FAIRFIELD COUNTY COMMISSIONERS
210 East Main Street
Lancaster, OH 43130

INVITATION TO BID

Pursuant to ORC 153.12

1. NOTICE TO BIDDERS

1.1 Purpose

The Fairfield County Commissioners are requesting sealed bids for the Installation of Electrical Vehicle (EV) Charging Stations at the Workforce Center, located at 4465 Coonpath Road, Carroll, Ohio, 43112.

The Engineer's estimate of cost is $62,205.

1.2 Estimated Key Dates

The following are the estimated key dates associated with the ITB process. Bids received after 10:00 a.m. EDT on the Bid Due Date (as defined below) will not be considered.

PUBLICATION DATE:	**Thursday, September 30, 2021**
INQUIRY PERIOD BEGINS:	**Monday, October 4, 2021, 8:00 a.m. EDT**
PRE-BID MEETING @ SITE	**Wednesday, October 6, 2021, 10:00 a.m. EDT**
INQUIRY PERIOD ENDS:	**Monday, October 18, 2021, 8:00 a.m., EDT**
BID DUE DATE:	**Friday, October 22, 2021, 10:00 a.m., EDT**
BID OPENING DATE:	**Friday, October 22, 2021, 10:00 a.m., EDT**

There are references in this ITB to the Bid Due Date, which shall mean the date, and time that the Offeror's bid response is due at the Fairfield County Commissioners office in Lancaster, Ohio. Sealed Bids received after 10:00 A.M. on the Due Date will not be evaluated. Each bid must be submitted in a sealed envelope and marked on the outside as "INSTALLATION OF EV CHARGING STATIONS".

The Fairfield County Commissioners reserve the right to reject any or all bids in response to this ITB, and to waive any irregularities, nonconformities, or noncompliance with the terms of this ITB.

1.3 Additional Estimated Dates

CONTRACT AWARD NOTIFICATION: Tuesday, October 26, 2021

PURCHASE ORDER ISSUED: Wednesday, November 3, 2021

CONTRACT NOTICE TO PROCEED DATE: Friday, November 5, 2021

FINAL CONTRACT COMPLETION DATE: May 5, 2022

1.4 Location for Bid Response Opening

The following is the site for the public opening of Offeror's bid response(s).

Fairfield County Commissioners
Third (3rd) Floor Hearing Room
210 East Main Street
Lancaster, OH 43130

2 EXECUTIVE SUMMARY

2.1 Purpose

This document is a request for bids to construct the ELECTRICAL VEHICLE (EV) CHARGING STATIONS under Section 153.12 of the Ohio Revised Code. The Work is to be performed in accordance with the plans and specifications included in this Invitation to Bid document. The Fairfield County Commissioners are soliciting competitive, sealed bids for the described work located in the downtown Lancaster, Ohio area. If a suitable offer is made in response to this Invitation to Bid (ITB), the Fairfield County Commissioners may enter into a contract to have the selected Offeror (the "Contractor") provide the described work.

Upon selecting the lowest and best bid, the Fairfield County Commissioners shall enter into a Contract with such person or entity in accordance with Revised Code Section 153.12. A contract for the described work shall be prepared by the Fairfield County Commissioners and submitted to the selected Offeror. This ITB provides details on what is required to submit a Bid for the Work, and what will be required of the Contractor in providing the described work. As used herein, the term "the Fairfield County Commissioners" shall also include any of their employees, agents, or representatives.

This ITB also gives the estimated key dates for the various events that are part of the submission process, selection process, and work commencement. While these dates are subject to change, the Fairfield County Commissioners will make efforts to adhere to the dates contained herein. Once a contract is awarded, the described work must be completed by the completion date agreed upon by the Fairfield County Commissioners and the Contractor.

2.2 Objectives

The purpose of this Invitation to Bid (ITB) is to solicit bids that fulfill the requirements, performance expectations, and deliverables as outlined in the Scope of Work and General Conditions Specifications (see Section 4). It shall be the successful Bidder's obligation to ensure that their personnel providing any work or services in accordance with this ITB are qualified to perform such work or services.

2.3 Calendar of Events

Significant dates in connection with this ITB are shown above and are subject to change. The Fairfield County Commissioners may change any one or more of the key dates at any time, however significant schedule changes before the Inquiry Period Begins are not expected. If schedule changes occur after the Inquiry Period Begins, all participants will be notified via email. Any such email

announcements shall be considered as an addendum(s) to this ITB. It will be the responsibility of the prospective Offerors to notify the County that they intend to bid upon downloading bid documents, and to check his/her email on a regular basis for posted addendums, changes and other ITB information.

A Pre-Bid Conference will be held at the project site on Wednesday, October 6, 2021 at 10:00 AM, which all prospective bidders are encouraged to attend.

3 INSTRUCTIONS TO BIDDERS

3.1 Purpose

The following sections provide details on how to respond to this Invitation to Bid (ITB). All responses must be complete and in the prescribed format subject to the right of the Fairfield County Commissioners to waive any irregularities, nonconformities, or noncompliance with the terms of this ITB as set forth above.

3.2 Contacts

The following individual will be the representative of the Fairfield County Commissioners who may be contacted in connection with this Invitation to Bid (ITB).

Dennis R. Keller
Facilities Manager
740-652-7097
dennis.keller@fairfieldcountyohio.gov

Bidders may obtain complete sets of the Invitation to Bid document posted on the Fairfield County website at: www.co.fairfield.oh.us , available for downloading by the bidder. Prospective bidders must notify Dennis R. Keller, Facilities Manager, of their intention to bid when downloading documents electronically, and provide their contact information to Dennis R. Keller. A complete set of the Invitation to Bid (ITB) document will also be made available at the office of the Fairfield County Board of Commissioners, 210 East Main Street, Third Floor, 210 East Main Street, Lancaster, Ohio 43130, if bidders cannot download and print the documents.

3.3 Inquiries

Bidders may make inquiries regarding this ITB any time prior to the conclusion of the Inquiry Period set forth above in the Estimated Key Dates. Bidders must use email to make their inquiries. All inquiries must be addressed to and sent to Dennis R. Keller : dennis.keller@fairfieldcountyohio.gov The submission of oral, telephonic, facsimile or telegraphic inquiries **will not** be accepted.

3.4 Preparation of Bid

3.4.1 Submit a bid amount on the original Bid Form furnished by the Fairfield County Commissioners, in this document.

3.4.2 Sign Bid Form with name printed below signature.

3.4.3 All bids submitted by an agent shall have a current power of attorney attached certifying the agent's authority to bind the party responding to the ITB.

3.4.4 Oral, telephonic, facsimile or telegraphic bids in response to this ITB will not be accepted.

3.4.5 Provide all the required attachments to the Bid Form as follows:

A) Non-Collusion Affidavit
B) EEO Certification
C) Affidavit of Property Tax Liability
D) Drug-Free Work Place
E) Contractor References and Contact Information: The bidder shall provide references to the Owner for three (3) similar projects successfully completed including contact information.

3.4.6 Submit sealed bids in an opaque envelope plainly marked on the outside with the project title "BID FOR INSTALLATION OF ELECTRIC VEHICLE CHARGING STATIONS", bid date and time, and name of the Offeror.

3.4.7 If the bid is mailed, the sealed bid shall be enclosed in a separate mailing envelope with the notation "SEALED BID ENCLOSED" on the face of the bid envelope.

3.4.8 Mailing and delivery address is:
FAIRFIELD COUNTY BOARD OF COMMISSIONERS
Third Floor
210 East Main Street
Lancaster, Ohio 43130

3.4.9 Bidders shall be solely responsible for the timely delivery of their bid in response to this ITB in the manner and time prescribed. No bid shall be considered if it arrives after the time scheduled, as determined by the Fairfield County Commissioners.

3.4.10 Bids in response to this ITB that are unsigned, improperly prepared, contain arithmetical errors, alterations or irregularities of any kind, may, at the Fairfield County Commissioners discretion be declared unacceptable.

3.4.11 Bid Security: Each bid must be accompanied by cash, certified check of the bidder, or a bid bond prepared on the form of bid bond, Ohio Revised Code Section 153.54(C), duly executed by the bidder as principal and having as surety thereon a surety company approved by the Owner, in the amount of at least 10% of the bid. Such cash, checks, or bid bonds will be returned to all except the three lowest bidders within three days after the opening of bids, and the remaining cash, checks, or bid bonds will be returned promptly after the Owner and the accepted bidder have executed the Contract; or if no award has been made within thirty (30) days after the date of the opening of bids, upon demand of the bidder at any time thereafter, so long as he/she has not been notified of the acceptance of his/her bid. Attorneys-in-fact who sign bid bonds or contract bonds must file with each bond a certified and effectively dated copy of their Power of Attorney.

3.4.12 Performance Bond: The Contractor shall furnish a Payment and Performance Bond or Bonds in the amount of one hundred percent (100%) of the Contract price covering the faithful performance of the Contract and the payment of all obligations arising thereunder, with security satisfactory to the Owner. The Payment and Performance Bond shall also serve as a guarantee against defective material and workmanship in the said work covered by said Contract, provided however, that no suit, action or proceeding by reason of any

defect whatever shall be brought upon this bond after two (2) years following the date of final acceptance of the work by Fairfield County, Ohio.

3.5 Contractor Pre-Qualification Verification Requirements

3.5.1 Qualified contractors will be required to submit the following documents before entering into a contract with the Fairfield County Commissioners:

1) A completed W-9 Tax Form (if not on file)
2) A copy of your Workers Compensation Certificate
3) Any required licenses and identification numbers
4) Liability Insurance Certificates as follows:

Commercial General Liability:	Minimum $1,000,000 per occurrence Minimum $1,000,000 aggregate
Auto Liability:	Minimum $1,000,000 per occurrence Minimum $1,000,000 aggregate
Umbrella/Excessive Liability:	Minimum $3,000,000 per occurrence

3.6 Laws and Regulations

3.6.1 The bidder's attention is directed to the fact that all applicable State laws, municipal ordinances, and the rules and regulations of all authorities having jurisdiction over this project shall apply to this contract.

3.7 Occupational Safety and Health Administration

3.7.1 Special attention by the bidders is also directed to the requirements of OSHA. The successful contractor will be required to observe all provisions of the Act, which are by reference included in the specified provisions of these specifications as if actually reproduced herein, and will be responsible for their full enforcement.

3.8 Award of Contract

3.8.1 The contract, if let, will be awarded to the lowest and best bid. In determining the awardee the following elements may be considered: whether the bidder maintains a permanent place of business; has adequate personnel and equipment to do the work safely, properly, and expeditiously; has suitable financial base to meet the obligations incidental to the work; has appropriate experience; has completed all items on the Bid Form; and has inserted no qualifying phrases or unbalanced items on the bid.

3.8.2 The Fairfield County Commissioners reserve the right to reject any and all bids in response to this ITB, and to waive any irregularities, nonconformities, or noncompliance with the terms of this ITB.

3.8.3 The bidder must be skilled in the use and interpretation of plans and specifications for this project, and has found them free of ambiguities and sufficient for bidding purposes. Further, he/she has carefully examined the site of the work and from his/her own observations, is satisfied as to the nature and location of the work, the character, and the quality of the materials and the difficulties likely to be encountered, and other items, which

may affect the performance of the work. He/she has based the bid solely on these documents, including any addenda and observations, and has not relied in any way on any explanation or interpretation, oral or written, from any other source. Therefore, the bidder agrees to hold the Fairfield County Commissioners harmless for his/her negligence, error, or omissions.

3.8.4 The Fairfield County Commissioners may consider any bids not prepared and submitted in accordance with the provisions hereof and may waive any formalities or irregularities in the bids submitted.

3.9 Time of Completion and Liquidated Damages

3.9.1 The final contract completion date shall be **180 calendar days** from the date of Notice to Proceed, to substantial completion of the parking lot work, final close-out documents and a final payment request is submitted.

3.9.2 Liquidated damages will be assessed at a rate of $100 per day to the contractor for late completion and occupancy of the new parking area by the Owner, unless an approved contract extension is granted.

3.10 Payment Applications and Changes to the Work

3.10.1 Full payment shall be made upon satisfactory completion of the work, and all contract close-out requirements are met. If partial payment applications are requested, they shall be submitted on a monthly basis and shall be at a "percentage of work completed basis" for the various categories of work.

3.10.2 Payment requests must be submitted on the approved Schedule of Values, using the AIA G702 Application and Certificate for Payment form. The Schedule of Values must be approved prior to the first payment request.

3.10.3 Retainage: An amount of eight percent (8%) of labor costs is to be withheld on monthly payments, and will be retained by the Owner until completion of the Contract as a guarantee that the Contractor will faithfully perform and completely fulfill the obligations and conditions imposed by this Contract, and will pay any damages caused the Owner by reason of any failure on his part to fulfill any or all of said obligations or conditions.

3.10.4 All changes to the Work involving a change in contract amount must be approved in advance by the Owner. The contractor will be required to submit a detailed labor and materials pricing breakdown for the change in contract scope for approval by the Owner and Architect. Change Orders will be authorized on a form designated by the Owner.

3.11 Contract Termination

3.11.1 Upon written notice to the contractor, the County may, without cause and without prejudice to any other right or remedy, elect to terminate the Contract. In such case, the Contractor shall be paid for all work executed and any expense sustained plus reasonable profit, unless such termination was due to the act or conduct of the Contractor.

3.12 Prevailing Wage

3.12.1 State Prevailing Wages shall be paid by the Contractor, and the Contractor shall comply with all administrative regulations required by the State of Ohio, Department of Commerce, Wage and Hour Administration.

3.12.2 Refer to the attached Prevailing Wage Rates applicable to this project, and to all other associated documents for prevailing wage compliance.

4 GENERAL CONDITIONS AND SCOPE OF WORK

4.1 **Scope of Work:** The purpose of this Invitation to Bid (ITB) is to obtain bids for a complete installation of the Electrical Vehicle (EV) Charging Stations, along with the associated site restoration work. The project is located at the Fairfield County Workforce Center, 4465 Coonpath Road, Carroll, Ohio, 43112.

4.2 The Contractor shall provide complete Installation of the EV Charging Stations, including all final construction and occupancy inspection approvals, ready for use by the County. The new EV Charging Stations are located in the existing parking lot area and this contract includes all associated site work disturbed during construction and as indicated on the construction drawings, as the Basis of Design.

4.3 The Contractor shall include all costs in the bid to furnish all labor, materials, and equipment necessary to complete the project.

4.4 The Owner shall obtain and pay for plan approval as required for building permits. Contractor shall obtain and pay for all other required permits, and provide any required notices as necessary to perform the work.

4.5 If necessary, the Contractor shall provide a field office and storage trailer on-site as necessary for the work, with temporary power, portable sanitation facilities, and all necessary temporary utilities.

4.6 The Contractor shall provide temporary construction fencing, if indicated on the contract drawings.

4.7 The Contractor will be encouraged to host a bi-weekly construction progress meeting at the jobsite field office, to be held on alternating Thursdays. The time will be agreed upon with the Owner.

4.8 Demolition and removal of all existing debris and spoils from the site is the responsibility of the contractor, and must be performed in a timely manner. The project site must be maintained in a clean and organized manner.

4.9 Provide all necessary traffic signage and lane closure barriers for public streets, alleys, and sidewalks as required per Fairfield County Engineer, Division of Transportation requirements. Submit a Maintenance of Traffic plan, if required, to the City and County.

4.10 The contractor is required to maintain all public streets in a clean condition, that are being used for trucking access to and from the site.

4.11 Provide dust control during construction activities to meet City and EPA requirements.

4.12 The Contractor must provide submittals of product literature and installation drawings for all items to be incorporated into the final Work, to the Engineer/Owner for review and approval prior to installation.

5. ADDITIONAL REQUIREMENTS

In addition to any other requirements herein, the Contractor shall comply with the requirements listed below:

a. General requirements
b. Coordination
c. Security
d. Fire safety
e. Hazardous materials
f. Cleaning
g. Storage space use

5.1 General Requirements

5.1.1 The Contractor shall comply with all applicable ordinances, laws, and regulations. The Contractor shall obtain and pay for any and all required permits and inspections as needed.

5.1.2 The Contractor will remove from the site, as required, any existing materials resulting from excavation or demolition at the building site.

5.1.3 The Contractor shall provide a Liability Insurance Certificate, and Workers Compensation Certificate to the County prior to the start of work.

5.2 Schedule and Coordination

5.2.1 The Contractor shall coordinate all construction activities with the authorized representative of the Fairfield County Commissioners and with the Architect/Engineer, and provide a written schedule of the work. The Project Schedule must be submitted and approved prior to the first payment application.

5.3 Security

5.3.1 The Contractor shall maintain security of the project site and its contents at all times during the term of the contract and any extensions thereto.

5.4 Fire Safety

5.4.1 The Contractor shall comply with all local fire safety requirements.

5.4.2 The Contractor shall provide adequate fire extinguishing equipment at all interior work areas requiring welding, soldering, or cutting with flame torches.

5.4.3 The Contractor shall take every precaution to prevent fires.

5.5 Hazardous Materials

5.5.1 The Contractor is cautioned to check the premises where the new Work is to be located for the existence of hazardous materials during the progress of the work.

5.5.2 In the event materials are encountered during the work which may present a health hazard to workers, occupants, or the public, the Contractor shall take the following actions:

a. Take immediate action to limit the exposure or hazardous condition.

b. Cease work in the area until suspected hazardous material can be identified.

c. Notify the Fairfield County representative of the condition. Such notification shall be made by the most expedient means with subsequent written confirmation.

5.5.3 Testing, identification, removal, or other processes to render hazardous materials safe within legal limits is to be provided by the Contractor, upon approval by the Owner.

5.6 Final Clean-Up

5.6.1 The Contractor shall perform periodic cleaning during the term of this agreement and maintain all surrounding areas in clean condition.

5.6.2 Upon final completion of the work, the Contractor shall perform sweeping of the roadway and surrounding parking areas to remove all dirt, mud, or debris.

CONTRACT FORM A

Fairfield County Commissioners
INSTALLATION OF ELECTRICAL VEHICLE(EV)
CHARGING STATIONS

BID FORM

Bids Must be submitted on this form only. (Type or Print Clearly)

Prevailing Wage rates apply.

ITEM 1 - BASE BID WORK :

1A. Lump Sum Bid Amount (labor & materials) $_____

Sub-Contractor Name: _____

Acknowledgement of Addenda Received: (List all Addendum numbers and date)

Addendum # _____ Date: _____

Addendum # _____ Date: _____

Addendum # _____ Date: _____

Having carefully read and examined the entire set of Construction Documents, including without limitation the Drawings, Specifications and all Addenda (listed above) prepared by the Architect for the above referenced Project;
and with a clear understanding of the delineation between Base Bid and Alternate Bid work; **and** having visited and examined the site, premises, and the conditions affecting the work, the undersigned Bidder proposes to perform all Work, furnish all labor, materials and equipment for this Project in strict compliance with the Construction Documents for the sums indicated above.

Note: The breakdown of this combined bid as indicated above is requested for the purpose of assisting the Owner in evaluating the bids received. **In order for your bid to be accepted, all blanks must be filled**.

Signed By Bidder:_____ Date: _____

Printed Name: _____ Title: _____

Company Name: _____

Address: _____

_____

Phone: _____

CONTRACT FORM B

NON-COLLUSION AFFIDAVIT

State of Ohio)
) SS:
Fairfield County)

I _____being first duly sworn, deposes and says that

he/she is _____(Sole Owner, a Partner, President, Secretary, etc.)

of _____

the party making the proposal; that such proposal is not made in the interest of or on behalf of any disclosed person, partnership, company, association, organization, or corporation, that such proposal is genuine and not collusive or sham; that said bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid, and has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or that anyone shall refrain from bidding; that said bidder has not in any manner, directly or indirectly sought by agreement, communication or conference with anyone to fix the bid price of said bidder or of any other bidder, or to fix any overhead profit, or cost element of such bid price, or of that of any other bidder or to secure any advantage against Fairfield County; that all statements contained in such proposal are true; and further, that said bidder has not, directly or indirectly, submitted his bid price or any breakdown thereof, of the contents thereof, or divulged information or data relative thereto, or paid and will not pay any fee in connection therewith, to any corporation, partnership, company, association, public official or employee, organization, or to any other individual except to such person or persons as have a partnership or other financial interest with said bidder in this general business.

Signed: _____ Title: _____

SWORN to and SUBSCRIBED before me this ____ day of _____, 20_____
in _____ County, State of Ohio.

My Commission expires: _____

_____
NOTARY PUBLIC

CONTRACT DOCUMENT C

Contractor Equal Employment Opportunity Certification

During the performance of this contract, the undersigned agrees as follows:

1. The undersigned will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The undersigned will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion or national origin. Such action shall include, but not be limited to the following: Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The undersigned agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this equal opportunity (federally assisted construction) clause.

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

3. The undersigned will send to each labor union or representative of workers, with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representative of the undersigned's commitment under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

4. The undersigned will comply with all provisions of Executive Order No. 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.

5. The undersigned will furnish all information and reports required by Executive Order No. 11246 of September 24, 1965, and by the rules, regulations, and relevant orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records and accounts by the administering agency of the Secretary of labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

6. In the event of the undersigned's non-compliance with the equal opportunity (federally assisted construction) clause of this contract of with any of the said rules, regulations, or orders, this contract may be canceled, terminated or suspended in whole or in part, and the undersigned may be declared ineligible for further Government contracts of federally assisted construction contracts in accordance with procedures authorized in Executive Order No. 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order No 11246 of September 24, 1965, or by rules, regulations, or order of the Secretary of Labor, or as provided by law.

7. The undersigned will include this equal opportunity (federally assisted construction) clause in every subcontract or purchase order unless exempted by the rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order No 11246 of September 24, 1965, so that such provision will be binding upon each subcontract or vender. The undersigned will take such action with respect to any subcontract or purchase order as the administering agency may direct as a means of enforcing such provisions, including sanctions for non-compliance: Provided, however, that in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor, as a result of such direction by the administering agency the undersigned may request the United States to enter into such litigation to protect the interest of the United States.

_____

(Signature) (Date)

_____

(Name and Title of Signer, Please Print)

_____

(Firm or Company Name)

CONTRACT FORM D

AFFIDAVIT OF CONTRACTOR OR SUPPLIER FOR NON~DELINQUENCY OF PERSONAL PROPERTY TAXES PER O.R.C. SECTION 5719.042

STATE OF OHIO)
) SS
COUNTY OF FAIRFIELD)

TO: Fairfield County Commissioners

The undersigned, being first duly sworn, having submitted a bid for;

_____,

hereby states that we were not charged at the time the bid was submitted with any delinquent personal property taxes on the general tax list of personal property of any county in which you as a taxing district have territory and that we were not charged with delinquent personal property taxes on any such tax list.

In consideration of the award of the above contract, the above statement is incorporated in said contract as a covenant of the undersigned.

_____
Contractor (Signature)

Sworn to before me and subscribed in my presence this____day of_____, 201__.

_____
Notary Public Seal
Commission Expires: _____

CONTRACT FORM E

DRUG FREE WORKPLACE

This is to certify that the undersigned Contractor complies with the Drug Free Workplace Act of 1988:

1. Any individual contractor must agree not to engage in the unlawful manufacture, distribution, dispensation, possession or use of a controlled substance in the performance of this contract.

2. All organizations covered by the Drug-Free Workplace Act of 1988 are required to provide a drug-free workplace.

In the event of the Contractor's non-compliance with the drug free workplace certification, contracts may be cancelled, terminated, or suspended in whole or in part, and the Contractor may be declared ineligible for further contracts.

_____ _____

Date Authorized Signature of Contractor

_____ _____

Company Name Print Name

Prevailing Wage Rate
Skilled Crafts

Name of Union: Carpenter Millwright Local 1090 Columbus

Change # : LCN01-2021fbLoc1241

Craft : Carpenter **Effective Date :** 06/17/2021 **Last Posted :** 06/17/2021

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Carpenter Millwright	$31.02		$7.50	$10.39	$0.45	$0.00	$6.00	$0.13	$0.00	$0.00	$55.49	$71.00
Apprentice	**Percent**											
1st 6 months	60.00	$18.61	$7.50	$10.39	$0.45	$0.00	$6.00	$0.13	$0.00	$0.00	$43.08	$52.39
2nd 6 months	65.00	$20.16	$7.50	$10.39	$0.45	$0.00	$6.00	$0.13	$0.00	$0.00	$44.63	$54.71
3rd 6 months	70.00	$21.71	$7.50	$10.39	$0.45	$0.00	$6.00	$0.13	$0.00	$0.00	$46.18	$57.04
4th 6 months	75.00	$23.26	$7.50	$10.39	$0.45	$0.00	$6.00	$0.13	$0.00	$0.00	$47.74	$59.37
5th 6 months	80.00	$24.82	$7.50	$10.39	$0.45	$0.00	$6.00	$0.13	$0.00	$0.00	$49.29	$61.69
6th 6 months	85.00	$26.37	$7.50	$10.39	$0.45	$0.00	$6.00	$0.13	$0.00	$0.00	$50.84	$64.02
7th 6 months	90.00	$27.92	$7.50	$10.39	$0.45	$0.00	$6.00	$0.13	$0.00	$0.00	$52.39	$66.35
8th 6 months	95.00	$29.47	$7.50	$10.39	$0.45	$0.00	$6.00	$0.13	$0.00	$0.00	$53.94	$68.67

Special Calculation Note : Other is for UBC National Fund.

Ratio :

3 Journeymen to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note) :

DELAWARE, FAIRFIELD, FRANKLIN, GUERNSEY, LICKING, MADISON, MARION, MORGAN, MUSKINGUM, NOBLE, PERRY, PICKAWAY, UNION

Special Jurisdictional Note :

Details :

The term “Millwright and Machine Erectors”’ jurisdiction shall mean the unloading, hoisting, rigging,

skidding, moving, dismantling, aligning, erecting, assembling, repairing, maintenance and adjusting of all structures, processing areas either under cover, underground or elsewhere, required to process material, handle, manufacture or service, be it powered or receiving power manually, by steam, gas, electricity, gasoline, diesel, nuclear, solar, water, air or chemically, and in industries such as and including, which are identified for the purpose of description, but not limited to, the following: woodworking plants; canning industries; steel mills; coffee roasting plants; paper and pulp; cellophane; stone crushing; gravel and sand washing and handling; refineries; grain storage and handling; asphalt plants; sewage disposal; water plants; laundries; bakeries; mixing plants; can, bottle and bag packing plants; textile mills; paint mills; breweries; milk processing plants; power plants; aluminum processing or manufacturing plants; and amusement and entertainment fields. The installation of mechanical equipment in atomic energy plants; installation of reactors in power plants; installation of control rods and equipment in reactors; and installation of mechanical equipment in rocket missile bases, launchers, launching gantry, floating bases, hydraulic escape doors and any and all component parts thereto, either assembled, semi-assembled or disassembled. The installation of, but not limited to, the following: setting-up of all engines, motors, generators, air compressors, fans, pumps, scales, hoppers, conveyors of all types, sizes and their supports; escalators; man lifts; moving sidewalks; hosts; dumb waiters; all types of feeding machinery; amusement devices; mechanical pin setters and spotters in bowling alleys; refrigeration equipment; and the installation of all types of equipment necessary and required to process material either in the manufacturing or servicing. The handling and installation of pulleys, gears, sheaves, fly wheels, air and vacuum drives, worm drives and gear drivers directly or indirectly coupled to motors, belts, chains, screws, legs, boots, guards, booth tanks, all bin valves, turn heads and indicators, shafting, bearings, cable sprockets cutting all key seats in new and old work, troughs, chippers, filters, calendars, rolls, winders, rewinders, slitters, cutters, wrapping machines, blowers, forging machines, rams, hydraulic or otherwise, planning, extruder, ball, dust collectors, equipment in meat packing plants, splicing or ropes and cables. The laying-out, fabrication and installation of protection equipment including machinery guards, making and setting of templates for machinery, fabrication of bolts, nuts, pans, dripping of holes for any equipment which the Millwrights install regardless of materials; all welding and burning regardless of type, fabrication of all lines, hose or tubing used in lubricating machinery installed by Millwrights; grinding, cleaning, servicing and any machine work necessary for any part of any equipment installed by the Millwrights; and the break-in and trail run of any equipment or machinery installed by the Millwrights. It is agreed the Millwrights shall use the layout tools and optic equipment necessary to perform their work.

Prevailing Wage Rate
Skilled Crafts

Name of Union: Cement Mason Local 132 (Columbus)

Change # : LCN01-2021fbLoc132

Craft : Cement **Effective Date :** 06/01/2021 **Last Posted :** 05/26/2021

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Cement Mason	$27.98		$7.85	$4.55	$0.65	$0.00	$3.10	$0.00	$0.00	$0.00	$44.13	$58.12
Apprentice	**Percent**											
1st yr	70.00	$19.59	$7.85	$4.55	$0.65	$0.00	$3.10	$0.00	$0.00	$0.00	$35.74	$45.53
2nd yr	80.00	$22.38	$7.85	$4.55	$0.65	$0.00	$3.10	$0.00	$0.00	$0.00	$38.53	$49.73
3rd yr	90.00	$25.18	$7.85	$4.55	$0.65	$0.00	$3.10	$0.00	$0.00	$0.00	$41.33	$53.92

Special Calculation Note : No special calculations for this skilled craft wage rate are required at this time.

Ratio :

3 Journeymen to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note) :

ASHLAND, COSHOCTON, CRAWFORD, DELAWARE, FAIRFIELD, FAYETTE, FRANKLIN, GUERNSEY, HOCKING, KNOX, LICKING, MADISON, MARION, MORROW, MUSKINGUM, PERRY, PICKAWAY, RICHLAND, ROSS, UNION, VINTON, WYANDOT

Special Jurisdictional Note :

Details :

Working on swing stage, slip scaffold or window jack scaffold shall receive the following rates:
$.50 above the regular rate for heights up to fifty (50) feet above grade level
$1.00 above the regular rate for heights over fifty (50) feet above grade level

Prevailing Wage Rate
Skilled Crafts

Name of Union: Electrical Local 683 Inside

Change # : LCN02-2021fbbLoc683In

Craft : Electrical **Effective Date :** 06/03/2021 **Last Posted :** 06/03/2021

Classification	BHR	Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
		H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Electrician	$35.50	$10.35	$7.84	$0.80	$0.00	$3.10	$0.00	$0.00	$0.00	$57.59	$75.34
Welding	$36.50	$10.35	$7.87	$0.80	$0.00	$3.10	$0.00	$0.00	$0.00	$58.62	$76.87
Mdium Voltage Splicing	$36.50	$10.35	$7.87	$0.80	$0.00	$3.10	$0.00	$0.00	$0.00	$58.62	$76.87
Over 100 feet	$53.25	$10.35	$8.37	$0.80	$0.00	$3.10	$0.00	$0.00	$0.00	$75.87	$102.49
Level 1 CW 0 to 2000 hours	$11.49	$6.35	$0.35	$0.68	$0.00	$0.35	$0.10	$0.00	$0.00	$19.32	$25.07
Level 2 CW 2001 to 4000 hours	$12.32	$6.35	$0.37	$0.68	$0.00	$0.37	$0.10	$0.00	$0.00	$20.19	$26.35
Level 3 CW 4001 to 6000 hours	$13.14	$6.35	$0.39	$0.68	$0.00	$0.39	$0.10	$0.00	$0.00	$21.05	$27.62
Level 4 CW 6001 to 8000 hours	$14.78	$6.35	$0.44	$0.68	$0.00	$0.44	$0.10	$0.00	$0.00	$22.79	$30.18
Level 1 CE 8001 to 10000 hours	$16.42	$6.35	$0.49	$0.68	$0.00	$0.49	$0.10	$0.00	$0.00	$24.53	$32.74
Level 2 CE 10,001 to 12,000 hours	$18.06	$6.35	$0.54	$0.68	$0.00	$0.54	$0.10	$0.00	$0.00	$26.27	$35.30
Level 3 CE 12,001 to14,000 hours	$22.99	$6.35	$0.69	$0.68	$0.00	$0.69	$0.10	$0.00	$0.00	$31.50	$43.00

Apprentice	Percent											
0-1000 hrs 1st Period	40.00	$14.20	$10.35	$3.14	$0.80	$0.00	$1.24	$0.00	$0.00	$0.00	$29.73	$36.83
1001-2000 hrs 2nd Period	45.00	$15.98	$10.35	$3.53	$0.80	$0.00	$1.40	$0.00	$0.00	$0.00	$32.06	$40.04
2001-3500 hrs 3rd Period	50.00	$17.75	$10.35	$3.92	$0.80	$0.00	$1.55	$0.00	$0.00	$0.00	$34.37	$43.25
3501-5000 hrs 4th Period	55.00	$19.53	$10.35	$4.31	$0.80	$0.00	$1.71	$0.00	$0.00	$0.00	$36.70	$46.46
5001-6500 hrs 5th Period	65.00	$23.07	$10.35	$5.09	$0.80	$0.00	$2.02	$0.00	$0.00	$0.00	$41.34	$52.87
6501-8000 hrs 6th Period	80.00	$28.40	$10.35	$6.27	$0.80	$0.00	$2.48	$0.00	$0.00	$0.00	$48.30	$62.50

Special Calculation Note : Other is Education Fund

Ratio :

1 to 3 Journeyman to 2 Apprentices
4 to 6 Journeyman to 4 Apprentices

Ratio
Construction Wireman and Construction Electrician
1 Journeyman to 2 Apprentices to 2 CW/CE
With a MAXIMUM of 6 CW/CE an on any jobsite

Construction Wireman and Construction Electricians may work on residential projects without working under the supervision of a Journeyman Wireman. On ALL other job sites, Construction Wireman and Construction Electricians CAN only be employed after an APPRENTICE IS EMPLOYED on the job site.

Jurisdiction (* denotes special jurisdictional note) :

CHAMPAIGN, CLARK, DELAWARE, FAIRFIELD, FRANKLIN, MADISON, PICKAWAY*, UNION

Special Jurisdictional Note : In Pickaway County the following townships: Circleville,Darby,Harrison,Jackson,Madison,Monroe,Muhlenberg,Scioto,Walnut,Washington.

Details :

Prevailing Wage Rate
Skilled Crafts

Name of Union: Labor Local 423

Change # : LCN01-2021ssLoc423

Craft : Laborer **Effective Date :** 07/28/2021 **Last Posted :** 07/28/2021

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Laborer Group 1	$28.73		$7.50	$3.90	$0.40	$0.00	$0.00	$0.00	$0.10	$0.00	$40.63	$55.00
Group 2	$29.04		$7.50	$3.90	$0.40	$0.00	$0.00	$0.00	$0.10	$0.00	$40.94	$55.46
Group 3	$29.35		$7.50	$3.90	$0.40	$0.00	$0.00	$0.00	$0.10	$0.00	$41.25	$55.93
Group 4	$29.66		$7.50	$3.90	$0.40	$0.00	$0.00	$0.00	$0.10	$0.00	$41.56	$56.39
Apprentice	**Percent**											
0-1000 hrs	60.00	$17.24	$7.50	$3.90	$0.40	$0.00	$0.00	$0.00	$0.10	$0.00	$29.14	$37.76
1001-2000 hrs	70.00	$20.11	$7.50	$3.90	$0.40	$0.00	$0.00	$0.00	$0.10	$0.00	$32.01	$42.07
2001-3000 hrs	80.00	$22.98	$7.50	$3.90	$0.40	$0.00	$0.00	$0.00	$0.10	$0.00	$34.88	$46.38
3001-4000 hrs	90.00	$25.86	$7.50	$3.90	$0.40	$0.00	$0.00	$0.00	$0.10	$0.00	$37.76	$50.69
More than 4000 hrs	100.00	$28.73	$7.50	$3.90	$0.40	$0.00	$0.00	$0.00	$0.10	$0.00	$40.63	$55.00

Special Calculation Note : No special calculations for this skilled craft wage rate are required at this time.

Ratio :

1 Journeymen to 1 Apprentice
4 Journeymen to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note) :

FAIRFIELD, FAYETTE, FRANKLIN, HOCKING, LICKING, MADISON, PICKAWAY, UNION

Special Jurisdictional Note :

Details :

Group 1:
General Laborers, Carpenter Tender, Cathodic Protection, Cleaning Debris, Cleaning of all Material, General Clean-up including Vacuum Cleaning, Scraping and Cleaning of Walls and Floors, Landscape, Installation and Removal of Fencing, Sod Layers, All Portable Heaters, Flagman, Loading

and Unloading of all Trucks, Handling and conveying all Materials, Washing of all Windows, Conveyer Belt, All Water Pumps up to and including three (3) inch intake, Watchman, Water Boy and Tool Room Attendant.
Group 1- Swimming Pools, Pool Decks, Surrounding Sidewalk and Parking Garages.

Group 2:
Skid Steer, Concrete Specialists, Brick Tender, Stone Mason Tender, Plaster Tender, Mortar Mixer and Operator, Cement Mason Tender, Construction Specialist, All Scaffold Builders (Swinging Scaffolds), Lagging, Bush Hammering,Jack Hammer Operator, Air or Electric Pneumatic Tool Operator, Power Driven Tools, Power Buggy Operators, Pouring and Placement of all concrete, Fork Lift Operators, Power Wheelbarrow Operators, Asphalt and Blacktop Rakers, Wrecker/Demolition, Sand Blasting and Chipping, Welders on Demolition, Grade Checkers, a person on a bucket pouring concrete, Gunite Nozzle man, Wagon and Churn Drill Operator, Concrete Saw Operator, Brush Feeders on pulverizers, Pipe Layers, Bottom Man, Laser Gun, Burners, Sand Blasting of concrete, Vibrator Man, Steward, Signal Man, Caisson, Caisson Bottom Man, Piledrivers, Asbestos and Lead Abatement Laborers.

Hazardous Waste (Level B): Any work requiring the following protective equipment must be paid at Group 2 rate,
A protective suit and an Air Purifying Respirator (APR) with the appropriate filter canisters. The ensemble is used when contaminants are reliably known not to be hazardous to the skin and not IDLH (Immediately Dangerous To Life or Health) and correct filter protection is available. This ensemble offers adequate protection for many jobs. Heat stress may be a problem due to inherent restrictions to breathing in an APR. Also, normal job related injury risk will be nearly as high as for Level C Equipment.

Group 3 Hazardous (Level C:) Any work requiring the following protective equipment must be paid at Group 3 rate,
A chemically resistant splash suit and a (SCBA) or Airline Respirator. This ensemble is required when the situation is very hazardous, such as oxygen deficient atmospheres, IDLH atmospheres, or confined space entries, but the risk of skin exposure is not as great as in Level D situations. Then Level C ensemble gives the second highest level of protection, but also puts physical stress on the worker; primarily heat stress, reduced vision,dexterity and mobility directly attributable to wearing of the protective equipment. Therefore, in addition to the hazardous material, the hazard of the normal job related injuries is greatly increased.

Group 4 Hazardous Waste (Level D) requiring the following protective equipment must be paid at Group 4 rate,
Protective equipment is required when the area has been known to contain extremely toxic contaminants or contaminants unknown but may be expected to be extremely toxic and /or Immediately Dangerous to Life and Health (IDLH). This ensemble includes fully encapsulated chemical suit (moon suit), Self Contained Breathing Apparatus (SCBA), or Airline Fed Respirator, and various types and numbers of boots and gloves, cool vests and voice activated radios are optional equipment sometimes worn. Level D ensembles provide the highest level of protection from contaminants but places the greatest physical and mental stress on the worker. The claustrophobic environment of the moon suit causes anxiety in most people, which greatly increases the already inherent heat stress problems. Also, this ensemble reduces vision, mobility, dexterity, and communication capacity, all of which increases the risk of normal job related injuries, ie., slips ,falls, caught between, etc

.
Hazardous Pay of $0.25 per hour shall be paid in addition to classifications shown above
Swing Scaffolds (suspended by rope or pulley), and swing scaffolds for grain storage tank or grain elevators, when the work is performed at a height of fifty (50) feet or more above the foundations or grade level, whichever is higher. Caisson work and tunnel work (depth being 15 feet or deeper)

Hazardous Waste Removal & Lead Abatement Workers: Exclusive or "Hot" area with toxic or hazardous materials, when one of the following personal protective equipment ensembles will be required for necessary protection against toxic contaminants. All of the ensembles increase the risks of certain types of worker-related injuries. When Laborers complement another craft receiving premium rate of pay Laborers will also receive premium pay for this "HOT" type of work.

Prevailing Wage Rate
Skilled Crafts

Name of Union: Operating Engineers - Building Local 18 - Zone III

Change # : LCN01-2021sksLoc18zone3

Craft : Operating Engineer **Effective Date :** 08/13/2021 **Last Posted :** 08/13/2021

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Operator Group A	$39.14		$8.76	$6.25	$0.85	$0.00	$0.00	$0.09	$0.00	$0.00	$55.09	$74.66
Operator Group B	$39.02		$8.76	$6.25	$0.85	$0.00	$0.00	$0.09	$0.00	$0.00	$54.97	$74.48
Operator Group C	$37.98		$8.76	$6.25	$0.85	$0.00	$0.00	$0.09	$0.00	$0.00	$53.93	$72.92
Operator Group D	$36.80		$8.76	$6.25	$0.85	$0.00	$0.00	$0.09	$0.00	$0.00	$52.75	$71.15
Operator Group E	$31.34		$8.76	$6.25	$0.85	$0.00	$0.00	$0.09	$0.00	$0.00	$47.29	$62.96
Master Mechanic	$39.39		$8.76	$6.25	$0.85	$0.00	$0.00	$0.09	$0.00	$0.00	$55.34	$75.03
Cranes 150'-180'	$39.64		$8.76	$6.25	$0.85	$0.00	$0.00	$0.09	$0.00	$0.00	$55.59	$75.41
Cranes 180'-249'	$40.14		$8.76	$6.25	$0.85	$0.00	$0.00	$0.09	$0.00	$0.00	$56.09	$76.16
Cranes 249' and over	$40.39		$8.76	$6.25	$0.85	$0.00	$0.00	$0.09	$0.00	$0.00	$56.34	$76.53
Apprentice	**Percent**											
1st Year	50.00	$19.57	$8.76	$6.25	$0.85	$0.00	$0.00	$0.09	$0.00	$0.00	$35.52	$45.31
2nd Year	60.00	$23.48	$8.76	$6.25	$0.85	$0.00	$0.00	$0.09	$0.00	$0.00	$39.43	$51.18
3rd Year	70.00	$27.40	$8.76	$6.25	$0.85	$0.00	$0.00	$0.09	$0.00	$0.00	$43.35	$57.05
4th Year	80.00	$31.31	$8.76	$6.25	$0.85	$0.00	$0.00	$0.09	$0.00	$0.00	$47.26	$62.92
Field Mechanic Trainee												
1st Year	50.00	$19.57	$8.76	$6.25	$0.85	$0.00	$0.00	$0.09	$0.00	$0.00	$35.52	$45.31
2nd Year	60.00	$23.48	$8.76	$6.25	$0.85	$0.00	$0.00	$0.09	$0.00	$0.00	$39.43	$51.18
3rd Year	70.00	$27.40	$8.76	$6.25	$0.85	$0.00	$0.00	$0.09	$0.00	$0.00	$43.35	$57.05
4th Year	80.00	$31.31	$8.76	$6.25	$0.85	$0.00	$0.00	$0.09	$0.00	$0.00	$47.26	$62.92

Special Calculation Note : Other: Education & Safety $0.09

Ratio :

For every (3) Operating Engineer Journeymen employed by the company there may be employed (1) Registered Apprentice or trainee Engineer through the referral when they are available. An apprenice, while employed as part of a crew per Article VIII, paragraph 78, will not be subject to the apprenticeship ratios in this collective bargaining agreement

Jurisdiction (* denotes special jurisdictional note) :

ADAMS, ALLEN, ASHLAND, ATHENS, AUGLAIZE, BELMONT, BROWN, BUTLER, CARROLL, CHAMPAIGN, CLARK, CLERMONT, CLINTON, COSHOCTON, CRAWFORD, DARKE, DEFIANCE, DELAWARE, FAIRFIELD, FAYETTE, FRANKLIN, FULTON, GALLIA, GREENE, GUERNSEY, HAMILTON, HANCOCK, HARDIN, HARRISON, HENRY, HIGHLAND, HOCKING, HOLMES, JACKSON, JEFFERSON, KNOX, LAWRENCE, LICKING, LOGAN, MADISON, MARION, MEIGS, MERCER, MIAMI, MONROE, MONTGOMERY, MORGAN, MORROW, MUSKINGUM, NOBLE, OTTAWA, PAULDING, PERRY, PICKAWAY, PIKE, PREBLE, PUTNAM, RICHLAND, ROSS, SANDUSKY, SCIOTO, SENECA, SHELBY, STARK, TUSCARAWAS, UNION, VAN WERT, VINTON, WARREN, WASHINGTON, WAYNE, WILLIAMS, WYANDOT

Special Jurisdictional Note :

Details :

Note: There will be a 10% increase for the apprentices on top of the percentages listed above provided they are operating mobile equipment. Mechanic Trainees will receive 10% increase if required to have CDL

Group A- Barrier Moving Machines; Boiler Operators or Compressor Operators, when compressor or boiler is mounted on crane (Piggyback Operation); Boom Trucks (all types); Cableways Cherry Pickers; Combination - Concrete Mixers & Towers; All Concrete Pumps with Booms; Cranes (all types); Compact Cranes, track or rubber over 4,000 pounds capacity; Cranes self-erecting, stationary, track or truck (all configurations); Derricks (all types); Draglines; Dredges (dipper, clam or suction) 3-man crew; Elevating Graders or Euclid Loaders; Floating Equipment; Forklift (rough terrain with winch/hoist); Gradalls; Helicopter Operators, hoisting building materials; Helicopter Winch Operators, Hoisting building materials; Hoes (All types); Hoists (with two or more drums in use); Horizonal Directional Drill; Hydraulic Gantry (lift system); Laser Finishing Machines; Laser Screed and like equipment; Lift Slab or Panel Jack Operators; Locomotives (all types); Maintenance Operator/Technician(Mechanic Operator/Technician and/or Welder); Mixers, paving (multiple drum); Mobile Concrete Pumps, with booms; Panelboards, (all types on site); Pile Drivers; Power Shovels; Prentice Loader; Rail Tamper (with automatic lifting and aligning device); Rotary Drills (all), used on caissons for foundations and sub-structure; Side Booms; Slip Form Pavers; Straddle Carriers (Building Construction on site); Trench Machines (over 24” wide); Tug Boats.

Group B - Articulating/end dumps (minus $4.00/hour from Group B rate); Asphalt Pavers; Bobcat-

type and/or skid steer loader with hoe attachment greater than 7000 lbs.; Bulldozers; CMI type Equipment; Concrete Saw, Vermeer-type; Endloaders; Hydro Milling Machine; Kolman-type Loaders (Dirt Loading); Lead Greasemen; Mucking Machines; Pettibone-Rail Equipment; Power Graders; Power Scoops; Power Scrapers; Push Cats;, Rotomills (all), grinders and planers of all types.

Group C - A-Frames; Air Compressors, Pressurizing Shafts or Tunnels; All Asphalt Rollers; Bobcat-type and/or Skid Steer Loader with or without attachments; Boilers (15 lbs. pressure and over); All Concrete Pumps (without booms with 5 inch system); Fork Lifts (except masonry); Highway Drills - all types (with integral power); Hoists (with one drum); House Elevators (except those automatic call button controlled), Buck Hoists, Transport Platforms, Construction Elevators; Hydro Vac/Excavator (when a second person is needed, the rate of pay will be "Class E"); Man Lifts; Material hoist/elevators; Mud Jacks; Pressure Grouting; Pump Operators (installing or operating Well Points or other types of Dewatering Systems); Pumps (4 inches and over discharge); Railroad Tie (Inserter/Remover); Rotovator (Lime-Soil Stabilizer); Submersible Pumps (4"and over discharge); Switch & Tie Tampers (without lifting and aligning device); Trench Machines (24" and under); Utility Operators.

Group D - Backfillers and Tampers; Ballast Re-locator; Batch Plant Operators; Bar and Joint Installing Machines; Bull Floats; Burlap and Curing Machines; Clefplanes; Compressors, on building construction; Concrete Mixers, more than one bag capacity; Concrete Mixers, one bag capacity (side loaders); All Concrete Pumps (without boom with 4" or smaller system); Concrete Spreader; Conveyors, used for handling building materials; Crushers; Deckhands; Drum Fireman (in asphalt plants); Farm type tractors pulling attachments; Finishing Machines; Form Trenchers; Generators: Gunite Machines; Hydro-seeders; Pavement Breakers (hydraulic or cable); Post Drivers; Post Hole Diggers; Pressure Pumps (over 1/2") discharge); Road Widening Trenchers; Rollers (except asphalt); Self-propelled sub-graders; Shotcrete Machines; Tire Repairmen; Tractors, pulling sheepsfoot post roller or grader; VAC/ALLS; Vibratory Compactors, with integral power; Welders.

Group E – Allen Screed Paver (concrete); Boilers (less than 15 lbs. pressure); Cranes-Compact, track or rubber (under 4,000 pounds capacity); Directional Drill "Locator"; Fueling and greasing +$3.00; Inboard/outboard Motor Boat Launches; Light Plant Operators; Masonry Fork Lifts; Oilers/Helpers; Power Driven Heaters (oil fired); Power Scrubbers; Power Sweepers; Pumps (under 4 inch discharge); Signalperson, Submersible Pumps (under 4" discharge).

Master Mechanics - Master Mechanic

Cranes 150' – 180' - Boom & Jib 150 - 180 feet

Cranes 180' – 249' - Boom & Jib 180 - 249 feet

Cranes 250' and over - Boom & Jib 250-feet or over

Prevailing Wage Rate
Skilled Crafts

Name of Union: Truck Driver Bldg & HevHwy Class 1
Locals 20,40,92,92b,100,175,284,438,377,637,908,957

Change # : LCRO1-2021fbBldgHevHwy

Craft : Truck Driver **Effective Date :** 05/21/2021 **Last Posted :** 05/21/2021

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Truck Driver CLASS 1 4 wheel service, dump, and batch trucks, Oil Distributor - Asphalt Distributor-Tandems	$29.24		$7.50	$8.50	$0.20	$0.00	$0.00	$0.00	$0.00	$0.00	$45.44	$60.06
Apprentice	**Percent**											
First 6 months	80.00	$23.39	$7.50	$8.50	$0.20	$0.00	$0.00	$0.00	$0.00	$0.00	$39.59	$51.29
7-12 months	85.00	$24.85	$7.50	$8.50	$0.20	$0.00	$0.00	$0.00	$0.00	$0.00	$41.05	$53.48
13-18 months	90.00	$26.32	$7.50	$8.50	$0.20	$0.00	$0.00	$0.00	$0.00	$0.00	$42.52	$55.67
19-24 months	95.00	$27.78	$7.50	$8.50	$0.20	$0.00	$0.00	$0.00	$0.00	$0.00	$43.98	$57.87
25-30 months	100.00	$29.24	$7.50	$8.50	$0.20	$0.00	$0.00	$0.00	$0.00	$0.00	$45.44	$60.06

Special Calculation Note : No special calculations for this skilled craft wage rate are required at this time.

Ratio :

3 Journeymen to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note) :

ADAMS, ALLEN, ASHLAND, ASHTABULA, ATHENS, AUGLAIZE, BELMONT, BROWN, BUTLER, CARROLL, CHAMPAIGN, CLARK, CLERMONT, CLINTON, COLUMBIANA, COSHOCTON, CRAWFORD, DARKE,

DEFIANCE, DELAWARE, ERIE, FAIRFIELD, FAYETTE, FRANKLIN, FULTON, GALLIA, GREENE, GUERNSEY, HAMILTON, HANCOCK, HARDIN, HARRISON, HENRY, HIGHLAND, HOCKING, HOLMES, HURON, JACKSON, JEFFERSON, KNOX, LAWRENCE, LICKING, LOGAN, LORAIN, LUCAS, MADISON, MAHONING, MARION, MEDINA, MEIGS, MERCER, MIAMI, MONROE, MONTGOMERY, MORGAN, MORROW, MUSKINGUM, NOBLE, OTTAWA, PAULDING, PERRY, PICKAWAY, PIKE, PORTAGE, PREBLE, PUTNAM, RICHLAND, ROSS, SANDUSKY, SCIOTO, SENECA, SHELBY, STARK, SUMMIT, TRUMBULL, TUSCARAWAS, UNION, VAN WERT, VINTON, WARREN, WASHINGTON, WAYNE, WILLIAMS, WOOD, WYANDOT

Special Jurisdictional Note :

Details :

** Asphalt - Oil spray bar man when operating from cab shall receive $0.20 cents per hour above their Basic Hourly Rate.

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DIVISION 26 - ELECTRICAL

SECTION 26 00 10 - GENERAL PROVISIONS

PART 1 GENERAL

1.01 REFERENCE

A. The General Conditions and other Contract Documents as set forth in the foregoing pages are hereby incorporated into and become a part of the Specifications for work under this title.

B. All Specifications under this Division Title are directed to and are the responsibility of the Electrical Contractor. Unless other trades or persons are specifically mentioned, "Electrical Contractor" is inferred and intended.

1.02 CONTRACT DRAWINGS

A. The Drawings accompanying these Specifications are complementary each to the other and what is called for by one shall be as if called for by both.

B. Consult all Contract Drawings that may affect the location of equipment, conduit and wiring and make minor adjustments in location to secure coordination.

C. Wiring layout is schematic and exact locations shall be determined by structural and other conditions. This does not mean that the design of the system may be changed. It refers only to the exact locations of conduit and equipment to fit into the building as constructed and with the coordination of conduit and other equipment with piping and equipment included under other divisions of the Specifications.

D. Coordinate layout of Electrical work with other trades. Make minor adjustments in location required for coordination. Locations of structural systems, heating work and plumbing lines shall take preference over locations of conduit lines where conflict occurs.

E. Other than minor adjustments shall be submitted to the Owner for approval before proceeding with the work.

F. The location of outlets and switches shown on the Drawings is approximate, and the Owner shall have the right to relocate any outlets or switches before they are installed without additional cost.

G. The first manufacturer listed in these Specifications or on the drawings, in schedule or coded note form, is the basis for design. Any manufacturers listed below this base manufacturer are considered to be other acceptable manufacturers. It shall be the responsibility of the Contractor and the Supplier to coordinate these other acceptable manufacturers' equipment with all building trades and building architecture. The other acceptable manufacturers' products shall match the base manufacturer's products in size, quality and performance.

1.03 MANUFACTURER'S DRAWINGS

A. The Contractor shall submit to the CM for review, within six weeks after date of contract, an electronic file containing a pdf file of the manufacturer's drawings and wiring diagrams. Refer to General Conditions for required submittal contents. The A/E will review Contractor's shop drawings and related submittals, as indicated below, with respect to the ability of the detailed work, when complete, to be a properly functioning integral element of the overall system designed by the A/E. Before submitting a shop drawing or any related material to the Engineer Contractor shall: review each such submission for conformance with the means, methods, techniques, and sequences, operations of construction, safety precautions and programs all of which are the sole responsibility of Contractor. Contractor shall approve each such submission by stamping each submittal before submitting it. The Engineer shall assume that no shop drawing or related submittal comprises a variation unless Contractor advises the Engineer otherwise. The items, types of submittals and related material are indicated below:

ITEMS	TYPE SUBMITTALS REQUIRED
Wire and Cable	Catalog Cuts
Grounding	Catalog Cuts
Raceways and Boxes	Catalog Cuts
Lighting Fixtures and Pole Bases	Catalog Cuts

B. The Engineer shall return shop drawings and related materials with comments provided that each submission has been called for and is stamped by Contractor as indicated above. The Engineer shall return, without comment, material not called for or which Contractor has not approved.

C. Engineer's review of Manufacturer's Drawings or Schedules shall not relieve the Contractor from responsibility for errors or omissions in Manufacturer's Drawings or Schedules and deviation from Engineer's Drawings or Specifications.

D. At the completion of the Job before final payment is made, the Contractor shall submit an electronic file in pdf format containing the Manufacturer's "As-Built" Drawings. Included with the Drawings shall be The Operating and Maintenance Manuals as called for in Section 26 01 20.

1.04 JOB-SITE COPY OF DOCUMENTS

A. Maintain at the site, one copy of all Drawings, Specifications, Addenda, approved Shop Drawings, Change Orders and other modifications, in good order. The Drawings shall be marked to record all changes made during construction, especially deviations made necessary to incorporate equipment different from base equipment specified. These shall be available to the Architect. The Drawings shall be marked to record all changes made during construction and shall be delivered to the Architect upon completion of the work. The Engineer will furnish an additional set of Drawings for this purpose upon request.

1.05 DISCREPANCIES IN THE DRAWINGS AND / OR SPECIFICATIONS

A. If there are discrepancies or ambiguities in the drawings and / or specifications, the electrical contractor shall submit an RFI to the Architect requesting clarification prior to the bid. If the electrical contractor does not submit an RFI, the equipment or installation method that has the greater cost impact shall take precedence.

PART 2 PRODUCTS

2.01 MATERIALS

A. All materials shall be new and un-deteriorated and of a quality not less than the minimum specified.

B. Materials and equipment for which there are Underwriters' Laboratories (UL) Standard requirements, listing and labels shall have listing of Underwriters' Laboratories and be so labeled.

2.02 SUBSTITUTIONS

A. Unless specifically noted, it is the intent of this article to make the Specification open in every respect to all available brands of material of equal quality during the period of bidding.

B. Bid shall be based on furnishing one of the brands of material and equipment mentioned in the Specifications. Submit, attached to the Bid, selected list of all material and equipment brands intended to be furnished if awarded the Contract. No change of brands shall be made after receipt of Bid and attached material brands list, unless approved in writing by the Engineer.

C. Refer to "Instructions to Bidders" regarding substitutions.

D. Where the Contractor furnishes equipment or material specified as equal or which is accepted as a substitution, the contractor is responsible for all modifications required for his work, and work of all other trades to install the equipment and ensure performance as originally specified.

2.03 GUARANTEES

A. The Electrical Contractor shall be responsible for all defects, repairs and replacements in materials and workmanship for a period of one (1) year after final written acceptance by the Owner.

B. Product guarantees greater than one (1) year shall be passed along to the Owner for full benefit of the manufacturer's warranty.

2.04 QUANTITIES

A. Items may be referred to as singular or plural on the Drawings and in the Specifications. The Contractor is responsible for determining quantity of each item required.

PART 3 EXECUTION

3.01 INSTALLATION

A. Furnish and install all necessary hangers, supports, straps, boxes, fittings and other similar appurtenances not indicated on the Drawings but which are required for a complete and properly installed system consistent with the Architectural treatment of the building.

B. Contractor shall become fully informed regarding peculiarities and limitations of space available for installation of materials and apparatuses under this contract, and see that all equipment necessary to be reached from time to time for operation and maintenance are made easily accessible. Clearances, when possible, shall be greater than those required by Code.

C. At least 6'-6" clear headroom must be maintained in front of all electrical equipment. Provide clear work space in front of electrical equipment in accordance with NEC table 210.26 (A)(1). The same clear work space is required at the rear of rear access equipment.

D. In accordance with NEC article 110.26, the width of the working space in front of the electrical equipment shall be the width of the equipment or 30”, whichever is greater. In all cases, the work shall permit at least a 90-degree opening of equipment doors or hinged panels.

3.02 WORKMANSHIP

A. Electrical work shall meet or exceed the standards of installation and workmanship set forth in the latest edition of the National Electrical Contractors Association publication entitled NECA Standard of Installation, except as otherwise modified in these Specifications or shown on the Drawings.

B. The Architect or Engineer reserves the right to direct the removal and replacement of any item which, in his opinion, does not present an orderly, neat or workmanlike appearance, provided that such item can be properly installed in an orderly way by methods usual in such work, or which does not comply with the contract drawings or these Specifications. Perform such removals or replacements when directed in writing by the Architect/Engineer and at the Contractor's expense.

C. The Electrical Contractor shall at all times keep the premises in a neat and orderly condition, and at the completion of the work shall properly clean up and cart away debris and excess materials.

3.03 COORDINATION WITH OTHER TRADES

A. The work shown on the electrical drawings are schematic. The electrical contractor shall review the entire set of construction documents and coordinate with other trades to avoid

conflicts with the electrical installations. Failure to coordinate will result in the electrical contractor remedying the electrical conflict(s) at his expense.

END OF SECTION

SECTION 26 00 20 - WORK INCLUDED

PART 1 GENERAL

1.01 SCOPE

A. Furnish all materials, labor, tools, transportation, incidentals and appurtenances to complete in every detail and leave in working order all items of work called for herein and shown on the accompanying Drawings.

B. It is the intent that the ensuing work shall be complete in every respect and that any material or work not specifically mentioned or shown on the Drawings, but necessary to fully complete the work, shall be furnished.

1.02 COORDINATION OF PLANS AND SPECIFICATIONS

A. Contact the Architect/Engineer immediately if there is any question regarding the meaning or intent of either the Plans or Specifications, or upon noticing any discrepancies or omissions in either the Plans or Specifications.

PART 2 PRODUCTS

Not Applicable

PART 3 EXECUTION

3.01 SITE VISITATION

A. The Bidder is encouraged to visit the site and become fully inform concerning all conditions affecting the scope of the work. Failure to visit the site shall not relieve the bidder from any responsibility in the performance of this Contract.

3.02 SUPERVISION OF WORK

A. The Contractor shall have in charge of the work, at all times during construction, a competent superintendent with a large experience in the work to be done under this Specification.

B. Refer to the Specifications covering all branches of the work and keep fully informed of the progress of general construction. Install all work that is concealed in sufficient time to insure proper location without delays to the work of the other trades. Properly attend to the work during the process of building-in to prevent misalignment and damage.

3.03 CUTTING AND PATCHING

A. Avoid cutting of concrete, masonry and other. When necessary, cutting shall be done by the Contractor with such tools and methods as to prevent unnecessary damage to surrounding areas or equipment.

B. No cutting shall be done which will in any way reduce the structural strength of the building or surface. Should such cutting be found necessary, the Engineer must first be fully informed of, and consent to, the proposed operation.

C. All cutting through poured concrete slabs and walls shall be done with core drills. No jackhammers will be allowed.

D. Repair of damages created by the Contractor to newly painted or refinished areas shall be done by the contractor.

E. All conduits, equipment, etc. that penetrates walls or floors shall have openings, sleeves, etc. filled and closed off to prevent the possible spread of fire or products of combustion through the wall or floor.

G. Where required to maintain fire rating, openings shall be sealed utilizing 3M Brand Fire Barrier Penetration Sealing systems. Fire barrier or fire stop systems from Crouse-Hinds, Thomas & Betts or Dow Corning may be used at Contractor's option. Openings shall be temporarily fire-stopped until permanent fire stopping is done.

3.04 CLEANING AND PAINTING

A. All electrical equipment shall be kept dry and clean during the construction period. Light fixtures, poles, etc. shall be covered with fiberglass reinforced plastic sheeting as a minimum form of protection. Provide additional protection if job conditions so require.

B. All finished surfaces of equipment furnished under this Contract shall be thoroughly cleaned of dirt. All scratched or damaged surfaces shall be touched up with matching materials before final acceptance of the work. No exposed ferrous metal surfaces shall be left unpainted. Touch-up all galvanized surfaces, if scratched, with two coats of aluminum paint.

C. Prime and paint all steel hangers, boxes, straps, rods, etc. which are not provided with rust-protective finish or if the protective finish is damaged during installation. Paint is to be zinc chromate primer with aluminum bronze finish. This includes unfinished, mechanical and "exposed to view" locations.

D. When all work is completed and has been satisfactorily tested and accepted by the Engineer, all fixtures, conduit and other exposed surfaces shall be thoroughly cleaned.

E. Dust must be held to a minimum when work is performed inside of the existing building.

F. Paint all exposed bare conduit, panels and boxes. Painting shall consist of two (2) coats of semi-gloss enamel paint. The Engineer shall select colors.

3.05 EXCAVATION AND BACKFILL

A. Provide all excavation and backfill necessary to get the work in place. Such excavation shall be carried to the minimum dimensions and depths indicated, or as necessary for the proper installation and completion of the work.

B. Remove all formwork and debris before backfill is placed. Backfill is to be brought to the proper elevation and shall be puddled, tamped and thoroughly compacted. Finished grade shall be replaced in kind, i.e., topsoil, seed, gravel, blacktop, concrete, etc to match existing and/or future surroundings.

C. Surplus soil removed from excavations shall be removed from the site by this Contractor unless the Owner requests that it be retained as future fill for rough grades.

D. All excavated areas shall be barricaded and properly protected.

3.06 CAST-IN-CONCRETE ITEMS

A. Anchor bolts, boxes, conduit, sleeves or any other items required to be in poured-in-place concrete shall be furnished along with full location information in time to cause no delay in work.

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END OF SECTION

SECTION 26 00 30 - CODES AND FEES

PART 1 GENERAL

1.01 CODES

A. All work performed under this Specification shall be done in accordance with the latest edition of the Ohio Building Code; National Electrical Code as prepared and published by the National Fire Protection Association; National Electrical Safety Code; Standards of National Bureau of Fire Underwriters; and any Federal, State or Local Codes that apply.

1.02 PERMITS AND FEES

A. The A/E will submit the construction documents to the State of Ohio Division of Industrial Compliance for plan review. A Certificate of Plan Approval will be obtained by the A/E and delivered to the Construction Manage to be posted at the project site. The subcontractor shall schedule inspections as required for acceptance of the work performed. The work and associated inspections shall be scheduled to maintain project continuity and to meet or exceed the milestone dates identified on the project schedule.

PART 2 PRODUCTS

Not Applicable

PART 3 EXECUTION

Not Applicable

END OF SECTION

SECTION 26 01 20 - OPERATION AND MAINTENANCE MANUALS

PART 1 GENERAL

1.01 OPERATION AND MAINTENANCE MANUALS

A. Refer to Division 1 front- end documents for required materials to assist in preparing record documentation per BGSU requirements.

PART 2 PRODUCTS

Not Applicable

PART 3 EXECUTION

3.01 OWNER PERSONNEL INSTRUCTION

A. After placing systems in operation, thoroughly instruct designated Owner's personnel on operation and maintenance of all equipment and systems.

B. Provide a minimum of four (4) hours of total instruction. Instructions shall include:

1) Location of equipment and explanation of function.
2) Clarification and explanation of operating and maintenance manuals.
3) Coordination of written and verbal instructions so personnel understand each.

C. The Electrical Contractor shall be responsible for arranging for the instruction and supervision at a time convenient to the Owner or his representative and for notifying the Architect of the time at least 48 hours in advance.

END OF SECTION

SECTION 26 01 26 - TESTS AND INSPECTIONS

PART 1 GENERAL

1.01 INSPECTIONS

A. Obtain all inspections required by all laws, ordinances, rules, regulations or public authority having jurisdiction. Obtain certificates of such inspections and submit these to the A/E. Pay all fees, charges and other expenses in connection with inspections.

B. Before any electrical work is covered, the A/E will inspect the electrical work completed at that time.

C. When the Contractor determines all work is completed and working properly per the Contract Documents, request a "Final" inspection by the A/E in writing. If more than one re-inspection is required after this final inspection, the Contractor shall bear all additional costs, including compensation for the A/E's additional necessary services. A final inspection will not be made until Operating and Maintenance Manuals and Test Reports are submitted and approved and all prior "Observation report" punch lists are completed, signed and returned to the A/E.

1.02 OBSERVATION REPORTS

A. During the course of construction, the A/E will prepare "Observation Reports" with a list of items found to be in need of correction. The Contractor shall correct all items listed. A space is provided on the form for the Contractor to note the completion of each item. All prior "Observation Report" items must be completed and the lists signed and returned to the A/E prior to making the final inspection. After the final list is issued, the same procedure applies.

1.03 TESTS

A. When the A/E makes final inspection of all electrical work, tests may be requested by the A/E or electrical inspector as deemed necessary. These tests may include operation of lights and equipment, continuity of conduit system, grounding and insulation resistances and various system operations. This Contractor shall provide such assistance as required, including manpower and tools, to perform these tests and simulate control sequences. The Contractor, not the A/E, is responsible to turn on the systems and demonstrate they are operating properly.

B. Submit data taken during such tests to the A/E. Pay all necessary professional fees involved in required testing of equipment.

C. If the A/E or inspector determines that any work requires special inspection, testing or approval which "Part 3: Execution" does not include, upon written authorization from the Owner, the A/E will instruct the Contractor to order such special inspection, testing or approval. The Contractor shall give timely notice so the A/E and Owner may observe these inspections, tests or approvals. If such special inspection or testing reveals a

failure of the work to comply with the requirements of the Contract Documents, the Contractor shall bear all costs thereof, including compensation for the A/E's additional services made necessary by such failure. Otherwise the Owner shall bear such costs, and an appropriate Change Order shall be issued.

1.04 UNACCEPTABLE WORK

A. Work shall be unacceptable when found to be defective or contrary to the Plans, Specifications or Codes specified, or accepted standards of good workmanship.

B. The Contractor shall promptly correct all work found unacceptable by the A/E or inspector whether observed before or after substantial completion and whether or not fabricated, installed or completed. The Contractor shall bear all costs of correcting such unacceptable work, including compensation for the A/E's additional services made necessary thereby.

1.05 GUARANTEE

A. This Contractor is responsible for all defects, repairs and replacements in materials and workmanship, for a period of one (1) year after final payment is approved by the A/E.

PART 2 PRODUCTS

Not Applicable.

PART 3 EXECUTION

Not Applicable.

END OF SECTION

SECTION 26 05 19 - WIRE AND CABLE

PART 1 GENERAL

1.01 SCOPE

A. Furnish and install all wiring required to connect complete power, lighting, grounding, control, and auxiliary systems.

PART 2 PRODUCTS

2.01 STANDARDS

A. All conductors shall be stranded and of the AWG size and type shown on the Drawings. Where no size or type is shown, conductors shall not be less than #12 type XHHW, THHN or THWN and rated for 75°C. All conductors shall be copper and have 600-volt insulation, be UL listed and of an American manufacturer. All conductors installed underground and/or in a wet location shall be XHHW.

Acceptable Manufacturers:
1. Southwire
2. General Cable
3. American Cable
4. Rome Cable

B. All conductors shall be stranded unless otherwise noted and conform to the latest edition of the Underwriters' Laboratories (UL), Inc., "Standard for Rubber Insulated Wires and Cables" and the National Electrical Code.

C. No wire used for lighting or power shall be smaller than #12 AWG.

PART 3 EXECUTION

3.01 INSTALLATION

A. All conductors shall be continuous from box-to-box. No joints shall be permitted in the circuit other than in junction boxes or fixtures.

B. All make up connections to fluorescent lighting fixtures and all branch circuit conductors run in wiring channels of fluorescent lighting fixtures shall be THHN, THHW or XHHW and rated 90°C.

C. Equipment ground conductors shall be of the same insulation type as the Engineered circuit conductors.

D. All conductors of a circuit shall follow the same path through any openings in metal partitions within the enclosure.

E. The ampacity of all conductors shall be at least as great as the rating of the fuse or circuit breaker on the line side of the conductors. Note the ampacity reduction required by Code when more than three conductors are placed in a raceway.

1. All conductors for distribution and control equipment terminations shall be based on full 75°C ampacity.

2. All conductors for appliance and utilization equipment terminations rated 100 amperes or less shall be based on 60°C ampacity.

F. Provide cable supports for vertical raceways per NEC Table 300.19 (A).

G. Wiring shall be installed in separate conduits for the following systems:

1. All emergency and exit lighting.

2. Control wiring.

H. Swab conduits free of moisture, dirt and grease before pulling wire. Care shall be exercised while installing wire in conduits so that conductor insulation will not be injured. No oils, grease or compounds other than Ideal "Wire Lube", "Yellow 77" or equal UL approved wire-pulling lubricants shall be used for pulling any conductors.

3.02 CONNECTIONS

A. All connections are to be made using pressure type terminals.

B. Where connections are to be made to devices or equipment under screw heads only, install insulated, crimp-type spade clips on the wire ends before the connections are made.

C. Connectors shall contain only one wire unless they are listed for multiple conductors.

D. Joints in #10 and smaller wire shall be made using the following types of connectors: 3M "Scotchlok", Ideal Industries, Inc. "Wing Nut", or Thomas and Betts "PT". Connectors shall be used only within their range. Other threaded-on types of insulated connectors shall not be used.

E. Joints in #8 and larger wire or joints in any wires above the range of threaded-on connectors shall be made using pressure type mechanical connectors applied after wires are cleaned and then insulated using two (2) layers of "Scotchfil" brand electrical insulation putty and covered by two (2) half-lapped layers of "Scotch 88", or Plymouth Slipknot gray vinyl-plastic electrical tape. Connectors can be installed and sealed against moisture by installing Raychem "TCS" (indoor) or “WCSM” (exterior) sealant-coated heat shrink tubing.

3.03 WIRE COLOR CODE

A. The following color code shall be used:

	120/208 Volt	277/480 Volt
Phase A	Black	Brown
Phase B	Red	Orange
Phase C	Blue	Yellow
Neutral	White	Gray
Equipment Ground	Green	Green
Isolated Ground	Green w/ yellow stripe	

B. Conductors #10 AWG or smaller shall have insulation colored as noted above.

C. Conductors #8 AWG or larger shall have insulation colored as noted above or be identified with colored tape, minimum size ½", wrapped twice around at each terminal, at each conduit entrance and at intervals of not more than 12 inches apart in all boxes, panel tubs, switchboards, etc.

D. Equipment grounding conductors #8 AWG and larger shall be green or have green tape applied in a continuous wrap where visible at panels, junction boxes, etc.

3.04 MARKING

A. All branch circuits shall be marked in the panelboard gutters. Markers shall indicate corresponding branch-circuit numbers.

B. All signal and control wires shall be marked at all termination points such as cabinets, terminal boxes, equipment racks, control panels, consoles, etc.

D. Wire markers shall be Thomas and Betts vinyl tape type WM wrapped once around the wire with the adhesive sides placed together to form a flag.

E. Wire markers shall be installed when wire is pulled.

END OF SECTION

SECTION 26 05 26 - GROUNDING

PART 1 GENERAL

1.01 SCOPE

A. Grounding of the service and service entrance equipment shall be in accordance with the National Electric Code.

B. All feeders and branch circuits over 100 volts shall include a Grounding Conductor sized in accordance with NEC Table 250.122, except not be smaller than #12 for power and lighting circuits and #14 for control circuits. All ground conductors shall be Green, or as specified under Section 26 05 19, "WIRE AND CABLE".

C. The Contractor shall, in the presence of the Engineer, test all system neutrals to prove they are free of grounds except at the source.

PART 2 PRODUCTS

2.01 GENERAL

A. All ground clamps shall be Penn-Union "GPL" type or similar by O.Z. or Burndy.

B. All cable connections to ground rods shall be by "Cadweld", "Thermoweld", or "Heliarc" welding process by using recommended molds, compound and correct gas mixtures.

C. Conduit grounding type bushing shall be T & B Series 3870 with appropriate size ground wire terminal.

D. Conduit for solitary ground conductors shall be rigid PVC non-metallic electrical conduit with U.L. label.

E. All panels shall be furnished with a **COPPER** ground bar similar to the neutral bar and having the same number, size and type of lugs. The ground bar shall be factory bonded to the panel tub above or below the neutral assembly, but shall not be in a gutter.

F. Enclosures, junction and pull boxes shall utilize a "panel" type ground bar or U.L. listed grounding lugs or screws, as the number of ground conductors dictates.

PART 3 EXECUTION

3.01 INSTALLATION

A. All solitary ground conductors shall be run in rigid PVC non-metallic conduit. Solitary ground conductors shall not be placed through metallic sleeves or conduits and shall not be completely encircled by metallic hangers or supports.

B. All enclosures, boxes, fixtures, receptacles, etc., shall be grounded by being securely bonded to the grounding conductor. Boxes, conduit, etc., shall not be used as part of the grounding "conductor" system.

C. Enclosures not requiring a ground bar shall have all ground conductors connected together and a pigtail the size of the largest conductor bonded to the enclosure with a single ground connector used for no other purpose.

D. Conduit system shall be electrically continuous. All locknuts shall cut through enameled or painted surfaces on enclosures. Where enclosures and non-current carrying metals are isolated from the conduit system, use bonding jumpers with approved clamps. Where reducing washers are used and where concentric or excentric knockouts are not completely removed bonding bushings shall be required.

END OF SECTION

SECTION 26 05 33 - RACEWAYS AND BOXES

PART 1 GENERAL

1.01 SCOPE

A. Furnish and install all conduits, outlet, junction and pullboxes, fittings, etc. as indicated on the drawing for a complete raceway system. Conduit, wiring, boxes, etc. shall be installed in a neat and workmanlike manner.

B. Furnish and install all outlet and junction box covers and wiring device plates as specified herein.

PART 2 PRODUCTS

2.01 CONDUIT – Rigid Metallic

A. All wiring in exterior spaces including feeders, branch circuits and auxiliary wiring shall be run in rigid heavy wall conduit or intermediate metal conduit (IMC).

B. All steel conduits shall be galvanized and have the manufacturer’s name and U.L. label attached to or stamped on each piece.

C. Each Section of conduit shall be straight, free from blisters and other defects and in 10’-0” lengths. Galvanizing shall be of such nature and so applied that it will not crack or flake when conduit is bent.

D. All conduit sizes stated in Specifications or marked on the Drawings are minimum size and shall be no less that 3/4”, unless otherwise noted.

2.02 CONDUIT - Electrical Metallic Tubing (EMT)

A. All wiring in building interior including feeders, branch circuits and auxiliary wiring shall be run in thin wall (EMT) conduit.

B. All steel conduits shall be galvanized and have the manufacturer's name and U.L. label attached to or stamped on each piece.

C. Each section of conduit shall be straight, free from blisters and other defects and in 10'-0" lengths. Galvanizing shall be of such nature and so applied that it will not crack or flake when conduit is bent.

D. All conduit sizes stated in Specifications or marked on the Drawings are minimum size and shall be no less than 3/4”, unless otherwise noted.

2.03 CONDUIT - Rigid Non-Metallic

A. Non-metallic conduit and fittings for concrete encasement shall be rigid PVC, power and communication type EB and UL Listed.

B. Non-metallic conduit and fittings for direct burial shall be rigid Schedule 80 PVC.

C. Non-metallic supports for grounding electrode conductor conduits shall be Burndy Nyloclip or by Clic.

2.04 CONDUIT FITTINGS - Metallic

A. All EMT connectors shall be of the compression insulated-throat type, similar to Thomas and Betts No. 5223 (3/4”), and construction shall be steel. Die cast fittings will not be allowed. Contractor may use Thomas and Betts, Raco, Steel City, or Midwest fittings.

B. All Galvanized Rigid (GCR) or IMC connectors shall be of the threaded type (3/4”) and construction shall be steel. Die cast fittings will not be allowed. Contractor may use Thomas and Betts, Raco, Steel City, or Midwest threaded fittings.

C. “Mineralac" type supports and "Unistrut" type one bolt supports with square ends shall not be used at any location.

2.05 BOXES FOR FLUSH WORK

A. Flush outlet, junction and pullboxes shall be pressed steel galvanized or sherardized and shall be a minimum of 4" square or octagonal similar to Appleton #40. Steel boxes cast in concrete shall be designed for concrete installation.

B. Flush wall boxes in tile, marble, brick or other finished masonry walls shall be Steel City GW-135-C Series or Raco 695 Series.

2.06 BOXES FOR EXTERIOR WORK

A. Boxes at exterior areas shall be watertight and dust-tight with gasketed covers.

2.07 BOXES FOR EXPOSED WORK

A. All boxes for exposed work in finished spaces shall be "FS" type with threaded hubs and rigid conduit riser.

PART 3 EXECUTION

3.01 INSTALLATION

A. All rigid (GRC) or intermediate (IMC) conduit entering cabinets, pull boxes, junction boxes or outlet boxes shall be secured with double lock nuts and bushed ends.

B. No more than four (4) 90° bends will be allowed in any one conduit run. Where more bends are necessary in any single run, a pull box shall be installed. Pull boxes shall also be installed in long runs at a maximum separation of 100'-0". All conduit, except in concrete slab or earth, shall be routed parallel or perpendicular to the lines of the building. No out of plumb or diagonal lines will be accepted.

C. Unless otherwise noted, all conduits shall be run concealed within the construction. Conduit in equipment rooms and on roof may be run exposed.

D. All conduits shall be substantially supported by pipe straps, suitable clamps or hangers that are attached to the elements of the structure to provide rigid installation. In no case shall conduit be attached to or supported from adjoining pipe, or installed in such a manner as to prevent the ready removal of other pipe for repairs.

E. Rigid or IMC conduit in poured concrete or buried beneath concrete slabs shall have a 1" minimum cover.

F. Exercise necessary precautions to prevent accumulation of water, dirt or concrete in conduits during execution of electrical work. Conduit in which water or foreign material has been permitted to accumulate shall be thoroughly cleaned or replaced where such accumulations cannot be removed.

G. All conduits must be kept dry and free of water or debris with approved pipe plugs or caps. Care shall be given that plugs or caps are installed before pouring concrete.

H.

1. A pull wire shall be installed in all empty conduits. In dry locations, pull wire shall be #14-gauge galvanized steel or nylon pull cord.

2. Both ends of all pull wires shall be identified by means of labels or tags, reading "PULL WIRE" and shall be numbered to refer to the same pull wire.

I. Seal all conduits entering from outside the building water and moisture tight.

J. All boxes shall be rigidly supported from structure independent of the conduit system. Boxes cast into masonry or concrete are considered to be rigidly supported.

K. Close all unused and open knockouts with plugs of the proper size.

L. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through floor.

a. For stub-ups at equipment mounted on outdoor concrete bases and where conduits penetrate building foundations, extend steel conduit horizontally a minimum of 60 inches (1500 mm) from edge of foundation or equipment base. Install insulated grounding bushings on terminations at equipment.

END OF SECTION

SECTION 26 51 13 - LIGHTING FIXTURES

PART 1 GENERAL

1.01 SCOPE

A. Furnish and install lighting fixtures as indicated in the Fixture Schedule shown on Drawings, and specified herein. Modify existing light poles to accept 180 degree quad mounting bracket.

B. All lighting fixtures are indicated on the Drawings with an identifying letter and number. Refer to the Fixture Schedule on the Drawings which indicates the type of mounting of the fixture in accordance with the Legend Section of the Schedule.

C. Lighting fixture shop drawing submittals shall include driver and accessory cut sheets clearly identifying the exact product types to be provided as listed in these specifications. Shop drawings will be rejected if this information is not included with the lighting fixture submittal.

PART 2 PRODUCTS

2.01 STANDARDS

A. Lighting fixtures scheduled on the Drawings are specified as standards for design, quality and appearance. The A/E will consider fixtures of other manufacturers provided they are equal to or better than the standard. Reference: Section 26 00 10, General Provisions.

B. Fixture materials given with the standard fixtures shall be maintained if alternate manufacturers are used, i.e., controls, drivers, sensors, brackets, etc.

2.02 GENERAL

A. Pole-mounted fixtures may be furnished with prewired feature provided they are U.L. approved for 75^{O}C. wiring and the junction box capacity is sufficient for the circuit wiring requirements.

2.03 LIGHT EMITTING DIODES (LEDs) AND DRIVER SYSTEMS

A. All LED fixtures shall have integral 0-10V dimming capabilities, 120-277V power supplies, and shall be U.L. approved.

B. LED Color temperature shall be 4000K to match adjacent luminaires unless otherwise noted.

C. Fixture shall be fully serviceable with upgradeable led light engine. Provide delivered lumens as noted in the fixture schedule.

D. Luminaries configuration shall be tested in accordance with LES LM-79.

E. Diodes shall be tested in accordance with IES LM-80, CRI 80 minimum at 50,000 hours.

F. 5 year minimum warranty to include, LED, driver and labor to replace fixture components or fixture as required.

G. Fixtures shall be dimmable to a minimum of 10%.

2.04 LAMPS

A. Light Emitting Diode (LED) lamp modules shall contain color-matched LEDs. LED modules shall be configured in serviceable and replaceable module configurations. Modules shall be pre-wired with quick-connect terminations.

PART 3 EXECUTION

3.01 GENERAL

A. Coordinate location adapter fabrication details necessary for the installation of light fixture mounting brackets. Identify the actual mounting system to be used and make all adjustments in fixture installation provisions required thereby.

B. Furnish all mounting straps, frames, rings and other accessories required for a complete lighting installation.

C. No fixtures shall be installed until painting is completed. Fixtures with paint marks on them shall be replaced.

D. All light fixtures shall be installed with centerlines symmetrical to the parking lot layouts, or at angles so designated by the plans. Fixtures not set thus shall be removed and reinstalled at this Contractor's expense.

E. Any fixtures scratched, bent, cracked or in any way damaged before acceptance by the Owner shall be replaced at this Contractor's expense.

F. All lamp modules and drivers shall be in working order at the time of final acceptance.

G. All lighting fixtures are to be grounded on the interior of the fixture housing and light pole on clean bare metal (free of paint), by use of a pigtail and fastened by a screw used for no other purpose.

3.02 INSTALLATION

A. Provide modifications to existing light poles to accommodate quad-head mounting brackets and new wiring. Furnish and install in-line fuse holder kits and fuses at the hand hole of the existing light pole.

B. Touch-up the paint finish for existing light poles after closure plate fabrication and installation has been completed.

C. Provide start-up and commissioning services.

D. Provide 4-hour Owner training for designated Building personnel to demonstrate operation of lighting fixtures, lighting control system.

END OF SECTION

SECTION 03 30 00 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. All labor, materials, equipment, special tools and services to complete cast-in-place concrete work required for the Project, as herein specified, and as indicated on the Drawings.

B. Related Sections:

1. Section 31 20 00 – Earth Moving.

1.2 REFERENCES

A. American Concrete Institute (ACI) 301-16 Specifications for Structural Concrete is hereby incorporated as part of this Section. Supplemental requirements and modifications listed herein take precedence over the requirements of ACI 301. All ACI 301 items unless modified by the Contract Documents are incorporated as written. When any part of any item is modified or voided, the unaltered provisions of the part shall apply as written.

B. ACI 305.1-14 Specification for Hot Weather Concreting.

C. ACI 306.1-90 Standard Specification for Cold Weather Concreting.

D. The ACI MNL 15(16) Field Reference Manual.

E. Other ACI references as noted in this Section.

F. American Association of State Highway and Transportation Officials (AASHTO) Specifications as noted in this Section.

G. ASTM International (ASTM) Specifications as noted in this Section.

H. Concrete Reinforcing Steel Institute (CRSI) Manual of Standard Practice, 27th Edition.

I. National Ready Mixed Concrete Association (NRMCA) Quality Control Manual.

1.3 SUBMITTALS

A. General.

1. Shop drawings shall be produced by the Contractor and submitted to the Project Engineer for review. Fabrication of material prior to the receipt of approved shop drawings for that material shall be at the Contractor's risk.
2. The Contractor is responsible to furnish field-verify information, coordinate material requirements, and review shop drawings prior to submittal of shop drawings to the Engineer. Receipt of shop drawings by Engineer will be an assumption by Engineer that this has been done.
3. Notations by the Engineer made on the shop drawings do not authorize additional compensation for the Contractor.

4. The Contract Documents (Drawings and Specifications) govern all concrete work. Errors on shop drawings or discrepancies between shop drawings and Contract Documents shall be governed by the Contract Documents. Even if shop drawings contain errors after review by the Engineer, no additional compensation is due Contractor to correct work to what is shown on Contract Documents.
5. The Engineer's review of details and construction operations shall not relieve the Contractor of responsibility to successfully complete the work in accordance with these Specifications and within the Contract time.

B. Submit mix designs and test results conforming to the requirements of Section 4 of ACI 301. Submit request for approval to use admixtures, if any. A complete mix design submittal must be furnished at least three weeks prior to the planned use of that mix. The Contractor is cautioned to undertake mix design preparation and submittal procedures immediately after authorization to proceed with the Project.

1. The submitted mix designs shall address weather conditions that are expected to occur during the concrete construction phase. Concrete mixes shall not only be designed for average temperature and humidity conditions, but also for adverse conditions (hot and cold weather), as applicable to this project.

C. Submit letter stating that concrete subcontractors and suppliers are familiar with the reference standards.

D. Submit a Quality Control Plan in accordance with Section 1 of ACI 301.

E. Submit reinforcing steel shop drawings in accordance with Section 3 of ACI 301.

F. Submit procedures and records required in hot and cold weather concreting work.

G. The following submittals shall be provided in accordance with ACI 301 and Division 01 - General Requirements.

1. Contractor's proposed Testing Agency.
2. Field and Laboratory tests that are the Contractor's responsibility.
3. Data and test documentation on proposed materials including but not limited to:
   a. Cement.
   b. Aggregates.
   c. Admixtures.
   d. Reinforcing.
   e. Curing materials.
   f. Related materials for concrete construction specified herein.
   g. Material for repair of surface defects if other than site-mixed portland-cement mortar.
4. Construction joints not shown on the drawings.
5. Method of developing bond at joints (except slabs on grade).
6. Method of adding admixtures.
7. Procedure for adding water to ready-mixed concrete at site, including method of measuring water.
8. Method(s) for preserving moisture in the concrete.
9. Ready-mixed concrete delivery tickets.
10. Thermal control plan for all mass concrete placements.

H. Submit Certificate of Conformance for concrete production facilities by NRMCA.

1.4 QUALITY ASSURANCE

A. Regulatory requirements:

1. Comply with applicable laws, ordinances, and the Ohio Building Code (OBC).
2. Comply with the referenced ACI publications, as modified and supplemented in this Section.

B. Tests and inspections:

1. The Contractor shall select an independent testing agency, subject to the Engineer's approval, to perform all testing required by the Contractor for qualification of proposed materials and the establishment of mix designs, for his use in determining concrete strengths for early form removal, and for all other testing services needed or required by the Contractor.

C. Ready-Mixed Plant Certification:

1. All ready-mixed concrete production facilities shall be certified by the NRMCA Program for Certification of Ready-Mixed Concrete Production Facilities.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver reinforcement to the project site bundled, tagged and marked. Use durable tags indicating bar size, lengths, etc., and other information corresponding to markings shown on placing drawings.

B. All reinforcement at the site shall be stored off the ground and protected from damage, accumulation of dirt and excessive rust.

C. Comply with CRSI "Field Handling Techniques for Epoxy-Coated Rebar at the Job Site" and as modified by this Section.

D. All formwork at the site shall be stored in a clean, dry location off the ground, covered and protected from damage and accumulation of dirt, etc.

1.6 COLD WEATHER CONCRETING

A. The provisions of ACI 306.1 shall be followed for all concrete placed or cured when the average daily temperature is below 40 °F. The methods of protection to be used for cold weather concrete, including preservation of moisture for curing of the concrete, shall be submitted in writing to the Architect/Engineer for review at least one week prior to cold weather placement.

B. Plan construction schedule and obtain needed materials and equipment on the job site in advance of cold weather.

C. All reinforcement, formwork and top 12 inches of the subgrade shall be clear of ice and snow and be not less than 40 °F at time of placement of concrete. The temperature of large embedded items, such as weld plate assemblies for structural steel framing, shall be no less than 35 °F at time of placement.

D. The concrete temperature as placed shall not be less than specified in column (2) of Table 3.2.1 in ACI 306.1, and shall not exceed these values by more than 20 °F. The temperature of the concrete being discharged shall be tested by the testing agency whenever cylinders are cast, and hourly by the Contractor. The Contractor shall maintain and submit same to the Architect/Engineer weekly.

E. Any covering, insulation or housing shall be extended to protect projecting reinforcement and embedments.

F. The Contractor shall install and read maximum/minimum thermometers twice daily during the construction and curing of all structural slabs in cold weather. Provide one thermometer for each 3000 square feet of slab. Place the thermometers near slab perimeter. The Contractor shall submit those temperature readings to the Architect/Engineer weekly.

G. Concrete shall be exposed to ambient temperature in a gradual manner after being cured. Refer to ACI 306.1, Table 3.2.1.

1.9 HOT WEATHER CONCRETING

A. The provisions of ACI 305.1 shall be followed for all concrete placed when the ambient air temperature is greater than 80 °F. Note: Concrete protection during windy conditions combined with heat or low humidity shall also conform to ACI 305.1. The methods of protection used for hot weather concreting shall be submitted in writing to the Architect/Engineer for review at least one week prior to hot weather placement.

B. Plan construction schedule and obtain needed materials and equipment on the job site in advance of hot weather.

C. The Contractor and ready-mix supplier shall review concrete mixes for use in hot weather with respect to placing requirements, strength and durability.

D. Concrete temperatures as discharged from the truck shall not exceed 95 °F. Ice, if used, shall be considered part of the total mix water (50 lbs. ice = 6 gallons of water). (Retarders in low slump superplasticized mixes may be required to comply with this requirement.)

E. The temperature of the concrete being discharged shall be tested by the testing agency whenever cylinders are cast, and hourly by the Contractor. The Contractor shall maintain a written record of these temperatures and submit same to the Architect/Engineer weekly.

F. Cool and moisten formwork and subgrade by sprinkling with water prior to placing concrete.

G. Placement and Finishing:

1. Concrete shall be discharged from the truck a maximum of one hour after the introduction of mix water to cement and aggregates.
2. Do not add water to mix to increase slump. Use the approved superplasticizer to maintain a placeable concrete mix.
3. Strike off and screed slabs immediately. Protect slab's surface against moisture loss prior to final finishing.
4. Thoroughly vibrate through all wall and column lift lines and adjacent slab placements to prevent cold joints.
5. Immediately apply liquid curing compound as specified in Section 5 (ACI 301) after final finishing. Follow with continuous wet curing as specified in paragraphs 5.3.6.4.a or 5.3.6.4.b (ACI 301) for a minimum of three days.

PART 2 - PRODUCTS

Not Used.

PART 3 EXECUTION

3.1 PRODUCT AND EXECUTION REQUIREMENTS ARE INCLUDED IN PARAGRAPHS ABOVE.

END OF SECTION

SECTION 31 10 00 - 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. Stripping and stockpiling topsoil.

1.3 DEFINITIONS

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

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

C. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction, and defined by a circle concentric with each tree with a radius 1.5 times the diameter of the drip line unless otherwise indicated.

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

1.4 MATERIAL OWNERSHIP

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

1.6 PROJECT CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
   1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
   2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.

B. Salvable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises.

C. Utility Locator Service: Notify Ohio Utility Protection Services for area where Project Is located before site clearing.

D. Do not commence site clearing operations until temporary erosion- and sedimentation-control and tree-protection measures 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. Erection of sheds or structures.
4. Impoundment of water.
5. Excavation or other digging unless otherwise indicated.
6. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.

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

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

PART 2 - PRODUCTS

2.1 MATERIALS

A. Satisfactory Soil Material: Obtain approved borrow soil material off-site when satisfactory soil material is not available on-site.

PART 3 - EXECUTION

3.1 PREPARATION

A. Install sedimentation and erosion control measures before commencing site clearing.

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

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 TREE AND PLANT PROTECTION

A. General: Protect trees and plants remaining on-site.

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

3.3 EXISTING UTILITIES

A. 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 Owner not less than three days in advance of proposed utility interruptions.

3.4 TOPSOIL STRIPPING

A. Remove sod and grass before stripping topsoil.

B. Strip topsoil to depths as encountered in the field 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 more 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. 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 or hauling off site as directed by the Owner.

3.5 SITE IMPROVEMENTS

A. Remove slabs, paving, curbs, and gutters as required for installation of duct banks.
   1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut a long 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.

3.6 DISPOSAL OF SURPLUS AND WASTE MATERIALS

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

END OF SECTION

SECTION 31 20 00 - 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. Section Includes:
1. Preparing subgrades for walks, pavements, turf and grasses, and plants.
2. Excavating and backfilling for structures.
3. Subgrades and base course for walks and pavements.
4. Subsurface drainage backfill for walls and trenches.
5. Excavating and backfilling trenches for utilities and pits for buried utility structures.

B. Related Requirements:
1. Division 03 Section "Cast-in-Place Concrete".
2. Division 31 Section "Site Clearing".
3. Division 32 Section "Turf and Grasses".

1.3 DEFINITIONS

A. Backfill: Soil material or engineered material used to fill an excavation.
1. Initial Backfill: Backfill placed 12 inches 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 course and walks and pavements.

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 Course: Aggregate layer that minimizes upward capillary flow of pore water.

F. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.
1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Engineer. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
2. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Engineer. Unauthorized excavation, as well as remedial work directed by Engineer, 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 1 cu. yd. or more in volume that exceed a standard penetration resistance of 100 blows/inch when tested by a geotechnical testing agency, according to ASTM D 1586.

I. 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.

J. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below base, drainage fill, drainage course, or topsoil materials.

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

1.4 SUBMITTALS

A. Material Test Reports: For each soil material proposed for fill and backfill as follows:
1. Classification according to ASTM D 2487.
2. Gradation report for each granular material.

1.5 PROJECT 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 Ohio Utility Protection Services for area where Project is located before beginning earth moving operations.

C. Do not commence earth moving operations until temporary erosion- and sedimentation-control measures, are in place.

D. Do not commence earth moving operations until plant protection measures 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. Erection of sheds or structures.
4. Impoundment of water.
5. Excavation or other digging unless otherwise indicated.
6. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.
7. 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, or a combination of these groups; free of rock or gravel larger than 4 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.

C. Unsatisfactory Soils: Soil Classification Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D 2487, 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; ASTM D 2940; conforming to ODOT Item 304.

E. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; conforming to ODOT Item 310.

F. Drainage Course: Narrowly graded mixture of washed stone, or uncrushed gravel; ASTMD 448; coarse-aggregate grading Size 56 or 57.

G. 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 0 to 5 percent passing a No. 4 sieve.

H. Sand: ASTM C 33; fine aggregate.

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

PART 3 - EXECUTION

3.1 PREPARATION

A. Install sedimentation and erosion control measures before commencing site grading.

B. 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.

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

D. Excavations and Embankments shall conform to the requirements of ODOT Item 203.

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 EXPLOSIVES

A. Explosives: Do not use explosives.

3.4 EXCAVATION, GENERAL

A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.
   1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

3.5 EXCAVATION AND 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.
   1. Excavation for Underground Electrical Utility Structures: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 1 inch. Do not disturb bottom of excavations intended as bearing surfaces.

B. Excavations at Edges of Tree- and Plant-Protection Zones:
   1. Excavate by hand 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.

3.6 EXCAVATION FOR UTILITY TRENCHES

A. Excavate trenches to indicated gradients, lines, depths, and elevations.
   1. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.

B. Excavate trenches to uniform widths.
   1. Clearance: 12 inches each side of pipe or conduit.

C. 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 4 inches or larger in nominal diameter, provide flat bottomed trench to allow for bedding material to be placed.
   2. For flat-bottomed, multiple-duct conduit units, excavate trench bottoms and support conduit on an undisturbed subgrade.
   3. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

D. 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.

3.7 SUBGRADE INSPECTION

A. Notify Engineer when excavations have reached required subgrade.

B. If Engineer determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.

C. Proof-roll subgrade below the pavements per ODOT Item 204 to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.

D. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.

E. 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 foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Low Strength Mortar may be used when approved by Engineer.
   1. Fill unauthorized excavations under other construction, pipe, or conduit as directed by Engineer.

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. 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 including, where applicable, subdrainage, damp proofing, waterproofing, and perimeter insulation.
   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 and bracing, and sheeting.

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

3.11 UTILITY TRENCH BACKFILL

A. Place backfill per the requirements of the utility owners or per ODOT Item 603.

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

C. 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.

D. Trenches under Footings: Backfill trenches excavated under footings and within 18 inches of bottom of footings with satisfactory soil; fill with concrete to elevation of bottom of footings.

E. Trenches under Roadways: Provide compacted fill to subgrade elevation. If the top of pipe is less than 12 inches below subgrade elevation provide low strength mortar from top of pipe to subgrade elevation.

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

G. Place and compact initial backfill of drainage fill, to a height of 12 inches over the pipe or conduit.

1. 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.
2. Place and compact final backfill of satisfactory soil to final subgrade elevation.
3. Install warning tape directly above utilities, 12 inches above the top of the utility.

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 satisfactory.

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 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:
1. Under structures, building slabs, steps, compact fill soil material at 98 percent.
2. Under walkways, and pavements compact fill soil material at 95 percent.
3. Under turf or unpaved areas, compact fill soil material at 90 percent.
4. For utility trenches, compact each layer of initial and final backfill soil material at 90 percent.

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 required elevations within the following tolerances:
1. Turf or Unpaved Areas: Plus or minus 1 inch of proposed grades and within 10 percent of proposed slopes.
2. Walks: Plus or minus 1 inch of proposed grades and within 5 percent of proposed slopes.
3. Pavements: Plus or minus 1/2 inch of proposed grades and within 5 percent of proposed slopes. Surface of pavement to comply with guidelines set forth in ODOT Item 401.

3.16 SUBSURFACE DRAINAGE

A. Drainage Backfill: Place and compact filter material over subsurface drain, in width and locations indicated, in compacted layers 6 inches.
1. Compact each filter material layer with a minimum of two passes of a plate-type vibratory compactor.

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. Place base course material over subbase course under hot-mix asphalt pavement.
2. Shape base course to required elevations and slopes.
3. Place base course according to ODOT Item 304.

3.18 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.

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.

3.19 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, 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.

END OF SECTION

SECTION 31 20 10 - FINISH GRADING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including Supplementary Conditions and Division 1 Specification sections, apply to this section.

1.2 SUMMARY

A. This Section includes the following:
   1. Topsoil.
   2. Placement of Topsoil.
   3. Ripping of Subgrade Soil.
   4. Finish Grading of Planting Area Soil Surfaces.

1.3 REFERENCES

A. ASTM – ASTM International: D 1557 - Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort.

B. EPA – Environmental Protection Agency:
   1. Method 8015.
   2. Method 8020.

C. USDA – United States Department of Agriculture:
   1. Texture Triangle Classification
   2. Handbook No. 60.

D. SSSA – Soil Science Society of America, Inc.
   1. Methods of Soil Analysis Part 1 – Physical and Mineralogical Methods, 1986.
   2. Methods of Soil Analysis Part 3 – Chemical Methods, 1996.

1.4 DEFINITIONS

A. Acceptance, Acceptable, or Accepted: Acceptance by the Landscape Architect in writing.

B. Aesthetic Acceptance of Grades: Acceptance by the Landscape Architect in writing of the aesthetic correctness of the contours. Aesthetic acceptance does not address whether areas drain properly, are at the correct elevations, or whether the soil has been compacted properly.

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

D. Excessive Compaction: Planting area soil or soil compaction greater than 75 percent maximum dry density as determined by ASTM D 1557.

E. Finished Grades: The required final soil surface elevations and contours indicated on the Drawings.

F. 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.

G. Subgrade Soil Surface: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.

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

1.5 QUALITY ASSURANCE

A. Perform earthwork in compliance with applicable requirements of governing authorities.

1.6 PROJECT CONDITIONS

A. Examination: Promptly notify the Owner of unexpected subsurface conditions. Discontinue work until notification to resume work is provided by the Construction Manager.

B. Environmental Requirements:

1. Do not work soil when moisture content is so great that excessive compaction will occur, nor when it is so dry that dust will from in the air or that clods will not break readily.
2. Apply water, if necessary, to bring soil to optimum moisture content for fine grading operations.
3. Do not work soil when muddy or frozen.

C. Existing Conditions:

1. Locate existing underground utilities in areas of work. If utilities are indicated to remain in place, provide adequate means of support and protection during fine grading operations.
2. If uncharted, or incorrectly charted, piping or other utilities are encountered during the Work, consult utility owner immediately for directions. Cooperate with Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.
3. Do not interrupt existing utilities serving facilities occupied by Owner or others, during occupied hours, except when permitted in writing by Owner and then only after acceptable temporary utility services have been provided.
4. Provide minimum 48-hour notice to Owner and receive written notice to proceed before interrupting any utility.
5. Contact Ohio Utilities Protection Service (OUPS) before commencement.

1.7 SEQUENCING

A. Topsoil Placement: In order to prevent excessive soil compaction, avoid placing topsoil in areas subject to construction vehicle and equipment traffic.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: All topsoil, fill and backfill material subject to testing and approval.

B. Existing Topsoil:

1. General: ASTM D 5286-92 topsoil.
2. Structure: Topsoil shall have sufficient structure that when amended, fertilized, and conditioned, will be loamy, friable, well drained, and supportive of vigorous plant growth. It must contain low concentrations of inhibitory constituents. Plant growth of dicots and monocots must be at least 80 percent of a known reference soil, free of inhibitory constituents. A soil containing inhibitory constituents will be deemed to be suitable if the inhibitory constituents can be properly counteracted. The soil must have sufficient moisture retention and nutrient retention to avoid excessive frequency of irrigation and fertilizer application.
3. Deleterious Materials: The soil must be clean and free of excessive gravel, rock, and physical impurities including stones larger than 1 inch in the greatest dimension, pockets of coarse sand, heavy or stiff clay lumps, sticks, brush, lumber, litter, paint, paint washout, plastics, metals, concrete slurry, concrete layers or chunks, cement, plaster, building debris, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid, and other extraneous materials harmful to plant growth.
4. Weeds: Free of noxious weeds, seeds, or vegetative parts of invasive plants including but not limited to quackgrass, Johnsongrass, poison ivy, nutsedge, nimblewill, Canada thistle, bindweed, bentgrass, wild garlic, ground ivy, perennial sorrel, and bromegrass.
5. Herbicides: Free of herbicides and petroleum-based materials or other substances of a hazardous or toxic nature which may inhibit plant growth.
6. Disease- Causing Organisms: Free of infestation of nematodes, grubs, or other pests, pest eggs, or other undesirable disease-causing organisms such as insects ant plant pathogens.

C. Amended Soils: See Section 329100 SOIL PREPARATION (TOPSOIL) for soil types and amendments.

2.2 SOURCE QUALITY CONTROL

A. Existing topsoil at the site will be used as the planting soil mix for the natural turf grass areas.

B. Off-site (borrow) topsoil may be used provided it meets the requirement of this section and its source or location is communicated to and approved by the Owner.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions under which work is to be performed. Obtain and examine the records and drawings of adjacent work and of existing utilities and their connections for conditions which may affect the work under this Section.

B. Verify that conditions are suitable to receive Work and that no defects or errors are present which would cause defective installation of products or cause latent defects in workmanship and function.

C. Verification of Subgrade: Verify that subgrade soil surface has been graded to correct elevations.

D. Excessive Compaction: Verify that soil in planting area is not excessively compacted.

E. Soil Preparation: Verify that soil preparation is complete.

F. Notification: Before proceeding with Work, notify the Owner's Representative in writing of unsuitable conditions and conflicts.

3.2 PREPARATION

A. Protection:
   1. Before starting fine grading, establish the location and extent of underground utilities in the work area. Exercise care to protect existing utilities during fine grading operations.
   2. Protect active utility and service lines uncovered by grading operations.
   3. Protect structures, utilities, sidewalks, pavements, irrigation systems, paving, plant materials, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by fine grading operations.
   4. Provide barricades, fences, or other barriers to protect existing conditions to remain from damage during construction.
   5. Use every possible precaution to prevent excessive compaction of planting area soil within or adjacent to the areas of Work.
   6. Do not store material or equipment, permit burning, or operate or park equipment under the branches of existing trees to remain.

3.3 FIELD ENGINEERING

A. Provide all layout work required. Establish extent of fine grading by area and elevation; designate and identify datum elevation and project engineering reference points. Set required lines, levels and elevations. Provide as many grade stakes and string lines as required to achieve smooth finish grades acceptable to the Owner. Mark each stake to indicate design finished grade indicated.

3.4 SUBGRADE PREPARATION

A. Ripping Subgrade Soil:
   1. Prior to placing topsoil, rip areas to receive topsoil on the same day topsoil is placed.
   2. Rip subgrade twice to a depth of 6 inches. Place ripping tines at 24 inches on center.
   3. Make second ripping pass in the direction 90 degrees to the direction of the first ripping pass.
   4. Do not rip closer than 24 inches to installed underground utility lines and structures.
   5. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so topsoil material will bond with existing material.

B. Cleaning Subgrade Soil: Clear subgrade of surface stones larger than 1 inch, debris, roots, branches, sticks, contaminated soil, and other extraneous materials.

3.5 STORAGE OF SOIL MATERIALS

A. Stockpile materials only in approved areas. Place, grade, and shape stockpiles for proper drainage.

B. Locate and retain soil materials away from edge of excavations. Do not store within drip line of existing trees.

C. Dispose of excess excavated soil material and materials not acceptable for use as backfill or fill.

D. Remove trash and debris.

3.6 TOPSOIL PLACEMENT

A. Place topsoil on same day that subgrade soil ripping occurs and prior to vehicle or equipment traffic running over ripped surface. Spread planting soil in lifts of 6 inches but not less than required to meet finish grades after light rolling and natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.

B. Place topsoil with equipment of appropriate size for area and in a manner that avoids excessive compaction of the topsoil.

C. Avoid repeatedly driving equipment in same tracks so that topsoil does not become excessively compacted.

D. Place topsoil to elevations that allow for settlement, addition of soil amendment, and finish grading tolerances.

3.7 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.

B. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.

C. 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.

3.8 FINISH GRADING

A. Perform grading within contract limits, including adjacent transition areas, to new elevations, levels, profiles and contours indicated. Provide subgrade surfaces parallel to finished surface grades. Provide uniform levels and slopes between new elevations and existing grades.

B. General:

1. Uniformly grade areas to a smooth uniform surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
2. Provide a smooth transition between adjacent existing grades and new grades.
3. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.
4. Slope finish grades to drain surface water to catch basins, area drains, or trench drains as shown on the Drawings.
5. Grade the soil surface at the edges of lawn areas, along paving areas, and curbs to an elevation 1 inch below the finished surface of adjacent paving and curbs, unless indicated otherwise.
6. Hand-rake soil surface using screed boards, string lines, and laser levels to achieve smooth surfaces acceptable to the Landscape Architect.

C. Equipment: Use equipment and hand tools of appropriate size and type to achieve the profiles, and a smooth soil surface free of high areas, depressions, equipment tracks, and excessive compaction.

D. Depressions and Loose Material: Fill any depressions and remove loose material to finish surface true to line and grade, presenting a smooth and unyielding surface.

E. Excessive Compaction:

1. Take precautions to prevent finished graded surfaces from becoming excessively compacted.
2. Protect finished graded surfaces from excessive compaction from vehicular, equipment, and foot traffic by laying down planks, plywood, or other accepted protective devices.
3. Do not store or stockpile materials on finished graded surfaces.
4. Mechanically loosen excessively compacted soil areas to full depth.

3.9 PROTECTION

A. Protecting Fine Graded Areas: Protect newly graded areas from traffic 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.

C. Repair erosion that occurs before plant or lawn installation.

D. During construction, maintain temporary soil erosion and sedimentation control measures in place. Inspect, repair and replace damaged or missing items as work progresses.

3.10 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner’s property.

END OF SECTION

SECTION 32 13 13 - CONCRETE 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. Curbs and gutters.
2. Walks.
3. Detectable warning mats.
4. Pavement markings.

B. Related Requirements:
1. Division 31 Section "Earth Moving".
2. Division 32 Section “Concrete Paving Joint Sealants”.

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash and other pozzolans, and ground granulated blast-furnace slag.

1.4 SUBMITTALS

A. Product Data: For each type of manufactured material and product indicated.

B. Samples: 10-lb (4.5-kg) sample of exposed aggregate for approval by Landscape Architect.

C. Design Mixtures: For each concrete pavement mixture. Include alternate mixture designs when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

D. Qualification Data: For testing agency.

E. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated, based on comprehensive testing of current materials.

F. Material Certificates: Signed by manufacturers certifying that each of the following materials complies with requirements:
1. Cementitious materials.
2. Steel reinforcement and reinforcement accessories.
3. Admixtures.
4. Curing compounds and sealant.
5. Applied finish materials.
6. Bonding agent or epoxy adhesive.
7. Joint fillers.

G. Field quality-control test reports.

H. Minutes of pre-installation conference.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer of ready-mixed concrete products who complies with ASTM C 94/C 94M requirements for production facilities and equipment.
   1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

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

C. Testing Agency Qualifications: An independent agency qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.
   1. Personnel conducting field tests shall be qualified as ACI Concrete Field-Testing Technician, Grade 1, according to ACI CP-01 or an equivalent certification program.

D. ACI Publications: Comply with ACI 301,305R, 306R, and 325.9R, "Specification for Structural Concrete," unless modified by requirements in the Contract Documents.

E. ASTM: Comply with applicable sections.

F. Concrete Testing Service: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
   1. Testing Frequency: Obtain at least one composite sample for each 100-cu. yd. or fraction thereof of each concrete mixture placed each day.
      a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
   2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
   3. Air Content: ASTM C 231, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
   4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F and below and when it is 80 deg F and above, and one test for each composite sample.
   5. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of three standard cylinder specimens for each composite sample.
   6. Compressive-Strength Tests: ASTMC 39/C 39M; test one specimen at seven days and two specimens at 28 days.

G. A compressive-strength test shall be the average compressive strength from two specimens obtained from same composite sample and tested at 28 days.

H. Americans with Disabilities Act (ADA): Comply with accessibility requirements.

I. Decorative (Exposed Aggregate) Concrete Contractor Qualifications; An employer of workers trained and approved by manufacturer of decorative cement concrete pavement systems. Contractor and field superintendent to have not less than five years' experience in the installation of

decorative concrete. Decorative Concrete Contractor must provide listing of no fewer than three references (including the project address, date of installation, owner contact information and methods used) for similar exposed aggregate installations installed within 100 mile radius of the project site.

1.6 PROJECT CONDITIONS

A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.

PART 2 - PRODUCTS

2.1 MANUFACTURES

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
   1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
   2. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.

2.2 FORMS

A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, smooth exposed surfaces.
   1. Use flexible or curved forms for curves with a radius 100 feet or less.

B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

2.3 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60; deformed.

B. Deformed Steel Welded Wire Mesh: ASTM A 497, flat sheets.

C. Tie Bars: ASTM A 615/A 615M, Grade 60, deformed.

2.4 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source throughout the Project:
   1. Portland Cement: ASTM C 150, Type I
      a. Portland Cement for exposed aggregate installations should be light gray in color.

B. Normal-Weight Aggregates: ASTM C 33, Class 4S coarse aggregate, uniformly graded. Provide aggregates from a single source with documented service record data of at least 10 years' satisfactory service in similar pavement applications and service conditions using similar aggregates and cementitious materials.
   1. Maximum Coarse-Aggregate Size: 1-1/2 inches nominal.

2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

C. Exposed Aggregate Application: Selected, hard, and durable; washed free of materials with deleterious reactivity to cement of that cause staining; with gap=graded coarse aggregate as follows:
1. Coarse Aggregate – 3/8-to-5/8-inch (10 to 16 mm) nominal
2. Coarse Construction Sand

D. Water: ASTM C 94/C 94M.

E. Air-Entraining Admixture: ASTM C 260.

F. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and to contain no more than 0.1 percent water-soluble chloride ions by mass of cementitious material.
1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
2. Retarding Admixture: ASTM C 494/C 494M, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

2.5 CURING MATERIALS

A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) dry.

B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

C. Water: Portable.

D. Curing compound shall be non-staining.

E. Sealant to be Silencure-A by Chem Masters.

2.6 RELATED MATERIALS

A. Expansion and Isolation Joint Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.

B. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

2.7 CONTROL JOINTS

A. Control joints indicated to be sawn shall be made by saw cutting concrete slab after concrete is finished and when the surface is stiff enough to support the weight of workmen without damage to the slab. Saw blade shall cut into slab at least 1½ in., but in no case less than 25% of slab depth.

B. Control joints indicated to be tooled shall be tooled into slab at least 1 ½ in., but in no case less than 25% of slab depth.

C. Unless otherwise indicated on the Drawings, control joints shall be located 10 ft. o.c. maximum.

2.8 CONSTRUCTION JOINTS

A. Transverse construction joints shall be placed whenever placing of concrete is suspended for more than 30 minutes.
   1. Butt joint with dowels or thickened edge joins shall be used if construction joints occur at location of control joint.
   2. Keyed joints with tiebars shall be used if the joint occurs at any other location.

2.9 BOND BREAKER

A. Bond breaker shall be asphalt felt conforming to ASTM D 226, Type I or 6 mil polyethylene sheeting.

2.10 CONCRETE MIXTURES

A. Prepare design mixtures, proportioned according to ACI 301, for each type and strength of normal-weight concrete determined by either laboratory trial mixes or field experience.
   1. Use a qualified independent testing agency for preparing and reporting proposed concrete mixture designs for the trial batch method.

B. Proportion mixtures to provide normal-weight concrete with the following properties:
   1. Compressive Strength (28 Days): 4000 psi.
   2. Maximum Water-Cementitious Materials Ratio at Point of Placement: 0.45.
   3. Slump Limit: 4 inches, plus or minus 1 inch.
   4. Air content: per ACI recommendations; 5-7%.

C. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.

D. Chemical Admixtures: Use admixtures according to manufacturer's written instructions.

2.11 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Furnish batch certificates for each batch discharged and used in the Work.
   1. When air temperature is between 85 deg F and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Mix concrete materials in appropriate drum-type batch machine mixer.
   1. For concrete mixes of 1 cu. yd. or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
   2. For concrete mixes larger than 1 cu. yd., increase mixing time by 15 seconds for each additional 1 cu. yd.
   3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixing time, quantity, and amount of water added.

2.12 DETECTABLE WARNING MAT

A. Embedded detectable warning mat: shall be textured to provide slip resistance and shall contrast visually with adjacent walking surfaces. Embedded detectable warning mat, pre-manufactured and set/pressed into concrete.

2.13 PAVEMENT MARKINGS

A. Pavement-marking paint: per ODOT Item 642.
   1. Color: White for parking lot striping; blue for ADA spaces.

PART 3 - EXECUTION

3.1 PREPARATION OF SUBGRADE

A. Areas to be paved will be compacted and brought to subgrade elevation before work of this section is performed. Final fine grading, filling, and compaction of areas to receive paving, as required to form a firm, uniform, accurate, and unyielding subgrade at required elevations and to required lines shall be done under this Section.

B. Existing subgrade material which will not readily compact as required shall be removed and replaced with satisfactory materials. Additional materials needed to bring subgrade to required line and grade and to replace unsuitable material removed shall be material conforming to this Section.

C. Subgrade of areas to be paved shall be recompacted as required to bring top 8 in. of material immediately below gravel base course to a compaction at optimum moisture of at least 95% of maximum density, as determined by ASTM D 1557. Subgrade compaction shall extend for a distance of at least 1 ft. beyond pavement edge.
   1. Field testing shall be conducted to determine in-place density accompanied by visual inspection of the compaction methods being used.

D. 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 directed by the Architect. Completed subgrade after filling such areas shall be uniformly and properly graded.

E. Areas being graded or compacted shall be kept shaped and drained during construction. Ruts greater than or equal to 2 in. deep in subgrade, shall be graded out, reshaped as required, and recompacted before placing pavement.

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

G. Disposal of debris and other material excavated under this section, and material unsuitable for or in excess of requirements for completing work of this section shall be disposed of off-site.

H. Prepared subgrade will be inspected by the Owner. Subgrade shall be approved by the Architect before installation of gravel base course. Disturbance to subgrade caused by inspection procedures shall be repaired under this section of the specification.

3.2 AGGREGATE BASE COURSE

A. Aggregate base course for paving and the spreading, grading, and compaction methods employed shall conform to standard requirements for usual base course of this type for first class road work, and shall conform to all applicable ODOT Specifications Sections.

B. Width of base course shall be greater than or equal to the width of pavement surface, if continuous lateral support is provided during rolling, and shall extend at least 2 x base thickness beyond edge of the course above, if not so supported.

C. Aggregate material shall be applied in lifts less than or equal to 6 in. thick, compacted measure. Each lift shall be separately compacted to specified density, using a 6-ton smooth drum vibratory roller equivalent to a 6-ton static roller, or an approved equivalent. Smaller areas or areas impossible to reach with large drum rollers shall be compacted to specified density using a vibrating plate compactor.
   1. Material shall be placed adjacent to wall, manhole, catch basin, and other structures only after they have been set to required grade and level.
   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 in. as measured by means of a 10 ft. long straightedge shall be replaced and properly recompacted.

D. Base course shall be compacted at optimum moisture content to not less than 95% of maximum density as determined by ASTM D 1557.

E. Subgrade and base course shall be kept clean and uncontaminated. Less select materials shall not be permitted to become mixed with gravel. Materials spilled outside pavement lines shall be removed and area repaired.

F. Portions of subgrade or of construction above which become contaminated, softened, or dislodged by passing of traffic, or otherwise injured, shall be cleaned, replaced, or otherwise repaired to conform to the requirements of this specification before proceeding with next operation.

3.3 STEEL REINFORCEMENT

A. Before being placed in position, reinforcing for reinforced concrete 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 necessary.

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

C. Unless otherwise indicated on the Drawings, reinforcing shall extend within 2 in. of formwork and expansion joints. Reinforcing shall continue through control joints.

D. After forms have been coated with form release agent, but before concrete is placed, reinforcing steel anchors shall be securely wired in the exact position called for, and shall be maintained in that position until concrete is placed and compacted. Chair bars and supports shall be provided in a number and arrangement satisfactory to the A/E.

3.4 PORTLAND CEMENT CONCRETE PAVING

A. Paving mix, equipment, methods of mixing and placing, and precautions to be observed as to weather, condition of base etc., shall meet the requirements of ACI 325.9R. Pavement shall be constructed in accordance with the Drawings.

B. The A/E shall be notified of concrete placement sufficiently in advance of start of operation to allow his representative to complete preliminary inspection of the work, including subgrade, forms, and reinforcing steel, if used.

C. Normal concrete placement procedures shall be followed. Concrete shall arrive at the jobsite so that no additional water will be required to produce the desired slump. When conditions develop that required addition of water to produce the desired slump, permission of the Architect must be obtained. The concrete shall be transported from the mixer to its place of deposit by a method that will prevent segregation or loss of material.

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

E. Adjacent work, etc., shall be protected from stain and damage during entire operation. Damaged and stained areas shall be replaced or repaired to equal their original conditions.

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

G. Concrete which has set or partially set before placing shall not be employed. Retempering of concrete will not be permitted.

H. Concrete shall be thoroughly spaded and tamped to secure a solid and homogeneous mass, thoroughly worked around reinforcement and into corners of forms.

I. When joining fresh concrete to concrete which has attained full set, latter shall be cleaned of foreign matter, and mortar scum and 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 in. thick, shall be well scrubbed into thoroughly dampened concrete base. New concrete shall be placed immediately, before grout has dried or set.

J. Install detectable warning plate in accordance with the manufacturer's directions.

3.5 FINISHING

A. Concrete flatwork surfaces shall be screeded off, bull floated, power or hand floated, troweled and finished true to line and grade, and free of hollows and bumps. Surface shall be dense, smooth, and at exact level and slope required.
   1. Finished concrete surface for subbases shall be wood floated to a slightly rough surface. Surface shall not deviate more than 1/4 in. in 10 ft.

B. Unless otherwise indicated, horizontal surfaces of concrete surfaces which will be exposed shall be given a light-medium 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 it to produce a pattern of small parallel grooves. Broom over all tool joints. 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.

1. "Window pane" finish sections to match adjacent walks.

C. Washed Exposed Aggregate Finish: Monolithic Exposed-Aggregate – Expose fine aggregate in pavement surfaces as follows:

1. Immediately after final troweling, spray-apply chemical surface retarder to pavement according to manufacturer's written instructions.
2. At the contractor's discretion and without dislodging aggregate, remove mortar paste by mechanical (brush) or chemical (acid) wash) means. Mechanical methods, if employed, should be performed while rinsing with water and as needed to minimize streaking and provide desired surface appearance.
3. Repeat acid wash or water flushing and brushing cycle until cement film is removed from aggregate surfaces to depth required and that the appearance of the finished concrete matches that of the approved samples.
4. Surfaces shall have a sandy-like appearance when completed.
5. Seal finished concrete only after the curing period is over with a product described in Section 3.6 below.

D. Immediately following finishing operations, arises at edge and both sides of expansion joints shall be rounded to a ¼ in. 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.

3.6 CURING

A. It is essential that concrete be kept continuously damp from time of placement until end of specified curing period. It is equally essential that water 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 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. If concrete is cured with a curing compound, compound shall be applied at a rate of 200 sq. ft. per gallon, in two applications perpendicular to each other.
3. Curing period shall be seven days minimum.

3.7 EXPANSION JOINTS

A. Expansion joints shall be 1/2 in. wide and unless otherwise indicated on the Drawings, shall be

located 30 ft. o.c. and at places where pavement meets other structures. Expansion joint shall be formed in the concrete to required width with preformed joint filler in place. Joint filler shall extend the full depth of the slab. Joint filler shall extend the full length of the expansion joint.

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

3.8 CONTROL JOINTS/CONTRACTION JOINTS

A. Saw cut joints to be installed at all pedestrian plazas (see plans). Joint 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. Saw cut joints shall be straight and accurate to line.
   1. Saw cut joints shall be sawn flush to vertical surfaces.
   2. Saw shall cut into pedestrian pavement at least 1 ½ in., but in no case less than 25% of slab depth.
   3. Unless otherwise indicated on the Drawings, control joints in pedestrian pavements shall be located 10 ft. o.c. maximum.

3.9 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, and 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 Architect. Procedures shall be in accordance with provisions of ACI 306R.

3.10 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 arrival on the job.

B. During periods of excessively hot weather (95° F., or above), ingredients in the concrete shall be cooled insofar as possible and cold mixing water shall be used to maintain the temperature of the concrete at permissible levels all in accordance with the provisions of ACI 305. Any concrete with a temperature above 95° F. when ready for placement will not be acceptable, and 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 as delivered 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.

3.11 SEALING OF JOINTS

A. Where indicated on the Drawings, expansion joints and control joints shall be sealed with joint sealant in accordance with the precautions specified in the Appendix of ASTM C 962.

3.12 PROTECTION OF CONCRETE SURFACES

A. Concrete surfaces shall be protected from traffic or damage until surfaces have hardened sufficiently. If necessary, 1/2 in. thick plywood sheets shall be used to protect the exposed surface.

3.13 PAVEMENT MARKINGS

A. Do not apply pavement-marking paint until layout, colors, and placement have been verified with Engineer.

B. Allow concrete paving to cure for a minimum of 28 days and be dry before starting pavement marking.

C. Sweep and clean surface to eliminate loose material and dust.

D. Apply paint per ODOT Item 642.

END OF SECTION

SECTION 32 13 73 - CONCRETE PAVING 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. Cold-applied joint sealants

B. Related Requirements:
   1. Division 32 Section “Concrete Paving”.

1.3 SUBMITTALS

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

B. Product Certificates: For each type of joint sealant and accessory, from manufacturer.

1.4 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.
   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 MANUFACTURES

A. Compatibility: Provide joint sealants, backing materials, 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. Colors of Exposed Joint Sealants: As selected by Owner from manufacturer's full range.

2.2 COLD-APPLIED JOINT SEALANTS

A. Single-Component, Nonsag, Silicone Joint Sealant for Concrete: ASTM D 5893, Type NS.
   1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      a. Crafco Inc., an ERGON company; RoadSaver Silicone.

b. Dow Corning Corporation; 888.
c. Pecora Corporation; 301 NS.

2.3 JOINT SEALANT BACKER MATERIALS

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

B. Round Backer Rods for Cold- and Hot-Applied Joint Sealants: ASTM D 5249, Type 1, of diameter and density required to control sealant depth and prevent bottom-side adhesion of sealant.

C. Backer Strips for Cold- and Hot-Applied Joint Sealants: ASTM D 5249; Type 2; of thickness and width required to control joint-sealant depth, prevent bottom-side adhesion of sealant, and fill remainder of joint opening under sealant.

2.4 PRIMERS

A. Primers: Product 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.

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.

B. Joint Priming: Prime joint substrates where indicated or where recommended in writing by joint-sealant manufacturer, based on 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.

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. Joint-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 joint-sealant backings of kind indicated to support joint 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 joint-sealant backings.
   2. Do not stretch, twist, puncture, or tear joint-sealant backings.
   3. Remove absorbent joint-sealant backings that have become wet before sealant application and replace them with dry materials.

D. Install joint sealants using proven techniques that comply with the following and at the same time backings are installed:
   1. Place joint 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.

E. Tooling of Nonsag Joint Sealants: Immediately after joint-sealant application and before skinning or curing begins, tool sealants according to the following requirements 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 joint sealant from surfaces adjacent to joints.
   2. Use tooling agents that are approved in writing by joint-sealant manufacturer and that do not discolor sealants or adjacent surfaces.

F. Provide joint configuration to comply with joint-sealant manufacturer's written instructions unless otherwise indicated.

3.4 CLEANING

A. Clean off excess joint 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.

3.5 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 and replace with joint sealant so installations in repaired areas are indistinguishable from the original work.

END OF SECTION

SECTION 32 91 00 - 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. The work of this Section consists of providing all labor, equipment, materials, incidental work, and construction methods necessary to provide and place planting soils as indicated on the Contract Documents and as specified in this Section
   1. Off-site mixing, amending and manufacturing planting soils from base components.
   2. Delivery of planting soil to the Project site.
   3. Stockpiling on the Project site in preparation for landscape grading
   4. Placing, spreading and grading of planting soil.

1.3 REFERENCES

A. ASTM International as referenced herein as ASTM.

B. U.S. Department of Agriculture (USDA) Handbook No. 60-Diagnosis and Improvement of Saline and Alkaline Soils.

1.4 DEFINITIONS

A. Planting Soils: The lawn and planting soils consist of a blend of natural topsoil without admixture of subsoil, stripped from the project site, and organic material. Do not mix subsoil with topsoil. The existing topsoil stripped from the Site requires testing after stockpiling to determine the proportion of soil amendments required to meet Specification Requirements.
   1. Base Components
      a. Base topsoil is a natural growing medium, either stripped from the Site or from other off-site sources.
      b. Uniform Sand is uniformly graded medium to coarse Uniform Sand.
      c. Organic Material is fully decomposed organic material

1.5 SUBMITTALS

A. At least 30 days prior to ordering materials, the Contractor shall submit to the Landscape Architect representative samples, certifications, manufacturer's product data and certified test results for materials as specified below for approval. No materials shall be ordered or delivered until the required submittals have been reviewed and approved by the Architect. Delivered materials shall closely match the approved samples. Approval shall not constitute final acceptance. The Landscape Architect reserves the right to reject, on or after delivery, any material that does not meet these Specifications.

B. Topsoil:
   1. Topsoil: Sample and test topsoil.
   2. The Contractor shall provide a one cubic foot representative sample per each 1,000 cubic yard topsoil for testing. All stockpile sampling shall be per ASTM D 75 and Appendixes for securing samples from stockpiles.
   3. Testing will be at the Contractor's expense. Contractor shall deliver all samples to testing laboratories via overnight courier and shall have the testing report sent directly to the Engineer. Perform all tests for gradation, organic content, soil chemistry and pH by the Soil and Plant Nutrient Laboratory, MSU Extension Service, Department of Crop and Soil Sciences of Michigan State University, East Lansing, MI 48824-1325; (517)355-0218.
   4. Testing reports shall be dated within 30 days of submission to the Landscape Architect. Testing reports beyond 30 days old will be rejected and new testing reports mandated.
   5. Testing reports shall include the following tests and recommendations. Contractor shall deliver samples to testing laboratories and shall have the testing report sent directly to the Architect from the Soil and plant Tissue Laboratory. Testing reports shall include the following tests and recommendations.
      a. Mechanical gradation (sieve analysis) shall be performed and compared to the USDA Soil Classification System. Sieve analysis shall be by combined hydrometer and wet sieving using sodium hexametaphosphate as a dispersant in compliance with ASTM D 422 after destruction of organic matter by H2O2. To facilitate review and approval of sieve analysis, provide a computer-generated gradation curve from MSU Extension Service, Department of Crop and Soil Sciences of Michigan State University.
      b. Percent of organics shall be determined by the loss on ignition of oven-dried samples. Test samples minus #10 material shall be oven-dried to a constant weight at a temperature of 450 degrees Fahrenheit (752 degrees Centigrade).
      c. Chemical analysis shall be undertaken for Nitrate Nitrogen, Ammonium Nitrogen, Phosphorus, Potassium, Calcium, Magnesium, extractable Aluminum, Lead, Zinc, Cadmium, Copper, Soluble Salts, and pH and buffer pH. A Conductivity Meter shall be used to measure Soluble Salts in 1:2 soil/water (v/v). Except where otherwise noted, nutrient tests shall be for available nutrients.
      d. Soil analysis tests shall show recommendations for soil additives to correct soils deficiencies as necessary, and for additives necessary to accomplish turf and planting work as specified.

C. Soil amendments:
   1. Submit
      a. Acidulant: Submit supplier’s certification that the acidulant being supplied conforms to these Specifications.
      b. Fertilizer: Submit product data of seeding and planting fertilizer and certificates showing composition and analysis. Submit fertilization rates for fertilizer product based upon soil testing, analysis, and recommendations

D. Sand:
   1. Tests shall be by combined hydrometer and wet sieving in compliance with ASTM D422 after destruction of organic matter by ignition.
   2. Test for agricultural suitability analysis including: Particle size and characteristics, pH.

1.6 EXAMINATION OF CONDITIONS

A. The Contractor shall be solely responsible for judging the full extent of work requirements involved, including but not limited to sampling and testing of on-site stockpiles of delivered off-site loam borrow prior to final planting installation.

1.7 SITE CONDITIONS

A. Soil Moisture Content
   1. Contractor shall not move, blend or grade soil when moisture content is so great that adequate mixing is not possible, nor when it is so dry that dust will form in the air or that clods will not break readily, nor when it is frozen. Apply water, if necessary, or allow soil to dry to bring soil moisture between 60% of optimum moisture content and optimum moisture content as determined by ASTM D698 for compaction, grading and plantings.
   2. Soil may not be manipulated in any way while in a wet condition, including moving of stockpiles, grading, planting or any other excavation. Contractor is responsible for removal and replacement of any and all soils that were manipulated when wet.
   3. Field Soil Moisture Test
      a. Form soil in palm of hand, if soil retains shape and crumbles upon touching, the soil may be worked.
      b. If the soil will not retain shape, it is too dry and should not be worked.
      c. If the soil retains shape and will not crumble, it is too wet and should not be worked.
      d. If the soil glistens or free water is observed when the sample is patted in the palm of hand the soil is too wet and should not be worked.

PART 2 - PRODUCTS

2.1 TOPSOIL – GENERAL

A. All work of manufacturing the various blends of planting soil for use on this project shall occur off site on property under the control of the Contractor and returned to the site fully amended and mixed to meet the requirements of this Section.

B. Off-Site Topsoil:
   1. Topsoil from off-site sources shall be provided for mixing with sand and compost to manufacture the specified soil mixes. Any amendments used to manufacture a soil to be imported shall meet the specifications defined in this section.

2.2 AMENDED TOPSOIL FOR GENERAL USE

A. Topsoil shall be amended with the specified sand or compost to produce a soil meeting the following criterion, as determined by ASTM F1632 or D422:
   1. Sand (0.05 to 2.0 mm) 65 – 75% with at least 50% of the total sand falling into the medium and coarse sand fractions and no more than 25% of the total sand in the fine and very fine sand fractions.
   2. Silt (0.002 to 0.05 mm) 15 - 25%
   3. Clay (< 0.002) 5 - 15%
   4. Gravel (> 2.0 mm) < 15%

5. Maximum size shall be three eights (3/8") inches largest diameter. For bidding purposes, topsoil, sand and compost, each as specified in this Section, shall be combined in an approximate mix ratio of 1 part by volume of sand to one part by volume of topsoil to one part by volume of compost (1S:1TS:1C). Final mix ratios to be determined by the Contractor and shall meet the requirements of this Section.

B. The amended soil shall have an organic matter content of 4 to 6% (by weight) as determined by ASTM F1647. For bidding purposes, the amount of compost required to increase the organic matter content to meet the specifications can range from 30 to 50% by volume, depending on the quality of the compost.

C. Ratio of the particle size for 80% passing (D80) to the particle size for 30% passing (D30) shall be 5.5 or less. (D80/D30 <8)

D. The amended soil shall have a minimum percolation rate of 0.50-inch per hour with the soil compacted to 88% of maximum standard proctor density (ASTM D698).

E. The topsoil meeting this specification shall serve as the baseline for subsequent quality control testing. Samples shall be taken every 1000 yards prior to placement on the lawn area for conformity to the specifications. Quality control testing shall include organic matter content and particle size analysis.

F. The final soil mix shall be submitted to a nutrient testing laboratory to determine the fertility status of the soil.

2.3 HIGH USE TURF MIX:

A. A sandy mix for use in high traffic areas as shown on the Plans.

B. The on-site topsoil or any imported topsoil shall be amended with the specified sand and/or compost to produce a soil meeting the following criteria, as determined by ASTM F1632 or D422:

1. Sand (0.05 to 2.0 mm) 70 – 85% with at least 50% of the total sand falling into the medium and coarse sand fractions and no more than 25% of the total sand in the fine and very fine sand fractions.
2. Silt (0.002 to 0.05 mm) 7 - 18%
3. Clay (< 0.002) 2 - 6%
4. Gravel (> 2.0 mm) < 15%
5. Maximum size shall be three eights (3/8") inches largest diameter. For bidding purposes, topsoil, sand and compost, each as specified in this Section, shall be combined in an approximate mix ratio of 3 parts by volume of sand to one part by volume of on-site topsoil to two parts by volume of compost (3S:1TS:2C). Final mix ratios to be determined by the Contractor and shall meet the requirements of this Section.

C. The amended soil shall have an organic matter content of 4 to 6% (by weight) as determined by ASTM F1647. For bidding purposes, the amount of compost required to increase the organic matter content to meet the specifications can range from 30 to 50% by volume, depending on the quality of the compost.

D. Ratio of the particle size for 80% passing (D80) to the particle size for 30% passing (D30) shall be 6 or less for high use turf mix (D80/D30 <6).

E. The amended soil shall have a minimum percolation rate of 3-inches per hour with the soil compacted to 88% of maximum standard proctor density (ASTM D698).

F. The topsoil meeting this specification shall serve as the baseline for subsequent quality control testing. Samples shall be taken every 1000 yards prior to placement on the lawn area for conformity to the specifications. Quality control testing shall include organic matter content and particle size analysis.

G. The final soil mix shall be submitted to a nutrient testing laboratory to determine the fertility status of the soil.

2.4 SOIL ADDITIVES

A. General: Soil additives shall be used to counteract soil deficiencies as recommended by the soils analysis and as supplements for turf construction as specified herein.

B. Acidulant for adjustment of loam borrow pH shall be commercial grade flours of sulfur, ferrous sulfate, or aluminum sulfate that are unadulterated. Acidulants shall be delivered in unopened containers with the name of the manufacturer, material, analysis and net weight appearing on each container.

C. Ground limestone for adjustment of loam borrow pH shall contain not less than 85 percent of total carbonates and shall be ground to such fineness that 40 percent will pass through 100 mesh sieve and 95 percent will pass through a 20-mesh sieve. Contractor shall be aware of loam borrow pH and the amount of lime needed to adjust pH to meet the requirements of the testing lab recommendations.

D. The compost used to amend the soil shall be well decomposed, stable, mature, aerobically composted product utilizing feedstock from yard wastes, food wastes, biosolids, or any combination of these. The compost shall meet the following criteria:
   1. An organic matter content of no less than 35% as determined by ASTM D2974.
   2. A moisture content of 35 – 70%, as determined by ASTM D2974.
   3. A carbon/nitrogen ratio of 15:1 to 30:1.
   4. Soluble salts not to exceed 2 dS/m.
   5. A Solvita Index of 5 to 8.
   6. 95 – 100% passing a 3/8” screen.
   7. A pH of 6 to 8.
   8. Non-phytotoxic.
   9. All EPA and state regulations for biosolid composts.

E. The Contractor shall submit representative samples of organic matter amendment they intend to bring onto the site to the owners testing agent. All reports shall be sent to the Landscape Architect for approval.

F. Sand shall be blended into the topsoil in the proper amount to achieve the particle size distribution described in these specifications. Sand for use as a soil amendment shall be a washed natural or classified sand meeting the following particle size distribution as determined by ASTM C-136 or F1632.

Sieve	Sieve Size	% Passing
No. 4	4.75 mm	100%
No. 8	2.38 mm	90 - 100%
No. 16	1.19 mm	80 - 100%
No. 30	0.60 mm	25 - 60
No. 50	0.30 mm	0 - 25%
No. 100	0.15 mm	0 - 5
No. 270	0.075 mm	0 - 3

G. In addition, the sand shall have a coefficient of uniformity (D60/D10) of less than 4.0.

H. Commercial fertilizer shall be a product complying with the State and United States fertilizer laws. Deliver fertilizer to the site in the original unopened containers bearing the manufacturer's certificate of compliance covering analysis and which shall be furnished to the Architect. Fertilizer shall contain not less than the percentages of weight of ingredients as recommended by the soil analysis.

1. Fertilizer for planting shall be formulated for top-dressing, soil surface application to plants. Fertilizer shall be designed and certified by the manufacturer to provide controlled release of fertilizer continuously for not less than 9 months. One hundred percent of the nitrogen content shall be derived from organic materials. Nitrogen source shall be coated to ensure slow release. Fertilizer percentages of weight of ingredients shall be as recommended by the soil testing and analysis specified, performed, and paid for under this Section, PLANTING SOILS.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: in the event field conditions are not as shown on Drawings and outlined in the Specifications, notify Landscape Architect in writing.

1. Spot and Invert Elevations: verify field elevations of site improvements such as drainage and utility fixtures, pavements, existing plantings, and subsurface piping conform to drawings.
2. Rough grade: verify specified elevations and prior earthwork operations have shaped, trimmed, and finished rough grade.

3.2 PREPARATION

A. Protection:

1. Contractor shall be required to clear working areas with Ohio Utility Protection Service prior to doing excavation on site. If work is to be done around underground utilities, appropriate authority of utility must be notified of impending work. Hand excavates areas adjacent to utilities. Contractor shall be responsible for damages done by himself or his personnel to existing utilities, which shall be repaired or paid for by Contractor.

3.3 MIXING PLANTING SOIL ON SITE

A. Soil additives shall be thoroughly incorporated into planting soil by harrowing or other methods standard to the industry.

B. Correct deficiencies in soil as directed by horticultural soil test results. Thoroughly incorporate amendments into planting mixture to ensure even distribution.

3.4 FILLING AND COMPACTION

A. Perform percolation tests on existing sub-soils or placed fill prior to placing and spreading planting soils (this requirement is waved where there is under drain perforated piping):
   1. Perform percolation testing of subsoil or placed fills to determine whether or not the subgrade will drain properly. Perform percolation tests as specified in this Section, for each lift of loam borrow.
   2. In the event that percolation testing indicates that the subsoil, placed fills or ordinary borrow has been over compacted and will not drain, the contractor shall loosen up the top 12 inches of the subgrade to be planted and seeded by ripping or other mechanical means. Re-compact the borrow by driving a small, tracked bulldozer over the area at low speeds so that the tracks of the bulldozer pass over the affected area and the soil is compacted to a density that will percolate as. Under no circumstances shall wheeled vehicles be driven over subsoil, placed fills or ordinary borrow that have been shown to percolate or subsoil, placed fills or ordinary borrow that has been loosened and shown to percolate.
   3. Perform sufficient percolation tests in areas of poorly draining or compacted subsoil or compacted placed fills as directed by the Landscape Architect to ensure that these underlying soils drain. Likewise, perform sufficient percolation tests after ripping and loosening to ensure that the soils are no longer too compact to drain.

B. Do not damage the work previously installed. Maintain all required angles of repose of materials adjacent to the loam as shown on the Contract Documents. Do not over excavate compacted subgrades of adjacent pavement or structures during loaming operations.

C. Confirm that the subgrade is at the proper elevation and that no further earthwork is required to bring the subgrade to proper elevations. Subgrade elevations shall slope parallel to the finished grade and or toward the subsurface drain lines as shown on the Contract Documents.

D. Clear the subgrade of all construction debris, trash, rubble and any foreign material. In the event that fuels, oils, concrete washout or other material harmful to plants have been spilled into the subgrade material, excavate the soil sufficiently to remove the harmful material. Such construction debris, trash, rubble and foreign material shall be removed from the site and disposed of in a legal manner. Fill any over excavation with approved fill and compact to the required subgrade compaction levels.

E. Do not proceed with the installation of amended topsoil until all utility work in the area has been installed.

F. Protect adjacent walls, walks and utilities from damage or staining by the soils. Use 0.5- inch plywood and or plastic sheeting as directed to cover existing concrete, metal and masonry work and other items as directed during the progress of the work. Clean up all trash and any soil or dirt spilled on any paved surface at the end of each working day.

3.5 FINE GRADING

A. Immediately prior to dumping and spreading loam borrow, the subgrade shall be cleaned of all stones greater than 2 inches and all debris or rubbish. Such material shall be removed from the site, not raked to the edges and buried. Notify the Architect that the subsoil has been cleaned and request his/her attendance on site to review and approve subgrade conditions prior to spreading loam borrow.

B. Amended topsoil shall be protected from erosion at all times. Materials shall be spread immediately upon approval soil test reports. Otherwise, materials that set on site for more than 24 hours shall be covered with tarpaulin or other soil erosion system acceptable to the Architect and surrounded by silt fence.

C. Place amended topsoil in two lifts. Place the first lift to a depth of 2 inches and harrow or till the loam into the underlying subsoil to a depth of 2 inches, creating a blended interface of loam and subsoil approximately 4 inches deep. Spread the second lift of loam to a minimum depth of 2 inches or greater as shown on the Contract Documents.

D. No loam borrow shall be handled, planted, or seeded in any way if it is in a wet or frozen condition. A moist loam borrow is desirable.

E. Fertilizer shall be spread and thoroughly incorporated into the top layer of the amended topsoil by harrowing or other method reviewed by the Landscape Architect. Fertilizer shall be applied at the rate recommend by the soil analysis.

F. Remove all large stiff clods, lumps, brush, roots, stumps, litter and other foreign matter. Remove from unscreened soils all stones over 1 inch in diameter from the top 6 Inches of the amended topsoil bed. Amended topsoil shall also be free of smaller stones in excessive quantities as determined by the Architect.

G. The Contractor shall install amended topsoil in successive horizontal lifts no thicker than 3 inches in areas of Reinforced Turf Root Zone Mix, 4 inches in turf areas (including areas of High Use Turf Mix and General Use Mix) and 12 inches in plant bed areas to the desired compaction as described herein. The Contractor shall install the soil at a higher level to anticipate any reduction of amended topsoil volume due to compaction, settling, erosion, decomposition, and other similar processes during the warranty period. The Landscape Architect will ensure that the full depths of amended topsoil for turf and plant beds are obtained by digging holes in the amended topsoil at the same frequency as for compaction testing.

1. Compact planting soil to the required density as specified herein.
2. Maximum dry density planting soil shall be determined in accordance with ASTM D698. The following percentages of minimum to maximum dry densities shall be achieved for amended topsoil.

   In turf, plant beds and tree pits:

	Minimum	Maximum
a. Fills within turf and planting areas in top eighteen inches of finished grade		
b. Reinforced Turf Root Zone Mix As achieved after two flood events per 3-inch lift.	83%	86%

3. The surface area of each lift hall shall be scarified by raking prior to placing the next lift.

H. Compaction:

1. For amended topsoil for general use in turf and plant beds, and for High Use Turf Mix in turf areas, compact each lift sufficiently to reduce settling but not enough to prevent the movement of water and feeder roots through the soil. The amended topsoil in each lift should feel firm to the foot in all areas and make only slight heel prints. At completion of the loam borrow installation, the soil should offer a firm, even resistance when a soil sampling tube is inserted from lift to lift.

2. For Reinforced Turf Root Zone Mix, consolidate the root zone mix and the fiber- reinforced root zone mix by flooding each lift a minimum of two times and allowing the water to drain away before subsequent flood events or successive soil lifts.

I. Percolation test procedure:

1. Dig a hole in the installed soil that is a minimum of 4 inches in diameter. Holes in 6-inch lift in turf areas shall be 4 inches deep. Holes in 12-inch lifts in plant beds shall be 8 inches deep. Do not penetrate through the lift being tested.
2. Fill the hole with water and let it drain completely. Immediately refill the hole with water and measure the rate of fall in the water level.
3. In the event that the water drains at a rate less than one inch per hour, till the soil to a depth required to break the over compaction.
4. Perform a minimum of one soil percolation test per 10,000 square feet area of turf area and 2,500 square feet of tree and shrub planting area as directed by the Landscape Architect.
5. Do not spread any amended topsoil for general use, high use turf mix of reinforced turf root zone mix until placed materials have been tested for percolation rates.

J. Select equipment and otherwise phase the installation of the amended topsoil to ensure that wheeled equipment does not travel over subsoil, placed fills or ordinary borrow or already installed soil. Movement of tracked equipment over said soils will be reviewed and considered for approval by the Landscape Architect. If it is determined by the Landscape Architect that wheeled equipment must travel over already installed soil, provide a written description of sequencing of work that ensures that compacted soil is loosened and un- compacted as the work progresses or place one-inch-thick steel plate ballast (or equivalent ballast approved by the Architect) over the length and width of any travel way to cover loam borrow to protect it from compaction.

K. Disturbed areas outside the limit of turf work shall be graded smooth and spread with a minimum of 6 inches of loam borrow to the finished grade.

3.6 CLEANING

A. Clean up debris generated under work of this section.

B. Site Improvements

1. Wash and sweep clean site improvements such as drainage and utility fixtures, pavements, existing plantings, and site furnishings.

3.7 PROTECTION

A. Protect work of this section until Final Acceptance.

B. Protect prepared soils from compaction by construction traffic and from contamination by construction materials and from saturation.

3.8 ACCEPTANCE

A. Confirm that the final grade of the loam borrow is at the proper finish grade elevations. Adjust grade as required to meet the contours and spot elevations noted on the Plans.

END OF SECTION

SECTION 32 92 00 - TURF AND GRASSES - SOD

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. Sodding
   2. Turf renovation.
   3. Maintenance
   4. Warranty

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: Imported soil that has been modified with soil amendments and fertilizers to produce a soil mixture best for lawn growth. See Section 329100 "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 ACTION SUBMITTALS

A. Product Data:
   1. Fertilizers - from manufacturer.
   2. Mycorrhizal inoculum.
   3. Pesticides and herbicides: Product label, manufacturer's product data sheet, application instructions and application equipment.

B. Source Quality Control:
   1. Samples:
      a. Sod: 3 foot long.
   2. Test Report:
      a. Topsoil: Test reports including soil amendments and fertilization rates for lawn areas. Refer to Section 329100 Soil Preparation (Topsoil).
   3. Certifications/Licenses:
      a. 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 suppliers.

1.6 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.

1.7 QUALITY ASSURANCE

A. Qualifications:
   1. The Contractor shall be a company specializing in sodding and 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 Landscape Architect.
   4. Pesticide applicator: State licensed, commercial.

1.8 DELIVERY, STORAGE, AND HANDLING

A. 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, drying, sun and wind.

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. Do not tear, stretch, or drop sod during handling and installation.
3. 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.
4. Accompany each delivery of bulk materials with appropriate certificates.

1.9 SCHEDULING

A. Seasonal Limitations:

1. Sod 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. Sodding: Comply with Cool Season Grass dates identified above.
4. If special circumstances warrant installation outside the normal installation season, submit a written request to the Owner describing conditions and stating the proposed variance. Sodding outside the specified seasons could extend warranty obligations will be dependent upon the extent of the variance.
5. Weather limitations: Proceed with 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.

1.10 WARRANTY, MAINTENANCE AND ACCEPTANCE

A. Substantial Completion:

1. The Substantial Completion inspection shall occur for the entire landscape and only one Notice of Substantial Completion will be issued. Phased approvals will not be permitted. Following the inspection, the Landscape Architect will issue a punch list identifying all work requiring completion or correction.
2. After receiving a Notice of Substantial Completion warrant and maintain all lawn areas (see Part 3.8) 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, the

Owner will conduct an inspection of all lawn areas. Following the inspection, the Owner 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.
   c. 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 regarded as needed and 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 for lawn areas shall be:
      a. 60 days from date of completion of Substantial Completion punch list but no less than 3 maintenance mowings.
         1). When the initial warranty and maintenance period has not elapsed before end of rowing 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, 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 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; depth being 1"-1 ½". 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. Sun and Partial Shade: Proportioned by weight as follows:
      a. 10 percent Kentucky bluegrass (*Poa pratensis*)
      b. 90 percent tall fescue (*Festuca arundinacea*) a minimum of three improved turf type varieties.

D. 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's spacing and installation instructions.

2.2 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.

2.3 WATER

A. Water for lawns shall be available from on-site sources.

B. Water shall be free of wastewater effluent or other hazardous chemicals.

2.4 TOPSOIL

A. Refer to Section 329100.

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). 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.

2.6 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.

2.7 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 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 subgrades 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. If necessary, 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.

3.3 PLACING TOPSOIL, SOIL AMENDMENTS AND FERTILIZER

A. Provide, fertilize and amend topsoil in accordance with testing laboratory recommendations specified under Section 329100 "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 2 granular pound 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-INSTALLATIONPREPARATION

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 Owner's acceptance of finish grading. Restore seedbed areas if eroded or otherwise disturbed after finish grading.

3.5 SODDING

A. Sodding Procedures:
   1. Lay sod within 24 hours of harvesting. Do not lay sod if dormant or if ground is frozen.
   2. To enhance rooting, moisten the soil to a depth of 4" – 6" 24 hours before laying sod.
   3. Correct all inequalities and soft spots in the sod bed before installation. Roll site with a 200-pound roller to firm the soil. Sod must be installed onto moist, smooth soil. Water thoroughly and allow surface to partially dry before installation. Do not create muddy soil or excessively moist condition that will result in rutting and disturbances to the finish grades. During installation, continue to fine grade areas immediately in advance of the work to maintain a smooth surface.
   4. Sod shall be entire pieces except where trimming is required at the ends of each row. No piece shall be less than 12-inches in any dimension.
   5. Lay sod to form a solid mass with joints staggered to prevent water from channelizing and eroding the sod bed. Butt ends and sides of sod rolls tightly together; do not overlap and do not stretch sod to make edges meet. Stagger rolls to offset joints in adjacent courses. There shall be no visible gaps between any adjacent piece of sod or at transitions between pavement, curbs and edging.
   6. Install initial row of sod in a straight line, beginning at bottom of slopes, perpendicular to direction of the sloped area. Lay sod perpendicular to slopes, and peg sod on slopes exceeding 3:1 or steeper with two pegs per square yard. When sod may be displaced during installation (steep slopes), work from ladders or treaded planks installing pegs immediately after each piece is installed.
   7. Tamp or roll sod with a 200-pound roller immediately after it is laid to ensure full contact between the sod root mass and topsoil. The finished surface shall be true to grade and shall be smooth, even, and equally firm at all points.
   8. After the sod is completely installed, resod all areas which have browned out or fail to show a uniform stand of grass. Repair all visible cracks between pieces of sod.
   9. Maintain soil moisture in accordance with 3.8 below.

3.6 TURF RENOVATION

A. All preparation work shall be conducted in accordance with 3.1 through 3.3 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 3.8 below.

3.7 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.

3.8 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 and sodding and 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 1.5.C 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 3.7 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-monthly 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 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.

3.9 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 phosphorous 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): Warm and 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.

3.10 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.

3.11 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. Remove non-degradable erosion-control measures after grass establishment period.

END OF SECTION