SECTION 6

HYDRAULIC SEWER MODEL

6-1 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 software designed for the analysis of sewer systems. The software selected for this study is H2OMap Sewer. It 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 data for pipe diameters, lengths, grades, and roughness coefficients as well as land use classifications. The developed Old Model Colony sewer model includes all of the City's manholes, sewer pipes (excluding laterals, private sewers, and sewers belonging to other agencies), pump stations, large point source flows, and tributary area boundaries. It is important to include all pipes in the model to comply with the Statewide Waste Discharge Requirements that requires hydraulic analysis of the City's entire collection system. 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 diameter (d/D).

6-2 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 6-1 is a list of the information that was imported into the model from the City's 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.

Table 6-1
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 + TOID
Downstream Invert Elevation (ft)	OUTELEV
Pipe Size (in)	DIAMETER
Pipe Length (ft)	PIPELENGTH

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.

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 was multiple line segments located between two nodes. Research showed that many of the fittings represented lateral connections. For modeling purposes, sewer pipes do not need to be separated whenever there is a lateral connection. 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 any 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.

6-3 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. 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.

6-4 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 implemented 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 the same 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 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.

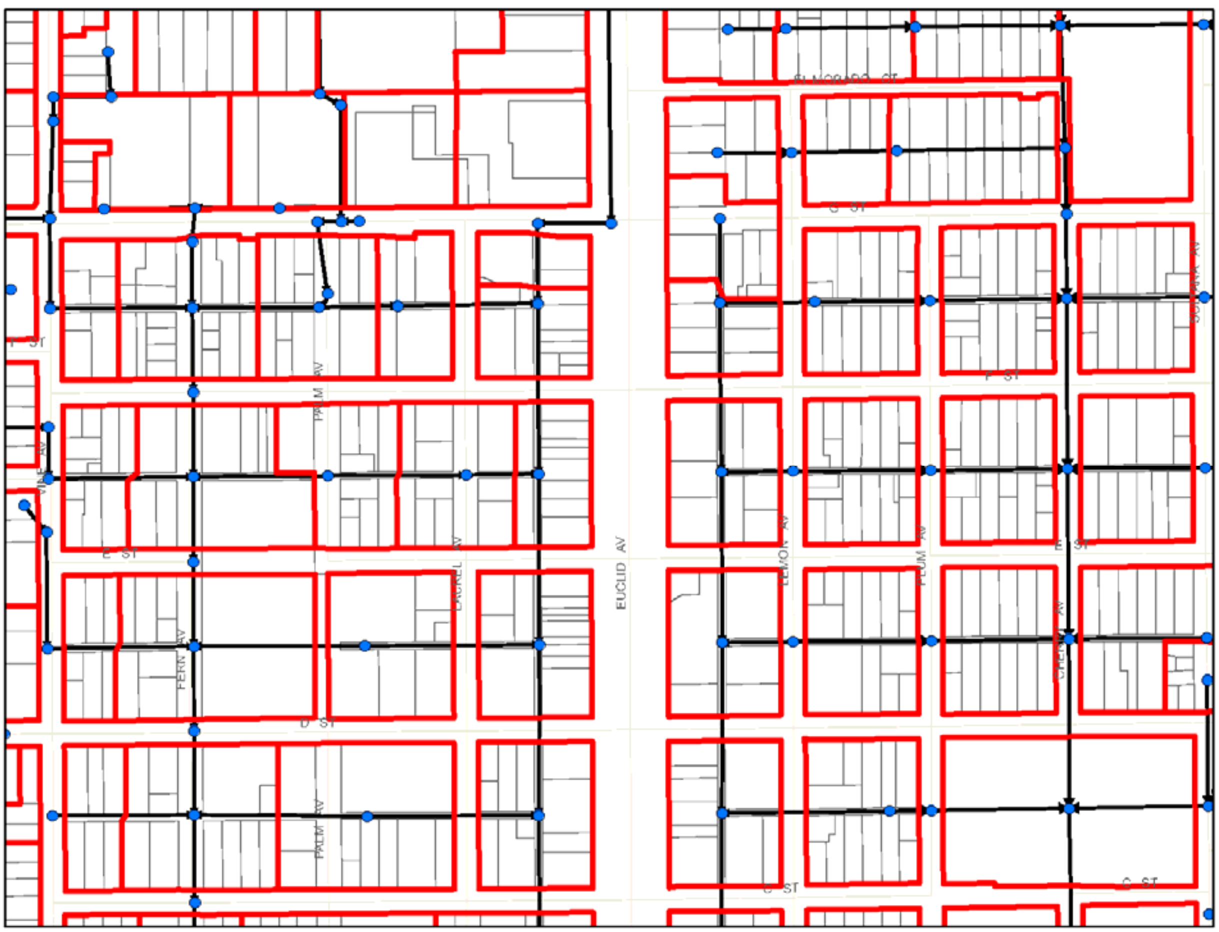
AKM met with the City staff to verify the flow direction at the aforementioned 38 "major" flow split locations. From viewing the potential split manholes in the field, many of the manhole designs as shown on the plans were verified. The flow direction was determined for several potential split manholes, which appeared to have significant amounts of flow being split in two directions. 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.

6-5 TRIBUTARY AREAS

For better accuracy, a polygon was manually created around individual sewer nodes in the model. Approximately 5,630 polygons were created. A sample area, displaying the tributary area polygons is shown in Figure 6-1. Most manholes have a tributary area assigned to it unless there are multiple manholes in the same area.

Figure 6-1
Tributary Area Polygons



6-6 MODEL LOADS

The existing land uses (discussed in Subsection 3-5) and the calibrated unit flow factors (see Table 4-2) were utilized to apply the average loads to the existing model. The ultimate land uses (discussed in Subsection 3-5) and the ultimate unit flow factors (see 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 Old Model Colony 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 as 13.8 mgd. The total ultimate average load is estimated as 30.1 mgd. The increase in ultimate loads is due to increased unit flow factors, anticipated densification in land use and population, and the assumption that the City will be fully occupied. It should be noted that the ultimate industrial unit flow factor (1900 gpd/ac) used is much larger than the existing unit flow factor (400 gpd/ac). The large increase allows for many of the warehouse and storage spaces to be converted to other industrial uses that use more water and thus produce more sewage.

6-7 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. The existing and ultimate public facility unit flow factors of 1,000 gpd/ac and 2,000 gpd/ac, respectively may not be high enough to represent school loads. It is more 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 and a unit flow factor of 25 gpd per student. 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 6-2.

Table 6-2
School Loads

Model Node ID	School Name	Address	Area (ac)	Number of Students	Unit Flow Factor (gpd/stu)	Average Sewage Generation (gpd)
High Schools						
F17120	Valley View High	1801 East Sixth St	18.00	822	25	20,550
F17FI	Gibson High	1800 East Seventh Street	13.00	109	25	2,725
H13110 & G13153	Chaffey High	1245 North Euclid Ave	31.10	3,407	25	85,175
H18100	Bernt High	2230 East Fourth St	2.04	321	25	8,025
O12133	Ontario High	901 West Francis St	36.82	2,690	25	67,250
R14502	Woodcrest High	2725 South Campus Ave	1.80	542	25	13,550
R21220	Colony High	3850 East Riverside Dr	37.90	2,323	25	58,075
Middle Schools						
H12179 & H12115	Danks Middle	1020 North Vine Ave	9.27	1,113	25	27,825
I16143	Wiltsey Middle	1450 East G St	15.05	1,027	25	25,675
M10101	Oaks Middle	1221 South Oaks Ave	14.31	1,010	25	25,250
M13157	De Anza Middle	1450 South Sultana Ave	9.46	951	25	23,775
R20141	Yokley Middle	2947 South Turner Ave	16.87	1,257	25	31,425

Table 6-2 (Continued)
School Loads

Model Node ID	School Name	Address	Area (ac)	Number of Students	Unit Flow Factor (gpd/stu)	Average Sewage Generation (gpd)
Elementary Schools						
F14141	Edison Elementary	515 East Sixth St	4.90	527	25	13,175
F17116	Arroyo Elementary	1700 East Seventh St	8.42	708	25	17,700
G10501	El Camino Elementary	1525 West Fifth St	9.48	820	25	20,500
G12115	Hawthorne Elementary	705 West Hawthorne St	7.26	853	25	21,325
G14143	Berlyn Elementary	1320 North Berlyn Ave	9.63	961	25	24,025
G16116	Vineyard Elementary	1500 East Sixth St	9.33	646	25	16,150
H11131	Elderberry Elementary	950 North Elderberry Ave	9.32	847	25	21,175
H15180	Del North Elementary	850 Del Norte Ave	9.28	787	25	19,675
H17100	Corona Elementary	1140 North Corona Ave	8.95	699	25	17,475
I13116	Central Elementary	415 East G St	4.42	580	25	14,500
J14100	Lincoln Elementary	440 North Allyn	7.00	372	25	9,300
J16105	Mariposa Elementary	1605 East D St	10.06	836	25	20,900
M13108	Euclid Elementary	1120 South Euclid Ave	4.94	634	25	15,850
N10140	Vista Grande Elementary	1390 West Francis St	7.05	613	25	15,325
O12501	Haynes Elementary	715 West Francis St	8.93	922	25	23,050
O13102	Sultana Elementary	1845 South Sultana Ave	7.93	960	25	24,000
P14103	Bon View Elementary	2121 South Bon View Ave	8.65	793	25	19,825
Q19123	Ontario Center Elementary	8776 Archibald Ave	11.48	772	25	19,300
Q19500	Mountain View Elementary	2947 South Turner Ave. A	16.87	588	25	14,700
Q21148	Creek View Elementary	3742 Lytle Creek North Loop	14.08	736	25	18,400
R14109	Liberty Elementary	2730 South Bon View Ave	9.55	766	25	19,150
R15132	Dickey Elementary	2840 Parco Ave	9.44	791	25	19,775
T19106	Ranch View Elementary	3300 Old Archibald Rd	10.02	733	25	18,325
		Total	**412.61**	**32,516**		**812,900**

**Number of students data from website: http://www.ed-data.k12.ca.us*

6-8 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 considered to be those customers with an average water use of 10,000 gpd or more. Low density residential users were 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.

Some water use data was utilized in Sewershed 4, even though the customer's average water use was below 10,000 gpd. This area consists of primarily industrial and commercial land uses and collectively, the water use is high. The additional sewage load was calculated and added to the model for calibration purposes.

There were a total of 69 high water users identified in the City, listed in Table 6-3. The land uses associated with each of the high water users were either commercial, industrial, or multi-family residential. These land use types typically consist of minimum amounts of landscape irrigation needs and primarily use the water indoors. Therefore, the sewage generation was estimated by taking 80 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.

Table 6-3
Point Source Loadings for High Water Users

General Data								Existing Conditions				Ultimate Conditions			
	Address	Customer Name	Model	Model Node ID	Area (Ac)	Water Use (gpd)	(1) Sewage Generation Estimate based on Water Use (gpd)	Existing Land Use	Calibrated UFF (gpd/ac)	(2) Sewer Load by UFF (gpd)	(3) Extra Sewer Load aded to Model (gpd)	Ultimate Land Use	Ultimate UFF (gpd/ac)	(2) Sewer Load by UFF (gpd)	(3) Extra Sewer Load aded to Model (gpd)
1	920 W Sixth St	Redeemer Lutheran Church	West	F11105	5.05	12,466	9,973	PUBLIC	1000	5,045	4,928				
2	1035 N Archibald Av / 2650 E Fourth St	Casa Partners III L.P.	East	H19109	5.73	59,650	47,720	MFR	2800	16,033	31,687	MDR	3600	20,614	27,106
3	915 N Center Av	City Of Ontarioxxxxx	East	H20121	6.17	19,336	15,468	OPEN	200	1,234	14,234	EROS	200	1,234	14,234
4	4413 E Mills Cr	Darden Restaurants	East	H23111	1.52	13,717	10,974	COM	1000	1,515	9,459	PC	2000	3,030	7,944
5	710 & 720 S Cypress Av	Grove Manor	West	I12143	1.34	39,430	31,544	MFR	2800	3,752	27,792	MDR	3600	4,824	26,720
6	227 W H St	Grove Apts	West	I13120	2.45	14,577	11,661	MFR	2800	6,866	4,796	HDR	4000	9,808	1,853
7	523 N Grove Av	Syal,Madan	North	I15173	0.96	11,770	9,416	MFR	2800	2,674	6,742	MDR	3600	3,438	5,978
8	1701 E Flora St	Muradliyan,Ed	North	I17113	3.37	12,866	10,293	MFR	2800	9,425	868				
9	2850-A E Inland Empire Bl		East	I19129	1.57	10,247	8,198	IND	400	630	7,568	PC	2000	3,148	5,050
10	3325 E Shelby St	3325 Shelby St, LLC	East	I20127	1.13	11,753	9,402	COM	1000	1,125	8,277	PC	2000	2,250	7,152
11	3760 E Inland Empire Bl	Benihana Restaurant	East	I21155	2.24	12,397	9,918	COM	1000	2,240	7,678	PC	2000	4,480	5,438
12	815 W Holt Bl #101	Superior Super Warehouse	West	J12191	1.52	10,676	8,540	COM	1000	1,522	7,018	GI	1900	2,892	5,649
13	333 N Euclid Av	Pomona First Federal	West	J13117	0.29	10,434	8,347	COM	1000	289	8,058	TC	4000	1,156	7,191
14	105 N Euclid Av	Mi Mexico Lindo	West	J13151	0.04	10,359	8,287	COM	1000	43	8,244	TC	2000	86	8,201
15	900 E Holt Bl	Champion Motors	North	J14183	0.80	10,542	8,434	COM	1000	797	7,637	EH	4000	3,188	5,246
16	1067 E Holt Bl	Skylark	North	J15143	2.68	13,306	10,645	MFR	2800	7,515	3,130				
17	1241 E Holt Bl	Peppertree Motel	North	J15148	0.28	10,074	8,059	COM	1000	284	7,775	EH	4000	1,136	6,923
18	1233 E Holt Bl	S K Investments	North	J15148	1.20	16,991	13,593	COM	1000	1,204	12,389	EH	4000	4,816	8,777
19	430 N Vineyard Av	Paul Garret Enterprises C/O Insigna	North	J17100	3.83	10,021	8,017	COM	1000	3,826	4,191	ARS	2000	7,652	365
20	3223 E Centrelake Dr	Panda Inn	East	J20102	1.80	13,695	10,956	IND	400	721	10,236	PC	2000	3,604	7,352
21	3201 E Centrelake Dr	Ontario Inn, LLC	East	J20105	2.35	18,713	14,970	COM	1000	2,354	12,616	PC	2000	4,708	10,262
22	4850 E Airport Dr	Thermal Dynamics	East	J23110	5.31	14,848	11,879	IND	400	2,124	9,755	PI	1900	10,089	1,790
23	5600 E Airport Dr	K Mart Dist Center	East	J25107	34.80	41,531	33,225	IND	400	13,920	19,305				
24	1150 W Brooks St	Heatherfield Foods	West	K11115	0.55	17,251	13,801	COM	1000	550	13,251	GI	1900	1,045	12,756

(1) *Sewage Generation Estimate = 0.80 x Water Use (gpd)*

(2) *Sewer Load = Area (Ac) x Unit Flow Factor or UFF (gpd/ac)*

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

Table 6-3 (continued)
Point Source Loadings for High Water Users

General Data								Existing Conditions				Ultimate Conditions			
	Address	Customer Name	Model	Model Node ID	Area (Ac)	Water Use (gpd)	(1) Sewage Generation Estimate based on Water Use (gpd)	Existing Land Use	Calibrated UFF (gpd/ac)	(2) Sewer Load by UFF (gpd)	(3) Extra Sewer Load aded to Model (gpd)	Ultimate Land Use	Ultimate UFF (gpd/ac)	(2) Sewer Load by UFF (gpd)	(3) Extra Sewer Load aded to Model (gpd)
25	805 W State St	Alumin Art Plating	West	K12137	0.72	18,891	15,113	IND	400	287	14,826	GI	1900	1,362	13,750
26	4000 E Airport Dr	Jomar Table Linens Inc	East	K22106	9.44	15,305	12,244	IND	400	3,776	8,468				
27	104 S Wanamaker Av	Total Logistic Control, LLC	East	K23100	8.80	14,996	11,997	IND	400	3,519	8,478				
28	5160 E Airport Dr	Chem Lab	East	K24107	9.52	38,887	31,110	IND	400	3,806	27,304	VI	1900	18,079	13,031
29	930 S Palmetto Av	C-M-Property	West	L11124	1.53	10,041	8,033	MFR	2800	4,278	3,755	MDR	3600	5,501	2,532
30	842 S Cucamonga Av	Fikse,Edward	West	L15119	1.65	11,647	9,318	COM	1000	1,648	7,670	IP	1900	3,131	6,186
31	1100 S Wanamaker Av		East	L23128	3.06	10,303	8,242	IND	400	1,224	7,018	PI	1900	5,816	2,426
32	1201 S Kettering Dr	Crown Toyota	East	L24103	3.59	15,812	12,649	COM	1000	3,592	9,057	PI	1900	6,825	5,824
33	732 W Phillips St	Washington Assoc I	West	M12128	1.51	11,355	9,084	MFR	2800	4,217	4,867	MDR	3600	5,422	3,662
34	109 W Belmont St	H K Realty	West	M13107	0.22	11,209	8,968	IND	1000	218	8,750	LDR	1600	349	8,619
35	1480 S Balboa Av	Soup Bases Loaded, Inc	West	M17135	0.69	10,872	8,698	IND	400	278	8,420	IP	1900	1,319	7,379
36	4060 E Jurupa St	Nordstrom, Inc	East	M22127; M22125	16.00	9,284	7,427	VAC BLDG	0	0	7,427				
37	1311 S Wanamaker Av	Ace Calendering Enterprises Inc	East	M23101	1.34	10,415	8,332	IND	400	535	7,797	PI	1900	2,540	5,792
38	1315 S Wanamaker Av	Citrus Motors Ontario	East	M23115	10.59	13,988	11,190	COM	1000	10,593	597				
39	1401 S Auto Center Dr	Penske Honda	East	M24121	5.54	11,403	9,123	COM	1000	5,540	3,583				
40	5505 E Jurupa St	Vargas-Montoya,J	East	M25121	2.36	22,350	17,880	IND	400	942	16,938	VI	1900	4,475	13,406
41	1502 & 1520 S Hellman /	Dennis Foland Inc / Rama Food Manufacture Corp.	East	N18100	6.37	19,630	15,704	IND	400	2,548	13,156	IP	1900	12,103	3,601
42	2315 E Locust St	Performance Freight System	East	N18105	2.64	2,773	2,218	IND	400	1,057	1,162				
43	2311 E Locust St	Pixel Touch	East	N18105	1.57	4,857	3,886	IND	400	626	3,259	IP	1900	2,975	910
44	2310 E Locust St	Okuma Fishing Tackle Corp	East	N18105	2.31	5,127	4,102	IND	400	925	3,177				
45	2275 E Locust Ct	E Plastic Trading World CO	East	N18107	1.60	3,372	2,698	IND	400	640	2,058				
46	2275 E Francis St	George S Chen Corp	East	N18114	2.43	9,258	7,406	IND	400	972	6,434	IP	1900	4,619	2,788
47	1700 S Hellman Av	Classic Container Inc	East	N18114	5.75	17,752	14,202	IND	400	2,299	11,902	IP	1900	10,921	3,280
48	2355 E Francis St	Superior Quality Foods	East	N18115	1.75	8,219	6,575	IND	400	698	5,877	IP	1900	3,316	3,260

(1) Sewage Generation Estimate = 0.80 x Water Use (gpd)

(2) Sewer Load = Area (Ac) x Unit Flow Factor or UFF (gpd/ac)

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

Table 6-3 (continued)
Point Source Loadings for High Water Users

General Data								Existing Conditions				Ultimate Conditions			
	Address	Customer Name	Model	Model Node ID	Area (Ac)	Water Use (gpd)	(1) Sewage Generation Estimate based on Water Use (gpd)	Existing Land Use	Calibrated UFF (gpd/ac)	(2) Sewer Load by UFF (gpd)	(3) Extra Sewer Load aded to Model (gpd)	Ultimate Land Use	Ultimate UFF (gpd/ac)	(2) Sewer Load by UFF (gpd)	(3) Extra Sewer Load aded to Model (gpd)
49	2151 E Francis St	Ruiz Mexican Foods	West	N18119	19.28	12,484	9,987	UND	0	0	9,987				
50	1550 S Archibald Av	Archibald Dis Ctr Lp	East	N19101	10.76	14,334	11,467	IND	400	4,304	7,163				
51	1393 S Sarah Pl	Catellus Dev	East	N24103	20.16	14,100	11,280	IND	400	8,064	3,216				
52	301 E Cedar St	Century Quality Management	West	O13117	3.48	14,719	11,775	MFR	2800	9,741	2,034				
53	2400 E Francis St	Kim Lighting	East	O18100	5.00	7,171	5,737	IND	400	2,000	3,737				
54	2300 E Francis St	Marten Trans Ltd	East	O18100	5.00	11,186	8,949	IND	400	2,000	6,949				
55	2625 E Cedar St	Dr. Graphix Inc	East	O18111	0.58	1,072	858	IND	400	234	624				
56	1910 S Proforma Av	Headmost Intl Inc	East	O18111	1.25	2,249	1,799	IND	400	500	1,299				
57	1920 S Proforma Av	VSMPO-TIRUS,US	East	O18111	1.02	2,399	1,919	IND	400	408	1,511				
58	1921 S Proforma Av	Sierra Automatic	East	O18111	0.50	2,648	2,118	IND	400	201	1,918	PI	1900	954	1,165
59	2605 E Cedar St	Thermal Dynamics	East	O18111	0.78	3,052	2,442	IND	400	312	2,130	PI	1900	1,480	962
60	1911 S Proforma Av	West End Brick N' Fire	East	O18111	0.85	3,162	2,530	IND	400	340	2,190	PI	1900	1,615	915
61	2240 E Cedar St	L & H Mold	East	O18123	0.57	2,678	2,142	IND	400	227	1,916	IP	1900	1,077	1,065
62	2049 S Hellman Av	Logar,Jacob	East	O18136		2,997	2,398	IND	400		2,398	IP	1900		2,398
63	2001 S Hellman Av	Mag Instruments	East	O18136		17,863	14,290	IND	400		14,290	IP	1900		14,290
64	2070 S Hellman Av	The Ultimate Print	East	O18148	0.53	1,442	1,154	IND	400	212	942	IP	1900	1,007	147
65	2260 E Spruce St	Carlisle Tire & Wheel Company	East	O18148	1.24	3,297	2,638	IND	400	496	2,142	IP	1900	2,356	282
66	2131 S Hellman Av	Fowler,Dale	East	O18148	6.00	12,039	9,631	IND	400	2,401	7,230				
67	1910 Archibald Av	LBA Industrial Fund -	East	O19114	1.62	8,443	6,754	COM	1000	1,616	5,138	PI	1900	3,070	3,684
68	5440 E Francis St B	Quill Corp	East	O24107	37.97	20,693	16,555	IND	400	15,188	1,367				
69	2313 E Philadelphia St	Fowler,Dale	East	P18107		11,520	9,216	IND	400		9,216	IP	1900		9,216
										Total	527,007			Total	306,557

(1) *Sewage Generation Estimate = 0.80 x Water Use (gpd)*

(2) *Sewer Load = Area (Ac) x Unit Flow Factor or UFF (gpd/ac)*

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

6-9 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 in Kimball Avenue. The sewers tributary to these four pump stations were modeled up until the decommissioned pump station location.

Currently the City operates two pump stations, which are used for conveying the wastewater flows to Inland Empire Utilities Agency's (IEUA) Regional Plant No. 1 (RP-1) located southerly of Pomona Freeway (SR 60) and west of Cucamonga Creek.

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 5-8. The estimated existing and ultimate flows to the station are detailed in Table 5-5 and Table 5-6, respectively. The existing average flow to the station is about 34 gpm. The ultimate average flow is expected to be approximately 48 gpm. Sewage collected at the Magnolia Pump Station is pumped to a gravity sewer in 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).

Haven Pump Station is located on the north side of the Pomona Freeway (SR-60) about 900 feet east of Haven Avenue. Its tributary area is shown on Figure 5-9. The estimated existing and ultimate flows to the station are detailed in Table 5-7 and Table 5-8, respectively. The existing average flow to the station is about 299 gpm. The ultimate average flow is estimated at about 1,341 gpm. Sewage collected at the Haven Pump Station is pumped northeast to the Inland Empire Utilities Agency (IEUA) collector in 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 was modeled up until the pump station location; however, the pump station and forcemain was not included in the hydraulic model.

6-10 HOLT BOULEVARD TRUNK SEWER

It should be noted that for this study, the Holt Boulevard Trunk Sewer Project, Phase A was considered a part of the existing system because construction is close to completion. Phase A consists of a sewer in Holt Boulevard from Lemon Avenue to Cucamonga Avenue, intercepting all flows north of Holt Boulevard and conveying it east to an existing IEUA trunk sewer in Cucamonga Avenue.

The Holt Boulevard Trunk Sewer Project, Phase B was considered a part of the ultimate system.