MASTER WASTEWATER REPORT
FOR
DEVELOPMENT UNIT 2
AT
EASTMARK

June 30, 2020

WP# 195036

Brookfield Residential

MASTER DEVELOPER APPROVAL

EASTMARK.

DATE 12/17/19

Christina Christian - Dev. Mngr.

Master Reports - DU2

Submitted to:

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Date Signed 06/30/2020
ARIZONA, U.S.A.

EXPIRES 06/30/21

mesa·az

DEVELOPMENT SERVICES
REVIEWED FOR CODE
COMPLIANCE
DATE 7/14/2020 RAP

WOOD/PATEL
MISSION: CLIENT SERVICE®

APPROVED

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1.0 INTRODUCTION

1.1 General Background and Project Location

The proposed Development Unit 2 (Site) is anticipated to comprise approximately 179 acres within the 3,154-acre Eastmark master planned community in the City of Mesa (City). Development Unit 2 (DU 2) is planned to include single-family residential, multi-family residential, office, and open spaces.

This Master Wastewater Report has been prepared in accordance with Wood, Patel & Associates, Inc.'s (WOODPATEL'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 Section 15, Township 1 South, Range 7 East of the Gila and Salt River Meridian. The Site is bounded by Warner Road to the south (from Ellsworth Road to Eastmark Parkway), Eastmark Parkway to the east (from Warner Road to the Mesquite Road alignment), Mesquite Road alignment to the north (from Eastmark Parkway to Ellsworth Road), and Ellsworth Road to the west (refer to Exhibit 1 – *Vicinity Map*).

1.2 Scope of Master Wastewater Report

The Master Wastewater Report for Development Unit 2 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 2 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 2 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 2), by Wood, Patel & Associates, Inc., dated June 30, 2020 , has been submitted concurrently with this report to the City of Mesa for review and approval to incorporate changes within DU 2. 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 report also 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, 2018*. 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 2. For a detailed breakdown of the DU 2 modeled land use, refer to the following:

- Table 1 – *DU 2 Modeled Land Use*
- Table 3 – *Overall Eastmark Modeled Land Use*
- Table 4 – *DU 2 Wastewater Model*
- Exhibit 2 – *DU 2 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 pre-developed Site consisted of multiple automotive test tracks and undisturbed desert, which borders the Site to the west and north, and the northern half of the eastern boundary. The south half of the eastern boundary has recently been constructed as part of DU 6 South. To the south, the Site is bounded by Warner Road and DU 3/4 which is currently under construction. The land generally slopes in a southwesterly direction, at approximately 0.5 to 1 percent. The peak elevation within the Site is approximately 1,415 feet above mean sea level (MSL), located along Inspirian Parkway, north of Ray Road. The lowest elevation within the Site is approximately 1,396 feet MSL, located at Warner Road and Ellsworth Road. 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 10-inch gravity sewer located along Signal Butte Road, between Elliot Road and Ramblewood Circle, and a 12-inch gravity sewer between Ramblewood Circle 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 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 18-inch, 21-inch, and 24-inch gravity sewer line along Ellsworth Road, from Warner Road to Ray Road.
- An existing 30-inch gravity sewer draining south to north, along the western portion of the Apple facility at the southwest corner of Signal Butte Road and Elliot Road.

- An existing 21-inch gravity sewer draining south to north, along Everton Terrance, to serve portions of DU 5 North.
- 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 portions of 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.
- An existing 18-inch gravity sewer along Point Twenty-Two Boulevard, draining from east to west, from Inspirian Parkway to Ellsworth Road.
- 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.
- Existing 8-inch sewer lines through Development Unit 6 South.
- Existing 8-inch sewer lines within DU 3S, DU 7, and DU 9.
- 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 within DU 3/4.
- Existing 12-inch and 18-inch sewer line draining west along Point Twenty-Two Boulevard, from Inspirian Parkway to Ellsworth Road.
- Existing 12-inch sewer line draining north to the south within Eastmark Parkway, from Sonic Avenue to Point Twenty-Two Boulevard.
- An existing 15-inch sewer line within Warner Road draining east to west from Eastmark Parkway to Ellsworth Road.
- An existing 12-inch sewer line within Eastmark Parkway draining north to south from the DU 6 South / DU 5 North boundary to Warner Road.

2.3 Existing Onsite Wastewater Infrastructure

There are no known sewer facilities within the Site. If sewer facilities are discovered, they will be removed by the developer, where applicable, with construction of DU 2.

3.0 WASTEWATER SYSTEM DESIGN

3.1 Design Criteria

Wastewater design flows and pipe-sizing criteria utilized in this DU 2 Master Wastewater Report are based on WOODPATEL's understanding of the following:

- The *Master Wastewater Report for Eastmark.*
- Applicable wastewater system design criteria listed in the *2019 City of Mesa Engineering Design Standards*, along with City accepted population based criteria per Table 2 – *DU 2 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 North.
- 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 2. 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 2 based on the design criteria listed above and planned land uses. Projected full build-out Average-Day Wastewater Flows for DU 2 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 North, are summarized as follows, in millions of gallons per day (MGD):

	Sewer Basins			
	Elliot Road Outfall (MGD)	Warner Road Outfall (MGD)	Ray Road Outfall (MGD)	**Total Average Day Flow (MGD):**
DU 2 Flows	0.000	0.221	0.000	0.221
Offsite Eastmark Flows (MGD)	1.553	0.364	1.781	3.698
Offsite Upstream of Eastmark Flows (MGD)	-	-	2.091	2.091
Total Average Day Flow (MGD):	**1.553**	**0.585**	**3.872**	**6.010**

Sewer pipe capacities are based upon conveying the flow at two-thirds of the pipe capacity. It is WOODPATEL's understanding that wet-weather infiltration is accounted for within the City of Mesa static peaking factors listed in the *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 2 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 27.9 percent of the full-flow capacity, with a d/D = 0.36. When the pool flow of 938 gpm is added to the peak wet-weather flow, the total sewer flow equals 1,536 gpm, which is 72 percent of the maximum capacity of the 18-inch sewer, and has a d/D equal to 0.63. 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, Warner Road, and Elliot Road sewer lines. The controlling section of the offsite Ray Road sewer is a 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 2 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. The existing 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 has been recently constructed to provide operational flexibility prior to the construction of the Warner Road offsite sewer.

It is WOODPATEL'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. This DU Master plan incorporates previously approved DU master plans for other development units that have either been partially or fully constructed.

The Elliot Road Sewer Basin currently consists of:

- 204.5 acres within DU 6 North
- 264.1 acres within DU 5 North
- Additional offsite areas from Signal Butte Road to the EMI at Elliot and Ellsworth.

The Warner Road Sewer Basin currently consists of:

- 82.9 acres within DU 5 North
- 89.2 acres within DU 3/4
- 194.7 acres within DU 6 South

The Warner sewer will also receive onsite flows from DU 1 when it is planned, designed and constructed. Flow from the Warner Sewer Basin will be diverted to the Ray Road Sewer Basin until the offsite Warner Road sewer is constructed downstream of Eastmark.

The Ray Road Sewer Basin has been entirely master planned with this report and consists of:

- 68.0 acres within DU 6 North
- 575.5 acres within DU 7
- 527 acres within DU 8 & 9
- 92.3 acres within DU 3 South
- 524.8 acres within DU 3/4
- 207.9 acres within DU 6 South

Currently, the offsite Elliot Road and Ray Road sewers have been constructed downstream of Eastmark, and the Warner Road and portions of the 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 existing and future flows from Parcels 6A, 6B, and 6C 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. An existing diversion manhole allows the City 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 2. The onsite collection system includes planned sewer mains with diameters ranging from internal 8-inch lines (not shown on Exhibit 2) to 18-inch. Refer to Tables 4 and 5 for wastewater models and calculated pipe capacities, and Exhibit 2 for the planned DU 2 wastewater infrastructure.

5.0 CONCLUSIONS

The Master Wastewater Report for Development Unit 2 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 2 is anticipated to be 179 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 2.

3. Wastewater design criteria are based on WOODPATEL's understanding of the *2019 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 2 is 0.221 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. WOODPATEL'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 2 MODELED LAND USE

Project: DU 2 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													
DU-2A	211.0	17.0	12.41	--	HDR-1	--	2	Persons/ DU	422	80	GPD/ Person	33,760	33,760
	--	--	--	2.8	ROW/Open Space	--	--	--	--	--	--	--	
DU-2B	49	7.0	7.00	--	MDR-4	--	2.7	Persons/ DU	132	80	GPD/ Person	10,560	54,254
	49	7.3	6.71	--	MDR-4	--	2.7	Persons/ DU	132	80	GPD/ Person	10,560	
	--	--	--	5.0	Commercial	50,000	--	--	--	0.135	GPD / SF	6,750	
	114	5.7	20.0	--	HDR-2	--	1.7	Persons/ DU	194	136	GPD/DU	26,384	
	--	--	--	4.6	ROW/Open Space	--	--	--	--	--	--	--	
DU-2C	83	12.3	6.75	--	MDR-4	--	2.7	Persons/ DU	224	80	GPD/ Person	17,920	82,960
	82	16.8	4.88	--	MDR-3	--	3.2	Persons/ DU	262	80	GPD/ Person	20,960	
	89	24.2	3.68	--	MDR-1	--	3	Persons/ DU	267	80	GPD/ Person	21,360	
	105	17.0	6.18	--	MDR-4	--	2.7	Persons/ DU	284	80	GPD/ Person	22,720	
	--	--	--	4.1	ROW/Open Space	--	--	--	--	--	--	--	
DU-2D	--	--	--	9.1	Park	--	--	--	--	--	--	--	--
DU-2E	36	11.5	3.13	--	MDR-1	--	3	Persons/ DU	108	80	GPD/ Person	8,640	50,120
	43	9.5	4.53	--	MDR-3	--	3.2	Persons/ DU	138	80	GPD/ Person	11,040	
	66	10.2	6.47	--	MDR-4	--	2.7	Persons/ DU	178	80	GPD/ Person	14,240	
	--	--	--	7.1	Commercial	120,000	--	--	--	0.135	GPD / SF	16,200	
	--	--	--	7.3	ROW/Open Space	--	--	--	--	--	--	--	
DU 2 Totals	**927**	**138.5**		**40.0**		**170,000**			**2,341**			**221,094**	**221,094**

TABLE 2

DU 2 WASTEWATER DESIGN CRITERIA

Project: DU 2 at Eastmark
Location: Mesa, Arizona
References: 2019 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
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 2019 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

LAND USE	Population Density		WASTEWATER DESIGN FLOWS (PER CAPITA)		NOTES
University - Boarded Student	---	---	80	GPD / Person	Source: City of Mesa approved polulation based criteria and Arizona Administrative Code, Title 18, Chapter 9.
University - Commuter Student and Staff	---	---	40	GPD / Person	
Elementary School - Student and Staff	200	Students and Staff / Acre	40	GPD / Person	
Middle School - Student and Staff	100	Students and Staff / Acre	40	GPD / Person	
Civic / Church / Library Staff	0.5	Employees / 1,000 S.F.	80	GPD / Person	
Civic / Church / Library Patrons	3	Patrons / 1,000 S.F.	20	GPD / Person	
Aquatic Center	200	Patrons and Staff / Acre	10	GPD / Person	
Commercial / Retail	2.5 Employees & Patrons/1,000 SF * 54 GPD/Person		0.135	GPD / SF	
Restaurant	2.5 Employees & Patrons/1,000 SF * 54 GPD/Person		0.135	GPD / SF	
Office	5 Employees/1,000 SF * 54 GPD/Person		0.27	GPD / SF	
Theater	250	Seats / Screen	5	GPD / Seat	
Hotel	---	---	75	GPD / Room	
Resort	---	---	380	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 approved population base 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.

Description	Value	Units	Note(s)
General			
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 2019 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**
Acreage	0.0	50.2	1,066.8	301.1	314.0	93.8	41.7	64.3	**1,931.9**	0.0	**---**
Dwelling Units	0	91	3,556	1,226	1,648	603	467	1,522	**9,113**	0	**9,113**

EASTMARK - WASTEWATER FLOW CALCULATIONS

Development Unit	Total Area (AC)	Residential (AC)	Total Dwelling Units	Hotel/ Resort Keys[1]	Gross Non-Residential[2] (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	--	0.0	0	--	--	--	0.0	0.0	0.0	--	--	--	--
2	178.5	138.5	927	0	12.1	170,000	0.0	0.0	0.0	27.9	221,094	178.5	1,239
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	421.7	3,252	234	55.4	1,092,202	60.8	5.5	--	70.7	894,225	614.0	1,456
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	269.5	3,337,200	0.0	0.0	0.0	3.0	695,425	272.5	2,552
6S	402.6	357.9	1,223	0	17.9	131,000	--	0.0	0.0	26.8	316,757	402.6	787
7	575.5	470.3	1,873	0	2.0	265,000	13.0	7.5	1.7	81.0	467,416	575.5	812
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:	**3,009.4**	**1,931.9**	**9,113**	**234**	**681.7**	**8,905,402**	**73.8**	**13.0**	**12.9**	**296.2**	**3,919,699**	**3,009.4**	**---**

[1] Anticipated number of "Keys" represents hotel and resort uses. This includes approximately 6.5 acres within DU 3/4.

[2] Non-residential wastewater flows are calculated based on actual land use where detailed information is known and estimated square feet on the remainder.

TABLE 4

DU 2 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	295,450	295,450	3.0	886,350
			DU-6C	67.3	1,000.0	67,300				
E6	E5	Existing	DU-5A	31.1	803.9	25,000	868,450	868,450	2.3	1,997,435
			DU-5B	47.4	1,000.0	47,400				
			DU-5E	185.6	4,289.1	796,050				
Total to Elliot Road Outfall				**468.6**		**1,553,150**	**1,553,150**	**1,553,150**		**3,779,060**
Warner Road Onsite Wastewater Flows										
W5	W2	Proposed	DU-2A	19.8	--	33,760	66,894	66,894	3.0	200,682
			60% DU-2B[11]	10.7	--	33,134				
W2	W14	Proposed	--	--	--	--	--	66,894	3.0	200,682
W13	W14	Proposed	40% DU-2B[11]	18.9	--	21,120	50,112	50,112	3.0	150,336
			35% DU-2C	21.3	--	28,992				
W14	W16	Proposed	--	--	--	--	--	117,006	3.0	351,018
W15	W16	Proposed	65% DU-2C	53.1	--	53,968	104,088	104,088	3.0	312,264
			DU-2E	45.6	--	50,120				
W16	W1	Proposed	--	--	--	--	--	221,094	3.0	663,282
W9	W8	Existing	6-6	19.3	721.2	13,920	43,616	43,616	2.3	100,317
			6-9, 6-17	25.4	1,169.1	29,696				
W10	W8	Existing	6-4, 6-5	36.5	604.9	22,080	22,080	22,080	2.3	50,784
W8	W7	Existing	6-16, 6-18	36.7	745.5	27,360	27,360	93,056	2.3	214,029
W11	W12	Proposed	DU-5C	50.5	1,000.0	50,500	75,500	75,500	3.0	226,500
			DU-5D	32.4	771.6	25,000				
W12	W7	Existing	6-19 to 6-23	76.8	939.7	72,168	72,168	147,668	2.3	339,636
W7	W6	Existing	DU-2D	9.1	--	--	69,192	309,916	2.3	712,807
			3/4-8 to 3/4-12	58.3	1,029.4	60,016				
			3/4-13 (84%)	11.1	826.7	9,176				
W6	W1	Existing	3/4-34	19.8	2,742.4	54,300	54,300	364,216	2.3	837,697
W1	WARNER ROAD SEWER	Proposed	--	--	--	--	--	585,310	3.0	1,755,930
Total to Warner Road Outfall at Ellsworth Road				**545.3**		**585,310**	**585,310**	**585,310**		**1,755,930**
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	R3A	(10)Existing	--	--	--	--	--	585,310	2.3	1,346,213
R3A	R3B	Existing	(1/6) 3/4-28 to 3/4-30	9.35	1597.1	14,933	14,933	600,243	2.3	1,380,559
R5	R3B	Proposed	(5/6) 3/4-28 to 3/4-30	46.75	1597.2	74,667	74,667	74,667	3.0	224,001
R3B	R2	Existing	--	--	--	--	--	674,910	2.3	1,552,293
R6	R9	Proposed	3/4-18	10.2	1,898.0	19,360	19,360	19,360	3.0	58,080
R9	R8	Existing	--	--	--	--	0	19,360	2.3	44,528
R8	R7	Existing	3/4-6	60.8	2,065.8	125,600	125,600	144,960	2.3	333,408
R50	R7	Proposed	3/4-14 to 3/4-17	46.9	1,097.1	51,456	105,272	105,272	3.0	315,816
			3/4-13 (16%)	2.3	754.8	1,736				
			3/4-23 to 3/4-27	62.3	836.0	52,080				
			3/4-19 to 3/4-22 & Park	66.7	-	-				
R7	R2	Existing	3/4-7	5.5	1,228.0	6,754	124,240	374,472	2.3	861,286
			3/4-9A	7.19	3,030.3	21,788				
			3/4-9B	7.37	2,491.2	18,360				
			3/4-10	18.7	1,082.9	20,250				
			3/4-31 to 3/4-33	41.9	1,362.5	57,088				
R2	R1	Existing	3/4-9C	2.22	456.3	1,013	1,013	1,050,395	1.9	1,995,751
R48	R49	Proposed	3/4-9D	4.35	4,201.6	18,277	104,152	104,152	2.5	260,380
			3/4-9G	1.83	765.6	1,401				
			3/4-9H	5.0	4,308.0	21,540				
			3/4-9J	10.68	4,470.4	47,744				
			3/4-9K	3.10	4,900.0	15,190				

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)
R49	R1	Proposed	3/4-9E	2.1	4,071.4	8,550	11,360	115,512	2.5	288,780
			(50%) 3/4-9F	3.0	936.7	2,810				
R46	R47	Proposed	DU-6D	65.0	165.0	10,725	10,725	10,725	3.0	32,175
R47	R24	Existing	6-1/2	45.4	565.6	25,680	43,365	54,090	2.3	124,407
			6-3	18.4	961.1	17,685				
R24	R22	Existing	7-8	23.5	1,307.2	30,720	56,235	110,325	2.3	253,748
			7-9	23.1	841.6	19,440				
			7-10	7.5	810.0	6,075				
R12	R22	Existing	6-7	21.0	697.1	14,640	27,120	27,120	2.3	62,376
			6-8	31.0	402.6	12,480				
R23	R22	Existing	7-6	18.5	493.0	9,120	90,480	90,480	2.3	208,104
			7-7	26.8	877.6	23,520				
			7-11	24.4	1,416.4	34,560				
			7-12	23.0	1,012.2	23,280				
R22	R21	Existing	--	--	--	--	--	227,925	2.3	524,228
R11	R10	Existing	6-13 to 6-15	50.2	769.7	38,640	38,640	38,640	2.3	88,872
R10	R21	Existing	6-10 to 6-12	41.9	1,012.1	42,408	42,408	81,048	2.3	186,410
R21	R20	Existing	7-13	19.2	975.0	18,720	73,440	382,413	2.3	879,550
			7-14	17.3	735.3	12,720				
			7-15	18.4	756.5	13,920				
			7-53	14.5	1,489.7	21,600				
			7-51	8.0	810.0	6,480				
R20	R19	Existing	7-16	26.4	963.6	25,440	56,056	438,469	2.3	1,008,479
			7-17	20.1	1,260.9	25,344				
			7-50	5.0	810.0	4,050				
			7-52,7-54	48.0	25	1,222				
			Other	33.0	-	-				
R19	R16	Existing	7-18	29.1	701.0	20,400	85,857	524,326	2.3	1,205,950
			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	1.7	810.0	1,377				
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	7-26	2.0	1,242.0	2,484	2,484	1,671,384	1.9	3,175,630
R15	R14	Existing	3/4-8B	8.5	3,454.1	29,360	60,750	1,732,134	1.9	3,291,055
			3/4-9L	6.13	5,120.7	31,390				
R40	R39	Existing	SB105	99.1	853.9	84,620	84,620	84,620	2.3	194,626
R39	R38	Existing	9-6	22.4	642.9	14,400	14,400	99,020	2.3	227,746
R38	R34	Existing	9-2	25.6	618.8	15,840	24,912	123,932	2.3	285,044
			9-3	11.2	810.0	9,072				
R36	R35	Existing	9-7	60.7	595.7	36,160	48,718	48,718	2.3	112,051
			Other	61.9	-	-				
			18% of 9-5	7.2	573.8	4,131				
			33% of 9-4	16.3	517.0	8,427				
R37	R35	Existing	82% of 9-5	32.6	580.0	18,909	35,762	35,762	2.3	82,253
			67% of 9-4	33.1	509.2	16,853				
R35	R34	Existing	---	--	--	--	--	84,480	2.3	194,304
R34	R33	Existing	---	--	--	--	--	208,412	2.3	479,348
R33	R27	Existing	18% of 9-1	10.3	528.2	5,440	5,440	213,852	2.3	491,860
R32	R30	Existing	8-6	23.6	925.4	21,840	60,480	60,480	2.3	139,104
			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	Existing	58% of 8-3	14.3	621.0	8,880	38,400	38,400	2.3	88,320
			56% of 8-2	16.8	700.0	11,760				
			8-1	22.9	775.5	17,760				
R30	R28	Existing	---	--	--	--	--	98,880	2.3	227,424
R29	R28	Existing	8-9	21.7	707.8	15,360	31,680	31,680	2.3	72,864
			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	Existing	---	--	--	--	--	130,560	2.3	300,288
R27	R26	Existing	42% of 9-1	24.0	526.7	12,640	12,640	357,052	2.3	821,220
R26	R25	Existing	40% of 9-1	22.9	531.0	12,160	12,160	369,212	2.3	849,188
R25	R41	Existing	---	--	--	--	--	369,212	2.3	849,188

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)
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	1,393.7	76,656	126,576	126,576	2.3	291,125
			3/4-4	34.0	1,468.2	49,920				
R41	R44	Existing	--	--	--	--	--	558,028	2.3	1,283,464
R43	R44	Existing	3S-1	30.9	1,100.3	34,000	34,000	34,000	2.3	78,200
R44	R14	Existing	--	--	--	--	--	592,028	2.3	1,361,664
R14	R13	Existing	50% 3/4-9F	3.0	937	2,810	2,810	2,326,972	1.9	4,421,247
R13	R1	Existing	LDR3-1	380	720.0	273,600	965,166	3,292,138	1.9	6,255,062
			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)	--	--	--	--	4,458,045	1.9	8,470,286

Total Onsite Flow to Elliot Road Outfall	**471.6**	(3)	**1,553,150**	**1,553,150**	**1,553,150**		**3,779,060**
Total Onsite Flow to Warner Road Outfall at Ellsworth Road	**545.3**	(4)	**585,310**	**585,310**	**585,310**		**1,755,930**
Total Onsite Flow to Ray Road Outfall at Ellsworth Road (Ray Sewer Basin Only)	**1,992.6**	(5)	**1,781,239**	**1,781,239**	**1,781,239**	(1), (8)	**3,384,354**
Total Onsite Flow to Ray Road Outfall at Ellsworth Road (Includes Warner and Ray Road Sewer Basins)	**2,537.9**	(6)	**2,366,549**	**2,366,549**	**2,366,549**	(1), (8)	**4,496,443**
Total Onsite Flow, Elliot + Warner + Ray Basins:	**3,009.5**		**3,919,699**	**3,919,699**	**3,919,699**		**8,275,503**
Total to Ray Road Outfall at Ellsworth Road (Ray Sewer Basin Only)	**4,742**	(7)	**3,872,735**	**3,872,735**	**3,872,735**	(1), (8)	**7,358,197**
Total to Ray Road Outfall at Ellsworth Road (Warner and Ray Sewer Basins)	**5,287**	(6), (7)	**4,458,045**	**4,458,045**	**4,458,045**	(1), (8), (9)	**8,470,286**

(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 occurance, but for calculations during the draining of the pool facility see Notes 3, 4, and 5 on Table 19.

(2) Offsite wastewater flow within the Signal Butte Road sewer line includes flow from 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 as shown on Tables 3 & refer to Overall Eastmark Wastewater Report. 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 as shown on Tables 3 & refer to Overall Eastmark Wastewater Report dated November 29,2019.

(5) The total acreage for the Ray Road Outfall at Ellsworth Road includes the area specified as right-of-way, park, or other as shown on Tables 1.

(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 initial buildout of Eastmark, the onsite flow from the Ray and Warner sewer basins will discharge to the existing 30-inch sewer line in Ray Road.

(10) The 18" and 21" sewer lines along Ellsworth have been constructed, so the existing peaking factors were utilized for these pipe segments.

(11) The wastewater flow generated from the commercial and multi-family residential land uses within DU-2B will discharge to the proposed sewer line along Mesquite. The single family residential land uses will discharge to through DU-2 (node W13 to W14) before discharging to Ellsworth Road.

TABLE 5

DU 2 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 FLOW RESULTS					
					GPD	GPM	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)
Elliot 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	886,350	616	0.66	2.5	281,113	75.9%
E6	E5	Existing	21	0.0020	4,663,391	3,238	1,997,435	1,387	0.45	3.3	2,665,956	42.8%
Warner Road Basin Pipe Sizes												
W5	W2	Proposed	12	0.0025	1,167,463	811	200,682	139	0.28	2.5	966,781	17.2%
W2	W14	Proposed	18	0.0020	3,083,566	2141	200,682	139	0.18	3.0	2,882,884	6.5%
W13	W14	Proposed	8	0.0035	473,785	329	150,336	104	0.38	2.3	323,449	31.7%
W14	W16	Proposed	18	0.0020	3,083,566	2141	351,018	244	0.23	3.0	2,732,548	11.4%
W15	W16	Proposed	8	0.0035	473,785	329	312,264	217	0.60	2.3	161,521	65.9%
W16	W1	Proposed	18	0.0020	3,083,566	2141	663,282	461	0.31	3.0	2,420,284	21.5%
W9	W8	Existing	8	0.0039	496,346	345	100,317	70	0.31	2.4	396,029	20.2%
W10	W8	Existing	8	0.0040	496,346	345	50,784	35	0.22	2.4	445,562	10.2%
W8	W7	Existing	8	0.0040	496,346	345	214,029	149	0.46	2.4	282,317	43.1%
W11	W12	Proposed	8	0.0040	496,346	345	226,500	157	0.48	2.4	269,846	45.6%
W12	W7	Existing	12	0.0030	1,268,982	881	339,636	236	0.35	2.8	929,346	26.8%
W7	W6	Existing	15	0.0025	2,061,994	1432	712,807	495	0.40	2.9	1,349,187	34.6%
W6	W1	Existing	15	0.0025	2,061,994	1432	837,697	582	0.44	2.9	1,224,297	40.6%
Ray Road Basin Pipe Sizes												
R4	R3A	(2) Existing	18	0.0025	3,426,184	2,379	1,346,213	935	0.44	3.3	2,079,971	39.3%
R3A	R3B	Existing	21	0.0020	4,663,391	3,238	1,380,559	959	0.37	3.3	3,282,832	29.6%
R5	R3B	Existing	8	0.0040	496,346	345	224,001	156	0.48	2.4	272,345	45.1%
R3B	R2	Existing	21	0.0020	4,663,391	3,238	1,552,293	1,078	0.40	3.3	3,111,098	33.3%
R6	R9	Proposed	8	0.0040	496,346	345	58,080	40	0.23	2.4	438,266	11.7%
R9	R8	Existing	8	0.0040	496,346	345	44,528	31	0.20	2.4	451,818	9.0%
R8	R7	(3) Existing	18	0.0020	3,083,566	2,141	333,408	232	0.22	3.0	2,750,158	10.8%
R50	R7	Proposed	8	0.0040	496,346	345	315,816	219	0.58	2.4	180,530	63.6%
R7	R2	(4) Existing	18	0.0020	3,083,566	2,141	861,286	598	0.36	3.0	2,222,280	27.9%
R2	R1	(5) Existing	24	0.0018	6,294,012	4,371	1,995,751	1,386	0.39	3.4	4,298,261	31.7%
R48	R49	Proposed	8	0.0040	775,473	539	260,380	181	0.40	2.4	515,093	33.6%
R49	R1	Proposed	10	0.0030	496,346	345	288,780	201	0.54	2.4	207,566	58.2%
R46	R47	Proposed	8	0.0040	496,346	345	32,175	22	0.18	2.4	464,171	6.5%
R47	R24	Existing	8	0.0040	496,346	345	124,407	86	0.34	2.4	371,939	25.1%
R24	R22	Existing	12	0.0045	1,522,778	1,057	253,748	176	0.28	3.3	1,269,030	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	524,228	364	0.41	3.3	998,550	34.4%
R11	R10	Existing	8	0.0040	496,346	345	88,872	62	0.28	2.7	407,474	17.9%
R10	R21	Existing	12	0.0030	1,268,982	881	186,410	129	0.26	2.7	1,082,572	14.7%
R21	R20	Existing	15	0.0020	1,903,379	1,322	879,550	611	0.48	2.7	1,023,829	46.2%
R20	R19	Existing	15	0.0020	1,903,379	1,322	1,008,479	700	0.52	2.7	894,900	53.0%
R19	R16	Existing	15	0.0020	1,903,379	1,322	1,205,950	837	0.58	2.7	697,429	63.4%
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	3,175,630	2,205	0.52	4.3	2,886,778	52.4%
R15	R14	Existing	21	0.0030	5,596,069	3,886	3,291,055	2,285	0.55	4.0	2,305,014	58.8%
R40	R39	Existing	10	0.0027	740,224	514	194,626	135	0.35	2.3	545,598	26.3%
R39	R38	Existing	10	0.0027	740,224	514	227,746	158	0.38	2.3	512,478	30.8%
R38	R34	Existing	12	0.0019	1,015,186	705	285,044	198	0.36	2.2	730,142	28.1%
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	479,348	333	0.38	2.2	1,106,801	30.2%
R33	R27	Existing	15	0.0014	1,586,149	1,101	491,860	342	0.38	2.2	1,094,289	31.0%
R32	R30	Existing	8	0.0038	473,785	329	139,104	97	0.38	2.3	334,681	29.4%
R31	R30	Existing	8	0.0098	767,080	533	88,320	61	0.23	3.8	678,760	11.5%
R30	R28	Existing	8	0.0126	879,886	611	227,424	158	0.35	4.3	652,462	25.8%
R29	R28	Existing	8	0.0038	473,785	329	72,864	51	0.27	2.3	400,921	15.4%
R28	R27	Existing	8	0.0043	518,907	360	300,288	209	0.54	2.5	218,619	57.9%
R27	R26	Existing	15	0.0014	1,586,149	1,101	821,220	570	0.51	2.2	764,929	51.8%
R26	R25	Existing	18	0.0011	2,284,123	1,586	849,188	590	0.42	2.2	1,434,935	37.2%
R25	R41	Existing	18	0.0011	2,284,123	1,586	849,188	590	0.42	2.2	1,434,935	37.2%
R42	R41	Existing	8	0.0040	496,346	345	143,152	99	0.37	2.4	353,194	28.8%
R45	R41	Existing	8	0.0040	496,346	345	291,125	202	0.55	2.4	205,221	58.7%
R41	R44	Existing	18	0.0011	2,284,123	1,586	1,283,464	891	0.53	2.2	1,000,659	56.2%
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	1,361,664	946	0.37	4.7	3,434,994	28.4%
R14	R13	Existing	21	0.0048	7,150,533	4,966	4,421,247	3,070	0.57	5.1	2,729,286	61.8%
R13	R1	Existing	24	0.0081	13,197,121	9,165	6,255,062	4,344	0.48	7.2	6,942,059	47.4%

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 prior to Warner Sewer Construction. The pipe size represents a scenario assuming no onsite flow discharging to Warner Road during the full buildout. If Warner Road sewer has been constructed prior to the complete buildout, then the Warner Sewer Basin could be diverted to the Warner Road sewer.

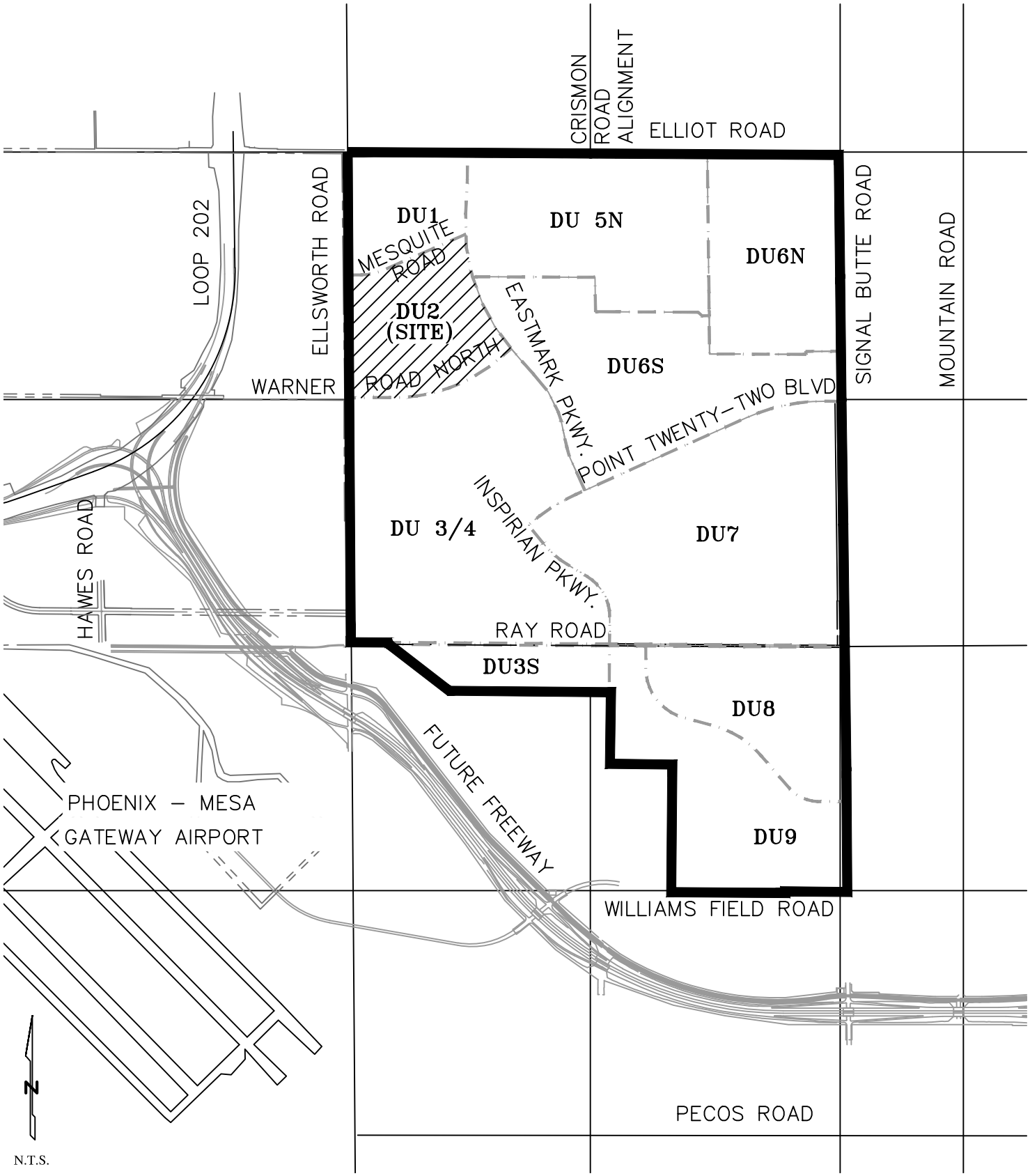
3) Peak Wet Weather Wastewater Flow for the proposed sewer area (3/4-6) aquatic center equals the average day flow of 34,000 gpd times a peaking factor of 3. However, during the draining of the pool facility, an additional capacity of 450,000 gallons over 8 hours is required by the City of Mesa Parks 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 1,170 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 55% full.

4) The additional flow of 937.5 GPM during the draining of the pool facility increases the peak wet weather flow to 1,536 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 72% full.

5) The additional flow of 937.5 GPM during the draining of the pool facility increases the peak wet weather flow to 2,359 GPM for the pipe segment R2 to R1. The pipe has a maximum capacity of 4,371 GPM; thus, the pipe will be flowing at 54% full.

EXHIBIT 1

VICINITY MAP



TOWNSHIP 1 SOUTH, RANGE 7 EAST
OF THE GILA AND SALT RIVER
MERIDIAN, MARICOPA COUNTY, ARIZONA

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NOT FOR CONSTRUCTION
OR RECORDING

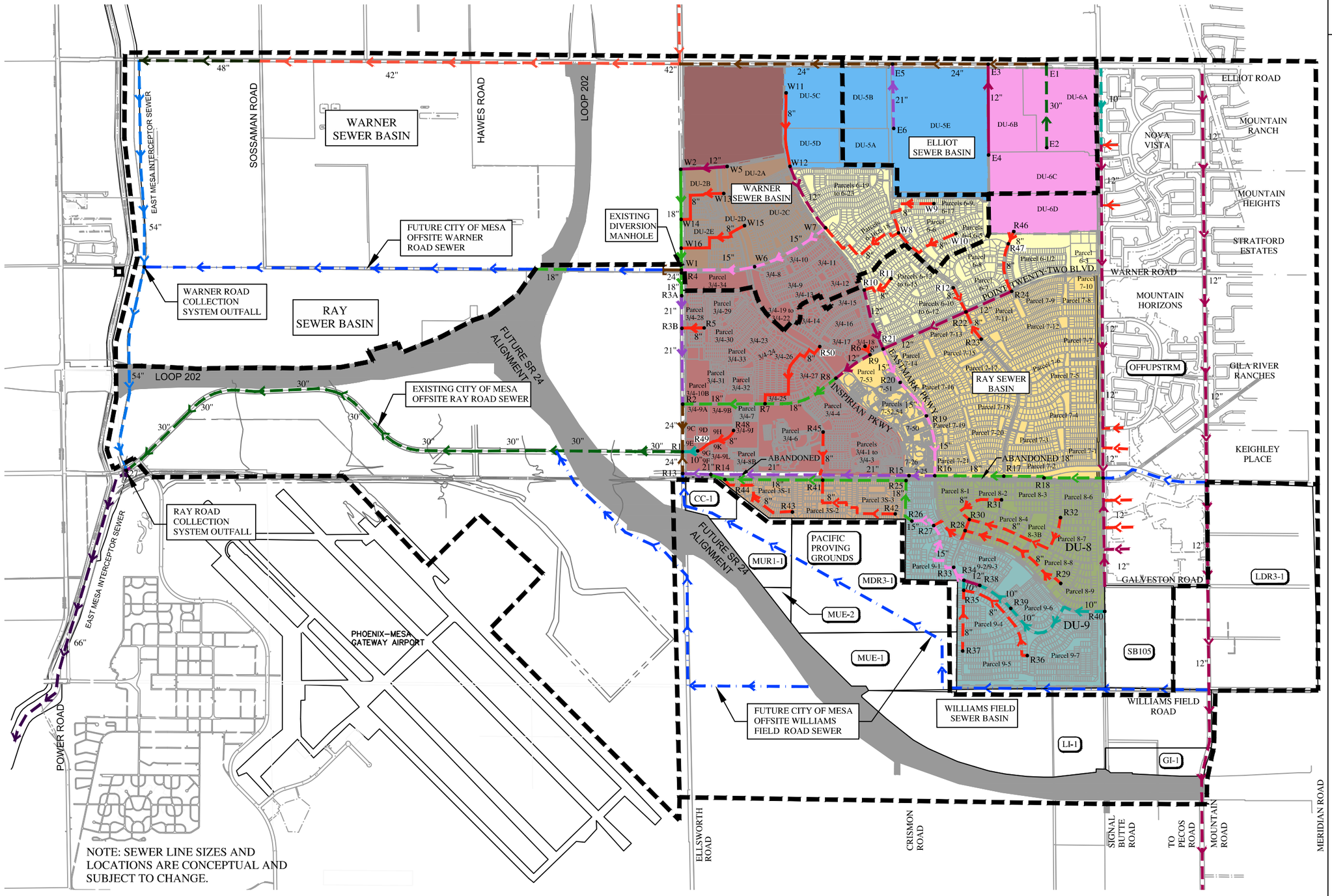
EXHIBIT 1: VICINITY MAP

EASTMARK
MESA, ARIZONA

WOOD PATEL

EXHIBIT 2

DU 2 MASTER SEWER EXHIBIT



LEGEND

EXISTING SEWER / FIRST LIFE CYCLE PLANNED SEWER

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

ON-SITE DEVELOPMENT UNITS

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

OFF-SITE LAND USE DESIGNATIONS*

SEWER BASIN BOUNDARIES
ONSITE SEWER SUB-BASIN BOUNDARIES
ONSITE SEWER SUB-BASIN LABELS — DU-1A
OFFSITE CONTRIBUTING SEWER BASIN — LDR3-1
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

N

0 2500 5000

Horz. 1 in. = 2500 ft.

PRELIMINARY
NOT FOR CONSTRUCTION
OR RECORDING

EXHIBIT 2 - DU 2 MASTER SEWER EXHIBIT

EASTMARK
MESA, ARIZONA

WOOD PATEL

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