PROJECT MANUAL

Ferndale Parks and Recreation

Wilson Park Improvement Project

Wilson2024

Ferndale, Michigan

PREPARED FOR:

Ferndale Parks & Recreation

1938 Burdette Street
Ferndale, MI 48220

PROJECT NO.: 14337

ISSUE DATE: November 15, 2023

ISSUED FOR: BID

This project is funded by the Michigan Department of Natural Resources Land and Water Conservation (Wilson2024). State and/or Federal Requirements apply.

SMITHGROUP
ANN ARBOR, MICHIGAN

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PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS, that we, the Undersigned

_____

_____

_____

as Principal, and _____

of _____

_____

as Sureties, and hereby held and firmly bound unto the

City of Ferndale

300 East Nine Mile, Ferndale, MI 48220

the full and just sum of _____ ($0,000,000.00)

for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors, and assigns.

Signed and Sealed this _____ day of _____, 20___.

The condition of the above obligation is such that if said

_____

shall well and faithfully do and perform the things agreed by City of Ferndale, MI to be done and performed by the annexed contract, according to the terms thereof, then this obligation shall be void; otherwise, the same shall remain in full force and effect.

It is mutually understood and agreed that in cases where changes are required, either by order of the Engineer, or Owner or by mutual agreement, such change or changes shall not modify, discharge or release this bond.

_____

_____

By: _____

(Principal) (SEAL)

_____

_____

By: _____

(Surety) (SEAL)

Signed, Sealed and Delivered

in the presence of:

_____

_____

_____

LABOR AND MATERIAL BOND

KNOW ALL MEN BY THESE PRESENTS, that we, _____

_____

Hereinafter called the Principal, and _____

_____

Hereinafter called the Surety, are held and firmly bound unto

City of Ferndale

300 East Nine Mile, Ferndale, MI 48220

Hereinafter called the Owner, in the Sum of _____

($0,000,000.00) to the payment whereof, well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

Sealed with our seals and dated this _____ day of _____, A.D., 20___.

WHEREAS, the above named Principal has entered into a certain contract with the Owner, dated the _____ day of _____, A.D., 20___, (hereinafter called the Contract) for

Martin Park Splash Pad, Contract: Parks 2021-01

_____

_____

which Contract and the Specifications for said work shall be deemed a part hereof as fully as if set out herein, and

NOW THEREFORE, the condition of this obligation is such that if payment shall be made by the Principal to any sub-contractor or by him or any sub-contractor as the same may become due and payable of all indebtedness which may arise from him to a sub-contractor or party performing labor or furnishing materials or supplies or any sub-contractor to any person, firm or corporation on account of any labor performed or materials or supplies furnished in the performance of said contract, then this obligation shall be void; otherwise, the same be in full force and effect.

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

_____

_____

By: _____ (Seal)

(PRINCIPAL)

_____

_____

By: _____ (Seal)

(SURETY)

Signed, Sealed and Delivered
in the presence of:

_____

_____

_____

MAINTENANCE AND GUARANTEE BOND

KNOW ALL MEN BY THESE PRESENTS, that,_____

as Principal, and _____

as Surety are held and firmly bound unto City of Ferndale

in the sum of _____

($0,000,000.00) good and lawful money of the United States of America, to be paid to said City of Ferndale, its legal representatives and assigns, for which payment well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, and each and every one of them jointly and severally, firmly by these presents. Sealed with our seals and dated this _____ day of _____, A.D., 20___.

WHEREAS, the above named Principal has entered into a certain written contract with City of Ferndale

DATED THIS _____ day of _____, A.D., 20___ wherein the said Principal covenanted and agreed as follows, to wit:

_____

_____

NOW THEREFORE, the condition of this obligation is such, that by and under said contract, the above named Principal has agreed with the City of Ferndale that for a period of 1 year(s) from the date of payment of Final Estimate, to keep in good order and repair any defect in all work done under said contract either by the Principal or his sub-contractors, or his material suppliers, that may develop during the said period due to improper materials, defective equipment, workmanship, and/or any other work affected in

making good such imperfections, shall also be made good all without expense to the Owner, excepting only such part or parts of said work as may have been disturbed without the consent or approval of the Principal after the final acceptance of the work, and that whenever directed to do so by the City of Ferndale by notice served in writing, either personally or by mail, on the Principal at _____ legal representatives, or successors, or on the Surety at

_____

WILL PROCEED at once to make sure repairs as directed by said City of Ferndale and in case of failure to do so within one week from the date of services of such notice, or within reasonable time not less than one week, as shall be fixed in said notice, then the said City of Ferndale shall have the right to purchase such materials and employ such labor and equipment as may be necessary for the purpose, and to undertake, do and make such repairs, and charge the expense thereof to, and receive same from said Principal or Surety. If any repair is necessary to be made at once to protect life and property, then an in that case, the said City of Ferndale may take immediate steps to repair or barricade such defects without notice to the contractor. In such accounting the said City of Ferndale shall not be held to obtain the lowest figures for the doing of the work, or any part thereof, but all sums actually paid therefore shall be charged to the Principal or Surety. In this connection, the judgment of the City of Ferndale is final and conclusive. If the said Principal for a period of 1 year(s) from the date of payment of Final Estimate, shall keep said work so constructed under said contract in good order and repair, excepting only such part of parts of said work which may have been disturbed without the consent or approval of said Principal after the final acceptance of the same, and shall whenever notice is given as hereinbefore specified, at once proceed to make

repair as in said notice directed, or shall reimburse said City of Ferndale for any expense incurred by making such repairs, should the Principal or Surety fail to do as hereinafter specified, and shall fully indemnify, defend and save harmless the said City of Ferndale from all suits and actions for damages of every name and description brought or claimed against it for or on account of any injury or damage to person or property received or sustained by any part or parties, by or from any of the acts or omissions or through the negligence of said Principal, servants, agents, or employees, in the prosecution of the work included in said contract, and from any and all claims arising under the Workmen's Compensation Act so called, of the State of Michigan, then the above obligation shall be void, otherwise to remain in full force and effect.

IN WITNESS WHEREOF, the parties hereto have caused this instrument to be executed by their respective authorized officers this _____ of _____, A.D., 20___.

_____

_____

By: _____ (Seal)

_____

_____

By: _____ (Seal)

Signed, Sealed and Delivered
in the presence of :

_____

_____

_____

CONTRACTOR'S DECLARATION

I hereby declare that I have not, during the period _____

to _____

A.D. 20___, performed any work, furnished any material, sustained any loss, damage or delay for any reason, including soil conditions encountered or created, or otherwise done anything for which I shall ask, demand, sue for, or claim compensation from _____

_____

the Owner, or his agents, in addition to the regular items set forth in the contract numbered _____ and dated _____

A.D. 20___ for _____

_____

executed between myself and the Owner, and in the Change Orders for work issued by the Owner in writing as provided thereunder, except as I hereby make claim for additional compensation and/or extension of time, as set forth on the itemized statement attached hereto.

There is not an itemized statement attached.

Date: _____

_____

(CONTRACTOR)

By: _____

Title: _____

CONTRACTOR'S AFFIDAVIT

(STATE OF MICHIGAN)
) ss
COUNTY OF)

The Undersigned, _____

hereby represents that on _____

he (it) was awarded a contract by _____,

hereinafter called the Owner, to _____

in accordance with the terms and conditions of Contract No. _____; and the Undersigned further represents that the subject work has now been accomplished and the said contract has now been completed.

The Undersigned hereby warrants and certifies that all of his (its) indebtedness arising by reason of the said contract has been fully paid or satisfactorily secured; and that all claims from sub-contractors and others for labor and material used in accomplishing the said project, as well as all other claims arising from the performance of the said contract, have been fully paid or satisfactorily settled. The Undersigned further agrees that, if any claim should hereinafter arise, he (it) shall assume responsibility for the same immediately upon request to do so by the Owner.

The Undersigned, for a valuable consideration, the receipt of which is hereby acknowledged, does further hereby waive, release and relinquish any and all claims or right of lien which the undersigned now has or may hereafter acquire upon the subject premises for labor and material used in accomplishing said project owned by the Owner.

This affidavit is freely and voluntarily given with full knowledge of the facts, on this ____ day of _____, 20___.

_____

(CONTRACTOR)

By: _____

Title: _____

Subscribed and sworn to before me, a

Notary Public in and for _____

County, Michigan, on this _____ day of

_____, 20___.

Notary Public:

_____

My Commission Expires: _____

SUPPLEMENTARY CONDITIONS

These Supplementary Conditions shall amplify or amend certain provisions in the Standard General Conditions of the Construction Contract (EJCDC C-700) (2002 Edition) and other provisions of the Contract Documents as indicated below. All provisions that are not so amended or supplemented remain in full force and effect.

SC-2.03 Amend the last sentence of 2.03.A. to read as follows: In no event will the Contract Times commence to run later than 90 days after the day of Bid opening or the 30th day after the effective date of the agreement, whichever date is earlier.

SC-4.02. In preparation of the drawings and specifications, Engineer or Engineer's Consultants have relied upon the following soil investigation reports prepared by:

None

The technical data contained in above listed reports upon which the contractor may rely are the soil boring logs and sieve analysis reports. Copies of these reports are included with the Bidding Documents.

These reports and drawings are not part of the Contract Documents but the technical data contained therein upon which Contractor is entitled to rely as provided in GC 4.02.B. and as identified and established above are incorporated therein by reference. Contractor is not entitled to rely upon other information and data utilized by Engineer and Engineer's Consultants in the preparation of Drawings and specifications.

SC-5.01 Add the following two paragraphs immediately after Section 5.01.C. of the General Conditions which are to read as follows:

5.01 (D) Contractor shall provide a Maintenance and Guarantee Bond payable to the Owner in an amount equal to 50 percent of the Final Contract Price for a period of two years.

5.01 (E) Contractor shall provide Performance Bond and Labor and Material Bonds on forms provided and in accordance with Article 5.01 of the General Conditions.

SC-5.04 Contractor's Insurance Requirements: General Conditions Section 5.04 is supplemented and amended as follows:

Prior to commencement of the work, the Contractor shall purchase and maintain during the term of the project such insurance as will protect him, the Owner(s) and the Engineer(s) from claims arising out of the work described in this contract and performed by the Contractor, Subcontractor(s) or Sub-subcontractor(s) consisting of:

A. **Worker's Compensation** insurance including Employer's Liability to cover employee injuries or disease compensable under the Worker's Compensation Statutes of the states in which work is conducted under this contract; disability benefit laws, if any; or Federal compensation acts such as U.S. Longshoremen or Harbor

Worker's, Maritime Employment, or Railroad Compensation Act(s), if applicable. Self-insurance plans approved by the regulatory authorities in the state in which work on this project is performed are acceptable.

B. A **Comprehensive General Liability** policy to cover bodily injury to persons other than employees and for damage to tangible property, including loss of use thereof, including the following exposure:

1. All premises and operations.
2. Explosion, collapse and underground damage.
3. Contractor's Protective coverage for independent contractors or subcontractors employed by him.
4. Contractual Liability for the obligation assumed in the Indemnification or Hold Harmless agreement found in Section 6.20 of the General Conditions of this contract.
5. The usual Personal Injury Liability endorsement with no exclusions pertaining to employment.
6. Products and Completed Operations coverage. This coverage shall extend through the contract guarantee period.

C. A **Comprehensive Automobile Liability** policy to cover bodily injury and property damage arising out of the ownership, maintenance or use of any motor vehicle, including owned, non-owned and hired vehicles. In light of standard policy provisions concerning (a) loading and unloading and (b) definitions pertaining to motor vehicles licensed for road use vs. unlicensed or self-propelled construction equipment, it is strongly recommended that the Comprehensive General Liability and the Comprehensive Auto Liability be written by the same insurance carrier, though not necessarily in one policy.

D. The Contractor will purchase for the Owner an **Owner's Protective Liability** policy to protect the Owner, the Engineer, their consultants, agents, employees, and such public corporations in whose jurisdiction the work is located for their contingent liability for work performed by the Contractor, the Subcontractor(s) or the Sub-subcontractor(s) under this contract.

E. ~~The Contractor shall purchase a **Builder's Risk-Installation Floater** in a form acceptable to the Owner covering property of the project for full cost of replacement as of the time of any loss which shall include, as named insured's, (a) the Contractor, (b) all Subcontractors, (c) all Sub-subcontractors, (d) the Owner, the Engineer(s) or Architect(s), and their respective interests may provide to be at the time of loss, covering insurable property which is the subject of this contract, whether in place, stored at the job site, stored elsewhere, or in transit at the risk of the insured(s). Coverage shall be effected on an "ALL RISK" form including, but~~

~~not limited to, the perils of fire, wind, vandalism, collapse, theft and earthquake, with exclusions normal to cover.~~

~~The contractor may arrange for such deductibles as he deems to be within his ability to self-assume, but he will be held solely responsible for the amount of such deductible and for any co-insurance penalties. Any insured loss shall be adjusted with the Owner and the Contractor and paid to the Owner and Contractor as Trustee for the other insured's.~~

F. **Umbrella or Excess Liability**

The Owner or its representative may, for certain projects, require limits higher than those stated. The Contractor is granted the option of arranging coverage under a single policy for the full limit required or by a combination of underlying policies with the balance provided by an Excess or Umbrella Liability policy equal to the total limit(s) requested. Umbrella or Excess policy wording shall be at least as broad as the primary or underlying policy (ies) and shall apply both to the contractor's general liability and to his automobile liability insurance.

Limits of Liability

The required limits of liability for insurance coverage requested in the General Conditions, Section 5.04 (B.2) shall be not less than the following:

A.	Workers Compensation	
	Coverage A - Compensation	500,000.00
	Coverage B - Employer's Liability	500,000.00
B.	Comprehensive General Liability	
	Bodily Injury - Each occurrence	1,000,000.00
	Bodily Injury - Aggregate (Completed Operations)	1,000,000.00
	Property Damage - Each Occurrence	500,000.00
	Property Damage - Aggregate	1,000,000.00
	or Combined Single Limit	1,000,000.00
C.	Comprehensive Automobile Liability	
	Bodily Injury	1,000,000.00
	Property Damage	500,000.00
	or Combined Single Limit	1,000,000.00

D.	Owner's Protective Liability	
	Bodily Injury - Each Occurrence	1,000,000.00
	Property Damage - Each Occurrence	500,000.00
	Property Damage - Aggregate	500,000.00
	or Combined Single Limit	1,000,000.00
E.	~~Builder's Risk-Installation Floater~~	~~Cost to Replace At Time of Loss~~
F.	Umbrella or Excess Liability	1,000,000.00

Insurance - Other Requirements

A. Notice of Cancellation of Intent not to Renew

Policies will be endorsed to provide that at least 30 days written notice shall be given to the Owner and to the Engineer of cancellation or of intent not to renew.

B. Evidence of Coverage

Prior to commencement of the Work, the Contractor shall furnish to the Owner four (4) Certificates of Insurance. The Owner reserves the right to request complete copies of policies it deemed necessary to ascertain details of coverage not provided by the certificates. Such policy copies shall be "Originally Signed Copies" and so designated.

Insurance Required for the Contractor

A. **Worker's Compensation** including Employer's Liability

B. **Comprehensive General Liability** including:

1. All premises and operations.
2. Explosion, collapse, and underground damage.
3. Contractor's Protective.
4. Contractual Liability for obligations assumed in the Indemnification-Hold Harmless agreement of this Contract.
5. Personal Injury Liability.
6. Products and Completed Operations.

C. **Comprehensive Automobile Liability** including owned, non-owned and hired vehicles.

D. **Umbrella or Excess Liability**

Insurance required for the Contractor shall include the following as additional insured:

1. City of Ferndale, its employees, its City Council and individual members thereof, agents and/or authorized representatives for the City.

2. Giffels-Webster Engineers, Inc. and their consultants, agents, employees, and/or authorized representatives.

Insurance Required for the Owner

A. **Owners' Protective Liability** which names as insured the Owner(s).

City of Ferndale
300 E. Nine Mile
Ferndale, MI 48220

Additional Insured shall include:

Giffels Webster Engineers, Inc., 1025 E. Maple, Suite 100, Birmingham, MI 48009, and their consultants, agents, and employees and such public corporations in whose jurisdiction the work is located.

~~Insurance Required per the Road Commission for Oakland County Permit:~~

~~If the Road Commission for Oakland County permit is not included in the Contract Documents, the bidder shall contact the Road Commission for Oakland County Permits Department to determine the separate certificate of insurance requirements.~~

~~Insurance Required per the Michigan Department of Transportation Permit~~

~~If the Michigan Department of Transportation permit is not included in the Contract Documents, the bidder shall contact the Michigan Department of Transportation Permits Department to determine the separate certificate of Insurance requirements.~~

Insurance Required for the Contractor and the Owner

A. ~~**Builders' Risk-Installation Floater** which names as insured(s) the Owner, the Engineer(s), their consultants, agents, and employees, the Contractor and all Subcontractors.~~

Qualification of Insurers

In order to determine financial strength and reputation of insurance carriers, all companies providing the coverage required shall be licensed or approved by the Insurance Bureau of the State of Michigan and shall have a financial rating not lower than X1 and a policyholder's service rating no lower than B+ as listed in A.M. Best's Key Rating Guide, current edition. Companies with ratings lower than B+:X1 will be acceptable only upon written consent of the Owner.

SC-5.06 Delete Section 5.06 of the General Conditions.

SC-6.06 Add a new sub-Section immediately after Section 6.06.G. of the General Conditions which is to read as follows:

Owner or Engineer may furnish to any such Subcontractor, Supplier or other person or organization, to the extent practicable, information about amounts paid to Contractor in accordance with Contractor's Applications for Payment on account of the particular Subcontractor's Supplier's, other person's or other organization's Work.

SC-14.02 Amend Section 14.02.C.1. of the General Conditions to read as follows: Payment becomes due to Contractor 30 days after presentation of the application for payment to Owner.

SECTION 001116 - ADVERTISEMENT TO BID

1.1 PROJECT INFORMATION

A. Notice to Bidders: Qualified bidders are invited to submit bids for Project as described in this Document according to the Instructions to Bidders.

B. Project Identification: Wilson Park Improvement Project

1. Project Location: 1280 Hilton Road – Ferndale, Michigan.

2. Owner: Ferndale Parks and Recreation: LaReina Wheeler, Parks and Recreation Department, Incubizo 1938 Burdette Street, Ferndale Michigan 48220 248.544.6767 lwheeler@ferndalemi.gov

C. Landscape Architect/Civil Engineer: Mark Woodhurst, mark.woodhurst@smithgroup.com SmithGroup 201 Depot Street Ann Arbor, Michigan 48104. 517.927.4959

D. Construction Administration Services: Scott Ringler, Giffels Webster, 1025 E Maple, Suite 100, Birmingham, Michigan 48009 248.852.3100

E. Project Description: Project consists of site clearing, erosion control measures, earthwork, playground installation, shelter, site furnishings, concrete flatwork, asphalt

F. Construction Contract: Bids will be received for the following Work:

1. General Contract (all trades).
2. Multiple Contract Project consisting of the following prime contracts:

a. General Building Construction.

G. Bid Release Date: November 15, 2023

H. State or Federal funds are being used to assist in construction and relevant State or Federal requirements will apply.

1.2 PROJECT SUMMARY

A. Wilson Park Project Improvements will include: earth moving and shaping; installation of concrete pathways and furniture pads; expansion of asphalt parking lot; installation of playground equipment furnished by Owner; installation of playground curbs and playground drainage system, installation of asphalt basketball courts and striping for the courts and parking lot, installation of picnic shelter furnished by Owner, shelter foundations, backfill and fine grading. Contractor will coordinate with Owner to allow for tree installation and turf restoration.

B. ALTERNATE WORK

C. Includes additional planting, electrical work, lawn underdrain installation and additional concrete pathways.

1.3 BID SUBMITTAL AND OPENING

A. 2 Hard copies of the proposals need to be submitted to Ferndale City Hall, 300 E. 9 Mile Rd (by the opening date and time – see below) in order to be considered. We also request a electronic copy be submitted, which can be done through bidnet.

B. Owner will receive sealed bids until the bid time and date at the location indicated below. Owner will consider bids prepared in compliance with the Instructions to Bidders issued by Owner, and delivered as follows:

Bid Date: December 20, 2023
Bid Time: 2:00 PM
Location: Ferndale City Hall, 300 E. 9 Mile Rd

C. Bids will be thereafter publicly opened and read aloud.

1.4 BID SECURITY

A. Bid security shall be submitted with each bid in the amount of 5 percent of the bid amount. No bids may be withdrawn for a period of 60 days after opening of bids. Owner reserves the right to reject any and all bids and to waive informalities and irregularities.

1.5 PREBID CONFERENCE

A. Prebid meeting: Prospective prime bidders are encouraged to attend a pre-bid meeting.

1. Meeting Date: December 6, 2023
2. Meeting Time: 11:00am
3. Location: Virtual Zoom Call
   Join Zoom Meeting
   https://us02web.zoom.us/j/8670392817?pwd=cEpKN0twNjZnbDdlc1V4TmVXNUxtUT09

   Meeting ID: 867 039 2817
   Passcode: wilson

   Dial by phone:
   +13126266799,,8670392817#,,,,*044260# US (Chicago)
   +16469313860,,8670392817#,,,,*044260# US
   Meeting ID: 867 039 2817
   Passcode: 044260
   Find your local number: https://us02web.zoom.us/u/kdIzaJxGjx

1.6 CONTRACTOR QUESTIONS / RFI / ADDENDA

A. Contractors to submit all RFI questions via BID Net prior to December 13, 2023 at 11:59pm. Any questions emailed to the City of Ferndale or consultants will not be considered or responded..

B. All RFI questions will be visible to all contractors.

C. Contractor's responsibility to check BID Net website for Addendums, updates, etc.

1.7 DOCUMENTS & BID SUBMISSION

A. Digital copies of the Contractor's Bid to be posted on BIDNET

B. Two (2) hard copies of the contractor bid must also be submitted to Ferndale City Hall prior to the bid opening date/time in order to be considered.

1.8 TIME OF COMPLETION

A. Bidders shall begin the Work on receipt of the Notice to Proceed and shall complete the Work within the Contract Time. Work is subject to liquidated damages. Refer to DRAFT AIA Document A101 – 2017 Standard Form of Agreement Between Owner and Contractor

1.9 BIDDER'S QUALIFICATIONS

A. To demonstrate qualifications to perform the Work, each Bidder must be prepared to submit within five days after Bid opening upon Owner's request detailed written evidence such as financial data, previous experience, present commitments and other such data as requested by the Owner. Each Bid must contain evidence of Bidder's qualifications to do business in the State where the project is located or covenant to obtain such qualification prior to award of the contract.

B. Bidders must be properly licensed under the laws governing their respective trades and be able to obtain insurance and bonds required for the Work. A Performance Bond, a separate Labor and Material Payment Bond, and Insurance in a form acceptable to Owner will be required of the successful Bidder.

C. Contractor to submit three (3) similar project work examples. Please provide the following:

1. Project One (Name / Location)
2. Owner Contact (Name / Phone Number)
3. Project Two (Name / Location)
4. Owner Contact (Name / Phone Number)
5. Project Three (Name / Location)
6. Owner Contact (Name / Phone Number)

END OF SECTION

SECTION 002113 - INSTRUCTIONS TO BIDDERS

1.1 INSTRUCTIONS TO BIDDERS

A. AIA Document A701, "Instructions to Bidders," is hereby incorporated into the Procurement and Contracting Requirements by reference.

1. A copy of AIA Document A701, "Instructions to Bidders," is bound in this Project Manual.

END OF SECTION

SECTION 003132 - GEOTECHNICAL DATA

PART 1 - GENERAL

1.1 Summary

A. Borings were taken on-site by G2 Consulting in late December 2022 / Early January 2023 – Report was completed on January 11, 2023

B. Geotechnical Report and boring logs have been included in project manual as an Appendix.

1.2 Use of Data

A. Soil borings were completed only for the use of design and are not part of the contract documents.

B. Bidders should visit the site and acquaint themselves with all existing conditions. Prior to bidding, bidders may make their own subsurface investigations to satisfy themselves as to site and subsurface conditions, but all such investigations shall be performed only under time schedules and arrangements approved in advance by the Owner's Representative.

C. The Contractor shall assume full responsibility for interpreting testing data and for the conclusions drawn from the information furnished, and from inspection of available information at the site.

END OF SECTION

SECTION 004123 - BID FORM - CONSTRUCTION MANAGEMENT (SINGLE-PRIME CONTRACT)

1.1 BID INFORMATION

A. Bidder: _____.

B. Project Name: Wilson Park Improvements

C. Project Location: 1280 Hilton Road – Ferndale, Michigan.

D. Owner: City of Ferndale

E. Landscape Architect: SmithGroup

F. Architect Project Number: 14337

1.2 CERTIFICATIONS AND BASE BID

A. **GRANT SUPPORTED ITEMS** / Base Bid, Single-Prime (All-Trades) Contract: The undersigned Bidder, having carefully examined the Procurement and Contracting Requirements, Conditions of the Contract, Drawings, Specifications, and all subsequent Addenda, as prepared by SmithGroup and the Architect's consultants, having visited the site, and being familiar with all conditions and requirements of the Work, hereby agrees to furnish all material, labor, equipment and services, including all scheduled allowances, necessary to complete the construction of above-named Project, according to the requirements of the Procurement and Contracting Documents, for the stipulated sum of:

1. _____ Dollars ($_____).

2. The above amount may be modified by amounts indicated by the Bidder on the attached Bid Supplement - Alternates and Bid Supplement - Unit Prices.

B. **NON-GRANT SUPPORTED ITEMS** / Base Bid, Single-Prime (All-Trades) Contract: The undersigned Bidder, having carefully examined the Procurement and Contracting Requirements, Conditions of the Contract, Drawings, Specifications, and all subsequent Addenda, as prepared by SmithGroup and the Architect's consultants, having visited the site, and being familiar with all conditions and requirements of the Work, hereby agrees to furnish all material, labor, equipment and services, including all scheduled allowances, necessary to complete the construction of above-named Project, according to the requirements of the Procurement and Contracting Documents, for the stipulated sum of:

1. _____ Dollars ($_____).

2. The above amount may be modified by amounts indicated by the Bidder on the attached Bid Supplement - Alternates and Bid Supplement - Unit Prices.

C. TOTAL GRANT SUPPORTED ITEMS + NON-GRANT SUPPORTED ITEMS

1. _____ Dollars ($_____)

1.3 BID GUARANTEE

A. The undersigned Bidder agrees to execute a contract for this Work in the above amount and to furnish surety as specified within 10 days after a written Notice of Award, if offered within 30 days after receipt of bids, and on failure to do so agrees to forfeit to Owner the attached cash, cashier's check, certified check, U.S. money order, or bid bond, as liquidated damages for such failure, in the following amount constituting five percent (5%) of the Base Bid amount above:

1. _____ Dollars ($_____).

B. In the event Owner does not offer a Notice of Award within the time limits stated above, Owner will return to the undersigned the cash, cashier's check, certified check, U.S. money order, or bid bond.

1.4 SUBCONTRACTORS AND SUPPLIERS

A. The following companies shall execute subcontracts for the portions of the Work indicated:

1. Concrete Work: _____

2. Asphalt Work:_____

3. Earth Moving: _____

4. NativePlanting:
_____

5. Playground: _____

1.5 TIME OF COMPLETION

A. The undersigned Bidder proposes and agrees hereby to commence the Work of the Contract Documents on a date specified in a written Notice to Proceed to be issued by Owner, and shall fully complete the Work within timeframe specified by Owner and with the Schedule.

1.6 ACKNOWLEDGEMENT OF ADDENDA

A. The undersigned Bidder acknowledges receipt of and use of the following Addenda in the preparation of this Bid:

1. Addendum No. 1, dated _____.

2. Addendum No. 2, dated _____.

3. Addendum No. 3, dated _____.

4. Addendum No. 4, dated _____.

1.7 BID SUPPLEMENTS

A. The following supplements are a part of this Bid Form and are attached hereto:

1. Bid Form Supplement - Alternates.

2. Bid Form Supplement - Unit Prices.

3. Bid Form Supplement - Allowances.

4. Bid Form Supplement - Bid Bond Form (AIA Document A310).

1.8 CONTRACTOR'S LICENSE

A. The undersigned further states that it is a duly licensed contractor, for the type of work proposed, in The State of Michigan / City of Ferndale and that all fees, permits, etc., pursuant to submitting this proposal have been paid in full.

1.9 SUBMISSION OF BID

A. Respectfully submitted this ____ day of _____, 2023.

B. Submitted By:_____(Name of bidding firm or corporation).

C. Authorized Signature:_____(Handwritten signature).

D. Signed By:_____(Type or print name).

E. Title:_____(Owner/Partner/President/Vice President).

F. Witnessed By:_____(Handwritten signature).

G. Attest:_____(Handwritten signature).

H. By:_____(Type or print name).

I. Title:_____(Corporate Secretary or Assistant Secretary).

J. Street Address:_____.

K. City, State, Zip:_____.

L. Phone:_____.

M. License No.:_____.

N. Federal ID No.:_____(Affix Corporate Seal Here).

END OF SECTION

SECTION 004322 - UNIT PRICES FORM

1.1 BID INFORMATION

A. Prime Contract Bidder: _____.

B. Project Name: Wilson Park Project Improvements

C. Project Location: 1280 Hilton Road – Ferndale, Michigan.

D. Owner: City of Ferndale

E. Landscape Architect/Civil Engineer: SmithGroup

1.2 BID FORM SUPPLEMENT

A. This form is required to be attached to the Bid Form.

B. The undersigned Bidder proposes the amounts below be added to or deducted from the Contract Sum on performance and measurement of the individual items of Work and for adjustment of the quantity given in the Unit-Price Allowance for the actual measurement of individual items of the Work.

C. If the unit price does not affect the Work of this Contract, the Bidder shall indicate "NOT APPLICABLE."

1.3 UNIT PRICES

*The project is partially funded by the MDNR Land and Water Conservation Fund. The asterisk (**) and **BOLDED** items below are grant supported, and the other items are non-grant participating work. Please include the total sum dollar amount of the grant supported items in the designated 'Grant Supported Items' area included on the Bid Form. All remaining items will be included in the 'Non-Grant Supported Items."*

A. Unit-Price No. 1: Earthwork - Non-Grant Supported

1. _____ Dollars ($_____) per CY.

B. **Unit-Price No. 2: Asphalt & Aggregate Base (Parking Lot + Striping/Wheel bumpers)

1. _____ Dollars ($_____) per TON.

C. Unit-Price No. 3: Asphalt & Aggregate Base (Basketball Courts) Non-Grant Supported

1. _____ Dollars ($_____) per TON.

D. **Unit-Price No. 4: Concrete Walks/Access Pathways (Includes Aggregate Base)

1. _____ Dollars ($_____) per SF.

E. **Unit-Price No. 5: Native Restoration (Seed, planting mix, labor)

1. _____ Dollars ($_____) per SF.

F. **Unit-Price No. 6: Playground (Aggregate Base, Separation Fabric, underdrains, install playground/play structure components and surfacing)

_____ Dollars ($_____) per SF.

G. **Unit-Price No 7. Shelter (Shelter Assembly & Foundations)

1. _____Dollars ($_____) LS

H. **Unit-Price No 8. Benches (Surface Mount)

1. _____Dollars ($_____) EA

I. **Unit-Price No 9. Drinking Fountain (Connection to ex line, Drinking Fountain)

1. _____Dollars ($_____) LS

J. **Unit-Price No 10. Recycling Bins (Surface Mount)

1. _____Dollars ($_____) EA

K. **Unit-Price No 12. Trash Bins (Surface Mount)

1. _____Dollars ($_____) EA

L. **Unit-Price No 13. Utilities (Stormwater)

1. _____Dollars ($_____) LF

M. **Unit-Price No 14. Signage (signage and concrete foundation)

1. _____Dollars ($_____) EA

N. **Unit-Price No 15. ADA Picnic Tables (Surface Mounted)

1. _____Dollars ($_____) EA

O. Unit-Price No 16. Site Preparation (Clear and Grub, removal) - Non-Grant Supported

1. _____Dollars ($_____) EA

P. Unit-Price No. 17: Asphalt & Aggregate Base (Parking Lot Expansion + Striping) - Non-Grant Supported

1. _____ Dollars ($_____) per TON.

Q. Unit-Price No 18. Existing Parking Lot, Asphalt Overlay - Non-Grant Supported

1. _____Dollars ($_____) TON

R. Unit-Price No 19. Install New Playground Equipment - Non-Grant Supported

1. _____Dollars ($_____) LS

S. Unit-Price No. 100: ALT A- Pedestrian Lights (Pedestrian Lights, Foundations and electrical connections) - Non-Grant Supported

1. _____ Dollars ($_____) EA.

T. Unit-Price No. 101: ALT B-Concrete Walks/Access Pathways (Includes excavation, Aggregate Base, fine grading) East Walk - Non-Grant Supported

1. _____ Dollars ($_____) per SF.

U. Unit-Price No. 102: ALT C-Decomposed Granite Strolling Garden (Includes excavation, Aggregate Base, Aggregate base, Decomposed Granite, Planting Mix) - Non-Grant Supported

1. _____ Dollars ($_____) per SF.

V. Unit-Price No. 103: ALT D-Underdrain System (Trenching, aggregate, underdrain in lawn area, restoration) - Non-Grant Supported

1. _____ Dollars ($_____) per LF.

W. Unit-Price No. 104: Alt E Poured-in-Place Playground Surfacing (Includes additional Aggregate Base and compaction) - Non-Grant Supported

1. _____ Dollars ($_____) per SF.

1.4 SUBMISSION OF BID SUPPLEMENT

A. Respectfully submitted this ____ day of _____, 2023.

B. Submitted By:_____(Insert name of bidding firm or corporation).

C. Authorized Signature:_____(Handwritten signature).

D. Signed By:_____(Type or print name).

E. Title:_____(Owner/Partner/President/Vice President).

END OF SECTION

SECTION 004373 - PROPOSED SCHEDULE OF VALUES FORM

1.1 BID FORM SUPPLEMENT

A. A completed Proposed Schedule of Values form is required to be attached to the Bid Form.

1.2 PROPOSED SCHEDULE OF VALUES FORM

A. Proposed Schedule of Values Form: Provide a breakdown of the bid amount, including alternates, in enough detail to facilitate continued evaluation of bid. Coordinate with the Project Manual table of contents. Provide multiple line items for principal material and subcontract amounts in excess of five percent of the Contract Sum.

B. Contractor to use attached Schedule of Values Form

C. Arrange schedule of values consistent with format of AIA Document G703.

1. Copies of AIA standard forms may be obtained from the American Institute of Architects; http://www.aia.org/contractdocs/purchase/index.htm; docspurchases@aia.org; (800) 942-7732.
2. Copies of EJCDC standard forms may be obtained from The Engineers Joint Contract Documents Committee; www.nspe.org/resources/shop-nspe/ejcdc-contract-documents; (703) 684-2800.

END OF SECTION

SECTION 007213 - GENERAL CONDITIONS OF THE CONTRACT
INCLUDED BY REFERENCE

The General Conditions of the Contract are those of the standard preprinted AIA Document A201-2007 General Conditions of the Contract for Construction, a copy of which is available from the Project Manager upon request. This document, included by reference, carries the same weight and force as if physically included in the Project Manual.

The contractor and all subcontractors must comply with all requirements of 1976 PA 453 (Elliott-Larsen Civil Rights Act), the 1976 PA 220 (Persons with Disabilities Civil Rights Act), and Executive Directive 2019-09, as amended. In accordance with these laws, all contracts the grantee enters into must contain a covenant by the contractor and any subcontractors not to discriminate against an employee or applicant for employment with respect to hire, tenure, terms, conditions, or privileges of employment, or a matter directly or indirectly related to employment, because of race, color, religion, national origin, age, sex, height, weight, marital status, partisan considerations, or a disability or genetic information that is unrelated to the individual's ability to perform the duties of a particular job or position.

The project is funded by the Federal Government, the Contractor is required to buy American-made products:
The Build America Buy America Act, enacted as part of the Infrastructure Investment and Jobs Act on November 15, 2021, established a domestic content procurement preference for all Federal financial assistance obligated for infrastructure projects after May 14, 2022. The domestic content procurement preference requires that all iron, steel, manufactured products, and construction materials used in covered infrastructure projects are produced in the United States. (Office of Acquisition Management – Dept of Commerce – United States of America)

END OF SECTION

SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

A. The following General Requirements are in addition and supplementary to the terms and conditions stated in the "The Contract Agreement." It is the intent of these General Requirements to work together with the specified requirements of the Contract Agreement to define the terms and conditions agreed to between the City of Ferndale and the Contractor for the performance of the Work. In the event there are any conflicts or specific contradictions between the Sections, the terms set forth in the Contract Agreement shall take precedence. Unless specifically mentioned otherwise, all costs to meet the conditions and requirements of these General Requirements shall not be paid for separately but shall be incorporated into the Contractor's pay item pricing.

B. Work covered by Contract Documents is as stipulated within this project manual and as accompanied by drawings.

C. Definitions. The following terms are used throughout the Contract Documents. The work will be governed in accord with the definitions.

1. Owner: Shall mean City of Ferndale – Ferndale Parks and Recreation.
2. Owner's Representative: Onsite representative from Ferndale Parks and Recreation
3. Professional Service Consultant: Shall mean SmithGroup (Designer) Giffles Webster (Construction Administration). Note that any reference to Inspection or Inspector in Division 01 through Division 35 shall not be defined as SmithGroup, but shall mean the testing agent, inspector, permit reviewer, compliance officer or other as defined within each section. Coordinate with Owner's Representative.
4. Fabricated: Fabricated pertains to items specifically assembled or made of selected materials or components to meet individual design requirements.
5. Manufactured: Manufactured means standard units, usually mass-produced by an established manufacturer of the respective item.
6. Provide: Provide means furnish and install.
7. Shop fabricated or shop made: Shop fabricated or shop made refers to items made by a Contractor or Subcontractor in their own Shop.

1.2 SUBMITTAL OF SHOP DRAWINGS

A. The Contractor shall submit the requisite shop drawings and catalog documents for any material or equipment proposed to be utilized in the performance of the Work to the Owner's Construction Engineering Inspection Consultant, which shall distribute the Submittals to the Landscape Architect/Civil Engineer with a copy to the Owner. The Contractor shall transmit said submittals to the Landscape Architect/Civil Engineer in a form and manner that would allow the Landscape Architect/Civil Engineer to review the submittals in an efficient and timely manner. The Design Engineer will review each submittal for compliance with the Contract Documents. If a submittal is found to be non-compliant, then the submittal will be returned to the Contractor to be corrected. Finally, after the Landscape Architect/Civil Engineer have reviewed and approved the submittals, the Contractor shall distribute the final submittal copies to the Owner as part of the close out documents.

1.3 AS-BUILT RECORDS

A. A set of Construction Documents shall be marked as As-Built Drawings and be maintained at the Project site by the Contractor for the purposes of making all changes, revisions, relocations, reroutes, or variances in the Work that differ from the Construction Documents. The As-Built Drawings shall be made accessible to all of the Contractor's subcontractors for recording any changes, field sketches, revisions, relocations, reroutes, or variances in the Work. The completed set of As-Built Drawings shall be transmitted to the Owner upon completion of the Work provided in a timely manner and in AutoCADD 2010

version or later, to the City. Field sketches and installation records, other than shop, fabrication, or field installation drawings, shall not be submitted separately but shall be recorded on the As-Built Drawing set only.

1.4 PROJECT MEETINGS

A. The Contractor shall arrange and conduct scheduled biweekly progress meeting and prepare and distribute meeting minutes. Special meetings for the purposes of coordinating and monitoring the work progress, identifying problems, informing subcontractor and Project participants of project status, stressing safety, coordinating construction details and inspecting quality conformance shall be conducted as required to assure the smooth and uninterrupted progression of the Work.

1.5 FIELD OFFICE BUILDINGS, SHEDS, AND TEMPORARY STORAGE AREAS

A. The Contractor shall provide all temporary field offices and storage area enclosures to conduct the Work and properly administrate the Work. The Contractor may locate field offices and storage areas on site at Contractor’s discretion, and subject to Owner Representative’s location approval, but Contractor will have full responsibility to maintain access to the Work and the work of the Owner. Any relocation of the Contractor’s temporary facilities required to provide access for installation of utilities or the Owner shall be done to maintain the schedule at no cost to the City of Ferndale.

1.6 TEMPORARY PROJECT SIGN

A. The Contractor, may at its own expense design, fabricate and construct one (1) Project Identification Sign for the purpose of advertising the Project. Contractor to coordinate with Landscape Architect/Civil Engineer for rendered graphics of proposed site. The sign shall be constructed of exterior grade wood, with weather resistant graphics and hardware and shall be a maximum of 16 square feet. The design and content of the sign shall be subject to the approval of the City.

1.7 CONSTRUCTION SEQUENCING AND NOTIFICATION PLAN

A. The Contractor must submit to the Owner’s Representative, Landscape Architect and Owner a detailed plan, which shall delineate the sequence of the various construction activities that will occur on the Project Site, all road closure requirements (including closure time duration on a per block basis) and proposed measures to maintain reasonable and safe access for the stakeholders and business owners which may be affected by construction activities. The Construction Sequence and Lane closure plan shall be provided to the Owner’s representative at the time of the Contractor’s first proposed Schedule submittal to the City, due within 7 days of the City providing the Contractor with a Notice to Proceed. The City at its sole discretion will determine the reasonableness of the Contractor’s plan to provide and maintain pedestrian and vehicular access. The Plan has to be approved by the Owner’s Representative, Landscape Architect and Owner before the Contractor will be allowed to commence work on the Project Site. Owner’s Representative to provide dates and limitations to site for Fairground events during the time of construction.

B. The Contractor shall designate only one (1) individual who will be assigned to the work throughout its entirety to be responsible for all communications with the stakeholders in the project area. The Contractor shall notify the stakeholders in writing at least thirty (30) days prior to the anticipated start of construction activities and again not less than seven (7) days prior to the actual start of construction activities. The Contractor may be required to fabricate and post signage in various locations on the project site advising the stakeholders in the project area of the forthcoming construction activity.

1.8 CONSTRUCTION PARKING

A. The Contractor shall be responsible for its employees' and subcontractors' vehicles while parked on or off the construction site. Any vehicle found to be owned by the Contractor's employee or an employee of the Contractor's subcontractor parked illegally may be towed away by the City and charged to the Contractor by Change Order. The City reserves the right to deny parking privileges on the Project site to any

individual who parks a vehicle improperly or operates any vehicle in an unsafe manner.

1.9 WATER SERVICE

A. If required for construction purposes, the Contractor will arrange for, or otherwise furnish, and pay for water required for the Work. The Contractor shall be responsible to provide and maintain connections, backwater valves, valves, and pipe that may be required to supply water at a point convenient to the work area. The locations of the connections shall be acceptable to Water Department.

1.10 TEMPORARY POWER, LIGHTING AND PHONE SERVICE

The Contractor will furnish and pay for electrical power and telephone service necessary for the Work including labor, equipment and materials required to make connections to power sources and to provide and pay for any required temporary electrical power and light at location of work. Temporary equipment and wiring for power, lighting and distribution requirements shall be in accordance with applicable provisions of governing laws, codes and ordinances. The Contractor shall maintain temporary wiring and related equipment so as not to constitute a hazard to persons or property. City may possibly provide electric to site. Temporary electrical power may be needed for portion of work.

1.11 TOILET FACILITIES

A. The Contractor shall arrange for, provide (per OSHA guidelines) and maintain temporary on-site sanitary toilet facilities for use by the Contractor and City for the duration of the Work.

1.12 WEATHER PROTECTION

A. The Contractor shall provide weather protection, including pumping water and temporary heat and ventilation as required during construction to protect the Work from damage due from freezing, frost, rain, dampness, excessive heat or other adverse elements and as required to maintain the continuous progression of the Work without stoppage due to the weather. This shall include hot and cold weather concrete placement protections recommended by the American Concrete Institute.

1.13 EXISTING SITE CONDITIONS

A. The information in this Bid Package is intended to orient the Contractor to the site. The Contractor will be responsible to thoroughly evaluate the site conditions for construction requirements. It is the responsibility of the Contractor in conjunction with the utility companies to verify the exact types and locations of existing utilities. All damage to existing utilities, caused by the Contractor, shall be repaired at Contractor’s expense, in accordance with the standards of the applicable City department or private utility company.

1.14 UTILITY SHUT-OFF REQUIREMENTS

A. The Contactor shall coordinate all utility shut-offs with the Utility Companies and departments to permit the proper and safe performance of the Work as scheduled. The Contractor shall have the full responsibility for contacting MISSDIG at least 72-hours prior to any subsurface excavation.

1.15 PROTECTION

A. The Contractor shall provide site protection, traffic controls and barricades as required to secure the site from trespassers and the general public. The Contractor shall install, in conformance to the requirements of the governing road/street authority, traffic controls for all work performed in the rights-of-way including curb cuts and utility taps.

1.16 REPLACEMENT OF DAMAGED WORK

A. The Contractor shall be responsible to pay all costs for the timely (within schedule parameters) replacement or restoration of any portion of the Facility damaged by fire or other cause during construction to the extent that such damage is a result of the negligence or a faulty installation made by the Contractor or its subcontractors.

1.17 EMERGENCIES

A. In any emergency affecting the safety of persons or property, the Contractor shall act at its discretion to prevent threatened damage, injury or loss, provided that the Contractor shall have determined that there is not sufficient time to advise and consult with the City prior to taking such action.

1.18 FIRE HAZARDS

A. The Contractor shall take all necessary precautions to eliminate possible fire hazards and to prevent damage to construction work, equipment, temporary field offices, storage sheds, and other property. During construction, the Contractor shall provide fire extinguishers and fire hose in accordance with the appropriate OSHA and construction industry rules and regulations.

1.19 FLAMMABLE HAZARDS

A. Gasoline, benzene, other combustible materials, oils, solvents, or chemicals shall not be poured into sewers, manholes, or traps. All casual spills shall be immediately cleaned up and all contaminated soil removed from the site and legally disposed. Tarpaulins and other materials used for temporary enclosures, coverings and protection shall be flameproofed. The Contractor shall comply with City, State and Federal regulations with respect to barrels and tanks containing flammable or hazardous materials, and shall remove any such materials immediately at the request of the City.

1.20 EXPLOSIVE CHARGES

A. Any fastening device, powder activated stud gun or any other device or system of any kind using an explosive charge for activation may not be used in performing work at the Project site unless it is specifically approved by OSHA or the City Health Department. It shall be the responsibility of the Contractor to secure all permits and permissions without extra cost to the City and to assure the safe use of any such devices by trained individuals.

1.21 FIRST AID

A. A completely equipped first-aid kit shall be provided and maintained by the Contractor at the site in a clean orderly condition and shall be readily accessible at all times to all the Contractor's employees. The Contractor shall designate certain employees who are properly instructed to be in charge of first aid. At least one such employee shall be available at the site whenever work is being carried on.

1.22 HOURS OF WORK

A. The Contractor may be performed between 7:00 AM and 7:00 PM, Monday through Saturday.. Any work done before 7:00 a.m., or after 7:00 p.m., or any time on Sunday, or legal holidays, will be done by City permit only. Failure to obtain a permit may result in confiscation of equipment, fine, arrest, or any combination of the above.

1. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Owner.
2. Notify Owner not less than two days in advance of proposed disruptive operations.

B. At the beginning of work on this Contract, the Contractor shall notify the CityCity, in writing, the schedule of the days and work hours proposed for a normal workweek. The Contractor shall be responsible for contacting in advance all involved parties whenever the Contractor intends to depart from the normal workweek schedule and resolve to the satisfaction of the CityCity any reasonable objections made. All costs incurred, due to the failure of the Contractor to properly notify involved parties, shall be paid by the Contractor or deducted from the Contractor’s contract amount.

C. The Contractor shall plan and conduct the Work so as not to create a public nuisance or disturb the peace specifically for any residents near or adjacent to the Project site. Should the Contractor be stopped by order of a public authority from working at such times that are contrary to or in violation of any law, ordinance, permit, or license, the Contractor shall not be entitled to an extension of time or additional compensation due to such stoppage.

D. In an emergency, requiring work to be performed outside the normal work week schedule to save or protect life or property, the requirements for the twenty-four (24) hour notification will be waived. The Contractor shall notify the City as soon as the Contractor determines that an emergency condition exists necessitating the change in or extension of the normal hours of work. However, the Contractor's determination of the existence of the emergency is subject to the review and revision by the City.

E. The normal workweek schedule and/or daily hours of work may be altered as directed by the City, when, in its reasonable judgment, such alteration is necessary to maintain the required progress of the Work.

1.23 SANITARY REQUIREMENT

A. Committing unnecessary acts of nuisance on the Project site is prohibited. Any employee who violates such provisions shall be promptly removed from the Project by the Contractor and not be permitted to work on the project site without the written consent of the City.

1.24 CLEANLINESS OF PROJECT SITE AND STREET

A. The Work and all public or private property used in connection with the Work shall be kept in a neat, clean and orderly condition at all times. Stored materials shall be safely stacked and ordered. Waste materials, rubbish and debris shall removed daily and shall not be allowed to accumulate. No burning of rubbish is permitted.

B. The Contractor shall remove unused construction equipment, temporary buildings and excess materials from the site upon the reasonable request of the EDC. The site shall not be permitted to become a storage yard for the Contractor’s equipment and materials not directly involve in the Work. Any stored equipment or unnecessary materials stockpiled shall be removed from the Project site upon the request of the City.

C. During the performance of the Work, the Contractor shall daily inspect and maintain the Project site in a clean condition including control of dust, picking up scattered construction debris, and removal of splattered materials from the surfaces of the new construction. Should the Contractor fail to maintain proper cleanliness or order of the site the City, upon 48 hour notice to the Contractor, shall arrange for the cleaning and removal of extraneous materials accumulated at the site and shall have the right to deduct the costs incurred from the Contract value.

D. Trucks hauling loose material from or to the project site shall be tight and their loads trimmed and tarped to prevent spillage on the public streets. This requirement likewise applies to suppliers making deliveries to the Project site. The Contractor will be held responsible to require compliance by the Contractor’s suppliers. The City shall have the right to deny site access to any subcontractor or supplier who refuses to comply with this requirement. The Contractor shall promptly (daily as a minimum) clean streets, sidewalks and alleys dirtied by any cause arising from the Contractor’s operations. Should the Contractor fail to maintain proper street cleanliness, the City, upon notice to the Contractor will clean any such public right of ways and shall have the right to deduct the costs incurred from the Contract value.

1.25 DEWATERING

A. The Contractor shall dewater and keep dry all trenches and other excavated areas at the site by evenly grading the surface drainage to eliminate standing water. The Contractor shall be responsible to protect structural bearing subgrades and materials from ponding, standing water or erosion. Dewatering operations shall not be permitted to discharge water to any other private properties. The Contractor shall be responsible for securing Water Department permission prior to discharging any water from the site into public sewers.

1.26 SECURITY

A. The Contractor shall secure and protect from theft, loss or damage all materials and equipment used for or relating to the Work until final completion and acceptance by the City.

1.27 WORKING AREA

A. All the Work under this Contract shall be performed on the Project site. The Contractor shall access the

Project site via City streets and rights-of-way. The Contractor shall review the legal loading limit for the access streets and rights-of-way and shall be responsible for coordinating deliveries and shipments that do not exceed the legal load limits.

B. The Contractor is required to confine their activities to the limits of the site. Any damage or disruption to adjacent sites is the responsibility of the Contractor to correct at no additional cost to the Owner. Damages not satisfactorily corrected in a timely manner may be corrected by the City.

C. The Contractor shall use Flagmen whenever trucks or equipment enter public roadways from the project site.

D. Should additional working or storage space be desired, the Contractor shall make all arrangements with any property owner and submit to the City written evidence that the Contractor has secured permission to use this property for construction purposes. The Contractor shall pay all expense in connection with its use, and in no way involves or obligates the City by such use.

E. Contractor shall get permission from the City and provide a plan for approval - including port-a-potty location, storage of equipment, construction access, etc. We want to see the plan and approve it to ensure placement is appropriate for the site and neighborhood. SPECIAL SYSTEM INSPECTIONS

F. The Contractor, as part of the Work, shall coordinate all specialty manufacturer inspections and testing required to certify that the installation of the Work meets the manufacturer’s conditions for warranty.

1.28 TIME OF STARTING AND COMPLETION OF WORK

A. The Contractor shall, carry on the construction operations continuously without stoppage so that all items of work are totally complete including punchlist in accordance with the agreed upon completion date. This shall not relieve the Contractor from the responsibility to coordinate the Work with City, and to sequence the Work including interrupting the Work as required by the City.

1.29 TESTING & INSPECTION

A. The City’s separately contracted Construction Engineering & Inspection Consultant shall arrange and pay for all testing and inspection required to verify conformance of the Work with the Contract Documents. All testing and inspection shall be coordinated with the City.

1.30 SOIL EROSION AND SEDIMENT CONTROL

A. The Contractor shall install and maintain, for the duration of the Project, soil erosion protection measures as required by the MDEQ, and Health Department. The Contractor shall provide other temporary soil erosion control as required to eliminate sedimentation from entering sewers and open ditches due to the Contractor’s operations. The Contractor shall remove completely all soil erosion control measures from the site at the end of the Project.

B. The Contractor will promptly remove soil, debris, or other materials spilled, dumped, or otherwise deposited on public streets, highways, or other public thoroughfares by the Contractor’s equipment and operations.

C. The Contractor shall abide by the requirements of the "Authorized Public Agency" under the provisions of Section 11 of Act 347 of the Public Acts of 1972, "Soil Erosion and Sedimentation Control Act" as modified or superseded.

D. Current Soil Erosion and Sediment Control Plans included in set are approved by the Health Department.

1.31 DISCLAIMER OF SITE INFORMATION

A. By its own examinations, observations, investigations and tests the Contractor shall make its own determination of the existing site conditions. Information contained in this Bid Package is provided solely for the informational use of the Contractor. The City does not guarantee the accuracy or sufficiency of any site information.

1.32 UNIT PRICES

A. Unit prices, if established during the Project, shall include all permits, fees, labor, material, tools, supervision, equipment, taxes, insurance and bonding necessary for or incidental to the proper completion of the Work.

1.33 TRUCK TICKETS

A. Any excavated materials removed from the site shall be controlled for assurance of legal dumping by (3) part "Truck Tickets" for each load of material removed from the site. The Contractor shall note on each truck ticket the bid package number, date, location of excavation, trucking firms, quantity of material and time of departure for each outgoing truck. The Contractor shall record the disposal site and time of disposal on the "Truck Ticket" and shall obtain the signature of the recipient of the material in verification thereof and return the completed "Truck Ticket" to the City.

1.34 ENVIRONMENTAL COORDINATION

A. Owner shall make available to the Contractor any environmental reports or information in the Owner's possession as reference information .to assist in the Contractor's required production of the Health and Safety Plan, as expressed in paragraph 1.3 of Section VII of the Bid Documents. Unless otherwise noted in the plans and specifications the Contractor shall assume that all excavated material in the right of way is contaminated and shall be taken to a licensed Class II landfill. If the Contractor encounters potential hazardous materials, the Contractor shall notify the EDC for inspection of the condition before proceeding with any Work in that area. The contractor shall continue with the orderly progression of work in non impacted areas. Subject to the nature of the hazardous material encountered and the Contractors qualifications, the EDC reserves the right to require the Contractor to perform any removal/remediation work for hazardous materials on a time and material basis, or negotiated basis according to the provisions of the Contract Documents.

1.35 PROTECTION OF THE PRIVATE AND EXISTING UTILITIES

A. The Contractor shall protect and maintain for the duration of the work all existing improvements and utilities that are to remain. The Contractor will immediately undertake and pay for the repair of any damaged existing improvements or utilities.

B. All unattended excavations, voids, pits, manholes or holes shall be barricaded immediately by the Contractor. Barriers shall be removed promptly by the Contractor when no longer required,

C. Precautions against fire, accidental explosion, excessive dust and accident shall be strictly enforced by the Contractor in cooperation with the City and the EDC.

D. The Contractor shall not allow salvaged material, debris, and trash to accumulate on the project site but shall require all such material to be hauled away on a regular, daily basis.

1.36 PROTECTION OUTSIDE THE PROJECT AREA

A. All existing areas outside the limits of the Work shall be protected from damage. All damage caused by the Contractor shall be corrected at the expense of the Contractor and to abide by City or City Standards.

B. During progress of work, the Contractor shall keep adjacent roads free of trash, debris, and salvage material resulting from the work.

C. The Contractor is advised that other construction activities may be performed by others within the Project area during this the performance of the Work under this Contract Agreement. The Contractor shall plan proposed trucking and all other vehicular routes accordingly in coordination with and at the reasonable direction of the City.

D. All construction traffic control signage and barricading shall conform to the standard requirements of the governmental body having jurisdiction over the street right of way.

1.37 TEMPORARY CONTROLS

A. Surface Water Control – The Contractor shall complete the work in such a manner so as not to entrap surface water on the site. Low areas caused by removals, shall be graded in such a manner to allow drainage to existing storm water structures. The Contractor shall be responsible for drying out and repairing any grade surfaces damaged due to the Contractors failure to properly grade the work area.

B. The Contractor shall secure and pay for all erosion control permits and conduct earth changes in a manner, which will effectively eliminate accelerated soil erosion and resulting sedimentation. Measures to be taken shall include but not be limited to:

C. Provide temporary soil erosion control to eliminate sedimentation from entering sewers and open ditches.

D. Remove sediment caused by accelerated soil erosion from runoff water before it leaves the site.

E. Maintain temporary soil erosion silt fences, sediment traps and control measures for the term of this contract.

F. Promptly remove soil, debris, or other material spilled, dumped, or otherwise deposited on public streets, highways, or other public thoroughfares during transit.

G. The Contractor shall utilize applicable soil erosion details, shown on Contract drawings, in implementing his work.

H. The Contractor shall utilize water trucks and other dust inhibiting methods to control fugitive dust emanating from the work activity performed under this scope of work. Truck and equipment wheels shall be cleaned before exiting the project area. Travel routes shall be established with the prior approval of the City to reduce dust in adjacent areas. Existing roads shall be used wherever practical based on street loading capacity.

1.38 SUSPECTED HAZARDOUS MATERIALS

A. In the event the Contractor encounters excavated materials that are suspected as hazardous, the Contractor shall notify the City for review, and through CityCity's Environmental Consultant the possible characterization and management of the suspect material. If it is determined that the suspect material is hazardous by the City's environmental Consultant, the Consultant will provide a material handling protocol for the Contractor.

1.39 WORK RESTRICTIONS

A. Comply with restrictions on construction operations.

B. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 CONTRACTOR USE OF PREMISES

A. Confine operations at site to areas permitted by:

1. Law
2. Permits
3. Contract

4. Owner's Representative
5. Required use of adjacent existing buildings
6. Contract documents

B. Confer with Owner's Representative and obtain full knowledge of all site rules and regulations affecting work.

C. Conform to site rules and regulations while engaged in project construction.

D. Site rules and regulations take precedence over others that may exist outside such jurisdiction.

E. Employees On Site: The Owner's Representative may examine Contractor's list of employees, including those of his subcontractors and their agents for all employees working on site.

F. Vehicle use: Rigidly enforce the following:

1. Keep all vehicles, mechanized or motorized equipment locked at all times when parked and unattended on Owner’s premises.
2. Do not, under any circumstance, leave any vehicle unattended with motor or engine running, or with ignition key in place.
3. All traffic control subject to Owner's Representative approval.
4. Contractor employee parking shall be limited to areas indicated by Owner's Representative.
5. Contractor shall not park any vehicles within the dripline of trees.

G. Do not unreasonably encumber site with materials or equipment.

H. Assume full responsibility for protection safety and safekeeping of products stored on premises.

I. Move all stored products or equipment, which interferes with operations of Owner or other subcontractors.

J. Obtain and pay for use of additional storage or work area needed for operations.

K. Limit use of site for work and storage:

1. To areas indicated on the drawings.
2. To areas approved in advance by Owner's Representative.

L. The Contractor acknowledges that the Owner will use the adjacent sites and the Contractor must maintain staff and appropriate safety requirements. Contractor to work with Owner's Representative to coordinate with scheduled events. Owner's Representative to provide schedule.

3.2 DUTIES OF CONTRACTOR

A. Except as specifically noted, provide and pay for:

1. Labor, materials and equipment.
2. Tools, construction equipment and machinery.
3. Water, heat and utilities required for construction.
4. Other facilities and services necessary for proper execution and completion of work.

B. Secure and pay for as necessary for proper execution and completion of work, and as applicable at time of receipt of bids.

1. Licenses.

C. Give required notices.

D. Promptly submit written notice to Professional Services Consultant of known or observed variances of

Contract Documents from legal requirements.

1. Appropriate modifications to Contract Documents will adjust necessary changes.
2. Assume responsibility for Work known to be contrary to such requirements.

E. Enforce strict discipline and good order among employees. Do not employ on Work:

1. Unfit persons.
2. Persons not skilled in assigned task.

F. Purchase and maintain insurance in accordance with the Contract Agreement.

G. Contractor shall protect existing site from damage. Contractor shall clean areas of construction debris, equipment, and material prior to Date of Completion for such area.

3.3 PERMITS

A. See Section 003143 PERMIT APPLICATION

3.4 TIME OF COMPLETION

A. Completion of work shall be in accordance with the schedule as indicated in the Bid Form.

3.5 JOB OPERATIONS

A. Project Security:

1. Take necessary precautions such as barrier to protect Owner's personnel, the public, in the area of construction.
2. Securely close off all areas of construction after working hours to prevent entry by unauthorized persons.
3. Provide barriers to prevent visitors from construction area.

3.6 WORK LIMITATIONS:

A. Owner's personnel may occupy all spaces around where work will be done. Any work done during times of occupancy shall be limited in scope to prevent disturbing it.

B. Give Owner's representative three days notice before starting Construction Work in any area.

C. All work, including material storage, shall be limited to the project area.

3.7 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.

END OF SECTION

SECTION 012300 - ALTERNATES

PART 1 - GENERAL

1.1 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.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for alternates.

1.3 DEFINITIONS

A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if the Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternates into the Work. No other adjustments are made to the Contract Sum.

1.4 PROCEDURES

A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.

1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.

B. Execute accepted alternates under the same conditions as other work of the Contract.

C. Schedule: A schedule of alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. Alternate No. 1 (A): Pedestrian Lighting – install (2) two pedestrian light poles and foundation. Connect to adjacent electrical services. See electrical plan

1. Base Bid: No lighting

B. Alternate No. 2(B) – Concrete walk. Addition of concrete walk on east side of park
1. Base Bid: Lawn (existing condition)

C. Alternate No. 3 (C): Strolling Garden – planting mix, decomposed granite walking paths
   1. Base Bid: Lawn (existing condition)

D. Alternate No. 4 (D): Underdrain system – trench in underdrain, connection to existing catch basin
   1. Base Bid: Lawn (existing condition)

E. Alternate No. 5 (E): Poured-in-Place Soft Surfacing – Install aggregate base and Poured-in-Place Soft Surfacing to a portion of the playground. Remaining will be fibar.
   1. Base Bid: total playground surfacing to be Fibar

END OF SECTION

SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 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.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for substitutions.

1.3 DEFINITIONS

A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

1.4 PROCEDURES

A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

1.5 SUBSTITUTIONS

A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than days prior to time required for preparation and review of related submittals.

1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
b. Substitution request is fully documented and properly submitted.
c. Requested substitution will not adversely affect Contractor's construction schedule.
d. Requested substitution has received necessary approvals of authorities having jurisdiction.
e. Requested substitution is compatible with other portions of the Work.
f. Requested substitution has been coordinated with other portions of the Work.
g. Requested substitution provides specified warranty.
h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

B. Substitutions for Convenience: Architect will consider requests for substitution if received within days after the Notice of Award. Requests received after that time may be considered or rejected at discretion of Architect.

1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

    a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
    b. Requested substitution does not require extensive revisions to the Contract Documents.
    c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
    d. Substitution request is fully documented and properly submitted.
    e. Requested substitution will not adversely affect Contractor's construction schedule.
    f. Requested substitution has received necessary approvals of authorities having jurisdiction.
    g. Requested substitution is compatible with other portions of the Work.
    h. Requested substitution has been coordinated with other portions of the Work.
    i. Requested substitution provides specified warranty.
    j. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 012510 - SUBSTITUTION REQUEST FORM

Date of Request: _____ CM/GC Tracking No.: _____ SG Tracking No.:

This substitution request is governed by the provisions of Section 012500.

☐ This Substitution Request is submitted during the bidding period.
☐ This Substitution Request is submitted with Proposed Products List dated _____
☐ This Substitution Request is submitted separate from and after submittal of the Proposed Products List.

RE: _____
Specifications Section Title Section No. Page Paragraph

PROPOSED SUBSTITUTION:
Reason for Substitution:

General Description:

The accompanying attachments, per 012500, provide a full description of the proposed substitution.

Proposed change:

☐ To Contract Sum: ☐ None ☐ Add: ☐ Deduct: $_____
☐ To Contract Time: ☐ None ☐ Add: ☐ Deduct: _____ days

Assumption of Responsibility for Equal Performance

Requester affirms that the proposed substitution conforms to required dimensions and meets or exceeds the standards of required function, appearance, and quality set by the specified product. Requester understands and affirms compliance with the provisions of Section 012500.

_____
Requester's Name Date

_____
Requester's Firm

ARCHITECT'S EVALUATION:

The proposed substitution is:

☐ Not Reviewed; ☐ Not Acceptable; ☐ Acceptable As Noted; ☐ Acceptable

Remarks: _____

_____
Name Date

cc: Owner; Requester; Contractor

Note: Owner's Acceptance of substitution request is not valid until documented through addendum or contract modification.

END OF DOCUMENT

SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 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.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for handling and processing Contract modifications.

1.3 MINOR CHANGES IN THE WORK

A. Architect will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time.

1.4 PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.

1. Work Change Proposal Requests issued by are not instructions either to stop work in progress or to execute the proposed change.
2. Within after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.

    a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
    b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
    c. Include costs of labor and supervision directly attributable to the change.
    d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to.

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.
5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
6. Comply with requirements in Section 012500 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.

7. Proposal Request Form: Contractor to provide request form

1.5 ADMINISTRATIVE CHANGE ORDERS

A. Allowance Adjustment: See Section 012100 "Allowances" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect actual costs of allowances.

B. Unit-Price Adjustment: See Section 012200 "Unit Prices" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect measured scope of unit-price work.

1.6 CHANGE ORDER PROCEDURES

A. On Owner's approval of a Work Change Proposal Request, will issue a Change Order for signatures of Owner and Contractor.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 012900 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 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.

1.2 SUMMARY

A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.

1.3 DEFINITIONS

A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.

1. Coordinate line items in the schedule of values with items required to be indicated as separate activities in Contractor's construction schedule.
2. Submit the schedule of values to Architect at earliest possible date, but no later than days before the date scheduled for submittal of initial Applications for Payment.
3. Subschedules for Phased Work: Where the Work is separated into phases requiring separately phased payments, provide subschedules showing values coordinated with each phase of payment.
4. Subschedules for Separate Elements of Work: Where the Contractor's construction schedule defines separate elements of the Work, provide subschedules showing values coordinated with each element.
5. Subschedules for Separate Design Contracts: Where the Owner has retained design professionals under separate contracts who will each provide certification of payment requests, provide subschedules showing values coordinated with the scope of each design services contract, as described in Section 011000 "Summary."

B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.

1. Identification: Include the following Project identification on the schedule of values:

a. Project name and location.
b. Name of Architect.
c. Architect's Project number.
d. Contractor's name and address.
e. Date of submittal.

2. Arrange the schedule of values in tabular form, with separate columns to indicate the following for each item listed:

a. Related Specification Section or Division.
b. Description of the Work.
c. Name of subcontractor.
d. Name of manufacturer or fabricator.

e. Name of supplier.
f. Change Orders (numbers) that affect value.
g. Dollar value of the following, as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent. Round dollar amounts to whole dollars, with total equal to Contract Sum.

1) Labor.
2) Materials.
3) Equipment.

3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Provide multiple line items for principal subcontract amounts in excess of percent of the Contract Sum.
4. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.

a. Differentiate between items stored on-site and items stored off-site.

5. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
6. Purchase Contracts: Provide a separate line item in the schedule of values for each purchase contract. Show line-item value of purchase contract. Indicate Owner payments or deposits, if any, and balance to be paid by Contractor.
7. Overhead Costs: Include total cost and proportionate share of general overhead and profit for each line item.
8. Overhead Costs: Show cost of temporary facilities and other major cost items that are not direct cost of actual work-in-place as separate line items.
9. Closeout Costs. Include separate line items under Contractor and principal subcontracts for Project closeout requirements in an amount totaling percent of the Contract Sum and subcontract amount.
10. Schedule of Values Revisions: Revise the schedule of values when Change Orders or Construction Change Directives result in a change in the Contract Sum. Include at least one separate line item for each Change Order and Construction Change Directive.

1.5 APPLICATIONS FOR PAYMENT

A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.

B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.

1. Submit draft copy of Application for Payment days prior to due date for review by Architect.

C. Application for Payment Forms: Use as form for Applications for Payment.

1. Other Application for Payment forms proposed by the Contractor shall be acceptable to and Owner. Submit forms for approval with initial submittal of schedule of values.

D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. will return incomplete applications without action.

1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.

3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
4. Indicate separate amounts for work being carried out under Owner-requested project acceleration.

E. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.

1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment for stored materials.
2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
3. Provide summary documentation for stored materials indicating the following:

    a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
    b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
    c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.

F. Transmittal: Submit signed and notarized original copies of each Application for Payment to by a method ensuring receipt. One copy shall include waivers of lien and similar attachments if required.

1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

G. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.

1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
2. When an application shows completion of an item, submit conditional final or full waivers.
3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
4. Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
5. Waiver Forms: Submit executed waivers of lien on forms acceptable to Owner.

H. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:

1. List of subcontractors.
2. Schedule of values.
3. Contractor's construction schedule (preliminary if not final).
4. Combined Contractor's construction schedule (preliminary if not final) incorporating Work of multiple contracts, with indication of acceptance of schedule by each Contractor.
5. Products list (preliminary if not final).
6. Sustainable design action plans, including preliminary project materials cost data.
7. Schedule of unit prices.
8. Submittal schedule (preliminary if not final).
9. List of Contractor's staff assignments.
10. List of Contractor's principal consultants.
11. Copies of building permits.
12. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
13. Initial progress report.
14. Report of preconstruction conference.
15. Certificates of insurance and insurance policies.
16. Performance and payment bonds.

17. Data needed to acquire Owner's insurance.

I. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.

1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
2. This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

J. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:

1. Evidence of completion of Project closeout requirements.
2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
3. Updated final statement, accounting for final changes to the Contract Sum.
4. AIA Document G706.
5. AIA Document G706A.
6. AIA Document G707.
7. Evidence that claims have been settled.
8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
9. Final liquidated damages settlement statement.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 013110 - REQUEST FOR INFORMATION

(This form is to be transmitted from GC or CM to SmithGroup) **RFI NO.:** _____
DATE TRANSMITTED: _____; Bid Pack: _____; Trade Contract: _____
Response requested from: ☐Civil; ☐Struct; ☐Arch; ☐Mech; ☐Elec; ☐Other _____
Brief description of RFI: (give details below): _____

PROVIDE SPECIFIC REFERENCES:	**Section No.** _____	**Section No.** _____	**Section No.** _____	**Section No.** _____	**example:**	**Section No.** 019999
➔	**Reference No.** _____	**Reference No.** _____	**Reference No.** _____	**Reference No.** _____		**Reference No.** 2.2.A.1

PROVIDE DRAWING REFERENCES: _____

Contractor requests information for the following from SmithGroup:

(Note: Request information for only 1 item per RFI. This permits individual handling and expedites response.)

_____

☐ This box, if checked, indicates a potential change to the Contract Sum associated with this RFI.
The change is in the range of $_____ to $_____.
☐ This box, if checked, indicates a potential change to the Contract Time associated with this RFI.
The change is in the range of _____ days to _____.days

Requested By: (name): _____
(After saving file, email or fax to SmithGroup Project Architect or Project Administrator.)

SmithGroup response: Date Received: _____

_____

☐ SG DOES NOT expect a change to the ☐Contract Sum ☐Contract Time related to this RFI.
☐ SG expect a change to the ☐Contract Sum ☐Contract Time related to this RFI.

Response By: _____Date: _____
Date Transmitted: _____ (Indicate the recipients and the means of transmittal below)

Distributed to: Name, Email Address or Fax Number	Email	Fax	Hand	Mail
_____	☐	☐	☐	☐
_____	☐	☐	☐	☐
_____	☐	☐	☐	☐
_____	☐	☐	☐	☐
_____	☐	☐	☐	☐

SmithGroup: Master Office Files
NOTE: This form is formatted for completion on screen using MS Word. Only form revisions by SmithGroup are valid.

END OF SECTION

SECTION 014200 - REFERENCES

PART 1 - GENERAL

1.1 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.

1.2 DEFINITIONS

A. General: Basic Contract definitions are included in the Conditions of the Contract.

B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.

C. "As Otherwise Direct": Used in relation to items to be determined after Contract by agreement between Owner, Architect, and Contractor, with input from other entities as appropriate.

D. "Certified": Guaranteed in writing over the signature of an authorized representative of the certifying organization.

E. "Directed": An instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."

F. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."

G. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.

H. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

I. "Install": Operations including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations at Project site.

J. "N.I.C" or "NIC": Not in Contract.

K. "Necessary": That which is reasonably necessary to the proper completion of the Work.

L. "Per": In accordance with the requirements of.

M. "Products": Materials, equipment, or systems.

N. "Provide": Furnish and install, complete and ready for the intended use.

O. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

P. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.

Q. "Replace": To put something new in place of.

R. "Required": Referring to requirements of the Contract Documents, unless its use clearly implies a different interpretation.

S. "Shown" or "Indicated": Appearing on the Drawings, unless their use clearly implies a different interpretation.

T. "Supply": Same as Furnish.

1.3 INDUSTRY STANDARDS

A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.

C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.

1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.4 ABBREVIATIONS AND ACRONYMS

A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale's "Encyclopedia of Associations: National Organizations of the U.S." or in Columbia Books' "National Trade & Professional Associations of the United States."

B. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. AABC - Associated Air Balance Council; www.aabc.com.
2. AAMA - American Architectural Manufacturers Association; www.aamanet.org.
3. AAPFCO - Association of American Plant Food Control Officials; www.aapfco.org.
4. AASHTO - American Association of State Highway and Transportation Officials; www.transportation.org.
5. AATCC - American Association of Textile Chemists and Colorists; www.aatcc.org.
6. ABMA - American Bearing Manufacturers Association; www.americanbearings.org.
7. ABMA - American Boiler Manufacturers Association; www.abma.com.
8. ACI - American Concrete Institute; (Formerly: ACI International); www.concrete.org
9. ACPA - American Concrete Pipe Association; www.concrete-pipe.org.
10. AEIC - Association of Edison Illuminating Companies, Inc. (The); www.aeic.org.
11. AF&PA - American Forest & Paper Association; www.afandpa.org.
12. AGA - American Gas Association; www.aga.org.
13. AHAM - Association of Home Appliance Manufacturers; www.aham.org.
14. AHRI - Air-Conditioning, Heating, and Refrigeration Institute (The); www.ahrinet.org.
15. AI - Asphalt Institute; www.asphaltinstitute.org.
16. AIA - American Institute of Architects (The); www.aia.org.
17. AISC - American Institute of Steel Construction; www.aisc.org.
18. AISI - American Iron and Steel Institute; www.steel.org.
19. AITC - American Institute of Timber Construction; www.aitc-glulam.org.
20. AMCA - Air Movement and Control Association International, Inc.; www.amca.org.
21. ANSI - American National Standards Institute; www.ansi.org.

22. AOSA - Association of Official Seed Analysts, Inc.; www.aosaseed.com.
23. APA - APA - The Engineered Wood Association; www.apawood.org.
24. APA - Architectural Precast Association; www.archprecast.org.
25. API - American Petroleum Institute; www.api.org.
26. ARI - Air-Conditioning & Refrigeration Institute; (See AHRI).
27. ARI - American Refrigeration Institute; (See AHRI).
28. ARMA - Asphalt Roofing Manufacturers Association; www.asphaltroofing.org.
29. ASCE - American Society of Civil Engineers; www.asce.org.
30. ASCE/SEI - American Society of Civil Engineers/Structural Engineering Institute; (See ASCE).
31. ASHRAE - American Society of Heating, Refrigerating and Air-Conditioning Engineers; www.ashrae.org.
32. ASME - ASME International; (American Society of Mechanical Engineers); www.asme.org.
33. ASSE - American Society of Safety Engineers (The); www.asse.org.
34. ASSE - American Society of Sanitary Engineering; www.asse-plumbing.org.
35. ASTM - ASTM International; www.astm.org.
36. ATIS - Alliance for Telecommunications Industry Solutions; www.atis.org.
37. AWEA - American Wind Energy Association; www.awea.org.
38. AWI - Architectural Woodwork Institute; www.awinet.org.
39. AWMAC - Architectural Woodwork Manufacturers Association of Canada; www.awmac.com.
40. AWPA - American Wood Protection Association; www.awpa.com.
41. AWS - American Welding Society; www.aws.org.
42. AWWA - American Water Works Association; www.awwa.org.
43. BHMA - Builders Hardware Manufacturers Association; www.buildershardware.com.
44. BIA - Brick Industry Association (The); www.gobrick.com.
45. BICSI - BICSI, Inc.; www.bicsi.org.
46. BIFMA - BIFMA International; (Business and Institutional Furniture Manufacturer's Association); www.bifma.org.
47. BISSC - Baking Industry Sanitation Standards Committee; www.bissc.org.
48. BWF - Badminton World Federation; (Formerly: International Badminton Federation); www.bissc.org.
49. CDA - Copper Development Association; www.copper.org.
50. CE - Conformite Europeenne; http://ec.europa.eu/growth/single-market/ce-marking/
51. CEA - Canadian Electricity Association; www.electricity.ca.
52. CEA - Consumer Electronics Association; www.ce.org.
53. CFFA - Chemical Fabrics and Film Association, Inc.; www.chemicalfabricsandfilm.com.
54. CFSEI - Cold-Formed Steel Engineers Institute; www.cfsei.org.
55. CGA - Compressed Gas Association; www.cganet.com.
56. CIMA - Cellulose Insulation Manufacturers Association; www.cellulose.org.
57. CISCA - Ceilings & Interior Systems Construction Association; www.cisca.org.
58. CISPI - Cast Iron Soil Pipe Institute; www.cispi.org.
59. CLFMI - Chain Link Fence Manufacturers Institute; www.chainlinkinfo.org.
60. CPA - Composite Panel Association; www.pbmdf.com.
61. CRI - Carpet and Rug Institute (The); www.carpet-rug.org.
62. CRRC - Cool Roof Rating Council; www.coolroofs.org.
63. CRSI - Concrete Reinforcing Steel Institute; www.crsi.org.
64. CSA - Canadian Standards Association; www.csa.ca.
65. CSA - CSA International; (Formerly: IAS - International Approval Services); www.csa-international.org.
66. CSI - Construction Specifications Institute (The); www.csinet.org.
67. CSSB - Cedar Shake & Shingle Bureau; www.cedarbureau.org.
68. CTI - Cooling Technology Institute; (Formerly: Cooling Tower Institute); www.cti.org.
69. CWC - Composite Wood Council; (See CPA).
70. DASMA - Door and Access Systems Manufacturers Association; www.dasma.com.
71. DHI - Door and Hardware Institute; www.dhi.org.
72. ECA - Electronic Components Association; (See ECIA).
73. ECAMA - Electronic Components Assemblies & Materials Association; (See ECIA).
74. ECIA - Electronic Components Industry Association; www.eciaonline.org.
75. EIA - Electronic Industries Alliance; (See TIA).
76. EIMA - EIFS Industry Members Association; www.eima.com.
77. EJMA - Expansion Joint Manufacturers Association, Inc.; www.ejma.org.
78. ESD - ESD Association; (Electrostatic Discharge Association); www.esda.org .
79. ESTA - Entertainment Services and Technology Association; (See PLASA).

80. ETL - Intertek (See Intertek); www.intertek.com.
81. EVO - Efficiency Valuation Organization; www.evo-world.org.
82. FCI - Fluid Controls Institute; www.fluidcontrolsinstitute.org.
83. FIBA - Federation Internationale de Basketball; (The International Basketball Federation); www.fiba.com.
84. FIVB - Federation Internationale de Volleyball; (The International Volleyball Federation); www.fivb.org.
85. FM Approvals - FM Approvals LLC; www.fmglobal.com.
86. FM Global - FM Global; (Formerly: FMG - FM Global); www.fmglobal.com.
87. FRSA - Florida Roofing, Sheet Metal & Air Conditioning Contractors Association, Inc.; www.floridaroof.com.
88. FSA - Fluid Sealing Association; www.fluidsealing.com.
89. FSC - Forest Stewardship Council U.S.; www.fscus.org.
90. GA - Gypsum Association; www.gypsum.org.
91. GANA - Glass Association of North America; www.glasswebsite.com.
92. GS - Green Seal; www.greenseal.org.
93. HI - Hydraulic Institute; www.pumps.org.
94. HI/GAMA - Hydronics Institute/Gas Appliance Manufacturers Association; (See AHRI).
95. HMMA - Hollow Metal Manufacturers Association; (See NAAMM).
96. HPVA - Hardwood Plywood & Veneer Association; www.hpva.org.
97. HPW - H. P. White Laboratory, Inc.; www.hpwhite.com.
98. IAPSC - International Association of Professional Security Consultants; www.iapsc.org.
99. IAS - International Accreditation Service; www.iasonline.org.
100. IAS - International Approval Services; (See CSA).
101. ICBO - International Conference of Building Officials; (See ICC).
102. ICC - International Code Council; www.iccsafe.org.
103. ICEA - Insulated Cable Engineers Association, Inc.; www.icea.net.
104. ICPA - International Cast Polymer Alliance; www.icpa-hq.org.
105. ICRI - International Concrete Repair Institute, Inc.; www.icri.org.
106. IEC - International Electrotechnical Commission; www.iec.ch.
107. IEEE - Institute of Electrical and Electronics Engineers, Inc. (The); www.ieee.org.
108. IES - Illuminating Engineering Society; (Formerly: Illuminating Engineering Society of North America); www.ies.org.
109. IESNA - Illuminating Engineering Society of North America; (See IES).
110. IEST - Institute of Environmental Sciences and Technology; www.iest.org.
111. IGMA - Insulating Glass Manufacturers Alliance; www.igmaonline.org.
112. IGSHPA - International Ground Source Heat Pump Association; www.igshpa.okstate.edu.
113. ILI - Indiana Limestone Institute of America, Inc.; www.iliai.com.
114. Intertek - Intertek Group; (Formerly: ETL SEMCO; Intertek Testing Service NA); www.intertek.com.
115. ISA - International Society of Automation (The); (Formerly: Instrumentation, Systems, and Automation Society); www.isa.org.
116. ISAS - Instrumentation, Systems, and Automation Society (The); (See ISA).
117. ISFA - International Surface Fabricators Association; (Formerly: International Solid Surface Fabricators Association); www.isfanow.org.
118. ISO - International Organization for Standardization; www.iso.org.
119. ISSFA - International Solid Surface Fabricators Association; (See ISFA).
120. ITU - International Telecommunication Union; www.itu.int/home.
121. KCMA - Kitchen Cabinet Manufacturers Association; www.kcma.org.
122. LMA - Laminating Materials Association; (See CPA).
123. LPI - Lightning Protection Institute; www.lightning.org.
124. MBMA - Metal Building Manufacturers Association; www.mbma.com.
125. MCA - Metal Construction Association; www.metalconstruction.org.
126. MFMA - Maple Flooring Manufacturers Association, Inc.; www.maplefloor.org.
127. MFMA - Metal Framing Manufacturers Association, Inc.; www.metalframingmfg.org.
128. MHIA - Material Handling Industry of America; www.mhia.org.
129. MIA - Marble Institute of America; www.marble-institute.com.
130. MMPA - Moulding & Millwork Producers Association; www.wmmpa.com.
131. MPI - Master Painters Institute; www.paintinfo.com.
132. MSS - Manufacturers Standardization Society of The Valve and Fittings Industry Inc.; www.mss-hq.org.
133. NAAMM - National Association of Architectural Metal Manufacturers; www.naamm.org.

134. NACE - NACE International; (National Association of Corrosion Engineers International); www.nace.org.
135. NADCA - National Air Duct Cleaners Association; www.nadca.com.
136. NAIMA - North American Insulation Manufacturers Association; www.naima.org.
137. NBGQA - National Building Granite Quarries Association, Inc.; www.nbgqa.com.
138. NBI - New Buildings Institute; www.newbuildings.org.
139. NCAA - National Collegiate Athletic Association (The); www.ncaa.org.
140. NCMA - National Concrete Masonry Association; www.ncma.org.
141. NEBB - National Environmental Balancing Bureau; www.nebb.org.
142. NECA - National Electrical Contractors Association; www.necanet.org.
143. NeLMA - Northeastern Lumber Manufacturers Association; www.nelma.org.
144. NEMA - National Electrical Manufacturers Association; www.nema.org.
145. NETA - InterNational Electrical Testing Association; www.netaworld.org.
146. NFHS - National Federation of State High School Associations; www.nfhs.org.
147. NFPA - National Fire Protection Association; www.nfpa.org.
148. NFPA - NFPA International; (See NFPA).
149. NFRC - National Fenestration Rating Council; www.nfrc.org.
150. NHLA - National Hardwood Lumber Association; www.nhla.com.
151. NLGA - National Lumber Grades Authority; www.nlga.org.
152. NOFMA - National Oak Flooring Manufacturers Association; (See NWFA).
153. NOMMA - National Ornamental & Miscellaneous Metals Association; www.nomma.org.
154. NRCA - National Roofing Contractors Association; www.nrca.net.
155. NRMCA - National Ready Mixed Concrete Association; www.nrmca.org.
156. NSF - NSF International; www.nsf.org.
157. NSPE - National Society of Professional Engineers; www.nspe.org.
158. NSSGA - National Stone, Sand & Gravel Association; www.nssga.org.
159. NTMA - National Terrazzo & Mosaic Association, Inc. (The); www.ntma.com.
160. NWFA - National Wood Flooring Association; www.nwfa.org.
161. PCI - Precast/Prestressed Concrete Institute; www.pci.org.
162. PDI - Plumbing & Drainage Institute; www.pdionline.org.
163. PLASA - PLASA; (Formerly: ESTA - Entertainment Services and Technology Association); http://www.plasa.org.
164. RCSC - Research Council on Structural Connections; www.boltcouncil.org.
165. RFCI - Resilient Floor Covering Institute; www.rfci.com.
166. RIS - Redwood Inspection Service; www.redwoodinspection.com.
167. SAE - SAE International; www.sae.org.
168. SCTE - Society of Cable Telecommunications Engineers; www.scte.org.
169. SDI - Steel Deck Institute; www.sdi.org.
170. SDI - Steel Door Institute; www.steeldoor.org.
171. SEFA - Scientific Equipment and Furniture Association (The); www.sefalabs.com.
172. SEI/ASCE - Structural Engineering Institute/American Society of Civil Engineers; (See ASCE).
173. SIA - Security Industry Association; www.siaonline.org.
174. SJI - Steel Joist Institute; www.steeljoist.org.
175. SMA - Screen Manufacturers Association; www.smainfo.org.
176. SMACNA - Sheet Metal and Air Conditioning Contractors' National Association; www.smacna.org.
177. SMPTE - Society of Motion Picture and Television Engineers; www.smpte.org.
178. SPFA - Spray Polyurethane Foam Alliance; www.sprayfoam.org.
179. SPIB - Southern Pine Inspection Bureau; www.spib.org.
180. SPRI - Single Ply Roofing Industry; www.spri.org.
181. SRCC - Solar Rating & Certification Corporation; www.solar-rating.org.
182. SSINA - Specialty Steel Industry of North America; www.ssina.com.
183. SSPC - SSPC: The Society for Protective Coatings; www.sspc.org.
184. STI - Steel Tank Institute; www.steeltank.com.
185. SWI - Steel Window Institute; www.steelwindows.com.
186. SWPA - Submersible Wastewater Pump Association; www.swpa.org.
187. TCA - Tilt-Up Concrete Association; www.tilt-up.org.
188. TCNA - Tile Council of North America, Inc.; www.tileusa.com.
189. TEMA - Tubular Exchanger Manufacturers Association, Inc.; www.tema.org.
190. TIA - Telecommunications Industry Association (The); (Formerly: TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance); www.tiaonline.org.
191. TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance; (See TIA).
192. TMS - The Masonry Society; www.masonrysociety.org.

193. TPI - Truss Plate Institute; www.tpinst.org.
194. TPI - Turfgrass Producers International; www.turfgrasssod.org.
195. TRI - Tile Roofing Institute; www.tileroofing.org.
196. UL - Underwriters Laboratories Inc.; http://www.ul.com.
197. UNI - Uni-Bell PVC Pipe Association; www.uni-bell.org.
198. USAV - USA Volleyball; www.usavolleyball.org.
199. USGBC - U.S. Green Building Council; www.usgbc.org.
200. USITT - United States Institute for Theatre Technology, Inc.; www.usitt.org.
201. WASTEC - Waste Equipment Technology Association; www.wastec.org.
202. WCLIB - West Coast Lumber Inspection Bureau; www.wclib.org.
203. WCMA - Window Covering Manufacturers Association; www.wcmanet.org.
204. WDMA - Window & Door Manufacturers Association; www.wdma.com.
205. WI - Woodwork Institute; www.wicnet.org.
206. WSRCA - Western States Roofing Contractors Association; www.wsrca.com.
207. WWPA - Western Wood Products Association; www.wwpa.org.

C. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is believed to be accurate as of the date of the Contract Documents.

1. DIN - Deutsches Institut fur Normung e.V.; www.din.de.
2. IAPMO - International Association of Plumbing and Mechanical Officials; www.iapmo.org.
3. ICC - International Code Council; www.iccsafe.org.
4. ICC-ES - ICC Evaluation Service, LLC; www.icc-es.org.

D. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Information is subject to change and is up to date as of the date of the Contract Documents.

1. COE - Army Corps of Engineers; www.usace.army.mil.
2. CPSC - Consumer Product Safety Commission; www.cpsc.gov.
3. DOC - Department of Commerce; National Institute of Standards and Technology; www.nist.gov.
4. DOD - Department of Defense; www.quicksearch.dla.mil.
5. DOE - Department of Energy; www.energy.gov.
6. EPA - Environmental Protection Agency; www.epa.gov.
7. FAA - Federal Aviation Administration; www.faa.gov.
8. FG - Federal Government Publications; www.gpo.gov/fdsys.
9. GSA - General Services Administration; www.gsa.gov.
10. HUD - Department of Housing and Urban Development; www.hud.gov.
11. LBL - Lawrence Berkeley National Laboratory; Environmental Energy Technologies Division; www.eetd.lbl.gov.
12. OSHA - Occupational Safety & Health Administration; www.osha.gov.
13. SD - Department of State; www.state.gov.
14. TRB - Transportation Research Board; National Cooperative Highway Research Program; The National Academies; www.trb.org.
15. USDA - Department of Agriculture; Agriculture Research Service; U.S. Salinity Laboratory; www.ars.usda.gov.
16. USDA - Department of Agriculture; Rural Utilities Service; www.usda.gov.
17. USDOJ - Department of Justice; Office of Justice Programs; National Institute of Justice; www.ojp.usdoj.gov.
18. USP - U.S. Pharmacopeial Convention; www.usp.org.
19. USPS - United States Postal Service; www.usps.com.

E. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. CFR - Code of Federal Regulations; Available from Government Printing Office; www.gpo.gov/fdsys.

2. DOD - Department of Defense; Military Specifications and Standards; Available from DLA Document Services; www.quicksearch.dla.mil.
3. DSCC - Defense Supply Center Columbus; (See FS).
4. FED-STD - Federal Standard; (See FS).
5. FS - Federal Specification; Available from DLA Document Services; www.quicksearch.dla.mil.

    a. Available from Defense Standardization Program; www.dsp.dla.mil.
    b. Available from General Services Administration; www.gsa.gov.
    c. Available from National Institute of Building Sciences/Whole Building Design Guide; www.wbdg.org/ccb.

6. MILSPEC - Military Specification and Standards; (See DOD).
7. USAB - United States Access Board; www.access-board.gov.
8. USATBCB - U.S. Architectural & Transportation Barriers Compliance Board; (See USAB).

F. State Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. CBHF; State of California; Department of Consumer Affairs; Bureau of Electronic and Appliance Repair, Home Furnishings and Thermal Insulation; www.bearhfti.ca.gov.
2. CCR; California Code of Regulations; Office of Administrative Law; California Title 24 Energy Code; www.calregs.com.
3. CDHS; California Department of Health Services; (See CDPH).
4. CDPH; California Department of Public Health; Indoor Air Quality Program; www.cal-iaq.org.
5. CPUC; California Public Utilities Commission; www.cpuc.ca.gov.
6. SCAQMD; South Coast Air Quality Management District; www.aqmd.gov.
7. TFS; Texas A&M Forest Service; Sustainable Forestry and Economic Development; www.txforestservice.tamu.edu.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 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.

1.2 SUMMARY

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

1.3 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 engaged in the Project to use temporary services and facilities without cost, including, but not limited to, Owner's Representative, Landscape Architect, occupants of Project, testing agencies, and authorities having jurisdiction.

B. Sewer, Water, and Electric Power Service: Use charges are specified in Section 011200 "Multiple Contract Summary."

1.4 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 IBC ADA requirements.

1.5 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.

PART 2 - PRODUCTS

2.1 EQUIPMENT

A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.

1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
2. Heating Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction, and marked for intended location and application.

C. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of at each return-air grille in system and remove at end of construction.

D. Air-Filtration Units: Primary and secondary HEPA-filter-equipped portable units with four-stage filtration. Provide single switch for emergency shutoff. Configure to run continuously.

PART 3 - EXECUTION

3.1 TEMPORARY FACILITIES, GENERAL

A. Conservation: Coordinate construction and use of temporary facilities with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as Owner's property.

3.2 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.

1. Locate facilities to limit site disturbance as specified in Section 011000 "Summary."

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.

3.3 TEMPORARY UTILITY INSTALLATION

A. General: Install temporary service or connect to existing service.

1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.

B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.

1. Connect temporary sewers to municipal system as directed by authorities having jurisdiction.

C. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.

1. Toilets: Use of Owner's existing toilet facilities will be permitted, as long as facilities are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.

D. Temporary Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.

1. Provide temporary dehumidification systems when required to reduce ambient and substrate moisture levels to level required to allow installation or application of finishes and their proper curing or drying.

E. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.

1. Prior to commencing work, isolate the HVAC system in area where work is to be performed according to coordination drawings.

    a. Disconnect supply and return ductwork in work area from HVAC systems servicing occupied areas.
    b. Maintain negative air pressure within work area using HEPA-equipped air-filtration units, starting with commencement of temporary partition construction, and continuing until removal of temporary partitions is complete.

2. Maintain dust partitions during the Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited work within occupied areas using portable dust-containment devices.
3. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.

F. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel. Install land-based telephone line(s) for each field office.

1. At each telephone, post a list of important telephone numbers.

    a. Police and fire departments.
    b. Ambulance service.
    c. Contractor's home office.
    d. Contractor's emergency after-hours telephone number.
    e. Architect's office.
    f. Engineers' offices.
    g. Owner's office.
    h. Principal subcontractors' field and home offices.

G. Electronic Communication Service: Provide a desktop computer in the primary field office adequate for use by Architect and Owner to access Project electronic documents and maintain electronic communications. Equip computer with not less than the following:

1. Processor: Intel Core i5 or i7.
2. Memory: gigabyte.
3. Disk Storage: gigabyte hard-disk drive and combination DVD-RW/CD-RW drive.
4. Display: 24-inch LCD monitor with 256-Mb dedicated video RAM.
5. Full-size keyboard and mouse.
6. Network Connectivity: .
7. Operating System: Microsoft Windows 7 Professional.
8. Productivity Software:

    a. Microsoft Office Professional, 2010 or higher, including Word, Excel, and Outlook.
    b. Adobe Reader 11.0 or higher.
    c. WinZip 7.0 or higher.

9. Printer: "All-in-one" unit equipped with printer server, combining color printing, photocopying, scanning, and faxing, or separate units for each of these three functions.

10. Internet Service: Broadband modem, router and ISP, equipped with hardware firewall, providing minimum Mbps upload and Mbps download speeds at each computer.
11. Internet Security: Integrated software, providing software firewall, virus, spyware, phishing, and spam protection in a combined application.
12. Backup: External hard drive, minimum terrabyte, with automated backup software providing daily backups.
13. Access to large format scanner.

3.4 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:

1. Provide construction for temporary offices, shops, and sheds located within construction area or within 30 feet of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.
2. Maintain support facilities until 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. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary roads and paved areas within construction limits indicated on Drawings.

1. Provide dust-control treatment that is nonpolluting and nontracking. Reapply treatment as required to minimize dust.

C. Temporary Use of Planned Permanent Roads and Paved Areas: Locate temporary roads and paved areas in same location as permanent roads and paved areas. Construct and maintain temporary roads and paved areas adequate for construction operations. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.

1. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.
2. Prepare subgrade and install subbase and base for temporary roads and paved areas according to Section 312000 "Earth Moving."
3. Recondition base after temporary use, including removing contaminated material, regrading, proofrolling, compacting, and testing.
4. Delay installation of final course of permanent hot-mix asphalt pavement until immediately before Substantial Completion. Repair hot-mix asphalt base-course pavement before installation of final course according to Section 321216 "Asphalt Paving."

D. 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.

E. Parking: Use designated areas of Owner's existing parking areas for construction personnel.

F. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.

1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
2. Remove snow and ice as required to minimize accumulations.

G. 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 touch up signs so they are legible at all times.

H. Waste Disposal Facilities: Comply with requirements specified in Section 017419 "Construction Waste Management and Disposal."

I. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 017300 "Execution."

J. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.

K. Temporary Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate.

L. Existing Stair Usage: Use of Owner's existing stairs will be permitted, provided stairs are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore stairs to condition existing before initial use.

1. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If stairs become damaged, restore damaged areas so no evidence remains of correction work.

M. Temporary Use of Permanent Stairs: Use of new stairs for construction traffic will be permitted, provided stairs are protected and finishes restored to new condition at time of Substantial Completion.

3.5 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.

1. Where access to adjacent properties is required in order to affect protection of existing facilities, obtain written permission from adjacent property owner to access property for that purpose.

B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

1. Comply with work restrictions specified in Section 011000 "Summary."

C. Temporary Erosion and Sedimentation Control: Comply with requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent and] requirements specified in Section 311000 "Site Clearing."

D. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings, requirements of DEQ Construction General Permit or authorities having jurisdiction, whichever is more stringent.

1. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross tree- or plant-protection zones.
2. Inspect, repair, and maintain erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
3. Clean, repair, and restore adjoining properties and roads affected by erosion and sedimentation from Project site during the course of Project.

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

E. 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.

F. Tree and Plant Protection: Comply with requirements specified in Section 015639 "Temporary Tree and Plant Protection."

G. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.

H. Pest Control: Engage pest-control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at Substantial Completion. Perform control operations lawfully, using materials approved by authorities having jurisdiction.

I. Site Enclosure Fence: Before construction operations begin, furnish and install site enclosure fence in a manner that will prevent people from easily entering site except by entrance gates.

1. Extent of Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations.
2. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Furnish one set of keys to Owner.

J. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each workday.

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

L. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.

M. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.

1. Where heating or cooling is needed and permanent enclosure is incomplete, insulate temporary enclosures.

N. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.

1. Prohibit smoking in construction areas. Comply with additional limits on smoking specified in other Sections.
2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

3.6 MOISTURE AND MOLD CONTROL

A. Contractor's Moisture-Protection Plan: Describe delivery, handling, storage, installation, and protection provisions for materials subject to water absorption or water damage.

1. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged Work.
2. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
3. Indicate methods to be used to avoid trapping water in finished work.

B. Exposed Construction Period: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:

1. Protect porous materials from water damage.
2. Protect stored and installed material from flowing or standing water.
3. Keep porous and organic materials from coming into prolonged contact with concrete.
4. Remove standing water from decks.
5. Keep deck openings covered or dammed.

C. Partially Enclosed Construction Period: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:

1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
2. Keep interior spaces reasonably clean and protected from water damage.
3. Periodically collect and remove waste containing cellulose or other organic matter.
4. Discard or replace water-damaged material.
5. Do not install material that is wet.
6. Discard and replace stored or installed material that begins to grow mold.
7. Perform work in a sequence that allows wet materials adequate time to dry before enclosing the material in gypsum board or other interior finishes.

D. Controlled Construction Period: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:

1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
2. Use temporary or permanent HVAC system to control humidity within ranges specified for installed and stored materials.
3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.

    a. Hygroscopic materials that may support mold growth, including wood and gypsum-based products, that become wet during the course of construction and remain wet for hours are considered defective and require replacing.
    b. Measure moisture content of materials that have been exposed to moisture during construction operations or after installation. Record readings beginning at time of exposure and continuing daily for hours. Identify materials containing moisture levels higher than allowed. Report findings in writing to Architect.
    c. Remove and replace materials that cannot be completely restored to their manufactured moisture level within hours.

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

D. 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. 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.
2. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 017700 "Closeout Procedures."

END OF SECTION

SECTION 015639 - TEMPORARY TREE AND PLANT PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 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.

1.3 DEFINITIONS

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

B. Caliper (DBH): Diameter breast height; diameter of a trunk as measured by a diameter tape at a height 54 inches above the ground line for trees with caliper of 8 inches or greater as measured at a height of 12 inches above the ground].

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

PART 2 - PRODUCTS

PART 3 - EXECUTION

3.1 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.

B. Prepare written report, endorsed by arborist, listing conditions detrimental to tree and plant protection.

3.2 PREPARATION

A. An existing Ginkgo tree located in the SW corner or the project adjacent to the parking lot must be protected and ensured to not be damaged or ground be disturbed during construction. This tree is of great importance and was germinated in space during a NASA mission.

B. Locate and clearly identify trees, shrubs, and other vegetation to remain with tape.

C. 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.

D. Place tree protection fencing outside the dripline of the tree

E. Tree-Protection Zones: Mulch areas inside tree-protection zones and other areas indicated. Do not exceed indicated thickness of mulch.

1. Apply 2-inch uniform thickness of organic mulch unless otherwise indicated. Do not place mulch within 6 inches of tree trunks.

3.3 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 033000 – CAST-IN-PLACE CONCRETE

PART – 1 GENERAL

1.1 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.

1.2 SUMMARY

A. Section specifies requirements for concrete cast-in-place on the site.

B. The work includes cast-in-place concrete pavement, walkways bases, unit paver bases, foundations, structures, and thrust blocks.

1.3 REFERENCE STANDARDS

A. References herein are made in accordance with the following abbreviations and all work under this Section shall conform to the latest editions as applicable.

1. American Concrete Institute (ACI):

301	Specifications for Structural Concrete
305R	Hot Weather Concreting
306R	Cold Weather Concreting
325.9R	Guide for Construction of Concrete Pavements and Concrete Bases

2. ASTM International (ASTM):

A82	Standard Specification for Steel Wire, Plain, for Concrete Reinforcement
A1064	Standard Specification for Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
A615	Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
C31	Standard Practice for Making and Curing Concrete Test Specimens in the Field
C33	Standard Specification for Concrete Aggregates
C94	Standard Specification for Ready-Mixed Concrete
C143	Standard Test Method for Slump of Hydraulic-Cement Concrete
C150	Standard Specification for Portland Cement
C171	Standard Specification for Sheet Materials for Curing Concrete
C231	Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
C260	Standard Specification for Air-Entraining Admixtures for Concrete
C309	Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete

C494 Standard Specification for Chemical Admixtures for Concrete

C1116 Standard Specification for Fiber-Reinforced Concrete

3. Concrete Reinforcing Steel Institute (CRSI):

Manual Manual of Standard Practice.

4. United States Department of Justice - Americans with Disabilities Act (ADA):

ADA ADA Accessibility Guidelines for Buildings and Facilities; 28 CFR Part 36.

1.4 QUALITY ASSURANCE

A. Work, materials, and color of the wheelchair ramp paving shall conform to applicable sections of Americans with Disabilities Act (ADA) and State Standards, whichever is more stringent.

B. Dimensions, locations, and details of equipment pads, anchors, supports, and similar features shown on the Drawings are approximate. Manufacturer's approved shop Drawings of equipment to be supported, anchored, or contained thereby shall be consulted for exact location, size, and details.

1.5 SUBMITTALS

A. Submit description of methods and sequence of placement for each type of specially-finished concrete, including description of methods and sequence of placement.

B. Submit manufacturer’s product data for the following:

1. Form release agent.
2. Concrete coloring additive.
3. Preformed joint filler.
4. Concrete reinforcement specification data from manufacturer.
5. Stamp and imprinting tools, manufacturer’s literature.
6. Manufacturer’s literature for protective coating for sidewalks.
7. Detectable Warning including manufacturer’s certification that product complies with ADA

1.6 **TESTING**

A. The Owner shall employ a qualified independent testing laboratory to inspect and test concrete paving and other cast-in-place concrete work.

B. When requested, Contractor shall prepare test specimens in accordance with ASTM C31, standard cylinder size 4-inch x 8 inch.

C. Testing of materials and installed work may occur at any time during progress of the work. Rejected materials and installed work shall be removed and replaced.

PART 2 - PRODUCTS

2.1 STEEL REINFORCEMENT

A. Steel reinforcing bars shall conform to ASTM A615, Grade 60, deformed.

1. Bars employed as dowels shall be hot-rolled plain rounds.

B. Steel Wire: ASTM A82, plain cold drawn steel.

C. Welded Wire Reinforcement: Welded wire reinforcement shall conform to the applicable requirements of ASTM A1064. Fabric reinforcement shall be furnished in flat sheets. Fabric reinforcement in rolls will not be permitted.

D. Supports for Reinforcement: Bolsters, chairs, and other devices for spacing, supporting, and fastening reinforcing bars, and welded wire fabric in place shall be wire bar-type supports complying with CRSI Manual.

1. For slabs-on-grade, use supports with sand plates or horizontal runners where base material will not support chair legs.

2. For exposed-to-view concrete surfaces where legs of supports are in contact with forms, provide supports with legs that are protected by plastic (CRSI Class 1).

2.2 PORTLAND CEMENT CONCRETE

A. Portland cement concrete shall conform to the following:

1. Maximum water-cement ratio shall be 0.45 conforming to ACI 316R.

2. Concrete shall be air-entrained type conforming to ASTM C94. Air content by volume shall be 6 percent + 1.5 percent, tested in accordance with ASTM C260.

3. Slump of concrete shall not be less than 3 inches nor greater than 4 inches, determined in accordance with ASTM C143.

4. Cement for concrete shall be a Portland cement conforming to ASTM C150, Type I or II. Only one color of cement, all of the same manufacturer, shall be used for the work.

5. Fine and coarse aggregates for concrete shall conform to ASTM C33.

6. Concrete shall contain a water reducing agent to minimize cement and water content of the concrete mix at the specified slump. Water reducing agent shall conform to ASTM C494, Type A.

7. Concrete shall contain no calcium chloride or admixtures containing calcium chloride. No admixtures other than those specified shall be used in the concrete without the specific written permission of the Engineer.

2.3 CONCRETE AGGREGATES

A. Fine Aggregates: Fine aggregates shall conform to ASTM C33, part 6.

B. Coarse Aggregates: Coarse aggregates shall conform to ASTM C33, Parts 9 through 11 and Tables 2 and 3, with the following Class designations:

1. Class 1S: For footings and foundations not exposed to the weather.

2. Class 4S: For pavements, driveways, curbs, walkways, sidewalks, and retaining walls that are exposed to the weather.

3. Class 1N: For pavements, driveways, curbs, walkways, sidewalks, and retaining walls that are not exposed to the weather.

C. Exposed Aggregate: Exposed aggregate for ADA curb ramps shall be selected, hard, durable, washed rounded stones free of deleterious reactivity to cement with graded sizes between 1/2 to 3/4 inch diameter nominal sieves.

2.4 COLORED CONCRETE

A. Color hardener and curing compound shall be manufactured and supplied by the Bomanite Corporation, 81 Encina Avenue, Palo Alto, CA 94301; tel. 800-854-2094, or approved equivalent.

1. Color for concrete shall have visual contrast with surrounding paving.

2. Curing compound shall be liquid applied.

B. Surface sealer shall be non-yellowing type which breathes water vapor, as manufactured by ProSoCo, Sika Chemical Corporation, Dural-International Corporation, or approved equivalent.

2.5 CURING MATERIALS FOR UNCOLORED CONCRETE

A. Curing shall be accomplished by the following methods.

1. Moist curing with burlap covering.

2. Curing paper, nonstaining, fiber reinforced laminated Kraft bituminous product conforming to ASTM C171. Four mil polyethylene sheeting may be substituted for curing paper.

3. Curing compound, a resin-base, white pigmented compound conforming to ASTM C309, Type 2.

2.6 EXPANSION JOINTS

A. Expansion joint filler shall be preformed, nonbituminous type conforming to ASTM D1752, Type II, similar to Sealtight Cork Expansion Joint Filler, manufactured by W.R. Meadows, Inc., Elgin, IL 60120, or approved equivalent.

1. Premolded filler shall be one piece for the full depth and width of the joint.

B. Smooth dowel shall be hot rolled plain steel dowel bonded at one end and operating in smooth close fitting sleeve (of same material) at the other end.

2.7 CONTROL JOINTS

A. Joint filler to be polyethylene foam with manufacturer’s recommended sealant.

2.8 FORMS

A. Cylindrical Forms: Sonotube Fibre Forms, wax-impregnated strippable forms manufactured by Sonoco Products Company, General Products Division, ABS or PVC plastic reusable forms, or approved equivalent.

B. Forms for Exposed Finish: Plywood, metal, metal-framed plywood faced, or other acceptable panel materials. Plywood shall conform to U.S. Product Standard PS-1 and APA Graded B-B (Concrete Form) Class I Exterior Grade plywood or B-B or A-C Class I high density overlay concrete form plywood. Formwork materials shall produce smooth, continuous, straight and level surfaces.

C. Forms for Unexposed Finish: Plywood, lumber, or metal, with lumber dressed on at least two edges and one side.

D. Form Ties: Prefabricated, adjustable length galvanized steel snap-off ties, with brackets, cones, cornerlocks, and other accessories as necessary.

E. Form Release Agent: Commercial formulation compounds that will not bond with, stain or adversely affect concrete.

F. Imprinting Tools: Mats and tools used to stamp projecting texture and patterns onto plastic concrete surfaces and which shall be specifically designed with rigid back supports to enable a clean, sharp, stamping image. Stamps for curb ramps shall be designed to meet ADA detectable warning requirements.

2.9 FIBROUS REINFORCING

A. Material shall meet ASTM C1116 and shall be as manufactured by NyCon Incorporated, or approved equal.

B. Mix fibrous reinforcement in accordance with manufacturer’s instructions including product data and technical bulletins.

1. Add fibrous reinforcement to concrete mix at the concrete batch facility.

2. Adding and mixing fibrous reinforcement at the job site will not be allowed.

C. Provide job mix design data to show concrete mix will attain specified strength requirements.

2.10 EXPOSED CONCRETE PROTECTIVE COATING

A. Protective Coating shall be silane-siloxane product.

PART 3 - EXECUTION

3.1 PREPARATION OF SUBGRADE

A. The subgrade of areas to be paved shall be graded and compacted as specified in Section 321100, “BASE COURSES (PAVEMENT)”.

B. Excavation required in pavement subgrade shall be completed before fine grading and final compaction of subgrade are performed. Where excavation must be performed in completed subgrade, subbase, base, or pavement, subsequent backfill and compaction shall be performed as required by the Engineer and as specified in Section 312000, “EARTH MOVING”.

C. Materials shall not be stored or stockpiled on subgrade.

D. Prepared subgrade will be inspected by the Engineer. Subgrade shall be approved for installation of the gravel base course. Disturbance to subgrade caused by inspection procedures shall be repaired.

3.2 BASE COURSE

A. Base course for concrete paving shall be pavement subbase course or gravel base materials specified in Section 321100, “BASE COURSES (PAVEMENT)“ as shown on the Drawings.

B. Width of base course shall extend beyond edge of the proposed pavement as shown on the Drawings.

C. Material shall be placed in lifts no more than 6 inches thick, compacted measure. Each lift shall be separately compacted to specified density.

1. Material shall be placed adjacent to wall, manhole, catch basin, and other structures only after they have been set to required grade.

2. Rolling shall begin at sides and progress to center of crowned areas, and shall begin on low side and progress toward high side of sloped areas. Rolling shall continue until material does not creep or wave ahead of roller wheels.

3. Surface irregularities which exceed 1/2 inch as measured by means of a 10 foot long straightedge shall be regraded and recompacted.

D. Base course shall be compacted at optimum moisture content to not less than 95 percent of maximum density as determined by ASTM D1557.

E. The base course shall be kept clean and uncontaminated. Less select materials shall not be permitted to become mixed with the base course material.

3.3 STEEL REINFORCEMENT

A. Before being placed in position, reinforcing steel shall be thoroughly cleaned of loose mill and rust scale, dirt, ice, and other foreign material which may reduce the bond between the concrete and reinforcing. Where there is delay in placing concrete after reinforcement is in place, bars shall be re-inspected and cleaned when required.

B. Any bar showing cracks after bending shall be discarded.

C. Unless otherwise shown on the Drawings, reinforcing shall extend within 2 inches of formwork and expansion joints. Reinforcing shall continue through control joints. Adjacent sheets of fabric reinforcing shall lap 6 inches.

D. After forms have been coated with form release agent, but before concrete is placed, reinforcing steel shall be securely wired in the required position and shall be maintained in that position until concrete is placed

and compacted. Chair bars and supports shall be installed in a number and arrangement approved by the Engineer.

3.4 FORMS

A. General: Design, erect, support, brace, and maintain formwork to support vertical, lateral, static, and dynamic loads that might be applied until concrete structure can support such loads. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation, and position. Maintain formwork construction tolerances and surface irregularities complying with the following ACI 347 limits.

1. Provide Class A tolerances for concrete surfaces exposed to view.

2. Provide Class C tolerances for other concrete surfaces.

B. Construct forms to provide for openings, offsets, sinkages, keyways, recesses, moldings, chamfers, blocking, screeds, bulkheads, anchorages, and inserts, and other features required for the work. Use selected materials to obtain required finishes. Solidly butt joints and provide back-up at joints to prevent cement paste from leaking.

C. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Kerf wood inserts for forming keyways, reglets, recesses, and other features for easy removal.

D. Chamfer exposed corners and edges, using wood, metal, PVC, or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.

E. Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, or other debris just before placing concrete. Re-tighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

3.5 INSTALLING EMBEDDED ITEMS

A. General: Set and build into formwork the anchorage devices and other embedded items required for work that is attached to, or supported by, cast-in-place concrete. Use setting drawings, diagrams, instructions, and directions provided by suppliers of items to be attached.

B. Forms for Slabs: Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and contours in finished surfaces. Provide and secure units to support screed strips using strike-off templates or compacting-type screeds.

3.6 PREPARING FORM SURFACES

A. Coat contact surfaces of forms with an approved, nonresidual, low-VOC form-coating compound before placing reinforcement.

3.7 CONCRETE PLACING

A. Equipment, methods of mixing and placing, and precautions to be observed as to weather, and condition of base shall meet the requirements of ACI 316R.

B. The Engineer shall be notified of scheduled concrete placement sufficiently in advance of start of operation to allow preliminary inspection of the work, including subgrade, forms, and reinforcing steel.

C. Work shall not be performed during rainy weather or when temperature is less than 40°F. (4.4°C.).

D. Adjacent work shall be protected from stain and damage. Damaged and stained areas shall be replaced or repaired to equal their original conditions.

E. Existing concrete, earth, and other water-permeable material against which new concrete is to be placed shall be thoroughly damp when concrete is placed. There shall be no free water on surface.

F. Concrete which has set or partially set, before placing shall not be used. Retempering of concrete will not be permitted.

G. Concrete shall be thoroughly vibrated, or otherwise consolidated to secure a solid and homogeneous mass, thoroughly worked around reinforcement and into corners of forms.

H. When joining fresh concrete to concrete which has attained full set, latter shall be cleaned of foreign matter, and mortar laitance shall be removed by chipping and washing. Clean, roughened base surface shall be saturated with water, but shall have no free water on surface. A coat of 1:1 cement-sand grout, approximately 1/8 inch thick, shall be well scrubbed into the thoroughly dampened concrete base. New concrete shall be placed immediately, before grout has dried or set.

3.8 FINISHING

A. Concrete surfaces shall be screeded and finished true to line and grade, and free of hollows and bumps. Surface shall be dense and smooth.

1. Finished concrete surface for concrete subbases shall be wood floated to a slightly rough surface. Surface shall not deviate more than 1/4 inch in 10 feet.

2. Finished concrete surfaces shall be wood floated and steel troweled, or broom finished, to a uniform surface. Surface shall not deviate more than 1/8 inch in 10 feet.

B. Horizontal surfaces of concrete surfaces which will be exposed shall be given a light broomed finish, with direction of grooves in concrete surface perpendicular to length of concrete band, slab, or pad. After concrete has set sufficiently to prevent coarse aggregate from being torn from surface, but before it has completely set, brooms shall be drawn across the surface to produce a pattern of small parallel grooves. Broomed surface shall be uniform, with no smooth, unduly rough or porous spots, or other irregularities. Coarse aggregate shall not be dislodged by brooming operation.

C. Vertical surfaces of concrete which will be exposed; refer to architectural concrete spec 033300 requirements

D. Immediately following finishing operations, arises at edges and both sides of expansion joints shall be rounded to a 1/4- inch radius. Control joints to be tooled shall be scored into slab surface with scoring tool. Adjacent edges of control joint shall at same time be finished to a 1/4-inch radius.

E. Where finishing is performed before end of curing period, concrete shall not be permitted to dry out, and shall be kept continuously moist from time of placing until end of curing period, or until curing membrane is applied.

F. Sidewalks, walkways, accessible routes, and ramps shall be constructed and finished in accordance with the Americans with Disabilities Act (ADA) and state and local requirements. Provide protective coating in accordance with manufacturer’s recommendations.

G. Exposed Aggregate Finish: Expose coarse aggregate in pavement surfaces as follows.

1. Immediately after float finishing, spray-apply chemical surface retarder to pavement according to manufacturer’s written instructions.

2. Cover pavement surface with plastic sheeting, sealing laps with tape, and remove when ready to continue finishing operations.

3. Without dislodging aggregate, remove excess mortar by lightly brushing surface with a stiff, nylon-bristle broom.

4. Fine-spray surface with water and brush. Repeat water flushing and brushing cycle until cement film is removed from aggregate surfaces to depth required.

3.9 CURING

A. Concrete shall be kept continuously damp from time of placement until end of specified curing period or cured by other methods. Water shall not be added to surface during floating and troweling operations, and not earlier than 24 hours after concrete placement. Between finishing operations, surface shall be protected from rapid drying by a covering of waterproofing paper. Surface shall be damp when the covering is placed

over it, and shall be kept damp by means of a fog spray of water, applied as often as necessary to prevent drying, but not sooner than 24 hours after placing concrete. None of the water so applied shall be troweled or floated into surface.

B. Concrete surfaces shall be cured by completely covering with curing paper or application of a curing compound.

1. Concrete cured using waterproof paper shall be completely covered with paper with seams lapped and sealed with tape. Concrete surface shall not be allowed to become moistened between 24 and 36 hours after placing concrete. During curing period, concrete surface shall be checked frequently, and sprayed with water as often as necessary to prevent drying, but not earlier than 24 hours after placing concrete.

2. Concrete cured with a curing compound shall have the compound applied at a rate of 200 square feet per gallon, in two applications perpendicular to each other.

3. Curing period shall be seven (7) days minimum.

C. Only if additional protection is absolutely required, the surface should remain uncovered after the seven (7) day period for at least four (4) days, after which time new and unwrinkled non-staining reinforced waterproof Kraft curing paper may be used.

3.10 EXPANSION JOINTS

A. Expansion joints shall be 1/2 inch wide and located to provide a maximum spacing of 50 feet between joints or where shown on the Drawings. Expansion joints shall be troweled in the concrete to required width with preformed joint filler in place. Joint filler shall extend the full depth of the slab and full length of the expansion joint.

1. For concrete walks, pavements, and pads, depth of joint filler shall be placed to form a 1-1/4 inch deep recess for sealant and backer rod below finished concrete surface.

2. Use of multiple pieces to make up required depth and width of joint will not be permitted.

3.11 CONSTRUCTION JOINTS

A. Construction joints shall be placed whenever placing of concrete is suspended for more than 30 minutes.

1. Butt joint with dowels or use a thickened edge joint if construction joints occur at control joint locations.

2. Keyed joints with tie-bars shall be used if the joint occurs at any other location.

3.12 CONTROL JOINTS

A. Control joints shall be tooled into the concrete slab, with 3-inch wide border and troweled edges, in pattern as shown on the Drawings. If no pattern is shown, then pattern shall result in square shape with a maximum area of 36 square feet. Joints shall be made after concrete is finished and when the surface is stiff enough to support the weight of workmen without damage to the slab, but before slab has achieved its final set.

B. Scoring shall cut into slab surface at least 1 inch, but in no case not less than 25 percent of slab depth.

3.13 COLD WEATHER CONCRETING

A. Materials for concrete shall be heated when concrete is mixed, placed, or cured when the mean daily temperature is below 40°F. or is expected to fall to below 40°F. within 72 hours. The concrete, after placing, shall be protected by covering, heat, or both.

B. Details of handling and protecting of concrete during freezing weather shall be subject to the approval and direction of the Engineer. Procedures shall be in accordance with provisions of ACI 306R.

3.14 HOT WEATHER CONCRETING

A. Concrete just placed shall be protected from the direct rays of the sun and the forms and reinforcement just prior to placing shall be sprinkled with cold water. Every effort shall be made to minimize delays which will result in excessive mixing of the concrete after its arrival on-site.

B. During periods of excessively hot weather (95°F., or above), ingredients in the concrete shall be cooled with cold mixing water to maintain the temperature of the concrete at permissible levels in accordance with the provisions of ACI 305R. Any concrete with a temperature above 95°F., when ready for placement, will be rejected.

C. Temperature records shall be maintained throughout the period of hot weather giving air temperature, general weather conditions (calm, windy, clear, cloudy, etc.) and relative humidity. Records shall include checks on temperature of concrete when delivered to Project site and after placing in forms. Data should be correlated with the progress of the work so that conditions surrounding the construction of any part of the structure can be ascertained.

3.15 PROTECTION OF CONCRETE SURFACES

A. Concrete surfaces shall be protected from traffic or damage until surfaces have hardened sufficiently.

END OF SECTION

SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Silicone joint sealants.

1.3 PRECONSTRUCTION TESTING

A. Testing will not be required if joint-sealant manufacturers submit joint preparation data that are based on previous testing, not older than 24 months, of sealant products for adhesion to, and compatibility with, joint substrates and other materials matching those submitted; and written recommendations for primers and substrate preparation needed for adhesion.

1.4 ACTION SUBMITTALS

A. Product Data: For each joint-sealant product indicated.

B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

C. Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 1/2-inch- wide joints formed between two 6-inch- long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

D. Joint-Sealant Schedule: Include the following information:
1. Joint-sealant application, joint location, and designation.
2. Joint-sealant manufacturer and product name.
3. Joint-sealant formulation.
4. Joint-sealant color.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

B. Source Limitations: Obtain each kind of joint sealant from single source from single manufacturer.

C. Provide the following upon request:

1. Qualification Data: For qualified Installer and testing agency.
2. Product Certificates: For each kind of joint sealant and accessory, from manufacturer.
3. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating that sealants comply with requirements.

D. Mockups: Install sealant in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section.

1.6 PROJECT CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:
1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
2. When joint substrates are wet.
3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

B. Liquid-Applied Joint Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied joint sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.
1. Suitability for Immersion in Liquids. Where sealants are indicated for Use I for joints that will be continuously immersed in liquids, provide products that have undergone testing according to ASTM C 1247. Liquid used for testing sealants is deionized water, unless otherwise indicated.

C. Stain-Test-Response Characteristics: Where sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

D. Suitability for Contact with Food: Where sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.

E. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 SILICONE JOINT SEALANTS

A. Sealant JS-S1 - Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 50, for Use NT.

1. Products: Subject to compliance with requirements, provide products from the following table that has a validation certificate from the Sealant, Waterproofing and Restoration Institute (SWRI).

2.3 JOINT SEALANT BACKING

A. General: Provide sealant backings of material that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.4 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.

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

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
2. Remove laitance and form-release agents from concrete.

B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
1. Do not leave gaps between ends of sealant backings.
2. Do not stretch, twist, puncture, or tear sealant backings.
3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
1. Remove excess sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces. Water-based tooling agents are unacceptable.
3. Provide concave joint profile per Figure 8A in ASTM C 1193, unless otherwise indicated.
4. Provide flush joint profile where indicated per Figure 8B in ASTM C 1193.
5. Provide recessed joint configuration of recess depth and at locations indicated per Figure 8C in ASTM C 1193.
    a. Use masking tape to protect surfaces adjacent to recessed tooled joints.

G. Installation of Preformed Silicone-Sealant System: Comply with the following requirements:

1. Apply masking tape to each side of joint, outside of area to be covered by sealant system.
2. Apply silicone sealant to each side of joint to produce a bead of size complying with preformed silicone-sealant system manufacturer's written instructions and covering a bonding area of not less than 3/8 inch. Hold edge of sealant bead 1/4 inch inside masking tape.
3. Within 10 minutes of sealant application, press silicone extrusion into sealant to wet extrusion and substrate. Use a roller to apply consistent pressure and ensure uniform contact between sealant and both extrusion and substrate.
4. Complete installation of sealant system in horizontal joints before installing in vertical joints. Lap vertical joints over horizontal joints. At ends of joints, cut silicone extrusion with a razor knife.

3.4 FIELD QUALITY CONTROL

A. Field-Adhesion Inspection: Field inspect joint-sealant adhesion to joint substrates as follows:

1. Inspect joints and report on the following:
    a. Whether sealants filled joint cavities and are free of voids.
    b. Whether sealant dimensions and configurations comply with specified requirements.
    c. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. Compare these results to determine if adhesion passes sealant manufacturer's field-adhesion hand-pull test criteria.

3.5 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.6 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.7 JOINT-SEALANT SCHEDULE

A. Joint-Sealant Application: Exterior joints in horizontal traffic surfaces; Type JS-S1.

1. Joint Locations:

a. Expansion joints in cast-in-place concrete pavement and sidewalks.

2. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

END OF SECTION

SECTION 129300 - SITE FURNISHINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

PART 2 - PRODUCTS

2.1 PRODUCTS

A. Waste Receptacle

Chase Park – Ferndale Parks Standard, side opening, Diameter 24”, Height 39”, Weight 167 lbs

Landscape Forms, Inc.

Kyle Verseman, PLA, ASLA

kylev@landscapeforms.com

Mobile: 734-223-2101

B. Recycling Receptacle

Chase Park – Ferndale Parks Standard, side opening, Diameter 24”, Height 39”, Weight 167 lbs

Landscape Forms, Inc.

Kyle Verseman, PLA, ASLA

kylev@landscapeforms.com

Mobile: 734-223-2101

C. Bench

Parc Vue – Ferndale Parks Standard, backed with arms

Depth: 25-3/4 inches, Total Height 35-1/2”, Arm Height 27-1/4”, Length 72”, surface mounted, Powder Coated Finish, Color directed by owner

Landscape Forms, Inc.

Kyle Verseman, PLA, ASLA

kylev@landscapeforms.com

Mobile: 734-223-2101

D. Bike Rack

Belson Outdoors

627 Amersale Drive, Naperville, IL 60563

800 323-5664

www.belson.com

5801 SM – Standard Inverted 'U' Bike Rack, Color by Owner

Height 36", Depth 17"

E. Drinking Fountain

Most Dependable Fountains

5705 Commander Drive, Arlington, TN 38002

901-867-0039

www.mostdependable.com

Model: 10145 SM

1) Bottle Filler (1)

2) High Bowl (1)

3) Low Bowl (1)

4) Pet Fountain (1)

5) Color – by Owner

F. Bike Repair Station

Barco Products

24 N. Washington Ave. Batavia, IL 60510

1-800-338-2697

Ultimate Bike Repair Station BR-32 - - Barco Products

Model: GR8833C

1) Surface Mount

G. Picnic Shelter – see plans for dimensions

Polygon Structures

4240 136th Ave Holland, MI 49424

Keith Alexander

keith@webuildfun.com

(734)560-5537

Steel Shade Structures - Poligon Open Air Shade Shelters

Model: REK 12x16

1) Roof Type: Multi-rib

2) Roof color: by Owner

3) Frame color: by Owner

4) Foundation Mount

H. Universal Accessible (UA) Picnic Table

Premiere Polysteel

305 Enterprise Drive

Po Box 77

Northwood, IA 50459

(641) 381-5203

8-Foot Accessible Free Standing Picnic Table

Model: 950-507

1) ADA Galvanized

2) Weight: 284 lbs

3) Color – by Owner

4) Surface Mount

I. Playground Structure

GameTime

150 PlayCore Drive SE Fort Payne, AL 35967

800-235-2440

Commercial Playground Equipment for Your Community | GameTime

Model: PS23014

1) Age: 5-12 years

2) Use Zone: 41’-7” x 35’-8”

3) Fall Height: 8’

4) Color – by Owner

5) Surface Mount

J. Swings

Existing swing set on site to be salvaged and relocated according to plans. Contractor to paint

K. Sensory Wave Spinning Chair

GameTime

150 PlayCore Drive SE Fort Payne, AL 35967

800-235-2440

Commercial Playground Equipment for Your Community | GameTime

Model: 3274

1) Age: 2-5, 5-12 years

2) Use Zone: 14’-6” x 14’-6”

3) Fall Height: 4’

4) Number of Children: 1

5) Color – by Owner

6) Or approved equal

L. Harmonic Chimes

GameTime

150 PlayCore Drive SE Fort Payne, AL 35967

800-235-2440

Commercial Playground Equipment for Your Community | GameTime

Model: 4676

1) Age: 2-5, 5-12 years

2) Surface Mount

M. Jazz C Major

GameTime

150 PlayCore Drive SE Fort Payne, AL 35967

800-235-2440

Commercial Playground Equipment for Your Community | GameTime

Model: 4682

1) Or approved equal

N. Basketball Hoop

Bison

603 L Street Lincoln, NE 68508

800-247-7668

Bisoninc

Model: PR70 4-1/2" heavy duty polycarbonate rectangle playground basketball system - Gooseneck System, 25 year warranty, 42" x 54" unbreakable, bulletproof clear polycarbonate backboard

1) Safe Play Area: 48", 60"

2) Or approved equal

O. Interpretive Signage / Pedestal Sign

Nutron OSM Outdoor Signs & Markers PO Box 487 North Olmstead, Ohio 44070 (or approved equal)

1) Architectural Signage System

2) 3" x 3" x 72" powdered coated aluminum post

3) 45 degree mounting plate

4) 18" x 24" ACM sign panel, printed high resolution UV resistant inks

5) SPP1824

6) Ferndale Parks and Rec and SmithGroup to provide final graphics for interpretive signage

7) 12" diameter x 42" depth foundation required for each interpretive sign, see plans for locations

8) Pedestal Signs (nutronosm.com)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for correct and level finished grade, mounting surfaces, installation tolerances, and other conditions affecting performance of the Work.

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

3.2 INSTALLATION

A. Comply with manufacturer's written installation instructions unless more stringent requirements are indicated. Complete field assembly of site furnishings where required.

B. Unless otherwise indicated, install site furnishings after landscaping and paving have been completed.

C. Install site furnishings level, plumb, true, and positioned at locations indicated on Drawings.

D. Post Setting: Set cast-in support posts in concrete footing with smooth top, shaped to shed water. Protect portion of posts above footing from concrete splatter. Verify that posts are set plumb or at correct angle and are aligned and at correct height and spacing. Hold posts in position during placement and finishing operations until concrete is sufficiently cured.

E. Posts Set into Voids in Concrete: Form or core-drill holes for installing posts in concrete to depth recommended in writing by manufacturer of site furnishings and 3/4 inch larger than OD of post. Clean holes of loose material, insert posts, and fill annular space between post and concrete with, mixed and placed to comply with anchoring material manufacturer's written instructions, with top smoothed and shaped to shed water.

END OF SECTION 129300

SECTION 311000 - SITE CLEARING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Protecting existing vegetation to remain.
2. Removing existing vegetation.
3. Clearing and grubbing.
4. Stripping and stockpiling topsoil.
5. Removing above- and below-grade site improvements.
6. Disconnecting, capping or sealing, and abandoning site utilities in place.
7. Temporary erosion and sedimentation control.

B. Related Requirements:

1. Section 015000 "Temporary Facilities and Controls" for temporary erosion- and sedimentation-control measures.

1.3 DEFINITIONS

A. Subsoil: Soil beneath the level of subgrade; soil beneath the topsoil layers of a naturally occurring soil profile, typified by less than 1 percent organic matter and few soil organisms.

B. Surface Soil: Soil that is present at the top layer of the existing soil profile. In undisturbed areas, surface soil is typically called "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; 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 larger than 2 inches in diameter; and free of weeds, roots, toxic materials, or other nonsoil materials.

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

E. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction and indicated according to requirements in Section 015639 "Temporary Tree and Plant Protection."

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

1.4 MATERIAL OWNERSHIP

A. Except for 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.

1.5 INFORMATIONAL SUBMITTALS

A. Record Drawings: Identifying and accurately showing locations of capped utilities and other subsurface structural, electrical, and mechanical conditions.

1.6 FIELD 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 trafficways if required by Owner or authorities having jurisdiction.
3. See site preparation drawings; coordinate with Owner for salvageable items.

B. Utility Locator Service: Notify Miss Dig 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. Tree- and Plant-Protection Zones: Protect according to requirements in Section 015639 "Temporary Tree and Plant Protection."

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

PART 2 - PRODUCTS

2.1 MATERIALS

A. Satisfactory Soil Material: Requirements for satisfactory soil material are specified in Section 312000 "Earth Moving."

1. Obtain approved borrow soil material off-site when satisfactory soil material is not available on-site.

B. Antirust Coating: Fast-curing, lead- and chromate-free, self-curing, universal modified-alkyd primer complying with MPI #23 (surface-tolerant, anticorrosive metal primer) or SSPC-Paint 20 or SSPC-Paint 29 zinc-rich coating.

PART 3 - EXECUTION

3.1 PREPARATION

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

B. Verify that trees, shrubs, and other vegetation to remain or to be relocated have been flagged and that protection zones have been identified and enclosed according to requirements in Section 015639 "Temporary Tree and Plant Protection."

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

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

3.2 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.

3.3 TREE AND PLANT PROTECTION

A. Protect trees and plants remaining on-site according to requirements in Section 015639 "Temporary Tree and Plant Protection."

3.4 EXISTING UTILITIES

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

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

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

3.5 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 larger than 3 inches in diameter, obstructions, and debris to a depth of 12 inches below exposed subgrade.
3. Chip removed tree branches and dispose of off-site.

B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.

1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches, and compact each layer to a density equal to adjacent original ground.

3.6 TOPSOIL STRIPPING

A. Remove sod and grass before stripping topsoil.

B. Strip topsoil to depth in a manner to prevent intermingling with underlying subsoil or other waste materials.

1. Remove subsoil and nonsoil materials from topsoil, including clay lumps, gravel, and other objects larger than 2 inches in diameter; trash, debris, weeds, roots, and other waste materials.

C. Stockpile topsoil away from edge of excavations without intermixing with subsoil or other materials. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust and erosion by water.

1. Limit height of topsoil stockpiles to 72 inches.
2. Do not stockpile topsoil within protection zones.
3. Stockpile surplus topsoil to allow for respreading deeper topsoil.

3.7 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.
2. Paint cut ends of steel reinforcement in concrete to remain with two coats of antirust coating, following coating manufacturer's written instructions. Keep paint off surfaces that will remain exposed.

3.8 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.

B. Separate recyclable materials produced during site clearing from other nonrecyclable materials. Store or stockpile without intermixing with other materials, and transport them to recycling facilities. Do not interfere with other Project work.

END OF SECTION

SECTION 312000 - EARTH MOVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Ferndale Parks will hire a Testing Agency (Owner's Testing Agency) directly to act on behalf of the County regarding direction for earthwork, asphalt and concrete testing.

B. Section Includes:

1. Excavating and filling for rough grading the Site.
2. Preparing subgrades for walks pavements turf and grasses and plants.
3. Base course for concrete walks.
4. Base course for asphalt paving.
5. Excavating and backfilling trenches for utilities and pits for buried utility structures.

C. Related Requirements:

1. Section 311000 "Site Clearing" for site stripping, grubbing, stripping and stockpiling topsoil, and removal of above- and below-grade improvements and utilities.
2. Section 329200 "Lawns" for finish grading in turf and grass areas, including preparing and placing planting soil for turf areas.
3. Section 329300 "Exterior Plantings" for finish grading in planting areas and tree and shrub pit excavation and planting.

1.3 DEFINITIONS

Retain definitions remaining after this Section has been edited. Revise to suit office or local earth-moving practices.

A. Backfill: Soil material or controlled low-strength material used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Base Course: Aggregate layer placed between the subgrade, and the concrete walks and hot-mix asphalt paving.

C. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.

D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

E. Drainage Aggregate: Free draining aggregate used to help infiltrate storm water into the ground water.

F. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

1. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Owner's Testing Agency. Unauthorized excavation, as well as remedial work directed by Owner's Testing Agency, shall be without additional compensation.

G. Fill: Soil materials used to raise existing grades.

H. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material that exceed 1 cu. yd. for bulk excavation or 3/4 cu. yd. for trench, and pit excavation that cannot be removed by rock-excavating equipment equivalent to the following in size and performance ratings, without systematic drilling, ram hammering, ripping, or blasting, when permitted:

1. Equipment for Trench, and Pit Excavation: Late-model, track-mounted hydraulic excavator; equipped with a 42-inch- maximum-width, short-tip-radius rock bucket; rated at not less than 138-hp flywheel power with bucket-curling force of not less than 28,700 lbf and stick-crowd force of not less than 18,400 lbf with extra-long reach boom.

I. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material 3/4 cu. yd. or more in volume that exceed a standard penetration resistance of 100 blows/2 inches when tested by a geotechnical testing agency, according to ASTM D 1586.

J. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

K. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage aggregate, or topsoil materials.

L. Utilities: On-site underground pipes, conduits, ducts, and cables as well as underground services within buildings.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of the following manufactured products required:

1. Geotextiles.
2. Warning tapes.

1.5 INFORMATIONAL SUBMITTALS

A. Material Test Reports: For each on-site and borrow soil material proposed for fill and backfill as follows:

1. Classification according to ASTM D 2487.
2. Laboratory compaction curve according to ASTM D 1557.
3. Gradation report.

1.6 FIELD CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earth-moving 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 "Miss Dig" for area where Project is located before beginning earth-moving operations. Or hire Private Utility Locate Service

C. Do not commence earth-moving operations until temporary site fencing and erosion- and sedimentation-control measures specified in Section 015000 "Temporary Facilities and Controls" and Section 311000 "Site Clearing" are in place.

D. Do not commence earth-moving operations until plant-protection measures specified in Section 015639 "Temporary Tree and Plant Protection" are in place.

E. 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.

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

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

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.

B. Satisfactory Soils: Soil Classification Groups GW, GP, GM, SW, SP, and SM according to ASTM D 2487, Groups A-1, A-2-4, A-2-5, and A-3 according to AASHTO M 145, or a combination of these groups; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.

1. To be placed under unpaved areas.

C. Unsatisfactory Soils: Soil Classification Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D 2487, Groups A-2-6, A-2-7, A-4, A-5, A-6, and A-7 according to AASHTO M 145, or a combination of these groups.

1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.

D. Base Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand, meeting MDOT 21AA gradation.

E. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand, meeting MDOT Class II gradation except at least 90 percent passing a 1-1/2-inch sieve.

1. To be placed under paved areas.

F. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940/D 2940M; except with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve.

G. Drainage Aggregate: Narrowly graded mixture of washed crushed stone, or crushed or uncrushed gravel meeting MDOT 6AA gradation.

H. Asphalt and Aggregate Mix: On-site ground asphalt and asphalt base material (aggregate) used for new base material for HMA paving. All excavation to accommodate the placement of Asphalt and Aggregate Mix provided by earthwork contractor.

I. Filter Material: Narrowly graded mixture of natural or crushed gravel, or crushed stone and natural sand; ASTM D 448; coarse-aggregate grading Size 67; with 100 percent passing a 1-inch sieve and zero to 5 percent passing a No. 4 sieve.

J. Sand: ASTM C 33/C 33M; fine aggregate.

K. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state.

2.2 GEOTEXTILES

A. Subsurface Drainage Geotextile: woven needle-punched geotextile, manufactured for subsurface drainage applications, made from polyolefins or polyesters; with elongation greater than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:
1. Mirafi RS380i (or approved equal)

2.3 ACCESSORIES

A. Detectable Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored as follows:

1. Red: Electric.
2. Yellow: Gas, oil, steam, and dangerous materials.
3. Orange: Telephone and other communications.
4. Blue: Water systems.
5. Green: Sewer systems.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth-moving operations.

B. Protect and maintain erosion and sedimentation controls during earth-moving operations.

C. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

3.2 DEWATERING

A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.

B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.

1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.

3.3 EXCAVATION, GENERAL

A. Excavation: Excavate to subgrade elevations. Material to be excavated will be classified as earth and rock. Do not excavate rock until it has been classified and cross sectioned by Owner's Testing Agency. The Contract Sum will be adjusted for rock excavation.

1. Earth excavation includes excavating pavements and obstructions visible on surface; underground structures, utilities, and other items indicated to be removed; and soil, boulders, and other materials not classified as rock or unauthorized excavation.

3.4 EXCAVATION FOR STRUCTURES

A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.

B. Excavations at Edges of Tree- and Plant-Protection Zones:

1. Excavate by hand or with an air spade to indicated lines, cross sections, elevations, and subgrades. If excavating by hand, use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.
2. Cut and protect roots according to requirements in Section 015639 "Temporary Tree and Plant Protection."

3.5 EXCAVATION FOR WALKS AND PAVEMENTS

A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.6 EXCAVATION FOR UTILITY AND INFILTRATION POD TRENCHES

A. Excavate trenches to indicated gradients, lines, depths, and elevations.

1. Beyond perimeter, excavate trenches to allow installation of top of pipe below frost line.

B. Excavate utility trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit unless otherwise indicated.

C. Utility Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.

1. For pipes and conduit less than 6 inches in nominal diameter, hand-excavate trench bottoms and support pipe and conduit on an undisturbed subgrade.
2. For pipes and conduit 6 inches or larger in nominal diameter, shape bottom of trench to support bottom 90 degrees of pipe or conduit circumference. Fill depressions with tamped sand backfill.
3. For infiltration pods, hand-excavate trench bottoms and support pipes and drainage aggregate on an undisturbed subgrade.

D. Utility Trench Bottoms: Excavate trenches 4 inches deeper than bottom of pipe and conduit elevations to allow for bedding course. Hand-excavate deeper for bells of pipe.

E. Trenches in Tree- and Plant-Protection Zones:

1. Hand-excavate to indicated lines, cross sections, elevations, and subgrades. Use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.
2. Do not cut main lateral roots or taproots; cut only smaller roots that interfere with installation of utilities.
3. Cut and protect roots according to requirements in Section 015639 "Temporary Tree and Plant Protection."

3.7 SUBGRADE INSPECTION

A. Notify Owner's Testing Agency~~,~~ when excavations have reached required subgrade.

B. If Owner's Testing Agency~~,~~ determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.

C. Proof-roll subgrade below pavements with a pneumatic-tired **filled front-end loader** to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.

1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction if possible. Limit vehicle speed to 3 mph.
2. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Architect, and replace with compacted backfill or fill as directed.

D. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect, without additional compensation.

3.8 UNAUTHORIZED EXCAVATION

A. Fill unauthorized excavation under trenches, pavement, infiltration pods, and utility structures as directed by Owner's Testing Agency

3.9 STORAGE OF SOIL MATERIALS

A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.10 BACKFILL

A. Place and compact backfill in excavations promptly, but not before completing the following:

1. Construction below finish grade.
2. Surveying locations of underground utilities for Record Documents.
3. Testing and inspecting underground utilities.
4. Removing concrete formwork.
5. Removing trash and debris.
6. Removing temporary shoring, bracing, and sheeting.

B. Place backfill on subgrades free of mud, frost, snow, or ice.

3.11 UTILITY TRENCH BACKFILL

A. Place backfill on subgrades free of mud, frost, snow, or ice.

B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

C. Backfill voids with satisfactory soil while removing shoring and bracing.

D. Initial Backfill:

1. Soil Backfill: Place and compact initial backfill of [subbase material] [satisfactory soil], free of particles larger than [1 inch] <Insert dimension> in any dimension, to a height of 12 inches over the pipe or conduit.

    a. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.

E. Final Backfill:

1. Soil Backfill: Place and compact final backfill of satisfactory soil to final subgrade elevation under unpaved areas.
2.
3. Soil Backfill:Place and compact final backfill of granular backfill up to subgrade of paved areas.

4. Retain "Controlled Low-Strength Material" Subparagraph below if controlled low-strength material is permitted or required as final backfill.

F. Detectable Warning Tape: Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.12 SOIL FILL

A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.

B. Place and compact fill material in layers to required elevations as follows:

1. Under grass and planted areas, use satisfactory soil material.
2. Under walks and pavements, use satisfactory soil material.
3. Under steps and ramps, use engineered fill.

C. Place soil fill on subgrades free of mud, frost, snow, or ice.

3.13 SOIL MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.

1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.14 COMPACTION OF SOIL BACKFILLS AND FILLS

A. Place backfill and fill soil materials in layers not more than [8 inches] <Insert dimension> in loose depth for material compacted by heavy compaction equipment and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

B. Place backfill and fill soil materials evenly on all sides of structures to required elevations and uniformly along the full length of each structure.

C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 1557:

1. Under pavements, and walkways, scarify and recompact top 12 inches of existing subgrade and each layer of backfill or fill soil material at 95 percent.
2. Under turf or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 85 percent.
3. For utility trenches, compact each layer of initial and final backfill soil material in accordance with 1. and 2. above.

3.15 GRADING

A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

1. Provide a smooth transition between adjacent existing grades and new grades.
2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to elevations required to achieve indicated finish elevations, within the following subgrade tolerances:

1. Turf or Unpaved Areas: Plus or minus 1 inch.
2. Walks: Plus or minus 1 inch.
3. Pavements: Plus or minus 1/2 inch.

3.16 SUBSURFACE DRAINAGE

A. Specified in Section 334600 "Subdrainage."

3.17 SUBBASE AND BASE COURSES UNDER PAVEMENTS AND WALKS

A. Place base course on subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place base course under pavements and walks as follows:

1. Shape base course to required crown elevations and cross-slope grades.
2. Place base course 6 inches or less in compacted thickness in a single layer.
3. Place base course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
4. Compact base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.

3.18 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified geotechnical engineering testing agency to perform tests and inspections.

B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.

C. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2937, and ASTM D 6938, as applicable. Tests will be performed at the following locations and frequencies:

1. Paved Areas: At subgrade and at each compacted fill and backfill layer, at least one test for every 4000 sq. ft. (372 sq. m) or less of paved area but in no case fewer than three tests.
2. Trench Backfill: At each compacted initial and final backfill layer, at least one test for every 150 feet or less of trench length but no fewer than two tests.

D. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained.

3.19 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

1. Scarify or remove and replace soil material to depth as directed by Owner’s Testing Agency ; reshape and recompact.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.20 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove unsatisfactory soil and waste materials, including 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 Owner’s Testing Agency

1. Remove waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

END OF SECTION

SECTION 321216 - ASPHALT PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
1. Cold milling of existing asphalt pavement.
2. Hot-mix asphalt patching.
3. Hot-mix asphalt paving.
4. Hot-mix asphalt overlay.
5. Asphalt surface treatments.

B. Related Requirements:
1. 311000 Site Clearing for demolition and removal of existing asphalt pavement.
2. Section 312000 "Earth Moving" for subgrade preparation, fill material, unbound-aggregate subbase and base courses, and aggregate pavement shoulders.
3. Section 321373 "Concrete Paving Joint Sealants" for joint sealants and fillers at pavement terminations.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.
1. Review methods and procedures related to hot-mix asphalt paving including, but not limited to, the following:
a. Review proposed sources of paving materials, including capabilities and location of plant that will manufacture hot-mix asphalt.
b. Review requirements for protecting paving work, including restriction of traffic during installation period and for remainder of construction period.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.
1. Include technical data and tested physical and performance properties.
2. Job-Mix Designs: Certification, by authorities having jurisdiction, of approval of each job mix proposed for the Work.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For testing agency.

B. Material Certificates: For each paving material.

C. Material Test Reports: For each paving material, by a qualified testing agency.

D. Field quality-control reports.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: **MDOT manufacture registered**

B. Testing Agency Qualifications: Qualified according to ASTM D 3666 for testing indicated.

C. Regulatory Requirements: Comply with materials, workmanship, and other applicable requirements of MDOT for asphalt paving work.
1. Measurement and payment provisions and safety program submittals included in standard specifications do not apply to this Section.

1.7 FIELD CONDITIONS

A. Environmental Limitations: Do not apply asphalt materials if subgrade is wet or excessively damp, if rain is imminent or expected before time required for adequate cure, or if the following conditions are not met:
1. Prime Coat: Minimum surface temperature of 60 deg F (15.6 deg C).
2. Tack Coat: Minimum surface temperature of 60 deg F (15.6 deg C).
3. Asphalt Base Course: Minimum surface temperature of 40 deg F (4.4 deg C) and rising at time of

placement.

4. Asphalt Surface Course: Minimum surface temperature of 60 deg F (15.6 deg C) at time of placement.

PART 2 - PRODUCTS

2.1 AGGREGATES

A. General: Use materials and gradations that have performed satisfactorily in previous installations.

B. Coarse Aggregate: ASTM D 692/D 692M, sound; angular

C. Fine Aggregate: ASTM D 1073 sharp-edged natural sand or sand prepared from stone, gravel, cured blast-furnace slag, or combinations thereof.
1. For hot-mix asphalt, limit natural sand to a maximum of 20 percent by weight of the total aggregate mass.

D. Mineral Filler: ASTM D 242/D 242M rock or slag dust, hydraulic cement, or other inert material.

2.2 ASPHALT MATERIALS

A. Asphalt Binder: AASHTO M 320, PG 58-28

B. Cutback Prime Coat: ASTM D 2027, medium-curing cutback asphalt, MC-30 or MC-70

C. Emulsified Asphalt Prime Coat: ASTM D 977

D. Tack Coat: **ASTM D 977** emulsified asphalt, MDOT SS-1h.

E. Water: Potable.

2.3 AUXILIARY MATERIALS

A. Sand: ASTM D 1073, Grade No. 2 or No. 3.

B. Paving Geotextile: AASHTO M 288 paving fabric; nonwoven polypropylene; resistant to chemical attack, rot, and mildew; and specifically designed for paving applications.

C. Joint Sealant: ASTM D 6690 Type II hot-applied, single-component, polymer-modified bituminous sealant.

2.4 MIXES

1. Base Course Limit: Recycled content more than **10** percent by weight.

B. Hot-Mix Asphalt: Dense-graded, hot-laid, hot-mix asphalt plant mixes approved by authorities having jurisdiction and complying with the following requirements:
1. Provide mixes with a history of satisfactory performance in geographical area where Project is located.
2. Base Course: MDOT 13A
3. Surface Course: MDOT 36A

C. Emulsified-Asphalt Slurry: ASTM D 3910, Type 3.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that subgrade is dry and in suitable condition to begin paving.

B. Proof-roll subgrade below pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.
1. Completely proof-roll subgrade in one direction[, Limit vehicle speed to 3 mph (5 km/h).
2. Proof roll with a loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons (13.6 tonnes).
3. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Architect, and replace with compacted backfill or fill as directed.

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

3.2 COLD MILLING

A. Clean existing pavement surface of loose and deleterious material immediately before cold milling. Remove existing asphalt pavement by cold milling to grades and cross sections indicated.
   1. Mill to a depth of [**1-1/2 inches (38 mm)**
   2. Mill to a uniform finished surface free of excessive gouges, grooves, and ridges.
   3. Control rate of milling to prevent tearing of existing asphalt course.
   4. Repair or replace curbs, manholes, and other construction damaged during cold milling.
   5. Excavate and trim unbound-aggregate base course, if encountered, and keep material separate from milled hot-mix asphalt.
   6. Patch surface depressions deeper than 1 inch (25 mm) after milling, before wearing course is laid.
   7. Keep milled pavement surface free of loose material and dust.
   8. Do not allow milled materials to accumulate on-site.

3.3 PATCHING

A. Asphalt Pavement: Saw cut perimeter of patch and excavate existing pavement section to sound base. Excavate rectangular or trapezoidal patches, extending 12 inches (300 mm) into perimeter of adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Remove excavated material. Recompact existing unbound-aggregate base course to form new subgrade.

B. Placing Patch Material: Partially fill excavated pavements with hot-mix asphalt base mix and, while still hot, compact. Cover asphalt base course with compacted, hot-mix surface layer finished flush with adjacent surfaces.

3.4 REPAIRS

A. Leveling Course: Install and compact leveling course consisting of hot-mix asphalt surface course to level sags and fill depressions deeper than 1 inch (25 mm) in existing pavements.
   1. Install leveling wedges in compacted lifts not exceeding 3 inches (75 mm) thick.

B. Crack and Joint Filling: Remove existing joint filler material from cracks or joints to a depth of [**1/4 inch (6 mm)**]
   1. Clean cracks and joints in existing hot-mix asphalt pavement.
   2. Use emulsified-asphalt slurry to seal cracks and joints less than 1/4 inch (6 mm) wide. Fill flush with surface of existing pavement and remove excess.
   3. Use hot-applied joint sealant to seal cracks and joints more than 1/4 inch (6 mm) wide. Fill flush with surface of existing pavement and remove excess.

3.5 SURFACE PREPARATION

A. General: Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces. Ensure that prepared subgrade is ready to receive paving.

B. Emulsified Asphalt Prime Coat: Apply uniformly over surface of compacted unbound-aggregate base course at a rate of 0.10 to 0.30 gal./sq. yd. per inch depth (0.5 to 1.40 L/sq. m per 25 mm depth). Apply enough material to penetrate and seal, but not flood, surface. Allow prime coat to cure.
   1. If prime coat is not entirely absorbed within 24 hours after application, spread sand over surface to blot excess asphalt. Use enough sand to prevent pickup under traffic. Remove loose sand by sweeping before pavement is placed and after volatiles have evaporated.
   2. Protect primed substrate from damage until ready to receive paving.

3.6 PLACING HOT-MIX ASPHALT

A. Machine place hot-mix asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand in areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross section, and thickness when compacted.
   1. Place hot-mix asphalt surface course in single lift.
   2. Spread mix at a minimum temperature of 250 deg F (121 deg C).
   3. Begin applying mix along centerline of crown for crowned sections and on high side of one-way slopes unless otherwise indicated.
   4. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt-paving mat.

B. Place paving in consecutive strips not less than 10 feet (3 m) wide unless infill edge strips of a lesser width are required.
   1. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap

previous strips. Overlap mix placement about 1 to 1-1/2 inches (25 to 38 mm) from strip to strip to ensure proper compaction of mix along longitudinal joints.

2. Complete a section of asphalt base course before placing asphalt surface course.

C. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

3.7 JOINTS

A. Construct joints to ensure a continuous bond between adjoining paving sections. Construct joints free of depressions, with same texture and smoothness as other sections of hot-mix asphalt course.

1. Clean contact surfaces and apply tack coat to joints.
2. Offset longitudinal joints, in successive courses, a minimum of 6 inches (150 mm).
3. Offset transverse joints, in successive courses, a minimum of 24 inches (600 mm).
4. Construct transverse joints at each point where paver ends a day's work and resumes work at a subsequent time. Construct these joints [**using either "bulkhead" or "papered" method according to AI MS-22, for both "Ending a Lane" and "Resumption of Paving Operations."**]
5. Compact joints as soon as hot-mix asphalt will bear roller weight without excessive displacement.
6. Compact asphalt at joints to a density within 2 percent of specified course density.

3.8 COMPACTION

A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot, hand tampers or with vibratory-plate compactors in areas inaccessible to rollers.

1. Complete compaction before mix temperature cools to 185 deg F (85 deg C).

B. Breakdown Rolling: Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Correct laydown and rolling operations to comply with requirements.

C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density:

1. Average Density: 96 percent of reference laboratory density according to **ASTM D 6927** but not less than 94 percent or greater than 100 percent.
2. Average Density: 92 percent of reference maximum theoretical density according to ASTM D 2041, but not less than 90 percent or greater than 96 percent.

D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.

E. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot; compact thoroughly.

F. Repairs: Remove paved areas that are defective or contaminated with foreign materials and replace with fresh, hot-mix asphalt. Compact by rolling to specified density and surface smoothness.

G. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.

H. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.9 INSTALLATION TOLERANCES

A. Pavement Thickness: Compact each course to produce the thickness indicated within the following tolerances:

1. Base Course: Plus or minus 1/4 inch
2. Surface Course: Plus 1/4 inch (6 mm), no minus.

B. Pavement Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10-foot (3-m) straightedge applied transversely or longitudinally to paved areas: (See tolerances in Court Spec)

1. Base Course: [**1/4 inch**
2. Surface Course: [**1/8 inch** Retain "Crowned Surfaces" Subparagraph below if required.

3.10 FIELD QUALITY CONTROL

A. Testing Agency: a qualified testing agency to perform tests and inspections.

B. Thickness: In-place compacted thickness of hot-mix asphalt courses will be determined according to

ASTM D 3549.

C. Surface Smoothness: Finished surface of each hot-mix asphalt course will be tested for compliance with smoothness tolerances.

D. In-Place Density: Testing agency will take samples of uncompacted paving mixtures and compacted pavement according to **ASTM D 979**
   1. Reference maximum theoretical density will be determined by averaging results from four samples of hot-mix asphalt-paving mixture delivered daily to site, prepared according to ASTM D 2041, and compacted according to job-mix specifications.
   2. In-place density of compacted pavement will be determined by testing core samples according to ASTM D 1188 or ASTM D 2726.
      a. One core sample will be taken for every 1000 sq. yd. (836 sq. m) or less of installed pavement, with no fewer than three cores taken.
      b. Field density of in-place compacted pavement may also be determined by nuclear method according to ASTM D 2950 and correlated with ASTM D 1188 or ASTM D 2726.

E. Replace and compact hot-mix asphalt where core tests were taken.

F. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements.

END OF SECTION

SECTION 321713 - PARKING BUMPERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
1. Precast concrete wheel stops.

1.3 ACTION SUBMITTALS

A. Product Data:
1. Precast concrete wheel stops.

B. Sustainable Design Submittals:

C. Samples for Verification: For wheel stops, **6 inches (150 mm) long** showing color and cross section; with mounting hardware.

PART 2 - PRODUCTS

2.1 PARKING BUMPERS

A. Precast Concrete Wheel Stops: Precast, steel-reinforced, air-entrained concrete; 4000-psi (27.6-MPa) minimum compressive strength; manufacturer's standard height and width 4-1/2 inches (115 mm) high by 9 inches (225 mm) wide by 72 inches (1800 mm) long. Provide chamfered corners, transverse drainage slots on underside, and a minimum of two factory-formed or -drilled vertical holes through wheel stop for anchoring to substrate.
1. Manufacturers: Subject to compliance with requirements, **provide products by one of the following**
   a. American Eagle Precast, LLC.
   b. American Precast Concrete Inc.
   c. Bush Concrete Products, Inc.
   d. Cast-Crete USA, Inc.
   e. Dura-Crete, Inc.
   f. Granite Precasting and Concrete, Inc.
   g. Oldcastle Precast, Inc.
   h. Steps Plus, Inc.
2. Source Limitations: Obtain wheel stops from single source from single manufacturer.
3. Surface Appearance: Smooth, free of pockets, sand streaks, honeycombs, and other obvious defects. Corners shall be uniform, straight, and sharp.
4. Surface Sealer: **Manufacturer's standard salt-resistant, clear sealer** applied at precasting location.
5. Mounting Hardware: Galvanized-steel **spike or dowel,** 1/2-inch (13-mm) **diameter,** 14-inch (350-mm) **minimum length lag screw, shield, and washers;** 1/2-inch (13-mm) **diameter,** 8-inch (203-mm) **minimum length hardware as standard with wheel-stop manufacturer**.
6. Color: **Gray**
7. Adhesive: Polyurethane or epoxy, as recommended in writing by wheel-stop manufacturer for adhesion to substrate.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that pavement is in suitable condition to begin installation in accordance with manufacturer's written instructions.

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

3.2 INSTALLATION

A. Install wheel stops in accordance with manufacturer's written instructions unless otherwise indicated.

B. Install wheel stops in bed of adhesive before anchoring to substrate.

C. Securely anchor wheel stops to substrate with hardware in each preformed vertical hole in wheel stop as recommended in writing by manufacturer. Recess head of hardware beneath top of wheel stop.

END OF SECTION 321713

SECTION 321723 - PAVEMENT MARKINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes painted markings and parking stall lines as shown on the drawings, applied to asphalt and concrete pavement.

1.3 REFERENCES

A. Reference Specifications

1. Unless otherwise specified, the materials and application shall comply with the 2003 Michigan Department of Transportation (MDOT) “Standard Specification for Construction” referred to as “MDOT.”

2. Also referenced Manual of Uniform Traffic Control Devices (MUTCD) 2009 Edition, including Revisions 1 & 2 May 2012.

1.4 FIELD CONDITIONS

A. Environmental Limitations: Proceed with pavement marking only on clean, dry surfaces and at a minimum ambient or surface temperature of 55 deg F for water-based materials, and not exceeding 95 deg F.

B. Existing Conditions: Examine work in place on which this work is dependent. Defects which may influence satisfactory completion and performance of this work shall be corrected in accordance with the requirements of the applicable section of work prior to commencement of work. Commencement shall be construed as work in place being acceptable for satisfying the requirements of this section.

C. Protection: Protect the work and adjacent work against damage during progress of the work. Construction equipment which will damage existing or new pavement shall not be used.

PART 2 - PRODUCTS

2.1 PAVEMENT MARKING PAINT

A. Traffic paint shall be from the MDOT Qualified Product List.

B. Glass beads shall comply with MDOT specifications.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that pavement is dry and in suitable condition to begin pavement marking according to manufacturer's written instructions.

B. Proceed with pavement marking only after unsatisfactory conditions have been corrected.

3.2 PAVEMENT MARKING

A. Do not apply pavement-marking paint until layout, colors, and placement have been verified with Landscape Architect.

B. Allow paving to age for a minimum of 30 days before starting pavement marking.

C. Sweep and clean surface to eliminate loose material and dust.

D. Apply paint with mechanical equipment to produce pavement markings, of dimensions indicated, with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils in lines 4 inches wide.

E. Parking Stall Color: White 4” width

F. Handicap Stall Color: Blue 4:” width with symbol – see drawings and refer to MUTCD

G. Turn Arrows Color: White

H. Lane separation at Entrance/Exits Color: Yellow 4” width

I. Lane separation at Exit Left Turn / Straight and Right Turn Lanes Color: White 4” width

J. Crosswalks Color: White – see details for dimensions

K. Stop bars Color: White

3.3 PROTECTING AND CLEANING

A. Protect pavement markings from damage and wear during remainder of construction period.

B. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

3.4 APPLICATION

A. Lines shall be mechanically painted on bituminous paving with one coat of traffic paint in the locations shown on drawings. Parking stall lines shall be painted only on bituminous surface. Paint on concrete curbs or gutters will not be accepted.

B. Wavy lines or lines with ragged edges will not be accepted.

C. Pavement marker shall be equipped as follows:

1. Provide self-propelled equipment certified by the Department in accordance with Equipment Certification Guidelines for Pavement markings. Certification is effective for 2 years.

2. Sufficient paint storage capacity to enable sustained pavement-marking operations and shall be equipped to assure uniform paint application.

3. Mechanical bead dispensers or pressurized bead dispensers.

4. Be equipped with a pressure regulator airjet capable of removing all debris from pavement in advance of the applicator gun.

   In general, the equipment shall accomplish the marking in a safe efficient and workmanlike manner.

   All vehicles used in the marking operations shall be equipped with rotating or oscillating flashers that are visible from both the front and rear of vehicle.

5. Marking shall be 4-inch minimum width lines. Markings shall be applied so that they adhere adequately to the surface. Glass beads for relectorization shall be applied in accordance with Table 6.29-1 of MDOT.

6. SINGLE LINE – YELLOW OR WHITE

   Single Line shall be applied as one solid 4-inch minimum line width. The paint shall be applied at a rate of 16 gallons per minute.

7. DOUBLE LINE – YELLOW

   Double Line shall be applied as two solid 4-inch minimum line width lanes separated by a discernable space (4”). The paint shall be applied at a rate of 32 gallons per minute.

8. As incidental, protection of wet paint shall be the Contractor’s responsibility.

9. New markings and/or retracted markings shall be placed, with reasonable tolerance, in their proper locations. Incorrect or misplaced markings shall be obliterated by grinding (removal) and remarked in accordance with Landscape Architect’s instructions.

   Applied markings with defects such as, but not limited to, fuzzy edges, non-uniform thickness, improper width, non or non-uniform reto-reflective feature, or an adhesion failure with the pavement surface, shall be considered unacceptable and replaced at Contractor’s expense.

END OF SECTION

SECTION 329100 - SOIL PREPARATION (TOPSOIL)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This section specifies all soil materials designated as "Topsoil" on the drawings or in the specifications. Supply topsoil for landscape work seeding, sod, transplant areas, heritage rose area and planting) from both on-site and off-site sources.

1.3 REFERENCES

A. ASTM International, as referenced herein as ASTM.

B. US Department of Agriculture (USDA) Handbook No. 60 – Diagnosis and Improvement of Saline and Alkali Soils.

PART 2 - PRODUCTS

2.1 TOPSOIL

A. Topsoil shall be a well-graded soil of good uniform quality. It shall be a natural, friable soil representative of productive soils in the vicinity. Topsoil shall be free of admixture of subsoil, foreign matter, objects larger than 25 mm (one inch) in any dimension, toxic substances, weeds and any material or substances that may be harmful to plant growth and shall have a pH value of not less than 6.0 nor more than 7.0, and should be best suited to the region, climate and plant material specific to the project.

B. Obtain material from stockpiles established under Section 31 20 00, EARTH MOVING, subparagraph, Stripping Topsoil that meet the general requirements as stated above. Amend topsoil not meeting the pH range specified by the addition of pH Adjusters.

C. If sufficient topsoil is not available on the site to meet the depth as specified herein, the Contractor shall furnish additional topsoil. At least 10 days prior to topsoil delivery, notify the Owner’s Representative of the source(s) from which topsoil is to be furnished. Obtain topsoil from well drained areas. Additional topsoil shall meet the general requirements as stated above and comply with the requirements specified in Section 01 45 29, TESTING LABORATORY SERVICES and Part 1.4.E of this Section. Amend

D. See Planting Specification for planting mixtures.

E. Topsoil Sieve Chart

Sieve Designation	Percent Passing
1 inch screen	100
1/4 inch screen	97 - 100
No. 10 U.S.S. mesh sieve	95 - 100
No. 140 U.S.S.	15 – 35

PART 3 - EXECUTION

3.1 FIELD QUALITY CONTROL

A. Sampling: Each soil test unit shall be a composite of five to seven subsamples taken the full depth of proposed source for each acre of surface area. For on-site stockpiles, discard upper 6 inches of soil before sampling. For large stockpiles, partial excavation will be required for collection of representative samples. Include site plan verifying the locations of all topsoil sampling. Topsoil test reports shall be accompanied with each sample unit for review and approval by the Landscape Architect.

B. Testing methods and written recommendations when not references elsewhere, shall comply with USDA's Handbook No. 60. Nutrient data to be given in parts per million (ppm) dry soil.

C. Topsoil shall be as defined in ASTM D5268.

D. Soil pH shall be tested in accordance with ASTM D4972.

E. Test for organic material by using ASTM D2974.

3.2 FINE GRADING

A. Contractor shall obtain Owner Representative’s written approval of previously completed rough grading work prior to commencing organic soil amendment incorporation work.

B. Immediately prior to dumping and spreading the approved organic soil amendment, the subgrade shall be cleaned of all stones greater than one inches (1”) and all debris or rubbish. Such material shall be removed from the site. Prior to spreading of the organic soil amendment, subgrades which are too compact to drain water and too compact based upon compaction tests shall be ripped with a claw one foot (1’) deep, pulled by a bulldozer two feet (2’) on center, both directions. Contractor shall then regrade surface.

C. Organic soil amendment material shall be placed and uniformly spread over approved finish sub-grades to a depth sufficiently greater than the specified depth so that after natural settlement and light rolling, the specified minimum compacted depth will have been provided and the completed work will conform to the lines, grades and elevations indicated with allowance for additional topsoil spreading for turfgrass areas in determining final elevations. Incorporate organic soil amendment by disc harrowing, rototilling or other means in a uniform manner. The depth of incorporation shall be based upon the organic content of the tested and approved organic soil amendment, so as to produce a finished soil with an organic matter content of between four (4) and six percent (6%). Supply additional organic soil amendment material, after in-place testing and approval, as may be needed to give the required organic matter content and finished grades under the Contract without additional cost to the Government.

D. Disturbed areas outside the limit of work shall be spread with four inch (4”) minimum depth of organic soil amendment material to the finished grade.

E. No subsoil or organic soil amendment material shall be handled in any way if it is in a wet or frozen condition.

F. Sufficient grade stakes shall be set for checking the finished grades. Stakes must be set in the bottom of swales and at the top of slopes. Connect contours and spot elevations with an even slope.

G. After organic soil amendment material has been incorporated into the subsoil, it shall be carefully prepared by scarifying or harrowing and hand raking. Remove all large stiff clods, lumps, brush, roots, stumps, litter and other foreign matter. Remove all stones over one and one half inch (1-1/2”) diameter from the amended soil bed. The amended soil shall also be free of smaller stones in excessive quantities as determined by the Resident Engineer.

H. The whole surface shall then be compacted with a roller or other suitable means to achieve a maximum dry density of 88 to 90 percent in accordance with compaction standards of ASTM D1557 Method D. During the compaction process, all depressions caused by settlement or rolling shall be filled with additional organic soil amendment and the surface shall be regraded and rolled until presenting a smooth and even finish corresponding to the required grades.

END OF SECTION

SECTION 3292000 - LAWNS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Seeding
2. Hydroseeding
3. Sodding
4. Sprigging
5. Mulching
6. Erosion control blanket – slope stabilization
7. Turf renovation
8. Maintenance
9. Warranty

B. Related Requirements:

1. Section 311000 "Site Clearing" for stripping and using on-site topsoil.
2. Section 312000 "Earth Moving" for mass grading of the site.
3. Section 312500 "Soil Erosion and Sedimentation Control" for soil stabilization during construction.
4. Section 329100 “Soil Preparation (Topsoil)” for lawns and plant mixture amendment.
5. Section 329300 "Exterior Plantings" for trees, shrubs, ground covers, and other plants as well as border edgings and mow strips.
6. Section 334600 "Subdrainage" for below-grade drainage of landscaped areas.

1.3 REFERENCES AND REGULATORY REQUIREMENTS

A. United States Department of Agriculture (USDA), Federal Seed Act - labeling and purity standards and miscellaneous requirements.

B. State Seed Laws – where applicable.

C. Association of Official Seed Analysts (AOSA): “Rules for Testing Seed”.

D. Turfgrass Producers International (TPI): Guidelines for Turfgrass Sod.

1.4 DEFINITIONS

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

B. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. Pesticides include insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. They also include substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.

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

D. Pure Live Seed (PLS): (percent germination x percent purity)/100 = Percent PLS

E. Topsoil: Existing, on-site soil that has been modified with soil amendments and fertilizers to produce a soil mixture best for lawn growth. See Section 329110 "Soil Preparation-Topsoil" and drawing designations for topsoil.

F. Subgrade: The surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before topsoil is placed.

1.5 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.6 ACTION SUBMITTALS

A. Product Data:

1. Erosion control blanket and anchors.
2. Fertilizers - from manufacturer.
3. Mycorrhizal inoculum.
4. Pesticides and herbicides: Product label, manufacturer's product data sheet, application instructions and application equipment.
5. Seeding and mulching equipment.
6. Straw Mulch tackifier – materials and equipment.
7. Lawn maintenance equipment.
8. Hydroseeding/hydromulching products – equipment and materials.
9. Maintenance edge aggregate gradation analysis.
10. Maintenance edge aggregate separation fabric.

B. Source Quality Control:

1. Samples:

a. Sod: 3 foot long (On-Site).
b. Straw Mulch: 1 cubic foot (On-Site).

2. Test Report:

a. Topsoil: Test reports including soil amendments and fertilization rates for each seed mix. Refer to Section 329100 Soil Preparation (Topsoil).

3. Certifications/Licenses:

a. Certification of Grass Seed for each grass-seed monostand or mixture, stating the botanical and common name, percentage by weight of each species and variety, and percentage of purity (PLS), germination, weed seed, year of production, and date of packaging. Include identification of source, name and telephone number of supplier.
b. Certification of sod from proposed sod supplier that identifies quality standard, turf species stating the botanical and common names, proportions of each species in the sod, composition of the root zone soil in which the sod has been grown, and date the sod was planted. Include identification of source, name and telephone number of supplier.

C. Field Quality Control:

1. Project Work Schedule: Within 4 weeks following the issuance of the Notice to Proceed, submit a project work schedule to the Landscape Architect indicating dates for delivery, installation, and Substantial Completion for all landscape work. The Schedule shall be comprehensive and address procurement, delivery, and installations of irrigation, lawn areas of the site. For a large site, the schedule shall reflect a phased installation and shall include support graphics required to identify this phased approach. Refer to 1.10 below for a complete list of schedule requirements.
2. Maintenance Schedule: Within 4 weeks following the issuance of the Notice to Proceed, submit a detailed typewritten approach and schedule for the warranty maintenance of all landscape activities outlined under 3.13 of this section. Coordinate landscape maintenance with other applicable Sections Section 329300 Exterior Plantings and combine all maintenance activities into one plan of action. The schedule shall be comprehensive and shall be the basis for monthly payment during the maintenance period.
3. Irrigation Plan: Prior to the issuance of Substantial Completion, submit a detailed typewritten approach and schedule that outlines watering requirements for maintaining the landscape as described herein. The Irrigation Plan shall be submitted in conjunction with the Maintenance Schedule. The plan shall address how the irrigation system will be operated during the warranty period, frequencies and durations that will be established to provide the correct watering rates for plants and lawns, inspection protocols and winterization procedures. If the automatic irrigation system is inoperative or not present, provide an approved temporary irrigation system or hand water from a source approved by the Landscape Architect and Owner's Representative. The system shall have the ability to be operated without moving hoses or sprinklers around the site between seeded/planted areas (i.e. system can be set to water one area for the required maintenance period), and may be automated with a timer. Supply all water and equipment at the Contractor’s expense from a source approved by the Owner's Representative. Reliance on natural precipitation will only be allowed with provision of recorded data from a rain gauge located within a 2-mile radius of the project site. The schedule shall be comprehensive and shall be the basis for monthly payment during the maintenance period.
4. Maintenance Report Forms: Using the approved Maintenance Schedule and Irrigation Plan as the framework for all maintenance activities (plant maintenance, and seed bed maintenance and irrigation operations). The Contractor shall provide detailed maintenance report forms for each site visit. The reports shall be completed by the on-site maintenance superintendent performing the work prior to leaving the site and shall be submitted monthly as back-up to each invoice. Office prepared reports will not be permitted and payment for this work will only be made by the Owner when proof of completed specified maintenance has been provided. Each report shall include the following:

    a. Date of activity.
    b. Length of time on site (start time and finish time).
    c. Name and signature of the maintenance superintendent.
    d. Number of personnel performing the work.
    e. Site climatic conditions (rain, wind, temperature, etc.)
    f. Detailed description of maintenance activities performed by area.

1.7 INFORMATIONAL SUBMITTALS

A. Qualification Data:

1. Include list of at least three similar projects completed in the last 5 years by Installer demonstrating Installer's capabilities and experience. Include project names, addresses, and year completed, and include names and addresses of owners' contact persons.
2. Provide resumes of field technician (foreman) responsible for managing the purchase and installation of all materials. Separate resumes shall be provided for the seeding, planting, irrigation and maintenance technicians.
3. License certificates for pesticide applicator.

1.8 QUALITY ASSURANCE

A. Qualifications:

1. The Contractor shall be a company specializing in seeding, sodding, exterior landscape, installations and maintenance, having a minimum 5 years' experience in projects of the scope and scale being specified.
2. Installer's field technician: The installer shall provide a full-time supervisor on site when work is in progress.
3. Maintenance field technician: The maintenance activities for all turf areas shall be performed by skilled employees of the landscape installer. Subcontractors specializing in landscape and turf maintenance will not be permitted unless approved in writing by the Owner's Representative.
4. Pesticide applicator: State licensed, commercial.

1.9 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 compliance with state and Federal laws, as applicable. During shipment and storage on site, protect materials from breakage, moisture, heat or other damage.

B. Sod: Harvest, deliver, store, and handle sod according to requirements in "Specifications for Turfgrass Sod Materials" and "Specifications for Turfgrass Sod Transplanting and Installation" sections in TPI's "Guideline Specifications to Turfgrass Sodding". Deliver sod within 24 hours of harvesting and in time for planting promptly. Protect sod from breakage and drying.

C. Straw Mulch: Straw mulch shall be stored off the ground under a cover that provides protection from moisture and humidity.

D. 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.
3. Accompany each delivery of bulk materials with appropriate certificates.

1.10 SCHEDULING

A. Work Schedule:

1. Upon authorization to proceed with the work, submit a project work schedule indicating the dates of each of the following items:

    a. Submittal schedule.
    b. Delivery of materials to the site.
    c. Layout of seed bed locations on the site.
    d. Installation including; topsoil placement, fine grading, seeding and sodding .
    e. Substantial Completion of the work.

2. Update schedule monthly to reflect progress of the work.

B. Seasonal Limitations:

1. Seed mixes shall be installed during planting seasons normally recognized in the job locality.
2. Cool Season Grasses: Install during the spring and fall only when soil temperatures are between 50 and 65 degrees Fahrenheit and air temperatures is 60 to 75 degrees Fahrenheit.

    a. Approximate spring installation: Between April 1 and May 15.

b. Approximate fall installation: Between August 15 and September 30 but no later than 60 days before the first average annual frost date.

3. Dormant seeding: Due to construction operations and schedules, if contractor cannot install seed/sod between April 1 and May 15, Contractor to seed/sod and provide irrigation to the area with Owner Representative's Approval.

4. If special circumstances warrant installation outside the normal installation season, submit a written request to the Owner's Representative describing conditions and stating the proposed variance. Seeding/Sodding outside the specified seasons may extend warranty obligations and will be dependent upon the extent of the variance.
5. Weather limitations: Proceed with seeding and sodding 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.
6. Coordination with Plantings: Plant trees, shrubs, and other plants after finish grades but prior to lawn installation unless otherwise indicated. When planting trees, shrubs, and other plants after lawn installation, protect completed areas, and promptly repair damage caused by planting operations.

1.11 WARRANTY, MAINTENANCE AND ACCEPTANCE

A. Substantial Completion:

1. The Substantial Completion inspection shall occur for the Phase 1 site work and landscape prior to the County Fair in 2019. Two Notice of Substantial Completion will be issued for Phase 1 (Building) and Phase 2 (Keeley Park). Following the inspection, the Landscape Architect will issue a punch list identifying all work requiring completion or correction.
2. The Substantial Completion inspection for the landscape shall occur in phases based upon the phasing plan approved at the beginning of the work by the Owner's Representative Following the inspection, the Landscape Architect will issue a punch list identifying all work requiring completion, replacement or correction.
3. The Contractor shall complete all punch list items within 2 weeks of its issuance. All repairs shall occur at no additional cost to the Owner.
4. Substantial Completion will be provided for all lawn areas complying with the following:

   a. Landscape Architect approval of all specified submittals.
   b. The work shall be 100% complete (including all site preparation, earthwork, topsoil, seeding, sodding, mulching, erosion control blanket, planting, irrigation and clean-up), and ready for inspection.

5. After receiving a Notice of Substantial Completion, warrant and maintain all lawn areas in a vigorous, well-kept condition until Final Acceptance.

B. Final Acceptance:

1. Approximately two weeks prior to the expiration of the warranty and maintenance period (or sooner if plantings are included in the inspection), the Owner's Representative will conduct an inspection of all lawn areas, plantings, irrigation system and review all previously submitted maintenance report forms to verify all completed maintenance activities. There shall be thorough documentation previously submitted by the contractor and field observations made by the Owner or Landscape Architect that the specified maintenance has occurred. Following the inspection, the Landscape Architect will issue a punch list identifying all work requiring completion, replacement or correction.
2. The Contractor shall complete all punch list items within 2 weeks of its issuance. All repairs shall occur at no additional cost to the Owner.
3. Final Acceptance will be based upon Owner approval and the work having:

   a. Uniform finished grades conforming to the drawings and free of erosion.

b. All maintenance items completed and documented by Contractor through maintenance report forms.
c. Satisfactory Seeded Lawn: At end of warranty and maintenance period, a healthy, uniform well-rooted, even-colored, close stand of grass has been established, free of weeds, disease and insect problems, and surface irregularities, with 100% coverage of the specified species.
d. Satisfactory Sodded Lawn: At end of warranty and maintenance period, a healthy, well-rooted, even-colored, viable lawn, free of weeds, disease and insect problems, open joints, bare or dead areas, and surface irregularities.

4. Areas which do not meet the contract requirements shall be regraded as needed and seeded, mulched, sodded. Use specified materials and procedures to reestablish lawn that does not comply with requirements and continue maintenance at no cost to the Owner until lawn is satisfactory.
5. Final Acceptance and the end of the warranty period for the lawns will occur only after all punch list items have been satisfactorily completed and the site is left in the condition specified under Cleanup and Protection.

C. Warranty and Maintenance Period:

1. The end of the warranty and maintenance period shall be:

a. July – one year following fall Substantial Completion (Phase 2).

b. October 31 – one year following fall Substantial Completion (Phase 1).

1) When the initial warranty and maintenance period has not elapsed before end of growing season (October 31), or if lawns are not fully established, continue maintenance during next growing season until all maintenance and warranty obligations have been met.

2. The Contractor will not be held responsible for defects resulting from neglect by Owner, abuse or damage by others, or unusual phenomena or incidents beyond landscape installer's control which result from floods, hail storms, winds over 100 miles per hour, fires or vandalism, unless Contractor has not completed specified installation in a manner that could have protected the landscaping from these phenomena.
3. If, in the opinion of the Owner’s Representative it is advisable to extend the warranty and maintenance period for an additional growing season, the contractor will be notified of such requirement by the Owner. Improper execution of the installation and/or failure to perform and document the specified maintenance in accordance with contract requirement shall be the basis for extending the period of establishment for a second growing season. All specified maintenance and warranty requirements will be required during this extended period and all costs shall be the responsibility of the Contractor.

PART 2 - PRODUCTS

2.1 SEED

A. Grass Seed: Fresh, clean, dry, new-crop seed complying with AOSA's "Rules for Testing Seeds" for purity and germination tolerances.

B. Other varieties that those specified may be submitted for approval to Landscape Architect, but they must be newer, more improved cultivars than what is listed.

C. Dormant seeding shall only be permitted if approved by Landscape Architect in writing. Apply seed at a rate that is 25 percent higher than the rates specified below.

D. Seed Species:

1. Quality: Seed of grass species as listed below for solar exposure, with not less than 90 percent germination, not less than 98 percent pure seed, and not more than 0.3 percent weed seed:

2. Full Sun: Kentucky bluegrass (Poa pratensis), a minimum of three improved turf type varieties.

    a. Install at a rate of 4 pounds Pure Live Seed (PLS) per 1000 square feet of bed.

3. Sun and Partial Shade Blend: Proportioned by weight as follows:

    a. 60 percent Kentucky bluegrass (Poa pratensis), a minimum of three improved turf type varieties.
    b. 30 percent fine fescue (Festuca), a minimum two varieties; chewing and creeping red.
    c. 10 percent perennial ryegrass (Lolium perenne).
    d. Install at a rate of 4 pounds Pure Live Seed (PLS) per 1000 square feet of bed.

4. Shade Blend: Proportioned by weight as follows:

    a. 65 percent fine fescues (Festuca), a minimum of three varieties consisting of chewing, creeping red and hard.
    b. 25 percent Kentucky bluegrass (Poa pratensis), a minimum two turf type varieties.
    c. 10 percent perennial ryegrass (Lolium perenne), use shade tolerant variety.
    d. Install at a rate of 6 pounds Pure Live Seed (PLS) per 1000 square feet of bed.

5. Shade and Sun Fescue Blend: Proportioned by weight as follows:

    a. 100% turf type tall fescue (Festuca) consisting of a minimum 3 improved varieties.
    b. All varieties shall be labeled endophyte free or contain beneficial endophytes.
    c. Install at a rate of 8 pounds Pure Live Seed (PLS) per 1000 square feet of bed.

2.2 TURFGRASS SOD

A. Provide an approved nursery grown, Number 1 Quality/Premium sod, complying with “Specifications for Turfgrass Sod Materials” in TPI’s “Guideline Specifications to Turfgrass Sodding”. Furnish sod comprised of the specified species and of uniform density, color, and texture, strongly rooted, weed free and capable of vigorous growth and development once installed. Sod shall be 2 years old and shall have been grown at a sod nursery in a mineral-based root zone. Sod grown on peat (organic soil) will not be approved. Sod shall be free of objectionable grassy and broad leaf weeds.

B. Thickness and width of sod shall be kept to strict dimensions, with width being 24” and containing 90-degree angle cut edges. Netting associated with harvest must be removed before installation.

C. Turfgrass Sod Species: Sod of grass species as follows, with not more than 0.5 percent weed seed:

1. Full Sun: Kentucky bluegrass (Poa pratensis), a minimum of three improved turf type varieties.
2. Sun and Partial Shade: Proportioned by weight as follows:

    a. 60 percent Kentucky bluegrass (Poa pratensis), a minimum of two improved turf type varieties.
    b. 40 percent chewing red fescue (Festuca rubra variety) a minimum of two varieties.

3. Shade: Proportioned by weight as follows:

    a. 60 percent fine fescues (Festuca), a minimum of two varieties; chewing, creeping red and hard.
    b. 40 percent Kentucky bluegrass (Poa pratensis), a minimum of two turf type varieties.

D. Turfgrass-Sod Species: Proprietary blend as follows: <insert sod product name and supplier>.

E. Sod Stakes: Sod Stakes shall be natural based plastic that is 100% biodegradable from microbial activity in accordance with ASTM D5338 or D6400, formed in a T-shaped with barbed heads and shoulders, minimum six inches long, color green and installed per manufacturer spacing and installation instructions.

2.3 STRAW MULCH

A. Straw Mulch: Provide stalks from oats, wheat, rye, barley or rice that are free of weeds, air-dry, clean, mildew- and seed-free, threshed straw of wheat, rye, oats, or barley.

1. Straw shall be in an air dry condition and suitable for placing with commercial mulch blowing equipment.

B. Tackifier

1. Hydraulically applied tackifier shall be an organic based or polymeric emulsion blend designed for use over long-fibered mulch (straw). Tackifier shall:

a. Be powder or liquid based
b. Achieve a drying time between 12 and 18 hours
c. Minimum 4 month longevity after application

2. Asphalt Emulsion tackifier is not permitted.

2.4 HYDRAULIC MULCH

A. Hydraulic mulch is not permitted.

B. Hydraulic Mulch: Provide biodegradable, cellulose fiber mulch made from 100% post-consumer recycled paper, or a combination of 70% recycled wood fiber and 30% post-consumer recycled paper cellulose fiber. Mulch should be processed to contain no growth or germination-inhibiting factors, nontoxic and dyed an appropriate color to facilitate visual metering of the application of materials. On an air-dry weight basis, provide hydroseeding mulch containing not more than 12 percent moisture, plus or minus three percent at the time of manufacture, with a pH range from 3.5 to 5.0 for wood/cellulose fiber blends and from 5.0 to 9.0 for 100% cellulose fiber mulch. Provide hydraulic mulch manufactured so that:

1. After addition and agitation in slurry tanks with the fibers, tackifier and water, the material will become uniformly suspended to form an homogeneous slurry. Mixing the lawn seed, fertilizers and soil amendments is prohibited.
2. When hydraulically sprayed on the ground, the material will form a blotter-like cover.
3. The cover will allow the absorption of moisture and allow rainfall or applied water to percolate to the underlying soil.

C. Hydraulic Mulch Tackifier

1. Binding agent shall clear and non-staining and result in a stabilized fiber matrix consisting of wood and/or paper fibers and a stabilizing emulsion that includes a hydro-colloidal tackifier and polycarbonate flocculant specific to hydraulic mulch applications.
2. Use products as recommended by fiber-mulch manufacturer for slurry application.
3. Asphalt Emulsion tackifier is not permitted.

2.5 EROSION CONTROL BLANKET

A. Erosion Control Blanket - [Type 1]: Intended for use on flat surfaces or slopes 4:1 (H:V) or greater where only sheet flow will be encountered.

1. Straw/jute blanket shall be constructed with a 100% agricultural straw matrix (0.5 lbs per square

yard), with jute or cotton netting on top and bottom, sewn together with biodegradable cloth thread. The blanket shall be 100% biodegradable, and have a typical functional longevity of 12 months after installation. Plastic netting will not be permitted.

B. Erosion Control Blanket - [Type 2]: Intended for use on slopes 4:1 (H:V) or greater or in drainage swales with velocities up to 8 feet per second (fps).

1. Straw/coconut fiber blanket shall be constructed with 70% agricultural straw (0.35 lbs per square yard), and 30% coconut (coir) fiber matrix (0.15 lbs per square yard), with 100% woven jute netting on the top and bottom, sewn together with biodegradable cloth thread. The Blanket shall be 100% biodegradable, and have a typical functional longevity of 18 months after installation. Plastic netting will not be permitted.

C. Erosion Control Blanket - Type 3: Intended for use on slopes 4:1 (H:V) or greater or in drainage swales with velocities up to 10 feet per second (fps).

1. Coconut fiber blanket shall be constructed with 100% coconut (coir) fiber matrix (0.50 lbs per square yard), with 100 % woven coir fiber netting on top and 100% woven jute netting on the bottom, sewn together with biodegradable cloth thread. The Blanket shall be 100% biodegradable, and have a typical functional longevity of 24 months after installation. Plastic netting will not be permitted.

D. Fasteners: Fasteners shall be natural based plastic that is 100% biodegradable from microbial activity in accordance with ASTM D5338 or D6400, formed in a T-shaped with barbed heads and shoulders, minimum six inches long, color green and installed per manufacturer's spacing and installation instructions.

2.6 EQUIPMENT

A. Tiller:

1. Equipment used for subsoiling or ripping compacted subsoils on slopes up to 2:1 (H:V): A minimum D-7 size tractor with a mounted ripper consisting of 3 to 5 tines spaced a maximum 24 inches apart. Tines shall be equipped with 12 inch wide winged ripper points and shall be capable of penetrating subsoils up to 24 inches deep in one pass.
2. Equipment used for subsoiling or ripping compacted subsoils on slopes up to 4:1 (H:V): A tractor mounted disk harrow consisting of 6 – 12 offset disks weighing a minimum 1,800 pounds each. The harrow shall be capable of penetrating subsoils up to 18 inches deep in one pass.

B. Fine Grading: Hand rake, tractor mounted york rake or other similar equipment.

C. Hydroseeder: Hydroseeding will not be permitted.

D. Hydroseeder: A truck-mounted, hydraulically driven variable speed agitation seeder that effectively shoots an aqueous mixture of seed, fertilizer, and mulch over broad areas through a discharge boom and hydraulic hose. Minimum tank capacity shall be 1,000 gallons.

E. Drop Spreader with Cultipacker, as manufactured by Brillion or John Deere or equivalent.

F. Broadcast Seeding: A spinning-disc type broadcaster with a calibration gauge (hand held and tractor mounted) shall be used to broadcast the seed over the designated areas.

G. Seed Imprinting Equipment: Used with spinning-disc type broadcaster to lightly cover or press seed into the soil. A tractor or all-terrain vehicle mounted dragging devise consisting of anchor chains, disk chains, cables, chain harrow or other similar equipment.

H. Straw Mulcher: A power mulcher that thrashes and separates, then evenly distributes the straw at a capacity between 2 and 20 tons per hour, with a discharge distance between 35 and 100 feet in still air.

I. Crimping Device: A mulch disc or other mechanical anchoring/crimping device for use in anchoring straw mulch into place, such as a Reinco Model MD-96 or equivalent, having flat discs with notched edges spaced 8” apart to impress mulch 1-3” down into soil.

2.7 WATER

A. Water for lawns shall be available from on-site sources.

B. Water shall be free of wastewater effluent or other hazardous chemicals

2.8 TOPSOIL

A. Refer to Section 329100

2.9 SOIL AMENDMENTS

A. Peat shall be a product having at least 95% organic content consisting of sphagnum peat moss with a pH range of 3.0 – 4.0 and Von Post decomposition value of H1 – H3, or low-lime reed-sedge peat with a pH range of 4.0 to 5.0 and Von Post decomposition value of H4 – H6. Product shall be free of sticks, wood or other debris.

B. Compost shall be a heavily decomposed mature/stabilized, humus-like material derived from the aerobic decomposition of yard clippings or other compostable materials. Manure is not suitable for use. The compost shall have a dark brown or black color, be capable of supporting plant growth without ongoing addition of fertilizers or other soil amendments and shall not have an objectionable odor. The compost shall be free of plastic, glass, metal and other physical contaminants, as well as viable weed seeds and other plant parts capable of reproducing (except airborne weed species). Composting facility shall be tested in accordance with the United States Composting Council, Seal of Testing Assurance (STA) following procedures as outlined in the Test Methods for the Examination of Composting and Compost protocols (TMECC).

1. pH: 5.5 to 8.
2. Moisture content: 35 to 55 percent by weight. No visible free water or dust is produced when handling it.
3. Sieve analysis: 100 percent passing ¾ inch screen.
4. Soluble salt content: Less than 5 percent.
5. Organic matter content: Minimum 60 percent.

C. Sand shall be clean, coarse, ungraded, meeting the requirements of ASTM C33 for fine aggregates.

D. pH Adjusters:

1. Lime shall be finely ground agricultural grade dolomitic limestone containing not less than 85% calcium and magnesium carbonates conforming to ASTM C602, Class T or O.
2. Elemental sulfur shall be granular, biodegradable, horticultural grade material containing at least 90% sulfur, with a minimum of 99% passing through No. 6 sieve and a maximum of 10% passing through No. 40 sieve.

E. Mycorrhizal Inoculum:

1. Mycorrhizal fungi in the inoculant shall be available as propagules, i.e., spores, root fragments and hyphae. The inoculant shall contain highly selected strains of low host specificity endo- and ectomycorrhizal fungi combined with other beneficial fungi (Trichoderma), humic acids, biostimulants, beneficial bacteria, soluble sea kelp, and yucca plant extracts, as manufactured by

Horticultural Alliance or approved equal. The selection of inoculants shall be based upon fungal partners that are compatible with the specified turf grasses.

2.10 FERTILIZER

A. Fertilizer shall be a complete fertilizer of neutral character, consisting of fast and slow-release nitrogen and shall be applied at the rates and formulations that release nutrients when new plants can effectively draw them from the soil.

1. The percentages of slow release and fast release nitrogen shall be adjusted based on the time of year fertilizers are being applied.
2. For fall seeding, the percentage of slow-release nitrogen shall be higher that spring seeding since a high percentage of fast-release nitrogen will be mostly lost by runoff or infiltration before plant uptake.

B. Composition: The percentages by weight shall be determined per recommendations of the soil testing reports for lawns.

2.11 PESTICIDES

A. General: Pesticide and herbicides shall be registered and approved by the EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides and herbicides unless authorized in writing by authorities having jurisdiction.

B. Pre-Emergent Herbicide (Selective and Nonselective): Effective for controlling the germination or growth of weeds within seeded areas at the soil level.

C. Post-Emergent Herbicide (Selective and Nonselective): Effective for controlling weed growth that has already germinated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. General:

1. The Contractor shall establish a quantifiable system to be employed in the field for measuring areas, weighing products and calibrating equipment on a daily basis to ensure all products are installed at the specified rates of application.
2. Prior to beginning work, examine and verify the acceptability of the project site and notify the Owner’s Representative of unsatisfactory conditions. Do not proceed with the work until unsatisfactory conditions have been corrected or resolved.
3. Identify areas of subsoil compaction prior to placement of topsoil.
4. Verify that no foreign or deleterious material has been deposited in soil within a planting area.
5. Where lawn installation occurs in close proximity to other site improvements, provide adequate protection to all features prior to commencing work. Promptly repair any items damaged during installation operations to their original condition.
6. Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions.
7. Suspend spoil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
8. Uniformly moisten excessively dry soil that is not workable and which is too dusty.
9. If lawn areas die or are rejected due to non-conformity to contract requirements, they must be removed from the site immediately and replaced before Substantial Completion.

B. Utilities: Have all underground utilities located by servicing agencies. In the vicinity of utilities, hand-excavate to minimize possibility of damage.

C. Coordination with Other Work:

1. The Contractor shall coordinate work with other contractors or trades to determine the appropriate sequence of landscape installation with respect to other work on the site.
2. Completed work installed out of construction sequence which is subsequently disturbed by the completion of work by other trades shall be repaired by the landscape installer at no cost to the Owner.
3. Maintain grade stakes and layout controls set by others until removal is mutually agreed upon by all parties concerned.

3.2 SUBGRADE PREPARATION

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

B. Install erosion control measures, if necessary, to prevent erosion or displacement of soils and discharge of soil-bearing water run-off or airborne dust to adjacent properties, natural resources and walkways.

C. Vegetation Removal: Strip and dispose of organic debris and root mat.

D. Topsoil stripping, stockpiling: Refer to Section 311000 - Site Clearing.

E. Maintain subgrade in areas to be topsoiled in a uniform condition so as to prevent future depressions. Prior to placing topsoil;

1. Till all subsoils to a minimum depth of 18-inches with approved equipment to remove all compacted subsoils. Tilling shall be complete breaking thoroughly fracturing. Perform tilling in two directions, one perpendicular to the other.
2. Upon completion of tilling, the subsoils will require light compaction and leveling to prevent ponding of water and settlement after topsoil placement. As a final operation, a light-weight tracked dozer shall be employed that will remove surface irregularities and prevent excessive settlement. During this procedure, the surface of the subsoil on slopes greater that 4:1 (H:V) shall be imprinted with tracks from the dozer. Imprinting shall be perpendicular to the slope and shall be approximately one-inch deep.
3. Do not proceed with topsoil placement until subgrade tilling and imprinting is completed to the satisfaction of the Landscape Architect.
4. Repair disturbances to previously graded areas and remove surplus subgrade material associated with any landscape construction.

F. If the prepared subgrade is eroded or compacted by rainfall prior to topsoil placement, rework the surface as specified.

G. In locations where existing topsoil has not been removed, till entire area in accordance with paragraph E above. Do not till within dripline of existing trees.

3.3 PLACING TOPSOIL, SOIL AMENDMENTS AND FERTILIZER

A. Provide, fertilize and amend topsoil in accordance with testing laboratory recommendations specified under Section 329113 "Soil Preparation (Topsoil)".

B. Uniformly distribute topsoil on lawn areas so that after light compaction and finish grading, a uniform depth of 4-inches is achieved. Reduce elevation of planting soil to allow for thickness of sod. Placement shall include spreading, cultivating, lightly compacting, dragging and grading to the conditions specified below.

C. Topsoil, when placed, shall be dry enough so as not to puddle or bond. Do not place topsoil when the subgrade is frozen, excessively wet, extremely dry or in a condition otherwise detrimental to proper grading or lawn operation.

D. Following topsoil placement but prior to finish grading, broadcast all soil amendments and fertilizer and rototill into the topsoil. The coverage areas for soil amendments and fertilizer shall be carefully calculated by the installer and fully blended into the entire topsoil profile. Do not incorporate soil amendments and fertilizer more than 5 days in advance of seeding.

E. Mycorrhizal Inoculum:

1. Rototill two granular pounds per 1,000 square feet of seed bed into the top four to six inches of topsoil or as recommended by supplier.

3.4 PRE-INSTALLATION PREPARATION

A. Finish Grading:

1. Immediately before lawn installation scarify, loosen, float, and drag topsoil as necessary to bring it to the proper condition. Remove all foreign matter larger than 1” in diameter. There shall be no visible plants, roots, debris or any foreign material present prior to installation.
2. Finished grades shall slope to drain, be free of depressions or other irregularities, lightly compacted to prevent settlement, and shall be uniform in slope between grading controls and the elevations indicated.
3. Finished grade for seeded lawn areas shall meet existing grades at contract limits and be ½” below top of curbs, walk paving, and metal edging if used.
4. Finished grade for sodded areas shall meet existing grades at contract limits and be 1” below top of curbs, walk paving, and metal edging if used.

B. Before lawn installation obtain Landscape Architect's acceptance of finish grading. Restore seedbed areas if eroded or otherwise disturbed after finish grading.

3.5 SEEDING AND MULCHING

A. Moisten prepared area before seeding if soil is dry. Water thoroughly and allow surface to partially dry before seeding. Do not create muddy soil.

B. Pay close attention to weather conditions. Ensure each area being seeded is fully completed in advance of weather conditions such as heavy rains and strong winds that will result in damage to the unfinished work. Fully completed shall mean seeding, dragging, mulching, crimping and tackifier.

C. Seeding Procedures:

1. Do not sow seed when weather conditions are unfavorable, such as during drought or high winds.
2. Perform seeding with only approved equipment. Do not broadcast or drop seed when wind velocity exceeds 10 mph.
3. Sow the seed uniformly at a rates specified under 2.1 of this section. For dormant seeding, increase seeding rates by 25% 9 (if accepted by Owner’s Repreentative).
4. Do not use wet seed or seed that is moldy or otherwise damaged.
5. Do not seed against existing trees. Limit extent of seed to outside edge of planting saucers, plant beds and other seed beds.
6. Evenly distribute seed by sowing equal quantities in two directions at right angles to each other.
7. Immediately following seeding, rake, drag or float all seed beds to provide a light covering of topsoil approximately 1/8 inch deep. When using equipment that lightly injects the seed into the soil, include equipment that lightly rolls the seed bed to provide good moisture contact between the seed and soil.
8. Maintain soil moisture in accordance with 3.11 below.

D. Mulching Procedures:

1. Do not use any straw that contains weeds and other plants that will contaminate the seed beds with unspecified plants. Carefully inspect each bale of straw prior to spreading and any bales observed to be contaminated with weeds shall be removed from the site on a daily basis.
2. Do not mechanically blow straw when wind speeds exceed 10 mph.
3. Remove all straw that has been deposited outside the limits of seeding and on adjacent pavement, plant beds and tree saucers.
4. Spread straw mulch evenly at the rate of approximately 2 tons dry straw per acre. Place all mulch over all seeded areas within 24 hours after seeding. A mechanical blower or hand spreading shall be used to apply mulch material, provided the machine has been specifically designed and approved for this purpose. Mulch shall be uniform in thickness and cover resulting in a blanket of straw approximately 1 ½ inches loose thickness with little to no visible soil.
5. Slopes 4:1 or steeper and drainage swales shall be stabilized with erosion control blanket in accordance with 3.12 below.
6. For dormant seeding, mulching shall be replaced with erosion control blanket in accordance with 3.12 below at no additional cost to the Owner.

E. Anchoring Mulch Procedures:

1. Anchor the mulch by using both an approved crimping device and applying tackifier on the mulched surface immediately following mulching operation.
2. Mulch shall be crimped in all seed beds where slopes are less than 4:1 (H:V) and of sufficient width to allow equipment to perform crimping without damaging the finish seed bed. Crimp all locations in two directions. When finished, straw shall be anchored one to two inches into the seed bed in rows no more than eight inches apart.
3. Tackifier shall be applied at the rate recommended by the manufacturer and shall be applied uniformly to all mulch either simultaneously with mulching operation or in a separate application. Take precautionary measures to prevent materials from marking or defacing structures, pavements, utilities, or plantings. Immediately clean all stains and damaged areas.
4. Any seed and mulch displaced due to improper crimping and bonding with tackifier shall be immediately replaced to the specified condition at no addition cost to the Owner.

3.6 HYDROSEEDING AND HYDROMULCHING

A. Protect adjacent and adjoining areas from hydroseeding and hydromulching overspray.

B. Moisten prepared area before seeding if soil is dry. Water thoroughly and allow surface to partially dry before seeding. Do not create muddy soil.

C. Pay close attention to weather conditions. Ensure each area being seeded is fully completed in advance of weather conditions such as heavy rains and strong winds that will result in damage to the unfinished work. Fully completed shall mean, seeding, mulching, crimping and tackifier.

D. Hydroseeding and mulching shall be installed as a two-step process.

1. Step One: Apply the seed and water slurry at the specified seed-sowing rate, with a light application of an approved hydraulic fiber mulch tracer.
2. Step Two: Apply the specified straw mulch and tackifier at specified rate, see 3.5 D and E above. Combining both steps into one will not be permitted.

E. Hydroseeding – Step One Procedures:

1. Fertilizer and soil amendments shall be applied as specified under 3.3 above and shall not be included within the step one slurry.
2. Apply seed on the previously prepared bed at the rates specified under 2.1 of this section. For dormant seeding, increase seeding rates by 25%.

3. Water used shall be obtained from fresh water source, and shall be free from injurious chemicals and other toxic substances at all times. Identify to the Owner all sources of water at least two weeks prior to use. The Owner, at his/her discretion, may take samples of the water at the source or from the tank at any time and have a laboratory test the samples for chemical and saline content.
4. Mixtures shall be constantly agitated from the time they are combined until they are finally applied to the seed bed. Once combined, mixtures shall be used within 8 hours.
5. Apply slurry uniformity and at the prescribed rate, avoiding misses and overlapping areas, gauging quantities of mixtures to measured application areas. Checks on the rate and uniformity of application may be made by the Landscape Architect observing the degree of wetting, or by distributing test sheets and observing the quantity of seed deposited thereon.
6. Direct application nozzle sufficiently upward so that the mixture falls to the ground in a uniform shower. Never direct spray toward the ground in a manner that produces erosion or runoff. Discontinue application during periods of high wind that affect the ability to properly apply the seed at a uniform cover.
7. Maintain soil moisture in accordance with 3.11 below.

F. Mulching – Step Two Procedures:

1. Hydromulching is not permitted. Apply straw mulch and erosion control blanket and anchor to soil as specified under 3.5 above.
2. Mulch all seeded areas with specified hydraulic mulch following the same requirements outlined under 3.6 E above.
3. Hydraulic mulch shall be applied at the following rates:

   a. 100% cellulose fibers: 2,000 lb/acre on slopes flatter than 4:1 (H:V).
   b. 70% wood fiber / 30% cellulose fiber: 2,500 lb/acre of slopes flatter than 4:1. (H:V).

4. Slopes 4:1 or steeper shall be stabilized with erosion control blanket in accordance with 3.12 below.
5. For dormant seeding, mulching shall be replaced with erosion control blanket in accordance with 3.12 below at no additional cost to the Owner.

G. Anchoring Mulch Procedures:

1. Spray hydraulic mulch tackifier concurrent with or immediately after mulching following the same requirements outlined under 3.6 E above.
2. Use only an approved tackifier applied at the rate recommended by the manufacturer.
3. Tackifier shall be applied at the rate recommended by the manufacturer and shall be applied uniformly to all mulch either simultaneously with mulching operation or in a separate application. Take precautionary measures to prevent materials from marking or defacing structures, pavements, utilities, or plantings. Immediately clean all stains and damaged areas.
4. Any seed and mulch displaced due to improper installation of tackifier shall be immediately replaced to the specified condition at no addition cost to the Owner.

3.7 TURF RENOVATION

A. All preparation work shall be conducted in accordance with 3.1 through 3.4 above. Following surface preparation, lawn installation shall be completed in accordance with the applicable lawn installation methods specified above. Blend newly seeded areas into adjacent existing lawns.

B. Renovate existing lawns where indicated. In areas where diseased or contaminated lawns are identified, remove existing topsoil and dispose off site.

C. Renovate lawns damaged by Contractor's operations, such as storage of materials, haul roads or other areas outside the limits of work.

D. Renovate lawns where topsoil containing foreign materials, such as oil drippings, fuel spills, stones, gravel, and other construction materials resulting from Contractor's operations has occurred. Remove existing topsoil and dispose off-site.

E. Mow, dethatch, core aerate, and rake existing turf where identified.

F. Maintain soil moisture in accordance with 3.11 below.

3.8 WATERING

A. Watering Procedures:

1. Immediately following lawn installation water all bed areas thoroughly and immediately with a fine mist until soil is soaked to a depth of at least 2-inches or as indicated above. Puddling of water or allowing the seedbed to dry is unacceptable.
2. For seeded areas, maintain soil in a moist condition (in hot dry weather irrigation may be required 2-4 times per day) until seeds have sprouted and reached a height of 1-inch. Water thereafter a minimum of once every 2-3 days unless natural rainfall has provided equivalent watering. Provide irrigation to moisten soil to a depth of 4” to encourage deeper rooting.
3. For sodded areas, begin watering the entire area within 24 hours of installation and water daily for the first two weeks; twice a day in hot dry weather. Keep soil in all areas moist but not soaked to 2-inches below the bottoms of the plants. Water thereafter a minimum of once every 2-3 days unless natural rainfall has provided equivalent watering until Final Acceptance. During this period, moisten soil to a minimum depth of 4” to encourage deeper rooting.
4. Watering at accelerated rates that dislodge seed and mulch materials or cause erosion shall be immediately repaired at no cost to the Owner.

3.9 EROSION CONTROL BLANKET

A. Erosion Control Blanket Procedures:

1. Install erosion control blanket as indicated in on the Plans and all seed beds with slopes 4:1 (H:V) or steeper.
2. Immediately following seeding, erosion control blanket shall be rolled out in place in the direction of the slope fall line. The material shall be applied without stretching and shall lie smoothly but loosely on the soil surface. Installers shall minimize walking directly on the seed or topsoil bed either before or after the blanket is applied.
3. All ends shall be buried a minimum of 4 inches deep and the trench shall be firmly tamped after closing.
4. In cases where roll ends join, the up-slope piece shall overlap the down-slope piece by at least 18 inches.
5. Anchor edges prior to backfilling trench, all overlaps at 12-inch intervals, and the center of each panel on 3-foot intervals.
6. The upslope ends of the blanket shall be buried a minimum of 6 inches deep and anchored at 12-inch intervals prior to backfilling trench.
7. Reseed all disturbed edges immediately following straw blanket installation and work seed into blanket.

3.10 MAINTENANCE

A. General: Maintain and establish lawn areas by watering, fertilizing, pest and weed control, litter removal, mowing, trimming, repairs, and performing other operations as required to establish healthy, viable lawn. Maintenance shall also include grade repair, seeding, sodding all associated soil amendments and fertilizers.

B. Provide all maintenance under the supervision of a skilled employee of the lawn installer. The skilled maintenance supervisor shall be: capable of operating the automatic irrigation system controller, conducting turf diagnostics to identify the presence of disease, insect and fertility problems, and directing a maintenance crew in the performance of horticultural maintenance practices identified below. Maintenance requirements identified below shall be the basis for information to be included in the Maintenance Schedule and Irrigation Plan identified under 1.5.C of this section and thoroughly documented under the required Maintenance Report Forms to verify the work has been properly performed.

1. Failure to perform and submit factual Maintenance Report Forms could result in non-payment for said services and require the extension of the warranty and maintenance period an additional year at the Contractor's expense.

C. Provide all equipment, materials, labor and services to maintain the landscape beginning immediately after each area is installed and continuing until Final Acceptance and the end of the warranty period. During this period, perform the following:

1. Inspect the entire landscape at least once per week during the growing season and perform needed maintenance promptly.
2. Prior to each mowing, collect all debris, litter and miscellaneous materials accumulating on the site and remove from the site.
3. Irrigation: Irrigate all turf areas to maintain optimum moisture within the root zone as specified under 3.11 above. When using an automatic sprinkler system, the lawn installer responsible for maintenance shall bear full responsibility to set each zone to the correct frequency and duration.
4. Mow all lawns weekly during the growing season and as described below. Mowing frequencies shall be adjusted based on cutting requirements and may require more frequent visits during high growth periods. Use mulching mower only with sharpened blades and alternate direction of each mowing session to prevent rutting.
5. Fertilize as described below.
6. Apply treatments as required to keep turf 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. Apply herbicides and pesticides as described below.
7. Remove leaves bi-weekly during the fall as they accumulate on the lawns. Bag and dispose off-site. Do not mow in advance of leaf removal.
8. Repair bare, eroded or settled areas and restore to provide a uniformly smooth lawn with the specified grasses. Provide same materials and installation procedures as those used in the original installation.
9. Reclaim/replace soil materials and turf damaged or lost in areas of subsidence. Roll, regrade, and replant bare or eroded areas to produce a uniformly smooth lawn.
10. In areas where mulch has been disturbed by wind or maintenance operations, add new mulch and anchor as required to prevent displacement.

D. Mowings: Mow turf as soon as top growth is tall enough to cut. Remove no more than one-third of grass-leaf growth in initial or subsequent mowings. At the time of each mowing, adjust mowing equipment to meet this requirement. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet. Schedule initial and subsequent mowings to maintain the following grass height:

1. Mow Kentucky bluegrass, fescue to a height of 2-1/2 to 3-inches.
2. For sodded lawns wait at least 2 weeks after installation for first mowing.
3. Mowing heights may increase during the hot summer months based on regional conditions.
4. Collect all grass clippings if mowings are not sufficiently timed to allow for composting into the existing lawn and accumulations of clippings can be observed on the surface of the grass. Collection and off-site disposal shall be performed at no additional cost to the Owner.

3.11 POST-INSTALLATION FERTILIZATION

A. Apply fertilizers at the time of season, rate of application and grade of N-P-K that maximizes the health of the lawn and minimizes the potential run-off of fertilizers to adjacent waterways and groundwater. Avoid the use of phosphorus unless site soils are deficient of this nutrient.

B. During the warranty and maintenance period, fertilize warm season grasses three times and cool season grasses two times during the growing season.

C. Test site topsoil in early-spring and base actual rates on testing recommendations.

D. Apply fertilizer during the following dates;

1. Spring (April / May): Cool season grasses: After the second spring mowing apply fertilizer at a rate of 1 lb. actual nitrogen per 1,000 square feet of lawn. Nitrogen shall be 70% slow-release. Avoid the use of phosphorous and apply at 4-0-1 ratio of N-P-K.
2. Fall (September/October): Warm and cool season grasses: 8 weeks following application of spring apply fertilizer at a rate of 1.5 lbs. actual nitrogen per 1,000 square feet of lawn. Nitrogen shall be water soluble, quick release. Avoid the use of phosphorous and apply at 3-0-1 ratio of N-P-K.

3.12 PESTICIDE APPLICATION

A. Apply pesticides, and other chemical products and biological control agents according to requirements of authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.

B. Post-Emergent Herbicides (Selective and Nonselective): Apply only as necessary to treat already-germinated weeds and according to manufacturer's written recommendations.

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

C. 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.

D. Protect newly seeded areas from stormwater flows discharging from paved surfaces until grass establishment. Additional water diversion and erosion control measures such as wattles and check dams may be utilized at Contractor's discretion and expense.

E. Remove nondegradable erosion-control measures after grass establishment period.

END OF SECTION

SECTION 329300 - EXTERIOR PLANTINGS

PART 1 - GENERAL

1.1 Related Documents

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

1.2 SUMMARY

A. Section Includes:

1. Tree and shrub plantings.
2. Herbaceous perennials, ornamental grasses.
3. Annual plantings.
4. Plant procurement.
5. Planting mixtures.
6. Plant mulch.
7. Staking and guying.
8. Maintenance.
9. Warranty replacements.

B. Related Requirements:

1. Section 015639 "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 311000 “Site Clearing” for stripping on-site topsoil.
3. Section 312000 “Earth Moving” for mass grading of the site.
4. Section 329100 “Soil Preparation (Topsoil)” for lawns and plant mixture amendment.
5. Section 329200 “Lawns” for lawn seeding and sodding.
6. Section 334600 “Subdrainage” for plant bed and tree pit underdrainage system.

1.3 REFERENCES AND REGULATORY REQUIREMENTS

A. Hortus Third, The Staff of the L.H. Bailey Hortorium. 1976. MacMillan Publishing Co., New York.

B. ASTM International, as referenced herein as ASTM.

C. American Standard for Nursery Stock, as referenced herein as ANSI Z60.1-2004.

D. United State Department of Agriculture (USDA), Plant disease and insect control Phytosanitary and Export Certifications.

E. United States Composting Council, Seal of Testing Assurance (STA), Procedures for sampling and testing as outlined in the Test Methods for the Examination of Composting and Compost (TMECC) protocols.

1.4 DEFINITIONS

A. Balled and Burlapped Stock: Plants dug with firm, natural balls of earth in which they were grown, with a 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.

B. 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 the minimum root spread according to ANSI Z60.1 for type and size of plant required.

C. 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.

D. Fabric Bag-Grown Stock: Healthy, vigorous, well-rooted plants established and grown in-ground in a porous fabric bag with well-established root system reaching sides of fabric bag. Fabric bag size is not less than diameter, depth, and volume required by ANSI Z60.1 for type and size of plant.

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

F. Mycorrhizal Inoculum: Fungi either introduced or naturally occurring in the soil that greatly increased plant roots growth and ability to absorb nutrients and water.

G. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. Pesticides include insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. They also include substances or mixtures intended for use as a plant regulator, defoliant, or desiccant. Some sources classify herbicides separately from pesticides.

H. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. Pests 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: Existing, on-site soil; imported soil; or manufactured soil that has been 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, annuals, perennials, 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. Root Production Method (RPM): A trademark technology referred to as root production method for a variety of tree and shrub species resulting is a dense fibrous root system for small sized plants.

N. Single Central Leader: A single central dominant leader branch, free of secondary co-dominant stems that would compete with the central leader, either naturally occurring or professionally trained in the nursery with no stem deformities or residual woody stubs from original leader.

O. Specimen Plant: Exceptionally heavy, symmetrical, and tightly knit, growth, superior in form, with properly spaced branching.

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

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

R. Sheared Evergreen: Any evergreen tree or shrub that has been heavily trimmed or pruned to remove the natural shape of the plant. An evergreen tree grown at a “Christmas “tree farm is typically sheared.

S. Young Plants: Lining out stock, seedlings generally sold within the wholesale trade for continued cultivation.

T. 'Detention POD': Stormwater area within linear planting islands with varying depth of aggregate wrapping a percolating detention system.

1.5 SUBMITTALS

A. The Landscape Architect will not be traveling to tag trees and plant material. The Contractor will submit photographs of plant material to be installed prior to delivery to the site. The Owner's Representative and Landscape Architect reserve the right to reject any plant material delivered to the site due to condition and appearance at no cost to the County.

B. The Contractor will provide photographs of each plant or groups of plants for approval. Images can be jpeg, pdf etc.

1.6 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.7 DELIVERY, STORAGE, AND HANDLING

A. General:

1. Packaged Materials: Deliver packaged materials in original unopened containers showing weight, analysis and name of manufacturer. During shipment and storage on site, protect materials from breakage, moisture, heat or other damage.
2. Store materials only in locations approved by the Owner.

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.
3. Accompany each delivery of bulk materials with appropriate certificates.

C. Plant Materials:

1. During shipment, do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Do not bend, stack or bind plants in a manner that damages bark, breaks branches or root systems, deforms root balls or destroys natural shape.
2. Transport plants in closed vehicles or with the entire load properly covered to protect from drying winds, heat, freezing or other exposure that may be harmful. Schedule shipping to minimize on-site storage of plants. Closed vehicles shall be adequately ventilated/refrigerated.
3. Stock shall not be shipped until the planting preparations have been completed. If planting is delayed more than 24 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.

    a. Heel-in bare-root stock. Pack root system in wet straw, hay, or other suitable material to keep root system moist until planting. Soak roots that are in less than moist condition in water for two hours. Plants with dry roots will be rejected. Any bare-root plants requiring sweating to break dormancy must have this procedure carried out before plants arrive onsite.
    b. Set balled stock on ground and cover ball with soil, or bark mulch.
    c. Do not remove container-grown stock from containers before time of planting.
    d. 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.

4. Schedule shipping aquatic tubers and plugs to result in on-site storage time of less than one day prior to installation. If delays beyond the contractor's control occur after delivery, store plants to ensure viability. All aquatic plants that are in a state of decay at the time of planting shall be rejected regardless of its condition at the time of delivery to the site.
5. Labels: Prior to shipping, each plant or bundle of like variety and size shall be labeled with legible weatherproof tags indicating the correct name and size of plant. Label aquatic plants (tubers, plugs, and/or bare-root) individually or in bundles of like variety.
6. Handle plants at all times in accordance with the best horticultural practices. Lift B&B materials from the bottom of the ball only; do not roll the plants. Plants handled otherwise will be subject to rejection. Balled and burlapped plants which have cracked or broken balls are not acceptable and shall not be planted. Plants with mechanical damage, deformation or breakage will not be accepted and are to be replaced at the Contractor's expense.

1.8 SCHEDULING

A. Work Schedule:

1. Upon authorization to proceed with the work, submit a project work schedule indicating the dates of each of the following items:

    a. Submittal schedule.
    b. Tagging of plants in nurseries.
    c. Delivery of other materials to the site.
    d. Staking of plant locations on the site.
    e. Delivery of plant material to the site.
    f. Planting.
    g. Substantial Completion of the work.
    h. Maintenance period.

2. Update schedule monthly to reflect progress of the work.

B. Planting Season:

1. Materials shall be installed during planting seasons normally recognized in the job locality.

2. USDA Hardiness Zone 5:

    a. B&B and container grown plants, planting season shall be from April 1 through June 1 and from October 1 until the prepared soil becomes frozen.
    b. Evergreen plants from April 1 through June 1 and from September 15 through October 15.
    c. Bare root woody plants and aquatic tuber and root stock only in spring from April 1 through approximately June 1 but no later than full leaf-out of existing woody and aquatic plants.
    d. Bulbs, corms and tubers from September 15 through November 1 and from April 1 through June 1. Spring vs. fall planting is species dependent and Contractor shall comply with seasonal limitations identified on the plant list included on the drawings.

3. USDA Hardiness Zone 6:

    a. B&B and container grown plants, planting season shall be from March 15 through May 15 and from October 1 until the prepared soil becomes frozen.
    b. Evergreen plants from March 15 through May 15 and from October 1 through November 1.
    c. Bare root woody plants and aquatic tuber and root stock only in spring from March 15 through approximately May 15 but no later than full leaf-out of existing woody and aquatic plants.
    d. Bulbs, corms and tubers from October 1 through November 15 and from March 15 through May 15. Spring vs. fall planting is species dependent and Contractor shall comply with seasonal limitations identified on the plant list included on the drawings.

4. If special circumstances warrant installation outside the normal planting season, submit a written request to the Landscape Architect describing conditions and stating the proposed variance. Planting outside the planting season could extend warranty obligations and will be dependent upon the extent of the variance.
5. 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.
6. Coordination with lawn installation: Plant trees, shrubs, and other plants after finish grades are established but before seeding/sodding unless otherwise indicated. When planting trees, shrubs, and other plants after seeding/sodding, protect completed areas, and promptly repair damage caused by planting operations.

1.9 WARRANTY, MAINTENANCE and acceptance

A. Substantial Completion:

1. The Substantial Completion inspection shall occur for the phase of work. Two Notices of Substantial Completion will be issued. Following the inspection, the Landscape Architect will issue a punch list identifying all work requiring completion or correction.
2. The Substantial Completion inspection for the landscape shall occur in phases based upon the phasing plan approved at the beginning of the work by the Landscape Architect. Following the inspection, the Landscape Architect will issue a punch list identifying all work requiring completion, replacement or correction.
3. The Contractor shall complete all punch list items within 2 weeks of its issuance. All repairs and plant replacements shall occur at no additional cost to the Owner.
4. Substantial Completion will be provided for all planting areas complying with the following:
5. Landscape Architect approval of all specified submittals.
6. The work shall be 100% complete including all site preparation, earthwork, plant mixture installation, plantings, lawns, irrigation and clean-up), and ready for inspection.
7. After receiving a Notice of Substantial Completion warrant and maintain all plantings in accordance with 3.13 of this Section in a vigorous, well-kept condition until Final Acceptance.

B. Final Acceptance:

1. Prior to plant dormancy and the expiration of the warranty and maintenance period, the Landscape Architect will conduct an inspection of all plantings. There shall be clear evidence through factual reporting by the contractor and field observations made by the Owner or Landscape Architect that the specified maintenance has occurred. Following the inspection, the Landscape Architect will issue a punch list identifying all work requiring completion, replacement or correction.
2. The contractor shall complete all punch list items within 2 weeks of its issuance. All repairs and plant replacements shall occur at no additional cost to the Owner.
3. Final Acceptance will be based upon Owner approval and the work having:

    a. Been well maintained with all landscape plantings in a healthy growing condition free of disease and insect problems.
    b. All maintenance items completed and documented by Contractor through maintenance report forms.

4. Final Acceptance and the end of the warranty period for the landscape will occur only after all punch list items have been satisfactorily completed and the site is left in the condition specified under Cleanup and Protection.

C. Warranty and Maintenance Period:

1. The end of the warranty and maintenance period shall be:

    a. July 31 (Phase 2) - one year following fall Substantial Completion.

b. October 31 – one year following fall Substantial Completion.
c. June 30 – one year following spring Substantial Completion.

2. Prior to and during the warranty and maintenance period, replace any plants that are damaged, dead, or, in the opinion of the Landscape Architect, are unhealthy, or have lost more than 25% of their natural shape due to dead branches, excessive pruning or improper maintenance. Rejected plant materials shall be removed from the site immediately after being rejected and legally disposed off-site. Replacement plants shall be installed within 2 weeks following the inspection unless otherwise agreed to in writing by the Owner.
3. Only one replacement of any plant is required after Substantial Completion, except for losses due to failure to comply with specified installation and/or maintenance requirements.
4. Make replacements in accordance with the original specifications, plant list, and notes. Fully restore areas damaged by replacement operations to their original and specified condition.
5. The Contractor will not be held responsible for defects resulting from neglect by Owner, abuse or damage by others, or unusual phenomena or incidents beyond landscape installer's control which result from, hail storms, winds over 100 miles per hour, fires or vandalism, unless Contractor has not completed specified installation in a manner that could have protected the landscaping from these phenomena.
6. If, in the opinion of the Landscape Architect, it is advisable to extend the warranty and maintenance period for an additional growing season, the contractor will be notified of such requirement by the Owner. Improper planting and/or failure to perform and document the specified maintenance in accordance with contract requirement shall be the basis for extending the period of establishment for a second growing season. All specified maintenance and warranty requirements will be required during this extended period and all costs shall be the responsibility of the Contractor.

PART 2 - PRODUCTS

2.1 WATER

A. Water for lawns shall be available from on-site sources.

B. Water shall be free of wastewater effluent or other hazardous chemicals. On-site sources of water may be available from the creek at no cost or from City hydrant with appropriate metering. Confirm prior to commencing work.

2.2 TOPSOIL

A. Refer to Section 329100.

2.3 PLANTING MIXTURES

A. General: All planting mixtures shall be well pulverized, blended materials, free of rocks, debris of any type, tree roots, and other extraneous materials that will impede plant growth. When blending off-site amendments (peat, compost, etc.) with topsoil, the topsoil shall be pulverized and screened to remove all non-soil materials greater than ½ inch diameter. On-site sub-soils will not be permitted for use in plant mixtures.

B. Standard planting backfill for individual tree and shrub pits shall be: 1 part existing, well pulverized soil excavated from planting pit or from site topsoil stockpile thoroughly blended with 1 part off-site topsoil and 1 part compost or peat.

C. Plant bed mixture for shrubs beds shall be: 1 part existing, well-pulverized soil excavated from planting bed or site topsoil stockpiles thoroughly blended with 1 part off-site topsoil and 1 part compost or peat.

D. Plant bed mixture for shrubs beds shall be: 2 parts off-site topsoil thoroughly blended with 1 part compost or peat.

E. Plant bed mixture for beds comprising a mix of shrubs, perennials, annuals, ornamental grasses and groundcover shall be 2 parts off-site topsoil thoroughly blended with 1 part compost or peat.

2.4 HERITAGE ROSE AREA

A. Heritage Rosa Area: Comprised of sandy loam mixture of 50% sand, 25% clay and 25% silt planting material at 18" depth, see designated areas on planting plan. All material shall be Coordinated with Owner's Representative for approval prior to installation. Men's Garden Club to review mixture prior to acceptance of submittal. Any additions or modifications to the Heritage Rose Area mix shall be paid for by the contractor at not subject to Owner's expense.

2.5 SOIL AMENDMENTS

A. Peat shall be a product having at least 95% organic content consisting of sphagnum peat moss with a pH range of 3.0 – 4.0 and Von Post decomposition value of H1 – H3, or low-lime reed-sedge peat with a pH range of 4.0 to 5.0 and Von Post decomposition value of H4 – H6. Product shall be free of sticks, wood or other debris.

B. Compost shall be a heavily decomposed mature/stabilized, humus-like material derived from the aerobic decomposition of yard clippings or other compostable materials. Manure is not suitable for use. The compost shall have a dark brown or black color, be capable of supporting plant growth without ongoing addition of fertilizers or other soil amendments and shall not have an objectionable odor. The compost shall be free of plastic, glass, metal and other physical contaminants, as well as viable weed seeds and other plant parts capable of reproducing (except airborne weed species).

1. pH: 5.5 to 8.
2. Moisture content: 35 to 55 percent by weight. No visible free water or dust is produced when handling it.
3. Sieve analysis: 100 percent passing ¾ inch screen.
4. Soluble salt content: Less than 5 percent.
5. Organic matter content: Minimum 60 percent.

C. Sand shall be clean, coarse, ungraded, meeting the requirements of ASTM C33 for fine aggregates.

D. pH Adjusters:

1. Lime shall be finely ground agricultural grade dolomitic limestone containing not less than 85% calcium and magnesium carbonates conforming to ASTM C602, Class T or O.
2. Elemental sulfur shall be granular, biodegradable, horticultural grade material containing at least 90% sulfur, with a minimum of 99% passing through No. 6 sieve and a maximum of 10% passing through No. 40 sieve.

E. Mycorrhizal Inoculum

1. Mycorrhizal fungi in the inoculant shall be available as propagules, i.e., spores, root fragments and hyphae. The inoculant shall contain highly selected strains of low host specificity endo- and ectomycorrhizal fungi combined with other beneficial fungi (Trichoderma), humic acids, biostimulants, beneficial bacteria, soluble sea kelp, and yucca plant extracts, as manufactured by Horticultural Alliance or approved equal.

2.6 FERTILIZER

A. Fertilizers are required at the time of installation and during the warranty/maintenance period. The fertilization program shall be based on soil testing and formulations and rates of application shall be based on test reports provided by the independent testing laboratory.

B. The independent testing laboratory shall also prepare a custom formulation and rate for each category of plants to be installed and maintained; i.e. trees, shrubs, perennials/ornamental grasses, annuals and bulbs.

C. Fertilizers shall include organic and inorganic, slow release and water-soluble nitrogen and the percentages shall be based on soil types and the time of year being applied. Fertilizers shall not be applied during the hot summer months unless specific to blooming plants or in the late summer when plant growth will not harden off prior to the first killing frost.

D. The fertilizer to be used to amend the soil before planting shall be granular fertilizer that conforms to applicable state and federal regulations, and contains no less than 60% slow-release nitrogen.

E. Fertilizer to be used during the year warranty maintenance period shall be a complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, not less than 30% of the nitrogen from a slow release source. Fifty percent of the nitrogen shall be derived from natural organic sources. The formulations shall be as outlined in 3.13B.12 of this Section.

2.7 PESTICIDES AND HERBICIDES

A. Pesticides and herbicides shall be registered and approved by the EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for project conditions and application. Do not use restricted-use pesticides and herbicides unless authorized in writing by authorities having jurisdiction.

1. Pre-Emergent Herbicide (Selective and Non-Selective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer.
2. Post-Emergent Herbicide (Selective and Non-Selective): Effective for controlling weed growth that has already germinated.

2.8 ANTIDESICCANTS

A. Water-soluble emulsion specifically manufactured for agricultural use that will provide a protective film over plant surfaces and be permeable enough to permit transpiration. Use according to manufacturer's written instructions.

2.9 DETENTION POD TREE PLANTING

A. The trees placed within the detention pod area shall have a minimum of 12" depth of Plant Bed Mixture measured from the bottom of the rootball to the top of the aggregate stormwater system, this assumes the rootball depth average for a 3" caliper tree is 20". Each tree shall have 10' minimum horizontal length of Plant Bed Mixture. See planting details and Stormwater Profile sheets for locations and design intent. Coordinate with Owner's Representative and Landscape Architect if the above minimum planting requirements are not met. Coordination with excavation team needed.

PART 3 - EXECUTION

3.1 EXAMINATION

A. General:

1. Prior to beginning work, examine and verify the acceptability of the project site and notify the Landscape Architect of unsatisfactory conditions. Do not proceed with the work until unsatisfactory conditions have been corrected or resolved.
2. Verify that no foreign or deleterious material has been deposited in soil within a planting area.

3. Where planting occurs in close proximity to other site improvements, provide adequate protection to all features prior to commencing work. Promptly repair any items damaged during planting operations to their original condition.
4. Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions.
5. Suspend spoil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
6. Uniformly moisten excessively dry soil that is not workable and which is too dusty.
7. If plants die or are rejected due to non-conformity to contract requirements, they must be removed from the site immediately and replaced before Substantial Completion.

B. Utilities: Have all underground utilities located by servicing agencies. In the vicinity of utilities, hand-excavate to minimize possibility of damage.

C. On-site sources of water will be available for use by the landscape installer.

D. Pesticides and Other Chemicals:

1. General: All plants delivered to the site shall be free of disease, pests, eggs, and larvae. Promptly remove all plants that do not conform to this requirement.

    a. Insecticides should only be used to control pests when present in quantities that will be detrimental to plant vigor.
    b. Applying foliar herbicides to control weeds in plant beds after installation will not be permitted unless approved in advance by the Landscape Architect. Approval will only be granted if plants to be controlled cannot be effectively removed by hand pulling. Foliar herbiciding will only be permitted as part of the weed control program developed by the Contractor in advance of planting.
    c. All chemical shall be stored and mixed off-site. No chemicals of any type shall remain on site at the end of each work day.
    d. Do not apply over water or dispose of used container on-site.
    e. Post all pesticide and herbicide applications.

2. Pre-emergent application:

    a. Apply granular chemicals in accordance with Manufacturer’s instruction.
    b. Apply in early spring just prior to targeted species breaking dormancy. Do not apply too early in the spring.
    c. Do not apply when weather conditions will prevent an effective application or will result in in-effective control of targeted species.
    d. Spread granular chemical only in areas intended to be treated. Promptly remove all granular material spread over pavement and in areas not intended to be treated.

3. Post-emergent application :

    a. Protect all landscape plantings outside of target areas.
    b. Mixing, cleaning or disposal of pesticides, herbicides, and other chemicals will not be permitted on site. Notify the Owner at least 24 hours prior to any application.
    c. Do not spray chemicals when wind exceeds 5 MPH.
    d. Repeat procedures until desired effect is achieved.
    e. Mixing, application and clean-up procedures shall be in accordance with manufacturer’s instructions.

E. Coordination with Other Work:

1. The Contractor shall coordinate work with other contractors or trades to determine the appropriate sequence of landscape installation with respect to other work on the site.
2. Completed work installed out of construction sequence which is subsequently disturbed by the completion of work by other trades shall be repaired by the landscape installer at no cost to the Owner.

3. Maintain grade stakes and layout controls set by others until removal is mutually agreed upon by all parties concerned.

3.2 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, if necessary, to prevent erosion or displacement of soils and discharge of soil-bearing water run-off or airborne dust to adjacent properties, natural resources and walkways.

C. Vegetation Removal: Strip and dispose of organic debris and root mat.

3.3 LAYOUT

A. Accurately lay out each plant location and planting bed edges according to the drawings, using clearly visible painted, labeled stakes or plastic flags. Spray paint continuous lines on bare soil delineating plant bed boundaries. When scaling locations on the drawings, use at least 2 known reference points as layout controls to determine plant locations. Do not proceed with planting operations until locations have been reviewed and approved in writing by the Landscape Architect.

B. Prior to installation, all plant locations and bed edges must be approved by the Landscape Architect, who may field adjust locations at no additional cost to Owner. Plants installed without layout approval are subject to relocation by the Contractor at their expense.

3.4 PLANT INSTALLATION

A. General: Complete all plantings, metal edging and mulching prior to fine grading adjacent seed beds.

1. For plant beds, complete rough grading.

B. Planting Pit Excavation:

1. For individual plant pits in seeded areas, spread seed bed topsoil to the uniform depth and rough grade prior to layout and planting pit excavation.
2. Remove rocks and other unclassified underground obstructions to at least 6 inches below the finished planting depth of the root ball. Trim perimeter of planting pit leaving center area of bottom raised slightly to support root ball and assist in drainage away from center. Ensure that root ball will sit on undisturbed base soil to prevent settling. If plant pits are initially dug too deep, add soil to raise it to the correct level and thoroughly tamp the added soil to prevent settling.
3. If underground utilities or other surface or subsurface obstructions are encountered that cannot be removed, do not proceed with planting operations until alternate planting locations have been selected and approved by the Landscape Architect.
4. Size and configure planting pits in accordance with the planting details. If rotating augers or other mechanical diggers are used, scarify the side walls and bottom of the pit.
5. Where poor soil percolation is probable, test drainage by filling planting pits with 12 inches of water. Record the drainage time for each pit and if, in the opinion of the Landscape Architect, the water does not adequately drain off within 24 hours, install drains or raise plant pits as directed.
6. Keep excavations covered or otherwise protected after working hours and when unattended by Installer's personnel.

C. Planting Bed Excavation:

1. Refer to Section 311000 – Site Clearing for vegetation removal and topsoil salvage for reuse in plant mixture.
2. Refer to Section 312000 – Earth Moving for earthwork requirements.

3. In locations where plant beds are shown on the drawings and earth moving is not required other than achieving the specified plant bed subgrades, excavate plant beds to the depth shown on the planting details. Remove all existing vegetation as described under 3.2C above. Following vegetation removal, strip existing topsoil and stockpile for testing and mixing with specified on/off-site topsoil and peat/compost. Remove surplus excavated subsoil material that is not part of the specified planting soil to an area designated by the County and legally dispose off-site. Following vegetation removal, top dress plant bed with four inches compost plant bed mixture and rototill into upper twelves inches of soil.
4. Grade subgrade smooth and uniform. Slope to perimeter of plant bed when underdrains are required to collect accumulated water within the bed.
5. Transition from plant bed subgrade to adjacent seed bed subgrade outside the limits of the plant bed to ensure full depth plant bed mixture is provided.
6. Where plant beds terminate next to pavement surfaces, subgrade transitions shall be 12 inches wide within the plant bed to protect pavement base material from being undermined.
7. Obtain approval from the Landscape Architect for all subgrades prior to placing plant mixtures. Notify the Landscape Architecture at least 48 hours in advance of placing plant mixture.
8. Keep excavations covered or otherwise protected after working hours and when unattended by Installer's personnel.

D. Mixing and Placing Planting Mixtures:

1. Install planting bed and planting pit mixtures to the specified proportions and depths. On-site mixing of existing topsoil with off-site materials shall result in a homogenous blend of all ingredients. Screen all mixture to remove foreign debris and rocks greater than ½ inch diameter prior to placement.
2. Place planting bed mixture in 6 inch lifts and lightly compact to prevent settlement after planting. Settlement that occurs after planting will require plant removal and the addition of additional plant mixture at the Contractor’s expense. When placing mixture in raised planters, set finish grade elevations 2 inches low for mulch placement.
3. Grade planting areas to a smooth, uniform surface plane. Roll and rake, remove ridges, and fill depressions to meet grade.
4. Before planting, obtain Landscape Architect’s approval of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

E. Fertilizing:

1. Prior to or during planting, amend all planting pit and bed mixes by incorporating fertilizer at rates specified by soil test reports as specified under Section 329100 – Soil Preparation (Topsoil). Do not broadcast fertilize over the surface of the soil or onto any plant root ball.
2. For individual plant pits, incorporate fertilizer into back fill during planting operations. For plant beds, pre-mix fertilizer prior to installation.

F. Planting and Backfill:

1. Do not plant when the ground is frozen or saturated.
2. Balled and burlapped plants: Do not use planting stock if root ball is cracked or broken before or during planting operation. Set the plant in the center of planting pit with the crown set between 1 inch above adjacent soil for shrubs and 2 inches above adjacent soil for trees. Plant root flares shall not be set below adjacent finish grade. Face plant to give the best appearance or relationship to primary views. Cut away burlap, rope, wire or other wrapping materials from the the entire root ball and remove from pit. If plastic wrap or other non-degradable materials are used in lieu of burlap, completely remove them from the root ball before backfilling. Backfill planting pit approximately two-thirds full, add fertilizer, water and allow planting mixture to settle. After the water has been absorbed, complete backfilling and tamp lightly to grade to prevent future settlement, and form a watering basin with plant mixture of the size indicated on Plans.
3. Container-grown plants: Remove containers and make at least five vertical cuts one-half to one inch deep around the root ball and thoroughly loosen the roots on the outside of the ball. Plant as specified above for balled and burlapped plants, and as modified herein. All container-grown stock shall be planted so that top of container soil is level with surrounding grade. Do not plant higher to account for mulch, as mulch should not cover plant crown.

3.5 SPECIAL PLANTING CONSIDERATIONS:

A. Mycorrhizal Inoculum:

1. Rototill 2 granular pounds per 1000 square feet into the top 8 inches of soil for plant beds or as recommended by supplier. Incorporate 1 pound per cubic yard of plant pit backfill as backfill is being placed.

B. Sloped Plantings:

1. 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. Complete planting as specified under 3.4 F above.

C. Mechanized Tree Spade Planting

1. Trees may be planted with an approved mechanized tree spade at the designated locations. Do not use tree spade to move trees larger than the maximum size allowed for a similar field-grown, balled-and-burlapped root-ball diameter according to ANSI Z60.1, or larger than the manufacturer's maximum size recommendation for the tree spade being used, whichever is smaller.
2. When extracting the tree, center the trunk within the tree spade and move tree with a solid ball of earth.
3. Cut exposed roots cleanly during transplanting operations.
4. Use the same tree spade to excavate the planting pit as was used to extract and transport the tree.
5. Fill all voids between the plating pit and root ball with off-site topsoil tamping or watering soil in place until all voids are filled.
6. Deep root water and fertilize immediately following installation.
7. Where possible, orient the tree in the same direction as in its original location.

3.6 MULCHING

A. Uniformly install mulch on all trees and shrub beds to depth shown on Plans within 48 hours of planting.

B. Keep mulch out of the crowns of shrubs and perennials, at least 3 inches from all tree trunks, and off sidewalks and roadways.

3.7 PRUNING

A. After planting, prune trees and shrubs to remove all dead, dying, broken, or crossed limbs flush with the ground or main stem leaving no stubs. Do not prune to shape or to compensate for transplanting shock without prior approval from the Landscape Architect. Retain natural form of the plant type. Prune using standard professional horticultural and arboricultural practices. Remove trimmings from the site.

B. Employ workers experienced in this type of work.

3.8 Delete wrapping if tree wrap is not required.

3.9 WRAPPING

A. The trunks of deciduous trees shall be wrapped immediately after planting, but not before the condition of the trunks has been inspected and approved by the Landscape Architect. Trim the margins of any abrasions or cuts with a sharp, sterile knife prior to applying wrap.

B. Wrap trees beginning at the base and extending to the first branches in a spiral pattern with an overlap of half the width of the paper.

C. Secure the wrapping at the top, bottom and at 18 inch maximum intervals with twine.

3.10 STAKING AND GUYING

A. Install guying and staking as shown on the details immediately after planting.

B. Remove and dispose of stakes and guys at the end of the warranty period.

3.11 CLEANUP AND PROTECTION

A. Remove excess and waste material daily. When planting has been completed, clear the site of all debris, stockpiles and materials.

B. Repair any damage to existing landscape, paving or other such features as a result of work related to this contract to its original condition.

C. Protect landscape work and materials from damage due to landscape operations, operations by other Contractors and trades, and trespassers. Maintain protection during installation and maintenance periods. Treat, repair or replace damaged landscape work as directed.

3.12 MAINTENANCE

A. Provide all maintenance under the supervision of a skilled employee of the landscape installer. The skilled maintenance supervisor shall be: capable of operating the automatic irrigation system controller, conduct plant diagnostics to identify the presence of disease and insect problems, and be capable of directing a maintenance crew in the performance of horticultural maintenance practices identified below. Maintenance requirements identified below shall be the basis for information to be included in the Maintenance Schedule and Irrigation Plan identified under 1.5 C of this section and thoroughly documented under the required Maintenance Report Forms 1.5.D to verify the work has been properly performed.

1. Failure to perform and submit factual Maintenance Report Forms could result in non-payment for said services and require the extension of the warranty and maintenance period an additional year at the Contractor’s expense.

B. Provide all equipment, materials, labor and services to maintain the landscape beginning immediately after each plant is installed and continuing until Final Acceptance and the end of the warranty period. Perform all work under the direct supervision of a technician trained to recognize and treat conditions affecting the establishment and growth of the plants and perform the following:

1. Inspect the entire landscape at least once per week during the growing season and perform needed maintenance promptly.
2. Irrigation:

    a. Irrigate all plants to maintain optimum moisture within the root zone. Reoccurring overly dry or wet conditions shall be grounds for rejection of plant material. When using an automatic sprinkler system, the landscape installer responsible for maintenance shall bear full responsibility to set each zone to the correct frequency and duration.

b. If the automatic irrigation system is inoperative or not present, provide an approved temporary irrigation system or hand water from a source approved by the Owner's Representative. The system shall have the ability to be operated without moving hoses or sprinklers around the site between seeded/planted areas (i.e. system can be set to water one area for the required maintenance period), and may be automated with a timer. Supply all water and equipment at the Contractor's expense from a source approved by the Owner's Representative.

3. All pruning shall be performed by or under the supervision of a licensed arborist. Prune dead wood and broken limbs as identified, in accordance with 3.7 - Pruning. Do not shear evergreens or any shrubs unless specifically required to be maintained as a sheared hedge. Maintain the natural shape of trees and shrubs.
4. Maintain stakes and guys taut and in the specified condition. Repair trees wraps if loose, torn or untied.
5. Maintain all plant beds and tree saucers weed free. Edge shrub and perennial beds and tree rings at least monthly during the growing season, keeping all tree rings to a uniform diameter. Hook mulch monthly and add mulch as needed.
6. Deadhead perennials as necessary during maintenance visits to extend blooming periods.
7. In spring – prior to the start of the growing season, cut all ornamental grasses, perennials ,annuals flush with the ground and remove cuttings from the site.
8. Apply treatments as necessary to keep plants and planted areas free of insects, pests, and disease. Use integrated pest management practices whenever possible to minimize the use of pesticides and herbicides. Treatments include utilizing physical and cultural controls.
9. All pesticides shall be applied by a licensed pesticide applicator. Apply pesticides and all other chemical products and biological control agents in accordance with the authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner at least 24 hours before each application is performed. No mixing or disposal of chemicals is allowed onsite.
10. Apply antidesiccant to upright conifers December through February, at least once per month. In locations subject to high wind or salt spray, install burlap windscreens around spreading conifers and broadleaf evergreens but do not allow burlap to touch evergreen plants.
11. Collect all litter and debris from plant beds and dispose off-site.
12. Fertilization:

    a. Trees, shrubs and ornamental grasses: Fertilize once in the fall after the first hard freeze (usually October) but before the ground freezes; 1 pound of 4-1-2 (N-P-K) per 1,000 square feet of ground below the tree canopy or shrub bed.
    b. Perennials: Fertilize twice, once in the early spring and again 8 weeks later with 1 pound of 5-10-5 (N-P-K) per 100 square feet.
    c. Annuals and bulbs: For bed plantings, use high phosphorous granular fertilizer 10-20-10 (N-P-K) monthly during the growing season applied at a rate identify on the package label. For potted annuals, use high phosphorous water-soluble fertilizer 10-20-10 (N-P-K) every 2 weeks applied at a rate identified on the package label.

13. Remove dead and unacceptable plants as their condition becomes apparent.
14. At the end of the warranty period, but prior to Final Inspection, remove all guying, trunk wrap, watering saucers and top dress tree rings and beds 1 inch deep with the specified mulch product.

END OF SECTION

SECTION 334100 - STORM DRAINAGE PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
1. Pipe and fittings.
2. Cleanouts.

1.3 ACTION SUBMITTALS

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

B. Shop Drawings:
1. Cleanouts
2. Underdrain pipe material and fittings

1.4 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Show pipe sizes, locations, and elevations. Show other piping in same trench and clearances from storm drainage system piping. Indicate interface and spatial relationship between manholes, piping, and proximate structures.

B. Product Certificates: For each type of cast-iron soil pipe and fitting, from manufacturer.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Do not store plastic manholes, pipe, and fittings in direct sunlight.

B. Protect pipe, pipe fittings, and seals from dirt and damage.

C. Handle manholes according to manufacturer's written rigging instructions.

PART 2 - PRODUCTS

2.1 PE PIPE AND FITTINGS

A. Corrugated PE Drainage Pipe and Fittings NPS 3 to NPS 10 (DN 80 to DN 250): AASHTO M 252M, Type S, with smooth waterway for coupling joints. HDPE Dual Wall 6” diameter.

2.2 CLEANOUTS

A. Cast-Iron Cleanouts:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following or approved equal.
2. Basis-of-Design Product: Subject to compliance with requirements, or comparable product by one of the following:
   a. Josam Company.
   b. MIFAB, Inc.
   c. Smith, Jay R. Mfg. Co.
   d. Tyler Pipe.
   e. Watts Water Technologies, Inc.
   f. Zurn Specification Drainage Operation; Zurn Plumbing Products Group.
3. Description: ASME A112.36.2M, round, gray-iron housing with clamping device and round, secured, scoriated, gray-iron cover. Include gray-iron ferrule with inside calk or spigot connection and countersunk, tapered-thread, brass closure plug.
4. Top-Loading Classification(s): Medium Duty
5. Sewer Pipe Fitting and Riser to Cleanout: ASTM A 74, Service class, cast-iron soil pipe and

fittings.

2.3 CONCRETE

A. General: Cast-in-place concrete according to ACI 318, ACI 350/350R (ACI 350M/350RM), and the following:
1. Cement: ASTM C 150, Type II.
2. Fine Aggregate: ASTM C 33, sand.
3. Coarse Aggregate: ASTM C 33, crushed gravel.
4. Water: Potable.

B. Portland Cement Design Mix: 4000 psi (27.6 MPa) minimum, with 0.45 maximum water/cementitious materials ratio.
1. Reinforcing Fabric: ASTM A 185/A 185M, steel, welded wire fabric, plain.
2. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (420 MPa) deformed steel.

C. Ballast and Pipe Supports: Portland cement design mix, 3000 psi (20.7 MPa) minimum, with 0.58 maximum water/cementitious materials ratio.
1. Reinforcing Fabric: ASTM A 185/A 185M, steel, welded wire fabric, plain.
2. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (420 MPa) deformed steel.

2.4 PIPE OUTLETS

A. Head Walls: Cast-in-place reinforced concrete, with apron and tapered sides.

B. Riprap Basins: No riprap required

PART 3 - EXECUTION

3.1 EARTHWORK

A. Excavation, trenching, and backfilling are specified in Section 312000 "Earth Moving."

3.2 PIPING INSTALLATION

A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.

B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.

C. Install manholes for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sewer is indicated.

D. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.

E. When installing pipe under streets or other obstructions that cannot be disturbed, use pipe-jacking process of microtunneling.

F. Install gravity-flow, nonpressure drainage piping according to the following:
1. Install piping pitched down in direction of flow.
2. Install piping [**NPS 6 (DN 150)**] <**Insert value**> and larger with restrained joints at tee fittings and at changes in direction. Use corrosion-resistant rods, pipe or fitting manufacturer's proprietary restraint system, or cast-in-place concrete supports or anchors.
3. Install piping with [**36-inch (915-mm)**] [**48-inch (1220-mm)**] [**60-inch (1520-mm)**] [**72-inch (1830-mm)**] <**Insert dimension**> minimum cover.
4. Install hub-and-spigot, cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook."
5. Install corrugated steel piping according to ASTM A 798/A 798M.
6. Install corrugated aluminum piping according to ASTM B 788/B 788M.
7. Install ABS sewer piping according to ASTM D 2321 and ASTM F 1668.
8. Install PE corrugated sewer piping according to ASTM D 2321.

9. Install PVC sewer piping according to ASTM D 2321 and ASTM F 1668.
10. Install PVC water-service piping according to ASTM D 2321 and ASTM F 1668.
11. Install nonreinforced-concrete sewer piping according to ASTM C 1479 and ACPA's "Concrete Pipe Installation Manual."
12. Install reinforced-concrete sewer piping according to ASTM C 1479 and ACPA's "Concrete Pipe Installation Manual."

3.3 PIPE JOINT CONSTRUCTION

A. Join gravity-flow, nonpressure drainage piping according to the following:
1. Join hub-and-spigot, cast-iron soil piping with gasketed joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for compression joints.
2. Join hub-and-spigot, cast-iron soil piping with calked joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for lead and oakum calked joints.
3. Join corrugated steel sewer piping according to ASTM A 798/A 798M.
4. Join corrugated aluminum sewer piping according to ASTM B 788/B 788M.
5. Join ABS sewer piping according to ASTM D 2321 and ASTM D 2751 for elastomeric-seal joints.
6. Join corrugated PE piping according to ASTM D 3212 for push-on joints.
7. Join PVC sewer piping according to ASTM D 2321 and ASTM D 3034 for elastomeric-seal joints or ASTM D 3034 for elastomeric-gasketed joints.
8. Join nonreinforced-concrete sewer piping according to ASTM C 14 (ASTM C 14M) and ACPA's "Concrete Pipe Installation Manual" for rubber-gasketed joints.
9. Join reinforced-concrete sewer piping according to ACPA's "Concrete Pipe Installation Manual" for rubber-gasketed joints.
10. Join dissimilar pipe materials with nonpressure-type flexible couplings.

B. Join force-main pressure piping according to the following:
1. Join PVC pressure piping according to AWWA M23 for gasketed joints.
2. Join PVC water-service piping according to ASTM D 2855 for solvent-cemented joints.
3. Join dissimilar pipe materials with pressure-type couplings.

3.4 CLEANOUT INSTALLATION

A. Install cleanouts and riser extensions from sewer pipes to cleanouts at grade. Use cast-iron soil pipe fittings in sewer pipes at branches for cleanouts and cast-iron soil pipe for riser extensions to cleanouts. Install piping so cleanouts open in direction of flow in sewer pipe.
1. Use Light-Duty, top-loading classification cleanouts in [**earth or unpaved foot-traffic**] <**Insert other**> areas.
2. Use Medium-Duty, top-loading classification cleanouts in [**paved foot-traffic**] <**Insert other**> areas.
3. Use Heavy-Duty, top-loading classification cleanouts in [**vehicle-traffic service**] <**Insert other**> areas.
4. Use Extra-Heavy-Duty, top-loading classification cleanouts in [**roads**] <**Insert area**>.

B. Set cleanout frames and covers in earth in cast-in-place concrete block, [**18 by 18 by 12 inches (450 by 450 by 300 mm)**] <**Insert dimensions**> deep. Set with tops [**1 inch (25 mm)**] <**Insert dimension**> above surrounding earth grade.

C. Set cleanout frames and covers in concrete pavement and roads with tops flush with pavement surface.

3.5 CONCRETE PLACEMENT

A. Place cast-in-place concrete according to ACI 318.

3.6 CONNECTIONS

A. Connect nonpressure, gravity-flow drainage piping in building's storm building drains specified in Section 221413 "Facility Storm Drainage Piping."

B. Connect force-main piping to building's storm drainage force mains specified in Section 221413 "Facility Storm Drainage Piping." Terminate piping where indicated.

C. Make connections to existing piping and underground manholes.
1. Use commercially manufactured wye fittings for piping branch connections. Remove section of existing pipe; install wye fitting into existing piping; and encase entire wye fitting, plus 6-inch (150-mm) overlap, with not less than 6 inches (150 mm) of concrete with 28-day compressive

strength of 3000 psi (20.7 MPa).

2. Make branch connections from side into existing piping, NPS 4 to NPS 20 (DN 100 to DN 500). Remove section of existing pipe, install wye fitting into existing piping, and encase entire wye with not less than 6 inches (150 mm) of concrete with 28-day compressive strength of 3000 psi (20.7 MPa).
3. Make branch connections from side into existing piping, NPS 21 (DN 525) or larger, or to underground manholes and structures by cutting into existing unit and creating an opening large enough to allow 3 inches (76 mm) of concrete to be packed around entering connection. Cut end of connection pipe passing through pipe or structure wall to conform to shape of and be flush with inside wall unless otherwise indicated. On outside of pipe, manhole, or structure wall, encase entering connection in 6 inches (150 mm) of concrete for minimum length of 12 inches (300 mm) to provide additional support of collar from connection to undisturbed ground.
   a. Use concrete that will attain a minimum 28-day compressive strength of 3000 psi (20.7 MPa) unless otherwise indicated.
   b. Use epoxy-bonding compound as interface between new and existing concrete and piping materials.
4. Protect existing piping, manholes, and structures to prevent concrete or debris from entering while making tap connections. Remove debris or other extraneous material that may accumulate.

D. Connect to sediment interceptors specified in Section 221323 "Sanitary Waste Interceptors."

3.7 IDENTIFICATION

A. Materials and their installation are specified in Section 312000 "Earth Moving." Arrange for installation of green warning tape directly over piping and at outside edge of underground structures.
   1. Use detectable warning tape over nonferrous piping and over edges of underground structures.

3.8 FIELD QUALITY CONTROL

A. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches (610 mm) of backfill is in place, and again at completion of Project.
   1. Submit separate reports for each system inspection.
   2. Defects requiring correction include the following:
      a. Alignment: Less than full diameter of inside of pipe is visible between structures.
      b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
      c. Damage: Crushed, broken, cracked, or otherwise damaged piping.
      d. Infiltration: Water leakage into piping.
      e. Exfiltration: Water leakage from or around piping.
   3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
   4. Reinspect and repeat procedure until results are satisfactory.

B. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.
   1. Do not enclose, cover, or put into service before inspection and approval.
   2. Test completed piping systems according to requirements of authorities having jurisdiction.
   3. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.
   4. Submit separate report for each test.
   5. Gravity-Flow Storm Drainage Piping: Test according to requirements of authorities having jurisdiction, UNI-B-6, and the following:
      a. Exception: Piping with soiltight joints unless required by authorities having jurisdiction.
      b. Option: Test plastic piping according to ASTM F 1417.
      c. Option: Test concrete piping according to ASTM C 924 (ASTM C 924M).
   6. Force-Main Storm Drainage Piping: Perform hydrostatic test after thrust blocks, supports, and anchors have hardened. Test at pressure not less than 1-1/2 times the maximum system operating pressure, but not less than [**150 psig (1035 kPa)**] <**Insert value**>.
      a. Ductile-Iron Piping: Test according to AWWA C600, "Hydraulic Testing" Section.
      b. PVC Piping: Test according to AWWA M23, "Testing and Maintenance" Chapter.

C. Leaks and loss in test pressure constitute defects that must be repaired.

D. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.

3.9 CLEANING

A. Clean interior of piping of dirt and superfluous materials. Flush with water.

END OF SECTION

APPENDIX

CONSULTING GROUP

Report of Geotechnical Pavement Investigation

Proposed Wilson Park Improvements
656 Academy Street
Ferndale, Michigan

Latitude 42.456339° N
Longitude 83.124913° W

Prepared for:

Smith Group
201 Depot Street, Second Floor
Ann Arbor, Michigan 48104

G2 Project No. 223618
January 11, 2023

g2consultinggroup.com

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CONSULTING GROUP

January 11, 2023

Mr. Mark Woodhurst, PLA, ASLA
Associate
Smith Group
201 Depot Street, Second Floor
Ann Arbor, Michigan 48104

RE: Report of Geotechnical Investigation
Proposed Wilson Park Improvements
656 Academy Street
Ferndale, Oakland County, Michigan
G2 Project No. 223618

Dear Mr. Woodhurst:

In accordance with your request, we have completed the geotechnical investigation for the proposed improvements to the existing Wilson Park located at 656 Academy Street in the City of Ferndale, Michigan. This report presents the results of our observations and analyses and includes recommendations and construction considerations relative to the proposed improvements.

As always, we appreciate the opportunity to be of service to Smith Group and look forward to discussing our findings. In the meantime, if you have any questions regarding this report or any other matter pertaining to the project, please call us.

Sincerely,

G2 Consulting Group, LLC

Zachery R. Lilly, E.I.T.
Staff Engineer

Jason B. Stoops, P.E.
Associate/Project Manager

ZRL/JBS/jbs

Enclosures

EXECUTIVE SUMMARY

We understand the project will consist of improving the existing Wilson Park located at 656 Academy Street in the City of Ferndale, Michigan. The improvements will include a parking lot expansion, new athletic courts, walking paths, and the construction of a new pavilion structure. The proposed parking lot expansion will consist of bituminous concrete and be located on the west side of the existing parking lot.

The existing pavements consist of bituminous concrete and an underlying aggregate base. Portland cement concrete was present beneath the bituminous concrete within soil boring B-03, and beneath the aggregate base within soil boring B-04. The bituminous concrete pavements range in thickness from 3 to 6 inches. The underlying sandy gravel aggregate base, where present, ranges in thickness from 6 to 8 inches. The Portland cement concrete within soil borings B-03 and B-04 ranged in thickness from 6 to 8 inches. Approximately 6 to 12 inches of topsoil are present at the ground surface of soil borings B-02, B-05 and B-06. Loose silty sand fill underlies the pavement section within soil borings B-02, B-03, and B-04 and extends to depths ranging from 2 to 4 feet below the ground surface. Stiff sandy clay fill underlies the granular fill within soil boring B-03 and extends to a depth of 3 feet. Native stiff to hard sandy clay underlies the topsoil and fill soils within all soil borings and extends to the explored depths.

The pavements within the existing parking lot are generally in poor condition, exhibiting moderate to high severity longitudinal, transverse, block, and fatigue cracking. The existing pavements within the proposed athletic court area are generally in poor condition, exhibiting moderate to high severity longitudinal and transverse cracking, with isolated areas of low to moderate severity block and fatigue cracking. Due to the poor condition of the existing parking lot pavements, and the proposed reconfiguration of the athletic court pavements, the existing pavements will be completely reconstructed. Given the cohesive subgrade soils, we recommend edge drains be installed along curbs and potential landscape islands which can further be connected into nearby catch basins.

We performed pavement design analyses in accordance with the "AASHTO Guide for Design of Pavement Structures". Based on the results of our analyses, we recommend the new parking lot and athletic courts bituminous pavement consist of a minimum section of 1-1/2 inches of MDOT 5EML or 36A bituminous concrete wearing course supported by 2 inches of MDOT 4EML bituminous concrete leveling course atop an 8 inches of MDOT 21AA dense-graded crushed limestone aggregate base. In addition, to minimize surface staining within the athletic courts, we recommend only limestone aggregate and sand be used in the bituminous mix. We recommend all bituminous materials have no binder from recycled asphalt (RAP) of the total binder and using a binder of PG 64-22 for the 5EML and 4EML or a binder of PG 58-22 for the 36A. An acrylic latex coating should be applied to the finished bituminous pavement surface upon completion of pavement curing period. We recommend a minimum pavement curing period of two weeks prior to placing an acrylic coating. However, the acrylic coating manufactures recommendations should be followed and can be longer than two weeks. In addition, we recommend the pavement surface be primed with a stain blocker prior to acrylic coating to minimize possible staining.

At the start of the earthwork operations any existing topsoil and vegetation within the proposed footprint of the pavilion should be removed in their entirety. Following removal of the topsoil and vegetation, the exposed subgrade should be evaluated for stability to support the pavilion slab-on-grade. Based upon the existing subgrade conditions and anticipated loading conditions, we recommend the proposed pavilion be supported on conventional strip and/or spread footings designed to bear on the native sandy clay at the anticipated bearing elevation. We recommend a net allowable bearing capacity of 4,000 pounds per square foot (psf) be used for design of foundations bearing on the native sandy clay. Exterior foundations should bear at a minimum depth of 3-1/2 feet below finished grade for protection against frost heave.

Do not consider this summary 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 project will consist of improving the existing Wilson Park located at 656 Academy Street in the City of Ferndale, Michigan. The improvements will include a parking lot expansion, new athletic courts, walking paths, and the construction of a new pavilion structure. The proposed parking lot expansion will consist of bituminous concrete and be located on the west side of the existing parking lot. The athletic courts will be constructed on the west side of the property just north of the existing parking lot and to the west of the existing soccer field. New Portland cement concrete sidewalks will also be constructed throughout the site. The proposed new pavilion structure will be constructed on the north side of the property to the south of the existing restroom building. Limited information about the proposed pavilion was available at the time of this report; however, we anticipate the proposed pavilion will be a prefabricated metal structure, will be slab-on-grade, and will be lightly loaded.

When information related to the structural loading conditions becomes available, G2 Consulting Group, LLC (G2) should be notified so we can review the recommendations presented herein. The purpose of our investigation is to determine and evaluate the general subsurface conditions at the site and develop recommendations for pavement construction, earthwork operations, foundations and construction considerations as they relate to the proposed project.

SCOPE OF SERVICES

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

1. We drilled a total of six (6) soil borings within the proposed improvement areas. Five of the soil borings, B-01 through B-05, were performed within the vicinity of the proposed parking lot pavement reconstruction and walking paths extending to a depth of 5 feet each. The remaining soil boring, B-06, was performed in the vicinity of the proposed pavilion extending to a depth of 15 feet below existing grade.
2. We performed laboratory testing on samples obtained from the soil borings. Laboratory testing included visual engineering, moisture contents, Atterberg limits, and unconfined compressive strength determinations.
3. We prepared this engineering report. Our report includes recommendations for pavement design, soil bearing capacity, estimated settlement, and construction considerations as they relate to the geotechnical conditions at the site.

FIELD OPERATIONS

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

The soil borings were drilled by G2 utilizing a truck-mounted drilling rig. The contractor used continuous flight 2-1/4 inch inside diameter hollow stem augers to advance the boreholes to the explored depths. Within each soil boring, soil samples were obtained at intervals of 2-1/2 feet extending to the explored depths by use of the Standard Penetration Test (SPT) method (ASTM D1586) which involves driving a 2-inch diameter split-spoon sampler into the soil with a 140-lb weight falling 30 inches. The sampler is generally driven in three successive 6-inch increments with the number of blows for each increment recorded. The number of blows required to advance the sample the last 12 inches is termed the Standard Penetration Resistance (N-value). The blow counts for each 6-inch increment and

the resulting N-value are presented on the individual soil boring logs.

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 changes in stratigraphy and observed groundwater levels to be used in conjunction with our analysis of the subsurface conditions. The final soil boring logs are based on the field logs and laboratory soil classification and testing. After completion of boring operations, the boreholes were backfilled with excavated soil, and capped with asphalt patch where applicable.

LABORATORY TESTING

Representative soil samples were subjected to laboratory testing to determine soil parameters pertinent to pavement design and site preparation. An experienced geotechnical engineer classified the samples in general conformance with the G2 General Notes Terminology. Laboratory testing on representative samples included:

- ASTM D2488 – Unified Soil Classification System (USCS) Visual-Manual Method
- ASTM D2166 – Moisture Content
- ASTM D4318 – Atterberg Limits

We estimated the unconfined compressive strengths of cohesive soils 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 spring-loaded cylinder.

The results of the moisture content and unconfined compressive strength laboratory tests are indicated on the individual soil boring logs at the depths the samples were obtained. The results of the Atterberg limits are presented graphically on Figure No. 8, in the Appendix. We will hold the soil samples for 60 days from the date of this report. If you would like to have the soil samples, please let us know.

SITE CONDITIONS

The proposed site improvements will be performed at the existing Wilson Park located at 656 Academy Street in the City of Ferndale, Michigan. Wilson Park is located on the west side of Hilton Road, south of Academy Street and north of University Street. An access drive leads from University Street to an existing parking lot on the south side of Wilson Park. The proposed improvement areas are currently covered with existing pavements, grass, and a few trees.

Based on topographical data obtained using Google Earth, site grades within the property are generally flat, with average site elevations between 636 feet and 639 feet within the proposed improvement area. The surrounding properties are generally residential in nature.

EXISTING PAVEMENT CONDITIONS

The existing pavements consist of bituminous concrete and an underlying aggregate base. Portland cement concrete was present beneath the bituminous concrete within soil boring B-03, and beneath the aggregate base within soil boring B-04. The bituminous concrete pavements range in thickness from 3 to 6 inches. The underlying sandy gravel aggregate base ranges in thickness from 6 to 8 inches, where present. The Portland cement concrete within soil borings B-03 and B-04 ranged in thickness from 6 to 8 inches.

Moderate to high severity longitudinal and transverse cracking is present throughout the pavement area. Moderate to high severity block and fatigue cracking is present within the existing parking lot, while isolated areas of low to moderate block and fatigue cracking are present within the existing pavements

within the proposed athletic courts area. The existing pavements are sloped, allowing surface runoff water to drain into the adjacent greenbelt.

SUBSURFACE CONDITIONS

Approximately 6 to 12 inches of topsoil are present at the ground surface of soil borings B-02, B-05 and B-06. Silty sand fill underlies the pavement section within soil borings B-02, B-03, and B-04 and extends to depths ranging from 2 to 4 feet below the ground surface. Sandy clay fill underlies the granular fill within soil boring B-03 and extends to a depth of 3 feet. Native sandy clay underlies the topsoil and fill soils within all soil borings and extends to the explored depths of 5 and 15 feet below the ground surface.

The silty sand fill is loose in relative density with SPT N-values ranging from 5 to 6 blows per foot (bpf). The native sandy clay is stiff to hard in consistency with natural moisture contents ranging from 10 to 21 percent, a plasticity index of 14 percent, a liquid limit of 30 percent, and unconfined compressive strengths ranging from 3,500 to 9,000 pounds per square foot (psf).

The stratification depths shown on the hand-auger 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 the field logs of the soils encountered.

Groundwater measurements were performed during and upon completion of drilling operations. Groundwater was encountered within soil boring B-04 at a depth of 4 feet during drilling corresponding to an elevation of approximately 635 feet. Fluctuations in perched and long-term groundwater levels should be anticipated due to seasonal variation and following periods of prolonged precipitation.

It should also be noted that groundwater observations made during drilling operations in predominantly cohesive soils are not necessarily indicative of the static groundwater level. This is due to the low permeability of such soils and the tendency of drilling operations to seal off the natural paths of groundwater flow.

The Soil Boring Location Plan, Plate No. 1, Soil Boring Logs, Figure Nos. 1 through 6, Atterberg Limits Results, Figure No. 7, and Photographic Documentation, Figure Nos. 8 and 9 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. 10.

PAVEMENT EVALUATION AND RECOMMENDATIONS

General

The pavements within the existing parking lot are generally in poor condition, exhibiting moderate to high severity longitudinal, transverse, block, and fatigue cracking. The existing pavements within the proposed athletic court area are generally in poor condition, exhibiting moderate to high severity longitudinal and transverse cracking, with isolated areas of low to moderate severity block and fatigue cracking. Due to the poor condition of the existing parking lot pavements, and the proposed reconfiguration of the athletic court pavements, the existing pavements will be completely reconstructed.

We anticipate the proposed project will include the removal of the existing pavement section, stockpiling the existing aggregate base, cutting the exposed subgrade to the proposed subgrade elevation, proof-rolling the exposed subgrade, and prepare the finished grade for the receipt of the pavement cross-

section materials

Pavement Reconstruction Recommendations

At the start of earthwork operations, the existing pavements and underlying aggregate base, or grass, topsoil, and vegetation be completely removed within the proposed pavement areas. We recommend the existing aggregate base be stockpiled on-site for re-use as engineered fill in undercut excavations or for engineered fill as necessary. Stockpiling of the existing aggregate base should be in a manner to limit the amount of intermixing with the underlying subgrade soils. The exposed cohesive subgrade should be thoroughly proof-rolled with a fully loaded tri-axle dump truck. Any areas exhibiting unstable or otherwise unsuitable soil conditions should be removed and replaced with engineered fill.

Subgrade undercuts, if required, should be evaluated by a qualified engineering technician to determine if subgrade stabilization is necessary. We recommend that undercut excavations, where required, be backfilled using stockpiled aggregate base or MDOT 21AA dense graded aggregate base placed in an engineered manner. Lift thicknesses should not exceed 9 inches. All engineered fill should be compacted to a density of at least 95 percent of the maximum density determined by the Modified Proctor (ASTM D 1557) or the Michigan Department of Transportation Density Testing and Inspection Manual. 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.

Cohesive soils can become unstable following periods of prolonged precipitation and repeated construction traffic. As such, we recommend construction operations be performed during periods of warm dry weather and the exposed subgrade is not left exposed to rain events

Parking Lot Pavement

We performed pavement design analyses in accordance with the "AASHTO Guide for Design of Pavement Structures". The subgrade soils will generally consist of stiff to hard sandy clay with moisture contents generally near the plastic limit. Based on the existing subgrade soils, we have provided design pavement sections based on an effective subgrade resilient modulus of 7,500 pounds per square inch (psi).

We anticipate the proposed pavement areas will consist of light-duty flexible bituminous concrete pavement sections for the parking lot. At the time of the investigation, traffic data was not available. We assume traffic will primarily consist of passenger vehicles and snow removal trucks. We have provided pavement sections based on the following design parameters, with the corresponding traffic loads. If design traffic volumes are determined to be more than what is presented here, G2 should be notified so we can evaluate the pavement sections based on actual design traffic conditions.

We performed pavement design analyses in accordance with the "AASHTO Guide for Design of Pavement Structures". Based on a light-duty pavement section, we assume a design load of 75,000 18-kip equivalent single-axle loads (ESALs) over a 20-year design life. If design traffic volumes are determined, G2 should be notified so we can evaluate the pavement sections based on actual design ESALs values.

For evaluation purposes, we estimated a serviceability loss of 2.0, a standard deviation of 0.49 for bituminous pavements and a reliability factor of 0.95. For the standard flexible pavement sections, we recommend the following cross-sections:

Typical Light-Duty Flexible Pavement Section		
Material	**Thickness**	**Structural Coefficient**
MDOT 5EML or 36A Bituminous Wearing Course	1-1/2 inches	0.42
MDOT 4EML Bituminous Leveling Course	2 inches	0.42
MDOT 21AA Aggregate Base Course (dense-graded)	8 inches	0.14
		Total SN = 2.59

All pavement materials are specified within the 2020 Standard Specifications for Construction from the Michigan Department of Transportation. The aggregate materials for the subbase are described in Section 902. The bituminous pavement materials are described in Section 501 and can be assigned a structural coefficient number of 0.42. The existing aggregate base material and imported aggregate base course materials consisting of limestone aggregates can be assigned a structural coefficient number of 0.14.

Athletic Courts Pavement

The subgrade soils in the vicinity of the proposed athletic courts will generally consist of stiff to hard sandy clay. The existing cohesive soils are suitable for support of the proposed pickleball court/basketball court pavements. Based on the existing subgrade soils, we have provided design pavement sections based on an effective subgrade resilient modulus of 7,500 pounds per square inch (psi).

Based on our analyses, we recommend a pavement design section consisting of 1-1/2 inches of MDOT 5EML or 36A bituminous concrete wearing course supported on 2 inches of 4EML bituminous concrete leveling course atop 8 inches of imported MDOT 21AA dense graded crushed limestone aggregate. In addition, to minimize surface staining, we recommend only limestone aggregate and sand be used in the bituminous mix. We recommend all bituminous materials have no binder from recycled asphalt (RAP) of the total binder and using a binder of PG 64-22 for the 5EML and 4EML or a binder of PG 58-22 for the 36A. An acrylic latex coating should be applied to the finished bituminous pavement surface upon completion of pavement curing period. We recommend a minimum pavement curing period of two weeks prior to placing an acrylic coating. However, the acrylic coating manufactures recommendations should be followed and can be longer than two weeks. In addition, we recommend the pavement surface be primed with a stain blocker prior to acrylic coating to minimize possible staining.

All pavement materials are specified within the 2020 Standard Specifications for Construction from the Michigan Department of Transportation. The aggregate materials for the subbase are described in Section 902. The bituminous pavement materials are described in Section 501.

Pavement Drainage and Maintenance

Proper pavement drainage is essential in areas with cohesive soil conditions. We recommend edge drains be provided continuously along curbs since they can become a source of water infiltration into the pavement subgrade within the south parking lot and access drives. Such drains should extend to minimum depths of 4 inches below the bottom of the proposed aggregate base course or granular fill placed within undercut areas. These drains should be connected to nearby catch basins. The pavement and subgrade should be properly sloped to promote effective surface and subsurface drainage and prevent water from ponding. We also recommend pavement subbase materials consist of non-frost-susceptible aggregates where possible.

Regular timely maintenance should be performed on the 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.

PAVILION RECOMMENDATIONS

Site Preparation

At the start of the earthwork operations, any existing topsoil and vegetation within the proposed footprint of the pavilion should be removed in their entirety. Following removal of the topsoil and vegetation, the exposed subgrade should be evaluated for stability to support the pavilion slab-on-grade. Given the cohesive nature of the site, we recommend the subgrade be proof-rolled utilizing a fully loaded tri-axle dump truck and monitored by a qualified geotechnical engineer. Any areas exhibiting unstable or otherwise unsuitable soil conditions should be removed and replaced with engineered fill. Any soils that are disturbed during grading operations should be removed and replaced with engineered fill.

Engineered fill should be free of organic matter, frozen soil, clods, or other harmful material. Frozen material should not be used as fill, nor should fill be placed on a frozen subgrade. Engineered fill should be 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). Any cohesive engineered fill material should be placed and compacted at moisture contents within 3 percent above and 1 percent below the optimum moisture content. Any granular engineered fill material should be placed and compacted at moisture contents within 2 percent above or below the optimum moisture content.

We recommend using an imported granular engineered fill, such as MDOT Class II sand, within confined areas such as adjacent to foundations. Granular engineered fill is generally more easily compacted than cohesive soils within these confined areas.

Foundation Recommendations

Based upon the existing subgrade conditions and anticipated loading conditions, we recommend the proposed pavilion be supported on conventional strip and/or spread footings designed to bear on the native sandy clay at the anticipated bearing elevation. We recommend a net allowable bearing capacity of 4,000 pounds per square foot (psf) be used for design of foundations bearing on the native sandy clay. Exterior foundations should bear at a minimum depth of 3-1/2 feet below finished grade for protection against frost heave. We recommend a qualified geotechnical engineer or technician be on site during construction to observe the excavations, measure the bearing depths, and confirm the bearing soils are consistent with the soils identified within this report.

Continuous wall or strip footings should be at least 12 inches in width and isolated spread footings should be at least 30 inches in their least dimension. Adjacent spread footings at different levels should be designed and constructed so the least lateral distance between them is equivalent to or more than the difference in their bearing levels. To achieve a change in the level of a strip foundation, the foundation should be gradually stepped at a grade no steeper than two units horizontal to one unit vertical.

If the recommendations outlined in this report are adhered to, total and differential settlements for the completed structure should be within 1 inch and ½ inch, respectively. We expect settlements of these magnitudes are within tolerable limits for the type of structure proposed.

Construction Considerations

Given the cohesive nature of the soils, we anticipate the contractor should be able to earth form the

foundations within the existing sandy clay soils. The sides of the spread and/or strip footing foundations should be constructed straight and vertical to reduce the risk of frozen soil adhering to the concrete and raising the foundations. In general, we do not anticipate accumulation of groundwater within foundation excavations at the depths anticipated for this project. However, if any groundwater or surface run off does occur, we expect they should be controllable with normal pumping from properly constructed sumps.

All excavations must be safely shored or sloped in accordance with MI-OSHA requirements. If material is stored or equipment is operated near an excavation, lower angle slopes or stronger shoring must be used to resist the extra pressure due to the superimposed loads. Where sloped excavations can be made, we recommend a maximum slope of 1horizontal units to 1 vertical unit (1H:1V) within the existing cohesive soil.

GENERAL COMMENTS

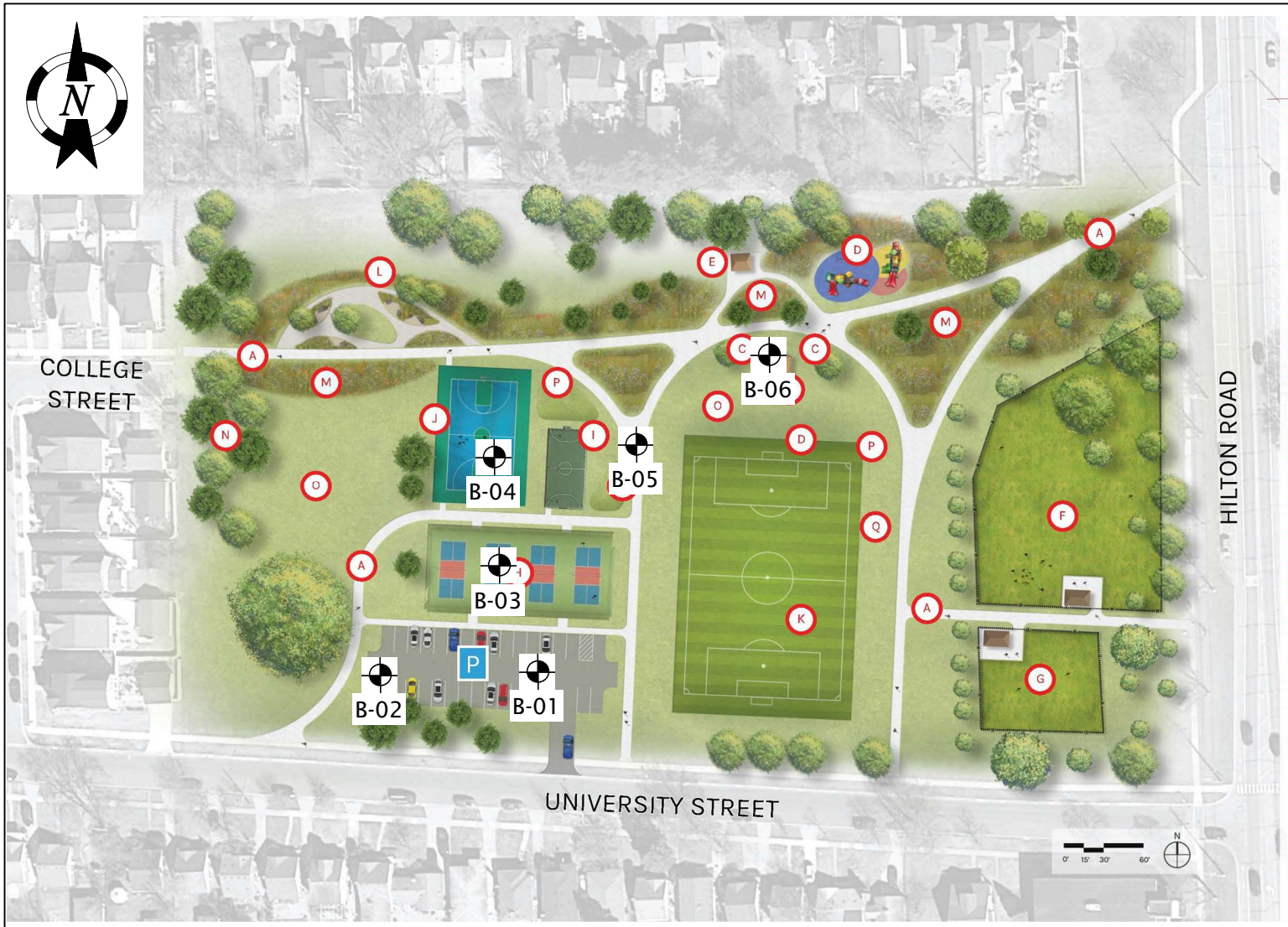
We have formulated the evaluations and recommendations presented in this report relative to site preparation and pavement construction on the basis of data provided to us relating to the general location for the proposed improvements. Any significant change in this data should be brought to our attention for review and evaluation with respect to the prevailing subsurface conditions.

The scope of the present investigation was limited to evaluation of subsurface conditions for the support of the pavements and other related aspects of the development. No chemical, environmental, or hydrogeological testing or analyses were included in the scope of this investigation. If changes occur in the design, location, or concept of the project, the conclusions and recommendations contained in this report are not valid unless G2 Consulting Group, LLC reviews the changes. G2 Consulting Group, LLC will then confirm the recommendations presented herein or make changes in writing.

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

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

APPENDIX



Soil borings performed by G2 Consulting Group, LLC on December 1, 2022

Soil Boring Location Plan

Proposed Wilson Park Improvements
656 Academy Street
City of Ferndale, Oakland County, Michigan

G2 CONSULTING GROUP

Project No. 223618	
Drawn by: ZRL	
Date: 1/11/23	Plate No. 1
Scale: NTS	

Project Name: Proposed Wilson Park Improvements

Project Location: 656 Academy Street
Ferndale, Michigan

G2 Project No. 223618

Latitude: 42.456339° Longitude: -83.124913°

Soil Boring No. B-01

CONSULTING GROUP

SUBSURFACE PROFILE				SOIL SAMPLE DATA					
ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 638.0 ft ±	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Bituminous Concrete (3 inches) 0.3							
		Fill: Gray Sand and Gravel with trace silt (8 inches) 0.9							
		Fill: Loose Brown Silty Sand with trace gravel 2.0		S-01	2 2 4	6	17.9		5000*
633.0		Very Stiff to Hard Mottled Brown and Gray Sandy Clay with trace gravel 5.0	5	S-02	6 9 12	21	12.9		9000*
628.0		End of Boring @ 5 ft	10						
623.0			15						
618.0			20						

Total Depth: 5 ft
Drilling Date: December 1, 2022
Inspector:
Contractor: G2 Consulting Group, LLC
Driller: Christopher Nicol

Drilling Method:
2-1/4 inch inside diameter hollow-stem augers

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Auger cuttings and cold patch asphalt

Figure No. 1

SOIL / PAVEMENT BORING 223618.GPJ 20150116.G2 CONSULTING DATA TEMPLATE.GDT 1/11/23

Project Name: Proposed Wilson Park Improvements

Project Location: 656 Academy Street
Ferndale, Michigan

G2 Project No. 223618

Latitude: 42.456346° Longitude: -83.125337°

Soil Boring No. B-02

CONSULTING GROUP

SUBSURFACE PROFILE				SOIL SAMPLE DATA					
ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 639.0 ft ±	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 (6 inches) 0.5							
		Hard Brown Sandy Clay with trace gravel		S-01	7 10 10	20	9.9		9000*
634.0		5.0	5	S-02	6 8 14	22	10.7		9000*
		End of Boring @ 5 ft							
629.0			10						
624.0			15						
619.0			20						

Total Depth: 5 ft
Drilling Date: December 1, 2022
Inspector:
Contractor: G2 Consulting Group, LLC
Driller: Christopher Nicol

Drilling Method:
2-1/4 inch inside diameter hollow-stem augers

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Auger cuttings

Figure No. 2

SOIL / PAVEMENT BORING 223618.GPJ 20150116.G2 CONSULTING DATA TEMPLATE.GDT 1/11/23

Project Name: Proposed Wilson Park Improvements

Project Location: 656 Academy Street
Ferndale, Michigan

G2 Project No. 223618

Latitude: 42.456557° Longitude: -83.124994°

Soil Boring No. B-03

CONSULTING GROUP

SUBSURFACE PROFILE				SOIL SAMPLE DATA					
ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 639.0 ft ±	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Bituminous Concrete (6 inches) 0.5							
		Portland Cement Concrete (6 inches) 1.0							
		Fill: Loose Brown Silty Sand with trace gravel 2.0		S-01A	2				
		Fill: Stiff Dark Brown Sandy Clay with trace gravel		S-01B	3 2	5	22.5		3500*
		(Organic Matter Content = 4.5%) 3.0							
		Stiff Mottled Brown and Gray Sandy Clay with trace gravel							
634.0		5.0	5	S-02	2 2 3	5	20.9		3500*
		End of Boring @ 5 ft							
629.0			10						
624.0			15						
619.0			20						

Total Depth: 5 ft
Drilling Date: December 1, 2022
Inspector:
Contractor: G2 Consulting Group, LLC
Driller: Christopher Nicol

Drilling Method:
2-1/4 inch inside diameter hollow-stem augers

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Auger cuttings and cold patch asphalt

Figure No. 3

SOIL / PAVEMENT BORING 223618.GPJ 20150116.G2 CONSULTING DATA TEMPLATE.GDT 1/11/23

Project Name: Proposed Wilson Park Improvements

Project Location: 656 Academy Street
Ferndale, Michigan

G2 Project No. 223618

Latitude: 42.456788° Longitude: -83.125016°

Soil Boring No. B-04

CONSULTING GROUP

SUBSURFACE PROFILE				SOIL SAMPLE DATA					
ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 639.0 ft ±	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Bituminous Concrete (5 inches) 0.4							
		Fill: Gray Sand and Gravel with trace silt (6 inches) 0.9							
		Portland Cement Concrete (8 inches) 1.4							
		Fill: Loose Brown Silty Sand with trace gravel		BS-01	3 3 3	6			
		4.0							
634.0		Hard Brown and Gray Sandy Clay with trace gravel 5.0	5	BS-02	2 3 5	8	18.1		9000*
		End of Boring @ 5 ft							
629.0			10						
624.0			15						
619.0			20						

Total Depth: 5 ft
Drilling Date: December 1, 2022
Inspector:
Contractor: G2 Consulting Group, LLC
Driller: Christopher Nicol

Drilling Method:
2-1/4 inch inside diameter hollow-stem augers

Water Level Observation:
4 feet during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Auger cuttings and cold patch asphalt

Figure No. 4

SOIL / PAVEMENT BORING 223618.GPJ 20150116.G2 CONSULTING DATA TEMPLATE.GDT 1/11/23

Project Name: Proposed Wilson Park Improvements

Project Location: 656 Academy Street
Ferndale, Michigan

G2 Project No. 223618

Latitude: 42.456808° Longitude: -83.124615°

Soil Boring No. B-05

CONSULTING GROUP

SUBSURFACE PROFILE				SOIL SAMPLE DATA					
ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 637.0 ft ±	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 (12 inches) 1.0							
		Very Stiff Brown Sandy Clay with trace gravel 2.5		BS-01	4 2 3	5	13.8		7000*
632.0		Hard Mottled Brown and Gray Sandy Clay with trace gravel 5.0	5	BS-02	4 6 9	15	16.6		9000*
627.0		End of Boring @ 5 ft	10						
622.0			15						
617.0			20						

Total Depth: 5 ft
Drilling Date: December 1, 2022
Inspector:
Contractor: G2 Consulting Group, LLC
Driller: Christopher Nicol

Drilling Method:
2-1/4 inch inside diameter hollow-stem augers

Water Level Observation:
Dry during and upon completion

Notes:
Borehole collapsed at 2-1/2 ft after auger removal
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Auger cuttings

Figure No. 5

SOIL / PAVEMENT BORING 223618.GPJ 20150116.G2 CONSULTING DATA TEMPLATE.GDT 1/11/23

Project Name: Proposed Wilson Park Improvements

Project Location: 656 Academy Street
Ferndale, Michigan

G2 Project No. 223618

Latitude: 42.457004° Longitude: -83.124240°

Soil Boring No. B-06

CONSULTING GROUP

SUBSURFACE PROFILE				SOIL SAMPLE DATA					
ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 638.0 ft ±	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 (12 inches)							
		1.0							
				BS-01	5 10 13	23	10.9		9000*
		Hard Mottled Brown and Gray Sandy Clay with trace gravel							
633.0			5	BS-02	8 14 17	31	13.5		9000*
		6.0							
				BS-03	9 16 21	37	11.4		9000*
		Hard Brown Sandy Clay with trace gravel							
628.0			10	BS-04	8 12 19	31	11.4		9000*
		12.0							
		Hard Gray Sandy Clay with trace gravel							
623.0		15.0	15	BS-05	4 8 10	18	12.7		9000*
		End of Boring @ 15 ft							
618.0			20						

Total Depth: 15 ft
Drilling Date: December 1, 2022
Inspector:
Contractor: G2 Consulting Group, LLC
Driller: Christopher Nicol

Drilling Method:
2-1/4 inch inside diameter hollow-stem augers

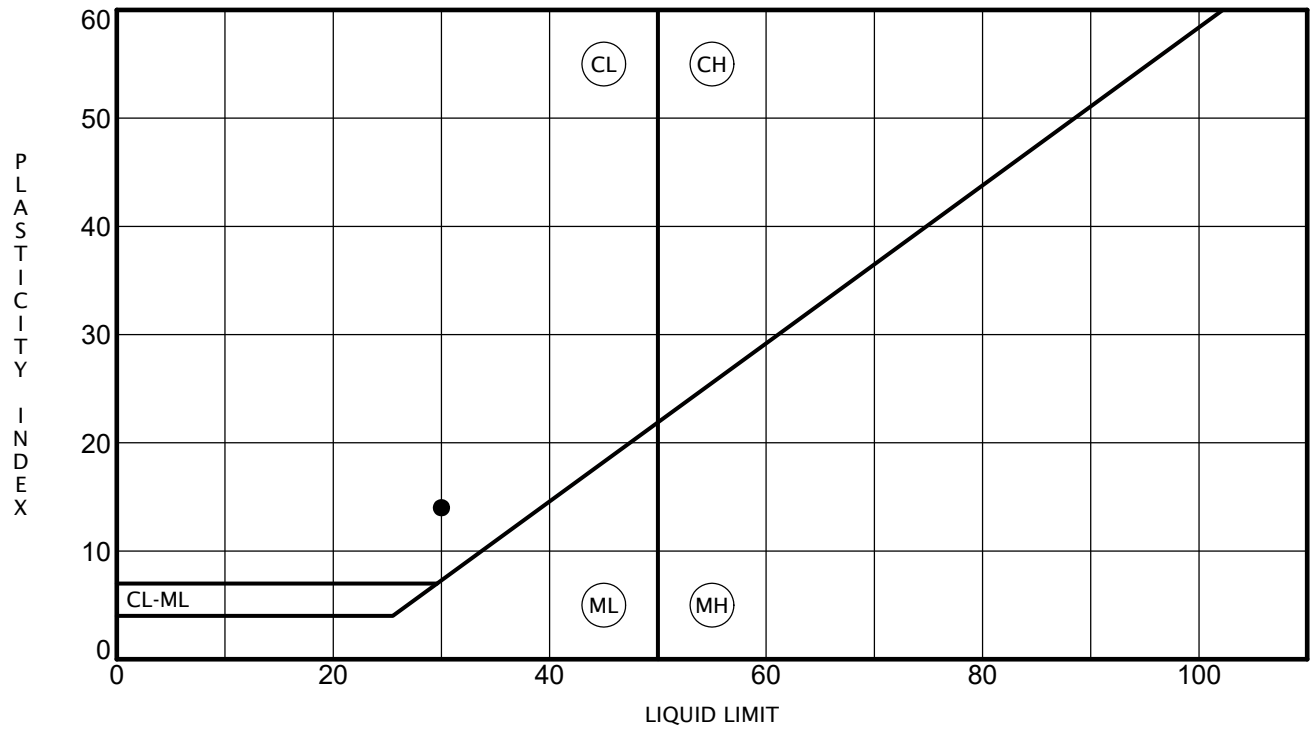
Water Level Observation:
Dry during and upon completion

Notes:
Borehole collapsed at 11 ft after auger removal
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Auger cuttings

Figure No. 6

SOIL / PAVEMENT BORING 223618.GPJ 20150116.G2 CONSULTING DATA TEMPLATE.GDT 1/11/23



	Specimen Identification		LL	PL	PI	Fines	M %	Classification
●	B-01	S-01	30	16	14		18	Mottled Brown and Gray Sandy Clay

CONSULTING GROUP

ATTERBERG LIMITS RESULTS

Project Name: Proposed Wilson Park Improvements

Project Location: 656 Academy Street
Ferndale, Michigan

G2 Project No.: 223618

Figure No. 7

US_ATTERBERG_LIMITS 223618.GPJ 20140820 G2 CONSULTING DATA TEMPLATE.GDT 1/10/23

Photographic Documentation
Proposed Wilson Park Improvements
Ferndale, Michigan
G2 Project No. 223618

Photograph No. 1: Moderate to high severity transversal, longitudinal, block, and fatigue cracking within parking lot near boring B-01. View to the east.

Photograph No. 2: Moderate to high severity transversal, longitudinal cracking within existing parking lot near boring B-01. View to the west.

Photographic Documentation
Proposed Wilson Park Improvements
Ferndale, Michigan
G2 Project No. 223618

Photograph No. 3: Moderate to high severity transverse, longitudinal, block and fatigue cracking within existing pavements near boring B-03. View to the northeast.

Photograph No. 4: Moderate to High severity longitudinal and transverse cracking within existing pavements near boring B-04. View to the south.

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 - Split 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).

SOIL EROSION & SEDIMENT CONTROL PERMIT

04-28-2023
Date Issued

000441-2023-CO
Permit Number

Under the provisions of Part 91, Soil Erosion and Sedimentation Control, of the Natural Resources and Environmental Protection Act, Act 451 of 1994, as amended, approval of the soil erosion and sediment control plan filed with this office for the following earth disruption is granted.

Project Description: Wilson Park Ferndale

Project Location: **SECTION** 34, CITY **OF** FERNDALE

WILSON PARK UNIVERSITY ST AND HILTON RD

Land Owner: CITY OF FERNDALE DEPARTMENT OF PUBLIC WORKS

Street Address: 521 E CAMBOURNE **Phone**: (248) 546-2521

City And State: FERNDALE, MICHIGAN **Zip**: 48220

Review Fee: $230.00 **Inspection Fee**: **$** 850.00

On Site Contact: MARK WOODHURST **Phone**: (734) 662-4457

Site Classifications: 2

CONDITIONS AND CLARIFICATIONS

Only checked conditions are applicable

1. This permit does not include or constitute a drainage review.
2. This permit does not waive the necessity for any other federal, state or local permits as may be applicable to the project.
3. This permit is subject to any changes deemed necessary by this office to ensure that no sedimentation occurs to off-site areas or waters of the state.
4. This Soil Erosion and Sediment Control Permit is for mass grading, utilities, and interstructure only. Construction of buildings and/or any other further development of this site will require an additional permit(s).

☐ 5. This permit is issued for a plan prepared by Smith Group, their Job No. 14337, sheet(s) CD100, last revised 03/21/2023 and dated 01/31/2023.

☐ 6. This is an AFTER-THE-FACT-PERMIT. The Owner(s) and /or their agent(s) did not obtain the required permit until the project was substantially in progress.

☑ 7. IF THIS WORK SITE IS BETWEEN ONE (1) AND FIVE (5) ACRES AND HAS A POINT SOURCE DISCHARGE OF THE STORM WATER TO WATERS OF THE STATE (DIRECTLY OR THROUGH A SEPARATE STORM DRAIN SYSTEM), THE SITE HAS AUTOMATIC COVERAGE UNDER THE PERMIT-BY-RULE FOR STORM WATER DISCHARGE.

☐ 8. IF THIS WORK SITE IS FIVE (5) ACRES OR LARGER AND HAS A POINT SOURCE DISCHARGE OF THE STORM WATER TO WATERS OF THE STATE (DIRECTLY OR THROUGH A SEPARATE STORM DRAIN SYSTEM), A FEDERAL STORM WATER DISCHARGE PERMIT (N.P.D.E.S. PERMIT) WILL BE REQUIRED. A NOTICE OF COVERAGE (NOC) FORM, SITE MAP, A COPY OF this PERMIT, AND PERMIT FEE MUST BE RECEIVED BY THE MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY BEFORE ANY CONSTRUCTION BEGINS AT THE SITE. CALL 517-241-8993 FOR MORE INFORMATION.

9. Maintain the soil erosion and sediment control measures described in this permit and establish permanent soil erosion measures in all disturbed areas. If “start-up” for the next phase of

CONTINUED ON BACK

JIM NASH, WATER RESOURCES COMMISSIONER
Designated Enforcement Agency
Part 91 of Public Act 451 of 1994

JOSEPH A. GARDNER
Soil Erosion & Sediment Control Agent
Oakland county, Michigan

construction following mass grading is delayed due to seasonal limitations, etc., then a combination of seeding, mulching, diversion ditching and/or additional perimeter sedimentation control measures may be required to achieve effective soil erosion and sediment control. Install and maintain such measures as necessary throughout the project.

☐ 10. This Soil Erosion and Sedimentation Control Permit does not convey permission to discharge into or work within the easement of the _____ Drain. Please contact the Oakland County Drain Commissioner's Office at 248-858-0958 for permit requirements.

11. That all required temporary erosion and sediment control measures will be installed and maintained according to the sequence-of-construction specified on the drawings, and the following requirements:

☑ A. Provide perimeter sedimentation controls, as specified in the sequence-of-construction, at locations as illustrated on the drawings.Design and install measures to convey water at a non erosive velocity before it leaves the site.

☐ B. Maintain a 25-foot wide vegetative buffer zone around the perimeter of the site.

☑ C. Immediately install stone access drive (1" x 3" crushed stone) at project entrance(s) and maintain it until a permanent drive is installed.

☑ D. Construct diversion berms or install sedimentation fencing as needed to prevent migration of sedimentation from the site to adjacent properties or bodies of water.

☑ E. Install geotextile filter fabric fence in accordance with the Soil Erosion and Sedimentation Control Standard Details. Straw bales can only be used behind silt fence as support for winter/frozen ground conditions.

☑ F. Install inlet filters on existing inlets in the affected area and maintain them throughout the project. Alternative inlet filters must be used in areas that may become a safety hazard due to flooding or freezing.

☐ G. Clear, grub, strip, and stockpile topsoil.

☐ H. Grade site, including construction of the detention/retention/sedimentation basin(s) and yard swales. Immediately establish vegetation on ditches, swales, and basins.

☐ I. Immediately install stone outlet filters on the basin outlet structure(s).

☐ J. Construct check dams as shown on the plans.

☑ K. Due to the steep slopes associated with this site, additional soil erosion control measures, such as diversion ditching, earth berming, slope stabilization, erosion control blankets, turf reinforcement mats, or a combination of these and other measures must be installed as shown on the plan to control soil erosion and sedimentation on the site.

☐ L. Install temporary erosion controls as required to confine sedimentation in the immediate area of construction for off-site water main, storm drain, or sanitary sewer. Begin off-site construction and continue to completion, maintaining soil erosion and sedimentation controls as necessary.

☐ M. Immediately establish vegetation on disturbed off-site areas.

☐ N. Install storm drain, sanitary sewer, and water main completely. Immediately install inlet filters on catch basins and inlets in pavement areas. Install rear yard catch basin inlet filters on catch basin and inlets in vegetated areas. Install flared end-sections on pipe ends, and rip-rap at pipe end-sections.

☑ O. Install driveway culverts and construct road ditches. Immediately establish vegetation in the road ditches.

☐ P. Begin building construction.

☐ Q. Install public utilities: gas, electric, telephone, etc.

☑ R. Install pavement and walks completely. Repair and/or replace inlet filters. Alternative inlet filters must be used in areas subject to flooding or freezing to prevent a safety hazard once the development is occupied.

☐ S. Complete home(s) or building(s) construction.

☑ T. If finish grading, redistribution of topsoil, and establishment of vegetation and/or landscaping cannot be completed immediately, do the following to minimize soil erosion and sedimentation:

☑ i. Try to maintain a 25-foot minimum vegetated buffer zone or greater in accordance with detail SP-1 of the Soil Erosion and Sedimentation Control Standard Details adjacent to

CONTINUED ON NEXT PAGE

curb or edge of pavement, wetlands, streams, lakes, or any other bodies of water and any off-site areas that receives surface runoff from this site.

☑ ii. If the required vegetative buffer cannot be achieved, a stone filter with geotextile filter fabric fence shall be installed on areas that drain to the pavement and/or geotextile filter fabric fence to prevent soil erosion and sedimentation on neighboring property.

☑ iii. Vegetate all swales, ditches, drainage easements, and disrupted off-site areas.

☐ iv. Install geotextile filter fabric fence around the top of retention and/or detention basins until said basins are vegetated.

☐ v. Install a minimum 25' x 25' sod inlet filter or greater in accordance with detail SP-1 of the Soil Erosion and Sedimentation Control Standard Details or rear yard catch basin filters around inlets.

☐ vi. Protect disrupted areas that drain directly into wetlands.

☐ vii. Protect disrupted areas that drain directly into _____ Lake.

U. If the proposed soil erosion controls are not properly maintained, or are insufficient, then additional soil erosion controls shall be required.

V. Temporary stabilization will be provided during the non-growing season for areas to be seeded or sodded. Areas temporarily stabilized during the non-growing season will be permanently stabilized immediately following the commencement of the next planting season. Straw or hay mulch will be removed or deeply incorporated into the soil before providing permanent stabilization. Dormant seeding is also recommended for early spring growth.

W. Clean pavements, walks, swales, ditches, culverts, watercourses, storm drains, retention and/or detention basins, lakes, streams and wetlands of accumulated sediment as needed through out the project. All pavement, walks, swales, ditches, culverts, watercourses, storm drains, retention and/or detention basins, lakes, streams, and wetlands will need to be cleaned in conjunction with the removal of temporary soil erosion control measures. Re-establish vegetation as necessary.

X. Complete permanent soil erosion control measures for the earth change within five calendar days after final grading or upon completion of the final earth change. If it is not possible to permanently stabilize the earth change, then maintain temporary soil erosion and sedimentation control measures until permanent soil erosion control measures are in place and the earth is stabilized. Permanent soil erosion vegetation is defined as having one (1) inch minimum of height and 90% of ground cover.

12. Soil erosion and sedimentation control measures shall be installed in accordance with the Oakland County Drain Commissioner's standard details. Design ,construct and complete earth changes in a manner that limits the exposed area for the shortest period of time.

13. Control devices shall be periodically maintained and cleaned of accumulated sediment. Streets in the affected area shall be cleaned daily of sediment and debris.

14. Erosion and sediment control devices shall remain operational until disrupted areas are permanently stabilized, at which time they shall be removed.

15. Submit revised plans to this office if there are changes to the grading plan, storm drainage system, soil erosion control plan, lot numbers, etc.

16. When permanent soil erosion control measures are completed, permanent vegetation established, and temporary soil erosion and sediment control measures removed, the permit holder will request a final inspection within one week of completion of permitted work. After final inspection, the permit is closed and no further earth disruption can occur without a new permit.

I JW _____ **agree to follow all of the above checked required soil erosion conditions.**
Landowner/agent initials

Enforcement Acknowledgement

1. Failure to comply with the applicable requirements of Part 91, Soil Erosion and Sedimentation Control, of the Natural Resources and Environmental Protection Act, Act 451 of the Public Acts of 1994, as amended (Part 91), is a civil infraction and will result in one or more of the following actions taken by this office: (1) a fine up to $2,500; (2) installation of soil erosion and sedimentation controls by county enforcing agency with all costs related to the administration, legal costs, permit or renewal fees and implementation of controls to be assessed against the landowner which may become a lien on the property if not paid; (3) a temporary restraining order will be filed in court to restrain any and all further construction at the property site, and to recover damages to the natural resources of the state; and (4) any other legal action necessary to ensure compliance with Michigan law.

2. **A person who knowingly violates Part 91 or knowingly makes a false statement in an application for a permit or in a soil erosion and sedimentation control plan may be ordered to pay a fine of up to $10,000 for each day of violation.**
3. **If corrective action is not taken within five (5) days of the date of a Notice of Determination of Violation letter, the permit holder will be responsible for a payment of a civil fine of not less than $2,500 or more than $25,000 for each day of violation. MCL 324.9121(1); 9121(2); and 9121(3).**
4. **By applying for and accepting this permit, the landowner hereby consents to the following: (1) the authority of the Michigan Department of Environmental Quality, or the county enforcing agency to enter upon the property at all reasonable times for the purpose of inspecting and investigating conditions or practices that may be in violation of Part 91; (2) installation of soil erosion and sedimentation controls by the county enforcing agency with all costs related to the administration, legal costs, permit or renewal fees and implementation of controls to be assessed against the landowner which may become a lien on the property.**
5. **No earth disruption can occur on this site before the issuance of the soil erosion permit.**
6. **A violation re-inspection fee of $175 will be assessed if the violations are not corrected within the five (5) day period.**

This permit will be renewed every three months from the expiration date at the current class inspection rate until the project has permanent soil erosion controls in place and temporary soil erosion controls removed.

An invoice for the renewal fee will be sent to the permit holder.

This Permit can only be renewed for a maximum of ONE (1) year of inactivity from the date of application.

I hereby acknowledge that I have read, understand, and accept the terms and conditions of this permit.

Property Owners Signature: Daniel Antosik Digitally signed by Daniel Antosik DN: cn=Daniel Antosik, o=City of Ferndale, ou=Public Works, email=dantosik@ferndalemi.gov, c=US Date: 2021.01.08 08:06:04 -05'00' _____

(or Designated Agent signature*)

* Designated agent must have a written and notarized statement from the property owner providing authorization to secure a permit on behalf of the property owner.