SECTION 7

HYDRAULIC SEWER MODEL

7-1 Hydraulic Model Software

To perform a detailed analysis of the sewer collection system, it is essential to create a mathematical model that is capable of simulating the operating characteristics of the system. The simulations for this study were performed utilizing Info Sewer, which is a GIS based computer program with the ability to perform steady state analyses of the flows in sanitary sewer systems. The program also manages and maintains the database that stores the sewer analysis input and output results. Manning's Equation is used for depth of flow calculations in the gravity sewer pipes.

The sewer system is modeled by entering pipe diameters, lengths, grades, and roughness coefficients as well as land use classifications. The sewer model includes all of the City's existing manholes, sewer pipes (excluding laterals, private sewers, and sewers belonging to other agencies), pump stations, large point source flows, and tributary area boundaries. The model identifies points of connection to regional facilities, primarily belonging to IEUA.

The model uses the average dry weather flows and determines peak flows based upon relationships specified by the user (see Section 4). Pumped flows and measured flows can be entered at any manhole as a fixed flow.

At the completion of a modeling run, output data is created for viewing on the screen or for printing. Output data for pipes include average and peak flow rate, velocity, pipe capacity, and ratio of flow depth to pipe diameter (d/D).

The sewer model files are provided in Appendix F. The model input and results are provided in tabular form in Appendix G.

7-2 Construction of Model Geometry

Information gathered from the City sewer GIS files, atlas sheets, as-built drawings and interviews with City staff was used to create the model geometry of the existing system.

The City's existing sewer GIS information was utilized to build the geometry of the hydraulic model. Table 7-1 is a list of the information that was imported into the model from the existing GIS. Only active sewers owned by the City of Ontario were included in the hydraulic model. Regional sewers, abandoned (ABD), inactive (I), and demolished (D) sewers were <u>not</u> modeled.

The City's gravity main GIS data did not contain unique upstream and downstream node identification labels. This was resolved by combining information from the upstream atlas grid identification (UP_grid) and the upstream manhole identification (FROMID) and by combining information from the downstream atlas grid identification (DN_grid) and the downstream manhole identification (TOID) to create unique labels that would match the manhole GIS data.

In most cases, if one of the node identification numbers was labeled as "DE" (dead end), the line segment represented a sewer stub-out intended for future extension of the sewer system. These segments usually did not include invert and slope information. There were approximately 1,532 of these segments in the existing sewer GIS. These stub-outs were not included in the hydraulic model.

Table 7-1
Data Imported from GIS Files to Hydraulic Model

Node Data	Manhole Shapefile Field Title
Unique ID	FACILITYID
Rim Elevation (ft)	RIMELEVATI
Invert Elevation (ft)	INVERTELEV
Pipe Data	**Gravity Mains Shapefile Field Title**
Unique ID	FACILITYID
Upstream Node ID	UP_grid + FROMID
Upstream Invert Elevation (ft)	INELEV
Downstream Node ID	DN_grid + FROMID
Downstream Invert Elevation (ft)	OUTLEEV
Pipe Size (in)	DIAMETER
Pipe Length (ft)	PIPELENGTH

There were also approximately 450 line segments with one of the node identification numbers labeled as "FI" (fitting). These identifications represented fittings which were not actually represented with a node in the GIS. In other words, there were multiple line segments between two nodes. Research showed that many of the fittings represented lateral connections. For modeling purposes, sewer pipes do not need to be separated at lateral connections. Importing these multiple line segments into the model will cause the network to be disconnected. These areas were corrected by creating a single pipe segment between the two nodes. The remaining segments of pipe were deleted. The appropriate data was associated with the new pipe segment created.

Some manholes did not have unique IDs in the sewer GIS and had to be renamed. For example, there were two manholes on atlas O13 with identification 133. One of them was renamed as 233. The complete manhole ID is therefore O13233 in the hydraulic model.

Sometimes additional nodes were added to the model, which were not a part of the sewer GIS files, to represent the intersection of two pipes. Although there may not be a manhole at these locations, the model needs to have a node at the intersection of all pipes in order to operate properly.

7-3 Missing Information

The City's existing sewer GIS data was not 100 percent complete. Approximately 1,175 reaches were found to be missing invert elevations, the length of the pipe, and/or the slope of the pipe. Several steps were taken to fill in the data gaps with the most accurate data available:

1. Missing inverts were calculated when there was enough information available (slope, pipe length, and one invert)
2. City staff conducted survey of several of the sewers missing data (see Appendix H). It was determined that the surveyed inverts coupled with the recorded GIS length, resulted in slopes very similar to what was used during the development of the 1995 Sewer Master Plan. Therefore, City staff approved the use of the 1995 Sewer Master Plan data

for pipes where the information could not be found in the City's current sewer GIS. The 1995 Sewer Master Plan data was utilized for approximately 790 reaches.

3. There were approximately 70 pipes where data was found on as-built construction plans. If the slope was found on the as-built plans, inverts and lengths were calculated to get the appropriate slope.
4. There were approximately 112 pipes for which data could not be found on the sewer GIS, as-built plans or in the 1995 Sewer Master Plan. Data had to be assumed for these pipes. If possible, the slope of an adjacent upstream or downstream pipe was used. Sometimes the street slope was used (based on the GIS contours). If no other information was available, a minimum slope of 0.004 was assumed.

7-4 Split Manholes and Flow Patterns

From the existing sewer GIS and sewer atlas sheets, 135 split manholes (more than one pipe exiting the manhole) were identified in the collection system. Many of these split manholes are located at summits in the upstream portions of the system. Thirty-eight split manholes were identified for further investigation due to their potential significance on the hydraulic model results. As-built plans for these 38 sites were reviewed. Some of the conditions found on the plans are as follows:

1. Plan shows a plug was installed in one of the outlets and the flow is diverted in one direction. In this case, the model was set up to divert all flow in one direction toward the active outlet.
2. Flow is split into two parallel lines, but comes back together into one line a little further downstream. In this case, the model was set up to split the flows appropriately based on the as-built pipe sizes and invert elevations.
3. One of the outlets acts as an overflow because the elevation leaving the manhole is much higher than the other outlet. In this case, the model generally assumes the normal flow conditions.
4. One of the outlets may have been abandoned. In this case, the model was set up to divert the flow in one direction toward the active outlet.
5. Upon further investigation, the tributary area to the split manhole is determined to be very small. In this case, the model was set up to split the flows appropriately based on the as-built pipe sizes and invert elevations.

AKM met with the City staff to verify the flow direction at the aforementioned 38 "major" flow split locations. Field reviews of the split manholes verified many of the as built manhole information. The locations of the "major" flow splits and the results of the field investigation are shown in Table 5-3 in Section 5 of this report.

Eight of the flow monitoring sites (1A, 2A, 2B, 2C, 11A, 11B, 12A, and 12B) discussed in Subsection 4-2, were selected for the purpose of quantifying the flow downstream of a "major" flow split so it could be modeled accurately.

7-5 Model Loads (Wastewater Flows)

General

The existing land uses discussed in Sub-section 3-5 and the calibrated unit flow factors shown in Table 4-2 were utilized to determine the average wastewater flows (loads) for the existing model. The ultimate land uses discussed in Subsection 3-5 and the ultimate unit flow factors shown in Table 4-3 were utilized to apply the average loads to the ultimate model.

Peak dry weather flows are calculated in the model by a user defined relationship. The peaking formula used in the sewer model is as follows:

$$Q_{peak}\ (cfs) = 2.0 \times Q_{ave}(cfs)^{0.92}$$

The total existing average load for Old Model Colony is estimated at 18.75 mgd. The total ultimate average load for Old Model Colony and New Model Colony is estimated at 45.03 mgd. The increase in ultimate flow is due to development of New Model Colony anticipated densification in land use and population per the City's 2010 General Plan and the assumption that the area will be fully occupied

Load Distribution

The sewage loads were applied to the model manholes with the use of Traffic Area Zone (TAZ) information provided by the City's planning department. TAZ information, shown in Table 7-2, included a breakdown of the ultimate land uses in terms of number of dwelling units for residential areas, building square footage for commercial and industrial areas, and acreage for open space and public facilities. This information combined with the ultimate unit flow factors was used to calculate the sewage loads for each TAZ area. The loads were then distributed to the manholes located within each TAZ area. School loads were calculated separately and applied to appropriate nodes as described in Section 7-6. The TAZ boundaries are shown on Figure 7-1.

Load Fields

In the model, the loads were generally assigned to fields by landuse type as follows:

- Load 1: Low Density, Low Medium Density, and Medium Density Residential
- Load 2: Rural Residential
- Load 3: High Density Residential
- Load 4: General Commercial, Business Park, Hospitality, Neighborhood Commercial, Office Commercial
- Load 5: Industrial
- Load 6: Public Facility, Public School, Airport
- Load 7: Mixed Use
- Load 8: Open Space Non-Recreational, Open Space Recreational
- Load 9: Transfer Loads from OMC to NMC Model
- Load 10: High Water User

Table 7-2
General Plan Land Use Buildout by TAZ - Units, Sq. Ft. and Acres

General			Rural Residential		Low Density Residential			Low Medium Density Residential		Medium Density Residential			High Density Residential		Neighborhood Commercial			General Commercial			Office Commercial				Hospitality				Business Park			Industrial					Mixed Use					Open Space Non-Recrea-tion	Open Space - Parkland	Open Space - Water	Public Facility	Public School	Airport	Land Fill	Rail	ROW
2010 TAZ	Special Planning Area / Note	Ac	Ac	Units (2 du/ac)	Ac	OMC Units (4 du/ac)	NMC Units (4.5 du/ac)	Ac	OMC & NMC Units (8.5 du/ac)	Ac	OMC Units (18 du/ac)	NMC Units (22 du/ac)	Ac	OMC & NMC Units (35 du/ac)	Ac	Office (20% at 0.3 FAR)	Commer-cial (80% at 0.3 FAR)	Ac	Office (10% at 0.3 FAR)	Commer-cial (90% at 0.3 FAR)	Ac	Office (70% at 0.75 FAR)	Commer-cial (25% at 0.75 FAR)	Lodging (5% at 0.75 FAR)	Ac	Office (20% at 1.0 FAR)	Commer-cial (30% at 1.0 FAR)	Lodging (50% at 1.0 FAR)	Ac	Office (50% at 0.40 FAR)	Industrial (50% at 0.40 FAR)	Ac	Office (10% at 0.55 FAR)	Industrial (45% at 0.55 FAR)	Mfg. (35% at 0.55 FAR)	Ware-house (10% at 0.55 FAR)	Name	Ac	Multi-Family Units	Office	Commer-cial	Ac	Ac	Ac	Ac	Ac	Ac	Ac	Ac	Ac
1		17.5			17.5	70.0									3.8	9,976	39,905																					17.4								10.2
2		19.7			20.3	81.1							19.7	691																								10.5								18.3
3		101.0			101.0	403.9				15.0	270				1.9	4,931	19,723																													41.2
4		1.6			76.8	307.3												1.6	2,141	19,269																						44.4				35.1
5		57.9			57.9	231.7				10.9	196																										3.3								25.0
6		31.7			50.4	201.5		18.8	160	16.0	288							31.7	41,376	372,382	2.1	46,970	16,775	3,355																					43.5
7		14.4			79.5	317.9												14.4	18,838	169,540																						7.8				39.5
8		95.7			95.7	382.8																																				1.8				46.7
9		48.1			48.1	192.6				0.4	7																																			25.5
10		44.4			44.4	177.5																																				4.8				19.0
11		48.1			48.1	192.6																																				9.5				29.0
12		29.0											29.0	1,013																								3.3								13.9
13		42.9			42.9	171.5																																					9.0		9.4				19.5
14		48.4											48.4	1,694																																	10.6
15		14.6			75.1	300.4				13.7	247		14.6	511	9.5	24,780	99,120																											9.0				38.4
16		6.1			55.3	221.3		27.3	232	23.3	420				5.7	14,904	59,614	6.1	7,986	71,874												13.2	31,548	141,968	110,420	31,548						0.3						33.7
17		11.9																11.9	15,609	140,479																											9.6
18		40.8			40.8	163.1				8.7	156				2.3	5,980	23,921																										19.6		9.5				18.1
19		58.8			58.8	235.4									7.2	18,752	75,009																															20.7
20		19.2			19.2	77.0																																						58.0				11.4
21		65.3			65.3	261.2				0.5	9																																					22.9
22		3.9			56.8	227.1				22.1	398				0.4	976	3,904	3.9	5,136	46,226																								4.6				28.4
23		5.6			66.1	264.4				12.5	225				2.9	7,533	30,131	5.6	7,264	65,373	2.1	48,548	17,339	3,468																			60.5			0.5	9.3				38.2
24		99.0			99.0	396.2				9.4	170				20.3	53,125	212,500				1.4	31,953	11,412	2,282																									43.3
25		0.0			78.9	315.6		17.3	147	8.5	153		0.04	1	0.5	1,320	5,280				2.1	47,029	16,796	3,359																					0.6	9.9				36.9
26		111.3			111.3	445.2				2.0	37				0.2	411	1,642				1.2	27,843	9,944	1,989																									39.2
27		138.8			138.8	555.2				3.2	58																																21.3						56.3
28		65.5			65.5	261.9									0.5	1,263	5,054																										20.0		9.2				32.7
29		9.0			31.0	123.9				24.3	437														9.0	78,556	117,834	196,389																				27.8
30		15.8			35.1	140.4				19.8	356							15.8	20,606	185,452																										0.7				37.7
31		200.7																																					Meredith	200.7	2,408	4,370,226	1,748,091	18.2				2.0				41.0
32		7.1						7.1	60	8.6	156																														Meredith (Part)	45.8	549	997,332	398,933	69.9								31.0
33		1.9								1.9	34																														Inland Empire	36.8	368	240,356	112,166		111.1							11.2
34		43.0																			43.0	984,425	351,580	70,316																									18.4
35		11.2								68.3	1,229		11.2	393							19.0	434,147	155,053	31,011																				6.2		7.0				26.5
36		40.9																			40.9	935,238	334,014	66,803																									20.9
37		14.4																			14.4	328,937	117,478	23,496																						1.9				6.9
38		77.6																																					Ontario Center	77.6	931	1,690,079	338,016									14.6
39		56.7																																					Ontario Center	56.7	680	1,233,940	246,788									13.0
40		35.1																																					Ontario Center	35.1	422	765,181	153,036									25.7
41		82.5																																					Ontario Center	82.5	990	1,797,700	359,540									14.2
42		60.1																																					Ontario Center	60.1	721	1,308,690	261,738									12.2
43		32.9																																					Ontario Center	32.9	395	716,424	143,285									24.7
44		198.0																																					Ontario Mills	198.0	396	1,293,687	3,234,219									44.1
45		41.5																																					Ontario Mills	41.5	83	271,130	677,825									41.3
46		12.0																12.0	15,732	141,591												85.9	205,851	926,327	720,477	205,851						23.1						24.7
47		19.8																															19.8	47,360	213,120	165,760	47,360						4.9						24.9
48		215.8																															215.8	516,929	2,326,181	1,809,252	516,929												23.8
49		58.7																															58.7	140,515	632,319	491,804	140,515												19.2
50		68.1			68.1	272.3																																										30.6
51		0.5			44.9	179.7				10.7	193		4.1	145				0.5	679	6,114																									4.8				21.5
52		15.9			15.9	63.6		12.6	107	1.3	23																																	4.5				9.1
53		19.0						11.5	98				19.0	664																												Downtown (Part)	17.0	357	118,643	118,643									21.2
54		10.6			24.9	99.7							10.6	372	0.1	227	907				1.8	41,914	14,969	2,994																		Downtown (Part)	3.2	68	22,583	22,583					4.4				22.9
55		22.6			22.6	90.4				2.1	38										7.4	168,483	60,173	12,035																									11.1
56		56.5			56.5	226.0		6.8	58	17.2	309				0.3	863	3,452				1.3	28,942	10,336	2,067																						7.0				27.5
57		28.1			28.1	112.5		2.0	17	4.1	74																																1.4	8.6		1.4				14.5
58		12.3			19.1	76.2				25.7	462							1.4	1,830	16,466					12.3	107,229	160,843	268,072																	23.7				12.8
59		24.5																							24.5	213,254	319,881	533,135																					6.3
60		21.7																							21.7	189,213	283,819	473,032															1.8						7.4
61		2.8			27.7	110.6				17.9	322		26.8	938				2.8	3,717	33,457																															24.1
62		3.2			42.1	168.3				7.1	128		12.8	448				3.2	4,143	37,290																															21.6
63		18.0											18.0	630																												Downtown (Part)	17.0	357	118,536	118,536									8.9
64		2.3						2.3	20				2.3	82																												Downtown (Part)	23.4	492	163,298	163,298									18.0
65		14.3																																								Downtown (Part)	14.3	300	99,639	99,639		2.1		15.4					14.3
66		0.3			24.3	97.4									5.8	15,071	60,283	0.3	411	3,696																															13.6
67		17.6			17.6	70.6		16.1	137	15.1	272				1.3	3,284	13,137																										East Holt	41.3	310	899,826	359,930									27.0
68		10.5			4.4	17.5				14.7	265																																East Holt (Part)	13.6	102	296,503	118,601	1.1	4.7							11.7
69		35.2			5.1	20.3		11.5	98	16.4	295														17.2	150,268	225,402	375,669	35.2	306,889	306,889																					15.6
70		39.3																							39.3	342,150	513,226	855,376																					6.0
71		64.4																																					Multi-Modal	64.4	387	1,263,251	1,263,251	3.6								21.8
72		17.2																																					Guasti	77.4	464	1,179,987	1,011,417						17.2		3.0	28.2
73		19.4																			66.3	1,516,324	541,544	108,309																								19.4		6.1	24.9

Table 7-2
General Plan Land Use Buildout by TAZ - Units, Sq. Ft. and Acres

General			Rural Residential		Low Density Residential			Low Medium Density Residential		Medium Density Residential			High Density Residential		Neighborhood Commercial			General Commercial			Office Commercial				Hospitality				Business Park			Industrial				Mixed Use					Open Space Non-Recrea-tion	Open Space - Parkland	Open Space - Water	Public Facility	Public School	Airport	Land Fill	Rail	ROW
2010 TAZ	Special Planning Area / Note	Ac	Ac	Units (2 du/ac)	Ac	OMC Units (4 du/ac)	NMC Units (4.5 du/ac)	Ac	OMC & NMC Units (8.5 du/ac)	Ac	OMC Units (18 du/ac)	NMC Units (22 du/ac)	Ac	OMC & NMC Units (35 du/ac)	Ac	Office (20% at 0.3 FAR)	Commer-cial (80% at 0.3 FAR)	Ac	Office (10% at 0.3 FAR)	Commer-cial (90% at 0.3 FAR)	Ac	Office (70% at 0.75 FAR)	Commer-cial (25% at 0.75 FAR)	Lodging (5% at 0.75 FAR)	Ac	Office (20% at 1.0 FAR)	Commer-cial (30% at 1.0 FAR)	Lodging (50% at 1.0 FAR)	Ac	Office (50% at 0.40 FAR)	Industrial (50% at 0.40 FAR)	Ac	Office (10% at 0.55 FAR)	Industrial (45% at 0.55 FAR)	Mfg. (35% at 0.55 FAR)	Ware-house (10% at 0.55 FAR)	Name	Ac	Multi-Family Units	Office	Commer-cial	Ac	Ac	Ac	Ac	Ac	Ac	Ac	Ac	Ac
74		68.9																			68.9	1,575,279	562,600	112,520																					3.0	17.1
75		36.5																36.5	47,712	429,412	23.3	531,736	189,906	37,981																					2.7	17.5
76		31.7																31.7	41,406	372,652												53.6	128,463	578,082	449,619	128,463								6.6			17.1	42.4
77		153.2																														153.2	367,029	1,651,631	1,284,602	367,029					4.1						23.0	79.8
78		29.0																											29.0	252,784	252,784	21.2	50,678	228,050	177,373	50,678											27.4	16.1
79		13.6																15.0	19,544	175,895									13.6	118,275	118,275	9.7	23,191	104,360	81,169	23,191											27.9	13.3
80		15.1																														15.1	36,279	163,256	126,977	36,279	Downtown (Part)	8.1	169	56,160	56,160							5.5	9.5
81		6.2																														6.2	14,800	66,600	51,800	14,800	Downtown (Part)	13.8	290	96,191	96,191							6.4	15.0
82		9.9																														9.9	23,677	106,546	82,869	23,677	Downtown (Part)	11.7	245	81,416	81,416				1.7			5.4	12.2
83		18.6													4.6	12,022	48,086																18.6	44,539	200,427	155,888	44,539											5.6	11.0
84		13.0																											13.0	113,010	113,010	19.7	47,263	212,684	165,421	47,263											5.9	8.8
85		23.8																											23.8	207,401	207,401	28.6	68,495	308,229	239,734	68,495											5.8	13.0
86		1.1																											18.5	161,094	161,094	1.5	3,703	16,663	12,960	3,703					0.5			1.1		10.6	6.4
87		0.3																							3.7	32,520	48,779	81,299	11.7	101,844	101,844													0.3		9.0	9.1
88		11.1																							17.2	149,419	224,128	373,547									Multi-Modal (Part)	11.7	70	230,003	230,003	0.3			11.1		15.1	21.7
89		71.9																														71.9	172,290	775,306	603,016	172,290											6.4	10.3
90		50.8													1.8	4,781	19,124												50.8	442,517	442,517	40.2	96,386	433,738	337,352	96,386												15.8
91	Incl BP Overlay	24.8			0.0	0.0		0.0	0						1.4	3,689	14,755												46.5	405,215	405,215	25.9	62,053	279,239	217,186	62,053												21.2
92	Incl BP Overlay	16.8			0.0	0.0									0.0	0	0												67.1	585,001	585,001	11.7	28,069	126,310	98,241	28,069												44.1
93	Incl BP & Ind Overlay	13.6			0.0	0.0									0.0	0	0												23.6	205,873	205,873	56.2	134,738	606,321	471,583	134,738						0.0				2.0	42.8
94		4.9																											4.9	42,392	42,392	31.9	76,336	343,511	267,175	76,336										0.1	15.6
95		14.8																														26.6	63,824	287,208	223,384	63,824								14.8		5.7	10.5
96		9.7																											9.7	84,247	84,247	24.4	58,384	262,726	204,343	58,384												13.1
97		17.9																														85.2	204,016	918,070	714,055	204,016								17.9			10.9
98		78.6																														78.6	188,244	847,099	658,855	188,244											11.6
99		58.0																														58.0	139,029	625,629	486,601	139,029											7.7
100		56.3																														56.3	134,913	607,109	472,196	134,913											10.5
101		174.4																														174.4	417,793	1,880,069	1,462,276	417,793											27.6
102		48.5																48.5	63,318	569,866												60.5	144,838	651,771	506,933	144,838					54.8						62.1
103		268.5																														268.5	643,202	2,894,409	2,251,207	643,202					24.0						19.0
104		11.1																														123.7	296,459	1,334,064	1,037,606	296,459								11.1			19.4
105		90.8																														90.8	217,643	979,393	761,750	217,643											11.9
106		54.9																														54.9	131,593	592,168	460,575	131,593									4.7		8.2
107		55.5																														55.5	133,040	598,680	465,640	133,040											10.5
108		19.0																19.0	24,840	223,560												37.8	90,619	407,785	317,166	90,619											15.2
109		88.6																														88.6	212,234	955,055	742,820	212,234											8.8
110		183.7																														183.7	440,194	1,980,873	1,540,679	440,194					31.9						14.7
111		21.1	110.6	221						30.9	557		21.1	739	3.9	10,285	41,138																											14.2			27.4
112		2.9			10.7	42.6		20.4	174	81.5	1,466		2.9	101	3.2	8,398	33,593																										4.7		1.1				28.7
113		77.3			77.3	309.1		3.4	29																																			4.8				35.2
114	Incl Ind Overlay	0.3			34.7	138.7												0.3	394	3,545												35.4	84,693	381,117	296,425	84,693											1.6	31.8
115	Incl BP & Ind Overlay	20.9			0.0	0.0																							10.4	90,605	90,605	22.3	53,426	240,419	186,992	53,426						0.0					8.7
116	Incl BP & Ind Overlay	16.7			0.0	0.0																							20.3	176,546	176,546	33.7	80,836	363,760	282,925	80,836												14.0
117		8.5																											8.5	73,974	73,974	11.5	27,580	124,111	96,531	27,580												6.7
118		88.0																														88.0	210,885	948,980	738,096	210,885					5.9						11.6
119		22.3	142.3	285	22.3	89.2				4.3	78																																	7.0				41.0
120		155.6			155.6	622.6				3.3	60				1.4	3,683	14,732																															66.0
121		78.0	36.3	73	78.0	312.2		1.1	9	8.3	150				5.1	13,284	53,137																										20.6		0.7				43.1
122		19.8			126.2	504.7		0.8	7	12.3	222				3.2	8,328	33,312																19.8	47,372	213,176	165,804	47,372										19.1			42.7
123	Incl Ind Overlay	89.4			0.0	0.0																										101.9	244,086	1,098,388	854,302	244,086											11.7
124		94.0																														94.0	225,259	1,013,667	788,408	225,259										9.5	10.6
125		50.4																											50.4	439,176	439,176	52.1	124,791	561,560	436,769	124,791												13.6
126		63.3																											63.3	551,318	551,318	38.0	91,061	409,777	318,715	91,061												15.0
127		142.5																														142.5	341,478	1,536,651	1,195,173	341,478					4.4						13.7
128		83.6																														83.6	200,329	901,480	701,151	200,329											20.2
129		133.2																														133.2	319,094	1,435,923	1,116,829	319,094											29.7
130		76.3																														76.3	182,894	823,023	640,129	182,894					7.7						16.5
131		153.0																														153.0	366,639	1,649,876	1,283,237	366,639											8.6	22.5
132		76.1																			33.3	761,112	271,826	54,365								76.1	182,231	820,039	637,808	182,231											4.2	17.2
133		230.6																														230.6	552,527	2,486,372	1,933,845	552,527											18.6
134		80.6																														80.6	193,052	868,733	675,681	193,052										0.6	3.6
135		58.2																														58.2	139,490	627,707	488,217	139,490					17.1					136.4	13.0	12.7
136		108.6																														108.6	260,145	1,170,652	910,507	260,145					13.6						18.3
137		57.1																														57.1	136,867	615,904	479,036	136,867					6.5				0.9		21.6
138		119.8																														119.8	287,006	1,291,528	1,004,522	287,006					30.9						8.5
139		131.5																														131.5	315,015	1,417,568	1,102,553	315,015											19.9
140		126.7																														126.7	303,562	1,366,027	1,062,465	303,562					7.7						15.8
141		126.5																														126.5	303,150	1,364,176	1,061,026	303,150					84.7						31.3
142		138.1																														138.1	330,766	1,488,446	1,157,680	330,766					12.8						7.9
143		149.2																														149.2	357,373	1,608,181	1,250,807	357,373											14.1
144		29.8	124.3	249						29.8	536				4.2	10,919	43,678																											19.3						29.4
145		89.5			89.5	357.9				23.5	423																																	4.7			45.6				35.6

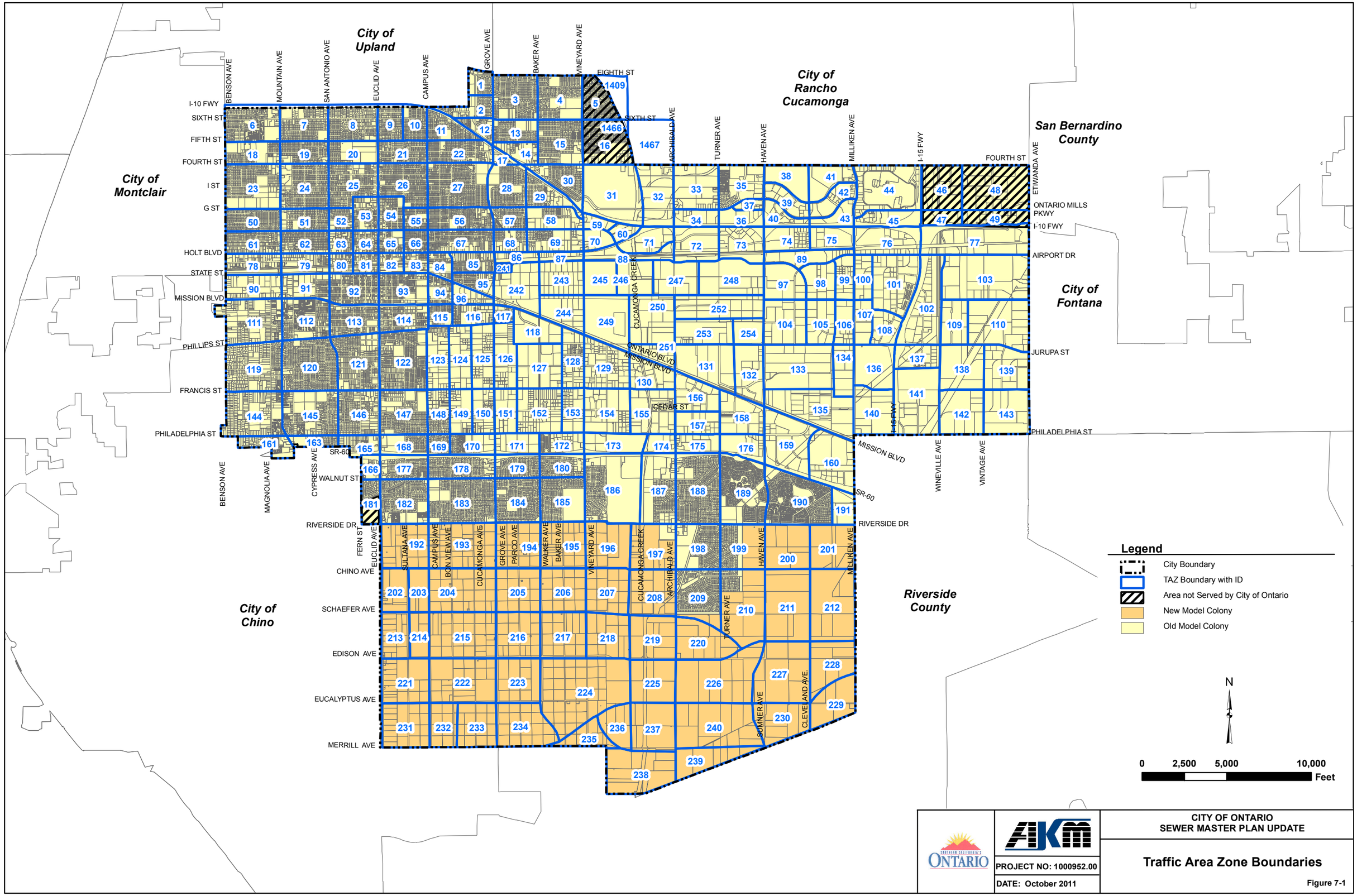
Table 7-2
General Plan Land Use Buildout by TAZ - Units, Sq. Ft. and Acres

General			Rural Residential		Low Density Residential			Low Medium Density Residential		Medium Density Residential			High Density Residential		Neighborhood Commercial			General Commercial			Office Commercial					Hospitality				Business Park			Industrial					Mixed Use					Open Space Non-Recrea-tion	Open Space - Parkland	Open Space - Water	Public Facility	Public School	Airport	Land Fill	Rail	ROW
2010 TAZ	Special Planning Area / Note	Ac	Ac	Units (2 du/ac)	Ac	OMC Units (4 du/ac)	NMC Units (4.5 du/ac)	Ac	OMC & NMC Units (8.5 du/ac)	Ac	OMC Units (18 du/ac)	NMC Units (22 du/ac)	Ac	OMC & NMC Units (35 du/ac)	Ac	Office (20% at 0.3 FAR)	Commer-cial (80% at 0.3 FAR)	Ac	Office (10% at 0.3 FAR)	Commer-cial (90% at 0.3 FAR)	Ac	Office (70% at 0.75 FAR)	Commer-cial (25% at 0.75 FAR)	Lodging (5% at 0.75 FAR)	Ac	Office (20% at 1.0 FAR)	Commer-cial (30% at 1.0 FAR)	Lodging (50% at 1.0 FAR)	Ac	Office (50% at 0.40 FAR)	Industrial (50% at 0.40 FAR)	Ac	Office (10% at 0.55 FAR)	Industrial (45% at 0.55 FAR)	Mfg. (35% at 0.55 FAR)	Ware-house (10% at 0.55 FAR)	Name	Ac	Multi-Family Units	Office	Commer-cial	Ac	Ac	Ac	Ac	Ac	Ac	Ac	Ac	Ac
146		72.5			72.5	290.0				35.0	629																										Euclid & Francis (Part)	10.4	157		182,048									31.1
147		0.5			98.2	392.9				21.9	395				1.0	2,576	10,303	0.5	630	5,666																							9.7							39.6
148		34.3			18.6	74.4				10.8	194																					34.3	82,199	369,894	287,696	82,199														16.3
149		57.5																														57.5	137,771	619,972	482,200	137,771						4.8			8.6					9.4
150		35.1																											35.1	305,522	305,522	35.7	85,567	385,052	299,485	85,567														9.0
151		41.2																											41.2	359,182	359,182	29.0	69,493	312,717	243,224	69,493														11.1
152		113.0																														113.0	270,810	1,218,643	947,833	270,810					24.0				4.6					18.1
153		50.4																														50.4	120,689	543,101	422,412	120,689					18.0									11.5
154		127.4																														127.4	305,206	1,373,425	1,068,220	305,206					16.8									20.4
155		135.8																														135.8	325,396	1,464,283	1,138,887	325,396					9.8									16.0
156		95.2																														95.2	227,962	1,025,829	797,867	227,962														17.9
157		66.1																														66.1	158,361	712,624	554,263	158,361									1.9					12.7
158		112.6																														112.6	269,668	1,213,504	943,837	269,668														17.5
159		126.1																			22.3	510,864	182,451	36,490								126.1	302,003	1,359,015	1,057,012	302,003					16.1									44.1
160		147.0																														147.0	352,186	1,584,835	1,232,649	352,186					9.6									32.3
161		6.8	17.0	34	6.8	27.2				11.7	210				12.3	32,196	128,782																																19.6
163		31.3			31.3	125.4									2.7	7,022	28,088																																9.3
165		12.8	22.5	45	1.8	7.2				7.2	130							12.8	16,740	150,657																														16.0
166	Incl Com Overlay	1.7			0.0	0.0				8.4	152				11.1	29,087	116,349	5.3	6,877	61,896																															12.3
168		5.9			15.1	60.5		24.9	212	2.8	51							5.9	7,758	69,820																															25.7
169		23.4			23.4	93.6																																												13.8
170		17.6			6.6	26.5				32.3	582							17.6	22,995	206,953																																18.6
171		5.9			0.0	0.0		56.3	479									5.9	7,693	69,237																																13.3
172		28.8			13.6	54.5															13.9	317,268	113,310	22,662								28.8	69,085	310,883	241,798	69,085														19.6
173		28.7				0.0															28.7	655,392	234,068	46,814																					8.7	48.2							13.4
174		3.7				0.0												3.7	4,840	43,564												27.3	65,486	294,688	229,201	65,486					5.0	0.6								10.5
175		6.4				0.0												6.4	8,356	75,200												48.2	115,530	519,883	404,354	115,530														12.7
176		58.1				0.0															7.5	171,882	61,386	12,277								58.1	139,179	626,306	487,127	139,179														17.9
177		1.7			44.1	176.4				2.7	49				6.3	16,455	65,819	1.7	2,247	20,219																															38.3
178		66.5			66.5	265.9									15.3	39,990	159,960																																46.0
179		49.5			49.5	198.0				0.01	0				2.5	6,580	26,322																																32.2
180		15.0			27.6	110.5				12.4	223							15.0	19,555	175,993																																29.1
181		8.9			23.5	94.0				16.6	300							8.9	11,670	105,032																																17.3
182		82.4			82.4	329.6				36.4	654				8.5	22,344	89,375																																		43.5
183		147.6			147.6	590.5																																												60.3
184		108.5			108.5	434.0																																												41.1
185		70.0			70.0	280.1		54.8	465																																										34.7
186		13.8			62.6	250.2				2.8	50				5.0	12,970	51,879	13.8	17,969	161,723																											3.9	143.4		34.2					44.8
187		36.9			47.0	187.9					0				13.2	34,373	137,492	36.9	48,215	433,937																											16.2	36.0		15.9					32.9
188		5.5			151.4	605.5				2.8	51				0.7	1,854	7,416	5.5	7,174	64,566																											10.0				11.5				71.9
189		109.7			109.7	438.7				17.2	310																																			22.8	13.8	8.2		17.3				55.4
190		3.3			126.1	504.3				23.6	424							3.3	4,291	38,622																											18.8	8.6			13.8				62.8
191		0.3			0.3	1.1																																						SR-60 & Hamner	41.1		313,261	349,063	11.2								8.6
192	NMC	15.2			58.9		265	19.9	169	58.8		1,294			9.4	24,525	98,099	15.2	19,804	178,232																																6.9
193	NMC	199.9			199.9		900	20.3	172			0			0.1	301	1,206																																			3.3
194	NMC	101.8			101.8		458	21.4	181	28.8		633			9.5	24,827	99,307																																			2.3
195	NMC	156.2			156.2		703								9.2	23,993	95,970																																			2.8
196	NMC	161.8			161.8		728																																													3.4
197	NMC (Part)	116.1			116.1		522			14.5	262				4.4	11,569	46,277																																			14.1
198		61.2			61.2	244.8	275			41.3		908			8.4	22,042	88,170																																			34.7
199	NMC (Part)	103.3			103.3	172.4	271								8.9	23,315	93,262																																			27.1
200	NMC	86.5			86.5		389	0.0	0																																												23.0
201	NMC	46.5			23.9		108			28.9		636						18.4	23,988	215,892									46.5	404,981	404,981																					27.2
202	NMC	30.5			30.5		137	0.2	2	61.3		1,349																																								4.2
203	NMC	69.9			69.9		315																																												0.0
204	NMC	188.3			188.3		847	25.4	216						8.6	22,413	89,652																																			0.0
205	NMC	105.4			105.4		474	38.0	323						0.3	861	3,444																																			0.0
206	NMC	139.3			139.3		627								9.7	25,286	101,144																																			0.0
207	NMC	141.4			141.4		637								0.3	736	2,942																																			4.4
208	NMC	58.2			58.2		262	0.1	1																																												16.6
209	NMC (Part)	109.8			109.8	387.6	58																																														48.6
210	NMC (Part)	128.9			137.6	89.6	518			29.7		653			14.7	38,423	153,693																																			30.2
211	NMC	32.7						32.7	278	64.4		1,417																																			NMC East (Part)	78.7	591	360,113	411,558	35.1	24.8							25.7
212	NMC	150.9										0																	150.9	1,314,957	1,314,957																					NMC East (Part)	75.5	566	345,282	394,608	11.0								22.4
213	NMC	0.2			0.2		1			43.9		967									41.0	937,216	334,720	66,944																											NMC West (Part)	1.1	12	20,623	3,437	13.3								6.1
214	NMC	1.5			1.5		7	23.4	199	36.6		804																																					NMC West (Part)	0.9	9	16,264	2,711	9.6								0.0
215	NMC	8.4			141.2		635	28.3	240	48.9		1,076						8.4	10,994	98,946																															NMC West (Part)	0.0	0	840	140	21.9								0.0
216	NMC	10.9			83.8		377	32.4	275	27.3		600						10.9	14,217	127,950																																	10.5								0.0
217	NMC	115.5			115.5		520			37.1		816																																			NMC West (Part)	6.0	63	109,728	18,288	11.8								0.0
218	NMC	105.0			105.0		473			27.0		593																																			NMC West (Part)	4.1	43	74,747	12,458	9.7	3.8							7.7
219	NMC	97.8			97.8		440	12.6	107			0																																										14.4
220	NMC	106.4			106.4		479			14.3		315																																											22.6
221	NMC	1.8						1.8	15	0.0		0									0.7	15,071	5,383	1,077																							NMC West	162.3	1,704	2,969,427	494,905									6.1

Table 7-2
General Plan Land Use Buildout by TAZ - Units, Sq. Ft. and Acres

General			Rural Residential		Low Density Residential			Low Medium Density Residential		Medium Density Residential			High Density Residential		Neighborhood Commercial			General Commercial			Office Commercial				Hospitality				Business Park			Industrial				Mixed Use				Open Space Non-Recrea-tion	Open Space - Parkland	Open Space - Water	Public Facility	Public School	Airport	Land Fill	Rail	ROW
2010 TAZ	Special Planning Area / Note	Ac	Ac	Units (2 du/ac)	Ac	OMC Units (4 du/ac)	NMC Units (4.5 du/ac)	Ac	OMC & NMC Units (8.5 du/ac)	Ac	OMC Units (18 du/ac)	NMC Units (22 du/ac)	Ac	OMC & NMC Units (35 du/ac)	Ac	Office (20% at 0.3 FAR)	Commer-cial (80% at 0.3 FAR)	Ac	Office (10% at 0.3 FAR)	Commer-cial (90% at 0.3 FAR)	Ac	Office (70% at 0.75 FAR)	Commer-cial (25% at 0.75 FAR)	Lodging (5% at 0.75 FAR)	Ac	Office (20% at 1.0 FAR)	Commer-cial (30% at 1.0 FAR)	Lodging (50% at 1.0 FAR)	Ac	Office (50% at 0.40 FAR)	Industrial (50% at 0.40 FAR)	Ac	Office (10% at 0.55 FAR)	Industrial (45% at 0.55 FAR)	Mfg. (35% at 0.55 FAR)	Ware-house (10% at 0.55 FAR)	Name	Ac	Multi-Family Units	Office	Commer-cial	Ac	Ac	Ac	Ac	Ac	Ac	Ac	Ac	Ac
222	NMC	12.6						5.7	49	139.0		3,057						12.6	16,412	147,704															NMC West (Part)	3.8	40	70,034	11,672		77.0								0.0
223	NMC	4.2						0.2	2	95.6		2,103						19.3	25,248	227,229									4.2	36,279	36,279										38.8							0.0
224	NMC	88.6			0.04		0.2			93.7		2,061						47.1	1,076,378	384,421	76,884						88.6	771,482	771,482								NMC West (Part)	137.4	1,443	2,513,483	418,914		72.8								2.5
225	NMC	81.9								81.9		1,801			11.5	30,043	120,172																						11.4	38.9		2.5					10.1
226	NMC	47.8			47.8		215			65.1		1,433																												117.9			63.7				11.7
227	NMC	89.4			89.4		402			36.5		802																									NMC East (Part)	49.3	370	225,685	257,926	27.8	21.0	26.7		0.0				13.9
228	NMC	41.7			41.7		187			39.4		866																									NMC East (Part)	60.2	451	275,253	314,575	2.4	6.3			0.3				5.3
229	NMC	104.6			104.6		471																																	0.3	4.4			11.6				13.6
230	NMC	93.4			93.4		420																																	3.8		24.3		21.6				13.0
231	NMC	19.6						74.7	635									42.9	56,015	504,138	24.1	551,596	196,999	39,400					19.6	170,399	170,399																	7.1
232	NMC	25.8						73.1	621																				25.8	224,542	224,542																	0.2
233	NMC	45.6						92.1	783																				45.6	397,306	397,306																	0.4
234	NMC	163.3						3.1	26									18.8	24,575	221,176									163.3	1,422,665	1,422,665																	0.3
235	NMC	70.6																											70.6	615,349	615,349	5.9	14,215	63,968	49,753	14,215												0.4
236	NMC	53.5								0.03		1									0.3	7,108	2,539	508					53.5	465,913	465,913	36.8	88,247	397,110	308,864	88,247													0.0
237	NMC	70.9								0.8		17			12.0	31,434	125,737				11.7	268,480	95,886	19,177				70.9	617,454	617,454	50.7	121,585	547,132	425,547	121,585					13.6							13.6
238	NMC	28.5																											28.5	248,237	248,237	175.2	419,695	1,888,628	1,468,933	419,695					12.1							7.9
239	NMC	83.1			83.1		374																																	16.3	5.9							19.3
240	NMC	228.7			228.7		1,029																																	13.6	8.5			10.3				28.5
241		0.4																														8.9	21,313	95,907	74,594	21,313							0.4				2.4
242		129.5																											2.1	18,657	18,657	8.1	19,440	87,480	68,040	19,440									129.5		6.6	10.9
243		119.7																																										119.7			1.1
244		98.8																																										98.8		6.2	4.4
245		90.9																																										90.9			1.2
246		101.3																																										101.3			0.0
247		124.2																																										124.2			0.0
248		177.1																																										177.1			2.5
249		164.8																																										164.8		6.5	5.1
250		124.5																														53.2	127,423	573,404	445,981	127,423								124.5			1.9
251		7.0																														43.4	104,021	468,096	364,075	104,021								7.0		6.6	5.9
252		167.5																																										167.5			0.9
253		14.2																														98.5	236,004	1,062,016	826,012	236,004								14.2			6.8
254		8.7																														49.8	119,331	536,988	417,657	119,331								8.7			4.8
1409		0.0			0.00	0.01																																		7.1								0.0
1466		0.0			0.03	0.1																																		3.9								1.0
1467		0.0			0.03	0.1																										0.03	61	276	215	61					5.8								
Total		**15,264**	**453**	**906**	**7,470**	**17,214**	**14,526**	**800**	**6,803**	**1,955**	**15,381**	**24,201**	**241**	**8,422**	**277**	**723,999**	**2,895,998**	**552**	**720,943**	**6,488,490**	**526**	**12,020,135**	**4,292,905**	**858,581**	**145**	**1,262,607**	**1,893,911**	**3,156,519**	**1,357**	**11,822,416**	**11,822,416**	**6,748**	**16,165,750**	**72,745,877**	**56,580,127**	**16,165,750**		**1,822**	**17,041**	**26,696,318**	**14,363,430**	**1,243**	**991**	**59**	**99**	**627**	**1,422**	**137**	**247**	**4,879**

Note: TAZ acres assume the areas within the Business Park, Industrial and Commercial Overlay areas will be developed accordingly and transition from their current underlying designations. Also ROW extends beyond the city limits since some TAZ boundaries extend outside the Ontario City Limits.



CITY OF ONTARIO
SEWER MASTER PLAN UPDATE

Traffic Area Zone Boundaries

PROJECT NO: 1000952.00

DATE: October 2011

Figure 7-1

7-6 Schools

The City's existing land use map and general plan map were used to designate land uses for the model. Schools are identified as public facilities on the City's maps. It is most appropriate to base the load upon the estimated number of students attending each school. Therefore, the school loads were calculated individually based upon the number of students. The public elementary school unit flow factor recommended is 15 gpd/student. The public junior high school and high school unit flow factor recommended is 20 gpd/student. These are typical factors used for planning purposes, based upon review of water use records and accounting for irrigation. The calculated flows were then manually input into the model at the appropriate node. A list of the schools and estimated average sewage generation is shown in Table 7-3.

Table 7-3
School Loads

Model	Model Node ID	School Name	Address	Area (ac)	Number of Students	Unit Flow Factor (gpd/stu)	Average Sewage Generation (gpd)
High Schools							
North	F17120	Valley View High	1801 East Sixth St	18.00	822	20	16,440
North	F17FI	Gibson High	1800 East Seventh Street	13.00	109	20	2,180
North	H13110 & G13153	Chaffey High	1245 North Euclid Ave	31.10	3,407	20	68,140
East	H18100	Bernt High	2230 East Fourth St	2.04	321	20	6,420
West	O12133	Ontario High	901 West Francis St	36.82	2,690	20	53,800
South	R14502	Woodcrest High	2725 South Campus Ave	1.80	542	20	10,840
South	R21100	Colony High	3850 East Riverside Dr	37.90	2,323	20	46,460
Middle Schools							
North	H12179 & H12115	Danks Middle	1020 North Vine Ave	9.27	1,113	20	22,260
North	I16143	Wiltsey Middle	1450 East G St	15.05	1,027	20	20,540
West	M10101	Oaks Middle	1221 South Oaks Ave	14.31	1,010	20	20,200
West	M13157	De Anza Middle	1450 South Sultana Ave	9.46	951	20	19,020
South	R20141	Yokley Middle	2947 South Turner Ave	16.87	1,257	20	25,140
Elementary Schools							
North	F14141	Edison Elementary	515 East Sixth St	4.90	527	15	7,905
North	F17116	Arroyo Elementary	1700 East Seventh St	8.42	708	15	10,620
West	G10501	El Camino Elementary	1525 West Fifth St	9.48	820	15	12,300
North	G12115	Hawthorne Elementary	705 West Hawthorne St	7.26	853	15	12,795
North	G14143	Berlyn Elementary	1320 North Berlyn Ave	9.63	961	15	14,415
North	G16116	Vineyard Elementary	1500 East Sixth St	9.33	646	15	9,690
West	H11131	Elderberry Elementary	950 North Elderberry Ave	9.32	847	15	12,705
North	H15180	Del North Elementary	850 Del Norte Ave	9.28	787	15	11,805
North	H17100	Corona Elementary	1140 North Corona Ave	8.95	699	15	10,485
North	I13116	Central Elementary	415 East G St	4.42	580	15	8,700
North	J14100	Lincoln Elementary	440 North Allyn	7.00	372	15	5,580
North	J16105	Mariposa Elementary	1605 East D St	10.06	836	15	12,540
West	M13108	Euclid Elementary	1120 South Euclid Ave	4.94	634	15	9,510
West	N10140	Vista Grande Elementary	1390 West Francis St	7.05	613	15	9,195
West	O12501	Haynes Elementary	715 West Francis St	8.93	922	15	13,830
West	O13102	Sultana Elementary	1845 South Sultana Ave	7.93	960	15	14,400
West	P14103	Bon View Elementary	2121 South Bon View Ave	8.65	793	15	11,895
South	Q19123	Ontario Center Elementary	8776 Archibald Ave	11.48	772	15	11,580
South	Q19500	Mountain View Elementary	2947 South Turner Ave. A	16.87	588	15	8,820
South	Q21148	Creek View Elementary	3742 Lytle Creek North Loop	14.08	736	15	11,040
South	R14109	Liberty Elementary	2730 South Bon View Ave	9.55	766	15	11,490
South	R15132	Dickey Elementary	2840 Parco Ave	9.44	791	15	11,865
South	T19106	Ranch View Elementary	3300 Old Archibald Rd	10.02	733	15	10,995
			Total	**412.61**	**32,516**		**565,600**

7-7 High Water Users

High water users will typically contribute large volumes of sewage to the local sewer system. Irrigation uses are excluded because this water does not contribute to the sewer system. For this study, the City provided water use records for its entire service area over a one year period. The high water users were initially considered to be those customers with an average water use of 14,400 gpd (10 gpm) or more. Low density residential users were generally excluded from this analysis assuming that a high water use in a low density residential would be due to irrigation or the use of a swimming pool. In these instances, the water would not be contributing to the local sewer system on a continuous basis.

For the existing sewer model, a total of 92 high water users were identified and are listed in Table 7-4. The land uses associated with each of the high water users were typically either commercial, industrial, or multi-family residential. These land use types typically have minimum amounts of landscape irrigation needs and primarily use the water indoors. Therefore, the sewage generation was estimated by taking 90 percent of the recorded average water use. The difference between the sewage flow estimated by water use records and the sewage flow estimated by unit flow factor and land use was then manually added to the hydraulic model at the appropriate node.

For the ultimate sewer model, a total of 17 high water users were identified and are listed in Table 7-5. The reason for the lower number of identified high water users is that the ultimate unit flow factors and land use resulted in higher sewage estimates. Therefore, less locations resulted in a higher sewage estimate based on water use compared to based on unit flow factors and land use.

7-8 Pump Stations

The City recently decommissioned four sewage pump stations, namely Turner Pump Station, Riverside-Archibald Pump Station, Archibald Ranch Pump Station, and Whispering Lakes Pump Station. The flows tributary to these pump stations have been diverted to the newly constructed Eastern Trunk Sewer which flows south through New Model Colony to the IEUA Kimball Interceptor Sewer on Kimball Avenue. The sewers tributary to these four pump stations were modeled up until the decommissioned pump station location in the OMC models and the flows are added at the same location represented in the NMC model.

Currently the City operates three pump stations, namely Magnolia Pump Station, Haven Pump Station, and Edenglen Pump Station.

The Magnolia Pump Station is located on the east side of Magnolia Avenue near the intersection with Monticello Street. Its tributary area is shown on Figure 5-7. The existing average flow to the station is about 34 gpm. The ultimate average flow is expected to be approximately 36 gpm. Sewage collected at the Magnolia Pump Station is pumped to a gravity sewer on Magnolia Avenue, located approximately 850 feet north of Philadelphia Street and is conveyed south to the RP-1. Since this outflow point from the Magnolia Pump Station is the City's gravity system, the pump station flows were included as a part of the hydraulic model and analysis. The tributary loads to Magnolia Pump Station were transferred in the model to the outflow point (MH O11123).

Table 7-4
Point Source Loadings for High Water Users – Existing Model

No.	Customer Name	Cutomer Address	Model	Model Node ID	(1) Sewage Generation Estimate based on Water Use (mgd)	Existing Land Use	Calibrated UFF (gpd/ac)	Area (ac)	(2) Sewer Load by UFF (mgd)	(3) Extra Sewer Load added to Model (mgd)
1	Alumin Art Plating	803 W State St	West	K12137	0.0185	IND	400	0.72	0.0003	0.0182
2	Ap-Transpark Llc	2910 E Inland Empire Bl	East	I19129	0.0417	COM	1000	14.52	0.0145	0.0272
3	Bedford-Prop Inv	1555 S Dupont Av	East	M22137	0.0231	COM	1000	20.93	0.0209	0.0022
4	Bericap	1671 S Champagne Av B	East	N25101	0.0139	IND	400	15.72	0.0063	0.0076
5	BMW Of America	1150 S Milliken Av	East	L22113	0.0160	IND	400	22.00	0.0088	0.0072
6	Casa Partners III L.P.	1661 E G St	East	H19109	0.0869	MFR	2800	5.73	0.0160	0.0709
7	Chem Lab	5180 E Airport Dr	East	K24107	0.0362	IND	400	9.52	0.0038	0.0324
8	Cintas Corporation	2150 S Proforma Av	East	O18129	0.1671	IND	400	6.18	0.0025	0.1646
9	Clement Pappas	1755 E Acacia St	West	M17121	0.0993	IND	400	8.84	0.0035	0.0958
10	Coastal Ontario LLC	1701 E D St	North	J16104	0.0900	MFR	2800	15.03	0.0421	0.0479
11	Coca Cola USA	1650 S Vintage Av	East	N25100	0.1133	IND	400	24.83	0.0099	0.1034
12	Colony Terrace Lp	2550 E Riverside Dr	South	S19104	0.0747	MFR	2800	14.53	0.0407	0.0341
13	Crothall Healthcare Inc	5410 E Francis St	East	O24100	0.1299	IND	400	37.97	0.0152	0.1147
14	Crown Toyota	1201 S Kettering Dr	East	L24103	0.0272	COM	1000	3.59	0.0036	0.0236
15	Culligan Water	1925 S Burgundy Pl	East	O23104	0.0437	IND	400	1.67	0.0007	0.0431
16	Dairy Fresh Products	601 S Rockefeller Av	East	K23113	0.0368	IND	400	12.90	0.0052	0.0316
17	Danco Metal Surfacing	1750 E Monticello Ct	South	P17152	0.0167	IND	400	0.70	0.0003	0.0165
18	Dba Guasti Plaza(4)	2700 E Guasti Rd	East	J19107	0.0178	VACANT	0	1.45	0.0000	0.0178
19	Dominos Pizza Dist Corp	301 S Rockefeller Av	East	K23101	0.0156	IND	400	2.78	0.0011	0.0144
20	Doubletree Hotel Ontario	222 N Vineyard Av	North	J17101	0.0741	COM	1000	13.59	0.0136	0.0605
21	DS Hotel Investment	1801 E G St	North	I17111	0.0264	COM	1000	5.61	0.0056	0.0208
22	Erp Operating Part	1005 N Center Av	East	H20105	0.0670	SFR	1200	17.34	0.0208	0.0462
23	Estancia Apartments	1720 E D St	North	J16119	0.0449	MFR	2800	9.51	0.0266	0.0183
24	F H Gasoline	506 N Euclid Av	West	I13151	0.0186	COM	1000	0.36	0.0004	0.0182
25	Fairfield Ontario Towne LLC	950 N Duesenberg Dr	East	H21115	0.0573	MFR	2800	18.29	0.0512	0.0061
26	Fern Creek(4)	2530 S Fern Av	South	P13118	0.0133	VACANT	0	7.86	0.0000	0.0133
27	Fresh Start Bakeries	1220 S Baker Av	West	M17110	0.0304	IND	400	9.34	0.0037	0.0267
28	Fruit Growers Supply	225 S Wineville Av	East	K24107	0.0506	COM	1000	26.73	0.0267	0.0239

Table 7-4 (Continued)
Point Source Loadings for High Water Users – Existing Model

No.	Customer Name	Cutomer Address	Model	Model Node ID	(1) Sewage Generation Estimate based on Water Use (mgd)	Existing Land Use	Calibrated UFF (gpd/ac)	Area (ac)	(2) Sewer Load by UFF (mgd)	(3) Extra Sewer Load added to Model (mgd)
29	Golden State Alliance	902 E Holt Bl	North	J14183	0.0185	COM	1000	0.80	0.0008	0.0177
30	Grove Apts	227 W H St	West	I13120	0.0158	MFR	2800	2.45	0.0069	0.0090
31	Grove Manor	720 S Cypress Av	West	I12143	0.0447	MFR	2800	1.34	0.0038	0.0410
32	H K Realty	109 W Belmont St	West	M13107	0.0162	IND	1000	0.22	0.0002	0.0160
33	Harris Place Apts	451 E Riverside Dr	South	R13139	0.0230	LMDR	1200	8.08	0.0097	0.0133
34	Hirchag,Frances	647 W Cedar St	West	O12129	0.0136	SFR	1200	0.21	0.0003	0.0134
35	Howard Packaging Inc.	620 S Magnolia Av #D	West	K11135	0.0186	COM	1000	0.64	0.0006	0.0180
36	Inland Christian Hm	1950 S Mountain Av	West	O11109	0.0303	MFR	2800	8.74	0.0245	0.0059
37	Inland Framing & Development(4)	607 W Holt Bl	West	J12173	0.0363	VACANT	0	0.73	0.0000	0.0363
38	Innkeepers Hospitality	700 N Haven Av	East	I21119	0.0467	COM	1000	7.75	0.0077	0.0390
39	J.D. Heiskell NCO	5355 E Airport Dr	East	J25101	0.0172	COM	1000	9.15	0.0092	0.0081
40	John Laing Homes	948 N Turner Av	East	H20120	0.0816	SFR	1200	0.16	0.0002	0.0814
41	Jomar Table Linens Inc	4000 E Airport Dr	East	K22106	0.0174	IND	400	9.44	0.0038	0.0136
42	K Mart Dist Center	5600 E Airport Dr	East	J25107	0.0352	IND	400	34.80	0.0139	0.0213
43	Kaiser Permanente	2295 S Vineyard Ave	South	P17156	0.0330	COM	1000	27.85	0.0279	0.0051
44	Kendred Hospital	555 N Campus Av	North	I14168	0.0149	COM	1000	4.51	0.0045	0.0103
45	La Terraza Apartments	551 E Riverside Dr	South	R14140	0.0319	MFR	2800	8.72	0.0244	0.0074
46	Lighthouse Transport LLC	2019 S Business Pw A	East	O19146	0.1848	IND	400	4.92	0.0020	0.1829
47	Merwyn's #996	1015 S Vintage Av	East	L25114	0.0224	IND	400	31.87	0.0127	0.0096
48	Mid Cities	1360 E D St	North	J16124	0.0281	MFR	2800	4.38	0.0123	0.0158
49	Mission Woods Inc.	1309 W Mission Bl	West	L11122	0.0382	MFR	2800	1.50	0.0042	0.0340
50	Mountain Gate Apts	1072 E Nocta St	North	J15140	0.0272	COM	1000	0.13	0.0001	0.0271
51	Mountain Shadows Owners	1300 N Elderberry Av	West	G11103	0.0634	SFR	1200	2.40	0.0029	0.0605
52	Mountain Village/CMS	1812 S Mountain Av	West	N11154	0.1889	SFR	1200	1.48	0.0018	0.1871
53	New Country 693	251 E Riverside Dr	South	R13137	0.0275	COM	1000	2.71	0.0027	0.0248
54	Ontario Convention Center	2000 E Convention Center Wy	North	J17108	0.0379	PUBLIC	1000	17.26	0.0173	0.0206
55	Ontario Inn,Llc	3201 E Centrelake Dr	East	J20105	0.0162	COM	1000	2.35	0.0024	0.0139
56	Ontario Marriot	2158 E Holt Bl	North	J17144	0.0161	COM	1000	10.30	0.0103	0.0058

Table 7-4 (Continued)
Point Source Loadings for High Water Users – Existing Model

No.	Customer Name	Cutomer Address	Model	Model Node ID	(1) Sewage Generation Estimate based on Water Use (mgd)	Existing Land Use	Calibrated UFF (gpd/ac)	Area (ac)	(2) Sewer Load by UFF (mgd)	(3) Extra Sewer Load added to Model (mgd)
57	Ontario-Hosp Suites	3400 E Shelby St	East	I20129	0.0185	COM	1000	3.26	0.0033	0.0152
58	Palm Village Gardens	1358 N San Diego Av	North	G17117	0.0150	SFR	1200	3.03	0.0036	0.0114
59	Pama Mgt #500	1348 E Nocta St	North	J16124	0.0159	MFR	2800	2.17	0.0061	0.0099
60	Park Vista	1031 S Palmetto Av	West	L11124	0.0709	SFR	1200	4.74	0.0057	0.0652
61	Philadlephia 103 Partners	926 W Philadelphia St # 99	South	P12129	0.0275	SFR	1200	0.02	0.0000	0.0275
62	Pick-A-Part	2025 S Milliken Av	East	O22105	0.0136	IND	400	26.13	0.0105	0.0032
63	Plaza Continental	3700 E Inland Empire Bl	East	I21161	0.0160	COM	1000	3.84	0.0038	0.0122
64	Plaza Continental	3750 E Inland Empire Bl	East	I21105	0.0156	COM	1000	3.43	0.0034	0.0122
65	Plott Nursing Home LLC	800 E Fifth St	North	G14501	0.0237	COM	1000	3.65	0.0037	0.0200
66	Propak California Corp	5772 E Jurupa St	East	M25125	0.0844	IND	400	16.75	0.0067	0.0777
67	Rama Foods	2131 S Parco Av	West	O16155	0.0170	IND	400	1.10	0.0004	0.0166
68	Red Roof Inn #216	1818 E Holt Bl	North	J17151	0.0129	COM	1000	1.93	0.0019	0.0110
69	Regis Contractors L P	955 N Duesenberg Dr	East	H21104	0.2311	MFR	2800	11.13	0.0312	0.1999
70	Residence Inn	2025 E Convention Center Wy	North	J17102	0.0307	COM	1000	4.95	0.0050	0.0257
71	Rezvani,Bob	4350 E Mills Circle	East	I23102	0.0139	COM	1000	1.48	0.0015	0.0124
72	RREEF Management Company	3281 E Guasti Rd	East	J20110	0.0228	COM	1000	6.67	0.0067	0.0161
73	S K Investments	1233 E Holt Bl	North	J15148	0.0133	COM	1000	1.20	0.0012	0.0121
74	Samoa Village#2	2300 S Sultana Av	South	P13117	0.0458	MFR	2800	10.02	0.0281	0.0177
75	Security Capital	2800 E Riverside Dr	South	S19108	0.1407	MFR	2800	20.87	0.0584	0.0823
76	Sheraton Ontario Airport	429 N Vineyard Av	North	I17126	0.0207	COM	1000	3.59	0.0036	0.0171
77	Sir James LP	3351 E Honeybrook Wy	South	R20124	0.1875	MFR	2800	7.36	0.0206	0.1669
78	Sunkist	620 E Sunkist St	West	K14160	0.0236	IND	400	11.05	0.0044	0.0192
79	Superior Quality Foods	2355 E Francis St	East	N18115	0.0137	IND	400	1.75	0.0007	0.0130
80	Ta Operation Corporation	4327 E Guasti Rd	East	J23106	0.0357	COM	1000	31.81	0.0318	0.0039
81	Taing Family Trust	2200 S Mountain Av	South	P11124	0.0134	COM	1000	0.77	0.0008	0.0127
82	The Casitas Apts	1900 S Campus Av	West	O14113	0.0873	MFR	2800	14.72	0.0412	0.0461
83	The Mills Mgmt Corp	4320 E Fourth St	East	H23113	0.2347	COM	1000	1.82	0.0018	0.2329

Table 7-4 (Continued)
Point Source Loadings for High Water Users – Existing Model

No.	Customer Name	Cutomer Address	Model	Model Node ID	[1] Sewage Generation Estimate based on Water Use (mgd)	Existing Land Use	Calibrated UFF (gpd/ac)	Area (ac)	[2] Sewer Load by UFF (mgd)	[3] Extra Sewer Load added to Model (mgd)
84	Total Logistic Control, LLC	104 S Wanamaker Av	East	K23100	0.0384	IND	400	8.80	0.0035	0.0349
85	Travelcenter Of	4265 E Guasti Rd	East	J22110	0.0421	IND	400	34.17	0.0137	0.0284
86	Trio Glen Community Assoc.	1754 E Flora St	North	I17124	0.0133	SFR	1200	0.03	0.0000	0.0133
87	Unifirst Corp	700 S Etiwanda Av	East	K26100	0.0572	IND	400	4.26	0.0017	0.0554
88	Vargas-Montoya,Jaime	5505 E Jurupa St	East	M25121	0.0240	IND	400	2.36	0.0009	0.0230
89	WCOT Centrelake LLC	3401 E Centrelake Dr	East	J20104	0.0175	IND	400	3.59	0.0014	0.0161
90	Wishy Washy Inc.	658 W Holt Bl	West	J12163	0.0131	COM	1000	3.90	0.0039	0.0092
91	Wong,Thomas	405 N Vineyard Av	North	J17105	0.0247	COM	1000	1.30	0.0013	0.0234
92		1053 W Philadelphia St	South	P11122	0.0185	COM	1000	1.40	0.0014	0.0171
									Total	**3.4266**

[1] Sewage Generation Estimate = 90% x Water Use (mgd)

[2] Sewer Load by UFF = Area (ac) x Unit Flow Factor (gpd/ac) / 1,000,000gpd/mgd

[3] Extra Sewer Load = Sewage Generation Estimate - Sewer Load by UFF

[4] Establised Land Use type prior to selection of High Water Users.

[5] Extra sewer load is considered an unpeakable or constant load due to 24 hour operation

Table 7-5
Point Source Loadings for High Water Users – Ultimate Model

No.	Name	Customer Address	(1) Sewage Generation Estimate based on Water Use (mgd)	Model	Model Node IDs		TAZ	Ultimate Land Use	(2) Estimated Sewer Load by Land Use and UFF (mgd)	(3) Total Extra Sewer Load added to Model (mgd)	(3) Extra Sewer Load added to Model at each Manhole (mgd)
1	Mountain Village/CMS and Inland Christian Hm	1812 S Mountain Av and 1950 S Mountain Av	0.2192	West	N11154	O11122	144	MDR	0.1126	0.1066	0.0266
					O11109	O11123					
2	Hirchag,Frances	647 W Cedar St	0.0136	West	O12129		145	LDR	0.0021	0.0116	0.0116
3	Grove Manor	720 S Cypress Av	0.0447	West	K12101	K12154	91	LMDR	0.0000	0.0447	0.0064
					K12102	K12159					
					K12151	L12100					
					K12152						
4	Mountain Shadows Owners	1300 N Elderberry Av	0.0634	West	F10118	G10127	6	LMDR	0.0384	0.0250	0.0018
					G10106	G10129					
					G10113	G11103					
					G10114	G11104					
					G10116	G11115					
					G10121	G11124					
					G10125	G11136					
5	Trio Glen Community Assoc.	1751 E Flora St and 1754 E Flora St	0.0418	North	I16140	I17115	58	LDR	0.0183	0.0235	0.0020
					I16141	I17119					
					I16142	I17126					
					I16149	I17127					
					I16150	I17131					
					I17114	J17106					
6	Pama Mgt #500	1348 E Nocta St	0.0159	North	J16123	J16137	68	BP	0.0128	0.0031	0.0010
					J16124						
7	F H Gasoline	506 N Euclid Av	0.0186	North	I13130	I13151	54	MU	0.0163	0.0023	0.0006
					I13142	J13104					

Table 7-5 (Continued)
Point Source Loadings for High Water Users – Ultimate Model

No.	Name	Customer Address	(1) Sewage Generation Estimate based on Water Use (mgd)	Model	Model Node IDs		TAZ	Ultimate Land Use	(2) Estimated Sewer Load by Land Use and UFF (mgd)	(3) Total Extra Sewer Load added to Model (mgd)	(3) Extra Sewer Load added to Model at each Manhole (mgd)
8	Sir James LP	3351 E Honeybrook Wy	0.1875	South	Q20157	R20109	189	MDR	0.0651	0.1224	0.0111
					Q20165	R20118					
					Q20171	R20119					
					R20101	R20123					
					R20105	R20124					
					R20108						
9	Colony Terrace Lp	2550 E Riverside Dr	0.0747	South	R18126	R18127	197	MDR	0.0549	0.0198	0.0099
10		1053 W Philadelphia St	0.0185	South	P11122	P11137	163	NC	0.0035	0.0150	0.0075
11	Country Meadows	1855 E Riverside Dr	0.1509	South	Q17175	R17140	185	LMDR	0.1117	0.0392	0.0039
					Q17182	R17152					
					R17110	R17153					
					R17119	R17154					
					R17130	R17155					
12	New Country 693	251 E Riverside Dr	0.0275	South	R13100	R13137	182	NC	0.0112	0.0163	0.0033
					R13133	R13142					
					R13134						
13	Ta Operation Corporation	4327 E Guasti Rd	0.0357	East	J22108	J23108	76	GC	0.0290	0.0067	0.0013
					J23106	J23109					
					J23107						
14	Travelcenter Of	4265 E Guasti Rd	0.0421	East	J22107	J22111	75	GC	0.0334	0.0087	0.0022
					J22110	J22113					
15	Lighthouse Transport LLC	2019 S Business Pw A	0.1848	East	O19144	P19100	157	IND	0.1109	0.0739	0.0062
					O19146	P19101					
					O19147	P19103					
					O19149	P19114					
					O19150	P19115					
					O20146	P20100					

Table 7-5 (Continued)
Point Source Loadings for High Water Users – Ultimate Model

No.	Name	Customer Address	(1) Sewage Generation Estimate based on Water Use (mgd)	Model	Model Node IDs		TAZ	Ultimate Land Use	(2) Estimated Sewer Load by Land Use and UFF (mgd)	(3) Total Extra Sewer Load added to Model (mgd)	(3) Extra Sewer Load added to Model at each Manhole (mgd)
16	Coca Cola USA	1650 S Vintage Av	0.1133	East	M25123	N25104	138	IND	0.1004	0.0129	0.0032
					N25100	N25109					
17	The Casitas Apts	1900 S Campus Av	0.0000	West	O13105	O13125	147	MDR	0.0859	0.0014	0.0002
					O13107	O13501					
					O13116	O14113					
					O13117	O14152					
									Total	**0.5330**	

(1) Sewage Generation Estimate = 90% x Water Use (mgd)

(2) Sewer Load by UFF = Area (ac) x Unit Flow Factor (gpd/ac) / 1,000,000 (gpd/mgd)

(3) Extra Sewer Load = Sewage Generation Estimate - Sewer Load by UFF

Haven Pump Station is located on the north side of the Pomona Freeway about 900 feet east of Haven Avenue. Its tributary area is shown on Figure 5-8. The existing average flow to the station is about 299 gpm. The ultimate average flow is estimated at about 1,394 gpm. Sewage collected at the Haven Pump Station is currently pumped northeast to the Inland Empire Utilities Agency (IEUA) collector on Cedar Street. Since the outflow point from the Haven Pump Station is not a City sewer facility, the data from the pump station will not affect the model of the existing sewer system. The sewers tributary to this pump station were modeled up to the pump station location. However, the pump station and forcemain were not included in the hydraulic model. For the ultimate conditions, the tributary flows to Haven Pump Station were transferred to manhole G90 in the NMC Model.

The Edenglen Pump Station is located on the north side of Chino Avenue, east of Mill Creek Avenue. It is a temporary lift station serving the first phase of homes in the Brookfield / Edenglen development. The pump station serves a total of 225 dwelling units with an estimated average flow of 48,000 gpd or 33 gpm (*per City Memorandum "Edenglen Lift Station Capacity" dated May 18, 2010*). The peak wet weather flow is estimated at 164,000 gpd or 114 gpm. During the pump station start-up testing which was conducted on November 9, 2007, the pump station delivered approximately 180 gpm. The tributary flows to Edenglen Pump Station were transferred in the existing system model to manhole R21218 in Riverside Drive. Ultimately, the flows from this development will be rerouted to the south through the New Model Colony sewer system.

7-9 Holt Boulevard Trunk Sewer

The Holt Trunk Sewer Project was constructed in two phases from Cucamonga Avenue to San Antonio Avenue. Phase A consists of a sewer on Holt Boulevard from Lemon Avenue to Cucamonga Avenue, intercepting all wastewater flow from north of Holt Boulevard and conveying it east to the existing IEUA Upland Interceptor Relief on Cucamonga Avenue. Phase B is a continuation of Phase A, extending the sewer on Holt Boulevard west from Lemon Avenue to the alley located just west of San Antonio Avenue. Essentially, all flows generated north of Holt Boulevard are intercepted by the new sewer and conveyed east to the existing IEUA Upland Interceptor Relief on Cucamonga Avenue. The area tributary to the Holt Boulevard sewer is shown on Figure 5-1 as Sewershed 2.

7-10 Siphons

It should be noted that the Info Sewer model does not include a detailed hydraulic analysis of the siphons in the existing sewer system. The model calculates an average slope using the inverts at the upstream and downstream end of the siphon. The hydraulic analysis results are based upon this calculated slope. If a siphon is in need of replacement, a detailed hydraulic analysis should be performed during the preliminary design phase of the project to size the siphon and determine the hydraulic grade lines in the adjacent portions of the system.

At the request of City staff, a detailed hydraulic analysis was performed on the siphon located south of Philadelphia Street and west of Haven Avenue. This siphon, referred to as the Archibald Trunk Siphon, was constructed in 2001 but identified as a part of the City's sewer system after the last

Sewer Master Plan was completed in 1995. The siphon was constructed by the San Bernardino County Flood Control District (SBCFCD) as a part of the Easterly Basin and West Cucamonga Channel project. It was designed and constructed to go underneath Cucamonga Channel. At the point of crossing, Cucamonga Channel is a concrete rectangular channel with a width of 43'-4" and a height that varies from 10'-1" to 11'-8". The siphon has 3 pipes, including an 8-inch, a 12-inch, and a 24-inch pipe. Under current conditions, the 8-inch pipe is gated and a metal core fiberglass stop log section is installed as a weir structure to divert the flow from the 24-inch pipe. Therefore, only the 12-inch pipe is in operation under normal conditions. At certain high flows, the sewage can overtop the weir and will be conveyed in the 24-inch pipe as well. At the downstream end of the siphon, the flow enters a 33-inch IEUA trunk sewer and is then conveyed southeast to the headworks of IEUA's RP-1 treatment plant.

The detailed hydraulic analysis performed on the Archibald Trunk Siphon showed that the existing 12-inch pipe could handle the existing average flow, the existing peak dry weather flow, and the ultimate average flow. Under ultimate peak dry weather flow conditions, the 8-inch pipe would be needed in addition to the 12-inch pipe to convey the flow through the siphon without overtopping the weir in the upstream manhole. The capacity of the 24-inch pipe could then be reserved for extreme wet weather flow conditions. The detailed siphon analysis and results are included in Appendix I of this report.

7-11 Amendments

The above subsections of Section 7 do not reflect any changes or analysis for Amendments. Refer to Appendix K for supporting information relating amended items.

The Carpenter Trunk Sewer in the NMC has been amended in February 2018 by Amendment #1 in Appendix K1.