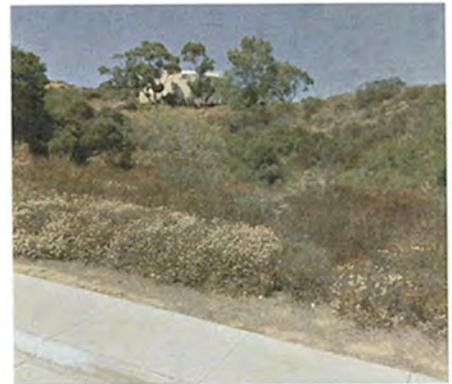


PRELIMINARY WATER REPORT

for the SKYLINE HEIGHTS PROJECT
in the City of Corona,
County of Riverside, California



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INTRODUCTION

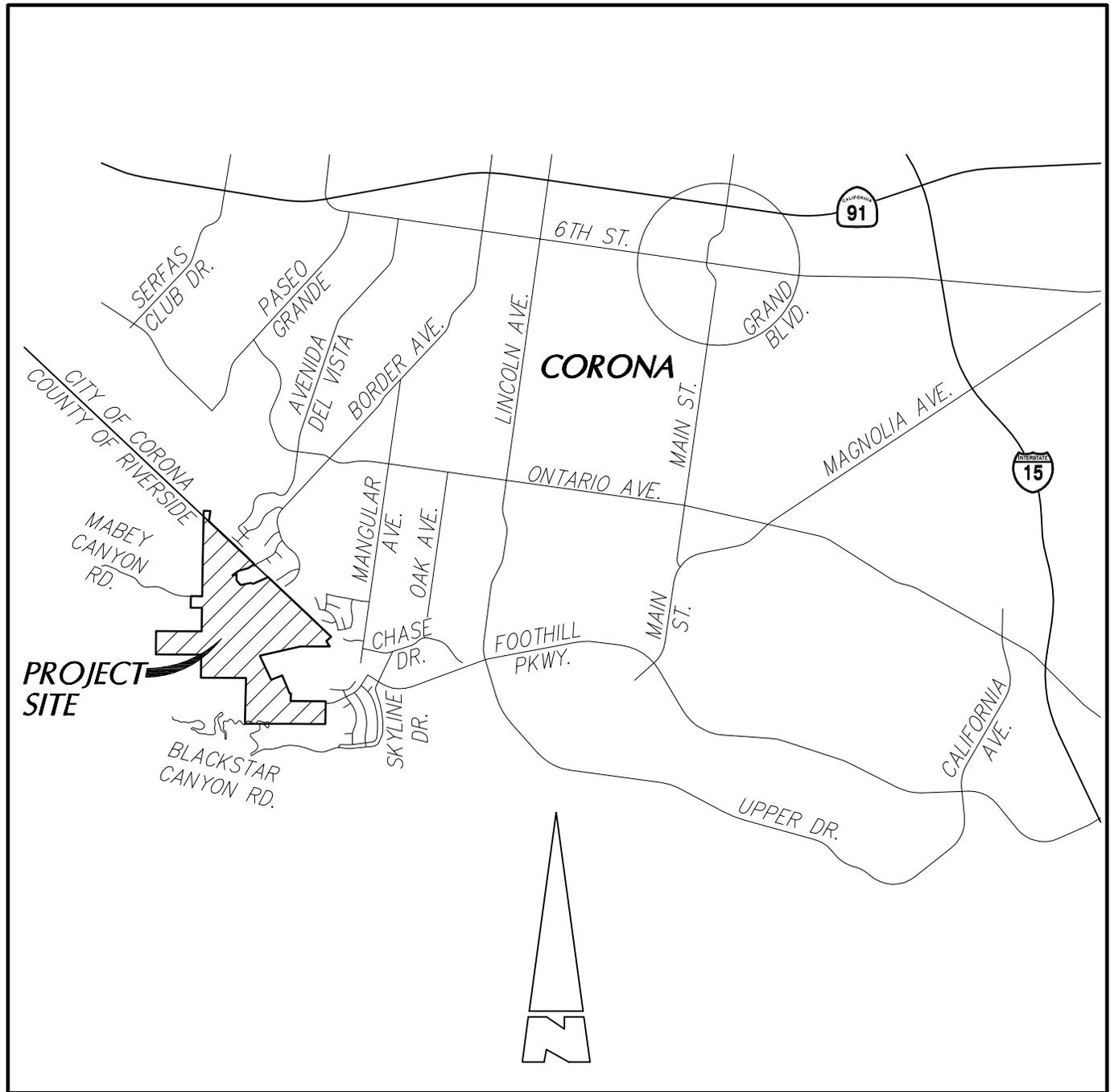
1.1 PURPOSE OF STUDY

The purpose of this report is to discuss the water facility needs of the Skyline Heights project as it relates to the City of Corona’s plans for the domestic water system. More specifically, this report will address: the existing water system, the estimated project water demands, projected reservoir storage, proposed pipelines and pumping facilities needed to support the proposed project and adjacent developments. It will also identify the approximate water distribution line alignments and pipe sizes, as well as proposed reservoir and pump station locations and sizes. The project water demands are based on the proposed land use and the City of Corona 2005 Water Master Plan. The analysis presented in this report is based on the Skyline Heights VTTM 36544.

1.2 PROJECT DESCRIPTION

The Skyline Heights project is comprised of 270.9 acres of vacant land situated in the hills to the southwest of the City of Corona in Western Riverside County, California adjacent to Foothill Parkway. The project area includes the area (approximately 17.16 acres) to be acquired by RCTC/City of Corona for the construction of the future Foothill Parkway westerly extension and Mabey Canyon Debris Basin expansion. The site is located approximately 3 miles south of the 71 and 91 Freeways and approximately 4 miles west of Interstate 15 (I-15). **Figure 1-1** shows a location map of the general area. The site is within the City of Corona’s Sphere of Influence and is proposed to be annexed to the City during the entitlement process. The City of Corona is currently processing the Capital Improvement Project for the Foothill Parkway Westerly Extension between Green River Road and Trudy Way. Construction is planned to be completed in the next few years. Foothill Parkway will border the eastern portion of the project and will be the primary access to the site.

The Skyline Heights project is generally bounded to the north and east by single-family residences and on the south and west by the Cleveland National Forest and large privately owned parcels. Within the general boundaries of the project is an undeveloped 10.0-acre parcel which is considered “Not a Part” and is owned by the U.S. Forest Service. Adjacent to the southeast portion of the project site is a single-family residential community which is currently graded and under construction (Tract Map 31955). The immediate surrounding area consists of Low Density Residential (2-6 du/ac) as well as undeveloped open space within the City of Corona. Skyline Drive, a graded forest service access road, is located just to the south of the project. This road provides recreational hiking and mountain biking opportunities to residents on a local and regional level.



LOCATION MAP

NOT TO SCALE

KWG ENGINEERS

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FIGURE 1-1

The project site consists of sparsely vegetated and otherwise undeveloped land with the exception of dirt roads. The site is characterized by steep topography, generally increasing in elevation from the northeast to the southwest. Several canyons and ravines are present which will convey natural drainage across the project site.

As proposed by the Skyline Heights project, the site consists of 292 single family low density residential lots with 7,200 sf minimum lot area. The project site is comprised of approximately 270.9 acres of undeveloped vacant land. However, of the 270.9 acres, approximately 17.16 acres will be acquired by the RCTC/City of Corona for the construction of the Westerly Extension of Foothill Parkway and Mabey Canyon Debris Basin. It is proposed that approximately 170.9 acres will be graded based on the conceptual grading plan. **Figure 1-2** shows a vicinity map of the area illustrating the location of the project and the developments in the area.

1.3 RELATED STUDIES

The City of Corona Water Master Plan, prepared by AKM Consulting Engineers in September 2005, provides a regional study identifying existing and future proposed water supply, storage, and transmission facilities within the City's ultimate service area. The study also presents design criteria to be utilized in water supply, system pressures, pipeline velocities, fire flow criteria, storage volumes, operational storage, fire protection storage, emergency storage, and pump capacities. The report also provides information on the District's planning and evaluation criteria that can be applied to determine projected water demands.

In conjunction with the City's current Capital Improvement Program (CIP) for the Westerly Extension of Foothill Parkway from Trudy Way to Green River Road, the City is planning on constructing in the next few years a 16-inch Zone 5 transmission line (CIP P-5C) in Foothill Parkway from Trudy Way to Mabey Canyon Road where it would tie into the existing Zone 5 water system which is currently fed off of the 1250 gpm Mabey Canyon Booster Station. For purposes of this water study, this Zone 5 transmission line is assumed to be in place by the time the Skyline Heights project is developed. The City had also planned for construction of a 16-inch Zone 4 transmission line (CIP P-4B) from Chase Drive to the Sierra Bella Development. However, due to inadequate funding, the City Department of Water & Power (DWP) decided to re-evaluate their Zone 4 Domestic Water System and proposed an alternative plan. This plan includes the construction of the following:

- 1) A new 16-inch Zone 5 transmission line in Foothill Parkway from Trudy Way to Sierra Bella Development;
- 2) A new 16-inch Zone 4 transmission line in Trudy Way from Foothill Parkway to the Skyline Heights Development; and
- 3) A new 2.5 MG Zone 4 Water Reservoir within the Skyline Heights development located at the southeast corner of the project site.

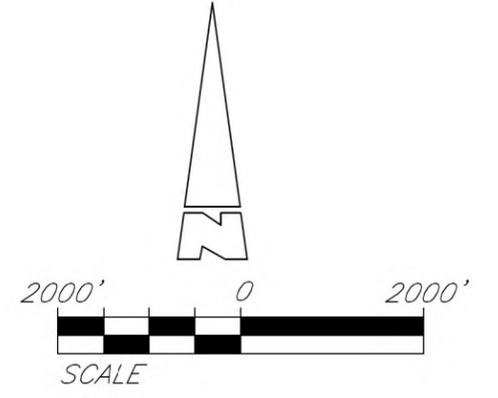


FIGURE 1-2
VICINITY MAP
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2

DESIGN CRITERIA

This section presents the design criteria used to evaluate recommended water system improvements required for the Skyline Heights project. The criteria utilized in this study are in accordance with the City of Corona 2005 Water Master Plan, and the 2012 City’s Department of Water and Power Design Policy.

2.1 WATER DUTY FACTORS

The water duty factor (WDF) used in projecting average day water demands for the project is based on a 3,540 gpd/ac for low density residential designation.

To convert Average Day Demand flows (ADD) to Maximum Day Demand flows (MDD) a factor of 1.8 was used. Similarly for Peak Hour Demand flows (PHD) a factor of 2.51 was used as described in the 2005 Water Master Plan.

2.2 PLANNING CRITERIA

The planning criteria are used to evaluate the proposed water system hydraulic models. They are utilized as a check to confirm that the values being developed are reasonable. A list of planning criteria used in the evaluation of this project is shown in **Table 2-1**.

TABLE 2-1

PLANNING CRITERIA		
Description	Value	Unit
Maximum Pressure	120	psi
Minimum Pressure		
Average Day	60	psi
Maximum Day and Peak Hour	60	psi
MDD + Fire Flow	20	psi
Maximum Pipeline Velocity		
Average Day Analysis	5	fps
Maximum Day and Peak Hour Analysis	7	fps
Fire Flow Analysis	12	fps
Fire Fighting Capabilities		
Single Family Residential – 2 hour duration	1,500	gpm
Operational Reservoir Storage Volume	0.5 MDD	-
Fire Suppression Storage Volume	0.18 MG	-
Terminal Storage Volume	10% Reservoir Storage Volume	-

2.3 SYSTEM PRESSURES

The water distribution system has been designed to maintain static pressures between 60 psi and 120 psi as much as possible. This criteria is used to initially divide a project between water service zones. **Appendix C** presents the City's 2011 Water System Atlas, which illustrates the general pressure zone boundaries within the City's service area. The northerly portion of the Skyline Heights project will be served by the existing Zone 5 (1380' HWL) water system and the southerly portion by the proposed intermediate Zone 6A (1560' HWL) pressure zone. The new pressure zone is identified as intermediate Zone 6A in this report because it is at a lower HWL than the City's Zone 6 pressure zone, but higher than the HWL for Zone 5 pressure system. The Zone 5 and Zone 6A pressure zones for the project site will be separated by a proposed normally closed zone valve. **Figure 2-1** presents a Proposed Water System Pressure Zone Map, which identifies the proposed pressure zone boundaries for the Skyline Heights project.

Computer modeling is then performed to ensure that adequate residual pressures are obtained under all demand conditions. The system has been designed to yield minimum residual pressures of approximately 60 psi during maximum day and peak hour demands and a minimum of 20 psi during maximum day demand plus fire flow conditions. Headloss in water lines is calculated using the Hazen-Williams equation with a "C" value of 110. Only locations where customers are served need to meet such pressure requirements. Nodes with pressures that could not be brought within acceptable parameters are identified and are presented as part of the analysis of the ultimate build-out condition scenario in Section 4.

2.4 PIPELINE VELOCITIES

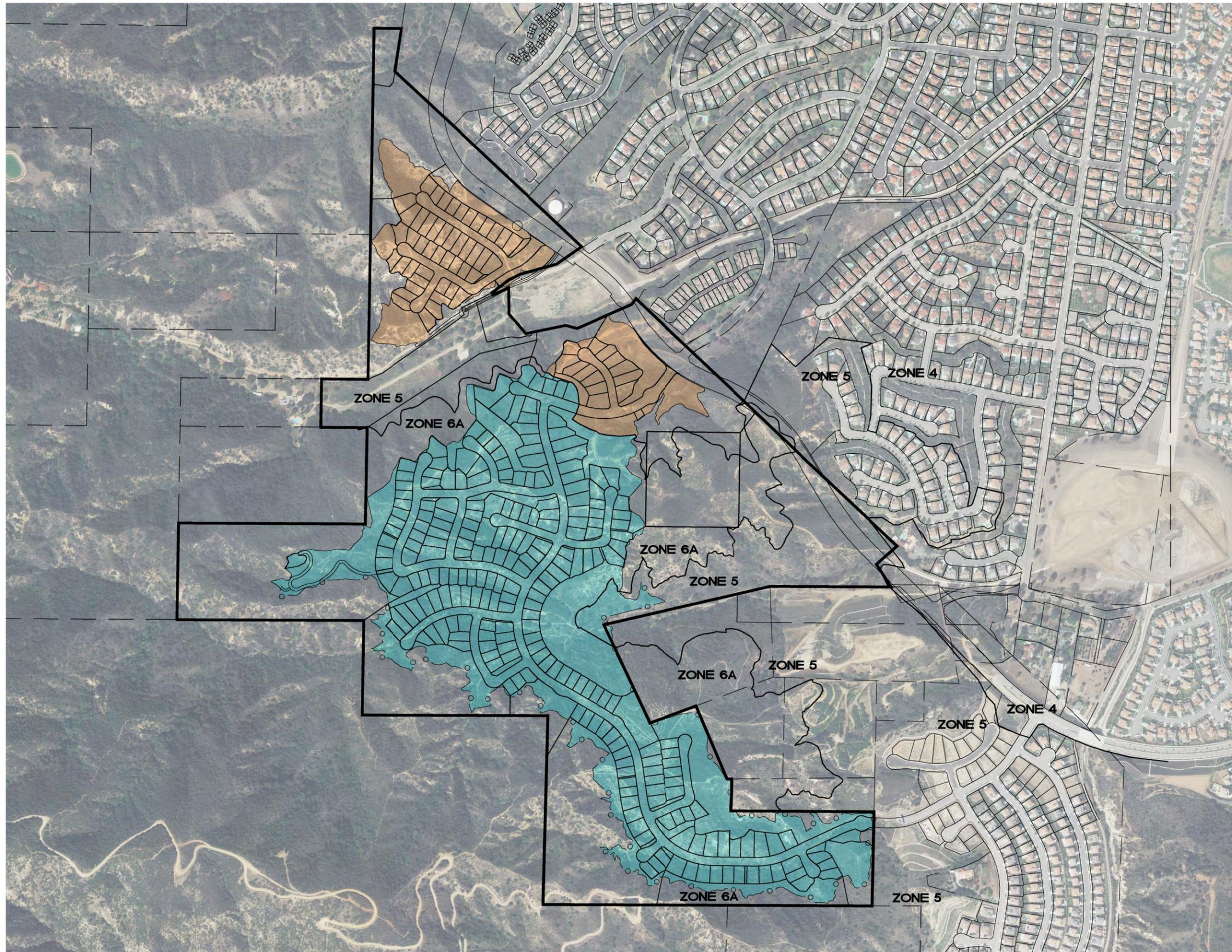
Distribution pipelines are designed for a maximum velocity of 5 fps for the ADD non-fire scenarios. The maximum velocity can increase to 7 fps for Maximum Day and Peak Hour non-fire scenarios. For fire flow scenarios, the pipe cannot exceed a maximum velocity of 12 fps.

2.5 STORAGE VOLUMES

The total required volume of storage in a water system consists of water for operational storage, fire flow storage and terminal storage. As per the 2005 Water Master Plan, the Skyline Heights project's operational storage and terminal storage is required to be equivalent to 50 percent of the maximum day demand and 10% of the reservoir storage volume, respectively. Fire flow and duration requirements were assumed to be 1500 gpm for 2 hour duration for single family residential developments which equals 0.18 MG. Water reservoir storage requirements are evaluated on a zone-by-zone basis.

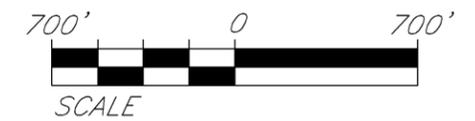
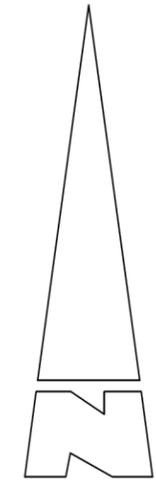
2.6 PUMP CAPACITY

Booster Pump Stations are typically sized to deliver the maximum day demands of the service areas, except in service areas supplied by a hydro-pneumatic pumping system (where the booster pumps must meet maximum day demands plus fire flow requirements and have fire-rated pumps). All booster stations shall incorporate a standby pump of the same size as the largest duty pump in case the largest unit is taken out of service. The pump stations should be equipped



LEGEND

- PRESSURE ZONE 5*
- PRESSURE ZONE 6A*



SKYLINE HEIGHTS
FIGURE 2-1
SKYLINE HEIGHTS PRESSURE ZONE MAP
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with modern pump controllers, flow meters, suction and discharge pressure gauges, proper isolation valves, and telemetry equipment. The booster station should also be equipped with emergency standby generators and automatic transfer switches in case of power outages.

3

EXISTING AND PROPOSED MASTER PLAN FACILITIES

This section discusses the existing and proposed master plan water facilities as identified in City of Corona 2005 Water Master Plan report. The 271-acre Skyline Heights project development (Skyline West as previously identified in the 2005 Water Master Plan) was included in the 2005 Water Master Plan and this section further validates the details of the proposed water facilities reflecting current development conditions.

3.1 EXISTING FACILITIES

The Skyline Heights project is located in the hills adjacent to the Cleveland National Forest and Foothill Parkway near the Mabey Canyon area in the City of Corona. The project is in the City's southwestern water service area. The existing water facilities in the vicinity of the project are located within the City's Zone 4 (1220' HWL), Zone 5B (1345' HWL), and Zone 5 (1380' HWL) water service zones. **Figure 3-1** presents a map showing the boundaries of the project and the regional water facilities in the vicinity of the project.

3.1.1 ZONE 5 (1380' HWL)

A new 16-inch Zone 5 (1380' HWL) waterline is proposed as part of the City's Foothill Parkway Westerly Extension Improvements and will be located in Foothill Parkway from Trudy Way to Mabey Canyon Road. This line reduces to a 12-inch line in Mabey Canyon Road and then connects into the existing Zone 5B (1345' HWL) Mabey Canyon Pumped Zone system. The new Zone 5 16-inch line will also continue northerly from Mabey Canyon Road to Sierra Bella Development where the pressure will be reduced to a Zone 4 water system to serve the Sierra Bella Developments. This water line system is assumed, for purposes of this study, to be in place prior to the development of Skyline Heights. The Zone 5 system pressure is supplied by the Mills Connection, Eagle Glen Zone 5 Booster Station, and Lester Zone 5 Booster Station (refer to 2005 Water Master Plan for location). The zone serves elevations between 1100 ft to 1260 ft AMSL. Water is stored in the Eagle Glen and Gilbert Reservoirs having capacities of 2.0 MG and 4.7 MG, respectively.

3.1.2 ZONE 5B (1345' HWL)

An existing 8-inch Zone 5B (1345' HWL) waterline is located in Mabey Canyon Road northeast of the project site. This sub zone is currently being served from the west by the Zone 4 system via an existing 1250 gpm hydro-pneumatic pump station (Mabey Canyon Booster Station). According to the City Department of Water and Power staff, this subzone system will be enhanced with the proposed Zone 5 water system inter-connection improvements. As a result,

the Mabey Canyon Booster Station will become a secondary water supply source for the Zone 5 system.

3.1.3 ZONE 4 (1220' HWL)

A new 16-inch Zone 4 water line is proposed as part of the City's Foothill Parkway Westerly Extension Improvements and will be located in Trudy Way from Foothill Parkway to the proposed Skyline Heights Development. This line will connect to a new master plan Zone 4 Water Reservoir located at the Skyline Heights Development. The reservoir shall be an underground tank and shall be constructed to City DWP standards and specifications. This tank is designed for a HWL of 1220 feet. The proposed Zone 4 Reservoir will have a storage capacity of 2.5 MG. The approximate reservoir dimension is estimated as a 120 foot diameter tank at 30 feet high. The tank is situated on a pad elevation of 1220 feet located on Lot "UU" at the west end of the project site. A 20-ft wide paved access road will be provided from "G" Street at a maximum grade of 12%.

The Zone 4 system pressure is supplied by the Mills Connection, Chase Booster Station, Border Booster Station, Lester Zone 4 Booster Station, and Zone 5 Pressure Reducing Stations. The zone serves elevations between 900 ft to 1100 ft AMSL. Water is stored in the Hayden Reservoir, Upper & Main Reservoir, and Avenida Del Vista Reservoirs having capacities of 1.6 MG, 4.0 MG, and 1.6 MG, respectively.

3.2 PROPOSED FACILITIES

According to the City of Corona 2005 Water Master Plan, there is no master plan water facilities planned for within the Skyline Heights project. However, the Skyline Heights project will be constructing water facilities in the new intermediate Zone 6A (1560' HWL) service area to supply the necessary system pressures to support the project's higher pad elevations. These water facilities include a new intermediate Zone 6A reservoir, booster pump station and associated pipelines.

3.2.1 ZONE 5 (1380' HWL)

There is no master plan water facilities proposed for the Skyline Heights project. However, the 16-inch transmission pipeline in Foothill Parkway will be a critical source of supply to the northern portion of the project which will be served by the Zone 5 water system.

3.2.2 ZONE 5B (1345' HWL)

As a secondary source of supply to the 45 lots north of Mabey Canyon, this sub-zone will require upsizing to accommodate the additional flows should the primary connection to the Zone 5 water system in Foothill Parkway goes offline for maintenance. The Zone 5B water system currently supplies water to the existing developments in this area via the existing Mabey Canyon Booster Pump Station at Border Avenue and Mabey Canyon Road. The booster pump station is currently sized for 1250 gpm pumps (1 duty and 1 standby each) and a 1500 gpm fire pump. The HWL for the existing booster pump station is 1345 feet. The additional demand generated from

Skyline's 45 lots will require the existing pumps to be upsized to 1340 gpm (additional MDD=90 gpm) for emergency purposes. The new HWL for this pump station will be same as the Zone 5 HWL of 1380 feet. The highest pad elevation to be served is 1212 feet which will yield a static pressure of 72 psi using the Zone 5 HWL of 1380 feet.

3.2.3 ZONE 6A (1560' HWL)

The Skyline Heights project is proposing to construct a Zone 6A Booster Pump Station located at the propose City of Corona Zone 4 Reservoir site just east of the adjacent Tract 39155. A 12-inch pipeline from the Zone 4 Reservoir will supply the necessary water demands to the proposed Zone 6A Booster Pump Station. The propose Zone 6A Booster Pump Station and Zone 4 Reservoir site is located along proposed "A" Street at the southeast corner of the project site.

The Zone 6A Booster Pump Station is sized for maximum day demands for Zone 6A and will include one (1) supply pump at 500 gpm, one (1) standby pump at 500 gpm, and one (1) fire flow pump at 1,500 gpm. The pump station is situated on a pad elevation of 1220 feet. The total dynamic head (TDH) for these pumps will consist of static lift, pipe friction losses, and minor system losses. The maximum static head is 364 feet corresponding to minimum and maximum tank levels of approximately 20 percent and 100 percent of tank capacity, respectively. The total estimated friction and minor losses is 6 feet based on 5735 feet of 12-inch piping. This results in a Total Dynamic Head of 370 feet. The booster pump station will have two (2) parallel 12-inch discharge lines that will looped within the project site and supply the proposed Zone 6A Reservoir located at the west end of the project site. The Zone 6A Reservoir is sized for a total storage capacity of 0.6 MG. A 'normally closed' zone valve as proposed on "B" Street will provide additional redundancy in the Zone 5 water system and a second point of connection.

4

WATER DEMANDS AND SIZING OF FACILITIES

This section provides the projected water demand for the Skyline Heights project, as well as determines the relative pipe sizes, reservoir storage requirements and booster pump station capacities.

4.1 PROJECTED WATER DEMANDS

The projected water demand factor of 3,540 gpd/ac for a low density residential land use designation was used to determine the Average Day Demands, Maximum Day Demands, and Peak Hour Demand for the project. There are 58 proposed lots to be served off of the Zone 5 pressure system, and 234 proposed lots to be served off of the Zone 6A pressure system. **Table 4-1** summarizes the projected Average Day, Maximum Day, and Peak Hour Demands for each water service zone within the project. As shown below the total estimated water demand generated by the Skyline Heights project is approximately 0.51 MGD Average Day Demand, 0.91 MGD Maximum Day Demand, and 1.27 MGD Peak Hour Demand.

TABLE 4-1

Water Demand Summary					
Watershed ID	Tributary Lots (DU)	Area (acres)	Average Day Demand (MGD)	Maximum Day Demand (MGD)	Peak Hour Demand (MGD)
Skyline Heights					
Zone 5	58	31.0	0.110	0.198	0.276
Zone 6A	234	113.0	0.400	0.720	1.004
Total	292	144.0	0.510	0.918	1.280

4.2 RESERVOIR STORAGE

Using the projected water demands, **Table 4-2** summarizes the required reservoir storage for each water service zone based upon the design criteria outlined in Section 2. The sizing presented in **Table 4-2** is for the Skyline Heights project only and does not include oversizing to accommodate other neighboring developments.

TABLE 4-2

RESERVOIR STORAGE REQUIREMENTS					
Water Zone ID	Maximum Day Demand (mgd)	Required Operational Storage (MG)	Required Fire Flow Storage (MG)	Required Terminal Storage (MG)	Total Required Storage (MG)
Skyline Heights					
Zone 5 (1380' HWL)	0.198	0.099	0.000	0.010	0.109
Zone 6A (1560' HWL)	0.720	0.360	0.180	0.050	0.590

Note: Operational Storage is based on 0.5xMDD. Terminal Storage is based on 10% of Reservoir Storage Volume. Fire Flow Demand is based on 1500 GPM for 2 hours.

The Skyline Heights project is proposing to construct one aboveground reservoir to supply the necessary storage and pressures needed to service the proposed intermediate Zone 6A. The reservoir shall be a prestressed concrete DN Type 1 water storage tank and shall be constructed to City DWP standards and specifications. This zone is designed for a HWL of 1560 feet. The proposed intermediate Zone 6A Reservoir has a storage capacity of 0.6 MG. The approximate reservoir dimension is estimated as a 58.5 foot diameter tank at 30 feet high. The tank sits on a pad elevation of 1530 feet located on Lot “T” at the west end of the project site. A 20-ft wide paved access road will be provided from “G” Street at a maximum grade of 12%.

The water storage required for the homes within the proposed Zone 5 pressure system will be supplied from the existing excess storage capacities from the City of Corona’s Zone 5 Reservoirs. According to Table 7-1 in the 2005 Water Master Plan, there is 1.7 MG of excess storage in the existing Zone 5 System.

4.3 BOOSTER PUMP STATION

The proposed Zone 6A Booster Pump Station is located along proposed “A” Street within the Zone 4 Reservoir site at the southeast corner of the project site. It is sized for maximum day demands for Zone 6A and will include one (1) supply pump at 500 gpm, one (1) standby pump at 500 gpm, and one (1) fire flow pump at 1,500 gpm. The pump station is situated on a pad elevation of 1220 feet. The total dynamic head (TDH) for these pumps will consist of static lift, pipe friction losses, and minor system losses. The maximum static head is 364 feet corresponding to minimum and maximum tank levels of approximately 20 percent and 100 percent of tank capacity, respectively. The total estimated friction and minor losses is 6 feet based on 5735 feet of 12-inch piping. This results in a Total Dynamic Head of 370 feet. The booster pump station will have two (2) parallel 12-inch discharge lines that will looped within the project site and supply the proposed Zone 6A Reservoir located at the west end of the project site. The Zone 6A Reservoir is sized for a total storage capacity of 0.6 MG.

4.4 WATER SYSTEM MODEL AND RESULTS

The analysis performed to determine the recommended onsite water system for the Skyline Heights project consists of computer modeling that utilizes the Innovyze H2OMAP Water v9.6

program. The solution to the computer model is based upon the design criteria as shown in Section 2. Two main scenarios were created to model the proposed water system conditions. Within each scenario, numerous demand conditions were calculated to determine the proposed system pressures and recommended line sizes within each of the proposed service zones.

A summary of the assumptions and settings for the ultimate condition steady-state Zone 4, Zone 5 and Zone 6A water system model are as follows:

Scenario 1

- 1) Assume fixed grade node in Zone 5 water system at Foothill Parkway and Trudy Way is 1370’.
- 2) Assume fixed grade node in existing Zone 5B water system at Mabey Canyon Road and Border is 1370’ since the will be converted to a Zone 5 system.
- 3) Assume check valve is installed on 12-inch pipe segment P-8 at node J-8 to allow on direction flow from Zone 5 to Zone 5B.
- 4) Assumes Zone 4 Reservoir is full at HWL of 1220’.
- 5) Fire flow test provided by City. A demand of 1176 gpm replicated in the model for the ADD, MDD, and PHD Scenarios and a demand of 2718 gpm for MDD+ Fire flow Scenarios to mimic data from fire flow test.
- 6) Assumes Zone 6A Reservoir is full at HWL of 1560’.
- 7) Assumes Zone 6A Pump Station is not operating. The Zone 6A lots within the project site are served entirely by the storage in Zone 6A Reservoir (Zone 6A 500 gpm duty pump is set to ‘closed’, the 500 gpm standby pump is set to ‘closed’, and 1,500 gpm fire flow pump is set to ‘closed’).

Scenario 2

- 1) Assume fixed grade node in Zone 5 water system at Foothill Parkway and Trudy Way is 1370’.
- 2) Assume fixed grade node in existing Zone 5B water system at Mabey Canyon Road and Border is 1370’ since the will be converted to a Zone 5 system.
- 3) Assume check valve is installed on 12-inch pipe segment P-8 at node J-8 to allow on direction flow from Zone 5 to Zone 5B.
- 4) Assumes Zone 4 Reservoir is full at HWL of 1220’.
- 5) Fire flow test provided by City. A demand of 1176 gpm replicated in the model for the ADD, MDD, and PHD Scenarios and a demand of 2718 gpm for MDD+ Fire flow Scenarios to mimic data from fire flow test.
- 6) Assumes Zone 6A Reservoir is empty at elevation 1530’.
- 7) Assumes Zone 6A Pump Station is running. The Zone 6A lots within project site are served entirely by the Zone 6A Pump Station (Zone 6A 500 gpm duty pump is set to ‘open’, the 500 gpm standby pump is set to ‘closed’, and 1,500 gpm fire flow pump is set to ‘open’ during fire flow conditions).

The demand conditions modeled in Scenarios 1 and 2 are as follows:

- 1) Average Day Demand
- 2) Maximum Day Demand
- 3) Peak Hour Demand

- 4) Maximum Day Demand plus 1,500 gpm fire flow at Node J-85 (Zone 4), Node J-13 (Zone 5) and Node J-32 (Zone 6A). (Notes: Critical fire flow model nodes are chosen based on highest elevation and distant from supply source.)

Figure 4-1 presents the Proposed Water Facilities Plan, which illustrates the proposed water facility improvements and their relative sizes based on the water system model results.

4.4.1 ZONE 5 (1380' HWL)

The Zone 5 system will serve the northern portion of the Skyline Heights project. **Table 4-3** summarizes the anticipated static pressures within this zone. To model the Zone 5 system, we assumed that all the demands are met from the existing Zone 5 water system. The computer modeling results for the Zone 5 analysis is provided in **Appendix F & G**. For all demand scenarios, we assumed that the water surface elevation at a point in the water system located at the intersection of Trudy Way and Foothill Parkway is 1370 feet. The results of the computer analysis indicate that the recommended piping has been sized to adequately serve the project. Residual pressures in excess of 20 psi are obtained during all maximum day demand plus fire flow scenarios. The proposed pipeline velocities are below the 5 fps requirement during the Average Day scenario and below 7 fps during Max Day and Peak Hour scenarios. In addition, the velocities in the lines do not exceed 12 fps during a Max Day plus Fire Flow condition.

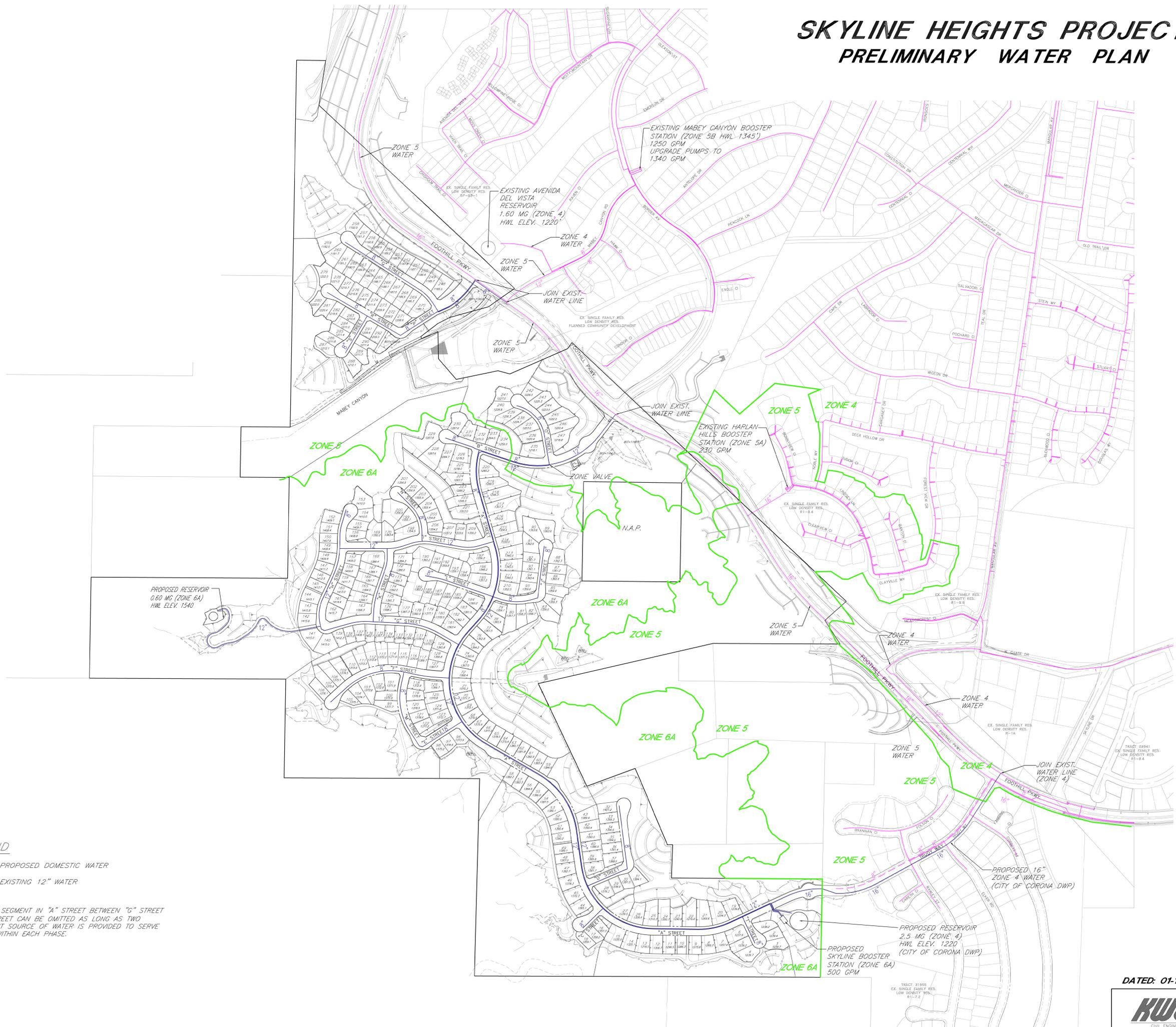
The major proposed piping in this pressure zone will consist of 12-inch and 8-inch distribution lines provided within the development areas. The computer modeling in **Appendix E** verifies that adequate service can be provided to the project during the demand scenarios considered.

4.4.2 ZONE 6A (1560' HWL)

The Zone 6A system will serve the southern portion of the Skyline Heights project. **Table 4-3** summarizes the anticipated static pressures within this zone. To model the Zone 6A system, we assumed that all the demands are met from the proposed Zone 6A water system. The computer modeling results for the Zone 6A analysis is provided in **Appendix F & G**. For all demand scenarios, we assumed that the high water level at the Zone 6A reservoir and the Zone 6A booster pump station is 1560 feet. We have also assumed that the zone valve in the proposed “B” Street is closed. The results of the computer analysis indicate that the recommended piping has been sized to adequately serve the project. Residual pressures in excess of 20 psi are obtained during all maximum day demand plus fire flow scenarios. The proposed pipeline velocities are below the 5 fps requirement during the Average Day scenario and below 7 fps during Max Day and Peak Hour scenarios. In addition, the velocities in the lines do not exceed 12 fps during a Max Day plus Fire Flow condition.

An onsite Zone 6A Booster Pump Station is proposed from the Zone 4 water system to the proposed intermediate Zone 6A Reservoir and Zone 6A pressure zone service area. The booster pump station site will be located on a pad along “A” Street within the Zone 4 Reservoir site at the on the southeastern end of the development, along the westerly extension of Trudy Way from existing Tract 31955. The proposed booster station pad elevation is at approximately 1220 feet.

SKYLINE HEIGHTS PROJECT PRELIMINARY WATER PLAN



LEGEND

- 12" PROPOSED DOMESTIC WATER
- 12" EXISTING 12" WATER

NOTE: PIPE SEGMENT IN "A" STREET BETWEEN "C" STREET AND "I" STREET CAN BE OMITTED AS LONG AS TWO INDEPENDENT SOURCE OF WATER IS PROVIDED TO SERVE EACH LOT WITHIN EACH PHASE.

DATED: 01-13-14 FIGURE 4-1



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12/24/13 12:12:14 PRELIMINARY REPORT WATER Figure 4-1.dwg 01/13/2014 09:26

The station should be equipped with three vertical turbine pumps. Two of the pumps of equal size, one duty pump and one standby, sized for pumping maximum day demands. Each pump will have a pumping capacity of 500 gpm, with approximately a 50 horsepower motor. The third pump will be a larger pump for additional fire protection with a capacity of 1,500 gpm, with a 100 horsepower motor. The pump station should be designed to operate based on the water level in the proposed Zone 6A storage tank. The total dynamic head (TDH) for these pumps will consist of static lift, pipe friction losses, and minor system losses. The maximum static head is 364 feet corresponding to minimum and maximum tank levels of approximately 20 percent and 100 percent of tank capacity, respectively. The total estimated friction and minor losses is 6 feet based on 5735 feet of 12-inch piping. This results in a Total Dynamic Head of 370 feet.

The major proposed piping in this pressure zone will consist of 12-inch and 8-inch distribution lines provided within the development areas. The computer modeling in **Appendix E** verifies that adequate service can be provided to the project during the demand scenarios considered.

TABLE 4-3

Water Service Zone Static Pressure Summary						
Water Zone ID	Lot Elevation (ft)		Static Pressure 100% Tank Level (psi)		Static Pressure 25% Tank Level (psi)	
	Min	Max	Min.	Max.	Min.	Max.
Skyline Heights						
Zone 5 (1380' HWL)	1185	1227	66	84	56	74
Zone 6A (1560' HWL)	1237	1416	62	140	52	130

Note: The above values have been calculated assuming that the reservoirs are at 25% and 100% tank levels.

PHASING & CONCLUSIONS

This section discusses the anticipated construction phasing of the proposed water infrastructure needed to support the Skyline Heights project. It also identifies and summarizes the water infrastructure required.

5.1 PROJECT PHASING

The Skyline Heights project will be developed in three map phases. The domestic water infrastructure facilities will be constructed in several phases based on the needs of the project site. Two independent source of water will be provided to each lot as required by the City of Corona DWP. **Figure 5-1** shows the proposed water improvements for each phase. As an option, the proposed water infrastructure can be re-phased and completed such that the pipe segment in “A” Street between “G” Street and “I” Street (approximately 769 linear feet of 8-inch line) can be omitted as long as two independent source of water is provided to serve each lot within each phase.

5.2 CONCLUSIONS

The Skyline Heights project will require the following Water Infrastructure to be constructed for the build-out condition:

City of Corona Capital Improvements

- Construction of new 16-inch Zone 5 waterline in Foothill Parkway from Trudy Way to Sierra Bella Development and 12-inch inter-tie in Mabey Canyon Road to existing Zone 5B water system (Mabey Canyon Booster System) as part of Foothill Parkway Westerly Extension Improvements.
- Construction of a new 16-inch Zone 4 waterline in Trudy Way from Foothill Parkway to proposed Zone 4 Reservoir site within Skyline Heights Development located at the southeastern corner of the Skyline Heights project site.
- Construction of a new 2.5 MG Zone 4 Reservoir and related appurtenances within the Skyline Heights project site.

Skyline Heights Infrastructure Improvements

PROPOSED Skyline Heights Infrastructure Improvements					
Project No.	Project Description	Facility Location	Zone	Proposed Pipe Size (inches)	Approx. Length (LF)
1	Distribution Waterlines	Onsite/Offsite	5	8	3,593
2	Distribution Waterlines	Onsite/Offsite	5	12	841
3	Distribution Waterlines	Onsite	6A	8	6,934
4	Distribution Waterlines	Onsite	6A	12	12,394
5	Upgrade Ex. Mabey Canyon Booster Pump Station to 1340 gpm capacity	Onsite	5B	-	-
6	Booster Pump Station (500 gpm capacity)	Onsite	6A	-	-
7	0.6 MG Water Reservoir (HWL 1560')	Onsite	6A	-	-
8	Zone Valve in "B" Street	Onsite	6A/5	-	-

These proposed water infrastructure facilities with respect to their proximate locations, alignments, and sizes are consistent with the City’s 2005 Water Master Plan and related water system studies in the City’s service area. The proposed Skyline Heights project onsite water facilities presented in this report are preliminary estimates of the anticipated water facilities necessary to service the project needs. Detailed water facilities report shall be prepared during final design to confirm actual required sizes of pipelines, valving, pumps, and other related appurtenances.

A

REFERENCES

City of Corona General Plan – Land Use and Zoning Map, City of Corona, adopted in December 6, 1993, maps updated in June 2010.

City of Corona Water Master Plan, AKM Consulting Engineers, September 2005.

City of Corona Department of Water and Power Design Policy, November 2012.

Appendix

B

SKYLINE HEIGHTS

TTM 36544

A.P.N. 275-030-008
OPEN SPACE-CH

A.P.N. 275-040-003
VACANT
AGRICULTURE

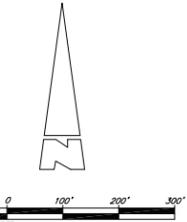
A.P.N. 275-040-001
OPEN SPACE-CH

A.P.N. 275-040-004
EXISTING RESIDENCE

A.P.N. 275-040-005
VACANT
AGRICULTURE

N.A.P.
A.P.N. 275-040-010
OPEN SPACE-CH

PROPOSED RESERVOIR
0.60 MG (ZONE 6A)
PAD = 1530.0'
H.W. ELEV. 1560'



TENTATIVE TRACT MAP NO. 36544
SKYLINE HEIGHTS
CITY OF CORONA

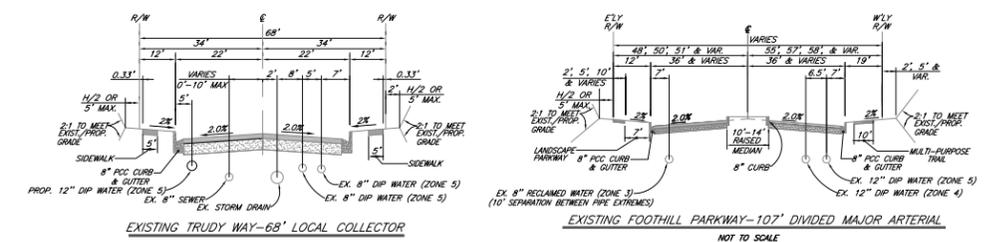
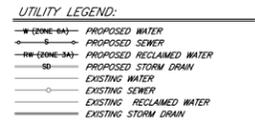
PREPARED FOR: RICHLAND DEVELOPERS, INC.
 3161 MICHELSON DRIVE, SUITE 425
 IRVINE, CA 92612
 949-261-7010

PREPARED BY: **KWC ENGINEERS**
LAND ENGINEERS • PLANNERS • SURVEYORS
 1800 COMPTON AVENUE, SUITE 100, CORONA, CA 92703-1000, 951-739-2130

SHEET
 11 OF 11
 SHEETS

DATE PLOTTED: 11/11/2014 11:54 AM (PROJECT MAPS) TERRY LEWIS - TEL: 951-739-2130

PRESSURE ZONE SUMMARY	
ZONE	MAX. PROPOSED SERVICE ELEV.
ZONE 5 (1380 HML)	1227
ZONE 6A (1550 HML)	1416



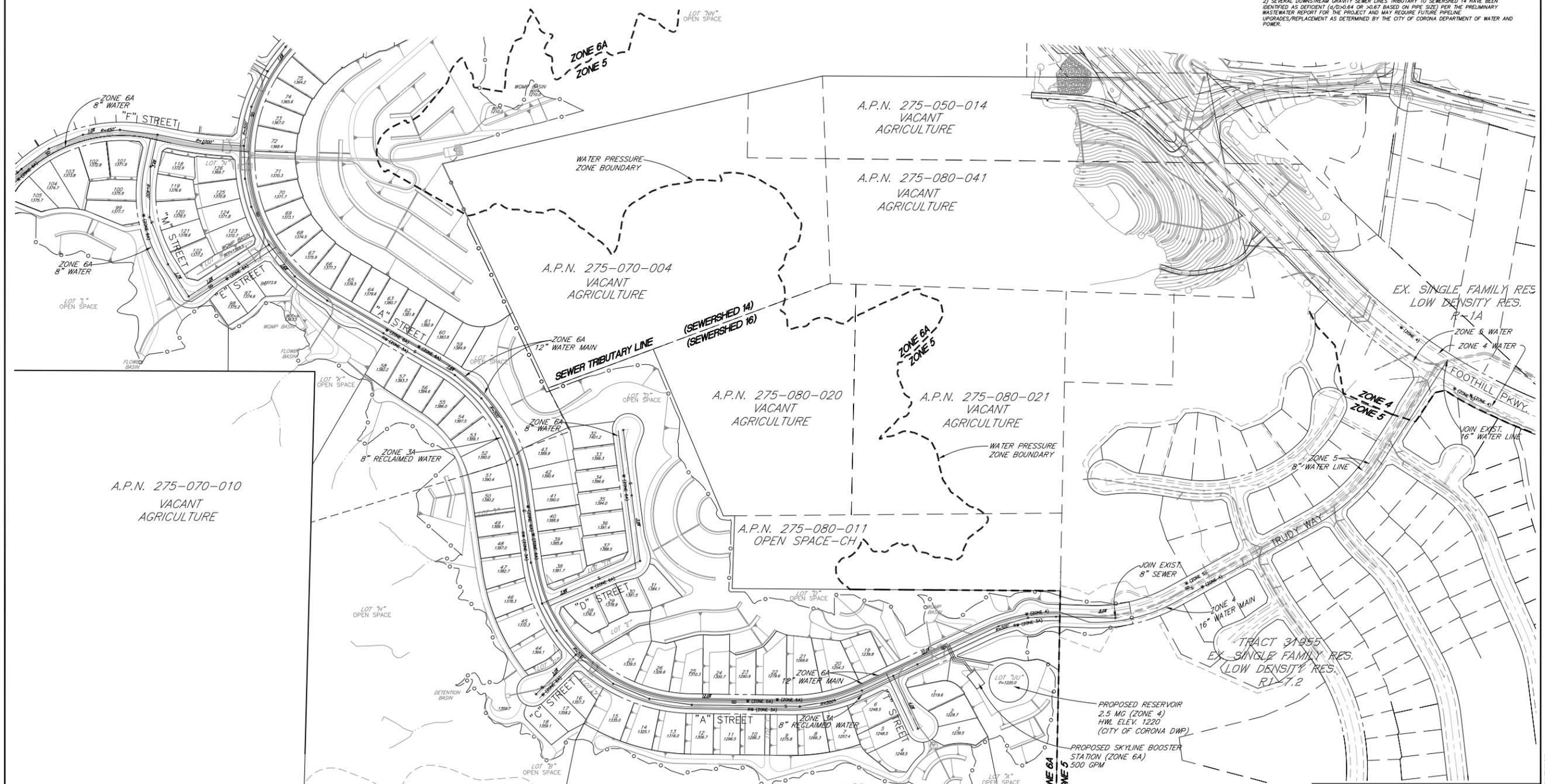
SEE CROSS SECTIONS ON SHEET 1 FOR PROPOSED ONSITE UTILITY LOCATIONS

GENERAL INFRASTRUCTURE IMPROVEMENT NOTES:

- DOMESTIC WATER SYSTEM:**
- 1) ALL DOMESTIC WATER DESIGN CRITERIA SHALL BE PER CITY OF CORONA DEPARTMENT OF WATER AND POWER STANDARDS AND RIVERSIDE COUNTY DEPARTMENT OF HEALTH SERVICES STANDARD UNLESS OTHERWISE APPROVED.
 - 2) MINIMUM STATIC PRESSURE SHALL BE 60 PSI AT PEAK HOUR.
 - 3) MINIMUM FLOW SHALL BE 1500 GPM.
 - 4) ON-SITE FIRE HYDRANTS SHALL BE SPACED A MAXIMUM OF 300 FEET APART.
 - 5) ALL PROPOSED PUMP STATIONS AND WATER RESERVOIR SITES SHALL BE PUBLICLY MAINTAINED.
- RECLAIMED WATER SYSTEM:**
- 1) ALL RECLAIMED WATER DESIGN CRITERIA SHALL BE PER CITY OF CORONA DEPARTMENT OF WATER AND POWER STANDARDS AND RIVERSIDE COUNTY DEPARTMENT OF HEALTH SERVICES STANDARD UNLESS OTHERWISE APPROVED.
 - 2) ALL LANDSCAPED LOTS SHALL BE IRRIGATED WITH RECLAIMED WATER.
 - 3) ALL PROPOSED PUMP STATIONS SITES SHALL BE PRIVATELY MAINTAINED.
- SEWER SYSTEM:**
- 1) ALL SEWER DESIGN CRITERIA SHALL BE PER CITY OF CORONA DEPARTMENT OF WATER AND POWER STANDARDS AND RIVERSIDE COUNTY DEPARTMENT OF HEALTH SERVICES STANDARD UNLESS OTHERWISE APPROVED.
 - 2) PROJECT DOWNSTREAM SEWER IMPACTS SHALL BE DETERMINED AND MITIGATED AS DIRECTED OR AGREED UPON WITH THE CITY OF CORONA DEPARTMENT OF WATER AND POWER.

INFRASTRUCTURE IMPROVEMENT SUMMARY:

- WATER SYSTEM:**
- 1) THE SKYLINE HEIGHTS PROJECT WILL BE SERVICED BY TWO PRESSURE ZONES, THE EXISTING ZONE 5 (1380 HML) AND THE INTERMEDIATE ZONE 6A (1540 HML). IT IS PROPOSED TO CONSTRUCT TWO 8-INCH WATERLINES IN TRUDY WAY AND A NEW 12-INCH LINE FROM FOOTHILL PARKWAY TO THE PROPOSED ZONE 6A BOOSTER PUMP STATION.
 - 2) THERE IS A 12-INCH ZONE 6A ON-SITE LOOPED WATERLINE FROM THE PROPOSED ZONE 6A BOOSTER PUMP STATION TO THE PROPOSED 0.8 MG ZONE 6A RESERVOIR AT 1540' HML.
 - 3) PROPOSED ZONE 6A BOOSTER PUMP STATION SHALL BE DESIGNED FOR 500 GPM FIRM CAPACITY AND A SEPARATE FIRE FLOW PUMP.
 - 4) A NETWORK OF ON-SITE 8-INCH DISTRIBUTION PIPELINES ARE ALSO PROPOSED FOR THE TWO WATER PRESSURE ZONES TO SERVE THE PROPOSED RESIDENTIAL LOTS.
 - 5) THE EXISTING ZONE 6B WABBY CANYON BOOSTER PUMP STATION (1345' HML) SHALL BE UP-SIZED FOR A TOTAL FIRM CAPACITY OF 1340 GPM TO ACCOMMODATE THE ADDITIONAL DEMAND FROM THE 45 RESIDENTIAL LOTS NORTH OF WABBY CANYON. THIS UPGRADE IS NEEDED ONLY AS A SECONDARY EMERGENCY SUPPLY SOURCE TO THE PRIMARY ZONE 5 CONNECTION AT FOOTHILL PARKWAY.
- RECLAIMED WATER SYSTEM:**
- 1) PROPOSED ZONE 3 AND 3A RECLAIMED WATER SYSTEM CONSISTS OF A 8-INCH AND 12-INCH DISTRIBUTION PIPELINES. THESE LINES WILL BE PRIVATELY MAINTAINED.
 - 2) PROPOSED ZONE 3A HYDRO-PNEUMATIC PUMP STATION WITH AN TOTAL FIRM CAPACITY OF 1150 GPM. PUMPS SHALL BE VARIABLE FREQUENCY DRIVE TYPE.
 - 3) ZONE 3 RECLAIMED WATER PIPELINES IS PROPOSED IN FOOTHILL PARKWAY IN CONJUNCTION WITH THE CITY OF CORONA'S FOOTHILL PARKWAY WESTERN EXTENSION IMPROVEMENT PROJECT. THIS PROJECT IS ANTICIPATED TO BE CONSTRUCTED PRIOR TO THE PROPOSED SKYLINE HEIGHTS PROJECT.
- SEWER SYSTEM:**
- 1) THE ON-SITE SEWER SYSTEM CONSISTS OF 8-INCH GRAVITY SEWER LINES. THERE WILL ALSO BE OPPOSITE 8-INCH SEWER LINES CONSTRUCTED TO CONNECT TO THE EXISTING SEWER SYSTEM.
 - 2) SEVERAL DOWNSTREAM GRAVITY SEWER LINES TRIBUTARY TO SEWERSHED 14 HAVE BEEN IDENTIFIED AS DEFICIENT (0.02-0.64 OR >0.67 BASED ON PIPE SIZE) PER THE PRELIMINARY WASTEWATER REPORT FOR THE PROJECT AND MAY REQUIRE FUTURE PIPELINE UPGRADES/REPLACEMENT AS DETERMINED BY THE CITY OF CORONA DEPARTMENT OF WATER AND POWER.

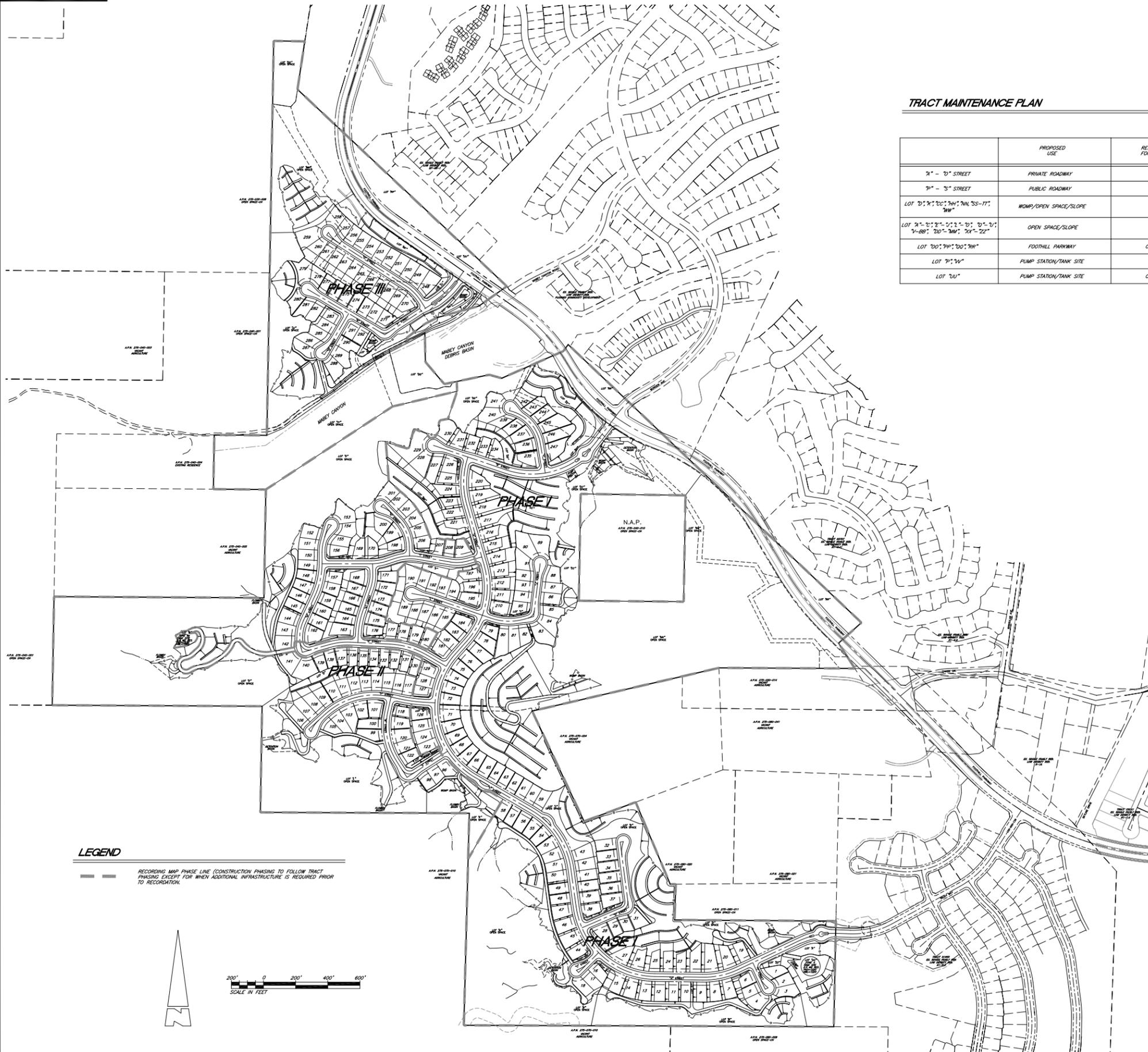


TENTATIVE TRACT MAP NO. 36544
SKYLINE HEIGHTS
CITY OF CORONA

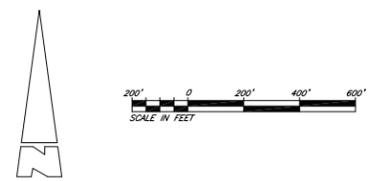
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SHEET 10 OF 11 SHEETS



LEGEND
 RECORDING MAP PHASE LINE (CONSTRUCTION PHASING TO FOLLOW TRACT PHASING EXCEPT FOR WHEN ADDITIONAL INFRASTRUCTURE IS REQUIRED PRIOR TO RECORDATION.)



TRACT PHASING PLAN

TRACT MAINTENANCE PLAN

	PROPOSED USE	RESPONSIBLE PARTY FOR CONSTRUCTION	RESPONSIBLE PARTY FOR OWNERSHIP	RESPONSIBLE PARTY FOR MAINTENANCE	
	7' - 0" STREET	PRIVATE ROADWAY	DEVELOPER	DEVELOPER	PROJECT H.O.A.
	7' - 0" STREET	PUBLIC ROADWAY	DEVELOPER	CITY OF CORONA	CITY OF CORONA
	LOT 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000	WOMP/OPEN SPACE/SLOPE	DEVELOPER	DEVELOPER	PROJECT H.O.A.
	LOT 1-10, 11-20, 21-30, 31-40, 41-50, 51-60, 61-70, 71-80, 81-90, 91-100, 101-110, 111-120, 121-130, 131-140, 141-150, 151-160, 161-170, 171-180, 181-190, 191-200, 201-210, 211-220, 221-230, 231-240, 241-250, 251-260, 261-270, 271-280, 281-290, 291-300, 301-310, 311-320, 321-330, 331-340, 341-350, 351-360, 361-370, 371-380, 381-390, 391-400, 401-410, 411-420, 421-430, 431-440, 441-450, 451-460, 461-470, 471-480, 481-490, 491-500, 501-510, 511-520, 521-530, 531-540, 541-550, 551-560, 561-570, 571-580, 581-590, 591-600, 601-610, 611-620, 621-630, 631-640, 641-650, 651-660, 661-670, 671-680, 681-690, 691-700, 701-710, 711-720, 721-730, 731-740, 741-750, 751-760, 761-770, 771-780, 781-790, 791-800, 801-810, 811-820, 821-830, 831-840, 841-850, 851-860, 861-870, 871-880, 881-890, 891-900, 901-910, 911-920, 921-930, 931-940, 941-950, 951-960, 961-970, 971-980, 981-990, 991-1000	OPEN SPACE/SLOPE	DEVELOPER	DEVELOPER	PROJECT H.O.A.
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	LOT 7, 8, 9	PUMP STATION/TANK SITE	DEVELOPER	CITY OF CORONA	CITY OF CORONA
	LOT 10	PUMP STATION/TANK SITE	CITY OF CORONA	CITY OF CORONA	CITY OF CORONA

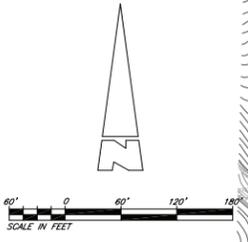
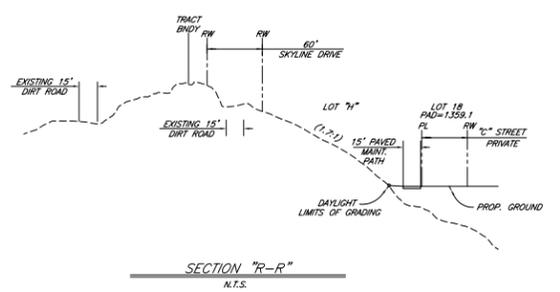
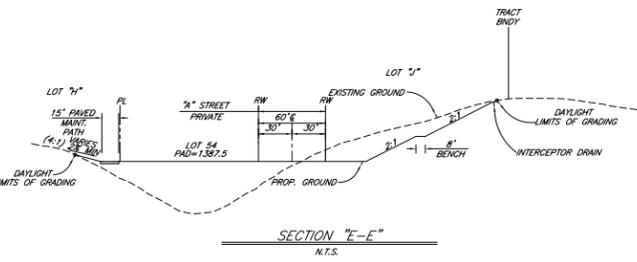
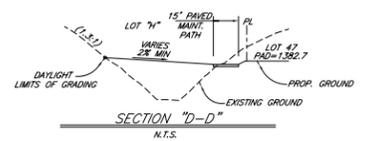
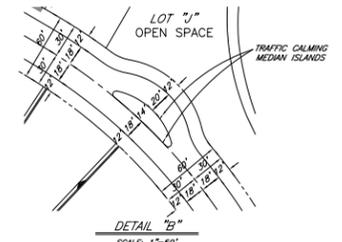
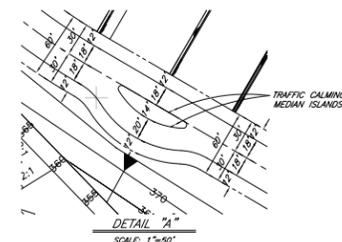
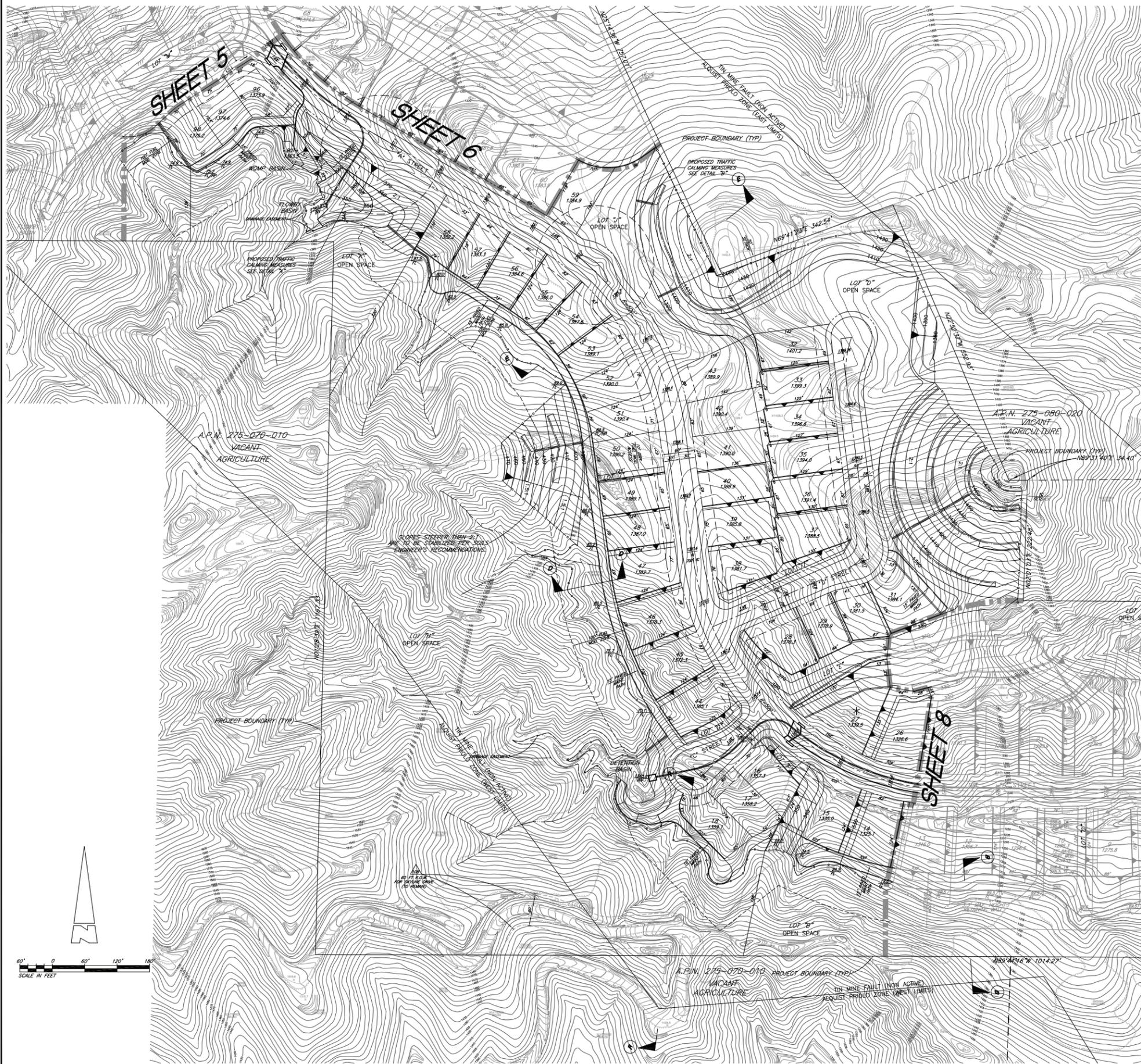
TENTATIVE TRACT MAP NO. 36544
SKYLINE HEIGHTS
CITY OF CORONA

PREPARED FOR: RICHLAND DEVELOPERS, INC.
 3161 MICHELSON DRIVE, SUITE 425
 IRVINE, CA 92612
 949-261-7010

PREPARED BY: **KWC ENGINEERS**
LAND ENGINEERS • PLANNERS • SURVEYORS
 1800 COMPTON AVENUE, SUITE 100, CORONA, CA 92626-1000, 951-739-2130

SHEET
 9 OF 11
 SHEETS

DATE: 12/13/13 11:24 AM (PROJECT MAPS) 12/13/13 11:24 AM (PROJECT MAPS)



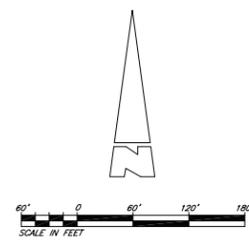
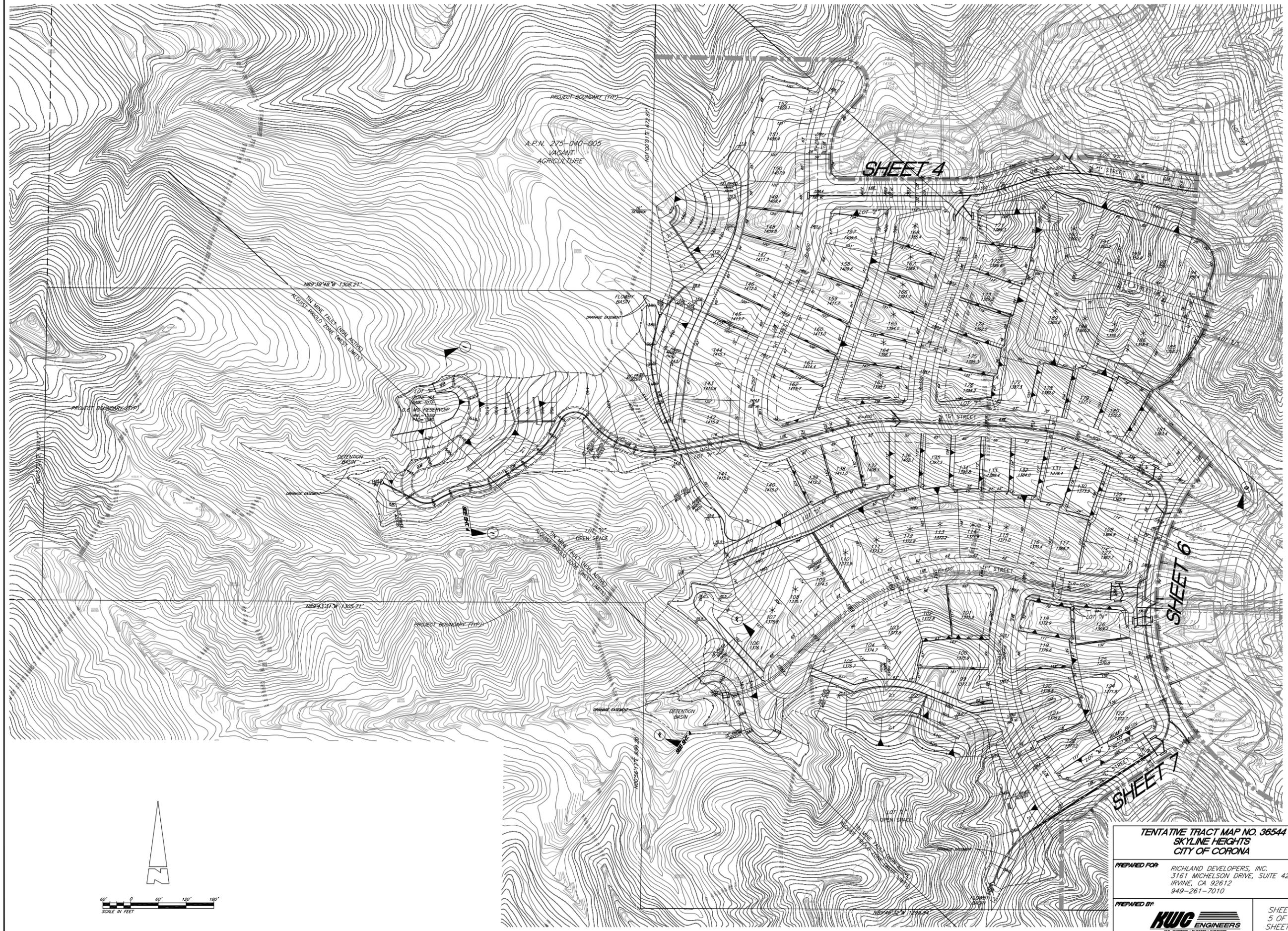
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SHEET
 7 OF 11
 SHEETS

DATE: 12/14/17 BY: JLM/AM/MP/STW/12-14-17-1711/1711/1711/1711/1711



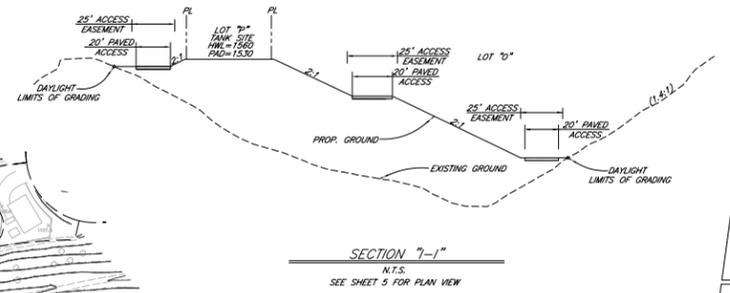
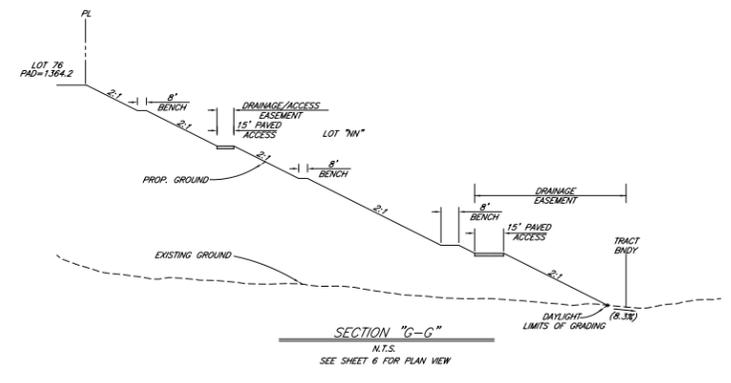
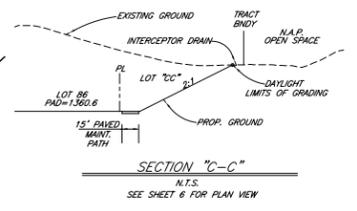
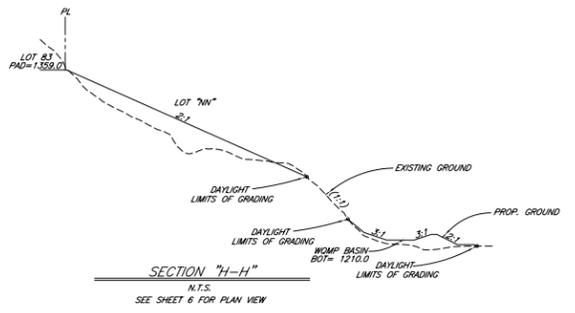
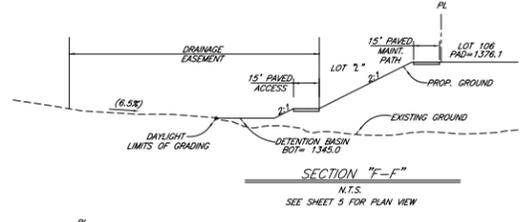
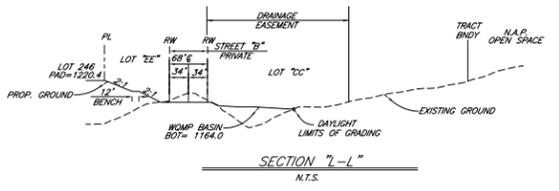
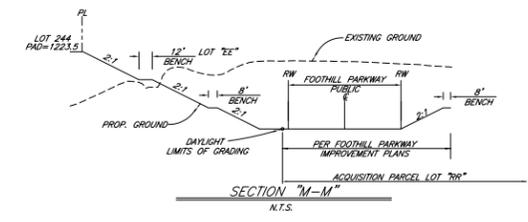
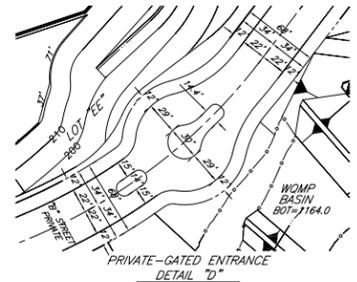
TENTATIVE TRACT MAP NO. 36544
SKYLINE HEIGHTS
CITY OF CORONA

PREPARED FOR: RICHLAND DEVELOPERS, INC.
 3161 MICHELSON DRIVE, SUITE 425
 IRVINE, CA 92612
 949-261-7010

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SHEET
 5 OF 11
 SHEETS

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SHEET 3

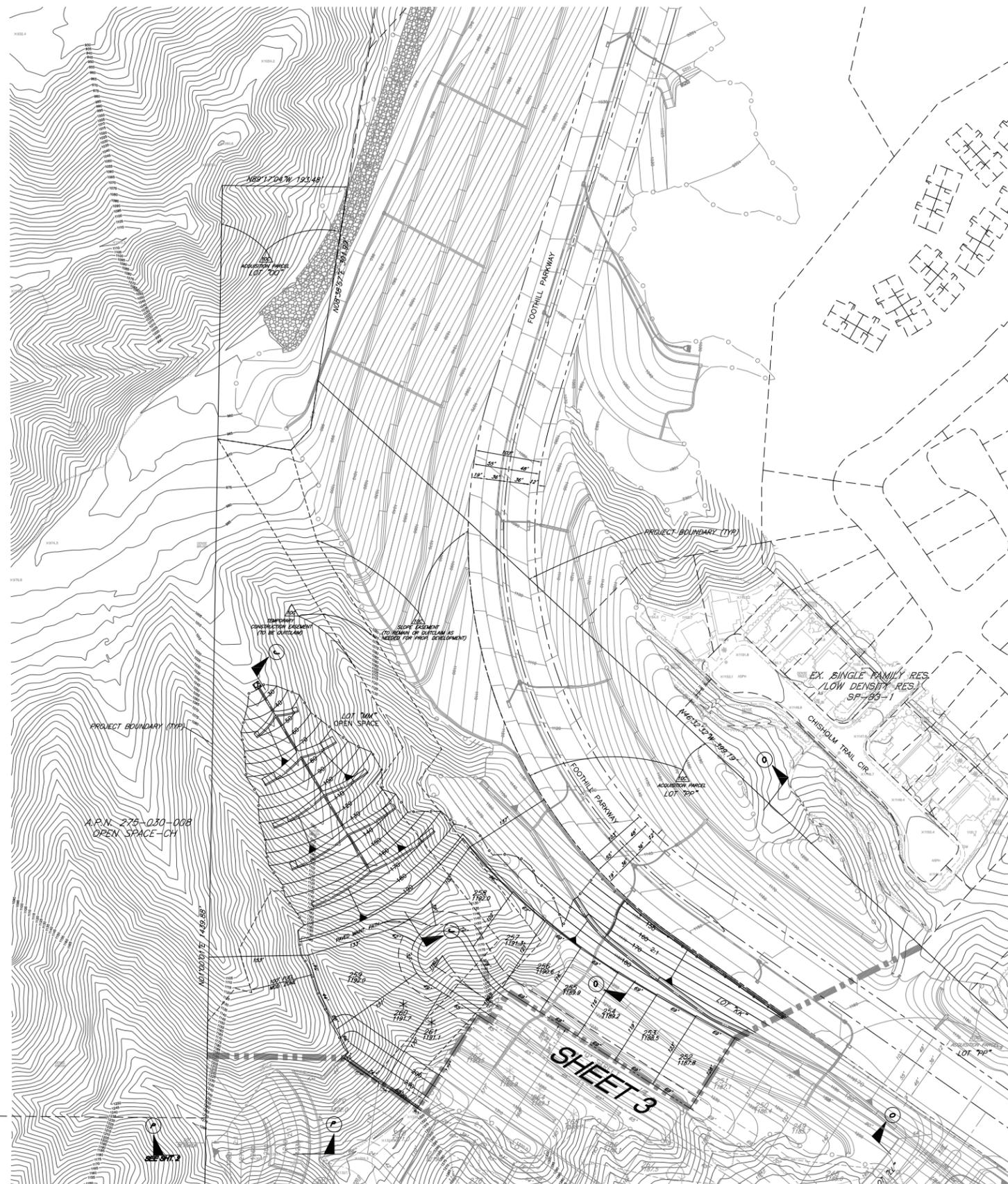
SHEET 6

TENTATIVE TRACT MAP NO. 36544
SKYLINE HEIGHTS
CITY OF CORONA

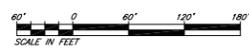
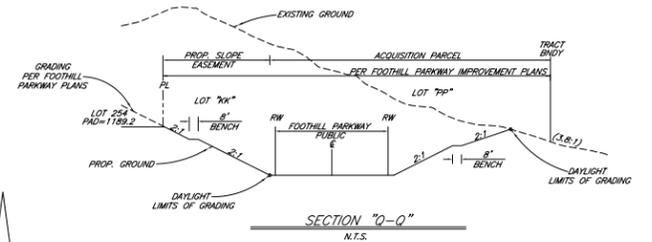
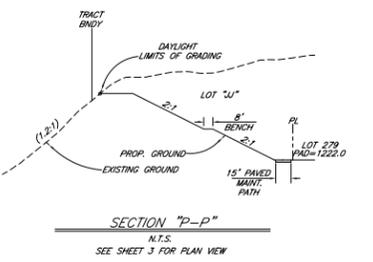
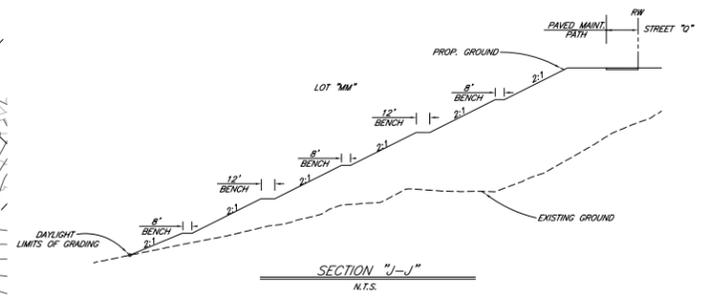
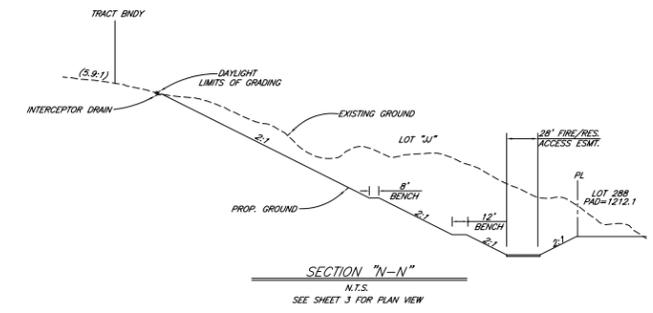
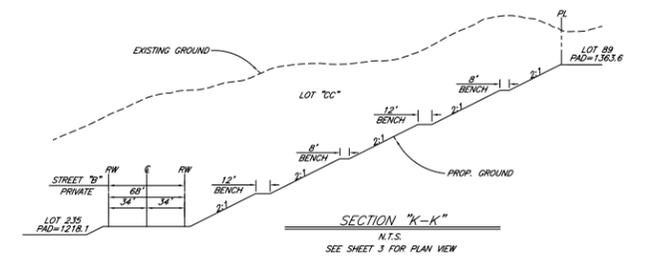
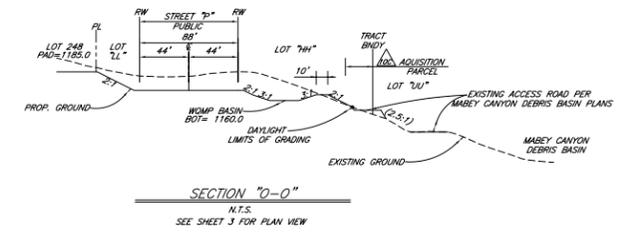
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SHEET 4 OF 11 SHEETS



SHEET 3



TENTATIVE TRACT MAP NO. 36544
SKYLINE HEIGHTS
CITY OF CORONA

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IRVINE, CA 92612
949-261-7010

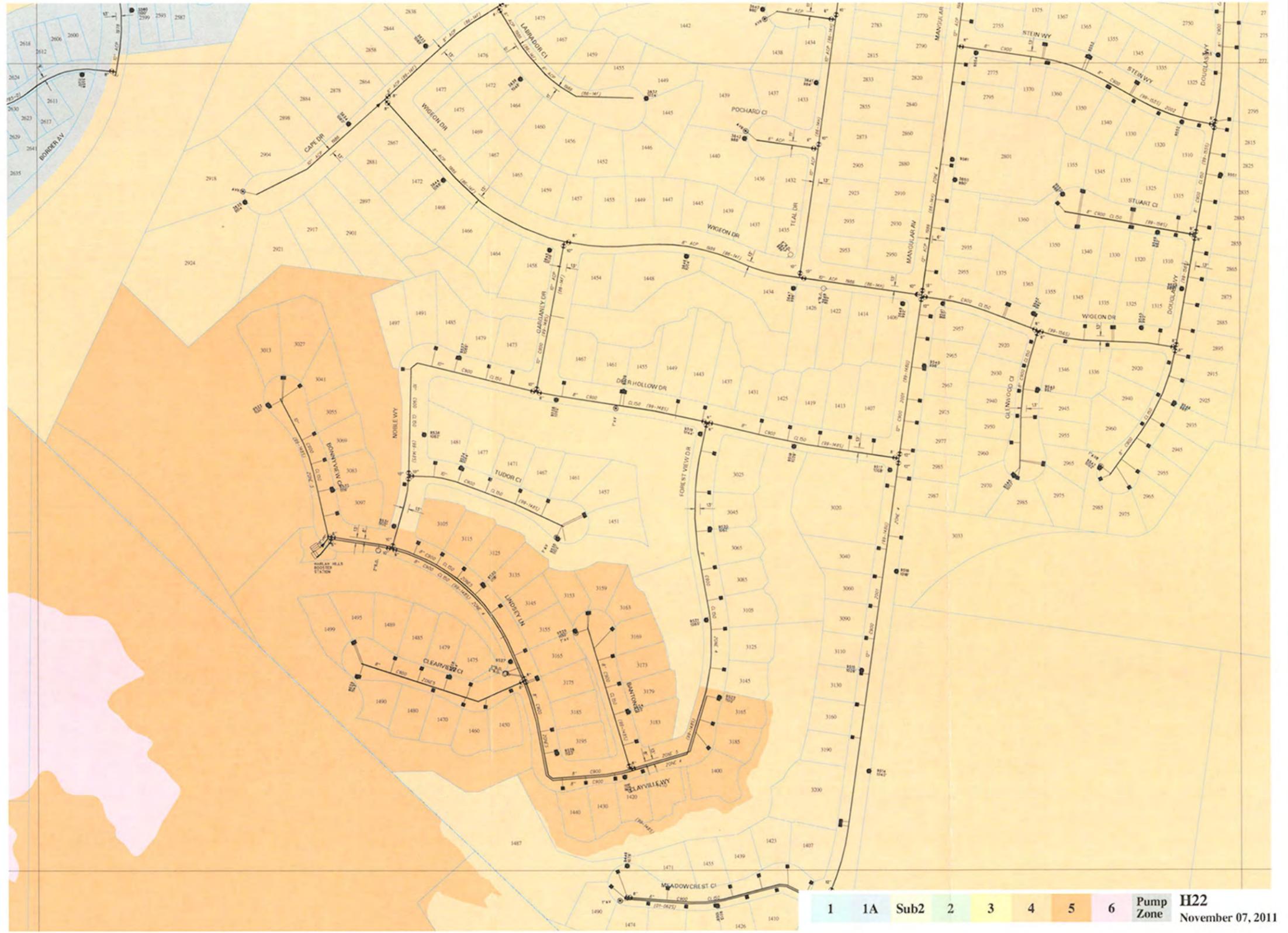
PREPARED BY: **HWC ENGINEERS**
2010 COMPTON AVENUE, SUITE 100, CORONA, CA 92626-1010
951-739-2130

SHEET 2 OF 11 SHEETS

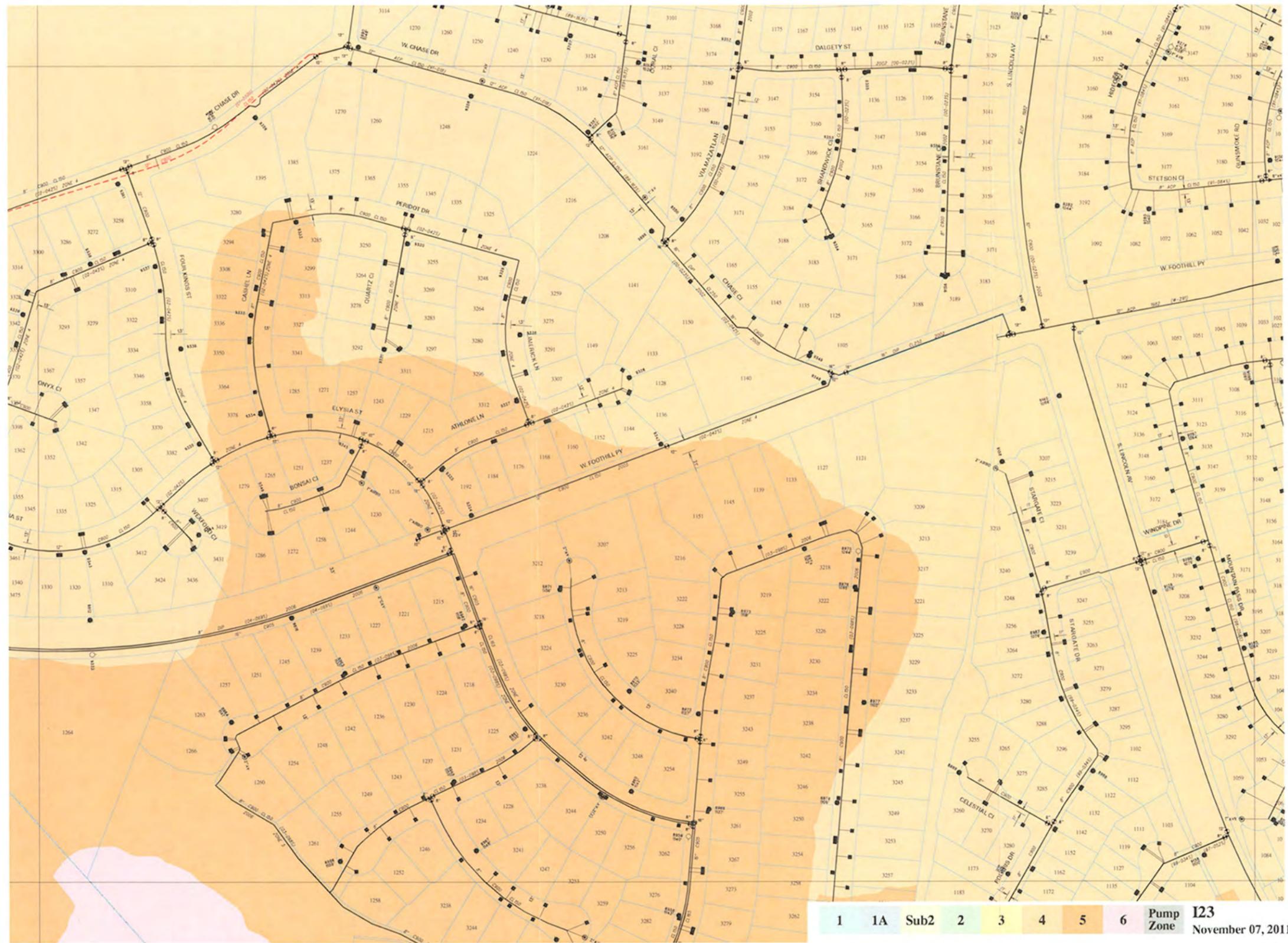
Appendix

C

**CITY OF CORONA
WATER SYSTEM ATLAS
AND PRESSURE ZONE MAP**

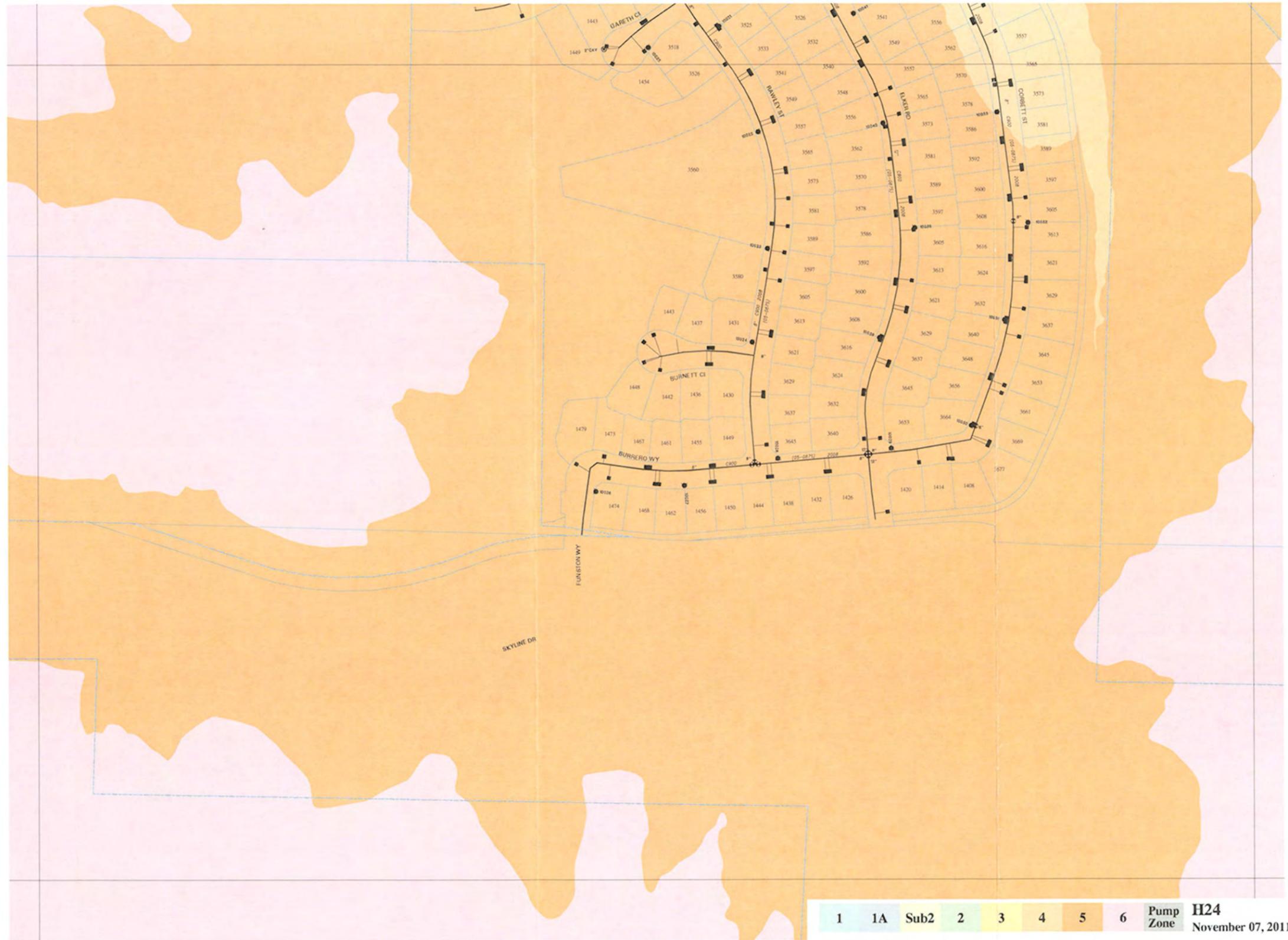


1 1A Sub2 2 3 4 5 6 Pump Zone H22
 November 07, 2011

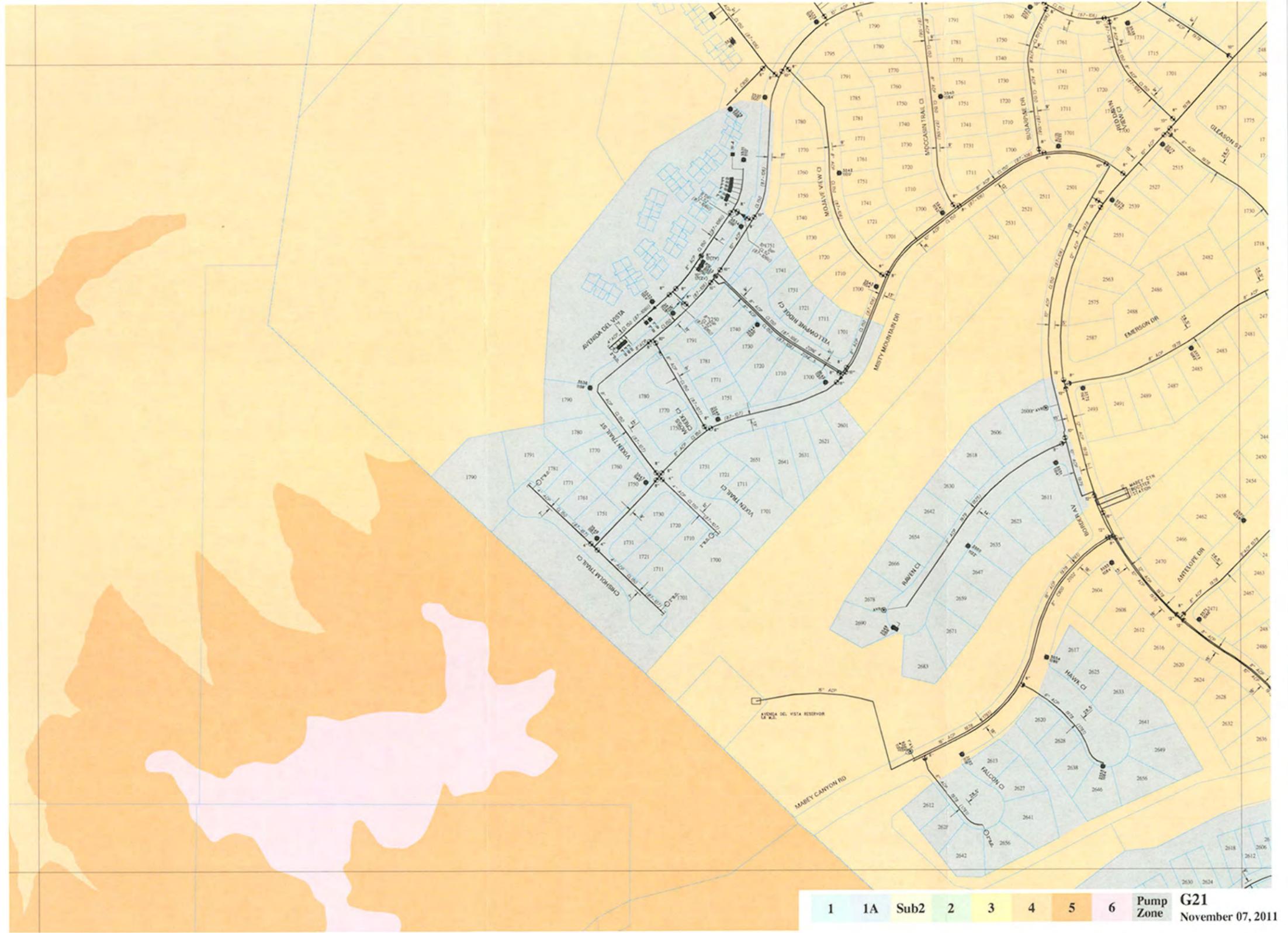




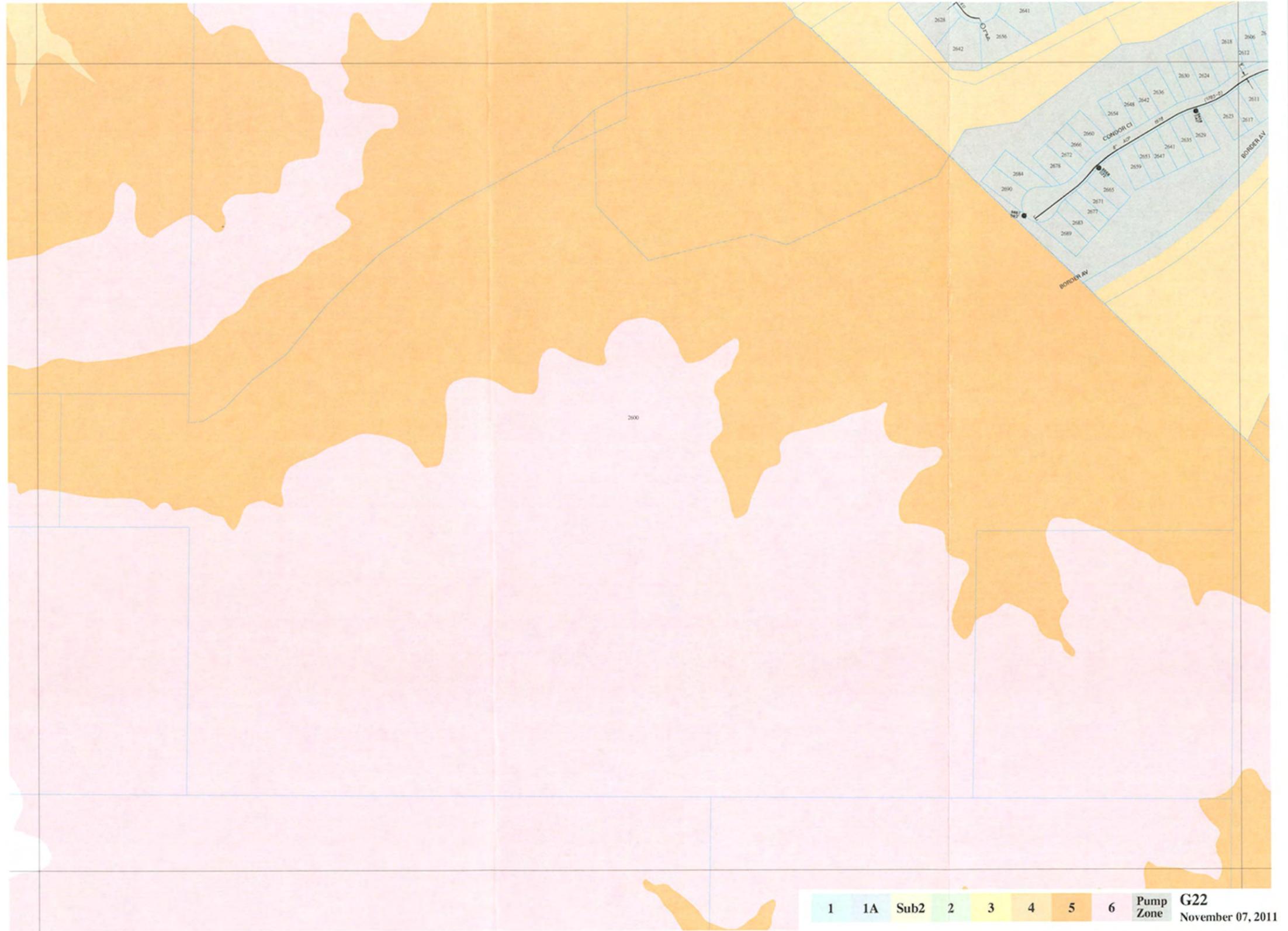
1 1A Sub2 2 3 4 5 6 Pump I24
 Zone November 07, 2011



1	1A	Sub2	2	3	4	5	6	Pump Zone	H24
									November 07, 2011



1 1A Sub2 2 3 4 5 6 Pump Zone G21
 November 07, 2011



1 1A Sub2 2 3 4 5 6 Pump Zone G22 November 07, 2011

Appendix

D

**CITY OF CORONA GENERAL PLAN
LAND USE AND ZONING MAP**

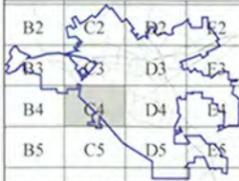
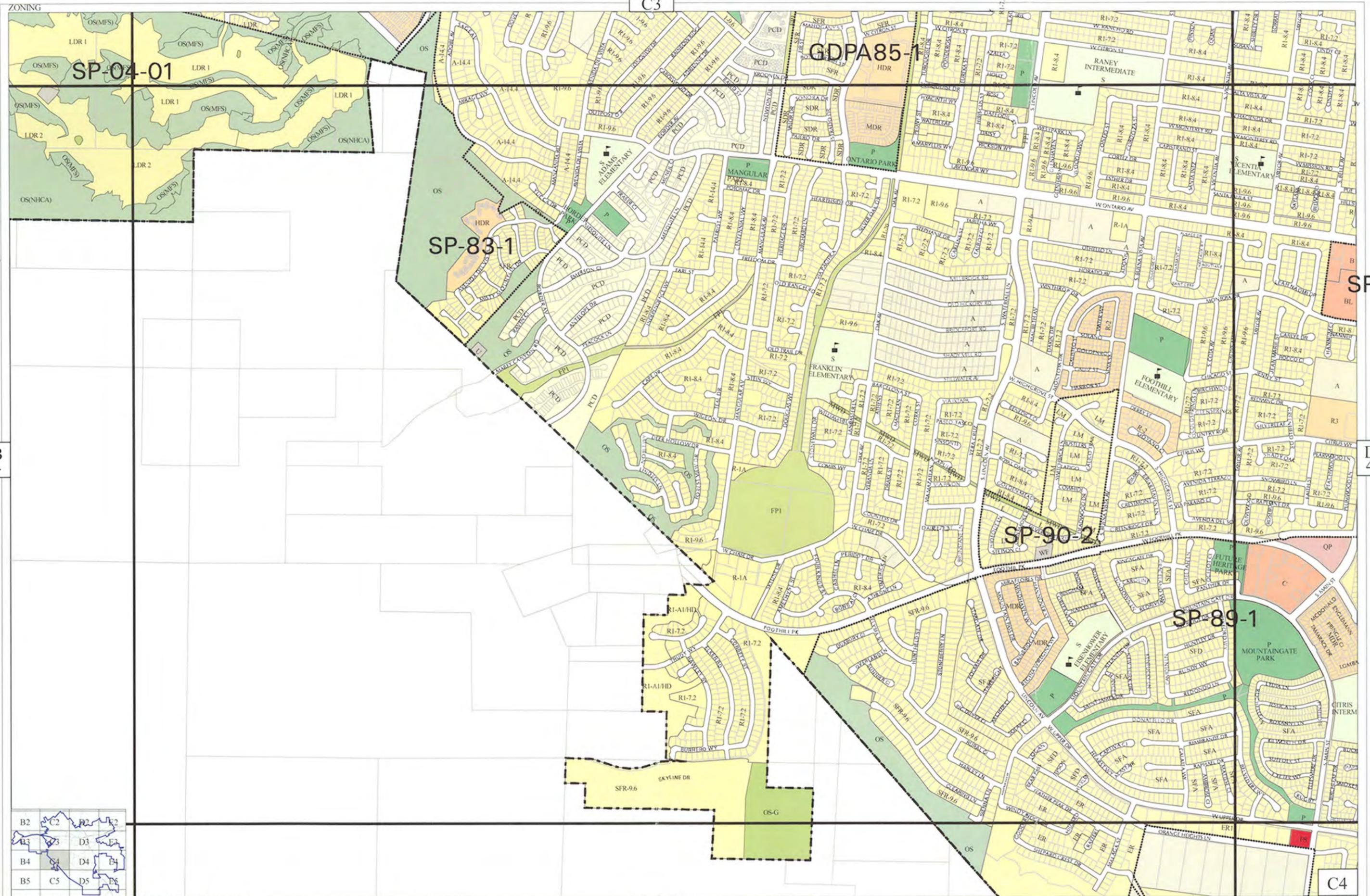
CITY OF CORONA ZONING ATLAS

A Agricultural	CR Commercial Retail District	IP Industrial Park	MF2 Multi Family Residential 2	R1-7.2 Single Family Residential (7,200 sq. lot min)	SF3 Single Family (Block3)
A/HD Agricultural/Hillside Development	CS Community Services	L Low Density Residential	MF3 Multi Family Residential 3	R1-7.6 Single Family Residential (7,600 sq. lot min)	SFA Single Family Attached
A/AP Agricultural (Agricultural Products)	D Downtown	LCI Limited Commercial - Industrial	MF4 Multi Family Residential 4	R1-8.4 Single Family Residential (8,400 sq. lot min)	SFC Single Family Condominium
A-14.4 Agricultural (14,400 sq. lot min.)	DB Detention Basin	LDR Low Density Residential	MFR Multi Family Residential	R1-8.0S Single Family Residential (8,400 sq. lot min)	SFD Single Family Detached Residential
A/MR Agricultural (Mineral Resource)	E Estate	LDR-72 Low Density Residential (7200 sq. ft. lot min.)	MHDR Medium High Density Residential	R1-9.6 Single Family Residential (9,600 sq. lot min)	SFR Single Family Residential
ACDD Automotive Commercial Development District	ER Estate Residential	LI Light Industrial	MI Medium Industrial	R1-12 Single Family Residential (12,000 sq. lot min)	SFR-5 Single Family (5,000 sq. min. lot)
BL1 Block1 (Lincoln Business Center)	ER1 Estate Residential Block 1	LM Low Density Residential	MP Mobile Home Park	R1-14.4 Single Family Residential (14,400 sq. lot min)	SFR-6 Single Family (6,000 sq. min lot)
BL1-O Block1-Overlay (Lincoln Business Center)	ER2 Estate Residential Block 2	LMD1 Low Density Residential 1	MH Mobile Home	R1-20 Single Family Residential (20,000 sq. lot min)	SFR-7 Single Family (7,000 sq. min lot)
BL2 Block2 (Lincoln Business Center)	EC Entertainment Commercial	LMD2 Low Density Residential 2	MSI Medium Service Industrial	R-2 Low Density Multiple Family Residential	SFR-7.2 Single Family (7,200 sq. min. lot)
BL3 Block3 (Lincoln Business Center)	ESR Entertainment/Specialty Retail Zone	LMDR Low Medium Density Residential	MWD MWD Easement	R-3 Multiple Family Residential	SFR-8.4 Single Family (8,400 sq. lot min)
BLK1 Block1 (Main Street South)	FPI Flood Plain	M Medium Density Residential	NC Neighborhood Commercial	RE Residential Estate	SFR-9 Single Family (9,000 sq. min lot)
BLK2 Block2 (Main Street South)	FS Fire Station	M1 Light Manufacturing	NCD Neighborhood Commercial District	RE-35 Residential Estate 35	SFR-9.6 Single Family (9,600 sq. min lot)
BLK3 Block3 (Main Street South)	G Golf	M2 General Manufacturing	MU Mixed Use	RES Reserve Area	SRSC Subregional Shopping Center
BLK4 Block4 (Main Street South)	Golf Course Golf	M2/O General Manufacturing (Oil)	OP Office Park	R-G Multiple Dwelling Zones	TC Transitional Commercial District
BLK5 Block5 (Main Street South)	GB Gateway Business	M3 Heavy Manufacturing	OS Open Space	RO Residential Office	TC-99-1 Transit/Mixed Use Zone
BLK6 Block6 (Main Street South)	GB1 Gateway Business 1	M3/MR Heavy Manufacturing (Mineral Resource)	OS(MLS) Open Space(Manufactured Landscaped Slopes)	RR Resort Residential	TR Transitional Retail District
BP Business Park	GC Golf Course	M4 Industrial Park	OS(PP) Open Space (Private Parks)	R/R Railroad	U Utility
BP Business Park Flex	GC General Commercial SP98-1	MP Mobile Home Park	OS(PPUO) Open Space(Private Parks Utility Overlay)	RSC Regional Shopping Center	UDR Urban Density Residential District
C Commercial	GP Greenbelt Park	MDR Medium Density Residential	OS(NHCA) Open Space(Natural Conservation Area)	SC Support Commercial	W Water
C2 Restricted Commercial	HDR High Density Residential	MDR7 Medium Density Residential (7 du/ac)	P Park	SC-99-01 Service Commercial Zone	WF Water Facility
C3 General Commercial	HDR16 High Density Residential (16 du/ac)	MDR8 Medium Density Residential (8 du/ac)	PCD Planned Community Development	SCE Support Commercial Freeway	WWTP Wastewater Treatment Plant
CC Commercial Center	HDR21 High Density Residential (21 du/ac)	MDR10 Medium Density Residential (10 du/ac)	QP Quasi Public	S School	
CER Custom Estate Residential	HDR22 High Density Residential (22 du/ac)	MDR12 Medium Density Residential (12 du/ac)	R Residential	SCI Support Commercial Industrial	
CF Freeway Access	HDR23 High Density Residential (23 du/ac)	MDR13 Medium Density Residential (13 du/ac)	R1 Single Family Residential	SFD Single Family Detached	
CG Commercial General	HER Hillside Estate Residential	MDR15 Medium Density Residential (15 du/ac)	R1A Single Family Residential (1ac. min.)	SF Single Family	
CP Professional and Office	I Industrial District	MDR22 Medium Density Residential (22 du/ac)	R1A/HD Single Family Residential (1ac. min.) Hillside	SF1 Single Family (Block1)	
CO/BP Commercial Office/Business Park Flex	ICDD Industrial Commercial Development District	MF1 Multi Family Residential 1	R1A/HD Single Family Residential (1ac. min.) Hillside	SF2 Single Family (Block2)	

SPECIFIC PLANS

SP 81-1 Lincoln Business Center Specific Plan	SP 84-2 Parkview Specific Plan	SP 89-1 Mountaingate Specific Plan	SP 90-5 Corona Vista Specific Plan	SP 99-1 North Main Street District Specific Plan
SP 81-2 Northeast Corona Specific Plan	GDPA85-1 Brookwood Specific Plan	SP 89-2 Chase Ranch Specific Plan	SP 90-6 Eagle Glen Specific Plan	SP 99-3 Dos Lagos Specific Plan
SP 82-1 Township in Corona Specific Plan	SP 85-1 Prado Point Specific Plan	SP 90-1 The Plaza on Sixth Street Specific Plan	SP 91-1 Main Street South Plaza Specific Plan	SP 00-1 Green River Ranch Specific Plan
SP 82-2 Bircher Business Center Specific Plan	SP 85-2 Sierra DeI Oro Specific Plan	SP 90-2 Todd Ranch Specific Plan	SP 91-2 El Cerrito Specific Plan	SP 01-1 Crown Ranch Estates Specific Plan
SP 83-1 Crown Ridge Specific Plan	SP 85-3 Corona Ranch Specific Plan	SP 90-3 Cheroкке Ranch Specific Plan	SP 95-1 Cimarron Specific Plan	SP 01-2 Corona Magnolia Specific Plan
SP 84-1 Concordia Specific Plan	SP 87-1 Westgate Specific Plan	SP 90-4 Empire Homes Specific Plan	SP 98-1 Downtown Revitalization Specific Plan	SP 04-01 Sierra Bella Specific Plan

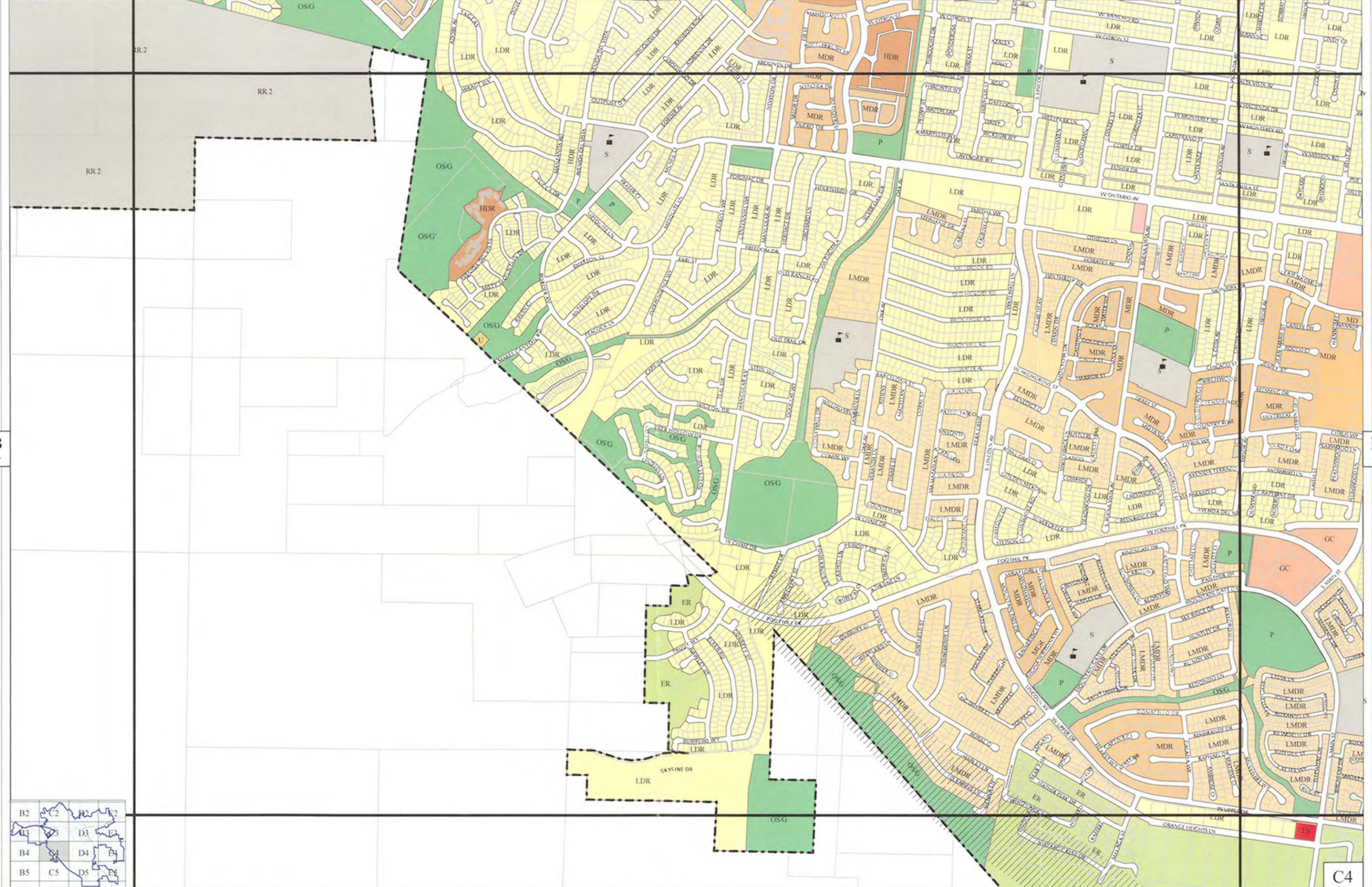
 Single Family Residential	 Utility	 North Main Street Specific Plan
 Multiple Family Residential	 Schools	 Garretson Avenue Overlay Zone
 Commercial/Industrial	 Planned Community Development	 Golf Course
 Heavy Industrial	 Open Space	 Schools
 Mixed Use	 Flood Control	 Corona City Boundary
 Commercial	 Parks	 Specific Plans Boundaries
 Office	 Agricultural	



CITY OF CORONA GENERAL PLAN ATLAS

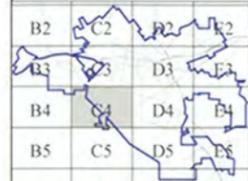
- | | |
|---|--|
|  AG Agriculture |  GI General Industry |
|  E Estate 1 - 3 du/acre |  P Parks |
|  RR 1 Rural Residential I 0.2 - .05 du/acre |  OS/G Open Space General |
|  RR 2 Rural Residential II 0.5 - 1 du/acre |  OS/R Open Space Recreation |
|  LDR Low Density Residential 3 - 6 du/acre | |
|  LMDR Low-Medium Density Residential 6 - 8 du/acre |  S School |
|  MDR Medium Density Residential 6 - 15 du/acre |  FS Fire Station |
|  HDR High Density Residential 15 - 36 du/acre |  U Utility |
|  OP Office/Professional |  Slope Management |
|  GC General Commercial |  Geologic Hazard Zone |
|  MUD Mixed Use: Downtown |  Schools |
|  MU 1 Mixed Use: Commercial and Residential |  Corona City Boundary |
|  MU 2 Mixed Use: Industrial and Commercial |  Corona Sphere of Influence |
|  LI Light Industry |  Railroad |

C3



B4

D4



C5

C4

E

ULTIMATE CONDITION MODEL DEMANDS AND MAP

SKYLINE HEIGHTS - ZONE 5 WATER DEMAND SUMMARY				
Node No.	Tributary Area (ac)	Average Day Demand (gpm)	Maximum Day Demand (gpm)	Peak Hour Demand (gpm)
J-10	1.73	4.25	7.64	10.66
J-11	9.09	22.34	40.22	56.08
J-12	1.85	4.54	8.18	11.40
J-13	3.08	7.57	13.63	19.00
J-14	4.07	10.00	17.99	25.09
J-44	11.22	27.59	49.66	69.25
Total:	31.03	76.29	137.32	191.48

SKYLINE HEIGHTS - ZONE 6A WATER DEMAND SUMMARY				
Node No.	Tributary Area (ac)	Average Day Demand (gpm)	Maximum Day Demand (gpm)	Peak Hour Demand (gpm)
J-18	4.21	10.35	18.63	25.98
J-19	1.52	3.74	6.73	9.38
J-20	7.41	18.23	32.81	45.75
J-21	6.66	16.38	29.48	41.10
J-22	5.51	13.53	24.36	33.97
J-23	5.84	14.36	25.85	36.04
J-24	12.88	31.66	56.99	79.46
J-26	1.38	3.39	6.11	8.52
J-27	0.93	2.30	4.13	5.76
J-28	3.88	9.53	17.15	23.91
J-29	3.31	8.13	14.63	20.41
J-30	5.86	14.42	25.95	36.19
J-31	2.80	6.88	12.39	17.28
J-32	7.02	17.25	31.06	43.31
J-33	3.36	8.26	14.87	20.73
J-34	2.13	5.24	9.43	13.15
J-35	4.19	10.29	18.53	25.84
J-37	3.79	9.32	16.78	23.41
J-38	4.60	11.31	20.36	28.39
J-39	5.39	13.26	23.86	33.27
J-40	3.11	7.64	13.75	19.17
J-41	9.50	23.35	42.03	58.61
J-42	2.84	6.98	12.56	17.52
J-83	4.91	12.07	21.73	30.30
Total:	113.03	277.86	500.14	697.42

Note:

- 1) Average Day Demand based on 3,540 gpd/ac for Low Density Residential.
- 2) Maximum Day Demand is 1.8xADD.
- 3) Peak Hour Demand is 2.51xADD.
- 4) Fire flow is 1500 gpm for 2 hours at Node J-85 (Zone 4), Node J-13 (Zone 5) and Node J-32 (Zone 6A).



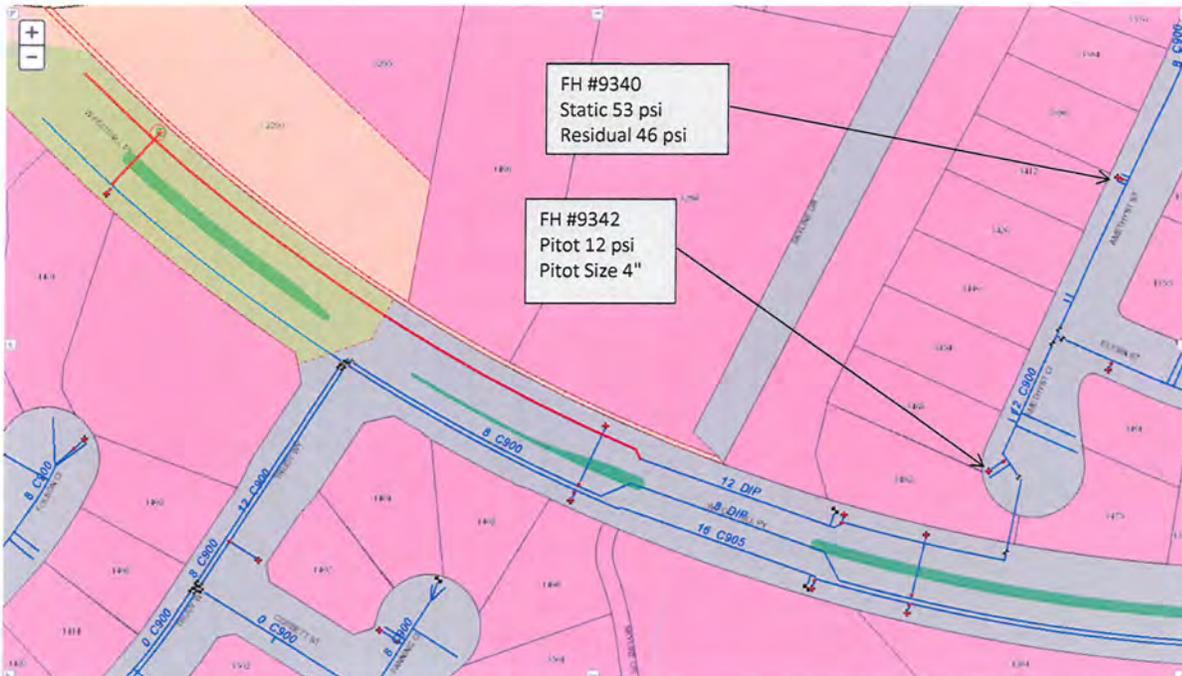
CITY OF CORONA
INFRASTRUCTURE & CONSTRUCTION DIVISION
FIRE FLOW TEST REPORT
TELEPHONE: 951-736-2234; FAX:951-735-3786

Requested By: Tom Koper Date: 1/17/2014
 Name of Company: City of Corona, DWP, Engineering Phone: 951-279-3604
 Billing Address: _____ Fax: _____
 _____ Email: Tom.Koper@ci.corona.ca.us
 Reason for Request: Skyline Development Flow Hydrant(s) #: 9342
 Site Address: Foothill PY @ Skyline Dr Residual Hydrant #: 9340
 (APN or Tract # is acceptable.)

Test Date: 1/22/2014 Test Time: 3:10 PM Test Performed By: Richard B., Julian R.

Static Pressure: 53 psi Total Hydrant(s) Flow: 1,176 gpm
 Residual Pressure: 46 psi 20 psi Residual Flow: 2,718 gpm

Flow Hydrant #: <u>9342</u>	Flow Hydrant #: _____	Flow Hydrant #: _____
Nozzle Size: <u>4'</u> inches	Nozzle Size: _____ inches	Nozzle Size: _____ inches
Pitot Pressure: <u>12</u> psi	Pitot Pressure: _____ psi	Pitot Pressure: _____ psi
Main Size: <u>12</u> inches	Main Size: _____ inches	Main Size: _____ inches
Test Duration: <u>3</u> minutes	Test Duration: _____ minutes	Test Duration: _____ minutes
Hydrant Flow: <u>1,176</u> gpm	Hydrant Flow: _____ gpm	Hydrant Flow: _____ gpm



Reviewed By Engineering: M.I

Approved By: Richard B. Wein

*Fire Flow Test is not valid without approval signature.



Hydrant ID **9340**

Street Address

Skyline Dr @ Foothill PY

Main Size 12", Nozzle Size 4", Pitot Pressure 12 psi, Duration 3 Minutes

Tested Date **1/22/2014**

Tested Time **3:10 AM**

Static Pressure PSI	53	Predicted Flow @ 20	2,718	NFPA
Residual Pressure PSI	46	Total GPM during flow test	1,176	AA Blue

Flow Hydrant **9342**

Street Address

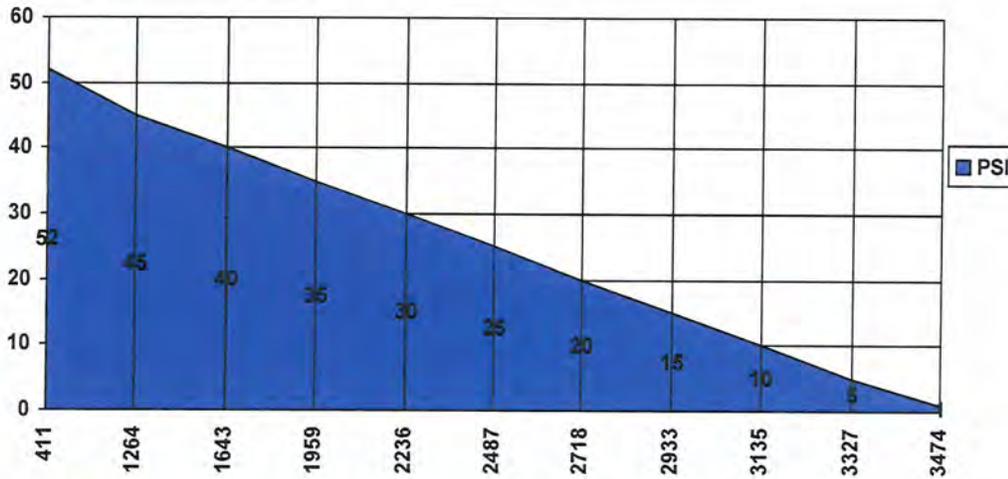
Skyline Dr @ Foothill PY

GPM **1,176**

Duration **3**

Main Size 12", Nozzle Size 4", Pitot Pressure 12 psi, Duration 3 Minutes

Flow





F

ULTIMATE CONDITION SCENARIO 1 ANALYSIS, NODE AND PIPE DIAGRAM

AVERAGE DAY DEMANDS ANALYSIS RESULTS
 ZONE 4, ZONE 5 AND 6A WATER SYSTEM ANALYSIS
 (SCENARIO 1: ZONE 4 TANK FULL, ZONE 6A TANK FULL & ZONE 6A PUMP OFF)

 Junction Pressures @ Steady State Analysis

Node	Demand (gpm)	Elevation (ft)	Hydraulic Grade (ft)	Pressure (psi)
J-1	0.00	1070.60	1370.00	129.73
J-10	4.25	1180.70	1369.97	82.01
J-11	22.34	1187.00	1369.95	79.27
J-12	4.54	1205.40	1369.96	71.30
J-13	7.57	1217.00	1369.96	66.28
J-14	10.00	1206.70	1369.96	70.74
J-15	0.00	1112.80	1370.00	111.44
J-16	0.00	1112.80	1370.00	111.44
J-17	0.00	1158.00	1370.00	91.86
J-18	10.35	1348.80	1559.43	91.27
J-19	3.74	1353.10	1559.43	89.40
J-2	0.00	1070.50	1370.00	129.77
J-20	18.23	1367.40	1559.39	83.19
J-21	16.38	1394.50	1559.38	71.44
J-22	13.53	1384.60	1559.39	75.74
J-23	14.36	1384.70	1559.44	75.72
J-24	31.66	1351.20	1559.39	90.21
J-25	0.00	1368.20	1559.48	82.88
J-26	3.39	1363.00	1559.49	85.14
J-27	2.30	1359.00	1559.51	86.88
J-28	9.53	1371.10	1559.48	81.63
J-29	8.13	1365.50	1559.48	84.05
J-3	0.00	1070.50	1370.00	129.77
J-30	14.42	1371.00	1559.48	81.67
J-31	6.88	1395.30	1559.55	71.17
J-32	17.25	1410.00	1559.60	64.82
J-33	8.26	1402.70	1559.58	67.98
J-34	5.24	1404.90	1559.58	67.02
J-35	10.29	1378.10	1559.52	78.61
J-36	0.00	1349.70	1559.42	90.87
J-37	9.32	1351.80	1559.42	89.96
J-38	11.31	1324.80	1559.40	101.65
J-39	13.26	1357.20	1559.39	87.61
J-4	0.00	1071.65	1370.00	129.27
J-40	7.64	1355.20	1559.39	88.48
J-41	23.35	1363.90	1559.40	84.71
J-42	6.98	1280.10	1559.39	121.02
J-43	0.00	1203.90	1369.98	71.96
J-44	27.59	1222.30	1369.97	63.98
J-45	0.00	1203.90	1559.40	154.04
J-5	0.00	1164.00	1369.98	89.25
J-6	0.00	1152.75	1369.98	94.13
J-7	0.00	1152.96	1369.98	94.04
J-72	0.00	1186.00	1220.00	14.73
J-76	0.00	1186.00	1220.00	14.73
J-77	0.00	1186.00	1559.41	161.80
J-78	0.00	1186.00	1559.41	161.80
J79	0.00	1187.50	1559.41	161.15
J-8	0.00	1117.56	1369.98	109.38
J-80	0.00	1186.00	1559.41	161.80
J-81	0.00	1070.00	1217.63	63.97
J-82	0.00	1230.00	1559.41	142.73
J-83	12.07	1235.00	1559.41	140.57
J-84	0.00	1161.00	1369.98	90.55
J-85	0.00	1082.00	1213.95	57.17
J-87	1176.00	1075.10	1212.40	59.49
J-9	0.00	1,161.00	1,369.98	90.55

Pipe Pressures @ Steady State Analysis											
ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/kft)	Status	Flow Reversal Count
P-1	J-1	R-1	300.81	16	110	-55.70	0.09	0.00	0.00	Open	0
P-10	J-10	J-84	337.21	8	110	-27.78	0.18	0.01	0.03	Open	0
P-11	J-9	J-6	254.31	8	110	-20.92	0.13	0.00	0.02	Open	0
P-12	J-9	J-10	331.30	8	110	20.92	0.13	0.01	0.02	Open	0
P-13	J-10	J-11	779.83	8	110	22.34	0.14	0.02	0.02	Open	0
P-14	J-12	J-10	553.74	8	110	-22.11	0.14	0.01	0.02	Open	0
P-15	J-13	J-12	308.82	8	110	-7.57	0.05	0.00	0.00	Open	0
P-16	J-14	J-12	286.07	8	110	-10.00	0.06	0.00	0.00	Open	0
P-17	J-81	T-4	2064.20	16	110	-1,176.00	1.88	2.37	1.15	Open	0
P-18	J-15	J-3	788.65	8	110	0.46	0.00	0.00	0.00	Open	0
P-19	J-2	J-16	791.22	8	110	0.46	0.00	0.00	0.00	Open	0
P-2	J-2	J-1	27.00	16	110	-55.70	0.09	0.00	0.00	Open	0
P-20	J-15	J-16	5.00	12	110	-0.46	0.00	0.00	0.00	Open	0
P-22	J-17	J-15	529.19	8	110	0.00	0.00	0.00	0.00	Open	0
P-24	J-18	J-82	977.95	12	110	56.48	0.16	0.02	0.02	Open	0
P-25	J-20	J-77	1484.96	12	110	-44.40	0.13	0.02	0.01	Open	0
P-26	J-19	J-18	187.24	8	110	-3.74	0.02	0.00	0.00	Open	0
P-27	J-21	J-20	709.56	8	110	-16.38	0.10	0.01	0.01	Open	0
P-28	J-22	J-20	379.05	12	110	-9.79	0.03	0.00	0.00	Open	0
P-29	J-23	J-18	562.63	12	110	70.57	0.20	0.01	0.03	Open	0
P-3	J-3	J-2	5.00	16	110	-55.23	0.09	0.00	0.00	Open	0
P-30	J-24	J-22	2023.61	12	110	3.74	0.01	0.00	0.00	Open	0
P-31	J-25	J-23	1090.36	12	110	84.93	0.24	0.04	0.04	Open	0
P-32	J-26	J-25	307.47	12	110	88.00	0.25	0.01	0.04	Open	0
P-33	J-27	J-26	233.50	12	110	120.40	0.34	0.02	0.07	Open	0
P-34	J-25	J-28	309.77	8	110	3.07	0.02	0.00	0.00	Open	0
P-35	J-29	J-28	550.04	8	110	6.46	0.04	0.00	0.00	Open	0
P-36	J-29	J-26	303.84	8	110	-29.01	0.19	0.01	0.04	Open	0
P-37	J-30	J-29	552.91	8	110	-14.42	0.09	0.01	0.01	Open	0
P-38	J-27	J-31	599.70	12	110	-122.70	0.35	0.04	0.07	Open	0
P-39	J-31	J-32	375.21	12	110	-172.12	0.49	0.05	0.13	Open	0
P-4	J-4	J-3	394.66	16	110	-55.70	0.09	0.00	0.00	Open	0
P-40	J-32	T-1	1234.21	12	110	-277.87	0.79	0.40	0.32	Open	0
P-41	J-32	J-33	544.77	12	110	88.50	0.25	0.02	0.04	Open	0
P-42	J-33	J-34	265.72	8	110	5.24	0.03	0.00	0.00	Open	0
P-43	J-33	J-35	315.18	8	110	75.00	0.48	0.06	0.21	Open	0
P-44	J-35	J-31	501.36	8	110	-42.54	0.27	0.04	0.07	Open	0
P-45	J-35	J-36	237.98	8	110	107.26	0.68	0.09	0.40	Open	0
P-46	J-36	J-37	381.08	8	110	9.32	0.06	0.00	0.00	Open	0
P-47	J-36	J-38	486.45	12	110	97.94	0.28	0.02	0.05	Open	0
P-48	J-38	J-24	376.04	12	110	56.30	0.16	0.01	0.02	Open	0
P-49	J-24	J-39	651.16	8	110	13.26	0.08	0.01	0.01	Open	0
P-5	J-5	J-4	3141.33	16	110	-55.70	0.09	0.01	0.00	Open	0
P-50	J-40	J-24	473.74	8	110	-7.64	0.05	0.00	0.00	Open	0
P-51	J-41	J-38	627.02	12	110	-30.33	0.09	0.00	0.01	Open	0
P-52	J-42	J-41	242.16	8	110	-6.98	0.04	0.00	0.00	Open	0
P-53	J-41	J-45	478.06	12	110	0.00	0.00	0.00	0.00	Open	0
P-54	J-43	J-5	570.16	12	110	-27.59	0.08	0.00	0.00	Open	0
P-55	J-44	J-43	484.26	8	110	-27.59	0.18	0.02	0.03	Open	0
P-56	J-43	J-45	0.50	12	110	0.00	0.00	0.00	0.00	Closed	0
P-6	J-6	J-5	1049.00	16	110	-28.11	0.04	0.00	0.00	Open	0
P-7	J-6	J-7	11.45	16	110	7.19	0.01	0.00	0.00	Open	0
P-75	J-72	J-76	3.20	12	110	0.00	0.00	0.00	0.00	Open	0
P-76	J-77	J-78	4.07	12	110	-44.40	0.13	0.00	0.00	Open	0
P-77	J-78	J79	3.66	12	110	-44.41	0.13	0.00	0.03	Open	0
P-78	J-78	J-80	3.14	12	110	0.00	0.00	0.00	0.00	Open	0
P-79	J-81	J-85	790.06	12	110	1,176.00	3.34	3.68	4.66	Open	0
P-8	J-7	J-8	424.10	12	110	-20.59	0.06	0.00	0.00	Open	0
P-81	J-82	J79	324.43	12	110	44.41	0.13	0.00	0.01	Open	0
P-82	J-82	J-83	197.73	12	110	12.07	0.03	0.00	0.00	Open	0
P-84	J-84	J-7	258.28	16	110	-27.78	0.04	0.00	0.00	Open	0
P-85	J-85	J-87	330.70	12	110	1,176.00	3.34	1.54	4.66	Open	0
P-86	J-72	T-4	61.13	12	110	0.00	0.00	0.00	0	Open	0
P-9	J-8	R-3	839.84	8	110	-20.59	0.13	0.02	0.02	Open	0

Pump Results @ Steady State Analysis									
ID	From Node	To Node	Flow (gpm)	Head Gain (ft)	Status	Setting	Avail. NPSH (ft)	Cavitation Index	
PMP1-1	J-76	J-80	0.00	0.00	Closed	0	0.00	0	
PMP1-2	J-76	J-80	0.00	0.00	Closed	0	0.00	0	
PMP1-3	J-76	J-80	0.00	0.00	Closed	0	0.00	0	

Tank Results @ Steady State Analysis							
ID	Flow (gpm)	Elevation (ft)	Hydraulic Grade (ft)	Pressure (psi)	% Full (%)	Volume (MG)	Level (ft)
R-1	-55.70	1,370.00	1,370.00	0.00	100	0	0
R-3	-20.59	1,370.00	1,370.00	0.00	100	0	0
T-1	-277.87	1,530.00	1,560.00	13.00	100	0.6	30
T-4	-1,175.99	1,190.00	1,220.00	13.00	100	2.54	30

MAXIMUM DAY DEMANDS ANALYSIS RESULTS
 ZONE 4, ZONE 5 AND 6A WATER SYSTEM ANALYSIS
 (SCENARIO 1: ZONE 4 TANK FULL, ZONE 6A TANK FULL & ZONE 6A PUMP OFF)

Junction Pressures @ Steady State Analysis

Node	Demand (gpm)	Elevation (ft)	Hydraulic Grade (ft)	Pressure (psi)
J-1	0.00	1070.60	1370.00	129.73
J-10	7.65	1180.70	1369.92	81.99
J-11	40.21	1187.00	1369.87	79.24
J-12	8.17	1205.40	1369.88	71.27
J-13	13.63	1217.00	1369.88	66.24
J-14	18.00	1206.70	1369.88	70.70
J-15	0.00	1112.80	1370.00	111.44
J-16	0.00	1112.80	1370.00	111.44
J-17	0.00	1158.00	1370.00	91.86
J-18	18.63	1348.80	1558.30	90.78
J-19	6.73	1353.10	1558.30	88.91
J-2	0.00	1070.50	1370.00	129.77
J-20	32.81	1367.40	1558.20	82.67
J-21	29.48	1394.50	1558.17	70.92
J-22	24.35	1384.60	1558.20	75.22
J-23	25.85	1384.70	1558.35	75.24
J-24	56.99	1351.20	1558.20	89.69
J-25	0.00	1368.20	1558.46	82.44
J-26	6.10	1363.00	1558.50	84.71
J-27	4.14	1359.00	1558.54	86.46
J-28	17.15	1371.10	1558.46	81.18
J-29	14.63	1365.50	1558.46	83.61
J-3	0.00	1070.50	1370.00	129.77
J-30	25.96	1371.00	1558.45	81.22
J-31	12.38	1395.30	1558.67	70.79
J-32	31.05	1410.00	1558.82	64.48
J-33	14.87	1402.70	1558.76	67.62
J-34	9.43	1404.90	1558.75	66.67
J-35	18.52	1378.10	1558.56	78.19
J-36	0.00	1349.70	1558.28	90.38
J-37	16.78	1351.80	1558.28	89.47
J-38	20.36	1324.80	1558.21	101.14
J-39	23.87	1357.20	1558.18	87.08
J-4	0.00	1071.65	1369.99	129.27
J-40	13.75	1355.20	1558.19	87.96
J-41	42.03	1363.90	1558.20	84.19
J-42	12.56	1280.10	1558.20	120.50
J-43	0.00	1203.90	1369.95	71.95
J-44	49.66	1222.30	1369.90	63.95
J-45	0.00	1203.90	1558.20	153.52
J-5	0.00	1164.00	1369.95	89.24
J-6	0.00	1152.75	1369.95	94.11
J-7	0.00	1152.96	1369.95	94.02
J-72	0.00	1186.00	1220.00	14.73
J-76	0.00	1186.00	1220.00	14.73
J-77	0.00	1186.00	1558.24	161.29
J-78	0.00	1186.00	1558.24	161.29
J79	0.00	1187.50	1558.24	160.64
J-8	0.00	1117.56	1369.95	109.36
J-80	0.00	1186.00	1558.24	161.29
J-81	0.00	1070.00	1217.63	63.97
J-82	0.00	1230.00	1558.25	142.23
J-83	21.73	1235.00	1558.25	140.07
J-84	0.00	1161.00	1369.95	90.54
J-85	0.00	1082.00	1213.95	57.17
J-87	1176.00	1075.10	1212.40	59.49
J-9	0.00	1,161.00	1,369.94	90.53

Pipe Pressures @ Steady State Analysis											
ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/kft)	Status	Flow Reversal Count
P-1	J-1	R-1	300.81	16	110	-100.26	0.16	0.00	0.01	Open	0
P-10	J-10	J-84	337.21	8	110	-50.01	0.32	0.03	0.10	Open	0
P-11	J-9	J-6	254.31	8	110	-37.65	0.24	0.01	0.06	Open	0
P-12	J-9	J-10	331.30	8	110	37.65	0.24	0.02	0.06	Open	0
P-13	J-10	J-11	779.83	8	110	40.21	0.26	0.05	0.06	Open	0
P-14	J-12	J-10	553.74	8	110	-39.80	0.25	0.04	0.06	Open	0
P-15	J-13	J-12	308.82	8	110	-13.63	0.09	0.00	0.01	Open	0
P-16	J-14	J-12	286.07	8	110	-18.00	0.11	0.00	0.01	Open	0
P-17	J-81	T-4	2064.20	16	110	-1,176.00	1.88	2.37	1.15	Open	0
P-18	J-15	J-3	788.65	8	110	0.90	0.01	0.00	0.00	Open	0
P-19	J-2	J-16	791.22	8	110	0.90	0.01	0.00	0.00	Open	0
P-2	J-2	J-1	27.00	16	110	-100.26	0.16	0.00	0.01	Open	0
P-20	J-15	J-16	5.00	12	110	-0.90	0.00	0.00	0.00	Open	0
P-22	J-17	J-15	529.19	8	110	0.00	0.00	0.00	0.00	Open	0
P-24	J-18	J-82	977.95	12	110	101.66	0.29	0.05	0.05	Open	0
P-25	J-20	J-77	1484.96	12	110	-79.93	0.23	0.05	0.03	Open	0
P-26	J-19	J-18	187.24	8	110	-6.73	0.04	0.00	0.00	Open	0
P-27	J-21	J-20	709.56	8	110	-29.48	0.19	0.03	0.04	Open	0
P-28	J-22	J-20	379.05	12	110	-17.63	0.05	0.00	0.00	Open	0
P-29	J-23	J-18	562.63	12	110	127.02	0.36	0.04	0.08	Open	0
P-3	J-3	J-2	5.00	16	110	-99.36	0.16	0.00	0.02	Open	0
P-30	J-24	J-22	2023.61	12	110	6.72	0.02	0.00	0.00	Open	0
P-31	J-25	J-23	1090.36	12	110	152.87	0.43	0.12	0.11	Open	0
P-32	J-26	J-25	307.47	12	110	158.39	0.45	0.04	0.11	Open	0
P-33	J-27	J-26	233.50	12	110	216.71	0.61	0.05	0.20	Open	0
P-34	J-25	J-28	309.77	8	110	5.52	0.04	0.00	0.00	Open	0
P-35	J-29	J-28	550.04	8	110	11.63	0.07	0.00	0.01	Open	0
P-36	J-29	J-26	303.84	8	110	-52.22	0.33	0.03	0.11	Open	0
P-37	J-30	J-29	552.91	8	110	-25.96	0.17	0.02	0.03	Open	0
P-38	J-27	J-31	599.70	12	110	-220.85	0.63	0.13	0.21	Open	0
P-39	J-31	J-32	375.21	12	110	-309.82	0.88	0.15	0.39	Open	0
P-4	J-4	J-3	394.66	16	110	-100.26	0.16	0.00	0.01	Open	0
P-40	J-32	T-1	1234.21	12	110	-500.17	1.42	1.18	0.96	Open	0
P-41	J-32	J-33	544.77	12	110	159.31	0.45	0.06	0.11	Open	0
P-42	J-33	J-34	265.72	8	110	9.43	0.06	0.00	0.00	Open	0
P-43	J-33	J-35	315.18	8	110	135.01	0.86	0.19	0.61	Open	0
P-44	J-35	J-31	501.36	8	110	-76.58	0.49	0.11	0.21	Open	0
P-45	J-35	J-36	237.98	8	110	193.06	1.23	0.28	1.18	Open	0
P-46	J-36	J-37	381.08	8	110	16.78	0.11	0.00	0.01	Open	0
P-47	J-36	J-38	486.45	12	110	176.29	0.50	0.07	0.14	Open	0
P-48	J-38	J-24	376.04	12	110	101.33	0.29	0.02	0.05	Open	0
P-49	J-24	J-39	651.16	8	110	23.87	0.15	0.02	0.02	Open	0
P-5	J-5	J-4	3141.33	16	110	-100.26	0.16	0.04	0.01	Open	0
P-50	J-40	J-24	473.74	8	110	-13.75	0.09	0.00	0.01	Open	0
P-51	J-41	J-38	627.02	12	110	-54.59	0.15	0.01	0.02	Open	0
P-52	J-42	J-41	242.16	8	110	-12.56	0.08	0.00	0.01	Open	0
P-53	J-41	J-45	478.06	12	110	0.00	0.00	0.00	0.00	Open	0
P-54	J-43	J-5	570.16	12	110	-49.66	0.14	0.01	0.01	Open	0
P-55	J-44	J-43	484.26	8	110	-49.66	0.32	0.05	0.10	Open	0
P-56	J-43	J-45	0.50	12	110	0.00	0.00	0.00	0.00	Closed	0
P-6	J-6	J-5	1049.00	16	110	-50.60	0.08	0.00	0.00	Open	0
P-7	J-6	J-7	11.45	16	110	12.95	0.02	0.00	0.00	Open	0
P-75	J-72	J-76	3.20	12	110	0.00	0.00	0.00	0.00	Open	0
P-76	J-77	J-78	4.07	12	110	-79.93	0.23	0.00	0.03	Open	0
P-77	J-78	J79	3.66	12	110	-79.93	0.23	0.00	0.03	Open	0
P-78	J-78	J-80	3.14	12	110	0.00	0.00	0.00	0.00	Open	0
P-79	J-81	J-85	790.06	12	110	1,176.00	3.34	3.68	4.66	Open	0
P-8	J-7	J-8	424.10	12	110	-37.06	0.11	0.00	0.01	Open	0
P-81	J-82	J79	324.43	12	110	79.93	0.23	0.01	0.03	Open	0
P-82	J-82	J-83	197.73	12	110	21.73	0.06	0.00	0.00	Open	0
P-84	J-84	J-7	258.28	16	110	-50.01	0.08	0.00	0.00	Open	0
P-85	J-85	J-87	330.70	12	110	1,176.00	3.34	1.54	4.66	Open	0
P-86	J-72	T-4	61.13	12	110	0.00	0.00	0.00	0	Open	0
P-9	J-8	R-3	839.84	8	110	-37.06	0.24	0.05	0.06	Open	0

Pump Results @ Steady State Analysis									
ID	From Node	To Node	Flow (gpm)	Head Gain (ft)	Status	Setting	Avail. NPSH (ft)	Cavitation Index	
PMP1-1	J-76	J-80	0.00	0.00	Closed	0	0.00	0	
PMP1-2	J-76	J-80	0.00	0.00	Closed	0	0.00	0	
PMP1-3	J-76	J-80	0.00	0.00	Closed	0	0.00	0	

Tank Results @ Steady State Analysis							
ID	Flow (gpm)	Elevation (ft)	Hydraulic Grade (ft)	Pressure (psi)	% Full (%)	Volume (MG)	Level (ft)
R-1	-100.26	1,370.00	1,370.00	0.00	100	0	0
R-3	-37.06	1,370.00	1,370.00	0.00	100	0	0
T-1	-500.17	1,530.00	1,560.00	13.00	100	0.6	30
T-4	-1,175.99	1,190.00	1,220.00	13.00	100	2.54	30

Pipe Pressures @ Steady State Analysis

ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/kft)	Status	Flow Reversal Count
P-1	J-1	R-1	300.81	16	110	-139.80	0.22	0.01	0.02	Open	0
P-10	J-10	J-84	337.21	8	110	-69.74	0.45	0.06	0.18	Open	0
P-11	J-9	J-6	254.31	8	110	-52.50	0.34	0.03	0.11	Open	0
P-12	J-9	J-10	331.30	8	110	52.50	0.34	0.04	0.11	Open	0
P-13	J-10	J-11	779.83	8	110	56.07	0.36	0.09	0.12	Open	0
P-14	J-12	J-10	553.74	8	110	-55.50	0.35	0.07	0.12	Open	0
P-15	J-13	J-12	308.82	8	110	-19.00	0.12	0.01	0.02	Open	0
P-16	J-14	J-12	286.07	8	110	-25.10	0.16	0.01	0.03	Open	0
P-17	J-81	T-4	2064.20	16	110	-1,176.00	1.88	2.37	1.15	Open	0
P-18	J-15	J-3	788.65	8	110	1.10	0.01	0.00	0.00	Open	0
P-19	J-2	J-16	791.22	8	110	1.11	0.01	0.00	0.00	Open	0
P-2	J-2	J-1	27.00	16	110	-139.80	0.22	0.00	0.02	Open	0
P-20	J-15	J-16	5.00	12	110	-1.11	0.00	0.00	0.00	Open	0
P-22	J-17	J-15	529.19	8	110	0.00	0.00	0.00	0.00	Open	0
P-24	J-18	J-82	977.95	12	110	141.76	0.40	0.09	0.09	Open	0
P-25	J-20	J-77	1484.96	12	110	-111.46	0.32	0.09	0.06	Open	0
P-26	J-19	J-18	187.24	8	110	-9.38	0.06	0.00	0.00	Open	0
P-27	J-21	J-20	709.56	8	110	-41.11	0.26	0.05	0.07	Open	0
P-28	J-22	J-20	379.05	12	110	-24.58	0.07	0.00	0.00	Open	0
P-29	J-23	J-18	562.63	12	110	177.12	0.50	0.08	0.14	Open	0
P-3	J-3	J-2	5.00	16	110	-138.70	0.22	0.00	0.02	Open	0
P-30	J-24	J-22	2023.61	12	110	9.38	0.03	0.00	0.00	Open	0
P-31	J-25	J-23	1090.36	12	110	213.16	0.60	0.22	0.20	Open	0
P-32	J-26	J-25	307.47	12	110	220.87	0.63	0.06	0.21	Open	0
P-33	J-27	J-26	233.50	12	110	302.19	0.86	0.09	0.38	Open	0
P-34	J-25	J-28	309.77	8	110	7.70	0.05	0.00	0.00	Open	0
P-35	J-29	J-28	550.04	8	110	16.22	0.10	0.01	0.01	Open	0
P-36	J-29	J-26	303.84	8	110	-72.82	0.46	0.06	0.19	Open	0
P-37	J-30	J-29	552.91	8	110	-36.19	0.23	0.03	0.05	Open	0
P-38	J-27	J-31	599.70	12	110	-307.97	0.87	0.23	0.39	Open	0
P-39	J-31	J-32	375.21	12	110	-432.02	1.23	0.27	0.73	Open	0
P-4	J-4	J-3	394.66	16	110	-139.80	0.22	0.01	0.02	Open	0
P-40	J-32	T-1	1234.21	12	110	-697.46	1.98	2.19	1.77	Open	0
P-41	J-32	J-33	544.77	12	110	222.14	0.63	0.12	0.21	Open	0
P-42	J-33	J-34	265.72	8	110	13.15	0.08	0.00	0.01	Open	0
P-43	J-33	J-35	315.18	8	110	188.26	1.20	0.36	1.13	Open	0
P-44	J-35	J-31	501.36	8	110	-106.78	0.68	0.20	0.40	Open	0
P-45	J-35	J-36	237.98	8	110	269.21	1.72	0.52	2.19	Open	0
P-46	J-36	J-37	381.08	8	110	23.39	0.15	0.01	0.02	Open	0
P-47	J-36	J-38	486.45	12	110	245.82	0.70	0.12	0.26	Open	0
P-48	J-38	J-24	376.04	12	110	141.30	0.40	0.03	0.09	Open	0
P-49	J-24	J-39	651.16	8	110	33.28	0.21	0.03	0.05	Open	0
P-5	J-5	J-4	3141.33	16	110	-139.80	0.22	0.07	0.02	Open	0
P-50	J-40	J-24	473.74	8	110	-19.18	0.12	0.01	0.02	Open	0
P-51	J-41	J-38	627.02	12	110	-76.13	0.22	0.02	0.03	Open	0
P-52	J-42	J-41	242.16	8	110	-17.52	0.11	0.00	0.01	Open	0
P-53	J-41	J-45	478.06	12	110	0.00	0.00	0.00	0.00	Open	0
P-54	J-43	J-5	570.16	12	110	-69.25	0.20	0.01	0.02	Open	0
P-55	J-44	J-43	484.26	8	110	-69.25	0.44	0.09	0.18	Open	0
P-56	J-43	J-45	0.50	12	110	0.00	0.00	0.00	0.00	Closed	0
P-6	J-6	J-5	1049.00	16	110	-70.55	0.11	0.01	0.01	Open	0
P-7	J-6	J-7	11.45	16	110	18.06	0.03	0.00	0.00	Open	0
P-75	J-72	J-76	3.20	12	110	0.00	0.00	0.00	0.00	Open	0
P-76	J-77	J-78	4.07	12	110	-111.46	0.32	0.00	0.06	Open	0
P-77	J-78	J79	3.66	12	110	-111.46	0.32	0.00	0.07	Open	0
P-78	J-78	J-80	3.14	12	110	0.00	0.00	0.00	0.00	Open	0
P-79	J-81	J-85	790.06	12	110	1,176.00	3.34	3.68	4.66	Open	0
P-8	J-7	J-8	424.10	12	110	-51.68	0.15	0.01	0.01	Open	0
P-81	J-82	J79	324.43	12	110	111.46	0.32	0.02	0.06	Open	0
P-82	J-82	J-83	197.73	12	110	30.30	0.09	0.00	0.01	Open	0
P-84	J-84	J-7	258.28	16	110	-69.74	0.11	0.00	0.01	Open	0
P-85	J-85	J-87	330.70	12	110	1,176.00	3.34	1.54	4.66	Open	0
P-86	J-72	T-4	61.13	12	110	0.00	0.00	0.00	0	Open	0
P-9	J-8	R-3	839.84	8	110	-51.68	0.33	0.09	0.1	Open	0

Pump Results @ Steady State Analysis									
ID	From Node	To Node	Flow (gpm)	Head Gain (ft)	Status	Setting	Avail. NPSH (ft)	Cavitation Index	
PMP1-1	J-76	J-80	0.00	0.00	Closed	0	0.00	0	
PMP1-2	J-76	J-80	0.00	0.00	Closed	0	0.00	0	
PMP1-3	J-76	J-80	0.00	0.00	Closed	0	0.00	0	

Tank Results @ Steady State Analysis							
ID	Flow (gpm)	Elevation (ft)	Hydraulic Grade (ft)	Pressure (psi)	% Full (%)	Volume (MG)	Level (ft)
R-1	-139.80	1,370.00	1,370.00	0.00	100	0	0
R-3	-51.68	1,370.00	1,370.00	0.00	100	0	0
T-1	-697.46	1,530.00	1,560.00	13.00	100	0.6	30
T-4	-1,176.00	1,190.00	1,220.00	13.00	100	2.54	30

MAXIMUM DAY DEMANDS + FIRE ANALYSIS RESULTS
 ZONE 4, ZONE 5 AND 6A WATER SYSTEM ANALYSIS
 (SCENARIO 1: ZONE 4 TANK FULL, ZONE 6A TANK FULL & ZONE 6A PUMP OFF)

Junction Pressures @ Steady State Analysis

Node	Demand (gpm)	Elevation (ft)	Hydraulic Grade (ft)	Pressure (psi)
J-1	0.00	1070.60	1369.66	129.58
J-10	7.65	1180.70	1357.34	76.54
J-11	40.21	1187.00	1357.29	73.78
J-12	8.17	1205.40	1326.68	52.55
J-13	1513.63	1217.00	1310.12	40.35
J-14	18.00	1206.70	1326.68	51.99
J-15	0.00	1112.80	1369.63	111.28
J-16	0.00	1112.80	1369.63	111.28
J-17	0.00	1158.00	1369.63	91.70
J-18	18.63	1348.80	1544.09	84.62
J-19	6.73	1353.10	1544.09	82.76
J-2	0.00	1070.50	1369.63	129.61
J-20	32.81	1367.40	1543.99	76.52
J-21	29.48	1394.50	1543.96	64.76
J-22	24.35	1384.60	1543.99	69.06
J-23	25.85	1384.70	1544.14	69.08
J-24	56.99	1351.20	1543.99	83.53
J-25	0.00	1368.20	1544.25	76.28
J-26	6.10	1363.00	1544.29	78.55
J-27	4.14	1359.00	1544.34	80.31
J-28	17.15	1371.10	1544.25	75.03
J-29	14.63	1365.50	1544.26	77.46
J-3	0.00	1070.50	1369.62	129.61
J-30	25.96	1371.00	1544.24	75.07
J-31	12.38	1395.30	1544.46	64.63
J-32	1531.05	1410.00	1544.61	58.33
J-33	14.87	1402.70	1544.55	61.46
J-34	9.43	1404.90	1544.55	60.51
J-35	18.52	1378.10	1544.36	72.04
J-36	0.00	1349.70	1544.07	84.22
J-37	16.78	1351.80	1544.07	83.31
J-38	20.36	1324.80	1544.01	94.98
J-39	23.87	1357.20	1543.97	80.93
J-4	0.00	1071.65	1369.17	128.92
J-40	13.75	1355.20	1543.98	81.80
J-41	42.03	1363.90	1544.00	78.04
J-42	12.56	1280.10	1543.99	114.35
J-43	0.00	1203.90	1365.60	70.06
J-44	49.66	1222.30	1365.55	62.07
J-45	0.00	1203.90	1544.00	147.36
J-5	0.00	1164.00	1365.61	87.36
J-6	0.00	1152.75	1364.51	91.76
J-7	0.00	1152.96	1364.51	91.66
J-72	0.00	1186.00	1220.00	14.73
J-76	0.00	1186.00	1220.00	14.73
J-77	0.00	1186.00	1544.04	155.14
J-78	0.00	1186.00	1544.04	155.14
J79	0.00	1187.50	1544.04	154.49
J-8	0.00	1117.56	1364.87	107.16
J-80	0.00	1186.00	1544.04	155.14
J-81	0.00	1070.00	1208.81	60.15
J-82	0.00	1230.00	1544.05	136.08
J-83	21.73	1235.00	1544.05	133.91
J-84	0.00	1161.00	1364.32	88.10
J-85	0.00	1082.00	1191.43	47.42
J-87	2718.00	1075.10	1184.15	47.25
J-9	0.00	1,161.00	1,361.39	86.83

Note: Fire demand of 1500 gpm at Node J-85 (Zone 4), Node J-13 (Zone 5) and Node J-32 (Zone 6) for residential

Pipe Pressures @ Steady State Analysis											
ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/kft)	Status	Flow Reversal Count
P-1	J-1	R-1	300.81	16	110	-1,168.78	1.87	0.34	1.14	Open	0
P-10	J-10	J-84	337.21	8	110	-905.77	5.78	6.99	20.72	Open	0
P-11	J-9	J-6	254.31	8	110	-681.89	4.35	3.11	12.25	Open	0
P-12	J-9	J-10	331.30	8	110	681.89	4.35	4.06	12.25	Open	0
P-13	J-10	J-11	779.83	8	110	40.21	0.26	0.05	0.06	Open	0
P-14	J-12	J-10	553.74	8	110	-1,539.80	9.83	30.66	55.36	Open	0
P-15	J-13	J-12	308.82	8	110	-1,513.63	9.66	16.56	53.63	Open	0
P-16	J-14	J-12	286.07	8	110	-18.00	0.11	0.00	0.01	Open	0
P-17	J-81	T-4	2064.20	16	110	-2,718.00	4.34	11.19	5.42	Open	0
P-18	J-15	J-3	788.65	8	110	8.38	0.05	0.00	0.00	Open	0
P-19	J-2	J-16	791.22	8	110	8.38	0.05	0.00	0.00	Open	0
P-2	J-2	J-1	27.00	16	110	-1,168.78	1.87	0.03	1.13	Open	0
P-20	J-15	J-16	5.00	12	110	-8.38	0.02	0.00	0.00	Open	0
P-22	J-17	J-15	529.19	8	110	0.00	0.00	0.00	0.00	Open	0
P-24	J-18	J-82	977.95	12	110	101.66	0.29	0.05	0.05	Open	0
P-25	J-20	J-77	1484.96	12	110	-79.93	0.23	0.05	0.03	Open	0
P-26	J-19	J-18	187.24	8	110	-6.73	0.04	0.00	0.00	Open	0
P-27	J-21	J-20	709.56	8	110	-29.48	0.19	0.03	0.04	Open	0
P-28	J-22	J-20	379.05	12	110	-17.63	0.05	0.00	0.00	Open	0
P-29	J-23	J-18	562.63	12	110	127.02	0.36	0.04	0.08	Open	0
P-3	J-3	J-2	5.00	16	110	-1,160.40	1.85	0.01	1.12	Open	0
P-30	J-24	J-22	2023.61	12	110	6.72	0.02	0.00	0.00	Open	0
P-31	J-25	J-23	1090.36	12	110	152.87	0.43	0.12	0.11	Open	0
P-32	J-26	J-25	307.47	12	110	158.38	0.45	0.03	0.11	Open	0
P-33	J-27	J-26	233.50	12	110	216.72	0.61	0.05	0.20	Open	0
P-34	J-25	J-28	309.77	8	110	5.51	0.04	0.00	0.00	Open	0
P-35	J-29	J-28	550.04	8	110	11.65	0.07	0.00	0.01	Open	0
P-36	J-29	J-26	303.84	8	110	-52.24	0.33	0.03	0.10	Open	0
P-37	J-30	J-29	552.91	8	110	-25.96	0.17	0.02	0.03	Open	0
P-38	J-27	J-31	599.70	12	110	-220.86	0.63	0.13	0.21	Open	0
P-39	J-31	J-32	375.21	12	110	-309.82	0.88	0.15	0.39	Open	0
P-4	J-4	J-3	394.66	16	110	-1,168.78	1.87	0.45	1.14	Open	0
P-40	J-32	T-1	1234.21	12	110	-2,000.17	5.67	15.39	12.47	Open	0
P-41	J-32	J-33	544.77	12	110	159.31	0.45	0.06	0.11	Open	0
P-42	J-33	J-34	265.72	8	110	9.43	0.06	0.00	0.00	Open	0
P-43	J-33	J-35	315.18	8	110	135.01	0.86	0.19	0.61	Open	0
P-44	J-35	J-31	501.36	8	110	-76.58	0.49	0.11	0.21	Open	0
P-45	J-35	J-36	237.98	8	110	193.06	1.23	0.28	1.18	Open	0
P-46	J-36	J-37	381.08	8	110	16.78	0.11	0.00	0.01	Open	0
P-47	J-36	J-38	486.45	12	110	176.29	0.50	0.07	0.14	Open	0
P-48	J-38	J-24	376.04	12	110	101.33	0.29	0.02	0.05	Open	0
P-49	J-24	J-39	651.16	8	110	23.87	0.15	0.02	0.02	Open	0
P-5	J-5	J-4	3141.33	16	110	-1,168.78	1.87	3.57	1.14	Open	0
P-50	J-40	J-24	473.74	8	110	-13.75	0.09	0.00	0.01	Open	0
P-51	J-41	J-38	627.02	12	110	-54.59	0.15	0.01	0.02	Open	0
P-52	J-42	J-41	242.16	8	110	-12.56	0.08	0.00	0.01	Open	0
P-53	J-41	J-45	478.06	12	110	0.00	0.00	0.00	0.00	Open	0
P-54	J-43	J-5	570.16	12	110	-49.66	0.14	0.01	0.01	Open	0
P-55	J-44	J-43	484.26	8	110	-49.66	0.32	0.05	0.10	Open	0
P-56	J-43	J-45	0.50	12	110	0.00	0.00	0.00	0.00	Closed	0
P-6	J-6	J-5	1049.00	16	110	-1,119.12	1.79	1.10	1.05	Open	0
P-7	J-6	J-7	11.45	16	110	437.22	0.70	0.00	0.18	Open	0
P-75	J-72	J-76	3.20	12	110	0.00	0.00	0.00	0.00	Open	0
P-76	J-77	J-78	4.07	12	110	-79.93	0.23	0.00	0.03	Open	0
P-77	J-78	J79	3.66	12	110	-79.93	0.23	0.00	0.03	Open	0
P-78	J-78	J-80	3.14	12	110	0.00	0.00	0.00	0.00	Open	0
P-79	J-81	J-85	790.06	12	110	2,718.00	7.71	17.38	22.00	Open	0
P-8	J-7	J-8	424.10	12	110	-468.54	1.33	0.36	0.85	Open	0
P-81	J-82	J79	324.43	12	110	79.93	0.23	0.01	0.03	Open	0
P-82	J-82	J-83	197.73	12	110	21.73	0.06	0.00	0.00	Open	0
P-84	J-84	J-7	258.28	16	110	-905.77	1.45	0.18	0.71	Open	0
P-85	J-85	J-87	330.70	12	110	2,718.00	7.71	7.28	22.00	Open	0
P-86	J-72	T-4	61.13	12	110	0.00	0.00	0.00	0	Open	0
P-9	J-8	R-3	839.84	8	110	-468.54	2.99	5.13	6.11	Open	0

PEAK HOUR DEMANDS ANALYSIS RESULTS
 ZONE 4, ZONE 5 AND 6A WATER SYSTEM ANALYSIS
 (SCENARIO 1: ZONE 4 TANK FULL, ZONE 6A TANK FULL & ZONE 6A PUMP OFF)

Junction Pressures @ Steady State Analysis

Node	Demand (gpm)	Elevation (ft)	Hydraulic Grade (ft)	Pressure (psi)
J-1	0.00	1070.60	1369.99	129.73
J-10	10.67	1180.70	1369.85	81.96
J-11	56.07	1187.00	1369.75	79.19
J-12	11.40	1205.40	1369.78	71.23
J-13	19.00	1217.00	1369.78	66.20
J-14	25.10	1206.70	1369.77	70.66
J-15	0.00	1112.80	1369.99	111.44
J-16	0.00	1112.80	1369.99	111.44
J-17	0.00	1158.00	1369.99	91.86
J-18	25.98	1348.80	1556.86	90.15
J-19	9.38	1353.10	1556.86	88.29
J-2	0.00	1070.50	1369.99	129.77
J-20	45.76	1367.40	1556.66	82.01
J-21	41.11	1394.50	1556.61	70.24
J-22	33.96	1384.60	1556.66	74.55
J-23	36.04	1384.70	1556.94	74.63
J-24	79.47	1351.20	1556.66	89.03
J-25	0.00	1368.20	1557.15	81.87
J-26	8.51	1363.00	1557.22	84.15
J-27	5.77	1359.00	1557.31	85.93
J-28	23.92	1371.10	1557.15	80.62
J-29	20.41	1365.50	1557.16	83.05
J-3	0.00	1070.50	1369.99	129.77
J-30	36.19	1371.00	1557.13	80.65
J-31	17.27	1395.30	1557.54	70.30
J-32	43.30	1410.00	1557.81	64.05
J-33	20.73	1402.70	1557.70	67.16
J-34	13.15	1404.90	1557.69	66.21
J-35	25.83	1378.10	1557.34	77.67
J-36	0.00	1349.70	1556.82	89.74
J-37	23.39	1351.80	1556.81	88.83
J-38	28.39	1324.80	1556.69	100.48
J-39	33.28	1357.20	1556.63	86.41
J-4	0.00	1071.65	1369.98	129.27
J-40	19.18	1355.20	1556.65	87.29
J-41	58.61	1363.90	1556.68	83.53
J-42	17.52	1280.10	1556.67	119.84
J-43	0.00	1203.90	1369.90	71.93
J-44	69.25	1222.30	1369.81	63.92
J-45	0.00	1203.90	1556.68	152.86
J-5	0.00	1164.00	1369.91	89.22
J-6	0.00	1152.75	1369.91	94.09
J-7	0.00	1152.96	1369.91	94.00
J-72	0.00	1186.00	1220.00	14.73
J-76	0.00	1186.00	1220.00	14.73
J-77	0.00	1186.00	1556.75	160.65
J-78	0.00	1186.00	1556.75	160.65
J79	0.00	1187.50	1556.75	160.00
J-8	0.00	1117.56	1369.91	109.34
J-80	0.00	1186.00	1556.75	160.65
J-81	0.00	1070.00	1217.63	63.97
J-82	0.00	1230.00	1556.77	141.59
J-83	30.30	1235.00	1556.77	139.42
J-84	0.00	1161.00	1369.91	90.52
J-85	0.00	1082.00	1213.95	57.17
J-87	1176.00	1075.10	1212.40	59.49
J-9	0.00	1,161.00	1,369.88	90.51

Pump Results @ Steady State Analysis									
ID	From Node	To Node	Flow (gpm)	Head Gain (ft)	Status	Setting	Avail. NPSH (ft)	Cavitation Index	
PMP1-1	J-76	J-80	0.00	0.00	Closed	0	0.00	0	
PMP1-2	J-76	J-80	0.00	0.00	Closed	0	0.00	0	
PMP1-3	J-76	J-80	0.00	0.00	Closed	0	0.00	0	

Tank Results @ Steady State Analysis							
ID	Flow (gpm)	Elevation (ft)	Hydraulic Grade (ft)	Pressure (psi)	% Full (%)	Volume (MG)	Level (ft)
R-1	-1,168.78	1,370.00	1,370.00	0.00	100	0	0
R-3	-468.54	1,370.00	1,370.00	0.00	100	0	0
T-1	-2,000.17	1,530.00	1,560.00	13.00	100	0.6	30
T-4	-2,717.99	1,190.00	1,220.00	13.00	100	2.54	30

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ULTIMATE CONDITION SCENARIO 2 ANALYSIS, NODE AND PIPE DIAGRAM

AVERAGE DAY DEMANDS ANALYSIS RESULTS
 ZONE 4, ZONE 5 AND 6A WATER SYSTEM ANALYSIS
 (SCENARIO 2: ZONE 4 TANK FULL, ZONE 6A TANK EMPTY & ZONE 6A PUMP ON)

Junction Pressures @ Steady State Analysis

Node	Demand (gpm)	Elevation (ft)	Hydraulic Grade (ft)	Pressure (psi)
J-1	0.00	1070.60	1370.00	129.73
J-10	4.25	1180.70	1369.97	82.01
J-11	22.34	1187.00	1369.95	79.27
J-12	4.54	1205.40	1369.96	71.30
J-13	7.57	1217.00	1369.96	66.28
J-14	10.00	1206.70	1369.96	70.74
J-15	0.00	1112.80	1370.00	111.44
J-16	0.00	1112.80	1370.00	111.44
J-17	0.00	1158.00	1370.00	91.86
J-18	10.35	1348.80	1531.49	79.16
J-19	3.74	1353.10	1531.49	77.29
J-2	0.00	1070.50	1370.00	129.77
J-20	18.23	1367.40	1531.50	71.10
J-21	16.38	1394.50	1531.49	59.36
J-22	13.53	1384.60	1531.40	63.61
J-23	14.36	1384.70	1531.28	63.52
J-24	31.66	1351.20	1530.91	77.87
J-25	0.00	1368.20	1530.93	70.51
J-26	3.39	1363.00	1530.86	72.73
J-27	2.30	1359.00	1530.80	74.44
J-28	9.53	1371.10	1530.90	69.24
J-29	8.13	1365.50	1530.86	71.65
J-3	0.00	1070.50	1370.00	129.77
J-30	14.42	1371.00	1530.86	69.27
J-31	6.88	1395.30	1530.65	58.65
J-32	17.25	1410.00	1530.54	52.23
J-33	8.26	1402.70	1530.56	55.40
J-34	5.24	1404.90	1530.56	54.45
J-35	10.29	1378.10	1530.67	66.11
J-36	0.00	1349.70	1530.81	78.47
J-37	9.32	1351.80	1530.81	77.56
J-38	11.31	1324.80	1530.85	89.28
J-39	13.26	1357.20	1530.91	75.27
J-4	0.00	1071.65	1370.00	129.27
J-40	7.64	1355.20	1530.91	76.14
J-41	23.35	1363.90	1530.85	72.34
J-42	6.98	1280.10	1530.85	108.65
J-43	0.00	1203.90	1369.98	71.96
J-44	27.59	1222.30	1369.97	63.98
J-45	0.00	1203.90	1530.85	141.67
J-5	0.00	1164.00	1369.98	89.25
J-6	0.00	1152.75	1369.98	94.13
J-7	0.00	1152.96	1369.98	94.04
J-72	0.00	1186.00	1219.92	14.70
J-76	0.00	1186.00	1219.91	14.69
J-77	0.00	1186.00	1532.00	149.92
J-78	0.00	1186.00	1532.01	149.92
J79	0.00	1187.50	1532.00	149.27
J-8	0.00	1117.56	1369.98	109.38
J-80	0.00	1186.00	1532.01	149.93
J-81	0.00	1070.00	1217.63	63.97
J-82	0.00	1230.00	1531.87	130.80
J-83	12.07	1235.00	1531.87	128.63
J-84	0.00	1161.00	1369.98	90.55
J-85	0.00	1082.00	1213.95	57.17
J-87	1176.00	1075.10	1212.40	59.49
J-9	0.00	1,161.00	1,369.98	90.55

Pipe Pressures @ Steady State Analysis											
ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/kft)	Status	Flow Reversal Count
P-1	J-1	R-1	300.81	16	110	-55.70	0.09	0.00	0.00	Open	0
P-10	J-10	J-84	337.21	8	110	-27.78	0.18	0.01	0.03	Open	0
P-11	J-9	J-6	254.31	8	110	-20.92	0.13	0.00	0.02	Open	0
P-12	J-9	J-10	331.30	8	110	20.92	0.13	0.01	0.02	Open	0
P-13	J-10	J-11	779.83	8	110	22.34	0.14	0.02	0.02	Open	0
P-14	J-12	J-10	553.74	8	110	-22.11	0.14	0.01	0.02	Open	0
P-15	J-13	J-12	308.82	8	110	-7.57	0.05	0.00	0.00	Open	0
P-16	J-14	J-12	286.07	8	110	-10.00	0.06	0.00	0.00	Open	0
P-17	J-81	T-4	2064.20	16	110	-1,176.00	1.88	2.37	1.15	Open	0
P-18	J-15	J-3	788.65	8	110	0.45	0.00	0.00	0.00	Open	0
P-19	J-2	J-16	791.22	8	110	0.45	0.00	0.00	0.00	Open	0
P-2	J-2	J-1	27.00	16	110	-55.70	0.09	0.00	0.00	Open	0
P-20	J-15	J-16	5.00	12	110	-0.45	0.00	0.00	0.00	Open	0
P-22	J-17	J-15	529.19	8	110	0.00	0.00	0.00	0.00	Open	0
P-24	J-18	J-82	977.95	12	110	-308.30	0.87	0.38	0.39	Open	0
P-25	J-20	J-77	1484.96	12	110	-285.73	0.81	0.50	0.34	Open	0
P-26	J-19	J-18	187.24	8	110	-3.74	0.02	0.00	0.00	Open	0
P-27	J-21	J-20	709.56	8	110	-16.38	0.10	0.01	0.01	Open	0
P-28	J-22	J-20	379.05	12	110	-251.12	0.71	0.10	0.27	Open	0
P-29	J-23	J-18	562.63	12	110	-294.21	0.83	0.20	0.36	Open	0
P-3	J-3	J-2	5.00	16	110	-55.25	0.09	0.00	0.00	Open	0
P-30	J-24	J-22	2023.61	12	110	-237.59	0.67	0.49	0.24	Open	0
P-31	J-25	J-23	1090.36	12	110	-279.85	0.79	0.36	0.33	Open	0
P-32	J-26	J-25	307.47	12	110	-230.05	0.65	0.07	0.23	Open	0
P-33	J-27	J-26	233.50	12	110	-244.38	0.69	0.06	0.25	Open	0
P-34	J-25	J-28	309.77	8	110	49.80	0.32	0.03	0.10	Open	0
P-35	J-29	J-28	550.04	8	110	-40.27	0.26	0.04	0.06	Open	0
P-36	J-29	J-26	303.84	8	110	17.72	0.11	0.00	0.01	Open	0
P-37	J-30	J-29	552.91	8	110	-14.42	0.09	0.01	0.01	Open	0
P-38	J-27	J-31	599.70	12	110	242.08	0.69	0.15	0.25	Open	0
P-39	J-31	J-32	375.21	12	110	261.86	0.74	0.11	0.29	Open	0
P-4	J-4	J-3	394.66	16	110	-55.70	0.09	0.00	0.00	Open	0
P-40	J-32	T-1	1234.21	12	110	328.23	0.93	0.54	0.44	Open	0
P-41	J-32	J-33	544.77	12	110	-83.63	0.24	0.02	0.03	Open	0
P-42	J-33	J-34	265.72	8	110	5.24	0.03	0.00	0.00	Open	0
P-43	J-33	J-35	315.18	8	110	-97.13	0.62	0.10	0.33	Open	0
P-44	J-35	J-31	501.36	8	110	26.65	0.17	0.02	0.03	Open	0
P-45	J-35	J-36	237.98	8	110	-134.07	0.86	0.14	0.60	Open	0
P-46	J-36	J-37	381.08	8	110	9.32	0.06	0.00	0.00	Open	0
P-47	J-36	J-38	486.45	12	110	-143.39	0.41	0.05	0.09	Open	0
P-48	J-38	J-24	376.04	12	110	-185.03	0.52	0.06	0.15	Open	0
P-49	J-24	J-39	651.16	8	110	13.26	0.08	0.01	0.01	Open	0
P-5	J-5	J-4	3141.33	16	110	-55.70	0.09	0.01	0.00	Open	0
P-50	J-40	J-24	473.74	8	110	-7.64	0.05	0.00	0.00	Open	0
P-51	J-41	J-38	627.02	12	110	-30.33	0.09	0.00	0.01	Open	0
P-52	J-42	J-41	242.16	8	110	-6.98	0.04	0.00	0.00	Open	0
P-53	J-41	J-45	478.06	12	110	0.00	0.00	0.00	0.00	Open	0
P-54	J-43	J-5	570.16	12	110	-27.59	0.08	0.00	0.00	Open	0
P-55	J-44	J-43	484.26	8	110	-27.59	0.18	0.02	0.03	Open	0
P-56	J-43	J-45	0.50	12	110	0.00	0.00	0.00	0.00	Closed	0
P-6	J-6	J-5	1049.00	16	110	-28.11	0.04	0.00	0.00	Open	0
P-7	J-6	J-7	11.45	16	110	7.19	0.01	0.00	0.00	Open	0
P-75	J-72	J-76	3.20	12	110	606.11	1.72	0.00	1.37	Open	0
P-76	J-77	J-78	4.07	12	110	-285.73	0.81	0.00	0.36	Open	0
P-77	J-78	J79	3.66	12	110	320.37	0.91	0.00	0.43	Open	0
P-78	J-78	J-80	3.14	12	110	-606.11	1.72	0.00	1.36	Open	0
P-79	J-81	J-85	790.06	12	110	1,176.00	3.34	3.68	4.66	Open	0
P-8	J-7	J-8	424.10	12	110	-20.59	0.06	0.00	0.00	Open	0
P-81	J-82	J79	324.43	12	110	-320.37	0.91	0.14	0.42	Open	0
P-82	J-82	J-83	197.73	12	110	12.07	0.03	0.00	0.00	Open	0
P-84	J-84	J-7	258.28	16	110	-27.78	0.04	0.00	0.00	Open	0
P-85	J-85	J-87	330.70	12	110	1,176.00	3.34	1.54	4.66	Open	0
P-86	J-72	T-4	61.13	12	110	-606.11	1.72	0.08	1.37	Open	0
P-9	J-8	R-3	839.84	8	110	-20.59	0.13	0.02	0.02	Open	0

Pump Results @ Steady State Analysis								
ID	From Node	To Node	Flow (gpm)	Head Gain (ft)	Status	Setting	Avail. NPSH (ft)	Cavitation Index
PMP1-1	J-76	J-80	606.11	312.10	Open	1	67.00	0
PMP1-2	J-76	J-80	0.00	0.00	Closed	0	0.00	0
PMP1-3	J-76	J-80	0.00	0.00	Closed	0	0.00	0

Tank Results @ Steady State Analysis							
ID	Flow (gpm)	Elevation (ft)	Hydraulic Grade (ft)	Pressure (psi)	% Full (%)	Volume (MG)	Level (ft)
R-1	-55.70	1,370.00	1,370.00	0.00	100	0	0
R-3	-20.59	1,370.00	1,370.00	0.00	100	0	0
T-1	328.23	1,530.00	1,530.00	0.00	0	0	0
T-4	-1,782.11	1,190.00	1,220.00	13.00	100	2.54	30

MAXIMUM DAY DEMANDS ANALYSIS RESULTS
 ZONE 4, ZONE 5 AND 6A WATER SYSTEM ANALYSIS
 (SCENARIO 2: ZONE 4 TANK FULL, ZONE 6A TANK EMPTY & ZONE 6A PUMP ON)

Junction Pressures @ Steady State Analysis

Node	Demand (gpm)	Elevation (ft)	Hydraulic Grade (ft)	Pressure (psi)
J-1	0.00	1070.60	1370.00	129.73
J-10	7.65	1180.70	1369.92	81.99
J-11	40.21	1187.00	1369.87	79.24
J-12	8.17	1205.40	1369.88	71.27
J-13	13.63	1217.00	1369.88	66.24
J-14	18.00	1206.70	1369.88	70.70
J-15	0.00	1112.80	1370.00	111.44
J-16	0.00	1112.80	1370.00	111.44
J-17	0.00	1158.00	1370.00	91.86
J-18	18.63	1348.80	1530.68	78.81
J-19	6.73	1353.10	1530.68	76.94
J-2	0.00	1070.50	1370.00	129.77
J-20	32.81	1367.40	1530.60	70.71
J-21	29.48	1394.50	1530.57	58.96
J-22	24.35	1384.60	1530.51	63.22
J-23	25.85	1384.70	1530.52	63.18
J-24	56.99	1351.20	1530.12	77.53
J-25	0.00	1368.20	1530.25	70.22
J-26	6.10	1363.00	1530.21	72.45
J-27	4.14	1359.00	1530.17	74.17
J-28	17.15	1371.10	1530.23	68.95
J-29	14.63	1365.50	1530.20	71.37
J-3	0.00	1070.50	1370.00	129.77
J-30	25.96	1371.00	1530.19	68.98
J-31	12.38	1395.30	1530.10	58.41
J-32	31.05	1410.00	1530.07	52.03
J-33	14.87	1402.70	1530.07	55.19
J-34	9.43	1404.90	1530.07	54.24
J-35	18.52	1378.10	1530.08	65.85
J-36	0.00	1349.70	1530.09	78.16
J-37	16.78	1351.80	1530.08	77.25
J-38	20.36	1324.80	1530.09	88.95
J-39	23.87	1357.20	1530.10	74.92
J-4	0.00	1071.65	1369.99	129.27
J-40	13.75	1355.20	1530.11	75.79
J-41	42.03	1363.90	1530.08	72.01
J-42	12.56	1280.10	1530.08	108.32
J-43	0.00	1203.90	1369.95	71.95
J-44	49.66	1222.30	1369.90	63.95
J-45	0.00	1203.90	1530.08	141.34
J-5	0.00	1164.00	1369.95	89.24
J-6	0.00	1152.75	1369.95	94.11
J-7	0.00	1152.96	1369.95	94.02
J-72	0.00	1186.00	1219.92	14.70
J-76	0.00	1186.00	1219.91	14.69
J-77	0.00	1186.00	1531.14	149.55
J-78	0.00	1186.00	1531.15	149.55
J79	0.00	1187.50	1531.14	148.90
J-8	0.00	1117.56	1369.95	109.36
J-80	0.00	1186.00	1531.15	149.55
J-81	0.00	1070.00	1217.63	63.97
J-82	0.00	1230.00	1531.02	130.43
J-83	21.73	1235.00	1531.02	128.26
J-84	0.00	1161.00	1369.95	90.54
J-85	0.00	1082.00	1213.95	57.17
J-87	1176.00	1075.10	1212.40	59.49
J-9	0.00	1,161.00	1,369.94	90.53

Pipe Pressures @ Steady State Analysis											
ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/kft)	Status	Flow Reversal Count
P-1	J-1	R-1	300.81	16	110	-100.26	0.16	0.00	0.01	Open	0
P-10	J-10	J-84	337.21	8	110	-50.01	0.32	0.03	0.10	Open	0
P-11	J-9	J-6	254.31	8	110	-37.65	0.24	0.01	0.06	Open	0
P-12	J-9	J-10	331.30	8	110	37.65	0.24	0.02	0.06	Open	0
P-13	J-10	J-11	779.83	8	110	40.21	0.26	0.05	0.06	Open	0
P-14	J-12	J-10	553.74	8	110	-39.80	0.25	0.04	0.06	Open	0
P-15	J-13	J-12	308.82	8	110	-13.63	0.09	0.00	0.01	Open	0
P-16	J-14	J-12	286.07	8	110	-18.00	0.11	0.00	0.01	Open	0
P-17	J-81	T-4	2064.20	16	110	-1,176.00	1.88	2.37	1.15	Open	0
P-18	J-15	J-3	788.65	8	110	0.73	0.00	0.00	0.00	Open	0
P-19	J-2	J-16	791.22	8	110	0.73	0.00	0.00	0.00	Open	0
P-2	J-2	J-1	27.00	16	110	-100.26	0.16	0.00	0.01	Open	0
P-20	J-15	J-16	5.00	12	110	-0.73	0.00	0.00	0.00	Open	0
P-22	J-17	J-15	529.19	8	110	0.00	0.00	0.00	0.00	Open	0
P-24	J-18	J-82	977.95	12	110	-288.04	0.82	0.34	0.34	Open	0
P-25	J-20	J-77	1484.96	12	110	-297.77	0.84	0.54	0.37	Open	0
P-26	J-19	J-18	187.24	8	110	-6.73	0.04	0.00	0.00	Open	0
P-27	J-21	J-20	709.56	8	110	-29.48	0.19	0.03	0.04	Open	0
P-28	J-22	J-20	379.05	12	110	-235.47	0.67	0.09	0.24	Open	0
P-29	J-23	J-18	562.63	12	110	-262.68	0.75	0.16	0.29	Open	0
P-3	J-3	J-2	5.00	16	110	-99.53	0.16	0.00	0.02	Open	0
P-30	J-24	J-22	2023.61	12	110	-211.12	0.60	0.39	0.19	Open	0
P-31	J-25	J-23	1090.36	12	110	-236.83	0.67	0.26	0.24	Open	0
P-32	J-26	J-25	307.47	12	110	-188.75	0.54	0.05	0.16	Open	0
P-33	J-27	J-26	233.50	12	110	-172.99	0.49	0.03	0.13	Open	0
P-34	J-25	J-28	309.77	8	110	48.08	0.31	0.03	0.09	Open	0
P-35	J-29	J-28	550.04	8	110	-30.92	0.20	0.02	0.04	Open	0
P-36	J-29	J-26	303.84	8	110	-9.67	0.06	0.00	0.00	Open	0
P-37	J-30	J-29	552.91	8	110	-25.96	0.17	0.02	0.03	Open	0
P-38	J-27	J-31	599.70	12	110	168.85	0.48	0.08	0.13	Open	0
P-39	J-31	J-32	375.21	12	110	129.80	0.37	0.03	0.08	Open	0
P-4	J-4	J-3	394.66	16	110	-100.26	0.16	0.00	0.01	Open	0
P-40	J-32	T-1	1234.21	12	110	107.37	0.30	0.07	0.06	Open	0
P-41	J-32	J-33	544.77	12	110	-8.62	0.02	0.00	0.00	Open	0
P-42	J-33	J-34	265.72	8	110	9.43	0.06	0.00	0.00	Open	0
P-43	J-33	J-35	315.18	8	110	-32.92	0.21	0.01	0.04	Open	0
P-44	J-35	J-31	501.36	8	110	-26.66	0.17	0.02	0.03	Open	0
P-45	J-35	J-36	237.98	8	110	-24.78	0.16	0.01	0.03	Open	0
P-46	J-36	J-37	381.08	8	110	16.78	0.11	0.00	0.01	Open	0
P-47	J-36	J-38	486.45	12	110	-41.56	0.12	0.00	0.01	Open	0
P-48	J-38	J-24	376.04	12	110	-116.51	0.33	0.02	0.06	Open	0
P-49	J-24	J-39	651.16	8	110	23.87	0.15	0.02	0.02	Open	0
P-5	J-5	J-4	3141.33	16	110	-100.26	0.16	0.04	0.01	Open	0
P-50	J-40	J-24	473.74	8	110	-13.75	0.09	0.00	0.01	Open	0
P-51	J-41	J-38	627.02	12	110	-54.59	0.15	0.01	0.02	Open	0
P-52	J-42	J-41	242.16	8	110	-12.56	0.08	0.00	0.01	Open	0
P-53	J-41	J-45	478.06	12	110	0.00	0.00	0.00	0.00	Open	0
P-54	J-43	J-5	570.16	12	110	-49.66	0.14	0.01	0.01	Open	0
P-55	J-44	J-43	484.26	8	110	-49.66	0.32	0.05	0.10	Open	0
P-56	J-43	J-45	0.50	12	110	0.00	0.00	0.00	0.00	Closed	0
P-6	J-6	J-5	1049.00	16	110	-50.60	0.08	0.00	0.00	Open	0
P-7	J-6	J-7	11.45	16	110	12.95	0.02	0.00	0.00	Open	0
P-75	J-72	J-76	3.20	12	110	607.54	1.72	0.00	1.37	Open	0
P-76	J-77	J-78	4.07	12	110	-297.77	0.84	0.00	0.39	Open	0
P-77	J-78	J79	3.66	12	110	309.77	0.88	0.00	0.40	Open	0
P-78	J-78	J-80	3.14	12	110	-607.54	1.72	0.00	1.36	Open	0
P-79	J-81	J-85	790.06	12	110	1,176.00	3.34	3.68	4.66	Open	0
P-8	J-7	J-8	424.10	12	110	-37.06	0.11	0.00	0.01	Open	0
P-81	J-82	J79	324.43	12	110	-309.77	0.88	0.13	0.39	Open	0
P-82	J-82	J-83	197.73	12	110	21.73	0.06	0.00	0.00	Open	0
P-84	J-84	J-7	258.28	16	110	-50.01	0.08	0.00	0.00	Open	0
P-85	J-85	J-87	330.70	12	110	1,176.00	3.34	1.54	4.66	Open	0
P-86	J-72	T-4	61.13	12	110	-607.54	1.72	0.08	1.37	Open	0
P-9	J-8	R-3	839.84	8	110	-37.06	0.24	0.05	0.06	Open	0

Pump Results @ Steady State Analysis								
ID	From Node	To Node	Flow (gpm)	Head Gain (ft)	Status	Setting	Avail. NPSH (ft)	Cavitation Index
PMP1-1	J-76	J-80	607.55	311.24	Open	1	67.00	0
PMP1-2	J-76	J-80	0.00	0.00	Closed	0	0.00	0
PMP1-3	J-76	J-80	0.00	0.00	Closed	0	0.00	0

Tank Results @ Steady State Analysis							
ID	Flow (gpm)	Elevation (ft)	Hydraulic Grade (ft)	Pressure (psi)	% Full (%)	Volume (MG)	Level (ft)
R-1	-100.26	1,370.00	1,370.00	0.00	100	0	0
R-3	-37.06	1,370.00	1,370.00	0.00	100	0	0
T-1	107.37	1,530.00	1,530.00	0.00	0	0	0
T-4	-1,783.54	1,190.00	1,220.00	13.00	100	2.54	30

PEAK HOUR DEMANDS ANALYSIS RESULTS
 ZONE 4, ZONE 5 AND 6A WATER SYSTEM ANALYSIS
 (SCENARIO 2: ZONE 4 TANK FULL, ZONE 6A TANK EMPTY & ZONE 6A PUMP ON)

Junction Pressures @ Steady State Analysis

Node	Demand (gpm)	Elevation (ft)	Hydraulic Grade (ft)	Pressure (psi)
J-1	0.00	1070.60	1369.99	129.73
J-10	10.67	1180.70	1369.85	81.96
J-11	56.07	1187.00	1369.75	79.19
J-12	11.40	1205.40	1369.78	71.23
J-13	19.00	1217.00	1369.78	66.20
J-14	25.10	1206.70	1369.77	70.66
J-15	0.00	1112.80	1369.99	111.44
J-16	0.00	1112.80	1369.99	111.44
J-17	0.00	1158.00	1369.99	91.86
J-18	25.98	1348.80	1472.65	53.66
J-19	9.38	1353.10	1472.65	51.80
J-2	0.00	1070.50	1369.99	129.77
J-20	45.76	1367.40	1472.52	45.55
J-21	41.11	1394.50	1472.48	33.79
J-22	33.96	1384.60	1472.42	38.05
J-23	36.04	1384.70	1472.46	38.03
J-24	79.47	1351.20	1471.98	52.34
J-25	0.00	1368.20	1472.16	45.05
J-26	8.51	1363.00	1472.11	47.28
J-27	5.77	1359.00	1472.08	49.00
J-28	23.92	1371.10	1472.13	43.78
J-29	20.41	1365.50	1472.10	46.19
J-3	0.00	1070.50	1369.99	129.77
J-30	36.19	1371.00	1472.07	43.80
J-31	17.27	1395.30	1472.02	33.24
J-32	43.30	1410.00	1472.00	26.86
J-33	20.73	1402.70	1471.99	30.02
J-34	13.15	1404.90	1471.99	29.07
J-35	25.83	1378.10	1471.98	40.68
J-36	0.00	1349.70	1471.97	52.98
J-37	23.39	1351.80	1471.96	52.07
J-38	28.39	1324.80	1471.97	63.77
J-39	33.28	1357.20	1471.95	49.72
J-4	0.00	1071.65	1369.98	129.27
J-40	19.18	1355.20	1471.98	50.60
J-41	58.61	1363.90	1471.95	46.82
J-42	17.52	1280.10	1471.95	83.13
J-43	0.00	1203.90	1369.90	71.93
J-44	69.25	1222.30	1369.81	63.92
J-45	0.00	1203.90	1471.95	116.15
J-5	0.00	1164.00	1369.91	89.22
J-6	0.00	1152.75	1369.91	94.09
J-7	0.00	1152.96	1369.91	94.00
J-72	0.00	1186.00	1219.89	14.69
J-76	0.00	1186.00	1219.89	14.68
J-77	0.00	1186.00	1473.23	124.46
J-78	0.00	1186.00	1473.23	124.46
J79	0.00	1187.50	1473.23	123.81
J-8	0.00	1117.56	1369.91	109.34
J-80	0.00	1186.00	1473.24	124.46
J-81	0.00	1070.00	1217.63	63.97
J-82	0.00	1230.00	1473.07	105.32
J-83	30.30	1235.00	1473.07	103.15
J-84	0.00	1161.00	1369.91	90.52
J-85	0.00	1082.00	1213.95	57.17
J-87	1176.00	1075.10	1212.40	59.49
J-9	0.00	1,161.00	1,369.88	90.51

Pipe Pressures @ Steady State Analysis											
ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/kft)	Status	Flow Reversal Count
P-1	J-1	R-1	300.81	16	110	-139.80	0.22	0.01	0.02	Open	0
P-10	J-10	J-84	337.21	8	110	-69.74	0.45	0.06	0.18	Open	0
P-11	J-9	J-6	254.31	8	110	-52.50	0.34	0.03	0.11	Open	0
P-12	J-9	J-10	331.30	8	110	52.50	0.34	0.04	0.11	Open	0
P-13	J-10	J-11	779.83	8	110	56.07	0.36	0.09	0.12	Open	0
P-14	J-12	J-10	553.74	8	110	-55.50	0.35	0.07	0.12	Open	0
P-15	J-13	J-12	308.82	8	110	-19.00	0.12	0.01	0.02	Open	0
P-16	J-14	J-12	286.07	8	110	-25.10	0.16	0.01	0.03	Open	0
P-17	J-81	T-4	2064.20	16	110	-1,176.00	1.88	2.37	1.15	Open	0
P-18	J-15	J-3	788.65	8	110	1.08	0.01	0.00	0.00	Open	0
P-19	J-2	J-16	791.22	8	110	1.08	0.01	0.00	0.00	Open	0
P-2	J-2	J-1	27.00	16	110	-139.80	0.22	0.00	0.02	Open	0
P-20	J-15	J-16	5.00	12	110	-1.08	0.00	0.00	0.00	Open	0
P-22	J-17	J-15	529.19	8	110	0.00	0.00	0.00	0.00	Open	0
P-24	J-18	J-82	977.95	12	110	-323.51	0.92	0.42	0.43	Open	0
P-25	J-20	J-77	1484.96	12	110	-343.64	0.97	0.71	0.48	Open	0
P-26	J-19	J-18	187.24	8	110	-9.38	0.06	0.00	0.00	Open	0
P-27	J-21	J-20	709.56	8	110	-41.11	0.26	0.05	0.07	Open	0
P-28	J-22	J-20	379.05	12	110	-256.77	0.73	0.11	0.28	Open	0
P-29	J-23	J-18	562.63	12	110	-288.15	0.82	0.19	0.34	Open	0
P-3	J-3	J-2	5.00	16	110	-138.73	0.22	0.00	0.02	Open	0
P-30	J-24	J-22	2023.61	12	110	-222.81	0.63	0.43	0.21	Open	0
P-31	J-25	J-23	1090.36	12	110	-252.11	0.72	0.29	0.27	Open	0
P-32	J-26	J-25	307.47	12	110	-196.28	0.56	0.05	0.17	Open	0
P-33	J-27	J-26	233.50	12	110	-163.08	0.46	0.03	0.12	Open	0
P-34	J-25	J-28	309.77	8	110	55.83	0.36	0.04	0.12	Open	0
P-35	J-29	J-28	550.04	8	110	-31.91	0.20	0.02	0.04	Open	0
P-36	J-29	J-26	303.84	8	110	-24.70	0.16	0.01	0.03	Open	0
P-37	J-30	J-29	552.91	8	110	-36.19	0.23	0.03	0.05	Open	0
P-38	J-27	J-31	599.70	12	110	157.30	0.45	0.07	0.11	Open	0
P-39	J-31	J-32	375.21	12	110	99.11	0.28	0.02	0.05	Open	0
P-4	J-4	J-3	394.66	16	110	-139.80	0.22	0.01	0.02	Open	0
P-40	J-32	T-1	1234.21	12	110	0.00	0.00	0.00	0.00	Closed	0
P-41	J-32	J-33	544.77	12	110	55.81	0.16	0.01	0.02	Open	0
P-42	J-33	J-34	265.72	8	110	13.15	0.08	0.00	0.01	Open	0
P-43	J-33	J-35	315.18	8	110	21.93	0.14	0.01	0.02	Open	0
P-44	J-35	J-31	501.36	8	110	-40.93	0.26	0.03	0.07	Open	0
P-45	J-35	J-36	237.98	8	110	37.02	0.24	0.01	0.06	Open	0
P-46	J-36	J-37	381.08	8	110	23.39	0.15	0.01	0.02	Open	0
P-47	J-36	J-38	486.45	12	110	13.63	0.04	0.00	0.00	Open	0
P-48	J-38	J-24	376.04	12	110	-90.89	0.26	0.02	0.04	Open	0
P-49	J-24	J-39	651.16	8	110	33.28	0.21	0.03	0.05	Open	0
P-5	J-5	J-4	3141.33	16	110	-139.80	0.22	0.07	0.02	Open	0
P-50	J-40	J-24	473.74	8	110	-19.18	0.12	0.01	0.02	Open	0
P-51	J-41	J-38	627.02	12	110	-76.13	0.22	0.02	0.03	Open	0
P-52	J-42	J-41	242.16	8	110	-17.52	0.11	0.00	0.01	Open	0
P-53	J-41	J-45	478.06	12	110	0.00	0.00	0.00	0.00	Open	0
P-54	J-43	J-5	570.16	12	110	-69.25	0.20	0.01	0.02	Open	0
P-55	J-44	J-43	484.26	8	110	-69.25	0.44	0.09	0.18	Open	0
P-56	J-43	J-45	0.50	12	110	0.00	0.00	0.00	0.00	Closed	0
P-6	J-6	J-5	1049.00	16	110	-70.55	0.11	0.01	0.01	Open	0
P-7	J-6	J-7	11.45	16	110	18.06	0.03	0.00	0.00	Open	0
P-75	J-72	J-76	3.20	12	110	697.45	1.98	0.01	1.79	Open	0
P-76	J-77	J-78	4.07	12	110	-343.64	0.97	0.00	0.45	Open	0
P-77	J-78	J79	3.66	12	110	353.81	1.00	0.00	0.50	Open	0
P-78	J-78	J-80	3.14	12	110	-697.45	1.98	0.01	1.79	Open	0
P-79	J-81	J-85	790.06	12	110	1,176.00	3.34	3.68	4.66	Open	0
P-8	J-7	J-8	424.10	12	110	-51.68	0.15	0.01	0.01	Open	0
P-81	J-82	J79	324.43	12	110	-353.81	1.00	0.16	0.50	Open	0
P-82	J-82	J-83	197.73	12	110	30.30	0.09	0.00	0.00	Open	0
P-84	J-84	J-7	258.28	16	110	-69.74	0.11	0.00	0.01	Open	0
P-85	J-85	J-87	330.70	12	110	1,176.00	3.34	1.54	4.66	Open	0
P-86	J-72	T-4	61.13	12	110	-697.45	1.98	0.11	1.77	Open	0
P-9	J-8	R-3	839.84	8	110	-51.68	0.33	0.09	0.1	Open	0

Pump Results @ Steady State Analysis								
ID	From Node	To Node	Flow (gpm)	Head Gain (ft)	Status	Setting	Avail. NPSH (ft)	Cavitation Index
PMP1-1	J-76	J-80	697.45	253.35	Open	1	66.97	0
PMP1-2	J-76	J-80	0.00	0.00	Closed	0	0.00	0
PMP1-3	J-76	J-80	0.00	0.00	Closed	0	0.00	0

Tank Results @ Steady State Analysis							
ID	Flow (gpm)	Elevation (ft)	Hydraulic Grade (ft)	Pressure (psi)	% Full (%)	Volume (MG)	Level (ft)
R-1	-139.80	1,370.00	1,370.00	0.00	100	0	0
R-3	-51.68	1,370.00	1,370.00	0.00	100	0	0
T-1	0.00	1,530.00	1,530.00	0.00	0	0	0
T-4	-1,873.45	1,190.00	1,220.00	13.00	100	2.54	30

MAXIMUM DAY DEMANDS + FIRE ANALYSIS RESULTS
 ZONE 4, ZONE 5 AND 6A WATER SYSTEM ANALYSIS
 (SCENARIO 2: ZONE 4 TANK FULL, ZONE 6A TANK EMPTY & ZONE 6A PUMP ON)

Junction Pressures @ Steady State Analysis

Node	Demand (gpm)	Elevation (ft)	Hydraulic Grade (ft)	Pressure (psi)
J-1	0.00	1070.60	1369.66	129.58
J-10	7.65	1180.70	1357.34	76.54
J-11	40.21	1187.00	1357.29	73.78
J-12	8.17	1205.40	1326.68	52.55
J-13	1513.63	1217.00	1310.12	40.35
J-14	18.00	1206.70	1326.68	51.99
J-15	0.00	1112.80	1369.63	111.28
J-16	0.00	1112.80	1369.63	111.28
J-17	0.00	1158.00	1369.63	91.70
J-18	18.63	1348.80	1545.00	85.01
J-19	6.73	1353.10	1545.00	83.15
J-2	0.00	1070.50	1369.63	129.61
J-20	32.81	1367.40	1546.28	77.51
J-21	29.48	1394.50	1546.25	65.75
J-22	24.35	1384.60	1545.05	69.52
J-23	25.85	1384.70	1542.25	68.26
J-24	56.99	1351.20	1538.80	81.29
J-25	0.00	1368.20	1537.12	73.19
J-26	6.10	1363.00	1536.07	74.99
J-27	4.14	1359.00	1535.08	76.30
J-28	17.15	1371.10	1536.77	71.79
J-29	14.63	1365.50	1536.25	73.99
J-3	0.00	1070.50	1369.62	129.61
J-30	25.96	1371.00	1536.23	71.60
J-31	12.38	1395.30	1532.56	59.47
J-32	1531.05	1410.00	1530.41	52.17
J-33	14.87	1402.70	1530.93	55.56
J-34	9.43	1404.90	1530.92	54.61
J-35	18.52	1378.10	1533.28	67.24
J-36	0.00	1349.70	1536.80	81.07
J-37	16.78	1351.80	1536.80	80.16
J-38	20.36	1324.80	1537.84	92.31
J-39	23.87	1357.20	1538.78	78.68
J-4	0.00	1071.65	1369.17	128.92
J-40	13.75	1355.20	1538.79	79.55
J-41	42.03	1363.90	1537.83	75.37
J-42	12.56	1280.10	1537.83	111.67
J-43	0.00	1203.90	1365.60	70.06
J-44	49.66	1222.30	1365.55	62.07
J-45	0.00	1203.90	1537.83	144.69
J-5	0.00	1164.00	1365.61	87.36
J-6	0.00	1152.75	1364.51	91.76
J-7	0.00	1152.96	1364.51	91.66
J-72	0.00	1186.00	1219.03	14.31
J-76	0.00	1186.00	1218.98	14.29
J-77	0.00	1186.00	1551.68	158.45
J-78	0.00	1186.00	1551.69	158.45
J79	0.00	1187.50	1551.67	157.80
J-8	0.00	1117.56	1364.87	107.16
J-80	0.00	1186.00	1551.74	158.48
J-81	0.00	1070.00	1208.81	60.15
J-82	0.00	1230.00	1549.97	138.64
J-83	21.73	1235.00	1549.97	136.48
J-84	0.00	1161.00	1364.32	88.10
J-85	0.00	1082.00	1191.43	47.42
J-87	2718.00	1075.10	1184.15	47.25
J-9	0.00	1,161.00	1,361.39	86.83

Note: Fire demand of 1500 gpm at Node J-85 (Zone 4), Node J-13 (Zone 5) and Node J-32 (Zone 6) for residential

Pipe Pressures @ Steady State Analysis											
ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/kft)	Status	Flow Reversal Count
P-1	J-1	R-1	300.81	16	110	-1,168.78	1.87	0.34	1.14	Open	0
P-10	J-10	J-84	337.21	8	110	-905.77	5.78	6.99	20.72	Open	0
P-11	J-9	J-6	254.31	8	110	-681.89	4.35	3.11	12.25	Open	0
P-12	J-9	J-10	331.30	8	110	681.89	4.35	4.06	12.25	Open	0
P-13	J-10	J-11	779.83	8	110	40.21	0.26	0.05	0.06	Open	0
P-14	J-12	J-10	553.74	8	110	-1,539.80	9.83	30.66	55.36	Open	0
P-15	J-13	J-12	308.82	8	110	-1,513.63	9.66	16.56	53.63	Open	0
P-16	J-14	J-12	286.07	8	110	-18.00	0.11	0.00	0.01	Open	0
P-17	J-81	T-4	2064.20	16	110	-2,718.00	4.34	11.19	5.42	Open	0
P-18	J-15	J-3	788.65	8	110	8.38	0.05	0.00	0.00	Open	0
P-19	J-2	J-16	791.22	8	110	8.38	0.05	0.00	0.00	Open	0
P-2	J-2	J-1	27.00	16	110	-1,168.78	1.87	0.03	1.13	Open	0
P-20	J-15	J-16	5.00	12	110	-8.38	0.02	0.00	0.00	Open	0
P-22	J-17	J-15	529.19	8	110	0.00	0.00	0.00	0.00	Open	0
P-24	J-18	J-82	977.95	12	110	-1,232.08	3.50	4.97	5.08	Open	0
P-25	J-20	J-77	1484.96	12	110	-1,028.21	2.92	5.40	3.64	Open	0
P-26	J-19	J-18	187.24	8	110	-6.73	0.04	0.00	0.00	Open	0
P-27	J-21	J-20	709.56	8	110	-29.48	0.19	0.03	0.04	Open	0
P-28	J-22	J-20	379.05	12	110	-965.91	2.74	1.23	3.24	Open	0
P-29	J-23	J-18	562.63	12	110	-1,206.72	3.42	2.75	4.89	Open	0
P-3	J-3	J-2	5.00	16	110	-1,160.40	1.85	0.01	1.12	Open	0
P-30	J-24	J-22	2023.61	12	110	-941.56	2.67	6.25	3.09	Open	0
P-31	J-25	J-23	1090.36	12	110	-1,180.87	3.35	5.12	4.70	Open	0
P-32	J-26	J-25	307.47	12	110	-992.40	2.82	1.05	3.41	Open	0
P-33	J-27	J-26	233.50	12	110	-1,117.03	3.17	0.99	4.24	Open	0
P-34	J-25	J-28	309.77	8	110	188.48	1.20	0.35	1.13	Open	0
P-35	J-29	J-28	550.04	8	110	-171.32	1.09	0.52	0.95	Open	0
P-36	J-29	J-26	303.84	8	110	130.73	0.83	0.17	0.57	Open	0
P-37	J-30	J-29	552.91	8	110	-25.96	0.17	0.02	0.03	Open	0
P-38	J-27	J-31	599.70	12	110	1,112.89	3.16	2.52	4.21	Open	0
P-39	J-31	J-32	375.21	12	110	1,314.97	3.73	2.15	5.73	Open	0
P-4	J-4	J-3	394.66	16	110	-1,168.78	1.87	0.45	1.14	Open	0
P-40	J-32	T-1	1234.21	12	110	281.85	0.80	0.41	0.33	Open	0
P-41	J-32	J-33	544.77	12	110	-497.93	1.41	0.52	0.95	Open	0
P-42	J-33	J-34	265.72	8	110	9.43	0.06	0.00	0.00	Open	0
P-43	J-33	J-35	315.18	8	110	-522.23	3.33	2.36	7.47	Open	0
P-44	J-35	J-31	501.36	8	110	214.47	1.37	0.72	1.44	Open	0
P-45	J-35	J-36	237.98	8	110	-755.22	4.82	3.52	14.80	Open	0
P-46	J-36	J-37	381.08	8	110	16.78	0.11	0.00	0.01	Open	0
P-47	J-36	J-38	486.45	12	110	-772.00	2.19	1.04	2.14	Open	0
P-48	J-38	J-24	376.04	12	110	-846.95	2.40	0.95	2.54	Open	0
P-49	J-24	J-39	651.16	8	110	23.87	0.15	0.02	0.02	Open	0
P-5	J-5	J-4	3141.33	16	110	-1,168.78	1.87	3.57	1.14	Open	0
P-50	J-40	J-24	473.74	8	110	-13.75	0.09	0.00	0.01	Open	0
P-51	J-41	J-38	627.02	12	110	-54.59	0.15	0.01	0.02	Open	0
P-52	J-42	J-41	242.16	8	110	-12.56	0.08	0.00	0.01	Open	0
P-53	J-41	J-45	478.06	12	110	0.00	0.00	0.00	0.00	Open	0
P-54	J-43	J-5	570.16	12	110	-49.66	0.14	0.01	0.01	Open	0
P-55	J-44	J-43	484.26	8	110	-49.66	0.32	0.05	0.10	Open	0
P-56	J-43	J-45	0.50	12	110	0.00	0.00	0.00	0.00	Closed	0
P-6	J-6	J-5	1049.00	16	110	-1,119.12	1.79	1.10	1.05	Open	0
P-7	J-6	J-7	11.45	16	110	437.22	0.70	0.00	0.18	Open	0
P-75	J-72	J-76	3.20	12	110	2,282.02	6.47	0.05	15.91	Open	0
P-76	J-77	J-78	4.07	12	110	-1,028.21	2.92	0.01	3.63	Open	0
P-77	J-78	J79	3.66	12	110	1,253.81	3.56	0.02	5.27	Open	0
P-78	J-78	J-80	3.14	12	110	-2,282.02	6.47	0.05	15.92	Open	0
P-79	J-81	J-85	790.06	12	110	2,718.00	7.71	17.38	22.00	Open	0
P-8	J-7	J-8	424.10	12	110	-468.54	1.33	0.36	0.85	Open	0
P-81	J-82	J79	324.43	12	110	-1,253.81	3.56	1.70	5.25	Open	0
P-82	J-82	J-83	197.73	12	110	21.73	0.06	0.00	0.00	Open	0
P-84	J-84	J-7	258.28	16	110	-905.77	1.45	0.18	0.71	Open	0
P-85	J-85	J-87	330.70	12	110	2,718.00	7.71	7.28	22.00	Open	0
P-86	J-72	T-4	61.13	12	110	-2,282.02	6.47	0.97	15.92	Open	0
P-9	J-8	R-3	839.84	8	110	-468.54	2.99	5.13	6.11	Open	0

Pump Results @ Steady State Analysis									
ID	From Node	To Node	Flow (gpm)	Head Gain (ft)	Status	Setting	Avail. NPSH (ft)	Cavitation Index	
PMP1-1	J-76	J-80	570.51	332.76	Open	1	66.06	0	
PMP1-2	J-76	J-80	0.00	0.00	Closed	0	0.00	0	
PMP1-3	J-76	J-80	1711.52	332.76	Open	1	66.08	0	

Tank Results @ Steady State Analysis							
ID	Flow (gpm)	Elevation (ft)	Hydraulic Grade (ft)	Pressure (psi)	% Full (%)	Volume (MG)	Level (ft)
R-1	-1,168.78	1,370.00	1,370.00	0.00	100	0	0
R-3	-468.54	1,370.00	1,370.00	0.00	100	0	0
T-1	281.85	1,530.00	1,530.00	0.00	0	0	0
T-4	-5,000.02	1,190.00	1,220.00	13.00	100	2.54	30

PRELIMINARY RECLAIMED WATER REPORT

for the SKYLINE HEIGHTS PROJECT
in the City of Corona,
County of Riverside, California



PREPARED FOR :

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January 16, 2014

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INTRODUCTION

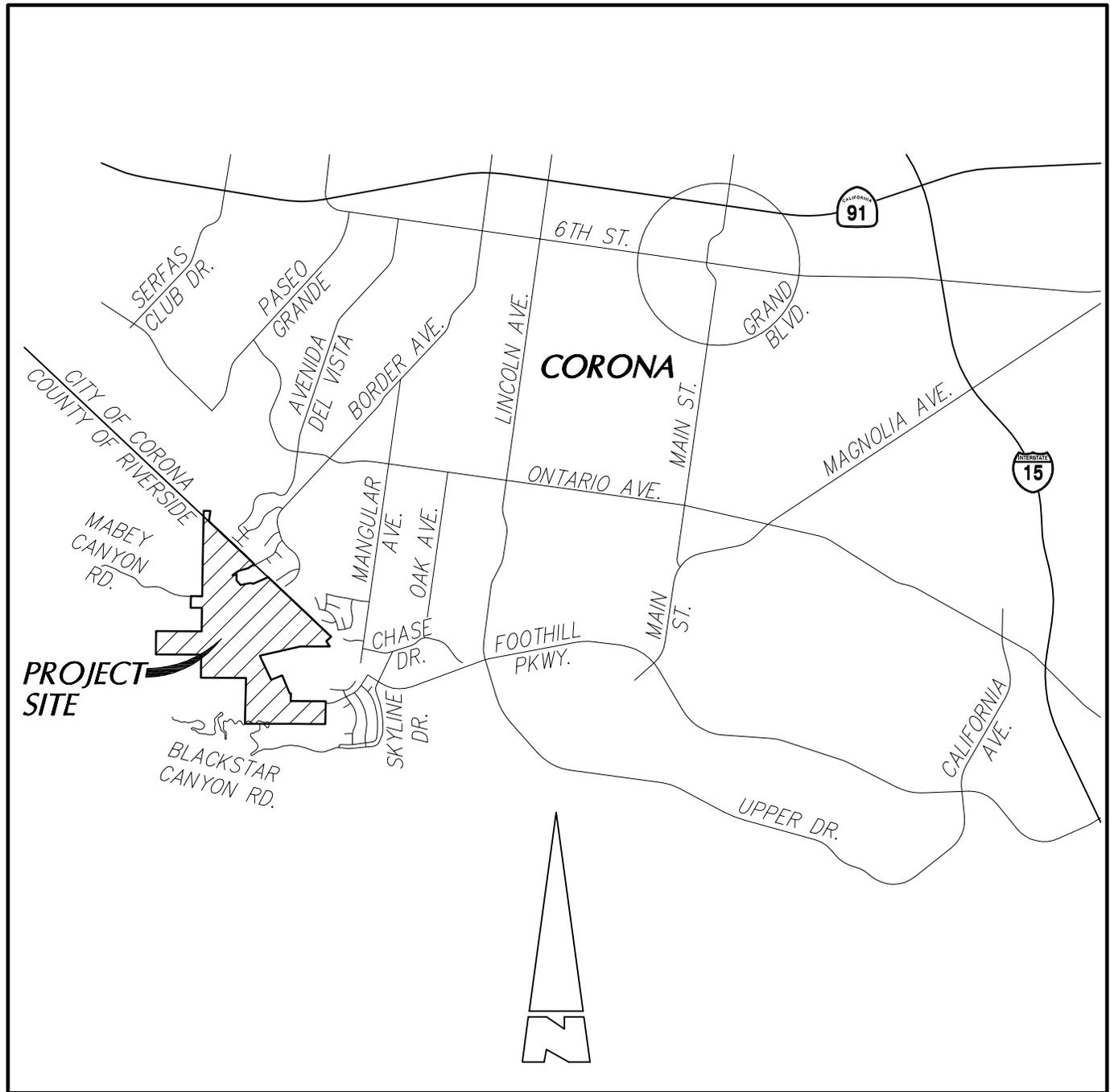
1.1 PURPOSE OF STUDY

The purpose of this report is to discuss the reclaimed water facility needs of the Skyline Heights project as it relates to the City of Corona’s plans for the reclaimed water system. More specifically, this report will address: the existing reclaimed water system, the estimated project reclaimed water demands, projected reservoir storage, proposed pipelines and pumping facilities needed to support the proposed project and adjacent developments. It will also identify the approximate reclaimed water line alignments and pipe sizes, as well as proposed reservoir and pump station locations and sizes. The project water demands are based on the proposed land use and the City of Corona Draft 2010 Reclaimed Water Master Plan. The analysis presented in this report is based on the Skyline Heights TTM 36544.

1.2 PROJECT DESCRIPTION

The Skyline Heights project is comprised of 270.9 acres of vacant land situated in the hills to the southwest of the City of Corona in Western Riverside County, California adjacent to Foothill Parkway. The project area includes the area (approximately 17.16 acres) to be acquired by RCTC/City of Corona for the construction of the future Foothill Parkway westerly extension and Mabey Canyon Debris Basin expansion. The site is located approximately 3 miles south of the 71 and 91 Freeways and approximately 4 miles west of Interstate 15 (I-15). **Figure 1-1** shows a location map of the general area. The site is within the City of Corona’s Sphere of Influence and is proposed to be annexed to the City during the entitlement process. The City of Corona is currently processing the Capital Improvement Project for the Foothill Parkway Westerly Extension between Green River Road and Trudy Way. Construction is planned to be completed in the next few years. Foothill Parkway will border the eastern portion of the project and will be the primary access to the site.

The Skyline Heights project is generally bounded to the north and east by single-family residences and on the south and west by the Cleveland National Forest and large privately owned parcels. Within the general boundaries of the project is an undeveloped 10.0-acre parcel which is considered “Not a Part” and is owned by the U.S. Forest Service. Adjacent to the southeast portion of the project site is a single-family residential community which is currently graded and under construction (Tract Map 31955). The immediate surrounding area consists of Low Density Residential (2-6 du/ac) as well as undeveloped open space within the City of Corona. Skyline Drive, a graded forest service access road, is located just to the south of the project. This road provides recreational hiking and mountain biking opportunities to residents on a local and regional level.



LOCATION MAP

NOT TO SCALE



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FIGURE 1-1

The project site consists of sparsely vegetated and otherwise undeveloped land with the exception of dirt roads. The site is characterized by steep topography, generally increasing in elevation from the northeast to the southwest. Several canyons and ravines are present which will convey natural drainage across the project site.

As proposed by the Skyline Heights project, the site consists of 291 single family low density residential lots with 7,200 sf minimum lot area. The project site is comprised of approximately 270.9 acres of undeveloped vacant land. However, of the 270.9 acres, approximately 17.16 acres will be acquired by the RCTC/City of Corona for the construction of the Westerly Extension of Foothill Parkway and Mabey Canyon Debris Basin. It is proposed that approximately 169.7 acres will be graded based on the conceptual grading plan. **Figure 1-2** shows a vicinity map of the area illustrating the location of the project and the developments in the area.

1.3 RELATED STUDIES

The City of Corona Reclaimed Water Master Plan, prepared by AKM Consulting Engineers in April 2010, provides a regional study identifying existing and future proposed reclaimed water supply, storage, pumping and pipeline facilities within the City's ultimate service area. The study also presents design criteria to be utilized in reclaimed water supply, system pressures, pipeline velocities, storage volumes, and pumping capacities. The report also provides information on the District's planning and evaluation criteria that can be applied to determine projected reclaimed water demands.

In conjunction with the City's current Capital Improvement Program (CIP) for the Westerly Extension of Foothill Parkway from Trudy Way to Green River Road, the City is planning on constructing in the next few years a 12-inch Zone 3 reclaimed water line in Foothill Parkway from Chase Drive to Serfas Club Drive and in Chase Drive from Foothill Parkway to Skyline Drive. These improvements have been identified in the draft 2010 Reclaimed Water Master Plan as CIP 104.

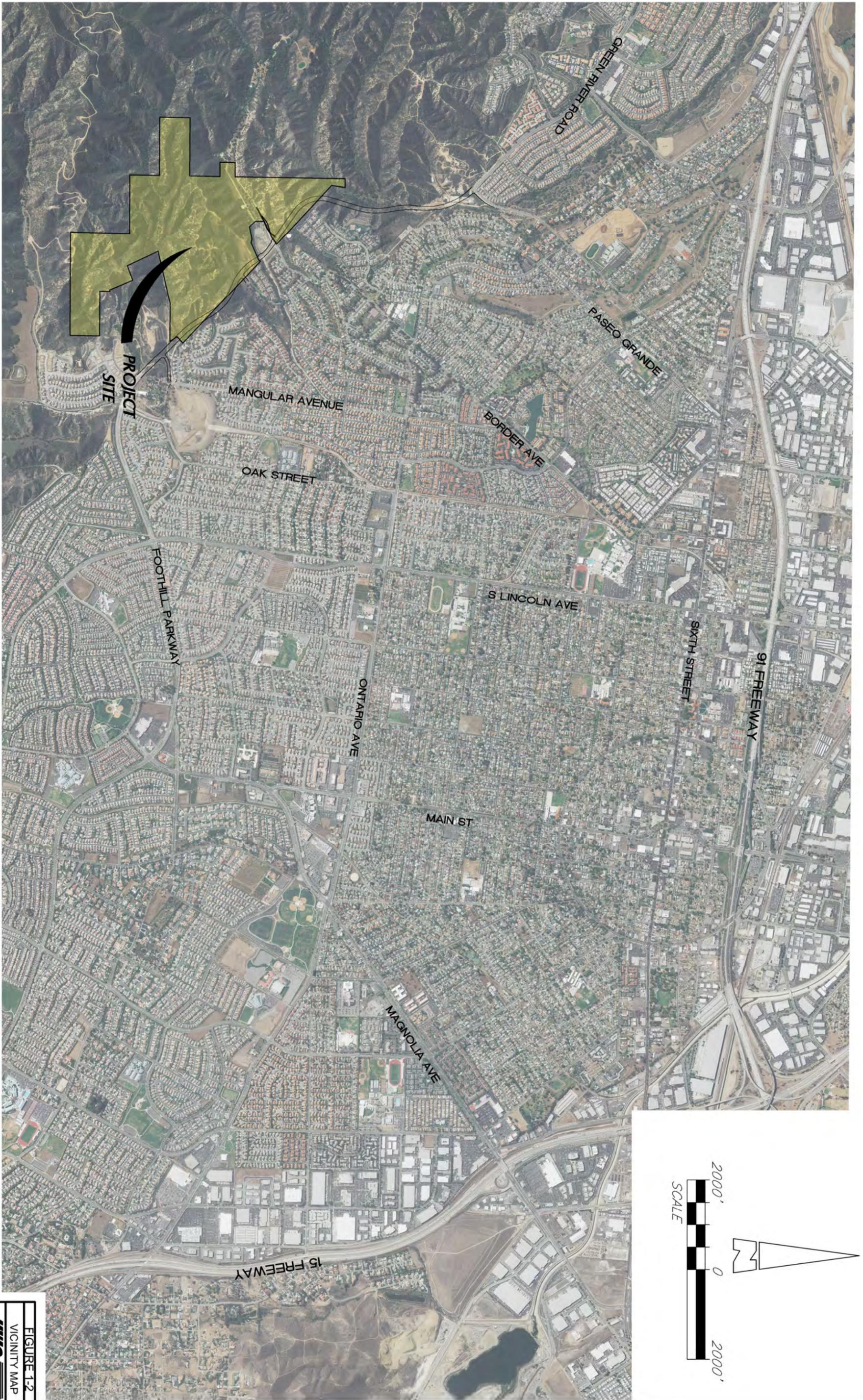


FIGURE 12
VICINITY MAP
RWG ENGINEERS

The project site consists of sparsely vegetated and otherwise undeveloped land with the exception of dirt roads. The site is characterized by steep topography, generally increasing in elevation from the northeast to the southwest. Several canyons and ravines are present which will convey natural drainage across the project site.

As proposed by the Skyline Heights project, the site consists of 292 single family low density residential lots with 7,200 sf minimum lot area. The project site is comprised of approximately 270.9 acres of undeveloped vacant land. However, of the 270.9 acres, approximately 17.16 acres will be acquired by the RCTC/City of Corona for the construction of the Westerly Extension of Foothill Parkway and Mabey Canyon Debris Basin. It is proposed that approximately 170.9 acres will be graded based on the conceptual grading plan. **Figure 1-2** shows a vicinity map of the area illustrating the location of the project and the developments in the area.

1.3 RELATED STUDIES

The City of Corona Reclaimed Water Master Plan, prepared by AKM Consulting Engineers in April 2010, provides a regional study identifying existing and future proposed reclaimed water supply, storage, pumping and pipeline facilities within the City's ultimate service area. The study also presents design criteria to be utilized in reclaimed water supply, system pressures, pipeline velocities, storage volumes, and pumping capacities. The report also provides information on the District's planning and evaluation criteria that can be applied to determine projected reclaimed water demands.

In conjunction with the City's current Capital Improvement Program (CIP) for the Westerly Extension of Foothill Parkway from Trudy Way to Green River Road, the City is planning on constructing in the next few years a 12-inch Zone 3 reclaimed water line in Foothill Parkway from Chase Drive to Serfas Club Drive and in Chase Drive from Foothill Parkway to Skyline Drive. These improvements have been identified in the draft 2010 Reclaimed Water Master Plan as CIP 104.

DESIGN CRITERIA

This section presents the design criteria used to evaluate recommended water system improvements required for the Skyline Heights project. The criteria utilized in this study are in accordance with the City of Corona Draft 2010 Reclaimed Water Master Plan, and the 2012 City’s Department of Water and Power Design Policy.

2.1 WATER DUTY FACTORS

The reclaimed water duty factor (WDF) used in projecting average day water demands for the project is based on a 4,500 gpd/ac for landscaped areas.

To convert Average Day Demand flows (ADD) to Maximum Day Demand flows (MDD) a factor of 4.0 was used. Similarly for Peak Hour Demand flows (PHD) a factor of 8.0 was used as described in the Draft 2010 Reclaimed Water Master plan. The higher peak demands are based on compressed demand times, i.e. 12-hour irrigation period instead of 24-hour period. According to the Master Plan, the 12-hour irrigation period is more reasonable.

2.2 PLANNING CRITERIA

The planning criteria are used to evaluate the proposed water system hydraulic models. They are utilized as a check to confirm that the values being developed are reasonable. A list of planning criteria used in the evaluation of this project is shown in **Table 2-1**.

TABLE 2-1

PLANNING CRITERIA		
Description	Value	Unit
Minimum Pressure		
Average Day Demand	80	psi
Maximum Day Demand	60	psi
Maximum Pipeline Velocity		
Peak Hour Analysis	7	fps
Reservoir Storage Volume	2xADD	-

2.3 SYSTEM PRESSURES

The reclaimed water distribution system has been designed to maintain minimum static pressures between 60 psi and 80 psi. This criteria is used to initially divide a project between water service zones. **Appendix C** presents the Existing Service Zones Map as presented in the 2010 Master Plan, which illustrates the general pressure zone boundaries within the City's service area. The Skyline Heights project will be served by two pressure zones, the existing Zone 3 (1380' HWL) and the proposed Zone 3A (1625' HWL). The new pressure zone is identified as Zone 3A in this report because it is at a higher HWL than the Zone 3 pressure system. The City's Reclaimed Water Master Plan does not identify any higher pressure zones for this area. As a result, the proposed project site will be served by a proposed Zone 3A hydro-pneumatic pump station.

Computer modeling is then performed to ensure that adequate residual pressures are obtained under all demand conditions. The system has been designed to yield minimum residual pressures of 80 psi during average day demand and 60 psi during maximum day demand conditions. Headloss in water lines is calculated using the Hazen-Williams equation with a "C" value of 110 for distribution mains. Nodes with pressures that could not be brought within acceptable parameters are identified and are presented as part of the analysis of the ultimate build-out scenario in Section 4.

2.4 PIPELINE VELOCITIES

The reclaimed water lines were designed to have a maximum velocity of 7 fps for the peak hour demand scenarios. However realistically, a maximum velocity of 7 fps applies to average day and maximum day demands as well.

2.5 STORAGE VOLUMES

The total required volume of storage in a reclaimed water system consists of water for operational storage and terminal storage. As per the Draft 2010 Reclaimed Water Master Plan, the terminal storage is required to be equivalent to 200% of the average day demand. Operational storage is not required since there is no need to equalize the variations in sources of supply. Water reservoir storage requirements are evaluated on a zone-by-zone basis.

2.6 PUMP CAPACITY

Pump Stations are typically sized for firm capacity to deliver the maximum day demands of the service areas for open zones and peak hour demands of the service areas for closed zones. All pump stations shall incorporate a standby pump of the same size as the largest duty pump in case the largest unit is taken out of service. The pumps shall be variable frequency drive (VFDs) type to provide continuous control of matching motor speed to the varying demands of the service area. The pump stations should be equipped with modern pump controllers, flow meters, suction and discharge pressure gauges, proper isolation and check valves, and telemetry equipment. The pump station should also be equipped with emergency standby generators and automatic transfer switches in case of power outages.

3

EXISTING AND PROPOSED RECLAIMED WATER FACILITIES

This section discusses the existing and proposed reclaimed water facilities as identified in City of Corona Draft 2010 Reclaimed Water Master Plan report. The 271-acre Skyline Heights project development (Skyline West as previously identified in the Draft 2010 Reclaimed Water Master Plan) was included in the Draft 2010 Reclaimed Water Master Plan and this section further validates the details of the proposed reclaimed water facilities reflecting current development conditions.

3.1 EXISTING FACILITIES

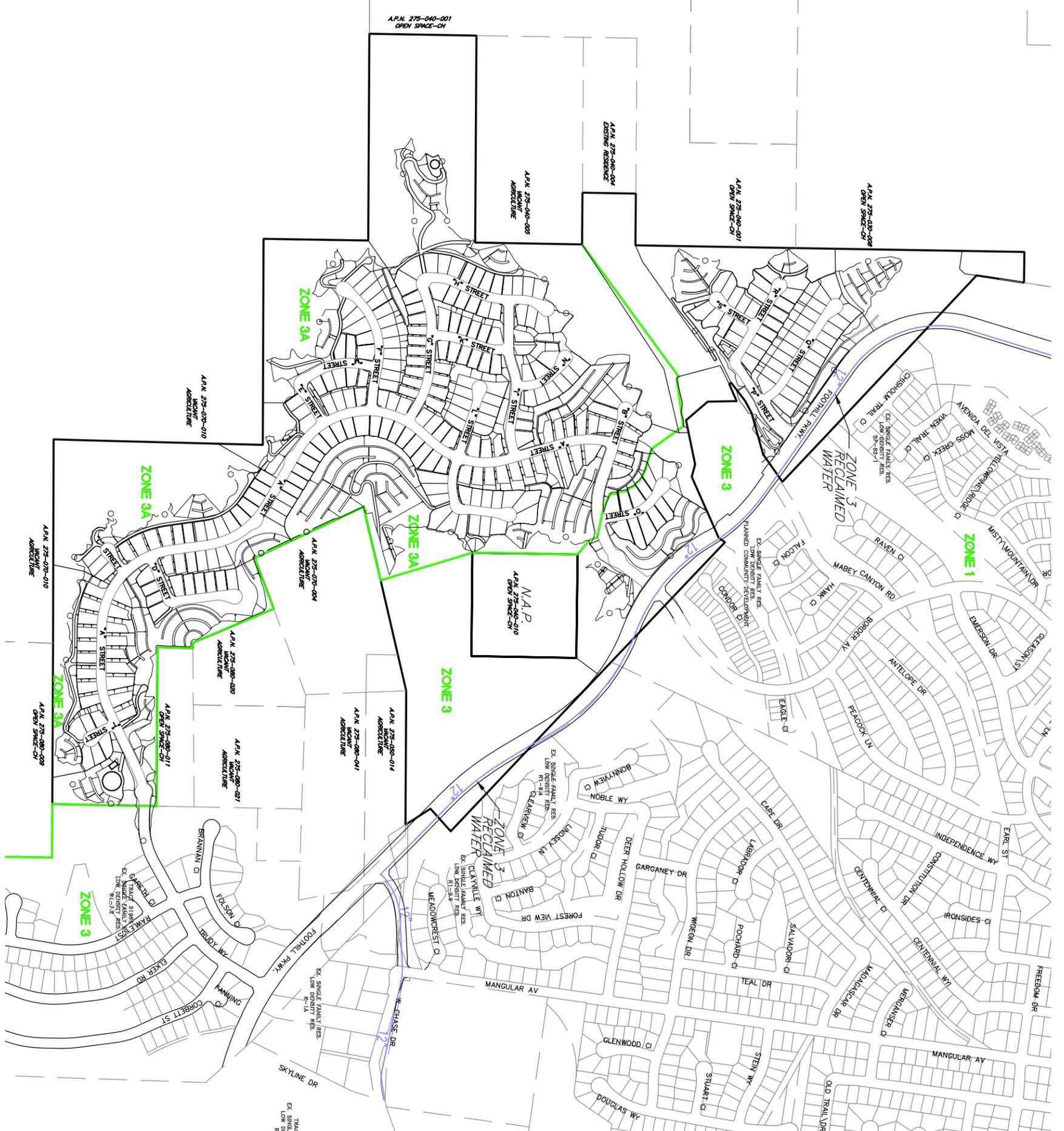
The Skyline Heights project is located in the hills adjacent to the Cleveland National Forest and Foothill Parkway near Mabey Canyon area in the City of Corona. The project is in City's southwestern water service area. The existing water facilities in the vicinity of the project are located within the City's Zone 3 (1380' HWL) reclaimed water service zones. **Figure 3-1** presents a map showing the boundaries of the project and the existing reclaimed water facilities in the vicinity of the project.

3.1.1 ZONE 3 (1380' HWL)

A new 12-inch Zone 3 reclaimed water line is proposed as part of the City's Foothill Parkway Westerly Extension Improvements and will be located in Foothill Parkway from Chase Drive to Serfas Club Drive and in Chase Drive from Foothill Parkway to Skyline Drive. This reclaimed water line is assumed to be in place prior to the development of Skyline Heights. The Zone 3 system pressure is supplied by the WRF 3 Booster Station and Border Avenue Booster Station. The zone serves elevations between 1033 ft to 1355 ft AMSL. Water is stored in the Gilbert Reservoir and WRF 3 having a capacity of 1.0 MG and 1.0 MG, respectively.

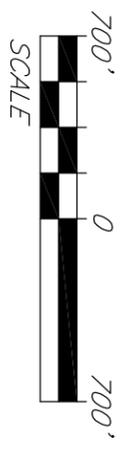
3.2 PROPOSED FACILITIES

The Skyline Heights project will be served by the City's existing Zone 3 (1380' HWL) service area for the northerly portion of the project site with elevations ranging from 1120 ft to 1340 ft. Private pumps systems will be installed as needed to supply the minimum pressures necessary to irrigate the landscape areas for elevations higher than 1241 feet within Zone 3. The remaining southerly portion of the site with elevations ranging from 1160 ft to 1510 ft will be served by a proposed intermediate Zone 3A (1625' HWL) which utilizes a hydro-pneumatic pump station to provide the necessary system pressures. The HWL for Zone 3A was established based on the



LEGEND

- 12" PROPOSED 12" RECLAIMED WATER PER CITY MASTER PLAN
- ZONE BOUNDARIES



SKYLINE HEIGHTS
FIGURE 3-1
SKYLINE HEIGHTS
EXISTING RECLAIMED WATER FACILITIES PLAN

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provided a pressure of 50 psi (minimum pressure for spray type system) to the highest elevation to be irrigated which is 1510 feet.

Figure 3-2 presents the Proposed Reclaimed Water Facilities Plan, which illustrates the boundaries of the project and the proposed reclaimed water facilities for the Skyline Heights project.

3.2.1 ZONE 3 (1380' HWL)

A new 12-inch reclaimed water line will be constructed in the proposed “B” Street from a tie-in point located off of an existing 12-inch line (CIP 104) Foothill Parkway at Border Avenue. This line will supply the proposed Zone 3A pump station as well as serve the proposed HOA landscaped areas south of Mabey Canyon with elevations between 1120 feet and 1241 feet AMSL.

A new 8-inch reclaimed water line will also be constructed in the proposed “P” Street, “R” Street and “S” Street from a tie-in point located off of an existing 12-inch line (CIP 104) Foothill Parkway at Mabey Canyon Road area. These lines will serve the proposed Zone 3 HOA landscaped areas north of Mabey Canyon.

The proposed Skyline Reservoir (CIP 403) is Master Plan Reclaimed Water Facility as identified in the 2010 Draft Reclaimed Water Master Plan. This reservoir is to be designed for 2.14 MG to service a portion of the future needs of the Zone 3 service area. In discussions with the City of Corona DWP staff, the location and funding of the Skyline Reservoir has not yet been finalized and will not be considered as part of this project’s reclaimed water analysis.

3.2.2 ZONE 3A (1625' HWL)

Located along proposed “B” Street just west of Foothill Parkway is a proposed Zone 3A (1625’ HWL) hydro-pneumatic pump station. This proposed pump station will service the HOA landscaped areas within the project site south of Mabey Canyon that are between elevations 1160 feet and 1510 feet AMSL. Pressure regulators will be installed as necessary to reduce the water pressures as needed at the proposed meter locations. A Conceptual Irrigation Meter Plan is provided in **Appendix B** for reference.

A network of new 8-inch reclaimed water lines will be constructed within the project site to service the proposed HOA landscaped areas. A segment of the discharge line from the pump station will be sized for 12-inch in order to reduce the velocity to below 7 fps per City of Corona DPW design guidelines.

The proposed Zone 3A Booster Pump Station is located along proposed “B” Street just west of Foothill Parkway. It is sized for Peak hour demand for Zone 3A and will include two (2) supply pumps at 575 gpm each at 50 HP, and one (1) standby pump at 575 gpm at 50 HP for a total firm capacity of 1150 gpm. The pumps shall be variable frequency drive (VFDs) type to provide continuous control of matching motor speed to the varying demands of the service area. The pump station is situated on a pad elevation of 1197 feet. The total dynamic head (TDH) for these



LEGEND

- 12" PROPOSED 12" RECLAIMED WATER PER CITY MASTER PLAN
- 8" PROPOSED 8" RECLAIMED WATER
- ZONE BOUNDARIES



SKYLINE HEIGHTS
FIGURE 3-2
SKYLINE HEIGHTS PROPOSED RECLAIMED WATER FACILITIES PLAN



pumps will consist of static lift, pipe friction losses, and minor system losses. The maximum static head is 269 feet corresponding to minimum and maximum tank levels of approximately 20 percent and 100 percent of tank capacity, respectively. The total estimated friction and minor losses is approximately 15 feet based on 2975 feet of 8-inch and 12-inch piping. This results in a Total Dynamic Head of 284 feet.

4

WATER DEMANDS AND SIZING OF FACILITIES

This section will provide the projected water demand for the Skyline Heights project as well as determine the relative mainline pipe sizes, the project’s reservoir storage requirements, and booster pump station capacities.

4.1 PROJECTED RECLAIMED WATER DEMANDS

The projected reclaimed water demand factor of 4,500 gpd/ac for landscaped areas was used to determine the Average Day Demands, Maximum Day Demands, and Peak Hour Demand for the project. There are 11.0 acres to be served off of the Zone 3 pressure system, and 45.4 acres to be served off of the Zone 3A pressure system. **Figure 4-1** shows the proposed landscaped areas within the Skyline Heights project that are served by the Zone 3 and Zone 3A system. **Table 4-1** summarizes the projected Average Day, Maximum Day, and Peak Hour Demands for each water service zone within the project. As shown below the total estimated reclaimed water demand generated by the Skyline Heights project is approximately 0.25 MGD Average Day Demand, 1.02 MGD Maximum Day Demand, and 2.03 MGD Peak Hour Demand.

TABLE 4-1

Reclaimed Water Demand Summary				
Reclaimed Water Zone ID	Tributary Area (acres)	Average Day Demand (MGD)	Maximum Day Demand (MGD)	Peak Hour Demand (MGD)
Skyline Heights				
Zone 3 (1380' HWL)	11.00	0.050	0.200	0.400
Zone 3A (1625' HWL)	45.40	0.204	0.816	1.632
Total	56.40	0.254	1.016	2.032

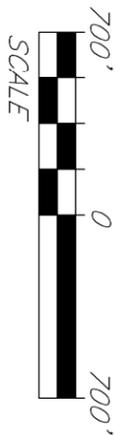
4.2 RESERVOIR STORAGE

Based upon the estimated reclaimed water demands, **Table 4-2** summarizes the required reservoir storage for each water service zone based upon the design criteria outlined in Section 2. The sizing presented in **Table 4-2** is for the Skyline Heights project only and does not include oversizing to accommodate other neighboring developments or the master plan demands.



LEGEND

-  PROPOSED 12" RECLAIMED WATER PER CITY MASTER PLAN
-  PROPOSED 8" RECLAIMED WATER
-  ZONE BOUNDARIES
-  IRRIGATED BY ZONE 3
-  IRRIGATED BY ZONE 3A



SKYLINE HEIGHTS
FIGURE 4-1
SKYLINE HEIGHTS
PROPOSED RECLAIMED WATER
LANDSCAPE AREA PLAN

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TABLE 4-2

RESERVOIR STORAGE REQUIREMENTS			
Reclaimed Water Zone ID	Average Day Demand (mgd)	Required Terminal Storage (MG)	Total Required Storage (MG)
Skyline Heights			
Zone 3 (1380' HWL)	0.050	0.152	0.304
Zone 3A (1625' HWL)	0.204	0.408	0.408

Note: Terminal Storage is 2xADD.

The proposed reservoir storage capacity required for this project within Zone 3 and Zone 3A is 0.72 MG. According to the draft 2010 Reclaimed Water Master Plan, a 2.14 MG Zone 3 Reservoir is proposed in the vicinity Skyline Heights project site. This master plan facility is identified as CIP 403. The Skyline project contributes approximately 34% to the overall storage requirement in the future Master Plan Reclaimed Water Reservoir (CIP 403). In discussions with the City of Corona DWP Staff, the Skyline project will not be conditioned to build the proposed Master Plan Reservoir (CIP 403) and can serve the upper zone within the project site via a proposed booster pump station.

4.3 PUMP STATION

According to the draft 2010 Reclaimed Water Master Plan, the City of Corona is not planning for a higher reclaimed water zone to serve the higher elevations for the area near the Skyline Heights project. Therefore in order to provide service to the upper zone areas within the Skyline Heights project, the project will require an onsite hydro-pneumatic pump station to be constructed. This pump station will provide the necessary system pressures to serve the HOA landscape areas within proposed Zone 3A.

The proposed Zone 3A Booster Pump Station is located along proposed “B” Street just west of Foothill Parkway. Using the reclaimed water demands for Zone 3A as shown on **Table 4-1** and the City’s design requirements, the Skyline Heights project will require a pump station having a firm capacity to pump the peak hour demands for the project site. The pump station will include two (2) supply pumps at 575 gpm each at 50 HP, and one (1) standby pump at 575 gpm at 50 HP for a total firm capacity of 1150 gpm. The pumps shall be variable frequency drive (VFDs) type to provide continuous control of matching motor speed to the varying demands of the service area. The pump station is situated on a pad elevation of 1197 feet. The total dynamic head (TDH) for these pumps will consist of static lift, pipe friction losses, and minor system losses. The maximum static head is 269 feet corresponding to minimum and maximum tank levels of approximately 20 percent and 100 percent of tank capacity, respectively. The total estimated friction and minor losses is approximately 15 feet based on 2975 feet of 8-inch and 12-inch piping. This results in a Total Dynamic Head of 284 feet. The pump station will also be equipped with pump controllers, flow meter, electrical panels, power transformer, standby

backup power generator, and telemetry equipment as per the City of Corona DWP design standards and guidelines.

4.4 WATER SYSTEM MODEL AND RESULTS

The analysis performed to determine the recommended onsite water system for the Skyline Heights project consists of computer modeling that utilizes the Innovyze H2OMAP Water v9.6 program. The solution to the computer model is based upon the design criteria as shown in Section 2. Three steady state demand scenarios, i.e. ADD, MDD, and PHD, were calculated and modeled to determine recommended line sizes within each of the proposed service zones. The HWL from the Zone 3 system is set conservatively at 1380 feet. According to DWP staff, upgrades to the Border Avenue pump station within the Zone 3 system will experience increased fluctuations in pressure but will not be modeled in this analysis. **Figure 3-2** presents the Proposed Reclaimed Water Facilities Plan, which illustrates the proposed reclaimed water facility improvements and their relative sizes based on the reclaimed water system model results.

4.4.1 ZONE 3 (1380' HWL)

The Zone 3 system will serve the northern portion of the Skyline Heights project. **Table 4-3** summarizes the anticipated static pressures within this zone. To model the Zone 3 system, we assumed that all the demands are met from the proposed Zone 3 reservoir and reclaimed water system. The computer modeling results for the Zone 3 analysis is provided in **Appendix F**. For all demand scenarios, we assumed that the water surface elevation (fixed grade node) at a point in the reclaimed water system located on Chase Drive at Oak Street is 1,380 feet.

The results of the computer analysis indicate that the recommended piping has been sized to adequately serve the project. During the maximum day demand scenario, the pressures observed in the system ranges between 72 psi and 132 psi. Similarly during the peak hour demand scenario, the pressures observed in the system ranges between 63 psi and 123 psi. Pressure regulators will be installed at proposed meter locations as needed to reduce system pressures. Pipeline velocities are below the 7 fps requirement during MDD and PHD scenarios which fall within the City's design requirements.

The proposed piping in this pressure zone will consist of 12-inch and 8-inch distribution pipelines. The computer modeling results in **Appendix F** verifies that adequate service pressures, at the meter locations, can be provided to the project during the demand scenarios considered.

4.4.2 ZONE 3A (1625' HWL)

The Zone 3A (1625' HWL) system will serve the southern portion of the Skyline Heights project between elevations 1160 ft to 1510 ft. **Table 4-3** summarizes the anticipated static pressures within this zone. To model the Zone 3A reclaimed water system, we assumed that all the demands are met from the proposed Zone 3 Reservoir within the Skyline Heights project. The Zone 3A system will be served by a hydro-pneumatic pump station with a HWL of 1625 feet. This pump station is modeled with the duty pump set to 'open' and the stand-by pump set to

‘closed’. The computer modeling results for the Zone 3A analysis is provided in **Appendix F**. For all demand scenarios, we have modeled the pump station using design point curve based on a TDH of 284 and a total firm capacity pumps of 1150 gpm (575 gpm each).

The results of the computer analysis indicate that the recommended piping has been sized to adequately serve the project. During the maximum day demand scenario, the pressures observed in the system ranges between 132 psi and 238 psi. Similarly during the peak hour demand scenario, the pressures observed in the system ranges between 80 psi and 191 psi. Pressure regulators will be installed at proposed meter locations as needed to reduce system pressures. Pipeline velocities are below the 7 fps requirement during MDD and PHD scenarios which falls within the City’s design requirement.

The proposed piping in this pressure zone will consist of 8-inch pipelines. The computer modeling results in **Appendix F** verifies that adequate service pressures, at the meter locations, can be provided to the project during the demand scenarios considered.

TABLE 4-3

Reclaimed Water Service Zone Static Pressure Summary				
Reclaimed Water Zone ID	Elevation (ft)		Static Pressure (psi)	
	Min	Max	Min.	Max.
Skyline Heights				
Zone 3 (1380' HWL)	1120	1241	60	112
Zone 3A (1625' HWL)	1160	1510	50	201

Note: The above values have been calculated assuming that the reservoirs are at high water levels.

5

PHASING & CONCLUSIONS

This section discusses the anticipated construction phasing of the proposed reclaimed water infrastructure needed to support the Skyline Heights project. It also identifies and summarizes the master planned water infrastructure required.

5.1 PROJECT PHASING

The Skyline Heights project will be developed in three (3) map phases. The reclaimed water infrastructure facilities will be constructed in several phases based on the needs of the project site.

5.2 CONCLUSIONS

The Skyline Heights project will require the following Reclaimed Water Infrastructure to be constructed for the build-out condition:

City of Corona Capital Improvements

- Construction of new 12-inch Zone 3 reclaimed waterline in Chase Drive from Skyline Drive to Foothill Parkway (CIP 104) as part of Foothill Parkway Westerly Extension Improvements.
- Construction of new 12-inch Zone 3 reclaimed waterline in Foothill Parkway from Chase Drive to Sierra Bella Development (CIP 104) as part of Foothill Parkway Westerly Extension Improvements.

Skyline Heights Infrastructure Improvements

Proposed Skyline Heights Infrastructure Improvements					
Project No.	Project Description	Facility Location	Zone	Proposed Pipe Size (inches)	Length (LF)
1	Distribution Reclaimed Water Lines	Onsite	3	8	1,223
2	Distribution Reclaimed Water Lines	Onsite	3	12	504
3	Distribution Reclaimed Water Lines	Onsite	3A	8	6,374
4	Distribution Reclaimed Water Lines	Onsite	3A	12	437
5	Booster Pump Station (1150 gpm capacity)	Onsite	3A	-	-

These proposed reclaimed water infrastructure facilities with respect to their approximate locations, alignments, and sizes are based on the results of the reclaimed water model presented in this report and are consistent with the City’s 2010 Draft Reclaimed Water Master Plan and related reclaimed water system studies in the City’s service area. The proposed Skyline Heights project onsite reclaimed water facilities presented in this report are preliminary estimates of the anticipated reclaimed water facilities necessary to service the project landscape irrigation needs.

A

REFERENCES

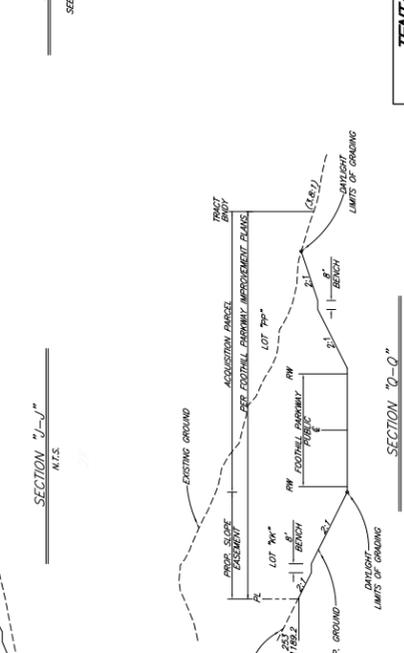
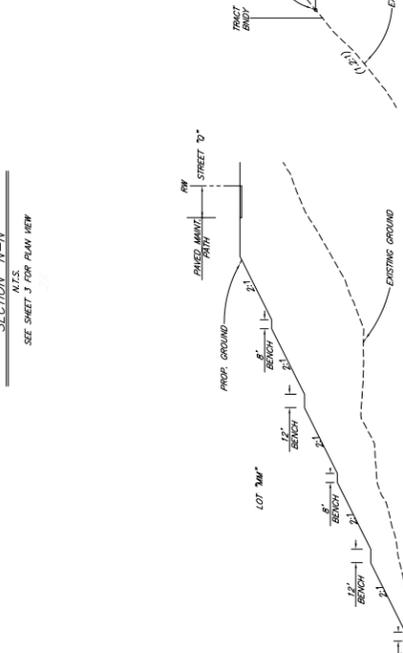
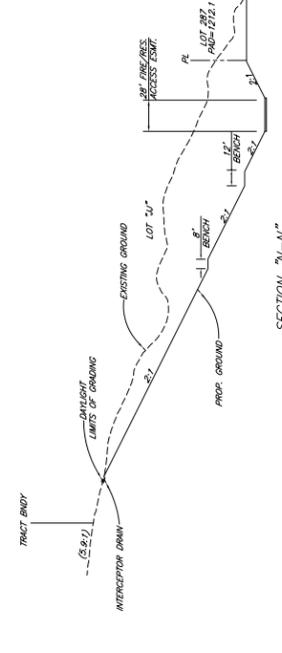
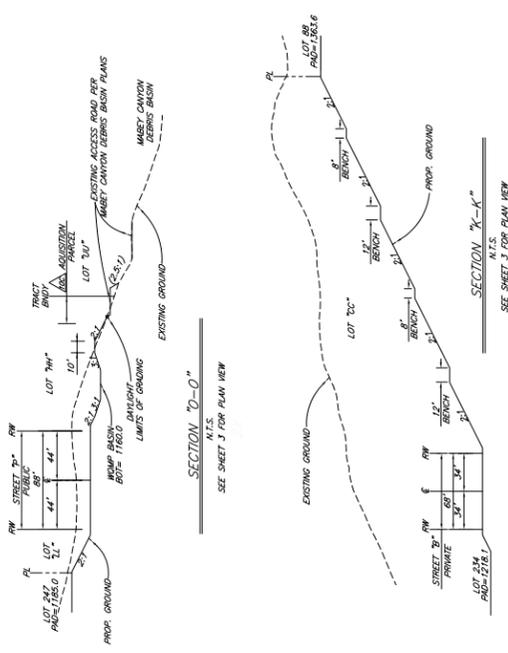
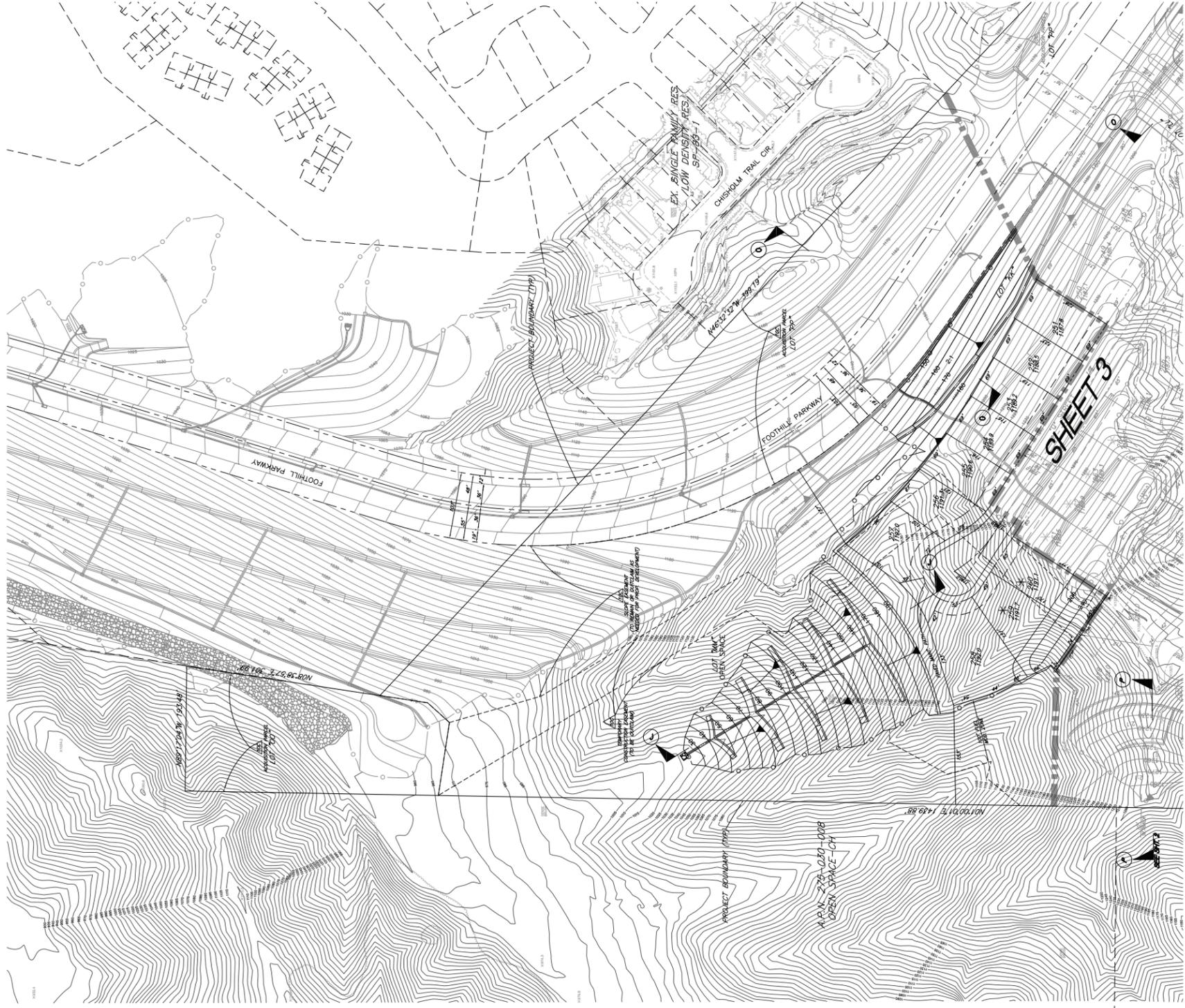
City of Corona Draft Reclaimed Water Master Plan, AKM Consulting Engineers, April 2010.

City of Corona Department of Water and Power Design Policy, November 2012.

Appendix

B

SKYLINE HEIGHTS
TTM 36544 & Conceptual Landscape Meter Plan



TENTATIVE TRACT MAP NO. 36544
SKYLINE HEIGHTS
CITY OF CORONA

PREPARED FOR:
 RICHLAND DEVELOPERS, INC.
 3161 MICHELSON DRIVE, SUITE 425
 IRVINE, CA 92612
 949-261-7010

PREPARED BY:
HWC ENGINEERS
 1000 UNIVERSITY AVENUE, SUITE 200, CORONA, CA 92626
 949-234-1110



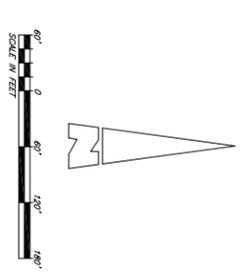
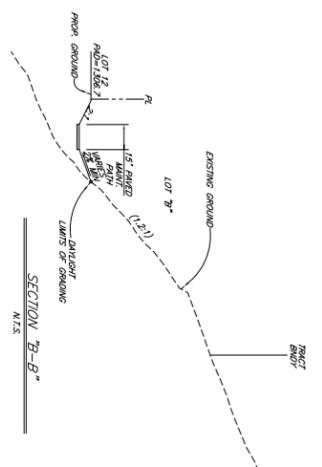
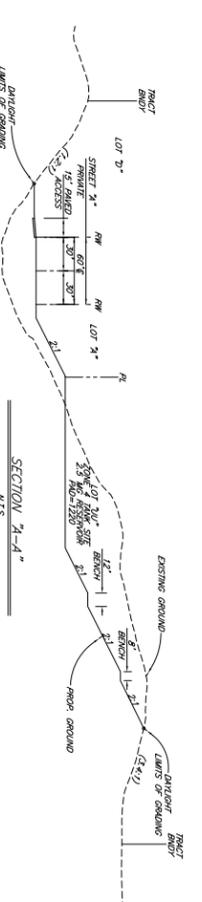
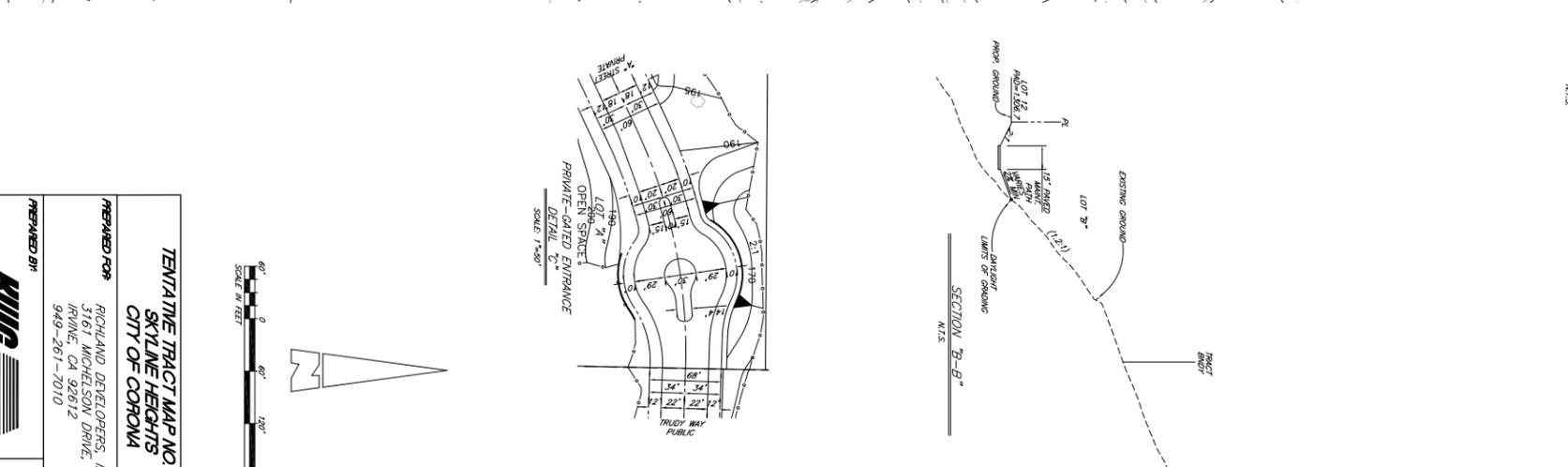
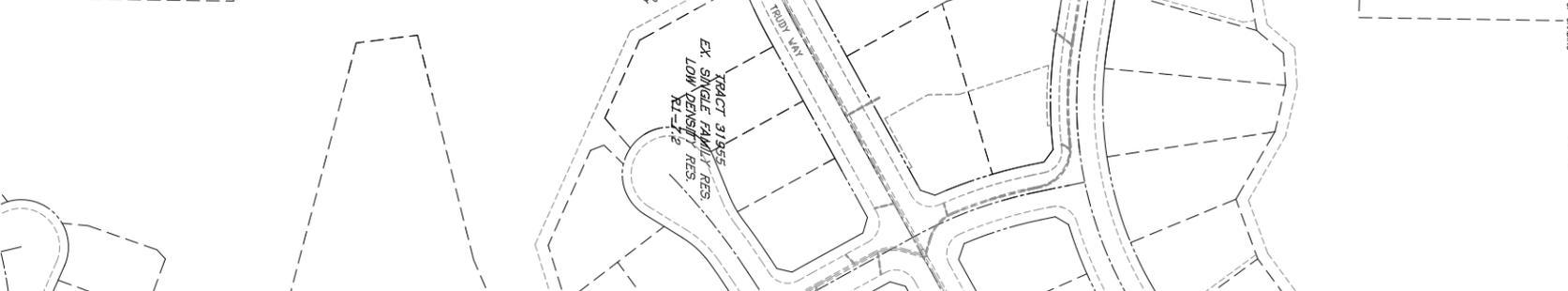


TENTATIVE TRACT MAP NO. 36544
SKYLINE HEIGHTS
CITY OF CORONA

PREPARED FOR:
 RICHLAND DEVELOPERS, INC.
 3161 MICHELSON DRIVE, SUITE 425
 IRVINE, CA 92612
 949-261-7010

PREPARED BY:
KWG ENGINEERS
INCORPORATED
 1000 WEST 10TH STREET, SUITE 200
 ANAHEIM, CALIFORNIA 92801
 714-771-1110

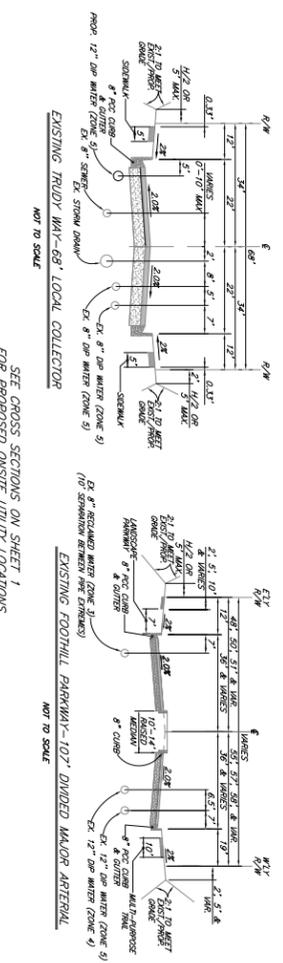
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 3 OF 11
 SHEETS



TENTATIVE TRACT MAP NO. 36544
SKYLARK HEIGHTS
CITY OF CORONA
 PREPARED FOR
 RICHLAND DEVELOPERS, INC.
 3161 MICHELSON DRIVE, SUITE 425
 IRVINE, CA 92612
 949-261-7010
 PREPARED BY
HWC ENGINEERS
 1885 COMMERCIAL STREET, SUITE 200, COSTA MESA, CALIFORNIA 92626
 SHEET
 8 OF 11
 SHEETS

PRESSURE ZONE SUMMARY

ZONE	RECLAIMED WATER	WATER PRESSURE SERVICE ELV.
ZONE 5 (150' HML)	144'	144'
ZONE 6A (180' HML)	144'	144'



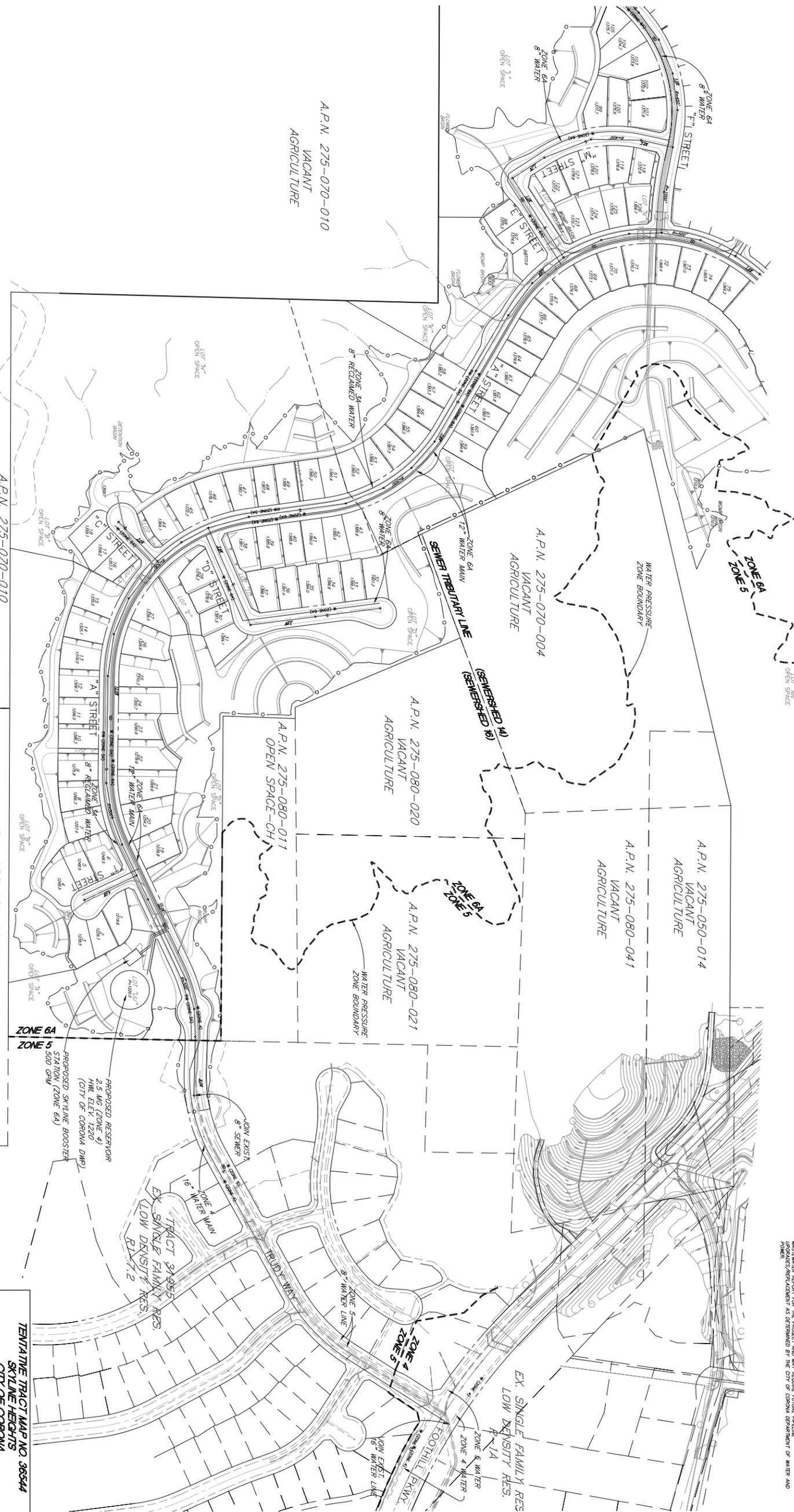
SEE CROSS SECTIONS ON SHEET 1 FOR PROPOSED ON-SITE UTILITY LOCATIONS

GENERAL INFRASTRUCTURE IMPROVEMENT NOTES:

- DOMESTIC WATER SYSTEM:**
- 1) ALL DOMESTIC WATER DESIGN CRITERIA SHALL BE PER CITY OF CORONA DEPARTMENT OF WATER AND POWER STANDARDS AND RIVERSIDE COUNTY DEPARTMENT OF HEALTH SERVICES STANDARD.
 - 2) MINIMUM STATIC PRESSURE SHALL BE 60 PSI AT PEAK HOUR.
 - 3) ON-SITE FIRE FLOW SHALL BE 500 GPM AT 150 PSI.
 - 4) ALL PROPOSED PUMP STATIONS AND WATER RESERVOIR SITES SHALL BE PUBLICLY MAINTAINED.
- RECLAIMED WATER SYSTEM:**
- 1) ALL RECLAIMED WATER DESIGN CRITERIA SHALL BE PER CITY OF CORONA DEPARTMENT OF WATER AND POWER STANDARDS AND RIVERSIDE COUNTY DEPARTMENT OF HEALTH SERVICES STANDARD UNLESS OTHERWISE APPROVED.
 - 2) ALL LANDSCAPED LOTS SHALL BE SERVED WITH RECLAIMED WATER.
 - 3) ALL PROPOSED PUMP STATIONS SHALL BE PERMITTED & MAINTAINED.
- SEWER SYSTEM:**
- 1) ALL SEWER DESIGN CRITERIA SHALL BE PER CITY OF CORONA DEPARTMENT OF WATER AND POWER STANDARDS AND RIVERSIDE COUNTY DEPARTMENT OF HEALTH SERVICES STANDARD UNLESS OTHERWISE APPROVED.
 - 2) PROJECT DOWNSTREAM SEWER IMPACTS SHALL BE DETERMINED AND MITIGATED AS DIRECTED OR AGREED UPON WITH THE CITY OF CORONA DEPARTMENT OF WATER AND POWER.

INFRASTRUCTURE IMPROVEMENT SUMMARY:

- WATER SYSTEM:**
- 1) THE SKYLINE HEIGHTS PROJECT WILL BE SERVED BY TWO PRESSURE ZONES, THE EXISTING ZONE 5 (150' HML) AND THE INTERMEDIATE ZONE 6A (180' HML). IT IS PROPOSED TO CONSTRUCT PARKWAY TO THE PROPOSED ZONE 6A BOOSTER PUMP STATION.
 - 2) A NETWORK OF ON-SITE 8-INCH DISTRIBUTION MAINS ARE ALSO PROPOSED FOR THE TWO WATER PRESSURE ZONES TO SERVE THE PROPOSED RESIDENTIAL LOTS.
 - 3) A NETWORK OF ON-SITE 8-INCH DISTRIBUTION MAINS ARE ALSO PROPOSED FOR THE TWO WATER PRESSURE ZONES TO SERVE THE PROPOSED RESIDENTIAL LOTS.
 - 4) A NETWORK OF ON-SITE 8-INCH DISTRIBUTION MAINS ARE ALSO PROPOSED FOR THE TWO WATER PRESSURE ZONES TO SERVE THE PROPOSED RESIDENTIAL LOTS.
 - 5) A NETWORK OF ON-SITE 8-INCH DISTRIBUTION MAINS ARE ALSO PROPOSED FOR THE TWO WATER PRESSURE ZONES TO SERVE THE PROPOSED RESIDENTIAL LOTS.
- SEWER SYSTEM:**
- 1) PROPOSED ON-SITE ZONE 3 AND 3A RECLAIMED WATER SYSTEM CONSISTS OF 8-INCH AND 12-INCH DISTRIBUTION MAINS. THESE LINES WILL BE PERMITTED & MAINTAINED.
 - 2) SEVERAL DOWNSTREAM QUALITY SEWER LINES TRIBUTARY TO SERVED 14 HAVE BEEN IDENTIFIED AS DEFICIENT (Q2-044) OR SLOTTED OVER PER SIZE FROM THE PRELIMINARY DESIGN. THESE LINES WILL BE PERMITTED & MAINTAINED.
 - 3) SEVERAL DOWNSTREAM QUALITY SEWER LINES TRIBUTARY TO SERVED 14 HAVE BEEN IDENTIFIED AS DEFICIENT (Q2-044) OR SLOTTED OVER PER SIZE FROM THE PRELIMINARY DESIGN. THESE LINES WILL BE PERMITTED & MAINTAINED.
 - 4) SEVERAL DOWNSTREAM QUALITY SEWER LINES TRIBUTARY TO SERVED 14 HAVE BEEN IDENTIFIED AS DEFICIENT (Q2-044) OR SLOTTED OVER PER SIZE FROM THE PRELIMINARY DESIGN. THESE LINES WILL BE PERMITTED & MAINTAINED.



A.P.N. 275-070-010
VACANT
AGRICULTURE

A.P.N. 275-070-004
VACANT
AGRICULTURE

A.P.N. 275-080-020
VACANT
AGRICULTURE

A.P.N. 275-050-014
VACANT
AGRICULTURE

A.P.N. 275-080-041
VACANT
AGRICULTURE

A.P.N. 275-080-021
VACANT
AGRICULTURE

A.P.N. 275-080-011
OPEN SPACE-CH

A.P.N. 275-070-010
VACANT
AGRICULTURE

A.P.N. 275-080-009
OPEN SPACE-CH

PROPOSED RESERVOIR
2.5 MG (ZONE 4)
HML ELEV. 1220
(CITY OF CORONA DWP)

PROPOSED SKYLINE BOOSTER
STATION (ZONE 6A)
500 GPM

TRACT 3A-055
EX. SINGLE FAMILY RES.
EX. LOW DENSITY RES.
R1.5

EX. SINGLE FAMILY RES.
EX. LOW DENSITY RES.
R1.5

TENTATIVE TRACT MAP NO. 36544
SKYLINE HEIGHTS
CITY OF CORONA

PREPARED BY: **RWG ENGINEERS**

PREPARED FOR: **RICHLAND DEVELOPERS, INC.**
3161 MICHELSON DRIVE, SUITE 425
IRVINE, CA 92612
949-261-7010

SHEET 10 OF 11
SHEETS

A.P.N. 275-030-008
OPEN SPACE-CH

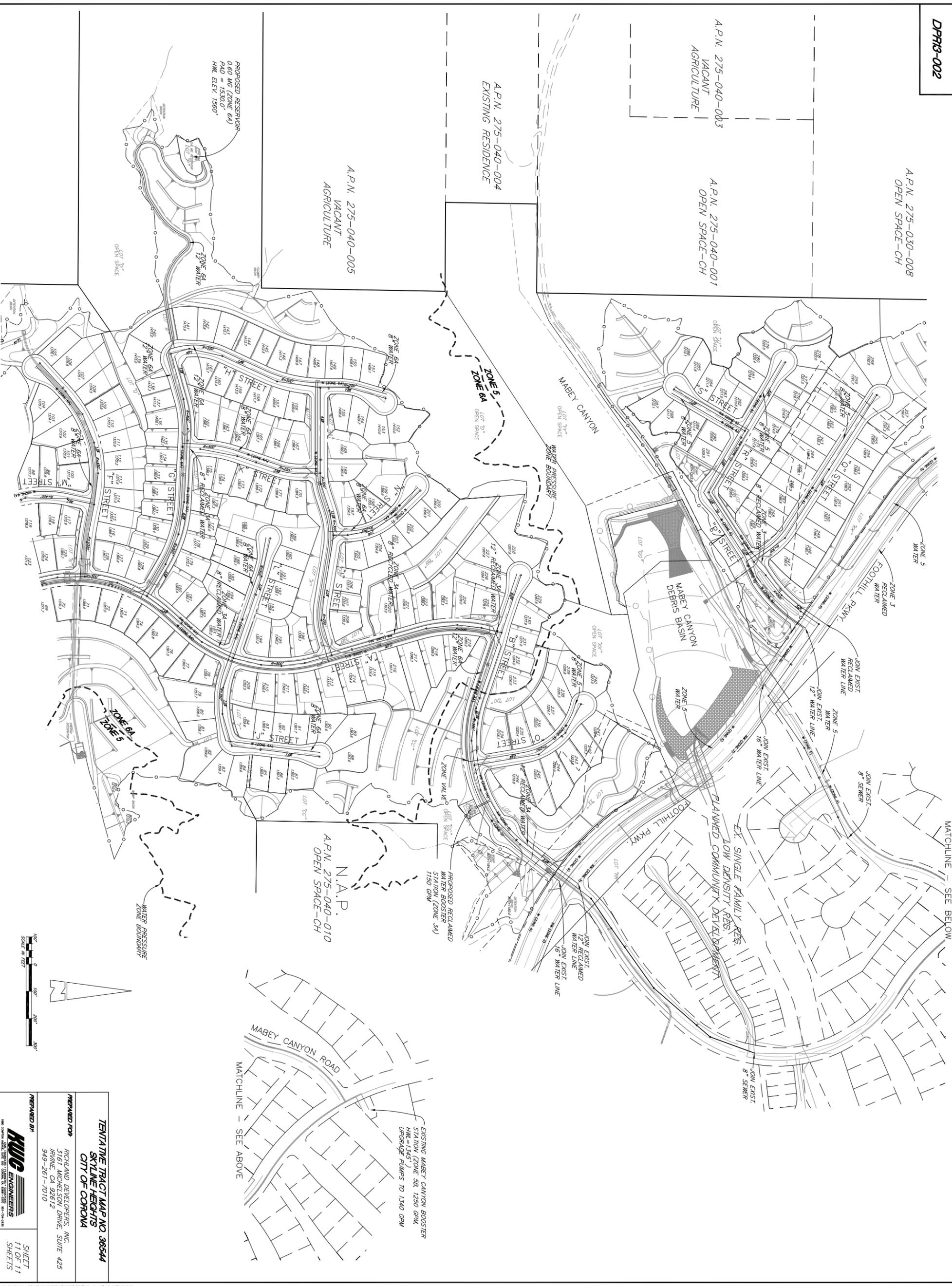
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VACANT
AGRICULTURE

A.P.N. 275-040-001
OPEN SPACE-CH

A.P.N. 275-040-004
EXISTING RESIDENCE

A.P.N. 275-040-005
VACANT
AGRICULTURE

PROPOSED RESERVOIR
0.60 MG (ZONE 64)
PAD = 1530.0'
H.M. ELEV. 1560.0'



MATCHLINE - SEE BELOW

EX. SINGLE FAMILY RES.
LOW DENSITY DEVELOPMENT

PROPOSED RECLAIMED
WATER BOOSTER
STATION (ZONE 34)
1150 GPM

N.A.P.
A.P.N. 275-040-010
OPEN SPACE-CH

EXISTING MABEY CANYON BOOSTER
STATION (ZONE 5B, 1250 GPM,
H.M. = 1345')
UPGRADE PUMPS TO 1340 GPM

MATCHLINE - SEE ABOVE



TENTATIVE TRACT MAP NO. 36544
SKYLINE HEIGHTS
CITY OF CORONA

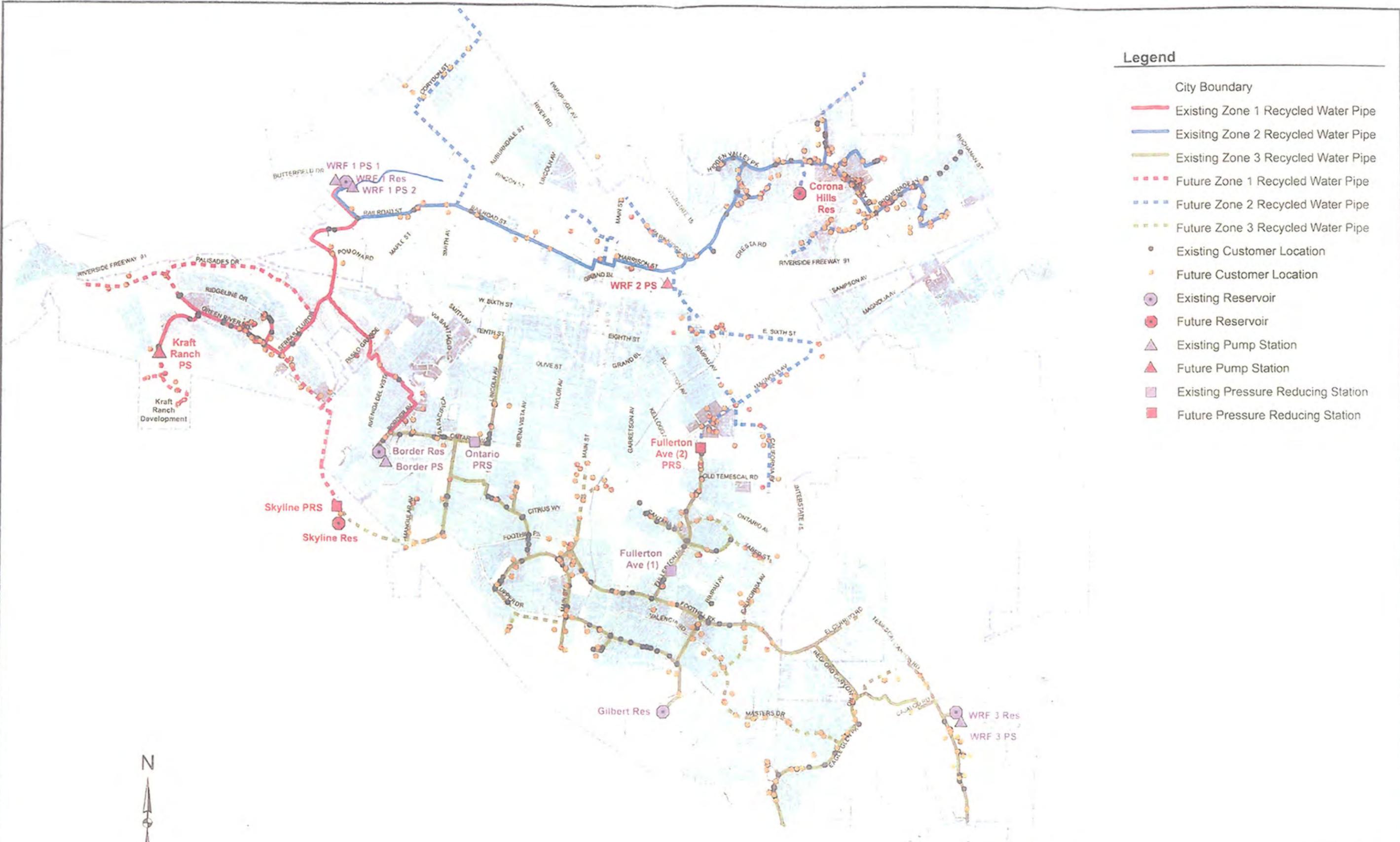
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 11 OF 11 SHEETS

Appendix

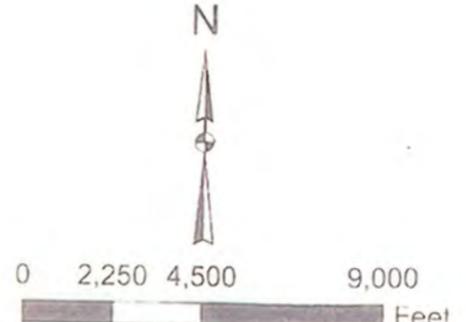
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**CITY OF CORONA
RECYCLED WATER SYSTEM
AND PRESSURE ZONE MAP**



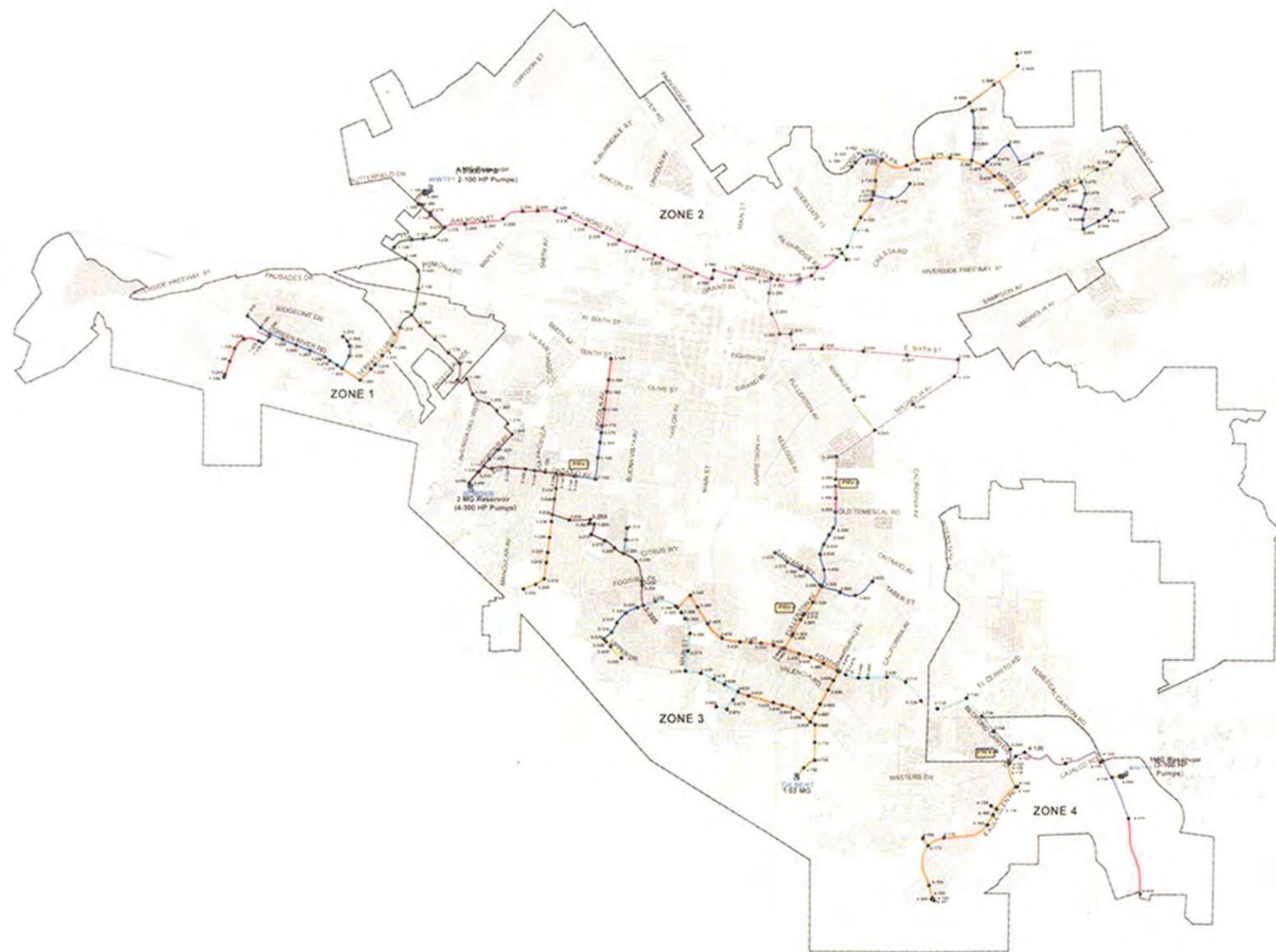
Legend

- City Boundary
- Existing Zone 1 Recycled Water Pipe
- Existing Zone 2 Recycled Water Pipe
- Existing Zone 3 Recycled Water Pipe
- Future Zone 1 Recycled Water Pipe
- Future Zone 2 Recycled Water Pipe
- Future Zone 3 Recycled Water Pipe
- Existing Customer Location
- Future Customer Location
- Existing Reservoir
- Future Reservoir
- Existing Pump Station
- Future Pump Station
- Existing Pressure Reducing Station
- Future Pressure Reducing Station



Legend

Existing Pipes	Future Pipes
4" pipe	6" pipe
6" pipe	12" pipe
8" pipe	16" pipe
10" pipe	City Boundary
12" pipe	Junction with ID Number
14" pipe	Reservoir and / or Pump Station Location
16" pipe	Pressure Reducing Valve
18" pipe	Surge Anticipator Valve
20" pipe	
24" pipe	



3



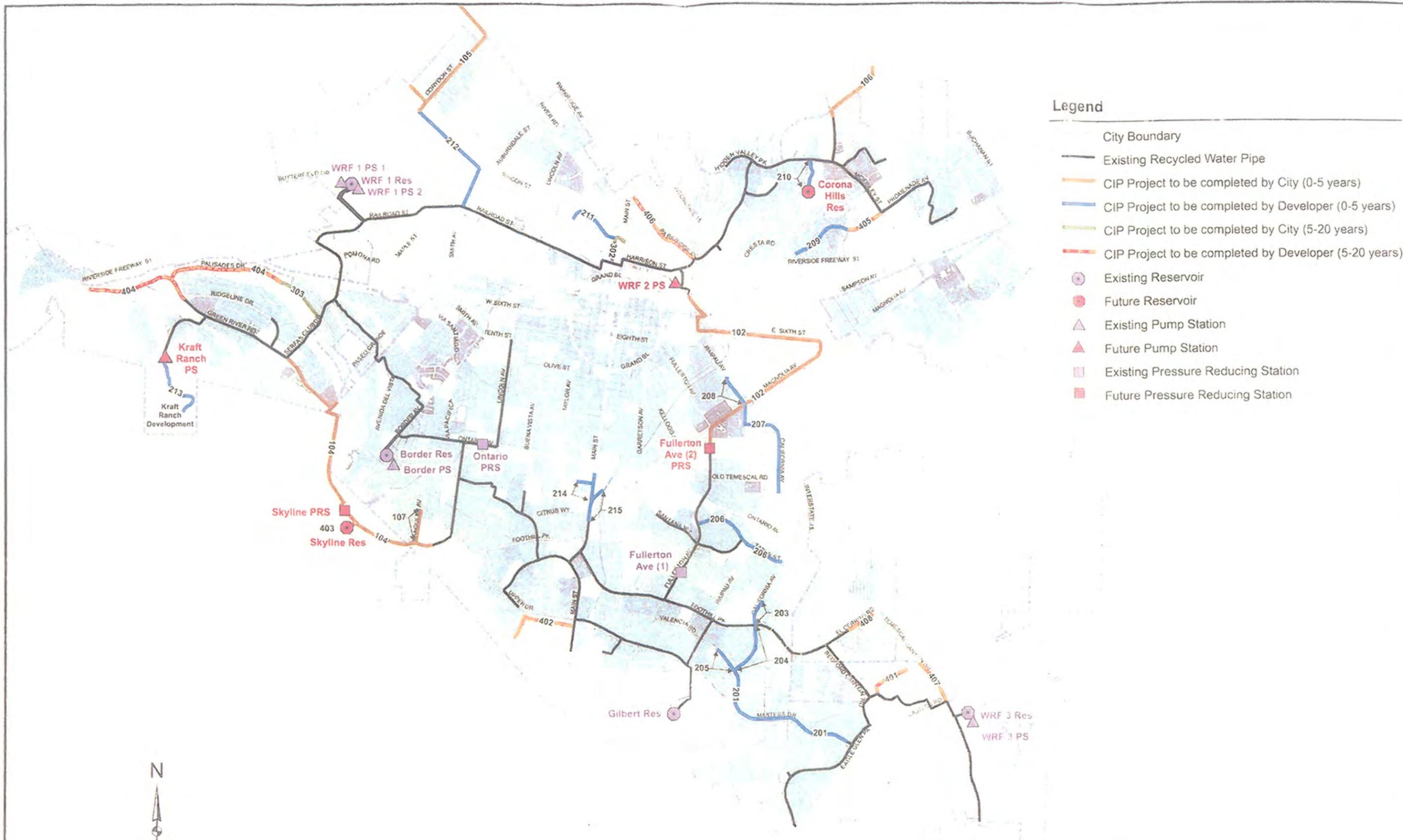
 Project No.: 760632.00 Date: July 2006	City of Corona Recycled Water Model
	Existing and Future Recycled Water System

Figure 5

Appendix

D

**CITY OF CORONA
CAPITAL IMPROVEMENT PROJECTS**



Legend

- City Boundary
- Existing Recycled Water Pipe
- CIP Project to be completed by City (0-5 years)
- CIP Project to be completed by Developer (0-5 years)
- CIP Project to be completed by City (5-20 years)
- CIP Project to be completed by Developer (5-20 years)
- Existing Reservoir
- Future Reservoir
- △ Existing Pump Station
- ▲ Future Pump Station
- Existing Pressure Reducing Station
- Future Pressure Reducing Station



E

ULTIMATE CONDITION MODEL DEMANDS AND MAP

SKYLINE HEIGHTS - ZONE 3 WATER DEMAND SUMMARY				
Node No.	Tributary Area (ac)	Average Day Demand (gpm)	Maximum Day Demand (gpm)	Peak Hour Demand (gpm)
J-2	2.63	8.20	32.81	65.63
J-4	1.54	4.82	19.28	38.56
J-6	1.93	6.04	24.16	48.32
J-7	4.90	15.31	61.23	122.47
Total:	11.00	34.37	137.49	274.98

SKYLINE HEIGHTS - ZONE 3A WATER DEMAND SUMMARY				
Node No.	Tributary Area (ac)	Average Day Demand (gpm)	Maximum Day Demand (gpm)	Peak Hour Demand (gpm)
J-10	5.25	16.40	65.61	131.21
J-11	3.22	10.06	40.23	80.46
J-12	2.50	7.80	31.20	62.41
J-14	7.56	23.63	94.51	189.02
J-15	6.26	19.56	78.25	156.51
J-16	6.44	20.13	80.51	161.02
J-17	4.29	13.40	53.61	107.22
J-18	3.99	12.47	49.88	99.75
J-20	5.90	18.44	73.75	147.50
Total:	45.40	141.89	567.55	1135.09

Note:

- 1) Average Day Demand based on 4,500 gpd/ac for landscape areas.
- 2) Maximum Day Demand is 4xADD.
- 3) Peak Hour Demand is 8xADD.
- 4) Tributary area includes 50 foot irrigated fuel modification areas.



F

ULTIMATE CONDITION ANALYSIS, NODE AND PIPE DIAGRAM

AVERAGE DAY DEMANDS ANALYSIS RESULTS
 ZONE 3 AND 3A WATER SYSTEM ANALYSIS
 (SCENARIO 1: ZONE 3 TANK FULL & ZONE 3A PUMP ON)

Junction Pressures @ Steady State Analysis

Node	Demand (gpm)	Elevation (ft)	Hydraulic Grade (ft)	Pressure (psi)
J-1	0.00	1095.70	1379.79	123.10
J-10	16.40	1238.30	1756.53	224.55
J-11	10.06	1314.60	1756.08	191.29
J-12	7.80	1350.90	1755.86	175.47
J-13	0.00	1357.50	1755.72	172.55
J-14	23.63	1362.40	1755.63	170.39
J-15	19.56	1370.80	1755.54	166.71
J-16	20.13	1383.10	1755.48	161.35
J-17	13.40	1346.80	1755.46	177.07
J-18	13.45	1220.30	1755.45	231.88
J-19	0.00	1163.90	1755.45	256.32
J-2	8.20	1160.90	1379.43	94.69
J-20	19.30	1408.90	1755.70	150.27
J-3	0.00	1160.20	1379.42	94.99
J-4	4.82	1142.40	1379.42	102.70
J-5	0.00	1068.50	1379.42	134.72
J-6	6.04	1200.50	1379.41	77.52
J-7	15.31	1205.30	1379.40	75.44
J-8	0.00	1192.50	1379.38	80.98
J-9	0.00	1192.50	1756.57	244.41

Pipe Pressures @ Steady State Analysis

ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/kft)	Status	Flow Reversal Count
P-1	R-1	J-1	1474.31	12	110	178.10	0.51	0.21	0.14	Open	0
P-10	J-10	J-11	828.45	8	110	127.33	0.81	0.45	0.55	Open	0
P-11	J-11	J-12	458.13	8	110	117.27	0.75	0.22	0.47	Open	0
P-12	J-12	J-13	346.20	8	110	109.47	0.70	0.14	0.41	Open	0
P-13	J-13	J-14	303.89	8	110	90.17	0.58	0.09	0.29	Open	0
P-14	J-14	J-15	528.91	8	110	66.54	0.42	0.09	0.16	Open	0
P-15	J-15	J-16	728.76	8	110	46.98	0.30	0.06	0.09	Open	0
P-16	J-16	J-17	704.78	8	110	26.85	0.17	0.02	0.03	Open	0
P-17	J-17	J-18	1070.62	8	110	13.45	0.09	0.01	0.01	Open	0
P-18	J-18	J-19	488.18	8	110	0.00	0.00	0.00	0.00	Open	0
P-19	J-13	J-20	915.73	8	110	19.30	0.12	0.02	0.02	Open	0
P-2	J-1	J-2	2559.54	12	110	178.10	0.51	0.36	0.14	Open	0
P-3	J-2	J-3	1328.19	12	110	26.17	0.07	0.01	0.00	Open	0
P-4	J-3	J-4	518.76	12	110	4.82	0.01	0.00	0.00	Open	0
P-5	J-4	J-5	841.96	12	110	0.00	0.00	0.00	0.00	Open	0
P-6	J-3	J-6	644.91	8	110	21.35	0.14	0.01	0.02	Open	0
P-7	J-6	J-7	577.97	8	110	15.31	0.10	0.01	0.01	Open	0
P-8	J-2	J-8	504.43	12	110	143.73	0.41	0.05	0.10	Open	0
P-9	J-9	J-10	436.76	12	110	143.73	0.41	0.04	0.10	Open	0

Pump Results @ Steady State Analysis

ID	From Node	To Node	Flow (gpm)	Head Gain (ft)	Status	Setting	Avail. NPSH (ft)	Cavitation Index
PMP-1	J-8	J-9	71.87	377.19	Open	1	219.95	0
PMP-2	J-8	J-9	71.87	377.19	Open	1	219.95	0
PMP-3	J-8	J-9	0.00	0.00	Closed	0	0	0

Tank Results @ Steady State Analysis

ID	Flow (gpm)	Elevation (ft)	Hydraulic Grade (ft)	Pressure (psi)	% Full (%)	Volume (MG)	Level (ft)
R-1	-178.10	1,380.00	1,380.00	0.00	100	0	0

PRELIMINARY WASTEWATER REPORT

for the **SKYLINE HEIGHTS PROJECT**
in the City of Corona,
County of Riverside, California



PREPARED FOR :

Richland Developers, Inc.
3161 Michelson Drive, Suite 425
Irvine, CA 92612

January 16, 2014

PREPARED BY:



KWC Engineers
1880 Compton Avenue, Suite 100
Corona, CA 92881
Tel: (951) 734-2130
www.kwcengineers.com



Mike C. Taing, RCE 64263

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INTRODUCTION

1.1 PURPOSE OF STUDY

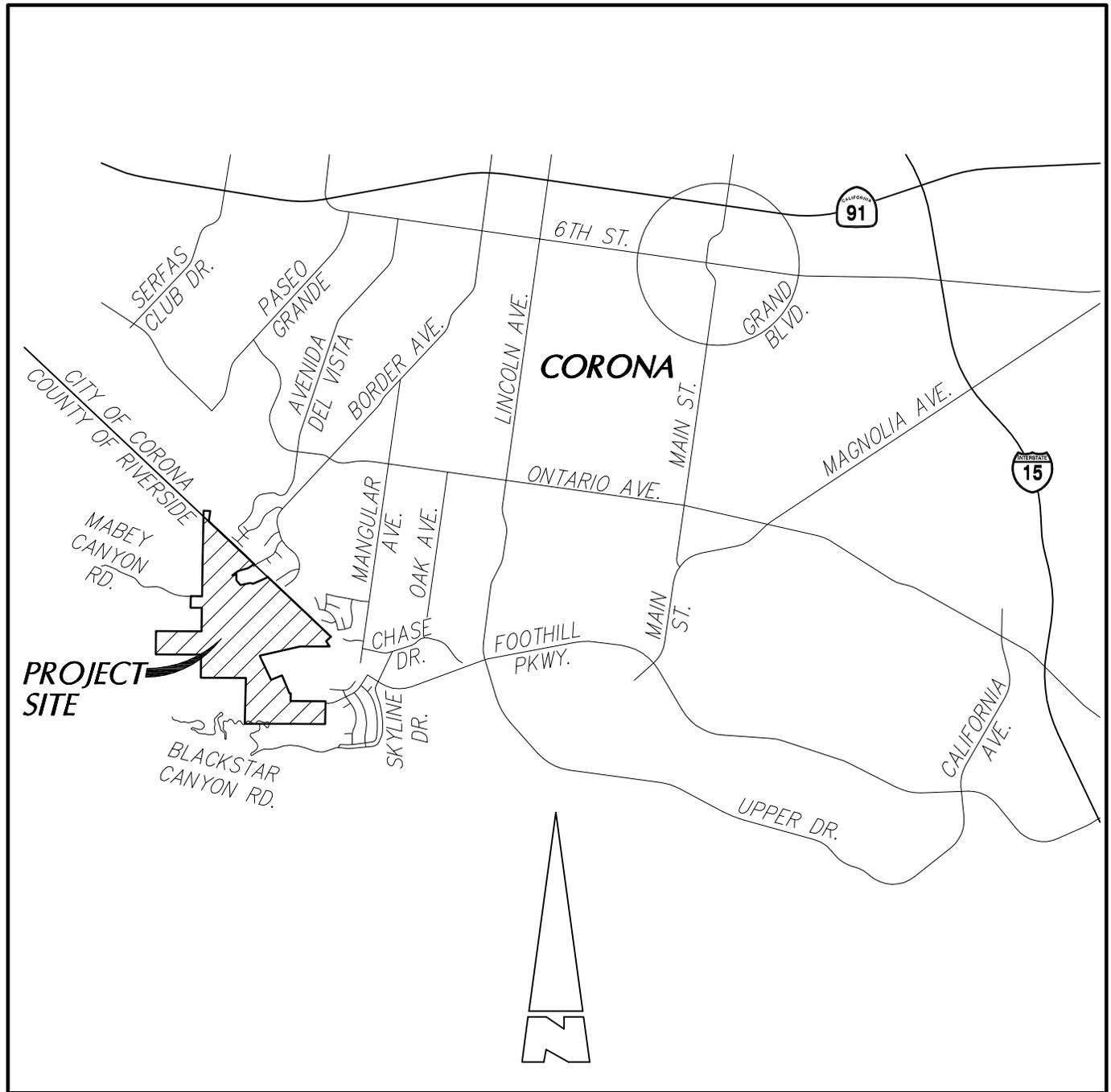
The Skyline Heights project is located within the City of Corona Department of Water and Power Sphere of Influence for sewer service. The purpose of this report is to discuss the impacts of the Skyline Heights project on the City of Corona Department of Water and Power Sewer Master Plan facilities, more specifically the trunk sewer lines within sewershed 14 and 16, and the project sewer contributions. This report will provide information identifying the contributions to the current system and recommended sewer facilities to support this project.

The Skyline Heights development is proposing a low density residential development on 270.9 acres connecting to the City of Corona’s westerly extension of Foothill Parkway. The Project’s sewer contributions are based on the City’s Sewer Master Plan report. This report will analyze the Skyline Heights sewer contributions and its impacts to the downstream trunk sewer lines based upon the available pipe capacity as identified in the 2005 Sewer Master Plan.

1.2 PROJECT DESCRIPTION

The Skyline Heights project is comprised of 270.9 acres of vacant land situated in the hills to the southwest of the City of Corona in Western Riverside County, California adjacent to Foothill Parkway. The project area includes the area (approximately 17.16 acres) to be acquired RCTC/City of Corona for the construction of the future Foothill Parkway westerly extension and Mabey Canyon Debris Basin expansion. The site is located approximately 3 miles south of the 71 and 91 Freeways and approximately 4 miles west of Interstate 15 (I-15). **Figure 1-1** shows a location map of the general area. The site is within the City of Corona’s Sphere of Influence and is proposed to be annexed to the City during the entitlement process. The City of Corona is currently processing the Capital Improvement Project for the Foothill Parkway Westerly Extension between Green River Road and Trudy Way. Construction is planned to be completed in the next few years. Foothill Parkway will border the eastern portion of the project and will be the primary access to the site.

The Skyline Heights project is generally bounded to the north and east by single-family residences and on the south and west by the Cleveland National Forest and large privately owned parcels. Within the general boundaries of the project is an undeveloped 10.0-acre parcel which is considered “Not a Part” and is owned by the U.S. Forest Service. Adjacent to the southeast portion of the project site is a single-family residential community which is currently graded and under construction (Tract Map 31955). The immediate surrounding area to the south and west consists of Low Density Residential (2-6 du/ac) as well as undeveloped open space within the City of Corona. Skyline Drive, a graded forest service access road, is located just to the south of



LOCATION MAP

NOT TO SCALE

KWG ENGINEERS

CIVIL ENGINEERS • PLANNERS • SURVEYORS
 1880 COMPTON AVENUE, SUITE 100 • CORONA, CA. 92881-3370 • 951-734-2130

FIGURE 1-1

the project. This road provides recreational hiking and mountain biking opportunities to residents on a local and regional level.

The project site consists of sparsely vegetated and otherwise undeveloped land with the exception of dirt roads. The site is characterized by steep topography, generally increasing in elevation from the northeast to the southwest. Several canyons and ravines are present which will convey natural drainage across the project site.

As proposed by the Skyline Heights project, the site consists of 292 single family 7,200 sf minimum lots with a low density residential land use designation (3-6 du/ac). The overall property is comprised of approximately 270.9 acres of undeveloped vacant land. However, of the 270.9 acres, approximately 17.16 acres will be acquired by the RCTC/City of Corona for the construction of the Westerly Extension of Foothill Parkway and Mabey Canyon Debris Basin. It is proposed that approximately 170.9 acres will be graded based on the conceptual grading plan. **Figure 1-2** shows a vicinity map of the area illustrating the location of the project and the developments in the area. **Appendix B** includes the current TTM 36544 for the Skyline Heights project.

1.3 RELATED STUDIES

The City of Corona 2005 Sewer Master Plan, prepared by AKM Consulting Engineers, provides a regional study identifying existing and proposed major sewer facilities within the City's ultimate service area. The master plan study also presents design criteria to be utilized in sizing gravity sewer lines, sewer lift stations, and force mains; as well as provide information on the City's sewer generation rates that can be applied to determine projected average and peak wastewater flows. The master plan reports also identifies deficiencies in the City's Sewer System and discusses the City's future planned Capital Improvement Projects to mitigate these system deficiencies.

The proposed Skyline Heights project is discussed and identified in the Sewer Master Plan as the Skyline West. The Master Plan had estimated that the project would produce an average dry weather flow of approximately 278,050 gpd or 0.43 cfs which is 3.5 times more than the average flows projected for the skyline heights project.

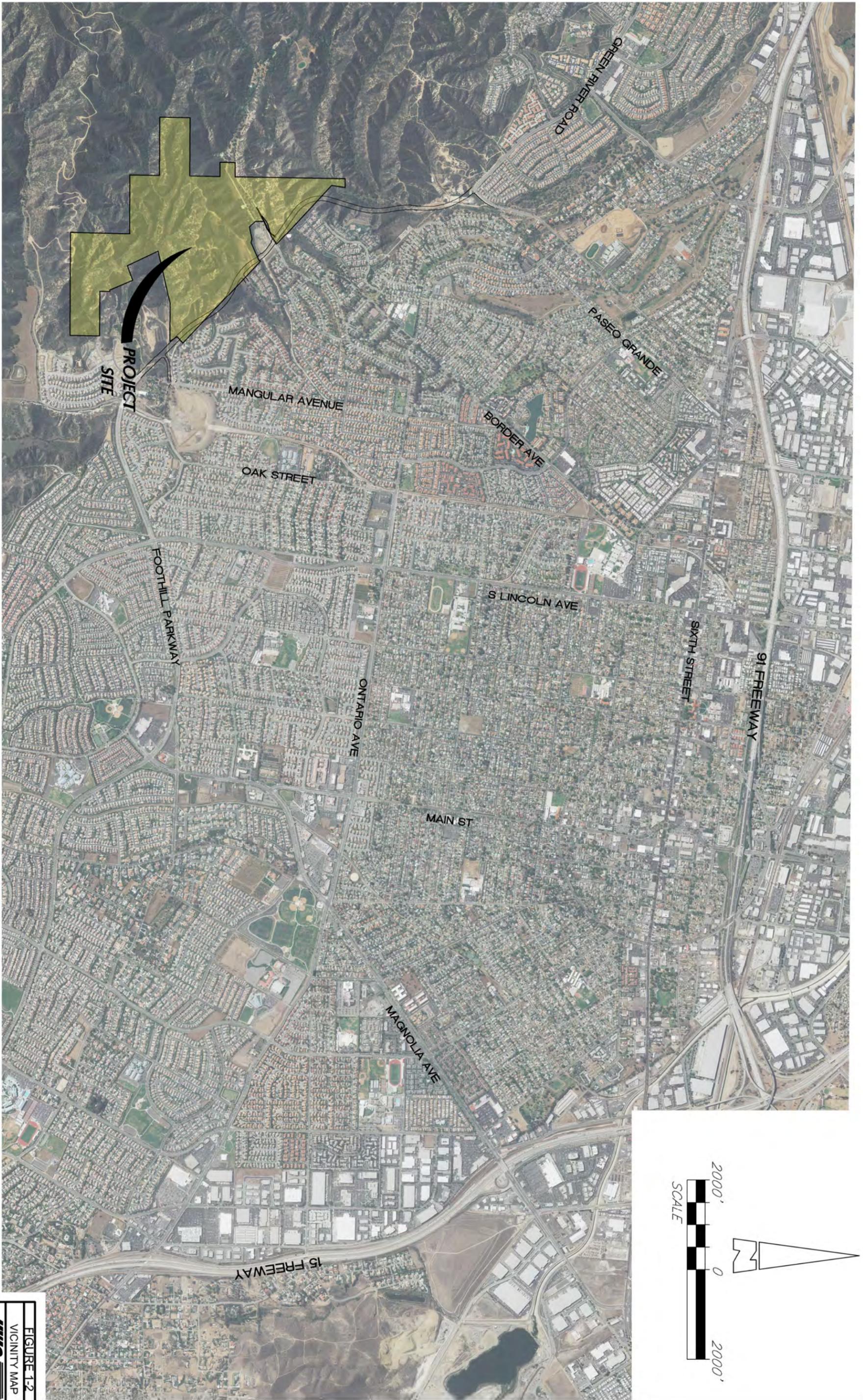


FIGURE 12
VICINITY MAP
RWG ENGINEERS

2

**DESIGN CRITERIA/
PROJECTED SEWAGE FLOWS**

This section presents the design criteria used to estimate the sewage flows and evaluate the recommended sewer system improvements required for the Skyline Heights project, and surrounding tributary areas within the sewershed 14 and 16 drainage area. See **Appendix C** for the existing sewershed boundaries. The criteria utilized in this study are in accordance with the September 2005 City of Corona Sewer Master Plan and the 2012 City’s Department of Water and Power Design Policy.

2.1 SEWAGE FLOWS

The sewage generation factors used to estimate the average daily flows for the project and surrounding tributary area are listed in **Table 2-1**.

TABLE 2-1

Recommended Unit Sewage Generation Factors			
Land Use category	Existing Unit Flow Factor (gpd/ac)	Ultimate Unit Flow Factor (gpd/ac)	Residential Flow Factors (gpd/du)
Rural Residential 1 (0.2 to 0.5 du/ac)	150	150	300
Rural Residential 2 (1 du/ac)	300	300	300
Residential Estate (1-3 du/ac)	500	500	300
Residential Low Density (3-6 du/ac)	1,000	1,000	270
Low Medium Density (6-8 du/ac)	1,200	1,200	270
Medium Density (6-15 du/ac)	1,700	1,700	240
High Density (15-36 du/ac)	2,000	2,000	200
Mixed Use	700	700	-
Commercial Business District	1,000	1,050	-
General Community Commercial	1,000	1,050	-
Office Professional	1,200	1,260	-
General Industrial	1,100	1,155	-
Institutional	800	800	-
Open Space/Recreation	130	130	-

To convert average dry weather daily flows to peak dry weather flows, the following formula was used:

$$\text{Peak Dry Weather Flow} = 1.95 * (\text{Average Flow in cfs})^{0.92}$$

2.2 GRAVITY SEWERS

All gravity sewers have been designed to convey peak flow. **Table 2-2** lists the maximum d/D peak dry weather flow for proposed and existing gravity sewer lines. All proposed pipes are designed with a d/D less than or equal to 0.50 at peak dry weather flows. Manning’s Equation with an “n” value of 0.013 was used to size all gravity sewers. All new sewers were designed to maintain a minimum velocity of two feet per second at design capacity to prevent the deposition of solids. To minimize excessive wear and tear of the pipe, pipes shall be designed to not exceed a maximum 8 feet per second velocity. All pipes will have a minimum of 7 feet of cover. **Table 2-3** lists the minimum slope requirements for various pipe sizes. When minimum velocities are not able to be met, minimum pipe slopes shall be maintained.

TABLE 2-2

d/D Criteria	
Pipe Size	Max d/D Peak Dry Weather Flow
Existing 12 inch diameter or smaller	0.64
Existing 15 inch diameter or larger	0.67
Proposed 12 inch diameter or smaller	0.50
Proposed 15 inch diameter or larger	0.67

TABLE 2-3

Minimum Slope Requirements	
Sewer Pipe Size (in)	S (ft/ft)
8	0.0040
10	0.0025
12	0.0020
15	0.0012
18	0.0010
21	0.0008
24	0.0007

2.3 PROJECTED SEWAGE FLOWS

Table 2-4 shows the calculated values for Average Dry Weather Flow (ADWF) and the Peak Dry Weather Flow (PDWF) for the Skyline Heights project. Calculations are based on the assumption of 270 gpd/du for low density residential development as stated in the Department of Water and Power 2012 Design Policy. The City of Corona Sewer Master Plan estimates that the Skyline West Project would produce approximately 278,050 gpd (or 0.430 cfs) which is 3.5 times more than the average dry weather flows projected for the Skyline Heights project 78,840 gpd (or 0.122 cfs). The estimated peak dry weather flow for the Skyline project based on the City’s peak flow equation is approximately 0.281 cfs.

TABLE 2-4

Skyline Heights - Projected Sewage Flows					
Project Sewer Drainage Area	Tributary Sewershed	No. of Lots	ADWF		PDWF
			MGD	CFS	CFS
Area 1	14	45	0.012	0.019	0.050
Area 2	14	196	0.053	0.082	0.195
	Subtotal	241	0.065	0.101	0.236
Area 3	16	51	0.014	0.021	0.056
	Project Total	292	0.079	0.122	0.281

3

EXISTING AND PROPOSED WASTEWATER FACILITIES

This section discusses the existing and proposed wastewater facilities as identified in City of Corona's 2005 Sewer Master Plan from September 2005 for the Skyline Heights project area. The Skyline Heights project's sewer contributions are tributary to the City's sewershed 14 and sewershed 16 which are tributary to Waste Water Treatment Plant (WWTP1).

3.1 2005 EXISTING FACILITIES

The Skyline Heights project is located in the City of Corona Department of Water and Power service area. The project is located West of the Interstate 15 Freeway connecting to the proposed Foothill Parkway. The Skyline Heights drainage area drains west towards the existing Wastewater Treatment Plant 1. The current treatment capacity of WWTP 1 is 11.5 MGD with an expected future reliable treatment capacity of 14.5 MGD with improvements. The project's proposed sewer flows will tie into the City's existing trunk sewer system, Mabey Canyon Road at Falcon Circle (Node 14-08680), in Border Avenue at Condor Circle (Node 14-09700), and in Chase Drive at Oak Street (Node 16-09300).

Sewershed 14 is located generally west of Lincoln Avenue between the Prado Flood Control Basin and the southerly city boundary. The trunk sewers in Sherman Avenue and Smith Avenue transport wastewater flows north to the 42-inch Railroad Trunk Sewer. These flows are tributary to the WWTP 1.

Sewershed 16 is located from west of Lincoln Avenue to east of Kellogg and Garretson Avenue, extending from the northerly service area boundary to the southerly City limits. Trunk sewers in Buena Vista Avenue, Vicentia Avenue, Sheridan Street, Victoria Avenue, and Joy Street convey waste water flows from the south to the 42-inch Railroad Trunk Sewer. Flows north of Temescal Wash are collected at the Joy and Parkridge Lift Station and then pumped across the wash to Harrison Street. From this point, the sewage flows by gravity to Railroad Street. These flows are tributary to the WWTP 1.

3.2 2005 CAPITAL IMPROVEMENT PROJECTS

In anticipation of the increased sewer flows associated with future developments throughout the City of Corona, the Department of Water and Power has proposed a number of Capital Improvement Projects to address deficiencies in the existing gravity sewer system. According to the 2005 Sewer Master Plan, there are three future planned Capital Improvement Projects which have been identified as CIP Project P-10 and P-12.

CIP Project P-10 will replace 8-inch and 10-inch sewers within Avenida Del Vista, Sixth Street, and Smith Avenue which have been identified to have a d/D varying between 0.65 and full under peak dry weather conditions. CIP Project P-12 is located upstream from project P-10 which has a d/D range from 0.68 to full under peak dry weather conditions. **Table 3-1** identifies these deficient pipe segments and their approximate locations.

TABLE 3-1

2005 Sewer Master Plan Deficient Pipelines - D/S of Skyline Heights Project						
Pipe segment	Existing Pipe Diameter (in)	Existing Pipe Length (ft)	Existing Pipe Slope (ft/ft)	Existing Peak Dry Weather Flow (cfs)	Existing Velocity (ft/s)	Existing Peak Dry Weather d/D
Kroonen Drive						
3468	8	169	0.0037	0.6615	2.398	0.74
3452	8	170	0.0040	0.6649	2.472	0.72
Brentwood Drive						
3212	8	164	0.0039	0.7624	2.184	1.00
Avenida Del Vista						
2694	10	113	0.0042	1.1582	2.922	0.68
2662	10	363	0.0044	1.1669	2.955	0.68
6 th Street						
1941	12	354	0.0017	1.9034	2.423	1.00
Smith Avenue						
1764	10	96	0.0203	2.3763	6.314	0.65
1748	10	253	0.0211	2.3915	6.423	0.65
1701	10	253	0.0202	2.4204	6.323	0.66
1658	10	403	0.0213	2.4269	6.463	0.65
1582	10	127	0.0206	2.4307	6.381	0.66
4984	10	257	0.0194	2.4467	6.237	0.68
1498	10	395	0.0202	2.4772	6.356	0.67
1406	10	319	0.0200	2.4837	6.331	0.68
1305	10	76	0.0170	2.5746	5.946	0.74
1291	10	106	0.0188	2.5751	6.208	0.71
1270	10	290	0.0196	2.6013	6.325	0.71
1062	10	148	0.0328	3.2918	8.146	0.69
979	10	301	0.0300	3.3124	7.859	0.72

3.3 UPDATED 2005 EXISTING SEWER MODEL

Since the completion of the 2005 Sewer Master Plan there have been a few changes to the existing sewer model. Pipe segments 6139, 7475, and 1941 has been upgraded from 12-inch to 15-inch and the slope of each pipe segment was changed to match Drawing No. 01-014U. The average sewer flow entering Node 14-17370 has been reduced from 0.2565 cfs to 0.1404 cfs as a result from 0.1181 cfs of flow being diverted to 8-inch sewer line south east of Manhole No. 2546. As a result of these system changes a number of previously deficient pipelines are no longer considered deficient. The updated list of existing deficiencies can be seen in **Table 3-2**.

TABLE 3-2

Updated 2005 Sewer Master Plan Deficient Pipelines - D/S of Skyline Heights Project						
Pipe segment	Existing Pipe Diameter (in)	Existing Pipe Length (ft)	Existing Pipe Slope (ft/ft)	Existing Peak Dry Weather Flow (cfs)	Existing Peak Dry Weather Velocity (ft/s)	Existing Peak Dry Weather d/D
Kroonen Drive						
3468	8	169	0.0037	0.6615	2.398	0.74
3452	8	170	0.0040	0.6649	2.472	0.72
Brentwood Drive						
3212	8	164	0.0039	0.7624	2.184	1.00
Avenida Del Vista	10					
2694	10	113	0.0042	1.1582	2.922	0.68
2662	10	363	0.0044	1.1669	2.955	0.68
Smith Avenue						
1305	10	76	0.0170	2.3671	5.87	0.69
1291	10	106	0.0188	2.3676	6.12	0.67
1270	10	290	0.0196	2.3939	6.23	0.66
1062	10	148	0.0327	3.0888	8.05	0.66
979	10	301	0.0300	3.1095	7.78	0.69

3.4 PROPOSED FACILITIES

The analysis of projected sewage flows for the Skyline Heights project and its estimated sewer contribution to the overall WWTP 1 peak flow treatment volume is consistent with the wastewater facilities identified with the City of Corona 2005 Sewer Master Plan.

The project site is broken up into three drainage areas. Area 1 consists of the 45 lots north of Mabey Canyon which drains to existing sewer manhole Node 14-08680 located in Mabey Canyon Road at Falcon Circle with an estimated peak sewer flow of 0.050 cfs from Area 1 tributary to Node 14-08680. Area 2 consists of 196 lots which drain to existing sewer manhole node 14-09700 located in Border Avenue at Condor Circle has an estimated peak sewer flow of 0.195 cfs from Area 2 and is tributary to Node 14-09700. Area 3 is located in the southern most area of the project consisting of 51 lots and draining to existing sewer manhole Node 16-09300 located in Chase Drive at Oak Street has an estimated peak sewer flow of 0.056 cfs from Area 3 tributary to Node 16-09300. Although Area 3 drains into existing 8-inch gravity sewer lines

upstream of Node 16-09300, the capacity of the pipes is adequate. All of the sewer facilities are designed to be in conformance with the City of Corona Department of Water and Power design guidelines. All onsite sewer facilities are sized for 8-inch gravity sewer lines which are contained within the street right-of-way. The pipe capacity of an 8-inch gravity sewer line having a 1% pipe slope is 0.59 cfs at a d/D of 0.50 is therefore sufficient to accommodate the flows within the project site. **Figure 3-1** shows the preliminary sewer layout for the Skyline Heights project.

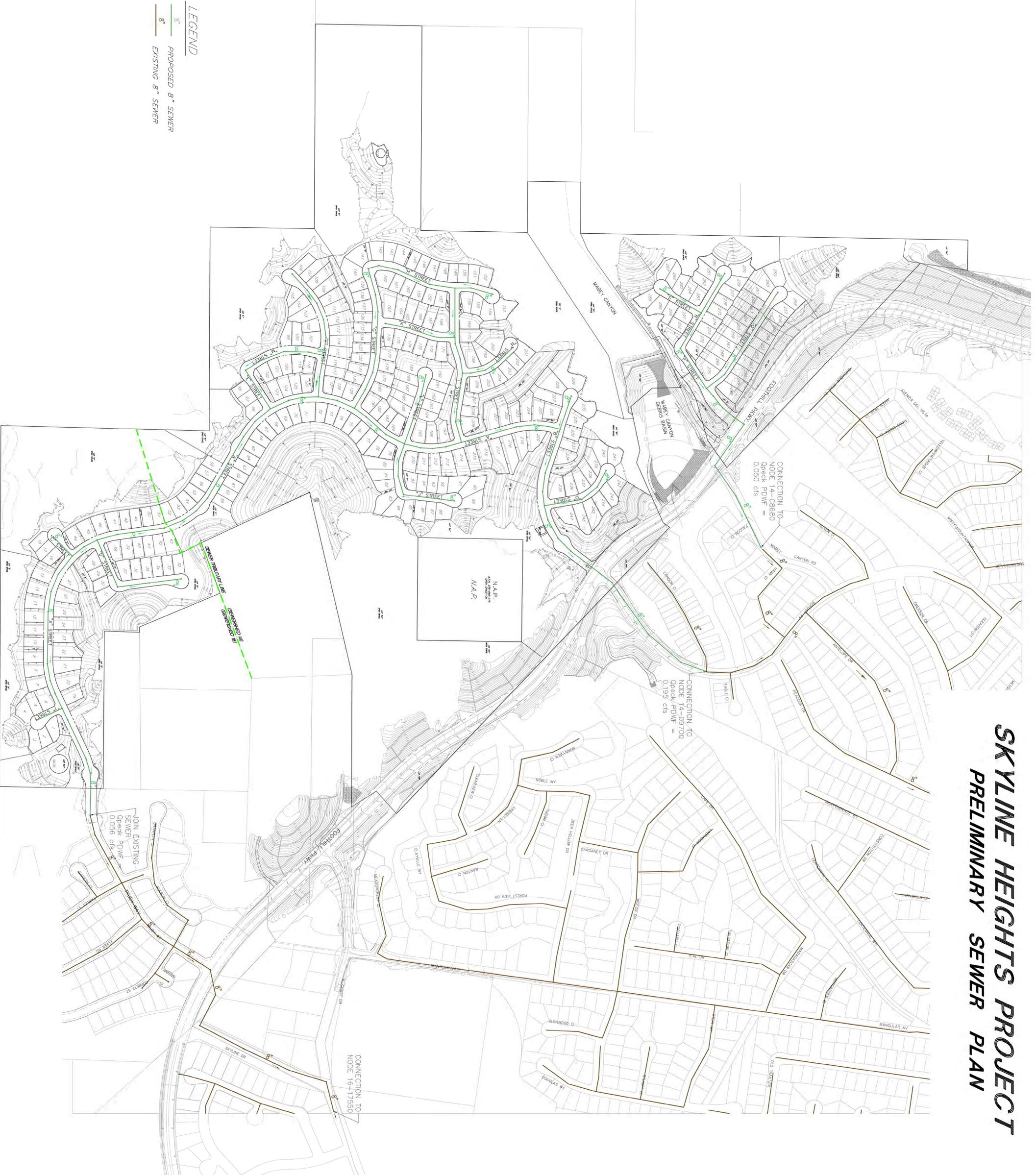
3.5 OFFSITE SEWER ANALYSIS

To analyze the offsite sewer impacts, hydraulic analysis was performed along the downstream trunk sewer system from the project's sewer connection points to the WWTP 1 near Railroad Street. The sewer modeling data contained in the 2005 Sewer Master Plan was used for the analysis data on the sewer collection system. An existing condition model was created using the existing updated 2005 sewer flows. A post-project condition model was then created by adding the proposed peak sewer flows to the collection system at their respective connection points. The sewer model was modeled utilizing the Innovzy H20MAP Sewer v10.5. The results of the sewer model are shown in **Appendix D**.

Table 3-3 shows existing offsite pipeline segments are deficient as a result of post project sewage contributions. All pipe segments identified previously in the updated 2005 Sewer Master Plan model as deficient lines and is currently planned for in the City's Capital Improvement Project are also included in **Table 3-3**. All post project deficient pipelines fall within sewershed 14. The post project deficient pipelines include 503 LF of existing 8-inch pipe, 3248 LF of existing 10-inch pipe, and 228 LF of existing 12-inch pipe. These pipelines are considered deficient based on the City's maximum d/D criteria, however, may be considered a low priority and would not be recommended for immediate replacement or upgrades.

Table 3-4 shows the recommended pipe upgrades for the impacted post-project deficient pipelines. Each deficient pipe is sized up to the next common gravity sewer pipe diameter (8-inch to 10-inch, 10-inch to 12-inch, and 12-inch to 15-inch). As a result of the proposed pipe upgrades, all impacted pipe segments will fall below the maximum d/D requirement. It is important to not that many of the pipelines which were identified as deficient per City of Corona DWP Design Criteria are slightly above the d/D threshold for peak dry weather condition based on the City's peaking factor equation. With advances in reduce flow technology; overall sewer system may experience a reduction in sewer hydraulic flows in the pipeline and to the wastewater treatment plant.

SKYLINE HEIGHTS PROJECT PRELIMINARY SEWER PLAN



LEGEND

8" PROPOSED 8" SEWER

8" EXISTING 8" SEWER

TABLE 3-3

Post-Project Deficient Pipelines – D/S of Skyline Heights Project									
Pipe segment	U/S Node ID	D/S Node ID	Ex. Pipe Length (ft)	Ex. Pipe Dia. (in)	Ex. Pipe Slope (ft/ft)	Ex. Peak Dry Weather Flow (cfs)	Post Project Peak Dry Weather Flow (cfs)	Ex. Peak Dry Weather d/D	Post Project Peak Dry Weather d/D
5776	14-15390	14-15460	228.03	12	0.0055	1.8788	2.0599	0.6209	0.6617
1764	14-17720	14-17940	96.01	10	0.0203	2.1672	2.3461	0.6119	0.6458
1701	14-18070	14-18270	253.00	10	0.0202	2.2116	2.3903	0.6215	0.6555
1658	14-18270	14-18400	402.85	10	0.0213	2.2182	2.3968	0.6117	0.6447
1582	14-18400	14-18260	127.04	10	0.0206	2.2220	2.4006	0.6190	0.6527
4984	14-18260	14-18380	257.21	10	0.0194	2.2381	2.4166	0.6346	0.6698
1498	14-18380	14-18580	394.77	10	0.0202	2.2690	2.4472	0.6318	0.6661
1406	14-18580	14-18750	318.63	10	0.0200	2.2755	2.4536	0.6354	0.6700
3468	14-14070	14-13700	168.56	8	0.0037	0.6615	0.8582	0.7369	1.0000
3452	14-13700	14-13400	170	8	0.004	0.6649	0.8615	0.7197	1.0000
3212	14-12790	14-12570	164	8	0.0039	0.7624	0.9570	1.0000	1.0000
2694	14-11280	14-11370	113	10	0.0042	1.1582	1.3465	0.6821	0.7708
2662	14-11370	14-11660	363.21	10	0.0044	1.1669	1.3551	0.6799	0.7668
1305	14-18750	14-18780	76.37	10	0.017	2.3671	2.5446	0.6927	0.7332
1291	14-18780	14-18820	105.7	10	0.0188	2.3676	2.5452	0.6676	0.7046
1270	14-18820	14-18960	290.3	10	0.0196	2.3939	2.5713	0.6633	0.6992
1062	14-19200	14-19260	148.12	10	0.0328	3.0888	3.2625	0.6625	0.6895
979	14-19390	14-19560	301.37	10	0.03	3.1095	3.2831	0.6874	0.7167

TABLE 3-4

Recommended Pipe Upgrades							
Pipe Segment	Pipe Length (ft)	Pipe Slope (ft/ft)	Ex. Pipe Dia. (in)	Proposed Replacement/ Parallel Pipe Dia. (in)	Post Project Peak Dry Weather Flow (cfs)	Post Project Peak Dry Weather d/D	Upgraded Peak Dry Weather d/D
5776	228.03	0.0055	12	15	2.0599	0.6617	0.4569
1764	96.01	0.0203	10	12	2.3461	0.6458	0.4767
1701	253.00	0.0202	10	12	2.3903	0.6555	0.4827
1658	402.85	0.0213	10	12	2.3968	0.6447	0.4761
1582	127.04	0.0206	10	12	2.4006	0.6527	0.4810
4984	257.21	0.0194	10	12	2.4166	0.6698	0.4913
1498	394.77	0.0202	10	12	2.4472	0.6661	0.4891
1406	318.63	0.0200	10	12	2.4536	0.6700	0.4914
3468	168.56	0.0037	8	12	0.8582	1.0000	0.4355
3452	170.00	0.004	8	12	0.8615	1.0000	0.4282
3212	164.00	0.0039	8	12	0.9570	1.0000	0.4575
2694	113.00	0.0042	10	12	1.3465	0.7708	0.5457
2662	363.21	0.0044	10	12	1.3551	0.7668	0.5439
1305	76.37	0.017	10	12	2.5446	0.7332	0.5269
1291	105.70	0.0188	10	12	2.5452	0.7046	0.5113
1270	290.30	0.0196	10	12	2.5713	0.6992	0.5083
1062	148.12	0.0328	10	12	3.2625	0.6895	0.5027
979	301.37	0.03	10	12	3.2831	0.7167	0.5180

CONCLUSIONS

The Skyline Heights project will require the following Sewer Infrastructure to be constructed and improved:

Skyline Heights Ultimate Build-out and Improvements

- Construction of 8-inch onsite gravity sewer lines within the Skyline Heights project;
- Construction of offsite 8-inch gravity sewer lines from onsite sewer system to existing sewer system connection points; and
- Potential mitigation of downstream trunk sewer impacts as a result of the sewer contributions from the Skyline Heights Project. The existing sewer system impacts are approximately 503 LF of 8-inch pipe, 3248 LF of 10-inch pipe and 228 LF of 12-inch pipe.

The City of Corona Sewer Master Plan estimates that the Skyline West Project would produce approximately 278,050 gpd (or 0.43 cfs) which is 3.5 times more than the average flows projected for the Skyline Heights project 78,840 gpd (or 0.122 cfs). The estimated peak dry weather flow for the Skyline project based on the City's peak flow equation is approximately 0.281 cfs. As a result, the Wastewater Treatment Plant 1 will be able to accommodate the anticipated sewer flows from the project. All onsite sewer facilities are 8-inch gravity sewer pipes and are contained within the proposed street right-of-ways. The proposed Skyline Heights onsite sewer facilities presented in this report are preliminary estimates of the anticipated sewer facilities necessary to service the project needs. All of the sewer facilities will be designed to the City of Corona Department of Water and Power latest Design Policy and Standards.

A

REFERENCES

City of Corona Sewer Master Plan, AKM Consulting Engineers, September 2005.

City of Corona Department of Water and Power Design Policy, November 2012.

Appendix

B

SKYLINE HEIGHTS

TTM 36544

SKYLINE HEIGHTS - TENTATIVE TRACT MAP NO. 36544 IN THE CITY OF CORONA

LEGAL DESCRIPTION:

PARCEL 1: (PART 275-040-012) ALL THE PORTION OF THE PORTION 1/4 OF THE CORNER 1/4 OF SECTION 4, TOWNSHIP 4 SOUTH, RANGE 7 WEST, SAN BERNARDINO BASIN AND MARIANA, SAN BERNARDINO COUNTY, CALIFORNIA.

EASEMENTS:

THE SHOWN EASEMENTS WERE PLACED FROM RECORD DATA BASED ON THE RECORDS OF THE COUNTY OF SAN BERNARDINO, CALIFORNIA.

GENERAL NOTES:

- 1. PREPARED JUNE 2013
2. TOTAL PROPOSED GROSS SQUARE FEET IS 270,919 AC. (INCLUDES 16,241 ACRES FOR FOOTBALL PARKWAY ACQUISITION BY CITY OF CORONA).

PROPERTY OWNERSHIP INFORMATION:

PARCEL 1: (PART 275-040-012) CITY OF CORONA
PARCEL 2: (PART 275-040-013) CITY OF CORONA
PARCEL 3: (PART 275-040-014) CITY OF CORONA

UTILITY LEGEND:

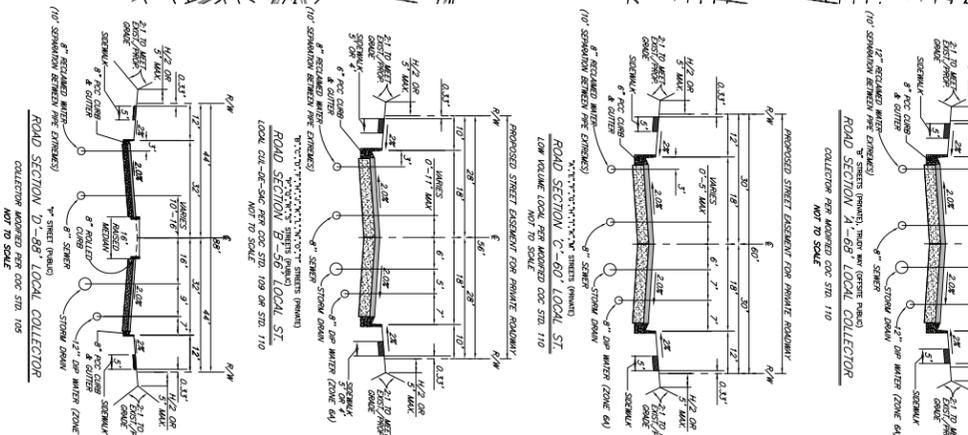
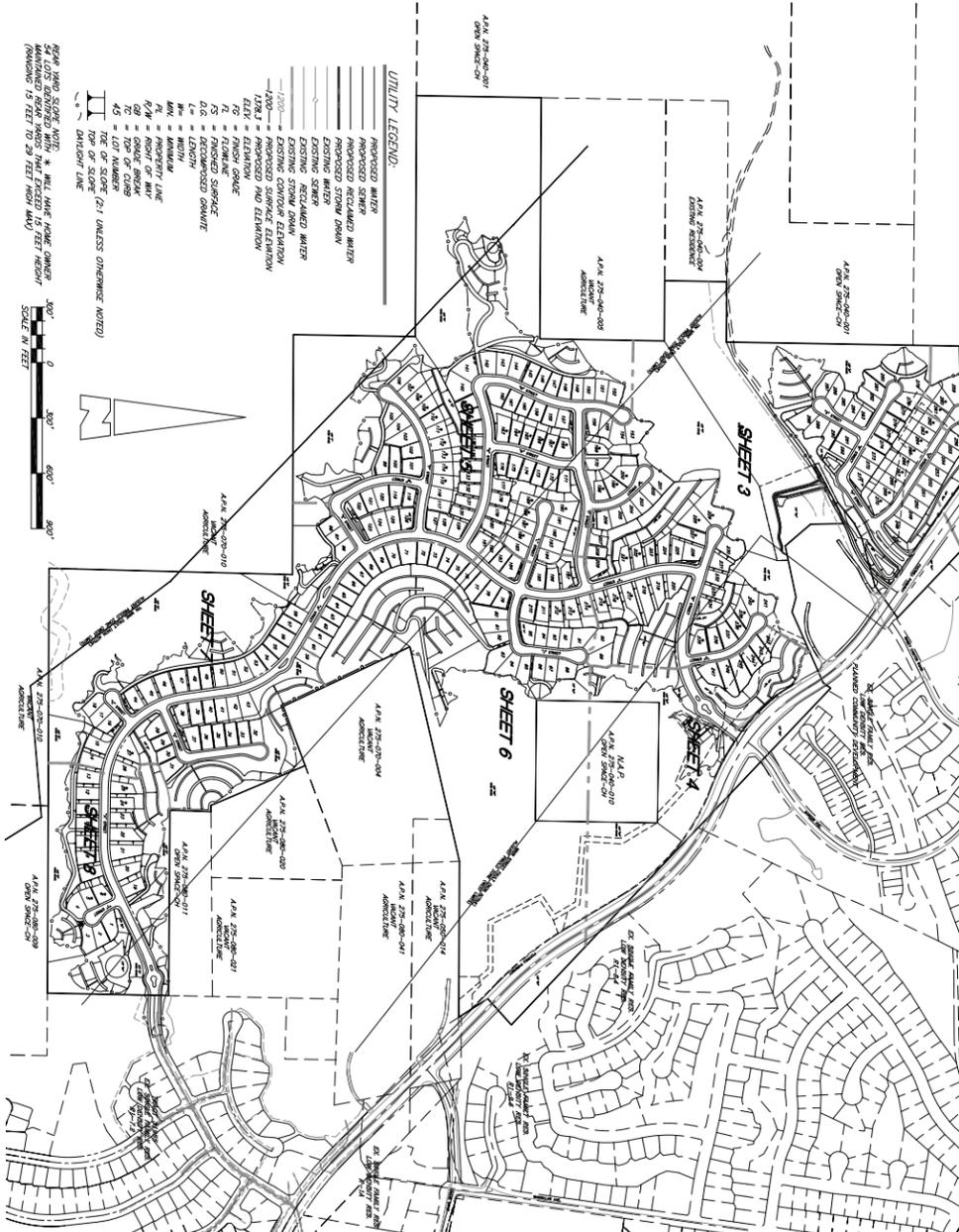
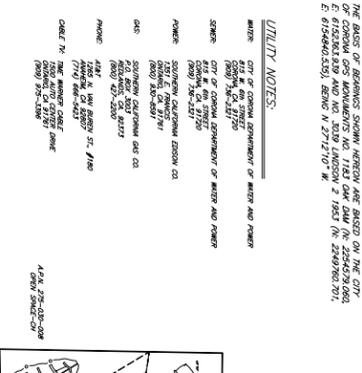


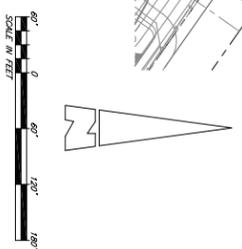
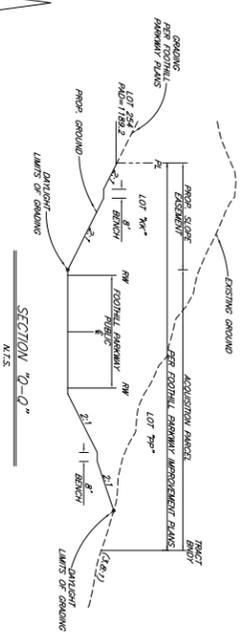
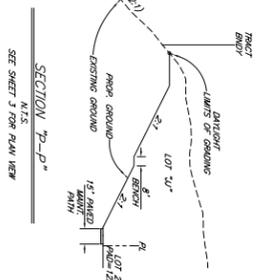
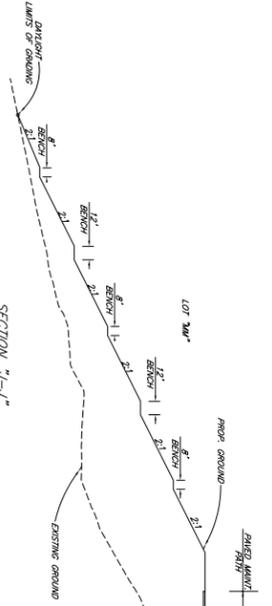
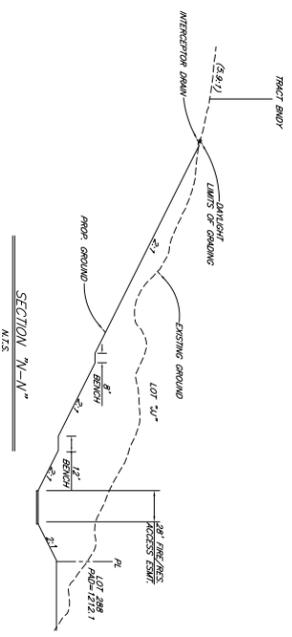
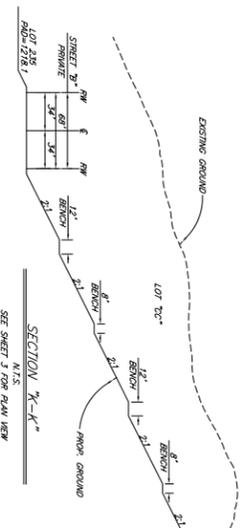
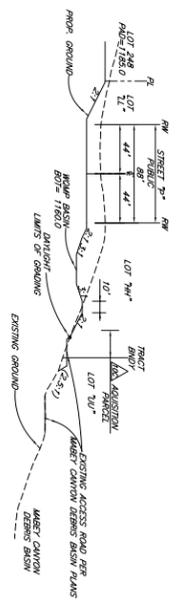
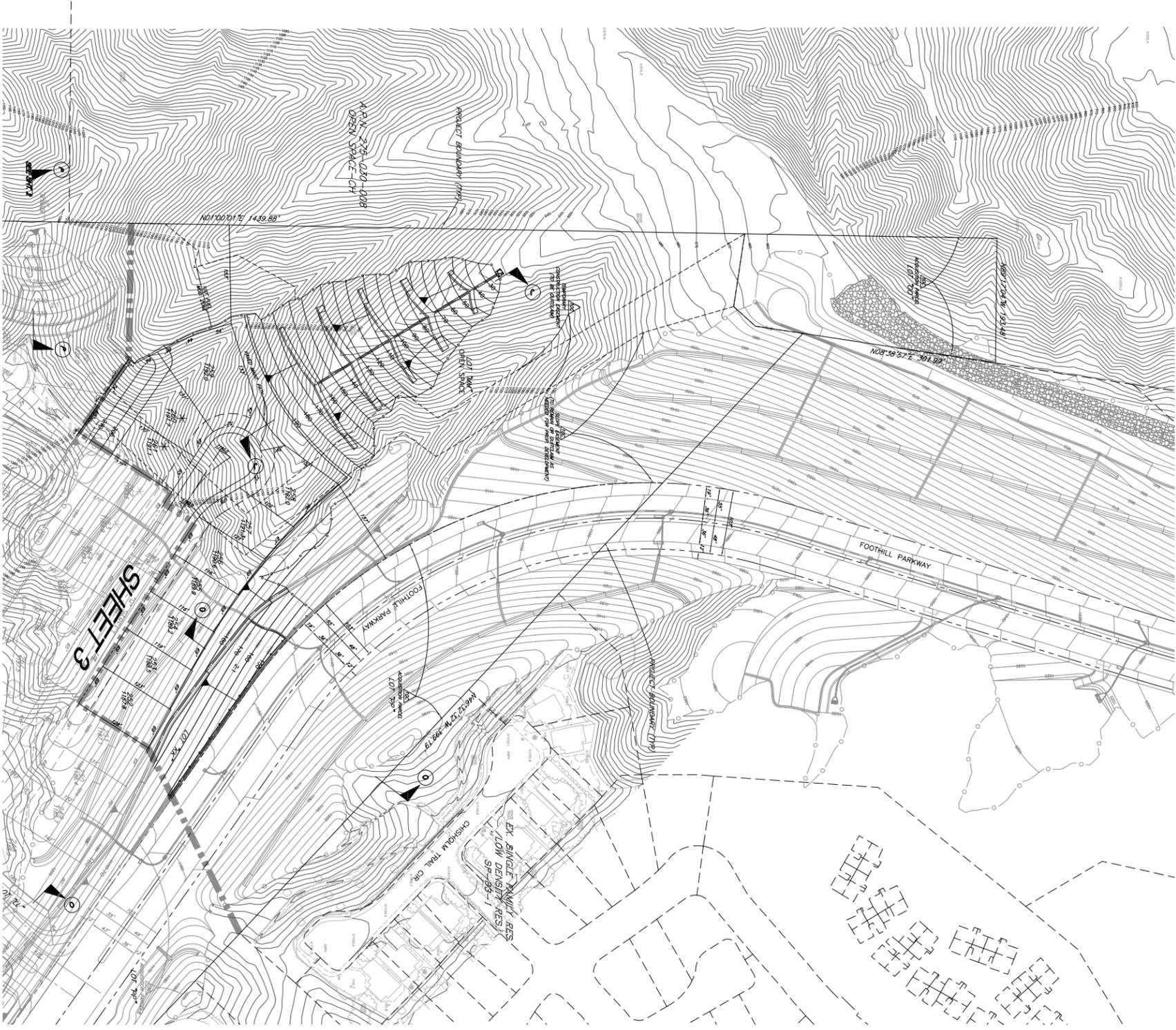
Table with 10 columns: LOT NO., AREA, PERCENTAGE, etc. for lot analysis.



Table with 10 columns: LOT NO., AREA, PERCENTAGE, etc. for lot analysis.

Large table with 10 columns: LOT NO., AREA, PERCENTAGE, etc. for lot analysis.

Project summary information including 'TOTAL SITE ESTIMATED CUT/FILL VOLUMES', 'PROJECT TOTALS', and contact information for Richard Developers, Inc.



TENTATIVE TRACT MAP NO. 36544
SKYLIVE HEIGHTS
CITY OF CORONA

PREPARED BY
RWG ENGINEERS
 1880 CENTRAL EXPRESSWAY, SUITE 200, IRVINE, CA 92614
 TEL: 949-261-1111 FAX: 949-261-1112

PREPARED FOR
 RICHLAND DEVELOPERS, INC.
 3161 MICHELSON DRIVE, SUITE 425
 IRVINE, CA 92612
 949-261-7010

SHEET
 2 OF 11
 SHEETS



EX. SINGLE-FAMILY RES.
 LOW-DENSITY RES.
 PLANNED COMMUNITY DEVELOPMENT

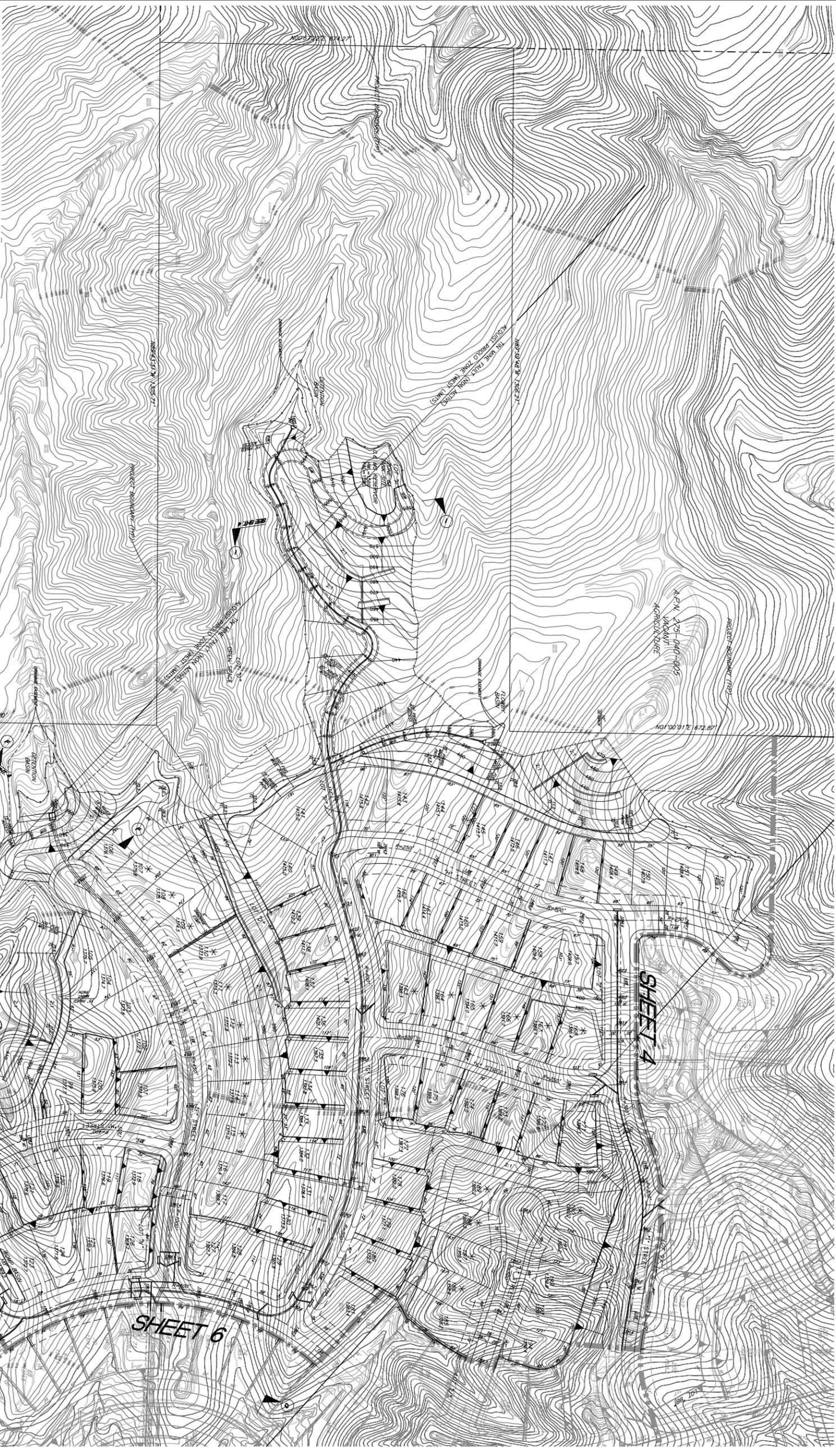


TENTATIVE TRACT MAP NO. 36544
 SKYLINE HEIGHTS
 CITY OF CORONA

PREPARED FOR
 RICHLAND DEVELOPERS, INC.
 3161 MICHELSON DRIVE, SUITE 425
 IRVINE, CA 92612
 949-261-7010

PREPARED BY
RWC
 ENGINEERS

SHEET
 3 OF 11
 SHEETS



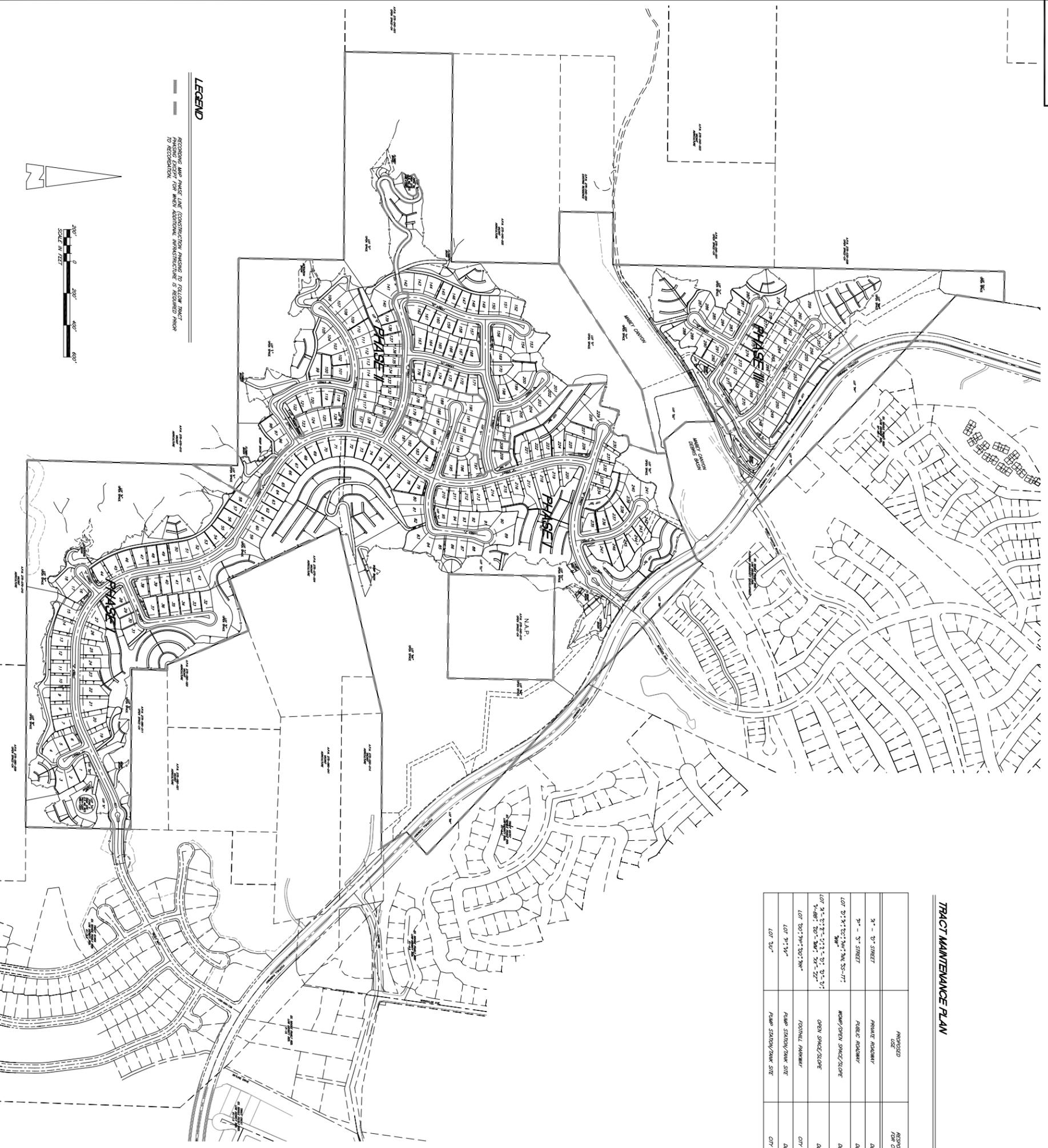
TENTATIVE TRACT MAP NO. 36544
 SKYLARK HEIGHTS
 CITY OF CORONA

PREPARED FOR
 RICHLAND DEVELOPERS, INC.
 3161 MICHELSON DRIVE, SUITE 425
 IRVINE, CA 92612
 949-261-7010

PREPARED BY
HWC
 ENGINEERS

SHEET
 5 OF 11
 SHEETS

100' 0" 200' 0" 400' 0" 800' 0" 1600' 0"
 SCALE IN FEET



LEGEND

REGROUND MAP PHASE LINE CONSTRUCTION PHASING TO FOLLOW TRACT PHASING EXCEPT FOR WHEN ADDITIONAL INFRASTRUCTURE IS REQUIRED INPHASE TO RECONSTRUCT



TRACT MAINTENANCE PLAN

PROPOSED USE	RESPONSIBLE PARTY FOR CONSTRUCTION	RESPONSIBLE PARTY FOR MAINTENANCE
PRIVATE ROADWAY	DEVELOPER	PROJECT HOA
PUBLIC ROADWAY	DEVELOPER	CITY OF CORONA
ROAD/OPEN SPACE/SLOPE	DEVELOPER	PROJECT HOA
OPEN SPACE/SLOPE	DEVELOPER	PROJECT HOA
ROOMING ROOMWAY	CITY OF CORONA	CITY OF CORONA
PUMP STATION/PUMP SITE	DEVELOPER	CITY OF CORONA
PUMP STATION/PUMP SITE	CITY OF CORONA	CITY OF CORONA

TRACT PHASING PLAN

TENTATIVE TRACT MAP NO. 36544
 SKYLARK HEIGHTS
 CITY OF CORONA

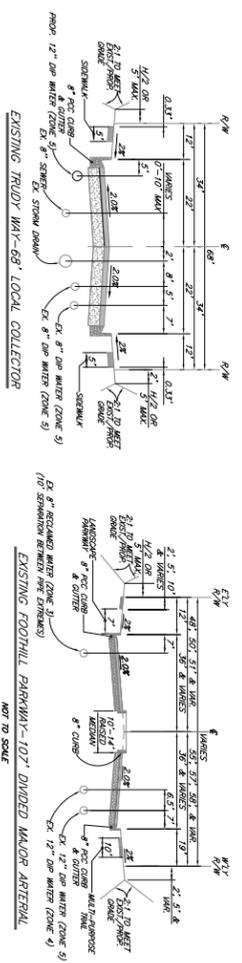
PREPARED FOR
 RICHLAND DEVELOPERS, INC.
 3161 MICHELSON DRIVE, SUITE 425
 IRVINE, CA 92612
 949-261-7010

PREPARED BY
 RUC ENGINEERS
 1880 CORONA AVE., SUITE 200, CORONA, CA 92703
 949-261-7010

SHEET
 9 OF 11
 SHEETS

PRESSURE ZONE SUMMARY

ZONE	RECLAIMED WATER	WATER PRESSURE SERVICE ELV.
ZONE 5 (150' HML)	144'	144'
ZONE 6A (180' HML)	144'	144'



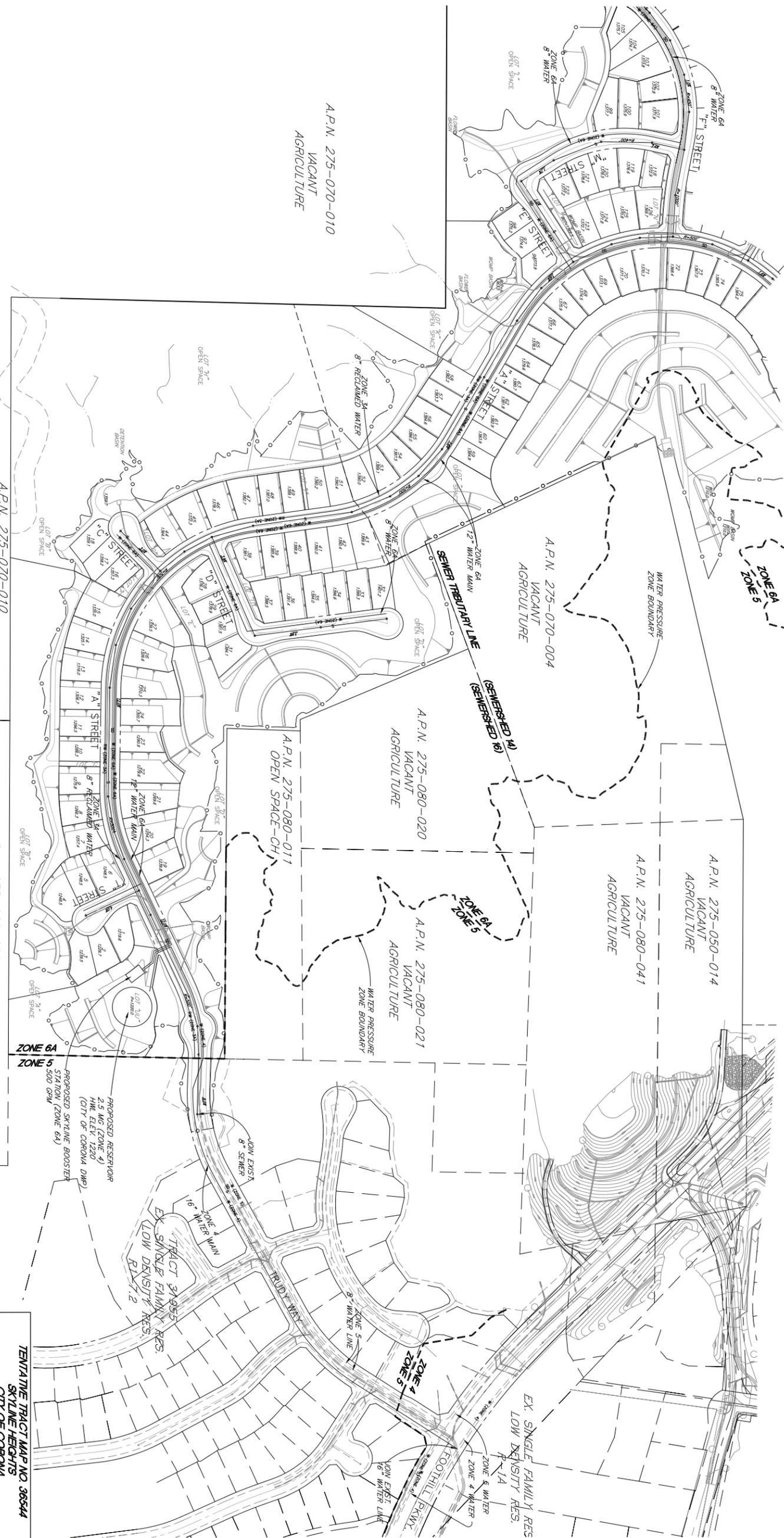
SEE CROSS SECTIONS ON SHEET 1 FOR PROPOSED ON-SITE UTILITY LOCATIONS

GENERAL INFRASTRUCTURE IMPROVEMENT NOTES:

- DOMESTIC WATER SYSTEM:**
- 1) ALL DOMESTIC WATER DESIGN CRITERIA SHALL BE PER CITY OF CORONA DEPARTMENT OF WATER AND POWER STANDARDS AND RIVERSIDE COUNTY DEPARTMENT OF HEALTH SERVICES STANDARD.
 - 2) MINIMUM STATIC PRESSURE SHALL BE 60 PSI AT PEAK HOUR.
 - 3) ON-SITE FIRE FLOW SHALL BE 500 GPM AT 150 PSI.
 - 4) ALL PROPOSED PUMP STATIONS AND WATER RESERVOIR SITES SHALL BE PUBLICLY MAINTAINED.
- RECLAIMED WATER SYSTEM:**
- 1) ALL RECLAIMED WATER DESIGN CRITERIA SHALL BE PER CITY OF CORONA DEPARTMENT OF WATER AND POWER STANDARDS AND RIVERSIDE COUNTY DEPARTMENT OF HEALTH SERVICES STANDARD UNLESS OTHERWISE APPROVED.
 - 2) ALL LANDSCAPED LOTS SHALL BE SERVED WITH RECLAIMED WATER.
 - 3) ALL PROPOSED PUMP STATIONS SHALL BE PERMITTED & MAINTAINED.
- SEWER SYSTEM:**
- 1) ALL SEWER DESIGN CRITERIA SHALL BE PER CITY OF CORONA DEPARTMENT OF WATER AND POWER STANDARDS AND RIVERSIDE COUNTY DEPARTMENT OF HEALTH SERVICES STANDARD UNLESS OTHERWISE APPROVED.
 - 2) PROJECT DOWNSTREAM SEWER IMPACTS SHALL BE DETERMINED AND MITIGATED AS DIRECTED OR AGREED UPON WITH THE CITY OF CORONA DEPARTMENT OF WATER AND POWER.

INFRASTRUCTURE IMPROVEMENT SUMMARY:

- WATER SYSTEM:**
- 1) THE SKYLINE HEIGHTS PROJECT WILL BE SERVED BY TWO PRESSURE ZONES, THE EXISTING ZONE 5 (150' HML) AND THE INTERMEDIATE ZONE 6A (180' HML). IT IS PROPOSED TO CONSTRUCT PARKWAY TO THE PROPOSED ZONE 6A BOOSTER PUMP STATION.
 - 2) A NETWORK OF ON-SITE 8-INCH DISTRIBUTION MAINS ARE ALSO PROPOSED FOR THE TWO WATER PRESSURE ZONES TO SERVE THE PROPOSED RESIDENTIAL LOTS.
 - 3) A NETWORK OF ON-SITE 8-INCH DISTRIBUTION MAINS ARE ALSO PROPOSED FOR THE TWO WATER PRESSURE ZONES TO SERVE THE PROPOSED RESIDENTIAL LOTS.
 - 4) A NETWORK OF ON-SITE 8-INCH DISTRIBUTION MAINS ARE ALSO PROPOSED FOR THE TWO WATER PRESSURE ZONES TO SERVE THE PROPOSED RESIDENTIAL LOTS.
 - 5) A NETWORK OF ON-SITE 8-INCH DISTRIBUTION MAINS ARE ALSO PROPOSED FOR THE TWO WATER PRESSURE ZONES TO SERVE THE PROPOSED RESIDENTIAL LOTS.
- SEWER SYSTEM:**
- 1) PROPOSED ON-SITE ZONE 3 AND 3A RECLAIMED WATER SYSTEM CONSISTS OF 8-INCH AND 12-INCH DISTRIBUTION MAINS. THESE LINES WILL BE PERMITTED & MAINTAINED.
 - 2) SEVERAL DOWNSTREAM QUALITY SEWER LINES TRIBUTARY TO SERVICED 14 HAVE BEEN IDENTIFIED AS DEFICIENT (Q2-044) OR SHALD BASED ON PERMITS FROM THE PRELIMINARY DESIGN. THESE LINES WILL BE PERMITTED & MAINTAINED.
 - 3) THE CITY OF CORONA'S FOOTHILL PARKWAY WESTERN IMPROVEMENT PROJECT THIS PROJECT IS ANTICIPATED TO BE CONSTRUCTED PRIOR TO THE PROPOSED SKYLINE HEIGHTS PROJECT.



TENTATIVE TRACT MAP NO. 36544
SKYLINE HEIGHTS
CITY OF CORONA

PREPARED BY: **RWG ENGINEERS**

PREPARED FOR: **RICHLAND DEVELOPERS, INC.**
 3161 MICHELSON DRIVE, SUITE 425
 IRVINE, CA 92612
 949-261-7010

SHEET 10 OF 11
 SHEETS

A.P.N. 275-030-008
OPEN SPACE-CH

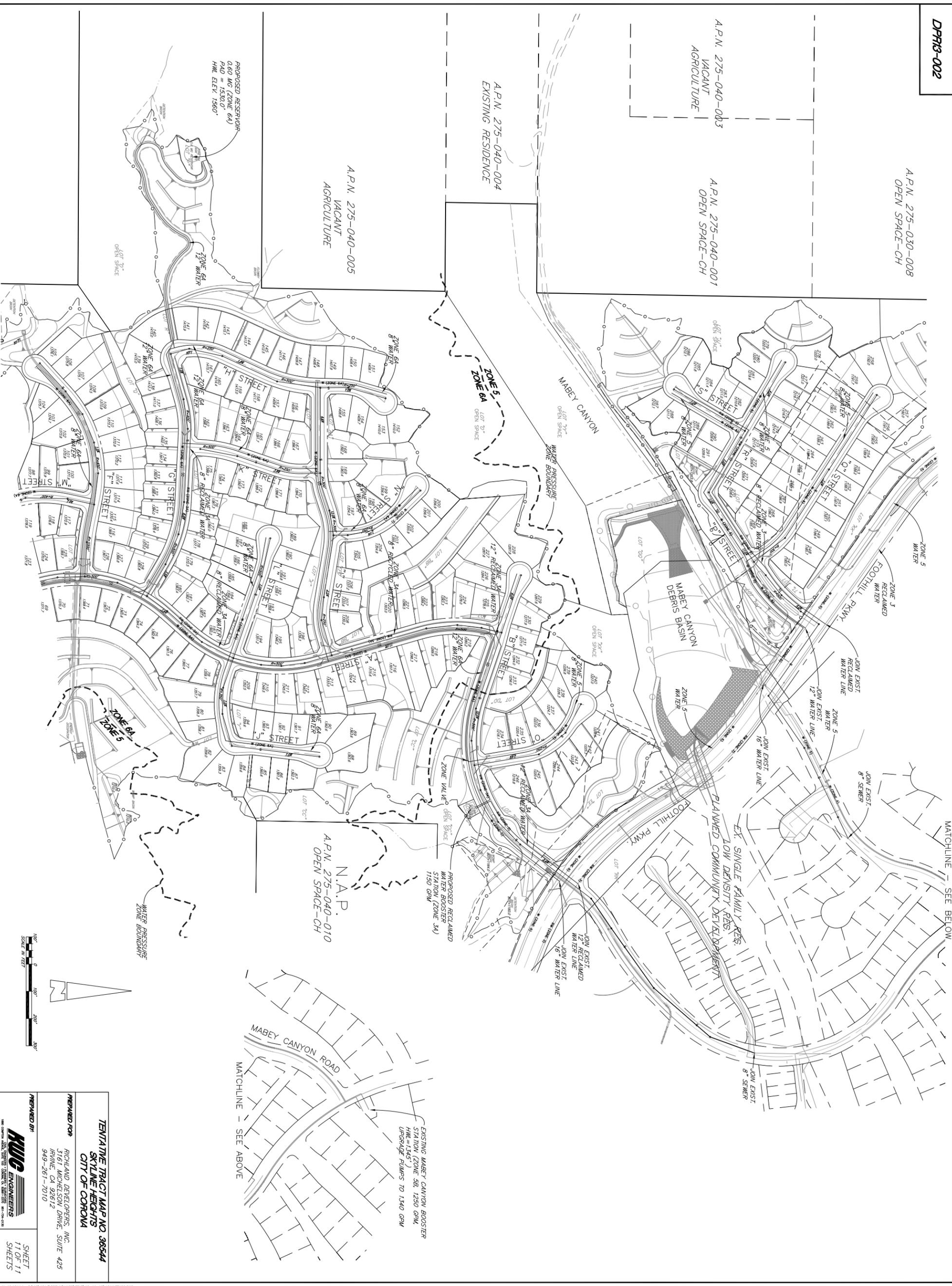
A.P.N. 275-040-003
VACANT
AGRICULTURE

A.P.N. 275-040-001
OPEN SPACE-CH

A.P.N. 275-040-004
EXISTING RESIDENCE

A.P.N. 275-040-005
VACANT
AGRICULTURE

PROPOSED RESERVOIR
0.60 MG (ZONE 64)
PAD = 1530.0'
H.M. ELEV. 1560.0'



MATCHLINE - SEE BELOW

EX. SINGLE FAMILY RES.
LOW DENSITY DEVELOPMENT

PROPOSED RECLAIMED
WATER BOOSTER
STATION (ZONE 34)
1150 GPM

N.A.P.
A.P.N. 275-040-010
OPEN SPACE-CH

EXISTING MABEY CANYON BOOSTER
STATION (ZONE 5B, 1250 GPM,
H.M. = 1345.0')
UPGRADE PUMPS TO 1340 GPM

MATCHLINE - SEE ABOVE



TENTATIVE TRACT MAP NO. 36544
SKYLINE HEIGHTS
CITY OF CORONA

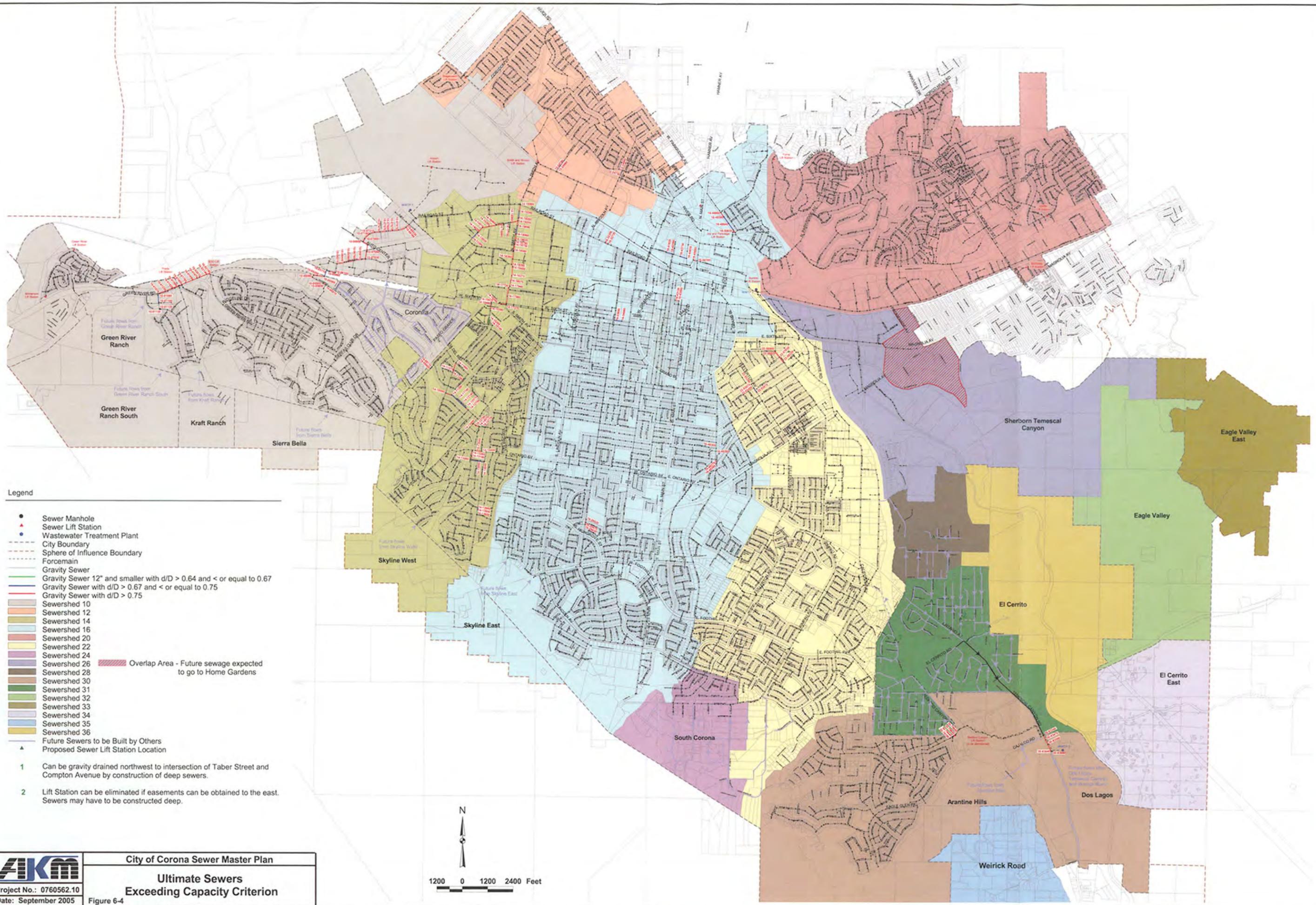
PREPARED FOR
 RICHLAND DEVELOPERS, INC.
 3161 MICHELSON DRIVE, SUITE 425
 IRVINE, CA 92612
 949-261-7010

PREPARED BY
RWG ENGINEERS
 11050
 SHEET 11 OF 11
 SHEETS

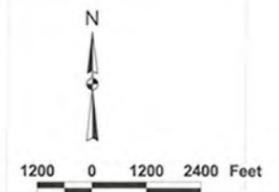
Appendix

C

**SKYLINE HEIGHTS DRAINAGE AREA
AND SEWERSHED BOUNDARY MAP**



- Legend**
- Sewer Manhole
 - ▲ Sewer Lift Station
 - Wastewater Treatment Plant
 - - - City Boundary
 - - - Sphere of Influence Boundary
 - - - Forcemain
 - Gravity Sewer
 - Gravity Sewer 12" and smaller with d/D > 0.64 and < or equal to 0.67
 - Gravity Sewer with d/D > 0.67 and < or equal to 0.75
 - Gravity Sewer with d/D > 0.75
 - █ Sewershed 10
 - █ Sewershed 12
 - █ Sewershed 14
 - █ Sewershed 16
 - █ Sewershed 20
 - █ Sewershed 22
 - █ Sewershed 24
 - █ Sewershed 26
 - █ Sewershed 28
 - █ Sewershed 30
 - █ Sewershed 31
 - █ Sewershed 32
 - █ Sewershed 33
 - █ Sewershed 34
 - █ Sewershed 35
 - █ Sewershed 36
 - ▲ Future Sewers to be Built by Others
 - ▲ Proposed Sewer Lift Station Location
 - 1 Can be gravity drained northwest to intersection of Taber Street and Compton Avenue by construction of deep sewers.
 - 2 Lift Station can be eliminated if easements can be obtained to the east. Sewers may have to be constructed deep.
- ▨ Overlap Area - Future sewage expected to go to Home Gardens



D

ANALYSIS OF DOWNSTREAM IMPACTS TO SEWER SYSTEM AND MODELING

Existing Hydraulic Model Results Sewershed 14

Pipe Model ID	U/S Node ID	D/S Node ID	Pipe Dia. (in)	Length (ft)	Slope (ft/ft)	Total		Peak Dry	Peak Dry
						Weather Flow (cfs)	Full Flow (cfs)	Weather Velocity (ft/s)	Weather d/D
1018	14-12840	14-11250	42	773.97	0.001124	20.21556	33.82225	3.671096	0.556946
1022	14-11250	14-11120	42	94.89	0.001265	20.23204	35.87446	3.840726	0.537354
1062	14-19200	14-19260	10	148.12	0.032744	3.088785	3.975119	8.05374	0.662476
1104	14-19090	14-19200	10	226.88	0.027239	2.436171	3.62562	7.129273	0.600037
1207	14-18960	14-19090	10	395.52	0.031301	2.416313	3.886532	7.509803	0.570862
1270	14-18820	14-18960	10	290.3	0.0196	2.393901	3.075521	6.232772	0.66333
1291	14-18780	14-18820	10	105.7	0.018827	2.367554	3.014221	6.119567	0.667603
1305	14-18750	14-18780	10	76.37	0.017022	2.36705	2.866133	5.871097	0.692749
1406	14-18580	14-18750	10	318.63	0.020023	2.275498	3.108516	6.224699	0.635376
1498	14-18380	14-18580	10	394.77	0.02024	2.268954	3.125269	6.24728	0.631836
1582	14-18400	14-18260	10	127.04	0.020623	2.222028	3.154761	6.266743	0.619019
1658	14-18270	14-18400	10	402.85	0.021298	2.2182	3.20596	6.3445	0.611694
1701	14-18070	14-18270	10	253	0.020198	2.211647	3.122024	6.208652	0.62146
1748	14-17940	14-18070	10	252.74	0.021128	2.182563	3.193153	6.302217	0.606812
1764	14-17720	14-17940	10	96.01	0.02031	2.167233	3.130727	6.195796	0.611938
1862	14-17580	14-17720	10	395.1	0.021286	2.167233	3.205019	6.310818	0.602539
1941	14-16360	14-17370	15	349.38	0.002004	1.903406	2.899136	2.520749	0.591064
2174	14-15040	14-15140	10	209.1	0.054137	1.207717	5.111311	7.668064	0.330811
2246	14-14470	14-15040	10	359	0.024178	1.207717	3.41585	5.723493	0.410675
2326	14-13830	14-14470	10	358	0.024525	1.207717	3.440265	5.753618	0.409058
2445	14-12630	14-13150	12	358	0.006341	1.207717	2.844528	3.473856	0.454895
2500	14-12160	14-12630	12	358	0.006341	1.207717	2.844528	3.473856	0.454895
2574	14-11660	14-12160	12	374.46	0.006329	1.198244	2.841909	3.464171	0.453125
2662	14-11370	14-11660	10	363.21	0.00435	1.166861	1.448891	2.954748	0.679932
2694	14-11280	14-11370	10	113	0.004248	1.15815	1.431751	2.922165	0.682129
2759	14-11110	14-11280	8	269	0.048067	1.152354	2.656313	7.339751	0.46051
2895	14-10860	14-11110	8	371.33	0.041553	1.143654	2.469785	6.939685	0.478088
2987	14-11200	14-10590	8	295	0.012644	0.781147	1.362384	4.035805	0.542847
3048	14-11740	14-11200	8	300	0.013133	0.775986	1.388493	4.087968	0.534424
3108	14-12140	14-11740	8	300	0.013033	0.771003	1.383197	4.069841	0.533569
3178	14-12570	14-12140	8	292.06	0.012634	0.766107	1.361863	4.015887	0.53656
3212	14-12790	14-12570	8	164	0.003902	0.762382	0.756875	2.184062	1
3285	14-13370	14-12790	8	304	0.029276	0.757553	2.073072	5.475725	0.418213
3320	14-13630	14-13370	8	148.99	0.028257	0.710626	2.036661	5.312971	0.407715
3355	14-13960	14-13630	8	146.69	0.029586	0.708112	2.084015	5.398438	0.401794
3420	14-13400	14-13960	8	304.06	0.030718	0.685454	2.123489	5.424885	0.390717
3452	14-13700	14-13400	8	170	0.004	0.664854	0.766278	2.472041	0.719727
3468	14-14070	14-13700	8	168.56	0.003738	0.661516	0.740712	2.398933	0.736938
3478	14-14770	14-14070	8	265.44	0.014241	0.647036	1.445835	4.027157	0.468781
3595	14-14550	14-14660	8	300.13	0.029587	0.637481	2.084049	5.246362	0.379517
3673	14-14480	14-14550	8	262.05	0.029193	0.632588	2.070117	5.210043	0.379303
3727	14-12400	14-12820	8	217.49	0.06575	0.1847	3.106737	4.883114	0.165405

Existing Hydraulic Model Results Sewershed 14

Pipe Model ID	U/S Node ID	D/S Node ID	Pipe Dia. (in)	Length (ft)	Slope (ft/ft)	Total		Peak Dry	Peak Dry
						Weather Flow (cfs)	Full Flow (cfs)	Weather Velocity (ft/s)	Weather d/D
3737	14-12820	14-13280	8	192.11	0.02915	0.186958	2.068594	3.678802	0.20314
3742	14-13280	14-13640	8	143.45	0.034089	0.625406	2.236971	5.4941	0.361633
3755	14-14400	14-14480	8	280.66	0.045464	0.628612	2.583398	6.1061	0.335938
3756	14-13640	14-14400	8	297.92	0.009835	0.626828	1.201545	3.478446	0.512756
3776	14-12450	14-12400	8	120	0.037917	0.166828	2.359235	3.90326	0.180038
3827	14-12190	14-12450	8	254.81	0.082689	0.163948	3.484016	5.10846	0.147659
3891	14-11970	14-12190	8	285	0.059158	0.159865	2.94688	4.507494	0.158203
3950	14-11820	14-11970	8	231.3	0.058971	0.157192	2.942223	4.48019	0.157028
3996	14-11450	14-11820	8	277.74	0.046878	0.154401	2.623267	4.110514	0.164612
4045	14-10940	14-11300	8	237.31	0.034933	0.146292	2.264516	3.647681	0.172256
4090	14-10970	14-10940	8	200.85	0.004879	0.104466	0.846317	1.648336	0.237244
4131	14-10810	14-10970	8	156.5	0.004792	0.102757	0.838744	1.629973	0.236359
4135	14-10750	14-10810	8	35.23	0.058189	0.10189	2.92265	3.918109	0.127777
4179	14-10060	14-10430	8	233.3	0.057008	0.077731	2.892841	3.586517	0.112793
4182	14-10580	14-10750	8	208.9	0.004883	0.101563	0.846617	1.635355	0.233871
4183	14-10430	14-10580	8	99.72	0.026474	0.081001	1.971365	2.776071	0.13829
4202	14-09780	14-10060	8	301.58	0.04619	0.072464	2.603937	3.262758	0.114693
4248	14-09510	14-09780	8	300	0.046167	0.065868	2.603277	3.169791	0.109596
4304	14-09460	14-09250	8	216.26	0.004578	0.03648	0.819758	1.182143	0.143723
4320	14-09300	14-09460	8	164.38	0.023786	0.018124	1.868616	1.702866	0.069565
4328	14-08680	14-08850	8	167.52	0.080349	0.008373	3.434356	2.055121	0.036423
4335	14-09080	14-09300	8	161.32	0.045252	0.015326	2.577351	2.0244	0.055267
4336	14-08850	14-09080	8	244.97	0.054333	0.010306	2.824156	1.911378	0.043972
4339	14-09620	14-09540	8	132.94	0.109674	0.017322	4.012426	2.858499	0.047569
4345	14-08540	14-08680	8	149.19	0.036195	0.007134	2.305065	1.483575	0.040714
4352	14-09760	14-09620	8	157.09	0.068878	0.01581	3.179769	2.365031	0.050819
4372	14-09700	14-09760	8	150.11	0.101592	0.014641	3.861769	2.644311	0.044765
4927	14-09370	WTP1	42	433.35	0.003323	20.33534	58.15229	5.507284	0.408203
4931	14-19260	14-19390	10	300	0.0526	3.099251	5.038241	9.710901	0.567078
4984	14-18260	14-18380	10	257.21	0.019439	2.238135	3.06286	6.130704	0.634644
5105	14-13150	14-13830	12	358	0.01148	1.207717	3.827526	4.319054	0.385925
5158	14-10590	14-10860	8	374.28	0.039569	1.141174	2.410102	6.81037	0.484314
5237	14-14660	14-14770	8	281.84	0.029591	0.642416	2.084193	5.257917	0.381073
5297	14-11300	14-11450	8	199.54	0.029117	0.150848	2.067423	3.452119	0.182831
5328	14-09250	14-09510	8	324.67	0.042443	0.059654	2.496087	2.987628	0.106651
5330	14-09540	14-09460	8	134.18	0.00477	0.018399	0.836763	0.976801	0.102493
5776	14-15390	14-15460	12	228.03	0.005526	1.87884	2.655388	3.666571	0.620911
5777	14-15360	14-15390	12	71	0.01662	1.829991	4.605222	5.527129	0.438232
5780	14-15260	14-15360	12	325	0.016985	1.829991	4.655503	5.571962	0.435547
5785	14-15140	14-15260	12	317.65	0.010011	1.829991	3.574192	4.577466	0.50708
5967	14-09730	14-09370	42	312.65	0.002463	20.23491	50.06349	4.926804	0.442444
5971	14-14000	14-13020	42	500	0.00096	20.16471	31.25652	3.452592	0.584473

Existing Hydraulic Model Results Sewershed 14

Pipe Model ID	U/S Node ID	D/S Node ID	Pipe Dia. (in)	Length (ft)	Slope (ft/ft)	Total Peak Dry Weather Flow (cfs)	Full Flow (cfs)	Peak Dry Weather Velocity (ft/s)	Peak Dry Weather d/D
5973	14-16410	14-14000	42	1,000.00	0.00099	20.16245	31.74114	3.494131	0.578674
5980	14-13020	14-12840	42	76.09	0.00276	20.17191	52.99695	5.133865	0.427795
6139	14-15460	14-09740	15	20.5	0.143902	1.886275	24.56986	11.84728	0.187439
6168	14-19280	14-16900	42	737.1	0.001446	20.06126	38.36369	4.03235	0.513428
6169	14-11120	14-09730	42	900	0.001067	20.23379	32.94726	3.598764	0.566467
7128	14-19560	14-19530	10	32.413	0.198377	3.112178	9.78435	15.93377	0.387604
7135	14-17370	14-17580	10	388.11	0.021283	2.15437	3.204784	6.302307	0.60022
7475	14-15470	14-16360	15	358.14	0.00201	1.899686	2.904079	2.522716	0.589722
920	14-19530	14-19280	42	61.67	0.001459	20.05922	38.53801	4.045921	0.512024
934	14-16900	14-16410	42	179.9	0.022735	20.09596	152.1076	10.96221	0.245483
9740	14-09740	14-15470	15	55.58	0.038143	1.886275	12.64962	7.401466	0.260956
979	14-19390	14-19560	10	301.37	0.029996	3.109546	3.804699	7.77931	0.687378

Existing Hydraulic Model Results Sewershed 16

Pipe Model ID	U/S Node ID	D/S Node ID	Pipe Dia. (in)	Length (ft)	Slope (ft/ft)	Total Peak Dry Weather Flow (cfs)	Full Flow (cfs)	Peak Dry Weather Velocity (ft/s)	Peak Dry Weather d/D
1018	14-12840	14-11250	42	773.97	0.001124	20.21556	33.82225	3.671096	0.556946
1022	14-11250	14-11120	42	94.89	0.001265	20.23204	35.87446	3.840726	0.537354
1325	16-35700	16-35920	15	178	0.019888	3.261504	9.133985	6.820377	0.412903
1402	16-35330	16-35700	15	259	0.023629	3.243468	9.95622	7.252223	0.3927
3832	16-19830	16-20700	10	329.79	0.002972	0.378663	1.197513	1.946915	0.386383
3845	16-20700	16-21560	10	340	0.002941	0.390705	1.19137	1.956219	0.394104
3857	16-21560	16-22580	10	360	0.002944	0.404464	1.192032	1.975453	0.401489
3870	16-22580	16-23840	10	350	0.003	0.409812	1.203225	1.995897	0.402344
3894	16-24930	16-25970	15	349	0.00384	1.122831	4.013362	2.804449	0.361755
3905	16-25970	16-27060	15	350	0.001771	1.127658	2.726029	2.116193	0.448242
3924	16-27060	16-28280	15	350	0.001771	1.132515	2.726029	2.11852	0.449341
3936	16-28280	16-29640	15	350	0.0018	1.140835	2.747925	2.13522	0.449158
3941	16-29640	16-30690	15	305	0.00177	1.145518	2.725308	2.124364	0.452332
4194	16-19000	16-19110	8	275	0.029564	0.306781	2.08322	4.269827	0.259308
4264	16-18870	16-19000	8	337.91	0.029653	0.287089	2.086361	4.193089	0.25058
4340	16-18630	16-18790	8	350.04	0.009542	0.256665	1.183506	2.708244	0.316315
4392	16-18350	16-18470	8	250	0.05764	0.121586	2.908829	4.116693	0.13945
4418	16-18200	16-18350	8	250	0.02832	0.118809	2.038932	3.185561	0.163803
4443	16-18080	16-18200	8	261.46	0.0301	0.117188	2.10204	3.241579	0.160309
4469	16-17980	16-18080	8	300	0.085367	0.034775	3.539976	3.238347	0.069984
4484	16-17820	16-17980	8	300	0.034533	0.033599	2.251518	2.337902	0.085266
4501	16-17670	16-17820	8	300	0.0192	0.032343	1.67883	1.883004	0.096252
4520	16-17550	16-17670	8	282.15	0.013362	0.026585	1.400512	1.563928	0.095573
4921	16-25610	16-23170	42	720	0.001583	12.35593	40.14127	3.672618	0.380798
4927	14-09370	WTP1	42	433.35	0.003323	20.33534	58.15229	5.507284	0.408203
4935	16-31100	16-28000	42	916.78	0.001069	12.29449	32.98264	3.177443	0.422852
5282	16-23840	16-24930	10	311	0.002894	0.41421	1.181754	1.975474	0.408722
5333	16-18470	16-18630	8	317.13	0.011856	0.247558	1.319263	2.898153	0.293457
5756	14-21650	14-19530	42	888.67	0.00117	13.12434	34.51051	3.342105	0.427612
5967	14-09730	14-09370	42	312.65	0.002463	20.23491	50.06349	4.926804	0.442444
5971	14-14000	14-13020	42	500	0.00096	20.16471	31.25652	3.452592	0.584473
5973	14-16410	14-14000	42	1,000.00	0.00099	20.16245	31.74114	3.494131	0.578674
5980	14-13020	14-12840	42	76.09	0.00276	20.17191	52.99695	5.133865	0.427795
6003	16-34890	16-34930	15	37.5	0.020533	3.2306	9.281077	6.88267	0.407166
6004	16-34810	16-34890	15	350	0.016771	3.220922	8.387909	6.385291	0.429901
6005	16-34670	16-34810	15	223	0.015605	3.214263	8.091068	6.214856	0.438141
6006	16-34060	16-34220	15	350	0.027143	3.194949	10.67079	7.59671	0.375153
6007	16-34930	16-35050	15	308.69	0.020182	3.233592	9.201347	6.841222	0.409302
6008	16-34400	16-34630	15	377	0.017162	3.209556	8.484966	6.433171	0.426331
6009	16-33880	16-34060	15	350	0.032571	3.190528	11.68926	8.112566	0.357025
6010	16-35220	16-35270	15	20	0.0355	3.243468	12.20346	8.408104	0.35199
6012	16-35050	16-35220	15	342	0.033392	3.242361	11.83556	8.222383	0.357727

Existing Hydraulic Model Results Sewershed 16

Pipe Model ID	U/S Node ID	D/S Node ID	Pipe Dia. (in)	Length (ft)	Slope (ft/ft)	Total Peak Dry Weather Flow (cfs)	Full Flow (cfs)	Peak Dry Weather Velocity (ft/s)	Peak Dry Weather d/D
6017	16-33750	16-33880	15	350	0.025029	3.188189	10.24676	7.372202	0.382996
6018	16-33410	16-33570	15	350	0.031314	3.18374	11.46146	7.993047	0.360382
6019	16-33280	16-33410	15	350	0.025143	3.181703	10.27013	7.380142	0.382111
6021	16-32990	16-33040	15	59	0.02	3.180977	9.159751	6.78847	0.406647
6023	16-32810	16-32990	15	456	0.021272	3.179181	9.446526	6.941958	0.399719
6026	16-32640	16-32810	15	328	0.029268	3.175639	11.0807	7.794091	0.366455
6028	16-32500	16-32640	15	350	0.037257	3.173145	12.50183	8.504162	0.343506
6032	16-32040	16-32180	15	271	0.02	3.168574	9.159751	6.781659	0.405762
6037	16-31800	16-32040	15	476	0.034622	3.166664	12.05157	8.277368	0.349854
6038	16-31710	16-31760	15	120	0.028167	3.164675	10.87017	7.679628	0.369537
6049	16-30890	16-31010	16	398	0.026859	3.018332	12.60841	7.416411	0.333069
6050	16-30690	16-30810	15	285.95	0.011995	3.017182	7.093665	5.546525	0.455383
6069	16-33140	16-33280	15	350	0.020771	3.181223	9.334732	6.883191	0.402466
6070	16-32180	16-32390	15	350	0.016371	3.169212	8.287279	6.302243	0.428894
6168	14-19280	14-16900	42	737.1	0.001446	20.06126	38.36369	4.03235	0.513428
6169	14-11120	14-09730	42	900	0.001067	20.23379	32.94726	3.598764	0.566467
7128	14-19560	14-19530	10	32.413	0.198377	3.112178	9.78435	15.93377	0.387604
7157	16-18790	16-18870	8	151.011	0.010264	0.271137	1.227489	2.823687	0.319336
7160	16-35270	16-35330	15	69	0.022609	3.243468	9.738822	7.136906	0.39743
7166	16-34630	16-34670	15	9	0.012222	3.211592	7.160507	5.676662	0.46936
7176	16-34220	16-34440	15	402	0.027413	3.204029	10.72374	7.630026	0.374725
7178	16-34440	16-34400	15	9	0.013333	3.208864	7.478905	5.861021	0.457642
7207	16-33570	16-33750	15	350	0.028171	3.185158	10.87109	7.694084	0.370789
7209	16-33040	16-33140	15	192	0.028958	3.180977	11.02187	7.768628	0.367798
7215	16-32390	16-32500	15	350	0.044343	3.171973	13.63894	9.053984	0.328064
7218	16-31580	16-31510	15	27	0.01963	3.028024	9.074542	6.653279	0.397858
7220	16-31430	16-31580	15	386	0.034352	3.027081	12.00457	8.151272	0.342316
7222	16-31510	16-31710	15	520	0.019808	3.029314	9.115607	6.675965	0.396973
7240	16-31320	16-31430	15	362	0.018232	3.024548	8.745534	6.474699	0.405701
7256	16-31010	16-31130	15	382	0.029712	3.020488	11.16439	7.72957	0.355347
7258	16-31130	16-31320	15	338	0.040503	3.022597	13.03503	8.645285	0.327576
7522	16-31760	16-31800	15	20	0.0225	3.165623	9.715383	7.077429	0.392731
7527	16-30810	16-30890	15	10	0.012	3.017372	7.095112	5.547843	0.455322
7708	16-19110	16-19210	8	257.01	0.029532	0.321159	2.082102	4.324848	0.265472
7711	16-19700	16-19820	10	320	0.007125	0.376068	1.854294	2.664945	0.305481
7712	16-19820	16-19830	10	22	0.03	0.377512	3.80493	4.450477	0.212753
7713	16-19490	16-19700	8	309.67	0.048116	0.368968	2.657662	5.354927	0.251709
7714	16-19300	16-19490	8	238	0.047983	0.338049	2.653999	5.216342	0.241013
7715	16-19220	16-19300	8	229	0.018603	0.331973	1.652507	3.700808	0.303986
7716	16-19210	16-19220	8	91	0.101538	0.32736	3.860748	6.738613	0.196838
8387	16-33990	16-31100	42	1,117.74	0.0011	12.29433	33.46472	3.211412	0.419464
8388	16-35970	16-33990	42	697.983	0.001404	12.24961	37.80033	3.507432	0.391541

Existing Hydraulic Model Results Sewershed 16

Pipe Model ID	U/S Node ID	D/S Node ID	Pipe Dia. (in)	Length (ft)	Slope (ft/ft)	Total Peak Dry Weather Flow (cfs)	Full Flow (cfs)	Peak Dry Weather Velocity (ft/s)	Peak Dry Weather d/D
8389	16-35920	16-35970	15	140.575	0.016717	3.271885	8.374301	6.404156	0.434082
920	14-19530	14-19280	42	61.67	0.001459	20.05922	38.53801	4.045921	0.512024
934	14-16900	14-16410	42	179.9	0.022735	20.09596	152.1076	10.96221	0.245483
980	16-23170	16-22570	42	165	0.000848	12.38159	29.38509	2.923635	0.452942
988	16-22570	14-21650	42	297	0.000875	12.38708	29.84788	2.957932	0.449066
989	16-28000	16-25610	42	770	0.001039	12.33466	32.51656	3.146944	0.427002

Post Project Hydraulic Model Results Sewershed 14

Pipe Model ID	U/S Node ID	D/S Node ID	Pipe Dia. (in)	Length (ft)	Slope (ft/ft)	Total Peak Dry Weather Flow (cfs)	Full Flow (cfs)	Peak Dry Weather Velocity (ft/s)	Peak Dry Weather d/D
1018	14-12840	14-11250	42	773.97	0.001124	20.40121	33.82225	3.679013	0.56012
1022	14-11250	14-11120	42	94.89	0.001265	20.41766	35.87446	3.848734	0.540405
1062	14-19200	14-19260	10	148.12	0.032744	3.262458	3.975119	8.133896	0.689514
1104	14-19090	14-19200	10	226.88	0.027239	2.613343	3.62562	7.236278	0.628784
1207	14-18960	14-19090	10	395.52	0.031301	2.593607	3.886532	7.630826	0.597351
1270	14-18820	14-18960	10	290.3	0.0196	2.571333	3.075521	6.313068	0.699219
1291	14-18780	14-18820	10	105.7	0.018827	2.54515	3.014221	6.19687	0.70459
1305	14-18750	14-18780	10	76.37	0.017022	2.544649	2.866133	5.936821	0.733276
1406	14-18580	14-18750	10	318.63	0.020023	2.453684	3.108516	6.316138	0.670044
1498	14-18380	14-18580	10	394.77	0.02024	2.447182	3.125269	6.341102	0.666138
1582	14-18400	14-18260	10	127.04	0.020623	2.400567	3.154761	6.366099	0.65271
1658	14-18270	14-18400	10	402.85	0.021298	2.396764	3.20596	6.446643	0.644714
1701	14-18070	14-18270	10	253	0.020198	2.390256	3.122024	6.30773	0.655518
1748	14-17940	14-18070	10	252.74	0.021128	2.361369	3.193153	6.406755	0.639893
1764	14-17720	14-17940	10	96.01	0.02031	2.346143	3.130727	6.298805	0.645752
1862	14-17580	14-17720	10	395.1	0.021286	2.346143	3.205019	6.417951	0.635376
1941	14-16360	14-17370	15	349.38	0.002004	2.084255	2.899136	2.570539	0.627625
2174	14-15040	14-15140	10	209.1	0.054137	1.395407	5.111311	7.982309	0.357056
2246	14-14470	14-15040	10	359	0.024178	1.395407	3.41585	5.947009	0.445068
2326	14-13830	14-14470	10	358	0.024525	1.395407	3.440265	5.97813	0.443298
2445	14-12630	14-13150	12	358	0.006341	1.395407	2.844528	3.604318	0.494446
2500	14-12160	14-12630	12	358	0.006341	1.395407	2.844528	3.604318	0.494446
2574	14-11660	14-12160	12	374.46	0.006329	1.386053	2.841909	3.596029	0.492737
2662	14-11370	14-11660	10	363.21	0.00435	1.35507	1.448891	3.019305	0.766846
2694	14-11280	14-11370	10	113	0.004248	1.346472	1.431751	2.984935	0.770752
2759	14-11110	14-11280	8	269	0.048067	1.340751	2.656313	7.627336	0.502808
2895	14-10860	14-11110	8	371.33	0.041553	1.332166	2.469785	7.209282	0.523071
2987	14-11200	14-10590	8	295	0.012644	0.975386	1.362384	4.243145	0.625854
3048	14-11740	14-11200	8	300	0.013133	0.970324	1.388493	4.302413	0.615784
3108	14-12140	14-11740	8	300	0.013033	0.965437	1.383197	4.284756	0.615295
3178	14-12570	14-12140	8	292.06	0.012634	0.960636	1.361863	4.228317	0.619629
3212	14-12790	14-12570	8	164	0.003902	0.956984	0.756875	2.741557	1
3285	14-13370	14-12790	8	304	0.029276	0.95225	2.073072	5.81265	0.475891
3320	14-13630	14-13370	8	148.99	0.028257	0.906275	2.036661	5.664522	0.467255
3355	14-13960	14-13630	8	146.69	0.029586	0.903815	2.084015	5.757706	0.460449
3420	14-13400	14-13960	8	304.06	0.030718	0.881639	2.123489	5.801136	0.449158
3452	14-13700	14-13400	8	170	0.004	0.861491	0.766278	2.467991	1
3468	14-14070	14-13700	8	168.56	0.003738	0.858228	0.740712	2.458643	1
3478	14-14770	14-14070	8	265.44	0.014241	0.844076	1.445835	4.301497	0.548889
3595	14-14550	14-14660	8	300.13	0.029587	0.83474	2.084049	5.639609	0.440186
3673	14-14480	14-14550	8	262.05	0.029193	0.829961	2.070117	5.60324	0.44043
3727	14-12400	14-12820	8	217.49	0.06575	0.398835	3.106737	6.119782	0.241974

Post Project Hydraulic Model Results Sewershed 14

Pipe Model ID	U/S Node ID	D/S Node ID	Pipe Dia. (in)	Length (ft)	Slope (ft/ft)	Total		Peak Dry	Peak Dry
						Weather Flow (cfs)	Full Flow (cfs)	Weather Velocity (ft/s)	Weather d/D
3737	14-12820	14-13280	8	192.11	0.02915	0.400948	2.068594	4.586175	0.298401
3742	14-13280	14-13640	8	143.45	0.034089	0.822948	2.236971	5.918639	0.4198
3755	14-14400	14-14480	8	280.66	0.045464	0.826078	2.583398	6.582627	0.388733
3756	14-13640	14-14400	8	297.92	0.009835	0.824336	1.201545	3.708574	0.608276
3776	14-12450	14-12400	8	120	0.037917	0.382162	2.359235	4.969273	0.272186
3827	14-12190	14-12450	8	254.81	0.082689	0.379484	3.484016	6.542858	0.22287
3891	14-11970	14-12190	8	285	0.059158	0.375691	2.94688	5.793556	0.241119
3950	14-11820	14-11970	8	231.3	0.058971	0.37321	2.942223	5.775962	0.240509
3996	14-11450	14-11820	8	277.74	0.046878	0.370622	2.623267	5.312575	0.253937
4045	14-10940	14-11300	8	237.31	0.034933	0.363119	2.264516	4.755974	0.270782
4090	14-10970	14-10940	8	200.85	0.004879	0.32482	0.846317	2.264687	0.429779
4131	14-10810	14-10970	8	156.5	0.004792	0.323272	0.838744	2.246953	0.430786
4135	14-10750	14-10810	8	35.23	0.058189	0.322488	2.92265	5.509694	0.224304
4179	14-10060	14-10430	8	233.3	0.057008	0.300811	2.892841	5.359926	0.217773
4182	14-10580	14-10750	8	208.9	0.004883	0.322192	0.846617	2.260541	0.427734
4183	14-10430	14-10580	8	99.72	0.026474	0.303722	1.971365	4.09333	0.26532
4202	14-09780	14-10060	8	301.58	0.04619	0.296139	2.603937	4.952013	0.227722
4248	14-09510	14-09780	8	300	0.046167	0.290322	2.603277	4.922986	0.225494
4304	14-09460	14-09250	8	216.26	0.004578	0.26498	0.819758	2.094937	0.391022
4320	14-09300	14-09460	8	164.38	0.023786	0.065938	1.868616	2.514098	0.128525
4328	14-08680	14-08850	8	167.52	0.080349	0.057422	3.434356	3.690739	0.089989
4335	14-09080	14-09300	8	161.32	0.045252	0.06345	2.577351	3.112633	0.10817
4336	14-08850	14-09080	8	244.97	0.054333	0.05907	2.824156	3.247163	0.10009
4339	14-09620	14-09540	8	132.94	0.109674	0.208192	4.012426	6.056918	0.154816
4345	14-08540	14-08680	8	149.19	0.036195	0.056381	2.305065	2.77844	0.107834
4352	14-09760	14-09620	8	157.09	0.068878	0.206978	3.179769	5.133931	0.172882
4372	14-09700	14-09760	8	150.11	0.101592	0.206046	3.861769	5.877563	0.156937
4927	14-09370	WTP1	42	433.35	0.003323	20.52084	58.15229	5.521241	0.410217
4931	14-19260	14-19390	10	300	0.0526	3.272874	5.038241	9.83302	0.587036
4984	14-18260	14-18380	10	257.21	0.019439	2.416567	3.06286	6.223148	0.6698
5105	14-13150	14-13830	12	358	0.01148	1.395407	3.827526	4.490595	0.417664
5158	14-10590	14-10860	8	374.28	0.039569	1.329718	2.410102	7.073675	0.530273
5237	14-14660	14-14770	8	281.84	0.029591	0.839562	2.084193	5.64854	0.441589
5297	14-11300	14-11450	8	199.54	0.029117	0.367332	2.067423	4.471628	0.285339
5328	14-09250	14-09510	8	324.67	0.042443	0.284878	2.496087	4.751961	0.228119
5330	14-09540	14-09460	8	134.18	0.00477	0.209061	0.836763	1.992244	0.340668
5776	14-15390	14-15460	12	228.03	0.005526	2.059883	2.655388	3.734915	0.661682
5777	14-15360	14-15390	12	71	0.01662	2.011429	4.605222	5.665698	0.46228
5780	14-15260	14-15360	12	325	0.016985	2.011429	4.655503	5.710722	0.459473
5785	14-15140	14-15260	12	317.65	0.010011	2.011429	3.574192	4.684803	0.536682
5967	14-09730	14-09370	42	312.65	0.002463	20.42053	50.06349	4.938945	0.444702
5971	14-14000	14-13020	42	500	0.00096	20.35042	31.25652	3.459957	0.587891

Post Project Hydraulic Model Results Sewershed 14

Pipe Model ID	U/S Node ID	D/S Node ID	Pipe Dia. (in)	Length (ft)	Slope (ft/ft)	Total Peak Dry Weather Flow (cfs)	Full Flow (cfs)	Peak Dry Weather Velocity (ft/s)	Peak Dry Weather d/D
5973	14-16410	14-14000	42	1,000.00	0.00099	20.34816	31.74114	3.50124	0.582092
5980	14-13020	14-12840	42	76.09	0.00276	20.35761	52.99695	5.146231	0.429993
6139	14-15460	14-09740	15	20.5	0.143902	2.06726	24.56986	12.17039	0.196091
6168	14-19280	14-16900	42	737.1	0.001446	20.2471	38.36369	4.041173	0.516296
6169	14-11120	14-09730	42	900	0.001067	20.41941	32.94726	3.606596	0.569702
7128	14-19560	14-19530	10	32.413	0.198377	3.28574	9.78435	16.16932	0.399231
7135	14-17370	14-17580	10	388.11	0.021283	2.33337	3.204784	6.410214	0.633057
7475	14-15470	14-16360	15	358.14	0.00201	2.080564	2.904079	2.573013	0.62616
920	14-19530	14-19280	42	61.67	0.001459	20.24506	38.53801	4.055283	0.514832
934	14-16900	14-16410	42	179.9	0.022735	20.28176	152.1076	10.99211	0.246613
9740	14-09740	14-15470	15	55.58	0.038143	2.06726	12.64962	7.598315	0.273407
979	14-19390	14-19560	10	301.37	0.029996	3.28312	3.804699	7.848225	0.716675

Post Project Hydraulic Model Results Sewershed 16

Pipe Model ID	U/S Node ID	D/S Node ID	Pipe Dia. (in)	Length (ft)	Slope (ft/ft)	Total Peak Dry Weather Flow (cfs)	Full Flow (cfs)	Peak Dry Weather Velocity (ft/s)	Peak Dry Weather d/D
1018	14-12840	14-11250	42	773.97	0.001124	20.40121	33.82225	3.679013	0.56012
1022	14-11250	14-11120	42	94.89	0.001265	20.41766	35.87446	3.848734	0.540405
1325	16-35700	16-35920	15	178	0.019888	3.297513	9.133985	6.840575	0.415405
1402	16-35330	16-35700	15	259	0.023629	3.279494	9.95622	7.274416	0.39505
3832	16-19830	16-20700	10	329.79	0.002972	0.4219	1.197513	2.004576	0.409882
3845	16-20700	16-21560	10	340	0.002941	0.433831	1.19137	2.011978	0.417419
3857	16-21560	16-22580	10	360	0.002944	0.447468	1.192032	2.029525	0.4245
3870	16-22580	16-23840	10	350	0.003	0.452769	1.203225	2.049865	0.425079
3894	16-24930	16-25970	15	349	0.00384	1.162298	4.013362	2.831266	0.3685
3905	16-25970	16-27060	15	350	0.001771	1.167111	2.726029	2.135074	0.457092
3924	16-27060	16-28280	15	350	0.001771	1.171953	2.726029	2.137616	0.45813
3936	16-28280	16-29640	15	350	0.0018	1.180248	2.747925	2.15424	0.457886
3941	16-29640	16-30690	15	305	0.00177	1.184918	2.725308	2.143056	0.461121
4194	16-19000	16-19110	8	275	0.029564	0.350765	2.08322	4.436989	0.277603
4264	16-18870	16-19000	8	337.91	0.029653	0.331309	2.086361	4.369678	0.26944
4340	16-18630	16-18790	8	350.04	0.009542	0.301283	1.183506	2.832508	0.344055
4392	16-18350	16-18470	8	250	0.05764	0.168824	2.908829	4.539406	0.163483
4418	16-18200	16-18350	8	250	0.02832	0.166125	2.038932	3.517288	0.193008
4443	16-18080	16-18200	8	261.46	0.0301	0.164551	2.10204	3.583498	0.189255
4469	16-17980	16-18080	8	300	0.085367	0.085872	3.539976	4.256012	0.107414
4484	16-17820	16-17980	8	300	0.034533	0.084786	2.251518	3.088797	0.132607
4501	16-17670	16-17820	8	300	0.0192	0.083628	1.67883	2.503472	0.151794
4520	16-17550	16-17670	8	282.15	0.013362	0.078355	1.400512	2.161757	0.160599
4921	16-25610	16-23170	42	720	0.001583	12.3888	40.14127	3.675248	0.381348
4927	14-09370	WTP1	42	433.35	0.003323	20.52084	58.15229	5.521241	0.410217
4935	16-31100	16-28000	42	916.78	0.001069	12.32738	32.98264	3.179871	0.423462
5282	16-23840	16-24930	10	311	0.002894	0.45713	1.181754	2.028202	0.431641
5333	16-18470	16-18630	8	317.13	0.011856	0.292305	1.319263	3.037332	0.319855
5756	14-21650	14-19530	42	888.67	0.00117	13.15698	34.51051	3.344747	0.428162
5967	14-09730	14-09370	42	312.65	0.002463	20.42053	50.06349	4.938945	0.444702
5971	14-14000	14-13020	42	500	0.00096	20.35042	31.25652	3.459957	0.587891
5973	14-16410	14-14000	42	1,000.00	0.00099	20.34816	31.74114	3.50124	0.582092
5980	14-13020	14-12840	42	76.09	0.00276	20.35761	52.99695	5.146231	0.429993
6003	16-34890	16-34930	15	37.5	0.020533	3.266638	9.281077	6.902918	0.409668
6004	16-34810	16-34890	15	350	0.016771	3.25697	8.387909	6.404582	0.432556
6005	16-34670	16-34810	15	223	0.015605	3.250317	8.091068	6.23266	0.440918
6006	16-34060	16-34220	15	350	0.027143	3.231022	10.67079	7.619703	0.377441
6007	16-34930	16-35050	15	308.69	0.020182	3.269628	9.201347	6.861615	0.411804
6008	16-34400	16-34630	15	377	0.017162	3.245615	8.484966	6.452965	0.428955
6009	16-33880	16-34060	15	350	0.032571	3.226606	11.68926	8.13807	0.359161
6010	16-35220	16-35270	15	20	0.0355	3.279494	12.20346	8.433736	0.354065
6012	16-35050	16-35220	15	342	0.033392	3.278388	11.83556	8.247731	0.359833

Post Project Hydraulic Model Results Sewershed 16

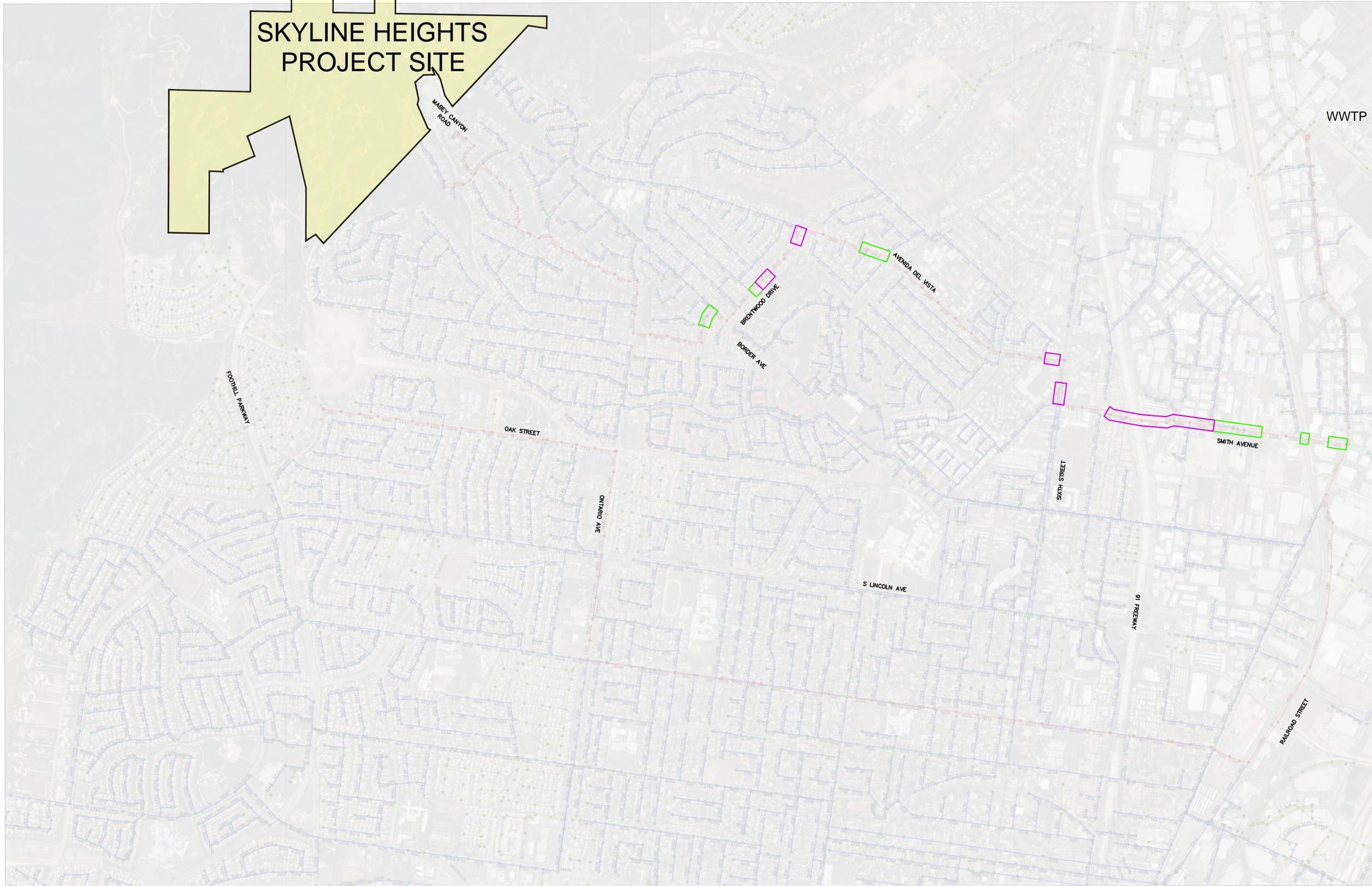
Pipe Model ID	U/S Node ID	D/S Node ID	Pipe Dia. (in)	Length (ft)	Slope (ft/ft)	Total Peak Dry Weather Flow (cfs)	Full Flow (cfs)	Peak Dry Weather Velocity (ft/s)	Peak Dry Weather d/D
6017	16-33750	16-33880	15	350	0.025029	3.224269	10.24676	7.394558	0.385345
6018	16-33410	16-33570	15	350	0.031314	3.219824	11.46146	8.018155	0.362549
6019	16-33280	16-33410	15	350	0.025143	3.217789	10.27013	7.402543	0.38446
6021	16-32990	16-33040	15	59	0.02	3.217064	9.159751	6.808957	0.40918
6023	16-32810	16-32990	15	456	0.021272	3.215269	9.446526	6.963197	0.402191
6026	16-32640	16-32810	15	328	0.029268	3.211731	11.0807	7.81914	0.368652
6028	16-32500	16-32640	15	350	0.037257	3.20924	12.50183	8.530441	0.345581
6032	16-32040	16-32180	15	271	0.02	3.204673	9.159751	6.801629	0.408325
6037	16-31800	16-32040	15	476	0.034622	3.202764	12.05157	8.302588	0.35199
6038	16-31710	16-31760	15	120	0.028167	3.200778	10.87017	7.703519	0.371796
6049	16-30890	16-31010	16	398	0.026859	3.054583	12.60841	7.440917	0.335175
6050	16-30690	16-30810	15	285.95	0.011995	3.053434	7.093665	5.563608	0.458496
6069	16-33140	16-33280	15	350	0.020771	3.21731	9.334732	6.903955	0.404968
6070	16-32180	16-32390	15	350	0.016371	3.205311	8.287279	6.320614	0.431641
6168	14-19280	14-16900	42	737.1	0.001446	20.2471	38.36369	4.041173	0.516296
6169	14-11120	14-09730	42	900	0.001067	20.41941	32.94726	3.606596	0.569702
7128	14-19560	14-19530	10	32.413	0.198377	3.28574	9.78435	16.16932	0.399231
7157	16-18790	16-18870	8	151.011	0.010264	0.31556	1.227489	2.946018	0.345825
7160	16-35270	16-35330	15	69	0.022609	3.279494	9.738822	7.158077	0.399841
7166	16-34630	16-34670	15	9	0.012222	3.247649	7.160507	5.692497	0.472412
7176	16-34220	16-34440	15	402	0.027413	3.240093	10.72374	7.65361	0.376984
7178	16-34440	16-34400	15	9	0.013333	3.244923	7.478905	5.877903	0.460571
7207	16-33570	16-33750	15	350	0.028171	3.221241	10.87109	7.717657	0.373047
7209	16-33040	16-33140	15	192	0.028958	3.217064	11.02187	7.79196	0.370056
7215	16-32390	16-32500	15	350	0.044343	3.208068	13.63894	9.082664	0.330017
7218	16-31580	16-31510	15	27	0.01963	3.064265	9.074542	6.674687	0.400452
7220	16-31430	16-31580	15	386	0.034352	3.063323	12.00457	8.178059	0.344482
7222	16-31510	16-31710	15	520	0.019808	3.065553	9.115607	6.697943	0.399536
7240	16-31320	16-31430	15	362	0.018232	3.060792	8.745534	6.494962	0.408386
7256	16-31010	16-31130	15	382	0.029712	3.056736	11.16439	7.75525	0.357605
7258	16-31130	16-31320	15	338	0.040503	3.058843	13.03503	8.674493	0.32962
7522	16-31760	16-31800	15	20	0.0225	3.201725	9.715383	7.09971	0.395142
7527	16-30810	16-30890	15	10	0.012	3.053624	7.095112	5.564917	0.458435
7708	16-19110	16-19210	8	257.01	0.029532	0.364981	2.082102	4.485778	0.283386
7711	16-19700	16-19820	10	320	0.007125	0.419329	1.854294	2.747754	0.323303
7712	16-19820	16-19830	10	22	0.03	0.42076	3.80493	4.593649	0.224548
7713	16-19490	16-19700	8	309.67	0.048116	0.412297	2.657662	5.528938	0.266266
7714	16-19300	16-19490	8	238	0.047983	0.381688	2.653999	5.402521	0.256226
7715	16-19220	16-19300	8	229	0.018603	0.375677	1.652507	3.831979	0.324188
7716	16-19210	16-19220	8	91	0.101538	0.371113	3.860748	6.990667	0.209442
8387	16-33990	16-31100	42	1,117.74	0.0011	12.32722	33.46472	3.213498	0.420105
8388	16-35970	16-33990	42	697.983	0.001404	12.28251	37.80033	3.509884	0.39212

Post Project Hydraulic Model Results Sewershed 16

Pipe Model ID	U/S Node ID	D/S Node ID	Pipe Dia. (in)	Length (ft)	Slope (ft/ft)	Total Peak Dry Weather Flow (cfs)	Full Flow (cfs)	Peak Dry Weather Velocity (ft/s)	Peak Dry Weather d/D
8389	16-35920	16-35970	15	140.575	0.016717	3.307884	8.374301	6.422311	0.436768
920	14-19530	14-19280	42	61.67	0.001459	20.24506	38.53801	4.055283	0.514832
934	14-16900	14-16410	42	179.9	0.022735	20.28176	152.1076	10.99211	0.246613
980	16-23170	16-22570	42	165	0.000848	12.41446	29.38509	2.925738	0.453613
988	16-22570	14-21650	42	297	0.000875	12.41994	29.84788	2.959995	0.449738
989	16-28000	16-25610	42	770	0.001039	12.36754	32.51656	3.149388	0.427612

CITY OF CORONA 2005 MASTER PLAN MODEL

**SKYLINE HEIGHTS
PROJECT SITE**



- LEGEND**
- TRUNK SEWER
 - DEFICIENT PIPELINES EXISTING 2013 UPDATE
 - IMPACTED PIPELINES (NEW DEFICIENCIES)

