Canton Tutujan by house no. 312 and 324 – This was a service line leak that was heard from a main valve. Estimated leak rate – 90 gallons per day.

Lemai Court right hand side in front of house 399 - This was a leak coming out from a hydrant barrel. The hydrant needs to be repair or replace. Estimated leak rate – 1,440 gallons per day.

Pale Kieron Hickey Drive by house nos. 162 and 256 – This was a service line leak that was heard from a hydrant valve. Estimated leak rate – 180 gallons per day.

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Camachile Court by house no. 122 - This was a visible service line leak that was heard from a main valve. Estimated leak rate – 180 gallons per day.

Chalan Guma Yuus between the St. Jude church and fire station – This was a visible leak from a defective main gate valve. The gate valve needs to be replaced to eliminate the leak. Estimated leak rate – 270 gallons per day.

Chalan Guma Yuus by house no. 268A - This was a visible service line leak that was heard from a hydrant valve. Estimated leak rate – 180 gallons per day.

Village of Agana, Agana Heights and surrounding area:

West O'Brien Drive and Chalan Santo Papa - This was a high pitch sound heard from a hydrant. Estimated leak rate – 1,440 gallons per day.

Padre Palomo Street and Hesler Place – This was a high pitch sound heard from a hydrant valve and main valve. Estimated leak rate – 1,440 gallons per day.

Serina Building - This was a high pitch leaking sound heard from a main valve by the sidewalk. Needs to go back for observation. Estimated leak rate – 1,440 gallons per day.

Herman Cortez Avenue – This was a high pitch leaking sound heard from a hydrant. This might be a possible main line leak. Needs to go back for observation. Estimated leak rate – 1,440 gallons per day.

Dulce Numbre de Maria Drive by Club Texas - This was a visible service line leak. Estimated leak rate – 180 gallons per day.

Corner of Paasan Drive and Tai Gigao Drive – This was a visible service line leak. Estimated leak rate – 180 gallons per day.

Additional leaks that was discovered and repaired by the Leak Detection Plan crew while doing the survey:

Niyog Drive – This was a leak before the meter tailpiece. The $\frac{3}{4}$ meter gasket was replaced to eliminate the leak.

Mendiola Drive – This was a leak by the water meter. The $\frac{5}{8}$ water meter gasket was replaced to eliminate the leak.

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Gutierrez Street – This was a leak by the gate valve. The gate valve was replaced with ball valve.

Village of Mangilao and surrounding area:

Exposed service line leaks that were discovered while doing the survey:

Tai Road last bus stop – Two service line leak pass house no. 270. Estimated leak rate – 270 gallons per day.

Songsong Street – This was a service line leak on the left hand side of a 2 story white house with gray trimming. Estimated leak rate – 180 gallons per day.

Songsong Street – This was a service line leak on the third house on the right hand side. Estimated leak rate – 180 gallons per day.

Ebat Court – This was a service line leak on the last house of house no. 96. Estimated leak rate – 180 gallons per day.

Ministry Lane – This was a visible service line leak located on Sharma Complex. Estimated leak rate – 180 gallons per day.

Spotsa Lane – This was a visible service line leak on the left hand side of house no. 159. Estimated leak rate – 180 gallons per day.

Tenorio Lane - This was a service line leak adjacent to house no. 164 that was heard from a hydrant. Estimated leak rate – 180 gallons per day.

Astrom Circle - Across 3MLS Building – This was a high pitch sound heard from a hydrant and sectional valve. The area of the valve was marked with blue paint. Estimated leak rate – 1,440 gallons per day.

Washington Drive – Across Puti Tai Nobia Lane - This was a leak from a packing of a main valve. The area was marked with blue paint. Estimated leak rate – 1,440 gallons per day.

Main entrance on the left hand side of Spotsa Lane – This was a high pitch sound heard from a main valve. The area was marked with blue paint. Estimated leak rate – 1,440 gallons per day.

Additional leak that was repaired by the Leak Detection Plan crew while doing the survey;

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Abing Street and entrance of Route 10 - This was an exposed unused service line leak on the left hand side of Abing Street and entrance of Route 10. Estimated leak rate – 180 gallons per day.

Across Plumeria Street – Route 15 – This was an exposed unused service line leak. Estimated leak rate – 180 gallons per day.

Sabanan Maagas Lane - This was a leak that was heard on the second hydrant on the right hand side going-in to Sabanan Maagas Lane. Estimated leak rate – 1,440 gallons per day.

Between Sabanan Maagas Road and Lemon Lane - This was a high pitch sound heard from a hydrant and sectional valve. Estimated leak rate – 1,440 gallons per day.

Corpus Street by house no. 215 - This was an exposed service line leak that was heard from a hydrant valve. Estimated leak rate – 180 gallons per day.

Perez Road - This was a visible service line leak. Estimated leak rate – 180 gallons per day.

Route 15 and Route 26 - This was a high pitch sound heard from a hydrant main valve. Discovered 2 visible leaks. Estimated leak rate – 1,440 gallons per day.

Bayan Street by house no. 199E - This was a service line leak that was heard from a hydrant valve and main valve. Estimated leak rate – 180 gallons per day.

Golden Cupid Road – First house on the left - This was a visible service line leak. Estimated leak rate – 180 gallons per day.

Roy T. Damian Street and Casimiru Street - This was a high pitch sound heard from a hydrant valve. This is a possible main water line leak. Estimated leak rate – 1,440 gallons per day.

Calle V.D. Perez - This was an unused service line leak that was leaking from the packing nut and repaired by the Leak Detection Plan crew. Estimated leak rate – 180 gallons per day.

Roy T. Damian Street and Tuba Street - This was a leak heard from a main water line valve. Estimated leak rate – 360 gallons per day.

Village of Barrigada and surrounding area:

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Machante Street - This was a visible service line leak. Estimated leak rate – 180 gallons per day.

S-24 on the shoulder of the road of Rte. 33 - This was a visible service line leak. Estimated leak rate – 180 gallons per day.

Taisan Street - This was a visible service line leak. Estimated leak rate – 180 gallons per day.

San Ramon Street - This was a hydrant leak and a service line leak on the last house by the road sign. Estimated leak rate – 180 gallons per day.

Lujan Way – There was two exposed service line leak that was discovered on the area. Both leaks were marked with blue arrow paint. Estimated leak rate – 270 gallons per day.

Entrance of Medina Way - This was a visible service line leak. Location of the leak was marked with blue arrow paint. Estimated leak rate – 180 gallons per day.

Leyang Road – 2nd dirt road from laundry mat on the right hand side or across bus stop next to Kaderon Street - This was a visible service line leak. Estimated leak rate – 180 gallons per day.

Across Balako Street on the right hand side of the road – House no. 434 - This was an exposed service line leak Estimated leak rate – 180 gallons per day.

Westbrook Street – House no. 125A - This was an exposed service line leak. Estimated leak rate – 180 gallons per day.

Lalo Barrigada - This was an exposed service line leak. Estimated leak rate – 180 gallons per day.

Hatgana and Tamuning Route 30:

Route 4 Mobil Gas Station – This was a service line leak surfacing on the shoulder of the road. Estimated leak rate – 720 gallons per day.

Hatgana – Ada Commercial Building – Paradise Fitness Center – This was a leak on an old 4-inch water main. Need to locate main valve or terminate the line. Estimated leak rate – 1,440 gallons per day.

Jasmin Way by the road sign – This was an expose service line leak. Estimated leak rate – 180 gallons per day.

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Corner of Route 1 and Governor Carlos Camacho Road by K Steak House – This was a leak from a defective gate valve. – Estimated leak rate – 180 gallons per day.

Fred Lock Smith Office Building – This was an unused service line leak that was repaired by the Leak Detection Plan crew on May 16, 2005. Estimated leak rate – 180 gallons per day.

Paluan Evangelical Church of Guam – This was a leak by the government side of the water meter and a service line leak. Estimated leak rate – 180 gallons per day.

Pas Street – Back side of Guam Premium Outlet – This was a possible main leak heard from main valve. The area was marked with blue arrow paint. Estimated leak rate – 2,880 gallons per day.

155B Fejeran Street – Water Meter no. 348051 – This was a leak on the government side of the water meter and was repaired by the Leak Detection Plan crew on May 16, 2005. Estimated leak rate – 180 gallons per day.

164-F Tun Jose Fejeran Street – Luis Duenas – Joe Toves - This was a visible service line leak. Estimated leak rate – 180 gallons per day.

Sunny's Electronic – This was an exposed service line leak on the shoulder of the road. The location of the leak was marked with blue arrow paint. Estimated leak rate – 180 gallons per day.

S-16 – Tun Jesus Crisostomo Street – This was a visible service line leak. The location of the leak was marked with blue arrow paint. Estimated leak rate – 180 gallons per day.

Tamuning – Governor C. G. Camacho – Route 30 – Route 14:

S-28 and 29 – This was an exposed service line leak. Estimated leak rate – 180 gallons per day.

Governor Bradley – House no. 396 – This was a service line leak that was heard on a hydrant. The leak was later confirmed with water streaking down the road. Estimated leak rate – 180 gallons per day.

Tun Justo Dungca Street – House no. 116 – This was an exposed service line leak. Estimated leak rate – 180 gallons per day.

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Tun Chong – This was an unused service line leak by the jungle area and was repaired by the Leak Detection Plan crew on May 17, 2005. Estimated leak rate 180 gallons per day.

Former Drive-in Theater – Open Lot between T&C Maintenance and New Century Building Hotel – This was an unused service line leak that was repaired by the Leak Detection Plan crew on May 18, 2005. Estimated leak rate - 180 gallons per day.

Mamis Road - At the end of the road before Yellow Pages Building - house on the left – This was a service line leak that was marked with blue arrow paint. Estimated leak rate – 180 gallons per day.

Royal Garden – This was a service line leak that was heard on G Street main valve in front of 28-4 condo. Estimated leak rate – 180 gallons per day.

Harmon Cliff Line Route 34

Former Carnival unused Service Lines – This was an exposed unused service line leak that was repaired by the Leak Detection Plan crew on May 31, 2005. Estimated leak rate 720 gallons per day.

Dededo – Liguán Terrace

South Hasmin Court – This was a service line leak that was heard from a hydrant. The leak was located down the street and was marked with blue arrow paint. Estimated leak rate – 180 gallons per day.

Dededo

Chando Court – This was a surface 2 inches galvanize service line leak that was repaired by the Leak Detection Plan crew on June 08, 2005. Estimated leak rate – 180 gallons per day.

East Liguán and Diseplina court – This was a leak that was heard from a hydrant valve. The repair of the leak will require a backhoe and excavation clearance from Guam Telephone Authority. Estimated leak rate - 1, 440 gallons per day.

Macheche, Dededo – Mogfog – Route 26

Villagomez Drive – Water Booster Pump Number 4 – This was a main valve leaking and streaming to the water reservoir area. Estimated leak rate – 720 gallons per day.

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Acho Latte Street – This was a service line leak that was heard from a hydrant adjacent to house no. 275. Estimated leak rate – 180 gallons per day.

Acho Latte Street – House no. 235 - This was a leak by the water meter that was repaired by the Leak Detection Plan crew on June 09, 2005. Estimated leak rate – 180 gallons per day.

Chandia Street – House no. 170 – This was a service line leak that was repaired by the Leak Detection Plan crew on June 09, 2005. Estimated leak rate –180 gallons per day.

Josen Olympia – Fellowship Church back side next to container – This was a service leak with water streaming down the road. Estimated leak rate – 180 gallons per day.

Chalan Gollai Appan – End of the road left hand side across house no. 201B – This was a service line leak that was marked with blue arrow paint. Estimated leak rate – 180 gallons per day.

Ahau Lane – House no. 141D – This was a possible main waterline break that was heard from a hydrant. The leak was located with water streaming out of the asphalt of the road. The location of the leak was marked with blue arrow paint. Estimated leak rate – 1,440 gallons per day.

Ahau lane – House no. 151 – This was a leak that was heard from the hydrant main valve. The leak was discovered with water streaming on the shoulder of the road. Estimated leak rate – 180 gallons per day.

Villagomez Road – This was an unused service line leak that was heard from a main valve and repaired by the Leak Detection Plan crew on June 09, 2005. Estimated leak rate – 180 gallons per day.

Dededo – Route 3

Ukudo – House no. 199 by the A.V. Pipeline – This was a service line leak that was streaming on the road. Estimated leak rate – 180 gallons per day.

Ukudo by the A.V. Pipeline – This was a leak that is constantly flowing creating a pond. Backhoe equipment is needed to excavate and clear the debris in the area before making repair. Estimated leak rate – 540 gallons per day.

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Alicia Court – This was a leak that was heard from a main valve. The area of the leakage was marked with blue arrow paint. Estimated leak rate – 720 gallons per day.

Dededo – Wusstig Road Left Side

Wusstig Drive and Chalan Despaci – This was a service line leak that was marked with square blue paint. Estimated leak rate – 360 gallons per day.

Parasio Street – This was a service line leak that was heard from a hydrant valve. The location of the leak was marked with blue arrow paint. Estimated leak rate – 360 gallons per day.

Chalan Adahi – Second hydrant - This was a leak that was heard from a hydrant. Discovered a service line leak in the area and was repaired by the Leak Detection Plan crew. Estimated leak rate – 720 gallons per day.

Chalan Boinatia – This was a service line leak that was repaired by the Leak Detection Plan crew on June 28, 2005. Estimated leak rate – 180 gallons per day.

Dededo – Ypaopao Estate – Batulo

ND- 4 Aga Boulevard – This was a service line leak that was repaired by the Leak Detection Plan crew on July 01, 2005. Estimated leak rate – 180 gallons per day.

Bumuchachu Road and Batulo Road – This was a service line leak that was repaired by the Leak Detection Plan crew on July 01, 2005. Estimated leak rate – 180 gallons per day.

Dededo

Quezon Street – House no. 155A – This was a minor service line leak that was streaming from the shoulder of the road. Estimated leak rate – 180 gallons per day.

Chalan Koda – Toward Cruzan Farm – This was a leak streaming on the left hand side of the road. The area of the leak was marked with blue arrow paint. Estimated leak rate – 180 gallons per day.

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Dededo – Astumbo Subdivision

Chalan A'abang – Behind FEMA 96 Sewer Pump Station - This was a high pitch sound of leak that was heard from a main valve. Estimated leak rate – 720 gallons per day.

Chalan Pakao – This was a low level sound main leak that was heard from a hydrant. Estimated leak rate 360 gallons per day.

Additional service line leak that was discovered while doing the survey:

Chalan Pakao – This was service line leak located at house no. 205. Estimated leak rate 180 gallons per day.

Chalan Pacha – This was service line leak streaming by the sidewalk. The leakage was from two abandoned houses disconnected water meters. Estimated leak rate 360 gallons per day.

BDN Sasata – Customer showed a service line leak located at house no. 166. Estimated leak rate 180 gallons per day.

Dededo – Ysengsong Road

Ysengsong Road – Adjacent to house no. 1624 – This was a leak cause by a broken hydrant. Some one had run over the hydrant and broke the stem. Estimated leak rate – 1,440 gallons per day.

Swamp Road – Adjacent to deep well D –19 – This was leak cause by a defective gate valve. The leak was from the packing of the gate valve and was repaired by the Leak Detection Plan crew on July 19, 2005. Estimated leak rate 180 gallons per day.

Dededo – Old Kaiser – Ysengsong Road

East Santa Barbara Street – This was a visible service line leak that was streaming to the shoulder of the road. The leak is adjacent to house no. 342. Estimated leak rate 180 gallons per day.

East Papaya Street – This was a leak that was heard from a hydrant. The leak was traced with a puddle of water bubbling out of the asphalt. The location of the leak was marked with blue arrow paint. Estimated leak rate 360 gallons per day.

Bonito Street – Adjacent to deep well D-22 - Ysengsong Road – This was a visible leak that was streaming to the shoulder of the road. The leak

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was from a defective two inches gate valve. Estimated leak rate 180 gallons per day.

Dededo Village – Kaiser Housing

West Binadu Street by the proposed Lada Low Cost Housing – This was a defective two inches gate valve. The gate valve was replaced on July 27, 2005. Estimated leak rate 360 gallons per day.

Helena Lane – House no. 181B – This was a service line leak by the consumer water meter. The leak was reported to Pressure Line Unit Repair Section with control no. 27763. Estimated leak rate 90 gallons per day.

Consolacion Street adjacent to Benavente Middle School – This was a hydrant leak from a hydrant's nozzle. The hydrant will require repair or replacement. This was reported to Pressure Line Unit Repair Section with control no. 27764. Estimated leak rate - 180 gallons per day.

Dededo Main Village

Redondon Luchan – This was a leak gushing out of a service line of an abandoned water meter that was repaired by the Leak Detection Plan crew on August 02, 2005. Estimated leak rate – 360 gallons a day.

Santa Barbara Street and Ysengsong Road – This was a high pitch sound that was heard from a hydrant. Need to go back for observation.

Yigo

Chalan Nigas – House no. 166 – This was an unused service line leak and a defective $\frac{3}{4}$ " gate valve that was repaired by the Leak Detection Plan crew on August 03, 2005. Estimated leak rate – 90 gallons per day.

Chalan Paipai – This was a high pitch sound that was heard from the main sectional valve. Further investigation discovered a two inches service line that was uprooted by a tree. The Leak Detection Plan crew made a repaired on the two inches service line on August 03, 2005. Estimated leak rate – 180 gallons per day.

Chalan Paraisu – This was a high pitch sound heard on a sectional valve and hydrant valve. Further investigation discovered a service line leak. Estimated leak rate – 90 gallons per day.

Chalan Caskahu – This was a leak that was previously reported to Pressure Line Unit Section with control no. 26871. The leak is streaming

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down the shoulder of the road. The Leak Detection Plan crew repaired the leak on August 03, 2005. Estimated leak rate 90 gallons per day.

Chalan Caskahu – Across house no. 328B – This was a sound that was heard from a service line and discovered an illegal hook-up. The Leak Detection Plan crew reported the illegal connection to Mr. Vince Cruz, Superintendent for Pressure Line Unit and Mr. Patricio Trevino, Direct

Responsible Charge for GWA. Mr. Cruz and Mr. Trevino took pictures of the illegal connection for evidence. Estimated leak rate – 90 gallons per day.

Chalan Leston – This was a leak previously reported to Pressure Line Unit Section with control number 27559. The Leak Detection Plan crew repaired the leak on August 03, 2005. Estimated leak rate – 90 gallons per day.

Chalan Sabana Pale – This was a leak that was verified by the Leak Detection Plan crew from the complained form with a control number 27552. There was no leaking sound but instead discovered the leak was repaired by unknown individual.

Tan Jose Road - This was a two inches (2") in diameter service line leak located in a remote area of the jungle where the leak cannot be seen. The Leak Detection Plan (LDP) crew repaired the leak by using a 2" full circle repair clamp on August 05, 2005. Estimated leak rate – 180 gallons per day.

Chalan Toming – This was an exposed 2" service line leak that was repaired by LDP crew using a 2" x 3" repair clamp on August 03, 2005. Estimated leak rate – 90 gallons per day.

Chalan Tun Ben Anaco – Behind Religious Educational Center - This was an unused ¾" service line leak that needs to be replace. Estimated leak rate – 90 gallons per day.

Route 1 – Tun Josen Diego Road – This was an inch and a quarter (1¼") galvanize service line leak that was repaired by LDP crew on August 7, 2005. Estimated leak rate – 80 gallons per day.

Toves Road – Access to Trinity Christian School - Adjacent to a pink house beside a vacant lot – This was a visible service line leak. Estimated leak rate – 80 gallons per day.

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Route 1 – God Send Enterprise – Bus Shelter Y-85 – This was a visible service line leak. The location of the leak was marked with blue arrow paint. Estimated leak rate – 180 gallons per day.

Chalan Donne Street – Across house no. 134 – This was a leak on a possible defected dry barrel hydrant. The hydrant needs to be replaced to eliminate the leak. This was reported to dispatch and given a control number 28078. Estimated leak rate – 1,440 gallons per day.

Chalan Lujuna – 1st right turn - Gray concrete house with no paint – This was a service line leak that was heard from a hydrant. The leak was reported to dispatch and given a control number 28079 Estimated leak rate – 180 gallons per day.

Chalan Tun Luis Takano – This was a leak that was heard on the last hydrant's valve at the end of the road. On the end of the road was a narrow dirt road where saturated water was located. GWA's laboratory technician was called to test for chlorine content. The result was verified to contained chlorine and determined to be a main waterline leak. Estimated leak rate – 28,000 gallons per day.

Chalan Tong Street – In-front of Asian Motors – This was a service line leak that was heard from a hydrant. Discovered water streaming on the shoulder of the road. The leak was reported to dispatch and was given a control number 27847. Estimated leak rate – 180 gallons per day.

Route 1 – In-front of Deep-well Y-21A – This was a puddle of water beside a hydrant. This might be a hydrant's valve damage or a main line leak. This was reported to dispatch and given a control number 28084. Estimated leak rate – 14,880 gallons a day.

East Gayinero – House no. 640 – This was a leak by the consumer water meter's propeller. The Leak Detection Plan crew replaced the meter propeller to stop the leak. Estimated leak rate – 80 gallons per day.

Jesus Amparo Street – House no. 243 – This was a leak by the consumer water meter's $\frac{3}{4}$ " gate valve. The Leak Detection Plan crew replaced the defective gate valve. Estimated leak rate – 80 gallons per day.

Chalan Tun Ramon Ana Street – By house no. 118 – This was a service line leak that required to be excavated by a backhoe in order to repair the leak. Estimated leak rate – 80 gallons per day.

Pacita Villa – This was an ongoing leak repair that is currently being excavated by a backhoe. Estimated leak rate – 1,440 gallons per day.

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Maria Q. San Miguel Lane – This was a leak that required to be excavated by a backhoe in order to repair the leak. Estimated leak rate – 360 gallons per day.

Santa Rosa – 414 Robit – This was a leak that required to be excavated by a backhoe in order to repair the leak. Estimated leak rate – 360 gallons per day.

422 Chalan Padiron Lagu - This was a hydrant leak from the hydrant's nozzle. The hydrant will require repair or replacement. Estimated leak rate - 1,440 gallons per day.

Chalan Sylvia – This was an exposed service line leak that was repaired by the Leak Detection Plan crew. Estimated leak rate – 80 gallons per day.

Chalan Tun Tomas Street – This was an unused proposal service line leak that was repaired by the Leak Detection Plan crew. Estimated leak rate – 80 gallons per day.

Yigo – Route 9 – AGAFU GUMAS – Machananao

Azud Avenue - This was a high pitch sound that was heard from a hydrant. This is a possible main line leak. Need to go back for observation. Estimated leak rate – 1,440 gallons per day.

Yigo – Machananao

Gill – Baza Subdivision – This was a subdivision that had too many leaks due to improper installation, inefficient shutoff valves and improper materials. The Leak Detection Plan (LDP) crew also discovered four (4) residential with an illegal water hook-up. LDP crew scheduled an investigation of the illegal connection with GWA's Revenue Protection Unit and the Guam Police Department. Pictures were taken of the illegal connection for evidence. Estimated water loss due to leaks and illegal connection – 4,800 gallons per day.

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CONCLUSIONS:

1. Based on the results of this leak detection study, the unaccounted for water leakage found can be attributed to the detectable and repairable water leaks in the system.
2. The study does not include water used for fire fighting, flushing programs, street cleaning, etc.
3. That all GWA's personnel and vendors maintain that all fire hydrants be properly closed during the use of the hydrant.



GUAM WATERWORKS AUTHORITY

Good Water Always

578 N. Marine Corps Drive, Tamuning, GU 96913-4111

Phone: (671) 647-2603 Fax: (671) 646-2335

INTER-OFFICE MEMORANDUM

DATE: November 19, 2004

TO: General Manager

FROM: Martin Roldan, Leak Detection Program Coordinator

SUBJECT: Non-registering Water Meters (WM), Foggy WM, Crack/Damage WM, Water Leaks WM, Buried WM, WM not listed or needs to be removed

Attached are the listings of water meters that were discovered by the leak detection crew, Mr. Frank Nauta and Mr. Tony Taitague, regarding the above subject while performing the field assessment for Piti water audit.

As part of the Leak Detection Program's purpose and responsibilities as intended by EPA Stipulated Orders, the findings are being forwarded to Ms. Becky Balajadia, Customer Service Supervisor, Mr. Ralph Hutton, in charge of RPU, Mr. Gerard Paulino, Meter Reader Supervisor, Mr. Tony Chargualaf, Acting Collection and Distribution Manager, Mr. Vincent Cruz and Mr. John Pangelinan, Collection and Distribution Superintendents, Mr. Paul Kemp, Compliance Officer and GWA's General Manager.

If you have any questions, please contact Martin Roldan, Frank Nauta or Tony Taitague, Leak Detection Section at 646-7842.

MARTIN ROLDAN

Attachment
MR/mr

Copy to Becky Balajadia, Ralph Hutton, Gerard Paulino, Paul Kemp, Frank Nauta, Tony Taitague, Tony Chargualaf, Vince Cruz, John Pangelinan and Martin Roldan

Appendix 2B

WATER METERS NOT LISTED NEEDING TO BE REMOVED

| | | | |
|----------|----------|----------|----------|
| 56280973 | 55909572 | 60042211 | 56710181 |
| 34804912 | 49938588 | 31261779 | |

NON REGISTERING WATER METERS

| | | | |
|----------|----------|----------|----------|
| 42844925 | 47396647 | 28854513 | 42992829 |
| 53467920 | 38908466 | 43320031 | 53472381 |
| 22635752 | 44616367 | 53469049 | 28733255 |
| 52619150 | 36626891 | 49863229 | 50412416 |
| 52199500 | 60234070 | 52564125 | |

FOGGY (UNREADABLE) WATER METERS

| | | | |
|----------|----------|----------|----------|
| 23141174 | 23141283 | 47313023 | 19334690 |
|----------|----------|----------|----------|

SERVICE LINE WATER LEAKS

| | | | |
|----------|----------|----------|----------|
| 53472192 | 46413903 | 44616042 | 44616041 |
| 42782429 | 48505892 | 32297209 | |

BURRIED (INACCESSABLE) WATER METERS

| | | | |
|----------|----------|----------|----------|
| 44616053 | 37006 | 43319174 | 34804713 |
| 32152661 | 57993943 | 42992751 | |