MW BROWN ENGINEERING, INC

Office (801) 572-1790 Fax (801) 572-1789
528 East 770 North, Orem, UT 84097

TRAVERSE MOUNTAIN AREA PLAN

CULINARY WATER

November 23, 2011

The approved concept plan dated November 23, 2011 was used to model the culinary water system for the Traverse Mountain area plan. The culinary system was modeled using Bentley System Water Cad version 8. Attached are the results of the model. The model was completed following the requirements of the Lehi City Development Code and the State of Utah Rules for Public Drinking Water Systems. A summary of the design criteria used is shown in figure 1.

The culinary water system will require the following:

	2011 Analysis **
Total Peak Day Flow & Source	3993 GPM
Total Storage Requirement	2,904,000 gal

Wells will be drilled to produce the required 3812 gpm source requirement. Assuming that a well produces 1400 gpm and the existing well produces 1400 gpm, the development would need to develop 2 more wells or find a source off site.

RECEIVED
NOV 2 2 2011
LEHI CITY

FIGURE 1

TRAVERSE MOUNTAIN AREA PLAN

CULINARY WATER DESIGN CRITERIA

Description	Assumption
Minimum Pipe Size	6-inch / Commercial 10-inch
Pipe Roughness Coefficient	130
Equivalent Residential Unit (ERU)	Residential: 1 Unit = 1 ERU Commercial/Civic: 2.7 ERU/Acre Recreational: 0.3 ERU/Acre
Average Daily Flow	400 gallons per day (GPD)/ERU* (equivalent to .28 GPM/ERU)
Peak Day Flow (PDF) & Source Requirement	800 GPD/ERU* (equivalent to 0.55 GPM/ERU)
Peak Hourly Flow (PIF)	1.0 GPM/ERU
Storage Requirement	400 GPD/ERU * (equivalent to one half of a peak day)
Fire Flow Requirement	500 GPM for sprinkler systems in School, Commercial, and Office Buildings. Plus PHF at 50 psi
Minimum Pressure	40 psi at peak instant
Maximum Pressure	120 psi
Tank Inlet-Outlet Pipe Sizing	Maximum Headloss: 6 feet/1000 linear feet of pipe with a flow equal to Peak Hour Flow plus Fire Flow
Pump Transmission Pipe Sizing	• Maximum Headloss: 3 feet/1000 linear feet of pipe with a flow equal to pump capacity

*Note: As recommended by the State of Utah Rules For Public Drinking Water.

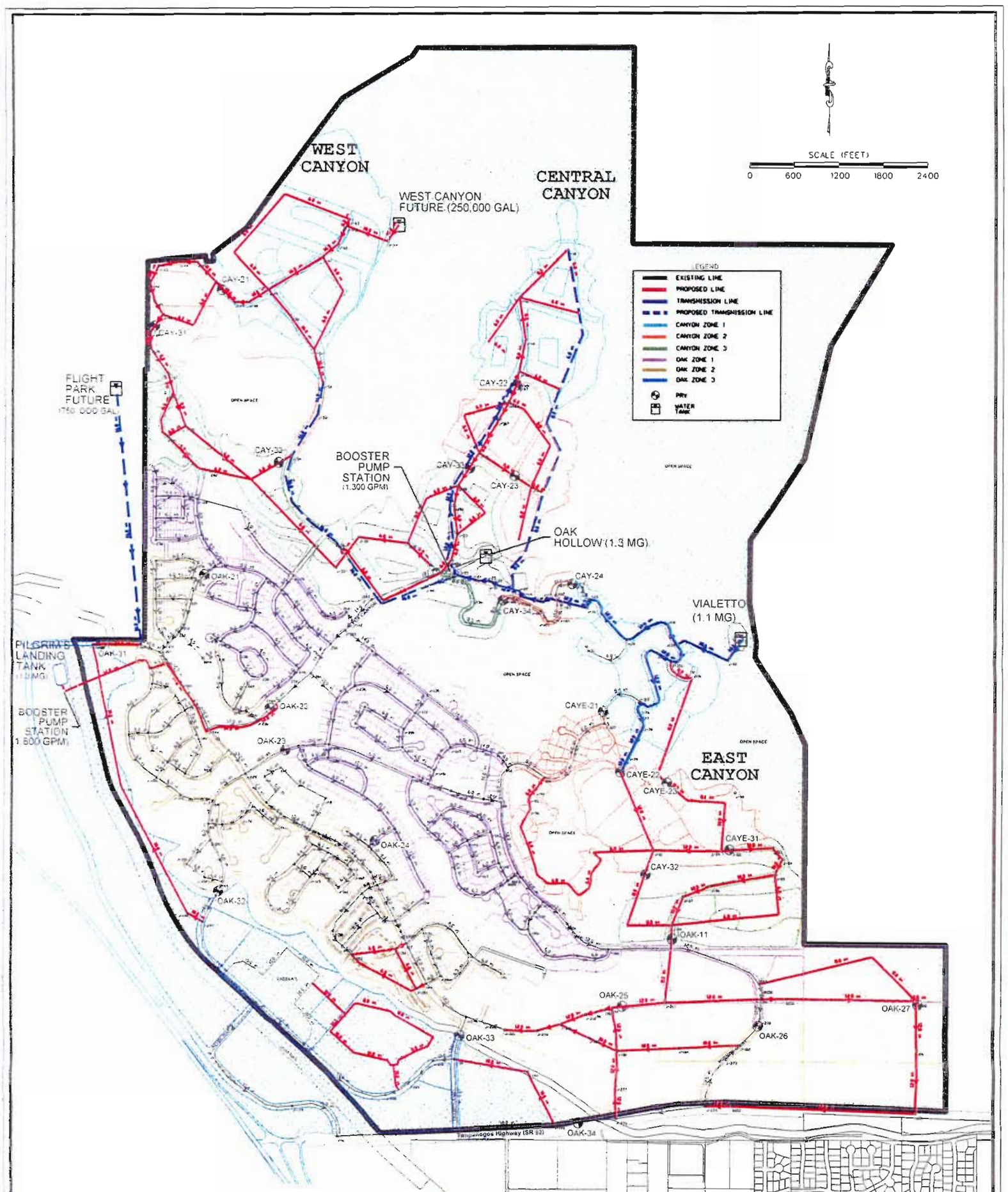
RECEIVED
NOV 2 3 2011
LEHI CITY

Modeling Scenarios	Scenario 1: PIF with Sprinklers • Tanks 1/3 Full, Pumps off • 0.8 GPM/ERU • 500 GPM fire sprinklers • Minimum Pressure 50 psi Scenario 2: PIF • Tanks 1/3 Full, Pumps off • 1.0 GPM/ERU • Minimum Pressure 40 psi

The following exhibits are attached:

1. Traverse Mountain Culinary Pipe Sizes.
2. Traverse Mountain Area Plan Culinary Schematic.
3. Traverse Mountain Culinary Water System Requirements.
4. Culinary Water Design
   - Scenario 1: PHF With Sprinklers
   - Scenario 2: PIF

RECEIVED
NOV 2 4 2011
SLC CITY



MW BROWN ENGINEERING, INC

Office: (801) 377-1790 Fax: (801) 377-1789
578 East 770 North, Orem UT 84097

Title: CULINARY WATER PLAN

Client: TRAVERSE MOUNTAIN, LEHI UTAH

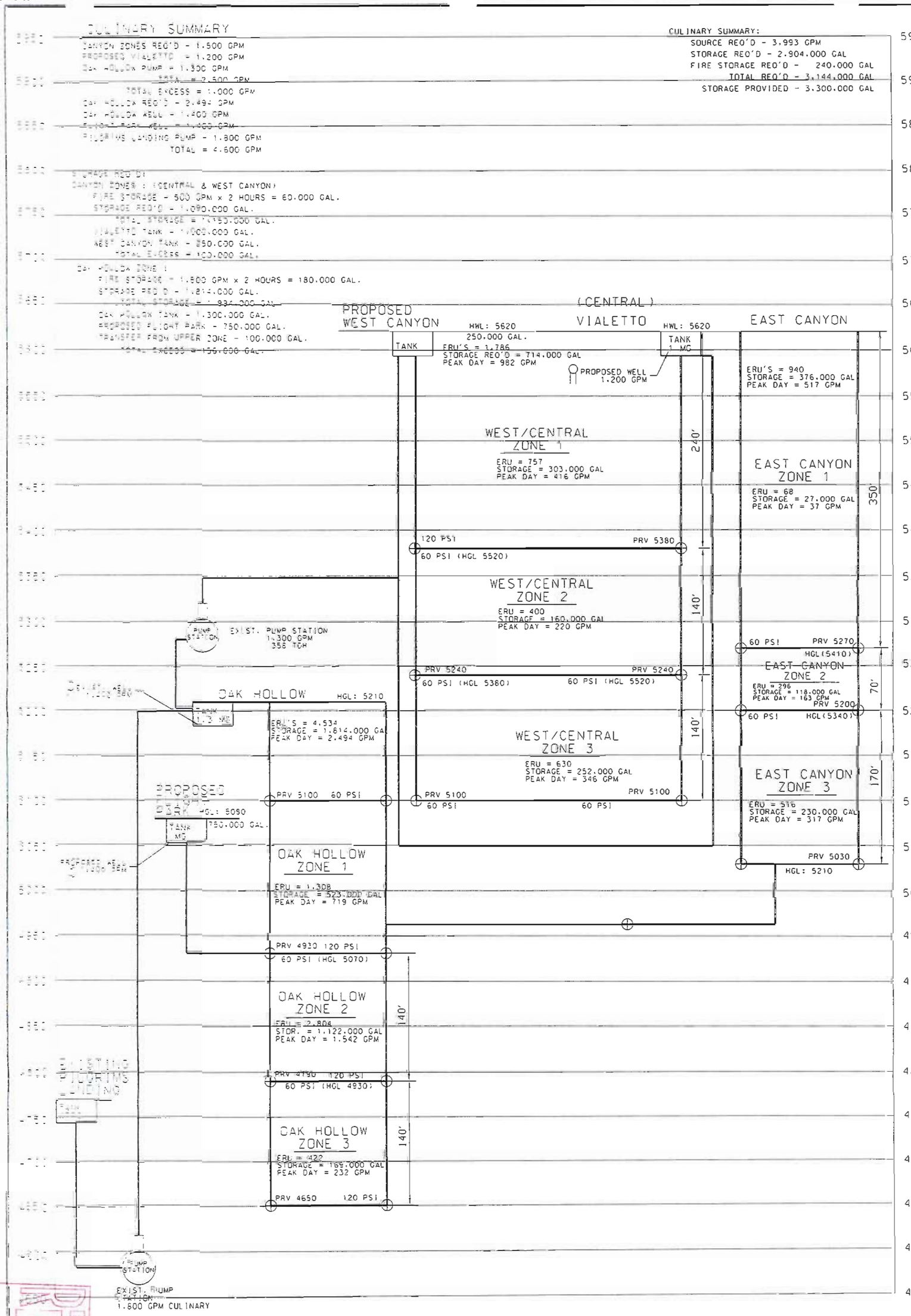
Drawing Name: CULINARY WATER PIPE SIZES

PROJECT NO. 2010.037.003

WAT-4

DATE: 11-23-11

RECEIVED NOV 21 2011



MW BROWN ENGINEERING, INC
Office (801) 377-1790 Fax: (801) 377-1789
575 East 770 North, Orem UT 84058

Client:

TRAVERSE MOUNTAIN, LEHI UTAH

Drawing Name:

CULINARY WATER SCHEMATIC

PROJECT NO. 2010.037.003

WAT-5

DATE: 11-23-11

NOV 23 2011

TRAVERSE MOUNTAIN AREA PLAN
CULINARY WATER SYSTEM REQUIREMENTS
TANK ZONE SUMMARY

Description		Total Area	Total Density	Units per acre	Commercial / Parks	Total	Storage Requirement	Peak Day	Peak Hour
					ERU'S	ERU's	Gallons	GPM	GPM
West/Central Canyons									
Total West/Central Canyons Zone 1		104.8	752	7.18	5	757	302,780	416	606
Total West/Central Canyons Zone 2		59.7	398	6.67	2	400	159,800	220	320
Total West/Central Canyons Zone 3		77.8	627	8.06	3	630	251,824	346	504
Total West/Central Canyons:		**242.3**	**1,777**	**7.33**	**9**	**1,786**	**714,404**	**982**	**1,429**
East Canyon									
Total East Canyon Zone 1		34.9	68	3.92	0	68	27,200	37	54
Total East Canyon Zone 2		97.3	290	24.03	6	296	118,448	163	237
Total East Canyon Zone 3		34.3	575	71.13	1	576	230,240	317	460
Total East Canyon		**166.5**	**933**	**5.60**	**7**	**940**	**375,888**	**517**	**752**
Oak Hollow									
Total Oak Hollow Zone 1		347.7	1,279	3.68	29	1,308	523,256	719	1,047
Total Oak Hollow Zone 2		471.9	2,508	5.31	296	2,804	1,121,776	1,542	2,244
Total Oak Hollow Zone 3		164.7	0	0.00	422	422	168,638	232	337
Total Oak Hollow		**984.3**	**3,787**	**3.85**	**748**	**4,534**	**1,813,670**	**2,494**	**3,627**
Canyons		408.8	2,710	6.63	16	2,726	1,090,292	1,499	2,181
Oak Hollow		984.3	3,787	3.85	748	4,534	1,813,670	2,494	3,627
Total Water Requirements		**1,393.0**	**6,496**	**4.66**	**764**	**7,260**	**2,903,962**	**3,993**	**5,808**
West Canyon		72.1	600	8.32	3	603	241,260	332	483
Central Canyon		136.3	900	6.60	6	906	362,424	498	725
East Canyon		113.0	826	7.31	7	833	333,088	458	666
Riverbend		88.7	519	5.85	0	519	207,600	285	415
Non Canyon		18.5	99	5.35	0	99	39,600	54	79
Platted		586.4	2,038	3.48	274	2,313	925,052	1,272	1,850
Perry Homes		168.6	968	5.74	5	973	389,000	535	778
Commercial		209.5	546	2.61	469	1,015	405,938	558	812
Total Water Requirements		**1,393.0**	**6,496**	**4.66**	**764**	**7,260**	**2,903,962**	**3,993**	**5,808**

RECEIVED NOV 23 2011

TRAVERSE MOUNTAIN AREA PLAN
CULINARY WATER SYSTEM REQUIREMENTS
TANK ZONE SUMMARY

Description	Area	Total Area	Total Density	Units per acre	Commercial / Parks	Total	Storage Requirement	Peak Day	Peak Hour
					ERU'S	ERU's	Gallons	GPM	GPM
West/Central Canyons Zone 1									
B1	West Canyon	3.20	16	5.00		16.00	6400	9	13
B2	West Canyon	1.90	10	5.26		10.00	4000	6	8
C1	West Canyon	12.80	105	8.20		105.00	42000	58	84
C2 - Park	West Canyon	3.00	0	0.00	0.90	0.90	360	0	1
D1	West Canyon	5.70	103	18.07		103.00	41200	57	82
E1	West Canyon	11.00	176	16.00		176.00	70400	97	141
E2 Park	West Canyon	3.00	0	0.00	0.90	0.90	360	0	1
F1	West Canyon	10.30	40	3.88		40.00	16000	22	32
F2 - Park	West Canyon	2.00	0	0.00	0.60	0.60	240	0	0
F3	West Canyon	3.20	16	5.00		16.00	6400	9	13
E1	Central Canyon	13.00	84	6.46		84.00	33600	46	67
E2 - Park	Central Canyon	2.00	0	0.00	0.60	0.60	240	0	0
F1 Park	Central Canyon	3.00	0	0.00	0.90	0.90	360	0	1
F2	Central Canyon	10.20	65	6.37		65.00	26000	36	52
F3 - Park	Central Canyon	2.00	0	0.00	0.60	0.60	240	0	0
G1	Central Canyon	8.90	57	6.40		57.00	22800	31	46
G2 - Park	Central Canyon	1.50	0	0.00	0.45	0.45	180	0	0
C	Riverbend	2.38	16	6.72		16.00	6400	9	13
D	Riverbend	5.70	64	11.23		64.00	25600	35	51
Total West/Central Canyons Zone 1		**104.78**	**752**	**7.18**	**5**	**757**	**302780**	**416**	**606**
West/Central Canyons Zone 2									
A1	West Canyon	6.50	78	12.00		78.00	31200	43	62
A2 Park	West Canyon	2.50	0	0.00	0.75	0.75	300	0	1
A3	West Canyon	7.00	56	8.00		56.00	22400	31	45
B	Central Canyon	7.00	44	6.29		44.00	17600	24	35
C	Central Canyon	5.70	36	6.32		36.00	14400	20	29
D1	Central Canyon	8.90	56	6.29		56.00	22400	31	45
D2 - Park	Central Canyon	1.50	0	0.00	0.45	0.45	180	0	0
H1	Central Canyon	8.90	56	6.29		56.00	22400	31	45
H2 - Park	Central Canyon	1.00	0	0.00	0.30	0.30	120	0	0
C	RiverBend	10.71	72	6.72		72.00	28800	40	58
Total West/Central Canyons Zone 2		**59.71**	**398**	**6.67**	**2**	**400**	**159800**	**220**	**320**

Flex Property not to exceed 500 Total Units

Commercial ERU =	2.7	x Acres
School ERU =	2.7	x Acres
Church ERU =	2.7	x Acres
Parks ERU =	0.3	x Acres

RECEIVED
NOV 23 2011
CITY

TRAVERSE MOUNTAIN AREA PLAN
CULINARY WATER SYSTEM REQUIREMENTS
TANK ZONE SUMMARY

Description	Area	Total Area	Total Density	Units per acre	Commercial / Parks	Total	Storage Requirement	Peak Day	Peak Hour
					ERU'S	ERU's	Gallons	GPM	GPM
West/Central Canyons Zone 3									
A1	Central Canyon	8.80	55	6.25		55.00	22000	30	44
A2 Park	Central Canyon	1.50	0	0.00	0.45	0.45	180	0	0
I1	Central Canyon	7.40	47	6.35		47.00	18800	26	38
I2 - Park	Central Canyon	1.00	0	0.00	0.30	0.30	120	0	0
J1	Central Canyon	12.90	141	10.93		141.00	56400	78	113
J2 - Park	Central Canyon	1.50	0	0.00	0.45	0.45	180	0	0
K1	Central Canyon	7.90	79	10.00		79.00	31600	43	63
K2 Park	Central Canyon	2.00	0	0.00	0.60	0.60	240	0	0
L1	Central Canyon	12.50	100	8.00		100.00	40000	55	80
L2 - Park	Central Canyon	2.00	0	0.00	0.60	0.60	240	0	0
M1	Central Canyon	4.00	80	20.00		80.00	32000	44	64
N - Park	Central Canyon	1.20	0	0.00	0.36	0.36	144	0	0
C	RiverBend	10.71	72	6.72		72.00	28800	40	58
B	RiverBend	4.35	53	12.14		52.80	21120	29	42
Total West/Central Canyons Zone 3		**77.76**	**627**	**8.06**	**3**	**630**	**251824**	**346**	**504**
East Canyon Zone 1									
E	Riverbend	18.90	34	1.80		34.00	13600	19	27
F	Riverbend	16.00	34	2.13		34.00	13600	19	27
Total East Canyon Zone 1		**34.90**	**68.00**	**3.92**	**0.00**	**68.00**	**27200.00**	**37.40**	**54.40**
East Canyon Zone 2									
C1	East Canyon	13.90	64	4.60		64.00	25600	35	51
C2 - Park	East Canyon	5.40	0	0.00	1.62	1.62	648	1	1
D1	East Canyon	3.20	15	4.69		15.00	6000	8	12
D2	East Canyon	13.90	42	3.02		42.00	16800	23	34
D3	East Canyon	15.00	65	4.33		65.00	26000	36	52
D4	East Canyon	12.30	65	5.28		65.00	26000	36	52
D5 - Park	East Canyon	2.00	0	0.00	0.60	0.60	240	0	0
D6 - Park	East Canyon	13.00	0	0.00	3.90	3.90	1560	2	3
Vialetto	Platted	18.60	39	2.10		39.00	15600	21	31
Total East Canyon Zone 2		**97.30**	**290.00**	**24.03**	**6.12**	**296.12**	**118448.00**	**162.87**	**236.90**
East Canyon Zone 3									
A1	East Canyon	10.00	180	18.00		180.00	72000	99	144
A2	East Canyon	10.10	202	20.00		202.00	80800	111	162
A3	East Canyon	3.20	58	18.13		58.00	23200	32	46
A4 - Park	East Canyon	2.00	0	0.00	0.60	0.60	240	0	0
B1	East Canyon	9.00	135	15.00		135.00	54000	74	108
Total East Canyon Zone 3		**34.30**	**575.00**	**71.13**	**0.60**	**575.60**	**230240.00**	**316.58**	**460.48**

RECEIVED NOV 23 2011

TRAVERSE MOUNTAIN AREA PLAN
CULINARY WATER SYSTEM REQUIREMENTS
TANK ZONE SUMMARY

Description	Area	Total Area	Total Density	Units per acre	Commercial / Parks	Total	Storage Requirement	Peak Day	Peak Hour
					ERU'S	ERU's	Gallons	GPM	GPM
Oak Hollow Zone 1									
Winterhaven (50%)	Platted	17.90	112	6.23		112	44,600	61	89
Public Park	Platted	6.70	0	0.00	2.01	2	804	1	2
Eagle Summit (90%)	Platted	52.83	156	2.95		156	62,230	86	125
Church (Ravencrest)	Platted	3.40	0	0.00	9.18	9	3,672	5	7
Woodhaven	Platted	56.90	167	2.93		167	66,800	92	134
Private Park	Platted	1.90	0	0.00	0.57	1	228	0	0
Private Park	Platted	0.40	0	0.00	0.12	0	48	0	0
Church (Chapel Ridge)	Platted	4.70	0	0.00	12.69	13	5,076	7	10
Vista Ridge	Platted	53.20	125	2.35		125	50,000	69	100
Private Park	Platted	0.30	0	0.00	0.09	0	36	0	0
Private Park	Platted	0.20	0	0.00	0.06	0	24	0	0
Private Park	Platted	0.20	0	0.00	0.06	0	24	0	0
Private Park	Platted	0.20	0	0.00	0.06	0	24	0	0
Chappel Ridge (25%)	Platted	7.60	25	3.32		25	10,100	14	20
Private Park	Platted	0.30	0	0.00	0.09	0	36	0	0
Hunter Chase (50%)	Platted	10.55	47	4.45		47	18,800	26	38
Private Park (50%)	Platted	0.20	0	0.00	0.06	0	24	0	0
Non Canyon A	Non Canyon	8.10	24	2.96		24	9,600	13	19
Non Canyon C	Non Canyon	3.30	6	1.82		6	2,400	3	5
Non-Canyon D	Non Canyon	0.60	3	5.00		3	1,200	2	2
Riverbend A	Riverbend	9.80	51	5.20		51	20,400	28	41
Riverbend B (70%)	Riverbend	10.15	123	12.14		123	49,280	68	99
Private Park	Perry Homes	10.00	0	0.00	3.00	3	1,200	2	2
Perry A1 (70%)	Perry Homes	23.03	91	3.95		91	36,400	50	73
Perry A2 - Park	Perry Homes	2.00	0	0.00	0.60	1	240	0	0
Perry B1	Perry Homes	25.40	120	4.72		120	48,000	66	96
Perry B2	Perry Homes	3.00	0	0.00	0.90	1	360	0	1
Perry C (50%)	Perry Homes	34.85	229	6.57		229	91,600	126	183
Total Oak Hollow Zone 1		**347.71**	**1279**	**3.68**	**29**	**1,308**	**523,256**	**719**	**1,047**

Commercial ERU =	2.7	x Acres
School ERU =	2.7	x Acres
Church ERU =	2.7	x Acres
Parks ERU =	0.3	x Acres

RECEIVED
NOV 23 2011
SANDY CITY

TRAVERSE MOUNTAIN AREA PLAN
CULINARY WATER SYSTEM REQUIREMENTS
TANK ZONE SUMMARY

Description	Area	Total Area	Total Density	Units per acre	Commercial / Parks	Total	Storage Requirement	Peak Day	Peak Hour
					ERU'S	ERU's	Gallons	GPM	GPM
Oak Hollow Zone 2									
Winterhaven (50%)	Platted	17.90	112	6.23		112	44,600	61	89
Church (Traverse Mtn)	Platted	5.00	0	0.00	13.50	14	5,400	7	11
Eagle Summit (10%)	Platted	52.83	156	2.95		156	62,280	86	125
Private Park	Platted	1.30	0	0.00	0.39	0	156	0	0
Shadow Ridge	Platted	45.00	201	4.47		201	80,400	111	161
School	Platted	7.90	0	0.00	21.33	21	8,532	12	17
Public Park	Platted	1.70	0	0.00	0.51	1	204	0	0
Country Run	Platted	28.70	113	3.94		113	45,200	62	90
Private Park	Platted	0.20	0	0.00	0.06	0	24	0	0
Chappel Ridge (75%)	Platted	22.80	76	3.32		76	30,300	42	61
Private Park	Platted	0.20	0	0.00	0.06	0	24	0	0
Church (Fox tail)	Platted	5.10	0	0.00	13.77	14	5,508	8	11
Harvest Homes	Platted	21.50	99	4.60		99	39,600	54	79
Private Park	Platted	2.50	0	0.00	0.75	1	300	0	1
Detention	Platted	2.10	0	0.00	0.63	1	252	0	1
Cresthaven Townhomes	Platted	12.20	122	10.00		122	48,800	67	98
Private Park	Platted	0.30	0	0.00	0.09	0	36	0	0
Cresthaven Appartments	Platted	17.00	344	20.24		344.00	137,600	189	275
Private Park	Platted	1.50	0	0.00	0.45	0.45	180	0	0
Hunter Chase (50%)	Platted	10.55	47	4.45		47.00	18,800	26	38
Private Park (50%)	Platted	0.20	0	0.00	0.06	0.06	24	0	0
Heathermore	Platted	20.60	99	4.81		99.00	39,600	54	79
Charter School	Platted	4.00	0	0.00	10.80	10.80	4,320	6	9
TM Sales Center	Platted	2.00	0	0.00	5.40	5.40	2,160	3	4
Non Canyon B	Non Canyon	6.50	66	10.15		66.00	26,400	36	53
Perry A1 (30%)	Perry Homes	9.87	39	3.95		39.00	15,600	21	31
Perry C (50%)	Perry Homes	34.85	229	6.57		229.00	91,600	126	183
Perry D	Perry Homes	25.60	260	10.16		260.00	104,000	143	208
HC	Commercial	1.80		0.00	4.86	4.86	1,944	3	4
HC	Commercial	3.10		0.00	8.37	8.37	3,348	5	7
Highway Commercial (70%)	Commercial	79.80		0.00	215.46	215.46	86,184	119	172
Highway Commercial/HDR	Commercial	27.30	546	20.00		546.00	218,400	300	437
Total Oak Hollow Zone 2		**471.90**	**2508**	**5.31**	**296**	**2,804**	**1,121,776**	**1,542**	**2,244**
Oak Hollow Zone 3									
Cabellas	Platted	31.70		0.00	85.59	85.59	34,236	47	68
Traverse Outlets	Platted	35.50		0.00	95.85	95.85	38,340	53	77
Public Park	Commercial	9.60		0.00	2.88	2.88	1,152	2	2
Highway Commercial	Commercial	9.40		0.00	25.38	25.38	10,152	14	20
Highway Commercial	Commercial	7.30		0.00	19.71	19.71	7,884	11	16
Highway Commercial	Commercial	7.80		0.00	21.06	21.06	8,424	12	17
Highway Commercial	Commercial	6.70		0.00	18.09	18.09	7,236	10	14
Highway Commercial	Commercial	5.00		0.00	13.50	13.50	5,400	7	11
Highway Commercial	Commercial	2.50		0.00	6.75	6.75	2,700	4	5
Highway Commercial	Commercial	14.80		0.00	39.96	39.96	15,984	22	32
Highway Commercial	Commercial	34.38		0.00	92.83	92.83	37,130	51	74
Total Oak Hollow Zone 3		**164.68**	**0**	**0.00**	**422**	**422**	**168,638**	**234**	**337**

RECEIVED NOV 2 4 2011