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January 5, 2016

Proposal No. 13647.01

Mr. Brian M. Rubel, P.E.
Tetra Tech
710 Avis Drive
Ann Arbor, Michigan 48108

**Geotechnical Subsurface Investigation
Proposed Above Ground Wet Weather Storage Tank and Valve Vault
Northfield Township Wastewater Treatment Plant
Whitmore Lake, Michigan**

Dear Mr. Rubel:

TTL Associates, Inc. (TTL) is pleased to provide this proposal to Tetra Tech for a geotechnical subsurface investigation for the above referenced project. TTL has developed this proposal for services based on an email Request for Proposal (RFP) from you to Ms. Katherine Chulski of TTL on December 18, 2015, which included a proposed site plan, as well as email correspondence sent from you to Ms. Chulski from December 18, 2015 and December 30, 2015, regarding valve vault depth and proposed future expansion.

PROJECT DESCRIPTION

It is our understanding that the project consists of construction of a new above-ground wet weather storage tank and a new valve vault at the existing Northfield Township wastewater treatment plant (WWTP). The WWTP is located approximately ½ mile north of 8 Mile Road and ¼ mile west of Lemen Road in Whitmore Lake, Michigan.

The site for the new tank is mostly undeveloped at this time, and includes a partially wooded area with a grassy path that traverses around the facility. The perimeter of the new tank is preliminary designed with slopes on the order of 4 horizontal to 1 vertical (4H:1V). Existing site grades are generally flat, indicated to range from Elevs. 913 to 910, although at the eastern edge of the tank perimeter a shallow depression with a bottom of Elev. 906 is indicated.

The tank will have a diameter of 100 feet with a tank floor indicated at Elev. 915. Based on existing site grades, approximately 3 to 4 feet of fill is required to raise site grades for the proposed tank. It is anticipated that the structure will have a concrete ringwall supported on footings. Structural loads were not available at the time of preparing this proposal. Maximum loads are assumed to not exceed 2,000 pounds per square foot (psf).

The valve vault will have a footprint of approximately 25 feet by 15 feet, with the bottom slab for this structure at a depth of roughly 6 to 8 feet below existing grade. Structural loads were not available at the time of preparing this proposal. Maximum loads are assumed to not exceed 2,000 psf.

We understand that soil borings are not needed for the future plant expansion immediately south of the existing facility. It is understood that this work is projected approximately 10 years in the future.

SCOPE OF WORK

TTL proposes to conduct a geotechnical subsurface investigation to evaluate the properties of the underlying soils with respect to design and construction of foundations at the above referenced location. A drill rig and crew will be utilized to advance soil borings into the underlying soils for the purpose of collecting soil samples and performing in-situ tests. Laboratory testing will be conducted on the collected soil samples to provide physical properties and characteristics of the underlying materials. Geotechnical engineering recommendations pertaining to design and construction will be developed based on information obtained from the drilling and laboratory testing.

The proposed scope has been divided into the following three tasks.

Task 1 - Mobilization, Drilling and Sampling

Based on the provided information, four (4) borings are proposed for this investigation. One boring will be performed near the center of the tank footprint and extended to a planned depth of 100 feet below existing grade. Three borings will be performed around the perimeter of the proposed tank footprint and extended to a planned depth of 20 feet. One of these perimeter borings will be located in the area of the proposed valve vault. The borings will be extended to these planned depths or to auger refusal, whichever is first encountered. If encountered soil conditions are such that deep foundations may be required, TTL will notify Tetra Tech to determine if deeper borings are warranted.

TTL will mobilize a drill rig and crew to the site, perform the indicated test borings, and return the collected soil samples to our laboratory for testing. The test borings will be located in the field by TTL in general accordance with the provided site plan. The borings will be located by taping or pacing methods. TTL will notify the utilities protection service (MISS DIG) for utility markings and clearances. **The client is to furnish TTL with plans identifying on-site underground structures and utilities, and to notify TTL of those structures and utilities not shown on said plans.** If obstructions, overhead power lines, or underground utilities are encountered, the test borings may have to be relocated. The relocation distance shall be kept to a minimum.

The test borings will be performed in general accordance with ASTM D 1586 and D 5434. Soil samples will be generally be collected at 2½-foot intervals to a depth of 10 feet and at 5-foot intervals thereafter using a split-spoon sampler. For the valve vault boring, soil samples will be collected at 2½-foot intervals to boring termination. Standard Penetration Tests will be performed at the same intervals. If soft to medium stiff cohesive soils are encountered, up to two Shelby tube samples will be obtained in general accordance with ASTM D 1587.

Groundwater readings will be obtained during drilling and upon completion of drilling operations. Upon completion of the drilling operations, each test boring will be backfilled with a mixture of bentonite chips and auger cuttings.

Task 2 - Laboratory Testing

Design and construction recommendations pertaining to foundations will be evaluated using soil index properties and engineering parameters determined from laboratory tests performed on the recovered soil samples. These tests will include the following:

- Moisture content determinations (ASTM D 2216)
- Dry density determinations and unconfined compressive strength tests (ASTM D 2166)
- Atterberg limits tests (ASTM D 4318)
- Particle size analyses (ASTM D 422)

All recovered soil samples will be tested for moisture content and visually or manually classified in accordance with the Unified Soil Classification System (ASTM D 2487 and D 2488). Dry density determinations and unconfined compressive strength tests will be performed on approximately 20 percent of the intact cohesive split-spoon samples as well as all recovered Shelby tube samples. Unconfined compressive strength estimates will be obtained for the remaining intact cohesive samples using a calibrated hand penetrometer. Additionally, an Atterberg limits test and a particle size analysis will be performed on two representative soil samples.

Task 3 - Engineering Analysis, Recommendations and Report Preparation

A geotechnical engineer will take the information from the driller's field logs and prepare engineering logs describing each encountered stratum. Geotechnical-related design and construction recommendations will be prepared under the direction of a licensed professional engineer. The recommendations will address soil conditions and characteristics, bearing capacities, and anticipated settlements. In addition, general construction recommendations will be provided by the geotechnical engineer, including excavation and backfill requirements, as well as groundwater conditions and control.

The final report will contain the field investigation and laboratory test data, state our findings and observations, and include a site plan and log identifying each test boring. The final report will also include the recommendations for tank foundations and valve vault foundations prepared under the direction of a licensed professional engineer.

ESTIMATED COST

TTL proposes to conduct the investigation described herein for a lump sum fee of **\$8,285.00**. This fee includes \$3,980 for drilling and sampling of subsoils not exceeding 160 lineal feet, \$855 for laboratory testing, and \$3,450 for engineering analysis and report preparation. Additional drilling and sampling of overburden soils, if deemed necessary by subsurface conditions and authorized by Tetra Tech prior to demobilization, would be performed on an add basis of \$30.00 per lineal foot. Delays incurred by the drilling crew due to circumstances beyond our control will be billed at the rate of \$222.00 per hour.

The engineering fee includes analysis and consultation through submittal of the final report. Any project meetings, as well as additional analysis and consultation services, will be invoiced in accordance with the following unit rates:

- Project Engineer for additional analysis and engineering evaluation, per hour \$ 110.00
- Chief Geotechnical Engineer (P.E.) for meetings and consultation, per hour..... \$ 146.00

TERMS AND CONDITIONS

Work shall be performed in accordance with the attached TTL Agreement for Services. Please execute both copies of the agreement form and return one copy to our office as our authorization to proceed. As an alternative, you may provide a Purchase Order referencing this proposal by number and date.

TTL will apply reasonable care to avoid encountering underground structures and utilities, including notifying MISS DIG prior to the field work to obtain clearances within MISS DIG's jurisdiction. **The client is to furnish TTL with plans identifying on-site underground structures and utilities, and to notify TTL of those structures and utilities not shown on said plans.** Any claims resulting from damage to structures/utilities not identified or mismarked by MISS DIG locaters and/or the client are not the responsibility of TTL, regardless if such damages are direct, indirect, or consequential.

SCHEDULE

TTL is prepared to begin work on this project upon receipt of written authorization to proceed. Based on our current drilling schedule, we anticipate that the field work can be completed within two weeks of receipt of written authorization and site plans showing existing on-site underground structures and utilities. Field operations are anticipated to require two days for completion. A PDF electronic copy

of our final report will be available approximately two weeks after completion of the drilling operations.

TTL Associates, Inc. appreciates this opportunity to provide Tetra Tech with our quality geotechnical services and we look forward to working with you on this project. Should you have any questions regarding this proposal, please contact us at (734) 455-8600.

Respectfully submitted,

TTL Associates, Inc.



Katherine D. Chulski, P.E.
Geotechnical Engineer



Curtis E. Roupe P.E.
Vice President

Attachments - Agreement for Services
- Terms and Conditions

T:\Geotech\Projects 2016\13647.01...\Proposal\13647.01 Geotech Proposal Wet Weather Storage Tank Northfield Twp WWTP MI

AGREEMENT FOR SERVICES

THIS AGREEMENT is by and between _____

Tetra Tech

710 Avis Drive

Ann Arbor, Michigan 48108

hereinafter called **CLIENT** and TTL Associates, Inc. of 44265 Plymouth Oaks Boulevard, Plymouth, Michigan 48170, hereinafter called **TTL** who agrees as follows:

DECLARATIONS. **CLIENT** desires to engage **TTL** to provide services as described in **TTL** Proposal No. 13647.01 dated January 5, 2016, a copy of which is attached hereto, and along with the **TERMS AND CONDITIONS**, which appear on the reverse side of this document, are made a part of this **AGREEMENT**.

ACCEPTANCE. Execution of this **AGREEMENT** or the issuance of any other written authorization by **CLIENT** to **TTL** such as a written Purchase Order will constitute acceptance of this **AGREEMENT**.

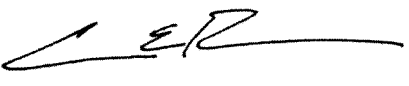
For **CLIENT**, By _____

Signature

Name

Title

EXECUTED THIS _____ DAY OF _____, 20____

For **TTL Associates, Inc.**, By  _____

Signature

Curtis E. Roupe, P.E.

Name

Vice President

Title

EXECUTED THIS 5th DAY OF January, 2016

Please sign one copy of this agreement and return it to TTL. The proposal is valid for 120 days.



TERMS AND CONDITIONS SCHEDULE A

As used herein, the word Client refers to the party purchasing services for work from TTL Associates, Inc. (TTL). The following terms and conditions shall govern the performance of services or work by TTL for or on behalf of Client, as contemplated by the order set forth on the reverse side hereof. Modification of these terms and conditions may be made only with the prior written consent of both parties and any attempts to alter such terms and conditions with purchase orders, acknowledgements, similar or other documentation shall be void.

1. **Scope: Standards.** TTL shall provide the services described on the reverse side hereof in accordance with generally accepted industry standards.
2. **Work Product.** Reports and results of TTL services are rendered for the exclusive use of Client, but at all times remain the property of TTL. The Client shall not advertise, publish or otherwise communicate TTL's work product to any third party without the prior written approval of an officer of TTL.
3. **Legal Proceedings.** If TTL work product is to be used in any legal proceeding, TTL shall charge and Client shall pay all TTL expenses together with then applicable TTL hourly rates for any court appearance, deposition, affidavit or the like by any TTL personnel. Preparation time shall also be billed and paid at such rates.
4. **Adversarial Proceedings.** In the event that TTL is ordered or subpoenaed to produce documents or testify on behalf of a third party, TTL shall so advise Client, whenever possible. Client may then determine whether it wishes to contest the subpoena or order.
5. **WARRANTY DISCLAIMER. OTHER THAN ITS COMMITMENT TO PERFORM SERVICES IN ACCORDANCE WITH GENERALLY ACCEPTED INDUSTRY STANDARDS, TTL MAKES NO WARRANTY WHATSOEVER. TTL MAKES NO WARRANTY OF MERCHANTABILITY AND NO WARRANTY OF FITNESS FOR ANY PARTICULAR PURPOSE.**
6. **Limitation of Liability. In no event will TTL's liability to Client, or to third parties claiming through Client (including, without limitation, Client's insurers) exceed \$50,000 regardless of the legal theory upon which a claim may be based, including contract, warranty, tort and indemnification. Without limiting the generality of the foregoing, this limitation is applicable to loss, destruction, or damage to Client property while in the possession or control of TTL. In no event will TTL be liable to Client or to third parties claiming through Client (including Client's insurers) for any incidental or consequential damages whatsoever regardless of the legal theory upon which a claim may be based.**
7. **Samples.** In the event that TTL services involve test samples, such samples will be obtained with reasonable care and preserved for a period of thirty (30) days. TTL reports relative to samples are applicable only to the specific samples tested and only depict conditions at the specific location of the test.
8. **Pricing.** Prices quoted by TTL are subject to change if not accepted by Client within sixty (60) days of the date of quotation or if the work is not commenced (through no fault of TTL) within sixty (60) days of the date of acceptance of such quotation.
9. **Payment.** TTL invoices shall be paid within thirty (30) days of invoice date. Amounts unpaid when due shall bear interest at the rate of one percent (1.0%) per month, compounded monthly, until paid.
10. **Governing Law.** This agreement and all transactions relating hereto shall be governed by the laws of the State of Ohio.
11. **Entire Agreement.** This proposal constitutes the entire agreement between TTL and Client regarding the subject matter hereof and replaces all prior written or oral agreements and understandings. It may be amended or altered only in a writing signed by both parties.

