

Chapter 2: Basic Planning Data & Water Demand Forecasting

2.1 Current Conditions

Population and Service Connections

As of April of 2010, the population of Sumas is 1,319 people. (The 2009 Sumas population was 1,326). Sumas conducts its own census each spring using the Washington State Office of Financial Management (OFM) approved methodology, so this number is believed to be very accurate.

As of August of 2009, service connections were as follows:

<u>Connection type</u>	<u>Number of connections</u>
Single-family	356
Multi-family	47
Comm., Gov., Ind.	93
Agricultural	0
Total	496

In addition, Sumas has three wholesale customers and one industrial customer: the City of Nooksack, the Nooksack Valley Water Association (NVWA), and the Sumas Rural Water Association (SRWA), all of which purchase potable water, and PSE electric co-generation facility that purchases non-potable water.

The 47 multi-family connections represent 152 dwelling units, so there are a total of 510 dwelling units in Sumas's service area.

Water Use Data

Sumas is a system with less than 1,000 connections and therefore is subject to certain Washington State Department of Health (DOH) data collection requirements. The tables below contain available data from 1993 to 1998 and 2003 to 2009.

Water Use Data (CF) - 1993
Sumas Population 839

Class	Count	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	De c	Year
In-city retail														
Residential	265	329690	229639	191897	218300	210035	217919	252163	246390	270535	206061	203573	240644	2816845
Comm/Gov/Ind	84	298706	228686	224573	407092	300639	332144	345222	340347	325255	377827	218231	236563	3635285
Subtotal	349	628396	458325	416470	625392	510674	550063	597385	586737	595790	583888	421804	477207	6452131
Wholesale														
Nooksack		335565	287425	293194	251249	325408	320333	308013	381616	361376	242518	248958	310034	3665689
NVWA		1352419	1179100	1167212	1028917	1007924	1242980	1317942	1525995	1851679	777122	1207893	1261893	14921075
SRWA		1560042	1346991	1466845	1472320	1631076	1517079	1574893	1717267	1637021	1621039	1385886	1423634	18354093
Subtotal		3248026	2813516	2927251	2752486	2964408	3080392	3200848	3624878	3850076	2640679	2842737	2995561	36940853
Total billed		3876422	3271841	3343721	3377878	3475082	3630455	3798233	4211615	4445866	3224567	3264541	3472768	43392989

Water Use Data (CF) - 1994
Sumas Population 873

Class	Count	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	De c	Year
In-city retail														
Residential	270	225401	218365	189972	239632	240000	275034	272722	411385	299611	221348	214818	228355	3036643
Comm/Gov/Ind	86	218910	217222	186683	230909	230007	303484	255851	343879	319900	277765	279432	303986	3168028
Subtotal	357	444311	435587	376655	470541	470007	578518	528573	755264	619511	499113	494250	532341	620467.
Wholesale														
Nooksack		250919	231572	256294	255382	324243	288518	309617	356832	231832	243521	272853	262424	3284007
NVWA		1186079	1127188	1260156	1196815	1487653	1307516	1521878	1988253	1525479	1404044	1339812	1345887	16690760
SRWA		1381980	1218302	1403101	1327184	1613123	1455022	1649806	2068395	1507483	1414420	1334343	1356174	17729333
Subtotal		2818978	2577062	2919551	2779381	3425019	3051056	3481301	4413480	3264794	3061985	2947008	2964485	37704100
Total billed		3263289	3012649	3296206	3249922	3895026	3629574	4009874	5168744	3884305	3561098	3441258	3496826	43908771

Water Use Data (CF) - 1995
Sumas Population 940

Class	Count	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
In-city retail														
Residential	274	249911	239391	228824	216256	229065	348642	325222	312433	280170	231739	228132	229095	3118880
Comm/Gov/Ind	90	231887	143707	267704	251502	281182	410618	375953	376902	305662	248257	239210	231181	3363765
Subtotal	364	481798	383098	496528	467758	510247	759260	701175	689335	585832	479996	467342	460276	6482645
Wholesale														
Nooksack		270111	221212	245207	271315	319988	381458	375194	308174	308424	279852	279764	270187	3530886
NVWA		1423407	1102810	1283869	1372975	1500920	1595269	1889285	1632720	1649650	1639702	1458889	1316571	17866067
SRWA		1470652	1331695	1390079	1528197	1629895	1787509	1928292	1825325	1569412	1534100	1386141	1365325	18746622
Subtotal		3164170	2655717	2919155	3172487	3450803	3764236	4192771	3766219	3527486	3453654	3124794	2952083	40143575
Total billed		3645968	3038815	3415683	3640245	3961050	4523496	4893946	4455554	4113318	3933650	3592136	3412359	46626220
Source meters														
SO6		1730510	1366690	1585850	1696730	1847650	2034850	2304640	1951940	1962300	1922450	1741620	1590410	21735640
SO4		1185053	957794	894612	896123	1178035	1462608	1687445	1360896	1313570	1064398	948048	1129853	14078435
SO5		1009853	1020829	1133088	1269706	1377674	1312299	1129011	1310428	1106698	1214198	1138302	931176	13953262
Total pumped		3925416	3345313	3613550	3862559	4403359	4809757	5121096	4623264	4382568	4201046	3827970	3651439	49767337
Unaccounted for		279448	306498	197867	222314	442309	286261	227150	167710	269250	267396	235834	239080	3141117
Bill/pump ratio		92.9%	90.8%	94.5%	94.2%	90.0%	94.0%	95.6%	96.4%	93.9%	93.6%	93.8%	93.5%	93.7%

Water Use Data (CF) - 1996
Sumas Population 968

Class	Count	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
In-city retail														
Residential	289	220600	349831	217004	229853	285278	278033	401123	406277	313397	266639	263264	249502	348100
Comm/Gov/Ind	83	221096	243831	205891	197943	224526	204407	433638	387558	287701	202247	180676	133140	2922654
Subtotal	372	441696	593662	422895	427796	509804	482440	834761	793835	601298	468886	443940	382642	6403655
Wholesale														
Nooksack		276366	333554	435132	257331	293306	325470	414604	452075	237294	276950	266206	303986	3872274
NVWA		1215543	1348588	1081790	1385735	1327913	1627114	1744331	2089899	1314478	1507079	1346336	1445508	17434314
SRWA		1316788	1303058	1285963	1326913	1339035	1566108	1733924	1886640	1277174	1415063	1325023	1337512	17113201
Subtotal		2808697	2985200	2802885	2969979	2960254	3518692	3892859	4428614	2828946	3199092	2937565	3087006	38419789
Total billed		3250393	3578862	3225780	3397775	3470058	4001132	4727620	5222449	3430244	3667978	3381505	3469648	44823444
Source meters														
SO6		1495196	1686000	1520590	1647140	1626720	1956040	2183425	2549289	1555150	1785260	1613160	1751800	21369770
SO4		1118302	1084265	1002634	907981	1088743	1299465	1370374	1625227	1083877	1866658	0	1171257	13618783
SO5		919719	1083623	1212146	1136511	1012273	1154572	1454947	1414024	862714	2158810	0	975802	13385141
Total pumped		3533217	3853888	3735370	3691632	3727736	4410077	5008746	5588540	3501741	5810728	1613160	3898859	48373694
Unaccounted for		282824	275026	509590	293857	257678	408945	281126	366091					3550250
Bill/pump ratio		92.0%	92.9%	86.4%	92.0%	93.1%	90.7%	94.4%	93.4%					92.7%

Water Use Data (CF) - 1997
Sumas Population 973

Class	Count	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
In-city retail														
Residential	299	337079	290832	260826	266006	287637	291887	296584	438759	358210	266701	246060	249809	3590390
Comm/Gov/Ind	78	187324	209131	163639	186187	225953	250693	212237	235527	296609	198767	162513	145673	2474253
Subtotal	377	524403	499963	424465	452193	513590	542580	508821	674286	654819	465468	408573	395482	6064643
Wholesale														
Nooksack	308831	273025	251856	262216	260211	260211	313280	364312	412519	288044	280294	260740	254820	3530148
NVWA	1423377	1276804	1207509	1332943	1395384	1436946	1613607	2823895	1541263	1331284	1395713	1305597	1305597	18084322
SRWA	1483725	1432486	1258554	1431582	1426975	1541694	1595761	1726321	1431207	1334744	1299915	1293035	1293035	17255999
Subtotal	3215933	2982315	2717919	3026741	3082570	3291920	3573680	4962735	3260514	2946322	2956368	2853452	2853452	38870469
Total billed		3740336	3482278	3142384	3478934	3596160	3834500	4082501	5637021	3915333	3411790	3364941	3248934	44935112
Source meters														
SO6	1735500	1551800	1457860	1597500	1660280	1752790	1980560	3240380	1832080	1613520	1657400	1562200	1562200	21641870
SO4	1102941	1113797	954238	1139973	1232807	1470134	0	0	0	0	0	0	0	7013890
SO5	1089171	899612	0	0	0	1001484	1139572	2754251	2392259	2128863	2091176	2164451	2164451	15660839
Total pumped		3927612	3565209	2412098	2737473	2893087	4224408	3120132	5994631	4224339	3742383	3748576	3726651	44316599
Unaccounted for	187276									309006	330593	383635	477717	
Bill/pump ratio	95.2%									92.7%	91.2%	89.8%	87.2%	

Water Use Data (CF) - 1998
Sumas Population 954

Class	Count	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
In-city retail														
Residential	303	267701	351997	214903	312362	256556	296243	314990	437567	411896	261284	235397	243228	3603924
Comm/Gov/Ind	81	267493	171199	136857	161090	203492	275605	243287	257723	383085	194850	151882	146318	2592881
Subtotal	384	535194	523196	351760	473452	460048	571848	558277	695090	794981	456134	387279	389546	6196805
Wholesale														
Nooksack		266756	239167	280814	307894	389538	326310	381804	483996	382872	275114	275185	267777	3877227
NVWA		1254676	1179498	1363418	1276315	1218572	1562189	1720429	1887854	1689605	1394711	1394835	1393965	17336067
SRWA		1273459	1062121	1631743	1402825	1375603	1651612	1845058	1608728	1623522	1391717	1353563	1346450	17566401
Subtotal		2794891	2480786	3275975	2987034	2983713	3540111	3947291	3980578	3695999	3061542	3023583	3008192	38779695
Total billed		3330085	3003982	3627735	3460486	3443761	4111959	4505568	4675668	4490980	3517676	3410862	3397758	44976500
Source meters														
SO6		1526050	1422060	1648430	1584880	1608110	1888000	2104600	2375200	2072500	1671800	1671100	1662200	21234930
SO4		260762	845227	1121725	979532	1001230	1135174	968289	552827	784104	949666	939759	933676	10471971
SO5		1959225	1015441	1069144	1109666	1317259	2323489	1841537	2161604	2012834	1189572	1157901	1199933	18357605
Total pumped		3746037	3282728	3839299	3674078	3926599	5346663	4914426	5089631	4869438	3811038	3768760	3795809	50064536
Unaccounted for		415952	278746	211564	213592	482838	1234704	408858	413963	378458	293362	357898	398071	5088006
Bill/pump ratio		88.9%	91.5%	94.5%	94.2%	87.7%	76.9%	91.7%	91.9%	92.2%	92.3%	90.5%	89.5%	89.8%

2003

WATER USE DATA (CF) - 2003
SUMAS POPULATION - 1002

Class	Count	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
In-city retail														
Residential	320	271219	232301	232620	337235	317085	365896	398639	441480	382050	263812	247596	238656	3728588
Comm/Gov/Ind	82	3545157	3321796	2836392	5018520	1657977	323085	2743214	586609	2936371	3463864	4183410	2387378	33103773
Subtotal	402	3316376	3554097	3069012	5355755	1975062	688981	3141853	1028089	3318421	3727676	4431006	2626034	36832362
Wholesale														
Nooksack		261904	238924	277611	257173	277099	365836	425748	405300	343356	262351	225655	309930	3650887
NWNA		1542113	1550076	1511189	1745997	1664571	2101514	3256102	3546600	1582423	1751029	1762045	1631880	23735539
SRWA		1279496	1114164	1305067	1284298	1590864	1675180	1757180	1759230	1607070	1465650	1395001	1509223	17742423
Subtotal		3183513	2903164	3093867	3287468	3522534	4142530	5439030	5711130	3532849	3479030	3382701	3451033	45128849
Total billed		7099889	6457261	6162879	8643223	5497596	4831511	8580883	6739219	6851270	7206706	7813707	6077067	81961211
Source Meters														
May Rd #3		2948783	2731336	3084598	3081671	65414	0	3390147	3349157	3211604	2961818	2996270	3100414	30921212
SO6		1986880	1738120	2001270	2087780	2020650	2397100	2515430	2400430	1796620	2035090	1942000	2016520	24937890
SO4		567433	521002	583034	604759	697673	1109665	1169064	1883850	1087032	675494	719906	318409	9937321
SO5		540106	443783	543516	576430	743703	804318	1095307	737660	1035320	680655	674558	146350	8021706
SO9		75953	69391	79258	75316	79899	65212	69573	66442	53374	19212	43278	67578	764486
Total pumped		6119155	5503632	6291676	6425956	3607339	4376295	8239521	8437539	7183950	6372269	6376012	5649271	74582615
Unaccounted for		-980734	-953629	128797	-2217267	-1890257	-455216	-341362	1698320	332680	-834437	-1437695	-427796	-7378596
Bill/pump ratio		-0.1603	-0.17327	0.02047	-0.34505	-0.524	-0.104	-0.0414	0.20128	0.04631	-0.13095	-0.22548	-0.0757	-1.512143

2004

WATER USE DATA (CF) - 2004
SUMAS POPULATION - 1079

Class	Count	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
In-city retail														
Residential	331	288027	241301	260375	261998	303657	318474	484131	708341	301716	266936	247128	249810	3931894
Comm/Gov/Ind	81	3588252	3175965	3376279	3607360	3552954	2448911	2559368	4821017	2987073	4076958	3202725	3344765	40741627
Subtotal	412	3876279	3417266	3636654	3869358	3856611	2767385	3043499	5529358	3288789	4343894	3449853	3594575	44673521
Wholesale														
Nooksack	302008	237217	285713	279715	286992	380654	463507	477827	255664	236027	218860	298219	3722403	3722403
NWNA	1745548	1689713	1604330	1767175	1834387	1980131	2521890	2291092	1817687	1891256	1845200	1705956	22694365	22694365
SRWA	1535197	1391909	1563956	1433171	1573298	1708101	1999838	1930710	1493096	1909227	1284903	1308000	19131406	19131406
Subtotal	3582753	3318839	3453999	3480061	3694677	4068886	4985235	4699629	3566447	4036510	3348963	3312175	45548174	45548174
Total billed	7459032	6736105	7090653	7349419	7551288	6836271	8028734	10228987	6856236	8380404	6798816	6906750	90221695	90221695
Source Meters														
May Rd #3	3056056	2981390	3156248	3431300	1367847	2264322	2298716	3126403	3065374	3237847	3044104	3198811	34228418	34228418
S06	2089600	1785200	1943600	2048500	2241200	1342700	2892200	2785600	2152200	2161000	2169800	2108500	25720100	25720100
S04	865441	728275	785360	792914	2360855	1605173	1367165	1629879	1181390	1192647	627834	559344	13696277	13696277
S05	690962	582486	644425	694411	1393950	1202794	1489572	1195788	538315	0	440481	550641	9423825	9423825
S09	543863	739171	555962	632754	660721	661149	628703	544451	623021	846497	811363	849491	8097146	8097146
Total pumped	7245922	6816522	7085595	7599879	8024573	7076138	8676356	9282121	7560300	7437991	7093582	7266787	91165766	91165766
Unaccounted for	-213110	80417	-5058	250460	473285	239867	647622	-946866	705064	-942413	294766	360037	944071	944071
Bill/pump ratio	-2.94%	1.18%	-0.07%	3.30%	5.90%	3.39%	7.46%	-10.20%	9.33%	-12.67%	4.16%	4.95%	1.04%	1.04%

2005

WATER USE DATA (CF) - 2005
SUMAS POPULATION - 1112

Class	Count	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
In-city retail														
Residential	355	278200	287569	258165	259486	297657	330991	370095	504696	325840	263450	240023	249359	3665531
Comm/Gov/Ind	99	2508318	3397544	3584225	3208758	3671891	257261	2920618	277590	3937198	3397239	3040902	3444612	33646156
Subtotal	454	2786518	3685113	3842390	3468244	3669548	588252	3290713	782286	4263038	3660689	3280925	3693971	37311687
Wholesale														
Nooksack		289762	244592	251078	245862	309903	293214	368974	477693	292758	254001	246068	243237	3517142
NWA		1864006	1756278	1844952	1840048	2027257	2059425	2212166	2684997	1814342	1852529	1753572	1913783	23623355
SRWA		1621609	1283162	1380050	1262599	1421990	1345208	1492919	1767082	1247610	1312848	1261200	1288507	16684784
Subtotal		3775377	3284032	3476080	3348509	3759150	3697847	4074059	4929772	3354710	3419378	3260840	3445627	43825281
Total billed		6561895	6969145	7318470	6816753	7728698	4286099	7364772	5712058	7617748	7080067	6541765	7139498	81136968
Source Meters														
May Rd #3		3091711	4285294	4526470	4023930	4666684	1734224	3451604	4823796	4858288	4299732	3775267	12911363	56438363
S06		622306	642450	664925	687388	711809	735282	761874	791165	814823	836823	857853	879085	9005783
S04		633743	611163	1080601	990026	1039906	861390	1244318	1422700	1097058	1041016	1018663	976590	12017174
S05		635508	569104	969358	929652	1016377	784451	1233933	1357125	986042	935949	915828	874799	11214126
S09		858342	748048	543409	508943	622794	758181	638088	675601	643422	579826	488074	521991	7586719
Total pumped		5841610	6856059	7784763	7139939	8047570	4873528	7335817	9070387	8399633	7693346	7055685	16163828	96262165
Unaccounted for		-720285	-113086	466293	323186	318872	587429	-28955	3358329	781885	613279	513920	9024330	15125197
Bill/pump ratio		-0.1233	-0.01649	0.0599	0.04526	0.03962	0.12053	-0.0039	0.37025	0.09309	0.07972	0.07284	0.558304	1.295772

2006

WATER USE DATA (CF) - 2006
SUMAS POPULATION - 1125

Class	Count	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
In-city retail														
Residential	379	251412	263312	250641	252584	320876	295458	540759	606475	439729	309194	304641	295705	4130786
Comm/Gov/Ind	91	3002949	1907000	292276	270821	318576	332557	686677	4856596	2611132	3917365	2890908	3068353	24155210
Subtotal	470	3254361	2170312	542917	523405	639452	628015	1227436	5463071	3050861	4226559	3195549	3364058	28285996
Wholesale														
Hookack		281029	231747	267852	280509	318932	331592	500835	437982	292535	311155	263344	271571	3789083
NVWA		1551631	1687453	1876498	1615031	1936168	1956108	2454775	2481348	1765925	2012285	1794216	2126169	23257607
SRWA		1233767	1207460	1479857	1252659	1605959	1433577	1798736	1775437	1584909	1513221	1324944	1414751	17625277
Subtotal		3066427	3126660	3624207	3148199	3861059	3721277	4754346	4694767	3643369	3836661	3382504	3812491	44671967
Total billed		6320788	5296972	4167124	3671604	4500511	4349292	5981782	1E+07	6694230	8063220	6578053	7176549	72957963
Source Meters														
May Rd #3		2512547	293787					831818	2994373	2833787	2764128	2303215	2652915	17186570
S06		2156600	1914500	2157600	2160700	2299500	2378300	2719500	2914400	2373700	2350300	2111400	2460000	26082000
S04		1000735	658034	668676	585641	702486	840347	1650949	1142179	1338275	1177620	1185334	1070294	12020570
S05		896216	585775	593422	518516	622967	775641	1159705	1785227	1160360	1011069	922941	941778	10973617
S09		446229	688449	920245	893814	918869	845762	496621	653106	664754	685177	367043	483978	8064047
Total pumped		7012327	2226045	4339943	4158671	4543822	4840050	6858593	9489285	8370876	7988294	6889933	7608965	74326804
Unaccounted for		691539	-3070927	172819	487067	43311	490758	876811	-668553	1676646	-74926	311880	432416	1368841
Bill/pump ratio		0.09862	-1.37954	0.03982	0.11712	0.00953	0.1014	0.12784	-0.07045	0.2003	-0.00938	0.04527	0.05683	-0.66266

2007

**WATER USE DATA (CF) - 2007
SUMAS POPULATION - 1191**

Class	Count	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
In-city retail														
Residential	397	324656	253565	250324	258218	318906	354308	459027	470474	366053	311046	256867	301865	3925309
Comm/Gov/Ind	91	3501133	3221652	2509420	311530	331249	391817	455194	420277	378236	270147	200264	213180	12204099
Subtotal	488	3825789	3475217	2759744	569748	650155	746125	914221	890751	744289	581193	457131	515045	16129408
Wholesale														
Nooksack		332473	276209	290511	309030	360268	344330	486407	465627	425408	276697	245447	241206	4053613
NWNA		2001657	1495711	1817109	1783920	1965136	1999360	2155503	2400773	1853492	1859823	1880373	1856074	23068931
SRWA		1322349	1043800	1282451	1157456	1189016	1250272	1478590	1670650	1274868	1200651	1189240	1159736	15219079
Subtotal		3656479	2815720	3390071	3250406	3574420	3593962	4120500	4537050	3553768	3337171	3315060	3257016	42341623
Total billed		7482268	6290937	6149815	3820154	4164575	4340087	5034721	5427801	4298057	3918364	3772191	3772061	58471031
Source Meters														
May Rd #3		940213	131469	294728	382075									1748485
S06		2379000	2029500	2217100	2271300	2467800	2424700	2512900	2912900	2399100	2346400	2170700	2295300	28426700
S04		1111016	1001671	865066	618114	485721	626711	996590	1024010	495307	737419	697580	676965	9336170
S05		906229	818355	713208	514425	860120	819050	1193930	904157	1100374	0	23810	661604	8515262
S09		580427	398475	653796	771243	796443	769197	780387	706176	688689	678074	610307	591430	8024644
Total pumped		5916885	4379470	4743898	4557157	4610084	4639658	5483807	5547243	4683470	3761893	3502397	4225299	56051261
Unaccounted for		-1565383	-1911467	-1405917	737003	445509	299571	449086	119442	385413	-156471	-269794	453238	-2419770
Bill/pump ratio		-0.26456	-0.43646	-0.29636	0.16172	0.09664	0.06457	0.08189	0.02153	0.08229	-0.04159	-0.077	0.10727	-0.500097

2008

WATER USE DATA (CF) - 2008
SUMAS POPULATION - 1264

Class	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
In-city retail													
Residential	309380	297674	309935	255112	297458	293124	575635	458831	363848	292245	245224	273313	3971779
Comm/Gov/Ind	240776	226115	204072	165783	203277	457263	561471	697813	3468212	2930909	678994	281258	10115943
Subtotal	550156	523789	514007	420896	500735	750387	1137106	1156644	3632060	3223154	924218	554571	14087722
Wholesale													
Nooksack	285195	249280	265365	269051	294452	360241	525182	370521	320076	300545	292956	318141	3851005
NWNA	2041484	1804830	1809455	1951719	2120328	2005749	2395754	2088239	1948394	1981535	1740964	2158809	24047260
SRWA	1160298	964117	1023952	1064561	1178884	1199744	1552252	1405006	1289850	1163670	757022	1145751	13905107
Subtotal	3486977	3018227	3098772	3285331	3593664	3565734	4473188	3863766	3558320	3445750	2790942	3622701	41803372
Total billed	4037133	3542016	3612779	3706226	4094399	4316121	5610294	5020410	7390380	6668904	3715160	4177272	55891094
Source Meters													
May Rd #3													
SO6	2486000	2167900	2331200	2261800	2431500	2498600	2267800	2455600	2385400	2327400	2336100	2482300	6658634
SO4	755668	686324	586537	700027	171765	540628	948850	754158	1103663	944345	815307	854452	28431600
SO5	700281	634479	540120	645495	1331337	936818	1633957	1412620	1183048	1013770	880188	916443	8861724
SO9	597687	553168	595858	566550	502286	490441	572954	527459	400534	211671	44491	100	11828556
Total pumped	4539636	4041871	4053715	4173872	4436888	4466487	5423561	5894101	7904971	6121704	4236460	5550447	5063199
Unaccounted for	502503	499855	440936	467646	342489	150366	-186733	873691	514591	-547200	521300	1373175	4952619
Bill/pump ratio	11.07%	12.37%	10.88%	11.20%	7.72%	3.37%	-3.44%	14.82%	6.51%	-8.94%	12.31%	24.74%	8.14%

2009

WATER USE DATA (CF) - 2009
SUMAS POPULATION - 1327

Class	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
In-city retail													
Residential	359162	266498	282711	296703	307302	504143	455718	492480	385591	71922	275212	168792	3866234
Comm/Gov/Ind	1211626	2561491	2337353	451651	488402	562792	2669570	3821308	320204	253552	1545106	1949381	18182436
Subtotal	1570788	2827989	2620064	748354	805704	1066935	3125288	4313788	705795	325474	1820318	2118173	22048670
Wholesale													
Nooksack	286223	294870	282504	284277	304765	484310	515173	336319	286167	224450	269751	287957	3856766
NVWA	1886857	1791370	2303636	1571753	1591515	1946720	2257947	2214381	1605493	1685590	1541649	1563513	21960424
SRIWA	1109314	951829	1099157	1092462	1092149	1437709	1604594	1681364	1237512	1239132	1153759	1114419	14813400
Subtotal	3282394	3038069	3685297	2948492	2988429	3868739	4377714	4232064	3129172	3149172	2965159	2965889	40630590
Total billed	4853182	5866058	6305361	3696846	3794133	4935674	7503002	8545862	3834967	3474646	4785477	5084062	62679260
Source Meters													
May Rd #3	663418	1822986	0	2579187	197762	356320	3287473	3377206	2832706	0	0	1061949	7271861
SO6	2394493	2268169	2620569	2055160	2180613	2441973	2157962	2627103	2201958	2072584	1943647	1995483	26959714
SO4	1013363	583463	755508	603570	668957	1015775	867086	919639	790714	836652	822005	654078	9531110
SO5	1179051	811243	867647	693676	765738	1283302	1275107	1517580	1026791	802206	746083	911016	11880440
SO9	94960	403801	450410	444312	453686	440391	572814	527459	400534	247856	417740	393782	4852745
Total pumped	5345585	5889662	4694134	6375905	4272756	5537761	8160442	8968987	7252703	3959298	3929475	5016308	60495870
Unaccounted for	492403	23604	-2E+06	2679059	478623	602087	657440	423135	3417736	484652	-856002	-67754	-2183390
Bill/pump ratio	9.21%	0.40%	-34.32%	42.02%	11.20%	10.87%	8.06%	4.72%	47.12%	12.24%	-21.78%	-1.35%	-3.61%

2.2 Future Conditions

Projected Population

Sumas adopted an update of its comprehensive land-use plan (CP) in November 2004. The CP contains a population projection that was developed in coordination with other jurisdictions in Whatcom County. The overall county population projection used for joint planning is within the range of projections provided by OFM and is therefore consistent with the Washington State Growth Management Act.

Based on the 2004 CP, Sumas expects an annual average growth rate of 2.45 percent (page 2-6 of the CP). The table below shows the resulting populations expected at various points in the future. This table is identical to Table 2-1 in the recently adopted Sumas CP.

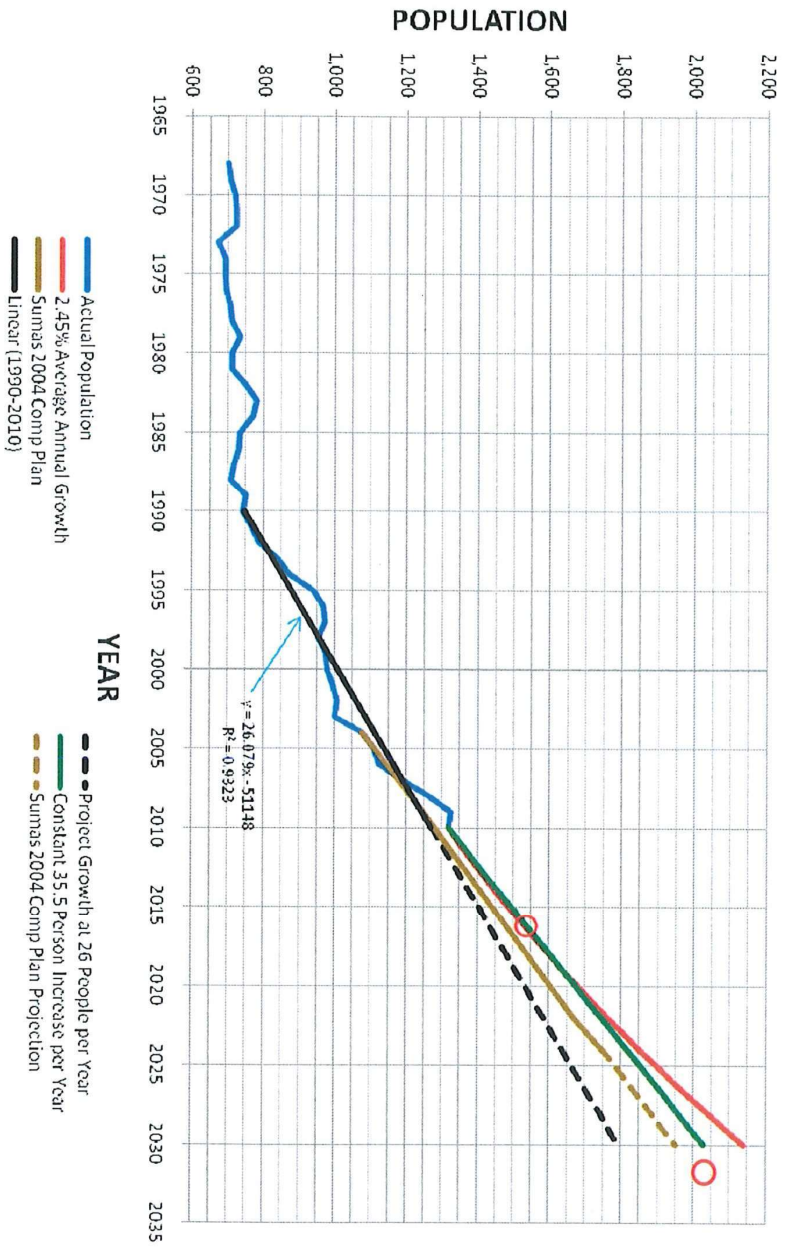
Milestone year	Projected population	Number of newcomers
2004. Baseline	1,079	-
2010. Six-year capital planning horizon.	1,248	169
2022. ECONorthwest report horizon.	1,669	590
2024. Planning period.	1,750	671

Figure 5, *Sumas Population: Actual and Projected*, provides a summary of additional information regarding Sumas population. Prior to 1990, Sumas had a nominal increase in population. During the 20 year period between 1990 and 2010 the population grew at approximately 26 people per year. Figure 5 shows Sumas' historic population as well as the projected population based on increasing at a rate of 26 people per year, and the 2004 CP information.

Population projection based on the Sumas' current population with a 2.45% annual average growth rate is also provided in Figure 5. Based on Whatcom County growth projection information, the population of Sumas is estimated to grow at a constant rate of approximately 35.5 people per year. This population project is slightly more conservative than the 2004 CP project and will be used for estimating peak hourly demand and water usage in this Water System Comprehensive Plan.

Based on a constant population growth rate of 35.5 people per year, the estimated Sumas population is 1,530 people in 2016 and 2,030 people in 2030. Based upon a CP ratio of 2.5 people per household there will be an estimated 612 homes in 2016 and 812 homes in 2030.

Figure 5: Sumas Population: Actual and Projected



Projected Land Use

Map 5A, *Residential Infill Potential*, and Map 5B, *Industrial Infill Potential*, in the 2004 CP show the future land-use scenario develop areas. The pattern of the projected use is similar to the pattern of the existing use: industrial development is expected west of the Cherry Street north-south rail line, commercial development is expected along the Cherry Street corridor, and residential development is expected at the east of town and within the Moe's Hill panhandle at the northwest edge of town.

The growth areas identified in these maps were used to locate potential residential housing and industrial users in the 2016 and 2030 condition. For the six-year and 20-year horizons, 116 and 316 new housing units are projected, respectively. Figure 6, *Six Year Projected Growth Area, 2016* and Figure 7, *20 Year Projected Growth Area, 2030*, identify the assumed location of future growth areas

Projected Non-Residential Water Needs

Consistent with the 2004 CP, Sumas seeks additional industrial growth at the west end of town, as well as revitalization of the Cherry Street commercial area. Projecting non-residential water needs is very difficult because of the wide variety of industries that might locate in Sumas. The existing industries are examples of this variety. At one extreme, the Puget Sound Energy co-generation plant used approximately 345,000 gpd in 2009 for cooling tower makeup. The original developers of the co-generation plant were attracted to Sumas by the availability of water and by the presence of a major natural-gas pipeline that crosses the border just east of town. At the other extreme, the Desticon truck-rail reload facility uses virtually no water. Desticon came to town because of the many highways and rail lines that converge at Sumas. Another industrial user, IKO Pacific, used an average of 16,000 gpd in 2009 for cooling its manufactured asphalt shingles. Also complicating the picture are Sumas's three wholesale customers, the SRWA, the NVWA, and the City of Nooksack. The two rural associations consume approximately 75% of the potable water withdrawn at the Sumas wellfield, with the bulk of that water used to support dairy operations. Predicting the fate of the dairy industry within Whatcom County is no easy task.

Non-residential demand is discussed in the following four categories:

- *Wholesale customers.*

- * SRWA

The current water agreement between the City of Sumas and Sumas Rural Water Association (SRWA) was signed on December 22, 2008. In this agreement Sumas agrees to provide SRWA a maximum annual volume of water equal to 470 acre feet and a maximum instantaneous flow of 500 gallons per minute. The City anticipates that this agreement may change over time and that as SRWA grows, they will request more water. Both the SRWA's water system plan and their historical water usage were evaluated in order for the City to plan for future water allocations in both the city and in SRWA.

In their technical memorandums, *Sumas Rural Water Association Water System Analysis and Methodology*, January 2009 and *System Future Demand Estimates for Use in Water Sale*

Figure 6, *Six Year Projected Growth Area, 2016*

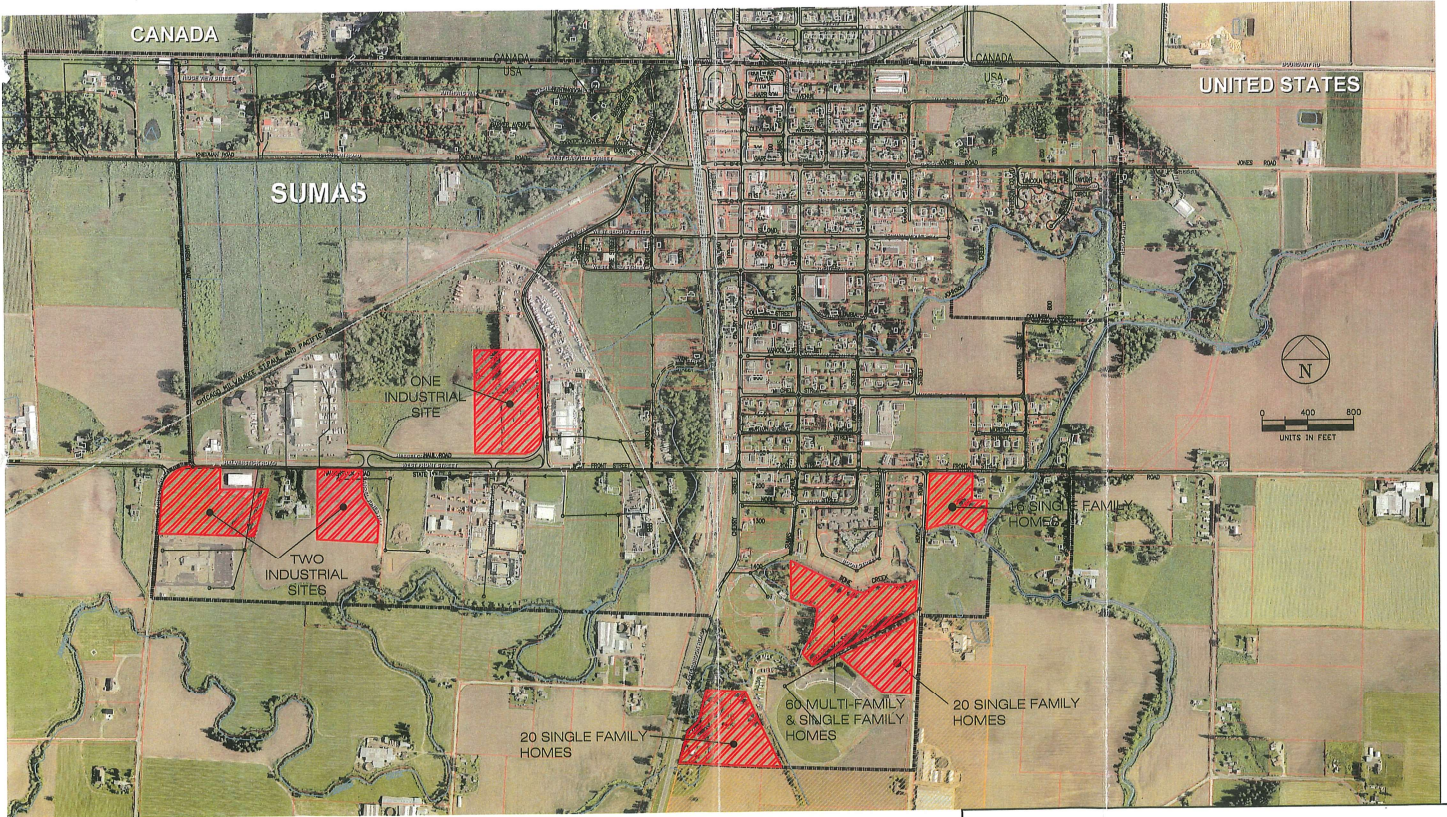


FIGURE 6



CASCADE
ENGINEERING GROUP, P.S., INC.
119 Grand Avenue, Suite D
Bellingham, Washington 98225 (360) 308-8181

Date: 1/13/2011
Scale: 1" = 400'

CITY OF SUMAS
PUBLIC WORKS DEPARTMENT
SIX YEAR PROJECTED GROWTH AREA
2016

433 CHERRY STREET SUMAS, WA 98295 (360) 988-5714, FAX (360) 988-8855

3/7/2011 4:58:17 PM \\sumas\work\sumas\projects\2011\016 SITE DEV\SUMAS0101.DWG

Figure 7, 20 Year Projected Growth Area, 2030

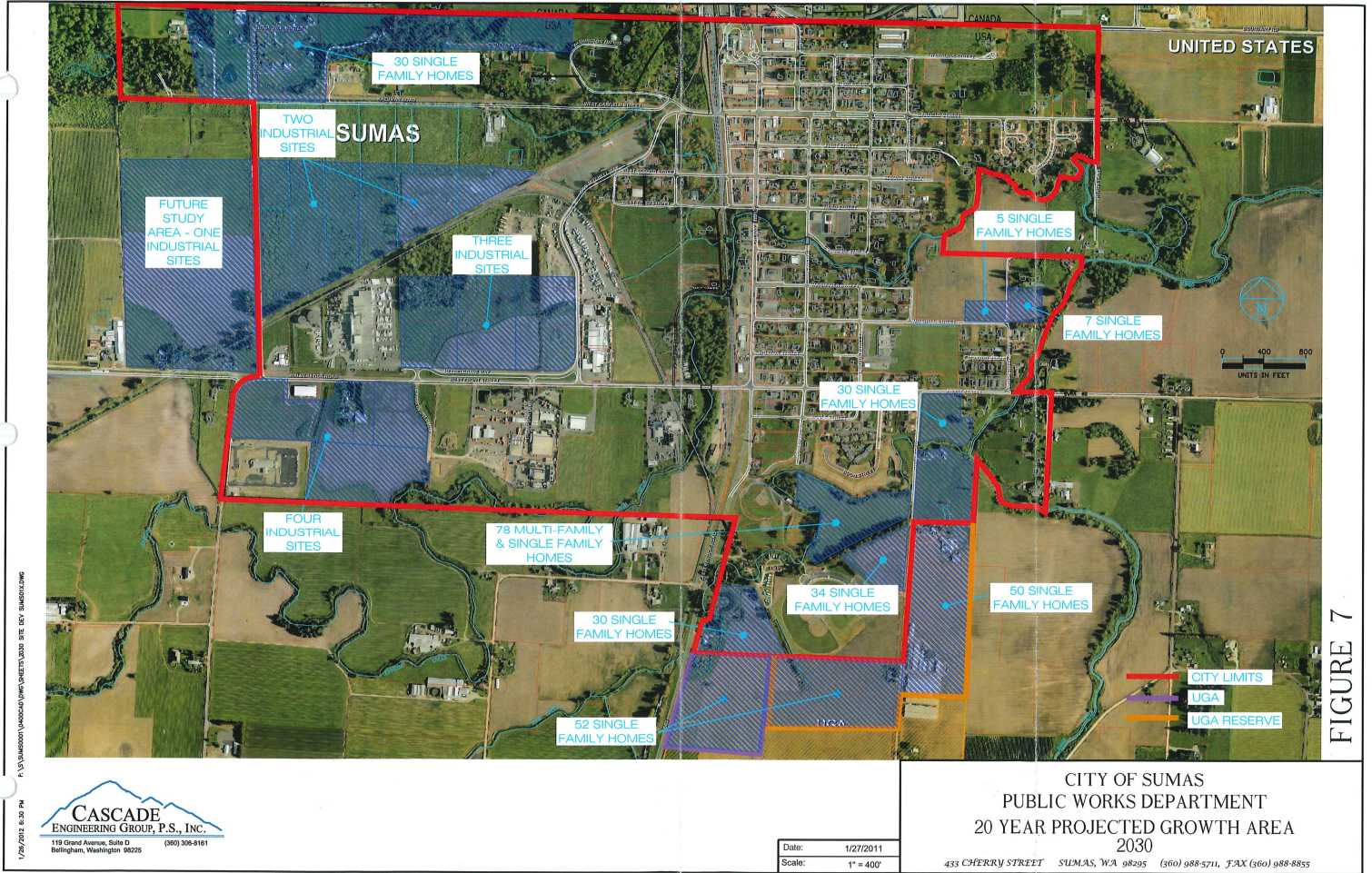


FIGURE 7

CASCADE
 ENGINEERING GROUP, P.S., INC.
 119 Grand Avenue, Suite D
 Bellingham, Washington 98225 (360) 308-8161

Agreement with the City of Sumas, dated January 15, 2009, both by David Evans and Associates, Inc., SRWA identifies their suggested annual water supply and peak hourly demand between 2008 and 2028.

Instantaneous Usage

The SRWA expects the consumption of the large users (dairies) to remain constant and the number of residences to increase at a rate of 2.6 percent annually over the next 20 years. Although the current agreement with SRWA is for the City to supply a maximum instantaneous flow of 500 gpm, the estimated Peak Hourly Demand of the SRWA system varies from 1,000 gpm in 2008 to 1,100 gpm in 2030. The City system is capable of delivering these peak hourly demand rates (1,000 gpm and 1,100 gpm) at the SRWA interties in 2016 and 2030. However, based on the City's existing water rights and water allocations to all its wholesale customers, the City cannot supply this peak hourly demand from the wellfield. The City can supply up to 700 gpm to the SRWA with the difference between the demand and supply being made up by the equalizing storage component of the SRWA 500,000 gallon storage tank. See Table 2-1: *Water Usage and Water Rights*, for additional information.

Annual Usage

The requested annual supply, as presented in these memorandums, is for for 500 acre-ft per year in 2008 and 800 acre-ft per year in 2028. A review of the SRWA historic usage (see Figure 8) shows that over the last five years their peak consumption was 400 acre-feet per year in 2006 and their consumption declined by 48 acre-ft to 352 acre-ft in 2009. (This decrease is believed to be caused by large users that have installed their own private wells.) The large dairy farmers are the main users in this system and their consumption is assumed to remain relatively constant over the next 20 years. Based on their historical usage and anticipated future growth, the City is planning to increase SRWA's annual water allocation from 470 acre-ft per year to 500 acre-ft per year for 2016 and rising to 600 acre-ft per year by 2030. See Table 2-1: *Water Usage and Water Rights*, for additional information.

* NVWA & Nooksack

Since the Nooksack Valley Water Association (NVWA) and Nooksack are supplied by a common system with a common source meter, the two systems will be combined with respect to future allocations. The current water agreement between the City of Sumas and the NVWA and the City of Nooksack was amended on August 28, 2009. In this agreement Sumas agrees to provide the City of Nooksack a maximum annual volume of water equal to 199 acre feet and to provide the NVWA a maximum annual volume of water equal to 569.6 acre feet, for a total of 768.6 acre-feet per year. The maximum instantaneous flow for the two systems is combined at a rate of 971.5 gallons per minute. The City anticipates that this agreement may change over time as both systems grow and that they will request more water. Both water system plans and their historical water usage were evaluated in order for the City to plan for future water allocations in both cities and in NVWA.

The current water plans for these two systems are: *the City of Nooksack Comprehensive Water System Plan*, by Sehome Engineering and Sehome Planning & Development Services, December

19, 2005; and, the *NVWA Water System Analysis*, by Wilson Engineering, February 2005. The following is a summary of their estimates for peak hourly demand and annual usage:

Nooksack (2022 - 20 year horizon):	PHD = 472 gpm	203 acre-ft/year (w/o conservation)
NVWA (full build out – may be greater than 20 years):	PHD = 1,497 gpm	641 acre-ft/year (based on 1,761 ERUs)
TOTAL	PHD = 1,969 gpm	844 acre-ft/year
Current Agreement	971.5 gpm	768.6 acre-ft/year

Instantaneous Usage

As shown above, the peak hourly demand substantially exceeds the current agreement’s maximum instantaneous flow rate. The combined Nooksack and NVWA presently utilizes equalizing storage in their reservoirs to meet this peak demand and it is anticipated that that will continue to do this to meet their future peak demand. Based on Sumas’ limited water right, the maximum flow rate supplied will be capped at 1,000 gpm in 2016 and 2030. See Tables 2-1 and 2-2 for additional information.

Annual Usage

Since Sumas’ annual usage is not as restrictive as the maximum flow rate, the annual usage allocation can continue to increase over time. The estimated annual usage is assumed to be in accordance with past usage and is estimated at 730 acre-ft in 2016 and 1,000 acre-ft in 2030 (see Figure 8 and Tables 2-1 and 2-2).

* PSE Cogen Plant

The cogen plant was purchased by PSE in 2009. Water usage by the plant has been erratic over the past few years and especially difficult to predict the future demand. The current Sumas-PSE user agreement is set at a peak hourly flow of 800 gpm and 969 acre-ft per year, which will be held constant and used for forecasting future demands.

North Whatcom County Water System

The City of Sumas has been approached by the Department of Health for the development of the North Whatcom County Water System in which Sumas will wheel water to the Northwood Park, Northwood, Meadowbrook, and Delta Water Associations. Currently, the details of the water wheeling have not been finalized (whether the water will be physically piped to these associations or if there will be a transfer of water right title). In anticipation of allocating water to these associations, Sumas has reserved a maximum instantaneous flow rate of 500 gpm and a maximum annual volume of 500 acre-feet for this new system. See Tables 2-1 and 2-2 for additional information.

• *General Industry and Commercial*

Given the amount of vacant industrial land and the variety of possible industries, it is not possible to exactly forecast future needs by industry and commercial development. Water requirements for future industrial development is assumed to be similar to the Desticon and IKO

Pacific needs previously discussed. Revitalization of the downtown commercial district will hopefully result in occupancy of the various buildings that are now vacant. These include a grocery store, a tavern, three gas stations, as well as numerous offices.

Based on past historic growth a conservative assumption for future water demand is that one large user will be added every two years to the system. This will result in three large users by 2016 and 10 large users by 2010. Each large user is assumed to require a 10,000 gpd with an associated Peak Hourly Demand of 30 gpm.

Water Demand Forecast

Combining the individual components discussed above, consolidated six-year and 20-year demand forecasts are presented in the figure and tables below. Figure 8 provides a summary of the annual water usage for the Sumas, SRWA, and combined Nooksack and NVWA systems. Projected usage for years 2016 and 2030 have been estimated based on past usage (linear regression), Sumas' assumed growth as outlined above, and Nooksack and NRWA growth with an average annual growth rate of 2.4% (for comparison purposes only). Table 2-1 and Table 2-2 are a summary of information for the existing water usage and estimated future usage. Calculations for estimating Sumas' ERU, PHD, and Average Annual Use can be found in Appendix D.

Water Rates

Existing water rates are as follows:

- *Residential, commercial, industrial.* \$9.00 per month base rate, including first 600 cubic feet (CF). \$0.98 for each 100 CF thereafter.
- *Co-gen1 rate.* \$0.42 per 100 CF basic rate.
- *Wholesale.* \$0.35 per 100 CF.

Figure 8. Annual Water Usage

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Figure 8: Annual Water Usage

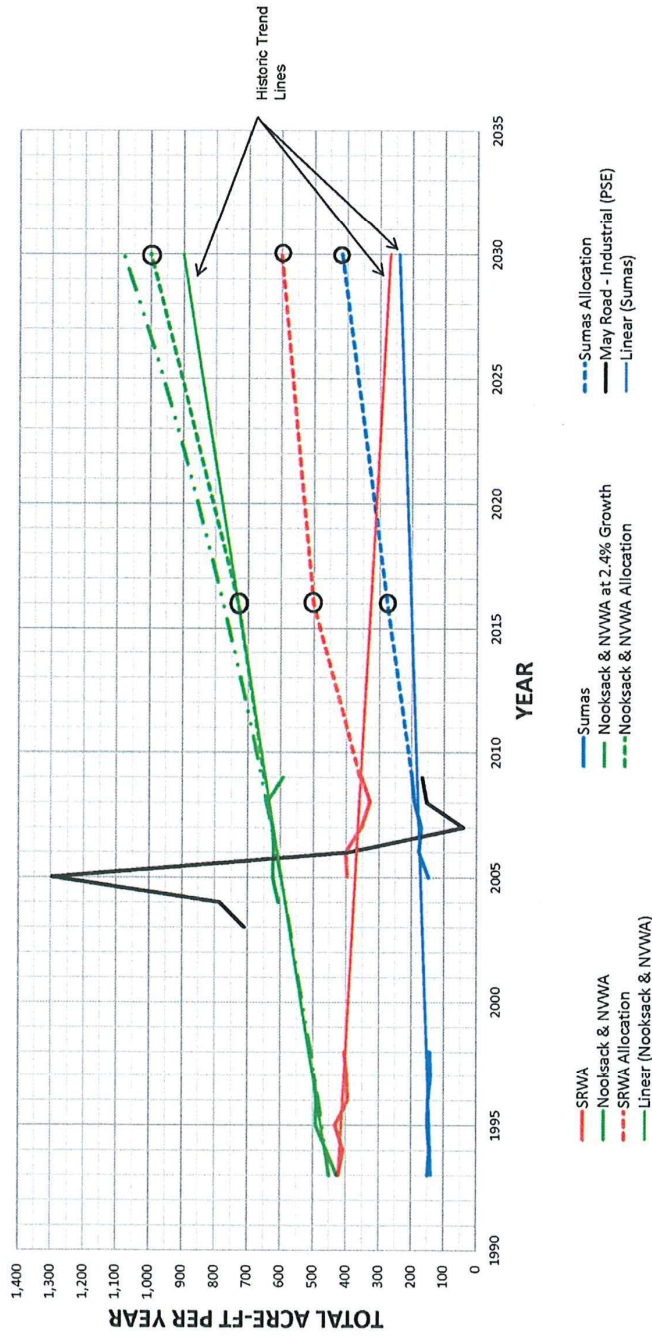


Table 2-1: Water Usage and Water Rights

Table 2-1 Water Usage and Water Rights

Potable Water Demand	GPD per ERU	2009/2010			2016			2030							
		# of Connections	# of ERUs	Annual Usage (Acre-ft)	# of Connections	# of ERUs	PHD (gpm)	Flow Rate Supplied (gpm)	Annual Usage (Acre-ft)	# of Connections	# of ERUs	PHD (gpm)	Flow Rate Supplied (gpm)	Annual Usage (Acre-ft)	
Sumas	282	496	627	499	198										
Resid., small Comm. & Ind. Large Users		475	475			612									
Estimated Future Usage		21	152			24									
						636									
Cogen - PSE User Agreement		1		800	969			800	969				800	969	
SRWA User Agreement				1,000	352			1,000	700	500			1,100	700	600
				500	470										
Nooksack & NVRWA				500	614				1,000	730				1,000	1,000
Nooksack User Agreement					199										
NVRWA User Agreement					569.6										
Combined				971.5	768.6										
North Whatcom County Water Association									500	500			500	500	
TOTAL				2,771	2,406			3,652	2,974				3,700	3,485	
DOE WATER RIGHT				Max. Rate (gpm)	Annual Usage (Acre-ft)			Max. Rate (gpm)	Annual Usage (Acre-ft)				Max. Rate (gpm)	Annual Usage (Acre-ft)	
GI-25171 (Kneuman Rd)				2,250	1,919			2,250	1,919				2,250	1,919	
GI-23698 (May Rd #1)				800	449			800	449				800	449	
GI-26398 (May Rd #2 & #3)				860	1,376			860	1,376				860	1,376	
TOTAL				3,910	3,744			3,910	3,744				3,910	3,744	
Available				1,140	1,338			258	770				210	259	

Table 2-2: Peak Hourly Demand and Maximum Flow Rate

Potable Water Demand	Existing Water Right (gpm)	Existing Pump Capacity (gpm)	Existing Well Capacity (gpm)	2010 Flow Rate Supplied (gpm)	2016 Flow Rate Supplied (gpm)	2030 Flow Rate Supplied (gpm)
Municipal						
G1-25171 (Knueman Rd)	2,250					
G1-23698 (May Rd 1)	800	200	200			
Nooksack & NVWA (Wells 1-3)		500	500	972	1,000	1,000
Sumas (Wells 4R & 5)		810	1,200	499	652	700
SRWA (Wells 4R & 5)		860	1,100	500	700	700
N. Whatcom Cnty. Water Assoc.					500	500
	3,050	2,370	3,000	1,971	2,852	2,900
Cogen Plant						
G1-26398 (May Rd 2 & 3)	860	900	900			
Cogen - PSE				800	800	800
Combined	3,910	3,270	3,900	2,771	3,652	3,700