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M E M O R A N D U M

DATE: December 10, 2024

TO: Emmanuel Ojo, Metropolitan Sewer District of Greater Cincinnati

FROM: American Structurepoint Inc.

RE: Camargo Canyon PS Elimination: Condition Assessment of Existing 20' span x 10' rise concrete arch culvert

CC:

American Structurepoint performed a condition assessment of the existing concrete arch culvert between Camargo Canyon Drive and Camargo Road in Maderia, Ohio on November 20, 2024. The purpose of the assessment and this memorandum is to document existing conditions prior to the construction of an 8-inch diameter conduit which, when constructed, will run approximately perpendicular to the culvert. The proposed 8-inch conduit will be constructed near mid-length of the culvert and will provide a minimum of 5-feet of clearance between the crown of the culvert and bottom of conduit.

The following conditions were observed:

Headwall/Wingwalls (Poor Condition)

- Headwall and wingwalls are present at the north (upstream) end only.
- The north (upstream) headwall has rotated away from the embankment, creating separation between the back face of headwall and the perimeter of the arch. Sink holes were observed in the embankment above the headwall.
- Widespread concrete deterioration is present throughout the north (upstream) headwall and wingwalls. Observed deficiencies include spalling, saturated, and unsound concrete, including voids and exposed reinforcing.
- Established trees and other vegetation are present immediately behind the north headwall and wingwalls.

Arch (Satisfactory Condition)

- Minor cracking, leaching, and reinforcing exposure are typical in isolated locations throughout the length of the culvert. Visible areas of the concrete are generally in good condition throughout most of the length of the culvert.

- Multiple areas of leakage were noted at approximately 2-3 feet above the spring line and at construction cold-joints throughout the length of the culvert.

Scour (Satisfactory Condition)

- The invert of the arch is lined with concrete, with no significant deficiencies observed. Spalling with exposed reinforcing was noted at the invert at the outlet.
- At the outlet of the culvert, water falls approximately 6-inches onto a concrete apron upon exiting the structure.
- A large scour pool was noted approximately 10-feet from the downstream end of the structure. Although excessive water depth prohibited inspectors from wading to assess for undermining, no visual indications of structure undermining were observed.

Channel (Satisfactory Condition)

- Retaining walls are present at the upstream and downstream channel. Assessment of these walls was outside the scope of services for this assessment.
- A drainage swale runs along the upstream (north) headwall and northwest wingwall. The banks of this swale are steep and unprotected from scour and erosion.
- Channel alignment is good, with flow aligned with the center of the structure at the inlet and outlet.

Prior to construction, it is recommended that the contractor perform an evaluation and analysis as necessary for anticipated construction loads.

Photographs



Photograph 1 – Upstream (north) elevation



Photograph 2 – Downstream (south) elevation



Photograph 3 – Upstream headwall deterioration (east side)



Photograph 4 – Upstream headwall deterioration (west side)



Photograph 5 – Embankment over upstream (north) headwall



Photograph 6 – Typical underside looking south near inlet



Photograph 7 – Typical east wall of culvert; note leakage



Photograph 8 – Typical west wall of culvert; note leakage



Photograph 9 – Isolated minor reinforcing exposure



Photograph 10 – Isolated leakage at cold-joint



Photograph 11 – Typical underside looking south at outlet



Photograph 12 – Waterfall and invert spalling at outlet



Photograph 13 – Scour pool at downstream end of outlet apron



Photograph 14 – Upstream channel looking north



Photograph 15 – Downstream channel looking south