

Attachment 2 – Water and Energy Savings and GHG Calculations

I. Water Savings

GCSD prepares annual water audits documenting the volume of “unaccounted” water. During 2012 the volume of “unaccounted” water was approximately 14 percent of the total raw water deliveries. During 2013 the volume of “unaccounted” water was approximately 17 percent of the total raw water deliveries. Copies of the audit reports are included in the appendix to this attachment.

Most of the “unaccounted” water was lost in leaks through the distribution system and leaks caused by bursting pipes during freezing conditions. Leaks in the distribution system are difficult to detect due to the nature of the terrain GCSD’s service area. Leaks inside homes are also difficult to detect because most of the residences are vacation homes and remain vacant most of the time.

GCSD’s goal is to use the proposed AMR technology to reduce the volume of “unaccounted” to approximately 10 percent or less (AWWA recommended benchmark). The following table shows the total annual consumption for years 2012 and 2013 and the volumes of unaccounted water:

	2012	2013
Total Raw Water Pumped, MG	145.77	155.65
Volume of Accounted Water, MG	125.16	129.6
Volume of Unaccounted Water, MG	20.61	20.05
Percent of Unaccounted Water	14%	17%

Using AMR technology GCSD can achieve the goal percent of unaccounted water of 10 percent or less. Using an average annual water use of 150 MG, and an average reduction in the volume of unaccounted water of 6 percent (current 16 percent to a goal of 10 percent), the annual water savings would be approximately 9 MG.

II. Energy Savings

GCSD pumps its water from the Mountain Tunnel from a depth of approximately 700 feet. The nature of the terrain requires water to be pumped several times before it is delivered to customers. During 2013 GCSD used 366,320 kwh at its Second Garrote WTP and 524,000 kwh at its Big Creek WTP. The combined power use divided by the total volume of raw water pumped yields a power use of approximately 5,720 kwh/MG. Using the water savings estimated above, the annual energy savings will be approximately 51,480 kwh.

III. GHG Reductions

GHG emissions will be reduced by reducing the power use associated with the lower consumption. However, GCSD will also reduce GHG by implementing the AMR technology. Currently GCSD staffs drive around the distribution system collecting meter reads. This task takes between 80 and 96 hours of staff time. Staff uses a 2008 Ford Ranger. The vehicle is constantly starting and stopping at each address to collect the meter reads. The vehicle that is used to read the meters drives approximately 200 miles. Using a 14 miles per gallon consumption as provided by the US EPA Office of Transportation & Air Quality, the annual consumption amounts to approximately 171.43 gallons. Using an equivalent of 1.25 therms per gallon and 29.3 kwh/therm, the annual kwh consumed by the vehicle is 6,278.6 kwh.

Appendix A
2012 and 2013 Annual Water Audits

PUBLIC WATER SYSTEM STATISTICS

Calendar Year **2012**

Jon Sterling, Chief Plant Operator
 PO Box 350
 Groveland, CA 95321
 PWS#5510009 SCRO

1. General Information

Please follow the provided instructions.

Contact : Jon Sterling
 Title: Operations Manager
 Phone: (209) 962-7161
 Fax: (209) 962-6286
 E-mail: jsterling@gcsd.org
 Website: www.gcsd.org
 County: Tuolumne
 Population served: **10000**
 Names of communities served: Groveland/Big Oak Flat

2. Active Service Connections

Customer Class	Potable Water		Recycled Water	
	Metered	Unmetered	Metered	Unmetered
Single Family Residential	3221			
Multi-family Residential				
Commercial/Institutional	89			
Industrial				
Landscape Irrigation				
Other				
Agricultural Irrigation				
TOTAL	3310			

3. Total Water Into the System - Units of production:

mg (Select: AF=acre-feet; MG=million gallons; CCF=hundred cubic feet)

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Potable	Wells													
	Surface	7.6196	6.03	6.7956	8.0024	13.6545	16.2016	20.9652	19.9904	15.9266	12.5896	8.8876	9.1118	145.7749
	Purchased ^{1/}													
	Total Potable	7.6196	6.03	6.7956	8.0024	13.6545	16.2016	20.9652	19.9904	15.9266	12.5896	8.8876	9.1118	145.7749
Untreated Water														
Recycled ^{2/}					0.842	3.07	5.747	9.655	7.733	10.162	1.287			38.496

1/ Potable wholesale supplier(s): _____

2/ Recycled wholesale supplier(s): _____

Level of treatment: _____

4. Metered Water Deliveries - Units of delivery:

mg (Select: AF=acre-feet; MG=million gallons; CCF=hundred cubic feet)

If recycled is included, X box ↓		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
A.	Single Family Residential	7.226497	5.197664	5.142462	5.593871	7.782243	12.34822	15.093371	15.96188	18.580369	9.33269	9.304982	5.694508	109.832043
B.	Multi-family Residential													
C.	Commercial/Institutional	0.514198	0.488243	0.461063	0.502004	0.733543	0.95578	1.155107	1.07353	1.326822	0.828218	0.791326	0.369784	8.739801
D.	Industrial													
E.	Landscape Irrigation													
F.	Other		0.09512	0.09512	0.19024	0.28536	0.49024	0.785	0.59512	0.49024	0.59512	2.39512	0.57072	6.5874
	Total Urban Retail (A thru F)	7.740695	5.781027	5.698645	6.286115	8.801146	13.79424	17.033478	17.63053	20.397431	10.756028	12.491428	6.635012	125.159244
	Agricultural Irrigation													
	Wholesale (to other agencies)													

"Other" Category represents distribution system flushing and main line repairs.

PUBLIC WATER SYSTEM STATISTICS

Calendar Year **2013**

Groveland CSD
 Jon Sterling, General Manager/
 Operations & Maintenance Manager
 PO Box 350 Groveland, CA 95321
 PWS# 5510009 SCRO

1. General Information

Please follow the provided instructions.

Contact : Jon Sterling
 Title: Operations & Maintenance Manager
 Phone: 1(209) 962-7161 x 24
 Fax: 1(209) 962-4943
 E-mail: jsterling@gcsd.org
 Website: www.gcsd.org
 County: Tuolumne
 Population served: 10000
 Names of communities served: Groveland/Big Oak Flat

2. Active Service Connections

Customer Class	Potable Water		Recycled Water	
	Metered	Unmetered	Metered	Unmetered
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Multi-family Residential				
Commercial/Institutional	89			
Industrial				
Landscape Irrigation				
Other				
Agricultural Irrigation				
TOTAL	3310			

3. Total Water Into the System - Units of production:

MG

(Select: AF=acre-feet; MG=million gallons; CCF=hundred cubic feet)

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Potable	Wells													
	Surface	8.8006	6.7575	7.8968	9.742	14.4944	17.1662	21.5618	20.6588	15.1991	12.2543	9.1226	11.9922	155.6463
	Purchased ^{1/}													
	Total Potable	8.8006	6.7575	7.8968	9.742	14.4944	17.1662	21.5618	20.6588	15.1991	12.2543	9.1226	11.9922	155.6463
Untreated Water														
Recycled ^{2/}				0.478	1.564	4.0495	4.922	4.7195	4.372	1.116	0.9585	0.7045	0.029	22.913

1/ Potable wholesale supplier(s): _____

2/ Recycled wholesale supplier(s): _____

Level of treatment: _____

4. Metered Water Deliveries - Units of delivery:

MG

(Select: AF=acre-feet; MG=million gallons; CCF=hundred cubic feet)

If recycled is included, X box ↓		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
A. Single Family Residential		6.541384	6.877302	5.168254	5.058444	7.799642	13.23176	15.32771	16.9439	14.44497	10.29594	8.613973	9.556035	119.8593
B. Multi-family Residential														
C. Commercial/Institutional		0.415716	0.458452	0.391669	0.459978	0.71036	1.113695	1.162407	1.189517	0.903317	0.750675	0.738489	0.647891	8.942166
D. Industrial														
E. Landscape Irrigation														
F. Other		0.0075	0.0046	0.00725	0.00715	0.00555	0.1596	0.3038	0.1037	0.096	0.0962	0.0053	0.0057	0.80235
Total Urban Retail (A thru F)		6.9646	7.340354	5.567173	5.525572	8.515552	14.50506	16.79392	18.23711	15.44428	11.14282	9.357762	10.20963	129.6038
Agricultural Irrigation														
Wholesale (to other agencies)														

The value of per capita water use is out of range. Please check your population, units, or volumes of water and try again

Appendix B
Fuel Consumption

[Find a Car](#) [Save Money & Fuel](#) [Benefits](#) [My MPG](#) [Advanced Vehicles & Fuels](#) [About EPA Ratings](#) [More...](#)

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Compare Side-by-Side

- Fuel Economy
- Energy and Environment
- Safety
- Specs

<div style="border: 1px solid gray; padding: 5px; width: 60px; margin: auto;">Personalize</div>	<div style="border: 1px solid gray; padding: 5px;"> <p>2008 Ford Ranger Pickup 4WD X</p> <div style="border: 1px solid gray; padding: 2px; margin-bottom: 5px;"> Gasoline Vehicle </div> <p>4.0 L, 6 cyl, Automatic 5-spd</p> </div> <div style="border: 1px solid gray; padding: 5px; width: 60px; margin: auto; margin-top: 10px;">Add a Vehicle</div>
<p>EPA Fuel Economy</p>	<p>Regular Gasoline</p> <p>14 <small>MPG</small> <small>combined city highway</small> <small>city/highway</small></p> <p>7.1 gal/100mi</p> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;"> Gasoline </div> <p>238 - 280 miles Total Range</p>
<p>Unofficial MPG Estimates from Vehicle Owners</p> <p>Learn more about "My MPG" Disclaimer</p>	<p>Average based on 2 vehicles</p> <p>13.8 <small>MPG</small></p> <p>11 <small>Lo</small> → 20 <small>Hi</small></p> <p>View Individual Estimates</p>
<p>You save or spend*</p> <p><small>Note: The average 2015 vehicle gets 24 MPG</small></p>	<p>You SPEND</p> <p>\$750</p> <p><small>more in fuel costs over 5 years compared to the average new vehicle</small></p>
<p>Annual Fuel Cost*</p>	<p>\$400</p>
<p>Cost to Drive 25 Miles</p>	<p>\$5.16</p>
<p>Cost to Fill the Tank</p>	<p>\$49-\$58</p>
<p>Tank Size</p>	<p>17.0-20.0 gallons</p>
<p>*Based on 0% highway, 100% city driving, 2,000 annual miles and current fuel prices. Personalize. MSRP and tank size data provided by Edmunds.com, Inc. Range on a tank and refueling costs assume 100% of fuel in tank will be used before refueling.</p>	