COE & VAN LOO
CONSULTANTS, INC.

WEST GOODYEAR
CENTRAL PLANNING AREA
MASTER WASTEWATER STUDY
UPDATE

Approved January 15, 2013

SUPPLEMENT 1

MARCH 21, 2014

APPROVED
DATE 4/7/14 BY DJ Ramirez
CITY OF GOODYEAR ENGINEERING

Prepared for:
West Goodyear Owners Group

- Keith-Palm Canyon, L.L.C. (aka Las Palmas)
- Pacific Capital Meadows, L.L.C. (aka Amber Meadows)
- Citrus & Lower Buckeye, L.L.C. (aka LaJolla Vista)
- Pradera Partners 160, L.L.C. (aka Pradera)
- SUNBELT Holding, Inc. (aka La Privada)
- Taylor Morrison, Inc. (aka Las Brisas Phase 2c)

Prepared by:

Coe & Van Loo Consultants, Inc.
4550 N. 12th Street
Phoenix, AZ 85014
(602) 264-6831
Contact: Eric Laurin, P.E.

Registered Professional Engineer (Civil)
CERTIFICATE NO. 14478
ERIC LAURIN
Date Signed 21 Mar '14
ARIZONA, U.S.A.
Expires: 6/30/15

HTE #12-1465	QS #53-93

CVL Project No.: 1.07.0112705

CVL CONSULTANTS

4550 North 12th Street | Phoenix, AZ 85014
602.264.6831

March 21, 2014

David Ramirez, City Engineer
City of Goodyear
190 N. 145th Avenue, Building D
Goodyear, AZ 85338

Re: West Goodyear Central Planning Area (WGCPA) Master Wastewater Study Update – Supplement 1
CVL Project # 1.07.0112705

Dear Mr. Ramirez:

Pursuant to our telephone conference call on February 12th, 2014, we have provided a new cover for this report in which the prior professional engineering seal and city approval stamp have been removed. The following are responses to the City of Goodyear's questions:

1. Compare El Cidro's tributary area in the Wastewater Master Plan, dated January 10th, 2014 with the WGCPA Master Wastewater Study Update – Supplement 1 dated March 21th, 2014.

   The differences between the two documents are:

   - ***Parcel 20.4 (WGCPA Master Wastewater Study Update – Supplement 1)/ Parcel 1F (El Cidro Wastewater Master Plan) has gained 2 dwelling units in the El Cidro Wastewater Master Plan. The consequence of this change is that 2 more dwelling units will discharge to the Las Brisas Lift Station compared to the WGCPA Master Wastewater Study Update – Supplement 1.***

   - ***Parcel 16.1 (WGCPA Master Wastewater Study Update – Supplement 1)/Parcel 4 (El Cidro Wastewater Master Plan) has gained 1 dwelling unit in the El Cidro Wastewater Master Plan. The consequence of this change is that 1 more dwelling unit will discharge directly to the gravity line in the Elwood alignment, 2006 Cost Recovery Ordinance Line C1.***

2. Compare the differences in cost and percentage between the 2006 Cost Recovery Ordinance and the latest Cost Recovery Ordinance.

   Please see the West Goodyear Central Planning Area 2014 Cost Recovery Ordinance Wastewater System Improvements, submittal dated March 21st, 2014.

Please do not hesitate to call us should there be any questions on this matter.

Sincerely,

COE & VAN LOO
Consultants, Inc.

Eric Laurin, PE, PEng
Associate, Director

EL/br

cc: P. Miller, PMC
K. Hall, PMC

CVL CONSULTANTS

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4550 North 12th Street | Phoenix, AZ 85014
602.264.6831

March 21, 2014

David Ramirez, City Engineer
City of Goodyear
190 N. 145th Avenue, Building D
Goodyear, AZ 85338

Re: West Goodyear Central Planning Area (WGCPA) Master Wastewater Study Update – Supplement 1 – 3rd Review
CVL Project # 1.07.0112705

Dear Mr. Ramirez:

Per our discussion on February 4th, 2014 Coe and Van Loo Consultants, Inc. (CVL) has prepared a revised Supplement 1 with attached summary of the conversation and responses.

1. Explanation to the adjustment of the service area for the Levinson parcel.

   In the January 2013 approved WGCPA Master Wastewater Study Update, 1/5th of Levinson's residential flow went to manhole 20i and 4/5th went to manhole 20f. This did not conform to Figures 5 and 6 and the Levinson 160 Wastewater Master Plan, dated August 2007 by CVL in which 1/3rd of the flow is discharged to manhole 20i and 2/3rds to 20f. The change has been made to Table 4 in this Supplement.

2. Explain adjustments made to Table 4.

Many adjustments have been made to Table 4, see bullet points below for a brief explanation:

- ***Manholes have been added in some proposed lines to better direct flows from developments.***
- ***Some internal (project specific) lines have had their alignment adjusted. These lines have been modified, because CVL has more knowledge on the project from internal reports and plans.***
- ***Some flows have been slightly adjusted due to changes in a development's dwelling units, which in turn will affect downstream lines. Also, direction of flow has been modified slightly to reflect development changes. El Cidro is an example, please see next comment for in depth explanation.***
- ***Some inverts have been adjusted to reflect design plans or reports that CVL has obtained or produced. This in turn changed inverts upstream.***

3. Explanation to the adjustment of the service area for the El Cidro Parcel.

   CVL has been retained to design the El Cidro (formerly known as El Cidro Ranch) parcel. El Cidro had 1,344 dwelling units in the January 2013 approved WGCPA Master Wastewater Study Update. In this supplement El Cidro has 1,262 dwelling units, so El Cidro has lost 82 dwelling units. Upon further review and analysis, this change does not result in offsite line size changes.

4. Add the explanation of the EDU calculations contained in the CVL response letter dated January 16th, 2014, in an appendix.

   An appendix has been added as requested.

5. Identify in the text all parcel name changes in the tables and figures.

   The comment has been incorporated as requested.

Should you have any questions or concerns, please contact us at (602) 264-6831 or etlaurin@cvlci.com.

Sincerely,

COE & VAN LOO
Consultants, Inc.

Eric Laurin, PE, PEng
Associate, Director

EL/br

cc: P. Miller, PMC
K. Hall, PMC

CVL CONSULTANTS

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Expires: 6/30/15

TABLES

FIGURES

APPENDIX

1.0 INTRODUCTION

1.1 General Description

In 2005 an association of 16 West Goodyear property owners formed a group known as the Initial Development Group (IDG) to develop a plan to solve water and sewer service issues in the area of the City of Goodyear (COG) known as the West Goodyear Central Planning Area (WGCPA), which may be described in the area of the COG bordered by I-10 on the north, Perryville Road on the west, MC 85 on the south and Cotton Lane on the east. To that end, the IDG negotiated a Memorandum of Understanding (MOU) with COG that stipulated among other things that a master water and wastewater studies be performed to quantify the WGCPA's necessary infrastructure improvements and service capacity needs to satisfactorily provide water and sewer service to the WGCPA. The IDG retained Coe & Van Loo Consultants, Inc. (CVL) to prepare the required master water and wastewater study documents. The WGCPA Water and WGCPA Wastewater master studies were completed and approved by COG in July 2006.

The MOU also stipulated that each of the participating property owners within the IDG enter into a Development Agreement (the Agreement) with the COG. Each Agreement had a 5-year "Sunset" term at the end of which all provisions would expire unless plats were recorded and all agreed upon development fees paid to COG. With only 2 of the 16 IDG Properties having proceeded under the terms of their Agreement, letters from the COG began being received by the various members of the IDG on October 15, 2010, stating that COG planned to allow the Development Agreements to lapse. Six (6) of the remaining 14 IDG properties responded to the COG with applications for an amendment to their Development Agreements that would extend the Sunset provision of the Agreement by two years allowing time to renegotiate the terms of the Agreement and then have a new Agreement for these six (6) properties this matter heard and ruled on by COG City Council.

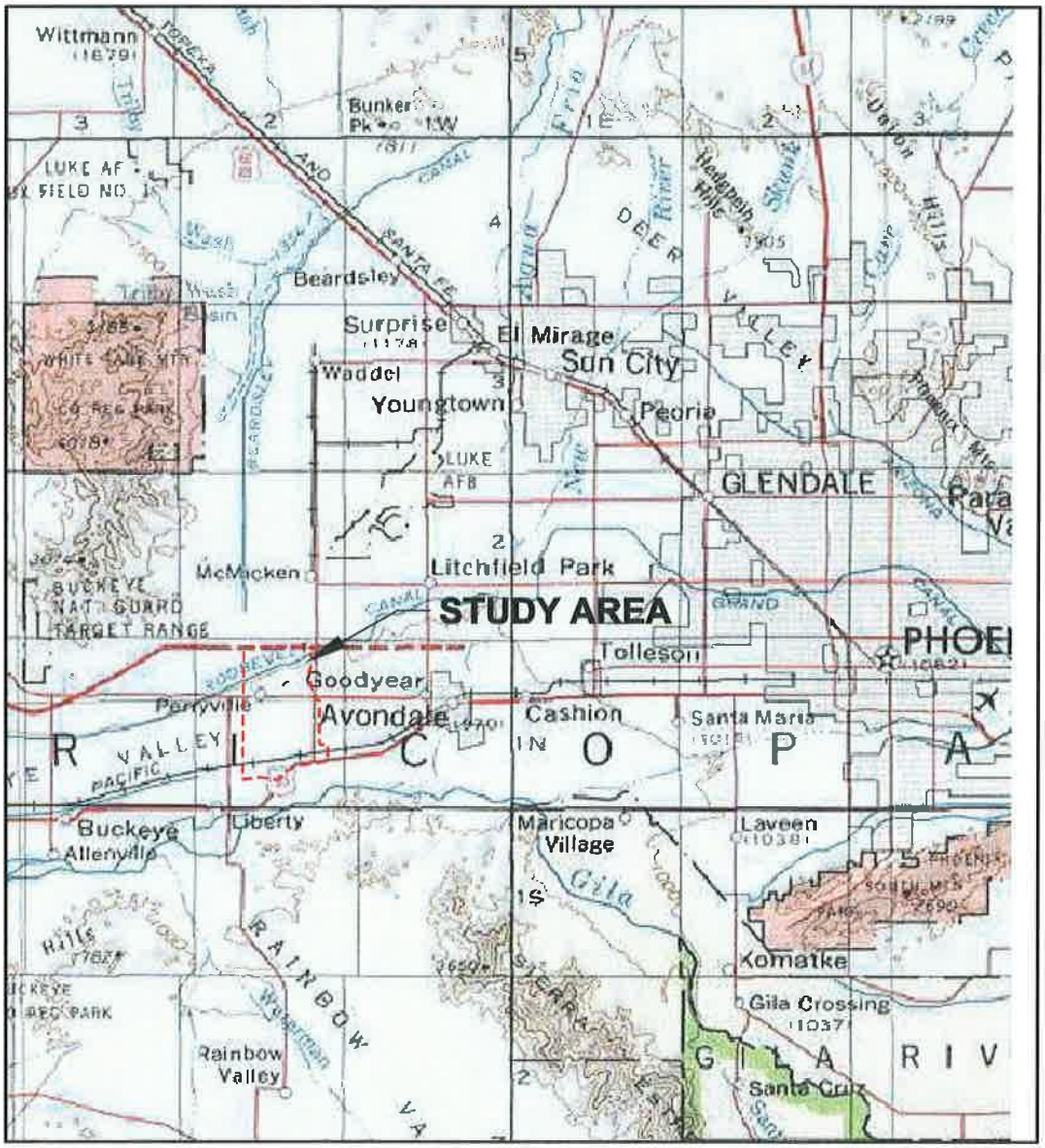
In December of 2011 the COG City Council approved Amendments for the six (6) responding IDG Members, which clarified the COG's position and indicated that the granting of a two-year extension would require that certain obligations be fulfilled by the five responding IDG Members including the preparation of new updated WGCPA Water and Wastewater Master Studies, which would reflect the findings of the COG's Integrated Water Master Plan (IWMP) and the recalculation of WGCPA's necessary Water and Wastewater infrastructure improvements and service capacity needs as well as cost allocation tables for the planned infrastructure improvements. The following report fulfills this requirement for the WGCPA Wastewater.

The wastewater system infrastructure needs of the WGCPA have been updated and are presented in this report. See Figure 1 for a WGCPA project vicinity map.

1.2 Scope of Work

The six (6) responding IDG Members retained CVL to complete an update to the previously completed Wastewater Master Plan as discussed above. This study determines what system improvements and service capacities are necessary to provide service to WGCPA properties not already served by existing COG facilities. This study has also recalculated the allocation of costs for these updated wastewater infrastructure facilities to the IDG properties as well as those other

WEST GOODYEAR CENTRAL PLANNING AREA



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SCALE: N.T.S.

VICINITY MAP	MASTER WASTEWATER STUDY	JOB NO 1.07.0112705
4550 NORTH 12TH STREET PHOENIX, ARIZONA 85014 TELEPHONE (602) 264-6831	COE & VAN LOO PLANNING • ENGINEERING • LANDSCAPE ARCHITECTURE	FIGURE 1

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WGCPA properties not already served by existing COG wastewater infrastructure facilities. The cost allocation for the new wastewater infrastructure facilities is based on a proportional basis set forth in Section 3.2 of this report. The COG will administer a Cost Recovery Ordinance as a mechanism for the reimbursement to each developing WGCPA property though a City Council approved wastewater Cost Recovery Ordinance. See Section 3.2 and Tables 3-1, 3-2 for further information.

This report provides for the following tasks:

- Review latest IWMP criteria.
- Using the latest dwelling counts and land use plans obtained as part of the Water Master Study, calculate the expected ultimate average day and peak day flow discharges for the WGCPA.
- Using the planned sewer line alignments found in the IWMP, calculate the required pipeline diameters to transport projected sewage flows within the WGCPA to the existing COG interceptor system and 157th Avenue Water Reclamation Facility (WRF). CVL notes that portions of the WGCPA cannot be served by gravity and will require a lift station. This analysis will be performed on an Excel spreadsheet in which tributary areas, contributing flows, population served, sewer line sizes, and pipe flow characteristics will be identified for each segment of the study area.
- The location and size of the required lift stations will be determined using IWMP criteria.
- Prepare a new report that summarizes our findings for review and approval by COG. The report will contain the following discussion points:
  - Introduction.
  - Sewer System Analysis.
  - Connection to Existing Facilities.
    - Interceptors.
    - 157th Avenue WRF and capacity requirements.
  - Cost Analysis and Allocation to the service area properties identified in this report have been updated and reflect the latest findings of this report. See Section 3.3.3 for an in-depth discussion.
  - Summary and Conclusions.
  - All necessary tables, figures and background information to adequately describe the findings will also be included in the report.

1.3 Location

The WGCPA wastewater service area is approximately 6,450 acres and is bounded on the north by the Interstate-10 (I-10), 1/2 mile east of Cotton Lane on the east, on the west by Perryville Road and on the south by the MC 85, and includes portions of sections 1, 2, 3, 10, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, and 27 of Township 1 North, Range 2 West of the Gila and Salt River base and Meridian, Maricopa County, Arizona. It is contained within a larger area established by the IWMP for this area of the City that extends south of Broadway Road to the Gila River, between Perryville Road and the approximate alignment of 155th Avenue as shown in Figure 15 of the

IWMP. The total area encompassed by the WGCPA and the IWMP extension is approximately 9,300 acres. See Figure 2.

1.4 Land Use and Population

The City of Goodyear Land Use Plan for 2012 was used to generate the wastewater flows for the WGCPA (See Appendix A) and for those areas of WGCPA not part of the IDG but within the study area. Input from the COG Engineering and Planning Departments was obtained in several meetings held in January and February 2012 to clarify the intent of the Land Use Plan and obtain guidance in assigning a land use designation to County Islands located within the study area. The area consists mostly of single-family residential with industrial and commercial properties designated in the northern and southern portions of the study area. A breakdown of land use and dwelling unit densities is presented in Figure 3 for IDG lands and additional development properties. Wastewater discharges for the study area are based on dwelling units and acreage and not per capita use, therefore, no population projections were made.

The IWMP land uses and expected wastewater discharges for those areas outside of the study area south of the southern limits of the study area and the Gila River were obtained from the IWMP.

1.5 Topographic Conditions

The WGPA Sewer Trunk Line Study Area consists of approximately 6,500 acres of a blend of undeveloped land used primarily for agriculture, and residential, commercial and industrial uses, the area slopes to a south to southeast direction. The total elevation change is approximately 157 feet, dropping from 1,045 feet above mean sea level (MSL) at Interstate 10 and Perryville Road to 890 feet above MSL at the Buckeye Canal. Elevations at the Gila River and Perryville Road are approximately 885 feet MSL.

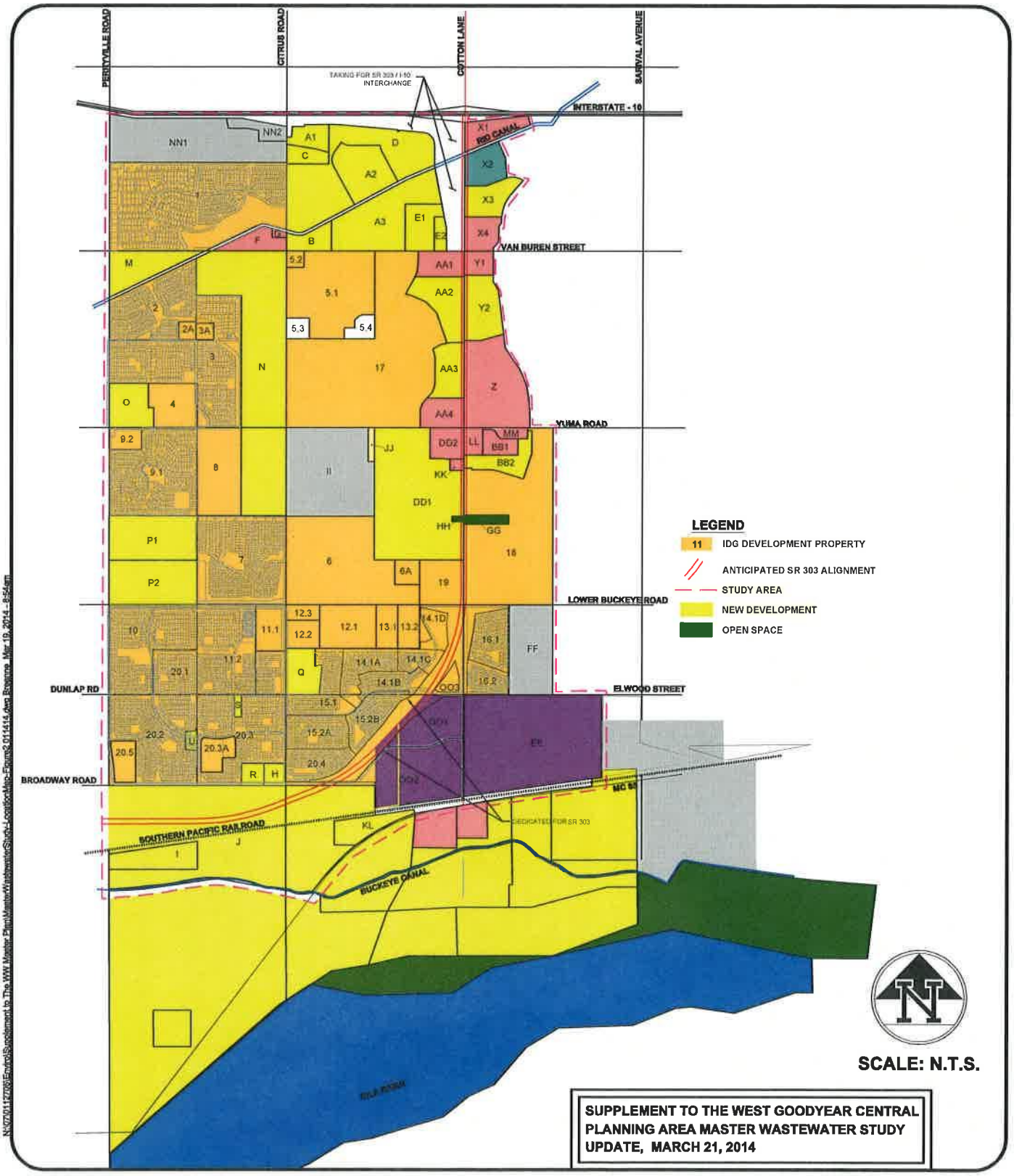
Major topographic features include I-10 along the north boundary of the study area, the Roosevelt Irrigation District (RID) Canal bisecting Sections 2, 3, the Buckeye Canal through Sections 26 and 27, and the Southern Pacific Railroad just south of Broadway Road. Cotton Lane is the proposed alignment for a future limited access roadway (Loop 303) from I-10 to Lower Buckeye with the proposed freeway sweeping southwest, then west, to Perryville approximately parallel to the UPRR.

1.6 Existing Wastewater Facilities

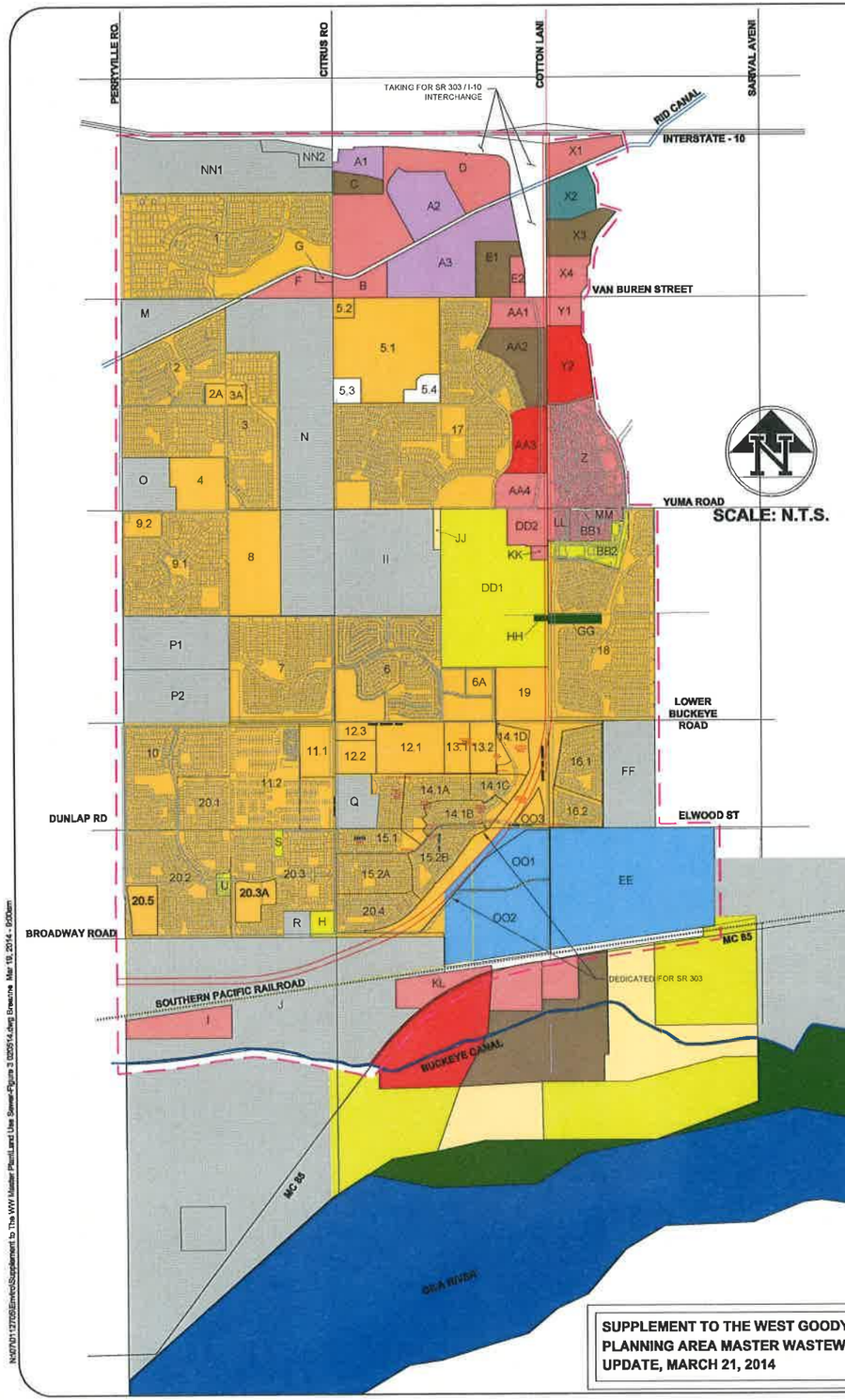
Significant improvements to the collection system have been made since the completion of the 2006 study. Major interceptors have been installed in the Elwood/Dunlap alignment; in Cotton Lane, from Dunlap to Yuma, and in other arterial streets and within residential developments as shown in Figure 4. A distinction is made between sewer lines installed by IDG participating properties as part of the 2006 Cost Recovery Analysis (CRO) and sewers installed by the COG or others.

The Rubbermaid plant is sewered through a system of gravity sewers and two small wastewater lift stations located just north and parallel to the Southern Pacific Railroad. A lift station was installed in 2008 at Broadway Avenue and the 181st Avenue alignment as part of the Las Brisas development. The lift station capacity is approximately 1,243 gpm for Phase 1 and 2,100 gpm

for ultimate conditions. A parallel 8-inch/10-inch force main transports the pumped flows to a manhole located approximately one-quarter mile west of Cotton Lane on Dunlap/Elwood Road. The lift station is currently off-line and the equipment mothballed.



LOCATION MAP	MASTER WASTEWATER STUDY	JOB NO 1.07.0112705
4550 NORTH 12TH STREET PHOENIX, ARIZONA 85014 TELEPHONE (602) 264-6831	COE & VAN LOO PLANNING • ENGINEERING • LANDSCAPE ARCHITECTURE	FIGURE 2



Area ID	IDG Development Properties	Land Use	Area (acres)	Units	Density (du/ac)	Unit Flow (gpad)	Unit Flow (gpad)	Average Flows (gpd)
1		Las Palmas	Single Family	263.56	750	2.85	144	-	108,000
2		Amber Meadows	Single Family	102.00	293	2.82	144	-	42,192
2A		Amber Meadows School	School	8.00	-	-	-	1019	8,114
3		La Privada	Single Family	189.82	569	3.00	144	-	81,936
3A		La Privada School	School	8.00	-	-	-	1019	8,114
4		Paseo Ridge Phase II	Single Family	41.63	135	3.25	144	-	19,440
5.1		Silva-Rose Gardens	Single Family	126.09	384	3.05	144	-	55,296
5.2		Silva-Rose	Commercial Pad	7.00	-	-	-	951	6,657
5.3		Silva-Rose Gardens	City Water &Fire Campus	10.00	-	-	-	1019	10,190
5.4		Silva-Rose Gardens	Charter School	8.00	-	-	-	1019	8,152
6		La Jolla Vista	Single Family	181.80	688	3.79	144	-	99,072
6A		La Jolla Vista School	School	12.00	-	-	-	1019	12,228
7		Pradera	Single Family	156.27	456	2.92	144	-	65,664
8		Paseo Ridge Phase I	Single Family	79.00	214	2.71	144	-	30,816
9.1		las Ventanas Single Family	Single Family	140.71	412	2.93	144	-	59,328
9.2		las Ventanas	Commercial Pad	15.00	-	-	-	951	14,265
10		Las Brisas Phase I	Single Family	120.00	324	2.70	144	-	46,656
11.1		Levinson	Commercial Pad	27.00	-	-	-	951	25,677
11.2		Levinson	Single Family	126.70	422	3.28	144	-	60,768
12.1		Citrus Ridge	Agua Fria HS District	50.00	-	-	-	1019	50,950
12.2		Citrus Ridge (R1-8)	Single Family	18.35	90	4.90	129	-	11,610
12.3		Citrus Ridge (C2)	Commercial Pad	8.41	-	-	-	951	7,998
13.1		Cotton Commons (MHD)	Multi-Family	19.57	300	15.33	124	-	37,200
13.2		Cotton Commons (MD)	Multi-Family	19.57	160	8.18	128	-	20,480
14.1a		EL CIDRO *EL CIDRO RANCH	Single Family	44.07	159	3.61	144	-	22,896
14.1b		EL CIDRO *EL CIDRO RANCH	Single Family	24.41	103	4.22	129	-	13,287
14.1c		EL CIDRO *EL CIDRO RANCH	Single Family	12.08	35	2.90	144	-	5,040
14.1d		EL CIDRO *EL CIDRO RANCH	Multi Family	17.30	74	4.28	129	-	9,546
15.1		EL CIDRO *EL CIDRO RANCH	Single Family	49.65	164	3.30	144	-	23,616
15.2a		EL CIDRO *EL CIDRO RANCH	Single Family	41.14	164	3.99	144	-	23,616
15.2b		EL CIDRO *EL CIDRO RANCH	Single Family	36.18	162	4.48	129	-	20,896
16.1		EL CIDRO *EL CIDRO RANCH	Single Family	42.42	152	3.58	144	-	21,888
16.2		EL CIDRO *EL CIDRO RANCH	Single Family	23.73	94	3.96	144	-	13,536
17		Canyon Trails 4 West (Centex)	Single Family	310.00	1064	3.43	144	-	153,216
18		Canyon Trails 4 South (TM)	Single Family	255.00	717	2.81	144	-	103,248
19		Sin Lomas	Single Family	40.00	135	3.38	144	-	19,440
20.1		Las Brisas Phase 2	Single Family	40.00	111	2.78	144	-	15,984
20.2		Las Brisas Phase 2	Single Family	150.00	416	2.78	144	-	59,904
20.3		Las Brisas Phase 2	Single Family	80.32	364	4.53	129	-	46,956
20.3 A		Las Brisas Phase 2 School	School	18.60	-	-	-	1019	18,915
20.4		EL CIDRO *EL CIDRO RANCH	Single Family	38.03	155	4.30	129	-	19,995
20.5		Las Brisas Phase 2	Commercial Pad	19.13	-	-	-	951	18,193
Sub Total				2975.94	9268				1,494,977

NOTE: NAMES WITH AN ASTERISK (*) AND ITALICIZED ARE FORMER NAMES OF THE DEVELOPMENT

Area (ID)	Additional Development Properties	Land Use	Area (acres)	Units	Density (du/ac)	Unit Flow (gpad)	Unit Flow (gpad)	Average Flows (gpd)
A1	-	Light Industrial	10	-	-	-	815	8,150
A2	-	Light Industrial	50				815	40,750
A3	-	Light Industrial	72				815	58,346
B	-	Community Commercial	20	-	-	-	951	19,020
C	-	M-HDR Multi-Family	10	160	15	124	-	18,600
D	-	Community Commercial	116	-	-	-	951	110,316
E1	-	M-HDR Multi-Family	20	300	15	124	-	37,200
E2	-	Community Commercial	5	-	-	-	951	4,755
F	-	Community Commercial	20	-	-	-	951	19,020
G	-	Community Commercial	2	-	-	-	951	1,902
H	-	LDR	10	30	3	144	-	4,320
I	-	Community Commercial	40	-	-	-	951	38,040
J	-	County Land-Light Industrial	370	-	-	-	815	301,550
K	-	Community Commercial	20	-	-	-	951	19,020
L	-	Community Commercial	7	-	-	-	951	6,657
M	-	County Land-RR	45	45	1	160	-	7,200
N	-	County Land-RR	250	250	1	160	-	40,000
O	-	County Land-LDR	30	90	3	144	-	12,960
P1	-	County Land-LDR	75	225	3	144	-	32,400
P2	-	County Land-RR	75	75	1	160	-	12,000
Q	-	County Land-LDR	30	90	3	144	-	12,960
R	-	County Land-LDR	10	30	3	144	-	4,320
S	-	LDR	3	9	3	144	-	1,296
U	-	LDR	5	15	3	144	-	2,160
X1	-	Community Commercial	28	-	-	-	951	24,726
X2	-	HDR Multi-Family	30	750	25	110	-	82,500
X3	-	M-HDR Multi-Family	31	465	15	124	-	57,660
X4	-	Community Commercial	23	-	-	-	951	21,873
Y1	-	Community Commercial	14	-	-	-	951	13,314
Y2	-	MDR Multi-Family	48	368	8	128	-	47,104
Z	-	Community Commercial	104	-	-	-	951	98,904
AA1	-	Community Commercial	24	-	-	-	951	22,824
AA2	-	M-HDR Multi-Family	47	705	15	124	-	87,420
AA3	-	MDR Multi-Family	33	264	8	128	-	33,792
AA4	-	Community Commercial	28	-	-	-	951	24,726
BB1	-	Community Commercial	14	-	-	-	951	13,314
BB2	-	LDR	27	81	3	144	-	11,664
DD1	-	LDR	214	642	3	144	-	92,448
DD2	-	Community Commercial	21	-	-	-	951	19,971
EE	-	General Industrial	258	-	-	-	1087	280,446
FF	-	County Land-RR	80	80	1	160	-	12,800
GG	-	Open Space	5	0	0	0	0	0
HH	-	Open Space	1	0	0	0	0	0
II	-	County Land-RR	155	155	1	160	-	24,800
JJ	-	L-MDR SingleFamily	4	20	5	129	-	2,580
KK	-	Community Commercial	3	-	-	-	951	2,853
LL	-	Community Commercial	10	-	-	-	951	9,510
MM	-	Community Commercial	7	-	-	-	951	6,657
NN1	-	County Land-Community Commercial	141	-	-	-	951	134,091
NN2	-	County Land-Light Industrial	13	-	-	-	815	10,591
OO1	-	General Industrial	50	-	-	-	1087	53,817
OO2	-	General Industrial	114	-	-	-	1087	123,375
OO3	-	Community Commercial	8	-	-	-	951	7,617
Sub Total			2926	4,839				2,134,319
Grand Total of Service Area			5902	14,105				3,629,296

AVERAGE DAILY FLOW (ADD) = 3.6 MGD

MAX DAY FLOW (ADD X 2.89) = 14.6 MGD

LEGEND

11	IDG DEVELOPMENT PROPERTY	LI	LIGHT INDUSTRIAL
LDR	LOW DENSITY RESIDENTIAL	GI	GENERAL INDUSTRIAL
L-MDR	LOW-MEDIUM DENSITY RESIDENTIAL	OS	OPEN SPACE
MDR	MEDIUM DENSITY RESIDENTIAL	COUNTY	
M-HDR	MEDIUM-HIGH DENSITY RESIDENTIAL	OTHER	
HDR	HIGH DENSITY RESIDENTIAL		ANTICIPATED SR 303 ALIGNMENT
CC	COMMUNITY COMMERCIAL		STUDY AREA

SUPPLEMENT TO THE WEST GOODYEAR CENTRAL PLANNING AREA MASTER WASTEWATER STUDY UPDATE, MARCH 21, 2014

N:\07\01127056\Enviro\Supplement to The WW Master Plan\Land Use Sewer-Figure 3 020514.dwg Breanne Mar 19, 2014 - 9:20am

WEST GOODYEAR
CENTRAL PLANNING AREA

WASTEWATER STUDY AREA - LAND USE

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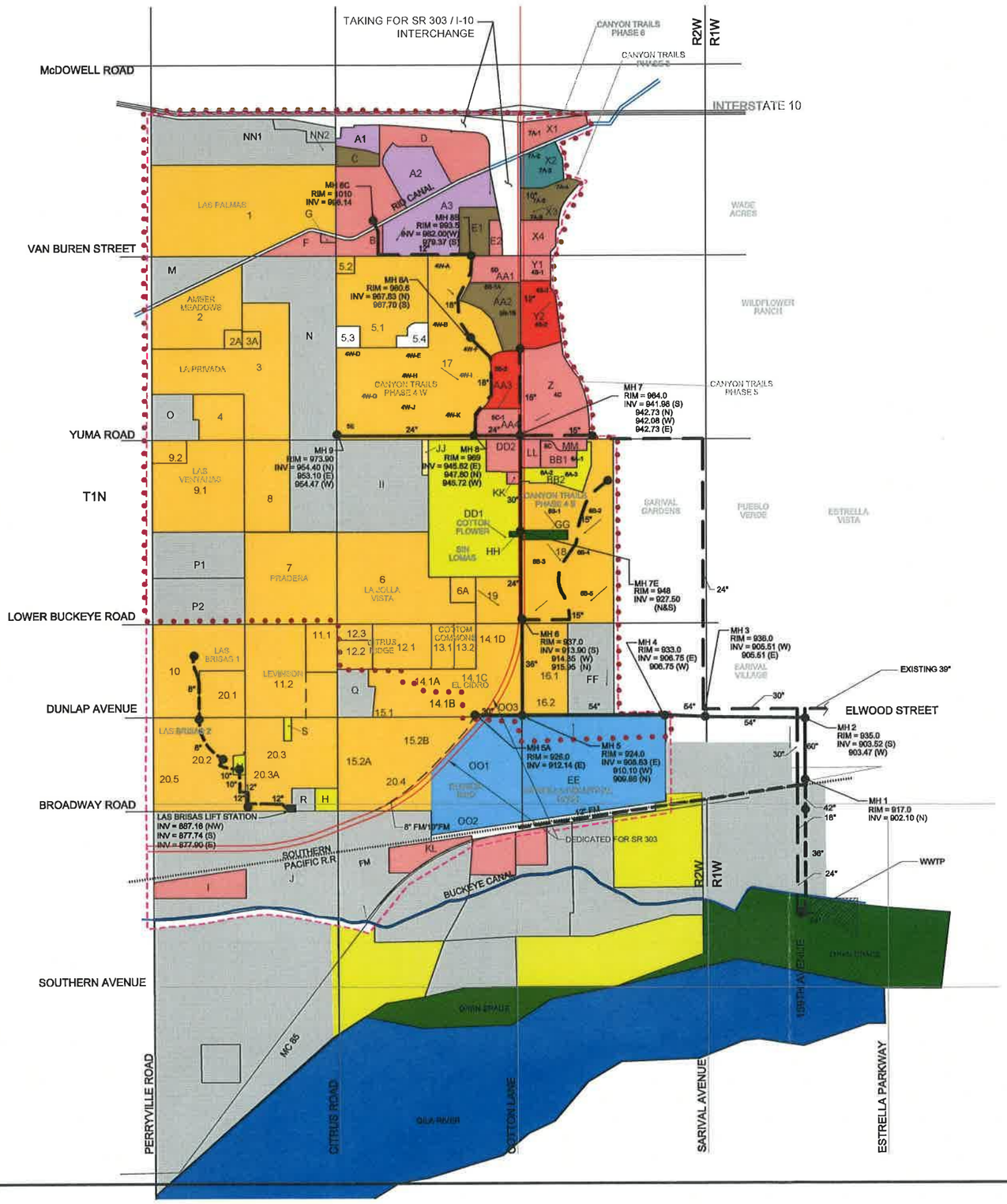
JOB NO
1.07.0112705

FIGURE
3



LEGEND

- STUDY LIMITS
- SERVICE AREA LIMITS - GRAVITY
- EXISTING SEWERS
- EXISTING SEWERS INSTALLED AS PART OF 2006 CRO
- EXISTING FORCE MAIN
- EXISTING MANHOLE
- GENERAL FLOW PATH TO MH
- 11 — IDG DEVELOPMENT PROPERTY
- B — ADDITIONAL DEVELOPMENT PROPERTY
- COUNTY LAND

SCALE: N.T.S.

SUPPLEMENT TO THE WEST GOODYEAR CENTRAL PLANNING AREA MASTER WASTEWATER STUDY UPDATE, MARCH 21, 2014

NOTE: SOME EXISTING RIMS AND INVERTS WHERE TAKEN FROM DESIGN PLANS NOT AS-BUILTS.

WEST GOODYEAR
CENTRAL PLANNING AREA

COE & VAN LOO
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EXISTING WEST GOODYEAR CENTRAL PLANNING AREA WASTEWATER SYSTEM

4550 NORTH 12TH STREET
PHOENIX, ARIZONA 85014
TELEPHONE (602) 264-6831

JOB NO
1.07.0112705

FIGURE
4

N:\07\0112705\Engrd\Supplement to The WW Master Plan\Existing WGCPA WW System-Figure 4 R2014-04.dwg Rasanna, Mar 19, 2014 - 8:58am

2.0 ANALYSIS

2.1 General

The existing sewer system will be expanded in the future as development occurs. The template established in the 2006 study has been updated and line sizes for planned sewers modified as necessary to reflect the latest land use plan and anticipated flows calculated using current unit factors. The sewer system presented in this plan was developed to serve existing and proposed developments in the WGCP Sewer Trunk Line Study Area. The study area has been subdivided into an area that can be accommodated by gravity sewers and smaller areas that may require a lift station (see Figure 6). All flows would be treated at the City's Wastewater Reclamation Facility (WWRF) located at 157th Avenue and the Buckeye Canal.

2.2 Wastewater System Design Criteria

The design in this wastewater master plan was based on criteria in the City of Goodyear's *Engineering Design Standards and Policies Manual.* The following criteria were used in developing this plan:

- Slopes shall, in 10-inch or smaller sewer lines, have a minimum velocity of 2 feet per second using Manning's equation, with an n-value of 0.013. For sewer lines larger than 10-inch, maintain velocities of 2.5 fps. See Table 6.3-1 in Engineering Design Manual.

- Terminal manholes within developments were assumed to have a minimum depth of 8 feet.

- **Sewer lines with diameters of 8 to 12 inches are to be designed with a domestic peak capacity of 1,000 gallons per day per dwelling unit flowing full and commercial flow is to be designed by multiplying average day flow (gpm) by a peaking factor of 2.89.**

- Sewer lines with diameters greater than 12 inches were designed using the criteria identified in the City's IWMP using generation rates listed in Table 1:

  Maximum daily flows were calculated using a peaking factor of 2.89.

  CVL notes that the COG has linked the wastewater generation rates to the water demand criteria. Wastewater generated for each land use is given as a percentage of water demanded for that land use. As an example, the unit water demand for a low density (2-4 du/ac) residential land use is 351 gal/day-unit; the wastewater unit rate is given as being 41 percent of the unit water demand or 144 gal/day-unit. This is the flow to be returned to the WWRF as sewage. The other 59 percent is lost through irrigation or other consumptive uses. These rates are also listed in Table 3-12 in the IWMP.

- The dwelling unit density for each tributary parcel was obtained from the general plan, from available lotting information or from input from the COG Planning Department. Also the General Plan was used to identify commercial and industrial parcels.

- For dissimilar sewer sizes, a crown-to-crown tie in was assumed.

- Areas tributary to lift stations will be served by the extension or installation of a collection system. Lift station pumping requirements may be phased to meet initial and ultimate flows as presented in wastewater master studies performed for individual parcels by the developer of the parcel. All flows will be treated at the 157th Avenue WWRF.

- All lift stations will be designed to be compatible with the City of Goodyear SCADA system.

2.3 Sewer System Analysis

2.3.1 Sewer System Description

The area slopes generally to the south and southeast. The sewer system flows by gravity and is designed to take advantage of the topographic conditions. The sewer system, therefore, was designed to flow to the south and southeast to take advantage of the natural slope of the land and avoid unnecessarily deep sewers. Most of the main sewer lines are in the major streets.

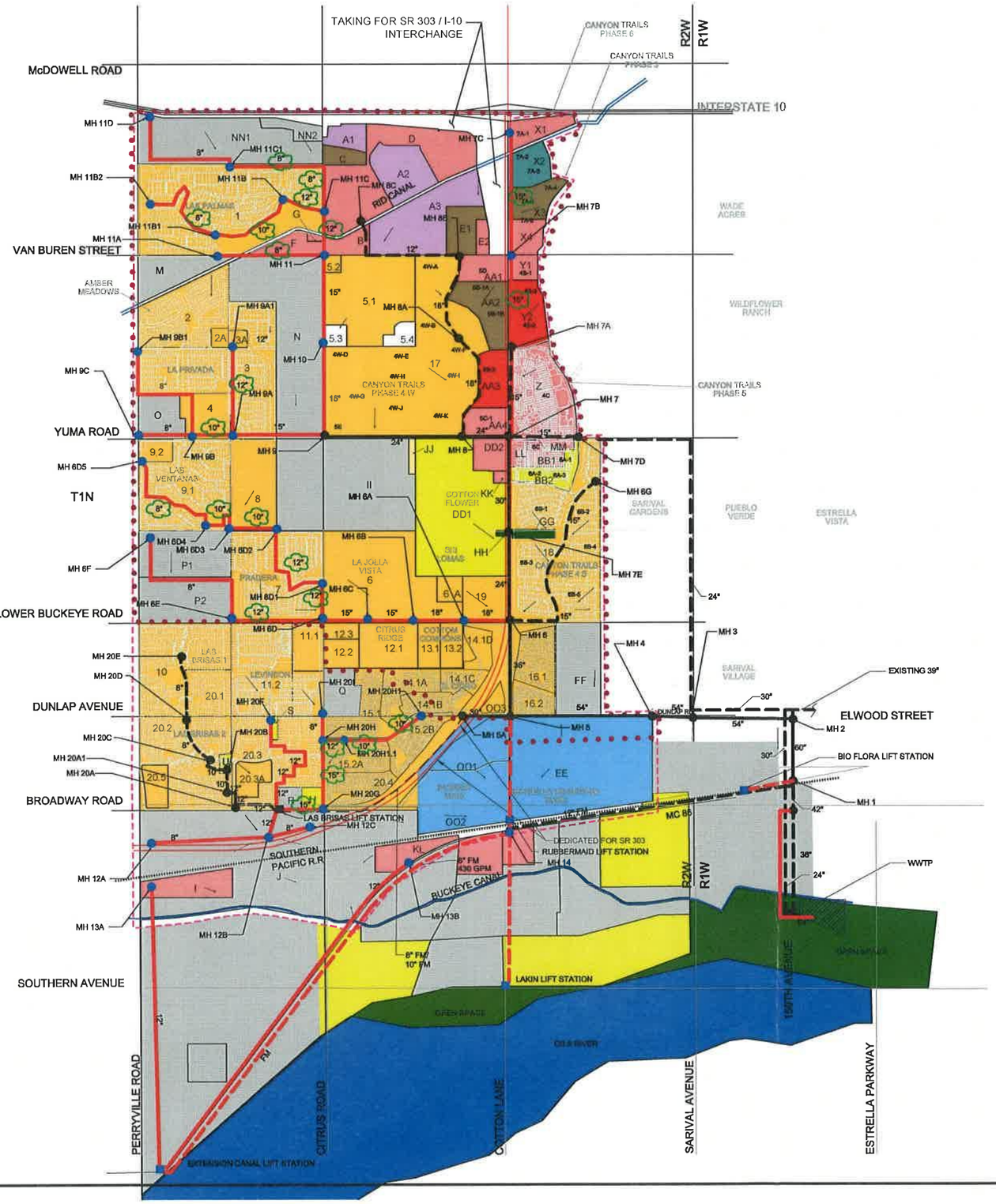
Presented in Figure 5 is the proposed sewer system for the area at ultimate build out. Line sizes are shown next to the proposed sewer line segments. Nodes are numbered and separate sewers of different line sizes. Subareas are shown and an arrow within each area indicates the sewer line that will receive the majority of flow from the area. Proposed sewer lines range in size from eight inches to 18 inches.

The area generally south of the SPRR will be served by four lift stations as shown in Figure 5, taken from the IWMP Figure 15 – Build Out 157th Avenue Basin (2007). Line sizes, lift station capacity, and force main locations were also taken directly from the IWMP.

The land use and areas for those parcels contributing flow to each reach of sewer line was tabulated and wastewater flows were calculated using the previously mentioned criteria. The flow data is summarized on Tables 2a-2c for ultimate conditions. Estimated invert elevations for each node are shown and the estimated depth for each upstream node is also presented. The line size and estimated length for each reach of sewer line is also shown. Land uses were taken from Figure 3.

2.3.2 Sewer Line Analysis

Sewer lines were sized as follows. The area tributary to the sewer was established using the existing topography. Flows were then calculated using the appropriate land use factors shown in Table 1. The smallest size sewer line was then selected that had the capacity to carry the calculated flow. The design of individual project or community sewer systems within each property's development will be performed in a wastewater master plan document to be submitted by a developer as required by the City of Goodyear. Therefore, sewer line sizing design for this study followed the criteria outlined in Section 2.2, items 3) and 4) above.



LEGEND

- STUDY LIMITS
- SERVICE AREA LIMITS - GRAVITY
- EXISTING SEWERS
- EXISTING SEWERS INSTALLED AS PART OF 2006 CRO
- PROPOSED SEWERS
- EXISTING FORCE MAIN
- PROPOSED FORCE MAIN
- PROPOSED MANHOLE
- EXISTING MANHOLE
- GENERAL FLOW PATH TO MH
- EXISTING LIFT STATION
- PROPOSED LIFT STATION
- 11 — IDG DEVELOPMENT PROPERTY
- B — ADDITIONAL DEVELOPMENT PROPERTY
- COUNTY LAND
- MODIFIED LINE SIZE

SCALE: N.T.S.

SUPPLEMENT TO THE WEST GOODYEAR CENTRAL PLANNING AREA MASTER WASTEWATER STUDY UPDATE, MARCH 21, 2014

WEST GOODYEAR CENTRAL PLANNING AREA

PROPOSED WASTEWATER SYSTEM

COE & VAN LOO
PLANNING • ENGINEERING • LANDSCAPE ARCHITECTURE
4550 NORTH 12TH STREET
PHOENIX, ARIZONA 85014
TELEPHONE (602) 264-6831

JOB NO
1.07.0112705

FIGURE
5

N:\07\0112705\Estrella\Supplement to The WW Master Plan\Sewer Master Plan-Figure 5-20140314.dwg Breanna Mar 19, 2014 - 2:08pm

Table 1 – Wastewater Unit Rates

Land Use	Wastewater Unit Rates
Single-Family Residential	
Rural (0-2 DU/Ac)	160 gpd/DU
Low Density (2-4 DU/Ac)	144 gpd/DU
Low-Medium Density (4-6 DU/Ac)	129 gpd/DU
Multi-Family Residential	
Medium Density (6-10 DU/Ac)	128 gpd/DU
Medium-High Density (10-20 DU/Ac)	124 gpd/DU
High Density (20+ DU/Ac)	110 gpd/DU
Industrial/Commercial	
Light Industrial	815 gpd/Ac
Community Commercial	951 gpd/Ac
General Industrial	1,087 gpd/Ac
Other	
Public/Quasi Public (School)	1,019 gpd/Ac

Each branch of the collection system was analyzed beginning with the upstream areas and continuing downstream to the major collector lines. The invert of each node was calculated using the slope necessary to achieve the minimum velocity. Inverts were then checked to determine if the depth was sufficient to meet the minimum cover requirements.

2.3.3 Wastewater Flows

Using the unit factor shown in Table 1, CVL calculated the flows anticipated from the WGCPA. See Table 2a for IDG properties, Table 2b for additional development properties and Table 2c for a summary of both.

Table 2a – Wastewater Generated Flows, IDG Properties

Area ID	Property	DU's	Unit Flow Lines ≥ 15" (gpdu)	Unit Flow (gpad)	Average Flows (gpd)	Peak Flows Line Sizes ≥ 15" (gpd)	Unit Peak Flow Line Sizes ≤ 12" (gpdu)	Peak Flow Line Sizes ≤ 12" (gpd)
1	Las Palmas	750	144		108,000	312,120	1,000	750,000
2	Amber Meadows	293	144		42,192	121,935	1,000	293,000
2A	Amber Meadows School			1,019	6,114	17,669	-	-
3	La Privada	569	144		81,936	236,795	1,000	569,000
3A	La Privada School			1,019	6,114	17,669	-	-
4	***Paseo Ridge Phase II** (*Lees)*	***135***	144		***19,440***	***56,182***	1,000	135,000
5.1	***Silva-Rose Gardens***	***384***	***144***		***55,296***	***159,805***	***1,000***	***384,000***
5.2	***Silva-Rose***			***951***	***6,657***	***19,239***	-	-
5.3	***Silva-Rose Gardens***			***1,019***	***10,190***	***29,449***	-	-
5.4	***Silva-Rose Gardens***			***1,019***	***8,152***	***23,559***	-	-
6	La Jolla Vista	688	144		99,072	286,318	1,000	688,000
6A	La Jolla Vista School	-	-	1,019	12,228	35,339	-	-
7	Pradera	456	144		65,664	189,769	1,000	456,000
8	***Paseo Ridge Phase I** (*Van Leeuwen)*	214	144		30,816	89,058	1,000	214,000
9.1	***Las Ventanas Single Family***	***412***	***144***		***59,328***	***171,458***	***1,000***	***412,000***
9.2	***Las Ventanas***			***951***	***14,265***	***41,226***	-	-
10	Las Brisas Phs 1	324	144		46,656	134,836	1,000	324,000
11.1	***Levinson***			***951***	***25,677***	***74,207***	-	-
11.2	***Levinson***	***422***	***144***		***60,768***	***175,620***	***1,000***	***422,000***
12.1	***Citrus Ridge***			***1019***	***50,950***	***147,246***	-	-
12.2	***Citrus Ridge (R1-6)***	***90***	***129***		***11,610***	***33,553***	***1,000***	***90,000***
12.3	***Citrus Ridge (C2)***			***951***	***7,998***	***23,114***	-	-
13.1	***Cotton Commons (MHD)***	***300***	***124***		***37,200***	***107,508***	***1,000***	***300,000***
13.2	***Cotton Commons (MD)***	***160***	***128***		***20,480***	***59,187***	***1,000***	***160,000***
14.1a	***El Cidro** (*El Cidro Ranch)*	***159***	***144***		***22,896***	***66,169***	***1,000***	***159,000***
14.1b	***El Cidro** (*El Cidro Ranch)*	***103***	***129***		***13,287***	***38,399***	***1,000***	***103,000***
14.1c	***El Cidro** (*El Cidro Ranch)*	***35***	***144***		***5,040***	***14,566***	***1,000***	***35,000***
14.1d	***El Cidro** (*El Cidro Ranch)*	***74***	***129***		***9,546***	***27,588***	***1,000***	***74,000***
15.1	***El Cidro** (*El Cidro Ranch)*	***164***	***144***		***23,616***	***68,250***	***1,000***	***164,000***
15.2a	***El Cidro** (*El Cidro Ranch)*	***164***	***144***		***23,616***	***68,250***	***1,000***	***164,000***
15.2b	***El Cidro** (*El Cidro Ranch)*	***162***	***129***		***20,898***	***60,395***	***1,000***	***162,000***
16.1	***El Cidro** (*El Cidro Ranch)*	***152***	***144***		***21,888***	***63,256***	***1,000***	***152,000***
16.2	***El Cidro** (*El Cidro Ranch)*	***94***	***144***		***13,536***	***39,119***	***1,000***	***94,000***
17	Canyon Trails 4 West (Centex)	1,064	144		153,216	442,794	1,000	1,064,000
18	Canyon Trails 4 South (TM)	717	144		103,248	298,387	1,000	717,000
19	Sin Lomas	135	144		19,440	56,182	1,000	135,000
20.1	***Las Brisas Phase 2***	***111***	***144***		***15,984***	***46,194***	***1,000***	***111,000***
20.2	***Las Brisas Phase 2***	***416***	***144***		***59,904***	***173,123***	***1,000***	***416,000***
20.3	***Las Brisas Phase 2***	***364***	***129***		***46,956***	***135,703***	***1,000***	***364,000***
20.3A	***Las Brisas Phase 2 School***			***1019***	***16,915***	***48,886***		
20.4	***El Cidro** (*El Cidro Ranch)*	***155***	***129***		***19,995***	***57,786***	***1,000***	***155,000***
20.5	***Las Brisas Phase 2***			***951***	***18,193***	***52,577***		
	GRAND TOTAL	***9266***			***1,494,977***	***4,320,485***		

Note: 1. All bolded and italicized cells have been modified.
2. Names with an asterisk (*) are former names of the development.

Table 2b – Wastewater Generated Flows by Land Use, Other Properties

Area ID	Land Use	DU's	*Unit Flow Lines ≥ 15" (gpdu)*	Unit Flow (gpad)	Average Flows (gpd)	*Peak Flows Line Sizes ≥ 15" (gpd)*	*Unit Peak Flow Line Sizes ≤ 12" (gpdu)*	*Peak Flow Line Sizes ≤ 12" (gpd)*
C	M-HDR	150	124		18,600	53,754	1,000	150,000
E1	M-HDR	300	124		37,200	107,508	1,000	300,000
H	LDR	30	144		4,320	12,485	1,000	30,000
M	County Land-RR	45	160		7,200	20,808	1,000	45,000
N	County Land-RR	250	160		40,000	115,600	1,000	250,000
O	County Land-LDR	90	144		12,960	37,454	1,000	90,000
P1	County Land-LDR	225	144		32,400	93,636	1,000	225,000
P2	County Land-RR	75	160		12,000	34,680	1,000	75,000
Q	County Land-LDR	90	144		12,960	37,454	1,000	90,000
R	County Land-LDR	30	144		4,320	12,485	1,000	30,000
S	LDR	9	144		1,296	3,745	1,000	9,000
U	LDR	15	144		2,160	6,242	1,000	15,000
X2	HDR	750	110		82,500	238,425	1,000	750,000
X3	M-HDR	465	124		57,660	166,637	1,000	465,000
Y2	MDR	368	128		47,104	136,131	1,000	368,000
AA2	M-HDR	705	124		87,420	252,644	1,000	705,000
AA3	MDR	264	128		33,792	97,659	1,000	264,000
BB2	LDR	81	144		11,664	33,709	1,000	81,000
DD1	LDR	642	144		92,448	267,175	1,000	642,000
FF	County Land-RR	80	160		12,800	36,992	1,000	80,000
GG	Open Space	0	0		0	0		
HH	Open Space	0	0		0	0		
II	County Land-RR	155	160		24,800	71,672	1,000	155,000
JJ	L-MDR	20	129		2,580	7,456	1,000	20,000
	Subtotal Residential	***4839***			***638,184***	***1,844,351***		
A1	Light Industrial			815	8,150	23,554	N/A[4]	N/A[4]
A2	Light Industrial			815	40,750	117,768	N/A[4]	N/A[4]
A3	Light Industrial			815	58,346	168,620	N/A[4]	N/A[4]
B	Community Commercial			951	19,020	54,968	N/A[4]	N/A[4]
D	Community Commercial			951	110,316	318,813	N/A[4]	N/A[4]
E2	Community Commercial			951	4,755	13,742	N/A[4]	N/A[4]
F	Community Commercial			951	19,020	54,968	N/A[4]	N/A[4]

Area ID	Land Use	DU's	*Unit Flow Lines ≥ 15" (gpdu)*	Unit Flow (gpad)	Average Flows (gpd)	*Peak Flows Line Sizes ≥ 15" (gpd)*	*Unit Peak Flow Line Sizes ≤ 12" (gpdu)*	*Peak Flow Line Sizes ≤ 12" (gpd)*
G	Community Commercial			951	1,902	5,497	N/A[4]	N/A[4]
I	Community Commercial			951	38,040	109,936	N/A[4]	N/A[4]
J	County Land-Light Industrial			815	301,550	871,480	N/A[4]	N/A[4]
K	Community Commercial			951	19,020	54,968	N/A[4]	N/A[4]
L	Community Commercial			951	6,657	19,239	N/A[4]	N/A[4]
X1	Community Commercial			951	24,726	71,458	N/A[4]	N/A[4]
X4	Community Commercial			951	21,873	63,213	N/A[4]	N/A[4]
Y1	Community Commercial			951	13,314	38,477	N/A[4]	N/A[4]
Z	Community Commercial			951	98,904	285,833	N/A[4]	N/A[4]
AA1	Community Commercial			951	22,824	65,961	N/A[4]	N/A[4]
AA4	Community Commercial			951	24,726	71,458	N/A[4]	N/A[4]
BB1	Community Commercial			951	13,314	38,477	N/A[4]	N/A[4]
DD2	Community Commercial			951	19,971	57,716	N/A[4]	N/A[4]
EE	General Industrial			1,087	280,446	810,489	N/A[4]	N/A[4]
KK	Community Commercial			951	2,853	8,245	N/A[4]	N/A[4]
LL	Community Commercial			951	9,510	27,484	N/A[4]	N/A[4]
MM	Community Commercial			951	6,657	19,239	N/A[4]	N/A[4]
NN1	County Land-Community Commercial			951	134,091	387,523	N/A[4]	N/A[4]
NN2	County Land-Light Industrial			815	10,391	30,031	N/A[4]	N/A[4]
OO1	General Industrial			1,087	53,817	155,532	N/A[4]	N/A[4]
OO2	General Industrial			1,087	123,375	356,552	N/A[4]	N/A[4]
OO3	Community Commercial			951	7,817	22,592	N/A[4]	N/A[4]
	Subtotal Industrial/Commercial				**1,496,135**	***4,323,833***		
	GRAND TOTAL				***2,134,319***	***6,168,184***		

[1]RR Rural Residential (0-2 du/ac)
[2]LDR- Low Density Residential (2-4 du/ac)
[3]M-HDR Medium-High Density Residential (10-20 du/ac)
[4]Sewer collection system for these parcels was not designed as part of this master plan. Off-site flow contributions taken from peak flows calculated from IWMP criteria.
Note: All bolded and italicized cells have been modified.

Table 2c – Total Wastewater Generated Flows in Study Area

Table	Land Use	DU's	Average Flows Residential (gpd)	Average Flows Commercial (gpd)	Total Average Flows (gpd)	Total Peak Flows (gpd)
2a	All	9,266	1,311,524	183,453	1,494,977	4,320,485
2b	All	4,839	638,184	1,496,135	2,134,319	6,168,184
	TOTAL	**14,105**	**1,949,708**	**1,679,588**	**3,629,296**	**10,488,669**

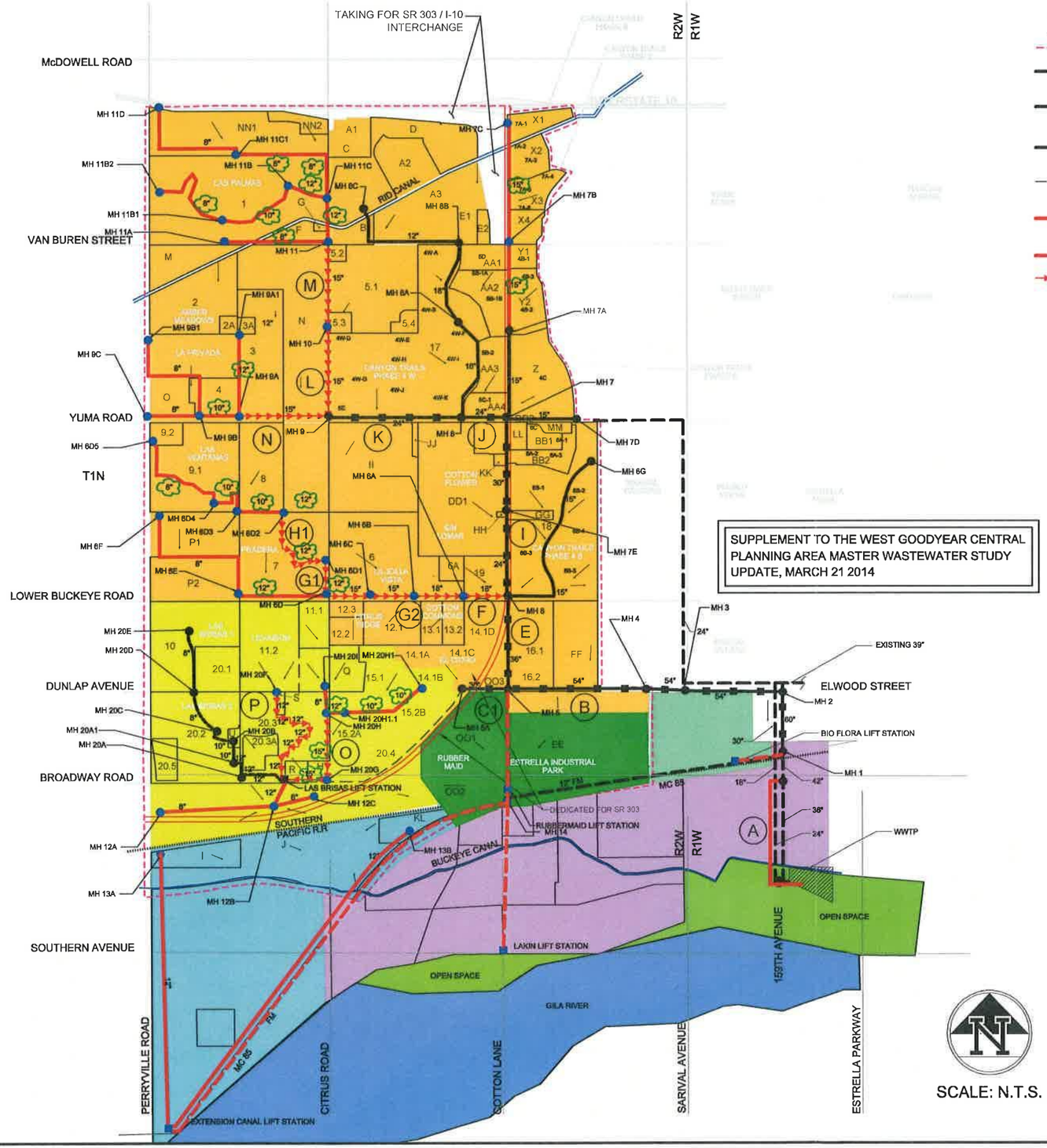
2.4 Discussion

Approximately 5,520 acres of the WGCPA study area may be served by gravity to the existing 54"/60" off-site sewer interceptor along the Dunlap Road/Elwood Ave alignment. The remaining area must be provided service through the Las Brisas Lift Station and Rubbermaid Lift Station. Areas south of the Southern Pacific Railroad will be served by three proposed lift stations described below and shown in the Figure 5 and 6 Buildout Collection System 157th Avenue Basin.

The Las Brisas lift station is located approximately 1,400 LF west of the intersection of Broadway and Citrus Roads. Its initial capacity is 1.79 MGD and has been designed for an ultimate capacity of 2.98 MGD in 2008 by Goodwin-Marshall as part of the mater planning of Las Brisas. Its tributary area is approximately 900 acres. This lift station was constructed as part of the Las Brisas development. A force main discharges pumped sewage to the existing 24-inch gravity interceptor in Dunlap/Elwood, at S 175th Avenue. This force main has been installed as a dry line from the proposed Las Brisas LS site to the reconnection point at 175th Avenue. It consists of an 8-inch and 10-inch pipeline. The City of Goodyear currently has a ROW reservation for the future Loop 303 alignment for the reach south of Lower Buckeye. The configuration of local streets will be impacted by this freeway if it sweeps west and south, parallel to the UPRR to Perryville. Final sewer alignments may vary from those shown in this report as the Loop 303 design progresses. Actual roadway construction is not anticipated until the 2015-2018 horizon.

A lift station will be required to service the low ground south of the SPRR, between Perryville and Cotton Lane. That area, including the 315 acre portion of the WGCPA study area, will drain by gravity to the proposed Extension Canal and Lakin lift stations and be pumped to the intersection of Cotton Lane and MC85 where it will discharge to the proposed Rubbermaid lift station. The proposed Extension Canal lift station is located at Baseline Road and Perryville Road and the proposed Lakin lift station is located north of Southern Avenue on Cotton Lane per the Black and Veach Integrated Master Plan Study, 2008.

The existing series of lift stations and force mains serving the former Rubbermaid parcel will be abandoned and a new lift station installed to pump collected wastewater to the existing 54 inch Interceptor at the intersection of Cotton Lane and Dunlap. Table 3 summarizes the pumping capacity required at buildout for each lift station described above. Data is derived from the 2008 IWMP as updated by information received from Goodwin & Marshall for the Las Brisas Lift Station. Any lift station required to provide service to the study area will be designed to be compatible with the City's SCADA system.



SUPPLEMENT TO THE WEST GOODYEAR CENTRAL PLANNING AREA MASTER WASTEWATER STUDY UPDATE, MARCH 21 2014

LEGEND

- STUDY LIMITS
- EXISTING SEWERS OUTSIDE SERVICE AREA
- EXISTING REGIONAL SEWER LINES FOR WGCPA (NOT PART OF ANY CRO)
- EXISTING SEWERS INSTALLED AS PART OF 2006 CRO
- EXISTING FM
- PROPOSED PROJECT SPECIFIC SEWERS (NON-REGIONAL)
- PROPOSED PROJECT SPECIFIC FORCE MAIN
- CRO REGIONAL SEWER LINES NOT YET BUILT
- PROPOSED MANHOLE
- EXISTING MANHOLE
- GENERAL FLOW PATH TO MH
- EXISTING LIFT STATION
- PROPOSED LIFT STATION
- LAS BRISAS LIFT STATION SERVICE AREA
- EXTENSION CANAL LIFT STATION SERVICE AREA
- RUBBERMAID LIFT STATION SERVICE AREA
- BIO FLORA LIFT STATION SERVICE AREA
- LAKIN LIFT STATION SERVICE AREA
- MODIFIED LINE SIZE

REGIONAL SEWER TRUNK LINE LEGEND

- (A) 159TH AVE (BOTTLENECK) SEWER TRUNK LINE BY CITY
- (B) ELWOOD / 159TH LINE
- (C1) L303 / EL CIDRO LINE
- (E) SOUTH COTTON LINE
- (F) EAST LOWER BUCKEYE LINE
- (G1) CITRUS/LOWER BUCKEYE LINE
- (G2) LOWER BUCKEYE LINE
- (H1) NORTH CITRUS LINE
- (I) NORTH COTTON LINE
- (J) EAST YUMA LINE
- (K) WEST YUMA LINE
- (L) NORTH CITRUS LINE
- (M) NORTH CITRUS (LAS PALMAS) LINE
- (N) 183RD AVE. & YUMA
- (O) SOUTH CITRUS LINE
- (P) LAS BRISAS LINE

NOTE:
MANHOLES SHOWN ARE FOR MASTER PLANNING PURPOSES, FINAL ENGINEERING DESIGN PLANS WILL BE REQUIRED TO PROVIDE MANHOLES SPACED PER CITY STANDARDS.

SCALE: N.T.S.

N:\70\1427\05\Report\March 21 2014\Supplement\Proposed IDG Property Sewers Figure 5 092414.dwg Rhonda Mar 18, 2014 - 7:41pm

WEST GOODYEAR
CENTRAL PLANNING AREA

COE & VAN LOO
PLANNING • ENGINEERING • LANDSCAPE ARCHITECTURE

PROPOSED IDG PROPERTY SEWERS

4550 NORTH 12TH STREET
PHOENIX, ARIZONA 85014
TELEPHONE (602) 264-6831

JOB NO
1.07.0112705

FIGURE
6

Table 3 – Lift Station Capacity Summary

Lift Station	Current Capacity	IWMP[2] Ultimate Peak Flows (2008)	Firm Capacity	Proposed Ultimate Firm Capacity
Lakin	-	2.47 MGD	2.5 MGD[2]	2.5 MGD
Extension Canal	-	1.36 MGD	1.36 MGD[2]	1.36 MGD
Las Brisas	1.79 MGD[1]	0.57 MGD	2.58 MGD[1]	2.98 MGD
Rubbermaid	0.12 MGD[2]	0.56 MGD	0.55 MGD[2]	4.41 MGD[3]
Bio Flora	0.21 MGD[2]	0.47 MGD	0.46 MGD[2]	0.46 MGD

[1] Capacity per Goodwin Marshall 2006 Las Brisas Lift Station Design Report, Section 1.1
[2] Capacity per IWMP, Table 13, Tech Memorandum No. 2-2.
[3] Sum of tributary LSs: Extension Canal, Lakin, plus Rubbermaid LS.

The Proposed Ultimate Firm pumping capacities for the lift stations were taken from the IWMP with the exception of the Rubbermaid Lift Station for which the contributing areas and tributary lift station capacities were added together. The Las Brisas Lift Station ultimate capacities were taken from the Goodwin & Marshall design report.

2.5 Proposed Wastewater Collection System

The four (4) page Table 4 presents the proposed wastewater flows in each section of the sewer collection system within the WGCPA study area. It includes both existing and proposed sewers. The inverts shown meet the criteria for minimum velocity and flow depth. Figure 5 depicts the proposed ultimate wastewater system.

The areas south of the Southern Pacific Railroad to the Gila River are shown schematically in Figures 5 and 6 as taken from the IWMP. Detailed collection system routing and flow-capacity calculations for individual pipes was not performed for these areas outside of the WGCPA study limits.

The Table 4 flows include wastewater from contributing areas south of MC 85/UPRR corridor to the Gila River. These areas, although outside the WGCPA, will discharge collected sewage to the Elwood Interceptor at Cotton Lane and Dunlap Road through a series of cascading lift stations. See Figure 6.

CVL notes that the peak lift station discharges from the Las Brisas, Extension Canal, Lakin, Rubbermaid, and Bio Flora Lift Station facilities were taken from Table 3 as new proposed firm capacity. Although pumped flows are expected to attenuate during system operation, CVL assumed that the flow contribution from each lift station would remain at the rated firm capacity and routed through the interceptor sewers.

Sewer alignments shown were developed from best available information. Should easements be required for any of the sewers depicted, acquisition may be necessary by the development for these lines.

2.6 Treatment Capacity Requirements

All flows within the WGCPA study limits and those areas south of the Southern Pacific Railroad to the Gila River will be collected and treated at the existing 157th Avenue WWRF (treatment plant) owned and operated by the City of Goodyear. The anticipated ultimate flows to the treatment plant from the WGCPA study area shown in Tables 2a, b, and c are duplicated below:

Wastewater Flows, IDG Properties	1,475,723 gpd
Wastewater Flows, Other Properties	2,137,343 gpd
Total	3,613,066 gpd

The existing permitted treatment capacity of the treatment plant is 4.0 MGD. Recent discussions with City Operating Staff have determined that current inflows to the treatment plant are consistently 3.1 to 3.2 MGD. CVL has been informed that the facility's inflows have reached 80 percent of design capacity thereby triggering a notice from the Maricopa County Environmental Service Department (MCESD) directing the City to begin studies to increase the treatment capacity of the facility.

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Supplement to the WGCPA Master Wastewater Study Update March 21, 2014

Start MH	End MH	Area ID	Average Flow (gpd)	Cumulative Average Flow (gpd)	Peaking Factor	Residential Peak Flow (Line Sizes 8" to 12") (gpdu)	Total Estimated Peak Flow: Lines ≤ 12" (gpd)	Total Estimated Peak Flow: Lines > 12" (gpd)	Estimated Ground Elevation (feet)	Estimated Length (feet)	Line Diameter (inches)	Sewer Line Slope (ft/ft)	Estimated Start Depth (feet)	Estimated Start Invert Elevation (ft)	Mid-line Bend Drops (ft)	Estimated End Invert Elevation (ft)	Sewer Line Capacity (gpd)	% Full (Q/Q_f)	Velocity Flowing Full (fps)	Depth of Flow (in) [goal seek]	X-sec Area of Flow (SF)	Hyd Radius (ft)	= 0	Actual Peak Velocity (fps)	d/D
11d	11c1	1/2 NN1	67046	67046	2.89		193,761	193,761	1041	4320	8	0.0065	8.4	1031.96	1.00	1002.88	629633	31%	2.8	3.0	0.1	0.1	0.00	2.46	0.38
11c1	11c	Flow From Line 11d-11c	67046	67046																					
		1/2NN1	67046	134091																					
		NN2	10391	144482																					
				144482	2.89		417,554	417,554	1017	2772	8	0.0065	13.6	1002.78	0.10	984.66	629633	66%	2.8	4.7	0.2	0.2	0.00	3.0	0.59
11b2	11b1	1/3 Las Palmas Development	36000	36000	2.89	250,000	250,000	104,040	1019	3083	8	0.0055	6.0	1012.45	0.60	994.81	580602	43%	2.6	3.7	0.2	0.2	0.00	2.5	0.46
11b1	11b	11b2 to 11b1	36000	36000		250,000																			
		1/3 Las Palmas Development	36000	72000		250,000																			
				72000	2.89		500,000	208,080	1009	2420	10	0.0024	13.4	994.31	0.40	980.54	697379	72%	2.0	6.3	0.4	0.2	0.00	2.2	0.63
11b	11c	Flow From Line 11b1 to 11b	72000	72000		500,000																			
		1/3 Las Palmas Development	36000	108000		250,000																			
				108000	2.89		750,000	312,120	1013	1280	12	0.0029	23.6	988.44	0.10	984.50	1244624	60%	2.5	6.7	0.5	0.3	0.00	2.6	0.56
11c	11	Flow From Line 11c1 - 11c	144482	144482																					
		Flow From Line 11b to 11c	108000	252482		750,000																			
				252482	2.89		1,167,554	729,674	1010	1338	12	0.0057	24.5	984.50	0.80	976.10	1735328	67%	3.4	7.2	0.5	0.3	0.00	3.7	0.60
11a	11	F	19020	19020																					
		G	1902	20922																					
		M	7200	28122																					
				28122	2.89		81,273	81,273	1010	3046	8	0.0033	22.7	986.63	0.00	976.58	448629	18%	2.0	2.3	0.1	0.1	0.00	1.5	0.29
11	10	Flow From Line 11c - 11	252482	252482																					
		Flow From Line 11a-11	28122	280604																					
		1/2 A3	29173	309777																					
		B	19020	328,797																					
		1/3N	13333	342,131																					
				342,131	2.89			988,757	1000	2,640	15	0.0031	22.8	976.00	0.70	967.10	2326670	42%	2.9	6.815	0.542	0.293	0.00	2.8	0.45
9c	9b	O	12960	12,960		90,000																			
				12,960	2.89		90,000	37,454	993	1,550	8	0.0033	18.7	973.64	1.80	966.72	448629	20%	2.0	2.426	0.089	0.115	0.00	1.56	0.30
9a1	9a	2 (Amber Meadows)	42192	42,192		293,000																			
		2A	6114	48,306																					
		3A	6114	54,420																					
		3/5 3	49162	103,582		341,400																			
				103,582	2.89		669,739	299,351	987	2,675	12	0.0030	17.3	968.67	0.00	960.64	1261154	53%	2.5	6.207	0.410	0.255	0.00	2.5	0.52
10	9	Flow From Line 11-10	342131	342,131																					
		1/3 N	13333	355,464																					
		5.1	55296	410,760																					
		5.2	6657	417,417																					
		5.3	10190	427,607																					
		5.4	8152	435,759																					
				435,759	2.89			1,259,343	987	2,736	15	0.0044	18.8	967.00	0.50	954.40	2775839	45%	3.5	7.075	0.569	0.301	0.00	3.4	0.47
9b1	9b	2/5 3	32774	32,774		227,600																			
				32,774	2.89		227,600	94,718	991	3,818	8	0.0035	9.2	981.12	1.10	966.66	462024	49%	2.0	3.958	0.172	0.166	0.00	2.0	0.49
9b	9a	4	19440	19,440		135,000																			
		Flow From Line 9c to 9b	12960	32,400		90,000																			
		Flow From Line 9b1 to 9b	32774	65,174		227,600																			
				65,174	2.89		452,600	188,354	981	1,130	10	0.0050	13.6	966.56	0.10	960.81	1001250	45%	2.8	4.707	0.252	0.200	0.00	2.8	0.47
9a	9	Flow From Line 9b to 9a	65174	65,174																					
		Flow From Line 9a1 to 9a	103582	168,756																					
				168,756	2.89			487,705	971	2,600	15	0.0022	9.7	960.39	0.20	954.47	1958147	25%	2.5	5.093	0.367	0.236	0.00	2.1	0.34
9	8	Flow From Line 9a-9	168756	168,756																					
		Flow From Line 10-9	435759	604,515																					
		17 (5E, 4W-D, 4W-G, 4W-G, 4W-H, 4W-J, 4W-K	80068	684,583																					
				684,583	2.89			1,978,444	974	4,200	24	0.0018	18.8	953.10	0.00	945.72	6128298	32%	3.0	9.362	1.135	0.421	0.00	2.7	0.39
8c	8b	A1	8150	8,150																					
		A2	40750	48,900																					
		1/2 A3	29173	78,073																					
		C	18600	96,673		150,000																			
		D	110316	206,989																					
		E1	37200	244,189		300,000																			
				244,189	2.89		994,444	705,706	1010	3,811	12	0.0035	12.9	996.14	0.80	982.00	1362202	73%	2.7	7.595	0.524	0.285	0.00	2.9	0.63

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8b	8a	Flow From Line 8c-8b	244189	244,189																					
		E2	4755	248,944																					
		AA1	22824	271,768																					
		AA2	87420	359,188																					
		17 (4W-A, 4W-B)	42505	401,693																					
				401,693	2.89			1,160,893	994	2,800	18	0.0039	12.6	979.37	0.60	967.83	4243397	27%	3.7	6.424	0.566	0.295	0.00	3.2	0.36
8a	8	Flow From Line 8b-8a	401693	401,693																					
		AA3	33792	435,485																					
		17 (4W-E, 4W-F, 4W-I)	30643.2	466,128																					
				466,128	2.89			1,347,111	981	3800	18	0.0052	11.4	967.70	0.00	947.80	4912683	27%	4.3	6.431	0.567	0.295	0.00	3.7	0.36
8	7	Flow From Line 8a-8	466128	466,128																					
		Flow From Line 9-8	684583	1,150,711																					
		AA4	24726	1,175,437																					
				1,175,437	2.89			3,397,012	969	1,129	24	0.0031	21.7	946.07	0.00	942.08	8140196	42%	4.0	10.792	1.370	0.466	0.00	3.8	0.45
7c	7b	X1	24726	24,726																					
		X2	82500	107,226																					
		X3	57660	164,886																					
		X4	21873	186,759																					
				186,759	2.89			539,734	1013	5,280	15	0.0044	6.8	1005.00	1.00	981.01	2755377	20%	3.5	4.493	0.309	0.213	0.00	2.7	0.30
7b	7a	Flow From Line 7c-7b	186759	186,759																					
		Y1	13314	200,073																					
		Y2	47104	247,177																					
				247,177	2.89			714,342	989	2,460	15	0.0045	6.7	981.01	0.50	969.42	2803059	25%	3.5	5.155	0.373	0.238	0.00	3.0	0.34
7a	7	Flow From Line 7b-7a	247177	247,177																					
		2/3 Z	65936	313,113																					
				313,113	2.89			904,897	978	2,460	15	0.0096	6.9	969.32	0.87	942.73	4090437	22%	5.2	4.786	0.337	0.225	0.00	4.2	0.32
7d	7	1/3 Z	32968	32,968																					
				32,968	2.89			95,278	960	1,983	15	0.0014	13.2	945.51	0.00	942.73	1562061	6%	2.0	2.509	0.135	0.128	0.00	1.1	0.17
7	7e	Flow From Line 8-7	1175437	1,175,437																					
		Flow From Line 7a-7	313113	1,488,550																					
		BB1	13314	1,501,864																					
		BB2	11664	1,513,528																					
		DD1 (2/3)	61632	1,575,160																					
		DD2	19971	1,595,131																					
		KK	2853	1,597,984																					
		LL	9510	1,607,494																					
		MM	6657	1,614,151																					
		GG	0	1,614,151																					
		HH	0	1,614,151																					
		18 (1/2)	51624	1,665,775																					
				1,665,775	2.89			4,814,089	964	3,260	30	0.0044	19.8	941.98	0.00	927.50	17583570	27%	5.5	10.710	1.573	0.491	0.00	4.7	0.36
7e	6	Flow From Line 7-7e	1665775	1,665,775																					
		1/2 18	51624	1,717,399																					
		1/3 DD1	30816	1,748,215																					
		GG	0	1,748,215																					
		HH	0	1,748,215																					
				1,748,215	2.89			5,052,341	948	1,925	24	0.0060	18.9	927.50	0.00	915.95	11324776	45%	5.6	11.211	1.439	0.478	0.00	5.4	0.47
6d5	6d4	1/2 9.1	29664	29,664		206,000																			
		9.2	14265	43,929																					
				43,929	2.89		247,226	126,955	975	3,178	8	0.0033	12.7	981.62	0.60	950.64	446326	55%	2.0	4.244	0.188	0.173	0.00	2.0	0.53
6d4	6d3	**Flow From Line 6d4 to 6d3**	43929	43929																					
		1/2 9.1	29664	73,593		206,000																			
				73,593	2.89		332,955	212,684	974	1,751	10	0.0025	22.6	950.54	0.30	945.86	708193	47%	2.0	4.815	0.260	0.203	0.00	2.0	0.48
6d3	6d2	Flow From Line 6d4 to 6d3	73593	73,593	2.89	332,955	332,955	212,684	970	1,242	10	0.0033	23.4	945.76	0.10	941.59	810646	41%	2.3	4.457	0.235	0.193	0.00	2.2	0.45
6d2	6d1	Flow from line 6d3 to 6d2	73593	73,593		332,955																			
		8	30816	104,409		214,000																			
		1/3 N	13333	117,742		83,333																			
		JJ	2580	120,322		20,000																			
		II	24800	145,122		155,000																			
				145,122	2.89		805,288	419,404	957	2,850	12	0.0035	14.4	941.59	0.50	931.11	1362202	59%	2.7	6.625	0.445	0.265	0.00	2.8	0.55
6d1	6d	Flow From Line 6d2 to 6d1	145122	145,122		805,288																			
				145,122	2.89		805,288	419,404	941	1,050	12	0.0030	9.0	931.01	0.10	927.76	1261154	64%	2.5	6.954	0.472	0.273	0.00	2.6	0.58
6f	6e	P1	32,400	32,400		225,000																			

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		P2	12000	44,400		75,000																			
				44,400	2.89		300,000	128,316	958	4,515	8	0.0033	6.7	950.68	0.00	935.78	448629	67%	2.0	4.776	0.217	0.185	0.00	2.1	0.60
6e	6d	Flow from line 6f - 6e	44400	44,400		300,000																			
		7	65664	110,064		456,000																			
				110,064	2.89		756,000	318,085	942	2,560	12	0.0030	5.9	935.44	0.00	927.76	1261154	60%	2.5	6.683	0.449	0.267	0.00	2.6	0.56
6d	6c	Flow From Line 6e to 6d	110064	110,064																					
		Flow From Line 6d2 to 6d	145122	255,186																					
		12.2	11610	266,796																					
		12.3	7998	274,794																					
				274,794	2.89			794,155	937	1297	15	0.0022	8.2	927.51	0.20	924.46	1958147	41%	2.5	6.637	0.524	0.288	0.00	2.3	0.44
6c	6b	Flow From Line 6d - 6c	274794	274,794																					
		2/5 6	39629	314,423																					
		12.1	50950	365,373																					
				365,373	2.89			1,055,928	946	1354	15	0.0022	20.1	924.46	0.00	921.48	1958147	54%	2.5	7.830	0.648	0.321	0.00	2.5	0.52
6b	6a	Flow From Line 6c - 6b	365373	365,373																					
		13.1	37200	402,573																					
		13.2	20480	423,053																					
		2/5 6	39629	462,682																					
				462,682	2.89			1,337,151	948	1313	18	0.0017	25.6	921.23	0.00	919.00	2799036	48%	2.5	8.747	0.852	0.368	0.00	2.4	0.49
6a	6	Flow From Line 6b - 6a	462682	462,682																					
		6A	12228	474,910																					
		1/5 6	19814	494,724																					
		19	19440	514,164																					
				514,164	2.89			1,485,935	945	1,491	18	0.0031	24.2	919.00	0.00	914.35	3791716	39%	3.3	7.813	0.736	0.341	0.00	3.1	0.43
6	5	Flow From Line 7e-6	1748215	1,748,215																					
		Flow From Line 6a-6	514164	2,262,379																					
		16.1	21888	2,284,267																					
		FF	12800	2,297,067																					
				2,297,067	2.89			6,638,524	937	2,762	36	0.0015	20.3	913.90	0.00	909.86	16485782	40%	3.6	15.866	3.002	0.689	0.00	3.4	0.44
20i	20h	1/3 11.2	20256	20,256		84,400																			
		11.1	25677	45,933																					
		Q	12960	58,893		90,000																			
				58,893	2.89		248,607	170,201	919	390	8	0.0323	19.5	898.82	0.00	886.22	1403563	18%	6.2	2.276	0.082	0.109	0.00	4.7	0.28
20h1	20h1.1	14.1B	13287	13,287		103,000																			
		3/10 14.1A	7056	20,343		49,000																			
		15.2B	20898	41,241		162,000																			
				41,241	2.89		314,000	119,186	920	2,025	10	0.0027	26.2	892.97	0.00	887.42	741295	42%	2.1	4.535	0.240	0.195	0.00	2.0	0.45
20h1.1	20h	Flow From Line 20h1-20h1.1	41241	41,241		314,000																			
		15.2A	23616	64,857		164,000																			
		15.1	23616	88,473		164,000																			
				88,473	2.89		642,000	255,687	915	475	12	0.0030	26.7	887.25	0.00	885.82	1264836	51%	2.5	6.042	0.396	0.251	0.00	2.5	0.50
20e	20d	1/3 10	15552	15,552		108,000																			
				15,552	2.89		108,000	44,945	939	1,842	8	0.0020	8.0	930.33	0.00	926.65	349257	31%	1.5	3.049	0.122	0.138	0.00	1.4	0.38
20d	20c	Flow From Line 20e to 20d	15552	15,552		108,000																			
		2/3 10	31104	46,656		216,000																			
		20.1	15984	62,640		111,000																			
				62,640	2.89		435,000	181,030	928	1,415	8	0.0020	6.0	921.33	0.00	918.50	349257	125%	1.5	7.136	0.329	0.199	-43.79	2.0	0.89
20c	20b	Flow From Line 20d-20c	62640	62,640		435,000																			
		20.5	18193	80,833																					
		1/3 20.2	19968	100,801		138,667																			
				100,801	2.89		626,243	291,314	926	780	10	0.0020	6.9	918.23	0.00	916.67	633246	99%	1.8	8.071	0.472	0.254	0.00	2.1	0.81
20b	20a1	Flow From Line 20c-20b	100801	100,801		626,243																			
		U	2160	102,961		15,000																			
		2/3 20.2	39936	142,897		277,333																			
				142,897	2.89		918,577	412,971	925	662	10	0.0020	7.8	916.40	0.00	915.08	633246	145%	1.8	9.221	0.526	0.245	-164.23	2.7	0.92
20a1	20a	Flow from Line 20b to 20a1	142897	142,897		918,577																			
		20.3A	16915	159,812																					
				159,812	2.89		967,462	461,857	923	638	12	0.0020	6.9	915.08	0.00	913.80	1029728	94%	2.0	9.215	0.647	0.303	0.00	2.3	0.77
20a	Las Brisas LS	Flow From Line 20a1-20a	159812	159,812	2.89	967,462	967,462	461,857	921	1,344	12	0.0198	6.2	913.80	0.00	867.16	3241715	30%	6.4	4.486	0.268	0.204	0.00	5.6	0.37

Table 4: Ultimate Sewer System
Supplement to the WGCPA Master Wastewater Study Update March 21, 2014

Start MH	End MH	Area ID	Average Flow (gpd)	Cumulative Average Flow (gpd)	Peaking Factor	Residential Peak Flow (Line Sizes 8" to 12") (gpdu)	Total Estimated Peak Flow: Lines ≤ 12" (gpd)	Total Estimated Peak Flow: Lines > 12" (gpd)	Estimated Ground Elevation (feet)	Estimated Length (feet)	Line Diameter (inches)	Sewer Line Slope (ft/ft)	Estimated Start Depth (feet)	Estimated Start Invert Elevation (ft)	Mid-line Bend Drops (ft)	Estimated End Invert Elevation (ft)	Sewer Line Capacity (gpd)	% Full (Q_i/Q_f)	Velocity Flowing Full (fps)	Depth of Flow (in) [goal seek]	X-sec Area of Flow (SF)	Hyd Radius (ft)	= 0	Actual Peak Velocity (fps)	d/D
20h	20g	Flow From Line 20i-20h	58893	58,893		248,607																			
		Flow From Line 20h1.1-20h	88473	147,366		642,000																			
		20.4	19995	167,361		155,000																			
				167,361	2.89		1,045,607	483,673	910	1,992	15	0.0022	23.1	885.64	0.00	881.20	1970974	25%	2.5	5.054	0.363	0.235	0.00	2.1	0.34
20f	Las Brisas LS	20.3	46956	46,956		364,000																			
		S	1296	48,252		9,000																			
		2/3 11.2	40512	88,764		337,600																			
				88,764	2.89		710,600	256,528	928	4,297	12	0.0054	16.0	910.52	0.00	897.16	1697701	42%	3.3	5.405	0.343	0.233	0.00	3.2	0.45
20g	Las Brisas LS	Flow from Line 20h-20g	167361	167,361		1,045,607																			
		R	4320	171,681		30,000																			
		H	4320	176,001		30,000																			
				176,001	2.89		1,105,607	508,643	906	1,350	15	0.0024	23.7	881.10	0.00	877.90	2032554	25%	2.6	5.106	0.369	0.237	0.00	2.1	0.34
12a	12b	1/4 J	75388	75,388																					
				75,388	2.89			217,870	905	3,350	8	0.0037	10.6	893.77	0.00	881.37	475041	46%	2.1	3.797	0.163	0.161	0.00	2.1	0.47
12c	12b	1/4 J	75388	75,388																					
				75,388	2.89			217,870	903	1,200	8	0.0100	9.0	893.37	0.00	881.37	780963	28%	3.5	2.885	0.113	0.132	0.00	3.0	0.36
12b	Las Brisas LS	Flow From Line 12a-12b	75388	75,388																					
		Flow From Line 12c-12b	75388	150,775																					
				150,775	2.89			435,740	905	1,000	12	0.0035	23.0	881.04	0.00	877.54	1362202	32%	2.7	4.658	0.282	0.209	0.00	2.4	0.39
Las Brisas LS	5a	Flow From Line 20f-Las BrisasLS	88764	88,764																					
		Flow From Line 20g-Las Brisas LS	176001	264,765																					
		Flow From Line 20a- Las Brisas LS	159812	424,577																					
		Flow From Line 12b-Las BrisasLS	150775	575,352																					
				575,352	From Table 3			2,980,000	Forcemain																
5a	5	14.1C	5040	5,040																					
		7/10 14.1A	15840	20,880																					
		14d	9546	30,426																					
		OO3	7817	38,243																					
				38,243	2.89			110,523																	
		Las Brisas Lift Station	2980000					3,090,523	926	1,346	30	0.0015	11.3	912.14		910.10	10266593	30%	3.2	11.268	1.685	0.511	0.00	2.8	0.38
13a	Extension Canal LS	I	38040	38040																					
		1/4 J	75388	113428																					
				113428	2.89			327,805	889	8,000	12	0.0030	6.8	881.20	0.80	857.20	1261154	26%	2.5	4.168	0.242	0.192	0.00	2.1	0.35
13b	Extension Canal LS	1/4 J	75388	75388																					
		K	19020	94408																					
		L	6657	101065																					
				101,065	2.89			292,076	902	11,260	12	0.0030	6.2	894.80	0.20	861.02	1261154	23%	2.5	3.922	0.223	0.183	0.00	2.0	0.33
Extension Canal LS	14	Flow From Line 13a-Extension Canal LS	113428	113,428																					
		Flow From Line 13b-Extension Canal LS	101065	214,492																					
				214,492	From Table 3			1,360,000	Forcemain																
Lakin	14	Lakin Lift Station	2500000	2,500,000	From Table 3			2,500,000	Forcemain																
14	Rubbermaid LS	Extension Canal LS to 14	1360000	1,360,000																					
		Lakin Lift Station	2500000	3,860,000																					
				3,860,000				3,860,000	905	200	24	0.0020	6.0	897.00	0.00	896.60	6538363	59%	3.2	13.239	1.777	0.531	0.00	3.4	0.55
Rubbermaid LS	5	Flow From Line 14 to Rubbermaid LS	3860000	3,860,000																					
		EE	280446	4,140,446																					
		OO1	53817	4,194,263																					
		OO2	123375	4,317,638																					
				4,317,638	From Table 3			4,410,000	Forcemain																

Table 4: Ultimate Sewer System
Supplement to the WGCPA Master Wastewater Study Update March 21, 2014

	Start MH	End MH	Area ID	Average Flow (gpd)	Cumulative Average Flow (gpd)	Peaking Factor	Residential Peak Flow (Line Sizes 8" to 12") (gpdu)	Total Estimated Peak Flow: Lines ≤ 12" (gpd)	Total Estimated Peak Flow: Lines > 12" (gpd)	Estimated Ground Elevation (feet)	Estimated Length (feet)	Line Diameter (inches)	Sewer Line Slope (ft/ft)	Estimated Start Depth (feet)	Estimated Start Invert Elevation (ft)	Mid-line Bend Drops (ft)	Estimated End Invert Elevation (ft)	Sewer Line Capacity (gpd)	% Full (Q/Q_f)	Velocity Flowing Full (fps)	Depth of Flow (in) [goal seek]	X-sec Area of Flow (SF)	Hyd Radius (ft)	= 0	Actual Peak Velocity (fps)	d/D
	5	4	16.2	13536	13,536																					
			Flow From Line 6-5	2297067	2,310,603																					
					2,310,603	2.89			6,677,643																	
			Flow From Line Rubbermaid LS-5	4410000																						
			Flow From Line 5a-5 (with Las Brisas LS)	3090523																						
				7500523					14,178,166	924	3,621	54	0.0006	11.1	908.83		906.75	30459642	47%	3.0	25.848	7.520	1.094	0.00	2.9	0.48
	4	3	Flow From Line 5-4	9811126	9,811,126				14,178,166	933	1,200	54	0.0010	21.5	906.75		905.51	40853344	35%	4.0	21.913	6.056	0.974	0.00	3.6	0.41
	3	2	Flow From line 4-3	9811126	9,811,126				14,178,166	936	2,580	54	0.0008	26.3	905.51		903.47	35736550	40%	3.5	23.601	6.681	1.028	0.00	3.3	0.44
	Bio Flora LS	1	Bio Flora Lift Station	460000	460,000	From Table 3			460,000	Forcemain																
	2	1	Flow From line 3-2	9811126	9,811,126																					
					9,811,126				14,178,166	935	1,900	60	0.0007	26.2	903.52		902.10	46014503	31%	3.6	22.822	6.855	1.032	0.00	3.2	0.38
	1	End	Bio Flora LS to 1	460000	460,000																					
			2 to 1	9811126	10,271,126																					
					10,271,126				14,638,166																	
				Total =	10,271,126				14,638,166																	

NOTES:

1. Flows for Table 4 reflect the contribution of flows outside of the WGCPA study area. WGCPA contributing sewage flows may be found in Tables 2A, 2B, 2C. Area sewage flows are tabulated from the entire planning area as shown in Figure 5.
2. XXXXXX Inverts taken from design plans.
3. XXXXXX As-built inverts.
4. XXXXXX Flows calculated for Residential Peaking Factor (Line Sizes 8" to 12") was calculated at 1,000 gpdu.
5. XXXXXX Modified line size
6. The peak flow for line 5 to 4 consists of the peak flow from line 6 to 5, the pump flow from Rubbermaid LS to 5 and the pump flow from line 5a to 5.

The City has indicated that it is actively planning for a 2 MGD expansion of treatment capacity by FY 2017/2018 to be obtained by increasing influent lift station pumping capacities with the replacement of existing pumps and the replacement of existing travelling bridge-type sand filters with disc filter to achieve a more rapid filtration rate.

Whether improvements to increase treatment capacities to accommodate WGCPA flows and flow from the remainder of the 157th Avenue Basin would require the City to update the existing master plan studies performed for the City by Malcolm Pirnie, Inc. (now Arcadis). It is expected that these improvements would be designed as modular expansions to the treatment plant of a size sufficient to accommodate forecasted near term flow increases.

2.7 Brine Disposal

Some of the raw water supplying the development area will be treated brackish groundwater. Waste brine from the reverse-osmosis process must be disposed of properly and will not be allowed to enter the sewer system for treatment at the 157th Avenue Facility. Disposal options will be discussed in the Master Water Study.

3.0 CONNECTION TO EXISTING FACILITIES

3.1 Collection System

Wastewater generated by the WGCPA will be connected to the City's existing sewer system at several locations, listed below and shown in Figure 5.

- Existing 24-inch sewer at Yuma Road and Citrus Road
- Existing 30-inch sewer at Lower Buckeye Road and Cotton Lane
- Existing 24-inch sewer at Dunlap Avenue and 175th Avenue
- Existing 54-inch sewer at Dunlap Avenue and Cotton Lane

Our analysis indicates that insufficient fall exists to connect the entire WGCPA to the existing collection system by gravity at some of the locations listed above. Lift stations will connect to the existing system using force mains as previously discussed. Figure 5 shows the WGCPA collection system areas that include a lift station and the area served by the gravity portion of the system. The areas south of the Southern Pacific Railroad will be served by three proposed lift stations as discussed above.

3.1.1 Capacity Analysis – 159th Avenue and MC 85

The 2006 report identified a reach in the City's existing interceptor system that was potentially undersized for the future anticipated ultimate flows generated by the entire 157th Avenue treatment plant basin upstream of that location. This reach was identified as the 'bottleneck" and is located at the intersection of the 159th Avenue alignment and MC 85 where upstream 60-inch and 30-inch interceptors are connected to a 42-inch and 18-inch sewers. The bottleneck extending south of MC 85 to the treatment plant site along 159th Avenue where the existing parallel lines are 24-inch and 36-inch. Figure 7 depicts the sewers discussed above.

In light of the changes to the land use plan and new flow data from the WGCPA, this report revisits the capacity of the sewer crossing the SPRR to determine if sufficient excess capacity exists in the line to accept flows from the tributary area. All slopes obtained from available as-built information.

N:\07.0112705\Engin\CADD\Goodyear Master\mxd\159AVE-SWR-Figure 7.dwg Breanna Mar 19, 2014 - 10:04am

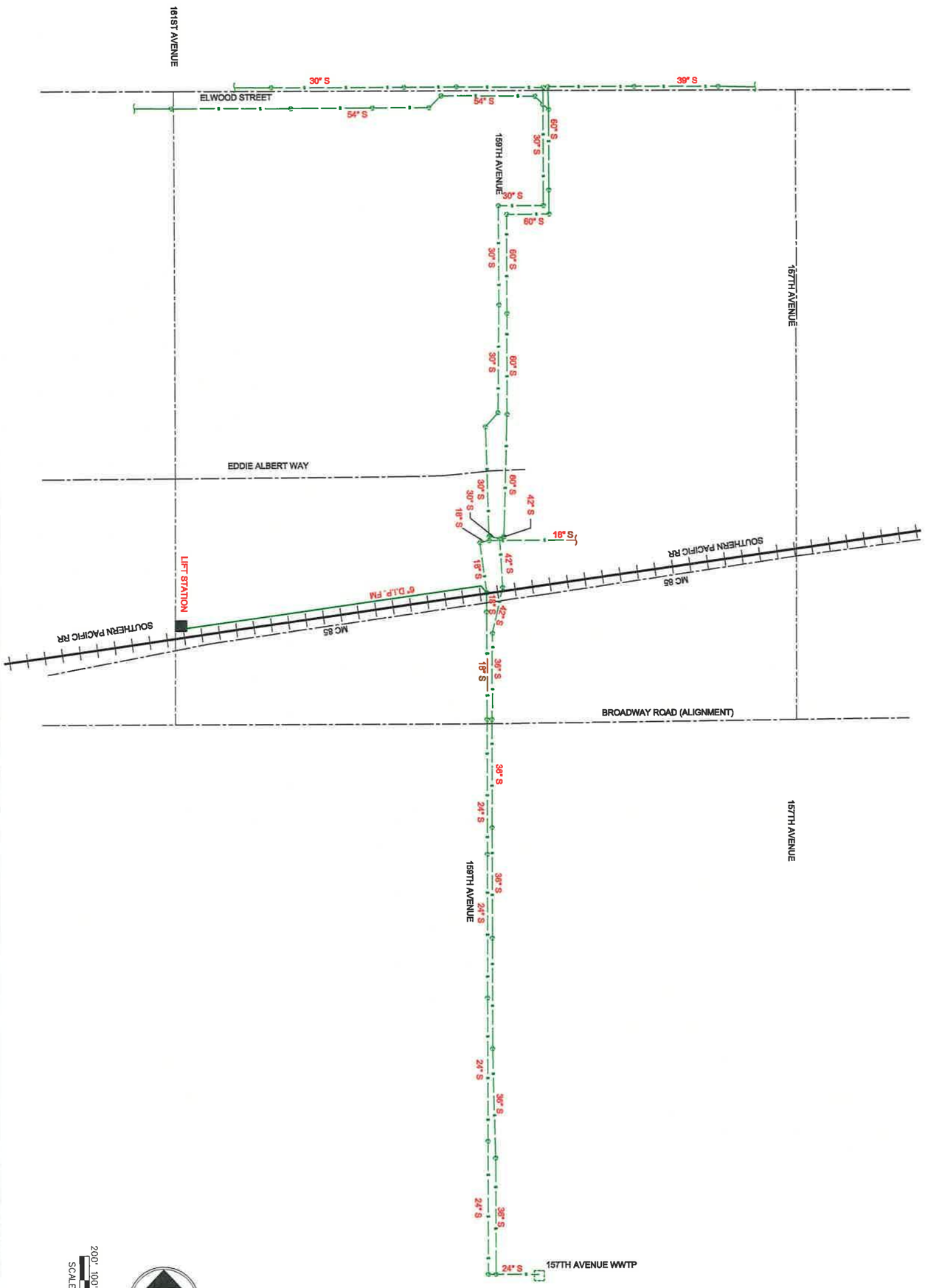

FIGURE 7	JOB NO 1.07.0112705	159th AVENUE SEWER TRUNK LINES AT MC 85 CROSSING	WEST GOODYEAR CENTRAL PLANNING AREA
		4550 NORTH 12TH STREET PHOENIX, ARIZONA 85014 TELEPHONE (602) 264-6831	COE & VAN LOO PLANNING • ENGINEERING • LANDSCAPE ARCHITECTURE

- Capacity at 159th Avenue/MC Route 85 interceptor crossings:

42-inch @ S = 0.0046 ft/ft	= 45.0 MGD
18-inch @ S = 0.0103 ft/ft	= 6.8 MGD
Total Capacity at Crossing:	= 51.8 MGD

Estimated total tributary area flows:

Exist. 30-inch Sarival	= 11.2 MGD
Cotton Lane Service Area[1]	= 17.0 MGD
39-inch Estrella Parkway	= 19.5 MGD
Total Flows at Crossing:	= 47.7[2] MGD

Pipe Capacity > Anticipated Flows and sufficient capacity exists in this reach.

- South of MC Route 85 along 159th Ave.:

36-inch @ S = 0.0012 ft/ft	= 15.0 MGD
24-inch @ S = 0.0012 ft/ft	= 5.2 MGD
Total Capacity	= 20.2 MGD
Total Flow	= 47.7 MGD

Pipe Capacity < Anticipated Flows

Must implement construction of parallel sewer to WWRF in this reach at some point in the future. CVL notes that current (2012) inflows to the treatment plant are approximately 3.2 MGD and sufficient capacity exists in the existing pipes to convey this flow. It is recommended that the City implement a program to tract flows at MC 85/159th Avenue when treatment plant inflows are 10 MGD.

- AT WWTP, Single 24-inch Pipe

24-inch @ S = 0.0019 ft/ft = 6.5 mgd

These capacities are very much less than anticipated future flows. The capacity is less than that required for accommodating WGCPA ultimate flows of 10.5 MGD. The City is aware of this issue and will upgrade the incoming interceptors as part of future treatment plant improvements to be identified in subsequent treatment plant master plans.

[1] Includes 10.5 MGD from WGCPA (Table 2C) which is included in the total of 14.6 MGD from Table 4. Balance of 2.3 MGD from other area not defined in this report that may be contributing to these flows.

[2] Flows taken from 2006 study for those areas not included in WGCPA.

3.2 157th Avenue Treatment Plant

All flows generated by the WGCPA will be treated at the City's 157th Avenue Water Reclamation Facility. This facility provides for tertiary treatment of municipal sewerage and has a current design capacity of 4.0 MGD.

As discussed above, the WWRF is currently (2012) treating wastewater flows at 80 percent of its 4.0 MGD capacity or 3.2 MGD. The City projects that 90 percent capacity will be reached by the fiscal years 2015/2016 and 95% capacity by 2017/2018. A 2 MGD expansion is under consideration for design. Construction of this additional capacity is planned to commence in 2015.

Future buildout flows of 3.6 MGD are expected from the WGCPA of which 1.5 MGD will be contributed by the IDG properties (see Table 2c).

The City has indicated that the 157th Avenue WRF will be expanded by 2.0 MGD by FY 2017/2018. Some of this capacity may be made available to the IDG subject to City approval. Additional Treatment plant capacity expansion will be necessary to accommodate anticipated flows from IDG and WGCPA as shown in Table 5 below.

Table 5 - 157th Avenue WRF Capacity

Item	Description	Flow (MGD)	Remarks
1	Current Built Capacity	4.0	Permitted Maximum Discharge
2	90% Design Discharge	3.6	Taking as 90% of max permitted discharge per ADEQ criterion
3	2012 WRF Inflow	3.2	From COG
4	2012 Excess Capacity	0.4	Item 2 – Item 3
5	Planned 2017/2018 Expansion	2.0	From COG
6	WRF Total Capacity 2018	6.0	Item 1 + Item 5
7	90% Design Discharge 2018	5.4	90% of Item 6
8	Projected 2018 Flows	3.8	Estimated
9	2018 Excess Capacity	1.6	Item 7 – Item 8
10	IDG Estimated Discharges	1.5	Table 2c in Report
11	Capacity Shortfall 2012	(1.1)	Item 4 – Item 10
12	Excess Capacity 2018	0.1	Item 9 – Item 10

[1] Upon reaching 90 percent of Permitted Discharge, WRFs are required to have begun construction of an expansion of the treatment capacity.

Review of the flow and capacity data in Table 4 indicates that the current WRF treatment capacity is insufficient to accept discharges from the IDG participating properties at buildout. The proposed 2 MGD treatment expansion contemplated in 2018 is sufficiently large to accommodate buildout IDG discharges.

3.3 Funding of Proposed Infrastructure Improvements

3.3.1 General

As previously discussed in this report, the WGCPA regional sewer trunk line system will be constructed in numerous sections by various private developers as necessary as each of the

various WGCPA properties in the service area are developed. The property owners for the planned projects are identified in Figure 2. The current estimate of gross acreage from each of the participating developments to be served by the proposed sewer system improvements is 2,977 acres. This report quantifies each participating developer's proportionate responsibilities of the sewer work. The City will administer a Cost Recovery Ordinance (CRO) for the WGCPA area to reimburse the participating developers who install these sewer trunk lines of all cost in excess of that developer's proportionate responsibility for designing and installing the various segments of sewer infrastructure shown in Figure 6.

Costs projected in the CRO tables are determined for each property on a gross acreage basis, see subsection 3.3.2.

We note that a cost for each parcel may be calculated on a normalized basis using Equivalent Dwelling Units (EDU). In this analysis, the number of units for each land use is recalculated using the anticipated discharges from a low density single family dwelling as the basis. Tables 6a and 6b list the allocation of EDUs by property. Appendix A contains a detailed discussion of the calculation of EDUs.

Table 6a – IDG Properties EDU

Area ID	IDG Development Group Properties	Land Use	Area (acres)	Average Flows (gpd)	EDU's
1	Las Palmas	Single Family	***264***	108,000	750
2	Amber Meadows	Single Family	102	42,192	293
2A	Amber Meadows School	School	6	6,114	42
3	La Privada	Single Family	***190***	81,936	569
3A	La Privada School	School	6	6,114	42
4	Paseo Ridge Phase II	Single Family	***42***	***19,440***	***135***
5.1	Silva-Rose Gardens	Single Family	***126***	55,296	384
5.2	Silva-Rose	Commercial Pad	7	6,657	46
5.3	Silva-Rose Gardens	City Water &Fire Campus	10	10,190	71
5.4	Silva-Rose Gardens	Charter School	8	8,152	57
6	La Jolla Vista	Single Family	***182***	***99,072***	***688***
6A	La Jolla Vista School	School	12	12,228	85
7	Pradera	Single Family	***156***	65,664	456
8	Paseo Ridge Phase I	Single Family	***79***	30,816	214
9.1	Las Ventanas Single Family	Single Family	***141***	***59,328***	***412***
9.2	Las Ventanas	Commercial Pad	15	14,265	99
10	Las Brisas Phase I	Single Family	120	46,656	324
11.1	Levinson	Commercial Pad	27	25,677	178
11.2	Levinson	Single Family	***129***	60,768	422
12.1	Citrus Ridge	Agua Fria HS District	50	50,950	354
12.2	Citrus Ridge (R1-6)	Single Family	***18***	***11,610***	***81***
12.3	Citrus Ridge (C2)	Commercial Pad	8	7,998	56

13.1	Cotton Commons (MHD)	Multi-Family	20	37,200	258
13.2	Cotton Commons (MD)	Multi-Family	20	20,480	142
14.1a	***El Cidro** (*El Cidro Ranch)*	Single Family	***44***	***22,896***	***159***
14.1b	***El Cidro** (*El Cidro Ranch)*	Single Family	***24***	***13,287***	***92***
14.1c	***El Cidro** (*El Cidro Ranch)*	Single Family	***12***	***5,040***	***35***
14.1d	***El Cidro** (*El Cidro Ranch)*	Multi Family	***17***	***9,546***	***66***
15.1	***El Cidro** (*El Cidro Ranch)*	Single Family	***50***	***23,616***	***164***
15.2a	***El Cidro** (*El Cidro Ranch)*	Single Family	**41**	***23,616***	***164***
15.2b	***El Cidro** (*El Cidro Ranch)*	Single Family	**36**	***20,898***	***145***
16.1	***El Cidro** (*El Cidro Ranch)*	Single Family	42	***21,888***	***152***
16.2	***El Cidro** (*El Cidro Ranch)*	Single Family	24	***13,536***	94
17	Canyon Trails 4 West (Centex)	Single Family	310	153,216	1,064
18	Canyon Trails 4 South (TM)	Single Family	255	103,248	717
19	Sin Lomas	Single Family	40	19,440	135
20.1	Las Brisas Phase 2	Single Family	40	15,984	111
20.2	Las Brisas Phase 2	Single Family	150	59,968	416
20.3	Las Brisas Phase 2	Single Family	***80***	***46,956***	364
20.3 A	Las Brisas Phase 2 School	School	17	16,915	117
20.4	***El Cidro** (*El Cidro Ranch)*	Single Family	36	***19,995***	***155***
20.5	Las Brisas Phase 2	Commercial Pad	19	***18,193***	***126***
Subtotal			***2,977***	***1,494,997***	***10,353***

[1] EDU = Average Day Flow/144 gpd, flow factor for low density SF land use.
Notes: 1. All bolded and italicized cells have been modified.
2. Names with an asterisk (*) are former names of the development.

Table 6b – Additional Development Properties EDU

Area (ID)	Land Use	Area (acres)	Average Flows (gpd)	EDU[1]
A1	Light Industrial	10	8,150	57
A2	Light Industrial	50	40,750	283
A3	Light Industrial	72	58,346	405
B	Community Commercial	20	19,020	132
C	M-HDR Multi-Family	10	18,600	129
D	Community Commercial	116	110,316	766
E1	M-HDR Multi-Family	20	37,200	258
E2	Community Commercial	5	4,755	33
F	Community Commercial	20	19,020	132
G	Community Commercial	2	1,902	13
H	LDR	10	4,320	30
I	Community Commercial	40	38,040	264
J	County Land-Light Industrial	370	301,550	2,094
K	Community Commercial	20	19,020	132
L	Community Commercial	7	6,657	46

M	County Land-RR	45	7,200	50
N	County Land-RR	250	40,000	278
O	County Land-LDR	30	12,960	90
P1	County Land-LDR	75	32,400	225
P2	County Land-RR	75	12,000	83
Q	County Land-LDR	30	12,960	90
R	County Land-LDR	10	4,320	30
S	LDR	3	1,296	9
U	LDR	5	2,160	15
X1	Community Commercial	26	24,726	172
X2	HDRMulti-Family	30	82,500	573
X3	M-HDRMulti-Family	31	57,660	400
X4	Community Commercial	23	21,873	152
Y1	Community Commercial	14	13,314	92
Y2	MDRMulti-Family	46	47,104	327
Z	Community Commercial	104	98,904	687
AA1	Community Commercial	24	22,824	159
AA2	M-HDR Multi-Family	47	87,420	607
AA3	MDR Multi-Family	33	33,792	235
AA4	Community Commercial	26	24,726	172
BB1	Community Commercial	14	13,314	92
BB2	LDR	27	11,664	81
DD1	LDR	214	92,448	642
DD2	Community Commercial	21	19,971	139
EE	General Industrial	258	280,446	1,948
FF	County Land-RR	80	12,800	89
GG	Open Space	8	-	0
HH	Open Space	1	-	0
II	County Land-RR	155	24,800	172
JJ	L-MDR SingleFamily	4	2,580	18
KK	Community Commercial	3	2,853	20
LL	Community Commercial	10	9,510	66
MM	Community Commercial	7	6,657	46
NN1	County Land-Community Commercial	141	134,091	931
NN2	County Land-Light Industrial	13	10,391	72
OO1	General Industrial	50	53,817	374
OO2	General Industrial	114	123,375	857
OO3	Community Commercial	8	7,817	54
Sub Total		***2,827***	***2,134,319***	***14,821***
Grand Total of Service Area		***5,804***	***3,629,321***	***25,174***

[1] EDU = Average Day Flow/144 gpd, flow factor for low density SF land use.
Note: All bolded and italicized cells have been modified.

3.3.2 Cost Recovery Ordinance Amendment

The allocation of costs to install the required sewer system improvements between the participating parties of the IDG was documented in a Cost Recovery Ordinance (CRO) implemented by the COG in 2006. In this update to the 2006 Wastewater Master Plan, it is noted that portions of the recommended sewer infrastructure improvements were installed by certain IDG participants since 2006. These mains are identified in Figure 6.

In this supplement to the *WGCPA Master Wastewater Study Update* the Cost Allocation tables have been divided to show each participating property owner's share of the costs for the existing CRO lines installed in accordance with the 2006 Wastewater Master Plan (Tables 7a and 8a) and each participating property owner's share of the costs for the installation of the proposed CRO sewers (Tables 7b and 8b). We note that Tables 7a and 8a depict parcel area and allocations show in the 2006 Cost Recovery Ordinance. The line costs were changed in the January 2013 approved *WGCPA Master Wastewater Study Update* to reflect as-bid costs. These figures cannot be changed unless modified by a change to the CRO.

The parcel area, line costs and allocations for proposed CRO lines have been updated in Tables 7b and 8b subject to the latest parcel information and system layouts as presented in this Supplement. Appendix B contains a summary of changes to the parcels (Table A) and the corresponding changes to the percentage allocation (Table B) and resulting cost changes (Table C).

As previously noted in this report, the Las Brisas development has installed a lift station and other sewers within the parcel since approval of the 2006 Wastewater Master Plan and CRO. The lift station's dual 8-inch and 10-inch force mains discharge to an existing manhole on the 30-inch Dunlap Road interceptor east of Cotton Lane. As part of the preparation of grading, drainage, paving, water, and sewer plans for the Las Brisas and El Cidro developments, the alignment of the sewers in both developments were modified from the 2006 Master Wastewater Study as described below and shown in Figure 6:

- *El Cidro* – All parcels west of 173rd Lane with the exception of two streets in the north portion of Parcel 1D and Parcel 2 flow to El Cidro Boulevard to Citrus Road and south on Citrus Road to Broadway Road, west to the Las Brisas Lift Station. Parcels east of 173rd Lane flow to the existing 30-inch Dunlap Road/Elwood Road interceptor.

  The Citrus Road sewer serving the El Cidro parcel will also collect wastewater from the east two-thirds of the Levinson parcel. This sewer will serve portions of both the El Cidro and Levinson properties and will be included in a MODIFIED CRO. CVL has given this line the designation "O" in Figure 6. Tables 4, 7b and 8b have been updated as well.

  Las Brisas – The west two-third of the Levinson parcel will be served by the extension of an internal Las Brisas line as shown in Figures 5 and 6. As above, this line will be added to a MODIFIED CRO. CVL has identified this line as "P" in Figure 6. Tables 4, 7b and 8b have been updated as well.

These changes result in the elimination of two segments of the gravity sewer line in El Cidro Boulevard/Elwood Road/Dunlap Road alignment from the 2006 CRO. This sewer now becomes a project specific sewer line serving the El Cidro property, only, until its intersection with a

sewer in Citrus Road serving the east one-third of the Levinson property at Citrus Road and El Cidro Boulevard. These two eliminated segments were previously listed in the 2006 CRO as projects D (West El Cidro) and the west ½ of project C (East El Cidro). The east ½ of C has been relabeled as C1 in the proposed 2012 CRO.

A reallocation of costs to each participating property for the installation of the remaining future sewer system improvements has become necessary as a result of the installation of sewer lines under the 2006 CRO. This reallocation has been performed and is presented in this report. We note that the original CRO MUST BE AMENDED by COG to accurately reflect the revised allocations of sewer system improvements costs.

3.3.3 Cost Allocation

By order of the COG City Council the WGCPA participating property owners identified in Figure 3 will share in the costs of the sewer lines identified in Figure 6 through the CRO as reimbursements to the installing developer. This share is determined by calculating the ratio of each property's gross acreage to the acreage of the participating development. Table 7a and 7b shows each sewer and each developer's responsibility for the installation costs of the sewer reach under consideration expressed as a percentage of the sewer's total cost. For example, El Cidro Ranch is responsible for contributing 6.64 percent of trunk sewer "B" and 20.56 percent of trunk sewer "C1" because its gross acreage in "C1" is a greater fraction of the total contributing acreage than those in line "B". It may also be noted that there are fewer participating developers discharging flows to "C1" when compared to "B" and that the construction costs would be shared between fewer parties, each party having therefore a larger share of the costs.

CRO lines already installed are shown in Tables 7a and 8a. Properties participating in the 2006 CRO established to construct these sewer lines will be required to reimburse the property that installed these lines as depicted in Tables 7a and 7b. The costs shown for these segments (B, C1, E, I, J and K) are "as-bid" by contractors. The total value of the costs associated with the installation of the existing IDG sewer system in the WGCPA is $14,134,423.

At this time, each developer's responsibility for trunk sewer costs for proposed and not yet built sewer lines is shown as a percentage in Table 7b. As various segments of the trunk sewer system are constructed and approved, the installing property shown in Figure 3 will file for compensation in accordance with the requirements of the Reimbursement Agreement under the CRO. Upon the commencement of construction of the participating property owners shown in Figure 3 will be asked to contribute to the reimbursement of the installing property's costs by an amount to be shown as a cost figure calculated from the percentages now presented in Table 7b. Table 8b contains an estimate of costs for the installation of sewer segments F, G1, G2, H1, L, M, N, O and P. The total value of the costs associated with the installation of the proposed IDG sewer system in the WGCPA is $8,316,936.82.

In addition, we note that the calculation of flows from the participating properties using the 2012 unit factors indicates that total discharges have decreased when compared with the 2006 report. This may result in the reduction in pipe line sizes for those CRO sewers not yet built. Costs of the pipe installation shown in Table 8a for those segments have not been changed, however, because the estimates indicate a maximum recovery amount allowed by the CRO. The allowable recovery costs assigned to the participating properties for the proposed CRO sewers as shown in Table 8b will be based on ACTUAL construction costs.

West Goodyear Central Planning Area - Master Wastewater Trunk Line Study: Percentage Responsibility Percentages

March 21, 2014			TRUNK LINE DESCRIPTIONS						
			B	C1	E	I	J	K	A
	Project Name	Estimated Area	E. Elwood / 159th Ave.	Loop 303/El Cidro	S. Cotton	N. Cotton	E. Yuma	W. Yuma	159th Ave (Bottleneck)
									Cost By City
1	Las Palmas	273	8.76%		13.45%	24.93%	24.93%	29.04%	N/A
2	Amber Meadows	108	3.46%		5.32%	9.86%	9.86%	11.49%	N/A
3	La Privada	200	6.42%		9.85%	18.26%	18.26%	21.28%	N/A
4	Paseo Ridge Phase II *(*Lees)*	44	1.41%		2.17%	4.02%	4.02%	4.68%	N/A
5	Silva-Rose Gardens *(*Silva)*	160	5.13%		7.88%	14.61%	14.61%	17.02%	N/A
6	La Jolla Vista	200	6.42%		9.85%				N/A
7	Pradera	160	5.13%		7.88%				N/A
8	Paseo Ridge Phase I *(*Van Leeuwen)*	80	2.57%		3.94%				N/A
9	Las Ventanas	160	5.13%		7.88%				N/A
10	Las Brisas Phs 1	120	3.85%	11.92%					N/A
11	Levinson	160	5.13%	15.89%					N/A
12	Citrus Ridge	80	2.57%	7.94%					N/A
13	Cotton Commons	40	1.28%		1.97%				N/A
14	El Cidro *(*El Cidro Ranch)*	207	6.64%	20.56%					N/A
15	El Cidro *(*Citrus Road 60)*	60	1.92%	5.96%					N/A
16	El Cidro *(*Cotton Lane 76)*	80	2.57%						N/A
17	Canyon Trails 4 West (Centex)	310	9.95%		15.27%	28.31%	28.31%	16.49%	N/A
18	Canyon Trails 4 South (TW)	255	8.18%		12.56%				N/A
19	Sin Lomas	40	1.28%		1.97%				N/A
20	Las Brisas 2	380	12.19%	37.74%					N/A
			100.00%	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	
	Grand Total Acres	**3117**							
	Total area tributary to the trunk line segment		3117	1007	2030	1095	1095	940	2552

Note: Names with an asterisk (*) are former names of the development.

West Goodyear Central Planning Area - Master Wastewater Trunk Line Study: Percentage Responsibility Percentages

March 21, 2014			TRUNK LINE DESCRIPTIONS								
			F	G1	G2	H1	L	M	N	O	P
	Project Name	Estimated Area	E. Lower Buckeye	Citrus/Lower Buckeye	Lower Buckeye	S. Citrus	N. Citrus	N. Citrus (Las Palmas)	183rd Ave & Yuma	S. Citrus	Las Brisas
1	Las Palmas	263.56					66.45%	100.00%			
2	Amber Meadows	107.57							31.21%		
3	La Privada	195.62							56.75%		
4	Paseo Ridge Phase II (*Lees)	41.53							12.05%		
5	Silva-Rose Gardens (*Silva)	133.09					33.55%				
6	La Jolla Vista	193.60	31.04%		15.67%						
7	Pradera	156.27	25.05%	39.97%	33.71%						
8	Paseo Ridge Phase I (*Van Leeuwen)	79.00	12.67%	20.21%	17.04%	33.66%					
9	Las Ventanas	155.71	24.96%	39.83%	33.59%	66.34%					
11	Levinson	155.70								21.64%	51.51%
13	Cotton Commons	39.14	6.28%								
14	El Cidro (*El Cidro Ranch)	90.67								11.63%	
15	El Cidro (*El Cidro Ranch)	126.56								51.94%	
20.3	Las Brisas Phase II	96.92									48.49%
20.4	El Cidro (*El Cidro Ranch)	36.03								14.79%	
			100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
	Grand Total Acres	**1870.97**									
	Total area tributary to the trunk line segment		623.72	390.98	463.62	234.71	396.65	263.56	344.72	243.66	199.88

Note:

Note: Names with an asterisk (*) are former names of the development.

West Goodyear Central Planning Area - Master Wastewater Trunk Line Study: Maximum Cost Reimbursement Matrix

March 21, 2014

				TRUNK LINE DESCRIPTIONS						
				B	C1	E	I	J	K	A
	Project Name	Estimated Area	Total Developer Costs	E. Elwood / 159th Ave.	Loop 303/El Cidro	S. Cotton	N. Cotton	E. Yuma	W. Yuma	159th Ave (Bottleneck)
			$	$	$	$	$	$	$	Cost By City
1	Las Palmas	273	$2,028,646	$613,090		$235,344	$632,832.20	$201,749.74	$345,631.07	N/A
2	Amber Meadows	108	$802,541	$242,541		$93,103	$250,351.20	$79,813.08	$136,733.17	N/A
3	La Privada	200	$1,486,188	$449,150		$172,413	$463,613.33	$147,802.01	$253,209.57	N/A
4	Paseo Ridge Phase II *(*Lees)*	44	$326,961	$98,813		$37,931	$101,994.93	$32,516.44	$55,706.11	N/A
5	Silva-Rose Gardens *(*Silva)*	160	$1,188,950	$359,320		$137,930	$370,890.67	$118,241.61	$202,567.66	N/A
6	La Jolla Vista	200	$621,563	$449,150		$172,413				N/A
7	Pradera	160	$497,250	$359,320		$137,930				N/A
8	Paseo Ridge Phase I *(*Van Leeuwen)*	80	$248,625	$179,660		$68,965				N/A
9	Las Ventanas	160	$497,250	$359,320		$137,930				N/A
10	Las Brisas Phs 1	120	$370,405	$269,490	$100,915					N/A
11	Levinson	160	$493,873	$359,320	$134,553					N/A
12	Citrus Ridge	80	$246,937	$179,660	$67,277					N/A
13	Cotton Commons	40	$124,313	$89,830		$34,483				N/A
14	El Cidro *(*El Cidro Ranch)*	207	$638,949	$464,870	$174,079					N/A
15	El Cidro *(*Citrus Road 60)*	60	$185,203	$134,745	$50,458					N/A
16	El Cidro *(*Cotton Lane 76)*	80	$179,660	$179,660						N/A
17	Canyon Trails 4 West (Centex)	310	$2,107,354	$696,182		$267,240	$718,600.67	$229,093.11	$196,237.42	N/A
18	Canyon Trails 4 South (TW)	255	$792,493	$572,666		$219,827				N/A
19	Sin Lomas	40	$124,313	$89,830		$34,483				N/A
20	Las Brisas 2	380	$1,172,949	$853,385	$319,565					N/A
	Total		**$14,134,423**	**$7,000,000**	**$846,846**	**$1,749,993**	**$2,538,283**	**$809,216**	**$1,190,085**	
	Grand Total	**3117**								
	Total area tributary to the trunk line segment			3117	1007	2030	1095	1095	940	2552

Note: Names with an asterisk (*) are former names of the development.

	TRUNK LINE DESCRIPTIONS						
	B	C1	E	I	J	K	A
	E. Elwood / 159th Ave.	Loop 303/El Cidro	S. Cotton	N. Cotton	E. Yuma	W. YUMA	159th Ave (Bottleneck)
Total Costs	$7,000,000	$846,846	$1,749,993	$2,538,283	$809,216	$1,190,085	-

West Goodyear Central Planning Area - Master Wastewater Trunk Line Study: Maximum Cost Reimbursement Matrix

March 21, 2014

				TRUNK LINE DESCRIPTIONS								
				F	G1	G2	H1	L	M	N	O	P
	Project Name	Estimated Area	Total Developer Costs	E. Lower Buckeye	Citrus/Lower Buckeye	Lower Buckeye	S. Citrus	N. Citrus	N. Citrus (Las Palmas)	183rd Ave & Yuma	S. Citrus	Las Brisas
			$	$	$	$	$	$	$	$	$	$
1	Las Palmas	263.56	$1,558,816.30					$622,289.31	$936,526.99			
2	Amber Meadows	107.57	$292,243.58							$292,243.58		
3	La Privada	195.62	$531,455.70							$531,455.70		
4	Paseo Ridge Phase II (*Lees)	41.53	$112,827.70							$112,827.70		
5	Silva-Rose Gardens (*Silva)	133.09	$314,237.68					$314,237.68				
6	La Jolla Vista	193.60	$350,977.73	$180,613.00		$170,364.73						
7	Pradera	156.27	$813,121.82	$145,787.16	$300,830.03	$366,504.63						
8	Paseo Ridge Phase I (*Van Leeuwen)	79.00	$703,794.23	$73,700.55	$152,080.20	$185,281.02	$292,732.46					
9	Las Ventanas	155.71	$1,387,187.34	$145,264.72	$299,751.99	$365,191.25	$576,979.38					
11	Levinson	155.70	$884,193.36								$186,376.25	$697,817.11
13	Cotton Commons	39.14	$36,514.43	$36,514.43							$100,114.51	
14	El Cidro (*El Cidro Ranch)	90.67	$100,114.51								$447,246.45	
15	El Cidro (*El Cidro Ranch)	126.56	$447,246.45									$656,880.68
20.3	Las Brisas Phase II	96.92	$656,880.68								$127,325.30	
20.4	El Cidro (*El Cidro Ranch)	36.03	$127,325.30									
	Total		**$8,316,936.82**	**$581,879.86**	**$752,662.22**	**$1,087,341.63**	**$869,711.84**	**$936,526.99**	**$936,526.99**	**$936,526.99**	**$861,062.50**	**$1,354,697.79**
	Grand Total	**1870.97**										
	Total area tributary to the trunk line segment			623.72	390.98	463.62	234.71	396.65	263.56	344.72	243.66	199.88

Note: Names with an asterisk (*) are former names of the development.

	TRUNK LINE DESCRIPTIONS								
	F	G1	G2	H1	L	M	N	O	P
	E. Lower Buckeye	Citrus/Lower Buckeye	Lower Buckeye	S. Citrus	N. Citrus	N. Citrus (Las Palmas)	183rd Ave & Yuma	S. Citrus	Las Brisas
Total Costs	$581,879.86	$752,662.22	$1,087,341.63	$869,711.84	$936,526.99	$936,526.99	$936,526.99	$861,062.50	$1,354,697.79

4.0 REFERENCES

1. "Engineering Design Standards and Policies Manual," City of Goodyear, Arizona.

2. Title 18, Chapter 9, Article 3 – Part E General Permits. January 7, 2005. From Arizona Revised Statutes.

3. Integrated Water Master Plan for City of Goodyear, Black & Veatch, June 2008.

4. "West Goodyear Central Planning Area Master Wastewater Study Update," report prepared by CVL, dated June 2006.

APPENDIX A
Discussion of the Calculation of EDUs

Discussion of the Calculation of Equivalent Dwelling Units

Dwelling units for a development are the number of proposed lots that are planned for the parcel. Flows or demands are calculated using unit factors ascribed for each unit and for each land use type. See Section 2.2 in the report. Equivalent dwelling units are a calculated number, which takes all types of land uses and brings them to a common basis using a unit factor for a single family dwelling.

For example, a development is designed to have 300 dwelling units of medium, high density (MHD) and 160 dwelling units medium density (MD), both of which are multi-family land uses. Average flows are calculated using this information and the wastewater generation rate in Table 6.3-2: Average Day Wastewater Generation Rates in the City of Goodyear Engineering Design Standards and Policies Manual. The average flows from this development are divided by 144 gpd, the flow factor for low density single family land use to achieve equivalent dwelling units. In conclusion, dwelling units and equivalent dwelling units will not match, unless the development is a low density single family land use, using 144gpd generation rate.

Also, equivalent dwelling units cannot be compared between water and wastewater system analysis. A wastewater equivalent dwelling unit is calculated by dividing the wastewater average flow by the low density single family generation rate of 144 gpd, as discussed in the previous paragraph. A water equivalent dwelling unit is calculated by dividing the water average day flow by the low density single family land use demand factor of 390 gpd. An example that illustrates water and wastewater equivalent dwelling units won't match is Cotton Commons. Cotton Commons is designed to have 300 dwelling units of medium, high density (MHD) and 160 dwelling units medium density (MD), both of which are multi-family land uses. Average wastewater flows are calculated using this information and the wastewater generation rate in Table 6.3-2: Average Day Wastewater Generation Rates in the City of Goodyear Engineering Design Standards and Policies Manual. Average water demands are calculated using the dwelling units stated above and the water demands in Table 5.1-1: Average Day Water Demands in the City of Goodyear Engineering Design Standards and Policies Manual. The equivalent dwelling units will not match between a wastewater and water analysis, see Table 1.

Table 1: Comparison of Water and Wastewater Dwelling Units

Report	Area ID	Development	Land Use	DU	Generation Rate/Demand (gpdu)	Average Flow/Average Demand (gpd)	EDU Generation Rate/Demand (gpd)	EDU
Wastewater	13.1	Cotton Commons (MHD)	Multi-family	300	124	37,200	144	258
Water	13.1	Cotton Commons (MHD)	Multi-family	300	256	76,800	390	197

APPENDIX B
Summary of Parcel Area and Cost Allocation Changes

Summary of Parcel Area and Cost Allocation Changes

The changes that have been made to Table 7b and 8b reflect the latest land use and/or design plans for each Area ID. See table below for the changes that have been included in Tables 7b and 8b in the WGCPA Master Wastewater Study Update/Supplement 1 Report. These changes conform to Table 4. Also, construction costs were updated by EPS Group, Inc. on June 7th, 2013 and October 31st, 2013 to update current cost estimates for each proposed CRO line. The numbers shown in Tables 7a and 8a have not been updated because they were constructed under the 2006 Cost Recovery Ordinance. See Tables A, B and C below.

Table A - Developments with Acreage Changes			
Area ID (Development Name)	**WGCPA Master WW Study Update, approved January 2013 (Acres)**	**Supplement #1 (Acres)**	**Reason for Modification**
1 (Las Palmas)	273.00	263.56	Updated to Reflect Maricopa County Assessors Map & Design Plans
2 (Amber Meadows)	108.00	107.57	Updated to Reflect Maricopa County Assessors Map & Design Plans
3 (La Privada)	200.00	195.62	Updated to Reflect Maricopa County Assessors Map
4 (Lees)	44.00	41.53	Updated to Reflect Maricopa County Assessors Map
5 (Silva)	160.00	133.09	Updated to Reflect Maricopa County Assessors Map
6 (La Jolla Vista)	200.00	193.60	Updated to Reflect Maricopa County Assessors Map & Design Plans
7 (La Pradera)	160.00	156.27	Updated to Reflect Maricopa County Assessors Map
8 (Van Leeuwen)	80.00	79.00	Updated to Reflect Maricopa County Assessors Map
9 (Las Ventanas)	160.00	155.71	Updated to Reflect Maricopa County Assessors Map & Design Plans
10 (Las Brisas Phase I)	120.00	120.00	Existing 2006 CRO Line
11 (Levinson)	160.00	155.70	Updated to Reflect Maricopa County Assessors Map
12 (Citrus Ridge)	80.00	80.00	Existing 2006 CRO Line
13 (Cotton Commons)	40.00	39.14	Updated to Reflect Maricopa County Assessors Map
14 (El Cidro)	207.00	90.67	Updated to Reflect Maricopa County Assessors Map & Design Plans[2]
15 (El Cidro)	60.00	126.56	Updated to Reflect Maricopa County Assessors Map & Design Plans[2]
16 (El Cidro)	80.00	80.00	Existing 2006 CRO Line
17 (Canyon Trails 4 West Centex)	310.00	310.00	Existing 2006 CRO Line
18 (Canyon Trails 4 South TW)	255.00	255.00	Existing 2006 CRO Line
19 (Sin Lomas)	40.00	40.00	Existing 2006 CRO Line

20 (Las Brisas 2)	380.00	380.00	This Area ID was Broken into Different Parcels 20.3 and 20.4, also a Portions Flow into Existing CRO Lines Only
20.3 (Las Brisas Phase II) NEW	-	96.92	Updated to Reflect Maricopa County Assessors Map [3]
20.4 (El Cidro) NEW	-	36.03	Updated to Reflect Maricopa County Assessors Map & Design Plans [3]

[1] Reserved

[2] These parcels acreages in the WGCPA Master Wastewater Study Update, approved January 2013, had the incorrect acreages for the given parcels. The acreages in that report were split, so that all the acreage from the El Cidro development that flow to CRO sewer Line O was given to Parcel 14. El Cidro's acreage that flowed directly to CRO sewer Line C1 was called Parcel 15. This has been corrected in this Supplement #1.

[3] These two parcels are broken out from the old Parcel 20. Parcel 20.3 represents the proposed portion of Las Brisas which flow into a proposed CRO Line P. Parcel 20.4 represents a parcel, which at the time of the WGCPA Master Wastewater Study Update, was owned by the Las Brisas owners and is now owned by the El Cidro owners. This parcel was broken out to represent new ownership.

Table B1 - Developments and Trunk Lines with Percentages Changes

	Trunk Line F		Trunk Line G1	
Area ID (Development Name)	**WGCPA Master WW Study Update, approved January 2013**	**Supplement #1**	**WGCPA Master WW Study Update, approved January 2013**	**Supplement #1**
6 (La Jolla Vista)	31.25 %	31.04 %	-	-
7 (La Pradera)	25.00 %	25.05 %	40.00 %	39.97 %
8 (Van Leeuwen)	12.50 %	12.67 %	20.00 %	20.21 %
9 (Las Ventanas)	25.00 %	24.96 %	40.00 %	39.83 %
13 (Cotton Commons)	6.25 %	6.28 %	-	-

Table B2 - Developments and Trunk Lines with Percentages Changes

	Trunk Line G2		Trunk Line H1	
Area ID (Development Name)	**WGCPA Master WW Study Update, approved January 2013**	**Supplement #1**	**WGCPA Master WW Study Update, approved January 2013**	**Supplement #1**
6 (La Jolla Vista)	33.33 %	15.67 %[1]	-	-
7 (La Pradera)	26.67 %	33.71 %	-	-
8 (Van Leeuwen)	13.33 %	17.04 %	33.33 %	33.66 %
9 (Las Ventanas)	26.67 %	33.59 %	66.67 %	66.34 %

[1] Only a portion of the total area for La Jolla Vista contributes to this line, approximately 73 acres.

Table B3 - Developments and Trunk Lines with Percentages Changes				
	Trunk Line L		Trunk Line N	
Area ID (Development Name)	WGCPA Master WW Study Update, approved January 2013	Supplement #1	WGCPA Master WW Study Update, approved January 2013	Supplement #1
1 (Las Palmas)	63.05 %	66.45 %	-	-
2 (Amber Meadows)	-	-	30.68 %	31.21 %
3 (La Privada)	-	-	56.82 %	56.75 %
4 (Lees)	-	-	12.50 %	12.05 %
5 (Silva)	36.95 %	33.55 %	-	-

Table B4 - Developments and Trunk Lines with Percentages Changes				
	Trunk Line O		Trunk Line P	
Area ID (Development Name)	WGCPA Master WW Study Update, approved January 2013	Supplement #1	WGCPA Master WW Study Update, approved January 2013	Supplement #1
11 (Levinson)	43.60 %	21.64 %[1]	29.63 %	51.51 %[2]
14 (El Cidro)	56.40 %	11.63 %[3]	-	-
15 (El Cidro)	-	51.94 %	-	-
20.3 (Las Brisas Phase II)	-	-	70.37 %	48.49 %
20.4 (El Cidro)	-	14.79 %	-	-

[1] Only a portion of the total area for Levinson contributes to this line, approximately 53 acres.
[2] Only a portion of the total area for Levinson contributes to this line, approximately 103 acres.
[3] Only a portion of the total area for 15 (El Cidro) contributes to this line, approximately 28 acres.

Table C1 - Developments and Trunk Lines with Cost Changes				
	Trunk Line F		Trunk Line G1	
Area ID (Development Name)	WGCPA Master WW Study Update, approved January 2013	Supplement #1	WGCPA Master WW Study Update, approved January 2013	Supplement #1
6 (La Jolla Vista)	$184,194.00	$180,613.00	-	-
7 (La Pradera)	$147,355.00	$145,787.16	$283,327.00	$300,830.03
8 (Van Leeuwen)	$73,678.00	$73,700.55	$141,663.00	$152,080.20
9 (Las Ventanas)	$147,355.00	$145,264.72	$283,327.00	$299,751.99
13 (Cotton Commons)	$36,514.43	$36,839.00	-	-

Table C2 - Developments and Trunk Lines with Cost Changes				
	Trunk Line G2		Trunk Line H1	
Area ID (Development Name)	WGCPA Master WW Study Update, approved January 2013	Supplement #1	WGCPA Master WW Study Update, approved January 2013	Supplement #1
6 (La Jolla Vista)	$340,096.00	$170,364.73[1]	-	-
7 (La Pradera)	$272,077.00	$366,504.63	-	-
8 (Van Leeuwen)	$136,038.00	$185,281.02	$235,178.00	$292,732.46
9 (Las Ventanas)	$272,077.00	$365,191.25	$470,357.00	$576,979.38

[1] Only a portion of the total area for La Jolla Vista contributes to this line, approximately 73 acres.

Table C3 - Developments and Trunk Lines with Cost Changes				
	Trunk Line L		Trunk Line N	
Area ID (Development Name)	WGCPA Master WW Study Update, approved January 2013	Supplement #1	WGCPA Master WW Study Update, approved January 2013	Supplement #1
1 (Las Palmas)	$570,466.00	$622,289.31	-	-
2 (Amber Meadows)	-	-	$274,792.00	$292,243.58
3 (La Privada)	-	-	$508,873.00	$531,455.70
4 (Lees)	-	-	$111,952.00	$112,827.70
5 (Silva)	$334,339.00	$314,237.68	-	-

Table C4 - Developments and Trunk Lines with Cost Changes				
	Trunk Line O		Trunk Line P	
Area ID (Development Name)	WGCPA Master WW Study Update, approved January 2013	Supplement #1	WGCPA Master WW Study Update, approved January 2013	Supplement #1
11 (Levinson)	$115,604.14	$186,376.25[1]	$116,557.78	$697,817.11[2]
14 (El Cidro)	$149,562.86	$100,114.51[3]	-	-
15 (El Cidro)	-	$447,246.45	-	-
20.3 (Las Brisas Phase II)	-	-	$276,872.22	$656,880.68
20.4 (El Cidro)	-	$127,325.30	-	-

[1] Only a portion of the total area for Levinson contributes to this line, approximately 53 acres.
[2] Only a portion of the total area for Levinson contributes to this line, approximately 103 acres.
[3] Only a portion of the total area for 15 El Cidro contributes to this line, approximately 28 acres.