PUBLIC IMPROVEMENT REQUEST FOR PROPOSAL

RFP# 23-09

Brooks Street Improvements Project

City of Ann Arbor
Public Services – Engineering Unit

Due Date: April 5, 2023 by 10:00 a.m. (local time)

Issued By:

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

TABLE OF CONTENTS

SECTION I: GENERAL INFORMATION 3

SECTION II: SCOPE OF WORK 11

SECTION III: MINIMUM INFORMATION REQUIRED 12

SECTION IV: ATTACHMENTS 21

SECTION V: STANDARD SPECIFICATIONS 57

SECTION VI: DETAILED SPECIFICATIONS 58

APPENDIX

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 Brooks Street Improvements Project.

B. BID SECURITY

Each bid must be accompanied by a certified check or a 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 March 30, 2023 at 5:00 p.m. (local time), and should be addressed as follows:

Scope of Work/Proposal Content questions shall be e-mailed to Theresa Bridges, PE – tbridges@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 virtual pre-proposal conference for this project will be held on Friday, March 24, 2023 at 11:00 A.M. on Microsoft Teams. Email the project manager, Theresa Bridges,

at tbridges@a2gov.org before 10:00 A.M. on the date of the pre-proposal meeting to receive an email invitation to the virtual 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 April 5, 2023 by 10:00a.m. (local time). 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 (1) digital copy of the proposal preferably on a USB/flash drive as one file in PDF format**

Proposals submitted should be clearly marked: **RFP# 23-09 Brooks Street 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. 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**
Written Question Deadline	March 30, 2023 5 p.m. (Local Time)
Proposal Due Date	April 5, 2023 10 a.m. (Local Time)
Selection/Negotiations	April 2023
Expected City Council Authorization	May 15, 2023

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.

V. 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 and specifications 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: Brooks Street Improvements								
RFP#: 23-09								**City Project #: 2021-016**
Item	**Description**	**Unit**	**Estimated Quantity**		**Unit Price**			**Total Price**
101.1	General Conditions, Max. $150,000	LS	1	$			$	
102.1	Digital Audio Visual Coverage	LS	1	$			$	
120.1	Project Supervision, Max $87,500	LS	1	$			$	
200	Certified Payroll Compliance and Reporting	LS	1	$			$	
201	Allowance for Unforeseen Site Conditions	DLR	25,000	$	1.00		$	25,000.00
210	Minor Traffic Devices, Max $40,000	LS	1	$			$	
215	"No Parking" Sign	EA	60	$			$	
216	Pedestrian Type II Barricade, Temp	EA	10	$			$	
219	Barricade Type III - Lighted	EA	20	$			$	
220	Temporary Sign, Type B	SFT	375	$			$	
221	Temporary Sign, Type B, Special	SFT	12	$			$	
222	Plastic Drum - Lighted	EA	30	$			$	
223	Grabber Cone, High Intensity, 42 Inch	EA	30	$			$	
224	Temporary Pedestrian Ramp	EA	4	$			$	
225	Temporary Pedestrian Mat	FT	140	$			$	
226	Pedestrian Channelizer Device	FT	440	$			$	
230	Protective Fencing	FT	3,600	$			$	
235	Tree Removal, 6-inch to 12-inch	EA	2	$			$	
236	Tree Removal, 13-inch to 24-inch	EA	8	$			$	
237	Tree Removal, Greater than 24-inch	EA	1	$			$	
240	Exploratory Excavation (0-10' deep)	EA	1	$			$	
245	Hand Dig, Sidewalk	SYD	267	$			$	
246	Hand Dig, Fire Hydrant Assembly, Remove	SYD	22	$			$	
305	6 inch SDR 35 PVC Sanitary Lead, Trench Detail 1A	FT	50	$			$	
315	6 Inch AASHTO M252 Perf. HDPE Storm Pipe w/ Slow Release Orifice	FT	33	$			$	
320	12 Inch CL IV RCP Storm Sewer Pipe, Trench Detail 1A	FT	389	$			$	
321	36 Inch CL IV RCP Storm Sewer Pipe, Trench Detail 1A	FT	201	$			$	
359.1	Sewer Tap, 12 inch	EA	1	$			$	
360.1	Dr Structure MH, 60 inch dia	EA	1	$			$	
360.2	Dr Structure MH, 72 inch dia	EA	1	$			$	
360.3	Dr Structure MH, 72 inch dia, Weir Wall, Vortex Valve, Including Depth	EA	1	$			$	
365.1	Dr Inlet Junction Structure, 36 inch dia	EA	2	$			$	
365.2	Dr Inlet Junction Structure, 60 inch dia	EA	3	$			$	
365.3	Dr Inlet Junction Structure, 72 inch dia	EA	1	$			$	

E. Schedule of Pricing/Cost

Project: Brooks Improvements Project

Item	Description	Unit	Estimated Quantity		Unit Price			Total Price
365.4	Dr Inlet Junction Struction, 60 inch dia, Add Depth	FT	6	$			$	
367.1	Dr Inlet Structure, 24-inch dia	EA	8	$			$	
367.2	Dr Structure, Low Point, 48-inch dia	EA	4	$			$	
368.1	Dr Inlet Overflow Structure, 36 inch dia	EA	1	$			$	
358.1	Sewer Remove, Any Size or Depth	FT	355	$			$	
386.1	Structure Remove, Any Size or Depth	EA	14	$			$	
400.1	6 inch Class 52 DIP w/polywrap, Trench Detail 1A	FT	41	$			$	
400.2	8 inch Class 52 DIP w/polywrap, Trench Detail 1A	FT	2,502	$			$	
400.3	16 inch Class 52 DIP w/polywrap, Trench Detail 1A	FT	63	$			$	
410.1	6 inch 45° Bend	EA	4	$			$	
410.2	8 inch 11.25° Bend	EA	1	$			$	
410.3	8 inch 22.5° Bend	EA	7	$			$	
410.4	8 inch 45° Bend	EA	8	$			$	
410.5	8 x 6 Inch Reducer	EA	11	$			$	
410.6	16 x 8 Inch Reducer	EA	1	$			$	
430.1	8 x 8 x 8 inch Tee	EA	10	$			$	
430.2	16 x 16 x 16 inch Tee	EA	1	$			$	
440.1	Fire Hydrant Assembly	EA	5	$			$	
442.1	8 Inch Gate Valve-in-Box	EA	3	$			$	
446.1	8 Inch Gate Valve-in Well	EA	9	$			$	
460	Excavate & Backfill for Water Service Tap and Lead	FT	530	$			$	
481.1	Water Main Pipe Abandonment	LS	1	$			$	
481.2	Water Main, Remove	FT	80	$			$	
482.1	Gate Valve-in-Box, Abandonment	EA	6	$			$	
483.1	Gate Valve-in-Well, Abandonment	EA	5	$			$	
484.1	Fire Hydrant Assembly, Remove	EA	4	$			$	
485.1	Temporary Water Main Line Stop, Additional Rental Day	EA	5	$			$	
485.2	Temporary Water Main Line Stop, 8 inch or less	EA	4	$			$	
485.4	Temporary Water Main Line Stop, 16 inch	EA	2	$			$	
486.1	Sacrificial Anode, 17 lb	EA	14	$			$	
486.2	Sacrificial Anode, 32 lb	EA	4	$			$	
500.1	HMA Pavement Removal, Any Depth	SYD	16,300	$			$	
501.1	Cold-Milling, 1.5 Inches	SYD	500	$			$	
502.1	Remove Concrete Curb or Curb & Gutter - Any Type	FT	3,000	$			$	
503.1	Remove Concrete Sidewalk, Ramp, & Drive - Any Thickness	SFT	3,600	$			$	
545.1	6-Inch Wrapped Underdrain	FT	350	$			$	

E. Schedule of Pricing/Cost

Project: Brooks Improvements Project

Item	Description	Unit	Estimated Quantity		Unit Price			Total Price
520.1	Machine Grading	SYD	18,800	$			$	
521.1	Subgrade Undercutting	CYD	200	$			$	
522.1	Non-Hazardous Contaminated Material Handling & Disposal	CYD	150	$			$	
522.2	Hazardous Contaminated Material Handling & Disposal - Contingency	CYD	50	$			$	
524.1	Class II Granular Material, C.I.P.	CYD	1,800	$			$	
525.1	21AA Limestone, C.I.P.	CYD	2,100	$			$	
531.1	HMA, 4EL	TON	2,000	$			$	
535.1	HMA, 5EL	TON	1,200	$			$	
539.2	HMA Hand Patching	TON	20	$			$	
539.3	Temporary HMA (13A)	TON	5	$			$	
550.1	Concrete Curb or Curb and Gutter - All Types	FT	3,500	$			$	
551.1	Concrete Speed Tables or Raised Cross Walk	SYD	271	$			$	
552.1	4 Inch Concrete Sidewalk	SFT	12,850	$			$	
553.1	6 Inch Concrete Sidewalk, Ramp, Drive Approach	SFT	1,000	$			$	
553.2	6 Inch Concrete Drive or Sidewalk - High Early	SFT	3,500	$			$	
555.1	Driveway Opening, Conc, Detail M	FT	50	$			$	
555.2	Driveway Opening, Conc, Detail M - High Early	FT	450	$			$	
556.1	Spillway, Conc, Modified	EA	1	$			$	
557.1	Detectable Warning, Cast In Place	FT	65	$			$	
563.1	Structure Covers	EA	28	$			$	
566.1	Adjust Structure Cover	EA	28	$			$	
567.1	Adjust Monument Box or Gate Valve Box	EA	10	$			$	
568.1	Additional Depth Structure Adjust/Repair	VF	3	$			$	
586.1	Recessing Pavt Mrkg, Longit	FT	1,150	$			$	
586.2	Recessing Pavt Mrkg, Transv	FT	105	$			$	
587.1	Pavt Mrkg, Polyurea, 12 inch, Crosswalk	FT	1,200	$			$	
587.2	Pavt Mrkg, Polyurea, 24 inch, Stop Bar	FT	105	$			$	
587.3	Pavt Mrkg, Polyurea, Chevron	EA	20	$			$	
594.3	Pavt Mrkg, Wet Reflective, Type R, Tape, 4 inch, Yellow,	FT	400	$			$	
702.1	Erosion Control, Inlet Filter	EA	20	$			$	
703.1	Erosion Control, Silt Fence	FT	100	$			$	
800	Transplanting Tree (Spade and Re-Plant)	EA	5	$			$	
850.1	Bioretention Area/Infiltration Trench	CYD	275	$			$	
850.2	Bioretention Soil Mix (Topsoil + Compost)	CYD	50	$			$	
851.01	Carex Vulpinoidea	EA	141	$			$	

E. Schedule of Pricing/Cost

Project: Brooks Improvements Project

Item	Description	Unit	Estimated Quantity		Unit Price			Total Price
851.02	Echinacea Purpurea	EA	87	$			$	
851.03	Eupatorium Perfoliatum	EA	109	$			$	
851.04	Anemone Canadensis L.	EA	16	$			$	
851.05	Oligoneuron Riddellii	EA	16	$			$	
851.06	Liatris Spicata	EA	55	$			$	
851.07	Ratibida Pinnata	EA	15	$			$	
851.08	Rudbeckia Fulgida	EA	38	$			$	
851.09	Schizachyrium Scoparium	EA	87	$			$	
851.1	Silphium Perfoliatu	EA	15	$			$	
851.11	Silphium Terbinthinaceum	EA	53	$			$	
851.12	Verbena Hastata	EA	55	$			$	
855.1	Fescue Seed Mix	LBS	14	$			$	
882.1	Turf establishment	SYD	1,600	$			$	
882.2	Mulch Blanket	SYD	150	$			$	
885.1	Rip Rap	SYD	5	$			$	
891.1	Site Clean-Up, Max $35,000	LS	1	$			$	
892.1	Irrigation System, Protection and Maintenance	DLR	5,000	$	1.00		$	5,000.00
	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 must 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 including Performance Bond and Labor and Materials Bond, General Conditions,

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 **[Insert Name of Administering Service Unit]**

Project means **[Insert Title of Bid and Bid Number]**

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: [**Insert the person's name**] whose job title is [**Insert job title**]. 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 [**Insert job title**].

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 $_____ 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

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 ($_____)

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
Public 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 _____, 202_.

_____	_____
(Name of Surety Company)	(Name of Principal)
By _____	By _____
(Signature)	(Signature)
Its _____	Its _____
(Title of Office)	(Title of Office)
Approved as to form:	Name and address of agent:
_____	_____
Atleen Kaur, City Attorney	_____
	_____

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)

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:

_____

_____

_____

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:

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.

ENFORCEMENT

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
ETH/GEN: ID #:	GROUP/CLASS #:	S								0											
NAME:										0			$0.00							$0.00	$0.00
ETH/GEN: ID #:	GROUP/CLASS #:	S								0											
NAME:										0			$0.00							$0.00	$0.00
ETH/GEN: ID #:	GROUP/CLASS #:	S								0											
NAME:										0			$0.00							$0.00	$0.00
ETH/GEN: ID #:	GROUP/CLASS #:	S								0											
NAME:										0			$0.00							$0.00	$0.00
ETH/GEN: ID #:	GROUP/CLASS #:	S								0											
NAME:										0			$0.00							$0.00	$0.00
ETH/GEN: ID #:	GROUP/CLASS #:	S								0											
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.

STANDARD SPECIFICATIONS

All work under this contract shall be performed in accordance with the Public Services Department Standard Specifications in effect at the date of availability of the contract documents stipulated in the Bid. 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

Detailed Specification	No. of Pages
Project Schedule and Payment	3
General Conditions	3
Audio Visual Recording	3
Project Supervision	4
Certified Payroll Compliance and Reporting	2
Allowance for Unforeseen Site Conditions	1
Coordination and Cooperation with Others and Work by Others	1
General Construction Notes	1
Protection of Utilities	1
Quantities and Unit Prices	1
Materials and Supplies Certifications	1
Soil Boring Pavement Section and Geotechnical Data	1
Vacuum Type Street and Utility Cleaning Equipment	1
Maintenance of Traffic	3
Minor Traffic Control	3
Traffic Control Signs and Barricades	3
Temporary Pedestrian Access Route (TPAR) Facilities	3
Protective Fencing	2
Tree Removal	2
Exploratory Excavation	2
Hand Digging	2
Drainage Structures	3
Sewer Removal and Abandonment	1
Flowable Fill	2
Water Main and Appurtenances	26
Water Main Abandonment	2
Line Stops	6
HMA Pavement Removal	2
Concrete Removal	3
Machine Grading, Modified	7
Subgrade Undercutting	1
In-Situ Soils and Removal and Disposal of Soil	3
Subbase and Aggregate Base	2
HMA Paving	5
6-Inch Wrapped Underdrain	2
Concrete Curb, Sidewalk, Driveway Approach and Pavement	5
Concrete Durability	7
Concrete Placement and Protection	2
Detectable Warning, Cast in Place	2
Structure Covers	2
Structure Cover Adjustments	3
Pavement Markings	1
Soil Erosion and Sedimentation Control	1
Infiltration Trench	1
Restoration	3
Protect Irrigation System	2

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 **June 5, 2023**, 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 water management improvements, road-narrowing and resurfacing, and new sidewalk; and shall be substantially completed on or before November 22, 2023.

3. The following workday, hour and other work restrictions are imposed by the City of Ann Arbor.

   Contractor operations shall be limited by local municipality work time, noise and dust ordinance:

   - Monday through Friday: 7:00 am – 8:00 p.m.
   - Saturday: 7:00 a.m.– 8:00 p.m.; Notice given to City of Ann Arbor no less than 48 hours and no more than 5 days
   - Sunday: Only with written approval from the City of Ann Arbor

   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 26, 2023, through 7:00 a.m. Tuesday May 30, 2023
   - Fourth of July, from 3:00 p.m. Monday July 3, 2023, through 7:00 a.m. Wednesday July 5, 2023
   - Labor Day, from 3:00 p.m. Friday September 1, 2023 through 7:00 a.m. Tuesday September 5, 2023

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

   - September 2, 2023

- September 9, 2023
- September 16, 2023
- September 23, 2023
- October 14, 2023
- November 4, 2023
- November 25, 2023

City Council approval is expected on or before **May 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.

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, **$500.00** 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.

Working in the Rain

The Contractor shall not work in the rain unless authorized in writing by the Engineer. The Engineer may delay or stop the work due to threatening weather conditions.

The Contractor shall not be compensated for unused materials or downtime due to rain, or the threat of rain.

The Contractor is solely responsible for repairing all damages to the work and to the site, including

road infrastructures, road subgrades, and any adjacent properties, which are caused as a result of working in the rain.

Working in the Dark

The Contractor shall not work in the dark except as approved by the Engineer and only when lighting for night work is provided as detailed elsewhere in this contract.

The Engineer may stop the work or may require the Contractor to defer certain work to another day if, in the Engineer's opinion, the work cannot be completed within the remaining daylight hours or if inadequate daylight is present to either properly perform or inspect the work.

The Contractor will not be compensated for unused materials or downtime when delays or work stoppages are directed by the Engineer for darkness and/or inadequate remaining daylight reasons.

The Contractor is solely responsible for repairing all damages to the work and to the site, including road infrastructures, road subgrades, and any adjacent properties, which are caused as a result of working in the dark.

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 Liquidated Damages from the payments due the Contractor, as stated in the contract.

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
GENERAL CONDITIONS

General

This item shall include all work described and required by the Drawings and specifications for which the item of work "General Conditions" is listed, as well as items of work not listed in the Bid Form including, but not limited to:

1. Scheduling and organization of all work, subcontractors, suppliers, testing, inspection, surveying, and staking.

2. Coordination of, and cooperation with, other contractors, agencies, departments, and utilities.

3. Coordination with City forces to stockpile and load used castings on City vehicles.

4. Protection and maintenance of all existing utilities, including support, protection, capping, repair, replacement, connection or reconnection of existing pipelines, and utilities damaged by the Contractor's operations.

5. Placing, maintaining, and removing additional needed soil erosion and sedimentation controls that are not paid separately.

6. Maintaining the site, and all areas within the Construction Influence Area, in a well-graded and drained state at all times during the course of the project.

7. The continuous maintenance of the temporary road surface within the Construction Influence Area throughout the duration of the construction. This includes any needed grading to maintain the surface in a smooth condition free of potholes, ruts, bumps, or other objectionable conditions.

8. Temporary sheeting, bracing, and shoring of excavations in accordance with the applicable MIOSHA Standards

9. Maintaining driveways drive openings, sidewalks, bike paths, mail deliveries, and solid waste/recycle pick-ups. This includes the placement and maintenance of gravel in driveway openings and on sidewalks as directed by the Engineer.

10. Using quantities of dust palliative, maintenance aggregate, and hot patching mixture for use as temporary base, surfacing, and dust control at utility crossings, side roads and driveways.

11. Storing all materials and equipment off lawn areas.

12. Site clean-up on a daily basis during the course of the project's construction.

13. Coordination efforts to furnish various HMA mixtures as directed by the Engineer.

14. Coordination efforts to furnish and operate various-size vehicles/equipment as directed by the Engineer.

15. Dewatering and drainage of excavations as required to maintain a stable, open hole.

16. Disposing of excess excavated materials and debris (excluding debris material removed from cleaning operations).

17. Temporary fill as necessary for equipment access or protection of existing utilities during construction, including restoration to original grades.

18. Temporary removal/relocation, storage, and re-installation/re-setting of existing street name, guide, and regulatory signs, mailboxes, fences, landscape areas, etc. which conflict with the proposed construction, including all fasteners, hardware, and materials required for re-installation/re-setting.

19. Furnishing and operating vacuum-type street cleaning equipment a minimum of once per week or as frequently as directed by the Engineer in order to remove mud, soil, rocks, debris, or any other deleterious materials from paved areas.

20. Furnishing and operating vacuum-type utility structure cleaning equipment.

21. Furnishing and operating both vibratory plate and pneumatic-type (“pogo-stick”) compactors.

22. Furnishing and operating a backhoe during all work activities.

23. Furnishing and operating a jackhammer and air compressor during all work activities.

24. Noise and dust control in accordance with the applicable City of Ann Arbor Ordinances.

25. Mobilization(s) and demobilization(s).

26. Furnishing submittals and certifications for all materials and supplies.

27. Removal and disposal of shrubs, brush, stumps, and trees less than 6-inches in diameter as directed by the Engineer.

28. Trimming of trees to accommodate construction activities as directed by Engineer.

29. The proper off-site disposal of all excavated materials and debris. The Contractor shall dispose of, at the Contractor’s expense, all excavated material. Costs for this work will not be paid for separately.

30. Fencing to protect excavations over 1-foot in depth during non-work hours or as directed by the Engineer. The fencing must be a minimum of 36-inches high, be constructed of orange HDPE material, and reasonably secured to prevent unwanted access.

31. All miscellaneous and incidental items such as overhead, insurance, and permits.

32. Meeting all requirements relating to Debarment Certification, Davis Bacon Act, and Disadvantaged Business Enterprise, and providing the necessary documentation.

Measurement and Payment

This item of work will be paid for on a pro rata basis at the time of each progress payment. Measurement will be based on the ratio between work completed during the payment period and the total Contract amount. When all of the work of this Contract has been completed, the measurement of this item shall be one Lump Sum, minus any deductions incurred for inadequate performance as described herein. This amount will not be increased for any reason, including extensions of time, extras, and/or additional work.

The completed work as measured for this item of work will be paid for at the Contract unit price for the following Contract pay item:

Contract Item (Pay Item)	Pay Unit
General Conditions, Max $_____	Lump Sum

The unit price for this item of work shall include all labor, material, and equipment costs to perform all the work specified in the Contract Documents and as included in this Detailed Specification.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
AUDIO-VISUAL RECORDING

Description

This work shall include providing a recording of the physical, structural, and aesthetic conditions of the construction site and adjacent areas as provided herein.

The audio-visual recording shall be:

1. Of professional quality, providing a clear and accurate audio and visual record of existing conditions.

2. Prepared during the three (3) week period immediately prior to the Preconstruction Meeting.

3. Furnished to the Engineer a minimum of one (1) week prior to bringing any materials or equipment within the areas described in this Detailed Specification.

4. Carried out under the supervision of the Engineer.

The Contractor shall furnish two (2) copies of the completed recording to the Engineer at, or prior to, the Preconstruction Meeting. An index of the recording, which will enable any area of the project to be easily found on the recording, shall be included. This includes indexing the files according to street and Station number as applicable. The Contractor shall retain a third copy of the recording for their own use.

Any portion of the recording determined by the Engineer to be unacceptable for the documentation of existing conditions shall be recorded again, at the Contractor's sole expense, and submitted to the Engineer prior to mobilizing onto the site.

Production

The audio-visual recording shall be completed in accordance with the following minimum requirements:

1. Format/No Editing

   The audio-visual recording shall be performed using equipment that allows audio and visual information to be recorded simultaneously and in color. The recording shall be provided on USB Drive. The quality of the recording shall be equal to or better than the standard in the industry. The recording shall not be edited.

2. Perspective/Speed/Pan/Zoom

   To ensure proper perspective, the distance from the ground to the camera lens shall not be less than 5-feet and the recording must proceed in the general direction of travel at a speed not to exceed 30-feet per minute (0.34 miles per hour). Pan and zoom rates shall be controlled sufficiently so that playback will ensure quality of the object viewed.

3. Display

   The recording equipment shall have transparent time and date stamp and digital annotation capabilities. The final copies of the recording shall continuously and simultaneously display the time (hours/minutes/seconds) and the date (month/date/year) in the upper left-hand corner of the frame. Accurate project stationing shall be included in the lower half of the frame in standard station format (i.e. 1+00). Below the stationing, periodic information is to be shown, including project name, name of area shown, direction of travel, viewing direction, etc.

4. Audio Commentary/Visual Features

   Locations relative to project limits and landmarks must be identified by both audio and video means at intervals no longer than 100-feet along the recording route. Additional audio commentary shall be provided as necessary during the recording to describe streets, buildings, landmarks, and other details, which will enhance the record of existing conditions.

5. Visibility/Ground Cover

   The recording shall be performed during a time of good visibility. The recording shall not be performed during periods of precipitation or when snow, leaves, or other natural debris obstruct the area being recorded.

Coverage

The audio-visual recording coverage shall include the following:

1. General Criteria

   This general criteria shall apply to all recording and shall include all areas where construction activities will take place or where construction vehicles or equipment will be operated or parked, and/or where materials will be stored or through which they will be transported. The recording shall extend an additional 50-feet outside of all areas. The recording shall include all significant, existing man-made and natural features such as driveways, sidewalks, utility covers, utility markers, utility poles, other utility features, traffic signal structures and features, pubic signs, private signs, fences, landscaping, trees, shrubs, other vegetation, and other similar or significant features.

2. Private Property

   Record all private property that may be utilized by the Contractor in conjunction with this project. These project areas must be disclosed by the Contractor prior to using them for the work of this project.

3. Road Construction Area

   The recording coverage shall:

   a. Extend to 50 feet outside of the right-of-way and easements area as shown on the plans.
   b. Extend 50 feet outside the construction limits on all streets, including side streets.
   c. Include both sides of each street, with each side being recorded separately.

4. Other Areas

   The Contractor shall record, at their sole expense, other areas where, in their opinion, the establishment of a record of existing conditions is warranted. The Contractor shall notify the Engineer in writing of such areas.

The Engineer may direct the recording of other minor areas not specified herein at the Contractor's sole expense.

Measurement and Payment

The completed work shall be paid for at the Contract unit price for the following Contract pay item:

Contract Item (Pay Item)	Pay Unit
Digital Audio-Visual Coverage	Lump Sum

Digital Audio-Visual Coverage shall include all labor, equipment, and materials required to perform the recording and to provide the finished recording the Engineer.

Payment will be made for "Digital Audio-Visual Coverage" following the review and acceptance of the recording by the Engineer. Within 21 days following the receipt of the recording, the Engineer will either accept it and authorize payment, or require that any discrepancies in the recording be addressed prior to making payment.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
PROJECT SUPERVISION

Description

The Contractor shall provide supervision in accordance with Subsection 104.07 of the Michigan Department of Transportation 2020 Standard Specifications for Construction, the City of Ann Arbor Public Services Department Standard Specifications, and as described herein.

The Contractor shall designate a full-time Project Supervisor to act as the Contractor's agent/representative, and to be responsible for scheduling and coordination of all subcontractors, suppliers, other governmental agencies, and all public and private utility companies.

The Project Supervisor shall not be an active crew member of the Contractor, shall not be an active member or employee of any subcontractor's work force, and shall not perform general or specialized labor tasks. The Project Supervisor shall be a full-time employee of the General Contractor and shall have all needed authority to make binding decisions on behalf of the Contractor in all matters pertaining to performance and execution of the work of the project.

The Project Supervisor shall work exclusively on this project and shall put forth his/her full effort into the organization and coordination of the work of this project.

One week prior to the pre-construction meeting, the Contractor shall designate a proposed Project Supervisor by name, and shall furnish the City with a current, thorough, detailed summary of the proposed Project Supervisor's work history, outlining all previous supervisory experience on projects of a similar size and nature. The detailed work history shall include personal and professional references (names and phone numbers) of persons (previous Owners or agents) who can attest to the qualifications and work history of the proposed Project Supervisor. Proposed candidates for Project Supervisor shall have a demonstrated ability to work harmoniously with the City, the public, subcontractors, and all other parties typically involved with work of this nature. The Supervising Professional will have the authority to reject a proposed Project Supervisor whom he/she considers unqualified.

The Project Supervisor shall be available 24 hours-per-day to provide proper supervision, coordination, and scheduling of the project for the duration of the Contract. The Contractor shall furnish the City with telephone numbers of the Project Supervisor in order to provide 24 hour-per-day access during business and non-business hours, including weekends and holidays.

The Project Supervisor shall be equipped by the Contractor with a “smart” mobile telephone with “data” and “text” capabilities to provide the City with 24 hour-per-day access to him/her during daily construction activities, during transit to and from the construction site, and during all non-business hours including weekends and holidays.

The Project Supervisor shall be equipped with assistants as necessary to provide project supervision as specified herein, and in accordance with the Contract.

Duties and Responsibilities

The Project Supervisor shall work harmoniously with the Engineer, the City, the public, subcontractors, and all other parties typically involved with work of this nature.

The Project Supervisor shall have a thorough, detailed understanding and working knowledge of all construction practices and methods specified elsewhere herein, as well as the handling, placement, testing and inspection of aggregates, aggregate products, bituminous concrete, portland cement concrete materials, and other such materials and products related to the work of this project.

The Project Supervisor shall be responsible for all of the work of all of the Contractor's, subcontractors', and suppliers' work forces.

The Project Supervisor shall be responsible for proper and adequate maintenance (emissions, safety, and general operation) of all of the Contractor's, subcontractors' and suppliers' equipment and vehicles. The Project Supervisor shall make all needed diligent and good-faith efforts to ensure that all equipment utilized in the performance of the work is properly maintained, safe, and complies with all legal and environmental requirements of the work as set forth in Section 107.15 of the 2020 MDOT Standard Specifications.

The Project Supervisor shall be responsible for the legal, proper, and safe parking/storage all the Contractor's, subcontractors' and suppliers' equipment, work vehicles, and employees' vehicles.

The Project Supervisor shall schedule and coordinate the work of all parties involved in the project, including utility companies, testing agencies, governmental agencies, all City departments (such as Utilities and Transportation), City Forester and City inspectors.

The Project Supervisor shall coordinate and schedule the work of any independent survey crews that may be retained by the City to witness and reset existing and new geographic/benchmark monuments. Failure to have existing monuments witnessed and reset may result in delays to the Contractor's work. Costs for such delays will be the Contractor's sole responsibility. The Project Supervisor shall also schedule and complete all needed survey request forms that are needed in order to schedule the services of survey personnel to properly layout all elements of the project work in accordance with the City of Ann Arbor Public Services Area Standard Specifications and the Michigan Department of Transportation 2020 Standard Specifications for Construction.

The Project Supervisor shall coordinate and schedule inspection performed by the City and Consultants (including material testing firms) in a timely manner, to assure proper and timely testing and inspection of the work.

The Project Supervisor shall review the Inspector's Daily Reports (IDRs) for accuracy and shall sign all IDRs on a daily basis as the representative of the Contractor. Items to be reviewed include descriptions, locations, and measurements of quantities of work performed, workforce, equipment, and weather. The Project Supervisor shall also be responsible for its subcontractors' review and initialing of IDRs containing work items performed by each respective subcontractor.

The Project Supervisor shall submit to the Engineer, an updated, detailed schedule of the proposed work on a weekly basis, and an update of all proposed changes on a daily basis, all in accordance with the Detailed Specification for Project Schedule contained elsewhere herein.

The Project Supervisor shall schedule and chair a weekly progress meeting with the Engineer and all subcontractors to discuss the work. Upon the completion of each meeting, the Project Supervisor shall prepare and distribute, to all present, a written summary of the meeting's minutes. Those in attendance shall review the minutes and, if necessary, comment on any deficiencies or errors prior to or at the next scheduled progress meeting.

Additional Performance Requirements

If, in the sole opinion of the Supervising Professional, the Project Supervisor is not adequately performing the duties as outlined in this Detailed Specification, the following system of notices will be given to the Contractor with the associated penalties:

- First Notice

  A warning will be issued in writing to the Contractor detailing the deficiencies in the Project Supervision. The Contractor must respond within seven (7) calendar days in writing with a plan to correct the stated deficiencies. Failure to respond within seven (7) calendar days will result in the issuing of a second notice.

- Second Notice

  A second warning will be issued in writing to the contractor further detailing the deficiencies in the Project Supervision. A deduction of 10%, or $10,000, whichever is greater, will be made from the original Project Supervision contract amount. The Contractor must respond within 7 calendar days in writing with a plan to correct the stated deficiencies. Failure to respond within 7 calendar days will result in the issuing of a third notice. At this time, the Engineer reserves the right to meet with personnel with the necessary authority within the Contractor’s organization to discuss the deficiencies in the Project Supervision.

- Third Notice

  A third notice will be issued in writing to the Contractor further detailing the deficiencies in the Project Supervision. An additional deduction of 25%, or $25,000, whichever is greater, will be made from the original Project Supervision contract amount, and the Project Supervisor shall be removed from the project, and replaced immediately with another individual to be approved by the Engineer.

Should, in the sole opinion of the Supervising Professional, the Project Supervisor fail to perform his/her duties and responsibilities as described herein to such a degree that the successful completion of the project is put in jeopardy, the above system of notices may be foregone, and the Contractor shall immediately replace the Project Supervisor upon receipt of written notice. Failure to provide adequate project supervision, as determined by the Engineer, shall be considered basis for the Supervising Professional to suspend work without extension of contract time or additional compensation.

If the original Project Supervision contract amount is insufficient to cover said deductions, the Project Supervision contract amount will be reduced to zero and a contract modification will be written to assess a penalty to cover the difference between the Project Supervision contract amount and the total amount of the deduction(s). It is fully expected however that the Project Supervision contract amount will be sufficient to cover any deductions.

Measurement and Payment

The completed work as measured for this item of work will be paid for at the Contract Unit Price for the following Contract (Pay) Item:

Contract Item (Pay Item)	Pay Unit
Project Supervision, Max $_____	Lump Sum

The unit price for this item of work shall include all labor, material, and equipment costs to perform all the work specified in the City Standard Specifications and as modified by this Detailed Specification.

Payment for this work will be made with each progress payment, on a pro rata basis, based on the percentage of construction completed. When all the work of this Contract has been completed, the measurement of this item shall be 1.0 times the Lump Sum bid amount, minus any deductions incurred for inadequate performance as described herein. This amount will not be increased for any reason, including extensions of time, extras, adjustments and/or additional work.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
CERTIFIED PAYROLL COMPLIANCE AND REPORTING

Description

This specification covers all administrative requirements, payroll reporting procedures to be followed by Contractors performing work on City-sponsored public improvements projects, and all other miscellaneous and incidental costs associated with complying with the applicable sections of the City of Ann Arbor Code of Ordinances with regard to payment of prevailing wages and its Prevailing Wage Compliance policy.

This specification is not intended to include the actual labor costs associated with the payment of prevailing wages as required. Those costs should be properly incorporated in all other items of work bid.

General

The Contractor is expected to comply with all applicable sections of Federal and State prevailing wage laws, duly promulgated regulations, the City of Ann Arbor Code of Ordinances, and its Prevailing Wage Compliance Policy as defined within the Contract Documents. The Contractor shall provide the required certified payrolls, City-required declarations, and reports requested elsewhere in the Contract Documents within the timeline(s) stipulated therein.

The Contractor shall also provide corrected copies of any submitted documents that are found to contain errors, omissions, inconsistencies, or other defects that render the report invalid. The corrected copies shall be provided when requested by the Supervising Professional.

The Contractor shall also attend any required meetings as needed to fully discuss and ensure compliance with the Contract requirements regarding prevailing wage compliance. The Contractor shall require all employees engaged in on-site work to participate in, provide the requested information to the extent practicable, and cooperate in the interview process. The City of Ann Arbor will provide the needed language interpreters in order to perform wage rate interviews or other field investigations as needed.

Certified Payrolls may be submitted on City-provided forms or forms used by the Contractor, as long as the Contractor’s forms contain all required payroll information. If the Contractor elects to provide their own forms, the forms shall be approved by the Supervising Professional prior to the beginning of on-site work.

Unbalanced Bidding

The City of Ann Arbor will examine the submitted cost for this item of work prior to Contract award. If the City determines, in its sole discretion, that the costs bid by the Contractor for complying with the Contract requirements are not reasonable, accurately reported, or may contain discrepancies, the City reserves the right to request additional documentation that fully supports and justifies the price as bid. Should the submitted information not be determined to be reasonable or justify the costs, the City reserves the right to pursue award of the Contract to the second low bidder without penalty or prejudice to any other remedies that it may have or may elect to exercise with respect to the original low-bidder.

The Contract Completion date will not be extended as a result of the City's investigation of the as-bid amount for this item of work, even if the anticipated contract award date must be adjusted. The only exception will be if the Contractor adequately demonstrates that their costs were appropriate and justifiable. If so, the City will adjust the Contract completion date by the number of calendar days commensurate with the length of the investigation, if the published Notice to Proceed date of the work cannot be met. The Contract unit prices for all other items of work will not be adjusted regardless of an adjustment of the Contract completion date being made.

Measurement and Payment

The completed work as measured for this item of work will be paid for at the Contract Unit Price for the following Contract (Pay) Item:

Contract Item (Pay Item)	Pay Unit
Certified Payroll Compliance and Reporting	Lump Sum

The unit price for this item of work shall include all supervisory, accounting, administrative, and equipment costs needed to monitor and perform all work related to maintaining compliance with the tasks specified in this Detailed Specification, the City of Ann Arbor Code of Ordinances, its Prevailing Wage Compliance policy and the applicable Federal and State laws.

Payment for this work will be made with each progress payment, on a pro-rata basis, based on the percentage of construction completed. When all the work of this Contract has been completed, the measurement of this item shall be 1.0 times the Lump Sum bid amount. This amount will not be increased for any reason, including extensions of time, extra work, and/or adjustments to existing items of work.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
ALLOWANCE FOR UNFORESEEN SITE CONDITIONS

Description

Allowance for unforeseen site conditions shall be paid under existing contract items where applicable, or under new item(s) at a negotiated price for work necessary for the completion of the project, but not expressly identified in the contract documents. Price paid shall be payment in full for all labor, material, and equipment required for remedying unforeseen physical conditions and shall be based upon an agreement negotiated and approved prior to beginning this Work.

Measurement and Payment

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

Contract Item (Pay Item)	Pay Unit
Allowance for Unforeseen Site Conditions	Dollar

The approved price for this item shall include all labor, material, and equipment costs required to complete the work.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
COORDINATION AND COOPERATION WITH OTHERS
AND
WORK BY OTHERS

Description

The Contractor is reminded as to the requirements of Article 104.08 of the 2020 Edition of the MDOT Standard Specifications, “Cooperation by the Contractor”.

The Contractor shall directly coordinate his/her work with individual City Departments/Divisions/Units.

No additional compensation will be paid to the Contractor, and no adjustments to Contract unit prices will be made, due to delays and/or the failure of others in the performance of their work, nor for delays due to the encountering of existing utilities that are, or are not, shown on the Plans.

The following utility Owners, and others not listed specifically, may have overhead and/or underground facilities located within the Right-of-Way/Public Easements:

- The City of Ann Arbor
- University of Michigan (UM)
- Michigan Department of Transportation (MDOT)
- AT&T
- Comcast
- DTE Energy - Detroit Edison Company (Edison)
- DTE Energy - Michigan Consolidated Gas Company (Michcon)
- Fiber Link Inc.
- Light Core (Century Tel)
- MCI Communications
- Windstream Communications

On all projects:

“Three (3) Working Days before you Dig - Call MISS DIG - Toll Free” Phone No. 800-482-7171.

The Owners of public or private utilities which will not interfere with the completed project and which do not present a hazard to the public or an extraordinary hazard to the Contractor's operations will not be required to move their facilities on or from the street right-of-way.

Stoppages created solely by the operations of the utility companies which delay utility revisions on any portion of this project may be considered as a basis of claim for an extension of time for project completion.

Costs for this work 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
GENERAL CONSTRUCTION NOTES

Description

The following notes pertain to all Plan sheets issued as part of this Contract, and these notes shall be considered part of each Plan Sheet or Detailed Information Sheet.

1. All work shall conform to latest revision of the City Standard Specifications.

2. The Contractor shall maintain access to all drives throughout the course of construction. Drives shall never be closed during non-working hours, unless otherwise authorized in writing by the Engineer.

3. The Contractor shall completely restore all existing site features to better than, or equal to, their existing condition.

4. The Contractor shall be aware that there are above-ground and below-ground utilities existing in and on these streets which include but are not limited to: gas mains and service leads; water mains and service leads; storm sewer mains and service leads; sanitary sewer mains and service leads; telephone poles, wires, cables and conduits; electrical poles, wires, cables and conduits; cable television wires, cables and conduits, and other various utilities. The Contractor shall conduct all of its work so as not to damage or alter in any way, any existing utility, except where specified on the Plans or where directed by the Engineer. The City has videotaped and cleaned all sanitary and storm sewers, including storm sewer inlet leads, and has found all these facilities to be in good condition, with the exception of those shown on the Plans for repairs or replacement.

5. The Contractor is solely responsible for any delays, damages, costs and/or charges incurred due to and/or by reason of any utility, structure, feature and/or site condition, whether shown on the Plans or not, and the Contractor shall repair and/or replace, at its sole expense, to as good or better condition, any and all utilities, structures, features and/or site conditions which are impacted by reason of the work, or injured by its operations, or injured during the operations of its subcontractors or suppliers.

6. No extra payments or adjustments to unit prices will be made for damages, delays, costs and/or charges due to existing utilities, structures, features and/or site conditions not shown or being incorrectly shown or represented on the Plans.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
PROTECTION OF UTILITIES

Description

Damages to utilities by the Contractor's operations shall be repaired by the utility owner at the Contractor's expense.

Delays to the work due to utility repairs are the sole responsibility of the Contractor.

The Contractor shall keep construction debris out of utilities at all times. The Contractor shall be back charged an amount of $50.00 per day for each manhole/inlet/utility pipe that contains construction debris caused as a result of the Contractor's (including subcontractors and suppliers) work.

The Contractor is solely responsible for any damages to the utilities or abutting properties due to construction debris.

Certain sanitary and storm sewers within the influence of construction may have been cleaned and videotaped prior to construction. The City may also choose to videotape utility line(s) during or after the work of this Contract to inspect them for damages and/or construction debris. If such inspection shows damage and/or debris, then all costs of such inspection, cleaning, repairs, etc., shall be the Contractor's sole responsibility. If such inspection is negative, the City will be responsible for the costs of such inspection.

Costs for this work 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
QUANTITIES AND UNIT PRICES

Contract Drawings / Plans

Bidders shall carefully check and review all Drawings, plans, and specifications, and advise the Engineer of any errors or omissions discovered. The Drawings/Plans may be supplemented by such additional Drawings/Plans and sketches as may be necessary or desirable as the work progresses. The Contractor shall perform all work shown on any additional or supplemental Drawings/Plans issued by the Engineer.

Bidders shall carefully examine the Bid Form, preliminary layouts, specifications, and the work sites 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.

Quantities and Unit Prices

Quantities as given are approximate and are estimated for bidding purposes. Quantities are not guaranteed and may vary by any amount. While it is the City's intent to complete the project substantially as drawn and specified herein, quantities may be changed or reduced to zero for cost savings or other reasons. **The City reserves the right to change the quantities, delete work, or add work, and no adjustment in unit price will be made for any change in any quantity.**

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
MATERIALS AND SUPPLIES CERTIFICATIONS

Description

The following materials and supplies shall be certified by the manufacturer or supplier as having been tested for compliance with the Specifications:

HMA Materials

Hot-Poured Joint Sealants

Cements, Coatings, Admixtures and Curing Materials

Sands and Aggregates

Steel and Fabricated Metal

Portland Cement Concrete Mixtures

Reinforcing Steel for Concrete

Reinforcing Fibers for Concrete

Pre-Cast Concrete Products

Sanitary Sewer Pipe

Storm Sewer Pipe

Water Main Pipe

Corrugated Metal Pipe

High Density Polyethylene Pipe

Edge Drain and Underdrain Pipe

Retaining Wall Materials

Seed Mixes

Geotextile Filter Fabric and Stabilization Fabric/Grids

The Contractor shall submit all certifications to the Engineer for review and approval a minimum of three business days prior to any scheduled delivery, installation, and/or construction of same.

Costs for this work 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
SOIL BORING, PAVEMENT SECTION AND GEOTECHNICAL DATA

Description

Data pertaining to existing soil borings and pavement sections which may be included in these Contract Documents are provided to help the Engineer and Contractor determine the soil conditions existing within the construction area. The City in no way guarantees existing conditions to be the same as shown in the data. The Contractor is solely responsible for any and all conclusions he/she may draw from the data.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
VACUUM TYPE STREET AND UTILITY CLEANING EQUIPMENT

Description

The Contractor shall furnish and operate throughout the construction period, vacuum type street cleaning and utility structure cleaning equipment (Vac-All, Vactor, etc.) approved by the Engineer, as directed by the Engineer for dust control, for dirt/debris control, and for street cleaning immediately prior to, and for street and utility structure cleaning after any and all paving. The cleaning equipment shall be of sufficient power to remove dust, dirt, and debris from the pavement and from utility structures in and adjacent to the construction area.

The Vac-all or similar equipment shall be approved by the Engineer prior to beginning the work. The equipment used shall have an effective means for preventing any dust resulting from the operation from escaping into the air.

Costs for this work 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
MAINTENANCE OF TRAFFIC

Description

Traffic shall be maintained in accordance with the City of Ann Arbor Public Services Department Standard Specifications and as specified in Sections 104.11, 812, and 922 of the Michigan Department of Transportation (MDOT) 2020 Standard Specifications for Construction, the 2011 Michigan Manual of Uniform Traffic Control Devices (MMUTCD), and as described herein.

The Contractor shall furnish, erect, maintain and, upon completion of the work, remove all traffic control devices and barricade lights as required on the project for the safety and protection of local traffic. This includes, but is not limited to, temporary advance, regulatory, and warning signs; barricades and channelizing devices at intersections and on streets where traffic is to be maintained; barricades at the ends of the project and at right-of-way lines of intersecting streets, and traffic control devices for moving construction operations.

Materials

The materials and equipment shall meet the requirements specified in the corresponding sections of the MDOT 2020 Standard Specifications for Construction and the 2011 MMUTCD.

Maintenance of Local Traffic

Unless otherwise indicated on the plans, all side roads shall not be closed to through traffic except during construction operations of short duration and only upon written approval of the Engineer.

Local access shall be maintained at all times for emergency vehicles, refuse pick-up, mail delivery, school buses, and ingress/egress to public and private properties.

Contractor must accommodate the safe access to the residential buildings and businesses located within construction area.

Driveways shall not be blocked for extended periods of time unless arrangements can be made with the affected property owner(s). When it becomes necessary to temporarily block driveways, the Contractor shall notify the affected property owners in advance to coordinate the work and allow sufficient time for vehicles to vacate from properties. It may be necessary to allow for vehicles to temporarily park in the roadway at locations that do not interfere with the Contractor's work. During these periods the owners of the respective vehicles must be available to, with proper notice, move their vehicles if it becomes necessary to accommodate the work.

At times, when it becomes necessary to temporarily obstruct local traffic during the performance of the work, the Contractor shall provide traffic regulator control in conformance with Chapter 6E of the MMUTCD, Sections 6E.01 thru 6E.08. A minimum of two traffic regulators are required. The cost of traffic regulator control shall be included in the contract pay item "Minor Traffic Control, Max $_____".

The Contractor shall use quantities of dust palliative, maintenance aggregate, and cold patching/HMA mixtures for use as temporary base, surfacing, and dust control at utility crossings, side roads and driveways (wherever required to maintain traffic), and where directed by the Engineer to maintain local access. The cost for the use of dust palliative, maintenance aggregate, cold patch and/or hot mix asphalt 36A mixture, as required and directed by the Engineer for maintenance of traffic and local access, shall be included in Contract pay item "General Conditions, Max $_____", and it will not be paid for separately.

The work of maintaining and relocating existing warning, regulatory and/or guide signs; and of removing, salvaging, and reinstalling existing signs and supports is included in the bid price for the contract pay item "Minor Traffic Control, Max $_____".

Mailboxes and newspaper boxes that are in the way of the construction shall be removed and reset immediately in a temporary location approved by the Engineer. Mail and paper delivery shall not be interrupted during the construction. Upon completion of the construction, all mailboxes and newspaper boxes, including their supports, shall be repositioned in their permanent locations as approved by the Engineer. This work shall be included in the contract unit price for the contract pay item "General Conditions, Max $_____", and it will not be paid for separately.

The Contractor shall perform the work of this Contract while maintaining traffic in accordance with the Contract Documents as specified herein. No traffic shall be allowed on newly placed asphalt surfaces until rolling has been satisfactorily completed and the surface has cooled sufficiently to prevent damage from traffic. This is to be accomplished by flag persons and by relocating traffic control devices to prevent traffic from entering the work area until such time that it can be safely maintained without damaging the new construction. The Contractor shall provide traffic regulators in sufficient number to maintain traffic as described herein, and to keep traffic off sections being surfaced, and provide for safe travel at all times as directed by the Engineer. The work of traffic regulators shall be included in the bid price for the contract pay item "Minor Traffic Control, Max $_____."

Each pressure distributor, paver and roller shall be equipped with at least one approved flasher light which shall be mounted on the equipment so as to give a warning signal ahead and behind.

Construction Influence Area (CIA) - The CIA shall include the proposed work areas within the right-of-way of the four proposed construction locations. The CIA shall include the affected portions of the driveways along and contiguous with these roadways.

In addition, the CIA shall include the rights-of-way of all roadway segments used for detours and all locations that contain advance warning and/or regulatory signs, pavement markings, plastic drums, traffic delineators, and all other project related traffic maintenance items.

Police and Fire - The Contractor shall notify local police, fire departments and emergency response units a minimum of three business days (72 hours) prior to the closure of any roads, or traffic shifts causing restricted movements of traffic or restricted access.

Work performed by City of Ann Arbor Signs and Signals Unit - No additional or extra compensation will be paid for any delays caused by City of Ann Arbor Signs and Signals.

Signal Modifications

Signal timing and phasing modifications are not anticipated for construction at this time. This shall be evaluated and if the need arises, the Contractor shall coordinate work with the City ahead of any decided changes in the traffic control.

Sign Removals and Storage

The Contractor shall remove and store the signs as shown on the plans and as directed by the Engineer. After construction is complete, but before opening any roadway to traffic, Signs and Signals will reinstall all signs in their proper, permanent location. To coordinate sign removal and installation/reinstallation, the Contractor shall notify the Signs and Signals Unit at least five (5) working days (Monday-Friday) in advance of when the sign work will need to be completed. It is the responsibility of the Contractor to ensure that City of Ann Arbor Signs and Signals Unit is scheduled, kept apprised of the progress of construction, and notified a second time immediately (4 working hours) prior to the need to complete the sign work. The installation/reinstallation of all signs shall be completed by the City of Ann Arbor Signs and Signals Unit.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
MINOR TRAFFIC CONTROL

Description

The work shall include, but is not limited to the following:

- Furnishing and operating of miscellaneous signs, warning devices, traffic regulators, flags, paddles, and cones;
- Operating of traffic control signs and barricades paid for separately;
- Operating of additional signs furnished by the City;
- Furnishing and installing meter bags;
- Coordinating with the City to have meter heads removed and reinstalled;
- Maintaining pedestrian traffic;
- Temporarily covering traffic controls;
- Temporarily covering existing signs as directed;
- Any and all other miscellaneous and/or incidental items which are necessary to properly perform the work.

This work shall consist of protecting and maintaining vehicular and pedestrian traffic, in accordance with Sections 104.11 and 812 of the of the Michigan Department of Transportation (MDOT) 2020 Standard Specifications for Construction; Part 6 of the 2011 Edition of the Michigan Manual of Uniform Traffic Control Devices (MMUTCD); and the City of Ann Arbor Public Services Department Standard Specifications, except as modified herein.

Materials, Equipment, and Construction Methods

Materials and equipment shall meet the requirements specified in the above designated sections of the MDOT 2020 Standard Specifications for Construction.

The Contractor shall maintain traffic such that no vehicle shall be required to drive into active work areas. Patch areas which extend more than halfway across the roadway shall be removed and replaced to provide a minimum of half the pavement width at all times for maintaining traffic.

The Contractor shall maintain pedestrian traffic at all times. For maintaining normal pedestrian traffic while performing sidewalk and driveway repair, Plastic Drum, High Intensity, Lighted, shall be placed by the Contractor as directed by the Engineer. The Contractor, when directed by the Engineer, shall place ADA compliant pedestrian barricades, "Sidewalk Closed" and/or "Cross Here" signs. The cost shall be included in this pay item and will not be paid for separately.

All existing signs, and signs erected by the City of Ann Arbor on this project shall be preserved, protected, and maintained by the Contractor. Existing City owned signs which are damaged by the Contractor during the work will be repaired by the City at the Contractor's expense.

Parking violation citations issued to the Contractor, subcontractor, and material suppliers including each of their respective employees shall be enforced under appropriate City Code.

The Contractor shall obtain a Traffic Detour or Lane Closure Permit from the City's Public Services – Engineering Unit, at least 48-hours in advance of any proposed lane or street closing. No lane closures shall be permitted July 4, and during the Labor Day and Memorial Day weekends.

The hours of work on all local streets are 7:00 a.m. to 8:00 p.m., Monday through Saturday, or as specified on the Lane Closure Permit. No equipment will be allowed in the street before or after these hours.

Local streets may only be closed to through traffic (local access only) with written authorization of the Engineer. Work must be completed each day such that all streets are re-opened to through traffic by 8:00 p.m. unless otherwise specified, directed, or authorized in writing by the Engineer. All major changes in traffic control shall be made either between 9:30 a.m. and 3:30 p.m. or between 7:00 p.m. and 6:30 a.m. to minimize interference with rush-hour traffic. All traffic controls must be in-place and ready for traffic each day by 6:30 a.m. and 3:30 p.m.

The Contractor shall temporarily cover conflicting traffic and/or parking signs when directed by the Engineer.

The Contractor shall replace missing or damaged traffic control devices as directed by the Engineer. When traffic control devices have been damaged by, or due to, the negligence of the Contractor, its subcontractors or material suppliers, the traffic control devices shall be replaced at the Contractor's expense.

The work for Minor Traffic Control shall include: furnishing and operating of miscellaneous signs and warning devices not paid for separately; operating and moving to multiple project locations of traffic control signs and barricades that are paid for separately; furnishing and operating cones; operating additional signs furnished by the City throughout the life of the Contract; operating pedestrian traffic control devices; maintaining a safe trench during all non-working hours; maintaining access to all drives; covering conflicting existing signs and removal of these covers; moving the traffic control removal of any and all traffic control devices utilized on the project upon completion of the work, and any and all other miscellaneous and/or incidental items which are necessary to properly perform the work.

The Contractor shall maintain vehicular and pedestrian traffic during the work by the use of traffic regulators, channelizing devices, and signs as necessary, as directed by the Engineer, and in accordance with 2011 Edition of the MMUTCD.

Traffic control devices meeting current MDOT and MMUTCD specifications shall be used on this project.

Sufficient signs shall be placed by the contractor to ensure the safety of the workers and the general public in accordance with the current MMUTCD.

Measurement and Payment

Minor Traffic Control will be paid for on a pro rata basis with each progress payment. Measurement will be based on the ratio between work completed during the payment period and the total contract amount. When all the work of this Contract has been completed, the measurement of this item shall be 1.0 Lump Sum.

The completed work as measured for these items of work will be paid for at the Contract Unit Price for the following Contract (Pay) Items:

Contract Item (Pay Item)	Pay Unit
Minor Traffic Control, Max $_____	Lump Sum

The unit price for this item of work shall include all labor, material, and equipment costs to perform all the work specified in the MDOT and City Standard Specifications for Construction, and as modified by this Detailed Specification.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
TRAFFIC CONTROL SIGNS AND BARRICADES

Description

This work shall consist of furnishing the traffic control devices for protecting and maintaining vehicular and pedestrian traffic as shown on the Plans and as directed by the Engineer in accordance with Sections 104.11, 812, and 922 of the Michigan Department of Transportation (MDOT) 2020 Standard Specifications for Construction; Part 6 of the 2011 Edition of the Michigan Manual of Uniform Traffic Control Devices (MMUTCD); and the City of Ann Arbor Public Services Department Standard Specifications, except as modified herein.

Materials

Materials shall meet the requirements specified in the above designated sections of the MDOT 2020 Standard Specifications for Construction and be furnished as directed by the Engineer.

The City will furnish "No Parking" signs to the Contractor at no cost. The Contractor shall furnish the sign support and mounting hardware materials, which materials shall be in accordance with those specified in Section 919 of the MDOT 2020 Standard Specifications for Construction.

Construction Methods

Pedestrian barricades shall extend the full width of the sidewalk; be orange or white in color, with orange and white reflective sheeting; and be fully ADA compliant.

Type II and Type III Barricades shall have standard orange-and-white stripes on both sides of the barricade. Lighted plastic drums shall be sufficiently ballasted to minimize tipping.

"Construction Ahead" warning signs shall be placed, as indicated on the Plans, or as directed by the Engineer, prior to the start of work, regardless of the nature, magnitude, or duration of the work.

“No Parking” Signs

Prior to the commencement of any construction activity, the Contractor shall place “No Parking” signs as directed by the Engineer. The Contractor shall obtain a permit for “Temporary Permission of Reserve Parking Lane for Work Related Purposes” from the City’s Public Services – Engineering Unit (at no cost to the contractor). This permit shall be obtained a minimum of five (5) business days prior to the posting of “No Parking” signs.

The Contractor shall securely bolt the signs to the sign supports as directed by the Engineer. The Contractor shall imbed the sign supports at least 2-feet into the ground, and there shall be a minimum of 6-feet and maximum of 7-feet of clearance maintained between the bottom of the sign and the ground. The signs are to be placed at intervals no more than 75 feet, and as necessary to eliminate parking in the construction area.

The installation of "No Parking" signs shall be in accordance with the permit. "No Parking" signs shall be installed by the Contractor, as directed by the Engineer, at least 48 hours prior to the proposed start-of-work/enforcement date.

"No Parking" signs shall be covered by the Contractor, thereby allowing on-street parking, until between 48 and 24 hours prior to the start of the work. "No Parking" signs shall be covered by the Contractor whenever there is no work being performed for a period of time longer than 72 hours. To maintain areas of on-street parking available for residents, the Engineer may direct the contractor to cover and uncover temporary “No Parking” signs within the project limits multiple times throughout the course of the project. Such repeated covering and uncovering of signs shall be included in this item of work and shall not be paid for separately.

"No Parking" signs shall be returned to the City upon the completion of work. The cost of unreturned signs will be back charged to the Contractor.

Measurement and Payment

All temporary traffic control devices furnished by the Contractor shall remain the property of the Contractor. The City shall not be responsible for stolen or damaged signs, barricades, barricade lights or other traffic maintenance items. The Contractor shall replace missing traffic control devices immediately, at no additional cost to the City.

Costs for transporting barricades and other temporary traffic control devices shall be included in the bid prices for the individual items of work.

For Type III Barricades, Channeling Devices, Plastic Drums, Portable Changeable Message Signs, and Sidewalk Barricades payment shall be for the maximum quantity used at each project location at any one time.

For Temporary Type B Signs, payment shall be for the quantity used at each project location.

The completed work as measured for these items of work will be paid for at the Contract Unit Price for the following Contract (Pay) Items:

Contract Item (Pay Item)	Pay Unit
Lighted Arrow Board	Each
Sign, Portable Changeable Message	Each
“No Parking” signs	Each
Pedestrian Type II Barricade, Temp	Each
Barricade Type III - Lighted	Each
Temporary Sign, Type B	Sq Ft
Temporary Sign, Type B, Special	Sq Ft
Plastic Drum - Lighted	Each
Channeling Device, 42 inch	Each

The unit price for this item of work shall include all labor, material, and equipment costs to furnish and one-time set up as specified in the MDOT and City Standard Specifications for Construction,

and as modified by this Detailed Specification. Additional operation of these items is to be included in “Minor Traffic Control, Max $____”.

The item “No Parking” Signs will be measured as the maximum number of signs installed on the project at any one-time. The unit price includes the removal and return of "No Parking" signs to the City upon completion of the project. The Contractor shall be back charged for the replacement costs for damaged or unreturned signs.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
TEMPORARY PEDESTRIAN ACCESS ROUTE (TPAR) FACILITIES

DESCRIPTION

This work consists of furnishing, installing, maintaining, relocating, and removing temporary pedestrian ramps, mats, and channelizers as identified in the proposal or on the plans. Use TPAR facilities to facilitate pedestrian travel on accessible facilities over curbs or other uneven terrain features with a vertical difference of 1/2 inch or greater. Damaged pedestrian facilities will be replaced as directed by the Engineer.

MATERIALS

A. Temporary Pedestrian Ramp

Provide materials to construct a temporary pedestrian ramp in accordance with the *Americans with Disabilities Act (ADA)*, the standard specifications, and the following:

1. Ensure the material used to construct the temporary pedestrian ramp is firm, stable, skid resistant, and forms a continuous hard surface. Ensure the surface does not warp, buckle or otherwise become uneven, and materials support the weight of pedestrians as well as motorized scooters and wheelchairs. Suitable materials to construct the surface of the ramp include asphalt materials, Oriented Strand Board (OSB) or plywood, dimensional lumber, certain reclaimed or other materials as approved by the Engineer. Compacted soils, aggregate and sand are prohibited.

2. Provide a handrail on both sides of the ramp if the ramp is not exposed to vehicle traffic and has a total rise greater than 6 inches, and a length greater than 72 inches. Ensure the handrail is between 1.25 and 1.5 inches wide and configured to be a “graspable” cross-section. See construction subsection 2.A for additional details. When the ramp is exposed to traffic, in lieu of handrails, use a protective edge 2.5 inches minimum height above the ramp surface or 1:10 flare on both sides of the ramp.

3. Ensure the surface of the ramp is free draining; in addition provide features that allow drainage to move past the ramp installation (i.e. along the gutter pan underneath the ramp if the ramp is installed on a curb).

4. Provide materials to construct detectable edging along open sides of the ramp if required.

5. If asphalt materials are not used to construct the surface of the ramp, provide an antiskid coating or surface treatment approved by the Engineer.

B. Temporary Pedestrian Mat

Provide materials for a temporary pedestrian mat in accordance with the *Americans with Disabilities Act (ADA)*, the standard specifications, and the following:

1. Ensure the material used for the temporary pedestrian mat is firm, stable, skid resistant, and forms a continuous hard surface. Ensure the surface does not warp, buckle

or otherwise become uneven, and materials support the weight of pedestrians as well as motorized scooters and wheelchairs. Suitable materials will be determined by the Engineer after shop drawings or products information is provided.

2. Mats shall be at least 60 inches wide and not have traversable edges more than ½ inch high.

3. Ensure the surface of the mat is free draining.

C. Pedestrian Channelizing Device

Provide materials for a temporary pedestrian mat in accordance with the *Americans with Disabilities Act (ADA)*, the standard specifications, and the following:

1. Upper surface shall be smooth, continuous for hand-trailing.
2. Detectible bottom edge shall be continuous, and space between the bottom and ground shall be less than 2 inches;
3. Ballast shall be located behind or internal to the device, and no support exceeding 0.5 inches in height shall protrude into the protected access route.
4. Devices shall interlock to ensure continuity of guidance.

CONSTRUCTION METHOD

Construct the temporary pedestrian ramp in accordance with the manufacturer's recommendations (if applicable), *ADA*, the plans, and the following:

1. Ensure the useable surface of the ramp is 48 inches wide and does not deflect due to pedestrian traffic. Ensure an anti-skid surface treatment is applied to the useable area of the ramp if it is not made from asphalt materials. The maximum cross slope of the ramp is 2 percent. Ensure both ends of the ramp smoothly transitions to the adjacent surface, with 1/4 inch or less vertical difference.

Construct the ramp to maintain a longitudinal slope from 1:10 to 1:12 where possible. Otherwise, a longitudinal slope from 1:8 to 1:10 may be used for a maximum rise of 3 inches. Temporary pedestrian ramps with longitudinal slopes greater than 1:8 are prohibited.

A. Provide a handrail on both sides of the ramp if required as stated herein. Ensure the top of the handrail is between 34 and 38 inches above the surface of the ramp. Ensure a minimum width of 36 inches is maintained between the handrails, with a minimum clearance of 1.5 inches behind and 18 inches above.

Construct the handrail such that the bending stress applied by a bending moment created by a 250 pound force is less than the allowable stress for the materials and the construction of the handrail. Construct the handrail to withstand the shear stress induced by a 250 pound force. Ensure all fasteners, mounting devices and support structures are also able to withstand shear stress induced by a 250 pound force.

2. Construct a detectable edging anytime a handrail is required, and anytime the path changes direction. This includes a turn onto the ramp from the path. Detectable edging must begin a maximum of 2.5 inches above the ramp surface, and extend at least 6 inches above the ramp surface.

3. Ensure a clear space (minimum 48 inches by 48 inches) is provided above and below the ramp.

4. Avoid locating ramps in areas of drainage collection, ponding or running water, which can produce slippery or unsafe conditions. If the ramp is located over a gutter pan or other drainage structure, provide features to facilitate water movement around or under the ramp as approved by the Engineer.

5. Ensure all debris and construction material is cleared from the surface of the ramp throughout its use. Ensure snow and ice is removed; the use of an approved de-icing agent may be required. Repair or replace the ramp if it becomes uneven, unstable, or displaces due to weather events, construction activities, or other causes as directed by the Engineer.

MEASUREMENT AND PAYMENT

All TPAR facilities furnished by the Contractor shall remain the property of the Contractor. The City shall not be responsible for stolen or damaged ramps, mats, channelizers, or other TPAR items. The Contractor shall replace missing TPAR facilities immediately, at no additional cost to the City.

Costs for transporting ramps, mats, and channelizers shall be included in the bid prices for the individual items of work.

For Mats, Channelizing Devices, and Ramps that are fabricated and reusable, payment shall be for the maximum quantity used at any one time. Ramps that are constructed at each location with suitable material that cannot be relocated, such as HMA, shall be will be paid for at each location.

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**
Temporary Pedestrian Ramp	Each
Temporary Pedestrian Mat	Ft
Pedestrian Channelizer	Ft

TPAR Facilities unit prices include all labor, equipment, and materials to furnish, install and remove temporary pedestrian ramps and mats at the locations shown on the plans, as well as all costs for maintaining, clearing debris, deicing, reconfiguring, and relocating the temporary pedestrian ramps and mats throughout the life of the contract. Additional operation of these items is to be included in “Minor Traffic Control, Max $____”.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
PROTECTIVE FENCING

Description

This work shall consist of taking all reasonable measures to protect all existing trees and vegetation designated to remain and be protected within the project limits, the construction influence area, and as directed by the Engineer, in accordance with Sections 201.03.A.2 and Section 808 of the Michigan Department of Transportation 2020 Standard Specifications for Construction and the City of Ann Arbor Public Services Department Standard Specifications, except as modified herein. The work shall also consist of installing protective fencing at the limits of the construction area as shown on the plans or in areas directed by the Engineer.

Materials

Fabric shall be orange, vinyl, snow fence material, 4-feet tall. Posts shall be 6-foot long, T-shaped, metal posts or 2-inch square hardwood stakes.

Means and Methods of Protection

Install protective fence at the limits of the construction area as shown on the plans or as directed by the Engineer.

The Contractor shall not operate equipment within the tree protection fence of any existing tree without the approval of the Engineer.

Construction material, supplies, or equipment shall not be stockpiled or stored within the limits of the tree protection fence.

Vehicles and personnel are not permitted within the limits of the tree protection fence.

The Contractor shall not attach chains, cables, ropes, nails, or other articles to any tree at any time.

Tree roots exposed during construction that are 1½-inch or greater in diameter must be pruned. All pruning operations shall be reviewed and approved by the Engineer. All root pruning shall be performed with sharp tools and shall provide clean cuts that do not unnecessarily damage the remaining bark or root. The Contractor shall not perform any backfilling operations until all root maintenance has been performed.

Any damage to trees owned by the City of Ann Arbor or other trees designated to be protected due to the Contractor's activities or activities of the Contractor's subcontractors or suppliers shall be repaired under the direction of the City Forester by an approved forestry specialist. The costs of these repairs shall be the sole responsibility of the Contractor.

Should the Contractor’s operations damage a plant’s roots to the extent that it must be removed, the Contractor shall either replace the plant with a commensurate number of plants, 2½-inch caliper trees of the species as determined by the City or compensate the City of Ann Arbor for the cash value of the plant or tree as determined by the City of Ann Arbor’s Forester. The City of Ann Arbor shall be solely responsible for determining which compensation method is used.

The City Forester shall supervise the replacement of any trees at the sole expense of the Contractor.

Remove tree protection fence when directed by the Engineer.

Measurement and Payment

The completed work shall be paid for at the contract unit price for the following Contract items (pay items):

Contract Item (Pay Item)	Pay Unit
Protective Fencing	Foot

Protective Fence will be measured in length, by feet of fence used, and will be paid for at the contract unit price which shall be payment in full for all labor, materials, and equipment needed to accomplish this work. No additional payment will be made for maintenance or reinstallation of fence during the construction period. No additional payment will be made for repair or replacement of vegetation as noted above.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
TREE REMOVAL

Description

This work shall consist of removing existing trees where indicated on the Plans, and as directed by the Engineer. This work shall include cutting and removing trees, their stumps, and roots from the ground, and disposing of all removed materials. All materials needed to accomplish this work are included in this pay item. All work shall be done in accordance with the City of Ann Arbor Public Services Department Standard Specifications, Section 202 of the Michigan Department of Transportation (MDOT) Standard Specifications for Construction (2020 edition) and as directed by the Engineer.

Tree removal on private property within easements shall be performed by the Contractor. The limits of tree removal shall be as directed by the Engineer. The Contractor must clearly mark the trees for removal at least one (1) week prior to the date of their intended removal.

Following the marking of the trees, the Contractor shall schedule a walkthrough with the Engineer, City of Ann Arbor Urban Forestry Coordinator, City of Ann Arbor Forester, and City of Ann Arbor Natural Area Preservation Deputy Manager to review all proposed tree removals.

The removal and disposal of trees greater than 6-inches in diameter shall be paid for as indicated below. The cutting, removal, and disposal of trees less than 6-inches in diameter, bushes, brush, or the trimming of trees will not be paid for separately and shall in included in the item of work “General Conditions Max $____”. Trees greater than 6-inches in diameter that are fallen across the work area and must be removed to permit work shall be paid for under the applicable “Tree Removal” pay item.

Unless otherwise approved by the Engineer, due to the potential existence of federally protected species, complete all tree removals identified as potential bat habitat between October 1 and March 31.

Construction Methods

The Construction Methods shall meet all requirements of the City of Ann Arbor Standard Specifications and MDOT Standard Specifications for Construction (2012 edition). As required, remove and dispose of trees with a diameter of at least 6 inches. Stumps shall be removed using a stump grinder to a depth of at least 8-inches below final grade. Prior to all tree removal, coordinate the required tree inspection walkthrough.

Where trees are identified for monitoring during the removal review walkthrough, do not remove the trees until adjacent sewer trenches are excavated and inspected by the City Forester for roots and health of tree. As determined by the Urban Forestry Coordinator, some trees indicated on the Plans for removal may be saved and left in place. Coordination with the Urban Forestry Coordinator, Forester and Engineer to determine if a tree is removed or not will not constitute an extension of time if the work is delayed. This work shall not be paid for separately and shall be included in the item of work “General Conditions”.

Removal

Cut and fell trees in a manner so as not to damage surrounding areas, fences, features, and adjacent trees designated to remain. Grub and remove stumps and roots. Backfill all resulting holes or excavations with Engineer approved material and dispose of all debris before ending the day's work.

Burning of any removed materials is strictly prohibited.

All trees removed as part of the work completed for this project shall be removed from the property unless otherwise requested by the City, or private property Owner. All wood requested by the City or the respective property Owner shall be cut into logs approximately 10-feet in length and placed at a location onsite as designated by the Engineer.

Measurement and Payment

This item shall be measured per tree removed and paid for on the basis of unit price each. The tree size will be determined by the average diameter of the tree trunk, measured to the nearest full inch, at a point 4.5-feet above the base of the tree at the ground line. Trees having major limbs lower than 4.5-feet from the ground shall be measured at the smallest diameter below such limbs. Where more than one (1) tree has grown from a common stump, each tree shall be measured as a separate tree. Dead trees fallen across the work area shall be paid for under the tree removal pay item based on their size.

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

Contract Item (Pay Item)	Pay Unit
Tree Removal, 6-inch to 12-inch	Each
Tree Removal, 13-inch to 24-inch	Each
Tree Removal, greater than 24-inch	Each

The items of work listed above shall be paid for by the number of trees actually removed. The unit price for these items of work shall include all labor, material, and equipment costs to perform the work as detailed herein.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
EXPLORATORY EXCAVATION

Description

The use of this Detailed Specification is to compensate the Contractor to locate underground infrastructure, such as culverts, sewers, utilities, and/or to expose the existing pavement section. Use must only be as directed and approved by the Engineer. This Detailed Specification is not to compensate the Contractor for the responsibilities in subsection 107.12 of the 2020 MDOT Standard Specifications for Construction.

This work consists of conducting a vertical exploratory investigation to expose an existing culvert, sewer, utility/utility service, or the existing pavement section in order to verify the location, condition, size, material, alignment and/or composition; allowing the Engineer to document the necessary information; and backfilling the excavation. It includes providing necessary lane, shoulder and/or sidewalk closures required to perform the work.

The intent of “Exploratory Excavation” is not to provide a means for the Contractor to locate each existing utility throughout the project, but for those that appear to be in conflict with the proposed work and their location is unclear or unknown. The Contractor is responsible for “using reasonable care to establish the precise location of the underground facilities in advance of construction” (Public Act 174 of 2013 - Miss Dig Law) as a part of the overall project contract.

Materials

Granular Material Class II ..... Section 902

Construction

The owner of any sewer or utility to be exposed will not take the facilities out of service during the exploratory investigation. Contact utility owners in accordance with subsection 107.12 of the 2020 MDOT Standard Specifications for Construction.

Establish necessary lane, shoulder and/or sidewalk closures required to perform work. Advance the exploratory excavation using vacuum excavation, hand digging, conventional machine excavation, or a combination thereof subject to approval of the Engineer. Allow the Engineer access to document the necessary information. If the technique used to advance the excavation causes any damage to the existing facilities, immediately contact the utility owner and cease all work until Engineer approves of an alternate method.

Take care to protect the exposed culvert, sewer, or utility from damage during construction. Repair or replace culvert, sewer or utility, damaged during exploratory excavation, in accordance with the standard specifications and as approved by the Engineer.

Obtain the Engineer's approval before backfilling the excavation. Complete backfilling no later than 24 hours after approval. Backfill in accordance with subsection 204.03.C of the 2020 MDOT Standard Specifications for Construction. Dispose of excess material in accordance with the standard specifications.

The Contractor is responsible for all costs associated with the repair work and out of service time

of all broken or damaged existing culverts, sewers or utilities resulting from any action by the Contractor. If the exploratory investigation results in damage to utilities, contact the owner of such utility to coordinate the repair.

Backfill excavation with compacted Granular Material Class II. Use material removed during exploratory investigation for backfill only if approved by of the Engineer

Measurement and Payment

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

Contract Item (Pay Item)	Pay Unit
Exploratory Excavation (0-10' deep)	Each

The approved price for this item shall include all labor, material, and equipment costs required to complete the work, including all costs associated with repair or replacement resulting from the Contractor's activities.

Exploratory Excavation, (0-10' deep) will be paid for per each excavation a maximum of 10-feet deep for a 4-foot maximum diameter hole, or as approved by the Engineer. Measure and pay for each 4-foot maximum diameter hole separately. One paid excavation may include multiple utility verifications if the utilities are close in proximity.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
HAND DIGGING

Description

This work consists of earth excavation down to the proposed grade using hand tools, or other method as approved by the engineer, only near substantial tree roots. The limits of excavation shall be as indicated on the plans and confirmed by visual inspection of the exposed root system by City staff as directed by the Engineer. Complete this work according to the Section 205 of the Michigan Department of Transportation (MDOT) 2020 Standard Specifications for Construction and as described herein.

Materials

Granular Material Class II ..... Section 902

Construction

Complete this work according to Section 205 of the MDOT 2020 Standard Specifications for Construction. **Hand Digging** includes, but is not limited to, the following work.

1. Remove miscellaneous materials covering the tree root system using hand tools, or other method as approved by the engineer, in a manner that reveals, without damaging, tree roots 1½-inch or greater in diameter for pruning operations.
2. Dispose of excess and unsuitable material according to section 205.
3. Hand dig to achieve rough grades or removals, as shown on the plan.
4. Tree roots exposed during construction that are 1½-inch or greater in diameter must be pruned. All pruning operations shall be reviewed and approved by the Engineer. All root pruning shall be performed with sharp tools and shall provide clean cuts that do not unnecessarily damage the remaining bark or root. The Contractor shall not perform any backfilling operations until all root maintenance has been performed.
5. Perform removals and backfill to rough grade as specified elsewhere in the contract.

Any damage to trees within the areas designated for Hand Digging due to the Contractor's activities or activities of the Contractor's subcontractors or suppliers shall be repaired under the direction of the City Forester by an approved forestry specialist. The costs of these repairs shall be the sole responsibility of the Contractor.

Should the Contractor’s operations damage a plant’s roots to the extent that it must be removed, the Contractor shall either replace the plant with a commensurate number of plants, 2½-inch caliper trees of the species as determined by the City or compensate the City of Ann Arbor for the cash value of the plant or tree as determined by the City of Ann Arbor’s Forester. The City of Ann Arbor shall be solely responsible for determining which compensation method is used.

Backfill excavation with compacted Granular Material Class II. Use material removed during exploratory investigation for backfill only if approved by of the Engineer.

Measurement and Payment

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

following pay item:

Contract Item (Pay Item)	**Pay Unit**
Hand Digging, Sidewalk	Syd
Hand Digging, Fire Hydrant Assembly, Remove	Syd

The approved price for this item shall include all labor, material, and equipment costs required to complete the work, including all costs associated with repair or replacement resulting from the Contractor's activities.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
DRAINAGE STRUCTURES

Description

This work shall consist of constructing drainage structures as shown on the plans and as directed by the Engineer, in accordance with Section 403 of the Michigan Department of Transportation 2020 Standard Specifications for Construction, and the City of Ann Arbor Public Services Department Standard Specifications, except as modified herein.

Materials

The materials used for this work shall conform to Subsection 403.02 of the Michigan Department of Transportation 2020 Standard Specifications for Construction, except as specified herein.

Storm sewer drainage structures shall be constructed of precast or cast-in-place reinforced concrete sections, or concrete masonry units. All sanitary sewer manholes and gate wells (water main valve manholes) shall be constructed of precast reinforced concrete sections.

Precast reinforced concrete bases, bottom sections, manhole risers, grade adjustment rings, concentric cones, eccentric cones, and flat slab tops shall conform to the requirements of ASTM C-478. Joints on precast manholes used on all sanitary sewers shall meet ASTM C-443, rubber O-ring gasket.

Precast manhole tees and radius pipe sections shall conform to requirements for reinforced concrete pipe, ASTM C-76, Class IV. Joints shall conform to adjacent pipe. Tees and radius pipe shall conform to details indicated on drawings offered by the Concrete Pipe Association of Michigan, Inc., or Engineer approved equal.

If precast drainage structures are used, they shall be designed to accommodate HL-93 Modified Live Load requirements as determined by a Professional Engineer licensed by the State of Michigan, regardless of where they are to be installed. For the purposes of design, a HL-93 Modified Live Load shall consist of 1.2 times the design truck or 1.2 times a single 60-kip load, whichever produces the greater stresses.

If precast structures are used, the Contractor shall field verify inverts prior to fabricating precast units. No additional payment will be made to the Contractor for precast units that cannot be used due to existing inverts being different than shown on the plans, changes in vertical or horizontal alignment due to conditions found in the field, or similar unforeseen circumstances.

If the Contractor elects to use pre-cast drainage structures, or if portions of the drainage structures are constructed with pre-cast concrete elements, the Contractor shall submit to the Engineer for review and approval shop drawings in accordance with Section 104.02 of the Michigan Department of Transportation 2020 Standard Specifications for Construction.

Drainage Structure Castings shall be as listed in Structure Cover detailed spec.

For each submittal or resubmittal, the Contractor shall allow at least 14 calendar days from the date of the submittal to receive the Engineer’s acceptance or request for revisions. The Engineer’s

comments shall be incorporated into the submitted plans, calculations, and descriptions. The Engineer's acceptance of submittals is required before beginning the work. Resubmittals shall be reviewed and returned to the General Contractor within 14 calendar days. Required revisions will not be a basis of payment for additional compensation, extra work, or an extension of contract time. The Contractor shall include time for this entire review process in their schedule.

Concrete masonry units shall conform to the requirements for concrete masonry units for catch basins and manholes, ASTM C-139.

Concrete brick shall conform to the requirements for concrete building brick, ASTM C-55, Grade N-1.

Plastic coated manhole steps shall be injection molded of copolymer, polypropylene, encapsulating a 1/2-inch grade-60 steel reinforcing bar. Plastic-coated manhole steps shall meet the performance test described in ASTM C-478, Paragraph II, and shall have an impact resistance of 300 ft.-lbs. with only minor deflection and no cracking or breaking. The steps shall resist pull out forces of 1500 lbs.

Construction

The construction methods used shall conform to Section 403.03 of the Michigan Department of Transportation 2020 Standard Specifications for Construction except as specified herein.

Excavation shall be carried out to the depth and width required to permit the construction of the required base. The excavation width shall be greater than the base. The bottom of the excavation shall be trimmed to a uniform horizontal bed and be completely dewatered before any concrete is placed therein. Precast manhole bases and precast bottom sections are allowed.

Concrete block construction shall only be allowed for storm sewer manholes and inlets and shall be built of the size and dimensions shown on the Plans. The block structure shall be built on a precast concrete base unit. The block shall be clean, laid in a full bed of mortar, and thoroughly bonded by completely filling the vertical end grooves with mortar to interlock with the adjacent block. The mortar beds and joints shall not exceed 3/4-inch thickness. The vertical joints are to be filled with the joints on the inside face rubbed full of mortar and struck smooth as the manhole, inlet or structure is built up. The entire outside face of the structure shall receive a 1/2" thick mortar coat and struck smooth. All masonry materials, sand, and water shall be heated to over 50°F during freezing weather, and the completed work shall be covered and protected from damage by freezing.

Circular precast manhole sections shall be constructed in accordance with the details as shown on the plans. Manhole stack units shall be constructed on level poured-in-place bases, precast concrete bases, or precast concrete bottom sections.

Precast cone sections shall be constructed in accordance with the details as shown on the plans. These units shall be eccentric for all manholes, precast or block. All structures shall be topped with a minimum of one (1) and a maximum of three (3) 2-inch-tall brick or precast adjustment courses.

Manholes, inlets, gate wells, and structures shall be constructed within 2-1/2 inches of plumb.

Frames and cover castings shall be set in full mortar beds and pointed on the structure interior to a smooth, brushed finish. The covers shall be set flush with sidewalk, roadway pavement, or ground surfaces. The Engineer shall be notified prior to the final paving to allow inspection of the final casting adjustments for all utility structures. In gravel streets, covers shall be set six to eight inches below finished gravel surface.

Sewer pipes shall extend into structures a minimum of 1/2 inch and a maximum of 3 inches.

Flow channels for sewer structures shall be finished in accordance with the details as shown on the plans. All flow channels shall be screeded and floated to a smooth, uniform surface and troweled to a hard surface finish.

Stubs for future sewer connections shall be furnished and placed by the Contractor as shown on the Plans and as directed by the Engineer. Connections shall be properly supported and braced when not resting on original ground so that any settlement will not disturb the connection. Stubs shall consist of one length of sewer pipe, of the size indicated on the Plans, with a watertight plug.

The excavation shall be kept in a dry condition.

All necessary adjustments for new structures shall be included in the cost of the structure.

Measurement and Payment

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

Contract Item (Pay Item)	Pay Unit
Dr Inlet Structure, 24 inch dia	Each
Dr Structure, __ inch dia	Each
Dr Structure, 48 inch dia, Low Point Inlet	Each
Dr Structure, __ inch dia, Add Depth	Foot
Sewer Bulkhead, __ inch	Each
Sewer Tap, ___inch	Each
Dr Inlet Junction Structure, __ inch dia	Each
Dr Inlet Overflow Structure, __ inch dia	Each

Payment for drainage structures includes furnishing the labor, equipment, and materials for all necessary excavation, disposing of surplus excavated material, backfilling, and constructing the structure complete, including frame, cover, pipe connections and structure cleaning. A standard depth manhole shall be considered to be 8 feet or less in depth (including sump). Depth of the MH shall be measured from the bottom of the casting to the top of the concrete base footing.

Payment for Drainage Structure Add Depth, includes furnishing the labor, equipment, and materials for all necessary excavation, disposing of surplus excavated material, backfilling, and constructing the structure to a depth greater than 8 feet deep. Measurement for Add Depth shall

be the difference from the bottom of the casting to the top of the concrete base footing minus 8 foot, rounded to the nearest ½ foot.

Payment for Sewer Bulkhead, includes furnishing the labor, equipment, and materials for constructing a bulkhead at an existing structure for pipe diameters 12 inches or greater. Any pipes removed from an existing structure less than 12-inches in diameter shall be repaired as incidental to the pipe removal pay item. Void in the structure shall be filled with brick and mortar to the full thickness of the structure wall and once hardened a cementitious parge coating shall be applied to the inside surface of the repair so that it has a uniform surface to the rest of the structure.

Payment for adjusting of drainage structure covers shall be included in payment for the structure.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
SEWER REMOVAL AND ABANDONMENT

Description

This work shall include removal and abandonment of existing sewers and structures of various size and depth as required by the Plans and as directed by the Engineer. All work shall be done in accordance with Section 203 of the 2020 Michigan Department of Transportation Standard Specifications for Construction, and the City of Ann Arbor Public Services Department Standard Specifications, except as modified herein.

Materials

Granular Material Class II ..... Section 902

Construction

Sewers, manholes, and drainage structures shall be removed and disposed of off-site in such a manner to avoid damaging any new or existing material which is to remain in-place. The hole or trench resulting from the removal of the manhole, sewer, or drainage structure shall be backfilled with Granular Material, CL II, in maximum lifts of 12 inches, and be compacted to 95% of its maximum unit weight, if located within the public rights-of-way, railroad rights-of-way, or within the influence of paved surfaces or structures. Otherwise, backfill shall be Engineer approved native material, compacted to 90% of its maximum unit weight, in lifts of 12 inches or less, unless otherwise noted on the plans. The void left in a structure resulting from sewer removal shall be bulkheaded with bricks and mortar to provide a watertight seal and constructed so that the remaining flow in the manhole is not impeded.

As directed by the Engineer and within two days of their removal, the Contractor shall deliver the removed structure covers to the City of Ann Arbor Public Works Unit located at the W.R. Wheeler Service Center at 4251 Stone School Road, Ann Arbor, MI 48108.

Measurement and Payment

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

Contract Item (Pay Item)	Pay Unit
Sewer Remove, Any Size or Depth	Foot
Sewer Abandon in Place, Any Size or Depth	Foot
Structure Remove, Any Size or Depth	Each

The approved price for this item shall include all labor, material, and equipment costs required to complete the work.

Sewer Abandon in Place, Any Size or Depth includes completely filling the pipe with flowable fill. See Flowable Fill Detailed Specifications for material and installation requirements.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
FLOWABLE FILL

Description

This work includes placing flowable fill to abandon sewers or other encountered utilities, as well as sections of utility trenches where compaction of the specified backfill may not be achievable due to the proximity of surrounding utilities, ground conditions, or the like, as shown on the plans and as directed by the Engineer. The work shall be performed in accordance with Section 203 of the 2020 Michigan Department of Transportation Standard Specifications for Construction and the City of Ann Arbor Public Services Department Standard Specifications, except as modified herein.

Materials

Provide flowable fill material, as directed by the Engineer, meeting one the following mixes:

1. Portland cement, fly ash, and water.
2. Portland cement, granular material, fly ash, and water.
3. Fly ash, granular material, and water.

Provide materials in accordance with the following requirements:

		[3]Specific Gravity
Portland Cement	MDOT Section 901	3.15
Fly Ash	[1]ASTM C 6l8(I)	2.40
Granular Material, Cl II	[2]MDOT Section 902	2.60
Water	MDOT Section 911	1.00

Note: Reference to MDOT relates to applicable sections of the Michigan Department of Transportation 2020 Standard Specifications for Construction.
[1]Except there is no limit on the loss of ignition.
[2]Except that 100% shall pass 3/4-inch sieve.
[3]Specific gravity values used for mix proportions given. If material used differs from these values, make appropriate adjustments as required to achieve an acceptable mixture.

Acceptable mixtures for flowable fill are as follows:

1. FF Mix Number One
   Cement Stabilized Fly Ash Mixture (Class F Fly Ash)

   Portland Cement – l00 lbs/cyd
   Fly Ash (Class F) – 2000 lbs/cyd
   Water – Sufficient amounts to produce the desired flowability (approx. 80 gal/cyd)

2. FF Mix Number Two
   Controlled Density Fill Mixture (Class F Fly Ash)

   Portland Cement – 50 lbs/cyd
   Fly Ash (Class F) – 500 lbs/cyd
   Granular Material – 2600 lbs/cyd

Water – Sufficient amounts to produce the desired flowability (approx. 50 gal/cyd)

3. FF Mix Number Three
   Controlled Density Fill Mixture (Class C Fly Ash)

   Fly Ash (Class C) – 300 lbs/cyd
   Granular Material – 2600 lbs/cyd
   Water – Sufficient amounts to produce the desired flowability (approx. 50 gal/cyd)

Construction

Flowable fill shall be placed as directed by the Engineer and as specified in the associated item of work's Detailed Specification. The Contractor is responsible to provide all needed materials and appurtenances to properly introduce the flowable fill into the pipe being abandoned. The Contractor shall also provide the needed vent device(s) to remove air that becomes trapped during the grouting operations. All measures provided by the Contractor for the introduction and venting of the grouting operations shall be effective.

All flowable fill, after setting, is intended to be removable by conventional mechanical excavation methods.

Measurement and Payment

The cost of Flowable Fill shall be included in the contract unit prices for the items of work for which it is associated and will not be paid for separately.

a. Description

The Contractor shall furnish all labor, equipment, pipe, valves, fittings, restrained-joint pipe, restrained-joint gaskets, special gaskets as detailed on the plans and in the specification, polywrap, blow-off assemblies, fire hydrants, fire hydrant extensions, and all other materials necessary to complete the work as shown on the Plans, as detailed in this Detailed Specification, and as directed by the Engineer.

All water main installation and testing procedures shall be performed in accordance with the plans, the requirements of this Detailed Specification, and as directed by the Engineer. The Contractor shall excavate all trenches and pits to the required dimensions; sheet, brace, and properly support the adjoining ground or structures where necessary to comply with MIOSHA, Section 104.07.B of the MDOT 2020 Standard Specifications for Construction, and other relevant safety standards.

The work for all items shall include, but not be limited to; pavement saw-cutting; excavation and disposal of excavated material; connections to new and existing water mains; the furnishing and installation of solid sleeves and push-on-joint plugs where needed; the furnishing, installation, and removal of sheeting and/or shoring where needed; all items necessary for the protection of the trench and all persons employed in the work during the work day and “after-hours” periods; polywrap; the furnishing, placement and compaction of approved bedding and backfill materials; thrust blocks; additional labor and equipment costs associated with any required nighttime water main work; cleaning, disinfecting, flushing, bacteriological and hydrostatic testing; and any other required items to complete the work as shown on the plans, as detailed in this Detailed Specification, and as directed by the Engineer.

The work of installing a gate valve-in-well shall include installation and backfill of the specified valve, furnishing and installing pre-cast concrete gate wells including the concrete base, straight pre-cast concrete sections, transition sections, frame, cover, and the adjustment of the structure cover.

Upon completion of the work, the Contractor shall clean the Gate Well to the approval of the Engineer.

The cost of adjusting new gate valve-in-boxes shall be included in the unit price for Gate Valve-in-Box and shall not be paid for separately.

The fire hydrant assembly work shall include the hydrant, the 6-inch gate valve-in-box, 3 feet of 6-inch pipe, the thrust block, and any required extensions to install the fire hydrant to the finish grade as shown on the plans.

b. Materials

1. Submittals. Prior to beginning construction, the Contractor shall submit the following:

A. Product data on all ductile iron pipe, valves, fittings, asbestos concrete pipe to ductile iron pipe fittings, and hydrants.

B. Manufacturer's certifications on all pipe, fittings, and precast concrete units indicating that all materials meet the minimum requirements of these specifications.

C. Information on equipment and methods to be used for flushing, chlorination, pressure, and bacteriological testing.

2. General Specifications.

A. Cast Ductile Iron Pipe and Fittings:

Cast ductile iron pipe shall be Iron Grade 60-42-10 and meet the requirements of ANSI/AWWA C151/A21.51 in all respects; with standard thickness cement mortar lining and asphaltic seal coat in accordance with ANSI/AWWA C104/A21.4; and, coated outside with an asphaltic coating in accordance with ANSI/AWWA C151/A21.51. 100% of the ferrous metals used in the manufacture of cast ductile iron pipe shall be recycled from scrap and other sources.

All pipe (except for pipe in bored steel casing) shall be Thickness Class 52 (Table 50.15, ANSI/AWWA C150/A21.50). Pipe in bored steel casing under railroad shall be Thickness Class 56.

Cast ductile iron river crossing pipe shall be Clow Corp. "F-141 River Crossing Pipe", U.S. Pipe "USIFLEX Boltless Flexible Joint Pipe" or equal approved by the Engineer and shall be thickness Class 56 minimum. The pipe shall have a boltless flexible joint of the ball and socket type, and be

designed for, and rated at, a minimum interior working water pressure of 250 psi.

Restrained joint pipe, where called for on the Plans, shall be boltless, factory-manufactured restrained joints gaskets for ductile iron pipe and fittings sizes 4-inch to 24-inch in diameter; utilizing Field Lok™ by US Pipe or Fast Grip by American Ductile Iron Pipe gaskets or approved equal. All gaskets shall be Tyton or Fast Tite joint in design with corrosion resistant stainless steel locking teeth vulcanized into the rubber. All restraining gaskets sizes 4-inches to 12-inches in diameter shall be functional for 350 psi operating pressure with a 2:1 safety factor and allowed for complete joint deflection of 5 degrees.

Cast ductile iron fittings shall be push-on joint (with the exception of solid

sleeves and fire hydrants which shall be mechanical joint), meeting the requirements of ANSI/AWWA C110/A21.10 for short body cast iron fittings. Fittings shall have a cement mortar lining and asphaltic seal coat in accordance with ANSI/AWWA C104/A21.4 and ANSI/AWWA C110/A21.10. The outside of all fittings shall have an asphaltic coating in accordance with ANSI/AWWA C110/A21.10.

Solid sleeves shall be long-pattern sleeves.

B. Gate Valves and Gate Valve Boxes:

All gate valves shall be resilient seated meeting the requirements of AWWA C509. All valves shall be of the push-on joint type, unless used on tapping sleeve assemblies, or noted otherwise on the plans. The valves supplied shall be:

a. Metroseal 250 Resilient Seated Gate Valve as manufactured by U.S. Pipe & Foundry Company
b. U. S. Pipe and Foundry Tyton Joint, Resilient Wedge Seated Gate Valve, meeting the requirements of AWWA C 509, AWWA C550, and ASTM D 2794
c. American Flow Control, Series 2500, Single Resilient Wedge
d. East Jordan Iron Works FlowMaster Resilient Wedge Valve
e. Mueller Series, 4" through 12", A-2360-38, Resilient Wedge – SL x SL
f. Tyler Series DRS 250-22 Double Resilient Wedge

All valves shall come equipped with a two-inch square operating nut, opening right.

Valve Boxes shall be as described in the "Structure Covers" Detailed Specification. Contractor shall use a No. 6 Base for a valve 8 inches or less and a No. 8 base for 10- and 12-inch valves.

C. Gate Valve Wells:

Pre-cast reinforced concrete bases, bottom sections, manhole risers, grade adjustment rings, concentric cones, eccentric cones, and flat-slab tops shall conform to the requirements of ASTM C-478. Joints on precast gate wells shall meet the requirements of ASTM C-443, rubber O-ring gasket.

Flat-slab top, pre-cast, gate wells shall be designed to accommodate HL-93 Modified Live Load requirements as determined by a Professional Engineer licensed by the State of Michigan, regardless of where they are to be installed. For the purposes of design, a HL-93 Modified Live Load shall consist of 1.2 times the design truck or 1.2 times a single 60-kip load, whichever produces the greater stresses.

D. Fire Hydrants:

Fire hydrants shall be East Jordan Iron Works Model 5-BR Water Master BR 250 with traffic flange. All fire hydrants shall have the following features: a 6 inch push-on joint pipe connection, ANSI/AWWA C111/A21.11; two 2-1/2 inch National Standard hose connections; one 5 inch integral Stortz connection (facing hydrant Stortz on right); one 3- 3/8"x7.5" pumper nozzle; 1-3/8 inch pentagon operating and cap nuts (1- 3/8 in. point-to-flat at top; 1-7/16 in. point-to-flat at base); open left; breakable flange construction; no barrel drain; and a painted red finish. Depth of bury (bottom of pipe to ground surface) is generally 6 feet but may vary depending on specific site conditions.The Stortz pumper connection must be 21 in. ± 3 in. above finished grade, and the breakable traffic flange must be between finished grade and 8 in. above finished grade.

Fire hydrant extensions shall be fully compatible with the manufacturer of the fire hydrant assembly provided and be approved by the Engineer. East Jordan Iron Works hydrants shall be provided with a model 5-BR extension kit.

All fire hydrants must be certified by Underwriters Laboratory (UL) or the National Sanitation Foundation (NSF) for use in a potable water system.

E. Tapping Sleeves and Valves:

Tapping sleeves and valves shall be manufactured of cast iron or stainless steel and designed for water service with a minimum working pressure of 150 psi. The sleeve shall be a full-bodied split sleeve design manufactured by one of the following manufacturers:

a) Clow No. F-5205;
b) Mueller Co. No. H-615;
c) Waterous Series 800;
d) East Jordan Iron Works MJ Tapping Sleeve with East Jordan FlowMaster RW Valve;
e) Tyler/Union D.I. MJ Tapping Sleeve;
f) Ford Meter Box Company Style FTSS;
g) Power Seal Model No. 3490 AS;
h) Smith Blair Model No. 622;
i) JCM 432 All Stainless-Steel Tapping Sleeve; and
j) Price Brothers Company Tapping Sleeve for Prestressed Concrete Steel Cylinder Pipe (only to be used on concrete water mains.)

Tapping Sleeves for Pre-stressed Concrete Steel Cylinder Pipe shall be in accordance with AWWA M-9. The sleeves shall have a separate gland which permits installation of the sleeve prior to cutting of the prestress wires. The gland shall have a fusion epoxy coated (per AWWA C-213)

waterway, and a broad gasket set in a retaining groove of a pressure plate gusseted to eliminate flexing. The gland shall be equipped with load bearing set screws to protect the cylinder. Grout under saddle is needed whether saddle is epoxy coated or not. Sleeves shall be furnished with grouting seals and grout horns to facilitate filling the space between the sleeve and the pipe. Tapping sleeves shall be a Price Brothers Company Tapping Sleeve for Prestressed Concrete Steel Cylinder Pipe or Engineer approved equal.

Tapping valves shall be double-disk type of the same manufacture as the sleeve, NRS with two-inch square operating nut-opening right, with a mechanical joint outlet.

All tapping sleeves and valves must be certified by Underwriters Laboratory (UL) or the National Sanitation Foundation (NSF) for use in a potable water system.

F. Asbestos Concrete Pipe to Ductile Iron Pipe Coupling:

The asbestos concrete pipe to ductile iron pipe coupling shall be the “Smith-Blair 415 (23.15”—21.60”) Gaskets, Alloy bolts and Epoxy” coupling or equivalent.

G. Joints:

Push-on joints shall be single gasket joint meeting the requirements of ANSI/AWWA C111/A21.11.

Mechanical joints for fire hydrants and solid sleeves shall be in accordance with ANSI/AWWA C111/A21.11 and shall be the Mega Lug Series 1100 joint restraint system manufactured by EBAA Iron Sales, Inc., or the Ford Meter Box Co. Uni-flange Retainer (UFR 1400-D-x style.)

Bolts for mechanical joints shall be high strength, low alloy steel bolts, only, meeting the requirements of ANSI/AWWA C111/A21.11. All bolts, nuts, and washers if required, shall be coated with a factory-applied flouropolymer coating meeting the following requirements:

Use Temperature: -100°F to 500°F

Salt Spray – ASTM B117 up to 4000 hours (nuts must not become frozen)

Pencil Hardness – 5H to 6H – ASTM D3363-92A Kinetic Coefficient of Friction – 0.06 to 0.08 Thickness – nominal 0.001” (1 mil)

Impact – 160 in-lbs as measured by ASTM D2794-93 Adhesion – 5B – ASTM D3359-95

Di-electric Strength – 500V per mil Elongation – 35% to 50%

Tensile Strength – 4,000 psi

Operating Pressure – up to 100,000 psi
Kesternich Test – Nuts not frozen up to 30+ cycles (DIN 50018) Corrosion

Resistance: as measured by;

ASTM D 1308 Muriatic Acid 31% HCL - 24 hours - No Effect Sulfuric Acid 93% H_2SO_4 - 24 hours - No Effect Caustic Soda 100% NaOH - 24 hours - No Effect Methy Ethyl Keytone MEK - 24 hours - No Effect
ASTM B117 Salt Fog - 1,000 hours - No Effect

The flouropolymer coating shall strongly adhere to surface being coated and shall not flake off or be easily removed by rubbing or brushing.

Cast ductile iron river crossing pipe joints shall be a push-on type ball and socket joint utilizing a first-grade rubber gasket. The joint shall be capable of 15-degree full turning deflection without separation, leakage, or restriction of the pipe waterway. Joint restraint shall be provided by a boltless means which is locked against accidental disengagement of the restraining component. Pipe shall be furnished with the necessary gaskets, lubricant, and retainer locking accessories.

Restrained, push-on joint, pipe shall be American Pipe's "Fast-Grip" gasket system; U.S. Pipe's "Field-Lok 350" gasket system; or Griffin Pipe “Field- Lok 350” gasket system.

The use of retainer glands and set screws shall not be acceptable.

Lubricants used in making up joints shall be supplied by the pipe manufacturer and the joints shall be coupled in accordance with the manufacturer's requirements.

H. Pipe Wrapping:

All Cast Ductile Iron Pipe, Fittings, and Valves (except river crossing pipe) shall be fully wrapped with polyethylene per ANSI/AWWA C105/A21.5 and the details as contained on the plans.

I. Anodes

Anodes shall be high potential magnesium anode ingots with packaged backfill. Anode ingot shall meet or exceed ASTM B843, Grade M1C for high-potential magnesium anodes.

Anode shall come furnished with minimum 10 feet of coiled #12 AWG solid

copper lead wire with TW, THHN or THWN insulation, firmly attached to the galvanized steel core of the anode. The core cavity shall be filled with electrical sealing compound to assure a fully insulated and protected connection. Magnesium anode and backfill shall be pre-packaged into a single unit in a permeable cloth bag.

Connection of anode lead wire to cast iron or ductile iron pipe or fittings shall be made by the thermite weld method. Thermite weld materials shall consist of wire sleeves, weld mold and weld cartridges according to the weld manufacturer's recommendations for the specific wire and pipe sizes and materials. Weld materials from different manufacturers shall not be interchanged. Weld molds shall be graphite molds. Ceramic "one -shot" molds will not be acceptable.

J. Casing Pipe:

Steel casing pipe used for construction at railroad or State highway crossings shall comply with the following minimum requirements unless more stringent requirements are established by the railroad or State. Casing pipes at other locations shall comply with the following minimum requirements unless otherwise indicated on the Plans or in the Specifications.

Nominal Diameter of Casing Pipe (Inches)	Minimum Wall Thickness (Inches)
Under 14	0.250
14, 16, and 18	0.312
20 and 22	0.375
24, 26, 28, and 30	0.500
32 and 34	0.563
36, 38, 40, 42, and 48	0.625

Steel pipe shall be non-spiral pipe and have a minimum yield strength of 35,000 psi. All joints shall be made leakproof using full penetration, continuous welds. Welds shall be ground smooth outside and inside (except inside 22 in. diameter and less) to prevent conflict with the soil or pipe placement. Steel pipe shall meet the requirements of ASTM A 53, Type E or S, Grade B.

Pipe Marking:

The following information shall be clearly marked on each length of pipe:

a) The pipe designation and class (e.g., A 53, Type S, Grade B.)

b) The name or trademark of the manufacturer.
c) Identification of the manufacturing plant.

Inspection:

All casing pipe furnished shall be subject to inspection on arrival at the job site by the Engineer. The purpose of the inspection shall be to cull and reject pipe that, independent of physical tests specified under the standard specifications designated herein, fails to conform to the requirements of these Specifications.

Rejected pipe shall be plainly marked by the Inspector and immediately removed from the site of the work by the Contractor, without cost to the City.

K. Water Main Pipe Marking:

The following information shall be clearly marked and/or cast on each length of pipe:

a) The pipe designation and class (e.g., D.I., Class 52).
b) The name or trademark of the manufacturer.
c) Country where cast.
d) The year in which the pipe was produced.

The following shall be distinctly cast on each fitting:

a) The pressure rating of the fitting.
b) Nominal diameters of openings.
c) The name or trademark of the manufacturer.
d) Country where cast.
e) The number of degrees or fraction of the circle on all bends.
f) Ductile iron fittings shall have the letters "DI" or "Ductile" cast on them.

L. Manufacturer's Certification:

All pipe furnished shall be accompanied by the manufacturer's certificate of test showing conformity with the Specifications. Each certificate shall identify a specific lot number, quantity of pipe, and show actual test results for the lot furnished. These certificates shall be submitted to the Inspector at the time of unloading.

All materials that will potentially be in contact with the City of Ann Arbor water supply must be certified by Underwriters Laboratory (UL) or the National Sanitation Foundation (NSF) for use in a potable water system.

These materials shall include pipe coatings, pipe metals, cement linings, and joint lubricants and gaskets.

M. Inspection:

All pipe furnished shall be subject to inspection on arrival at the job site by the Engineer. The purpose of the inspection shall be to cull and reject pipe or fittings that, independent of physical tests specified under the standard specifications designated herein, fail to conform to the requirements of these Specifications.

The Contractor shall notify the Engineer sufficiently in advance so that an Inspector may be on the job during the unloading of materials. A minimum notice of 24 hours is required for such unloading and inspection. The Contractor shall also notify the Engineer when the material has arrived at the site.

All ductile iron water main pipe shall be stacked on pallets off the existing grade, with each end plugged or bagged so as to keep the pipe interior clean until final installation.

Cast ductile iron pipe and fittings shall be subject to rejection on account of any of the following:

a) Variation in any dimension exceeding the permissible variations given in the material specifications.
b) Any crack or defect in the cement mortar lining which, in the opinion of the Engineer, is non-repairable, including, but not limited to, loose or "hollow" lining.
c) Any signs of physical damage or poor manufacturing which might render the material unsuitable for its intended use.
d) Variation of more than 1/16 inch per lineal foot in alignment of pipe intended to be straight.
e) Damaged ends, where in the judgment of the Engineer such damage would prevent making a satisfactory joint.
f) Improper handling during delivery, unloading, or installation.

Rejected pipe shall be plainly marked by the Inspector and immediately removed from the site of the work by the Contractor, without cost to the City.

N. Water Main Bedding and Backfill Materials:

Bedding and backfill material for Trench Detail I (under roadbed), Modified, shall be Granular Material, Class II, meeting the requirements of Section 902. Bedding and backfill for Trench Detail V (outside of the 1:1 influence line of roadbed or curb and gutter), Modified, shall be Granular Material, Class II

and Engineer approved native material, placed in accordance with the trench details.

c. Coordination with Existing Water Supply System

The Contractor may not operate City water main valves. For valve operation, contact the City of Ann Arbor Public Services Area. It is recommended that the Contractor request that the existing valves, which will need to be operated in order to perform the water main work, are checked in advance of the work to ensure that they operate properly.

Several items of work on this project require coordination with the City of Ann Arbor Public Services Area (The City). The Contractor shall notify the City three (3) full working days in advance of any items requiring coordination with the City.

The Contractor shall complete the water main work in a manner which minimizes the disruption of water service. Water quality issues arise, and treatment costs increase when the well field system is taken off line. No shutdowns at the well field shall occur on Saturdays or Sundays. Shutdowns shall not be for longer than 8.0 hours for any given shutdown event. Liquidated damages as detailed and described on page C-2 of these documents shall apply to any shutdowns that occur on Saturday or Sunday or for a period of time longer than 8.0 hours in any given 24 hour period.

The Contractor shall be responsible for coordination with the City of Ann Arbor Public Services Area for the installation of 1-inch corporations in the gate wells to be used for testing and filling of new main. The Contractor shall pay the City of Ann Arbor's Public Works Unit all costs associated with installing the corporations.

The Contractor must have all materials, fittings, pumps and other miscellaneous equipment, and personnel on site before the City of Ann Arbor Public Services Area personnel will prepare and shutdown an existing main.

d. Water Main Installation, Bacteriologic and Hydrostatic Testing, and Acceptance Requirements

Installation of proposed water mains will require work in close proximity to existing utilities. This must be taken into consideration when the contractor determines the required trench safety requirements. All excavation shall conform to all relevant MIOSHA Standards; the Contractor is solely responsible for determining all excavation and trench safety requirements.

1. Dry Tap:

   When a connection to an existing water main is to be made in the dry, the existing main to which a connection is to be made shall be isolated by the closing of the necessary existing valves, and the water from the existing main shall then be pumped

out or removed by other means so that the connection may be made in the dry. All pipe materials and appurtenances which will come into contact with potable City water after the restoration of water service following the connections shall be disinfected with a strong chlorine solution prior to installation.

The Contractor may not operate City water main valves. For valve operation, contact City of Ann Arbor Public Services Area personnel; the City of Ann Arbor personnel will direct the operation of all valves by Contractor personnel. It is recommended that the Contractor request that the existing valves, which will need to be operated in order to perform the water main work, are checked in advance of the work to ensure that they operate properly. If the Contractor elects not to request the operation of the valves in advance of any required water main operation, then a request for extension of contract time will not be allowed.

It is possible that the valves which need to be operated to facilitate a shutdown will not close entirely, thereby allowing water to leak past the valve into the area of the shutdown. The Contractor shall provide the necessary labor, material, and equipment to enable work to be completed with a poor shut down. Under no circumstances shall the Contractor be compensated for “downtime” associated with water main valve or appurtenance failure or its inability to properly operate or close fully. An extension of contract time may be allowed, if the Contractor has requested that the water main valves have been exercised in advance of the intended water main shutdown.

Due to the size and length of pipe being shut down, and the quality of shutdown attained, large amounts of water may need to be removed from the excavation. Where possible, the water shall be run directly into nearby storm sewer inlets via pumps and hose.

The Contractor shall have all pipe, fittings and appurtenances required to complete the water main connection prior to the excavation for the connection, or the work will not be allowed to commence.

The Contractor shall complete the water main work in a manner which minimizes the disruption of water service to the greatest extent possible.

The City must notify all businesses 48 hours in advance of a water main shut- down; residences must be notified 24 hours in advance. To give the City an opportunity to provide such notification, the Contractor shall schedule the water main shutdowns at least 72 hours in advance, and preferably a full four or five days in advance, of the water main shut-down.

No water main shutdown shall take place after 12:00 p.m. (noon), unless written permission has been granted by the Engineer and that the Contractor has sufficient lighting equipment to provide a safe and efficient work area for working after dark. No water main will be shut down until the main has been exposed and cleaned and is ready to be cut.

There shall be no gap larger than 1/4 inch left in the existing water main as a result of the tie-in. If needed, a closure piece ("thrust ring") of such size so as to meet this requirement shall be installed.

2. Wet Tap:

   Prior to the installation of a tapping sleeve, the section of pipe to be tapped shall be cleaned of all foreign material and wire brushed to a smooth surface. The two halves of the sleeve shall be placed around the pipe with the gaskets installed per the manufacturer's instructions. The bolts shall be tightened evenly from the center toward the ends. The bolts shall be tightened to the manufacturer's specified torque.

   When performing a wet tap in a prestressed concrete steel cylinder water main, grout is to be placed under the tapping saddle whether or not the saddle is epoxy coated.

   All pipe materials and appurtenances which may come into contact with potable City water shall be disinfected with a strong chlorine solution prior to installation. This includes the pipe section to be tapped, the two halves of the sleeve, gaskets, and the gate valve.

   Prior to installation of the end gaskets, the sleeve shall be blocked with cement bricks such that the outlet is in proper position. The end gaskets shall be installed with an overlap as specified by the manufacturer.

   The glands shall be assembled on the pipe. The bolts around the gland shall be tightened evenly, causing the gaskets to uniformly compress.

   The valve shall be installed on the sleeve following the manufacturer's instructions. Prior to tapping, the assembly shall be tested using the test plug tap in the sleeve with the valve closed, or by placing a tapped plug on the outlet of the valve with the valve open. The assembly shall be pressurized to l50 psi and hold the pressure fifteen minutes. After the pressure test is complete, the pipe shall be tapped.

3. Oversized Water Mains:

   Portions of the proposed water mains or fittings may connect with existing water mains or fittings. The possibility exists that some of the existing water mains may have been constructed using oversized, cast iron, pipe. Where tie-ins or interconnections are specified and the existing main is found to be oversized, the Contractor shall furnish and install Clow 3501B Sleeves, Tyler Dual Sleeve 5-146L, or Rockwell 441 Sleeves. These sleeves are to be present on the jobsite prior to the excavation for the water main connection, or the work will not be allowed to commence.

4. Permissible Deflection at Joints:

Wherever it is necessary to deflect ductile iron pipe from a straight line, either in the vertical or horizontal plane, to avoid obstructions, to plumb valve stems, or where long-radius curves are permitted, the amount of deflection allowed shall not exceed that required for satisfactory making of the joint and shall be approved by the Engineer. The deflection shall not exceed the following amounts:

Size of Pipe (Inches)	Joint Angle (Degrees)	Deflection in 18 ft. (Inches)	Approx. Radius of Curve Produced by Succession of 18 ft. Lengths (Feet)
4	5	19	205
6	5	19	205
8	5	19	205
10	5	19	205
12	5	19	205
16	3	11	340
20	3	11	340
24	3	11	340
30	3	11	340

The above joint deflection angles apply to fittings as well as pipe joints.

5. Trench Opening:

The Contractor shall fully comply with all laws and regulations governing construction methods and the furnishing and use of all safeguards, safety devices, protective equipment, and pollution controls. Where required to support the surfaces of adjacent roadways, structures, or excavations, or to protect the construction work, adjacent work, or workmen, the Contractor shall design and install sheeting, bracing, and shoring. The Engineer will not review the Contractor's design(s) or be responsible for the adequacy of the elements supporting the trench. The placing of such supports shall not release the Contractor of the responsibility for the sufficiency and integrity of the trench, trench opening, and the safety of all persons involved in the work.

Sheeting, bracing, and shoring shall not be left in place after completion of the work except as required by the Engineer. In the removing of sheeting and bracing after the construction has been completed, special care shall be taken to prevent any caving of the sides of the excavation and injury to the completed work or to adjacent property. Where the Engineer requires the sheeting, bracing, or shoring to be left in place it shall be cut off below the established surface grade as required by the Engineer.

All excavation shall be performed in such a manner as to provide adequate room for the construction and installation of the work to the lines, grades and dimensions shown on the Plans. The width of the trench shall be ample to permit the pipe to be laid and jointed properly, and the backfill to be placed and compacted as specified.

For each size of pipe, the minimum trench width shall provide clearance of four inches on each side of the bell of the pipe or fitting or six inches on each side of the pipe barrel, whichever is greater. Trenches shall be of such extra width, when required, to permit the convenient placing of timber supports, sheeting and bracing, and handling of special fittings. The Work shall be performed such that the existing utilities, asphalt curb and gutter, and existing pavement shall be protected at all times.

In excavating for water mains, the excavation shall at all times be finished to the required grade in advance of the pipeline, but unless otherwise permitted in writing by the Engineer, not more than 50 feet of trench shall be open at one time in advance of the pipe. At no time shall more than 200 feet of trench be opened and incompletely backfilled. At the end of each day, no more than 10 feet of trench may be left open, and access to all drives shall be restored.

This opening shall be surrounded by fencing and barricades or plated. The remainder of the trenching operation shall be available for safe vehicular and pedestrian traffic at all times.

It is essential that the discharge of the trench de-watering pumps be conducted to natural drainage channels, drains, or storm sewers. Engineer- approved soil erosion and sedimentation controls shall be installed and maintained at the point of discharge.

The length of street which may be occupied by the construction work at any one time shall be subject to the approval of the Engineer and will be based on the requirements of use of the street by the public.

6. Boring Pits

The means and methods of boring pit excavation and support, in whatever conditions encountered or created, shall be determined by the Contractor, subject to approval by the Engineer. All costs shall be included in the Contract Price per lineal foot of bored water main. Perform all excavations required for construction of pits, shafts, and other structures. Excavations shall include any and all materials encountered in the Work, such as topsoil, clay, sand, gravel, cinders, rocks, boulders, fill, old timber, buried trees and roots, abandoned utilities, abandoned foundations and structures, buried debris, or any combination of these, in whatever condition found.

Provide and maintain all sheeting, shoring, and bracing required in shafts and pits, and open cut excavations to ensure protection and safety of personnel and to protect adjacent structures, property and work in place. The Contractor shall be responsible for the complete design of all sheeting, shoring, and bracing work. The design shall be appropriate for the soil conditions, shall be of such strength, quality,

dimension and spacing as to prevent caving or loss of ground or squeezing within the neat lines of the excavation, and shall effectively restrain movement of the adjacent soil. Prior to installing the sheeting, shoring, or bracing, the Contractor shall submit plans for this work to the Engineer for informational purposes only. Sheeting, shoring, and bracing shall conform to the current federal or state regulations for safety.

Excavate as required to perform all boring work to the grades, lines and levels indicated on the Plans and as specified herein. Construct approach trenches, pits and shafts of sufficient length and width to accommodate the equipment being used, the pipe units to be placed and the manpower working. Locate the approach tunnel or working shaft or pit so that it will not unduly interfere with traffic or with the use of adjacent property.

Where required, control the infiltration of groundwater into the excavation. Use dewatering systems to lower the groundwater to below the bottom of the shaft or use other approved methods at no additional cost to the Owner.

Any relocations or removal and replacement of utilities, including gas mains, water mains, services, sewers, irrigation systems, signs, and other miscellaneous items required to construct shafts shall be incidental to the project unless otherwise specified.

Excavation under railroads shall conform to the requirements of the American Railroad Engineering Association (AREA) and the railroad corporation having jurisdiction.

7. Laying Pipe:

Each pipe shall be inspected for defects prior to being lowered into the trench. Inside of pipe and outside of spigot shall be cleaned of any earth or foreign matter.

Proper implements, tools, and facilities satisfactory to the Engineer shall be provided and used by the Contractor for the safe and convenient prosecution of the work. All pipe, fittings, valves, and hydrants shall be carefully lowered into the trench piece by piece by means of an excavator using chains, slings, or other suitable tools or equipment as recommended by the manufacturer, in such a manner as to prevent damage to them and their protective coatings and linings. Under no circumstances shall materials be dropped or dumped into the trench.

New water main construction shall not be connected into the existing system until it has been tested and accepted by the Engineer. The Contractor shall excavate for all bell holes and shall place the bell of the pipe in the excavated bell hole. Pipe shall be laid on the prepared trench bottom with the bell ends facing the direction of laying, unless otherwise directed by the Engineer.

The Contractor shall take every precaution to prevent foreign material from entering

the pipe while it is being placed in the line. During laying operations, no debris, tools, clothing, or other materials shall be placed in the pipe. At times when pipe laying is not in progress, the open ends of pipe shall be closed by a watertight plug. This provision shall apply during the noon hours as well as overnight. If water is in the trench, the seal shall remain in place until the trench is pumped completely dry.

Pipe shall be jointed as specified elsewhere herein. The pipe shall be secured in place with approved backfill material tamped under it except at the bells. Pipe and fittings which do not allow a sufficient and uniform space for joints shall be removed and replaced with pipe and fittings of proper dimensions to insure such uniform space. Precautions shall be taken to prevent dirt from entering the joint space.

All pipe shall be laid at the correct line and grade as indicated by the grade stakes and offset line. Each pipe, as laid, shall be checked by the Contractor to ensure that this result is obtained. The staking shall be provided by the Engineer. No pipe shall be laid until a cut sheet for that pipe has been approved by the Engineer. The grade as shown on the Plans is that of the top-of-pipe for water main; and the work must conform to this profile. For water main construction, a variation from the profile grade of two inches with ductile iron pipe, and three inches with reinforced concrete pipe, will be deemed sufficient reason to cause the work to be rejected and re-laid. Water main pipe alignment shall be maintained so as not to vary more than three inches from the correct line. Any pipe found out of line shall be re-laid properly by the Contractor.

Due to conditions in the field, changes to the proposed vertical and horizontal alignment of the proposed water main may become necessary. The Contractor shall, where directed by the Engineer, excavate up to 60 feet in advance of the pipe laying operation to expose existing underground facilities thereby enabling the Engineer to make alignment decisions. The Contractor is required to realign (re-lay) the water main up to 2 feet vertically and/or horizontally as directed by the Engineer at no extra cost to the project. The excavation in advance of the pipe laying is intended to help eliminate the need for re-laying pipe.

8. Crossing Existing Structures and Facilities:

During the construction it may be necessary to cross under or over certain sewers, drains, culverts, water lines, gas lines, electric lines, fiber optic communication, telecommunication, and other types of underground structures or facilities, known or unknown. The Contractor shall make every effort to prevent damage to such underground structures and facilities. The Contractor shall not intentionally damage or break existing structures or facilities and repair them in order to expedite the water main installation process.

Wherever such structures or facilities may inadvertently be disturbed or broken, they shall be restored to a condition that is equal to, or better than, that was encountered prior to the damage. All damaged structures and/or facilities shall be made fully acceptable to the owner and the City, at the Contractor's expense. All

crossings shall be made with a minimum of twelve inches of vertical clearance between or alongside existing structures or facilities.

9. Cutting Pipe:

   Cutting cast iron or ductile iron pipe for inserting valves, fittings, or closure pieces shall be performed in a neat and workmanlike manner without damage to the pipe or cement lining and so as to leave a smooth end at right angles to the longitudinal axis. Where the type of pipe joint in use is such that it employs push-on assembly to affect the joint seal, the outside of the cut end shall be tapered back 1/8 inch with a coarse file or a portable grinder at an angle of about 30 degrees. The tapering must remove all sharp and/or rough edges which might injure the gasket.

   The flame cutting of pipe will not be allowed. Reinforced concrete water main pipe shall not be cut.

10. Setting Water Main Fittings and Accessories:

    Valves, fittings, plugs, hydrants, etc. shall be set and joined to pipe in the manner specified in the Section entitled “Making Joints.”

    Hydrants shall be located as shown on the Plans or as directed by the Engineer in such a manner as to provide complete accessibility and minimize the possibility of damage from vehicles or injury to pedestrians.

    Hydrants shall be set to stand plumb with their nozzles parallel to the street and the pumper nozzle facing the street. Hydrants shall be set with pumper nozzles between 18 and 24 inches above finished grade, or as directed in writing by the Engineer.

11. Making Joints:

    Mechanical means shall be used for pulling home all rubber-gasket pipes regardless of trench condition where manual means will not result in pushing and holding the pipe home. When a trench box or liner is used, a cable shall be used to pull the joints home and hold them in position.

    Where work is performed in wet trenches or trenches with running sand, the Contractor shall provide and use mechanical means for pulling the pipe home in making up the joint and for holding the pipe joints tight until completion of the line. Mechanical means shall consist of a cable placed inside or outside of the pipe with a suitable winch, jack, or come along for pulling the pipe home and holding the pipe in position.

    Where not required by these Specifications, manual means will be acceptable only if the joints can be pushed home and held.

12. Anchorage for Water Main Fittings and Accessories:

All plugs, caps, tees, hydrants, and bends shall be provided with MDOT Grade S2 concrete meeting the requirements of Section 701 of the 2012 MDOT Standard Specifications for Construction reaction backing (thrust block) as shown on the Plans or specified herein. Valves shall be restrained from movement at adjacent sleeves by the use of a closure piece, or thrust ring (full size pipe section cut to fill the gap inside the sleeve to within 1/4") as specified herein.

Reaction backing shall be placed between unexcavated solid ground and the fitting to be anchored. The area of bearing on the pipe and on the ground in each instance shall be that shown on the details or directed by the Engineer. The reaction backing shall, unless otherwise shown or directed, be so placed that the pipe and fitting joints will be accessible for repairs. This shall include adequate protection of any bolts from direct contact with the concrete.

Metal harnesses of tie rods or clamps may not be used instead of concrete reaction backing. Mega-Lug joint restraint systems and restrained, push-on joint, pipe shall be used where connections to existing lines require immediate pressurization, as specified herein.

In the event that the Engineer determines a change in the anchorage or design is required due to unsuitable earth conditions, changes may be ordered by the Engineer.

The use of friction clamps or set-screw type retainer glands for thrust restraint will not be allowed.

13. Casing Pipe Installation

Casing pipe I.D. shall be a minimum of 6-inches larger than the largest O.D. of the water main pipe. Larger diameter casing pipes shall be required where so noted on the plans. Place pipe to the lines and grades indicated on the Plans. Use care to not damage pipe, joints, or joint material.

Perform boring or auguring excavation by excavating an opening larger than the outside diameter of the pipe to be installed. The diameter of the excavation shall not exceed the outside diameter of the casing pipe by more than 1-inch. Employ grouting or other methods approved by the Engineer to fill voids within 48 hours of completing the bore.

14. Abandonment or Removal of Water Main:

The Contractor shall abandon or remove water main(s) where shown on the Plans. All work shall be performed in accordance with the Detailed Specification entitled “Water Main Abandonment.”

15. Water Main Testing:

The water main shall be disinfected and tested by the Contractor in the presence of the Engineer in accordance with the requirements below. The Contractor shall furnish all piping, pumps, hoses, gauges, and other materials and equipment required to carry out the tests using water from the City's water mains. All chlorinated water shall be discharged directly to the sanitary sewer and will not be allowed to be discharged to the ground or any surrounding water course. Any hoses which are needed to direct water from blow-offs and/or hydrants during water main testing and flushing shall be supplied by the Contractor. The City shall furnish and install one inch corporation stops at all necessary locations, at the expense of the Contractor. The tapping of water mains, the installation of all corporation stops, and the operation of valves and hydrants is reserved for City personnel. The Contractor is required to assist in valve and hydrant operation, however. The Contractor shall give the City forty-eight hours prior written notice of intent and desire to test water mains.

16. Bacteriological Testing Sequences:

In the case of all water mains connected to existing facilities, flushing, chlorination and bacteriological testing must precede pressure testing. Where mains can be totally isolated from existing facilities with air gaps or double valves, pressure testing may precede chlorination and bacteriological testing. The normal sequence and time requirements for testing are:

Isolated (Gapped) Water Main	Connected Water Main
1. Fill Main	1. Flush and Swab*
2. Pressure Test	2. Chlorinate
3. Connect One End of Main	3. Wait; 24 hours
4. Flush and Swab*	4. Flush**
5. Chlorinate	5. Wait; 24 hours
6. Wait; 24 hours	6. Bacteriological Samples
7. Flush**	7. Wait; 24 hours
8. Wait; 24 hours	8. Bacteriological Samples
9. Bacteriological Samples	9. Wait; 48 hours
10.Wait; 24 hours	10. Pressure Test (If both sets of Bacteriological samples pass)
11.Bacteriological Samples	11. Flush
12. Wait; 48 hours	12. Wait; 24 hours
13. Make Final Connection(s) – Place in Service (If both sets of bacteriological samples pass)	13. Bacteriological Samples
	14. Wait; 24 hours
	15. Bacteriological Samples

	16. Wait; 48 hours
	17. Place in Service (If both sets of bacteriological samples pass)

*Collect flush water in operable storm water retention/detention facility.
**Discharge flush water into approved sanitary sewer.

The Contractor shall not connect any end of a newly constructed water main to an existing, in-service, water main, until the newly constructed water main passes the hydrostatic test, unless approved in writing by the Engineer.

17. Hydrostatic (Pressure Test):

Insofar as is practical, mains shall be pressure tested between valves. The maximum length of water main to be tested in any one test shall be 1500 feet. The section of main to be tested shall be slowly filled with potable water and the entrained air within the pipe removed or absorbed and pumped up to a pressure of 150 psi (or other pressure if specified) and the test period shall start immediately thereafter. The lines shall then be maintained under a test pressure of 145-155 psi for a continuous period of three hours by pumping chlorinated (25 ppm) water into the line at frequent intervals. The volume of water so added shall be measured and considered to represent the leakage from the line under test during the interval. Visible leaks shall be repaired regardless of test results. The leakage under the conditions of the test shall not exceed the values shown in the table below. If one side of a double disc gate valve is under test pressure, that seat shall count as four joints.

Maximum Allowable Leakage per 100 Joints at 150 psi Avg. Test Pressure

Pipe Diameter (Inches)	4	6	8	10	12	16	20	24	30	36
Leakage (gallons/hr)	0.66	0.99	1.32	1.66	1.99	2.65	3.30	3.97	4.97	5.96

In the event that the leakage exceeds the maximum allowable leakage as specified above, the joints in the line shall be carefully inspected for leaks and repaired where necessary. Any pipes or fittings found to be leaking shall be removed and replaced with new pieces by the Contractor. After this work has been performed, all tests shall be repeated.

18. Flushing and Swabbing:

The Contractor shall flush the water main after making a connection to the existing City water main where a valve separates the new water main from the existing main. As a result, flushing will be accomplished using flow through the full size of

the new water main. If a storm water retention/detention facility is to be constructed as part of the project, this facility is to be completed, stabilized, operable, and utilized for the collection of the flushing water. All pipe, materials, and appurtenances which will come into contact with potable City water after the restoration of water service following the connection shall be disinfected with a strong chlorine solution prior to installation.

Water main shall be cleaned using a high-density poly-pig, Girard Aqua Swab (2 lbs/ft3 density) swab, or Engineer approved equal and flushed. The diameter of the blow-off pipes shall be at least 50% of the diameter of the pipe being flushed. Hydrants, with internal components removed, may serve as blow-offs for mains 12 inches and less. The Contractor shall provide details, for the review and approval of the Engineer, for the various required blow-offs. Blow-off pipes, discharge hoses, where needed, and associated costs shall be included in the cost of the permanent water main being installed and will not be paid for separately. If there are no branch connections to be swabbed, the poly-pig shall be inserted in the new water main at the time of connection described above.

The poly-pig shall be located on the "downstream" or new side of the separation valve. The poly-pig shall then be forced through the new water main during the first flush and discharged through a construction blow-off of sufficient size to allow passage of the poly-pig. For water mains with branch connections, a launching tee or wye shall be installed as shown in the details, for launching multiple poly-pigs. The main line and each branch main shall be flushed and swabbed individually. Following the successful final bacteriological testing of the water main, the launching tee/wye shall be permanently capped at its branch.

During the flushing and swabbing of a water main, the discharge point for the main shall be left open, with all other discharge points closed, to direct the poly-pig completely through the main being swabbed to its point of termination. Following the initial swabbing of water main, the separation valve shall be closed, and then the discharge point closed. If a branch water main is to be swabbed, the poly-pig is then to be placed in the launcher; the discharge point for the branch water main is to be opened; the poly-pig is to be inserted into the water main; the separation valve partially opened and the branch water main flushed and swabbed.

Following the swabbing of the water main(s), the water main(s) are to be flushed as required. If approved or directed by the Engineer, the water main(s) may be flushed overnight, provided that proper controls (i.e. hoses directed into storm structures, etc.) are installed to direct and control the flushing water.

19. Chlorination:

After the water mains to be tested have been acceptably flushed, they shall be disinfected in accordance with AWWA C651 "Disinfecting Water Mains" and these Specifications. All new mains and fittings, and any existing mains contaminated by the Contractor, shall be chlorinated to a minimum residual of fifty (50) parts per

million (ppm) with commercial liquid chlorine solution (sodium hypochlorite - pool type). Other forms of chlorination and disinfection methods of water mains may be presented by the Contractor and shall receive prior approval in writing by the Engineer before being used. The minimum recommended dosage of sodium hypochlorite is as follows (based on 10% available chlorine):

Recommended Minimum Chlorine Dosage to Disinfect 100 L.F. of Pipe

Pipe Diameter (inches)	10% Chlorine Solution (gallon)
6	0.153
8	0.272
10	0.426
12	0.613
16	1.090
20	1.703
24	2.452

The chlorinated water shall remain in the mains for a minimum of 24 hours, at the end of which period the chlorinated water at all parts of the main must show free available chlorine residual of at least twenty-five (25) ppm. If less than 25 ppm residual is shown at the end of the first 24-hour period, additional chlorine shall be added until a residual of not less than 25 ppm at all parts of the system is shown after a subsequent 24-hour period. The chlorinated water shall then be removed from the mains and disposed of into an existing, approved City sanitary sewer main, or other location approved in writing by the Engineer. All chlorinated water shall be discharged directly to the sanitary sewer and will not be allowed to be discharged to the ground or any surrounding water course. The mains shall then be left full of water ready for bacteriological testing.

20. Bacteriological Testing:

The City will obtain bacteriological samples of the water in the mains for analysis from testing blow-offs, corporations, or other sampling points as determined acceptable by the City. Samples will be taken after the mains have been satisfactorily chlorinated in accordance with these Specifications, the chlorinated water flushed out and removed, and the mains filled with potable water. The water samples will only be bacteriologically tested at the City's Water Treatment Plant Laboratory; the use of other laboratories or testing locations shall not be allowed or deemed to provide satisfactory test results by the City of Ann Arbor under any circumstance. No samples will be deemed acceptable until they meet all city requirements. If the newly constructed water main is connected at one end to an in-service section of the City water main, and the chlorination precedes pressure testing, the City will also take samples after satisfactory pressure testing. In each

case, two sets of samples shall be taken; a period of 24 hours must elapse between flushing of the main and drawing of the first samples, with the second samples being drawn 24 hours after the first samples were drawn. For each sample, a minimum of 48 hours is required to obtain test results. All samples must pass the bacteriological test.

The Contractor shall plan for these testing sequences and durations in his construction schedule. Contract time will continue during all water main testing phases, regardless of duration.

e. Construction, General Requirements

Coordination with the City of Ann Arbor Field Operations Unit for the installation of 1-inch corporations in the gate wells to be used for water main testing and/or filling of new main.

The Contractor must have all materials, fittings, pumps and other miscellaneous equipment, and personnel on-site before the City of Ann Arbor Public Services personnel will prepare and shutdown and existing main.

The bedding and backfill for Trench Detail IA (under roadbed), Modified, shall be MDOT Granular Material, Class II compacted to 95% of its maximum dry density in maximum lifts of 12 inches. The bedding and backfill for Trench Detail V (within 1:1 influence of the roadbed or curb and gutter), Modified, to a point 12 inches above the top of pipe, shall be MDOT Class II sand compacted to 95% of its maximum dry density. The material above this point shall be Engineer-approved native material compacted to 90% of its maximum dry density.

The Contractor shall dig-up and expose all utility crossings prior to laying any water main pipe. This will allow the Engineer to adjust the grade of the water main, if possible, to avoid the existing utilities. The costs of the ‘dig-ups”, and all related costs, shall be included in the respective items of work in this Detailed Specification. Some “dig-ups” may need to occur out of Phase.

Should the water main, or other pay items in this Detailed Specification, conflict with abandoned sewers or water mains, the conflicting section of the abandoned sewer or water main shall be removed, and the remaining sections shall be (re)abandoned in accordance the Detailed Specification for “Water Main and Appurtenances, Abandon” and the Detailed Specification for “Sewer, Any Size or Depth, Abandon,” except that flow filling the sewer will not be required. All the work shall be included in the cost of the water main, or other pay items in this Detailed Specification.

f. Excavate and Backfill for Water Service Tap and Lead

This work shall consist of exposing new water mains and excavating and backfilling a

trench from the water main as directed by the Engineer for the purpose of transferring existing water services to new water mains or replacing existing water services as necessary.

The trench is to be excavated to the applicable MIOSHA standards for the purposes of transferring water services, installing water service taps, leads, and curb stops and boxes. The City will furnish all labor and materials for taps, leads, and curb stops and boxes. The Contractor will not be entitled to extra compensation due to delays caused by City of Ann Arbor personnel in performing work on the project. The Contractor shall be responsible for all coordination with the City of Ann Arbor – Field Operations personnel for the scheduling and execution of the work.

Granular Material, Class II bedding (3 inch) and backfill material shall be placed in lifts not to exceed 12 inches and compacted to a minimum of 95% of its maximum dry density as measured by the AASHTO T-180 test.

g. Lighting Requirements for Nighttime Water Main Work

Night work shall be lighted to an average intensity of 10 foot-candles minimum. Sufficient light sources shall be provided to achieve this illumination requirement. The lighting scheme shall be submitted to the Engineer for review and approval a minimum of 72 hours prior to the anticipated commencement of the nighttime work. Nighttime work will not be allowed to begin until such time as the lighting scheme has been approved by the Engineer.

The lighting shall allow the inspector to clearly see and inspect all work operations. Light sources shall be adjusted as directed by the Engineer, as many times as needed, in order to meet the requirement.

Lighting systems may be fixed, portable, or equipment mounted. A power source shall be supplied with sufficient capacity to operate the lighting system. The power source shall not violate any local noise ordinance requirements. The lighting system(s) shall be arranged such that they do not interfere with the vision of motorists, glare or shine in the eyes of oncoming drivers, or unnecessarily illuminate surrounding properties or residences. After initial set-up, drive through and observe the lighted area from each direction on the roadway. Adjust lighting units as many times as needed in order to comply with these requirements.

h. Sequence of Construction

All water main construction shall be completed in accordance with the Detailed Specification entitled “Maintaining Traffic and Construction Sequencing” and as detailed herein. The Contractor shall schedule and coordinate all water main shutdowns with the Engineer. The Contractor shall submit for the Engineer’s review and approval the sequence of all water main “shutdowns” and tie-ins such that disruption in service to existing properties is minimized to the greatest extent possible.

Should the Engineer not accept the Contractor's proposed construction sequence, it shall not be a basis of claim for extension of contract time or additional compensation.

All water main and appurtenances shall be pressure tested, cleaned, disinfected and bacteriological tested in accordance with the specifications outlined within this Detailed Specification.

After acceptance of each section of new main the Contractor shall begin coordination with the City of Ann Arbor Public Services Area for the reconnection of water services.

i. Measurement and Payment

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

Contract Item (Pay Item)	**Pay Unit**
__ Inch CL-52, D.I.P. w/ Polywrap, Trench Detail __	Feet
___" ___◦ Bend	Each
___" x___" Reducer	Each
__" x __" Cross	Each
__" x __" x __" Tee	Each
Fire Hydrant Assembly	Each
__" Gate Valve-in Box	Each
__" Gate Valve-in Well	Each
__" Tapping Sleeve, Valve-in Box	Each
__" Tapping Sleeve, Valve-in Well	Each
Excavate & Backfill for Water Service Tap and Lead	Feet
Sacrificial Anode __ lb	Each

All work shall be paid in full at the contract unit prices which shall include all labor, materials and equipment required including all required costs associated with night time work, supplemental lighting, and all other required elements of the work.

Water main pipe per lineal foot includes restrained joints, where called for on the plans. Water main in bored steel casing includes all excavation, boring pits, sheeting, shoring, bracing, backfilling, casing pipe and water main in casing.

Fittings other than those specifically listed as separate contract items, blow-off assemblies, sleeves, hoses, and restrained joint pipe and gaskets, special gaskets, and the like, shall not be paid for separately, but shall be considered included in the payment for __ Inch CL-52, D.I.P. w/ Polywrap, Trench Detail __. Crosses, tees and other fittings specifically listed as separate contract items (pay items), shall be paid for at the contract unit price for each unit installed.

Gate Valve-in-Box includes the Valve Box and cover. Valve Box Extensions will only be paid for if they are required by the plans and they are not required due to the Contractor's operations.

"Excavate and Backfill for Water Service Tap and Lead" shall be paid for per each trench excavated in total at the location where the new and existing water services are to be reconnected. The Contractor shall be aware that the plan quantities are estimates only. The actual amount of excavation and backfill may be significantly more or less based on actual field conditions. Price adjustments based upon Section 103.02.B shall not apply to this item of work.

"Sacrificial Anode, _lb" shall include excavation, thermite welding anode lead to existing watermain, and backfilling excavation as specified.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
WATER MAIN ABANDONMENT

BMS 1 of 2 3/15/23

Description

This work shall include abandoning or removing existing water mains, valve, valve wells, valve boxes, and fire hydrant assemblies of various sizes as required by the Plans. All work shall be performed in accordance with the project plans, as detailed in this specification, and as directed by the Engineer.

Materials

All materials shall meet the requirements specified in Division 9 of the 2020 MDOT Standard Specifications for Construction.

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 each end and plugging the abandoned main at its end(s) with brick and mortar, concrete, or mechanical joint plug.

The Contractor shall remove water mains where shown on the Plans and as directed by the Engineer. This includes, but is not limited to, cutting the main to be removed on both ends, completely removing, and properly disposing of the water main, thrust block, and appurtenances off-site. Plugging the abandoned main is included in Water Main Pipe, Abandon.

Any resulting hole or trench shall be backfilled with Granular Material, Class II, in maximum lifts of 12 inches, and be compacted to 95% of its maximum dry density, if located within the public rights-of-way, railroad rights-of-way, or within the influence of paved surfaces or structures. Applicable road pavement cross-section shall be installed per plans and as directed by the Engineer. Otherwise, backfill shall be Engineer approved native material, compacted to 90% of its maximum dry density, in lifts of 12 inches or less, unless otherwise noted on the plans.

Work to be completed on the live mains is shown on the Plans and paid for separately.

Valve wells and valve boxes shall be abandoned per the City of Ann Arbor standard where shown on the Plans and as directed by the Engineer. This includes, but is not limited to, breaking down any manholes (remove manhole ring and cover and the top 4 feet of manhole structure, breaking out the manhole base, and backfilling as specified herein), removing the top 4 feet of any valve boxes and backfilling with Granular Material, Class II.

In locations as shown on the Plans or where abandoned water main, valves or valve wells are within 30 inches of the proposed subgrade, the pipe, valves or valve wells shall be removed completely. The resulting hole or trench shall be backfilled as specified herein.

Fire Hydrant Assembly removal consists of complete removal of the existing fire hydrant, pipe, and companion valve, including excavation; pipe cutting; thrust block removal; pipe plug; thrust block; the furnishing, placing, and compacting of approved granular backfill material.

As directed by the Engineer, salvaged valves, valve operating nuts, fire hydrant assemblies and structure covers shall be delivered to the City of Ann Arbor Public Works Unit located at the W.R. Wheeler Service Center at 4251 Stone School Road, Ann Arbor, MI 48108 within two days of their removal. Materials not delivered to Wheeler, valve boxes, and wells shall be disposed of at the contractor's sole expense.

Measurement and Payment

The unit price for this item of work shall include all labor, material, and equipment costs to perform all the work specified in the Standard Specifications and as modified by this Detailed Specification.

Contract Item (Pay Item)	Pay Unit
Water Main Pipe Abandonment	LS
Water Main, Remove	Foot
Gate Valve-in-Box Abandonment	Each
Gate Valve-in-Well Abandonment	Each
Fire Hydrant Assembly, Remove	Each

The unit prices for these items of work shall include all labor, material, and equipment costs to perform all the work specified in the Standard Specifications and as modified by this Detailed Specification.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
LINE STOPS

Description

The Contractor shall furnish all materials, labor and equipment to properly install and set water main line stops into the existing Ductile Iron Main(s) at the locations as shown on the plans and as directed by the Engineer. All work shall be performed in accordance with the requirements as detailed herein.

The existing mains, upstream and downstream of the proposed line stop(s) cannot be shut down or taken out of service. To ensure that the entire operation shall be accomplished without interruption of service or flow, the installation shall be accomplished by Contractor personnel skilled and experienced in the procedures specific to line stops of the required size(s).

The work shall include, but not be limited to; pavement saw-cutting; excavation and disposal of excavated material; the furnishing, installation, and removal of sheeting and/or shoring where needed; the furnishing, placement and compaction of approved bedding and backfill materials; furnishing and placing suitable, clean, gravel to create a stable working surface at the bottom of the excavation; de-watering; pipe cleaning, measuring, and performing all advance work necessary to prepare for the performance of the line stop; nighttime lighting as required; the removal of all materials and equipment associated with the work when no longer needed; and backfill, restoration and compaction of subgrade.

This work shall also include all traffic maintenance and control items in accordance with the Michigan Manual of Uniform Traffic Control Devices.

Materials

Bedding and backfill for areas contained within a segment of water main designated as Trench Detail I (under roadbed), Modified, shall be Granular Material, Class II, meeting the requirements of Section 902 of the 2020 MDOT Standard Specifications for Construction. For work within a segment of water main designated as Trench Detail V (outside of the 1:1 influence line of roadbed or curb and gutter), Modified, Granular Material, Class II and Engineer approved native material, placed in accordance with the trench details, shall be used.

The Contractor shall submit to the Engineer two (2) sets of drawings, furnished by manufacturers, fully and distinctly illustrated and describing the Line Stop fittings proposed to be furnished. Work shall not commence until such time as the drawings have been reviewed and accepted by the Engineer.

Line Stop Fittings shall be full encirclement, pressure retention type split tee. It shall consist of two steel weldments; an upper line stop flange saddle plate and a lower saddle plate. These two saddle plates shall be contiguous.

Line Stop Flange: The outlet of each fitting shall be machined from a 150 lb. forged steel flange (ASTM A181 or A105) or from pressure vessel quality steel plate (ASTM A285, Grade C); flat faced and drilled per ANSI B16.5). Suitable independently operated locking devices shall be provided in the periphery of the flange to secure the completion plug.

Line stop Nozzle: The nozzle, which lies between the saddle and the flange shall be fabricated from steel pipe (ASTM A234). After welding and stress relief, the nozzle shall be accurately bored as follows to accommodate the Line stop plugging head:

a) Machine an internal circular shoulder to seal against the circumferential gasket carried on the plugging head.

Completion Plug: The completion plug shall be machined from a stress relieved carbon steel weldment. It shall contain two (2) circumferential grooves: one to receive the locking devices from the Line stop flange, and the second to contain a compressible "O" ring to seal pressure tight against the bore of the flange.

Blind Flange: Each Line stop fitting shall be closed with a blind flange. Facing and drilling of the blind flange shall be compatible with that of the Line stop flange. Minimum blind flange thickness shall be that of AWWA Spec. 207, Class D.

Saddle Alignment Marking: Each saddle-half shall be matched and marked with serial numbers, to insure proper alignment in the field.

Fasteners: All bolts, studs, and nuts used on Line stop, drain/equalization fittings, blind flange, and other elements that shall remain upon completion of the work shall be stainless steel and meet the requirements of ASTM F 593.

General: Manufacturer will exercise extreme care to ensure that weldments are of adequate strength, properly shaped, securely reinforced, and free from distortion that could stress the ductile iron main during installation, pressure tapping, or Line stopping operations. All steel shall meet the requirements of ASTM A36, as a minimum. All weldments shall be braced and stress relieved.

Gaskets: Shall be molded from elastomer compounds that resist compression setting and are compatible with water in the 32 to 140 deg. F temperature range.

Upper Line stop Flange Saddle: Shall consist of a saddle plate, a Line stop flange, and a Line Stop nozzle. The interior of the saddle plate, adjacent to and concentric with the O.D. of the nozzle, shall be grooved to retain a gasket which shall seal the saddle plate to the exterior of the ductile iron main. This gasket shall constitute the only seal between the main and the fitting. The flange saddle shall also meet the following requirements:

a) Saddle plate shall be of a minimum of 0.375" in thickness. It shall be shaped to be concentric to the outside of the ductile iron main. The smallest I.D. of the saddle and its interior rings shall exceed the O.D. of the main by a minimum of 0.250" to allow for ovality of the main;
b) Line stop nozzle of 0.375" min. wall thickness shall be securely welded to the saddle plate;
c) The Line Stop flange shall be securely welded to the nozzle. After welding, the assembly shall be braced, stress relieved, and bored to receive the completion

plug and the circumferential gasket of the Line Stop machine plugging head; and,

d) Bolt, nut of stud, nut, and washer assemblies shall be furnished to draw the upper and lower saddles together for sealing. Bolting brackets shall be gusseted.

Lower Saddle Plate: Saddle plate shall be of a minimum 0.375" thickness and shall be shaped to be concentric to the outside brackets shall match upper half.

Equipment

The equipment shall consist of a cylindrical plugging head that contains a flat, expandable elastomer sealing element. The plugging head shall be advanced into and retracted from the main by means of a linear actuator. When retracted, the plugging head and carrier are housed in an adapter, bolted pressure tight between the tapping valve and the actuator.

Sealing Element: The element shall be monolithically molded from a suitable polyurethane compound. The element shall be flat in a plane perpendicular to the flow in the main. Minimum thickness of the element shall be 4". The bottom of the element shall be semi-circular to conform to the bore of the main.

Drilling equipment: Shall be in good working condition, equipped with power drive to ensure smooth cutting, and to minimize shock and vibration. Cutting equipment shall be carbide tipped and capable of being replaced without removal from the jobsite.

Plugging Head: The diameter of the cylindrical plugging head shall be slightly smaller than the bore of the Line Stop nozzle. The plugging head shall have a suitable circumferential gasket to seal against the shoulder in the Line stop nozzle. This gasket shall also seal against the sealing element to prevent bypass flow around the Line stop.

Deposits in Bore of Main: The semi-cylindrical bottom of the plugging head shall be designed to break and dislodge tuberculation and other deposits in the bore of the main which might interfere with a satisfactory Line stop.

Method of Construction

Installation of proposed line stops mains will require work in close proximity to existing utilities. This must be taken into consideration when the contractor determines the required trench safety requirements. The line stop location(s) shall be identified by the contractor, subject to approval by the Engineer.

All excavation shall conform to MIOSHA Standards; the Contractor is solely responsible for determining all excavation and trench safety requirements.

If necessary, The City will reduce the pressure to 100 psig or less for the duration of the installations. The entire operation of installing the line stop shall be accomplished without

reduction of water pressure in the main(s) below 100 psig. It shall be the responsibility of the Contractor to verify pressure prior to commencing the installation.

Preliminary Field Inspection of Water Main:

Dimensional, specification, and other data regarding the existing mains have been taken from existing records. This information may be inaccurate, out of date, and/or inadequate. The data have not been verified by field inspections. Further, the water main consists of ductile iron pipe which may contain dimensional and structural flaws. In addition, the Contractor shall anticipate that exterior main conditions, bells, service connections, or presence of adjoining utilities may require relocation of proposed line stop. Prior to proceeding with the installation of any line stop, it is necessary to know the exact main outside diameter of the water main, if it has any ovality, and the internal diameter of the pipe before line stop fittings and plugging head sealing elements can be manufactured and/or ordered.

Prior to ordering material, Contractor shall excavate at each proposed location and carefully measure the outside diameter of the water main with calipers along at least four (4) locations to determine ovality and the critical outside diameter of the water main. The Contractor shall determine main wall thickness, uniformity, and structural integrity by means of ultrasonic testing. Data shall be taken to determine extent of internal deposits, tuberculation, etc.

If the Engineer determines that Contractor's data are not adequate, the Engineer may direct Contractor to make one or more pressure taps on main to obtain test pipe coupons for the Engineer's evaluation. The minimum size of the test coupon shall be 5" diameter, drilled through a nominal 6" valve. Pressure tapping saddles and other materials used for inspection taps shall conform to the requirements of this Special Provision. The Contractor shall anticipate that heavy interior corrosion and/or tuberculation exists within the water main.

If, in Engineer's opinion, the proposed location is unsatisfactory based on measurements of the existing pipe at the locations of the proposed line stops, the Engineer will direct excavation at another site. Excavating, de-watering, inspections, backfill, and restoration will be paid for separately in accordance with the applicable contract unit prices or Section 109.05.C and 109.05.D of the 2020 MDOT Standard Specifications for Construction whichever the Engineer deems most appropriate.

Because of possible internal corrosion and deposits in existing water mains, a "bottle- tight" shut down may not occur. A satisfactory shutdown which allows the work to be accomplished (i.e. valve replacement, water main tie-in, etc.) using drainage pumps to de- water excavations, with workmen wearing boots and raingear, if necessary, must be obtained. The Contractor will not be allowed to proceed with further work until an acceptable shutdown is achieved. The Contractor shall be aware that this may require the halting of work and re-scheduling of all work operations.

Contractor shall power wire brush and grind the exterior of the water main to remove any debris, corrosion deposits, or other surface irregularities that might interfere with proper seating and sealing of each line stop fitting against each main. Any structural defects in the water main, service connections, appurtenances, adjacent utilities, etc., that could interfere with the line stop installation shall be immediately reported to Engineer.

All line stop fittings and appurtenances shall be cleaned and disinfected in accordance with the current City of Ann Arbor Public Services Area Standard Specifications prior to bolting any of the line stop fittings in place or commencing any pipe cutting.

Contractor shall fit upper and lower saddle plate assemblies to main, thoroughly checking for proper fit to main. Under no circumstances shall Contractor attempt to force, reshape, or bend saddle plates by excessive tightening of saddle studs while the line stop fitting is assembled around the main. Any required retrofitting shall be accomplished with the fitting removed from the main. Any damage to fitting, accessories, or main shall be repaired at Contractor's expense to the satisfaction of Engineer.

Upper and Lower saddle halves shall be drawn together by bolt assemblies and the Saddle plates shall be bolted together in the horizontal position.

All line stop work shall be performed in accordance with the equipment manufacturers approved work procedures and installation guidelines.

Final closure of the water main shall be accomplished by insertion of a manufacturer- approved completion plug. The Contractor shall test the completion plug sealing through the use of a bleed off assembly in the machine housing.

The Contractor shall remove the temporary valve and the installation of a blind flange shall be completed.

The Contractor shall place polyethylene encasement meeting the requirements of the City of Ann Arbor Standard Specifications for Construction around the upper and lower saddle halves, the blind flange, and to a point at least 1 foot on either side of the saddle halves. All polyethylene encasement shall be securely taped to the water main such that water entry is minimized to the greatest extent possible.

Lighting Requirements for Nighttime Water Main Work:

Night work shall be lighted to an average intensity of 108 lux minimum. Sufficient light sources shall be provided to achieve this illumination requirement. The lighting scheme shall be submitted to the Engineer for review and approval. Nighttime water main work will not be allowed to begin until such time as the lighting scheme has been approved by the Engineer.

The lighting shall allow the inspector to clearly see and inspect all work operations, including pipe, fitting, and valve installations, disinfection of the pipe, pipe cleaning, and all other night work.

Lighting systems may be fixed, portable, or equipment mounted. A power source shall be supplied with sufficient capacity to operate the lighting system. The lighting system(s) shall be arranged such that they do not interfere with the vision of motorists or unnecessarily illuminate surrounding properties or residences.

Measurement and Payment

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

Contract Item (Pay Item)	Pay Unit
Temporary Water Main Line Stop, Additional Rental Day	Each
Temporary Water Main Line Stop, 8-inch or Less	Each
Temporary Water Main Line Stop, 10-inch or 12-inch	Each
Temporary Water Main Line Stop, ___ inch	Each

All work shall be paid in full at the contract unit prices which shall include all the labor, materials, and equipment required to perform the work as detailed herein. This shall also include all required costs associated with night time work, supplemental lighting, and all other required elements of the work, including all traffic maintenance and control.

“Additional Rental Day” will be paid for each day after the first installation and day of use of a temporary water main line stop, regardless of size, until, in the opinion of the Engineer, the line stop is no longer needed.

Pavement removal, aggregate base course, bituminous pavement, and traffic control items as necessary to construct the line stop (as determined by the Engineer), shall be paid for separately as specified elsewhere; all other items shall be included in the pay item for the line stop.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
HMA PAVEMENT REMOVAL

Description

This work shall consist of cold milling and/or pavement removal as shown on the plans and as directed by Engineer, in accordance with Sections 204 and 501 of the 2020 MDOT Standard Specifications for Construction, and the City of Ann Arbor Public Services Department Standard Specifications, except as modified herein.

Construction

Prior to the start of work, the Engineer and Contractor together shall identify, and field measure all items to be cold milled and/or removed. The Engineer shall approve of all limits prior to any work being performed by the Contractor.

The Contractor shall saw-cut and remove pavement as shown on the Plans, as marked in the field, and as directed by the Engineer.

The removal of HMA pavement from around manholes, structures, and utility covers, and the removal of bituminous curbing, bituminous driveway wedges, bituminous surface on existing curb and gutter, and bituminous surfaces around other miscellaneous unremoved areas shall be paid for as “HMA Pavement Removal, Any Depth.”

If concrete or masonry pavements are encountered beneath the HMA surface being removed, the Engineer will measure each type of additionally encountered pavement at the unit price for the associated type of pavement removal.

Bricks/masonry units, if present, shall be removed, salvaged, and neatly stacked/stockpiled by the Contractor, and later delivered by the Contractor to a City owned facility as directed by the Engineer.

The Contractor shall remove and properly dispose of all excavated material and debris, including all asphalt and concrete. The Contractor shall not stockpile excavated materials overnight on, or adjacent to, the site.

Subbase or subgrade materials removed without authorization by the Engineer shall be replaced and compacted by the Contractor at the Contractor's expense, with materials specified by the Engineer.

In areas where pavement removal is to be performed adjacent to existing pavement that is to remain in place, the pavement shall be saw-cut prior to removal. Backhoe teeth, jackhammers equipped with spike points, milling machines, and backhoe mounted wheel cutters shall not be used.

Damage to adjacent pavement, pavement base, subbase, curb, curb and gutter, sidewalk, utility structures, or other site features, due to removal operations shall be repaired by the Contractor, at the Contractor's expense, as directed by the Engineer.

The Engineer may direct aggregate base materials to be either removed from or added to the job-site, to properly complete the work. Where the Engineer directs the addition of such materials, they shall be paid for as the Item of Work: "21AA Limestone, C.I.P" or "Class II Granular Material, C.I.P." Where the Engineer directs such materials to be removed, it will paid with "Subgrade Undercutting."

Excavated/removal areas shall be adequately protected with barricades or fencing at all times.

The Contractor shall remove the full depth of the pavement unless otherwise shown on the plans or directed by the Engineer.

The Contractor shall construct butt-joints, and trim butt-joints just prior to HMA paving as shown on the Plans, and as directed by the Engineer.

At various times throughout the work, the Engineer may direct the Contractor to use smaller and/or lighter equipment, and to defer certain work tasks, in order to protect the grade and/or adjacent areas. The Contractor shall not be entitled to any additional compensation for the use of smaller equipment, lighter equipment, or work task deferral.

Measurement and Payment

The completed work, as described, will be measured, and paid for at the respective Contract unit prices for the following respective pay items:

Contract Item (Pay Item)	Pay Unit
HMA Pavement Removal, Any Depth	Square Yard
Cold Milling, __ inches	Square Yard

All saw-cutting required for removals shall be included in the appropriate item of work and will not be paid for separately.

The unit prices for these items of work shall include all material disposal, labor, material, and equipment costs to perform all the work specified in the Standard Specifications and as modified by this Detailed Specification.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
CONCRETE REMOVAL

Description

This work shall consist of removing and properly disposing of concrete curb, gutter, curb and gutter, integral curb, concrete pavement, sidewalk, sidewalk ramps, drive openings, and drive approach pavements as shown on the plans and as directed by the Engineer, in accordance with Section 204 of the Michigan Department of Transportation (MDOT) 2020 Standard Specifications for Construction, and the City of Ann Arbor Public Services Department Standard Specifications, except as modified herein.

Materials

Granular Material, Class II..... Section 902

Construction

Prior to the start of work, the Engineer and Contractor together shall identify, and field measure all items to be removed. The Engineer shall approve of all removal limits prior to any removals being performed by the Contractor. Contractor shall be responsible for removals beyond the agreed upon limits.

The removal of concrete will include removal and off-site disposal of existing concrete curb, gutter, curb & gutter, integral curb, pavement, sidewalk, sidewalk ramps, drive openings, and drives pavement regardless of pavement depth, type, or material.

The Contractor shall perform full-depth saw-cutting at removal limits, including those necessary to construct 2-foot wide MDOT Type M drive openings, and including those necessary to provide for the partial removal of existing drive approaches as shown on the Plans, as directed by the Engineer, and as marked for removal. The Contractor shall cut steel reinforcement bars as directed by the Engineer at all areas of removal. All saw-cutting shall be performed under wet conditions to prevent excessive airborne dust. All resulting slurry and debris shall be cleaned up the satisfaction of the Engineer.

The Contractor shall excavate, cut, remove stumps, remove brush, grade, and trim as needed and as directed, and shall import, furnish, fill, place, grade, and compact granular material as needed to: construct new concrete items; repair or replace existing concrete items; relocate existing concrete items to their new specified/directed elevations/locations, including all necessary grading at elevation changes of curb and gutter, sidewalks and ramps; and at locations where existing concrete items are to be removed and turf is to be established in its place. If not specifically shown on the Plans, this will be included in the appropriate concrete removal item and not paid for separately.

The Contractor shall coordinate with the City Forester prior to the removal of any tree roots over 2 inches in diameter.

At various times throughout the work, the Engineer may direct the Contractor to use smaller and/or lighter equipment, and to defer certain work tasks, in order to protect the grade and/or adjacent areas. The Contractor shall not be entitled to any additional compensation for the use of smaller

equipment, lighter equipment, or work task deferral.

The Engineer may direct aggregate base materials to be either removed from or added to the job-site, to properly complete the work. Where the Engineer directs the addition of such materials, they shall be paid for as the Item of Work: “21AA Limestone, C.I.P.”. Where the Engineer directs such materials to be removed, they will not be paid for separately, but shall be included in the appropriate concrete removal item.

Concrete removal outside the edge-of-metal shall be paid for as the appropriate item of either “Remove Concrete Curb or Curb & Gutter - Any Type”, or “Remove Concrete Sidewalk, Ramp, & Drive - Any Thickness”.

Where existing concrete curb or curb & gutter is to be replaced on a street with a concrete (or brick) base, the Engineer may direct the Contractor to remove a 1-to-2-foot wide, full-depth section of pavement and pavement base from immediately in front of the curb & gutter. As part of this pavement/base removal, the Contractor shall perform additional (double) full-depth saw-cutting along the entire removal limits, and shall take sufficient care so as not to damage and/or disturb any adjacent pavement, pavement base, and/or any other site feature, all as directed by the Engineer. The removals shall be to a sufficient width and depth to allow for the placement and removal of the curb & gutter formwork. After the removal of the formwork, the Contractor shall replace the concrete base to its original thickness and elevation(s).

Excavated/removal areas shall be adequately protected with barricades and/or fencing at all times.

Removed or excavated materials which are not incorporated into the work shall become the property of the Contractor and shall be immediately removed and properly disposed of off-site. Removed or excavated materials may not be stockpiled overnight on, or adjacent to, the site.

Subbase or subgrade materials removed without authorization by the Engineer shall be replaced and compacted by the Contractor at the Contractor's expense, with materials specified by the Engineer.

Sidewalk ramp removal shall be measured and paid for as “Remove Concrete Sidewalk, Ramp, & Drive - Any Thickness”.

Integral curb and gutter that is removed as part of “Remove Concrete Sidewalk, Ramp, & Drive - Any Thickness” shall be measured and paid for by the square yard, along with the pavement removal quantity.

All saw-cutting required for removals shall be included in the appropriate item of work, and will not be paid for separately. Payment for saw-cutting to create or modify Type M openings and to allow for the partial removal of existing drives shall be included in the price of the item of work, “Remove Concrete Sidewalk, Ramp, & Drive - Any Thickness” and will not be paid for separately.

Measurement and Payment

The completed work, as described, will be measured, and paid for at the respective Contract unit prices for the following respective pay items:

Contract Item (Pay Item)	Pay Unit
Remove Concrete Curb or Curb and Gutter, Any Thickness	Foot
Remove Concrete Sidewalk, Ramp, & Drive - Any Thickness	Square Foot

All saw-cutting required for removals shall be included in the appropriate item of work and will not be paid for separately.

The unit prices for these items of work shall include all labor, material, and equipment costs to perform all the work specified in the Standard Specifications and as modified by this Detailed Specification.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
MACHINE GRADING

Description

The pay item “Machine Grading” shall be completed in accordance with Section 205 the Michigan Department of Transportation 2020 Standard Specifications for Construction (MDOT 2020 SSC) and shall include all work indicated in the MDOT 2020 SSC, shown on the plans, and as specified herein, with the exception that “Subgrade Undercutting, Type II,” “Subgrade Manipulation,” and “Rock Excavation” shall be paid for separately when separate pay items for the respective items are included in the proposal. “Machine Grading“ shall include all the work specified herein for which there is no separate pay item.

The following abbreviated table of contents for Section 205 (Roadway Earthwork) of the MDOT 2020 SSC is provided for reference. It is not a complete table of contents for all Section 205 work required to complete the project.

SECTION/TITLE **PAGE**

205.01 Description 2-18
205.02 Materials 2-18
205.03 Construction 2-19
A. Preparing Roadway Foundation 2-19
1. Removing and Salvaging Topsoil 2-19
B. Rock Excavation 2-20
E. Subrade Undercutting 2-21
F. Subgrade Manipulation 2-22
G. Earth Excavation 2-22
H. Roadway Embankment 2-23
4. Placing and Compacting Embankment 2-24
205.04 Measurement and Payment 2-31

Soils Information

Soil information provided as part of the contract documents is for informational purposes only and shall not relieve the Contractor of the responsibility of investigating all local conditions before bidding.

Materials

All materials and mixtures shall meet the requirements as specified in Section 205 of the MDOT 2020 Standard Specifications for Construction, except as specified herein.

General Provisions

The contractor shall:

1. Grade around mailboxes, trees, light poles, power poles, and the like, which are to remain in place. The Contractor shall be responsible for any damage caused to such structures.
2. Maintain the work in a finished condition until it is accepted by the Engineer.

Removal of Trees and Vegetation

The Contractor shall remove and properly dispose of off-site all vegetation; brush; roots; and stumps, as shown on the plans, and as directed by the Engineer as required to complete the project. This work will be paid for be paid for as “Machine Grading” and will not be paid for separately.

Removal and Salvaging of Topsoil

The removal, salvaging and stockpiling of topsoil, and all related work, shall be performed in accordance with Section 205.03.A.1 (Removing and Salvaging Topsoil) of the MDOT 2020 SSC.

Miscellaneous Removals

“Machine Grading” includes the removal of any surface feature located within the grading limits which must be removed and for which there is no specific pay item established in the proposal for its removal.

Protection of Grade

The work shall be kept well drained at all times. Foundation, roadway embankment or subgrade that becomes damaged by rain shall be undercut and backfilled, or otherwise remedied, by the Contractor, at his/her sole expense, as directed by the Engineer.

The Contractor shall be responsible for the maintenance of the foundation, roadway embankment, and subgrade. Any damage caused by traffic or the Contractor’s operations, to the foundation, roadway embankment or subgrade shall be remedied by the Contractor at his/her sole expense.

The Contractor shall conduct his/her operations and provide the necessary equipment to ensure the satisfactory completion of the work without damaging the foundation, roadway embankment or subgrade. This may require the transporting and movement of materials over additional distances.

Protection of Utilities and Vaults/Structures

Utility lines, vaults, and structures may become exposed at, above, or below, the foundation or subgrade elevation during machine grading or subgrade undercutting operations. If this occurs, the Contractor shall protect facilities and excavate around, above and/or below the utility lines, as directed, to complete the machine grading or subgrade undercutting operations. Payment, at contract unit prices, for “Machine Grading” or “Subgrade Undercutting,” whichever applies, will be considered as payment in full for this work. The contractor shall protect vaults and structures and not undermine or damage facilities.

Removal of Cable, Conduits, and Pipe

The Contractor shall remove, and properly dispose of off-site, all abandoned cables, conduit, and pipe encountered at, or above the bottom of any earthwork excavation or undercut. Where the inverts of abandoned, or to be abandoned or removed, conduits or pipe are less than 16 inches below the bottom of any earth excavation or undercut, the conduits and/or pipe shall be removed and the resulting void filled with an Engineer approved material. The fill material shall be compacted to 95% of its maximum unit weight in lifts not exceeding 12 inches. No separate payment will be made for removal of conduit or pipe, or any of the work, described in this section.

Foundation Preparation

Foundation is defined as the original earth grade upon which roadway embankment is placed. The foundation work shall be completed in accordance with Section 205.03.A (Preparing Roadway Foundation) of the MDOT 2020 SSC as shown on the plans, and as specified herein.

The foundation shall be compacted to 95% of its maximum unit weight, as measured by the AASHTO T-180 method, to a depth of at least 10 inches. If this cannot be achieved, in the opinion of the Engineer, he/she will direct the Contractor to perform “Subgrade Undercutting” as described herein, on the foundation.

Roadway Embankment Construction

Roadway embankment is defined as the construction of earth on the prepared foundation to form the subgrade. Roadway embankment work shall be completed in accordance with Section 205.03 H (Roadway Embankment) of the MDOT 2020 SSC as shown on the plans, and as specified herein.

Roadway embankment shall be compacted to a minimum of 95% of its maximum unit weight, as measured by the AASHTO T-180 method.

Subgrade Construction

Subgrade is defined as the final earth grade which extends from grading limit to grading limit. The subgrade shall be constructed by performing earth excavation and roadway embankment work in accordance with Section 205.03.G (Earth Excavation) and Section 205.03 H (Roadway Embankment) of the MDOT 2020 SSC, as shown on the plans, and as specified herein.

The subgrade shall be constructed to the contours and cross-sections shown on the plans, as specified herein. To achieve this, the work shall include, but not be limited to:

1. Removal and disposal off-site of any surplus or unsuitable materials.
2. Furnishing from off-site any additional Engineer approved fill materials necessary.
3. Moving existing and/or furnished materials longitudinally and transversely as necessary.

4. Cutting, placing, compacting, and trimming existing and/or furnished materials to construct the roadway embankment and subgrade to the specified tolerances.
5. Stockpiling, and moving again, any cut materials which cannot be immediately placed upon excavation due to construction staging.

The subgrade shall be graded to accommodate all subbases and aggregate bases wherever used, all bioswale and adjacent planting beds, all roadway pavements, curb and gutter, driveways, sidewalks, bicycle paths, other similar structures, bioswale planting mix, topsoil and any other features which the subgrade supports.

The subgrade shall be prepared so as to ensure uniform support for the pavement structure. The finished subgrade shall be placed to within 1 inch below and ¾ inch above plan grade. Variations within this tolerance shall be gradual.

The subgrade shall be compacted to a minimum of 95% of its maximum unit weight, as measured by the AASHTO T-180 method, to a depth of 10 inches. If this cannot be achieved, in the opinion of the Engineer, he/she may direct the Contractor to perform ”Subgrade Undercutting” as described herein.

Proof Rolling

The Contractor shall proof-roll the foundation and/or subgrade with a pneumatic tired roller with a suitable body for ballast loading and a gross load capacity that can be varied from 25 and 40 tons. In lieu of this test roller, with the approval of the Engineer, the Contractor may use a fully loaded single axle or tandem axle dump truck.

Subgrade Undercutting

“Subgrade Undercutting” shall be performed on the foundation or subgrade in accordance with Section 205.03.E (Subgrade Undercutting) of the MDOT 2020 SSC, as shown on the plans, as specified herein, and as directed by the Engineer.

Rock Excavation

Rock excavation shall be performed in accordance with Section 205.03.B (Rock Excavation) of the MDOT 2020 SSC, as shown on the plans, and as directed by the Engineer.

The pay item “Rock Excavation” will apply only to boulders over ½ cubic yard in volume. Boulders will be measured individually, and the volume computed from the average dimension measured in three directions. The removal of rocks, concrete and masonry less than ½ cubic yard in volume shall not be included in the pay item “Rock Excavation,” but shall be included in the pay item “Machine Grading”.

If the proposal does not include a pay item for “Rock Excavation,” rocks measuring over ½ cubic yard in volume shall be paid for as extra work.

Lowering Structures

All structures shall be lowered prior to Machine Grading, paid for as part of “Adjust Structure Cover” or “Adjust Monument Box or Gate Valve Box”.

Structure and Sewer Cleanliness

All sewers, and structures, including manholes, gate wells, valve boxes, inlet structures and curbs shall be protected from damage and contamination by debris and construction materials. Structures shall be maintained clean of construction debris and properly covered at all times during the construction. The Contractor shall immediately clean any structures and/or sewers that become contaminated with construction debris. The Contractor shall be responsible for all direct and indirect damages which are caused by sewers or structures which have been made unclean or have been damaged by the Contractor.

Contractor’s Calculations

Existing and proposed cross sections are provided in the plans. The Contractor shall perform his/her own computations and is responsible to inspect the site to determine his/her own estimate of the quantities of work involved.

Deviations between the existing contours and the existing and proposed cross-sections shown on the plans shall not be cause for additional compensation.

Construction Method

The Contractor shall construct earth grades as required to develop the typical and/or detailed cross-section(s) as shown on the Plans, as detailed in the Specifications, and as directed by the Engineer. This shall include, but not be limited to, the excavation of miscellaneous concrete and miscellaneous HMA pavement, soil, rocks of any size, stumps, trees less than 6-inches, logs, and bricks; the removal and proper disposal off-site of surplus excavated material; the scarifying, plowing, disking, moving and shaping of earth; the trimming, grading, compaction and proof-rolling of the prepared subgrade; the importing, furnishing, placement and compaction of embankment and/or fill materials; the full depth saw-cutting of pavement at the removal limits; the grading of sideslopes; general restoration in accordance with the Detailed Specifications elsewhere herein and the general items of the work as specified herein. Road subbase and base materials shall be paid for separately.

The Contractor shall remove, add to, re-shape, re-grade, and re-compact the existing roadbed materials, and shall construct the roadway to the cross-section(s) as indicated on the Plans, as detailed in the Specifications, and as directed by the Engineer. The Contractor shall use blade graders, maintainers, vibratory rollers, and/or other equipment as necessary, and as detailed in the Specifications and as directed by the Engineer, for this work. Use of each specific piece of equipment is subject to the approval of the Engineer.

The Contractor shall remove, dispose or salvage, deliver to any location within the City limits, and neatly stack/stockpile all bricks, if present, as directed by the Engineer.

Signs in the grading limits shall be salvaged and provided to City as directed by the Engineer.

The Contractor shall move excavated and/or imported materials longitudinally and/or transversely where necessary, and as directed by Engineer.

The Contractor shall keep the work well graded and drained at all times.

The Contractor shall not use rubber-tired equipment on the subgrade, when its use causes or may cause, in the opinion of the Engineer, damage to the subgrade. The Contractor shall conduct its operation(s), and provide all necessary equipment, to insure the satisfactory completion of the work without damaging the subgrade. This includes the transporting, stockpiling, re-handling, and movement of materials over additional distances, in-lieu-of driving on an unprotected, or partially unprotected, subgrade.

The Contractor is solely responsible for the maintenance and protection of the subgrade. Further, any damage to the subgrade which, in the opinion of the Engineer, is caused as a result of the Contractor's operation(s), or its subcontractors' or suppliers' operation(s), shall be repaired by the Contractor at the Contractor's expense. This includes any additional earthwork and/or maintenance materials as directed by the Engineer, for the purposes of the Contractor's maintenance and protection of the subgrade. The Contractor shall not be entitled to any additional compensation for the implementation of these procedures.

The Contractor shall perform all rough and/or finish grading and compaction to the grades shown on the Plans, as detailed in the Specifications, and as directed by the Engineer.

The Contractor shall proof roll all graded and compacted surfaces in the presence of the Engineer as detailed in the Specifications. The Engineer will monitor the proof rolling operation to locate deleterious and/or uncompacted materials and will direct undercuts, as necessary.

At various times throughout the work, the Engineer may direct the Contractor to use smaller and/or lighter equipment, and to defer certain work tasks, in order to protect the grade and/or adjacent areas. The Contractor shall not be entitled to any additional compensation for the use of smaller equipment, lighter equipment, or work task deferral.

The Contractor shall coordinate with the City Forester prior to the removal of any tree roots 1½ - inch or larger in size.

Measurement and Payment

Measurement for payment for the item “Machine Grading” shall be area within the limits of the work.

The completed work as measured for this item of work will be paid for at the Contract unit price for the following Contract (Pay) Item:

Contract Item (Pay Item)	**Pay Unit**
Machine Grading	Square Yard

"Machine Grading" shall be paid for one time per square yard regardless of any re-working that may be necessary.

The pay item "Machine Grading" shall include all the work specified herein, including, but not limited to, the removal and offsite disposal of any surplus or unsuitable materials and the furnishing from off-site any additional Engineer approved fill materials necessary to construct the embankment and subgrade per plans.

The unit price for this item of work shall include all labor, material, and equipment costs to perform all the work specified in the Standard Specifications and as modified by this Detailed Specification.

The Contractor is advised that due to the phasing of the project and the probable unsuitability of some or all of the excavated material for use as approved fill material, there may be imbalances between the amount of earth cut which is suitable for reuse as fill, and the amount of earth needed to construct the lines and grades shown on the plans, or as directed by the Engineer. The Contractor shall make provisions for such imbalances and shall include in the bid price for this work the cost of importing/furnishing, placement, and compaction of the material, as well as the cost of stockpiling and re-handling of imported and/or on-site Engineer approved materials as necessary to complete the work of constructing the embankment and subgrade to the cross sections shown on the plans.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
SUBGRADE UNDERCUTTING

Description

This work includes removal of unsuitable subgrade material(s) in the areas and limits identified by the Engineer and backfill with Class II Granular Material in accordance with the 2020 MDOT Standard Specifications for Construction, and the City of Ann Arbor Public Services Department Standard Specifications, except as modified herein.

Materials

Materials will be in accordance with those specified in Section 902 of the Michigan Department of Transportation (MDOT) 2020 Standard Specifications for Construction.

Construction

After the pavement has been removed, and/or after rough/finish grading, and/or at the time of proof rolling, the Engineer may inspect the grade to determine the need for, and the limits of, undercuts. After undercut areas are excavated to the depths as directed by the Engineer, the areas shall be trimmed, shaped, evenly graded, and re-compacted to not less than 95% of the soils maximum unit weight as determined by the AASHTO T-180 test. The Contractor shall properly dispose of all excess materials.

Backfill areas of Subgrade Undercutting with Granular Material Class II or such other such material as directed by the Engineer, to be paid for as “Class II Granular Material, C.I.P.” The backfill material shall be compacted to not less than 95% of its maximum unit weight as determined by the AASHTO T-180 test.

At various times throughout the work, the Engineer may direct the Contractor to use smaller and/or lighter equipment, and to defer certain work tasks, in order to protect the grade and/or adjacent areas. The Contractor shall not be entitled to any additional compensation for the use of smaller equipment, lighter equipment, or work task deferral.

Measurement and Payment

These items of work shall be measured for payment by calculating the volume of the undercut excavation prior to the placement of backfill. The completed work as measured for these items of work will be paid for at the Contract Unit Price for the following Contract (Pay) Item:

Contract Item (Pay Item)	Pay Unit
Subgrade Undercutting	Cubic Yard

The unit price for this item of work shall include all labor, material, and equipment costs to perform all the work specified by this Detailed Specification.

CITY OF ANN ARBOR

DETAILED SPECIFICATION
FOR
IN-SITU SOILS
AND
REMOVAL AND DISPOSAL OF CONTAMINATED SOIL

a. Description. This Detailed Specification governs the classification of existing in-situ soils that can be encountered on the project site and the proper management and disposal of contaminated soils that may be encountered during the performance of the work of the project.

b. Existing In-situ Soils. The Contractor shall be aware that soils within the City of Ann Arbor and Washtenaw County contain levels of naturally-occurring, regulated, elemental metals. The City of Ann Arbor has completed testing on numerous projects and levels of these naturally–occurring, regulated, elemental metals that may be encountered within the City of Ann Arbor and have found that they generally correspond to concentrations presented in the 2005 State of Michigan Background Soil Survey approved by the Michigan Department of Environment, Great Lakes, and Energy (EGLE) on October 4, 2019 for the Huron-Erie glacial Lobe.

All excavated material generated on the project shall become the property of the Contractor. Any excavated material that cannot be incorporated into the project work, in accordance with the material requirements of the work being performed, must be properly disposed of off-site by the Contractor. Consequently, excavated soils that do not exhibit odors, discoloration, or other indications of contamination, and meet the definition of an inert material in accordance with Part 115 Solid Waste Management of the Michigan Natural Resources and Environmental Protection Public Act 451 of 1994 (MNREPA Act 451), are not required to be disposed of in a landfill. These soils shall be disposed of by the Contractor by the method of their choice. The City of Ann Arbor suggests a disposal method that minimizes future human contact with the soil or the soil's contact with a water course or ground water sources, due to the possibility of elevated concentrations of naturally-occurring, regulated, elemental metals. The Contractor shall be responsible for any disposal or relocation methods that they chose to employ in the disposal of these soils.

The Contractor's submittal of a bid for this project shall be considered prima fascie evidence that they have considered these facts and have included all necessary resources to perform all work of this project and to properly dispose of excavated soils from this project off-site.

The Geotechnical Report is included in the RFP. Please note, some black/discolored clay soil with petroleum type odor was found at shallow depths in Boring 9.

c. Contaminated Soil. If the Contractor encounters soil suspected of containing contaminated constituents other than those of naturally-occurring, regulated, elemental metals it must be tested and classified prior to transport and disposal in accordance with EGLE Waste Characterization Guidance. Contaminated soil characterized as non-hazardous or hazardous may not be reused on-site within the project area. Non-hazardous, non-Resource Conservation and Recovery Act (RCRA) contaminated material shall be managed in accordance with Part 201 Environmental Remediation of the MNREPA Act 451. RCRA hazardous material shall be managed in accordance with Part 111 Hazardous Management of the MNREPA Act 451.

Soils containing elevated levels of naturally-occurring, regulated, elemental metals that are determined to be above EGLE-regulated background levels are excluded from the definition of

"Contaminated Soil." During the performance of work on a project, if such soils are found or determined to exist after a course of testing and characterization, the off-site disposal of those soils shall not be paid.
Contaminated soil shall be placed in a vehicle equipped to carry the class of the material on public roads to the disposal site in accordance with applicable federal, state, or local regulations applicable to such soil, whether it is non-hazardous or hazardous.

d. Sampling and Analysis of Contaminated Soil. The Contractor shall be responsible for all sampling and analysis required for the disposal of contaminated material. Refer to EGLE Waste Characterization Guidance for guidance on the type of analysis required.

If the results of the analysis show the material to be non-hazardous or hazardous as defined by Part 111, of the Natural Resources and Environmental Act, Act 451, P.A. 1994, the Engineer shall be notified immediately. The material shall then be disposed of at a licensed Type I or Type II landfill as required by the applicable EGLE guidance.

e. Disposal and Method of Construction. This work shall be performed in accordance with Sections 104.07.B, 107.01, 204 and 205 of the MDOT 2020 Standard Specifications for Construction, except as modified herein or as directed by the Engineer.

The Contractor shall have all manifests signed by its representative, the Engineer's representative, the authorized representative of the waste hauler and the waste disposal facility.

f. Excavation of Contaminated Soil. This work shall be performed in accordance with Sections 104.07.B, 107.01, 204 and 205 of the MDOT 2020 Standard Specifications for Construction, except as modified herein or as directed by the Engineer.

The Contractor shall have all manifests signed by its representative, the Engineer's representative, the authorized representative of the waste hauler and the waste disposal facility.

g. Temporary Storage of Contaminated Soil. Excavated non-hazardous or hazardous contaminated soil which is to be temporarily stockpiled shall be placed on plastic sheeting or tarps having a minimum thickness of 6 mils or in trucks, roll-off boxes, or other containers, such that no liquid may escape from the containment. At the end of each work day, the contaminated material shall be covered securely with plastic sheeting of 6 mils thickness or greater.

Excavated hazardous or non-hazardous material shall be disposed of as soon as approval is received from the disposal site. In no case shall this material be stockpiled for longer than 30 days prior to disposal.

The Contractor is responsible for the necessary coordination such that his/her work activities are not adversely impacted by the stockpiling of contaminated soil. Stockpiled soil shall not impair sight distance or drainage. Time extensions shall not be granted by the Engineer for delays in receiving approval for the disposal of contaminated material at the appropriate landfill or other similar circumstances.

h. Disposal of Non-hazardous and Hazardous Contaminated Soil. Disposal of non-hazardous contaminated soil shall be at a licensed Type II sanitary landfill. Disposal of hazardous contaminated soil shall be at a licensed Type I hazardous waste landfill. The Contractor shall submit at the pre-construction meeting the name of the Type II or Type I landfill to be used for disposal, the sampling and analysis requirements of the landfill, and verification

that the use of the proposed landfill will meet the requirements of the County solid waste plan.

The disposal facility must be acceptable to the City of Ann Arbor and therefore approval must be obtained from the Engineer prior to commencing disposal operations. Prior to obtaining approval for the disposal from the City, the Contractor shall provide a copy of the laboratory analysis to the Engineer.

i. Measurement and Payment. The completed work as described herein will be paid for at the contract unit price for the following contract items (pay items):

Pay Item	**Pay Unit**
Non-Hazardous Contaminated Soil Handling and Disposal (LM)	Cubic Yard
Hazardous Contaminated Soil Handling and Disposal (LM)	Cubic Yard

Contaminated soil handling and disposal will be measured by volume in cubic yards, loose measure, as contained in the hauling unit. Under no circumstance will the Contractor be paid for quantities of this soil that have not received prior approval for payment by the Engineer and as measured and tracked by the Engineer and the Contractor. The Contractor will not be paid "standard amounts" that have been determined by the disposal facility; only measured volumes as computed by the Engineer will be paid. Prior to payment, the Engineer shall be given receipts from the disposal facility(s) for the number of cubic yards disposed of at that facility. Payment for this work shall include all costs for materials, labor and equipment needed for storage, loading, transportation, and disposal of the non-hazardous contaminated material. Disposal costs shall include any and all documentation required by the landfill. Payment for these items shall be the same, regardless of whether or not the Contractor temporarily stores the contaminated material; the Contractor shall not be paid for re-handling of the material due to construction staging, stockpiling, or other related activities.

Payment for excavation and handling of contaminated soil shall be included with the related items of work being performed when the material was encountered.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
SUBBASE AND AGGREGATE BASE

Description

This work shall consist of constructing subbase and/or aggregate base courses, on either a prepared subgrade or subbase as indicated on the Plans or where directed by the Engineer. This work shall be performed in accordance with Sections 301, 302, 305, and 307 of the 2012 MDOT Standard Specification for Construction and the City of Ann Arbor Public Services Department Standard Specifications, except as modified 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 shall be either 21AA limestone (permanent and temporary applications) with a maximum loss by washing of 8% and any subbase shall be Class II Granular Material.

Construction Method

Subbase and aggregate base courses shall not be placed when there are indications that the mixture may become frozen before the maximum unit weight is obtained, and in no case shall they be placed on a frozen subbase or subgrade.

The subbase and subgrade shall be shaped to the crown and grade specified on the plans and maintained in a smooth condition. The top of the subbase shall be placed to within ½-inch below and ½-inch above plan grade. The top of the aggregate base shall be placed to within ½-inch below and ¼-inch above plan grade. Variations within this tolerance shall be gradual. If, in the opinion of the Engineer, the Contractor's equipment is causing or will cause any ruts in or damage to the subbase or subgrade, the equipment shall not be permitted on the subbase or subgrade.

Should the subgrade, subbase or aggregate base become damaged due to the Contractor's equipment or by local traffic, the subgrade, subbase, or aggregate base course shall be restored to the condition required by the Specifications without additional compensation to the Contractor.

No pavement course, concrete curb and gutter, or concrete driveway opening shall be placed until the subbase has been compacted to not less than 95%, and aggregate base course to not less than 98% of their respective maximum dry densities and approved by the Engineer.

Base course aggregate shall be handled and/or stockpiled on-site in a manner that minimizes segregation. Base course aggregate shall be deposited from trucks or through a spreader in a manner that will minimize segregation of material and that is approved by the Engineer. The re-handling of base course aggregate by the Contractor will not be considered sufficient cause to allow the material to become segregated. The Contractor may be required to wet the materials prior to and/or during placement to minimize segregation and to aid in compaction of the material should it be necessary.

Aggregate base courses shall be placed in uniform layers such that when compacted, they have the thicknesses shown on the Plans, or as directed by the Engineer. The loose measure of any layer shall not be more than 9-inches or less than 4-inches.

All structures, including manholes, valve boxes, inlet structures and curbs shall be protected from damage and contamination by debris and construction materials. Structures shall be maintained clean of construction debris and properly covered at all times during the construction.

The Contractor may be charged for the cleaning (by others) of accumulated construction debris in the utility structures, and damages resulting from the uncleaned structures.

Measurement and Payment

Where granular materials are used as base, as subbase, or as fill for excavations in Machine Grading areas, items of work "21AA Limestone, C.I.P." and " Class II Granular Material, C.I.P." shall be measured and paid accordingly.

Where granular materials are used as fill for undercuts at locations other than Machine Grading areas, item of work shall be paid in accordance with "Class II Granular Material, C.I.P."

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

Contract Item (Pay Item)	Pay Unit
Class II Granular Material, C.I.P.	Cubic Yard
21AA Limestone, CIP.	Cubic Yard

The provisions of Section 306.04 regarding excess moisture content, moisture corrections, and pay weights shall apply to this item of work.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
HMA PAVING

Description

This work include the paving of Hot Mix Asphalt (HMA) pavement base, leveling, and top courses as shown on the plans and as directed by the Engineer, in accordance with Section 501 of the Michigan Department of Transportation (MDOT) 2020 Standard Specifications for Construction, and the City of Ann Arbor Public Services Department Standard Specifications, except as modified herein.

Materials and Equipment

The mixes are shown on the plans.

All equipment shall conform to Section 501.03.A of the 2020 MDOT Standard Specifications for Construction, except as modified herein.

The Contractor shall have a 10-foot long straight edge, rubber-tired backhoe (Case 580 type, or equivalent), air-compressor with the ability to develop a minimum pressure of 100 pounds per square inch and continuous rated capacity of 150 cubic feet per minute of air flow, and jackhammer available during all paving operations. The Contractor shall be required to perform any miscellaneous cleaning, trimming, material removal, and other tasks as required by the Engineer in order to ensure the proper and orderly placement of all HMA materials on this project.

The Contractor shall provide sufficient rollers to achieve the specified asphalt densities.

At various times throughout the work, the Engineer may direct the Contractor to use smaller and/or lighter equipment, and to defer certain work tasks, in order to protect the grade and/or adjacent areas, including hauling units. The Contractor shall not be entitled to any additional compensation for the use of smaller equipment, lighter equipment, or work task deferral.

Each pressure distributor, paver and roller shall be equipped with at least one approved flasher light which shall be mounted on the equipment so as to give a warning signal ahead and behind.

Reclaimed Asphalt Pavement (RAP) in HMA Mixtures
The use of Reclaimed Asphalt Pavement (RAP) in HMA mixtures shall be in accordance with Section 501.02.A.2 of the 2020 MDOT Standard Specifications for Construction, and the City of Ann Arbor Standard Specifications.

Construction Methods

All concrete work shall be completed prior to placing HMA mixtures.

The Contractor shall place HMA wedges using the base, leveling, and top course mixtures specified herein, as directed by the Engineer, prior to placing the top course. Such wedging shall be measured and paid for at the respective unit price of the appropriate HMA Pavement item.

Cleaning and Bond Coat Application

Cleaning and bond coat application shall be performed in accordance with Sections 501.03.C and 501.03.D of the 2020 MDOT Standard Specifications for Construction, except as modified herein, and as directed by the Engineer.

The bond coat shall be applied at a minimum rate of 0.05 gallons/SY. Before placing the bond coat, the existing pavement surface shall be thoroughly cleaned in accordance with the "Vacuum Type Street and Utility Cleaning Equipment" Detailed Specification. The Contractor shall also thoroughly clean all joints, cracks, and edges to a minimum depth of 1-inch with compressed air, vac-all type equipment, or other approved mechanical or hand methods, to remove all dirt, debris, and all foreign material.

HMA Placement

Placement shall conform to Section 501.03.F of the 2020 MDOT Standard Specifications, except as modified herein, and as directed by the Engineer.

HMA placement shall not commence until the aggregate base course or the adjacent, underlying layer of pavement section has been approved by the Engineer.

The top course shall be placed with a ¼-inch lip at the gutter edge of metal. All HMA thickness dimensions are compacted-in-place.

The pay item "HMA Approach" shall include the work to pave driveway approaches, as indicated on the plans.

The pay item "HMA, ____" shall include the work to pave the roadway, side streets, intersections, etc. to the limits shown on the plans.

Paving Operation Scheduling

The Contractor shall schedule the paving operation to avoid longitudinal cold joints that would be required to be left "open" overnight.

In all cases, the Contractor shall pave the primary road's through-traffic lanes ("main line") first, from point-of-beginning to the point-of-ending. All other paving including, but not limited to; acceleration and deceleration lanes, intersection approaches, and center left-turn lanes shall be paved following completion of main line paving, unless authorized by the Engineer prior to the placement of any pavement.

Rate of Paver Operation

The rate of the paver's travel shall be maintained such that the paving operation will be continuous, resulting in no transverse cold joints, but shall never exceed the rate of 50-feet per minute.

The Contractor shall furnish and operate enough material, equipment, and hauling units so as to keep the paving machine(s) moving continuously at all times. Failure to do so shall be cause for the suspension of the paving operation until the Contractor can demonstrate to the satisfaction of the Engineer, that sufficient resources have been dedicated to perform the work in accordance with the project specifications.

Longitudinal and Transverse Joints

Longitudinal and transverse joints shall conform to Section 502.03.F of the 2020 MDOT Standard Specifications for Construction and as specified herein. For mainline HMA paving, the width of the mat for each pass of the paver shall be not less than 10.5-feet, nor greater than 15-feet, except as noted in the plans and as directed by the Engineer. The Engineer will direct the layout of all HMA longitudinal joints during construction.

Prior to placing the adjacent paving pass on the leveling and top courses of HMA, the Contractor shall cut and remove 6-inch to 8-inch of the previously placed pavement at the free edge of the pavement by means of a coulter wheel. The Engineer reserves the right to reject any method(s) for cutting the pavement that does not provide a vertical and satisfactory edge, free of tearing, bending, or other deformations, as determined by the Engineer. Any method(s) employed by the Contractor shall be completely effective. The cut edge shall have a uniform bead of pavement joint adhesive applied to the full height of the joint. The removal of this HMA material and resulting edge must be approved by the Engineer prior to proceeding with the placement of the succeeding pass of HMA. The base course of HMA and its vertical edge will have bond coat applied in accordance with Section 501.03.D. All costs associated with complying with these requirements will not be paid for separately but shall be considered to be included in the HMA items of work.

Pavement joint adhesive shall be hot applied, meet, or exceed, the following properties, and be approved by the Engineer prior to performing HMA placement:

- Brookfield Viscosity, 400°F, ASTM D2669 – 4,000 to 10,000 cp
- Cone Penetration, 77°F, ASTM D5329 – 60 to 100
- Flow, 140°F, ASTM D5329 – 5mm maximum
- Resilience, 77°F, ASTM D5329 – 30% minimum
- Ductility, 77°F, ASTM D113 – 30 cm minimum
- Ductility, 39.2°F, ASTM D113 – 30 cm minimum
- Tensile Adhesion, 77°F, ASTM D5329 – 500% minimum
- Softening Point, ASTM D36 - 170°F minimum
- Asphalt Compatibility, ASTM D5329 – pass

Feather Joints

Feather joints shall be constructed so as to vary the thickness of the HMA from zero inches to the required paving thickness at the rate of approximately 1.5-inch over a distance of 10-feet, or as directed by the Engineer. The Contractor shall rake the larger pieces of aggregate out of feather joints prior to compaction.

Butt Joints

Construction of butt joints, where directed by the Engineer, shall conform to Sections 501.03.C.3 and 501.03.C.4 of the 2020 MDOT Standard Specifications for Construction, except as modified herein.

When a butt joint is specified or directed to be placed by the Engineer, remove the existing HMA surface to the thickness of the proposed overlay, or full depth, as directed by the Engineer, for the full width or length of the joint. The HMA material shall be sawcut to the directed depth along the pavement edge or removal line to prevent tearing of the pavement surface. Cut joints that will be exposed in the completed surface must be cut with a saw or a cold-milling machine or other methods approved by the Engineer. Joints that will be covered by HMA must be cut with a saw, a cold-milling machine, or other methods approved by the Engineer.

Rakers

The Contractor shall provide a minimum of two (2) rakers during the placement of all top and leveling courses.

Faulty Mixtures

The Contractor and Engineer shall carefully observe the paving operation for signs of faulty mixtures. Points of weakness in the surface shall be removed or corrected by the Contractor, at his/her sole expense, prior to paving subsequent lifts of HMA material. Such corrective action may include the removal and replacement of thin or contaminated sections of pavement, segregated HMA, and any sections that are weak or unstable. Once the Contractor or his representative is notified by the Engineer that the material being placed is out of allowable tolerances, or that there is a problem with the paving operation, the Contractor shall stop the paving operation at once, and shall not be permitted to continue placing HMA material until again authorized by the Engineer. Any costs associated with meeting the requirements specified herein shall not be paid for separately but shall be included in the item(s) of work being performed at the time the faulty mixture was discovered.

Measurement and Payment

Measurement of these HMA paving items shall be by the ton, in place. Unused HMA remaining in trucks after the work is completed shall be returned to the plant and re-weighed, and the corrected weight slip shall be provided to the Engineer. **No payment will be made for the unused HMA material.** All weight slips must include the type of mixture (codes are not acceptable), as well as vehicle number, gross weight, tare weight and net weight.

Corrective action shall be enforced as described in Division 5 of the 2020 MDOT Standard Specifications for Construction and will be based on the City's testing reports.

All costs for furnishing and operating vacuum-type street cleaning equipment, backhoes, jackhammers, and air compressors shall be included in the bid prices for these items of work or

in the item of work “General Conditions, Max $_____”.

All costs of meeting the requirements of this Detailed Specification shall be included in the bid prices for HMA items in the proposal and will not be paid for separately.

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

Contract Item (Pay Item)	**Pay Unit**
HMA, ____	Ton
HMA Approach	Ton
Hand Patching	Ton

The unit prices for these items of work shall include all labor, material, and equipment costs to perform all the work specified in the Standard Specifications and as modified by this Detailed Specification.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
6-INCH WRAPPED UNDERDRAIN

Description

This work shall consist of furnishing and installing 6-inch diameter geotextile-wrapped, perforated or slotted underdrain pipe, using MDOT 2NS, as directed by the Engineer, for all backfill material. Work shall be performed in accordance with Section 404 of the 2020 edition of the MDOT Standard Specifications, except as specified herein.

Materials

The materials used for this work shall conform to Subsection 404 of the Michigan Department of Transportation 2020 Standard Specifications for Construction, except as specified herein.

The Geotextile Filter Fabric for encasing the underdrain pipe shall be an approved material such as nylon, polypropylene, fiberglass, or polyester, and shall be either woven, heat bonded, knitted, or of continuous fibers. The geotextile shall completely cover and be secured to the pipe. In an un-stretched condition, knitted polyester fabrics shall weigh at least 3.0 ounces per square yard, and all other geotextiles shall weigh at least 3.5 ounces per square yard. The fabric shall be strong and tough and have a porosity such that the fabric will retain soil particles larger than 0.106 mm (no. 140 sieve) and shall pass aggregate particles finer than 0.025 mm. Geotextiles shall be stored and handled carefully and in accordance with the both the manufacturer's recommendations and the Engineer's direction, and shall not be exposed to heat or direct sunlight. Torn or punctured geotextiles shall not be used.

Construction Methods

The installation of underdrain shall precede all other construction activities including but not limited to pavement milling, pavement pulverization, pavement removal, pavement patching, and curb repair.

The Contractor shall excavate, cut, remove stumps, remove brush, remove pavement, grade, and trim as needed and as directed, and shall import, furnish, fill, place, grade, and compact MDOT 2NS fine aggregate to construct underdrain as specified on the Plans, and as directed by the Engineer.

The trench shall be constructed to have a minimum width of 18-inches and shall be typically excavated to the depth specified in the Plans or directed by the Engineer.

The underdrain shall be installed at the line, grade, and depth specified on the Plans or as directed by the Engineer. The minimum percent grade shall be 0.5%, and the minimum cover from top-of-pipe to finished top-of-curb grade shall be 4-feet. The Contractor shall maintain line and grade by means of a laser. The Engineer will not provide line, grade or staking.

Upgrade ends of the pipe shall be closed with suitable plugs to prevent entrance of trench backfill material. All couplings, tees, plugs, and other fittings shall be manufactured and installed so as to prevent any infiltration of trench backfill material.

The Contractor shall tap at least one end of the underdrain into a storm sewer structure, as directed by the Engineer.

During the construction of underdrain runs, the Engineer may direct the Contractor to terminate or modify underdrain construction due to conflicts with buried obstructions or if the minimum 4-foot cover cannot be maintained. There will be no adjustment to the Contract Unit Price due to changes in quantity.

The first lift (bedding) of backfill shall be MDOT 2NS material to a maximum thickness of 3-inches. Subsequent lifts shall be MDOT 2NS material to a maximum thickness of 12-inches.

Removed or excavated materials which are not incorporated into the work shall become the property of the Contractor and shall be immediately removed and properly disposed of off-site. Removed or excavated materials may not be stockpiled overnight on, or adjacent to, the site.

All structures, inlets and manholes shall be maintained free of accumulations of silt, debris, and other foreign matter throughout construction, until the time of final acceptance.

Measurement and Payment

Two 5-foot sections of underdrain, and connecting (tapping) underdrain(s) into drainage structure(s) will not be paid for separately but shall be included in the bid price for this item of work.

The completed work as measured for this item of work will be paid for at the Contract Unit Price for the following Contract (Pay) Item:

CONTRACT (PAY) ITEM	PAY UNIT
6-inch Wrapped Underdrain	Foot

The unit price for this item of work shall include all labor, material, and equipment costs to perform all the work specified in the Standard Specifications and as modified by this Detailed Specification.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
CONCRETE CURB, SIDEWALK, DRIVE APPROACH, AND PAVEMENT

Description

This work shall consist of constructing concrete items including curb, gutter, curb and gutter, sidewalks, drive approaches, and drive openings, all of any type and/or dimensions, all of either regular, fibermesh reinforced, and/or high-early concrete, in accordance with Sections 801, 802, and 803 of the Michigan Department of Transportation (MDOT) 2020 Standard Specifications for Construction, except as specified herein, as shown on the Plans, as described in this Detailed Specification, and as directed by the Engineer.

The Contractor is responsible to construct all sidewalks, sidewalk ramps, curbs, and all other concrete items within ADAAG (ADA Accessibility Guidelines) compliance. All sidewalks and curb ramps must be constructed in accordance with MDOT Standard Plan R-28 latest version of standard plan/detail in place at time of the bid letting.

In addition, all concrete items of work shall comply with the Detailed Specifications for Concrete Durability and Concrete Placement and Protection.

Materials

Concrete mixtures shall be as follows (or as directed by the Engineer), and concrete materials shall meet the requirements specified in the referenced sections of the MDOT Standard Specifications for Construction:

Item Description	Concrete Mixture	MDOT Section
All Items Except High Early	3000, 3500	1004
All High Early Items	4500	1004

Construction Method

General

Curb, gutter, curb and gutter, sidewalk, sidewalk ramps, drive openings, and drives shall be replaced the same day they are removed unless otherwise prohibited by the required construction.

Concrete items, including sidewalk, non-integral curb/gutter, drives, and structure adjustments shall be completed prior to the placement of pavement.

All subgrade work shall be completed prior to placing concrete items, unless directed or approved by the Engineer.

The subbase shall be trimmed to final elevation before placing curb. Curb shall not be placed on a pedestal or mound.

The Contractor shall excavate, cut, remove stumps, remove brush, remove pavement, grade, and trim as needed and as directed, and shall import, furnish, fill, place, grade, and compact Class II granular material and 21AA Aggregate material as needed to: construct new concrete

items; to repair or replace existing concrete items; to relocate existing concrete items to their new specified/directed elevations/locations, including all necessary grading at elevation changes of curb and gutter, sidewalks and ramps; and at locations where existing concrete items are to be removed and turf is to be established in its place.

At locations where the subgrade, subbase or base becomes either disturbed, saturated or otherwise damaged, and where directed by the Engineer, the Contractor shall remove a minimum thickness layer of the subgrade, subbase or base, and replace it with approved 21AA Aggregate material, compacted in place of: 4-inch for 4" Sidewalk, and 6-inch for 6" Sidewalk Ramps, Drives Approaches, and 8" Pavement; to a width 6 inches greater to either side of the finished concrete product.

The Contractor shall coordinate with the City Forester prior to the removal of any tree roots over 2 inches in diameter.

High-early concrete shall be used in areas as directed by Engineer.

The Contractor is responsible for any damage to concrete items, including but not limited to vandalism; vehicular, pedestrian and/or miscellaneous structural damage; surface texture damage; and rain damage.

The Contractor shall maintain on-site at all times a sufficient quantity of adequate materials to protect concrete items. The Engineer may suspend or defer concrete placement if rain protection is not available. The Contractor shall not be entitled to any additional compensation due to work suspension or deferral resulting from a lack of adequate rain protection.

The Contractor shall perform full-depth saw cutting at removal limits, including those necessary to construct 2-foot wide Type L and M drive openings, and including those necessary to provide for the partial removal of existing drive approaches and pavement, as shown on the Plans, as directed by the Engineer, and as marked for removal.

The subbase and adjacent concrete shall be sufficiently wet-down with water prior to placing concrete, to prevent water loss from the new concrete, and to form a better bond between old and new concrete. If a cold-joint becomes necessary, the existing concrete surface(s) shall be cleaned with compressed air to expose the aggregate in the concrete.

Where it is necessary to remove existing pavement to provide space for concrete formwork, a sufficient amount of the existing pavement shall be removed to allow for the use of a vibratory plate compactor in front of the curb.

Where concrete items are placed in areas adjacent to existing pavement that is beyond the general resurfacing (pavement removal and/or milling) limits, the adjacent pavement area shall be backfilled and permanently patched within 48-hours of obtaining 80% of design strength. The backfill material shall be MDOT 21AA aggregate compacted in place to 95%, up to the elevation of the proposed bottom of pavement. The pavement patching material(s) shall be as specified and as directed by the Engineer.

Where concrete items are placed adjacent to existing pavement that is within areas scheduled for subsequent pavement removal and/or milling, the adjacent pavement area shall, within 48-hours of the removal of concrete formwork, be backfilled with MDOT 21AA aggregate compacted in place to 95% up to the elevation of the bottom of the adjacent pavement.

Prior to compacting backfill in front of curb and gutter, the back of curb shall be backfilled with approved material and compacted by mechanical means to 95%.

At various times throughout the work, the Engineer may direct the Contractor to use smaller and/or lighter equipment, and to defer certain work tasks, in order to protect the grade and/or adjacent areas. The Contractor shall not be entitled to any additional compensation for the use of smaller equipment, lighter equipment, or work task deferral.

Restoration

The Contractor shall restore all disturbed areas to better than or equal to their original condition within two calendar days from the date of concrete obtains 80% design strength. All restoration work and materials shall be in accordance with the City of Ann Arbor Standard Specifications for Construction.

Contraction Joints in Sidewalk

Contraction joints shall be placed at 5-foot intervals and may be tooled or sawed. The method of forming joints and spacing shall be approved by the Engineer prior to construction.

Expansion Joints in Sidewalks

¾-inch wide expansion joints shall be placed through concrete sidewalks in line with the extension of all property lines, at all expansion joints in the abutting curb, gutter, and combination curb and gutter, and as directed by the Engineer. Transverse expansion joints shall be placed through the sidewalks at uniform intervals of not more than 300-feet.

½-inch wide expansion joints shall be placed between the sidewalk and back of abutting curb or gutter, at the juncture of two sidewalks, between the sidewalk and buildings and other rigid structures, and as directed by the Engineer.

Expansion Joints in Curb and Gutter

¾-inch wide expansion joints shall be placed at all street returns, at all expansion joints in an abutting pavement, at each side of all driveways (at radius points), elsewhere at 300-foot maximum intervals, and as directed by the Engineer. Expansion joint material shall extend to the full depth of the joint. After installation, the top shall not be above the concrete nor be more than ½-inch below it. No reinforcing steel shall extend through expansion joints.

Plane of Weakness Joints in Curb and Gutter

Intermediate plane of weakness joints shall be placed to divide the structure into uniform sections, normally 10-feet in length, with a minimum being 8-feet in length, and shall be placed

opposite all plane of weakness joints in the abutting concrete base course.

Plane of weakness joints shall be formed by narrow divider plates, which shall extend 3-inches into the exposed surfaces of the curb or curb and gutter. Plates shall be notched, if necessary, to permit the steel reinforcement to be continuous through the joint.

Measurement and Payment

No additional compensation will be paid for the construction of concrete items adjacent to existing concrete curb, gutter, pavement, or any other pavement or surface feature(s).

A deduction in length for catch basins and inlet castings will be made to measurements of Curb and Gutter. Curb, gutter, or curb and gutter shall be paid as "Concrete Curb or Curb & Gutter – All Types".

Restoration work, including backfilling behind the curb ready for topsoil, compacting, HMA patching adjacent to concrete items, will be paid for separately. Restoration HMA will be paid for separately under HMA _, topsoil, seed and mulch will be paid of separately under Turf Establishment.

Payment for saw-cutting for Type L and M openings and for partial removal of existing drives shall be included in the price for the item of work, “Remove Concrete Sidewalk, Ramp & Drive - Any Thickness”, and will not be paid for separately.

Payment for the removal of HMA pavement and aggregate base to provide space for concrete formwork and vibratory plate compactor shall be included in the price for the item of work, “HMA Pavement Removal, Any Depth”.

Pay item: 4 inch Concrete Sidewalk, shall be placed on 4 inches of Class II sand subbase paid for separately as “Class II Granular Material, C.I.P.- CYD”

Pay items: 6” Concrete Sidewalk, Ramp, Drive Approach, 6” Concrete Drive or Sidewalk - High Early, 8” Concrete Pavement, and 8” Concrete Pavement – High Early shall be placed on 6 inches of Class II sand subbase course paid for separately as “Class II Granular Material, C.I.P.- CYD”.

All concrete pavement, including that which is installed with integral curb and gutter, will be measured and paid for by the area actually placed in square feet (SFT).

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

Contract Item (Pay Item)	**Pay Unit**
Concrete Curb or Curb and Gutter, All Types	Foot
4” Concrete Sidewalk	Square Foot
6” Concrete Sidewalk, Ramp, Drive Approach	Square Foot
6” Concrete Drive or Sidewalk - High Early	Square Foot
8” Concrete Pavement	Square Foot
8” Concrete Pavement – High Early	Square Foot
Driveway Opening, Conc, Detail M	Foot
Driveway Opening, Conc, Detail M - High Early	Foot

The unit prices for these items of work shall include all labor, material, and equipment costs to perform all the work specified in the Standard Specifications and as modified by this Detailed Specification.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
CONCRETE DURABILITY

Description

The Contractor shall furnish a Portland cement concrete mixture for this project that has been tested under this specification and shown to be resistant to excessive expansion caused by alkali-silica reactivity (ASR) and provides adequate air entrainment for freeze thaw durability. The Contractor shall construct the project with practices outlined in this specification.

Materials

The materials provided for use on this project shall conform to the following requirements:

Portland Cement	ASTM C-150
Fine Aggregate	ASTM C-33*
Coarse Aggregate	ASTM C-33*
Fly Ash, Class F	ASTM C-618
Slag Cement, Grade 100, 120	ASTM C-989
Silica Fume	ASTM C-1240
Blended Cements	ASTM C-595
Air Entraining Admixtures	ASTM C-260
Chemical Admixtures	ASTM C-494
White Membrane Cure	ASTM C-309 Type 2

*Fine and coarse aggregates shall consist of natural aggregates as defined in the Michigan Department of Transportation 2020 Standard Specifications for Construction Section 902.02.A.1.

The Contractor shall provide documentation that all materials to be incorporated into proposed mixed designs meet the requirements of this section.

Alkali-Silica Reactivity

The Contractor shall supply to the Engineer preliminary concrete mix designs including a list and location of all suppliers of concrete materials. The Contractor shall evaluate the mixtures for the potential for excessive expansion caused by ASR and provide documentation to the Engineer. The Contractor's evaluation shall include a review of any previous testing of the material sources intended to be used for both the fine and coarse aggregates for the concrete mixtures. The previous testing may be from other projects or records provided by the material suppliers.

Aggregates shall be tested under ASTM C-1260. If the expansion of the mortar bars is less than 0.10%, at 14 days, the aggregates shall be considered innocuous and there are no restrictions for ASR mitigation required with this material.

Previous aggregate test data may be used. If no previous test data is available, for the concrete mix, that shows that it is resistant to ASR, a concrete mixture that will mitigate the potential for ASR must be designed using either Method 1 or 2 as described below.

Method 1

Substitution of a portion of the cement with Class F Fly Ash, Slag Cement Grade 100 or 120, or a ternary mix (blended cement) containing a blend of Portland cement and slag cement, or Class F fly ash, or silica fume.

The maximum substitution of cement with the fly ash permitted shall be 25% by weight of total cementitious material (cement plus fly ash). Additional requirements for the Fly Ash, Class F are that the Calcium Oxide (CaO) percent shall be less than 10% and the available alkalis shall not exceed a maximum of 1.5%. A copy of the most recent mill test report shall be submitted to verify. Note: a Class C fly ash with a minimum total oxide (SiO_2 + Al_2O_3 + Fe_2O_3) of 66% and a minimum SiO_2 of 38% may be used in lieu of Type F fly ash.

The maximum substitution of cement with the Slag Cement permitted shall be 40% by weight of total cementitious material (cement plus Slag Cement). The minimum replacement rate with Slag Cement shall be 25%.

For a ternary blend, the total replacement of supplementary cementitious materials is 40% with a blend consisting of a maximum of 15% Type F fly ash, and/or 8% silica fume and/or slag cement.

For Method 1, the effectiveness of the proposed mix combination to resist the potential for excessive expansion caused by ASR shall be demonstrated using current or historic data. To demonstrate the effectiveness of the proposed mix the Contractor shall construct and test mortar bars per ASTM C1567 (14-day test) using both the fine and coarse aggregate along with the proposed cementitious material for the concrete mixture. If a mortar bar constructed of these materials produces an expansion of less than 0.10%, concrete mixture will be considered to be resistant to excessive expansion due to ASR.

If a mortar bar constructed of these materials produces an expansion of 0.10% or greater, concrete mixtures containing these materials shall not be considered resistant to the potential for excessive expansion due to ASR and shall be rejected. Additional testing, including alternate proportions or different materials will be required.

Method 2

Use low alkali cement and maintain the total alkali content from the cementitious at no more than 3.0 lbs/cyd (Na_2Oeq). The total alkali contribution is calculated by the quantity contained in the Portland cement only.

Requirements for Low Alkali Cement are that the alkali content does not exceed 0.60% expressed as Na_2O equivalent. Equivalent sodium oxide is calculated as: (percent Na_2O + 0.658 x percent K_2O).

For either Method 1 or 2, if the Contractor intends to change any component material supplied after the mix design has been approved all concrete work will be suspended with no cost to the project or extensions of time, unless approved, until evaluation of the new mixtures and testing of the

new materials demonstrates that it is resistant to excessive expansion due to ASR.

The Engineer and Contractor shall monitor the concrete that is delivered to the project site so as to insure that the approved mix design is being followed. The supplier shall include on the delivery ticket for each batch of concrete delivered to the job, the identification and proportions of each material batched.

When concrete is placed during cold weather, defined for the purposes of this Detailed Specification to be, air temperatures below 40ºF, the use of accelerators, heated aggregates, silica fume and/or additional forms of cold weather protection will be required. Cold weather will not eliminate the requirement for furnishing and placing a concrete mix that is considered resistant to ASR attack.

Prior to cool weather placement, defined for the purposes of this detailed specification to be, air temperatures between 40ºF and 60ºF, the set time of the proposed mix shall be verified under anticipated field conditions. This information shall be used when scheduling pours and saw crews.

Air Entrainment

Air entrainment shall be accomplished by addition of an approved air entraining agent. Air content as determined by ASTM C 231 or ASTM C 173, shall be determined on each day of production as early and as frequently as necessary until the air content is consistently acceptable. If during the period of time while adjustments are being made to the concrete to create a mixture that is consistently acceptable, concrete is produced that does not meet the requirements of this Detailed Specification, the Engineer may reject the material and direct it to be removed from the jobsite. Any rejected material shall be removed from the jobsite at the Contractor's sole expense. Quality Control testing performed by the Contractor to ensure compliance with the project specifications shall be performed on the grade ahead of the placement operation.

Paver Placement

During production, the plastic concrete material shall be tested for acceptance at a point ahead of the paver. The air content of the concrete mixture that the Contractor shall provide shall be known as the Acceptance Air Content (AAC). The Contractor shall also provide additional entrained air in the concrete mixture to account for the air loss which occurs in the concrete mixture experienced during transportation, consolidation, and placement of the concrete. The "air loss" shall be added to the air content of the concrete mixture as established on the approved concrete mix design. The AAC for the project will be 6.0% plus an amount equal to the air loss.

For up to the first four loads, the air content measured on-site prior to placement shall be at least 8.0% and no more than 12.0%. To establish the initial AAC on the first day of paving, the air content of the first load shall be tested at the plant. After initial testing at the plant the Contractor shall provide at least two (2) sample sets to determine the actual air loss during placement. A sample set shall consist of two (2) samples of concrete from the same batch, one (1) taken at the point of discharge and the other from the in-place concrete behind the paver. The air loss from the two (2) sample sets shall be averaged and added to 6.0% to establish the AAC (rounded to the next

higher 0.5%). After the testing and adjustment procedure(s) have been completed, the project acceptance air tests shall be taken prior to placement. The Contractor shall provide concrete to the jobsite that has an air content of plus 2.0%, or minus 1.0%, of the AAC.

After the AAC has been established, it shall be verified and/or adjusted through daily checks of the air loss through the paver. The Contractor shall check the air loss through the paver a minimum of two times a day. A Revised AAC shall be required to be established by the Contractor if the average air loss from two (2) consecutive tests deviates by more than 0.5% from the current accepted air loss. The testing operations performed by the Contractor to establish a revised AAC shall be performed to the satisfaction of the Engineer. The Contractor shall be solely responsible for any delays and/or costs that occur to the project while establishing revised AACs.

Construction Methods

Aggregate Control

Gradation Control

The supplier shall provide a detailed stockpile management plan, describing their process control procedure for shipping, handling, and stockpiling of each aggregate including workforce training.

Moisture Control

All aggregate materials must be conditioned to a moisture content of not less than saturated surface dry (SSD) prior to batching. A watering process using an effective sprinkler system designed and operated by the Contractor shall be required on all coarse aggregate material stockpiles.

The Contractor shall provide verification that these processes have been performed by the supplier. The Engineer reserves the right to independently verify that the supplier has complied with these standards.

Mixing

Central Mix Plants

The total volume of the batch shall not exceed the designated size of the mixer or the rated capacity as shown on the manufacturer's rating plate.

Drum Mix Plants

After all solid materials are assembled in the mixer drum; the mixing time shall be a minimum of 60 seconds and a maximum of five (5) minutes. The mixing time may be decreased if the ASTM C-94 11.3.3 mixer efficiency tests show that the concrete mixing is satisfactory. The Engineer may require an increase in the minimum mix time if the mixer efficiency test determines that the concrete is not being mixed satisfactorily. The minimum mixing time shall start after the mixer is

fully charged. Mixers shall be operated at the speed recommended by the manufacturer as mixing speed. The mixer shall be charged so that a uniform blend of materials reached the mixer throughout the charging cycle. Any additional slump water required shall be added to the mixing chamber by the end of the first 25% of the specified mixing time. Mixers shall not be used if the drum is not clean or if the mixing blades are damaged or badly worn.

Ribbon Mixers

After all solid materials are assembled in the mixer; the mixing time shall be a minimum of 30 seconds and a maximum of 2.5 minutes. The mixing time may be decreased if the ASTM C-94 11.3.3 mixer efficiency tests show that the concrete mixing is satisfactory. The Engineer may require an increase in the minimum mix time if the mixer efficiency test determines that the concrete is not being mixed satisfactorily. The minimum mixing time shall be indicated by an accurate timing device which is automatically started when the mixer is fully charged. Mixers shall be operated at the speed recommended by the manufacturer as mixing speed. The mixer shall be charged so that a uniform blend of materials reached the mixer throughout the charging cycle. After any additional slump water is added to the mixing chamber the mixing shall continue for a minimum of 10 seconds. Mixers shall not be used if the mixer is not clean or if the mixing blades are damaged or badly worn.

Truck Mixers

The capacities and mixing capabilities shall be as defined in ASTM C 94, and each unit shall have an attached plate containing the information described therein. The plate may be issued by the Truck Mixer Manufacturer. The mixer capacity shall not be exceeded, and the mixing speeds shall be within the designated limits. Truck mixers shall be equipped with a reliable reset revolution counter. If truck mixers are used for mixing while in transit, the revolution counter shall register the number of revolutions at mixing speed.

An authorized representative of the concrete producer shall certify that the interior of the mixer drum is clean and reasonably free of hardened concrete, that the fins or paddles are not broken or worn excessively, that the other parts are in proper working order, and that the unit has been checked by the representative within the previous **30 calendar day period** to substantiate this certification. The current, signed certification shall be with the unit at all times.

The required mixing shall be between 70 and 90 revolutions. The mixing shall be at the rate designated by the manufacturer and shall produce uniform, thoroughly mixed concrete.

The Engineer may inspect mixer units at any time to assure compliance with certification requirements, and removal of inspection ports may be required. Should the Engineer question the quality of mixing, the Engineer may check the slump variation within the batch. Should the slump variation between two (2) samples taken, one (1) after approximately 20% discharge and one (1) after approximately 90% discharge of the batch, show a variation greater than ¾-inch (20 mm) or 25% of the average of the two, whichever is greater, the Engineer may require the mixing to be increased, the batch size reduced, the charging procedure be modified or the unit removed from the work.

The practice of adding water on the site shall be discouraged. After the slump of the concrete in the first round of trucks has been adjusted on-site, the amount of water added at the plant shall be adjusted accordingly for that day's work. All additions of water on site shall be approved by the Engineer.

Curing

Apply liquid curing compound in a fine atomized spray to form a continuous, uniform film on the horizontal surface, vertical edges, curbs and back of curbs immediately after the surface moisture has disappeared, but no later than 30 minutes after concrete placement. With approval of the Engineer, the timing of cure application may be adjusted due to varying weather conditions and concrete mix properties.

The cure system shall be on site and tested prior to concrete placement.

Apply a curing compound at a rate of application not less than 2-gallons per 25-square yards. The Contractor shall keep the material thoroughly mixed per the Manufacturer's recommendations. The curing compound shall not be diluted.

The finished product shall appear as a uniformly painted solid white surface. Areas exhibiting a blotchy or spotty appearance shall be recoated immediately.

Compliance with Standards

The Engineer will review and approve all material test reports and mix designs supplied by the Contractor before any placement of concrete. The Engineer will visually inspect the placed concrete and review the concrete test reports prior to final acceptance.

Acceptance sampling and testing will be performed using the sampling method and testing option selected by the Engineer. Acceptance testing will be performed at the frequency specified by the Engineer. Quality control measures to insure job control are the responsibility of the Contractor. The Engineer's testing and/or test results will not relieve the Contractor from his/her responsibilities to produce, deliver, and place concrete that meets all project requirements. The Engineer's test results are for acceptance purposes only.

If the results of the testing are not in compliance with the project specifications, the Engineer shall determine appropriate corrective action(s). Time extensions will not be granted to the Contractor during the time that the Engineer is determining the necessary corrective actions.

If, in the Engineer's judgment, the rejected material must be replaced, the material in question will be removed and replaced at the Contractor's sole expense. The removal costs will be deemed to include all relevant and associated costs including, but not limited to; re-mobilization, traffic control, re-grading the aggregate base course, if required, placement of material meeting the project specifications, and all other expenses. Time extensions will not be granted to the Contractor for any required repair work to meet the requirements of this specification.

If the Engineer decides that the material in question can remain in place, an adjustment to the contractunit price(s) may be made of up to 100% of the bid price(s) for the affected items of work.

Measurement and Payment

The cost associated with complying with the requirements as described herein, including any required remedial action(s), shall be included in the cost of other items of work and shall not be paid for separately.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
CONCRETE PLACEMENT AND PROTECTION

Description

This work shall consist of furnishing all labor, material, and equipment needed to furnish, place, and protect all concrete material in accordance with the requirements of this detailed specification.

Materials

The concrete shall meet the requirements of Sections 1001 and 1004 of the Michigan Department of Transportation (MDOT) 2020 Standard Specifications for Construction.

The Contractor shall propose specific concrete mix designs for the intended project purpose in accordance with the requirements of this special provision and other applicable special provisions and/or project requirements. The Engineer's acceptance of a mix design shall not relieve the Contractor of their responsibility for the manufacture of the concrete mixture(s), its placement, or performance.

Construction

The Contractor shall perform all concrete placement operations in weather that is suitable for the successful placement and curing of the concrete materials. Concrete shall not be placed during periods of active precipitation.

The Contractor shall complete all needed formwork, base and/or sub-base preparation, and any other related items that are deemed necessary for the proper completion of the work. The Contractor shall not commence the placement of concrete until they receive all needed approvals from the Engineer for placement. The Engineer's approval of the Contractor to place concrete shall not relieve the Contractor of their responsibility for the proper placement and protection of the concrete materials or its long-term performance.

During periods when precipitation is threatening, provide durable, plastic sheeting, approved by the Engineer, in sufficient quantity to cover and protect all freshly placed concrete such that precipitation does not come into contact with the concrete. The Contractor shall arrange the placement of the plastic sheeting such that the surface of any freshly placed concrete is not marred by contact with the plastic; any seams in the plastic sheeting shall be watertight. The Contractor shall place adequate supports along and over the freshly placed concrete to prevent contact of the plastic and concrete. The Contractor shall ensure that sufficient dams or barriers are placed along the edges of the freshly placed concrete to prevent erosion of the underlying materials or damage to the edges of the freshly placed concrete. All measures shall be effective.

Any concrete damaged by precipitation shall be removed and replaced at the Contractor's expense. The Engineer shall decide if the concrete has been damaged and the limits of removal and replacement.

Concrete shall only be placed when the rate of surface evaporation at the site is less than 0.20 pounds per square foot per hour, according to Figure 706-1 of the MDOT 2020.

Standard Specifications for Construction. The Contractor shall provide approved equipment for determining the relative humidity and wind velocity at the site.

Water shall not be added to the placed concrete in order to aid finishing. Any water added to the concrete for slump adjustments shall be done by adding water to the mixing unit and thoroughly re-mixing the concrete for 30 revolutions of the mixing unit at mixing speed. Water shall not be added such that the design water-to-cement ratio of the concrete mixture or the design slump of the concrete mix is exceeded.

Concrete curing shall be performed in accordance with Subsection 602.03.M of the MDOT 2020 Standard Specifications for Construction. Curing operations shall take precedence over texturing operations and continued concrete placement. All curing compound applied shall provide uniform coverage over the entire surface being protected. The placement of curing compound shall be free of spots, blotches, or uncovered or non-uniformly covered areas. Should any areas be determined to exist by the Engineer, the curing compound shall be immediately re-applied by the Contractor at no additional cost to the project.

The Contractor shall take all precautions when placing concrete to protect it from damage due to the elements. Concrete shall not be placed during precipitation events.

Concrete shall be protected from weather and temperature according to the requirements of Subsection 602.03.T MDOT 2020 Standard Specifications for Construction. Concrete shall not be placed when the temperature of the plastic concrete mixture itself is greater than 90°F. In conditions where low temperature protection is required, the Contractor shall cover the concrete with insulated blankets, or other means as approved by the Engineer, to protect the concrete from damage. The concrete shall remain protected until it has reached a compressive strength of at least 1,000 psi, or as directed by the Engineer.

Measurement and Payment

All costs associated with the conformance to the requirements as described herein will not be paid for separately but shall be considered to be included in the respective items of work.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
DETECTABLE WARNING, CAST IN PLACE

Description

This work shall consist of furnishing and installing cast in place detectable warning units in compliance with the Americans with Disability Act (ADA). All work shall be in accordance with MDOT Standard Detail R-28 latest version in place at time of the bid letting.

Materials

The detectable warning tiles shall be colored as Federal Number 22144 (variously referred to as "Clay Red" or "Brick Red"). The detectable warning tiles shall meet the following material properties, dimensions, and tolerances using the most current test methods:

1. Water Absorption: Not to exceed 0.35% when tested in accordance with ASTM-D570.

2. Slip Resistance: 0.80 minimum combined wet/dry static coefficient of friction on top domes and field area, when tested in accordance with ASTM C1028.

3. Compressive Strength: 18,000 psi minimum, when tested in accordance with ASTM D695.

4. Tensile Strength: 10,000 psi minimum, when tested in accordance with ASTM D638.

5. Flexural Strength: 24,000 psi minimum, when tested in accordance with ASTM D790.

6. Chemical Stain Resistance: No reaction to 1% hydrochloric acid, urine, chewing gum, soap solution, motor oil, bleach, calcium chloride, when tested in accordance with ASTM D543 or D1308.

7. Wear Depth: 300 minimum, when tested in accordance with ASTM C501.

8. Flame Spread: 25 maximum, when tested in accordance with ASTM E84.

9. Gardner Impact: 50 in.-lbs. minimum, when tested in accordance with Geometry "GE" of ASTM D5420.

10. Accelerated Weathering of Tile when tested by ASTM-G155 or ASTM G151 shall exhibit the following result-$\Delta E<6.0$ as well as no deterioration, fading or chalking of surface when exposed to 3000 hours minimum exposure.

11. Wheel Loading: The cast in place tile shall be mounted on a concrete platform with a ½" airspace at the underside of the tile top plate then subjected to the specified maximum load of 10,400 lbs., corresponding to an 8,000 lb individual wheel load and a 30% impact factor. The tile shall exhibit no visible damage at the maximum load of 10,400 lbs using AASHTO-HB17 single sheet HS20-44 loading "Standard Specifications for Highways and Bridges."

12. Salt and Spray Performance of Tile and Adhesive System when tested to ASTM-B117 not to show any deterioration or other defects after 100 hours of exposure.

Construction Methods

Installer's Qualifications: Engage an experienced Installer who has successfully completed tile installations similar in material, design, and extent to that indicated for this Project.

The contractor shall follow manufacturer specifications for installation, except where they conflict with MDOT Standard Detail R-28 latest version in place at the time of bidding, or other project requirements.

Measurement and Payment

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

Contract Item (Pay Item)	Pay Unit
Detectable Warning, Cast In Place	Foot

The unit price for this item of work shall include all labor, material, and equipment costs to perform all the work specified in the Standard Specifications and as modified by this Detailed Specification.

Unit length will be measured in place, taken at the mid-point of the 2 ft tile, following the arc of the tiles if placed in a radius.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
STRUCTURE COVERS

TCA 1 of 2 3/15/23

Description

This work shall consist of replacing and furnishing frames and covers for utility (storm, sanitary, and water) structures as shown on the plans and as directed by the Engineer, in accordance with Section 403 of the 2020 MDOT Standard Specifications for Construction and the City of Ann Arbor Public Services Department Standard Specifications, except as modified herein.

Materials

Provide materials meeting the requirements of subsection 403.02 and section 908 of the MDOT 2020 Standard Specifications. Provide frames and covers conforming to the model(s) shown in the table below, or equivalent approved by the Engineer.

Type of Casting	Use	EJ No.
Frame and Cover	Sanitary	1040AGS
Manhole Frame and Cover	Storm and Water	1040 w/ Type A Cover Type M1
Curb Inlet/Catch Basin Frame and Cover	Barrier curb & gutter	7045Z w/ 7045M1 Sinusoidal Grate
Curb Inlet/ Double Catch Basin Frame and Cover	Low point Barrier curb and gutter	7034Z w/7030 M2 Cubic Grate
Curb Inlet/Catch Basin Frame and Cover	Mountable curb & gutter	7065 w/ 7045M1 Sinusoidal Grate
Flat Inlet Frame and Cover	Driveway	5000 w/ Type M2 Sinusoidal Grate
Inlet/Catch Basin Frame and Cover	Beehive	1040Z O2 6” Tall, Black coated
Valve Box and Cover	Water Valve	8560 Screw Type 3 Piece Valve Box Set D

Frames and covers shall have machined bearing surfaces and City of Ann Arbor custom logo. Each cover shall have the word "SANITARY", “STORM”, “WATER”.

Construction

All work shall be performed in accordance with subsection 403.03 of the MDOT 2020 Standard Specifications.

The Contractor shall store materials on site and/or at locations arranged by the Contractor, subject to the approval of the Engineer. The Contractor shall not store materials or equipment, including metal castings and steel plates, on any lawn areas.

Measurement and Payment

The completed work as measured shall be paid at the Contract unit price for the following Contract items (pay items):

Contract Item (Pay Item)	Pay Unit
Structure Covers	Each

Payment for this item of work shall include all labor, materials and equipment needed to furnish and install the structure cover.

Payment for the frame shall be paid for as part of “Adjust Structure Cover”.

Payment for a gate-valve box includes the cover and is included in the appropriate gate-valve box item.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
STRUCTURE COVER ADJUSTMENTS

Description

This work shall consist of adjusting, replacing, and pointing structures, handholes, valve wells or boxes, and monument boxes of concrete and concrete block masonry; the replacing, salvaging and transporting of existing metal covers, and/or castings; including all excavation, backfilling, patching and the removal and proper disposal off-site of all excavated material and debris, as shown on the plans and in accordance with Division 4 and section 818 of the 2020 MDOT Standard Specifications for Construction and the City of Ann Arbor Public Services Department Standard Specifications, except as modified herein.

Materials

Materials shall meet the requirements of sections 403 and 1004 of the 2020 edition of the MDOT Standard Specifications, except that concrete shall be MDOT 4500 per Section 1004 of the 2020 MDOT Standard Specifications.

Construction

A new frame (casting) shall be included in the cost of the work. The cover may be reused as directed by the Engineer. If the Engineer directs for a cover to be replaced, it shall be paid for as “Structure Cover”. All City of Ann Arbor castings and covers not being reused shall be delivered to the City Utilities Department yard at 4251 Stone School Road (Wheeler Center) at the Contractor’s expense.

Materials shall be stored by the Contractor at locations arranged by the Contractor, subject to the approval of the Engineer. The Contractor shall not store materials or equipment, including metal castings and steel plates, on any lawn area.

Hidden, or unknown utility structures may be encountered during the work. It is the Contractor's responsibility to inform the respective utility owner(s) of such findings. In such instances, the City may direct the Contractor to adjust the structure(s) to grade. This work will be paid as “Adjust Structure Cover”.

The pointing of structures is included in all adjustments.

A thermoplastic concrete form may be used for a cast-in-place concrete structure riser/collar, as approved by the Engineer.

This item includes the final adjustment of castings of any type (including drop inlets) to their respective finished elevations, up or down. All materials required to make the adjustments shall be included in this item of work. All underground structure covers shall be adjusted such that their finished surface elevation is within ¼-inch of the finished surface sections, grades, slopes, and elevations, as shown on the Plans, and as directed by the Engineer. The work shall be verified by the use of a 10-foot straight-edge placed parallel with the pavement centerline. Structures not meeting the ¼-inch tolerance shall be readjusted and finish patched, as directed by the Engineer, at the Contractor's expense.

The Contractor shall coordinate with the Engineer and applicable non-City utilities for manholes and valves adjustments during this project.

All structure covers, utility covers, valve boxes or monument boxes shall be backfilled with MDOT 4500 concrete from the depth of excavation necessary for adjustment, up to an elevation 2-inches below the top flange of the adjusted casting, as shown on the Plans. This work shall be included in the respective items of work, and will not be paid for separately.

Round Concrete Collar

Contractor may use a skid-steer with attached hydraulically mechanical circular core saw system to saw pavement full depth and adjust the casting, as approved by the Engineer. In which case, all structure covers, utility covers, valve boxes or monument boxes shall be backfilled with MDOT 4500 concrete from the depth of excavation necessary for adjustment, up to grade, such that their finished surface elevation is within 1/4-inch of the finished surface sections, grades, slopes, and elevations, as shown on the Plans, and as directed by the Engineer.

The collar shall be round, with the structure cover centered in the collar. The diameter of the collar must be no more than 4 feet, except where approved by the Engineer. Four (4) joints shall be tooled in a cross pattern. The Engineer may also require the concrete collar to be treated with black color hardener.

Lowering Structures

Prior to cutting the subgrade, or Machine grading aggregate base, the Contractor shall remove structure covers, lower the structures by removing the frame and chimney, adjustment rings, to a point between 8 inches and 12 inches below the proposed grade, and cover the structures with a steel plate. Structures shall not be raised prior to placing roadway embankment.

The steel plates for covering structure openings shall conform to the plan detail, be pegged and properly placed to prevent their movement under all traffic, be thick enough to carry all traffic, and prevent the infiltration of debris into the structures.

The Contractor shall lower valve boxes to a point between 8 inches and 12 inches below the proposed grade. Valve boxes shall not be raised prior to placing roadway embankment.

The void in the grade above the steel plates used for structure lowerings and valve box lowerings shall be backfilled, and compacted to 95% of its maximum dry density, with an Engineer approved coarse aggregate.

The Contractor shall coordinate the lowering of private utility structures with the private utility companies.

This item includes the final adjustment of existing structure frame and covers, up or down, to their finished elevations. This also includes the replacement of the top half of the water boxes and monument boxes where required and shall be included in this item of work.

Gate valve box tops and covers shall be reused, except when broken or directed by the Engineer. New tops and covers will be provided by the City.

Frame and covers for monument boxes will be provided by the City.

The Contractor shall transport new castings and covers to the site from the City Utilities Department yard at 4251 Stone School Road (Wheeler Center).

Any City casting and/or cover not being reused on the project shall be delivered to the Wheeler Center at the Contractor's expense.

Measurement and Payment

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

Contract Item (Pay Item)	Pay Unit
Adjust Structure Cover	Each
Adjust Monument Box or Gate Valve Box	Each

The approved price for this item shall include all labor, material, and equipment costs required to complete the work as specified herein.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
PAVEMENT MARKING

Description

This work consists of providing and placing permanent pavement markings in accordance with the Michigan Manual of Uniform Traffic Control Devices (MMTUTCD), lasted version published at time of advertisement. Provide pavement markings that conform to the Plans, the Michigan Department of Transportation (MDOT) 2020 Standard Specifications for Construction, MDOT Pavement Marking Standard Plans, City of Ann Arbor Special Details, and as specified herein.

Materials

Provide materials in accordance with Sections 811 and 920 of the MDOT 2020 Standard Specifications for Construction. Provide the Material Safety Data Sheets to the Engineer for required materials and supplies. Dispose of unused material and containers in accordance with the federal Resource Conservation Recovery Act (RCRA) of 1976 as amended, and 1994 PA 451, Part 111 Hazardous Waste Management. Provide samples of permanent marking materials upon request.

Construction Methods

The preparation and placement of permanent markings shall conform to Section 811 of the MDOT 2020 Standard Specifications, the Plans, and as specified herein.

Measurement and Payment

Completed work, as described, will be measured, and paid for at Contract unit prices for the following Contract (pay) items:

Contract Item (Pay Item)	Pay Unit
Pavt Mrkg, Polyurea, __-inch, White	Foot
Pavt Mrkg, Polyurea, __-inch, Yellow	Foot
Recessing Pavt Mrkg, Longit	Foot
Recessing Pavt Mrkg, Transv	Square Foot
Pavt Mrkg, Polyurea, 12-inch Crosswalk	Foot
Pavt Mrkg, Polyurea, 24-inch Stop Bar	Foot
Pavt Mrkg, Polyurea, _____ Sym	Each
Pavt Mrkg, Polyurea, _____ Legend	Each
Pavt Mrkg, Ovly Cold Plastic, Direction Arrow Sym, Bike	Each
Pavt Mrkg, Ovly Cold Plastic, Bike, Small Sym	Each
Pavt Mrkg, Ovly Cold Plastic, Sharrow Symbol	Each

Guide lines are included in “Recessing Pavt Mrkg, Longit”.

The unit prices for these items of work shall include all labor, material, and equipment costs to perform all the work specified in the MDOT 2020 Standard Specifications for Construction and as modified by this Detailed Specification.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
SOIL EROSION CONTROL

Description

This work includes furnishing, placing, maintaining and removing soil erosion and sedimentation control measures, including but not limited to, silt fence and fabric filters at all drainage structures as shown on the plans and as directed by Engineer, in accordance with Section 208 of the 2020 MDOT Standard Specifications for Construction and the City of Ann Arbor Public Services Department Standard Specifications, except as modified herein.

Filters in existing and proposed inlets, as well as silt fence downstream of construction area, shall be installed in order to minimize the erosion of soil and the sedimentation of water courses. The related work includes cleaning as required during the performance of the project work, removing and disposing of accumulated sediment, and replacement of filters if required by the Engineer so as to provide a properly working inlet filter and a well-drained site.

Materials

Inlet filters shall be in accordance with:

a. REGULAR FLOW SILTSACK® manufactured by ACF Environmental (800) 448-3636;
b. FLEXSTORM® Style FX manufactured by Advanced Drainage Systems, Inc. (800) 821-6710;
c. CATCH-ALL® manufactured by Price & Company (866) 960-4300;
d. or Engineer approved equal.

Silt fence shall be in accordance with Section 208 of the 2020 MDOT Standard Specifications for Construction.

Methods of Construction

The Contractor shall install, maintain, clean, and re-install and/or replace inlet filters and silt fence in accordance with the manufacturer's specifications and as directed by the Engineer at no additional cost. The Contractor shall dispose of debris off-site.

Measurement and Payment

The completed work of Soil Erosion Control will be paid for at the Contract unit price for the following Contract items (pay items):

Contract Item (Pay Item)	Pay Unit
Erosion Control, Inlet Filter	Each
Erosion Control, Silt Fence	Feet

The unit prices for these items of work shall include all labor, material, and equipment costs to perform all the work specified in the Standard Specifications and as modified by this Detailed Specification.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
INFILTRATION TRENCH

BMS:TCB 1 of 1 3/15/23

Description

This work shall consist of constructing drainage infiltration trenches as shown on the plans and as directed by the Engineer, in accordance with MDOT 2020 Standard Specifications for Construction, and the City of Ann Arbor Public Services Department Standard Specifications, as modified herein.

Materials

The materials used for this work shall conform to MDOT 2020 Standard Specifications for Construction including:

- Nonwoven geotextile fabric, minimum 6 oz., Marafi 160N, TerraTex N06, US Fabric 165 NW, or Engineer approved equal.
- 6A washed natural aggregate.

Construction

The entire infiltration trench area shall be excavated to subgrade prior to installing geotextile fabric. Completely remove all roots and deleterious material from the excavated area. Avoid compaction of subgrade soil and scarify compacted subgrade soils to a minimum depth of 6 inches. Do not place geotextile until subgrade surface has been inspected and approved by the Engineer.

Begin installation of stone reservoir immediately after approval of subgrade preparation. Place geotextile in accordance with Manufacturer's standards and recommendations, with minimum 16 inches overlap. Place stone aggregate in uniform layers to the dimensions shown on the Plans. Wrap the stone completely in geotextile fabric.

Measurement and Payment

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

Contract Item (Pay Item)	Pay Unit
Bioretention Area/Infiltration Trench	Cubic Yard
Bioretention Soil Mix (Topsoil and Compost)	Cubic Yard

Payment includes furnishing the labor, equipment, and materials for excavation, disposing of excavated material, and constructing the complete infiltration trench.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
RESTORATION

Description

This item of work shall conform to Division IX, Section II, “Clean-Up & Restoration” of the Public Services Area Standard Specifications, and Sections 816 and 917 of Michigan Department of Transportation (MDOT) 2020 Standard Specifications for Construction, except as specified herein.

Site Clean-Up shall include the removal of all surplus materials from the site including, but not limited to, tools, dirt, rubbish, wooden stakes, construction debris, and excess excavated material; the restoration of all woodland, hardscaped, and landscaped areas; replacement of furniture, fixtures, fences, and similar features disturbed by the work; sweeping/cleaning of road surfaces, drives, and sidewalks; removal of temporary fill, and cleaning culverts.

Turf Establishment includes placing topsoil, seed, fertilizer, and mulch on all disturbed areas that have as approved directed by the Engineer.

Mulch blankets and/or High Velocity Mulch Blankets shall be placed on restored areas as shown on the plans and as directed by the Engineer.

Spray Mulch Anchoring shall be permissible only if specifically shown on the plans or approved by the Engineer.

Materials

The materials shall meet the requirements specified in Sections 816.02 and 917 the Michigan Department of Transportation (MDOT) 2020 Standard Specifications as designated, as specified herein, and as approved by the Engineer:

- Topsoil – 4-inches in depth. See Section 917.06.
- Turf Grass seed mixture shall be THM. See Table 816-1 for description and rate of application, and Table 917-2 for purity, germination, and proportions.
- Fertilizers shall be a Class A. See Section 816.03.B for rate of application, and Section 917.09.B.1 for composition requirements.
- Water used shall be obtained from fresh water sources and shall be free from injurious chemicals and other toxic substances.
- Mulch - Mulch seeded areas with the appropriate materials for the site conditions to promote germination and growth of seed and to mitigate soil erosion and sedimentation.
- Mulch Blankets and High Velocity Mulch Blankets as specified in Section 917.14
- Spray Mulch Anchoring as specified in Section 914.14

Construction, Maintenance, and Acceptance

Turf Establishment, Mulching, and Mulch Blankets shall be in constructed in conformance with section 816 of the MDOT 2020 Standard Specifications.

It is the responsibility of the Contractor to establish a dense area of permanent grasses, sedges, rushes and forbs, free from mounds and depressions prior to final acceptance and payment of this project. Any portion of a seeded area that fails to show a uniform germination shall be reseeded. Such reseeding shall be at the Contractor's expense and shall continue until a dense lawn is established. The Contractor is responsible for restoring all areas disturbed by his construction.

The Contractor shall maintain all seeded areas until they have been accepted by the Engineer. Maintenance shall begin immediately after the seed is in place and continue until final acceptance with the following requirements:

Seeded areas shall be protected and maintained by watering, mowing, and reseeding as necessary, until the period of time when the final acceptance and payment is made by the Engineer for the project, to establish a uniform, weed-free, stand of the specified grasses, sedges, rushes and forbs. Maintenance includes furnishing and installing additional topsoil and reseeding all as may be required to correct all settlement and erosion until the date of final acceptance.

Damage to seeded areas resulting from erosion shall be repaired by the Contractor at the Contractor's expense. Scattered bare spots in seeded areas will not be allowed over three (3) percent of the area nor greater than 6"x 6" in size.

When the above requirements have been fulfilled, the Engineer will accept the seeded areas.

Site Clean-Up must be performed upon the completion of each sub-phase of work (as described in the Detailed Specification for Project Schedule), and not as one single operation at the completion of the entire project.

Measurement and Payment

Measurement and payment for this item of work shall conform to Division IX, Section 2, Item No. 891, Clean-Up & Restoration of the Public Services Area Standard Specifications except as modified herein.

Contract Item (Pay Item)	Pay Unit
Turf Establishment	Square Yard
Mulch Blankets	Square Yard
High Velocity Mulch Blankets	Square Yard
Spray Mulch Anchoring	Square Yard
Site Clean-Up	Lump Sum

The completed work for “Site Clean-Up” will be paid for on a lump sum (LS) basis. Partial payment of Site Clean-Up may be paid as work progresses for areas that are complete, as determined by the Engineer. The sum of partial payments shall not exceed 50% of the total amount until the work on the entire project is complete and ready for final acceptance.

"Turf Establishment” will be measured by area in square yards and shall include the installation of subsequent fertilizer, seed and mulch. This pay item will be paid for at the contract unit price which shall be payment in full for all labor, materials, and equipment needed to accomplish this work as detailed herein.

After initial placement of the topsoil and seed mixture(s), 50 percent of the total quantity placed for “Turf Establishment” will be certified for payment. The remaining 50 percent of the total quantities will be held by the Engineer until such time as all seeded areas have been established and accepted by the Engineer.

Mulch Blankets, High Velocity Mulch Blankets, and Spray Mulch Anchoring will be measured by square yards of area covered. Payment shall include all labor, equipment, and materials necessary to complete installation per the manufacturers’ requirements.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
PROTECTING AND PRESERVING IRRIGATION SYSTEMS

Description

This work shall consist of all labor, materials, and equipment necessary to investigate, locate, save and protect from damage, ensure continued and proper operation during the performance of the project work, re-establish operation as necessary, and, upon completion of all project work, ensure that all existing sprinkler systems located within the project limits, or those affected by the project, are functioning in a satisfactory manner as determined by the Engineer.

Materials

None specified.

Construction

The Contractor shall be aware that properties located within the project limits have underground sprinkler systems that irrigate both private property and portions of the public right-of-way. The irrigation systems have been installed by a variety of private installers and may utilize several different materials and/or suppliers of the various components. Portions of the existing irrigation systems have been installed under paved areas, extend into landscaped islands, or may be required to be located within such areas at the conclusion of the project's construction.

The Contractor shall perform the necessary investigations to determine the precise location of the irrigation systems and all affected components prior to the commencement of construction operations. The Contractor shall determine all impacts to the systems that will result pursuant to the project's construction and take all necessary actions to ensure that the sprinkler systems will remain functional during the project's construction. The Contractor shall re-establish the sprinkler systems in such a manner at appropriate intermediate and final project milestones that the original functionality of the system is maintained to the greatest extent possible.

The Contractor shall contact all property owners prior to the commencement of the work to determine the impacts to their irrigation systems and coordinate with them to ensure satisfactory operation of the irrigation systems during construction.

All work shall be approved by the Engineer and the affected property owner(s) at the conclusion of the project's work.

This is an allowance type item. This allowance is not for solving problems caused by the Contractor's neglect, errors, omissions, or other deeds of the Contractor's own fault. Protecting existing irrigation systems where it is not necessary to remove it to complete the work is included in the contract unit price for the pay item General Conditions, Max $_____.

The Contractor is required to present a detailed scope of work and detailed costs for any work contemplated under the irrigation system allowance to the Engineer. No work is to begin until scope and costs have been finalized and approved by the Engineer in writing.

Thereafter, if the approved price for this work is more or less than the allowance amount in the Contract, the Contract Price shall be adjusted accordingly by Change Order. The payment shall

be made on the basis of the actual approved amount without additional charge or markups for overhead, insurances, bonds, or any other incidental expenses. The Contractor shall be responsible for all coordination involved and for the timely completion of the work to fit his/her schedule.

Measurement and Payment

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

Contract Item (Pay Item)	Pay Unit
Irrigation System, Protection and Maintenance, Allowance	Dollar

The approved price for this item shall include all labor, material, and equipment costs required to complete the work.

APPENDIX

Testing Engineers & Consultants, Inc.

City of Ann Arbor
301 E. Huron Street, 4th Floor
Ann Arbor, Michigan 48104

GEOTECHNICAL INVESTIGATION

FOR

Brooks and Mixtwood Street Improvement Project
Ann Arbor, Michigan

TEC Report: 63122

By:

Testing Engineers & Consultants, Inc.
1343 Rochester Road
P.O. Box 249
Troy, Michigan 48099-0249
(248) 588-6200

December 30, 2022

Testing Engineers & Consultants, Inc.
1343 Rochester Road • PO Box 249 • Troy, Michigan 48099-0249
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Engineering Client Success

TEC Report: 63122
Date Issued: December 30, 2022

Ms. Theresa Bridges
City of Ann Arbor
301 E. Huron Street, 4th Floor
Ann Arbor, Michigan 48104

Re: Geotechnical Investigation For
Brooks and Mixtwood Street Improvement Project
Ann Arbor, Michigan

Dear Ms. Bridges:

Please find enclosed the results of a geotechnical investigation performed at the above referenced site. This geotechnical report presents our field and laboratory results; engineering analysis; and our recommendations for design of water main, as well as important construction considerations.

As you may know, Testing Engineers & Consultants, Inc. (TEC) has fifty-six years of experience in Quality Control Testing and Construction Inspection. We would be pleased to provide these services on this project.

Should you have any questions regarding this report, please let us know. It has been a pleasure to be of service to you.

Respectfully submitted,

TESTING ENGINEERS & CONSULTANTS, INC.

Carey J. Suhan, P.E.,
Vice President, Geotechnical
& Environmental Services

CJS/ln
Enclosure

Certified WBENC Women's Business Enterprise

Testing Engineers & Consultants, Inc.

Ms. Theresa Bridges
City of Ann Arbor
December 30, 2022

TEC Report: 63122

TABLE OF CONTENTS

1.0	INTRODUCTION		1
2.0	FIELD INVESTIGATION		1
3.0	LABORATORY TESTING		2
4.0	GENERAL SUBSURFACE CONDITIONS		2
	4.1	Subsoil Conditions	2
	4.2	Ground Water Observations	3
5.0	ANALYSIS AND RECOMMENDATIONS		4
	5.1	Proposed Project	4
	5.2	Ground Water Conditions	4
	5.3	Recommended Earthwork Operations	4
	5.4	Water Main Construction Considerations	5
	5.5	Pavements	6
	5.6	Cased Borehole Infiltration Test	7
6.0	DESIGN REVIEW AND FIELD MONITORING		8

APPENDIX

TEST BORING LOCATION PLANS

LOGS OF TEST BORINGS

SIEVE ANALYSIS RESULTS

DARWin™ PAVEMENT DESIGN OUTPUT

CASED BOREHOLE INFILTRATION TEST RESULTS

GENERAL NOTES FOR SOIL CLASSIFICATION

Testing Engineers & Consultants, Inc.

Ms. Theresa Bridges
City of Ann Arbor
December 30, 2022

TEC Report: 63122

1.0 INTRODUCTION

This report presents the results of a geotechnical investigation for the proposed water main and pavement replacement along Brooks and Mixtwood Streets in Ann Arbor, Michigan. Authorization to perform this investigation was given verbally by Ms. Theresa Bridges in accordance with TEC Proposal 060-22-270Rev1.

The purpose of this investigation was to obtain information necessary to determine basic engineering properties of soils at the site through a series of test borings and laboratory tests performed on the soil samples obtained during the field investigation. This information has been evaluated to provide the general recommendations for site development preparations, establish requirements for water main designs and identify possible construction problems.

2.0 FIELD INVESTIGATION

Seventeen test borings were drilled on the site at the locations shown on the Test Boring Location Plans. Eighteen borings were scheduled to be drilled, but due to conflict with buried utilities, overhead utilities and overhead tree branches, Boring No. 4 was not drilled. Boring Nos. 1, 5 through 3 and 5 through 16 were drilled on Brooks Street between Miller Avenue and Vesper Street. Boring Nos. 17 and 18 were drilled on Mixtwood Street between Red Oaks Street and Brooks Street. The locations are accurate to within a short distance of the locations shown on the location plans included in the appendix. The test borings were drilled on November 17, 18, 22, 27, 28 and 30 and December 1, 2022 with truck-mounted auger equipment to depths of 10 and 20 feet below the existing grade.

Drilling methods and standard penetration tests were performed in general accordance with the current ASTM D1452 and D1586 procedures, respectively. These procedures specify that a standard 2-inch O.D. split-barrel sampler be driven by a 140-pound hammer with a free fall of 30 inches. The number of hammer blows required to drive the split-barrel sampler through three successive 6-inch increments is recorded on the Test Boring Log. The first 6-inch increment is used for setting the sampler firmly in the soil and the sum of the hammer blows for the second and third increments is referred to as the "Standard Penetration Index" (N). N values were obtained with an automatic trip hammer.

From the standard penetration test a soil sample is recovered in the liner sampler tubes that are located inside the split-barrel sampler. Upon recovery of a soil sample, the liner tubes are removed from the split-barrel sampler and placed in a container which is sealed to minimize moisture losses during transportation to the laboratory. Standard penetration tests are usually made at depths of 2 ½, 5, 7 ½ and 10 feet and at 5-foot depth intervals thereafter. These parameters may vary for a given project depending on the nature of the subsoils and the geotechnical information required.

2.0 FIELD INVESTIGATION (Cont'd)

In addition, pavement cores were obtained at the boring locations with a diamond tipped core barrel. Core measurements are shown on the boring logs. Also, cased borehole infiltration tests were performed at Boring Nos. 1, 5, 16 and 18. The casing was set in the sand and sandy clay at a depth of 8 feet. A cased borehole infiltration test was to be performed at Boring No. 13, but because the soils were clay, which can be considered practically impermeable, no infiltration test was performed.

3.0 LABORATORY TESTING

The laboratory testing consisted of determining the unconfined compressive strength, the natural bulk density and the natural moisture content of the soil samples recovered in the liner sampler tubes. In the unconfined compression tests, the compressive strength of the soil is determined by axially loading a soil sample until failure is observed or 15% strain, whichever occurs first. The above referenced test data are recorded on the boring logs. Some test results may deviate from the norm because of variations in texture, imperfect samples, presence of pebbles and/or sand streaks, etc. The results are still reported although they may not be relevant.

The particle size distribution of eight granular soil samples was also determined. The distribution provides soil classification information, structural support parameters, and estimates of the permeability and permeability-related behavior of the granular soils. The results are included in the appendix.

Samples taken in the field are retained in our laboratory for 60 days and are then destroyed unless special disposition is requested by the client. Samples retained over a long period of time are subject to moisture loss and are then no longer representative of the conditions initially encountered.

4.0 GENERAL SUBSURFACE CONDITIONS

4.1 Subsoil Conditions

The soil conditions encountered in the borings are presented on the individual boring logs. Each log presents the soil types encountered at that location as well as laboratory test data, ground water data, and other pertinent information. Descriptions of the various soil consistencies, relative densities and particle sizes are given in the Appendix. Definitions of the terms and symbols utilized in this report may be found in ASTM D653.

4.1 Subsoil Conditions (Cont'd)

The hot mix asphalt (HMA) pavement thickness varied from 1 ½ inches at Boring No. 3 to 11 inches at Boring No. 16. Fill below the pavement was encountered at 13 borings. The fill at Boring Nos. 2, 3, 6, 7, 13, 14 and 16 consisted of sand, gravelly sand, and clayey sand that ranged in thickness from 7 to 13 ½ inches at six of the borings and extended to depths of 2'4" and 2'8" at Boring Nos. 6 and 16, respectively. At Boring Nos. 8 through 11, the underlying fill consisted of clayey well graded sand and crushed gravel that measured in thickness from 8 to 12 ¾ inches at Boring Nos. 9 through 11 and extends to a depth of 2'2" at Boring No. 8.

At Boring No. 12, the fill consisted of gravelly, clayey well graded sand that was about 7 inches thick. The fill at Boring No. 5 consisted of clay that was measured to be 3 ¾ inches thick.

At Boring No. 9, additional fill consisting of black or discolored clay with some silt extended to a depth of 4'11" below the existing pavement surface. A petroleum type of odor was detected by the drillers in the black clay between a depth of 1 ½ feet and 4'3". Occasionally, some clay, silt, gravel or crushed asphalt was encountered in the sand, gravelly sand and clayey sand fill.

The underlying native soils were generally various layers of loose to dense sand and plastic to hard clay and sandy clay with some silt. Silt layers were encountered in the deeper sand at Boring Nos. 1 and 2. Wet sand seams were encountered in the clay at Boring Nos. 7 and 9 at depths below 18 feet at Boring No. 7 and between depths of 10 ½ and 17 feet at Boring No. 9. The dense sand was encountered at Boring No. 11 at a depth of 13 feet and extended to a depth of 18 feet. The hard clay was encountered at Boring Nos. 6, 7 and 9 through 11 and 17 at depths ranging from 8 to 10 feet at the shallow borings (Nos. 6, 7 and 17) and from 17 to 10 feet at the deep borings (Nos. 9 through 11). The hard clay extended to the terminal depth of the borings.

Standard penetration values range from 4 blows per foot to 50 blows for a penetration of 3 inches with unconfined compressive strength of 580 to 16,810 pounds per square foot (psf). Bulk densities range from 107 to 145 pounds per cubic foot with moisture contents of 3 to 25 percent of the dry weight of the soil.

4.2 Ground Water Observations

Water level readings were taken in the bore holes during and after the completion of drilling. These observations are noted on the respective Test Boring Logs. Ground water was first encountered during drilling at Boring Nos. 7, 9 and 10 at depths of 18 feet, 4'11" and

4.2 Ground Water Observations (Cont'd)

14 ½ feet, respectively. After completion of drilling and removal of the augers, water was measured at depths of 18'3", 3'4" and 14'1", respectively, at which depths the boreholes at Boring Nos. 9 and 10 caved in. No water was observed in the other 14 borings either during drilling or after completion of drilling.

5.0 ANALYSIS AND RECOMMENDATIONS

5.1 Proposed Project

The proposed project is to consist of the replacement of water mains and pavements at Brooks Street between Miller Avenue and Vesper Street and Mixtwood Street between Red Oaks Street and Brooks Street.

5.2 Ground Water Conditions

The position of water levels found in test borings may vary somewhat depending on seasonal precipitation. At the level encountered in Boring No. 9, ground water will need to be addressed for design and installation of the water main in the area of Boring No. 9. The water main invert at this boring will be in the plastic clay with wet sand seams.

Ground water should be controllable by pumping from properly prepared sumps in the excavations.

5.3 Recommended Earthwork Operations

Within the route of the water main replacement, the pavement should be removed prior to the site being graded. Excavation may then proceed until the required depth is reached.

In the area of Boring No. 9, wet sand seams were encountered in the plastic clay at the anticipated water main invert depth. If ground water cannot be sufficiently controlled, 1 to 3 inch size crushed stone can be placed to stabilize the bottom as will be discussed in Section 5.4. Where such over excavation is performed the excavation and replacement with engineered fill should extend outward from the edge of either side of the pipe a distance equal to the depth of the overexcavation. As outlined in the Ground Water Conditions section, dewatering will need to be performed during excavation operations to prevent destabilization of the bottom of the excavations. Pumping from properly prepared sumps should be adequate.

5.3 Recommended Earthwork Operations (Cont'd)

In addition, loose sand was encountered at the anticipated water main invert depth at Boring Nos. 2 and 10. The sand should be thoroughly compacted before installation of the pipe.

Engineered backfill required for construction excavations or fill required to achieve desired grades should preferably consist of clean and well graded granular soils. On-site granular material, where clay and silt content is minimal and the material meets MDOT Class II classification, should be satisfactory for use, particularly for balancing and grading the site. Fill should be placed in uniform layers not more than 9 inches in thickness with the soils in each layer compacted to the minimum MDOT requirement. Fill should be at approximately the optimum moisture content during placement and compaction. Furthermore, frozen material must not be used as fill and fill should not be placed on frozen ground.

Within the depth of the excavation, where the upper 7 feet is loose to medium compact sand, lateral support structure or side sloping with a minimum 1H:1V ratio will be required for anticipated excavations. Where the excavation extends into plastic to firm clay, such as at Boring Nos. 8, 9, 13, 17 and 18, a minimum slope of 1H:1V should be satisfactory. Where the excavation extends into stiff to extremely stiff clay, such as at Boring Nos. 6, 7, 12, 14 and 15, a minimum of 1/2H:1V should be satisfactory. In any case, MIOSHA regulations and requirements for worker protection should be followed. Because the new water main route is in the roadway and is adjacent to curbs and sidewalks, sloping may not be feasible. For temporary construction of the trench, support may be provided by cantilevered sheeting supported by struts braced across the trench. Proper bracing of the excavation will improve stability of the cut. Very short term sheeting may be designed for a lateral earth pressure of 40 psf per foot of depth. This value does not include a factor of safety for construction surcharge. Sheeting extending between the trench and any wet sand seams would have the added benefit of cutting off of some ground water flow.

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

5.4 Water Main Construction Considerations

The depth of the proposed water main is assumed to be approximately 6 to 8 feet below existing ground surface. In the area of Boring No. 9 at this depth, the pipe will be supported on plastic clay with wet sand seams. As outlined in the Ground Water Considerations section, the ground water will need to be controlled during the excavation operations. If ground water

5.4 Water Main Construction Considerations (Cont'd)

cannot be adequately controlled some softening and destabilization of the clayey soil may be expected and the soils may need to be undercut and replaced with one to three inch size crushed aggregated as outlined in the Recommended Earthwork Operations section. The engineered crushed aggregate fill should be placed in 12 inch lifts and each life compacted until stable. The top of the fill should be topped with 21AA crushed aggregate to close up the void spaces. This stabilization will help minimize the potential for piping and detrimental settlement of supporting soils.

For excavations with near vertical sides of 6 feet and deeper extending into the sand the factor of safety against bottom heave is about 12 for the loose sand and clayey sand and 6 for the plastic clay which is above the desired factor of safety of 1.5 to 2.0. The factor of safety will depend on the size of the trench and particular soil conditions. However, in sandy soils heave is generally not a concern. Of more importance is ground water control to maintain a stable excavation.

Excavation should be done in dry conditions by sufficiently lowering and controlling the ground water prior to commencement of construction. The bottom of excavation must be free of standing water and the level of water must be kept several feet below the base of excavation. Excavation should start from the lower end of water main grade line and proceed upgrade.

It is recommended that a minimum of 6 inches of clean granular bedding be used beneath and surrounding the pipe.

5.5 Pavements

Where excavations for the new water main is performed, new pavement is required. Because the water main trench excavation will take up a major portion of the roadway, it is expected that the entire width of the roadway will be reconstructed. The subgrade resulting from the site preparation, as outlined in the recommended earthwork operations section, will provide a fair subgrade for support of pavements.

For Brooks and Mixtwood Streets, the following section is recommended:

2 inch bituminous concrete wearing course (MDOT 5E1 or 4E1)
2 ½ inch bituminous concrete leveling course (MDOT 4E1)
10 inches untreated aggregate base (MDOT 21AA)

The above pavement cross section is determined from the DARWin™ Pavement Design Program. We assumed an ADT of 2,500 with two percent of the traffic being commercial.

5.5 Pavements (Cont'd)

Based on the projected road reconstruction, the annual growth is estimated to be about 1.0 percent. A 20 year design life and an estimated CBR of 3 was used to design the pavement. The result from the DARWin™ Pavement Design Program can be found in the appendix. If expected traffic volumes or other data is greater than this we should be consulted to re-evaluate the data.

Air entrained MDOT P1 grade concrete with partial slag cement replacement is recommended for new curb and gutter, mainline pavement at intersections & drive approaches or miscellaneous flatwork. If a high-performance concrete pavement is desired, MDOT P1M concrete is recommended. TEC recommends that the proposed concrete mixes effectively mitigate the potential for ASR reactivity utilizing a combination of methods such as partial slag cement substitution, use of low alkali Portland cement, and verification testing of the ASR expansion potential of the proposed fine aggregates and/or combinations of cementitious materials.

The pavement should be properly crowned and shaped in order to provide effective surface drainage and prevent water ponding. A 1.5 percent slope is recommended. Edge drains along the perimeter of the pavement and finger drains around catch basins are recommended to prevent water from infiltrating the subgrade. All drains should be connected to storm sewer or other outlets.

The pavement recommendations presented above are intended to provide a serviceable pavement for an extended period of time. However, all pavements show deterioration with time and require regular maintenance such as occasional repairs of cracks and pot holes. The need for such maintenance efforts is not necessarily indicative of premature pavement failure. The serviceable life of the pavement can be substantially reduced if maintenance and minor repair is not performed in a timely manner.

5.6 Cased Borehole Infiltration Test

A cased borehole test was performed in four boreholes. The cased borehole test consists of installing a steel casing in an augered hole. The casing is pushed to the infiltration interface depth and filled with water. In this case, the casing was set at a depth of 8 feet below existing ground surface which is approximately the design infiltration depth. The testing was performed in accordance with the Low Impact Design Manual for Michigan and Washtenaw County Water Resources Commissioner (WCWRC) guidelines.

The table below outlines the encountered soil, the depth at which the test was performed and the determined infiltration rate in inches per hour.

5.6 Cased Borehole Infiltration Test (Cont'd)

Boring No.	Soil Description	Test Depth (A)	Infiltration Rate, Inches Per Hour	Design Infiltration Rate, Inches Per Hour (B)
1	Brown fine sand with silt layers	8	0.2	0.1
5	Brown fine sand with some silt	8	4.5	2.2
16	Brown fine sand with some silt	8	0.56	0.28
18	Brown sandy clay with some silt & trace of gravel	8	0.5	0.25

A. Below existing ground surface
B. Based on a safety factor of 2

The infiltration capacity of these soils will be limited by the limited vertical extent of these sandy layers, and the ground water encountered below. Furthermore, variations in the clay content can greatly reduce the infiltration.

A safety factor of 2 should be incorporated in the design of the infiltration by the designer.

6.0 DESIGN REVIEW AND FIELD MONITORING

The evaluations and recommendations presented in this report relative to site preparation and water main installation have been formulated on the basis of assumed and provided data relating to the location, type and finished grades for the proposed structure and adjacent areas. Any significant change in this data should be brought to our attention for review and evaluation with respect to the prevailing subsoil conditions.

When the plans are finalized, a consultation should be arranged with us for a review to verify that the evaluations and recommendations have been properly interpreted.

Soil conditions at the site could vary from those generalized on the basis of test borings made at specific locations. It is therefore recommended that Testing Engineers & Consultants, Inc. be retained to provide soil engineering services during the site preparation, excavation and

6.0 DESIGN REVIEW AND FIELD MONITORING (Cont'd)

water main phases of the proposed project. This is to observe compliance with the design concepts, specifications and recommendations. Also, this provides opportunity for design changes to be made in the event that subsurface conditions differ from those anticipated prior to the start of construction.

Gary E. Putt, P.E.
Senior Project Engineer

Carey J. Suhan, P.E.
Vice President, Geotechnical
& Environmental Services

GEP/CJS/ln

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Testing Engineers & Consultants, Inc.

Ms. Theresa Bridges
City of Ann Arbor
December 30, 2022

TEC Report: 63122

APPENDIX

Test Boring Location Plans

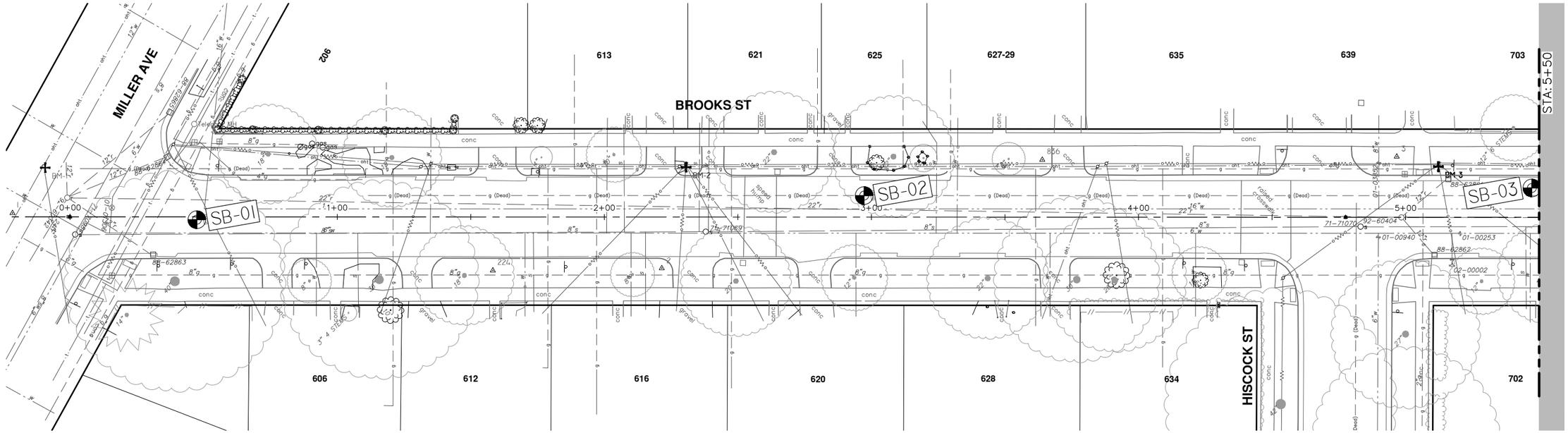
Logs Of Test Borings

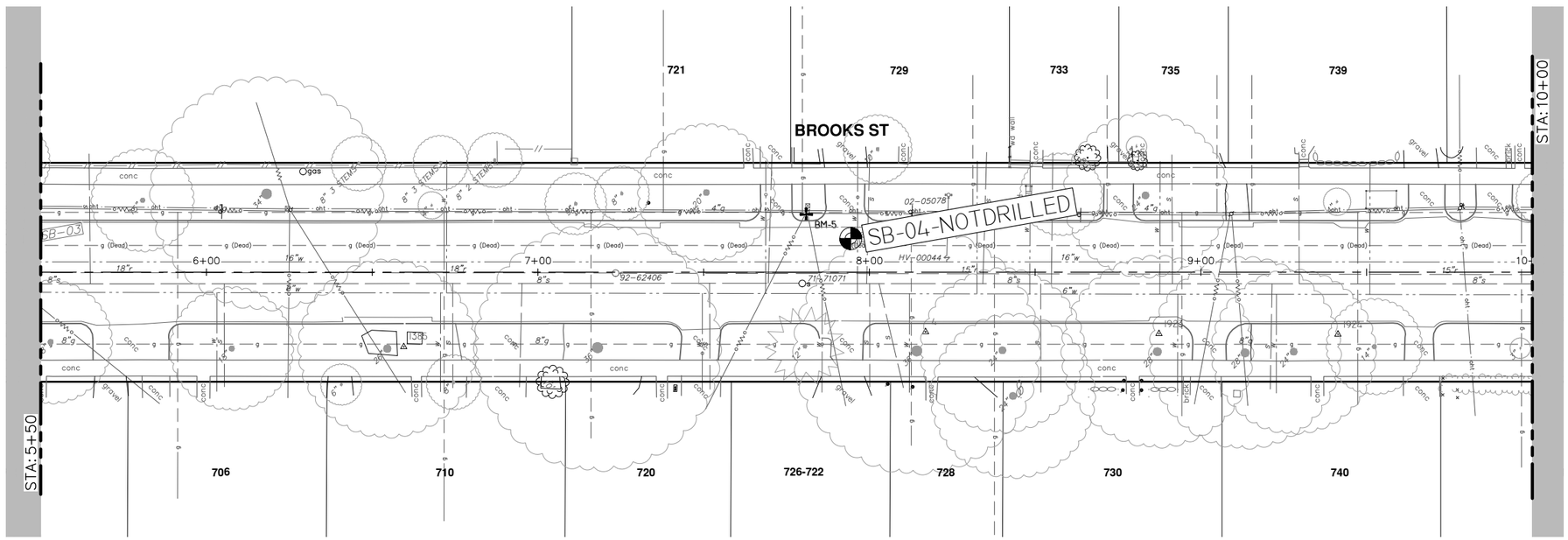
Sieve Analysis Results

DARWin™ Pavement Design Output

Cased Borehole Infiltration Test Results

General Notes For Soil Classification





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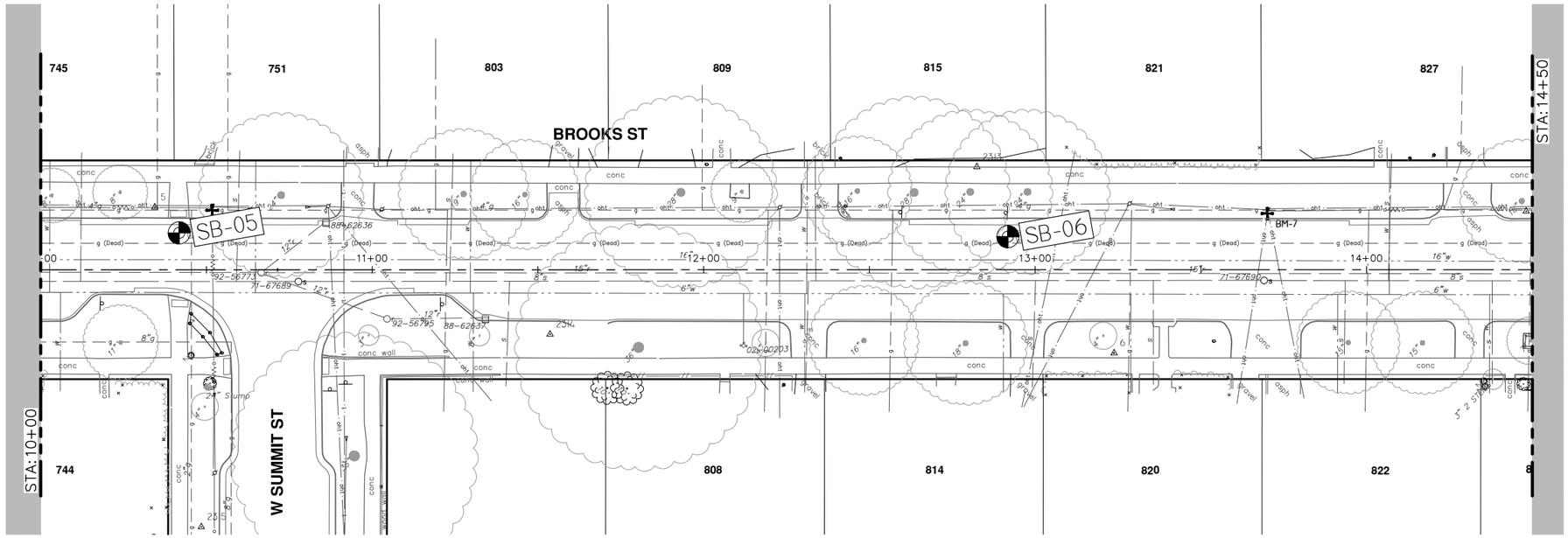

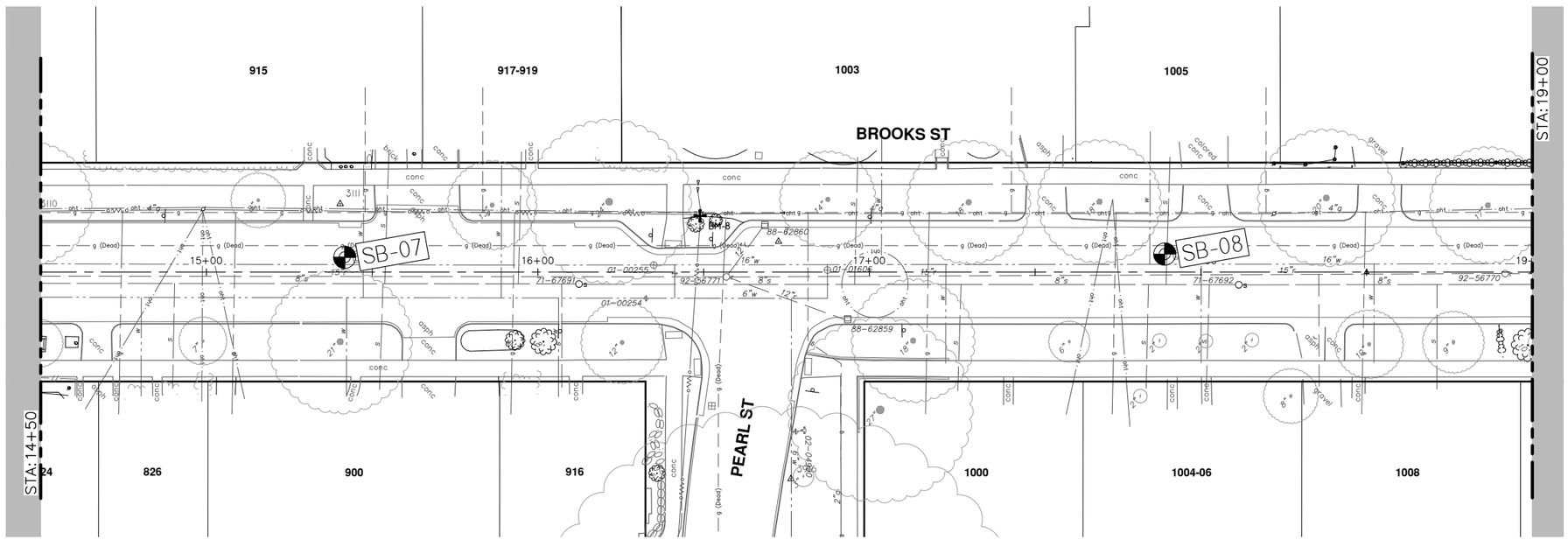

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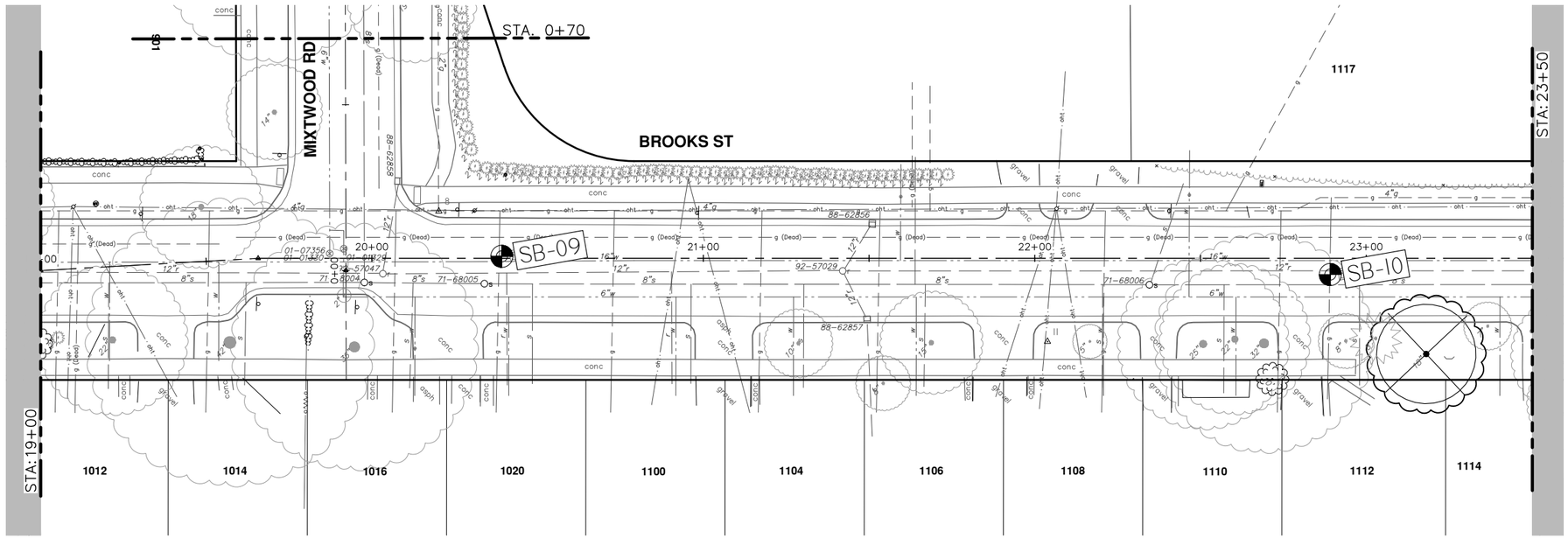

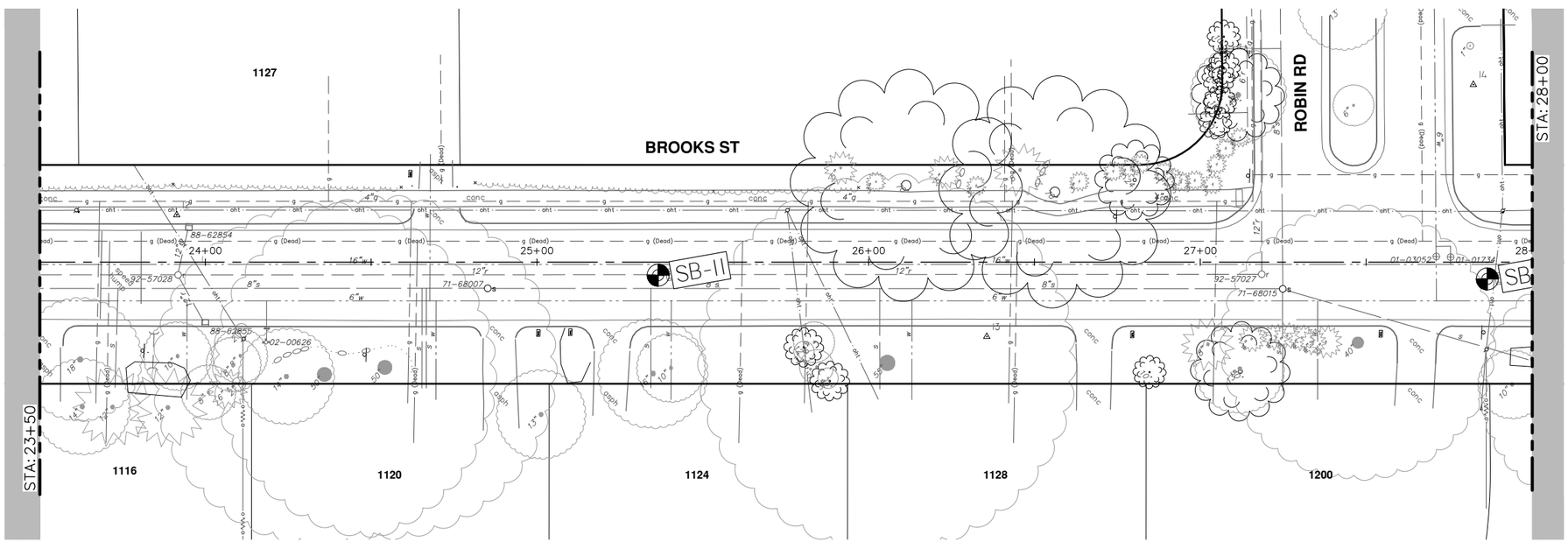

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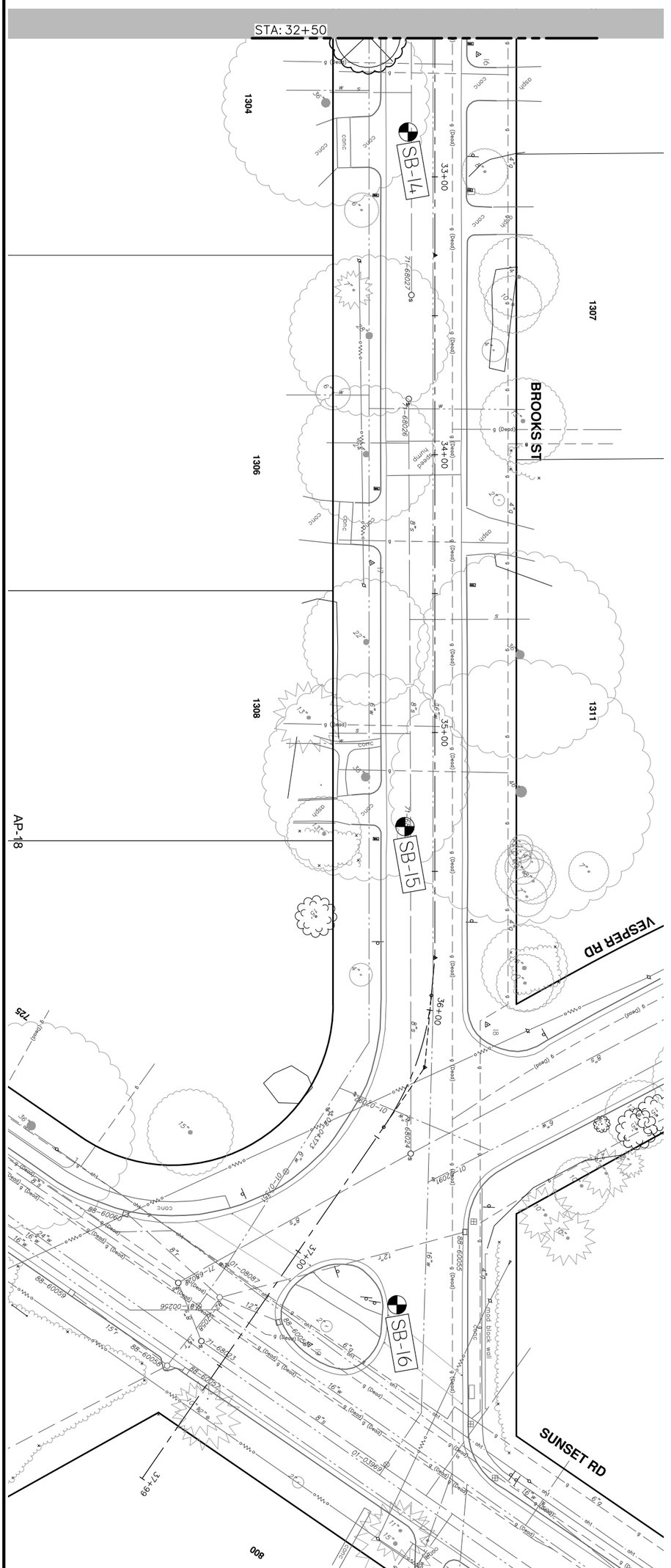

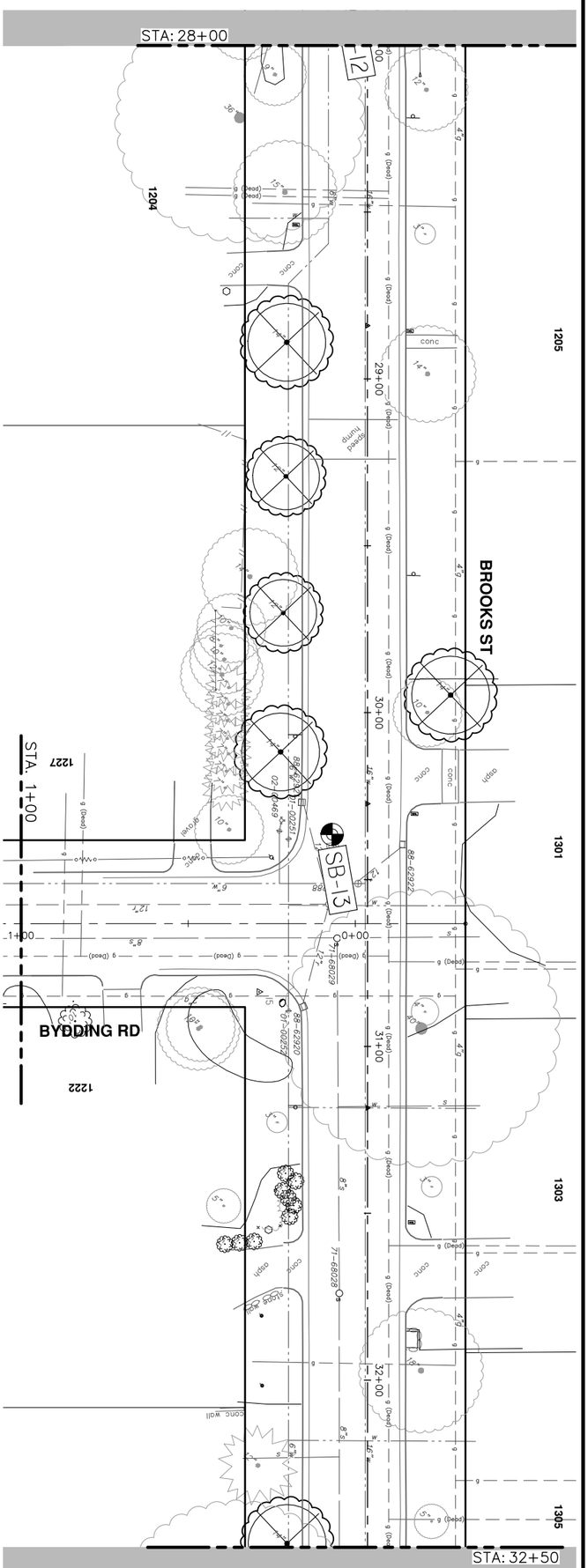

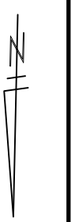

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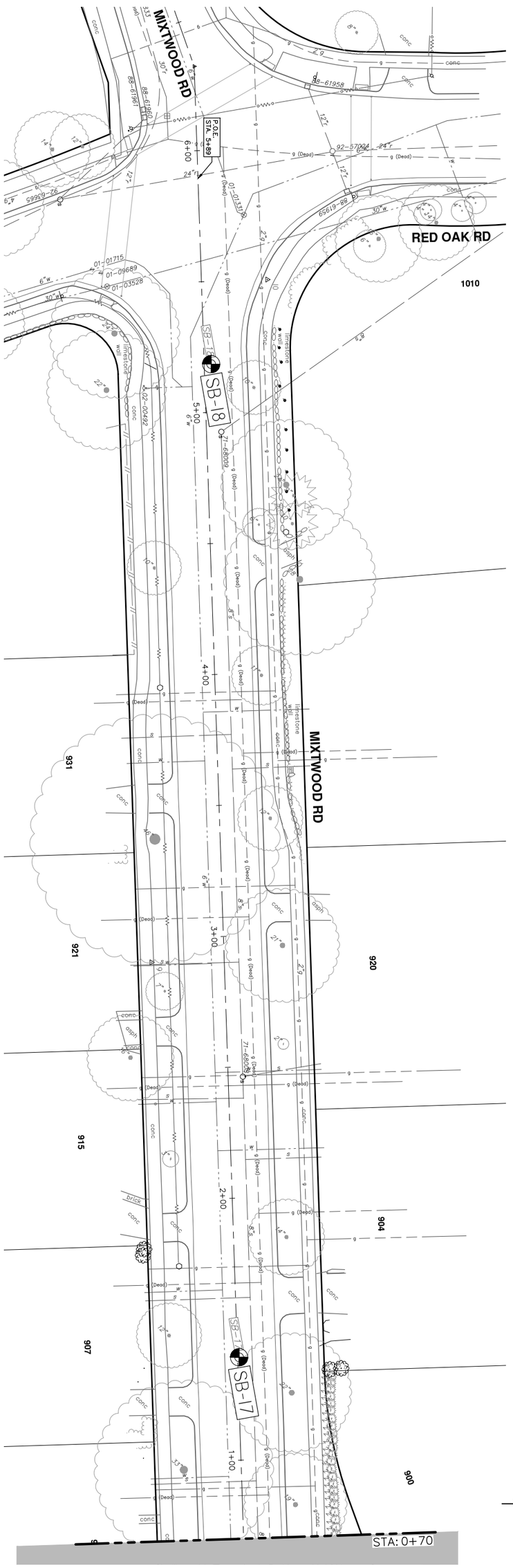

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(248) 588-6200 or (313) T-E-S-T-I-N-G
Fax (248) 588-6232

Boring No.: 1 **Job No.:** 63122

Project: Brooks and Mixtwood Street Improvement

Client: City of Ann Arbor

Location: Ann Arbor, Michigan

Type of Rig: Truck

Drilled By: R. Favor

Drilling Method: Solid Stem Augers

Started: 11/28/2022

Ground Surface Elevation:

Completed: 11/28/2022

Depth (ft)	Sample Type	N	Strata Change	Soil Classification	w	d	qu
			.46	ASPHALT (5 1/2")			
	LS	4 4 4			12.6	129	
2.5				Loose Moist Brown Clayey Fine SAND With Some Silt & Trace Of Gravel			
			3.5				
	LS	4 5 8		Medium Compact Moist Brown Very Fine SAND	9.3	140	
5.0							
	LS	5 5 6			21.1	128	
7.5			8				
	LS	3 5 9		Medium Compact Moist Brown Fine SAND With Silt Layers	18.5	129	
10.0			10				
				Bottom of Boring at 10'			
12.5							
15.0							
17.5							
20.0							
22.5							

"N" - Standard Penetration Resistance
SS - 2" I.D. Split Spoon Sample
LS - Sectional Liner Sample
ST - Shelby Tube Sample
AS - Auger Sample

w - H2O, % of dry weight
d - Bulk Density, pcf
qu - Unconfined Compression, psf
DP - Direct Push
RC - Rock Core

Water Encountered: None

At Completion: None

Boring No. 1

Testing Engineers & Consultants, Inc.

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Fax (248) 588-6232

Boring No.: 2 **Job No.:** 63122

Project: Brooks and Mixtwood Street Improvement

Client: City of Ann Arbor

Location: Ann Arbor, Michigan

Type of Rig: Truck

Drilled By: R. Favor

Drilling Method: Solid Stem Augers

Started: 11/18/2022

Ground Surface Elevation:

Completed: 11/18/2022

Depth (ft)	Sample Type	N	Strata Change	Soil Classification	w	d	qu
			.33				
			.92	ASPHALT (4")			
	LS	4			15.2	133	
		6		Moist Brown Gravelly Fine Sand With Some Clay-FILL (7")			
2.5		5					
	LS	3		Firm Moist Brown Sandy CLAY With Some Silt & Trace Of Gravel	18.4	131	
		6					
5.0		4					
			6				
	LS	2		Loose Moist Brown Fine SAND With Trace Of Gravel	7.4	127	
		2					
7.5		3					
			8.5				
	LS	3			17.2	122	
		3		Loose Moist Brown Fine SAND With Trace Of Gravel & Some Silt Layers			
10.0		2	10				
				Bottom of Boring at 10'			
12.5							
15.0							
17.5							
20.0							
22.5							

"N" - Standard Penetration Resistance
SS - 2" I.D. Split Spoon Sample
LS - Sectional Liner Sample
ST - Shelby Tube Sample
AS - Auger Sample

w - H2O, % of dry weight
d - Bulk Density, pcf
qu - Unconfined Compression, psf
DP - Direct Push
RC - Rock Core

Water Encountered: None

At Completion: None

Boring No. 2

Testing Engineers & Consultants, Inc.

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Boring No.: 3 **Job No.:** 63122

Project: Brooks and Mixtwood Street Improvement

Client: City of Ann Arbor

Location: Ann Arbor, Michigan

Type of Rig: Truck

Drilled By: R. Favor

Drilling Method: Solid Stem Augers

Started: 11/18/2022

Ground Surface Elevation:

Completed: 11/18/2022

Depth (ft)	Sample Type	N	Strata Change	Soil Classification	w	d	qu
			.13				
	LS	5 4 4	1.25	ASPHALT (1 1/2")	10.6	130	
2.5			3	Moist Dark Brown Medium Sand With Trace Of Gravel, Some Clay & Crushed Asphalt-FILL			
	LS	2 4 4		Loose Moist Brown Fine SAND With Trace Of Gravel	14.2	126	
5.0			6	Loose Moist Brown Silty SAND With Trace Of Gravel	3.4	130	
	LS	4 6 7		Medium Compact Moist Brown Fine To Medium SAND With Trace Of Gravel			
7.5					9.8	140	
	LS	4 5 9					
10.0			12				
12.5				Loose Moist Brown Medium SAND With Trace Of Gravel	5.2	131	
	LS	3 4 5					
15.0							
17.5					6.8	136	
	LS	4 4 17	19.5 20				
20.0				Stiff Moist Brown CLAY With Some Silt & Trace Of Gravel Bottom of Boring at 20'			
22.5							

"N" - Standard Penetration Resistance
SS - 2" I.D. Split Spoon Sample
LS - Sectional Liner Sample
ST - Shelby Tube Sample
AS - Auger Sample

w - H2O, % of dry weight
d - Bulk Density, pcf
qu - Unconfined Compression, psf
DP - Direct Push
RC - Rock Core

Water Encountered: None

At Completion: None

Boring No. 3

Testing Engineers & Consultants, Inc.

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Fax (248) 588-6232

Boring No.: 5 **Job No.:** 63122

Project: Brooks and Mixtwood Street Improvement

Client: City of Ann Arbor

Location: Ann Arbor, Michigan

Type of Rig: Truck

Drilled By: R. Favor

Drilling Method: Solid Stem Augers

Started: 11/18/2022

Ground Surface Elevation:

Completed: 11/18/2022

Depth (ft)	Sample Type	N	Strata Change	Soil Classification	w	d	qu
			.69				
	LS	6	1	ASPHALT (8 1/4")	5.6	138	
		9					
2.5		13	2.5	Wet Dark Brown Clay With Trace Of Gravel-FILL			
	LS	5		Medium Compact Moist Brown Medium To Coarse SAND With Trace Of Gravel	4.0	136	
		10					
5.0		12					
				Medium Compact Moist Brown Fine SAND With Some Silt			
	LS	7			2.9	139	
		8					
7.5		12					
	LS	6			2.9	143	
		9					
10.0		10	10				
				Bottom of Boring at 10'			
12.5							
15.0							
17.5							
20.0							
22.5							

"N" - Standard Penetration Resistance
SS - 2" I.D. Split Spoon Sample
LS - Sectional Liner Sample
ST - Shelby Tube Sample
AS - Auger Sample

w - H2O, % of dry weight
d - Bulk Density, pcf
qu - Unconfined Compression, psf
DP - Direct Push
RC - Rock Core

Water Encountered: None

At Completion: None

Boring No. 5

Testing Engineers & Consultants, Inc.

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(248) 588-6200 or (313) T-E-S-T-I-N-G
Fax (248) 588-6232

Boring No.: 6 **Job No.:** 63122

Project: Brooks and Mixtwood Street Improvement

Client: City of Ann Arbor

Location: Ann Arbor, Michigan

Type of Rig: Truck

Drilled By: R. Favor

Drilling Method: Solid Stem Augers

Started: 11/30/2022

Ground Surface Elevation:

Completed: 11/30/2022

Depth (ft)	Sample Type	N	Strata Change	Soil Classification	w	d	qu
			.35	ASPHALT (4 1/4")			
	LS	5			7.6	107	580
		5	2.33	Medium Compact Moist Brown Clayey Fine SAND With Some Silt & Trace Of Gravel			
2.5		6					
	LS	6			8.7	137	4450
		11		Stiff Moist Brown CLAY With Some Silt, Trace Of Gravel & Sand Seams			
5.0		15	5.5				
	LS	17		Extremely Stiff Moist Brown CLAY With Some Sand, Silt & Trace Of Gravel	8.4	141	9480
		22					
7.5		28	8				
	LS	22		Hard Moist Brown CLAY With Some Sand, Silt & Trace Of Gravel	7.3	138	
		32	10				
10.0		39		Bottom of Boring at 10'			
12.5							
15.0							
17.5							
20.0							
22.5							

"N" - Standard Penetration Resistance
SS - 2" I.D. Split Spoon Sample
LS - Sectional Liner Sample
ST - Shelby Tube Sample
AS - Auger Sample

w - H2O, % of dry weight
d - Bulk Density, pcf
qu - Unconfined Compression, psf
DP - Direct Push
RC - Rock Core

Water Encountered: None

At Completion: None

Boring No. 6

Testing Engineers & Consultants, Inc.

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Fax (248) 588-6232

Boring No.: 7 **Job No.:** 63122

Client: City of Ann Arbor

Type of Rig: Truck

Drilling Method: Solid Stem Augers

Ground Surface Elevation:

Project: Brooks and Mixtwood Street Improvement

Location: Ann Arbor, Michigan

Drilled By: R. Favor

Started: 12/1/2022

Completed: 12/1/2022

Depth (ft)	Sample Type	N	Strata Change	Soil Classification	w	d	qu
			.35				
	LS	3	1.25	ASPHALT (4 1/4")	11.7	131	
		3					
2.5		4		Moist Dark Brown Clayey Fine Sand With Some Silt & Trace Of Gravel-FILL			
			3.5				
	LS	5		Plastic Moist Brown Sandy CLAY With Some Silt & Trace Of Gravel	7.3	135	
		6					
5.0		7					
			5.5				
	LS	13		Firm Moist Brown Sandy CLAY With Some Silt & Trace Of Gravel	7.6	135	
		21					
7.5		27					
				Extremely Stiff Moist Brown Sandy CLAY With Some Silt & Trace Of Gravel			
	LS	26	9		6.9	144	
		38					
10.0		43		Hard Moist Brown CLAY With Some Silt & Trace Of Gravel			
12.5							
			13.5				
	LS	23			6.4	145	
		42		Hard Moist Variegated CLAY With Some Silt & Trace Of Gravel			
15.0		42					
17.5			18				
	LS	23		Hard Moist Gray CLAY With Some Silt, Trace Of Gravel & Wet Sand Seams	6.5	145	
		27					
20.0		36	20				
				Bottom of Boring at 20'			
22.5							

"N" - Standard Penetration Resistance
SS - 2" I.D. Split Spoon Sample
LS - Sectional Liner Sample
ST - Shelby Tube Sample
AS - Auger Sample

w - H2O, % of dry weight
d - Bulk Density, pcf
qu - Unconfined Compression, psf
DP - Direct Push
RC - Rock Core

Water Encountered: 18'0"

At Completion: 18'3"

Boring No. 7

Testing Engineers & Consultants, Inc.

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Boring No.: 8 **Job No.:** 63122

Project: Brooks and Mixtwood Street Improvement

Client: City of Ann Arbor

Location: Ann Arbor, Michigan

Type of Rig: Truck

Drilled By: R. Favor

Drilling Method: Solid Stem Augers

Started: 12/1/2022

Ground Surface Elevation:

Completed: 12/1/2022

Depth (ft)	Sample Type	N	Strata Change	Soil Classification	w	d	qu
			.38	ASPHALT (4 1/2")	8.3	142	
	LS	7					
		5	2.17	Loose Moist Brown Well Graded Clayey Sand With Crushed Gravel-FILL			
2.5		4	3				
	LS	3			15.0	126	
		3		Firm Moist Brown Sandy CLAY With Some Silt & Trace Of Gravel			
5.0		4					
	LS	2		Plastic Moist Brown Sandy CLAY With Some Silt & Trace Of Gravel	11.7	126	
		3					
7.5		4					
					11.7	131	
	LS	6	9.33				
		7	10	Stiff Moist Brown CLAY With Some Silt & Trace Of Gravel			
10.0		13		Bottom of Boring at 10'			
12.5							
15.0							
17.5							
20.0							
22.5							

"N" - Standard Penetration Resistance
SS - 2" I.D. Split Spoon Sample
LS - Sectional Liner Sample
ST - Shelby Tube Sample
AS - Auger Sample

w - H2O, % of dry weight
d - Bulk Density, pcf
qu - Unconfined Compression, psf
DP - Direct Push
RC - Rock Core

Water Encountered: None

At Completion: None

Boring No. 8

Testing Engineers & Consultants, Inc.

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(248) 588-6200 or (313) T-E-S-T-I-N-G
Fax (248) 588-6232

Boring No.: 9 **Job No.:** 63122

Project: Brooks and Mixtwood Street Improvement

Client: City of Ann Arbor

Location: Ann Arbor, Michigan

Type of Rig: Truck

Drilled By: R. Favor

Drilling Method: Solid Stem Augers

Started: 11/30/2022

Ground Surface Elevation:

Completed: 12/1/2022

Depth (ft)	Sample Type	N	Strata Change	Soil Classification	w	d	qu
			.44				
	LS	8	1.5	ASPHALT (5 1/4")	20.7	120	
2.5		3 1		Moist Brown Clayey Well Graded Sand With Crushed Gravel-FILL			
	LS	4	4.25	Soft Moist Black Clay With Some Silt & Petroleum Odor-FILL	21.4	128	
5.0		2 2	4.92	Soft Moist Discolored Clay With Some Silt, Trace Of Gravel & Sand Seams-FILL	10.9	136	
	LS	3					
7.5		3 3		Plastic Moist Brown CLAY With Some Silt, Trace Of Gravel & Wet Sand Seams			
	LS	6	9		9.3	137	1650
10.0		4 4	10.5	Plastic Moist Brown CLAY With Some Silt & Trace Of Gravel			
				Stiff Moist Gray CLAY With Some Silt, Trace Of Gravel & Wet Sand Seams			
12.5							
	LS	3			10.0	141	
15.0		6 16					
			17				
17.5				Hard Moist Gray CLAY With Some Silt & Trace Of Gravel			
	LS	20			6.6	145	
20.0		37 48	20				
				Bottom of Boring at 20'			
22.5							

"N" - Standard Penetration Resistance
SS - 2" I.D. Split Spoon Sample
LS - Sectional Liner Sample
ST - Shelby Tube Sample
AS - Auger Sample

w - H_2O, % of dry weight
d - Bulk Density, pcf
qu - Unconfined Compression, psf
DP - Direct Push
RC - Rock Core

Water Encountered: 4'11"

At Completion: 3'4"

Boring No. 9

Testing Engineers & Consultants, Inc.

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Fax (248) 588-6232

Boring No.: 10 **Job No.:** 63122

Project: Brooks and Mixtwood Street Improvement

Client: City of Ann Arbor

Location: Ann Arbor, Michigan

Type of Rig: Truck

Drilled By: R. Favor

Drilling Method: Solid Stem Augers

Started: 11/30/2022

Ground Surface Elevation:

Completed: 11/30/2022

Depth (ft)	Sample Type	N	Strata Change	Soil Classification	w	d	qu
			.4				
	LS	6	1.25	ASPHALT (4 3/4")	11.5	126	2470
		6					
2.5		6	3	Moist Brown Clayey Well Graded Sand With Crushed Gravel-FILL			
	LS	5			11.5	127	1980
		4		Firm Moist Brown CLAY With Some Silt, Trace Of Gravel & Sand Seams			
5.0		6					
	LS	3		Plastic Moist Brown CLAY With Some Silt, Trace Of Gravel & Sand	4.8	116	
		3	7				
7.5		5					
			8.5	Loose Moist Brown Fine SAND With Trace Of Gravel			
	LS	5			3.6	129	
		7		Medium Compact Moist Brown Fine SAND With Some Silt			
10.0		12					
12.5							
	LS	10			8.6	136	
		12	14.5				
15.0		14		Medium Compact Wet Brown Medium To Coarse SAND With Trace Of Gravel			
17.5							
	LS	28	19		9.3	143	16810
		57/6"	20	Hard Moist Gray CLAY With Some Silt & Trace Of Gravel			
20.0				Bottom of Boring at 20'			
22.5							

"N" - Standard Penetration Resistance
SS - 2" I.D. Split Spoon Sample
LS - Sectional Liner Sample
ST - Shelby Tube Sample
AS - Auger Sample

w - H2O, % of dry weight
d - Bulk Density, pcf
qu - Unconfined Compression, psf
DP - Direct Push
RC - Rock Core

Water Encountered: 14'6"

At Completion: 14'1"

Boring No. 10

Testing Engineers & Consultants, Inc.

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Boring No.: 11 **Job No.:** 63122

Project: Brooks and Mixtwood Street Improvement

Client: City of Ann Arbor

Location: Ann Arbor, Michigan

Type of Rig: Truck

Drilled By: R. Favor

Drilling Method: Solid Stem Augers

Started: 12/1/2022

Ground Surface Elevation:

Completed: 12/1/2022

Depth (ft)	Sample Type	N	Strata Change	Soil Classification	w	d	qu
			.58				
			1.25	ASPHALT (7")			
	LS	3			17.3	123	
		4					
2.5		3		Moist Brown Clayey Well Graded Sand With Crushed Gravel-FILL			
	LS	4	4	Plastic Moist Brown CLAY With Some Silt & Trace Of Gravel	24.7	116	
		4					
5.0		4					
				Plastic Moist Variegated CLAY With Some Silt, Trace Of Gravel & Sand Seams			
	LS	6	6.5		3.5	130	
		16					
7.5		30	8	Compact Moist Brown Fine SAND With Trace Of Gravel			
	LS	11		Medium Compact Moist Brown Fine SAND With Trace Of Gravel & Clay Layers	8.9	141	
		10					
10.0		8					
12.5			13				
	LS	12		Dense Moist Brown Medium To Coarse SAND With Trace Of Gravel, Clay Layers & Cobbles	7.1	144	
		33					
15.0		50/3"					
17.5			18				
	LS	9		Hard Moist Brown CLAY With Some Silt & Trace Of Gravel	9.1	141	
		50/6"	20				
20.0				Bottom of Boring at 20'			
22.5							

"N" - Standard Penetration Resistance
SS - 2" I.D. Split Spoon Sample
LS - Sectional Liner Sample
ST - Shelby Tube Sample
AS - Auger Sample

w - H2O, % of dry weight
d - Bulk Density, pcf
qu - Unconfined Compression, psf
DP - Direct Push
RC - Rock Core

Water Encountered: None

At Completion: None

Boring No. 11

Testing Engineers & Consultants, Inc.

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Boring No.: 12 **Job No.:** 63122

Project: Brooks and Mixtwood Street Improvement

Client: City of Ann Arbor

Location: Ann Arbor, Michigan

Type of Rig: Truck

Drilled By: R. Favor

Drilling Method: Solid Stem Augers

Started: 11/22/2022

Ground Surface Elevation:

Completed: 11/22/2022

Depth (ft)	Sample Type	N	Strata Change	Soil Classification	w	d	qu
			.33				
			.92	ASPHALT (4")			
	LS	3			17.4	131	7420
		5		Moist Brown Gravelly Clayey Well Graded Sand-FILL (7")			
2.5		8					
	LS	5		Stiff Moist Brown CLAY With Some Silt & Trace Of Gravel	10.8	138	4120
		6					
5.0		7					
					11.7	139	
	LS	5					
		6					
7.5		7					
			8.5		8.0	138	11950
	LS	6					
		9		Extremely Stiff Moist Brown CLAY With Some Silt & Trace Of Gravel			
10.0		10	10				
				Bottom of Boring at 10'			
12.5							
15.0							
17.5							
20.0							
22.5							

"N" - Standard Penetration Resistance
SS - 2" I.D. Split Spoon Sample
LS - Sectional Liner Sample
ST - Shelby Tube Sample
AS - Auger Sample

w - H2O, % of dry weight
d - Bulk Density, pcf
qu - Unconfined Compression, psf
DP - Direct Push
RC - Rock Core

Water Encountered: None

At Completion: None

Boring No. 12

Testing Engineers & Consultants, Inc.

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Fax (248) 588-6232

Boring No.: 13 **Job No.:** 63122

Project: Brooks and Mixtwood Street Improvement

Client: City of Ann Arbor

Location: Ann Arbor, Michigan

Type of Rig: Truck

Drilled By: R. Favor

Drilling Method: Solid Stem Augers

Started: 11/22/2022

Ground Surface Elevation:

Completed: 11/22/2022

Depth (ft)	Sample Type	N	Strata Change	Soil Classification	w	d	qu
			.48				
	LS	3 4 5	1.25	ASPHALT (5 3/4")	15.4	134	
2.5			3	Moist Brown Fine Sand With Some Gravel-FILL			
	LS	4 6 7		Firm Moist Brown Oxidized CLAY With Some Silt & Trace Of Gravel	23.2	126	
5.0			5.5	Firm Moist Brown CLAY With Some Silt & Trace Of Gravel			
	LS	3 3 4		Plastic Moist Brown CLAY With Some Silt & Trace Of Gravel	14.8	135	
7.5							
	LS	2 3 4			17.7	132	
10.0			10	Bottom of Boring at 10'			
12.5							
15.0							
17.5							
20.0							
22.5							

"N" - Standard Penetration Resistance
SS - 2" I.D. Split Spoon Sample
LS - Sectional Liner Sample
ST - Shelby Tube Sample
AS - Auger Sample

w - H2O, % of dry weight
d - Bulk Density, pcf
qu - Unconfined Compression, psf
DP - Direct Push
RC - Rock Core

Water Encountered: None

At Completion: None

Boring No. 13

Testing Engineers & Consultants, Inc.

1343 Rochester Road - PO Box 249 - Troy, Michigan - 48099-0249
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Fax (248) 588-6232

Boring No.: 14 **Job No.:** 63122

Project: Brooks and Mixtwood Street Improvement

Client: City of Ann Arbor

Location: Ann Arbor, Michigan

Type of Rig: Truck

Drilled By: R. Favor

Drilling Method: Solid Stem Augers

Started: 11/22/2022

Ground Surface Elevation:

Completed: 11/22/2022

Depth (ft)	Sample Type	N	Strata Change	Soil Classification	w	d	qu
			.54				
			1.17	ASPHALT (6 1/2")			
	LS	4			11.0	140	
		5		Moist Brown Sand With Some Gravel-FILL			
2.5		4					
	LS	3		Firm Moist Brown CLAY With Some Silt & Trace Of Gravel	11.8	139	
		4					
5.0		5					
	LS	5			17.1	132	
		6	7.33				
7.5		6		Stiff Moist Gray CLAY With Some Silt & Trace Of Gravel			
	LS	3			14.5	131	5770
		5	10				
10.0		5		Bottom of Boring at 10'			
12.5							
15.0							
17.5							
20.0							
22.5							

"N" - Standard Penetration Resistance
SS - 2" I.D. Split Spoon Sample
LS - Sectional Liner Sample
ST - Shelby Tube Sample
AS - Auger Sample

w - H2O, % of dry weight
d - Bulk Density, pcf
qu - Unconfined Compression, psf
DP - Direct Push
RC - Rock Core

Water Encountered: None

At Completion: None

Boring No. 14

Testing Engineers & Consultants, Inc.

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Fax (248) 588-6232

Boring No.: 15 **Job No.:** 63122

Project: Brooks and Mixtwood Street Improvement

Client: City of Ann Arbor

Location: Ann Arbor, Michigan

Type of Rig: Truck

Drilled By: R. Favor

Drilling Method: Solid Stem Augers

Started: 11/22/2022

Ground Surface Elevation:

Completed: 11/22/2022

Depth (ft)	Sample Type	N	Strata Change	Soil Classification	w	d	qu
			.5	ASPHALT (6")			
	LS	3 4 5			12.2	139	
2.5			3	Firm Moist Brown CLAY With Some Silt, Trace Of Gravel & Sand Seams			
	LS	3 3 3		Plastic Moist Brown CLAY With Some Silt & Trace Of Gravel	18.5	130	
5.0			6				
	LS	5 7 10		Stiff Moist Brown CLAY With Some Silt & Trace Of Gravel	13.6	134	4290
7.5			8				
	LS	5 6 10		Extremely Stiff Moist Brown CLAY With Some Silt & Trace Of Gravel	15.4	134	14010
10.0			10	Bottom of Boring at 10'			
12.5							
15.0							
17.5							
20.0							
22.5							

"N" - Standard Penetration Resistance
SS - 2" I.D. Split Spoon Sample
LS - Sectional Liner Sample
ST - Shelby Tube Sample
AS - Auger Sample

w - H2O, % of dry weight
d - Bulk Density, pcf
qu - Unconfined Compression, psf
DP - Direct Push
RC - Rock Core

Water Encountered: None

At Completion: None

Boring No. 15

Testing Engineers & Consultants, Inc.

1343 Rochester Road - PO Box 249 - Troy, Michigan - 48099-0249
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Boring No.: 16 **Job No.:** 63122

Project: Brooks and Mixtwood Street Improvement

Client: City of Ann Arbor

Location: Ann Arbor, Michigan

Type of Rig: Truck

Drilled By: R. Favor

Drilling Method: Solid Stem Augers

Started: 11/22/2022

Ground Surface Elevation:

Completed: 11/22/2022

Depth (ft)	Sample Type	N	Strata Change	Soil Classification	w	d	qu
			.92	ASPHALT (11")			
	LS	15			6.2	138	
		8					
2.5		6	2.67	Medium Compact Moist Brown Gravelly Well Graded Sand With Some Silt & Clay-FILL			
	LS	3			19.0	122	
		2		Plastic Moist Brown CLAY With Some Silt & Trace Of Gravel			
5.0		3					
	LS	3	6.5		4.8	139	
		10					
7.5		13		Medium Compact Moist Brown Medium SAND With Trace Of Gravel			
			8.5				
	LS	9			3.8	138	
		15		Compact Moist Brown Fine SAND With Some Silt			
10.0		20	10				
				Bottom of Boring at 10'			
12.5							
15.0							
17.5							
20.0							
22.5							

"N" - Standard Penetration Resistance
SS - 2" I.D. Split Spoon Sample
LS - Sectional Liner Sample
ST - Shelby Tube Sample
AS - Auger Sample

w - H2O, % of dry weight
d - Bulk Density, pcf
qu - Unconfined Compression, psf
DP - Direct Push
RC - Rock Core

Water Encountered: None

At Completion: None

Boring No. 16

Testing Engineers & Consultants, Inc.

1343 Rochester Road - PO Box 249 - Troy, Michigan - 48099-0249
(248) 588-6200 or (313) T-E-S-T-I-N-G
Fax (248) 588-6232

Boring No.: 17 **Job No.:** 63122

Client: City of Ann Arbor

Type of Rig: Truck

Drilling Method: Solid Stem Augers

Ground Surface Elevation:

Project: Brooks and Mixtwood Street Improvement

Location: Ann Arbor, Michigan

Drilled By: R. Favor

Started: 11/18/2022

Completed: 11/18/2022

Depth (ft)	Sample Type	N	Strata Change	Soil Classification	w	d	qu
			.25				
			1	ASPHALT (3")			
	LS	4			9.8	142	
		6					
2.5		8	2.75	Moist Brown Clayey Medium To Fine Sand With Some Gravel-FILL			
	LS	5			8.7	142	
		6	4.42	Firm Moist Brown Sandy CLAY With Some Silt & Trace Of Gravel			
5.0		7					
	LS	3		Medium Compact Moist Brown Fine SAND With Trace Of Gravel	11.2	140	
		4					
7.5		7		Firm Moist Brown CLAY With Some Silt & Trace Of Gravel			
	LS	13			7.5	144	
		25					
10.0		50/4"	10				
			11	Hard Moist Gray CLAY With Some Silt & Trace Of Gravel			
12.5				Bottom of Boring at 11'			
15.0							
17.5							
20.0							
22.5							

"N" - Standard Penetration Resistance
SS - 2" I.D. Split Spoon Sample
LS - Sectional Liner Sample
ST - Shelby Tube Sample
AS - Auger Sample

w - H2O, % of dry weight
d - Bulk Density, pcf
qu - Unconfined Compression, psf
DP - Direct Push
RC - Rock Core

Water Encountered: None

At Completion: None

Boring No. 17

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Fax (248) 588-6232

Boring No.: 18 **Job No.:** 63122

Project: Brooks and Mixtwood Street Improvement

Client: City of Ann Arbor

Location: Ann Arbor, Michigan

Type of Rig: Truck

Drilled By: R. Favor

Drilling Method: Solid Stem Augers

Started: 11/18/2022

Ground Surface Elevation:

Completed: 11/18/2022

Depth (ft)	Sample Type	N	Strata Change	Soil Classification	w	d	qu
			.5	ASPHALT (6")			
	LS	7 7 5			9.1	141	
2.5				Medium Compact Moist Brown Clayey Fine SAND With Some Silt & Trace Of Gravel			
			3.5				
	LS	4 6 7			12.0	139	
5.0				Firm Moist Brown Sandy CLAY With Some Silt & Trace Of Gravel			
	LS	6 7 7			9.3	140	
7.5							
	LS	4 5 7			10.4	141	
10.0			10				
				Bottom of Boring at 10'			
12.5							
15.0							
17.5							
20.0							
22.5							

"N" - Standard Penetration Resistance
SS - 2" I.D. Split Spoon Sample
LS - Sectional Liner Sample
ST - Shelby Tube Sample
AS - Auger Sample

w - H2O, % of dry weight
d - Bulk Density, pcf
qu - Unconfined Compression, psf
DP - Direct Push
RC - Rock Core

Water Encountered: None

At Completion: None

Boring No. 18

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SIEVE ANALYSIS RESULTS

PROJECT: Brooks & Mixtwood Street Improvement Project **TEC REPORT NUMBER:** 63122

LOCATION: Ann Arbor, Michigan **DATE:** 12/6/2022
CLIENT: City of Ann Arbor

Material Description: Brown Clayey Fine Sand With Some Silt & Trace of Gravel
Date Sampled: 11/28/22

Sample Source / Depth: SB-1 @ 2.5'
Sampled By: R. Favor

Sample Location:
TEC Lab Sample Number: 1651

Intended Use:
Remarks:

AGGREGATE ANALYSIS

Sieve No.	Total Weight Retained	Total Percent Retained	Total Percent Passing	Specification Range
3"				
2-1/2"				
1-1/2"				
1"				
3/4"				
1/2"		0.0	100.0	
3/8"	4.1	2.0	98.0	
#4	8.5	4.1	95.9	
#10	16.1	7.8	92.2	
#20	21.7	10.5	89.5	
#30	24.7	12.0	88.0	
#40	29.6	14.3	85.7	
#100	59.7	28.9	71.1	
#200	117.4	56.9	43.1	
Total Sample	206.5	100.0	0.0	

SAMPLE DATA

Initial Sample Weight (g)	206.5
Weight After Wash (g)	117.4
Loss in Weight (g)	89.1
Loss by Wash (%)	43.1%

Tested By: J. Johnson
Reviewed By: G. Putt

Test Method: ASTM C117/C136 X AASHTO T11/T27 _____ MTM 108/109 _____

Remarks:

Respectfully Submitted:
Testing Engineers and Consultants, Inc.

Testing Engineers and Consultants, Inc.

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SIEVE ANALYSIS RESULTS

PROJECT: Brooks & Mixtwood Street Improvement Project **TEC REPORT NUMBER:** 63122

LOCATION: Ann Arbor, Michigan **DATE:** 12/6/2022
CLIENT: City of Ann Arbor

Material Description: Brown Fine Sand With Silt Layers Date Sampled: 11/28/22

Sample Source / Depth: SB-1 @ 10' Sampled By: R. Favor

Sample Location: TEC Lab Sample Number: 1649

Intended Use: Remarks:

AGGREGATE ANALYSIS

Sieve No.	Total Weight Retained	Total Percent Retained	Total Percent Passing	Specification Range
3"				
2-1/2"				
1-1/2"				
1"				
3/4"				
1/2"				
3/8"				
#4		0.0	100.0	
#10	0.3	0.2	99.8	
#20	2.0	1.2	98.8	
#30	3.6	2.2	97.8	
#40	8.4	5.1	94.9	
#100	26.7	16.3	83.7	
#200	61.6	37.5	62.5	
Total Sample	164.2	100.0	0.0	

SAMPLE DATA

Initial Sample Weight (g)	164.2
Weight After Wash (g)	61.6
Loss in Weight (g)	102.6
Loss by Wash (%)	62.5%

Tested By: J. Johnson/P. Guisinger
Reviewed By: G. Putt

Test Method: ASTM C117/C136 X AASHTO T11/T27 _____ MTM 108/109 _____

Remarks:

Respectfully Submitted:
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SIEVE ANALYSIS RESULTS

PROJECT: Brooks & Mixtwood Street Improvement Project **TEC REPORT NUMBER:** 63122

LOCATION: Ann Arbor, Michigan **DATE:** 12/6/2022
CLIENT: City of Ann Arbor

Material Description: Brown Gravelly Fine Sand With Some Clay
Date Sampled: 11/18/22

Sample Source / Depth: SB-2 4"-11"
Sampled By: R. Favor

Sample Location:
TEC Lab Sample Number: 1652

Intended Use:
Remarks:

AGGREGATE ANALYSIS

Sieve No.	Total Weight Retained	Total Percent Retained	Total Percent Passing	Specification Range
3"				
2-1/2"				
1-1/2"				
1"				
3/4"		0.0	100.0	
1/2"	37.2	5.7	94.3	
3/8"	76.2	11.6	88.4	
#4	156.3	23.8	76.2	
#10	232.7	35.5	64.5	
#20	280.9	42.8	57.2	
#30	300.8	45.9	54.1	
#40	326.6	49.8	50.2	
#100	478.1	72.9	27.1	
#200	540.9	82.5	17.5	
Total Sample	656.0	100.0	0.0	

SAMPLE DATA

Initial Sample Weight (g)	656.0
Weight After Wash (g)	540.9
Loss in Weight (g)	115.1
Loss by Wash (%)	17.5%

Tested By: J. Johnson/P. Guisinger
Reviewed By: G. Putt

Test Method: ASTM C117/C136 X AASHTO T11/T27 _____ MTM 108/109 _____

Remarks:

Respectfully Submitted:
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SIEVE ANALYSIS RESULTS

PROJECT: Brooks & Mixtwood Street Improvement Project **TEC REPORT NUMBER:** 63122

DATE: 12/6/2022

LOCATION: Ann Arbor, Michigan
CLIENT: City of Ann Arbor

Material Description: Brown Clayey Well Graded Sand & Crushed Gravel

Date Sampled: 11/18/22

Sample Source / Depth: SB-8 4.5"-1.5'

Sampled By: R. Favor

Sample Location:

TEC Lab Sample Number: 1653

Intended Use:

Remarks:

AGGREGATE ANALYSIS

Sieve No.	Total Weight Retained	Total Percent Retained	Total Percent Passing	Specification Range
3"				
2-1/2"				
1-1/2"				
1"		0.0	100.0	
3/4"	21.0	2.7	97.3	
1/2"	118.1	14.9	85.1	
3/8"	177.9	22.5	77.5	
#4	310.0	39.2	60.8	
#10	416.1	52.6	47.4	
#20	477.6	60.4	39.6	
#30	494.9	62.6	37.4	
#40	510.1	64.5	35.5	
#100	564.7	71.4	28.6	
#200	615.3	77.8	22.2	
Total Sample	790.4	100.0	0.0	

SAMPLE DATA

Initial Sample Weight (g)	790.4
Weight After Wash (g)	615.3
Loss in Weight (g)	175.1
Loss by Wash (%)	22.2%

Tested By: J. Johnson/P. Guisinger

Reviewed By: G. Putt

Test Method: ASTM C117/C136 X AASHTO T11/T27 _____ MTM 108/109 _____

Remarks:

Respectfully Submitted:
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SIEVE ANALYSIS RESULTS

PROJECT: Brooks & Mixtwood Street Improvement Project **TEC REPORT NUMBER:** 63122

DATE: 12/6/2022

LOCATION: Ann Arbor, Michigan
CLIENT: City of Ann Arbor

Material Description: Brown Gravelly, Clayey Well Graded Sand

Date Sampled: 11/22/22

Sample Source / Depth: SB-12 4"-11"

Sampled By: R. Favor

Sample Location:

TEC Lab Sample Number: 1654

Intended Use:

Remarks:

AGGREGATE ANALYSIS

Sieve No.	Total Weight Retained	Total Percent Retained	Total Percent Passing	Specification Range
3"				
2-1/2"				
1-1/2"				
1"		0.0	100.0	
3/4"	19.7	2.9	97.1	
1/2"	74.8	10.9	89.1	
3/8"	110.6	16.2	83.8	
#4	193.0	28.2	71.8	
#10	270.7	39.5	60.5	
#20	339.6	49.6	50.4	
#30	371.3	54.2	45.8	
#40	406.1	59.3	40.7	
#100	489.9	71.5	28.5	
#200	521.3	76.1	23.9	
Total Sample	684.7	100.0	0.0	

SAMPLE DATA

Initial Sample Weight (g)	684.7
Weight After Wash (g)	521.3
Loss in Weight (g)	163.4
Loss by Wash (%)	23.9%

Tested By: J. Johnson/P. Guisinger

Reviewed By: G. Putt

Test Method: ASTM C117/C136 X AASHTO T11/T27 _____ MTM 108/109 _____

Remarks:

Respectfully Submitted:
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SIEVE ANALYSIS RESULTS

PROJECT: Brooks & Mixtwood Street Improvement Project **TEC REPORT NUMBER:** 63122

LOCATION: Ann Arbor, Michigan **DATE:** 12/6/2022
CLIENT: City of Ann Arbor

Material Description: Brown Gravelly Well Graded Sand With Some Silt & Clay
Date Sampled: 11/22/22

Sample Source / Depth: SB-16 @ 2.5'
Sampled By: R. Favor

Sample Location:
TEC Lab Sample Number: 1655

Intended Use:
Remarks:

AGGREGATE ANALYSIS

Sieve No.	Total Weight Retained	Total Percent Retained	Total Percent Passing	Specification Range
3"				
2-1/2"				
1-1/2"				
1"				
3/4"		0.0	100.0	
1/2"	25.3	9.2	90.8	
3/8"	41.4	15.1	84.9	
#4	92.0	33.6	66.4	
#10	137.1	50.0	50.0	
#20	176.4	64.4	35.6	
#30	191.0	69.7	30.3	
#40	206.2	75.3	24.7	
#100	236.1	86.2	13.8	
#200	244.0	89.1	10.9	
Total Sample	274.0	100.0	0.0	

SAMPLE DATA

Initial Sample Weight (g)	274.0
Weight After Wash (g)	244.0
Loss in Weight (g)	30.0
Loss by Wash (%)	10.9%

Tested By: J. Johnson/P. Guisinger
Reviewed By: G. Putt

Test Method: ASTM C117/C136 X AASHTO T11/T27 _____ MTM 108/109 _____

Remarks:

Respectfully Submitted:
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Testing Engineers and Consultants, Inc.

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SIEVE ANALYSIS RESULTS

PROJECT: Brooks & Mixtwood Street Improvement Project **TEC REPORT NUMBER:** 63122

LOCATION: Ann Arbor, Michigan **DATE:** 12/6/2022
CLIENT: City of Ann Arbor

Material Description: Brown Fine Sand With Some Silt Date Sampled: 11/22/22

Sample Source / Depth: SB-16 @ 10' Sampled By: R. Favor

Sample Location: TEC Lab Sample Number: 1650

Intended Use: Remarks:

AGGREGATE ANALYSIS

Sieve No.	Total Weight Retained	Total Percent Retained	Total Percent Passing	Specification Range
3"				
2-1/2"				
1-1/2"				
1"				
3/4"				
1/2"				
3/8"		0.0	100.0	
#4	2.4	0.9	99.1	
#10	4.4	1.7	98.3	
#20	7.3	2.8	97.2	
#30	10.2	4.0	96.0	
#40	19.9	7.8	92.2	
#100	186.5	72.8	27.2	
#200	221.7	86.5	13.5	
Total Sample	256.2	100.0	0.0	

SAMPLE DATA

Initial Sample Weight (g)	256.2
Weight After Wash (g)	221.7
Loss in Weight (g)	34.5
Loss by Wash (%)	13.5%

Tested By: J. Johnson/P. Guisinger
Reviewed By: G. Putt

Test Method: ASTM C117/C136 X AASHTO T11/T27 _____ MTM 108/109 _____

Remarks:

Respectfully Submitted:
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Testing Engineers and Consultants, Inc.

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SIEVE ANALYSIS RESULTS

PROJECT: Brooks & Mixtwood Street Improvement Project **TEC REPORT NUMBER:** 63122

LOCATION: Ann Arbor, Michigan **DATE:** 12/6/2022
CLIENT: City of Ann Arbor

Material Description: Brown Clayey Medium to Fine Sand With Some Gravel
Date Sampled: 11/18/22

Sample Source / Depth: SB- 17 3"-1'
Sampled By: R. Favor

Sample Location:
TEC Lab Sample Number: 1656

Intended Use:
Remarks:

AGGREGATE ANALYSIS

Sieve No.	Total Weight Retained	Total Percent Retained	Total Percent Passing	Specification Range
3"				
2-1/2"				
1-1/2"				
1"				
3/4"		0.0	100.0	
1/2"	34.9	4.9	95.1	
3/8"	65.9	9.3	90.7	
#4	139.4	19.7	80.3	
#10	214.3	30.3	69.7	
#20	286.2	40.5	59.5	
#30	321.9	45.5	54.5	
#40	363.7	51.4	48.6	
#100	478.6	67.7	32.3	
#200	524.4	74.1	25.9	
Total Sample	707.4	100.0	0.0	

SAMPLE DATA

Initial Sample Weight (g)	707.4
Weight After Wash (g)	524.4
Loss in Weight (g)	183.0
Loss by Wash (%)	25.9%

Tested By: J. Johnson/P. Guisinger
Reviewed By: G. Putt

Test Method: ASTM C117/C136 X AASHTO T11/T27 _____ MTM 108/109 _____

Remarks:

Respectfully Submitted:
Testing Engineers and Consultants, Inc.

DARWin(tm) - Pavement Design

A Proprietary AASHTOWARE(tm)
Computer Software Product

Flexible Structural Design Module

Testing Engineers and Consultants, Inc.
1343 Rochester Road
Troy, MI 48083
W.J. West

Project Description
Brooks and Mixtwood Street Improvements Project, Ann Arbor, Michigan

Flexible Structural Design Module Data

18-kip ESALs Over Initial Performance Period	128,810
Initial Serviceability	4.5
Terminal Serviceability	2.5
Reliability Level (%)	95
Overall Standard Deviation	.49
Roadbed Soil Resilient Modulus (PSI)	4,500
Stage Construction	1
Calculated Structural Number	3.20

Specified Layer Design

Layer	1
Material Description	Top
Structural Coefficient (Ai)	.42
Drainage Coefficient (Mi)	1
Layer Thickness (Di) (in)	2.00
Calculated Layer SN	.84

Layer	2
Material Description	Leveling Course
Structural Coefficient (Ai)	.42
Drainage Coefficient (Mi)	1
Layer Thickness (Di) (in)	2.00
Calculated Layer SN	.84

Layer	3
Material Description	leveling Course
Structural Coefficient (Ai)	.36
Drainage Coefficient (Mi)	1
Layer Thickness (Di) (in)	.50
Calculated Layer SN	.18

Layer	4
Material Description	Aggregate Base
Structural Coefficient (Ai)	.14
Drainage Coefficient (Mi)	1
Layer Thickness (Di) (in)	10.00
Calculated Layer SN	1.40
Total Thickness (in)	14.50
Total Calculated SN	3.26

Simple ESAL Calculation

Initial Performance Period (years)	20
Initial Two-Way Daily Traffic (ADT)	2,500
% Heavy Trucks (of ADT) FHWA Class 5 or Greater	2

Testing Engineers Consultants, Inc.

CASED BOREHOLE INFILTRATION TEST

TEC Project No.: 63122

Client: City of Ann Arbor

Project Brooks & Mixtwood St. Improv. Proj.

Test Location: SB-18

Date: 11/30/22

Comments:

Falling Head Test

Test

Time Interval (min.)	Water level from top of casing (in.)
30	1/4"
60 ~~10~~	1/4"
90 ~~20~~	1/4"
120 ~~30~~	1/4"
40	
50	
60	
70	
80	
90	
100	
110	
120	

Procedure:

1.Drill to desired depth. Presoak for one hour in two 30 minute intervals. Measure the water level drop with time.

2. For last 30 minute interval:

If water drop is two inches or more
use 10 minute intervals

If water level drop is less than two
inches use 30 minute intervals.

3. Continue re-filling and taking readings for a minimum of four readings

Presoak

Time Interval (min.)	Water level from top of ring (in.)
30	1/2"
60	1/4"

Infiltation Rate (in/hr): 30 min.

Testing Engineers Consultants, Inc.

CASED BOREHOLE INFILTRATION TEST

TEC Project No.: 63122

Client: City of Ann Arbor

Project Brooks & Mixtwood

Test Location: SB-1

Date: 11/28/22

Comments:

Falling Head Test

Test

Time Interval (min.)	Water level from top of casing (in.)
30	1/4"
60 ~~10~~	1/16"
90 ~~20~~	1/16"
120 ~~30~~	0"
150 ~~40~~	
180 ~~50~~	
60	
70	
80	
90	
100	
110	
120	

Procedure:

1.Drill to desired depth. Presoak for one hour in two 30 minute intervals. Measure the water level drop with time.

2. For last 30 minute interval:

If water drop is two inches or more
use 10 minute intervals

If water level drop is less than two
inches use 30 minute intervals.

3. Continue re-filling and taking readings for a minimum of four readings

Presoak

Time Interval (min.)	Water level from top of ring (in.)
30	1 1/2"
60	1/8"

Infiltation Rate (in/hr): 30 min.

Testing Engineers Consultants, Inc.

DOUBLE RING INFILTROMETER TEST

TEC Project No.: 63122

Client: City of Ann Arbor

Project Brooks & Mixtwood St. Improv. Proj.

Test Location: SB-5

Date: 12/1/22

Comments:

Test

Time Interval (min.)	Water level from top of ring (in.)
0	X
10	1 5/16"
20	1 1/4"
30	3/4"
40	3/4"
50	
60	
70	
80	
90	
100	
110	
120	

Procedure:

1.Presoak for one hour in two 30 minute intervals, refilling after each 30 minutes.

2. For last 30 minute interval:

If water drop is two inches or more use 10 minute intervals

If water level drop is less than two inches use 30 minute intervals.

3. Continue readings for a minimum of eight readings (re fill after each reading)
or
until there is 1/4 inch or less drop between the highest and lowest of four consecutive readings

Presoak

Time Interval (min.)	Water level from top of ring (in.)
30	3"
60	2 7/16"

Infiltation Rate (in/hr): 10 min.

Testing Engineers Consultants, Inc.

DOUBLE RING INFILTROMETER TEST

TEC Project No.: 63122

Client: City of Ann Arbor

Project Brooks + Mixtwood St. Improv. Proj

Test Location: SB-16

Date: 11/30/22

Comments:

Test

Time Interval (min.)	Water level from top of ring (in.)
30	3/8"
60 ~~40~~	1/4"
90 ~~20~~	1/4"
120 ~~30~~	1/4"
40	
50	
60	
70	
80	
90	
100	
110	
120	

Procedure:

1.Presoak for one hour in two 30 minute intervals, refilling after each 30 minutes.

2. For last 30 minute interval:

If water drop is two inches or more use 10 minute intervals

If water level drop is less than two inches use 30 minute intervals.

3. Continue readings for a minimum of eight readings (re fill after each reading)
or
until there is 1/4 inch or less drop between the highest and lowest of four consecutive readings

Presoak

Time Interval (min.)	Water level from top of ring (in.)
30	1/2"
60	3/8"

Infiltation Rate (in/hr): 30

Testing Engineers & Consultants, Inc.

Ms. Theresa Bridges
City of Ann Arbor
December 30, 2022

TEC Report: 63122

SOIL DESCRIPTIONS

In order to provide uniformity throughout our projects, the following nomenclature has been adopted to describe soil characteristics:

CONSISTENCY AND RELATIVE DENSITY

COHESIVE SOILS			GRANULAR SOILS	
UNCONFINED COMPRESSIVE STRENGTH, PSF	"N" VALUES	CONSISTENCY	"N" VALUES	RELATIVE DENSITY
Below 500	0 – 2	Very Soft	0 – 4	Very Loose
500 – 1,000	3 – 4	Soft	5 – 10	Loose
1,000 – 2,000	5 – 8	Plastic	11 – 30	Medium Compact
2,000 – 4,000	9 – 15	Firm	31 – 50	Compact
4,000 – 8,000	16 – 30	Stiff	50+	Dense
8,000 – 16,000	31 – 50	Ex. Stiff		
Over 16,000	51+	Hard		

Material Types By Particle Size	**ASTM D2487**
BOULDERS	Stones Over 12" In Diameter
COBBLES	Stones 3" To 12" In Diameter
GRAVEL	#4 To 3" Diameter
COARSE SAND	#10 To #4 Sieves
MEDIUM SAND	#40 To #10 Sieves

Testing Engineers & Consultants, Inc.

Ms. Theresa Bridges
City of Ann Arbor
December 30, 2022

TEC Report: 63122

SOIL DESCRIPTIONS (Cont'd)

Material Types By Particle Size	**ASTM D2487**
FINE SAND	#200 To #40 Sieves
SILT	Minus #200 Sieve Material, Fairly Non-Plastic, Falls Below "A"-Line
CLAY	Minus #200 Sieve Material Plastic Material That Has A Tendency To Stick Together, Can Be Rolled Into Fine Rods When Moistened; Falls Above "A"-Line
PEAT	Black Organic Material Containing Partially Decayed Vegetable Matter
MARL	Fresh Water Deposits Of Calcium Carbonate, Often Containing Percentages Of Peat, Clay & Fine Sand
SWAMP BOTTOM DEPOSITS	Mixtures Of Peat, Marl, Vegetation & Fine Sand Containing Large Amounts Of Decayable Organic Material