Section 1

EXECUTIVE SUMMARY

1-1 Introduction

Background

The City of Ontario has a population of about 174,536. Its boundaries cover approximately 49 square miles of residential, commercial, industrial, public and agricultural lands as well as the Ontario International Airport.

The existing Old Model Colony sewer collection system is made up of a network of gravity sewers, pump stations, and force mains. The gravity system consists of approximately 365.7 miles (1,931,134 ft) of pipe and 7,582 manholes and cleanouts. The system also includes three pump stations and 11,588 feet of associated force mains. The total existing average sewer load for Old Model Colony is estimated at 18.75 mgd. With an existing population of 174,536 persons, this is equivalent to approximately 107 gpd/person.

Objectives

The objective of this Master Plan is to evaluate the City's sewer collection system and to provide a framework for undertaking the construction of new and replacement facilities for the service area in an efficient and cost effective manner. As a planning document, it is general in nature and is predicated upon the best information available at this time.

1-2 Study Area

Location

The study area is located approximately 35 miles east of downtown Los Angeles and encompasses approximately 49 square miles of residential, commercial, industrial, public and agricultural lands as well as the Ontario International Airport.

The City is divided into two distinct areas, Old Model Colony (OMC) and New Model Colony (NMC). The two areas are generally divided by Riverside Drive. OMC consists of existing residential, commercial, and industrial developments. It comprises approximately 36 square miles. NMC is an agricultural area that was annexed to the City in 1999. It is approximately 13 square miles and currently consists of primarily agricultural land. The City's 2010 General Plan details plans to develop the agricultural lands in NMC into a mix of residential, commercial, industrial, and public uses. The ultimate residential population of NMC is expected to reach 162,518. Development of NMC has begun with the construction of the Brookfield Homes Development, Edenglen, located southwest of the intersection of Riverside Drive and Mill Creek Avenue.

Topography

Elevations within the study area range from 1170 feet amsl at the north City boundary near Grove Avenue to 630 feet amsl at the intersection of Archibald Avenue and Schaefer Avenue. The terrain slopes generally from north to south and east to west.

Climate

The climate in the area is Mediterranean-like with generally moderate temperatures and low humidity year-round. The average median temperature is approximately 83^{o} F. The average annual days of sunshine is 312. The historical average annual rainfall is about 11.3 inches. Most of the rainfall typically occurs between October and April

Land Use

Existing Conditions - The City is a well planned urban community with a balance of residential, commercial, and industrial land uses. Within the service area, the primary land use in the City is residential (8,921 Ac or 27.9 %). Industrial use also makes up a significant portion of the total existing land use (4,898 Ac or 15.3%). Approximately 3,369 acres or 10.5 percent of the total is currently undeveloped. The total number of housing units in the City is estimated at 47,390.

Ultimate Conditions - The ultimate land uses are based upon the City's latest general plan document entitled *The Ontario Plan (2010).* The residential area increases to 10,915 acres (34.2 percent of total). The employment area, including business parks and industrial uses, is expected to entail about 8,103 acres (25.4 percent of total). The total number of ultimate housing units is estimated at 104,030.

Population

Since its incorporation in 1890, the City of Ontario has grown from a population of 683 to approximately 174,536 in 2010 (*Ref: California Department of Finance*). With the total number of housing units at approximately 47,795 and a 3.7 percent vacancy rate, the population per household is estimated to be 3.8 (*Ref: California Department of Finance*).

The ultimate population in New Model Colony is expected to be approximately 162,518 (*Ref: 2010 General Plan Approved Landuse Buildout Estimate Table*). The ultimate population in Old Model Colony is estimated at 195,752. The total ultimate population is estimated at 358,270 which will more than double the existing population.

1-3 Criteria

General

Establishing performance standards is an important part of evaluating existing wastewater collection systems, as it forms the basis for system analysis and system improvement recommendations. These standards include methodology for estimating wastewater design flows and minimum design standards for the collection system pipes, pump stations, and force mains.

Flow Monitoring

In order to estimate the residential, commercial, and industrial wastewater flows in the City, a temporary flow monitoring study was conducted by ADS Environmental Services from November 4, 2006 to December 12, 2006 at fifteen locations.

Unit Flow Factors

Unit flow factors utilized in this study were developed based upon the existing land uses obtained from the City's GIS and results of the flow monitoring studies. Water use records, aerial photographs and field reviews supplemented this information. The Ultimate Unit Flow Factors are shown in Table 1-1. See Section 4-2 for further details on the development of the unit flow factors utilized in this study.

Table 1-1
Ultimate Unit Flow Factors

Landuse		Density (du/ac)	Density (people/du)	FAR	Aveage Dry Weather Unit Flow Factor[1]			
Residential								
Rural Residential	RR	0 - 2	4.0		250	gpd/du	500	gpd/ac
Low Density Residential	LDR	2 - 5	4.0		240	gpd/du	1,200	gpd/ac
Low Medium Density Residential	LMDR	5 - 11	4.0		240	gpd/du	2,000	gpd/ac
Medium Density Residential (OMC)	MDR	11 - 25	3.8		210	gpd/du	4,200	gpd/ac
Medium Density Residential (NMC)	MDR	11 - 25	3.3		182	gpd/du	4,200	gpd/ac
High Density Residential (OMC)	HDR	25 - 45	3.3		180	gpd/du	6,300	gpd/ac
High Density Residential (MU Areas)	HDR	25 - 45	2.0		110	gpd/du	5,000	gpd/ac
Commercial								
Business Park	BP			0.40	70	gpd/tsf	1,200	gpd/ac
General Commercial	GC			0.30	70	gpd/tsf	900	gpd/ac
Hospitality[2]	HOS			1.00	100	gpd/tsf	140	gpd/room
Neighborhood Commercial	NC			0.30	100	gpd/tsf	1,300	gpd/ac
Office Commercial	OC			0.75	90	gpd/tsf	3,000	gpd/ac
Restaurant[3]					1,000	gpd/tsf		
Industrial								
Industrial	IND			0.55	70	gpd/tsf	1,600	gpd/ac
Mixed Use								
Mixed Use	MU				Use various unit flow factors for			
Open Space								
Open Space Non-Recreational	OS-NR						200	gpd/ac
Open Space Recreational	OS-R						200	gpd/ac
Public								
Public Facility	PF						1,500	gpd/ac
Public School - Elementary[4]	PS				15	gpd/stu		
Public School - Junior High or High School[4]	PS				20	gpd/stu		

[1] Unit Flow Factor Abbreviations:
ac = acre
du = dwelling unit
gpd = gallons per day
room = hotel/motel room
stu = student
tsf = thousand square feet

[2] For future hospitality areas, sewage loads can be estimated based on the number of projected rooms. It is not recommended to estimate the load based on acreage.

[3] For future restaurants, sewage loads can be estimated based on the building square footage.

[4] For future schools, sewage loads should be estimated based on the number of students. It is not recommended to estimate the load based on acreage.

Peaking Factors

The adequacy of a sewage collection system is based upon its ability to convey the peak dry weather flow (PDWF) and peak wet weather flow (PWWF).

The temporary flow monitoring data was reviewed to develop peaking relationships at each site. As expected, these relationships varied from site to site depending upon the makeup and size of the tributary land use. Based upon the information from the temporary flow monitoring effort, the following peaking relationships for dry weather and wet weather were selected for this study:

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

where Q_{peak} = Peak Dry Weather Flow
Q_{ave} = Average Dry Weather Flow

Peak Wet Weather Flow (PWWF) = 1.34 x Peak Dry Weather Flow (PDWF)

Sewer Design Criteria

Design criteria are established to ensure that the collection system can operate effectively under all flow conditions. Each pipe segment must convey the peak wet weather flows without surcharging the system. Low flows must be conveyed at a velocity that will prevent solids from settling and blocking the system. A summary of the established sewer system criteria is shown in Table 1-2. Specific details of the criteria recommended for the collection system, the pump stations, and service to Specific Plan and development sub-areas are included in Section 4 of this report.

1-4 Existing Sewer System

General Description

The City's existing sewer collection system in Old Model Colony is made up of a network of gravity sewers, pump stations, and force mains. The gravity system consists of approximately 365.7 miles (1,931,134 ft) of pipe and 7,582 manholes and cleanouts. The system also includes three existing pump stations and 11,588 feet of associated force mains. The total existing average sewer load for Old Model Colony is estimated at 18.75 mgd. With an existing population of 174,536 persons, this is equivalent to approximately 107 gpd/person.

The general direction of flow is from north to south and east to west. The majority of the local sewers tie directly into one of the Inland Empire Utilities Agency (IEUA) trunk sewers crossing through the City. The sewage is then transported to IEUA's Regional Plant No. 1 (RP-1) and RP-5 for treatment.

The existing sewers are primarily constructed of vitrified clay pipe with sizes ranging from 4-inches to 42-inches in diameter. Approximately 75 percent of the pipes are 8-inches in diameter. The majority of the sewer system was constructed between 1950 and 1990. Some of the collection system was constructed as early as 1895.

Table 1-2
Sewer System Criteria

Collection System	
Minimum Pipe Size	8-inch
Minimum Velocity	2.0 ft/sec at average flow 3.0 ft/sec at peak dry weather flow
Pipe Depth to Diameter Ratio for *Existing Pipes*	0.64 for all pipe sizes at peak dry weather flow 0.82 for all pipe sizes at peak wet weather flow
Pipe Depth to Diameter Ratio for *New Construction*	0.50 for pipes 12-inches and smaller at peak dry weather flow 0.64 for pipes 15-inches and larger at peak dry weather flow 0.82 for all pipe sizes at peak wet weather flow
Pump Stations	
Pumps	▪ Minimum 2 each sized at peak wet weather flow ▪ Minimum solids handling capacity 3"
Wet Wells	▪ Sized to limit pump cycling to less than 4 to 6 times/hr ▪ Provide sufficient storage at peak wet weather flow to allow response to a failure ▪ Equipment to be maintained must be accessible without entering structure
Ventilation	▪ 12 -air changes/hour minimum in dry well and as required by NFPA 820 ▪ 30-air changes/hour minimum in wet well if not operated continuously ▪ 12-air changes/hour minimum in wet well if operated continuously
Controls	Redundant system. Float operated back-up controls.
Emergency Power	Stationary source with automatic transfer switch
Telemetry	Full SCADA with dialer system as back up at all pump stations to alert personnel in the event of a station failure.
Force Mains	▪ Minimum velocity 3.0 ft/sec ▪ Maximum velocity 5.0 ft/sec ▪ Minimum size 4" ▪ Air/Vacs installed in vaults ▪ Plumb Air/Vacs piping back to wet well to avoid discharges of raw sewage to vaults

Regional Facilities

Regional wastewater services are provided to the City of Ontario and its neighboring agencies by the Inland Empire Utilities Agency (IEUA). Several regional trunk sewers collect sewage generated in the City and transport it to IEUA's Regional Plant No.1 and Regional Plant No.5 for treatment. RP-1, located south of the Pomona Freeway (SR-60) and west of Cucamonga Creek, has been in operation since 1948 and has a current capacity of 44 million gallons per day. RP-1 also serves the Cities of Rancho Cucamonga, Upland, Montclair, Fontana, and portions of unincorporated San Bernardino County.

IEUA began operation of Regional Plant No. 5 (RP-5) in March 2004. RP-5 is located in the City of Chino at the southeast corner of Kimball Avenue and El Prado Road. Sewage generated in New Model Colony, as well as the wastewater flows diverted from the Old Model Colony sewer pump station tributary areas are treated at RP-5. The ultimate treatment capacity of RP-5 will be 60 million gallons per day.

IEUA had originally planned to bypass an average flow of up to 20 mgd from RP-1 to RP-5 via the NMC sewer system and Kimball Interceptor Sewer located on Kimball Avenue west of Baker Street. The first NMC sewer constructed (Eastern Trunk Sewer) was designed to carry 9 mgd of bypass flow from RP-1. Currently, IEUA does not expect to pursue the remaining 11 mgd bypass capacity in the NMC sewer system.

Sewersheds

The City's service area has been divided into eight (8) sewersheds, primarily based on the outlet points where the City's system ties into a downstream facility owned by IEUA.

Inverted Siphons

The City's existing sewer collection system includes inverted siphons at nine locations. Each was constructed to go under a major flood control channel or a conflicting utility. The primary concern with siphons is the fact that grease and debris can often build up in the depressed section requiring frequent maintenance to prevent sewer spills.

Flow Splits

Multiple flow splits exist within the existing sewer collection system. Field investigations were conducted at the "major" flow splits, which are identified as those located on a main trunk sewer with larger tributary areas.

Septic Tanks

There are approximately 206 septic tanks in Old Model Colony per City records. Initial recommendations for connecting the parcels with septic tanks to the existing sewer system are provided in Section 5-6. It was beyond the scope of work of this study to conduct evaluations of individual site. Future work to determine the feasibility of connecting these parcels to the sewer system may include field investigations, site surveys, and review of existing utility plans.

Pump Stations

Details of the existing Magnolia Pump Station, Haven Pump Station, and Edenglen Pump Station are provided in Section 5-8. Each of the firm capacities of the pump stations was found to be sufficient for pumping the existing and ultimate estimated tributary peak wet weather sewage flows.

1-5 Ultimate Sewer System

The ultimate sewer collection system will include service to New Model Colony. Approximately 140,000 feet of additional trunk sewer will be added to the City's system in New Model Colony, ranging in size from 12-inches to 36-inches.

The ultimate average sewage generation 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. Water conservation efforts were not included in the ultimate average sewage generation estimate. For planning purposes, it is believed to be better not to include water conservation efforts that are not definitive. This will prevent the undersizing of gravity sewers and pump stations. A summary of the projected sewage generation by landuse is shown in Table 1-3.

Table 1-3
City of Ontario
Ultimate Sewage Generation

Land Use Type	OMC Sewer Loads (gpd)	NMC Sewer Loads (gpd)	Sewer Loads due to High Water Users (gpd)	Total (gpd)	Total (mgd)
Rural Residential	226,497	0	0	226,497	0.23
Low Density Residential	4,022,533	3,486,222	35,039	7,543,793	7.54
Low-Medium Density Residential	546,270	1,030,784	108,882	1,685,936	1.69
Medium Density Residential	3,100,730	5,082,309	250,186	8,433,225	8.43
High Density Residential	1,516,007	0	0	1,516,007	1.52
General Commercial	354,181	133,876	15,364	503,422	0.50
Business Park	718,599	936,539	3,155	1,658,293	1.66
Hospitality	631,304	0	0	631,304	0.63
Neighborhood Commercial	214,663	139,885	31,247	385,795	0.39
Office Commercial	1,178,265	367,181	0	1,545,446	1.55
Industrial	10,205,821	450,619	1,125,948	11,782,388	11.78
Public Facility	144,223	3,725	0	147,948	0.15
Public School	565,600		0	565,600	0.57
Airport	507,053		0	507,053	0.51
Mixed Use	4,971,008	1,791,707	2,298	6,765,013	6.77
Open Space - Non-Recreational	137,649	101,268	0	238,918	0.24
Open Space - Recreational	105,621	92,647	691,819	890,087	0.89
Total	**29,146,027**	**13,616,761**	**2,263,937**	**45,026,724**	**45.03**

1-6 Hydraulic Sewer Model

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.

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. Only active sewers owned by the City of Ontario were included in the hydraulic model. Regional sewers were not modeled.

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, described in Section 7-3, were taken to fill in the data gaps with the most accurate data available.

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 (38) split manholes were identified for further investigation due to their potential significance on the hydraulic model results. As-built plans were reviewed and field inspections of the 38 "major" split manhole locations were conducted. The information obtained was used to select flow monitoring locations and to calibrate the hydraulic model.

Model Loads

The existing land uses and the calibrated unit flow factors were utilized to apply the average loads (sewage flows) to the existing model. The ultimate land uses and the ultimate unit flow factors 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 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 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.

Schools

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.

High Water Users

High water users will typically contribute large volumes of sewage to the collection 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. 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.

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.

The tributary flows to the Magnolia Pump Station were transferred in the model to the outflow point, manhole O11123, located on Magnolia Avenue south of Cedar Court. The tributary flows to Edenglen Pump Station were transferred in the model to manhole R21218 on Riverside Drive. The ultimate tributary flows to Haven Pump Station were transferred to manhole G90 in the NMC model.

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.

1-7 System Analysis

Hydraulic Analysis

The analysis of the existing sewer collection system was based upon the calculated existing and ultimate peak dry weather flows. The hydraulic analysis results can be found in the appendix of this report.

Existing pipes that exceed the following criteria are considered hydraulically deficient:

Peak Dry Weather d/D > 0.64

The total length of sewer found to be capacity deficient per the developed criteria is 45,724 feet. This is about 2.4 percent (45,724 / 1,931,134) of the total system length.

Each of the firm capacities of the pump stations was found to be sufficient for pumping the existing and ultimate estimated tributary peak wet weather sewage flows.

Condition Assessment

Condition assessment of the existing sewer system was not a part of the scope of work for this master plan. Per the General Waste Discharge Requirements, discussed in Sub-section 2-5, the City's Operation and Maintenance Plan must have been completed and certified by November 2, 2008.

The City has currently completed video inspections of about 1.6 million feet of its existing sewer system. It is planned to have the remaining footage completed in FY 2010-2011. The City plans to budget yearly for sewer condition evaluation and repairs.

'Hot Spots'

Hot Spots are areas of the system with reoccurring problems that require maintenance and cleaning on a quarterly basis minimum. Currently, there are 102 reaches with a total length of 23,247 feet that are considered to be Hot Spots in the existing system. Operations staff reports that the causes of the hot spots are grease, roots, sags, and some hydraulic issues where flow in a low flow sewer is restricted from merging properly into sewers carrying flows with high velocities.

Sanitary Sewer Overflows

There were a total of 34 sanitary sewer overflows responded to by the City of Ontario crews between January 2007 and September 2010. The details of these spills are shown in Table 8-3. The total number of reported spills over the past four years is as follows:

10 spills in 2007 (1.64 spills per 100 miles, excluding 4 on private property)

7 spills in 2008 (0.55 spills per 100 miles, excluding 5 on private property)

11 spills in 2009 (1.36 spills per 100 miles, excluding 6 on private property)

6 spills in 2010 (0.82 spills per 100 miles, excluding 3 on private property)

A sewer collection system with less than three (3) spills from the publicly owned system (excludes private property spills that do not result from a blockage in the public system) per 100 miles per year is considered an adequate system. For the Old Model Colony sewer system (365.7 miles), this is an average of eleven (3 x 3.657) spills per year. Per the provided documentation, the City has an excellent record with minimal spills.

Maintenance Program

A comprehensive maintenance program is an important tool in assuring reliable system operation. This not only includes regular inspections and preventative maintenance, but also good record keeping.

Preventative maintenance is a crucial element of the maintenance program. The preventative maintenance program (PMP) consists of cleaning, inspection, condition assessment, and rehabilitation tasks. Currently, the City has a documented preventative maintenance program. The City should review and update the PMP annually as a part of the City's Operation and Maintenance Plan that is required by the Statewide WDR.

Sewer inspection includes CCTV inspection and condition assessment of the collection system, visual inspection of manholes and their flow channels, ground surface inspection of rights of way and easements, and odor and corrosion monitoring. Condition assessment includes, review of the inspection data, and formulation of maintenance, rehabilitation, and replacement projects. Following the completion of the initial CCTV inspection program, the City should develop a continuing inspection plan based upon the knowledge gained from the initial program. Each spill site must be CCTV inspected to pinpoint the cause of the spill, and implementation of corrective measures for preventing repeat spills.

The City currently has about 365.7 miles of pipe. In order to comply with the upcoming CMOM requirements, WDR requirements, and the City's regular preventative maintenance program, the City must quantify the number of employees and equipment necessary to perform these tasks.

Minimum staff recommendations are as follows:

1. Two cleaning crews consisting of three employees each are needed to run the hydro-jet machines and clean the sewers on a routine basis.
2. A separate crew consisting of three employees is needed to televise sewers on a routine basis following cleaning, perform hot spot cleaning, conduct flow monitoring, and performing emergency repairs. As an alternative, the City can contract out the CCTV inspection services and flow monitoring services.

3. A pump station maintenance crew consisting of two employees to keep up with the sewer pump station maintenance work.

4. One full time staff member is recommended to ensure that the City can complete all elements of the general waste discharge requirements, including the Fats, Oils, and Grease (FOG) enforcement and source pollution control enforcement.

1-8 Capital Improvement Program

The primary goal of the Capital Improvement Program (CIP) is to provide the City of Ontario with a long-range planning tool for implementing its sewer infrastructure improvements in an orderly manner and a basis for financing of these improvements. To accomplish this goal, the program is phased based upon the implementation cost of the facilities, the quantity of work the City can reasonably administer each year, and the funds available for these projects.

Capital Improvement Project Priorities

The capital improvement projects were selected primarily with consideration of the health and safety of the public and protection of the environment by minimizing the possibility of overflows. The projects that will eliminate the capacity deficiencies in the gravity collection system are prioritized based upon the hydraulic analyses conducted during this study. As the City completes CCTV inspection of the system, severe and major defects identified should be incorporated into the CIP and addressed. When the CCTV inspection is completed and a full condition assessment has been conducted, the capital improvement project priorities should be reevaluated.

For this study, the gravity sewer projects were prioritized as follows:

1. Facilities identified with capacity deficiencies under existing peak dry weather conditions. **Flow monitoring is recommended prior to project implementation.**

2. Facilities that have calculated ultimate capacity deficiencies but are currently considered adequate under existing peak dry weather conditions. **Flow monitoring is recommended prior to project implementation.** When the measured peak flows exceed the pipe capacity (d/D = 0.64 during peak dry weather conditions), the projects should be reprioritized.

In some cases, larger sewers are given higher priorities than small sewers because they serve larger areas and a spill would be expected to be larger in quantity. When segments of sewers with lower priorities are located in the same vicinity as a higher priority project, an exception is made to include these lower priority sewers in that project to provide a more economically feasible Capital Improvement Program.

Capital Improvement Program

Old Model Colony

The Capital Improvement Program is developed based upon the results of the hydraulic analyses and the established priorities. The recommended improvement project locations in Old Model Colony are illustrated on Figure 1-1 and are listed in detail in Table 1-4 by priority, along with cost estimates. These estimates are based upon recent information for similar projects in the Southern California area, and include contingencies for this planning level study.

The cost estimates presented in Table 1-4 reflect replacement of the existing facilities. Replacement costs are generally more conservative and will therefore allow the City more flexibility for each project. Preliminary design studies should be conducted utilizing detailed utility information to identify and evaluate project alternatives such as parallel pipes and/or diversions prior to final design. The pipe ID numbers and upstream and downstream manhole ID numbers given in Table 1-4 correspond to the City's sewer GIS and atlas maps.

The construction costs are based upon the following:

8-18 inch diameter pipe	$40 / diameter inch / ft
21 inch diameter pipe and greater	$35 / diameter inch / ft

Old Model Colony is largely occupied and there are many existing utilities to consider. Therefore, the costs of replacing sewer facilities will be generally higher than in an area that is undeveloped such as New Model Colony. The total costs shown in Table 1-4 include engineering, administration and contingency costs. Contingency costs are estimated at 15 percent of the construction costs. Engineering and administration costs are estimated at 15 percent of the construction plus contingency costs.

The recommended CIP has been based upon the best information currently available. It should be updated as new information becomes available from sources such as CCTV inspections and from maintenance crew observations. The project priorities may be revised to correspond to changed conditions, such as impending facility failures, or to take advantage of concurrent construction such as street paving projects or adjacent infrastructure work.

Some of the projects recommended are small and it may not be feasible to implement them as a single project. Therefore, several projects should be combined and bid as a package. Some of the projects may be broken down into smaller components to fit the City's budgetary and other obligations.

The Old Model Colony CIP shown in Table 1-4 includes about $44.6 million dollars in gravity collection system projects. The City has currently completed video inspections of about 1.6 million feet of its existing sewer system. It is planned to have the remaining footage completed in FY 2010-2011. The City plans to budget yearly for sewer condition evaluation and repairs.

New Model Colony

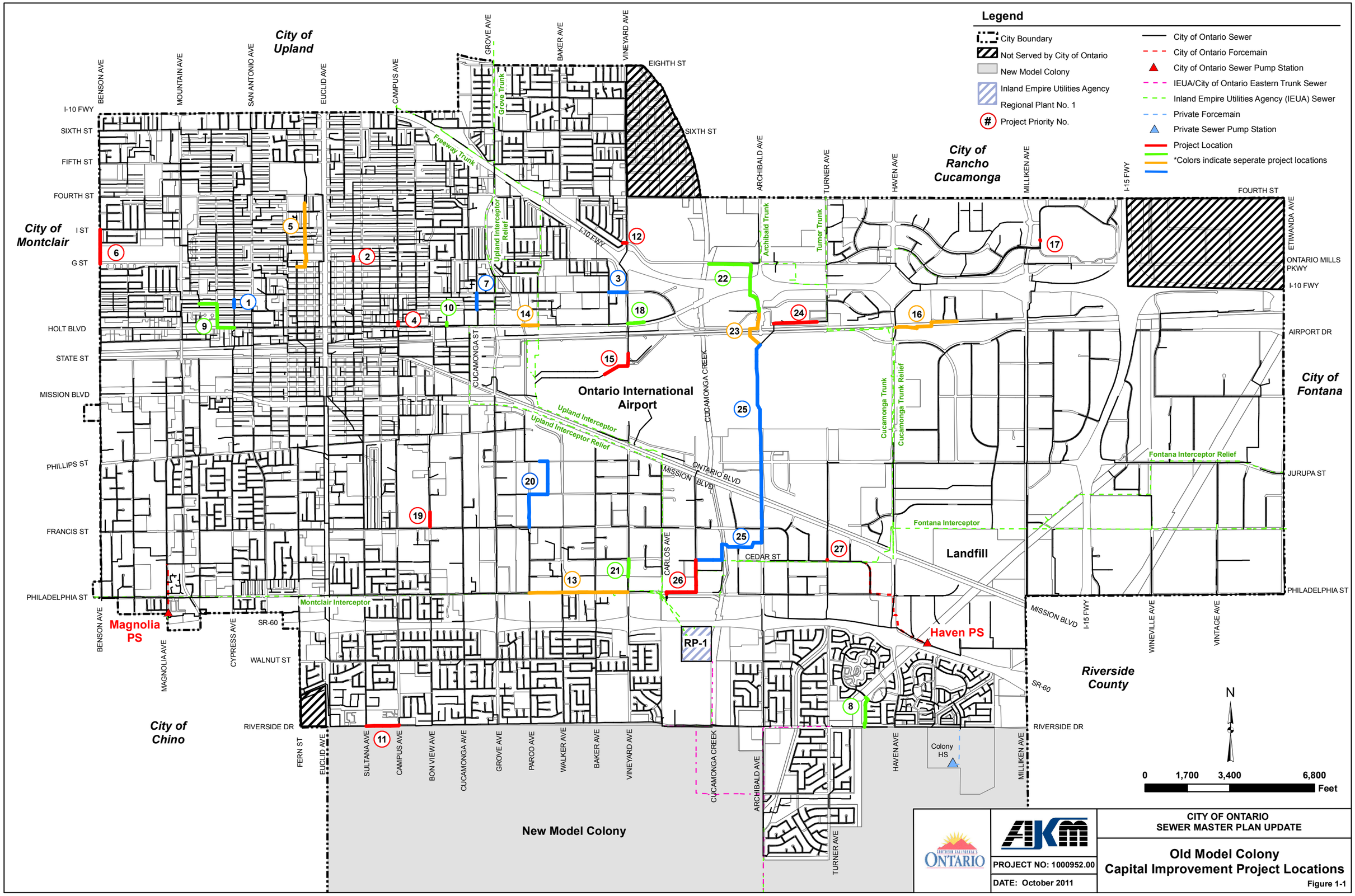
The proposed pipes for New Model Colony are shown on Figure 1-2 and are listed in Table 1-5.

Cost estimates are based on the following:

8-18 inch diameter pipe	$21 / diameter inch / ft
21 inch diameter pipe and greater	$17 / diameter inch / ft

The total costs shown in Table 1-2 include engineering, administration and contingency costs. Contingency costs are estimated at 10 percent of the construction costs. Engineering and administration costs are estimated at 15 percent of the construction plus contingency costs.

The New Model Colony CIP shown in Table 1-5 includes about $59.7 million dollars in gravity collection system projects.


Legend
City Boundary
Not Served by City of Ontario
New Model Colony
Inland Empire Utilities Agency
Regional Plant No. 1
Project Priority No.
City of Ontario Sewer
City of Ontario Forcemain
City of Ontario Sewer Pump Station
IEUA/City of Ontario Eastern Trunk Sewer
Inland Empire Utilities Agency (IEUA) Sewer
Private Forcemain
Private Sewer Pump Station
Project Location
*Colors indicate seperate project locations
City of Upland
City of Montclair
City of Rancho Cucamonga
City of Fontana
City of Chino
Riverside County
Ontario International Airport
Landfill
New Model Colony
RP-1
Magnolia PS
Haven PS
Colony HS
Grove Trunk
Freeway Trunk
Upland Interceptor Relief
Archibald Trunk
Turner Trunk
Cucamonga Trunk
Cucamonga Trunk Relief
Upland Interceptor
Upland Interceptor Relief
Fontana Interceptor Relief
Fontana Interceptor
Montclair Interceptor
BENSON AVE
MOUNTAIN AVE
SAN ANTONIO AVE
EUCLID AVE
CAMPUS AVE
GROVE AVE
BAKER AVE
VINEYARD AVE
EIGHTH ST
SIXTH ST
ARCHIBALD AVE
TURNER AVE
HAVEN AVE
MILLIKEN AVE
I-15 FWY
FOURTH ST
ETIWANDA AVE
ONTARIO MILLS PKWY
I-10 FWY
AIRPORT DR
I-10 FWY
I ST
G ST
HOLT BLVD
STATE ST
MISSION BLVD
PHILLIPS ST
FRANCIS ST
PHILADELPHIA ST
CUCAMONGA ST
CUCAMONGA CREEK
ONTARIO BLVD
MISSION BLVD
CARLOS AVE
CEDAR ST
JURUPA ST
PHILADELPHIA ST
MISSION BLVD
I-15 FWY
WINEVILLE AVE
VINTAGE AVE
SR-60
CYPRESS AVE
WALNUT ST
SR-60
RIVERSIDE DR
RIVERSIDE DR
FERN ST
SULTANA AVE
BON VIEW AVE
PARCO AVE
WALKER AVE
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6,800
Feet
CITY OF ONTARIO
SEWER MASTER PLAN UPDATE
Old Model Colony
Capital Improvement Project Locations
Figure 1-1
PROJECT NO: 1000952.00
DATE: October 2011

Table 1-4
Old Model Colony Capital Improvement Projects

Project No.	Model	Pipe ID	U/S MH ID	D/S MH ID	Street Location	Existing Pipe Size (in)	Replace-ment Pipe Size (in)	Length (ft)	Existing Slope	Unit Cost ($/ft)	Cons. Cost ($)	Contingency Cost ($)	Eng, Admin, Contingency Cost ($)	Total Cost ($)	% Existing Develop-ment	% Ultimate Develop-ment
1	North	J121052	J12119	J12123	Easement north and south of Hollowell St, east of Boulder Ave	8	12	181	0.0079	480	86,736	13,010	14,962	114,708	100	0
	North	J121053	J12123	J12125		8	12	136	0.0079	480	65,136	9,770	11,236	86,142	100	0
							Subtotal	**316**		**Subtotal**	**151,872**	**22,781**	**26,198**	**200,851**		
2	North	I131014	I13124	I13129	Cherry Ave north of G St	8	10	172	0.0033	400	68,800	10,320	11,868	90,988	100	0
							Subtotal	**172**		**Subtotal**	**68,800**	**10,320**	**11,868**	**90,988**		
3	North	J171006	J17103	J17105	D St between Corona Ave and Vineyard Ave	8	12	361	0.0060	480	173,280	25,992	29,891	229,163	100	0
	North	J171007	J17105	J17104		8	12	361	0.0060	480	173,112	25,967	29,862	228,941	100	0
							Subtotal	**722**		**Subtotal**	**346,392**	**51,959**	**59,753**	**458,103**		
4	North	J141077	J14163	J14170	Campus Ave north of Holt Blvd	8	12	28	0.0170	480	13,248	1,987	2,285	17,520	100	0
	North	J141084	J14170	J14186		8	12	85	0.0140	480	40,800	6,120	7,038	53,958	100	0
							Subtotal	**113**		**Subtotal**	**54,048**	**8,107**	**9,323**	**71,478**		
5	North	H131048	H13126	H13139	Easement west of Euclid Ave from north of J St to easement south of G St	8	10	325	0.0030	400	130,000	19,500	22,425	171,925	100	0
	North	H131038	H13139	H13154		8	10	345	0.0060	400	138,000	20,700	23,805	182,505	100	0
	North	H131039	H13154	H13161		8	10	325	0.0030	400	130,000	19,500	22,425	171,925	100	0
	North	H131075	H13161	I13102		8	10	320	0.0030	400	128,000	19,200	22,080	169,280	100	0
	North	I131036	I13102	I13113		8	10	320	0.0030	400	128,000	19,200	22,080	169,280	100	0
	North	I131035	I13113	I13120		8	10	320	0.0020	400	128,000	19,200	22,080	169,280	100	0
	North	I131028	I13120	I13122		8	10	57	0.0053	400	22,720	3,408	3,919	30,047	100	0
	North	I131027	I13122	I13131		8	10	297	0.0098	400	118,920	17,838	20,514	157,272	100	0
	North	I131033	I13131	I13132		8	10	62	0.0060	400	24,664	3,700	4,255	32,618	100	0
	North	I131059	I13132	I13137		8	10	190	0.0075	400	76,000	11,400	13,110	100,510	100	0
	North	I131060	I13137	I13FI		8	10	46	0.0075	400	18,556	2,783	3,201	24,540	100	0
	North	I131062	I13FI	I13145		8	10	351	0.0075	400	140,400	21,060	24,219	185,679	100	0
							Subtotal	**2,958**		**Subtotal**	**1,183,260**	**177,489**	**204,112**	**1,564,861**		
6	West	I101005	H10135	I10108	Benson Ave between I St and G St	8	12	527	0.0183	480	252,912	37,937	43,627	334,476	100	0
	West	I101011	I10108	I10111		8	12	395	0.0184	480	189,600	28,440	32,706	250,746	100	0
	West	I101012	I10111	I10112		8	12	444	0.0184	480	213,024	31,954	36,747	281,724	100	0
							Subtotal	**1,366**		**Subtotal**	**655,536**	**98,330**	**113,080**	**866,946**		
7	North	J151018	J15114	J15125	Virginia Ave between D St and Nocta St	8	10	326	0.0041	400	130,200	19,530	22,460	172,190	80	20
	North	J151045	J15125	J15137		8	10	333	0.0041	400	133,120	19,968	22,963	176,051	80	20
							Subtotal	**658**		**Subtotal**	**263,320**	**39,498**	**45,423**	**348,241**		
8	South	R201064	R20119	R20122	Deer Creek Lp west of Laurel Tree Dr	10	15	129	0.0032	600	77,268	11,590	13,329	102,187	100	0
	South	R201051	R20122	R20129	Laurel Tree Dr between Deer Creek Lp and Riverside Dr	10	15	245	0.0052	600	146,718	22,008	25,309	194,035	100	0
	South	R201050	R20129	R20138		10	15	237	0.0052	600	142,014	21,302	24,497	187,814	100	0
	South	R201049	R20138	R20146		10	15	237	0.0052	600	142,200	21,330	24,530	188,060	100	0
	South	R201042	R20146	R20151		10	15	233	0.0120	600	139,800	20,970	24,116	184,886	99	1
	South	R201043	R20151	R20150		10	15	32	0.0076	600	19,200	2,880	3,312	25,392	99	1
	South	R201044	R20150	R20161		10	15	144	0.0040	600	86,544	12,982	14,929	114,454	99	1
							Subtotal	**1,256**		**Subtotal**	**753,744**	**113,062**	**130,021**	**996,826**		
9	North		J11132		Hollowell St, west of Boulder Ave		12	720		480	345,600	51,840	59,616	457,056	69	31
	North				Boulder Ave, Hollowell St to Holt Blvd		12	950		480	456,000	68,400	78,660	603,060	70	30
	North			J12198	Holt Blvd, east of Boulder Ave		12	680		480	326,400	48,960	56,304	431,664	70	30
							Subtotal	**2,350**		**Subtotal**	**1,128,000**	**169,200**	**194,580**	**1,491,780**		
10	North	J151033	J15145	J15155	Easement north of Holt Blvd, east of Allyn Ave	8	10	130	0.0081	400	51,800	7,770	8,936	68,506	89	11
							Subtotal	**130**		**Subtotal**	**51,800**	**7,770**	**8,936**	**68,506**		
11	South	R141017	R14156	R14155	Riverside Dr between Sultana Ave and Campus Ave	12	15	321	0.0011	600	192,360	28,854	33,182	254,396	89	11
	South	R141018	R14155	R14154		12	15	321	0.0011	600	192,366	28,855	33,183	254,404	84	16
	South	R141019	R14154	R14153		12	15	227	0.0016	600	136,200	20,430	23,495	180,125	80	20
	South	R141016	R14153	R14150		12	15	320	0.0011	600	192,240	28,836	33,161	254,237	76	24
	South	R141060	R14150	R14148		12	15	26	0.0016	600	15,420	2,313	2,660	20,393	76	24
							Subtotal	**1,214**		**Subtotal**	**728,586**	**109,288**	**125,681**	**963,555**		
12	North	I171011	I17103	I17104	Plaza Serena St Granada Ct to Vineyard Ave	8	12	153	0.0040	480	73,646	11,047	12,704	97,397	70	30
							Subtotal	**153**		**Subtotal**	**73,646**	**11,047**	**12,704**	**97,397**		
13	West	P161009	P16112	P16111	Philadelphia St between Parco Ave and Vineyard Ave	36	42	323	0.0005	1470	474,075	71,111	81,778	626,964	85	15
	West	P161010	P16111	P16109		36	42	330	0.0005	1470	485,100	72,765	83,680	641,545	85	15
	West	P161011	P16109	P16107		36	42	323	0.0005	1470	474,810	71,222	81,905	627,936	85	15
	West	P161012	P16107	P16105		36	42	312	0.0005	1470	458,640	68,796	79,115	606,551	85	15
	West	P161021	P16105	P16104		36	42	340	0.0005	1470	499,065	74,860	86,089	660,013	85	15
	West	P161022	P16104	P16103		36	42	327	0.0005	1470	479,955	71,993	82,792	634,740	85	15
	West	P161023	P16103	P16102		36	42	327	0.0005	1470	480,690	72,104	82,919	635,713	85	15
	West	P171003	P16102	P17132		36	42	326	0.0005	1470	479,749	71,962	82,757	634,468	85	15
	West	P171015	P17132	P17131		36	42	323	0.0005	1470	475,016	71,252	81,940	628,208	85	15
	West	P171018	P17131	P17130		36	42	325	0.0005	1470	477,015	71,552	82,285	630,852	85	15
	West	P171020	P17130	P17128		36	42	330	0.0005	1470	485,100	72,765	83,680	641,545	85	15
	West	P171021	P17128	P17126		36	42	309	0.0006	1470	453,789	68,068	78,279	600,136	85	15
							Subtotal	**3,893**		**Subtotal**	**5,723,004**	**858,451**	**987,218**	**7,568,673**		
14	North	J161027	J16135	J16137	Holt Blvd west of Imperial Ave	10	15	330	0.0026	600	197,700	29,655	34,103	261,458	62	38
	North	J161047	J16137	J16133		10	15	303	0.0026	600	181,800	27,270	31,361	240,431	61	39
							Subtotal	**633**		**Subtotal**	**379,500**	**56,925**	**65,464**	**501,889**		
15	North	K171005	K17104	K17107	Vineyard Ave south of Airport Dr	15	18	294	0.0061	720	211,968	31,795	36,564	280,328	69	31
	North	K171006	K17107	K17108	Easement west of Vineyard Ave, south of Airport Dr	18	21	237	0.0024	735	173,982	26,097	30,012	230,091	69	31
	North	K171024	K17108	K17109		18	21	373	0.0020	735	274,008	41,101	47,266	362,376	69	31
	North	K171022	K17109	K17110		18	21	204	0.0019	735	149,859	22,479	25,851	198,189	69	31
	North	K171020	K17110	K17111		18	21	419	0.0019	735	307,965	46,195	53,124	407,284	69	31
							Subtotal	**1,527**		**Subtotal**	**1,117,782**	**167,667**	**192,817**	**1,478,267**		

Table 1-4
Old Model Colony Capital Improvement Projects

Project No.	Model	Pipe ID	U/S MH ID	D/S MH ID	Street Location	Existing Pipe Size (in)	Replace-ment Pipe Size (in)	Length (ft)	Existing Slope	Unit Cost ($/ft)	Cons. Cost ($)	Contingency Cost ($)	Eng, Admin, Contingency Cost ($)	Total Cost ($)	% Existing Develop-ment	% Ultimate Develop-ment
16	East	J211031	J21115	J21116	Guasti Rd between Sequoia Ave and Ponderosa Ave	8	12	342	0.0032	480	164,160	24,624	28,318	217,102	53	47
	East	J211030	J21116	J21117		8	12	199	0.0018	480	95,606	14,341	16,492	126,439	53	47
	East	J211036	J21117	J21118	Guasti Rd west of Ponderosa Ave	8	15	139	0.0055	600	83,292	12,494	14,368	110,154	38	62
	East	J211029	J21118	J21120		8	15	340	0.0032	600	204,000	30,600	35,190	269,790	42	58
	East	J211028	J21120	J21122	Easement east of Haven Ave	8	15	135	0.0032	600	81,000	12,150	13,973	107,123	42	58
	East	J211027	J21122	J21123		8	15	326	0.0032	600	195,600	29,340	33,741	258,681	37	63
	East	J211017	J21123	J21124		8	15	254	0.0032	600	152,610	22,892	26,325	201,827	33	67
	East	J211042	J21124	J21132		8	15	67	0.0027	600	40,422	6,063	6,973	53,458	33	67
	East	J211043	J21132	J21128		8	15	198	0.0027	600	118,884	17,833	20,507	157,224	33	67
	East	J211019	J21128	J21125		8	15	198	0.0027	600	118,884	17,833	20,507	157,224	30	70
	East	J211016	J21125	J21126		8	15	326	0.0033	600	195,600	29,340	33,741	258,681	28	72
	East	J211041	J21126	J21127		8	15	158	0.0032	600	94,800	14,220	16,353	125,373	28	72
							Subtotal	**2,683**		**Subtotal**	**1,544,858**	**231,729**	**266,488**	**2,043,075**		
17	East	Proposed1	I23100	I23101	Mills Cir north of Mall Dr	-	15	40	0.1292	-	100,000	15,000	17,250	132,250	66	34
							Subtotal	**40**		**Subtotal**	**100,000**	**15,000**	**17,250**	**132,250**		
18	North	J171057	J17127	J17128	Holt Blvd east of Vineyard Ave	12	15	326	0.0009	600	195,600	29,340	33,741	258,681	55	45
	North	J171056	J17128	J17131		12	15	326	0.0051	600	195,600	29,340	33,741	258,681	50	50
							Subtotal	**652**		**Subtotal**	**391,200**	**58,680**	**67,482**	**517,362**		
19	West	N141086	N14135	N14145	Bonview Ave north of Francis St	8	12	326	0.0060	480	156,480	23,472	26,993	206,945	39	61
	West	N141085	N14145	N14151		8	12	254	0.0060	480	121,920	18,288	21,031	161,239	38	62
							Subtotal	**580**		**Subtotal**	**278,400**	**41,760**	**48,024**	**368,184**		
20	West	M161010	M16105	M16104	Acacia St west of Walker St	8	12	322	0.0023	480	154,685	23,203	26,683	204,571	17	83
	West	M161013	M16104	M16108	Easement between Acacia St and Locust St	8	12	296	0.0189	480	142,080	21,312	24,509	187,901	20	80
	West	M161017	M16108	M16109		8	12	296	0.0050	480	142,080	21,312	24,509	187,901	20	80
	West	M161016	M16109	M16110		8	12	296	0.0050	480	142,080	21,312	24,509	187,901	20	80
	West	N161002	M16110	N16100		8	12	296	0.0050	480	142,080	21,312	24,509	187,901	20	80
	West	N161013	N16100	N16103		8	12	114	0.0050	480	54,677	8,202	9,432	72,310	20	80
	West	N161016	N16103	N16104	Locust St east of Parco Ave	8	12	90	0.0037	480	43,200	6,480	7,452	57,132	18	82
	West	N161012	N16104	N16105		8	12	326	0.0050	480	156,480	23,472	26,993	206,945	18	82
	West	N161011	N16105	N16108		8	12	326	0.0050	480	156,480	23,472	26,993	206,945	20	80
	West	N161017	N16108	N16999	Parco Ave between Locust St and Francis St	8	12	292	0.0050	480	140,160	21,024	24,178	185,362	18	82
	West	N169999	N16999	N16998		8	12	296	0.0050	480	142,080	21,312	24,509	187,901	18	82
	West	N169998	N16998	N16506		8	12	62	0.0050	480	29,760	4,464	5,134	39,358	17	83
	West	N161038	N16506	N16112		8	12	204	0.0050	480	98,078	14,712	16,919	129,709	17	83
	West	N161037	N16112	N16119		8	12	152	0.0050	480	72,960	10,944	12,586	96,490	17	83
							Subtotal	**3,369**		**Subtotal**	**1,616,880**	**242,532**	**278,912**	**2,138,324**		
21	West	O171058	O17121	O17142	Vineyard Ave south of Cedar St	8	12	349	0.0048	480	167,520	25,128	28,897	221,545	27	73
	West	O171057	O17142	O17152		8	12	347	0.0033	480	166,454	24,968	28,713	220,136	28	72
	West	O171047	O17152	O17153		8	12	95	0.0444	480	45,600	6,840	7,866	60,306	27	73
							Subtotal	**791**		**Subtotal**	**379,574**	**56,936**	**65,477**	**501,987**		
22	East	I181015	I18109	I18110	Inland Empire Blvd west of Archibald Ave	15	18	346	0.0028	720	249,120	37,368	42,973	329,461	1	99
	East	I181026	I18110	I18111		15	18	346	0.0028	720	249,120	37,368	42,973	329,461	1	99
	East	I181002	I18111	I19120		15	18	345	0.0028	720	248,530	37,279	42,871	328,680	1	99
	East	I191027	I19120	I19121		15	18	347	0.0028	720	249,710	37,457	43,075	330,242	1	99
	East	I191029	I19121	I19122	Easement between Inland Empire Blvd and Guasti Rd	15	21	216	0.0020	735	158,760	23,814	27,386	209,960	11	89
	East	I191022	I19122	I19123		15	21	283	0.0020	735	207,638	31,146	35,817	274,601	10	90
	East	J191006	I19123	J19102		15	21	735	0.0020	735	540,225	81,034	93,189	714,448	10	90
	East	J191016	J19102	J19103		15	21	104	0.0171	735	76,440	11,466	13,186	101,092	10	90
	East	J191027	J19103	J19105		15	21	323	0.0170	735	237,405	35,611	40,952	313,968	10	90
	East	J191018	J19105	J19106		15	21	233	0.0170	735	171,255	25,688	29,541	226,485	9	91
	East	J191017	J19106	J19107		15	21	54	0.0170	735	39,690	5,954	6,847	52,490	9	91
	East	J191019	J19107	J19111		15	21	113	0.0136	735	83,055	12,458	14,327	109,840	11	89
							Subtotal	**3,445**		**Subtotal**	**2,510,948**	**376,642**	**433,138**	**3,320,728**		
23	East	J191020	J19111	J19114	Easement south of Guasti Rd	15	21	223	0.0097	735	163,905	24,586	28,274	216,764	13	87
	East	J191021	J19114	J19118		15	21	229	0.0091	735	168,668	25,300	29,095	223,063	13	87
	East	J191022	J19118	J19132		15	21	228	0.0090	735	167,808	25,171	28,947	221,926	13	87
	East	J191052	J19132	J19133		15	21	204	0.0086	735	149,675	22,451	25,819	197,946	13	87
	East	J191051	J19133	J19134		15	21	95	0.0082	735	69,825	10,474	12,045	92,344	12	88
	East	J191003	J19134	K19101		18	21	284	0.0061	735	208,740	31,311	36,008	276,059	12	88
	East	K191008	K19101	K19104		18	21	298	0.0059	735	219,030	32,855	37,783	289,667	10	90
	East	K191007	K19104	K19105		18	21	125	0.0058	735	91,875	13,781	15,848	121,505	10	90
	East	K191006	K19105	K19106		18	21	9	0.0056	735	6,615	992	1,141	8,748	10	90
	East	K191005	K19106	K19108		18	21	85	0.0059	735	62,475	9,371	10,777	82,623	10	90
							Subtotal	**1,780**		**Subtotal**	**1,308,616**	**196,292**	**225,736**	**1,730,645**		
24	East	J191004	J20131	J19116	Old Guasti Rd west of Turner Ave	8	12	303	0.0045	480	145,200	21,780	25,047	192,027	18	82
	East	J191047	J19116	J19119		8	12	297	0.0044	480	142,416	21,362	24,567	188,345	16	84
	East	J191046	J19119	J19121		8	12	313	0.0045	480	150,384	22,558	25,941	198,883	14	86
	East	J191035	J19121	J19123		8	12	354	0.0048	480	169,776	25,466	29,286	224,529	12	88
	East	J191034	J19123	J19125		8	12	380	0.0042	480	182,544	27,382	31,489	241,414	11	89
	East	J191036	J19125	J19126		8	12	80	0.0054	480	38,400	5,760	6,624	50,784	10	90
							Subtotal	**1,727**		**Subtotal**	**828,720**	**124,308**	**142,954**	**1,095,982**		

Table 1-4
Old Model Colony Capital Improvement Projects

Project No.	Model	Pipe ID	U/S MH ID	D/S MH ID	Street Location	Existing Pipe Size (in)	Replace-ment Pipe Size (in)	Length (ft)	Existing Slope	Unit Cost ($/ft)	Cons. Cost ($)	Contingency Cost ($)	Eng, Admin, Contingency Cost ($)	Total Cost ($)	% Existing Develop-ment	% Ultimate Develop-ment
25	East	K191002	K19108	K19109	Archibald Ave south of Airport Dr to south of Francis St	18	21	217	0.0035	735	159,208	23,881	27,463	210,553	10	90
	East	K191003	K19109	K19111		18	21	221	0.0038	735	162,435	24,365	28,020	214,820	10	90
	East	K191004	K19111	K19112		18	21	253	0.0038	735	185,955	27,893	32,077	245,925	10	90
	East	K191009	K19112	K19115		18	21	285	0.0035	735	209,475	31,421	36,134	277,031	10	90
	East	K191028	K19115	K19116		18	21	119	0.0035	735	87,465	13,120	15,088	115,672	10	90
	East	K191027	K19116	K19118		18	21	215	0.0035	735	158,025	23,704	27,259	208,988	10	90
	East	L191002	K19118	L19100		15	21	651	0.0128	735	478,257	71,739	82,499	632,495	10	90
	East	L191014	L19100	L19101		15	21	419	0.0120	735	307,965	46,195	53,124	407,284	10	90
	East	L191005	L19101	L19102		15	21	205	0.0120	735	150,624	22,594	25,983	199,200	10	90
	East	L191006	L19102	L19103		15	21	436	0.0132	735	320,460	48,069	55,279	423,808	10	90
	East	L191007	L19103	L19104		15	21	339	0.0084	735	249,165	37,375	42,981	329,521	10	90
	East	L191001	L19104	M19100		15	21	318	0.0085	735	233,730	35,060	40,318	309,108	10	90
	East	M191008	M19100	M19102		15	21	331	0.0085	735	243,285	36,493	41,967	321,744	10	90
	East	M191011	M19102	M19104		15	21	326	0.0085	735	239,610	35,942	41,333	316,884	10	90
	East	M191014	M19104	M19106		15	21	329	0.0113	735	241,815	36,272	41,713	319,800	10	90
	East	M191018	M19106	M19108		15	21	343	0.0130	735	252,105	37,816	43,488	333,409	10	90
	East	M191019	M19108	M19110	Archibald Ave south of Airport Dr to south of Francis St	15	21	326	0.0129	735	239,610	35,942	41,333	316,884	11	89
	East	M191002	M19110	N19101		15	21	351	0.0130	735	257,985	38,698	44,502	341,185	11	89
	East	N191010	N19101	N19105		15	21	272	0.0132	735	199,949	29,992	34,491	264,433	11	89
	East	N191011	N19105	N19107		15	21	61	0.0158	735	45,107	6,766	7,781	59,654	11	89
	East	N191021	N19107	N19108		15	21	242	0.0129	735	177,583	26,638	30,633	234,854	11	89
	East	N191022	N19108	N19109		15	21	363	0.0129	735	267,077	40,062	46,071	353,209	11	89
	East	N191023	N19109	N19110		15	21	326	0.0073	735	239,610	35,942	41,333	316,884	11	89
	East	N191024	N19110	N19112		15	21	319	0.0130	735	234,480	35,172	40,448	310,099	11	89
	East	N191033	N19112	N19118		15	21	25	0.0332	735	18,375	2,756	3,170	24,301	11	89
	East	N191003	N19118	O19102		15	21	314	0.0115	735	231,011	34,652	39,849	305,511	11	89
	East	O191028	O19102	O19107		15	21	253	0.0079	735	185,654	27,848	32,025	245,527	12	88
	East	O191016	O19107	O19106	Easement between Archibald Ave and west side of Cucomonga Creek	18	30	322	0.0016	1050	337,764	50,665	58,264	446,693	11	89
	East	O191017	O19106	O19114		18	30	186	0.0016	1050	195,153	29,273	33,664	258,090	11	89
	East	O191018	O19114	O19113		18	30	291	0.0016	1050	305,550	45,833	52,707	404,090	11	89
	East	O191006	O19113	O18106		18	30	250	0.0016	1050	262,500	39,375	45,281	347,156	11	89
	East	O181079	O18106	O18105		18	30	387	0.0016	1050	406,350	60,953	70,095	537,398	12	88
	East	O181025	O18105	O18103		18	30	121	0.0016	1050	127,050	19,058	21,916	168,024	12	88
	East	O181012	O18103	O18102		18	30	177	0.0016	1050	185,703	27,855	32,034	245,592	12	88
	East	O181016	O18102	O18108	Easement west of Cucamonga Creek	18	30	310	0.0016	1050	325,647	48,847	56,174	430,668	12	88
	East	O181015	O18108	O18118		18	30	311	0.0016	1050	326,162	48,924	56,263	431,349	12	88
	East	O181075	O18118	O18117	Easement between Cucamonga Creek	18	30	356	0.0016	1050	374,189	56,128	64,548	494,864	12	88
	East	O181014	O18117	O18116		18	30	356	0.0016	1050	373,800	56,070	64,481	494,351	12	88
	East	O181013	O18116	O18115		18	30	356	0.0016	1050	374,094	56,114	64,531	494,739	12	88
							Subtotal	**11,281**		**Subtotal**	**9,369,981**	**1,405,497**	**1,616,322**	**12,391,799**		
26	East	O181027	O18115	O18124	Hellman Ave between Cedar St and Philadelphia St	18	30	40	0.0047	1050	42,000	6,300	7,245	55,545	13	87
	East	O181084	O18124	O18130		18	30	287	0.0048	1050	301,350	45,203	51,983	398,535	13	87
	East	O181098	O18130	O18135		18	30	75	0.0046	1050	78,750	11,813	13,584	104,147	13	87
	East	O181087	O18135	O18148		18	30	235	0.0050	1050	246,855	37,028	42,582	326,466	13	87
	East	O181004	O18148	P18101		18	30	369	0.0022	1050	386,925	58,039	66,745	511,708	13	87
	East	P181019	P18101	P18108		18	30	263	0.0022	1050	276,423	41,463	47,683	365,569	13	87
	East	P181007	P18108	P18107	Philadelphia St west of Hellman Ave	18	30	333	0.0014	1050	350,070	52,511	60,387	462,968	13	87
	East	P181008	P18107	P18106		18	30	336	0.0014	1050	352,800	52,920	60,858	466,578	13	87
	East	P181011	P18106	P18105		18	30	251	0.0014	1050	263,025	39,454	45,372	347,851	13	87
	East	P181016	P18105	P18133		18	30	249	0.0014	1050	261,450	39,218	45,100	345,768	13	87
	East	P181060	P18133	P18132		18	30	74	0.0112	1050	77,700	11,655	13,403	102,758	13	87
							Subtotal	**2,512**		**Subtotal**	**2,637,348**	**395,602**	**454,943**	**3,487,893**		
27	East	O201020	O20118	O20119	Turner Ave north of Cedar St	10	15	9	0.0078	-	100,000	15,000	17,250	132,250	19	81
							Subtotal	**9**		**Subtotal**	**100,000**	**15,000**	**17,250**	**132,250**		
							Total	**46,329**		**Total**	**33,745,815**	**5,061,872**	**5,821,153**	**44,628,841**		

STATE ST
MISSION BLVD
PHILLIPS ST
FRANCIS ST
PHILADELPHIA ST
BENSON AVE
MAGNOLIA AVE
CYPRESS AVE
SR-60
WALNUT ST
RIVERSIDE DR
FERN ST
EUCLID AVE
CHINO AVE
SCHAEFER AVE
EDISON AVE
EUCALYPTUS AVE
MERRILL AVE
CUCAMONGA CREEK
ONTARIO BLVD
MISSION BLVD
CEDAR ST
SULTANA AVE
CAMPUS AVE
BON VIEW AVE
CUCAMONGA AVE
GROVE AVE
PARCO AVE
WALKER AVE
BAKER AVE
VINEYARD AVE
CARPENTER AVE
ARCHIBALD AVE
HAVEN AVE
TURNER AVE
SUMNER AVE
CLEVELAND AVE.
MILLIKEN AVE
I-15 FWY
WINEVILLE AVE
VINTAGE AVE
JURUPA ST

City of Fontana

Riverside County

City of Chino

Upland Interceptor Relief
Cucamonga Trunk
Cucamonga Trunk Relief
Fontana Interceptor Relief
Fontana Interceptor

Magnolia PS
Haven PS
RP-1
RP-5

Walker Ave Trunk Sewer
Euclid Ave Trunk Sewer
Bon View Ave Trunk Sewer
Grove Ave Trunk Sewer
Western Trunk Sewer
Carpenter Ave Trunk Sewer
Eastern Trunk Sewer
Haven Ave Trunk Sewer
Cleveland Ave Trunk Sewer
Edison Ave Trunk Sewer
Eucalyptus Ave Trunk Sewer
Merrill Ave Trunk Sewer
Bellgrave Ave Trunk Sewer
Kimball Interceptor

Colony HS

A70 B50 C50 D70
A60 B40 C40 D60
A50 B30 C30 D50
A40 B20 C20 D40
A30 B10 C10 D10
A20
A10
D120 D110 D100A D100 D90 D150 D165 D170
E380
E680 E620 E560
F10 F40 F50
G90 G80 G70 G65 G60 G50 G40 G35 G25 G20 G10
H70 H60 H50 H40 H30 H20 H10

Legend

- City Boundary
- Magnolia PS Tributary Area
- Haven PS Tributary Area - Future NMC Service Area
- Not Served by City of Ontario
- NMC Service Area
- Regional Wastewater Treatment Plant
- Manholes
- Regional Connections to IEUA Trunks Sewer
- City of Ontario Sewer Pump Station
- City of Ontario Force Main
- City of Ontario Sewer
- IEUA/City of Ontario RP-1 Bypass Sewer - Joint Facility
- IEUA/City of Ontario Eastern Trunk Sewer - Joint Facility
- IEUA Kimball Interceptor Extension
- Proposed Western Trunk Sewer
- Inland Empire Utilities Agency (IEUA) Sewer
- Proposed City of Ontario NMC Sewer
- Private Forcemain
- Private Sewer Pump Station

N

0 1,750 3,500 7,000 Feet

CITY OF ONTARIO
SEWER MASTER PLAN UPDATE

Proposed New Model Colony Capital Improvement Projects

Figure 1-2

PROJECT NO: 1000952.00
DATE: April 2012

Table 1-5
New Model Colony Proposed Sewer System

Pipe ID	U/S MH ID	D/S MH ID	Street Location	Proposed Pipe Size (in)	Length (ft)	Estimated Slope	Unit Cost ($/ft)	Cons. Cost ($)	Contingency Cost ($)	Engineering & Admin. Cost ($)	Total Cost ($)	% OMC	% NMC
D120	D120	D110	Carpenter Ave	18	2,528	0.0063	378	955,673	95,567	157,686	1,208,926	100	0
D110	D110	D100A		21	2,650	0.0094	357	946,082	94,608	156,104	1,196,794	84	16
D100A	D100A	D60	Schaefer Ave	30	3,852	0.0013	510	1,964,483	196,448	324,140	2,485,071	84	16
D60	D60	D50		30	2,640	0.0114	510	1,346,187	134,619	222,121	1,702,926	64	36
D50	D50	D40		30	2,639	0.0072	510	1,346,141	134,614	222,113	1,702,868	55	45
D40	D40	D30	Walker Ave	30	1,291	0.0047	510	658,242	65,824	108,610	832,676	51	49
D30	D30	D20		30	950	0.0056	510	484,372	48,437	79,921	612,731	51	49
D20	D20	D10		30	376	0.0121	510	191,727	19,173	31,635	242,535	51	49
D10	D10	C10		30	2,636	0.0025	510	1,344,288	134,429	221,807	1,700,524	49	51
C10	C10	B10	Merrill Ave	36	2,651	0.0026	612	1,622,386	162,239	267,694	2,052,319	35	65
B10	B10	A30		36	4,170	0.0028	612	2,552,029	255,203	421,085	3,228,317	25	75
A30	A30	A20		36	2,655	0.0105	612	1,624,780	162,478	268,089	2,055,347	19	81
A20	A20	A10	Euclid Ave	36	2,521	0.0056	612	1,542,828	154,283	254,567	1,951,678	19	81
Western Trunk Sewer				**Subtotal**	**31,558**			**16,579,219**	**1,657,922**	**2,735,571**	**20,972,713**		
F40	F40	E620	Eucalyptus Ave	15	3,900	0.0044	315	1,228,500	122,850	202,703	1,554,053	0	100
Eucalyptus Avenue Trunk Sewer				**Subtotal**	**3,900**			**1,228,500**	**122,850**	**202,703**	**1,554,053**		
G40	G40	F10		27	2,960	0.0025	459	1,358,640	135,864	224,176	1,718,680	68	32
F10	F10	E680	Edison Ave	30	2,762	0.0020	510	1,408,450	140,845	232,394	1,781,689	64	36
Edison Avenue Trunk Sewer				**Subtotal**	**5,722**			**2,767,090**	**276,709**	**456,570**	**3,500,368**		
G90	G90	G80		18	1,556	0.0095	378	588,092	58,809	97,035	743,936	100	0
G80	G80	G70		21	2,419	0.0111	357	863,549	86,355	142,486	1,092,390	100	0
G70	G70	G65		21	2,620	0.0078	357	935,340	93,534	154,331	1,183,205	94	6
G65	G65	G60	Haven Ave	21	1,440	0.0131	357	513,982	51,398	84,807	650,187	94	6
G60	G60	G50		21	2,632	0.0092	357	939,624	93,962	155,038	1,188,624	73	27
G50	G50	G40		21	1,304	0.0086	357	465,528	46,553	76,812	588,893	73	27
Haven Avenue Trunk Sewer				**Subtotal**	**11,970**			**4,306,115**	**430,612**	**710,509**	**5,447,236**		
H70	H70	H60		12	1,016	0.0100	252	255,947	25,595	42,231	323,773	0	100
H60	H60	H50		12	1,325	0.0116	252	333,900	33,390	55,094	422,384	0	100
H50	H50	H40		12	1,328	0.0088	252	334,656	33,466	55,218	423,340	0	100
H40	H40	H30	Cleveland Ave	15	2,665	0.0086	315	839,475	83,948	138,513	1,061,936	0	100
H30	H30	H20		15	1,263	0.0079	315	397,845	39,785	65,644	503,274	0	100
H20	H20	H10		18	1,560	0.0076	378	589,664	58,966	97,295	745,925	0	100
H10	H10	G10		24	2,879	0.0009	408	1,174,434	117,443	193,782	1,485,659	0	100
G10	G10	F50	Merrill Ave	24	2,829	0.0033	408	1,154,127	115,413	190,431	1,459,971	0	100
F50	F50	E560		24	2,190	0.0032	408	893,536	89,354	147,433	1,130,323	0	100
G35	G35	G25		12	2,521	0.0058	252	635,168	63,517	104,803	803,487	0	100
G25	G25	G20	Sumner Ave	12	1,149	0.0084	252	289,456	28,946	47,760	366,162	0	100
G20	G20	G10		12	1,694	0.0094	252	426,888	42,689	70,437	540,013	0	100
Cleveland, Bellgrave, Merrill Ave Trunk Sewer				**Subtotal**	**22,417**			**7,325,095**	**732,510**	**1,208,641**	**9,266,246**		
D70	D70	D60	Walker Ave	12	2,624	0.0050	252	661,305	66,130	109,115	836,550	0	100
Walker Avenue Trunk Sewer				**Subtotal**	**2,624**			**661,305**	**66,130**	**109,115**	**836,550**		
C50	C50	C40		12	2,643	0.0095	252	666,146	66,615	109,914	842,674	0	100
C40	C40	C30	Grove Ave	15	2,643	0.0095	315	832,632	83,263	137,384	1,053,280	0	100
C30	C30	C20		18	2,632	0.0061	378	994,870	99,487	164,153	1,258,510	0	100
C20	C20	C10		18	2,670	0.0090	378	1,009,395	100,939	166,550	1,276,884	0	100
Grove Avenue Trunk Sewer				**Subtotal**	**10,589**			**3,503,042**	**350,304**	**578,002**	**4,431,349**		
B50	B50	B40		12	2,647	0.0109	252	667,161	66,716	110,082	843,959	0	100
B40	B40	B30	Bon View Ave	15	2,635	0.0089	315	830,130	83,013	136,972	1,050,115	0	100
B30	B30	B20		18	2,628	0.0094	378	993,375	99,337	163,907	1,256,619	0	100
B20	B20	B10		18	2,655	0.0076	378	1,003,554	100,355	165,586	1,269,495	0	100
Bon View Avenue Trunk Sewer				**Subtotal**	**10,566**			**3,494,220**	**349,422**	**576,546**	**4,420,189**		
A70	A70	A60		12	2,646	0.0120	252	666,785	66,679	110,020	843,484	0	100
A60	A60	A50	Euclid Ave	15	2,627	0.0088	315	827,558	82,756	136,547	1,046,860	0	100
A50	A50	A40		18	2,646	0.0091	378	1,000,082	100,008	165,014	1,265,104	0	100
A40	A40	A30		18	2,669	0.0112	378	1,008,784	100,878	166,449	1,276,112	0	100
Euclid Avenue Trunk Sewer				**Subtotal**	**10,588**			**3,503,210**	**350,321**	**578,030**	**4,431,560**		
D100	D100	D90		12	2,322	0.0078	252	585,144	58,514	96,549	740,207	0	100
D150	D90	D150		15	2,637	0.0076	315	830,566	83,057	137,043	1,050,667	0	100
D160	D150	D165	Carpenter Ave	18	2,615	0.0077	378	988,297	98,830	163,069	1,250,196	0	100
D170	D165	D170		18	2,494	0.0108	378	942,732	94,273	155,551	1,192,556	0	100
D180	D170	E380		18	1,237	0.0125	378	467,586	46,759	77,152	591,496	0	100
Carpenter Avenue Trunk Sewer				**Subtotal**	**11,304**			**3,814,325**	**381,433**	**629,364**	**4,825,122**		
				Total	**121,238**		**Total**	**47,182,122**	**4,718,212**	**7,785,050**	**59,685,384**		