PUBLIC IMPROVEMENT REQUEST FOR PROPOSAL

RFP# 24-08

S. Seventh St. and Greenview Dr. Improvements

City of Ann Arbor
Public Services / Engineering

Due Date: February 27, 2024, by 11:00AM (local time)

Issued By:

City of Ann Arbor
Procurement Unit
301 E. Huron Street
Ann Arbor, MI 48104

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SECTION I - GENERAL INFORMATION

A. OBJECTIVE

The purpose of this Request for Proposal (RFP) is to select a firm to provide construction services for the S. Seventh St. and Greenview Dr. Improvements Project.

B. BID SECURITY

Each bid must be accompanied by a certified check or Bid Bond by a surety licensed and authorized to do business within the State of Michigan, in the amount of 5% of the total of the bid price.

Proposals that fail to provide a bid security upon proposal opening will be deemed non-responsive and will not be considered for award.

C. QUESTIONS AND CLARIFICATIONS / DESIGNATED CITY CONTACTS

All questions regarding this Request for Proposal (RFP) shall be submitted via e-mail. Questions will be accepted and answered in accordance with the terms and conditions of this RFP.

All questions shall be submitted on or before February 12, 2024 at 12:00 p.m. (local time), and should be addressed as follows:

Scope of Work/Proposal Content questions shall be e-mailed to Tracy Anderson, PE, Project Manager – Tanderson@a2gov.org

RFP Process and Compliance questions shall be e-mailed to Colin Spencer, Buyer - CSpencer@a2gov.org

Should any prospective bidder be in doubt as to the true meaning of any portion of this RFP, or should the prospective bidder find any ambiguity, inconsistency, or omission therein, the prospective bidder shall make a written request for an official interpretation or correction by the due date for questions above.

All interpretations, corrections, or additions to this RFP will be made only as an official addendum that will be posted to a2gov.org and MITN.info and it shall be the prospective bidder's responsibility to ensure they have received all addenda before submitting a proposal. Any addendum issued by the City shall become part of the RFP, and must be incorporated in the proposal where applicable.

D. PRE-PROPOSAL MEETING

A non-mandatory, virtual pre-proposal conference for this project will be held on **February 7, 2024, at 10:00 a.m.** via Microsoft Teams. Contact the project manager, Tracy Anderson, at TAnderson@a2gov.org by February 7, 2024, at 9:00 a.m. to receive an email invite to the meeting.

Attendance at this conference is highly recommended. Administrative and technical questions regarding this project will be answered at this time. The pre-proposal conference is for information only. Any answers furnished will not be official until verified in writing by the Financial Service Area, Procurement Unit. Answers that change or substantially clarify the proposal will be affirmed in an addendum.

E. PROPOSAL FORMAT

To be considered, each firm must submit a response to this RFP using the format provided in Section III. No other distribution of proposals is to be made by the prospective bidder. An official authorized to bind the bidder to its provisions must sign the proposal. Each proposal must remain valid for at least one hundred and twenty (120) days from the due date of this RFP.

Proposals should be prepared simply and economically providing a straightforward, concise description of the bidder's ability to meet the requirements of the RFP. No erasures are permitted. Mistakes may be crossed out and corrected and must be initialed in ink by the person signing the proposal.

F. SELECTION CRITERIA

Responses to this RFP will be evaluated using a point system as shown in Section III. A selection committee comprised primarily of staff from the City will complete the evaluation.

If interviews are desired by the City, the selected firms will be given the opportunity to discuss their proposal, qualifications, past experience, and their fee proposal in more detail. The City further reserves the right to interview the key personnel assigned by the selected bidder to this project.

All proposals submitted may be subject to clarifications and further negotiation. All agreements resulting from negotiations that differ from what is represented within the RFP or in the proposal response shall be documented and included as part of the final contract.

G. SEALED PROPOSAL SUBMISSION

All proposals are due and must be delivered to the City on or before February 27, 2024, by 11:00a.m. Proposals submitted late or via oral, telephonic, telegraphic, electronic mail or facsimile **will not** be considered or accepted.

Each respondent should submit in a sealed envelope:

- **one (1) original proposal**
- **one (1) additional proposal copy**
- **one USB/flash drive that contains:**
  - **one (1) digital copy of the proposal preferably as one file in PDF format**
  - **one (1) digital copy of E. Schedule of Pricing/Cost preferably as one file in Excel format. A blank Schedule of Pricing/Cost Excel spreadsheet for this project can be provided by the project manager for your use.**

Proposals submitted should be clearly marked: **"RFP No. 24-08 – S. Seventh St. and Greenview Dr. Improvements"** and list the bidder's name and address.

Proposals must be addressed and delivered to:
City of Ann Arbor
c/o Customer Service
301 East Huron Street
Ann Arbor, MI 48107

All proposals received on or before the due date will be publicly opened and recorded on the due date. No immediate decisions will be rendered.

Hand delivered proposals may be dropped off in the Purchasing drop box located in the Ann Street (north) vestibule/entrance of City Hall which is open to the public Monday through Friday from 8am to 5pm (except holidays). The City will not be liable to any prospective bidder for any unforeseen circumstances, delivery, or postal delays. Postmarking on the due date will not substitute for receipt of the proposal.

Bidders are responsible for submission of their proposal. Additional time will not be granted to a single prospective bidder. However, additional time may be granted to all prospective bidders at the discretion of the City.

A proposal may be disqualified if the following required forms are not included with the proposal:

- **Attachment D - Prevailing Wage Declaration of Compliance**
- **Attachment E - Living Wage Declaration of Compliance**
- **Attachment G - Vendor Conflict of Interest Disclosure Form**

- **Attachment H - Non-Discrimination Declaration of Compliance**

Proposals that fail to provide these forms listed above upon proposal opening may be deemed non-responsive and may not be considered for award.

H. DISCLOSURES

Under the Freedom of Information Act (Public Act 442), the City is obligated to permit review of its files, if requested by others. All information in a proposal is subject to disclosure under this provision. This act also provides for a complete disclosure of contracts and attachments thereto.

I. TYPE OF CONTRACT

A sample of the Construction Agreement is included as Attachment A. Those who wish to submit a proposal to the City are required to review this sample agreement carefully. **The City will not entertain changes to its Construction Agreement.**

For all construction work, the respondent must further adhere to the City of Ann Arbor General Conditions. The General Conditions are included herein. Retainage will be held as necessary based on individual tasks and not on the total contract value. The Contractor shall provide the required bonds included in the Contract Documents for the duration of the Contract.

The City reserves the right to award the total proposal, to reject any or all proposals in whole or in part, and to waive any informality or technical defects if, in the City's sole judgment, the best interests of the City will be so served.

This RFP and the selected bidder's response thereto, shall constitute the basis of the scope of services in the contract by reference.

J. NONDISCRIMINATION

All bidders proposing to do business with the City shall satisfy the contract compliance administrative policy adopted by the City Administrator in accordance with the Section 9:158 of the Ann Arbor City Code. Breach of the obligation not to discriminate as outlined in Attachment G shall be a material breach of the contract. Contractors are required to post a copy of Ann Arbor's Non-Discrimination Ordinance attached at all work locations where its employees provide services under a contract with the City.

K. WAGE REQUIREMENTS

The Attachments provided herein outline the requirements for payment of prevailing wages or of a "living wage" to employees providing service to the City under this contract. The successful bidder must comply with all applicable requirements and provide documentary proof of compliance when requested.

Pursuant to Resolution R-16-469 all public improvement contractors are subject to prevailing wage and will be required to provide to the City payroll records sufficient to demonstrate compliance with the prevailing wage requirements. Use of Michigan Department of Transportation Prevailing Wage Forms (sample attached hereto) or a City-approved equivalent will be required along with wage rate interviews.

For laborers whose wage level are subject to federal, state and/or local prevailing wage law the appropriate Davis-Bacon wage rate classification is identified based upon the work including within this contract. **The wage determination(s) current on the date 10 days before proposals are due shall apply to this contract.** The U.S. Department of Labor (DOL) has provided explanations to assist with classification in the following resource link: www.wdol.gov.

For the purposes of this RFP the Construction Type of Heavy and Highway will apply.

L. CONFLICT OF INTEREST DISCLOSURE

The City of Ann Arbor Purchasing Policy requires that the consultant complete a Conflict of Interest Disclosure form. A contract may not be awarded to the selected bidder unless and until the Procurement Unit and the City Administrator have reviewed the Disclosure form and determined that no conflict exists under applicable federal, state, or local law or administrative regulation. Not every relationship or situation disclosed on the Disclosure Form may be a disqualifying conflict. Depending on applicable law and regulations, some contracts may awarded on the recommendation of the City Administrator after full disclosure, where such action is allowed by law, if demonstrated competitive pricing exists and/or it is determined the award is in the best interest of the City. A copy of the Conflict of Interest Disclosure Form is attached.

M. COST LIABILITY

The City of Ann Arbor assumes no responsibility or liability for costs incurred by the bidder prior to the execution of an Agreement. The liability of the City is limited to the terms and conditions outlined in the Agreement. By submitting a proposal, bidder agrees to bear all costs incurred or related to the preparation, submission, and selection process for the proposal.

N. DEBARMENT

Submission of a proposal in response to this RFP is certification that the Respondent is not currently debarred, suspended, proposed for debarment, and declared ineligible or voluntarily excluded from participation in this transaction by any State or Federal departments or agency. Submission is also agreement that the City will be notified of any changes in this status.

O. PROPOSAL PROTEST

All proposal protests must be in writing and filed with the Purchasing Manager within five (5) business days of any notices of intent, including, but not exclusively, divisions on prequalification of bidders, shortlisting of bidders, or a notice of intent to award. Only bidders who responded to the solicitation may file a bid protest. The bidder must clearly state the reasons for the protest. If any bidder contacts a City Service Area/Unit and indicates a desire to protest an award, the Service Area/Unit shall refer the bidder to the Purchasing Manager. The Purchasing Manager will provide the bidder with the appropriate instructions for filing the protest. The protest shall be reviewed by the City Administrator or designee, whose decision shall be final.

Any inquiries or requests regarding this procurement should be only submitted in writing to the Designated City Contacts provided herein. Attempts by the bidder to initiate contact with anyone other than the Designated City Contacts provided herein that the bidder believes can influence the procurement decision, e.g., Elected Officials, City Administrator, Selection Committee Members, Appointed Committee Members, etc., may lead to immediate elimination from further consideration.

P. SCHEDULE

The following is the schedule for this RFP process.

Activity/Event	**Anticipated Date**
Pre-Proposal Conference	Feb. 7, 2024, 10:00 a.m. (Local Time)
Written Question Deadline	Feb. 12, 2024, 12:00 p.m. (Local Time)
Addenda Published (if needed)	Week of Feb. 12, 2024
Proposal Due Date	Feb. 27, 2024, 11:00 a.m. (Local Time)
Selection/Negotiations	February/March 2024
Expected City Council Authorizations	April 15, 2024

The above schedule is for information purposes only and is subject to change at the City's discretion.

Q. IRS FORM W-9

The selected bidder will be required to provide the City of Ann Arbor an IRS form W-9.

R. RESERVATION OF RIGHTS

1. The City reserves the right in its sole and absolute discretion to accept or reject any or all proposals, or alternative proposals, in whole or in part, with or without cause.

2. The City reserves the right to waive, or not waive, informalities or irregularities in terms or conditions of any proposal if determined by the City to be in its best interest.
3. The City reserves the right to request additional information from any or all bidders.
4. The City reserves the right to reject any proposal that it determines to be unresponsive and deficient in any of the information requested within RFP.
5. The City reserves the right to determine whether the scope of the project will be entirely as described in the RFP, a portion of the scope, or a revised scope be implemented.
6. The City reserves the right to select one or more contractors or service providers to perform services.
7. The City reserves the right to retain all proposals submitted and to use any ideas in a proposal regardless of whether that proposal is selected. Submission of a proposal indicates acceptance by the firm of the conditions contained in this RFP, unless clearly and specifically noted in the proposal submitted.
8. The City reserves the right to disqualify proposals that fail to respond to any requirements outlined in the RFP, or failure to enclose copies of the required documents outlined within the RFP.

S. IDLEFREE ORDINANCE

The City of Ann Arbor adopted an idling reduction Ordinance that went into effect July 1, 2017. The full text of the ordinance (including exemptions) can be found at: www.a2gov.org/idlefree.

Under the ordinance, No Operator of a Commercial Vehicle shall cause or permit the Commercial Vehicle to Idle:

(a) For any period of time while the Commercial Vehicle is unoccupied; or

(b) For more than 5 minutes in any 60-minute period while the Commercial Vehicle is occupied.

In addition, generators and other internal combustion engines are covered

(1) Excluding Motor Vehicle engines, no internal combustion engine shall be operated except when it is providing power or electrical energy to equipment or a tool that is actively in use.

T. ENVIRONMENTAL COMMITMENT

The City of Ann Arbor recognizes its responsibility to minimize negative impacts on human health and the environment while supporting a vibrant community and economy. The City further recognizes that the products and services the City buys have inherent environmental and economic impacts and that the City should make procurement decisions that embody, promote, and encourage the City's commitment to the environment.

The City encourages potential vendors to bring forward emerging and progressive products and services that are best suited to the City's environmental principles.

U. MAJOR SUBCONTRACTORS

The Bidder shall identify each major subcontractor it expects to engage for this Contract if the work to be subcontracted is 15% or more of the bid sum or over $50,000, whichever is less. The Bidder also shall identify the work to be subcontracted to each major subcontractor. The Bidder shall not change or replace a subcontractor without approval by the City.

N. LIQUIDATED DAMAGES

A liquidated damages clause, as given on page C-2, Article III of the Contract, provides that the Contractor shall pay the City as liquidated damages, and not as a penalty, a sum certain per day for each and every day that the Contractor may be in default of completion of the specified work, within the time(s) stated in the Contract, or written extensions.

Liquidated damages clauses, as given in the General Conditions, provide further that the City shall be entitled to impose and recover liquidated damages for breach of the obligations under Chapter 112 of the City Code.

The liquidated damages are for the non-quantifiable aspects of any of the previously identified events and do not cover actual damages that can be shown or quantified nor are they intended to preclude recovery of actual damages in addition to the recovery of liquidated damages.

SECTION II - SCOPE OF WORK

Please see the plan set for more details.

SECTION III - MINIMUM INFORMATION REQUIRED

PROPOSAL FORMAT

The following describes the elements that should be included in each of the proposal sections and the weighted point system that will be used for evaluation of the proposals.

Bidders should organize Proposals into the following Sections:

A. Qualifications, Experience and Accountability
B. Workplace Safety
C. Workforce Development
D. Social Equity and Sustainability
E. Schedule of Pricing/Cost
F. Authorized Negotiator
G. Attachments

Bidders are strongly encouraged to provided details for all of the information requested below within initial proposals. Backup documentation may be requested at the sole discretion of the City to validate all of the responses provided herein by bidders. False statements by bidders to any of the criteria provided herein will result in the proposal being considered non-responsive and will not be considered for award.

Pursuant to Sec 1:325 of the City Code which sets forth requirements for evaluating public improvement bids, Bidders should submit the following:

A. Qualifications, Experience and Accountability - 20 Points

1. Qualifications and experience of the bidder and of key persons, management, and supervisory personnel to be assigned by the bidder.

2. References from individuals or entities the bidder has worked for within the last five (5) years including information regarding records of performance and job site cooperation.

3. Evidence of any quality control program used by the bidder and the results of any such program on the bidder's previous projects.

4. A statement from the bidder as to any major subcontractors it expects to engage including the name, work, and amount.

B. Workplace Safety – 20 Points

1. Provide a copy of the bidder's safety program, and evidence of a safety-training program for employees addressing potential hazards of the proposed job site. Bidder must identify a designated qualified safety representative responsible for bidder's safety program who serves as a contact for safety related matters.

2. Provide the bidder's Experience Modification Rating ("EMR") for the last three consecutive years. Preference within this criterion will be given to an EMR of 1.0 or less based on a three-year average.

3. Evidence that all craft labor that will be employed by the bidder for the project has, or will have prior to project commencement, completed at least an authorized 10-hour OSHA Construction Safety Course.

4. For the last three years provide a copy of any documented violations and the bidder's corrective actions as a result of inspections conducted by the Michigan Occupational Safety & Health Administration (MIOSHA), U.S. Department of Labor – Occupational Safety and Health Administration (OSHA), or any other applicable safety agency.

C. Workforce Development – 20 Points

1. Documentation as to bidder's pay rates, health insurance, pension or other retirement benefits, paid leave, or other fringe benefits to its employees.

2.. Documentation that the bidder participates in a Registered Apprenticeship Program that is registered with the United States Department of Labor Office of Apprenticeship or by a State Apprenticeship Agency recognized by the USDOL Office of Apprenticeship. USDOL apprenticeship agreements shall be disclosed to the City in the solicitation response.

3. Bidders shall disclose the number of non-craft employees who will work on the project on a 1099 basis, and the bidders shall be awarded points based on their relative reliance on 1099 work arrangements with more points assigned to companies with fewer 1099 arrangements. Bidders will acknowledge that the City may ask them to produce payroll records at points during the project to verify compliance with this section.

D. Social Equity and Sustainability – 20 Points

1. A statement from the bidder as to what percentage of its workforce resides in the City of Ann Arbor and in Washtenaw County, Michigan. The City will consider in

evaluating which bids best serve its interests, the extent to which responsible and qualified bidders employ individuals in either the city of the county. Washtenaw County jurisdiction is prioritized for evaluation purposes for this solicitation.

2. Evidence of Equal Employment Opportunity Programs for minorities, women, veterans, returning citizens, and small businesses.

3. Evidence that the bidder is an equal opportunity employer and does not discriminate on the basis of race, sex, pregnancy, age, religion, national origin, marital status, sexual orientation, gender identity or expression, height, weight, or disability.

4. The bidder's proposed use of sustainable products, technologies, or practices for the project, which reduce the impact on human health and the environment, including raw materials acquisition, production, manufacturing, packaging, distribution, reuse, operation, maintenance, and waste management.

5. The bidder's environmental record, including findings of violations and penalties imposed by government agencies.

E. Schedule of Pricing/Cost – 20 Points

Company:

Project: S Seventh and Greenview Improvements
File #: 2020-031 **RFP#: 24-08**

ITEM NUMBER	DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT PRICE	TOTAL PRICE
01000.00	**General**				
01000.00	General Conditions, Max. $315,000	LS	1	$	$
01001.00	Project Supervision, Max. $160,000	LS	1	$	$
01002.00	Project Clean-Up and Restoration	LS	1	$	$
01003.00	Digital Audio Visual Coverage	LS	1	$	$
01021.00	Erosion Control, Inlet Protection, Fabric Drop	Ea	40	$	$
01030.00	Tree Protection Fence	Ft	2,500	$	$
01040.00	Minor Traffic Control, Max. $80,000	LS	1	$	$
01041.00	Traffic Regulator Control	LS	1	$	$
01050.00	Sign, Type B, Temp, Prismatic, Furn & Oper	Sft	873	$	$
01051.00	Sign, Type B, Temp, Prismatic, Special, Furn & Oper	Sft	101	$	$
01052.00	Temporary "No Parking" Sign	Ea	150	$	$
01070.00	Sign, Portable, Changeable Message, Furn & Oper	Ea	6	$	$
01080.00	Plastic Drum, High Intensity, Lighted, Furn & Oper	Ea	225	$	$
01081.00	Channelizer Cone, High Intensity, 42 In., Furn & Oper	Ea	25	$	$
01092.00	Barricade, Type III, High Intensity, Double Sided, Lighted, Furn & Oper	Ea	45	$	$
01100.00	Pedestrian Type II Barricade, Temp, Furn & Oper	Ea	10	$	$
01101.00	Pedestrian Channelizer Device, Furn & Oper	Ea	20	$	$
01102.00	Temporary Pedestrian Ramp, Furn & Oper	Ea	2	$	$
01103.00	Temporary Pedestrian Mat, Furn & Oper	Ft	24	$	$
01124.00	Pavt Mrkg, Wet Reflective, Type R, Tape, Rt Turn Arrow	Ea	2	$	$
01125.00	Pavt Mrkg, Wet Reflective, Type R, Tape, Thru Arrow	Ea	2	$	$
01127.00	Pavt Mrkg, Wet Reflective, Type R, Tape, 6 In., White, Temp	Ft	64	$	$
02000.00	**Removals**				
02000.01	Tree, Rem, 6 In. - 12 In.	Ea	3	$	$
02000.03	Tree, Rem, 20 In. - 29 In.	Ea	1	$	$
02020.00	HMA, Any Thickness, Rem	Syd	25,000	$	$
02030.00	Curb, Gutter, and Curb and Gutter, Any Type, Rem	Ft	9,700	$	$
02040.00	Sidewalk, Sidewalk Ramp, and Driveway Approach, Any Thickness, Rem	Sft	23,300	$	$
03000.00	**Earthwork**				
03001.71	DS_Sidewalk Grading	Syd	2,700	$	$
03001.72	DS_Driveway Grading	Syd	2,000	$	$
03001.73	DS_Roadway Grading, S Seventh St	Syd	7,500	$	$
03001.74	DS_Roadway Grading, S Greenview Dr	Syd	3,800	$	$
03001.75	DS_Roadway Grading, N Greenview Dr	Syd	11,000	$	$
03021.00	Subgrade Undercutting, Type II	Cyd	100	$	$
03022.00	Subgrade Undercutting, Type III	Cyd	200	$	$
03030.01	Exploratory Excavation, SD-TD-1, (0-10' Deep)	Ea	1	$	$
04000.00	**Sanitary Sewer**				
04014.01	6 In., SDR 26 PVC Sanitary Service Lead, SD-TD-2	Ft	100	$	$
04060.00	Sanitary Structure Cover	Ea	24	$	$
04061.00	Sanitary Structure Cover, Adjust	Ea	24	$	$

06000.00	**Storm and Drainage**				
06000.01	12 In., CL IV RCP Storm Sewer, SD-TD-1	Ft	1,816	$	$
06000.03	18 In., CL IV RCP Storm Sewer, SD-TD-1	Ft	115	$	$
06000.05	24 In., CL IV RCP Storm Sewer, SD-TD-1	Ft	290	$	$
06000.07	36 In., CL IV RCP Storm Sewer, SD-TD-1	Ft	100	$	$
06000.09	48 In., CL IV RCP Storm Sewer, SD-TD-1	Ft	1,200	$	$
06050.06	Storm Manhole, 72 In. Dia. , Additional Depth	Ft	6	$	$
06050.71	DS_Storm Manhole, 48 In. Dia. (0-8' deep)	Ea	4	$	$
06050.73	DS_Storm Manhole, 60 In. Dia. (0-8' deep)	Ea	1	$	$
06050.75	DS_Storm Manhole, 72 In. Dia. (0-8' deep)	Ea	6	$	$
06060.71	DS_Storm Inlet-Junction, 36 In. Dia., (0-8' deep)	Ea	1	$	$
06060.73	DS_Storm Inlet-Junction, 48 In. Dia., (0-8' deep)	Ea	4	$	$
06060.77	DS_Storm Inlet-Junction, 72 In. Dia., (0-8' deep)	Ea	6	$	$
06070.02	Storm Single Inlet, 24 In. Dia., Additional Depth	Ft	8.5	$	$
06070.71	DS_Storm Single Inlet, 24 In. Dia., (0-8' deep)	Ea	30	$	$
06080.02	Storm High Capacity Inlet, 48 In. Dia., Additional Depth	Ft	6.5	$	$
06080.71	DS_Storm High Capacity Inlet, 48 In. Dia., (0-8' deep)	Ea	12	$	$
06090.02	Storm Manhole with Weir, 72 In. Dia., Additional Depth	Ft	5.0	$	$
06090.71	DS_Storm Manhole with Weir, 72 In. Dia. (0-8' deep)	Ea	5	$	$
06100.71	DS_Storm Manhole Over Existing ("Doghouse"), 48 In. Dia.	Ea	3	$	$
06100.73	DS_Storm Manhole Over Existing ("Doghouse"), 72 In. Dia.	Ea	1	$	$
06120.03	Storm Sewer Pipe, 12 In. Dia., Rem	Ft	730	$	$
06140.00	Storm Sewer Structure, Rem	Ea	3	$	$
06150.00	Storm Sewer Drop Structure, Rem	Ea	14	$	$
06160.01	Storm Structure Cover	Ea	15	$	$
06160.02	Storm Structure Cover, Adjust	Ea	15	$	$
06182.02	Underdrain, Edge, 6 In.	Ft	1,750	$	$
07000.00	**Water Main**				
07000.02	6 In., PC 350 DIP w/polywrap, SD-TD-1	Ft	60	$	$
07000.03	8 In., PC 350 DIP w/polywrap, SD-TD-1	Ft	4,130	$	$
07000.05	12 In., PC 350 DIP w/polywrap, SD-TD-1	Ft	1,750	$	$
07011.01	8 In. 90° DIP Bend	Ea	8	$	$
07011.02	8 In. 45° DIP Bend	Ea	14	$	$
07011.03	8 In. 22.5° DIP Bend	Ea	11	$	$
07011.04	8 In. 11.25° DIP Bend	Ea	4	$	$
07013.02	12 In. 45° DIP Bend	Ea	2	$	$
07013.04	12 In. 11.25° DIP Bend	Ea	4	$	$
07020.03	8 In. X 6 In. DIP Reducer	Ea	19	$	$
07020.08	12 In. X 6 In. DIP Reducer	Ea	1	$	$
07030.06	8 In. X 8 In. X 8 In. DIP Tee	Ea	14	$	$
07030.13	12 In. X 12 In. X 8 In. DIP Tee	Ea	8	$	$
07030.15	12 In. X 12 In. X 12 In. DIP Tee	Ea	3	$	$
07050.72	DS_Gate Valve in Box, 8 In.	Ea	5	$	$
07050.74	DS_Gate Valve in Box, 12 In.	Ea	4	$	$
07060.72	DS_Gate Valve in Well, 8 In.	Ea	7	$	$
07060.74	DS_Gate Valve in Well, 12 In.	Ea	5	$	$
07080.00	Excavate & Backfill For Water Service Tap and Lead	Ft	1,200	$	$
07100.00	Fire Hydrant Assembly, Complete	Ea	13	$	$
07102.00	Fire Hydrant Assembly, Rem	Ea	9	$	$
07110.01	Sacrificial Anode, 17-pound	Ea	10	$	$
07110.02	Sacrificial Anode, 32-pound	Ea	4	$	$

07120.00	Gate Box, Adjust	Ea	1	$	$
07121.00	Curb Box, Adjust	Ea	1	$	$
07130.01	Temporary Water Main Line Stop, 8 In. or less	Ea	8	$	$
07130.03	Temporary Water Main Line Stop, 12 In.	Ea	2	$	$
07131.00	Temporary Water Main Line Stop, Additional Rental Day	Ea	2	$	$
07141.71	DS_Water Main Pipe, Abandon, Modified, S Seventh St	LS	1	$	$
07141.72	DS_Water Main Pipe, Abandon, Modified, S Greenview Dr	LS	1	$	$
07141.73	DS_Water Main Pipe, Abandon, Modified, N Greenview Dr	LS	1	$	$
07160.02	Gate Valve in Box, 6 In. Dia., Abandon	Ea	7	$	$
07170.02	Gate Valve in Box, 6 In. Dia., Rem	Ea	1	$	$
07180.02	Gate Valve in Well, 6 In. Dia., Abandon	Ea	8	$	$
07180.05	Gate Valve in Well, 12 In. Dia., Abandon	Ea	3	$	$
08000.00	**Streets, Driveways, & Sidewalks**				
08000.00	Subbase, CIP	Cyd	100	$	$
08010.02	Aggregate Base, 6 In., 21AA, CIP	Syd	1,930	$	$
08010.03	Aggregate Base, 8 In., 21AA, CIP	Syd	22,225	$	$
08060.00	Hand Patching	Ton	40	$	$
08070.14	HMA, 4EL	Ton	4,350	$	$
08110.00	Conc, Curb or Curb & Gutter, All Types	Ft	7,800	$	$
08120.01	Conc, Driveway Opening, Type M	Ft	1,900	$	$
08130.01	Conc, Sidewalk, 4 In.	Sft	18,185	$	$
08131.71	DS_Conc, Sidewalk, Drive Approach, or Ramp, 6 In.	Sft	16,250	$	$
08131.72	DS_Conc, Sidewalk, Drive Approach, or Ramp, 8 In.	Sft	1,260	$	$
08150.00	Detectable Warning Surface	Ft	310	$	$
08180.04	Pavt Mrkg, Ovly Cold Plastic, Sharrow Sym	Ea	8	$	$
08200.01	Pavt Mrkg, Polyurea, Bike, Large Sym	Ea	1	$	$
08200.06	Pavt Mrkg, Polyurea, 12 In., Cross Hatching, Yellow	Ft	100	$	$
08200.07	Pavt Mrkg, Polyurea, 12 In., Crosswalk	Ft	1,510	$	$
08200.09	Pavt Mrkg, Polyurea, 24 In., Stop Bar	Ft	256	$	$
08200.12	Pavt Mrkg, Polyurea, 4 In., Yellow	Ft	420	$	$
08200.13	Pavt Mrkg, Polyurea, 6 In., White	Ft	425	$	$
08200.15	Pavt Mrkg, Polyurea, Lt Turn Arrow Sym	Ea	2	$	$
08200.71	DS_Pavt Mrkg, Polyurea, 18 In., White	Ft	200	$	$
08245.70	DS_Pavt Mrkg, Polymer Cement, Green, Bike Lane	Sft	600	$	$
08251.00	Recessing Pavt Mrkg, Longit	Ft	1,040	$	$
08252.00	Recessing Pavt Mrkg, Transv	Sft	2,025	$	$
08300.00	Monument Box, Adjust	Ea	3	$	$
10000.00	**Landscaping**				
10000.01	Tree, Medium, B&B	Ea	5	$	$
10000.02	Tree, Large, B&B	Ea	7	$	$
10050.00	Underground Sprinkling System, Restore	Dlr	4,000	$ 1.00	$ 4,000.00
10060.00	Turf Restoration	Syd	5,760	$	$
	TOTAL BID AMOUNT			**$**	

F. AUTHORIZED NEGOTIATOR / NEGOTIATIBLE ELEMENTS (ALTERNATES)

Include the name, phone number, and e-mail address of persons(s) in your organization authorized to negotiate the agreement with the City.

The proposal price shall include materials and equipment selected from the designated items and manufacturers listed in the bidding documents. This is done to establish uniformity in bidding and to establish standards of quality for the items named.

If the bidder wishes to quote alternate items for consideration by the City, it may do so under this Section. A complete description of the item and the proposed price differential mus be provided. Unless approved at the time of award, substitutions where items are specifically named will be considered only as a negotiated change in Contract Sum.

If the Bidder takes exception to the time stipulated in Article III of the Contract, Time of Completion, page C-2, it is requested to stipulate its proposed time for performance of the work.

Consideration for any proposed alternative items or time may be negotiated at the discretion of the City.

G. ATTACHMENTS

General Declaration, Legal Status of Bidder, Conflict of Interest Form, Living Wage Compliance Form, Prevailing Wage Compliance Form and the Non-Discrimination Form should be completed and returned with the proposal. These elements should be included as attachments to the proposal submission.

PROPOSAL EVALUATION

1. The selection committee will evaluate each proposal by the above-described criteria and point system. The City reserves the right to reject any proposal that it determines to be unresponsive and deficient in any of the information requested for evaluation. A proposal with all the requested information does not guarantee the proposing firm to be a candidate for an interview if interviews are selected to be held by the City. The committee may contact references to verify material submitted by the bidder.

2. The committee then will schedule interviews with the selected firms if necessary. The selected firms will be given the opportunity to discuss in more detail their qualifications, past experience, proposed work plan (if applicable) and pricing.

3. The interview should include the project team members expected to work on the project, but no more than six members total. The interview shall consist of a presentation of up to thirty minutes (or the length provided by the committee) by the

bidder, including the person who will be the project manager on this contract, followed by approximately thirty minutes of questions and answers. Audiovisual aids may be used during the oral interviews. The committee may record the oral interviews.

4. The firms interviewed will then be re-evaluated by the above criteria and adjustments to scoring will be made as appropriate. After evaluation of the proposals, further negotiation with the selected firm may be pursued leading to the award of a contract by City Council, if suitable proposals are received.

The City reserves the right to waive the interview process and evaluate the bidder based on their proposal and pricing schedules alone.

The City will determine whether the final scope of the project to be negotiated will be entirely as described in this RFP, a portion of the scope, or a revised scope.

Work to be done under this contract is generally described through the detailed specifications and must be completed fully in accordance with the contract documents.

Any proposal that does not conform fully to these instructions may be rejected.

PREPARATION OF PROPOSALS

Proposals should have no plastic bindings but will not be rejected as non-responsive for being bound. Staples or binder clips are acceptable. Proposals should be printed double sided on recycled paper.

Each person signing the proposal certifies that they are a person in the bidder's firm/organization responsible for the decisions regarding the fees being offered in the Proposal and has not and will not participate in any action contrary to the terms of this provision.

ADDENDA

If it becomes necessary to revise any part of the RFP, notice of the addendum will be posted to Michigan Inter-governmental Trade Network (MITN) www.mitn.info and/or the City of Ann Arbor web site www.A2gov.org for all parties to download.

Each bidder should acknowledge in its proposal all addenda it has received on the General Declarations form provided in the Attachments section herein. The failure of a bidder to receive or acknowledge receipt of any addenda shall not relieve the bidder of the responsibility for complying with the terms thereof. The City will not be bound by oral responses to inquiries or written responses other than official written addenda.

SECTION IV - ATTACHMENTS

Attachment A – Sample Standard Contract

Attachment B – General Declarations

Attachment C - Legal Status of Bidder

Attachment D – Prevailing Wage Declaration of Compliance Form

Attachment E – Living Wage Declaration of Compliance Form

Attachment F – Living Wage Ordinance Poster

Attachment G – Vendor Conflict of Interest Disclosure Form

Attachment H – Non-Discrimination Ordinance Declaration of Compliance Form

Attachment I – Non-Discrimination Ordinance Poster

Sample Certified Payroll Report Template

ATTACHMENT A
SAMPLE STANDARD CONTRACT

If a contract is awarded, the selected contractor will be required to adhere to a set of general contract provisions which will become a part of any formal agreement. These provisions are general principles which apply to all contractors of service to the City of Ann Arbor such as the following:

Administrative Use Only
Contract Date: _____

CONTRACT

THIS CONTRACT is between the CITY OF ANN ARBOR, a Michigan Municipal Corporation, 301 East Huron Street, Ann Arbor, Michigan 48104 ("City") and _____ _____("Contractor")

_____

(An individual/partnership/corporation, include state of incorporation) (Address)

Based upon the mutual promises below, the Contractor and the City agree as follows:

ARTICLE I - Scope of Work

The Contractor agrees to furnish all of the materials, equipment and labor necessary; and to abide by all the duties and responsibilities applicable to it for the project titled **[Insert Title of Bid and Bid Number**] in accordance with the requirements and provisions of the following documents, including all written modifications incorporated into any of the documents, all of which are incorporated as part of this Contract:

Non-discrimination and Living Wage Declaration of Compliance Forms (if applicable)
Vendor Conflict of Interest Form
Prevailing Wage Declaration of Compliance Form (if applicable)
Bid Forms
Contract and Exhibits
Bonds
General Conditions
Standard Specifications
Detailed Specifications
Plans
Addenda

ARTICLE II - Definitions

Administering Service Area/Unit means **Public Services Area/Engineering Unit**

Project means **RFP # 24-08, S. Seventh St. and Greenview Dr. Improvements**

Supervising Professional means the person acting under the authorization of the manager of the Administering Service Area/Unit. At the time this Contract is executed, the Supervising Professional is: Nicolas Hutchinson, PE whose job title is City Engineer.

If there is any question concerning who the Supervising Professional is, Contractor shall confirm with the manager of the Administering Service Area/Unit.

Contractor's Representative means _____ [**Insert name**] whose job title is _____.

ARTICLE III - Time of Completion

(A) The work to be completed under this Contract shall begin immediately on the date specified in the Notice to Proceed issued by the City.

(B) The entire work for this Contract shall be completed within _____ ( ) consecutive calendar days.

(C) Failure to complete all the work within the time specified above, including any extension granted in writing by the Supervising Professional, shall obligate the Contractor to pay the City, as liquidated damages and not as a penalty, an amount equal to $2,000 for each calendar day of delay in the completion of all the work. If any liquidated damages are unpaid by the Contractor, the City shall be entitled to deduct these unpaid liquidated damages from the monies due the Contractor.

The liquidated damages are for the non-quantifiable aspects of any of the previously identified events and do not cover actual damages that can be shown or quantified nor are they intended to preclude recovery of actual damages in addition to the recovery of liquidated damages.

ARTICLE IV - The Contract Sum

(A) The City shall pay to the Contractor for the performance of the Contract, the unit prices as given in the Bid Form for the estimated bid total of:

_____Dollars ($_____)

(B) The amount paid shall be equitably adjusted to cover changes in the work ordered by the Supervising Professional but not required by the Contract Documents. Increases or decreases shall be determined only by written agreement between the City and Contractor.

ARTICLE V - Assignment

This Contract may not be assigned or subcontracted any portion of any right or obligation under this contract without the written consent of the City. Notwithstanding any consent by the City to any assignment, Contractor shall at all times remain bound to all warranties, certifications, indemnifications, promises and performances, however described, as are required of it under this contract unless specifically released from the requirement, in writing, by the City.

ARTICLE VI - Choice of Law

This Contract shall be construed, governed, and enforced in accordance with the laws of the State of Michigan. By executing this Contract, the Contractor and the City agree to venue in a court of appropriate jurisdiction sitting within Washtenaw County for purposes of any action arising under this Contract. The parties stipulate that the venue referenced in this Contract is for convenience and waive any claim of non-convenience.

Whenever possible, each provision of the Contract will be interpreted in a manner as to be effective and valid under applicable law. The prohibition or invalidity, under applicable law, of any provision will not invalidate the remainder of the Contract.

ARTICLE VII - Relationship of the Parties

The parties of the Contract agree that it is not a Contract of employment but is a Contract to accomplish a specific result. Contractor is an independent Contractor performing services for the City. Nothing contained in this Contract shall be deemed to constitute any other relationship between the City and the Contractor.

Contractor certifies that it has no personal or financial interest in the project other than the compensation it is to receive under the Contract. Contractor certifies that it is not, and shall not become, overdue or in default to the City for any Contract, debt, or any other obligation to the City including real or personal property taxes. City shall have the right to set off any such debt against compensation awarded for services under this Contract.

ARTICLE VIII - Notice

All notices given under this Contract shall be in writing, and shall be by personal delivery or by certified mail with return receipt requested to the parties at their respective addresses as specified in the Contract Documents or other address the Contractor may specify in writing. Notice will be deemed given on the date when one of the following first occur: (1) the date of actual receipt; or (2) three days after mailing certified U.S. mail.

ARTICLE IX - Indemnification

To the fullest extent permitted by law, Contractor shall indemnify, defend and hold the City, its officers, employees and agents harmless from all suits, claims, judgments and expenses including attorney's fees resulting or alleged to result, in whole or in part, from any act or omission, which is in any way connected or associated with this Contract, by the Contractor or anyone acting on the Contractor's behalf under this Contract. Contractor shall not be responsible to indemnify the City for losses or damages caused by or resulting from the City's sole negligence. The provisions of this Article shall survive the expiration or earlier termination of this contract for any reason.

ARTICLE X - Entire Agreement

This Contract represents the entire understanding between the City and the Contractor and it supersedes all prior representations, negotiations, agreements, or understandings whether written or oral. Neither party has relied on any prior representations in entering into this Contract. No terms or conditions of either party's invoice, purchase order or other administrative document shall modify the terms and conditions of this Contract, regardless of the other party's failure to object to such form. This Contract shall be binding on and shall inure to the benefit of the parties

to this Contract and their permitted successors and permitted assigns and nothing in this Contract, express or implied, is intended to or shall confer on any other person or entity any legal or equitable right, benefit, or remedy of any nature whatsoever under or by reason of this Contract. This Contract may be altered, amended or modified only by written amendment signed by the City and the Contractor.

ARTICLE XI – Electronic Transactions

The City and Contractor agree that signatures on this Contract may be delivered electronically in lieu of an original signature and agree to treat electronic signatures as original signatures that bind them to this Contract. This Contract may be executed and delivered by facsimile and upon such delivery, the facsimile signature will be deemed to have the same effect as if the original signature had been delivered to the other party.

FOR CONTRACTOR

By_____

Its:_____

FOR THE CITY OF ANN ARBOR

By_____
Christopher Taylor, Mayor

By_____
Jacqueline Beaudry, City Clerk

Approved as to substance

By_____
Milton Dohoney, Jr.
City Administrator

By_____
Brian Steglitz
Services Area Administrator

Approved as to form and content

_____
Atleen Kaur, City Attorney

PERFORMANCE BOND

(1) _____ of _____ (referred to as "Principal"), and _____, a corporation duly authorized to do business in the State of Michigan (referred to as "Surety"), are bound to the City of Ann Arbor, Michigan (referred to as "City"), for $, the payment of which Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, by this bond.

(2) The Principal has entered a written Contract with the City entitled _____ _____, for RFP No. _____ and this bond is given for that Contract in compliance with Act No. 213 of the Michigan Public Acts of 1963, as amended, being MCL 129.201 et seq.

(3) Whenever the Principal is declared by the City to be in default under the Contract, the Surety may promptly remedy the default or shall promptly:

(a) complete the Contract in accordance with its terms and conditions; or

(b) obtain a bid or bids for submission to the City for completing the Contract in accordance with its terms and conditions, and upon determination by Surety of the lowest responsible bidder, arrange for a Contract between such bidder and the City, and make available, as work progresses, sufficient funds to pay the cost of completion less the balance of the Contract price; but not exceeding, including other costs and damages for which Surety may be liable hereunder, the amount set forth in paragraph 1.

(4) Surety shall have no obligation to the City if the Principal fully and promptly performs under the Contract.

(5) Surety agrees that no change, extension of time, alteration or addition to the terms of the Contract or to the work to be performed thereunder, or the specifications accompanying it shall in any way affect its obligations on this bond, and waives notice of any such change, extension of time, alteration or addition to the terms of the Contract or to the work, or to the specifications.

(6) Principal, Surety, and the City agree that signatures on this bond may be delivered electronically in lieu of an original signature and agree to treat electronic signatures as original signatures that bind them to this bond. This bond may be executed and delivered by facsimile and upon such delivery, the facsimile signature will be deemed to have the same effect as if the original signature had been delivered to the other party.

SIGNED AND SEALED this _____ day of _____, 2024.

_____
(Name of Surety Company)

By _____
(Signature)

Its _____
(Title of Office)

Approved as to form:

_____
Atleen Kaur, City Attorney

_____
(Name of Principal)

By _____
(Signature)

Its _____
(Title of Office)

Name and address of agent:

_____

_____

_____

LABOR AND MATERIAL BOND

(1) _____

of _____(referred to as "Principal"), and _____, a corporation duly authorized to do business in the State of Michigan, (referred to as "Surety"), are bound to the City of Ann Arbor, Michigan (referred to as "City"), for the use and benefit of claimants as defined in Act 213 of Michigan Public Acts of 1963, as amended, being MCL 129.201 et seq., in the amount of

$ _____, for the payment of which Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, by this bond.

(2) The Principal has entered a written Contract with the Cityentitled _____

_____

_____

____, for RFP No. _____; and this bond is given for that Contract in compliance with Act No. 213 of the Michigan Public Acts of 1963 as amended;

(3) If the Principal fails to promptly and fully repay claimants for labor and material reasonably required under the Contract, the Surety shall pay those claimants.

(4) Surety's obligations shall not exceed the amount stated in paragraph 1, and Surety shall have no obligation if the Principal promptly and fully pays the claimants.

(5) Principal, Surety, and the City agree that signatures on this bond may be delivered electronically in lieu of an original signature and agree to treat electronic signatures as original signatures that bind them to this bond. This bond may be executed and delivered by facsimile and upon such delivery, the facsimile signature will be deemed to have the same effect as if the original signature had been delivered to the other party.

SIGNED AND SEALED this _____ day of _____, 202_

_____	_____
(Name of Surety Company)	(Name of Principal)
By _____	By _____
(Signature)	(Signature)
Its _____	Its _____
(Title of Office)	(Title of Office)

Approved as to form:

Atleen Kaur, City Attorney

Name and address of agent:

GENERAL CONDITIONS

Section 1 - Execution, Correlation and Intent of Documents

The contract documents shall be signed in 2 copies by the City and the Contractor.

The contract documents are complementary and what is called for by any one shall be binding. The intention of the documents is to include all labor and materials, equipment and transportation necessary for the proper execution of the work. Materials or work described in words which so applied have a well-known technical or trade meaning have the meaning of those recognized standards.

In case of a conflict among the contract documents listed below in any requirement(s), the requirement(s) of the document listed first shall prevail over any conflicting requirement(s) of a document listed later.

(1) Addenda in reverse chronological order; (2) Detailed Specifications; (3) Standard Specifications; (4) Plans; (5) General Conditions; (6) Contract; (7) Bid Forms; (8) Bond Forms; (9) Bid.

Section 2 - Order of Completion

The Contractor shall submit with each invoice, and at other times reasonably requested by the Supervising Professional, schedules showing the order in which the Contractor proposes to carry on the work. They shall include the dates at which the Contractor will start the several parts of the work, the estimated dates of completion of the several parts, and important milestones within the several parts.

Section 3 - Familiarity with Work

The Bidder or its representative shall make personal investigations of the site of the work and of existing structures and shall determine to its own satisfaction the conditions to be encountered, the nature of the ground, the difficulties involved, and all other factors affecting the work proposed under this Contract. The Bidder to whom this Contract is awarded will not be entitled to any additional compensation unless conditions are clearly different from those which could reasonably have been anticipated by a person making diligent and thorough investigation of the site.

The Bidder shall immediately notify the City upon discovery, and in every case prior to submitting its Bid, of every error or omission in the bidding documents that would be identified by a reasonably competent, diligent Bidder. In no case will a Bidder be allowed the benefit of extra compensation or time to complete the work under this Contract for extra expenses or time spent as a result of the error or omission.

Section 4 - Wage Requirements

Under this Contract, the Contractor shall conform to Chapter 14 of Title I of the Code of the City of Ann Arbor as amended; which in part states "...that all craftsmen, mechanics and laborers employed directly on the site in connection with said improvements, including said employees of

subcontractors, shall receive the prevailing wage for the corresponding classes of craftsmen, mechanics and laborers, as determined by statistics for the Ann Arbor area compiled by the United States Department of Labor. At the request of the City, any contractor or subcontractor shall provide satisfactory proof of compliance with the contract provisions required by the Section.

Pursuant to Resolution R-16-469 all public improvement contractors are subject to prevailing wage and will be required to provide to the City payroll records sufficient to demonstrate compliance with the prevailing wage requirements. A sample Prevailing Wage Form is provided in the Appendix herein for reference as to what will be expected from contractors. Use of the Prevailing Wage Form provided in the Appendix section or a City-approved equivalent will be required along with wage rate interviews.

Where the Contract and the Ann Arbor City Ordinance are silent as to definitions of terms required in determining contract compliance with regard to prevailing wages, the definitions provided in the Davis-Bacon Act as amended (40 U.S.C. 278-a to 276-a-7) for the terms shall be used.

If the Contractor is a “covered employer” as defined in Chapter 23 of the Ann Arbor City Code, the Contractor agrees to comply with the living wage provisions of Chapter 23 of the Ann Arbor City Code. The Contractor agrees to pay those employees providing Services to the City under this Contract a “living wage,” as defined in Section 1:815 of the Ann Arbor City Code, as adjusted in accordance with Section 1:815(3); to post a notice approved by the City of the applicability of Chapter 23 in every location in which regular or contract employees providing services under this Contract are working; to maintain records of compliance; if requested by the City, to provide documentation to verify compliance; to take no action that would reduce the compensation, wages, fringe benefits, or leave available to any employee or person contracted for employment in order to pay the living wage required by Section 1:815; and otherwise to comply with the requirements of Chapter 23.

Contractor agrees that all subcontracts entered into by the Contractor shall contain similar wage provision covering subcontractor’s employees who perform work on this contract.

Section 5 - Non-Discrimination

The Contractor agrees to comply, and to require its subcontractor(s) to comply, with the nondiscrimination provisions of MCL 37.2209. The Contractor further agrees to comply with the provisions of Section 9:158 of Chapter 112 of Title IX of the Ann Arbor City Code, and to assure that applicants are employed and that employees are treated during employment in a manner which provides equal employment opportunity.

Section 6 - Materials, Appliances, Employees

Unless otherwise stipulated, the Contractor shall provide and pay for all materials, labor, water, tools, equipment, light, power, transportation, and other facilities necessary or used for the execution and completion of the work. Unless otherwise specified, all materials incorporated in the permanent work shall be new, and both workmanship and materials shall be of the highest quality. The Contractor shall, if required, furnish satisfactory evidence as to the kind and quality of materials.

The Contractor shall at all times enforce strict discipline and good order among its employees, and shall seek to avoid employing on the work any unfit person or anyone not skilled in the work assigned.

Adequate sanitary facilities shall be provided by the Contractor.

Section 7 - Qualifications for Employment

The Contractor shall employ competent laborers and mechanics for the work under this Contract. For work performed under this Contract, employment preference shall be given to qualified local residents.

Section 8 - Royalties and Patents

The Contractor shall pay all royalties and license fees. It shall defend all suits or claims for infringements of any patent rights and shall hold the City harmless from loss on account of infringement except that the City shall be responsible for all infringement loss when a particular process or the product of a particular manufacturer or manufacturers is specified, unless the City has notified the Contractor prior to the signing of the Contract that the particular process or product is patented or is believed to be patented.

Section 9 - Permits and Regulations

The Contractor must secure and pay for all permits, permit or plan review fees and licenses necessary for the prosecution of the work. These include but are not limited to City building permits, right-of-way permits, lane closure permits, right-of-way occupancy permits, and the like. The City shall secure and pay for easements shown on the plans unless otherwise specified.

The Contractor shall give all notices and comply with all laws, ordinances, rules and regulations bearing on the conduct of the work as drawn and specified. If the Contractor observes that the contract documents are at variance with those requirements, it shall promptly notify the Supervising Professional in writing, and any necessary changes shall be adjusted as provided in the Contract for changes in the work.

Section 10 - Protection of the Public and of Work and Property

The Contractor is responsible for the means, methods, sequences, techniques and procedures of construction and safety programs associated with the work contemplated by this contract. The Contractor, its agents or sub-contractors, shall comply with the "General Rules and Regulations for the Construction Industry" as published by the Construction Safety Commission of the State of Michigan and to all other local, State and National laws, ordinances, rules and regulations pertaining to safety of persons and property.

The Contractor shall take all necessary and reasonable precautions to protect the safety of the public. It shall continuously maintain adequate protection of all work from damage, and shall take all necessary and reasonable precautions to adequately protect all public and private property from injury or loss arising in connection with this Contract. It shall make good any damage, injury or loss to its work and to public and private property resulting from lack of reasonable protective precautions, except as may be due to errors in the contract documents, or caused by agents or

employees of the City. The Contractor shall obtain and maintain sufficient insurance to cover damage to any City property at the site by any cause.

In an emergency affecting the safety of life, or the work, or of adjoining property, the Contractor is, without special instructions or authorization from the Supervising Professional, permitted to act at its discretion to prevent the threatened loss or injury. It shall also so act, without appeal, if authorized or instructed by the Supervising Professional.

Any compensation claimed by the Contractor for emergency work shall be determined by agreement or in accordance with the terms of Claims for Extra Cost - Section 15.

Section 11 - Inspection of Work

The City shall provide sufficient competent personnel for the inspection of the work.

The Supervising Professional shall at all times have access to the work whenever it is in preparation or progress, and the Contractor shall provide proper facilities for access and for inspection.

If the specifications, the Supervising Professional's instructions, laws, ordinances, or any public authority require any work to be specially tested or approved, the Contractor shall give the Supervising Professional timely notice of its readiness for inspection, and if the inspection is by an authority other than the Supervising Professional, of the date fixed for the inspection. Inspections by the Supervising Professional shall be made promptly, and where practicable at the source of supply. If any work should be covered up without approval or consent of the Supervising Professional, it must, if required by the Supervising Professional, be uncovered for examination and properly restored at the Contractor's expense.

Re-examination of any work may be ordered by the Supervising Professional, and, if so ordered, the work must be uncovered by the Contractor. If the work is found to be in accordance with the contract documents, the City shall pay the cost of re-examination and replacement. If the work is not in accordance with the contract documents, the Contractor shall pay the cost.

Section 12 - Superintendence

The Contractor shall keep on the work site, during its progress, a competent superintendent and any necessary assistants, all satisfactory to the Supervising Professional. The superintendent will be responsible to perform all on-site project management for the Contractor. The superintendent shall be experienced in the work required for this Contract. The superintendent shall represent the Contractor and all direction given to the superintendent shall be binding as if given to the Contractor. Important directions shall immediately be confirmed in writing to the Contractor. Other directions will be confirmed on written request. The Contractor shall give efficient superintendence to the work, using its best skill and attention.

Section 13 - Changes in the Work

The City may make changes to the quantities of work within the general scope of the Contract at any time by a written order and without notice to the sureties. If the changes add to or deduct from the extent of the work, the Contract Sum shall be adjusted accordingly. All the changes shall be

executed under the conditions of the original Contract except that any claim for extension of time caused by the change shall be adjusted at the time of ordering the change.

In giving instructions, the Supervising Professional shall have authority to make minor changes in the work not involving extra cost and not inconsistent with the purposes of the work, but otherwise, except in an emergency endangering life or property, no extra work or change shall be made unless in pursuance of a written order by the Supervising Professional, and no claim for an addition to the Contract Sum shall be valid unless the additional work was ordered in writing.

The Contractor shall proceed with the work as changed and the value of the work shall be determined as provided in Claims for Extra Cost - Section 15.

Section 14 - Extension of Time

Extension of time stipulated in the Contract for completion of the work will be made if and as the Supervising Professional may deem proper under any of the following circumstances:

(1) When work under an extra work order is added to the work under this Contract;

(2) When the work is suspended as provided in Section 20;

(3) When the work of the Contractor is delayed on account of conditions which could not have been foreseen, or which were beyond the control of the Contractor, and which were not the result of its fault or negligence;

(4) Delays in the progress of the work caused by any act or neglect of the City or of its employees or by other Contractors employed by the City;

(5) Delay due to an act of Government;

(6) Delay by the Supervising Professional in the furnishing of plans and necessary information;

(7) Other cause which in the opinion of the Supervising Professional entitles the Contractor to an extension of time.

The Contractor shall notify the Supervising Professional within 7 days of an occurrence or conditions which, in the Contractor's opinion, entitle it to an extension of time. The notice shall be in writing and submitted in ample time to permit full investigation and evaluation of the Contractor's claim. The Supervising Professional shall acknowledge receipt of the Contractor's notice within 7 days of its receipt. Failure to timely provide the written notice shall constitute a waiver by the Contractor of any claim.

In situations where an extension of time in contract completion is appropriate under this or any other section of the contract, the Contractor understands and agrees that the only available adjustment for events that cause any delays in contract completion shall be extension of the required time for contract completion and that there shall be no adjustments in the money due the Contractor on account of the delay.

Section 15 - Claims for Extra Cost

If the Contractor claims that any instructions by drawings or other media issued after the date of the Contract involved extra cost under this Contract, it shall give the Supervising Professional written notice within 7 days after the receipt of the instructions, and in any event before proceeding to execute the work, except in emergency endangering life or property. The procedure shall then be as provided for Changes in the Work-Section l3. No claim shall be valid unless so made.

If the Supervising Professional orders, in writing, the performance of any work not covered by the contract documents, and for which no item of work is provided in the Contract, and for which no unit price or lump sum basis can be agreed upon, then the extra work shall be done on a Cost-Plus-Percentage basis of payment as follows:

(1) The Contractor shall be reimbursed for all reasonable costs incurred in doing the work, and shall receive an additional payment of 15% of all the reasonable costs to cover both its indirect overhead costs and profit;

(2) The term "Cost" shall cover all payroll charges for employees and supervision required under the specific order, together with all worker's compensation, Social Security, pension and retirement allowances and social insurance, or other regular payroll charges on same; the cost of all material and supplies required of either temporary or permanent character; rental of all power-driven equipment at agreed upon rates, together with cost of fuel and supply charges for the equipment; and any costs incurred by the Contractor as a direct result of executing the order, if approved by the Supervising Professional;

(3) If the extra is performed under subcontract, the subcontractor shall be allowed to compute its charges as described above. The Contractor shall be permitted to add an additional charge of 5% percent to that of the subcontractor for the Contractor's supervision and contractual responsibility;

(4) The quantities and items of work done each day shall be submitted to the Supervising Professional in a satisfactory form on the succeeding day, and shall be approved by the Supervising Professional and the Contractor or adjusted at once;

(5) Payments of all charges for work under this Section in any one month shall be made along with normal progress payments. Retainage shall be in accordance with Progress Payments-Section 16.

No additional compensation will be provided for additional equipment, materials, personnel, overtime or special charges required to perform the work within the time requirements of the Contract.

When extra work is required and no suitable price for machinery and equipment can be determined in accordance with this Section, the hourly rate paid shall be 1/40 of the basic weekly rate listed in the Rental Rate Blue Book published by Dataquest Incorporated and applicable to the time period the equipment was first used for the extra work. The hourly rate will be deemed to include all costs of operation such as bucket or blade, fuel, maintenance, "regional factors", insurance, taxes, and the like, but not the costs of the operator.

Section 16 - Progress Payments

The Contractor shall submit each month, or at longer intervals, if it so desires, an invoice covering work performed for which it believes payment, under the Contract terms, is due. The submission shall be to the City's Finance Department - Accounting Division. The Supervising Professional will, within 10 days following submission of the invoice, prepare a certificate for payment for the work in an amount to be determined by the Supervising Professional as fairly representing the acceptable work performed during the period covered by the Contractor's invoice. To insure the proper performance of this Contract, the City will retain a percentage of the estimate in accordance with Act 524, Public Acts of 1980. The City will then, following the receipt of the Supervising Professional's Certificate, make payment to the Contractor as soon as feasible, which is anticipated will be within 15 days.

An allowance may be made in progress payments if substantial quantities of permanent material have been delivered to the site but not incorporated in the completed work if the Contractor, in the opinion of the Supervising Professional, is diligently pursuing the work under this Contract. Such materials shall be properly stored and adequately protected. Allowance in the estimate shall be at the invoice price value of the items. Notwithstanding any payment of any allowance, all risk of loss due to vandalism or any damages to the stored materials remains with the Contractor.

In the case of Contracts which include only the Furnishing and Delivering of Equipment, the payments shall be; 60% of the Contract Sum upon the delivery of all equipment to be furnished, or in the case of delivery of a usable portion of the equipment in advance of the total equipment delivery, 60% of the estimated value of the portion of the equipment may be paid upon its delivery in advance of the time of the remainder of the equipment to be furnished; 30% of the Contract Sum upon completion of erection of all equipment furnished, but not later than 60 days after the date of delivery of all of the equipment to be furnished; and payment of the final 10% on final completion of erection, testing and acceptance of all the equipment to be furnished; but not later than l80 days after the date of delivery of all of the equipment to be furnished, unless testing has been completed and shows the equipment to be unacceptable.

With each invoice for periodic payment, the Contractor shall enclose a Contractor's Declaration - Section 43, and an updated project schedule per Order of Completion - Section 2.

Section 17 - Deductions for Uncorrected Work

If the Supervising Professional decides it is inexpedient to correct work that has been damaged or that was not done in accordance with the Contract, an equitable deduction from the Contract price shall be made.

Section 18 - Correction of Work Before Final Payment

The Contractor shall promptly remove from the premises all materials condemned by the Supervising Professional as failing to meet Contract requirements, whether incorporated in the work or not, and the Contractor shall promptly replace and re-execute the work in accordance with the Contract and without expense to the City and shall bear the expense of making good all work of other contractors destroyed or damaged by the removal or replacement.

If the Contractor does not remove the condemned work and materials within l0 days after written notice, the City may remove them and, if the removed material has value, may store the material

at the expense of the Contractor. If the Contractor does not pay the expense of the removal within 10 days thereafter, the City may, upon 10 days written notice, sell the removed materials at auction or private sale and shall pay to the Contractor the net proceeds, after deducting all costs and expenses that should have been borne by the Contractor. If the removed material has no value, the Contractor must pay the City the expenses for disposal within 10 days of invoice for the disposal costs.

The inspection or lack of inspection of any material or work pertaining to this Contract shall not relieve the Contractor of its obligation to fulfill this Contract and defective work shall be made good. Unsuitable materials may be rejected by the Supervising Professional notwithstanding that the work and materials have been previously overlooked by the Supervising Professional and accepted or estimated for payment or paid for. If the work or any part shall be found defective at any time before the final acceptance of the whole work, the Contractor shall forthwith make good the defect in a manner satisfactory to the Supervising Professional. The judgment and the decision of the Supervising Professional as to whether the materials supplied and the work done under this Contract comply with the requirements of the Contract shall be conclusive and final.

Section 19 - Acceptance and Final Payment

Upon receipt of written notice that the work is ready for final inspection and acceptance, the Supervising Professional will promptly make the inspection. When the Supervising Professional finds the work acceptable under the Contract and the Contract fully performed, the Supervising Professional will promptly sign and issue a final certificate stating that the work required by this Contract has been completed and is accepted by the City under the terms and conditions of the Contract. The entire balance found to be due the Contractor, including the retained percentage, shall be paid to the Contractor by the City within 30 days after the date of the final certificate.

Before issuance of final certificates, the Contractor shall file with the City:

(1) The consent of the surety to payment of the final estimate;
(2) The Contractor's Affidavit in the form required by Section 44.

In case the Affidavit or consent is not furnished, the City may retain out of any amount due the Contractor, sums sufficient to cover all lienable claims.

The making and acceptance of the final payment shall constitute a waiver of all claims by the City except those arising from:

(1) unsettled liens;
(2) faulty work appearing within 12 months after final payment;
(3) hidden defects in meeting the requirements of the plans and specifications;
(4) manufacturer's guarantees.

It shall also constitute a waiver of all claims by the Contractor, except those previously made and still unsettled.

Section 20 - Suspension of Work

The City may at any time suspend the work, or any part by giving 5 days notice to the Contractor in writing. The work shall be resumed by the Contractor within 10 days after the date fixed in the

written notice from the City to the Contractor to do so. The City shall reimburse the Contractor for expense incurred by the Contractor in connection with the work under this Contract as a result of the suspension.

If the work, or any part, shall be stopped by the notice in writing, and if the City does not give notice in writing to the Contractor to resume work at a date within 90 days of the date fixed in the written notice to suspend, then the Contractor may abandon that portion of the work suspended and will be entitled to the estimates and payments for all work done on the portions abandoned, if any, plus 10% of the value of the work abandoned, to compensate for loss of overhead, plant expense, and anticipated profit.

Section 21 - Delays and the City's Right to Terminate Contract

If the Contractor refuses or fails to prosecute the work, or any separate part of it, with the diligence required to insure completion, ready for operation, within the allowable number of consecutive calendar days specified plus extensions, or fails to complete the work within the required time, the City may, by written notice to the Contractor, terminate its right to proceed with the work or any part of the work as to which there has been delay. After providing the notice the City may take over the work and prosecute it to completion, by contract or otherwise, and the Contractor and its sureties shall be liable to the City for any excess cost to the City. If the Contractor's right to proceed is terminated, the City may take possession of and utilize in completing the work, any materials, appliances and plant as may be on the site of the work and useful for completing the work. The right of the Contractor to proceed shall not be terminated or the Contractor charged with liquidated damages where an extension of time is granted under Extension of Time - Section 14.

If the Contractor is adjudged a bankrupt, or if it makes a general assignment for the benefit of creditors, or if a receiver is appointed on account of its insolvency, or if it persistently or repeatedly refuses or fails except in cases for which extension of time is provided, to supply enough properly skilled workers or proper materials, or if it fails to make prompt payments to subcontractors or for material or labor, or persistently disregards laws, ordinances or the instructions of the Supervising Professional, or otherwise is guilty of a substantial violation of any provision of the Contract, then the City, upon the certificate of the Supervising Professional that sufficient cause exists to justify such action, may, without prejudice to any other right or remedy and after giving the Contractor 3 days written notice, terminate this Contract. The City may then take possession of the premises and of all materials, tools and appliances thereon and without prejudice to any other remedy it may have, make good the deficiencies or finish the work by whatever method it may deem expedient, and deduct the cost from the payment due the Contractor. The Contractor shall not be entitled to receive any further payment until the work is finished. If the expense of finishing the work, including compensation for additional managerial and administrative services exceeds the unpaid balance of the Contract Sum, the Contractor and its surety are liable to the City for any excess cost incurred. The expense incurred by the City, and the damage incurred through the Contractor's default, shall be certified by the Supervising Professional.

Section 22 - Contractor's Right to Terminate Contract

If the work should be stopped under an order of any court, or other public authority, for a period of 3 months, through no act or fault of the Contractor or of anyone employed by it, then the Contractor may, upon 7 days written notice to the City, terminate this Contract and recover from the City payment for all acceptable work executed plus reasonable profit.

Section 23 - City's Right To Do Work

If the Contractor should neglect to prosecute the work properly or fail to perform any provision of this Contract, the City, 3 days after giving written notice to the Contractor and its surety may, without prejudice to any other remedy the City may have, make good the deficiencies and may deduct the cost from the payment due to the Contractor.

Section 24 - Removal of Equipment and Supplies

In case of termination of this Contract before completion, from any or no cause, the Contractor, if notified to do so by the City, shall promptly remove any part or all of its equipment and supplies from the property of the City, failing which the City shall have the right to remove the equipment and supplies at the expense of the Contractor.

The removed equipment and supplies may be stored by the City and, if all costs of removal and storage are not paid by the Contractor within 10 days of invoicing, the City upon 10 days written notice may sell the equipment and supplies at auction or private sale, and shall pay the Contractor the net proceeds after deducting all costs and expenses that should have been borne by the Contractor and after deducting all amounts claimed due by any lien holder of the equipment or supplies.

Section 25 - Responsibility for Work and Warranties

The Contractor assumes full responsibility for any and all materials and equipment used in the construction of the work and may not make claims against the City for damages to materials and equipment from any cause except negligence or willful act of the City. Until its final acceptance, the Contractor shall be responsible for damage to or destruction of the project (except for any part covered by Partial Completion and Acceptance - Section 26). The Contractor shall make good all work damaged or destroyed before acceptance. All risk of loss remains with the Contractor until final acceptance of the work (Section 19) or partial acceptance (Section 26). The Contractor is advised to investigate obtaining its own builders risk insurance.

The Contractor shall guarantee the quality of the work for a period of one year. The Contractor shall also unconditionally guarantee the quality of all equipment and materials that are furnished and installed under the contract for a period of one year. At the end of one year after the Contractor's receipt of final payment, the complete work, including equipment and materials furnished and installed under the contract, shall be inspected by the Contractor and the Supervising Professional. Any defects shall be corrected by the Contractor at its expense as soon as practicable but in all cases within 60 days. Any defects that are identified prior to the end of one year shall also be inspected by the Contractor and the Supervising Professional and shall be corrected by the Contractor at its expense as soon as practicable but in all cases within 60 days. The Contractor shall assign all manufacturer or material supplier warranties to the City prior to final payment. The assignment shall not relieve the Contractor of its obligations under this paragraph to correct defects.

Section 26 - Partial Completion and Acceptance

If at any time prior to the issuance of the final certificate referred to in Acceptance and Final Payment - Section 19, any portion of the permanent construction has been satisfactorily completed, and if the Supervising Professional determines that portion of the permanent construction is not required for the operations of the Contractor but is needed by the City, the Supervising Professional shall issue to the Contractor a certificate of partial completion, and immediately the City may take over and use the portion of the permanent construction described in the certificate, and exclude the Contractor from that portion.

The issuance of a certificate of partial completion shall not constitute an extension of the Contractor's time to complete the portion of the permanent construction to which it relates if the Contractor has failed to complete it in accordance with the terms of this Contract. The issuance of the certificate shall not release the Contractor or its sureties from any obligations under this Contract including bonds.

If prior use increases the cost of, or delays the work, the Contractor shall be entitled to extra compensation, or extension of time, or both, as the Supervising Professional may determine.

Section 27 - Payments Withheld Prior to Final Acceptance of Work

The City may withhold or, on account of subsequently discovered evidence, nullify the whole or part of any certificate to the extent reasonably appropriate to protect the City from loss on account of:

(1) Defective work not remedied;

(2) Claims filed or reasonable evidence indicating probable filing of claims by other parties against the Contractor;

(3) Failure of the Contractor to make payments properly to subcontractors or for material or labor;

(4) Damage to another Contractor.

When the above grounds are removed or the Contractor provides a Surety Bond satisfactory to the City which will protect the City in the amount withheld, payment shall be made for amounts withheld under this section.

Section 28 - Contractor's Insurance

(1) The Contractor shall procure and maintain during the life of this Contract, including the guarantee period and during any warranty work, such insurance policies, including those set forth below, as will protect itself and the City from all claims for bodily injuries, death or property damage that may arise under this Contract; whether the act(s) or omission(s) giving rise to the claim were made by the Contractor, any subcontractor, or anyone employed by them directly or indirectly. Prior to commencement of any work under this contract, Contractor shall provide to the City documentation satisfactory to the City, through City-approved means (currently myCOI), demonstrating it has obtained the required policies and endorsements. The certificates of insurance endorsements and/or copies of

policy language shall document that the Contractor satisfies the following minimum requirements. Contractor shall add registration@mycoitracking.com to its safe sender's list so that it will receive necessary communication from myCOI. When requested, Contractor shall provide the same documentation for its subcontractor(s) (if any).

Required insurance policies include:

(a) Worker's Compensation Insurance in accordance with all applicable state and federal statutes. Further, Employers Liability Coverage shall be obtained in the following minimum amounts:

Bodily Injury by Accident - $500,000 each accident
Bodily Injury by Disease - $500,000 each employee
Bodily Injury by Disease - $500,000 each policy limit

(b) Commercial General Liability Insurance equivalent to, as a minimum, Insurance Services Office form CG 00 01 04 13 or current equivalent. The City of Ann Arbor shall be named as an additional insured. There shall be no added exclusions or limiting endorsements specifically for the following coverages: Products and Completed Operations, Explosion, Collapse and Underground coverage or Pollution. Further there shall be no added exclusions or limiting endorsements that diminish the City's protections as an additional insured under the policy. The following minimum limits of liability are required:

$1,000,000	Each occurrence as respect Bodily Injury Liability or Property Damage Liability, or both combined.
$2,000,000	Per Project General Aggregate
$1,000,000	Personal and Advertising Injury
$2,000,000	Products and Completed Operations Aggregate, which, notwithstanding anything to the contrary herein, shall be maintained for three years from the date the Project is completed.

(c) Motor Vehicle Liability Insurance, including Michigan No-Fault Coverages, equivalent to, as a minimum, Insurance Services Office form CA 00 01 10 13 or current equivalent. Coverage shall include all owned vehicles, all non-owned vehicles and all hired vehicles. The City of Ann Arbor shall be named as an additional insured. There shall be no added exclusions or limiting endorsements that diminish the City's protections as an additional insured under the policy. Further, the limits of liability shall be $1,000,000 for each occurrence as respects Bodily Injury Liability or Property Damage Liability, or both combined.

(d) Umbrella/Excess Liability Insurance shall be provided to apply excess of the Commercial General Liability, Employers Liability and the Motor Vehicle coverage enumerated above, for each occurrence and for aggregate in the amount of $1,000,000.

(2) Insurance required under subsection (1)(b) and (1)(c) above shall be considered primary as respects any other valid or collectible insurance that the City may possess, including any self-insured retentions the City may have; and any other insurance the City does possess shall be considered excess insurance only and shall not be required to contribute

with this insurance. Further, the Contractor agrees to waive any right of recovery by its insurer against the City for any insurance listed herein.

(3) Insurance companies and policy forms are subject to approval of the City Attorney, which approval shall not be unreasonably withheld. Documentation must provide and demonstrate an unconditional and un-qualified 30-day written notice of cancellation in favor of the City of Ann Arbor. Further, the documentation must explicitly state the following: (a) the policy number(s); name of insurance company(s); name and address of the agent(s) or authorized representative(s); name(s), email address(es), and address of insured; project name; policy expiration date; and specific coverage amounts; (b) any deductibles or self-insured retentions which may be approved by the City, in its sole discretion; (c) that the policy conforms to the requirements specified Contractor shall furnish the City with satisfactory certificates of insurance and endorsements prior to commencement of any work. Upon request, the Contractor shall provide within 30 days a copy of the policy(ies) and all required endorsements to the City. If any of the above coverages expire by their terms during the term of this Contract, the Contractor shall deliver proof of renewal and/or new policies and endorsements to the Administering Service Area/Unit at least ten days prior to the expiration date.

(4) Any Insurance provider of Contractor shall be authorized to do business in the State of Michigan and shall carry and maintain a minimum rating assigned by A.M. Best & Company's Key Rating Guide of "A-" Overall and a minimum Financial Size Category of "V". Insurance policies and certificates issued by non-authorized insurance companies are not acceptable unless approved in writing by the City.

(5) City reserves the right to require additional coverage and/or coverage amounts as may be included from time to time in the Detailed Specifications for the Project.

(6) The provisions of General Condition 28 shall survive the expiration or earlier termination of this contract for any reason.

Section 29 - Surety Bonds

Bonds will be required from the successful bidder as follows:

(1) A Performance Bond to the City of Ann Arbor for the amount of the bid(s) accepted;
(2) A Labor and Material Bond to the City of Ann Arbor for the amount of the bid(s) accepted.

Bonds shall be executed on forms supplied by the City in a manner and by a Surety Company authorized to transact business in Michigan and satisfactory to the City Attorney.

Section 30 - Damage Claims

The Contractor shall be held responsible for all damages to property of the City or others, caused by or resulting from the negligence of the Contractor, its employees, or agents during the progress of or connected with the prosecution of the work, whether within the limits of the work or elsewhere. The Contractor must restore all property injured including sidewalks, curbing, sodding, pipes, conduit, sewers or other public or private property to not less than its original condition with new work.

Section 31 - Refusal to Obey Instructions

If the Contractor refuses to obey the instructions of the Supervising Professional, the Supervising Professional shall withdraw inspection from the work, and no payments will be made for work performed thereafter nor may work be performed thereafter until the Supervising Professional shall have again authorized the work to proceed.

Section 32 - Assignment

Neither party to the Contract shall assign the Contract without the written consent of the other. The Contractor may assign any monies due to it to a third party acceptable to the City.

Section 33 - Rights of Various Interests

Whenever work being done by the City's forces or by other contractors is contiguous to work covered by this Contract, the respective rights of the various interests involved shall be established by the Supervising Professional, to secure the completion of the various portions of the work in general harmony.

The Contractor is responsible to coordinate all aspects of the work, including coordination of, and with, utility companies and other contractors whose work impacts this project.

Section 34 - Subcontracts

The Contractor shall not award any work to any subcontractor without prior written approval of the City. The approval will not be given until the Contractor submits to the City a written statement concerning the proposed award to the subcontractor. The statement shall contain all information the City may require.

The Contractor shall be as fully responsible to the City for the acts and omissions of its subcontractors, and of persons either directly or indirectly employed by them, as it is for the acts and omissions of persons directly employed by it.

The Contractor shall cause appropriate provisions to be inserted in all subcontracts relative to the work to bind subcontractors to the Contractor by the terms of the General Conditions and all other contract documents applicable to the work of the subcontractors and to give the Contractor the same power to terminate any subcontract that the City may exercise over the Contractor under any provision of the contract documents.

Nothing contained in the contract documents shall create any contractual relation between any subcontractor and the City.

Section 35 - Supervising Professional's Status

The Supervising Professional has the right to inspect any or all work. The Supervising Professional has authority to stop the work whenever stoppage may be appropriate to insure the proper execution of the Contract. The Supervising Professional has the authority to reject all work and materials which do not conform to the Contract and to decide questions which arise in the execution of the work.

The Supervising Professional shall make all measurements and determinations of quantities. Those measurements and determinations are final and conclusive between the parties.

Section 36 - Supervising Professional's Decisions

The Supervising Professional shall, within a reasonable time after their presentation to the Supervising Professional, make decisions in writing on all claims of the City or the Contractor and on all other matters relating to the execution and progress of the work or the interpretation of the contract documents.

Section 37 - Storing Materials and Supplies

Materials and supplies may be stored at the site of the work at locations agreeable to the City unless specific exception is listed elsewhere in these documents. Ample way for foot traffic and drainage must be provided, and gutters must, at all times, be kept free from obstruction. Traffic on streets shall be interfered with as little as possible. The Contractor may not enter or occupy with agents, employees, tools, or material any private property without first obtaining written permission from its owner. A copy of the permission shall be furnished to the Supervising Professional.

Section 38 - Lands for Work

The Contractor shall provide, at its own expense and without liability to the City, any additional land and access that may be required for temporary construction facilities or for storage of materials.

Section 39 - Cleaning Up

The Contractor shall, as directed by the Supervising Professional, remove at its own expense from the City's property and from all public and private property all temporary structures, rubbish and waste materials resulting from its operations unless otherwise specifically approved, in writing, by the Supervising Professional.

Section 40 - Salvage

The Supervising Professional may designate for salvage any materials from existing structures or underground services. Materials so designated remain City property and shall be transported or stored at a location as the Supervising Professional may direct.

Section 41 - Night, Saturday or Sunday Work

No night or Sunday work (without prior written City approval) will be permitted except in the case of an emergency and then only to the extent absolutely necessary. The City may allow night work which, in the opinion of the Supervising Professional, can be satisfactorily performed at night. Night work is any work between 8:00 p.m. and 7:00 a.m. No Saturday work will be permitted unless the Contractor gives the Supervising Professional at least 48 hours but not more than 5 days notice of the Contractor's intention to work the upcoming Saturday.

Section 42 - Sales Taxes

Under State law the City is exempt from the assessment of State Sales Tax on its direct purchases. Contractors who acquire materials, equipment, supplies, etc. for incorporation in City projects are not likewise exempt. State Law shall prevail. The Bidder shall familiarize itself with the State Law and prepare its Bid accordingly. No extra payment will be allowed under this Contract for failure of the Contractor to make proper allowance in this bid for taxes it must pay.

Section 43

CONTRACTOR'S DECLARATION

I hereby declare that I have not, during the period _____, 20___, to _____, 20 , performed any work, furnished any materials, sustained any loss, damage or delay, or otherwise done anything in addition to the regular items (or executed change orders) set forth in the Contract titled _____, for which I shall ask, demand, sue for, or claim compensation or extension of time from the City, except as I hereby make claim for additional compensation or extension of time as set forth on the attached itemized statement. I further declare that I have paid all payroll obligations related to this Contract that have become due during the above period and that all invoices related to this Contract received more than 30 days prior to this declaration have been paid in full except as listed below.

There is/is not (Contractor please circle one and strike one as appropriate) an itemized statement attached regarding a request for additional compensation or extension of time.

_____ _____
Contractor Date

By _____
(Signature)

Its _____
(Title of Office)

Past due invoices, if any, are listed below.

Section 44

CONTRACTOR'S AFFIDAVIT

The undersigned Contractor,_____, represents that on _____, 20___, it was awarded a contract by the City of Ann Arbor, Michigan to_____ under the terms and conditions of a Contract titled _____. The Contractor represents that all work has now been accomplished and the Contract is complete.

The Contractor warrants and certifies that all of its indebtedness arising by reason of the Contract has been fully paid or satisfactorily secured; and that all claims from subcontractors and others for labor and material used in accomplishing the project, as well as all other claims arising from the performance of the Contract, have been fully paid or satisfactorily settled. The Contractor agrees that, if any claim should hereafter arise, it shall assume responsibility for it immediately upon request to do so by the City of Ann Arbor.

The Contractor, for valuable consideration received, does further waive, release and relinquish any and all claims or right of lien which the Contractor now has or may acquire upon the subject premises for labor and material used in the project owned by the City of Ann Arbor.

This affidavit is freely and voluntarily given with full knowledge of the facts.

_____ _____
Contractor Date

By _____
(Signature)

Its _____
(Title of Office)

Subscribed and sworn to before me, on this _____ day of _____, 20__
_____ , _____ County, Michigan
Notary Public
_____ County, MI
My commission expires on:

STANDARD SPECIFICATIONS

All work under this contract shall be performed in accordance with the **2024 Public Services Department Standard Specifications**. All work under this Contract which is not included in these Standard Specifications, or which is performed using modifications to these Standard Specifications, shall be performed in accordance with the Detailed Specifications included in these contract documents.

Standard Specifications are available online:

http://www.a2gov.org/departments/engineering/Pages/Engineering-and-Contractor-Resources.aspx

DETAILED SPECIFICATIONS

An item number ending in X.7X and an item's description starting with "DS_" indicates a detailed specification.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
PROJECT SCHEDULE AND PAYMENT

Description

Examination of Plans, Specifications, and Work Site

Bidders shall carefully examine the Bid Form, plans, specifications, and the work site until the Bidder is satisfied as to all local conditions affecting the contract and the detailed requirements of construction. The submission of the bid shall be considered prima facie evidence that the Bidder has made such examination and is satisfied as to the conditions to be encountered in performing the work and all requirements of the Contract.

The entire work under this Contract shall be completed in accordance with, and subject to, the scheduling requirements as outlined below, and all other requirements of the Contract Documents.

1. The Contractor shall begin the work of this project on or before **April 29, 2024**, and only upon receipt of the fully executed Contract and Notice to Proceed. Appropriate time extensions shall be granted if the Notice to Proceed is delayed beyond this date.

2. This Contract requires water main, storm sewer, sidewalk replaced, road resurfacing and turf establishment, and shall be completed within **two hundred (200) consecutive calendar days**. Contractor shall determine the sequence of work at the project locations and shall not be actively working on more than two project locations, unless otherwise approved by the Engineer. The three project locations and location specific work requirements include:

    a. S Seventh Street (Delaware to Scio Church) – No longer than seventy (70) consecutive calendar days. Must commence after June 13, 2024 and be paved and open to traffic by August 26, 2024.
    b. South Greenview (S Seventh to Scio Church) – No longer than forty-five (45) consecutive calendar days.
    c. North Greenview (Scio Church to W Stadium) – No longer than eighty (80) consecutive calendar days.

3. Contractor shall sequence the water and storm sewer installation in a way that does not interrupt service of other utilities.

4. Contractor shall provide all necessary sewer flow control to maintain flow at all existing sewer crossings, connections and lead transfers.

5. No work shall be performed during Holiday weekends as follows, unless approved by the City of Ann Arbor:

    - Memorial Day, from 3:00 p.m. Friday May 24, 2024, through 7:00 a.m. Tuesday May 28, 2024
    - Fourth of July, from 3:00 p.m. Wednesday July 3, 2024, through 7:00 a.m. Friday July 5, 2024

- Labor Day, from 3:00 p.m. Friday August 30, 2024 through 7:00 a.m. Tuesday September 3, 2024

6. No work shall be performed during University of Michigan home football games.

City Council approval is expected on or before **April 15, 2023**. The Contractor shall not begin the work without approval from the Project Engineer, and in no case before the receipt of the Notice to Proceed.

Contractor will be furnished with two (2) copies of the Contract, for his/her execution, before the aforementioned City Council meeting. The Contractor shall properly execute both copies of the Contract and return them, with the required Bonds and Insurance Certificate, to the City within **ten (10) days.**

Time is of the essence in the performance of the work of this contract. The Contractor is expected to mobilize sufficient personnel and equipment and work throughout all authorized hours to complete the project by the final completion date. Should the Contractor demonstrate that they must work on some Sundays in order to maintain the project schedule, they may do so between the hours of 9:00 a.m. and 5:00 p.m. with prior approval from the City. There will be no additional compensation due to the Contractor for work performed on Sundays.

Prior to the start of any construction, the Contractor shall submit a detailed schedule of work for the Engineer's review and approval. Work shall not be started until a schedule is approved in writing by the Engineer. The proposed schedule must fully comply with the scheduling requirements contained in this Detailed Specification. The Contractor shall update the approved work schedule upon request by the Engineer and present it to the Engineer within seven days of said request.

Liquidated Damages

Failure to complete all work as specified herein within the times specified herein, including time extensions granted thereto as determined by the Engineer, shall entitle the City to deduct from the payments due the Contractor, **$2,000.00** in Liquidated Damages, and not as a penalty, for delays in the completion of the work for each and every calendar day beyond the times for each sub-phase, as required by this Detailed Specification.

Liquidated Damages will be assessed until the required work is completed in the current construction season. If, with the Engineer’s approval, work is extended beyond seasonal limitations, the assessment of Liquidated Damages will be discontinued until the work is resumed in the following construction season.

Measurement and Payment

If the construction Contract is not completed within the specified calendar day period including any extensions of time granted thereto, at the sole discretion of the City of Ann Arbor, this Contract may be terminated with no additional compensation due to the Contractor, and the Contractor

may be forbidden to bid on future City of Ann Arbor projects for a period of at least three (3) years. If the Engineer elects to terminate the Contract, Contract items paid for on a Lump Sum basis shall be paid up to a maximum percentage equal to the percentage of the Contract work that has been completed.

Costs for the Contractor to organize, coordinate, and schedule all of the work of the project, will not be paid for separately, but shall be included in the bid price of the Contract Item “General Conditions, Max $_____”.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
GRADING

AA:TCA 1 of 2 1/30/24

Description

This work shall consist of furnishing all labor, tools, equipment, and material to shape and prepare all subgrade, subbase, and/or base layers to remain to grades and cross sections indicated on the Plans or as directed by the Engineer. This work shall be performed in accordance with 2024 Public Services Standard Specifications Article 10, Section III.G., except as specified herein.

Construction

Access to driveways and entrances may be permitted to be temporarily interrupted provided the Contractor provides at least 24 hours advanced notification to the property owners/tenants, and schedules the work to minimize the duration of the interruption.

After all associated removals, the remaining subgrade, subbase, or aggregate base course shall be shaped and prepared to the grades and cross-sections indicated on the plans, including earth excavation, removal, and offsite disposal of any surplus material.

The remaining course shall be proof rolled. All other work (such as undercutting) shall be performed to prepare for the placement of the subsequent course and must be approved by the Engineer.

The contractor shall hone the grade of the final course of subbase or aggregate base for placement of concrete or HMA to the to the grades and cross-sections indicated on the plans.

Measurement And Payment

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

Pay Item	Pay Unit
DS_Sidewalk Grading	Square Yards
DS_Driveway Grading	Square Yards
DS_Roadway Grading, _____	Square Yards

DS_Sidewalk Grading will be measured in the unit above for the area of required subbase or aggregate base for new sidewalk and new sidewalk ramps. This item shall be paid when final grading of the subbase or aggregate base is complete.

DS_Driveway Grading will be measured in the unit above for the area of required aggregate base for new driveways, including new sidewalk through driveways. This item shall be paid when final grading of the aggregate base is complete.

DS_ Roadway Grading, _____ will be measured in the unit above for the area disturbed to construct the associated roadway and any new curb. Area will be measured from the edge of

metal of remaining curb to 1 foot beyond the back of new curb. This item shall be paid when final grading of the base is complete.

Areas where the existing grade is to be cut to achieve the proposed subgrade elevation (cut-sections) will not be paid for separately. The removal and offsite disposal of cut- section materials required to meet specified grades and cross sections shall be included in **DS_ _____ Grading, _____**.

Removal of pavement, curb, sidewalk, driveways, and ramps; trench backfill, subgrade undercuts; placement and compaction of subbase and aggregate base; and turf establishment shall be paid as part of separate pay items.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
DRAINAGE STRUCTURES

Description

This work shall consist of furnishing all labor, tools, equipment, and material to construct drainage structures in accordance with 2024 Public Services Standard Specifications Article 4 and Article 10, Section II.S., as shown on the plans, and as specified herein.

Materials

Fluidic-Amp Vortex valve, as shown on the plans.

Structure cover, as specified on the plans.

Construction

Install vortex valve per manufacturer recommendation.

Measurement and Payment

The completed work, as described, will be measured and paid for at the approved price for the following pay item:

Pay Item	Pay Unit
DS_Storm Manhole, __ In. Dia. (0-8' deep)	Each
DS_Storm Inlet-Junction, __ In. Dia., (0-8' deep)	Each
DS_Storm Single Inlet, __ In. Dia., (0-8' deep)	Each
DS_Storm High Capacity Inlet, __ In. Dia., (0-8' deep)	Each
DS_Storm Manhole with Weir, __ In. Dia. (0-8' deep)	Each
DS_Storm Manhole Over Existing ("Doghouse"), __ In. Dia.	Each

Payment for the structure frame and cover, as specified, and the adjusting of drainage structure covers shall be included in payment for the structure and shall not paid for separately.

Payment for the vortex valve shall be included in payment for **DS_Strom Manhole with Weir, 72 In. Dia. (0-8' deep)**.

Description

This work shall consist of furnishing all labor, tools, equipment, and material to construct drainage structures in accordance with 2024 Public Services Standard Specifications Article 3 and Article 10, Section II.K., as shown on the plans, and as specified herein.

Measurement and Payment

The completed work, as described, will be measured and paid for at the approved price for the following pay item:

Pay Item	Pay Unit
DS_Gate Valve in Well, __ In.	Each
DS_Gate Valve in Box, __ In.	Each

The gate well frame and cover shall be included in payment for **DS_Gate Valve in Well, ___ In.** and shall not be paid for separately.

The gate valve box shall be included in payment for **DS_Gate Valve in Box, ___ In.** and shall not be paid for separately.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
WATER MAIN ABANDON

AA:TCA 1 of 1 1/30/24

Description

This work shall consist of furnishing all labor, tools, equipment, and material to properly abandon water mains as indicated on the Plans or as directed by the Engineer. This work shall be performed in accordance with 2024 Public Services Standard Specifications Article 3, except as specified herein.

Construction

The Contractor shall abandon water mains where shown on the Plans and as directed by the Engineer. This includes, but is not limited to, properly draining the main, cutting the main at every connection point (each end and all side street connections), and plugging the abandoned cut ends with brick and mortar, concrete, or mechanical joint plug.

Any previously abandoned water main that is removed for installation of another utility shall be properly abandoned and plugged on each remaining end. This is included in the payment of the installed utility and shall be paid for separately.

Measurement And Payment

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

Pay Item	Pay Unit
DS_Water Main Pipe, Abandon, Modified, _____	LS

Payment shall be made when the entire water main is properly abandoned on the associated road.

No additional payment shall be made for removing or abandoning previously abandoned water main that is removed for installation of another utility.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
DRIVEWAY AND SIDEWALK

AA:TCA 1 of 1 1/30/24

Description

This work shall consist of constructing subbase and/or aggregate base courses, on either a prepared subbase or aggregate base as indicated on the Plans or where directed by the Engineer. This work shall be performed in accordance with performed in accordance with Public Services Standard Specifications (2024) Article 10, Section III.G. and Section III.H., except as specified herein.

Materials

The material used for this work shall meet the requirements of Sections 301, 302, 305, 307, and 902 of MDOT 2020 Standard Specification for Construction, except that the aggregate base under driveways shall be 21AA limestone (permanent and temporary applications) with a maximum loss by washing of 8% and any subbase under sidewalks shall be Class II Granular Material.

Construction

Concrete drive approaches shall be placed on 6” of 21AA limestone.

Sidewalk through drive approaches shall be placed on 6” of 21AA limestone.

Measurement and Payment

Where 21AA is used for aggregate base course, it shall be measured and paid in accordance with **Aggregate Base, __ In., 21AA, CIP**.

The completed work as measured will be paid for at the contract unit prices for the following Contract items (pay items):

Pay Item	**Pay Unit**
DS_Conc, Sidewalk, Drive Approach, or Ramp, __ In.	Square Feet

Payment includes all labor, material and equipment needed to furnish and install concrete sidewalk and drive approaches.

The aggregate base shall be paid for separately.

Excavation for placement of driveway base material shall be included in the item of work **DS_Driveway Grading**.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
PAVEMENT MARKINGS

Description

This work consists of installing a polymer cement surface system (PCSS) on a prepared substrate in accordance with these specifications, the plans, and/or as directed by the Engineer for the purposes of delineating dedicated or shared bicycle lanes. This work shall be performed in accordance with performed in accordance with 2024 Public Services Standard Specifications Article 10, Section III.M., except as specified herein.

Materials

Green Bike Lanes: Use Endurablend™ System PCSS material manufactured by Pavement Surface Coatings, LLC, 81 Ball Road, Mountain Lakes, NJ 07046. (Telephone: 866-215-6120) or approved equal. Pre-approval of an equivalent product must have proven in- place history over asphalt and/or concrete and meet the material property requirements shown below and be installed in accordance with this specification. The color will be green and must comply with FHWA standards for daytime and nighttime chromaticity values.

1. The daytime chromaticity coordinates for the color used for green colored pavement shall be as follows:

1		2		3		4	
x	y	x	y	x	y	x	y
0.230	0.754	0.266	0.500	0.367	0.500	0.444	0.555

2. The daytime luminance factor (Y) shall be at least 7, but no more than 35.

3. The nighttime chromaticity coordinates for the color used for green colored pavement shall be as follows:

1		2		3		4	
x	y	x	y	x	y	x	y
0.230	0.754	0.366	0.540	0.450	0.500	0.479	0.520

4. PCSS Material Properties: The polymer cement surface or approved equal shall provide a skid and abrasion resistant surface and meet or exceed the requirements in Table 2.1.

Table 2.1 - Polymer Cement Material Properties

Description	Test Method	Value
Compressive Strength, (at 28 days) 2" Cube[1]	ASTM C-109	>3,200 PSI
Tensile Strength[1]	ASTM C-190	>350 PSI
Bond Strength with Asphalt[1,2]	ASTM C-1583	>250 PSI

Table 2.1 - Polymer Cement Material Properties (Cont.)		
Description	**Test Method**	**Value**
Skid Resistance (at 60km/hr)	ASTM E-1911 ASTM E-274	>40 >40
Length Change[1]	ASTM C-157	<0.024%
Solar Reflectivity Index[3,4]	ASTM C-1549 ASTM E-1980	>0.29
Wet Mix Flowability[7]	ASTM C-939	20-45 sec
Wet Mix Air Voids[7]	Chase Meter	<6%
Total Air Content[5]	Microscope Analysis of Section	<5%
Flexibility[6]	½" Thick Beam under Static Load – Max. Deflection	≥½"

1) The data shown is representative of laboratory test 28 day cured samples at 50% humidity.
2) Prepare a test sample by overlaying ¼" (6mm) of product on 12.5mm HMA sample.
3) Obtain an SRI of greater than 29 by using pigments or changing the color index of the aggregate. It is not applicable for requested color pigments.
4) Only applicable for projects where a LEED certification credit is a requirement of the surfacing or where specifications require a reflective surfacing.
5) Required to provide balance between flexibility, minimal permeability, and therefore maximum durability.
6) Use the same loading rate as for the ASTM C-109 test above.
7) Quality assurance tests for site.

5. Chemical Admixtures/Pigments: The manufacturer shall approve the dosage rates and the conditions for use in the PCSS of any chemical admixtures and/or color pigments.

6. Delivery, Storage, and Handling: Deliver material to site in weatherproof containers and store in a covered and ventilated location.

White Pavement Markings: per 2024 Public Services Standard Specifications Article 10, Section III.M.

Construction

Construct white pavement markings per 2024 Public Services Standard Specifications Article 10, Section III.M.

Construct green bike lane pavement markings in accordance with manufacturer application

and installation procedures, 2024 Public Services Standard Specifications Article 10, Section III.M., as applicable, and as directed by the Engineer.

Use equipment approved by the manufacturer or an approved installer. The installer shall demonstrate that the equipment is capable of handling materials, performing the work, maintaining proper material temperature, maintaining the minimum level of required productivity, and producing a product of the specified quality and be maintained in good mechanical condition. Provide sufficient equipment to enable the prosecution of the work in accordance with the project schedule and completion of the work in the specified time. Use equipment capable of handling and transferring the dry materials and liquids to the approved mixer without causing spillage, segregation, or contamination.

The measuring and mixing operation shall be capable of producing a consistent homogeneous mix sufficient to maintain the production levels required for the work. Charge the water and dry blend into the mixer and blend to the desired consistency while maintaining effective temperatures to prevent flashing of the mix. Hand mixing in pails is not permissible.

Follow manufacturer recommended pavement and air temperatures. Place PCSS only when all the following conditions are met:

- The pavement surface is dry.
- Ambient and substrate temperatures are 50° F (10° C) and rising and expected to remain above 50° F (10° C) for 6 hours.
- There is no forecast of temperatures below 35° F (2° C) within 24 hours from the time of placement.
- The weather is not foggy or rainy. When rain appears imminent, all placement operations shall cease, and the work shall not resume until the threat of rain has passed.

When the ambient temperature is below 50° F (10° C) but will remain above 40° F (5° C) during paving and the substrate temperatures are 50° F (10° C) and rising, place the PCSS with the approval of Engineer and add manufacturer approved accelerators to the mix.

Take care when placing the PCSS if the substrate temperature exceeds 130° F (50° C). Closely monitor application temperatures of the substrate above 130° F (50° C) for performance during the course of application. Any observable defects occurring as a result of extreme temperature should be cause for immediate halting of placement operations.

Where the ambient paving air temperature is going to exceed 90° F (32° C) consider use of cold water and ice for the blending operation. Where the provision of cold water or replacing the part of the water requirement with ice is not possible, then use a retarder with the mix.

The substrate that is to receive the PCSS system shall be cleaned of sand, dirt, dust, rock, or any other debris that could prevent proper adhesion. Clean and prepare the surface by power broom, scraping, compressed air or sandblasting, high pressure water, or other approved

methods in conformance with ASTM D4263 as necessary to assure bonding between the PCSS surface course and the substrate. Do not start PCSS operations until the surface is in a condition as recommended by the manufacturer and approved by the Engineer. The Contractor at its expense shall correct any/all surface damage resulting from cleaning/preparation work, as directed by the Engineer.

All substrate receiving PCSS shall be free of potholes, spalling, or other areas of structural deterioration. If identified in the plans, or directed by the Engineer, excavate all such areas to a depth where the substrate is structurally sound and repair with an approved method. Report structurally deficient areas not identified for repair in the plans to the Engineer.

The Contractor shall lay out all pavement marking areas and then for review by the Engineer. The Engineer shall approve the marking layout prior to placement of material.

Deposit PCSS uniformly on the substrate by roto-stator spray equipment. Use a spray apparatus device approved by the manufacturer and having the capability of mixing the materials at a rate to insure continuous spray operations.

Stenciled Pavement: This design requires a base coat of the material to be applied by squeegee or spray on top of asphalt or concrete pavement. Concrete pavement may require shot blasting to roughen the surface to ensure proper bonding. The base coat provides a grout line color plus seals the surface. Once the base coat has cured, apply the specified stencil pattern, and spray the topcoat. Remove stencil when the topcoat has reached the proper consistency and allow coating to cure. Cure to traffic time is approximately 2 hours at 70 degrees. The total cured thickness should be between 1/8” and 3/16”.

The stencils should be a plastic or paper pattern consistent with the design of the crosswalks.

Non-Patterned Application: This design uses a colored or base color coating without a decorative pattern. Apply the material to the asphalt or concrete pavement using roto-stator spray apparatus. Concrete pavement may require shot blasting to roughen the surface to ensure proper bonding. A smooth or textured surface can be created. A textured surface is achieved by adding aggregate to the mix or distributing a fine aggregate to the surface after application as specified in the plans. Cure to traffic time is approximately 2 hours at 70 degrees. The total cured thickness should be between 1/8” and 3/16”.

Curing and Opening to Traffic: The Contractor shall take care to protect the PCSS surface course from traffic until the area is sufficiently cured. Curing time will vary depending on ambient and surface temperatures. Do not open the PCSS to traffic until it has reached sufficient compressive strength and vehicular traffic will not damage the surface. Obtain approval for opening from a representative of the manufacturer, the installer, or the Engineer. The Contractor at its expense shall correct any damage to the PCSS surface resulting from failure to protect it or open it to traffic without approval or proper cure.

Measurement And Payment

Measure and pay for the completed work, as described, at the respective contract unit price using the following respective pay item:

Pay Item	Pay Unit
DS_Pavt Mrkg, Polyurea, 18 In., White	Feet
DS_Pavt Mrkg, Polymer Cement Surface, Bike Lane Green	Square Foot

DS_Pavt Mrkg, Polyurea, 18 In., White will be measured in place and paid for at the contract unit price per linear foot which price shall be payment in full for all labor, equipment, and materials as specified in this provision to accomplish this work.

DS_Pavt Mrkg, Polymer Cement Surface, Bike Lane Green will be measured in place and paid for at the contract unit price per square foot, which price shall be payment in full for all labor, equipment, and materials as specified in this provision to accomplish this work.

ATTACHMENT B
GENERAL DECLARATIONS

City of Ann Arbor
Guy C. Larcom Municipal Building
Ann Arbor, Michigan 48107

Ladies and Gentlemen:

The undersigned, as Bidder, declares that this Bid is made in good faith, without fraud or collusion with any person or persons bidding on the same Contract; that this Bidder has carefully read and examined the bid documents, including City Nondiscrimination requirements and Declaration of Compliance Form, Living Wage requirements and Declaration of Compliance Form, Prevailing Wage requirements and Declaration of Compliance Form, Vendor Conflict of Interest Form, Notice of Pre-Bid Conference, General Information, Bid, Bid Forms, Contract, Bond Forms, General Conditions, Standard Specifications, Detailed Specifications, all Addenda, and the Plans (if applicable) and understands them. The Bidder declares that it conducted a full investigation at the site and of the work proposed and is fully informed as to the nature of the work and the conditions relating to the work's performance. The Bidder also declares that it has extensive experience in successfully completing projects similar to this one.

The Bidder acknowledges that it has not received or relied upon any representations or warrants of any nature whatsoever from the City of Ann Arbor, its agents or employees, and that this Bid is based solely upon the Bidder's own independent business judgment.

The undersigned proposes to perform all work shown on the plans or described in the bid documents, including any addenda issued, and to furnish all necessary machinery, tools, apparatus, and other means of construction to do all the work, furnish all the materials, and complete the work in strict accordance with all terms of the Contract of which this Bid is one part.

In accordance with these bid documents, and Addenda numbered _____, the undersigned, as Bidder, proposes to perform at the sites in and/or around Ann Arbor, Michigan, all the work included herein for the amounts set forth in the Bid Forms.

The Bidder declares that it has become fully familiar with the liquidated damage clauses for completion times and for compliance with City Code Chapter 112, understands and agrees that the liquidated damages are for the non-quantifiable aspects of non-compliance and do not cover actual damages that may be shown and agrees that if awarded the Contract, all liquidated damage clauses form part of the Contract.

The Bidder declares that it has become fully familiar with the provisions of Chapter 14, Section 1:320 (Prevailing wages) and Chapter 23 (Living Wage) of the Code of the City of Ann Arbor and that it understands and agrees to comply, to the extent applicable to employees providing services to the City under this Contract, with the wage and reporting requirements stated in the City Code provisions cited. Bidder certifies that the statements contained in the City Prevailing Wage and Living Wage Declaration of Compliance Forms are true and correct. Bidder further agrees that the cited provisions of Chapter 14 and Chapter 23 form a part of this Contract.

The Bidder declares that it has become familiar with the City Conflict of Interest Disclosure Form and certifies that the statement contained therein is true and correct.

The Bidder encloses a certified check or Bid Bond in the amount of 5% of the total of the Bid Price. The Bidder agrees both to contract for the work and to furnish the necessary Bonds and insurance documentation within 10 days after being notified of the acceptance of the Bid.

If this Bid is accepted by the City and the Bidder fails to contract and furnish the required Bonds and insurance documentation within 10 days after being notified of the acceptance of this Bid, then the Bidder shall be considered to have abandoned the Contract and the certified check or Bid Bond accompanying this Bid shall become due and payable to the City.

If the Bidder enters into the Contract in accordance with this Bid, or if this Bid is rejected, then the accompanying check or Bid Bond shall be returned to the Bidder.

In submitting this Bid, it is understood that the right is reserved by the City to accept any Bid, to reject any or all Bids, to waive irregularities and/or informalities in any Bid, and to make the award in any manner the City believes to be in its best interest.

SIGNED THIS _____ DAY OF _____, 202_.

_____	_____
Bidder's Name	Authorized Signature of Bidder
_____	_____
Official Address	(Print Name of Signer Above)
_____	_____
Telephone Number	Email Address for Award Notice

ATTACHMENT C
LEGAL STATUS OF BIDDER

(The bidder shall fill out the appropriate form and strike out the other three.)

Bidder declares that it is:

* A corporation organized and doing business under the laws of the State of _____, for whom _____, bearing the office title of_____, whose signature is affixed to this Bid, is authorized to execute contracts.

NOTE: If not incorporated in Michigan, please attach the corporation's Certificate of Authority

• A limited liability company doing business under the laws of the State of _____, whom _____ bearing the title of _____ whose signature is affixed to this proposal, is authorized to execute contract on behalf of the LLC.

* A partnership, organized under the laws of the state of _____ and filed in the county of _____, whose members are (list all members and the street and mailing address of each) (attach separate sheet if necessary):

_____

_____

_____

_____

_____

* An individual, whose signature with address, is affixed to this Bid: __ _____
(initial here)

Authorized Official

_____ **Date** _____**,** 202_

(Print) Name _____ Title _____

Company:

_____

Address:

_____

Contact Phone ( ) _____ Fax ( ) _____

Email _____

ATTACHMENT D
PREVAILING WAGE DECLARATION OF COMPLIANCE

The "wage and employment requirements" of Section 1:320 of Chapter 14 of Title I of the Ann Arbor City Code mandates that the city not enter any contract, understanding or other arrangement for a public improvement for or on behalf of the city unless the contract provides that all craftsmen, mechanics and laborers employed directly on the site in connection with said improvements, including said employees of subcontractors, shall receive the prevailing wage for the corresponding classes of craftsmen, mechanics and laborers, as determined by statistics for the Ann Arbor area compiled by the United States Department of Labor. Where the contract and the Ann Arbor City Code are silent as to definitions of terms required in determining contract compliance with regard to prevailing wages, the definitions provided in the Davis-Bacon Act as amended (40 U.S.C. 278-a to 276-a-7) for the terms shall be used. Further, to the extent that any employees of the contractor providing services under this contract are not part of the class of craftsmen, mechanics and laborers who receive a prevailing wage in conformance with section 1:320 of Chapter 14 of Title I of the Code of the City of Ann Arbor, employees shall be paid a prescribed minimum level of compensation (i.e. Living Wage) for the time those employees perform work on the contract in conformance with section 1:815 of Chapter 23 of Title I of the Code of the City of Ann Arbor.

At the request of the city, any contractor or subcontractor shall provide satisfactory proof of compliance with this provision.

The Contractor agrees:

(a) To pay each of its employees whose wage level is required to comply with federal, state or local prevailing wage law, for work covered or funded by this contract with the City,

(b) To require each subcontractor performing work covered or funded by this contract with the City to pay each of its employees the applicable prescribed wage level under the conditions stated in subsection (a) or (b) above.

(c) To provide to the City payroll records or other documentation within ten (10) business days from the receipt of a request by the City.

(d) To permit access to work sites to City representatives for the purposes of monitoring compliance, and investigating complaints or non-compliance.

The undersigned states that he/she has the requisite authority to act on behalf of his/her employer in these matters and has offered to provide the services in accordance with the terms of the wage and employment provisions of the Chapter 14 of the Ann Arbor City Code. The undersigned certifies that he/she has read and is familiar with the terms of Section 1:320 of Chapter 14 of the Ann Arbor City Code and by executing this Declaration of Compliance obligates his/her employer and any subcontractor employed by it to perform work on the contract to the wage and employment requirements stated herein. The undersigned further acknowledges and agrees that if it is found to be in violation of the wage and employment requirements of Section 1:320 of the Chapter 14 of the Ann Arbor City Code it shall has be deemed a material breach of the terms of the contract and grounds for termination of same by the City.

_____
Company Name

_____
Signature of Authorized Representative Date

_____
Print Name and Title

_____
Address, City, State, Zip

_____
Phone/Email address

Questions about this form? Contact Procurement Office City of Ann Arbor Phone: 734/794-6500

ATTACHMENT E
LIVING WAGE ORDINANCE DECLARATION OF COMPLIANCE

The Ann Arbor Living Wage Ordinance (Section 1:811-1:821 of Chapter 23 of Title I of the Code) requires that an employer who is (a) a contractor providing services to or for the City for a value greater than $10,000 for any twelve-month contract term, or (b) a recipient of federal, state, or local grant funding administered by the City for a value greater than $10,000, or (c) a recipient of financial assistance awarded by the City for a value greater than $10,000, shall pay its employees a prescribed minimum level of compensation (i.e., Living Wage) for the time those employees perform work on the contract or in connection with the grant or financial assistance. The Living Wage must be paid to these employees for the length of the contract/program.

Companies employing fewer than 5 persons and non-profits employing fewer than 10 persons are exempt from compliance with the Living Wage Ordinance. If this exemption applies to your company/non-profit agency please check here [___] *No. of employees__*

The Contractor or Grantee agrees:

(a) To pay each of its employees whose wage level is not required to comply with federal, state or local prevailing wage law, for work covered or funded by a contract with or grant from the City, no less than the Living Wage. The current Living Wage is defined as $15.90/hour for those employers that provide employee health care (as defined in the Ordinance at Section 1:815 Sec. 1 (a)), or no less than $17.73/hour for those employers that do not provide health care. The Contractor or Grantor understands that the Living Wage is adjusted and established annually on April 30 in accordance with the Ordinance and covered employers shall be required to pay the adjusted amount thereafter to be in compliance with Section 1:815(3).

Check the applicable box below which applies to your workforce

[___] Employees who are assigned to any covered City contract/grant will be paid at or above the applicable living wage without health benefits

[___] Employees who are assigned to any covered City contract/grant will be paid at or above the applicable living wage with health benefits

(b) To post a notice approved by the City regarding the applicability of the Living Wage Ordinance in every work place or other location in which employees or other persons contracting for employment are working.

(c) To provide to the City payroll records or other documentation within ten (10) business days from the receipt of a request by the City.

(d) To permit access to work sites to City representatives for the purposes of monitoring compliance, and investigating complaints or non-compliance.

(e) To take no action that would reduce the compensation, wages, fringe benefits, or leave available to any employee covered by the Living Wage Ordinance or any person contracted for employment and covered by the Living Wage Ordinance in order to pay the living wage required by the Living Wage Ordinance.

The undersigned states that he/she has the requisite authority to act on behalf of his/her employer in these matters and has offered to provide the services or agrees to accept financial assistance in accordance with the terms of the Living Wage Ordinance. The undersigned certifies that he/she has read and is familiar with the terms of the Living Wage Ordinance, obligates the Employer/Grantee to those terms and acknowledges that if his/her employer is found to be in violation of Ordinance it may be subject to civil penalties and termination of the awarded contract or grant of financial assistance.

_____	_____
Company Name	Street Address
_____	_____
Signature of Authorized Representative Date	City, State, Zip
_____	_____
Print Name and Title	Phone/Email address

Attachment F

CITY OF ANN ARBOR
LIVING WAGE ORDINANCE

RATE EFFECTIVE APRIL 30, 2023 - ENDING APRIL 29, 2024

$15.90 per hour
If the employer provides health care benefits*

$17.73 per hour
If the employer does **NOT** provide health care benefits*

Employers providing services to or for the City of Ann Arbor or recipients of grants or financial assistance from the City of Ann Arbor for a value of more than $10,000 in a twelve-month period of time must pay those employees performing work on a City of Ann Arbor contract or grant, the above living wage.

V.

W. ENFORCEMENT

X. The City of Ann Arbor may recover back wages either administratively or through court action for the employees that have been underpaid in violation of the law. Persons denied payment of the living wage have the right to bring a civil action for damages in addition to any action taken by the City.

Violation of this Ordinance is punishable by fines of not more than $500/violation plus costs, with each day being considered a separate violation. Additionally, the City of Ann Arbor has the right to modify, terminate, cancel or suspend a contract in the event of a violation of the Ordinance.

* Health Care benefits include those paid for by the employer or making an employer contribution toward the purchase of health care. The employee contribution must not exceed $.50 an hour for an average work week; and the employer cost or contribution must equal no less than $1/hr for the average work week.

The Law Requires Employers to Display This Poster Where Employees Can Readily See It.

For Additional Information or to File a Complaint contact
Colin Spencer at 734/794-6500 or cspencer@a2gov.org

Revised 2/1/2023

ATTACHEMENT G

Vendor Conflict of Interest Disclosure Form

All vendors interested in conducting business with the City of Ann Arbor must complete and return the Vendor Conflict of Interest Disclosure Form in order to be eligible to be awarded a contract. Please note that all vendors are subject to comply with the City of Ann Arbor's conflict of interest policies as stated within the certification section below.

If a vendor has a relationship with a City of Ann Arbor official or employee, an immediate family member of a City of Ann Arbor official or employee, the vendor shall disclose the information required below.

1. No City official or employee or City employee's immediate family member has an ownership interest in vendor's company or is deriving personal financial gain from this contract.
2. No retired or separated City official or employee who has been retired or separated from the City for less than one (1) year has an ownership interest in vendor's Company.
3. No City employee is contemporaneously employed or prospectively to be employed with the vendor.
4. Vendor hereby declares it has not and will not provide gifts or hospitality of any dollar value or any other gratuities to any City employee or elected official to obtain or maintain a contract.
5. Please note any exceptions below:

Conflict of Interest Disclosure*	
Name of City of Ann Arbor employees, elected officials or immediate family members with whom there may be a potential conflict of interest.	( ) Relationship to employee _____ ( ) Interest in vendor's company ( ) Other (please describe in box below)

*Disclosing a potential conflict of interest does not disqualify vendors. In the event vendors do not disclose potential conflicts of interest and they are detected by the City, vendor will be exempt from doing business with the City.

I certify that this Conflict of Interest Disclosure has been examined by me and that its contents are true and correct to my knowledge and belief and I have the authority to so certify on behalf of the Vendor by my signature below:		
Vendor Name	**Vendor Phone Number**	
Signature of Vendor Authorized Representative	**Date**	**Printed Name of Vendor Authorized Representative**

Questions about this form? Contact Procurement Office City of Ann Arbor Phone: 734/794-6500, procurement@a2gov.org

ATTACHMENT H

DECLARATION OF COMPLIANCE

Non-Discrimination Ordinance

The "non discrimination by city contractors" provision of the City of Ann Arbor Non-Discrimination Ordinance (Ann Arbor City Code Chapter 112, Section 9:158) requires all contractors proposing to do business with the City to treat employees in a manner which provides equal employment opportunity and does not discriminate against any of their employees, any City employee working with them, or any applicant for employment on the basis of actual or perceived age, arrest record, color, disability, educational association, familial status, family responsibilities, gender expression, gender identity, genetic information, height, HIV status, marital status, national origin, political beliefs, race, religion, sex, sexual orientation, source of income, veteran status, victim of domestic violence or stalking, or weight. It also requires that the contractors include a similar provision in all subcontracts that they execute for City work or programs.

In addition the City Non-Discrimination Ordinance requires that all contractors proposing to do business with the City of Ann Arbor must satisfy the contract compliance administrative policy adopted by the City Administrator. A copy of that policy may be obtained from the Purchasing Manager

The Contractor agrees:

(a) To comply with the terms of the City of Ann Arbor's Non-Discrimination Ordinance and contract compliance administrative policy, including but not limited to an acceptable affirmative action program if applicable.

(b) To post the City of Ann Arbor's Non-Discrimination Ordinance Notice in every work place or other location in which employees or other persons are contracted to provide services under a contract with the City.

(c) To provide documentation within the specified time frame in connection with any workforce verification, compliance review or complaint investigation.

(d) To permit access to employees and work sites to City representatives for the purposes of monitoring compliance, or investigating complaints of non-compliance.

The undersigned states that he/she has the requisite authority to act on behalf of his/her employer in these matters and has offered to provide the services in accordance with the terms of the Ann Arbor Non-Discrimination Ordinance. The undersigned certifies that he/she has read and is familiar with the terms of the Non-Discrimination Ordinance, obligates the Contractor to those terms and acknowledges that if his/her employer is found to be in violation of Ordinance it may be subject to civil penalties and termination of the awarded contract.

_____
Company Name

_____
Signature of Authorized Representative Date

_____
Print Name and Title

_____
Address, City, State, Zip

_____
Phone/Email Address

Questions about the Notice or the City Administrative Policy, Please contact:
Procurement Office of the City of Ann Arbor
(734) 794-6500

ATTACHMENT I

CITY OF ANN ARBOR NON-DISCRIMINATION ORDINANCE

Relevant provisions of Chapter 112, Nondiscrimination, of the Ann Arbor City Code are included below. You can review the entire ordinance at www.a2gov.org/humanrights.

Intent: It is the intent of the city that no individual be denied equal protection of the laws; nor shall any individual be denied the enjoyment of his or her civil or political rights or be discriminated against because of actual or perceived age, arrest record, color, disability, educational association, familial status, family responsibilities, gender expression, gender identity, genetic information, height, HIV status, marital status, national origin, political beliefs, race, religion, sex, sexual orientation, source of income, veteran status, victim of domestic violence or stalking, or weight.

Discriminatory Employment Practices: No person shall discriminate in the hire, employment, compensation, work classifications, conditions or terms, promotion or demotion, or termination of employment of any individual. No person shall discriminate in limiting membership, conditions of membership or termination of membership in any labor union or apprenticeship program.

Discriminatory Effects: No person shall adopt, enforce or employ any policy or requirement which has the effect of creating unequal opportunities according to actual or perceived age, arrest record, color, disability, educational association, familial status, family responsibilities, gender expression, gender identity, genetic information, height, HIV status, marital status, national origin, political beliefs, race, religion, sex, sexual orientation, source of income, veteran status, victim of domestic violence or stalking, or weight for an individual to obtain housing, employment or public accommodation, except for a bona fide business necessity. Such a necessity does not arise due to a mere inconvenience or because of suspected objection to such a person by neighbors, customers or other persons.

Nondiscrimination by City Contractors: All contractors proposing to do business with the City of Ann Arbor shall satisfy the contract compliance administrative policy adopted by the City Administrator in accordance with the guidelines of this section. All city contractors shall ensure that applicants are employed and that employees are treated during employment in a manner which provides equal employment opportunity and tends to eliminate inequality based upon any classification protected by this chapter. All contractors shall agree not to discriminate against an employee or applicant for employment with respect to hire, tenure, terms, conditions, or privileges of employment, or a matter directly or indirectly related to employment, because of any applicable protected classification. All contractors shall be required to post a copy of Ann Arbor's Non-Discrimination Ordinance at all work locations where its employees provide services under a contract with the city.

Complaint Procedure: If any individual believes there has been a violation of this chapter, he/she may file a complaint with the City's Human Rights Commission. The complaint must be filed within 180 calendar days from the date of the individual's knowledge of the allegedly discriminatory action or 180 calendar days from the date when the individual should have known of the allegedly discriminatory action. A complaint that is not filed within this timeframe cannot be considered by the Human Rights Commission. To file a complaint, first complete the complaint form, which is available at www.a2gov.org/humanrights. Then submit it to the Human Rights Commission by e-mail (hrc@a2gov.org), by mail (Ann Arbor Human Rights Commission, PO Box 8647, Ann Arbor, MI 48107), or in person (City Clerk's Office). For further information, please call the commission at 734-794-6141 or e-mail the commission at hrc@a2gov.org.

Private Actions For Damages or Injunctive Relief: To the extent allowed by law, an individual who is the victim of discriminatory action in violation of this chapter may bring a civil action for appropriate injunctive relief or damages or both against the person(s) who acted in violation of this chapter.

THIS IS AN OFFICIAL GOVERNMENT NOTICE AND
MUST BE DISPLAYED WHERE EMPLOYEES CAN READILY SEE IT.

Michigan Department
Of Transportation
CP-347 (04/10)

MICHIGAN DEPARTMENT OF TRANSPORTATION
CERTIFIED PAYROLL
COMPLETION OF CERTIFIED PAYROLL FORM FULFILLS THE MINIMUM MDOT PREVAILING WAGE REQUIREMENTS

(1) NAME OF CONTRACTOR / SUBCONTRACTOR (CIRCLE ONE)	(2) ADDRESS		
(3) PAYROLL NO. / (4) FOR WEEK ENDING	(5) PROJECT AND LOCATION		(6) CONTRACT ID

(a) EMPLOYEE INFORMATION	(b) WORK CLASSIFICATION	(c) Hour Type	(d) DAY AND DATE HOURS WORKED ON PROJECT							(e) TOTAL HOURS ON PROJECT	(f) PROJECT RATE OF PAY	(g) PROJECT RATE OF FRINGE PAY	(h) GROSS PROJECT EARNED / GROSS WEEKLY EARNED	(i) TOTAL WEEKLY HOURS WORKED ALL JOBS	(j) DEDUCTIONS FICA	FEDERAL	STATE		OTHER	TOTAL DEDUCT	(k) TOTAL WEEKLY WAGES PAID FOR ALL JOBS
NAME:										0			$0.00							$0.00	$0.00
ETH/GEN: ID #:	GROUP/CLASS #:	S								0											
NAME:										0			$0.00							$0.00	$0.00
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NAME:										0			$0.00							$0.00	$0.00
ETH/GEN: ID #:	GROUP/CLASS #:	S								0											

Date _____

I, _____ _____
(Name of Signatory Party) (Title)

do hereby state:

(1) That I pay or supervise the payment of the persons employed by

_____ on the
(Contractor or Subcontractor)

_____; that during the payroll period commencing on the
(Building or Work)

_____ day of _____, _____, and ending the _____ day of _____, _____,
all persons employed on said project have been paid the full weekly wages earned, that no rebates have been or will be made either directly or indirectly to or on behalf of said

_____ from the full
(Contractor or Subcontractor)

weekly wages earned by any person and that no deductions have been made either directly or indirectly from the full wages earned by any person, other than permissible deductions as defined in Regulations, Part 3 (29 C.F.R. Subtitle A), issued by the Secretary of Labor under the Copeland Act, as amended (48 Stat. 948, 63 Start. 108, 72 Stat. 967; 76 Stat. 357; 40 U.S.C. § 3145), and described below:

_____

_____

_____

_____

(2) That any payrolls otherwise under this contract required to be submitted for the above period are correct and complete; that the wage rates for laborers or mechanics contained therein are not less than the applicable wage rates contained in any wage determination incorporated into the contract; that the classifications set forth therein for each laborer or mechanic conform with the work he performed.

(3) That any apprentices employed in the above period are duly registered in a bona fide apprenticeship program registered with a State apprenticeship agency recognized by the Bureau of Apprenticeship and Training, United States Department of Labor, or if no such recognized agency exists in a State, are registered with the Bureau of Apprenticeship and Training, United States Department of Labor.

(4) That:

(a) WHERE FRINGE BENEFITS ARE PAID TO APPROVED PLANS, FUNDS, OR PROGRAMS

☐ – in addition to the basic hourly wage rates paid to each laborer or mechanic listed in the above referenced payroll, payments of fringe benefits as listed in the contract have been or will be made to appropriate programs for the benefit of such employees, except as noted in section 4(c) below.

(b) WHERE FRINGE BENEFITS ARE PAID IN CASH

☐ – Each laborer or mechanic listed in the above referenced payroll has been paid, as indicated on the payroll, an amount not less than the sum of the applicable basic hourly wage rate plus the amount of the required fringe benefits as listed in the contract, except as noted in section 4(c) below.

(c) EXCEPTIONS

EXCEPTION (CRAFT)	EXPLANATION

REMARKS:

NAME AND TITLE	SIGNATURE

THE WILLFUL FALSIFICATION OF ANY OF THE ABOVE STATEMENTS MAY SUBJECT THE CONTRACTOR OR SUBCONTRACTOR TO CIVIL OR CRIMINAL PROSECUTION. SEE SECTION 1001 OF TITLE 18 AND SECTION 231 OF TITLE 31 OF THE UNITED STATES CODE.

Geotechnical Investigation Report

2020 Miscellaneous Geotechnical Services

Ann Arbor, Michigan

CTI Project No. 1208070085

Prepared for

City of Ann Arbor
Public Services Area
Project Management Services Unit
301 East Huron Street
Ann Arbor, MI 48107
734.794.6110
734.994.8297 FAX

December 2020

Prepared by

CTI and Associates, Inc.
28001 Cabot Drive, Ste 250
Novi, Michigan 48377
248.486.5100
248.486.5050 FAX

Protecting, Enhancing, and Restoring Our Environment

December 22, 2020

Mr. Igor V. Kotlyar, P.E.
Project Manager
City of Ann Arbor – Engineering
Ann Arbor, MI 48107

RE: 2020 Miscellaneous Geotechnical Services
City of Ann Arbor
Ann Arbor, Michigan
CTI Project No. 1208070085

Dear Mr. Kotlyar:

As requested, CTI and Associates, Inc. (CTI) has completed a geotechnical investigation as part of the 2020 Miscellaneous Geotechnical Services Contract. A total of 43 soil borings and 41 pavement cores were completed through City of Ann Arbor (City) streets. The number, depth, and locations of the soil borings were selected by the City.

The enclosed report presents the results of our findings and an engineering interpretation of these findings with respect to the soil related phases of the project including estimates of resilient moduli to be used for pavement design. Recommendations for the construction observation and preparation of the encountered subgrade soils to improve their suitability for pavement construction are included in the report sections that follow. Table 2 in the enclosed report identifies borings where conditions requiring special attention, such as very loose, soft, or very wet soils were encountered.

Our evaluation was performed in general accordance with the scope of services outlined in CTI Proposal No. 119PRO8070-025 dated November 21, 2019 and the Professional Services Agreement between the City of Ann Arbor and CTI dated May 5, 2020. We appreciate the opportunity to be of service to you on this project. If you have any questions regarding this report or if we can be of further assistance, such as providing field monitoring and quality control inspection services during construction, please contact our office.

Sincerely,

CTI and Associates, Inc.

Mohammad Kabalan, P.E.
Project Engineer

Amber Spears, E.I.T.
Project Engineer

TABLE OF CONTENTS

Appendix

- **Boring Location Maps**
- **Soil Boring Logs**
- **Core Photo Log**
- **General Notes for Soil Classificaiton**

1.0 INTRODUCTION

1.1 GENERAL

This report presents the results of the geotechnical investigation performed by CTI and Associates, Inc. (CTI) as part of the 2020 Miscellaneous Geotechnical Services Contract. A total of 43 soil borings and 41 pavement cores were completed through City of Ann Arbor (City) streets. The number, depth, and locations of the soil borings were selected by the City. This report presents the results of CTI's findings and an engineering interpretation of these findings with respect to the soil related phases of the project including estimates of resilient moduli to be used for pavement design.

In general, soils encountered at several locations will require preparation as outlined in Section 5 of this report to be able to support new pavement. The soils encountered at some of these locations were found to have deficiencies and it is advisable that they be undercut and replaced as discussed in this report. Recommendations for the construction observation and preparation of the encountered subgrade soils to improve their suitability for pavement construction are included in the report sections that follow. Table 2 of the report identifies borings where conditions requiring special attention, such as very loose, soft, or very wet soils were encountered.

CTI's evaluation was performed in general accordance with the scope of services outlined in CTI Proposal No. 119PRO8070-025 dated November 21, 2019 and the Professional Services Agreement between the City of Ann Arbor and CTI dated May 5, 2020.

1.2 PURPOSE AND SCOPE

The purpose of this study was to determine the general subsurface conditions beneath each street by drilling test borings and to evaluate the encountered soils for suitability with respect to pavement support, drainage, and utility support. Specifically, the report presents our evaluations and recommendations regarding the following items:

A. General subsurface (soil and groundwater) conditions at the site.

B. Design recommendations, specifically pavement design parameters including estimates of resilient moduli of encountered soils.

C. Construction recommendations including include site preparation and earthwork operations, groundwater conditions and controls, potential construction problems and recommendations regarding quality control during construction.

The evaluations and recommendations discussed in this report are based on the soil conditions encountered in the test borings performed at the specific boring locations, and on the date indicated on the boring logs. The soil conditions may vary at locations other than the actual soil boring locations. These variations may not become evident until the time of construction.

If variations in the reported soil conditions are encountered, CTI should be contacted immediately. In such a case, it may be necessary for CTI to reevaluate the recommendations of this report. Such a reevaluation may be possible from on-site observations or may require additional investigations. If any such variations are revealed, they may result in increased construction costs. A contingency should be provided in the project budget to accommodate such variations.

CTI's authorized scope of services included a geotechnical study of the subject site and did not include an environmental assessment for determining the presence or absence of hazardous or toxic materials in the soil or groundwater at, below or around the site. The presence or absence of contaminated material is

not implied, inferred, or suggested by this report or the results of this study. Any statement contained within this report or presented on the soil boring logs regarding odors, colors, or unusual items are strictly for informational purposes only. If any recognized environmental concerns are identified for this site, the evaluations and/or recommendations presented in this report may require amendment.

2.0 SITE AND PROJECT CHARACTERISTICS

2.1 PROJECT DESCRIPTION

CTI was awarded the 2020 Miscellaneous Geotechnical Services bundle on May 5, 2020. The bundle included a total of 41 boring locations and 39 pavement cores on 6 different streets within the City. The proposed boring locations were marked in the field by City personnel prior to field activities. Following the boring location marking by the City, CTI requested the Miss Dig service to locate the existing underground utility locations at each boring location. Several borings were offset from the marked locations due to conflicts with underground utilities, overhead obstructions (trees and overhead electric lines), and/or to maintain traffic flow. Two additional locations on Main Street were drilled due to underground obstructions encountered. Table 1 presents the specific breakdown of the number of requested borings per street, the boring depths, and the limits of exploration. All the completed soil borings were located within the streets.

Table 1. Summary of requested soil borings

Street	Cross Streets	No. of Borings	No. of Pavement Cores	Depth (ft)	Abbreviation*
Scio Church Road	S. Maple to S. Seventh Street	8	7	5	SCI
S. Seventh Street	Scio Church Road to Greenview Drive	3	3	5	SEV
S. Seventh Street	Scio Church Road to Greenview Drive	4	4	20	SEV
Greenview Drive	Scio Church Road to S. Seventh Street	7	7	5	GRV
N. Main Street	N. Main Street to Lake Shore Drive	5**	5**	20	MAI
Newport Road	Newport Road to Bird Drive	1		15	NEW
W. Liberty Street	S. Seventh Street to Crest Avenue	5	5	5	LIB
Plymouth Road	Point Lane to Maiden Lane	8	8	5	PLY
	Total	**41**	**39**		

*Note: this abbreviation is used throughout the report and appendices to aid the reader in correlating the results of the field and laboratory tests and observations.
**Note: two additional borings were completed on Main Street due to underground obstructions at initial locations.

The recommendations presented in this report are based on the provided and/or assumed project information and the results of our geotechnical exploration. If any of the above noted project information is considered incorrect or is changed, CTI should be informed in writing so that a review can be performed and any necessary revisions to our recommendations can be made.

3.0 INVESTIGATION PROCEDURES

3.1 FIELD INVESTIGATION

CTI's field investigation consisted of drilling 43 soil borings and 41 pavement cores through 7 different streets within Ann Arbor City limits. The approximate as-drilled locations of the borings are listed on the

boring location maps, included in the appendix of this report. As requested, the borings were extended to different depths below the top of pavement as shown in Table 1.

Several boring locations were in conflict with overhead and underground utilities and were relocated as a result. Borings were relocated in a way that maintained proper coverage (i.e., boring spacing) of the investigated area to the extent possible.

The borings were located in the field by City personnel prior to the drilling activities. The drilling operations were performed under direction of CTI personnel between December 1 and December 10, 2020. Prior to drilling the soil borings, the pavement structure was explored with a core drill equipped with six-inch nominal diameter core barrels. After extraction of the cores at each location, when possible, the core samples were measured and labeled. The soil borings were then drilled with a truck-mounted drill rig using hollow stem augers. Soil samples were obtained at 2.5-foot-intervals by the Standard Penetration Test Method (ASTM D1586), whereby a 2-inch outside diameter split-barrel sampler is driven into the soil with a 140-pound weight falling freely through a distance of 30 inches. The sampler is generally driven three successive 6-inch increments, with the number of blows for each increment being recorded. The number of blows required to advance the sampler from 6 to 18 inches is termed the Standard Penetration Resistance, N.

The soil samples obtained with the split-barrel sampler were sealed in glass jar containers and transported to our laboratory along with the retrieved pavement core samples for further classification and testing. After completion of the drilling operations, the boreholes were backfilled with excavated soil (i.e., auger cuttings) and disturbed pavement patched with a cold asphalt patching mix.

Soil and groundwater conditions observed in the test borings have been evaluated and are presented on the boring logs included in the Appendix. To aid in understanding the data presented on the boring logs, "General Notes for Soil Classification," describing nomenclature used in soil descriptions, are also included in the Appendix. It should be noted that the soil descriptions reported on the test boring logs are based upon field logs prepared by experienced drillers with modifications made based on the results of laboratory testing and engineering review

3.2 Laboratory Testing

The laboratory testing program was directed towards determining the general soil classification and physical properties of the soil pertinent for pavement design and site preparation. All laboratory testing was performed in general accordance with applicable ASTM test method standards. The laboratory testing consisted of visual soil classification of every sample and natural moisture content testing of cohesive soil samples. The unconfined compressive strength of selected cohesive samples was also estimated based on the resistance to a calibrated spring-loaded hand penetrometer. At the time of the preparation of this report, no further lab testing was requested by the City.

The soil samples were visually classified in general accordance with the Unified Soil Classification System (USCS). The estimated USCS group symbol is shown in parentheses following the written description of the various strata on the boring logs. The results of all laboratory tests are indicated on the boring logs at the depths the samples were obtained and/or on the "Summary of Laboratory Test Results" included in the Appendix.

4.0 GENERAL SUBSURFACE CONDITIONS

The following paragraphs present generalized soil and groundwater conditions encountered at the subject site based on the available test borings.

Greenview Street: The pavement encountered on Greenview Street consisted of approximately 3 ½ to 6 ½ inches of asphalt. The subgrade material mostly consisted of very stiff and hard silty clay.

Liberty Street: The pavement encountered on Ashley street consisted of approximately 4 to 6 ½ inches of asphalt. Underneath the asphalt, a layer of concrete ranging in thickness from 4 to 8 ½ inches was encountered. The subgrade material mostly consisted of loose sands with varying amounts of silt and clay. These soils will require improvement as outlined in Section 5 of this report.

Main Street: The pavement encountered on Main Street consisted of approximately 5 ½ to 9 ¾ inches of asphalt. The asphalt was underlain by a layer of concrete between 7 and 8 inches thick. At two of the planned locations (MAI-2 and MAI-3), an obstruction was encountered at a depth of approximately 5 feet which therefore led to abandoning drilling at those locations. Two alternate locations (MAI-2A and MAI-3A) were identified and drilled instead. Stiff and medium stiff fine-grained soils were encountered at several locations and would require improvement as outlined in Section 5 of this report.

Plymouth Road: The pavement encountered on Plymouth Road consisted of approximately 6 to 7 ½ inches of asphalt. The subgrade material mostly consisted of sand with varying amounts of silt and clay. Gravelly sand was encountered underneath the sand layer at PLY-1 and PLY-2.

Scio Church Road: The pavement thickness on Scio Church Road ranged from approximately 3 ½ inches to 8 ½ inches of asphalt. SCI-7 was drilled in the median and therefore no pavement was encountered. Except for thin layers of sand encountered underneath the pavement, Silty Clays were mostly encounted throughout the entire depth of exploration with a few exceptions. Therefore, the deeper soils at this location are not suitable for underground stormwater infiltration features because of the relatively low permeability of silty clays. Medium stiff silty clays were encountered at locations of SCI-2, SCI-3, and SCI-7 which would require improvement as outlined in Section 5 of this report.

Seventh Street: The pavement on Seventh Street consisted of approximately 3 ¼ to 11 ¼ inches of asphalt. The subgrade material mainly consisted of Clay and Silty Clay material. Five of the borings on this street were drilled to a depth of 20 feet below ground surface. The deeper strata also mainly consisted of Clay and Silty Clay, which is typically not suitable for underground stormwater infiltration options. Soft and stiff clays were encountered between SEV-4 and SEV-7 which would require improvement as outlined in Section 5 of this report.

Table 2 below identifies areas where conditions requiring special attention were encountered. For a more detailed description of the subsurface conditions encountered at the site, please refer to the individual soil boring logs and the Boring Location Plan provided in the appendix. For a complete list of pavement core measurements, refer to Table A.1 at the end of the report.

Table 2. Areas requiring special attention

Boring Number	Notes
MAI-4	Very loose sands encountered near surface
PLY-6	Soft clays encountered near surface.
SEV-3	Soft clays encountered near surface

4.1 Soil and Groundwater Conditions

4.1.1 Summary

The above subsurface description is of a generalized nature and is intended to highlight the major stratification features and material characteristics. The individual test boring logs should be reviewed for specific information. The stratification depths shown on the test boring logs represent the soil conditions at the actual boring locations only. Variations may occur between and/or beyond the boring locations. The nature and extent of any variations may not become evident until the time of construction. If significant variations in the soil conditions are discovered during construction, it should be immediately brought to the attention of CTI, before removal.

Table 3 below presents a summary of the encountered subgrade conditions in addition to an estimate of the resilient modulus of the subgrade materials, located under the existing road base at each location. These estimates are based on the assumption that the base material will be removed, and the subgrade will be prepared according to the recommendations presented in Section 5. If the City decides to reuse part or all of the existing base material, leaving the subgrade in its current condition, CTI should be informed of the proposed design to determine if it will be necessary to revise the values given below.

Table 3. Summary of subgrade conditions at explored locations

Street	No. of Borings	Depth (ft)	Ex. Asphalt Pavement Thickness (in)	Ex. Concrete Pavement Thickness * (in)	Ex. Base Thickness (in)	Base Type	Subgrade Soil Description	Estimated Resilient Modulus, M_r (ksi)**
Scio Church Road	7	5	3.5-6.5	N/A	6-20	Sand with gravel	Silty clay with varying amounts of sand and gravel	6
Scio Church Road	1	20	N/A	N/A	N/A	N/A	Silty clay with sand and gravel	6
S. Seventh Street	3	5	4.75-8.5	N/A	2.5-8	Sand with gravel	Silty clay with sand and gravel	6
S. Seventh Street	5	20	3.25-11.25	N/A	1-16	Sand with gravel	Silty clay and clay	6
Greenview Drive	7	5	N/A	N/A	3-8.5	Sand with gravel	Silty clay with varying amounts of sand and gravel	6
N. Main Street	5	20	5.5-9.75	7-8	6-15	gravel / sand	Fine to coarse sand with silty clay underneath	10
Newport Road.	1	15	N/A	N/A	N/A	N/A	Fine to medium sand with small amounts of silt	11
W. Liberty Street	5	10	4-6.5	4-8.5	4	Silty sand	Fine to coarse sand with varying amounts of silt and clay Gravelly sand in 1 location	11
Plymouth Road	9	5	6-7.5	N/A	5	Sand with gravel	Fine to coarse sand with varying amounts of silt and clay	11

*Note that concrete was not found in all boring locations

**Note: The resilient modulus values were conservatively estimated based on the classification of the subgrade material using correlations presented in the Federal Highway Administration Geotechnical Aspects of Pavements Reference Manual

4.2 Groundwater Conditions

The drillers looked for indications of groundwater seepage both during and upon completion of the drilling operations. Groundwater seepage was not observed within any of the test borings either during or after drilling. During drilling, water was encountered at relatively shallow depths (less than 5 feet) in one boring on Plymouth Road (PLY-6). After drilling, water was observed in 7 borings at depths ranging from 2.8 to 11.6 feet below the top of pavement.

The short-term groundwater level observations from the borings are not necessarily indicative of the static, long-term groundwater conditions. The groundwater conditions discussed herein and indicated on the soil boring logs represent those encountered at the time of the field investigation. The groundwater levels, including perched groundwater accumulations, should be expected to fluctuate seasonally, based on variations in precipitation, evaporation, surface run-off and other factors not evident at the time of our investigation. Typically, groundwater levels and volumes are expected to be higher in the winter and spring seasons compared to the summer and fall months. The actual groundwater levels at the time of construction may vary from those provided herein.

The above soil and groundwater conditions represent a generalized summary of the subsurface conditions and material characteristics. The individual Test Boring Logs should be reviewed for specific information and details relating to specific areas of the site.

5.0 ANALYSIS AND DESIGN RECOMMENDATIONS

At the time this report was prepared, the overall project was in the planning and design stage. The following recommendations have been developed based on the previously assumed/described project characteristics and subsurface conditions. If there is any significant change in the project characteristics from those presented earlier, a review should be made by CTI to determine if any modifications in the evaluations and recommendations included in this report will be required.

In general, soils encountered near the surface (shallower than 5 feet) in the several of the locations will require preparation as outlined in this section in order to be able to support new pavement. For the purpose of this report, these soils were identified for improvement using the following criteria:

- Are granular and classified as having loose or very loose relative density (N < 11)
- Are cohesive and exhibit an unconfined compressive strength less than 4000 psf when tested with a pocket penetrometer
- Contain organic material

Based on the above criteria, soils on Liberty Street, Main Street, Scio Church Road, and Seventh Street will require improvement as discussed in the following sections. Regardless if improvement is needed or not, general site preparation methods presented in the following sections should be applied to develop a suitable subgrade for the placement of pavement materials. CTI assumes that the full existing pavement section including the base material will be removed to allow the preparation of the subgrade. If the owner is willing to assume the risks related to decreased pavement life/serviceability, some of this material could be left in place. However, CTI must be notified to determine if any modifications in the estimated resilient modulus value is necessary. It is advisable that the inadequate soils encountered at locations described in Table 2 above be undercut and replaced as discussed in Section 5.1 as the soils at these locations were found to be very loose or soft.

5.1 SITE PREPARATION

At the start of earthwork operations, all existing pavement and any deleterious material should be removed in their entirety from the new pavement areas. The thickness of the existing pavement, aggregate base and near surface fill layer (where present) should be expected to vary across the site. The depth of unsuitable soil to be removed should be determined by CTI at the time of stripping and rough grading. A CTI representative should also be on-site during the subgrade preparation operations to determine the suitability of the subgrade for pavement support.

The subgrade soils should be evaluated and prepared during construction as follows. After rough grade has been achieved in cut areas and prior to fill placement in fill areas, the exposed subgrade should be thoroughly proofrolled. Proofrolling should be performed with a heavily loaded front-end loader, tandem-axle dump truck or other suitable rubber-tired vehicles. The purpose of the proofrolling operations is to locate localized areas of excessively loose, soft or weak subgrade soils which may be present at the time of construction. Soils that are observed to rut or deflect excessively during proofrolling should be removed or stabilized by conventional methods such as disking, drying, and re-compacting. The loose sands encountered in the majority of the boring locations can be improved using these methods. Note that these conditions may exist elsewhere between borings.

If it is not feasible to dry and re-compact the unsuitable subgrade soils due to unfavorable weather conditions, scheduling, etc., it may be necessary to remove such soils and replace them with engineered fill. The thickness of the undercut will depend on the severity of the unstable soils encountered at specific locations. If significant subgrade instability is observed, a layer of crushed aggregate may be necessary to stabilize the subgrade before placement of the selected engineered fill material. The use of a woven geotextile below the crushed aggregate layer could also be considered to provide additional subgrade stability.

It should be noted that the actual locations and depths of any undercutting and/or stabilization should be established in the field at the time of construction. The extent to which yielding subgrades may be a problem is difficult to predict beforehand since it is dependent upon several factors including seasonal conditions, precipitation, construction practices, etc.

Once the site has been evaluated, proofrolled, and/or stabilized, the inspected area should not be allowed to remain exposed more than one day or to appreciable precipitation or other wet conditions. it should also not be subjected to construction traffic, otherwise a re-evaluation should be made. The site earthwork operations should be carried out during a period of dry weather, if possible. This should minimize potential subgrade problems, although they may not be eliminated. The severity of subgrade instability will depend to a high degree on the weather conditions prevailing during construction.

5.2 Fill Materials and Compaction

After subgrade preparation and observation have been completed, engineered fill placement may begin. Any fill placed below the proposed pavement area should be an approved material that is free of topsoil, organics, frozen soil or any other unsuitable material.

If clay soils or granular soils containing greater than 12 percent clay are used as fill, close moisture content control will be required to achieve the recommended degree of compaction. Cohesive fill materials should be low to medium in plasticity, with a liquid limit less than 40 and plasticity index less than 20. Wet cohesive soils are difficult to compact and the specified compaction may not be achieved. Wet cohesive soils may require drying or mixing with dry soil to facilitate compaction. If water must be added to dry soil, it should be uniformly applied and thoroughly mixed into the soil by disking or scarifying.

The engineered fill should be placed in uniform horizontal layers not exceeding 8 to 12 inches in loose thickness for clean granular soils and 4 to 6 inches in loose thickness for clay soils (or clayey granular soils exhibiting cohesive characteristics), depending on the type and size of compaction equipment used. The lift thickness for sands that have an appreciable amount of fines (i.e., silt or clay) should be decreased accordingly. The engineered fill should be compacted to achieve a density of not less than 95 percent of the maximum dry density as determined by the Modified Proctor Compaction Test (ASTM D1557). Also, the upper 12 inches of the subgrade soils should be compacted, prior to any fill placement, to achieve a density of not less than 95 percent of the maximum dry density as determined by the Modified Proctor test. The as-compacted moisture content of the engineered fill should be within 2 to 3 percent of the optimum moisture content for the soil. The placement and testing of engineered fill should be observed and properly documented in the field by CTI.

We recommend that the contract specifications include provisions for moisture conditioning of any on-site soils that are to be used as engineered fill. Some of the native soils may require moisture conditioning to allow for proper compaction. The success of aeration and drying of clay soils will be dependent on the time of year, the prevailing weather conditions and the contractor's effort. During cold and/or wet periods of the year, the saturated or disturbed clay soils will be more difficult to dry. In this case, the contractor may have to use drier on-site soils or imported sand.

If site grading or other construction activity is planned during cold weather, it is recommended that proper winter construction practices are followed. All snow and ice should be removed from cut and fill areas prior to grading. Frozen materials should not be used as engineered fill and no fill, footings, slabs or pavement should be placed on soils that are frozen or contain frozen material.

5.3 Support of Pavement

The subgrade soils should be prepared in accordance with the methods presented in Section 5.1 of this report for support of the pavement sections. Special attention should be paid to the areas of concern mentioned in Section 5.0 and Table 2. As discussed previously, we recommend the subgrade be subjected to a comprehensive proofrolling and evaluation program to determine the overall suitability at the time of construction. The areas requiring subgrade improvement should be determined in the field by CTI through proper inspection and evaluation at the time of construction. Provisions should be established in the construction documents for this purpose.

The long-term performance of the pavement will typically be a function of the quality of the subgrade soil at the time of construction along with the quality, thickness and strength of the overall pavement section. The most critical portion of the subgrade is the 3-4 feet immediately beneath the pavement section, which provides the primary strength needed for pavement section support. Beyond that, the impact of poor soils then starts to diminish with depth. Soils in a saturated condition, uncontrolled fill and/or organic materials present within the upper 2 to 3 feet of the pavement subgrade can be detrimental if the design does not account for this substandard soil condition, especially during the spring freeze-thaw cycles.

The pavement system should be properly drained to reduce the potential for weakening the subgrade. Provisions should be made to prevent surface run-off water from accumulating within the aggregate base course of the pavement. The pavement and underlying subgrade should be suitably crowned or sloped to promote effective surface drainage and prevent water ponding.

We anticipate that the pavement surface will drain via storm sewers (where present) and via run-off methods where storm sewers are not available. Where the reconstruction project includes the installation of a storm sewer system in clay soils, finger drains should be installed at all catch basin locations to provide drainage for surface water that may become trapped in the pavement aggregate base course. At a minimum, a system of finger drains or stub drains should be placed around all catch basins within the pavement areas to minimize the accumulation of water in the frost susceptible subgrade soils. These under drains should be installed below the aggregate base course layer of the pavement system and be properly protected with free-draining coarse aggregate material and filter fabric.

All pavements require regular maintenance and occasional repairs to keep them in a serviceable condition. Of particular value is timely sealing of joints and cracks, which if left un-repaired, can serve to permit water to enter the pavement section and cause rapid deterioration of the pavement during freeze-thaw cycles. The need for such routine maintenance and repair is not necessarily indicative of premature pavement failure. However, if appropriate maintenance and repairs are not performed on a timely basis, the serviceable life of the pavement can be reduced significantly.

Actual pavement section thickness should be provided by the design civil engineer based on design traffic loads and volume and the owner's design life requirements. All pavement materials and procedures should conform to standard MDOT and City of Ann Arbor requirements.

Based on the results of the soil borings performed, Resilient Modulus values (M_r) for the encountered soils have been estimated and are presented in Table 3, along with a summary of the encountered pavement and subgrade conditions. The resilient modulus values were conservatively estimated based on

the classification of the subgrade material using correlations presented in the Federal Highway Administration Geotechnical Aspects of Pavements Reference Manual

6.0 GENERAL CONSTRUCTION PROCEDURES AND RECOMMENDATIONS

6.1 GENERAL

Experience indicates that variations in soil conditions are encountered during construction. In order to permit correlation between the soil boring data and the actual soil conditions encountered during construction, it is recommended that a continuous inspection and review of the soil related phases of construction work be carried out. We recommend the site preparation activities, engineered fill placement and foundation construction be observed by a qualified engineering technician. The technician should perform the appropriate type and number of field tests needed to verify compliance with construction specifications and that the pavement subgrade soils are suitable.

The existing clayey soils found in various boring locations noted above could be potentially troublesome for some earthwork operations, depending on the prevailing moisture content. These soils have relatively poor drainage characteristics and are susceptible to ponding, subsequent softening and pumping due to construction traffic. During a wet season or periods of heavy precipitation, the silty and clayey subgrade soils may become unstable and provide limited support for some rubber-tired construction equipment. If pumping of the subgrade occurs due to construction traffic, an evaluation of the site and construction procedures should be made by a geotechnical engineer.

6.2 UTILITY EXCAVATIONS

In general, all excavations should be safely sheeted, shored, sloped or braced in accordance with OSHA guidelines. Construction traffic, stockpiles of soil and construction materials should be kept away from the edges of the excavations a lateral distance at least 1.5 times the depth of the excavation.

Utility excavations are generally expected to consist of open-cut methods. In this regard, the utility trench sidewalls should be adequately braced or sloped back to prevent sloughing and caving. In any case, appropriate measures will be required to maintain the stability of excavation sidewalls. The required measures will depend on the depth and width of excavations and groundwater conditions at specific locations. The excavation support system for utilities could consist of internally braced sheeting, trench boxes or sliding trench shields. If material is stored or equipment is operated near an excavation, stronger shoring must be used to resist the extra pressure due to the superimposed loads.

The angle of the excavation side slopes should be decided based on the soil type and unconfined compressive strength of the excavated soil per MIOSHA requirements. For excavations greater than 5 feet and less than 20 feet in depth, MIOSHA has different sloping requirements for a variety of soil types. The table presented below provides a summary of the requirements for informational purposes only. Prior to designing or constructing a stable and safe excavation, the contractor must refer to MIOSHA standards.

Table 4. Maximum Allowable Angle of Repose for the Side of an Excavation

Soil Type	Maximum Allowable Excavation Side Slope		Maximum Angle of Repose (Degrees)
	Horizontal	Vertical	
Clay with minimum unconfined compressive strength of 2.5 tsf	1	2	63
Clay with minimum unconfined compressive strength of 1.5 tsf	2	3	56
Clay with minimum unconfined compressive strength of 1.0 tsf; Dry granular soils; Dry sand and clay mixtures	1	1	45
Granular soil with wet clay or silt seams; Clay with a minimum unconfined compressive strength of 1.0 tsf that contains running sand seams	1½	1	34
Saturated granular soil; Clay with an unconfined compressive strength less than 1.0 tsf	2	1	26
Running/sloughing soil (sand or clay)	3	1	18

Soils exposed in the bases of all satisfactory excavations should be protected against any detrimental change in conditions such as disturbances from rain and freezing. Surface run-off water should be drained away from the excavations and not allowed to pond. If possible, all utilities should be placed the same day the excavation is made. If this is not possible, the footing excavations should be adequately protected.

6.3 Groundwater Control

Based on the observed groundwater conditions in the test borings, no significant groundwater related problems are anticipated during pavement construction. However, the conditions encountered at the majority of the boring locations are conducive to the development of perched water accumulations within the granular soils. If perched accumulations occur, some groundwater seepage could be encountered.

Proper groundwater control measures should be maintained during all earthwork activities in order to limit the disturbance of the subgrade soils. These measures should include a provision of temporary drainage ditches to discharge any perched water outside the construction area. For relatively shallow excavations, it appears that minor perched groundwater accumulations, if encountered, should be controllable by conventional pumping methods from standard sump pits extending into the natural clay soils.

Any groundwater related problems should be evaluated in the field by a qualified geotechnical engineer so that the best remedial measures can be determined.

Table A.1. Measured thickness of pavement cores (to nearest ¼")

Core Number	Surface Material	Surface Material Thickness (in)	Underlying Pavement Material	Underlying Material Thickness (in)
SCI-1	Asphalt	6.38	None	
SCI-2	Asphalt	4.17	None	
SCI-3	Asphalt	5.27	None	
SCI-4	Asphalt	3.43	None	
SCI-5	Asphalt	3.93	None	
SCI-6	Asphalt	5.78	None	
SCI-8	Asphalt	5.53	None	
SEV-1	Asphalt	8.15	None	
SEV-2	Asphalt	8.43	None	
SEV-3	Asphalt	11.23	None	
SEV-4	Asphalt	3.38	None	
SEV-5	Asphalt	5.13	None	
SEV-6	Asphalt	3.94	None	
SEV-7	Asphalt	7.61	None	
SEV-8	Asphalt	4.79	None	
GRV-1	Asphalt	6.63	None	
GRV-2	Asphalt	5.33	None	
GRV-3	Asphalt	4.21	None	
GRV-4	Asphalt	6.07	None	
GRV-5	Asphalt	2.18	None	
GRV-6	Asphalt	6.60	None	
GRV-7	Asphalt	3.54	None	
MAI-2	Asphalt	9.71	Concrete	7.27
MAI-3	Asphalt	9.08	Concrete	7.64
MAI-4	Asphalt	8	None	
MAI-5	Asphalt	5.52	None	
LIB-1	Asphalt	4.11	Concrete	8.43
LIB-2	Asphalt	4.84	Concrete	7.85
LIB-3	Asphalt	4.15	Concrete	4.05
LIB-4	Asphalt	4.55	Concrete	7.13
LIB-5	Asphalt	6.31	Concrete	7
PLY-1	Asphalt	6.67	None	
PLY-2	Asphalt	6.90	None	
PLY-3	Asphalt	6.74	None	
PLY-4	Asphalt	7.43	None	
PLY-5	Asphalt	6.67	None	
PLY-6	Asphalt	6.64	None	
PLY-7	Asphalt	6.77	None	
PLY-8	Asphalt	6.03	None	
PLY-9	Asphalt	7.35	None	

Appendix

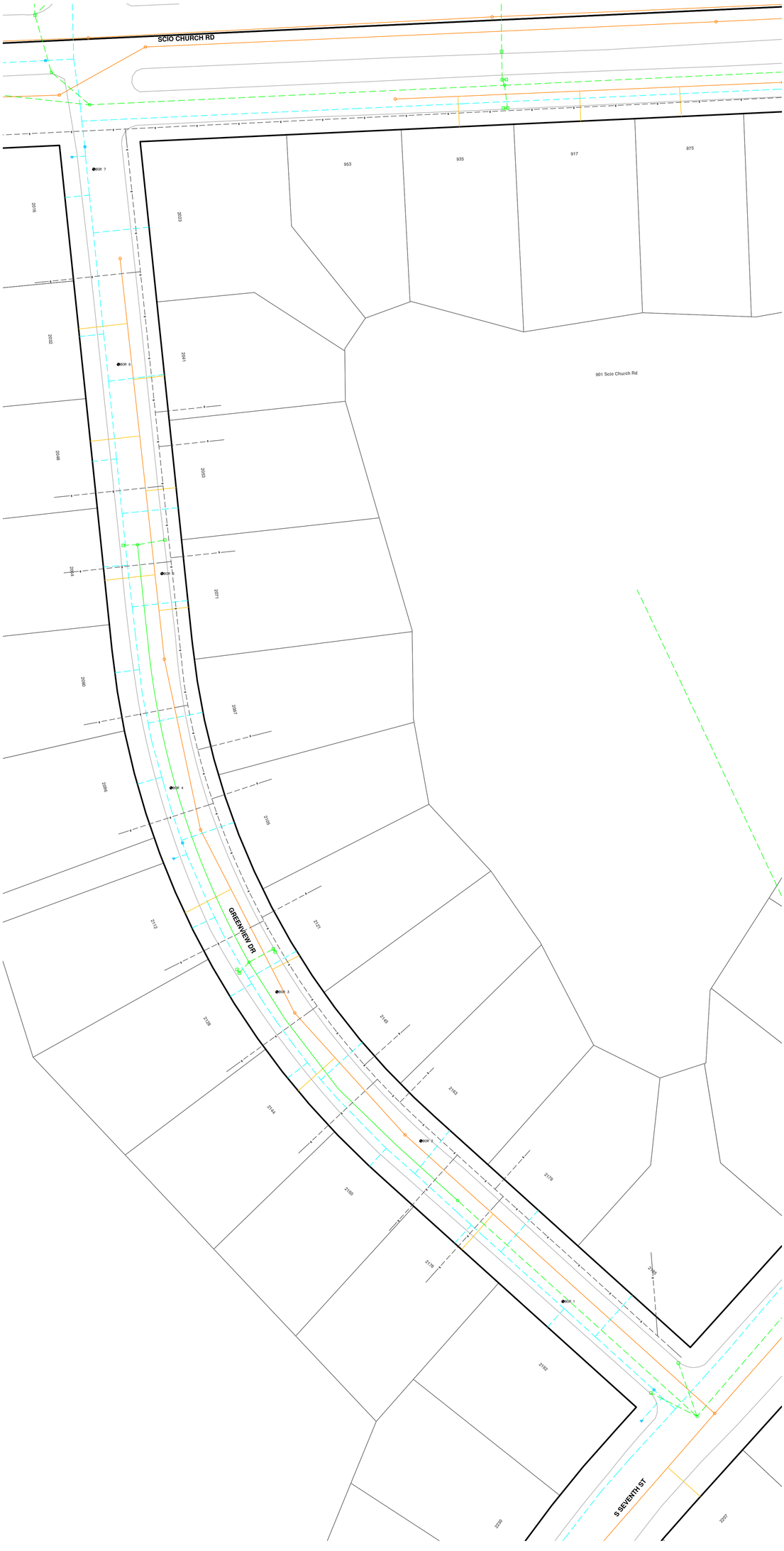
Boring Location Plans

map Ann Arbor

Search... Sign in

S Seventh St, Scio Church to Greenview

- 5' deep soil borings
- 20' deep soil borings


SCIO CHURCH RD
GREENVIEW DR
S SEVENTH ST
901 Scio Church Rd
953
935
917
875
2016
2023
2035
2041
2048
2053
2064
2071
2080
2087
2096
2105
2112
2121
2128
2136
2144
2153
2160
2169
2176
2179
2185
2192
2200
2207
POR 7
POR 6
POR 5
POR 4
POR 3
POR 2
POR 1

Soil Boring Logs

Project Number: 1208070085
Project Name: City of Ann Arbor
Misc Geotechnical Services
Project Location: Ann Arbor, MI
Client Name: City of Ann Arbor
Date Started: 12/10/20 Completed: 12/10/20
Time Started: Completed:
Logged By: R. Jackson Checked By: A. Spears

Boring No: GRV-1
Longitude: Latitude:
Surface Elevation (ft):
Drilling Firm: BRAX Drilling
Driller Name: Al Guzdzial
Drilling Method: HSA
Drill Rig Model:
Auger Size: 3.25"
Weather:

DEPTH (ft)	DESCRIPTION OF STRATA	LEGEND	SAMPLE	RECOVERY (in)	BLOW COUNTS (N VALUE)	UCS (tsf)
0	6.63 inches of ASPHALT pavement.					
	SAND (SP) - brown, with gravel, dense					
	SILTY CLAY (CL) - brown, with sand and gravel, very stiff, moist		SS-1		2-3-6 (9)	3.5
	SILTY CLAY (CL) - brown, with sand and gravel, hard, moist		SS-2		3-6-9 (15)	4.5
5	End of Borehole = 5.0'. Borehole backfilled upon completion.					

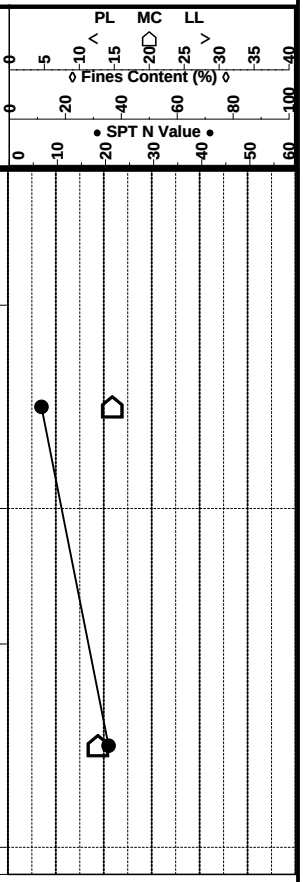
Groundwater During Drilling: NA
Groundwater After Drilling: NA
Cave-in Depth: 2.9167 ft.
End of Boring: 5'

Notes: No water encountered

Project Number: 1208070085
Project Name: City of Ann Arbor
Misc Geotechnical Services
Project Location: Ann Arbor, MI
Client Name: City of Ann Arbor
Date Started: 12/10/20 Completed: 12/10/20
Time Started: Completed:
Logged By: R. Jackson Checked By: A. Spears

Boring No: GRV-2
Longitude: Latitude:
Surface Elevation (ft):
Drilling Firm: BRAX Drilling
Driller Name: Al Guzdzial
Drilling Method: HSA
Drill Rig Model:
Auger Size: 3.25"
Weather:

DEPTH (ft)	DESCRIPTION OF STRATA	LEGEND	SAMPLE	RECOVERY (in)	BLOW COUNTS (N VALUE)	UCS (tsf)
0	5.33 inches of ASPHALT pavement.					
	SAND (SP) - brown, with gravel, dense					
	SILTY CLAY (CL) - brown, with sand and gravel, very stiff, moist		SS-1		2-4-3 (7)	2.25
	SILTY CLAY (CL) - brown, with sand and gravel, hard, moist		SS-2		5-9-12 (21)	4.5
5	End of Borehole = 5.0'. Borehole backfilled upon completion.					



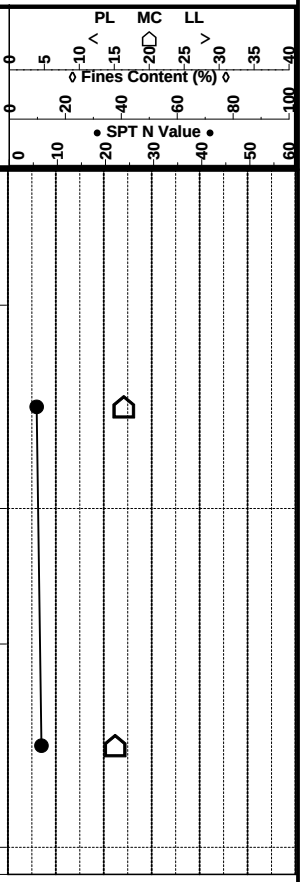
Groundwater During Drilling: NA
Groundwater After Drilling: NA
Cave-in Depth: 3.25 ft.
End of Boring: 5'

Notes: No water encountered

Project Number: 1208070085
Project Name: City of Ann Arbor
Misc Geotechnical Services
Project Location: Ann Arbor, MI
Client Name: City of Ann Arbor
Date Started: 12/10/20 Completed: 12/10/20
Time Started: Completed:
Logged By: R. Jackson Checked By: A. Spears

Boring No: GRV-3
Longitude: Latitude:
Surface Elevation (ft):
Drilling Firm: BRAX Drilling
Driller Name: Al Guzdzial
Drilling Method: HSA
Drill Rig Model:
Auger Size: 3.25"
Weather:

DEPTH (ft)	DESCRIPTION OF STRATA	LEGEND	SAMPLE	RECOVERY (in)	BLOW COUNTS (N VALUE)	UCS (tsf)
0	4.21 inches of ASPHALT pavement.					
	SAND (SP) - brown, with gravel, dense					
	SILTY CLAY (CL) - brown, with sand and gravel, very stiff, moist		SS-1		3-3-3 (6)	2.75
			SS-2		3-3-4 (7)	3.25
5	End of Borehole = 5.0'. Borehole backfilled upon completion.					



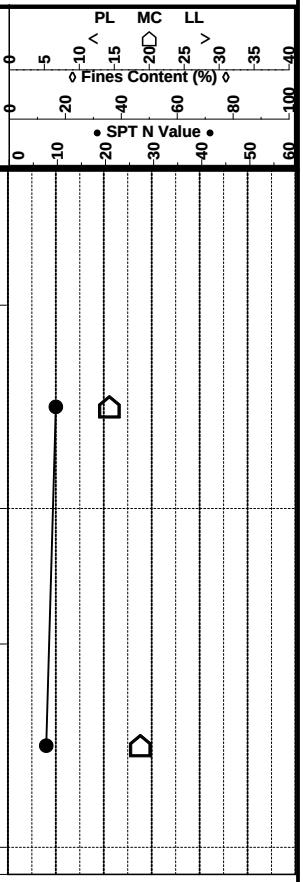
Groundwater During Drilling: NA
Groundwater After Drilling: NA
Cave-in Depth: 2.83 ft.
End of Boring: 5'

Notes: No water encountered

Project Number: 1208070085
Project Name: City of Ann Arbor
Misc Geotechnical Services
Project Location: Ann Arbor, MI
Client Name: City of Ann Arbor
Date Started: 12/10/20 Completed: 12/10/20
Time Started: Completed:
Logged By: R. Jackson Checked By: A. Spears

Boring No: GRV-4
Longitude: Latitude:
Surface Elevation (ft):
Drilling Firm: BRAX Drilling
Driller Name: Al Guzdzial
Drilling Method: HSA
Drill Rig Model:
Auger Size: 3.25"
Weather:

DEPTH (ft)	DESCRIPTION OF STRATA	LEGEND	SAMPLE	RECOVERY (in)	BLOW COUNTS (N VALUE)	UCS (tsf)
0	6 inches of ASPHALT pavement.					
	SAND (SP) - brown, with gravel, dense					
	SILTY CLAY (CL) - brown, with sand and gravel, hard, moist		SS-1		2-4-6 (10)	4.2 5
	SILTY CLAY (CL) - brown, with sand and gravel, very stiff, moist		SS-2		3-4-4 (8)	3.5
5	End of Borehole = 5.0'. Borehole backfilled upon completion.					



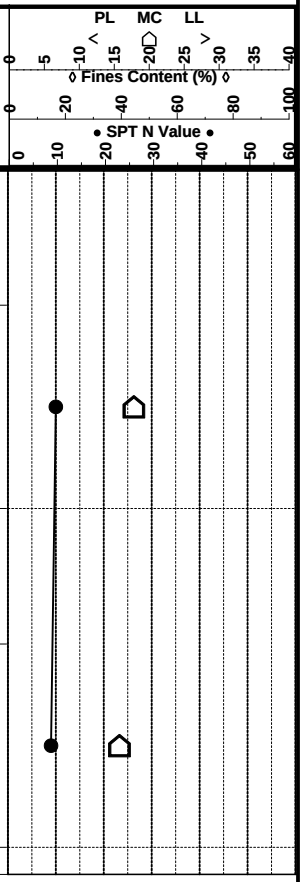
Groundwater During Drilling: NA
Groundwater After Drilling: NA
Cave-in Depth: 3.33 ft.
End of Boring: 5'

Notes: No water encountered

Project Number: 1208070085
Project Name: City of Ann Arbor
Misc Geotechnical Services
Project Location: Ann Arbor, MI
Client Name: City of Ann Arbor
Date Started: 12/10/20 Completed: 12/10/20
Time Started: Completed:
Logged By: R. Jackson Checked By: A. Spears

Boring No: GRV-5
Longitude: Latitude:
Surface Elevation (ft):
Drilling Firm: BRAX Drilling
Driller Name: Al Guzdzial
Drilling Method: HSA
Drill Rig Model:
Auger Size: 3.25"
Weather:

DEPTH (ft)	DESCRIPTION OF STRATA	LEGEND	SAMPLE	RECOVERY (in)	BLOW COUNTS (N VALUE)	UCS (tsf)
0	2.18 inches of ASPHALT pavement. SAND (SP) - brown, with gravel, dense					
	SILTY CLAY (CL) - brown, with sand and gravel, hard, moist		SS-1		3-5-5 (10)	4.5
	SILTY CLAY (CL) - brown, with sand and gravel, hard, moist		SS-2		4-4-5 (9)	3.25
5	End of Borehole = 5.0'. Borehole backfilled upon completion.					



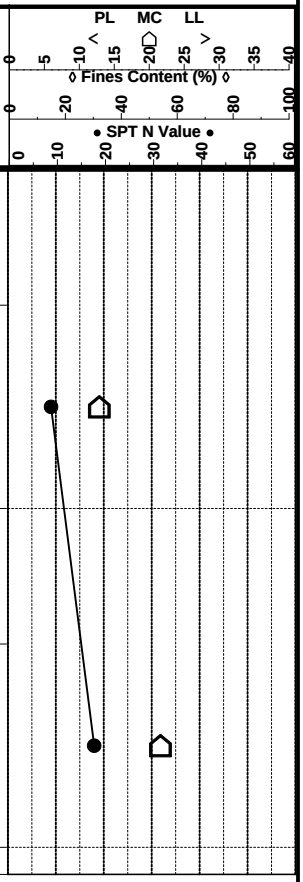
Groundwater During Drilling: NA
Groundwater After Drilling: NA
Cave-in Depth: 2.583 ft.
End of Boring: 5'

Notes: No water encountered

Project Number: 1208070085
Project Name: City of Ann Arbor
Misc Geotechnical Services
Project Location: Ann Arbor, MI
Client Name: City of Ann Arbor
Date Started: 12/10/20 Completed: 12/10/20
Time Started: Completed:
Logged By: R. Jackson Checked By: A. Spears

Boring No: GRV-6
Longitude: Latitude:
Surface Elevation (ft):
Drilling Firm: BRAX Drilling
Driller Name: Al Guzdzial
Drilling Method: HSA
Drill Rig Model:
Auger Size: 3.25"
Weather:

DEPTH (ft)	DESCRIPTION OF STRATA	LEGEND	SAMPLE	RECOVERY (in)	BLOW COUNTS (N VALUE)	UCS (tsf)
0	6.6 inches of ASPHALT pavement.					
	SAND (SP) - brown, with gravel, dense					
	SILTY CLAY (CL) - brown, with sand and gravel, very stiff, moist		SS-1		3-3-6 (9)	4
	SILTY CLAY (CL) - brown, with sand and gravel, hard, moist		SS-2		3-7-11 (18)	4.5
5	End of Borehole = 5.0'. Borehole backfilled upon completion.					



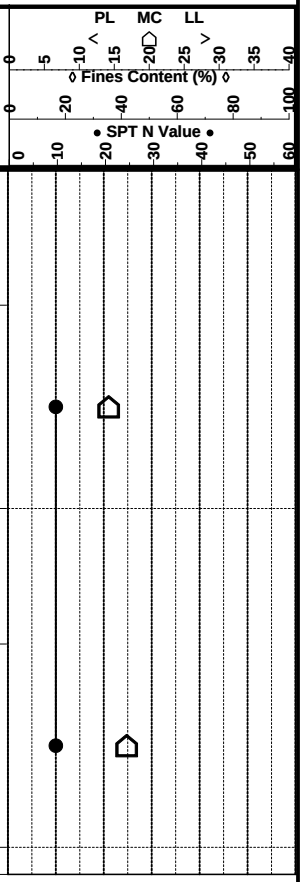
Groundwater During Drilling: NA
Groundwater After Drilling: NA
Cave-in Depth: 2.9167 ft.
End of Boring: 5'

Notes: No water encountered

Project Number: 1208070085
Project Name: City of Ann Arbor
Misc Geotechnical Services
Project Location: Ann Arbor, MI
Client Name: City of Ann Arbor
Date Started: 12/10/20 Completed: 12/10/20
Time Started: Completed:
Logged By: R. Jackson Checked By: A. Spears

Boring No: GRV-7
Longitude: Latitude:
Surface Elevation (ft):
Drilling Firm: BRAX Drilling
Driller Name: Al Guzdzial
Drilling Method: HSA
Drill Rig Model:
Auger Size: 3.25"
Weather:

DEPTH (ft)	DESCRIPTION OF STRATA	LEGEND	SAMPLE	RECOVERY (in)	BLOW COUNTS (N VALUE)	UCS (tsf)
0	3.5 inches of ASPHALT pavement.					
	SAND (SP) - brown, with gravel, dense					
	SILTY CLAY (CL) - brown, with sand and gravel, very stiff, moist		SS-1		3-4-6 (10)	2.5
			SS-2		3-5-5 (10)	3
5	End of Borehole = 5.0'. Borehole backfilled upon completion.					



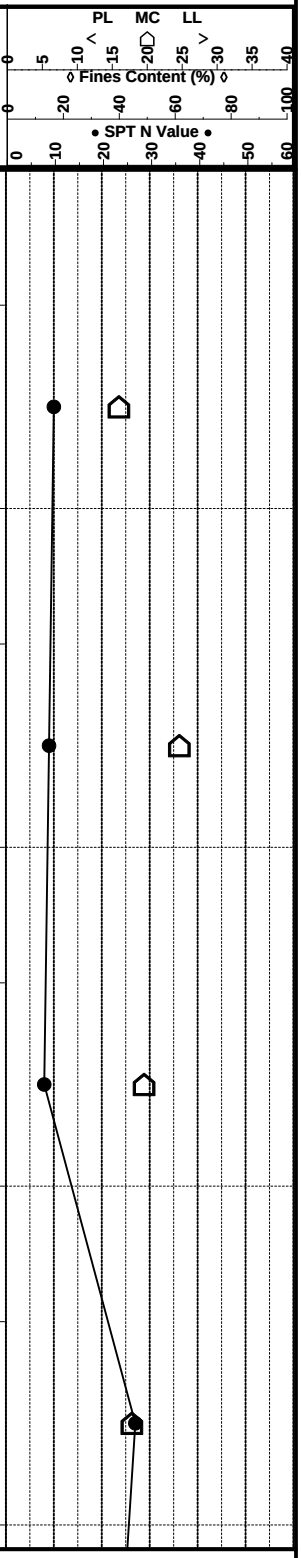
Groundwater During Drilling: NA
Groundwater After Drilling: NA
Cave-in Depth: 2.583 ft.
End of Boring: 5'

Notes: No water encountered

Project Number: 1208070085
Project Name: City of Ann Arbor
Misc Geotechnical Services
Project Location: Ann Arbor, MI
Client Name: City of Ann Arbor
Date Started: 12/4/20 Completed: 12/4/20
Time Started: Completed:
Logged By: R. Jackson Checked By: A. Spears

Boring No: SEV-1
Longitude: Latitude:
Surface Elevation (ft):
Drilling Firm: BRAX Drilling
Driller Name: Al Guzdzial
Drilling Method: HSA
Drill Rig Model:
Auger Size: 3.25"
Weather:

DEPTH (ft)	DESCRIPTION OF STRATA	LEGEND	SAMPLE	RECOVERY (in)	BLOW COUNTS (N VALUE)	UCS (tsf)
0	8.15 inches of ASPHALT pavement.					
	SAND (SP) - brown, fine to coarse grained, with gravel, loose, dry					
	SILTY CLAY (CL) - brown, with sand and gravel, hard, dry		SS-1		3-3-7 (10)	4.5
	CLAY (CL) - brown, some silt and sand, very stiff, moist		SS-2		3-4-5 (9)	2.7 5
5	SILTY CLAY (CL) - brown, with sand and gravel, hard, moist		SS-3		2-4-4 (8)	4.5
	SILTY CLAY (CL) - brown, some sand and gravel, hard, moist		SS-4		4-10-17 (27)	4.5
10						



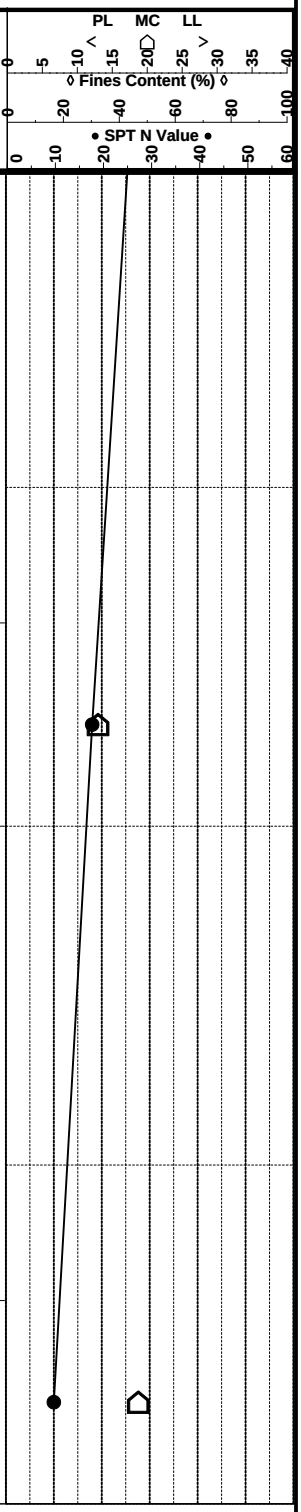
Groundwater During Drilling: NA
Groundwater After Drilling: NA
Cave-in Depth: 8.75 ft.
End of Boring: 20'

Notes: No water encountered

Project Number: 1208070085
Project Name: City of Ann Arbor
Misc Geotechnical Services
Project Location: Ann Arbor, MI
Client Name: City of Ann Arbor
Date Started: 12/4/20 Completed: 12/4/20
Time Started: Completed:
Logged By: R. Jackson Checked By: A. Spears

Boring No: SEV-1
Longitude: Latitude:
Surface Elevation (ft):
Drilling Firm: BRAX Drilling
Driller Name: Al Guzdzial
Drilling Method: HSA
Drill Rig Model:
Auger Size: 3.25"
Weather:

DEPTH (ft)	DESCRIPTION OF STRATA	LEGEND	SAMPLE	RECOVERY (in)	BLOW COUNTS (N VALUE)	UCS (tsf)
15	SILTY CLAY (CL) - brown, some sand and gravel, very stiff, moist		SS-5		3-8-10 (18)	3.5
20	CLAY (CL) - gray, with silt, sand, and gravel, very stiff, moist		SS-6		4-4-6 (10)	2.7 5
	End of Borehole = 20.0'. Borehole					



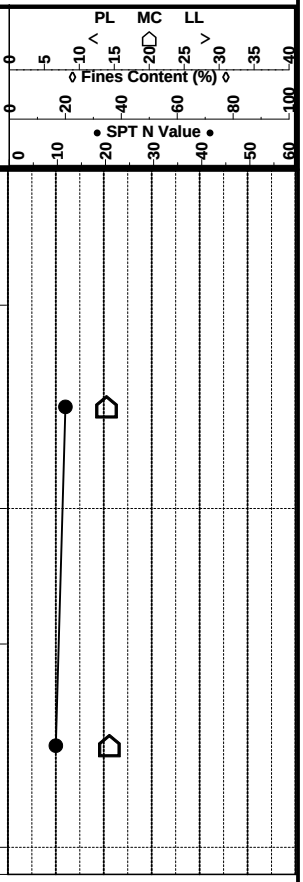
Groundwater During Drilling: NA
Groundwater After Drilling: NA
Cave-in Depth: 8.75 ft.
End of Boring: 20'

Notes: No water encountered

Project Number: 1208070085
Project Name: City of Ann Arbor
Misc Geotechnical Services
Project Location: Ann Arbor, MI
Client Name: City of Ann Arbor
Date Started: 12/4/20 Completed: 12/4/20
Time Started: Completed:
Logged By: R. Jackson Checked By: A. Spears

Boring No: SEV-2
Longitude: Latitude:
Surface Elevation (ft):
Drilling Firm: BRAX Drilling
Driller Name: Al Guzdzial
Drilling Method: HSA
Drill Rig Model:
Auger Size: 3.25"
Weather:

DEPTH (ft)	DESCRIPTION OF STRATA	LEGEND	SAMPLE	RECOVERY (in)	BLOW COUNTS (N VALUE)	UCS (tsf)
0	8.43 inches of ASPHALT pavement.					
	SAND (SP) - brown, fine to coarse grained, with gravel, medium dense, dry					
	SILTY CLAY (CL) - brown, with sand and gravel, hard, moist		SS-1		2-5-7 (12)	4.5
			SS-2		3-4-6 (10)	4.5
5	End of Borehole = 5.0'. Borehole backfilled upon completion.					



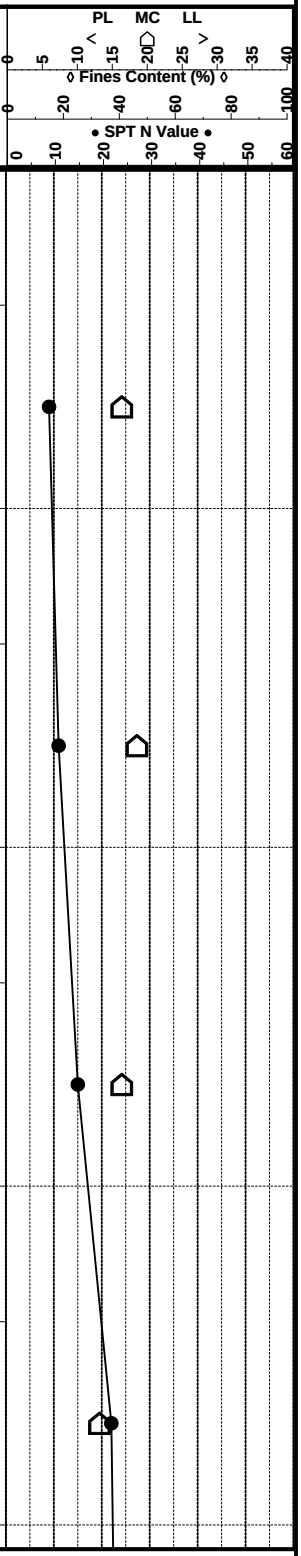
Groundwater During Drilling: NA
Groundwater After Drilling: NA
Cave-in Depth: 2.83 ft.
End of Boring: 5'

Notes: No water encountered

Project Number: 1208070085
Project Name: City of Ann Arbor
Misc Geotechnical Services
Project Location: Ann Arbor, MI
Client Name: City of Ann Arbor
Date Started: 12/4/20 Completed: 12/4/20
Time Started: Completed:
Logged By: R. Jackson Checked By: A. Spears

Boring No: SEV-3
Longitude: Latitude:
Surface Elevation (ft):
Drilling Firm: BRAX Drilling
Driller Name: Al Guzdzial
Drilling Method: HSA
Drill Rig Model:
Auger Size: 3.25"
Weather:

DEPTH (ft)	DESCRIPTION OF STRATA	LEGEND	SAMPLE	RECOVERY (in)	BLOW COUNTS (N VALUE)	UCS (tsf)
0	11.23 inches of ASPHALT pavement.					
	SAND (SP) - brown, fine to coarse grained, with gravel, loose, dry SILTY CLAY (CL) - brown, with sand and gravel, hard, moist		SS-1		2-3-6 (9)	4.5
			SS-2		2-4-7 (11)	4
5						
			SS-3		3-7-8 (15)	4.5
			SS-4		5-10-12 (22)	4.5
10						



Groundwater During Drilling: NA
Groundwater After Drilling: NA
Cave-in Depth: 9.583 ft.
End of Boring: 20'

Notes: No water encountered

Project Number: 1208070085
Project Name: City of Ann Arbor
Misc Geotechnical Services
Project Location: Ann Arbor, MI
Client Name: City of Ann Arbor
Date Started: 12/4/20 Completed: 12/4/20
Time Started: Completed:
Logged By: R. Jackson Checked By: A. Spears

Boring No: SEV-3
Longitude: Latitude:
Surface Elevation (ft):
Drilling Firm: BRAX Drilling
Driller Name: Al Guzdzial
Drilling Method: HSA
Drill Rig Model:
Auger Size: 3.25"
Weather:

DEPTH (ft)	DESCRIPTION OF STRATA	LEGEND	SAMPLE	RECOVERY (in)	BLOW COUNTS (N VALUE)	UCS (tsf)
15			SS-5		5-11-13 (24)	4.5
20	SILTY CLAY (CL) - brown, with sand and gravel, very stiff, moist		SS-6		3-5-9 (16)	3.5
	End of Borehole = 20.0'. Borehole					

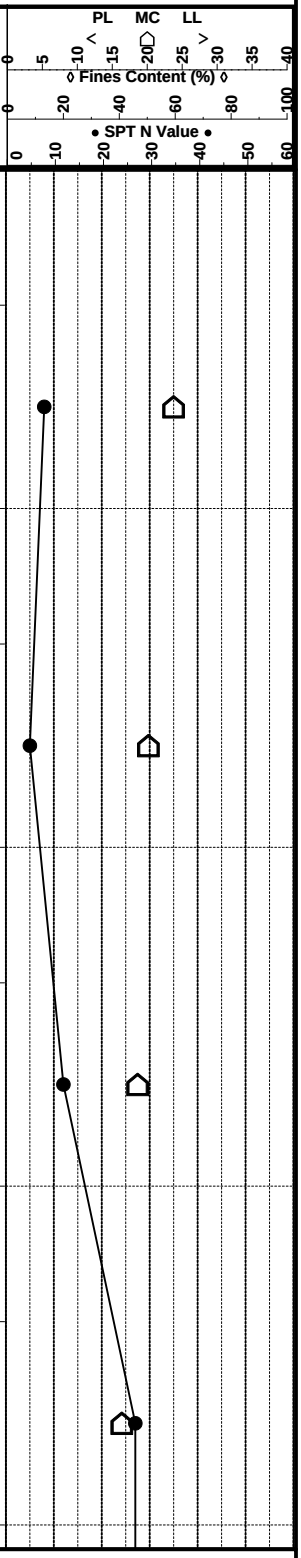
Groundwater During Drilling: NA
Groundwater After Drilling: NA
Cave-in Depth: 9.583 ft.
End of Boring: 20'

Notes: No water encountered

Project Number: 1208070085
Project Name: City of Ann Arbor
Misc Geotechnical Services
Project Location: Ann Arbor, MI
Client Name: City of Ann Arbor
Date Started: Completed:
Time Started: Completed:
Logged By: R. Jackson Checked By: A. Spears

Boring No: SEV-4
Longitude: Latitude:
Surface Elevation (ft):
Drilling Firm: BRAX Drilling
Driller Name: Al Guzdzial
Drilling Method: HSA
Drill Rig Model:
Auger Size: 3.25"
Weather:

DEPTH (ft)	DESCRIPTION OF STRATA	LEGEND	SAMPLE	RECOVERY (in)	BLOW COUNTS (N VALUE)	UCS (tsf)
0	3.38 inches of ASPHALT pavement.					
	SAND (SP) - brown, with gravel					
	SILTY CLAY (CL) - brown, with sand and gravel, very stiff, moist		SS-1		3-3-5 (8)	3.25
	CLAY (CL) - brown, with silt, sand, and gravel, stiff, moist		SS-2		2-2-3 (5)	0.5
5						
	SILTY CLAY (CL) - brown, with sand and gravel, very stiff, moist		SS-3		3-5-7 (12)	4
	SILTY CLAY (CL) -brown, with sand and gravel, hard, moist		SS-4		4-11-16 (27)	4.5
10						



Groundwater During Drilling: NA
Groundwater After Drilling: NA
Cave-in Depth: 11.33 ft.
End of Boring: 20'

Notes: No water encountered

Project Number: 1208070085
Project Name: City of Ann Arbor
Misc Geotechnical Services
Project Location: Ann Arbor, MI
Client Name: City of Ann Arbor
Date Started: Completed:
Time Started: Completed:
Logged By: R. Jackson Checked By: A. Spears

Boring No: SEV-4
Longitude: Latitude:
Surface Elevation (ft):
Drilling Firm: BRAX Drilling
Driller Name: Al Guzdzial
Drilling Method: HSA
Drill Rig Model:
Auger Size: 3.25"
Weather:

DEPTH (ft)	DESCRIPTION OF STRATA	LEGEND	SAMPLE	RECOVERY (in)	BLOW COUNTS (N VALUE)	UCS (tsf)
15			SS-5		7-13-14 (27)	4.5
20			SS-6		5-9-10 (19)	4.5
	End of Borehole = 20.0'. Borehole					

PL MC LL
0 5 10 15 20 25 30 35 40
◊ Fines Content (%) ◊
0 20 40 60 80 100
• SPT N Value •
0 10 20 30 40 50 60

Groundwater During Drilling: NA
Groundwater After Drilling: NA
Cave-in Depth: 11.33 ft.
End of Boring: 20'

Notes: No water encountered

Project Number: 1208070085
Project Name: City of Ann Arbor
Misc Geotechnical Services
Project Location: Ann Arbor, MI
Client Name: City of Ann Arbor
Date Started: 12/3/20 Completed: 12/3/20
Time Started: Completed:
Logged By: R. Jackson Checked By: A. Spears

Boring No: SEV-5
Longitude: Latitude:
Surface Elevation (ft):
Drilling Firm: BRAX Drilling
Driller Name: Al Guzdzial
Drilling Method: HSA
Drill Rig Model:
Auger Size: 3.25"
Weather:

DEPTH (ft)	DESCRIPTION OF STRATA	LEGEND	SAMPLE	RECOVERY (in)	BLOW COUNTS (N VALUE)	UCS (tsf)
0	5.13 inches of ASPHALT pavement					
	SAND (SP) - brown, fine to coarse grained, with gravel, loose, dry					
	SILTY CLAY (CL) - brown, with sand and gravel, stiff, moist		SS-1		3-5-5 (10)	1.25
	SILTY CLAY (CL) - brown, with sand and gravel, very stiff, moist		SS-2		3-5-8 (13)	2.5
5	End of Borehole = 5.0'. Borehole backfilled upon completion.					

Groundwater During Drilling: none
Groundwater After Drilling: 2.83 ft.
Cave-in Depth: 2.83 ft.
End of Boring: 5'

Notes: No water encountered

Project Number: 1208070085
Project Name: City of Ann Arbor
Misc Geotechnical Services
Project Location: Ann Arbor, MI
Client Name: City of Ann Arbor
Date Started: 12/3/20 Completed: 12/3/20
Time Started: Completed:
Logged By: R. Jackson Checked By: A. Spears

Boring No: SEV-6
Longitude: Latitude:
Surface Elevation (ft):
Drilling Firm: BRAX Drilling
Driller Name: Al Guzdzial
Drilling Method: HSA
Drill Rig Model:
Auger Size: 3.25"
Weather:

DEPTH (ft)	DESCRIPTION OF STRATA	LEGEND	SAMPLE	RECOVERY (in)	BLOW COUNTS (N VALUE)	UCS (tsf)
0	3.94 inches of ASPHALT pavement.					
	SAND (SP) - brown, fine to coarse grained, with gravel, loose, dry					
	SILTY CLAY (CL) - brown, with sand and gravel, stiff, moist		SS-1		3-4-6 (10)	2
	SANDY SILT (ML) - brown, with clay and gravel, stiff, moist		SS-2		1-3-3 (6)	1.5
5	SILTY CLAY (CL) - brown, with sand and gravel, hard, moist		SS-3		3-4-12 (16)	4.5
			SS-4		3-7-9 (16)	4.5
10						

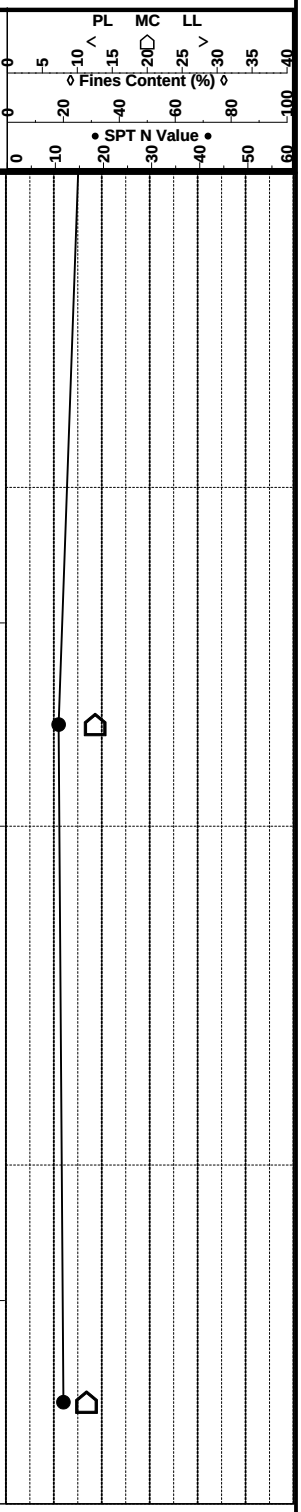
Groundwater During Drilling: NA
Groundwater After Drilling: NA
Cave-in Depth: 6.583 ft.
End of Boring: 20'

Notes: No water encountered

Project Number: 1208070085
Project Name: City of Ann Arbor
Misc Geotechnical Services
Project Location: Ann Arbor, MI
Client Name: City of Ann Arbor
Date Started: 12/3/20 Completed: 12/3/20
Time Started: Completed:
Logged By: R. Jackson Checked By: A. Spears

Boring No: SEV-6
Longitude: Latitude:
Surface Elevation (ft):
Drilling Firm: BRAX Drilling
Driller Name: Al Guzdzial
Drilling Method: HSA
Drill Rig Model:
Auger Size: 3.25"
Weather:

DEPTH (ft)	DESCRIPTION OF STRATA	LEGEND	SAMPLE	RECOVERY (in)	BLOW COUNTS (N VALUE)	UCS (tsf)
15	SILTY CLAY (CL) - brown, with sand and gravel, very stiff, moist		SS-5		3-5-6 (11)	2.5
20	SILTY CLAY (CL) - gray, with sand and gravel, moist, stiff		SS-6		3-5-7 (12)	1.7 5
	End of Borehole = 20.0'. Borehole					



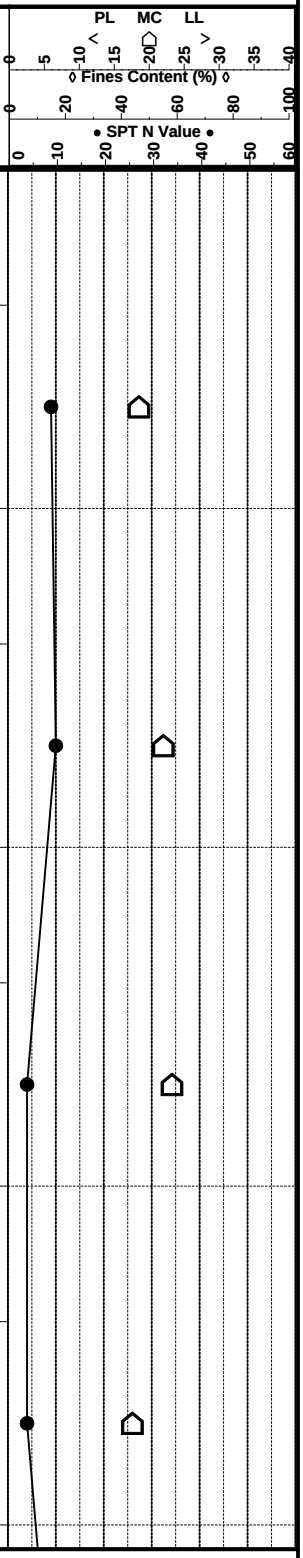
Groundwater During Drilling: NA
Groundwater After Drilling: NA
Cave-in Depth: 6.583 ft.
End of Boring: 20'

Notes: No water encountered

Project Number: 1208070085
Project Name: City of Ann Arbor
Misc Geotechnical Services
Project Location: Ann Arbor, MI
Client Name: City of Ann Arbor
Date Started: 12/3/20 Completed: 12/3/20
Time Started: Completed:
Logged By: R. Jackson Checked By: A. Spears

Boring No: SEV-7
Longitude: Latitude:
Surface Elevation (ft):
Drilling Firm: BRAX Drilling
Driller Name: Al Guzdzial
Drilling Method: HSA
Drill Rig Model:
Auger Size: 3.25"
Weather:

DEPTH (ft)	DESCRIPTION OF STRATA	LEGEND	SAMPLE	RECOVERY (in)	BLOW COUNTS (N VALUE)	UCS (tsf)
0	7.61 inches of ASPHALT pavement					
	SAND (SP) - brown, fine to coarse grained, with gravel, loose, dry		SS-1		2-3-6 (9)	
	SILTY CLAY (CL) - brown, with sand and gravel, stiff, moist					
	CLAY (CL) - brown, with silt, sand, and gravel, stiff, moist		SS-2		2-3-7 (10)	1.5
5						
	CLAY (CL) - brown, with silt, sand, and gravel, medium stiff, moist		SS-3		1-2-2 (4)	1
			SS-4		1-2-2 (4)	1
10						



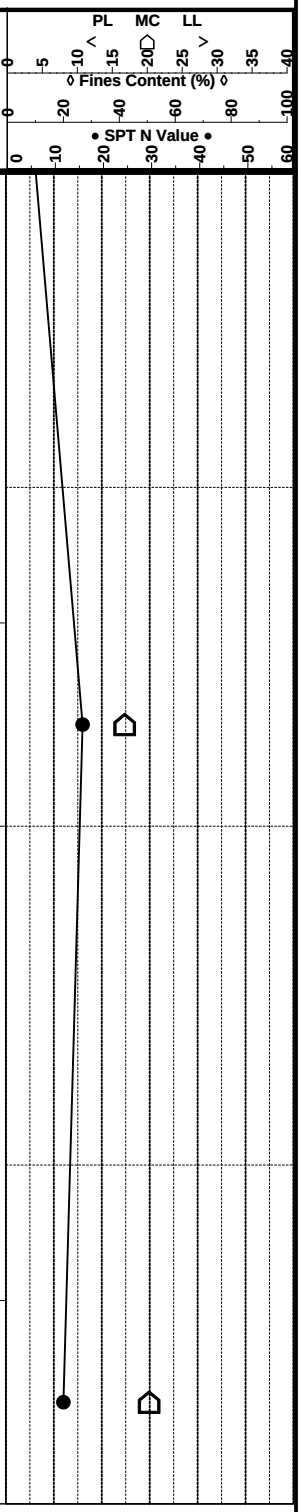
Groundwater During Drilling: none
Groundwater After Drilling: 10.75 ft.
Cave-in Depth: 10.75 ft.
End of Boring: 20'

Notes:

Project Number: 1208070085
Project Name: City of Ann Arbor
Misc Geotechnical Services
Project Location: Ann Arbor, MI
Client Name: City of Ann Arbor
Date Started: 12/3/20 Completed: 12/3/20
Time Started: Completed:
Logged By: R. Jackson Checked By: A. Spears

Boring No: SEV-7
Longitude: Latitude:
Surface Elevation (ft):
Drilling Firm: BRAX Drilling
Driller Name: Al Guzdzial
Drilling Method: HSA
Drill Rig Model:
Auger Size: 3.25"
Weather:

DEPTH (ft)	DESCRIPTION OF STRATA	LEGEND	SAMPLE	RECOVERY (in)	BLOW COUNTS (N VALUE)	UCS (tsf)
15	SANDY SILT (ML) - gray, with clay and gravel, very stiff, moist		SS-5		3-7-9 (16)	4
20	CLAY (CL) - brown, trace silt and sand, very stiff, moist		SS-6		3-5-7 (12)	2.2 5
	End of Borehole = 20.0'. Borehole					



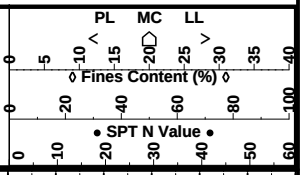
Groundwater During Drilling: none
Groundwater After Drilling: 10.75 ft.
Cave-in Depth: 10.75 ft.
End of Boring: 20'

Notes:

Project Number: 1208070085
Project Name: City of Ann Arbor
Misc Geotechnical Services
Project Location: Ann Arbor, MI
Client Name: City of Ann Arbor
Date Started: 12/3/20 Completed: 12/3/20
Time Started: Completed:
Logged By: R. Jackson Checked By: A. Spears

Boring No: SEV-8
Longitude: Latitude:
Surface Elevation (ft):
Drilling Firm: BRAX Drilling
Driller Name: Al Guzdzial
Drilling Method: HSA
Drill Rig Model:
Auger Size: 3.25"
Weather:

DEPTH (ft)	DESCRIPTION OF STRATA	LEGEND	SAMPLE	RECOVERY (in)	BLOW COUNTS (N VALUE)	UCS (tsf)
0	4.79 inches of ASPHALT pavement					
	SAND (SP) - brown, fine to coarse grained, with gravel, medium dense, dry					
	SILTY CLAY (CL) - brown, with sand and gravel, hard, moist		SS-1		4-6-10 (16)	4.5
			SS-2		4-8-8 (16)	4.5
5	End of Borehole = 5.0'. Borehole backfilled upon completion.					



Groundwater During Drilling: none
Groundwater After Drilling: 3.167 ft.
Cave-in Depth: 3.167 ft.
End of Boring: 5'

Notes:

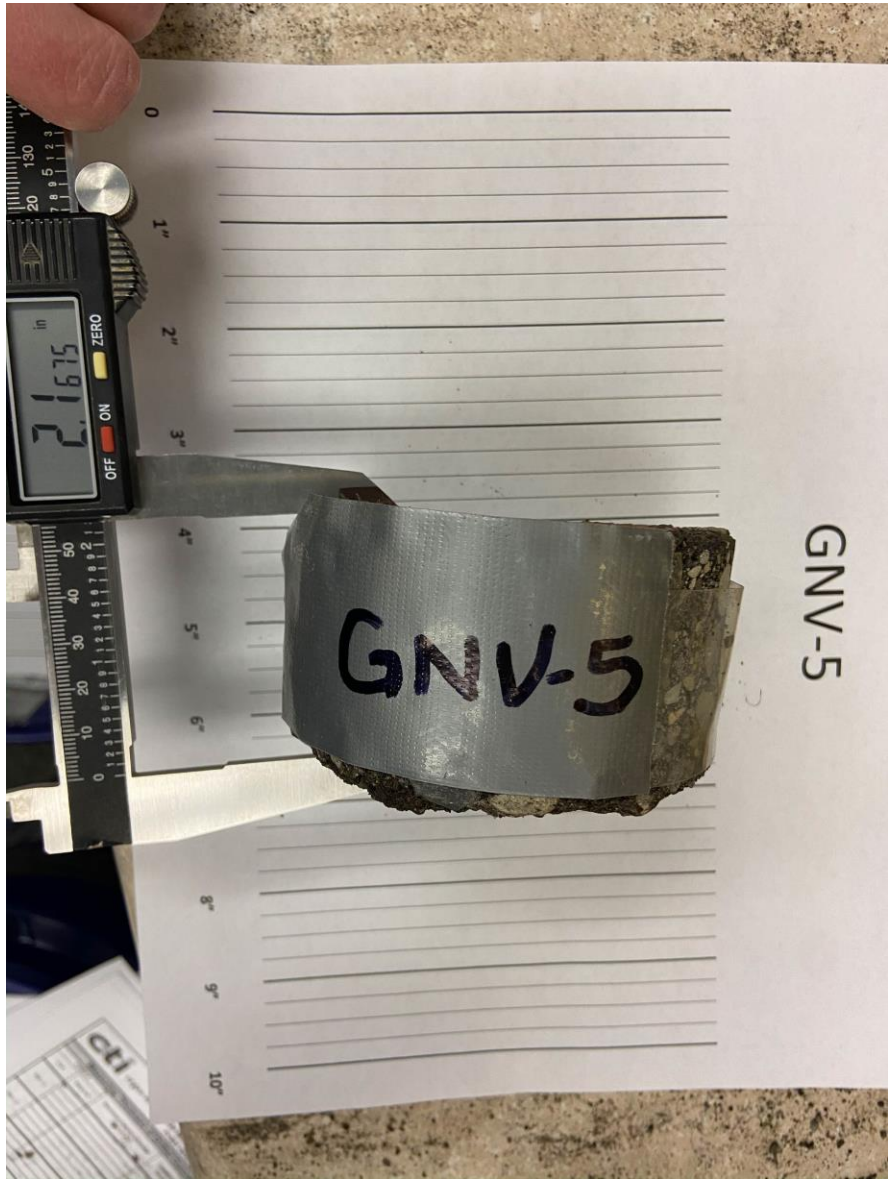
Core Photo Log

GNV (1)

GNV (2)

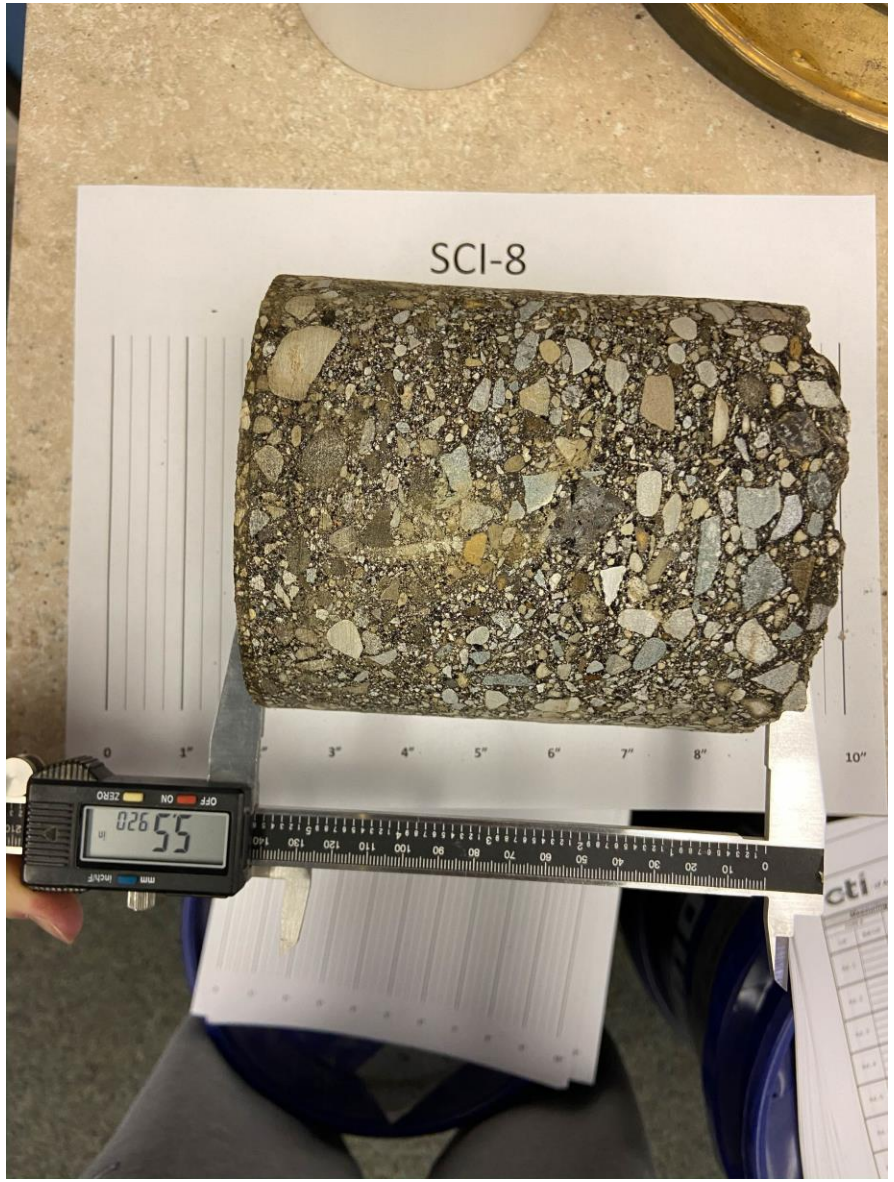
GNV (3)

GNV (4)



GNV (5)

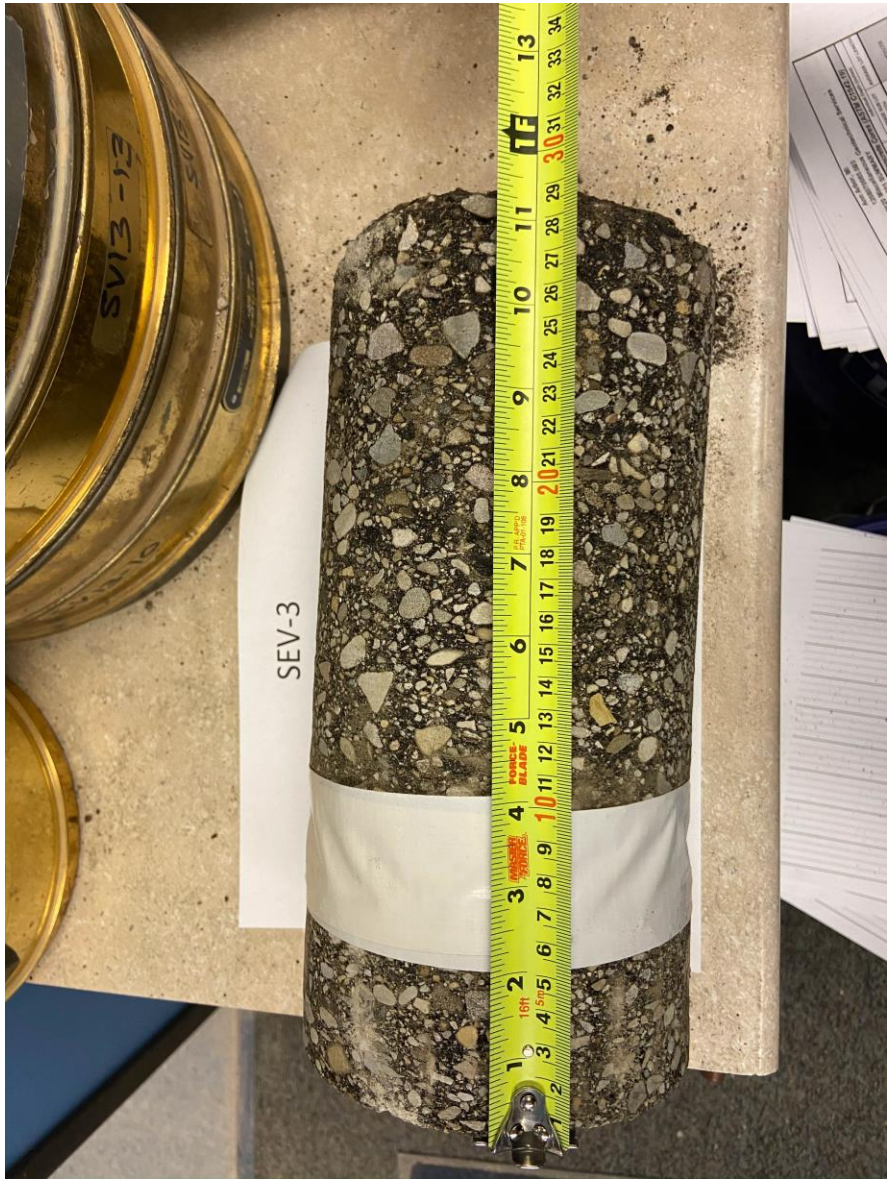
GNV (6)



SCI (8)

SEV (1)

SEV (2)



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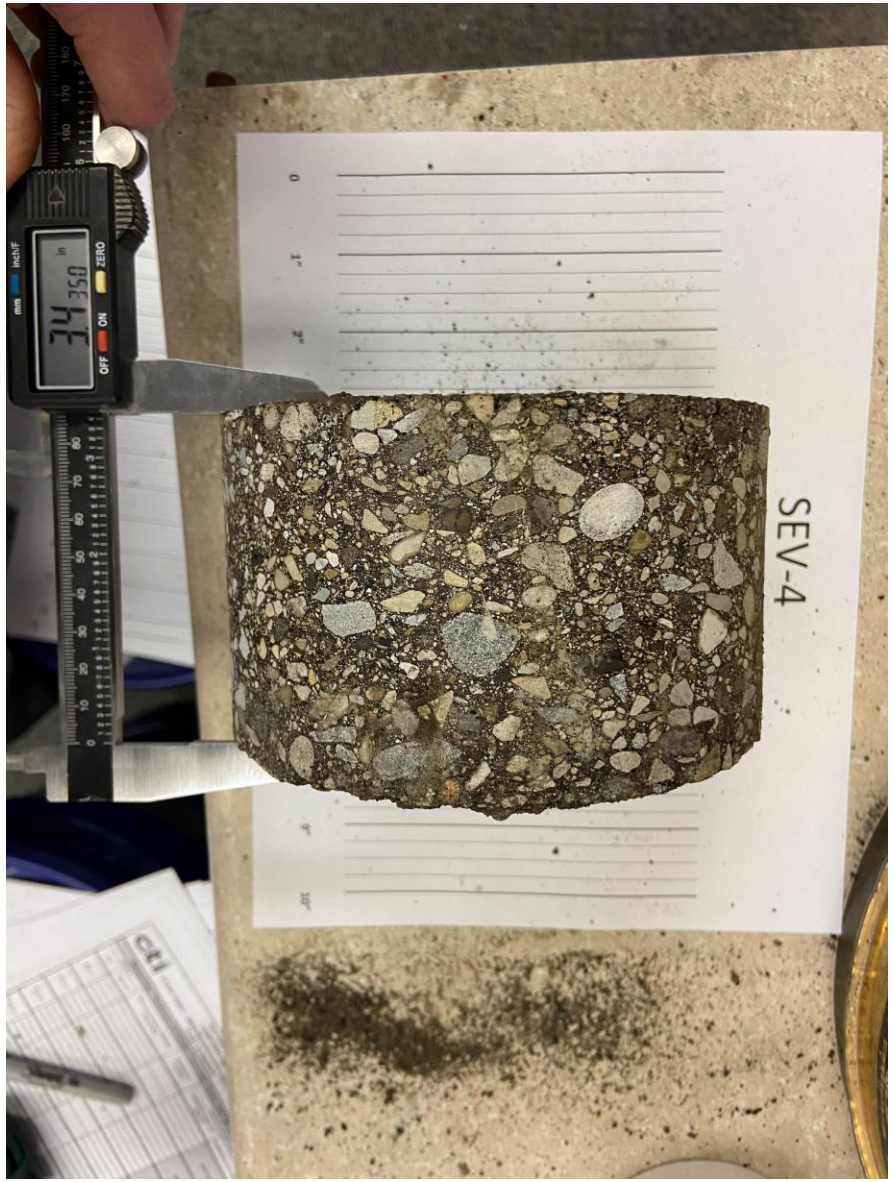
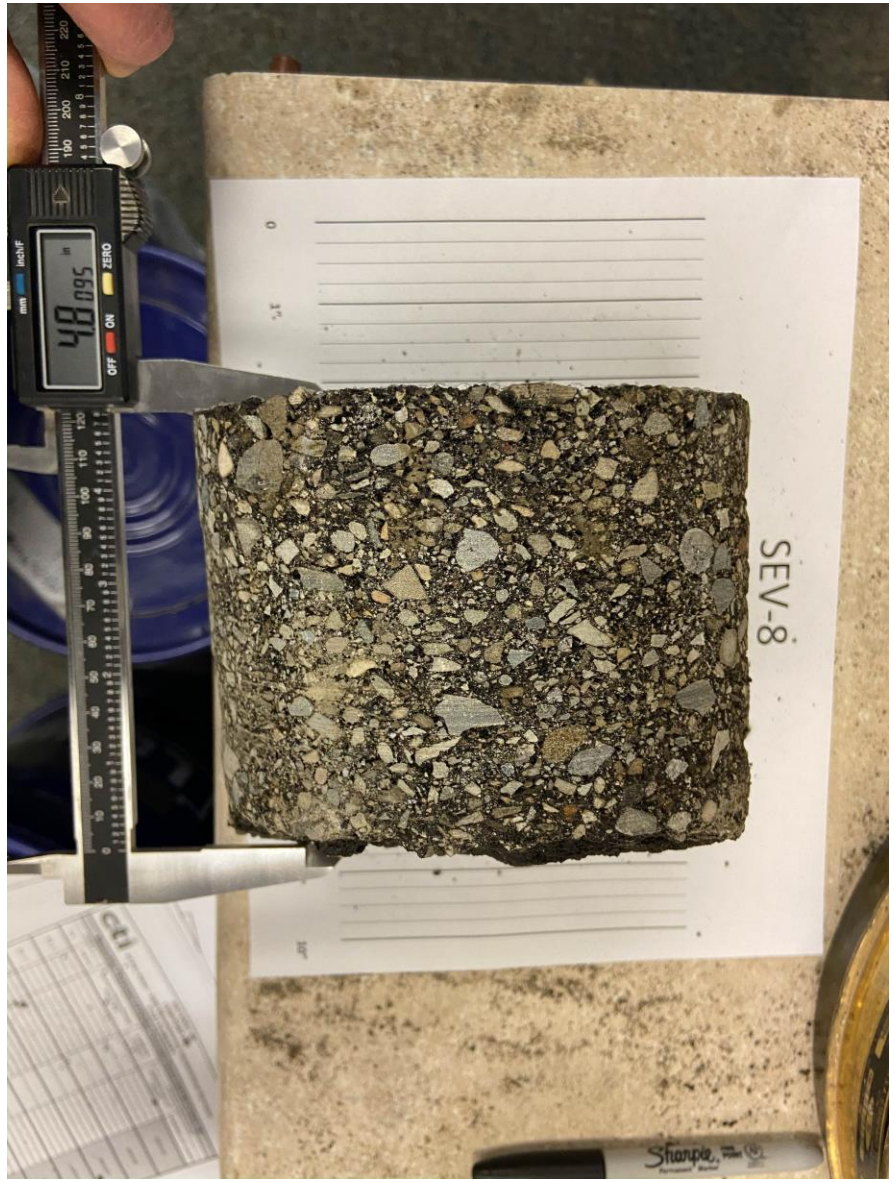


SEV (4)

SEV (5)

SEV (6)



SEV (7)

General Notes for Soil Classification

CTI and Associates, Inc.

GENERAL NOTES FOR SOIL CLASSIFICATION

STANDARD PENETRATION TEST: Driving a 2" outside diameter, 1-3/8" inside diameter sampler a distance of 18 inches into undisturbed soil with a 140 pound hammer free falling a distance of 30 inches. The sampler is driven three successive 6-inch increments. The number of blows required for the last 12 inches of penetration is termed the Standard Penetration Resistance (N).

GROUNDWATER: Observations are made at the times indicated on logs. Porosity of soil strata, weather conditions and site topography may cause changes in the water levels.

SOIL CLASSIFICATION PROCEDURE: Classification on the logs is generally made by visual inspection. For fine-grained soils (silt, clay and combinations thereof), the classification is primarily based upon plasticity. For coarse-grained soils (sand and gravel), the classification is based upon particle size distribution. Minor soil constituents are reported as "trace" (0-5%), "some" (5-12%) and "with" (15-29%). Where the minor constituents are in excess of 29%, an adjective is used preceding the major constituent name (i.e. for sands containing 35% silt, the soil is classified as silty sand).

PARTICLE SIZE DISTRIBUTION

Boulders	-	Greater than 12 inches average diameter
Cobbles	-	3 inches to 12 inches
Gravel –		
Coarse	-	¾ inches to 3 inches
Fine	-	No. 4 (4.75mm) to ¾ inches
Sand –		
Coarse	-	No. 10 (2.00mm) to No. 4 (4.75mm)
Medium	-	No. 40 (0.425mm) to No. 10 (2.00mm)
Fine	-	No. 200 (0.075mm) to No. 40 (0.425mm)
Silt and Clay	-	Less than 0.075mm, Classification based upon plasticity. Generally silt particles size ranges from 0.005mm to 0.075mm and clay particle size is less than 0.005mm.

CONSISTENCY OF FINE GRAINED SOILS IN TERMS OF UNCONFINED COMPRESSIVE STRENGTH AND N-VALUES

Consistency	Unconfined Compressive Strength (Tons per square foot)	Approximate range of N
Very Soft	Less than 0.25	0 - 2
Soft	0.25 to 0.5	3 - 4
Medium Stiff	0.5 to 1.0	5 - 8
Stiff	1.0 to 2.0	9 - 15
Very Stiff	2.0 to 4.0	16 - 30
Hard	over 4.0	over 31

RELATIVE DENSITY OF COARSE GRAINED SOILS ACCORDING TO N-VALUES

Density Classification	Relative Density, %	Approximate Range of N
Very Loose	0 – 15	0 – 4
Loose	16 – 35	5 – 10
Medium Dense	36 - 65	11 - 30
Dense	66 - 85	31 – 50
Very Dense	86 – 100	over 50

Relative density of cohesionless soils is based upon an evaluation of the Standard Penetration Resistance (N), modified as required for overburden pressure.

GEOTECHNICAL INVESTIGATION REPORT

GREENVIEW DRIVE WATER MAIN
ANN ARBOR, MICHIGAN

MSG PROJECT NO.: ANNA0039

JANUARY 12, 2023

PREPARED FOR:
CITY OF ANN ARBOR
301 E. HURON STREET
PO BOX 8647
ANN ARBOR, MICHIGAN 48104

PREPARED BY:
THE MANNIK & SMITH GROUP, INC.
2365 S. HAGGERTY ROAD
CANTON, MICHIGAN 48188

Mannik Smith GROUP

January 12, 2023

Tracy Anderson, PE
Project Manager
City of Ann Arbor
301 E. Huron Street
PO Box 8647
Ann Arbor, Michigan 48104

RE: Geotechnical Investigation Report
Greenview Drive Water Main
Ann Arbor, Michigan
MSG Project Number: ANNA0039

Dear Ms. Anderson:

This report presents the results of our geotechnical investigation for the proposed water main replacement on Greenview Drive in Ann Arbor, Michigan. We completed this investigation in accordance with our contract with the City of Ann Arbor dated May 15, 2020.

We trust that this report addresses your project needs. We appreciate the opportunity to work with you on this very important project. Please contact us if you have any questions or if we can be of further assistance.

Sincerely,
The Mannik & Smith Group, Inc.

Kevin D. Brown, PE
Geotechnical Engineer

Ibraheem Shunnar, PE
Principal/Vice President

2365 Haggerty Road South, Canton, Michigan 48188 Tel: 734.397.3100 Fax: 734.397.3131
www.MannikSmithGroup.com

TABLE OF CONTENTS

APPENDICES

1.0 INTRODUCTION

1.1 General

The Mannik & Smith Group, Inc., (MSG) was retained by the City of Ann Arbor to conduct a geotechnical investigation to support the design of a proposed water main on Greenview Drive within the city limits. The approximate site location is depicted in Figure 1 - Site Location Map in Appendix A. This geotechnical investigation was performed in general accordance with our contract with the City of Ann Arbor dated May 15, 2020.

1.2 Project Information and Site Conditions

The overall project consists of the design of a proposed water main on Greenview Drive between Scio Church Road and West Stadium Boulevard. The project limits are approximately 2,600 feet in length. The existing right-of-way (ROW) of Greenview Drive is 66 feet in width, which includes 38-foot wide asphalt-surfaced pavement and concrete pedestrian sidewalks on either side of the roadway. The existing roadway is designated for two lanes of traffic, one lane for southbound and one lane for northbound; the roadway also has space for street-side parking on both sides of the road. The areas around the pavement is grass-covered with a few trees and bushes.

2.0 SUBSURFACE INVESTIGATION

2.1 Field Exploration

The subsurface investigation consisted of performing a total of ten (10) soil borings, designated SB-01 to SB-10. Soil borings SB-02, SB-05, and SB-09 were advanced to a depth of 20 feet below ground surface (bgs), while the remaining soil borings were advanced to a depth of 10 feet bgs. The number of borings, the approximate locations, and the boring depths were determined by City engineers. The boring locations were field located by MSG. Surveying of the boring locations was not performed; however, the approximate boring locations were field marked by MSG personnel by measuring from existing site features. A Soil Boring Location Plan is presented in Figure 2 in Appendix A.

2.1.1 Drilling

The drilling operations for this investigation were performed on December 15 and December 16, 2022. The soil borings were performed using a track-mounted Geoprobe 7822DT drill rig. The borings were advanced by hydraulically pushing 3.25-inch diameter steel casing. Upon completion, the boreholes were backfilled using soil cuttings and bentonite chips, and were capped with cold patch asphalt.

2.1.2 Standard Penetration Test

Standard Penetration Test (SPT) and soil sampling was conducted in accordance with ASTM D1586 procedures ("Standard Method for Penetration Tests and Split Barrel Sampling of Soils") and was completed at 2.5-foot intervals for the first 10 feet and at 5-foot intervals thereafter. At each interval, a 2-inch outer diameter split spoon sampler is driven 18 inches into the soil with blows of a 140-pound hammer falling 30 inches. The sampler is generally driven in three successive 6-inch increments with the blows for each 6-inch increment being recorded. The number of blows required to advance the sampler through 12 inches after an initial penetration of 6 inches is termed as the Standard Penetration Test resistance (N-value) and is presented graphically on individual Soil Boring Logs.

2.1.3 Sampling and Testing

Soil samples were recovered using a split-spoon sampling procedure in general accordance with ASTM D1586 Standard ("Standard Method for Penetration Tests and Split Barrel Sampling of Soils"). Soil samples were recovered from the hand auger borings at each apparent soil strata encountered. All collected samples were labeled with the soil boring designation and a unique sample number. The samples were sealed in glass jars in the field to protect the soil and maintain the soil's natural moisture content. Cohesive soil samples were subjected to unconfined compressive strength testing using Pocket Penetrometer methods.

All samples were transferred to MSG's laboratory. The soil samples collected from this investigation will be retained in our laboratory for a period of 30 days after the date of submission of the final report, after which they will be discarded unless we are notified otherwise.

2.1.4 Groundwater Level Observation Procedures

Whenever possible, groundwater level observations were made during the drilling operations and are shown in the Soil Boring Logs. Prior to backfilling, each open borehole was observed again for groundwater. During drilling, the depth at which free water was observed, where drill cuttings became saturated or where saturated samples were collected, was indicated as the groundwater level during drilling. In particular, in pervious soils (granular soils), water levels are considered relatively reliable when solid or hollow-stem augers are used for drilling. It should be noted that seasonal variations and recent rainfall conditions may influence the groundwater table significantly.

2.2 Visual Classification

Each sample recovered from the borings was examined and visually classified according to ASTM D2488. This examination was performed to verify conditions identified within field boring logs and to perform visual-manual classification of samples. During the examination process, the geotechnical engineer finalized the soil boring logs. All soil samples were classified in general accordance with the Unified Soil Classification System (USCS). The USCS group symbol determined from the visual-manual classification is shown in parentheses at the end of the sample description for each layer shown on the Soil Boring Logs.

The results of the soil classification and soil testing are included on the Soil Boring Logs, which are presented in Appendix B. Also included in Appendix B are General Soil Sample Notes, and a Boring/Well Log Key that illustrates the soil classification criteria and terminology used on the Soil Boring Logs.

3.0 SUBSURFACE CONDITIONS

3.1 Subsurface Classification

The subsurface soil and groundwater conditions encountered in the borings drilled at the site are presented in the Soil Boring Logs contained in Appendix B. Notes and symbols illustrating the soil classification criteria and terminology used in the boring logs are also included in Appendix B.

The following sections describe the subsurface conditions in terms of major soil strata for the purposes of geotechnical exploration. The soil boundaries indicated are inferred from non-continuous sampling and observations of the drilling operations and/or sampling resistance. The subsurface conditions discussed in the following sections and those shown on the boring logs represent an evaluation of the subsurface conditions based on interpretation of the field and laboratory data using normally accepted geotechnical engineering judgement and common engineering practice standards. The subsurface conditions described herein may vary beyond the boring locations and at different times of the year. A generalized soil profile of the subsurface conditions encountered across the site of the proposed site improvements, beginning at the ground surface and extended downward is as follows:

Surficial Material

Asphalt with a thickness ranging from 10 inches to 12 inches was encountered at all the soil boring locations.

Clay (CL)

Medium stiff to hard brown silty lean clay with variable amounts of sand and gravel was encountered at all soil boring locations. This material extended to the termination depths of the borings at 10 feet to 20 feet bgs (approximate elevation 943 to 920 feet).

3.2 Groundwater Observations

Groundwater was not encountered in any of the borings during drilling operations. Typically, the level where the soil color changes from brown to gray is generally indicative of the long term groundwater level. As this color change was not observed in any of the borings, we conclude the long-term water table is below the depth of the explored borings. Water levels reported are accurate only for the time and date the borings were drilled. The borings were backfilled and sealed the same day that they were completed. Long term monitoring of the boreholes was not included as part of the scope of our subsurface investigation.

It should be noted that the elevation of the natural groundwater table is likely to vary throughout the year depending on the amount of precipitation, runoff, evaporation, and percolation in the area, as well as the water level in any surface water bodies in the vicinity. Long-term monitoring with monitoring wells or piezometers would be necessary to accurately assess the groundwater levels and fluctuation patterns at the site.

4.0 ANALYSES AND RECOMMENDATIONS

The following sections discuss in detail the results of our analyses and geotechnical recommendations with respect to the design and construction of the proposed water main.

4.1 Design Soil Profile

Based on our review of the subsurface soil conditions, we have developed the following design soil profile for this project. This soil profile will be used in the completion of our analysis.

Table 4.1-1
DESIGN SOIL PROFILE

Layer No	Soil Description	Thickness (ft)	Total Unit Weight (pcf)	Cohesion (psf)	Friction Angle (deg)
1	Medium stiff to stiff clay (CL)	5	130.0	2,000	0
2	Very stiff to hard clay (CL)	15	130.0	4,000	0

4.2 Site Preparation

The following are our recommendations for the site soil preparation based on the geotechnical investigation performed for this project. These recommendations should be incorporated into the project specifications.

Before proceeding with construction, surface soils, vegetation, topsoil, root systems, refuse, asphalt, concrete including any existing abandoned buried foundations, and other deleterious materials should be stripped from the proposed construction areas. The bearing soils should be observed by a geotechnical engineer and visually checked for suitability as a bearing soil.

Generally, areas exposed by stripping operations on which subgrade preparations are to be performed should be compacted in place to 98 percent of Standard Proctor or 95 percent of Modified Proctor. Soft, loose, or saturated soils that are difficult to compact may require an undercut and replacement with engineered fill for stabilization.

The contractor is responsible for controlling surface water at the construction site using Contractor's Means and Methods. Every effort should be taken to minimize disturbance during compaction or over excavation and storm water should be diverted away from the construction perimeter or pumped out using a sump to accommodate

proper site preparation and soil compaction. Cohesive soils are moisture sensitive and could become unstable if proper site water controls are not implemented and/or if they are subject to construction traffic.

Utilities may exist within or in the vicinity of the construction area. If such utilities are present, they should be removed and relocated or abandoned in place. Plans shall be made to protect existing utilities and any other feature or structure within or in the vicinity of the construction area. If abandoned in place, it is recommended that the utility pipe be filled with cement grout to mitigate the potential for collapse in the future. Should the utility lines be removed from the site, the resultant trench excavations should be backfilled with well-compacted granular material, placed and compacted in accordance with the recommendations of Section 4.3.

4.3 Fill Placement and Engineered Fill Requirements

All fill operations shall meet the requirements of the City of Ann Arbor. All fill should consist of inorganic soil that is free from all deleterious materials and construction debris. The fill material should be verified by an approved testing laboratory or by a geotechnical engineering firm. Fill materials should not be placed in a frozen condition or upon frozen subgrades. Since the site soils generally consist of lean clay, we recommend a minimum of 6 inches of clean granular fill should be placed to provide the required bedding. In utility trenches, granular backfill material should extend at least two pipe diameters above the pipe's crown. Proper drainage should be maintained during and after fill placement to prevent water from impacting compaction efforts or long-term fill integrity.

The soil should be compacted to 98 percent of the Standard Proctor or 95 percent of Modified Proctor maximum dry density within two (2) percent of the optimum moisture content. A qualified geotechnical consultant should be retained to monitor all fill placement in order to assure that materials are placed according to their suitability, and compaction requirements are achieved. In-place soil moisture/density testing should be performed during fill placement activities to assure proper fill compaction. Areas that do not achieve compaction requirements after initial placement should be re-compacted to meet project requirements.

The actual lift thickness suitable for fill placement is dependent upon the soil type, compaction equipment, and the compaction specification. In general, fill should be placed in 9-inch loose thickness lifts (8-inch compacted); assuming appropriately weighted and ballasted compaction equipment is utilized. In confined areas where hand operated compaction equipment is required, 4-inch and 6-inch loose thickness lifts should be utilized for hand operated vibratory plate compactors and hand operated vibratory drum rollers weighing at least 1,000 pounds, respectively. Sand fills should be compacted using smooth vibratory rollers. Clay fills should be compacted using a sheep foot compactor. The geotechnical engineer, as part of the construction monitoring, should review the equipment utilized for compaction to confirm suitability relative to the specified loose lift thickness. If necessary, the geotechnical engineer will recommend a revised lift thickness suitable to the equipment performing compaction.

To minimize corrosion of existing metallic utilities, topsoil, organic soils, existing fill soils, and mixtures of sand and clay should not be placed adjacent to metallic utilities. In addition, buried utilities of different metallic materials should be electrically isolated from each other to minimize galvanic corrosion.

5.0 CONSTRUCTION CONSIDERATIONS

5.1 Excavation and Slope

Familiarity with applicable local, state and federal safety regulations, including current OSHA excavation and trench safety is vital. Therefore it should be a requisite for both the Owner and Contractor with the Contractor by and large being responsible for the safety of the site. Activities at the site, including demolition, foundation construction, utilities, and site preparation, may require excavations at significant depths below the ground surface. Slope height, slope inclination, and excavation depth should in no case exceed those specified in local, state, or federal safety (OSHA Health and Safety Standards for Excavations, 29 CFR Part 1926 Subpart P)

regulations. Such regulations are strictly enforced and, if not followed, the Owner, Contractor, or earthwork or utility Subcontractors could be liable for substantial penalties.

Flatter slopes are required where soils are stockpiled or in the vicinity of existing structures. If sufficient room is not available for sloping the excavation walls, temporary shoring will be required. It is our recommendations that any excavation in excess of 5 feet in depth or excavations requiring temporary shoring should be designed by a professional engineer.

Alternatively, vertical excavation may be performed if steel sheet pile, sliding trench shields or trench boxes are used to retain the soils and constructability concerns are addressed. Steel sheeting should be designed to account for the lateral soil pressure and minimize deflections at the top of the sheeting to no more than 2 inches.

5.2 Groundwater Control

Groundwater was not encountered during or after drilling operations. We anticipate the long-term groundwater table is situated at a depth below the explored soil borings. Perched water may be possible in utility trenches or if granular soils are encountered at the site during construction.

Due to the low permeability of the soils and potential depth of groundwater, significant infiltration problems are not anticipated. However, the Contractor should be prepared to address general water infiltration (i.e. pumping water from prepared sumps). The amount and type of dewatering required during construction will be further impacted by the weather, groundwater levels at the time of construction, the effectiveness of the Contractor's techniques in preventing surface water runoff from entering open excavations.

6.0 GENERAL QUALIFICATIONS AND LIMITATIONS

The evaluations, conclusions and recommendations in this report are based on our interpretation of the field and laboratory data obtained during the geotechnical investigation, our understanding of the project and our experience during previous work, with similar sites and subsurface conditions. Data used during this exploration included:

- Ten (10) exploratory borings performed during this investigation;
- Observations of the project site by our staff;
- Results of laboratory soil testing; and,
- Results of the geotechnical analyses.

The subsurface conditions discussed in this report and those shown on the boring logs represent an estimate of the subsurface conditions based on interpretation of the boring data using normally accepted geotechnical engineering judgments. Although individual test borings are representative of the subsurface conditions at the boring locations on the dates shown, they are not necessarily indicative of subsurface conditions at other locations or at other times. MSG is not responsible for independent conclusions, opinions, or recommendations made by others based upon information presented in this report.

We strongly recommend the final project plans and specifications be reviewed by MSG's geotechnical engineer to confirm that the geotechnical aspects are generally consistent with the recommendations of this report. In particular, the specifications for excavation and foundation construction should be prepared and/or reviewed by MSG's Geotechnical Engineer of Record. In addition, we recommend site subgrade preparation, fill compaction activities, and foundation installation activities should be monitored by MSG's geotechnical engineer or his/her representative.

This report and evaluation reflects only the geotechnical aspects of the subsurface conditions at the site. Review and evaluation of environmental aspects of subsurface conditions are beyond the scope of this report.

APPENDIX A

FIGURE 1 – SITE LOCATION MAP
FIGURE 2 – SOIL BORING LOCATION PLAN

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Figure 1: Site Location Map
Greenview Drive Water Main
Ann Arbor, Michigan
MSG Project No.: ANNA0039

Map Adapted from
Google Earth 2023 ®

N

Mannik Smith GROUP
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Figure 2: Boring Location Map
Greenview Drive Water Main
Ann Arbor, Michigan
MSG Project No.: ANNA0039

Map Adapted from
Google Earth 2023 ®

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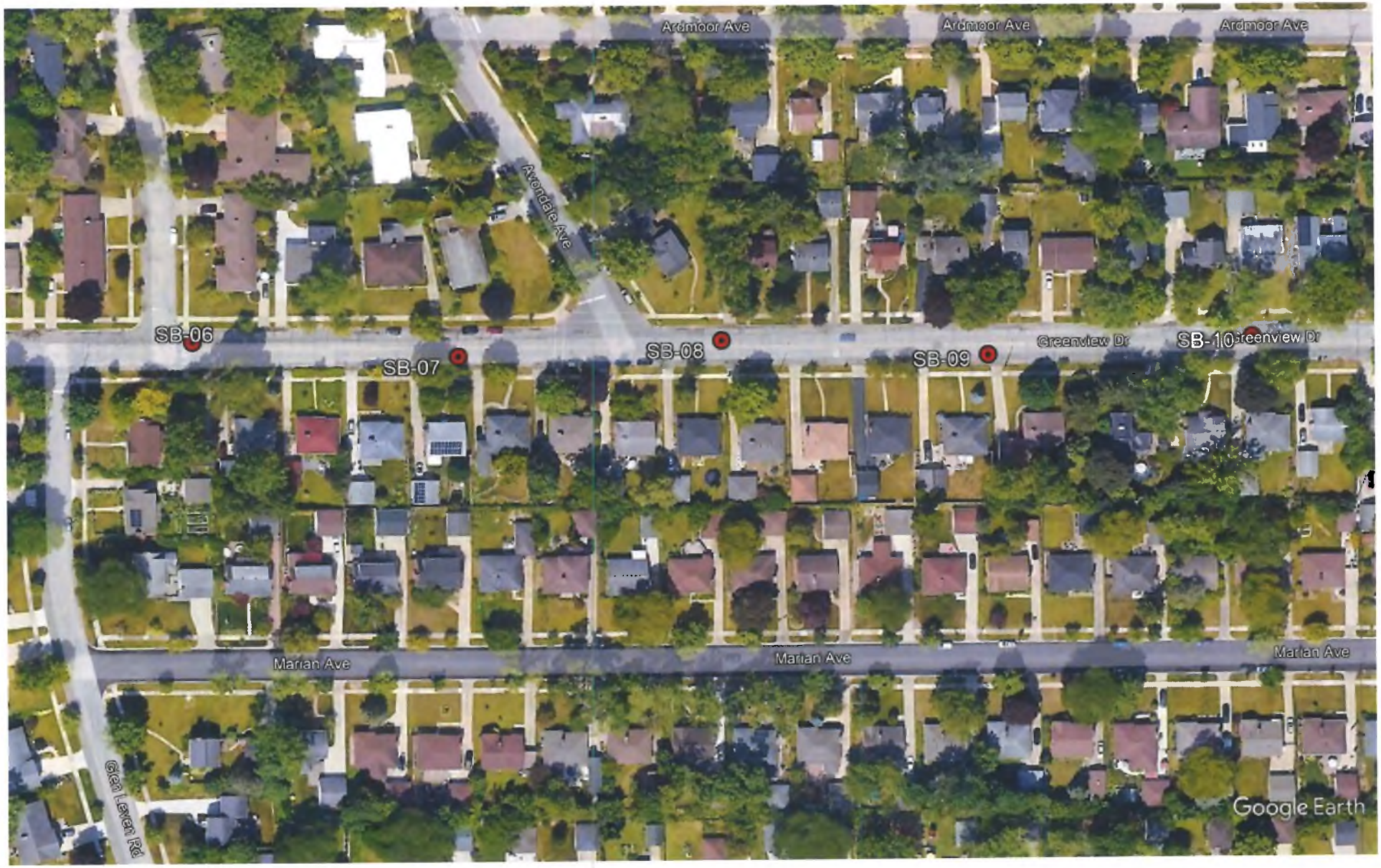

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Figure 2: Boring Location Map
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Map Adapted from
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APPENDIX B

SOIL BORING LOGS

GENERAL SOIL SAMPLE NOTES

Unless noted, all terms utilized herein refer to the Standard Definitions presented in ASTM D653.

Standard Penetration Test (ASTM D1586): A 2.0-inch outside-diameter (O.D.), 1-3/8-inch inside-diameter (I.D.) split barrel sampler is driven into undisturbed soil by means of a 140-pound weight falling freely through a vertical distance of 30 inches. The sampler is normally driven three successive 6-inch increments. The total number of blows required for the final 12 inches of penetration is the Standard Penetration Resistance (N).

COHESIVE SOILS

Consistency	Approximate Range of N	Unconfined Compressive Strength (psf)
Very Soft	0 – 1	Below 500
Soft	2 – 4	500 – 1,000
Medium Stiff	5 – 8	1,000 – 2,000
Stiff	9 – 15	2,000 – 4,000
Very Stiff	16 – 30	4,000 – 8,000
Hard	31 – 50	8,000 – 16,000
Very Hard	Over 50	Over 16,000

COHESIONLESS SOILS

Density Classification	Approximate Range of N
Very Loose	0 – 4
Loose	5 – 10
Medium Dense	11 – 30
Dense	31 – 50
Very Dense	Over 50

CLASSIFICATION

The major soil constituent is the principal noun, i.e. sand, silt, gravel. The second major soil constituent and other minor constituents are reported as follows:

Second Major Constituent (percent by weight)	Minor Constituents (percent by weight)
Trace – 1% to 11%	Trace – 1% to 11%
Adjective – 12% to 35% (clayey, silty, etc.)	Little – 12% to 22%
	Some – 23% to 33%
And – Over 35%	

PARTICLE SIZES

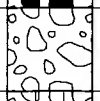
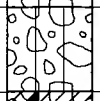
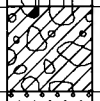
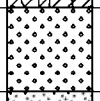
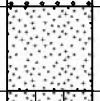
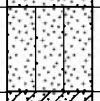
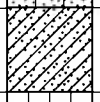
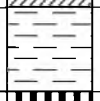
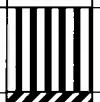
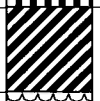
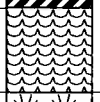
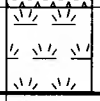
Boulders		- Greater than 12 inches (305 mm)
Cobbles		- 3 inches (76.2 mm) to 12 inches (305 mm)
Gravel:	Coarse	- ¾ inches (19.05 mm) to 3 inches (76.2 mm)
	Fine	- No.4 (4.75 mm) to ¾ inches (19.05 mm)
Sand:	Coarse	- No. 10 (2.00 mm) to No. 4 (4.75 mm)
	Medium	- No. 40 (0.425 mm) to No. 10 (2.00 mm)
	Fine	- No. 200 (0.074 mm) to No. 40 (0.425 mm)
Silt		- 0.005 mm to 0.074 mm
Clay		- Less than 0.005 mm

If clay content is sufficient so that clay dominates soil properties, clay becomes the principal noun with the other major soil constituent as modifier: i.e., silty clay. Other minor soil constituents may be included in accordance with the classification breakdown for cohesionless soils: i.e., silty clay, trace sand, little gravel.

If sand particle size is greater than 11% by weight of the total sample weight, the adjective (i.e., fine, medium or coarse) is added to the soil description for the sand portion of the sample, provided sand is the major or second major constituent.

SAMPLE DESIGNATIONS

AS	Auger Sample - directly from auger flight	ST	Shelby Tube Sample - 3-inch diameter unless otherwise noted
BS	Miscellaneous Samples - Bottle or Bag	PS	Piston Sample - 3-inch diameter unless otherwise noted
MC	Macro-Core Sample - 2.25-inch O.D., 1.75-inch I.D., 5 feet long polyethylene liner	RC	Rock Core - NX core unless otherwise noted
LB	Large-Bore (Micro-Core) Sample - 1-inch diameter, 2 feet long polyethylene liner	CS	CME Continuous Sample - 5 feet long, 3-inch diameter unless otherwise noted
SS	Split Spoon Sample - 1-inch or 2-inch O.D.	HA	Hand Auger
LS	Split Spoon (SS) Sampler with 3 feet long liner insert	DP	Drive Point
NR	No Recovery	CM	Coring Machine

MAJOR DIVISIONS					TYPICAL NAMES
COARSE-GRAINED SOILS MORE THAN HALF IS COARSER THAN NO. 200 SIEVE	GRAVELS MORE THAN HALF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE	CLEAN GRAVELS WITH LESS THAN 15% FINES	GW		WELL-GRADED GRAVELS WITH OR WITHOUT SAND
			GP		POORLY-GRADED GRAVELS WITH OR WITHOUT SAND
		GRAVELS WITH 15% OR MORE FINES	GM		SILTY GRAVELS WITH OR WITHOUT SAND
			GC		CLAYEY GRAVELS WITH OR WITHOUT SAND
	SANDS MORE THAN HALF COARSE FRACTION IS FINER THAN NO. 4 SIEVE SIZE	CLEAN SANDS WITH LESS THAN 15% FINES	SW		WELL-GRADED SANDS WITH OR WITHOUT GRAVEL
			SP		POORLY-GRADED SANDS WITH OR WITHOUT GRAVEL
		SANDS WITH 15% OR MORE FINES	SM		SILTY SANDS WITH OR WITHOUT GRAVEL
			SC		CLAYEY SANDS WITH OR WITHOUT GRAVEL
FINE-GRAINED SOILS MORE THAN HALF IS FINER THAN NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT 50% OR LESS		ML		INORGANIC SILTS OF LOW TO MEDIUM PLASTICITY WITH OR WITHOUT SAND OR GRAVEL
			CL		INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY WITH OR WITHOUT SAND OR GRAVEL
			OL		ORGANIC SILTS OR CLAYS OF LOW TO MEDIUM PLASTICITY WITH OR WITHOUT SAND OR GRAVEL
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50%		MH		INORGANIC SILTS OF HIGH PLASTICITY WITH OR WITHOUT SAND OR GRAVEL
			CH		INORGANIC CLAYS OF HIGH PLASTICITY WITH OR WITHOUT SAND OR GRAVEL
			OH		ORGANIC SILTS OR CLAYS OF HIGH PLASTICITY WITH OR WITHOUT SAND OR GRAVEL
HIGHLY ORGANIC SOILS			PT		PEAT AND OTHER HIGHLY ORGANIC SOILS

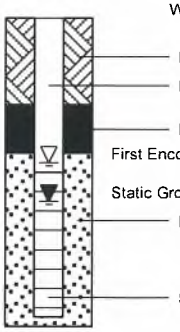
SYMBOLS KEY

SAMPLE TYPES

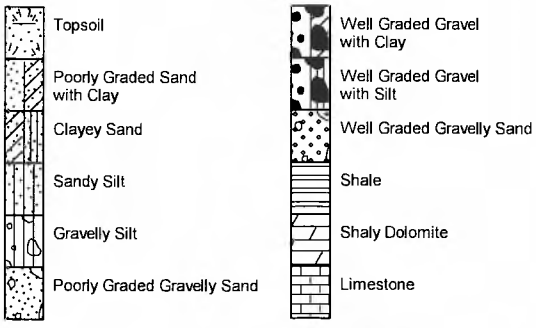
Rock Core

Split Spoon sample, 1 inch or 2 inch outer-diameter.

WELL SYMBOLS



OTHER MATERIAL SYMBOLS



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BORING / WELL LOG KEY

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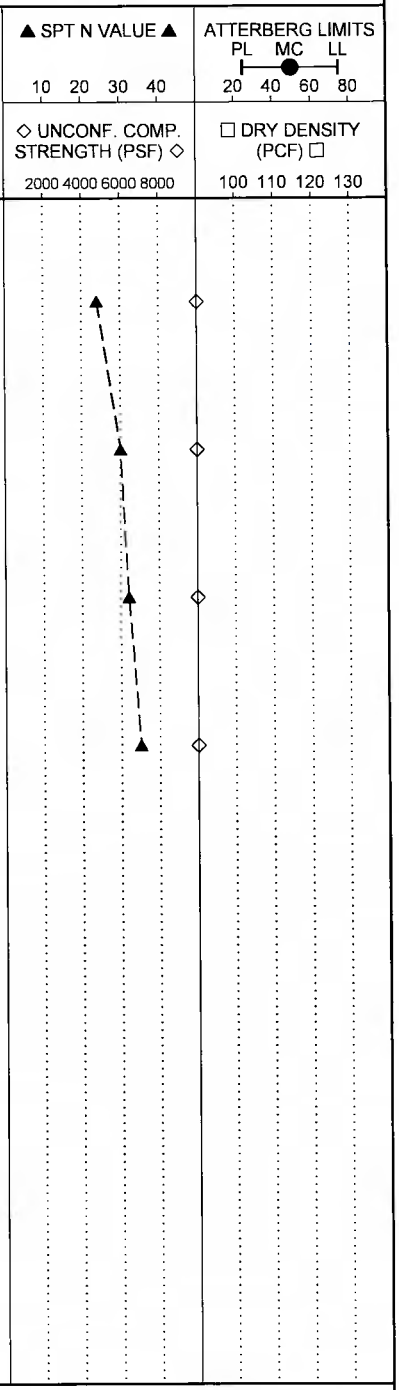
BORING ID: SB-01

CLIENT City of Ann Arbor
PROJECT NAME Greenview Drive Water Main
PROJECT NUMBER ANNA0039
PROJECT LOCATION Ann Arbor, Michigan
DATE STARTED 12/15/22 **COMPLETED** 12/15/22
BORING COORDINATES 276435.1 N;13286597.3 E FEET
DRILLING METHOD Direct Push
GROUND ELEVATION 934.0 FEET
DRILLING CONTRACTOR MSG
TOTAL DEPTH 10.0 FT **BACKFILL** Cuttings/Patch
DRILL RIG Geoprobe 7822 DT **HAMMER TYPE** Automatic
LOGGED BY KY **CHECKED BY** KDB
DRILLER BM
REMARKS Coordinates and EL. estimated from Google Earth

ELEVATION (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (FEET)	SAMPLE TYPE NUMBER	BLOW COUNTS	SPT N VALUE	RECOVERY % (RQD)	DRY DENSITY (PCF)	UNCONF. COMP. STRENGTH (PSF)	MOISTURE CONTENT (%)
933.1		ASPHALT (11 inches)	0							
		Very stiff to hard, mottled brown and gray silty LEAN CLAY, trace sand and gravel, moist (CL)		SS 1	7-10-14	24	100		9000+P	
			5	SS 2	13-15-15	30	100		9000+P	
				SS 3	14-13-19	32	95		9000+P	
924.0			10	SS 4	15-15-20	35	100		9000+P	
		Bottom of borehole at 10.0 feet.								



LEGEND:

- ▽ WATER LEVEL AT TIME OF DRILLING N/A
- ▼ WATER LEVEL AT END OF DRILLING N/A
- ▼ WATER LEVEL AFTER DRILLING N/A

D = UCS TEST PERFORMED ON DISTURBED SAMPLE
P = POCKET PENETROMETER TEST
T = TORVANE SHEAR TEST

AASHTO R18

The Mannik & Smith Group, Inc.
2365 Haggerty Road South, Canton, MI 48188
ph: (734) 397-3100 fax: (734) 397-3131
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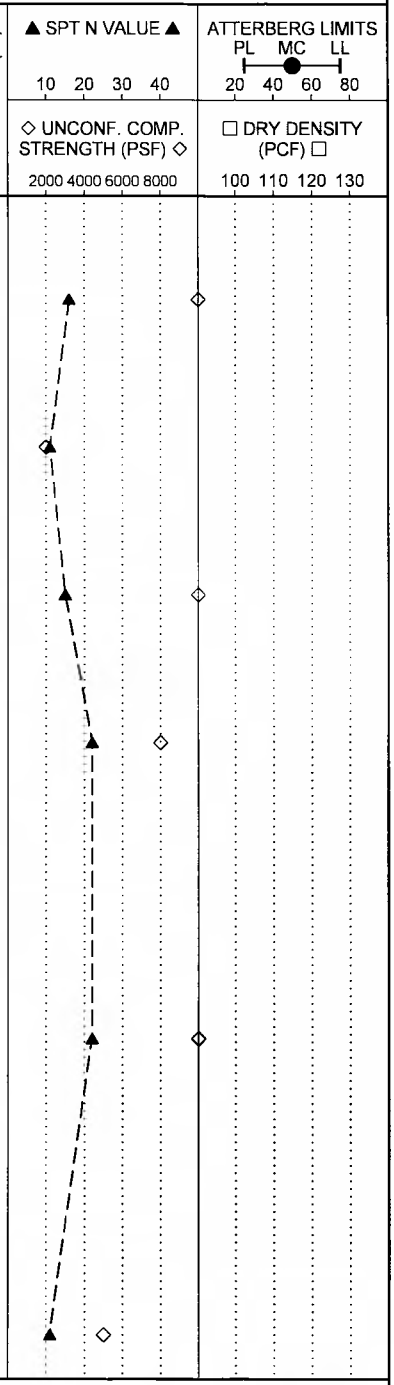
BORING ID: SB-02

CLIENT City of Ann Arbor
PROJECT NAME Greenview Drive Water Main
PROJECT NUMBER ANNA0039
PROJECT LOCATION Ann Arbor, Michigan
DATE STARTED 12/15/22 **COMPLETED** 12/15/22
BORING COORDINATES 276685.3 N;13286574.8 E FEET
DRILLING METHOD Direct Push
GROUND ELEVATION 944.0 FEET
DRILLING CONTRACTOR MSG
TOTAL DEPTH 20.0 FT **BACKFILL** Cuttings/Patch
DRILL RIG Geoprobe 7822 DT **HAMMER TYPE** Automatic
LOGGED BY KY **CHECKED BY** KDB
DRILLER BM
REMARKS Coordinates and EL. estimated from Google Earth

ELEVATION (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (FEET)	SAMPLE TYPE NUMBER	BLOW COUNTS	SPT N VALUE	RECOVERY % (RQD)	DRY DENSITY (PCF)	UNCONF. COMP. STRENGTH (PSF)	MOISTURE CONTENT (%)
943.2		ASPHALT (10 inches)	0							
940.5		Very stiff to hard, brown silty SANDY LEAN CLAY, trace gravel, dry (CL)		SS 1	6-8-8	16	95		9000+P	
938.0		Stiff, brown silty LEAN CLAY, trace sand and gravel, damp (CL)	5	SS 2	5-5-6	11	95		2000P	
930.5		Very stiff to hard, brown silty LEAN CLAY, little sand, trace gravel, moist (CL)		SS 3	7-8-7	15	100		9000+P	
			10	SS 4	9-10-12	22	100		8000P	
		Very stiff to hard, gray silty LEAN CLAY, trace sand and gravel, moist (CL)	15	SS 5	10-10-12	22	89		9000+P	
924.0			20	SS 6	5-5-6	11	100		5000P	



Bottom of borehole at 20.0 feet.

LEGEND:

▽ WATER LEVEL AT TIME OF DRILLING N/A
▼ WATER LEVEL AT END OF DRILLING N/A
▼ WATER LEVEL AFTER DRILLING N/A

D = UCS TEST PERFORMED ON DISTURBED SAMPLE
P = POCKET PENETROMETER TEST
T = TORVANE SHEAR TEST

AASHTO R18

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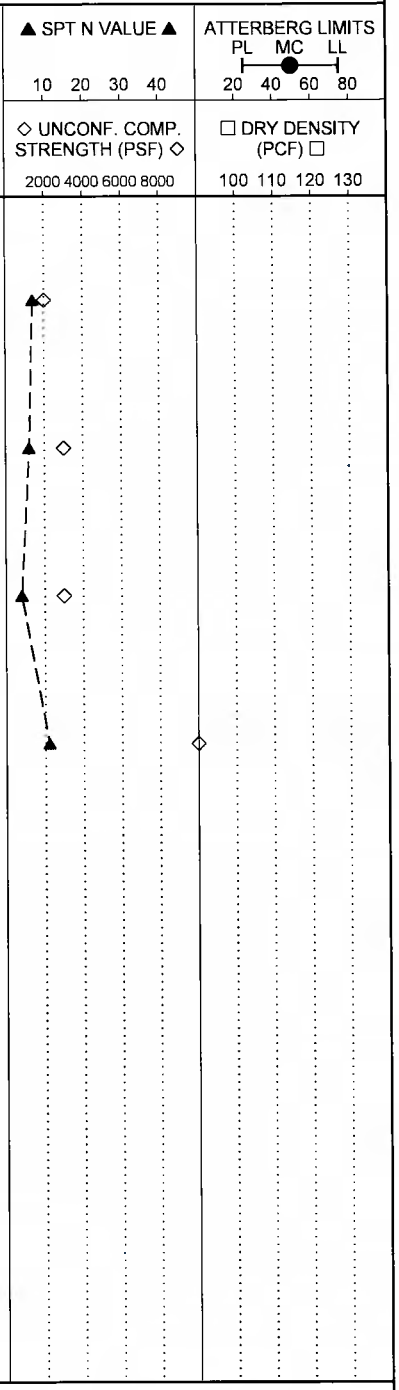
www.manniksmithgroup.com

BORING ID: SB-03

CLIENT City of Ann Arbor
PROJECT NAME Greenview Drive Water Main
PROJECT NUMBER ANNA0039
PROJECT LOCATION Ann Arbor, Michigan
DATE STARTED 12/15/22 **COMPLETED** 12/15/22
BORING COORDINATES 276933.1 N;13286584.0 E FEET
DRILLING METHOD Direct Push
GROUND ELEVATION 947.0 FEET
DRILLING CONTRACTOR MSG
TOTAL DEPTH 10.0 FT **BACKFILL** Cuttings/Patch
DRILL RIG Geoprobe 7822 DT **HAMMER TYPE** Automatic
LOGGED BY KY **CHECKED BY** KDB
DRILLER BM
REMARKS Coordinates and EL. estimated from Google Earth

ELEVATION (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (FEET)	SAMPLE TYPE NUMBER	BLOW COUNTS	SPT N VALUE	RECOVERY % (RQD)	DRY DENSITY (PCF)	UNCONF. COMP. STRENGTH (PSF)	MOISTURE CONTENT (%)
946.2		ASPHALT (10 inches)	0							
943.5		Medium stiff, brown silty SANDY LEAN CLAY, trace gravel, damp (CL)		SS 1	3-3-4	7	100		2000^{P}	
		Medium stiff to stiff, brown silty LEAN CLAY, trace sand and gravel, moist (CL)	5	SS 2	2-3-3	6	100		3000^{P}	
				SS 3	2-2-2	4	100		3000^{P}	
937.0		@ 8.5 feet, hard	10	SS 4	4-5-6	11	100		9000+^{P}	
		Bottom of borehole at 10.0 feet.								



LEGEND:

- ▽ WATER LEVEL AT TIME OF DRILLING N/A
- ▼ WATER LEVEL AT END OF DRILLING N/A
- ▼ WATER LEVEL AFTER DRILLING N/A

D = UCS TEST PERFORMED ON DISTURBED SAMPLE
P = POCKET PENETROMETER TEST
T = TORVANE SHEAR TEST

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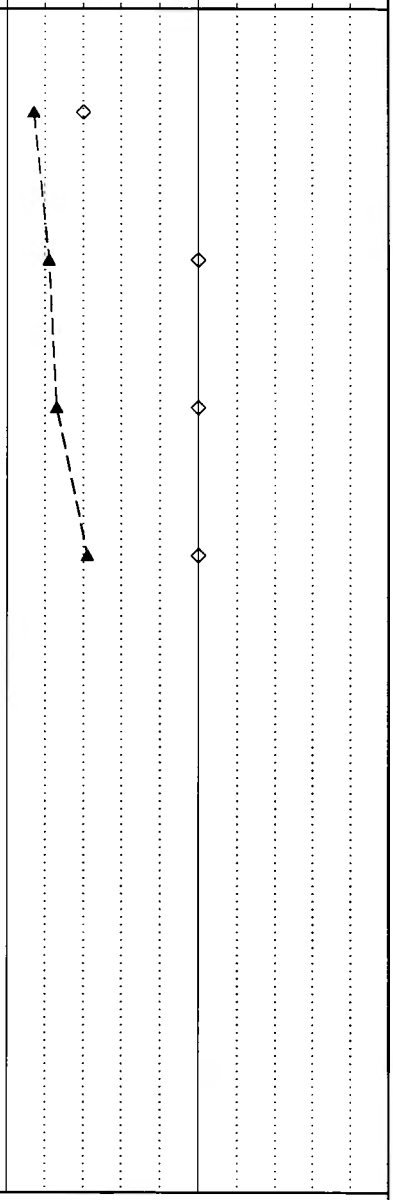
BORING ID: SB-04

CLIENT City of Ann Arbor
PROJECT NAME Greenview Drive Water Main
PROJECT NUMBER ANNA0039
PROJECT LOCATION Ann Arbor, Michigan
DATE STARTED 12/15/22 **COMPLETED** 12/15/22
BORING COORDINATES 277182.5 N;13286554.0 E FEET
DRILLING METHOD Direct Push
GROUND ELEVATION 946.0 FEET
DRILLING CONTRACTOR MSG
TOTAL DEPTH 10.0 FT **BACKFILL** Cuttings/Patch
DRILL RIG Geoprobe 7822 DT **HAMMER TYPE** Automatic
LOGGED BY KY **CHECKED BY** KDB
DRILLER BM
REMARKS Coordinates and EL. estimated from Google Earth

ELEVATION (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (FEET)	SAMPLE TYPE NUMBER	BLOW COUNTS	SPT N VALUE	RECOVERY % (RQD)	DRY DENSITY (PCF)	UNCONF. COMP. STRENGTH (PSF)	MOISTURE CONTENT (%)
945.1		ASPHALT (11 inches)	0							
942.5		Medium stiff to stiff, brown silty LEAN CLAY, trace sand and gravel, moist (CL)		SS 1	2-3-4	7	100		4000^{P}	
936.0		Very stiff to hard, brown silty LEAN CLAY, little sand, trace gravel, moist (CL)	5	SS 2	4-6-5	11	100		9000+^{P}	
				SS 3	6-6-7	13	89		9000+^{P}	
			10	SS 4	8-10-11	21	95		9000+^{P}	
		Bottom of borehole at 10.0 feet.								



LEGEND:

- ▽ WATER LEVEL AT TIME OF DRILLING N/A
- ▼ WATER LEVEL AT END OF DRILLING N/A
- ▼ WATER LEVEL AFTER DRILLING N/A

D = UCS TEST PERFORMED ON DISTURBED SAMPLE
P = POCKET PENETROMETER TEST
T = TORVANE SHEAR TEST

AASHTO R18

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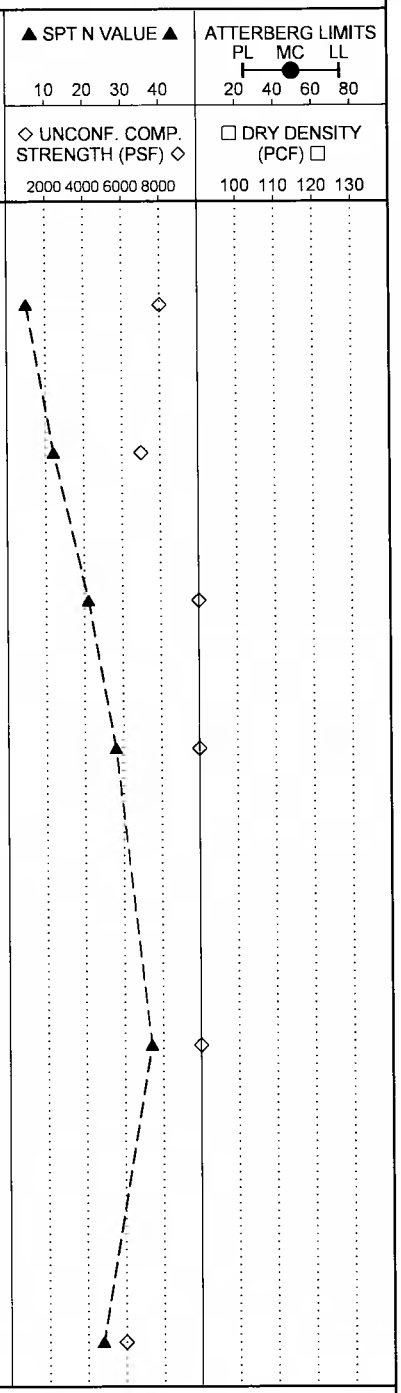
BORING ID: SB-05

CLIENT City of Ann Arbor
PROJECT NAME Greenview Drive Water Main
PROJECT NUMBER ANNA0039
PROJECT LOCATION Ann Arbor, Michigan
DATE STARTED 12/15/22 **COMPLETED** 12/15/22
BORING COORDINATES 277431.4 N;13286552.1 E FEET
DRILLING METHOD Direct Push
GROUND ELEVATION 940.0 FEET
DRILLING CONTRACTOR MSG
TOTAL DEPTH 20.0 FT **BACKFILL** Cuttings/Patch
DRILL RIG Geoprobe 7822 DT **HAMMER TYPE** Automatic
LOGGED BY KY **CHECKED BY** KDB
DRILLER BM
REMARKS Coordinates and EL. estimated from Google Earth

ELEVATION (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (FEET)	SAMPLE TYPE NUMBER	BLOW COUNTS	SPT N VALUE	RECOVERY % (RQD)	DRY DENSITY (PCF)	UNCONF. COMP. STRENGTH (PSF)	MOISTURE CONTENT (%)
939.1		ASPHALT (11 inches)	0							
		Very stiff to hard, mottled brown and gray silty LEAN CLAY, trace sand and gravel, dry (CL)		SS 1	2-2-3	5	100		8000[P]	
			5	SS 2	3-5-7	12	100		7000[P]	
				SS 3	8-10-11	21	95		9000+[P]	
930.0			10	SS 4	11-13-15	28	100		9000+[P]	
		Hard, brown silty LEAN CLAY, trace sand and gravel, moist (CL)								
925.0			15	SS 5	14-17-20	37	100		9000+[P]	
		Very stiff, gray silty LEAN CLAY, some sand, trace gravel, damp (CL)								
920.0			20	SS 6	9-11-13	24	100		6000[P]	



Bottom of borehole at 20.0 feet.

LEGEND:

▽ WATER LEVEL AT TIME OF DRILLING N/A
▼ WATER LEVEL AT END OF DRILLING N/A
▼ WATER LEVEL AFTER DRILLING N/A

D = UCS TEST PERFORMED ON DISTURBED SAMPLE
P = POCKET PENETROMETER TEST
T = TORVANE SHEAR TEST

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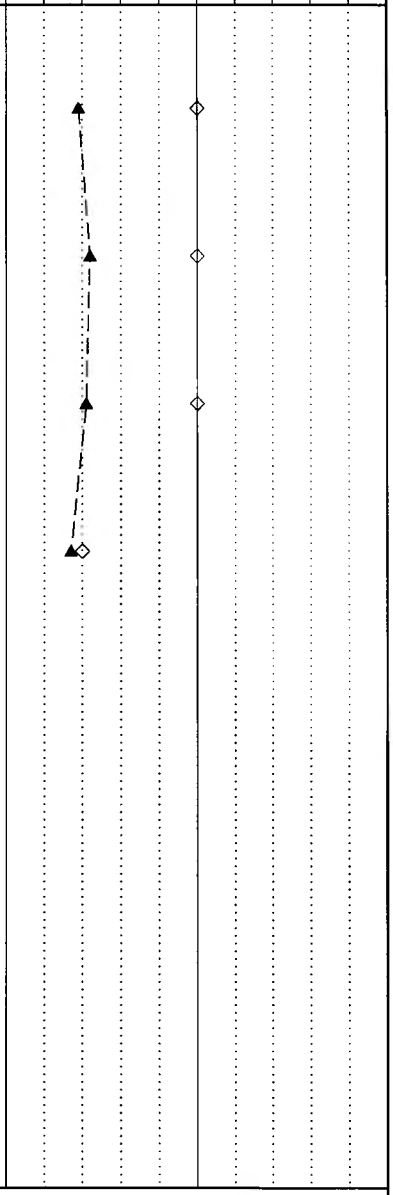
BORING ID: SB-06

CLIENT City of Ann Arbor
PROJECT NAME Greenview Drive Water Main
PROJECT NUMBER ANNA0039
PROJECT LOCATION Ann Arbor, Michigan
DATE STARTED 12/15/22 **COMPLETED** 12/15/22
BORING COORDINATES 277682.7 N;13286550.3 E FEET
DRILLING METHOD Direct Push
GROUND ELEVATION 938.0 FEET
DRILLING CONTRACTOR MSG
TOTAL DEPTH 10.0 FT **BACKFILL** Cuttings/Patch
DRILL RIG Geoprobe 7822 DT **HAMMER TYPE** Automatic
LOGGED BY KY **CHECKED BY** KDB
DRILLER BM
REMARKS Coordinates and EL. estimated from Google Earth

ELEVATION (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (FEET)	SAMPLE TYPE NUMBER	BLOW COUNTS	SPT N VALUE	RECOVERY % (RQD)	DRY DENSITY (PCF)	UNCONF. COMP. STRENGTH (PSF)	MOISTURE CONTENT (%)
937.2		ASPHALT (10 inches)	0							
		Very stiff to hard, brown silty LEAN CLAY, trace sand and gravel, moist (CL)		SS 1	7-9-10	19	100		9000+P	
934.5		Very stiff to hard, brown silty LEAN CLAY, little sand, trace gravel, dry (CL)	5	SS 2	9-11-11	22	100		9000+P	
		@ 6 feet, mottled brown and gray		SS 3	8-10-11	21	100		9000+P	
929.5		Very stiff, brown silty LEAN CLAY, some sand, trace gravel, damp (CL)	10	SS 4	6-9-8	17	100		4000P	
928.0		Bottom of borehole at 10.0 feet.								



LEGEND:

- ▽ WATER LEVEL AT TIME OF DRILLING N/A
- ▽ WATER LEVEL AT END OF DRILLING N/A
- ▼ WATER LEVEL AFTER DRILLING N/A

D = UCS TEST PERFORMED ON DISTURBED SAMPLE
P = POCKET PENETROMETER TEST
T = TORVANE SHEAR TEST

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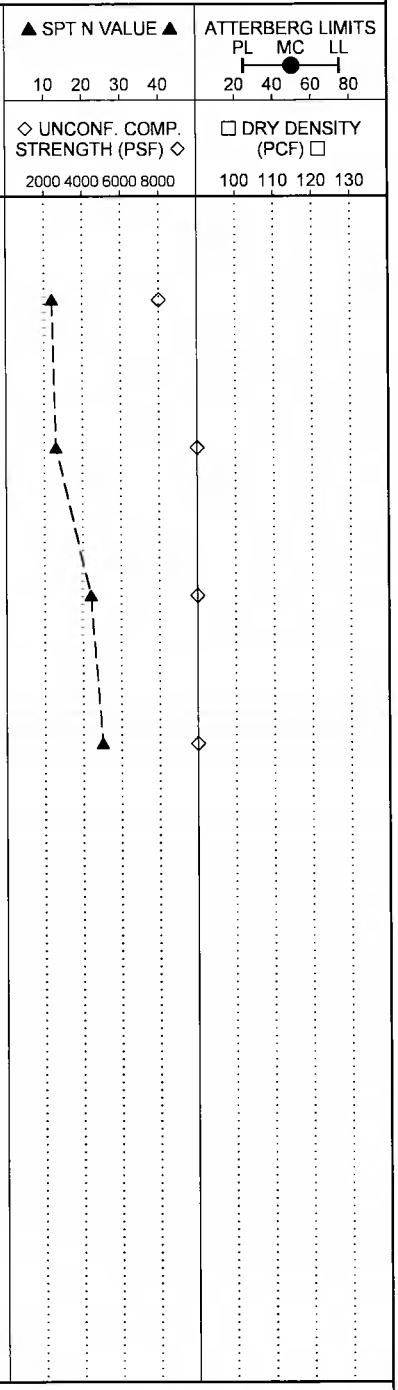
www.manniksmithgroup.com

BORING ID: SB-07

CLIENT City of Ann Arbor
PROJECT NAME Greenview Drive Water Main
PROJECT NUMBER ANNA0039
PROJECT LOCATION Ann Arbor, Michigan
DATE STARTED 12/16/22 **COMPLETED** 12/16/22
BORING COORDINATES 277933.7 N;13286548.5 E FEET
DRILLING METHOD Direct Push
GROUND ELEVATION 939.0 FEET
DRILLING CONTRACTOR MSG
TOTAL DEPTH 10.0 FT **BACKFILL** Cuttings/Patch
DRILL RIG Geoprobe 7822 DT **HAMMER TYPE** Automatic
LOGGED BY KY **CHECKED BY** KDB
DRILLER BM
REMARKS Coordinates and EL. estimated from Google Earth

ELEVATION (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (FEET)	SAMPLE TYPE NUMBER	BLOW COUNTS	SPT N VALUE	RECOVERY % (RQD)	DRY DENSITY (PCF)	UNCONF. COMP. STRENGTH (PSF)	MOISTURE CONTENT (%)
938.0		ASPHALT (12 inches)	0							
935.5		Stiff to very stiff, brown silty LEAN CLAY, little sand, trace gravel, moist (CL)		SS 1	4-5-7	12	100		8000[P]	
933.0		Hard, mottled brown and gray silty LEAN CLAY, little sand, trace gravel, dry (CL)	5	SS 2	6-5-8	13	100		9000+[P]	
929.0		Very stiff to hard, brown silty LEAN CLAY, little sand, trace gravel, moist (CL)		SS 3	8-10-12	22	95		9000+[P]	
			10	SS 4	9-11-14	25	100		9000+[P]	
		Bottom of borehole at 10.0 feet.								



LEGEND:

▽ WATER LEVEL AT TIME OF DRILLING N/A
▼ WATER LEVEL AT END OF DRILLING N/A
▼ WATER LEVEL AFTER DRILLING N/A

D = UCS TEST PERFORMED ON DISTURBED SAMPLE
P = POCKET PENETROMETER TEST
T = TORVANE SHEAR TEST

AASHTO R18

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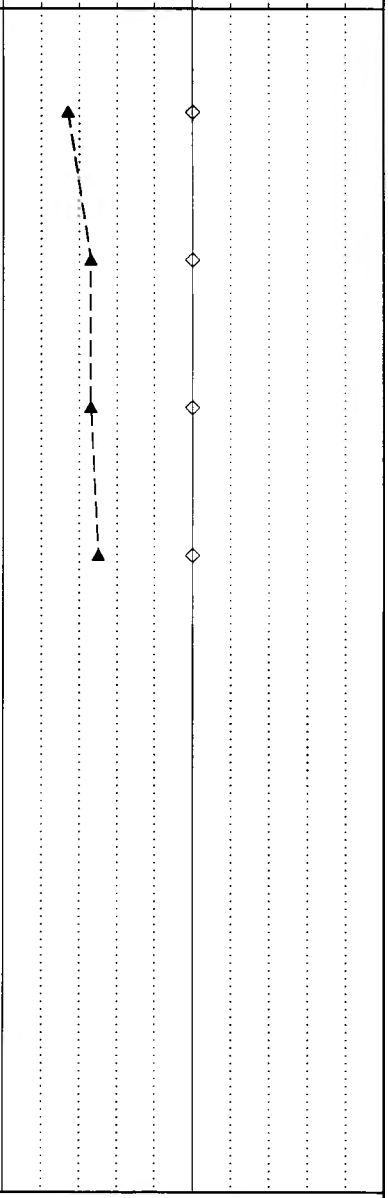
BORING ID: SB-08

CLIENT City of Ann Arbor
PROJECT NAME Greenview Drive Water Main
PROJECT NUMBER ANNA0039
PROJECT LOCATION Ann Arbor, Michigan
DATE STARTED 12/16/22 **COMPLETED** 12/16/22
BORING COORDINATES 278182.4 N;13286538.2 E FEET
DRILLING METHOD Direct Push
GROUND ELEVATION 942.0 FEET
DRILLING CONTRACTOR MSG
TOTAL DEPTH 10.0 FT **BACKFILL** Cuttings/Patch
DRILL RIG Geoprobe 7822 DT **HAMMER TYPE** Automatic
LOGGED BY KY **CHECKED BY** KDB
DRILLER BM
REMARKS Coordinates and EL. estimated from Google Earth

ELEVATION (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (FEET)	SAMPLE TYPE NUMBER	BLOW COUNTS	SPT N VALUE	RECOVERY % (RQD)	DRY DENSITY (PCF)	UNCONF. COMP. STRENGTH (PSF)	MOISTURE CONTENT (%)
941.1		ASPHALT (11 inches)	0							
		Very stiff to hard, mottled brown and gray silty LEAN CLAY, little sand, trace gravel, dry (CL)		SS 1	7-7-10	17	100		9000+P	
				SS 2	9-11-12	23	100		9000+P	
			5	SS 3	10-10-13	23	100		9000+P	
933.5										
932.0		Very stiff to hard, brown silty LEAN CLAY, trace sand and gravel, moist (CL)	10	SS 4	9-12-13	25	100		9000+P	
		Bottom of borehole at 10.0 feet.								



LEGEND:

- ▽ WATER LEVEL AT TIME OF DRILLING N/A
- ▽ WATER LEVEL AT END OF DRILLING N/A
- ▼ WATER LEVEL AFTER DRILLING N/A

D = UCS TEST PERFORMED ON DISTURBED SAMPLE
P = POCKET PENETROMETER TEST
T = TORVANE SHEAR TEST

AASHTO R18

BORING ID: SB-09

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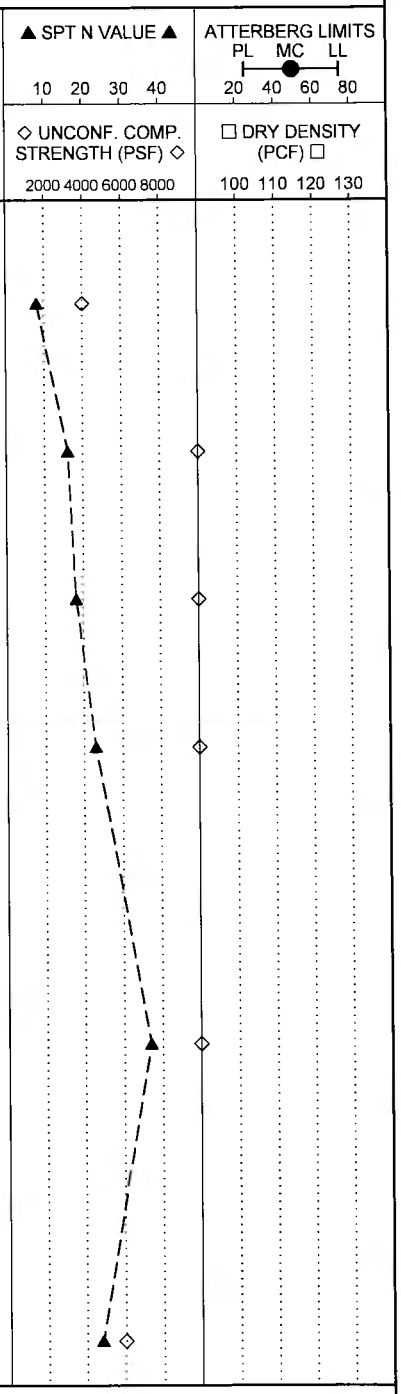
CLIENT City of Ann Arbor
PROJECT NAME Greenview Drive Water Main
PROJECT NUMBER ANNA0039
PROJECT LOCATION Ann Arbor, Michigan
DATE STARTED 12/16/22 **COMPLETED** 12/16/22
BORING COORDINATES 278435.3 N;13286547.5 E FEET
DRILLING METHOD Direct Push
GROUND ELEVATION 950.0 FEET
DRILLING CONTRACTOR MSG
TOTAL DEPTH 20.0 FT **BACKFILL** Cuttings/Patch
DRILL RIG Geoprobe 7822 DT **HAMMER TYPE** Automatic
LOGGED BY KY **CHECKED BY** KDB
DRILLER BM
REMARKS Coordinates and EL. estimated from Google Earth

ELEVATION (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (FEET)	SAMPLE TYPE NUMBER	BLOW COUNTS	SPT N VALUE	RECOVERY % (RQD)	DRY DENSITY (PCF)	UNCONF. COMP. STRENGTH (PSF)	MOISTURE CONTENT (%)
949.0		ASPHALT (12 inches)	0							
946.5		Medium stiff to stiff, brown silty LEAN CLAY, trace sand and gravel, moist (CL)		SS 1	2-3-5	8	100		4000[P]	
944.0		Very stiff to hard, mottled brown and gray silty LEAN CLAY, little sand, trace gravel, dry (CL)	5	SS 2	6-7-9	16	100		9000+[P]	
935.0		Very stiff to hard, brown silty LEAN CLAY, trace sand and gravel, moist (CL)	10	SS 3	8-8-10	18	100		9000+[P]	
				SS 4	9-11-12	23	95		9000+[P]	
			15	SS 5	14-17-20	37	95		9000+[P]	
930.0		Very stiff, gray silty LEAN CLAY, little sand, trace gravel, damp (CL)	20	SS 6	9-11-13	24	100		6000[P]	



Bottom of borehole at 20.0 feet.

LEGEND:

▽ **WATER LEVEL AT TIME OF DRILLING** N/A
▼ **WATER LEVEL AT END OF DRILLING** N/A
▼ **WATER LEVEL AFTER DRILLING** N/A

D = UCS TEST PERFORMED ON DISTURBED SAMPLE
P = POCKET PENETROMETER TEST
T = TORVANE SHEAR TEST

AASHTO R18

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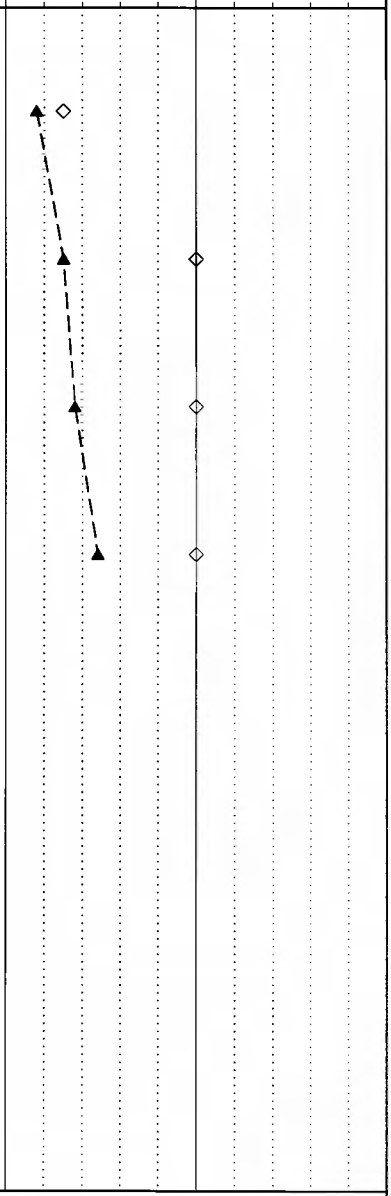
BORING ID: SB-10

CLIENT City of Ann Arbor
PROJECT NAME Greenview Drive Water Main
PROJECT NUMBER ANNA0039
PROJECT LOCATION Ann Arbor, Michigan
DATE STARTED 12/16/22 **COMPLETED** 12/16/22
BORING COORDINATES 278685.7 N;13286525.1 E FEET
DRILLING METHOD Direct Push
GROUND ELEVATION 953.0 FEET
DRILLING CONTRACTOR MSG
TOTAL DEPTH 10.0 FT **BACKFILL** Cuttings/Patch
DRILL RIG Geoprobe 7822 DT **HAMMER TYPE** Automatic
LOGGED BY KY **CHECKED BY** KDB
DRILLER BM
REMARKS Coordinates and EL. estimated from Google Earth

ELEVATION (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (FEET)	SAMPLE TYPE NUMBER	BLOW COUNTS	SPT N VALUE	RECOVERY % (RQD)	DRY DENSITY (PCF)	UNCONF. COMP. STRENGTH (PSF)	MOISTURE CONTENT (%)
952.2		ASPHALT (10 inches)	0							
		Medium stiff to stiff, brown silty LEAN CLAY, trace sand and gravel, damp (CL)		SS 1	3-4-4	8	100		3000[P]	
949.5		Very stiff to hard, brown silty LEAN CLAY, little sand, trace gravel, moist (CL)	5	SS 2	5-7-8	15	100		9000+[P]	
				SS 3	7-8-10	18	100		9000+[P]	
943.0			10	SS 4	9-11-13	24	100		9000+[P]	
		Bottom of borehole at 10.0 feet.								



LEGEND:

WATER LEVEL AT TIME OF DRILLING N/A
WATER LEVEL AT END OF DRILLING N/A
WATER LEVEL AFTER DRILLING N/A

D = UCS TEST PERFORMED ON DISTURBED SAMPLE
P = POCKET PENETROMETER TEST
T = TORVANE SHEAR TEST

AASHTO R18