ADDENDUM
NO. 3

December 23, 2019

Carmel Elementary School
Carmel, IN 46032

TO: ALL BIDDERS OF RECORD

This Addendum forms a part of and modifies the Bidding Requirements, Contract Forms, Contract Conditions, the Specifications and the Drawings dated November 19, 2019, by CSO Architects. Acknowledge receipt of the Addendum in the space provided on the Bid Form. Failure to do so may subject the Bidder to disqualification.

This Addendum consists of Page ADD 3-1, 3-2, 3-3, 3-4; CSO Architects Addendum 3, dated December 20, 2019, consisting of 8 pages; 06 42 16 – Flush Wood Paneling by CSO, 10 13 00 – Directories by CSO, 31 30 00 –Site Clearing by A&F, 31 20 00 –Earth Moving By A&F, C101 – Demo Plan (Overall) By A&F, C102 – Demo Plan (North) By A&F, C103 – Demo Plan (South) By A&F, C301 – Grading Plan (North) By A&F, C302 – Grading Plan (South) By A&F, C402a – SWPP Plan (Const) Phase Ii By A&F, C500 – Structure Data Table By A&F, C501 – Overall Utility Plan By A&F, C502 – Utility Plan (North) By A&F, C503 – Utility Plan (South) By A&F, C504 – Plan & Profile (Storm) By A&F, C505– Plan & Profile (Storm) By A&F, C506 – Plan & Profile (Storm) By A&F, C507 – Plan & Profile (Storm) By A&F, C508 – Plan & Profile (Storm) By A&F, C509 – Plan & Profile (Storm) By A&F, C510 – Plan & Profile (Storm) By A&F, C511 – Plan & Profile (Storm) By A&F, C512 – Plan & Profile (Storm) By A&F, C513 – Plan & Profile (Sanitary) By A&F, C514 – Plan & Profile (Sanitary) By A&F, C601 – Site & Storm Details By A&F, C603 – Storm Details By A&F, L001 – Site Overview By Context, L101 – Site Materials Plan By Context, L102 – Site Materials Plan By Context, L103 – Site Materials Plan By Context, L104 – Site Materials Plan By Context, L105 – Site Materials Plan By Context, L201 – Layout Plan By Context, L202 – Layout Plan By Context, L203 – Layout Plan By Context, L207 – Layout Plan By Context, L401 – Planting Plan By Context, L402 – Planting Plan By Context, L403 – Planting Plan By Context, L404 – Planting Plan By Context L410 – Planting Details By Context, L500 – Site Details By Context, L501 – Site Details By Context, A120 – Composite Roof Plan By CSO, T303 – Security Diagrams By Design 27

A. GENERAL CLARIFICATIONS:

1. Any work related to future library drive is to be excluded from the Carmel Elementary bid.

2. There are no out-buildings (concession building, dugout, maintenance barn, etc.) included in this project. Any reference to such scope of work is to be disregarded.

3. Any alternates referenced in the plans that are not scheduled in the 01 23 00 Alternates Specification Section shall be part of the base bid.

B. SPECIFICATION SECTION 00 31 00 - Indiana Bid Form:

1. Add: Alternate Bid No. 6 – PORTLAND CEMENT SOIL STABILIZATION (MANDATORY)

C. SPECIFICATION SECTION 01 12 00 – Multiple Contract Summary:

1. Paragraph 3.03 Bid Categories

A. Bid Category No. 1:

Add the following Specification Sections:

06 42 16 – Flush Wood Paneling
10 13 00 – Directories

Add the following Clarifications:

22. Bid Category No. 1 Contractor to furnish and install bike racks.

23. Bid Category No. 1 Contractor is to furnish and install Discovery Center Desk and Reception Desk.

24. Bid Category No. 1 Contractor is to furnish and install asphalt subbase as outlined in the Guideline Schedule in preparation of installing asphalt binder and surface as soon as temperatures are appropriate.

25. Bid Category No. 1 Contractor to furnish and install all joint sealants for the project in accordance to specification section 07 92 00 – Joint Sealants.

26. This Contractor shall furnish the upholstered laminate seating and custom casework including the Discovery Center reception desk as further detailed in the 06 40 00 specification.

27. Bid Category No. 1 Contractor to provide pricing for Alternate No. 6 – PORTLAND CEMENT SOIL STABILIZATION.

F. <u>Bid Category No. 6:</u>

<u>Delete the following Specification Section:</u>

08 12 16 – Interior Aluminum Doors and Frames

<u>Add the following Clarifications:</u>

2. Bid Category No. 6 Contractor to furnish and install all interior and exterior joint sealants at aluminum entrances/windows/storefronts in accordance to specification section 07 92 00 – Joints Sealants and 08 41 13 – Aluminum-Framed Entrances and Storefronts.

3. The Owner will directly finance any third party quality control testing as outlined in section 3.04 FIELD QUAILITY CONTROL in specification section 08 41 13 – Aluminum-Framed Entrances and Storefronts.

I. <u>Bid Category No. 9:</u>

<u>Add The Following Clarification:</u>

2. The VS1 Marker Surface is listed in the A900 series of plans.

J. <u>Bid Category No. 10:</u>

<u>Add the following Specification Section:</u>

12 36 61 – Simulated Stone Countertops

<u>Add The Following Clarification:</u>

4. Caulking of all casework and countertops is by Bid Category No. 1.

N. Bid Category No. 14:

Add The Following Clarification:

8. The vendor supporting the RS2 access control system for Carmel Clay Schools is further outlines in 28 13 00 Access Control is Central Indiana Hardware with the point of contact as follows: Damir Husejnovic Husejnovicd@cih-inc.com 317-558-5700.

D. SPECIFICATION SECTION 01 23 00 – Alternates

Paragraph 1.04 Schedule Of Alternates

F. ALTERNATE NO. 6: PORTLAND CEMENT SOIL STABILZATION (MANDATORY)

Description: Contractor to provide pricing for Portland cement stabilization of native soil and subsequent lifts for entirety of building pad and extending 5' beyond building limits. After initial stripping operations, the upper fourteen (14) inches of the exposed subgrade should then be modified with cement at an approximate rate of 60 pounds per square yard. Subsequent lifts of fourteen (14) inches are to be cement stabilized at an approximate rate of 4%. The actual spread rate should be determined based on field conditions and the cement used.

ADDENDUM

CSO
ARCHITECTURE · INTERIOR DESIGN

ADDENDUM NO: 3

BID PACKAGE NO: N/A

PROJECT: Carmel Elementary School

PROJECT NO: 18094 DATE: 12/20/2019 BY: Brent Hite

JOHN E. RIGSBEE REGISTERED No. 920019 STATE OF INDIANA ARCHITECT

This Addendum is issued in accordance with the provisions of "The General Conditions of the Contract for Construction," Article 1, "Contract Documents" and becomes a part of the Contract Documents as provided therein. This Addendum includes:

Addendum Pages:
Attachments:

06 42 16 – FLUSH WOOD PANELING By CSO
10 13 00 – DIRECTORIES by CSO
31 30 00 –SITE CLEARING by A&F
31 20 00 –EARTH MOVING by A&F
C101 – DEMO PLAN (OVERALL) by A&F
C102 – DEMO PLAN (NORTH) by A&F
C103 – DEMO PLAN (SOUTH) by A&F
C301 – GRADING PLAN (NORTH) by A&F
C302 – GRADING PLAN (SOUTH) by A&F
C402A – SWPP PLAN (CONST) PHASE II by A&F
C500 – STRUCTURE DATA TABLE by A&F
C501 – OVERALL UTILITY PLAN by A&F
C502 – UTILITY PLAN (NORTH) by A&F
C503 – UTILITY PLAN (SOUTH) by A&F
C504 – PLAN & PROFILE (STORM) by A&F
C505– PLAN & PROFILE (STORM) by A&F
C506 – PLAN & PROFILE (STORM) by A&F
C507 – PLAN & PROFILE (STORM) by A&F
C508 – PLAN & PROFILE (STORM) by A&F
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C510 – PLAN & PROFILE (STORM) by A&F
C511 – PLAN & PROFILE (STORM) by A&F
C512 – PLAN & PROFILE (STORM) by A&F
C513 – PLAN & PROFILE (SANITARY) by A&F
C514 – PLAN & PROFILE (SANITARY) by A&F
C601 – SITE & STORM DETAILS by A&F
C603 – STORM DETAILS by A&F
L001 – SITE OVERVIEW by Context
L101 – SITE MATERIALS PLAN by Context
L102 – SITE MATERIALS PLAN by Context
L103 – SITE MATERIALS PLAN by Context

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L104 – SITE MATERIALS PLAN by Context
L105 – SITE MATERIALS PLAN by Context
L201 – LAYOUT PLAN by Context
L202 – LAYOUT PLAN by Context
L203 – LAYOUT PLAN by Context
L207 – LAYOUT PLAN by Context
L401 – PLANTING PLAN by Context
L402 – PLANTING PLAN by Context
L403 – PLANTING PLAN by Context
L404 – PLANTING PLAN by Context
L410 – PLANTING DETAILS by Context
L500 – SITE DETAILS by Context
L501 – SITE DETAILS by Context
A120 – COMPOSITE ROOF PLAN By CSO
T303 – SECURITY DIAGRAMS by Design 27

PART 1 - BIDDING AND CONTRACT REQUIRMENTS

1.01 NOT USED

PART 2 - SPECIFICATIONS

2.01 06 42 16 – Flush Wood Paneling

A. Add section in its entirety.

2.02 07 21 00 – Thermal Insulation

A. Add 2.04A5 as follows:

5. Johns Manville

2.03 07 21 19 – Spray Foam Insulation

A. Add 2.02A1g as follows:

g. Johns Manville

2.04 08 12 16 – Interior Aluminum Doors and Frames

A. Delete specification in its entirety.

2.05 08 15 48 – Fiberglass Doors

A. Add 2.02A7 as follows:

7. Vale Doors

2.06 09 50 00 – Wood Panel Ceilings

A. Add 2.01A6 as follows:

6. Rulon International

2.07 <u>10 13 00 – Directories</u>

A. Add section in its entirety.

2.08 <u>23 34 23 – HVAC Power Ventilators</u>

A. 2.1, A, add “ACME” as an approved manufacturer.

B. 2.2, A, add “ACME” as an approved manufacturer.

C. 2.3, I, add “ACME” as an approved manufacturer

2.09 <u>23 37 13 – Diffusers, Registers and Grilles</u>

A. Add “Kruger” as an approved manufacturer for grilles, registers, and diffusers.

2.010 <u>31 10 00 – Site Clearing</u>

A. Specification updated to clarify demolition coordination with owner & construction manager.

2.011 <u>31 20 00 – Earth Moving</u>

A. Specification updated to remove all references to Detention Basin clay liner.

2.012 <u>32 12 16 – Asphalt Paving</u>

A. Add subsection 2.01G as follows;

G. Chemically-treated subgrade: Comply with current version of INDOT specifications and all City of Carmel standards. In cases where the standards disagree, the greater requirement shall prevail.

B. Remove and replace subsection 2.02B as follows;

B. Refer to current version of INDOT specifications for mix formula and composition limits on the above mixtures, unless otherwise noted. Binder and surface courses may contain reclaimed asphalt pavement (RAP) in conformance with INDOT standards.

C. Remove and replace 3.02B as follows;

B. Couse Lifts: comply with INDOT requirements regarding finished thickness of any course being at least two times, but not more than four times the maximum particles size as shown on the DMF (except 4.74mm mixtures which shall be at least 1.5 time, but not more than 3 times the maximum particle size). In cases where a course exceeds 3” in depth, multiple lifts shall be employed as part of base bid.

2.013 32 33 00 – Site Furnishings

A. Add section 1.2A6 as follows:

6. Bike Racks

B. Add subsection 2.8 as follows:

2.6 Bike Racks

A. Basis-of-design: Landscape Structures – Emerson Bike Rack, or approved equal prior to bidding.

1. Quantities as shown on plans
2. Field locate with landscape architect prior to installation
3. Black powder coat; matt finish
4. Surface mount per all manufacturer's recommendations, including all anchoring hardware and fittings necessary for a turn-key, complete installation.

PART 3 - DRAWINGS

CIVIL

3.01 C101, C102, & C103 –DEMO PLANS

A. Language clarifying legacy preservation was added.

B. Demolition notes updated.

C. Eastern parcel owned by school was shown.

3.02 C301 – GRADING PLAN (NORTH)

A. Minor grading adjustments were made in carious places

B. Swales and subsurface drains were added near the detention basin

3.03 C302 – GRADING PLAN (SOUTH)

A. Top bank elevation was established at 854.7 around the south edge of the parking lot to ensure that the overland flood route will travel north during major storms.

3.04 C402A – SWPP PLAN CONSTRUCTION PHASE II

A. Sheet added.

3.05 C500 – STRUCTURE DATA TABLE

A. Various structure types and sizes changed.

B. Diversion Manholes & Aquaswirl Structures changed to XCelerators.

3.06 C502 – UTILITY PLAN (NORTH)

A. Storm Configuration northwest of the building was changed.

B. Inline Aquaswirl Structures changed to Aquashield XCelerators with Diversion structures. Additional manholes were added downstream as a convergence structures.

C. Water main lowering added near storm structure 746.

D. Subsurface drains added to all structures within paved areas.

3.07 C503 – UTILITY PLAN (SOUTH)

A. Sanitary material type updated to PVC.

B. Hydrant and associated watermain was added to the south parking lot

C. “No Parking” striping added near fire hydrants

3.08 C504-C514 SITE & STORM DETAILS

A. Limits of granular backfill shown

B. Various structures, sizes, alignments and casting changed as clouded.

3.09 C603 –STORM WATER DETAILS

A. Water Quality Details updated to include XCelerator and diversion structures.

SITE / LANDSCAPE

3.010 L001 Site Overview

A. Revise: 56’ Access Easement Revised to 56’ Dedicated ROW

B. Added current and proposed building square footage note

3.011 L101 Site Materials Plan

A. Revised F1.6-F1.9 to include Steel Pipe Bollard and provide unity throughout all Materials sheets.

B. Added: Walk to be constructed others.

3.012 L102 Site Materials Plan

A. Revised F1.6-F1.9 to include Steel Pipe Bollard and provide unity throughout all Materials sheets.

B. Added Walk to be constructed others.

C. Revised Concrete Path Material Call out along North Eastern corner.

D. Added additional path for BMP access requirements and added 2 picnic tables at this location.

3.013 L103 Site Materials Plan

A. Revised F1.6-F1.9 to include Steel Pipe Bollard and provide unity throughout all Materials sheets.

B. Added 3 Steel Bollards at Service Area.

3.014 L104 Site Materials Plan

A. Revised F1.6-F1.9 to include Steel Pipe Bollard and provide unity throughout all Materials sheets.

3.015 L105 Playground Materials Enlargement Plan

A. Revised F1.6-F1.9 to include Steel Pipe Bollard and provide unity throughout all Materials sheets.

B. Updated F1.9 Shade Sail Callout to correspond with Materials Legend changes.

C. Revised F2.2 Fence to reflect 4’-0” black vinyl coated chain link fence.

3.016 L201 Layout Plan

A. Added Walk to be constructed by others

3.017 L202 Layout Plan

A. Added walk to be constructed by others.

B. Updated jointing along northern and north eastern pedestrian path.

C. Added concrete path extension at northern pedestrian path/underground detention area.

3.018 L203 Layout Plan

A. Added 3 bollards at service area

3.019 L207 Layout Plan

A. Update: show bike racks at flagpole area

3.020 L401 Planting Plan

A. Relocated Trees due to addition of Walk to be constructed by others, removed shrubs in northern revised tree area (area also affects L402).

B. Removed Shade Trees and Ornamental Trees per Urban Forester request

C. Added Shrubs along northern edge of parking lot perimeter.

D. Updated Ordinance Chart counts.

3.021 L402 Planting Plan

A. Relocated Trees due to addition of Walk to be constructed by others, removed shrubs in northern revised tree area (area also affects L401).

B. Removed shrubs along eastern property.

C. Added plant material along new concrete path at the Underground Detention.

D. Updated Ordinance Chart counts.

E. Change tree type at berm near basketball court area per Urban Forester request.

3.022 L403 Planting Plan

A. Removed Trees near parking lot.

B. Removed Ornamental Trees along western property line

C. Updated Ordinance Chart counts.

3.023 L404 Planting Plan

A. Relocated Trees near bus parking lot, and shifted eastern tree line west a few feet.

B. Updated Ordinance Chart counts.

3.024 L410 Planting Details

A. Updated Plant Schedule.

3.025 L500 Site Details

A. Update Detail 3 Heavy Duty Asphalt Pavement

B. Added Detail 11 Steel Pipe Bollard

3.026 L501 Site Details

A. Update Detail 1 Accessible Ramp Configurations

TECHNOLOGY

3.027 T303 – SECURITY DIAGRAMS

A. Revised detail #1 “ACCESS CONTROL FUNCTIONAL DIAGRAM” to match specifications.

ARCHITECTURAL

3.028 KEYNOTE LEGEND – All sheets with the Keynote Legend effected.

A. 05 52 13-E

1. Keynote to read **“1-1/4” I.D. ANODIZED ALUMINUM PIPE AND TUBE RAILING”**

B. 05 52 13-F

1. Keynote to be eliminated and changed to "**05 52 13-A"**, typical all drawings.

3.029 A120 – COMPOSITE ROOF PLAN

A. Show ROOF PLAN NOTES as indicated on attached sheet.

3.030 A504 – WINDOW SCHEDULE

A. Window 316.1, change material to be "**AL"** in lieu of ~~HM,~~ and finish to "**AN**" in lieu of ~~PT~~

PART 4 - OTHER ITEMS

4.01 NOT USED

A. NOT USED

PART 5 - QUESTION AND ANSWER

5.01 Asphalt specs has a 25% RAP (reclaimed asphalt pavement) cap. Is this by design? Its more typical to use an INDOT mix with a 30% allowance. Please advise.

A. RAP is acceptable in accordance with the latest INDOT standards

5.02 What bid category is responsible for the "butcher block benchtop" shown on the casework elevation drawings (reference A621)? Div 6 specs make no reference to butcher block and Spec 123619 only makes reference to butcher block "countertops".

A. The butcher-block countertop specification is to be used as a bench seat per the classroom elevations. Stained finish required to match Architects sample.

5.03 On the exhaust fan equipment schedule EF-K and EF-L are for the Concession exhaust. Is there a separate building on the grounds for these items?

A. These exhaust fans are not utilized on this project.

END OF ADDENDUM

SECTION 06 42 16 - FLUSH WOOD PANELING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section Includes:

1. Flush wood paneling.
2. Shop finishing of flush wood paneling.

1.03 COORDINATION

A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that paneling can be installed as indicated.

1.04 PREINSTALLATION MEETINGS

1.05 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include data for fire-retardant treatment from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements.

B. Shop Drawings: For flush wood paneling.

1. Include plans, elevations, sections, and attachment details.
2. Show details full size.
3. Show locations and sizes of furring and blocking, including concealed blocking specified in other Sections.
4. For paneling produced from premanufactured sets, show finished panel sizes, set numbers, sequence numbers within sets, and method of cutting panels to produce indicated sizes.

C. Samples for Verification: For the following:

1. Veneer-Faced Panel Products for Transparent Finish: 8 by 10 inches (200 by 250 mm), for each species and cut. Include at least one face-veneer seam and finish as specified.

1.06 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer AND fabricator.

B. Product Certificates: For each type of product.

C. Evaluation Reports: For fire-retardant-treated materials, from ICC-ES.

1.07 QUALITY ASSURANCE

A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.

B. Installer Qualifications: Fabricator of products.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver paneling until painting and similar operations that might damage paneling have been completed in installation areas. Store paneling in installation areas or in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

1.09 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install paneling until building is enclosed, wet-work is complete, and HVAC system is operating and will maintain temperature and relative humidity at levels planned for building occupants during the remainder of the construction period.

B. Field Measurements: Where paneling is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1. Locate concealed framing, blocking, and reinforcements that support paneling by field measurements before being enclosed/concealed by construction and indicate measurements on Shop Drawings.

PART 2 - PRODUCTS

2.01 PANELING, GENERAL

A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of flush wood paneling (wood-veneer wall surfacing) indicated for construction, finishes, installation, and other requirements.

1. The Contract Documents contain requirements that are more stringent than the referenced woodwork quality standard. Comply with requirements of Contract Documents in addition to those of the referenced quality standard.

2.02 FLUSH WOOD PANELING (WOOD-VENEER WALL SURFACING)

A. Grade: Premium.

B. Basis of Design: Fashion Architectural Designs, Stacked Wood, Geometry Collection, FAD3313 or approved equivalent.

C. Wood Species and Cut: White Oak.

D. Panel-Matching Method:

1. No matching is required between adjacent panels. Select and arrange panels for similarity of grain pattern and color between adjacent panels.
2. Premanufactured panel sets used full width within each separate area.

E. Panel Core Construction: Fire-retardant particleboard or fire-retardant MDF.

1. Thickness: 3/4 inch (19 mm).

F. Exposed Panel Edges: Inset solid-wood or wood-veneer matching faces.

G. Fire-Retardant-Treated Paneling: Panels shall consist of wood-veneer and fire-retardant particleboard or fire-retardant, medium-density fiberboard (MDF). Panels shall have a flame-spread index of 25 or less and a smoke-developed index of 450 or less per ASTM E 84, and be listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction.

H. Assemble panels by gluing and concealed fastening.

2.03 MATERIALS

A. Materials, General: Provide materials that comply with requirements of referenced quality standard for each quality grade specified unless otherwise indicated.

B. Wood Moisture Content: 8 to 13 percent.

C. Composite Wood Products: Provide materials that comply with requirements of referenced quality standard for each quality grade specified unless otherwise indicated.

1. MDF: ANSI A208.2, Grade 130.
2. Particleboard: ANSI A208.1, Grade M-2.
3. Veneer-Faced Panel Products (Hardwood Plywood): HPVA HP-1.

2.04 FIRE-RETARDANT-TREATED MATERIALS

A. Fire-Retardant-Treated Materials, General: Where fire-retardant-treated materials are indicated, use materials that are acceptable to authorities having jurisdiction and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.

1. Use treated materials that comply with requirements of referenced quality standard. Do not use materials that are warped, discolored, or otherwise defective.
2. Use fire-retardant-treatment formulations that do not bleed through or otherwise adversely affect finishes. Do not use colorants to distinguish treated materials from untreated materials.
3. Identify fire-retardant-treated materials with appropriate classification marking of qualified testing agency in the form of removable paper label or imprint on surfaces that will be concealed from view after installation.

B. Fire-Retardant Fiberboard: MDF panels complying with ANSI A208.2, made from softwood fibers, synthetic resins, and fire-retardant chemicals mixed together at time of panel manufacture to achieve flame-spread index of 25 or less and smoke-developed index of 200 or less per ASTM E 84.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. Panel Source International, Inc.
   b. SierraPine.

2.05 INSTALLATION MATERIALS

A. Furring, Blocking, Shims, and Hanging Strips: Fire-retardant-treated softwood lumber, kiln-dried to less than 15 percent moisture content.

B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide metal expansion sleeves or expansion bolts for post-installed anchors. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls.

C. Installation Adhesive: Product recommended by panel fabricator for each substrate for secure anchorage.

2.06 FABRICATION

A. Sand fire-retardant-treated wood lightly to remove raised grain on exposed surfaces before fabrication.

B. Arrange paneling in shop or other suitable space in proposed sequence for examination by Architect. Mark units with temporary sequence numbers to indicate position in proposed layout.

   1. Lay out one elevation at a time if approved by Architect.
   2. Notify Architect seven days in advance of the date and time when layout will be available for viewing.
   3. Provide lighting of similar type and level as that of final installation for viewing layout unless otherwise approved by Architect.
   4. Rearrange paneling as directed by Architect until layout is approved.
   5. Do not trim end units and other nonmodular-size units to less than modular size until after Architect's approval of layout. Indicate trimming by masking edges of units with nonmarking material.
   6. Obtain Architect's approval of layout before start of assembly. Mark units and Shop Drawings with assembly sequence numbers based on approved layout.

C. Complete fabrication, including assembly, to maximum extent possible, before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

   1. Notify Architect seven days in advance of the dates and times paneling fabrication will be complete.

D. Shop cut openings, to maximum extent possible, to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

2.07 SHOP FINISHING

A. General: Finish paneling at fabrication shop as specified in this Section. Defer only final touchup, cleaning, and polishing until after installation.

B. Preparation for Finishing: Comply with referenced quality standard for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing paneling, as applicable to each unit of work.

1. Backpriming: Apply two coats of sealer or primer, compatible with finish coats, to concealed surfaces of paneling.

C. Transparent Finish:

1. Grade: Premium.
2. Finish: System – UV Varnish 10%.
3. Wash Coat for Closed-Grain Woods: Apply wash-coat sealer to woodwork made from closed-grain wood before staining and finishing.
4. Staining: Match approved sample for color.
5. Sheen: Satin, 31-45 gloss units measured on 60-degree gloss meter per ASTM D 523.

PART 3 - EXECUTION

3.01 PREPARATION

A. Before installation, condition paneling to humidity conditions in installation areas.

B. Before installing paneling, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming.

3.02 INSTALLATION

A. Grade: Install paneling to comply with quality standard grade of paneling to be installed.

B. Install paneling level, plumb, true in line, and without distortion. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches (3 mm in 2400 mm). Install with no more than 1/16 inch in 96-inch (1.6 mm in 2400-mm) vertical cup or bow and 1/8 inch in 96-inch (3 mm in 2400-mm) horizontal variation from a true plane.

1. For flush paneling with revealed joints, install with variations in reveal width, alignment of top and bottom edges, and flushness between adjacent panels not exceeding 1/32 inch (0.8 mm).

C. Anchor paneling to supporting substrate with blind nailing, in addition to utilizing 100% polyurethane glue in pattern recommended by manufacturer.

1. Do not use face fastening unless otherwise indicated.

D. Complete finishing work specified in this Section to extent not completed at shop or before installation of paneling. Fill nail holes with matching filler where exposed.

1. Apply specified finish coats, including stains and paste fillers if any, to exposed surfaces where only sealer/prime coats are shop applied.

3.03 ADJUSTING AND CLEANING

A. Repair damaged and defective paneling, where possible, to eliminate defects. Where not possible to repair, replace paneling. Adjust for uniform appearance.

B. Clean paneling on exposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

END OF SECTION

SECTION 10 13 00 - DIRECTORIES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section Includes:

1. Changeable-letter directories.

B. Related Requirements:

1.03 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site

1.04 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for directories. Include furnished specialties and accessories.
2. Include electrical characteristics for illuminated directories.

B. Shop Drawings: For directories.

1. Include plans, elevations, sections, and attachment details.
2. Include sections of typical trim members.
3. Indicate layout directory, including header and message strips.
4. Include diagrams for power wiring.

C. Samples: For each exposed product and for each color and texture specified, as follows:

1. Trim: 6 inches (150 mm) long for profile and color of factory finish.
2. Typeface: Typeface Sample for size and font.
3. Letterboard Panel: Not less than 8-1/2 by 11 inches (215 by 280 mm).
4. Changeable Letters: Six full-size letters indicating size and font.

D. Samples for Initial Selection: For units with factory-applied color finishes, as follows:

1. Section of header panel for color selection.
2. Color swatches for trim factory finish.
3. Full-size changeable letters in each size and font available.

E. Samples for Verification: For each type of directory indicated, as follows:

1. Trim: 6-inch- (150-mm-) long sections of each trim profile], in color selected.

2. Message Strips: Full-size Samples of message strips in color selected with Sample of selected typeface and size.
3. Letterboards: Not less than 8-1/2 by 11 inches (215 by 280 mm), mounted on substrate indicated for final Work. Include one panel for each type, color, and texture required.
4. Letters: Full-size Samples of changeable letters of each size and font specified.

1.05 CLOSEOUT SUBMITTALS

A. Maintenance Data: For directories to include in maintenance manuals.

1.06 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install directories until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

B. Field Measurements: Verify actual dimensions of openings for directories by field measurements before fabrication.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Source Limitations: Obtain each type of directory from single source from single manufacturer.

2.02 PERFORMANCE REQUIREMENTS

A. Electrical Components: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.03 CHANGEABLE-LETTER DIRECTORIES

A. Enclosed-Face, Changeable-Letter Directory Factory-fabricated unit consisting of manufacturer's standard, 2-inch- (50-mm-) deep perimeter frame with removable letterboard on back inside surface and with glazed doors.

1. Subject to requirements and manufactured by one of the following:

a. AARCO Products
b. ASI Sign Systems
c. CR Laurence Co.
d. CIG-JAN Products
e. Claridge Products
f. Marsh Industries
g. Signature, INC.

2. Aluminum Perimeter Frame: Extruded aluminum with weather-resistant backing for exterior use.

a. Perimeter Frame Profile: Square.

b. Perimeter Frame Corners: Square.
c. Finish: Manufacturer's standard baked enamel or powder coat.

1) Color: Match Architect's sample

3. Glazed Sliding Doors: Unframed, clear-tempered-glass doors supported on nylon or ball-bearing rollers in extruded-aluminum top and bottom track, with plastic top guide and rubber bumpers. Equip each door with ground finger pull and adjustable cylinder lock with two keys.

a. Door Track: Same finish on exposed surfaces as perimeter frame.
b. Number of Doors: Two.

4. Header Panel**:** Illuminated; with translucent acrylic sheet panel set within overall perimeter frame; with matching frame that separates header panel from letterboard.
5. Exterior Directories: Aluminum-framed units of weather-resistant construction; with vents to dissipate trapped moisture, weather-resistant letterboard, and weather-stripped hinged doors.
6. Illumination System: Concealed top-lighting system consisting of LED-strip fixtures. Include lamps and internal wiring with single, concealed electrical connection to building system. Coordinate electrical characteristics with power supply provided.

a. Ballasts: Low-temperature, high-power-factor, low-energy, LED lamp ballasts that comply with Certified Ballast Manufacturers Association standards and carry its label. Provide exterior ballasts for exterior directories.
b. Electrical Characteristics: Single phase, 120 volts.

7. Letterboard: Manufacturer's standard vinyl covered panel material, with grooves spaced at 1/4 inch (6 mm) o.c. to receive changeable letters.

a. Color: As selected by Architect from manufacturer's full range.

8. Letters: Molded plastic with tabs for engaging grooves in letterboard. Provide manufacturer's standard assortment of not less than [300] <Insert number> characters for each size, style, color, and case required; include letters, numbers, and characters. Package letters in compartmentalized carrying box.

a. Height: 1 inch (25 mm)
b. Style: Arial
c. Color: Black
d. Case: All capitals

9. Width: As indicated on Drawings
10. Height: As indicated on Drawings
11. Mounting: Semi-recessed.

2.04 MATERIALS

A. Aluminum: Alloy and temper recommended by aluminum producer and manufacturer for type of use and finish indicated, and as follows:

1. Sheet: ASTM B 209 (ASTM B 209M).

2. Extruded Shapes: ASTM B 221 (ASTM B 221M), Alloy 6063.

B. Stainless-Steel Sheet: ASTM A 666, Type 304.

C. Copper-Alloy Brass Sheet: ASTM B 36/B 36M, Alloy UNS No. C26000 (cartridge brass, 70 percent copper).

D. Copper-Alloy Bronze Sheet: ASTM B 36/B 36M, Alloy UNS No. C28000 (muntz metal, 60 percent copper).

E. Clear Float Glass: ASTM C 1036, Type I, Class 1, Quality q3.

F. Clear Tempered Glass: ASTM C 1048, Kind FT, Condition A, Type I, Class 1 (clear), Quality q3, with exposed edges seamed before tempering.

G. Fasteners: Provide screws, bolts, and other fastening devices made from same material as items being fastened, except provide hot-dip galvanized, stainless-steel, or aluminum fasteners for exterior applications. Provide types, sizes, and lengths to suit installation conditions. Use security fasteners where exposed to view.

2.05 FABRICATION

A. Fabricate directories to requirements indicated for dimensions, design, and thickness and finish of materials. Use metals and shapes of thickness and reinforcement to produce flat surfaces, free of oil canning, and to impart strength for size, design, and application indicated.

B. Fabricate directory cabinets and door frames with reinforced corners, mitered and welded to a hairline fit, with no exposed fasteners. Provide structural reinforcement to prevent racking and misalignment.

C. Fabricate exterior directories with vents to permit evaporation of moisture trapped inside.

D. Provide hold-open arms for doors of top-hinged directories.

2.06 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.07 ALUMINUM FINISHES

A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

B. Color Anodic Finish: AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm or thicker.

C. Baked-Enamel or Powder-Coat Finish: AAMA 2603 except with a minimum dry film thickness of 1.5 mils (0.04 mm). Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

2.08 STAINLESS-STEEL FINISHES

A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.

B. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.

1. Run grain of directional finishes with long dimension of each piece.
2. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
3. Directional Satin Finish: No. 4.
4. Mirrorlike Reflective, Nondirectional Polish: No. 8.

2.09 COPPER-ALLOY FINISHES

A. Buffed Finish: M21 (Mechanical Finish: buffed, smooth specular).

B. Medium-Satin Finish: M32 (Mechanical Finish: directionally textured, medium satin).

C. Fine-Matte Finish: M42 (Mechanical Finish: nondirectional finish, fine matte).

D. Statuary Conversion Coating over Satin Finish: M32-C55 (Mechanical Finish: directionally textured, medium satin; Chemical Finish: conversion coating, sulfide).

1. Color: Match Architect's sample.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine walls, with Installer present, for compliance with requirements for installation tolerances, surface conditions of wall, and other conditions affecting performance of the Work.

B. Examine roughing-in for electrical power system to verify actual locations of connections before installation of illuminated directories.

C. Examine walls and partitions for proper backing for directories.

D. Examine walls and partitions for suitable framing depth if recessed directories will be installed.

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

3.02 PREPARATION

A. Prepare recesses for directories as required by type and size of unit.

3.03 INSTALLATION

A. General: Install directories in locations and at mounting heights indicated on Drawings, or if not indicated, at heights indicated below. Keep perimeter lines straight, level, and plumb. Provide grounds, clips, backing materials, adhesives, brackets, anchors, trim, and accessories necessary for complete installation.

1. Mounting Height: [**72 inches (1829 mm)**] <**Insert dimension**> above finished floor to top of directory.

B. Recessed Directories: Attach directories to wall framing with fasteners at not more than 16 inches (400 mm) o.c. Attach aluminum trim over edges of recessed directories, and conceal grounds and clips.

C. Surface-Mounted Directories: Attach directories to wall surfaces with concealed clips, hangers, or grounds fastened at not more than 16 inches (400 mm) o.c. Secure both top and bottom of directories to walls.

D. Comply with requirements specified elsewhere for connecting illuminated directories.

1. After installation is complete, install new fluorescent lamps.

3.04 ADJUSTING AND CLEANING

A. Adjust directory doors to operate smoothly without warp or bind and so that contact points meet accurately. Lubricate operating hardware as recommended by manufacturer.

B. Touch up factory-applied finishes to restore damaged or soiled areas.

END OF SECTION 101300

SECTION 311000 - SITE CLEARING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract apply to Work of this Section and all Sections in the Project Manual whether or not specifically indicated.

1.2 SUMMARY

A. This Section includes the following:

1. Protecting existing trees and vegetation to remain.
2. Removing trees and other vegetation.
3. Clearing and grubbing.
4. Topsoil stripping and stockpiling.
5. Demolition and removal of selected site elements including pavement systems, walks, signage, debris and miscellaneous equipment.
6. Removal and abandonment of selected utilities and sewer systems.

B. Related Sections include the following:

1. “Earth moving” for soil materials, excavating, backfilling, and site grading.

1.3 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 requirements.

1.4 DEFINITIONS

A. Topsoil: Natural or cultivated surface-soil layer containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 2 inches in diameter; and free of weeds, roots, and other deleterious materials.

1.5 MATERIALS OWNERSHIP

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

1.6 PROJECT CONDITIONS

A. General:

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

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

2. Demolition activities shall not interfere with or interrupt the operations of the facility, employees or the public.
3. A complete and operable utility system must be maintained at all times.
4. Sufficient parking and site access must be maintained at all times.

B. Salvable Improvements: Carefully remove items to avoid damages. Except for items indicated to be retained as Owner's property, salvaged materials not indicated for reuse shall become the Contractor's property and removed from the site.

C. Notify utility locator service for area where Project is located at least 48 hours before site clearing.

D. Improvements on Adjoining Property: Authority for performing earth moving indicated on rights-of-way or property adjoining Owner's property will be obtained by Owner before award of Contract.

1. Do not begin work on offsite property until permits are provided by Owner.

E. Protection of Existing Improvements: Provide protections necessary to prevent damage to existing improvements indicated to remain in place.

1. Protect improvements on adjoining properties and on Owner's property.

2. Restore damaged improvements to their original condition, as acceptable to property owners or other parties or authorities having jurisdiction.

F. Obtain and pay for permits required for the execution of the Work.

G. Notify corporations, companies, individuals, and local authorities owning conduits, wires, or pipes that will be affected by this Work. Arrange for removal of utility lines running to or on the property that will interfere with the execution of the Work.

H. Protect and maintain conduit, drains, sewers, pipes, and wires that are to remain. Provide and maintain markers for location of underground facilities.

I. See the drawings for light poles or site elements to be protected, moved, or removed from the site.

1.7 EXISTING SERVICES

A. The locations of on-site underground utilities are approximate and have been identified based surface evidence, and location by underground utility locating service. The Contractor shall confirm the locations of underground utilities as shown on the Drawings.

B. Arrange and pay for disconnecting, removing, capping, and plugging utility services where indicated on the Drawings. Notify affected utility companies in advance and obtain approval before starting this Work.

J. Place markers to indicate location of disconnected services. Identify service lines and capping locations on Project Record Documents.

PART 2 – PRODUCTS

2.1 MATERIALS

A. A. Safety Fence: Beacon Plus bright orange polyethylene safety fence with 3 ½" x 1 ½" mesh grid by Tensar or approved equal.

B. Satisfactory Soil Materials: Requirements for satisfactory soil materials are specified in Section 312000 of the Project Manual.

1. Obtain approved borrow soil materials off-site when satisfactory soil materials are not available on-site.

C. Controlled Low-strength Material: Controlled low-strength material: self-compacting, flowable concrete material produced from the following:

1. Portland Cement: ASTM C 150/C 150M, Type I.
2. Fly Ash: ASTM C 618, Class C or F.
3. Normal-Weight Aggregate: ASTM C 33/C 33M, 3/4-inch nominal maximum aggregate size.
4. Foaming Agent: ASTM C 869/C 869M.
5. Water: ASTM C 94/C 94M.
6. Air-Entraining Admixture: ASTM C 260/C 260M.

PART 3 – EXECUTION

3.1 PREPARATION

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

B. Locate and clearly flag trees and vegetation to remain or to be relocated.

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

1. The Contractor shall meet and walk the site with the Owner and Construction Manager prior to each phase of demolition. The Contractor shall strictly adhere to direction from Owner and Construction Manager to ensure students, staff, and the mission and values of the school are protected. The Contractor shall also receive direction on any items to be salvaged and returned to the Owner during this meeting for each demolition phase.
2. Demolition shall be done in such a manner to protect adjacent properties.
3. If adjacent materials are damaged, repair or replace damaged improvements to their original condition, as acceptable to Owner at no cost to the Owner.
4. If the Contractor interrupts any utility service to the existing school prior to existing school building demolition phase, the contractor shall repair or replace the connection as acceptable to the Owner at no cost to the Owner.
5. If existing facilities and site features, such as playgrounds, parking lot pavement or other equipment, are damaged or removed prior to the school demolition phase, the Contractor shall repair or replace at no cost to the Owner.

3.2 TREE PROTECTION

A. Erect and maintain a temporary plastic, high visibility, orange construction fence around drip line of individual trees or around perimeter drip line of groups of trees to remain where drip line extends into the construction area. Fence when construction is complete.

1. Do not store construction materials, debris, or excavated material within drip line of remaining trees.
2. Do not permit vehicles, equipment, or foot traffic within drip line of remaining trees.

B. Do not excavate within drip line of trees, unless otherwise indicated.

C. Where excavation for new construction is required within drip line of trees, hand clear and excavate to minimize damage to root systems. Use narrow-tine spading forks, comb soil to expose roots, and cleanly cut roots as close to excavation as possible.

1. Cover exposed roots with burlap and water regularly.
2. Temporarily support and protect roots from damage until they are permanently relocated and covered with soil.
3. Coat cut faces of roots more than 1-1/2 inches in diameter with emulsified asphalt or other approved coating formulated for use on damaged plant tissues.
4. Cover exposed roots with wet burlap to prevent roots from drying out. Backfill with soil as soon as possible.
5. Repair or replace trees and vegetation indicated to remain that are damaged by construction operations (but could be avoided by use of care), in a manner approved by the Designer.

3.3 UTILITIES

A. Locate, identify, disconnect, and seal or cap off utilities indicated to be removed. Arrange to shut off indicated utilities with utility companies. Abandoned utilities 4” diameter and larger to be left if place shall be filled with low-strength flowable concrete.

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

1. Notify Owner’s Representative not less than two days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Owner Representative’s written permission.

C. Removal above-grade utilities, appurtenances and equipment as shown on the Drawings.

1. Relocate existing appurtenances and equipment where indicated on the Drawings.
2. Remove below grade pipes, conduit, cables and structure where indicated on the Drawings and where such improvements interfere with proposed construction activities, Backfill excavations in accordance with Section 312000 “Earth Moving” of the Project Manual.

3.4 UTILITY ABANDONMENT

A. Abandon in-place below-grade old service lines and unused utilities. The contractor shall coordinate with each utility owner to determine scope of existing utility removal. Assume that all existing service lines for any and all utilities must be completely removed and replaced. The cost of utility removal shall be the responsibility of the contractor.

1. Below-grade pipes 4 inches in diameter or larger indicated to be abandoned in-place on the Drawings shall be capped at both ends and filled completely with "excavatable" grade flowable concrete fill. Capping shall include a brick and mortar, grout, or concrete plug sufficient to withstand the pressure of the flowable fill.

3.5 DEMOLITION OF PAVEMENTS CURBS AND WALKS

A. Remove surface improvements including pavements curbs and walks to the limits shown on the Drawings.

1. Demolish asphalt and concrete pavements and walks and aggregate base material as shown on the Drawings. If the Contractor elects to reuse or recycle such materials, they shall be crushed and installed in accordance with the requirements of the Drawings and Specifications.
2. Sawcut a clean edge where shown on the Drawings and where proposed improvements will abut pavements, walks and curbs to remain.
3. Stockpile demolished materials to be reused or recycled in a manner so as not to interfere with surface drainage or construction activities.

3.6 CLEARING AND GRUBBING

A. Remove obstructions, trees, shrubs, grass, and other vegetation to permit installation of new construction. Removal includes digging out stumps and obstructions and grubbing roots.

1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
2. Cut minor roots and branches of trees indicated to remain in a clean and careful manner where such roots and branches obstruct installation of new construction.
3. Completely remove stumps, roots, obstructions, and debris extending to a depth of 18 inches below exposed subgrade.
4. Remove stumps, roots, obstructions and debris to within 24 inches of foundations and backfill with low strength concrete or other material approved by geotechnical engineer.
5. Use only hand methods for grubbing within drip line of remaining trees.

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

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

3.7 TOPSOIL STRIPPING

A. Remove sod and grass before stripping topsoil.

B. Strip topsoil to depths required.

1. Strip surface soil of unsuitable topsoil, including trash, debris, weeds, roots, and other waste materials.

C. Stockpile topsoil materials away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water.

1. Limit height of topsoil stockpiles to 15 feet.
2. Do not stockpile topsoil within drip line of remaining trees.
3. Stockpile surplus topsoil and allow for re-spreading deeper topsoil.

3.8 DISPOSAL

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

B. Stockpile topsoil necessary to complete the work in locations as shown on the Drawings.

END OF SECTION 311000

SECTION 312000 - EARTH MOVING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. All work shall conform to the requirements of the Indiana Department of Transportation (INDOT) Standard Specifications, 2014, Sections 203.01 through 203.26 with the additions below.

B. INDOT methods of Measurement and Pay Items do not apply to this project

1.2 SUMMARY

A. This Section includes the following:

1. Excavating and filling for rough grading the site.
2. Preparing subgrades for walks, pavements, lawns, and slabs-on-grade.
3. Excavating and backfilling for structures.
4. Subbase course for walks and pavements.
5. Drainage course for slabs-on-grade.
6. Subsurface drainage backfill for walls and trenches
7. Excavating and backfilling trenches for underground utilities and sewer systems.
8. Grading of areas to receive topsoil and re-spreading topsoil.
9. Geotechnical testing as required below.
10. Preparation of Record Documents per regulatory agency requirements.

1.3 RELATED REQUIREMENTS

A. This Section includes the following:

1. Section 311000 "Site Clearing" for site stripping, grubbing, stripping and stockpiling topsoil, and removal of above- and below-grade improvements and utilities.

2. The geotechnical engineer will test excavated spoils for use in backfill. Geotechnical Engineer shall also test all subgrades for proper compaction rates and provide designs for excavation support and protection if needed based on soil conditions and OSHA requirements.

1.5 DEFINITIONS

A. Backfill: Soil materials used to fill an excavation.

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

B. Base Course: Layer placed between the subbase course and asphalt paving.

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

D. Drainage Course: Course supporting the slab-on-grade that also minimizes upward capillary flow of pore water.

#5 Aggregate Drainage Fill: Washed, narrowly graded mixture of coarse aggregate material, ASTM 2940 with a grade of 1" to No. 8 (4.75mm). More Specifically:

100% passing 1 ½" Sieve
85-98 % passing 1" Sieve
30-60% passing ½" Sieve
15-45% passing 3/8" Sieve
0-15% passing No. 4 Sieve
0-10% passing No. 8 Sieve

E. Borrow: Satisfactory soil imported from off-site or on-site borrow pit for use as fill or backfill.

F. Topsoil: Fertile soil meeting requirements of ASTM D 5268 with a pH range of 5.5 to 7 and a minimum of 2 percent organic material content. Clean soil per planting soil requirements.

G. "B" Borrow: Granular material complying with the requirements of Section 211 of the INDOT Standard Specifications.

H. Excavation: Removal of material encountered above subgrade elevations not included as rock excavation or excavation which is otherwise classified and paid for.

1. Authorized Additional Excavation (Over-Excavation): Excavation below subgrade elevations of unsatisfactory soil materials as directed by the Owner's Materials Testing Firm. Additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
2. Bulk Excavation: Excavations more than 10 feet (3 m) in width and pits more than 30 feet (9 m) in either length or width.
3. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated dimensions without direction by the Designer. Unauthorized excavation, as well as remedial work directed by the Designer, shall be without additional compensation.

I. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1 ½-inch sieve and not more than 10 percent passing a No. 200 sieve.

J. Satisfactory Soils: Satisfactory soils for Fill and Backfill include soil groups GW, WP, GM, SW, SP and SM, or a combination of these groups free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.

K. Unsatisfactory Fill Soils: Unsatisfactory soils for fill include soil classification groups GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D2487.

L. Spongy and Yielding soils: Soils containing greater than 7% by dry weight organic material or soils with a maximum dry density of less than 90 pcf shall not be incorporated in the fill under pavement or structures. Loss on ignition will be determined in accordance with AASHTO T 267, and density will be determined in accordance with AASHTO T 99.

M. Structural Fill: Satisfactory soils, B-borrow, or engineered fill material obtained from on-site excavations or from off-site sources which will support structural loads. Structural fill must have a liquid limit less than 40 and a plasticity index less than 20.

N. General Fill: Satisfactory soil material obtained from common excavation, unsuitable material excavation, and off-site borrow locations if necessary, for backfilling construction in all areas not within the zone of influence and meeting the specified material requirements. General fill material shall also include crushed aggregate materials resulting from building and site improvement demolition activities. Crushed concrete, asphalt, brick and masonry free of finishes, paints, coatings, wire mesh and reinforcing steel may be used as general fill material with a maximum particle size of 4 inches in diameter.

O. Rock: Rock material in beds, ledges, un-stratified masses, and conglomerate deposits and boulders of rock material 1.5 cu. yd. or more in volume that when tested by an independent geotechnical testing agency, according to ASTM D 1586, exceeds a standard penetration resistance of 100 blows/2 inches or material which cannot be readily excavated by use of a crawler mounted hydraulic excavator of not less than 40,000 lbs gross operating weight in satisfactory running condition and operated in accordance with the manufacturers recommended operating instructions.

P. Subbase Course: Layer placed between the subgrade and base course for asphalt paving, or layer placed between the subgrade and a concrete pavement or walk.

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

R. Utilities include on-site underground pipes, conduits, ducts, and cables.

S. Lean Concrete: Concrete of low cementations material content.

T. Flowable Fill or Controlled Low Strength Material (CLSM): A self-compacting alternative to granular backfill material that is not concrete and has a compressive strength between 50 and 200 psi.

~~U. Clay Lining for Detention Pond: Material that conforms to the Unified Soil Classifications CL, GC, or SC.~~

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

W. #2 Aggregate: Coarse aggregate material complying with the requirements of Section 904 of the INDOT Standard Specifications.

X. #8 Aggregate: Coarse aggregate material complying with the requirements of Section 904 of the INDOT Standard Specifications.

Y. #53 Aggregate: Coarse aggregate material complying with the requirements of Section 904 of the INDOT Standard Specifications.

1.6 SUBMITTALS

A. Building pad certification from testing agency.

B. Product Data for the following (where required):

1. Each type of plastic warning tape.
2. Drainage fabric.

3. Separation fabric.
4. Low Strength Concrete Mix

B. Samples: For the following:

1. Samples of on and off-site borrow material for testing by Geotechnical Testing Agency.

C. Material Test Reports: From testing agency indicating and interpreting test results for compliance of the following with requirements indicated:

1. Classification according to ASTM D 2487 of each on-site or borrow soil material proposed for fill and backfill.
2. Laboratory compaction curve according to ASTM D 1557 or ASTM D698 for each on-site or borrow soil material proposed for fill and backfill.

A. As-built Record Documents: Contractor to prepare and submit as-built record plans and documents as required by the project documents, Owner, and all jurisdictional/regulatory authorities.

1.7 PROJECT CONDITIONS

A. Existing Utilities: Do not interrupt utilities serving facilities occupied by the Owner or others unless permitted by the Owner's Representative and then only after arranging to provide temporary utility services according to requirements indicated.

1.8 DUST CONTROL

A. The Contractor shall comply with the requirements of 325 IAC 6-4 for fugitive dust.

B. The Contractor shall take adequate measures to control dust on the site. The Contractor shall have on the site an adequate number of watering vehicles to control dust by his operations.

1.9 QUALITY CONTROL

A. Geotechnical Testing Agency Qualifications: An independent testing agency qualified according to ASTM E 329 to conduct soil materials and rock-definition testing, as documented according to ASTM D 3740 and to certify as suitable material, free of any environmental contaminates.

B. Imported (borrow) soil must be tested and certified, by the testing agency, as suitable material, free of any environmental contaminates. Coordinate imported materials and their source with Division 31 Section "Erosion and Sedimentation Control" and the Storm Water Pollution Prevention Plan. The Contractor will be liable for any and all clean-up costs associated with unapproved, imported materials.

1.10 FIELD CONDITIONS

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

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.

2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.

B. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by the Owner's Representative and then only after arranging to provide temporary utility services according to requirements indicated.

C. Improvements on Adjoining Property: Authority for performing earth moving indicated on property adjoining Owner's property will be obtained by Owner before award of Contract.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

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

B. Provide ASTM D 2487 classified soil materials according to geotechnical engineers written recommendation in Division 00 "Geotechnical Data."

C. Satisfactory Soils: ASTM D 2487 soil classification groups GW, GP, GM, SW, SP, and SM and B-Borrow as defined by INDOT, or a combination of these group symbols; free of rock or gravel larger than 3 inches (75 mm) in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter. On-site materials approved for use as engineered fill shall be approved by the Owner's provided testing agency.

D. Unsatisfactory Soils: ASTM D 2487 soil classification groups CL, GC, SC, ML, MH, CH, OL, OH, and PT, or a combination of these group symbols which are not suitable for the support of foundations, floor slabs, pavements, or other elements.

~~E. Detention Basin Clay Lining: Soil Classification Groups CL, GC, or SC as approved by the on-site geotechnical engineer.~~

F. Provide aggregate materials according to the Indiana Department of Transportation (INDOT) Standard Specifications, latest edition, Section 904.

1. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch (37.5-mm) sieve and not more than 12 percent passing a No. 200 (0.075-mm) sieve.

2. Base Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 95 percent passing a 1-1/2-inch (37.5-mm) sieve and not more than 8 percent passing a No. 200 (0.075-mm) sieve.

3. Engineered Granular Fill: Naturally or artificially graded mixture of natural or crushed

4. gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch (37.5-mm) sieve and not more than 12 percent passing a No. 200 (0.075-mm) sieve.

5. B" Borrow: Granular material complying with the requirements of Section 211 of the INDOT Standard Specifications.

6. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940 except with 100 percent passing a 1-inch (25-mm) sieve and not more than 8 percent passing a No. 200 (0.075-mm) sieve.

7. Drainage Course: Narrowly graded mixture of washed crushed stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading INDOT Size #5; with 100 percent passing a 1-1/2-inch sieve and 0 to 10 percent passing a No. 8 sieve.

8. Sand: Fine aggregates ASTM C 33/C 33M; fine aggregate as defined in Section 904.02 of INDOT Standard Specifications.

9. Final Trench Backfill: Satisfactory soil material obtained from on-site or off-site source meeting the requirements of INDOT B-borrow or Category I or Category II granular fill per AASHTO Soil Classifications or low-strength flowable concrete material as required by regulating agencies and matching INDOT specification 213 for Flowable Fill.

10. Structural Fill: Satisfactory soil materials, B –Borrow, or engineered fill *as required by on-site geotechnical testing agency.* Unforeseen upgrades of fill material from satisfactory soil material to chemically modified, granular or engineered material shall be paid for according to the Contract Provisions for Changes in Work.

G. Lime: Soil modification material as described in Section 207 and Section 913.04(b) of the current INDOT Standard Specifications and as generally used for subgrade modifications.

2.2 GEOTEXTILES

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

1. Survivability: Class 1; AASHTO M 288-15.
2. Grab Tensile Strength: 205lbf (912 N); ASTM D 4632.
3. Tear Strength: 80 lbf (356 N); ASTM D 4533.
4. Puncture Strength: 500 lbf (2224 N); ASTM D 6241.
5. Apparent Opening Size: No. 80 sieve, maximum; ASTM D 4751.
6. Permittivity: 1.4 per second, minimum; ASTM D 4491.
7. UV Stability: 70 percent after 500 hours exposure; ASTM D 4355.

B. Separation Geotextile: Woven geotextile fabric, manufactured for separation applications, made from monofilament polypropylene yarns; complying with AASHTO M 288 and the following, measured per test methods referenced:

1. Survivability: Class 2; AASHTO M 288.
2. Survivability: As follows:

   a. Grab Tensile Strength: 200 lbf CD; ASTM D 4632.
   b. Tear Strength: 75 lbf CD; ASTM D 4533.
   c. Puncture Strength: 675 lbf (3115 N); ASTM D 6241.

3. Apparent Opening Size: No. 40 (0.425-mm) sieve, maximum; ASTM D 4751.
4. Fow Rate: 145 gal./min/sq. ft.; ASTM D 4491.
5. UV Stability: 90 percent after 500 hours' exposure; ASTM D 4355.

2.2 CONTROLLED LOW-STRENGTH MATERIAL

A. Controlled Low-Strength Material: Self-compacting, flowable concrete material produced meeting the requirements of INDOT non-removable low strength concrete and from the following:

1. Portland Cement: ASTM C 150/C 150M, Type I.
2. Fly Ash: ASTM C 618, Class C or F.
3. Normal-Weight Aggregate: ASTM C 33/C 33M, 3/4-inch nominal maximum aggregate size.
4. Water: ASTM C 94/C 94M.
5. Air-Entraining Admixture: ASTM C 260/C 260M.

2.3 ACCESSORIES

A. Warning Tape: Detectable-Type Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility; colored as follows:

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

PART 3 - EXECUTION

3.1 PREPARATION

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

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

C. Tree protection is specified in the Division 31 Section "Site Clearing."

D. Protect unattended open excavations by placing construction fencing and warning tape completely around the excavation.

E. Occupational Safety and Health Administration (OSHA) standards for excavations ; final Rule 29 CFR Part 1926, Subpart ‘P’ applies to all excavations exceeding five (5) feet in depth. Additionally, excavations exceeding twenty (20) feet in depth require the design of a trench safety system by a registered professional engineer.

3.2 DEWATERING

A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area. Dewater excavations as necessary due to groundwater infiltration.

B. Protect subgrades and foundation soils from softening and damage by rain or water accumulation.

1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.
2. Install a dewatering system, as specified in Storm Water Pollution Prevention plan sheets. Do not discharge dewatering runoff directly into public storm water systems or drainage swales. All dewatering runoff shall be filtered as specified in Storm water Pollution Prevention plans.

3.3 EXCAVATION

A. Explosives: Do not use explosives.

B. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.

1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

2. Remove rock to lines and grades indicated to permit installation of permanent construction without exceeding the following dimensions:

a. 24 inches outside of concrete forms other than at footings.
b. 12 inches outside of concrete forms at footings.
c. 6 inches outside of minimum required dimensions of concrete cast against grade.
d. Outside dimensions of concrete walls indicated to be cast against rock without forms or exterior waterproofing treatments.
e. 6 inches beneath bottom of concrete slabs on grade.
f. 6 inches beneath pipe in trenches, and 24 inches wider than pipe

3.4 STABILITY OF EXCAVATIONS

A. Comply with OSHA, local codes, ordinances, and requirements of authorities having jurisdiction to maintain stable excavations.
B. Contractor is responsible for hiring on-site geotechnical engineer registered in the State of Indiana, and approved by Owner, provide designs for excavation support and protection based on soil conditions and as required by OSHAA or on-site conditions.

3.5 EXCAVATION FOR PAVEMENTS AND BUILDING PADS

A. Excavate surfaces under pavements and building pads to indicated cross sections, elevations, and grades to within a tolerance of plus or minus 0.10 foot.

3.6 EXCAVATION FOR STRUCTURES

A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch (25 mm). Extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.

1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.

3.7 EXCAVATION FOR SEWER AND UTILITY TRENCHES

A. Excavate trenches to indicated slopes, lines, depths, and invert elevations.

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

1. Clearance: 12 inches on each side of pipe or conduit or as indicated on the Drawings.

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

1. For pipes or conduit less than 6 inches in nominal diameter and flat-bottomed, multiple-duct conduit units, hand-excavate trench bottoms and support pipe and conduit on an undisturbed subgrade or on compacted granular fill as plans indicate.
2. For pipes and conduit 6 inches or larger in nominal diameter, shape bottom of trench to support bottom 90 degrees of pipe circumference. Fill depressions with tamped Category I or II material per AASHTO Soil Classifications or material as indicated on the Drawings.
3. Where encountering rock or another unyielding bearing surface, carry trench excavation 6 inches below invert elevation to receive bedding course.

3.8 EXCAVATION FOR WALKS, PAVEMENTS, AND SLABS

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

B. Subgrades shall be constructed uniformly transversely across the width of the pavement including shoulders or curbs unless shown otherwise on the plans. Seasonal precipitation and moisture content of the soils will not be considered “unforeseen conditions.” Contractor shall anticipate the need for alternate means of subgrade stabilization based on project schedule and anticipated season. For “allowed” unforeseen conditions, methods <u>other than</u> compaction to maximum dry density ASTM D1557 and Paragraph 3.17 needed as a result of on-site testing or failed proof rolling will be paid for according to the contract provisions for Changes in Work
1. Chemical Modification in accordance with Section 215 of current INDOT Standard Specifications.
2. Engineered Fill in accordance with INDOT Section 301

3. Geogrid in accordance with INDOT Section 214 placed under aggregate No. 53 in accordance with INDOT Section 301, or
4. Soil Compaction or as stated in Paragraph 3.17 C.

3.9 APPROVAL OF SUBGRADE

A. Notify Testing Firm when excavations have reached required subgrade.

B. Proofroll subgrade below building slabs and pavement and subsequent lifts of fill material within the limits of building pads and pavements in accordance with the requirements of the Testing Firm and/or INDOT Standard Specification Section 203.26.

C. If Testing Firm Engineer determines that unforeseen unsatisfactory or spongy soil is present, continue excavation, replace with chemically modified soil (lime) compacted granular backfill or engineered fill material as directed, and prepare subgrade as described above.

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

D. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by the Engineer.

3.10 UNAUTHORIZED EXCAVATION

A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill may be used when approved by Engineer.

1. Fill unauthorized excavations under other construction or utility pipe as directed by Engineer.

3.11 STORAGE OF SOIL MATERIALS

A. Stockpile excavated materials acceptable for backfill and fill soil materials, including acceptable borrow materials. Stockpile suitable soil materials separate from topsoil and unsuitable material stockpiles without intermixing. Place, grade, and shape stockpiles to drain surface water.

1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees or immediately next to property lines.

3.12 BACKFILL

A. Backfill excavations promptly, but not before completing the following:

1. Acceptance of construction below finish grade.
2. Testing, inspecting, and approval of underground utilities.
3. Concrete formwork removal.
4. Removal of trash and debris from excavation.
5. Removal of temporary shoring and bracing, and sheeting.
6. Surveying locations of underground utilities for Record Documents shall be done as directed by on-site inspecting engineer.

3.13 SEWER AND UTILITY TRENCH BACKFILL

A. Place and compact bedding course on unyielding bearing surfaces and to fill unauthorized excavations. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

B. Place and compact haunching and initial backfill in loose lifts not exceeding 8 inches in thickness. Place and compact haunching and initial backfill in 6-inch maximum lifts for interior utility trenches.

1. Carefully compact material under pipe haunches and bring backfill evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of utility system.
2. Materials for haunching and initial backfill are specified on the Drawings.

C. Backfill trenches excavated under footings and within 18 inches (450 mm) of bottom of footings; fill with concrete to elevation of bottom of footings using Low Strength Concrete specified in paragraph 2.2.

D. Backfill trenches within 5 feet of pavement with INDOT B-Borrow or Category I or Category II granular fill per AASHTO Soil Classifications or low-strength flowable concrete material as required by regulating agencies.

E. Coordinate backfilling with utilities testing.

F. Fill voids with approved backfill materials as shoring and bracing, and sheeting is removed.

G. Place and compact final backfill as indicated on the Drawings.

a. Final backfill for trenches under and within 5 feet of paved areas and in areas requiring granular backfill as indicated on the Drawings shall be per Paragraph D above and shall comply with all applicable regulatory requirements. Final backfill shall be placed in eight-inch (8”) maximum lifts and compacted by mechanical tamping devices.
b. Within 12 inches of water main pipe backfill shall be granular fill per INDOT 903.02 size No. 8 regardless of proximity to paved areas.

H. Pipe bedding and backfill lifts shall be compacted to a dry density not less than 95% maximum dry density as determined by the Modified Proctor Test (ASTM D-1557).

I. Install warning tape as required by the utility company. Different utilities require the tracing wire to be installed in different locations and depths. Some require it to be installed directly on top of the pipe.

3.14 SUBSURFACE DRAINAGE

A. Subdrainage Pipe: Specified in Section 334100 "Storm Utility Drainage Piping."

B. Subsurface Drain: Place subsurface drainage geotextile around perimeter of subdrainage trench. Place a 6-inch course of filter material on subsurface drainage geotextile to support subdrainage pipe. Encase subdrainage pipe in a minimum of 12 inches of filter material, placed in compacted layers 6 inches thick, and wrap in subsurface drainage geotextile, overlapping sides and ends at least 6 inches.

1. Compact each filter material layer to 85% maximum dry density as determined by the Modified Proctor Test (ASTM D-1557) with a minimum of two passes of a plate-type vibratory compactor. Retain "Drainage Backfill" Paragraph below if using free-draining granular backfill against walls.

C. Drainage Backfill: Place and compact filter material over subsurface drain, in width indicated, to within 12 inches of final subgrade, in compacted layers 6 inches thick. Overlay drainage backfill with one layer of subsurface drainage geotextile, overlapping sides and ends at least 6 inches.

1. Compact each filter material layer to 85 percent of maximum dry unit weight according to ASTM D -1557 with a minimum of two passes of a plate-type vibratory compactor.

3.15 FILL

A. Preparation: Remove vegetation, topsoil, debris, wet, and unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placing fills.

1. Where new fill is to be placed on existing slopes that are 5:1 or greater, construct benches a minimum of 10 feet in width cut into the existing slop prior to the placement of fill.

B. After areas to receive fill have been stripped of topsoil and before fill is placed, the building areas and areas to be paved shall be proofrolled per Section 203.26 of INDOT Standard Specifications. Isolated soft pockets that are located during the proofroll phase shall be excavated and replaced with structural backfill. The material removed from the soft pockets shall be disposed of on-site as directed by the Designer or reused as fill materials in yard areas only. Such required replacement of soft pockets shall be identified by the Materials Testing Firm.

C. Place fill material on approved subgrade or on a previously approved lift in 8” layers to required elevations for each location listed below.

1. Under grass, use satisfactory excavated or borrow soil material.
2. Under buildings and pavements, use structural fill.
3. Under footings and foundations use engineered fill.

3.16 MOISTURE CONTROL

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

1. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.
2. Remove and replace, or scarify and air-dry satisfactory soil material that is too wet to compact to specified density.

a. Stockpile or spread and dry removed wet satisfactory soil material.

3.17 COMPACTION

A. Place backfill and fill materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

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

1. Percentage of Maximum Dry Density Requirements: Methods other than compaction to maximum dry density will be compensated for be paid for according to the contract provisions for Changes in Work.

C. Compact soil to not less than the following percentages of the Modified Proctor maximum dry density according to ASTM D-1557 or as dictated by on-site structural and/or geotechnical engineer:

1. All structural fill beneath pavement, (greater than 12” below pavement subgrade elevation) and floor slabs: compact each lift (8” lift maximum) below subgrade to at least 95 percent maximum Modified Proctor maximum dry density according to ASTM D-1557.
2. For fill supporting footings and the top 12” of pavement subgrade: compact to at least 95 percent maximum Modified Proctor dry density per ASTM D-1557.
3. The detention basin clay liner shall be compacted to 90 percent maximum dry density of a Modified Proctor (ASTM D-1557).
4. All pavement subbase and base materials shall be compacted at 95% maximum Modified Proctor dry density
5. Under lawn or unpaved areas, compact the top 6 inches below subgrade and each layer of backfill or fill material to at least 85 percent Modified Proctor maximum dry density.
6. All fill shall be compacted to the specified density. When the results of the in-place density tests indicate that the compaction limits are not obtained, the areas shall be reworked and retested until the specified limits are reached.
7. <u>It is the responsibility of the contractor and each sub-contractor</u> to verify the location of all utilities and services shown or not shown, and to establish safe working conditions and adequate building foundation and pavement support.

3.18 GRADING

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

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

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

1. Lawn or Unpaved Areas: Plus or minus 0.20 feet.
2. Walks: Plus or minus 0.10 feet.
3. Storm Utility Trench Bottoms: Plus or minus 0.10 feet.
4. Pavements: Plus or minus 0.10 feet.
5. Building Pads: Plus or minus 0.10 feet.

3.19 SUBBASE AND BASE COURSES

A. Under pavements and walks, place subbase course material on prepared subgrades free of frost, mud, snow or ice. Place base course material over subbases to pavements where required by the Drawings.

1. Compact subbase and base courses.
2. Shape subbase and base to required crown elevations and cross-slope grades.
3. When thickness of compacted subbase or base course is 6 inches or less, place materials in a single layer.
4. When thickness of compacted subbase or base course exceeds 6 inches, place materials in equal layers, with no layer more than 6 inches thick or less than 3 inches thick when compacted.
5. Pavement Shoulders: Place shoulders along edges of subbase course to pre-vent lateral movement. Construct shoulders, at least 12 inches wide, of satis-factory soil materials and compact simultaneously with each subbase layer to not less than 93 percent modified proctor maximum dry density according to ASTM D-1557 or 100% maximum Standard Proctor dry density ASTM D-698.

3.20 DRAINAGE COURSE UNDER CONCRETE SLABS-ON-GRADE

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

B. On prepared subgrade, place and compact drainage course under cast-in-place concrete slabs-on-grade as follows:

1. Install subdrainage geotextile on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.
2. Place drainage course 6 inches or less in compacted thickness in a single layer.
3. Place drainage course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
4. Compact each layer of drainage course to required cross sections and thicknesses to not less than 95 percent of modified proctor maximum dry unit weight according to ASTM D 1557.

3.21 FIELD QUALITY CONTROL

A. Special Inspections: **Contractor** will engage a qualified special inspector to perform the following special inspections:

1. Determine prior to placement of fill that site has been prepared in compliance with requirements.

2. Determine that fill material classification and maximum lift thickness comply with requirements.

3. Determine, during placement and compaction, that in-place density of compacted fill complies with requirements.

B. Materials Testing Firm Services: Allow testing agency to inspect and test each sub-grade and each fill or backfill layer. Do not proceed until test results for previously completed work verify compliance with requirements. Provide equipment and man-power to conduct proof roll inspections per the requirements of the Testing Firm.

1. Perform field in-place density tests according to INDOT Standard Specifications Section 203.23 and 203.24.

2. Proof-rolling shall be performed per INDOT Standard Specifications Section 203.26.

3. Structural fill and final subgrades: At subgrades and at each 8" compacted fill and backfill lift layer, perform at least one field in-place density test for every 3,000 square feet of building area or pavement area or for each 1,000 cys of fill placed, but in no case fewer than one test per 3000 square feet on the final sub-grade or finish grade elevation.

4. Trench Backfill: In each compacted initial and final backfill layer, perform at least one field in-place density test for every 150 feet of trench length, but no fewer than two tests per lift.

5. Footing Subgrade: The geotechnical testing agency shall inspect the subgrade and perform any necessary test to insure the actual bearing capacities meet or exceed the design capacities. The Testing Agency shall verify the bearing capacity at each spread column footing and every 10 feet on center for strip footings prior to placement of concrete.

6. Foundation Wall Backfill: At each compacted backfill lift/layer, at least one test for every 100 feet of wall length, but no fewer than two tests.

7. When testing agency reports that subgrades, fills, or backfills are below specified density, scarify and moisten or aerate, or remove and replace soil to the depth required, re-compact and retest until required density is obtained.

3.22 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris.

B. Repair and re-establish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or lose compaction due to subsequent construction operations or weather conditions.

1. Scarify or remove and replace material to depth directed by the Testing Firm; re-shape and re-compact at optimum moisture content to the required density.

C. Settling: Where settling occurs during the Project correction period, remove finished surfacing, backfill with additional approved material, compact, and reconstruct surfacing.

1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to the greatest extent possible.

3.23 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. <u>Excess unsuitable soils shall be disposed of off-site at a location approved for such activities by local and federal regulatory authorities. Excess topsoil and suitable materials should be disposed of off-site.</u>

3.24 PROJECT RECORD DOCUMENTS

A. Record Documents: Contractor to prepare and submit as-built record plans and documents as required by the project documents, Owner and all jurisdictional authorities.

END OF SECTION 312000