The Livingston Educational Service Agency (the “L.E.S.A.”) is accepting bids for Phase II of the bus parking reconstruction project. Sealed bids must be received by 2:00 p.m. on May 13, 2019 at 1425 W. Grand River, Howell, MI 48843, where bids will be opened and read aloud at such time. Late bids will not be considered or accepted. Each bidder must be bonded, complete the Family Relationship Disclosure Form should a relationship exist between the owner or any employee of the bidder and any member of the L.E.S.A. school board or superintendent, and the Iran Sanction Disclosure Form. A bid that does not include these forms shall not be accepted. Additional information and bid requirements are available at www.livingstonesa.org

Bid Documents are available through O’Neal Constriction by emailing: mgudenau@onealconstruction.com
REQUEST FOR SUBCONTRACTOR BIDS

Project: LESA Phase II Parking Lot

Location: 1425 W. Grand River, Howell, MI 48843

Architect: Lindhout Associates, Brighton, MI 48116

GC/CM: O’Neal Construction, Inc. is the construction manager

Description: The Livingston Educational Service Agency (L.E.S.A.) is accepting bids for Phase II of bus parking improvements.

Schedule: Construction is scheduled to begin July 2019.

Bid Due Date: Sealed bids are due Monday, May 13, 2019 at 2:00PM at 1425 W. Grand River, Howell, MI 48843, where they will be opened and read aloud. A certified check or bank draft payable to the Owner, or a satisfactory Bid Bond executed by the bidder and surety company, in the amount of five percent (5%) of the proposal amount shall be submitted with each proposal. Each bid must be accompanied by the Familial Relationship Disclosure and the Iran Sanction Disclosure Forms. (See Instructions to Bidders). A bid that does not include these forms shall not be accepted.

Plans and Specs: Plans and specifications are available electronically from O’Neal Construction by downloading them from the following link:

https://onealconstruction.box.com/s/37y487wiqu6kxkm8nhk2iz8ruszhuoq

Questions: Contact Matt Gudenau: (734) 769-0770

Please send an e-mail response to confirm you will be bidding. mgudenau@onealconstruction.com

Thank you.
LESAs Bus Parking Reconstruction

INSTRUCTIONS TO BIDDERS: 4/29/2019

Copies of Bidding Documents

Bid Documents are available from O’Neal Construction electronically at no cost.

Submission of Proposals

Sealed bids are due Monday, May 13th, at 2:00 PM local time at 1425 W. Grand River, Howell, MI 48843, where they will be publicly opened and read aloud.

Proposals shall be submitted in a sealed, opaque envelope, marked on the outside with the bidder’s name, the name of the project, and the statement “THIS ENVELOPE CONTAINS A BID PROPOSAL FOR BID DIVISION ____” (fill in the blank with the appropriate bid division or divisions).

The bidder assumes full responsibility for timely delivery at the location designated for receipt of bids. Late bids will not be accepted.

A certified check or bank draft payable to the Owner, or a satisfactory Bid Bond executed by the bidder and surety company, in the amount of five percent (5%) of the proposal amount shall be submitted with each proposal.

Each bid must be accompanied by a sworn and notarized statement disclosing any familial relationship that exists between the owner or any employee of the bidder and any member of the LESA school board or superintendent. A bid that does not include that familial statement shall not be accepted.

Form of Proposal

Every proposal shall be submitted on the Subcontractor Bid Form. A single lump-sum price for multiple bid categories is acceptable. Bids for partial categories are not acceptable.

The proposal form shall be filled out in ink or typewritten. Quotes shall include written and numeric forms. In the case of discrepancy, the written form shall govern. All proposals shall bear original signatures and shall be dated in longhand.
The proposal shall remain firm for no less than sixty (60) calendar days after the bid due date.

**Family and Iran Sanction Disclosure Form**

Each bid must be accompanied by a sworn and notarized statement disclosing any family relationship that exist between the owner or any employee of the bidder and any member of the L.E.S.A. school board or superintendent, and any Iran sanctions disclosures.

**Schedule**

The work shall begin in July 2019.

**Bonds**

A certified check or bank draft payable to the Owner, or a satisfactory Bid Bond executed by the bidder and surety company, in the amount of five percent (5%) of the proposal amount shall be submitted with each proposal. Labor & material performance bonds ARE also required. All bidders shall include the cost of labor & material performance bonds in their base bid.

**Insurance Requirements**

Comprehensive General Liability with policy limits of not less than One Million Dollars ($1,000,000.00) for each occurrence and in the aggregate for bodily injury and property damage.

Automobile Liability covering owned and rented vehicles operated by the Construction Manager with policy limits of not less than One Million Dollars ($1,000,000.00 ) combined single limit and aggregate for bodily injury and property damage.

Workers’ Compensation at statutory limits and Employers Liability with a policy limit of not less than Five Hundred Thousand Dollars ($500,000.00).

**Acceptance of Proposals**

The owner reserves the right to accept or reject any and/or all proposals and to waive informalities and/or irregularities as its interests may require.

**Questions**

Please direct all questions to Matt Gudenau at O’Neal Construction by email at: mgudenau@onealconstruction.com or call 734-769-0770
These responsibilities or scopes summarize the basic work to be included by each trade subcontractor. These lists are not complete descriptions that comprehensively define or exclude work for each trade. These scopes attempt to assign responsibilities where tasks are sometimes split between two trades. Items included in the Contract Documents but not listed below are the responsibility of the trade contractor that would provide such items per industry standards. In addition to all items included in the specific trade categories, all contractors must include work described in the very first category: 1A. Responsibilities of Each Subcontractor. If there is conflict between these scopes and the Contract Documents, the contractor shall comply with the more stringent requirement(s). All contractors are responsible for items depicted on any Drawing within the Contract Documents; not just the drawings for their discipline (e.g., “20B. PLUMBING” is responsible for plumbing elements depicted on Civil Drawings, not just Plumbing Drawings).

All work items listed below include labor and material for a complete installation unless noted otherwise.

**LESA Bus Parking Reconstruction**

**Bid Category 1A**

**Responsibilities of Each Subcontractor**

**BID DOCUMENTS**
- Drawings dated 04/23/19
- Project Manual dated 04/22/19
- Instruction to bidders
- Request for Subcontractor Bids
- Bid scopes
- Geotechnical Report
- Bid Form

**SAFETY**
- Comply with all requirements of MIOSHA and O’Neal Safety Program
- Job Safety Analysis (turn in before work begins and weekly thereafter)
- Daily Safety Huddle report with sign-in (turn in daily)
- Toolbox Talk (turn in weekly)
- Daily equipment inspections (turn in daily)
- Safety Inspection of entire jobsite (turn in weekly)
- Restore any safety or security barricades removed for own work
- If a hazard is created by your workers it must immediately be addressed.
- 100% 6’ Tie-off
Subcontractor Responsibilities and Bid Scopes

LOGISTICS
- Deliver, unload & protect own materials
- Unloading, hoisting, rigging and setting of your work
- Supervise own crew & coordinate with O’Neal Superintendent
- Take into account limited space for on-site storage of materials and equipment and must coordinate such with OCI Superintendent
- Remobilizations and comebacks as required
- Barricades and traffic maintenance as required
- Provide flagmen/traffic control and barricades as needed for your work
- Material staging as agreed upon with OCI superintendent
- Provide just in time material deliveries
- Special delivery requirements during frost law period
- Means and methods to gain access to your work

LAYOUT/COORDINATION
- Coordination w/ other trades to eliminate interferences

CONTRACT
- Pay required sales taxes
- Obtain written approval from OCI before starting any work additional to your contract,
- 10% Retainage will be held until agreed upon by the owner, architect and OCI

CLEANUP/PROTECTION
- Keep streets, drives and parking lots clean at all times, include necessary sweeping
- Daily cleanup
- Protect all existing utilities, structures, facilities, and finishes as needed to do your work
- Protect own work from weather and continuing construction operations
- Protect finished work as required to complete your work
- Restoration of any damage to the site fence, gates, erosion control or existing conditions
- Protect adjacent properties from damage during work and repair all damages caused by work

CODE/PERMITS
- Perform work in accordance with all applicable laws and codes
- Include all permits and fees for your work
- Scheduling and coordination of inspections for your work with authority having jurisdiction
- Comply with building codes as indicated on project documents.
- Obtain required trade permits and inspections from local authority having jurisdiction.
Subcontractor Responsibilities and Bid Scopes

Bid Category 02
Asphalt Paving

I. Scope of Work

SPECIFICATIONS
- Division 02A – Site Development
- Division 02C – Excavating and Grading
- Division 02F – Soil Borings
- Division 02G – Asphalt Paving
- Division 02L – Removal and Demolition

BASE BID
- Bid Category 1A. Responsibilities of Each Subcontractor
  - All required site demolition shown on drawings including saw cutting where new asphalt paving shown.
  - Disposal of all demo
  - Furnish and install all materials required for asphalt paving.
  - Asphalt striping for asphalt work per drawings
  - Final grading of sub grade prior to placement of stone base
  - Include stone base material underneath asphalt paving
  - Include all necessary barricades/traffic control and related permits required. Leave all barricading and traffic control in place until directed by OCI Superintendent.

II. Work to be Excluded
- Concrete Paving
- Pavement striping on concrete surfaces
- All soil erosion control measures shown on sheet 3 and 4 (By Bid Category 03)
- All work associated with phase 2C
Bid Category 03
Concrete

I. Scope of Work

SPECIFICATIONS
- Division 03A – General Concrete

BASE BID
- Bid Category 1A. Responsibilities of Each Subcontractor
- All required site demolition shown on drawings including saw cutting where new asphalt paving shown.
- Disposal of all demo
- All concrete pavement shown on drawings
- Concrete striping for concrete work per drawings
- No site modifications to concrete mix designs unless previously approved
- Concrete truck washout provisions (including but not limited to dumpsters, liners, soil erosion measures, etc.). Concrete washout plan must be approved by O’Neal Superintendent
- Clean-up and properly dispose of all slurry and wash-out left behind after completion of work
- Cleaning of roads and streets caused by the contractor on an as-needed basis.
- Include any mobilizations required for phasing
- Final grading of sub grade prior to placement of stone base
- Include stone base material underneath concrete
- All soil erosion control measures shown on sheet 3 and 4
- Removal of all soil erosion control measures shown on sheet 3 and 4 after completion of project as directed by OCI Superintendent.
- Geotextile fabric as shown on sheet 3
- F&I all curb & gutter work
- Include all necessary barricades/traffic control and related permits required. Leave all barricading and traffic control in place until directed by OCI Superintendent.

II. Work to be Excluded
- Asphalt Paving
- Pavement striping on asphalt surfaces
- All work associated with phase 2C
AFFIDAVIT OF COMPLIANCE – IRAN ECONOMIC SANCTIONS ACT
Michigan Public Act No. 517 of 2012

The undersigned, the owner or authorized officer of ____________________________ (the “Bidder”), pursuant to the compliance certification requirement provided in the Livingston Educational Service Agency Invitation To Bid For ____________________________, hereby certifies, represents and warrants that the Bidder (including its officers, directors and employees) is not an “Iran Linked Business” within the meaning of the Iran Economic Sanctions Act, Michigan Public Act No. 517 of 2012 (the “Act”), and that in the event Bidder is awarded a Contract as a result of the aforementioned Invitation To Bid, the Bidder will not become an “Iran Linked Business” at any time during the course of performing under the Contract.

The Bidder further acknowledges that any person who is found to have submitted a false certification is responsible for a civil penalty of not more than $250,000.00 or 2 times the amount of the Contract or proposed Contract for which the false certification was made, whichever is greater, the cost of the Intermediate School District’s investigation, and reasonable attorney fees, in addition to the fine. Moreover, any person who submitted a false certification shall be ineligible to bid on an Invitation To Bid for three (3) years from the date the it is determined that the person has submitted the false certification.

BIDDER:

Name of Bidder

By: ____________________________
Its: ____________________________
Date: ____________________________

STATE OF ____________)   
)ss.
COUNTY OF _____________)

This instrument was acknowledged before me on the ____ day of ____________, 2019, by ____________________________.

__________________________________________, Notary Public
__________________________________________ County, _________
My Commission Expires:
Acting in the County of: _____________
AFFIDAVIT OF BIDDER
FAMILIAL RELATIONSHIP
DISCLOSURE STATEMENT

I do herewith swear that I as owner, and/or any of my employees

DO _____ DO NOT _____ have a familial relationship with any member of the

Livingston Educational Service Agency board, intermediate school board, or
board of directors or the superintendent of the school district, intermediate
superintendent of the intermediate school district, or chief executive officer of the
public school academy.

If yes, please complete the following:

__________________________________________
Contractor or Employee Name  Relationship

To Whom (L.E.S.A. Employee as described above)

The undersigned appeared before me this ____day of _________2019.

__________________________________________
Legal signature of Owner

State of Michigan

County of _______________

Subscribed and sworn to before me this ____________ day of ____________ 2019.

________________________  My Commission expires __________________
Notary Public
SUBCONTRACTOR BID FORM

Project name: LESA Phase II Bus Parking Reconstruction

Date bid submitted: ________________________________

Subcontractor name: ________________________________

Subcontractor email: ________________________________

Subcontractor address: ___________________________________________________________________
(street, city & state)

Contact numbers: ___________________________________________________________________
(phone) (fax)

Owner: Livingston Educational Service Agency
1425 W. Grand River
Howell, MI 48843

Architect: Lindhout Associates architects aia pc
10465 Citation Drive
Brighton, MI 48116

Construction Manager: O’Neal Construction, Inc.
525 W. William
Ann Arbor, MI 48103

Bidder agrees to perform all work for bid scopes listed below in accordance with the following drawings, supplemental bid information and addenda:

Drawings dated: ________________________________________________________________

Bid Category (or Categories):

_________________        _________________        _________________        _________________
Phase 2A
Base Bid amount (including Michigan sales tax): __________________________________________
(written)

______________________________________________________  ($_______________________)
(numbers)
Phase 2B
Base Bid amount (including Michigan sales tax): __________________________________________
(written)

______________________________________________________  ($_______________________)
(numbers)
Phase 2A & 2B Combined
Base Bid amount (including Michigan sales tax):

__________________________________________________________________________
(written)

__________________________________________________________________________ ($_______________________)
(numbers)

Unit Prices
Undercut existing soils and haul off site: $_________________/CY

Bring new class II sand to the site. Place and compact: $_________________/CY

EMR
Subcontractor’s current Experience Modification Rate (“EMR”): ________________

Bidder agrees that his bid shall remain valid and not be withdrawn for a period of 60 days after submission.

Subcontractor authorized signature: ____________________________________________

(signature & date)

(print name & title)

Witnessed in the presence of: ________________________________________________

(signature & date)

(print name & title)

This form is to be submitted in duplicate with all spaces filled in.
CONSTRUCTION PLANS
FOR PHASE 2
L.E.S.A. PARKING LOT RECONSTRUCTION
PART OF SW QUARTER, SECTION 26
CITY OF HOWELL, LIVINGSTON COUNTY, MI

PROPERTY DESCRIPTION:
PART OF SW QUARTER, SECTION 26, PROPERTY AREA IS DESCRIBED AS FOLLOWING PART OF
THE NORTHWEST Corner of the Southwestern Quarter of the Town, City of Howell, Michigan
DESCRIBED FOR LINES BEGINNING AT A POINT ON THE SECTION LINE SOUTH 87°45'30" WEST
USE 200.246.6735 FAX 517.548.1670 HOWELL, MI. 48843
3121 E. GRAND RIVER AVE.
Engineers    Surveyors    Planners    Landscape Architects
Engineering
MICHIGAN MUTCD MANUAL AND SHALL BE INCIDENTAL TO THE CONTRACT.
33. ALL PERMANENT SIGNS AND PAVEMENT MARKINGS SHALL BE INSTALLED IN ACCORDANCE WITH THE LATEST REVISION OF THE
32. SOIL EROSION MEASURES SHALL BE MAINTAINED BY THE CONTRACTOR UNTIL VEGETATION HAS BEEN RE-ESTABLISHED.
30. NO SEEDING SHALL BE DONE AFTER OCTOBER 15 WITHOUT APPROVAL OF THE ENGINEER.
29. ALL GRADING IN THE PLANS SHALL BE DONE AS PART OF THIS CONTRACT. ALL DELETERIOUS MATERIAL SHALL BE REMOVED
28. AFTER REMOVAL OF TOPSOIL, THE SUBGRADE SHALL BE COMPACTED TO 95% OF ITS UNIT WEIGHT.
IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS.
TOWNSHIP. NO WORK SHALL BE DONE UNLESS THE APPROPRIATE TRAFFIC CONTROL DEVICES ARE IN PLACE.
26. TRAFFIC SHALL BE MAINTAINED DURING CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL SIGNS
SHOWN IN THE PLANS.
25. ALL ROOTS, STUMPS AND OTHER OBJECTIONABLE MATERIALS SHALL BE REMOVED AND THE HOLE BACKFILLED WITH SUITABLE
MATERIAL. WHERE GRADE CORRECTION IS REQUIRED, THE SUBGRADE SHALL BE CUT TO CONFORM TO THE CROSS-SECTION AS
24. ALL AREAS DISTURBED BY THE CONTRACTOR BEYOND THE NORMAL CONSTRUCTION LIMITS OF THE PROJECT SHALL BE SODDED
INCLUDING BUT NOT LIMITED TO EXISTING FENCE, LAWN, TREES AND SHRUBBERY.
23. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO THE PROPERTY BEYOND THE CONSTRUCTION LIMITS
PROPERTY OWNERS ADJACENT TO THE PROJECT.
22. NO TREES ARE TO BE REMOVED UNTIL MARKED IN THE FIELD BY THE ENGINEER.
21. IF WORK EXTENDS BEYOND NOVEMBER 15, NO COMPENSATION WILL BE DUE TO THE CONTRACTOR FOR ANY WINTER PROTECTION
THE CONTRACT OR IN THE SPECIFICATION OR FOR ANY REASONABLE DELAYS IN CONSTRUCTION DUE TO THE ENCOUNTERING OR
18. THE CONTRACTOR IS RESPONSIBLE FOR ALL DAMAGE TO EXISTING UTILITIES.
17. THE CONTRACTOR SHALL MAINTAIN THE SITE IN A MANNER SO THAT WORKMEN AND PUBLIC SHALL BE PROTECTED FROM INJURY,
16. ALL EXCAVATION UNDER OR WITHIN 3 FEET OF PUBLIC PAVEMENT, EXISTING OR PROPOSED SHALL BE BACKFILLED AND
COMPACTED WITH SAND (MDOT CLASS II).
15. THE CONTRACTOR SHALL CALL MISS DIG A MINIMUM OF 72 HOURS PRIOR TO THE START OF CONSTRUCTION.
14. THE CONTRACTOR SHALL KEEP THE AREA OUTSIDE THE "CONSTRUCTION LIMITS" BROOM CLEAN AT ALL TIMES.
13. THE CONTRACTOR SHALL COORDINATE WITH ALL OWNERS TO DETERMINE THE LOCATION OF EXISTING LANDSCAPING, IRRIGATION LINES & PRIVATE UTILITY LINES. THE CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE TO EXISTING LANDSCAPING, IRRIGATION LINES, SPRINKLER OR TANK TRUCK.
12. THE CONTRACTOR SHALL REMOVE ALL TRASH AND DEBRIS FROM THE SITE UPON COMPLETION OF THE PROJECT.
11. THE CONTRACTOR SHALL COORDINATE WITH ALL OWNERS TO DETERMINE THE LOCATION OF EXISTING LANDSCAPING, IRRIGATION LINES, SPRINKLER OR TANK TRUCK.
10. DURING THE CONSTRUCTION OPERATIONS, THE CONTRACTOR SHALL NOT PERFORM WORK BY PRIVATE AGREEMENT WITH
EXISTING UTILITIES THAT MAY OR MAY NOT BE SHOWN ON THE PLANS.
9. ANY DISCREPANCY IN THIS PLAN AND ACTUAL FIELD CONDITIONS SHALL BE REPORTED TO THE DESIGN ENGINEER PRIOR TO THE
START OF CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFICATION OF ALL SETBACKS, EASEMENTS AND
RIGHT-OF-WAY LINE OF HIGHLANDER WAY TO THE POINT OF BEGINNING. CONTAINING 33.23
PART OF HOWELL PUBLIC SCHOOLS PROPERTY WHICH IS DESCRIBED AS FOLLOWS: PART OF
1. THE CONTRACTOR SHALL HOLD HARMLESS THE DESIGN PROFESSIONAL, MUNICIPALITY, COUNTY, STATE AND ALL OF THE MUNICIPALITY, COUNTY, STATE AND ALL OF THE MUNICIPALITY, COUNTY, STATE AND
2. DO NOT SCALE THESE DRAWINGS AS IT IS A REPRODUCTION AND SUBJECT TO DISTORTION.
3. A GRADING PERMIT FOR SOIL EROSION-SEDIMENTATION CONTROL SHALL BE OBTAINED FROM THE GOVERNING AGENCY PRIOR TO
THE START OF CONSTRUCTION.
4. ALL WORK DESCRIBED ON THIS CONSTRUCTION PLAN SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE REQUIREMENTS OF ALL LOCAL, STATE AND FEDERAL PERMITS, REGULATIONS, DESIGN SPECIFICATIONS AND THE LATEST MICHIGAN DEPARTMENT OF TRANSPORTATION (MDOT) SPECIFICATIONS.HOWELL, MI. 48843
3121 E. GRAND RIVER AVE.
Engineers    Surveyors    Planners    Landscape Architects
Engineering
MICHIGAN MUTCD MANUAL AND SHALL BE INCIDENTAL TO THE CONTRACT.
33. ALL PERMANENT SIGNS AND PAVEMENT MARKINGS SHALL BE INSTALLED IN ACCORDANCE WITH THE LATEST REVISION OF THE
32. SOIL EROSION MEASURES SHALL BE MAINTAINED BY THE CONTRACTOR UNTIL VEGETATION HAS BEEN RE-ESTABLISHED.
30. NO SEEDING SHALL BE DONE AFTER OCTOBER 15 WITHOUT APPROVAL OF THE ENGINEER.
29. ALL GRADING IN THE PLANS SHALL BE DONE AS PART OF THIS CONTRACT. ALL DELETERIOUS MATERIAL SHALL BE REMOVED
28. AFTER REMOVAL OF TOPSOIL, THE SUBGRADE SHALL BE COMPACTED TO 95% OF ITS UNIT WEIGHT.
IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS.
TOWNSHIP. NO WORK SHALL BE DONE UNLESS THE APPROPRIATE TRAFFIC CONTROL DEVICES ARE IN PLACE.
26. TRAFFIC SHALL BE MAINTAINED DURING CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL SIGNS
SHOWN IN THE PLANS.
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INCLUDING BUT NOT LIMITED TO EXISTING FENCE, LAWN, TREES AND SHRUBBERY.
23. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO THE PROPERTY BEYOND THE CONSTRUCTION LIMITS
PROPERTY OWNERS ADJACENT TO THE PROJECT.
22. NO TREES ARE TO BE REMOVED UNTIL MARKED IN THE FIELD BY THE ENGINEER.
21. IF WORK EXTENDS BEYOND NOVEMBER 15, NO COMPENSATION WILL BE DUE TO THE CONTRACTOR FOR ANY WINTER PROTECTION
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COMPACTED WITH SAND (MDOT CLASS II).
15. THE CONTRACTOR SHALL CALL MISS DIG A MINIMUM OF 72 HOURS PRIOR TO THE START OF CONSTRUCTION.
14. THE CONTRACTOR SHALL KEEP THE AREA OUTSIDE THE "CONSTRUCTION LIMITS" BROOM CLEAN AT ALL TIMES.
13. THE CONTRACTOR SHALL COORDINATE WITH ALL OWNERS TO DETERMINE THE LOCATION OF EXISTING LANDSCAPING, IRRIGATION LINES, SPRINKLER OR TANK TRUCK.
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2. DO NOT SCALE THESE DRAWINGS AS IT IS A REPRODUCTION AND SUBJECT TO DISTORTION.
3. A GRADING PERMIT FOR SOIL EROSION-SEDIMENTATION CONTROL SHALL BE OBTAINED FROM THE GOVERNING AGENCY PRIOR TO
THE START OF CONSTRUCTION.
SAW CUT EXISTING ASPHALT 1' AWAY FROM EDGE OF UTILITIES/EQUIPMENT.

EX. CONC.

STEEL I-BEAM POST W/ELEC. OUTLET TYP

(2) 3" STEEL POST W/ELEC. OUTLET TYP

8" BOLLARD POSTS AROUND A/C UNIT ON CONCRETE PAD; LEAVE IN PLACE; INSTALL NEW ASPHALT.

REMOVE CONCRETE PAD AND RATWALL FOR NEW WORK.

REMOVE EXISTING ASPHALT, SEE THIS SHEET FOR EXISTING PAVEMENT CROSS SECTION.

REMOVE TOPSOIL FOR NEW WORK.

REMOVE EXISTING ASPHALT FOR NEW WORK, SEE THIS SHEET FOR EXISTING PAVEMENT CROSS SECTION.

CAUTION! ELECTRICAL PANEL.

SAW CUT 1' WIDE STRIP OF EXISTING ASPHALT AROUND EXISTING SHED.

SCALE: 1 INCH = 30 FEET

0

30

15

30

0
SITE PLAN / GRADING PLAN / SOIL EROSION CONTROL PLAN

NOTES:
1. PROPOSED CONCRETE TO MATCH EXISTING CONCRETE/ASPHALT ELEVATIONS ON ALL SIDES
2. SEE SHEET 4 FOR EROSION CONTROL NOTES AND DETAILS

PHASE DESCRIPTIONS:
2A - CONCRETE BUS PARKING
2B - ASPHALT PAVING DRIVES ONLY
2C - ASPHALT PAVING DRIVES AND PARKING AREAS

SOIL EROSION CONTROL MEASURES

TOTAL DISTURBED AREA = 80,076.74 SF (1.83 AC)

PHASE 2A WORK
INSTALL 8" CONCRETE PAVEMENT, SEE THIS SHEET FOR CROSS SECTION

PHASE 2B WORK
INSTALL 8" CONCRETE PAVEMENT AND 8" 21AA COMP GRAVEL BASE ON GEO-TEXTILE FABRIC, SEE THIS SHEET FOR CROSS SECTION

PHASE 2C WORK
NEW ASPHALT
7,936 SF
11,682 SF
7.4' WIDE BUILDING ENTRANCE, STRIPED

BARRIER FREE PARKING SIGN (TYPICAL); SEE THIS SHEET FOR DETAIL

SCALE: 1 INCH = 30 FEET

188.3'
31.5'
9.0'
24.0'
34.3'
20.0'
25.7'
27.7'
20.0'
26.3'
8.6'
15.1'
21.1'
21.0'
9.0'
20.0'

RESERVED PARKING VAN ACCESSIBLE 18"

5'-0"
SOIL EROSION CONTROL NOTES:
1. A SOIL EROSION CONTROL PERMIT SHALL BE OBTAINED FROM THE LIVINGSTON COUNTY DRAIN COMMISSIONER PRIOR TO CONSTRUCTION.
2. SEE CONSTRUCTION AND EROSION CONTROL DETAILS ON SHEET C10 FOR ADDITIONAL LIVINGSTON COUNTY TEMPORARY CONTROLS REQUIREMENTS.
3. APPROPRIATE SOIL EROSION CONTROL MEASURES SHALL BE ESTABLISHED PRIOR TO CONSTRUCTION AND CONTINUOUSLY MAINTAINED BY THE CONTRACTOR UNTIL VEGETATION HAS BEEN RE-ESTABLISHED.
4. CATCH-BASIN INLET PROTECTION SHALL BE INSTALLED ON ALL NEW INLETS AS THEY ARE CONSTRUCTED.
GENERAL SPECIFICATIONS

of material and labor required in the construction and completion of a site re-paving and lighting project for the Livingston Educational Service Agency Bus Facility.

PHASE 2 SITE IMPROVEMENTS
for:

in accordance with the accompanying drawings and specifications prepared by:

Lindhout Associates Architects a.i.a., p.c
10465 citation drive, brighton, michigan 48116
Comm. No. 17109
810-227-5668
DIVISION 01 - GENERAL REQUIREMENTS

Advertisement for Bids from O’Neal Construction

Section IB - Instructions to bidders IB-1 thru IB-2
Section 01A - General Requirements 1A-1 thru 1A-6
Section 01B - Special Conditions 1B-1 thru 1B-5

DIVISION 02 - SITE WORK

Section 02A - Site Development 2A-1 thru 2A-2
Section 02C - Excavating and Grading 2C-1 thru 2C-2
Section 02F - Soil Borings 2F-1 thru 2F-35
Section 02G - Asphalt 2G-1 thru 2G-2
Section 02L - Removal and Demolition 2L-1 thru 2L-2

DIVISION 03 - CONCRETE

Section 03A - General Concrete 3A-1 thru 3A-5

End of Index
INSTRUCTIONS TO BIDDERS

Proposals, to be entitled to consideration, must be made in accordance with the following instructions:

01 Sub-contract proposals for Phase 2 shall be made as prescribed by the General Contractor, in their invitation for Sub-Contract Bids.

02 Proposals shall be received for Livingston Educational Services Agency Additions, Lindhout Associates Architects Comm. No. 17109 by the General Contractor, O’Neal Construction, Ann Arbor MI, .Telephone 734-769-0770.

03 Should a bidder find discrepancies in, or omissions from, the drawings or documents, or should he be in doubt as to their meaning, he should at once notify the General Contractor who will send a written instruction to all bidders. Neither the Architect, nor the General Contractor will be responsible for any oral instructions.

04 Before submitting a proposal, bidders should carefully examine the drawings and specifications, visit the site of the work, fully inform themselves as to all existing conditions and limitations under which they shall work and shall include in the proposal a sum to cover the cost of all items included in the sub-contract.

05 The competency and responsibility of the invited subcontractors has been considered prior to the invitation to bid, however, the Owner does not obligate himself to the lowest or any other bidder and reserves the right to reject any or all proposals, in whole or in part, and to waive any informalities therein.

06 Any addenda issued during the time of bidding are to be covered in the proposal and in closing a contract they will become a part thereof. No addenda will be issued less than three (3) days prior to the due date of proposals.

CONTRACTS

01 It is intended that the work as shown on the accompanying drawings and described in the specifications shall be done under one general contract for all trades between the Owner and O’Neal Construction, Inc.

02 Proposals will be received for:

a. PROPOSAL "A: - ALL TRADES - Specification Divisions 1, 2, & 3.
   Architects Comm. No. 17109

CONTRACT DOCUMENTS

01 The instruments upon which proposals and contract for the work are to be based are:

a. Specifications for Work Divisions 1, 2, & 3.
b. Architectural and Civil Drawings covering the work.
c. Addenda as may be issued in the course of bidding.
d. The form of Agreement, which the successful Bidder will be required to execute is AIA Document B104-2007.

BIDDING DOCUMENTS

01 The drawings and specifications are the exclusive property of the Architect and must not be altered in any fashion. Bidding Documents will be distributed electronically upon request.
COMMUNITY RESOURCES

01 The Owner desires that the resources of the local market area be employed to the greatest possible extent.

02 Therefore, Subcontractors, Suppliers, Skilled Tradesmen and Labor should be drawn from the local market area whenever competitive pricing, good performance and high quality are available.

GENERAL CONDITIONS

01 See Contractors contract requirements.
DIVISION 01A  GENERAL REQUIREMENTS

SECTION 01A  SUPPLEMENTARY GENERAL CONDITIONS

01 The General Conditions of the Contract for the Construction of Buildings Standard Form of the American Institute of Architects, 1992 Edition: Article 1 through 14 inclusive are hereby, except as the same way be inconsistent with, made a part of this specification.

   a. Where any article of the "A.I.A. General Conditions" is herein supplemented, the A.I.A. provisions shall remain in effect. All the supplemental provisions shall be considered as added thereto. Where any such article is amended, voided or superseded, the provisions of such article not so specifically amended, voided or superseded, shall remain in effect.

02 ARTICLE 15  DRAWINGS AND SPECIFICATIONS

   a. The drawings and specifications are complementary, and what is called for by one is binding as if called for by the other.

03 ARTICLE 16  INSURANCE

   This article shall void Article II of the General Conditions as cited in Paragraph A under the heading of this Division.

16.1 CONTRACTORS LIABILITY INSURANCE

16.1.1 The Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, such insurance as will protect the contractor from claims set forth below which may arise out of or result from the Contractor's operations under the Contract, and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts and of them may be liable:

   .1 claims under workers' or workmen's compensation, disability benefit and other similar employee benefit acts which are applicable to the Work to be performed;

   .2 claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;

   .3 claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;

   .4 claims for damages insured by usual personal injury liability coverage which are sustained (1) by a person as a result of an offense directly or indirectly related to employment of such person by the Contractor, or (2) by another person;

   .5 claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;

   .6 claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of any motor vehicle; and

   .7 claims involving contractual liability insurance applicable to the Contractors obligations, under Paragraph 3.18.

16.1.2 The insurance required by Subparagraph 16.1.1 shall be written for not less than the limits of liability specified in the Contract Documents, or required by law, whichever coverage is greater.

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Coverage, whether written on an occurrence or claims-made basis, shall be maintained without interruption from date of commencement of the Work until date of final payment and termination of any coverage required to be maintained after final payment. Notwithstanding the above, the insurance required by paragraph 16.1 shall be on an occurrence basis.

16.1.2.1 Such insurance shall be written to include the following coverage and for not less that the following minimum limits or greater if required by law:

.1 Worker's Compensation, Occupational Disease and Employer's Liability Insurance:

A. State of Michigan - Statutory Limits
B. Applicable Federal (if any) - Statutory limits.
C. Employer's Liability -
   Bodily Injury by Accident - $1,000,000 each accident
   Bodily Injury by Disease - $1,000,000 each employee
   Bodily Injury by Disease - $1,000,000 each policy limit

.2 Commercial General Liability Insurance including as minimum coverage:

- Premises - Operations Liability
- Independent Contractor's Protective Liability
- Broad Form Property Damage Endorsement
- Blank Contractual
- Personal Injury, with Employment Exclusion deleted

A. Special Requirements:

1. Property Damage Liability Insurance will provide "X, C, and U" (Explosion, collapse and underground hazard) coverage as applicable.
2. Products and Completed Operation to be maintained for 1 year after final payment.
3. The owner, architect, their consultants, agents and employees, shall be named as: additional insured's on the commercial general liability policy of the general contractor an/or subcontractor of any tier.

B. Limits of Liability:

$1,000,000 Each Occurrence as respects Bodily Injury Liability or Property Damage Liability, or both combined.
$2,000,000 General Aggregate
$1,000,000 Products/Completed Operations Aggregate
$1,000,000 Personal and Advertising Injury

.3 Automobile Liability Insurance:

A. Special Requirements:

1. All owned, hired, and non-owned vehicles including the loading or unloading thereof.
2. The owner, architect, their consultants, agents and employees, shall be named as "additional insured's" on the commercial automobile liability policy of the general contractor and/or subcontractor of any tier.

B. Limits of Liability

$1,000,000 Each occurrence as respects Bodily Injury Liability or Property Damage Liability, or both combined.

.4 Owner's and Architect's Protective Liability Incurrence:

The Contractor will furnish and maintain during the entire period of construction an Owner's Protective Liability Policy written in the name of the owner, architect, and architect's consultants, with the following limits of liability:

Limit of Liability:

$1,000,000 Each occurrence as respects Bodily Injury Liability or Property Damage Liability, or both combined.

$2,000,000 General Aggregate

.5 Umbrella/Excess Liability Insurance:

Limit of Liability

$1,000,000 Each occurrence

$1,000,000 Aggregate

16.1.3 Certificates of Insurance for the above coverage and the Owner's Protective Policy shall be submitted to the Architect for transmittal to the Owner for his approval prior to the start of construction. The Contractor shall certify to the Owner that he has obtained or will obtain similar certificates of insurance from each of his Subcontractors before their work commences. Each Subcontractor must be covered by insurance of the same character and in the same amounts as the Contractor unless the Contractor and the Owner agree that a reduced coverage is adequate. Each subcontractor's insurance shall cover the Owner, Architect, their agents and employees. The Contractor shall submit a statement with each monthly affidavit stating that he has obtained certificates of insurance, or other satisfactory evidence, that all required insurance is in force for each of the Subcontractors listed on his affidavit. If the "additional insured" have other insurance which is applicable to the loss, it shall be on an excess or contingent basis. The amount of the company's liability under this policy shall not be reduced by the existence of such other insurance Contractor certificates shall be in duplicate on standard Acord forms.

16.1.3.1 Certificate of insurance shall contain a statement therein or a rider attached thereto incorporating the indemnity clause stated in Paragraph 3.18 (Indemnification) and Subparagraphs 3.18.1, 3.18.1.1, 3.18.2 and 3.18.3 of the General Conditions, and including the changes and addition made in those subparagraphs within these Supplemental General Conditions.

16.1.3.2 These Certificates and the insurance policies required by this Paragraph 16.1 shall contain a provision that coverage afforded under the policies will not be canceled or allowed to expire until at least thirty (30) days prior written notice has been given to the Owner and Architect. If any of the foregoing insurance coverage is required to remain in force after final payment and are reasonably available, an additional certificate evidencing continuation of such coverage
shall be submitted with the final Application for Payment as required by Subparagraph 9.10.2. Information concerning reduction of coverage shall be furnished by the Contractor with reasonable promptness in accordance with the Contractor's information and belief.

06.1.3.3 The obligations of the Contractor under the provisions of this article shall not extend to the liability of the Architect, his agents or employees arising out of (1) the preparation or approval of maps, drawings, opinions, reports, surveys, change orders, designs, or specifications, or (2) the giving of or the failure to give directions or instructions by the Architect, his agents or employees to the extent that such giving or failure to give is the cause of the injury or damage.

16.2 OWNER'S LIABILITY INSURANCE

16.2.1 The Owner shall be responsible for purchasing and maintaining the Owner's usual liability insurance. Optionally, the Owner may purchase and maintain other insurance for self-protection against claims, which may arise from operations under the Contract. The Contractor shall not be responsible for purchasing and maintaining this optional Owner's liability insurance unless specifically required by the Contract Documents.

16.3 PROPERTY INSURANCE

16.3.1 Unless otherwise provided, the Owner shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance in the amount of the initial Contract Sum as well as subsequent modifications thereto for the entire Work at the site on a replacement cost basis without voluntary deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made and provided in Paragraph 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Paragraph 16.3 to be covered, whichever is earlier. This insurance shall include interests of the Owner, Architect, the Contractor, Subcontractors and the Sub-subcontractors in the Work.

Property Insurance provided by Owners shall not cover any tools, apparatus, machinery, scaffolding, hoists, forms, staging, shoring and other similar items commonly referred to as construction equipment, which may be on the site and the capital value of which is not included in the Work. The Contractor shall make his own arrangements for any insurance he may require on such construction equipment.

16.3.1.2 If the Owner does not intend to purchase such property insurance required by the Contract and with all of the coverage in the amount described above, the Owner shall so inform the Contractor in writing prior to commencement of the Work. The Contractor may then affect insurance, which will protect the interests of the Contractor, Subcontractors and Sub-subcontractors in the Work, and by appropriate Change Order, the cost thereof shall be charged to the Owner. If the contractor is damaged by the failure or neglect of the Owner to purchase or maintain insurance as described above, without so notifying the Contractor then the Owner shall bear all reasonable cost properly attributably thereto.

16.3.1.3 If the property insurance required minimum deductibles and such deductibles are identified in the Contract Documents, the Contractor shall pay costs not covered because of such deductibles. If the Owner or insurer increases the required minimum deductibles above the amounts so identified or if the Owner elects to purchase this insurance with voluntary deductible amounts, the Owner shall be responsible for payment of the additional costs not covered because of such increased or voluntary deductibles. If deductibles are not identified to the Contract Documents, the Owner shall pay costs not covered because of deductibles. The property insurance for the Work requires a minimum deductible of: $5,000 per claim.
16.3.2 **Boiler and Machinery Insurance.** The Owner shall purchase and maintain boiler and machinery insurance required by the Contract Documents or by law, which shall specifically cover such insured objects during installation and until final acceptance by the Owner; this insurance shall include interests of the Owner, Contractor, Subcontractors and Sub-subcontractors in the Work, and the Owner and Contractor shall be named insured’s.

16.3.3 **Loss of Use Insurance.** The Owner, at the Owner's option, may purchase and maintain such insurance as will insure the Owner against loss of use of the Owner's property due to fire or other hazards, however caused. The Owner waives the rights of action against the Contractor for loss of use of the Owner's property, including consequential losses due to fire or other hazards however caused.

16.3.4 If the Contractor requests in writing that insurance for risks other than those described herein or for other special hazards be included in the property insurance policy, the Owner shall, if possible, include such insurance, and the cost thereof shall be charged to the contractor by appropriate Change order.

16.3.5 If during the Project construction period the Owner insures properties, real or personal or both, adjoining or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, the Owner shall waive all rights in accordance with the terms of Subparagraph 16.3.7 for damages caused by fire or other perils covered by this separate property insurance. All separate policies shall provide this waiver of subrogation by endorsement or otherwise.

16.3.6 Before an exposure to loss may occur, the Owner shall file with the Contractor a copy of each policy that includes insurance coverage required by the Paragraph 16.3. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project. Each policy shall contain a provision that the policy will not be cancelled or allowed to expire until at least 30 days prior written notice has been given to the Contractor.

16.3.7 **Waivers of Subrogation.** If permitted by the Owner's and Contractor's insurance companies, without penalties, the Owner and Contractor waive all rights against (1) each other and any of their Subcontractors, Sub-subcontractors, agents and employees, each of the other, and (2) the Architect, Architect's consultants, separate contractors described in Article 6, if any, and any of their Subcontractors, Sub-subcontractors, agents and employees, for damages caused by fire or other perils to the extent covered by property insurance obtained pursuant to this Paragraph 16.3 or other property insurance applicable to the Work, except such rights as they have to proceeds of such insurance held by the Owner as fiduciary. The Owner or Contractor, as appropriate, shall require of the Architect, Architect's consultants, separate contractors described in Article 6, if any, and the Subcontractors, Sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.

16.3.8 A loss insured under Owner's property insurance shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insured, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Subparagraph 16.3.10. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriated agreements, written where legally required for validity, shall require Subcontractors in similar manner.

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16.3.9 If required in writing by a party in interest, the Owner as fiduciary shall, upon occurrence of an insured loss, give bond for proper performance of the Owner's duties. The cost of required bonds shall be charged against proceeds received as fiduciary. The Owner shall deposit in a separate account proceeds he received, which the Owner shall distribute in accordance with such agreement as the parties in interest may reach or in accordance with an arbitration award in which case the procedure shall be as provided in Paragraph 4.5. If after such loss no other special agreement is made, replacement of damaged property shall be covered by appropriate Change Order.

16.3.10 The Owner as fiduciary shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within five days after occurrence of loss to the Owner's exercise of this power; if such objection be made, arbitrators shall be chosen as provided in Paragraph 4.5. The Owner as fiduciary shall, in that case, make settlement with insurers in accordance with directions of such arbitrators. If distribution of insurance proceeds by arbitration is required, the arbitrators will direct such distribution.

16.3.11 Partial occupancy or use in accordance with Paragraph 9.9 shall not commence until the insurance company or companies providing property insurance have consented to such partial occupancy or use by endorsement or otherwise. The Owner and the Contractor shall take reasonable steps to obtain consent of the insurance company or companies and shall, without mutual consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse or reduction of insurance.

16.4 PERFORMANCE BOND AND PAYMENT BOND

16.4.1 The Owner shall have the right to require the Contractor to furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in bidding requirements or specifically required in the Contract Documents on the date of execution of the Contract.

16.4.2 Upon the request of any person or entity appearing to be a potential beneficiary of bonds, covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall permit a copy to be made.

16.4.3 The Contractor, before commencing the Work, shall furnish a Performance Bond and a Labor and Material Payment Bond. The Performance Bond shall be in an amount equal to one hundred percent (100%) of the full amount of the Contract Sum as security for the faithful performance of the obligations of the Contract Documents, and the Labor and Material Payment Bond shall be in an amount equal to one hundred percent (100%) of the full amount of the Contract Sum as security for the payment of all persons performing labor and furnishing materials in connection with the Contract Documents. Such bond shall be on A.I.A. Document A-311, insured by the American Institute of Architects, shall be issued by a surety satisfactory to the Owner and shall name the Owner as primary co-obligee.

16.5 MISCELLANEOUS REQUIREMENTS

16.5.1 All insurance coverage shall be provided by insurance companies having policy holder ratings no lower than "A" and financial ratings not lower than "XII" in the Best's Insurance Guide, latest edition in effect as of the date of the Contract.

16.5.2 The Contractor is responsible for determining that Subcontractors are adequately insured against claims arising out of relating to the work. The premium cost and charges for such insurance, shall be paid by each Subcontractor.
ARTICLE 1S  
01 The contract involves the construction of new pavement at the bus center for the Livingston Educational Service Agency and requires completion by August 16, 2019.

ARTICLE 2S  
01 The Sub-contractors shall be held to have examined the site and have informed themselves of the conditions under which they must work. They shall make due allowance for the conditions that are reasonably apparent in their proposal.

ARTICLE 3S  
01 Each Sub-Contractor shall lay out the work, establish all levels and heights and provide the assistance of a competent surveyor for the work required by the sub-contractor.

02 The General Contractor shall establish a permanent benchmark where directed to which all measurements and levels shall be referred during the progress of the work.

ARTICLE 4S  
01 The General Contractor and Sub-contractors may at their option establish field offices if coordinated with the Construction Manager's Site Control Plan.

02 The contractor's trailers, material storage, etc., shall be located so as to not interfere with Owner's use of existing building and parking areas on site.

ARTICLE 5S  
01 Water: The General Contractor shall arrange for all water used during construction. Water shall be available through Owners existing building on site. Each sub-contractor requiring water shall provide connections.

02 Electrical: The existing electrical system may be used by contractors. Each sub-contractor shall make connections for their use as needed. Owner shall bear cost of metered power.

ARTICLE 6S  
01 The General Contractor shall provide temporary toilet facilities in an inconspicuous location on the site to satisfy City and County Health Officials.

ARTICLE 7S  
01 Deleted.

ARTICLE 8S  
01 Deleted.

ARTICLE 9S  
01 All shop drawings shall be examined by the General Contractor for coordination with other trades and general conformity to contract documents before submission to the Architect for the Architects review and shall bear the signature of the party so doing. In general, six (6) copies, or 1sepia and 2 prints, should be furnished.

02 Corrections or comments made on the shop drawings during their review do not relieve the contractor from compliance with requirements of the drawings and specifications. This check is only for review of the general conformance with the design concept of the project and general compliance with the information given in the contract documents. The contractor is responsible for:
Confirming and correlating all quantities and dimensions.
Selecting fabrication processes and techniques of construction.
Coordinating his or her work with that of all other trades and performing all work in a safe and satisfactory manner.

03 Architects review of Shop Drawings shall not be construed to relieve supplier of any obligations set forth in the original contract documents. Specific reference shall be made on the Shop Drawings of any contradictions of the original documents and specific acceptance of that contradiction must be made on the drawings by the Architect.

04 The preceding conditions are in addition to those covered under Article 3.12 of the General Conditions of the Contract.

**ARTICLE 10S**
**CLOSE OUT AND GUARANTEEES**

01 At the completion of the Contract and prior to final payment:
   a. The General Contractor and sub-contractors shall give to the Owner a written guarantee that they will make good at their own expense any defects in material or workmanship, not due to ordinary wear or improper use, which may develop within one (1) year from the date of acceptance of the work unless otherwise stated in the specifications.
   b. The Owner shall be furnished with the following as it may apply to the project and as called for in the specifications:
      1. Owner’s manuals for operation and maintenance of equipment furnished under the Architectural trades.
      2. List of sub-contractors employed on the project, including addresses, phone and fax numbers.

**ARTICLE 11S**
**PROGRESS SCHEDULES**

01 At the time of signing of the contract, the General Contractor, in co-operation with his sub-contractors, shall furnish a schedule giving the time of starting and finishing of each trade involved.

02 The Schedule shall be maintained throughout the job to give an up-to-date statement of progress and completion time.

03 Satisfactory rate of progress and completion on time shall be essential conditions of the contract.

**ARTICLE 12S**
**DELETED**

**ARTICLE 13S**
**TEMPORARY PROTECTION**

01 The General Contractor shall assume responsibility for the building, site and immediately adjacent areas, providing protection to meet the governing laws.

02 He shall provide suitable temporary walks, fences, enclosures, to maintain unobstructed areas for pedestrians, vehicles, fire protection equipment, etc., including temporary exit enclosures.

03 The General Contractor is referred to Article 10 of the General Conditions - Protection of Persons and Property.

**ARTICLE 14S**
**ACCESS TO SITE**

01 Contractors shall consult with Architect on maintaining access route to the site for construction vehicles. All damage to existing walks, drives and landscaped areas traversed by construction vehicles shall be made good by the General Contractor.

**ARTICLE 15S**
**OWNER’S USE OF SITE**

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01 The Owner will maintain normal operation at all existing buildings on site during the construction period. The various contractors shall take all possible precautions to minimize interference with the operations. Specific considerations shall be as follows.

a. Access to existing building shall be maintained at all times.

b. Maintain uninterrupted, protected egress from all required exit doors of the building to the satisfaction of the Local Fire Marshal or Building Authority.

c. On site storage of materials shall be arranged in such a manner to not interfere with the normal use of the parking areas.

ARTICLE 16S
01 Construction Manager shall determine all sequencing.

ARTICLE 17S
01 The contractor or contractors for this work shall at all times allow the Owner and any other contractors and their employees to be in the building or about the premises undisturbed as may be required in the execution of other portions of the building work, and installation of equipment, etc. Each contractor shall so arrange his work that it will interfere as little as possible with that of other trades or contracts; and in the event of disputes of such nature, the Architect's ruling in the matter shall be final and binding on all parties.

ARTICLE 18S
01 The award of subcontracts shall be subject to the right of rejection by the Owner and the Architect of any individual sub-contractor. All contracts made by the General Contractor with subcontractors shall be covered by the terms and conditions of the prime contract.

ARTICLE 19S
01 The Owner reserves the right to negotiate with the contractor to occupy the site, or any portion thereof, before the site has been finally completed and accepted. It being mutually understood and agreed that such occupancy does not relieve the contractors from completing their respective work or obligations within the time specified.

02 Considerations relative to insurance coverage during partial occupancy shall be as outlined in Article 16.3.11 of the Supplemental General Conditions, Section 1A of the specifications.

ARTICLE 20S
01 The General Contractor shall apply and pay, where necessary, for all required building and land use permits; all required plan review fees; in addition to any other required permits.

02 The electrical contractor shall apply and pay for their respective permits and any required plan review fees. They shall call for all inspections and comply with all requirements.

03 If an inspection fee is charged due to the failure of sub-contractor to meet code or make his work accessible for the inspection, he is responsible for the re-inspection fee charged, if any.

04 The General Contractor, sub-contractors and their suppliers shall comply with Michigan Building Code Section 1704 Special Inspections, as it may be applied to the project by the local Building Authority for inspections and certifications.

ARTICLE 21S
01 Shall be as established in General Contractors Bid Documents.
ARTICLE 22S  NON DISCRIMINATION IN EMPLOYMENT

01 In connection with performance of work under this contract, the contractor agrees as follows:

a. The contractor will not discriminate against any employee or applicant for employment because of sex, race, creed, color, or national origin. Such action shall include, but not be limited to the following: employment, upgrading, demotion or transfer, recruitment of other forms of compensation, and selection for training, including apprenticeship.

b. The contractor will, in all solicitations or advertisements for employees placed by or on behalf of the contractor state that all applicants will receive consideration for employment without regard to sex, race, creed, color or national origin.

c. The contractor will take such action with respect to any sub-contractor purchase order as the contracting agency may direct as means of enforcing such provisions, including sanctions for non-compliance.

ARTICLE 23S  LOCAL BONDING REQUIREMENTS

01 Access to site as indicated on site plan will be on roads under the Jurisdiction of Livingston County and the State of Michigan.

02 The General Contractor shall post a cash bond, if required, with the State, City and/or County in the amount determined by the Department of Public Works. Bond shall be against any damage done on streets, curbs, sidewalks, etc., in right-of-way.

03 Contractors shall abide by all restrictions on class of roads traveled.

04 The General Contractor shall post all required bonds required for Site Improvements.

ARTICLE 24S  TRADE AGREEMENTS

01 The drawings and specifications make no attempt to define jurisdictional boundaries of the various trade unions. Systems and materials are specified under headings most suited to the project and construction locale from the Architect's and Owners viewpoint.

ARTICLE 25S  GAS SERVICE

01 Deleted.

ARTICLE 26S  SOIL EROSION PERMIT

01 General Contractor shall apply and pay for required soil erosion permit as called for by local regulatory agency if shown on the Civil Engineering documents.

ARTICLE 27S  CONSTRUCTION FENCE

01 The General Contractor may fence in the construction and storage areas in accordance with the General Contractor’s Site Control Plan, Contractor’s option.

ARTICLE 28S  SAFETY RULES

01 All contractors and their employees shall comply with applicable requirements of "General Safety Rules and Regulations for the Construction Industry", as promulgated by the Construction Safety Commission of the State of Michigan including all amendments.

02 General Contractor and all sub-contractors shall become familiar with and comply with the "Safety and Health Regulation for Construction" as promulgated by the Occupational Safety and Health Administrator of the U.S. Department of Labor.

ARTICLE 29S  CONNECTION CHARGES

01 Deleted.

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ARTICLE 30S  BASE BID SPECIFICATION

Whenever the specifications call for one specific product, material application, etc. the Contractor or sub-contractor shall bid solely on that which is named. All Base Bids shall then be consistent in such a manner as to permit the best possible evaluation of all proposals.

a. The Owner and architect in no way wish to overlook any possible alternate material that may be satisfactory as a direct substitute. A list of proposed alternates of materials, products, methods, etc., may be proposed to, or by, the General Contractor or Construction Manager for inclusion in the proposal to the Owner. The proposal to the Owner shall state the proposed substitute and the cost savings, if any, of the substitution. The Base Bid, however, shall be based on all items as specified.

b. Should any real and definite hardship result in the foregoing "Base Bid" the Contractor shall communicate the facts to the Architect, and if warranted, an addendum will be issued to all bidders rectifying the condition.

ARTICLE 31S  TESTING

All testing as called for in the specifications shall be performed by a licensed testing laboratory approved by the Architect.

The General Contractor shall be responsible for obtaining and paying for the services of the approved laboratory for testing as outlined in the following Sections of the specifications as they may apply to the project:

a. Section 02C – Excavating, Grading and Backfill.
   1. Compacted backfill.

b. Section 03A – Concrete Work
   1. Test cylinders of each load of concrete for footings and site concrete.
   2. Pre stress anchor test of 10% of anchor bolts.
   3. All cast in place concrete.
DIVISION 02  SITE WORK

GENERAL

01 All work under this Division shall meet requirements of Division 1 and instructions and include everything necessary and incidental to completion of items outlined.

02 Work Included:
   a. Site clearing, sub-soil preparation, back-filling, exterior rough and finish grading.
   b. Base Preparation for Exterior Concrete Flatwork
   c. Paving
   d. De-watering
   e. Removal and Demolition

05 Work by Others
   a. By Division 03 - General Concrete Work

SECTION 02A  SITE DEVELOPMENT

SCOPE OF WORK

01 All work under this heading shall meet requirements of Division 1 and Instructions to Bidders and include everything necessary and incidental to completion of items outlined.

02 Work Included:
   a. All required permits and inspections.
   b. Erosion and sedimentation control if required.
   c. De-watering.
   d. Final Clean-up.

ORDINANCES, PERMITS, AND INSPECTIONS

01 The Contractor shall observe all ordinances, rules, and regulations of municipal, county, state and federal departments and agencies. He shall obtain and pay for all permits, bonds, and licenses necessary for the execution of this contract.

02 The Contractor shall make arrangements for such inspection that the City of Howell, the Livingston County Drain Commission or other agencies may require. The cost of such inspection will be borne by the Contractor.

03 The Contractor shall notify the Architect and the various responsible agencies seventy-two hours prior to the beginning of any of the work.

REPORT OF ERROR AND DISCREPANCIES

01 If in the course of his work, the Contractor finds discrepancies between the plans, grade stakes, and physical conditions encountered in the work, he shall immediately inform the Architect, verbally and in writing, and to suspend work in such area until authorized by the Architect to proceed.

DE-WATERING

April 22, 2019
This contractor is referred to Section 02F for log of soil borings as they may affect his work. Detail report is included herein. Dewatering is not anticipated for this project and should be included in the base bid.

The de-watering methods employed shall prevent water and subsurface or groundwater from flowing into excavations, and flooding the project and surrounding area.

Do not allow water to accumulate in excavations. Remove water from excavations to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to the stability of sub grades and foundations. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other de-watering system components necessary to convey the water away from the construction areas.

Convey water removed from excavations and rainwater to collecting or run-off areas. Do not use trench excavations for site utilities as temporary drainage ditches.

USE OF EXPLOSIVES

The use of explosives is not permitted.

EROSION AND SEDIMENTATION CONTROLS

The Contractor shall comply with the Livingston County Drain Commission requirements for soil erosion and sedimentation control. The cost of such erosion measures shall be incidental to the cost of construction work and shall be included in the prices bid. See Civil Engineering Drawings for methods of control, if required.

The period of time that erodible earth material is exposed shall be kept to a minimum by prompt completion of the various construction stages, followed by final surfacing. Care shall be exercised to prevent sediments from entering the drainage system.

Permit fee shall be paid by the General Contractor.

DISPOSAL OF EXCAVATED MATERIALS

The Contractor shall be required to legally dispose of all excess excavated materials, trash, debris and waste materials at his own expense.

Excavated clay, rubble, brush, organic matter, etc., shall be removed from site by this contractor at his expense.

FINAL CLEANUP AND ACCEPTANCE OF THE WORK

Following the completion of the work, the Contractor shall clean the entire area of any debris and/or excess or misplaced material due to his operation and obtain Architect's approval of the finished work.
EXCAVATING, GRADING & BACK-FILLING

SCOPE OF WORK

01 All work under this heading shall meet requirements of Division 1 and Instructions to Bidders and include everything necessary and incidental to completion of items outlined.

02 Work included:
   a. Excavating, grading and back-filling.

EXCAVATING

01 Excavate to levels indicated on the drawings for footings, and pavements.

02 The bottom of all excavations shall be reasonably clear of loose or surplus material and must be approved by the Architect prior to pouring of concrete or laying pipe.

03 Should proper soil bearing not be found at the levels indicated on drawings, the Architect shall be notified at once. Any additional excavation below the stated elevations will be classed as an extra only when authorized by the Architect.

04 Should excavations be carried below the required depths by error of the Contractor, he shall, at his own expense, backfill areas with concrete to proper elevations.

05 Store excavated sand used for backfill along trench so not to overload embankment. Excavated clay, silt or other deleterious material shall be removed from site.

06 Provide all necessary shoring, boxes, bracing, sheeting, etc. to protect sides of embankments until backfill has been placed. All work shall be in accordance with MI-OSHA requirements.

07 Take all necessary precautions to protect employees, other persons and property at all times. Provide and maintain barriers as will effectively prevent accidents due to the construction activity.

GRADING

01 This contractor shall do all rough and finish grading as indicated on topographic site plan, per the Civil Engineering Drawings and in all areas disturbed by construction activity. Finished surfaces shall conform to established grades. Surfaces shall be graded smooth with no pockets or perceptible reverse slopes.

FILLING AND BACKFILLING

01 Exterior: Excavated material will be permitted for Backfilling at exterior of foundation walls where walks and paving do not occur if it is kept free of construction debris, roots, etc. Fill shall be placed in 12 inch lifts and compacted to provide minimum settlement. Do all filling necessary to bring existing grades up to indicated grades. Fill under paving of any kind shall be as specified for "Interior" fill.

02 Seasonal limits: No fill material shall be placed, spread or compacted while it is frozen or thawing or during unfavorable weather conditions. When the work is interrupted by heavy rain, filling operations shall not be resumed until the moisture content and density of the previously placed fill are as specified.

COMPACTIION

April 22, 2019
01 Each layer of fill shall be mechanically compacted to meet or exceed the following requirements.

a. Fill, within building including footings, under paving, and walks, shall be compacted to 95% of the maximum bulk density as determined by the A.A.S.H.O. test designation T-180 (modified proctor test).

b. Fill, beyond building, paving, and walks, shall be compacted to 90% of the maximum bulk density as determined by the above test.

02 Compaction Tests: The General Contractor shall obtain the services of a testing laboratory, approved by the Architect, for determining the satisfactory soil density of the compacted sand fill where placed in depths exceeding 18”, and at bottom of foundation excavations to confirm stated loading requirements for soil bearing capacity. Inspection and compaction reports shall be submitted to the Architect prior to any subsequent work. Tests not meeting the density requirements shall be repeated at the Contractor's expense.

a. One test shall be taken at every 50 lineal feet of pipe excavation per 2 foot of depth. First test shall be taken within 12” of top of pipe and last test at 12” below finish grade line.

b. One test shall be taken at every 500 square feet of fill area in building per lift of fill depth.

**FILL RESTORATION**

01 When excavating work has been completed in filled areas, the Contractor shall restore any fill material about the interior and exterior of the building to quality and degree of compaction as called for under this section of the Specifications.
01 The Report of Geotechnical Investigation including log of Soil borings taken on the property is included in this Section.

02 These borings are furnished for information purposes only. The Contractor should note the dates that the borings were made.

03 The Contractor shall satisfy himself of the conditions under which he is to work and be responsible for accepting those conditions insofar as reasonable pre-construction investigation can determine.
Report of Geotechnical Investigation

Proposed Livingston Educational Service Agency Pavement Replacement Southeast of W. Highland Road and N. Highlander Way City of Howell, Livingston County, Michigan

Prepared for:
Lindhout Associates Architects, AIA PC
10465 Citation Drive
Brighton, Michigan 48116

G2 Project No. 173537
March 13, 2018
March 13, 2018

Mr. Piet W. Lindhout, Architect, CEO
Lindhout Associates Architects, AIA PC
10465 Citation Drive
Brighton, Michigan 48116

RE: Report of Geotechnical Investigation
Proposed Livingston Educational Service Agency Pavement Replacement
Southeast of W. Highland Road and N. Highlander Way
City of Howell, Livingston County, Michigan
G2 Project No. 173537

Dear Mr. Lindhout:

In accordance with your request, we have completed the geotechnical investigation for the proposed pavement replacement at the Livingston Educational Service Agency located in Howell, Michigan. This report presents the results of our observations and analyses, and includes recommendations and construction considerations relative to the proposed pavement replacement.

We appreciate the opportunity to be of service to Lindhout Associates Architects and look forward to discussing our findings. In the meantime, if you have any questions regarding this report or any other matter pertaining to the project, please call us.

Sincerely,

G2 Consulting Group, LLC

[Signatures]

Michael L. Evans, P.E.
Project Engineer

David L. Wanlass, P.E.
Project Manager

MLE/DLW/nab

Enclosures
EXECUTIVE SUMMARY

We understand the project consists of replacing the existing pavements at the Livingston Educational Service Agency located in Howell, Michigan. The existing pavements consist of bituminous concrete and Portland cement concrete and are in fair condition with some signs of distress. It is our understanding the proposed project will include the removal or pulverization of the existing pavements, and replacement with either bituminous concrete or Portland cement concrete pavement.

The existing pavement section, at the boring locations, consists of bituminous concrete, overlying an aggregate base course. The bituminous concrete ranges in thickness from 2 to 6 inches with an average thickness of 3-1/4 inches. The underlying aggregate base course generally consists of sand and gravelly sand and measures 3 to 10 inches in thickness. In general, granular and cohesive fill soils are present below the pavement section and extend to depths ranging from 2-3/4 feet to the explored depth of 5 feet. A 3-inch thick buried layer of silty clay topsoil underlies the fill soils within boring B-05 and extends to an approximate depth of 3-1/2 feet. Native silty clay, sand and clayey sand underlie the fill soils and extend to the explored depth of 5 feet. Groundwater was observed at depths ranging from 2-1/2 to 3-1/2 feet within borings B-03, B-09, B-19 and B-21 both during and upon completion of the drilling operations. No groundwater was observed within the remaining borings either during or upon completion of the drilling operations. The encountered groundwater appears to be perched with the granular soils, and does not likely represent the long-term groundwater level.

The existing bituminous concrete and Portland cement concrete pavements appear to be in fair condition with the surfaces exhibiting moderate severity shrinkage and fatigue related cracking. Snow was present and covered some portions of the parking lot at the time of the drilling operations; therefore, a thorough evaluation of the existing pavements could not be performed.

We recommend completely removing the existing pavement and aggregate base material within the replacement areas, proof-rolling/proof-compacting the exposed subgrade, undercutting and replacing any unstable soils as necessary, placing aggregate base conforming to MDOT 21AA gradation and quality limits, and constructing a new pavement section. Alternatively, the existing pavements could be pulverized and compacted to be used as aggregate base and the new pavement section can be constructed on the pulverized base. The pulverization option should only be considered if the existing grades can be raised above their current level. The existing bituminous concrete should be saw-cut a minimum of 2 feet laterally beyond the proposed replacement areas.

Approximately 3 inches of buried topsoil, with an organic matter content of 7.8 percent, is present within boring B-05 between the approximate depths of 3-1/4 and 3-1/2 feet below the ground surface. Completely removing the buried topsoil and replacing the undercut area with engineered fill will be cost prohibitive; therefore, provided final grades are not raised more than one foot, we recommend the buried topsoil remain in-place. If the risk of potential long-term settlement in this area is unacceptable, all of the existing buried topsoil should be removed and replaced with non-organic engineered fill.

For a light-duty flexible pavement section, we recommend 1-1/2 inches of MDOT 36A or 4C bituminous concrete wearing course, and 2-1/2 inches of MDOT 3C bituminous concrete leveling course, supported on 8 inches of MDOT 21AA aggregate base course. For a heavy-duty flexible pavement section, we recommend 1-1/2 inches of MDOT 4C or 5E1 bituminous concrete wearing course, and 4 inches (2 lifts of 2 inches) of MDOT 3C or 4E1 bituminous concrete leveling course, supported on 11 inches of MDOT 21AA aggregate base course. We recommend a heavy-duty rigid pavement section consisting of 7 inches of MDOT P1 Portland cement concrete support on 8 inches of MDOT 21AA aggregate base course. If the existing pavements are pulverized and used as aggregate base, the pulverized aggregate base thicknesses should be modified based on a reduced structural coefficient of 0.11.
PROJECT DESCRIPTION

We understand the project consists of replacing the existing pavements at the Livingston Educational Service Agency located in Howell, Michigan. The existing pavements consist of bituminous concrete and Portland cement concrete and are in fair condition with some signs of distress. It is our understanding the proposed project will include the removal or pulverization of the existing pavements, and replacement with either concrete pavement or asphalt pavement. We understand the southern portion of the parking lot will receive mostly passenger vehicles while the northern portion is intended to receive mostly bus traffic with occasional delivery vehicles, refuse vehicles and snow removal equipment.

SCOPE OF SERVICES

The field operations, laboratory testing, and engineering report preparation were performed under the direction and supervision of a licensed professional engineer. Our services were performed according to generally accepted standards and procedures in the practice of geotechnical engineering in this area. Our scope of services for this project consists of the following specific items:

1. We performed a cursory visual identification of the types and relative magnitudes of observable pavement distress.
2. We performed twenty-one (21) soil borings throughout the existing pavement area. All soil borings extended to a depth of 5 feet below the existing grade. We measured the existing pavement section materials (bituminous concrete and aggregate base) and identified the type and condition of subgrade soils.
3. We performed laboratory testing on samples obtained from the soil borings. Laboratory testing included visual engineering classification, Atterberg limits, natural moisture content, organic matter content, and unconfined compressive strength determinations.
4. We prepared this engineering report. Our report includes recommendations for existing pavement replacement.

FIELD OPERATIONS

Lindhout Associates Architects, in conjunction with G2 Consulting Group, LLC (G2), selected the number, depth, and location of the soil borings. The soil borings were located in the field by a G2 representative by measuring from existing site features and landmarks using conventional taping methods. A majority of the soil borings were offset due to accessibility issues within the parking lot. The approximate soil boring locations are shown on the Soil Boring Location Plan, Plate No. 1. Ground surface elevations were not available at the time of the field investigation.

The soil borings were drilled using a truck mounted rotary drilling rig. Continuous flight 3-1/4 inch, inside diameter, hollow-stem augers were used to advance the boreholes to the explored depths. Within each soil boring, soil samples were obtained at intervals of 2-1/2 feet and 5 feet. These samples were obtained by the Standard Penetration Test (SPT) method (ASTM D 1586), which involves driving a 2-inch diameter split-spoon sampler into the soil with a 140-pound weight falling 30 inches. The sampler is generally driven three successive 6-inch increments with the number of blows for each increment recorded. The number of blows required to advance the sampler the last 12 inches is termed the Standard Penetration Resistance (N). Blow counts for each 6-inch increment and the resulting N-values are presented on the individual soil boring logs. In addition to the SPT samples, bag samples of the aggregate base were also obtained at each of the soil boring locations. A cobble was encountered during the sampling at a depth of 5 feet within boring B-09; therefore, no sample was recovered. A bag sample of the auger cuttings was obtained for laboratory evaluation.

The soil samples were placed in sealed containers in the field and brought to our laboratory for testing and classification. During field operations, the driller maintained logs of the encountered subsurface conditions, including changes in stratigraphy and observed groundwater levels. The final boring logs
are based on the field logs supplemented by laboratory soil classification and test results. Upon completion of drilling operations, the boreholes were backfilled with auger cuttings and capped with cold patch.

LABORATORY TESTING

Representative soil samples were subjected to laboratory testing to determine soil parameters pertinent to pavement design and site preparation. An experienced geotechnical engineer classified the samples in general conformance with the Unified Soil Classification System.

Laboratory testing included Atterberg limits, natural moisture content, organic matter content, and unconfined compressive strength determinations. Atterberg limits were determined in accordance with ASTM D 4318 “Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils”. The organic matter content of representative samples was determined in accordance with ASTM Test Method D 2974, “Standard Test Methods for Moisture, Ash, and Organic Matter of Peat and Other Organic Soils”. The unconfined compressive strengths were determined using a spring-loaded hand penetrometer. The hand penetrometer estimates the unconfined compressive strength to a maximum of 4-1/2 tons per square foot (tsf) by measuring the resistance of the soil sample to the penetration of a calibrated spring-loaded cylinder.

The results of the moisture content, organic matter content, and unconfined compressive strength laboratory tests are indicated on the soil boring logs at the depths the samples were obtained. Atterberg limits are shown graphically on Figure No. 22 in the Appendix. We will hold the soil samples for 60 days from the date of this report. If you would like the samples, please let us know.

EXISTING PAVEMENT AND SUBSURFACE CONDITIONS

The existing pavement section, at the boring locations, consists of bituminous concrete overlying an aggregate base course. The bituminous concrete ranges in thickness from 2 to 6 inches with an average thickness of 3-1/4 inches. The underlying aggregate base course generally consists of sand and gravelly sand and measures 3 to 10 inches in thickness.

Granular and cohesive fill soils, consisting of sand, clayey sand, silty sand and silty clay, are present below the pavement section at B-02, B-03, B-05, B-07 through B-19 and B-21, and extend to depths ranging from 2-3/4 feet to the explored depth of 5 feet. The granular fill soils are loose to compact with organic matter contents of 1.9 and 2.3 percent and Standard Penetration Test (SPT) N-values ranging from 10 to 49 blows per foot. The cohesive fill soils are hard in consistency with a moisture content of 14 percent and an unconfined compressive strength of 8,000 pounds per square foot.

A 3-inch thick buried layer of silty clay topsoil underlies the fill soils within boring B-05 and extends to an approximate depth of 3-1/2 feet. The buried topsoil has an organic matter content of 7.8 percent.

Native silty clay underlies the pavement section within borings B-01, B-04, B-06 and B-20, the buried topsoil within boring B-05, and fill soils within boring B-02, B-03, B-07 through B-09, B-11 through B-14, B-19 and B-21, and extends to the explored depth of 5 feet. The native silty clay is stiff to hard in consistency with moisture contents ranging from 13 to 26 percent, a liquid limit of 31 percent, a plasticity index of 17 percent, and unconfined compressive strengths ranging from 2,000 to 9,000 psf.

Native sand and clayey sand underlie the fill soils within borings B-10, B-17 and B-18, and extend to the explored depth of 5 feet. The native sand and clayey sand are loose to medium compact with SPT N-values ranging from 10 to 18 blows per foot. The clayey sand within boring B-10 at a depth of 5 feet has an organic matter content of 2.3 percent.

The stratification depths shown on the soil boring logs represent the soil conditions at the boring locations. Variations may occur between borings. Additionally, the stratigraphic lines represent the
approximate boundaries between soil types. The transition may be more gradual than what is shown. We have prepared the boring logs on the basis of laboratory classification and testing as well as field logs of the soils encountered.

Groundwater was observed at depths ranging from 2-1/2 to 3-1/2 feet within borings B-03, B-09, B-19 and B-21 both during and upon completion of the drilling operations. No groundwater was observed within the remaining borings either during or upon completion of the drilling operations. The encountered groundwater appears to be perched with the granular soils, and does not likely represent the long-term groundwater level.

Fluctuations in perched and long-term groundwater levels should be anticipated due to seasonal variations and following periods of prolonged precipitation. It should also be noted that groundwater observations made during drilling operations in predominantly cohesive soils are not necessarily indicative of the static groundwater level. This is due to the low permeability of such soils and the tendency of drilling operations to seal off the natural paths of groundwater flow.

The Soil Boring Location Plan, Plate No. 1, Soil Boring Logs, Figure Nos. 1 through 21, and Atterberg Limits Results, Figure No. 22, are presented in the Appendix. The soil profiles described above are generalized descriptions of the conditions encountered at the boring locations. General Notes Terminology defining the nomenclature used on the boring logs and elsewhere in this report are presented on Figure No. 23.

PAVEMENT EVALUATION AND RECOMMENDATIONS

General

The existing bituminous concrete pavement appears to be in fair condition with the surface exhibiting moderate severity shrinkage and fatigue related cracking. In addition, the existing Portland cement concrete pavement appears to be in fair condition with the surface exhibiting some transverse cracking. Snow was present and covered some portions of the parking lot at the time of the drilling operations; therefore, a thorough evaluation of the existing pavements could not be performed.

We recommend completely removing the existing pavement and aggregate base material within the replacement areas, proof-rolling/proof-compacting the exposed subgrade, undercutting and replacing any unstable soils as necessary, placing aggregate base conforming to MDOT 21AA gradation and quality limits, and constructing a new pavement section. Alternatively, the existing pavements could be pulverized and compacted to be used as aggregate base and the new pavement section can be constructed on the pulverized base. The pulverization option should only be considered if the existing grades can be raised above their current level. The existing bituminous concrete should be saw-cut a minimum of 2 feet laterally beyond the proposed replacement areas.

Approximately 3 inches of buried topsoil, with an organic matter content of 7.8 percent, is present within boring B-05 between the approximate depths of 3-1/4 and 3-1/2 feet below the ground surface. Completely removing the buried topsoil and replacing the undercut area with engineered fill will be cost prohibitive; therefore, provided final grades are not raised more than one foot, we recommend the buried topsoil remain in-place. If the buried topsoil remains in-place, some future increased maintenance, repairs and/or pavement overlay in this area may be required prior to the end of the pavement design life. If the risk of potential long-term settlement in this area is unacceptable, all of the existing buried topsoil should be removed and replaced with non-organic engineered fill.

Once the existing pavements and aggregate base are completely removed within the replacement areas, or the existing pavements are pulverized and compacted, the subgrade soils should be evaluated for stability. We anticipate the subgrade soils in the northwest corner of the proposed site will consist of native silty clay and cohesive fill. These subgrade soils should be thoroughly proof-rolled using a heavily loaded, rubber-tired dump truck. Unsuitable soils or soils exhibiting excessive instability or rutting
should be removed by undercutting to stable soils. Within the remaining portions of the parking lot, we
anticipate the subgrade soils will consist of granular fill. The granular subgrade should be thoroughly
proof-compacted using a minimum 15-ton smooth drum vibratory roller making a minimum of 10
passes in two perpendicular directions. Due to the presence of the perched groundwater, we
recommend the vibratory setting be turned off during compaction operations or the perched
groundwater be removed from the granular soils prior to the compaction operations. Any unsuitable
soils or soils exhibiting excessive instability should be removed and replaced with engineered fill or
should be densified with additional compaction.

Undercuts, if required, should be evaluated by a qualified engineering technician to determine if further
subgrade stabilization is necessary. We recommend any undercut excavations be backfilled with MDOT
21AA aggregate placed in an engineered manner. Engineered fill should be placed in uniform horizontal
layers, not more than 9 inches in loose thickness. All engineered fill should be compacted to achieve a
density of at least 95 percent of the maximum dry density as determined by the Modified Proctor
compaction test (ASTM D 1557). All engineered fill material should be placed and compacted at
approximately the optimum moisture content. Frozen material should not be used as fill, nor should fill
be placed on a frozen subgrade.

Pavement Design

We understand the southern portion of the parking lot is intended to receive mostly passenger vehicles,
with occasional delivery vehicles, refuse vehicles, and snow removal equipment, and the replacement
pavements will consist of bituminous concrete. The northern portion of the replacement area is a bus
depot for the Livingston Educational Service Agency as well as Howell Public Schools, and the
replacement pavements will consist of either bituminous concrete or Portland cement concrete. No
traffic loading data was available at the time of this report. Therefore, we have provided a light-duty
pavement design, based on 50,000 equivalent 18-kip single-axle loads (ESALs), for the southern portion
of the parking lot, and a heavy-duty pavement design, based on 700,000 ESALs, for the northern
portion. If more accurate traffic data become available, G2 should be contacted to review and update
our analyses, if appropriate. We performed pavement design analyses in accordance with the “AASHTO
Guide for Design of Pavement Structures.”

Based on the variable subgrade soils, we recommend an effective roadbed soil resilient modulus of
5,000 pounds per square inch (psi) for use in flexible pavement design and an effective modulus of
subgrade reaction of 100 pounds per cubic inch for use in rigid pavement design. For evaluation of
flexible pavements, we estimated a serviceability loss of 2.0, a reliability factor of 0.85, and a standard
deviation of 0.45. For evaluation of rigid pavements, we estimated a serviceability loss of 2.0, load
transfer coefficient of 3.2, a drainage coefficient of 1.0, a standard deviation of 0.35, a reliability factor
of 0.85, a concrete modulus of rupture of 650 psi, and a concrete elastic modulus of 3,600,000 psi.
Based on the results of our analyses, we recommend the following minimum pavement design cross
sections:

<table>
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<th>Light-Duty Flexible Pavement Section</th>
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<tbody>
<tr>
<td>Material</td>
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<tr>
<td>-------------------------------------</td>
</tr>
<tr>
<td>MDOT 13A or 4C Bituminous Wearing Course</td>
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<tr>
<td>MDOT 3C Bituminous Leveling Course</td>
</tr>
<tr>
<td>MDOT 21AA Aggregate Base Course</td>
</tr>
<tr>
<td>or Pulverized (Recycled) Aggregate Base Course</td>
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<td>Total SN = 2.72</td>
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### Heavy-Duty Flexible Pavement Section

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<tr>
<td>MDOT 4E1 Bituminous Leveling Course</td>
<td>2 inches</td>
<td>0.40</td>
</tr>
<tr>
<td>MDOT 21AA Aggregate Base Course</td>
<td>11 inches</td>
<td>0.14</td>
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<tr>
<td>or Pulverized (Recycled) Aggregate Base Course</td>
<td>14 inches</td>
<td>0.11</td>
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<td><strong>Total SN = 3.74</strong></td>
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### Rigid Pavement Section

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<td>7 inches</td>
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<td>MDOT 21AA Aggregate Base Course</td>
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<td>or Pulverized (Recycled) Aggregate Base Course</td>
<td>10-1/2 inches</td>
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All pavement materials are specified within the 2012 Standard Specifications for Construction from the Michigan Department of Transportation. The bituminous pavement materials are described in Section 501 and can be assigned a structural coefficient number of 0.40. Any imported MDOT 21AA material can be assigned a structural coefficient number of 0.14. If the existing pavements are pulverized and used as aggregate base, the pulverized aggregate base thicknesses should be modified based on a reduced structural coefficient of 0.11. The Portland cement concrete pavement materials are described in Section 601.

**Pavement Drainage and Maintenance**

The existing granular fill overlying the native cohesive soils, could become saturated if proper drainage measures are not implemented. We recommend edge drains are provided around the perimeter of any proposed landscaped islands and along curbs since they can become a source of water infiltration into the pavement subgrade. Such drains should be connected to nearby catch basins. In addition, we recommend finger drains be installed at the catch basin locations. A minimum of four (4) finger drains should extend a minimum of 15 feet outward for each catch basin. The pavement and subgrade should be properly sloped to promote effective surface and subsurface drainage and prevent water from ponding. We also recommend pavement subbase materials consist of non-frost-susceptible aggregates where possible.

Regular timely maintenance should be performed on the pavements to reduce the potential deterioration associated with moisture infiltration through surface cracks. The owner should be prepared to seal the cracks with a hot-applied elastic crack filler as soon as possible after cracking develops and as often as necessary to block the passage of water to the subgrade soils.

**GENERAL COMMENTS**

We have formulated the evaluations and recommendations presented in this report relative to site preparation and pavement construction on the basis of data provided to us relating to the general location for the proposed pavement replacement. Any significant change in this data should be brought to our attention for review and evaluation with respect to the prevailing subsurface conditions.
The scope of the present investigation was limited to evaluation of subsurface conditions for the support of the pavements and other related aspects of the development. No chemical, environmental, or hydrogeological testing or analyses were included in the scope of this investigation. If changes occur in the design, location, or concept of the project, the conclusions and recommendations contained in this report are not valid unless G2 Consulting Group, LLC reviews the changes. G2 Consulting Group, LLC will then confirm the recommendations presented herein or make changes in writing.

We have based the analyses and recommendations submitted in this report upon the data from soil borings performed at the approximate locations shown on the Soil Boring Location Plan, Plate No. 1. This report does not reflect variations that may occur between the actual boring locations. The nature and extent of any such variations may not become clear until the time of construction. If significant variations then become evident, it may be necessary for us to re-evaluate our report recommendations.

Soil conditions at the site could vary from those generalized on the basis of soil borings made at specific locations. It is, therefore, recommended that G2 Consulting Group, LLC be retained to provide soil engineering services during the site preparation and pavement construction phases of the proposed project. This is to observe compliance with the design concepts, specifications, and recommendations. Also, this allows design changes to be made in the event that subsurface conditions differ from those anticipated prior to the start of construction.
APPENDIX

Soil Boring Location Plan  
Plate No. 1

Soil Boring Logs  
Figure Nos. 1 through 21

Atterberg Limits Results  
Figure No. 22

General Notes Terminology  
Figure No. 23
Soil Borings Performed by Triple R Drilling on February 11, 2018
**Project Name:** LESA Pavement Replacement  
**Project Location:** Southeast of W. Highland Road and N. Highlander Way, Howell, Michigan  
**G2 Project No.:** 173537  
**Latitude:** N/A  
**Longitude:** N/A

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### SOIL SAMPLE DATA

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<th>STD. PEN. RESISTANCE (N)</th>
<th>MOISTURE CONTENT (%)</th>
<th>DRY DENSITY (PCF)</th>
<th>UNCONF. COMP. STR. (PSF)</th>
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<td>6</td>
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<td>14.5</td>
<td>9000*</td>
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---

### SUBSURFACE PROFILE

- **GROUND SURFACE ELEVATION:** N/A
- **G2 Project No.:** 173537
- **Project Name:** LESA Pavement Replacement
- **Project Location:** Southeast of W. Highland Road and N. Highlander Way, Howell, Michigan
- **G2 Project No.:** 173537
- **Latitude:** N/A
- **Longitude:** N/A

#### Soil Profile:

1. **0.3 ft:** Bituminous Concrete (3 inches)  
2. **0.8 ft:** Aggregate Base: Brown and Gray  
3. **Gravelly Sand with trace silt (6 inches):** Hard Brown Silty Clay with trace sand and gravel  
4. **5 ft:** End of Boring @ 5 ft

---

**Notes:**
- *Calibrated Hand Penetrometer
- Borehole backfilled with auger cuttings and capped with cold patch

---

**Excavation Backfilling Procedure:**
- Borehole backfilled with auger cuttings and capped with cold patch

---

**Water Level Observation:**
- Dry during and upon completion of drilling operations

---

**Total Depth:** 5 ft  
**Drilling Date:** February 11, 2018  
**Inspector:** R. Rau

---

**Drilling Method:** 3-1/4 inch inside diameter hollow-stem augers

---

**Diagram:**
- Figure No. 1
## Soil Boring No. B-02

**Project Name:** LESA Pavement Replacement  
**Project Location:** Southeast of W. Highland Road and N. Highlander Way  
**Project Location:** Howell, Michigan  
**G2 Project No.:** 173537  
**Latitude:** N/A  
**Longitude:** N/A

### Soil Sample Data

<table>
<thead>
<tr>
<th>DEPTH (ft)</th>
<th>PROFILE</th>
<th>GROUND SURFACE ELEVATION</th>
<th>MOISTURE CONTENT (%)</th>
<th>DRY DENSITY (PCF)</th>
<th>UNCONF. COMP. STR. (PSF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.4</td>
<td>Bituminous Concrete (5 inches)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.0</td>
<td>Aggregate Base: Brown Sand with trace silt and gravel (7 inches)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.0</td>
<td>Fill: Medium Compct Brown Clayey Sand with trace gravel</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Hard Brown Silty Clay with trace sand and gravel</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>End of Boring @ 5 ft</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Soils

- **Bituminous Concrete (5 inches)**
- **Aggregate Base: Brown Sand with trace silt and gravel (7 inches)**
- **Fill: Medium Compct Brown Clayey Sand with trace gravel**
- **Hard Brown Silty Clay with trace sand and gravel**

### Notes

- **Water Level Observation:** Dry during and upon completion of drilling operations
- **Excavation Backfilling Procedure:** Borehole backfilled with auger cuttings and capped with cold patch
- **Drilling Method:** 3-1/4 inch inside diameter hollow-stem augers

---

*Calibrated Hand Penetrometer*
### Soil Boring No. B-03

**Project Name:** LESA Pavement Replacement  
**Project Location:** Southeast of W. Highland Road and N. Highlander Way, Howell, Michigan  
**G2 Project No.:** 173537  
**Latitude:** N/A  
**Longitude:** N/A

#### SUBSURFACE PROFILE

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Profile</th>
<th>GROUND SURFACE ELEVATION: N/A</th>
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<tbody>
<tr>
<td>0.3</td>
<td>Bituminous Concrete (3 inches)</td>
<td></td>
</tr>
<tr>
<td>0.8</td>
<td>Aggregate Base: Gray Gravelly Sand with trace silt (6 inches)</td>
<td></td>
</tr>
<tr>
<td>3.0</td>
<td>Fill: Medium Compact Brown Sand with trace silt</td>
<td></td>
</tr>
<tr>
<td>5.0</td>
<td>Hard Brown Silty Clay with trace sand and gravel</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>End of Boring @ 5 ft</td>
<td></td>
</tr>
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</table>

#### Soil Sample Data

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>BLOWS/6-INCHES</th>
<th>STD. PEN. RESISTANCE (N)</th>
<th>MOISTURE CONTENT (%)</th>
<th>DRY DENSITY (PCF)</th>
<th>UNCONF. COMP. STR. (PSF)</th>
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<tbody>
<tr>
<td>S-1</td>
<td>6</td>
<td>9</td>
<td>11</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>S-2</td>
<td>8</td>
<td>11</td>
<td>10</td>
<td>21</td>
<td>16.6</td>
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**Notes:**  
* Calibrated Hand Penetrometer  

**Excavation Backfilling Procedure:**  
Borehole backfilled with auger cuttings and capped with cold patch

---

**Water Level Observation:**  
3-1/2 feet during and upon completion of the drilling operations

**Total Depth:** 5 ft  
**Drilling Date:** February 11, 2018  
**Inspector:**  
**Contractor:** Triple R Drilling  
**Driller:** R. Rau  
**Drilling Method:** 3-1/4 inch inside diameter hollow-stem augers

---

**Remarks:**  
- Figure No. 3
## Soil Boring No. B-04

**Ground Surface Elevation:** N/A

### Subsurface Profile

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Profile</th>
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</thead>
<tbody>
<tr>
<td>0.3</td>
<td>Bituminous Concrete (3 inches)</td>
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<tr>
<td>0.7</td>
<td>Aggregate Base: Browns Gravely Sand with trace silt (5 inches)</td>
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<tr>
<td>5</td>
<td>Very Stiff to Hard Brown Silty Clay with trace sand and gravel and sand seams</td>
<td></td>
</tr>
<tr>
<td>5.0</td>
<td>End of Boring @ 5 ft</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
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### Soil Sample Data

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Sample Type-No.</th>
<th>Blows/6-inches</th>
<th>Std. Pen. Resistance (N)</th>
<th>Moisture Content (%)</th>
<th>Dry Density (PCF)</th>
<th>Unconf. Comp. Str. (PSF)</th>
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</thead>
<tbody>
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<td>5</td>
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<td>11</td>
<td>20</td>
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<td>S-2</td>
<td>8</td>
<td>11</td>
<td>14</td>
<td>25</td>
<td>15.0</td>
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</tbody>
</table>

**Total Depth:** 5 ft  
**Drilling Date:** February 11, 2018  
**Inspector:** Triple R Drilling  
**Contractor:** R. Rau  
**Driller:** R. Rau  
**Drilling Method:** 3-1/4 inch inside diameter hollow-stem augers  
**Water Level Observation:** Dry during and upon completion of drilling operations  
**Notes:** * Calibrated Hand Penetrometer  
**Excavation Backfilling Procedure:** Borehole backfilled with auger cuttings and capped with cold patch  

---

**Figure No. 4**
Soil Boring No. B-05

SUBSURFACE PROFILE

<table>
<thead>
<tr>
<th>DEPTH (ft)</th>
<th>PROFILE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>GROUND SURFACE ELEVATION: N/A</td>
</tr>
</tbody>
</table>

- Bituminous Concrete (5 inches) 0.6
- Aggregate Base: Brown Sand with trace silt (9 inches) 1.2
- Fill: Hard Brown Silty Clay with trace sand and gravel
- Buried Topsoil: Dark Brown Silty Clay with trace sand and gravel (Organic Matter Content = 7.8%) 3.3
- Stiff Brown Silty Clay with trace sand and gravel 3.5
- End of Boring @ 5 ft 5.0

<table>
<thead>
<tr>
<th>DEPTH (ft)</th>
<th>SAMPLE TYPE-NO.</th>
<th>BLOWS/6-INCHES</th>
<th>STD. PEN. RESISTANCE (N)</th>
<th>MOISTURE CONTENT (%)</th>
<th>DRY DENSITY (PCF)</th>
<th>UNCONF. COMP. STR. (PSF)</th>
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</thead>
<tbody>
<tr>
<td>5</td>
<td>S-1</td>
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<td>6</td>
<td>5</td>
<td>11</td>
<td>14.5</td>
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<td>S-2</td>
<td>3</td>
<td>5</td>
<td>6</td>
<td>11</td>
<td>25.8</td>
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</table>

Total Depth: 5 ft
Drilling Date: February 11, 2018
Inspector: R. Rau
Contractor: Triple R Drilling
Driller: R. Rau
Drilling Method: 3-1/4 inch inside diameter hollow-stem augers

Water Level Observation: Dry during and upon completion of drilling operations
Notes: * Calibrated Hand Penetrometer
Excavation Backfilling Procedure: Borehole backfilled with auger cuttings and capped with cold patch
**SUBSURFACE PROFILE**

<table>
<thead>
<tr>
<th>DEPTH (ft)</th>
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<tbody>
<tr>
<td>0.3</td>
<td>Bituminous Concrete (3 inches)</td>
</tr>
<tr>
<td>1.1</td>
<td>Aggregate Base: Brown and Gray Sand with trace silt (10 inches)</td>
</tr>
<tr>
<td>3.0</td>
<td>Stiff Brown Silty Clay with trace sand and gravel</td>
</tr>
<tr>
<td>5.0</td>
<td>Hard Brown Silty Clay with trace sand and gravel</td>
</tr>
<tr>
<td>10.0</td>
<td>End of Boring @ 5 ft</td>
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**SOIL SAMPLE DATA**

<table>
<thead>
<tr>
<th>SAMPLE TYPE-NO.</th>
<th>BLOWS/6-INCHES</th>
<th>STD. PEN. RESISTANCE (N)</th>
<th>MOISTURE CONTENT (%)</th>
<th>DRY DENSITY (PCF)</th>
<th>UNCONF. COMP. STR. (PSF)</th>
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</thead>
<tbody>
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<td>5</td>
<td>10</td>
<td>13.9</td>
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<td>S-2</td>
<td>6</td>
<td>15</td>
<td>26</td>
<td>13.1</td>
<td>8000*</td>
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</table>

**GROUND SURFACE ELEVATION:** N/A

**Drilling Date:** February 11, 2018

**Driller:** R. Rau

**Drilling Method:** 3-1/4 inch inside diameter hollow-stem augers

**Notes:**
- * Calibrated Hand Penetrometer
- Excavation Backfilling Procedure: Borehole backfilled with auger cuttings and capped with cold patch
**Subsurface Profile**

- **Bituminous Concrete (2 inches)**
- **Aggregate Base: Brown Sand with trace gravel (10 inches)**
- **Fill: Medium Compact Brown Silty Sand with trace gravel**
- **Hard Brown Silty Clay with trace sand and gravel**
- **End of Boring @ 5 ft**

### Soil Sample Data

<table>
<thead>
<tr>
<th></th>
<th></th>
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<tbody>
<tr>
<td>S-1</td>
<td>8</td>
<td>11</td>
<td>21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S-2</td>
<td>3</td>
<td>6</td>
<td>15</td>
<td>14.2</td>
<td>8000*</td>
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</table>

**Notes:**
- *Calibrated Hand Penetrometer*
- Site excavated, backfilled with auger cuttings and capped with cold patch

**Water Level Observation:**
- Dry during and upon completion of drilling operations

**Excavation and Backfilling Procedure:**
- Borehole backfilled with auger cuttings and capped with cold patch

---

**Project Details**

- **Project Name:** LESA Pavement Replacement
- **Project Location:** Southeast of W. Highland Road and N. Highlander Way, Howell, Michigan
- **Project No:** 173537
- **Latitude:** N/A
- **Longitude:** N/A
- **Drilling Method:** 3-1/4 inch inside diameter hollow-stem augers
- **Drilling Date:** February 11, 2018
- **Inspector:** Triple R Drilling
- **Driller:** R. Rau
- **Contractor:** R. Rau
- **Total Depth:** 5 ft
Soil Boring No. B-08

SUBSURFACE PROFILE

GROUND SURFACE ELEVATION: N/A

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<thead>
<tr>
<th>DEPTH (ft)</th>
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<tbody>
<tr>
<td>0.2</td>
<td>Bituminous Concrete (2 inches)</td>
</tr>
<tr>
<td>0.4</td>
<td>Aggregate Base: Brown and Black Sand with trace silt and gravel (3 inches)</td>
</tr>
<tr>
<td>3.5</td>
<td>Fill: Loose Brown Silty Sand with trace clay</td>
</tr>
<tr>
<td>5</td>
<td>Hard Brown Silty Clay with trace sand and gravel</td>
</tr>
<tr>
<td>10</td>
<td>End of Boring @ 5 ft</td>
</tr>
</tbody>
</table>

SOIL SAMPLE DATA

<table>
<thead>
<tr>
<th>SAMPLE NO.</th>
<th>BLOWS/6-INCHES</th>
<th>STD. PEN. RESISTANCE (N)</th>
<th>MOISTURE CONTENT (%)</th>
<th>DRY DENSITY (PCF)</th>
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<td>5</td>
<td>10</td>
<td></td>
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</tr>
<tr>
<td>S-2</td>
<td>5</td>
<td>5</td>
<td>10</td>
<td>14.0</td>
<td>9000*</td>
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</table>

Total Depth: 5 ft
Drilling Date: February 11, 2018
Inspector: R. Rau
Contractor: Triple R Drilling
Driller: R. Rau
Drilling Method: 3-1/4 inch inside diameter hollow-stem augers

Water Level Observation:
Dry during and upon completion of drilling operations

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Borehole backfilled with auger cuttings and capped with cold patch

Figure No. 8
**Subsurface Profile**

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.4</td>
<td>Bituminous Concrete (5 inches)</td>
</tr>
<tr>
<td>1.2</td>
<td>Aggregate Base: Gray Gravelly Sand with trace silt (9 inches)</td>
</tr>
<tr>
<td>4.8</td>
<td>Fill: Medium Compact Brown Sand with trace silt</td>
</tr>
<tr>
<td>5</td>
<td>Stiff Brown Silty Clay with trace sand and gravel (Cobble encountered at 4.3/4 feet)</td>
</tr>
<tr>
<td>5</td>
<td>End of Boring @ 5 ft</td>
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**Soil Sample Data**

<table>
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<tr>
<th>Sample Type-No.</th>
<th>B/M 6-inches</th>
<th>Std. Pen. Resistance (N)</th>
<th>Moisture Content (%)</th>
<th>Dry Density (PCF)</th>
<th>Unconf. Comp. Str. (PSF)</th>
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<td>6</td>
<td>13</td>
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<td>-</td>
<td>-</td>
<td>14.1</td>
<td>2000*</td>
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**Notes:**
- * Calibrated Hand Penetrometer

**Excavation Backfilling Procedure:**
- Borehole backfilled with auger cuttings and capped with cold patch

**Ground Surface Elevation:** N/A

**Water Level Observation:**
- 3 feet during and upon completion of the drilling operations

**Total Depth:** 5 ft

**Drilling Date:** February 11, 2018

**Inspector:** R. Rau

**Contractor:** Triple R Drilling

**Driller:** R. Rau

**Drilling Method:** 3-1/4 inch inside diameter hollow-stem augers
Project Name: LESA Pavement Replacement
Project Location: Southeast of W. Highland Road and N. Highlander Way,
Howell, Michigan
G2 Project No. 173537
Latitude: N/A Longitude: N/A

Soil Boring No. B-10

SUBSURFACE PROFILE

GROUND SURFACE ELEVATION: N/A

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<th>DEPTH (ft)</th>
<th>PROFILE</th>
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<tr>
<td>0.3</td>
<td>Bituminous Concrete (4 inches)</td>
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<tr>
<td>1.0</td>
<td>Aggregate Base: Brown Sand with trace silt and gravel (8 inches)</td>
</tr>
<tr>
<td>4.0</td>
<td>Fill: Hard Brown Silty Clay with trace sand and gravel and sand seams</td>
</tr>
<tr>
<td>5.0</td>
<td>Medium Compact Brown and Black Clayey Sand with trace silt (Organic Matter Content = 2.3%)</td>
</tr>
<tr>
<td>5.5</td>
<td>End of Boring @ 5 ft</td>
</tr>
</tbody>
</table>

SOIL SAMPLE DATA

<table>
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<tr>
<th>SAMPLE TYPE-NO.</th>
<th>BLOWS/6-INCHES</th>
<th>STD. PEN. RESISTANCE (N)</th>
<th>MOISTURE CONTENT (%)</th>
<th>DRY DENSITY (PCF)</th>
<th>UNCONF. COMP. STR. (PSF)</th>
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<tbody>
<tr>
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<td>5</td>
<td>12</td>
<td>14.0</td>
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<td>S-2</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>13</td>
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Total Depth: 5 ft
Drilling Date: February 11, 2018
Inspector: R. Rau
Contractor: Triple R Drilling
Driller: R. Rau
Drilling Method: 3-1/4 inch inside diameter hollow-stem augers

Water Level Observation: Dry during and upon completion of drilling operations
Notes: * Calibrated Hand Penetrometer
Excavation Backfilling Procedure: Borehole backfilled with auger cuttings and capped with cold patch

Figure No. 10
Soil Boring No. B-11

SUBSURFACE PROFILE

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<th>DEPTH (ft)</th>
<th>PROFILE</th>
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<td>0.3</td>
<td>Bituminous Concrete (3 inches)</td>
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<tr>
<td>0.9</td>
<td>Aggregate Base: Brown Sand with trace silt and gravel (8 inches)</td>
</tr>
<tr>
<td>3.0</td>
<td>Fill: Medium Compact Brown Silty Sand with trace gravel</td>
</tr>
<tr>
<td>5</td>
<td>Very Stiff Brown Silty Clay with trace sand and gravel</td>
</tr>
<tr>
<td>5</td>
<td>End of Boring @ 5 ft</td>
</tr>
<tr>
<td>5</td>
<td>End of Boring @ 5 ft</td>
</tr>
<tr>
<td>5</td>
<td>End of Boring @ 5 ft</td>
</tr>
<tr>
<td>10</td>
<td>End of Boring @ 5 ft</td>
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</table>

GROUND SURFACE ELEVATION: N/A

Depth (ft):
5
10

SOIL SAMPLE DATA

<table>
<thead>
<tr>
<th>SAMPLE TYPE-NO.</th>
<th>BLOWS/6-INCHES</th>
<th>STD. PEN. RESISTANCE (N)</th>
<th>MOISTURE CONTENT (%)</th>
<th>DRY DENSITY (PCF)</th>
<th>UNCONF. COMP. STR. (PSF)</th>
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<td>S-1</td>
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<td>11</td>
<td>20</td>
<td>12.0</td>
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Notes:
- * Calibrated Hand Penetrometer
- Excavation Backfilling Procedure: Borehole backfilled with auger cuttings and capped with cold patch

Water Level Observation:
- Dry during and upon completion of drilling operations

Drilling Method:
- 3-1/4 inch inside diameter hollow-stem augers

Drilling Date:
February 11, 2018

Inspector:
Triple R Drilling

Contractor:
R. Rau

Driller:
R. Rau

Total Depth:
5 ft

Latitude: N/A
Longitude: N/A

Project Name: LESA Pavement Replacement
Project Location: Southeast of W. Highland Road and N. Highlander Way, Howell, Michigan
G2 Project No.: 173537
Latitude: N/A
Longitude: N/A
### Soil Sample Data

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<tr>
<th>DEPTH (ft)</th>
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<th>BLOWS/6-INCHES</th>
<th>STD. PEN. RESISTANCE (N)</th>
<th>MOISTURE CONTENT (%)</th>
<th>DRY DENSITY (PCF)</th>
<th>UNCONF. COMP. STR. (PSF)</th>
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</thead>
<tbody>
<tr>
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<td>9</td>
<td>7</td>
<td>16</td>
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<tr>
<td>5.0</td>
<td>S-2</td>
<td>15</td>
<td>9</td>
<td>23</td>
<td>12.9</td>
<td>8000*</td>
</tr>
</tbody>
</table>

**Soil Sample Data**

- **Bituminous Concrete (3 inches)**
- **Aggregate Base: Brown Sand with trace silt and gravel (9 inches)**
- **Fill: Medium Compact Brown Silty Sand with trace gravel**
- **Very Stiff Brown Silty Clay with trace sand and gravel**

**Ground Surface Elevation:** N/A

**Subsurface Profile**

- **Depth:** 5 ft
- **Drilling Date:** February 11, 2018
- **Inspector:** R. Rau
- **Driller:** R. Rau
- **Drilling Method:** 3-1/4 inch inside diameter hollow-stem augers

**Notes:**
- *Calibrated Hand Penetrometer
- Excavation Backfilling Procedure: Borehole backfilled with auger cuttings and capped with cold patch

**Water Level Observation:**
- Dry during and upon completion of drilling operations
Soil Boring No. B-13

SUBSURFACE PROFILE

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<td>GROUND SURFACE ELEVATION: N/A</td>
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<tr>
<td>0.5</td>
<td>Bituminous Concrete (6 inches)</td>
</tr>
<tr>
<td>1.2</td>
<td>Aggregate Base: Gray Gravelly Sand with trace silt (8 inches)</td>
</tr>
<tr>
<td>3.5</td>
<td>Fill: Medium Compact Brown Clayey Sand with trace gravel</td>
</tr>
<tr>
<td>5.0</td>
<td>Very Stiff Brown Silty Clay with trace sand and gravel</td>
</tr>
<tr>
<td>5</td>
<td>End of Boring @ 5 ft</td>
</tr>
</tbody>
</table>

SOIL SAMPLE DATA

<table>
<thead>
<tr>
<th>DEPTH (ft)</th>
<th>SAMPLE TYPE-NO.</th>
<th>BLOWS/6-INCHES</th>
<th>STD. PEN. RESISTANCE (N)</th>
<th>MOISTURE CONTENT (%)</th>
<th>DRY DENSITY (PCF)</th>
<th>UNCONF. COMP. STR. (PSF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>5-1</td>
<td>8</td>
<td>6</td>
<td>11</td>
<td>S-1</td>
<td>5000*</td>
</tr>
<tr>
<td>5</td>
<td>5-2</td>
<td>5</td>
<td>5</td>
<td>15</td>
<td>11.0</td>
<td>5000*</td>
</tr>
</tbody>
</table>

Total Depth: 5 ft
Drilling Date: February 11, 2018
Inspector: Triple R Drilling
Driller: R. Rau
Drilling Method: 3-1/4 inch inside diameter hollow-stem augers

Water Level Observation:
Dry during and upon completion of drilling operations

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Borehole backfilled with auger cuttings and capped with cold patch
## Soil Boring No. B-14

### SOIL SAMPLE DATA

<table>
<thead>
<tr>
<th>DEPTH (ft)</th>
<th>SAMPLE TYPE-NO.</th>
<th>BLOWS/6-INCHES</th>
<th>STD. PEN. RESISTANCE (N)</th>
<th>MOISTURE CONTENT (%)</th>
<th>DRY DENSITY (PCF)</th>
<th>UNCONF. COMP. STR. (PSF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.2</td>
<td>S-1</td>
<td>9</td>
<td>10</td>
<td>5</td>
<td>15</td>
<td></td>
</tr>
</tbody>
</table>

### SUBSURFACE PROFILE

- **GROUND SURFACE ELEVATION:** N/A
- **Total Depth:** 10 ft

<table>
<thead>
<tr>
<th>DEPTH (ft)</th>
<th>PROFILE</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.2</td>
<td>Bituminous Concrete (2-1/2 inches)</td>
</tr>
<tr>
<td>1.0</td>
<td>Aggregate Base: Brown Gravelly Sand with trace silt (10 inches)</td>
</tr>
<tr>
<td>4.0</td>
<td>Fill: Medium Compact Brown Sand with trace sand and gravel</td>
</tr>
<tr>
<td>5</td>
<td>Very Stiff Brown and Gray Silty Clay with trace sand and gravel</td>
</tr>
<tr>
<td>5.0</td>
<td>End of Boring @ 5 ft</td>
</tr>
</tbody>
</table>

### Notes:
- *Calibrated Hand Penetrometer*
- **Excavation Backfilling Procedure:**
  - Borehole backfilled with auger cuttings and capped with cold patch

### Water Level Observation:
- Dry during and upon completion of drilling operations

### Drilling Details:
- **Total Depth:** 5 ft
- **Drilling Date:** February 11, 2018
- **Inspector:**
- **Contractor:** Triple R Drilling
- **Driller:** R. Rau
- **Drilling Method:** 3-1/4 inch inside diameter hollow-stem augers

---

**Figure No. 14**
Project Name: LESA Pavement Replacement
Project Location: Southeast of W. Highland Road and N. Highlander Way
Howell, Michigan
G2 Project No. 173537
Latitude: N/A  Longitude: N/A

SOIL SAMPLE DATA

<table>
<thead>
<tr>
<th>DEPTH (ft)</th>
<th>SAMPLE NO.</th>
<th>BLOWS/6-INCHES</th>
<th>STD. PEN. RESISTANCE (N)</th>
<th>MOISTURE CONTENT (%)</th>
<th>DRY DENSITY (PCF)</th>
<th>UNCONF. COMP. STR. (PSF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.2</td>
<td>5-1</td>
<td>10</td>
<td>10</td>
<td>21</td>
<td>8</td>
<td>21</td>
</tr>
<tr>
<td>5</td>
<td>5-2</td>
<td>8</td>
<td>14</td>
<td>23</td>
<td>9</td>
<td>23</td>
</tr>
</tbody>
</table>

SUBSURFACE PROFILE

GROUND SURFACE ELEVATION: N/A

<table>
<thead>
<tr>
<th>DEPTH (ft)</th>
<th>PROFILE</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.2</td>
<td>Bituminous Concrete (2 inches)</td>
</tr>
<tr>
<td>1.0</td>
<td>Aggregate Base: Brown Sand with trace silt (10 inches)</td>
</tr>
<tr>
<td>5</td>
<td>Fill: Medium Compact Brown Sand with trace silt and gravel</td>
</tr>
<tr>
<td>10</td>
<td>End of Boring @ 5 ft</td>
</tr>
</tbody>
</table>

Total Depth: 5 ft
Drilling Date: February 11, 2018
Inspector: R. Rau
Contractor: Triple R Drilling
Driller: R. Rau

Drilling Method: 3-1/4 inch inside diameter hollow-stem augers

Water Level Observation: Dry during and upon completion of drilling operations
Excavation Backfilling Procedure: Borehole backfilled with auger cuttings and capped with cold patch

Figure No. 15
### Soil Boring No. B-16

#### SUBSURFACE PROFILE

<table>
<thead>
<tr>
<th>DEPTH (ft)</th>
<th>PROFILE</th>
<th>GROUND SURFACE ELEVATION: N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.2</td>
<td>Bituminous Concrete (2-1/2 inches)</td>
<td></td>
</tr>
<tr>
<td>0.8</td>
<td>Aggregate Base: Brown Sand with trace silt and gravel (7 inches)</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Fill: Medium Compact to Compact Brown Silty Sand with trace gravel and cobbles (Organic Matter Content = 2.3%)</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>End of Boring @ 5 ft</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Fill: Medium Compact to Compact Brown Silty Sand with trace gravel and cobbles (Organic Matter Content = 2.3%)</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>End of Boring @ 5 ft</td>
<td></td>
</tr>
</tbody>
</table>

#### Water Level Observation:
Dry during and upon completion of drilling operations

#### Excavation Backfilling Procedure:
Borehole backfilled with auger cuttings and capped with cold patch

#### Total Depth: 5 ft
Drilling Date: February 11, 2018
Inspector: Triple R Drilling
Contractor: R. Rau

Drilling Method:
3-1/4 inch inside diameter hollow-stem augers

---

#### SOIL SAMPLE DATA

<table>
<thead>
<tr>
<th>SAMPLE TYPE-NO.</th>
<th>DEPTH (ft)</th>
<th>BLOWS/6-INCHES</th>
<th>STD. PEN. RESISTANCE (N)</th>
<th>MOISTURE CONTENT (%)</th>
<th>DRY DENSITY (PCF)</th>
<th>UNCONF. COMP. STR. (PSF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>S-1</td>
<td>5.0</td>
<td>55</td>
<td>24</td>
<td>25</td>
<td>49</td>
<td></td>
</tr>
<tr>
<td>S-2</td>
<td>5.0</td>
<td>6</td>
<td>9</td>
<td>12</td>
<td>21</td>
<td></td>
</tr>
</tbody>
</table>

---

Figure No. 16
### Soil Boring No. B-17

**Project Name:** LESA Pavement Replacement  
**Project Location:** Southeast of W. Highland Road and N. Highlander Way, Howell, Michigan  
**G2 Project No.:** 173537  
**Latitude:** N/A  
**Longitude:** N/A

#### Subsurface Profile

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Profile</th>
<th>Ground Surface Elevation: N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.3</td>
<td>Bituminous Concrete (3 inches)</td>
<td></td>
</tr>
<tr>
<td>0.9</td>
<td>Aggregate Base: Brown Sand with trace silt and gravel (8 inches)</td>
<td></td>
</tr>
<tr>
<td>3.0</td>
<td>Fill: Medium Compact Brown Silty Sand with trace gravel (Organic Matter Content = 1.9%)</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Medium Compact Brown Sand with trace silt</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>End of Boring @ 5 ft</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Sample Type-No.</th>
<th>Blisters/6-Inches</th>
<th>Std. Pen. Resistance (N)</th>
<th>Moisture Content (%)</th>
<th>Dry Density (PCF)</th>
<th>Unconf. Comp. Str. (PSF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.3</td>
<td>S-1</td>
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<td>12</td>
<td>22</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.0</td>
<td>S-2</td>
<td>6</td>
<td>7</td>
<td>18</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Total Depth:** 5 ft  
**Drilling Date:** February 11, 2018  
**Inspector:** Triple R Drilling  
**Contractor:** R. Rau  
**Drilling Method:** 3-1/4 inch inside diameter hollow-stem augers  

**Water Level Observation:** Dry during and upon completion of drilling operations  
**Excavation Backfilling Procedure:** Borehole backfilled with auger cuttings and capped with cold patch

Figure No. 17
### Soil Sample Data

<table>
<thead>
<tr>
<th>SAMPLE TYPE-NO.</th>
<th>BLOWS / 6-INCHES</th>
<th>STD. PEN. RESISTANCE (N)</th>
<th>MOISTURE CONTENT (%)</th>
<th>DRY DENSITY (PCF)</th>
<th>UNCONF. COMP. STR. (PSF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>S-1</td>
<td>12</td>
<td>10</td>
<td>8</td>
<td>18</td>
<td></td>
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<td>S-2</td>
<td>5</td>
<td>5</td>
<td>10</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Subsurface Profile

<table>
<thead>
<tr>
<th>DEPTH (ft)</th>
<th>PROFILE</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.2</td>
<td>Bituminous Concrete (2 inches)</td>
</tr>
<tr>
<td>0.9</td>
<td>Aggregate Base: Brown Sand with trace silt and gravel (9 inches)</td>
</tr>
<tr>
<td>3.5</td>
<td>Fill: Medium Compact Brown Silty Sand with trace gravel</td>
</tr>
<tr>
<td>5</td>
<td>Loose Brown Sand with trace silt</td>
</tr>
<tr>
<td>5.0</td>
<td>End of Boring @ 5 ft</td>
</tr>
<tr>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>

**Total Depth:** 5 ft  
**Drilling Date:** February 11, 2018  
**Inspector:** Triple R Drilling  
**Contractor:** R. Rau  
**Driller:** R. Rau

**Drilling Method:** 3-1/4 inch inside diameter hollow-stem augers  
**Water Level Observation:** Dry during and upon completion of drilling operations  
**Excavation Backfilling Procedure:** Borehole backfilled with auger cuttings and capped with cold patch
Soil Boring No. B-19

Soil / Pavement Boring 173537.GPJ  20140820 G2 CONSULTING DATA TEMPLATE.GDT  2/23/18

Subsurface Profile:

- **Ground Surface Elevation:** N/A
- **Total Depth:** 5 ft
- **Drilling Date:** February 11, 2018
- **Inspector:**
- **Contractor:** Triple R Drilling
- **Driller:** R. Rau
- **Drilling Method:** 3-1/4 inch inside diameter hollow-stem augers
- **Water Level Observation:** 3-1/2 feet during and upon completion of the drilling operations
- **Notes:** *Calibrated Hand Penetrometer

Soil Sample Data:

<table>
<thead>
<tr>
<th>Sample Type-No.</th>
<th>Blows/6-Inches</th>
<th>Std. Pen. Resistance (N)</th>
<th>Moisture Content (%)</th>
<th>Dry Density (PCF)</th>
<th>Unconf. Comp. Str. (PSF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>S-1</td>
<td>7</td>
<td>9</td>
<td>10</td>
<td>19</td>
<td></td>
</tr>
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<td>S-2</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>7</td>
<td>12.9</td>
</tr>
</tbody>
</table>

End of Boring @ 5 ft
Bituminous Concrete (3 inches)
Aggregate Base: Brown and Black Gravelly Sand (6 inches)
Stiff Brown and Gray Silty Clay with trace sand and gravel

End of Boring @ 5 ft

<table>
<thead>
<tr>
<th>DEPTH (ft)</th>
<th>PROFILE</th>
<th>GROUND SURFACE ELEVATION: N/A</th>
<th>DEPTH (ft)</th>
<th>SAMPLE TYPE-NO.</th>
<th>BLOWS/6-INCHES</th>
<th>STD. PEN. RESISTANCE (N)</th>
<th>MOISTURE CONTENT (%)</th>
<th>DRY DENSITY (PCF)</th>
<th>UNCONF. COMP. STR. (PSF)</th>
</tr>
</thead>
<tbody>
<tr>
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<td>0.1</td>
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<td>7</td>
<td>4</td>
<td>8</td>
<td>16.6</td>
<td>2000*</td>
</tr>
<tr>
<td>0.8</td>
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<td></td>
<td>5.0</td>
<td>5-1</td>
<td>4</td>
<td>4</td>
<td>8</td>
<td>16.6</td>
<td>2000*</td>
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<td></td>
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<td></td>
</tr>
</tbody>
</table>

Total Depth: 5 ft
Drilling Date: February 11, 2018
Inspector: R. Rau
Contractor: Triple R Drilling
Driller: R. Rau
Drilling Method: 3-1/4 inch inside diameter hollow-stem augers

Water Level Observation:
Dry during and upon completion of drilling operations

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Borehole backfilled with auger cuttings and capped with cold patch

Figure No. 20
Soil Boring No. B-21

Project Name: LESA Pavement Replacement
Project Location: Southeast of W. Highland Road and N. Highlander Way
Howell, Michigan
G2 Project No. 173537
Latitude: N/A Longitude: N/A

SOIL SAMPLE DATA

<table>
<thead>
<tr>
<th>DEPTH (ft)</th>
<th>PROFILE</th>
<th>GROUND SURFACE ELEVATION: N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.3</td>
<td>Bituminous Concrete (3 inches)</td>
<td>0.3</td>
</tr>
<tr>
<td>1.0</td>
<td>Aggregate Base: Brown Sand with trace gravel (9 inches)</td>
<td>1.0</td>
</tr>
<tr>
<td>3.5</td>
<td>Fill: Medium Compact Brown Sand with trace silt and gravel</td>
<td>3.5</td>
</tr>
<tr>
<td>5</td>
<td>Very Stiff Gray Silty Clay with trace sand and gravel</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>End of Boring @ 5 ft</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DEPTH (ft)</th>
<th>SAMPLE TYPE-NO.</th>
<th>BLOWS/ 6-INCHES</th>
<th>STD. PEN. RESISTANCE (N)</th>
<th>MOISTURE CONTENT (%)</th>
<th>DRY DENSITY (PCF)</th>
<th>UNCONF. COMP. STR. (PSF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>S-1</td>
<td>9</td>
<td>9</td>
<td>8</td>
<td>17</td>
<td></td>
</tr>
</tbody>
</table>

Notes:
- * Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
- Borehole backfilled with auger cuttings and capped with cold patch

Water Level Observation:
- 2-1/2 feet during and upon completion of the drilling operations

Drilling Method:
- 3-1/4 inch inside diameter hollow-stem augers
<table>
<thead>
<tr>
<th>Specimen Identification</th>
<th>LL</th>
<th>PL</th>
<th>PI</th>
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<td>31</td>
<td>14</td>
<td>17</td>
<td>15</td>
<td>Brown Silty Clay</td>
</tr>
</tbody>
</table>
SECTION 02G

ASPHALT PAVING

SCOPE OF WORK

01 All work under this heading shall meet requirements of Division 01 and Instructions to Bidders and include everything necessary to complete the construction of asphalt paving and items accessory to the parking and drive areas, including but not limited to the following:

02 Work Included:
   a. Compaction of sub grade.
   b. Placing of stone and asphalt base and asphalt wearing course.

03 Work by Others:
   a. By Division 03 - Concrete paving, curbs and walks.

SUB SURFACE PREPARATION

01 After all underground piping has been placed, backfilled and compacted, and all sub grade brought to proper level and cleared of foreign substances, the entire sub grade is to be compacted with a 10 ton vibrating roller. Perform all necessary fine grading to insure the minimum specified depth will bring the surface to the indicated elevations.

BASE COURSE AND BITUMINOUS PAVING

01 Provide base course and bituminous pavement as shown on Civil Engineering Drawings.

INSTALLATION

01 All equipment and methods of installation shall comply with MDOT Section 4.0 Specifications.

02 Placing equipment shall be self-propelled paver capable of spreading the bituminous mixture true to line and grade at a uniform thickness.

03 Rolling equipment shall consist of three-wheeled type and tandem type steel wheel rollers and pneumatic-tired rollers.

04 Mixing and placing of hot bituminous mixture shall be performed only when weather conditions are as limited by MDOT Table 4.00-2.

05 Begin rolling of mixture as soon after placing as the mixture will support the roller without undue displacement or hair cracking. Rolling shall proceed until all roller marks are eliminated and no further compression is possible. Keep roller moist to prevent adhesion.

06 In places inaccessible to rollers obtain required compaction with hot hand tampers and hand rollers.

07 Binder and wearing course shall be compacted to a maximum of 96% of the maximum bulk density of the material.

08 Provide 0.05 gallons per square yard of bond coat between lifts.

09 The finished bituminous pavement surface shall be smooth and even, free of voids, and true to the lines, grades and cross sections indicated on the drawings. When tested with a ten foot straight edge parallel to the center line of the surfaced area the finished surface shall not show
a deviation in excess of 1/4 inch. Skin patching is not permitted. Correct low areas and depressions, or deficient course thicknesses, by removal and replacement of the deficient pavement.

10 After final rolling of pavement, barricade pavement to prevent vehicular traffic until pavement is sufficiently cooled to accept traffic.

GUARANTEE

01 Asphalt paving Contractor shall provide a two (2) year written guarantee, covering defects in workmanship and material.
SECTION 02L

REMOVAL AND DEMOLITION

SCOPE OF WORK

01 All work under this heading shall meet requirements of Division 1 and Instructions to Bidders and include everything necessary and incidental to completion of removal and demolition work.

02 Work Included:
   a. Removal and demolition of existing pavements and foundations walls as detailed on the Civil Engineering and Architectural Site Plan.
   b. This Contractor shall obtain and pay for all required permits and all bonding covering his work.

03 Certificates of insurance policies shall be filed with the Owner and the Architect prior to commencing work.

INSPECTIONS

01 Contractor and Owners representatives shall meet prior to beginning of work to inspect the site and establish limits of the work.

02 This contractor shall call for any inspections of the demolition work required by the local authority.

EXISTING SERVICES

01 Protect and maintain all active conduit, sewers, pipes, overhead and underground wires existing on the site.

TEMPORARY PROTECTION

01 Provide, erect and maintain all necessary fences, planking, bracing, shoring, sheath piling, warning signs to protect the existing site and all persons using same or public sidewalks adjacent to the site.

02 Remove all protections when work is completed and hazardous conditions are no longer present.

03 Provide temporary weather protection and building security of existing space during the removal of existing enclosures and coordinate with other trades the timing of the removal and their ability to continue temporary protection.

REMOVAL AND DEMOLITION

01 Perform all removal and demolition work as outlined on the drawings. See Civil Engineering and Architectural Site Plan Drawings.

02 Materials that may become hazardous during demolition shall be removed and disposed of properly prior to the commencement of any demolition.

03 A list of work includes the following, but is not all inclusive:
   a. Existing asphalt pavement as shown.
   b. Existing Concrete pad and rat walls as shown.

04 The following items shall be salvaged and turned over to Owner for his future use:
a. None.

**RECYCLED MATERIAL**

01 Removal and Demolition Contractor shall employ any offered recycling service available for the various materials being removed from the building.

02 Following are materials that are project specific:

a. Asphalt pavement.
b. Concrete.

**WORKMANSHIP**

01 All work shall be executed in an orderly and careful manner, with due consideration for adjacent property holders.

a. Driveways and parking areas shall be kept clear and swept daily.
b. Rubbish and debris shall be removed promptly and not allowed to accumulate.
c. Sprinkle rubbish and debris with water as required to control dust.

**PROHIBITED ACTIVITIES**

01 Prohibited activities are as follows:

a. Creation of "Attractive Nuisances".
b. Storing, unprotected or overnight, of hazardous or dangerous materials.
c. Burning of any nature.
d. Burying of rubble on site.
DIVISION 03  CONCRETE

GENERAL

01 All concrete work shall be detailed and constructed in accordance with the latest specifications of the American Concrete Institute and Concrete Reinforcing Steel Institute and all materials shall conform to current standard specifications of the ASTM as may apply to the work and respective materials.

SECTION 03A  CONCRETE

SCOPE OF WORK

01 All work under this heading shall meet requirements of Division 1 and Instructions to Bidders and include everything necessary and incidental to completion of items outlined.

02 Work Included:
   a. Concrete Pavement, Slabs on grade, reinforcing mesh.

05 Items furnished by other divisions for installation by this Division:
   a. By Division 16 - Anchor Bolts for light fixtures

06 Work by Others:
   a. By Division 02- Preparation of sub-grade to receive Pavement.

MATERIALS

01 Cement: Shall be Portland Cement (ASTM C-150 Type 1) of American Manufacturer.

02 Aggregate: All aggregate shall conform to ASTM C-33 Specifications for Concrete Aggregate. Maximum aggregate size shall not exceed 3/4 of clear space between reinforcing bars or 1/5 minimum thickness of formed slabs.
   a. Pea Gravel shall be clean washed river-run gravel, 3/8" size and conform to ASTM C33.

03 Combined Aggregate: Shall be of such composition as to permit between 30% and 50% to pass through a No. 4 sieve.

04 Water: Shall be suitable for drinking purposes.

05 Sand: Shall meet MDOT specification for Grade 2 porous fill containing less than 5% of particles passing a No. 200 screen.

06 Reinforcing Steel: Shall be ASTM A-615 specifications for deformed billet steel for concrete reinforcement (Fy=60,000 psi).

07 Reinforcing Mats: Shall be ASTM A-1064 specification for wire mesh having a rigid connection of intersecting wires. 6x12 W8.5 & W4 96" (+0,+0) x 15'0" (6,6) @ 93# per sheet, as manufactured by Engineered Wire Products, Inc.
08 **Concrete:** Limits for proportions of concrete made with average materials are indicated in the following table. Trial mixtures shall establish exact proportions for all materials to be used within the limits of the table.

<table>
<thead>
<tr>
<th>CLASS OF CONCRETE</th>
<th>MINIMUM 28 DAY STRENGTH (PSI)</th>
<th>MAX. W/C RATIO LBS. HOH/LB. CEMENT</th>
<th>NOM. AGGR. SIZE</th>
<th>MINIMUM CEMENT CONTENT PER CUBIC YARDS* WEIGHT</th>
<th>SLUMP</th>
<th>AIR CONT. %</th>
</tr>
</thead>
<tbody>
<tr>
<td>STRUCTURAL CLASS 5</td>
<td>4500</td>
<td>0.49</td>
<td>3/4&quot; 1 -1/2&quot;</td>
<td>Determined by trial mix</td>
<td>4&quot;</td>
<td>2</td>
</tr>
<tr>
<td>STRUCTURAL CLASS 4</td>
<td>4500</td>
<td>0.54</td>
<td>3/4&quot; 1 -1/2&quot;</td>
<td>6-1/4 5-3/4</td>
<td>588</td>
<td>541</td>
</tr>
<tr>
<td>STANDARD EXPOSED CONCRETE</td>
<td>4500</td>
<td>0.45</td>
<td>3/4&quot; 1-1/2&quot;</td>
<td>6-1/4 5-3/4</td>
<td>611</td>
<td>541</td>
</tr>
<tr>
<td>STANDARD FLOOR CONCRETE**</td>
<td>4000</td>
<td>0.45</td>
<td>3/4&quot; 1-1/2&quot;</td>
<td>6 5-1/2</td>
<td>564</td>
<td>517</td>
</tr>
<tr>
<td>STANDARD FOUNDATION CONCRETE</td>
<td>3000</td>
<td>0.60</td>
<td>3/4&quot; 1-1/2&quot;</td>
<td>5-1/2 5-1/2</td>
<td>517</td>
<td>494</td>
</tr>
<tr>
<td>STANDARD CONCRETE TOPPING</td>
<td>3500</td>
<td>0.60</td>
<td>3/8&quot; pea gravel</td>
<td>6 564</td>
<td>4&quot;</td>
<td>2</td>
</tr>
</tbody>
</table>

* Cement content may be reduced by 1/2 bag per cu. yd. for un-reinforced mass concrete.

** Omit air entraining agent in hardened slabs.

Additional design mixes by the supplier that meet the above performance requirements are permitted pending proper documentation and submission for Architect's approval prior to bid due date.

09 **Admixtures:** For air entraining and water-reducing shall be as manufactured by W.R. Grace Co. or Master Builders, and employed in strict accordance with the manufacturers recommendations (ASTM C260 & ASTM C494, Type A). Air content in air entrained concrete delivered shall be +/- 1-1/2 percent. Non-corrosive, non-chloride accelerator shall be "Accelguard" by The Euclid Chemical Co. (ASTM C494, Type C or E). No admixtures containing chloride ions are permitted. No fly ash shall be permitted in exterior concrete.

10 **Reinforcing Fibers:**

a. **Synthetic Fibers:** Shall be 100% virgin nylon (polyamides) fibers from Axim Italcementi Group, PO Box 234, 8282 Middlebranch Road, Middlebranch, Ohio, 44652. Fibrosol N fibers shall be used in all concrete where indicated under “Material Location” in the specifications. The fibers shall be used in strict compliance with the manufacturer’s recommendations as to type and amount and/or as indicated on drawings. The fiber manufacturer or approved distributor shall provide the services of a qualified employee for a pre-job meeting and initial job start up. Only fibers designed and manufactured specifically for use in concrete from 100% virgin nylon (polyamides) and so certified by the manufacturer shall be acceptable.

b. **Steel Fibers:** Shall be ASTM A820 Type 1 cold drawn wire fibers from SI Corporation, 4019 Industry Drive, Chattanooga, Tennessee 37416. Novocon 1050HE fibers shall be used in all concrete locations as specified within the contract documents. The fibers shall
be used in strict accordance with the manufacturer’s recommendations as to type and amount and/or as indicated on drawings. The fiber manufacturer or approved distributor shall provide the services of a qualified employee for a pre-job meeting and initial job start up. Only steel fibers designed and manufactured specifically for use in concrete from ASTM A820 Type 1 cold drawn wire and so certified by the manufacturer shall be acceptable.

c. Accepted Alternate Manufacture: Contractor may submit, to the architect for review, alternates for potential acceptance as an equal product.

11 Expansion Joint Material: W. R. Meadows fiber or ceramar ½” or equivalent conforming to ASTM D-1752 for interior work and ASTM D1751 for exterior work. Provide “Snap-Cap” expansion joint cap.

12 Curing Compound: ChemRex “Masterkure N-Seal VOC” or Sonneborn “Kure-N-Seal, Euclid Chemical “Diamond Clear VOX” or Dayton Superior “Safe Cure & Seal” (J-18).

13 Hardener: ChemRex “Lapidolith”. Hardener at Pathway Addition to be installed by Floor Finishing Contractor

14 Non-Shrink Grout: ChemRex "Masterflow 928" or "Sonogrupt" 10K, grout.

15 Perimeter Insulation: Shall be Dow Styrofoam "Scoreboard" extruded polystyrene foam insulation or U.S.I. "FoamulaR", 2” x 24”.

16 Vapor Barrier: .006 .010 polyethylene film

MATERIAL LOCATIONS

01 Sand: As shown in pavement details.

02 Reinforcing Steel: Not Used.

03 Reinforcing Mats: Concrete pavement.

04 Standard Exposed Concrete: Concrete pavement.

05 Standard Floor Concrete: Not Used.

06 Standard Foundation Concrete: Not Used.

07 Concrete Engineered Reinforcing Fibers: Not Used.

08 Expansion Joint Material: At all slabs abutting concrete or masonry walls.

09 Curing Compound: Concrete pavement.

10 Hardener: Not Used.

11 Non-Shrink Grout: Not Used.

12 Perimeter Insulation: Not Used.

13 Vapor Barrier: Not Used.
REINFORCING STEEL AND MATS

01 Provide shop drawings for all reinforcing steel.
02 On site storage of reinforcing steel shall provide isolation from the ground and protection from the weather.
03 All reinforcement bar and mats shall be free of paint, dirt, oil and excessive rust.
04 Place reinforcement as shown on the Drawings in a secure manner to prohibit displacing during the pouring of concrete. Bars shall be securely wired together at their intersections.
05 Mat reinforcement shall be carefully and frequently hooked during the placement of floor slabs on grade to assure its placement as shown on the details.
06 Provide OSHA approved caps for all exposed ends of reinforcing steel extending beyond completed pours and awaiting future embedment.

CONCRETE

01 Concrete shall be transit-mixed from a plant approved by the Architect, and shall conform to ASTM Designation C-94/94M.
02 The transit-mix plant shall have in operation satisfactory measuring devices to assure accurate and uniform proportions of the materials as specified. Verification of this information shall accompany each individual delivery to the job site. Information shall include material quantities of the mix: moisture contents; admixes, (if any); size of the load and time of day and date when truck was loaded.
03 Mixing trucks shall be of an approved design to provide separate container for holding water. Mixing water shall be added ONLY at the proper time required to provide necessary consistency and not to exceed maximum slump as specified.

DEPOSITING CONCRETE

01 All formwork shall be cleaned, wetted down or oiled (in freezing weather) before depositing concrete. When placing concrete on grade, fill shall be smooth and firmly tamped to proper elevations. See Division 02 for compaction requirements.
03 Concrete shall be conveyed from mixer to the place of deposit in buggies, carts or conveyers as soon as possible after mixing. Do not use troughs. Handling of concrete shall be done in such a manner as to prevent free fall of more than three (3) feet. Always place concrete into face of previously placed material. When placing into deep forms, discharge concrete through hose or hopper directly to the level of the material being placed so as to prevent free fall.
04 All pours shall be continuous, keeping concrete plastic until final levels are attained. Take all necessary precautions to prevent voids and surface defects. Tamp or vibrate as conditions warrant. Penetrate previously placed layers at regular intervals when vibrating. Consult with Architect on location of all construction joints required.

SETTING ANCHOR BOLTS

April 22, 2019
01 Anchor bolts shall be set according to approved electrical fixture submittal drawings. Anchor bolts shall be accurately located and leveled employing services of a qualified surveyor.

**CONCRETE PAVEMENT**

01 Provide and install concrete pavement as shown on Civil Engineering and Architectural Drawings

02 Pavement shall be placed on compacted base. Provide expansion joints as shown on drawings.

**CONCRETE TESTING**

01 General Contractor shall arrange and pay for an approved independent testing laboratory to make test cylinders of all poured-in-place concrete. Test cylinders and laboratory tests shall be made in accord with ACI Standards and ASTM Specifications. Provide a minimum of one test (consisting of three cylinders per each test) for each 50 cubic yards placed, but not less than one test per day. One cylinder shall be broken at 7 days; two at 28 days. Cylinders shall be properly cured by the laboratory making the tests.

**CURING AND WEATHER PROTECTION**

01 Protect concrete at all times, keeping surfaces damp for at least seven days in warm weather, and keep covered as long as required in freezing weather.

02 Cold weather concreting work shall be performed in accordance with ACI 306R and 306.1 at the following minimum temperatures:
   a.  Air Temperature 30-45 degrees F: Concrete temperature 60 degrees F minimum.
   b.  Air Temperature 0-30 degrees F: Concrete temperature 65 degrees F minimum.
   c.  Air Temperature below 0 degrees F: Concrete temperature 70 degrees F minimum.
   d.  Maintain concrete temperature at not less than 50 degrees for at least 7 days.

03 Warm weather concreting shall be performed in accordance with ACI 305R with the maximum allowable temperatures of 90 degrees.

04 The method of maintaining the proper temperature during hardening shall be subject to prior approval. Obtain Architects approval of any admixtures employed to facilitate cold and hot weather concreting.

**POINTING AND CLEANING**

01 Where walls, slab edges and concrete other than specified to be etched is exposed to view, fill all holes, smooth all irregularities and point smooth with mortar. Concrete shall be steel brushed clean and left in smooth even color.

**GUARANTEE**

01 This contractor shall provide a written guarantee all work under this contract shall be free of any defects in material or workmanship, not due to ordinary wear or improper use, which may develop within one (1) year from the date of acceptance of the work.