


**MASTER WASTEWATER REPORT
FOR
DEVELOPMENT UNIT 3/4
AT
EASTMARK**

Revised September 8, 2017
May 14, 2014
WP# 174708

DMB	Master Developer Approval	
<i>CR</i>	Date	<i>9/11/17</i>

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EXPIRES *10-30-18*

APPROVED
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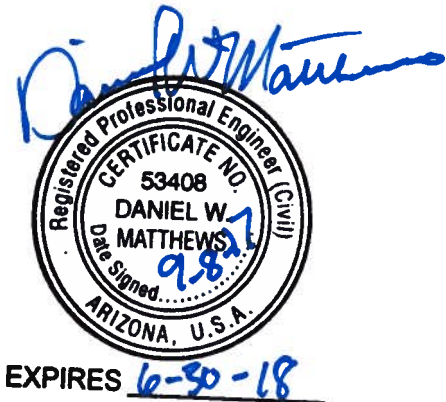
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1.0 INTRODUCTION

1.1 General Background and Project Location

The proposed Development Unit 3/4 (Site) is anticipated to comprise approximately 614 acres within the 3,154-acre Eastmark master planned community in the City of Mesa (City). Development Unit 3/4 (DU 3/4) is planned to include single-family residential, multi-family residential, commercial mixed-use, office, high school, aquatic center, hotel, and open spaces.

This Master Wastewater Report has been prepared in accordance with Wood, Patel & Associates, Inc.'s (Wood/Patel's) understanding of the City of Mesa's technical requirements for wastewater collection systems, as applicable for the development known as Eastmark.

The Site is located within Sections 15, 22, and 23, Township 1 South, Range 7 East of the Gila and Salt River Meridian. The Site is bounded by Ray Road to the south (from Ellsworth Road to Inspirian Parkway), Inspirian Parkway on the east (from Ray Road to Point Twenty-Two Boulevard), Point Twenty-Two Boulevard on the south (from Inspirian Parkway to Eastmark Parkway), Eastmark Parkway on the east (from Point Twenty-Two Boulevard to Warner Road), Warner Road on the north, and Ellsworth Road on the west (refer to Exhibit 1 – *Vicinity Map*).

1.2 Scope of Master Wastewater Report

The Master Wastewater Report for Development Unit 3/4 at Eastmark presents wastewater design flows, and sewer main sizes and locations as required to provide wastewater service to the Site. The purpose of this report is to provide a revised sewer analysis reflecting the developed condition planning of DU 3/4 prior to the full buildout of Eastmark, based on the land uses provided by DMB Mesa Proving Grounds, LLC, and to identify the sewer infrastructure required to serve the Site, while meeting the requirements of the City's Engineering and Design Standards.

Updates to the DU 3/4 Master Wastewater Report may be required if significant changes are made to the land uses and assumptions utilized to prepare this report. Additionally, design criteria may change based on actual wastewater generation to calculate demand on the system in the future.

1.3 Wastewater Master Report for Eastmark

The *Master Wastewater Report Update for Eastmark* (for DU 5-5N-6S), by Wood, Patel & Associates, Inc., dated August 22, 2017, has been submitted to the City of Mesa. Additionally, the *Master Wastewater Report Update for Eastmark*, by Wood, Patel & Associates, Inc. dated September 8, 2017, is being submitted concurrently for review and approval to the City of Mesa to incorporate changes within DU 3/4. The report sets the design criteria required within Eastmark, and sets sewer basin boundaries tributary to the Elliot Road, Warner Road, and Ray Road offsite sewers. The updated report includes revised land uses and sewer alignments across Eastmark.

1.4 Study Area and Full-Buildout Condition

The study area includes the Warner and Ray Road Sewer Drainage Basins, per the *City of Mesa Wastewater Master Plan Update, 2009*. The design criteria, utilized to calculate wastewater flows and determine required pipe sizes for the Site, are based on projected full-buildout conditions for DU 3/4. For a detailed breakdown of the DU 3/4 modeled land use, refer to the following:

- Table 1 – *DU 3/4 Modeled Land Use*
- Table 3 – *Overall Eastmark Modeled Land Use*
- Table 4 – *DU 3/4 Wastewater Model*
- Exhibit 2 – *DU 3/4 Master Sewer Exhibit*

1.5 Basis of Design Reports for Specific Individual Developments

As development progresses within the Site, Basis of Design (BOD) reports are required for specific individual developments to ensure compliance with the Master Report and this Development Unit Master Report, and to identify significant variations in land use, wastewater flows, and the wastewater infrastructure needed to serve the parcel.

2.0 EXISTING CONDITIONS

2.1 Topographic Conditions

The Site consists of multiple automotive test tracks and undisturbed desert, which borders the Site to the west, north, and the northern half of the eastern boundary. Adjacent to the Site, along Eastmark Parkway, Parcels 6-10 through 6-15 within DU 6S are currently under construction. Along the southern half of the eastern boundary, DU 7 has been constructed. To the south, the Site is bound by Ray Road. The land generally slopes in a southwesterly direction, at approximately 0.5 to 1 percent. The peak elevation within the Site is approximately 1,425 feet above mean sea level (MSL), located along Inspirian Parkway, north of Ray Road. The lowest elevation within the Site is approximately 1,390 feet MSL, located at the southwest corner of DU 3/4. Refer to Exhibit 1 for roadway alignments.

2.2 Existing Offsite Wastewater Infrastructure

Existing public wastewater infrastructure in the vicinity of the Site includes the following:

- An existing 12-inch gravity sewer located along Mountain Road, between Elliot Road and Pecos Road.
- An existing 12-inch gravity sewer located along Signal Butte Road, between Elliot Road and Galveston Road.
- An existing 18-inch dry gravity sewer located along Warner Road, within the Loop 202 Freeway right-of-way.
- The East Mesa Interceptor (EMI), extending south along Ellsworth Road then west along Elliot Road for two and one-half (2½) miles west of the Site. EMI gravity pipe sizes range from 42 to 66 inches in the vicinity of Eastmark.
- A 27-inch and 30-inch gravity sewer located along Ray Road, flowing east from Ellsworth Road discharging to the EMI, and a 21-inch and 18-inch gravity sewer between Ellsworth Road and Signal Butte Road.
- An existing 24-inch gravity sewer along Elliot Road, from the Apple facility at the southwest corner of Signal Butte Road and Elliot Road to the EMI in Ellsworth Road.

- An existing 30-inch gravity sewer traversing south to north, along the western portion of the Apple facility at the southwest corner of Signal Butte Road and Elliot Road.
- An existing 18-inch and 21-inch gravity sewer along the Ray Road alignment north of the Powerline Floodway.
- An existing 15-inch sewer within Eastmark Parkway, from Ray Road to Point Twenty-Two Boulevard, to serve DU 6 South and DU 7.
- An existing 12-inch sewer within Point Twenty-Two Boulevard, from Eastmark Parkway to west of Signal Butte Road, to serve DU 6 South and DU 7.
- Existing 8-inch sewer lines within DU 7, DU 3 South, and DU 8 & 9.
- Existing 18-inch sewer along the Ray Road alignment, from Inspirian Parkway to east of Ellsworth Road, to serve DU 8 & 9.
- Existing 18-inch, 15-inch, 12-inch, 10-inch, and 8-inch sewer drainage southeast to northwest through DU 8 and DU 9.
- Existing 8-inch sewers draining south along Everton Terrace and Parc Joule, from Parcels 6-1, 6-2, 6-3, 6-7, and 6-8 boundary within DU 6 South to Point Twenty-Two Boulevard.
- It is our understanding that 8-inch sewer lines through Parcels 6-1, 6-2, 6-7, and 6-8 within Development Unit 6 South are currently under construction or have been recently completed.
- Existing 8-inch sewer lines within DU 3S, DU 7, and DU 9.

2.3 Existing Onsite Wastewater Infrastructure

Existing public wastewater collection systems onsite include the following:

- An existing 8-inch sewer line draining south along Copernicus Drive, from Palladium Drive to Ray Road, to serve Parcels 3/4-1 through 3/4-4.

3.0 WASTEWATER SYSTEM DESIGN

3.1 Design Criteria

Wastewater design flows and pipe-sizing criteria utilized in this DU 3/4 Master Wastewater Report are based on Wood/Patel's understanding of the following:

- The *Master Wastewater Report for Eastmark*.
- Applicable wastewater system design criteria listed in the *2012 City of Mesa Engineering Design Standards*, along with City accepted population based criteria per Table 2 – *DU 3/4 Wastewater Design Criteria*.
- Previously-approved report criteria for DU 5 North, DU 6 North, DU 6 South, DU 7, DU 8 & 9, DU 3 South, and DU 3/4 Phase 1.
- Regionally-accepted design standards.
- Title 18, Chapter 9 of the *Arizona Administrative Code*.

The design criteria, as shown in Table 2 was used to determine the Average-Day Wastewater Flow, based on the detailed land use and conceptual land use throughout DU 3/4. Table 1 presents the Average Day-Wastewater Flow for each land use category based on density and population.

3.2 Wastewater Design Flows

Estimated wastewater design flows under full-buildout conditions were estimated for DU 3/4 based on the design criteria listed above and planned land uses. Projected full build-out Average Day Wastewater Flows for DU 3/4 and the existing/planned development within Eastmark, including DU 5 North, DU 6 South, DU 6 North, DU 7, DU 8 & 9, DU 3 South, and DU 3/4 Phase 1, are summarized as follows in millions of gallons per day (MGD):

	Sewer Basins			Total Average Day Flow (MGD):
	Elliot Road Outfall (MGD)	Warner Road Outfall (MGD)	Ray Road Outfall (MGD)	
DU 3/4	0	0.09	0.95	1.04
Offsite Eastmark Flows (MGD)	1.49	0.24	1.04	4.77
Offsite Upstream of Eastmark Flows (MGD)	-	-	2.09	-
Total Average Day Flow (MGD):	1.49	0.33	4.08	-

Sewer pipe capacities are based upon conveying the flow at two-thirds of the pipe capacity. It is Wood/Patel’s understanding that wet-weather infiltration is accounted for within the City of Mesa static peaking factors listed in the *2012 City of Mesa Engineering Design Standards*. Static methodology is required by the City on an individual project basis to size onsite sewer lines.

An additional scenario was analyzed in this report to evaluate pipe sizes during a peak wet-weather wastewater flow, while a 450,000-gallon pool is drained at a rate to empty within 8 hours (938 gpm) downstream of the proposed Aquatic Center within DU 3/4 Parcel 3/4-6. Results of the peak wet-weather flow analysis are shown on Table 5 – *DU 3/4 Calculated Pipe Capacities*. Results show that during the full-buildout peak wet-weather event, the limiting section of downstream sewer is the proposed 18-inch line from Node R7 to Node R2, located downstream of the Aquatic Center. During the peak wet-weather flows, this pipe section is flowing at 48.2 percent of the full-flow capacity, with a $d/D = 0.48$. When the pool flow of 938 gpm is added to the peak wet-weather flow, the total sewer flow equals 1,969 gpm, which is 91 percent of the maximum capacity of the 18-inch sewer, and has a d/D equal to 0.76. Refer to Exhibit 2 for pipe locations.

It is our understanding the City utilized a diurnal peaking methodology to evaluate the overall tributary area, including Eastmark, to aid in the design of the Ray Road and Elliot Road sewers. Diurnal peaking methodology is based on observed and/or estimated daily wastewater flow cycles for comparable developed areas, and is generally less conservative than static modeling resulting in lower peak flows.

As a result, the peak wet-weather flows calculated in this report for Eastmark may vary from those used in designing the Ray Road and Elliot Road sewer lines. The controlling section of the Ray Road sewer is an offsite 30-inch pipe at 0.20 percent slope. The capacity of this pipe flowing full is approximately 11.85 MGD, and at $d/D = 0.9$ is 12.6 MGD. Therefore, the peak wet-weather flows for Eastmark would not exceed the capacity of the Ray Road Sewer.

The development of DU 3/4 is proposed to be served by the Ray Road sewer until the average-day threshold flow in the Ray Road sewer at Ellsworth Road and Ray Road from Eastmark approved plats reaches 2.8 MGD, as set by the City. At this time, the Warner Road sewer line will need to be constructed. Eastmark will be responsible for coordinating with the City of Mesa and other owners contributing to the Warner Sewer Basin downstream of Eastmark, to the design and construction of the Warner Road sewer from Ellsworth Road to the EMI. Eastmark will be responsible for a pro-rata share (based on flow capacity) of the cost to design and construct the Warner Road sewer line from Ellsworth Road to the EMI. The diversion manhole at the Ellsworth and Warner Roads intersection, 18-inch sewer line, 21-inch sewer line, and 24-inch sewer line south of Warner Road is required to be constructed to provide operational flexibility prior to the construction of the Warner Road offsite sewer.

Additionally, it is Wood/Patel's understanding that the City of Mesa will evaluate their wastewater collection system downstream of Eastmark utilizing diurnal peaking factors to evaluate if the system has capacity to convey flows estimated within this report. If these evaluations indicate the capacity is exceeded in these lines, DMB would participate in projects necessary to provide additional capacity in these lines.

4.0 PROPOSED SYSTEM

4.1 Planned Wastewater Infrastructure

The City of Mesa's Wastewater Master Plan has four (4) sewer drainage basins within the study area of the Site, which include the Elliot Road, Warner Road, Ray Road, and Williams Field Road Sewer Drainage Basins. The Elliot Road Basin consists of 137.2 acres of DU 6 North, and approximately 264 acres of DU 5 North. Additional offsite areas from Signal Butte Road to the EMI at the corner of Elliot and Ellsworth Roads, also contribute flow. The Warner Road Basin consists of the remainder of DU 5 North (approximately 347 acres), 183.6 acres from DU 6 South, and 99.1 acres from DU 3/4. Additionally, property west of the Site to the EMI is also included within the Warner Sewer Basin. The Ray Road Basin consists of a portion of Eastmark and property to the east and west. The Williams Field Basin includes property to the south and east of Eastmark. Currently, the offsite Elliot Road and Ray Road sewers have been constructed downstream of Eastmark, and the Warner Road and Williams Field Road sewers have not been designed or constructed.

Based on the City of Mesa's Wastewater Master Plan, three sewer lines west of Ellsworth Road, along Elliot Road, Warner Road, and Ray Road, are planned to serve the four sewer drainage basins.

4.1.1 Elliot Sewer Drainage Basin

Within the Elliot Sewer Drainage Basin, onsite flows from Parcels 6A and 6B within DU 6N, and Parcels 5A, 5B, and 5E within DU 5N, are conveyed by gravity north to the existing Elliot Road Sewer. The Elliot Road Sewer was initially constructed to serve the Apple facility site within DU 6N. The Elliot Sewer conveys flow west to the EMI at the intersection of Elliot and Ellsworth Roads.

4.1.2 Warner Sewer Drainage Basin

Within the Warner Sewer Drainage Basin, onsite flows are conveyed by gravity sewer to the intersection of Ellsworth Road and Warner Road. A diversion manhole is planned to be constructed to direct the flow south to Ellsworth Road and Ray Road during construction of the offsite Warner Road Sewer. From this

point, the Warner Basin flow will combine with the Ray and Williams Field Basins flows, and will be conveyed through the offsite Ray Road sewer line to the EMI.

In the full-buildout condition, the diversion manhole may be adjusted to direct a portion of, or all of, the flow from the onsite Warner Basin to the offsite Warner Road sewer line. The diversion manhole will provide the City operational flexibility to direct flow to the Warner Road and Ray Road sewer lines, as necessary.

4.1.3 Ray Road Sewer Drainage Basin

The development east of Mountain Road discharges into an existing sewer line along Mountain Road. An existing diversion structure at Mountain Road and Ray Road allows the City to send the flow to either the Ray Road or Pecos Road sewers. It is our understanding all flow north of Ray Road is currently diverted to the Ray Road sewer, while flow from the development south of Ray Road is conveyed south to Pecos Road. The City indicated it is their intent to continue this mode of operation to provide additional capacity in the Pecos Road sewer for future development along Pecos Road. This report considers the total design flow from the existing developments east of Eastmark for the Ray Road sewer contributing full-buildout flow at this time. This upstream flow is accounted for per the *Master Wastewater Report for Ray Road Sewer between Ellsworth and Mountain Roads*, prepared by CMX, L.L.C., dated November 18, 2005.

Portions of the original Ray Road sewer have been abandoned in place and replaced with a new sewer within Ray Road, with capacity to convey the projected buildout flows from both Eastmark and offsite.

4.2 Pipe Sizing

Proposed sewer lines for the Site were sized to accommodate peak wet-weather flow conditions for the full-buildout conditions of DU 3/4. The onsite collection system includes planned sewer mains with diameters ranging from 8 inches to 30 inches. Refer to Tables 4 and 5 for wastewater models and calculated pipe capacities, and Exhibit 2 for the planned DU 3/4 wastewater infrastructure.

5.0 CONCLUSIONS

The Master Wastewater Report for Development Unit 3/4 at Eastmark presented herein meets City of Mesa standards and requirements, and serves as a guide for construction documents associated with the planned wastewater system. The following items highlight critical conclusions:

1. Development Unit 3/4 is anticipated to be 614 acres within the 3,154-acre Eastmark master planned community in the City of Mesa.
2. The wastewater system presented is based on the projected full-buildout condition of DU 3/4.
3. Wastewater design criteria are based on Wood/Patel's understanding of the *2012 City of Mesa Engineering & Design Standards*, City-accepted population based criteria, regionally accepted design standards, the *Master Wastewater Report Update for Eastmark*, and Title 18, Chapter 9 of the *Arizona Administrative Code*.
4. The approximate average daily flow generated at build-out by DU 3/4 is 1.04 MGD per Section 3.2 of this report.
5. Proposed onsite sewer mains are sized to accommodate peak wet-weather design flow for the full-buildout condition.
6. Wood/Patel's model of the proposed on-site wastewater system provides conveyance and capacity in conformance with the City of Mesa's standards and Title 18 of the *Arizona Administrative Code*.
7. The City of Mesa will evaluate their wastewater collection system downstream of Eastmark utilizing diurnal peaking factors to evaluate if the system has capacity to convey flows estimated within this report. If these evaluations indicate capacity is exceeded in these lines, DMB would participate in projects necessary to provide additional capacity in these lines.

TABLE 1

DU 3/4 MODELED LAND USE

WOOD/PATEL

TABLE 1 - DU 3/4 MODELED LAND USE

Project: DU 3/4 at Eastmark
Location: Mesa, Arizona

PRELIMINARY LAND USE AND DWELLING UNIT BREAKDOWN

Parcel	No. of DUs	Residential Acres	Density (DU/Acre)	Non-Residential Acres	Land Use	Floor Area (SQ. FT.)	Population Density	Total Population	Wastewater Design Flows (Per Capita)	Avg Day Flow (GPD)	Total Avg Day Flow (GPD)
WARNER ROAD SEWER											
3/4-14	87	24.1	3.6	--	MDR-2	--	3.1	269.7	80	21,576	21,576
3/4-15	60	16.8	3.6	--	MDR-2	--	3.1	186.0	80	14,880	14,880
3/4-17	210	58.2	3.6	--	MDR-2	--	3.1	651.0	80	52,080	52,080
Warner Road Totals	357	99.1		0.0		0		1,107		88,536	88,536
RAY ROAD SEWER											
3/4-1 to 3/4-3	251	40.0	6.28	--	MDR-4	0	2.7	678	80	54,240	76,720
	165	11.0	15.00	--	HDR-2	--	1.7	281	80	22,480	
	--	--	--	4.0	Open Space	0	--	--	--	--	
3/4-4	195	34.0	5.74	--	MDR-3	--	3.2	624	80	49,920	49,920
3/4-5	263	45.1	5.83	--	MDR-3	--	3.2	841.6	80	67,328	67,328
3/4-6	--	--	--	60.8	High School Aquatic Center (17 AC)	420,000	100	6,080	40	243,200	277,200
	--	--	--	--		20,000	200	3,400	10	34,000	
3/4-7	--	--	--	5.5	Church	21,000	0.4	8.4	54	454	
	--	--	--	--			15.0	315	20	6,300	39,856
	--	--	--	14.0	Commercial / Retail / Restaurant	245,000	2.5	613	54	33,102	
3/4-8	210	8.5	24.71	--	HDR-2	--	1.7	357	80	28,560	28,560
	--	--	--	--	Commercial / Retail / Restaurant	280,000	2.5	700	54	37,800	
3/4-9	--	--	--	43.4	Office	525,000	5.0	2,625	54	141,750	205,800
	--	--	--	--	Theater	12 Screens 50,000	250	3,000	5.0	15,000	
	--	--	--	--	Hotel	45,000	150	--	75	11,250	
3/4-10	--	--	--	16.7	Commercial / Retail / Restaurant	250,000	2.5	625	54	33,750	33,750

Parcel	No. of DUs	Residential Acres	Density (DU/Acre)	Non-Residential Acres	Land Use	Floor Area (SQ. FT.)	Population Density		Total Population	Wastewater Design Flows (Per Capita)		Avg Day Flow (GPD)	Total Avg Day Flow (GPD)
							Persons/ DU	Employees and Patrons / 1,000 S.F.		80	GPD/ Person		
3/4-11	90	25.1	3.6	--	MDR-2	--	3.1	Persons/ DU	279.0	80	GPD/ Person	22,320	29,070
	--	--	--	5.0	Commercial / Retail / Restaurant	50,000	2.5	Employees and Patrons / 1,000 S.F.	125	54	GPD / Person	6,750	
3/4-12	216	60.0	3.6	--	MDR-2	--	3.1	Persons/ DU	669.6	80	GPD/ Person	53,568	53,568
3/4-13	172	47.7	3.6	--	MDR-2	--	3.1	Persons/ DU	533.2	80	GPD/ Person	42,656	42,656
3/4-16	113	31.5	3.6	--	MDR-2	--	3.1	Persons/ DU	350.3	80	GPD/ Person	28,024	28,024
3/4-18	--	--	--	10.8	Commercial / Retail / Restaurant	150,000	2.5	Employees and Patrons / 1,000 S.F.	375	54	GPD / Person	20,250	20,250
3/4-19	--	--	--	26.1	Park	--	--	--	--	--	--	--	--
Other	--	--	--	25.7	Road ROW	--	--	--	--	--	--	--	--
Ray Road Totals	1,675	302.9		212.0		2,056,000			22,480			952,702	952,702
DU 3/4 Totals	2,032	402.0		212.0		2,056,000			23,587			1,041,238	1,041,238

TABLE 2

DU 3/4 WASTEWATER DESIGN CRITERIA

Project: DU 3/4 at Eastmark
Location: Mesa, Arizona
References: 2012 City of Mesa Engineering Design Standards and City of Mesa Approved Population Based Criteria

UNIT DAILY RESIDENTIAL WASTEWATER FLOWS										
LAND USE CATEGORY	LAND USE	DWELLING UNIT DENSITY		POPULATION DENSITY		WASTEWATER DESIGN FLOWS (PER CAPITA)		UNIT DAILY WASTEWATER FLOWS		NOTES
		Value	Units	Value	Units	Value	Units	Value	Units	
LDR-1	Low Density Residential (LDR 0-1)	0.5	DU / Acre	2.5	Persons/ DU	80	GPD/ Person	200	GPD/DU	Source: Dwelling unit density divisions are based on City of Mesa 2025 General Plan. Unit wastewater flows are based on the City of Mesa 2012 Engineering and Design Standards.
LDR-2	LDR 0-1 & LDR 1-2 AVG.	1	DU / Acre	2.5	Persons/ DU	80	GPD/ Person	200	GPD/DU	
LDR-3	Low Density Residential (LDR 1-2)	1.2	DU / Acre	3.0	Persons/ DU	80	GPD/ Person	240	GPD/DU	
MDR-1	Medium Density Residential (MDR 2-4)	3.0	DU / Acre	3.0	Persons/ DU	80	GPD/ Person	240	GPD/DU	
MDR-2	MDR 2-4 & MDR 4-6 AVG.	4	DU / Acre	3.1	Persons/ DU	80	GPD/ Person	248	GPD/DU	
MDR-3	Medium Density Residential (MDR 4-6)	5.0	DU / Acre	3.2	Persons/ DU	80	GPD/ Person	256	GPD/DU	
MDR-4	Medium Density Residential (MDR 6-10)	6.5	DU / Acre	2.7	Persons/ DU	80	GPD/ Person	216	GPD/DU	
HDR-1	High Density Residential (HDR 10-15)	11.0	DU / Acre	2.0	Persons/ DU	80	GPD/ Person	160	GPD/DU	
HDR-2	High Density Residential (HDR 15+)	20.0	DU / Acre	1.7	Persons/ DU	80	GPD/ Person	136	GPD/DU	
MUR-1	Mixed Use/Residential (MUR) Residential	15.0	DU / Acre	1.7	Persons/ DU	80	GPD/ Person	136	GPD/DU	

UNIT DAILY NON-RESIDENTIAL WASTEWATER FLOWS					NOTES
LAND USE	Population Density	WASTEWATER DESIGN FLOWS (PER CAPITA)			
University - Boarded Student	---	80	GPD / Person		Source: City of Mesa approved population based criteria and Arizona Administrative Code, Title 18, Chapter 9.
University - Commuter Student and Staff	---	40	GPD / Person		
Elementary School - Student and Staff	200	40	Students and Staff / Acre		
Middle School - Student and Staff	100	40	Students and Staff / Acre		
Civic / Church / Library Staff	0.4	54	Employees / 1,000 S.F.		
Civic / Church / Library Patrons	2	20	Patrons / 1,000 S.F.		
Aquatic Center	200	10	Patrons and Staff / Acre		
Commercial / Retail / Restaurant	2.5	54	Employees and Patrons / 1,000 S.F.		
Office	5	54	Employees / 1,000 S.F.		
Theater	250	5	Seats / Screen		
Hotel	---	75	GPD / Room		
Resort	---	150	GPD / Room		

OFFSITE									
LAND USE	DWELLING UNIT DENSITY		POPULATION DENSITY		WASTEWATER DESIGN FLOWS (PER CAPITA)		UNIT DAILY WASTEWATER FLOWS		NOTES
	Value	Units	Value	Units	Value	Units	Value	Units	
CC	--	--	14.0	Employees/ Acre	54	GPD/ Employee	756	GPD/ AC	Source: City of Mesa 2009 Engineering and Design Standards and the City of Mesa 2025 General Plan
O	--	--	23.0	Employees/ Acre	54	GPD/ Employee	1,242	GPD/ AC	
RC	--	--	14.0	Employees/ Acre	54	GPD/ Employee	756	GPD/ AC	
BPI	--	--	8.0	Employees/ Acre	54	GPD/ Employee	432	GPD/ AC	
NC	--	--	11.0	Employees/ Acre	54	GPD/ Employee	594	GPD/ AC	
LI	--	--	7.0	Employees/ Acre	54	GPD/ Employee	378	GPD/ AC	
MUE	--	--	15.0	Employees/ Acre	54	GPD/ Employee	810	GPD/ AC	
GI	--	--	15.0	Employees/ Acre	54	GPD/ Employee	810	GPD/ AC	
OFFUPSTREAM	1,040,576 GPD / 1470 Acres = 708 GPD/AC						708	GPD/ AC	Source: Master Wastewater Report for Ray Road Sewer Between Ellsworth and Mountain Roads, by CMX, 11/18/2005.

General	Description	Value	Units	Note(s)
	Minimum Velocity (d/D=2/3)	2	ft/sec	1
	Maximum Flow Velocity (d/D=2/3)	9	ft/sec	1
	Maximum Peak Flow Depth-to-Diameter Ratio (d/D)	0.67	-	
	Minimum Pipe Diameter	8	in	1
	Manning's "n" value	0.013	-	2
	Peaking Factor (New Pipes ADF < 1.0 MGD)	3		1
	Peaking Factor (New Pipes 1.0 < ADF < 10.0 MGD)	2.5		1
	Peaking Factor (New Pipes 10.0 < ADF < 20.0 MGD)	2.3		1
	Peaking Factor (Existing Pipes ADF < 1.0 MGD)	2.3		1
	Peaking Factor (Existing Pipes 1.0 < ADF < 10.0 MGD)	1.9		1
	Peaking Factor (Existing Pipes 10.0 < ADF < 20.0 MGD)	1.7		1

- Notes:**
 1. Per The City of Mesa 2012 Engineering & Design Standards
 2. Title 18, Chapter 9 of the Arizona Administrative Code

TABLE 3

OVERALL EASTMARK MODELED LAND USE

Project: Eastmark
Location: Mesa, Arizona

EASTMARK - PRELIMINARY RESIDENTIAL LAND USE AND DWELLING UNIT BREAKDOWN

Land Use	LDR-2	LDR-3	MDR-1	MDR-2	MDR-3	MDR-4	HDR-1	HDR-2	Residential Total	Mixed Use Residential Acres/Units	Total Residential Units
Acres	0.0	50.2	971.8	492.8	187.9	40.0	20.0	19.5	1,782.2	0.0	---
Dwelling Units	0	91	3,214	1,888	1,012	251	220	375	7,051	0	7,051

EASTMARK - WASTEWATER FLOW CALCULATIONS

Development Unit	Total Area (AC)	Residential (AC)	Total Dwelling Units	Hotel/Resort Keys ⁽¹⁾	Gross Non-Residential (AC)	Total Floor Area (sq. ft.)	Education (AC)	Church (AC)	Civic (AC)	Other (AC)	Avg. Day Wastewater Flow (GPD)	Development Unit Flow Area (AC)	Unit Daily Wastewater Flow (GPD/AC)
1	---	---	---	---	---	---	---	---	---	---	---	---	---
2	---	---	---	---	---	---	---	---	---	---	---	---	---
3S	92.3	92.3	388	0	0.0	0	0.0	0.0	0.0	0.0	96,240	92.3	1,043
3/4	614.0	402.0	2,032	150	156.2	2,056,000	60.8	5.5	---	55.8	1,041,238	614.0	1,696
5N	347.0	0.0	0	0	324.8	3,710,000	---	---	---	22.2	943,950	347.0	2,720
6N	272.5	0.0	0	0	202.2	3,337,200	0.0	0.0	0.0	3.0	628,101	272.5	2,305
6S	402.6	360.9	1,223	0	17.9	131,000	---	0.0	0.0	23.8	316,757	402.6	787
7	575.5	475.8	1,958	0	5.5	265,000	26.0	7.5	2.5	58.2	495,319	575.5	861
8	198.8	196.1	544	0	0.0	0	0.0	0.0	0.0	2.7	130,560	198.8	657
9	328.2	255.1	906	0	0.0	200,000	0.0	0.0	11.2	61.9	154,032	328.2	469
Subtotal:	2,830.9	1,782.2	7,051	150	706.6	9,699,200	86.8	13.0	13.7	227.6	3,806,197	2,830.9	---

⁽¹⁾ Anticipated number of "Keys" represents hotel and resort uses. This includes approximately 2.5 acres within DU 3/4.

TABLE 4

DU 3/4 WASTEWATER MODEL

Project: Eastmark
 Location: Mesa, Arizona
 References: City of Mesa 2012 Engineering and Design Standards
 Arizona Administrative Code, Title 18, Chapter 9

FROM NODE	TO NODE	PROPOSED /EXISTING SEWER PIPE	SEWER AREA(S) SERVED	AREA SERVED (ACRES)	UNIT FLOW (GPD/AC)	PARCEL ADF (GPD)	SEWER NODE ADF (GPD)	TOTAL ADF (GPD)	PEAKING FACTOR	PEAK WET WEATHER FLOW (GPD)
Elliot Road Onsite Wastewater Flows										
E2	E1	Existing	DU-6A	86.5	4,500.0	389,250	389,250	389,250	2.3	895,275
E4	E3	Proposed	DU-6B	50.7	4,500.0	228,150	228,150	228,150	3.0	684,450
E6	E5	Proposed	DU-5A	25.0	1,000.0	25,000	868,450	868,450	3.0	2,605,350
			DU-5B	47.4	1,000.0	47,400				
			DU-5E	176.9	4,500.0	796,050				

Total to Elliot Road Outfall				386.5		1,485,850	1,485,850	1,485,850		4,185,075
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Warner Road Onsite Wastewater Flows										
W9	W8	Proposed	6-6	17.9	777.7	13,920	43,616	43,616	3.0	130,848
			6-9, 6-17	24.9	1,192.6	29,696				
W10	W8	Proposed	6-4, 6-5	31.3	705.4	22,080	22,080	22,080	3.0	66,240
W8	W7	Proposed	6-16, 6-18	36.7	745.5	27,360	27,360	93,056	3.0	279,168
W11	W12	Proposed	DU-5C	50.5	1,000.0	50,500	75,500	75,500	3.0	226,500
			DU-5D	25.0	1,000.0	25,000				
W12	W7	Proposed	6-19 to 6-23	72.8	991.3	72,168	72,168	147,668	3.0	443,004
W7	W6	Proposed	3/4-15	16.8	885.7	14,880	66,960	307,684	3.0	923,052
			3/4-17	58.2	894.8	52,080				
W6	W1	Proposed	3/4-14	24.1	895.3	21,576	21,576	329,260	3.0	987,780
W1	WARNER ROAD SEWER	Proposed	--	--	--	--	--	329,260	3.0	987,780

Total to Warner Road Outfall				358.2		329,260	329,260	329,260		987,780
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Ray Road Onsite And Offsite Upstream Wastewater Flows										
FROM NODE	TO NODE	PROPOSED /EXISTING SEWER PIPE	SEWER AREA(S) SERVED	AREA SERVED (ACRES)	UNIT FLOW (GPD/AC)	PARCEL ADF (GPD)	SEWER NODE ADF (GPD)	TOTAL ADF (GPD)	PEAKING FACTOR	PEAK WET WEATHER FLOW (GPD)
R4	R3	Proposed	(1/3) 3/4-11				9,690	338,950	3.0	1,016,850
R5	R3	Proposed	(1/2) 3/4-16	15.7	892.5	14,012	66,358	66,358	3.0	199,074
			3/4-13	47.7	894.3	42,656				
			(1/3) 3/4-11	10.0	969.0	9,690				
R3	R2	Proposed	(1/3) 3/4-11	10.0	969.0	9,690	43,440	448,748	3.0	1,346,244
R6	R9	Proposed	3/4-10	16.7	2,021.0	33,750	20,250	20,250	3.0	60,750
R9	R8	Proposed	3/4-18	10.8	1,875.0	20,250	35,200	55,450	3.0	166,350
			3/4-19	26.1	--	--				
R8	R7	Proposed	7-23	20.0	1,760.0	35,200	446,860	502,310	3.0	1,506,930
			(1/2) 3/4-5	22.6	1,489.6	33,664				
			3/4-6	60.8	4,559.2	277,200				
			3/4-7	19.5	2,043.9	39,856				
			3/4-8	8.5	3,360.0	28,560				
			3/4-12	60.0	892.8	53,568				
R7	R2	Proposed	(1/2) 3/4-16	15.8	886.8	14,012	33,664	535,974	3.0	1,607,922
R2	R1	Proposed	(1/2) 3/4-5	22.6	1,489.6	33,664	137,200	1,121,922	2.5	2,804,805
R46	R47	Proposed	(2/3) 3/4-9	28.9	4,747.4	137,200	10,701	10,701	3.0	32,103
R47	R24	Existing	DU-6C	132.3	80.9	10,701	43,365	54,066	2.3	124,352
			6-1/2	34.0	755.3	25,680				
R24	R22	Existing	6-3	17.9	988.0	17,685	56,235	110,301	2.3	253,692
			7-8	23.5	1,307.2	30,720				
			7-9	23.1	841.6	19,440				
R12	R22	Existing	7-10	7.5	810.0	6,075	27,120	27,120	2.3	62,376
			6-7	21.0	697.1	14,640				
R23	R22	Existing	6-8	30.2	413.2	12,480	90,480	90,480	2.3	208,104
			7-6	18.5	493.0	9,120				
			7-7	26.8	877.6	23,520				
			7-11	24.4	1,416.4	34,560				
R22	R21	Existing	7-12	23.0	1,012.2	23,280	--	227,901	2.3	524,172
R11	R10	Proposed	--	--	--	--	38,640	38,640	3.0	115,920
R10	R21	Proposed	6-13 to 6-15	50.2	769.7	38,640	42,408	81,048	3.0	243,144
			6-10 to 6-12	41.9	1,012.1	42,408				

Project: Eastmark
 Location: Mesa, Arizona
 References: City of Mesa 2012 Engineering and Design Standards
 Arizona Administrative Code, Title 18, Chapter 9

FROM NODE	TO NODE	PROPOSED /EXISTING SEWER PIPE	SEWER AREA(S) SERVED	AREA SERVED (ACRES)	UNIT FLOW (GPD/AC)	PARCEL ADF (GPD)	SEWER NODE ADF (GPD)	TOTAL ADF (GPD)	PEAKING FACTOR	PEAK WET WEATHER FLOW (GPD)
R21	R20	Existing	7-13	19.2	975.0	18,720	50,220	359,169	2.3	826,089
			7-14	17.3	735.3	12,720				
			7-15	18.4	756.5	13,920				
			7-24	6.0	810.0	4,860				
R20	R19	Existing	7-16	26.4	963.6	25,440	66,984	426,153	2.3	980,152
			7-17	20.1	1,260.9	25,344				
			7-22	20.0	810.0	16,200				
			7-27	29.3	--	--				
R19	R16	Existing	7-18	29.1	701.0	20,400	93,336	519,489	2.3	1,194,825
			7-19	23.8	1,038.7	24,720				
			7-20	19.9	964.8	19,200				
			7-21	19.0	1,061.1	20,160				
			7-25	2.5	810.0	2,025				
			7-26	5.5	1,242.0	6,831				
R18	R17	Existing	OFFUPSTREAM ⁽²⁾	1,473	707.2	1,041,710	1,099,214	1,099,214	1.9	2,088,507
			7-1	15.9	1,352.5	21,504				
			7-4	32.3	624.1	20,160				
			7-5	25.1	631.1	15,840				
R17	R16	Existing	7-2	19.3	982.4	18,960	45,360	1,144,574	1.9	2,174,691
			7-3	30.7	859.9	26,400				
R16	R15	Existing	--	--	--	--	--	1,664,063	1.9	3,161,720
R15	R14	Existing	--	--	--	--	--	1,664,063	1.9	3,161,720
R40	R39	Existing	SB105	99.1	840.4	83,280	83,280	83,280	2.3	191,544
R39	R38	Existing	9-6	22.4	642.9	14,400	14,400	97,680	2.3	224,664
R38	R34	Existing	9-2	25.6	618.8	15,840	24,912	122,592	2.3	281,962
			9-3	11.2	810.0	9,072				
			9-7	60.7	595.7	36,160				
R36	R35	Existing	18% of 9-5	7.2	573.8	4,131	48,718	48,718	2.3	112,051
			33% of 9-4	16.3	517.0	8,427				
			82% of 9-5	32.6	580.0	18,909				
R37	R35	Existing	67% of 9-4	33.1	509.2	16,853	35,762	35,762	2.3	82,253
R35	R34	Existing	--	--	--	--	--	84,480	2.3	194,304
R34	R33	Existing	--	--	--	--	--	207,072	2.3	476,266
R33	R27	Existing	18% of 9-1	10.3	528.2	5,440	5,440	212,512	2.3	488,778
R32	R30	Proposed	8-6	23.6	925.4	21,840	60,480	60,480	3.0	181,440
			8-7	28.2	629.8	17,760				
			42% of 8-3	10.4	623.1	6,480				
			8-3B	6.7	322.4	2,160				
			67% of 8-4	14.1	476.6	6,720				
			26% of 8-2	7.8	707.7	5,520				
R31	R30	Proposed	58% of 8-3	14.3	621.0	8,880	38,400	38,400	3.0	115,200
			56% of 8-2	16.8	700.0	11,760				
			8-1	22.9	775.5	17,760				
R30	R28	Proposed	--	--	--	--	--	98,880	3.0	296,640
R29	R28	Proposed	8-9	21.7	707.8	15,360	31,680	31,680	3.0	95,040
			8-8	20.0	468.0	9,360				
			33% of 8-4	6.9	487.0	3,360				
			18% of 8-2	5.4	666.7	3,600				
R28	R27	Proposed	--	--	--	--	--	130,560	3.0	391,680
R27	R26	Existing	42% of 9-1	24.0	526.7	12,640	12,640	355,712	2.3	818,138
R26	R25	Existing	40% of 9-1	22.9	531.0	12,160	12,160	367,872	2.3	846,106
R25	R41	Existing	--	--	--	--	--	367,872	2.3	846,106
R42	R41	Existing	3S-2	31.4	891.7	28,000	62,240	62,240	2.3	143,152
			3S-3	30.0	1,141.3	34,240				
R45	R41	Existing	3/4-1 to 3/4-3	55.0	1,394.9	76,720	126,640	126,640	2.3	291,272
			3/4-4	34.0	1,468.2	49,920				
R41	R44	Existing	--	--	--	--	--	556,752	2.3	1,280,530
R43	R44	Existing	3S-1	30.9	1,100.3	34,000	34,000	34,000	2.3	78,200
R44	R14	Existing	--	--	--	--	--	590,752	2.3	1,358,730
R14	R13	Existing	--	--	--	--	--	2,254,815	1.9	4,284,149

Project: Eastmark
 Location: Mesa, Arizona
 References: City of Mesa 2012 Engineering and Design Standards
 Arizona Administrative Code, Title 18, Chapter 9

FROM NODE	TO NODE	PROPOSED /EXISTING SEWER PIPE	SEWER AREA(S) SERVED	AREA SERVED (ACRES)	UNIT FLOW (GPD/AC)	PARCEL ADF (GPD)	SEWER NODE ADF (GPD)	TOTAL ADF (GPD)	PEAKING FACTOR	PEAK WET WEATHER FLOW (GPD)
R13	R1	Existing	(1/3) 3/4-9	14.5	4,731.0	68,600	1,033,766	3,288,581	1.9	6,248,304
			LDR3-1	380	720.0	273,600				
			GI-1	40	810.0	32,400				
			LI-1	318	378.0	120,204				
			MUE-1	112	810.0	90,720				
			MUE-2	7	810.0	5,670				
			MDR3-1	231	1,280.0	295,680				
			MUR1-1	62	2,040.0	126,480				
	CC-1	27	756.0	20,412						
R1	RAY ROAD SEWER	Existing	(1)	--	--	--	--	4,410,503	1.9	8,379,956

Total Onsite Flow to Elliot Road Outfall	404.3	(3)	1,485,850	1,485,850	1,485,850	4,185,075
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Total Onsite Flow to Warner Road Outfall	376.7	(4)	329,260	329,260	329,260	987,780
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Total Onsite Flow to Ray Road Outfall at Ellsworth Road (Ray Sewer Basin Only)	2,049.9	(5)	1,991,087	1,991,087	1,991,087	(1), (8)	3,783,065
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Total Onsite Flow to Ray Road Outfall at Ellsworth Road (Includes Warner and Ray Road Sewer Basins)	2,426.6	(6)	2,320,347	2,320,347	2,320,347	(1), (8)	4,408,659
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Total Onsite Flow, Elliot + Warner + Ray Basins:	2,830.9		3,806,197	3,806,197	3,806,197		8,593,734
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Total to Ray Road Outfall at Ellsworth Road (Ray Sewer Basin Only)	4,799	(7)	4,081,243	4,081,243	4,081,243	(1), (8)	7,754,362
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Total to Ray Road Outfall at Ellsworth Road (Warner and Ray Sewer Basins)	5,176	(6), (7)	4,410,503	4,410,503	4,410,503	(1), (8), (9)	8,379,956
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(1) Peak Wet Weather Wastewater Flow for the proposed sewer area (3/4-6) aquatic center equals the average day flow of 34,000 GPD times a peaking factor of 3. Additionally, during the draining of the pool facility, an additional capacity of 450,000 gallons over 8 hours is required by the City of Mesa Parks and Recreation. Draining the pool facility is considered a rare occurrence, but for calculations during the draining of the pool facility see Notes 3, 4, and 5 on Table 5.

(2) Offsite wastewater flow within the Signal Butte Road sewer line includes flow from the existing residential developments to the east (Avg Day = 1,040,576 gpd) per the Master Wastewater Report for Ray Road Sewer Between Ellsworth and Mountain Roads, by CMX, 11/18/2005, and the City of Mesa Signal Butte/Elliot Water Campus (Avg Day = 1,134 gpd)

(3) The total acreage for the Elliot Road Outfall at Ellsworth Road includes the area specified as right-of-way or other within DU 6 North and DU 5 North. From the *Master Wastewater Report Update for Eastmark*, the total right-of-way/open space accounted for in these tables is approximately 17.8 acres.

(4) The total acreage for the Warner Road Outfall at Ellsworth Road includes the area specified as right-of-way or other DU 6 South and DU 5 North per the land uses shown in the *Master Wastewater Report Update for Eastmark*.

(5) The total acreage for the Ray Road Outfall at Ellsworth Road includes the area specified as right-of-way, park, or other within development units DU 7, DU 8 & 9, DU 6 South from the *Master Wastewater Report Update for Eastmark*. Additionally, Table 2 within this report shows open space acreage accounted for within the Ray Sewer Basin. The total right-of-way/open space accounted for in these development units is approximately 129.2 acres.

(6) Total acreage for the Ray Road Outfall at Ellsworth includes the acreage from the Ray and Warner Sewer Basins.

(7) Total flow to Ray Road Outfall at Ellsworth Road includes offsite sewer to the south and east of Eastmark.

(8) The existing peaking factors for existing sewer lines were utilized. Less than 1 MGD=2.3, 1 to 10 MGD=1.9.

(9) During the buildout of DU 3/4, the onsite flow from the Ray and Warner sewer basins will discharge to the existing 30-inch sewer line in Ray Road.

TABLE 5

DU 3/4 CALCULATED PIPE CAPACITIES

Project: Eastmark
 Location: Mesa, Arizona
 References: ADEQ Bulletin No. 11
 City of Mesa 2012 Engineering and Design Standards

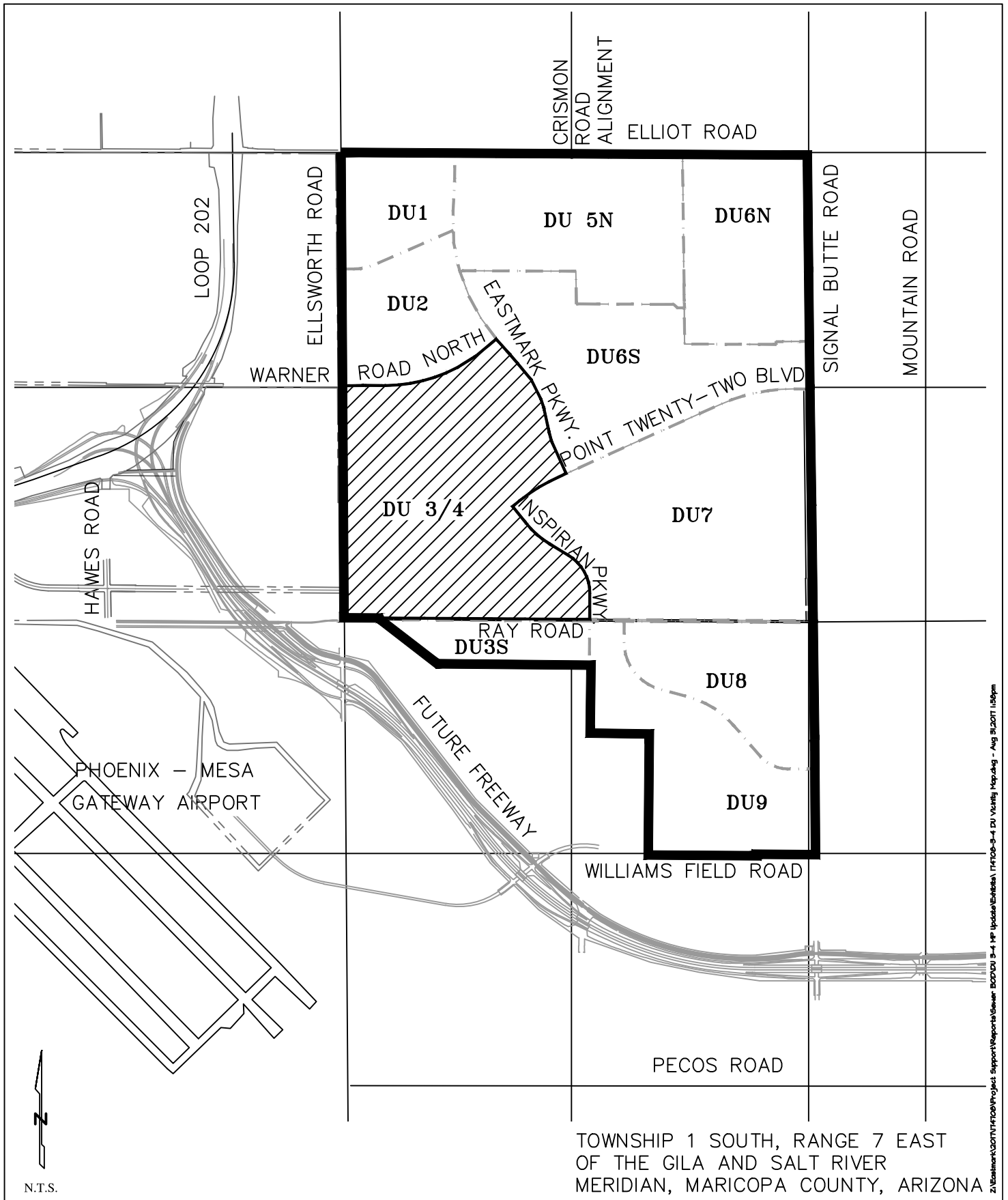
FROM NODE	TO NODE	NOTES	PIPE DIA. (INCHES)	MODELED PIPE SLOPE (FT / FT)	PIPE CAPACITY		PEAK WET WEATHER FLOW (GPD)	PEAK WET WEATHER FLOW (GPM)	d/D (WET WEATHER)	FLOW VELOCITY (FT/S) AT d/D=2/3	SURPLUS CAPACITY (WET WEATHER) (GPD)	PERCENT OF CAPACITY (WET WEATHER)
					GPD	GPM						
					PEAK FLOW RESULTS							
Elliott Road Basin Pipe Sizes												
E2	E1	(1) Existing	30	0.0010	8,248,208	5,728	895,275	622	0.22	2.9	7,352,933	10.9%
E4	E3	Proposed	12	0.0025	1,167,463	811	684,450	475	0.55	2.5	483,013	58.6%
E6	E5	Proposed	21	0.0020	4,663,391	3,238	2,605,350	1,809	0.53	3.3	2,058,041	55.9%
Warner Road Basin Pipe Sizes												
W9	W8	Proposed	8	0.0040	496,346	345	130,848	91	0.35	2.4	365,498	26.4%
W10	W8	Proposed	8	0.0040	496,346	345	66,240	46	0.25	2.4	430,106	13.3%
W8	W7	Proposed	8	0.0040	496,346	345	279,168	194	0.53	2.4	217,178	56.2%
W11	W12	Proposed	8	0.0040	496,346	345	226,500	157	0.48	2.4	269,846	45.6%
W12	W7	Proposed	12	0.0025	1,167,463	811	443,004	308	0.43	2.5	724,459	37.9%
W7	W6	Proposed	15	0.0025	2,061,994	1432	923,052	641	0.47	2.9	1,138,942	44.8%
W6	W1	Proposed	15	0.0025	2,061,994	1432	987,780	686	0.48	2.9	1,074,214	47.9%
Ray Road Basin Pipe Sizes												
R4	R3	(2) Proposed	18	0.0020	3,083,566	2,141	1,016,850	706	0.40	3.0	2,066,716	33.0%
R5	R3	Proposed	8	0.0040	496,346	345	199,074	138	0.44	2.4	297,272	40.1%
R3	R2	Proposed	21	0.0020	4,663,391	3,238	1,346,244	935	0.37	3.3	3,317,147	28.9%
R6	R9	Proposed	8	0.0040	496,346	345	80,750	42	0.24	2.4	435,596	12.2%
R9	R8	Proposed	8	0.0040	496,346	345	166,350	116	0.40	2.4	329,996	33.5%
R8	R7	(3) Proposed	18	0.0020	3,083,566	2,141	1,508,930	1,046	0.49	3.0	1,576,636	48.9%
R7	R2	(4) Proposed	18	0.0020	3,083,566	2,141	1,607,922	1,117	0.52	3.0	1,475,644	52.1%
R2	R1	(5) Proposed	24	0.0020	6,497,044	4,512	2,804,805	1,949	0.46	3.5	3,692,239	43.2%
R46	R47	Proposed	8	0.0040	496,346	345	32,103	22	0.18	2.4	464,243	6.5%
R47	R24	Proposed	8	0.0040	496,346	345	124,352	86	0.34	2.4	371,994	25.1%
R24	R22	Existing	12	0.0045	1,522,778	1,057	253,692	176	0.28	3.3	1,269,086	16.7%
R12	R22	Existing	8	0.0040	496,346	345	62,376	43	0.24	2.8	433,970	12.6%
R23	R22	Existing	8	0.0050	564,029	392	208,104	145	0.42	2.8	355,925	36.9%
R22	R21	Existing	12	0.0045	1,522,778	1,057	524,172	364	0.41	3.3	998,606	34.4%
R11	R10	Proposed	8	0.0040	496,346	345	115,920	81	0.33	2.7	380,426	23.4%
R10	R21	Proposed	12	0.0030	1,266,982	881	243,144	169	0.30	2.7	1,023,838	19.2%
R21	R20	Existing	15	0.0020	1,903,379	1,322	826,089	574	0.46	2.7	1,077,290	43.4%
R20	R19	Existing	15	0.0020	1,903,379	1,322	980,152	681	0.51	2.7	923,227	51.5%
R19	R16	Existing	15	0.0020	1,903,379	1,322	1,194,825	830	0.58	2.7	708,554	62.8%
R18	R17	Existing	18	0.0064	5,481,895	3,807	2,088,507	1,450	0.42	5.3	3,393,388	38.1%
R17	R16	Existing	18	0.0070	5,710,307	3,965	2,174,691	1,510	0.43	5.5	3,535,616	38.1%
R16	R15	Existing	21	0.0034	6,062,408	4,210	3,161,720	2,196	0.52	4.3	2,900,688	52.2%
R15	R14	Existing	21	0.0030	5,596,069	3,886	3,161,720	2,196	0.54	4.0	2,434,349	56.5%
R40	R39	Existing	10	0.0027	740,224	514	191,544	133	0.35	2.3	548,680	25.9%
R39	R38	Existing	10	0.0027	740,224	514	224,684	156	0.38	2.3	515,560	30.4%
R38	R34	Existing	12	0.0019	1,015,186	705	281,962	196	0.36	2.2	733,224	27.8%
R36	R35	Existing	8	0.0033	451,224	313	112,051	78	0.34	2.2	339,173	24.8%
R37	R35	Existing	8	0.0033	451,224	313	82,253	57	0.29	2.2	368,971	18.2%
R35	R34	Existing	10	0.0024	704,975	490	194,304	135	0.36	2.2	510,671	27.6%
R34	R33	Existing	15	0.0014	1,586,149	1,101	476,266	331	0.38	2.2	1,109,883	30.0%
R33	R27	Existing	15	0.0014	1,586,149	1,101	488,778	339	0.38	2.2	1,097,371	30.8%
R32	R30	Proposed	8	0.0038	473,785	329	181,440	126	0.43	2.3	292,345	38.3%
R31	R30	Proposed	8	0.0036	767,080	533	115,200	80	0.27	3.8	651,880	15.0%
R30	R28	Proposed	8	0.0126	879,886	611	296,840	206	0.40	4.3	583,046	33.7%
R29	R28	Proposed	8	0.0038	473,785	329	95,040	66	0.31	2.3	378,745	20.1%
R27	R27	Proposed	8	0.0043	518,907	360	391,680	272	0.65	2.5	127,227	75.5%
R27	R26	Existing	15	0.0014	1,586,149	1,101	818,138	568	0.51	2.2	768,011	51.6%
R26	R25	Existing	18	0.0011	2,284,123	1,586	846,106	588	0.42	2.2	1,438,017	37.0%
R25	R41	Existing	18	0.0011	2,284,123	1,586	846,106	588	0.42	2.2	1,438,017	37.0%
R42	R41	Existing	8	0.0040	496,346	345	143,152	99	0.37	2.4	353,194	28.8%
R45	R41	Existing	8	0.0034	451,224	313	291,272	202	0.59	2.2	159,952	64.6%
R41	R44	Existing	18	0.0011	2,284,123	1,586	1,280,530	889	0.53	2.2	1,003,593	56.1%
R43	R44	Existing	8	0.0040	496,346	345	78,200	54	0.27	2.4	418,146	15.8%
R44	R14	Existing	18	0.0050	4,796,658	3,331	1,358,730	944	0.37	4.7	3,437,928	28.3%
R14	R13	Existing	21	0.0048	7,150,533	4,966	4,284,149	2,975	0.56	5.1	2,866,384	59.9%
R13	R1	Existing	24	0.0081	13,197,121	9,165	6,248,304	4,339	0.48	7.2	6,948,817	47.3%

NOTES:

- (1) Pipe segment E2 to E1 is existing and was originally sized by First Solar's Engineer to convey the entire DU 6 North Parcels.
- (2) This pipe segment has been upsized to convey the Warner Sewer Basin flow during the first life cycle. The pipe size represents a scenario assuming no onsite flow discharging to Warner Road during the first life cycle. If Warner Road sewer has been constructed prior to the complete buildout of the first life cycle at Eastmark, then the Warner Sewer Basin could be diverted to the Warner Road sewer.
- 3) Peak Wet Weather Wastewater Flow for the proposed sewer area (3/4-6) aquatic center equals the average day flow of 34,000 gpd times a peaking factor of 3. However, during the draining of the pool facility, an additional capacity of 450,000 gallons over 8 hours is required by the City of Mesa Parks and Recreation. Therefore, all sewer lines downstream of node R8 have an additional 937.5 GPM (450,000 gallons/8 hours/ 60 minutes per hour) during the time the pool facility is drained. This additional flow increases the peak wet weather flow to 1,984 GPM for the pipe segment R8 to R7. The pipe has a maximum capacity of 2,141 GPM; thus, the pipe will be flowing at 93% full. Additionally, d/D = 0.75 during the draining of the pool.
- 4) The additional flow of 937.5 GPM during the draining of the pool facility increases the peak wet weather flow to 2,055 GPM for the pipe segment R7 to R2. The pipe has a maximum capacity of 2,141 GPM; thus, the pipe will be flowing at 96% full. Additionally, d/D = 0.78 during the draining of the pool.
- 5) The additional flow of 937.5 GPM during the draining of the pool facility increases the peak wet weather flow to 2,886 GPM for the pipe segment R2 to R1. The pipe has a maximum capacity of 4,512 GPM; thus, the pipe will be flowing at 65% full. Additionally, d/D = 0.58 during the draining of the pool.

EXHIBIT 1

VICINITY MAP



Z:\exam\K001\171700\Project_Support\Reports\Sealer_B00\DU 5-4_HF_Update\Exhibit1_171700-9-1 DU Vicinity Map.dwg - Aug 31, 2011 1:56pm

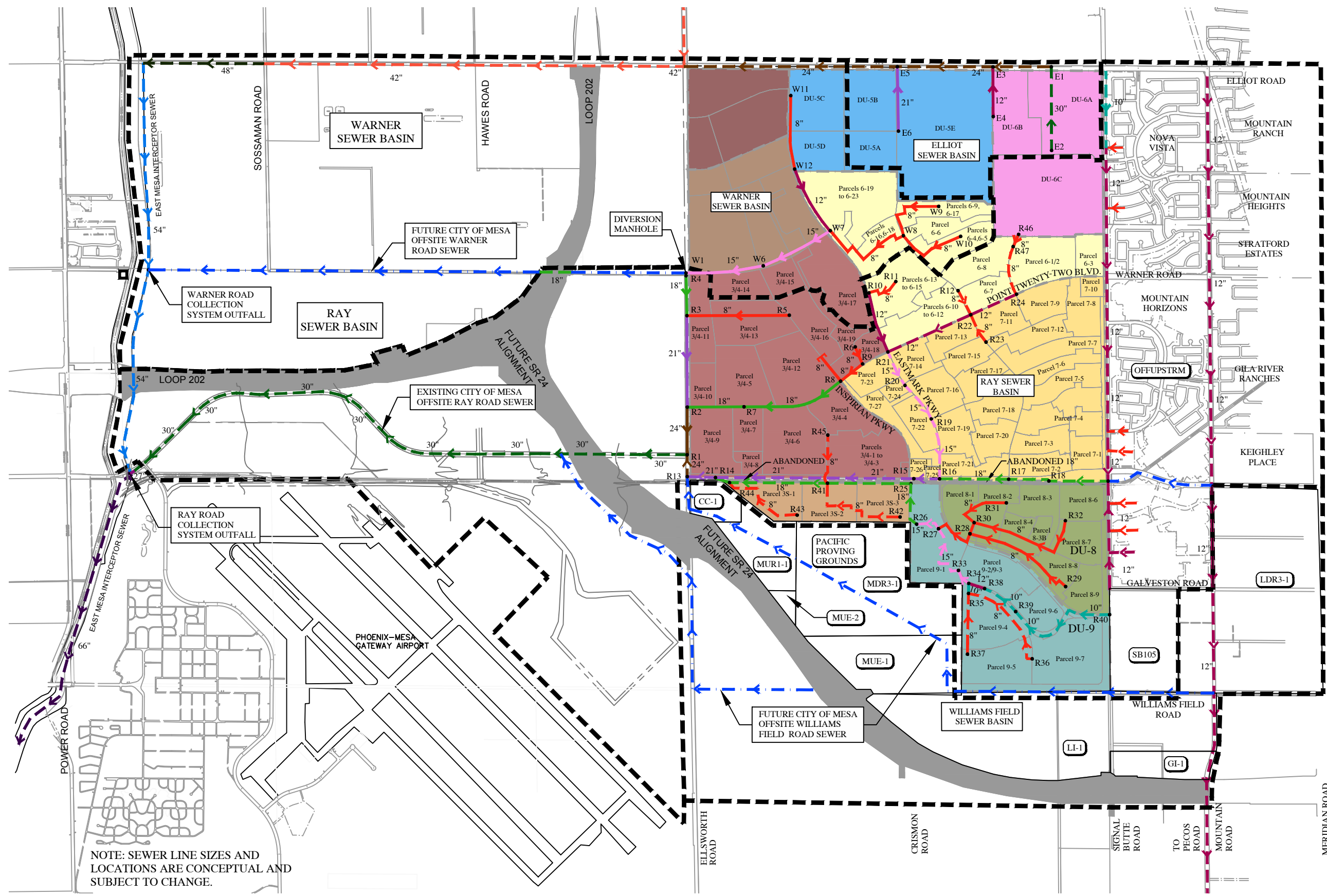
NOT FOR CONSTRUCTION
OR RECORDING

EXHIBIT 1: VICINITY MAP
EASTMARK
MESA, ARIZONA

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www.woodpatel.com
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EXHIBIT 2

DU 3/4 MASTER SEWER EXHIBIT



NOTE: SEWER LINE SIZES AND LOCATIONS ARE CONCEPTUAL AND SUBJECT TO CHANGE.

LEGEND

EXISTING SEWER	PLANNED SEWER
8"	8"
10"	10"
12"	12"
15"	15"
18"	18"
21"	21"
24"	24"
27"	27"
30"	30"
36"	36"
42"	42"
48"	48"
54"	54"
66"	66"

ON-SITE DEVELOPMENT UNITS

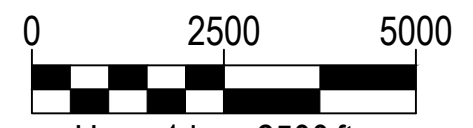
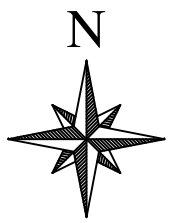
DU 1	DU 6N
DU 2	DU 6S
DU 3S	DU 7
DU 3/4	DU 8
DU 5N	DU 9

OFF-SITE LAND USE DESIGNATIONS*

- SEWER BASIN BOUNDARIES
- ONSITE SEWER SUB-BASIN BOUNDARIES
- ONSITE SEWER SUB-BASIN LABELS
- OFFSITE CONTRIBUTING SEWER BASIN
- OFFSITE SEWER SUB-BASIN BOUNDARIES
- * OFF-SITE LAND USE DESIGNATIONS ARE PER THE 2004 COM WWMP

OTHER

- FUTURE SEWER BY OTHERS
- EXISTING SEWER LIFT STATION



Horz. 1 in. = 2500 ft.

PRELIMINARY
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EXHIBIT 2 - DU 3/4 MASTER SEWER EXHIBIT
EASTMARK
MESA, ARIZONA

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