

# Final Report

## Water Line Leak Detection Project for: City of Cannon Beach, OR



Project Dates:  
04/23/2018 through 05/03/2018

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# **COVER LETTER**

June 1, 2018

City of Cannon Beach  
Attn: Dan Willyard  
163 E. Gower St.  
Cannon Beach, OR 97110

**Re: April/May 2018 Water Distribution System Leak Detection Project**

Dear Mr. Willyard:

Utility Services Associates, LLC, (USA) is pleased to submit the enclosed Final Report on leak detection services recently completed.

The information contained in this Final Report details the procedures and results specific to this project. When applicable, recommendations have been made concerning the best approach for the repair of leaks detected and preparation for future leak detection projects.

**As you review this Final Report, please pay close attention to the Water Loss Consultant's remarks and field observations in the Project Observation section of this report. These may assist you in determining the best course of action regarding specific leaks.**

**At times specific individual Leak Reports may differ in the Final Report from those provided during the course of the project. These changes, usually insignificant, generally pertain to the manner in which we report leaks and do not alter the methods used or results of pinpointing.**

**We strongly suggest you contact us prior to excavating any leak that we have labeled with "CAUTION" for further explanation.**

This leak detection project is productive since we pinpointed leakage that, when repaired, can reduce your water loss, saving City of Cannon Beach dollars now and in the future. We appreciate your confidence in USA. If you have any questions, call us at (877) 585-5325 or (206) 429-3751.

Sincerely,  
  
Rob Meston  
President



## **EXECUTIVE SUMMARY**

## LEAK DETECTION EXECUTIVE SUMMARY

From April 23, 2018 through May 3, 2018, USA performed a leak survey for **City of Cannon Beach, OR**. Our Water Loss Consultant, Jerry Thomas, used and appreciated the information provided by Shawn Cole and Darryl Walker to expedite and provide an accurate survey. The tables below detail the information gathered.

### Time Spent on Project

Surveying:	40.77 Hr
Pinpointing:	11.25 Hr
Other Time:	19.98 Hr
<b>Total Time:</b>	<b>72 Hr</b>

### Total Areas Surveyed

Total Distance in Miles	15.2297
Total Distance in feet	80,413

The mileage was estimated by the Water Loss Consultant and may not match maps.

### Access Points Contacted

Hydrants	99
Valves	465
Services	1,335
Other	0
<b>Total</b>	<b>1,899</b>

### Leak Type Noises Detected

Hydrants	0
Valves	4
Services	18
Other	1
<b>Total</b>	<b>23</b>

### Leaks Pinpointed

Main	0
Valve	3
Hydrant	0
Service Line	8
Service Connection	0
Curbstop	2
Meter	7
<b>Total</b>	<b>20</b>

### Total Water Loss Identified

Gallons Per Minute (GPM):	32.25
Gallons Per Day:	46,440
Gallons Per Month:	1,412,550
Gallons Per Year:	16,950,600

### Unidentified Water Loss

Faulty Meters	0
Unidentified Leaks	0
Possible Consumer Side Leaks	0

This project was divided into two phases; the survey phase and the pinpointing phase. The following pages outline exactly how those two phases progressed and the results of each. Any leaks pinpointed will be detailed in the attached Leak Reports.

# **PROJECT OBSERVATIONS**

# PROJECT OBSERVATIONS (Water Distribution Lines)

## **GENERAL**

USA recently completed a 9-day, leak detection project for the City of Cannon Beach, OR. The fieldwork portion of the project was started on April 23, 2018 and completed on May 3, 2018. The following notes were compiled from data collected from USA Water Loss Consultant Jerry Thomas, during the fieldwork:

## **SPECIFICS**

The project was broken down into two different phases:

1. **Survey Phase** – sounding of appurtenances and recording all leak anomalies detected for further investigation.

Pressures ranged from 25 to 80 PSI in the area allowing for a thorough survey of the requested area. Approximately 15.23 miles of distribution system were surveyed over the period of the project. The pipe material surveyed consisted mostly of AC and PVC. A point-to-point survey was conducted on all PVC based pipe.

Overall, sound travel was good. Preparation was also good. Field assistance was excellent, which helped to expedite the survey.

As a result of the Survey Phase, we detected and recorded twenty-three (23) leak type noises for re-investigation during the Pinpointing Phase.

2. **Pinpointing Phase** – pinpointing all anomalies that were detected during the survey phase.

The phase started with the follow-up of the leak anomalies detected during the Survey Phase.

A total of twenty (20) leaks were pinpointed during this portion of the project. Please refer to each leak report for more information and a drawing.

## **RECOMMENDATIONS:**

Overall, the areas surveyed seem in fairly good repair. A majority of the issues were found on service lines. We recommend a point-to-point survey in the future as it is likely there are service leaks that may not be easily detected unless each service line is checked.

## **CONCLUSION**

The leaks that were detected, when repaired, should have a very positive impact in reducing Real Losses and lowering operating costs due to non-revenue water loss.

We would like to thank Shawn Cole and Darryl Walker for their efforts, technical assistance and overall system knowledge, all of which were integral to the successful completion of this project. We look forward to working with the City of Cannon Beach, OR on future conservation projects.

Jerry Thomas  
Water Loss Consultant

## **SURVEY PHASE REVIEW**

## SURVEY PHASE REVIEW (Water Distribution Lines)

The first step in our survey was to review the distribution maps of the system for familiarization of the pipe network and available appurtenances to be used for contact points.

We then conducted a comprehensive survey by making physical contact with all available appurtenances (valves, hydrants, and services). USA used a sonic leak detection amplification instrument designed for this purpose.

### Appurtenances Surveyed

<b>Hydrant</b>	99
<b>Valves</b>	465
<b>Services</b>	1,335
<b>Other</b>	0
<b>Total</b>	<b>1,899</b>

When normal contact points were not available or could not be created within a reasonable distance, we made an attempt to use a sonic ground listening instrument to make physical ground contact at intervals no greater than 6 feet directly over the pipe. If conditions did not allow this procedure our Water Loss Consultant advised you at time of project and notes of such are included in the Project Observations. Ground listening devices are employed when ground cover is pavement, cement or similar hard surface.

When ground cover was not a hard surface and normal contact points were not available, we made an attempt to use probe rods or a specially designed sounding plate at 6-foot intervals. A sound amplification instrument with 3VG or greater transducer was employed in conjunction with this equipment, directly over the pipe. If conditions did not allow this procedure our Water Loss Consultant advised you at time of project and was detailed in the Project Observations section of this Final Report. Direct contact to the main line at intervals outlined in Preparation for Service resulted in the most thorough survey.

### Areas Surveyed

<b>Street</b>	<b>From</b>	<b>To</b>	<b>Distance</b>
Fernwood St	S Hemlock St	S Pacific St	396
W Surfcrest Ave	S Pacific St	End	796
Delta St	S Pacific St	S Hemlock St	616
Susitna St	S Pacific St	End	723
Chisana St	S Pacific St	End	767
Nelchena St	S Pacific St	End	703
Matanuska St	S Pacific St	Pacific St	319
Nebesna St	S Hemlock St	End	521
Tanana Ave	E End	W End	637
Gulcana Ave	S Hemlock St	End	576
Amber Lane	S Hemlock St	End	537
Chilcoot Trail	S Hemlock St	End	614
Yukon St	S Hemlock St	End	533



Vista Del Mar	Yukon St	Pacific St	420
Pacific St	S Hemlock St	End	803
Gogona Ave	S Hemlock St	End	419
Nazina Ave	S Hemlock St	End	191
Chena St	S Hemlock St	End	310
Center St	S Hemlock St	Pacific St	327
Pacific St	Center St	S Hemlock St	792
Haystack Lane	S Hemlock St	End	381
Forest Lawn	S Hemlock St	Loop	1,049
View Point Ter	S Hemlock St	Ross Lane	573
Arbor Lane	View Point Ter	Spruce St	694
Ross Lane	Spruce St	S Hemlock St	754
Hills Lane	S Hemlock St	End	896
Elliott Way	S Hemlock St	End	849
S Hemlock St	Pacific St	Elliott Way	3,166
S Hemlock St	Elliott Way	1st St	3,456
Gower Ave	W End	Spruce St	1,007
Pacific St	Gower Ave	End	749
Spruce Ct	Spruce St	End	409
Harrison St	Elm St	Beach	1,419
Van Buren St	Elm St	Beach	1,572
Jackson St	Elm St	Beach	1,594
N Hemlock St	1st St	3rd St	1,309
N Spruce St	1st St	End	1,819
N Larch St	1st St	End	1,041
3rd St	N Hemlock St	Spruce St	229
Monroe St	Elm St	Beach	1,614
Elm St	Monroe St	End	735
Madison St	Spruce St	Beach	1,030
Jefferson St	Spruce St	Beach	937
Adams St	Spruce St	Beach	911
Washington St	Spruce St	Beach	923
Ocean St	Harrison St	Washington St	1,612
Laurel St	Washington St	1st St	757
Taft St	S Hemlock St	Laurel St	436
Spruce St	Spruce Ct	1st St	2,382
Coolidge St	S Hemlock St	End	527
Evergreen St	Coolidge St	Dawes Ave	199
Cypress Ct	Dawes Ave	Spruce Ct	304
Dawes Ave	S Hemlock St	End	936
Spruce Ct	Sunset Blvd	Coolidge St	140
Sunset Blvd	S Hemlock St	Seascape Dr	2,425
Poplar St	Sunset Blvd	End	839
Elk Land Rd	Elk Creek Rd	End	1,319
Silver Point Ct	Elk Creek Rd	End	137
Haskell Lane	Elk Creek Rd	End	641
Vinemaple St	Haskell Lane	End	122
Salal Turn	Haskell Lane	End	99
Crescent Court	Elk Creek Rd	End	155

Kimberly Court	Elk Creek Rd	End	155
Glenwood Court	Elk Creek Rd	End	149
Elk Creek Terr	Elk Creek Rd	End	554
Elk Creek Rd	Sunset Blvd	End	1,421
Cascara Lane	Elk Creek Rd	End	166
Antler St	3rd St	Beaver St	297
Beaver St	Antler St	Fir St	255
3rd St	Spruce St	Fir St	386
Fir St	3rd St	End	1,138
Beech St	Fir St	End	648
6th St	Beech St	Old Cannon Beach Road	501
Elm St	5th St	End	503
Antler Rd	5th St	End	276
Ash St	5th St	End	238
Breakers Condos	5th St	Loop	637
Larch St	S End	End	1,499
N Hemlock St	440 N Hemlock St	6th St	1,016
6th St	Ecola State Park Rd	Laurel St	783
Ecola State Park Rd	6th St	7th St	738
Spruce St	Ecola State Park Rd	End	321
Monica Court	Spruce St	End	121
7th St	Ecola State Park Rd	End	437
N Hemlock St	7th St	End	413
Laurel St	5th St	End	1,486
Oak St	Laurel St	End	1,861
<b>Total Intersecting Lines in Feet</b>			<b>11,268</b>
<b>Total Area Surveyed in Feet</b>			<b>80,413</b>
<b>Total Area Surveyed in Miles</b>			<b>15.2297</b>

A detailed report of decibel levels at suspected leak sound locations and observations were compiled during the survey for reinvestigation and possible pinpointing at a later time. This reinvestigation increased the speed of the survey and eliminated correlating on most false leak sounds.

#### Leak Type Noises Detected

Contact Points	Noises Detected
Hydrant	0
Valves	4
Services	18
Other	1
<b>Total</b>	<b>23</b>

All indications of leaks found during the survey were verified a second time, after which, the leaks were pinpointed with a computer based sound correlator when possible. Pinpointing information can be found in the Pinpointing and Leak Reports Sections.

End of Section

# **PINPOINTING PHASE REVIEW**

## PINPOINTING PHASE REVIEW (Water Distribution Lines)

All indications of leaks found during the survey were verified a second time, after which, the leaks were pinpointed with a computer based sound correlator when possible. Pinpointing leak locations through interpretation of sound intensity, either by ear, decibel metering or other like methods was not used when contact points were available for use with the correlator. However, ground listening devices were used as a quick double check on pinpointed leaks.

The equipment used did not normally require valves to be operated during surveying and pinpointing. However, on occasion, services or valves were operated to eliminate service draw noises or to change velocity noise.

The correlator equipment used had the capability to prompt the operator to input the variables when different pipe sizes and/or pipe material were encountered in the same span to be investigated. This is necessary to insure accuracy of results based on the automatic computation of the correct leak sound velocity in leak pinpointing operations. Our correlators have the capability of correlating up to seven various pipe sizes and types at one time in a given space. To insure effective performance in all field environments encountered in the distribution system (i.e. traffic noise, draw, pump operation, industrial noise, etc.), the correlator equipment provides 16 auto filter options and/or infinite manual filter options.

We provided a copy of leak reports, when pinpointed, which included leak locations and estimated GPM loss.

### Leaks Pinpointed

Number	Leak Type	Location	GPM
1	Service Line	3088 S Pacific St	5.00
2	Meter	288 Gogona Ave	1.00
3	Curb Stop	1956 Pacific St	0.50
4	Valve	Jackson St & S Hemlock St	0.50
5	Service Line	163 Jackson St	0.50
6	Service Line	131 W Delta St	1.00
7	Service Line	188 Elliott Way	1.00
8	Valve	Jefferson St & S Hemlock St	5.00
9	Curb Stop	172 Harrison St	1.00
10	Meter	171 Jackson St	0.50
11	Meter	195 E Jackson St	0.50
12	Valve	Fir St East of Bridge	1.00
13	Meter	Bldg 10 - The Breakers	0.50
14	Meter	523 Larch St	0.25
15	Meter	427 Crescent Court	1.00
16	Service Line	107 Sunset Blvd	5.00
17	Service Line	107 Monroe St	1.00
18	Service Line	163 Monroe St	1.00
19	Meter	1315 S Hemlock St	1.00
20	Service Line	Monica Court	5.00
<b>Total</b>			<b>32.25</b>

These leak reports, also included a leak repair priority classification. These classifications are as follows:

**Class I** Any leak which is hazardous in terms of potential undermining, possibly resulting in surface collapse, encroachment and/or damage to nearby utilities, commercial or private properties or leaks severe enough to warrant immediate repair.

**Class II** All leaks that display water losses significant enough to be monitored on a regular repair schedule.

**Class III** Relatively small leaks that should be repaired as workload permits.

#### Repair Priority

Number	Leak Type	Location	GPM
<b>Total Class I</b>			<b>0.00</b>

Number	Leak Type	Location	GPM
6	Service Line	131 W Delta St	1.00
8	Valve	Jefferson St & S Hemlock St	5.00
18	Service Line	163 Monroe St	1.00
20	Service Line	Monica Court	5.00
<b>Total Class II</b>			<b>12.00</b>

Number	Leak Type	Location	GPM
1	Service Line	3088 S Pacific St	5.00
2	Meter	288 Gogona Ave	1.00
3	Curb Stop	1956 Pacific St	0.50
4	Valve	Jackson St & S Hemlock St	0.50
5	Service Line	163 Jackson St	0.50
7	Service Line	188 Elliott Way	1.00
9	Curb Stop	172 Harrison St	1.00
10	Meter	171 Jackson St	0.50
11	Meter	195 E Jackson St	0.50
12	Valve	Fir St East of Bridge	1.00
13	Meter	Bldg 10 - The Breakers	0.50
14	Meter	523 Larch St	0.25
15	Meter	427 Crescent Court	1.00
16	Service Line	107 Sunset Blvd	5.00
17	Service Line	107 Monroe St	1.00
19	Meter	1315 S Hemlock St	1.00
<b>Total Class III</b>			<b>20.25</b>

Whenever any of the leaks detected by USA were repaired prior to completion of the field work, we gave City of Cannon Beach the option to have that section of the system re-surveyed to be sure no very quiet leaks were missed due to an over powering noisy leak sound.

Please note that leakage that was detected and pinpointed may be larger or smaller than estimated. Estimates are based on several variables including type and size of pipe, pressure and interpretation of correlation filter results.

End of Section

# **LEAK REPORTS**





# LEAK REPORT

Leak #:	1
Date:	April 23, 2018
Map #:	
Coordinates	

Leak Type
SERVICE LINE
Leak Address
3088 S PACIFIC ST

Client: City of Cannon Beach

Agreement: 18172

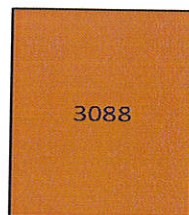
## REMARKS

STRONG LEAK NOISE HEARD AT CURB STOP. GROUND MICROPHONE SURVEY ALONG THE POLY SERVICE LINE AND AC MAIN. BEST LEAK NOISE DETECTED AT APPROX 2' FROM THE METER ON THE SERVICE LINE.

Action(s) Taken:

Recommendation(s): EXCAVATE & REPAIR

THIS DRAWING IS NOT TO SCALE



LEAK 2' FROM  
METER



8" PVC

S. PACIFIC ST.

## EQUIPMENT USED

S-30

LD-12

## LEAK INFORMATION

Leak Consultant:	JT
Leak Class:	III
Leak Rate (GPM):	5.00
Cover Type:	ASPHALT
Site Marked:	YES
Mins. Pinpointing:	20

LEAK IMAGE NOT AVAILABLE

## Computer Correlation Results

Scan Time	Grade	Dist. "Red"	Dist. "Blue"

## Water Loss (gallons)

Daily:	7,200
Weekly:	50,400
Monthly:	216,000
Annual:	2,628,000



# LEAK REPORT

Leak #:	2
Date:	April 24, 2028
Map #:	
Coordinates	

Leak Type
METER
Leak Address
288 GOGONA AVE

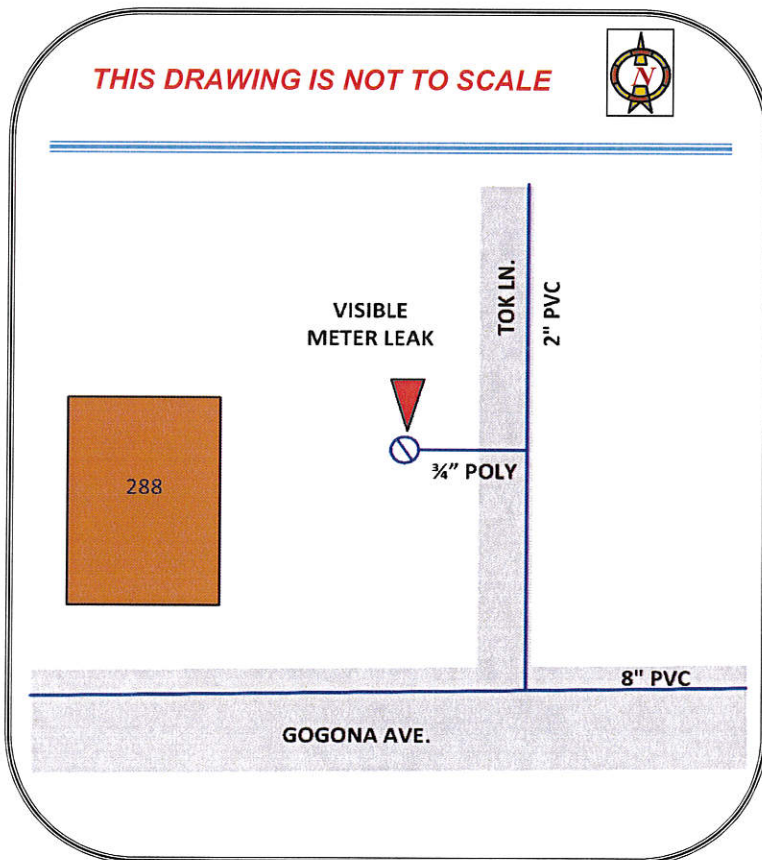
Client: City of Cannon Beach

Agreement: 18172

REMARKS
STRONG LEAK NOISE AT THE CURB STOP WITH SURFACE WATER IN THE METER BOX. VISIBLE LEAK AT THE METER COUPLING.

Action(s) Taken:

Recommendation(s): EXCAVATE & REPAIR



EQUIPMENT USED	
	S-30
LEAK INFORMATION	
Leak Consultant:	JT
Leak Class:	III
Leak Rate (GPM):	1.00
Cover Type:	GRAVEL
Site Marked:	YES
Mins. Pinpointing:	15

LEAK IMAGE NOT AVAILABLE

Computer Correlation Results			
Scan Time	Grade	Dist. "Red"	Dist. "Blue"

Water Loss (gallons)	
Daily:	1,440
Weekly:	10,080
Monthly:	43,200
Annual:	525,600





# LEAK REPORT

Leak #:	3
Date:	April 24, 2018
Map #:	
Coordinates	

Leak Type
CURB STOP
Leak Address
1956 PACIFIC ST

Client: City of Cannon Beach

Agreement: 18172

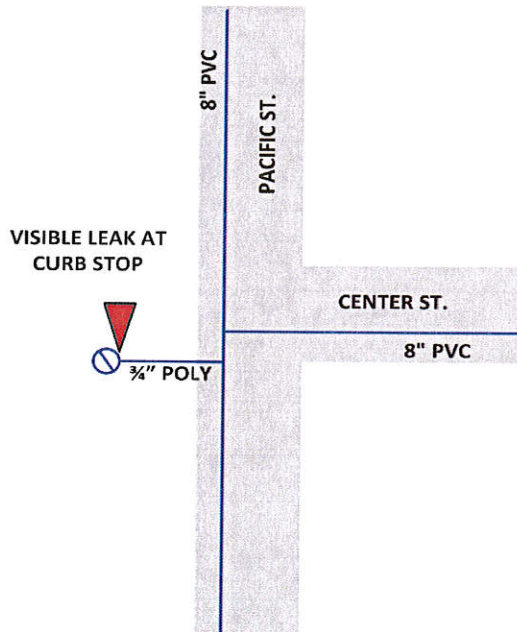
## REMARKS

LEAK NOISE AND VISIBLE LEAK AT THE CURB STOP.

Action(s) Taken:

Recommendation(s): EXCAVATE & REPAIR

THIS DRAWING IS NOT TO SCALE



## EQUIPMENT USED

S-30

## LEAK INFORMATION

Leak Consultant:	JT
Leak Class:	III
Leak Rate (GPM):	0.50
Cover Type:	ASPHALT
Site Marked:	YES
Mins. Pinpointing:	15

LEAK IMAGE NOT AVAILABLE

## Computer Correlation Results

Scan Time	Grade	Dist. "Red"	Dist. "Blue"

## Water Loss (gallons)

Daily:	720
Weekly:	5,040
Monthly:	21,600
Annual:	262,800



# LEAK REPORT

Leak #:	4
Date:	April 25, 2018
Map #:	
Coordinates	

Leak Type
VALVE
Leak Address
JACKSON ST AND S HEMLOCK ST

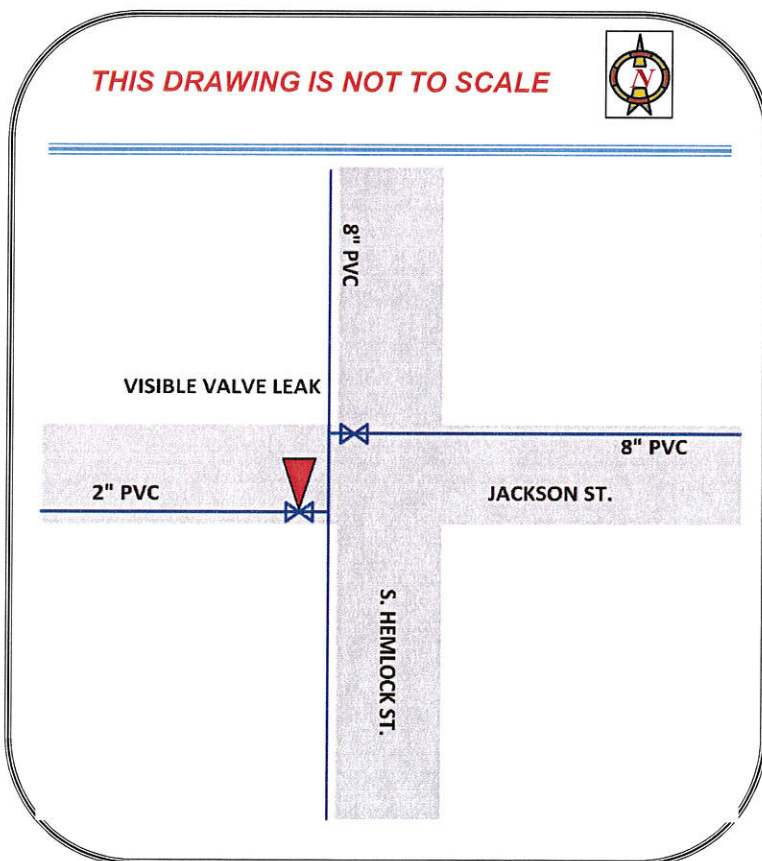
Client:	City of Cannon Beach
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Agreement:	18172
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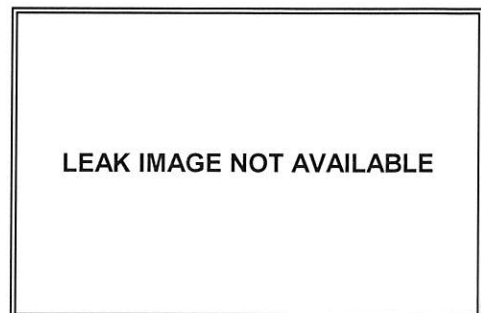
REMARKS
NOISE DETECTED ON VALVE. VISIBLE LEAK FROM VALVE, POSSIBLE PACKING LEAK.

Action(s) Taken: \_\_\_\_\_

Recommendation(s): REPAIR / REPLACE



EQUIPMENT USED	
	S-30
LEAK INFORMATION	
Leak Consultant:	JT
Leak Class:	III
Leak Rate (GPM):	0.50
Cover Type:	ASPHALT
Site Marked:	YES
Mins. Pinpointing:	10



Computer Correlation Results			
Scan Time	Grade	Dist. "Red"	Dist. "Blue"

Water Loss (gallons)	
Daily:	720
Weekly:	5,040
Monthly:	21,600
Annual:	262,800





# LEAK REPORT

Leak #:	5
Date:	April 25, 2018
Map #:	
Coordinates	

Leak Type
SERVICE LINE
Leak Address
163 JACKSON ST

Client: City of Cannon Beach

Agreement: 18172

## REMARKS

LEAK NOISE PRESENT AT CURP STOP. VISIBLE LEAK AT THE POLY SERVICE LINE CONNECTION.

Action(s) Taken:

Recommendation(s): EXCAVATE & REPAIR

THIS DRAWING IS NOT TO SCALE



JACKSON ST.

2" PVC

3/4" POLY



VISIBLE LEAK

163

## EQUIPMENT USED

S-30

## LEAK INFORMATION

Leak Consultant:	JT
Leak Class:	III
Leak Rate (GPM):	0.50
Cover Type:	SOIL
Site Marked:	YES
Mins. Pinpointing:	10

LEAK IMAGE NOT AVAILABLE

## Computer Correlation Results

Scan Time	Grade	Dist. "Red"	Dist. "Blue"

## Water Loss (gallons)

Daily:	720
Weekly:	5,040
Monthly:	21,600
Annual:	262,800



# LEAK REPORT

Leak #:	6
Date:	April 27, 2018
Map #:	
Coordinates	
45 52.4775N, 123 57.6261W	

Leak Type
SERVICE LINE
Leak Address
131 W DELTA ST

Client: City of Cannon Beach

Agreement: 18172

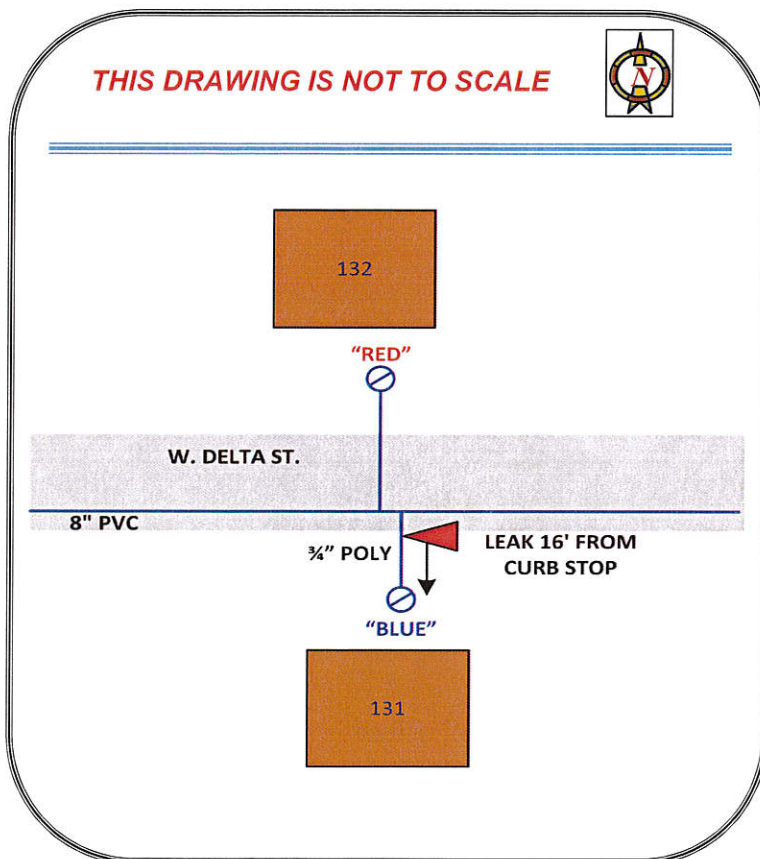
## REMARKS

LEAK NOISE DETECTED AT CURB STOP WITH NO METER USAGE NOTED OR WATER ACCUMULATION PRESENT. FIRST SETUP WAS CONFIRMED WITH THE GROUND MICROPHONE AT 16' NORTH OF THE CURB STOP. THE SECOND SETUP WAS UNABLE TO VERIFY THE FIRST DUE TO A LOWER GRADE RESULT DUE FROM PIPE TYPE AND/OR SOUND MATCH.

Action(s) Taken:

Recommendation(s): EXCAVATE & REPAIR

THIS DRAWING IS NOT TO SCALE



## EQUIPMENT USED

S-30
LD-12
LC-2500

## LEAK INFORMATION

Leak Consultant:	JT
Leak Class:	II
Leak Rate (GPM):	1.00
Cover Type:	ASPHALT
Site Marked:	YES
Mins. Pinpointing:	60

LEAK IMAGE NOT AVAILABLE

## Computer Correlation Results

Scan Time	Grade	Dist. "Red"	Dist. "Blue"
50	A	29	18
80	B	72	12

## Water Loss (gallons)

Daily:	1,440
Weekly:	10,080
Monthly:	43,200
Annual:	525,600





# LEAK REPORT

Leak #:	7
Date:	April 27, 2018
Map #:	
Coordinates	

Leak Type
SERVICE LINE
Leak Address
188 ELLIOTT WAY

Client: City of Cannon Beach

Agreement: 18172

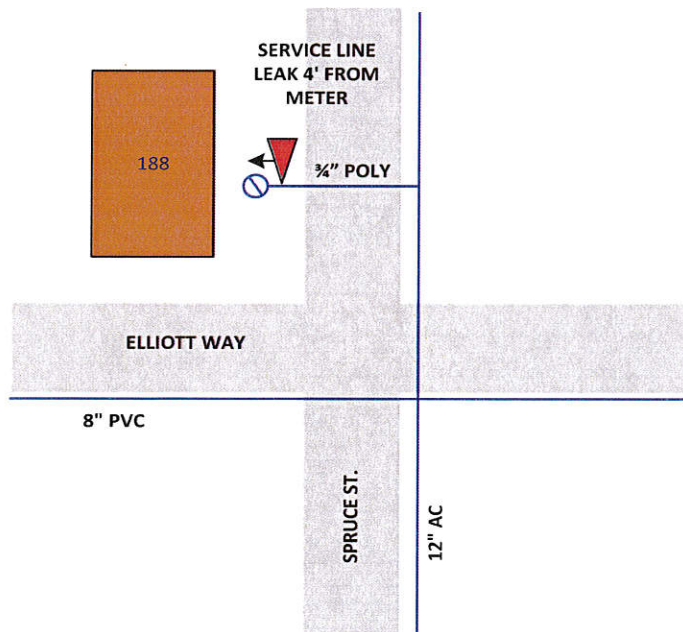
## REMARKS

LEAK NOISE DETECTED AT CURB STOP WITH NO METER USAGE OR WATER ACCUMULATION PESENT. CORRELATION WAS INCONCLUSIVE, LIKELY DUE TO MAIN TYPE AND LENGTH. A PROBE ROD SURVEY WAS CONDUCTED WITH THE BEST LEAK NOISE BEING HEARD AT 4' TO THE EAST OF THE CURB STOP.

Action(s) Taken:

Recommendation(s): EXCAVATE & REPAIR

THIS DRAWING IS NOT TO SCALE



## EQUIPMENT USED

S-30
LD-12
LC-2500

## LEAK INFORMATION

Leak Consultant:	JT
Leak Class:	III
Leak Rate (GPM):	1.00
Cover Type:	SOIL
Site Marked:	YES
Mins. Pinpointing:	50

LEAK IMAGE NOT AVAILABLE

## Computer Correlation Results

Scan Time	Grade	Dist. "Red"	Dist. "Blue"

## Water Loss (gallons)

Daily:	1,440
Weekly:	10,080
Monthly:	43,200
Annual:	525,600



# LEAK REPORT

Leak #:	8
Date:	April 27, 2018
Map #:	
Lat:	
Long:	

Leak Type
VALVE
Leak Address
JEFFERSON ST AND S HEMLOCK ST

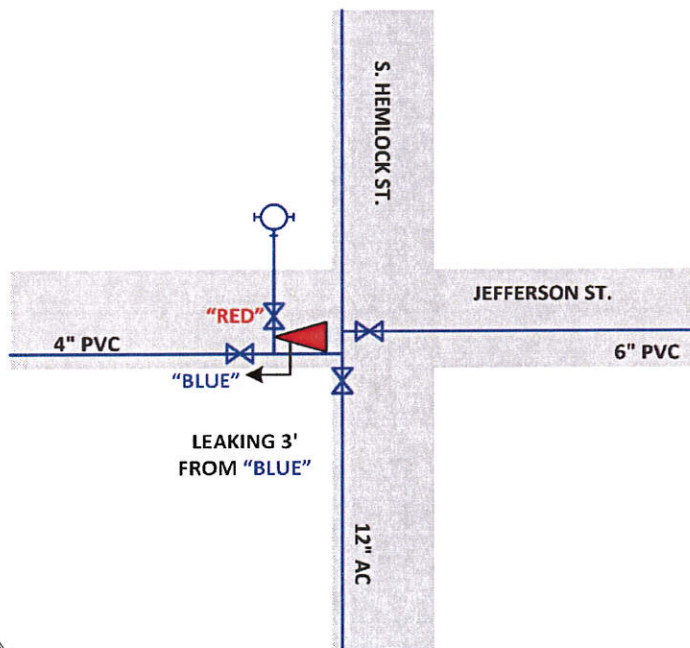
## REMARKS

LEAK NOISE DETECTED ACROSS ALL VALVES IN THE CLUSTER. MULTIPLE SETUPS WERE DONE TO VERIFY THE PINPOINT LOCATION. THE HYDRANT VALVE WAS ISOLATED TO ELIMINATE FLOW, WITH NO CHANGE TO THE LEAK NOISE. ALL SETUPS INDICATE A LEAK ON THE SOUTH SIDE OF THE ISOLATION VALVE. THIS WAS CONFIRMED WITH THE GROUND MICROPHONE.

Action(s) Taken: ISOLATED TO ELIMINATE FLOW

Recommendation(s): EXCAVATE & REPAIR

THIS DRAWING IS NOT TO SCALE



## EQUIPMENT USED

S-30

LD-12

LC-2500

## LEAK INFORMATION

Leak Consultant:	JT
Leak Class:	II
Leak Rate (GPM):	5
Cover Type:	ASPHALT
Site Marked:	YES
Mins. Pinpointing:	45

LEAK IMAGE NOT AVAILABLE

## Computer Correlation Results

Scan Time	Grade	Dist. "Red"	Dist. "Blue"
10	A	12	10
10	A	14	6
10	A	0	3

## Water Loss (gallons)

Daily:	7,200
Weekly:	50,400
Monthly:	216,000
Annual:	2,628,000





# LEAK REPORT

Leak #:	9
Date:	April 27, 2018
Map #:	
Coordinates	

Leak Type
CURB STOP
Leak Address
172 HARRISON ST

Client: City of Cannon Beach

Agreement: 18172

## REMARKS

HIGH PITCH LEAK NOISE DETECTED AT THE CURB STOP WITH WATER ACCUMULATED IN THE METER BOX. PUMPED OUT BOX TO REVEAL A VISIBLE LEAK FROM THE CURB STOP COUPLING.

Action(s) Taken:

Recommendation(s): REPAIR / REPLACE

THIS DRAWING IS NOT TO SCALE



VISIBLE LEAK AT  
CURB STOP  
COUPLING



172

HARRISON ST.

8" PVC

## EQUIPMENT USED

S-30

## LEAK INFORMATION

Leak Consultant:	JT
Leak Class:	III
Leak Rate (GPM):	1.00
Cover Type:	METER BOX OR VAULT
Site Marked:	YES
Mins. Pinpointing:	35

LEAK IMAGE NOT AVAILABLE

## Computer Correlation Results

Scan Time	Grade	Dist. "Red"	Dist. "Blue"

## Water Loss (gallons)

Daily:	1,440
Weekly:	10,080
Monthly:	43,200
Annual:	525,600



# LEAK REPORT

Leak #:	10
Date:	April 27, 2018
Map #:	
Coordinates	

Leak Type
METER
Leak Address
171 JACKSON ST

Client: City of Cannon Beach

Agreement: 18172

## REMARKS

HIGH PITCH LEAK NOISE DETECTED AT THE CURB STOP WITH SOME WATER ACCUMULATION PRESENT. RAN A SINGLE SETUP WITH LOW GRADE INCONCLUSIVE RESULTS. DUG OUT THE METER BOX TO REVEAL A VISIBLE LEAK AT THE METER SETTER.

Action(s) Taken:

Recommendation(s): EXCAVATE & REPAIR

THIS DRAWING IS NOT TO SCALE



JACKSON ST.

2" PVC

3/4" POLY



VISIBLE METER SETTER LEAK

171

## EQUIPMENT USED

S-30
LD-12
LC-2500

## LEAK INFORMATION

Leak Consultant:	JT
Leak Class:	III
Leak Rate (GPM):	0.50
Cover Type:	METER BOX OR VAULT
Site Marked:	YES
Mins. Pinpointing:	45

LEAK IMAGE NOT AVAILABLE

## Computer Correlation Results

Scan Time	Grade	Dist. "Red"	Dist. "Blue"

## Water Loss (gallons)

Daily:	720
Weekly:	5,040
Monthly:	21,600
Annual:	262,800





# LEAK REPORT

Leak #:	11
Date:	April 27, 2018
Map #:	
Coordinates	

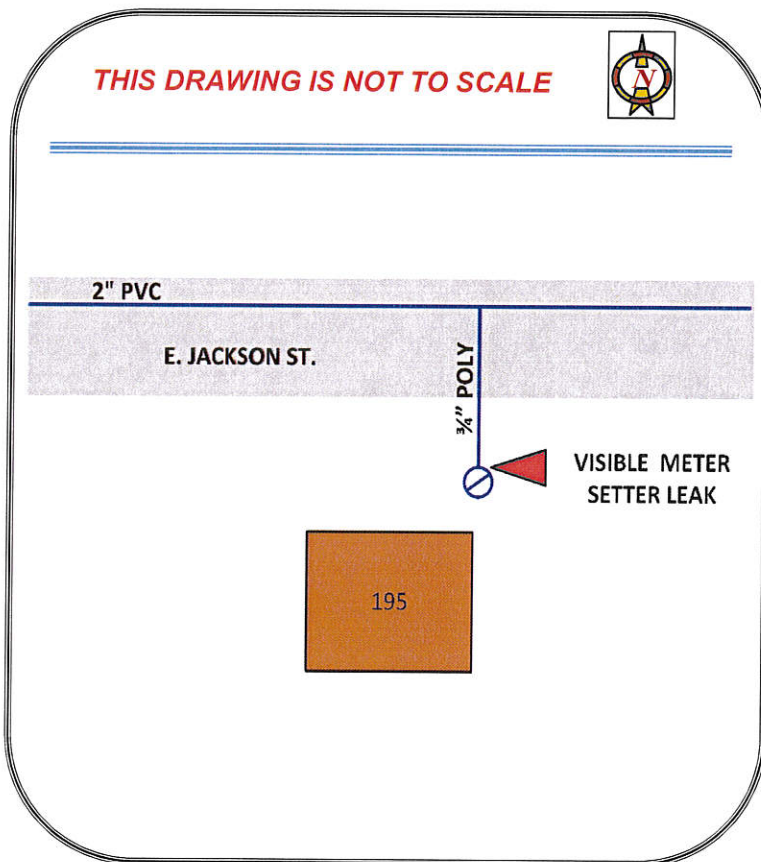
Leak Type
METER
Leak Address
195 E JACKSON ST

Client: City of Cannon Beach

Agreement: 18172

REMARKS
HIGH PITCH LEAK NOISE DETECTED AT THE CURBSTOP WITH WATER ACCUMULATION. VISIBLE LEAK FROM THE CURB STOP.

Action(s) Taken: \_\_\_\_\_  
 Recommendation(s): REPAIR / REPLACE



EQUIPMENT USED	
	S-30
LEAK INFORMATION	
Leak Consultant:	JT
Leak Class:	III
Leak Rate (GPM):	0.50
Cover Type:	METER BOX OR VAULT
Site Marked:	YES
Mins. Pinpointing:	25

LEAK IMAGE NOT AVAILABLE

Computer Correlation Results			
Scan Time	Grade	Dist. "Red"	Dist. "Blue"

Water Loss (gallons)	
Daily:	720
Weekly:	5,040
Monthly:	21,600
Annual:	262,800



# LEAK REPORT

Leak #:	12
Date:	May 1, 2018
Map #:	
Coordinates	

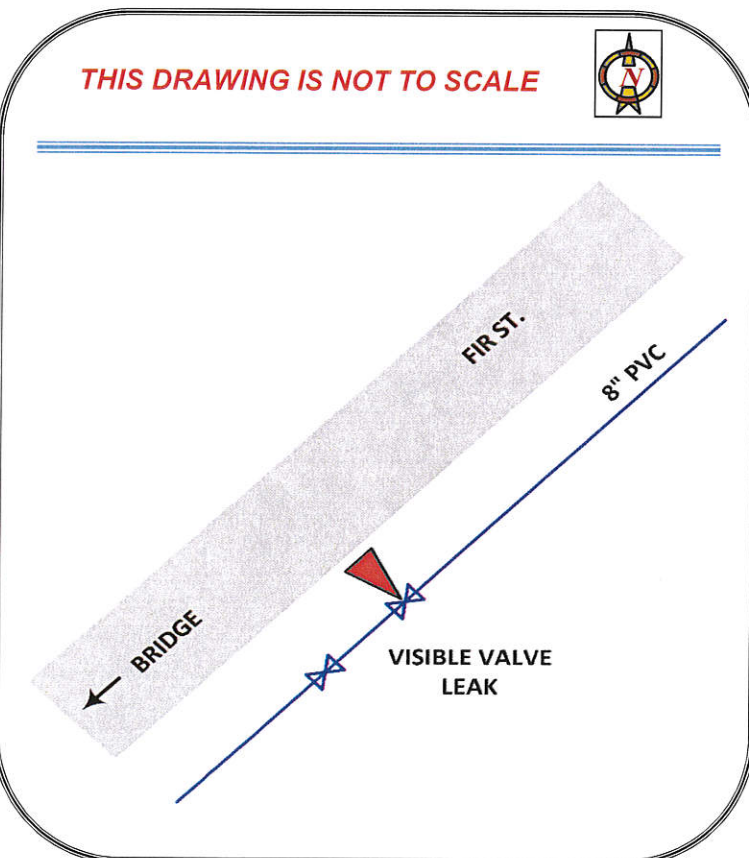
Leak Type
VALVE
Leak Address
FIR ST EAST OF BRIDGE

Client:	City of Cannon Beach
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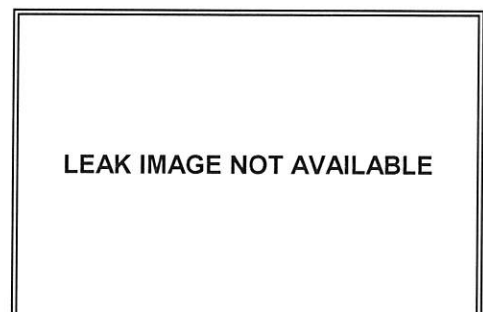
Agreement:	18172
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REMARKS
VISIBLE LEAK FROM VALVE STEM.

Action(s) Taken:	
Recommendation(s):	REPAIR / REPLACE



EQUIPMENT USED	
	S-30
LEAK INFORMATION	
Leak Consultant:	JT
Leak Class:	III
Leak Rate (GPM):	1.00
Cover Type:	SOIL
Site Marked:	YES
Mins. Pinpointing:	10



Computer Correlation Results			
Scan Time	Grade	Dist. "Red"	Dist. "Blue"

Water Loss (gallons)	
Daily:	1,440
Weekly:	10,080
Monthly:	43,200
Annual:	525,600





# LEAK REPORT

Leak #:	13
Date:	May 2, 2018
Map #:	
Coordinates	

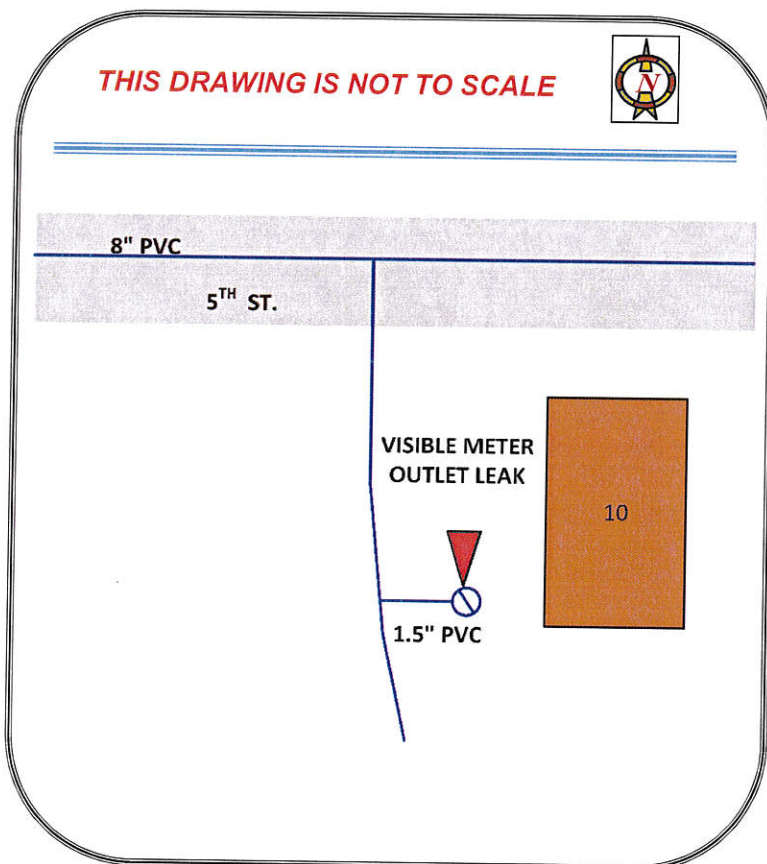
Leak Type
METER
Leak Address
BLDG #10 THE BREAKERS

Client: City of Cannon Beach

Agreement: 18172

REMARKS
VISIBLE LEAK FROM THE METER OUTLET.

Action(s) Taken: Recommendation(s): REPAIR / REPLACE



EQUIPMENT USED	
S-30	
LEAK INFORMATION	
Leak Consultant:	JT
Leak Class:	III
Leak Rate (GPM):	0.50
Cover Type:	SOIL
Site Marked:	YES
Mins. Pinpointing:	15

LEAK IMAGE NOT AVAILABLE

Computer Correlation Results			
Scan Time	Grade	Dist. "Red"	Dist. "Blue"

Water Loss (gallons)	
Daily:	720
Weekly:	5,040
Monthly:	21,600
Annual:	262,800



# LEAK REPORT

Leak #:	14
Date:	May 2, 2018
Map #:	
Coordinates	

Leak Type
METER
Leak Address
523 LARCH ST

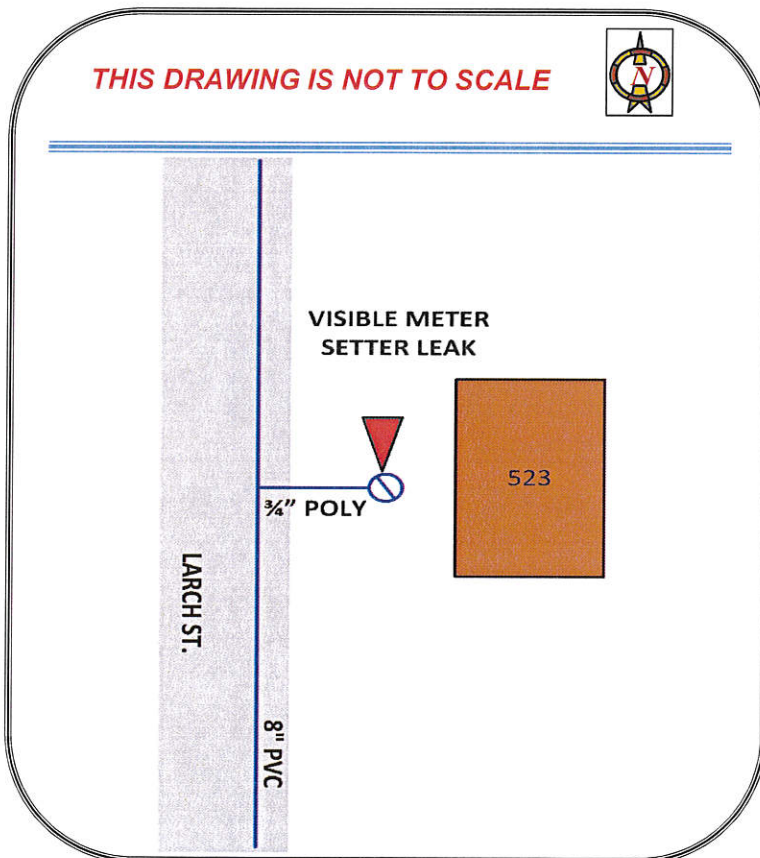
Client: City of Cannon Beach

Agreement: 18172

REMARKS
LEAK NOISE DETECTED AT THE CURB STOP. DUG OUT THE METER BOX TO REVEAL A VISIBLE LEAK FROM THE METER SETTER INLET.

Action(s) Taken:

Recommendation(s): REPAIR / REPLACE



EQUIPMENT USED	
	S-30
LEAK INFORMATION	
Leak Consultant:	JT
Leak Class:	III
Leak Rate (GPM):	0.25
Cover Type:	SOIL
Site Marked:	YES
Mins. Pinpointing:	30

LEAK IMAGE NOT AVAILABLE

Computer Correlation Results			
Scan Time	Grade	Dist. "Red"	Dist. "Blue"

Water Loss (gallons)	
Daily:	360
Weekly:	2,520
Monthly:	10,800
Annual:	131,400





# LEAK REPORT

Leak #:	15
Date:	May 2, 2018
Map #:	
Coordinates	

Leak Type
METER
Leak Address
427 CRESENT COURT

Client: City of Cannon Beach

Agreement: 18172

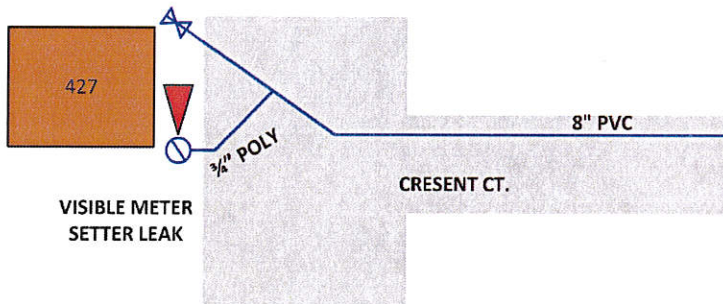
## REMARKS

LEAK NOISE DETECTED AT THE CURB STOP, WITH WATER ACCULUTION IN THE METER BOX. PUMPED OUT BOX TO REVEAL A VISIBLE LEAK AT THE METER SETTER INLET.

Action(s) Taken:

Recommendation(s): REPAIR / REPLACE

THIS DRAWING IS NOT TO SCALE



## EQUIPMENT USED

S-30

## LEAK INFORMATION

Leak Consultant:	JT
Leak Class:	III
Leak Rate (GPM):	1.00
Cover Type:	SOIL
Site Marked:	YES
Mins. Pinpointing:	40

LEAK IMAGE NOT AVAILABLE

## Computer Correlation Results

Scan Time	Grade	Dist. "Red"	Dist. "Blue"

## Water Loss (gallons)

Daily:	1,440
Weekly:	10,080
Monthly:	43,200
Annual:	525,600



# LEAK REPORT

Leak #:	16
Date:	May 3, 2018
Map #:	
Coordinates	

Leak Type
SERVICE LINE
Leak Address
107 SUNSET BLVD

Client: City of Cannon Beach

Agreement: 18172

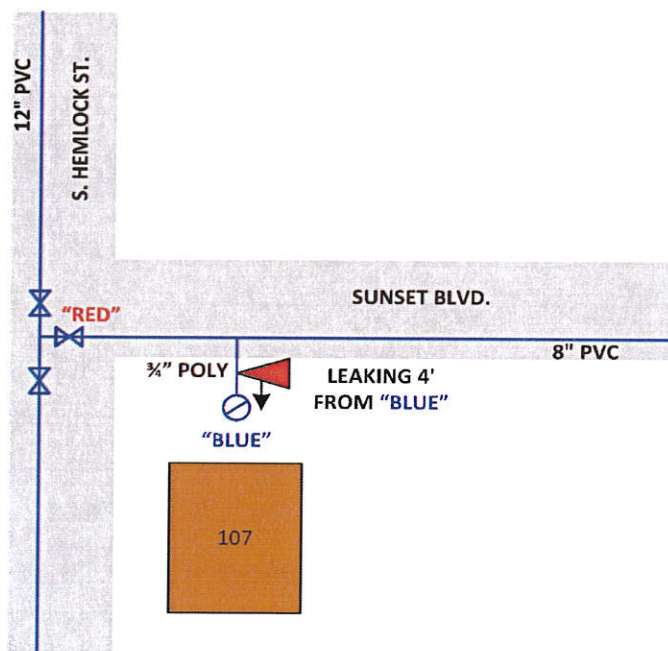
## REMARKS

STRONG LOW PITCH LEAK NOISE DETECTED AT THE CURB STOP. ONLY SETUP YIELDED A LOW GRADE RESULT ON MULTIPLE NOISE FILTER SETTINGS. THE GROUND MICROPHONE CONFIRMED THE CORRELATION RESULTS AT 4' FROM THE CURB STOP.

Action(s) Taken:

Recommendation(s): EXCAVATE & REPAIR

THIS DRAWING IS NOT TO SCALE



## EQUIPMENT USED

S-30
LD-12
LC-2500

## LEAK INFORMATION

Leak Consultant:	JT
Leak Class:	III
Leak Rate (GPM):	5.00
Cover Type:	CONCRETE
Site Marked:	YES
Mins. Pinpointing:	65

LEAK IMAGE NOT AVAILABLE

## Computer Correlation Results

Scan Time	Grade	Dist. "Red"	Dist. "Blue"
25	B	71	4

## Water Loss (gallons)

Daily:	7,200
Weekly:	50,400
Monthly:	216,000
Annual:	2,628,000





# LEAK REPORT

Leak #:	17
Date:	May 3, 2018
Map #:	
Coordinates	

Leak Type
SERVICE LINE
Leak Address
107 MONROE ST

Client: City of Cannon Beach

Agreement: 18172

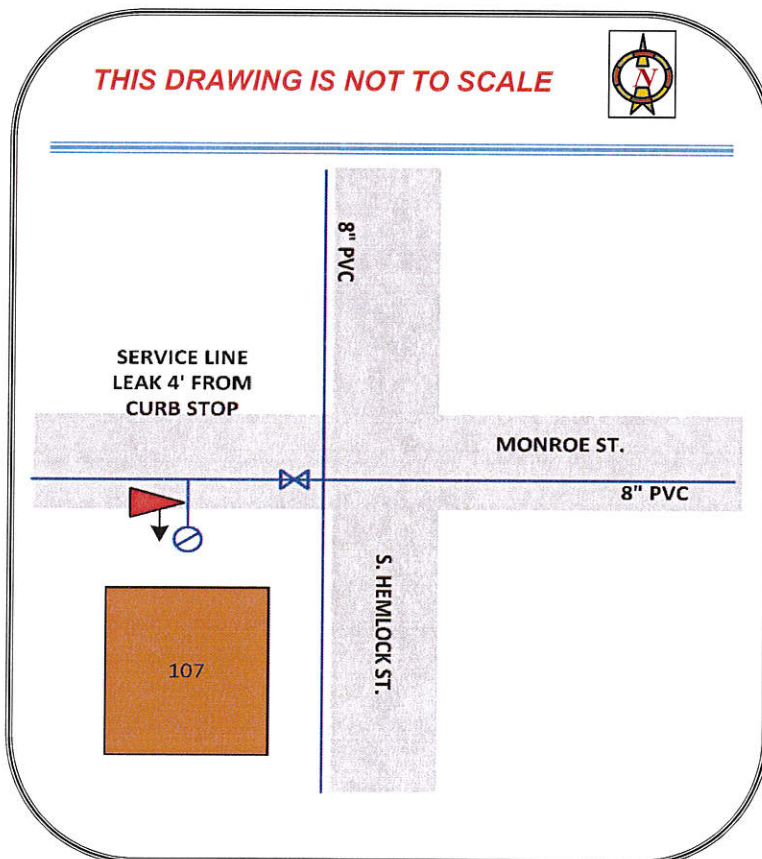
## REMARKS

LIGHT LEAK NOISE DETECTED AT THE CURB STOP WITH NO WATER ACCUMULATION PRESENT. NO SETUPS WERE AVAILABLE DUE TO PIPE TYPE AND LACK OF CONTACT POINTS. A GROUND MICROPHONE SURVEY WAS CONDUCTED WITH A VERY STRONG LEAK NOISE DETECTED AT 4' FROM THE CURB STOP.

Action(s) Taken:

Recommendation(s): EXCAVATE & REPAIR

THIS DRAWING IS NOT TO SCALE



## EQUIPMENT USED

S-30
LD-12

## LEAK INFORMATION

Leak Consultant:	JT
Leak Class:	III
Leak Rate (GPM):	1.00
Cover Type:	ASPHALT
Site Marked:	YES
Mins. Pinpointing:	40

LEAK IMAGE NOT AVAILABLE

## Computer Correlation Results

Scan Time	Grade	Dist. "Red"	Dist. "Blue"

## Water Loss (gallons)

Daily:	1,440
Weekly:	10,080
Monthly:	43,200
Annual:	525,600



# LEAK REPORT

Leak #:	18
Date:	May 3, 2018
Map #:	
Coordinates	

Leak Type
SERVICE LINE
Leak Address
163 MONROE ST

Client: City of Cannon Beach

Agreement: 18172

## REMARKS

LIGHT LEAK NOISE DETECTED AT THE CURB STOP WITH NO WATER ACCUMULATION PRESENT. NO SETUP WERE AVAILABLE DUE TO PIPE TYPE AND LACK OF CONTACT POINTS. A GROUND MICROPHONE SURVEY WAS CONDUCTED WITH A VERY STRONG LEAK NOISE DETECTED AT 7' FROM THE CURB STOP.

Action(s) Taken:

Recommendation(s): EXCAVATE & REPAIR

THIS DRAWING IS NOT TO SCALE



MONROE ST.

8" PVC

3/4" POLY

SERVICE LINE  
LEAK 7' FROM  
CURB STOP

163

## EQUIPMENT USED

S-30

LD-12

## LEAK INFORMATION

Leak Consultant:	JT
Leak Class:	II
Leak Rate (GPM):	1.00
Cover Type:	ASPHALT
Site Marked:	YES
Mins. Pinpointing:	35

LEAK IMAGE NOT AVAILABLE

## Computer Correlation Results

Scan Time	Grade	Dist. "Red"	Dist. "Blue"

## Water Loss (gallons)

Daily:	1,440
Weekly:	10,080
Monthly:	43,200
Annual:	525,600





# LEAK REPORT

Leak #:	19
Date:	May 3, 2018
Map #:	
Coordinates	

Leak Type
METER
Leak Address
1315 S HEMLOCK ST

Client: City of Cannon Beach

Agreement: 18172

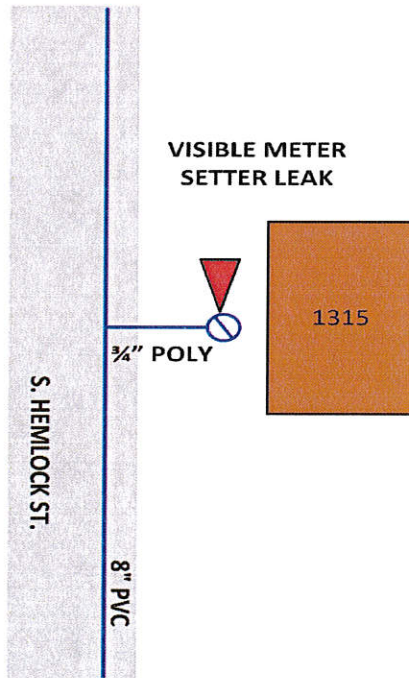
## REMARKS

STRONG LEAK NOISE AT THE CURB STOP WITH WATER ACCUMULATION IN THE METER BOX. THIS IS A LOCKED OUT SERVICE WITH NO METER PRESENT. GROUND MICROPHONE SURVEY ALONG THE SERVICE LINE YIELDED NO DETECTABLE LEAK NOISES. THE METER BOX WAS PUMPED OUT AND WOULD REFILL AT A SIMILAR RATE. THE LEAK COMES FROM THE LOWER SETTER CONNECTION.

Action(s) Taken:

Recommendation(s): EXCAVATE & REPAIR

THIS DRAWING IS NOT TO SCALE



## EQUIPMENT USED

S-30

LD-12

## LEAK INFORMATION

Leak Consultant:	JT
Leak Class:	III
Leak Rate (GPM):	1.00
Cover Type:	CONCRETE
Site Marked:	NO
Mins. Pinpointing:	50

LEAK IMAGE NOT AVAILABLE

## Computer Correlation Results

Scan Time	Grade	Dist. "Red"	Dist. "Blue"

## Water Loss (gallons)

Daily:	1,440
Weekly:	10,080
Monthly:	43,200
Annual:	525,600





# LEAK REPORT

Leak #:	20
Date:	May 2, 2018
Map #:	
Coordinates	

Leak Type
SERVICE LINE
Leak Address
MONICA COURT

Client: City of Cannon Beach

Agreement: 18172

## REMARKS

STRONG LEAK NOISE AT METER SETTER NORTH OF HYDRANT. MONICA COURT IS FUTURE EXPANSION AND NO ADDRESSES ARE ASSIGNED. FIRST SETUP HAD A HIGH-GRADE RESULT BUT COULD NOT BE VERIFIED WITH GROUND MICROPHONE. SECOND SETUP WAS INCONCLUSIVE. A GROUND MICROPHONE SURVEY WAS DONE ALONG THE ENTIRE SERVICE LINE WITH THE BEST LEAK NOISE HEARD AT 11' TO THE WEST OF THE CURB STOP ALONG THE SERVICE LINE.

Action(s) Taken:

Recommendation(s): EXCAVATE & REPAIR

THIS DRAWING IS NOT TO SCALE



CAUTION  
LEAK LOCATION  
NOT PRECISE

SERVICE LINE LEAK  
BETWEEN 11-13'  
FROM SETTER

8" PVC

MONICA CT.

## EQUIPMENT USED

S-30
LD-12
LC-2500

## LEAK INFORMATION

Leak Consultant:	JT
Leak Class:	II
Leak Rate (GPM):	5.00
Cover Type:	ASPHALT
Site Marked:	YES
Mins. Pinpointing:	60

LEAK IMAGE NOT AVAILABLE

## Computer Correlation Results

Scan Time	Grade	Dist. "Red"	Dist. "Blue"
30	A	13	39

## Water Loss (gallons)

Daily:	7,200
Weekly:	50,400
Monthly:	216,000
Annual:	2,628,000



## **CONCLUSION**

## LEAK SURVEY CONCLUSION

Our thanks to Dan Willyard and all persons involved with this project for their assistance in gathering all the necessary paperwork and personnel to create, with USA, a mutually beneficial leak detection project.

With this survey you have demonstrated concern for prudent water utilization and conservation.

Capitalizing on the most advanced leak detection technology available today, USA has successfully completed this Leak Detection Survey. The contents of this Final Report provide City of Cannon Beach with a permanent record of the activities performed to complete a Leak Survey along with the results achieved.

An important characteristic of this Leak Report is that the facts contained herein can be used in formulating a database for decision making regarding: the need for possible future meter programs, rehabilitation and pipe line replacement and/or the investigation of new water sources, etc. These types of decisions, regarding your utilization of water, now can be predicated more on facts rather than supposition or conjecture.

Prompt repair of any leaks reported provide an immediate benefit to City of Cannon Beach, which includes recovery of most water revenue and water conservation, etc.

Having achieved these results, we recommend that you continue to set up the infrastructure necessary to continue investigating leakage in the water distribution system. Implementation of any on-going leak survey program will ensure that leak losses are kept to a minimum, and the added enhancement of saving costs due to emergency call outs.

Utility Services Associates, LLC, is proud to have served City of Cannon Beach in this way and we wish to thank you for your substantial assistance and cooperation in this project.

If you or your staff has any questions regarding this Final Report, please feel free to call us at (877) 585-5325 or (206) 429-3751.

Best Regards,



Rob Meston  
President



