CHURCH ROAD
OVER MUSKRAT CREEK

PROJECT MANUAL
BIDS & CONSTRUCTION

Prepared For:
Clinton County Road Commission
CONSTITUTION HALL
P.O. BOX 3017
LANSING, MI 48909

Prepared By:
LAND & RESOURCE ENGINEERING (LRE)
PROJECT NO. 20-072
October 19, 2020

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BID SOLICITATION

The Clinton County Road Commission is soliciting sealed proposals for the Church Road over Muskrat Creek project. Items of work include approximately 60 linear feet of 24-foot by 10-foot concrete box culvert, 100 linear feet of guardrail replacement, and 350 square yards of aggregate surface course and all related work.

Sealed proposals will be received at the Clinton County Road Commission Office: 3536 S. US Highway 27, St Johns, Michigan 48879 until 10:00 a.m. local time, Monday, November 2, 2020 at which time they will be publicly opened and read aloud.

Contract Documents will be emailed to prospective bidders beginning October 19, 2020.

A mandatory pre-bid meeting will be held at 10:00 a.m. on Monday, October 26, 2020 at the Clinton County Road Commission Office: 3536 S. US Highway 27, St Johns, Michigan 48879. The OWNER and ENGINEER will be present to discuss the project. Prospective bidders are required to attend and participate in the pre-bid meeting. All bidders must sign in by name of attendee and business represented. Only bids from bidders in attendance at the pre-bid meeting will be opened. All others will be considered non-responsive.

Contractors shall direct all questions to the project engineer, Kyle Patrick, P.E., of Land & Resource Engineering, (616) 301-7888 before 12:00 p.m. on Wednesday, October 28, 2020.

Each proposal shall be accompanied by a certified check or bid bond by a recognized surety in the amount of five percent (5%) of the total of the bid price made out to the Clinton County Road Commission.

After the time of opening, no bid may be withdrawn for a period of one hundred twenty (120) days.

The Clinton County Road Commission reserves the right to accept any bid, reject any or all bids, to waive informalities and make the award in any manner deemed in the best interest of the County.

CLINTON COUNTY ROAD COMMISSION

Douglas Steffen
Managing Director

ARTICLE 1 – BASIS OF PROPOSAL

1.1 The Bid is based on unit and lump sum prices as stipulated in the Bid Form. The totals of the extensions of unit and lump sum prices will be used as a basis for determining the total bid price.

1.2 All work necessary for completion of the Contract, but not specifically listed as a pay item, will be considered to be covered under one or more of the Bid items.

1.3 Where the Bid consists of separate sections of work, each section may be awarded separately or together with other section(s), whichever will be in the best interests of the OWNER. BIDDERS may bid any or all sections.

ARTICLE 2 - QUALIFICATIONS OF BIDDERS

Bids are solicited only from responsible BIDDERS skilled and regularly engaged in work of similar character and magnitude.

ARTICLE 3 – EXAMINATION OF CONTRACT DOCUMENTS AND SITE

3.1 Before submitting a Bid, each BIDDER shall:

A. Examine the Contract Documents thoroughly;

B. Visit the Site to become familiar with local conditions that may in any manner affect cost, progress, performance or timely completion of the Work;

C. Become familiar with all laws, rules and regulations that may in any manner affect cost, progress, performance or timely completion of the Work; and

D. Study and carefully correlate BIDDER's observations with the Contract Documents.

3.2 Surveys, investigations, and reports of subsurface or latent physical conditions at the Site which have been relied upon by ENGINEER in preparing the Drawings and Specifications are not guaranteed as to accuracy or completeness. Each BIDDER shall, at his own expense, make additional surveys and investigations as necessary to determine his Bid for the performance of the Work.

ARTICLE 4 - INTERPRETATION

Questions about the meaning or intent of the Contract Documents shall be submitted to the ENGINEER not less than seven (7) days prior to date of opening of Bids. Replies will be issued by Addenda mailed or delivered to Plan holders of Record not less than three (3) days before Bids are due. ENGINEER may issue other Addenda at any time prior to opening of Bids. Only answers given by Addenda shall be binding. Oral and other interpretations or clarifications shall be without legal effect.

ARTICLE 5 – BID SECURITY

5.1 Each proposal shall be accompanied by a certified check or bid bond by a recognized surety in the amount of five percent (5%) of the total of the bid price made out to Clinton County Road Commission. Bid Security from each BIDDER on the Work shall be by a single Surety.

5.2 A Bid Bond when used as Bid Security, shall be issued by a Surety named in U.S. Treasury Circular 570 licensed to conduct business in the state in which the Work is located.

5.3 The Bid Security of the successful BIDDER will be retained until the executed Agreement, Bonds, insurance certificates and other required information is delivered by the BIDDER to the OWNER.

5.4 Failure of the successful BIDDER to execute and deliver the Agreement, Bonds, insurance certificates and other required information within ten (10) days of the Notice of Award shall be just cause for OWNER to annul the Notice of Award and declare the Bid and Bid Security forfeited.

5.5 The Bid Security of any BIDDER whom OWNER believes to have a reasonable chance of receiving the award may be retained by OWNER until either the executed Agreement, Bonds, insurance certificates and other required information are delivered by the successful BIDDER to the OWNER or the expiration of the time limit specified for the Bid Hold Period, whichever occurs first.

5.6 Unless specifically requested, Bid Bond will not be returned to BIDDER.

ARTICLE 6 – CONTRACT TIME

The time(s) for completion of the Work shall be as stipulated in the Agreement. If the time requirement(s) cannot be met, the BIDDER is requested to stipulate in the Bid Form his schedule for performance of the Work. Consideration will be given to time in evaluating Bids.

ARTICLE 7 - LIQUIDATED DAMAGES AND EXPENSES

Provisions for liquidated damages and expenses for failure to complete on time are set forth in the Agreement.

ARTICLE 8 – BID PREPARATION

8.1 Submit the Bid on the separate Proposal and Bid Form with Bid Security and other required documents. The bound copy is for BIDDER's records.

8.2 No change shall be made in the wording of the form or in any of the items. Bids should be typed or filled out legibly in ink.

8.3 All names must be printed or typed below the signature.

8.4 The Proposal shall contain an acknowledgement of receipt of all Addenda.

8.5 Bid by partnership shall be executed in the partnership name and signed by a partner. Partner's title must appear under signature.

8.6 Bid submitted by two or more firms will not be considered (i.e. no joint bids).

8.7 Bid by corporation must be executed in the corporate name by a corporate officer accompanied by evidence of authority to sign. The corporate address and state of incorporation shall be listed.

8.8 Agreement will be on the basis of material and equipment described in the Contract Documents without consideration of substitute or "or-equal" items; except for alternates which may be offered by the BIDDER in the Bid Form and accepted by the OWNER prior to execution of the Agreement. Applications for substitutions will be considered only after the Agreement has been executed. The procedure for substitutions is set forth in the General Conditions.

8.9 On unit price Bids, BIDDERS shall show the unit price for each item listed, the total price for the quantity of each item, and the total price for all items. If ENGINEER finds any errors in the Bidder's computations, ENGINEER reserves the right to make corrections.

ARTICLE 9 – SUBMISSION OF BIDS

9.1 Bids, Bid Security and other required documents shall be submitted prior to the time and at the place indicated in the Bid Solicitation.

9.2 Submit Bid Documents, in a sealed envelope, properly identified.

9.3 If the Bid Documents are sent through the mail or other delivery system, the sealed envelope shall be enclosed in a separate envelope with the notation "BID ENCLOSED" on the face thereof.

9.4 Bid documents may not be sent by facsimile. Bids must be submitted in a sealed envelope as stated in part 9.2

9.5 A <u>mandatory</u> pre-bid meeting will be held at 10:00 a.m. on Monday, October 26, 2020 at the Clinton County Road Commission Office: 3536 S. US Highway 27, St Johns, Michigan 48879. The OWNER and ENGINEER will be present to discuss the project. Prospective bidders are required to attend and participate in the pre-bid meeting. All bidders must sign in by name of attendee and business represented. Only bids from bidders in attendance at the pre-bid meeting will be opened. All others will be considered non-responsive.

ARTICLE 10 – MODIFICATION AND WITHDRAWAL OF BIDS

10.1 Bids may be modified or withdrawn by an appropriate document duly executed and delivered to the place where Bids are to be submitted at any time prior to the opening of Bids.

10.2 If, within 24 hours after Bids are opened, any BIDDER files a duly signed notice with OWNER and promptly thereafter demonstrates to the reasonable satisfaction of OWNER that there was a material and substantial mistake in the preparation of Bid, that BIDDER may withdraw its Bid, and the Bid Security will be returned by OWNER.

ARTICLE 11 – OPENING OF BIDS

The Bid opening location and time will be as indicated in the Bid Solicitation.

ARTICLE 12 - BID HOLD PERIOD

All bids shall remain firm, after the day of the Bid opening, for the period stipulated in the Bid Solicitation.

ARTICLE 13 – AWARD OF CONTRACT(S)

13.1 BIDDER will be required to complete Bid documentation and correct irregularities as a condition of award. OWNER reserves the right to reject any and all Bids and waive any and all irregularities. OWNER further reserves the right to accept or reject nonconforming, qualified, alternate or conditional Bids.

13.2 In evaluating Bids, OWNER will consider the qualifications of the BIDDERS, whether or not the Bids comply with the prescribed requirements and include completed alternates and unit prices if requested in the Bid Form. OWNER may conduct investigations to establish the responsibility, qualifications and financial ability of the BIDDERS and proposed Subcontractors to do the Work within the prescribed time. OWNER reserves the right to reject the Bid of any BIDDER who does not pass such evaluation to OWNER's satisfaction.

13.3 Subject to the rights reserved by the OWNER, it is intended that a contract will be awarded to a responsible, responsive BIDDER whose evaluation indicates to OWNER that such award will be in the best interests of the OWNER.

13.4 Prior to the Notice of Award, ENGINEER will notify the apparent successful BIDDER if OWNER, after due investigation, has reasonable objection to any listed Subcontractor(s), where such listing is requested in the Bid Form. Failure of OWNER to make objection prior to Notice of Award will constitute acceptance of the listed Subcontractor(s), but not a waiver of any right of OWNER to reject defective work, material or equipment, or material and equipment not in conformance with the requirements of the Contract Documents.

13.5 If, prior to the Notice of Award, OWNER refuses to accept any listed Subcontractor(s), the apparent successful BIDDER may:

A. Submit an acceptable substitute without an increase in bid price; or

B. Withdraw Bid and Bid Security.

13.6 If, after Notice of Award, OWNER refuses to accept any Subcontractor, CONTRACTOR shall submit an acceptable substitute and the Contract Price will be adjusted by the difference in cost occasioned by such substitution.

13.7 Concurrently with execution and delivery of Agreement, CONTRACTOR shall deliver to OWNER the Bonds, insurance certificates and other information as required by the Contract Documents.

13.8 If Bidder is a business entity (i.e., corporation, partnership, joint venture, etc.) organized under the laws of a state other than the state of the location of the Work, Bidder must provide evidence of proper registration to do business in the state of the location of the Work as a condition to execution of the Agreement.

13.9 The Agreement and such other documents as required will be signed by OWNER and CONTRACTOR within 25 days of the Notice of Award. OWNER will sign Agreement within 10 days of receipt of required Bonds, insurance certificates, other required information, and CONTRACTOR executed Agreement. OWNER, CONTRACTOR, SURETY and ENGINEER will each receive an executed copy of the Agreement.

Geotechnical evaluation was performed by SME in April, 2020

The Geotechnical Report is included in contrac specifications.

GEOTECHNICAL EVALUATION REPORT

CHURCH ROAD OVER MUSKRAT CREEK
STRUCTURE NUMBER 13138
RILEY TOWNSHIP, CLINTON COUNTY, MICHIGAN

SME Project Number: 084096.00
September 25, 2020

SME

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Kalamazoo, MI 49008-5611

T (269) 323-3555

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September 25, 2020

Mr. Marc Trotter, PE
Director of Engineering
Clinton County Road Commission
3536 S. Business Route US 127
St. Johns, Michigan 48879

Via E-mail: trotterm@ccrc-roads.com (PDF file)

RE: Geotechnical Evaluation
Church Road over Muskrat Creek – Structure No. 13138
Riley Township, Clinton County, Michigan
SME Project No. 084096.00

Dear Mr. Trotter:

We have completed our geotechnical evaluation for the referenced project. This report summarizes the conditions at the exploratory locations and provides geotechnical design and construction recommendations for the proposed culvert replacement.

We appreciate this opportunity to be of service. If you have questions or require additional information, please contact me.

Sincerely,

SME

Scott T. Roosa, PE
Senior Consultant

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1. INTRODUCTION

This report presents the results of the geotechnical evaluation performed by SME for the proposed structure replacement carrying Church Road over Muskrat Creek – Structure No. 13138. This evaluation was conducted in general accordance with the scope of services outlined in SME Proposal No. P01175.20, dated April 16, 2020. Our services for this project were authorized by the Clinton County Road Commission (CCRC).

SME received the following information, which was used in the evaluation and preparation of this report:

- A request for engineering services proposal, dated April 9, 2020, and prepared by the CCRC.
- Existing bridge drawings titled “Existing Bridge Sketches”, dated February 3, 2020, and prepared by the CCRC.
- A plan sheet (Sheet Number A, latest issue date of 07/13/2020) showing preliminary plan and profile drawings for two new structure options, and prepared by Land & Resource Engineering (LRE).

1.1 SITE CONDITIONS AND PROJECT DESCRIPTION

The existing structure carrying Church Road over Muskrat Creek is located about 0.4 miles west of South Forest Hill Road in Riley Township, Clinton County, Michigan. Church Road is a two-lane gravel roadway, and the road was closed at the crossing at the time of our evaluation. The location of the site is shown on the Location Map inset on the Boring Location Diagram (Figure No. 1) included in Appendix A.

The existing structure consists of four, 7½-foot by 8-foot timber box barrels with about 8 feet of cover. Based on our understanding, the existing structure was built in 1970, with partial rehabilitation completed in 2012. Muskrat Creek, which flows south to north under Church Road, is under the jurisdiction of the Clinton County Drain Commissioner (CCDC). Image 1, below, depicts the existing structure in April 2020.

IMAGE 1: Photo of north side of structure taken on April 24, 2020.

Based on information provided by LRE, the new structure is planned to consist of a 24-foot (span) by 10-foot (rise) four-sided concrete box culvert. The length of the proposed improvements along Church Road is anticipated to be limited to that necessary to construct the new culvert, beginning near Station 1+55 and ending near Station 2+55. Based on the topographic information shown on the plans provided by

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LRE, the surface of Church Road is between about elevations 742 and 745 feet within the project limits, and the flow line of Muskrat Creek is near elevation 727 feet. The invert of the new structure is planned to match that of the existing structure near elevation 725 feet. The proposed grades on Church Road are planned to match the existing grades. Slopes for incidental embankment widening in the reconstruction area are planned to be established at 1 Vertical to 2 Horizontal (1V:2H) or flatter.

2. EVALUATION PROCEDURES

2.1 FIELD EXPLORATION

SME completed three borings (designated B1, B2, and B2A) at the site on April 30, 2020. Borings B1 and B2A extended to depths of 49½ feet and 49 feet, respectively, below the existing ground surface. Boring B2 extended 11 feet below the existing ground surface. During soil sampling activities for boring B2, the drillers encountered concrete debris and rubble and terminated the boring about 11 feet below existing ground surface because of drilling refusal. The boring was then offset 7 feet east, and a new boring was completed (designated as boring B2A). The drillers advanced augers at boring B2A without sampling (i.e., "blind-drilled") to 8½ feet below the existing ground surface and then resumed sampling to the explored depth. The approximate locations of the borings are shown on Figure No. 1.

On April 24, 2020, SME visited the site to review the existing site conditions. During this site visit, SME used a hand-operated bucket auger to obtain soil samples from the creek bed for particle size distribution analysis. The sampling location is referred to as hand auger boring HAB1, and the location of this boring is shown on Figure No. 1. The soils collected from the hand auger bucket were sealed in plastic bags. A muck probe sounding rod was used to probe the creek bed to estimate the depth of soft/loose sediment in the creek bed. The muck probes were performed with a $^{7}/_{16}$-inch diameter steel rod and pointed tip attached to a tee handle. The muck probes were manually advanced through the sediment until refusal was encountered, at which point the depth from existing creek bottom to the probe tip was recorded.

The CCRC and SME jointly determined the planned number, locations, and depths of the borings. SME staked the planned boring locations by measuring from and referencing existing site features. SME obtained the latitude and longitude coordinates (WGS 84) at the planned boring locations using a Trimble GeoXH GPS device with sub-meter accuracy, and these coordinates are shown on the logs for borings B1 and B2. The existing ground surface elevations at the boring locations were estimated by SME to the nearest 1 foot based on topographic information shown on the plans by LRE.

The borings were drilled using a truck-mounted rotary drill rig and were advanced using continuous-flight, hollow-stem augers. The borings included soil sampling based upon the Split-Barrel Sampling procedure. Recovered split-barrel samples were sealed in glass jars by the driller.

Groundwater observations were recorded during and immediately after completion of each boring. The boreholes were backfilled with auger cuttings after completion and collection of groundwater readings. Therefore, long-term groundwater levels were not obtained from the borings. The boreholes were capped with concrete after backfilling.

Soil samples recovered from the field exploration were delivered to the SME laboratory for further observation and testing.

2.2 LABORATORY TESTING

The laboratory testing program consisted of performing visual soil classification on recovered soil samples in general accordance with ASTM D-2488. Moisture content and hand penetrometer tests were performed on a portion of cohesive samples recovered from the borings. In addition, a sieve analysis (gradational analysis test) was performed on a representative sample obtained from the channel/creek bottom at the location of hand auger boring HAB1. The Laboratory Testing Procedures in Appendix B

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provides general descriptions of the laboratory tests. Based on the laboratory testing, we described the soils and assigned a Unified Soil Classification System (USCS) group symbol to each of the soil strata observed.

Upon completion of the laboratory testing, boring logs were prepared that include information on materials encountered, the soil descriptions, penetration resistances, pertinent field observations made during the drilling operations, and the results of the laboratory testing (except for the results of the gradational analysis test). The boring logs are included in Appendix A. Explanations of symbols and terms used on the boring logs are provided on the Boring Log Terminology sheet included in Appendix A. A Particle Size Distribution Report with the gradational analysis results for the sample obtained at HAB1 is included in Appendix A.

Soil samples are normally retained in our laboratory for 60 days and are then disposed of, unless instructed otherwise.

3. SUBSURFACE CONDITIONS

3.1 SOIL CONDITIONS

As indicated on the boring logs, a hammer efficiency was available for the drill rig used to complete the borings. Therefore, the N-values shown on the logs and discussed in this report represent N-values normalized or corrected to a 60 percent hammer efficiency (N_{60}).

The soil conditions observed at borings B1 and B2/B2A (located within the gravel roadway of Church Road) generally consisted of about 4 to 8 inches of sand and gravel overlying sandy fill (designated as “SP” and “SM” according to the USCS) extending to a depths of 9.5 to 11 feet. At the location of boring B2, the fill contained concrete fragments to a depth about 11 feet and the borehole had to be abandoned due to drilling refusal. No concrete fragments were observed at the offset location, boring B2A, within the fill. Below the fill, the underlying naturally occurring soils consisted of sand and silt strata extending to depths of about 33 to 34 feet below the existing ground surface, underlain by silty clay extending to the maximum depths explored. Based on the N-values from the sampling, the relative density of the sand and silt strata was generally described as medium dense to dense. The consistency of the silty clay was generally described as very stiff to hard based on hand penetrometer-type shear strength estimates typically in the range of 3 to more than 4½ kips per square-foot (ksf), and moisture contents ranged from about 7 to 12 percent.

SME performed muck probes in the channel at the upstream and downstream ends of the culvert. Muck probes north of the existing culvert (at the downstream end) were advanced about 36 inches below the creek bottom prior to encountering a “hard bottom”. On the south (upstream) side of the culvert, SME advanced muck probes about 24 to 27 inches below the existing creek bottom prior to encountering refusal on what was anticipated to be crushed concrete or riprap. Based on our observations, the soft conditions encountered above refusal consisted of loose granular sediment. Concrete fragments and riprap were observed on the creek banks on the upstream side of the culvert.

The soil profile described above and included on the boring logs is a generalized description of the conditions observed. The stratification depths described above and shown on the boring logs are intended to indicate a zone of transition from one soil type to another. They are not intended to show exact depths of change from one soil type to another. The soil descriptions are based on visual classifications of the soils encountered. Soil conditions may vary between or away from the boring locations. Refer to the boring logs for the soil conditions at the specific boring locations.

Thickness measurements of surficial materials reported on the boring logs should be considered approximate since mixing of these materials with the underlying subgrade can occur while advancing the augers, and it is difficult to measure the thickness of surface materials in small-diameter boreholes.

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Therefore, if accurate thickness measurements are required for inclusion in bid documents of for quantity estimates, additional evaluations, such as shallow test pits, should be performed.

3.2 GROUNDWATER CONDITIONS

Groundwater was observed during and upon completion of drilling at depths of 13 feet and 12 feet below the existing ground surface at borings B1 and B2A, respectively, or between about elevations 729 and 731 feet. These observations are relatively consistent with the water level in the creek at the time of the field exploration. As indicated above, the flow line of the creek is shown to be near elevation 727 feet on the plans by LRE.

Groundwater levels should be expected to fluctuate throughout the year, based on variation in precipitation, evaporation, run-off, the surface water levels in the existing creek, and other factors. The groundwater levels reported on the boring logs and presented in this section represent conditions at the time the readings were taken. The groundwater level at the time of construction may vary from those conditions noted on the logs.

4. ANALYSIS AND RECOMMENDATIONS

4.1 CULVERT SUPPORT AND GROUNDWATER CONTROL

Information shown on the preliminary plans indicates the bottom of the new box culvert will be established near elevation 724 feet. Based on our observations at the boring locations, the culvert foundation subgrade is anticipated to consist of wet, medium dense sands. A layer of medium dense (cohesionless) silt was observed at borings B1 and B2A below about elevation 721 to 723 feet. In general, these conditions are anticipated to provide suitable support for the proposed box culvert, provided the subgrade is adequately prepared. Due to the presence of wet sand, we anticipate a cofferdam consisting of driven steel sheeting will be necessary to divert the creek and facilitate excavations for the placement of the new structure. Considering the presence of the silt stratum beginning at about elevation 721 to 723 feet, we anticipate that dewatering a closed excavation (cofferdam) using multiple sumps and pumps will be suitable to dewater the wet sands (with a cofferdam present) to facilitate placement of bedding material and the new structure. Deep wells are not anticipated to be effective due to the presence of the silt. We recommend the box structure be placed over a minimum of 12 inches of bedding material consisting of 9 inches of coarse aggregate 6A (modified to consist of at least 80 percent crushed), covered with 3 inches of aggregate 34R in accordance with Section 406.03.G.2 of the MDOT Standard Specifications for Construction. Prior to placement of the bedding material, the subgrade should be probed and tested for suitability of support. We recommend that disturbed or soft subgrade soils, if encountered, be undercut and replaced with additional crushed aggregate. The bottom of the proposed bedding material is anticipated to be below the soft/loose sediments encountered at the muck probe locations.

As an alternative to dewatering, consideration could also be given to constructing a concrete tremie seal inside the cofferdam. If a tremie seal is required or selected for use by the contractor, we recommend a minimum of 12 inches of MDOT CLASS III sand be used for bedding material below the culvert bottom and above the top of the concrete of the tremie seal. The bedding material may be placed directly on top of the tremie seal and compacted with a vibratory plate compactor.

Due to the presence of concrete fragments at the location of boring B2 on the east side of the existing culvert structure, some difficulty may be encountered during sheet pile installation for the cofferdam. It may be necessary to excavate adjacent to the existing structure and remove concrete debris/rubble in the existing backfill prior to installing the sheeting. It also may be necessary to shift the limits of the sheeting depending on the actual conditions encountered.

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4.2 BACKFILL REQUIREMENTS

Fill placed within the construction area, including structure backfill, should be an approved material, free of frozen soil, organics, or other deleterious materials. In accordance with the MDOT 2012 Stand Specifications for Construction, granular fill meeting MDOT Class II, III, or IIIA Granular Material will be required to backfill the culvert excavation within the limits of the roadbed. The sandy fill soils observed in borings B1 and B2 above the anticipated bearing elevation of the structure are not anticipated to meet the gradational requirements of MDOT Class II, III, IIIA Granular Material. We recommend granular fill meeting MDOT Class II be imported to the site for use as structure backfill. The fill should be placed in level layers not exceeding 9 inches in loose thickness and be compacted to a minimum of 95 percent of the maximum dry density, per the MDOT specifications. Sand fill should be compacted with a smooth drum, vibratory roller or vibratory place compactor including either a walk-behind type compactor or a plate compactor mounted on a backhoe or excavator (i.e., a Ho-Pac®).

When backfilling, backfill on opposite sides of the culvert should be placed at the same time, so backfill levels on opposite sides do not differ by more than 2 feet. We recommend the manufacturer's requirements for placement and compaction of engineered fill around the culvert be compared to the recommendations provided above. Where recommendations for engineered fill placement and compaction in this report conflict with the manufacturer's recommendations, we recommend the manufacturer's recommendations govern.

Care should be taken during sheeting removal to not disrupt the bedding material and pipe backfill. Lateral movement of the backfill material could cause slippage in the box segments which would be detrimental following construction. If a tremie seal is utilized, the sheeting associated with the cofferdam should not be extracted and instead the top of the sheeting should be cut-off to a suitable elevation and the remaining portions of the sheeting left in-place.

4.3 OTHER DESIGN AND CONSTRUCTION CONSIDERATIONS

A design submittal for proposed excavation and dewatering methods should be prepared by the contractor's engineer and submitted to the project team for review and approval. The submittal should include details on excavation support, and details regarding dewatering. The contractor's engineer should also prepare a design submittal for the cofferdam, including for the tremie seal, if selected, and submit to the project team for review and comment. The design submittal for the cofferdam should include information on construction sequencing, sheeting section and depth, calculations that demonstrate stability under all construction conditions, including stability of the tremie seal (if selected) or bottom stability of the excavation inside the cofferdam. Information on existing and previous structures at the crossing location should be provided to the contractor so that this information can be considered in the development of plans for excavation and for construction of the cofferdam.

Construction of the new culvert will require temporarily diverting flow in the creek around the construction area. The contractor must provide protection of the work area from flows in the creek (including flood conditions) during construction. We recommend the proposed excavation and dewatering method be designed to protect the work area from flows in the creek during construction and to facilitate diversion of flow in the creek around the construction area. Temporary dewatering should remain in-place until backfilling is completed above the normal site groundwater levels (in the absence of dewatering). Performing the work during the drier summer months is recommended since flows in the creek are likely lowest during this time.

The contractor should take precautions to protect adjacent utilities and other structures during construction, if necessary. Critical utilities, if any, should be reviewed and made available to the contractor during the bidding phase as it will be critical in cofferdam design and construction.

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We recommend temporary construction slopes be graded no steeper than 1.5:1 (horizontal to vertical) due to the presence of sandy fill. Excavations into the wet sands will require support, as discussed. The condition of any temporary slope utilized during construction should be monitored for stability.

All excavations should be sloped, shored, or braced in accordance with MIOSHA requirements. The contractor should provide an adequately constructed and braced shoring system for employees working in an excavation that may expose employees to the danger of moving ground. If material is stored or heavy equipment is operated near an excavation, stronger shoring must be used to resist the increased pressure due to the superimposed loads.

5. SIGNATURES

Report Prepared By:

Scott T. Roosa, PE
Senior Consultant

Report Reviewed By:

Jeffery M. Krusinga, PE, GE
Senior Consultant

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APPENDIX A

BORING LOCATION DIAGRAM (FIGURE NO. 1)
BORING LOG TERMINOLOGY
BORING LOGS (B1, B2, AND B2A)
PARTICLE SIZE DISTRIBUTION REPORT

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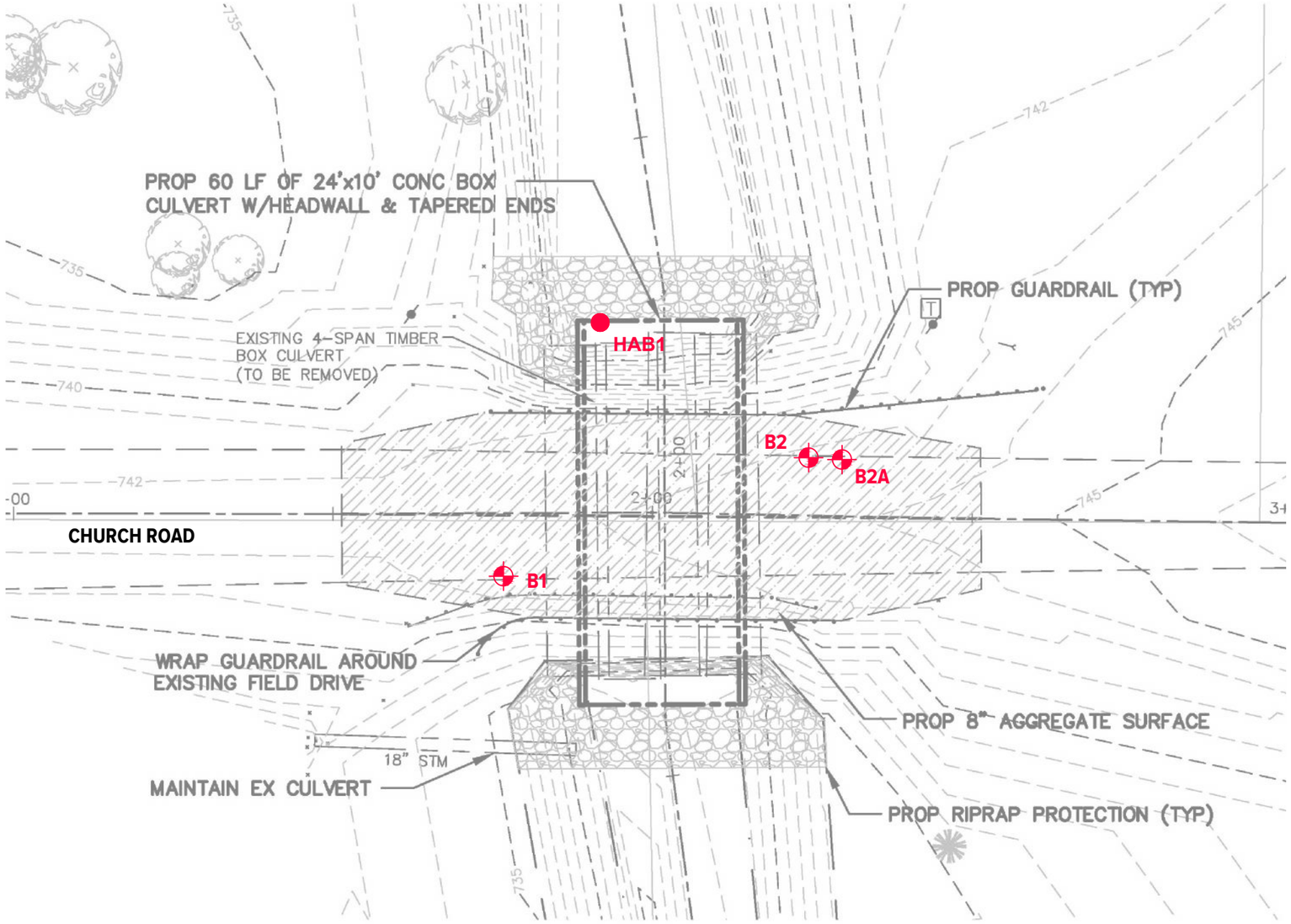

PLAN VIEW - OPTION 1 - CONC BOX CULVERT OPTION

0' 20' 40'

GRAPHIC SCALE: 1" = 20'

LEGEND

- APPROXIMATE BORING LOCATION
- APPROXIMATE HAND AUGER BORING LOCATION

LOCATION MAP
NOT TO SCALE

NOTE:
BASE DRAWING INFORMATION TAKEN FROM A PDF FILE TITLED "CHURCH RD OVER MUSKRAT CREEK CROSSING" (SHEET NUMBER A, LATEST ISSUE DATE OF 07/13/2020) PREPARED BY LAND & RESOURCE ENGINEERING.

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Project
CHURCH ROAD OVER MUSKRAT CREEK

Project Location
RILEY TOWNSHIP, CLINTON COUNTY, MICHIGAN

Sheet Name
BORING LOCATION DIAGRAM

No.	Revision Date

Date 09/14/2020
CADD JGR
Designer STR
Scale AS NOTED
Project 084096.00
Figure No. 1

DRAWING NOTE: SCALE DEPICTED IS MEANT FOR 11" X 17" AND WILL SCALE INCORRECTLY IF PRINTED ON ANY OTHER SIZE MEDIA

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PLOT DATE: Sep 25, 2020 - 12:10pm - jose.rios
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BORING LOG TERMINOLOGY

UNIFIED SOIL CLASSIFICATION AND SYMBOL CHART

COARSE-GRAINED SOIL (more than 50% of material is larger than No. 200 sieve size.)			
GRAVEL More than 50% of coarse fraction larger than No. 4 sieve size	Clean Gravel (Less than 5% fines)	GW	Well-graded gravel; gravel-sand mixtures, little or no fines
		GP	Poorly-graded gravel; gravel-sand mixtures, little or no fines
	Gravel with fines (More than 12% fines)	GM	Silty gravel; gravel-sand-silt mixtures
		GC	Clayey gravel; gravel-sand-clay mixtures
SAND 50% or more of coarse fraction smaller than No. 4 sieve size	Clean Sand (Less than 5% fines)	SW	Well-graded sand; sand-gravel mixtures, little or no fines
		SP	Poorly graded sand; sand-gravel mixtures, little or no fines
	Sand with fines (More than 12% fines)	SM	Silty sand; sand-silt-gravel mixtures
		SC	Clayey sand; sand–clay-gravel mixtures
FINE-GRAINED SOIL (50% or more of material is smaller than No. 200 sieve size)			
SILT AND CLAY Liquid limit less than 50%		ML	Inorganic silt; sandy silt or gravelly silt with slight plasticity
		CL	Inorganic clay of low plasticity; lean clay, sandy clay, gravelly clay
		OL	Organic silt and organic clay of low plasticity
SILT AND CLAY Liquid limit 50% or greater		MH	Inorganic silt of high plasticity, elastic silt
		CH	Inorganic clay of high plasticity, fat clay
		OH	Organic silt and organic clay of high plasticity
HIGHLY ORGANIC SOIL		PT	Peat and other highly organic soil

OTHER MATERIAL SYMBOLS

Topsoil, Void, Sandstone, Asphalt, Glacial Till, Siltstone, Base, Coal, Limestone, Concrete, Shale, Fill

LABORATORY CLASSIFICATION CRITERIA

GW	$C_U = \frac{D_{60}}{D_{10}}$ greater than 4; $C_C = \frac{D_{30}^2}{D_{10} \times D_{60}}$ between 1 and 3	
GP	Not meeting all gradation requirements for GW	
GM	Atterberg limits below "A" line or PI less than 4	Above "A" line with PI between 4 and 7 are borderline cases requiring use of dual symbols
GC	Atterberg limits above "A" line with PI greater than 7	
SW	$C_U = \frac{D_{60}}{D_{10}}$ greater than 6; $C_C = \frac{D_{30}^2}{D_{10} \times D_{60}}$ between 1 and 3	
SP	Not meeting all gradation requirements for SW	
SM	Atterberg limits below "A" line or PI less than 4	Above "A" line with PI between 4 and 7 are borderline cases requiring use of dual symbols
SC	Atterberg limits above "A" line with PI greater than 7	

Determine percentages of sand and gravel from grain-size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows:

Less than 5 percent……GW, GP, SW, SP
More than 12 percent……GM, GC, SM, SC
5 to 12 percent……Cases requiring dual symbols

- SP-SM or SW-SM (SAND with Silt or SAND with Silt and Gravel)
- SP-SC or SW-SC (SAND with Clay or SAND with Clay and Gravel)
- GP-GM or GW-GM (GRAVEL with Silt or GRAVEL with Silt and Sand)
- GP-GC or GW-GC (GRAVEL with Clay or GRAVEL with Clay and Sand)

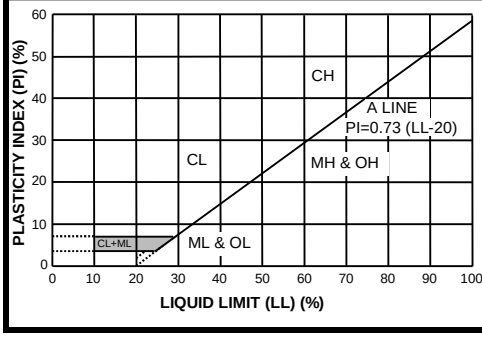
If the fines are CL-ML:

- SC-SM (SILTY CLAYEY SAND or SILTY CLAYEY SAND with Gravel)
- SM-SC (CLAYEY SILTY SAND or CLAYEY SILTY SAND with Gravel)
- GC-GM (SILTY CLAYEY GRAVEL or SILTY CLAYEY GRAVEL with Sand)

PARTICLE SIZES

Boulders	-	Greater than 12 inches
Cobbles	-	3 inches to 12 inches
Gravel- Coarse	-	3/4 inches to 3 inches
Fine	-	No. 4 to 3/4 inches
Sand- Coarse	-	No. 10 to No. 4
Medium	-	No. 40 to No. 10
Fine	-	No. 200 to No. 40
Silt and Clay	-	Less than (0.0074 mm)

PLASTICITY CHART



VISUAL MANUAL PROCEDURE

When laboratory tests are not performed to confirm the classification of soils exhibiting borderline classifications, the two possible classifications would be separated with a slash, as follows:

For soils where it is difficult to distinguish if it is a coarse or fine-grained soil:

- SC/CL (CLAYEY SAND to Sandy LEAN CLAY)
- SM/ML (SILTY SAND to SANDY SILT)
- GC/CL (CLAYEY GRAVEL to Gravelly LEAN CLAY)
- GM/ML (SILTY GRAVEL to Gravelly SILT)

For soils where it is difficult to distinguish if it is sand or gravel, poorly or well-graded sand or gravel; silt or clay; or plastic or non-plastic silt or clay:

- SP/GP or SW/GW (SAND with Gravel to GRAVEL with Sand)
- SC/GC (CLAYEY SAND with Gravel to CLAYEY GRAVEL with Sand)
- SM/GM (SILTY SAND with Gravel to SILTY GRAVEL with Sand)
- SW/SP (SAND or SAND with Gravel)
- GP/GW (GRAVEL or GRAVEL with Sand)
- SC/SM (CLAYEY to SILTY SAND)
- GM/GC (SILTY to CLAYEY GRAVEL)
- CL/ML (SILTY CLAY)
- ML/CL (CLAYEY SILT)
- CH/MH (FAT CLAY to ELASTIC SILT)
- CL/CH (LEAN to FAT CLAY)
- MH/ML (ELASTIC SILT to SILT)

DRILLING AND SAMPLING ABBREVIATIONS

2ST	–	Shelby Tube – 2" O.D.
3ST	–	Shelby Tube – 3" O.D.
AS	–	Auger Sample
GS	–	Grab Sample
LS	–	Liner Sample
NR	–	No Recovery
PM	–	Pressure Meter
RC	–	Rock Core diamond bit. NX size, except where noted
SB	–	Split Barrel Sample 1-3/8" I.D., 2" O.D., except where noted
VS	–	Vane Shear
WS	–	Wash Sample

OTHER ABBREVIATIONS

WOH	–	Weight of Hammer
WOR	–	Weight of Rods
SP	–	Soil Probe
PID	–	Photo Ionization Device
FID	–	Flame Ionization Device

DEPOSITIONAL FEATURES

Parting	–	as much as 1/16 inch thick
Seam	–	1/16 inch to 1/2 inch thick
Layer	–	1/2 inch to 12 inches thick
Stratum	–	greater than 12 inches thick
Pocket	–	deposit of limited lateral extent
Lens	–	lenticular deposit
Hardpan/Till	–	an unstratified, consolidated or cemented mixture of clay, silt, sand and/or gravel, the size/shape of the constituents vary widely
Lacustrine	–	soil deposited by lake water
Mottled	–	soil irregularly marked with spots of different colors that vary in number and size
Varved	–	alternating partings or seams of silt and/or clay
Occasional	–	one or less per foot of thickness
Frequent	–	more than one per foot of thickness
Interbedded	–	strata of soil or beds of rock lying between or alternating with other strata of a different nature

DESCRIPTION OF RELATIVE QUANTITIES

The visual-manual procedure uses the following terms to describe the relative quantities of notable foreign materials, gravel, sand or fines:

Trace	–	particles are present but estimated to be less than 5%
Few	–	5 to 10%
Little	–	15 to 25%
Some	–	30 to 45%
Mostly	–	50 to 100%

CLASSIFICATION TERMINOLOGY AND CORRELATIONS

Cohesionless Soils

Relative Density	N_{60} (N-Value) (Blows per foot)
Very Loose	0 to 4
Loose	5 to 10
Medium Dense	11 to 30
Dense	31 to 50
Very Dense	51 to 80
Extremely Dense	Over 81

Cohesive Soils

Consistency	N_{60} (N-Value) (Blows per foot)	Undrained Shear Strength (kips/ft^2)
Very Soft	<2	0.25 or less
Soft	2 - 4	> 0.25 to 0.50
Medium	5 - 8	> 0.50 to 1.0
Stiff	9 - 15	> 1.0 to 2.0
Very Stiff	16 - 30	> 2.0 to 4.0
Hard	> 30	> 4.0 or greater

Standard Penetration 'N-Value' = Blows per foot of a 140-pound hammer falling 30 inches on a 2-inch O.D. split barrel sampler, except where noted. N60 values as reported on boring logs represent raw N-values corrected for hammer efficiency only.

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BORING B1

BORING DEPTH: 49.5 FEET

PROJECT NAME: Church Road over Muskrat Creek
PROJECT NUMBER: 084096.00
CLIENT: Clinton County Road Commission
PROJECT LOCATION: Riley Township, Clinton County, Michigan

DATE STARTED: 4/30/20 **COMPLETED:** 4/30/20 **BORING METHOD:** Hollow-stem Augers
DRILLER: RM **RIG NO.:** 531-CME550LCX **LOGGED BY:** MWB **CHECKED BY:** STR

LATITUDE: 42.922127 N
LONGITUDE: -84.689675 W
ELEVATION: 742± FT

ELEV (FT)	DEPTH (FT)	PROFILE DESCRIPTION	SAMPLE TYPE/NO.	RECOVERY LENGTH (INCHES)	SPT BLOWS PER SIX INCHES
741.6	0.4	4 inches of SAND and GRAVEL	SB1	18	3 3 3
		FILL- Fine to Medium SILTY SAND- Frequent Sandy Clay Layers and Seams- Brown- Moist- Loose to Very Loose (SM)	SB2	18	1 2 1
			SB3	18	2 1 3
734.0	8.0				
732.5	9.5	FILL- Fine to Medium SILTY SAND- Frequent Wood Fibers- Brown and Orange- Moist- Medium Dense (SM)	SB4	18	7 10 11
			SB5	18	9 11 15
		Fine SAND- Brown- Moist to Wet- Dense to Medium Dense (SP)	SB6	18	6 8 12
			SB7	18	7 9 11
723.0	19.0		SB8	18	6 7 11
		SILT- Gray- Wet- Medium Dense (ML)	SB9	18	5 8 11
			SB10	18	7 8 10
714.0	28.0				
		SILT- Frequent Silty Clay Layers- Gray- Wet- Medium Dense (ML)	SB11	18	4 4 5

HAMMER EFFICIENCY: 83%
DATE: 3/10/2020
N_{60} --

DRY DENSITY (pcf) -- ■ 90 100 110 120
MOISTURE & ATTERBERG LIMITS (%) PL MC LL 10 20 30 40
SHEAR STRENGTH (KSF) 1 2 3 4
▽ HAND PENE.
⊠ TORVANE SHEAR
● UNC. COMP.
⊡ VANE SHEAR (PK)
× VANE SHEAR (REM)
◈ TRIAXIAL (UU)

REMARKS

GROUNDWATER & BACKFILL INFORMATION

	DEPTH (FT)	ELEV (FT)
▽ **DURING BORING:**	13.0	729.0
▼ **AT END OF BORING:**	13.0	729.0

BACKFILL METHOD: Note 4

NOTES:
1. The indicated stratification lines are approximate. The in-situ transitions between materials may be gradual.
2. The colors depicted on the symbolic profile are solely for visualization purposes and do not necessarily represent the in-situ colors encountered.
3. Water added to hollow-stem augers below a depth of 15 feet.
4. Borehole backfilled with auger cuttings to 6 inches below the ground surface and capped with concrete after backfilling the borehole.

(Continued Next Page)

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BORING B1

BORING DEPTH: 49.5 FEET

PROJECT NAME: Church Road over Muskrat Creek

PROJECT NUMBER: 084096.00

CLIENT: Clinton County Road Commission

PROJECT LOCATION: Riley Township, Clinton County, Michigan

LATITUDE: 42.922127 N
LONGITUDE: -84.689675 W
ELEVATION: 742± FT

HAMMER EFFICIENCY: 83%
DATE: 3/10/2020
N_{60} -- ○

DRY DENSITY (pcf) -- ■ (90 100 110 120)
MOISTURE & ATTERBERG LIMITS (%) (PL MC LL; 10 20 30 40)

▽ HAND PENE.
⊠ TORVANE SHEAR
● UNC. COMP.
⊡ VANE SHEAR (PK)
× VANE SHEAR (REM)
⊕ TRIAXIAL (UU)
SHEAR STRENGTH (KSF) (1 2 3 4)

ELEVATION (FEET)	DEPTH (FEET)	PROFILE DESCRIPTION	SAMPLE TYPE/NO. INTERVAL	RECOVERY LENGTH (INCHES)	SPT BLOWS PER SIX INCHES	REMARKS
710	30	SILT- Frequent Silty Clay Layers- Gray- Wet- Medium Dense (ML) *(continued)*				
	34.0 / 708.0		SB12	12	6 12 23	
	35	SILTY CLAY- Gray- Very Stiff (CL/ML)				
705	36.5 / 705.5					
			SB13	12	38 61	
700	40	Sandy SILTY CLAY- Gray- Hard (CL/ML)				
			SB14	18	36 38 70	
695	45					
	49.5 / 692.5		SB15	12	41 74	
		END OF BORING AT 49.5 FEET.				
690	50					
685	55					
680	60					
675	65					
	70					

SB12: 48 (N60), 12 (MC); HAND PENE. 4.5+
SB13: 84+ (N60), 7 (MC); HAND PENE. 4.5+
SB14: 149 (N60), 7 (MC); HAND PENE. 4.5+
SB15: 100+ (N60), 9 (MC); HAND PENE. 4.5+

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BORING B2

BORING DEPTH: 11 FEET

PROJECT NAME: Church Road over Muskrat Creek **PROJECT NUMBER:** 084096.00

CLIENT: Clinton County Road Commission **PROJECT LOCATION:** Riley Township, Clinton County, Michigan

DATE STARTED: 4/30/20 **COMPLETED:** 4/30/20 **BORING METHOD:** Hollow-stem Augers

DRILLER: RM **RIG NO.:** 531-CME550LCX **LOGGED BY:** MWB **CHECKED BY:** STR

LATITUDE: 42.922168 N
LONGITUDE: -84.689504 W
ELEVATION: 743± FT

HAMMER EFFICIENCY: 83%
DATE: 3/10/2020
N_{60} -- ○

DRY DENSITY (pcf) -- ■ (90 100 110 120)
MOISTURE & ATTERBERG LIMITS (%) (PL MC LL)

▽ HAND PENE.
⊠ TORVANE SHEAR
● UNC. COMP.
⊡ VANE SHEAR (PK)
× VANE SHEAR (REM)
◈ TRIAXIAL (UU)
SHEAR STRENGTH (KSF)

ELEVATION (FEET)	DEPTH (FEET)	PROFILE DESCRIPTION	SAMPLE TYPE/NO. INTERVAL	RECOVERY LENGTH (INCHES)	SPT BLOWS PER SIX INCHES	REMARKS
743	0					
	0.7	8 inches of SAND and GRAVEL				
742.3						
		FILL- Fine to Medium SILTY SAND with Gravel- Brown- Moist- Dense (SM)	SB1	18	8 10 13	
	3.0					
740			SB2	4	50/4"	
	5	FILL- Fine to Coarse SAND- Frequent Crushed Concrete Fragments- Occasional Cobbles- Gray to Brown- Moist- Extremely Dense (SP)	SB3	6	66	
735			SB4	2	50/3"	
	10					
732.0	11.0					
		END OF BORING AT 11.0 FEET.				Refusal on an obstruction at 11 feet.
730						
	15					
725						
	20					
720						
	25					
715						
	30					

GROUNDWATER & BACKFILL INFORMATION

GROUNDWATER WAS NOT ENCOUNTERED

BACKFILL METHOD: Note 3

NOTES:
1. The indicated stratification lines are approximate. The in-situ transitions between materials may be gradual.
2. The colors depicted on the symbolic profile are solely for visualization purposes and do not necessarily represent the in-situ colors encountered.
3. Borehole backfilled with auger cuttings to 6 inches below the ground surface and capped with concrete after backfilling the borehole.
4. Driller reported encountering an obstruction about 11 feet below the ground surface. Boring was then offset 7 feet east, blind-drilled to 8.5 feet, and then drilled and sampled to the explored depth of 49 feet. See the log for boring B2A.

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BORING B2A

BORING DEPTH: 49 FEET

PROJECT NAME: Church Road over Muskrat Creek
PROJECT NUMBER: 084096.00
CLIENT: Clinton County Road Commission
PROJECT LOCATION: Riley Township, Clinton County, Michigan

DATE STARTED: 4/30/20 **COMPLETED:** 4/30/20 **BORING METHOD:** Hollow-stem Augers
DRILLER: RM **RIG NO.:** 531-CME550LCX **LOGGED BY:** MWB **CHECKED BY:** STR

OFFSET: 7 ft. East of Boring B2
ELEVATION: 743± FT

ELEVATION (FEET)	DEPTH (FEET)	PROFILE DESCRIPTION	SAMPLE TYPE/NO. INTERVAL	RECOVERY LENGTH (INCHES)	SPT BLOWS PER SIX INCHES
740	0	Drilled Without Sampling (see the log for boring B2)			
735	5				
	8.5				
		FILL- Fine to Medium SILTY SAND- Brown- Moist- Medium Dense (SM)	SB1	18	4 4 5
	10.0				
730	10	Fine to Medium SAND- Brown- Moist (SP)	SB2	18	5 8 13
	11.5				
		Fine SILTY SAND- Brown- Moist to Wet- Medium Dense to Dense (SM)	SB3	18	8 12 13
725	15		SB4	18	7 9 15
	18.0				
		Fine SAND- Brown- Wet- Dense (SP)	SB5	18	8 10 15
720	20		SB6	18	8 10 13
	22.0				
			SB7	18	9 11 17
715	25	SILT- Gray- Wet- Dense to Medium Dense (ML)			
			SB8	18	5 6 6
	30				

HAMMER EFFICIENCY: 83%
DATE: 3/10/2020
N_{60} -- ○

DRY DENSITY (pcf) -- ■ (90 100 110 120)
MOISTURE & ATTERBERG LIMITS (%) (PL MC LL) (10 20 30 40)

SHEAR STRENGTH (KSF) (1 2 3 4)
▽ HAND PENE.
⊠ TORVANE SHEAR
● UNC. COMP.
⊡ VANE SHEAR (PK)
× VANE SHEAR (REM)
◈ TRIAXIAL (UU)

REMARKS

GROUNDWATER & BACKFILL INFORMATION

	DEPTH (FT)	ELEV (FT)
▽ **DURING BORING:**	12.0	731.0
▼ **AT END OF BORING:**	12.0	731.0

BACKFILL METHOD: Note 3

NOTES:
1. The indicated stratification lines are approximate. The in-situ transitions between materials may be gradual.
2. The colors depicted on the symbolic profile are solely for visualization purposes and do not necessarily represent the in-situ colors encountered.
3. Water added to hollow-stem augers below a depth of 15 feet.
4. Borehole backfilled with auger cuttings to 6 inches below the ground surface and capped with concrete after backfilling the borehole.

(Continued Next Page)

SME

BORING B2A

BORING DEPTH: 49 FEET

PROJECT NAME: Church Road over Muskrat Creek

PROJECT NUMBER: 084096.00

CLIENT: Clinton County Road Commission

PROJECT LOCATION: Riley Township, Clinton County, Michigan

OFFSET: 7 ft. East of Boring B2
ELEVATION: 743± FT

ELEVATION (FEET)	DEPTH (FEET)	PROFILE DESCRIPTION	SAMPLE TYPE/NO. INTERVAL	RECOVERY LENGTH (INCHES)	SPT BLOWS PER SIX INCHES	REMARKS
710	33.0	SILT- Gray- Wet- Dense to Medium Dense (ML) *(continued)*	SB9	18	9 13 20	
705	38.0		SB10	18	20 26 37	
700	43.0	Sandy SILTY CLAY- Gray- Hard to Stiff (CL/ML)	SB11	12	43 50 56	
695	49.0		SB12	6	71	
694.0		END OF BORING AT 49.0 FEET.				

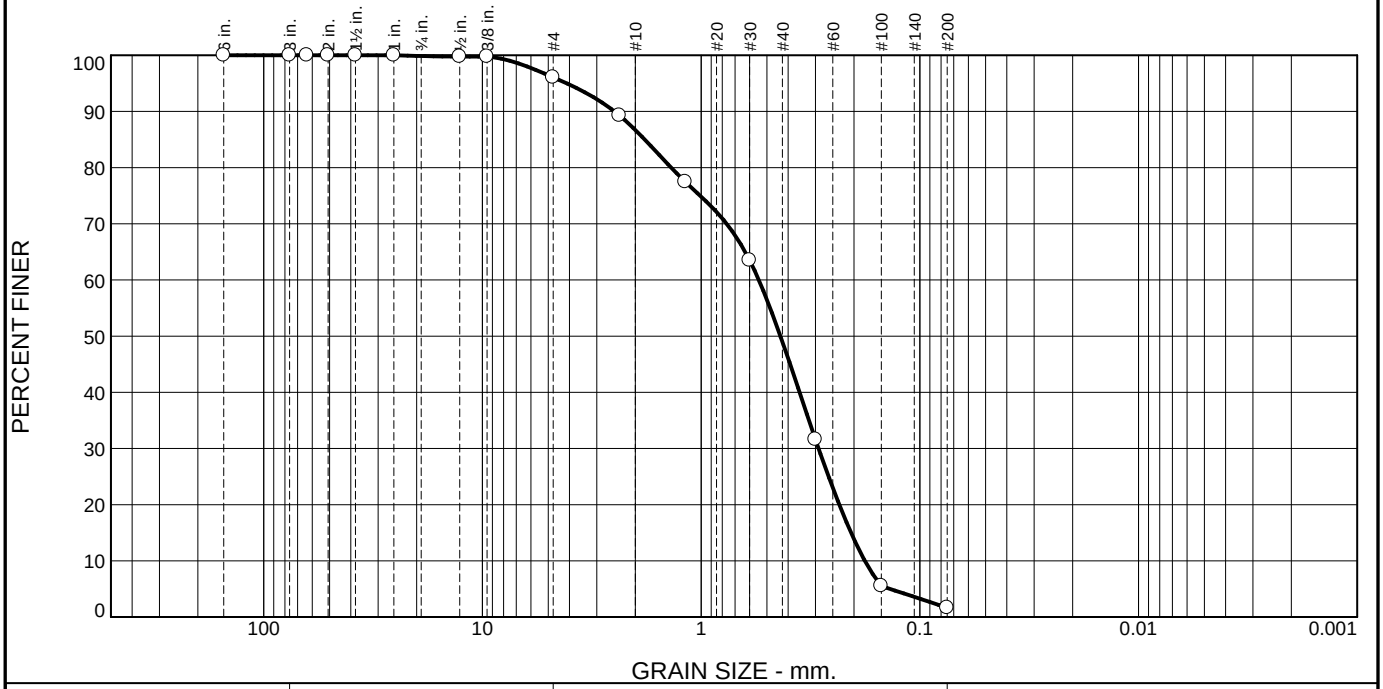
HAMMER EFFICIENCY: 83%
DATE: 3/10/2020
N_{60} -- ○

DRY DENSITY (pcf) -- ■ (90 100 110 120)
MOISTURE & ATTERBERG LIMITS (%) (PL MC LL)

HAND PENE. ▽
TORVANE SHEAR ⊠
UNC. COMP. ●
VANE SHEAR (PK) ⊡
VANE SHEAR (REM) ×
TRIAXIAL (UU) ⊕
SHEAR STRENGTH (KSF)

Depth	HAMMER EFFICIENCY: 83% DATE: 3/10/2020 N_{60} -- ○	DRY DENSITY (pcf) -- ■ 90 100 110 120 / MOISTURE & ATTERBERG LIMITS (%) PL MC LL	SHEAR STRENGTH (KSF) 1 2 3 4
35	46	10	4.5+
40	87	8	4.5+
45	147	11	
49	98+	11	

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.1	3.8	9.4	37.7	47.3	1.7	

Test Results (ASTM C136 & ASTM C117)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
6	100.0		
3	100.0		
2 1/2	100.0		
2	100.0		
1 1/2	100.0		
1	100.0		
1/2	99.8		
3/8	99.8		
#4	96.1		
#8	89.3		
#16	77.4		
#30	63.5		
#50	31.6		
#100	5.5		
#200	1.7		

* (no specification provided)

Material Description

Fine to Coarse SAND, Gray

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NP **PI=** NP

Classification

USCS (D 2487)= SP **AASHTO (M 145)=**

Coefficients

D_{90}= 2.4897 D_{85}= 1.8114 D_{60}= 0.5449
D_{50}= 0.4339 D_{30}= 0.2904 D_{15}= 0.2063
D_{10}= 0.1784 C_u= 3.05 C_c= 0.87

Remarks

Date Received: 4/24/2020 **Date Tested:** 5/8/2020

Tested By: Errol Gilbert, CET

Checked By: Scott Roosa, PE

Title: Senior Project Engineer

Location: HAB-1, 24 to 32 inches

Date Sampled: 4/24/2020

SME

Client: Clinton County Road Commission

Project: Church Road over Muskrat Creek

Project No: 084096.00 **Figure**

APPENDIX B

IMPORTANT INFORMATION ABOUT THIS GEOTECHNICAL-ENGINEERING REPORT

GENERAL COMMENTS

LABORATORY TESTING PROCEDURES

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, you can benefit from a lowered exposure to problems associated with subsurface conditions at project sites and development of them that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed herein, contact your GBA-member geotechnical engineer. Active engagement in GBA exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Understand the Geotechnical-Engineering Services Provided for this Report

Geotechnical-engineering services typically include the planning, collection, interpretation, and analysis of exploratory data from widely spaced borings and/or test pits. Field data are combined with results from laboratory tests of soil and rock samples obtained from field exploration (if applicable), observations made during site reconnaissance, and historical information to form one or more models of the expected subsurface conditions beneath the site. Local geology and alterations of the site surface and subsurface by previous and proposed construction are also important considerations. Geotechnical engineers apply their engineering training, experience, and judgment to adapt the requirements of the prospective project to the subsurface model(s). Estimates are made of the subsurface conditions that will likely be exposed during construction as well as the expected performance of foundations and other structures being planned and/or affected by construction activities.

The culmination of these geotechnical-engineering services is typically a geotechnical-engineering report providing the data obtained, a discussion of the subsurface model(s), the engineering and geologic engineering assessments and analyses made, and the recommendations developed to satisfy the given requirements of the project. These reports may be titled investigations, explorations, studies, assessments, or evaluations. Regardless of the title used, the geotechnical-engineering report is an engineering interpretation of the subsurface conditions within the context of the project and does not represent a close examination, systematic inquiry, or thorough investigation of all site and subsurface conditions.

Geotechnical-Engineering Services are Performed for Specific Purposes, Persons, and Projects, and At Specific Times

Geotechnical engineers structure their services to meet the specific needs, goals, and risk management preferences of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client.

Likewise, geotechnical-engineering services are performed for a specific project and purpose. For example, it is unlikely that a geotechnical-engineering study for a refrigerated warehouse will be the same as one prepared for a parking garage; and a few borings drilled during a preliminary study to evaluate site feasibility will not be adequate to develop geotechnical design recommendations for the project.

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project or purpose;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, the reliability of a geotechnical-engineering report can be affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying the recommendations in it. A minor amount of additional testing or analysis after the passage of time – if any is required at all – could prevent major problems.

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read the report in its entirety. Do not rely on an executive summary. Do not read selective elements only. *Read and refer to the report in full.*

You Need to Inform Your Geotechnical Engineer About Change

Your geotechnical engineer considered unique, project-specific factors when developing the scope of study behind this report and developing the confirmation-dependent recommendations the report conveys. Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the elevation, configuration, location, orientation, function or weight of the proposed structure and the desired performance criteria;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project or site changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept*

responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface using various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing is performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgement to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team through project completion to obtain informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, they are not final, because the geotechnical engineer who developed them relied heavily on judgement and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* exposed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a continuing member of the design team, to:

- confer with other design-team members;
- help develop specifications;
- review pertinent elements of other design professionals' plans and specifications; and
- be available whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction-phase observations.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for information purposes only.* To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. This happens in part because soil and rock on project sites are typically heterogeneous and not manufactured materials with well-defined engineering properties like steel and concrete. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually provide environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures.* If you have not obtained your own environmental information about the project site, ask your geotechnical consultant for a recommendation on how to find environmental risk-management guidance.

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, the engineer's services were not designed, conducted, or intended to prevent migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration. Confront the risk of moisture infiltration*** by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are not building-envelope or mold specialists.***

GEOPROFESSIONAL BUSINESS ASSOCIATION

Telephone: 301/565-2733
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GENERAL COMMENTS

BASIS OF GEOTECHNICAL REPORT

This report has been prepared in accordance with generally accepted geotechnical engineering practices to assist in the design and/or evaluation of this project. If the project plans, design criteria, and other project information referenced in this report and utilized by SME to prepare our recommendations are changed, the conclusions and recommendations contained in this report are not considered valid unless the changes are reviewed, and the conclusions and recommendations of this report are modified or approved in writing by our office.

The discussions and recommendations submitted in this report are based on the available project information, described in this report, and the geotechnical data obtained from the field exploration at the locations indicated in the report. Variations in the soil and groundwater conditions commonly occur between or away from sampling locations. The nature and extent of the variations may not become evident until the time of construction. If significant variations are observed during construction, SME should be contacted to reevaluate the recommendations of this report. SME should be retained to continue our services through construction to observe and evaluate the actual subsurface conditions relative to the recommendations made in this report.

In the process of obtaining and testing samples and preparing this report, procedures are followed that represent reasonable and accepted practice in the field of soil and foundation engineering. Specifically, field logs are prepared during the field exploration that describe field occurrences, sampling locations, and other information. Samples obtained in the field are frequently subjected to additional testing and reclassification in the laboratory and differences may exist between the field logs and the report logs. The engineer preparing the report reviews the field logs, laboratory classifications, and test data and then prepares the report logs. Our recommendations are based on the contents of the report logs and the information contained therein.

REVIEW OF DESIGN DETAILS, PLANS, AND SPECIFICATIONS

SME should be retained to review the design details, project plans, and specifications to verify those documents are consistent with the recommendations contained in this report.

REVIEW OF REPORT INFORMATION WITH PROJECT TEAM

Implementation of our recommendations may affect the design, construction, and performance of the proposed improvements, along with the potential inherent risks involved with the proposed construction. The client and key members of the design team, including SME, should discuss the issues covered in this report so that the issues are understood and applied in a manner consistent with the owner's budget, tolerance of risk, and expectations for performance and maintenance.

FIELD VERIFICATION OF GEOTECHNICAL CONDITIONS

SME should be retained to verify the recommendations of this report are properly implemented during construction. This may avoid misinterpretation of our recommendations by other parties and will allow us to review and modify our recommendations if variations in the site subsurface conditions are encountered.

PROJECT INFORMATION FOR CONTRACTOR

This report and any future addenda or other reports regarding this site should be made available to prospective contractors prior to submitting their proposals for their information only and to supply them with facts relative to the subsurface evaluation and laboratory test results. If the selected contractor encounters subsurface conditions during construction, which differ from those presented in this report, the contractor should promptly describe the nature and extent of the differing conditions in writing and SME should be notified so that we can verify those conditions. The construction contract should include provisions for dealing with differing conditions and contingency funds should be reserved for potential problems during earthwork and foundation construction. We would be pleased to assist you in developing the contract provisions based on our experience.

The contractor should be prepared to handle environmental conditions encountered at this site, which may affect the excavation, removal, or disposal of soil; dewatering of excavations; and health and safety of workers. Any Environmental Assessment reports prepared for this site should be made available for review by bidders and the successful contractor.

THIRD PARTY RELIANCE/REUSE OF THIS REPORT

This report has been prepared solely for the use of our Client for the project specifically described in this report. This report cannot be relied upon by other parties not involved in the project, unless specifically allowed by SME in writing. SME also is not responsible for the interpretation by other parties of the geotechnical data and the recommendations provided herein.

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LABORATORY TESTING PROCEDURES

VISUAL ENGINEERING CLASSIFICATION

Visual classification was performed on recovered samples. The appended General Notes and Unified Soil Classification System (USCS) sheets include a brief summary of the general method used visually classify the soil and assign an appropriate USCS group symbol. The estimated group symbol, according to the USCS, is shown in parentheses following the textural description of the various strata on the boring logs appended to this report. The soil descriptions developed from visual classifications are sometimes modified to reflect the results of laboratory testing.

MOISTURE CONTENT

Moisture content tests were performed by weighing samples from the field at their in-situ moisture condition. These samples were then dried at a constant temperature (approximately 110º C) overnight in an oven. After drying, the samples were weighed to determine the dry weight of the sample and the weight of the water that was expelled during drying. The moisture content of the specimen is expressed as a percent and is the weight of the water compared to the dry weight of the specimen.

HAND PENETROMETER TESTS

In the hand penetrometer test, the unconfined compressive strength of a cohesive soil sample is estimated by measuring the resistance of the sample to the penetration of a small calibrated, spring-loaded cylinder. The maximum capacity of the penetrometer is 4.5 tons per square-foot (tsf). Theoretically, the undrained shear strength of the cohesive sample is one-half the unconfined compressive strength. The undrained shear strength (based on the hand penetrometer test) presented on the boring logs is reported in units of kips per square-foot (ksf).

TORVANE SHEAR TESTS

In the Torvane test, the shear strength of a low strength, cohesive soil sample is estimated by measuring the resistance of the sample to a torque applied through vanes inserted into the sample. The undrained shear strength of the samples is measured from the maximum torque required to shear the sample and is reported in units of kips per square-foot (ksf).

LOSS-ON-IGNITION (ORGANIC CONTENT) TESTS

Loss-on-ignition (LOI) tests are conducted by first weighing the sample and then heating the sample to dry the moisture from the sample (in the same manner as determining the moisture content of the soil). The sample is then re-weighed to determine the dry weight and then heated for 4 hours in a muffle furnace at a high temperature (approximately 440º C). After cooling, the sample is re-weighed to calculate the amount of ash remaining, which in turn is used to determine the amount of organic matter burned from the original dry sample. The organic matter content of the specimen is expressed as a percent compared to the dry weight of the sample.

ATTERBERG LIMITS TESTS

Atterberg limits tests consist of two components. The plastic limit of a cohesive sample is determined by rolling the sample into a thread and the plastic limit is the moisture content where a 1/8-inch thread begins to crumble. The liquid limit is determined by placing a ½-inch thick soil pat into the liquid limits cup and using a grooving tool to divide the soil pat in half. The cup is then tapped on the base of the liquid limits device using a crank handle. The number of drops of the cup to close the gap formed by the grooving tool ½ inch is recorded along with the corresponding moisture content of the sample. This procedure is repeated several times at different moisture contents and a graph of moisture content and the corresponding number of blows is plotted. The liquid limit is defined as the moisture content at a nominal 25 drops of the cup. From this test, the plasticity index can be determined by subtracting the plastic limit from the liquid limit.

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Passionate People Building
and Revitalizing our World

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SECTION 00300 PROPOSAL

Douglas Steffen, Managing Director
Clinton County Road Commission
3536 S US Highway 27
St. Johns, MI 48879

ARTICLE 1-CONTRACT PRICE

Having carefully examined the site of the proposed Work; being fully informed of the conditions to be met in the prosecution and completion of the Work; having read and examined the Contract Documents applicable to this Work and agreeing to be bound thereby; the undersigned proposes to perform all services, and furnish all necessary labor, materials, tools, and equipment to complete the Work described in the Contract Documents for the amounts set forth in the accompanying Bid Form.

ARTICLE 2-CONTRACT TIME

If awarded a Contract, undersigned agrees to prosecute the Work regularly and diligently to ensure full completion within the Contract Time(s) indicated in the Agreement.

ARTICLE 3-LIQUIDATED DAMAGES

The undersigned agrees that liquidated damages, in the amount stipulated in the Agreement, shall be assessed for each day that expires after the completion time(s), stipulated in the Agreement, until the Work is complete.

ARTICLE 4 -BIDDER'S QUALIFICATIONS

The undersigned agrees to furnish, upon request, a list of projects of a similar nature completed in the last 3 years.

ARTICLE 5-WAIVER

The undersigned certifies the price(s) entered in the Bid Form are correct and complete and that all information given or furnished in connection therewith is correct, complete and submitted as intended. The undersigned waives any right to:

5.1 Claims he may now have or which may accrue to him,

5.2 Refuse to execute the Contract if awarded to him,

5.3 Demand the return of the Bid Security,

5.4 Be relieved from any obligation by reason of any errors, mistakes or omissions, subject to right of withdrawal of Bid as provided in the Instructions to Bidders.

ARTICLE 6-BID NON-COLLUSIVE

The undersigned certifies that this Proposal is fair, genuine and not collusive or sham, and has not in any manner, directly or indirectly, agreed or colluded with any other person, firm or association to submit a sham Bid, to refrain from bidding, or in any way to fix the amount of this Bid or that of any other BIDDER, or to secure any advantage against the OWNER. The undersigned further certifies that no officer or employee of the OWNER is personally or financially interested, directly or indirectly, in this Bid or in the undersigned.

ARTICLE 7-BID SECURITY

The undersigned encloses a Bid Security in the form and amount stipulated in the Instructions to Bidders. The undersigned agrees to contract for the Work and to furnish the necessary Bonds, Insurance Certificates and other information, as stipulated in the Instructions to Bidders. If this Proposal shall be accepted by the OWNER and the undersigned shall fail to contract as aforesaid and to furnish the required Bonds, Insurance Certificates and other information, then the undersigned shall be considered to have abandoned the Contract and the Bid Security accompanying this Proposal shall become due and payable to the OWNER.

ARTICLE 8-OWNERS' RIGHTS

In submitting this Bid, it is understood that the right is reserved by the OWNER to accept any Bid, or reject any or all Bids, or to waive irregularities and/or informalities in any Bid and to make the award in any manner deemed in the best interest of the OWNER. By submission of this bid, undersigned agrees to provide sufficient additional information to allow the OWNER to deduce the qualifications and capabilities of the undersigned to perform the WORK and to waive any claim that it has, or may have, against the OWNER, any of its agents, or employees, arising out of, or in connection with, the administration, evaluation or recommendation of any PROPOSAL.

ARTICLE 9-RECEIPT OF ADDENDA

Receipt of Addenda _____ through _____ is acknowledged.

SIGNED THIS _____ DAY OF _____, 20___.

_____ (Firm Name)

_____ (Signature)

_____ (Street Address)

_____ (Name Printed)

_____ (City, State and Zip)

_____ (Title)

_____ (Telephone No.)

LEGAL STATUS OF BIDDER: (Fill out appropriate form and cross out others.)

*A Corporation, duly organized in good standing and doing business under the laws of the state of _____, for whom _____ bearing the office title of _____ whose signature is affixed to this proposal, is duly authorized to execute contracts. If a foreign corporation, the BIDDER states this corporation is qualified to and will register in state in which project Work is located.

*A Partnership, all members of which with address are:

_____ _____

_____ _____

_____ _____

_____ _____

*An Individual whose name with address is:

_____ _____

ARTICLE 1-SCHEDULE OF PRICES

Having reviewed the site and being fully informed of the conditions and having thoroughly examined the plans and specifications pertaining to this work, the undersigned proposes to furnish all labor, materials (unless otherwise noted), tools and equipment for the specified work within the Contract Time and accepts the provisions for Liquidated Damages as described in Article 3 of the Agreement for Church Road Over Muskrat Creek..

Line #	Item ID - Description	Unit	Qty.	Unit Price	Bid Amount
1	1500001 - Mobilization, Max 10%	LS	1		
2	2030003 - Culv, Rem, Over 48 inch	Ea	1		
3	2040035 - Guardrail, Rem	Ft	132		
4	2057002 - Roadway Grading	Sta	1		
5	2060002 - Backfill Structure, CIP	Cyd	1,000		
6	2060010 - Excavation, Fdn	Cyd	900		
7	2080036 - Erosion Control, Silt Fence	Ft	200		
8	2087050 - Erosion Control, Sediment Log	Ea	1		
9	2090001 - Project Cleanup	LS	1		
10	3010002 - Subbase, CIP	Cyd	120		
11	3060012 - Aggregate SurfaceCse, 8 inch	Syd	350		
12	4017051 - Culv, Precast Conc Box, 24 foot by 10 foot, Furn and Install	Ft	60		
13	4060005 - Culv Bedding, Box Culv	Cyd	63		
14	4067050 - Bypass Pumping	Ea	1		
15	8070000 - Guardrail, Type B	Ft	75		
16	8070010 - Guardrail, Curved, Type B	Ft	12.5		
17	8070040 - Guardrail Approach Terminal, Type 1B	Ea	1		
18	8070050 - Guradrail Departing Terminal, Type B	Ea	2		
19	8070080 - Guardrail Reflector	Ea	8		
20	8120020 - Barricade, Type III, High Intensity, Furn	Ea	4		
21	8120021 - Barricade, Type III, High Intensity, Oper	Ea	4		
22	8120170 - Minor Traffic Devices	LS	1		
23	8120250 - Plastic Drum, High Intensity, Furn	Ea	10		
24	8120251 - Plastic Drum, High Intensity, Oper	Ea	10		
25	8120350 - Sign, Type B, Temp, Prismatic, Furn	Sft	64		
26	8120351 - Sign, Type B, Temp, Prismatic, Oper	Sft	64		
27	8130005 - Riprap, Heavy	Syd	200		
28	8160101 - Slope Restoration, Type B	Syd	200		
29	8160102 - Slope Restoration, Type C	Syd	200		

Bid Total = _____

ARTICLE 2-MATERIAL AND EQUIPMENT ALTERNATES

The Contract Documents stipulate that the Base Bid price shall include materials and equipment selected from the designated items and manufacturers listed therein. This is done to establish uniformity in bidding and to establish standards of quality for the items named.

If the BIDDER wishes to quote alternate items for consideration by the OWNER, he may do so under this Article. A complete description of the item and the proposed price differential are to be provided. Unless approved at the time of award, substitutions, where items are specifically named, will be considered only in accordance with the terms set forth in the General Conditions.

Item No.	Description	Add/Deduct

ARTICLE 3-TIME ALTERNATE

If the BIDDER takes exception to the time(s) stipulated in Section 00500 Article 3 - Contract Time of the Agreement, he is requested to stipulate below his proposed time for performance of the Work. Consideration will be given to time in evaluating bids.

ARTICLE 4-SUBCONTRACTOR LISTING

Bid is submitted on the basis of the use of the following Subcontractors:

Work Item	Firm	City

Please note if work is to be performed by BIDDER. Failure to list Subcontractors with the Bid waives BIDDER'S rights to a change in Contract Time or Price or withdrawal of Bid and Bid Security; in the event OWNER has reasonable objection to any Subcontractor.

OWNER shall have the right to reject any Subcontractor for reasonable cause. If Subcontractors are not identified in the Bid, the BIDDER/CONTRACTOR shall engage a Subcontractor acceptable to OWNER and waives the right to withdraw Bid and Bid Security, and further, waives right to a change in Contract Time or Price due to failure to list.

SECTION 00500 AGREEMENT

This Agreement is dated the _____ day of _____ 20___, by and between the Clinton County Road Commission hereinafter called OWNER, and _____, hereinafter called CONTRACTOR.

OWNER and CONTRACTOR, in consideration of the mutual covenants set forth herein, agree as follows:

ARTICLE 1-WORK

CONTRACTOR shall complete the Work as specified or indicated in the Contract Documents, generally described as follows: Church Road Over Muskrat Creek.

ARTICLE 2-ENGINEER

The Work has been designed by the firm of Land & Resource Engineering, who will act as ENGINEER on the Work, unless Notice is otherwise given by the OWNER.

ARTICLE 3-CONTRACT TIME

3.1 The Work to be completed under this Contract may be commenced 10 days after receipt of a fully executed Contract and Notice to Proceed.

3.2 The Work under this Contract, including all items except for final restoration and project clean-up, shall be substantially complete on or before April 30, 2021 in accordance with the General Conditions. The Work under this Contract shall be completed and set for final payment in accordance with the General Conditions on or before May 15, 2021. These dates shall be the Contract Time(s).

3.3 OWNER and CONTRACTOR recognize that time is of the essence of this Contract and that OWNER will suffer financial loss if the Work is not completed within the Contract Time(s) plus any extensions as provided for in the General Conditions. They recognize that the financial loss suffered by OWNER in the event that CONTRACTOR fails to complete the Work within the Contract Time(s) would be most difficult to determine accurately in any legal or arbitration proceedings. Instead of requiring such proof, OWNER and CONTRACTOR agree that as liquidated damages, but not as a penalty, CONTRACTOR shall pay OWNER Three Hundred & 00/100 Dollars ($300.00) for each day of delay in the completion of the Work beyond the Contract Time(s).

3.4 CONTRACTOR agrees to pay, in addition to liquidated damages, expenses arising from failure to complete the Work within the Contract Time including expenses for engineering services, attorney's fees, technical services and administration costs.

ARTICLE 4-CONTRACT PRICE

4.1 OWNER shall pay CONTRACTOR for performance of the Work in accordance with the Contract Documents in current funds as follows: _____ Dollars ($_____).

4.2 The amount paid shall be equitably adjusted to cover changes in the Work ordered by the ENGINEER but not required by the specifications. Such increases or decreases in the Contract Price shall be determined by agreement between the OWNER and CONTRACTOR.

ARTICLE 5-PAYMENTS

5.1 CONTRACTOR will prepare and submit monthly and final payment requests in accordance with the General Conditions.

5.2 OWNER will make monthly and final payments in accordance with the GENERAL CONDITIONS.

5.3 All monies not paid when due shall bear interest at the greater of the rate of 7% per annum, or the highest rate allowed by law.

ARTICLE 6-CONTRACT DOCUMENTS

6.1 The complete Contract between OWNER and CONTRACTOR consists of the following Contract Documents:

Notice of Letting	General Conditions
Instruction to Bidders	Supplemental Conditions
Proposal	Specifications / Special Provisions
Bid Form	Drawings
Bonds	Agreement
Modifications	Addenda (numbers ___ thru ___ inclusive)

6.2 In resolving conflicts, errors and discrepancies, the Contract Documents shall be given precedence in the following order: Modifications, Agreement, Addenda Supplemental Conditions, General Conditions, Specifications, Drawings, Advertisement, Instructions to Bidders, Proposal/Bid Form, and Bonds.

ARTICLE 7-CONTRACTOR'S REPRESENTATION

7.1 By executing the Agreement, CONTRACTOR represents that CONTRACTOR has visited the Site and assumes full responsibility for being familiar with the nature and extent of the Contract Documents, Work, locality, local conditions and availability of manpower, materials and machinery that may in any manner affect the Work to be done, the Contract Price or the Contract Time.

7.2 Contractor is familiar with all federal, state and local laws and regulations that pertain to completion of the Work as specified in the contract documents.

7.3 CONTRACTOR has carefully studied and compared the Contract Documents and checked and verified all figures shown thereon and all field measurements. CONTRACTOR has reported to ENGINEER any conflict, error or discrepancy which CONTRACTOR has discovered.

ARTICLE 8-MISCELLANEOUS

8.1 Terms used in this Agreement are defined in the General Conditions.

8.2 Neither party shall assign, in whole or in part, any of its rights or obligations, including any monies due, or to become due, under the terms of the Contract Documents without the written prior consent of the other party. This paragraph shall not be construed to limit the powers vested in the OWNER under the General Conditions.

8.3 The OWNER and CONTRACTOR each binds itself, successors and assigns to the other party hereto in respect to all covenants, agreements, and obligations contained in the Contract Documents.

8.4 The Contract Documents may only be altered, amended, or repealed by a Modification.

IN TESTIMONY WHEREOF, the parties hereto have executed this contract in at least three (3) counterparts, each of which shall be deemed an original, the day and year first above written.

WITNESS

CONTRACTOR

(Contractor)

(Name)

By
(Signature)

Title

WITNESS

OWNER

Clinton County Road Commission

Douglas Steffen

By
(Signature)

Title: Managing Director

LEGAL STATUS OF CONTRACTOR: (Fill out appropriate form and cross out others.)

*A Corporation: The same officer shall not execute both the Agreement and this certificate, unless only one person occupies all corporation offices.

I, _____ certify that I am the _____ _____ of the corporation named as CONTRACTOR herein; that _____, who signed this Agreement on behalf of the corporation, was then _____ of the corporation, that the Agreement was duly signed for and in behalf of the corporation by authority of its board of directors, and is within the scope of its corporate powers. If a foreign corporation, this corporation is qualified to and will register in state in which project Work is located.

_____ _____ LS
(Date) (Signature)

*A Partnership: The same officer shall not execute both the Agreement and this certificate, unless only one person occupies all partnership offices.

I, _____, certify that I am the _____ _____ of the partnership named as CONTRACTOR herein; that _____, who signed this Agreement on behalf of the partnership, was then _____ of the partnership, that the Agreement was duly signed for and in behalf of the partnership by authority of its partners, and is within the scope of its partnership powers. If a foreign partnership, this partnership is qualified to and will register in state in which project Work is located.

_____ _____ L.S.
(Date) (Signature)

SECTION 00600 AFFIDAVIT OF COMPLETION

ARTICLE 1 - AFFIDAVIT OF COMPLETION

STATE OF MICHIGAN _____)
) ss
COUNTY OF _____)

The undersigned _____, as CONTRACTOR, being duly sworn, deposes and says that he entered into a contract with Clinton County Road Commission, as OWNER, on the ____ day of _____, 20____ for the construction of the Church Road over Muskrat Creek crossing. Deponent further says that the Work under the terms of the said Contract has been completed and all indebtedness incurred by him to subcontractors, material-men, and laborers in his employ has been paid in full or satisfactorily secured.

Deponent further says this affidavit is furnished before final payment or before the retainage, withheld in accordance with the provisions stated in said Contract, may be reduced.

Deponent further says he hereby waives and releases any and all claims or rights which he may have, in connection with said Contract, against OWNER or the premises upon which said Contract Work was performed, and agrees to indemnify OWNER against any and all such claims or rights which may be asserted by subcontractors, material-men, and laborers with whom CONTRACTOR has contracted for performance under said Contract.

Further, deponent saith not.

WITNESSES: SIGNED:

_____ _____

By:_____

Title:_____

Subscribed and sworn to before me this _____ day of _____, 20____.

_____
Notary Public, _____ County,_____

My commission expires: _____

We, _____, as Surety on the above described Contract, hereby give our consent to the payment to the CONTRACTOR as indicated above.

DATE: _____ SIGNED: _____
(Attorney-in-fact)

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS, that _____ _____, as Principal, and _____, a Corporation, organized and existing under the laws of the State of _____, and duly authorized to transact business in the State of Michigan, as Surety, are held and firmly bound unto Clinton County Road Commission, as obligee, and hereinafter called OWNER, in the just and full sum of _____ Dollars ($_____) lawful money of the United States of America, for the payment whereof the Principal and Surety bind themselves, their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the above Principal has entered into a written Contract with the OWNER, dated the _____ day of _____, 20____, for Church Road Over Muskrat Creek in accordance with plans and specifications prepared by Land & Resource Engineering, 2121 3 Mile Rd NW, Walker, MI 49544 which Contract is hereby referred to and made a part hereof as fully and to the same extent as if the same were entirely written herein.

NOW, THEREFORE, the conditions of this obligation are such, that if the said Principal shall in all respects well and truly keep and perform the said Contract, and shall pay all sums of money due or to become due, for any labor, materials, apparatus, fixtures or equipment furnished for the purpose of constructing the work provided in said Contract, and shall defend, indemnify and save harmless the OWNER against any and all liens, encumbrances, damages, demands, expenses, costs and charges of every kind except as otherwise provided in said Contract Documents, arising out of or in relation to the performance of said Work and the provisions of said Contract, and shall remove and replace any defects in workmanship or materials which may be apparent or may develop within a period for one year from the date of final acceptance, then this obligation shall be null and void; otherwise it shall remain in full force and effect;

AND PROVIDED, that any alterations which may be made in the terms of said Contract, or in the Work to be done under it, or any extension of time for the performance of said Contract, or any forbearance on the part of either party to the other, or the placing of an inspector or resident engineer thereon by the OWNER, shall not in any way release the Principal and Surety or either of them, their heirs, executors, administrators, successors or assigns from any liability hereunder; notice to the surety of any such alteration, extension or forbearance being hereby waived.

Signed and sealed this _____ day of _____A.D., 20__.

WITNESS: PRINCIPAL:

_____

By_____(Seal)

_____ By _____

WITNESS: SURETY:

_____ By_____(Seal)

Title_____

LOCAL ADDRESS OF AGENT FOR SURETY:

_____

Street City State Zip Code

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS, that _____ _____, as Principal, and _____, a Corporation, organized and existing under the laws of the State of _____, and duly authorized to transact business in the State of Michigan, as Surety, are held and firmly bound unto Clinton County Road Commission, as obligee, and hereinafter called OWNER, in the just and full sum of ($_____) lawful money of the United States of America, or the payment whereof the Principal and Surety bind themselves, their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the above Principal has entered into a written Contract with the OWNER, dated the _____ day of _____, 20__ for the Church Road Over Muskrat Creek in accordance with plans and specifications prepared by Land & Resource Engineering, 2121 3 Mile Rd NW, Walker, Michigan 49544 which Contract is hereby referred to and made a part hereof as fully and to the same extent as if the same were entirely written herein;

AND WHEREAS, this bond is given in compliance with subject to the provisions of Act. No. 213 of the Public Acts of Michigan, for the year 1963, as amended by subsequent acts to date.

NOW, THEREFORE, the condition of this obligation is that if the Principal and his Subcontractors shall make all payments as they become due and payable of all amounts owing to Subcontractors and to parties supplying labor or materials to the Principal or to his Subcontractors in the prosecution of the Work provided for in said Contract (intending to include herein all claimants as defined in Section 6 of Act 213 of 1963, as amended), then this obligation shall be void, otherwise the same shall be in full force and effect;

AND PROVIDED, that any alterations which may be made in the terms of said Contract, or in the Work to be done under it, or the giving by the party of the first part of said Contract, any extension of time for the performance of said Contract or any other forbearance on the part of either party to the other, shall not in any way release the Principal and the Surety or either of them, their heirs, executors, administrators, successors or assigns from any liability hereunder; notice to the Surety of any alterations, extensions of or of any forbearance being hereby waived.

Signed and sealed this _____ day of _____A.D., 20__.

WITNESS:

_____

WITNESS:

_____

PRINCIPAL:

_____

By_____(Seal)

By _____

SURETY:

By_____(Seal)

Title_____

LOCAL ADDRESS OF AGENT FOR SURETY:

_____

Street City State Zip Code

ARTICLE 1-DEFINITIONS

Wherever used in these General Conditions or in the other Contract Documents, the following terms shall have the meanings indicated which shall be applicable to both the singular and plural thereof:

Act of God	Unpredictable phenomenon of nature such as earthquake, flood or cyclone.
Addendum	A document issued by ENGINEER prior to the receipt of bids which sets forth additional provisions, changes or clarifications of the Contract Documents.
Advertisement	The notice published by OWNER to solicit Bids.
Affidavit of Completion	A document which includes the CONTRACTOR's sworn statement that the Work has been completed in accordance with the Contract Documents and that labor and material men have been paid and the Surety's consent to final payment.
Agreement	An instrument, signed by OWNER and CONTRACTOR covering the Work to be performed and setting forth the Contract Time, the Contract Price and other matters.
Allowance	A fixed sum stipulated in the Contract Documents, to be used in total or in part, as determined by the OWNER, for a specific service, product or group of products to be furnished by CONTRACTOR. All cash allowances shall be included in the Contract Price.
Bid	The offer of the BIDDER submitted on the prescribed forms setting forth the conditions under and prices for which the Work will be performed.
Bid Documents	The Bid and additional documents required to be submitted with the Bid as set forth in the Instructions to Bidders.
BIDDER	Any person, firm, joint venture or corporation submitting a Bid for the Work.
Bid Security	Bid Bond or other instrument of security furnished by BIDDER.
Bonds	Bid, Performance and Payment Bonds furnished by CONTRACTOR.
Bulletin	A document issued by ENGINEER which clarifies and interprets the Contract Documents or which directs minor changes or alterations in the Work not involving extra cost.
Certificate of Completion	Notice from ENGINEER to OWNER that the Work has been completed and establishing a one year bonded correction period.
Change Order	An order to CONTRACTOR signed by OWNER authorizing an addition, deletion or revision in the Work, or an adjustment in the Contract Price or the Contract Time or both, issued after execution of the Agreement.
Construction Schedule	The timetable outline of CONTRACTOR's sequence of operations.
Contract	The agreement between OWNER and CONTRACTOR set forth in the Contract Documents.
Contract Documents	The Agreement and all related documents as identified in the Agreement.
Contract Price	The total moneys payable to CONTRACTOR for the Work.
Contract Time	The stated date or number of days for the completion of the Work.
CONTRACTOR	The person, firm, joint venture or corporation with whom OWNER has executed the Contract.
Day	Calendar day of 24 hours from midnight to the next midnight.
Defective Work	Work that does not conform to the requirements of the Contract Documents and damaged Work.
Drawings	The Drawings prepared or approved by ENGINEER and approved by OWNER, which show the character and scope of the Work to be performed.
Effective Date of Contract	The date shown in the Agreement.

ENGINEER	The designated representative of the OWNER.
General Requirements	The Sections of Division 1 of the Specifications.
Inspect, Inspection, Inspector	Observe the work of the CONTRACTOR as it relates to implementing CONSULTANT's plans, specifications, reports, and other instruments of professional service. An inspector has no authority or responsibility to direct any construction workers, and may not stop the work. An inspector is not responsible for the means, methods, sequences, or operations of construction, or safety procedures attendant thereto.
Insurance Certificate	The documents issued by CONTRACTOR's insurer listing policies and extent of coverage applicable to the Work.
Liens	Claims, security interests, and encumbrances.
Modification	(a) An amendment of the Contract Documents signed by both parties, (b) a Change Order, or (c) Bulletin. A Modification may only be issued after the Effective Date of the Contract.
Notice	A written communication between the parties specifically called for by the Contract Documents.
Notice of Award	The Notice by OWNER to BIDDER that BIDDER has been awarded the Contract.
Notice of Termination	Notice from OWNER to CONTRACTOR terminating services of the CONTRACTOR.
Notice to Proceed	A Notice by ENGINEER to CONTRACTOR fixing the date on which the Contract Time will commence and on which CONTRACTOR shall start the Work.
OWNER	The public body or authority, corporation, association, partnership, or individual with whom CONTRACTOR has entered into the Contract and for whom the Work is to be performed.
Partial Completion	For the Work that is being constructed in phases, Partial Completion is Substantial Completion of a defined portion of the Work. Partial Completion is reached whenever the defined portion of the Work is ready for use by OWNER. To be considered partially complete, use must not be prevented by other activities of CONTRACTOR. When use is delayed by factors that are beyond CONTRACTOR's control, the designated portion of the Work shall be considered partially complete.
Partial Utilization	Partial Utilization is placing a portion of the Work or facility in service for the purpose for which it was intended or for a related use before reaching Partial Completion or Substantial Completion.
Planholders of Record	Parties recorded by ENGINEER as having received a copy of Contract Documents and a separate set of Bid Documents and as making required deposit therefor, under their own name.
Product	Materials, systems, and equipment incorporated or to be incorporated in the Work.
Product Data	Catalog data, illustrations, standard schedules, performance charts, instructions, and other information prepared by manufacturer or supplier.
Project	Work and other related facilities of the OWNER.
Project Manual	The volume or volumes containing the bidding information, schedules, equipment uses, page-size details, and the Contract Documents for the Work except large drawings and modifications.
Proposal	The document which forms a portion of the Bid.
Provide	Furnish and install.
Resident Project Representative	The authorized representative of ENGINEER who is assigned to the Work site or any part thereof.

Schedule of Values	The breakdown of the Bid into component parts aggregating the total Bid.
Shop Drawings	All drawings, diagrams, illustrations, schedules and other data specifically prepared by CONTRACTOR, a Subcontractor, manufacturer, fabricator, supplier or distributor to illustrate the equipment, material or some portion of the Work.
Site	The location(s) where the Work is to performed.
Specifications	Those portions of the Contract Documents consisting of technical descriptions of materials, equipment, systems, standards and workmanship as applied to the Work, and certain administrative details applicable thereto, specifically Divisions 1 through 16.
Subcontractor	An individual, firm, joint venture or corporation having a direct contract with CONTRACTOR or with any other Subcontractor for the performance of a part of the Work at the Site.
Substantial Completion	The stage in construction when the Work can be utilized for the purposes for which it was intended. This includes the completion of all contract items in accordance with the plans and specifications with the exception of restoration.
Supplier	Firm providing products to CONTRACTOR.
Surety	A company which provides a Bond.
Work	The entire completed construction and the various separately identified parts thereof required to be furnished under the Contract Documents. Work is the result of performing services, furnishing labor, and furnishing and incorporating Products into the construction as required by the Contract Documents.

ARTICLE 2-PRELIMINARY MATTERS

COPIES OF DOCUMENTS

2.1 OWNER will furnish CONTRACTOR up to 10 copies of the Contract Documents. Additional copies will be furnished, upon request, as ENGINEER determines are necessary for execution of the Work. Copies requested beyond these limits are available at the cost of reproduction.

CONTRACTOR'S REPRESENTATION:

2.2 By executing the Agreement, CONTRACTOR represents that CONTRACTOR has visited the Site and assumes full responsibility for being familiar with the nature and extent of the Contract Documents, Work, locality, local conditions and availability of manpower, materials and machinery that may in any manner affect the Work to be done, the Contract Price or the Contract Time.

CONTRACT TIME

2.3 The Contract Time will commence on the day indicated in the Notice to Proceed; but in no event shall the Contract Time commence later than the later of 30 days after the time stipulated for Bids to remain firm or 30 days after the Effective Date of Contract.

2.4 The date of beginning and the Contract Time for completion of the Work are essential conditions of the Contract Documents. Time requirements are for the benefit of OWNER, CONTRACTOR and other Project Contractors.

2.5 CONTRACTOR shall proceed with the Work at a rate of progress to ensure completion within the stipulated Contract Time. It is expressly agreed by CONTRACTOR that the Contract Time is reasonable, taking into consideration the average climatic and economic conditions and the availability of manpower, products, and construction machinery prevailing at the locality of the Work.

BEFORE STARTING THE WORK

2.6 CONTRACTOR shall carefully study and compare the Contract Documents and check and verify all figures shown thereon and all field measurements. CONTRACTOR shall, within 48 hours, report to ENGINEER any conflict, error or discrepancy which CONTRACTOR may discover before proceeding with the Work.

2.7 CONTRACTOR shall submit to the ENGINEER:
Construction Schedules;
Schedule of Values;
Schedule of Shop Drawings,
Product Data and samples.

2.8 A preconstruction meeting will be held to review the Construction Schedules, to establish procedures for handling Shop Drawings and other submissions and for processing payments, and to establish working relationships between the parties.

STARTING THE WORK

2.9 CONTRACTOR shall start to perform the Work on the date when the Contract Time commences.

2.10 CONTRACTOR shall attend a progress meeting a minimum of once each month at a time and place designated by the ENGINEER.

ARTICLE 3-CONTRACT DOCUMENTS INTENT

GENERAL:

3.1 It is the intent that the Contract Documents comprise the entire agreement between OWNER and CONTRACTOR and may be altered only by a Modification.

3.2 All communications between OWNER, CONTRACTOR, and ENGINEER intended to affect or modify any of the terms or obligations contained in the Contract Documents shall be in writing in order to be valid. Communications intended to affect or modify the Contract Documents include the following terms: claim, submission, notice, request, acceptance, report, objection, order, consent, advise, communicate, communications, certify, authorize, authorization, issue, or like terms.

3.3 No oral order, objection, claim or notice by OWNER, CONTRACTOR or ENGINEER shall affect or modify any of the terms or obligations contained in the Contract Documents.

3.4 The Contract Documents are complementary; what is called for by one is as binding as if called for by all. In resolving conflicts, errors and discrepancies, the documents shall be given precedence in the order stipulated in the Agreement. Detailed drawings shall govern over general drawings. Any Work that may reasonably be inferred from the Contract Documents as being required to produce the intended result shall be supplied whether or not it is specifically called for. Work, materials or equipment described in words which, so applied, have a well-known technical or trade meaning shall be deemed to refer to such recognized standards or meanings.

3.5 The Contract Documents shall be governed by the law of the place of the Work.

REUSE OF DOCUMENTS

3.6 Neither CONTRACTOR nor any Subcontractor, manufacturer, fabricator, supplier or distributor shall have or acquire any title to or ownership rights in any of the Drawings, Specifications or other documents or copies thereof prepared by or bearing the seal of ENGINEER; and they shall not reuse any of them on extensions of the Project or any other project without written consent of OWNER and ENGINEER and specific written verification or adaptation by ENGINEER.

ARTICLE 4-LANDS AND CONTROLS

GENERAL

4.1 OWNER will, upon request, furnish to CONTRACTOR copies of all available boundary surveys and subsurface tests.

AVAILABILITY OF LANDS

4.2 OWNER will furnish, not later than CONTRACTOR's Construction Schedule starting date, the lands or rights-of-way upon which or within which the Work is to be performed, rights-of-way for access thereto, and lands designated for the use of CONTRACTOR. Easements for permanent structures or permanent changes in existing facilities will be obtained by OWNER. CONTRACTOR shall obtain all additional lands and access required for temporary construction facilities and storage of materials and equipment.

UNFORESEEN SUBSURFACE CONDITIONS

4.3 The underground conditions indicated in the Contract Documents represent the information available at the time of preparation and are not guaranteed as to accuracy or completeness. CONTRACTOR shall within 48 hours after discovery notify OWNER and ENGINEER of any subsurface or latent physical conditions at the site differing materially from those indicated in the Contract Documents. ENGINEER will investigate within 72 hours after Notice and, if warranted, advise OWNER to obtain additional investigations and tests. If said additional investigations and tests show subsurface or latent physical conditions to be materially different and which could not have reasonably been anticipated by CONTRACTOR, a Change Order will be issued incorporating the necessary revision.

REFERENCE POINTS

4.4 CONTRACTOR shall be responsible for the preservation of established property corners, monuments, bench marks and similar reference points outside of the normal working area. CONTRACTOR shall report to ENGINEER whenever any reference point is lost, destroyed or requires relocation.

4.5 Replacement of reference points within the normal working area are the responsibility of OWNER. CONTRACTOR shall report to ENGINEER whenever any reference point is in danger of being lost or destroyed or requires relocation.

4.6 Construction stakes will be provided by the OWNER to the extent as may be set forth in the Specifications.

ARTICLE 5 - BONDS AND INSURANCE

PERFORMANCE AND PAYMENT BONDs:

5.1 CONTRACTOR shall furnish separate Bonds as security for the faithful performance and payment of all CONTRACTOR's obligations under the Contract Documents. Each of these Bonds shall be in amounts at least equal to the Contract Price and in such form and with such Sureties as are acceptable to OWNER. Bond forms for the aforementioned securities are a part of the Contract Documents and CONTRACTOR shall ensure that each executed copy of the Bond form is complete and sealed.

A. Bonds shall be issued by a Surety named in U.S. Treasury Circular 570 licensed to conduct business in the state where the Work is located.

B. If the Surety on any Bond is declared bankrupt or becomes insolvent or its right to do business is terminated in the state where the Work is located, or it ceases to be listed as an acceptable Surety in U.S. Treasury Circular 570, CONTRACTOR shall, within 5 days thereafter, substitute another Bond from an acceptable Surety.

CONTRACTOR'S LIABILITY INSURANCE

5.2 CONTRACTOR shall purchase and maintain such comprehensive general liability and other insurance from an insurance company authorized to write casualty insurance in the state where the Work is located and

shall provide protection from claims set forth below which may arise out of, or result from, CONTRACTOR's performance of the Work and CONTRACTOR's other obligations under the Contract Documents, whether such performance is by CONTRACTOR, by any Subcontractor, by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable.

A. Claims under worker's compensation, disability benefits, and other similar employee benefits.

B. Claims for damages because of bodily injury, occupational sickness or disease, or death of CONTRACTOR's employees.

C. Claims for damages because of bodily injury, sickness or disease, or death of any person other than CONTRACTOR's employees.

D. Claims for damages insured by personal injury liability coverage which are sustained by any person as a result of an offense directly or indirectly related to the employment of such person by CONTRACTOR or by any other person for any other reason.

E. Claims for damages because of injury to, or destruction of, tangible property, including loss of use resulting therefrom.

F. Claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.

ARTICLE 6-CONTRACTOR'S RESPONSIBILITIES

GENERAL

6.1 CONTRACTOR will issue communications relative to the Work, to OWNER through ENGINEER.

6.2 CONTRACTOR shall supervise and direct the Work competently, efficiently and with skill and attention required to complete the Work in accordance with the Contract Documents. CONTRACTOR shall be solely responsible for the means, methods, techniques, sequences and procedures of construction. CONTRACTOR shall be responsible for accurate compliance of the finished Work with the Contract Documents.

6.3 CONTRACTOR shall keep on the Work, at all times the Work is in progress, a competent superintendent who shall be replaced only under extraordinary circumstances with Notice to OWNER and ENGINEER. The superintendent shall have authority to act on behalf of CONTRACTOR. All communications given to the superintendent shall be binding on CONTRACTOR.

6.4 CONTRACTOR shall provide notice to allow all utilities to locate their facilities prior to the performance of Work. The form and time of notice, the person(s) notified and all other issues related to notice to utilities which may be affected by the Work shall be in accordance with the laws and regulations of the state in which the Work is to be performed.

6.5 Unless otherwise specified, restricted work times shall be as follows, except in the event of an emergency as defined in this Article: Sunday or holiday work will not be permitted; and, work will not be permitted from 8:00 p.m. to 7:00 a.m.

LABOR, MATERIALS AND EQUIPMENT

6.6 CONTRACTOR shall provide competent, suitably qualified personnel to execute and complete the Work as required by the Contract Documents. CONTRACTOR shall at all times maintain good discipline and order at the Site. ENGINEER may judge the competency and qualifications of personnel and, upon his written request to the CONTRACTOR, the CONTRACTOR shall cause the immediate dismissal from the Work of any personnel considered by ENGINEER to be incompetent and/or unqualified.

6.7 CONTRACTOR shall guarantee that he has available the quantities and quality of labor and supervision necessary to fulfill the CONTRACTOR'S obligations under the Contract Documents.

6.8 CONTRACTOR shall furnish all materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, and all other facilities and incidentals necessary for the execution, testing, initial operation, and completion of the Work.

6.9 All Products shall be of good quality and new. When required by ENGINEER, CONTRACTOR shall furnish satisfactory evidence as to the kind and quality of materials and installed equipment. CONTRACTOR shall submit to the ENGINEER Shop Drawings, Product Data and samples of Products to be incorporated in the Work.

SUBCONTRACTORS

6.10 CONTRACTOR shall be fully responsible for all acts and omissions of Subcontractors and of persons directly or indirectly employed by them and persons for whose acts any of them may be liable to the same extent that CONTRACTOR is responsible for the acts and omissions of persons directly employed by CONTRACTOR. Nothing in the Contract Documents shall create any contractual relationship between any Subcontractor and OWNER or ENGINEER or any obligation on the part of OWNER or ENGINEER to pay or to see to the payment of any moneys due any Subcontractor, except as may otherwise be required by law. OWNER or ENGINEER may furnish to any Subcontractor, to the extent practicable, evidence of amounts paid to CONTRACTOR for specific work done.

6.11 The Divisions and Sections of the Specifications and the identifications of any Drawings shall not control CONTRACTOR in dividing the Work among Subcontractors or delineating work to be performed by any specific trade.

6.12 All work performed for CONTRACTOR by a Subcontractor shall be pursuant to an appropriate agreement between CONTRACTOR and the Subcontractor, subject to the applicable terms and conditions of the Contract Documents.

SUBSTITUTE PRODUCTS

6.13 Whenever Products are specified or described in the Drawings or Specifications by using the name of a proprietary item or the name of a particular manufacturer, fabricator, supplier or distributor, it is intended to establish the type, function and quality required. Unless the substitution is specifically prohibited, substitute items may be accepted by ENGINEER. ENGINEER will be the sole judge of the acceptability of proposed substitutions. No substitution shall be ordered or installed without ENGINEER's prior acceptance. OWNER may require CONTRACTOR to furnish a special performance guarantee or other surety with respect to any substitute.

A. During the bidding period, requests for substitutions may be given consideration by the ENGINEER, and if approved, an Addendum will be issued to incorporate the approved Product into the Contract Documents. Such requests must be received by the ENGINEER in ample time, not later than 10 days before bid due date, so that any necessary Addendum can be issued to all prospective BIDDERS before submission of the Bids.

B. A request for substitution after award of the Contract shall be accepted from the CONTRACTOR only, shall be accompanied by manufacturer's data or other detailed description of the proposed Product and will be considered for one of the following reasons only:

1. Increased value to the OWNER.
2. Decreased cost to the OWNER.
3. Specified item not procurable.

C. A request for a substitution constitutes a representation that the CONTRACTOR has investigated and determined that the proposed Product is equal to or superior in all respects to that specified.

D. CONTRACTOR shall reimburse OWNER for the charges of ENGINEER and ENGINEER's consultants for evaluating accepted or rejected substitutes and for resulting changes in Drawings and Specifications.

OWNER FURNISHED PRODUCTS:

6.14 When the Contract Documents stipulate that the OWNER will furnish Products to be incorporated in the Work, the CONTRACTOR'S responsibilities will be:

A. Coordinate the delivery of each product with the OWNER. OWNER'S requirements for notification for each product will be determined at the pre-construction meeting but under no circumstance shall the notification period be less than 3 business days.

B. Review the Shop Drawings, Product Data and samples.

C. Submit to ENGINEER Notice of any discrepancies or problems anticipated in the use of the Product.

D. Receive and unload the Products at the Site.

E. Promptly inspect Products jointly with the OWNER, record shortages, and damaged or defective items.

F. Handle Products at the Site, including uncrating and storage.

G. Protect the Products from exposure to the elements and from damage.

H. Assemble, install, connect, and adjust the Products as stipulated in the Specifications.

I. Repair or replace items damaged by the CONTRACTOR.

PERMITS

6.15 CONTRACTOR shall obtain all temporary permits required to complete the Work. Application and inspection fees associated with temporary permits shall be paid by the CONTRACTOR.

USE OF PREMISES

6.16 CONTRACTOR shall confine Work operations to the Site and other designated areas. All disturbed areas shall be restored to equal to or better than original condition.

6.17 Material and equipment storage areas on Site shall be established and maintained in a manner that will not disrupt or impair the use of the Site.

PATENT FEES AND ROYALTIES

6.18 CONTRACTOR shall pay license fees, royalties and costs incident to the use of any invention, design, process or device which is the subject of patent rights or copyrights in connection with the Work. OWNER will pay for processes involved in the operation of the completed facilities.

SAFETY AND PROTECTION

6.19 CONTRACTOR shall be responsible for initiating, maintaining and supervising safety programs in connection with the Work. CONTRACTOR shall take precautions and provide protection to prevent damage, injury or loss to:

A. Employees on the Work and other persons who may be affected thereby;
B. The Work and Products to be incorporated therein, whether in storage on or off the site; and
C. Other property at the Site or adjacent thereto, both above and below ground, not designated for removal, relocation or replacement. CONTRACTOR shall erect and maintain necessary safeguards for safety and protection of property and shall notify owners of adjacent utilities when prosecution of the Work may affect them. CONTRACTOR shall be responsible for costs associated with all damage, injury or loss.

6.20 CONTRACTOR shall designate a superintendent at the site as safety officer, whose duty shall be the prevention of accidents.

6.21 Damage, injury or loss to property referred to in this Article caused, directly or indirectly, in whole or in part, by CONTRACTOR, any Subcontractor and anyone directly or indirectly employed by any of them and anyone for whose acts any of them may be liable, shall be remedied by CONTRACTOR at CONTRACTOR'S cost. CONTRACTOR's duties and responsibilities for the safety and protection of the Work shall continue until the Work is completed and ENGINEER has issued the Certificate of Completion.

LAWS AND REGULATIONS

6.22 CONTRACTOR shall comply with all laws, ordinances, rules, regulations and orders of public bodies applicable to the Work.

6.23 When the CONTRACTOR becomes aware that the Contract Documents, or any requirements thereof, are at variance to laws and regulations, CONTRACTOR shall promptly serve written Notice to the ENGINEER. Any alterations required to bring the Work in compliance will be made by Modification.

6.24 When the CONTRACTOR is aware that the Contract Documents, or any requirements thereof, are at variance to laws and regulations and performs any of the Work contrary to laws and regulations without Notice to the ENGINEER, all costs incurred in correcting the Work shall be borne by the CONTRACTOR.

HAZARDOUS MATERIALS

6.25 In the event CONTRACTOR discovers on the Site unexpected regulated hazardous materials, including without limitation, inorganics, organics and asbestos, CONTRACTOR shall immediately give Notice to ENGINEER and request a determination of how to proceed. In the event CONTRACTOR releases, under any circumstances, regulated hazardous materials on the Site, CONTRACTOR shall immediately give Notice to ENGINEER, take emergency action as appropriate and, following approval by ENGINEER of CONTRACTOR'S proposed plan of remediation, CONTRACTOR shall remediate said release at CONTRACTOR'S expense, all in compliance with all applicable laws and regulations.

EMERGENCIES

6.26 In emergencies affecting the safety of persons, the Work or adjacent property, CONTRACTOR, without authorization from ENGINEER or OWNER, is obligated to act, at CONTRACTOR's discretion, to prevent threatened damage, injury or loss. CONTRACTOR shall give ENGINEER prompt Notice of the emergency action taken, and any significant changes in the Work or deviations from the Contract Documents caused thereby.

INDEMNIFICATION

6.27 CONTRACTOR shall indemnify, defend and hold harmless OWNER and ENGINEER, their consultants, agents and employees, from and against claims, damages, losses, attorney's fees, and expenses arising out of, or resulting from, the performance of the Work, provided that any such claim, damage, loss or expense:

A. is attributable to bodily injury, sickness, disease or death, or to injury to, or destruction of, tangible property other than the Work itself, including the loss of use resulting therefrom; and

B. is caused in whole or in part by any negligent act or omission of CONTRACTOR, any Subcontractor, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, regardless of whether or not it is caused in part by a party indemnified hereunder.

6.28 In all claims against OWNER or ENGINEER or their agents or employees, by any employee of CONTRACTOR or Subcontractors or anyone for whose acts they may be liable, the indemnification obligation shall not be limited by the amount or type of damages, compensation or benefits under workmen's compensation acts, disability benefit acts, or other employee benefit acts.

6.29 The indemnification obligation of CONTRACTOR shall not extend to the liability of ENGINEER, agents or employees arising out of the preparation or approval of maps, Drawings, reports, surveys, Change Orders, designs or Specifications.

ARTICLE 7-WORK BY OTHERS

7.1 OWNER may perform or may contract with others to do additional work related to the Project. CONTRACTOR shall afford others a reasonable opportunity to perform work as well as to store materials and equipment on Site and shall properly integrate and coordinate CONTRACTOR's work with others. CONTRACTOR shall coordinate and cooperate with contractors working in the area for other owners or jurisdictions.

7.2 If any part of CONTRACTOR's work depends for proper execution or results upon the work of other contractors, other owners, or OWNER, CONTRACTOR shall inspect and promptly report to ENGINEER any defects or deficiencies in such work. CONTRACTOR's failure to so report shall constitute an acceptance of the other work as fit and proper for integration with CONTRACTOR's work.

7.3 Additional Work resulting from other contracts, or work by OWNER not noted in the Contract Documents will be added by Change Order.

ARTICLE 8-OWNER'S RESPONSIBILITIES

GENERAL

8.1 In case of termination of the employment of ENGINEER, OWNER will appoint an engineer against whom CONTRACTOR makes no substantial objections, whose status under the Contract Documents will be that of the former ENGINEER.

8.2 OWNER will furnish the data required under the Contract Documents promptly and will make payments to CONTRACTOR promptly.

OWNER FURNISHED PRODUCTS

8.3 When the Contract Documents stipulate that the OWNER will furnish Products to be incorporated in the Work, the OWNER'S responsibilities will be:

A. Arrange for and deliver the necessary Shop Drawings, Product Data, and samples to the CONTRACTOR.

B. Arrange and pay for delivery of the Products to the Site in accordance with the Construction Schedule.

C. Deliver supplier's bill of materials to the CONTRACTOR.

D. Inspect deliveries jointly with the CONTRACTOR.

E. Submit claims for transportation damage.

ARTICLE 9-ENGINEER'S STATUS

OWNER'S REPRESENTATIVE

9.1 ENGINEER will be OWNER'S representative during the bidding and construction period. Communications between the OWNER and the CONTRACTOR, or claimant, will be directed through the ENGINEER. The duties, responsibilities and limitations of authority of ENGINEER as OWNER's representative during the bidding and construction are set forth in these Contract Documents and shall be modified only with consent of OWNER and ENGINEER.

9.2 ENGINEER will not be responsible for the construction means, methods, techniques, sequences or procedures, or the safety precautions and programs incident thereto, and ENGINEER will not be responsible for the CONTRACTOR's failure to perform the Work in accordance with the Contract Documents.

9.3. ENGINEER will not be responsible for the acts or omissions of the CONTRACTOR, or any Subcontractors, or any of their agents or employees, or any other persons performing any of the Work.

VISITS TO SITE

9.4 ENGINEER will make visits to the site at intervals appropriate to the various stages of construction to observe the progress and quality of the executed Work and to determine, in general, if the Work is proceeding in accordance with the Contract Documents. ENGINEER will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. ENGINEER'S efforts will be directed toward providing for OWNER a greater degree of confidence that the completed Work will conform to the Contract Documents. On the basis of such visits and on-site observations as an experienced and qualified professional, ENGINEER will keep OWNER informed of the progress of the Work and will endeavor to guard OWNER against defects and deficiencies in the Work.

CLARIFICATIONS AND INTERPRETATIONS

9.5 ENGINEER may issue clarifications or interpretations consistent with, or inferable from, the intent of the Contract Documents.

SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

9.6 ENGINEER shall review Shop Drawings, Product Data and samples of Products submitted by the CONTRACTOR.

REJECTING DEFECTIVE WORK

9.7 ENGINEER will have authority to disapprove of or reject Defective Work. ENGINEER will also have authority to require special inspection or testing of Work whether or not the Work is fabricated, installed or completed.

SITE REPRESENTATIVE

9.8 ENGINEER will furnish a Resident Project Representative, who may have one or more assistants, to aid OWNER and ENGINEER in carrying out their responsibilities at the Site. The duties, responsibilities and authority of the Resident Project Representative are set forth in Article 18 of these General Conditions.

DECISIONS ON DISAGREEMENT

9.9 ENGINEER will be initial interpreter of the requirements of Contract Documents and judge of acceptability of the Work. Claims, disputes, and other matters pertaining to bidding, execution and progress of the Work shall be referred initially to ENGINEER with a request for an informal meeting and a formal decision. Notice of each such claim, dispute and other matter shall be delivered by claimant to ENGINEER and other party within 15 days of occurrence of the event giving rise thereto. Additional supporting data shall be supplied within 30 days of occurrence. ENGINEER's written decision will be rendered within 40 days after the occurrence. In ENGINEER's capacity as interpreter and judge, ENGINEER will be impartial to OWNER, CONTRACTOR or claimant and will not be liable for any decision rendered in good faith.

9.10 The rendering of a decision by ENGINEER with respect to any such claim, dispute or other matter, will be a condition precedent to arbitration under these General Conditions. The ENGINEER's decision shall become final and binding on the parties 30 days after the decision is rendered unless deferred by an arbitration request, litigation or administrative appeal (if applicable) is filed by either party within the 30-day period. Lawsuits shall be brought in Kent County.

9.11 No decision made by ENGINEER in good faith, either to exercise or not to exercise authority under this Article shall give rise to any duty, liability or responsibility of ENGINEER to claimant, CONTRACTOR, any Subcontractor, any of their agents or employees, or any other person performing any of the Work.

ARTICLE 10-CHANGES IN THE WORK

10.1 Without invalidating the Contract, OWNER may, at any time, order additions, deletions or revisions in the Work by Change Orders. Upon receipt of an executed Change Order, CONTRACTOR shall proceed with the Work involved.

10.2 ENGINEER may authorize minor changes or alterations in the Work not involving extra cost and not inconsistent with the overall intent of the Contract Documents. These changes will be authorized by a Bulletin and will be binding upon OWNER and CONTRACTOR.

10.3 Additional work performed by CONTRACTOR without authorization of a Change Order will not entitle CONTRACTOR to an increase in the Contract Price or an extension of the Contract Time, except as set forth in these General Conditions.

10.4 OWNER shall execute appropriate Change Orders recommended by ENGINEER as set forth in these General Conditions.

10.5 It shall be CONTRACTOR's responsibility to notify Surety of any changes affecting the general scope of the Work or change in the Contract Price or Time. The amount of the applicable Bonds shall be adjusted accordingly.

ARTICLE 11-CHANGE OF CONTRACT PRICE

GENERAL

11.1 The Contract Price constitutes the total compensation payable for performing all duties, responsibilities and obligations assigned to or undertaken by CONTRACTOR, and includes all taxes payable by CONTRACTOR as a result of the Work.

11.2 The Contract Price shall only be changed by a Change Order. Claims for a change in the Contract Price shall be submitted, with supporting data, to ENGINEER within 15 days of the occurrence of the event giving rise to the claim.

11.3 Claims for extra compensation shall not be made by CONTRACTOR for reasonable delays:

A. caused by the work of other Project contractors or subcontractors.

B. due to the failure of OWNER to perform any obligations required of OWNER under these Contract Documents.

11.4 Value of the Work covered by a Change Order shall be determined by one of the following methods:

A. where the Work is covered by Contract unit prices by application of unit prices to the items involved.

B. by mutual acceptance of a lump sum.

C. on the basis of the cost of the Work, plus overhead and profit, but only in the event OWNER and CONTRACTOR cannot agree on one of the above methods.

COST-PLUS WORK

11.5 Cost-plus work means cost of the Work plus a fee. Cost of the Work means the sum of all costs incurred and paid by CONTRACTOR in the performance of cost-plus work. Such costs shall be in amounts no higher than those prevailing in the locality of the Work. Cost of the Work shall only include:

A. payroll costs for employees including superintendents and foremen at the Site in the direct employ of CONTRACTOR under schedules of job classifications. Payroll costs shall include, but not be limited to, salaries and wages, social security contributions, unemployment, excise and payroll

taxes, workers' or workmen's compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay.

B. cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation, storage and manufacturers' field services.

C. rentals of all construction equipment, machinery and accessories, and costs of transportation, loading, unloading, installation, dismantling and removal. Rental rates shall not exceed rates listed in the "Rental Rate Blue Book for Construction Equipment" published by Equipment Guide Book Company. Rates allowed will be based on the most economical time unit. The rental determined by multiplying the rate (e.g., hourly, daily, weekly, etc.) by the period of use shall not exceed the rental determined by applying the next highest rate (e.g., for this purpose the daily rate would be "higher" than the hourly rate, etc.) to the corresponding period of use.

D. fees of special consultants.

E. cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, hand tools, office and temporary facilities at the Site.

F. transportation, travel and subsistence expenses.

G. sales, use or similar taxes imposed by any governmental authority.

H. unavoidable deposit losses, royalty payments, and fees for permits and licenses, and losses and damages to the Work not compensated by insurance.

I. the cost of utilities, fuel, telegrams, long distance telephone calls, and expressage.

11.6 Cost of the Work shall not include:

A. compensation for CONTRACTOR's officers, executives, principals, managers, professionals, clerks and other personnel, whether at the Site or office.

B. any part of CONTRACTOR's capital expenses, including interest on CONTRACTOR's capital employed for the Work and charges against CONTRACTOR for delinquent payments.

C. cost due to the negligence of CONTRACTOR, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of Defective Work or damage to the property, disposal of materials or equipment wrongly supplied.

D. other overhead or general expense costs.

11.7 The fee allowed to the CONTRACTOR for overhead and profit shall be 10 percent of the cost of the Work; except for payments to Subcontractors in which case the fee shall be 5 percent.

11.8 Payments to Subcontractors will be determined in the same manner as CONTRACTOR's cost of the Work. The fee allowed to the Subcontractors for overhead and profit shall be 10 percent.

11.9 The amount of credit to OWNER for any change which results in a net decrease in cost will be the amount of the actual net decrease, exclusive of any fee for overhead and profit. When both additions and credits are involved in any one change, the overhead and profit shall be based on the net increase in the Work.

11.10 CONTRACTOR shall submit daily cost reports of cost-plus work to the ENGINEER.

ARTICLE 12-CHANGE OF THE CONTRACT TIME

12.1 The Contract Time may only be altered by a Change Order. Claim for a change of Contract Time shall be delivered to OWNER and ENGINEER within 15 days of the event giving rise to the claim. Adjustment in the Contract Time will be determined by ENGINEER.

12.2 The Contract Time will be extended in an amount equal to time lost due to unreasonable time delays beyond control of CONTRACTOR. Reasons for such delays shall be restricted to fires, labor disputes, epidemics, abnormal weather conditions, and Acts of God. In addition, Contract Time may be extended for unreasonable time delays:

A. caused solely by work of other Project contractors or subcontractors directly contracted by the OWNER

B. due to failure of OWNER to perform any obligations required of OWNER under these Contract Documents.

ARTICLE 13-WARRANTY, TESTS AND DEFECTIVE WORK

WARRANTY AND GUARANTEE

13.1 CONTRACTOR warrants and guarantees to OWNER and ENGINEER that materials and equipment shall be new and that Work shall be of good quality and free from faults or defects and in accordance with requirements of the Contract Documents. Prompt Notice of any defects will be given to CONTRACTOR.

13.2 CONTRACTOR warrants and guarantees that title to all Work, materials and equipment covered by monthly estimates, passes automatically to OWNER at the time of payment, free and clear of all liens.

TESTS AND INSPECTIONS

13.3 If the Contract Documents, laws, ordinances, rules, regulations or orders of any public authority having jurisdiction require any portion of the Work to be inspected, tested, or approved by someone other than CONTRACTOR, CONTRACTOR shall give ENGINEER timely notice of readiness therefore. Such tests shall be in accordance with the methods prescribed by the applicable organization or the Contract Documents. All certification fees, testing laboratory fees, and inspection fees of said public authorities will be paid by CONTRACTOR. Inspection coordination is the responsibility of the CONTRACTOR, unless otherwise indicated in the Contract Documents.

13.4 Neither observations by ENGINEER nor inspections, tests or approvals by persons other than CONTRACTOR shall relieve CONTRACTOR from obligations to perform the Work required by the Contract Documents, laws, ordinances, rules, regulations or orders of public authority having jurisdiction.

13.5 When inspection readiness is declared by the CONTRACTOR and the inspection proves unsuccessful, all costs for the inspection shall be borne by the CONTRACTOR.

ACCESS TO THE WORK

13.6 ENGINEER, his representatives, and representatives of OWNER shall at all times have access to the Work. CONTRACTOR shall provide proper facilities for access, observation of the Work, and for any inspection or testing by manufacturers, suppliers, material men, and other parties as authorized by OWNER.

UNCOVERING WORK

13.7 If Work requiring inspection, testing or approval is covered either without ENGINEER's written approval where required, or contrary to ENGINEER's specific request, the Work shall, if requested by ENGINEER, be uncovered for observation and replaced at CONTRACTOR's expense.

13.8 If ENGINEER considers it necessary or advisable that covered Work be inspected or tested, other than as outlined under the previous paragraph, CONTRACTOR, at ENGINEER's request, shall uncover and expose that portion of the Work. If the Work is defective, CONTRACTOR shall bear all the expenses of satisfactory

repair and reconstruction, including compensation for additional engineering services resulting therefrom. If such Work is not found to be defective, CONTRACTOR shall be allowed an increase in Contract Price, an extension of Contract Time, or both, directly attributable to such uncovering and reconstruction.

CUTTING AND PATCHING

13.9 CONTRACTOR shall be responsible for all cutting, fitting and patching required to complete the Work, to make its several parts fit together properly, or to uncover portions of the Work to provide for installation of ill-timed Work. CONTRACTOR shall not cut or alter any part of the Work or the work of another Contractor or Subcontractor without written approval of the ENGINEER. In no case shall the CONTRACTOR endanger any portion of the Work by cutting or altering any part of it.

CORRECTION OR REMOVAL OF DEFECTIVE WORK

13.10 CONTRACTOR shall promptly, as specified by ENGINEER, either correct any Defective Work or remove it from the Site and replace it with acceptable Work. If CONTRACTOR does not correct or remove and replace such Defective Work within a reasonable time, OWNER may have the deficiency corrected or the Defective Work removed and replaced by others. All direct and indirect costs of such correction or removal, and replacement, including compensation for additional engineering services, shall be paid by CONTRACTOR in an amount as verified by ENGINEER. CONTRACTOR shall also repair all Work of others destroyed or damaged by replacement of CONTRACTOR's Defective Work.

ONE YEAR CORRECTION PERIOD

13.11 Prior to the expiration of one year after the date of Acceptance or such longer period of time as may be prescribed by law or by the terms of any applicable special guarantee required by the Contract Documents, CONTRACTOR shall promptly correct identified Defective Work or remove it from the Site and replace it with acceptable Work. If CONTRACTOR does not promptly comply, OWNER's rights to correction will be the same as for Defective Work in this Article. Repairs and replacements made under this paragraph shall bear an additional 12-month correction period dated from the acceptance of repair and replacement.

ACCEPTANCE OF DEFECTIVE WORK

13.12 If OWNER prefers to accept Defective Work, an appropriate reduction in the Contract Price will be made. If the acceptance occurs after final payment, an appropriate amount, as determined by ENGINEER, shall be paid by CONTRACTOR to OWNER.

OWNER'S RIGHT TO DO WORK:

13.13 If CONTRACTOR should neglect to prosecute the Work properly and diligently, or fail to perform any provision of this Contract, including requirements of the Construction Schedule, OWNER, after three (3) days Notice to CONTRACTOR and his Surety may, without prejudice to any other remedy that OWNER may have, correct and remedy any such deficiency. Direct and indirect costs of OWNER, including compensation for additional engineering services, shall be verified by ENGINEER and an appropriate reduction in the Contract Price will be made. If the payments due CONTRACTOR are not sufficient to cover such amount, CONTRACTOR shall pay the difference to OWNER.

ARTICLE 14-PAYMENTS AND COMPLETION

PROGRESS PAYMENTS AND RETAINAGES

14.1 As a condition precedent to the first progress payment, CONTRACTOR shall submit a Construction Schedule and Schedule of Values.

14.2 CONTRACTOR will prepare a monthly payment request, supported by such data as ENGINEER may reasonably request from CONTRACTOR.

14.3 The payment requests shall not include Products not incorporated in the Work unless specifically requested by CONTRACTOR and approved by OWNER subject to the following mandatory conditions:

A. the Products have been specifically manufactured for the Work;

B. the Products have been delivered and suitably stored at the Site or at another location agreed to; and

C. CONTRACTOR has furnished supporting data, satisfactory to OWNER that establishes OWNER's title to the Products, free of any Liens or other encumbrances, and protects OWNER's interest therein, including applicable insurance.

14.4 Progress payments and retainage shall conform to the following, provided CONTRACTOR'S progress is in accordance with the approved Construction Schedule and the conditions for payment as set forth in this Article.

A. Progress payments covering the first 50 percent of the Work shall be 90 percent of the progress period Work completed and 75 percent of the Products furnished and not incorporated in the Work, but specifically authorized by the OWNER.

B. Progress payments covering the final 50 percent of the Work, at the discretion of the OWNER, may be increased to 100 percent of the progress period Work completed and 75 percent of Products furnished and not incorporated in the Work, but specifically authorized by the OWNER.

C. All payments to the CONTRACTOR by the OWNER, including retainage, shall be in accordance with all laws and regulations applicable to these activities in the state in which the Work is performed.

APPROVAL OF PAYMENT

14.5 CONTRACTOR will prepare monthly payment requests and present them to ENGINEER for recommendation to the OWNER. ENGINEER shall complete review of such requests, make adjustments as deemed appropriate, and forward to the OWNER within ten (10) days of receipt from the CONTRACTOR.

14.6 ENGINEER'S submittal and recommendation of any payment request shall constitute a representation by ENGINEER to OWNER, based on ENGINEER's on-site observations of Work in progress as an experienced qualified professional, that the Work has progressed to the point indicated; that, to the best of ENGINEER's knowledge, information and belief, the quality of the Work is in accordance with the Contract Documents; and that CONTRACTOR is entitled to payment. However, by recommending payment, ENGINEER shall not thereby be deemed to have represented that ENGINEER made exhaustive or continuous on-site inspections to check the quality or the quantity of the Work, or that ENGINEER has reviewed the means, methods, techniques, sequences, and procedures of construction or that ENGINEER has made any examination to ascertain how or for what purpose CONTRACTOR has used the moneys paid or to be paid to CONTRACTOR or that title to any Work, materials, or equipment has passed to OWNER free and clear of any liens.

14.7 OWNER will make payment to CONTRACTOR on monthly requests within 30 days of ENGINEER'S presentation to OWNER.

PAYMENT WITHHELD

14.8 ENGINEER may not recommend any payment or may nullify any payment previously recommended, to such extent as may be necessary to protect OWNER from loss because:

A. Work is defective or completed Work has been damaged requiring correction or replacement.

B. Written claims have been made against OWNER or liens have been filed in connection with the Work.

C. Contract Price has been reduced by Modifications.

D. CONTRACTOR has failed to file receipts for payment of equipment and materials not incorporated in the Work.

E. OWNER has been required to correct Defective Work or complete neglected Work.

F. Unsatisfactory prosecution of the Work, including failure to clean-up or failure to perform testing as required by the Contract Documents.

PARTIAL UTILIZATION

14.9 OWNER shall have the right to take possession of, and use any completed or partially completed portions of the Work prior to completion. The OWNER's possession and use shall not be deemed an acceptance of any Work not completed in accordance with the Contract Documents. Unless otherwise called for in the Contract Documents, CONTRACTOR will be reimbursed for any extra costs or provide an extension of Contract Time for any delays or both which result from Partial Utilization of Work. Special insurance coverage, if required, shall be provided by the OWNER. Upon receipt of a request from OWNER to utilize a portion of the Work, ENGINEER shall:

A. make an inspection and shall prepare a list of items of incomplete and Defective Work remaining for the portion of the Work to be utilized.

B. determine if any extra compensation or time extension is due the CONTRACTOR due to the OWNER'S Partial Utilization of the Work.

SUBSTANTIAL COMPLETION

14.10 When ENGINEER considers that the Work has been substantially but not entirely completed and full completion thereof is materially delayed through no fault of CONTRACTOR, ENGINEER will issue a Certification of Substantial Completion. Liquidated damages for that portion of Work will not be assessed beyond the date of Substantial Completion.

PAYMENT FOR SUBSTANTIAL COMPLETION

14.11 OWNER will, upon Certificate of Substantial Completion by ENGINEER and without terminating the Contract, make payment of the balance due for Work fully completed and accepted. Consent of the Surety shall be submitted by CONTRACTOR to ENGINEER prior to certification of such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

NOTIFICATION OF COMPLETION

14.12 When CONTRACTOR considers the Work required in the performance of this Contract to be complete and ready for final inspection, CONTRACTOR shall provide Notice to the ENGINEER.

FINAL INSPECTION

14.13 CONTRACTOR shall serve Notice of completion on ENGINEER who will, within 7 days, schedule the final inspection with OWNER and CONTRACTOR, and will notify CONTRACTOR of incomplete and Defective Work. CONTRACTOR shall remedy such defects immediately and again submit a Notice of completion. Questions regarding quantities for payment will be measured jointly by the CONTRACTOR and ENGINEER.

FINAL PAYMENT

14.14 After CONTRACTOR has remedied all incomplete and Defective Work and delivered documents required by the Contract Documents, CONTRACTOR will prepare a request for final payment. CONTRACTOR shall furnish an executed Affidavit of Completion, in the form set forth in Article 19 of these General Conditions, including consent of the Surety to final payment. In lieu thereof, CONTRACTOR may furnish a Bond satisfactory to OWNER to indemnify OWNER against any lien.

APPROVAL OF FINAL PAYMENT

14.15 If ENGINEER is satisfied that the Work has been completed, and has received CONTRACTOR's Affidavit of Completion, ENGINEER will, within 10 days, issue the Certificate of Completion and present a

recommendation for final payment to the OWNER for approval and payment. If said documentation is satisfactory in form and substance, OWNER shall pay CONTRACTOR within 30 days of receipt thereof.

CONTRACTOR'S CONTINUING OBLIGATION

14.16 The CONTRACTOR's obligation to perform the Work in accordance with the Contract Documents shall be absolute. Recommendation of any progress or final payment by ENGINEER, issuance of a Certificate of Substantial Completion, any payment by OWNER to CONTRACTOR, any use or occupancy of the Work or any part thereof by OWNER, any act of acceptance by OWNER or any failure to do so, or any correction of Defective Work by OWNER shall not constitute an acceptance of Work contrary to the Contract Documents.

14.17 The duties and obligations imposed on CONTRACTOR by these General Conditions, and the rights and remedies available hereunder, and the rights and remedies available to OWNER and ENGINEER hereunder, shall be in addition to, and not a limitation of, any otherwise imposed or available by law, by special guarantee, or other provisions of the Contract Documents.

WAIVER OF CLAIMS

14.18 The making and acceptance of final payment shall constitute:

A. a waiver of all claims by OWNER against CONTRACTOR, except claims arising from unsettled Liens, from Defective Work appearing after final inspection pursuant to this Article or from failure to comply with the Contract Documents. However, it shall not constitute a waiver by OWNER of any rights with respect to CONTRACTOR's continuing obligations under the Contract Documents; and

B. A waiver of all claims by CONTRACTOR against OWNER, except those claims under negotiation, arbitration, or litigation.

14.19 CONTRACTOR'S refusal to accept the final payment as tendered by OWNER shall constitute a waiver of any right to interest thereon.

LIQUIDATED DAMAGES

14.20 OWNER will deduct the amount of any liquidated damages and expenses, calculated in accordance with the Agreement, from moneys due or to become due to CONTRACTOR. If such amount exceeds such unpaid balance, the CONTRACTOR shall pay the difference to the OWNER.

ARTICLE15-SUSPENSION AND TERMINATION

WORK SUSPENSION

15.1 OWNER may order CONTRACTOR to suspend the Work, or any portion thereof, until the reason for such suspension has been eliminated; however, this right shall not give rise to any duty by OWNER to exercise this right for the benefit of CONTRACTOR or any other party.

15.2 OWNER may suspend the Work for the following reasons:

A. Defective Work.

B. CONTRACTOR fails to supply sufficient skilled workmen or suitable Products.

C. CONTRACTOR fails to make prompt payments to Subcontractors or for labor or Products.

D. CONTRACTOR fails to maintain proper insurance, bonds, licenses, or federal, state, or local permits.

OWNER TERMINATION OF WORK

15.3 Upon the occurrence of any one or more of the following events OWNER may, after giving CONTRACTOR and Surety 10 days written Notice of Termination, terminate the services of the CONTRACTOR.

A. CONTRACTOR fails to initiate and diligently proceed with the Work.

B. CONTRACTOR is adjudged bankrupt or insolvent.

C. CONTRACTOR makes a general assignment for the benefit of creditors.

D. a trustee or receiver is appointed for CONTRACTOR or for any of CONTRACTOR's property.

E. CONTRACTOR files a petition to take advantage of any debtor's act, or to reorganize under the bankruptcy or similar laws.

F. CONTRACTOR repeatedly fails to supply sufficient skilled workmen or suitable Products.

G. CONTRACTOR repeatedly fails to make prompt payments to Subcontractors or for labor or Products.

H. CONTRACTOR disregards laws, ordinances, rules, regulations or orders of any public body having jurisdiction.

I. CONTRACTOR disregards the authority of the ENGINEER.

J. CONTRACTOR otherwise violates any provisions of the Contract Documents.

OWNER COMPLETION OF WORK ON TERMINATION:

15.4 If the Surety does not resume performance of the Work within 10 days after Notice of Termination is received from OWNER, OWNER shall have the absolute right to complete the Work in the most expeditious manner and shall have the right to exclude CONTRACTOR from the Site and take possession of the Work and of all CONTRACTOR's tools, appliances, equipment and machinery at the Site and use the same without liability to CONTRACTOR for trespass or conversion. OWNER may incorporate in the Work all Products for which OWNER has paid CONTRACTOR but which are stored elsewhere. In such case CONTRACTOR shall not be entitled to receive any further payment until the Work is finished. If the balance due to CONTRACTOR at the time of termination exceeds the direct and indirect costs of completing the Work, including compensation for additional engineering services, attorney's fees, technical services and administrative costs, such excess shall be paid to CONTRACTOR. If such costs exceed such unpaid balance, CONTRACTOR shall pay the difference to OWNER. Such costs incurred by OWNER shall be verified by ENGINEER and incorporated in a Change Order, but in finishing the Work OWNER shall not be required to obtain the lowest cost for the remaining portion of the Work performed.

OWNER'S ADDITIONAL TERMINATION RIGHTS

15.5 Where CONTRACTOR's services have been terminated by OWNER, said termination shall not affect any rights of OWNER against CONTRACTOR then existing or which may thereafter accrue. Any retention due or payment of money by OWNER to CONTRACTOR shall not release CONTRACTOR from liability.

OWNER'S TERMINATION FOR CONVENIENCE

15.6 Upon 10 days' written Notice to CONTRACTOR, Surety and ENGINEER, OWNER may, without cause and without prejudice to any other right or remedy, elect to abandon the Work and terminate the Contract. In such case, CONTRACTOR will be paid for Work executed and expense sustained plus a reasonable profit.

CONTRACTOR'S CONTINUING WORK DURING DISPUTES

15.7 CONTRACTOR shall carry on the Work and maintain the Construction Schedule during all disputes or disagreements with OWNER. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as CONTRACTOR and OWNER may otherwise agree.

CONTRACTOR MAY STOP WORK OR TERMINATE

15.8 If, through no act or fault of CONTRACTOR, the Work is suspended for a period of more than 90 days by the OWNER or by an order of court or other public authority, or OWNER fails to pay CONTRACTOR any sum recommended by ENGINEER within 90 days of its presentation, then CONTRACTOR may, upon 10 days' written Notice to OWNER, terminate this Contract and recover from OWNER payment for all Work executed and any expense sustained plus a reasonable profit. In lieu of terminating the Contract, CONTRACTOR may, upon 10 days' notice to OWNER, stop the Work until CONTRACTOR has been paid amounts then due.

ARTICLE 16-ARBITRATION

16.1 In the event that a claim, dispute or other question arises relating to the Contract Documents, except claims which have been waived by the making or acceptance of final payment or claims not subject to arbitration under applicable law, OWNER and CONTRACTOR may, by mutual agreement, submit the claim, dispute or matter to arbitration. In the event the parties agree to arbitration, the right to proceed to arbitration shall be subject to the terms and conditions in this Article.

16.2 The parties must agree on the specific claims, disputes or matters to be arbitrated. The written arbitration submission shall state the nature and circumstances surrounding the claim or dispute, state the amount claimed or relief sought, and the specific supporting provisions relied upon in the Contract Documents. The scope of the arbitration shall be strictly limited to matters defined in the arbitration submission.

16.3 Once the arbitration submission has been signed by both parties, it shall be submitted to the American Arbitration Association which shall proceed to process the case in accordance with the Construction Industry Arbitration Rules, except to the extent that the same have been modified by this Article and the arbitration submission.

16.4 The arbitration panel shall consist of one Professional Engineer or Architect, one Contractor, and one Attorney selected in accordance with the applicable rules of the American Arbitration Association. In lieu of the appointment of an Arbitration Panel to settle an existing claim or dispute, OWNER and CONTRACTOR may agree upon a permanent arbitrator or Arbitration Panel to decide all claims, disputes, and other matters relating to the Contract Documents.

16.5 The arbitrator or Arbitration Panel shall apply the terms and conditions of the Contract Documents to the claim, dispute or matter submitted to it and shall base its decision on said Contract Documents.

16.6 The arbitrator's or Arbitration Panel's decision shall be set forth in writing, shall state the decision on each claim, dispute or matter submitted, and the reason for each decision.

16.7 Once a written arbitration submission has been executed, the agreement to arbitrate shall be specifically enforceable under the prevailing arbitration law. The arbitration award rendered by the arbitrator(s) shall be final and judgment may be entered upon it in any court having jurisdiction thereof.

16.8 During the pendency of the arbitration proceedings, CONTRACTOR covenants and agrees that CONTRACTOR shall continue to proceed with the Work required pursuant to the Contract Documents. In the event that CONTRACTOR is terminated by OWNER at any time prior to the issuance of the arbitrator's or Arbitration Panel's written decision, or if CONTRACTOR fails to proceed with the Work during the pendency of the arbitration proceedings, OWNER shall be entitled to obtain a court order enjoining the continuance of said arbitration proceedings by reason of such action.

ARTICLE 17-MISCELLANEOUS

17.1 Whenever any provision of the Contract Documents requires the giving of Notice, it shall be deemed to have been validly given, if delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or if sent by certified mail or commercial carrier, with provision for receipt acknowledgement, to the last business address known to party who gives the Notice. Notice may also be made by facsimile transmission. In such case, Notice will be deemed received when the transmission is made. The party making such facsimile transmissions shall also forward a copy of such Notice by regular mail.

17.2 If any section, paragraph, clause or provision of the Contract Documents shall be held invalid, the invalidity of such section, paragraph, clause or provision shall not affect any of the other provisions of the Contract Documents. The Article and paragraph headings in the Contract Documents are furnished for convenience of reference only and shall not be considered to be a part of the Contract Documents.

ARTICLE 18-RESIDENT PROJECT REPRESENTATIVE

GENERAL

18.1 Resident Project Representative is ENGINEER's Agent under the supervision of ENGINEER in matters pertaining to the on-site Work. Dealings with Subcontractors shall be through, or with knowledge of, CONTRACTOR.

DUTIES AND RESPONSIBILITIES

18.2 Resident Project Representative will:

A. Review the Construction Schedule, schedule of Shop Drawing submissions, and Schedule of Values prepared by CONTRACTOR, and consult with ENGINEER concerning their acceptability.

B. Attend preconstruction conferences, progress meetings, and other job conferences; chair meetings and maintain and circulate copies of minutes and notices thereof.

C. Serve as ENGINEER's liaison with CONTRACTOR, principally through with CONTRACTOR's Superintendent. Assist ENGINEER as OWNER's liaison when CONTRACTOR's operations affect OWNER's on-site operations.

D. Assist ENGINEER in obtaining from OWNER additional details or information when required for proper execution of the Work.

E. Receive Shop Drawings, Product Data and samples, submittals, and receive samples delivered at the site for ENGINEER's examination.

F. Advise ENGINEER and CONTRACTOR immediately of the commencement of any Work requiring a Shop Drawing of sample submission if the submission has not been approved by ENGINEER.

G. Conduct on-site observations of the Work to assist ENGINEER in determining compliance with the Contract Documents.

H. Report to ENGINEER whenever it appears that any portion of the Work does not conform to the Contract Documents or has been damaged prior to final payment; and advise ENGINEER when it appears any portion of the Work should be uncovered for observation or requires special testing, inspection or approval.

I. Verify that required tests, equipment and systems startups, and operating and maintenance instructions are conducted in the presence of required personnel, and that CONTRACTOR maintains adequate records thereof; observe, record and report to ENGINEER details of test procedures, startups, inspections, and operating and maintenance instructions.

J. Accompany inspectors representing public or other agencies having jurisdiction on the Project; record and report to ENGINEER on the outcome of these inspections.

K. Transmit to CONTRACTOR, ENGINEER's clarifications and interpretations of the Contract Documents.

L. Consider and evaluate CONTRACTOR's suggestions for modifications in Drawings or Specifications and report them with recommendations to ENGINEER.

M. Maintain at the Site orderly files for correspondence, reports of job conferences, Shop Drawings, Product Data and samples submissions, reproductions of original Contract Documents, including all

Addenda, Change Orders, additional Drawings, ENGINEER's clarifications and interpretations of the Contract Documents, progress reports, and other Project related documents.

N. Maintain a log book, recording hours on the Site, weather conditions, data relative to extras or deductions, list of visiting officials and representatives of manufacturers, fabricators, suppliers and distributors, daily activities, decisions, and general and specific observations of test procedures.

O. Consult with ENGINEER relative to scheduled major tests, inspections or start of critical phases of the Work.

P. Report accidents immediately to ENGINEER.

Q. Review applications for payment with CONTRACTOR and forward them with recommendations to ENGINEER, noting relation to the Schedule of Values, Work completed, and payment for materials and equipment not incorporated in the Work.

R. During the course of the Work, verify that certificates, maintenance and operation manuals, and other data required to be assembled and furnished by CONTRACTOR are applicable to the items actually installed; and that this material is delivered to ENGINEER for review and forwarding to OWNER prior to final acceptance of the Work.

S. Prior to, and as a condition of, recommending to ENGINEER issuance of a Certificate of Substantial Completion, Resident Project Representative will:

1. Prepare a list of incomplete or Defective Work.

2. Verify that all items required for Substantial Completion have been corrected or completed.

3. Secure agreement between OWNER and CONTRACTOR relative to responsibilities for utilities, heat, janitorial services, insurance, Project security, access by the parties, safety and any other matters.

4. Secure CONTRACTOR's specific Construction Schedule to fully complete the Work.

T. Conduct final inspection with ENGINEER, OWNER and CONTRACTOR and prepare a final list of items to be completed or corrected.

U. Verify that all items on final list have been completed or corrected and make recommendations to ENGINEER concerning acceptance.

LIMITATIONS OF AUTHORITY

18.3 Resident Project Representative shall not guarantee or warrant CONTRACTOR's Work. Except upon written instructions of ENGINEER, Resident Project Representative shall not:

A. Authorize any deviation from the Contract Documents or approve any substitute Products.

B. Exceed limitations on ENGINEER's authority as set forth in the Contract Documents.

C. Undertake any of the responsibilities of CONTRACTOR, Subcontractors or CONTRACTOR's Superintendent, or expedite the Work.

D. Advise on, or issue directions relative to, any aspect of the means, methods, techniques, sequences or procedures of construction unless such is specifically called for in the Contract Documents.

E. Advise on, or issue directions as to, safety precautions and programs in connection with the Work.

F. Authorize OWNER to occupy the Project in whole or in part.

G. Participate in specialized field or laboratory tests.

These Supplemental Conditions amend or supplement the General Conditions and other provisions of the Contract Documents as indicated below. All provisions which are not so amended or supplemented remain in full force and effect.

The terms used in these supplemental Conditions will have the meanings indicated in the General Conditions. Additional terms used in these Supplemental Conditions have the meanings indicated below, which are applicable to both the singular and plural thereof.

ARTICLE 5 – BONDS AND INSURANCE

Add the following new paragraphs immediately after paragraph 5.2.F:

5.3 This insurance shall be written for the following minimum limits of liability and shall have an endorsement covering all CONTRACTOR'S obligations under the Contract Documents:

A. Worker's Compensation & Employer's Liability Insurance:

Worker's Compensation	Statutory
Employer's Liability	$500,000

B. Comprehensive General Liability (personal injury, bodily injury and property damage) - covering premises; underground, explosion and collapse hazard; products completed operations; independent contractors' property damage; personal injury and blanket broad form contractual liability.

General Aggregate	$2,000,000
Each Occurrence	$1,000,000

This Policy must include coverage for the liability assumed by the CONTRACTOR under the indemnity provisions of the Contract.

C. Automobile Liability Insurance (bodily injury and property damage) - covering all owned, hired and non-owned automobile equipment.

Combined Single Limit	$1,000,000

Coverage will also comply with all applicable automobile statutes and no-fault laws.

Comprehensive General Liability and Comprehensive Automobile Liability Insurance may be arranged under a single policy for the full limits required or a combination of underlying policies with the balance provided by an Excess or Umbrella Liability Policy.

OWNER'S LIABILITY INSURANCE

5.4 CONTRACTOR shall obtain Owner's Protective liability insurance in the name of OWNER and ENGINEER as agent for OWNER, with such provisions as will protect OWNER and ENGINEER from contingent liability under this Contract, and shall maintain and pay the premiums of such insurance. The amounts of coverage shall be the same as CONTRACTOR's liability insurance requirements in this Article.

CERTIFICATE OF INSURANCE:

5.5 Before commencing performance of Contract, CONTRACTOR shall furnish the OWNER with Certificates of Insurance evidencing:

A. OWNER (Clinton County Road Commission) shall be listed as Certificate Holder.

B. The following shall be listed as additional insured:
1. Clinton County Drain Commissioner
2. Muskrat Creek Drain Drainage District
3. Land & Resource Engineering (LRE)
4. Riley Township
5. People of the State of Michigan

C. Insurer(s) affording coverage, acceptable to the OWNER.

D. Effective and expiration dates of policies.

E. That the OWNER will be given 30 days written notice of any cancellation, non-renewal or material change in any policy.

F. That the Contractual Liability Endorsement has been included in Comprehensive General Liability policy.

G. Any deductibles and/or self-insured retentions.

H. Any exclusions to policies which are not part of the standard form.

SECTION 01410 REGULATORY REQUIREMENTS

PART 1-GENERAL

1.01 SUMMARY:

A. This Section includes provisions for requirements and fees of regulatory agencies.

B. The General Conditions requires that CONTRACTOR obtain and pay for all construction permits. This Section includes provisions for specific permits but does not include all permits.

1.02 PERMITS:

A. Highway, Road or Street:
1. Work performed and operations of CONTRACTOR within the limits of rights-of-way shall fulfill the requirements of the authority having jurisdiction over and control of the rights-of-way.
2. OWNER will obtain permits to occupy and maintain the utility in the rights-of-way, but CONTRACTOR shall obtain permits to perform construction and shall furnish necessary insurance and bonds required by the authority.
3. CONTRACTOR shall obtain a written release from the authority having jurisdiction stating that all repairs within said rights-of-way have been completed to their satisfaction prior to final acceptance to OWNER.

B. Soil Erosion and Sedimentation Control (Part 91, Act 451, PA 1994)
1. CONTRACTOR shall comply with the requirements and conditions of the Soil Erosion and Sedimentation Control Permit to be obtained by OWNER.

PART 1 - GENERAL

1.01 STAKING:

A. Control points, benchmarks and construction stakes will be furnished by the OWNER through the ENGINEER as necessary to facilitate construction.

B. If restaking is required, it shall be performed by the ENGINEER at the CONTRACTOR'S expense.

C. CONTRACTOR shall order the staking Three (3) working days in advance of the need for said staking.

1.02 INSPECTION & MATERIAL TESTING:

A. Field inspection and testing will be performed by ENGINEER and paid for by the OWNER.

B. The CONTRACTOR shall pay for the cost of any additional testing required when materials or concrete fail to meet the requirements of this specification.

C. The CONTRACTOR shall provide access to all portions of the work and furnish any necessary assistance to the ENGINEER or OWNER’s testing agency in obtaining and handling samples at the project site or at the source of materials.

PART 1 - GENERAL

1.01 All Work shall be in accordance with the Michigan Department of Transportation (MDOT), "Standard Specifications for Construction," 2012 edition, unless otherwise modified by the Contract Documents.

1.02 MEASUREMENT AND PAYMENT:

A. Measurement and payment methods shall be conducted in accordance with the Michigan Department of Transportation (MDOT), "Standard Specifications for Construction," 2012 edition, unless otherwise modified by Special Provision.

B. The ENGINEER will take all measurements and compute quantities accordingly. CONTRACTOR may assist in this effort.

1.03 TECHNICAL SPECIFICATIONS:

A. All Work shall be in accordance with MDOT, “Standard Specifications for Construction,” 2012 edition, unless otherwise modified on the Drawings or by Special Provision.

CLINTON COUNTY ROAD COMMISSION

SPECIAL PROVISION
FOR
ROADWAY GRADING

CON:LRE 1 of 1 10/2020

a. Description. This work consists of excavation and grading required for widening, resurfacing, and flattening sideslopes. Complete this work at locations in accordance with typical cross sections, as shown on the plans or as directed by the Engineer.

b. Materials. Furnish embankment material in accordance with section 205 of the Standard Specifications for Construction or as approved by the Engineer.

c. Construction. Complete this work in accordance with the standard specifications. The work of station grading includes, but is not limited to, the following:

1. Topsoil stripping.

2. Earthwork, including: earth excavation, embankment, and grading required to construct proposed typical cross sections.

3. Removal of miscellaneous items including, but not limited to, broken concrete pieces, existing edge drain or underdrain, underdrain outlet and end sections, riprap, loose pieces of HMA on ditch slopes, other items as directed by the Engineer, or other items indicated on the plans to be removed and included in Station Grading.

4. Removal of cattails, brush, trees less than 6 inches in diameter, and miscellaneous debris.

5. Movement and stockpiling of suitable excavated material including embankment and riprap when necessary to construct proposed cross sections.

6. Disposal of excess excavated material, unsuitable excavated material and other miscellaneous materials required to be removed.

7. Grading and compaction of existing material below the grade line.

d. Measurement and Payment. The completed work, as described, will be measured and paid for at the contract unit price using the following pay items:

Pay Item	**Pay Unit**
Roadway Grading	Station

Roadway Grading includes all labor, equipment and materials necessary to complete the work as described and will be measured by length in stations along the road centerline and include both sides of the road. The work will extend to the right-of-way (ROW) line or slope stake line, whichever is furthest.

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
NON-COMPLIANCE WITH SOIL EROSION AND SEDIMENTATION CONTROL REQUIREMENTS

CFS:DMG 1 of 2 APPR:TWK:HZ:06-13-17
FHWA:APPR:06-13-17

a. Description. This special provision establishes negative adjustments related to the failure to properly install and maintain soil erosion and sedimentation control (SESC) measures and the conditions under which these adjustments will be determined and applied. Nothing in this special provision modifies section 107 of the Standard Specifications for Construction.

Delays to the project as a result of the Contractor conducting corrective actions for SESC measures do not constitute a valid reason for an extension of time.

Ensure deficiencies with SESC measures are corrected in the time frame stated herein. For those deficiencies not corrected within the stated time frame, the Engineer will make a negative adjustment to the contract as stated herein.

b. Materials. None specified.

c. Construction. Install all temporary erosion control measures identified on the plans and as directed by the Engineer for an impacted area of the project prior to the start of any earth disturbance including, but not limited to, clearing, grading and excavation in that area. The Engineer will inspect these measures every 7 days and within 24 hours after a precipitation event that results in a discharge from the site. Deficiencies will be documented on the National Pollutant Discharge Elimination System and SESC Inspection Report (MDOT Form 1126).

If at any time during the project, including the time during the seasonal suspension, the Engineer documents deficient SESC measures, the Engineer will provide written notification with instructions for corrective action to the Contractor. The time frame for completion of these corrective actions will be specified in the notification and will be discussed with the Contractor as necessary.

Deficiencies are defined as one or more of the following:

1. Failure to install or construct SESC measures shown on the plans or as directed by the Engineer;

2. Failure to maintain the measures;

3. Failure to conduct earth change activities in a manner consistent with all applicable environmental permit requirements;

4. Failure to comply with the area limitations or the time limitations stated in subsections 208.03.A and 208.03.B, respectively, of the Standard Specifications for Construction.

SESC deficiencies are either emergency or non-emergency and the time frame for corrective action is determined accordingly. Sediment leaving the right-of-way or entering a drainage structure, waters of the state, or loss of support of the roadbed impacting public safety constitutes an emergency and corrective actions must be completed within 24 hours of notification, including weekends or holidays regardless of whether the Contractor is working or not. Non-emergency deficiencies must be corrected within 5 calendar days of notification.

For those emergency corrective actions not completed within 24 hours of notification, the Contractor will be assessed $100.00 per hour for every hour the deficiency remains uncorrected after the initial 24 hours of notification. For those non-emergency corrective actions not completed within 5 calendar days, the Contractor will be assessed $500.00 per day for every day, or part thereof, the deficiency remains uncorrected after the initial 5 days of notification.

If it is not practicable to complete the non-emergency corrective actions within 5 calendar days, the Contractor must document the reasons and propose a corrective action plan to the Engineer within 5 days of notification. The corrective action plan must contain the Contractor's course of action and a time frame for completion. If the reasons and the corrective action plan are acceptable to the Engineer, the Contractor will be allowed to proceed with the plan as proposed without incurring a negative adjustment. If the approved corrective action plan is not completed as proposed, the Contractor will be assessed $1000.00 per calendar day for every day, or part thereof, the deficiency remains uncorrected after the time frame is exceeded in the approved corrective action plan.

Correct, in the timeframe stated herein, all other emergency or non-emergency SESC deficiencies documented anywhere else on the project during completion of the approved corrective action plan.

d. Measurement and Payment. The Engineer will make the necessary monetary adjustment to the contract amount based on the length of time the Contractor allows the deficiencies to remain uncorrected after the time allowance stated herein and as described to cover any costs incurred by the Department as a result of SESC violations.

All costs associated with corrective actions required due to the Contractor's failure to properly install or maintain SESC measures on this project will be borne by the Contractor.

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
CULVERT, PRECAST CONCRETE BOX, FURNISH AND INSTALL

CON:LRE 1 of 2 10/20

a. Description. This work consists of all labor, equipment, and materials necessary to design, load rate, manufacture, store and deliver precast box culvert and appurtenances in accordance with section 406 of the Standard Specifications for Construction, as specified herein, and as detailed on the plans.

b. Materials. Provide material in accordance with subsection 406.02 of the Standard Specifications for Construction.

c. Construction. Design, submit shop drawings, load rating, and manufacture box culvert and appurtenances in accordance with subsection 406.03 of the Standard Specifications for Construction. Culvert supplier must possess a valid National Precast Concrete Association (NPCA) or American Concrete Pipe Association (ACPA) certification.

Notify the Engineer at least 2 weeks before beginning fabrication inspection. Provide the Department access to perform quality assurance inspection. The Department does not consider quality assurance inspection a substitute for the manufacturer's quality control requirements.

d. Storage and Delivery.

1. Store the materials at a site to be chosen by the Contractor and approved by the Department until the installation Contractor (hereafter referred to as the Installer) has installed all of the required materials.

2. Deliver the materials to the worksite in accordance with the requirements of the progress clause.

3. Deliver the materials to a site near the worksite selected by the Installer and approved by the Engineer.

4. If any materials become damaged at any time during possession by the Contractor or Installer, the damaged material must be replaced at no cost to the Department.

e. Measurement and Payment. The completed work, as described, will be measured and paid for at the contract unit price using the following pay item:

Pay Item	**Pay Unit**
Culv, Precast Conc Box, 24 Foot by 10 Foot, Furn and Install	Foot

Culv, Precast Conc Box, 24 Foot by 10 Foot, Furn and Install includes the following:

1. Designing, manufacturing, load rating, storing and delivering precast elements;
2. Headwalls, footings, tapered sections, precast;
3. Inserts; and
4. Furnish and installation of precast box culvert elements per plans and specifications.

The Owner will pay for **Culv, Precast Box, 24 Foot by 10 Foot, Furn and Install** by plan quantity in accordance with subsection 109.01.A.

MICHIGAN
DEPARTMENT OF TRANSPORTATION

FREQUENTLY USED SPECIAL PROVISION
FOR
BOX CULVERT JOINT TIE ASSEMBLIES

BOB:TRK 1 of 1 10/20

a. Description. This work consists of furnishing and installing tie rods, plate washers, lock washers and nuts and sealant for filling the joint tie holes through the box culvert wall between the last 3 segments. This special provision applies to the last 2 joints of box culverts with openings of any size, unless otherwise detailed on the plans.

This work consists of providing all labor, equipment and materials necessary to furnish and install Box Culvert Joint Tie Assemblies as shown on the plans and detailed on Standard Plan R-84 series. Alternative tie options may be approved by the Engineer.

b. Materials. Furnish the following materials or approved equivalent:

1. 1 inch diameter rods.

2. 2 inch by 2 inch by 5/16 inch plate washers.

3. lock washers and nuts for 1 inch diameter rods

4. Select tie rod hole filler in accordance with subsection 713.02.B of the Standard Specifications for Construction.

All hardware must be steel, 36 ksi minimum, galvanized in accordance with ASTM F 2329 and ASTM A123.

c. Construction. Install and maintain joint tie assemblies and hole filler during construction and backfilling activities. Use caution when placing and compacting backfill materials adjacent to the assemblies. Damage to the joint tie assemblies caused by the Contractor's operation must be repaired at no cost to the Department.

Apply tie rod hole filler in accordance with subsection 713.03.F of the Standard Specifications for Construction.

d. Measurement and Payment. The completed work, as described, is incidental to the price of the box culvert.

Joint Water Proofing and geotextile blanket on the exterior of the culvert will not be paid for separately but are included in the price for the box culvert.

CLINTON COUNTY ROAD COMMISSION

SPECIAL PROVISION
FOR
BYPASS PUMPING

CON:LRE 1 of 1 09/20

a. Description. This work consists of furnishing all labor, equipment and materials necessary to operate, maintain, remove, and dispose of a temporary water bypass pumping system at each location designated in the contract as approved by the Engineer. The temporary bypass pumping system must function to enable the completion of the work and it will be required to operate 24 hours per day, 7 days per week for the duration required.

b. Materials. None specified.

c. Construction. Furnish, install, test, operate, monitor, and maintain temporary bypass pumping system(s) in accordance with subsection 406.03.G of the Standard Specifications for Construction as applicable and as shown on the plans. The Contractor is responsible for all damages caused by temporary bypass pumping.

Submit a bypass pumping plan to the Engineer for approval at least 10 work days prior to conducting the work. The plan must be of sufficient detail and contain all pertinent items of the bypass pumping system.

d. Measurement and Payment. The completed work, as described, will be measured and paid for at the contract unit price using the following pay items:

Pay Item	**Pay Unit**
Bypass Pumping	Each

Bypass Pumping, includes installing and maintaining a temporary bypass pumping system and miscellaneous equipment for a complete and operating system. Removal and disposal of this temporary system is included in this pay item and will not be paid for separately.

CLINTON COUNTY ROAD COMMISSION

SPECIAL PROVISION
FOR
MAINTAINING TRAFFIC,
PERMANENT SIGNING AND PAVEMENT MARKING

CON:LRE 10/20

a. Description. This work shall consist of all labor, materials and equipment required to maintain traffic in accordance with the Special Provisions for Maintaining Traffic, and as specified herein for Church Road over Muskrat Creek in Clinton County.

b. General. Traffic shall be maintained according to Section 812 of the *MDOT 2012 Standard Specifications for Construction*, including any Supplemental Specifications, *2011 Michigan Manual of Uniform Traffic Control Devices*, and as specified herein.

1. The Contractor shall notify the Project Engineer a minimum of 3 business days prior to the implementation of any detours, road closures, lane closures and major traffic shifts.

2. Coordinate operations with Contractors performing work on other projects within or adjacent to the Construction Influence Area (CIA).

3. The Contractor is required to maintain traffic to driveways within the CIA at all times except during actual construction of the driveway or as directed by the Project Engineer.

c. Construction Influence Area (CIA). The CIA shall include the right-of-way of the following roadways, within the approximate limits described below:

1. Church Rd from S Forest Hill Rd to Dexter Trail
2. S Forest Hill Rd
3. Dexter Trail

d. Traffic Restrictions.

1. No work shall be performed during the following holiday periods:

Holiday	Start Date and time	End Date and time
Memorial Day	3:00 p.m. Thursday May 21st	6:00 a.m. Tuesday May 26th
Fourth of July	3:00 p.m. Wednesday July 1st	6:00 a.m. Monday July 6th
Labor Day	3:00 p.m. Thursday September 3rd	6:00 a.m. Tuesday September 8th

2. All work shall be conducted during the hours of 7 am to 7 pm, Monday through Saturday. Night and weekend work may be permitted, at the discretion of the Engineer and MDOT. However, any additional cost for maintaining traffic shall be borne by the Contractor.

3. The contractor shall maintain and coordinate daily waste pickup, mail deliveries and deliveries at all homes and businesses affected by construction.

4. Maintain access for emergency vehicles at all times. The Contractor will be required to assist emergency vehicles (fire, ambulance, police) in gaining access into and around the work zone at all times without exception.

5. The Contractor must notify the Engineer at least 24 hours in advance of modifying any permanent traffic control devices in accordance with Section 812 of the MDOT 2012 Specifications for Construction.

e. Stage Construction. The traffic control required by this Special Provision for work on Cleveland Road (M-57) is based on the suggested sequence of operations described below. An alternate traffic control plan may be used by the Contractor, subject to review and approval by the Engineer. Following is a brief description of traffic control required during each construction stage:

1. Staging:

   A. Work may begin 10 days after Notice to Proceed.

   B. Install temporary maintenance of traffic control devices per plans, Engineer, and MMUTCD. Maintain traffic per plan.

   C. Construct road and drain improvements

   D. Project will be substantially complete on or before April 30, 2020, with final completion including all restoration and cleanup on or before May 15, 2020.

   E. Perform all restoration, signs, and pavement and open roads to full-traffic. Remove temporary maintenance of traffic control devices.

f. Traffic Control Devices.

1. General

   A. All traffic control devices and their usage shall conform to the most current revision of Part 6 of the Michigan Manual of Uniform Traffic Control Devices (MMUTCD), 2011 edition. The most current revision of Part 6 of the Michigan

Manual of Uniform Traffic Control Devices (MMUTCD), 2011 edition can be found at the following website: http://mdotwas1.mdot.state.mi.us/public/tands/Details_Web/mmutcdpart6.pdf

B. During non-working periods, any work site with uncompleted work shall have advance signs (W21-4 - "Road Work Ahead") and plastic drums, at specific locations, as directed by the Engineer, at no additional cost.

C. Access to all business and residential drives shall be maintained at all times during construction.

2. Temporary Signs

A. Distances shown between construction warning, regulatory, and guide signs shown on the typical sign sequences are approximate and may require field adjustments as directed by the Engineer. Refer to the attached sheet M0020a for Tables of “D” and “L” values.

B. Ground driven sign supports for temporary signs shall be as shown on Typical Plan WZD-100-A. Refer to Traffic and Safety Special Detail WZD-125-E for portable supports.

C. Maintaining Traffic sequence for closure and detours will utilize the existing sequence set up by the road commission and contractor will supplement items identified in this special provision and detailed on the plans.

D. (2) W20-3 ROAD CLOSED signs are included to be used at the direction of the Engineer.

E. (2) W21-4 ROAD WORK AHEAD signs are included to be used at the direction of the Engineer.

F. All temporary signs shall be mounted at a 5-foot minimum bottom height in uncurbed areas and 7-foot minimum bottom height in curbed or pedestrian areas.

G. All temporary signs shall be faced with prismatic retroreflective sheeting.

H. Distances shown between construction warning, regulatory and guide signs shown on the typicals are approximate and may require field adjustment, as directed by the Engineer.

I. All temporary signs shall be constructed with legends and symbols flush to the sign face and not extending beyond the sign borders or edges.

J. All temporary signs that will be in place for more than 14 days shall be mounted on driven posts.

K. Place sign covers on all existing speed limit signs in conflict with proposed maintaining traffic signing sequence. Sign Covers are included in the “Minor Traffic Devices” item.

3. Permanent Signs

A. There are no new permanent signs on the project.

4. Channelizing Devices

A. Channelizing devices required shall be plastic drums with high intensity sheeting.

B. Spacing for channelizing devices is 50’ in tapers and 100’ in tangents.

C. Provide 11’ width lane minimum with 2’ shy distance during all closures.

D. 10 high intensity plastic drums are included to be used at the direction of the Engineer.

5. Temporary Pavement Markings

A. There are no temporary pavement markings called for on the project.

6. Permanent Pavement Markings

A. There are no permanent pavement markings called for on the project.

g. M**easurement and Payment**- The estimate of quantities for maintaining traffic is based on signing and related traffic control devices for the roadway closure, and two "ROAD WORK AHEAD" (W21-4) signs.

1. Payment for all temporary traffic control items shall be measured and paid for in accordance with Section 812.04 of the MDOT 2012 Standard Specifications of Construction.

2. Payment for temporary signs shall be made on the maximum square foot of dissimilar sign legends in use at any one time during the project.

3. Payment for permanent pavement markings shall be made by the foot.

4. Any additional signing or maintaining traffic devices required to expedite the construction shall be at the Contractor's expense.

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
EROSION CONTROL, SEDIMENT LOG

RSD:JLB 1 of 1 APPR:DMG:HZ:02-22-16

a. Description. This work consists of providing all labor, equipment and materials necessary to install, maintain, remove and dispose of sediment logs as an alternative to Erosion Control, Check Dam, Stone at the locations shown on the plans and as directed by the Engineer. Perform all work in accordance with section 208 of the Standard Specifications for Construction, the manufacturer's installation instructions and this special provision.

b. Materials. Ensure the sediment log is composed of evenly distributed, interlocking weed seed free fibers encased in an open weave degradable containment fabric. Secure netting at the end of the log. Choose size and fibers that will perform as needed and provide the longevity required.

The following devices are approved for use as acceptable alternatives:

Curlex Sediment Log - American Excelsior Co., Arlington, TX (800) 777-7645

SediMax-FR, SediMax-SW - North American Green, Poseyville, IN (888) 828-5126

Erosion Control Log - Green Solutions, Baton Rouge, LA (800) 848-4500

Sediment Retention Fiber Roll - Western Excelsior Corp., Mancos, CO (800) 833-8573

c. Construction. Provide the manufacturer's published installation guidelines to the Engineer prior to installation. Do not commence installation until the Engineer has approved the proposed installation procedures. Install the sediment log on prepared (seeded) grades in ditches as shown on the plans in strict accordance with the manufacturer's published installation guidelines, with particular emphasis on requirements for anchoring materials, frequency, and pattern recommended for site geometry.

d. Measurement and Payment. The completed work, as described, will be measured and paid for at the contract unit price using the following pay item:

Pay Item	**Pay Unit**
Erosion Control, Sediment Log	Each

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
SLOPE RESTORATION, NON-FREEWAY

a. Description. This work consists of preparing all lawns and slopes on non-freeway projects designated for slope restoration on the plans or as directed by the Engineer and applying topsoil, fertilizer, seed, mulch with mulch anchor, mulch blanket, high velocity mulch blanket and permanent turf reinforcement mat to those areas. Turf establishment must be in accordance with section 816 of the Standard Specifications for Construction and Standard Plan R-100 Series, except as modified herein or otherwise directed by the Engineer.

b. Materials. The materials and application rates specified in sections 816 and 917 of the Standard Specifications for Construction apply unless modified by this special provision or otherwise directed by the Engineer. The following materials must be used on this project:

1. Seeding mixture as called for on the plans

2. Fertilizer, Chemical Nutrient, Class A

3. Topsoil Surface, Furnished or Salvaged, 4 inch. Remove any stones greater than 1/2 inch in diameter or other debris from all topsoil.

4. Mulch and Mulch Anchoring, Mulch Blanket and High Velocity Mulch Blanket

5. Permanent Turf Reinforcement Mat (TRM) must be 100 percent synthetic and consist of 100 percent ultraviolet (UV) stabilized polyolefin fibers sewn between two layers of black UV stabilized polypropylene netting with polyolefin thread. The TRM must meet the following "minimum average roll value" requirements:

Property	Test Method	Requirement
Mass/Unit Area	ASTM D 6566	10 oz/syd
Ultraviolet Stability @ 1000 hrs	ASTM D 4355	80 percent
Tensile Strength (MD)	ASTM D 6818	165 lbs/ft

Acceptance. Supply a Test Data Certification for the permanent TRM from one of the following manufacturers:

Recyclex - American Excelsior Co., Arlington, TX (800) 777-7645
P300 - North American Green, Poseyville, IN (800) 772-2040
Landlok 450 - Propex, Inc., Chattanooga, TN (800) 621-1273
PP5-10 - Western Excelsior, Mancos, CO (800) 833-8573

c. Construction. Construction methods must be in accordance with subsection 816.03 of the Standard Specifications for Construction. Begin this work as soon as possible after final grading of the areas designated for slope restoration but no later than the maximum time frames stated in

subsection 208.03 of the Standard Specifications for Construction. It may be necessary, as directed by the Engineer, to place materials by hand.

Shape, compact and assure all areas to be seeded are weed free prior to placing topsoil. Place topsoil to the minimum depth indicated above, to meet proposed finished grade. If the area being restored requires more than the minimum depth of topsoil to meet finished grade, this additional depth must be filled using topsoil or, at the Contractor's option, embankment. Furnishing and placing this additional material is included in this item of work.

Topsoil must be weed and weed seed free and friable prior to placing seed. Remove any stones greater than 1/2 inch in diameter or other debris. Apply seed mixture and fertilizer to prepared soil surface. Incorporate seed into top 1/2 inch of topsoil

Apply mulch at a rate of 2 tons per acre. Place Mulch Anchoring over the mulch at a rate specified in subsection 816.03.F of the Standard Specifications for Construction. Mulch Blanket and High Velocity Mulch Blanket must be placed in accordance with subsection 816.03.H of the Standard Specifications for Construction and as shown on Standard Plan R-100 Series.

Areas constructed with the TRM must be installed on prepared (seeded) grades as shown on the plans in strict accordance with the manufacturer's published installation guidelines. The top edge of the TRM must be anchored in a minimum 6 inch deep trench. Operation of equipment on the slope will not be allowed after placement of the TRM. No credit for splices, overlaps, tucks or wasted material will be made.

If an area washes out after this work has been properly completed and approved by the Engineer, make the required corrections to prevent future washouts and replace the topsoil, fertilizer, seed and mulch. This replacement will be paid for as additional work using the applicable contract items.

If an area washes out for reasons attributable to the Contractor's activity or failure to take proper precautions, replacement will be at the Contractor's expense.

The Engineer will inspect the seeded turf to ensure the end product is well established, weed free, in a vigorous growing condition, and contains the species called for in the seeding mixture.

If the seeded turf is not well established at the end of the first growing season, the Contractor is responsible to re-seed until the turf is well established and approved by the Engineer.

If weeds are determined by the Engineer to cover more than 10 percent of the total area of slope restoration, the Contractor must provide weed control in accordance with subsection 816.03.J of the Standard Specifications for Construction. Weed control will be at the Contractor's expense with no additional charges to the project.

d. Measurement and Payment. The completed work, as described, will be measured and paid for at the contract unit price using the following pay item:

Pay Item	**Pay Unit**
Slope Restoration, Type __	Square Yard

1. Place **Slope Restoration, Type A** in all areas not described in the other types of slope restoration and will be measured by area in square yards in place. **Slope Restoration, Type A**

includes all labor, equipment and materials required to install Topsoil Surface, Furnished or Salvaged; Fertilizer, Chemical Nutrient, Class A; Seeding Mixture; and Mulch and Mulch Anchoring which will not be paid for separately but is included in the contract unit price for **Slope Restoration, Type A**.

2. Place **Slope Restoration, Type B** parallel (6 feet minimum) to the edge of the roadway, in areas that have a 1 on 3 slope and in any ditch with a grade less than 1.5 percent, or as directed by the Engineer. **Slope Restoration, Type B** will be measured by area in square yards in place. **Slope Restoration, Type B** includes all labor, equipment and materials required to install Topsoil Surface, Furnished or Salvaged; Fertilizer, Chemical Nutrient, Class A; Seeding Mixture; and Mulch Blanket which will not be paid for separately but is included in the contract unit price for **Slope Restoration, Type B**.

3. Place **Slope Restoration, Type C** in areas that have a 1 on 2 slope, any ditch with a grade of 1.5 percent to 3 percent or as directed by the Engineer. **Slope Restoration, Type C** will be measured by area in square yards in place. **Slope Restoration, Type C** includes all labor, equipment and materials required to install Topsoil, Furnished or Salvaged; Fertilizer, Chemical Nutrient, Class A; Seeding Mixture; and High Velocity Mulch Blanket which will not be paid for separately but is included in the contract unit price for **Slope Restoration, Type C**.

4. Place **Slope Restoration, Type D** in areas that have a slope steeper than 1 on 2, any ditch with a grade steeper than 3 percent or as directed by the Engineer. **Slope Restoration, Type D** will be measured by area in square yards in place. **Slope Restoration, Type D** includes all labor, equipment and materials required to install Topsoil, Furnished or Salvaged; Fertilizer, Chemical Nutrient, Class A; Seeding Mixture; and TRM which will not be paid for separately but is included in the contract unit price for **Slope Restoration, Type D.**