CHAPTER 3 - FUTURE CONDITIONS

List Tables

List of Figures

A. Demography and Land Use

1. Population Projections

The following information is consistent with the recently completed Airway Heights Comprehensive Sewer Plan (April 2003) and has been coordinated with the forthcoming update to the City's Comprehensive Plan. For the purposes of this wastewater facilities plan, projections of growth are represented in equivalent residential units (ERUs). Developer projections have been provided in this

format, and this approach parallels the City's accounting and fee basis. The projected growth for the Airway Heights area includes developer projections combined with historical growth rates for the area. The industrial and business developments represent the bulk of the expansion of service anticipated within the City's boundaries for the next six years. The estimated development sizes, prorated according to building projections over the expected construction period of the developments, combined with a two percent growth rate in other areas, yielded the future service projections for this report. Projected growth in ERUs and sewage flows is summarized in Tables 3-1 and 3-2, and are shown graphically in Figures 3-1 and 3-2.

This analysis considers that the wastewater treatment facility starts operations in the year 2010; the 20-year point in the service life would then occur in the year 2030.

Existing Population Served

There were approximately 1,591 ERUs (Equivalent Residential Units) being served by the City of Airway Heights sewer collection system at the end of 2000. This number includes the assessments for commercial and industrial users (135 ERUs), the correctional facility (1,054 ERUs), and single and multi-family residences (402 ERUs). This number has been used as the base for future growth within the City outside of the development projects specifically delineated below.

Anticipated Developments

The City consists of two primary development areas – the area north of SR2, consisting of primarily residential, some commercial sites and the correctional facility, and the area south of SR2, consisting of primarily commercial and industrial sites. The majority of growth in the 6-year planning horizon is anticipated to occur in residential, commercial and industrial development. The correctional facility is not expected to expand within the 20-year planning period between 2010 and 2030.

The Sewer Comprehensive Plan estimated that the residential areas north of SR2 are expected to add approximately 1390 ERUs between 2010 and 2030. Approximately 980 ERUs are expected from new development while 410 ERUs will be from the connection of existing residences to the collection system.

The commercial and industrial areas are expected to add approximately 1450 ERUs between 2010 and 2030. Approximately 1100 ERUs will be due to new development while the remaining 340 ERUs will be from the connection of current and anticipated businesses lacking sewer availability to the collection system.

Projections

The projected number of ERUs at the projected start of operations in 2010 is 3,651. The projected number of ERUs at the twenty-year point in the facility service life planning period is 6,286. Please see Table 3-1 for a complete annualized growth analysis.

For comparison purposes, other population projections for Spokane County as a whole indicate a much slower growth trend. For the period of 1995 to 2010, the figures from the Washington State

Office of Fiscal Management indicate an annual growth rate of approximately 0.66%. For the same period, an economic forecast summary dated May 1995, by Washington Water Power indicates an annual growth rate of 1.2% in Spokane County.

From Table 3-1, the annual population growth rate for the Airway Heights area for the period 2003 through 2008 is projected to be 2.2% (compounded annually), and then approximately 1.8% in subsequent years. The annual sewer connection ERU growth rate in this time frame is projected to be approximately 9%, reflecting increases resulting from the Septic Tank Elimination Program (see Table 3-1), and anticipated commercial/industrial growth. The sewer connection ERU growth is projected at approximately 4.5% in subsequent years, due to the anticipated continuation of the Septic Tank Elimination Program. These growth rates are higher than those projected for Spokane County overall. However, the Airway Heights area is expected to continue to experience rapid growth in the coming years.

Table 3-2 and Figure 3-2 illustrate the anticipated growth in wastewater flows. If projections hold, then the City can expect to reach the average daily flows allowed in the Interlocal Agreement sometime in 2006.

Table 3-1. ERU Growth Projections

YEAR	TOTAL ERUs JAN. 1	RES ERUs	PROJ RES. DEVELOP. ERU GROWTH	PROJ ERU GROWTH DUE TO RES. SEPTIC ELIMIN.	COMM/ INDUST. ERUs	COMM/ INDUST. DEVELOP. ERU GROWTH	PROJ. ERU GROWTH DUE TO COMM'L SEPTIC ELIMIN.	INSTITUT. ERUs DOC	TOTAL ANNUAL ERU GROWTH	TOTAL ERUs DEC 31
2000										1,591
2001	1,591	402	50	12	135	26	0	1054	88	1,679
2002	1,679	464	51	12	161	159	6	1054	228	1,907
2003	1,907	527	50	12	326	158	6	1054	226	2,133
2004	2,133	589	51	12	490	158	6	1054	227	2,360
2005	2,360	652	50	15	654	158	6	1054	229	2,589
2006	2,589	717	51	15	818	158	6	1054	230	2,819
2007	2,819	783	50	20	982	158	12	1054	240	3,059
2008	3,059	853	50	25	1,152	95	12	1054	182	3,241
2009	3,241	928	51	45	1,259	95	12	1054	203	3,444
2010	**3,444**	**1,024**	**50**	**50**	**1,366**	**95**	**12**	**1054**	**207**	**3,651**
2011	3,651	1,124	51	50	1,473	95	12	1054	208	3,859
2012	3,859	1,225	50	75	1,580	70	18	1054	213	4,072
2013	4,072	1,350	51	75	1,668	70	18	1054	214	4,286
2014	4,286	1,476	50	75	1,756	70	30	1054	225	4,511
2015	4,511	1,601	51	45	1,856	70	30	1054	196	4,707
2016	4,707	1,697	50	41	1,956	70	30	1054	191	4,898
2017	4,898	1,788	50	0	2,056	50	35	1054	135	5,033
2018	5,033	1,838	51	0	2,141	50	36	1054	137	5,170
2019	5,170	1,889	50	0	2,227	50	35	1054	135	5,305
2020	5,305	1,939	51	0	2,312	50	35	1054	136	5,441
2021	5,441	1,990	50	0	2,397	45	30	1054	125	5,566
2022	5,566	2,040	50	0	2,472	45	20	1054	115	5,681
2023	5,681	2,090	50	0	2,537	35	0	1054	85	5,766
2024	5,766	2,140	45	0	2,572	35	0	1054	80	5,846
2025	5,846	2,185	45	0	2,607	35	0	1054	80	5,926
2026	5,926	2,230	40	0	2,642	35	0	1054	75	6,001
2027	6,001	2,270	40	0	2,677	35	0	1054	75	6,076
2028	6,076	2,310	35	0	2,712	35	0	1054	70	6,146
2029	6,146	2,345	35	0	2,747	35	0	1054	70	6,216
2030	**6,216**	**2,380**	35	**0**	**2,782**	**35**	**0**	**1054**	**70**	**6,286**

Figure 3-1. ERU Growth Projection

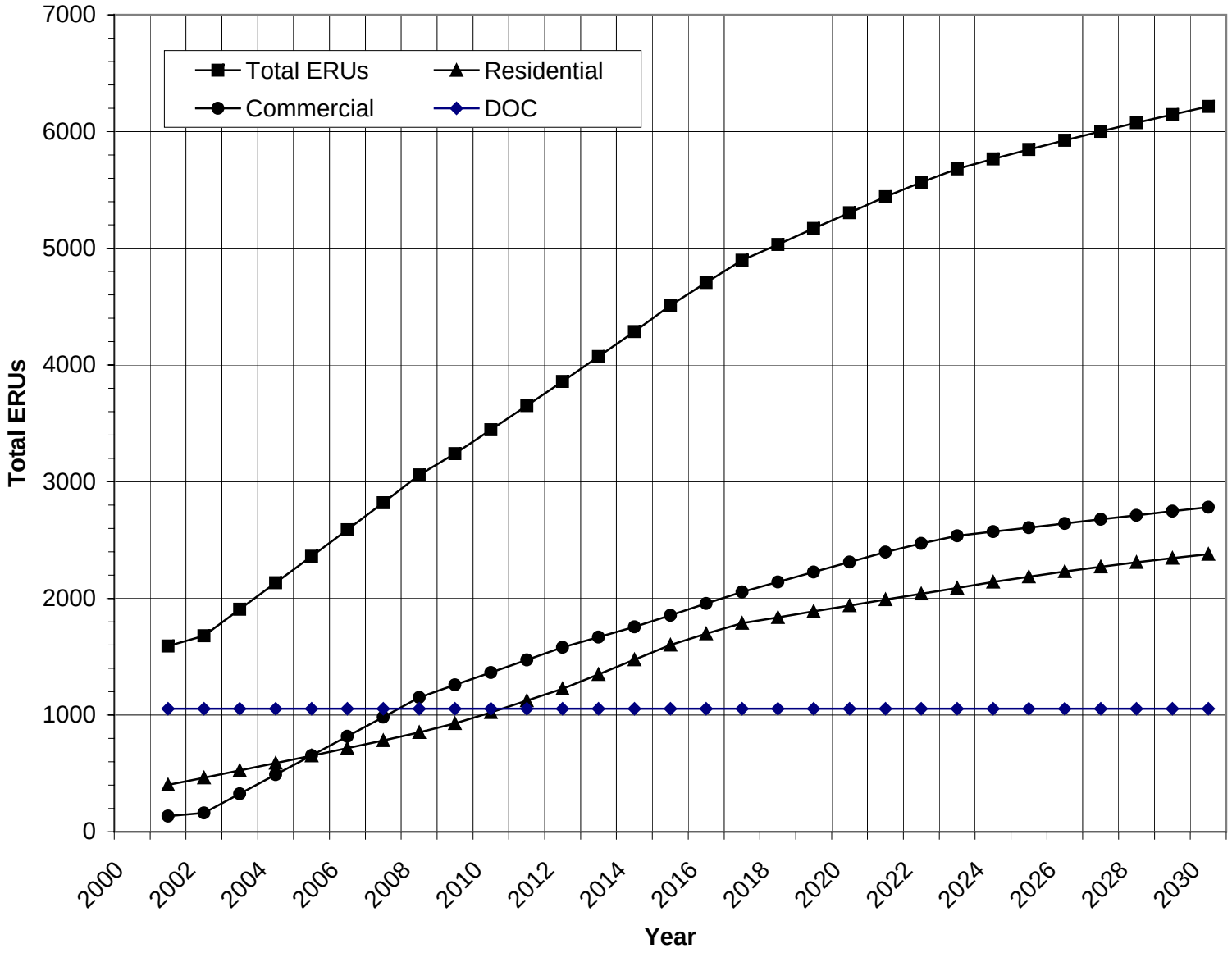
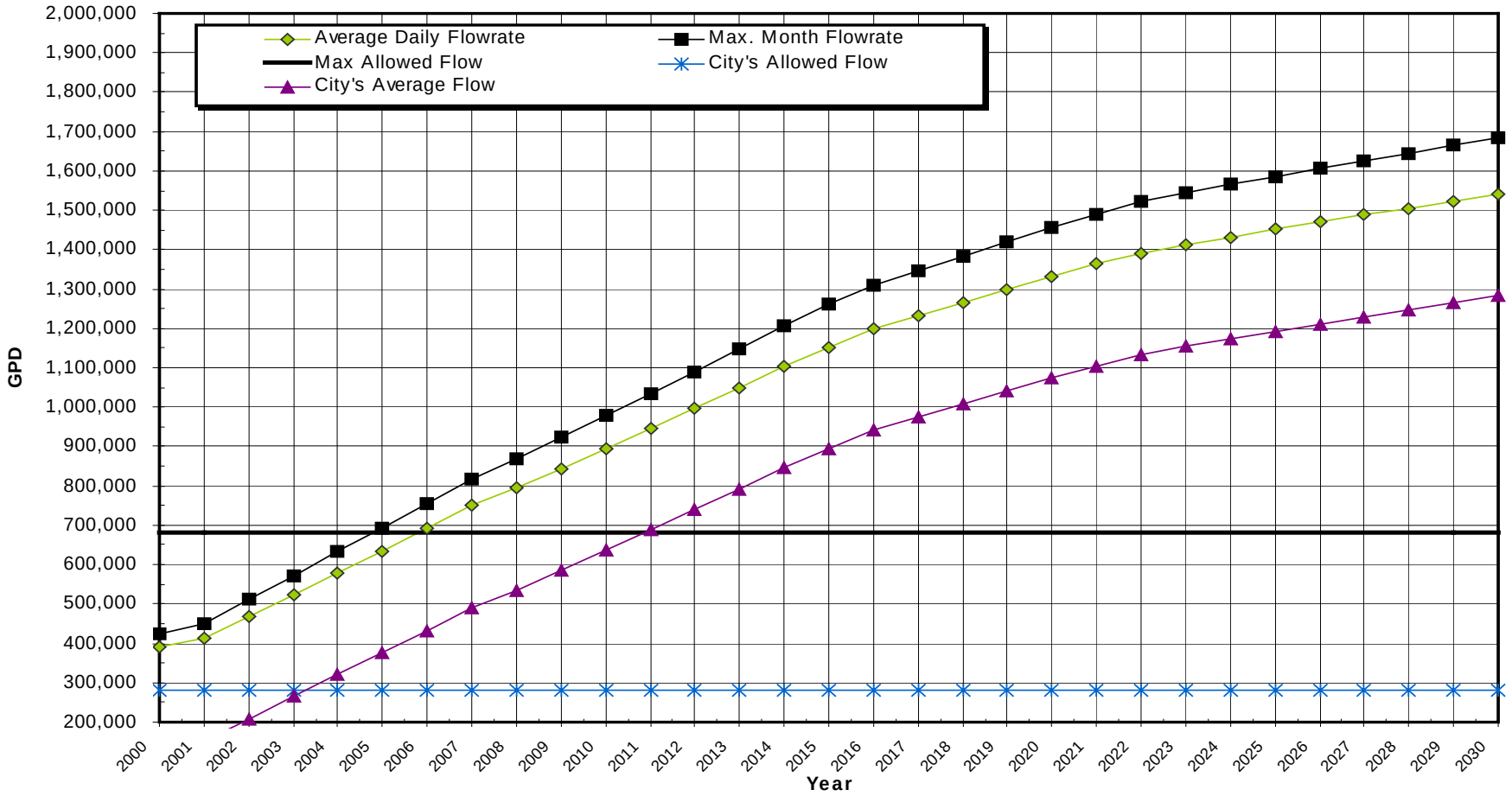


Table 3-2. Wastewater Flow Projections

YEAR	TOTAL EST. POPULATION	TOTAL ERUs	AVERAGE DAILY FLOWRATE (GPD/ERU)	CITY'S AVG. DAY WW FLOW (GPD)	AHCC AVG. DAY EST. WW FLOW (GPD)	TOTAL AVERAGE DAILY FLOW (GPD)	MAX MONTH DAILY FLOWRATE (GPD/ERU)	MAX MONTH FLOW (GPD)
2000	4545	1,591	245	131,707	258,230	389,937	268	425,890
2001	4658	1,679	245	153,125	258,230	411,355	268	449,446
2002	4771	1,907	245	208,985	258,230	467,215	268	510,479
2003	4884	2,133	245	264,355	258,230	522,585	268	570,976
2004	4997	2,360	245	***319,970***	258,230	578,200	268	631,741
2005	5110	2,589	245	376,075	258,230	634,305	268	693,042
2006	5223	2,819	245	432,425	258,230	***690,655***	268	754,610
2007	5336	3,059	245	491,225	258,230	749,455	268	818,855
2008	5449	3,241	245	535,815	258,230	794,045	268	867,574
2009	5562	3,444	245	585,550	258,230	843,780	268	921,914
2010	**5675**	**3,651**	**245**	**636,265**	**258,230**	**894,495**	**268**	**977,325**
2011	5788	3,859	245	687,225	258,230	945,455	268	1,033,004
2012	5901	4,072	245	739,410	258,230	997,640	268	1,090,021
2013	6014	4,286	245	791,840	258,230	1,050,070	268	1,147,306
2014	6127	4,511	245	846,965	258,230	1,105,195	268	1,207,536
2015	6240	4,707	245	894,985	258,230	1,153,215	268	1,260,003
2016	6353	4,898	245	941,780	258,230	1,200,010	268	1,311,131
2017	6466	5,033	245	974,855	258,230	1,233,085	268	1,347,269
2018	6579	5,170	245	1,008,420	258,230	1,266,650	268	1,383,942
2019	6692	5,305	245	1,041,495	258,230	1,299,725	268	1,420,079
2020	6805	5,441	245	1,074,815	258,230	1,333,045	268	1,456,485
2021	6918	5,566	245	1,105,440	258,230	1,363,670	268	1,489,946
2022	7031	5,681	245	1,133,615	258,230	1,391,845	268	1,520,730
2023	7115	5,766	245	1,154,440	258,230	1,412,670	268	1,543,483
2024	7198	5,846	245	1,174,040	258,230	1,432,270	268	1,564,898
2025	7280	5,926	245	1,193,640	258,230	1,451,870	268	1,586,313
2026	7362	6,001	245	1,212,015	258,230	1,470,245	268	1,606,390
2027	7442	6,076	245	1,230,390	258,230	1,488,620	268	1,626,466
2028	7524	6,146	245	1,247,540	258,230	1,505,770	268	1,645,204
2029	7607	6,216	245	1,264,690	258,230	1,522,920	268	1,663,942
2030	**7691**	**6,286**	**245**	**1,281,840**	**258,230**	**1,540,070**	**268**	**1,682,680**

Figure 3-2. Wastewater Flow Projections



Ultimate Densities

The projected ultimate densities for each of the seven drainage basins within the City's future service area (see Figure 3-3) are tabulated in Table 3-3. These ERU densities and basin limits are based on consideration of land uses, topography, and known development plans, as provided in the City's 1995 "Preliminary Design Brief for the South Side Sewer Collection System." Generally, multiplying the area in a given zoning classification by a unit rate of wastewater generation (considered typical for the zoning classification), and dividing that result by the unit rate per ERU led to the ERU densities.

Basins N1, S3, and S5 currently connect to the West Plains Interceptor near Highway 2 and Hayford Road. As the system develops, basin S1 could be expected to contribute at this location. Basin S6 and the easterly portion of basin S5 connect to the West Plains Interceptor at 21st Avenue and Hayford Road. The remainder of basin S5 and all of basin S4 are expected to contribute at this location in the future.

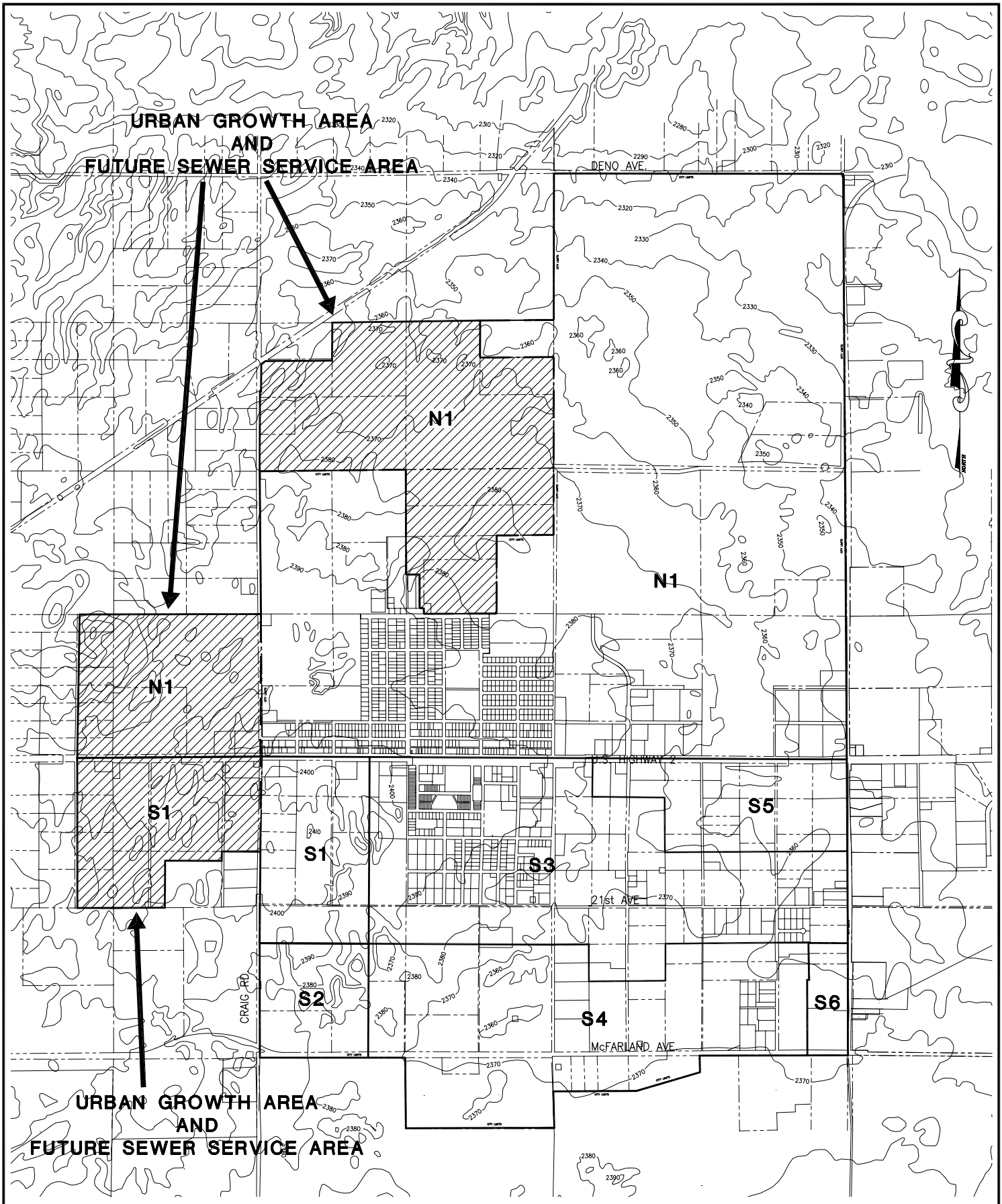
As the City expands into the Urban Growth Areas, Basin N1 would expect to receive flows from the northwesterly UGA, and the portion of the westerly UGA situated north of Highway 2. With the exception of the current Off-Road Vehicle Park, zoning for the northwesterly UGA is anticipated to be for residential development. Basin S1 would expect to receive flows from the portion of the westerly UGA situated south of Highway 2. Due to limitations arising from the approach pattern to Fairchild AFB, zoning for the westerly UGA is anticipated to be for commercial/industrial development.

Note that the total number of ERU's at ultimate density for the Future Service Area is projected to be 25,964 ERUs, compared to the year 2030 projection of 6,286 ERU's in Table 3-1. This indicates that the entire service area will be developed to approximately 24% of ultimate density at the 20-year point in the service life of the wastewater treatment facility.

Table 3-3. Ultimate Density By Drainage Basin

DRAINAGE BASIN NUMBER*	ULTIMATE DENSITY (ESTIMATED ERU'S)**	ULTIMATE DENSITY (with Future UGAs)***
N1	12,078	14,049
S1	602	1212
S2	1,102	1,102
S3	4,187	4,187
S4	3,852	3,852
S5	1,287	1,287
S6	275	275
TOTAL	**23,384**	**25,964**

*Please refer to Sewer Basin Boundary Map, Attachment No. 1
** Current Service Area. Please refer to Appendix F for calculation of ERU Densities in basins S1 through S6
*** Future Service Area. Urban Growth Areas (UGAs) are noted on Figure 3-3



DSGND BY: EP	CHCKD BY: EP	CITY OF AIRWAY HEIGHTS FUTURE SERVICE AREA MAP	CENTURY WEST ENGINEERING CORPORATION 1825 N. Hutchinson Rd. 2nd Floor Spokane, WA 99212 509-838-3810 phone • 509-624-0355 fax
DRWN BY: WLH	SCALE: NTS		
PROJECT NO: 30423.021.01			DATE: 10/14/09 | FIGURE: 3–3

B. Wastewater Flow and Load Projections

1. Wastewater Flow and Loading Projections For The City Of Airway Heights

The projected flow and loadings for the City of Airway Heights, including the Airway Heights Corrections Center, and the design criteria for a potential new Wastewater Treatment and Reclamation Facility (WWT&RF) to serve the City of Airway Heights, are shown in Table 3-4, Wastewater Flow and Loading Projections For the City of Airway Heights. The projections are provided in ten-year increments from the year 2000 through the year 2030, including projections for the year 2010, the estimated facility operation start-up date, and for the year 2030, the year the facility would be expected to reach its 20-year design capacity.

The flow and load projections do not include Fairchild Air Force Base (FAFB), Spokane County areas outside of the Airway Heights Urban Growth Area, or other areas currently served by the City of Spokane. The projected criteria also assume no growth at the Airway Heights Corrections Center beyond its current capacity of 1,054 ERU. Some discretion was used in assigning wastewater strength for the projections, as the analytical results summarized in Table 2-4 appeared to be unrepresentative in a few instances and due to the lack of historical data for specific parameters (i.e., diurnal flow, ammonia-nitrogen, Total Kjeldahl Nitrogen (TKN), nitrate-nitrogen, and nitrite-nitrogen).

As seen from Table 3-4, a proposed WWT&RF that could treat the City's projected flow and loadings through the year 2030 would be approximately 50 percent larger than the current Medical Lake WWT&RF and would be approximately the same size as the current City of Cheney Wastewater Treatment and Reclamation Plant. (The current annual average design flow of the Medical Lake WWT&RF is 1.0 MGD, and the current annual average design flow of the City of Cheney Wastewater Treatment and Reclamation Plant is 1.5 MGD.)

2. Wastewater Flow and Loading Projections For The City Of Airway Heights And Fairchild Air Force Base

The projected flow and loadings for FAFB only, and a combination of the City of Airway Heights and FAFB are shown in Table 3-5, Wastewater Flow and Loading Projections For the City of Airway Heights and FAFB. The projections provided in the table for the combination of the City of Airway Heights and FAFB wastewater flows and loadings are the sum of the values in Table 3-4 for the City of Airway Heights only and the values in Table 3-5 for FAFB only. As in Table 3-4, the projections in Table III-5 are also provided in ten-year increments from the year 2000 through the year 2030. The projections for the year 2030 would be the design criteria for a potential new WWT&RF to serve the City of Airway Heights and FAFB. However, the projections do not include Spokane County areas outside of the Airway Heights Urban Growth Area, or other areas currently served by the City of Spokane. The projected criteria also assume no growth at the Airway Heights Corrections Center beyond its current capacity of 1,054 ERU and no growth at FAFB beyond its current capacity of 4,082 ERUs.

Table 3-4. Wastewater Flow and Loading Projections For The City of Airway Heights					
		Year			
Parameter	**Factor**	**2000**	**2010**	**2020**	**2030**
ERU Projection[1]		1591	3651	5441	6286
Annual Average Flow, MGD[2]	1.00	0.390	0.894	1.33	1.54
Maximum Month Average Flow, MGD[2]	1.09	0.426	0.977	1.46	1.68
Maximum Day Average Flow, MGD[3]	1.20	0.468	1.07	1.60	1.85
Peak Flow, MGD[4]	2.50	0.975	2.24	3.33	3.85
Annual Average BOD, ppd (270 mg/l)[5,6]	270	878	2,014	3,002	3,468
Maximum Month BOD, ppd (380 mg/l)[5,7]	380	1,236	2,835	4,225	4,881
Maximum Day BOD, PPD[5,8]	1.3	1,607	3,685	5,492	6,345
Annual Average TSS, PPD (250 mg/l)[6,9]	250	813	1,865	2,779	3,211
Maximum Month TSS, PPD (350 mg/l)[7,9]	350	1,138	2,611	3,891	4,495
Maximum Day TSS, PPD[8,9]	1.3	1,480	3,394	5,059	5,844
Annual Average TKN, PPD (44 mg/l)[10,11]	44	143	328	489	565
Maximum Month TKN, PPD (50 mg/l)[10,11]	50	163	373	556	642
Maximum Day TKN, PPD[8,10]	1.3	211	485	723	835
Annual Average NH_3-N, PPD (60% TKN)[12,13]	0.6	86	197	294	339
Maximum Month NH_3-N, PPD (60% TKN)[12,13]	0.6	98	224	334	385
Maximum Day NH_3-N, PPD[12,13]	0.6	127	291	434	501
Annual Average TP, PPD (6.6 mg/l)[6,14]	6.6	21	49	73	85
Maximum Month TP, PPD (8.1 mg/l)[7,14]	8.1	26	60	90	104
Maximum Day TP, PPD[8,14]	1.3	34	79	117	135

1 The ERU Projection assumes that the number of Airway Heights Corrections Center ERUs remains constant at 1,054 through year 2030.

2 Annual Average Flow (AAF) and Maximum Month Average Flow (MMAF) for the various years are based on Table III-2 Wastewater Flow Projections and the City of Airway Heights Comprehensive Sewer Plan (Century West Engineering Corporation, 2003).

3 The peaking factor for the Maximum Day Average Flow (MDAF) is based on the ratio of the MDAF to the AAF for City of Airway Heights daily flow measurements for years 2002 and 2003.

4 Because diurnal flow measurement data is unavailable for the preparation of this Facilities Plan, the (hourly) peaking factor is estimated to be 2.5 times the AAF based on the Washington State Department of Ecology Publication No. 98-37, Criteria for Sewage Works Design, December 1998, and Recommended Standards for Wastewater Facilities (10 States Standards), 1990 Edition.

5 BOD = 5-Day Biochemical Oxygen Demand.

6 The annual average loading is calculated from the AAF and the arithmetic mean of the analytical data summarized in Table 2-4.

7 The maximum month average loading is calculated from the AAF and the arithmetic mean plus one standard deviation of the analytical data summarized in Table 2-4.

8 The maximum day average loading is assumed to be 30 percent greater than the maximum month average loading. The peaking factor is therefore multiplied by the maximum month average loading to determine the maximum day average loading.

9 TSS = Total Suspended Solids.

10 TKN = Total Kjeldahl Nitrogen = Ammonia-nitrogen plus organic-nitrogen.

11 The TKN loading is calculated based on the analytical measurement of one sample collected on May 2, 2002.

12 NH_3-N = Ammonia-Nitrogen.

13 Ammonia-nitrogen loading is assumed to be 60 percent of TKN loading based on the analytical measurements of one sample collected on May 2, 2002.

14 TP = Total Phosphorus

Table 3-5. Wastewater Flow and Loading Projections For City of Airway Heights & FAFB						
	FAFB Only		City of Airway Heights and FAFB			
			Year			
Parameter	**Factor**	**Value**	**2000**	**2010**	**2020**	**2030**
ERU Projection[1]		4,082	5,673	7,733	9,523	10,368
Annual Average Flow, MGD[2]	1.00	1.00	1.39	1.89	2.33	2.54
Maximum Month Average Flow, MGD[3]	1.58	1.58	2.00	2.55	3.03	3.26
Maximum Day Average Flow, MGD[4]	1.30	2.05	2.52	3.12	3.65	3.90
Peak Flow, MGD[5]	2.50	2.50	3.47	4.74	5.83	6.35
Annual Average BOD, ppd (120 mg/l)[6,7]	120	1,001	1,879	3,015	4,003	4,469
Maximum Month BOD, ppd (190 mg/l)[6,8]	190	1,585	2,820	4,419	5,809	6,465
Maximum Day BOD, PPD[6,9]	1.3	2,060	3,667	5,745	7,552	8,405
Annual Average TSS, PPD (130 mg/l)[7,10]	130	1,084	1,897	2,949	3,864	4,295
Maximum Month TSS, PPD (220 mg/l)[8,10]	220	1,835	2,973	4,446	5,726	6,330
Maximum Day TSS, PPD[9,10]	1.3	2,385	3,865	5,780	7,444	8,229
Annual Average TKN, PPD (20 mg/l)[11,12]	20	167	310	495	656	732
Maximum Month TKN, PPD (22 mg/l)[11,12]	22	183	346	556	739	826
Maximum Day TKN, PPD[9,12]	1.3	239	450	723	961	1,073
Annual Average NH_3-N, PPD (60% TKN)[13,14]	0.6	100	186	297	394	439
Maximum Month NH_3-N, PPD (60% TKN)[13,14]	0.6	110	208	334	444	495
Maximum Day NH_3-N, PPD[13,14]	0.6	143	270	434	577	644
Annual Average TP, PPD (4.1 mg/l)[7,15]	4.1	34	56	83	108	119
Maximum Month TP, PPD (5.8 mg/l)[8,15]	5.8	48	75	109	138	152
Maximum Day TP, PPD[9,15]	1.3	63	97	141	180	198

1 The ERU Projection assumes that the number of Airway Heights Corrections Center ERUs remains constant at 1,054 through year 2030 and the number of FAFB ERUs remains constant at 4,082 through 2030.
2 The AAF for FAFB is equal to the current AAF capacity reserved in the City of Spokane's wastewater collection and treatment system per the interlocal agreement between the City of Spokane and Airway Heights.
3 The MMAF for FAFB is the MMAF of all flows measured from FAFB from 1999 through 2003.
4 Because daily flow measurement data was unavailable for preparation of this Facilities Plan, the Maximum Day Average Flow (MDAF) for FAFB is assumed to be 30 percent greater than the MMAF. The peaking factor is therefore multiplied by the MMAF to determine the MDAF.
5 Because diurnal flow measurement data was unavailable for preparation of this Facilities Plan, the (hourly) peaking factor is estimated to be 2.5 times the AAF based on the Washington State Department of Ecology Publication No. 98-37, Criteria for Sewage Works Design, December 1998, and Recommended Standards for Wastewater Facilities (10 States Standards), 1990 Edition.
6 BOD = 5-Day Biochemical Oxygen Demand.
7 The annual average loading is calculated from the AAF and the arithmetic mean of the analytical data summarized in Table 2-5.
8 The maximum month average loading is calculated from the AAF and the arithmetic mean plus one standard deviation of the analytical data summarized in Table 2-5.
9 The maximum day average loading is assumed to be 30 percent greater than the maximum month average loading. The peaking factor is therefore multiplied by the maximum month average loading to determine the maximum day average loading.
10 TSS = Total Suspended Solids.
11 TKN = Total Kjeldahl Nitrogen = Ammonia-nitrogen plus organic-nitrogen.
12 The TKN concentration is determined assuming the same wastewater BOD:TKN ratio for both the City of Airway Heights and FAFB.
13 NH_3-N = Ammonia-Nitrogen.
14 Ammonia-nitrogen loading is assumed to be 60 percent of TKN loading based on the analytical measurements of one sample collected on May 2, 2002.
15 TP = Total Phosphorus

The Average Annual Flow (AAF) of 1.0 MGD from FAFB in Table III-5 is based on the existing capacity reserved for FAFB in the City of Spokane collection and treatment system per the Interlocal Agreement between the two entities. The AAF from FAFB from years 1999 through 2003 has averaged approximately 0.810 MGD with a maximum AAF of 0.903 MGD occurring in 2003. The monthly average flows have consistently been less than 1.0 MGD from September 1997 through February 2004. Prior to this period, the average monthly wet weather wastewater flows from FAFB consistently exceeded 1.0 MGD, reaching a maximum month average flow of 2.34 MGD in January of 1997. It is believed that infiltration and inflow reduction measures at FAFB have contributed to the steep decline in the wet weather flows from FAFB after the 1997 wet season.

However, in March of 2004, the average monthly wastewater flow reached 1.064 MGD, exceeding 1.0 MGD for the first time in six years. Therefore, it is unclear if an AAF allowance of 1.0 MGD for FAFB would be sufficient to serve the wastewater treatment needs of FAFB in future years, and further study would be required prior to finalization of an Interlocal Agreement and the above design criteria for a proposed WWT&RF to serve both the City of Airway Heights and FAFB.

3. Wastewater Flow And Loading Projections For The City of Airway Heights, Fairchild Air Force Base, And The City of Spokane West Plains Sewer Service Area

The City of Spokane West Plains Sewer Service Area includes Spokane International Airport (SIA), Geiger Heights residential area, the Fairways Golf Course area, and residences and businesses along I-90 between the City of Spokane city limits and the State Route 902 exit and along State Highway 2 to the City of Airway Heights city limits. Figure 3-4 shows the City of Spokane Sewer Service Area with the West Plains Sewer Service Area circled.

The projected flow and loadings for the City of Spokane West Plains Sewer Service Area only, and for a combination of the City of Airway Heights, FAFB, and the City of Spokane West Plains Sewer Service Area are shown in Table 3-6. The projections provided in the table for the combination of the City of Airway Heights, FAFB, and City of Spokane West Plains Sewer Service Area are the sum of the values in Table 3-5 for the City of Airway Heights and FAFB and the values in Table 3-6 for the City of Spokane West Plains Sewer Service Area only. As in the previous tables, the projections are provided in ten-year increments from the year 2000 through the year 2030. The projections for the year 2030 would be the design criteria for a potential new WWT&RF that would serve the City of Airway Heights, FAFB, and the City of Spokane West Plains Sewer Service Area. To simplify the projections, the criteria assume no growth at the Airway Heights Corrections Center beyond its current capacity of 1,054 ERUs (0.26 MGD AAF), no growth at FAFB beyond its current reserved capacity of 4,082 ERUs (1.0 MGD AAF), and no growth in the City of Spokane West Plains Sewer Service Area beyond its assumed reserved capacity of 6,122 ERUs (1.5 MGD AAF).

The AAF for the City of Spokane West Plains Sewer Service Area is based on an assumed reserved capacity of 1.5 MGD in a proposed regional WWT&RF that could serve the area. Because of the lack of comprehensive flow monitoring from the West Plains Sewer Service Area, the required reserved treatment capacity is an imprecise approximation as to what the projected wastewater flow from the area will be in the year 2030.

Figure 3-4. City of Spokane Sewer Service Area

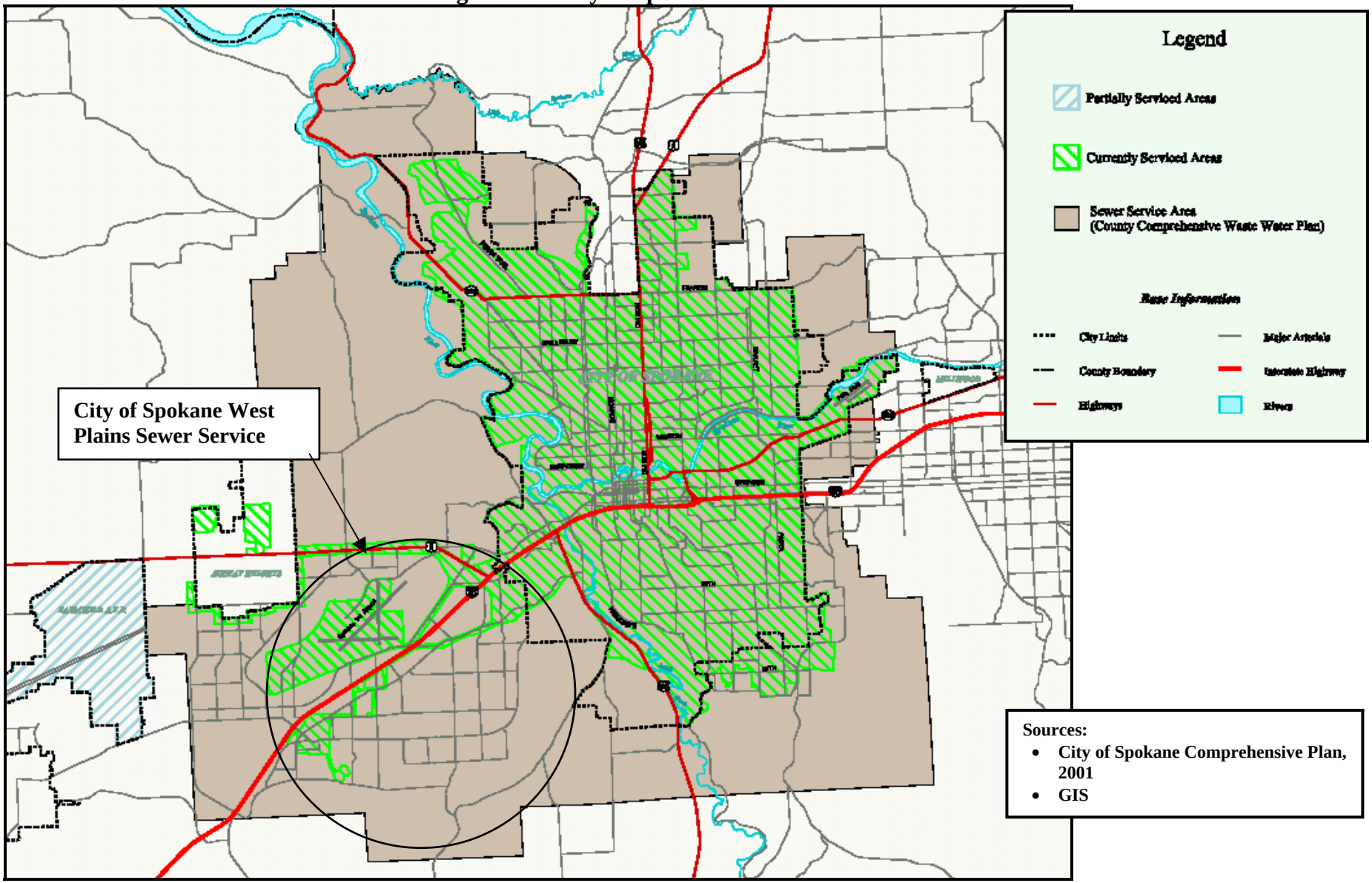


Table 3-6. Wastewater Flow and Loading Projections For The City of Airway Heights, FAFB, and City of Spokane West Plains Sewer Service Area

Parameter	City of Spokane West Plains Service Area Only[1]		City of Airway Heights, FAFB, and City of Spokane West Plains Sewer Service Area			
			Year			
	Factor	Value	2000	2010	2020	2030
ERU Projection[2]		6,122	11,795	13,855	15,645	16,490
Annual Average Flow, MGD[3]	1.00	1.50	2.89	3.39	3.83	4.04
Maximum Month Average Flow, MGD[4]	1.75	2.63	4.63	5.18	5.66	5.88
Maximum Day Average Flow, MGD[5]	1.30	3.41	5.93	6.53	7.06	7.31
Peak Flow, MGD[6]	2.50	3.75	7.22	8.49	9.58	10.10
Annual Average BOD, ppd (162 mg/l)[7,8]	162	2,028	3,906	5,043	6,030	6,496
Maximum Month BOD, ppd (243 mg/l)[7,8]	243	3,044	5,864	7,463	8,853	9,509
Maximum Day BOD, PPD[7,9]	1.3	3,957	7,623	9,702	11,509	12,362
Annual Average TSS, PPD (164 mg/l)[8,10]	164	2,047	3,945	4,997	5,911	6,343
Maximum Month TSS, PPD (256 mg/l)[8,10]	256	3,208	6,181	7,654	8,934	9,539
Maximum Day TSS, PPD[9,10]	1.3	4,171	8,036	9,951	11,615	12,400
Annual Average TKN, PPD (27 mg/l)[11,12]	27	334	644	829	990	1,066
Maximum Month TKN, PPD (30 mg/l)[11,12]	30	373	720	930	1,113	1,199
Maximum Day TKN, PPD[9,11]	1.3	486	935	1,209	1,447	1,559
Annual Average NH_3-N, PPD (60% TKN)[13,14]	0.6	201	387	498	594	640
Maximum Month NH_3-N, PPD (60% TKN)[13,14]	0.6	224	432	558	668	720
Maximum Day NH_3-N, PPD[13,14]	0.6	291	561	725	868	935
Annual Average TP, PPD (4.8 mg/l)[8,15]	4.8	60	116	143	168	179
Maximum Month TP, PPD (6.4 mg/l)[8,15]	6.4	81	155	189	219	233
Maximum Day TP, PPD[9,15]	1.3	105	202	246	285	303

1 The City of Spokane West Plains Sewer Service Area includes Spokane International Airport (SIA), Geiger Heights residential area, the Fairways Golf Course area, and residences and businesses along I-90 between the City of Spokane city limits and SR 902 and along State Highway 2 to the City of Airway Heights city limits. Refer to Figure 3-4 for area location and boundaries.

2 The ERU Projection assumes that the number of Airway Heights Corrections Center ERUs remains constant at 1,054 through year 2030, the number of FAFB ERUs remains constant at 4,082 through 2030, and the City of Spokane West Plains Sewer Service Area remains constant at 6,122.

3 The AAF for the City of Spokane West Plains Sewer Service Area is based on an assumed reserved capacity of 1.5 MGD in a proposed regional treatment and reclamation facility that might serve the area.

4 The MMAF peaking factor for the City of Spokane West Plains Sewer Service Area is based on the ratio of the existing MMAF from SIA (approximately 1.4 MGD) and the AAF flow from SIA (approximately 0.8 MGD).

5 Because daily flow measurement data was unavailable for preparation of this Facilities Plan, the Maximum Day Average Flow (MDAF) is assumed to be 30 percent greater than the MMAF. The peaking factor is therefore multiplied by the MMAF to determine the MDAF.

6 Because diurnal flow measurement data was unavailable for preparation of this Facilities Plan, the (hourly) peaking factor is estimated to be 2.5 times the AAF based on the Washington State Department of Ecology Publication No. 98-37, Criteria for Sewage Works Design, December 1998, and Recommended Standards for Wastewater Facilities (10 States Standards), 1990 Edition.

7 BOD = 5-Day Biochemical Oxygen Demand.

8 The annual average and maximum month loadings are calculated from the AAF and the equivalent concentration of a combined City of Airway Heights and FAFB wastewater.

9 The maximum day average loading is assumed to be 30 percent greater than the maximum month average loading. The peaking factor is therefore multiplied by the maximum month average loading to determine the maximum day average loading.

10 TSS = Total Suspended Solids.

11 TKN = Total Kjeldahl Nitrogen = Ammonia-nitrogen plus organic-nitrogen.

12 The TKN concentration is determined assuming the same wastewater BOD:TKN ratio for the City of Airway Heights, FAFB, and the City of Spokane West Plains Sewer Service Area.

13 NH_3-N = Ammonia-Nitrogen.

14 Ammonia-nitrogen loading is assumed to be 60 percent of TKN loading.

15 TP = Total Phosphorus

The only areas within the West Plains Sewer Service Area from which the City of Spokane currently monitors flow is the SIA and Geiger Heights residential area. City of Spokane staff estimates the current AAF from SIA to be approximately 0.8 MGD. The Geiger Heights residential area AAF in 2003 was 0.11 MGD. Using a 1.2% growth rate (Washington Water Power Economic Forecast Summary for Spokane County, May 1995) for these areas, the estimated flow from SIA and Geiger Heights residential area in year 2030 would be approximately 1.25 MGD. An additional 0.25 MGD has been included in the projection to account for flows from areas within the City of Spokane West Plains Sewer Service Area that are outside of the SIA or Geiger Heights residential area.

For comparison, the Spokane County Comprehensive Wastewater Management Plan (Economic and Engineering Services, Inc., July 1981) predicted a West Plains area wastewater flow, including the City of Airway Heights but not including FAFB, of 2.6 MGD average dry weather flow (ADWF) for year 2002 and 4.6 MGD ADWF in year 2022. If the projected flow from FAFB is included, the West Plains area flows projected in that report would be 3.6 MGD ADWF for year 2002 and 5.6 ADWF in year 2022. These flows are the same order of magnitude (within 40%) as the projected 4.0 MGD AAF from the West Plains area (including City of Airway Heights and FAFB) in year 2030 proposed for a regional WWT&RF. The more recent 2001 Spokane County Comprehensive Wastewater Management Plan, the 2001 City of Spokane Comprehensive Plan, and the 1999 City of Spokane Wastewater Facilities Plan were reviewed for wastewater flow information, but did not include flow projections from the City of Spokane West Plains Sewer Service Area. A more detailed analysis may be performed that could consider land use in the flow approximations and refine the projected wastewater flows from the City of Spokane Sewer Service Area. However, this analysis is not within the scope of this Facilities Plan.

C. Future of Existing On-Site Wastewater Systems

The City anticipates continued reductions in the number of existing on-site septic systems in the residential areas, as funding becomes available. This program is considered in developing the ERU and wastewater flow projections.

As the public sewer system is developed in the southerly portion of the City, parcels served by on-site systems are connected to the public sewer system. Where sewer is available within 200 feet of a given project site, the City requires owners of developed parcels and to extend and connect to the public sewer system. Owners of undeveloped parcels are required to connect to the sewer system as a condition of the development approval.

D. Future Pretreatment Requirements

This report anticipates that the City of Airway Heights will be required to meet current pretreatment requirements, unless modified by the NPDES permit for the Wastewater Treatment Facility or requirements for the proposed treatment method. Current pretreatment requirements are addressed in the Interlocal Agreement between the City of Airway Heights and the City of Spokane (Appendix A). Pretreatment requirements are codified in Section 13.06.920 of the Airway Heights Municipal Code (Appendix B.1).

E. Future Collection System

The City of Airway Heights currently discharges to the West Plains Interceptor at SR2 & Hayford Road (Connection #1), and at 21st Avenue and Hayford Road (Connection #2). With the exception of a lift station serving the Kalispel Tribal Casino at Sprague Avenue and Hayford Road, the remainder of the City's system flows by gravity to the connection points.

Each of the various site alternatives will require some degree of expansion to the current collection system in order to convey flows to the proposed treatment Facility.

1. Alternative 1: A small lift station and force main would be needed to convey flows from Connection #2 to a point north of SR2 for connection to a gravity system running north in Hayford Road from SR2 to the site. Flows from the northwest portion of town would be conveyed north in Russell Street from 6th Avenue. This line would be constructed as warranted by development. The Russell Street line could serve to convey flows from a portion of the existing residential area generally found north of Eleventh Avenue and west of Lawson.

2. Alternatives 2, 3, and 4: Since the Facility would be located uphill of the service area, Lift stations would initially be required at the SR2 and 21st Avenue connections. Ultimately, gravity lines would be needed in Hayford Road and Russell Street, as well as a lift station at the north line of the service area

A schematic diagram of the "backbone" sewer collection system common to all the different site alternatives is shown at Figure 3-5a.

F. Future Flow Reduction Measures

The City of Airway Heights implemented a water conservation plan as part of the 2002 Comprehensive Water Plan. The conservation plan includes measures to encourage water conservation through customer education activities, requiring water meters for all services, water audits of large users, tiered water rates, and encouraging use of water efficient appliances and fixtures. The City has set a target goal of reducing water usage rates by 5%. In addition, the City also ties sewer service rates to water consumption to encourage conservation. The reduction in water consumption is expected to result in a reduction of water used for irrigation and landscaping purposes. In extreme cases, water conservation measures would reduce sewer flows discharged to the city's collection system.

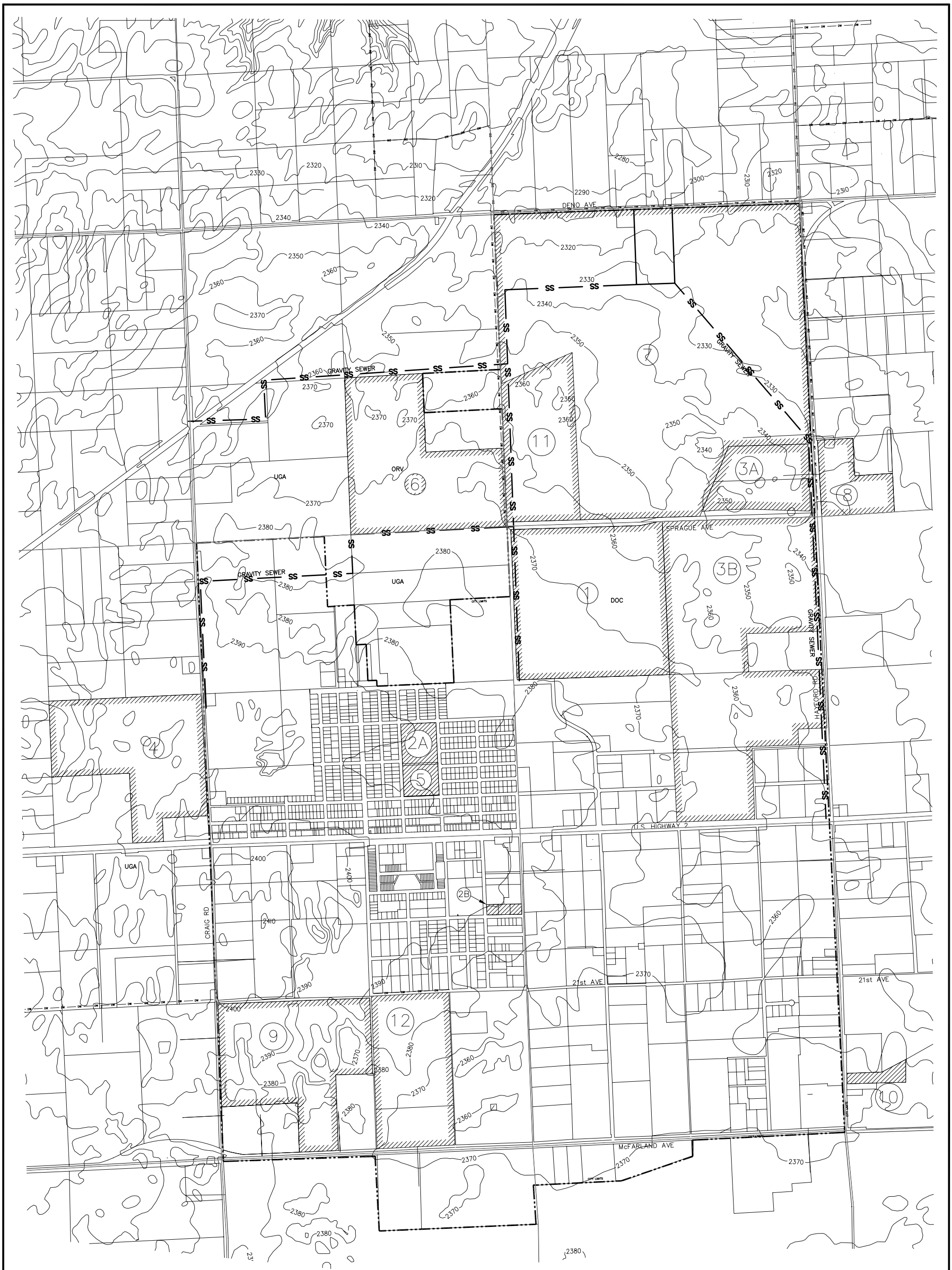
It is intended that the proposed WWTF will incorporate a system to distribute reclaimed water to various users around the City. Peak daytime requirements (6 a.m. to 6 p.m.) are estimated at 1.442 MGal, based on current usage figures for Shamrock Paving and Spokane Rock Products. Off-peak flows are estimated at 1.045 MGal; these flows consist primarily of irrigation uses at such locations as the Department of Corrections site, the Kalispel Tribal Casino site, and City parks. By providing suitably treated reclaimed water for these uses, the demand on the domestic water supply system by these uses (particularly for uses that do not require potable-quality water) can be significantly reduced. A schematic diagram of the "backbone" reclaimed water system common to all the different site alternatives is shown at Figure 3-5b.

G. Future Open Space/Recreation Alternatives

The preferred site consists of approximately 75 acres and includes a parcel containing 2 wells serving the municipal water supply system. The concept plan for this project (see Chapter V) contemplates that approximately 40 acres will be needed to treat the 20-year design flow and to dispose of the reclaimed water, at least on a seasonal basis. Approximately 35 acres would remain for use as a reserve area.

In concept, use of a portion of the preferred site for open space and recreation uses appears to be generally compatible with both the underlying zoning, the contemplated surface discharge using percolation, and an Accident Prevention Zone overlay for Fairchild Air Force Base. If open surface basins are utilized for disposal, however, open space and recreation uses would be more limited than if a subsurface infiltration system were utilized to discharge the reclaimed water from the plant. Open surface basins would require some limitations of general public access to ensure that a given basin would not be filled with reclaimed water while occupied for recreational use, and to prevent the "attractive nuisance" of a pond. Subsurface infiltration facilities, being obscured from public view, could co-exist with surface activities with relatively light restrictions on general public access.

There are other areas in the City that may be suitable for use as reclaimed water storage basins to develop the volume needed to serve the anticipated summer demand; these areas are located both to the north and south of SR2. The City has been approached by at least one developer of a residential project to discuss the possibility of a City recreation facility in the northwest part of the City, south of 6th Avenue and west of Ziegler Street. The topography at this location (a former borrow pit) would support a water feature, if some means to retain at least the demand volume were installed. A feeder/distributor line in the 6th Avenue alignment could supply this location.



LEGEND

SS SS COMMON SEWER COLLECTION

2A POTENTIAL RECLAIMED WATER CUSTOMER REFER TO TABLE 4–1

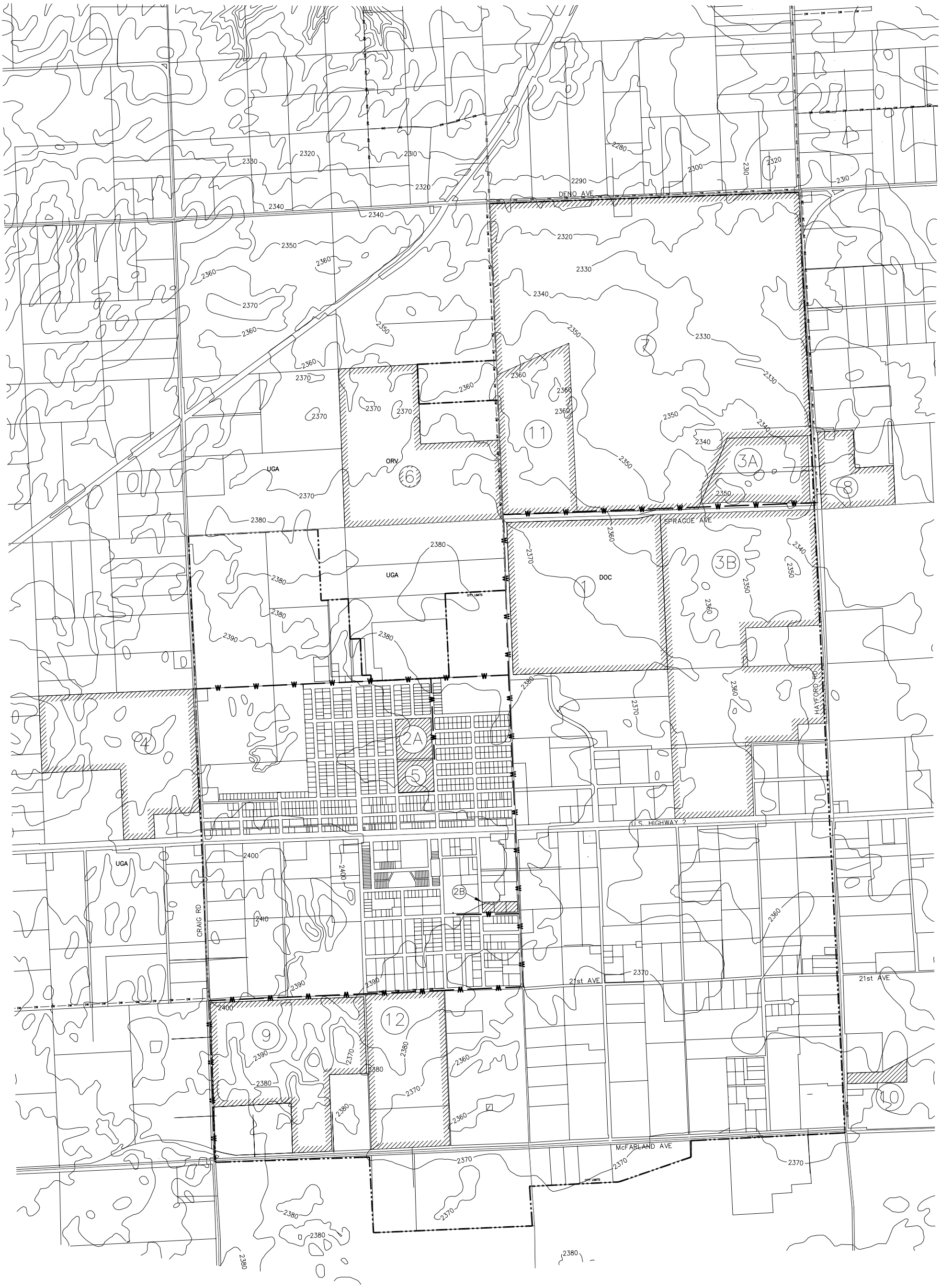
DESIGNED BY: EP	
DRAWN BY: WLH	SCALE: NTS
CHECKED BY: EP	
PROJECT NO: 30423.021.01	

CITY OF AIRWAY HEIGHTS

FUTURE SEWER COLLECTION

CENTURY WEST
ENGINEERING CORPORATION
1825 N. Hutchinson Rd. 2nd Floor
Spokane, WA 99212
509-838-3810 phone • 509-624-0355 fax

DATE: 6/25/04 FIGURE 3–5a



LEGEND

— W — W — COMMON RECLAIMED WATER

2A POTENTIAL RECLAIMED WATER CUSTOMER REFER TO TABLE 4–1

DESIGNED BY: EP	
DRAWN BY: WLH	SCALE: NTS
CHECKED BY: EP	
PROJECT NO: 30423.021.01	

CITY OF AIRWAY HEIGHTS

RECLAIMED WATER DISTRIBUTION

CENTURY WEST
ENGINEERING CORPORATION
1825 N. Hutchinson Rd. 2nd Floor
Spokane, WA 99212
509-838-3810 phone • 509-624-0355 fax

DATE: 6/25/04

FIGURE 3–5b