CITY of NOVI CITY COUNCIL

Agenda Item E
December 17, 2018

SUBJECT: Approval to award civil engineering services to OHM Advisors for a stream restoration study associated with the Middle Rouge at 9 Mile Road project in the amount of $54,900.

SUBMITTING DEPARTMENT: Department of Public Works, Engineering Division

CITY MANAGER APPROVAL: CM

EXPENDITURE REQUIRED	**$ 54,900**
AMOUNT BUDGETED	**$ 64,900**
APPROPRIATION REQUIRED	**$ 0**
LINE ITEM NUMBER	**210-211.00-805.000 Engineering Consulting**

BACKGROUND INFORMATION:

The City has reached out to City Engineering Consultant OHM Advisors to perform an in-depth stream restoration study of the site and include a second site just north of Meadowbrook Lake. The purpose of the study will evaluate and develop the best methods for streambank restoration and develop cost estimates for future budgeting purposes associated with the City's Capital Improvement Program (CIP).

The attached *Stream Restoration Study Engineering Services* proposal, as executed by City Engineering Consultant OHM Advisors outlines the scope of services in more detail. The fee rate per the Exhibit B Fee Curve Schedule (as part of the City's general Engineering Services Contract with OHM Advisors) is $115 per hour (general consulting hourly fees). The study also includes work requiring specific technical expertise (not included in the Fee Curve) which is charged at a higher rate. The total cost of the study is $54,900 (390 hours of work and a $3600 subcontractor fee for a title company). The Engineering Division has reviewed the scope of services proposal and recommends approval.

RECOMMENDED ACTION: Approval to award civil engineering services to OHM Advisors for a stream restoration study associated with the Middle Rouge at 9 Mile Road project in the amount of $54,900.

Middle Rouge at 9 Mile Streambank Study

Location Map

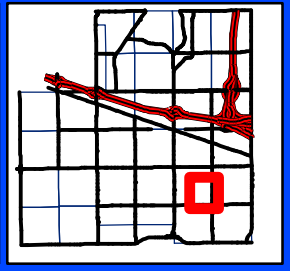
Map Author: Joseph Akers
Date: November 28, 2018
Project: Middle Rouge at 9 Mile
Version #: 1

Amended By:
Date:
Department:

MAP INTERPRETATION NOTICE

Map information depicted is not intended to replace or substitute for any official or primary source. This map was intended to meet National Map Accuracy Standards and use the most recent, accurate sources available to the people of the City of Novi. Boundary measurements and area calculations are approximate and should not be construed as survey measurements performed by a licensed Michigan Surveyor as defined in Michigan Public Act 132 of 1970 as amended. Please contact the City GIS Manager to confirm source and accuracy information related to this map.

Areas of Study



City of Novi
Engineering Division
Department of Public Services
26300 Lee BeGole Drive
Novi, MI 48375
cityofnovi.org

Feet
0 105 210 420 630

1 inch = 501 feet

February 28, 2018

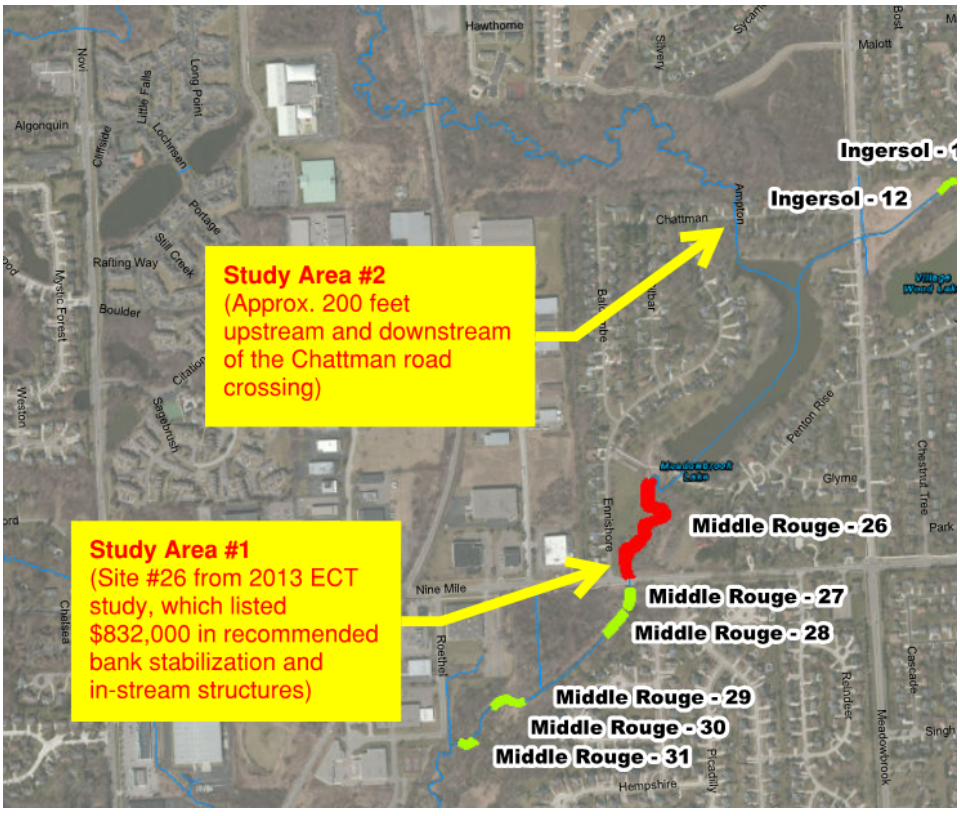
Mr. George Melistas
Engineering Senior Manager
City of Novi
Field Services Complex
Department of Public Services
26300 Lee BeGole Drive
Novi, MI 48375

Subject: Stream Restoration Study

Dear Mr. Melistas:

OHM Advisors understands that the City of Novi is seeking professional engineering services for stream evaluation, surveying, development of alternatives, and conceptual engineering for two reaches of the Rouge River that are experiencing excessive erosion. Figure 1 depicts the study area locations.

Figure 1: Stream Restoration Study Area Locations



OHM Advisors
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WORK PLAN

We divided our work plan into the following six tasks, which are associated with the first phase of the project. A future phase will include development of plans, contract documents, and construction engineering, which will be addressed in a separate proposal. The current proposal includes the work necessary to gain an understanding of the issues, to determine the best methods for restoration, and to develop planning level cost estimates for City budgeting purposes.

- Task 1: Project Initiation and MDEQ Pre-App Meeting
- Task 2: Site Inventory & Assessment
- Task 3: Stream Survey
- Task 4: Hydrology and Hydraulics
- Task 5: Property Title Reviews
- Task 6: Basis of Design Report

Task 1: Project Initiation and MDEQ Pre-App Meeting

Under this task, OHM will meet with City of Novi staff to kick off the project, refine the project scope and schedule, review background information, and perform preliminary site visits. We will also meet with MDEQ on site to facilitate the permitting process. Specific work efforts include:

1. Preliminary site visits (toothpick surveys) to help gain an understanding of erosion problems and to get a better sense of the surroundings.
2. Meetings with the City to develop the project scope and schedule.
3. Obtain and review information from the City including GIS data, area historical drainage information, existing studies, and other available resources.
4. Prepare a MDEQ Pre-application Meeting Request and meet with the MDEQ on site to determine permitting requirements and obtain MDEQ input. We have assumed that the City will pay the pre-application fee.

Deliverables:

- MDEQ Pre-application Meeting Request
- MDEQ Pre-application Meeting Notes

Task 2: Site Inventory & Assessment

As the first major task, we will complete a site inventory for each study area to identify specific problem areas, determine if there are any reach-wide problems that need to be investigated, and to be assured that site restoration activities do not negatively impact upstream or downstream sections of the river. OHM will walk the river to assess the bed and bank conditions and identify other bank problem areas, locate outfalls, groundwater seeps, and obstructions; photographing and obtaining GPS coordinates of each if needed. Specific work efforts include:

1. Perform a field inventory of the site collecting data related to the degree of bank erosion, habitat conditions, soil types and seep locations, channel conditions (degree of incision, bankfull depth, bank slope, percent of vegetative cover, existence of obstructions, man-made features, access potential, hydraulic controls, riffle/pool locations, substrate, etc.) and determine initial recommended treatment. GPS

coordinates and photos will be obtained at each identified location.

2. Obtain sediment core samples from the failed bank and point bars (if available). We have assumed 2 core samples will be obtained for this project.

3. Obtain sediment core samples from a nearby riffle. We have assumed 2 core samples will be obtained for this project. At the location of each core sample, a pebble count will be performed.

4. Perform a sieve analysis and obtain D16, D35, D50, D84 and D95 for each sample. This information will be plotted along with obtaining a survey cross section in each location and computing the hydraulic radius of each cross section.

5. Compile data and develop the Inventory portion of the Design Basis Report.

Deliverable:

- Inventory portion of Design Basis to be submitted as part of Task 6.

Task 3: Stream Survey

Under this task OHM will obtain cross sections of the stream at key locations. The survey will be based on the FEMA datum, to match the datum of the existing FEMA study. Specific work efforts include:

1. Obtain horizontal and vertical survey control. We expect that control can be obtained in the "leaf off" condition and with GPS equipment.

2. Obtain up to 6 stream cross sections at each site (12 total). Cross sections will include the top of bank on both sides of the stream, toe of slopes on both sides, channel bottom (thalweg), and intermediate points across the stream channel. Locations of cross sections will be selected based on information needed for modeling and to obtain measurements of bankfull field indicators.

3. Obtain additional survey needed to determine if culverts are sized adequately, including road profiles, cross-sections at the upstream/downstream faces of each culverts (including culvert invert elevations), and one cross-section approximately 200' downstream of each culvert, which will help establish the starting water surface elevation.

4. Process topographic survey for development of base drawings. The surveyed data will be collected and presented on 24" x 36" drawings, with appropriate scales, using AutoCAD software. Survey plans will include plan (1"=100'), profile (1"=5' vertical) and cross sections (1"-10' vertical).

5. Create a preliminary access plan depicting areas that could be used by contractor for site access and storage of materials and equipment.

Deliverable:

- Base plans

Task 4: Hydrology and Hydraulics

The tributary area associated with each study area is greater than two squares miles, so we will request peak flows from MDEQ for use in developing the hydraulic analysis. Measurements of bankfull field indicators (depositional features) will be collected in the field and used in conjunction with the hydraulic model and flows obtained from MDEQ to estimate the bankfull flow rate (typically 1 to 2-year recurrence interval), which is the key parameter needed to design bankfull channel dimensions and to size in-stream structures.

OHM will develop an existing and proposed condition steady, one-dimensional flow backwater analysis in HEC-RAS to determine existing hydraulic parameters (water surface, energy grade, velocity, flow depth, shear stress, etc). The existing model along with physical stream measurements will be used to determine the required size of a stable channel and protection measures needed. Specific work efforts are as follows:

1. Obtain peak flows from the MDEQ for the 1-year, 2-year, 10-year, 50-year, and 100-year recurrence interval events for use in developing the hydraulic analysis.

2. Develop a backwater analysis using the ACOE HEC-RAS program for the existing and proposed conditions to obtain open channel hydraulic parameters. The data will be tabulated in an open channel summary that identifies, in locations of significance, the channel cross section location, cross section area, and channel grade along with hydraulic parameters at each cross section. The summary will be developed for the bankfull, 10-, 50- and 100-year events. It is our understanding that a detailed Flood Insurance Study (FIS) was performed for this area. We will use the FIS information to compare to our hydraulics to verify our results.

3. Perform bankfull dimensionless shear stress computations in HEC-RAS and check with hand computations using core sample and cross section data. Perform scour computations to determine bury depth of proposed toe/in-stream stabilization measures. These computations will aid in determination of the stable channel/bank condition. It should be noted that to maintain stability, a stream must be able to transport the largest size of sediment and have the capacity to transport the load on an annual basis. These computations will be performed as per methods outlined in the NRCS NEH Part 64 Stream Restoration Guide.

4. Determine size of channel and treatment methods that will result in a stable channel design. An iterative process will be used to compare shear stresses (existing and proposed) to shear stresses for various channel sizes and treatment methods. Various options will be considered and compared with other criteria, including tree clearing and extent of disturbance.

5. Determine if the culverts at the Nine Mile Road and Chattman Road crossing are adequately sized.

6. Prepare the hydraulic portion of the design basis outlining hydraulic findings.

Deliverable:

- Hydraulic portion of Design Basis to be submitted as part of Task 6.

Task 5: Property Title Reviews

Property title reviews will be performed to identify property lines and existing easements through coordination between OHM and a subcontractor (title agency). The results will be used to help develop construction access plans and to identify areas where temporary construction easements may be needed. OHM will review title work and pass through subcontractor costs for up to 10 title reviews.

Deliverable:

- Title review documentation to be submitted as part of Task 6.

Task 6: Design Basis Report

Under this task, OHM will compile data from the previous tasks and develop conceptual alternatives and preliminary cost estimates into a design basis report. Specific work efforts include:

1. Compile the Stream Inventory and Hydrology & Hydraulics information into the report.
2. Conceptual sketches of restoration measures will be prepared based on the results of the proposed condition hydraulic analysis. Conceptual plan views will be developed with GIS aerial backgrounds to provide a preliminary indication of access area and associated impacts. Conceptual details will also be provided.
3. Prepare planning level cost estimates for anticipated restoration measures.
4. Compile information into a design basis report and submit to the City for review.
5. Meet with the City and modify the Design Basis based on City comments. This report will be used for the MDEQ Joint Permit Application submittal. Once the recommendations in the report are agreed upon, we will initiate preliminary design.

Deliverable:

- Design Basis

ENGINEERING FEES

Total engineering fees for the project outlined in our Work Plan are below:

Task	Cost
Task 1 – Project Initiation and MDEQ Pre-App Meeting	$10,600
Task 2 – Site Inventory and Assessment	$9,200
Task 3 – Stream Survey	$7,400
Task 4 – Hydrology and Hydraulics	$11,400
Task 5 – Property Title Reviews	$5,100
Task 6 – Design Basis Report	$11,200
Total Cost	**$54,900**

The City will be invoiced monthly for the value of services completed to date, based on OHM's current hourly rate schedule and the Continuing Services Agreement between OHM and the City. All invoices are payable upon receipt.

SCHEDULE

The tasks outlined in our work plan will be completed by August 31, 2018.

FURTHER CLARIFICATIONS AND ASSUMPTIONS

- Permit fees to be paid by the City directly or as reimbursable to OHM.
- If any additional professional services not specifically described in the scope of work are requested by the City of Novi, OHM Advisors will provide a separate proposal for said services, prior to conducting any additional services.

We thank you for the opportunity to provide professional engineering services to the City of Novi. If you have any questions or require additional information, please do not hesitate to contact me.

Sincerely,
OHM Advisors

James C. Stevens, PE
Principal

cc: Ron Cavallaro, PE, OHM
Charles Humphriss, PE, OHM