

BASIS OF DESIGN – WATER SYSTEM RELOCATION

The following memorandum describes the current condition and the proposed improvements of the City of Scottsdale (City) potable and non-potable water system located along North Miller Road from East Pinnacle Peak Road to East Happy Valley Road.

1. General Location and Description

The City has contracted with Olsson to provide engineering design improvements for Hayden Road/Miller Road, from Pinnacle Peak Road to Happy Valley Road. The project includes the construction of a bridge spanning Rawhide Wash and approximately 2,600 feet of roadway and drainage improvements. The purpose of this memorandum is to document the existing condition and proposed relocation of the existing potable and non-potable waterlines within Miller Road.

The project limits are Hayden Road/Miller Road, from Pinnacle Peak Road to Happy Valley Road. The project fully spans Rawhide Wash at Hayden Road/Miller Road. Currently there are three waterlines running parallel along Hayden Road/Miller Road that will need to be relocated to accommodate construction of the bridge piers at the Rawhide Wash crossing.

This project will relocate the existing 16-inch Ductile Iron Pipe (DIP) water main, 36-inch DIP water main and 16-inch DIP non potable water main along North Hayden Road/Miller Road from Mariposa Grande Road to East Parkview Lane, Scottsdale, Arizona. The surrounding area consist of single-family residential properties.

All proposed improvements will be installed within the existing public right-of-way and/or a new water line easement.

2. Existing Conditions

Per the City Quarter Section Map, topographic survey and as-builts the following existing water mains are located within the project area is as follows:

- 16-inch ACP water main, Hayden/Miller Road: This distribution main extends north and south from Pinnacle Peak Road to Happy Valley Road and varies from 39 feet to the east of the right of way line to 37 feet to the west of the monument line.
- 36-inch DIP water main, Hayden/Miller Road: This transmission main extends north and south from Pinnacle Peak Road to Happy Valley Road and varies from 10 feet to the east of the right of way line to 21 feet to the east of the monument line.
- 16-inch DIP non-potable water main, Hayden/Miller Road: This main extends north and south from Pinnacle Peak Road to Happy Valley Road and varies from 3 feet to the east of the right of way line to 14 feet to the east of the monument line.
- 8-inch water distribution main, Mariposa Grande Road: This distribution main extends east from the existing 16-inch ACP water main along Hayden/Miller Road to serve the La Vista subdivision.

These mains service the numerous residential subdivisions located along North Miller Road. These subdivisions are connected to the water distribution network through 6" and 8" distribution lines.

3. Proposed Water System Relocation

The water main improvements include approximately 974 LF of 16-inch Non Potable DIP, 1,172 LF 16-inch potable DIP, 964 LF of 36-inch DIP, 36-inch butterfly valves (including by-pass assemblies), 16-inch gate valves and 6-inch gate valves.

Minimum horizontal and vertical clearance between utilities are specified on the construction drawings in accordance with Arizona Department of Environmental Quality (ADEQ) requirements, Maricopa Association of Governments (MAG) Standard Details and Specifications for Construction and City supplements thereto.

The bridge design will be a concrete slab supported by abutments and 5 mid-span rows of 42-inch diameter piers. According to the drainage memorandum prepared by JE Fuller, the minimum required clear horizontal distance between the waterline and the bridge piers is 45 ft. At this distance, the maximum scour was calculated to be 14.0 ft. The new waterlines will be installed below the calculated scour depth.

The geotechnical report prepared by Olsson states that the combination of chemical/electrical test results indicates that the site soils in contact with metals are not likely to cause any significant corrosion. The high value of resistivity decreases the potential for corrosion in metals. The Chloride content (<100 ppm) and sulfate content (<200) do not pose any concern for corrosion. However, the City design standards and practice requires the installation of an external corrosion protection system for all buried water lines throughout the project. All water distribution mains shall use a sacrificial anode cathodic protection system to prevent external corrosion in conformance with City of Scottsdale Design Standards and Policies Manual.

Mechanical joint restraint shall be used at all DIP pipe, bends and fittings or where joint restraint devices are shown on the plans. Joint restraints shall conform to MAG Standard Detail 303.

4. Design Parameters

The following design criteria and standards (as a minimum) were followed for the proposed water system design.

- City of Scottsdale, Engineering & Design Standards (latest edition)
- MAG, Uniform Standard Specifications for Public Works Construction (latest edition)
- MAG, Uniform Standard Details for Public Works Construction (latest edition)
- City of Scottsdale, Amendments to MAG Uniform Standard Specifications and Details for Public Works Construction (latest edition)
- Flood Control District of Maricopa County (FCDMC) Drainage Design Manual for Maricopa County -Hydraulics (latest edition)
- JE Fuller, Draft March 2021, Rawhide Mitigation Final Design Hydrology, Hydraulics, Sediment Transport and Sour Report, FCD 2018C015, Work Assignment No. 1
- JE Fuller, Memorandum May 7, 2021, Hayden Road/Miller Road: Pinnacle Peak Road to Happy Valley Road, Miller Road Bridge Corridor 60% Hydraulics, Sediment Transport, Scour and Design
- Olsson Premier, May 24,2021, Geotechnical Evaluation and Foundation Analyses for Roadway Improvements & New Bridge
- Federal, State, and local regulations, ordinances, and requirements.

All required supplemental details and specifications are incorporated and referenced on the project drawings.