SPECIFICATIONS FOR

THE CONSTRUCTION OF
SITE IMPROVEMENTS AT
LAKEWOOD FOREST PRESERVE

Bid Spec Number: 22044

February 28, 2023

ATTACHMENT B

SPECIFICATIONS

SECTION 05310 – PAVEMENT MARKINGS

SECTION 05400 – CONCRETE PAVEMENT

SECTION 05420 – CONCRETE CURBS

SECTION 05430 – DETECTABLE WARNINGS

SECTION 06100 – STONE WALLS

SECTION 07300 – CONCRETE STRUCTURES. CAST-IN-PLACE

SECTION 07400 – PIERS AND DOCKS

SECTION 07511 – EVAPORATOR RESTROOM FACILITY, VAULT ONLY

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SECTION 09110 – HERBICIDE TREATMENT

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SECTION 09300 – TURF SEEDING

SECTION 09310 – NATIVE SEEDING

SECTION 01000

GENERAL PROJECT REQUIREMENTS

1. GENERAL

1.01 DESCRIPTION

A. Work under this section includes:

1. Summary of the Work
2. Coordination and Meetings
3. Permits and Regulations
4. Plans and Specifications
5. Layout and Staking
6. Quality Assurance and Guarantee
7. Materials
8. Shop Drawings, Product Data and Samples

1.02 SUMMARY OF THE WORK

A. The Work to be performed under this Contract consists of the complete construction of Site Improvements at Lakewood Forest Preserve in accordance with the Contract Documents. The Work shall also meet the requirements of all permitting agencies. The Work generally includes, but is not limited to all labor, equipment, and materials to:

- construct a fully accessible 1.6-mile asphalt trails,
- reconstruct the main entrance and 0.5-mile Forest Preserve Road,
- reconstruct 0.2-mile interior drives and (4) parking areas,
- construct concrete walkways,
- install utilities and related infrastructure including: electrical system, (2) water wells, water distribution system and (1) septic system,
- install (3) evaporator restroom vaults,
- grade (2) shelter pads,
- install (2) floating piers with (3) concrete abutments,
- place boulders for seating, walls and shoreline restoration,
- seed turf and native areas

B. Furnish all labor, materials, equipment, tools, and transportation which is reasonably and properly inferable and necessary for the proper completion of the Work, whether specifically indicated in this Contract or not.

C. Whenever the performance of work is indicated within the Contract Documents and no item is included in the Contract for payment, the work shall be considered incidental to the Contract, and additional compensation will not be allowed.

D. Repair, replace, or otherwise settle with the Owner and/or any other affected property owners, any damage to property or existing facilities of any kind due to the actions of the Contractor.

1.03 COORDINATION AND MEETINGS

A. The Contractor shall be required to attend a pre-construction meeting prior to beginning the Work to review the Contract Documents (including, but not limited to, Plans, Specifications and other supporting documents), construction scheduling, personnel contacts, quality controls and inspect the site. The Contractor shall submit a schedule of construction within one week from the pre-construction meeting for approval by the Owner.

B. The Contractor shall communicate the work progress and upcoming project tasks to the Owner via phone or email at least every 48 hours. The Contractor shall also schedule on-site progress meetings to review and coordinate the Work.

C. The Contractor shall become thoroughly familiar with the required Owner and permit agency inspections and promptly notify the respective parties before the required inspection is due. Failure to have the Work inspected as required may result in denial of payment for said Work.

D. The Contractor shall notify the Owner of any interruption or stoppage of work lasting two days or more before the work stoppage. The Contractor shall inform the Owner of all changes in the construction schedule as soon as they become apparent.

E. The Contractor shall be fully responsible for the coordination of its Work and the Work of its employees, subcontractors, and suppliers and to assure compliance with schedules. The Contractor is responsible for any and all coordination required for public and private utility compliance.

F. The Owner may have separate contracts in force at the same time and in the same areas as the Work. The Contractor shall coordinate the Work so as to not cause delays or obstructions or affect the quality of work by others and shall otherwise cooperate with others at the Work Site.

1.04 PERMITS, BONDS AND REGULATIONS

A. The Owner shall obtain, at its expense, all required governmental permits as described in Attachment A of this Contract. All other provisions and requirements contained in any and all other required governmental permits associated with the Work are the responsibility of the Contractor and shall be considered to be part of this Contract. The Contractor shall be solely responsible for performing all Work in establishing and maintaining compliance with the same governmental permits.

B. The Contractor shall, at its sole expense, procure and furnish all bonds and all certificates and policies of insurance required by all applicable permitting agencies. The Contractor shall obtain, at its expense, all other required licenses, approvals and authorizations.

C. The Contractor shall be responsible for scheduling and attending all permit inspections and meetings.

D. The Contractor shall comply with all state and federal safety regulations, as outlined in the latest revisions of the Federal Construction Safety Standards (Series 1926), and with applicable provisions and regulations of the Occupation Safety and Health Administrative (OSHA) standards of the Williams-Steiger Occupational Health State Safety Act of 1970 (revised).

1.05 PLANS AND SPECIFICATIONS

A. Only complete sets of plans approved by the Owner and specifically marked "FOR CONSTRUCTION" (Plans) shall be used to construct the Work. Prior to bidding and commencement of construction, the Contractor shall verify all dimensions and conditions affecting their work with the actual conditions at the job site. If there are any discrepancies from what is shown on the Plans, the Contractor must immediately report same to the Owner before performing any work; otherwise, the Contractor assumes full responsibility. In the event of disagreement between the Plans, Specifications, and/or details, the Contractor shall secure written instructions from the Owner prior to proceeding with any part of the work affected by omissions or discrepancies. Failing to secure such instruction, the Contractor shall be considered to have proceeded at its own risk and expense. In the event of any doubt or question arising with respect to the true meaning of the Plans or Specifications, the decision of the Owner shall be final and conclusive.

B. The Contractor shall keep a set of Contract Documents, including approved Plans and Specifications at the Work Site and shall maintain a legible record on said Plans of any changes, modifications, or alterations to the Work. Upon completion of the Contractor's work, said Plans and information shall be provided to the Owner as the Record Drawings. Final Contract Payment shall not be made until the Record Drawings have been received by the Owner.

C. In the event of a conflict between any provision in any of the following component parts of these Contract Documents, the provision in the component part first listed below shall govern over any other component part which follows it, except as may otherwise specifically stated. Said component parts are the following:

1. Plans
2. Addendum to the Specifications
3. Special Provisions
4. Specifications

D. All work shall conform to the following Standards and Manuals:

1. "Standard Specifications for Road and Bridge Construction in Illinois," including "Supplemental Specifications and Recurring Special Provisions" as prepared by the Illinois Department of Transportation, hereinafter referred to as the "IDOT Standard Specifications."
2. "Standard Specifications for Water and Sewer Main Construction in Illinois," (SSWS) shall govern all water and sewer main construction.
3. "Illinois Highway Standards for Traffic Control," (IHSTC) as published by the Illinois Department of Transportation.
4. "Manual for Uniform Traffic Control Devices" (MUTCD) as published by the Federal Highways Administration.
5. "Illinois Urban Manual," as prepared for the Illinois Environmental Protection Agency (IEPA) by Illinois Urban Manual Technical Review Committee and Steering Committee.

E. Any reference to published specifications or standards of any organization or association shall comply with the requirements of the specification or standard which is current on the date of the Advertisement for Bids. In case of a conflict between the referenced specifications or standards, the one having the more

stringent requirements shall govern. In case of conflict between the referenced specifications or standards and this Contract, this Contract shall govern.

F. Wherever the following abbreviations are used in these Specifications or on the Plans, they are to be construed as the respective expressions represented:

1. Abbreviations:

a. AA	–	Aluminum Association
b. AASHTO	–	American Association of State Highway and Transportation Officials
c. ACI	–	American Concrete Institute
d. ANSI	–	American National Standards Institute
e. ASTM	–	ASTM International
f. AWS	–	American Welding Society
g. AWWA	–	American Water Works Association
h. CRSI	–	Concrete Reinforcing Steel Institute
i. FSS	–	Federal Specifications and Standards
j. NEC	–	National Electrical Code
k. NECA	–	National Electrical Contractors Association
l. NEMA	–	National Electrical Manufacturers Association
m. OSHA	–	U.S. Department of Labor, Occupational Safety and Health Administration
n. PS	–	United States Products Standards
o. STD. SPEC.	–	IDOT Standard Specifications for Road and Bridge Construction
p. SSPC	–	Society for Protective Coatings
q. UL	–	Underwriters Laboratories

2. Definitions:

a. Architect	–	The Owner’s authorized representative.
b. Contract	–	The written Agreement between the Owner and the Contractor setting forth the obligations of the parties thereunder, including, but not limited to, the performance of the work, the furnishing of labor and materials, and the basis of payment. See “Contract” in the “Bid Package Table of Contents” for more detail.
c. Engineer	–	The Owner’s authorized representative.
d. Pay Item	–	A specifically described unit of work for which a price is provided in the Contract.
e. Plans	–	The Contract drawings, or exact reproductions thereof, that show the location, character, dimensions, and details of the work to be done. Contract drawings include, but are not limited to, the approved plans, profiles, typical cross sections, detail drawings, shop drawings, working drawings, layout drawings, supplemental drawings, and IDOT Highway Standards.

f. Specifications – The body of directions, provisions, and requirements contained herein, or in any supplement adopted by the Owner, together with written agreements and all documents of any description made or to be made pertaining to the method or manner of performing and paving for the work, the quantities, and the quality of materials to be furnished under the contract.

1.06 LAYOUT AND STAKING

A. Control data, benchmarks and other data for construction purposes may be provided by the Owner in digital format for use by the Contractor. Use of control data and points at the site other than that which has been approved by the Owner to construct the Work may result in rejection of that Work and all related payment denied.

B. The Owner may have performed staking for trail alignments or other improvements for pre-construction purposes such as vegetation clearing and / or alignment testing. The Contractor may utilize these points for construction with approval of the Owner. Otherwise, the Contractor shall be responsible for providing and maintaining all layout and staking for the improvements specified. All layout shall utilize either traditional electronic survey equipment (total station, etc.) or GPS and shall be accurate in both the horizontal and vertical planes to +/- one tenth (.1) of a foot. Only a qualified Registered Land Surveyor (RLS) or a person trained under a RLS shall be utilized to provide construction staking.

C. The Owner shall retain the right to review and inspect any layout and staking before commencement of the Work if so requested beforehand by the Owner.

1.07 QUALITY ASSURANCE AND GUARANTEE

A. Before acceptance and final payment by the Owner, all work shall be quantified, inspected and approved by the Owner. Final payment shall be made after all of the Work has been approved and accepted, and in accordance with the Contract Documents.

B. After final acceptance by the Owner and all applicable government permitting agencies, all Work performed under this Contract shall be guaranteed against defects in materials and workmanship of any nature for a period of twelve months by the Contractor and his/her surety.

C. Special attention is drawn to Article 105.06 of the IDOT Standard Specifications, which requires the Contractor to have a competent superintendent on the project site at all times, irrespective of the amount of work sublet. The superintendent shall be capable of reading and understanding the Plans and Specifications, shall have full authority to execute orders to expedite Work, and shall be responsible for scheduling and have control of all work as the agent of the Contractor. Failure to comply with this provision will result in a suspension of work.

D. The Work described in this Contract requires specialized knowledge, experience, skills and equipment to successfully complete. The Contractor shall possess the full capability to execute the work as specified, including trained, experienced and skilled personnel and possession or access to the required equipment.

E. The Owner is not responsible for the construction means, methods, techniques, sequences or procedures, time of performance, programs or for any safety precautions used by the Contractor. The Contractor is solely responsible for execution of his/her work, in accordance with the Contract.

F. The Contractor shall indemnify the Architect/Engineer, their agents, the Owner and its agents and all applicable permit agencies (as required) from all liability involved in the construction, installation and testing of the Work and name them as additionally insured.

1.08 MATERIALS

A. General

1. The source of materials to be used shall be in accordance with the Contract Documents and as approved by the Owner before delivery. The approval of the source of any material shall continue as long as the material conforms to the Specifications.

2. All material not conforming to the requirements of the Specifications shall be considered as defective and shall be removed from the Work. If in place, faulty materials shall be removed by Contractor at its expense and replaced with acceptable material unless permitted otherwise by the Owner. No defective materials that have been subsequently corrected shall be reused until approval has been given.

3. Upon failure of Contractor to comply immediately with any order of the Owner to remove and replace defective material, the Owner shall have authority to remove and replace defective materials, and to deduct the cost of removal and replacement from any monies due or to become due to Contractor. Failure to reject any defective materials or Work at the time of installation shall in no way prevent later rejection when such defects are discovered, nor obligate the Owner to issue its final acceptance.

B. Manufactured materials and products shall be delivered to the Work Site as needed for installation, undamaged, in original packages, containers, or bundles, as packaged by the manufacturer with manufacturer's name, brand, seals, and labels intact.

C. Contractor shall be responsible for protection and preservation of all materials until final payment.

D. Contractor shall provide temporary protection of the Work from damage by the elements and protect finished surfaces to prevent any damage resulting from the Work of any trade.

E. Substitutions and Product Options

1. The intent of these Specifications is to provide the Owner with a high-quality project without discouraging competitive bidding. Substitutions may be submitted and will be evaluated as specified herein.

2. For products specified by reference standards only, Contractor may provide a product complying with the specified standard with proof of compliance.

3. For products specified by performance and descriptive methods, without naming manufacturer's products, Contractor may provide the products of any manufacturer complying with the Contract Documents, subject to the review of product data and approval by the Owner as specified herein.

4. For products specified by naming one or more manufacturer's products followed by the words "or approved equal", Contractor may provide any of the named products or may submit a product by another manufacturer as an equal for the review and approval by the Owner as specified herein and subject to conditions specified elsewhere. If requirements are specified in addition to naming manufacturer's products, any product provided must comply with all of the specified requirements.

5. If Contractor wishes to provide a product other than one named in the Specifications, Contractor shall submit sufficient information to the Owner for evaluation and determination of acceptability of the product prior to purchase and delivery of the product. Contractor is responsible for obtaining information required by the Owner for the evaluation of products, which includes complete manufacturer’s literature and technical data. The Owner is responsible for determination of the equality of products, and Owner's decision shall be final, except as otherwise provided by Law.

6. The substitution requirements of this Section are in addition to the requirements of the General Conditions and Supplementary Conditions.

1.09 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

A. Descriptions

1. Shop Drawings

a. Shop Drawings shall be original drawings, specifications and calculations prepared by a contractor, subcontractor, supplier, manufacturer or distributor, which illustrates some portion of the Work.
b. Shop Drawings shall be prepared by a qualified detailer specifically for this project and not from other unrelated projects. They shall include the project name, Owner’s project number, location, date and be identified by reference to sheet and detail numbers on the Plans.
c. Reproductions for submittal shall be full size prints clearly stamped and signed by the Contractor.
d. Shop Drawings shall include all plans, elevations, sections, details, labels and notes to fully describe material type, quantity, quality and size; layout, orientation, location, fabrication, erection and setting of assemblies; and references and industry standards to govern the construction.
e. Product data are manufacturer's standard schematic drawings, catalog sheets, brochures, diagrams, schedules, performance charts, illustrations, and other standard descriptive data. This includes applicable warranties, operating manuals, and/or maintenance instructions.
f. Standard drawings shall be modified to delete information that is not applicable to the Work and supplemented to provide additional information applicable to the Work.

g. Catalog sheets, brochures, etc., shall be clearly marked to identify pertinent materials, products, or models.

2. Samples are physical examples to illustrate materials, equipment, or workmanship and to establish standards by which Work is to be evaluated.

B. Contractor's Responsibilities

1. Prior to submission, the Contractor shall thoroughly check Shop Drawings, product data, and samples for completeness, material availability and for compliance with the Contract Documents and shall verify all quantities, dimensions and field conditions and shall coordinate the Shop Drawings with the requirements for other related Work.

2. The Contractor's responsibility for errors and omissions in submittals is not relieved by the Owner’s review of submittals.

3. The Contractor shall notify the Owner, in writing at the time of submission, of deviations in submittals from the requirements of the Contract Documents. Contractor's responsibility for deviations in submittals from the requirements of the Contract Documents is not relieved by the Owner's review of submittals, unless the Owner gives written acceptance of specific deviations.

4. Begin no Work that requires submittals until return of submittals with the Owner’s stamp and initials or signature indicating the submittal has been accepted.

5. Prompt delivery and removal of all sample materials to and from the Work site shall be the responsibility of the Contractor.

C. Submission Requirements and Owner’s Review

1. The Owner will retain one copy of approved Shop Drawings and product data. Submit the number of samples indicated in the individual Specification sections.

2. Shop Drawings, product data, and samples shall be submitted by Contractor to the Owner. Submittals shall be properly identified with the name of the Contract, dated, and each lot submitted shall be accompanied by a letter of transmittal referring to the name of the Work and to the Specification page number and/or Plan number for identification of each item. Submittals for each type of Work shall be numbered consecutively, and the numbering system shall be retained throughout all revisions.

3. Submittals shall bear Contractor's stamp of approval certifying that they have been checked. Submittals without Contractor's initialed or signed certification stamp and submittals which, in the Owner’s opinion are incomplete contain errors or have not been properly checked, will be returned unchecked by the Owner for resubmission.

4. At the time of each submission, Contractor shall give the Owner specific written notice of each variation that the Shop Drawings or samples may have from the requirements of the Contract Documents and shall cause a

specific notation to be made on each Shop Drawing submitted of each such variation.

5. The Owner will review submittals with reasonable promptness. The Owner's review of submittals shall not be construed as a complete check, and shall not relieve Contractor from responsibility for complete compliance with the Contract requirements. The Owner's review will be only for conformance with the design concept of the Work and for compliance with the information given in the Contract Documents and shall not extend to means, methods, techniques, sequences or procedures of construction (except where a specific means, method, technique, sequence or procedure of construction is indicated in or required by the Contract Documents) or to safety precautions or programs incident thereto. The review of a separate item as such will not indicate approval of the assembly in which the item functions. No corrections, changes, or deviations indicated on submittals reviewed by the Owner shall be considered as a Change Order.

6. Contractor shall make corrections required by the Owner and shall return the required number of corrected copies of Shop Drawings for review. Contractor shall direct specific attention in writing to revisions other than the corrections called for by the Owner on previous submittals.

7. In the event a third submittal is required, due to previous submittals of incomplete or incorrect data or not in compliance with the Contract Documents, the Contractor will be charged one-half of the cost incurred by the Owner for the review of the third submittal. The Contractor shall bear the total cost incurred by the Owner for all subsequent reviews. The costs charged to the Contractor will be deducted by the Owner from payments due to the Contractor.

8. Distribution of copies of acceptable submittals will be as mutually determined by Contractor and Owner on an individual item basis during or following the preconstruction conference.

END OF SECTION 01000

SECTION 01010

MEASUREMENT AND PAYMENT

1. GENERAL

1.01 DESCRIPTION

A. All applications for payment shall be with the Owner's approved forms and completed, signed, and notarized by the Contractor. The Owner may request additional backing documents, spreadsheets, delivery tickets, or other proof or measurement of the work being billed.

B. Payment for all work done in compliance with the Contract, inclusive of furnishing all manpower, equipment, materials, and performance of all operations relative to construction of this Project, will be made under the Payment Items listed in Part 2 of this Section 01010. Incidental work required by the Contract for which there is no specific Payment Item is still required to be performed and no additional compensation will be allowed for such work.

C Quantities necessary to complete the work as shown in Attachment A to the Contract shall govern over those estimated in the Bidder's Proposal. The Contractor shall take no advantage of any apparent error or omission in the Plans or Specifications, and the Owner shall be permitted to make corrections and interpretations as may be deemed necessary for fulfillment of the intent of the Contract.

D. All work shall be completed per the Contract Documents. Where shown, references to specific sections of the Specifications and/or sheets in the Plans should be consulted to determine the full scope of the work.

E. All measurement and payment provisions of the IDOT Standard Specifications are deleted.

F. The Subsections in Part 2 below describe the measurement of and payment for the Work to be completed under the Contract Unit Price Items listed in the Schedule of Prices. The following terms and abbreviations are synonymous:

1.	Acre	=	AC
2.	Each	=	EA
3.	Cubic Yard	=	CY
4.	Face Square Foot	=	FSF
5.	Lineal Foot	=	LF
6.	Lump Sum	=	LS
7.	Square Yard	=	SY
8.	Ton	=	TN

2. MEASUREMENT AND PAYMENT

02 SITE PREPARATION AND PROTECTION

02-01 MOBILIZATION AND TEMPORARY SITE ACCESS

A. Measurement

1. This work shall not be measured for payment but shall be paid for according to the following schedule. The amount which a Contractor shall be paid for mobilization under the schedule below is limited to three percent (3%) of the original Contract amount. Should the bid for mobilization exceed three percent, the amount over three percent shall not be paid until the final pay application.

    a. Upon execution of the contract, fifty percent (50%) of the pay item may be paid.

    b. When ten percent (10%) of the original Contract amount has been earned, an additional forty percent (40%) may be paid.

    c. Upon completion of the Contract, the remaining ten percent (10%) of the pay item may be paid, along with any amount in excess of the three percent of the original contract amount. Specifications are included in Section 02100.

B. Payment

1. This work shall be paid for at the contract unit price of Lump Sum for MOBILIZATION AND TEMPORARY SITE ACCESS.

02-02 STABILIZED CONSTRUCTION ENTRANCE [CONTINGENT]

A. Measurement

1. This work shall be measured for payment as counted individually in place, complete per the Contract Documents. Specifications are included in Section 02100. Fifty percent (50%) of the pay item shall be paid out upon installation of the stabilized entry. Final payment shall be made upon Owner’s final approval of each restored entrance location.

B. Payment

1. This work shall be paid for at the contract unit price per Each for STABILIZED CONSTRUCTION ENTRANCE [CONTINGENT].

02-03 TEMPORARY TRAFFIC CONTROL

A. Measurement

1. This work shall not be measured for payment but will be considered complete upon final approval by the Owner and all relevant governing agencies per the Contract Documents and all applicable permits, regulations, and standards. Specifications are included in Section 02200.

B. Payment

1. This work shall be paid for at the contract unit price per Lump Sum for TEMPORARY TRAFFIC CONTROL. Payment may be made in part or in full dependent on the requirements of the project.

02-04 TEMPORARY CONSTRUCTION FENCE, 4′

A. Measurement

1. This work shall be measured for payment in place in lineal feet, complete per the Contract Documents. Specifications are included in Section 02300.

B. Payment

1. This work shall be paid for at the contract unit price per Lineal Foot for TEMPORARY CONSTRUCTION FENCE, 4′.

02-05 SILT FENCE

A. Measurement

1. This work shall be measured for payment in place in lineal feet, complete per the Contract Documents. Specifications are included in Section 02400. Seventy percent (70%) of the pay item shall be paid out upon installation of the silt fence. Final payment shall be made upon Owner’s final approval of the removed silt fence and restoration of the work areas.

B. Payment

1. This work shall be paid for at the contract unit price per Lineal Foot for SILT FENCE.

02-06 FILTER SOCK

A. Measurement

1. This work shall be measured for payment in place in lineal feet, for the installation, maintenance, and removal of the filter sock, complete per the Contract Documents. Specifications are included in Section 02400. Seventy percent (70%) of the pay item shall be paid out upon installation of the filter sock. Final payment shall be made upon Owner’s final approval of the removed filter sock.

B. Payment

1. This work shall be paid for at the contract unit price per Lineal Foot for FILTER SOCK.

02-07 TEMPORARY DITCH CHECK [CONTINGENT]

A. Measurement

1. This work shall be measured for payment as counted in place per each location which shall consist of 2 units at 7′ in length each and complete per the Contract Documents. Specifications are included in Section 02400.

B. Payment

1. This work shall be paid for at the contract unit price per Each for TEMPORARY DITCH CHECK [CONTINGENT].

02-08 PERMEABLE PLASTIC DITCH CHECK

A. Measurement

1. This work shall be measured for payment as counted in place per each location which shall consist of 5 units at 3.3′ in length each and complete per the Contract Documents. Specifications are included in Section 02400.

B. Payment

1. This work shall be paid for at the contract unit price per Each for PERMEABLE PLASTIC DITCH CHECK.

02-09 DRAIN INLET PROTECTION [CONTINGENT]

A. Measurement

1. This work shall be counted in place per inlet location, complete per the Contract Documents and as required by the applicable soil erosion and sediment control permits, regulations, and industry standards. Specifications are included in Section 02400.

B. Payment

1. This work shall be paid for at the contract unit price per Each for DRAIN INLET PROTECTION [CONTINGENT].

02-10 DRAIN INLET FILTER [CONTINGENT]

A. Measurement

1. This work shall be counted in place per inlet location, complete per the Contract Documents. Specifications are included in Section 02400.

B. Payment

1. This work shall be paid for at the contract unit price per Each for DRAIN INLET FILTER [CONTINGENT].

02-11 TEMPORARY SEED [CONTINGENT]

A. Measurement

1. This work shall be measured in place per square yard, complete per the Contract Documents and as required by the applicable soil erosion and sediment control permits, regulations, and industry standards. Specifications are included in Section 02400.

B. Payment

1. This work shall be paid for at the contract unit price per Square Yard for TEMPORARY SEED [CONTINGENT].

02-12 HYDROMULCH, SLOPES 2:1 OR LESS [CONTINGENT]

A. Measurement

1. This work shall be measured for payment in place in square yards, complete per the Contract Documents. Areas which receive erosion control blanket shall not be included in this measurement. Specifications are included in Section 02400.

B. Payment

1. This work shall be paid for at the contract unit price per Square Yard for HYDROMULCH, SLOPES 2:1 OR LESS [CONTINGENT].

02-13 TURBIDITY BARRIER

A. Measurement

1. This work shall be measured for payment in place in lineal feet, for the installation, maintenance, and removal of the turbidity barrier, complete per the Contract Documents. Specifications are included in Section 02400. Seventy percent (70%) of the pay item shall be paid out upon installation of the turbidity barrier. Final payment shall be made upon Owner's final approval of the removed turbidity barrier.

B. Payment

1. This work shall be paid for at the contract unit price per Lineal Foot for TURBIDITY BARRIER.

02-14 DEWATERING [CONTINGENT]

A. Measurement

1. This work shall not be measured for payment but will be considered complete upon final approval by the Owner and all relevant governing agencies per the Contract Documents and all applicable permits, regulations, and standards. Dewatering shall remain active when needed for the duration of the contract. Specifications are included in Section 02400.

B. Payment

1. This work shall be paid for at the contract unit price per Lump Sum for DEWATERING [CONTINGENT].

02-15 TREE REMOVAL WITH STUMP GRINDING, (VARIOUS SIZE RANGES) [CONTINGENT]

A. Measurement

1. This work shall be measured for payment as counted in place, before removal, complete per the Contract Documents. Measurement for each tree shall be diameter in inches at breast height (DBH) made prior to the removal of the tree. Specifications are included in Section 02500.

B. Payment

1. This work shall be paid for at the contract unit price Per Each for: TREE REMOVAL WITH STUMP GRINDING, 6″ to 15″ DBH [CONTINGENT]; TREE REMOVAL WITH STUMP GRINDING, [CONTINGENT]16″ to 30″ DBH [CONTINGENT]; and TREE REMOVAL WITH STUMP GRINDING, 30″ + DBH [CONTINGENT].

02-16 STUMP GRINDING, (VARIOUS SIZE RANGES)

A. Measurement

1. This work shall be measured for payment as counted in place, before removal, complete per the Contract Documents. Measurement for each stump shall be average of widest and shortest diameter at top of stump. Specifications are included in Section 02500.

B. Payment

1. This work shall be paid for at the contract unit price Per Each for STUMP GRINDING, 6″ to 15″ DIAMETER; STUMP GRINDING, 16″ to 30″ DIAMETER; and STUMP GRINDING, 30″ + DIAMETER [CONTINGENT].

02-17 TREE ROOT PRUNING [CONTINGENT]

A. Measurement

1. This work shall be measured for payment in lineal feet, complete per the Contract Documents. Specifications are included in Section 02500.

B. Payment

1. This work shall be paid for at the contract unit price per Lineal Foot for TREE ROOT PRUNING [CONTINGENT].

02-18 TREE BRANCH PRUNING, (VARIOUS SIZE RANGES) [CONTINGENT]

A. Measurement

1. This work shall be measured for payment per each tree, complete per the Contract Documents. Specifications are included in Section 02500.

B. Payment

1. This work shall be paid for at the contract unit price per Each for TREE BRANCH PRUNING, 6″ – 12″ DIAMETER [CONTINGENT] and TREE BRANCH PRUNING, 13″ – 24″ DIAMETER [CONTINGENT].

02-19 FIELD MOWING [CONTINGENT]

A. Measurement

1. This work shall be measured for payment in acres or portions of acres complete per the Contract Documents. Specifications are included in Section 02500.

B. Payment

1. This work shall be paid for at the contract unit price per Acres for FIELD MOWING [CONTINGENT].

02-20 SAW CUTS, FULL DEPTH

A. Measurement

1. This work shall be measured for payment in place in lineal feet, complete per the Contract Documents. Specifications are included in Section 02600.

B. Payment

1. This work shall be paid for at the contract unit price per Lineal Foot for SAW CUTS, FULL DEPTH.

02-21 ASPHALT SURFACE REMOVAL, 1-1/2″

A. Measurement

1. This work shall be measured for payment in place in square yards, complete per the Contract Documents. Specifications are included in Section 02600.

B. Payment

1. This work shall be paid for at the contract unit price per Square Yard for ASPHALT SURFACE REMOVAL, 1-1/2″

02-22 ASPHALT PAVEMENT REMOVAL, FULL DEPTH

A. Measurement

1. This work shall be measured for payment in place in square yards, complete per the Contract Documents. Specifications are included in Section 02600.

B. Payment

1. This work shall be paid for at the contract unit price per Square Yard for ASPHALT PAVEMENT REMOVAL AND DISPOSAL, FULL DEPTH

02-23 PAVEMENT PULVERIZATION, FULL DEPTH

A. Measurement

1. This work shall be measured for payment in place in square yards, complete per the Contract Documents. Specifications are included in Section 02600.

B. Payment

1. This work shall be paid for at the contract unit price per Square Yard for PAVEMENT PULVERIZATION, FULL DEPTH.

02-24 CONCRETE PAVEMENT REMOVAL, FULL DEPTH

A. Measurement

1. This work shall be measured for payment in place in square yards, complete per the Contract Documents. Specifications are included in Section 02600.

B. Payment

1. This work shall be paid for at the contract unit price per Square Yard for CONCRETE PAVEMENT REMOVAL, FULL DEPTH.

02-25 CURB AND GUTTER REMOVAL

A. Measurement

1. This work shall be measured for payment in place in lineal feet, complete per the Contract Documents. Specifications are included in Section 02600.

B. Payment

1. This work shall be paid for at the contract unit price per Lineal Foot for CURB AND GUTTER REMOVAL.

02-26 AGGREGATE REMOVAL FOR REUSE, 6″ DEPTH (MIN.)

A. Measurement

1. This work shall be measured for payment in place in square yards, complete per the Contract Documents. Specifications are included in Section 02610.

B. Payment

1. This work shall be paid for at the contract unit price per Square Yard for AGGREGATE REMOVAL FOR REUSE, 6″ DEPTH (MIN.).

02-27 STORM SEWER REMOVAL AND DISPOSAL

A. Measurement

1. This work shall not be measured for payment but will be considered complete upon the Owner’s approval and as indicated on the Plans.

B. Payment

1. This work shall be paid for at the contract unit price per Each for STORM SEWER REMOVAL AND DISPOSAL.

02-28 STORM STRUCTURE REMOVAL AND DISPOSAL

A. Measurement

1. This work shall not be measured for payment but will be considered complete upon the Owner’s approval and as indicated on the Plans.

B. Payment

1. This work shall be paid for at the contract unit price per Each for STORM STRUCTURE REMOVAL AND DISPOSAL.

02-29 MISC. MANHOLE REMOVAL AND DISPOSAL

A. Measurement

1. This work shall not be measured for payment but will be considered complete upon the Owner’s approval and as indicated on the Plans. This work shall include all manholes shown on the Plans, excluding storm manholes which are included in the preceding pay item.

B. Payment

1. This work shall be paid for at the contract unit price per Each for MISC. MANHOLE REMOVAL AND DISPOSAL.

02-30 UTILITY STRUCTURE REMOVAL AND DISPOSAL (VARIOUS)

A. Measurement

1. This work shall not be measured for payment but will be considered complete upon the Owner’s approval and as indicated on the Plans. This work shall include all misc. utility structure removal items shown on the Plans, including, but not necessarily limited to: electrical stands, transformers and handholes; water spigots, hand pumps, hydrants valve vaults.

B. Payment

1. This work shall be paid for at the contract unit price per Each for UTILITY STRUCTURE REMOVAL AND DISPOSAL (VARIOUS).

02-31 TIMBER WALL REMOVAL AND DISPOSAL

A. Measurement

1. This work shall be measured for payment in place in lineal feet, complete per the Contract Documents.

B. Payment

1. This work shall be paid for at the contract unit price per Lineal Foot for TIMBER WALL REMOVAL AND DISPOSAL.

02-32 GATE REMOVAL, SALVAGE AND RETURN TO OWNER

A. Measurement

1. This work shall not be measured for payment but will be considered complete upon the Owner's approval for the careful removal of gates to be returned to Owner for reuse as indicated on the Plans.

B. Payment

1. This work shall be paid for at the contract unit price per Each for GATE REMOVAL, SALVAGE AND RETURN TO OWNER.

03 EARTHWORK AND DRAINAGE

03-01 SITE GRADING, COMPLETE

A. Measurement

1. This work shall not be measured for payment but will be considered to be complete upon the Owner's approval and as indicated in the Contract Documents. Specifications are included in Section 03100.

B. Payment

1. This work shall be paid for at the contract unit price per Lump Sum for SITE GRADING, COMPLETE.

03-02 SITE GRADING, SENSITIVE WOODED AREAS

A. Measurement

1. This work shall not be measured for payment but will be considered to be complete upon the Owner's acceptance and as per the Contract Documents. Specifications are included in Section 03100.

B. Payment

1. This work shall be paid for at the contract unit price per Lump Sum for SITE GRADING, SENSITIVE WOODED AREAS.

03-03 STRUCTURE EXCAVATION

A. Measurement

1. This work shall be measured for payment in place based on the difference between original grades and dimensions and the new grades

and dimensions after excavation is complete by means of topographic survey or by the method of average end areas and as per the Contract Documents. Specifications are included in Section 03100.

B. Payment

1. This work shall be paid for at the contract unit price per Cubic Yard for STRUCTURE EXCAVATION. Any work performed without the Owner's approval may result in denial of payment.

03-04 EXCAVATION OF UNSUITABLE MATERIALS [CONTINGENT]

A. Measurement

1. This work shall be performed only upon the Owner's approval. This work shall be measured for payment in place in their original positions by means of topographic survey or by the method of average end areas and as per the Contract Documents. Specifications are included in Section 03110.

B. Payment

1. This work shall be paid for at the contract unit price per Cubic Yard for EXCAVATION OF UNSUITABLE MATERIALS [CONTINGENT]. Any work performed without the Owner's approval may result in denial of payment.

03-05 ON-SITE DISPOSAL OF UNSUITABLE MATERIALS [CONTINGENT]

A. Measurement

1. This work shall be performed only upon the Owner's approval. This work shall be measured for payment in place in Cubic Yards and as per the Contract Documents. Specifications are included in Section 03100.

B. Payment

1. This work shall be paid for at the contract unit price per Cubic Yard for ON-SITE DISPOSAL OF UNSUITABLE MATERIALS [CONTINGENT]. Any work performed without the Owner's approval may result in denial of payment.

03-06 GEOTEXTILE GROUND STABILIZATION (SENSITIVE WOODED AREAS)

A. Measurement

1. This work shall be performed only upon the Owner's approval for areas of unsuitable materials. This work shall be measured for payment in place in, complete per the Contract Documents. Specifications are included in Section 03110.

B. Payment

1. This work shall be paid for at the contract unit price per Square Yard for GEOTEXTILE GROUND STABILIZATION (SENSITIVE WOODED AREAS). Any work performed without the Owner's approval may result in denial of payment.

03-07 GEOTEXTILE GROUND STABILIZATION [CONTINGENT]

A. Measurement

1. This work shall be performed only upon the Owner's approval for areas of unsuitable materials. This work shall be measured for payment in place in square yards, complete per the Contract Documents. Specifications are included in Section 03110.

B. Payment

1. This work shall be paid for at the contract unit price per Square Yard for GEOTEXTILE GROUND STABILIZATION [CONTINGENT]. Any work performed without the Owner's approval may result in denial of payment.

03-08 POROUS GRANULAR EMBANKMENT (PGE), CA-1 [CONTINGENT]

A. Measurement

1. This work shall be performed only upon the Owner's approval. This work shall be measured for payment in place in cubic yards, complete per the Contract Documents. Measurement shall be performed directly after excavation and before PGE has been installed. Specifications are included in Section 03110.

B. Payment

1. This work shall be paid for at the contract unit price per Cubic Yard for POROUS GRANULAR EMBANKMENT (PGE), CA-1 [CONTINGENT]. Any work performed without the Owner's approval may result in denial of payment.

03-09 TOPSOIL FURNISH AND PLACEMENT, 4″ [CONTINGENT]

A. Measurement

1. This work shall be measured for payment in place in square yards per the specified depth and as per the Contract Documents. Specifications are included in Section 03120.

B. Payment

1. This work shall be paid for at the contract unit price per Square Yard for TOPSOIL FURNISH AND PLACEMENT, 4″ [CONTINGENT].

03-10 FINISH GRADING

A. Measurement

1. This work shall be measured for payment in place in square yards, complete per the Contract Documents. Measurements for finish grading shall match total measurements for all seeding. Specifications are included in Section 03120.

B. Payment

1. This work shall be paid for at the contract unit price per Square Yard for FINISH GRADING.

03-11 CULVERT CROSSING, COMPLETE

A. Measurement

1. This work shall be measured for payment as counted in place, complete per the Contract Documents. This pay item shall include the installation of

culvert pipe, bedding, backfill, inlets, end sections and riprap at the outfall of the culvert. Specifications are included in Section 03200.

B. Payment

1. This work shall be paid for at the contract unit price Per Each as listed individually in the Schedule of Prices for CULVERT CROSSING, COMPLETE.

03-12 DRAINAGE STRUCTURES

A. Measurement

1. This work shall be measured for payment in lineal feet for storm sewers, pipe drains and pipe underdrains and as counted in place for other drainage structures, complete per the Contract Documents. Specifications are included in Section 03300.

B. Payment

1. The following work shall be paid for at the contract unit price per Lineal Foot:

STORM SEWER, 12″ HDPE
STORM SEWER, 15″ HDPE
STORM SEWER, 21″ HDPE
STORM SEWER, 12″ RCP
STORM SEWER, 18″ RCP
PIPE DRAIN, 4″ PVC
PIPE UNDERDRAIN, 6″ PVC
PIPE UNDERDRAIN, 6″ #EZ-1501FB

2. The following work shall be paid for at the contract unit price Per Each:

CONCRETE HEADWALL, IDOT 601101
FLARED END SECTION, 12″ RCP
FLARED END SECTION, 18″ RCP
FLARED END SECTION, 12″ MES
FLARED END SECTION, 15″ MES
FLARED END SECTION, 18″ MES
FLARED END SECTION, 24″ MES
INLET, TY A, 2′ Dia., TY 1 FR & GR, CL
MANHOLE, TY A, 4′ Dia., TY 1 FR & GR, CL
MANHOLE, TY A FLAT SLAB, 4′ Dia., TY 8 GR

03-13 RIPRAP

A. Measurement

1. This work shall be measured for payment in place in square yards, complete per the Contract Documents in locations not associated with Culvert Crossings, Complete. Measurements for riprap shall match total measurements for all seeding. Specifications are included in Section 03120.

B. Payment

1. This work shall be paid for at the contract unit price per Square Yard for RIPRAP.

04 UTILITIES

04-01 UTILITY SLEEVE, 4″, PVC, OPEN TRENCH

A. Measurement

1. This work shall be measured for payment in lineal feet, complete per the Contract Documents. Specifications are included in Section 04100.

B. Payment

1. This work shall be paid for at the contract unit price per Lineal Foot for UTILITY SLEEVE, 4″, PVC, OPEN TRENCH.

04-02 UTILITY SLEEVE, 4″, PVC, DIRECTIONAL DRILL

A. Measurement

1. This work shall be measured for payment in lineal feet, complete per the Contract Documents. Specifications are included in Section 04100.

B. Payment

1. This work shall be paid for at the contract unit price per Lineal Foot for UTILITY SLEEVE, 4″, PVC, DIRECTIONAL DRILL.

04-03 ELECTRICAL UNDERGROUND CONDUIT, 5″ PVC OPEN TRENCH

A. Measurement

1. This work shall be measured for payment in lineal feet, complete per the Contract Documents. Specifications are included in Section 04110 and Section 04200.

B. Payment

1. This work shall be paid for at the contract unit price per Lineal Foot for ELECTRICAL UNDERGROUND CONDUIT, 5″ OPEN TRENCH.

04-04 ELECTRICAL UNDERGROUND CONDUIT, 5″ PVC DIRECTIONAL DRILL

A. Measurement

1. This work shall be measured for payment in lineal feet, complete per the Contract Documents. Specifications are included in Section 04110 and Section 04200.

B. Payment

1. This work shall be paid for at the contract unit price per Lineal Foot for ELECTRICAL UNDERGROUND CONDUIT, 5″ DIRECTIONAL DRILL.

04-05 ELECTRICAL SERVICE INSTALLATION

A. Measurement

1. This work shall not be measured for payment but will be considered complete upon final approval by the Owner and all relevant governing

agencies per the Contract Documents and all applicable permits, regulations, and standards. Specifications are included in Section 04200.

B. Payment

1. This work shall be paid for at the contract unit price per Lump Sum for ELECTRICAL SERVICE INSTALLATION. Payment may be made in part or in full dependent on the requirements of the project.

04-06 ELECTRICAL SERVICE CONNECTION

A. Measurement

1. This work shall not be measured for payment but will be considered complete upon final approval by the Owner and all relevant governing agencies per the Contract Documents and all applicable permits, regulations, and standards. Specifications are included in Section 04200.

B. Payment

1. This work shall be paid for at the contract unit price per Lump Sum for ELECTRICAL SERVICE CONNECTION. Payment may be made in part or in full dependent on the requirements of the project.

04-07 ELECTRICAL AND LIGHTING CONTROL PANELS

A. Measurement

1. This work shall not be measured for payment but will be considered complete upon final approval by the Owner and all relevant governing agencies per the Contract Documents and all applicable permits, regulations, and standards. Specifications are included in Section 04200.

B. Payment

1. This work shall be paid for at the contract unit price per Lump Sum for ELECTRICAL AND LIGHTING CONTROL PANELS. Payment may be made in part or in full dependent on the requirements of the project.

04-08 HANDHOLE, 3′ X 3′ X 3′

A. Measurement

1. This work shall be measured for payment for Each, complete upon final approval by the Owner and all relevant governing agencies per the Contract Documents and all applicable permits, regulations, and standards. Specifications are included in Section 04200.

B. Payment

1. This work shall be paid for at the contract unit price per Each for HANDHOLE, 3′ X 3′ X 3′.

04-09 CONCRETE TRANSFORMER PAD

A. Measurement

1. This work shall be measured for payment per each, complete per the Contract Documents. Specifications are included in Section 04200.

B. Payment

1. This work shall be paid for at the contract unit price per Each for CONCRETE TRANSFORMER PAD.

04-10 RECONFIGURE SIGN AND UNDERPASS ELECTRIC FEED

A. Measurement

1. This work shall be measured for payment per lump sum, complete per the Contract Documents. Specifications are included in Section 04200.

B. Payment

1. This work shall be paid for at the contract unit price per Lump Sum for RECONFIGURE SIGN AND UNDERPASS ELECTRIC FEED.

04-11 WATER WELL, COMPLETE

A. Measurement

1. This work shall not be measured for payment but will be considered complete upon final approval by the Owner and all relevant governing agencies per the Contract Documents and all applicable permits, regulations, and standards. This work shall also include the necessary permit through the Lake County Health Department and all water quality testing and water treatment that may be required. Specifications are included in Section 04300.

B. Payment

1. This work shall be paid for at the contract unit price per Each for WATER WELL, COMPLETE.

04-12 WATER SERVICE CONNECTION

A. Measurement

1. This work shall not be measured for payment but will be considered complete upon final approval by the Owner and all relevant governing agencies per the Contract Documents and all applicable permits, regulations, and standards. Specifications are included in Section 04310.

B. Payment

1. This work shall be paid for at the contract unit price per Each for WATER SERVICE CONNECTION. Payment may be made in part or in full dependent on the requirements of the project.

04-13 WATER SERVICE LINE, COMPLETE

A. Measurement

1. This work shall be measured for payment in place in lineal feet, for the installation of water service piping, complete per the Contract Documents. Specifications are included in Section 04310.

B. Payment

1. The following work shall be paid for at the contract unit price per Lineal Foot:

WATER SERVICE LINE, 1″ TYPE K COPPER, OPEN TRENCH, COMPLETE

WATER SERVICE LINE, 1″ HDPE, OPEN TRENCH, COMPLETE

WATER SERVICE LINE, 1″ HDPE, DIRECTIONAL DRILL, COMPLETE

WATER SERVICE LINE, 1-1/4″ HDPE, OPEN TRENCH, COMPLETE

WATER SERVICE LINE, 1-1/4″ HDPE, DIRECTIONAL DRILL, COMPLETE

WATER SERVICE LINE, 2″ HDPE, OPEN TRENCH, COMPLETE

WATER SERVICE LINE, 2″ HDPE, DIRECTIONAL DRILL, COMPLETE

04-14 WATER B-BOX VALVE, COMPLETE

A. Measurement

1. This work shall be measured for payment as counted in place per each furnished and installed and complete per the Contract Documents. Specifications are included in Section 04310.

B. Payment

1. This work shall be paid for at the contract unit price per Each for WATER B-BOX VALVE, COMPLETE.

04-15 DRINKING FOUNTAIN

A. Measurement

1. This work shall be measured for payment as counted in place per each drinking fountain furnished and installed and complete per the Contract Documents. Specifications are included in Section 04320.

B. Payment

1. This work shall be paid for at the contract unit price per Each for DRINKING FOUNTAIN.

04-16 DRINKING FOUNTAIN VAULT, 5′, COMPLETE

A. Measurement

1. This work shall be measured for payment as counted in place per each drinking fountain vault furnished and installed and complete per the Contract Documents. Specifications are included in Section 04320.

B. Payment

1. This work shall be paid for at the contract unit price per Each for DRINKING FOUNTAIN VAULT, 5′, COMPLETE.

04-17 SANITARY SYSTEM, SEPTIC, COMPLETE

A. Measurement

1. This work shall not be measured for payment but will be considered complete upon final approval by the Owner and all relevant governing agencies per the Contract Documents and all applicable permits, regulations, and standards. Specifications are included in Section 04400.

B. Payment

1. This work shall be paid for at the contract unit price per Lump Sum for SANITARY SYSTEM, SEPTIC, COMPLETE.

05 PAVEMENTS AND SURFACES

05-01 SUBGRADE PREPARATION

A. Measurement

1. This work shall be measured for payment in place in square yards, complete per the Contract Documents. Measurements for length for trails shall be taken along the centerline of the trail. For trails the standard width measurement shall be one foot (1′) greater than the specified finished trail width. For roads and parking areas, the measurements shall include an additional one foot (1′) past the finished pavement edges along all perimeters of the pavement. Specifications are included in Section 05100.

B. Payment

1. This work shall be paid for at the contract unit price per Square Yard for SUBGRADE PREPARATION.

05-02 AGGREGATE BASE COURSE, RECYCLED, 5″, TRAIL

A. Measurement

1. This work utilizes existing on-site aggregate and pulverized or crushed and screened pavement from areas designated for onsite pavement removal or reuse. This work shall be measured for payment in place in square yards, complete per the Contract Documents. For trails, Measurements for length shall be taken along the centerline of the trail. Measurements for width shall be one foot (1’) greater than the finished width of the pavement. Specifications are included in Section 05200 and Section 02610.

B. Payment

1. This work shall be paid for at the contract unit price per Square Yard for AGGREGATE BASE COURSE, RECYCLED, 5″, TRAIL.

05-03 AGGREGATE BASE COURSE, RECYCLED; 5″ MIN., TRAIL

A. Measurement

1. This work is applicable in areas such as Sensitive Wooded Areas where minimal grading and subgrade preparation with the presence of cross slopes require a variable aggregate base depth. This work utilizes existing on-site aggregate and pulverized or crushed and screened pavement from areas designated for onsite pavement removal or reuse. This work shall be measured for payment in place in square yards, complete per the Contract Documents. Measurements for length shall be taken along the centerline of the trail. Measurements for width shall be one foot (1′) greater than the finished width of the pavement. Due to the variable nature of the work, no measurements for additional depth greater than the 5″ minimum are made. Specifications are included in Section 05200 and Section 02610.

B. Payment

1. This work shall be paid for at the contract unit price per Square Yard for AGGREGATE BASE COURSE, RECYCLED, 5″ MIN., TRAIL

05-04 HOT-MIX ASPHALT SURFACE COURSE, MIX “D”, N50, 3″,

A. Measurement

1. This work shall be measured for payment in place in square yards, complete per the Contract Documents. For trails, measurements for length shall be taken along the centerline of the trail and the standard width shall not be measured but shall be per the Contract Documents. Specifications are included in Section 05200.

B. Payment

1. This work shall be paid for at the contract unit price per Square Yard for HOT-MIX ASPHALT SURFACE COURSE, MIX “D”, N50, 3″.

05-05 AGGREGATE BASE COURSE, RECYCLED, 9″ MIN.

A. Measurement

1. This work utilizes existing on-site aggregate and pulverized or crushed and screened pavement from areas designated for onsite pavement removal or reuse. This work shall be measured for payment in place in square yards, complete per the Contract Documents. For roads or other linear pavements, the measurements for length shall be taken along the centerline and the width shall extend an additional one foot (1′) from the finished edge of pavement at each side. At parking areas measurements for length and width shall be one foot (1′) greater than the finished dimensions of the pavement. Specifications are included in Section 05300 and Section 02610.

B. Payment

1. This work shall be paid for at the contract unit price per Square Yard for AGGREGATE BASE COURSE, RECYCLED, 9″ MIN.

05-06 HOT-MIX ASPHALT BINDER COURSE, IL-19.0, N50, 2 ¼″

A. Measurement

1. This work shall be measured for payment in place in square yards, complete per the Contract Documents. Specifications are included in Section 05300.

B. Payment

1. This work shall be paid for at the contract unit price per Square Yard for HOT-MIX ASPHALT BINDER COURSE, IL-19.0, N50, 2 ¼″.

05-07 BITUMINOUS PRIME COAT

A. Measurement

1. This work shall be measured for payment in place in square yards, complete per the Contract Documents. Measurements for area shall equal that of the applicable Hot-Mix Asphalt Binder Course. Specifications are included in Section 05300.

B. Payment

1. This work shall be paid for at the contract unit price per Square Yard for BITUMINOUS PRIME COAT.

05-08 HOT-MIX ASPHALT SURFACE COURSE, MIX “D”, N50, 1 ¾″

A. Measurement

1. This work shall be measured for payment in place in square yards, complete per the Contract Documents. Specifications are included in Section 05300.

B. Payment

1. This work shall be paid for at the contract unit price per Square Yard for HOT-MIX ASPHALT SURFACE COURSE, 1 ¾″.

05-09 PAVEMENT MARKING LINE

A. Measurement

1. This work shall be measured for payment in place in lineal feet per specified line width complete per the Contract Documents. Specifications are included in Section 05310.

B. Payment

1. The following work shall be paid for at the contract unit price per Lineal Foot:

PAVEMENT MARKING LINE, 4″, YELLOW, EPOXY
PAVEMENT MARKING LINE, 4″, WHITE, THERMOPLASTIC
PAVEMENT MARKING LINE, 6″, WHITE, THERMOPLASTIC
PAVEMENT MARKING LINE, 12″, WHITE, THERMOPLASTIC
PAVEMENT MARKING LINE, 24″, WHITE, THERMOPLASTIC

05-10 PAVEMENT MARKING LETTERS AND SYMBOLS

A. Measurement

1. This work shall be measured for payment per each per specified symbol complete per the Contract Documents. Specifications are included in Section 05310.

B. Payment

1. The following work shall be paid for at the contract unit price per Each:

PAVEMENT MARKING LETTERS AND SYMBOLS, YELLOW, EPOXY
PAVEMENT MARKING LETTERS AND SYMBOLS, WHITE, THERMOPLASTIC

05-11 AGGREGATE BASE COURSE, RECYCLED, 5″, CONCRETE PAVEMENT

A. Measurement

1. This work utilizes existing on-site aggregate and pulverized or crushed and screened pavement from areas designated for onsite pavement removal or reuse. This work shall be measured for payment in place in square yards, complete per the Contract Documents. Measurements for length shall be taken along the centerline of the walks and flatwork.

Measurements for width shall be one foot (1′) greater than the finished width of the pavement. Specifications are included in Section 05200 and Section 02610.

B. Payment

1. This work shall be paid for at the contract unit price per Square Yard for AGGREGATE BASE COURSE, RECYCLED, 5″, CONCRETE PAVEMENT.

05-12 CONCRETE PAVEMENT, 5″

A. Measurement

1. This work shall not be measured for payment but shall be per the dimensions indicated in the Contract Documents. Specifications are included in Section 05400.

B. Payment

1. This work shall be paid for at the contract unit price per Square Yard for CONCRETE PAVEMENT, 5″.

05-13 CONCRETE PAVEMENT, 7″

A. Measurement

1. This work shall not be measured for payment but shall be per the dimensions indicated in the Contract Documents. Specifications are included in Section 05400.

B. Payment

1. This work shall be paid for at the contract unit price per Square Yard for CONCRETE PAVEMENT, 7″.

05-14 CONCRETE PAVEMENT, THICKENED EDGE

A. Measurement

1. This work shall be measured for payment in place in lineal feet, complete per the Contract Documents. Specifications are included in Section 05420.

B. Payment

1. This work shall be paid for at the contract unit price per Lineal Foot for CONCRETE PAVEMENT, THICKENED EDGE.

05-15 CONCRETE CURB AND GUTTER, B-6.12

A. Measurement

1. This work shall be measured for payment in place in lineal feet, complete per the Contract Documents. Specifications are included in Section 05420.

B. Payment

1. This work shall be paid for at the contract unit price per Lineal Foot for CONCRETE CURB AND GUTTER, B-6.12.

05-16 CONCRETE CURB AND GUTTER, DEPRESSED

A. Measurement

1. This work shall be measured for payment in place in Lineal Foot, complete per the Contract Documents. Specifications are included in Section 05420.

B. Payment

1. This work shall be paid for at the contract unit price per Lineal Foot for CONCRETE CURB AND GUTTER, DEPRESSED.

05-17 DETECTABLE WARNINGS

A. Measurement

1. This work shall be measured for payment in place in square feet, complete per the Contract Documents. Specifications are included in Section 05430.

B. Payment

1. This work shall be paid for at the contract unit price per Square Foot for DETECTABLE WARNINGS

06 WALLS AND STAIRS

06-01 BOULDER SLOPE TREATMENT

A. Measurement

1. This work shall be measured for payment in place in square yards, complete per the Contract Documents. Specifications are included in Section 06100.

B. Payment

1. This work shall be paid for at the contract unit price per Square Yard for BOULDER SLOPE TREATMENT.

06-02 BOULDER, INDIVIDUAL PLACEMENT

A. Measurement

1. This work shall be measured for payment in place per each, complete per the Contract Documents. Specifications are included in Section 06100.

B. Payment

1. This work shall be paid for at the contract unit price per Each for BOULDER, INDIVIDUAL PLACEMENT.

06-03 LIMESTONE SLAB SEATWALL, COMPLETE

A. Measurement

1. This work shall be measured for payment in place in lineal feet along the wall face. This pay item shall include excavation, subgrade preparation, geotextile fabric, aggregate bases (3” stone; 6” to 9” granite cobble stone; aggregate base course – CA-6, type B; aggregate backfill, CA-7);

limestone slab; finish grading). Specifications are included in Section 06100.

B. Payment

1. The following work shall be paid for at the contract unit price per Lineal Foot:

LIMESTONE SLAB SEATWALL, 1 COURSE, COMPLETE
LIMESTONE SLAB SEATWALL, 2 COURSES, COMPLETE

06-04 LIMESTONE SHORELINE WALL, COMPLETE

A. Measurement

1. This work shall be measured for payment in place in lineal feet along the wall face. This pay item shall include excavation, subgrade preparation, geotextile fabric, aggregate base (3" stone; 6" to 9" granite cobble stone; aggregate base course – CA-6, type B; aggregate backfill, CA-7); limestone slab; finish grading). Specifications are included in Section 06100.

B. Payment

1. The following work shall be paid for at the contract unit price per Lineal Foot:

LIMESTONE SHORELINE WALL, 1 COURSE, COMPLETE
LIMESTONE SHORELINE WALL, 2 COURSES, COMPLETE
LIMESTONE SHORELINE WALL, 3 COURSES, COMPLETE
LIMESTONE SHORELINE WALL, 4 COURSES, COMPLETE
LIMESTONE SHORELINE WALL, 5 COURSES, COMPLETE

07 STRUCTURES

07-01 CONCRETE PIER ABUTMENT, CAST-IN-PLACE, TAYLOR LAKE WEST SIDE

A. Measurement

1. This work shall not be measured for payment but will be considered to be complete upon the Owner's approval and as per the Contract Documents. Specifications are included in Section 07300.

B. Payment

1. This work shall be paid for at the contract unit price per Each for CONCRETE PIER ABUTMENT, CAST-IN-PLACE, TAYLOR LAKE WEST SIDE.

07-02 CONCRETE PIER ABUTMENT, CAST-IN-PLACE, TAYLOR LAKE EAST SIDE

A. Measurement

1. This work shall not be measured for payment but will be considered to be complete upon the Owner's approval and as per the Contract Documents. Specifications are included in Section 07300.

B. Payment

1. This work shall be paid for at the contract unit price per Each for CONCRETE PIER ABUTMENT, CAST-IN-PLACE, TAYLOR LAKE EAST SIDE.

07-03 FLOATING PIER, TAYLOR LAKE WEST SIDE, COMPLETE

A. Measurement

1. This work shall not be measured for payment but will be considered to be complete upon the Owner's approval and as per the Contract Documents. This pay item shall include all components of the floating pier including but not limited to anchorage system, skirting and rub rails, ramps, decking, piers, and attachment to the abutment. The pay item does not include abutments or the guardrails on the abutment or ramp sections. Specifications are included in Section 07400.

B. Payment

1. This work shall be paid for at the contract unit price per Lump Sum for FLOATING PIER, TAYLOR LAKE WEST SIDE, COMPLETE.

07-04 FLOATING PIER, TAYLOR LAKE EAST SIDE, COMPLETE

A. Measurement

1. This work shall not be measured for payment but will be considered to be complete upon the Owner's approval and as per the Contract Documents. This pay item shall include all components of the floating pier including but not limited to anchorage system, skirting and rub rails, ramps, decking, piers, and attachment to the abutment. The pay item does not include abutments or the guardrails on the abutment or ramp sections. Specifications are included in Section 07400.

B. Payment

1. This work shall be paid for at the contract unit price per Lump Sum for FLOATING PIER, TAYLOR LAKE EAST SIDE, COMPLETE.

07-05 EVAPORATOR RESTROOM FACILITY VAULT

A. Measurement

1. This work shall not be measured for payment but will be considered to be complete upon the Owner's approval and as per the Contract Documents. Specifications are included in Section 07511.

B. Payment

1. This work shall be paid for at the contract unit price per Each for EVAPORATOR RESTROOM FACILITY VAULT.

08 SITE AMENITIES

08-01 SIGN. REGULATORY

A. Measurement

1. This work shall be counted in place per each, complete per the Contract Documents. Specifications are included in Section 08300.

B. Payment

1. This work shall be paid for at the contract unit price per Each for SIGN, REGULATORY.

09 LANDSCAPE

09-01 SOIL PREPARATION FOR PLANTING

A. Measurement

1. This work shall be measured for payment in place in square yards, complete per the Contract Documents. Specifications are included in Section 09100.

B. Payment

1. This work shall be paid for at the contract unit price per Square Yard for SOIL PREPARATION FOR PLANTING.

09-02 HERBICIDE, GLYPHOSATE, NON-AQUATIC

A. Measurement

1. This work shall be measured for payment in place in acres or partial acres complete per the Contract Documents. Specifications are included in Section 09110.

B. Payment

1. This work shall be paid for at the contract unit price per Acre for HERBICIDE, GLYPHOSATE, NON-AQUATIC.

09-03 HERBICIDE, GLYPHOSATE, AQUATIC

A. Measurement

1. This work shall be measured for payment in place in acres or partial acres complete per the Contract Documents. Specifications are included in Section 09110.

B. Payment

1. This work shall be paid for at the contract unit price per Acre for HERBICIDE, GLYPHOSATE, AQUATIC.

09-04 HERBICIDE, BROADLEAF, TURF [CONTINGENT]

A. Measurement

1. This work shall be measured for payment in place in acres or partial acres complete per the Contract Documents. Specifications are included in Section 09110.

B. Payment

1. This work shall be paid for at the contract unit price per Acre for HERBICIDE, BROADLEAF, TURF [CONTINGENT].

09-05 WOOD CHIPS

A. Measurement

1. This work shall be measured for payment in place in square yards, complete per the Contract Documents. Specifications are included in Section 09200.

B. Payment

1. This work shall be paid for at the contract unit price per Square Yard for WOOD CHIPS.

09-06 PLANTING – WETLAND

A. Measurement

This work shall be measured for payment in place in square yards, complete per the Contract Documents. Specifications are included in Section 09300.

B. Payment

1. This work shall be paid for at the contract unit price per Square Yard for PLANTING – WETLAND.

09-07 SEEDING – LCFP PARKLAND MIX

A. Measurement

This work shall be measured for payment in place in square yards, complete per the Contract Documents. Specifications are included in Section 09300.

B. Payment

1. This work shall be paid for at the contract unit price per Square Yard for SEEDING – PARKLAND MIX.

09-08 SEEDING – LCFP HIGH-TRAFFIC MIX

A. Measurement

1. This work shall be measured for payment in place in square yards, complete per the Contract Documents. Specifications are included in Section 09300.

B. Payment

1. This work shall be paid for at the contract unit price per Square Yard for SEEDING – HIGH-TRAFFIC MIX.

09-09 SEEDING – LCFP LOW-MAINTENANCE MIX

A. Measurement

1. This work shall be measured for payment in place in square yards, complete per the Contract Documents. Specifications are included in Section 09300.

B. Payment

1. This work shall be paid for at the contract unit price per Square Yard for – SEEDING – LCFP LOW-MAINTENANCE MIX.

09-10 EROSION CONTROL BLANKET

A. Measurement

1. This work shall be measured for payment in place in square yards, complete per the Contract Documents. Specifications are included in Section 09300.

B. Payment

1. This work shall be paid for at the contract unit price per Square Yard for EROSION CONTROL BLANKET.

09-11 HYDROMULCH, SLOPES 2:1 OR LESS

A. Measurement

1. This work shall be measured for payment in place per acre, complete per the Contract Documents. Areas which receive erosion control blanket shall not be included in this measurement. Specifications are included in Section 09300.

B. Payment

1. This work shall be paid for at the contract unit price per Acre for HYDROMULCH, SLOPES 2:1 OR LESS.

09-12 FERTILIZATION – MOWN TURF, SUPPLEMENTAL [CONTINGENT]

A. Measurement

1. This work shall be measured for payment in place in square yards, complete per the Contract Documents. Specifications are included in Section 09300.

B. Payment

1. This work shall be paid for at the contract unit price per Square Yard for FERTILIZATION – MOWN TURF, SUPPLEMENTAL [CONTINGENT].

09-13 TURF MOWING [CONTINGENT]

A. Measurement

1. This work shall be measured for payment in place in square yards, complete per the Contract Documents. Specifications are included in Section 09300.

B. Payment

1. This work shall be paid for at the contract unit price per Acre for TURF MOWING [CONTINGENT].

09-14 SEEDING – LCFP COVER CROP MIX

A. Measurement

1. This work shall be measured for payment in place in acres, complete per the Contract Documents. Specifications are included in Section 09310.

B. Payment

1. This work shall be paid for at the contract unit price per Acre for SEEDING – LCFP COVER CROP MIX.

09-15 SEEDING – SHORTGRASS PRAIRIE MIX

A. Measurement

1. This work shall be measured for payment in place in acres, complete per the Contract Documents. Specifications are included in Section 09310.

B. Payment

1. This work shall be paid for at the contract unit price per Acre for SEEDING – SHORTGRASS PRAIRIE MIX.

09-16 SEEDING – LCFP WOODLAND MIX

A. Measurement

1. This work shall be measured for payment in place in acres, complete per the Contract Documents. Specifications are included in Section 09310.

B. Payment

1. This work shall be paid for at the contract unit price per Acre for SEEDING – LCFP WOODLAND MIX.

09-17 FIELD MOWING [CONTINGENT]

A. Measurement

1. This work shall be measured for payment in place in acres, complete per the Contract Documents. Specifications are included in Section 09310.

B. Payment

1. This work shall be paid for at the contract unit price per Acre for FIELD MOWING [CONTINGENT].

09-18 HERBICIDE TREATMENT – NATIVE SEEDED AREAS [CONTINGENT]

A. Measurement

1. This work shall be measured for payment in place in acres, complete per the Contract Documents. Specifications are included in Section 09310.

B. Payment

1. This work shall be paid for at the contract unit price per Acre for HERBICIDE TREATMENT – NATIVE SEEDED AREAS [CONTINGENT].

END OF SECTION 01010

SECTION 02100

TEMPORARY ACCESS AND FACILITIES

1. GENERAL

1.01 DESCRIPTION

A. Work under this section includes:

1. Mobilization costs, temporary construction and facilities and transportation required to perform the permanent improvements.

B. Other specification sections which directly relate to the work of this section include, but are not limited to, the following:

1. Section 02200 – Temporary Traffic Control
2. Section 02300 – Site Resource Protection

C. The Contractor shall, at its sole expense, procure and furnish all bonds required by other agencies and jurisdictions in order to access the work site.

2. PRODUCTS

2.01 STABILIZED CONSTRUCTION ENTRANCE

A. Aggregate shall be an angular crushed stone meeting the requirements of IDOT CA-1, also known locally as 3″ Stone.

B. Geotextile fabric

1. Geotextile fabric shall be non-woven, needle punched polypropylene staple fiber that is UV stabilized and resistant to chemicals, mildew and insects.

2. The geotextile fabric shall be:

a. Thrace-LINQ GTF-225EX

b. or approved equivalent meeting the following criteria:

Grab Tensile Strength	215 lbs
Elongation	50%
Puncture	600 lbs
Permittivity	1.3 sec^{-1}

2.02 TEMPORARY CULVERTS AND CROSSINGS

A. Aggregate surface for temporary crossings shall meet the requirements of IDOT CA-1, locally known as 3″ Stone.

B. Geotextile fabric shall be non-woven, needle punched polypropylene staple fiber that is UV stabilized and resistant to chemicals, mildew and insects such as:

1. Thrace-LINQ GTF-225EX

2. or approved equivalent meeting the following criteria:

Grab Tensile Strength	215 lbs
Elongation	50%
Puncture	600 lbs

Permittivity	1.3 sec^{-1}

C. Pipe size and type for temporary crossing shall be as indicated on the Plans.

3. EXECUTION

3.01 SITE ACCESS AND CONSTRUCTION LIMITS

A. All site access shall be limited to the designated locations either shown on the Plans or otherwise designated by the Owner. Under no circumstances shall the Contractor attempt to access the site from an unauthorized public right-of-way without expressed permission or permit from the Owner and the appropriate jurisdiction.

B. The Contractor shall work within construction limits as designated by the Owner. The Owner reserves the right to reduce construction limits to avoid damage to environmentally sensitive areas. Material storage and construction parking may occur only in those areas designated by the Owner. Do not unreasonably encumber the site with materials or equipment. All haul roads which are located outside of the immediate construction zone or shall impact the site in any way shall be approved by the Owner before put in use. All site impacts caused by material storage, access and transportation shall be restored to their original conditions as specified in this Contract.

C. When the project requires a specific construction sequence, the work shall follow construction sequencing as shown on the Plans or otherwise indicated by the Owner and the Contractor shall not be allowed to begin work on the next project phase until the previous phase has been fully completed and approved by the Owner. Once a phase has been completed and approved, the Contractor shall completely barricade off the work area with 4-foot high orange construction fence to prevent construction traffic and the general public from entering completed phase. Any changes to the sequencing shown on the Plans shall be approved in writing by the Owner.

D. This project is being constructed on public lands, and as such, portions of the site within or outside of the construction limits may remain open to the public. The Contractor shall assure the safety of all persons encountered during the work and grant them Right-of-Way regardless of whether the locations has been closed, fenced or signed as a construction zone. When operating machinery in areas that are open to the public, the Contractor shall provide adequate safety personnel on the ground to monitor the work and public conflicts.

E. All construction facilities and temporary controls shall be maintained in a secure, safe and useful condition until removed from the Work Site. The Contractor shall be solely responsible for any material losses due to vandalism, theft, weather occurrences or Acts of God. The Contractor shall provide a daily inspection of Work Area and shall take whatever measures are necessary to protect the safety of the public, workmen, and materials, and provide for the security of the Work Site, both day and night. Any and all security or construction fencing will be the responsibility of the Contractor. If present, the Contractor shall be responsible for locking and unlocking gates of the Owner.

F. The Contractor shall be solely responsible for all access and logistical considerations outside of the Owner’s property, including permissions, permits, road bonds and any associated costs.

3.02 UTILITIES

A. The Owner will not provide any utility services unless specifically noted on the Plans. The Contractor shall provide and pay all costs for necessary temporary electrical, heat, and water. The Contractor shall provide water for all construction and testing purposes. The Contractor shall provide all temporary piping, hoses, etc., required to transport water to the point of usage.

3.03 MOBILIZATION AND TEMPORARY SITE ACCESS

A. When included in the Schedule of Prices, the Contractor shall be paid for indirect costs necessary to initiate and complete the Work. These costs may include mobilizing equipment and materials, temporary construction office trailer, temporary sanitary facilities, permit boxes, surveying, construction layout, temporary utilities, water sources, signage and other temporary indirect costs associated with the Work.

3.04 STABILIZED CONSTRUCTION ENTRANCE

A. Install stabilized construction entrance at the location indicated on the Plans.

B. If the Contractor utilizes any other location(s) for construction access, a stabilized construction entrance must be installed where the construction entrance(s) access public right-of-ways, streets, or any paved surfaces. Any such additional construction entrances must be approved by the Owner, the jurisdictional authority and Designated Erosion Control Inspector (DECI). The cost of any additional construction entrances shall be based on the unit price established in the Schedule of Prices.

C. Aggregate must be underlain by the specified geotextile fabric in all areas; using full width rolls with end seams overlapped a minimum of 4 feet.

D. Any sediment reaching paved surfaces shall be removed immediately.

E. The Contractor shall maintain the stabilized construction entrance in good working condition, including but not limited to replacement of rock and removal of accumulated sediment, throughout the duration of the project until removal.

F. Stabilized construction entrance shall be removed by the Contractor at the end of the project or as otherwise directed by the DECI. Ground beneath stabilized construction entrance and any incidental disturbed areas shall be restored as per sections 03130 – Finish Grading and Topsoil and 09300 – Seeding.

3.05 TEMPORARY CULVERTS AND CROSSINGS

A. Install temporary culverts and crossings at the location(s) indicated on the Plans.

B. Unless shown in the Plans and details, the means and methods used to create temporary crossings shall be determined by the Contractor and approved by the Owner. The method chosen should provide a stable crossing with a minimum level of disturbance to the site. Timbers, temporary road mats or other methods which do not require filling may be used outside of drainage flows.

C. The contractor shall maintain temporary crossings in good working condition, including but not limited to the addition or replacement of aggregate, throughout the duration of the project until removal.

D. Temporary crossings shall be removed by the Contractor at the end of the project or as otherwise directed by the Owner.

3.06 TEMPORARY SANITARY FACILITIES

A. Provide temporary toilet facilities as required. Maintain these during the entire period of construction under this Contract for the use of all construction personnel on the job. Enough chemical toilets shall be provided to conveniently serve the needs of all personnel. Chemical toilets and their maintenance shall meet the requirements of State and Local Health Regulations and Ordinances.

3.07 PERMIT BOX

A. Provide permit box to safely store and protect required permit paperwork on site throughout the duration of construction. Permit paperwork to include Stormwater Pollution Prevention Plan (SWPPP), LCSMC Permit, and any other papers required by permitting agencies.

3.08 SITE RESTORATION

A. Areas disturbed during construction due to required stabilized entries, haul roads, staging areas, temporary crossings or other site access areas approved by the Owner shall be restored as directed by the Owner. This work shall be performed as per Sections 03120 – Finish Grading and Topsoil, 09300 – Turf Seeding and 09310 – Native Seeding and measured for payment.

END OF SECTION 02100

SECTION 02200
TEMPORARY TRAFFIC CONTROL

1. GENERAL

1.01 DESCRIPTION

A. Work under this section includes:

1. Temporary traffic control shall consist of the furnishing, installing, maintaining, relocating and removing work zone traffic control, flagging and protecting of public and private right of ways.

2. PRODUCTS

2.01 GENERAL

A. Temporary traffic control products shall meet the requirements of the governing jurisdiction. Refer to the plans, IDOT and LCDOT Standard Specifications, MUTCD, and the project permits for specific product standards.

3. EXECUTION

3.01 GENERAL

A. The Contractor shall be responsible for executing all work zone traffic control, including installation, maintenance, protection and removal of traffic control products, according to the project permits and local, county, state and federal jurisdictions. When included in the Plans, the Contractor shall follow any requirements indicated for Maintenance of Traffic. All traffic control shall be in accordance with the IDOT Standard Specifications and the Manual on Uniform Traffic Control Devices.

B. The Contractor shall obtain, erect, maintain and remove after project completion, all signs, barricades, fencing and other control devices as may be necessary to regulate, warn or guide vehicular or pedestrian traffic for purposes of maintaining a safe work site, whether or not those measures are described in the Contract Documents. These measures shall also be moved, relocated or increased in quantity depending on the daily work conditions.

C. All existing traffic signs, street signs, etc. that interfere with construction operations and are not noted for removal or disposal shall be removed and reset by Contractor at locations as designated by the Owner. This shall be considered incidental to the Contract, and no additional compensation shall be allowed. Damage to these items shall be repaired or replaced by the Contractor at Contractor's expense. All signs not required to be reset shall be delivered to their Owner, as appropriate. In addition, all mail boxes that interfere with construction shall be similarly relocated at no additional cost, in accordance with the IDOT Standard Specifications.

D. This project is being constructed on public lands, and as such, portions of the site outside of the work areas may remain open to the public. The Contractor shall understand that in areas open to the public, the public shall have pedestrian and vehicular right-of-way over any construction traffic or activities. Extreme caution must be exercised by the contractor both in work areas and in the transportation of equipment and materials to the work areas.

3.02 PEDESTRIAN DETOURS

A. When construction activities interrupt the safe passage of pedestrians on existing trails which are to remain open during the Contract, the Contractor shall provide a detour or bypass such that safe passage can occur. This detour route shall typically be in the form of a mowed vegetated trail unless other temporary improvements are indicated in the Plans. Appropriate signage shall be placed in both directions of the existing trail to warn of the construction activities ahead.

END OF SECTION 02200

SECTION 02300

SITE RESOURCE PROTECTION

1. GENERAL

1.01 DESCRIPTION

A. Work under this section includes:

1. Requirements for the preservation and protection of natural resources and man-made facilities at the Work Site and restrictions on construction impacts.

B. Other specification sections which directly relate to the work of this section include, but are not limited to, the following:

1. Section 02400 – Soil Erosion and Sediment Control
2. Section 02500 – Vegetation Removal
3. Section 03100 – Earthwork and Grading

2. PRODUCTS

2.01 TEMPORARY CONSTRUCTION FENCE

A. Fencing shall be heavy duty orange polyethylene or fabric fence, 4′ in height. Steel posts shall be heavy duty “T” posts, 5′ minimum in length. Wood posts shall be a minimum of 2″ x 2″ x 5′ minimum in length.

2.02 TEMPORARY CHAIN LINK FENCE AND GATES

A. Chain link fence and gates shall consist of metal fabric with 0.148 diameter wire and woven on 2″ spacing and meeting AASHTO M 181. Fence fabric shall be adequately supported and attached to metal rails and supports with steel or aluminum hog rings. Chain link fence shall be 6′ in height. Chain link gates shall be 6′ in height and 12′ in length with hinge post bracing and support wheel. All fence and gates shall be supplied in excellent condition and free from torn, distorted or otherwise damaged fabric.

B. Metal posts, rail, braces and gate frames shall meet the requirements of AASHTO M 181 and shall be provided as driven posts for open ground and / or with base supports for paved areas. Metal posts and support members shall be straight and free from defects.

3. EXECUTION

3.01 EXISTING FACILITIES

A. The Contractor shall be responsible for the care and protection of all existing buildings, structures, pavements, roadways, trails, fences, utilities and any other existing facilities or improvements on the work site, whether under the direct jurisdiction of the Owner or not.

B. With the exception of approved site access disturbances as described in Section 02100 – Temporary Access and Facilities, any damage to existing facilities shall be repaired or replaced to the satisfaction of the Owner or appropriate agency at no additional cost to the Owner. No additional compensation will be allowed

under this Contract for the repair, replacement, or restoration of existing site elements as identified herein.

C. Upon completion of the Contract, any and all debris, construction materials, equipment or other items associated with the project shall be removed from the site. Any disturbed areas shall be fine graded to ensure positive drainage and seeded according to these specifications.

D. Burning of any material within or adjacent to the work area is prohibited unless approved by the Owner.

E. During the Contract period, the Contractor shall be responsible for the protection and maintenance of all property boundary and utility markers, whether set by the Owner, other agencies or adjacent landowners. This shall include the standard yellow or white Carsonite markers utilized by the Owner. If any such markers are removed, damaged or burned, the Contractor shall re-establish those exact locations through standard land survey methods and replace the marker with the exact same marking material as was originally in place. All land survey, material and installation costs shall be paid for by the Contractor.

3.02. UTILITIES

A. Easements for existing utilities, both public and private, and utilities within public rights-of-way may be shown on the Plans, according to available records and are provided only for the convenience of the Contractor. The Contractor shall be responsible for determining the exact location in the field of these utility lines, clearly marking them as such and assuring their protection from damage due to construction operations.

B. Electric, telephone, natural gas, and other utility companies may have underground and/or overhead service facilities in the vicinity of the proposed work. The Contractor shall be solely responsible for having the utility companies locate their facilities in the field prior to construction, and shall also be responsible for maintenance and preservation of these facilities. The Contractor shall call J.U.L.I.E. at (800) 892-0123 or 811 for utility locations at least 48 hours prior to start of construction. The Contractor shall coordinate construction operations and schedules with the utility companies to avoid potential conflicts and damages. No relocation of utility lines and/or structures may proceed unless specific written permission has been granted by the Owner and utility company. If utilities of any nature are encountered, either located by J.U.L.I.E. or not, and found to conflict in location with new construction, the Contractor shall notify the Owner and utility company immediately so that the conflict may be resolved.

C. Should any damages occur due to any action by the Contractor, repairs shall be made by the Contractor, at its expense, in a manner acceptable to the Owner and utility company.

D. Overhead or aerial utilities which may interfere with the construction activities shall be properly flagged and caution signs posted.

3.03. DUST AND MUD CONTROL

A. Take all necessary precautions to control dust and mud associated with the Work of this Contract, subject to the approval of the Owner. In dry weather, spray dusty areas daily with water in order to control dust. Take necessary steps to prevent the tracking of mud onto adjacent streets and highways. If indicated on the Plans

or deemed necessary by the Owner, the Contractor shall provide and operate a wash station to clean equipment and vehicles before they access any pavement.

B. At a minimum, all streets and highways impacted by the construction shall be cleaned at the end of each working day using mechanical street sweeping equipment. If adequate precautions to control dust and mud are not taken by the Contractor, additional street sweeping shall be performed at the direction of the Owner and at no additional cost to the Owner.

C. If the Contractor does not take sufficient precautions in the opinion of the Owner to control dust and mud associated with the Work of this Contract, the Owner reserves the right to stop Contractor's Work without extension to the Contract until Contractor provides acceptable dust and mud control.

3.04 CONSTRUCTION NOISE

A. All engines and engine-driven equipment used for hauling or construction shall be equipped with an adequate muffler in constant operation and properly maintained to prevent excessive or unusual noise.

B. Any machine or device which is regulated by Federal or State of Illinois noise standards shall conform to those standards.

C. When equipment noise is generated in a work area located near other jurisdictions or residential areas, the Contractor shall abide by the appropriate municipal ordinances regulating work hours for purposes of limiting construction noise.

3.05 CONTAMINATION

A. The Contractor shall be solely responsible for the use, storage and transportation of any potential contaminants during the execution of the Contract. Fuels, oils, pesticides, chemicals or any other material that may cause harm to the site shall be cleaned, removed and disposed of according to local, state and federal guidelines. All equipment and vehicles shall be properly maintained to prevent contamination and shall be promptly removed from the site upon first evidence of leakage or spills. Under no circumstances shall fuels of any type be stored on the site.

B. If the Contractor does not take sufficient precautions in the opinion of the Owner to safeguard the site from contamination or adequately mitigate contaminant damage, the Owner reserves the right to stop the Contractor's work without extension to the Contract and remedy the contamination by other means, with the cost of any such work deducted from the Contract.

3.06 TEMPORARY CONSTRUCTION AND CHAIN LINK FENCE AND GATES

A. The Contractor shall erect the temporary fencing and / or gates at locations shown on the Plans or as directed by the Owner. The Owner reserves the right to specify additional fencing installation locations not shown on the Plans and/or to eliminate fence installation locations.

B. Steel fence posts shall be firmly driven into the ground and spaced to adequately support the fencing. The fencing shall be drawn tight to the posts and secured such that no sagging of the fencing may occur.

C. Temporary construction fencing shall remain in place and be properly maintained until final seeding and restoration is complete, unless directed otherwise by the Owner. Upon removal, all fencing materials shall be removed from the site.

3.07 NATURAL AND CULTURAL RESOURCE PROTECTION ZONES

A. Areas outside of the primary construction zone which are separated by temporary construction fence may be designated as Natural and/or Cultural Resource Protection Zones. These areas contain trees, vegetation, soils and/or other sensitive resources. Access to these areas by foot, vehicle or other equipment for any purpose is strictly prohibited.

B. If at any time the Contractor believes that access to the Natural and Cultural Resource Protection Zone is necessary to accomplish the work, the Contractor shall immediately request a site inspection and meeting with the Owner to determine the course of action. The Contractor shall not initiate any work within the Natural Resource Protection Zone until receiving approval by the Owner and a determination of procedure and possible mitigation requirements.

3.08 TREE PRESERVATION

A. Prior to the start of construction, the Contractor shall meet with the Owner at the site to inspect the existing trees which are to remain and determine potential impacts that may be caused by construction activities. Overhanging branches and tree root zones shall be noted and if required, the method of pruning or other procedure shall be determined and approved by the Owner.

B. The Contractor shall not damage, cut, prune, transplant or remove any tree; attach any rope, wire, nail or other object to any tree; allow any gaseous, liquid or solid substance or equipment to contact any tree or the soil located within the drip line of any tree; impair normal surface drainage around any tree; allow any fire to burn which will injure any tree or act in any way to affect the vigor or appearance of any tree, except as such action is specifically authorized by the Plans for individually designated trees or groups of trees. Any necessary action by the Contractor that would affect trees, which have not been specifically designated, must be approved in advance by the Owner.

C. If during grading or other construction it becomes necessary to expose or sever tree roots, the Contractor shall cleanly cut such roots with a sharp saw, pruner, or power trencher so that ripping or tearing is avoided.

3.09 NATURAL AND CULTURAL RESOURCE DAMAGE OR LOSS AND OWNER'S COMPENSATION

A. The Contractor shall be liable for any damage or loss of any natural or cultural resource, including, but not limited to, trees, shrubs, herbaceous plants, soils, wetlands, streams, rivers, lakes, ponds, archeological sites or other natural habitat which is caused by the Contractor due to negligence or violation of any provision in these specifications. The Owner reserves the right to receive just compensation for any such damage or loss in a form acceptable to the Owner, including repair, restoration to original conditions, replacement of comparable kind and quantity or monetary restitution by Contract amount adjustment or direct payment.

B. In the event that trees, shrubs or other plants are irreparably damaged or destroyed by actions of the Contractor as outlined above, the plant material shall be replaced by the Contractor with like kind, size and quantity at no cost to the

Owner or shall reimburse the Owner by direct payment. In the event that a plant species is unavailable, the Owner shall determine a replacement species. In the event that a damaged or destroyed plant is large and/or irreplaceable in size, the plant shall be replaced by an equivalent quantity of smaller plants, i.e., a tree measuring 24″ in trunk diameter may be replaced with 12 trees measuring 2″ in trunk diameter. Replacement of all plant materials shall include the furnishing and planting of the materials with a one-year guarantee for subsequent replacement should the plant material fail to survive.

END OF SECTION 02300

SECTION 02400

SOIL EROSION AND SEDIMENT CONTROL

1. GENERAL

1.01 DESCRIPTION

A. Work under this section includes:

1. Provide all temporary soil erosion and sediment control (SESC) measures as shown on the Plans and as required by the project permits and applicable agencies during the life of the Contract.

B. Other specification sections which may directly relate to the work of this section include, but are not limited to, the following:

1. Section 02100 – Temporary Access and Facilities
2. Section 02300 – Site Resource Protection
3. Section 02500 – Vegetation Removal
4. Section 03100 – Earthwork and Grading
5. Section 03120 – Finish Grading and Topsoil
6. Section 09300 – Turf Seeding
7. Section 09310 – Native Seeding

1.02 REGULATIONS, REQUIREMENTS AND INSPECTIONS

A. The Contractor shall comply with all project permits, regulations and applicable federal, state and local statutes relating to the prevention and abatement of soil erosion, sediment control and water pollution. The local permit authority is the Lake County Stormwater Management Commission (LCSMC), 500 West Winchester Road, Suite 201, Libertyville, IL 60048, (847) 337-7700.

B. In the event of conflict between the requirements of these specification and the pollution control laws, rules or regulations for federal, state or local agencies, the more restrictive laws, rules or regulations shall govern.

C. Refer to the Plans for LCSMC's "Soil Erosion and Sediment Control Construction Notes".

D. The Contractor must employ a Designated Erosion Control Inspector (DECI) as approved by LCSMC for this project.

E. The Contractor/DECI shall be responsible for the oversight of all required soil erosion and sediment control regulations and measures as required by LCSMC, including inspections, recording and distribution of Field Observation Reports, and maintenance of the Storm Water Pollution Prevention Plan (SWPPP). Any fines or other penalties imposed by the governing agencies upon the Owner as a result of the Contractor's actions or inactions shall be the responsibility of the Contractor.

F. The DECI shall distribute all Field Owner within 48 hours of the report date, unless a violation is noted, upon which the LCSMC, Contractor and Owner shall be notified with 24 hours. Upon Observation Reports to the Contractor and the satisfactory completion of the construction and site stabilization, the DECI shall provide the Owner with a complete project history including reports.

1.03 COORDINATION WITH PERMANENT CONTROL FEATURES

A. The temporary control provisions contained herein shall be coordinated with permanent erosion control features to the extent practical to assure economical, effective and continuous soil erosion and sediment control throughout the construction and post construction period.

1.04 QUALITY ASSURANCE

A. SESC measures shall at all times meet the requirements of the applicable permits and regulations. Should the Contractor fail to meet these requirements or, in the opinion of the Owner, performs the requirements in an unsatisfactory manner, the Owner may suspend the performance of any or all construction until the unsatisfactory condition has been corrected. Such suspension shall not be the basis of any claim by the Contractor for additional compensations from the Owner nor for an extension of time to complete the Work.

1.05 REFERENCE DOCUMENTS

A. Utilize the latest versions of the following:

B. Guidance Manual – “Storm Water Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices” (EPA 832-R-005).

C. Summary of Guidance Manual – “Strom Water Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices” (EPA)

D. Lake County Stormwater Management Commission. Watershed Development Ordinance. (LCSMC WDO)

E. Illinois Urban Manual. USDA Natural Resources Conservation Service, Illinois Environmental Protection Agency

F. Standard Specification for Geotextile Specification for Highway Applications. AASHTO Designation: M 288-00.

2. PRODUCTS

2.01 GENERAL

A. The following products may be shown on the Plans or specified for this Contract:

2.02 SILT FENCE

A. Silt fence shall be non-wire backed and meet the requirements of the Lake County Watershed Development Ordinance (AASHTO M288-00 specifications).

2.03 FILTER SOCK

A. Filter sock shall meet the requirements established by AASHTO, the US Army Corps of Engineers, the Natural Resource Conservation Service and / or the USEPA National Pollutant Discharge Elimination System.

2.04 TEMPORARY DITCH CHECKS

A. Temporary ditch checks shall be Triangular Silt Dikes by the Triangular Silt Dike Company, www.tri-siltdike.com

B. or approved equal

2.05 PERMEABLE PLASTIC DITCH CHECKS

A. Permeable plastic ditch checks shall be GeoRidge® permeable plastic berms as manufactured by Nilex (www.nilex.com).

B. or approved equal

2.06 DRAIN INLET PROTECTION

A. Silt fence, filter sock and/or ditch checks meeting the material specifications above shall be installed and maintained at each culvert as specified.

B. or approved equal

2.07 DRAIN INLET FILTER

A. Drain inlet protection shall be Flexstorm Inlet Filter with standard zinc-plated framing and Type FX filter bag, as manufactured by Inlet and Pipe Protection, Inc., Naperville, IL, (866) 287-8655, flexstorminletfilters.com.

B. or approved equal

2.08 TEMPORARY SEED

A. Seed for temporary vegetative stabilization of stockpiles and other ungraded areas shall be Annual Rye Grass.

2.09 HYDROMULCH

A. Hydromulch for slopes 2:1 or less shall be:

1. ProMatrix Engineered Fiber Matrix (EFM), a hydraulically-applied seeding mulch composed of 100% recycled Thermally Refined wood fibers, crimped interlocking man-made biodegradable fibers and naturally derived polymers. It shall be delivered in the manufacturer's sealed weather-resistant 50-pound bags, as manufactured by:

   PROFILE Products LLC
   750 Lake-Cook Road – Suite 440
   Buffalo Grove, IL 60089
   (800) 366-1180
   www.profileproducts.com

2. or approved equal. Provide manufacturer's product sheet for any proposed equal product approval.

B. Hydromulch for slopes greater than 2:1 shall be:

1. Flexterra HP-FGM, a hydraulically-applied, 100% biodegradable seeding mulch composed of thermally refined wood fibers (80%), cross-linked biopolymers and water absorbents (10%), crimped, man-made interlocking fibers (5%) and micro-pore granules (5%). The material shall be phytosanitized and free from plastic netting. It shall be delivered in the manufacturer's sealed weather-resistant 50-pound bags, as manufactured by:

   PROFILE Products LLC
   750 Lake-Cook Road – Suite 440
   Buffalo Grove, IL 60089
   (800) 366-1180
   www.profileproducts.com

2. or approved equal. Provide manufacturer's product sheet for any proposed equal product approval.

2.10 TURBIDITY BARRIER

A. Turbidity Barrier (also called Turbidity Curtain or Floating Silt Curtain) shall meet the following criteria:

1. Fabric shall be first quality material and have a notarized material certification sent to the Owner.
2. All pocket seems shall test out to 92% of the strength of the fabric.
3. Foam floats shall be 7″ x 7″ x 8″.
4. Mooring cable shall be 5/16″ galvanized aircraft cable.
5. Chain ballast shall be 5/16″ G30 Zinc plated proof coil chain.
6. All section lengths of the curtain shall be attached together.
7. Depth of the curtain shall be the depth of the water plus any additional depth to account for water fluctuations.
8. Turbidity Curtain is to be as distributed by:

a. Hanes Geo Components
1820 Internationale Blvd.
Glendale Heights, IL 60139
(630) 279-0915
hanesgeo.com

b. or approved equal

2.11 OTHER MATERIALS

A. All other materials necessary for soil erosion and sediment control requirements shall meet typical accepted industry standards and are subject to approval by the Owner.

3. EXECUTION

3.01 PRIOR TO CONSTRUCTION

A. Prior to the start of construction and installation of SESC measures, an on-site pre-construction meeting must be held with the Contractor, DECI, LCSMC Enforcement Officer and Owner.

B. No soil disturbance shall be started until the LCSMC Enforcement Officer has inspected and accepted the soil erosion and sediment control measures.

C. SESC features shall be constructed prior to the commencement of site grading and/or hydrologic disturbance of upland areas.

3.02 GENERAL

A. Soil disturbance shall be conducted in such a manner as to minimize erosion. Soil stabilization measures shall consider the time of year, site conditions and the use of temporary or permanent measures.

B. Stabilization measures shall be initiated as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased.

C. Areas or embankments having slopes greater than or equal to 3:1 shall be stabilized with sod, turf reinforcement mat or erosion control blanket in combination with seeding.

D. All temporary and permanent SESC measures must be maintained and repaired as needed. The Contractor shall be ultimately responsible for maintenance and repair.

H. Soil stockpiles shall not be located in a flood-prone area or a designated wetland buffer.

J. The SESC measures indicated on the Plans are the minimum requirements. Additional measures may be required as directed by the DECI or Owner.

K. The methods and sequencing of vegetation removal shall be such as to minimize erosion.

L. Fills shall be placed and compacted in such a manner that soil sliding and erosion is minimized.

M. Excavation and earth fill shall be conducted in such a manner as not to divert water outside of the project limits, including onto adjoining property, without prior written permission from the Owner.

3.03 TEMPORARY SITE DRAINAGE

A. During construction operations, the Contractor shall ensure positive site drainage at the conclusion of each day. Site drainage may be achieved by ditching, pumping or other acceptable method. Contractor's failure to provide the above will preclude any possible added compensation requested due to delays or unsuitable materials created as a result thereof.

B. Whenever, during construction operations, any loose materials are deposited in the flow line of gutters, drainage structures, ditches, culverts, etc., such that the natural flow line of water is obstructed, this loose material shall be removed at the close of each working day by the responsible party. At the conclusion of construction operations, all drainage structures and flow lines shall be free from dirt and debris. This work shall be considered incidental to the Contract.

C. All field tile encountered during construction operations shall be connected to the proposed storm sewer or extended to outlet into a proposed drainage way. If this cannot be accomplished, then it shall be repaired with new pipe of similar size and material to the original line and put in acceptable operating condition. A record of the location of all field tile or on-site drain pipe encountered shall be kept by Contractor and turned over to the Owner upon completion of the project. The cost of this work shall be considered as incidental to the Contract and no additional compensation will be allowed.

3.04 SILT FENCE

A. Install silt fence at the locations shown on the Plans and as directed by the DECI, governing agency or Owner.

B. Silt fence shall be installed as per AASHTO M288-00 and as shown on the Plans. Silt fence shall be static sliced or trenched in, backfilled and compacted.

C. Silt fence j-hooks shall be installed at locations where required. The ends of silt fence j-hooks shall have the ends at a higher elevation than the middle of the silt fence line to help prevent the "ending around" of stormwater.

D. Silt fence shall be inspected within 24 hours after rainfall events equal to or greater than 0.5″ in 24 hours. Silt fence shall be maintained in an upright and good condition at all times. If the fabric or stakes become ineffective at any time, they shall be replaced immediately. Sediment shall be removed from silt fence when accumulation reaches one-half the height of the silt fence.

E. All silt fences shall be removed and properly disposed of after upslope areas have been stabilized unless directed otherwise by the DECI. All accumulated silt shall be removed and all remaining trenches shall be filled with either the excess silt or new pulverized topsoil. Areas disturbed by the removal of silt fence shall be graded, seeded and stabilized per Sections 03120 – Finish Grading and Topsoil, 09300 – Turf Seeding and 09310 – Native Seeding.

3.05 FILTER SOCK

A. Install filter sock at the locations shown on the Plans and as directed by the DECI, governing agency or Owner.

B. Filter sock shall be secured using 2 crossed 2″ x 2″ wood stakes (one on each side forming an “X”) driven into the ground a minimum 8 inches deep and located every 10 feet of length.

3.06 TEMPORAY DITCH CHECKS

A. Install temporaty ditch checks in conjunction with permanent stabilization and seeding and where indicated on the Plans. Each ditch check location shall consist of 3 units joined together for a total length of 21 feet unless physical restrictions are present, in which case the maximum number of units possible shall be installed.

B. The Contractor shall provide maintenance of the ditch checks including removal and disposal of any materials caught by the ditch checks. After final stabilization and removal of the ditch check, all accumulated silt shall be removed or respread, without interrupting drainage, and graded, seeded and stabilized.

C. The ditch checks shall remain in place until all contributing upslope areas and swales have been stabilized, at which time the ditch checks shall be removed by the Contractor.

3.07 PERMEABLE PLASTIC DITCH CHECKS

A. Install permeable plastic ditch checks in conjunction with permanent stabilization and seeding and where indicated on the Plans. Each ditch check location shall consist of 5 units joined together for a total length of 16.5 feet unless physical restrictions are present, in which case the maximum number of units possible shall be installed.

B. The Contractor shall provide maintenance of the ditch checks including removal and disposal of any materials caught by the ditch checks. After final stabilization and removal of the ditch check, all accumulated silt shall be removed or respread, without interrupting drainage, and graded, seeded and stabilized.

C. The ditch checks shall remain in place until all contributing upslope areas and swales have been stabilized, at which time the ditch checks shall be removed by the Contractor.

3.08 DRAIN INLET PROTECTION

A. Install drain inlet protection at proposed locations according to the design plan details and manufacturer's recommendations and maintain all protection through adequate cleaning.

3.09 DRAIN INLET FILTER

A. Install drain inlet filter according to the manufacturer's recommendations and maintain all inlet protection through adequate cleaning.

3.10 TEMPORARY SEEDING

A. Perform temporary seeding according to the time and schedule listed elsewhere within this section and/or on the Plans.

B. Sow seed for temporary vegetative stabilization at a rate of 200 lb. per acre (unless noted otherwise), using a broadcast or hydroseeding method.

3.11 HYDROMULCH

A. Apply hydromulch according to the requirements in Section 09300 – Turf Seeding.

END OF SECTION 02400

SECTION 02500

VEGETATION REMOVAL

1. GENERAL

1.01 DESCRIPTION

A. Work under this section includes:

1. Removal of targeted trees, shrubs and other vegetation required for site development and/or site restoration.

2. Mowing of herbaceous and small woody plants.

B. Other specification sections which directly relate to the work of this section include, but are not limited to, the following:

1. Section 02100 – Temporary Site Access and Facilities

2. Section 02300 – Site Resource Protection

3. Section 09110 – Herbicide Treatment

1.02 REFERENCE STANDARDS

A. Plant size designation and measurement shall be based on the latest edition of the American Standard for Nursery Stock. Tree sizing is stated in inches Diameter at Breast Height (DBH) unless otherwise indicated.

1.03 PREBID REVIEW

A. Information regarding the location and extent of vegetation removal requirements, either graphically or in notes, is shown on the Plans. However, the Contractor, Subcontractor and / or clearing personnel shall conduct a thorough site inspection to determine the exact scope, location, timber density, species composition, site access limitations and preferred removal techniques for purposes of costing and planning the Work.

1.04 QUALITY ASSURANCE

A. The work described in this section requires specialized knowledge, experience, skills and equipment to perform successfully. The proposed work site is a forest preserve and may contain flora, fauna and / or soils which are highly sensitive to disturbance. Therefore, the Contractor directly performing the work described in this Section shall possess the following qualifications:

1. The ability to identify all species of trees, shrubs and herbaceous plants typically found in Lake County. The ability to identify undesirable or weedy target species is of particular value.

2. The ability to safely and effectively cut, remove and process the target vegetation, including large trees measuring over 24″ in diameter, using both mechanical and hand techniques without damage to other desirable plants or the site in general.

3. Possession of, or the ability to acquire, the specific types of equipment required to perform the work, including low-impact equipment.

4. The ability to safely manage vegetation burning, perform chipping operations and dispose of vegetation off site when required.

1.05 SUBMITTALS

A. The Owner reserves the right to approve the Contractor or Subcontractor who will be directly involved in performing the required work. This approval shall be dependent on the submittal to the Owner, at least 14 days prior to the start of work, of the following:

1. A list of 5 projects similar in scope and size which have been satisfactorily completed in the past 5 years that clearly demonstrate the ability to complete the work as specified. This submittal shall include the project name, project location, completion date, Owner's name and contact information, size in acres and a detailed description of the work performed, including forest or landscape composition, removal techniques, equipment and herbicides used and any follow up work. In addition, all projects listed must involve selective species removal and tree preservation. Clear cut projects shall not be acceptable as reference projects.

2. A list of all equipment proposed for use on the project, including type, make, model, year and Ground Pressure Rating (GPR) where applicable.

2. PRODUCTS – Not Used

3. EXECUTION

3.01 GENERAL

A. Specific project requirements for vegetation removal may be indicated on the Plans. This information may include access routes, staging, storage and burn areas, restricted access areas, specific trees to be removed, tree protection fencing, required removal methods, equipment requirements, target species for removal, target species for preservation, herbicide applications, disposal methods, mowing instructions and other pertinent information.

B. A partial or complete tree survey indicating individual trees 6 inches in diameter DBH or larger may or may not be shown on the Plans, but no species list or tree size range is provided by the Owner. Unless noted otherwise, it is not the intent of the Plans to locate and identify every tree or shrub on the site relative to the work described in this section. The Contractor shall determine the extent of work during the site inspection described above.

C. No mobilization or other work shall commence until a meeting with the Owner, Contractor and designated foreman is conducted on site. At this time the scope of work shall be reviewed and any specific field markings will be identified. The Contractor shall notify the Owner at least 24 hours before the start or restart of work.

D. All work must be conducted under the direct supervision of the original designated clearing foreman.

E. Additional information and instructions regarding the work may be conveyed by the Owner through markings in the field. This may include staking or flagging for removal limits, individual plants to be removed, individual plants to be girdled, root pruning lines, trees to be pruned, individual plants to be preserved ("Do Not Cut" flagging), fencing layout, restricted access areas, haul routes and other

specific requirements. Any damage or disturbance to construction staking shall be replaced by the Contractor.

F. The Contractor shall be responsible for positively identifying all woody species before they are cut, removed or treated with herbicide.

G. During the performance of the vegetation removal work, should any uncertainty arise regarding the removal of specific trees or other plants, the Contractor or clearing foreman shall immediately inform the Owner for a determination in the field.

H. Sites which contain areas sensitive to disturbance such as wetlands, rare plant species, sensitive root zones and / or sensitive soils may be off-limits to machine access. No clearing equipment shall enter these areas. Removals shall be performed by hand or by equipment that can be located outside of the protected area and reached via a boom.

I. The Contractor shall be solely responsible for the repair of any and all other damage to the Owner's property, including roads, trails, bridges, signs and other features.

J. Protection of public utilities in the performance of the work is the sole responsibility of the Contractor, and any damage shall be promptly reported to the appropriate local office. The Owner shall bear no responsibility in the costs of such repair.

K. After the site clearing and vegetation removal has been complete according to the conditions determined at the preconstruction site meeting, the Owner and Contractor shall meet for a final review of the work area. If the original contract terms have been satisfied and additional clearing or tree removal is requested by the Owner, the work shall be measured for additional payment.

3.02 SAFETY

A. It is the responsibility of the Contractor to perform the work according to the highest industry safety standards, the guidelines and requirements of the Occupational Safety and Health Administration (OSHA) and all other applicable local, state and federal requirements.

B. The work described herein is being performed on a public forest preserve and as such portions of the site may be either open to or generally accessible to the public. Extreme caution must be exercised when operating machinery or performing any tasks where there is the potential for personal injury. Special attention is called to operations which cause cut materials to be propelled into adjacent areas. When any cutting of material occurs within 300 feet of roads, trails or adjacent properties, the Contractor shall post signs at those areas to warn the public. When flying debris is likely to contact these areas, the Contractor shall post personnel to assure that access to the work zone is secured.

3.03 DAMAGE TO OR REMOVAL OF SPECIES TO BE PRESERVED

A. It is of utmost importance during selective removal operations that no individual plants of species to be preserved or otherwise identified as desirable to the Owner be damaged or destroyed. Should any such significant damage or unauthorized removal occur which causes a loss of property to the Owner, the Contractor shall be required to perform the following remediation:

1. Removal and disposal of significantly damaged plants at no additional cost to the Owner.

2. Replacement of lost plant material, in the form of new plant material at a replacement ratio of 2 inches of replacement for each 1 inch of plant material damaged or lost. The Owner shall determine or approve the species, source, size, quantity and planting locations of the replacement material before any replacement work is started. The Contractor shall obtain, plant, mulch, water and guarantee the planting for one year with no additional cost to the Owner.

3.04 SEASONAL RESTRICTIONS

A. Specific commencement and completion dates are stated in Attachment A of the Contract. Vegetation removal for development such as trails shall be scheduled to precede construction activities.

B. When sensitive soil conditions or root protection zones are identified, the Owner may restrict clearing equipment access until suitable frost conditions and / or snow cover is present. Restrictions may also be imposed when soil moisture levels are such that any equipment use may cause substantial ground disturbance. Other required work schedules may be indicated on the Plans.

C. Projects requiring tree clearing will follow the following U.S. Fish and Wildlife Service's (USFWS) restrictions pertaining to the Northern Long Eared Bat (NLEB) habitat:

1. Trees 3 inches or greater in diameter at breast height shall not be cleared between April 1 and September 30.

2. Those projects that are within 2 ½ miles of a recorded NLEB site, the tree clearing restriction shall be April 1 through October 31.

3. Exceptions exist for tree trimming and clearing of hazards, which can occur at any time with coordination and prior approval from Owner.

3.05 ROOT PROTECTION AND RESTRICTED ACCESS ZONES

A. The Owner may establish boundaries for areas that require a high level of protection from disturbance due to the presence of sensitive flora, fauna or cultural resources. Some of these areas may be restricted to foot traffic only and will require hand removal of vegetation. Other areas may be off-limits to all types of access. The Owner may fence these areas or otherwise indicate to the Contractor any such limitations.

3.06 VEGETATION REMOVAL AREAS

A. Vegetation Removal Areas may be identified in the Plans for each project and each individual portion of the work zone when required. When used, these areas shall be graphically indicated or described in the notes. Individual trees may be shown on the Plans either within or outside of the Vegetation Removal Area. They are shown to assist the Contractor in evaluating the composition of the vegetation in the removal area and not as individual items for measurement and payment unless noted as such.

B. The Owner may further define the Vegetation Removal Areas by marking areas or individual plants in the field. These markings may include flagging, staking, painted markings or other indications to describe the work.

C. Access and haul routes, staging, chipping and loading areas and burn areas may be identified on the Plans or in the field by the Owner.

D. Each Vegetation Removal Area shall include specific information and instructions that further define the required work. The information and instructions may include:

1. Approximate size of Vegetation Removal Area in acres
2. Removal of all woody vegetation
3. Removal of targeted species only
4. Removal of targeted species of specific sizes only
5. Removal of field marked trees
6. Removal of all non-native trees and shrubs
7. Removal of select native species
8. Girdle targeted or marked trees
9. Trees or species to be preserved ('Do Not Cut')
10. Stump grind all tree removals 6″ DBH and larger
11. Removal of all existing fallen branches and logs
12. Hand or machine raking of all debris
13. Chip and remove all material from site
14. Chip and spread all material on site
15. Burn all cut material on site

3.07 VEGETATION REMOVAL PAY ITEMS DEFINED

A. VEGETATION REMOVAL – COMPLETE

This pay item is an all-inclusive lump sum pay item which provides for the complete vegetation clearing and removal requirements of the project and site. When checked, the following items shall be required for this project:

☒ Field Mowing: The mowing of herbaceous and small woody plants utilizing a tractor mounted rear mowing deck or similar equipment. Areas to be mowed shall include the complete work or grading limits or as indicated on the Plans.

☐ Tree and Shrub Clearing < 6″ Diameter: Includes the cutting, gathering and removal of minor trees and shrubs which are not shown individually on the Plans within the work or grading limits or as shown on the Plans.

☐ Tree Removal > 6″ DBH (Shown on the Plans): The cutting, gathering, processing and removal of trees as indicated on the Plans.

☒ Tree Removal > 6″ DBH (Marked in the Field): The cutting, gathering, processing and removal of trees as marked in the field. The Bidder / Contractor must inspect the site to determine the extent of the work.

☒ Stump Grinding (All Cut Trees 6″+ DBH): The stump and crown grinding of all trees 6″ + DBH either indicated on the Plans or marked in the field. Previously cut trees shall be marked in the field or shown on the Plans and quantified on the Plans.

☒ Disposal: Logs shall be hauled off site. Material that can be chipped may be chipped on site and shall be hauled off site.

☐ Disposal: Burning of vegetation is allowed on this project with coordination and approval of the Owner.

☐ Debris Raking and Removal: All Vegetation Removal Areas shall be raked of all loose vegetative material for seeding purposes.

B. TREE REMOVAL WITH STUMP GRINDING (6-15″, 16-30″, 31″+)

This pay item is used for measurement and payment of individual trees for removal and includes all cutting, gathering, hauling, disposal and stump grinding. Payment for this item shall be per Each for each size range.

C. STUMP GRINDING (6-15″, 16-30″, 31″+)

This pay item is used for measurement and payment of individual stumps for stump grinding. Payment for this item shall be per Each for each size range.

D. TREE ROOT PRUNING

This pay item shall include the mechanical and hand pruning of tree roots as marked in the field by the Owner. Payment for this item shall be per Lineal Feet.

E. TREE BRANCH PRUNING (6 – 12”, 13 – 24”)

This pay item shall include the cutting and removal of individual branches as directed by the Owner. Payment for this item shall be per each branch cut and shall be counted before cutting.

F. FIELD MOWING

This pay item shall include the mowing of herbaceous and minor woody plant material in a single pass. Additional passes for the purpose of reducing debris volume shall be paid as an additional mowing. Payment for this item shall be per acre or parts of acres.

3.08 HAND CUTTING AND REMOVAL

A. Hand cutting removal is defined as those removals performed without any wheeled or tracked ground equipment and performed with chainsaws, hand saws and pruning tools. Hand removal shall be indicated in the Plans for areas sensitive to ground disturbance by heavy equipment.

3.09 MACHINE TREE MOWING

A. Machine tree mowing is defined as the removal of woody plant material with a trunk diameter of six inches (6”) or less DBH and similar sized shrubs using a forestry mower attachment of varying types, including rotating drum, tree shear, deck mowers and brush mulchers.

3.10 MACHINE TREE REMOVAL

A. Machine tree removal is defined as the removal of any trees with various machinery larger than forestry mowers. This work may be performed with a feller buncher or similar boom or arm mounted cutter / grapple which allows minimum ground movement to reach, cut and remove individual trees. The primary operating equipment shall be an excavator or similar machine with rubber tracks and a ground pressure rating of 9.0 PSI or less. Access routes and movement around desirable trees with large equipment shall be carefully planned to avoid unnecessary ground disturbance.

3.11 CUT TREE HANDLING

A. Cut tree handling is defined as the movement of cut materials from the point of origin to staging, loading, chipping or burn areas. Equipment such as skidders and forwarders shall be utilized in designated haul routes and not in root protection zones, areas contained by temporary tree protection fencing or other sensitive areas.

3.12 GIRDLING

A. Girdling is defined as the cutting and complete removal of a tree's bark including cork cambium, phloem and cambium around the entire circumference of the trunk such that the tree is caused to die. Some trees larger than 12" DBH may be girdled if not adjacent to property boundaries, roadways, trails, or other assets and only if marked by the Owner. All trees designated for girdling shall be double cut. +Cuts shall be made approximately 8-10 inches apart, parallel to each other and horizontal to the ground surface. Girdling cuts shall not be made higher than 3 feet above the ground surface.

3.13 STUMP GRINDING

A. When required, machine stump grinding shall be performed on trees 6" DBH and larger to a depth of at least ten inches (10"). Stump grinding shall not be performed in areas contained by temporary tree protection fencing or other sensitive areas designated by the Owner. The Contractor shall be aware of the presence of roads, trails or other public areas where stump grinding operations may pose a hazard. Appropriate warning signs or additional personnel shall be posted in areas subject to pedestrian traffic. Should the chipping operations pose a risk to any persons nearby, the operation shall be halted until safe conditions resume.

3.14 DEBRIS RAKING AND REMOVAL

A. Debris raking is defined as the removal of all small loose vegetative matter such as leaves, twigs, bark, and small branches for purposes of exposing the soil surface for seeding purposes.

B. Unless included in Vegetation Removal – Complete, Debris Raking and Removal may be separately specified on the Plans or requested by the Owner. The pay item for this work shall be paid per Acre.

3.15 TREE ROOT PRUNING

A. Tree root pruning shall be performed at the locations shown on the Plans or as marked in the field. Root pruning shall be performed with a mechanical trenching machine to a depth of 24″. After trenching, any torn roots or those over 1' in diameter shall be hand pruned to a smooth cut.

3.16 FIELD MOWING

A. Field mowing is defined as the mechanical cutting of herbaceous and minor woody material in open fields or lightly wooded areas. Areas designated for field mowing shall be cut to 6" or less in height with a tractor-mounted mowing deck. When mowed debris is excessive, the Owner may request additional mowings to reduce the size of the debris.

B. All mowing equipment (tractors, mowers, etc.) used in the work shall be thoroughly cleaned after the completion of mowing work at a particular site, and

prior to beginning the work on the next site in order to prevent the transfer of weed seeds and invasive plants from one site to another.

3.17 PROCESSING, REMOVAL AND DISPOSAL OF CUT MATERIAL

A. BRUSH CHIPPING AND GRINDING

1. Brush chipping locations shall be approved by the Owner prior to the start of work. The locations shall allow the hauling of brush to the chipper without creating excessive ground damage to the site and shall be accessible by haul trucks should removal from the site be required. Chipping operations shall be located such that there is no risk to the public from flying debris or other safety concerns.

2. Unless designated otherwise by the Owner, all chipped material shall be loaded and hauled off site. The loading and hauling operations shall be performed such that no excessive ground damage occurs to the site. When chipped material is approved by the Owner to remain on site, it shall be spread in layers of no more than 2” deep and only at locations identified by the Owner.

3. When brush chipping is required, larger logs or other material not suitable for chipping shall be loaded and hauled from the site.

B. BURNING

1. Burning cut vegetation is only allowed if specifically stated in the Plans.

2. Brush piles and burning locations shall be constructed within the project boundaries in areas designated by the Owner. Brush piles will be constructed in areas where low ground fuel levels exist, soil is bare or there is sparse leaf litter and at least 200 feet from adjacent properties, trails, parking areas, roads, sensitive ecological features and any other area where safety is a concern. Brush piles will be constructed at least 50’ from any standing dead trees or snags and shall not be located under existing live trees.

3. Brush piles shall be of a size and density to effectively accomplish ignition and consumption of the burn material. Cut branches shall generally be less than 15’ in length. Piles should be no more than 10’ high, 30’ in diameter and stacked in a parallel manner with smaller material placed at the bottom of the pile and larger material placed at the top so that compression occurs as the pile is built.

4. The Contractor shall have on site at all times appropriate protective and fire control equipment such as water tanks, back pack pumpers and hand tools to manage the brush piles during ignition, burning, and clean up. During all burning operations, the Contractor shall have a first aid kit, portable eye wash station, chemical spill kit and a working cell phone on site for communication with the Owner and local fire departments.

5. Brush piles shall be ignited only when prevailing winds are between 5 and 25 mph and Relative Humidity is greater than 35% unless otherwise approved by the Owner. Ignition and burning may commence only upon the approval of the Owner.

6. The Contractor shall continually monitor the burn piles to assure that fire and smoke hazards, loss of property or ecological habitat does not occur

and that the safety of the public is protected at all times. Material which has been adequately burned should be raked inward as the burn pile decreases in size. The burn piles shall be monitored by the Contractor until all brush fuel is consumed and the remaining ashes are cool to the touch. Ash piles shall be raked out evenly. In the event that the fire or associated smoke creates a safety hazard, the Contractor shall immediately reduce or extinguish the burn pile to eliminate the hazard. Should loss of control of the fire occur, the Contractor shall immediately contact the appropriate fire department or 911 and the Owner.

7. The Owner shall secure an Illinois Environmental Protection Agency Open Burning Permit and a list of the appropriate contact agencies and phone numbers for the site. The Contractor shall notify the required agencies by telephone on a daily basis prior to ignition. The authority of the local fire departments supersedes that of the Owner and Contractor in regards to ignition and burning of all brush piles.

END OF SECTION 02500

SECTION 02600

DEMOLITION AND REMOVALS

1. GENERAL

1.01 DESCRIPTION

A. Work under this section includes:

1. Removal of pavement, structures and other items as indicated on the Plans.

B. Other specification sections which directly relate to the work of this section include, but are not limited to, the following:

1. Section 02200 – Temporary Traffic Control
2. Section 02300 – Site Resource Protection
3. Section 02400 – Soil Erosion and Sediment Control
4. Section 02610 – Reclaimed Pavement

2. PRODUCTS – Not Used

3. EXECUTION

3.01 GENERAL

A. Before any demolition or removal begins, the Contractor shall protect trees, sensitive natural resources, private property and any other site elements which are designated to remain as indicated on the Plans or in the field by the Owner.

B. When working in a public Right-of-Way (ROW) the Contractor shall conduct operations according to the requirements of the ROW jurisdiction and all Maintenance of Traffic rules and documents.

C. The Contractor shall protect benchmarks, property corners, other survey monuments, utility markers, signs, mailboxes, adjacent pavements and structures from damage or displacement. If any such damage occurs the Contractor shall bear full responsibility for all replacement and restoration to the original condition.

3.02 SAW CUTS, FULL DEPTH

A. The Contractor shall saw cut pavements and structures to their full depth prior to removal or as directed on the Plans. Optional saw cuts performed to aid Contractor's removal operation will not be measured for payment.

3.03 REMOVAL OF PAVEMENTS, CURBS AND AGGREGATES, FULL AND PARTIAL DEPTHS

A. If Reclaimed Pavement is specified for this work, refer to Section 02610 which supersedes this section for the removal of pavements, curbs and aggregates.

B. The removal of asphalt, concrete or aggregate pavements and concrete curb and gutters shall include all breaking or separating materials, excavation, loading,

hauling and disposal of the pavement to its' full depth. Hot-mix asphalt pavement may be removed to full depth by milling.

C. Unless otherwise noted on the Plans, all removed materials shall be disposed of legally off site.

D. If so noted on the Plans, aggregate pavements may be removed to a specific depth.

E. If so noted on the Plans, the Contractor shall create a butt joint to accept replacement of adjacent paving.

3.04 ASPHALT SURFACE REMOVAL

A. The removal of asphalt surface for subsequent resurfacing shall include any associated saw cutting at the work limits. The surface shall be removed to the specified depth with a self-propelled milling machine.

B. The remaining milled surface shall not be gouged, broken or otherwise damaged by the milling operation. Sufficient cutting passes shall be made so that all irregularities or high spots which may affect resurfacing are eliminated.

C. All adjacent structures such as curbs, gutters, other pavements to remain, drainage structures or other elements to remain shall be protected from damage by the milling operation.

D. Resurfacing shall be paid for as separate items in the Contract.

3.05 REMOVAL AND DISPOSAL OF EXISTING SITE ELEMENTS

A. When indicated on the Plans, the Contractor shall remove existing site elements such as fences, utility poles, culverts, drainage structures, signs, gates, debris and other items designated for removal. Unless otherwise indicated, if such items are partially buried, then all above and below ground portions shall be removed. All existing site elements to be removed shall be disposed of legally off site.

3.06 STRUCTURE REMOVAL

A. The Contractor shall raze and remove all buildings, bridges, abutments and other designated structures and their associated appurtenances as indicated on the Plans. This work shall include all razing, breaking, loading, hauling and legal off-site disposal.

B. When indicated on the Plans, any depressions or voids created by the demolition shall be filled to the existing adjacent grades with material approved by the Owner.

3.07 OFF-SITE DISPOSAL

A. When a designated demolition or removal specifically does not include hauling and disposal or when debris is discovered after the start of work that the Owner desires to be removed, the Contractor shall be paid for such work as requested by the Owner.

3.08 RESTORATION

A. In all areas disturbed as a result of demolition activities, the Contractor shall backfill said areas to a depth of 4 inches below finished (existing) grade unless otherwise noted on Plans, with clean on-site fill material, place topsoil to a minimum depth of 4 inches unless otherwise noted on Plans, fine grade, seed

with seed mix shown on Plans and install erosion control blanket unless otherwise noted on the Plans. All restoration work shall be in compliance with sections 03120 – Finish Grading and Topsoil, 09300 – Turf Seeding and 09310 Native Seeding.

END OF SECTION 0260

SECTION 02610
RECLAIMED PAVEMENT

1. GENERAL

1.01 DESCRIPTION

A. Work under this section includes:

1. Pulverizing existing asphalt roads, trails and walks for reuse as aggregate base on site.
2. Milling existing asphalt roads and trails for reuse as aggregate base on site
3. Reusing existing aggregate surfaces and base course materials as aggregate base on site.

B. Other specification sections which directly relate to the work of this section include, but are not limited to, the following:

1. Section 02200 – Temporary Traffic Control
2. Section 02300 – Site Resource Protection
3. Section 02400 – Soil Erosion and Sediment Control
4. Section 05200 – Trails
5. Section 05300 – Roads and Parking
6. Section 05400 – Concrete Pavement

1.02 EQUIPMENT

A. SELF-PROPELLED RECLAIMER

1. The self-propelled reclaimer shall have a minimum power of 500 hp and be capable of fully pulverizing the existing pavement to the depth required and mixing the materials to produce a homogenous material.
2. The self-propelled reclaimer shall be capable of reclaiming not less than 8 feet wide and up to 12 inches deep in each pass.

B. SELF-PROPELLED VIBRATORY PADFOOT ROLLER

1. The self-propelled vibratory pad foot roller shall have 84-inch-wide drums and gross weight of not less than 10 tons. A front mounted blade is recommended for back-dragging

C. SELF-PROPELLED VIBRATORY STEEL ROLLER

1. The self-propelled vibratory steel roller shall have double drums and gross weight of not less than 10 tons.

D. PORTABLE IMPACT CRUSHER AND SCREENER (OPTIONAL)

1. Portable Impact Crusher and Screener shall have magnet on conveyor or elsewhere to separate metal from crushed aggregate. Make and model of portable impact crusher and screener to be submitted with bid.

2. PRODUCTS

2.01 PULVERIZED ASPHALT AND AGGREGATE BASE MIXTURE

A. 100 percent of the pulverized material shall pass a 1-1/2″ screen. The pulverized material shall be reasonably well graded from coarse to fine. Pulverized material that is gap-graded or single sized will not be accepted.

3. EXECUTION

3.01 PAVEMENT PULVERIZATION

A. Asphalt that cannot be directly pulverized in place shall be removed and transferred to existing pavement or aggregate areas that are accessible to the pulverizing equipment and incorporated into the pulverizing operation.

B. Pulverizing shall be performed to a nominal depth of 2 to 3 inches below existing asphalt pavement or minimum combined thickness of 6 inches of existing asphalt and aggregate base when asphalt thickness is 3 inches or less. The actual depth to be pulverized may vary depending on the existing conditions in the field or as directed by the Owner.

C. The Contractor shall be capable of adding sufficient water to prevent segregation of the pulverized material and achieve the required compaction for aggregate base courses per Sections 05200, 05300 and 05400.

D. In areas where pulverizing will be re-laid in place as an aggregate base ““aggregate base coarse, recycled”), the lay down of material shall be performed using a motor grader, paver or other means to achieve a uniform surface with the proper profile and crown per Plans.

E. In areas where pulverizing will not be re-laid in place, material shall be transferred to Plan locations requiring “aggregate base coarse, recycled,”or stockpiled, in locations approved by Owner, for later placement.

F. Immediately after lay down of material, either in place, or in alternate locations, compaction shall be performed per Sections 05200, 05300 and 05400 in the following sequence.

1. First with a vibratory pads foot roller.

2. Second with a vibratory steel drum roller.

3.02 MILLED PAVEMENT

A. Millings from areas designated on the Plans shall be transferred to existing aggregate roadways and incorporated into the pulverizing operation.

3.03 EXISTING AGGREGATE SURFACES AND BASES SCHEDULED FOR REMOVAL

A. Existing aggregate surfaces and bases scheduled for removal meeting the gradation and other requirements of Sections 05200, 05300 and 05400 shall be reused as “aggregate base coarse, recycled,” material elsewhere per Plans.

B. Existing aggregate surfaces and bases scheduled for removal not meeting the requirements of Sections 05200, 05300 and 05400 shall be utilized as general fill as part of general earthwork in locations approved by Owner.

3.04 ASPHALT AND CONCRETE CRUSHING USING ONSITE PORTABLE CRUSEHER AND SCREENER (OPTIONAL)

A. A portable impact crusher and screener may be used onsite to process asphalt and concrete for reuse as aggregate base in addition to, or in lieu of a self-propelled reclaimer.

B. 100 percent of the crushed material shall pass a 1-1/2″ screen. The crushed material shall be reasonably well graded from coarse to fine. Crushed material that is gap-graded or single sized will not be accepted.

C. Metal must be separated from crushed aggregate as part of the crushing process. Contractor shall dispose of metal off-site.

D. Existing aggregate surfaces and bases scheduled for removal meeting the gradation and other requirements of Sections 05200, 05300 and 05400 shall be blended with the crushed material to create a 50% blend of asphalt and/or concrete to 50% existing aggregate and reused as “aggregate base coarse, recycled,” material elsewhere per Plans.

E. The lay down of “aggregate base coarse, recycled,” material shall be performed using a motor grader, paver or other means to achieve a uniform surface with the proper profile and crown per Plans.

END OF SECTION 02610

SECTION 03100

EARTHWORK AND GRADING

1. GENERAL

1.01 DESCRIPTION

A. Work under this section includes:

1. All mass earthwork, excavation, placement and rough grading of soils for pavements, landscape areas and other site improvements.

B. Other specification sections which may directly relate to the work in this section include, but are not limited to, the following:

1. Section 02300 – Site Resource Protection
2. Section 02400 – Soil Erosion and Sediment Control
3. Section 02500 – Vegetation Removal
4. Section 02600 – Demolition and Removals
5. Section 03110 – Ground Stabilization
6. Section 05100 – Subgrade Preparation

2. PRODUCTS

2.01 ON-SITE FURNISHED EXCAVATION

A. On-site excavated soils and borrow materials to be used for fills shall meet the requirements of Article 204.02 of the IDOT Standard Specifications and shall be subject to approval by the Owner prior to harvesting, hauling and placement.

2.02 IMPORTED FURNISHED EXCAVATION

A. Off-site furnished material shall be suitable for fills meeting the requirements of Article 204.02 of the IDOT Standard Specifications and shall be subject to approval by the Owner prior to delivery to the Work site.

3. EXECUTION

3.01 GENERAL REQUIREMENTS

A. The Contractor shall inspect the site, review any provided geotechnical data and become familiar with the site conditions prior to bidding and start of work. Any geotechnical investigations provided by the Owner apply only to those locations where the data was collected and may not be indicative of conditions elsewhere on the site.

B. Unless specifically noted, all elevations and contours shown on the Plans are finished grades. Grades at points between elevations or contours are to be determined by uniform slopes between given grades or elevations, or between such figures and existing grades. Perform all rough and finish grading required to attain the elevations indicated on the Plans. Grading tolerances shall be plus or minus one-tenth of a foot (0.1′) for all rough and finish work.

C. Excavation and embankment work shall conform to the applicable requirements of Sections 202, 203, 204, 205, 207, and 502 of the IDOT Standard

Specifications except that excavated materials that are suitable for structural fill material shall be used in the construction of the embankments to raise trails, pavements and structures to the proposed subgrade. Suitable material from excavation that is used as embankment or other structural fills shall be free from rocks, roots, sticks, and other foreign bodies that could affect compaction.

D. Unless otherwise indicated, material for fills shall be suitable on-site excavated soil and borrow material and shall be subject to approval by the Owner. Fill material and the surface to be filled shall be free of any frozen material. Material previously compacted that has been flooded and no longer meets the density specified shall be re-compacted or replaced.

E. No site grading shall begin until all required soil erosion and sediment control measures are in place and a pre-construction meeting has been held with the Owner and representatives from the Lake County Stormwater Management Commission to identify any other permitting requirements.

F. Before commencement of earthwork and grading, perform all vegetation clearing and removals.

G. Where the Contractor's equipment is operated on any portion of pavement or other structure used by traffic on or adjacent to the section under construction, the Contractor shall clean the pavement of all dirt and debris at the end of each day’s operations and at other times as directed by the Owner.

H. The Contractor shall use all means necessary to protect the Work before, during, and after construction and to protect all objects designated to remain. In the event of damage, Contractor shall immediately make all repairs and replacements necessary to the approval of the Owner and at no additional cost to the Owner.

I. During construction operations the Contractor shall ensure positive site drainage at the conclusion of each day. Provide berms or channels to prevent flooding of subgrades. Promptly remove all water collecting in depressions. Site drainage may be achieved by ditching, pumping or any other acceptable method. The Contractor’s failure to provide the above will preclude any possible added compensation requested due to delays or unsuitable materials created as a result thereof.

J. Earthwork shall not take place when soil moisture is excessive. Do not place, spread, fill or roll during unfavorable weather conditions. Do not resume operations until the soil moisture content is such that the specifications can be achieved. The Contractor may scarify the surface to accelerate drying to required moisture content but no additional compensation shall be allowed without the approval of the Owner.

3.02 GEOTECHNICAL INVESTIGATIONS AND SOILS REPORTS

A. ☒ A geotechnical investigation and soils report has been completed for this project and is included in these Contract Documents. The Owner assumes no responsibility for the accuracy of the report and the information contained in the report applies only to those locations where the sampling was performed and may not be indicative of conditions elsewhere on the site.

B. ☐ No geotechnical investigation or soils report has been performed for this project.

3.03 BALANCE OF CUTS AND FILLS

A. One of the following conditions is anticipated for this project:

☒ It is anticipated that the site contains adequate soil resources and potential borrow areas (Borrow Areas) to achieve the proposed grades with a balance of cuts and fills. The Contractor shall utilize the proposed excavations and any Borrow Area locations shown or explained on the Plans to balance cuts and fills. If additional locations are needed beyond the identified Borrow Areas, selection shall be coordinated with, and approved by, the Owner.

☐ It is anticipated that the site does not contain suitable borrow areas and any additional fill material that may be required will need to be imported from another suitable off-site location. In the case of soil overages, any excess soils shall be excavated, deposited and graded on the site.

☐ This project contains excessive soil cuts which cannot be entirely relocated at the site. A quantity of these soils shall be removed from the site.

B. It is the Owner's intent that the final site grading will result in a balance between soil cuts and soil fills, regardless of whether soil quantities on the site are adequate, deficient or in excess. The Contractor shall be solely responsible for balancing site materials according to the Plans and existing and proposed finish grades. On-site topsoil stripping and stockpiling, excavation, hauling, placement and re-spreading of materials beyond the specified Work areas shall be incidental to the Work when required to balance cuts and fills.

C. The Contractor shall be solely responsible for determining all earthwork quantities based on the existing and proposed elevations provided on the Plans. The Contractor shall be responsible for performing any additional survey work that the Contractor deems necessary to complete an accurate estimate of earthwork quantities.

D. If material overages are indicated, the excess soils shall be excavated, harvested, hauled or otherwise moved to new locations and deposited and spread as directed by the Owner. Topsoil at new cut or fill areas shall be stripped, stockpiled and then re-spread after establishment of subgrades. When material deficits occur, Borrow Areas may be indicated on the Plans or identified in the field by the Owner.

E. When required to utilize Borrow Areas, the Contractor shall strip, stockpile and re-spread any existing topsoil as part of the borrow operations. All clearing outside Construction Limits shall be approved by Owner prior to commencing work. Owner shall review and approve final grading and restoration of Borrow Areas prior to topsoil re-spread. Owner reserves the right to make field adjustments to the Borrow Areas and shall approve final shaping prior to topsoil respread.

F. If on-site excavation and borrow operations do not provide enough suitable material for fill areas, the Contractor shall be responsible for providing off-site fill material as part of the Site Grading pay item. Contingency quantities for On-Site Furnished Excavation and / or Imported Furnished Excavation shall be for replacement of unsuitable soils only and at the direction of the Owner.

G. When there is excess on-site topsoil, the Contractor shall spread and grade the topsoil in thicknesses greater than the minimum where possible. The Contractor

shall also respread and grade excess on-site topsoil in other areas as directed by the Owner.

3.04 SITE GRADING REQUIREMENTS

A. This work shall consist of furnishing all materials, equipment and labor to create the proposed grades, subgrades, elevations, contours and land shapes as indicated on the Plans This work shall include all required topsoil stripping and stockpiling, mass earthwork, rough grading, excavation, filling, hauling, importing of soils from off-site locations, soil placement, shaping and spreading of stockpiled topsoil. Site grading shall provide for any required subgrade elevations for proposed aggregate bases, pavement, surfacing, structures, topsoil or other improvements.

B. All topsoil or soils to be utilized for planting, seeding or re-vegetation shall be carefully stripped, harvested and segregated from the soils below. Topsoil shall be stripped and stockpiled before any filling is performed. Soils which are not suitable for planting shall not be mixed or harvested with topsoil. After stripping, the topsoil shall be deposited in the identified location for stockpile materials for re-spreading at a later time. For trail development, topsoil shall be deposited in rows along the length of the trail. Topsoil stockpiles shall not be overly compacted. Protect all topsoil stockpiles from contamination by other materials or harmful substances.

C. During the process of creating the required cuts and fills, should the Contractor encounter unsuitable material in areas that require structural fill, the Contractor shall immediately notify the Owner prior to proceeding with the work. Upon inspection of the work area, the Owner shall determine a prescribed remedy. If it is determined that excessive soil moisture is present, the Contractor shall aerate, disc or otherwise dry the material to make it suitable for use. If the Owner determines that removal is warranted, the unsuitable materials shall be removed and replaced as specified in Section 03110 – Ground Stabilization. The material used for replacement shall be approved by the Owner.

D. Areas proposed for trails and pavement shall be compacted to a minimum 95% of maximum density based on a Standard Proctor (ASTM D-698).

E. Areas proposed for structural fills for building pads shall be compacted to a minimum of percent 95% based on a Modified Proctor (ASTM D-1557).

F. Areas proposed for landscaped areas shall not be compacted in excess of 85% density based on Standard Proctor.

G. Where proposed improvements or grades require cuts or excavation, the excavated material shall be utilized in achieving specified grades at other areas of the site. If the excavated material meets the requirements, it may be used as structural fill. No material shall be hauled from the site or placed in an unauthorized location without the Owner’s approval, and no compensation shall be allowed for such hauling and disposal unless specifically listed in the Schedule of Prices.

H. Site grading shall include the creation of all ditches, swales and other drainage landforms shown in the Plans. Ditches and swales shall be shaped with smooth transitions to adjacent grades. Ditches shall be sloped to drain in the direction shown on the Plans. The Contractor shall be solely responsible for assuring positive drainage upon the completion of site grading.

I. Areas proposed for landscaping, planting, seeding or re-vegetation shall receive a minimum of 4 inches of topsoil from on-site stockpiles unless otherwise specified. Before placement of topsoil, the Contractor shall assure that the existing soil surface is not overly compacted or glazed and free from debris. If such conditions exist, the Contractor shall clean, scarify and/or till the surface to a minimum depth of 8 inches before the placement of topsoil. The topsoil shall be spread evenly and graded in preparation for Finish Grading. Any branches, roots, rocks or other debris shall be removed and disposed. Place and spread the topsoil to the minimum thickness as specified and in a uniform layer.

J. Upon completion of the proposed improvements, all areas which have become impacted by excessive soil compaction such as haul routes and staging areas shall be disked, tilled or otherwise relieved of compaction such that those areas can sustain long-term vegetative growth. Final payment for Site Grading shall not be paid until these areas are made acceptable for final landscaping.

3.05 SITE GRADING, SENSITIVE WOODED AREA REQUIREMENTS

A. This work shall consist of furnishing all materials, equipment and labor to create the proposed grades and subgrades required for trail construction and other improvements in sensitive wooded areas. Sensitive wooded areas differ from open areas in that they contain valuable trees and vegetation that may potentially be harmed by soil disturbance. It also differs in that no additional Subgrade Preparation is required. It is the intent of the Owner to minimize any potential harm to tree root systems by limiting the amount of grading and soil disturbance.

B. Site grading in sensitive wooded areas shall include herbaceous vegetation mowing when needed, removal of surface litter and, placement of cut soils, formation of ditching by minor filling rather than cutting, shaping shoulder areas and testing of soil materials to attain the subgrade elevations required for trail construction. The Contractor shall limit the width of the graded area to only that which is necessary to construct the actual trail width and avoid performing the work during excessively wet conditions. A typical cross section is shown in the Plans; however, the Contractor shall be required to adjust the final profile depending on adjacent trees and site conditions. These variances in design may include eliminating, redirecting or shortening the ditches, adjusting the final trail location and adjusting the finish grade of the trail.

C. Before the start of surface grading, the Owner shall inspect the soil conditions and vegetation and determine the extent and depth of surface removal required to provide an adequate subgrade condition with minimal root damage. This depth shall generally be between 1 to 4 inches. This depth may vary across different parts of the site. Any material which is removed from the trail bed subgrade shall be deposited adjacent to the trail edges for re-spreading after trail surface construction. The final subgrade surface shall be smooth, uniform and reflective of the original surface profile.

D. Upon completion of the surface soil removal, the Owner and Contractor shall review the surface conditions together prior to any other work to reveal any unsuitable soils or areas. No rolling or compaction shall be performed on the subgrade unless directed by the Owner.

E. Ditching shall be constructed at the locations specified on the Plans and at locations directed by the Owner by adjustment of the finished elevations in conjunction with filling adjacent to the edge of pavement. Ditches shall be sloped to drain in the direction shown on the Plans. Field modifications from the typical

detail shown on the Plans may be required in an effort to preserve desirable trees. This may include relocation of ditching, deleting ditches adjacent to trees, creating shorter ditches perpendicular to the trail and adjusting the built dimensions. The Contractor shall review drainage issues with the Owner onsite before commencement of work in sensitive wooded areas.

3.06 DEEP EXCAVATION AND SEPARATION OF SOILS FOR LANDSCAPE AREAS

A. When the proposed grading requires excavation to elevations 48″ or more below the existing natural surface, additional separation of soil layers shall be performed to assure that the final soil profile is suitable for the growth of trees, shrubs and herbaceous plants. In addition to stripping and stockpiling the Topsoil Layer, the Contractor shall strip, separate and stockpile the next 36″ depth of the Subsoil Layer directly underlying the topsoil layer. Soils excavated from below 48″ of the existing natural surface shall be separated from both the Topsoil and Subsoil Layers.

B. In areas proposed for planting, seeding or sodding, the previously separated soils as described above shall be respread and layered according to their original natural position. Soils excavated from depths of 48″ and deeper shall be deposited first in the deepest position. Next, the Subsoil Layer originating directly below the Topsoil Layer shall be deposited and respread in an even layer. The final finished elevations shall be achieved by respreading of the Topsoil Layer.

3.07 ON-SITE AND IMPORTED FURNISHED EXCAVATION

A. On-Site Furnished Excavation and Imported Furnished Excavation are strictly contingent items when listed in the Schedule of Prices and shall only be used with the Owner’s approval when anticipated borrow areas prove to be insufficient in quality as suitable structural fill material and no other suitable borrow areas exist on the site.

B. All provided Furnished Excavation shall be in accordance with Section 205 of the IDOT Standard Specifications. Samples of Imported Furnished Excavation material shall be submitted to the Owner for approval prior to delivery and installation.

C. On-Site Furnished Excavation shall include all labor and equipment to strip and segregate topsoil, excavate, load, haul, dump, place, compact, re-spread topsoil and otherwise transfer suitable material from a borrow area to the designated fill area.

D. Imported Furnished Excavation shall include all labor and equipment to locate, test, acquire, excavate, load, haul, dump, place, compact, re-spread topsoil and otherwise transfer suitable material from an off-site source to the designated fill area.

E. Furnished Excavation used in trail and road embankment construction as well as other pavement areas shall be compacted to a minimum of 95% based on a Standard Proctor (ASTM D-698).

F. Furnished Excavation used in structural fills for building pads shall be compacted to a minimum of 95% based on a Modified Proctor (ASTM D-1557).

3.08 STRUCTURE EXCAVATION

A. Structure Excavation is defined as excavation directly related to the construction of specific structural elements such as footings, vaults, buildings, abutments,

underpasses and other related improvements which require excavation that is typically deeper and requiring more precise dimensions, depths and side slopes than typically required for general earth excavation.

B. Quantities for Structure Excavation shall be defined either by excavation dimensions shown on the plans or by the dimensional requirements of the structure itself, bedding and backfill requirements and safety considerations for sloped or benched sides greater than 5 feet in height.

C. Structure Excavation shall be measured and paid separately from any other unrelated earthwork and grading.

END OF SECTION 03100

SECTION 03110

GROUND STABILIZATION

1. GENERAL

1.01 DESCRIPTION

A. Work under this section includes:

1. Removal of unsuitable soils and placement of geotextile fabrics and suitable replacement materials.

B. Other specification sections which may directly relate to the work in this section include, but are not limited to, the following:

1. Section 03100 – Earthwork and Grading
2. Section 05100 – Subgrade Preparation

2. PRODUCTS

2.01 ON-SITE FURNISHED EXCAVATION

A. Excavated soil and borrow material to be used for undercuts shall meet the requirements of Article 204.02 of the IDOT Standard Specifications and shall be subject to approval by the Owner.

2.02 IMPORTED FURNISHED EXCAVATION

A. Offsite furnished material shall be suitable for undercuts meeting the requirements of Article 204.02 of the IDOT Standard Specifications and shall be subject to approval by the Owner.

2.03 GEOTEXTILE FABRIC

A. Geotextile fabric shall be non-woven; needle punched polypropylene staple fiber that is UV stabilized and resistant to chemicals, mildew and insects.

B. The geotextile fabric shall be:

1. Thrace-LINQ 225EX
2. or approved equivalent meeting the following minimum criteria:

Grab Tensile Strength	215 lbs.
Elongation	50%
Puncture (CBR)	600 lbs.
Permittivity	1.3 sec $^{-1}$

2.04. POROUS GRANULAR EMBANKMENT (PGE), CA-1

A. Aggregate materials for use as PGE shall be CA-1, in conformance with Article 1004.01 of the IDOT Standard Specifications. Sources and/or samples of the proposed material shall be submitted to the Owner prior to delivery and installation.

3. EXECUTION

3.01 GENERAL

A. If at any time the Contractor discovers unsuitable or unstable material in areas that require structural fill for trails, pavements or structures, work shall be stopped and the Owner shall be contacted immediately. The Contractor shall excavate test pits at select locations to allow examination of the subsoils by the Owner. A determination shall be made by the Owner as to the most appropriate remedy and the Contractor shall be directed to perform the additional work. This work may include removal and replacement of soils, placement of geotextile fabrics or other remedies and shall be paid for as per the Schedule of Prices.

3.02 TEST ROLLING EQUIPMENT AND PROCEDURES

A. Test rolling of subgrades shall be performed in the presence of the Owner. When test rolling reveals unsuitable or unstable soils, the Owner shall determine the most appropriate remedy and direct the Contractor accordingly as described above.

B. Test rolling equipment shall conform to following description:

1. Tandem axle, dual wheel dump truck.
2. Tire pressure shall be no less than 90 percent of manufacturer's recommended maximum inflation.
3. Minimum gross weight of loaded truck shall be 60,000 pounds.
4. Provide weigh slip to the Owner.

C. Perform test rolling procedure as follows:

1. Operate equipment at a rate not to exceed 3 mph to 5 mph or a comfortable walking pace.
2. Adjust speed to allow the Owner to measure any deflections and areas of rutting.
3. Operate test rolling equipment in a pattern so that affected areas are loaded with at least one pass.
4. After test rolling, check subgrade for conformance to Plans, and correct any surface irregularities. Re-shape subgrade within tolerances specified.

D. Test Rolling Evaluation:

1. Rutting up to 1 inch is acceptable.
2. Rutting in excess of 1 inch but not more than 6 inches, shall be considered a failure and requires reworking soil and compaction to required density.
3. Deflection, (pumping) up to 1 inch is acceptable.
4. Deflection in excess of 1 inch but not more than 2 inches shall be acceptable if there is not substantial cracking or lateral movement of soil.
5. Deflection in excess of 2 inches but not more than 6 inches shall be considered a failure, and requires reworking soil and compaction to required density.

6. Rutting and deflection in excess of 6 inches will require review and recommendation for corrective action by the Owner.

7. After remedial work is performed, a final test roll shall be performed upon completion of work.

8. If remedial work is performed as directed, second test roll may be waived at discretion of the Owner.

E. When performing Subgrade Preparation, if it is determined that the material composition is acceptable and that excessive moisture has rendered the material unstable, the Contractor shall perform air drying techniques as per Article 301.04 of the IDOT Standard Specifications before consideration of removal of the material.

3.03 EXCAVATION AND ON-SITE DISPOSAL OF UNSUITABLE MATERIAL

A. Work contained under this pay item shall include the excavation, removal, loading hauling and on-site spreading of material deemed unsuitable by the Owner.

B. Prior to the commencement of this work, the Owner shall determine the exact dimensions, depths and quantities to be removed. Failure of the Contractor to have the work area properly inspected, approved and quantified by the Owner will result in the denial of payment for such work.

C. All excess excavated soils and spoil materials shall be relocated to an on-site area and spread as directed by the Owner. This work shall include any stripping, stockpiling and respreading of topsoil at the deposition area. Should the Owner require that material be removed from the site, it shall be paid for under a separate pay item if so included in the Schedule of Prices.

3.04 PLACEMENT OF FURNISHED EXCAVATION

A. Work contained under this item shall include placement, compaction and testing of suitable onsite or imported furnished excavation in areas of undercut as directed by the Owner. This work shall be done in accordance with Section 205 of the IDOT Standard Specifications.

B. Compaction shall be to a minimum 95 percent of maximum density based on a Standard Proctor (ASTM D-698). Where compaction of the subgrade is required, any areas that are inaccessible to a roller shall be compacted either by other mechanical means or using a hand tamper meeting the approval of the Owner.

C. After final filling and compacting, undercut areas shall be proof rolled in the presence of the Owner.

3.05 GEOTEXTILE GROUND STABILIZATION

A. This work shall consist of furnishing all materials, equipment and labor for the installation of geotechnical fabric over soils which will have trails, pavements or structures. Geotechnical Fabric is to be installed in locations as directed and approved by the Owner.

B. Geotechnical fabric is to be installed as a full width continuous sheet whenever possible and roll ends shall be overlapped a minimum of 4 feet.

3.06 PLACEMENT OF POROUS GRANULAR EMBANKMENT (PGE), CA-1

A. This work shall consist of furnishing all materials, equipment, and labor for the installation of Porous Granular Embankment (PGE). PGE shall be placed at the locations, dimensions and depths as directed by the Owner.

B. This item shall be used as replacement for unstable and unsuitable material that has been removed. PGE shall be furnished, placed and consolidated or compacted to the satisfaction of the Owner and in accordance with Section 207 of the IDOT Standard Specifications.

END OF SECTION 03110

SECTION 03120

FINISH GRADING AND TOPSOIL

1. GENERAL

1.01 DESCRIPTION

A. Work under this section may include:

1. Furnished topsoil placement and finish grading for revegetation of select areas of the work site.

B. Other specification sections which may directly relate to the work in this section include, but are not limited to, the following:

1. Section 03100 – Earthwork and Grading
2. Section 05200 – Trails
3. Section 09201 – Wood Chip Mulch
4. Section 09300 – Turf Seeding
5. Section 09310 – Native Seeding

2. PRODUCTS

2.01 FURNISHED TOPSOIL

A. After existing on-site topsoil has been respread, the Owner will determine if additional furnished topsoil is required. That decision will be based on quality and quantity of existing topsoil.

B. Topsoil shall consist of natural loam, sandy loam, silty loam, silty clay loam, or clay loam humus-bearing soils which are fertile and friable, adapted to the sustenance of plant life and originating from the A soil horizon of prairie and / or agricultural lands. Topsoil shall be free of stones, roots, trash, debris, contaminants, residual herbicides and other materials deleterious to plant growth. A sample and a soil analysis test by an independent lab shall be submitted along with the source location of the material. Topsoil testing shall indicate a pH between 6.0 and 8.0 and an organic content of not less than 4%. For Pulverized Topsoil, the following particle gradation is required:

Sieve Designation	Percent Passing
1″ screen	100
¼″ screen	97 – 100
No. 10 US Sieve Series	95 – 100
No. 140 US Sieve Series	60 – 90

2.02 COMPOST

A. Compost for use as soil amendments, planting mixes and for topdressing shall be 100% organic decomposed plant materials derived from grass clippings, leaves, small brush, silage, hay or other appropriate feedstock. The compost shall originate from a facility approved by the Illinois Environmental Protection Agency. The component proportions and processing methods shall be strictly managed to produce a product that meets or exceeds the EPA Performance Standards for General Use Compost and for End-Product Compost Derived from

Landscape Waste and the U.S. Composting Council Seal of Testing Assurance Program. The compost shall be entirely free of inorganic materials, fuels, poisons or other contaminants. The end product shall be mature, stable, weed free and produced by aerobic decomposition through temperature management and appropriate remixing schedules. It shall be screened to result in a maximum ½″ particle size. The compost shall have a pH of between 6.0 and 8.0.

B. Provide full laboratory test results and a product sample for approval.

3. EXECUTION

3.01 GENERAL

A. Provide all filling, spreading, cleaning and finish grading to achieve the lines, grades and minimum thickness indicated in the Contract Documents. Placement of onsite topsoil and furnished topsoil (if required) shall conform to Section 211 of the IDOT Standard Specifications. All finish grading shall be done in a manner that provides positive drainage.

B. A significant amount of handwork is required to ensure a clean and smooth horizontal trail edge and a smooth transition between the edge of the trail and the adjacent grassed areas. Areas immediately adjacent to the trail shall be of the same or a lesser elevation than the edge of trail in order to allow water to flow off the trail surface as quickly and efficiently as possible.

C. Unless specifically noted, all grades shown are finished grades. Elevations at points between elevations or contours are to be determined by uniform slopes between given grades or elevations, or between such figures and existing grades. Perform all finish grading required to attain the elevations indicated on the Plans. Grading tolerance shall be plus or minus one tenth (0.1) of a foot for all finish grading.

3.02 TOPSOIL EXCAVATION AND PLACEMENT (VARIOUS DEPTHS)

A. When indicated in the Contract Documents, topsoil shall be sourced from on-site locations. This work shall include the excavation, hauling and placement of topsoil from on-site location to areas requiring restoration or additional topsoil. Topsoil may be sourced from locations being excavated for the construction of proposed roads, trails, concrete pavements and structures or other borrow locations determined by the Owner. Topsoil depths for excavation vary by location and shall be determined from the geotechnical (boring) data. Excavated topsoil shall be transported to fill areas and placed at the depths required to achieve the proposed finish elevations. This work shall include all related grading and trimming of adjacent areas to assure positive drainage across the fill areas. Finish Grading and other final restoration work shall not be included in this Pay Item.

3.03 EXCESSIVE COMPACTION

A. Topsoil spreading and finish grading shall not commence on excessively compacted soils. Soils which have been compacted by construction activities, especially haul routes, shall be relieved of the excessive compaction by mechanical means such as use of a chisel plow, disc and rake which can physically break up the soil to the full depth of compaction. This work shall not be paid for separately but shall be considered incidental to Site Grading.

3.04 FINISH GRADING

A. Finish grading shall include all soil fracturing, blending and shaping to create a smooth and uniform surface for planting. Depressions from settlement shall be filled as needed. Transitions in grade shall be gradual and rounded. All surfaces shall be finished to provide adequate drainage. Create grades which drain away from structures at a minimum of 1/4-inch per foot for 10 feet.

B. The respreading of topsoil which has been stripped and stockpiled from graded areas is not included in this section. All respreading of stockpiled topsoil shall be paid for under the pay item Site Grading. Only the final finish grading of on-site topsoil is included in this section.

C. All areas of the work site indicated for planting, seeding or revegetation, and additionally all previously vegetated areas that have been disturbed, construction access, staging, stockpile and storage areas, borrow sites, disposal areas and any other bare soil areas requiring restoration shall be finish graded.

D. No soil shall be placed or worked while muddy or frozen.

E. When complete, the surface of the topsoil shall be free from rocks and debris greater than one inch in diameter and soil clods greater than 2 inch diameter. Areas adjacent to paving shall be trimmed of all aggregate base beyond the specified width. If surface debris cannot be adequately cleaned manually, the Contractor shall utilize a dedicated mechanical rock and debris collection attachment for motorized equipment.

F. New finish graded areas shall be protected from traffic and erosion. All settlement or washing away that may occur from any cause prior to or after seeding and soil stabilization shall be repaired and finish graded again to the required elevations, shapes and slopes at no additional cost to the Owner.

3.05 FURNISHED TOPSOIL

A. This work shall include all materials, equipment, and labor to provide, place, spread and fine grade furnished topsoil to the minimum thickness as specified in the Contract Documents.

B. Before placement of topsoil, the Contractor shall assure that the existing soil surface is not overly compacted or glazed and free from debris. If such conditions exist, the Contractor shall clean, scarify and/or till the surface to a minimum depth of 8 inches before the placement of topsoil. Place and spread the topsoil to the minimum thickness as specified and in a uniform layer. Do not excessively compact the topsoil after placement.

C. If required, furnished topsoil shall be fine graded as described above.

3.06 COMPOST SOIL AMENDMENT (DEPTH)

A. Compost shall be spread evenly at the required depth and tilled into the existing soil to a minimum depth of 8 inches using a powered mechanical tiller or tiller attachment. The surface shall then be raked and graded to a smooth surface profile.

END OF SECTION 03120

SECTION 03200
CULVERT CROSSINGS

1. GENERAL

1.01 DESCRIPTION

A. Work under this section may include:

1. Installation of culvert pipe, bedding, backfill, inlets, end sections and riprap at the outfall of the culvert.

B. Other specification sections which may directly relate to the work in this section include, but are not limited to, include the following:

1. Section 03100 – Earthwork and Grading
2. Section 03110 – Ground Stabilization
4. Section 03120 – Finish Grading and Topsoil
5. Section 05100 – Subgrade Preparation
6. Section 05200 – Trails
7. Section 05300 – Roads and Parking

2. PRODUCTS

2.01 CORRUGATED HIGH DENSITY POLYETHYLENE PIPE

A. Corrugated High Density Polyethylene (HDPE) pipe shall be constructed in accordance with AASHTO Specification M252 and M294, as applicable, or ASTM F2306. HDPE pipe shall be black, corrugated on the exterior with smooth walled interior. Pipe diameters and lengths shall be as specified on the Construction Drawings, and appropriately sized flared end sections shall be installed at each end of the pipe. HDPE pipe shall be Advanced Drainage Systems (ADS) N-12, or approved equal.

B. Joints for Corrugated HDPE shall be elastomeric joints in conformance with ASTM F477 and Manufacturer's Specifications.

2.02 REINFORCED CONCRETE PIPE (RCP)

A. Reinforced concrete pipe shall conform to AASHTO M 170 or ASTM C76. Pipe class shall be Class II unless otherwise indicated. Pipe diameters and lengths shall be as specified on the Plans.

B. Joints shall include a trowel applied bituminous mastic compound in accordance with Section 1055 of the IDOT Standard Specifications.

2.03 PRECAST RCP FLARED END SECTIONS (FES)

A. Precast RCP FES shall conform to the applicable requirements of AASHTO M 170 or ASTM C76. FES sizes shall be as specified on the contract drawings.

2.04 CORRUGATED STEEL PIPE (CSP)

A. CSP shall be constructed in accordance with AASHTO Specifications M 218 and M 36. Pipe diameters and lengths shall be as specified on the Plans, and appropriately sized flared end sections shall be installed at each end of the pipe.

B. Pipe diameters will be one size larger than HDPE pipe when a connection between two dissimilar pipes is to be made. Joints for the connection of HDPE to CSP shall be a double wide reinforced, rubberized mastic, external sealing band coupler per the manufacturer's specifications.

1. The dissimilar pipe coupler shall be:

a. MarMac Dissimilar Pipe Couplers ("DP Couplers")

b. or approved equivalent meeting the criteria listed above.

C. Pipe joint coupling bands shall be provided meeting the pipe manufacturer's recommendations. Coupling bands shall be installed to provide straight alignment of the connecting pipe ends. The bands shall be positioned to overlap adjacent pipes equally. The coupling bands shall be corrugated to match the corrugations of the pipe section ends being connected.

2.05 METAL FLARED END SECTIONS (MES)

A. This specification covers metal end sections used on the inlet and outlet ends of CSP and HDPE pipe. The galvanized material used in the fabrication of the end sections shall conform to the applicable material requirements of AASHTO M 218 or ASTM A 929. All fabrication of the product shall occur within the United States of America. The end sections shall be manufactured to show careful finished workmanship. There shall be no loosely formed seams or ragged shear edges. The markings on the sheets as received from the steel supplier shall be legible. The metallic coating on the end section shall not be bruised, broken or otherwise damaged. If there is damage to the coating it shall be repaired in accordance with ASTM A 780.

B. Metal end sections will match the diameter of the CSP extension when being used with HDPE pipe. Where metal end sections are connected directly to HDPE pipe, the metal end section will typically be one diameter larger.

2.06 RIPRAP

A. The riprap shall be natural field stone cobbles and boulders reasonably graded from a minimum of 5 inches to a maximum of 12 inches in diameter unless specified differently on the Plans. The cobbles shall be of mixed geologic origin primarily granite, as is typically found in the Fox River basin of northern Illinois and throughout Wisconsin. Crushed limestone riprap is not acceptable and will not be approved. Samples of the specified material shall be submitted for approval to the Owner prior to delivery and placement. Riprap shall include the appropriate geotextile fabric when specified on the Plans.

2.07 GEOTEXTILE FABRIC

A. Geotextile fabric underlayment for riprap shall be non-woven; needle punched polypropylene staple fiber that is UV stabilized and resistant to chemicals, mildew and insects.

B. The geotextile fabric shall be:

1. Thrace-LINQ GTF-225EX

2. or approved equivalent meeting the following minimum criteria:

Grab Tensile Strength	215 lbs.
Elongation	50%

Puncture (CBR)	600 lbs.
Permittivity	1.3 sec^{-1}

2.08 BACKFILL AND BEDDING, CA-6, TYPE B

A. Backfill material shall be CA-6, Type B, in conformance with Article 1004.01 of the IDOT Standard Specifications except as noted below. The source of the material shall be approved by the Owner prior to delivery. Samples of the proposed material shall be submitted to the Owner for approval prior to delivery and installation.

B. Backfill beneath and within 2 feet of aggregate trail or paved surfaces shall consist of trench backfill meeting the requirements Section 208 of the Standard Specifications.

3. EXECUTION

3.01 GENERAL

A. Culvert crossing material shall be as designated on the Plans.

B. Contractor shall install and maintain erosion control measures including the installation of ditch checks and silt fence at culvert crossing locations as shown on the Plans prior to the commencement of any construction activities at that culvert crossing location. Ditch checks and silt fence shall be in accordance with the Construction Drawings.

C. Contractor shall submit Shop drawings and provide details for all items required to complete the work at each culvert crossing for review and approval by the Owner prior to the commencement of any construction activities.

3.02 SUBGRADE PREPARATION

A. Existing topsoil within culvert crossing area shall be stripped and stockpiled, subgrade shall be excavated to the required lines and grades as shown on the Plans and to match the existing ditch bottom slope. The subgrade shall be compacted to a minimum of 95% density based on a Standard Proctor (ASTM D-698). If the required compaction density cannot be achieved due to the presence of unsuitable material, the material shall be excavated and replaced with either compacted suitable on-site fill, Porous Granular Embankment (PGE) or Trail Embankment and Geotechnical Fabric as approved by the Owner (See Section 03110 Unsuitable Materials).

3.03 CULVERT INSTALLATION

A. Culvert installation shall conform to Article 542.04 of the IDOT Standard Specifications, applicable manufacturer’s recommended installation procedures and the Plans.

B. Backfill material shall be placed and compacted in uniform lifts of a maximum loose thickness of 6 inches.

C. Bedding and haunching shall be in accordance with Manufacturers’ requirements.

3.04 RIPRAP

A. Riprap shall be installed at the locations and in the dimensions shown on the Plans. The riprap shall be placed to a depth shown on the Plans and placed on an approved Geotextile Filter Fabric.

B. Riprap shall be placed in accordance with Section 281 of the IDOT Standard Specifications.

3.05 CULVERT DITCHING

A. Ditching shall be provided upstream and downstream of each culvert to provide adequate drainage along flow path of culvert. Ditching shall match existing drainage way in slope and dimension. All flow obstruction shall be removed to provide a clear flow path.

3.06 END TREATMENTS

A. Installation of end treatments shall conform to Articles 502.10 and 540.07 of the IDOT Standard Specifications, applicable manufacturer's recommended installation procedures and shall be the size, type and at the locations as shown on the Plans.

END OF SECTION 03200

SECTION 03300

DRAINAGE STRUCTURES

1. GENERAL

1.01 DESCRIPTION

A. Work under this section includes:

1. Installation of storm sewer structures (sewers, pipes, inlets, manholes, catch basins, etc.) and associated frames and grates.

B. Other specification sections which may directly relate to the work in this section include, but are not limited to, the following:

1. Section 02400 – Soil Erosion and Sediment Control
2. Section 03100 – Earthwork and Grading
3. Section 05100 – Subgrade Preparation

2. PRODUCTS

2.01 PRECAST CONCRETE MANHOLES, OUTLET CONTROL STRUCTURES, CATCH BASINS AND INLETS

A. Precast manholes and structures shall conform to ASTM C478, Section 602 and Article 1042.10 of the IDOT Standard Specifications. Design dimensions shall be as shown on the Plans.

2.02 CAST IRON FRAMES AND GRATES

A. Castings shall conform to the requirements of gray iron castings as specified in ASTM A 48 or ductile iron castings as specified in ASTM A 536 of the type and size shown on the Plans.

2.03 CONCRETE SEWER PIPE

A. Reinforced Concrete Sewer Pipe

1. Reinforced Concrete Sewer Pipe shall conform to Section 550 and Article 1042.06 of the IDOT Standard Specifications and ASTM C76, and shall be of the nominal diameter and class indicated on the Plans.

B. Joints for Concrete Sewer Pipe

1. Joints for concrete sewer pipe shall be rubber ring joints conforming to ASTM C443 or cold applied asphaltic compound joints.
2. Rubber gaskets shall consist of a special rubber designed to resist hardening and disintegration from contact with sewage and water over long periods of time. The ring shall fit snugly over the spigot end of the pipe. Provide rubber cement and bituminous or other coating as required to insure a proper joint.
3. Material for cold applied asphaltic compound joints shall be Ram-Nek as manufactured by K. T. Snyder Company, Houston, Texas; Ropax Packing and Kalktite Sewer Joint Compound as manufactured by Prestite Engineering Company; or equal.

4. Other joints for concrete sewer pipe; such as mortar or die-cast bituminous joints, may be used only if specifically approved by the OWNER.

2.04 POLYVINYL CHLORIDE PIPE STORM SEWER/FIELD TILE/DRAIN LINE

A. Polyvinyl Chloride (PVC) pipe and fittings shall conform to ASTM D2241 and have a Standard Dimension Ratio (SDR) of 26. Pipe diameters and lengths shall be as specified on the Plans.

B. Joints for PVC pipe and fittings shall be furnished with elastomeric gasket joints conforming to ASTM F477.

C. Cleanouts/Observation structures shall be constructed with fittings of the same materials and diameter as the mainline sewer.

D. Connection to existing sewers shall be made with manufactured fittings where possible. Stainless steel non-shear couplings shall be utilized at locations where connection is made to a non-standard pipe size/material after approval from the OWNER.

2.05 POLYVINYL CHLORIDE PIPE UNDERDRAIN

E. Polyvinyl Chloride (PVC) underdrain pipe and fittings shall conform to ASTM D3034 and have a Standard Dimension Ratio (SDR) of 35. Pipe diameters and lengths shall be as specified on the Plans.

F. Joints for PVC pipe and fittings shall be furnished with elastomeric gasket joints conforming to ASTM F477.

G. PVC underdrain pipe shall be perforated with two (2) 5/8″ diameter holes spaced at 6 inches on center longitudinally along the pipe. Holes shall be spaced at an angle of approximately 120 degrees when viewed in section view.

2.06 PERFORATED CORRUGATED HIGH DENSITY POLYETHYLENE PIPE UNDERDRAIN

A. Corrugated High Density Polyethylene (HDPE) pipe shall be constructed in accordance with AASHTO Specification M252 and M294, as applicable, or ASTM F2306. Underdrain shall conform to Article 601.02(b) (4) Article 1040.04 of the IDOT Standard Specifications. Pipe diameters and lengths shall be as specified on the Plans.

2.07 PREFABRICATED TRENCH DRAINS

A. Prefabricated trench drains shall be manufactured with SMC/GRP (sheet molding compound/glass reinforced polyester) material or polymer reinforced concrete. Each section of trench drain shall be 39.4″ in length and manufactured with a sloped invert.

B. All metal components shall be stainless steel.

C. Grates shall be stainless steel with perforated openings rated for Load Class C (light trucks) or greater, comply with ADA requirements, and lock into place.

D. Transition to different pipe materials shall be made with fittings manufactured by the same company the manufactures the selected trench drain.

E. Trench drains shall be Mea-Josam Pro-Plus 100C series or ACO KlassikDrain K100 series. Grates shall be Mea-Josam Pro-Plus Series Part No. 152781 or ACO Type 465Q

F. or Approved Equal

2.08 BACKFILL AND BEDDING, CA-6, TYPE B

A. Backfill material shall be CA-6, Type B, in conformance with Article 1004.01 of the IDOT Standard Specifications except as noted below and on the details. The source of the material shall be approved by the Owner prior to delivery. Samples of the proposed material shall be submitted to the Owner for approval prior to delivery and installation.

B. Backfill beneath and within 2 feet of aggregate trail or paved surfaces shall consist of trench backfill meeting the requirements Section 208 of the Standard Specifications.

3. EXECUTION

3.01 STORM DRAINAGE STRUCTURES (MANHOLES, OUTLET CONTROL STRUCTURES)

A. This work shall consist of furnishing all materials, equipment, and labor and performance of all required operations of the installation of the storm drainage structures as specified and shown on the Plans.

B. The work shall meet the applicable sections of Division V of the Standard Specifications for Water and Sewer Construction in Illinois, latest edition.

C. Contractor to install specified sediment control protection device or measures upon completion of installation of storm drainage structure.

3.02 STORM SEWER / FIELD TILE / DRAIN LINE

A. This work shall consist of furnishing all materials, equipment, and labor and performance of all required operations of the installation of the Storm Sewer of the diameter, material, and length as specified and shown on the Plans, including fittings for changes in directions or materials, and cleanouts.

B. The work shall meet the applicable sections of Division V of the Standard Specifications for Water and Sewer Construction in Illinois, latest edition and Article 550.06-08 of the IDOT Standard Specifications.

C. All lengths of pipe shall be dimensioned accurately to measurements established at the site, and shall be worked into place without springing or forcing.

D. The Contractor shall cut all pipe and drill all holes that may be necessary. Cut sections of pipe shall be reamed or filed to remove all burrs. The pipe interior and joints shall be thoroughly cleaned before being installed and kept clean during construction.

E. All changes in direction shall be made with fittings or approved joint deflection. Bending of pipe is prohibited.

F. Any transition from one pipe size to another shall be made with a reducing fitting. Reducing bushings are prohibited except where specifically indicated on the Plans or approved by the Owner.

G. Contractor to install specified sediment control protection device or measures upon completion of installation of storm drainage structure.

H. Pipe shall be installed true to the lines and grades from reference stakes set by the Contractor by the use of an adjustable pipe laser.

I. Pipe shall be laid progressively up grade, with bell upstream, in a manner to form close, concentric joints with smooth bottom inverts.

3.03 UNDERDRAIN

A. This work shall consist of furnishing all materials, equipment, and labor and performance of all required operations of the installation of the underdrain of the diameter, material, and length as specified and shown on the Plans.

B. The work shall meet the applicable sections of Division V of the Standard Specifications for Water and Sewer Construction in Illinois, latest edition and Article 601.01-05 of the IDOT Standard Specifications.

C. All lengths of pipe shall be dimensioned accurately to measurements established at the site, and shall be worked into place without springing or forcing.

D. The Contractor shall cut all pipe and drill all holes that may be necessary. Cut sections of pipe shall be reamed or filed to remove all burrs. The pipe interior and joints shall be thoroughly cleaned before being installed and kept clean during construction.

E. All changes in direction shall be made with fittings or approved joint deflection. Bending of pipe is prohibited.

F. Any transition from one pipe size to another shall be made with a reducing fitting. Reducing bushings are prohibited except where specifically indicated on the Plans or approved by the Owner.

3.04 SEPARATION OF NON-POTABLE AND POTABLE WATER LINES

A. Horizontal Separation

1. Whenever possible, existing and proposed potable watermains shall be separated at least 10 feet horizontally from any existing or proposed sewer or drain line.

2. Should local conditions prevail which would prevent a lateral separation of 10 feet, a watermain may be laid closer than 10 feet to, or in the same trench as, a storm or sanitary sewer provided the main is laid in a separate trench or on an undisturbed earth shelf located to one side of the sewer and at such an elevation that the bottom of the watermain is at least 18 inches above the top of the sewer.

B. Vertical Separation

1. Whenever potable watermains and non-potable lines cross or run parallel within 10 feet, the watermain should be laid at such an elevation that the bottom of the watermain is 18 inches above the top of the drain or sewer. This vertical separation should be maintained for that portion of the watermain located within 10 feet, horizontally, of any sewer or drain crossed, said 10 feet to be measured as the normal distance from the watermain to the drain or sewer.

2. Where it is necessary for the watermain to pass under a sewer or drain line, the top of the watermain shall be 18 inches below the bottom of the sewer or drain line, and the watermain installed inside a casing pipe. This casing pipe shall extend each side of the crossing until the horizontal distance from the end of the casing to the sewer or drain line is at least 10-feet.

3. In making such crossings, it is preferable to center a length of watermain pipe over the sewer to be crossed so that the joints will be equal distance from the sewer and as remote therefrom as possible. Means to support the non-potable lines to prevent their settling and breaking the watermain shall also be provided.

C. Exceptions

1. If it is impossible to obtain proper horizontal and/or vertical separation as stipulated in A.1. or B.1., both the watermain and sewer shall be constructed of watermain grade **[ductile iron]** pressure pipe for a distance of at least 10 feet on each side of the crossing. Both pipes shall be pressure tested to assure watertightness before backfilling.

D. Water Service Lines

1. The horizontal and vertical separation between water service lines and all sanitary sewers, storm sewers and any drain should be the same as for watermains, as detailed in Paragraphs A and B, except when minimum horizontal and vertical separation cannot be maintained. Copper is to be used for water service lines.

3.05 PREFABRICATED TRENCH DRAINS

A. Trench drains shall be installed at locations shown and to the orientation and grades specified on the Plans and/or at additional locations as specified by the Owner.

B. Trench drains shall be wet-set in a concrete envelope with at least 6-inches on concrete on all sides.

C. Trench drain shall be installed in accordance with the selected manufacturer’s recommendations and details.

3.06 FIELD TILE REPLACEMENT

A. Pipe shall be installed in accordance with 3.02 – STORM SEWER from this section.

B. Where connection is made to an existing filed tile that flows off-site or conveys flow from off-site, an observation structure shall be installed.

C. Replacement shall follow the same general alignment of the existing tile such that the existing tile is removed along the length of replacement.

END OF SECTION 03300

SECTION 04100

UTILITY SLEEVES

1. GENERAL

1.01 DESCRIPTION

A. Work under this section includes:

1. Furnishing and installing underground pipe raceways and utility sleeves for utility services.

B. Other specification sections which may directly relate to the work in this section include, but are not limited to, the following:

1. Section 05200 – Trails
2. Section 05300 – Roads and Parking
3. Section 05400 – Concrete Pavement

2. PRODUCTS

2.01 PIPE

A. Pipe sleeves for utilities shall be Schedule 40 PVC Conduit of the diameter shown on the Plans.

2.02. TRACER WIRE

A. Tracer wire shall be #12 AWG plastic coated solid wire suitable for direct burial.

2.03 TRENCH BACKFILL AND BEDDING

A. Backfill material shall match that which is required by the surface type. Backfill material at locations of paved surfaces such as trails, roads, parking areas and concrete surfaces shall be CA-6, Type B, in conformance with Article 1004.01 of the IDOT Standard Specifications unless noted otherwise on the plans. Backfill material in landscape areas shall be the existing soils at the pipe location.

3. EXECUTION

3.01 GENERAL

A. Utility sleeves shall be installed at the locations and at the depths shown on the Plans. Tracer wire shall be firmly attached to the pipe sleeves prior to burial.

3.02 TRENCH BACKFILL AND BEDDING

A. Trench backfill and bedding for utility sleeves under pavement shall be compacted to match the pavement base aggregate, typically to a minimum of 95% density based on a Standard Proctor (ASTM D-698). At locations in landscape areas, the topsoil at the pipe location shall be separated from other soils below and then respread as the surface layer during backfill.

3.03 PVC CONDUIT FITTINGS

A. All fittings shall be Schedule 40 PVC made specifically electrical conduit. All fittings for turns shall be large radius wide sweep type. End caps shall be provided and attached to all pipe ends.

END SECTION 04100

SECTION 04110

DIRECTIONAL DRILLING

1. GENERAL

1.01 DESCRIPTION

A. Work under this section includes:

1. Directional Drilling for water, electric and misc. utility lines.

B. Other specification sections which may directly relate to the work in this section include, but are not limited to, the following:

1. Section 04200 – Electric Service and Distribution
2. Section 04310 – Water Distribution

1.92 SUBMITTALS

A. Work under this section includes:

1. Directional Drilling for water

2. PRODUCTS

2.01 DRILLING FLUID

A. Drilling fluid shall be composed of clean water and appropriate clay additives. Water shall be from an authorized source with a pH of 8.5-10. Water of a lower pH or with excessive calcium shall be treated with the appropriate amount of sodium carbonate or equal. The water and additives shall be mixed thoroughly and be absent of any clumps or clods. No potentially hazardous material may be used in drilling fluid.

3. EXECUTION

3.01 SAFETY

A. Contractor shall adhere to all applicable state, federal and local safety regulations and all operations shall be conducted in a safe manner. Safety meetings shall be conducted at least weekly with a written record of attendance and topic submitted to Owner.

3.02 PIPE

A. Pipe materials shall be of the type listed in each section above.

3.03 PILOT HOLE

A. Pilot hole shall be drilled on bore path with no deviations greater than 5% of depth over a length of 100 feet. In the event that pilot does deviate from bore path more than 5% of depth in 100 feet, Contractor will notify Owner and the Owner may require Contractor to pullback and re-drill from the location along bore path before the deviation.

3.04. INADVERTENT RETURN

A. In the event that a drilling fluid fracture, inadvertent returns or returns loss occurs during pilot hole drilling operations, Contractor shall cease drilling, wait at least

30 minutes, inject a quantity of drilling fluid with a viscosity exceeding 120 seconds as measured by a March funnel and then wait another 30 minutes. If mud fracture or returns loss continues, Contractor will cease operations and notify Owner. Contractor shall provide sufficient silt fence, vacuum trucks or other means required to contain all mud and/or remove it from the site. No additional compensation will be allowed for containment or cleanup of mud fractures.

3.05. REAMING

A. Upon successful completion of pilot hole, Contractor will ream bore hole to a minimum of 25% greater than outside diameter pipe using the appropriate tools. Contractor will not attempt to ream at one time more than the drilling equipment and mud system are designed to safely handle.

3.06. PULL BACK

A. After successfully reaming bore hole to the required diameter, Contractor will pull the pipe through the bore hole. Pipe will be placed on pipe rollers before pulling into bore hole with rollers spaced close enough to prevent excessive sagging of pipe. In front of the pipe will be a swivel and reamer to compact bore hole walls. Once pull-back operations have commenced, operations must continue without interruption until pipe is completely pulled into bore hole. During pull-back operations, Contractor will not apply more than the maximum safe pipe pull pressure at any time. The Contractor shall install a test section of pipe, which will fail prior to damaging the pipe or joint restraint, attached to the front of the pull-back pipe. At no time shall the pull-back force exceed the maximum forces specified by the pipe or joint restraint manufacturer for the size and/or dimension ratio of pipe being installed.

END SECTION 04110

SECTION 04200

ELECTRICAL SERVICE AND DISTRIBUTION

1. GENERAL

1.01 DESCRIPTION

A. Work under this section includes:

1. Furnishing and installing conduit, ducts, and duct accessories for direct-buried conduit.
2. Furnishing and installing handholes and boxes.

B. Other specification sections which may directly relate to the work in this section include, but are not limited to, the following:

1. Section 04100 – Utility Sleeves
2. Section 04300 – Water Wells
3. Section 04400 – Sanitary Systems

1.02 DEFINITIONS

A. RNC: Rigid nonmetallic conduit.

1.03 SUBMITTALS

A. Product Data, for the following:

1. Duct-bank materials, including separators and miscellaneous components.
2. Ducts and conduits and their accessories, including elbows, end bells, bends, fittings, and solvent cement.
3. Accessories for manholes, handholes, boxes, and other utility structures.
4. Warning tape.
5. Warning planks.

B. Shop Drawings for Precast or Factory-Fabricated Underground Utility Structures: Include plans, elevations, sections, details, attachments to other work, and accessories, including the following:

1. Duct entry provisions, including locations and duct sizes.
2. Reinforcement details.
3. Frame and cover design and manhole frame support rings.

C. Shop Drawings for Handholes and Boxes Other Than Precast Concrete: Include dimensioned plans, sections, and elevations, and fabrication and installation details, including the following:

1. Duct entry provisions, including locations and duct sizes.
2. Cover design.

D. Product Certificates: For concrete and steel used in precast concrete handholes, as required by ASTM C 858.

1.04 QUALITY ASSURANCE

A. Comply with NFPA 70.

1.05 COORDINATION

A. Coordinate layout and installation of ducts, handholes, and boxes with final arrangement of other utilities, site grading, and surface features as determined in the field.

B. Coordinate elevations of ducts and duct-bank entrances into handholes, and boxes with final locations and profiles of ducts and duct banks as determined by coordination with other utilities, underground obstructions, and surface features. Revise locations and elevations from those indicated as required to suit field conditions and to ensure that duct runs drain to manholes and handholes, and as approved by Owner.

2. PRODUCTS

2.01 CONDUIT

A. Rigid Steel Conduit: Galvanized. Comply with ANSI C80.1.

B. RNC: NEMA TC 2, Type EPC-40-PVC, UL 651, with matching fittings by same manufacturer as the conduit, complying with NEMA TC 3 and UL 514B.

2.02 NONMETALLIC DUCTS AND DUCT ACCESSORIES

A. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Plans or a comparable product by one of the following:

1. ARNCO Corp.
2. Beck Manufacturing.
3. Cantex, Inc.
4. CertainTeed Corp.; Pipe & Plastics Group.
5. Condux International, Inc.
6. ElecSys, Inc.
7. Electri-Flex Company.
8. IPEX Inc.
9. Lamson & Sessions; Carlon Electrical Products.
10. Manhattan/CDT; a division of Cable Design Technologies.
11. Sporadic/AFC Cable Systems, Inc.

B. Duct Accessories:

1. Duct Separators: Factory-fabricated rigid PVC interlocking spacers, sized for type and sizes of ducts with which used, and selected to provide minimum duct spacings indicated while supporting ducts during concreting or backfilling.

2. Warning Tape: Underground-line warning tape specified in Division 26 Section "Identification for Electrical Systems."

3. Concrete Warning Planks: Nominal 12 by 24 by 3 inches (300 by 600 by 76 mm) in size, manufactured from 6000-psi (41-MPa) concrete.

   a. Color: Red dye added to concrete during batching.

   b. Mark each plank with "ELECTRIC" in 2-inch- (50-mm-) high, deep letters.

2.03 HANDHOLES AND BOXES

A. Description: Comply with SCTE 77.

1. Color: Gray.

2. Configuration: Units shall be designed for flush burial and have **open** bottom, unless otherwise indicated.

3. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure.

4. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.

5. Cover Legend: Molded lettering, "ELECTRIC."

6. Direct-Buried Wiring Entrance Provisions: Knockouts equipped with insulated bushings or end-bell fittings, selected to suit box material, sized for wiring indicated, and arranged for secure, fixed installation in enclosure wall.

7. Retain first subparagraph below if ducts will enter enclosure through the side. Otherwise, entry will be made through an open bottom or through side openings cut in the field as specified in Part 3. Coordinate with Plans.

8. Duct Entrance Provisions: Duct-terminating fittings shall mate with entering ducts for secure, fixed installation in enclosure wall.

9. Handholes 12 inches wide by 24 inches long (300 mm wide by 600 mm long) and larger shall have factory-installed inserts for cable racks and pulling-in irons.

B. Retain one or more of four paragraphs and associated subparagraphs below to select enclosure type(s) for areas not subject to deliberate traffic by vehicles. Coordinate selection with Part 3 "Underground Enclosure Application" Article. For enclosures with cover options, verify that selected cover is available with the load rating specified in Part 3 "Underground Enclosure Application" Article.

C. Polymer Concrete Handholes and Boxes with Polymer Concrete Cover: Molded of sand and aggregate, bound together with a polymer resin, and reinforced with steel or fiberglass or a combination of the two.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

3. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Plans or a comparable product by one of the following:

a. Armorcast Products Company.

b. Carson Industries LLC.

c. CDR Systems Corporation.

d. NewBasis.

2.04 POWER FOR LIFT STATION

A. ComEd Transformer, primary voltage to 120/240-volt, single phase.

B. 100-amp meter socket and 50-amp 120/240-volt single phase panel, mounted on corrosive resistant post installed in concrete base.

C. 1P20 amp breaker to feed receptacle.

D. Receptacle for lift station pump to plug into.

E. (2) 1P20 breakers (spare)

3. EXECUTION

3.01 UNDERGROUND DUCT APPLICATION

A. Ducts for Electrical Feeders over 600 V and Less: RNC**,** NEMA Type [**EPC-80**] [**EPC- 40**]-PVC, in direct-buried duct bank, unless otherwise indicated.

3.02 EARTHWORK

A. Excavation and Backfill: Comply with Division 22 Section "Earth Moving," but do not use heavy-duty, hydraulic-operated, compaction equipment. n of disturbed features and areas.

B. Restore surface features at areas disturbed by excavation and reestablish original grades, unless otherwise indicated. Replace removed sod immediately after backfilling is completed.

C. Restore areas disturbed by trenching, storing of dirt, cable laying, and other work. Restore vegetation and include necessary topsoiling, fertilizing, liming, seeding, sodding, sprigging, and mulching. Comply with Division 32 Sections "Turfs and Grasses" and "Plants."

D. Cut and patch existing pavement in the path of underground ducts and utility structures according to Division 01 Section "Cutting and Patching."

3.03 DUCT INSTALLATION

A. Slope: Pitch ducts a minimum slope of 1:300 down toward manholes and handholes and away from buildings and equipment. Slope ducts from a high point in runs between two handholes to drain in both directions.

B. Curves and Bends: Use 5-degree angle couplings for small changes in direction. Use manufactured long sweep bends with a minimum radius of 48 inches (1220 mm), both horizontally and vertically, at other locations, unless otherwise indicated.

C. Joints: Use solvent-cemented joints in ducts and fittings and make watertight according to manufacturer's written instructions. Stagger couplings so those of adjacent ducts do not lie in same plane.

D. Pulling Cord: Install 100-lbf- (445-N-) test nylon cord in ducts, including spares.

E. Direct-Buried Duct Banks:

1. Support ducts on duct separators coordinated with duct size, duct spacing, and outdoor temperature.

2. Space separators close enough to prevent sagging and deforming of ducts, with not less than 4 spacers per 20 feet (6 m) of duct. Secure separators to earth and to ducts to prevent displacement during backfill and yet permit linear duct movement due to expansion and contraction as temperature changes. Stagger spacers approximately 6 inches (150 mm) between tiers.

3. Excavate trench bottom to provide firm and uniform support for duct bank. Prepare trench bottoms as specified in Division 22 Section "Earth Moving" for pipes less than 6 inches (150 mm) in nominal diameter.

4. Install backfill as specified in Division 22 Section "Earth Moving."

5. Install ducts with a minimum of 3 inches (75 mm) between ducts for like services and 6 inches (150 mm) between power and signal ducts.

6. Requirements in first subparagraph below exceed NFPA 70. Retain for conservative design.

7. Depth: Install top of duct bank at least 30 inches (900 mm) below finished grade, unless otherwise indicated.

3.04 INSTALLATION OF HANDHOLES AND BOXES OTHER THAN PRECAST CONCRETE

A. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting ducts to minimize bends and deflections required for proper entrances. Use box extension if required to match depths of ducts, and seal joint between box and extension as recommended by the manufacturer.

B. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1/2-inch (12.7-mm) sieve to No. 4 (4.75-mm) sieve and compacted to same density as adjacent undisturbed earth.

C. Elevation: In paved areas and trafficways, set so cover surface will be flush with finished grade

END OF SECTION 04200

SECTION 04300
WATER WELLS

1. GENERAL

1.01 DESCRIPTION

A. Work under this section includes:

1. Installation of Water Wells and all other materials necessary to construct the proposed improvements.

B. Other specification sections which may directly relate to the work in this section include, but are not limited to, include the following:

1. Section 03100 – Earthwork and Grading
2. Section 04310 – Water Distribution

1.02 QUALITY ASSURANCE

A. Contractor Qualifications: The work described in this section requires specialized knowledge, experience, skills and equipment to successfully complete. The Contractor shall possess the full capability to execute the work as specified, including trained, experienced, and skilled personnel and possession or access to the required equipment.

B. Shop Drawings:

1. Shop Drawings, submittal requirements, procedures and schedules shall meet the requirements contained in Subsection 1.09 of Section 01000, General Project Requirements.

C. Substitutions and Product Options:

1. These shall meet the requirements in Subsection 1.08.E of Section 01000, General Project Requirements.
2. Provide three (3) locations and contacts of similar work of this nature.
3. All approved equals shall be notified with written statements of their approval. Manufacturers shall not bid this project without this written notification.

2. PRODUCTS

2.01 WELL CASINGS AND ESTIMATED DEPTH

A. 6″ PVC Casing SDR-21 200 psi at 73 degrees Farenheit, ASTM D-2241

B. Estimated Depth – To be determined by contractor for required design flow and water quality (Approximately 320 ft)

2.02 PIPING, TANK, ELECTRICAL, FITTINGS AND ADAPTERS

A. PVC Drop Pipe:

1. 1 ¼″ diameter PVC Sch 80, 630 psi, PVC 1120 NSF ASTM D1785

B. Submersible Pump Wire:

1. THW 75 degree Celsius Flat Double Insolated Submersible Water Pump Cable 600V

D. Parts:

1. Brass adapters with stainless steel clamps, brass nipples and brass elbows

E. Well Cap:

1. Lunde/Monitor, vented/gasketed well cap according to State and County codes, or approved equal.

F. Well Pressure Storage Tank:

1. Amtrol “Well-X-Trol” WX-103, Captive Air Tank, Amtrol Brand NSF/ANSI 61, or approved equal

G. Water mains (Supply pipe from well to building)

1. Coil Plastic HDPE 200 PSI SIDR 9 ASTM 2239 SNF-PW U.P. Code AWW-C901 PEPF4710, 1 ¼″ to building.

H. Pitless Adapter(s)

1. "Baker" Pitless Adapter- M18-09-12001005-001 SPS56PBWEOCO or approved equal

a. Pitless well adapters in accordance with section 920.40 Subsection F of the Illinois Water Well and Pump Installation Contractors License Code.

2. "Campbell" Pitless Adapter - Pitless Adapter Standard PAS-97 Certified to NSF/ANSI 372, or approved equal

a. Pitless well adapters in accordance with section 920.40 Subsection F of the Illinois Water Well and Pump Installation Contractors License Code.

2.03 GROUT

A. WYO-BEN GROUT-WELL DF NSF/ANSI 60 granular, or approved equal

2.04 WATER WELL SCREENS

A. Approved Manufacturer: Johnson Stainless Steel Slotted, or approved equal

B. Screen Material: Fabricated of ASTM A 666, Type 304 stainless steel tube; with slotted or perforated surface and designed for well-screen applications.

B. Screen Couplings: Butt-type, stainless-steel coupling rings.

C. Screen Fittings: Screen, with necessary fittings, closes bottom and makes tight seal between top of screen and well casing.

D. Maximum Entering Velocity: 0.1 fps

2.05 PACK MATERIAL – Depends on what slot Screen used.

A. Coarse, uniformly graded filter sand, maximum 1/8 inch (3 mm) in diameter.

B. Fine gravel, maximum 1/4 inch (6 mm) in diameter.

2.06 SUBMERSIBLE WELL PUMPS

A. Acceptable Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. “Goulds” Pump Water Technology
2. “Franklin” Motor classified UL Water Quality
3. or approved equal

B. Description: Submersible, well pump complying with HI 2.1-2.2 and HI 2.3; with the following features:

C. Impeller Material: Plastic

D. Motor: Capable of continuous operation under water, with protected submersible power cable.

E. Column Pipe: PVC Sch 80, 630 psi, PVC 1120 NSF ASTM D1785.

F. Discharge Piping: Coil Plastic HDPE 200 PSI SIDR 9 ASTM 2239 SNF-PW U.P. Code AWW-C901 PEPF4710

G. Capacities and Characteristics:

1. Capacity: 30 gpm
2. Discharge Head: 65-70 psi
3. Discharge Size: 1 ¼″
4. Speed: 3,450 rpm
5. Motor Horsepower: 3 HP

2.07 MOTORS –

A. General requirements for motors are specified in Division 22 Section "Common Motor Requirements for Plumbing Equipment."

B. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.

C. Controllers, Electrical Devices, and Wiring: Electrical devices and connections are specified in other sections of this specification.

2.08 WELL CONTROL PANEL

A. Digital display on drive.

2.09 CHLORINATOR

A. Contractor/Water Treatment Company to shall size chlorinator to provide the proper chlorination in ppm as required by local and state codes.

3. EXECUTION

3.01 PREPARATION

A. Neighborhood Well Data: Review operating and test analyses.

3.02 INSTALLATION

A. Construct well using rotary drilling method.

B. Take samples of substrata formation at 10-foot (3-m) intervals and at changes in formation throughout entire depth of each water supply well. Carefully preserve samples on-site in glass jars properly labeled for identification.

C. Excavate for mud pit or provide aboveground structure, acceptable to authorities having jurisdiction, to allow settlement of cuttings and circulation of drill fluids back to well without discharging to on-site waterways. Disposal of slurry in portable pit to be sucked out.

D. Enlarge pilot hole and install permanent casing, screen, and grout. Install first section of casing with hardened steel driving shoe of an OD slightly larger than casing couplings if threaded couplings are used.

E. Set casing and liners round, plumb, and true to line.

F. Join casing pipe as follows:

1. Pre-beveled
2. Solvent weld
3. Mix grout per manufacturers specifications.
4. Place grout continuously, from bottom to top surface, to ensure filling of annular space in one operation. Do not perform other operations in well within 72 hours after grouting of casing. When quick-setting cement is used, this period may be reduced to 24 hours.
5. Provide permanent casing with temporary well cap. Install with top of casing 36 inches (910 mm) above finished grade.
6. Develop wells to maximum yield per foot (meter) of drawdown.
7. Extract maximum practical quantity of sand, drill fluid, and other fine materials from water-bearing formation.
8. Avoid settlement and disturbance of strata above water-bearing formation.
9. Do not disturb sealing around well casings.
10. Continue developing wells until water contains no more than 2 ppm of sand by weight when pumped at maximum testing rate.
11. Install submersible well pumps according to HI 2.1-2.4 and provide access for periodic maintenance. Truck has to back up within 10’ for service.
12. Before lowering permanent pump into well, lower a dummy pump that is slightly longer and wider than permanent pump to determine that permanent pump can be installed. Correct alignment problems.
13. Before lowering permanent pump into well, start pump to verify correct rotation.
14. Securely tighten discharge piping joints.
15. Connect motor to submersible pump and locate near well bottom.
16. Connect power cable while connection points are dry and undamaged.

17. Do not damage power cable during installation; use cable clamps that do not have sharp edges.

18. Install water-sealed surface plate that will support pump and piping.(pitless adapter)

3.03 CONNECTIONS

A. Piping installation requirements are specified elsewhere in other sections of the specifications. Plans indicate general arrangement of piping, fittings, and specialties.

B. Connect piping between well pump and water piping.

C. Connect water distribution system in trench to well pipe at pitless unit.

D. Ground equipment according to National Electrical Code (NEC) requirements.

E. Connect wiring according to National Electrical Code (NEC) requirements.

3.04 FIELD QUALITY CONTROL

A. Test Preparation: Clean water supply wells of foreign substances. Swab casings using alkalis, if necessary, to remove foreign substances.

B. Perform tests and inspections and prepare test reports.

C. Tests and Inspections:

D. Plumbness and Alignment Testing: Comply with AWWA A100.

Furnish samples of water-bearing formation to testing laboratory and well-screen manufacturer for mechanical sieve analysis.

Prepare reports on static level of ground water, level of water for various pumping rates, and depth to water-bearing strata.

E. Performance Test Preparation: Start well pump and adjust controls and pressure setting. Replace damaged and malfunctioning controls and equipment.

F. Performance Testing: Conduct final pumping tests after wells have been constructed, cleaned, and tested for plumbness and alignment.

G. Arrange to conduct tests, with seven days' advance notice, after test pump and auxiliary equipment have been installed. Note water-level elevations referred to for each assigned datum in wells.

H. Provide discharge piping to conduct water to locations where disposal will not create a nuisance or endanger adjacent property. Comply with requirements of authorities having jurisdiction.

I. Provide and maintain equipment of adequate size and type for measuring flow of water, such as weir box, orifice, or water meter.

J. Measure elevation to water level in wells.

K. Perform two bailer or air-ejection tests to determine expected yield. Test at depths with sufficient quantity of water to satisfy desired yields. Done when well is drilled.

L. Test Pump: Variable capacity test pump with capacity equal to maximum expected yields at pressure equal to drawdown in wells, plus losses in pump columns and discharge pipes. Done when pump is installed.

M. Start and adjust test pumps and equipment to required pumping rates.

N. Record readings of water levels in wells and pumping rates at 30-minute maximum intervals throughout 24-hour minimum period.

O. Record maximum yields when drawdown is 60 inches (1500 mm) above top of suction screens after designated times.

P. Operate pumping units continuously for 8 hours after maximum drawdown is reached.

Q. Record returning water levels in wells and plot curves of well recovery rates.

R. Remove sand, stones, and other foreign materials that may become deposited in wells after completing final tests.

3.05 WATER ANALYSIS TESTING:

A. Well drilling contractor to engage an Illinois certified and accredited testing agency to make bacteriological, physical, and chemical analyses of water from each finished well and report the results. Make analyses according to requirements of authorities having jurisdiction.

B. Analyze water sample from each finished well for bacteriological, physical, and chemical quality and report the results. Make analyses according to requirements of authorities having jurisdiction.

3.06 CLEANING

A. Disinfect water supply wells according to AWWA A100 and AWWA C654 before testing well pumps. Well is chlorinated after drilling and during installation of pump and tank.

B. Follow water supply well disinfection procedures required by authorities having jurisdiction before testing well pumps.

3.07 PROTECTION

A. Water Quality Protection: Prevent well contamination, including undesirable physical and chemical characteristics.

B. Ensure that mud pit will not leak or overflow into streams or wetlands. When well is accepted, remove mud and solids in mud pit from Project site and restore site to finished grade.

C. Provide casings, seals, sterilizing agents, and other materials to eliminate contamination; shut off contaminated water.

D. Exercise care to prevent breakdown or collapse of strata overlaying that from which water is to be drawn.

E. Protect water supply wells to prevent tampering and introducing foreign matter. Retain temporary well cap until installation is complete.

END OF SECTION 04300

SECTION 04310
WATER DISTRIBUTION

1. GENERAL

1.01 DESCRIPTION

A. Work under this section includes:

1. Installation of water lines, valves and access boxes.

B. Other specification sections which may directly relate to the work in this section include, but are not limited to, include the following:

1. Section 04110 – Directional Drilling
2. Section 04300 – Water Wells
3. Section 04320 – Drinking Fountains
4. Section 04321 – Drinking Fountain Vaults

1.02 SUBMITTALS

A. Shop Drawings and Product Data

1. Submit manufacturer's certification of compliance with referenced standards.

2. PRODUCTS

2.01 WATER LINES

A. HDPE Potable water line tubing shall meet the requirements of ASTM D2737, AWWA C901 and NSF/ANSI Standards 14 and 61. Pipe dimensions shall meet Copper Tubing Size (CTS) standards. HDPE lines shall be equipped with a tracer wire and tracer wire box in accordance with the construction drawings.

2.02 B-BOX

A. Curb stops shall be Mueller MARK II ORISEAL Curb Valve H-15154 or approved equal, having inlets and outlets matching the water lines and suitable for connections to either copper or HDPE lines as specified on the construction drawings.

C. Curb service box shall be Minneapolis Pattern Mueller H-10300 Series or approved equal.

D. The curb service box shall be installed over the curb stop per the manufacturers specifications and held in a truly vertical position until sufficient backfill has been placed to ensure permanent vertical alignment of the box. The top of the box shall be adjusted and set flush with the established ground surface grade.

3. EXECUTION

3.01 WATER LINES

A. The construction of all water lines shall be Governed by the following:

1. The "Standard Specifications for Water and Sewer Construction in Illinois", latest revision.
2. The "Illinois Administrative Code, Title 77, Part 890" the "Illinois Plumbing Code", latest revision
3. The "Illinois Administrative Code, Title 35, Subtitle F" "public water supplies", latest revision

B. Water lines shall be installed as specified on the Plans, having a minimum 5.5-ft depth of cover to the top of pipe.

3.02 B-BOX

A. All new curb stops and access boxes shall be installed in the location indicated on the Plans.

B. The curb service box shall be installed over the curb stop per the manufacturers specifications and held in a truly vertical position until sufficient backfill has been placed to ensure permanent vertical alignment of the box.

C. The top of the box shall be adjusted and set flush with the established ground surface grade.

3.03 DISINFECTION

A. Water lines shall be disinfected/chlorinated according with state and local requirements.

B. Documentation of the disinfection/chlorination shall be provided to the Owner.

END OF SECTION 04310

SECTION 04320
DRINKING FOUNTAIN

1. GENERAL

1.01 DESCRIPTION

A. Work under this section includes:

1. Installation of ADA front approach drinking fountains.

B. Other specification sections which may directly relate to the work in this section include, but are not limited to, the following:

1. Section 04310 – Water Distribution
2. Section 04321 – Drinking Fountain Vaults

1.02. SUBMITTALS

A. Shop Drawings and Product Data

1. Submit shop drawings of drinking fountains for approval.

2. PRODUCTS

2.01 MULTI-USE WATER FIXTURE

A. Multi-use water fixture shall be:

1. Model 10145 SMSS with attached hand wash station, recessed hose bib and lock door, with oven-baked powder coated in chrome matte color.
2. Drinking fountain to include the options of stainless steel, SS surface carrier, pet fountain, recessed hose bib and lock door, seasonal covers for each drinking basin (3), and leash hook as manufactured by Most Dependable Fountains.
3. Stainless steel pedestal - One piece weld construction with standard 304 schedule 10 stainless steel.
4. 18 gauge electro-polished stainless steel receptor bowl.
5. Bubbler Head - Stainless steel anti-squirt head (weighing a pound and a half) mounted with a lock nut and washer to prevent tampering. Lock nut pin holds bubbler in locked position to prevent twisting or turning. Design should provide a steady stream trajectory.
6. Control valve requires less than 5 lbs. to operate. Non-cartridge O-ring valve delivers steady stream of water through an adjustable valve. This valve design is to operate and function at 30 to 80 PSI. Ideal operating pressure is 60 PSI.
7. Water supply (lead free) Maintenance free reinforced nylobraid tubing that is NSF-61 certified. This tubing is not plastic. It is supplied with a ½″ MIP threaded inlet with stainless steel strainer. Union fittings at every connection. Supply line stops above grade.
8. Refer to the Contract Drawings and Section 03300 for water fountain drain line specifications and the details on the Plans.

9. Working parts to be accessible through the bowl of fountain. Supply and waste connections are through the above-grade access door. All access plates, brackets, vandal resistant bolts and screws are stainless steel.

B. As provided by:

1. MOST DEPENDABLE FOUNTAINS, INC. (800) 552-6331, (901) 867-0039, Fax (901) 867-4008 5705 Commander Dr., Arlington, TN 38002-0587, www.mostdependable.com.

2. or approved equal.

3. EXECUTION

3.01 DRINKING FOUNTAIN

A. Drinking fountain shall be installed at locations shown and to the orientation and grades specified on the Plans and/or at additional locations as specified by the Owner.

B. Drinking fountains shall be surface mounted to concrete walk using the SS surface carrier per manufacturers specifications. Surface mount installation to be anchored on top of existing surface concrete walk with anchor bolts through mounting plate that is welded to the fountain. Surface Mount Fountains provide an access door with vandal resistant stainless-steel screws. Surface mount carrier to be used for surface mount installation.

END OF SECTION 04320

SECTION 04321

DRINKING FOUNTAIN VAULT

1. GENERAL

1.01 DESCRIPTION

A. Work under this section includes:

1. Installation of water lines, fittings, and valves
2. Drain lines
3. Drinking fountain vaults, construction and accessories

B. Other specification sections which may directly relate to the work in this section include, but are not limited to, the following:

1. Section 04310 – Water Distribution
2. Section 04320 – Drinking Fountain

1.02. SUBMITTALS

A. Shop Drawings and Product Data

1. Submit shop drawings of vault, manhole steps, frames and lids for approval.
2. Submit manufacturer's certification of compliance with referenced standards.

2. PRODUCTS

2.01 WATER LINES AND VALVES

A. All piping from B-Box to vault, within vault, and to drinking fountain shall be copper water tube, Type K, soft temper, for underground service conforming to ASTM B-88 and B-251. The pipe shall be marked with manufacturer's name or trademark and a mark indicative of the type of pipe. The outside diameter of the pipe and minimum weight per meter (foot) of the pipe shall not be less than that listed in ASTM B-251, Table 11. Fittings shall not be “push-on” type.

B. Brass ball valves within vault shall be provided as specified on the Plans.

2.02 DRAIN LINES

A. Drain line from drinking fountain through wall of drinking fountain vault shall be 4″ PVC, SDR 26 conforming to ASTM D-3034, with gasket joints conforming to ASTM D-3212.

2.03 GENERAL

A. Concrete for vault shall have minimum 4,000 PSI compressive strength at 28 days.

B. Welded wire fabric shall conform to ASTM Al85. As a minimum, use 4 x 4 - W4 x W4 welded wire fabric unless structural requirements indicate otherwise.

2.04 VAULT BASES

A. Bases shall be one-piece precast base sections consisting of integrally cast slab and bottom ring section.

B. Bottom ring diameter shall be as indicated on the Plans.

2.05 VAULT RISERS

A. Risers shall be of the following types, unless otherwise indicated on the Plans:

1. Precast Reinforced Concrete Riser Sections - ASTM C478.

B. Riser diameter shall be as indicated on the Plans.

C. Gaskets for seating precast sections shall be preformed gasket joint strips conforming to Fed. Spec. SS-S-00210, Type I, Rope Form, or Kent Seal Mastic.

2.06 VAULT CONES AND TOPS

A. Unless otherwise indicated on the Plans, cone top sections shall be precast concrete, eccentric type with 24-inch diameter top opening conforming to ASTM C478.

B. Where indicated on the Plans, provide 8-inch (minimum) thickness flat slab tops with eccentric 24-inch diameter opening.

2.07 VAULT FRAMES AND LIDS

A. Provide nominal 24-inch diameter cast iron frames and lids, of the types specified on the Plans. The frame shall have at least one concealed pick hole. Watertight frames and lids, if indicated on the Plans, shall have machined bearing surfaces, resilient gaskets, cap screws, and recessed lid lifting devices.

B. Structures shall have frame and covers as noted on the Plans.

2.08 STEPS

A. Steps shall be in accordance with local, state and federal regulations. Steps shall be of the type required for the method of construction selected and shall be cast in place. Steps shall be 12-inches minimum width and shall be plastic coated steel. The minimum allowable design live load for steps shall be a single load of 300 lbs. concentrated at the point which will cause maximum stress on the member. The steps shall be provided with a depth ring or plate a minimum of 3-inches from the embedded end of the leg to provide for uniform setting depth of all steps. The embedded end of each leg shall be formed in such a way to provide positive anchoring of the step. Steps shall have non-slip treads which project a minimum of 4-inches from the manhole wall. Treads shall be designed so that the foot cannot slip off the end of the step.

2.09 EXTERIOR COATINGS

A. Outside surface of manholes and valve vaults (bases, risers, and cones) shall be water proofed with two coats coal tar epoxy.

2.10 EXTERNAL SEALING SYSTEM

A. All manhole riser joints are to be sealed with an external sealing system consisting of extruded rolls of EPDM rubber with mastic on both edges of one side.

B. Thickness to be 60 mil and mastic shall be a non-hardening butyl rubber sealant.

C. Materials to meet specifications ASTM C923, ASTM C443 and ASTM F477.

D. Product to be E Z Stick or approved equal.

2.11 ADJUSTING RINGS

A. All castings shall be raised using wire reinforced precast concrete adjusting rings.

2.12 BACKFILL AND BEDDING, CA-6, TYPE B

A. Backfill material shall be CA-6, Type B, in conformance with Article 1004.01 of the IDOT Standard Specifications except as noted below. The source of the material shall be approved by the Owner prior to delivery. Samples of the proposed material shall be submitted to the Owner for approval prior to delivery and installation.

B. Backfill beneath and within 2 feet of aggregate trail or paved surfaces shall consist of trench backfill meeting the requirements of Section 208 of the Standard Specifications.

3. EXECUTION

3.01 GENERAL

A. The construction of all water and drain lines shall be Governed by the following:

1. The “Standard Specifications for Water and Sewer Construction in Illinois”, latest revision.

2. The “Illinois Administrative Code, Title 77, Part 890”

3. The “Illinois Plumbing Code”, latest revision

4. The “Illinois Administrative Code, Title 35, Subtitle F” “public water supplies”, latest revision

3.02 WATER LINES

A. Water lines shall be installed as specified on the Plans, having a minimum 5.5-ft depth of cover to the top of pipe, except for riser pipes within vault.

3.03 DRAIN LINES

A. Drain lines shall include piping from drinking fountain connection through vault, and extend through vault wall a minimum of 5-feet.

3.04 DRINKING FOUNTAIN VAULTS

A. Precast concrete rings and reinforced concrete pipe sections shall be laid so that the axis of the manhole is vertical. Gaskets for riser joints shall be installed in accordance with the manufacturer's recommendations.

B. Steps shall be installed in all structures unless otherwise indicated. Steps shall be plumb and easily accessible from top openings, and shall be provided at 12-inches on centers.

C. Unless otherwise indicated on the Plans, set castings at finished grade.

END OF SECTION 04321

SECTION 04400

SANITARY SYSTEMS, SEPTIC

1. GENERAL

1.01 DESCRIPTION

A. Work under this section includes:

1. Installation of Septic System, and all other materials necessary to construct the proposed improvements.

B. Other specification sections which may directly relate to the work in this section include, but are not limited to, the following:

1. Section 02300 – Site Resource Protection
2. Section 02400 – Soil Erosion and Sediment Control
3. Section 04200 – Electrical Service and Distribution

1.02 QUALITY ASSURANCE

A. Contractor Qualifications: The work described in this section requires specialized knowledge, experience, skills and equipment to successfully complete. The Contractor shall possess the full capability to execute the work as specified, including trained, experienced and skilled personnel and possession or access to the required equipment.

B. Shop Drawings:

1. Shop Drawings, submittal requirements, procedures and schedules shall meet the requirements contained in Subsection 1.09 of Section 01000, General Project Requirements.

C. Substitutions and Product Options:

1. These shall meet the requirements in Subsection 1.08.E of Section 01000, General Project Requirements.
2. Provide three (3) locations and contacts of similar work of this nature.
3. All approved equals shall be notified with written statements of their approval. Manufacturers shall not bid this project without this written notification.

2. PRODUCTS

2.01 SANITARY SEWER

A. The sanitary sewer and fittings shall be constructed of polyvinyl chloride (PVC) schedule 40 pipe of the diameter shown on the drawings.

B. All PVC sanitary sewer joints shall be gasketed, bell and spigot, push on type conforming to ASTM D3212.

2.02 SEPTIC TANK

A. Acceptable Manufacturer: Grove Concrete or approved equal.

B. Governing standards, as applicable:

1. Tank manufacturer shall be in the business of manufacturing tanks to Underwriter Laboratories (UL) Standard 1316

C. Loading Conditions – Tank shall meet the following design criteria:

1. Internal Load – Tank shall withstand a 5-psig air-pressure test (3 psig for a 12′ diameter tank) with 5:1 safety factor. When tank is designed for onsite testing, Contractor shall individually test tank for leakage prior to installation. Maximum test pressure is 5 psig (3 psig for a 12′-diameter tank).

2. Surface Loads – Tank shall withstand surface H-20 axle loads when properly installed according to tank manufacturer's current Installation Manual and Operating Guidelines.

3. External Hydrostatic Pressure – Tank shall be capable of being buried in ground with 7′ of overburden over the top of the tank, the hole fully flooded and a safety factor of 5:1 against general buckling.

4. Tank shall support accessory equipment – such as inlet and outlet piping, effluent filter chamber, ladders and baffles – when installed according to tank manufacturer's current Installation Manual and Operating Guidelines.

D. Product Storage

1. Tank shall be capable of storing wastewater products limited to the collection and storage of human solid or liquid organic sewage.

2. Tank shall be vented to atmospheric pressure.

3. Tank shall be capable of storing products identified in the manufacturer's current standard limited warranty.

E. Accessories

1. Piping

a. Schedule 40 PVC shall be used for inlet and outlet piping.

b. All piping shall be factory-sealed to enable field tightness testing with at least one pipe opening provided with a threaded fitting for connecting a pressure-test manifold.

F. Access Openings

1. Location(s) shall be shown on tank drawings.

2. Optional riser extensions shall be concrete.

3. With tanks designed for onsite tightness testing, all access opening shall be factor sealed to enable field tightness testing.

G. Optional Anchor Straps

1. Straps shall be FRP anchor straps as supplied by tank manufacturer.

2. Number and location of straps shall be specified in current literature by tank manufacturer.

H. Optional Ladders

1. Ladders shall be the standard ladder as supplied by tank manufacturer.

I. Optional Fittings

1. All threaded fittings shall be constructed of carbon steel or FRP.

2. All standard threaded fittings shall be half-couplings and shall be 2″-, 4″- or 6″-diameter. Reducers are to be used for smaller sizes where shown and provided by Contractor.

3. All FRP and PVC nozzles shall be flat-faced and flanged and shall conform to ANSI B16.5 150# bolting pattern.

J. Optional Internal Pump Platforms

1. Pump platforms shall be FRP.

2. Contact tank manufacturer with pump details, such as dimensions and weight.

2.03 SEWAGE PUMP

A. Sewage pump shall be:

1. “Champion” Pump Company, Inc., CPE4V-13, or approved equal

2. Motor Horsepower: 1/2 HP

3. Discharge: 2″ Diameter, NPT, Vertical

2.04 SEPTIC FIELD

A. Septic field shall be constructed as shown on the Plans.

2.05 FLOAT VALVE

A. The modulating Float Control Valve shall be a pilot operated diaphragm valve designed to maintain a constant liquid level in a tank or reservoir. It shall throttle open on a lowering liquid level and throttle closed upon a rising liquid level.

B. The main valve shall be a hydraulically operated, single diaphragm actuated, globe or angle pattern valve. Y-pattern valves shall not be permitted. The valve shall contain a disc and diaphragm assembly that forms a sealed chamber below the valve cover, separating operating pressure from in-line pressure. The diaphragm shall be constructed of nylon-reinforced Buna-N, shall not seal directly against the valve seat, and shall be fully supported by the valve body and cover. Rolling diaphragm construction will not be allowed and there shall be no pistons operating the main valve or any pilot controls.

C. The main valve body and cover shall be Ductile Iron ASTM A536, and all internal cast components shall be Ductile Iron CF8M (316) Stainless Steel. All Ductile Iron components, including the body and cover, shall be lined and coated with an NSF 61 Certified Epoxy Coating applied by the electrostatic heat fusion process. All main valve throttling components (valve seat and disc guide) shall be stainless steel. The valve body and cover must be machined with a 360-degree locating lip to assure proper alignment.

D. The disc and diaphragm assembly shall contain a Buna-N synthetic rubber “Quad Seal” that is securely retained on 3-1/2 sides by a disc retainer and disc guide. Diaphragm assemblies utilizing bolts or cap screws for component retention will not be permitted.

E. The exposed portion of the Quad Seal shall contact the valve seat and seal drip-tight. The disc and diaphragm assembly must be guided by two separate bearings, one installed in the valve cover and one concentrically located within the valve seat, to avoid deflection and assure positive disc-to-seat contact. Center guided valves will not be permitted. All necessary repairs shall be made from the top of the valve while the body remains in line.

F. Pilot control systems for 3″ valves and smaller shall contain a Flow Clean Strainer, Adjustable Closing Speed Control, and Modulating Float Pilot. Pilot control systems for valves 4″ and larger shall contain an external Y-Strainer, Adjustable Closing Speed Control, Modulating Float Pilot, and Isolation Ball Valves on all body connections. All pilot control systems shall utilize copper tubing and brass fittings regardless of valve size.

G. The valve shall be Watts ACV Model F110-10 (Globe) pattern Modulating Float Control Valve or manufacturer approved equivalent.

2.06 ALARM SYSTEM

A. An audio/visual alarm shall be installed per the contract documents in a location approved by the Owner.

B. Alarm shall be SJE Rhombus, Tank Alert XT Alarm, or approved equal.

3. EXECUTION

3.01 SANITARY SEWER

A. Unless otherwise allowed by the engineer, the Contractor shall place a well compacted, fine aggregate bedding at least four inches below the pipe and extending the entire width of the trench for the length of the pipe.

B. The pipe shall be placed so that the entire length of the pipe will have full bearing. No blocking of any kind shall be used to adjust the pipe to grade except when used with concrete encasement.

C. Laying of sewer pipe shall be accomplished to line and grade in the trench only after it has been de-watered and the foundation and/or bedding has been prepared. Mud, silt, gravel, and other foreign material shall be kept out of the pipe and off the jointing surface.

D. All pipe laid shall be retained in position so as to maintain alignment and joint closure until sufficient backfill has been completed to adequately hold the pipe in place. All pipes shall be laid to conform to be the prescribed line and grade shown on the plans.

E. The sewer pipe, unless otherwise approved by the engineer, shall be laid up grade from point of connection on the existing sewer or from a designated starting point. When pipe laying is not in progress, the forward end of the pipe shall be kept tightly closed with an approved temporary plug.

3.02 TESTING

A. Testing – Tank shall be tested according to the Grove Concrete Installation Manual and Operating Guidelines in effect at time of installation.

B. Optional Testing – Prior to installation, a tank-tightness test consisting of a 5-psig air pressure/soap test shall be performed per the tank testing procedures

outlined in the Grove Concrete Installation Manual and Operating Guidelines in effect at time of installation.

3.03 INSTALLATION

A. Contractor shall be trained in proper installation procedures by the tank manufacturer, the state, and other applicable agencies.

END OF SECTION 04400

SECTION 05100

SUBGRADE PREPARATION

1. GENERAL

1.01 DESCRIPTION

A. Work under this section includes:

1. Final preparation of the subgrade for trails, roads and parking, misc. pavements, and structures.

B. Other specification sections which may directly relate to the work in this section include, but are not limited to, the following:

1. Section 03100 – Earthwork and Grading
2. Section 03110 – Ground Stabilization
3. Section 05200 – Trails
4. Section 05300 – Roads and Parking
5. Section 05400 – Concrete Pavement

2. PRODUCTS

2.01 GEOTEXTILE FOR GROUND STABILIZATION

A. Geotextile fabric shall be non-woven, needle punched polypropylene staple fiber that is UV stabilized and resistant to chemicals, mildew and insects.

B. The geotextile fabric shall be:

1. Thrace-LINQ 225EX
2. or approved equivalent meeting the following minimum criteria:

Grab Tensile Strength	215 lbs
Elongation	50%
Puncture (CBR)	600 lbs
Permittivity	1.3 sec^{-1}

3. EXECUTION

3.01 GENERAL

A. Subgrade preparation shall be performed after the completion of Site Grading at all locations which will receive trails, pavement or structural improvements in preparation for the placement of aggregate base material.

B. When proof rolling reveals additional unstable areas, undercut excavation shall be undertaken only as approved and directed by the Owner.

C. All excess excavated and spoil materials shall be spread or relocated on-site or removed from the site as directed by the Owner.

3.02 SUBGRADE PREPARATION – OPEN AREAS

A. This work shall consist of furnishing all materials, equipment and labor for the final preparation of the subgrade for open areas. Subgrade preparation for open

areas shall include final grading to within 0.1-foot of specified subgrade elevations, shaping, disking, aerating, sheepsfoot rolling, vibratory rolling, compacting, proof rolling and testing as required.

B. Areas proposed for trails and pavement shall be compacted to a minimum 95 percent of maximum density based on a Standard Proctor (ASTM D-698). Any areas that are inaccessible to a roller shall be compacted either by other mechanical means or using a hand tamper meeting the approval of the Owner. The Contractor shall proof roll the finished subgrade with the Owner present.

C. Areas proposed for structural fills for building pads shall be compacted to a minimum of 95 percent based on a Modified Proctor (ASTM D-1557).

D. When proof rolling reveals additional unstable soil areas, the Owner shall be notified immediately. If soil moisture is excessive, the material shall be aerated and compacted again and retested. If, in the opinion of the Owner a more significant remedy is required, the Contractor shall be directed to perform additional work such as removal of unsuitable materials, placement of geotextile fabrics and/or soil replacement with an approved suitable material. These more significant tasks shall be paid for under separate pay items.

E. When soil moisture is excessive or inadequate, the surfaces shall be disked, wetted or dried as required, and re-compacted. Where soil has been softened or eroded by flooding or placement during unfavorable weather, remove all affected areas and re-compact as specified.

3.03 TEST ROLLING EQUIPMENT AND PROCEDURES

A. Test rolling of subgrades shall be performed in the presence of the Owner. When test rolling reveals unsuitable or unstable soils, the Owner shall determine the most appropriate remedy and direct the Contractor accordingly as described above.

B. Test rolling equipment shall conform to the following description:

1. Tandem axle, dual wheel dump truck.
2. Tire pressure shall be no less than 95 percent of manufacturer’s recommended maximum inflation.
3. Minimum gross weight of loaded truck shall be 60,000 pounds.
4. Provide weigh slip to Owner.

C. Perform test rolling procedure as follows:

1. Operate equipment at a rate not to exceed 3 mph to 5 mph or a comfortable walking pace.
2. Adjust speed to allow the Owner to measure any deflections and areas of rutting.
3. Operate test rolling equipment in a pattern so that affected areas are loaded with at least 1 pass.
4. After test rolling, check subgrade for conformance to Plans, and correct any surface irregularities. Re-shape subgrade within tolerances specified.

D. Test Rolling Evaluation:

1. Rutting up to one 1 inch is acceptable.

2. Rutting in excess of 1 inch but not more than 6 inches, shall be considered a failure and requires reworking soil and compaction to required density.
3. Deflection, (pumping) up to 1 inch is acceptable.
4. Deflection in excess of 1 inch but not more than 2 inches shall be acceptable if there is not substantial cracking or lateral movement of soil.
5. Deflection in excess of 2 inches but not more than 6 inches shall be considered a failure, and requires reworking soil and compaction to required density.
6. Rutting and deflection in excess of 6 inches will require review and recommendation for corrective action by the Owner.
7. After remedial work is performed, a final test roll shall be performed upon completion of work.
8. If remedial work is performed as directed, second test roll may be waived at discretion of the Owner.

E. When performing Subgrade Preparation, if it is determined that the material composition is acceptable and that excessive moisture has rendered the material unstable, the Contractor shall perform air drying techniques as per Article 301.04 of the IDOT Standard Specifications before consideration of removal of the material.

3.04 SUBGRADE PREPARATION – SENSITIVE WOODED AREAS

A. Machine subgrade preparation for the trail sections in sensitive wooded areas is not required. Work required prior to installation of geotextile fabric and placement of aggregate base for sensitive wooded areas is described in the subsection “Site Grading - Sensitive Wooded Areas” contained in Section 03100 – Earthwork and Grading.

B. After final surface preparation, the Contractor shall install the specified geotextile fabric at trail sections identified as sensitive wooded areas on the Plans. The geotextile shall extend 1 foot past the finished edge of the trail. Full rolls shall be cut to the appropriate width as needed. Roll ends shall be overlapped a minimum of 4 feet. All wrinkles shall be removed from the fabric before covering with stone. No Aggregate Base Course shall be placed until the subgrade and geotextile fabric has been approved by the Owner.

3.05 SUBGRADE PREPARATION – TRAILS OVER EXISTING GRAVEL

A. This work shall consist of furnishing all materials, equipment and labor for the final preparation of the trail subgrade over existing gravel surfaces. Subgrade preparation shall include grading of existing gravel surfaces, leveling, profiling, filling low areas and pot holes with CA-6, cutting ridges and high points, compacting, proof rolling and testing as required.

B. Compaction shall be to a minimum 95 percent of maximum density based on a Standard Proctor (ASTM D-698).

END OF SECTION 05100

SECTION 05200
TRAILS

1. GENERAL

1.01 DESCRIPTION

A. Work under this section includes:

1. Trails and other pedestrian pavements with surfaces consisting of fine aggregates or hot-mix asphalt.

B. Other specification sections which may directly relate to the work in this section include, but are not limited to, the following:

1. Section 03100 – Earthwork and Grading
2. Section 03110 – Ground Stabilization
3. Section 03120 – Finish Grading and Topsoil
4. Section 03200 – Culvert Crossings
5. Section 05100 – Subgrade Preparation

1.02 SUBMITTALS

A. Prior to placing bituminous mixtures, the Contractor shall submit to the Owner for approval the HMA mix design and name of the supplying plant with IDOT certifications.

B. Contractor shall submit source information and samples of aggregate surface materials to the Owner for approval prior to delivery and placement.

C. Contractor shall submit source information and samples of aggregate base materials to the Owner for approval prior to delivery and placement.

D. For grass trails, the Contractor shall submit seed mix composition and sources for approval by the Owner.

1.03 TESTING

A. The Owner shall employ a professional testing service to perform density and / or other tests for the base and surface courses. The Contractor shall follow the instructions of the testing technician when a specific course of action is deemed necessary.

2. PRODUCTS

2.01 AGGREGATE SURFACE COURSE – FA-21

A. Aggregate surfaces for trail construction shall be crushed aggregate material complying with IDOT Standard Specification Article 1003.01 gradation FA-21. Aggregate shall consist of 100% crushed native material and buff in color as typically found in the Fox River valley of northern Illinois and southern Wisconsin. Limestone screenings are not acceptable. Furnished material shall be obtained from one of the following locations:

1. Thelen Sand and Gravel

Route 173 (North Pit)
Antioch, Illinois
Prime Bike Path Mix
847-395-3313

2. Payne & Dolan, Inc.
28327 W. Route 173
Antioch, IL 60002
Prime Bike Path Mix
847-838-3700

3. or approved equal.

2.02 AGGREGATE BASE COURSE – CA-6, TYPE B

A. Aggregate materials for use as aggregate base course shall be CA-6, Type B, in conformance with IDOT Standard Specification Article 1004.01.

2.03 HOT-MIX ASPHALT MATERIALS

A. All hot-mix asphalt materials shall comply with the applicable provisions of the IDOT Standard Specifications.

B. Trail HMA Mix Design shall be Mix “D”, N50 (IL 9.5 mm) as per the IDOT Standard Specifications.

2.04 AGGREGATE SUBBASE COURSE – CA-7/11, 10″

A. Aggregate materials for use as aggregate subbase course in sensitive woodland areas shall be CA-7/11, in conformance with IDOT Standard Specification Article 1004.01.

3. EXECUTION

3.01 AGGREGATE BASE COURSE – CA-6, Type B

A. This work shall consist of furnishing all materials, equipment, and labor and performance of all required operations for the installation of the aggregate base course for construction of the proposed trail and as specified in the Contract Documents. No aggregate base course shall be placed until the subgrade has been proof rolled or otherwise tested for stability and approved by the Owner or Engineer.

B. The work shall meet the applicable portions of Section 301 and 351 of the IDOT Standard Specifications except as herein noted.

C. The Contractor shall establish all grades to achieve the minimum thickness indicated in the Contract Documents prior to ordering delivery of granular base material. Owner shall not be responsible for any costs associated with the delivery of surplus granular material.

D. Aggregate base course shall be placed with a paver box or other method approved by Owner to ensure uniform width, depth, crown, and final surface smoothness. Placement of the aggregate base shall closely follow the horizontal alignment shown on the Plans and/or as staked in the field. The paver box operator shall possess sufficient skills and experience to perform the work.

E. Aggregate base course shall be compacted half the trail width at a time to preserve the specified crown. Compaction shall be to a minimum of ninety-five

percent (95%) Standard Proctor in accordance with the IDOT Standard Specifications. Any portion of the proposed trail without the required crown after compaction will not be accepted by the Owner and the Contractor will be required to take whatever steps necessary to provide the required crown. All irregularities in the trail base course shall be smoothed out. Depressions shall be filled, high points cut down and the entire aggregate base course edge shall be trimmed and finished uniformly.

F. The Contractor shall perform a proof roll of the aggregate base course with the Owner present for approval. Any failures of the base course, as determined by Owner, that occur during the proof rolling shall be immediately repaired and subjected to retesting until all areas have passed the testing or proof rolling.

3.02 AGGREGATE BASE COURSE – SENSITIVE WOODED AREAS

A. Aggregate base courses for trails constructed in sensitive wooded areas may require variable depths across the width of the trail to achieve the desired finish elevations due to the minimal modification of the underlying sub-base. The Contractor shall maintain the minimum base depths as shown in the Plans and increase the base depth as needed to achieve the desired finish elevations and cross section. Additional base course depths required to achieve the specified surface profile shall not be measured for payment but shall be paid for separately as a variable depth aggregate base course.

3.03 AGGREGATE SURFACE COURSE – FA 21

A. This work shall consist of furnishing all materials, equipment, and labor and performance of all required operations for the installation of the aggregate surface course for construction of the proposed trail.

B. The work shall meet the applicable portions of Section 402 of the IDOT Standard Specifications except as herein noted. No surface course shall be placed until the base course has been approved by the Owner.

C. Aggregate surface course shall be placed with a paver box or other method approved by Owner to ensure uniform width, depth, crown, and final surface smoothness.

D. The paver box operator shall possess sufficient skills and experience to perform the work.

E. Trail surface course shall be compacted half the trail width at a time, to preserve the crown, except where Plans indicate a trail cross slope. Compaction shall be to a minimum of 95% Standard Proctor in accordance with the IDOT Standard Specifications. Any portion of the proposed trail without the required crown after compaction will not be accepted by the Owner and the Contractor will be required to take whatever steps necessary to provide the required crown. All irregularities in the trail surface shall be smoothed out. Depressions shall be filled and the entire trail surface shall be trimmed and finished uniformly.

3.04 HOT-MIX ASPHALT SURFACE

A. The work shall meet the applicable portions of the IDOT Standard Specifications except as herein noted.

B. HMA surface course shall be placed with a paver box or other method approved by Owner to ensure uniform width, depth, crown, and final surface smoothness. Finished work which results in measurable deviations in the specified lines,

dimensions or surface conditions and / or which may create unsafe conditions, inadequate drainage, segregation of materials or substantial aesthetic deficiencies shall be removed and replaced to the satisfaction of the Owner.

3.05 AGGREGATE SUBBASE COURSE – CA 7/11

A. Aggregate subbase course shall be constructed for trails constructed only in specific areas as shown on the Plans. The depth of the aggregate subbase course may vary across the width of the trail to achieve the desired finish elevations due to the minimal modification of the underlying sub-base (3″ to 4″) but shall average approximately 10″. The Contractor shall maintain the minimum subbase depths as shown in the Plans and increase the base depth as needed to achieve the desired finish elevations and cross section. Additional base course depths required to achieve the specified surface profile shall not be measured separately for payment but shall be considered incidental to the pay item.

3.06 AGGREGATE TRAIL REPAIR

A. Any aggregate trail, in part or in whole, which is damaged by the Contractor in the course of performing the contract, shall be restored to pre-existing condition using only the approved materials indicated in this specification. Any rutting or displacement or distortion of the original trail profile shall require that the damaged areas be removed and reconstructed per the Owner’s standard details, sections and specifications.

END OF SECTION 05200

SECTION 05300

ROADS AND PARKING

1. GENERAL

1.01 DESCRIPTION

A. Work under this section includes:

1. Hot-mix asphalt roads and parking areas

B. Other specification sections which may directly relate to the work in this section include, but are not limited to, the following:

1. Section 03100 – Earthwork and Grading
2. Section 03110 – Ground Stabilization
3. Section 03120 – Finish Grading and Topsoil
4. Section 05100 – Subgrade Preparation

C. All work under this section shall meet the requirements of the latest edition of the Illinois Department of Transportation Standard Specifications for Road and Bridge Construction.

1.02 SUBMITTALS

A. Prior to placing bituminous mixtures, submit to the Owner for approval the name of the plant proposed for use and the names of approving agencies.

B. Submit certifications from plant producing bituminous mixtures that binder course and surface course meet specified standards.

1.03 TESTING

A. The Owner shall employ a professional testing service to perform density and / or other tests for the base and surface courses. The Contractor shall follow the instructions of the testing technician when a specific course of action is deemed necessary.

2. PRODUCTS

2.01 AGGREGATES

A. Coarse aggregates for Hot Mix Asphalt (HMA) base, binder and surface courses shall comply with the applicable provisions of IDOT Standard Specifications Article 1004.

B. Aggregate materials for use in an aggregate base course shall be CA-6, Type B, in conformance with IDOT Standard Specifications Article 1004.01. The source of the material shall be approved by the Owner prior to delivery. Samples of the proposed material shall be submitted to the Owner prior to delivery and installation.

2.02 BITUMINOUS PRIME COAT

A. The bituminous prime coat shall comply with Grade SS-1, Article 406.02 of the IDOT Standard Specifications.

2.03 HOT MIX ASPHALT MATERIALS

A. Bituminous materials shall comply with the applicable provisions of the IDOT Standard Specifications.

B. Binder course mixture shall be graded and mixed to comply with Mix IL 19.0 of the IDOT Standard Specifications.

C. Surface course mixture shall be graded and mixed to comply with Mixture D of the IDOT Standard Specifications.

3. EXECUTION

3.01 AGGREGATE BASE – CA-6, Type B

A. This work shall consist of furnishing all materials, equipment, and labor and performance of all required operations of the installation of the aggregate base course for construction of the proposed road and parking areas as specified and shown on the Plans. No Aggregate Base Course shall be placed until the Subgrade has been approved by the Owner or Engineer.

B. The work shall meet the applicable portions of Section 301 and 351 of the IDOT Standard Specifications except as herein noted. Compaction shall be to a minimum of ninety-five (95) percent Standard Proctor.

C. The Contractor shall establish all grades to achieve the minimum thickness indicated on the Plans prior to ordering delivery of granular base material. Owner shall not be responsible for any costs associated with the delivery of surplus granular material.

D. The Contractor may be required to perform a proof roll of the aggregate base course. Any failures of the base course, as determined by Owner or Engineer, that occur during the proof rolling shall be immediately repaired and subjected to proof rolling until all areas have passed. Owner or Engineer to approve the base course.

3.02 HOT-MIX ASPHALT PAVING

A. Binder Course

1. This work shall consist of furnishing all materials, equipment, and labor and performance of all required operations for the installation of the HMA binder course for construction of the proposed roads and parking areas.

2. HMA binder course construction shall be of the thickness indicated on the Plans and shall comply with applicable provisions of Section 406 of the IDOT Standard Specifications except as herein noted. No HMA binder course shall be placed until the base course has been approved by the Owner.

3. Do not place HMA binder course when temperatures in the shade are below 40 degrees Fahrenheit.

B. Bituminous Prime Coat

1. Apply primer over binder course at the rate of 0.10 gallon per square yard in compliance with Article 406.05 (b) of the IDOT Standard Specifications.

C. Surface Course

1. This work shall consist of furnishing all materials, equipment, and labor and performance of all required operations for the installation of the HMA surface course for construction of the proposed roads and parking areas.

2. HMA surface course construction shall be of the thickness indicated on the Plans and shall comply with applicable provisions of Section 406 of the IDOT Standard Specifications except as herein noted. No HMA surface course shall be placed until the binder course has been approved by the Owner.

3. Do not place HMA surface course when temperatures in the shade are below 45 degrees Fahrenheit.

D. Protection for HMA Surfacing

1. Contractor shall protect all completed sections of HMA paving until the Owner has approved the pavement for traffic.

3.03 HOT-MIX ASPHALT PATCHING

A. This work shall consist of removing the HMA surface to the depth specified with a self-propelled milling machine as per the conditions of IDOT Article 440.04 of the Standard Specifications. Unless specified otherwise, the resulting surface millings shall be disposed of off-site.

END OF SECTION 05300

SECTION 05310

PAVEMENT MARKINGS

1. GENERAL

1.01 DESCRIPTION

A. Work under this Section includes:

1. Furnishing and applying pavement markings.

B. Other specification sections which may directly relate to the work in this section include, but are not limited to, the following:

1. Section 05300 – Roads and Parking

2. PRODUCTS

2.01 GENERAL

A. Pavement Markings shall be in accordance with Section 780 of the IDOT Standard Specifications. Materials shall be in accordance with Section 1095 of the IDOT Standard Specifications

1. Article 1095.01 Thermoplastic Pavement Marking
2. Article 1095.02 Paint Pavement Marking
3. Article 1095.04 Epoxy Pavement Marking
4. Article 1095.05 Preformed Thermoplastic Pavement Marking

3. EXECUTION

3.01 GENERAL

A. Pavement markings shall be installed at locations shown on the Plans at the dimensions indicated.

3.02 PAVEMENT MARKINGS

A. Pavement Markings shall be installed in accordance with the Contract Documents and in accordance with all applicable Federal, State, County and Local Ordinances and Standards.

END OF SECTION 05310

SECTION 05400

CONCRETE PAVEMENT

1. GENERAL

1.01 DESCRIPTION

A. Work under this section includes:

1. Poured-in-place pavement composed of Portland cement concrete with or without reinforcement, constructed on a prepared subgrade and aggregate base, with or without forms.

B. Other specification sections which may directly relate to the work in this section include, but are not limited to, the following:

1. Section 03120 – Finish Grading and Topsoil
2. Section 05100 – Subgrade Preparation
3. Section 07300 – Cast-in-Place Concrete Structures

1.02 SUBMITTALS

A. Prior to placing Portland cement concrete mixtures, submit to the Owner for approval the name of the plant proposed for use and the names of approving agencies.

B. Submit certifications from plant producing Portland cement concrete mixtures that mixtures meet specified standards.

1.03 TESTING

A. The Owner shall employ a professional testing service to perform testing of the Portland cement concrete. The Contractor shall follow the instructions of the testing technician when a specific course of action is deemed necessary.

B. Testing shall be in accordance with applicable sections of the IDOT Standard Specifications.

2. PRODUCTS

2.01 PORTLAND CEMENT CONCRETE PAVEMENT

A. Materials and equipment shall comply with Articles 420.02 and 420.03 of the IDOT Standard Specifications.

3. EXECUTION

3.01 PORTLAND CEMENT CONCRETE PAVEMENT

A. This work shall consist of furnishing all materials, equipment, labor and transportation and performance of all required operations of the installation, finishing, protection and curing of the Portland cement concrete pavement. No pavement shall be placed until the Subgrade has been approved by the Owner.

B. The work shall meet the applicable portions of Section 420 of the IDOT Standard Specifications.

C. The Contractor shall establish all grades to achieve the minimum thickness indicated on the Plans prior to ordering delivery of the Portland cement concrete. Owner shall not be responsible for any costs associated with the delivery of surplus Portland cement concrete material.

D. Joints shall be in conformance with the plans and Article 420.05 of the Standard Specifications.

E. Finish shall be medium-coarse broom finish, perpendicular to traffic flow. Conform with ACI 301.

F. Contractor shall protect all completed sections of Portland cement concrete pavement until the Owner has approved the pavement for traffic.

END OF SECTION 05400

SECTION 05420
CONCRETE CURBS

1. GENERAL

1.01 DESCRIPTION

A. Work under this section includes:

1. Portland cement concrete curbs and combination curbs and gutters.

B. Other specification sections which may directly relate to the work in this section include, but are not limited to, the following:

1. Section 03100 – Earthwork and Grading
2. Section 05100 – Subgrade Preparation
3. Section 05300 – Roads and Parking
4. Section 07300 – Cast-in-Place Concrete Structures

1.02 SUBMITTALS

A. Prior to placing Portland cement concrete mixtures, submit to the Owner for approval the name of the supplying and design mix certifications.

B. Submit certifications from plant producing Portland cement concrete mixtures that mixtures meet specified standards.

1.03 TESTING

A. The Owner may employ a professional testing service to perform testing of the Portland cement concrete. The Contractor shall follow the instructions of the testing technician when a specific course of action is deemed necessary.

B. Testing shall be in accordance with applicable sections of the IDOT Standard Specifications.

2. PRODUCTS

2.01 GENERAL

A. Work shall be in accordance with Section 606 for Concrete Gutter, Curb, Median and Paved Ditch of the IDOT Standard Specifications.

2.02 AGGREGATE BASE

A. Aggregate materials for use as aggregate base course shall be CA-6, Type B, in conformance with IDOT Standard Specification Article 1004.01. The source of the material shall be approved by the Owner prior to delivery.

2.03 PORTLAND CEMENT

A. Portland cement concrete shall meet the requirements of IDOT Class “SI” and Section 1020 of the IDOT Standard Specifications.

3. EXECUTION

3.01 PORTLAND CEMENT CONCRETE CURBS AND GUTTERS

A. Work shall be in accordance with Section 606 for Concrete Gutter, Curb, Median and Paved Ditch of the IDOT Standard Specifications.

B. All work shall be in protected from damage until completion of the project and replaced should damage occur.

END OF SECTION 05420

SECTION 05430

DETECTABLE WARNINGS

1. GENERAL

1.01 DESCRIPTION

A. Work under this section includes:

1. Furnishing and installing detectable warning panels.

B. Other specification sections which may directly relate to the work in this section include, but are not limited to, the following:

1. Section 05400 – Concrete Pavement

2. PRODUCTS

2.01 DETECTABLE WARNINGS

A. Detectable Warnings shall be brick red, preformed truncated dome inserts meeting the requirements of the ADAAG, the detail shown on the Plans and Section 424.09 of the IDOT Standard Specifications.

3. EXECUTION

3.01 GENERAL

A. Detectable Warnings shall be installed at locations shown on the Plans.

3.02 DETECTABLE WARNINGS

A. Detectable Warnings shall be installed in accordance with the Section 424.09 of the IDOT Standard Specifications and the manufacturer's specifications.

END OF SECTION 05430

SECTION 06100
STONE WALLS

1. GENERAL

1.01 DESCRIPTION

A. Work under this section includes:

1. Construction of stone walls and slope treatments.
2. Installation of geotextile fabric, aggregate base, aggregate backfill and drain pipe where required.

B. Other specification sections which may directly relate to the work in this section include, but are not limited to, the following:

1. Section 02400 – Soil Erosion and Sediment Control
2. Section 03100 – Earthwork and Grading
3. Section 03120 – Finish Grading and Topsoil
4. Section 09210 – Aquatic and Wetland Plants
5. Section 09300 – Turf Seeding
6. Section 09310 – Native Seeding

1.02 SUBMITTALS

A. For sources of stone from any supplier other than that specified herein, the Contractor shall submit samples of the material for approval by the Owner prior to delivery and placement. For geotextile fabrics, the Contractor shall submit a product tag or other proof of product compliance to the Owner before installation. Use of any product other than specified requires the submittal of samples and complete manufacturer's specifications to the Owner for approval.

B. Provide sample materials for 6″ to 9″ granite cobble stone toe.

C. Submit photographic representation of limestone slabs, granite boulder slope treatments, and granite boulder-individual placement for Owner review and approval.

2. PRODUCTS

2.01 TURBIDITY BARRIERS

A. Refer to Section 02400 – Soil Erosion and Sediment Control.

2.02 GEOTEXTILE FABRIC

A. Geotextile fabric shall be non-woven; needle punched polypropylene staple fiber that is UV stabilized and resistant to chemicals, mildew and insects.

B. The geotextile fabric shall be:

1. Thrace-LINQ GTF-225EX

Grab Tensile Strength	215 lbs
Elongation	50%
Puncture	600 lbs

Permittivity	1.3 sec

2.03 3″ STONE

A. 3″ crushed, angular, washed limestone.

2.04 6″ TO 9″ GRANITE COBBLE STONE TOE

A. The granite cobble stone toe shall be natural field stone cobbles and boulders reasonably graded from a minimum of 6 inches to a maximum of 9 inches in diameter unless specified differently on the Plans. The cobbles shall be of mixed geologic origin primarily granite, as is typically found in the Fox River basin of northern Illinois and throughout Wisconsin. Crushed limestone riprap is not acceptable and will not be approved. Samples of the specified material shall be submitted for approval to the Owner prior to delivery and placement.

2.05 AGGREGATE BASE COURSE – CA-6, TYPE B

A. Aggregate materials for use as aggregate base course shall be CA-6, Type B, in conformance with IDOT Standard Specification Article 1004.01.

2.06 AGGREGATE BACKFILL, CA-7

A. Aggregate materials for use as aggregate base course shall be CA-7, in conformance with IDOT Standard Specification Article 1004.01.

2.07 LIMETSONE SLAB

A. Limestone outcropping: 11″-12″ thickness, 2′-3′ depth, 3′-5′ length.

1. Weber Stone Company
12791 Stone City Road X28
Anamosa, Iowa 52205
(319) 462-3581
https://weberstone.com/

2. or approved equal.

B. Samples of the specified material shall be photographically submitted for approval to the Owner prior to delivery and placement.

2.08 GRANITE BOULDER SLOPE TREATMENT

A. Boulders shall be naturally occurring field stones which have been rounded by glaciation. The boulders shall be of mixed geologic origin, primarily granite, as typically found in the Fox River basin of northern Illinois and southern Wisconsin. Boulder colors shall generally range from buff to various shades of brown and gray. The boulders shall be provided in evenly graded size ranges and proportions as specified on the Plans. Samples of the specified material shall be photographically submitted for approval to the Owner prior to delivery and placement.

B. Boulders shall be: 30% 8″ to 12″; 70% 12″ to 24″.

C. Boulders shall be from:

1. Super Aggregates
5435 Bull Valley Rd. Suite 330
McHenry, IL 60050
(815) 385-8000

2. or approved equal.

2.09 GRANITE BOULDER – INDIVIDUAL PLACEMENT

A. Boulders shall be naturally occurring field stones which have been rounded by glaciation. The boulders shall be of mixed geologic origin, primarily granite, as typically found in the Fox River basin of northern Illinois and southern Wisconsin. Boulder colors shall generally range from buff to various shades of brown and gray. Samples of the specified material shall be photographically submitted for approval to the Owner prior to delivery and placement.

B. Boulders shall be: 36″ to 48″ length, 36″ to 60″ wide, and 24″ to 36″ height.

C. Boulders shall available from:

1. Super Aggregates
5435 Bull Valley Rd. Suite 330
McHenry, IL 60050
(815) 385-8000

2. or approved equal.

2.10 SEED AND EROSION CONTROL BLANKET

A. Refer to Section 09310 – Native Seeding for seeding and erosion control products.

3. EXECUTION

3.01 SITE PREPARATION

A. All protection measures, including silt fence, filter socks, turbidity curtains, temporary construction fencing, etc. shall be installed prior to commencement of work.

B. If dewatering services are used, adjoining properties and discharge locations shall be protected from erosion. Discharges shall be routed through an effective sediment control measure (e.g. sediment trap, sediment basin, or other appropriate measure).

C. All existing topsoil in the work area which is subject to grading and construction of the stone walls shall be stripped and stockpiled. The subgrade at the work area shall be cut, filled and otherwise shaped to create the required lines, grades and wall batter angle as shown on the Plans. The subgrade at the base of the wall shall be excavated to form a trench to assure the proper burial depth of the first course of material. The trench shall be of adequate depth to accommodate any required aggregate base. The subgrade at the wall base trench shall be undisturbed clay soil or compacted to a minimum of 95% density based on a Standard Proctor (ASTM D-698). If the required compaction density cannot be achieved due to the presence of unsuitable material or conditions the Contractor shall immediately inform the Owner to determine the appropriate method to achieve the required subgrade conditions.

3.02 GEOTEXTILE FABRIC AND AGGREGATE BASE

A. Place and secure the geotextile fabric where indicated on the Plans. Aggregate backfill shall be placed and compacted in the subgrade trench to the depths and dimensions shown on the Plans. Compact the material in uniform lifts of a maximum loose thickness of 6 inches. Elevations at the top of the finished

aggregate base shall be such that proper burial depths of the first stone course are achieved.

3.03 STONE PLACEMENT

A. The Contractor and Owner shall meet at the work site prior to the start of construction to verify the type, location, orientation, and finished appearance desired by the Owner. The Contractor shall place the stones to accurately reflect the dimensions, grades and batter angle as shown on the Plans.

B. Stones shall be fitted and placed individually to achieve minimal gaps between stones and with no geotextile fabric or backfill materials visible. To achieve minimal gaps, portions of the wall may require the placement of multiple layers of stones. The finished top of wall shall be uniform in elevation or slope, depending on the desired intent. Boulder sizes shall be evenly distributed throughout the wall face.

3.04 BOULDERS – INDIVIDUAL PLACEMENT

A. This work includes the setting of individual boulders for largely aesthetic purposes. The Contractor and Owner shall meet at the work site prior to the start of construction to determine the selection and location of individual boulders and the finished appearance desired by the Owner. The Contractor shall place the selected boulders as marked in the field by the Owner.

B. Boulders shall be placed prior to the installation of concrete pavement. Isolation joints shall be installed between the boulder and concrete pavement.

3.05 RESTORATION

A. Dress the edges and area above the stone wall and slope treatments for seeding.

B. Remove the turbidity barrier upon acceptance of work by regulatory agency.

END OF SECTION 06100

SECTION 07300
CONCRETE STRUCTURES, CAST-IN-PLACE

1. GENERAL

1.01 DESCRIPTION

A. Work under this section includes:

1. All poured in place Portland Cement Concrete for walls, abutments, footings, stairs, structures, vaults, and other improvements.

B. Other specification sections which may directly relate to the work in this section include, but are not limited to, the following:

1. Section 05400 – Concrete Pavement
2. Section 05410 – Exposed Aggregate Concrete Pavement
3. Section 05420 – Concrete Curbs
4. Section 07400 – Piers and Docks
5. Section 07510 – Evaporator Restroom Facility

1.03 QUALITY ASSURANCE

A. Cast-in place concrete work shall be performed in accordance with ACI 318, unless specified otherwise. Concrete materials and operations will be tested and inspected as the work progresses. Failure to detect any defective work or materials shall not in any way prevent later rejection when such defect is discovered nor shall it obligate the Owner for final acceptance.

B. The Owner may employ a professional testing service to perform testing of the Portland cement concrete. The Contractor shall follow the instructions of the testing technician when a specific course of action is deemed necessary.

C. Testing shall be in accordance with applicable sections of the IDOT Standard Specifications.

D. Testing Services

1. The following testing services shall be performed by the designated Testing Agency:

a. Review and/or check-test the Contractor's proposed materials for compliance with the specifications.

b. Review and check-test the Contractor's proposed mixture design when required by the Owner.

c. Secure production samples of materials at plants or stockpiles during the course of the work and test for compliance with the specifications. Tests of cement and aggregates shall be performed to ensure conformance with Specification requirements. Manufacturer's certification that cement materials meet Specification requirements and results of manufacturer's own material tests will be acceptable in lieu of tests by inspection and testing firm. Aggregates testing shall be performed by independent inspection and testing firm, for compliance with

ASTM C33, including limits for deleterious substances, grading and physical property requirements.

d. Conduct strength tests of the concrete during construction in accordance with the following procedures:

1. Secure composite samples in accordance with ASTM C172. Each sample shall be obtained on a random basis, avoiding any selection of the test batch other than by a number selected at random before commencement of concrete placement.

2. Mold and cure four specimens from each sample in accordance with ASTM C31. Any deviations from the requirements of this Standard shall be recorded in the test report.

3. Test specimens in accordance with ASTM C39. Two specimens shall be tested at 28 days for acceptance and one shall be tested at 7 days for information. One specimen shall be held should additional testing be required and ordered. The acceptance test results shall be the average of the two specimens tested at 28 days. If one specimen in a test manifests evidence of improper sampling, molding or testing, it shall be discarded and the strength of the remaining cylinder shall be considered the test result. Should both specimens show any of the above defects, the entire test shall be discarded.

4. Make at least one strength test for each 50 cubic yards or fraction thereof, of each mixture design of concrete placed in any one day.

5. When the total quantity of concrete with a given mixture design is less than 50 cubic yards, the strength tests may be waived by the Owner if, in its judgment, adequate evidence of satisfactory strength is provided, such as strength test results for the same kind of concrete supplied on the same day and under comparable conditions to other work or other projects.

e. Determine slump of the concrete sample for each strength test and whenever consistency of concrete appears to vary, using ASTM C143.

f. Determine air content of normal weight concrete sample for each strength test in accordance with either ASTM C231, ASTM C173 or ASTM C138.

g. Determine temperature of concrete sample for each strength test.

E. Duties and Authorities of Designated Test Firm

1. Representatives of the firm shall inspect, sample and test the materials and the production of concrete as required by the Owner. When it appears that any material furnished or work performed by the Contractor fails to fulfill specification requirements, the testing agency shall report any such deficiency to the Owner and the Contractor.

2. The testing firm shall report all test and inspection results to the Owner and Contractor immediately after they are performed. All test reports shall include the exact location in the work at which the batch representing a test was deposited. Reports of strength test shall include detailed information on storage and curing of specimens prior to testing.

3. The testing firm and its representatives are not authorized to revoke, alter, relax, enlarge or release any requirements of the contract documents, nor to approve or accept any portion of the work.

F. Responsibilities and Duties of Contractor

1. The Contractor shall provide the necessary testing services for the following:

a. Qualification of proposed materials and the establishment of mixture designs.

b. Other testing services needed or required by the Contractor.

c. The use of testing services shall in no way relieve the Contractor of the responsibility to furnish materials and construction in full compliance with the contract documents.

d. The Contractor shall submit to the Owner the concrete materials and the concrete mix designs from the redi-mix supplier proposed for use for each class of concrete with a written request for acceptance. This submittal shall include the results of all testing performed to qualify the materials and to establish the mix designs. No concrete shall be placed in the work until the Contractor has received such acceptance in writing.

e. To facilitate testing and inspection, the Contractor shall:

1. Furnish any necessary labor to assist the designated testing agency in obtaining and handling samples at the project or other sources for materials.

2. Advise the Owner and the testing agency sufficiently in advance of operations to allow for completion of quality tests and for the assignment of personnel.

3. Provide and maintain for the sole use of the testing agency adequate facilities for safe storage and proper curing of concrete test specimens on the project site for the first 24 hours as required by ASTM C31.

4. Submit copies of mill test reports for shipments of cement and reinforcing steel to the Owner when required.

1.04 REFERENCE STANDARDS

A. ACI 301 - Specifications for Structural Concrete for Buildings.

B. ACI 304 - Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete.

C. ACI 305 - Recommended Practice for Hot Weather Concreting.

D. ACI 306 - Recommended Practice for Cold Weather Concreting.

E. ACI 318 - Building Code Requirements for Reinforced Concrete.

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

G. ASTM C33 - Concrete Aggregates.

H. ASTM C94 - Ready-Mixed Concrete.

I. ASTM C150 - Portland Cement.

J. ASTM C171 - Sheet Materials for Curing Concrete.

K. ASTM C138 - Standard Test Method for Density (Unit Weight), Yield, And Air Content (Gravimetric) Of Concrete

L. ASTM C173 - Standard Test Method for Air Content of Freshly Mixed Concrete by The Volumetric Method

M. ASTM C231 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method

N. ASTM C260 - Air Entraining Admixtures for Concrete.

O. ASTM C309 - Liquid Membrane-Forming Compounds for Curing Concrete.

P. ASTM C494 - Chemical Admixtures for Concrete.

2. PRODUCTS

2.01 CONCRETE MATERIALS

A. Cement: Portland Cement, ASTM C150, Type I.

B. Fine and Coarse Aggregates: ASTM C33.

C. Water: Clean and free from injurious amounts of oil, alkali, organic matter, or other deleterious material.

2.02 ADMIXTURES

A. Air Entrainment: ASTM C260.

B. Chemical: ASTM C494, Type A - Water reducing. Type B - retarding. Type C - accelerating. Type D - water reducing and retarding. Type E - water reducing and accelerating.

2.03 CURING MATERIALS

A. Curing Compound: Resin based, type; ASTM C309, Type 2 - white pigmented, Class B.

B. Polyethylene Film: 4 mil. thick, white opaque color, ASTM C171.

2.04 ACCESSORIES

A. Bonding Agent: Two component modified epoxy resin.

B. Vapor Barrier: 4 mil. unless otherwise shown on the Plans. Clear polyethelene film, type recommended for below grade application.

C. Non-Shrink Grout: Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents; capable of developing minimum compressive strength of 2,400 psi in 2 days and 7,000 psi in 28 days.

2.05 CONCRETE MIXES

A. Mix concrete in accordance with ASTM C94.

B. Provide concrete of the following strength:

1. Compressive strength (28 day): 4,000 psi.

2. Entrained Air Content: As indicated in ACI 301, Table 3.4.1.

3. Cement Content: Minimum 564 pounds per cubic yard.

4. Water Cement Ratio: Maximum 0.45.

5. Slump: 1-inch minimum, 3-inch maximum for footings and substructure walls; 4-inch maximum for slabs, pavement, beams, reinforced walls and columns. Loss of slump in pumping shall not exceed 1-1/2-inch.

C. Select proportions for normal weight concrete in accordance with ACI 301, 3.8, Method 1.

D. Use water reducing admixtures only when accepted by Owner.

E. Use accelerating admixtures only in cold weather and only when accepted by Engineer. If accepted, use of admixture will not relax cold weather placement requirements. Calcium chloride shall not be used.

F. Use retarding admixtures only in hot weather and only when accepted by Engineer.

G. Use air entrained concrete for all concrete exposed to the exterior.

3. EXECUTION

3.01 PLACING CONCRETE

A. If dewatering services are used, adjoining properties and discharge locations shall be protected from erosion. Discharges shall be routed through an effective sediment control measure (e.g. sediment trap, sediment basin, or other appropriate measure).

B. Place concrete in accordance with ACI 304.

C. Notify Engineer minimum 24 hours prior to commencement of concreting operations.

D. Ensure anchors, seats, plates and other items to be cast into concrete are placed, held securely and will not cause hardship in placing concrete. Rectify same and proceed with Work.

E. Maintain records of poured concrete items. Record date, location for pour, quantity, air temperature, and test samples taken.

F. Ensure reinforcement, inserts, embedded parts, and formed expansion and contraction joints are not disturbed during concrete placement.

G. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent. Apply bonding agent in accordance with manufacturer's recommendations.

H. Pour concrete continuously between predetermined construction and control joints. Do not break or interrupt successive pours such that cold joints occur.

I. Pour floor slabs in checkerboard or saw cut pattern indicated on Contract Drawings. Saw cut control joints within 24 hours after finishing. Use 3/16-inch thick blade, cutting l/4-inch into depth of slab thickness.

J. In locations where new concrete is dowelled to existing Work, drill holes in existing concrete, insert steel dowels, and pack solidly with non-shrink grout.

K. Honeycomb or embedded debris in concrete is not acceptable. Notify Engineer upon discovery.

L. Conform to ACI 305 when concreting during hot weather.

M. Conform to ACI 306 when concreting during cold weather.

N. Maintain concrete cover around reinforcing in accordance with ACI 3l87 or as otherwise indicated on the Plans.

O. Install vapor barrier under interior slabs on grade. Lap joints minimum 1 foot and seal. Do not disturb or damage vapor barrier while placing concrete reinforcing. If damage does occur, repair areas before placing concrete. Use vapor barrier materials, lapped over damaged areas minimum 6-inches in all directions and sealed.

P. Separate slabs-on-grade from vertical surfaces where shown with 1/2-inch thick joint filler. Extend joint filler from bottom of slab to within 1/2-inch of finished slab surface. Refer to IDOT Standard Specifications for joint filler requirements.

3.03 FINISHING OF FORMED SURFACES

A. Exposed Surfaces: Unless indicated otherwise, concrete that will be exposed in the completed structure shall receive Smooth Form Finish conforming with ACI 301.

3.02 CURING AND PROTECTION

A. Beginning immediately after placement, protect concrete from premature drying, excessive hot or cold temperatures, and mechanical injury. Maintain concrete with minimal water loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

B. One additional test cylinder shall be taken during cold weather concreting, and cured on the Work Site under same conditions as concrete it represents.

C. One slump test and one air test shall be taken for each set of test cylinders taken.

D. Follow sampling and testing procedures referred in ASTM C94.

END OF SECTION 07300

SECTION 07400
PIERS AND DOCKS

1. GENERAL

1.01 DESCRIPTION

A. Work under this section includes:

1. Design, fabricate, install and furnish all plant, labor, equipment, supplies and materials and perform all operations required for installation of a complete, fully functional and operational floating fishing pier, including but not necessarily limited to fishing piers, ramp, anchorages, and railings, all as indicated on the drawings and specified herein.

B. Other specification sections which directly relate to the work of this section include, but are not limited to, the following:

1. Section 02400 – Soil Erosion and Sediment Control
2. Section 07300 – Cast-in-Place Concrete Structures

1.02 REQUIREMENTS

A. The Plans are general in nature and show basic floating fishing pier layout with required dimensions, and certain required materials and details of construction.

B. A minimum of ten (10) years of proven experience in floating pier system fabrication and installation is required.

C. The fishing pier shown on the Plans is patterned after the type manufactured by Flotation Docking Systems (FDS), of Cedarville, Michigan. However, the intent is not to preclude other pier systems of different manufacture as long as they meet the required design loads, are within the range of required dimensions, are constructed with the specified materials, and are of a quality equal to or better than that specified in this Section.

D. Use of an alternative product must be approved prior to bidding. Failure to pre-approve an alternative product assumes (mandates) that bidder has reflected an intended use of the above-named manufacturer.

E. The contract drawings are not intended to be used for fabrication. The Contractor shall prepare and submit Engineered Shop Drawings to the Owner for approval prior to fabricating and installing the required fishing pier.

F. Other materials and equipment shall be as indicated on the Drawings, however, all other materials not specifically described but required for a complete and proper installation of the work under this Section, shall be new, first quality, and if selected by the Contractor, subject to the approval of the Owner.

G. **All drawings and calculations submitted must be sealed by a Professional Engineer experienced in the design of floating piers and anchorages. If the Engineer is not a full-time employee of the pier manufacturer, proof must be provided of satisfactory experience in floating pier system design including anchorages for conditions similar to those which will be experienced on this project. The burden of proof of the merit of the proposed floating pier system including anchorages is upon the manufacturer.**

1.03 QUALITY ASSURANCE

A. **Qualification of the Bidder:** A minimum of ten (10) years of proven experience in the design, manufacturing, and installation (specifically) of Floating Fishing Piers. Being a dock manufacturer without the specific experience of executing Fishing Pier projects does not qualify a prospective bidder for this work. Anchorage requirements herein, disallow conventional spuds or piling. Experienced use of monocoque structures are therefore the required concept of anchorage. Use of stiff arms is not acceptable.

B. **Pre-qualification:** In order to obtain pre-qualification status for this project, the following list of submittals must be presented within one week of bid date in order to provide the owner's representative with sufficient time to review said alternative request.

1. Applicable specifications and typical fabrication drawings showing cross sections, details, attachments, connections, anchorage details and all other necessary information for adequate product analysis.

2. A list of existing installations placed during the required ten (10) year performance period where floating dock systems similar to that to be qualified have been installed at locations with similar climatic and ice conditions. Such listing shall include the date installed and the name, address and telephone number of the installation's owner, or the owner's local contact.

3. Catalog information on all commercial equipment being installed as part of the system, whether specified or offered as a substitution.

4. General literature covering floating dock manufacturer and his product.

5. Design calculations for piers, connectors, bracing, flotation, bridges, anchorages and related pier system components based upon specified loading conditions. Decking shall not be considered as part of the load carrying structure. **All drawings and calculations submitted must be sealed by a Professional Engineer experienced in the design of floating piers and anchorages. If the Engineer is not a full-time employee of the pier manufacturer, proof must be provided of satisfactory experience in floating pier system design including anchorages for conditions similar to those which will be experienced on this project. The burden of proof of the merit of the proposed floating pier system including anchorages is upon the manufacturer.**

C. Prospective bidders are cautioned that qualification of any floating fishing pier is not to be considered as a determination of complete product acceptability and that a pre-qualified system may be determined by the Engineer as being in need of modification on the basis of subsequently introduced information on shop drawings or in the final submitted structural calculations as reviewed by the Engineer. In any case, the system furnished must comply with the design criteria specified herein.

1.04 DIMENSIONS

A. Fishing pier and dock layout shall be to the configuration shown on the drawings. Widths of piers are to the edge of the piers and do not include rub-rails and fenders.

B. Piers may be up to 3 inches less than the specified widths to allow some tolerance in the manufacturing process. However, the pier width shall be uniform

and the 3-inch tolerance does not imply that variations in width over the length of the pier(s) will be tolerated.

C. Bridge widths shall match pier widths, but in no case where individual finger pier bridges are used shall the clear width between hand rails be less than 30 inches. If roller connections are used on main pier bridges, the bridge width may be reduced to the pier width less 2 feet.

D. For 8’ wide main pier, a minimum of 5’-0” clear deck travel width shall be maintained for barrier free requirements, except as shown on fishing pier.

1.05 DESIGN CRITERIA

A. The design assumes the top of decking is 18” above water elevation.

B. The framework shall be a hybrid composite of southern yellow pine, structural steel fabricated components (galvanized where applicable), and galvanized sheet steel. The assembly format shall be of monocoque design utilizing 2” thick exterior framing lumber, 2” thick interior bulkheading on maximum 4’-0” transverse span and 5’-0” longitudinal span, and 20 gauge sheet steel upper and lower skin on body work. Structural steel fabricated corner and finger connectors shall have a minimum 6” legs and a sectional depth equal to that of the dock frame. Bulkheads shall be of the same material as the timber sidewall. Framing shall act as a bulkhead member to withstand compression and shall be the full width of the unit @ 48” spacing along the length of each unit. This support framing/bulkhead shall be incorporated with a continuous flotation encasement to provide rigidly constructed monocoque units.

C. Unless otherwise noted, floating piers, anchorages and connections shall be designed in accordance with ASCE Report No. 50 “Small Craft Harbors” dated 1969 or current edition, and the revised edition “Planning and Design Guidelines for Small Craft Harbors” dated 1994.

D. All structural members shall be designed and appropriately sized to carry and accept all design loads without failure or excessive deformation. Members shall be so sized to compensate for reductions in cross section resulting from the drilling of bolt holes and cutting of openings needed for utilities. Only single width fishing pier modules shall be allowed for piers up to 5 feet in width. Where the required width of tee pier requires fabrication from narrower pier modules, the individual pier modules shall not be less than four feet in width. Overlapping adjacent modules by staggering transverse joints to insure maximum strength is encouraged. However, overlapping is not required as long as sufficient longitudinal joint strength is otherwise provided.

E. Connections shall allow only vertical rotation and shall be rigidly constructed to prevent horizontal translation or rotation,

1. The methodology analysis proposed is based on utilization as a composite member about the y-y axis.

2. The minimum recommended moment of inertia $L_{y\text{-}y}$ of the 4’-0” composite finger pier shall be similar or equal to 60,000 in^4 or its transformed equivalent based on modulus of elasticity ratios. The corresponding pipe connection bracing required should have a minimum moment of inertia for a steel member of 3.02 in^4.

1.05 DEFLECTION CRITERIA

A. Fishing piers, ramps, connections and anchorages shall be designed for the following loads and conditions.

B. Vertical:

1. Vertical Dead Load: Dead loads shall be the entire weight of the floating fishing pier and attachments including anchorages.

2. Vertical Live Load: A uniform live load of not less than 30 pounds per square foot on the deck and structural frame of the floating piers shall be used. Minimum live load for flotation shall be 30 pounds per square foot.

3. Combined Vertical Dead Load and Live Load: Combined dead load plus live load for fishing piers and ramps shall be the actual dead load including utilities plus 30 psf live load. However, for purposes of calculation, the combined dead load plus required 30 psf live load shall never be calculated as being less than 50 psf. Ramps shall be so designed that maximum live load deflection of the ramp is limited to 1/180 of the span. Extra flotation of the same general type and design used for the floating fishing pier shall be installed at end sections as required to compensate for end reactions of ramps due to combined loading. In no case shall the supporting fishing pier module at the ramp connection be less than the designated freeboard under combined loading nor more than 2” above the freeboard shown on the approved shop drawings under the full deadload including utilities.

4. Dead Load Freeboard: Fishing pier manufacturer shall provide fishing piers with dead load freeboards of approximately 18”. However, actual dead load freeboard shall not vary appreciably from the freeboard designated on the manufacturer’s approved shop drawings with fishing pier presenting a reasonably level, flat, even surface to the eye under dead load conditions. As indicated, fishing pier shall be reasonably level, but in no case shall a cross slope exceeding 1½” in 8’ of width be tolerated under dead load conditions. At the design load of dead load plus 30 psf live load a freeboard of not less than 10 inches shall be maintained. Freeboard loss shall not be more than 2½” at the end of 5 years.

C. Horizontal:

1. Wind Load: The uniform wind load for determining lateral loading on an independent pier or pier system from any direction, will be 15 psf on all projected surfaces. Wind loads shall be calculated in directions both perpendicular to and parallel to the main pier and the maximum wind loading shall be used for design of piers and anchorages.

2. Fishing piers and flotation shall sustain the loads imposed by nonmoving ice without damage, fracture or puncture.

3. The dock system including ramp and anchorages shall be capable of sustaining waves up to 1½ feet without damage.

1.06 REFERENCE

A. Reference is made in these specifications to the codes and/or standards promulgated by the following agencies and organizations:

1. **ASCE** American Society of Civil Engineers, 345 East 47th Street, New York, N. Y. 10017
2. **ASTM** American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103
3. **AWPA** American Wood Preservers Association
4. **AWPB** American Wood Preservers Bureau, P.O. Box 6085, Arlington, Virginia 22206
5. **AWS** American Welding Society, Inc., 2501 N.W. 7th Street, Miami, Florida 33125
6. **LWD** Low Water Datum
7. **SPIB** Southern Pine Inspection Bureau

B. Compliance:

1. Comply with those codes and/or standards specified in this Section and referenced above.
2. All work and materials shall be in conformity with all federal and state codes, laws, and regulations.
3. Where requirements of the contract documents exceed those of above mentioned codes, regulations, and standards, the requirements of the Contract Documents shall govern.

C. In case of conflict between the referenced codes and/or standards, the most stringent requirements shall govern.

1.07 SUBMITTALS

A. Lowest qualified Bidder shall be required to submit Engineered Shop Drawings of the complete pier system to the Owner for approval prior to fabrication of the required floating pier system.

1. The shop drawings shall show all dimensions, clearances, and anchorage locations.
2. In addition, if design calculations for this project (as described above) were not previously submitted during prequalification and similar type calculations were substituted, at the discretion of the Engineer, two copies of said calculations may be required along with the shop drawings.

B. The successful bidder shall be required to submit a construction sequence schedule as well as a construction time schedule.

C. The successful bidder shall submit a copy of the quality control program that is used to manufacture their particular floating pier system. The quality control program submitted by the manufacture will be used by the project engineer to establish his/her inspection schedule and testing requirements to insure compliance with the plans and specifications, particularly in the following areas.

1. Weld quality.
2. Certifications for materials such as steel, galvanizing, wood, wood treatment, bolts and fasteners, flotation, and flotation encasement.
3. Dimensional inspection.
4. Galvanizing.

5. Quality of flotation material and encasement during manufacturing.

D. Drawings and calculations submitted must be sealed by a Professional Engineer experienced in the design of floating piers and anchorages. If the Engineer is not a full-time employee of the pier manufacturer, proof must be provided of satisfactory experience in floating pier system design including anchorages for conditions similar to those which will be experienced on this project. The burden of proof of the merit of the proposed floating pier system including anchorages is upon the manufacturer.

1.08 PRODUCT HANDLING

A. Use all means necessary to protect the materials of this Section before, during and after installation and to protect the work and materials of all other trades.

B. In the event of damage, immediately make all repairs and replacements necessary to the approval of the Engineer and at no additional cost to the Owner.

2. PRODUCTS

2.01 LUMBER

A. Decking lumber shall be No. 1 select structural Southern Yellow Pine or better and shall conform to the rules of the SPIB as applicable. Deck boards shall be kiln dried. Framing lumber shall be No. 1 Southern Yellow Pine or better, and shall conform to the rules of the SPIB. Timber and lumber shall be pressure treated with CA-B or ACQ preservative in accordance with AWPB Standard LP-22 and each piece shall bear the AWPA Quality Mark.

2.02 STRUCTURAL AND MISCELLANEOUS STEEL

A. Structural and miscellaneous steel shall conform to the requirements of the Standard Specification for Structural Steel, ASTM Designation A36 or stronger. All steel shall be zinc coated (hot-dipped) in accordance with the requirements of ASTM Designation A123 except where structural steel remains out of sight as per State of Michigan exemption. Note: galvanizing of steel components reduces their structural integrity.

B. Structural aluminum shapes and/or extrusions shall be made from 6061-T6 aluminum, conforming to the requirements of ASTM Designation B221.

C. Fasteners: Bolts, lag bolts, screws, nails, flat washers and lock washers shall be of the type and size best suited for the intended use. Low-carbon bolts shall conform to the requirements for Grade “A” bolts, ASTM Designation A307. High strength bolts shall conform to the requirements of ASTM Designation A325 or A490.

1. All nailing and screw fasteners shall be hot dipped galvanized. All other bolts and washers (1/2” diameter and above) may be galvanized by electroplating process.

2. The coating thickness shall be of a minimum that corrosion of nonwear surfaces does not appear during the warranty period. Stainless steel fasteners may be substituted for protected Steel.

D. Cleats shall be heavy duty 10 inch bullhorn design made of cast aluminum alloy 319 (27,000 psi tensile, 18,000 psi yield) with countersunk hex bolt head lock features. Cleats shall be of the size indicated and shall be installed at the locations shown on the drawings.

1. Cleats shall be securely bolted directly to the pier's structural framing or fastened securely to the structural framing through appropriate intermediate members as approved by the Floating Pier / Courtesy Dock Design Engineer.

2. Bolts, nuts, and washers (both standard and lock) shall be of adequate size and strength for tying up boats normally using the slip adjacent to the cleats and shall be hot dipped or mechanically galvanized.

E. Arc welding electrodes shall conform to American Welding Society "Iron and Steel Arc Welding Electrodes".

F. Galvanized steel sheet metal shall be at least 20 gauge, conforming to the requirements of either the Standard Specifications for zinc-coated (Galvanized Carbon Steel Sheets of a Commercial Quality, ASTM Designation A526) or zinc-coated (Galvanized) Steel sheets of structural quality, coils and cut lengths, ASTM Designation A446.

1. The steel base metal, its formability and zinc coating shall be in accordance with ASTM Designation A525.

2. The zinc coating shall be a minimum of 2.0 ounces per square foot.

G. Aluminum alloy plate shall be equivalent in strength to 20-gauge steel and be 0.124-inch-thick, alloy 5052, H36 Marine Aluminum conforming to the requirements of the Standard Specification for Aluminum-Alloy Sheet and Plate ASTM Designation: B209.

2.03 FLOTATION MATERIAL

A. The flotation material shall be closed cell polystyrene with an average density of 1.0 pounds per cubic foot and a buoyancy factor of 59.0 pounds per cubic foot to allow for moisture absorption.

B. Flotation shall be provided by closed-cell polystyrene cellular materials, either pre-formed or expanded in place.

1. The flotation material shall be fully encased in at least 20 gauge galvanized steel sheet metal, marine aluminum at least 0.124 inches thick, and wood having a nominal thickness of 2 inches.

3. EXECUTION

3.01 INSTALLATION

A. The pier manufacturer shall provide a full time superintendent at the job site to supervise and coordinate the unloading, assembly and installation of the floating fishing pier including anchorages and ramp as well as to coordinate fishing pier related activities with those activities that are the responsibility of other trades and/or contractors.

B. A maximum amount of fabrication and assembly shall be done at the pier manufacturer's plant rather than on the job site.

3.02 PIERS

A. Fishing Pier shall be pre-fabricated within practical limits in the plant by the pier manufacturer and delivered ready for flotation. All workmanship shall be first class in all respects as determined by the Engineer and any units not representing a finished and acceptable appearance will be rejected.

B. All connector plates, including those in-line, at the corners and at knee braces which receive loads from impact and anchorage forces shall be of a height, width and thickness sufficient to dissipate the required loads to the framework without distortion or damage.

1. Connections may be either of the single or double shear type with hinge pin (bolt) holes parallel and along the hinge pin axis.

2. Hinge pin holes shall be as tight as possible to eliminate excessive “slop” and unnecessary movement in the joints.

3. Calculations may be required to demonstrate the frame’s ability to accept such loads imposed through the connectors as well as the ability of the connections (single or double shear) to resist the loads without distortion or damage.

C. All steel galvanized members must be hot dip galvanized after fabrication, including welding, and after the drilling of bolt holes for the attachment of anchorages and deck mounted components.

1. Exception is given only to the above referenced exemption and those field welds that must be performed, as determined by the Floating Pier / Courtesy Dock Design Engineer, at a custom connection and done so in the interest of quality control.

2. Where applicable, enough coats of an acceptable cold galvanizing compound must be applied to the field weld to give a thickness equal to the adjoining original hot dip galvanizing.

D. Where heavy plates are used in lieu of standard SAE washers (only on frame interior) hot dip galvanizing will not be required. Structural knee braces boxed in by wood and not visible are painted in lieu of galvanizing. Only the portion of intermediate spud that is visible above water is to be galvanized.

E. All finished steel members shall be free from twists, bends, distortions, and open joints. All steel construction shall be free of sharp edges and burrs. Ends of exposed steel members shall be rounded or beveled. All coping and mitering shall be done with care. Projecting materials and burrs, which would prevent bearing of the various members on each other, shall be removed.

F. All welding shall conform to the requirements of the American Welding Society. Welds shall be a solid and homogenous part of the metals joined and shall be free from pits or scale, and shall be of full area and length required to develop the required strength for the intended use. All shop welders, welding operators, welding equipment and welding procedures used in production of steel structures shall have been qualified in accordance with the qualification procedures of AWS D1.1. Welders shall be certified to perform the welds that are shown on the fabrication drawings. Proof of qualifications shall be required.

G. All bolts, nuts and washers shall be of a size and strength adequate for the loads imposed and shall be set square with connecting structural members with the nuts drawn up tight. Lock washers or other devices or techniques shall be used to prevent nuts from loosening after being properly tightened.

1. No bolt threads shall be allowed within the structural components in hinge type connections.

2. Hinge pins or bolts shall be of a positive locking type, which will not allow loosening or loss of the pin or bolt from movement of the joint.

3. High strength bolts shall be used where required in accordance with the American Institute of Steel Construction's specifications for "Structural Joints using ASTM A325 or A490 Bolts".

H. Lumber shall be counterbored wherever projecting bolt heads or nuts may damage boats or provide a hazard to fishing pier users. Counterboring shall be sufficiently deep to permit installation of the bolts and nuts with washers well below the surface of the wood.

3.03 DECKING

A. Deck boards shall be fastened by screwing.

1. Decking shall be screwed down for easy removal in those locations where electrical boxes, valves, drains, etc. must be accessed.

2. Deck screws shall be stainless steel and small and have heads flush with the deck surface or slightly depressed to provide a flat, even walking surface. Deck screws shall be installed so as not to fracture the wood and cause splintering at the hole.

3. Number of screws used per connection shall be adequate to firmly attach the deck boards and provide a flat, even walking surface. Fasteners of whatever type shall be located in symmetrical patterns throughout with fasteners in straight lines.

B. Deck boards shall be installed with no space between adjacent deck boards. Decking shall be installed perpendicular to the longitudinal axis of the fishing pier.

C. Deck boards shall be supported at a maximum of 3 feet on center with the boards laid heart side down.

D. Openings between adjacent floating fishing pier modules shall not exceed ½ inch, however, the opening between adjacent pier module end deck boards shall not exceed ⅛ inch. All connections between floating fishing pier modules shall not protrude above the level of the pier surface.

3.04 RAMPS

A. A ramp shall be required between the fishing pier and trestle or fixed abutment, as shown on the plans. Ramps shall have timber decks constructed of 2" x 6" lumber, adequately supported, installed parallel to the longitudinal axis of the bridge and meeting the material requirements specified in this section.

B. The ramps may be hinged at both end and have a sliding or roller (wheeled) connection at the other to allow for movement due to fluctuating water levels. Wheels shall be of adequate strength to carry the design live loads applied to the bridge in addition to the weight of the bridge and handrails.

C. Hinged connections at both ends may be used if the anchorage system used allows for the horizontal movement of the pier(s). In all cases, the bridge connections shall be so designed as not to present any excessive openings or significant differences in elevation between the bridge and point of connection at the shore and pier under a range of lake levels from +5'' above to -1' below LWD.

D. A hinged threshold plate shall be used with a sliding or roller type connection where the ramp joins the pier to avoid a step. The bottom of the ramp shall be

designed so that the step, without the threshold plate, shall not exceed 6 inches. The required hinge threshold plate shall be attached at the bottom of the bridge, shall be the full width of the bridge and shall be 36 inches long if the step is 6 inches high. For lesser height steps, the length of the threshold plate shall be proportioned accordingly. The threshold plate shall be fabricated from ¼" thick rib-reinforced aluminum deck plate of adequate strength and design to prevent abnormal deflection and shall have a slip resistant surface.

E. Handrails shall be required on both sides of all ramps and may be part of the structural support or separate units. Top rail is to be 42 inches above the deck surface with intermediate railings.

1. All rails shall be smooth with no sharp corners, burrs, etc., so as to make a smooth member for hand contact.

2. Handrail and handrail brackets shall be designed to withstand a minimum concentrated load of 200 pounds applied from any direction at any point on the handrail.

3. Sharp corners on railings or trusses used as handrails shall be avoided by the use of short 45° miters, short curved sections, or other approved methods.

4. Protrusions on the railing or on the bridges themselves shall not have sharp corners.

3.05 SKIRTING AND RUBRAILS

A. Skirting (to the waterline) is preferred. Required structural framework and flotation devices shall be skirted from decking to no less than 2" above the waterline at dead loading. In the case where skirting is the prime side wall member (timber box type floating piers) extend sidewall to the bottom of the unit with nominal 2" thick wood meeting the lumber requirements specified.

1. The skirting must be adequately secured full depth to the frame members at maximum 4'-0" spacing along unit with bolts or other acceptable fasteners as dictated by sound engineering practices to prevent skirting and frame damage by ice, wave and impact design forces.

2. Fendering shall be non-marring white extruded vinyl or flexible polyvinyl chloride, resistant to sunlight, water, gasoline, oil or other agents common to marinas.

3.06 LADDERS

A. A safety ladders shall be installed on the fishing pier as shown on the plan.

B. Ladders at the ends of finger piers shall be so attached as to accommodate spuds if spuds are required at these locations.

C. Ladders shall be constructed of galvanized steel, aluminum or an approved equal in accordance with accepted engineering practice.

D. Materials shall conform to applicable requirements of this specification.

1. Clear spacing between vertical rails shall not be less than 18 or more than 24 inches with on center spacing of rungs at 10 to 12 inches.

2. The bottom of ladders shall project down into the water so that the top of the bottom rung is 36 inches below the still water surface.

3. The top of the rails shall project 36 inches above the pier deck surface with rungs omitted between the rails above the deck.

3.07 ANCHORAGE SYSTEM

A. The floating fishing pier shall be secured via a transmission of all anchorage loads through the pier's structure – through the pier's gangway ramp, and into the shore-based concrete landing abutment. The manufacturer shall provide abutment sizing and connection detail requirements to the Floating Pier / Courtesy Dock Design Engineer specified within shore work bidding documents.

3.08 MAINTENANCE AND OPERATIONS MANUAL

A. Upon completion of the project, the Contractor shall furnish the Owner three (3) copies of a "Maintenance and Operations Manual", which shall include instructions and related information for maintaining and operating the floating fishing pier system and anchorages.

B. The Contractor shall include in the manual a detailed procedure for systematically maintaining and winterizing the fishing pier system and its anchorages in an effort to minimizing ice damage to the system during the winter.

3.09 WARRANTY

A. If a pier system of different manufacture than FDS is utilized, a warranty meeting or exceeding the criteria listed below must be provided.

B. FDS warrants to the original purchaser of a facility designed and installed by FDS, that the product shall be free from defects in materials, workmanship, and/or design under normal use for a period of five (5) years.

C. All dockage components, connectors, and appurtenances have been designed and are constructed to the performance standards identified within the preceding general specifications. Conditions exceeding these standards (patterned after Michigan Department of Natural Resources design criteria for small craft harbors) may precipitate damage not covered under this warranty.

D. Anchorage systems and any related damage to the anchorage system, if specified by others, may not be covered as a part of this warranty.

1. At any time within the warranty period FDS will replace and/or repair any part, assembly or portion thereof, which our examination shall disclose to our satisfaction to be defective, without expense to the Owner.

2. This warranty specifically excludes misuse, alteration, or damage resulting from transportation after initial installation as well as from flood, windstorm, **moving ice (thermal expansion, current, or wind-driven), fire, or an act of God exceeding the design criteria set forth in these specifications. Piers located immediately adjacent to vertical walls will require either de-icing or winter removal**.

3. Commercially purchased items shall be warranted for one (1) year or the warranty period provided by the manufacturer, if longer than one year.

END OF SECTION 07400

SECTION 07511

EVAPORATOR RESTROOM FACILITY, VAULT ONLY

1. GENERAL

1.01 DESCRIPTION

A. Work under this Section includes:

1. Furnishing, delivering and installation of an evaporator restroom vault.

B. Other specification sections which directly relate to the work of this section include, but are not limited to, the following:

1. Section 01000 – General Project Requirements
2. Section 02100 – Temporary Access and Facilities
3. Section 02200 – Temporary Traffic Control
4. Section 02300 – Site Resource Protection
5. Section 02400 – Soil Erosion and Sediment Control
6. Section 02600 – Demolition and Removals

1.02 QUALITY ASSURANCE

A. Contractor Qualifications: The work described in this section requires specialized knowledge, experience, skills and equipment to successfully complete. The Contractor shall possess the full capability to execute the work as specified, including trained, experienced and skilled personnel and possession or access to the required equipment.

B. Shop Drawings:

1. Shop Drawings, submittal requirements, procedures and schedules for facility shall meet the requirements contained in Subsection 1.09 of Section 01000, General Project Requirements.

C. Substitutions and Product Options:

1. These shall meet the requirements in Subsection 1.08.E of Section 01000, General Project Requirements.
2. All approved equals shall be notified with written statements of their approval. Manufacturers shall not bid this project without this written notification.

2. PRODUCTS

2.01 EVAPORATOR RESTROOM FACILITY

A. GENERAL

1. The structure shall consist of a concrete vault that will sit below an overhead structure installed by Others. The vault shall be a certified water tight vault with a factory installed spray in two-part 100% solid polyurethane chemical resistant liner. The vault shall be built by a precast company that is currently certified by the National Precast Concrete Association.

B. PRECAST CONCRETE FLOOR SYSTEM AND FOUNDATION/VAULT

1. Restroom floor shall be a one-piece structural monolithic precast concrete slab manufacture in a closed environmentally controlled plant. Concrete to develop 5,000 psi in 28 days. The floor slab shall be designed and engineered with pick-up points for possible future relocation. The slab shall be 6" thick concrete with a 6″ steel angle at the lift points, the floor finish shall have a non-skid broom finish. After the slab is cured it will be sealed with a two-part epoxy coating. The structural rebar shall be welded to the perimeter angle, the minimum rebar size shall be #4 at 12″ on center each way. Anchor bolts shall be 5/8″ with 2″ x 2″ x 3/16″ plate washers. The anchor bolts will be embedded in a minimum 4″ of concrete, the walls will be installed directly on concrete. Installation of walls on ferrous (steel) surfaces will not be permitted. Floor drains shall be set with epoxy into the slab by the Contractor.

2. Foundation shall be manufactured in a closed environmentally controlled plant. Construction shall be 6″ thick concrete floor with 4″ concrete walls. Concrete to develop 5,000 psi in 28 days. The floor slab shall have pick-up points for possible future relocation.

3. Manufacturer must have a minimum of 3 years of experience in building similar floor systems. The floor system shall be built by a precast company that is currently certified by the National Precast Concrete Association.

3. EXECUTION

3.01 GENERAL REQUIREMENTS

A. All work shall conform with all local, state and national building and zoning codes applicable to the nature and substance of the work described herein.

The following minimum standards (most current) shall apply:

1. Illinois Building Code
2. National Electric Code
3. Illinois Plumbing Code
4. State of Illinois Accessibility Code
5. International Mechanical Code
6. International Fire Code
7. Illinois Energy Conservation Code

3.02 SITE PREPARATION AND ACCESS

A. Facility shall be installed at the location and elevation shown on the Plans. It shall be accurately located and staked using the approved control points.

B. Contractor shall provide a clear and safe access to the building site for the delivery truck. If access cannot be provided via delivery truck, the Contractor shall take delivery at an alternate site and will be responsible for final transportation to the job site at no additional charge to the Owner.

C. A crane may be used for off-loading and setting the structure on site and shall be the responsibility of the Contractor. A spreader bar assembly will be required. The dimensions for the lifting points shall be outlined on the shop drawings. The

shop drawings must be reviewed by the crane company for clarification as to the requirements of the spreader bar assembly.

3.03 EXCAVATION

A. Blade-off organic matter and stockpile for later use.

B. Dispose of trash or rubble.

C. Excavate for all footings, piers, tanks and all work included in this contract. Footings shall extend to the required bearing of 3,000 lbs/sf regardless of dimensions. Protect the completed excavation against freezing.

D. Excavation required shall be per Plans and specifications.

3.04 BACKFILL

A. Backfill walls, footings, foundations 4″ below finish grades outside buildings. Dispose of all excess material off-site. Provide additional fill to meet grades as shown.

B. Sand, clay, gravel, crushed stone or other non-organic or imperishable materials may be used as backfill. Deposit material in 6″ layers and compact to 95%. Mixing of dissimilar materials is unacceptable.

3.05 UTILITY HOOKUPS

A. Contractor shall install additional vent pipe and roof curb.

B. Contractor shall install the roof vent fan and final electrical connection to the fan.

3.06 ANCHORING OF THE RESTROOM

A. Anchor the restroom to the foundation per Plans and specifications. This includes weld plates between the floor slab and vault.

END OF SECTION 07520

SECTION 08300

SIGNAGE

1. GENERAL

1.01 DESCRIPTION

A. Work under this section includes:

1. Furnishing and installing permanent signs.

2. PRODUCTS

2.01 GENERAL

A. Signs shall be in accordance with the Manual on Uniform Traffic Control Devices for Streets and Highways, Latest Edition and as indicated on the Plans.

3. EXECUTION

3.01 GENERAL

A. Signs shall be installed at locations shown on the Plans.

3.02 SIGNS

A. Signs shall be installed in accordance with the Manual on Uniform Traffic Control Devices for Streets and Highways, Latest Edition and applicable Federal, State, County and Local Ordinances and Standards.

END OF SECTION 08300

SECTION 08800
METAL FABRICATIONS

1. GENERAL

1.01 DESCRIPTION

A. Work under this section includes:

1. Provision and installation of stair handrails, ramp handrails, guardrails, abutment guardrails, custom counters, custom bench, and custom platform bench.

B. Other specification sections which may directly relate to the work in this section include, but are not limited to, the following:

1. Section 05400 – Concrete Pavement
2. Section 07300 – Concrete Structures, Cast-in-place
3. Section 07400 – Piers and Docks

1.02 QUALITY ASSURANCE

A The work described in this section requires specialized knowledge, experience, skills and equipment to successfully complete. The Contractor shall possess the full capability to execute the work as specified, including trained, experienced and skilled personnel and possession or access to the required equipment.

B. The metal fabricator shall provide proof of qualifications, including a work history documenting a minimum of 5 projects completed in the last 5 years which are comparable in scope, techniques and size. This information shall include a complete project description, lead foreman experience history, location, client name and contact phone numbers. The Contractor shall provide this information in the bidder's forms of this Contract.

C. Submittals

1. Product Data: Provide manufacturer's material descriptions, construction details, dimension of individual components and profiles, and finishes for posts, infill panels, rails, base plates, fittings, and hardware.
    a. Provide documentation of compliance with the Build America, Buy America (BABA or the Act).
2. Shop Drawings: Contractor shall provide engineered Shop Drawings for Owner approval prior to fabrication. Show dimensions, metal thickness, finishes, joints, attachments, and relationship of work to adjacent construction.
3. Samples for Verification: For each type of exposed finish required, prepared on components indicated below and of the same thickness and metal indicated for the Work. If finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
    a. 6-inch-long sections of each different linear member, including handrails, top rails, posts, and balusters.
    b. Fittings and brackets.

c. Assembled samples, made from full-size components, including top rail, post, handrail, and infill. Show method of finished members at intersections.

4. Mockup: Before installing guardrail, build mockup on one section to verify selections made under sample Submittals and demonstrate aesthetic effects and qualities of materials and execution.

1.03 PROJECT CONDITIONS

A. Field Measurements: Verify dimensions by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying with Work.

1.04 SYSTEM DESCRIPTION

A. Minimum Design Loads

1. Handrails, Guardrails, Abutment Guardrails, Custom Counters, Custom Bench and Custom Platform Bench:

a. 50 pounds per linear foot applied in any direction at top, transferred via attachments and supports.

b. Concentrated 200-pound load applied in any direction at any point along top, transferred via attachments and supports.

c. Maximum deflection under loading: L/120.

2. Infill panels:

a. Concentrated load of 50 pounds per foot applied horizontally to an area of 1 square foot.

3. Concentrated and uniform loads do not need to be applied simultaneously.

4. Allow for thermal movements from ambient and surface temperature acting on exterior guardrails and handrails

a. Temperature Change: 120 Degrees-Fahrenheit ambient; 180 Degrees-Fahrenheit material surfaces.

5. Perform design under direct supervision of Professional Structural Engineer licensed in State in which work is performed.

6. Fabricate in accordance with ASTM E985.

1.05 ACCESSIBILITY REQUIREMENTS

A. All components of this section shall be code-compliant and adhere with most stringent federal, state or local accessibility requirements.

1.06 DELIVERY, STORAGE AND HANDLING

A. Store steel above ground on platforms, skids, or other supports; separate with wooden separators.

B. Protect steel from corrosion.

C. Prevent damage to prime coat and galvanized coatings.

1.07 WARRANTY

A. Manufacturer shall warrant products and accessories against defects in materials and workmanship when utilized for their intended use.

B. Warranty Period: Five years from date of Substantial Completion.

2. PRODUCTS

2.01 MATERIALS – STEEL

A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.

1. Shapes: ASTM A36/A36M.
2. Plate: ASTM A283/A283M.
3. Sheet: ASTM A1008/A1008M.
4. Pipe: ASTM A501/A501M.
5. Tube: ASTM A500/A500M.
6. Bars: ASTM A108.

B. Brackets, Flanges, and Anchors: Same metal and finish as supported rails unless otherwise indicated.

1. Provide either formed- or cast-metal brackets with predrilled hole for exposed bolt anchorage.
2. Galvanized-Steel Components: Plated-steel fasteners complying with ASTM B 633, Class FE/Zn 25 for electrodeposited zinc coating.

C. Fasteners for Anchoring to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring guardrails or handrails to other types of construction indicated and capable of withstanding design loads.

2.02 MATERIALS - MISCELLANEOUS

A. Wood Rails for Guardrails: Clear, straight-grained hardwood rails secured to metal guardrail.

1. Species: White Oak
2. Finish: Sealed ends
3. Profile: As indicated

2.03 ACCESSORIES

A. Exposed Screws: Same material as metal being fastened; Philips flat head, countersunk, unless noted otherwise.

B. Bolts: ASTM A307, hexagonal head type.

C. Anchoring Cement: Factory-packaged, water-resistant, exterior rated, non-shrink, non-staining, hydraulic-controlled expansion cement formulation for mixing with water at project site to create pourable anchoring, patching, and grouting compound.

2.04 FABRICATION

A. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.

B. Assemble railings in the shop to the greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.

C. Cut, drill, and punch metals cleanly and accurately. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

D. Form work true to line and level with accurate angles and surfaces.

E. Fabricate connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate. Locate weep holes in inconspicuous locations.

F. Cut, reinforce, drill, and tap to receive finish hardware, screws, and similar items.

G. Exposed Mechanical Fastenings: Flush countersunk screw or bolts, unobtrusively located, consistent with design of component except where specifically noted otherwise.

H. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

I. Bend members in jogs to produce uniform curvature for each configuration required; maintain cross section of member throughout the entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.

J. Close exposed ends of hollow railing members with prefabricated end fittings.

K. Welding:

1. Use welds for permanent connections where possible. Grind exposed welds smooth.

2. Tack welds prohibited on exposed surfaces.

3. Steel shapes, plate, pipe, and tube: Conform to AWS D1.1/D1.1M.

4. Steel sheet: Conform to AWS D1.3/D1.3M.

2.05 FINISHES

A. Exterior Ferrous Metal – Galvanized:

1. Galvanized; ASTM A123/A123M, to 2.0 ounces per square foot.

2. Shop clean surfaces and apply phosphate film at factory for surfaces to be painted in the field.

3. Comply with NAAMM’s “Metal Finished Manual for Architectural and Metal Products” recommendations for applying and designating finishing.

4. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipment.

3. EXECUTION

3.01 INSTALLATION

A. Install items in accordance with approved Shop Drawings.

B. Install components plumb, level, and rigid.

C. Welding:

1. Field welds prohibited. Only shop welding is acceptable.

2. Grind and fill exposed welds; finish smooth and flush.

3. Tack welds prohibited on exposed surfaces.

4. Steel shapes, plate, pipes, and tube: Conform to AWS D1.1/D1.1M.

5. Steel sheet: Conform to AWS D1.3/D1.3M.

D. Install sleeved components with anchoring cement.

E. Prevent contact of dissimilar metals by use of zinc rich paint, bituminous coating, or non-absorptive gaskets.

3.02 SITE PREPARATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for concrete, floating pier, pavement work, and other conditions affecting performance.

B. Do not begin installation before final grading is completed and concrete has completely set, unless otherwise permitted by Owner.

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

D. Mark locations of the guardrails and handrails before installation.

3.03 ADJUSTING

A. Clean and touch up galvanized coatings at welded and abraded surfaces in accordance with ASTM A780, Annex A2.

END OF SECTION 08130

SECTION 09110

HERBACIDE TREATMENT

1. GENERAL

1.01 DESCRIPTION

A. Work under this section includes:

1. Preparation and application of herbicides to eliminate undesirable plants for landscape establishment and restoration.

B. Other specification sections which directly relate to the work of this section include, but are not limited to, the following:

1. Section 02100 – Temporary Access and Facilities
2. Section 02300 – Site Resource Protection
3. Section 02500 – Vegetation Removal

1.02 QUALITY ASSURANCE

A. The work described in this section requires specialized knowledge, experience, skills and equipment to perform successfully. The proposed work site is a forest preserve and may contain flora, fauna and / or soils which are highly sensitive to disturbance, herbicide drift and overspray.

B. This Contract includes work tasks and site inspections which require the identification of native, introduced and / or invasive plants that may exist on the site at any time. The Contractor shall employ an experienced biologist, botanist, ecologist, or equivalent to oversee the work, oversee all herbicide use and recommend best management practices to assure that the herbicide applications are effective and that desirable species are not impacted.

C. The work in this section includes the use of herbicides for control of undesirable plant species. The Contractor shall employ persons trained in the prescription, preparation and application of such herbicides that are typically used in native landscape management and are licensed by the State of Illinois as Pesticide Operators or Applicators. The Contractor must submit a valid copy of these licenses for all personnel performing herbicide application on the project.

D. All pay items for herbicide application shall include a guaranty for effectiveness in eliminating the target species. Should the initial application fail to eliminate the target species, the Contractor shall re-apply the herbicide until those target species are eliminated at no additional charge to the Owner. The manufacturer's Product Data Sheet list of species controlled shall be used to determine effectiveness.

E. The Owner shall inspect the treated areas approximately 2 to 4 weeks after application to determine the effectiveness of the treatment. If the initial treatment is judged to be less than 100% effective, additional spot treatments may be ordered by the Owner until the target species are adequately eliminated.

1.03 SUBMITTALS

A. The Owner reserves the right to approve the Contractor or Subcontractor who will be directly involved in performing the required work. This approval shall be

dependent on the submittal to the Owner, at least 14 days prior to the start of work, of the following:

1. A list of 10 projects similar in scope and size which have been satisfactorily completed in the past 5 years that clearly demonstrate the ability to complete the work as specified. This submittal shall include the project name, project location, completion date, owners' name and contact information, size in acres and a detailed description of the work performed, landscape composition, equipment and herbicides used and any follow up work. In addition, all projects listed must involve selective species removal, tree preservation and herbicide applications.
2. A list of every person who is proposed to perform work with herbicides on the project, their years of licensed experience working with herbicides and proof of their possession of a current Illinois Pesticide Applicators or Operators License.
3. A list of all equipment proposed for use on the project, including type, make, model, year and Ground Pressure Rating (GPR) where applicable.

B. The Contractor shall submit a Product Data Sheet (PDS) and Safety Data Sheet (SDS) for each herbicide to be utilized for the work before the start of work.

1.04 SAFETY

A. It is the responsibility of the Contractor to perform the work according to the highest industry safety standards, the guidelines and requirements of the Occupational Safety and Health Administration (OSHA) and all other applicable local, state and federal requirements.

B. The work described herein is being performed on a public forest preserve and as such portions of the site may be either open to or generally accessible to the public. Extreme caution must be exercised when operating machinery or performing any tasks where there is the potential for personal injury.

2. PRODUCTS

2.01 HERBICIDES

A. Glyphosate, Non-Aquatic (e.g. Roundup Pro)

1. 41.00% active ingredient

B. Glyphosate, Aquatic (e.g. Aquamaster)

1. 53.80% active ingredient

C. Broadleaf, Turf, Post-emergent (e.g. SpeedZone)

1. 28.57% active ingredient 2,4-D
2. 0.62% active ingredient Carfentrazone-ethyl
3. 28.57% active ingredient Mecoprop-p acid
4. 1.7% active ingredient Dicamba

D. Clopyralid (e.g. Transline)

1. 40.90% active ingredient

E. Trichlopyr, Type 3A (e.g. Garlon 3A)

1. 44.40% active ingredient

F. Trichlopyr, Type 4 (e.g. Garlon 4)

1. 61.60% active ingredient

2.02 ADDITIVES

A. Non-Ionic Surfactant for Herbicides

B. Basal Oil Carrier

C. pH Balancer

D. Dye Marker

3. EXECUTION

3.01 GENERAL

A. Specific project requirements for herbicide treatments may be indicated on the Plans.

B. No mobilization or other work shall commence until a meeting with the Owner, Contractor and designated foreman is conducted on site. At this time the scope of work shall be reviewed and any specific instructions shall be identified. The Contractor shall notify the Owner at least 24 hours before the start or restart of work. For large scale blanket applications, the area shall be measured for payment before work begins.

C. Additional information and instructions regarding the work may be conveyed by the Owner through markings in the field. This may include staking or flagging for treatment limits, individual plants to be treated, restricted access areas, access routes and other specific requirements.

D. Before proceeding, Contractor shall provide the Owner with a list of herbicides, surfactants, water conditioners, dyes, pH balancers, and other chemicals and adjuvants to be used for implementation of this project. The Contractor shall maintain on site at all times the appropriate Safety Data Sheets (SDS) for all substances utilized on site. Herbicide application records shall be provided to the Owner on a weekly basis in the Owner's format as required for Illinois EPA NPDES permit compliance.

E. Herbicides shall be applied by a State of Illinois licensed applicator or licensed operator working under the direct (on site) supervision of a licensed applicator. The Owner requires that all applicators and operators working for the Contractor shall have on file with the Owner a copy of their herbicide licenses.

F. The Owner shall approve of all equipment used to apply herbicides. These may include mechanized boom spraying, portable back pack sprayers, wick applicators or other equipment and techniques.

G. The Contractor shall be responsible for positively identifying all species before they are treated with herbicide. Extreme caution shall be used to prevent over-application of herbicides and non-target damage to desirable plants. Only herbicides approved for aquatic applications shall be used where open water or saturated soils is present.

H. During the performance of the herbicide treatments, should any uncertainty arise regarding the specific plants to be treated or avoided, the Contractor or foreman shall immediately inform the Owner for a determination in the field.

I. It is of utmost importance during herbicide treatment operations that no individual plants of species to be preserved or otherwise identified as desirable to the Owner be damaged or come in contact with herbicides. Should any such significant damage or unauthorized removal occur which causes a loss of property to the Owner, the Contractor shall be required to perform the following remediation:

1. Remove and dispose of significantly damaged plants at no additional cost to the Owner.

2. Replace lost plant material, in the form of new plant material at a replacement ratio of 2 inches of replacement for each 1 inch of plant material damaged or lost. The Owner shall determine or approve the species, source, size, quantity and planting locations of the replacement material before any replacement work is started. The Contractor shall obtain, plant, mulch, water and guarantee the planting for one year with no additional cost to the Owner.

3. Unless indicated on the Plans or marked in the field for removal, the following list represents the most commonly found woody native species to be protected and preserved on the site:

Acer saccharum	Sugar Maple
Acer saccharinum	Silver Maple
Amelanchier spp.	Serviceberry
Carpinus caroliniana	American Hornbeam
Carya spp.	Hickories, (all species)
Celtis occidentalis	Hackberry
Crataegus spp.	Hawthorn (all species)
Juglans nigra	Black Walnut
Juglans cinerea	Butternut
Malus ioensis	Prairie Crabapple
Malus coronaria	Sweet Crabapple
Ostrya virginiana	Ironwood
Populus deltoides	Cottonwood (large specimens only)
Populus tremuloides	Quaking Aspen
Prunus serotina	Black Cherry
Quercus spp.	Oaks (all species)
Tilia Americana	Basswood

J. Sites which contain areas sensitive to disturbance such as wetlands, rare plant species, sensitive root zones and / or sensitive soils may be off-limits to machine access. No equipment shall enter these areas. Herbicide treatments shall be performed by hand or by equipment that can be located outside of the protected area and reached via a boom.

K. The Contractor shall be solely responsible for the repair of any and all other damage to the Owner’s property, including roads, trails, bridges, signs and other features.

L. After the herbicide treatment has been completed according to the conditions determined at the preconstruction site meeting, the Owner and Contractor shall

meet for a final review of the work area. If the original contract terms have been satisfied, the work shall be measured for payment.

M. The Contractor shall be solely responsible for adhering to the herbicide manufacturer's recommendations and requirements regarding safety and application techniques for maximum effectiveness. Special attention should be given to recommendations regarding temperature, humidity and rainfall.

3.02 GLYPHOSATE, NON-AQUATIC – BROAD HERBACEOUS APPLICATIONS

A. For new seeding or restoration of areas where complete elimination of herbaceous weeds is desired, apply glyphosate evenly and completely to the designated target area. The concentration rate for this pay item shall be a 2% solution.

B. For these non-target applications, a motorized boom sprayer rig or back pack sprayer may be used.

3.03 GLYPHOSATE, AQUATIC – BROAD HERBACEOUS APPLICATIONS

A. For use in wet or aquatic areas, especially where Common Reed (*Phragmites australis*), Reed Canary Grass (*Phalaris arundinacea*), Cattail (*Typha*) or Canada Thistle (*Cirsium arvense*) are present, Aquamaster or its' generic equivalents shall be used in place of Roundup at a 5% solution and as per Article 3.02 above.

3.04 BROADLEAF, TURF – WEED CONTROL IN TURF

A. For use before or during turf grass establishment, broadleaf weed control shall be utilized when directed by the Owner. Apply at 4.0 pints per acre for broadcast applications. Apply at 1.5 oz/gal for spot spray applications. Particular care must be exercised to avoid weather conditions where volatilization and herbicide drift can occur when used near other desirable vegetation. For newly seeded areas, assure that the seedlings have fully hardened off before application. Refer to the herbicide label for recommended timing.

3.05 CLOPYRALID – BROADLEAF APPLICATIONS

A. For use before and during native seed establishment for the control of Thistle (*Cirsium*), Clovers (*Trifolium*), Teasel (*Dipsacu*) and other difficult broadleaf weeds. The concentration rate for this pay item shall be a 0.75% solution.

B. Clopyralid may be applied as a broad non-target foliar spray or by spot spraying selective plants.

3.06 TRICHLOPYR, TYPES 3A & 4 – WOODY PLANT APPLICATIONS

A. For use to eliminate woody plant species either as a foliar spray, foliar wick, cut stump treatment or for girdling.

B. Stump treatment shall be applied to the stump cambium adjacent to the outer bark within 30 minutes of being cut using a wick or sponge applicator.

C. Herbicides for stump treatment shall be mixed with a basal oil carrier, dye and pH balancer to the specified concentration. Fuel oils shall not be used as carriers or for dilution. Mix herbicides at a location off site or where protection from spills and ground contamination can be assured. Use an impervious ground protection below all mixing locations.

D. Girdling is defined as the cutting and complete removal of a tree's bark including cork cambium, phloem and cambium around the entire circumference of the trunk such that the tree is caused to die. Some trees larger than 12″ DBH may be girdled if not adjacent to property boundaries, roadways, trails, or other assets and only if marked by the Owner. All trees designated for girdling shall be double cut. Cuts shall be made approximately 8-10 inches apart, parallel to each other and horizontal to the ground surface. Girdling cuts shall not be made higher than 3 feet above the ground surface.

E. All girdled trees shall have herbicide applied to the inside of both girdle rings.

F. A follow-up foliar application of herbicide to suckers, seedlings or other stimulated new growth of the target woody species shall be performed during the growing season immediately following the initial cutting and stump treatment of the said target species application. The Contractor shall initiate foliar herbicide application promptly when new stems are large enough to effectively treat, generally at a stem length of 3″ to 6″ and no larger than 12″. It is critical that regrowth is not allowed to achieve extensive size before treatment due to decreased herbicide effectiveness, increased herbicide quantities required and the additional risk of damage to non-target species. Failure of the Contractor to perform regrowth treatment in a timely fashion may result in the suspension of work and / or payment to the Contractor.

G. For all follow-up treatments, herbicide shall be applied to growing leaves utilizing a wick applicator. Spray application shall be used only upon approval of the Owner.

H. Herbicides for regrowth treatment shall be mixed with water, non-ionic surfactant, dye and pH balancer to the specified concentration. Mix herbicides at a location off site or where protection from spills and ground contamination can be assured. Use an impervious ground protection below all mixing locations.

I. The concentration rate for Trichlopyr per pay item shall be as follows:

1. Type 3A Foliar Spray: 5% solution
2. Type 4 Stump Treatment: 25% solution
3. Type 4 for Girdling: 5% solution

END OF SECTION 09110

SECTION 09201
WOOD CHIPS

1.01 DESCRIPTION

A. Work under this section includes:

1. Placement of wood chips.

2. PRODUCTS

2.01 MULCH

A. Wood Chips for use as mulch on tree rings shall be arborist chips derived from the chipping of woody plant material. The wood chips shall be free from inorganic materials, contaminants, fuels, invasive weed seeds, diseases, harmful insects such as Emerald Ash Borer or any other type of material detrimental to plant growth. Provide a product sample for approval.

3. EXECUTION

A. Spade edge mulch ring around trees as shown on the Plans.

B. Place 3” of wood chips.

END OF SECTION 09200

SECTION 09210
AQUATIC AND WETLAND PLANTING

1. GENERAL

1.01 DESCRIPTION

A. Work under this section includes:

1. Installation of emergent/aquatic plant materials and related work.

B. Other specification sections which directly relate to the work of this section include, but are not limited to, the following:

1. Section 02300 – Site Resource Protection
2. Section 02400 – Soil Erosion and Sediment Control

1.02 QUALITY ASSURANCE

A. Provide at least one person who shall be present at all times during execution of this portion of the work and shall be thoroughly familiar with the type and operation of equipment and techniques being used. Said person shall direct all work performed under this section.

B. Native species shall be true to their taxonomic name as specified, and shall follow Plants of the Chicago Region by F. Swink and G. Wilhelm (1994).

1.03 SUBMITTALS

A. Prior to the start of the Work, Contractor completing the work described in this section must submit documentation of prior experience and expertise in this type of work. Submit a minimum of 3 references, including contact names and phone numbers, who can verify these qualifications. Work described in this section may not begin until these qualifications have been approved.

B. Prior to the start of the Work, the Contractor must submit a complete listing of the source of all plant materials to be used. Include complete data on source, quantity, and quality. Plant materials shall not be delivered to the project site until this submittal has been approved.

C. Prior to the start of the Work, the Contractor must submit material certificates for all plant materials to be used, signed by nursery. Planting may not begin until after approval of this submittal.

D. Prior to the start of the Work, the Contractor shall submit their written schedules and methods for accomplishment of the wetland planting work. No Work shall be started until control schedules and methods of operations have been approved.

E. Prior to the start of the Work, the Contractor shall submit the name and qualifications of the person(s) who shall direct this portion of the work. Said person(s) shall be competent at identification of plant materials to be utilized during the season work is completed, and shall be present at all times during execution of this portion of the work.

F. Prior to the start of the Work, the Contractor shall submit shop drawing(s) of goose cages.

1.04 SATISFACTORY PERFORMANCE

A. Wetland planting work shall at all times be satisfactory to the Owner. When it becomes necessary, the Owner will inform the Contractor of unsatisfactory procedures and operations. If the unsatisfactory procedures and operations are not corrected promptly, the Owner may suspend the performance of any or all other Work until the unsatisfactory condition has been corrected, and such suspension shall not be the basis of any claim by the Contractor for additional compensation from the Owner nor for an extension of time to complete the Work.

2. **PRODUCTS**

2.01 PLANT MATERIALS - GENERAL

A. Planting zones shall contain the specified mixes of species at the specified rates. The Contractor shall not add or omit any species to the specified mixes without prior approval from the Owner.

B. Each species shall be packaged individually to allow inspection by the Owner. Trays containing multiple species shall be summarily rejected.

C. All plant materials must exhibit healthy vigorous growth as determined by the Owner.

D. Shipments/Delivery

1. Any shipments/deliveries of plants shall be packaged and delivered so as to ensure the viability of the plant material.

2. There shall be no plant deliveries on weekends or holidays without prior approval so as to allow for their inspection and approval.

3. Bare root material shall be delivered/shipped only when ambient temperatures are expected to remain below 75 F.

4. All plants shall be healthy, rooted out, and ready for immediate installation upon delivery. The Contractor shall replace any plants that are deemed inconsistent with these characteristics.

E. The original source of propagules (seeds, cuttings, etc.) of plants shall be guaranteed within a 150-mile radius of the project site. The Contractor shall note in submittals the origins of all plant materials.

F. The Owner may consider substitutions, and reserves the right to make additions and/or deletions of quantities and species depending upon plant availability.

G. Plants shall be provided in containers as described below. If one or more species is not available in containers, it may be provided bare root as described below with prior approval of the Consultant.

1. 2.5″ Pot: The standard “plug” container with dimensions of 2.5″ x 2.5″ square x 3.5″ deep, consisting of 32 plants per flat. Potted plants with containers equivalent to or larger than this are acceptable as well (e.g. GT38); note this in submittal. Smaller plugs (e.g., flats of 50, 72, 96 etc.) will not be accepted. Two year old plants are preferred.

2. Bare Root: All bare root plants shall have at least one full growing season prior to this year (2+ years old).

H If the Contractor believes one or more of the specified species are not available at the time of planting, the Contractor shall submit a written statement to the Owner indicating which species are not available, the nurseries the Contractor has contacted, and what species the Contractor proposes substituting for the specified species.

2.02 PLANTS

A. Wetland Plants as indicated on the plans shall be as follows:

Scientific Name	Common Name	Quantity/Acre
Acorus calamus	Sweet flag	500
Iris virginica	Iris	500
Pontedaria cordata	Pickerel plant	500
Polygonum amphibium	Knotweed	500
Sagitaria latifolia	Arrowhead	500
Scirpus acutus	Hard stemmed bulrush	500
Scirpus atrovirens	Dark green bulrush	500
Scirpus fluviatilis	River bulrush	500
Sparganium americanum	Bur reed	500
Zizania aquatica	Wild rice	500

2.03 HERBIVORY PROTECTION

A. Herbivory protection shall be at least 24’ in height.

B. Contractor shall provide Shop Drawing(s) of herbivory protection for review and approval prior to the commencement of planting operations.

3. EXECUTION

3.01 METHOD

A. All plant materials shall be subject to inspection and approval by the Owner prior to installation.

B. Planting shall be conducted after May 1 but no later than June 15.

C. Deliver plant materials to project site after preparations for planting have been completed.

D. Plant materials shall be packed in such a manner as to ensure adequate protection against wind damage, desiccation, and other physical damage while in transit.

E. If planting is delayed more than 4 hours after delivery, keep plant materials in refrigerated container or set plants in shade protected from weather and mechanical damage, and keep moist and cool.

F. Prior to planting, the Contractor shall stake, flag or otherwise identify in the field the proposed boundaries of all planting zones for approval.

G. All plant materials shall be adequately healed in to prevent desiccation and/or upheaval.

H. If area to be planted was treated with herbicide, planting shall occur no less than 14 days after herbicide application.

I. Plants shall be planted in pods of 50 plants of the same species, planted on 1 foot centers.

J. All plant materials shall be watered by the Contractor immediately following planting, excluding those planted in standing water. The Contractor shall be responsible for continued watering of all plant materials as necessary during guarantee period.

K. All plants provided under this section must be protected with goose cages concurrent with planting.

L. If so directed by the Owner, the Contractor will be required to herbivory protection at no additional cost to the Owner. Contractor shall be responsible for the proper disposal of all herbivory protection materials at their expense.

3.02 CLEAN-UP, REMOVAL, AND REPAIR

A. The Contractor shall keep his work area free of debris. After planting is complete, clean up any remaining materials, debris, trash, etc. Avoid driving or walking over planted areas.

B. After work has been completed remove tools, empty containers, barricades, and all other debris generated by the Contractor.

C. Repair any damages caused by the Contractor during completion of the work described in this section.

3.03 INSPECTION

A. Schedule an inspection of all plant materials prior to planting.

B. Schedule an inspection of planting zone layout prior to planting.

C. After planting has been completed, schedule an acceptance inspection of the work

3.04 GUARANTY

A. The work shall be considered complete after all wetland planting work has been completed in compliance with the Plans and specifications, and the Contractor has completed all clean up, removal, and repair as described in this section.

B. Contractor shall guarantee no less than 95% survival of planted vegetation as determined by the Owner in each individual planting area at the end of the first growing season following planting.

1. At no additional cost to the Owner, the Contractor shall replace all dead plant material within any planting area that does not achieve 95% survival.

C. The Contractor must notify the Owner in writing of any concerns related to project design prior to commencement of planting. Later claims of non-performance resulting from project design will be rejected if concerns were not thoroughly and specifically described in writing by the Contractor prior to commencement of work.

END OF SECTION 9210

SECTION 09300

TURF SEEDING

1. GENERAL

1.01 DESCRIPTION

A. This section includes:

1. Installation and establishment of turf-type seed mixes and related products.

2. Maintenance of seeded areas during establishment period.

B. Other specification sections which may directly relate to the work in this section include, but are not limited to, the following:

1. Section 02400 – Soil Erosion and Sediment Control

2. Section 03120 – Finish Grading and Topsoil

3. Section 09110 – Herbicide Treatment

1.02 QUALITY ASSURANCE

A. Contractor Qualifications: The work described in this section requires specialized knowledge, experience, skills and equipment to successfully complete. The Contractor shall possess the full capability to execute the work as specified, including trained, experienced and skilled personnel and possession or access to the required equipment. The Contractor shall also provide the name and qualifications of the foreman assigned to this project. The Contractor or Subcontractors responsible for the work in this section are subject to Owner approval as described in Article 1.12.

1.03 SUBMITTALS

A. Prior to delivery of any materials to the site, submit manufacturer or supplier material sheets for any and all materials to be used during this portion of the work. Include complete data on source, quantity and quality. No materials shall be delivered to project site until the corresponding submittal has been approved. Refer to the product descriptions below for specific submittal requirements.

2. PRODUCTS

2.01 FERTILIZER

A Fertilizer for all areas to be seeded with turf seed mixes shall be a balanced (such as 20-20-20) nitrogen – phosphorous - potassium composition that contains a minimum of 25% of the nitrogen component in a slow release form.

B. Submit the manufacturer’s product sheet with material analysis, nitrogen release information and quantity of bags required to provide 2 pounds of nitrogen per 1000 square feet for the specified seeding areas for approval.

C. Provide fertilizer to the site in original unopened bags from the manufacturer showing complete analysis of nitrogen, phosphorous, potassium, minor elements and major element source types.

2.02 EROSION CONTROL BLANKET

A. Erosion control blanket shall be:

1. S75BN Single Net Straw Blanket, a 9.3-lb. leno-woven biodegradable jute top netting with 100% straw fiber matrix, as provided by:

   North American Green, Inc.
   P.O. Box 66
   Evansville, IN 47618-9989
   (800) 772-2040
   www.nagreen.com

2. or approved equal

B. Erosion control blanket staples shall be:

1. 6’ in length, composed of Polyhydroxyalkanoate (PHA) plastic and 100% biodegradable from microbial activity in accordance with ASTM D5338 and ASTM D5271, as provided by:

   a. E-Staples by
   American Excelsior Company
   Arlington, Texas
   (800) 777-7645
   www.curlex.com

   b. Eco-Stake 6” Hardwood Pins by
   North American Green, Inc.
   P.O. Box 66
   Evansville, IN 47618-9989
   (800) 772-2040
   www.nagreen.com

   c. or approved equal. Provide manufacturer’s product sheet for any proposed equal product approval.

2.03 HYDRO-MULCH AND HEAVY DUTY HYDROMULCH

A. Hydromulch for slopes 2:1 or less shall be:

1. ProMatrix Engineered Fiber Matrix (EFM), a hydraulically-applied seeding mulch composed of 100% recycled Thermally Refined wood fibers, crimped interlocking man-made biodegradable fibers and naturally derived polymers. It shall be delivered in the manufacturer’s sealed weather-resistant 50-pound bags, as manufactured by:

   a. PROFILE Products LLC
   750 Lake-Cook Road – Suite 440
   Buffalo Grove, IL 60089
   (800) 366-1180
   www.profileproducts.com

2. or approved equal. Provide manufacturer’s product sheet for any proposed equal product approval.

B. Heavy Duty Hydromulch for slopes greater than 2:1 shall be:

1. Flexterra HP-FGM, a hydraulically-applied, 100% biodegradable seeding mulch composed of thermally refined wood fibers (80%), cross-linked biopolymers and water absorbents (10%), crimped, man-made interlocking fibers (5%) and micro-pore granules (5%). The material shall be phytosanitized and free from plastic netting. It shall be delivered in the manufacturer's sealed weather-resistant 50-pound bags, as manufactured by:

a. PROFILE Products LLC
750 Lake-Cook Road – Suite 440
Buffalo Grove, IL 60089
(800) 366-1180
www.profileproducts.com

b. or approved equal. Provide manufacturer's product sheet for any proposed equal product approval.

2.04 WATER

A. Water shall be free from oil, acid, alkali, salts, and other harmful substances. Water may be utilized from potable or non-potable sources such as lakes and ponds. The Owner shall not be responsible for providing water. Any available water sources located on the Owners' property shall not be utilized without permission from the Owner.

2.05 SEED

A. The Contractor shall provide all seed in original unopened bags as mixed by the supplier. Each bag shall bear the supplier's guarantee of composition and percentage of purity and germination. Each bag shall list the botanical, common and cultivar names of each species, percentage of species mix, year of production and packaging, seed origin and net weight. Seed shall be protected against leakage, damage and moisture to insure viability and dormancy. No seed shall be sown until the Owner has inspected and approved the unopened seed mix bags.

B. Seed Mixes

When checked, seed mixes indicated on the Plans include the following:

1. ☐ LCFP PARKLAND MIX

SPECIES OR MIX	RATE (lbs. per A/1000 sf)	% +/-
Kentucky Bluegrass Mix	155 / 3.5	70%
Creeping Red Fescue	45 / 1.0	20%
Perennial Rye	20 / .5	10%
TOTAL	**220 / 5.0**	**100%**

a. Kentucky Bluegrass Mix shall be a blend of at least two improved cultivars selected for low maintenance and short germination and establishment time.

b. Improved Creeping Red Fescue shall be an improved cultivar or blend of cultivars.

c. Perennial Rye shall be an improved cultivar or blend of cultivars selected for disease resistance.

2. ☐ LCFP HIGH-TRAFFIC MIX

SPECIES OR MIX	RATE (lbs. per. A/1000sf)	% +/-
Turf-Type Tall Fescue Mix	300 / 6.9	85%
Kentucky Bluegrass Mix	50 / 1.1	15%
TOTAL	**350 / 8**	**100%**

a. Turf Type Tall Fescue Mix shall be a blend of at least two improved cultivars selected for drought tolerance, wear resistance, USDA Zone 5 hardiness and with a leaf texture suitable for blending with Kentucky Bluegrass. At least 30% of the mix shall be a rhizomatous selection such as Titan, Defiance, etc.

b. Kentucky Bluegrass Mix shall be a blend of at least two improved cultivars selected for low maintenance and short germination and establishment time.

3. ☐ LCFP LOW MAINTENANCE MIX

SPECIES OR MIX	RATE (lbs. per A/1000sf)	% +/-
Fine Fescue Mix	260 / 6	100%
TOTAL	**260 / 6**	**100%**

a. Fine Fescue Mix shall be a blend of creeping red, chewings, hard and sheep's fescue; acceptable commercial blends include Highlands Fescue Mix, Legend Fine Fescue Blend and Greenskeeper National Links Mixture.

3. EXECUTION

3.01 SEED BED PREPARATION

A. Seed bed preparation shall not begin until all other site work, topsoil spreading and finish grading have been completed. Before seed bed preparation, the Contractor shall assure that the final grading allows for proper drainage.

B. All areas to be seeded shall be inspected and approved by the Owner prior to the sowing of seed.

C. Surfaces to be seeded shall be loose and friable to a minimum depth of 3 inches. Hard and compacted surfaces are not acceptable and must be disked or tilled and raked to provide a suitable seed bed. Any rocks, soil cods or other debris greater than 1' in diameter that is generated shall be removed and disposed. The prepared surface shall be free from crusting and caking.

D. Seed beds that cannot be adequately cleaned of debris by manual raking and picking shall be cleaned by mechanical means using a dedicated rock / debris collecting tractor attachment.

3.02 FERTILIZATION

A. The specified fertilizer shall be applied a rate of 2 pounds of Nitrogen per 1000 square feet or 87 pounds of Nitrogen per acre using a calibrated drop spreader or other mechanical method that will result in uniform coverage. Application of the fertilizer by hand is not acceptable.

B. Fertilizer shall be applied prior to seeding. No fertilizer shall be applied until the Owner has inspected and approved the products. Payment for fertilization shall not be approved until proof of yield has been demonstrated by a counting of the fertilizer bags.

C. No fertilizer shall be applied in areas designated for native seed mixes.

3.03 SEEDING – GENERAL

A. All areas of bare soil which have been graded or otherwise disturbed by construction shall be seeded, unless specified on the Plans otherwise. Refer to the Plans for locations of the specified seed mixes.

B. Temporary work areas, staging areas, haul roads and all other similarly disturbed areas which require restoration shall be prepared and seeded according to the requirements contained in this section.

3.04 SEEDING METHODS

A. Shall be performed by the method(s) checked below:

1. ☒ Broadcast method using calibrated drop spreaders, either manually operated or using motorized equipment. Broadcast seeding is the only approved method in small or narrow areas where mechanical seeding equipment cannot make two passes as described below. After broadcasting seed, the seed bed shall be lightly raked either manually or with a machine drag attachment.

2. ☐ Mechanical seeding method using equipment which deposits seed in linear rows or furrows directly on the soil then packs and covers the seed in one continuous operation. This method may only be used when space allows the seed to be installed in two directions with the second pass being 45 to 60 degrees from the first pass. Mechanical seeding method shall not be used on grass trails or trail shoulders. Mechanical equipment must be calibrated to deposit the proper amount of seed at the proper depth, generally 1/8’ to ¼’ deep.

B. Regardless of the method used to deposit the seed, all seeded areas shall be rolled using a smooth or lightly spiked mechanical roller.

C. All seeding equipment shall be approved by the Owner prior to seeding. Seeding equipment shall be properly calibrated to the required seeding rates.

3.05 SEEDING SCHEDULES

A. Turf seeding is recommended to be performed between April 1 and June 1 or from August 1 and October 1 for optimum germination. The Contractor may elect to perform this seeding immediately after work progress allows; however, all

responsibility for supplemental watering to stimulate germination and growth shall rest with the Contractor. Guaranty and maintenance requirements as specified herein are not changed or relieved by the timing of seeding.

3.06 EROSION CONTROL BLANKET

A. Immediately after seeding is complete, place erosion control blanket on all areas as designated on the Plans. Refer to the manufacturer's recommendation for selection of staple patterns and quantities appropriate to the site conditions.

B. The Contractor shall guarantee that all erosion control blanket remains securely in place until a minimum of 90% of the ground has been stabilized by germination and growth of permanent or temporary seed. Erosion control blanket shall be re-stapled, reapplied or otherwise reset as specified as often as necessary until stabilization has been achieved.

C. On slopes greater than 3:1 the Contractor shall install the erosion control blanket with a trenched edge at the top of the slope to resist water infiltration under the blanket.

3.07 HYDROMULCH

A. Immediately after seeding is complete, apply hydromulch on all areas as designated on the plans. Hydromulch shall not be applied to areas which are to receive erosion control blanket. Strictly comply with the equipment and material manufacturer's instructions and recommendations. The timing of the hydromulch application shall allow the product to fully cure before the next precipitation event.

B. The hydromulch shall be applied in at least two opposing passes at the following rates:

4H – 1V to 3H – 1V Slopes: 3000 lbs. / acre

3H – 1V to 2H – 1V Slopes: 3500 lbs. / acre

2H – 1V to 1H – 1V Slopes: 4000 lbs. / acre (Heavy Duty Hydromulch only)

3.08 WATERING

A. Supplemental watering of seeded areas shall be performed at the discretion of the Contractor. Watering may be necessary in order to conform to the guarantee requirements as described in this section.

3.09 TURF MOWING

A. All turf areas shall be maintained at mowed height of 3' until achieving the performance and guaranty criteria for seeded areas. Mow turf promptly when it reaches a height of 6' in height.

3.10 GUARANTY

A. General: All guaranties for turf seeding and other related work in this section shall be solely at the cost of the Contractor. The guarantee period shall be in effect until the ground coverage requirement described below is met and the final acceptance is issued in writing by the Owner.

B. Seed Beds: Upon completion of seeding operations, the Contractor shall become responsible for protecting the seeded areas from any damage resulting from foot or vehicle traffic, vandalism or weather. When possible, isolate and contain the completed areas with temporary fencing. Erosion or soil subsidence caused by

rain shall be repaired to the original grade, prepared for seed, reseeded and the appropriate erosion control product reapplied. Any damage which occurs before achieving the performance and guaranty criteria shall be repaired to original specifications by the Contractor at no expense to the Owner.

C. Seed Germination and Establishment: Seeded areas shall have a minimum of 90% ground coverage with active growth and no bare ground greater than two square feet before final acceptance. Approximately 90 days after the initial seeding (or the following spring for fall seeding), the site shall be inspected by the Owner and Contractor to determine turf coverage, condition and plan for remedial seeding if necessary. At the proper time as determined by the Owner, the Contractor shall promptly remove any erosion control blanket or hydromulch and reseed the bare areas according to the specifications as necessary until the minimum coverage is achieved. After each reseeding, the Contractor shall reinstall new erosion control blanket or reapply hydromulch as originally indicated on the plans. If, after three growing seasons (one growing season defined as either spring: May-June or fall: September-October), the required coverage has not been achieved, the Owner reserves the right to reduce payment or retainage for compensation for the amount of ground without adequate germination and growth.

D. Hydromulch: The Contractor shall guarantee that all hydromulch is applied at the recommended rate. Any areas where the minimum rate is not achieved shall be reapplied until meeting the specification. The Contractor shall guarantee that all hydromulch remains effective and shall reapply the hydromulch as needed until such time that the minimum seed coverage is achieved.

E. Erosion Control Blanket: Any erosion control blanket which becomes displaced for any reason shall be reinstalled to its original condition and position with additional staples. Any erosion control blanket which becomes damaged or otherwise ineffective shall be replaced with new product. All rills and gullies shall be repaired and the area shall be reseeded prior to reinstallation of erosion control blanket.

END OF SECTION 09300

SECTION 09310

NATIVE SEEDING

1. GENERAL

1.01 DESCRIPTION

A. Work under this section includes:

1. Installation of native seed mixes and related products.

2. Maintenance and care of seeded areas during the establishment period.

B. Other specification sections which may directly relate to the work in this section include, but are not limited to, include the following:

1. Section 02400 – Soil Erosion and Sediment Control

2. Section 03120 – Finish Grading and Topsoil

3. Section 09110 – Herbicide Treatment

1.02 CONTRACTOR QUALIFICATIONS

A. The work described in this section requires specialized knowledge, experience, skills and equipment to successfully complete. The Contractor shall possess the full capability to execute the work as specified, including trained, experienced and skilled personnel and possession or access to the required equipment.

B. The native seeding contractor shall provide proof of qualifications, including a work history documenting a minimum of 5 native seeding projects completed in the last 5 years which are comparable in scope, techniques and size. This information shall include a complete project description, lead foreman experience history, location, client name and contact phone numbers. The Contractor shall provide this information in the bidder's forms in described in Article 1.12 of this Contract.

C. This Contract includes work tasks and site inspections which require the identification of native, introduced and / or invasive plants that exist on the site at any time. The Contractor shall employ an experienced biologist, botanist, ecologist, or equivalent to oversee the work and monitor plant establishment and recommend best management practices to assure the success of the project. This person shall also oversee all herbicide use.

1.03 SUBMITTALS

A. Submit detailed seed data sheets as described in Article 2.04 of this section.

B. Submit samples or manufacturer's data sheets on all other materials used in the performance of this work.

C. Submit specific information on seeding equipment to be used for approval.

2. PRODUCTS

2.01 EROSION CONTROL BLANKET

A. Erosion control blanket shall be:

1. S75BN Single Net Straw Blanket, a 9.3-lb. leno-woven biodegradable jute top netting with 100% straw fiber matrix, as provided by:

a. North American Green, Inc.
P.O. Box 66
Evansville, IN 47618-9989
(800) 772-2040
www.nagreen.com

b. or approved equal

B. Erosion control blanket staples shall be:

1. 6″ in length, composed of Polyhydroxyalkanoate (PHA) plastic and 100% biodegradable from microbial activity in accordance with ASTM D5338 and ASTM D5271, as provided by:

a. E-Staples by
American Excelsior Company
Arlington, Texas
(800) 777-7645
www.curlex.com

b. Eco-Stake 6″ Hardwood Pins by
North American Green, Inc.
P.O. Box 66
Evansville, IN 47618-9989
(800) 772-2040
www.nagreen.com

c. or approved equal. Provide Manufacturer's product manufacturer's product sheet for any proposed equal product approval.

2.02 HYDROMULCH

A. Hydromulch for slopes 2:1 or less shall be:

1. ProMatrix Engineered Fiber Matrix (EFM), a hydraulically-applied seeding mulch composed of 100% recycled Thermally Refined wood fibers, crimped interlocking man-made biodegradable fibers and naturally derived polymers. It shall be delivered in the manufacturer's sealed weather-resistant 50-pound bags, as manufactured by:

a. PROFILE Products LLC
750 Lake-Cook Road – Suite 440
Buffalo Grove, IL 60089
(800) 366-1180
www.profileproducts.com

2. or approved equal. Provide manufacturer's product sheet for any proposed equal product approval.

B. Hydromulch for slopes greater than 2:1 shall be:

1. Flexterra HP-FGM, a hydraulically-applied, 100% biodegradable seeding mulch composed of thermally refined wood fibers (80%), cross-linked biopolymers and water absorbents (10%), crimped, man-made interlocking fibers (5%) and micro-pore granules (5%). The material shall be phytosanitized and free from plastic netting. It shall be delivered in the manufacturer's sealed weather-resistant 50-pound bags, as manufactured by:

a. PROFILE Products LLC
750 Lake-Cook Road – Suite 440
Buffalo Grove, IL 60089
(800) 366-1180
www.profileproducts.com

2. or approved equal. Provide manufacturer's product sheet for any proposed equal product approval.

2.03 WATER

A. Water shall be free from oil, acid, alkali, salts, and other harmful substances. Water may be utilized from potable or non-potable sources such as lakes and ponds. The Owner shall not be responsible for providing water. Any available water sources located on the Owners' property shall not be utilized without permission from the Owner.

2.04 SEED MIXES

A. Seed mixes and seeding locations are indicated on the Plans. When a custom seed mix is specified, it shall be described in the Plans by species composition and relative quantities of each species per area of measurement.

B. Standard Seed Mixes: When indicated on the Plans, the following Standard Seed Mixes shall be provided.

1. ☒ LCFP COVER CROP MIX

SPECIES	COMMON NAME	LBS. / ACRE
Avena sativa	Oats	40.0
Lolium multiflorum	Annual Rye	20.0
TOTAL	60.00 LBS.	

2. ☐ LCFP PRAIRIE COVER CROP MIX

SPECIES	COMMON NAME	LBS. / ACRE
Avena sativa	Oats	25.0
Elymus canadensis	Canada Wild Rye	5.0
Lolium multiflorum	Annual Rye	15.0
Panicum virgatum	Switch Grass	0.75
Schizachyrium scoparium	Little Bluestem	1.0
Monarda fistulosa	Wild Bergamot	0.065
Rudbeckia hirta	Black-eyed Susan	0.065
TOTAL		46.88 LBS.

Note: LCFP Cover Crop Mix shall be delivered separate from all native seed mixes.

3. ☐ LCFP TALLGRASS PRAIRIE MIX

GRASS SPECIES	COMMON NAME	LBS. / ACRE
Andropogon gerardii	Big Bluestem	0.75
Bouteloua curtipendula	Sideoats Grama	1.5
Elymus canadensis	Canada Wild Rye	1.0
Panicum virgatum	Switch Grass	1.5

Schizachyrium scoparium	Little Bluestem	2.0
Sorghastrum nutens	Indian Grass	0.5
Sporobolus heteroleptis	Prairie Dropseed	0.75
TOTAL		8.0 LBS.

FORB SPECIES	COMMON NAME	OZ. / ACRE
Allium cernuum	Nodding Onion	3.0
Asclepias tuberosa	Butterfly Weed	3.0
Aster laevis	Smooth Blue Aster	1.0
Aster novae-angliae	New England Aster	0.5
Aster oolentangiense	Sky Blue Aster	0.5
Baptisia alba	White Indigo	4.0
Coreopsis palmata	Prairie Coreopsis	1.5
Dalea purpurea	Purple Prairie Clover	9.0
Desmodium canadense	Showy Tick Trefoil	3.0
Echinacea pallida	Pale Purple Coneflower	8.0
Eryngium yuccafolium	Rattlesnake Master	4.0
Liatris aspera	Rough Blazingstar	2.5
Liatris spicata	Marsh Blazingstar	4.0
Monarda fistulosa	Wild Bergamot	1.5
Oenothera pilosella	Prairie Sundrops	0.25
Penstemon digitalis	Foxglove Beardtogue	3.0
Pycnanthemum virginianum	Mountain Mint	0.5
Ratibita pinnata	Yellow Coneflower	3.0
Rudbeckia hirta	Black-eyed Susan	1.0
Rudbeckia subtomentosa	Sweet Black-eyed Susan	3.0
Solidago speciosa	Showy Goldenrod	1.0
Verbena stricta	Hoary Vervain	3.0
Veronicastrum virginicum	Culver's Root	0.25
Zizia aurea	Golden Alexanders	3.0
TOTAL OUNCES		63.5
TOTAL LBS.		3.97

4. ☒ **LCFP SHORTGRASS PRAIRIE MIX**

GRASS SPECIES	COMMON NAME	LBS. / ACR
Bouteloua curtipendula	Sideoats Grama	1.5
Carex bicknelli	Bicknell's sedge	1.0
Elymus canadensis	Canada Wild Rye	1.0
Panicum virgatum	Switch Grass	1.5
Schizachyrium scoparium	Little Bluestem	2.0
Sporobolus heteroleptis	Prairie Dropseed	1.0
TOTAL		8.0 LBS.

FORB SPECIES	COMMON NAME	OZ. / ACRE
Allium cernuum	Nodding Onion	3.0
Asclepias tuberosa	Butterfly Weed	3.0
Aster laevis	Smooth Blue Aster	1.0
Aster novae-angliae	New England Aster	0.5
Aster oolentangiense	Sky Blue Aster	0.5
Baptisia alba	White Indigo	4.0
Coreopsis palmata	Prairie Coreopsis	1.5
Dalea purpurea	Purple Prairie Clover	9.0
Desmodium canadense	Showy Tick Trefoil	3.0
Echinacea pallida	Pale Purple Coneflower	8.0
Eryngium yuccafolium	Rattlesnake Master	4.0
Liatris aspera	Rough Blazingstar	2.5
Liatris spicata	Marsh Blazingstar	4.0
Monarda fistulosa	Wild Bergamot	1.5
Oenothera pilosella	Prairie Sundrops	0.25
Penstemon digitalis	Foxglove Beardtogue	3.0
Pycnanthemum virginianum	Mountain Mint	0.5
Ratibita pinnata	Yellow Coneflower	3.0
Rudbeckia hirta	Black-eyed Susan	1.0
Rudbeckia subtomentosa	Sweet Black-eyed Susan	3.0
Solidago speciosa	Showy Goldenrod	1.0
Verbena stricta	Hoary Vervain	3.0
Veronicastrum virginicum	Culver's Root	0.25
Zizia aurea	Golden Alexanders	3.0
TOTAL OUNCES		63.5
TOTAL LBS.		3.97

5. ☐ **LCFP FESCUE PRAIRIE MIX**

GRASS SPECIES	COMMON NAME	LBS. / ACRE
Festuca sp.	Fine Fescue Mix (1)	150
Elymus canadensis	Canada Wild Rye	1.0
Panicum virgatum	Switch Grass	1.25
Schizachyrium scoparium	Little Bluestem	2.0
Sporobolus heteroleptis	Prairie Dropseed	0.75
TOTAL		155.0 LBS.

FORB SPECIES	COMMON NAME	OZ. / ACRE
Allium cernuum	Nodding Onion	3.0

Asclepias tuberosa	Butterfly Weed	3.0
Aster laevis	Smooth Blue Aster	1.0
Aster oblongifolius	Aromatic Aster	0.5
Baptisia alba	White Indigo	4.0
Camassia scilloides	Wild Hyacinth	3.0
Coreopsis palmata	Prairie Coreopsis	1.5
Dalea purpurea	Purple Prairie Clover	9.0
Desmodium canadense	Showy Tick Trefoil	3.0
Echinacea pallida	Pale Purple Coneflower	8.0
Eryngium yuccafolium	Rattlesnake Master	4.0
Liatris aspera	Rough Blazingstar	2.5
Liatris spicata	Marsh Blazingstar	4.0
Monarda fistulosa	Wild Bergamot	1.5
Oenothera pilosella	Prairie Sundrops	0.25
Penstemon digitalis	Foxglove Beardtogue	3.0
Pycnanthemum virginianum	Mountain Mint	0.5
Rudbeckia subtomentosa	Sweet Black-eyed Susan	3.0
Ruellia humilis	Wild Petunia	4.75
Solidago speciosa	Showy Goldenrod	1.0
Verbena stricta	Hoary Vervain	3.0
TOTAL OUNCES		63.5
TOTAL LBS.		3.97

Fine Fescue Mix shall be a blend of creeping red, chewings, hard and sheep's fescue; acceptable commercial blends include Highlands Fescue Mix, Legend Fine Fescue Blend and Greenskeeper National Links Mixture.

6. ☐ LCFP ROADSIDE PRAIRIE MIX

COVER CROP	**LBS./A**
Fine Fescue Mix	150
SUBTOTAL	**150**

NATIVE GRASSES	**LBS./A**
Andropogon scoparius	1.25
Panicum virgatum	1.25
Sporobolus heterolepsis	1.5
SUBTOTAL	**4**

NATIVE FORBS	**OZ./A**
Aster novae-angliae	1

Echinacea pallida	14
Monarda fistulosa	2
Pycnanthemum virginianum	.5
Rudbeckia hirta	2
Rudbeckia subtomentosa	4
SUBTOTAL	**23.5 (1.4 lbs.)**

7. ☒ **LCFP WOODLAND SEED MIXES**

GRASS SPECIES	COMMON NAME	LBS. / ACRE
Bromus pubescens	Woodland Brome	0.30
Carex normalis	Spreading Oval Sedge	0.20
Carex rosea	Curly Wood Sedge	0.25
Carex shortiana	Short's Sedge	0.15
Carex sprengelli	Long-beaked Sedge	0.15
Elymus canadensis	Canada Wild Rye	2.00
Elymus hystrix	Bottlebrush Grass	2.00
Elymus villosus	Silky Wild Rye	1.25
Luzula multiflora	Common Wood Rush	0.10
Muhlenbergia mexicana	Leafy Satin Grass	0.10
TOTAL		6.5 LBS.

FORB SPECIES	COMMON NAME	OZ. / ACRE
Allium cernuum	Nodding Onion	5.0
Anemone canadensis	Meadow Anemone	.25
Anemone virginiana	Tall Anemone	.40
Anemonella thalictroides	Rue anemone	.25
Aquilegia canadensis	Wild Columbine	.33
Claytonia virginica	Spring Beauty	.10
Dodecatheon media	Shooting star	.20
Eutrochium purpureum	Purple joe pye weed	.30
Geranium maculatum	Wild geranium	2.0
Helianthus strumosus	Pale-leaved sunflower	2.5
Heuchera richardsonii	Prairie alum root	.10
Penstemon calycosus	Small beardtongue	.10
Polygonatum biflorum	Smooth Solomon's seal	.75
Polemonium reptans	Jacob's ladder	.70
Podophyllum peltatum	May apple	.75
Rudbeckia triloba	Brown-eyed susan	.50
Sanguinaria canadensis	Bloodroot	1.0
Solidago flexicaulis	Broad-leaved goldenrod	.20
Solidago juncea	Early goldenrod	.20
Solidago ulmifolia	Elm-leaved goldenrod	.30
Symphyotrichum laeve	Smooth blue aster	.40

Thalictrum dasycarpum	Purple meadow rue	2.0
Veronicastrum virginicum	Culver's root	.10
TOTAL OUNCES		18.43
TOTAL LBS.		1.15

8. ☐ CUSTOM NATIVE SEED MIXES

One or more custom seed mixes are utilized for this project. Refer to the Plans for species compositions and quantities per area.

2.03 SEED MIX REQUIREMENTS – COVER CROP MIX

A. Unless approved by the Owner, all cover crop seed mixes shall be packaged and delivered separate from the native seed mixes to allow for seasonal differences and methods in seed installation.

2.04 SEED MIX REQUIREMENTS – PRAIRIE AND OTHER NATIVE MIXES

A. Prior to acquisition and delivery of seed, the Contractor shall submit suppliers' detailed seed data for approval by the Owner. Information for each species shall include lot number, harvest year and place of origin, test dates, processing performed, inoculants included, certified Pure Live Seed (PLS) weight, bulk weight including inert matter, other crop and weed seed percentages and adjusted bulk weight to meet PLS weight requirements. The submittal shall also indicate any lack of availability from the primary source and related information from other potential seed sources. Substitutions shall not be permitted without approval by the Owner. Once the seed data is approved, the Contractor shall deliver the seed in unopened bags with tags or data sheets attached matching the approved seed requirements described in this specification.

B. All species shall be sourced from within a 200 mile radius from Lake County, Illinois.

C. All species shall be provided on a Pure Live Seed (PLS) weight basis. PLS shall be defined as (purity) x (total germination). Tetrazolium (TZ) testing for viability may be utilized when appropriate.

D. All species with dispersal appendages (e.g. *Asclepias, Aster, Liatris, Solidago*, etc. shall be supplied on a de-fluffed basis.

E. All "hulled" species (e.g. *Desmodium, Dalea*, etc.) shall be supplied on a de-hulled basis.

F. All other species shall be cleaned as close to the bare caryopsis as possible without effecting seed viability.

G. All legume species (e.g. *Baptisia, Dalea, Desmodium*, etc.) shall be provided with a genus-specific bacterium inoculum for each different species.

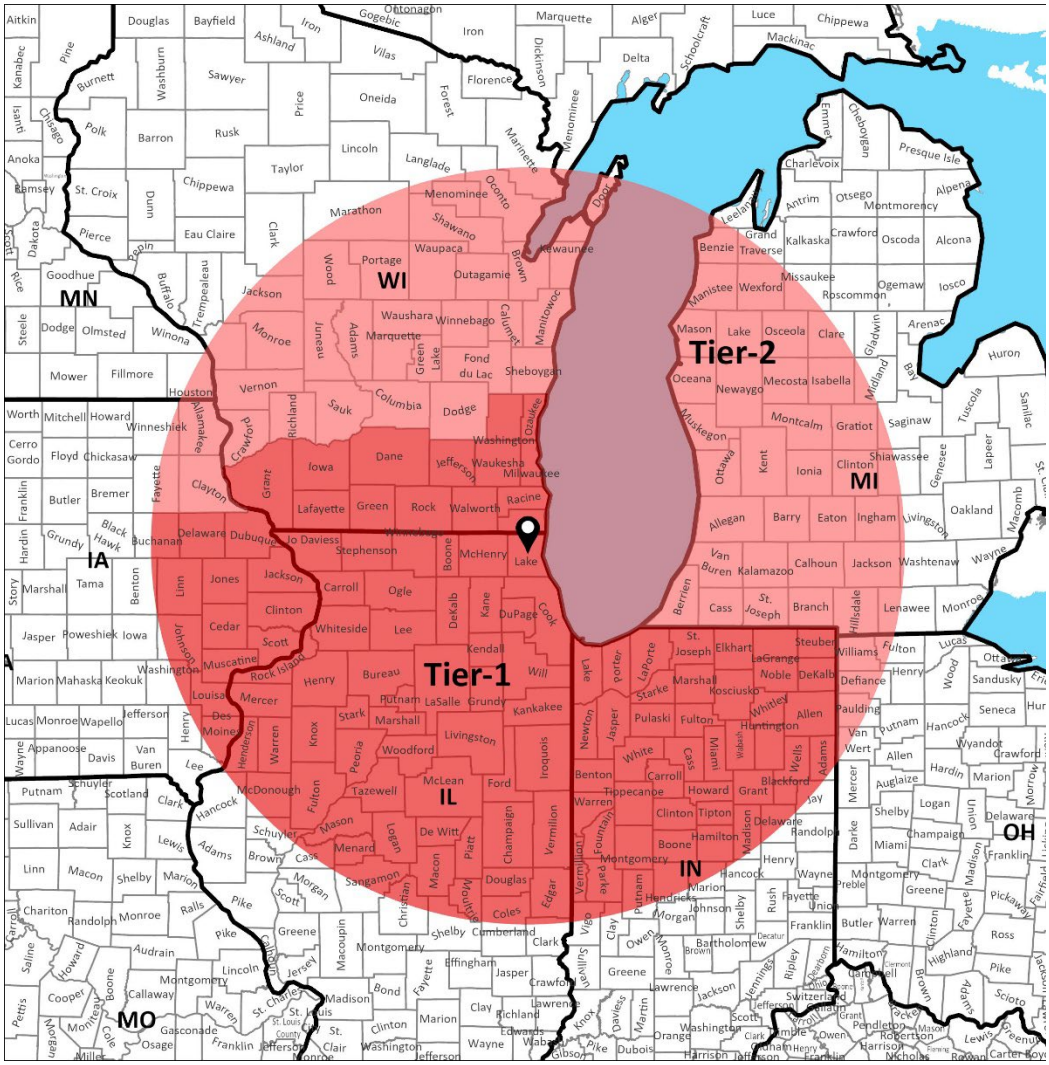
H. Seeds of all forbs should be stored in cold conditions whenever possible.

I. Seed bags shall be stored at the recommended temperature and not exposed to moisture.

J. Seed mixes shall be packaged for the appropriate installation method. This shall include segregation of seed by size to assure an even distribution of different species that vary greatly in size in relation to equipment metering and delivery requirements.

2.05 SEED MIX REQUIREMENTS – PROVENANCE

A. The District has a two-tier seed provenance system for native plant material sourcing. All native plant material shall be First-Tier whenever possible. If First-Tier plant material sourcing is not available, the District reserves the right to approve sourcing from Tier 2.



B. First-Tier seed provenance counties in Illinois, Wisconsin, Indiana and Iowa include:

a. **Illinois**: Bureau, Carroll, Cass, Champaign, Coles, Cook, De Witt, DeKalb, Douglas, DuPage, Edgar, Ford, Fulton, Henderson, Jo Daviess, Kane, Kendall, Knox, La Salle, Lake, Lee, Livingston, Logan, Macon, Marshall, McDonough, McHenry, McLean, Menard, Mercer, Moultrie, Ogle, Peoria, Piatt, Putnam, Rock Island, Sangamon, Schuyler, Stark, Stephenson, Tazewell, Vermilion, Warren, Winnebago, Whiteside, Warren, Will, and Woodford counties.

b. **Wisconsin**: Dane, Grant, Green, Iowa, Jefferson, Kenosha, Lafayette, Milwaukee, Ozaukee, Racine, Rock, Walworth, Waukesha, Waukesha, and Washington counties.

c. **Indiana**: Adams, Allen, Benton, Blackford, Boone, Carroll, Cass, Clinton, De Kalb, Delaware, Elkhart, Fountain, Fulton, Grant, Hamilton, Hendricks, Howard, Huntington, Jasper, Kosciusko, Lake, LaGrange, LaPorte,

Madison, Marshall, Miami, Montgomery, Newton, Noble, Parke, Porter, Pulaski, Putnam, St. Joseph, Starke, Steuben, Tippecanoe, Tipton, Vermillion, Wabash, Warren, Wells, White, and Whitley counties.

d. **Iowa**: Buchanan, Cedar, Clinton, Delaware, Des Moines, Dubuque, Jackson, Johnson, Jones, Linn, Louisa, Muscatine, and Scott counties.

3. EXECUTION

3.01 SEED BED PREPARATION

A. Seed bed preparation shall not begin until all other site work, topsoil spreading and finish grading have been completed.

B. All areas to be seeded shall be inspected and approved by the Owner prior to the sowing of seed.

C. Surfaces to be seeded shall be loose and friable to a minimum depth of 3 inches. Hard and compacted surfaces are not acceptable and must be tilled and raked to provide a suitable seed bed. Any rocks greater than 1″ in diameter or soil cods or vegetative debris greater than 2″ in diameter that is generated shall be removed and disposed. Seed beds that cannot be adequately cleaned of debris by manual raking and picking shall be cleaned by mechanical means using a dedicated rock / debris collecting tractor attachment.

3.02 HERBICIDE APPLICATION BEFORE SEEDING

A. Areas which contain undesirable or weed species at the time of seeding shall be sprayed with an appropriate herbicide when directed by the Owner. Refer to Section 09110 – Herbicide Treatment for the specific requirements of this this work.

3.03 SEEDING – GENERAL

A. All areas of bare soil which have been graded or otherwise disturbed by construction shall be seeded, unless specified on the plans otherwise. Refer to the plans for locations of the specified seed mixes. No seed shall be sown during unfavorable conditions such as high winds or very wet soil.

B. Temporary work areas, staging areas, haul roads and all other similarly disturbed areas which require restoration shall be prepared and seeded according to the requirements contained in this section.

3.04 SEEDING SCHEDULE AND METHODS

A. When installing prairie and other types of native seed mixes, seeding schedules, methods and equipment shall be determined by the requirements for both soil erosion and sediment control management and the germination and establishment of the native seed mix. In order to accommodate both of these requirements, separate seeding of cover crop mix and the native mix may be required. Initial seeding shall be performed immediately after finish grading and seed bed preparation has been completed. Unless directed otherwise by the Owner, cover crop and native seed installation shall be performed according to the following schedule:

1. April 1 to October 15

Install Cover Crop Mix only with hydromulch.

2. October 15 to April 1

B. For bare soil conditions which have not been seeded with Cover Crop, install both Cover Crop Mix and Native Mix in one installation with either hydromulch or erosion control blanket.

C. For areas previously seeded with Cover Crop, install Native Seed Mix only. No seed mulch or cover is required unless bare soil conditions are prevalent.

D. Native seeding shall not be installed during periods of snow or ice cover, wet soil conditions or during periods of high winds when using the broadcast method.

E. Seeding shall be performed using the Broadcast Method or by Drill Method using equipment especially suited to the installation of native seed mixes. All seeding equipment shall be approved by the Owner. A carrier agent such as sand, perlite, ground corn cobs or similar material shall be used when native seed size or quantity is insufficient to distribute evenly.

F. The broadcast method shall always be used when bare soil conditions and a prepared seed bed are present. The seed shall be distributed using only a dedicated broadcast spreader such as a Cyclone or Seed Slinger with proper calibration. Hand cast seeding shall not be acceptable. The seed shall be broadcast in two passes approximately 90 degrees from each other. The Owner may require that the seed be segregated by size or species and broadcast in separate passes. Immediately after seed dispersal, the seeded areas shall be lightly raked, either manually or utilizing a tractor and drag attachment and then rolled with a smooth surfaced roller.

G. Mechanical drill seeders shall be used only when existing vegetative cover prevents broadcast seeding. When used they shall be of the type specifically designed for native seed installation (such as those by Truax, Tye or John Deere) which utilizes multiple seed boxes to segregate seed species by size and places the various seeds at the proper planting depth. The seeder shall be equipped to install seed into existing vegetation when required. The seeder shall be equipped with separate drop tubes for each seed size, discs to open the seed furrows and a packer assembly to compact the soil directly over the seed. Mechanical drill seeding is the required method when existing cover crop is present. Mechanical drill seeding shall be performed at half rates in two directions to achieve the full specified rate.

H. All seeding shall be done at a right angle to the surface drainage when possible.

3.05 SEED BED ROLLING / CULTIPACKING

A. When included in the Schedule of Prices, the Contractor shall roll the seed bed immediately after broadcasting the seed. The roller shall be a smooth surfaced drum style typically used for sod installations, either manual, powered or tractor drawn.

3.06 EROSION CONTROL BLANKET

A. Immediately after seeding is complete, place erosion control blanket on all areas as designated on the plans. Refer to the manufacturer’s recommendation for selection of staple patterns and quantities appropriate to the site conditions.

B. The Contractor shall guarantee that all erosion control blanket remains securely in place until a minimum of 90% of the ground has been stabilized by germination and growth of permanent or temporary seed. Erosion control blanket shall be re-

stapled, reapplied or otherwise reset as specified as often as necessary until stabilization has been achieved.

C. On slopes greater than 3:1 the Contractor shall install the erosion control blanket with a trenched edge at the top of the slope to resist water infiltration under the blanket.

3.07 HYDROMULCH

A. Immediately after seeding is complete, apply hydromulch on all areas as designated on the plans. Hydromulch shall not be applied to areas which are to receive erosion control blanket. Strictly comply with the equipment and material manufacturer's instructions and recommendations. The timing of the hydromulch application shall allow the product to fully cure before the next precipitation event. The hydromulch shall be applied in at least two opposing passes at the following rates:

4H – 1V to 3H – 1V Slopes: 3,000 lbs. / acre
3H – 1V to 2H – 1V Slopes: 3,500 lbs. / acre
2H – 1V to 1H – 1V Slopes: 4,000 lbs. / acre (Heavy Duty Hydromulch only)

3.08 ESTABLISHMENT PERIOD

A. An establishment period shall commence 30 days following the satisfactory inspection and acceptance of the native seed mix. This period shall continue for a 2 year term during which the seeding shall be monitored and maintenance tasks prescribed. Pay items are included for all maintenance tasks.

3.09 MONITORING AND INSPECTIONS

A. The Contractor and the Owner shall inspect the site at least twice per year. These inspections shall occur approximately around May 1st and July 15th unless the parties agree to an adjusted schedule. The vegetative monitoring will be based on meander surveys of all seeded areas. During these inspections, the site shall be evaluated for germination and presence of both the desired native species and of the presence of non-native, weedy or invasive species. The Owner shall determine what if any maintenance actions should be performed to best assure the successful establishment of the desired species. These inspections shall continue through the second and final year of the term, with specific remedial actions determined and scheduled after each inspection of the site.

3.10 FIELD MOWING

A. Field Mowing shall consist of the mowing of native seeded areas to a height determined by the site inspections, typically at 6″, for purposes of reducing competition from undesirable species or to control weed seed germination. It shall be performed according to the scheduled time set at the time of inspection. Mowing which is performed outside of the scheduled times may be rejected for payment if the desired outcome is not achieved.

3.11 HERBICIDE TREATMENT – NATIVE SEEDED AREAS

A. Herbicide Treatments shall include either Glyphosate (Roundup) or Clopyralid (Transline) as described in Section 09110 – Herbicide Treatment. The Contractor shall apply the herbicides per the manufacturer's recommendations and as instructed by the Owner. The application may be selective in nature, or broadly

applied depending on the composition of the vegetation present at the time of treatment.

3.12 NATIVE SEEDING - CONTINGENCY

A. When indicated by the site inspections, the Contractor shall perform additional seeding in specific areas as directed by the Owner. The seed mix shall be the original mix specified and the installation method shall be determined by the extent of vegetation present in the targeted areas.

3.13 GUARANTY

A. Seed Beds: Upon completion of seeding operations, the Contractor shall become responsible for protecting the seeded areas from any damage resulting from foot or vehicle traffic, vandalism or weather. When possible, isolate and contain the completed areas with temporary fencing. Erosion or soil subsidence caused by rain shall be repaired to the original grade, prepared for seed, reseeded and the appropriate erosion control product reapplied. Any damage which occurs before achieving the performance and guaranty criteria shall be repaired to original specifications by the Contractor at no expense to the Owner.

B. LCFP Cover Crop Mix: Cover crop seeding shall have a minimum of 90% ground coverage with active growth and no bare ground greater than five (5) square feet before final acceptance. This minimum ground coverage shall be achieved within 90 days of the original seeding. After the 90 day period or the following spring for seeding performed in fall, the Contractor shall reseed any areas not meeting these criteria at no additional cost to the Owner.

C. LCFP Native Mixes: No minimum ground coverage or native species count guaranty is included in this Contract. However, should the Contractor fail to meet any or all of the material or execution requirements contained in this section, the Owner reserves the right to withhold payment or require the Contractor to perform the work again, including additional seed installation.

D. Hydromulch: The Contractor shall guarantee that all hydromulch is applied at the specified rate. Any areas where the specified rate is not achieved shall be reapplied until meeting the specification. The Contractor shall guarantee that all hydromulch remains effective and shall reapply the hydromulch as needed until such time that the minimum seed coverage is achieved.

E. Erosion Control Blanket: Any erosion control blanket which becomes displaced for any reason shall be reinstalled to its' original condition and position with additional staples. Any erosion control blanket which becomes damaged or otherwise ineffective shall be replaced with new product. All rills and gullies shall be repaired and the area shall be reseeded prior to reinstallation of erosion control blanket.

END OF SECTION 09310