CONTRACT DOCUMENTS
FOR

BUHR PARK IMPROVEMENTS

DECEMBER, 2011

BID NO. ITB-4196

PARKS AND RECREATION SERVICES
Administering Department

CITY OF ANN ARBOR
301 East Huron Street
Ann Arbor, Michigan 48104

Version 06/2004

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ADVERTISEMENT FOR
FOR THE
BUHR PARK IMPROVEMENTS
CITY OF ANN ARBOR, MICHIGAN

BID NO. ITB-4196

Sealed Bids will be received by the City of Ann Arbor Procurement Office, 301 East Huron Street, Fifth Floor, Larcom City Hall, on or before Thursday, January 12, 2012 at 10:00 AM for construction of Buhr Park Improvements. Bids will be publically opened and read aloud at this time.

A pre-bid conference will be held Thursday, December 22, 2011 at 10:00 AM at the Cobblestone Farm located at 2781 Packard Road, Ann Arbor, Michigan 48108. Attendance is highly recommended.

Work to be done includes parking lot paving and expansion, ADA improvements, storm water improvements, pathway construction and related work at Buhr Park and Cobblestone Farm.

Bid documents may be downloaded from the following websites:

http://www.a2gov.org/government/financeadminservices/procurement/Pages/OpenBidsandProposals.aspx or www.govbids.com

Each proposal shall be accompanied by a certified check, or Bid Bond by a recognized surety, in the amount of 5% of the total of the bid price. A proposal, once submitted, becomes the property of the City. In the sole discretion of the City, the City reserves the right to allow a bidder to reclaim submitted documents provided the documents are requested and retrieved no later than 48 hours prior to the scheduled bid opening.

The successful Bidder will be required to furnish satisfactory performance and labor and material bonds in the amount of 100% of the bid price and satisfactory insurance coverage.

Precondition for entering into a Contract with the City of Ann Arbor is compliance with Chapter 112 of Title IX of the Code of the City of Ann Arbor. The successful Bidder may also be required to comply with Chapter 23 of Title I of the Code of the City of Ann Arbor. Further information is outlined in the Contract Documents.

After the time of opening, no Bid may be withdrawn for a period of 90 days. The City reserves the right 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.

Technical questions regarding this project may be submitted to Mark Pascoe, PE via email at mark.pascoe@stantec.com. The deadline for questions shall be seven calendar days before bids are due.

Any further information on bid documents may be obtained from the Procurement Office, (734) 794-6500 ext. 42506.

CITY OF ANN ARBOR, MICHIGAN

CITY OF ANN ARBOR PROCUREMENT OFFICE
HUMAN RIGHTS CONTRACT COMPLIANCE FORM

Form #1

Entire Organization (Totals for All Locations where applicable)

Name of Company/Organization_____ Date Form Completed_____

Name and Title of Person Completing this Form_____ Name of President _____

Address_____ County_____ Phone #_____
(Street address) (City) (State) (Zip) (Area Code)

Fax#_____ Email Address_____
(Area Code)

EMPLOYMENT DATA

Job Categories	**Number of Employees (Report employees in only one category)**														
	Male							**Female**							
	White	Black or African American	Asian	Hispanic or Latino	Native Hawaiian or Other Pacific Islander	American Indian or Alaska Native	Mixed	White	Black or African American	Asian	Hispanic or Latino	Native Hawaiian or Other Pacific Islander	American Indian or Alaskan Native	Mixed	**TOTAL COLUMNS A-N**
	A	**B**	**C**	**D**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**M**	**N**		
Exec/Sr. Level Officials															
Supervisors															
Professionals															
Technicians															
Sales															
Admin. Support															
Craftspeople															
Operatives															
Service Workers															
Laborers/Helper															
Apprentices															
Other															
TOTAL															
PREVIOUS YEAR TOTAL															

CITY OF ANN ARBOR PROCUREMENT OFFICE
HUMAN RIGHTS CONTRACT COMPLIANCE FORM

Form #2

Local Office (Only those employees that will do local or on-site work, if applicable)

Name of Company/Organization_____ Date Form Completed_____

Name and Title of Person Completing this Form_____ Name of President _____

Address_____ County_____ Phone #_____
(Street address) (City) (State) (Zip) (Area Code)

Fax#_____ Email Address_____
(Area Code)

EMPLOYMENT DATA

Job Categories	**Number of Employees (Report employees in only one category)**														
	Male							**Female**							
	White	Black or African American	Asian	Hispanic or Latino	Native Hawaiian or Other Pacific Islander	American Indian or Alaska Native	Mixed	White	Black or African American	Asian	Hispanic or Latino	Native Hawaiian or Other Pacific Islander	American Indian or Alaskan Native	Mixed	**TOTAL COLUMNS A-N**
	A	**B**	**C**	**D**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**M**	**N**		
Exec/Sr. Level Officials															
Supervisors															
Professionals															
Technicians															
Sales															
Admin. Support															
Craftspeople															
Operatives															
Service Workers															
Laborers/Helper															
Apprentices															
Other															
TOTAL															
PREVIOUS YEAR TOTAL															

City of Ann Arbor Procurement Office

INSTRUCTIONS FOR CONTRACTORS

For Completing CONTRACT COMPLIANCE FORM

City Policy

The "non discrimination in contracts" provision of the City Code, (Chapter 112, Section 9:161) requires contractors/vendors/grantees doing business with the City not to discriminate on the basis of actual or perceived race, color, religion, national origin, sex, age, condition of pregnancy, marital status, physical or mental limitations, source of income, family responsibilities, educational association, sexual orientation, gender identity or HIV status against any of their employees, any City employee working with them, or any applicant for employment. It also requires that the contractors/vendors/grantees include a similar provision in all subcontracts that they execute for City work or programs.

This Ordinance further requires that each prospective contractor/vendor submit employment data to the City showing current total employee breakdown by occupation, race and gender. This allows the Human Rights Office to determine whether or not the contractor/vendor has a workforce that is reflective of the availability of women and under-represented minorities within the contractor's labor recruitment area (the area where they can reasonably be expected to recruit employees). ***This data is provided to the City on the Human Rights Contract Compliance Forms (attached).***

To complete the form:

1) **If a company has more than one location, then that company must complete 2 versions of the form.**

- **Form #1** should contain the employment data for the **entire corporation**.
- **Form #2** should contain the employment data for those employees:
  - who will be working on-site;
  - in the office responsible for completing the contract; or,
  - in the case of non-profit grantees, those employees working on the project funded by the City grant(s).

2) If the company has only one location, fill out Form #1 only.

3) Complete all data in the upper section of the form including the name of the person who completes the form and the name of the company/organization's president.

4) Complete the Employment Data in the remainder of the form. Please be sure to complete all columns including the Total Columns on the far right side of the form, and the Total row and Previous Year Total row at the bottom of the form.

5) Return the completed form(s) to *your contact* in the City Department for whom you will be conducting the work.

For assistance in completing the form, contact:
Procurement Office of the City of Ann Arbor
734/794-6500 ext. 45206

If a contractor is determined to be out of compliance, the Procurement Office will work with them to assist them in coming into compliance.

→ RATE EFFECTIVE MAY 1, 2011-ENDING APRIL 29, 2012←

LIVING WAGE ORDINANCE – CITY OF ANN ARBOR

$11.83 per hour
if the employer provides health care benefits*****

$13.19 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:

Linda Newton, Procurement Assistant
734/794-6500 ext. 45206 or lnewton@a2gov.org LW-1

City of Ann Arbor

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 employers providing services to the City or recipients of grants for financial assistance (in amounts greater than $10,000 in a twelve-month period of time) pay their employees who are working on the City project or grant, a minimum level of compensation known as the **Living Wage**. This wage must be paid to the employees for the length of the contract/project.

Companies employing fewer than 5 persons and non-profits employing fewer than 10 persons are exempt from the Ordinance. If this exemption applies to your firm, please check below:

_____ This company is exempt due to the fact that we employ or contract with fewer than 5 individuals.
_____ This **non-profit agency** is exempt due to the fact that we employ or contract with fewer than 10 employees.

The Ordinance requires that all contractors/vendors and/or grantees agree to the following terms:

a) To pay each of its employees performing work on any covered contract or grant with the City, no less than the living wage, which is defined as $11.83/hour when health care is provided, or no less than $13.19/hour for those employers that do *not* provide health care. It is understood that the Living Wage will be adjusted each year on April 30, and covered employers will be required to pay the adjusted amount thereafter. The rates stated above include any adjustment for 2011.

b) Please check the boxes below which apply to your workforce:

☐ Employees who are assigned to *any covered* City project or grant will be paid at or above the applicable living wage without health benefits Yes_____ No_____

OR

☐ Employees who are assigned to *any covered* City project or grant will be paid at or above the applicable living wage with health benefits Yes_____ No_____

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

d) To provide the City payroll records or other documentation as requested; and,

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

The undersigned authorized representative hereby obligates the contractor/vendor or grantee to the above stated conditions under penalty of perjury and violation of the Ordinance.

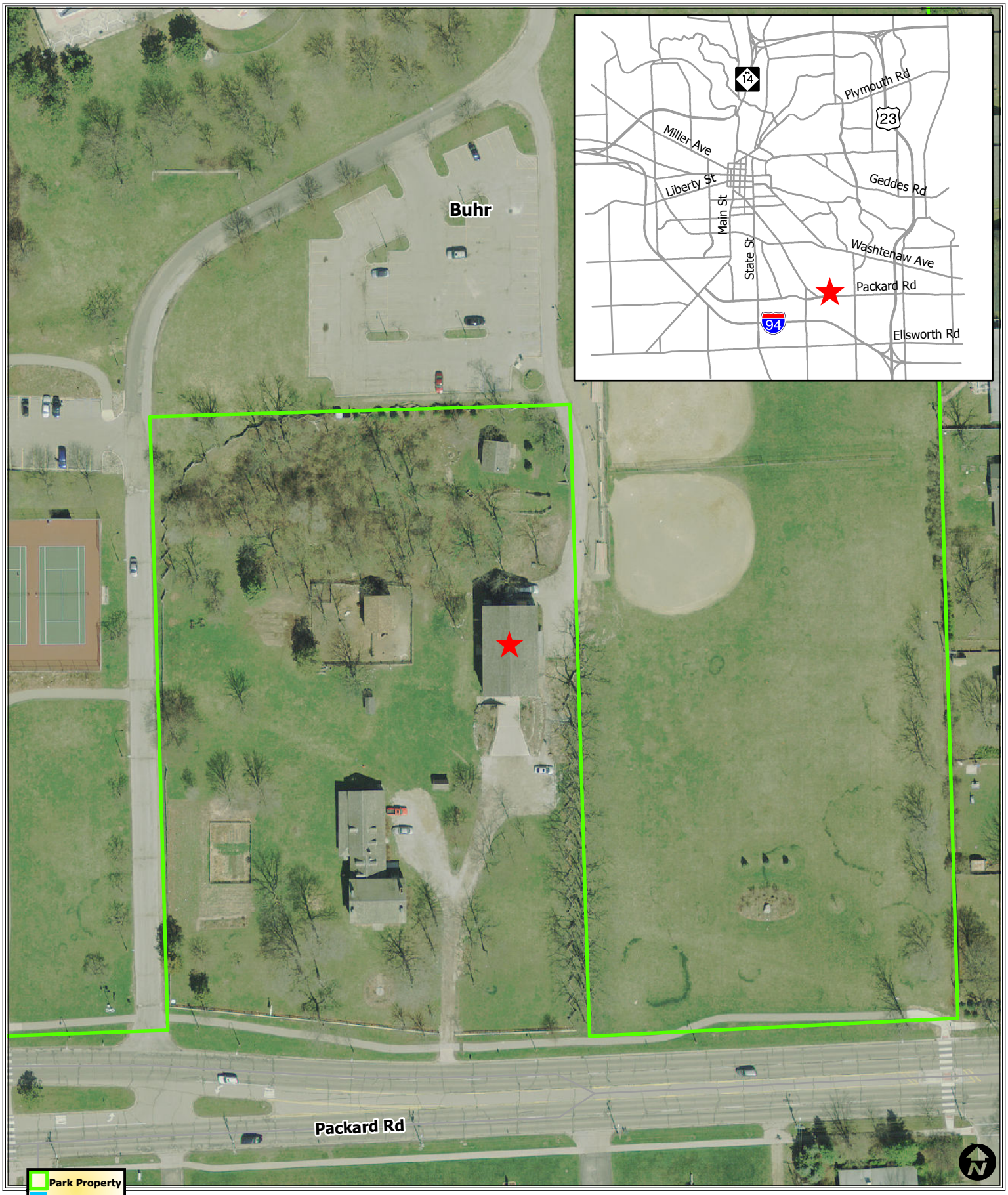
Company Name	Address City State Zip
Signature of Authorized Representative	Phone (area code)
Type or Print Name and Title	Email address
Date signed	

Questions about this form? Please contact:
Procurement Office City of Ann Arbor
Phone: 734/794-6576 Fax:734/994-1795

NOTICE OF PRE-BID CONFERENCE

A pre-bid conference for this project will be held on Thursday, December 22, 2011 at 10:00 AM at the Cobblestone Farm located at 2781 Packard Road, Ann Arbor, Michigan 48108. A location map is attached.

Attendance at this conference is optional, but highly recommended. Administrative and technical questions regarding this project will be answered at this time. If any questions arise whose answers constitute modifications to the bid documents, an addendum will be issued.



Location of Pre-Bid Meeting

Map Created: 12/6/2011

INSTRUCTIONS TO BIDDERS

General

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. All work to be done under this Contract is located in or near the City of Ann Arbor.

The City shall make available to all prospective Bidders, prior to receipt of the Bids, access to the area in which the work is to be performed. Advance notice should be given to the Administering Service Area/Unit in cases where access to the site must be arranged by the City.

Any proposal which does not conform fully with these instructions may be rejected.

Proposals

Proposals must be submitted on the "Proposal Forms" and "Bid Forms" provided, without removal from the binder, with each blank properly filled in. Sealed proposals will be received by the City of Ann Arbor Purchasing Division, Fifth Floor, City Hall, Ann Arbor, Michigan, at the time stipulated in the Advertisement, promptly after which proposals will be publicly opened and read aloud. Each proposal must be enclosed in a sealed envelope, endorsed across one end:

BID #ITB-4196, Proposal for Buhr Park Improvements.

The City will evaluate Proposals based on cost as well as experience. Contractors that have not included the required list of similar work experience, associated references in Section 5 of the Bid Form may have their bid rejected.

The City intends to award a Contract(s) to the lowest responsible Bidder(s). On multi-divisional Contracts, separate divisions may be awarded to separate Bidders. The City may also utilize discounts offered in the Bid Forms, if any, to determine the lowest responsible Bidder on each division, and award multiple divisions to a single Bidder, so that the lowest total cost is achieved for the City. For unit price bids, the Contract will be awarded based upon the lump sum and unit prices stated by the bidder for the work items specified in the bid documents, with consideration given to any alternates selected by the City. If the City determines that the unit price for any item is materially different for the work item bid than either other bidders or the general market, the City, in its sole discretion, in addition to any other right it may have, may reject the bid as not responsible or non-conforming.

The acceptability of major subcontractors will be considered in determining if a Bidder is responsible. In comparing proposals, the City will give consideration to alternate proposals for items listed in the forms, or other alternates which the Bidder may wish to submit, but preference will be given to Base Bid Proposals.

The City reserves the right 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.

Bid Security

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

Withdrawal of Bids

After the time of opening, no Bid may be withdrawn for the period of days specified in the Advertisement.

Contract Time

Time is of the essence in the performance of the work under this Contract. The available time for work under this Contract is indicated on page C-1, Article III of the Contract. Interim milestones are indicated on the drawings. If these time requirements can not be met, the Bidder must stipulate on Bid Form Section 3 - Time Alternate its schedule for performance of the work. Consideration will be given to time in evaluating bids.

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, on the Plans, or written extensions. Liquidated damages shall be assessed based on the intermediated deadlines stated in the Contract, on the Plans, 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.

Human Rights Information

Section 5, beginning at page GC-3, outlines the requirements for fair employment practices under City of Ann Arbor Contracts. To establish compliance with this Ordinance, the Bidder must complete and return with its bid completed copies of the white and pink Human Rights Division Contract Compliance Forms (copy attached) or an acceptable equivalent.

Wage Requirements

Section 4, beginning at page GC-1, outlines 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 may be required to provide documentary proof of compliance.

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.

PROPOSAL

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 Advertisement, Human Rights Division Contract Compliance Forms, Notice of Pre-Bid Conference, Instructions to Bidders, Supplemental Instructions to Bidders, Proposal, Bid Forms, Contract, Bond Forms, General Conditions, Standard Specifications, Detailed Specifications, all Addenda, and the Plans 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 proposal 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 1:319 (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 further agrees that the cited provisions of Chapter 14 and Chapter 23 form a part of this Contract.

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 Proposal shall become due and payable to the City.

If the Bidder enters into the Contract in accordance with this Proposal, or if this Proposal 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 _____, 2012.

_____
Bidder's Name

_____ _____
Official Address Authorized Signature of Bidder

_____ _____
Telephone Number (Print Name of Signer Above)

LEGAL STATUS OF BIDDER

(The Bidder shall fill out the appropriate form and strike out the other two.)

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 proposal, is authorized to execute contracts.

* A partnership, list all members and the street and mailing address of each:

_____

_____

_____

_____

_____

_____

Also identify the County and State where partnership papers are filed:

County of _____, State of _____

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

BID FORM

Section 1 – Schedule of Prices

Project: Buhr Park Improvements
Bid No.: ITB-4196

NOTES:

1. All bidders shall provide a Unit Price and Total Price for all bid items identified.
2. Quantities included in bid table represent estimated quantities for different work. Contractor shall be compensated for the actual number of items completed using the unit prices provided.
3. The City, at their sole discretion, may elect to delete any portion of the work delineated below, with no change to the unit prices provided. Work shall be determined based upon the availability of funds.
4. Any item not provided in the following list shall be considered incidental.
5. Each item listed below shall be preceded by the description "Furnish all labor, materials, equipment, all related items necessary to field measure, prepare, demolish, deliver, construct, install, maintain and restore." Any item not provided in the following list shall be considered incidental.
6. Contract shall be awarded based on the base bid or any combination of the base bid and alternate bid areas in any manner the City believes to be in its best interest.

Item #	Item	Quantity	Unit	Unit Price	Total Price
Base Bid Items					
1	For the entire work in these Contract Documents (not including Base Bid Items 2 and 3 below), complete as specified and furnish all labor, materials, equipment and all related items necessary to field measure, prepare, demolish, deliver, construct, install, maintain and restore the work.	1	LS		
2	21AA Limestone	2500	TON		
3	MDOT Type II Undercut (Geotextile Fabric Incidental)	500	CY		
				Base Bid Subtotal	

Alternate Area #1 Items (Cobblestone Farm Parking Lot)					
1	For the additional work identified in these Contract Documents as Alternate Area #1 (not including Alternate Area #1 Bid Item 2), complete as specified and furnish all labor, materials, equipment and all related items necessary to field measure, prepare, demolish, deliver, construct, install, maintain and restore the work.	1	LS		
2	21AA Limestone	1000	TON		
				Alternate Area #1 Subtotal	

Alternate Area #2 (Ice Rink/Pool Service Drive)					
1	For the additional work identified in these Contract Documents as Alternate Area #2 (not including Alternate Area #2 Bid Item 2 below), complete as specified and furnish all labor, materials, equipment and all related items necessary to field measure, prepare, demolish, deliver, construct, install, maintain and restore the work.	1	LS		
2	21AA Limestone	100	TON		
				Alternate Area #2 Subtotal	

Section 2 - Material and Equipment Alternates

The Base Bid 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 Contractor 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.

Item Number	Description	Add/Deduct Amount

If the Bidder does not suggest any material or equipment alternate, the Bidder **MUST** complete the following statement:

For the work outlined in this request for bid, the bidder does NOT propose any material or equipment alternate under the Contract.

Signature of Authorized Representative of Bidder _____

Section 3 - Time Alternate

If the Bidder takes exception to the time stipulated in Article III of the Contract, Time of Completion, page C-1, it is requested to stipulate below its proposed time for performance of the work. Consideration will be given to time in evaluating bids.

If the Bidder does not suggest any time alternate, the Bidder **MUST** complete the following statement:

For the work outlined in this request for bid, the bidder does NOT propose any time alternate under the Contract.

Signature of Authorized Representative of Bidder _____

BID FORM

Section 4 - Major Subcontractors

For purposes of this Contract, a Subcontractor is anyone (other than the Contractor) who performs work (other than or in addition to the furnishing of materials, plans or equipment) at or about the construction site, directly or indirectly for or on behalf of the Contractor (and whether or not in privity of Contract with the Contractor), but shall not include any individual who furnishes merely the individual's own personal labor or services.

For the work outlined in these documents the Bidder expects to engage the following major subcontractors to perform the work identified:

Subcontractor (Name and Address)	Work	Amount
	Earthwork	
	Paving	
	Landscaping	
	Other	

If the Bidder does not expect to engage any major subcontractor, the Bidder **MUST** complete the following statement:

For the work outlined in this request for bid, the bidder does NOT expect to engage any major subcontractor to perform work under the Contract.

Signature of Authorized Representative of Bidder _____

BID FORM

Section 5 – References

Include a minimum of three references from previously completed, similar work, within the past five years.

1) _____ _____ _____
Project Name Cost Date Constructed

_____ _____
Contact Name Phone Number

2) _____ _____ _____
Project Name Cost Date Constructed

_____ _____
Contact Name Phone Number

3) _____ _____ _____
Project Name Cost Date Constructed

_____ _____
Contact Name Phone Number

CONTRACT

THIS AGREEMENT is made on the _____ day of _____, 2012, between the CITY OF ANN ARBOR, a Michigan Municipal Corporation, 310 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 "Buhr Park Improvements" in accordance with the requirements and provisions of the following documents, including all written modifications incorporated into any of the documents, which are incorporated as part of this Contract:

Human Rights Division Contract
Living Wage Declaration of Compliance Forms (if applicable)
Bid Forms
Proposal
Contract and Exhibits
Bonds
General Conditions
Standard Specifications
Detailed Specifications
Plans
Addenda

ARTICLE II - Definitions

Administering Service Area/Unit means Parks and Recreation Services.

Supervising Professional or Owner means Landscape Architect, Senior Utilities Engineer or other persons acting under the authorization of the Administrator/Manager of the Administering Service Area/Unit.

Engineer or Owner's Representative means Consulting Professional acting under the authorization of the Supervising Professional/Owner.

Project means, Buhr Park Improvements, Bid No. ITB-4196

ARTICLE III - Time of Completion

(A) The work to be completed under this Contract shall begin immediately after the Contractor's receipt of a fully executed Contract.

(B) The entire work for this Contract shall be completed within 120 calendar days for the base bid. Should the City elect to construct Alternate Bid Area #1 and/or #2, the completion time shall be extended by 15 days for each Alternate Bid Area that is constructed. The Buhr Park Parking Lot at the pool/hockey rink must be completed between April 1 and May 15. Liquidated damages shall apply to this intermediate milestone as well.

(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 $250.00 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.

As an independent requirement, where the Detailed Specifications or Plans identify certain portions of the work to be completed within a shorter period of time and the Contractor fails to complete each portion within the shorter period specified for each portion, including any extension granted in writing by the Project Supervisor, the City is entitled to deduct from the monies due the Contractor, as liquidated damages and not as a penalty, the amount equal to $250.00 for each portion or Phase of the work not timely completed for each calendar day of delay in completion of each portion of the work.

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.

Liquidated damages under this section are in addition to any liquidated damages due under Section 5 of the General Conditions.

ARTICLE IV - The Contract Sum

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

_____Dollars ($_____)

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

ARTICLE V - Assignment

This Contract may not be assigned or subcontracted without the written consent of 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 agreement, 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.

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 agreement.

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.

ARTICLE IX - Indemnification

To the fullest extent permitted by law, for any loss not covered by insurance under this Contract, Contractor shall indemnify, defend and hold harmless 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.

ARTICLE X - Entire Agreement

This Contract represents the entire understanding between the City and the Contractor and it supersedes all prior representations or agreements whether written or oral. Neither party has relied on any prior representations in entering into this Contract. This Contract may be altered, amended or modified only by written amendment signed by the City and the Contractor.

FOR CONTRACTOR

By_____
Its:_____

FOR THE CITY OF ANN ARBOR

By_____
John Hieftje, Mayor

By_____
Jacqueline Beaudry, City Clerk

Approved as to substance

By_____
Steven D. Powers, City Administrator

By_____
Sumedh Bahl, Community Services Area Administrator

Approved as to form and content

_____
Stephen K. Postema, 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 dated _____, 2012, for: _____ _____ 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.

SIGNED AND SEALED this _____ day of _____, 2012.

_____ (Name of Surety Company)	_____ (Name of Principal)
By _____ (Signature)	By _____ (Signature)
Its _____ (Title of Office)	Its _____ (Title of Office)
Approved as to form:	Name and address of agent:
_____ Stephen K. Postema, 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 City, dated _____, 2012, for _____

_____

_____; 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.

SIGNED AND SEALED this _____ day of _____, 2012.

_____
(Name of Surety Company)

By _____
(Signature)

Its _____
(Title of Office)

_____
(Name of Principal)

By _____
(Signature)

Its _____
(Title of Office)

Approved as to form:

_____
Stephen K. Postema, City Attorney

Name and address of agent:

_____

_____

_____

GENERAL CONDITIONS

Section 1 - Execution, Correlation and Intent of Documents

The Contract Documents shall be signed in 2 copies by the City and the Contractor.

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

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

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

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".

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.

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 1:319 of Chapter 14 of Title I of the Code of the City of Ann Arbor, the Contractor agrees to conform to Chapter 23 of Title I of the Code of the City of Ann Arbor, as amended, which in part states:

1:814. Applicability.

(1) This Chapter shall apply to any person that is a Contractor/vendor or grantee as defined in Section 1:813 that employs or Contracts with five (5) or more individuals; provided, however, that this Chapter shall not apply to a non-profit Contractor/vendor or non-profit grantee unless it employs or Contracts with ten (10) or more individuals.

(2) This Chapter shall apply to any grant, Contract, or subcontract or other form of financial assistance awarded to or entered into with a Contractor/vendor or grantee after the effective date of this Chapter and to the extension or renewal after the effective date of this Chapter of any grant, Contract, or subcontract or other form of financial assistance with a Contractor/vendor or grantee.

1:815. Living Wages Required.

(1) Every Contractor/vendor or grantee, as defined in Section 1:813, shall pay its covered employees a living wage as established in this Section.

(a) For a covered employer that provides employee health care to its employees, the living wage shall be $9.42 an hour, or the adjusted amount hereafter established under Section 1:815(3).

(b) For a covered employer that does not provide health care to its employees, the living wage shall be $10.91 an hour, or the adjusted amount hereafter established under Section 1:815(3).

(2) In order to qualify to pay the living wage rate for covered employers providing employee health care under subsection 1:815(1)(a), a covered employer shall furnish proof of said health care coverage and payment therefore to the City Administrator or his/her designee.

(3) The amount of the living wage established in this Section shall be adjusted upward no later than April 30, 2002, and every year thereafter by a percentage equal to the percentage increase, if any, in the federal poverty guidelines as published by the United States Department of Health and Human Services for the years 2001 and 2002. Subsequent annual adjustments shall be based upon the percentage increase, if any, in the United States Department of Health and Human Services poverty guidelines when comparing the prior calendar year's poverty guidelines to the present calendar year's guidelines. The applicable percentage amount will be converted to an amount in cents by multiplying the existing wage

under Section 1.815(1)(b) by said percentage, rounding upward to the next cent, and adding this amount of cents to the existing living wage levels established under Sections 1:815(1)(a) and 1:815(1)(b). Prior to April 1 of each calendar year, the City will notify any covered employer of this adjustment by posting a written notice in a prominent place in City Hall, and, in the case of a covered employer that has provided an address of record to the City, by a written letter to each such covered employer.

Section 5 - Non-Discrimination

The Contractor agrees to comply with the nondiscrimination provisions of Chapter 112 of the Ann Arbor City Code and to take affirmative action to assure that applicants are employed and that employees are treated during employment in a manner which provides equal employment opportunity and tends to eliminate any inequality based upon race, national origin or sex. The Contractor agrees to comply with the provisions of Section 9:161 of Chapter 112 of the Ann Arbor City Code and in particular the following excerpts:

9:161 NONDISCRIMINATION BY CITY CONTRACTORS

(1) All Contractors proposing to do business with the City of Ann Arbor shall satisfy the nondiscrimination administrative policy adopted by the City Administrator in accordance with the guidelines of this section. All Contractors shall receive approval from the Director prior to entering into a Contract with the City, unless specifically exempted by administrative policy. All City Contractors shall take affirmative action to insure 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 race, national origin or sex.

(2) Each prospective Contractor shall submit to the City data showing current total employment by occupational category, sex and minority group. If, after verifying this data, the Director concludes that it indicates total minority and female employment commensurate with their availability within the Contractor's labor recruitment area, i.e., the area from which the Contractor can reasonably be expected to recruit, said Contractor shall be accepted by the Director as having fulfilled affirmative action requirements for a period of one year at which time the Director shall conduct another review. Other Contractors shall develop an affirmative action program in conjunction with the Director. Said program shall include specific goals and timetables for the hiring and promotion of minorities and females. Said goals shall reflect the availability of minorities and females within the Contractor's labor recruitment area. In the case of construction Contractors, the Director shall use for employment verification the labor recruitment area of the Ann Arbor-Ypsilanti standard metropolitan statistical area. Construction Contractors determined to be in compliance shall be accepted by the Director as having fulfilled affirmative action requirements for a period of six (6) months at which time the Director shall conduct another review.

(3) In hiring for construction projects, Contractors shall make good faith efforts to employ local persons, so as to enhance the local economy.

(4) All Contracts shall include provisions through which the Contractor agrees, in addition to any other applicable Federal or State labor laws:

(a) To set goals, in conference with the Human Resources Director, for each job category or

division of the work force used in the completion of the City work;

(b) To provide periodic reports concerning the progress the Contractor has made in meeting the affirmative action goals it has agreed to;

(c) To permit the Director access to all books, records and accounts pertaining to its employment practices for the purpose of determining compliance with the affirmative action requirements.

(5) The Director shall monitor the compliance of each Contractor with the nondiscrimination provisions of each Contract. The Director shall develop procedures and regulations consistent with the administrative policy adopted by the City Administrator for notice and enforcement of non-compliance. Such procedures and regulations shall include a provision for the posting of Contractors not in compliance.

(6) All City Contracts shall provide further that breach of the obligation not to discriminate shall be a material breach of the Contract for which the City shall be entitled, at its option, to do any or all of the following:

(a) To cancel, terminate, or suspend the Contract in whole or part and/or refuse to make any required periodic payments under the Contract;

(b) Declare the Contractor ineligible for the award of any future Contracts with the City for a specified length of time;

(c) To recover liquidated damages of a specified sum, said sum to be that percentage of the labor expenditure for the time period involved which would have accrued to minority group members had the affirmative action not been breached;

(d) Impose for each day of non-compliance, liquidated damages of a specified sum, based upon the following schedule:

Contract Amount	Assessed Damages Per Day of Non-Compliance
$ 10,000 - 24,999	$ 25.00
25,000 - 99,999	50.00
100,000 - 199,999	100.00
200,000 - 499,999	150.00
500,000 - 1,499,999	200.00
1,500,000 - 2,999,999	250.00
3,000,000 - 4,999,999	300.00
5,000,000 - and above	500.00

(e) In addition the Contractor shall be liable for any costs or expenses incurred by the City of Ann Arbor in obtaining from other sources the work and services to be rendered or performed or the goods or properties to be furnished or delivered to the City under this Contract.

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

A. 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 from all claims for bodily injuries, death or property damage which may arise under this Contract; whether the acts were made by the Contractor or by any subcontractor or anyone employed by them directly or indirectly. The following insurance policies are required:

1. 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

2. Commercial General Liability Insurance equivalent to, as a minimum, Insurance Services Office form CG 00 01 07 98. The City of Ann Arbor shall be named as an additional insured. There shall be no added exclusions or limiting endorsements including, but not limited to: Products and Completed Operations, Explosion, Collapse and Underground coverage or Pollution. Further, 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 Job General Aggregate

   $1,000,000 Personal and Advertising Injury

   $2,000,000 Products and Completed Operations Aggregate

3. Motor Vehicle Liability Insurance, including Michigan No-Fault Coverages, equivalent to, as a minimum, Insurance Services Office form CA 00 01 07 97. The City of Ann Arbor shall be named as an additional insured. There shall be no added exclusions or limiting endorsements. Coverage shall include all owned vehicles, all non-owned vehicles and all hired vehicles. 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.

4. 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.

B. Insurance required under Section A.2 and A.3 of this Contract 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.

C. In the case of all Contracts involving on-site work, the Contractor shall provide to the City before the commencement of any work under this Contract documentation demonstrating it

has obtained the above mentioned policies. Documentation must provide and demonstrate an unconditional 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; name of insurance company; name and address of the agent or authorized representative; name and address of insured; project name; policy expiration date; and specific coverage amounts; (b) any deductibles or self-insured retentions which shall be approved by the City, in its sole discretion; (c) that the policy conforms to the requirements specified. An original certificate of insurance may be provided as an initial indication of the required insurance, provided that no later than 21 calendar days after commencement of any work the Contractor supplies a copy of the endorsements required on the policies. Upon request, the Contractor shall provide within 30 days a copy of the policy(ies) 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 to the Administering Service Area/Unit at least ten days prior to the expiration date.

D. Any Insurance provider of Contractor shall be admitted and 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-admitted insurance companies are not acceptable unless approved in writing by the City.

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 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.

CONTRACTOR'S DECLARATION

I hereby declare that I have not, during the period _____, 201_, to_____, 201_, 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 Buhr Park Improvements, 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.

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 Buhr Park Improvements.

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
By _____
(Signature)
Its_____
(Title of Office)

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

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 Advertisement. 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.

A copy of the Public Services Department Standard Specifications may be purchased from the Engineering Division, (Fourth Floor, City Hall, Ann Arbor, Michigan), for $35.00 per copy. In addition, a copy of these Standard Specifications is available for public viewing at the Engineering Division office, for review Monday through Friday between the hours of 8:30 a.m. and 4:00 p.m.

SECTION 01000

GENERAL REQUIREMENTS

1.00 GENERAL

1.01 DESCRIPTION OF WORK

A. Work under this Contract consists of various site improvements to Buhr Park, including improvements to the entrance drive, parking lots, traffic circulation and pathways, as well as additional proposed items such as pervious pavement, bio-swales, and rain gardens.

B. Contract drawings are included which give specific locations for all work under this Contract.

1.02 EXISTING FACILITIES ACCESS

A. The project site is located within a public park and the CONTRACTOR shall be responsible for maintaining access to existing facilities for public use during the construction period.

B. Access to existing facilities shall not be temporarily disrupted without coordination with and prior approval of the OWNER.

1.03 CONSTRUCTION WATER

A. Water for construction is not available from the OWNER. The CONTRACTOR shall be responsible for providing all necessary water.

1.04 CONSTRUCTION POWER

A. Electrical power to be used during construction is not available from the OWNER. The CONTRACTOR shall be responsible for providing all power generation.

1.05 NOTIFICATION OF UTILITIES

A. The CONTRACTOR shall notify all utilities prior to any excavation. Information regarding size and location is available from the utility.

B. MISS DIG - The Detroit Edison Co., Michigan Consolidated Gas Co., and the telephone companies are members of a utility communication system called "MISS DIG" that provides service to participating utilities. The CONTRACTORS shall contact "MISS DIG" not less than 72 hours before starting construction for assistance in locating utilities or for any work to be done near utilities.

1.06 WORK SCHEDULE

A. The CONTRACTOR shall provide a work schedule meeting the construction method and sequence shown on Sheet 2 of the plans. The schedule shall be complete and shall show in detail the manner in which he proposes to complete the work under this Contract. The purpose of the schedule is to assist the OWNER in notifying the public of inconveniences, and to determine if the CONTRACTOR is reasonably proceeding with the work to assure completion within the specified time.

B. Construction activities are prohibited on the weekends.

1.07 CONSTRUCTION PERMITS

A. The CONTRACTOR will be required to follow the requirements established by all permits necessary for the construction of this project. The following is a list of all permits that must be obtained prior to the beginning of construction.

1. Soil Erosion and Sedimentation Control Permit, as part of Public Act 451 (1994), Part 91, City of Ann Arbor.

B. The Soil Erosion and Sedimentation Control permit shall be applied for by the CONTRACTOR. The plan review fee will be paid for by the CONTRACTOR. The CONTRACTOR will be required to obtain the permit, pay all associated fees, and adhere to all requirements of the permit. The CONTRACTOR must submit a copy of the permit to the OWNER and/or OWNER's REPRESENTATIVE prior to construction.

1.08 CONSTRUCTION STAKING

A. The CONTRACTOR will be required to provide construction staking.

1.09 CONSTRUCTION MATERIAL TESTING

A. CONTRACTOR will be responsible for all material testing required to meet the requirements of all permit agencies, MDOT, City of Ann Arbor and the plans and specifications.

B. Testing required will include, but not be limited to, sieve analysis, compaction testing, concrete testing and bituminous testing.

C. Material Testing

1. The CONTRACTOR shall provide and pay for the service of an independent materials testing laboratory to provide material and compaction testing. The type and minimum frequency of testing shall be as follows:

a. Utility Trenches

- Sieve analysis per source
- Proctor per source
- Compaction testing at 50' intervals per lift, as required

b. Aggregate

- Sieve analysis per source
- Proctor per source
- Compaction test at each location. Where length exceeds 100', one test per 50'

c. Asphalt Pavement

- Extraction per day
- Thickness and density at each location. When length exceeds 100', one test per 50'

d. Concrete Pavement, Drives, Sidewalks and Curb & Gutter

- Slump, minimum 50 CYD or load
- Air entrainment, minimum 50 CYD or load
- Comprehensive strength, minimum 50 CYD or load

2. The ENGINEER shall determine the exact location of all tests. The CONTRACTOR shall notify the ENGINEER of all other test results at least 48 hours in advance of all new materials to be used. Any area failing tests shall be corrected and retested at the Contractor's expense.

3. Copies of test reports shall be furnished to the OWNER and distributed to parties designated by the OWNER.

1.10 PROJECT PROGRESS MEETING

A. It shall be the responsibility of the CONTRACTOR to have a representative present at each meeting. The meetings shall be held at least once a month as directed by the OWNER/ENGINEER, but may be more frequent during critical portions of the work.

1.11 AUDIO-VIDEO DVD COVERAGE

A. The CONTRACTOR shall furnish to the OWNER, an audio-video DVD recording for all areas proposed for improvement.

B. The audio-video recording shall be DVD and of such quality to accurately describe the existing conditions. The DVD shall be produced two (2) weeks prior to the placement of materials or equipment in the construction area. The DVD shall be of commercial quality and of size commonly used.

C. The entire area must be recorded with the rate of speed less than 48 ft per minute. Camera functions such as panning rate; zoom-in/zoom-out shall be controlled to provide optimum object clarity. The entire front yard and front of each house must be fully visible in the video such that all objects and pavements can be clearly interpreted.

D. The DVD must be recorded while the visibility is clear and at no time will it be allowed during periods of ground cover.

E. The DVD shall be continuous running and shall include date, time, and location at appropriate intervals. The location shall be easily referenced to the Contract Drawings.

1.12 METHOD OF MEASUREMENT AND BASIS OF PAYMENT

A. General

1. The method of measurement and the basis of payment for each item in the Proposal will be as specified in the Bid Form. The items are generally grouped by the section of the Specifications under which the particular unit of work is detailed. There will be no payment allowed for any unit of work not specifically mentioned in the Proposal as a bid item, and any such unit of work not mentioned in the Proposal, but necessary for the completion of the Project, will be considered as incidental to the construction of the Project.

B. Measurement

1. Quantities of work completed under the Contract will be measured by the ENGINEER according to the United States standard measures. When tons are specified, the unit shall be the ton of 2,000 pounds. When measurements are stated in miles, stations, acres, they will be horizontal measurements unless specified otherwise. Where measurements are specified to be "in place," they will be taken along the actual surface of the completed item to obtain lineal, area, or volume measurements.

C. Payment

1. In each and every instance, where a Basis of Payment is specified, it shall be understood to be prefaced by the following statement, "The Contract Unit Price bid in the Proposal will be payment in full for all labor, materials, and equipment necessary to furnish and install the following according to the Plans and Specifications". Payment shall be made on the basis of the actual quantity of the item completed and accepted at the unit price for such item named in the Proposal. Surface restoration percentages identified under these items will not be paid until landscaping has been completed.

END OF SECTION

SECTION 01210

ALLOWANCES

1.00 GENERAL

1.01 SUMMARY

A. This Section specifies administrative and procedural requirements for processing allowances. Utilities and their installation or repair are shown and specified in the Contract Documents by allowances.

1.02 DEFINITIONS

A. Lump Sum Allowance: A monetary sum that includes, as part of the Contract Price, the associated costs and requirements to complete the specified allowance.

1.03 SUBMITTALS

A. Submit invoices or delivery slips to indicate actual quantities of materials delivered to the site or services performed for use in fulfillment of each allowance.

1.04 OWNER'S INSTRUCTIONS

A. At the earliest feasible date after contract award, the CONTRACTOR shall notify all utility companies and begin coordination efforts in order to avoid delay in performance of the work.

B. Use allowances only as directed for OWNER's purposes, and only by Change Orders which designate amounts to be charged to the allowance.

C. If the actual price for the specified allowance is more or less than the stated allowance, the Contract Price shall be adjusted accordingly by Change Order. The adjustment in Contract Price shall be made in accordance with the GENERAL CONDITIONS.

D. At project closeout, any amounts remaining in allowances will be credited to OWNER by Change Order.

2.00 PRODUCTS

NOT USED

3.00 EXECUTION

3.01 PREPARATION

A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related construction activities.

3.02 LUMP SUM ALLOWANCE FOR MAINTENANCE AND GUARANTEE PERIOD

A. The CONTRACTOR shall assume responsibility for maintaining his work to the end of the guarantee period. The guarantee period shall be for one (1) full year from the date of substantial completion. During this period, the CONTRACTOR shall make maintenance trips during the growing season as necessary to provide an established, thriving, and maintained turf.

B. Restrict traffic from all turf areas until grass is established. Erect signs and barriers as required.

C. The CONTRACTOR agrees to guarantee all plantings for one year from time of planting. This guarantee includes furnishing new plantings as well as labor and material for installation of replacements. All replacement plantings shall be guaranteed and maintained for an additional period of one year.

D. Inspection of the plantings will be made jointly by the CONTRACTOR and ENGINEER at the completion of planting. All plants not in a healthy, growing condition shall be removed and replaced with plants of like kind, size and quality as originally specified before the close of the next planting season. CONTRACTOR to provide notification at least 10 working days before requested inspection date.

E. The CONTRACTOR shall be required to produce a satisfactory stand of grass. Scattered bare spots no larger than 2 inches shall not total more than 3 square feet in any 100 sq. ft area.

F. The CONTRACTOR will guarantee his WORK for a period of one (1) year. An allowance of $5,000 shall be included in the CONTRACTOR's bid and shall be retained by the OWNER for the entire Warranty and Guaranteed period after which it shall be paid to the CONTRACTOR following his satisfactory completion of maintenance and correction of any additional punchlist items which may have manifested in that time.

END OF SECTION

SECTION 01330

SUBMITTAL PROCEDURES

1.00 GENERAL

1.01 SECTION INCLUDES

A. Submittal Procedures

B. Shop Drawings

C. Manufacturers' Instructions

D. Construction Schedule

E. Schedule of Values

1.02 SUBMITTAL PROCEDURES

A. Package each submittal appropriately for shipping and handling. This shall include an index either on the transmittal or within the submittal itself. Transmit each submittal from CONTRACTOR to ENGINEER using a transmittal form. Submittals received from sources other than CONTRACTOR will be returned without action. Use separate transmittals for items from different specification sections. Number each submittal consecutively. Resubmittals should have the same number as the original, plus a letter designation for each Resubmittal (i.e. 7-A, 7-B, etc.).

B. Indicate on the transmittal relevant information and requests for data. On the form, or separate sheet, record deviations from Contract Document requirements, including minor variations and limitations. Include CONTRACTOR's certification that information complies with Contract Document requirements. On Resubmittal, all changes shall be clearly identified for ease of review. Resubmittals shall be reviewed for the clearly identified changes only. Any changes not clearly identified will not be reviewed and original submittal shall govern.

C. Include the following information on the label for processing and recording action taken.

1. Project name.
2. Date.
3. Name and address of ENGINEER.
4. Name and address of CONTRACTOR.
5. Name and address of subcontractor.
6. Name and address of supplier.
7. Name of manufacturer.
8. Number and title of appropriate specification sections.
9. Drawing number and detail references, as appropriate.

D. Schedule submittals to expedite the Project, and deliver to ENGINEER at business address. Coordinate submission of related items. Coordinate related activities that require sequential activity.

E. Review and approve shop drawings, project data, and samples before submitting them.

F. Verify field measurements, field construction criteria, catalog numbers, and similar data. Indicate on the submission exactly what was verified.

G. Any markings done by CONTRACTOR shall be done in a color other than red. Red is reserved for ENGINEER's marking.

H. The number of copies to be submitted will be determined at the pre-construction conference. Reproducible may be submitted and will be marked and returned to CONTRACTOR. Blue or black line prints shall be submitted in sufficient quantity for distribution to ENGINEER and OWNER recipients.

I. Coordinate each submittal with the requirements of the Contract Documents.

J. Provide space for CONTRACTOR and ENGINEER review stamps.

K. Apply CONTRACTOR's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction Work, and coordination of information, is in accordance with the requirements of the Work and Contract Documents.

L. Submit the number of copies that the CONTRACTOR requires, plus three copies that will be retained by the OWNER and ENGINEER.

M. Identify variations from Contract Documents and Product or system limitations that may be detrimental to successful performance of the completed Work.

N. No claim will be allowed for damages or extension of time because of delays in the work resulting from rejection of material or from revision and resubmittal of shop drawings, project data, or samples.

O. No extension of contract time will be authorized because of failure to transmit submittals to ENGINEER sufficiently in advance of the work to permit processing.

P. ENGINEER reserves the right to withhold action on a submittal required coordination with other submittals until related submittals are received.

Q. Do not install materials or equipment which require submittals until the submittals are returned with ENGINEER's/OWNER's stamp and initials or signature indicating approval. The OWNER shall have final approval authority.

R. CONTRACTOR's responsibility of errors, omissions, and deviations from requirements of Contract Documents in submittals is not relieved by the ENGINEER's review.

S. Distribute copies of reviewed submittals to concerned parties. Instruct parties to promptly report any inability to comply with requirements.

T. Do not use Shop Drawings without an appropriate final stamp indicating action taken in connection with construction.

U. Submittals not requested in conformance with this Specification will not be recognized or processed.

V. Revise and resubmit as required, identify all changes made since the previous submittal.

1.03 SHOP DRAWINGS

A. Shop Drawings: Submit to ENGINEER for review for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. Produce copies and distribute in accordance with SUBMITTAL PROCEDURES.

B. Submit newly prepared information, drawn to accurate scale. Highlight, encircle, or otherwise indicate deviations from the Contract Documents. Do not reproduce Contract Documents or copy standard information as the basis of Shop Drawings. Standard information prepared without specific reference to the project is not considered Shop Drawings.

C. Shop Drawings include fabrication and installation Drawings, setting diagrams, schedules, patterns, templates, and similar drawings. Include the following information:

1. Dimension.
2. Identification of products and materials included.
3. Compliance with specified standards.
4. Notation of coordination requirements.
5. Notation of dimensions established by field measurements.

D. Standard manufactured items in the form of catalog work sheets showing illustrated cuts of the items to be furnished, scale details, sizes, dimensions, quantity, and all other pertinent information should be submitted and approved in a similar manner.

E. Measurements given on Shop Drawings or standard catalog sheets, as established from Contract Drawings and as approved by ENGINEER, shall be followed. When it is necessary to verify field measurements, they shall be checked and established by CONTRACTOR. The field measurements so established shall be followed by CONTRACTOR and by all affected trades.

1.04 MANUFACTURER'S INSTRUCTIONS

A. When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, to ENGINEER for delivery to OWNER in quantities specified for Product Data.

B. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

1.05 CONSTRUCTION SCHEDULE

A. Bar Chart Schedule:

1. Prepare a fully developed, horizontal bar chart type construction schedule. Submit within 30 days of the date established for commencement of the work.

2. Provide a separate item bar for each significant construction activity. Provide a continuous vertical line to identify the first working day of each week. Use the same breakdown of units of the work as indicated on schedule of values.

3. Prepare schedule of sheet, or series of sheets, of stable transparency, or other reproducible media, of sufficient width to show data for entire construction period.

4. Secure time commitments for performing critical elements of the work from parties involved. Coordinate each element on schedule with other construction activities, including the OWNER's operation of the facility and other CONTRACTORS on site; include minor

elements involved in the sequence of the work. Show each activity in proper sequence. Indicate graphically sequences necessary for completion of related portions of the work.

5. Coordinate construction schedule with schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests, and other schedules.

6. Indicate completion in advance of the date established for substantial completion. Indicate substantial completion of schedule to allow time for ENGINEER's procedures necessary for certification of substantial completion.

B. Schedule Updating: Revise schedule after each meeting or activity, where revisions have been recognized or made within two weeks following the meeting or activity.

1.06 SCHEDULE OF VALUES

A. Submit typed schedule for review and approval. The approved schedule of values will be used to prepare future Applications for Payment.

B. Submit Schedule of Values in triplicate to the ENGINEER within 15 days after date of OWNER-CONTRACTOR Agreement for approval.

C. Format: Identify each line item with number and title of the major specification Section.

D. Include within each line item, a direct proportional amount of CONTRACTOR's overhead and profit.

E. Revise schedule to list approved Change Orders, with each Application for Payment.

F. Include the following Project Identification on the Schedule of Values:

1. Project Name and Location
2. Name of ENGINEER
3. Project Number
4. CONTRACTOR's Name and Address
5. Date of Submittal

G. Arrange Schedule of Values in a tabular form with separate rows for each Specification Section and separate columns for each major structure of area of Work. Additionally, separate line items for the following shall be included:

1. Mobilization
2. Bonds & Insurance
3. Allowances
4. Start-Up and Commissioning
5. Project Close-Out

H. Provide a breakdown of the Contract Price in sufficient detail to facilitate continued evaluation of Application for Payment and progress reports. Break principal subcontract amounts down into several line items.

I. For each part of the Work where an Applicant for Payment may include materials for equipment, purchased or fabricated and stored, but not yet installed, provide separate line items on Schedule of Values for initial cost of the materials, for each subsequent stage of completion, and for total installed value of that part of the Work.

J. Update and resubmit schedule of values when change orders result in a change in the contract price.

2.00 PRODUCTS

Not Applicable

3.00 EXECUTIONS

3.01 ENGINEER'S ACTION

A. Except for submittals for record, information or similar purposes, where action and return is required or requested, ENGINEER will review each submittal, mark to indicate action taken, and return promptly.

1. Compliance with specified characteristics is CONTRACTOR's responsibility.

B. Action Stamp: ENGINEER will stamp each submittal with a uniform, self-explanatory action stamp. The stamp will be appropriately marked, as follows, to indicate the action taken:

1. Final Unrestricted Release: Where submittals are marked "No Exceptions Taken" that part of the work covered by the submittal may proceed provided it complies with the requirements of the Contract Documents; final acceptance will depend upon the compliance.

2. Final-But-Restricted Release: When submittals are marked "Make Corrections Noted" that part of the work covered by the submittal may proceed, provided it complies with notation or correction on the submittal and requirements of the Contract Documents; final acceptance will depend on that compliance.

3. Returned for Resubmittal: When submittal is marked "Rejected" or "Revise and Resubmit" do not proceed with the part of the work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal in accordance with the notations; resubmit without delay. Repeat if necessary to obtain a different action mark.

   a. Do not permit submittals marked "Rejected" or "Revise and Resubmit" to be used at site, or elsewhere where work is in progress.

4. Additional Information Needed: When submittal is marked "Submit Specified Item" CONTRACTOR shall submit requested information.

5. Other Action: Where a submittal is primarily for information or record purposes, special processing or other activity, the submittal will be returned, marked "Acknowledge Receipt".

6. The approval of ENGINEER shall not relieve CONTRACTOR of responsibility for errors on Drawings or submittals as ENGINEER's checking is intended to cover compliance with Drawings and specifications and not enter into every detail of the shop work.

END OF SECTION

SECTION 01500

TEMPORARY FACILITIES AND CONTROLS

1.00 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

1.03 USE CHARGES

A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited to, OWNER's construction forces, Landscape Architect, testing agencies, and authorities having jurisdiction.

1.04 INFORMATIONAL SUBMITTALS

A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.

B. Erosion- and Sedimentation-Control Plan: Show compliance with requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.

C. Dust-Control Plan: Submit coordination drawing and narrative that indicates the dust- control measures proposed for use, proposed locations, and proposed time frame for their operation. Identify further options if proposed measures are later determined to be inadequate. Include the following:

1. Locations of dust-control partitions at each phase of work.
2. Waste handling procedures.
3. Other dust-control measures.

1.05 QUALITY ASSURANCE

A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

C. Accessible Temporary Egress: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines.

1.06 PROJECT CONDITIONS

A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before OWNER's acceptance, regardless of previously assigned responsibilities.

2.00 PRODUCTS

Not applicable.

3.00 EXECUTION

3.01 INSTALLATION, GENERAL

A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.

B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.02 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:

1. Maintain support facilities until Landscape Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to OWNER.

B. Traffic Controls: Comply with requirements of authorities having jurisdiction.

1. Protect existing site improvements to remain including curbs, pavement, and utilities.

2. Maintain access for fire-fighting equipment and access to fire hydrants.

C. Parking: Provide temporary parking areas for construction personnel.

D. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.

1. Identification Signs: Provide Project identification signs as indicated on Drawings.

2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.

a. Provide temporary, directional signs for construction personnel and visitors.

3. Maintain and touchup signs so they are legible at all times.

3.03 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.

B. Temporary Erosion and Sedimentation Control: Comply with requirements of 2003 EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent and requirements specified in Section 02311 "Site Clearing."

C. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.

D. Tree and Plant Protection: Comply with requirements specified in Section 01563 "Temporary Tree and Plant Protection".

E. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

3.04 OPERATION, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

B. Maintenance: Maintain facilities in good operating condition until removal.

1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

C. Operate Project-identification-sign lighting daily from dusk until 12:00 midnight.

D. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.

E. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are property of CONTRACTOR. OWNER reserves right to take possession of Project identification signs.

2. Remove temporary roads and paved areas not intended for or acceptable for integration into permanent construction. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.

3. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period.

END OF SECTION

SECTION 01563

TEMPORARY TREE AND PLANT PROTECTION

1.00 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section includes general protection and pruning of existing trees and plants that are affected by execution of the Work, whether temporary or permanent construction.

1.03 DEFINITIONS

A. Caliper: Diameter of a trunk measured by a diameter tape at 12 inches (300 mm) above the ground for trees up to, and including, 4-inch (100-mm) size; and 54 inches (1.37 m) above the ground for trees larger than 4-inch (100-mm) size.

B. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction, and indicated on Drawings.

C. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction, and indicated on Drawings.

D. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.04 SUBMITTALS

A. Product Data: For each type of product indicated.

1.05 QUALITY ASSURANCE

A. Tree Service Firm Qualifications: An experienced tree service firm that has successfully completed temporary tree and plant protection work similar to that required for this Project and that will assign an experienced, qualified arborist to Project site during execution of the Work.

B. Preinstallation Conference: Conduct conference at Project site.

1. Review methods and procedures related to temporary tree and plant protection including, but not limited to, the following:

    a. Construction schedule. Verify availability of materials, personnel, and equipment needed to make progress and avoid delays.
    b. Enforcing requirements for protection zones.
    c. Arborist's responsibilities.
    d. Field quality control.

1.06 PROJECT CONDITIONS

A. The following practices are prohibited within protection zones:

1. Storage of construction materials, debris, or excavated material.
2. Parking vehicles or equipment.
3. Foot traffic.
4. Erection of sheds or structures.
5. Impoundment of water.
6. Excavation or other digging unless otherwise indicated.
7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.

B. Do not direct vehicle or equipment exhaust toward protection zones.

C. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones and organic mulch.

2.00 PRODUCTS

2.01 MATERIALS

A. Topsoil: Natural or cultivated top layer of the soil profile or manufactured topsoil; containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 1 inch (25 mm) in diameter; and free of weeds, roots, and toxic and other nonsoil materials.

1. Obtain topsoil only from well-drained sites where topsoil is 4 inches (100 mm) deep or more; do not obtain from bogs or marshes.

B. Protection-Zone Fencing: Fencing fixed in position and meeting the following requirements. Previously used materials may be used when approved by Landscape Architect.

1. Plastic Protection-Zone Fencing: Plastic construction fencing constructed of high-density extruded and stretched polyethylene fabric with 2-inch (50-mm) maximum opening in pattern and weighing a minimum of 0.4 lb/ft. (0.6 kg/m); remaining flexible from minus 60 to plus 200 deg F (minus 16 to plus 93 deg C); inert to most chemicals and acids; minimum tensile yield strength of 2000 psi (13.8 MPa) and ultimate tensile strength of 2680 psi (18.5 MPa); secured with plastic bands or galvanized-steel or stainless-steel wire ties; and supported by tubular or T-shape galvanized-steel posts spaced not more than 8 feet (2.4 m) apart.

a. Height: 4 feet (1.2 m).
b. Color: High-visibility orange, nonfading.

2. Gates: Single swing access gates matching material and appearance of fencing, to allow for maintenance activities within protection zones; leaf width 24 inches (610 mm).

3.00 EXECUTION

3.01 EXAMINATION

A. Erosion and Sedimentation Control: Examine the site to verify that temporary erosion- and sedimentation-control measures are in place. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.

3.02 PREPARATION

A. Locate and clearly identify trees, shrubs, and other vegetation to remain or to be relocated. Flag each tree trunk at 54 inches (1372 mm) above the ground.

B. Protect tree root systems from damage caused by runoff or spillage of noxious materials while mixing, placing, or storing construction materials. Protect root systems from ponding, eroding, or excessive wetting caused by dewatering operations.

3.03 TREE- AND PLANT-PROTECTION ZONES

A. Protection-Zone Fencing: Install protection-zone fencing along edges of protection zones before materials or equipment are brought on the site and construction operations begin in a manner that will prevent people from easily entering protected area except by entrance gates. Construct fencing so as not to obstruct safe passage or visibility at vehicle intersections where fencing is located adjacent to pedestrian walkways or in close proximity to street intersections, drives, or other vehicular circulation.

1. Posts: Set or drive posts into ground one-third the total height of the fence without concrete footings. Where a post is located on existing paving or concrete to remain, provide appropriate means of post support acceptable to Landscape Architect.

2. Access Gates: Install where indicated; adjust to operate smoothly, easily, and quietly, free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.

B. Maintain protection zones free of weeds and trash.

C. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by Landscape Architect.

D. Maintain protection-zone fencing and signage in good condition as acceptable to Landscape Architect and remove when construction operations are complete and equipment has been removed from the site.

1. Do not remove protection-zone fencing, even temporarily, to allow deliveries or equipment access through the protection zone.
2. Temporary access is permitted subject to preapproval in writing by arborist if a root buffer effective against soil compaction is constructed as directed by arborist. Maintain root buffer so long as access is permitted.

3.04 EXCAVATION

A. General: Excavate at edge of protection zones and for trenches indicated within protection zones according to requirements in Section 02312 "Landscape Grading".

B. Redirect roots in backfill areas where possible. If encountering large, main lateral roots, expose roots beyond excavation limits as required to bend and redirect them without breaking. If encountered immediately adjacent to location of new construction and redirection is not practical, cut roots approximately 3 inches back from new construction and as required for root pruning.

C. Do not allow exposed roots to dry out before placing permanent backfill. Provide temporary earth cover or pack with peat moss and wrap with burlap. Water and maintain in a moist condition. Temporarily support and protect roots from damage until they are permanently relocated and covered with soil.

3.05 ROOT PRUNING

A. Prune roots that are affected by temporary and permanent construction. Prune roots as follows:

1. Cut roots manually by digging a trench and cutting exposed roots with sharp pruning instruments; do not break, tear, chop, or slant the cuts. Do not use a backhoe or other equipment that rips, tears, or pulls roots.
2. Cut Ends: Do not paint cut root ends.
3. Temporarily support and protect roots from damage until they are permanently redirected and covered with soil.
4. Cover exposed roots with burlap and water regularly.
5. Backfill as soon as possible according to requirements in Section 02312 "Landscape Grading".

B. Root Pruning at Edge of Protection Zone: Prune roots 12 inches (300 mm) outside of the protection zone, by cleanly cutting all roots to the depth of the required excavation.

C. Root Pruning within Protection Zone: Clear and excavate by hand to the depth of the required excavation to minimize damage to root systems. Use narrow-tine spading forks, comb soil to expose roots, and cleanly cut roots as close to excavation as possible.

3.06 FIELD QUALITY CONTROL

A. Inspections: Engage a qualified arborist to direct plant-protection measures in the vicinity of trees, shrubs, and other vegetation indicated to remain and to prepare inspection reports.

3.07 REPAIR AND REPLACEMENT

A. General: Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by Landscape Architect.

1. Submit details of proposed root cutting and tree and shrub repairs.
2. Have arborist perform the root cutting, branch pruning, and damage repair of trees and shrubs.
3. Treat damaged trunks, limbs, and roots according to arborist's written instructions.
4. Perform repairs within 24 hours.
5. Replace vegetation that cannot be repaired and restored to full-growth status, as determined by Landscape Architect.

B. Trees: Remove and replace trees indicated to remain that are more than 66 percent dead or in an unhealthy condition before the end of the corrections period or are damaged during construction operations that Landscape Architect determines are incapable of restoring to normal growth pattern.

1. Provide new trees of same size and species as those being replaced for each tree that measures 6 inches (150 mm) or smaller in caliper size.
2. Plant and maintain new trees as specified in Section 02329 "Plants".

3.08 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove excess excavated material, displaced trees, trash and debris, and legally dispose of them off OWNER's property.

END OF SECTION

SECTION 02000

EARTHWORK

1.00 GENERAL

1.01 DESCRIPTION

A. The CONTRACTOR shall perform all excavation and backfilling necessary to complete the work. This shall include the excavation of earth and rock, the removal and disposal of unsuitable material, dewatering, placement of suitable fill and backfill material, and the restoration and final grading for all earth surfaces.

1.02 WORK WITHIN RIGHTS-OF-WAY

A. Where the governmental bodies having jurisdiction of the streets or rights-of-way have specific specifications relating to the requirements for work within their jurisdiction, such requirements must be met as a minimum requirement, and if these Specifications impose further limitation on the work, they shall also be met as the required work standard.

B. During all operations of the CONTRACTOR in the streets and roadways, the CONTRACTOR shall maintain barricades, lights, and warning signs as required by the agency having jurisdiction.

1.03 WORK WITHIN EASEMENTS

A. During construction within any easements, the CONTRACTOR shall confine himself to the limits shown on the Plans. He shall notify property owners in advance of moving equipment on easements and use of the access routes which will be designated by the OWNER. The OWNER will cooperate in working out the details of access. The topsoil over the trench shall be removed and carefully replaced upon completion of the work. The backfill of the trench in the easement may be left slightly high to provide for any slight residual settlement. Any trees, shrubs, or bushes removed shall be replaced to the satisfaction of the property owner.

1.04 SOIL BORINGS

A. Soil boring results, if taken on a site, are appended to these Specifications with locations noted. Boring logs are shown to be generally representative of the site and to assist in the design and construction of the work.

2.00 PRODUCTS

2.01 BACKFILL MATERIAL

A. For areas not requiring "granular backfill" material, backfill shall be of the excavated material, with the exception that materials such as soft clay, topsoil, muck, cinders, vegetable matter, refuse, boulders and other objectionable and non-packing earth shall be excluded from the backfill and removed from the site. Stone larger than 3 inches in any dimension shall be excluded from the backfill and removed from the site by the CONTRACTOR.

B. Where "granular material" backfill is required as specified herein, backfill material shall be defined as a material meeting granular material Class II as defined in 2003 MDOT 902.08.

3.00 EXECUTION

3.01 GENERAL EXCAVATION

A. Excavation shall be performed by any practicable method consistent with the integrity and protection of the work and neighboring structures, workmen, and the public. Topsoil shall be separately removed and stockpiled for reuse.

B. All excavation, except where necessary to tunnel, bore or jack under roads, railroads, tree roots and other obstructions within the limits indicated on the Plans, may be open cut from the surface. Tunneling or boring under trees shall be considered as incidental to construction and will not be considered as cause for request for additional payment.

C. Foreign material or unsuitable foundation material encountered such as wood, boulders, etc., which obstruct the excavation, shall be removed. Such materials found at the bottom of the excavation shall be removed and the foundation restored with approved materials.

D. If excess excavation is made or the material becomes disturbed so as to require removal beyond the prescribed limits, the resulting space shall be filled with selected material solidly tamped into place, in not more than 6-inch layers to the satisfaction of the ENGINEER, before the construction work proceeds. At the direction of the ENGINEER, the excess excavation may be filled with 2,000 psi concrete at the CONTRACTOR's expense.

E. The excavation shall be kept dry during the work. Where water is encountered in the excavation, it shall be removed by pumping or well points. All necessary precautions shall be taken to prevent damage to existing wells and to completed or partially completed structures. The CONTRACTOR shall be responsible for all damages caused by him due to inadequate or improper protection.

3.02 EXCAVATION FOR SEWERS AND WATER MAINS

A. Trenches shall be excavated to the depth required with allowance for bedding the pipe. The trench shall be cut wider and deeper at each pipe joint location to provide for properly completing the pipe joint and to relieve the joint of all loadings.

B. The width of the trench at the top of a rigid pipe shall be sufficient to allow the pipe to be laid and jointed properly and shall provide for a minimum net clearance of 6 inches and a maximum net clearance of 12 inches on each side of the barrel of the pipe and to allow the backfill to be placed and properly compacted.

C. The width of trench at the top of a flexible pipe backfill when using concrete bedding shall be sufficient to allow the pipe to be laid and jointed properly with the minimum net clearance of 12 inches and a maximum net clearance of 18 inches on each side of the barrel of the pipe.

D. Where the conditions of the ground require, or where the work is in close proximity of existing structures, the sides of excavation shall be securely held by bracing and/or sheeting which may be removed in units when the level of the backfill has reached a point where it is safe to pull the sheeting without disturbing the protected feature. No sheeting, bracing, or other timber shall be left in the excavation upon the completion of the main or other structures, except with the specific review and direction of the ENGINEER.

E. Other underground mains, sewers or structures encountered in the excavation shall be adequately supported during the CONTRACTOR's operations, and before backfilling, shall be given permanent support as directed by the ENGINEER to meet the standards or requirements of the owning utility or agency.

F. Water, sewer, gas and other utility services disturbed by the CONTRACTOR in his operations shall be repaired or replaced in a manner equal to the original condition by the CONTRACTOR at his own expense. Where these services are encountered and are undamaged, they shall be supported and/or protected by the CONTRACTOR at his expense against later settlement and/or damage after backfill. The CONTRACTOR shall consult the agency or the utility firm having jurisdiction over any duct line, gas main, etc., which may cross the excavation to determine method of supporting such duct or pipe.

G. All excavated material shall be piled in a manner that will not endanger the work and that will avoid obstructing sidewalks and driveways. Hydrants under pressure, valve manhole covers, valve boxes, curb stop boxes, fire and police call boxes, or other utility controls shall be left unobstructed and accessible until the work is completed. Gutters shall be kept clean, or other satisfactory provisions made for street drainage, and natural water courses shall not be obstructed except as otherwise provided for herein on a temporary basis.

3.03 EXCAVATION FOR STRUCTURES

A. Excavation for structures shall be extended sufficiently beyond the limits of the structure to provide ample room for form construction and for practicable construction methods to be followed.

B. Requirements for excavation of sewers and water mains shall also apply to this Section.

3.04 EXCAVATION FOR PAVED SURFACES

A. In excavating around manholes and catch basins or inlets, care shall be exercised to avoid removing the casings and pushing dirt into the structures. Dirt pushed into manholes, catch basins or inlets by the CONTRACTOR's operations shall be immediately removed so that the dirt will not be carried into the sewer by the flow of sewage or storm water.

B. The CONTRACTOR shall take ample precautions to protect all trees and ornamental shrubbery not within the limits of the construction area, or within the construction areas shown on the Plans to be retained from injury by workmen, equipment, or any other agencies connected with the work, including subcontractors. Such protection shall be provided during the progress of the excavation, grading, or other phases of the work as necessary. Such trees or shrubbery shall be surrounded by protective posts or fencing before construction begins, when in the judgment of the ENGINEER, such precautionary measures are necessary. If, as a result of any phase of the work, trees are damaged or it is necessary to remove limbs in the way of construction, the repair of the damage and such limb removal shall be done by the CONTRACTOR as directed by the ENGINEER. All costs for the protective work shall be borne by the CONTRACTOR as incidental to the Contract work.

3.05 SHORING, SHEETING AND BRACING

A. Where sheet piling, shoring, sheeting, bracing, or other supports are necessary, they shall be furnished, placed, maintained, and except as shown or specified otherwise, removed by the CONTRACTOR.

B. All sheet piling, shoring, sheeting and bracing shall be designed by a professional engineer engaged by the CONTRACTOR with demonstrated competence and experience in such work. The sheeting system shall be designed to prevent bottom failure and hydrostatic uplift within the excavation. Provision shall also be made in the design for lateral pressures due to side slope and construction equipment or other surcharge loads, as applicable.

C. The CONTRACTOR shall provide to the ENGINEER for his review, design calculation and arrangement drawings of the sheeting system prior to ordering any materials for bracing, sheeting, etc., and prior to the commencement of the excavation.

D. All materials, except as otherwise specified, used for sheeting and sheet piling, lagging, braces, shores, and stringers, or waling strips shall be of approved quality and dimensions throughout.

E. Materials for sheeting systems shall be furnished and driven or set in place by the CONTRACTOR, where necessary or wherever ordered by the ENGINEER, whether the same is or is not considered necessary by the CONTRACTOR. If, in the opinion of the ENGINEER, the materials furnished by the CONTRACTOR are not of proper quality or sufficient size or not properly placed to ensure the safety of the work or of adjacent structures and property, the CONTRACTOR shall, upon notice from the ENGINEER to that effect, forthwith procure, furnish and set in place or drive other and satisfactory materials, or place the material in a satisfactory manner; and if he shall fail or neglect to do so, the ENGINEER may order all or any part of the work to be stopped until such materials so used are furnished and placed; and the CONTRACTOR shall not be entitled to claim, demand, or receive any compensation for larger size or better quality or different disposal of materials ordered by the ENGINEER, nor any compensation for allowance of any kind whatsoever for or on account of any damage or delay resulting from such stoppage of work.

F. Steel sheet piling may be either new or used. It shall be of adequate strength, straight and properly braced. Steel sheet piling shall be of the interlocking type. Friction in the interlocks shall not be assumed to contribute to the strength of the sheet piling.

G. The design, planning, installation and removal, if required, of all sheet piling, shoring, sheeting, and bracing shall be accomplished in such a manner as to maintain the required excavation or trench section and to maintain the undisturbed state of the soils below and adjacent to the excavation.

H. Steel sheet piling for the excavation shall be driven straight and in-line. The piling shall be supported aboveground, before driving, by a guide frame at least 20 ft high which will keep the piling accurately in the required position and vertical. Each piece of piling shall be driven only a few feet at a time and driving shall proceed continuously around the perimeter so that the piles shall reach their full penetration together.

I. Walers and bracing shall be supplied and installed as required to complete the sheeting system. Walers and braces shall be of adequate strength for the load imposed. Splices in walers shall develop the full strength of the member in bending, shear, and axial compression.

J. If bracing members are to be removed during construction, the timing and procedure for removal shall not induce excessive stresses in the permanent structures or in steel sheet piling and bracing members.

K. If the construction sequence of structures requires the transfer of bracing to the completed portions of any structure, the CONTRACTOR shall secure written acceptance of the ENGINEER prior to the installation of such bracing.

L. In trenching operations the use of horizontal strutting below the barrel of pipe or the use of the pipe as support for trench racing will not be permitted. The use of a traveling shield for sewer construction shall require that the device be approved for use by a professional engineer. Sheet piling and timbers in trench excavations shall be withdrawn in a manner so as to prevent subsequent settlement of the pipe or additional backfill loadings which might overload the pipe.

M. The neglect, failure, or refusal of the ENGINEER to order the use of sheeting, or sheet piling or steel, or to order the same to be left in place, or the giving or failure to give of any order or directions as to the manner or methods of driving or placing sheeting, sheet piling, bracing, shores, etc., shall not in any way relieve the CONTRACTOR of any or all obligations under this Contract. Sheeting left in place shall be cut off one (1) ft below existing grade.

N. The rules of the OSHA and the State Department of Labor with respect to excavation and construction shall at all times be strictly observed.

3.06 BACKFILLING FOR SEWERS AND WATER MAINS

A. Backfilling shall consist of placement of the prescribed materials from a level 12 inches above the crown of the pipe. Placement shall be as follows:

1. Under gravel driveways, gravel roads and shoulders, the backfill shall be granular material which shall be solidly compacted by mechanical tamps in layers of not more than 12 inches loose thickness with backfilling carried up to within 12 inches of finished grade. Compaction of backfill shall be such as to obtain 95% of the maximum unit density as determined at the optimum moisture content.

2. Under pavements, curb, paved driveways, and sidewalks, the backfill shall be granular material compacted in layers not to exceed 12 inches loose thickness with backfilling carried up to subgrade. Compaction of backfill shall be such as to obtain 95% of the maximum unit density as determined at the optimum moisture content. After a period of about 60 days or less, if the backfill compaction is satisfactory to the ENGINEER, to provide for any slight settlement, the CONTRACTOR shall retrim neatly any broken edges of pavement and replace the top surface of the backfill within the pavement area with pavement surface equal to that surface which was removed. The pavement shall be replaced in accordance with the standard specifications of the agency having jurisdiction.

3. Backfill around lift stations, or buried underground structures shall be granular material compacted in 12-inch lifts. Compaction of backfill shall be such as to obtain 95% of the maximum unit density as determined at the optimum moisture content.

4. For all other areas, backfilling shall consist of placing excavated material as defined in Paragraph 2.01.A. of this Section, in 12-inch lifts to finish grade. Compaction of backfill shall be such as to obtain 90% of the maximum unit density as determined at the optimum moisture content.

3.07 FILLING AND BACKFILLING FOR STRUCTURES

A. Embankments underlying structural footings, streets and drives, sidewalks and around structures shall be granular material meeting the requirements of the Michigan Department of Transportation for granular material compacted to 95% density.

B. In all other areas, material required for embankments and backfilling shall be soil or soil-rock mixture free of organic and other deleterious matter and shall contain no more than 15% rocks or lumps larger than 2-1/2 inches in the greatest dimension, compacted to 90% density.

C. Under all interior and exterior floor slabs, an 8-inch thick granular cushion shall be placed. This material shall be clean mineral aggregate meeting the following gradation requirements:

Passing the No. 4 Sieve	100%
Passing the No. 200 Sieve	0-3%

D. Where embankment material is placed to achieve a new surface elevation, the top 4 inches shall be approved topsoil either salvaged from the site or hauled in by the CONTRACTOR.

3.08 FILLING AND BACKFILLING FOR PAVED SURFACES

A. Embankments, including sand cushions and granular fills, shall be placed in successive layers not more than 6 inches in depth the full width of the cross section, each layer to be thoroughly compacted by means of vibratory compactors or by an approved pneumatic-tired roller or combination thereof, as required by the ENGINEER. Each layer shall be compacted to not less than 95% of the maximum unit density as determined at the optimum moisture content. All parts of the embankment shall be uniformly compacted and the CONTRACTOR shall so direct all earthmoving equipment used in the work so that the same shall be attained. Embankment or fill outside the limits of the subgrade where sand or gravel is not required shall be made with suitable material which is free from perishable organic matter, rubbish, stones, broken concrete, roots, or other foreign materials, at no additional compensation. Before any embankments begin, the base shall be made firm and cleared of topsoil, sod or other perishable material. The sides of the embankment shall be neatly and evenly dressed to the slope shown on the Plans, or such other slope as the ENGINEER may direct.

B. Upon completion of the placing of the curbs, and after the concrete has cured sufficiently, forms shall be removed and the excavated space behind the curb shall be backfilled with a good quality of surface soil, free of rubbish, stone, broken concrete, roots or other foreign material. Where adequate acceptable material for backfill behind the curb is not available, granular fill conforming to 2003 MDOT 902.08, Class II, shall be used. Where the area behind the curb is in cut, it shall be trimmed from the top of the curb on the slope shown on the Plans. If the area is in embankment or fill, an earth berm shall be placed immediately adjacent to the top of the curb and then the embankment of fill shall be finished to the slope shown on the Plans. All trimming and finishing shall be done in a neat, workmanlike manner. All excess concrete and debris shall be removed from the excavation behind the curb line before backfilling begins.

C. In construction of non-rigid pavements, backfilling back of curb and gutter shall be completed before placement and compaction of the base course of the roadway.

3.09 PREPARATION OF SUBGRADE FOR PAVED SURFACES

A. The bottom of the excavation for the pavement or top of the fill shall be known as the pavement subgrade and shall be smoothed, trimmed and compacted to the required line, grade and cross section to receive the road material. It shall be thoroughly compacted by rolling with a roller of approved type weighing not less than 8 tons. The subgrade shall be compacted to at least 95% of the maximum density as designated by the test method AASHO T-180. Inaccessible areas, where rolling is not practical, shall be thoroughly compacted by mechanical tampers capable of striking a blow equivalent to at least 250 foot-pounds per square foot. The subgrade thus formed shall be maintained in a smooth and compacted condition until the pavement has been placed. No base course, surfacing, curb, or curb and gutter, shall be placed until the subgrade has been reviewed by the ENGINEER. The subgrade shall be finished in an acceptable condition at least one day in advance of the pavement construction at all times. Six inches of compacted depth of granular material shall be used where uncompactable soil is encountered. The granular fill shall conform to the 2003 MDOT 902.08, Class II, compacted to 95% of its density.

B. Immediately prior to placing the pavement, the subgrade shall be tested for conformity with the cross section shown on the Plans by means of an approved template riding on the curb and gutter sections or on side forms. If necessary, materials shall be removed or added, as required, to bring all portions of the subgrade to the correct elevation. Corrected portions shall then be thoroughly compacted and again tested with the template. Pavement material shall not be placed at any portion of the subgrade which has not been tested for correct elevation.

C. The finished subgrade shall be maintained in a smooth and compacted condition until the pavement is placed. No storage piles of fine or coarse aggregate shall be placed directly upon the finished subgrade. Should the subgrade become rutted or disturbed in any manner, it shall be reshaped and recompacted.

3.10 GRADING

A. The CONTRACTOR shall grade the site to achieve the elevations as shown on the Plans. All disturbed areas beyond the grading limits shall be restored to prior condition.

B. Surplus excavated material not needed for embankment shall be disposed of by the CONTRACTOR. Headwalls, culverts, drains, sewers and appurtenances filled or damaged by the CONTRACTOR during the course of his operations shall be cleaned, repaired, or replaced at his expense.

C. All temporary earth changes shall be in conformance with the Soil and Erosion Control Act.

3.11 RESTORATION

A. Headwalls, culverts, and drainage systems filled or damaged by the CONTRACTOR during the course of his operations shall be cleaned, relaid or rebuilt with new materials to a condition equal to the original state, and of thickness equal to the original structure and to the original line and grade at the CONTRACTOR's expense.

B. Where the excavation is located beside a ditch and/or where an existing ditch is filled or disturbed in the CONTRACTOR's operations, the CONTRACTOR shall clean, repair, or replace the ditch with properly pitched bottom and side slopes and of section and capacity not less than the original section.

C. Where excavation has been through lawn areas, the CONTRACTOR shall restore the disturbed area by placing topsoil and seeding or sodding over the final backfill material.

D. The CONTRACTOR shall remove excess dirt and other construction material from the site of the work and leave the site in a condition equal to its original state.

E. The final condition of the streets and roadways shall be subject to the approval of the governmental body having jurisdiction thereof, as well as review by the ENGINEER.

END OF SECTION

SECTION 02010

SITE GENERAL PROVISIONS

1.00 GENERAL

1.01 DESCRIPTION

A. The CONTRACTOR shall provide all labor, materials, tools and equipment necessary for the preparation and completion of the site of the project.

1.02 PROTECTION OF TREES

A. All trees which are to be preserved and which, in the opinion of the ENGINEER, might be subject to damage by the CONTRACTOR's operations, shall be adequately protected against damage to the bark by 2-inch thick vertical planking securely wired or tied completely around the tree trunk. Such protection shall not be removed until authorized by the ENGINEER.

B. Machine excavation shall not be made within a circular area of any tree, the diameter of the area in feet being equal to the diameter of the tree in inches. If hand excavation within this area cuts across a large root of a tree, the cutting of which, in the opinion of the ENGINEER, would be injurious to the tree, the CONTRACTOR shall tunnel under such root and protect it from injury throughout the work.

C. No trees are to be removed without the expressed approval of the governmental body having jurisdiction thereof, and of the ENGINEER.

1.03 TEMPORARY ROADWAYS

A. The location of any temporary roadways and/or access drives shall be subject to the approval of the OWNER.

1.04 WORK AREA AND STORAGE OF MATERIALS

A. CONTRACTOR shall submit a proposed site access plan to the OWNER and ENGINEER for review. The access plan shall include locations of equipment access points and materials storage locations.

B. CONTRACTOR shall install standard 6-foot high chain link fence around the perimeter of the staging area. Provide gated access as necessary with padlock and chains. At the completion of the project, CONTRACTOR shall remove all fencing around the staging area, restore and return the space to existing or better conditions.

C. The working area shall be organized in an orderly manner with storage and tool sheds, offices and sanitary facilities, parking areas for employees, and all other necessary facilities developed and maintained by the CONTRACTOR. The CONTRACTOR shall keep the site and all haul roads reasonably clean and dust free.

D. All materials, supplies and equipment, whether furnished by the CONTRACTOR or by the OWNER, shall be delivered, stored and handled as to prevent the inclusion of foreign materials and/or damage by water, freezing, breakage or other causes. The ENGINEER may require the CONTRACTOR to provide an enclosed storage shed for the storage of the above mentioned materials, supplies and equipment. Packaged materials shall be delivered in the original unopened containers and shall be stored until ready for use. All materials which have been stored shall meet the requirements of the Specifications at the time they are used in the project.

E. Where the CONTRACTOR is required to do work within the rights-of-way under the jurisdiction of governmental bodies, he shall meet the requirements of said governmental bodies for the work and storage within their jurisdiction. Such requirements must be met as a minimum requirement, and if the specifications given herein impose further limitations on the work, they shall also be met as the required work standard.

1.05 EXISTING PUBLIC UTILITIES

A. The CONTRACTOR shall conduct his operations so as not to damage any existing utility whether shown in the Plans or not. The CONTRACTOR shall correct, at his own expense, any injury caused during the operations of his subcontractors or suppliers.

1.06 NOTIFICATION TO UTILITIES

A. Prior to the start of any operations in the vicinity of any utilities, the CONTRACTOR shall notify the utility companies and request that they stake out the locations of the utilities in question.

1.07 SANITARY REQUIREMENTS

A. The CONTRACTOR shall provide adequate sanitary facilities for all persons employed on the project. The sanitary facilities shall conform in every way to the requirements of the "General Safety Rules and Regulations for the Construction Industry".

1.08 UTILITIES

A. The CONTRACTOR shall make all necessary arrangements for the provisions of all utility services, temporary or permanent, required under this Contract. The CONTRACTOR shall pay all costs for such connections and services.

B. All utility services shall be inspected by and shall meet the requirements of the applicable codes and governmental bodies.

2.00 PRODUCTS

Not Applicable

3.00 EXECUTION

3.01 CONTROL OF WATER POLLUTION AND SILTATION

A. General Requirements

1. The CONTRACTOR shall conduct his work in a manner to comply with the Soil Erosion and Sedimentation Control Act of 1972, (MICH P.A. 347) that will not cause damaging siltation or pollution of the water in streams, rivers, lakes and reservoirs. All work of water pollution and siltation control is subject to inspection by the Department of Natural Resources.

2. All applicable regulations of fish and wildlife agencies and statutes relating to the prevention and abatement of pollution shall be complied with in the performance of the Contract.

3. Construction operations shall be conducted in such manner as to reduce erosion to the practicable minimum and prevent damaging siltation to streams or lakes. The area of erodible land exposed to the elements by grading operations, including gravel pits, waste or disposal areas and haul roads, at any one time shall be subject to approval of the ENGINEER and the duration of such exposure prior to final trimming and finishing of the areas shall be as short as practical. The ENGINEER shall have full authority to order the suspension of grading and other operations pending adequate and proper performance of trimming, finishing and maintenance work or to restrict the area of erodible land exposed to the elements.

4. Gravel or stone, consisting of durable particles of rock and containing only negligible quantities of fines, shall be used for construction pads, and haul roads.

5. The disturbance of lands and waters that are outside the limits of construction as staked is prohibited, except as found necessary and approved by the ENGINEER.

6. The CONTRACTOR shall conduct his work in such manner as to prevent the entry of fuels, oils, bituminous materials, chemicals, sewage or other harmful materials into streams, rivers, lakes or reservoirs.

7. Water from aggregate washing or other operations containing sediment shall be treated by filtration, by use of a settling basin or other means to reduce the sediment content to a level acceptable to the Department of Natural Resources.

B. Temporary Control Requirements

1. The CONTRACTOR shall provide temporary soil erosion and sedimental controls according to current local soil conservation district soil erosion and sedimentation control standards and specifications or revisions thereof.

2. The CONTRACTOR shall not pump water directly from the excavation into a storm sewer but shall construct and maintain stilling basins to receive the pumpage with an overflow from the basins to the storm sewer. The basins shall be of sufficient size to allow proper settling of sediment before the water flows into the storm sewer. The CONTRACTOR shall remove and/or restore the basin area to original condition after backfilling is complete.

3. Permanent soil erosion control measures for all slopes, channels, ditches or any disturbed land area shall be completed within 15 calendar days after final grading or the final earth change has been completed or where significant earth change activity ceases, temporary soil erosion control measures shall be implemented within 30 calendar days. All temporary soil erosion control measures shall be maintained until permanent soil erosion control measures are implemented.

3.02 FINISH GRADING, TOP SOIL

A. After all backfilling and rough grading has been completed and thoroughly compacted, the entire disturbed area at the site shall be graded to smooth, even surfaces as shown by the proposed new contours shown on the Plans. The portion of the disturbed area where no new contours are shown shall be graded to smooth, even surfaces approximating the original surfaces.

B. All debris and larger stones and sticks and the like shall be removed and disposed of and the entire disturbed area made ready for the addition of top soil and seeding.

END OF SECTION

SECTION 02030

DEMOLITION

1.00 GENERAL

1.01 DESCRIPTION

A. Furnish all labor, materials, tools, and equipment necessary to properly dismantle and/or remove the items shown on the Plans or specified herein. This work shall include removal of such items as superstructures, pavements, curb and gutter, sidewalks, manholes, catch basins, and pipes.

2.00 PRODUCTS

2.01 CONCRETE FILL

A. Concrete required for fill or plugging shall be 3000 psi, air entrained concrete.

3.00 EXECUTION

3.01 GENERAL

A. The CONTRACTOR shall exercise special precautions during construction, not to damage any remaining pavement, sidewalk, or curb and gutter and no construction equipment with tractor lugs or other defacing or damaging components will be permitted on these surfaces. Where it is necessary for such equipment to travel over paved areas, the CONTRACTOR shall provide suitable planks and blocking to prevent damaging paved surfaces.

B. Broken pieces of pavement, sidewalk, or curb and gutter shall be removed from the work and disposed of by the CONTRACTOR. Under no circumstances shall these materials be used in backfilling any pipe trenches.

3.02 PAVEMENTS

A. Cut and remove from the work all pavement, curb and gutter, or sidewalk that would be damaged by the work. Cutting of concrete pavement, where permitted, shall be done with a concrete saw, in a manner meeting the approval of the ENGINEER. Asphalt pavements shall be cut by a tool leaving a square neat cut. Pavements shall be cut back so the pavement opening is 6 inches wider on each side than the width of the trench, and care shall be taken during construction operations so as not to cave the banks or undermine remaining pavement. Any reinforcement encountered shall not be cut out, but shall be left protruding at least two feet from the face of the cut and shall be bent out of the way to be replaced later and spliced to new reinforcement.

B. All strips of the existing pavement which are less than 2 ft wide and which are between the cut pavement and the concrete gutter shall be removed and replaced.

3.04 SIDEWALKS, CURB AND GUTTER, AND DRIVEWAYS

A. In cutting through sidewalks, driveways, or curb and gutter, the CONTRACTOR shall remove full slabs of sidewalk or driveway or full lengths of curb and gutter to the nearest regular joint on each side of the excavation.

3.05 CATCH BASINS, MANHOLES, AND PIPING

A. Covers and frames shall be removed from catch basins and manholes designated to be abandoned. These castings shall remain the property of the OWNER. All existing piping connections shall be plugged with a non-shrink grout and the structure backfilled in accordance with Section 2000 - Earthwork.

END OF SECTION

SECTION 02130

PAVEMENT, CURB, WALKS AND PATHS

1.00 GENERAL

1.01 DESCRIPTION

A. The CONTRACTOR shall furnish all labor, materials, tools and equipment necessary to construct the various conventional pavements and walks as described herein and/or shown on the Plans.

B. This work may include, but not necessarily be limited to the following:

1. Aggregate Paving (Roads and Driveways)
2. Hot Mix Asphalt Paving (Roads and Driveways)
3. Concrete Paving (Roads)
4. Concrete Driveways
5. Concrete Curb and Gutter
6. Concrete Walks
7. Hot Mix Asphalt Paths
8. Ramps
9. Concrete Restoration
10. Pavement Marking
11. Permanent Signage
12. Pulverize Existing Asphalt

C. Where MDOT occurs in statements in this Section, it shall mean Michigan Department of Transportation, 2003 Edition.

D. Where HMA occurs in statements in this Section, it shall mean Hot Mix Asphalt.

1.02 RELATED WORK

A. Removal of the items listed in Subsection 1.01.B, if existing, is described in Section 02030 – Demolition.

B. Preparation of a stabilized subgrade is described in Section 02000 – Earthwork.

2.00 PRODUCTS

2.01 SUBBASE

A. Subbase shall meet the requirements of the 2003 MDOT Standard Specifications for Construction, Section 902.08, Class II material.

2.02 AGGREGATE BASE COURSE

A. Aggregate shall meet the requirements of the 2003 MDOT Standard Specifications for Construction, Section 902.06, 21AA limestone aggregate.

2.03 AGGREGATE SURFACE COURSE

A. Aggregate shall meet the requirements of the 2003 MDOT Standard Specifications for Construction, Section 902.06, 23A limestone aggregate.

2.04 HMA PAVEMENT

A. HMA base, leveling, and wearing courses shall meet the requirements of the 2003 MDOT Standard Specifications for Construction, Section 501. The type of mixture shall be per the Contract Plans.

2.05 PRIME AND BOND COATS

A. Prime and bond coats shall meet the requirements of the 2003 MDOT Standard Specifications for Construction, Section 904.

2.06 CONCRETE PAVEMENT

A. Concrete shall meet the requirements of the 2003 MDOT Standard Specifications for Construction, Section 601, Grade P1. When indicated on the plans or in the Contract Proposal, Grade HE shall be required. When indicated on the plans or in the Contract Proposal, curb shall be integral to pavement, with curb material meeting the same requirements as the pavement.

2.07 CONCRETE DRIVEWAYS

A. Concrete driveways shall meet the requirements of the 2003 MDOT Standard Specifications for Construction, Section 801.02. Concrete shall be Grade P1 unless otherwise indicated on the plans or Contract Proposal for Grade HE.

2.08 CONCRETE CURB AND GUTTER

A. Concrete curb and gutter shall meet the requirements of the 2003 MDOT Standard Specifications for Construction, Section 802.02. Concrete shall be Grade P1 unless otherwise indicated on the plans for Grade HE to match the pavement type.

2.09 HMA CURB

A. HMA curb shall meet the requirements of the 2003 MDOT Standard Specifications for Construction, Section 805.02. The type of mixture shall be per the Contract Plans.

2.10 CONCRETE WALKS

A. Concrete walk shall meet the requirements of the 2003 MDOT Standard Specifications for Construction, Section 803.02. Concrete shall be Grade P1.

2.11 RAMPS

A. Ramps shall meet the requirements of the 2003 MDOT Standard Specifications for Construction, Section 803.02. Concrete shall be Grade P1.

2.12 CONCRETE PAVEMENT RESTORATION

A. Restoration of existing concrete condition, when indicated on the plans or on the Contract Proposal, shall meet the requirements of the 2003 MDOT Standard Specifications for Construction, Section 603.02.

2.13 PAVEMENT MARKING

A. Pavement markings shall be regular dry reflectorized markings, color to be determined by ENGINEER, per City of Ann Arbor and 2003 MDOT Standards.

B. Pavement marking shall include two (2) applications as necessary and removal of existing markings to blend with new markings as necessary.

2.14 PERMANENT SIGNAGE

A. Permanent signage shall be per the Michigan Manual of Uniform Traffic Control Devices (MMUTCD).

B. Signage shall be mounted on steel posts and are to include all bolts, nuts and any other items necessary to install the signage per City of Ann Arbor and 2003 MDOT Standards.

2.15 PULVERIZE EXISTING ASPHALT

A. Existing asphalt shall be pulverized to full depth for addition to 21AA Limestone to produce the proposed base material for the new asphalt pavements.

3.00 EXECUTION

3.01 SUBBASE

A. Subbase shall meet the requirements of the 2003 MDOT Standard Specifications for Construction, Section 301. Measurement and Payment shall be provided per the Bid Form in these Contract Documents, superseding the MDOT Specification.

3.01 AGGREGATE PAVEMENT

A. Aggregate base course shall meet the requirements of the 2003 MDOT Standard Specifications for Construction, Section 302. Measurement and Payment shall be provided per the Bid Form in these Contract Documents, superseding the MDOT Specification.

B. Aggregate surface courses shall meet the requirements of the 2003 MDOT Standard Specifications for Construction, Section 306. Measurement and Payment shall be provided per the Bid Form in these Contract Documents, superseding the MDOT Specification.

3.02 HMA PAVEMENT

A. HMA base, leveling, and surface courses shall meet the requirements of the 2003 MDOT Standard Specifications for Construction, Sections 502-504 for the mixture type identified in the Contract Proposal or on the plans. Measurement and Payment shall be provided per the Bid Form in these Contract Documents, superseding the MDOT Specification.

3.03 PRIME COAT

A. Prime coat shall be applied on a prepared aggregate base at a rate of 0.25 gallons per square yard.

3.04 BOND COAT

A. Bond coat shall be applied to an asphalt base course at a rate of 0.10 gallons per square yard.

3.05 CONCRETE PAVEMENT

A. Concrete pavement shall meet the requirements of the 2003 MDOT Standard Specifications for Construction, Sections 602, 604 and 605. Measurement and Payment shall be provided per the Bid Form in these contract documents, superseding the MDOT Specification.

3.06 CONCRETE DRIVEWAYS

A. Concrete driveways shall meet the requirements of the 2003 MDOT Standard Specifications for Construction, Section 801.

3.07 CONCRETE CURB AND GUTTER

A. Concrete curb and gutter shall meet the requirements of the 2003 MDOT Standard Specifications for Construction, Section 802, and be sized equal to that removed or as shown on the plans.

3.08 CONCRETE WALKS

A. Concrete walks shall meet the requirements of the 2003 MDOT Standard Specifications for Construction, Section 803.

3.09 HMA PATHS

A. HMA paths shall meet the requirements of the 2003 MDOT Standard Specifications for Construction, Section 806.

3.10 RAMPS

A. Ramps shall meet the requirements of the 2003 MDOT Standard Specifications for Construction, Section 803. Truncated domes shall be pre-fabricated inlayed type. Stamping and tinting of truncated domes is not allowed.

3.11 CONCRETE RESTORATION

A. Restoration of existing concrete pavement condition shall meet the requirements of the 2003 MDOT Standard Specifications for Construction, Section 603.

3.12 PAVEMENT MARKING

A. Application of pavement markings shall include all necessary barrels and barricades to keep traffic off of the markings until dry.

3.13 PERMANENT SIGNAGE

A. CONTRACTOR shall include all materials and equipment to properly install permanent signage per City of Ann Arbor and 2003 MDOT Standards.

3.14 PULVERIZE EXISTING ASPHALT

A. CONTRACTOR shall include all equipment necessary to pulverize, remove stockpile, mix and place pulverized material. Stockpile location to be approved by the OWNER.

END OF SECTION

SECTION 02311

SITE CLEARING

1.00 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes:

1. Protecting existing vegetation to remain.
2. Removing existing vegetation.
3. Clearing and grubbing.
4. Disconnecting, capping or sealing, and removing site utilities.
5. Temporary erosion- and sedimentation-control measures.

B. Related Sections:

1. Section 01500 "Temporary Facilities and Controls" for temporary utility services, construction and support facilities, security and protection facilities, and temporary erosion- and sedimentation-control measures.

1.03 DEFINITIONS

A. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.

B. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil; but in disturbed areas such as urban environments, the surface soil can be subsoil.

C. Topsoil: Top layer of the soil profile consisting of existing native surface topsoil or existing in-place surface soil and is the zone where plant roots grow.

D. Topsoil: Top layer of the soil profile consisting of existing native surface topsoil or existing in-place surface soil and is the zone where plant roots grow. Its appearance is generally friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 2 inches (50 mm) in diameter; and free of subsoil and weeds, roots, toxic materials, or other nonsoil materials.

E. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction, and indicated on Drawings.

F. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction, and indicated on Drawings.

G. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.04 MATERIAL OWNERSHIP

A. Except for stripped topsoil and other materials indicated to be stockpiled or otherwise remain OWNER's property, cleared materials shall become CONTRACTOR's property and shall be removed from Project site.

1.05 INFORMATIONAL SUBMITTALS

A. Record Drawings: CONTRACTOR shall submit plans identifying and accurately showing locations of capped utilities and other subsurface structural, electrical, and mechanical conditions.

1.06 PROJECT CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from OWNER and authorities having jurisdiction.
2. Provide alternate routes around closed or obstructed traffic ways if required by OWNER or authorities having jurisdiction.

B. Utility Locator Service: Notify utility locator service for area where Project is located before site clearing.

C. Do not commence site clearing operations until temporary erosion- and sedimentation-control and plant-protection measures are in place.

D. The following practices are prohibited within protection zones:

1. Storage of construction materials, debris, or excavated material.
2. Parking vehicles or equipment.
3. Foot traffic.
4. Erection of sheds or structures.
5. Impoundment of water.
6. Excavation or other digging unless otherwise indicated.
7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.

E. Do not direct vehicle or equipment exhaust towards protection zones.

F. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones.

G. Soil Stripping, Handling, and Stockpiling: Perform only when the topsoil is dry or slightly moist.

2.00 PRODUCTS

Not Applicable

3.00 EXECUTION

3.01 PREPARATION

A. Protect and maintain benchmarks and survey control points from disturbance during construction.

B. Locate and clearly identify trees, shrubs, and other vegetation to remain or to be relocated. Flag each tree trunk at 54 inches (1372 mm) above the ground.

C. Protect existing site improvements to remain from damage during construction.

1. Restore damaged improvements to their original condition, as acceptable to OWNER.

3.02 TEMPORARY EROSION AND SEDIMENTATION CONTROL

A. Provide temporary erosion- and sedimentation-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings and requirements of authorities having jurisdiction.

B. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.

C. Inspect, maintain, and repair erosion- and sedimentation-control measures during construction until permanent vegetation has been established.

D. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.03 TREE AND PLANT PROTECTION

A. General: Protect trees and plants remaining on-site according to requirements in Section 01563 "Temporary Tree and Plant Protection".

B. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by Landscape Architect.

3.04 EXISTING UTILITIES

A. Locate, identify, disconnect, and seal or cap utilities indicated to be removed.

1. Arrange with utility companies to shut off indicated utilities.

B. Locate, identify, and disconnect utilities indicated to be abandoned in place.

C. Interrupting Existing Utilities: Do not interrupt utilities serving facilities occupied by OWNER or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Landscape Architect not less than two days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Landscape Architect's written permission.

D. Excavate for and remove underground utilities indicated to be removed.

3.05 CLEARING AND GRUBBING

A. Remove obstructions, trees, shrubs, and other vegetation to permit installation of new construction.

1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
2. Grind down stumps and remove roots, obstructions, and debris to a depth of 18 inches (450 mm) below exposed subgrade.
3. Use only hand methods for grubbing within protection zones.
4. Chip removed tree branches and dispose of off-site.

3.06 SITE IMPROVEMENTS

A. Remove existing above- and below-grade improvements as indicated and necessary to facilitate new construction.

B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.

1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut along line of existing pavement to remain before removing adjacent existing pavement. Saw-cut faces vertically.

3.07 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off OWNER's property.

END OF SECTION

SECTION 02328

TURF AND GRASSES

1.00 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes:

1. Plugging.
2. Fescue Seeding

B. Related Sections:

1. Section 02311 "Site Clearing" for topsoil stripping and stockpiling.
2. Section 02312 "Landscape Grading" for excavation, filling and backfilling, and rough grading.
3. Section 02329 "Plants" for border edgings.

1.03 DEFINITIONS

A. Finish Grade: Elevation of finished surface of planting soil.

B. Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.

C. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. These include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.

D. Planting Soil: Standardized topsoil; existing, native surface topsoil; existing, in-place surface soil; imported topsoil; or manufactured topsoil that is modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.

E. Subgrade: Surface or elevation of subsoil remaining after excavation is complete or top surface of a fill or backfill before planting soil is placed.

F. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.

G. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil, but in disturbed areas such as urban environments, the surface soil can be subsoil.

1.04 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

1. Pesticides and Herbicides: Include product label and manufacturer's application instructions specific to this Project.

1.05 INFORMATIONAL SUBMITTALS

A. Maintenance Instructions: Recommended procedures to be established by OWNER for maintenance of turf during a calendar year. Submit before expiration of required initial maintenance periods.

1.06 QUALITY ASSURANCE

A. Installer Qualifications: A qualified landscape Installer whose work has resulted in successful turf establishment.

1. Professional Membership: Installer shall be a member in good standing of either the Professional Landcare Network or the American Nursery and Landscape Association.
2. Experience: Three years' experience in turf installation.
3. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.
4. Personnel Certifications: Installer's field supervisor shall have certification in one of the following categories from the Professional Landcare Network:

    a. Certified Landscape Technician - Exterior, with installation maintenance specialty area(s), designated CLT-Exterior.
    b. Certified Turfgrass Professional, designated CTP.
    c. Certified Turfgrass Professional of Cool Season Lawns, designated CTP-CSL.

5. Maintenance Proximity: Not more than one hour normal travel time from Installer's place of business to Project site.

B. Soil Analysis: For each unamended soil type, furnish soil analysis and a written report by a qualified soil-testing laboratory stating percentages of organic matter; gradation of sand, silt, and clay content; cation exchange capacity; deleterious material; pH; and mineral and plant-nutrient content of the soil.

1. Testing methods and written recommendations shall comply with USDA's Handbook No. 60.
2. The soil-testing laboratory shall oversee soil sampling, with depth, location, and number of samples to be taken per instructions from Landscape Architect. A minimum of three representative samples shall be taken from varied locations for each soil to be used or amended for planting purposes.
3. Report suitability of tested soil for turf growth.

    a. Based on the test results, state recommendations for soil treatments and soil amendments to be incorporated. State recommendations in weight per 1000 sq. ft. (92.9 sq. m) or volume per cu. yd. (0.76 cu. m) for nitrogen, phosphorus, and potash nutrients and soil amendments to be added to produce satisfactory planting soil suitable for healthy, viable plants.

b. Report presence of problem salts, minerals, or heavy metals, including aluminum, arsenic, barium, cadmium, chromium, cobalt, lead, lithium, and vanadium. If such problem materials are present, provide additional recommendations for corrective action.

C. Preinstallation Conference: Conduct conference at Project site.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Seed and Other Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of conformance with state and federal laws, as applicable.

B. Bulk Materials:

1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.

1.08 PROJECT CONDITIONS

A. Planting Restrictions: Plant during one of the following periods. Coordinate planting periods with initial maintenance periods to provide required maintenance from date of planting completion.

1. Spring Planting: May 30 – June 15
2. Fall Planting: September 1 – October 15

B. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions.

1.09 MAINTENANCE SERVICE

A. Initial Plant Maintenance Service: Provide full maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after each area is planted and continue until acceptable cover is established, but for not less than 12 Months from date of Substantial Completion.

B. Continuing Maintenance Proposal: From Installer to Owner, in the form of a standard yearly (or other period) maintenance agreement, starting on date initial maintenance service is concluded. State services, obligations, conditions, and terms for agreement period and for future renewal options.

2.00 PRODUCTS

2.01 LANDSCAPE PLANTINGS

A. Fescue Seed: Fresh, clean, and dry new seed, of mixed species as follows:

SPECIES	COMMON NAME	LBS/AC
Festuca brevipila	Hard Fescue	0.5 lbs/ac
Festuca ovina	Sheep Fescue	0.5 lbs/ac
Festuca rubra	Red Fescue	0.5 lbs/ac
Festuca rubra subs. fallax	Chewing Fescue	0.5 lbs/ac
Festucarubra var. rubra	Creeping Fescue	0.5 lbs/ac
Temporary Cover		
Avena Sativa	Seed Oats	24 lbs/ac

B. Bioswale Plantings: Plugs of mixed species as follows:

SPECIES	COMMON NAME	SPACING
Grasses		
Carex comosa	Bristly Sedge	1-3’
Carex hystericina	Porcupine Sedge	1-3’
Carex vulpinoidea	Fox Sedge	1-3’
Juncus effusus	Soft-stemmed Bulrush	1-3’
Panicum virgatum	Switch Grass	1-3’
Scirpus atrovirens	Dark Green Rush	1-3’
Sorgastrum nutans	Indian Grass	1-3’
Forbs		
Aster puniceum	Swamp Aster	1-3’
Eupatorium perfoliatum	Boneset	1-3’
Iris versicolor	Blueflag Iris	1-3’
Liatris spicata	Marsh Blazing Star	1-3’
Lobelia cardinalis	Cardinal Flower	1-3’
Lobelia siphilitica	Great Blue Flower	1-3’
Mimulus ringens	Monkey Flower	1-3’
Oenothera biennis	Evening Primrose	1-3’
Physostegia virginiana	False Dragonhead	1-3’
Rudbeckia fulgida	Showy Black-eyed Susan	1-3’
Silphium terebinthinaceum	Prairie Dock	1-3’
Verbena hastata	Blue Vervain	1-3’
Vernonia missurica	Ironweed	1-3’
Zizia aurea	Golden Alexander	1-3’

C. Turfgrass Seed Mix: Fresh, clean, and dry new seed, of mixed species as follows:

30% Kentucky Blue Grass (*Poa pratensis*)
20% Perennial rye Grass (*Lolium perenne*)
50% Creeping Red Fescue (*Festuca rubra*)

D. Seed Carrier: Inert material, sharp clean sand or perlite, mixed with seed at a ratio of not less than two parts seed carrier to one part seed.

2.02 ORGANIC SOIL AMENDMENTS

A. Compost: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 1/2-inch (12.5-mm) sieve; soluble salt content of 5 to 10 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:

1. Organic Matter Content: 25 to 35 percent of dry weight.
2. Feedstock: Agricultural, food, or industrial residuals; biosolids; yard trimmings; or source-separated or compostable mixed solid waste.

2.03 PLANTING SOILS

A. Planting Soil: Imported topsoil or manufactured topsoil from off-site sources. Obtain topsoil displaced from naturally well-drained construction or mining sites where topsoil occurs at least 6 inches (150 mm) deep; do not obtain from agricultural land, bogs or marshes.

1. Additional Properties of Imported Topsoil or Manufactured Topsoil: Screened and free of stones 1 inch (25 mm) or larger in any dimension; free of roots, plants, sod, clods, clay lumps, pockets of coarse sand, paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, building debris, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid, and other extraneous materials harmful to plant growth; free of obnoxious weeds and invasive plants including quackgrass, Johnsongrass, poison ivy, nutsedge, nimblewill, Canada thistle, bindweed, bentgrass, wild garlic, ground ivy, perennial sorrel, and bromegrass; not infested with nematodes, grubs, other pests, pest eggs, or other undesirable organisms and disease-causing plant pathogens; friable and with sufficient structure to give good tilth and aeration. Continuous, air-filled, pore-space content on a volume/volume basis shall be at least 15 percent when moisture is present at field capacity. Soil shall have a field capacity of at least 15 percent on a dry weight basis.

2.04 MULCHES

A. Straw Mulch: Provide air-dry, clean, mildew- and seed-free, salt hay or threshed straw of wheat, rye, oats, or barley.

B. Compost Mulch: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 1-inch (25-mm) sieve; soluble salt content of 2 to 5 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:

1. Organic Matter Content: 50 to 60 percent of dry weight.
2. Feedstock: Agricultural, food, or industrial residuals; biosolids; yard trimmings; or source-separated or compostable mixed solid waste.

C. Fiber Mulch: Biodegradable, dyed-wood, cellulose-fiber mulch; nontoxic and free of plant-growth or germination inhibitors; with a maximum moisture content of 15 percent and a pH range of 4.5 to 6.5.

3.00 EXECUTION

3.01 EXAMINATION

A. Examine areas to be planted for compliance with requirements and other conditions affecting performance.

1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
2. Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions.
3. Suspend soil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
4. Uniformly moisten excessively dry soil that is not workable and which is too dusty.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Landscape Architect and replace with new planting soil.

3.02 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, and plantings from damage caused by planting operations.

1. Protect grade stakes set by others until directed to remove them.

3.03 PLUGGING

A. Plant plugs in holes or furrows, spaced 12 inches (300 mm) apart in both directions. On slopes, contour furrows to near level.

3.04 FESCUE SEED

A. Do not broadcast or drop seed when wind velocity exceeds 5 mph (8 km/h). Evenly distribute seed by sowing equal quantities in two directions at right angles to each other.

1. Do not use wet seed or seed that is moldy or otherwise damaged.

B. Sow Fescue Seed at a total rate of 9.7 oz. /1000 sq. ft.

C. Brush seed into top 1/16 inch (1.6 mm) of soil, roll lightly, and water with fine spray.

D. Water newly planted areas and keep moist until cover is established.

3.05 FESCUE AND TURFGRASS COVER

A. Maintain and establish permanent cover by watering, weeding, mowing, trimming, replanting, and performing other operations as required to establish a healthy, viable cover. Roll, regrade, and replant bare or eroded areas and remulch. Provide materials and installation the same as those used in the original installation.

1. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace materials damaged or lost in areas of subsidence.
2. In areas where mulch has been disturbed by wind or maintenance operations, add new mulch and anchor as required to prevent displacement.
3. Apply treatments as required to keep fescue cover and soil free of pests and pathogens or disease. Use integrated pest management practices whenever possible to minimize the use of pesticides and reduce hazards.

B. Watering: Install and maintain temporary piping, hoses, and watering equipment to convey water from sources and to keep area uniformly moist.

1. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas.
2. Water area with fine spray at a minimum rate of 1/2 inch (13 mm) per week for eight weeks after planting unless rainfall precipitation is adequate.

3.06 CLEANUP AND PROTECTION

A. Promptly remove soil and debris created by turf work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.

B. Erect temporary fencing or barricades and warning signs as required to protect newly planted areas from traffic. Maintain fencing and barricades throughout initial maintenance period and remove after plantings are established.

END OF SECTION

SECTION 02329

PLANTS

1.00 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes:

1. Plants.
2. Planting soils.
3. Tree stabilization.

B. Related Sections:

1. Section 01563 "Temporary Tree and Plant Protection" for protecting, trimming, pruning, repairing, and replacing existing trees to remain that interfere with, or are affected by, execution of the Work.
2. Section 02328 "Turf and Grasses" for turf (lawn) and fescue planting, hydroseeding, and erosion-control materials.

1.03 DEFINITIONS

A. Backfill: The earth used to replace or the act of replacing earth in an excavation.

B. Balled and Burlapped Stock: Plants dug with firm, natural balls of earth in which they were grown, with ball size not less than diameter and depth recommended by ANSI Z60.1 for type and size of plant required; wrapped with burlap, tied, rigidly supported, and drum laced with twine with the root flare visible at the surface of the ball as recommended by ANSI Z60.1.

C. Balled and Potted Stock: Plants dug with firm, natural balls of earth in which they are grown and placed, unbroken, in a container. Ball size is not less than diameter and depth recommended by ANSI Z60.1 for type and size of plant required.

D. Bare-Root Stock: Plants with a well-branched, fibrous-root system developed by transplanting or root pruning, with soil or growing medium removed, and with not less than minimum root spread according to ANSI Z60.1 for type and size of plant required.

E. Container-Grown Stock: Healthy, vigorous, well-rooted plants grown in a container, with a well-established root system reaching sides of container and maintaining a firm ball when removed from container. Container shall be rigid enough to hold ball shape and protect root mass during shipping and be sized according to ANSI Z60.1 for type and size of plant required.

F. Finish Grade: Elevation of finished surface of planting soil.

G. Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.

H. Pests: Living organisms that occur where they are not desired, or that cause damage to plants, animals, or people. These include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.

I. Planting Area: Areas to be planted.

J. Planting Soil: Standardized topsoil; existing, native surface topsoil; existing, in-place surface soil; imported topsoil; or manufactured topsoil that is modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.

K. Plant; Plants; Plant Material: These terms refer to vegetation in general, including trees, shrubs, vines, ground covers, ornamental grasses, bulbs, corms, tubers, or herbaceous vegetation.

L. Root Flare: Also called "trunk flare." The area at the base of the plant's stem or trunk where the stem or trunk broadens to form roots; the area of transition between the root system and the stem or trunk.

M. Stem Girdling Roots: Roots that encircle the stems (trunks) of trees below the soil surface.

N. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.

O. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.

P. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil; but in disturbed areas such as urban environments, the surface soil can be subsoil.

1.04 ACTION SUBMITTALS

A. Product Data: For each type of product indicated, including soils.

1. Plant Materials: Include quantities, sizes, quality, and sources for plant materials.
2. Plant Photographs: Include color photographs in digital format of each required species and size of plant material as it will be furnished to the Project. Take photographs from an angle depicting true size and condition of the typical plant to be furnished. Include a scale rod or other measuring device in each photograph. For species where more than 20 plants are required, include a minimum of three photographs showing the average plant, the best quality plant, and the worst quality plant to be furnished. Identify each photograph with the full scientific name of the plant, plant size, and name of the growing nursery.

1.05 INFORMATIONAL SUBMITTALS

A. Product Certificates: For each type of manufactured product, from manufacturer, and complying with the following:

1. Manufacturer's certified analysis of standard products.
2. Analysis of other materials by a recognized laboratory made according to methods established by the Association of Official Analytical Chemists, where applicable.

B. Maintenance Instructions: Recommended procedures to be established by OWNER for maintenance of plants during a calendar year. Submit before start of required maintenance periods.

C. Warranty: Sample of special warranty.

1.06 QUALITY ASSURANCE

A. Installer Qualifications: A qualified landscape Installer whose work has resulted in successful establishment of plants.

1. Professional Membership: Installer shall be a member in good standing of either the Professional Landcare Network or the American Nursery and Landscape Association.
2. Experience: Five years' experience in landscape installation.
3. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.
4. Personnel Certifications: Installer's personnel assigned to the Work shall have certification in one of the following categories from the Professional Landcare Network:

    a. Certified Landscape Technician - Exterior, with installation maintenance specialty area(s), designated CLT-Exterior.
    b. Certified Landscape Technician - Interior, designated CLT-Interior.
    c. Certified Ornamental Landscape Professional, designated COLP.

B. Provide quality, size, genus, species, and variety of plants indicated, complying with applicable requirements in ANSI Z60.1.

1. Selection of plants purchased under allowances will be made by Landscape Architect, who will tag plants at their place of growth before they are prepared for transplanting.

C. Measurements: Measure according to ANSI Z60.1. Do not prune to obtain required sizes.

1. Trees and Shrubs: Measure with branches and trunks or canes in their normal position. Take height measurements from or near the top of the root flare for field-grown stock and container grown stock. Measure main body of tree or shrub for height and spread; do not measure branches or roots tip to tip. Take caliper measurements 12 inches (300 mm) above the root flare for trees up to 4-inch (100-mm) caliper size, and 54 inches (1370 mm) above the root flare for larger sizes.
2. Other Plants: Measure with stems, petioles, and foliage in their normal position.

D. Plant Material Observation: Landscape Architect may observe plant material either at place of growth or at site before planting for compliance with requirements for genus, species, variety, cultivar, size, and quality. Landscape Architect retains right to observe trees and shrubs further for size and condition of balls and root systems, pests, disease symptoms, injuries, and latent defects and to reject unsatisfactory or defective material at any time during progress of work. Remove rejected trees or shrubs immediately from Project site.

1. Notify Landscape Architect of sources of planting materials seven days in advance of delivery to site.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of conformance with state and federal laws if applicable.

B. Bulk Materials:

1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.

C. Deliver bare-root stock plants freshly dug. Immediately after digging up bare-root stock, pack root system in wet straw, hay, or other suitable material to keep root system moist until planting.

D. Do not prune trees and shrubs before delivery. Protect bark, branches, and root systems from sun scald, drying, wind burn, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Provide protective covering of plants during shipping and delivery. Do not drop plants during delivery and handling.

E. Handle planting stock by root ball.

F. Store bulbs, corms, and tubers in a dry place at 60 to 65 deg F (16 to 18 deg C) until planting.

G. Deliver plants after preparations for planting have been completed, and install immediately. If planting is delayed more than six hours after delivery, set plants and trees in their appropriate aspect (sun, filtered sun, or shade), protect from weather and mechanical damage, and keep roots moist.

1. Heel-in bare-root stock. Soak roots that are in dry condition in water for two hours. Reject dried-out plants.
2. Set balled stock on ground and cover ball with soil, peat moss, sawdust, or other acceptable material.
3. Do not remove container-grown stock from containers before time of planting.
4. Water root systems of plants stored on-site deeply and thoroughly with a fine-mist spray. Water as often as necessary to maintain root systems in a moist, but not overly-wet condition.

1.08 PROJECT CONDITIONS

A. Field Measurements: Verify actual grade elevations, service and utility locations, irrigation system components, and dimensions of plantings and construction contiguous with new plantings by field measurements before proceeding with planting work.

B. Interruption of Existing Services or Utilities: Do not interrupt services or utilities to facilities occupied by OWNER or others unless permitted under the following conditions and then only after arranging to provide temporary services or utilities according to requirements indicated:

1. Notify Landscape Architect and OWNER no fewer than two days in advance of proposed interruption of each service or utility.
2. Do not proceed with interruption of services or utilities without OWNER's written permission.

C. Planting Restrictions: Plant during one of the following periods. Coordinate planting periods with maintenance periods to provide required maintenance from date of Substantial Completion.

1. Spring Planting: When the ground is free from frost and the threat of heavy frost is over (approximately May 15) – June 15
2. Fall Planting: September 1 – October 15

D. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions and warranty requirements.

1.09 WARRANTY

A. Special Warranty: Installer agrees to repair or replace plantings and accessories that fail in materials, workmanship, or growth within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Death and unsatisfactory growth, except for defects resulting from abuse, lack of adequate maintenance, or neglect by OWNER, or incidents that are beyond CONTRACTOR's control.
b. Structural failures including plantings falling or blowing over.
c. Faulty performance of tree stabilization.
d. Deterioration of metals, metal finishes, and other materials beyond normal weathering.

2. Warranty Periods from Date of Planting Completion:

a. Trees, Shrubs, Vines, and Ornamental Grasses: 12 months.
b. Ground Covers, Biennials, Perennials, and Other Plants: 12 months.

3. Include the following remedial actions as a minimum:

a. Immediately remove dead plants and replace unless required to plant in the succeeding planting season.
b. Replace plants that are more than 25 percent dead or in an unhealthy condition at end of warranty period.
c. A limit of one replacement of each plant will be required except for losses or replacements due to failure to comply with requirements.
d. Provide extended warranty for period equal to original warranty period, for replaced plant material.

1.10 MAINTENANCE SERVICE

A. Initial Maintenance Service for Trees and Shrubs: Provide maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after

plants are installed and continue until plantings are acceptably healthy and well established but for not less than maintenance period below.

1. Maintenance Period: 12 months from date of planting completion.

B. Continuing Maintenance Proposal: From Installer to OWNER, in the form of a standard yearly (or other period) maintenance agreement, starting on date initial maintenance service is concluded. State services, obligations, conditions, and terms for agreement period and for future renewal options.

2.00 PRODUCTS

2.01 PLANT MATERIAL

A. General: Furnish nursery-grown plants true to genus, species, variety, cultivar, stem form, shearing, and other features indicated in Plant Schedule or Plant Legend shown on Drawings and complying with ANSI Z60.1; and with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock, densely foliated when in leaf and free of disease, pests, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.

1. Trees with damaged, crooked, or multiple leaders; tight vertical branches where bark is squeezed between two branches or between branch and trunk ("included bark"); crossing trunks; cut-off limbs more than 3/4 inch (19 mm) in diameter; or with stem girdling roots will be rejected.
2. Collected Stock: Do not use plants harvested from the wild, from native stands, from an established landscape planting, or not grown in a nursery unless otherwise indicated.

B. Provide plants of sizes, grades, and ball or container sizes complying with ANSI Z60.1 for types and form of plants required. Plants of a larger size may be used if acceptable to Landscape Architect, with a proportionate increase in size of roots or balls.

C. Root-Ball Depth: Furnish trees and shrubs with root balls measured from top of root ball, which shall begin at root flare according to ANSI Z60.1. Root flare shall be visible before planting.

2.02 PLANTING SOILS

A. Planting Soil: Imported topsoil or manufactured topsoil from off-site sources. Obtain topsoil displaced from naturally well-drained construction or mining sites where topsoil occurs at least 6 inches (150 mm) deep; do not obtain from agricultural land, bogs, or marshes.

1. Additional Properties of Imported Topsoil or Manufactured Topsoil: Screened and free of stones 1 inch (25 mm) or larger in any dimension; free of roots, plants, sod, clods, clay lumps, pockets of coarse sand, paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, building debris, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid, and other extraneous materials harmful to plant growth; free of obnoxious weeds and invasive plants including quackgrass, Johnsongrass, poison ivy, nutsedge, nimblewill, Canada thistle, bindweed, bentgrass, wild garlic, ground ivy, perennial sorrel, and bromegrass; not infested with nematodes; grubs; or other pests, pest eggs, or other undesirable organisms and disease-causing plant pathogens; friable and with sufficient structure to give good tilth and aeration. Continuous, air-filled pore space content on a volume/volume basis shall be at least 15

percent when moisture is present at field capacity. Soil shall have a field capacity of at least 15 percent on a dry weight basis.

2.03 MULCHES

A. Compost Mulch: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 1-inch (25-mm) sieve; soluble salt content of 2 to 5 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:

1. Organic Matter Content: 50 to 60 percent of dry weight.
2. Feedstock: Agricultural, food, or industrial residuals; biosolids; yard trimmings; or source-separated or compostable mixed solid waste.

2.04 TREE STABILIZATION MATERIALS

A. Stakes and Guys:

1. Upright and Guy Stakes: Rough-sawn, sound, new hardwood, free of knots, holes, cross grain, and other defects, 2-by-2-inch nominal (38-by-38-mm actual) by length indicated, pointed at one end.
2. Flexible Ties: Wide rubber or elastic bands or straps of length required to reach stakes or turnbuckles.
3. Guys and Tie Wires: ASTM A 641/A 641M, Class 1, galvanized-steel wire, two-strand, twisted, 0.106 inch (2.7 mm) in diameter.
4. Tree-Tie Webbing: UV-resistant polypropylene or nylon webbing with brass grommets.
5. Guy Cables: Five-strand, 3/16-inch- (4.8-mm-) diameter, galvanized-steel cable, with zinc-coated turnbuckles, a minimum of 3 inches (75 mm) long, with two 3/8-inch (10-mm) galvanized eyebolts.
6. Flags: Standard surveyor's plastic flagging tape, white, 6 inches (150 mm) long.

3.00 EXECUTION

3.01 EXAMINATION

A. Examine areas to receive plants for compliance with requirements and conditions affecting installation and performance.

1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
2. Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions.
3. Suspend soil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
4. Uniformly moisten excessively dry soil that is not workable and which is too dusty.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Landscape Architect and replace with new planting soil.

3.02 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities and turf areas and existing plants from damage caused by planting operations.

B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

C. Lay out individual tree and shrub locations and areas for multiple plantings. Stake locations, outline areas, adjust locations when requested, and obtain Landscape Architect's acceptance of layout before excavating or planting. Make minor adjustments as required.

D. Lay out plants at locations directed by Landscape Architect. Stake locations of individual trees and shrubs and outline areas for multiple plantings.

3.03 PLANTING AREA ESTABLISHMENT

A. Loosen subgrade of planting areas to a minimum depth of 6 inches (150 mm). Remove stones larger than 1 inch (25 mm) in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off OWNER's property.

1. Spread planting soil to a depth of 6 inches (150 mm) but not less than required to meet finish grades after natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.

    a. Spread approximately one-half the thickness of planting soil over loosened subgrade. Mix thoroughly into top 2 inches (50 mm) of subgrade. Spread remainder of planting soil.

B. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

C. Before planting, obtain Landscape Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

3.04 EXCAVATION FOR TREES AND SHRUBS

A. Planting Pits and Trenches: Excavate circular planting pits with sides sloping inward at a 45-degree angle. Excavations with vertical sides are not acceptable. Trim perimeter of bottom leaving center area of bottom raised slightly to support root ball and assist in drainage away from center. Do not further disturb base. Ensure that root ball will sit on undisturbed base soil to prevent settling. Scarify sides of planting pit smeared or smoothed during excavation.

1. Excavate approximately two and a half times as wide as ball diameter for balled and burlapped and container-grown stock.
2. Excavate at least 12 inches (300 mm) wider than root spread and deep enough to accommodate vertical roots for bare-root stock.
3. Do not excavate deeper than depth of the root ball, measured from the root flare to the bottom of the root ball.
4. If area under the plant was initially dug too deep, add soil to raise it to the correct level and thoroughly tamp the added soil to prevent settling.

5. Maintain required angles of repose of adjacent materials as shown on the Drawings. Do not excavate subgrades of adjacent paving, structures, hardscapes, or other new or existing improvements.
6. Maintain supervision of excavations during working hours.
7. Keep excavations covered or otherwise protected overnight.
8. If drain tile is shown on Drawings or required under planting areas, excavate to top of porous backfill over tile.

B. Subsoil and topsoil removed from excavations may not be used as planting soil.

C. Obstructions: Notify Landscape Architect if unexpected rock or obstructions detrimental to trees or shrubs are encountered in excavations.

1. Hardpan Layer: Drill 6-inch- (150-mm-) diameter holes, 24 inches (600 mm) apart, into free-draining strata or to a depth of 10 feet (3 m), whichever is less, and backfill with free-draining material.

D. Drainage: Notify Landscape Architect if subsoil conditions evidence unexpected water seepage or retention in tree or shrub planting pits.

E. Fill excavations with water and allow to percolate away before positioning trees and shrubs.

3.05 TREE, SHRUB, AND VINE PLANTING

A. Before planting, verify that root flare is visible at top of root ball according to ANSI Z60.1. If root flare is not visible, remove soil in a level manner from the root ball to where the top-most root emerges from the trunk. After soil removal to expose the root flare, verify that root ball still meets size requirements.

B. Remove stem girdling roots and kinked roots. Remove injured roots by cutting cleanly; do not break.

C. Set balled and burlapped stock plumb and in center of planting pit or trench with root flare 2 inches (50 mm) adjacent finish grades.

1. Use planting soil for backfill.
2. After placing some backfill around root ball to stabilize plant, carefully cut and remove burlap, rope, and wire baskets from tops of root balls and from sides, but do not remove from under root balls. Remove pallets, if any, before setting. Do not use planting stock if root ball is cracked or broken before or during planting operation.
3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
4. Continue backfilling process. Water again after placing and tamping final layer of soil.

D. Set container-grown stock plumb and in center of planting pit or trench with root flare flush with adjacent finish grades.

1. Use planting soil for backfill.
2. Carefully remove root ball from container without damaging root ball or plant.
3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
4. Continue backfilling process. Water again after placing and tamping final layer of soil.

E. When planting on slopes, set the plant so the root flare on the uphill side is flush with the surrounding soil on the slope; the edge of the root ball on the downhill side will be above the surrounding soil. Apply enough soil to cover the downhill side of the root ball.

3.06 TREE STABILIZATION

A. Install trunk stabilization as follows unless otherwise indicated:

1. Upright Staking and Tying: Stake trees of 2- through 5-inch (50- through 125-mm) caliper. Stake trees of less than 2-inch (50-mm) caliper only as required to prevent wind tip out. Use a minimum of two stakes of length required to penetrate at least 18 inches (450 mm) below bottom of backfilled excavation and to extend 48 inches (1220 mm) above grade. Set vertical stakes and space to avoid penetrating root balls or root masses.
2. Use two stakes for trees up to 12 feet (3.6 m) high and 2-1/2 inches (63 mm) or less in caliper; three stakes for trees less than 14 feet (4.2 m) high and up to 4 inches (100 mm) in caliper. Space stakes equally around trees.
3. Support trees with bands of flexible ties at contact points with tree trunk. Allow enough slack to avoid rigid restraint of tree.
4. Support trees with two strands of tie wire, connected to the brass grommets of tree-tie webbing at contact points with tree trunk. Allow enough slack to avoid rigid restraint of tree.

B. Staking and Guying: Stake and guy trees more than 14 feet (4.2 m) in height and more than 3 inches (75 mm) in caliper unless otherwise indicated. Securely attach no fewer than three guys to stakes 30 inches (760 mm) long, driven to grade.

1. Site-Fabricated Staking-and-Guying Method:

    a. For trees more than 6 inches (150 mm) in caliper, anchor guys to wood deadmen buried at least 36 inches (900 mm) below grade. Provide turnbuckle for each guy wire and tighten securely.
    b. Support trees with bands of flexible ties at contact points with tree trunk and reaching to turnbuckle. Allow enough slack to avoid rigid restraint of tree.
    c. Support trees with strands of cable or multiple strands of tie wire, connected to the brass grommets of tree-tie webbing at contact points with tree trunk and reaching to turnbuckle. Allow enough slack to avoid rigid restraint of tree.
    d. Attach flags to each guy wire, 30 inches (760 mm) above finish grade.
    e. Paint turnbuckles with luminescent white paint.

3.07 GROUND COVER AND PLANT PLANTING

A. Set out and space ground cover and plants other than trees, shrubs, and vines as indicated in even rows with triangular spacing.

B. Use planting soil for backfill.

C. Dig holes large enough to allow spreading of roots.

D. For rooted cutting plants supplied in flats, plant each in a manner that will minimally disturb the root system but to a depth not less than two nodes.

E. Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water.

F. Water thoroughly after planting, taking care not to cover plant crowns with wet soil.

G. Protect plants from hot sun and wind; remove protection if plants show evidence of recovery from transplanting shock.

3.08 PLANTING AREA MULCHING

A. Mulch backfilled surfaces of planting areas and other areas indicated.

3.09 PLANT MAINTENANCE

A. Maintain plantings by pruning, cultivating, watering, weeding, fertilizing, mulching, restoring planting saucers, adjusting and repairing tree-stabilization devices, resetting to proper grades or vertical position, and performing other operations as required to establish healthy, viable plantings. Spray or treat as required to keep trees and shrubs free of insects and disease.

B. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace mulch materials damaged or lost in areas of subsidence.

3.10 CLEANUP AND PROTECTION

A. During planting, keep adjacent paving and construction clean and work area in an orderly condition.

B. Protect plants from damage due to landscape operations and operations of other CONTRACTORS and trades. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged plantings.

C. After installation and before Substantial Completion, remove nursery tags, nursery stakes, tie tape, labels, wire, burlap, and other debris from plant material, planting areas, and Project site.

3.11 DISPOSAL

A. Remove surplus soil and waste material including excess subsoil, unsuitable soil, trash, and debris and legally dispose of them off OWNER's property.

END OF SECTION

SECTION 03296

TRANSPLANTING

1.00 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section includes transplanting non-nursery-grown trees by tree spade.

1.03 DEFINITIONS

A. General: See definitions in ANSI A300 (Part 6) and in ANSI Z60.1 pertaining to field-grown trees, except as otherwise defined in this Section.

B. Caliper: Diameter of a trunk as measured by a diameter tape at a height 6 inches above the root flair for trees up to, and including, 4-inch size at this height; and as measured at a height of 12 inches above the root flair for trees larger than 4-inch size.

C. Caliper (DBH): Diameter breast height; diameter of a trunk as measured by a diameter tape at a height 54 inches above the ground line.

D. Root-Ball Depth: Measured from bottom of trunk flare to the bottom of root ball.

E. Root-Ball Width: Measured horizontally across the root ball with an approximately circular form or the least dimension for non-round root balls, not necessarily centered on the tree trunk.

F. Root Flare: Also called "trunk flare". The area at the base of the tree's stem or trunk where the stem or trunk broadens to form roots; the area of transition between the root system and the stem or trunk.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of conformance with state and federal laws if applicable.

B. Bulk Materials:

1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or trees.
2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
3. Accompany each delivery with appropriate certificates.

C. Protect bark, branches, and root systems from sun scald, drying, wind burn, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees in such a manner as to destroy their natural shape.

D. Completely cover foliage when transporting trees while they are in foliage.

E. Handle trees by root ball. Do not drop trees.

F. Move trees after preparations for planting have been completed, and install immediately. If planting is delayed more than six hours after moving, set trees in their appropriate aspect (sun, filtered sun, or shade), protect from weather and mechanical damage, and keep roots moist.

1.05 FIELD CONDITIONS

A. Field Measurements: Verify final grade elevations and final locations of trees and construction contiguous with trees by field measurements before proceeding with transplanting work. Perform transplanting only after finish grades are established.

B. Weather Limitations: Proceed with transplanting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Do not transplant during excessively wet or frozen conditions. Apply products during favorable weather conditions according to manufacturer's written instructions and warranty requirements.

1.06 MAINTENANCE SERVICE

A. Initial Maintenance Service: Provide tree maintenance by skilled employees of tree-service firm and as required in Part 3. Begin maintenance immediately after preparatory pruning and continue until plantings are healthy and well established but for not less than maintenance period below.

1. Maintenance Period: 12 months from date of transplanting completion.

2.00 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

A. General Performance: Transplanted trees shall be healthy and resume vigorous growth within one year of transplanting without dieback due to defective extracting, handling, planting, maintenance, or other defects in the Work.

2.02 PLANTING MATERIALS

A. Backfill Soil: Excavated soil mixed with planting soil of suitable moisture content and granular texture for placing and compacting in planting pit around tree, and free of stones, roots, plants, sod, clods, clay lumps, pockets of coarse sand, concrete slurry, concrete layers or chunks, cement, plaster, building debris, and other extraneous materials harmful to plant growth.

1. Mixture: Well-blended mix of two parts excavated soil to one part planting soil.

2.03 TREE-STABILIZATION MATERIALS

A. Trunk-Stabilization Materials:

1. Upright and Guy Stakes: Rough-sawn, sound, new hardwood, free of knots, holes, cross grain, and other defects, 2 x 2-inch nominal by length indicated, pointed at one end.
2. Wood Deadmen: Timbers measuring 8 inches in diameter and 48 inches long, treated with specified wood preservative treatment by pressure process.
3. Flexible Ties: Wide rubber or elastic bands or straps.
4. Guys and Tie Wires: ASTM A 641/A 641M, Class 1, galvanized-steel wire, two-strand, twisted, 0.106 inch in diameter.
5. Tree-Tie Webbing: UV-resistant polypropylene or nylon webbing with brass grommets.
6. Guy Cable: Five-strand, 3/16-inch diameter, galvanized-steel cable, fitted with zinc-coated 3/8-inch galvanized eyebolts at ends.
7. Flags: Standard surveyor's plastic flagging tape, white, 6 inches long.

2.04 WATERING DEVICES

A. Slow-Release Watering Device: Standard product manufactured for drip-irrigation of plants and emptying its water contents over a period of 2 to 9 hours; manufactured from UV-light stabilized nylon-reinforced polyethylene sheet, PVC, or HDPE plastic.

2.05 MISCELLANEOUS PRODUCTS

A. Organic Mulch: Shredded hardwood as specified in Section 02329 "Plants".

3.00 EXECUTION

3.01 EXAMINATION

A. Erosion and Sedimentation Control: Examine the site to verify that temporary erosion- and sedimentation-control measures are in place. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross transplanting areas.

B. For the record, prepare written report, endorsed by arborist, listing conditions detrimental to transplanting work and tree protection and health.

C. Proceed with transplanting only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, other facilities, turf areas, and other plants and planting areas from damage caused by transplanting operations.

B. Utility Locator Service: Notify utility locator service for area where Project is located before beginning excavation.

C. Locate and clearly identify trees for transplanting. Flag each tree at 54 inches above the ground.

3.03 EXCAVATION AND PLANTING EQUIPMENT

A. Tree Spade: Track-mounted mechanized tree mover; sized according to manufacturer's size recommendation for each tree being transplanted.

3.04 EXCAVATING PLANTING PITS

A. General: Excavate under supervision of the arborist.

1. Excavate planting pits or trenches with sides sloping. Trim perimeter of bottom leaving center area of bottom raised slightly to support root ball and assist in drainage away from center. Do not further disturb base. Ensure that root ball will sit on undisturbed base soil. Scarify sides of planting pit smeared or smoothed during excavation.
2. Excavate approximately three times as wide as root ball.
3. Keep excavations covered or otherwise protected until replanting trees.

B. Subsoil and topsoil removed from excavations may not be used as planting soil.

C. Obstructions: Notify Architect if unexpected rock or obstructions detrimental to trees are encountered in excavations.

1. Hardpan Layer: Drill 6-inch diameter holes, 24 inches apart, into free-draining strata or to a depth of 10 feet, whichever is less, and backfill with free-draining material.

D. Seepage: Notify Architect if subsoil conditions evidence unexpected water seepage into tree-planting pits.

E. Drainage: Fill planting pit or trench with 6 inches of water and time the infiltration rate of the soil. If the drainage rate is less than 0.25 inch per hour, notify Architect to determine need for subsurface drainage.

F. Saline or Sodic Soils: Completely fill excavations with water and allow to percolate away before positioning trees.

3.05 EXTRACTING TREES

A. General: Extract trees under supervision of the arborist.

B. Orientation Marking: Mark the north side of each tree with non-permanent paint before extracting.

C. Root-Ball Width: Minimum 10 inches of root-ball diameter, or least dimension for non-round root balls, for each inch of tree caliper being transplanted.

1. Out-of-Season Planting: If planting before or after the in-season period for tree, provide a minimum root-ball diameter of 12 inches for each inch of tree caliper being transplanted.

D. Root-Ball Depth: As determined by the arborist for each species and size of tree and for site conditions at original and planting locations.

E. Digging:

1. Dig and clear a pit with tree spade to the depth of the root system. Do not use a backhoe or other equipment that rips, tears, or pulls roots.

2. Use narrow-tine spading forks to comb soil to expose roots with minimal damage to root system.
3. If encountering large, main lateral roots, expose roots beyond excavation limits as required to bend and redirect them without breaking.
4. Cut exposed roots manually with sharp pruning instruments; do not break, tear, chop, or slant the cuts. Do not paint or apply sealants on cut root ends.
5. Temporarily support and protect exposed roots from damage until they are permanently redirected and covered with soil. Cover roots with burlap and keep them moist until planted.

F. Extracting with Tree Spade: Use the same tree spade to extract the tree as will be used to transport and plant the tree.

1. Do not use tree spade to move trees larger than the manufacturer's maximum size recommendation for the tree spade being used.
2. When extracting the tree, center the trunk within the tree spade and move tree with a solid ball of earth.

3.06 PLANTING

A. Planting Standard: Perform planting according to ANSI A300 (Part 6) unless otherwise indicated.

B. Before planting, verify that root flare is visible at top of root ball. If root flare is not visible, remove soil in a level manner from the root ball to where the top-most root emerges from the trunk. After soil removal to expose the root flare, verify that root ball still meets size requirements.

C. Ensure that root flare is visible after planting.

D. Remove injured roots by cutting cleanly; do not break. Do not paint or apply sealants on cut root ends.

E. Orientation: Position the tree so that its north side, marked before extracting, is facing north in its new location.

F. Set tree plumb and in center of planting pit with bottom of root flare 2 inches above adjacent finish grades.

1. Use specified backfill soil for backfill.
2. If area under the tree was initially dug too deep, add backfill to raise it to the correct level and thoroughly tamp the added soil to prevent settling.
3. After placing some backfill around root ball to stabilize plant, begin backfilling.
4. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
5. Redirect exposed root ends downward in backfill areas where possible. Hand-expose roots as required to bend and redirect them without breaking. If encountered immediately adjacent to location of new construction and redirection is not practical, cut roots approximately 3 inches back from new construction and as required for root pruning.
6. Place planting tablets in each planting pit when pit is approximately one-half filled; in amounts recommended by arborist. Place tablets beside the root ball about 1 inch (25 mm) from root tips; do not place tablets in bottom of the hole.
7. Continue backfilling process. Water again after placing and tamping final layer of soil.

G. Planting with Tree Spade: Use the same tree spade for planting as was used to extract and transport the tree. Do not use tree spade for trees larger than the manufacturer's maximum size recommendation for the tree spade being used.

H. Slopes: When planting on slopes, set the tree so the root flare on the uphill side is flush with the surrounding soil on the slope; the edge of the root ball on the downhill side will be above the surrounding soil. Apply enough soil to cover the downhill side of the root ball.

3.07 TREE STABILIZATION

A. Trunk Stabilization by Upright Staking and Tying: Install trunk stabilization as follows unless otherwise indicated on Drawings or directed by arborist.

1. Upright Staking and Tying: Stake only as required to prevent wind tip out. Use a minimum of three stakes of length required to penetrate at least 18 inches below bottom of backfilled excavation and to extend one-third of trunk height above grade. Set stakes vertical and space to avoid penetrating root balls or root masses.
2. Support trees with bands of flexible ties at contact points with tree trunk. Allow enough slack to avoid rigid restraint of tree.
3. Support trees with two strands of tie wire, connected to the brass grommets of tree-tie webbing at contact points with tree trunk. Allow enough slack to avoid rigid restraint of tree.

B. Trunk Stabilization by Staking and Guying: Install trunk stabilization as follows unless otherwise indicated on Drawings or directed by arborist.

1. Site-Fabricated Staking-and-Guying Method: Install no fewer than three guys spaced equally around tree.

a. Securely attach guys to stakes 30 inches long, driven to grade. Adjust spacing to avoid penetrating root balls or root masses. Provide turnbuckle for each guy wire and tighten securely.
b. For trees more than 6 inches in caliper, anchor guys to wood deadmen buried at least 36 inches below grade. Provide turnbuckle for each guy wire and tighten securely.
c. Support trees with bands of flexible ties at contact points with tree trunk and reaching to a turnbuckle. Allow enough slack to avoid rigid restraint of tree.
d. Support trees with guy cable or multiple strands of tie wire, connected to the brass grommets of tree-tie webbing at contact points with tree trunk and reaching to a turnbuckle. Allow enough slack to avoid rigid restraint of tree.
e. Attach flags to each guy wire, 30 inches above finish grade.

3.08 MULCHING

A. Organic Mulch: Apply 3-inch average thickness of organic mulch over whole surface of planting area, and finish level with adjacent finish grades. Do not place mulch within 6 inches of trunks or stems.

3.09 INSTALLING SLOW-RELEASE WATERING DEVICE

A. Place device on top of the mulch at base of tree and fill with water according to manufacturer's written instructions.

3.10 TREE MAINTENANCE

A. Perform tree maintenance as recommended by arborist. Maintain arborist observation of transplanting work.

B. Maintain trees by pruning, cultivating, watering, weeding, fertilizing, mulching, restoring planting saucers, adjusting and repairing tree-stabilization devices, resetting to proper grades or vertical position, and performing other operations as required to establish healthy, viable plantings. Treat as required to keep trees free of insects and disease.

C. From time of tree extraction measure soil moisture adjacent to edge of each root ball weekly. Record findings and weather conditions.

D. Fill areas of soil subsidence with backfill soil. Replenish mulch materials damaged or lost in areas of subsidence.

E. Apply treatments as required to keep tree materials, planted areas, and soils free of pests and pathogens or disease. Use integrated pest management practices whenever possible to minimize the use of pesticides and reduce hazards. Treatments include physical controls such as hosing off foliage, mechanical controls such as traps, and biological control agents.

3.11 REPAIR AND REPLACEMENT

A. General: Repair or replace transplanted trees and other plants indicated to remain or be relocated that are damaged by construction operations, in a manner recommended by the arborist and approved by Architect.

1. Submit details of proposed pruning and repairs.
2. Perform repairs of damaged trunks, branches, and roots within 24 hours according to arborist's written instructions.
3. Replace trees and other plants that cannot be repaired and restored to full-growth status, as determined by Architect.

B. Remove and replace trees that are more than 25 percent dead or in an unhealthy condition before the end of the corrections period or are damaged during construction operations that Architect determines are incapable of restoring to normal growth pattern.

1. Provide new trees of same size as those being replaced for each tree of 6 inches or smaller in caliper size.
2. Provide two new tree(s) of 4-inch caliper size for each tree being replaced that measures more than 6 inches in caliper size.
3. Species of Replacement Trees: Species selected by Architect.

3.12 CLEANUP AND PROTECTION

A. During transplanting, keep adjacent paving and construction clean and work area in an orderly condition.

B. Protect trees from damage due to transplanting operations and operations of other CONTRACTORS and trades. Maintain protection during transplanting and maintenance periods. Treat, repair, or replace damaged plantings.

C. After planting and before Substantial Completion, remove tags, markings, tie tape, labels, wire, burlap, and other debris from transplanted trees, planting areas, and Project site.

3.13 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Except for materials indicated to be recycled, remove surplus soil, excess excavated material, waste materials, displaced plants, trash, and debris, and legally dispose of them off OWNER's property.

B. Transport surplus satisfactory soil to designated storage areas on OWNER's property. Stockpile or spread soil as directed by Architect.

   1. Except for materials indicated to be retained on OWNER's property or recycled, remove excess excavated material, waste materials, displaced plants, trash, and debris, and legally dispose of them off OWNER's property.

END OF SECTION

SECTION 04071

DRIVABLE GRASS

1.00 GENERAL

1.01 DESCRIPTION

A. Work shall consist of furnishing all material, labor, services and related items to complete the installation of Drivable Grass® a permeable, plantable and flexible pavement system in accordance with these specifications.

B. Work includes installing the materials in reasonably close conformity with the lines, grades, design, and dimensions shown in the construction Drawings.

1.02 REFERENCE DOCUMENTS

A. ASTM D422 – Particle Size Analysis

B. ASTM D698 – Laboratory Compaction Characteristics of Soil – Standard Proctor

C. ASTM D1557 – Laboratory Compaction Characteristics of Soil – Modified Proctor

D. ASTM C39/39M – Std. Test Method for Compressive Strength of Cylindrical Concrete Specimens

E. ASTM C33 Std. Spec. for Concrete Aggregates

F. ASTM C31/C31M Standard Practice for Making and Curing Concrete Test Specimens in the Field

G. ASTM C150 Std. Spec for Portland Cement

H. ASTM C94/C94M Std. Spec. for Ready – Mixed Concrete

I. ASTM C1157 Std. Performance Specification for Hydraulic Cement

J. ASTM C595 Std. Spec. for Blended Hydraulic Cement

K. ASTM C618 Std. Spec. for Coal Fly Ash and Raw or Calcined Natural Pozzolan for use in Concrete*

L. ASTM C1611/C1611M Std. Test Method for Slump Flow of Self-Consolidating Concrete

M. ASTM C989 Std. Spec. for Ground Granulated Blast-Furnace Slag for use in Concrete and Mortars *

N. ASTM C979 Std. Spec. for Pigment for Integrally Colored Concrete

O. ACI 201 American Concrete Institute Report on Durability

P. ACI 211 American Concrete Institute Std. Practice for Selecting Proportions for Normal, Heavy Weight, and Mass Concrete

* Denotes regional applicability

1.03 SUBMITTALS/CERTIFICATION

A. Procedures: Comply with Section 01330 “Submittal Procedures”.

B. Product Data: Submit manufacturer’s product data, including installation instructions.

C. Samples: Submit manufacturer’s sample of permeable, flexible and plantable pavement system.

D. Warranty: Submit manufacturer’s standard warranty.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has successfully completed installations of pavers or other pavement systems on projects of similar or larger scope and magnitude.

B. Single Source Responsibility: Obtain one color, type and variety of permeable, plantable and flexible pavement system mats from a single lot manufactured by a single source. Materials shall be available and be consistent in quality, appearance and physical properties without delaying progress of work.

C. Prior to commencing the work of this section, verify the accuracy of layout and grading. Verify that all sub-grades and base course aggregate conditions are as specified. Notify the Engineer of any discrepancies and coordinate the correction of those discrepancies with other trades as necessary.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to site in manufacturer’s original palletized configuration with labels clearly identifying product style number, color, name and manufacturer.

B. Check all materials upon delivery to assure that the proper type, grade, color, and certification have been received.

C. Store materials in clean, dry area in accordance with manufacturer’s instructions.

D. Protect all materials from damage due to jobsite conditions and in accordance with manufacturer's recommendations. Damaged materials shall not be incorporated into the work.

1.06 PROJECT CONDITIONS

A. Review installation procedures and coordinate Drivable Grass® installation with other work around installation area.

B. All adjacent hardscape, paving, and mow curbs/strips required by construction documents shall be completed prior to the installation of the Drivable Grass® paving mats.

C. Gradients for Drivable Grass® paving mats can vary from flat to 12%, depending upon vehicle type and use of paved area. For steeper conditions, consult with a qualified Civil Engineer. For firelanes, consult local fire department for maximum allowable gradients.

D. Cold weather applications:

1. Coordinate maintenance contracts.
2. Snowplow equipment operators should be educated about the underlying surface prior to beginning snow removal. Snowplow equipment should be fitted with teflon runners, which will help keep the snowplow blade from damaging the product.
3. For sites that will require the use of heavy-duty snowplowing machinery, install mow curb/strips prior to installation of Drivable Grass® paving mats. Drivable Grass® should be depressed ½" below the top of the mow curb/strip to protect the product from the snowplow blade.
4. Do not use frozen materials or materials mixed or coated with ice or frost.
5. Do not build on frozen, wet, or muddy subgrade

E. Protect partially completed paving against damage from other construction traffic when work is in progress and until grass root system has had time to mature (about 3 to 4 weeks). Projects using aggregate infill instead of planting are drivable upon completing infill.

F. Areas adjacent to Drivable Grass® installation should be protected during construction.

2.00 PRODUCTS

2.01 MANUFACTURER

A. Soil Retention Products, Inc., 2501 State Street, Carlsbad, CA 92008. Phone: 760-966-6090 and 800-346-7995, fax: 760-966-6099, website: www.soilretention.com, e-mail: sales@soilretention.com.

2.02 PERMEABLE, FLEXIBLE, PLANTABLE PAVEMENT SYSTEM

A. Permeable, Flexible, Plantable Pavement System: Drivable Grass®

1. Nominal Dimensions in inches (l x w x h)	24 x 24 x 1.5
2. Gross Area of Each Mat in square feet	4
3. Weight of Each Mat in pounds	45
4. Plantable Area in percent	60 (100 for sod)
5. Mats per pallet (each)	60
6. Area Covered per Pallet in square feet	240

B. Color — Buff/tan, Grey, Terra Cotta* **

1. Flexibility (minimum radius of curvature in inches) — 12
2. Concrete Compressive Strength @ 28 days in psi — 5000
3. Propriety Grid Reinforcement — Engineered Plastic

*Terra Cotta available as standard color from CA only
**Other colors available for special order all regions

C. Filter Fabric – Appropriate filter weave fabric by Mirafi Inc. or equal, if required by ENGINEER.

D. Base Aggregate – Crushed permeable base, crushed miscellaneous base (CMB), crushed aggregate base (CAB), crushed rock or similar structural material normally used as a base course for pavement systems and meeting the gradation and or permeability requirements shown on the Drawings.

E. Bedding Course – Approximately 1" minimum thick clean sharp sand for non-planting applications. Use 1.5" to 3" thick clean sharp sand for planting applications. Clean sharp sand for planting to be comprised of a moderate percentage (20%) of granular organic or other plant nutrients for heavy duty applications and 30% granular organic material for light duty applications. Sand shall be clean, non-plastic, and free from deleterious or foreign matter. The sand shall be sharp or manufactured from crushed rock. Do not use limestone screenings or stone dust. Grading of samples shall be done according to ASTM C 136. The particles shall be sharp and conform to the grading requirements shown below:

ASTM C33 CSA A23.1-M94

Sieve Size	Percent Passing
3/8 in. (9.5 mm)	100
No. 4 (4.75 mm)	95 to 100
No. 8 (2.36 mm)	85 to 100
No. 16 (1.18 mm)	50 to 85
No. 30 (0.600 mm)	25 to 60
No. 50 (0.300mm)	0 to 30
No. 100 (0.15mm)	2 to 10

F. Infill – Infill for planting applications will consist of clean sharp sand and have a moderate percentage (20%) of granular organic or other plant nutrients for heavy duty applications and 30% granular organic material for light duty applications. Infill not intended to support vegetation is likely to consist of 3/8" minus stone, decomposed granite, stone dust, etc., depending on application and aesthetic needs.

G. Concrete Mow Curb - As required by the engineer and specifications and included on the drawings.

H. Grass - Check with Landscape Architect for preferred mixtures for subject site and use.

I. Mulch - (Needed only for seed, stolon or plug applications) shall be of wood or paper cellulose types. Mulches of straw, pine needles, etc., will not be acceptable because of their low moisture holding capacity.

J. Fertilizer - A commercial “starter” fertilizer shall be used. Check with local grass supplier for recommendations.

3.00 EXECUTION

3.01 SUBGRADE PREPARATION

A. Vertical depth to accommodate structural section (if applicable) of base aggregate, sand layer, and Drivable Grass® mat thickness.

B. Excavate to the lines and grades shown on the construction Drawings.

C. Install any mow strips or curbs as specified.

D. Proof roll foundation area as directed to determine if remedial work is required.

E. OWNER's representative shall inspect the excavation and approve prior to placement of base material or fill soils.

F. Over-excavation and replacement of unsuitable subgrade soils with approved compacted fill shall be compensated as agreed upon with the OWNER.

3.02 INSTALLATION OF AGGREGATE BASE AND SAND SETTING BED

A. Install and compact aggregate base as required by the contract drawings.

B. Install irrigation lines and sprinklers to the specified depth and location within the aggregate base as required by the contract drawings.

C. Install level and compact a thin sand bedding course upon which permeable, flexible and plantable pavement system will be installed. A 1” (min.) layer of clean sharp sand can be used for non-planted applications that require driving. Use a 3” layer of clean sharp sand for areas that are to be planted. Sand shall be amended with a small amount of granular organics or fertilizer to facilitate grass growth. Amended sand shall consist of 80% clean sharp sand and 20% granular organic material for heavy duty applications and 70% clean sharp sand and 30% granular organic material for light use applications. Non-driving applications such as drainage swales can be installed on rock.

3.03 INSTALL DRIVABLE GRASS ® PAVEMENT SYSTEM

A. Install permeable, flexible, and plantable pavement system in accordance with the manufacturer’s guidelines.

B. Install system to the line, grades and locations required by the contract documents.

C. Butt mats against each other leaving no significant gaps.

3.04 FILL SYSTEM WITH INFILL MATERIAL

A. Fill permeable, flexible and plantable pavement system in accordance with the manufacturer’s installation instructions.

B. Infill for planting to be comprised of 80% clean sharp sand and 20% granular organic material for heavy duty applications and 70% clean sharp sand and 30% granular organic material for light use applications.

C. For systems without vegetation, mats may be filled with DG, sand, crushed rock, or decorative stone, as required by the specifications. A layer of filter weave fabric installed above sand bedding course is recommended to deter weed growth and soil loss under the mats.

D. Spread infill uniformly across the mats by sweeping or other approved method.

3.05 VEGETATE MAT SYSTEM

A. Install planting materials as specified in the construction drawings. Seeding, sodding, stolonizing, and plugging, may be acceptable provided that planting is conducted in accordance with the project documents.

B. Installed planting areas, excluding sod, shall be covered by a light layer of organic mulch as a topper to preserve moisture and promote germination and/or plant establishment.

3.06 EROSION CONTROL

A. Provide dust and erosion control protection plan in accordance with the Contract Documents.

B. During plant establishment no significant run on water shall be allowed. For aggregate infill, no significant run on silty water shall be allowed.

3.07 FIELD QUALITY CONTROL

A. The OWNER shall engage inspection and testing services, including independent laboratories, to provide quality assurance and testing services during construction. This does not relieve the CONTRACTOR from securing the necessary construction control testing during construction when required by the Contract Documents.

B. Qualified and experienced technicians and ENGINEERS shall perform testing and inspections services.

C. As a minimum, quality assurance testing should include subgrade soil inspection, aggregate base quality, thickness, and compaction, and observation of construction for general compliance with design Drawings and specifications.

END OF SECTION

Appendix B
Geotechnical Report

G2 CONSULTING GROUP

Revised Report of
Pavement Investigation

Buhr Park
2751 Packard Road
Ann Arbor, Michigan 48108

Latitude 42.255972° N
Longitude 83.711231° W

Prepared for:

Stantec
3959 Research Park Drive
Ann Arbor, Michigan 48108-2216

G2 Project No. 110480r
September 21, 2011

G2 CONSULTING GROUP

September 21, 2011

Mr. Mark D. Pascoe, P.E
Stantec
3959 Research Park Drive
Ann Arbor, Michigan 48108-2216

Re: Revised Report of Pavement Investigation
Buhr Park
2751 Packard Road
Ann Arbor, Michigan 48108
G2 Project No. 110480r

Dear Mr. Pascoe:

We have completed the revised pavement investigation for the proposed parking lot and access drive reconstruction and associated stormwater improvements for Buhr Park in Ann Arbor, Michigan. This report presents the results of our observations and analyses and our recommendations for subgrade preparation, pavement design, and construction considerations as they relate to the geotechnical conditions at the site.

We appreciate the opportunity to be of service to Stantec on this project and look forward to discussing the recommendations presented. In the meantime, if you have any questions regarding this report or any other matter pertaining to the project, please contact us.

Sincerely,

G2 Consulting Group, LLC

Amy L. Schneider, P.E.
Project Engineer

Noel J. Hargrave-Thomas, P.E.
Project Manager

ALS/NJHT/kls

Enclosures

Geotechnical & Geoenvironmental
Engineering Services
1866 Woodslee Street
Troy, Michigan 48083
248.680.0400
FAX 248.680.9745

EXECUTIVE SUMMARY

We understand the proposed project will include reconstructing the existing bituminous concrete parking lots and access drive for Buhr Park in Ann Arbor, Michigan. Infiltration rates for granular soils within the areas surrounding the pavements are also required for stormwater management purposes.

Soil borings B-1 through B-7 were drilled within the existing pavement areas while borings B-8 through B-10 were drilled within the grass areas adjacent to the pavements. The existing pavements consist of a bituminous surface layer and an aggregate base course layer. The existing bituminous concrete pavement thickness at the boring locations generally ranges from 4 to 7 inches, with the exception of the borings B-4 and B-5 within the north access drive area where 2 inches of bituminous pavement are present. The underlying aggregate base course consists of a silty sand and gravelly sand ranges from 4 to 8 inches in thickness. Grain-size analyses were performed on five samples of the aggregate base. Test results indicate the aggregate base does not meet the gradation requirements of a MDOT 21AA dense-graded aggregate due to excessive fines and insufficient amount of gravel larger than ½ inch diameter. Approximately 8 to 10 inches of silty sand topsoil are present within borings B-8 through B-10. Fill soils, consisting of loose to medium compact silty sand, sand, sandy clay, and silty clay, underlie the pavement section and topsoil within borings B-1, B-3, and B-8 through B-10 extending to depths ranging from 2 to 6 feet. Approximately 4 to 6 percent organic matter is present within the fill within borings B-3, B-9, and B-10. Native stiff to very stiff silty clay and sandy clay underlie the fill and pavement section within borings B-3, B-4, B-6, and B-10 and extend to approximate depths ranging from 3-1/2 feet to the explored depth of 5 feet. Native granular soils, consisting of loose to medium compact silty sand, clayey sand, and gravelly sand, underlie the fill, cohesive soils, and aggregate base and extend to the explored depths of 5 to 10 feet. No groundwater was observed during or upon completion within the borings.

Based on visual defects, the existing bituminous pavements have degraded to a fair to poor condition and are approaching the end of their serviceable life throughout the property, with the exception of the tennis court parking lot and the south access drive. The pavements have deteriorated along the pavement edge, due to inadequate drainage of the pavement surface. Therefore, we recommend completely removing the existing bituminous pavements and underlying aggregate base and reconstructing a new pavement section. The tennis court pavements can remain in place, as no visual distress is apparent, or milled and overlayed. The south access drive can be completely reconstructed or milled and overlayed, if desired. After removal of the existing bituminous pavements and aggregate base, the existing subbase should be proof-compacted and proofrolled and evaluated for stability. Unstable areas should be undercut to a stable depth and backfilled with MDOT 21AA dense-graded aggregate.

This summary is not to be considered separate from the entire text of this report with all the conclusions and qualifications mentioned herein. Details of our analysis and recommendations are discussed in the following sections and in the Appendix of this report.

PROJECT DESCRIPTION

We understand the proposed project will include reconstructing the existing bituminous concrete parking lots and access drive for Buhr Park in Ann Arbor, Michigan. We understand the entire park is currently being altered for stormwater management, including construction of two detention basins in the past couple of years. Reconstructing the existing pavements is part of the overall master plan for the park. For evaluation purposes, we have divided the park pavements into four sections: north parking lot, southeast parking lot, north access drive, and south access drive. These areas are indicated on the Soil Boring Location Plan, Plate No. 1.

Final grades were not available at the time of this investigation; however, we anticipate that final grades will be near existing grades based on the overall plan for the park with the exception of the north parking lot for the ice arena/pool. We understand the existing pavements at the ice arena/pool do not meet the requirements of the Americans with Disabilities Act; thus, the existing grades need to be altered slightly.

The purpose of our investigation is to assess the general conditions of the existing pavements and geotechnical conditions, provide recommendations for pavement reconstruction, and provide infiltration rates for granular soils within the areas surrounding the pavements for stormwater management purposes.

SCOPE OF SERVICES

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

1. We performed a cursory visual identification of the types and relative magnitudes of observable pavement distress.

2. We drilled a total of ten soil borings within the overall park property. Seven borings, B-1 through B-7, were drilled within the existing pavement and extended to a depth of 5 feet each. We measured the existing pavement section materials (bituminous concrete and aggregate base) and identified the type and condition of subgrade materials. Three borings, B-8 through B-10, were drilled within the adjacent grass covered areas for stormwater management purposes and extended to a depth of 10 feet each.

3. We performed laboratory testing on representative samples obtained from the soil borings. Laboratory testing included soil classification, loss-on-ignition (L.O.I.), natural moisture content, grain-size analyses, and unconfined compressive strength determinations.

4. We prepared this engineering report. The report includes recommendations regarding subgrade preparation, pavement reconstruction, and construction considerations related to pavement reconstruction.

FIELD OPERATIONS

Stantec selected the number, depth, and location of the soil borings based on the existing site features and development requirements. The soil boring locations were determined in the field by measuring from existing site features using conventional taping methods and staked by a representative of G2 Consulting Group, LLC (G2) prior to boring operations. The approximate soil boring locations are shown on the Soil Boring Location Plan, Plate No. 1. No ground surface elevations were available at the time of this investigation.

Soil borings were drilled using a truck-mounted rotary drilling rig. Continuous flight, 2-1/4-inch inside diameter hollow-stem augers were used to advance the boreholes. Within each soil boring, soil samples were obtained at intervals of 2-1/2 feet. These samples were obtained by the Standard Penetration Test method ASTM D 1586, which involves driving a 2-inch diameter split-spoon sampler into the soil with a 140-pound weight falling 30 inches. The sampler is generally driven three successive 6-inch increments with the number of blows for each increment recorded. The number of blows required to advance the sampler the last 12 inches is termed the Standard Penetration Resistance (N). The blow counts for each 6-inch increment and the resulting N-value are presented on the individual soil boring logs.

The soil samples were placed in sealed containers in the field and brought to the laboratory for testing and classification. During the drilling operations, the drilling crew maintained logs of the encountered subsurface conditions, including change in stratigraphy and observed groundwater levels of the soil borings to be used in conjunction with our analysis of the subsurface conditions. The final boring logs are based on the field logs and laboratory soil classification of these results. After completion of the drilling operations, the boreholes were backfilled with excavated soil and bituminous cold patch, where applicable.

LABORATORY TESTING

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

Laboratory testing included soil classification, organic content, natural moisture content, grain-size analyses, and unconfined compressive strength determination. The organic content of representative samples was determined in accordance with ASTM Test Method D 2974, “Standard Test Methods for Moisture, Ash, and Organic Matter of Peat and Other Organic Soils”. Grain-size distributions were determined in general conformance with ASTM D 422 method of testing. The unconfined compressive strengths were determined by using a spring loaded hand penetrometer. The hand penetrometer estimates the unconfined compressive strength to a maximum of 4-1/2 tons per square foot (tsf) by measuring the resistance of the soil sample to the penetration of a calibrated spring-loaded cylinder.

The results of the laboratory tests are indicated on the boring logs at the depths the samples were obtained. We will hold the soil samples for 60 days from the date of this report. If you would like the samples, please let us know.

EXISTING PAVEMENT/SITE CONDITIONS

The existing pavements consist of a bituminous surface layer and an aggregate base course layer. The existing bituminous concrete pavement thickness at the boring locations generally ranges from 4 to 7 inches, with the exception of the borings B-4 and B-5 within the north access drive area where 2 inches of bituminous pavement are present. The underlying aggregate base course consists of a silty sand and gravelly sand ranges from 4 to 8 inches in thickness. A grain-size analysis was performed on a sample of the aggregate base. Test results indicate the aggregate base does not meet the gradation requirements of a MDOT 21AA dense-graded aggregate due to excessive fines and insufficient amount of gravel larger than ½ inch diameter.

Based on historical imagery, we estimate the pavements are a minimum of 12 years old. We performed borings within the access drive alignment as well as the north and southeast parking lots. No borings were performed within the parking lot north of the tennis courts. A majority of the pavement appears to be in fair to poor condition based on observable surface defects. Moderate to high severity fatigue and transverse cracking are present throughout a majority of the north access drive and parking lots – see Photograph Nos. 1, 4, and 10. The south access drive appears to be in moderate to fair condition with random areas of fatigue and transverse cracking – see Photograph No. 18. Evidence of occasional cold patching and potholes are present in various areas of the pavements – see Photograph Nos. 6 and 14. Evidence of poor drainage, consisting of standing water, was present also. The parking lot by the tennis courts appears to be in good condition within no significant visible signs of distress.

Portland cement concrete curb and gutter are present along the perimeter of the north parking lot and tennis court parking lot and are in good condition with typical reveal heights. Sidewalk is present along the west side of the north parking lot with minimal reveal. Concrete curb block make up the curb around the southeast parking lot. The overall property generally slopes to the south. Pavements within the north parking lot slope toward the perimeter of the pavements. Within the southeast parking lot, pavements generally slope to the existing catch basins. No curb and gutter are present along the existing access drive. Deterioration of the edge of the access drives is evident throughout the site.

Representative pictures of the types of pavement distress observed during our site visit are presented in the appendix as Photographic Documentation, Figure Nos. 13 through 21. The approximate locations of the photographs used in the Photographic Documentation are shown on the attached Photograph Location Plan, Plate No. 2.

EXISTING SUBSURFACE CONDITIONS

Soil borings B-1 through B-7 were drilled within the existing pavement areas. Silty sand fill underlies the pavement section within borings B-1 and B-3 and extends to depths of 2 and 3-1/2 feet. Organic matter is present within the fill at boring B-3. Native silty clay and sandy clay underlie the fill and pavement section within borings B-3 and B-6 and extend to approximate depths ranging from 3-1/2 feet to the explored depth of 5 feet. Native granular soils, consisting of silty sand, clayey sand, and gravelly sand, underlie the fill, cohesive soils, and aggregate base and extend to the explored depths of 5 to 10 feet.

The silty sand fill is loose to medium compact with Standard Penetration Test N-values of 6 and 11 percent. The native silty clay and sandy clay are stiff to very stiff with natural moisture contents ranging from 9 to 17 percent and unconfined compressive strengths ranging from 3,500 to 8,000 psf. The native granular soils are loose to medium compact with N-values ranging from 9 to 26 blows per foot.

Groundwater observations were performed during and upon completion of drilling operations. Within borings B-8 and B-9, groundwater was encountered at depths of 8-1/2 and 6 feet respectively. Upon completion of drilling with boring B-9, the groundwater was measured at an approximate depth of 4 feet. No measurable groundwater was observed during or upon completion within the remaining boring locations. Fluctuations in perched and long-term groundwater levels should be anticipated due to seasonal variations and following periods of prolonged precipitation.

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

The Soil Boring Location Plan, Plate No. 1, Soil Boring Logs, Figure Nos. 1 through 10, Grain Size Distribution, Figure Nos. 11 and 12, and Photographic Documentation, Figure Nos. 13 through 21, are presented in the Appendix. The soil profiles described above are generalized descriptions of the conditions encountered at the boring locations. General Notes defining the nomenclature used on the boring logs and elsewhere in this report are presented on Figure No. 22.

PAVEMENT EVALUATION AND RECOMMENDATIONS

General

Based on visual defects, the existing bituminous pavements have degraded to a fair to poor condition, with the exception of the tennis courts and the south access drive. The pavements have deteriorated along the pavement edge and around catch basin, due to inadequate drainage of the pavement surface. In addition, it appears the existing bituminous concrete pavements are approaching the end of their serviceable life. Therefore, we recommend removing the existing bituminous pavements and underlying aggregate base to allow for construction of a new pavement section. Within the tennis court parking lot, the pavements can remain in place or be milled and overlayed, if desired. Within the south access drive area, the existing pavements can be milled and overlayed, if desired. After milling, any areas of distress should be completely removed to the underlying aggregate base and a full depth pavement section constructed. After patching the distressed areas, the pavement overlay may be placed.

Pavement Subgrade Preparation

North and Southeast Parking Lots and North Access Drive

We recommend completely removing the bituminous pavement surface and underlying aggregate base as necessary to construct the new pavement section within the north and southeast parking lots and north access drive to allow for construction of a new pavement section. The removed pavements can be pulverized and utilized as aggregate base, if desired. The bituminous concrete should be pulverized such that the largest aggregate size is less than 2 inches. The existing aggregate base has greater than the specified 8 percent fines per MDOT 21AA specifications and should not be reused as aggregate base. The pavement and subgrade should be graded and properly sloped to promote effective surface and subsurface drainage and prevent water from ponding. The subgrade course should be evaluated for stability before constructing the new bituminous surface or placing any aggregate base material. Based on the predominantly granular subgrade, we recommend the subgrade be proof compacted using a heavy vibratory roller weighing a minimum of 10 tons. The vibration setting of the roller should be set to full amplitude during proof-compaction operations. Any unstable or unsuitable soils observed during proof compacting should be improved by additional compaction or removed and replaced with engineered fill.

Engineered fill should be MDOT 21AA aggregate and placed in uniform horizontal layers, not more than 9 inches in loose thickness. The engineered fill should be compacted to achieve a density of at least 95 percent of the maximum dry density as determined by the Modified Proctor compaction test (ASTM D 1557). All engineered fill material should be placed and compacted at approximately the optimum moisture content. Frozen material should not be used as fill, nor should fill be placed on a frozen subgrade.

South Access Drive and Tennis Court Parking Lot

If an overlay is desired for these areas rather than complete reconstruction, we anticipate the serviceable life of the existing pavements may be extended by rehabilitating the pavement. We recommend installation of a bituminous overlay across the entire pavement surface. The rehabilitation process would include:

1. Mill off 1-1/2 inches of the existing bituminous pavement to allow for placement of a 2-inch thick bituminous overlay.
2. Clean out all exposed joints and cracks in the milled surface and fill them with hot-applied elastic crack filler. Saw cut and full depth remove any areas of fatigue to the underlying aggregate base to allow construction of a full depth section.
3. Apply a tack coat to the milled surface. Allow tack to fully break prior to overlay.
4. Overlay the pavement in a single-lift.

Pavement Design

We recommend pavement design analyses be performed in accordance with the “AASHTO Guide for Design of Pavement Structures”. Based on the variable soil conditions, presence of cohesive material, and organic matter, we recommend pavement sections and overlays be designed based on an effective

subgrade resilient modulus of 7,000 pounds per square inch (psi). This value has been selected to apply to the existing soil conditions at the site as well as to reflect seasonal effects of moisture and temperature changes on the subgrade soils.

For design purposes, bituminous pavement materials and can be assigned a structural coefficient number of 0.37. Aggregate base course material can be assigned a structural coefficient number of 0.14, while pulverized bituminous material can be assigned a structural coefficient number of 0.11. Large front-loading refuse trucks can impose significant concentrated wheel loads within trash dumpster pick-up areas. This type of loading can result in rutting of asphalt pavements and ultimately in failure. Therefore, we recommend non-reinforced Portland cement concrete pavement, at least 8 inches in thickness, be used in these areas. The concrete pavement should extend far enough away from the dumpsters such that the vehicle's wheels will be supported by the concrete pavement during dumpster access activities.

Pavement Drainage

Proper drainage is considered to be an important consideration for pavement design on cohesive soils. The pavement and pavement subgrade should be properly sloped to promote effective surface and subsurface drainage and prevent water from ponding. In addition, we recommend the surrounding greenbelt areas be properly sloped to prevent water from ponding at the pavement edge. We recommend pavement subbase materials consist of non-frost-susceptible aggregates.

During our site visit, we observed catch basins only in the southeast parking lot, no curb and gutters present along the access drives, and concrete parking block as curb within the southeast parking lot; thus, surface run off sheet drains to adjacent green belt areas. Consideration should be given to constructing concrete gutters, catch basins, and/or concrete bands with rainwater best management practices to improve the serviceable life of the reconstructed pavements. If catch basins and curb and gutters are constructed, we recommend edge drains be constructed around the perimeter of any landscaped islands and along curbs, since they can become a source of water infiltration into the pavement subgrade. Such drains could be connected to new catch basins. The number and location of the proposed catch basins should be based on the park's master plan and stormwater basin locations.

Pavement Maintenance

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

STORMWATER MANAGEMENT

Soil borings B-8 through B-10 were performed to evaluate the subsurface conditions for stormwater management and infiltration of surface water from the pavements. Soil conditions within borings B-8 through B-10 consist of approximately 8 to 10 inches of silty sand topsoil underlain by loose to medium compact sand fill and silty sand fill extending to an approximate depth of 2-1/2 to 3 feet. The sand fill within boring B-9 is underlain by stiff silty clay fill with concrete debris extending to an

approximate depth of 6 feet. Stiff silty clay is present below the fill within boring B-10 and extends to an approximate depth of 5 feet. Granular soils, consisting of loose to medium compact clayey sand, silty sand, and gravelly sand are present below the fill and silty clay extending to the explored depth of 10 feet within borings B-8 and B-10 and to an approximate depth of 8 feet within boring B-9. Medium silty clay underlies the clayey sand within boring B-9 and extends to the explored depth of 10 feet.

We performed grain size analyses on the silty sand and sand within the upper 2-1/2 feet within borings B-8 and B-9 to determine the permeability of the material. We anticipate the granular soils encountered within with upper 2-1/2 to 3 feet at borings B-8 through B-10 will allow for moderate water infiltration into the subsurface. We recommend a coefficient of permeability (k) of $1x10^{-2}$ to $8x10^{-3}$ cm/sec be used in estimating the infiltration rates of the granular soils in the vicinity of the proposed basin. The clayey sand and silty clay present below the granular soils have very low permeability. Infiltration rates in the area of boring B-10 can be increased provided conductivity is made with the gravelly sand present below an approximate depth of 5 feet.

GENERAL COMMENTS

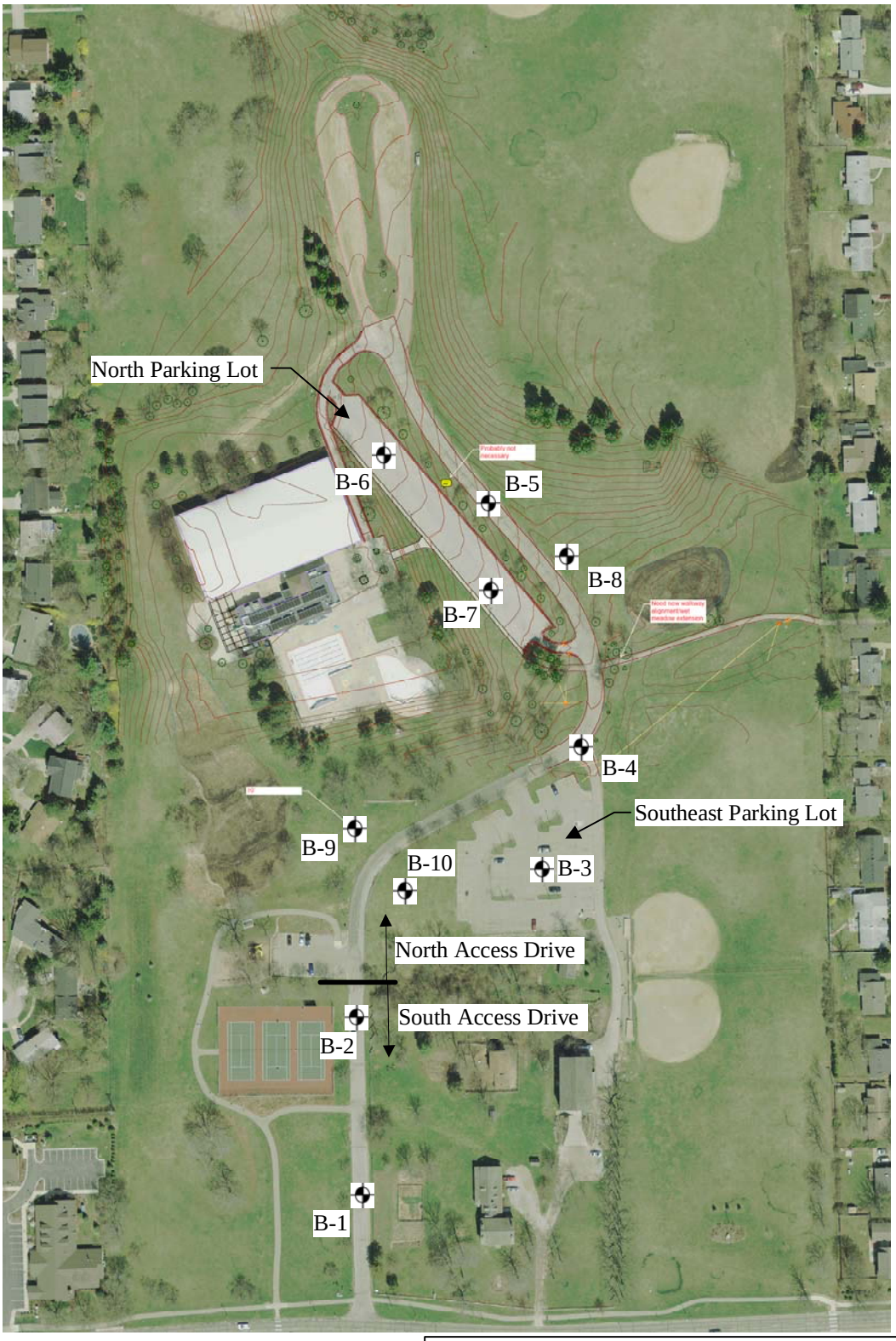
We have formulated the evaluations and recommendations presented in this report relative to site preparation and new pavement construction on the basis of data provided to us relating to the general location and grade for the proposed parking lot. If changes occur in the design, location, or concept of the project, the conclusions and recommendations contained in this report are not valid unless G2 Consulting Group, LLC reviews the changes. G2 Consulting Group, LLC will then confirm the recommendations presented herein or make changes in writing.

The scope of the present investigation was limited to evaluation of subsurface conditions for the support of the proposed pavement and other related aspects of the development. No chemical, environmental, or hydrogeological testing or analyses were included in the scope of this investigation.

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

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

APPENDIX



Legend

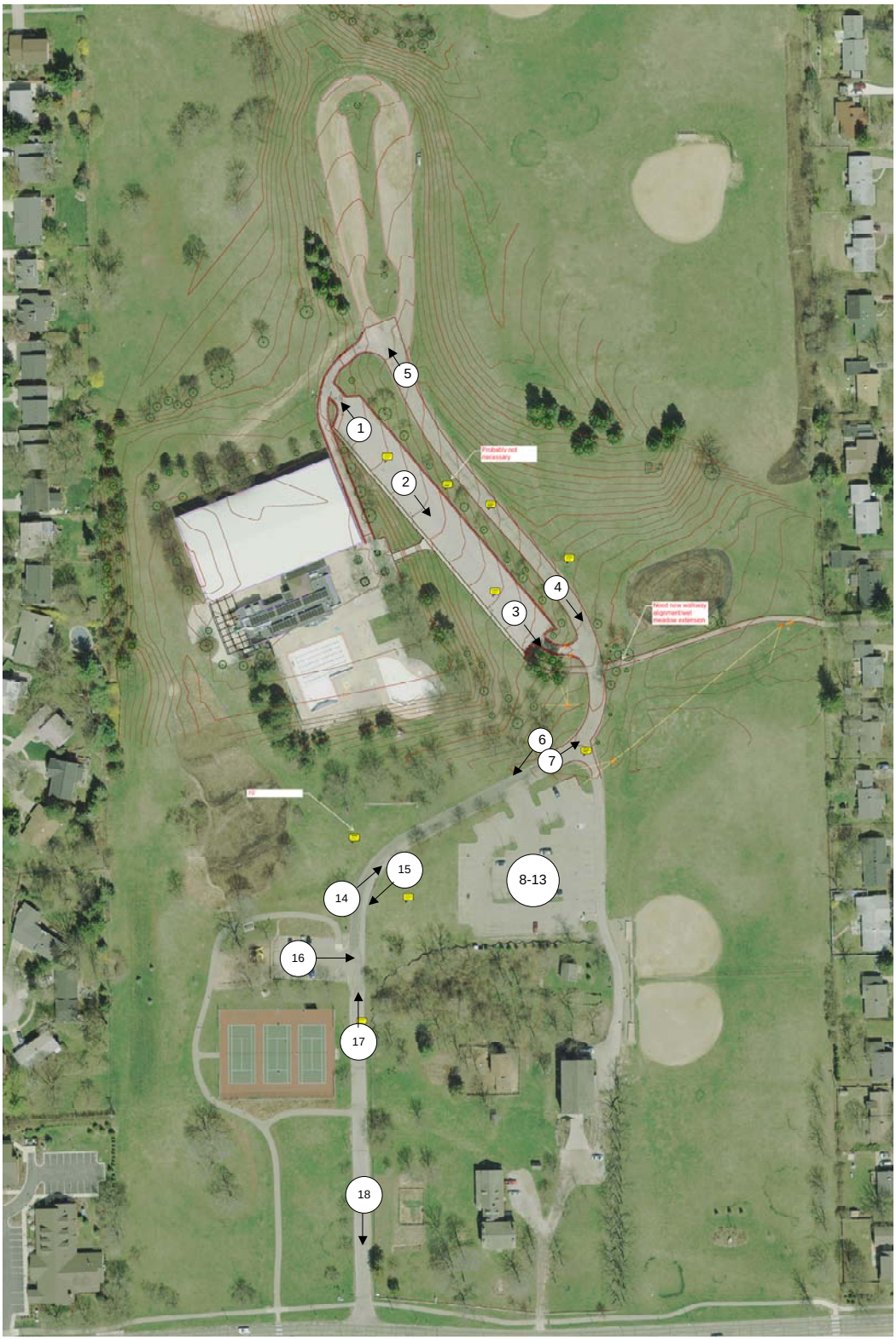
Soil Borings Drilled by Strata Drilling, Inc. on August 15, 2011

Soil Boring Location Plan

Buhr Park
Packard Road
Ann Arbor, Michigan

G2 CONSULTING GROUP
1866 Woodslee Street
Troy, Michigan 48083

Project No. 110480	
Drawn by: ALS	
Date: 8-26-11	Plate No. 1
Scale: NTS	



Legend

16 → Photograph Number and Location

Photograph Location Plan

Buhr Park
Packard Road
Ann Arbor, Michigan

G2 CONSULTING GROUP
1866 Woodslee Street
Troy, Michigan 48083

Project No. 110480	
Drawn by: ALS	
Date: 8-26-11	Plate No. 2
Scale: NTS	

Project Name: Buhr Park

Project Location: Packard Road
Ann Arbor, Michigan

G2 Project No. 110480

Latitude: N/A Longitude: N/A

Soil Boring No. **B-1**

G2 Consulting Group, LLC

SUBSURFACE PROFILE

GROUND SURFACE ELEVATION: N/A

DEPTH (ft)	PRO-FILE		DEPTH (ft)
		Asphalt (5 inches) 0.4	
		Fill: Medium Compact Dark Brown and Brown Silty Sand with trace gravel 2.0	
		Medium Compact Brown Clayey Sand with trace silt 4.0	
5		Medium Compact Brown Gravelly Sand with trace silt 5.0	5
		End of Boring @ 5ft	
10			10
15			15

SOIL SAMPLE DATA

SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
BS					
S-1	6 5 6	11			
S-2	2 5 6	11			

Total Depth: 5ft
Drilling Date: August 15, 2011
Inspector:
Contractor: Strata Drilling, Inc.
Driller: B. Sienkiewicz

Water Level Observation:
Dry during and upon completion

Excavation Backfilling Procedure:
Backfilled with auger cuttings and bituminous cold patch

Drilling Method:
2-1/4 inch inside diameter hollow stem auger

Figure No. 1

SOIL / PAVEMENT BORING 110480.GPJ G2_CONS.GDT 8/29/11

Project Name: Buhr Park

Project Location: Packard Road
Ann Arbor, Michigan

G2 Project No. 110480

Latitude: N/A Longitude: N/A

Soil Boring No. **B-2**

Consulting Group, LLC

SUBSURFACE PROFILE

SOIL SAMPLE DATA

DEPTH (ft)	PRO-FILE	GROUND SURFACE ELEVATION: N/A	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Asphalt (6 inches) 0.5		BS					
		Fill: Brown Gravelly Sand with little silt 1.2		S-1	5 7 7	14			
5		Medium Compact Brown Gravelly Sand with little silt 5.0	5	S-2	10 12 9	21			
		End of Boring @ 5ft							
10			10						
15			15						

Total Depth: 5ft
Drilling Date: August 15, 2011
Inspector:
Contractor: Strata Drilling, Inc.
Driller: B. Sienkiewicz

Water Level Observation:
Dry during and upon completion

Excavation Backfilling Procedure:
Backfilled with auger cuttings and bituminous cold patch

Drilling Method:
2-1/4 inch inside diameter hollow stem auger

Figure No. 2

SOIL / PAVEMENT BORING 110480.GPJ G2_CONS.GDT 8/29/11

Project Name: Buhr Park

Project Location: Packard Road
Ann Arbor, Michigan

G2 Project No. 110480

Latitude: N/A Longitude: N/A

Soil Boring No. **B-3**

G2 Consulting Group, LLC

SUBSURFACE PROFILE

SOIL SAMPLE DATA

DEPTH (ft)	PRO-FILE	GROUND SURFACE ELEVATION: N/A	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Asphalt (4 inches) 0.3		BS					
		Fill: Brown Gravelly Sand with little silt 0.7							
		Fill: Loose Dark Brown Silty Sand with little gravel, silty clay layers, and organic matter		S-1	4 3 3	6	10.2		
		3.5							
5		Stiff Brown Silty Clay with trace sand 5.0	5	S-2	1 2 2	4	16.5		3500*
		End of Boring @ 5ft							
10			10						
15			15						

Total Depth: 5ft
Drilling Date: August 15, 2011
Inspector:
Contractor: Strata Drilling, Inc.
Driller: B. Sienkiewicz

Drilling Method:
2-1/4 inch inside diameter hollow stem auger

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Backfilled with auger cuttings and bituminous cold patch

Figure No. 3

SOIL / PAVEMENT BORING 110480.GPJ G2_CONS.GDT 8/29/11

Project Name: Buhr Park

Project Location: Packard Road
Ann Arbor, Michigan

G2 Project No. 110480

Latitude: N/A Longitude: N/A

Soil Boring No. **B-4**

G2 Consulting Group, LLC

SUBSURFACE PROFILE

GROUND SURFACE ELEVATION: N/A

DEPTH (ft)	PRO-FILE		DEPTH (ft)
		Asphalt (2 inches) 0.2	
		Fill: Gravelly Sand with little silt 0.7	
		Very Stiff Dark Brown and Brown Silty Clay with sand layers	
		3.5	
		Loose Brown Silty Sand trace gravel and sandy clay seams	
5		5.0	5
		End of Boring @ 5ft	
10			10
15			15

SOIL SAMPLE DATA

SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
BS					
S-1	5 6 7	13	12.5		
S-2	5 5 4	9			5500*

Total Depth: 5ft
Drilling Date: August 15, 2011
Inspector:
Contractor: Strata Drilling, Inc.
Driller: B. Sienkiewicz

Drilling Method:
2-1/4 inch inside diameter hollow stem auger

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Backfilled with auger cuttings and bituminous cold patch

Figure No. 4

SOIL / PAVEMENT BORING 110480.GPJ G2_CONS.GDT 8/29/11

Project Name: Buhr Park

Project Location: Packard Road
Ann Arbor, Michigan

G2 Project No. 110480

Latitude: N/A Longitude: N/A

Soil Boring No. **B-5**

G2 Consulting Group, LLC

SUBSURFACE PROFILE

SOIL SAMPLE DATA

DEPTH (ft)	PRO-FILE	GROUND SURFACE ELEVATION: N/A	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Asphalt (2 inches) 0.2		BS					
		Fill: Brown Gravelly Sand with trace silt 0.8							
				S-1	5 6 7	13			
		Medium Compact Brown Silty Sand							
5		5.0	5	S-2	5 7 8	15			
		End of Boring @ 5ft							
10			10						
15			15						

Total Depth: 5ft
Drilling Date: August 15, 2011
Inspector:
Contractor: Strata Drilling, Inc.
Driller: B. Sienkiewicz

Water Level Observation:
Dry during and upon completion

Excavation Backfilling Procedure:
Backfilled with auger cuttings and bituminous cold patch

Drilling Method:
2-1/4 inch inside diameter hollow stem auger

Figure No. 5

SOIL / PAVEMENT BORING 110480.GPJ G2_CONS.GDT 8/29/11

Project Name: Buhr Park

Project Location: Packard Road
Ann Arbor, Michigan

G2 Project No. 110480

Latitude: N/A Longitude: N/A

Soil Boring No. **B-6**

G2 Consulting Group, LLC

SUBSURFACE PROFILE

GROUND SURFACE ELEVATION: N/A

DEPTH (ft)	PRO-FILE		DEPTH (ft)
		Asphalt (7 inches)	
		0.7	
		Fill: Black Gravelly Sand	
		1.0	
		Very Stiff Dark Brown and Brown Sandy Clay with trace gravel	
		3.5	
		Medium Compact Brown Silty Sand with trace gravel	
5		5.0	5
		End of Boring @ 5ft	
10			10
15			15

SOIL SAMPLE DATA

SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
S-1	5 6 8	14	9.4		8000*
S-2	9 12 14	26			

Total Depth: 5ft
Drilling Date: August 15, 2011
Inspector:
Contractor: Strata Drilling, Inc.
Driller: B. Sienkiewicz

Drilling Method:
2-1/4 inch inside diameter hollow stem auger

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Backfilled with auger cuttings and bituminous cold patch

Figure No. 6

SOIL / PAVEMENT BORING 110480.GPJ G2_CONS.GDT 8/29/11

Project Name: Buhr Park

Project Location: Packard Road
Ann Arbor, Michigan

G2 Project No. 110480

Latitude: N/A Longitude: N/A

Soil Boring No. **B-7**

G2 Consulting Group, LLC

SUBSURFACE PROFILE				SOIL SAMPLE DATA					
DEPTH (ft)	PRO-FILE	GROUND SURFACE ELEVATION: N/A	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Asphalt (5-1/2 inches) 0.4							
		Fill: Brown Gravelly Sand 1.0							
		Medium Compact Brown Silty Sand with little sand and trace clay 2.5		S-1	5 5 6	11			
5		Medium Compact Brown Silty Sand 5.0	5	S-2	4 5 7	12			
		End of Boring @ 5ft							
10			10						
15			15						

Total Depth: 5ft
Drilling Date: August 15, 2011
Inspector:
Contractor: Strata Drilling, Inc.
Driller: B. Sienkiewicz

Water Level Observation:
Dry during and upon completion

Excavation Backfilling Procedure:
Backfilled with auger cuttings and bituminous cold patch

Drilling Method:
2-1/4 inch inside diameter hollow stem auger

Figure No. 7

SOIL / PAVEMENT BORING 110480.GPJ G2_CONS.GDT 8/29/11

Project Name: Buhr Park

Project Location: Packard Road
Ann Arbor, Michigan

G2 Project No. 110480

Latitude: N/A Longitude: N/A

Soil Boring No. **B-8**

G2 Consulting Group, LLC

SUBSURFACE PROFILE

GROUND SURFACE ELEVATION: N/A

DEPTH (ft)	PRO-FILE		DEPTH (ft)
		Topsoil: Dark Brown Silty Sand	
		0.8	
		Fill: Loose Dark Brown and Brown Silty Sand	
		3.0	
5		Loose Brown and Gray Clayey Sand	5
		5.5	
		Loose to Medium Compact Brown Silty Sand	
10		10.0	10
		End of Boring @ 10ft	
15			15

SOIL SAMPLE DATA

SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
S-1	3 2 3	5			
S-2	2 2 2	4			
S-3	3 6 5	11			
S-4	3 4 4	8			

Total Depth: 10ft
Drilling Date: August 15, 2011
Inspector:
Contractor: Strata Drilling, Inc.
Driller: B. Sienkiewicz

Water Level Observation:
8-1/2 feet during drilling

Excavation Backfilling Procedure:
Backfilled with auger cuttings

Drilling Method:
2-1/4 inch inside diameter hollow stem auger

Figure No. 8

SOIL / PAVEMENT BORING 110480.GPJ G2_CONS.GDT 8/29/11

Project Name: Buhr Park

Project Location: Packard Road
Ann Arbor, Michigan

G2 Project No. 110480

Latitude: N/A Longitude: N/A

Soil Boring No. **B-9**

G2 Consulting Group, LLC

SUBSURFACE PROFILE

GROUND SURFACE ELEVATION: N/A

DEPTH (ft)	PRO-FILE		DEPTH (ft)
		Topsoil: Dark Brown Silty Sand	
		0.8	
		Fill: Medium Compact Brown Sand with trace silt	
		3.0	
5		Fill: Stiff Dark Brown Silty Clay with little sand, concrete, organic matter (Organic Content =3.8%)	5
		6.0	
		Loose Gray Clayey Sand with little silt	
		8.0	
10		Medium Gray Silty Clay with little sand and trace gravel, organic matter (Organic Content = 3.2%)	10
		10.0	
		End of Boring @ 10ft	
15			15

SOIL SAMPLE DATA

SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
S-1	5 7 8	15			
S-2	6 5 4	9	16.8		4000*
S-3	W.O.H. 2 3	5			
S-4	4 3 3	6	20.3		1000*

Total Depth: 10ft
Drilling Date: August 15, 2011
Inspector:
Contractor: Strata Drilling, Inc.
Driller: B. Sienkiewicz

Drilling Method:
2-1/4 inch inside diameter hollow stem auger

Water Level Observation:
6 feet during drilling; 4 feet upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Backfilled with auger cuttings

Figure No. 9

SOIL / PAVEMENT BORING 110480.GPJ G2_CONS.GDT 8/29/11

Project Name: Buhr Park

Project Location: Packard Road
Ann Arbor, Michigan

G2 Project No. 110480

Latitude: N/A Longitude: N/A

Soil Boring No. **B-10**

G2 Consulting Group, LLC

SUBSURFACE PROFILE				SOIL SAMPLE DATA					
DEPTH (ft)	PRO-FILE	GROUND SURFACE ELEVATION: N/A	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Topsoil: Dark Brown Silty Sand (0.7)							
		Fill: Medium Compact Dark Brown Silty Sand with trace gravel and organic matter (Organic Content = 6.2%) (2.5)		S-1	5 5 6	11	19.6		
5		Stiff Brown Silty Clay with trace gravel and frequent gravelly sand layers (5.0)	5	S-2	4 7 9	16			
		Medium Compact Brown Gravelly Sand with trace silt		S-3	7 11 13	24			
10		(10.0)	10	S-4	6 9 13	22			
		End of Boring @ 10ft							
15			15						

Total Depth: 10ft
Drilling Date: August 15, 2011
Inspector:
Contractor: Strata Drilling, Inc.
Driller: B. Sienkiewicz

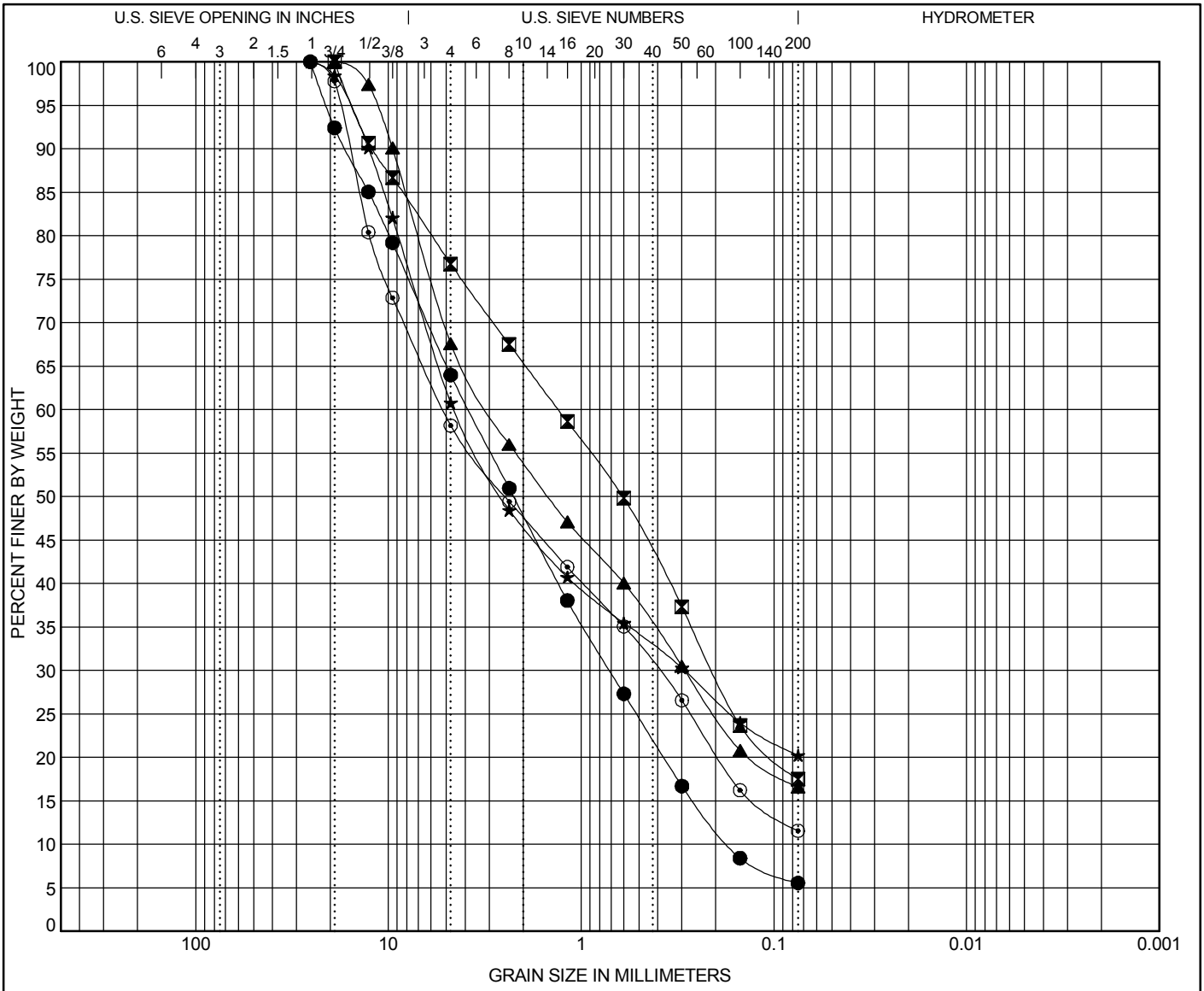
Water Level Observation:
Dry during and upon completion

Excavation Backfilling Procedure:
Backfilled with auger cuttings

Drilling Method:
2-1/4 inch inside diameter hollow stem auger

Figure No. 10

SOIL / PAVEMENT BORING 110480.GPJ G2_CONS.GDT 8/29/11



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Description	LL	PL	PI	Cc	Cu
●	**B-1**	**BS**	**Gravelly Sand with trace silt**				**0.77**	**22.38**
⊠	**B-2**	**BS**	**Gravelly Sand with little silt**					
▲	**B-3**	**BS**	**Gravelly Sand with little silt**					
★	**B-4**	**BS**	**Gravelly Sand with little silt**					
⊙	**B-5**	**BS**	**Gravelly Sand with trace silt**				**0.51**	**86.85**

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**B-1**	**BS**	**25.4**	**3.84**	**0.712**	**0.172**	**36.0**	**58.4**	**5.5**	
⊠	**B-2**	**BS**	**19.05**	**1.315**	**0.207**		**23.3**	**59.2**	**17.5**	
▲	**B-3**	**BS**	**19.05**	**3.007**	**0.29**		**32.4**	**51.0**	**16.6**	
★	**B-4**	**BS**	**25.4**	**4.548**	**0.291**		**39.2**	**40.5**	**20.2**	
⊙	**B-5**	**BS**	**25.4**	**5.183**	**0.398**		**41.8**	**46.6**	**11.5**	

Consulting Group, LLC

GRAIN SIZE DISTRIBUTION

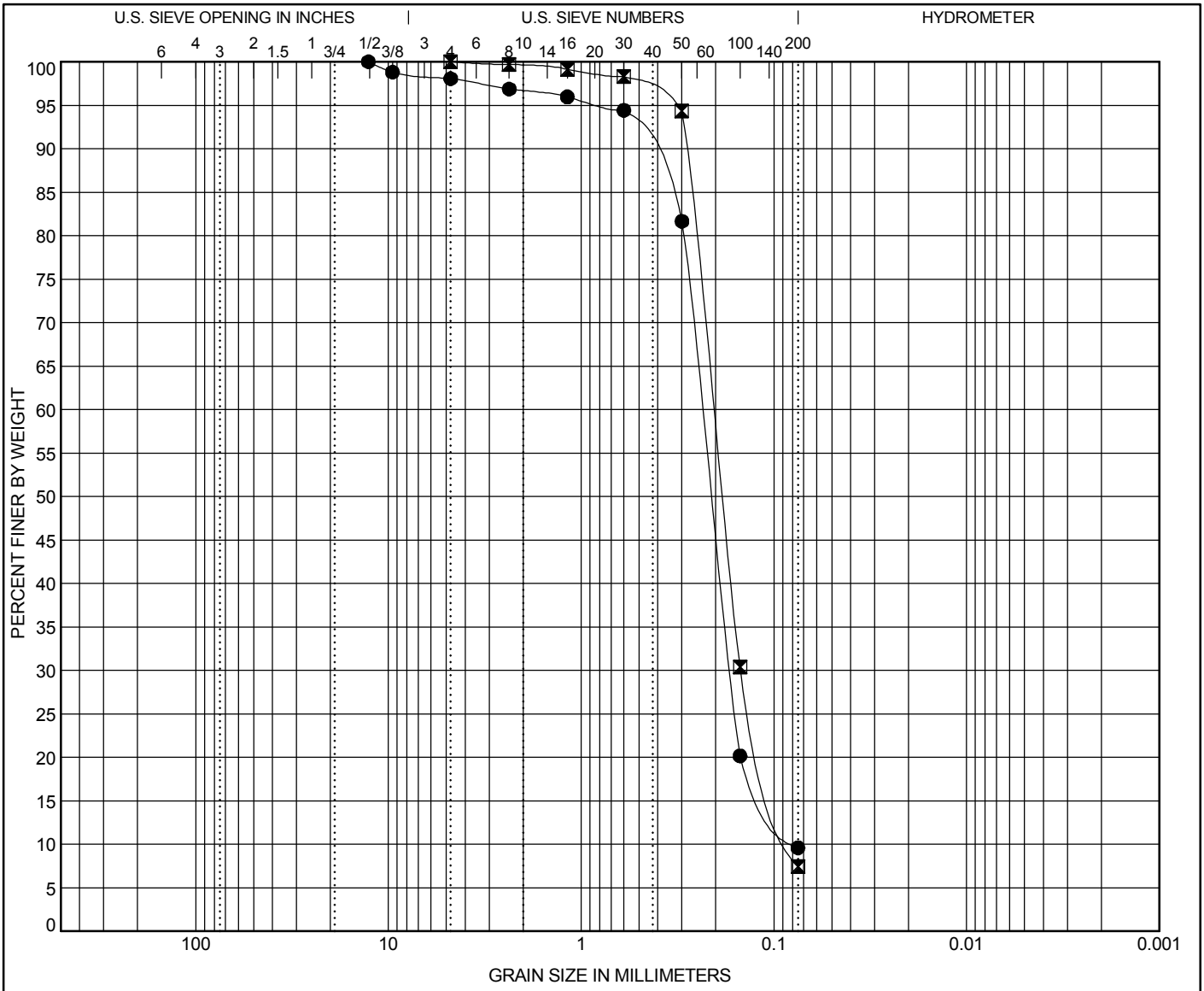
Project Name: Buhr Park

Project Location: Packard Road
Ann Arbor, Michigan

G2 Project No.: 110480

Figure No. 11

US_GRAIN_SIZE 110480.GPJ G2_CONS.GDT 8/29/11



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Description	LL	PL	PI	Cc	Cu
●	**B-8**	**S-1**	**Silty Sand with trace gravel**				**1.55**	**3.05**
⊠	**B-9**	**S-1**	**Sand with trace silt**				**1.31**	**2.55**

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**B-8**	**S-1**	**12.7**	**0.235**	**0.168**	**0.077**	**1.9**	**88.5**	**9.6**	
⊠	**B-9**	**S-1**	**4.75**	**0.207**	**0.148**	**0.081**	**0.0**	**92.6**	**7.4**	

US_GRAIN_SIZE 110480.GPJ G2_CONS.GDT 8/29/11

G2 Consulting Group, LLC

GRAIN SIZE DISTRIBUTION

Project Name: Buhr Park

Project Location: Packard Road
Ann Arbor, Michigan

G2 Project No.: 110480

Figure No. 12

Photographic Documentation
Buhr Park
Ann Arbor, Michigan
G2 Project No. 110480

Photograph No. 1: Moderate to high severity fatigue cracking in north parking lot.

Photograph No. 2: Moderate severity longitudinal and fatigue cracking in north parking lot.

Photographic Documentation
Buhr Park
Ann Arbor, Michigan
G2 Project No. 110480

Photograph No. 3: Moderate severity longitudinal and fatigue cracking in north parking lot.

Photograph No. 4: High severity fatigue cracking in north access drive. Note previous patching.

Photographic Documentation
Buhr Park
Ann Arbor, Michigan
G2 Project No. 110480

Photograph No. 5: High severity fatigue cracking in north access drive.

Photograph No. 6: High severity fatigue cracking and large pothole in access drive. Note area of patching or overlay at top of photograph.

Photographic Documentation
Buhr Park
Ann Arbor, Michigan
G2 Project No. 110480

Photograph No. 7: High severity fatigue cracking in access drive. Note no curbs are present.

Photograph No. 8: Moderate severity fatigue cracking in south parking lot.

Photographic Documentation
Buhr Park
Ann Arbor, Michigan
G2 Project No. 110480

Photograph No. 9: Low to moderate severity fatigue cracking in south parking lot. Note curbs are constructed of concrete parking blocks.

Photograph No. 10: High severity fatigue cracking.

Photographic Documentation
Buhr Park
Ann Arbor, Michigan
G2 Project No. 110480

Photograph No. 11: Moderate severity fatigue cracking and evidence of previous ponding. It appears previous rehabilitation may have been performed around catch basin.

Photograph No. 12: Settlement and deterioration of bituminous pavement around catch basin.

Photographic Documentation
Buhr Park
Ann Arbor, Michigan
G2 Project No. 110480

Photograph No. 13: View of overall south parking lot. Pavement is in moderate condition.

Photograph No. 14: High severity fatigue cracking in access drive.

Photographic Documentation
Buhr Park
Ann Arbor, Michigan
G2 Project No. 110480

Photograph No. 15: High severity fatigue cracking and edge deterioration (with ponding water) in access drive.

Photograph No. 16: Tennis court parking lot.

Photographic Documentation
Buhr Park
Ann Arbor, Michigan
G2 Project No. 110480

Photograph No. 17: Moderate to high severity transverse cracking and fatigue cracking with ponding water in access drive.

Photograph No. 18: Areas of moderate severity transverse and fatigue cracking in access drive.

GENERAL NOTES TERMINOLOGY

Unless otherwise noted, all terms herein refer to the Standard Definitions presented in ASTM 653.

PARTICLE SIZE

Boulders		- greater than 12 inches
Cobbles		- 3 inches to 12 inches
Gravel	- Coarse	- 3/4 inches to 3 inches
	- Fine	- No. 4 to 3/4 inches
Sand	- Coarse	- No. 10 to No. 4
	- Medium	- No. 40 to No. 10
	- Fine	- No. 200 to No. 40
Silt		- 0.005mm to 0.074mm
Clay		- Less than 0.005mm

CLASSIFICATION

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

Second Major Constituent (percent by weight)	Minor Constituent (percent by weight)
Trace - 1 to 12%	Trace - 1 to 12%
Adjective - 12 to 35%	Little - 12 to 23%
And - over 35%	Some - 23 to 33%

COHESIVE SOILS

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

Consistency	Unconfined Compressive Strength (psf)	Approximate Range of (N)
Very Soft	Below 500	0 - 2
Soft	500 - 1,000	3 - 4
Medium	1,000 - 2,000	5 - 8
Stiff	2,000 - 4,000	9 - 15
Very Stiff	4,000 - 8,000	16 - 30
Hard	8,000 - 16,000	31 - 50
Very Hard	Over 16,000	Over 50

Consistency of cohesive soils is based upon an evaluation of the observed resistance to deformation under load and not upon the Standard Penetration Resistance (N).

COHESIONLESS SOILS

Density Classification	Relative Density %	Approximate Range of (N)
Very Loose	0 - 15	0 - 4
Loose	16 - 35	5 - 10
Medium Compact	36 - 65	11 - 30
Compact	66 - 85	31 - 50
Very Compact	86 - 100	Over 50

Relative Density of cohesionless soils is based upon the evaluation of the Standard Penetration Resistance (N), modified as required for depth effects, sampling effects, etc.

SAMPLE DESIGNATIONS

AS - Auger Sample – Cuttings directly from auger flight
BS - Bottle or Bag Samples
S - Spilt Spoon Sample - ASTM D 1586
LS - Liner Sample with liner insert 3 inches in length
ST - Shelby Tube sample - 3 inch diameter unless otherwise noted
PS - Piston Sample - 3 inch diameter unless otherwise noted
RC - Rock Core - NX core unless otherwise noted

STANDARD PENETRATION TEST (ASTM D 1586) - A 2.0 inch outside-diameter, 1-3/8 inch inside-diameter split barrel sampler is driven into undisturbed soil by means of a 140-pound weight falling freely through a vertical distance of 30 inches. The sampler is normally driven three successive 6-inch increments. The total number of blows required for the final 12 inches of penetration is the Standard Penetration Resistance (N).