



## Wastewater Basis of Design Report

For

# McCormick-Stillman Railroad Park - Roundhouse, Splash Pad & Site Improvements

City of Scottsdale, Arizona

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Project No. 19-1519

Date: July 2023

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## 1.0 Introduction

The McCormick - Stillman Railroad Park Roundhouse, Splash Pad & Site Improvements is a proposed 0.22-acre development to the existing McCormick Stillman Railroad Park. The project is located at 7301 E. Indian Bend Road at the McCormick Stillman Railroad Park in Maricopa County and is bounded by Indian Bend Road to the North and Scottsdale Road to the West. The project lies within a portion of the northwest corner of Section 11, Township 2 North, Range 4 East of the Gila and Salt River Meridian in Maricopa County, Arizona.

This report will review the sewer system. The proposed system will connect to the existing sanitary manhole located on site.

The calculations of sewer flow and pipe sizing in this report are based on system design criteria in the City of Scottsdale Design Standards and Policies Manual.

## 2.0 Sewer Design

### 2.1 Sewer System

The proposed sewer system will replace an existing 6" Sanitary line. The proposed sewer line will connect to an existing manhole on site, which flows into Indian Bend Road.

### 2.2 Design Requirements

All wastewater facilities for this project will be designed in accordance with the City of Scottsdale Design Standards and Policies Manual, as well as ADEQ Bulletin 11 Chapter IV Section D and MAG standards and specifications.

The buildings on the site will be serviced as described above. The average sewer flow was calculated based on a demand of 0.5 gpd per square foot with the building at 9,465 sf. The following criteria have been utilized in the analysis of the system demands:

- Average Sewer Flow 0.5 gpd/sf
- Peaking Factor 3.0

The design flow to the splash pad is 60 GPM and the splash pad usage time is 2 hours. Water will be stored in a 5,000-gallon holding tank for reuse. Once the holding tank capacity is met, overflow at a rate of 60 gpm will be discharged to the sewer system. The total overflow during the 2-hour operational time of the splash pad is 2,200

gallons per day. The following criteria have been utilized in the analysis of the system demands:

- Average Sewer Flow from Splash Pad 2,200 gpd
- Peak Sewer Flow from Splash Pad 60 gpm

### 2.3 Sewer Demand Calculations

Daily Sewer Demand for the Project is based on the following criteria:

Average Sewer Flow – Building  
 $0.5 \text{ gpd/sf} \times 9,465 \text{ sf} = 4,733 \text{ gpd} = 3.28 \text{ gpm}$   
Peak Sewer Flow – Building  
 $3.0 \times 4,733 \text{ gpd} = 14,199 \text{ gpd} = 9.86 \text{ gpm}$

Average Sewer Flow – Splash Pad  
 $60 \text{ gpm} \times 120 \text{ Min.} = 7,200 \text{ gpd}$   
Peak Sewer Flow – Splash Pad  
 $7,200 \text{ gpd} / 2 \text{ hrs} = 3,600 \text{ gallons/hr.} = 60 \text{ gpm}$

Capacity of 8" Sewer at 0.33% slope = 448,589 GPD = 311.52 GPM

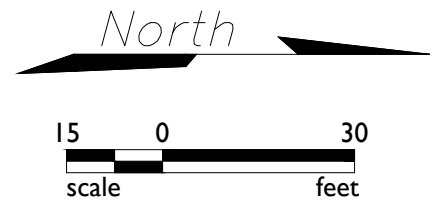
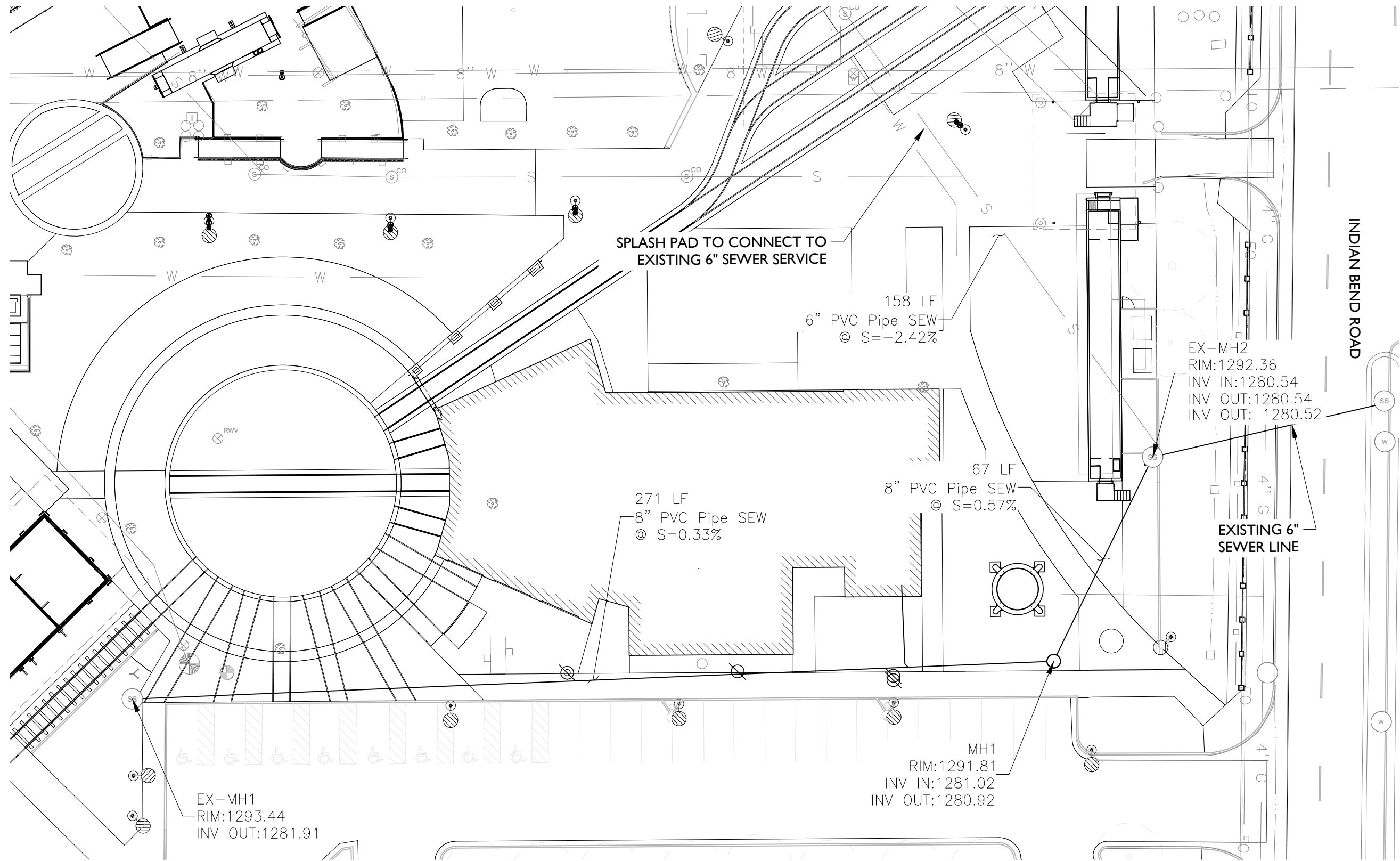
Capacity of 6" Sewer at 0.50% slope = 256,406 GPD = 178.06 GPM

### 3.0 Conclusions

- City of Scottsdale Design Standards have been met.
- The proposed sewer main is an 8" gravity-fed.
- The sewer service is a 6" gravity-fed.
- Minimum slopes for the 8" pipe = 0.33%
- System will connect into an existing sewer manhole on site.
- Total Capacity of the new 8" sewer main is 448,589 GPD.

## **Appendix A:**

### **Figures**



McCormick-Stillman Railroad Park  
City of Scottsdale, AZ

Sewer Exhibit

JOB NO  
19-1519

SHEET  
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Average Daily Sewer Flows and Pipe Capacity Using Manning's Equation

|              |              |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |           |  |  |  |  |
|--------------|--------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|-------|-----------|--|--|--|--|
| Project:     | I9-1519 MSRP |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |           |  |  |  |  |
| Prepared by: | Nick Delp    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | Date: | 7/24/2023 |  |  |  |  |

Calculations Assume 0.5 GPD/SF  
Calculations Assume 9,465.0 SF

| Sewer Pipe Information |             |                    |               |                     | Additional Flow Information |                              |                     |     |                                | Peak Demand Information     |                       |                |                   |                   |                   | Full Flow Check          |                   | Non-Pressurized Flow Calculations |                    |                    |                    |                               |                        |                          |
|------------------------|-------------|--------------------|---------------|---------------------|-----------------------------|------------------------------|---------------------|-----|--------------------------------|-----------------------------|-----------------------|----------------|-------------------|-------------------|-------------------|--------------------------|-------------------|-----------------------------------|--------------------|--------------------|--------------------|-------------------------------|------------------------|--------------------------|
| Sewer Reach            | Length (ft) | Pipe Diameter (in) | Slope (ft/ft) | Manning's Roughness | Description                 | Additional Contributing Lots | Flushing Flow (GPM) |     | Additional Upstream Flow (GPD) | Cumulative Daily Flow (GPD) | Equilivant Population | Peaking Factor | Peak Demand (GPD) | Peak Demand (MGD) | Peak Demand (cfs) | Full Flow Capacity (cfs) | Pressurized Flow? | Theta of flow (rad)               | Depth of Flow (ft) | Percent Full (d/D) | Area of Flow (ft2) | Wetted Perimeter of flow (ft) | Velocity of Flow (fps) | Full Flow Velocity (fps) |
| EXMH-1 - MH1           | 271         | 8                  | 0.0033        | 0.013               |                             | 1                            |                     |     |                                | 4,733                       | 9,465                 | 3.00           | 14,198            | 0.014             | 0.022             | 0.70                     | NO                | 1.23                              | 0.06               | 9%                 | 0.0161             | 0.411                         | 0.84                   | 2.00                     |
| MH1 - EXMH2            | 67          | 8                  | 0.0057        | 0.013               |                             | 0                            |                     |     |                                | 4,733                       | 9,465                 | 3.00           | 14,198            | 0.014             | 0.022             | 0.91                     | NO                | 1.16                              | 0.05               | 8%                 | 0.0136             | 0.388                         | 1.00                   | 2.63                     |
|                        |             |                    |               |                     |                             |                              |                     |     |                                |                             |                       |                |                   |                   |                   |                          |                   |                                   |                    |                    |                    |                               |                        |                          |
| Splash Pad - EXMH2     | 158         | 6                  | 0.0242        | 0.013               |                             |                              | 60                  | (1) | 7,200                          | 7,200                       | 14,400                | 3.00           | 21,600            | 0.022             | 0.033             | 0.88                     | NO                | 2.29                              | 0.15               | 29%                | 0.0478             | 0.571                         | 3.41                   | 4.47                     |
|                        |             |                    |               |                     |                             |                              |                     |     |                                |                             |                       |                |                   |                   |                   |                          |                   |                                   |                    |                    |                    |                               |                        |                          |
| EXMH2 - Indian Bend Rd | 64          | 6                  | 0.0050        | 0.013               |                             |                              |                     |     | 11,933                         | 11,933                      | 23,865                | 3.00           | 35,798            | 0.036             | 0.055             | 0.40                     | NO                | 1.78                              | 0.09               | 19%                | 0.0250             | 0.445                         | 1.27                   | 2.04                     |
|                        |             |                    |               |                     |                             |                              |                     |     |                                |                             |                       |                |                   |                   |                   |                          |                   |                                   |                    |                    |                    |                               |                        |                          |

Notes:  
(1) 60 gpm coming from Splash Pad