

To: Town of Ulysses, NY

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FROM: MRB Group

DATE: April 5, 2024

MRB GROUP PROJECT NO: 2104.24001

RE: TOWN OF ULYSSES – SCOPING ASSISTANCE

Project #3 – Stormwater Culvert(s) Inventory

- The Town of Ulysses has several hundred culverts with the majority in unknown condition. Culverts come in many shapes and sizes and their impacts on drainage areas can be significant. While there are several hundred culverts located in the Town, many are State/County or Privately owned and maintained.
- The request by the Town has been to develop a prioritized replacement/rehabilitation plan for all Town-owned culverts (200 Total assumed for estimating purposes). It is assumed that State/County or Privately owned culverts would not be included in the inventory/assessment.
- **Step 1: Perform a Condition Assessment of each Culvert (Total 200)**
Condition assessment can identify the following:
 - o Structural integrity of pipe/conduit, headwall, and roadway. Walking within a waterway is required to understand complete condition.
 - o Condition of upstream/downstream channels and signs of erosion at the inlet and outlet of culvert(s).
 - o Aquatic connectivity or identification of physical barriers preventing the movement of species along a natural waterway. Large drop-offs at the outlets of culverts will prevent aquatic movement and will result in continued erosion without proper stabilization or protection.
 - o Physical documentation of the size of the opening (circular, square, oblong, etc.). In conjunction with physically documenting the size of the culvert, Global Positioning System (GPS) equipment can be used to obtain survey grade elevations at varying locations to perform Hydraulic Capacity evaluations of existing conduits/structures.

- GPS points physically locate culverts with Northing/Eastings to be used as part of inventory establishment.
- Photographs taken and field logs can be the starting point for development of an Asset Management Program for Stormwater Structures. Photographs and field logs are often incorporated into a Geographic Information System (GIS) for inventorying infrastructure and can document degradation of conditions over years.
 - **Condition Assessment = \$58,500.00**
- https://naacc.org/naacc_search_crossing.cfm
 - The Town may consider using the North Atlantic Aquatic Connectivity Collaborative website for developing an initial inventory of culverts as a tool in lieu of site visits.
 - While the website is informational and substantive, physically assessing condition cannot be performed solely from a desktop review and comprehensive (as scoped) or selective site visits will be required.
- **Step 2: Develop Inventory and Record Keeping**
 - Assigning key nomenclature with physical locations (Northing/Easting) will establish the townwide inventory of stormwater culverts.
 - Inventory can be established in ArcGIS if Town has an existing GIS database. Otherwise, a GIS database can be established or a more streamlined approach with Excel or other document management software. The scope does not include developing a GIS system for the inventory.
 - Inventory field logs, pictures, and condition(s) assessment.
 - Create an existing figure in AutoCAD with survey information.
 - **Microsoft Excel Inventory/Record Keeping = \$54,000.00**
- **Step 3: Develop a Hydraulic Model of each existing culvert to determine hydraulic capacity.**
 - Define the 25-year, 50-year, 100-year and 500-year stream flows for each location. Evaluate the hydraulic capacity of the structure to overtop roadway or have detrimental flooding.
 - Storm intensity for evaluating existing/proposed culverts to be coordinated with Town for uniform evaluation.
 - **Model Each Existing Culvert = \$64,000.00**

- **Step 4: Model proposed opening size requirements.**
 - o Conceptually model the opening size for undersized culverts at varying storm intensities. The model will be performed based on the storm intensity selected for the existing capacity evaluations.
 - o Provide a preliminary selection for type of culvert and size to fit the needs of the site-specific area. Work with culvert/precast manufacturers on sizing culvert based on 'typical' sizes.
 - **Model and Size Proposed Culvert = \$72,000.00**

- **Step 5: Asset Management Program**
 - o Develop a means to establish a priority ranking system for repair/replacement or refurbishment of existing culverts.
 - o A ranking system can be created that fits the needs of the Town. Point or Ranking system can be created based on following inputs but not limited to:
 - Size of the Drainage Area
 - Vehicular Traffic experienced (type and volume)
 - Hydraulic Capacity
 - Aquatic Connectivity
 - Structural Integrity and/or Longevity of existing structure(s)
 - Historical Flooding Conditions Documented
 - o Provide a letter report with an explanation of the proposed ranking system, document general findings and assumptions used throughout the development of the Asset Management Ranking System. Provide a final table or summary with a ranking system of all structures (Total 200).
 - **Asset Management Deliverable = \$27,500.00**

- **Total Cost Project #3 = \$276,000.00**