

ADDENDUM NO. 1
TO THE
DRAWINGS AND SPECIFICATIONS
FOR THE
HILLSIDE DRIVE / PATTERSON DRIVE / ROGERS STREET AREA IMPROVEMENTS
PW 09-05

ISSUED FROM: CITY HALL AT THE SHOWERS BUILDING
Post Office Box 100
401 North Morton Street
Bloomington, Indiana 47404

ISSUE DATE: June 26, 2009

Bid DATE: July 2, 2009

This Addendum No.1, to the drawings and specifications shall supplement, amend and become a part of the bidding documents, plans, and specifications. All bids and construction contracts shall be based on these modifications to the original contract documents.

ITEM No. 1: ATTACHMENT "A" SECTION 9 OF THE CONTRACT DOCUMENTS SHALL BE AMENDED TO DELETE THE REFERENCE TO "APRIL 3, 2009" WITH REGARD TO THE COMPLETION OF THE PROJECT. THIS PROJECT'S COMPLETION TIME WILL BE 120 DAYS FROM THE ISSUED "NOTICE TO PROCEED".

ITEM No. 2: EVERY EFFORT SHALL BE MADE TO COMPLETE THE PLANTING OF TREES WITHIN THE 120 DAYS ALLOWED FOR THE COMPLETION OF THE PROJECT. SHOULD TREES NOT BE PLANTED PRIOR TO THE COMPLETION OF THE 120 DAY TIME ALLOTTED, PROOF OF ORDER AND CONFIRMATION WILL BE REQUIRED TO ENSURE THAT ALL POSSIBLE ACTIONS HAVE BEEN EFFICIENTLY TAKEN AND DUE TO CIRCUMSTANCES OUTSIDE THE CONTROL OF THE CONTRACTOR, THE TREES COULD NOT HAVE BEEN PLANTED.

ITEM No. 3: REFERENCE ON SHEET 28 OF THE PLANS STATING "PRECAST ON SITE" SHALL BE DELETED.

ITEM No. 4: CLARIFICATION WITH REGARD TO SODDING SHALL BE "ALL DISTURBED AREAS SHALL BE SODDED" WITH SODDING COMPLETED PER THE CITY OF BLOOMINGTON SPECIFICATIONS.

ITEM No. 5: SHEET 12 SHALL BE AMENDED TO REPLACE SITE LEGEND REFERENCE TO ITEM 15, WITH ITEM 13 WITH REGARD TO THE PLACEMENT OF STANDING CURB AS OPPOSED TO COMBINED CURB AND GUTTER.

ITEM No. 6: ALL REFERENCES TO CIRCLE 'S' SHALL BE REPLACED WITH CIRCLE '11' ON THE SITE PLAN TO INDICATE AREAS TO BE SAW-CUT.

ITEM No. 7: WHERE PLACEMENT OF COVER OVER PIPE AND STRUCTURES OCCURS WITH CONFLICT OF ANY DETAIL. PREFERENCE SHALL BE GIVEN TO PAVEMENT OVER THE USAGE OF STONE.

ITEM No. 8: STRUCTURES 44 AND 45 SHALL INCLUDE THE PLACEMENT OF EAST JORDAN 1022 CASTING WITH "STORM" INCLUDED AS WORDING ON THE CASTING SURFACE.

ITEM No. 9: A QUANTITY OF 10 PAVEMENT MARKINGS (8 FEET IN HEIGHT X 5.9 FEET WIDE) STATING "ONLY" SHALL BE INCLUDED WITH THE BID TO COMPLIMENT LEFT AND RIGHT TURN ARROWS. EXACT LOCATION TO BE DETERMINED BY DEREK NEFF, TRAFFIC DIVISION.

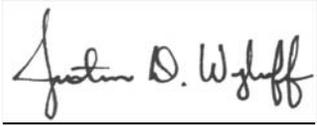
ITEM No. 10: ALL PORTLAND CEMENT CONCRETE SHALL BE 4000P.S.I.

ITEM No. 11: TOPSOIL SHALL BE DEFINED AS DESCRIBED AND MEETING CITY OF BLOOMINGTON STANDARD SPECIFICATIONS, HEREIN INCORPORATED INTO THE SPECIAL CONDITIONS AND ATTACHED TO THIS ADDENDUM.

ITEM No. 12: #53 STONE TYPE 'O' SHALL BE PLACED UNDER ALL PAVED ROADWAY AREAS.

ITEM No. 13: UNIT PRICE FOR ROCK SHALL BE ESTABLISHED UNDER ITEM #28 IN THE UNIT PRICE SHEET.

ITEM No. 14: THE BID SHALL INCLUDE THE INSTALLATION OF 2000 FEET OF SILT FENCE TO BE ESTABLISHED AT THE DISCRETION OF CITY OF BLOOMINGTON.

	 CERTIFIED BY: JUSTIN D. WYKOFF CITY OF BLOOMINGTON STATE OF INDIANA
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Acknowledge receipt of the addendum by submitting a signed copy with your bid proposal.

RECEIVED BY: CONTRACTOR (FIRM AND ADDRESS)

SIGNATURE: _____

DATE: _____

PRINTED NAME: _____

TITLE: _____

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SECTION SUMMARY OF WORK

PART 1 GENERAL

1.01 WORK COVERED BY CONTRACT DOCUMENTS

- A. All applicable requirements of the Project Manual, including Bidding Requirements, General and Supplemental Conditions, and General Requirements, apply to each section of the Specifications.
- B. Project Location: East 3rd Street between Clarizz Blvd and Smith Road, Bloomington, Indiana.
- C. Work consists of, but not limited to, furnishing all labor, tools, materials, transportation, and equipment necessary for the construction of an Asphalt multi-use pathway and all other work indicated on the drawings.
- D. Contractor shall comply with all applicable laws, ordinances, rules, regulations and lawful orders of any public authority having jurisdiction for the safety of persons or property or to protect them from injury or loss. He shall erect and maintain, as required by existing conditions and progress of work, all reasonable safeguards for safety and protection including posting danger signs and other warnings against hazards. All requirements of the Occupational Safety and Health Act are to be followed explicitly and are the responsibility of the Contractor.

1.02 INSPECTION OF SITE

- A. All prospective Bidders are urged to visit the project site and to examine existing conditions and make note of any conditions, which may pertain to their work. Failure to do so will not relieve Bidder of responsibility in connection with his work.
 - 1. See also, Instruction to Bidders.

1.03 SALES TAX EXEMPTION

- A. Owner is exempt from sales tax on products permanently incorporated in the work.
- B. Obtain sales tax exemption certificate number from the Office of the City Controller, (812) 349-3412.
- C. Upon completion of the work, file with the Owner, a notarized statement that all purchases made under exemption certificate were entitled to be exempt.
- D. Pay legally assessed penalties for improper use of certificate number.

1.04 CONTRACTOR'S USE OF PREMISES

- A. Temporary Facilities.
 - 1. Toilet facilities are not available.
 - 2. Contractor will be responsible for obtaining all utilities necessary to perform their work.
- B. Contract Limits.

1. Contract limits shall be restricted to those areas shown on plans.
- C. Protection of Property.
 1. Contractor shall provide adequate protection for portion of existing property where no new work occurs. Contractor shall assume all costs resulting from any damages.

1.05 PARKING AND STORAGE

- A. Parking areas for use of Contractor and his employees shall be .
- B. Storage and staging areas will be as designated by the Engineer.
- C. While the Owner may designate storage areas for temporary storage of material, the Owner cannot guarantee the security of items placed there by Contractor.

1.06 OWNER OCCUPANCY

- A. The Contractor shall cooperate with Owner's Representative in all construction operations to minimize conflicts, and to facilitate owners of adjacent property.
- B. Do not unreasonably encumber site with materials or equipment.
 1. Unless streets, sidewalks, and other pathways are to be closed to traffic, Contractor is to provide for traffic control through the project.
- C. Assume full responsibility for protection and safekeeping of products stored at work site.

1.07 FINAL CLEAN-UP

- A. Remove all debris, rubbish, and unused materials. Repair all damaged surfaces.
- B. Clean all finished surfaces by means of sweeping or as directed by the Engineer.

1.08 CLOSE-OUT

- A. Owner's Representative and Contractor shall make a joint final inspection. Contractors to deliver a complete release of all liens up to any retained amount and clarify that all bills for labor and materials or services have been paid.

1.09 PROTECTION

- A. Protect trees, shrubs, lawns, and other features to remain.
- B. Protect existing structures, roads, sidewalks, paving and curbs that are to remain.
- C. Repair damage to the satisfaction of the Engineer and in accordance with these Specifications.
- D. All lawns that are damaged due to work operations shall be replanted with Sod.
- E. Topsoil Fill For Damaged Areas: Natural, friable loam, typical of locality; free of subsoil, roots, grass, excessive amounts of weeds, stone and foreign

matter; containing minimum of 4 percent and maximum of 25 percent organic matter.

- F. Protect all traffic signs and markings designated to remain. All signs indicated to be removed shall be removed by the Owner upon proper notification.

1.10 BASE BID

- A.

1.11 ALTERNATES

1.12 SCHEDULING

- A. Project shall be completed within _____ calendar days from notice to proceed.
- B. Contractor shall prepare a schedule of work for Owner's review prior to commencing work on the project.
 - 1. Schedule shall indicate all construction activities and sequencing.
 - 2. Include on schedule, all required submittals and shop drawings.

1.13 GUARANTEE

- A. The Contractor shall guarantee in writing on his letterhead in four (4) copies that all labor, materials, and performances for a period of two (2) years from the date of acceptance.

END OF SECTION

SECTION 01045 CUTTING AND PATCHING

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Contractor shall be responsible for all cutting and patching as required to complete the work.

1.02 PREPARATION

- A. Provide devices and methods to protect other portions of project from damage.

1.03 PERFORMANCE

- A. Execute cutting and demolition by methods, which will present no damage to other work, and will provide surfaces to receive installation of repairs.
- B. Execute fitting and adjustment of products to provide a finished installation to comply with specified products, functions, tolerances and finishes.
- C. Restore work, which has been cut or removed; install new products to provide completed work in accordance with requirements of Contract Documents.

1.04 DUST PROTECTION

- A. Contain dust from cutting operations by utilizing wet-cutting equipment.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Unless otherwise noted on the plans, use materials of similar quality, color and finish to compliment or match existing.

PART 3 EXECUTION

3.01 PREPARATION

- A. Prepare existing surfaces to receive new materials.
- B. Provide blocking or fillers where necessary for flush surfaces.

3.02 INSTALLATION

- A. Install materials plumb, level, flush and true to line and grade.
- B. Finish surfaces to blend in with existing to fully finished appearance.

END OF SECTION

SECTION 01050 FIELD ENGINEERING

PART 1 GENERAL

1.01 SUMMARY

- A. General: This section specifies administrative and procedural requirements for field engineering services, including:
 - 1. Land survey work.
 - 2. Civil engineering services.

1.02 SUBMITTALS

- A. Certificates:
 - 1. Submit a certificate signed by the Land Surveyor or Professional Engineer certifying that the location and elevation of improvements comply with the Contract Documents.
- B. Project Record Documents:
 - 1. Submit a record of work performed and record survey data.

1.03 QUALITY ASSURANCE

- A. Surveyor:
 - 1. Engage a Registered Land Surveyor registered in the State of Indiana, to perform land-surveying services required.
- B. Engineer:
 - 1. Engage a Professional Engineer, as necessary, of the discipline required, registered in the State of Indiana, to perform required engineering services.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION

3.01 EXAMINATION

- A. The Owner will identify existing control points and property line corner stakes.
- B. Verify layout information shown on the Drawings, in relation to the property survey and existing benchmark before proceeding to layout the work. Locate and protect existing benchmark and control points. Preserve permanent reference points during construction.
- C. Do not change or relocate benchmark or control points without prior written approval. Promptly replace lost or destroyed project control points. Base replacements on the original survey control points.
- D. Establish and maintain a minimum of two permanent benchmark on the site, referenced to data established by survey control points. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
- E. Existing Utilities and Equipment:

1. The existence and location of underground and other utilities and construction indicated as existing are not guaranteed.
2. Before beginning sitework, investigate and verify the existence and location of underground utilities and other construction.

3.02 PERFORMANCE

- A. Working from lines and levels established by the property survey, establish benchmark and markers to set lines and levels at each stage of construction and elsewhere as needed to properly locate each element of the Project. Calculate and measure required dimensions within indicated or recognized tolerances. Do not scale drawings to determine dimensions.
- B. Advise entities engaged in construction activities, of marked lines and levels provided for their use.
- C. As construction proceeds, check every major element for line, level and plumb.
- D. Surveyor's Log:
 1. Maintain a surveyor's log of control and other survey work. Make this log available for reference.
 2. Record deviations from required lines and levels, and advise the Engineer when deviations that exceed indicated or recognized tolerances are detected.
 3. On Project Record Drawings, record deviations that are accepted and not corrected.
- E. Site Improvements:
 1. Locate and lay out site improvements, including pavements, stakes for grading, fill and topsoil placement by instrumentation and similar appropriate means.
- F. Existing Utilities:
 1. Furnish information necessary to adjust, move or relocate existing structures, utility poles, lines, services or other appurtenances located in, or affected by construction. Coordinate with local authorities having jurisdiction. Existing utilities include those utilities that have been installed during this project.

END OF SECTION

SECTION 01340 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Submit shop drawings, Product Data and Samples required by Contract Documents.
- B. See individual Sections for specific requirements.

1.02 RELATED REQUIREMENTS

- A. Definitions and Additional Responsibilities of Parties: Conditions of the Contract.
- B. Designate in the construction schedule, or in a separate coordinated schedule, the dates for submissions and the dates that reviewed Shop Drawings, Product Data and Samples will be needed.

1.03 SHOP DRAWINGS

- A. Drawings shall be presented in a clear and thorough manner.
- B. Details shall be identified by reference to sheet and detail, as shown on Contract Drawings.

1.04 PRODUCT DATA

- A. Preparation
 1. Clearly mark each copy to identify pertinent products or models.
 2. Show performance characteristics and capacities.
 3. Show dimensions and clearances required.
 4. Show wiring or piping diagrams and controls.
 5. Manufacturer's standard schematic drawings and diagrams:
- B. Modify drawings and diagrams to delete information, which is not applicable to the work.
- C. Supplement standard information to provide information specifically applicable to the work.

1.05 SAMPLES

- A. Office samples shall be of sufficient size and quantity to clearly illustrate:
- B. Functional characteristics of the product, with integrally related parts and attachment devices.
- C. Full range of color, texture and pattern.

1.06 CONTRACTOR RESPONSIBILITIES

- A. Review Shop Drawings, Product Data and Samples prior to submission.
- B. Determine and verify:
 1. Field measurements.
 2. Field construction criteria.
 3. Catalog numbers and similar data.

4. Conformance with specifications.
- C. Coordinate each submittal with requirements of the work and of the Contract Documents.
- D. Notify the Engineer in writing, at time of submission, of any deviations in the submittals from requirements of contract Documents.
- E. Do not begin fabrication or work, which requires submittals until return of submittals with Engineer approval.

1.07 SUBMISSION REQUIREMENTS

- A. Make submittals promptly in accordance with approved schedule, and in such sequence as to cause no delay in the Work or in the work of any other Contractor.
- B. Number of submittals required:
 1. Shop Drawings: Submit number of opaque reproductions, which Contractor requires, plus two copies which will be retained by the Engineer.
 2. Product Data: Submit the number of copies, which the Contractor requires, plus two which will be retained by the Engineer.
 3. Samples: Submit the number stated in each specification section.
- C. Submittals shall contain:
 1. The date of submission and the dates of any previous submissions.
 2. The Project title and number.
 3. Contract identification.
 4. The names of:
 - a) Contractor
 - b) Supplier
 - c) Manufacturer
 5. Identification of the product with the specification section number.
 6. Field dimensions, clearly stated as such.
 7. Relation to adjacent or critical features of the work or materials.
 8. Applicable standards, such as ASTM or Federal Specification numbers.
 9. Identification of deviations from Contract Documents.
 10. Identification of revisions or re-submittals.
 11. An 8 inch by 3 inch blank space for Contractor and Engineer stamps.
 12. Contractor's stamp, initialed or signed, certifying to review of submittal, verification of products, field measurements and field construction criteria, and coordination of the information within the submittal with requirements of the work and Contract Documents.

1.08 RESUBMISSION REQUIREMENTS

- A. Make any corrections or changes in the submittals required by the Engineer and resubmit until approved.
- B. Shop Drawings and Product Data:
 1. Revise initial drawings or data, and resubmit as specified for the initial submittal.

2. Indicate any changes that have been made other than those requested by the Engineer.

1.09 DISTRIBUTION

- A. Distribute reproductions of Shop Drawings and copies of Product Data which carry the Engineer's stamp of approval to:
 1. Job site file.
 2. Subcontractors.

1.10 ENGINEER'S DUTIES

- A. Review submittals with reasonable promptness and in accord with schedule.
- B. Affix stamp and initials or signature, and indicate requirements for re-submittal, or approval of submittal.
- C. Return submittals to Contractor for distribution, or for resubmission.

END OF SECTION

SECTION 01630 SUBSTITUTIONS AND PRODUCT OPTIONS

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Furnish and install products specified under options and conditions for substitutions stated in this Section.

1.02 PRODUCTS LIST

- A. Within 30 days after award of Contract, submit to Engineer, five copies of complete list of major products, which are proposed for installation.
- B. Tabulate products by specification section number and title.
- C. For products specified only by reference standards, list for each such product:
 - 1. Name and address of Manufacturer.
 - 2. Trade name.
 - 3. Model or catalog destination.
 - 4. Manufacturer's data.
 - 5. Reference standards.
 - 6. Performance test data.

1.03 CONTRACTOR'S OPTIONS

- A. For products specified by reference standard, select product meeting that standard, by any Manufacturer.
- B. For products specified by naming several products or Manufacturers, select any one of products and Manufacturers named which complies with Specifications.
- C. For products specified by naming one or more products or Manufacturers and stating "or equal", submit a request as for substitutions, for any product or Manufacturer which is not specifically named.
- D. For products specified by naming only one product and Manufacturer, there is no option and no substitution allowed.
- E. Approval and determination of quality is vested in the Owner and Engineer, whose decision is final and binding upon all concerned. Should it be determined that the substituted product is not equal to the product specified, the Owner and Engineer have a right to choose either the product specified or one of equal quality without cost to the Owner.

1.04 SUBSTITUTIONS

- A. Within a period of 30 days after award of Contract, Engineer will consider formal requests from the Contractor for substitution of products in place of those specified.
- B. After the end of that period, requests will be considered only in the case of product unavailability or other conditions beyond the control of the Contractor.
- C. Submit a separate request for each substitution. Support each request with:

1. Complete data substantiating compliance of proposed substitution with requirements stated in Contract Documents:
 2. Product identification, including Manufacturer's name and address.
 3. Manufacturer's literature; identify:
 4. Product description.
 5. Reference standards.
 6. Performance and test data.
 7. Samples, as applicable.
 8. Name and address of similar projects on which product has been used, and date of each installation.
 9. Itemized comparison of the proposed substitution with product specified; list significant variations.
 10. Data relating to changes in construction schedule.
 11. Any effect of substitution on separate contracts.
 12. List any changes required in other work or products.
 13. Accurate cost data comparing proposed substitutions with product specified.
 14. Amount of any net change to Contract sum.
 15. Designation of required license fees or royalties.
 16. Designation of availability of maintenance services and sources of replacement materials.
- D. Substitutions will not be considered for acceptance when:
1. They are indicated or implied on shop drawings or product data submittals without a formal request from Contractor.
 2. They are requested directly from a Subcontractor or Supplier.
 3. Acceptance will require substantial revision of Contract Documents.
- E. Substitute products shall not be ordered or installed without written acceptance of the Engineer.
- F. The Engineer will determine acceptability of proposed substitutions.

1.05 CONTRACTOR'S REPRESENTATION

- A. In making formal request for substitution, Contractor represents that:
1. He has investigated proposed product and has determined that it is equal to or superior in all respects to that specified.
 2. He will provide same warranties or bonds for substitution as for product specified.
 3. He will coordinate installation of accepted substitution into the work and will make such changes as may be required for the work to be complete in all respects.
 4. He waives claims for additional costs caused by substitution which may subsequently become apparent.
 5. Cost data is complete and includes related costs under his contract, but not:
 - a) Costs under separate contracts.
 - b) Engineer's costs for redesign or revision of Contract Documents.

1.06 ENGINEER'S DUTIES

- A. Review Contractor's requests for substitutions with reasonable promptness.
- B. Notify Contractor, in writing, of decision to accept or reject requested substitutions.

END OF SECTION

SECTION 02110 SITE CLEARING

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Clear areas shown on the accompanying drawings and specifications therein.
- B. Remove surface debris, gravel, and soil.
- C. Remove concrete and asphalt.
- D. Remove sanitary and storm sewers.
- E. Remove trees noted to be removed or necessary to complete the work as shown.
- F. All materials and site elements to be excavated or demolished will be removed off site to an approved landfill or recycled.

1.02 RELATED WORK

- A. Section 01045 - Cutting and Patching
- B. Section 02200 - Earthwork
- C. Section 02215 - Excavation
- D. Section 02260 - Finish Grading

1.03 UTILITIES

- A. Notify the Owner and the Engineer in advance of any utilities needing to be disconnected.

PART 2 NOT USED

PART 3 EXECUTION

3.01 CLEARING

- A. Remove unsatisfactory soil materials, stones, obstructions, deleterious material and debris from ground surface prior to placement of new work.

3.02 TREE AND PLANT PROTECTION

- A. Before any work is begun, or any equipment is moved onto site, the Owner's Representative and Contractor will inspect the site to verify trees, shrubs, and bushes which are to be protected, pruned, relocated or removed.
- B. Preserve and protect existing trees and plants at site, which are designated to remain, and those adjacent to site.
- C. Consult with the Owner, and remove agreed on trees, roots, branches and stumps, which interfere with the construction. Employ qualified tree surgeon to remove and to treat cuts. Saw cut roots 1" diameter or larger and treat with Pruning Paint.
- D. Protect root zones of trees and plants:
 - 1. Do not allow vehicular traffic or parking.
 - 2. Do not store materials or products.

3. Prevent dumping of refuse or chemically injurious materials or liquids.
 4. Prevent puddling or continuous running water.
 5. Carefully supervise excavating, grading, filling, and subsequent construction operations, to prevent damage.
- E. Existing trees and shrubs that are damaged or die as a result of construction shall be suitably repaired or replaced with plant material of same kind and size or as approved by Owner. Low hanging branches and unsound or unsightly branches on trees and shrubs designated to remain shall be pruned as required and directed by Owner's Representative.

3.03 REMOVAL

- A. Completely remove barricades, including foundations, when construction has progressed to the point that they are no longer needed, and when approved by Owner's Representative.
- B. Remove stumps and roots, on trees and shrubs indicated to be removed, to a depth of 24 inches.
- C. Clean and repair damage caused by installation, fill and grade areas of the site to required elevations and slopes, clean the area, and remove debris from the site.

END OF SECTION

SECTION 02200 EARTHWORK

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Related Sections: The following Sections contain requirements that relate to this Section.
 - 1. Division 2 Section "Site Clearing" for site stripping, grubbing, topsoil removal, and tree protection.

1.02 SUMMARY

- A. This section includes the following:
 - 1. Preparing and grading subgrades for slabs-on-grade, walks, pavements, and landscaping.
 - 2. Excavating and backfilling for structures.
 - 3. Sub-base course for walks and pavements.
 - 4. Excavating and backfilling trenches within building lines.
 - 5. Excavating and backfilling for underground mechanical and electrical utilities and appurtenances.

1.03 DEFINITIONS

- A. Excavation consists of the removal of materials encountered to subgrade elevations and reuse or disposal of materials removed.
- B. Subgrade: The uppermost surface of an excavation or the top surface of a fill or backfill immediately below sub-base, drainage fill, or topsoil materials.
- C. Borrow: soil material obtained off-site when sufficient approved soil material is not available from excavations.
- D. Sub-base Course: The layer placed between the subgrade and base course in paving system or the layer placed between the subgrade and surface of a pavement or walk.
- E. Base Course: The layer placed between the sub-base and surface pavement in a paving system.
- F. Unauthorized excavation consists of removing materials beyond indicated subgrade elevations or dimensions without direction by the Engineer. Unauthorized excavation, as well as remedial work directed by the Engineer, shall be at the Contractor's expense.
- G. Structures: Manholes, buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below ground surfaces.
- H. Utilities include on-site underground pipes, conduits, ducts, and cables, as well as underground services within building lines.

1.04 PROJECT CONDITIONS

- A. Existing Utilities: Do not interrupt existing utilities serving facilities occupied by the owner or others except when permitted in writing by the Owner and then only after acceptable temporary utility services have been provided.
- B. Provide a minimum 48-hours' notice to the Owner and receive written notice to proceed before interrupting any utility.
- C. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with Owner to shutoff services if lines are inactive.

PART 2 PRODUCTS

2.01 SOIL MATERIALS

- A. General: Provide approved borrow soil materials from off-site when sufficient approved soil materials are not available from excavations.
- B. Satisfactory Soil Materials: ASTM D 2487 soil classification groups GW, GP, GM, SW, SP and SM; free of rock or gravel larger than 1 inches in any dimension, debris, waste, frozen materials, vegetation and other deleterious matter.
- C. Unsatisfactory Soil Materials: ASTM D 2487 soil classification groups GC, SC, ML, MH, CL, CH, OH, and PT.
- D. Backfill and Fill Materials: Satisfactory soil materials.
- E. Sub-base and Base Materials: 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 sieve and not more than 8 percent passing a No. 200 sieve or as noted otherwise on drawings.
- F. Engineered Fill: sub-base or base materials.
- G. Bedding Material: Sub-base or base materials with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve.
- H. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state.

PART 3 EXECUTION

3.01 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. Protect subgrades and foundation soils against freezing temperatures or frost. Provide protective insulating materials as necessary.
- C. 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.
- D. Tree protection is specified in Division 2 Section "Site Clearing".

3.02 DEWATERING

- A. Prevent surface water and subsurface or ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.
- B. Protect Subgrades and foundation soils from softening and damage by rain or water accumulation.

3.03 EXPLOSIVES

- A. Do not use explosives.

3.04 STABILITY OF EXCAVATIONS

- A. Comply with all codes, ordinances, and requirements of authorities having jurisdiction to maintain stable excavations.

3.05 EXCAVATION FOR STRUCTURES

- A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 0.10 foot. Extend excavations a sufficient distance from structures for placing and removing concrete formwork, installing services and other construction, and for inspections.
- B. 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.

3.06 EXCAVATION FOR WALKS AND PAVEMENTS

- A. Excavate surfaces under walks and pavements to indicated cross sections, elevations, and grades.

3.07 EXCAVATION FOR UTILITY TRENCHES

- A. Excavate trenches to indicated slopes, lines, depths and invert elevations.
- B. Excavate trenches to uniform width 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.
- C. Clearances: As indicated.
- D. 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.
- E. 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.
- F. For pipes and conduit 6 inches or larger in nominal diameter, shape bottom of trench to support bottom 90 degrees of pipe circumferences. Fill depressions with tamped sand backfill.

- G. Where encountering rock or another unyielding bearing surface, carry trench excavation 6 inches below invert elevation to receive bedding course.

3.08 APPROVAL OF SUBGRADE

- A. Notify engineer when excavations have reached required subgrade.
- B. When the Engineer determines that unforeseen unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed by the Engineer.
- C. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by the Engineer.

3.09 APPROVAL OF SUBGRADE

- A. Fill unauthorized excavation under foundations or wall footings by extending indicated bottom elevations of concrete foundation or footing to excavation bottom, without altering required top elevation. Lean concrete fill may be used to bring elevations to proper position when acceptable to the Engineer.
- B. Where indicated widths of utility trenches are exceeded, provide stronger pipe, or special installation procedures, as required by the Engineer.

3.10 STORAGE OF SOIL MATERIALS

- A. Stockpile excavated materials acceptable for backfill and fill soil materials, including acceptable borrow materials. Stockpile soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent wind-blown dust.
- B. Stockpile soils materials away from edge of excavations. Do not store within drip line of remaining trees.

3.11 BACKFILL

- A. Backfill excavations promptly, but not before completing the following:
 - 1. Acceptance of construction below finish grade.
 - 2. Surveying locations of underground utilities for record documents.
 - 3. Testing, inspecting, and approval of underground utilities, unless noted otherwise.
 - 4. Concrete formwork removal.
 - 5. Removal of trash and debris from excavation.
 - 6. Removal of temporary shoring and bracing, and sheeting.

3.12 UTILITY TRENCH BACKFILL

- A. Place and compact bedding course on rock and other 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 initial backfill of satisfactory material or sub-base material, free of particles larger than 1 inch, to a height of 12 inches over the utility pipe of conduit.

- C. 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.
- D. Coordinate backfilling with utilities testing.
- E. Fill voids with approved backfill materials as shoring and bracing, and sheeting is removed.
- F. Place and compact final backfill of satisfactory soil material to final subgrade.

3.13 FILL

- A. Preparation: Remove vegetation, topsoil, debris, wet, and unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placing fills.
- B. Plow strip, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing surfaces.
- C. When subgrade or existing ground surface to receive fill has a density less than that required for fill, break up ground surface to a depth required, pulverize, moisture-condition or aerate soil and re-compact to required density.
- D. Place fill material in layers to required elevations for each location listed below.
 - 1. Under grass, use satisfactory excavated or borrow soil material.
 - 2. Under walks and pavements, use sub-base or base material, or satisfactory excavated or borrow soil material.
 - 3. Under steps and ramps, use sub-base material.
 - 4. Under structures, footings and foundations, use engineered fill.

3.14 MOISTURE CONTROL

- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill layer before compaction to within 2 percent of optimum moisture content.
- B. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.
- C. Remove and replace, scarify and air-dry satisfactory soil material that is too wet to compact to specified density.
- D. Stockpile or spread and dry removed wet satisfactory soil material.

3.15 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 materials 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.
- C. Percentage of Maximum Dry Density Requirements: Compact soil to not less than the following percentages of maximum dry density according to ASTM D 1557:

1. Under structures, building slabs, steps, and pavements, compact the top 12 inches below subgrade and each layer of backfill or fill material at 95 percent maximum dry density.
2. Under walkways, compact the top 6 inches below subgrade and each layer of backfill or fill material at 95 percent maximum dry density.
3. Under lawn or unpaved areas, compact the top 6 inches below subgrade and each layer of backfill or fill material at 90 percent maximum dry density.

3.16 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.
- B. Provide a smooth transition between existing adjacent grades and new grades.
- C. Cut out soft spots, fill low spots, and trim high spots to conform to required surface tolerances.
- D. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
 1. Walks: Plus or minus 0.10 foot.
 2. Lawn or Unpaved Areas: Plus or minus 0.10 foot.

3.17 SUB-BASE AND BASE COURSES

- A. Under pavements and walks, place sub-base course material on prepared subgrades. Place base course material over sub-base to pavements.
- B. Compact sub-base and base courses at optimum moisture content to required grades, lines, cross section and thickness to not less than 95 percent of ASTM D 4254 relative density.
- C. Shape sub-base and base to required crown elevations and cross-slope grades.
- D. When thickness of compacted sub-base of base course is 6 inches or less, place materials in a single layer.
- E. When thickness of compacted sub-base of 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.

3.18 PROTECTION

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- B. Repair and re-establish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or loose compaction due to subsequent construction operations or weather conditions.
- C. Scarify or remove and replace material to a depth directed by the Engineer; reshape and re-compact at optimum moisture content to the required density.
- D. Settling: Where settling occurs during the Project correction period, remove finished surfacing, backfill with additional approved material, compact, and reconstruct surfacing.

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

3.19 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Disposal: Transport surplus satisfactory soil to designated storage areas on the Owner's property. Stockpile or spread soil as directed by the Engineer.
- B. Remove waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off the owner's property.

END OF SECTION

SECTION 02215 EXCAVATION

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Excavation for utilities, curbs, wall footings, light bases, storm drains, and other improvements.
- B. Additional work as indicated on drawings.

1.02 RELATED WORK

- A. Section 02200: Earthwork: Topsoil and subsoil removal from site surface.
- B. Section 02220: Backfilling.
- C. Section 02260: Finish Grading.

1.03 PROTECTION

- A. Protect excavations by shoring, bracing, sheet piling, underpinning or other methods required to prevent cave-in or loose soil from falling into excavation.
- B. Notify Owner of unexpected subsurface conditions and discontinue affected work in area until notified to resume work.
- C. Protect bottom of excavations and soil adjacent to and beneath foundations from frost.
- D. Grade excavation top perimeter to prevent surface water run-off into excavation.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Subsoil: Excavated material, graded free of lumps larger than 6 inches, rocks larger than 3 inches and debris.

PART 3 EXECUTION

3.01 PREPARATION

- A. Identify required lines, levels, contours and datum.
- B. Maintain and protect existing utilities remaining which pass through work area.

3.02 EXCAVATION

- A. Excavate subsoil and loose rock required for installation of site elements.
- B. Excavate to working elevations.
- C. Remove lumped subsoil, boulders, and rock up to 1/3 cu. yd. measured by volume.
- D. Correct unauthorized excavation at no cost to Owner.

- E. Stockpile excavated material in area designated on site and remove excess subsoil not being reused from site.

3.03 FIELD QUALITY CONTROL

- A. Provide for visual inspection of bearing surfaces.

END OF SECTION

SECTION 02221 BACKFILLING

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Site Backfilling
- B. Compaction requirements
- C. Fill under slab-on-grade.

1.02 RELATED WORK

- A. Section 02200 – Earthwork.
- B. Section 02215 – Excavation.
- C. Section 02260 – Finish Grading: Final backfilling of topsoil.

PART 2 PRODUCTS

2.01 FILL MATERIALS

- A. Granular Fill: No. 53 stone.
- B. Subsoil: Reused; free of lumps larger than 4 inches, rocks larger than 2 inches and debris.
- C. Topsoil in accordance with Section 02260

PART 3 EXECUTION

3.01 INSPECTION

- A. Verify stockpiled fill to be reused is approved.
- B. Verify areas to be backfilled are free of debris, snow, ice, or water and ground surfaces are not frozen.
- C. Areas to be backfilled shall be inspected and approved by the Engineer prior to backfilling.

3.02 PREPARATION

- A. When necessary, compact subgrade surfaces to density requirements for backfill material.
- B. Cut out soft areas of subgrade not readily capable of compaction. Backfill with appropriate type fill as called for. Compact to density equal to requirements for subsequent backfill material.

3.03 BACKFILLING

- A. Backfill areas to contours and elevations. Use unfrozen materials.
- B. Backfill systematically, as early as possible, to allow maximum time for natural settlement. Do not backfill over porous, wet, or spongy subgrade surfaces.

- C. Place and compact crushed stone fill materials in continuous layers not exceeding 6 inches loose depth.
- D. Place and compact subsoil fill material in continuous layers not exceeding 8 inches loose depth.
- E. Maintain optimum moisture content of backfill materials to attain required compaction density.
- F. Make changes in grade gradual. Blend slopes into level areas.
- G. Remove surplus backfill materials from site.
- H. Leave stockpile areas completely free of excess fill materials.

3.04 SCHEDULE OF LOCATIONS

- A. The paragraphs below identify location, fill material to be used identified from lower to upper fill type, compacted thickness of each fill, and compaction expressed as a percentage of maximum density and optimum moisture in comparison with ANSI/ASTM D 1557 and D 698.
 - 1. Fill under grasses areas: Subsoil fill, to 6 inches below finish grade, compacted to 88 percent.
 - 2. Fill under asphalt and concrete: compacted to 95 percent.

END OF SECTION

SECTION 02260 FINISH GRADING

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Finish grade sub-soil.
- B. Replenish topsoil in areas where clearing has been completed and not scheduled to receive new base course materials.
- C. Place, finish grade, and compact topsoil.

1.02 RELATED WORK

- A. Section 02200: Earthwork
- B. Section 02485: Seeding and Mulching
- C. Section 02486: Sodding

1.03 PROTECTION

- A. Prevent damage to existing features. Correct damage at no cost to the Owner.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Existing topsoil on site: Existing topsoil shall be removed where advantageous. This soil may be reused for lawns and plantings provided that it meets the topsoil requirements below.
 - 1. Topsoil: Friable loam free from subsoil, roots, grass, excessive amount of weeds, stones and foreign matter; acidity range pH of 6.0 to 7.0; containing a minimum of 6% and a maximum of 25% organic matter; soluble salts shall be higher than 500 parts per million.
 - 2. Lime: Shall be ground limestone containing not less than 85% passing through a 100-mesh sieve and 90% passing through a 20-mesh sieve.

2.02 TESTING

- A. Soil sample tests: The Landscape Contractor shall take three representative samples from the topsoil source and submit them for soil tests. If the pH range of topsoil is not between 6.0 and 7.0, then it shall be amended by the Landscape Contractor according to the guide below or the Landscape Contractor may select another topsoil source and submit new soil sample tests.
 - 1. If the pH level is below 6.0, add limestone at a rate of 2.5 lbs. per cubic yard or 92 lbs. Per 1,000 square feet to raise pH one full point.
 - 2. If the pH level is above 7.0, add aluminum sulfate at a rate of 2.5 lbs. Per cubic yard or 92 lbs. Per 1,000 square feet to lower pH one full point.
- B. All testing of soil be at the Contractor's expense.

PART 3 EXECUTION

3.01 SUB-SOIL PREPARATION

- A. Rough grade subsoil systematically to allow for a maximum amount of settlement and compaction. Eliminate uneven areas and low spots. Remove debris, roots, branches, stones, etc. Remove subsoil which has been contaminated with petroleum products.
- B. Excavate and fill where necessary to bring sub-soil to required levels, profiles and contours. Make changes in grade gradual. Blend slopes into level areas.
- C. Cultivate sub-grade to depth of 6 inches where topsoil is to be placed. Repeat cultivation in areas where equipment used for hauling and spreading topsoil has compacted subsoil.
- D. Compact materials to meet the following minimum percentages of modified proctor density, ASTM D1557, method C or D. Compact subsoil to the following:
 - 1. 88% where topsoil is to be placed.
 - 2. 95% where stabilizing base for asphalt and concrete is to be placed.

3.02 PLACING TOPSOIL

- A. Use topsoil in relatively dry state. Place during dry weather.
- B. Fine grade topsoil eliminating rough or low areas to ensure positive drainage. Maintain levels, profiles and contours of sub-grades.
- C. Remove stone, roots, grass, weeds, debris and other foreign material while spreading.
- D. Manually spread topsoil around trees to prevent damage which may be caused by grading equipment.
- E. Lightly compact placed topsoil.

3.03 SURPLUS MATERIAL

- A. Remove surplus subsoil and topsoil from site.
- B. Leave stockpile areas and entire job site clean and raked, ready to receive landscaping.

END OF SECTION

SECTION 02485 SEEDING AND MULCHING

PART 1 GENERAL

1.01 WORK INCLUDED

- A. This work shall consist of either or both plain and mulched seeding. It includes furnishing and placing seed, fertilizer, inoculants, top soil, and mulch, if required, in a prepared seed bed or furnishing and placing sod at locations shown on the plans, or as directed.

1.02 RELATED WORK

- A. Section 02260 – Finish Grading

PART 2 PRODUCTS

2.01 MATERIALS

- A. Seed mixtures shall be classified as follows. Mixes including warm season grasses, forbs, or aquatic species will be specified in the plans.
- B. Seed Mixture R.
 - 1. This is a general purpose seed mixture. It shall be applied at the rate of 170 lb/acre. The mixture shall consist of 95 lb of low endophyte Kentucky 31 Fescue or approved equal, 65 lb perennial rye grass, and 10 lb Jasper Red Fescue or approved equal.
- C. Materials shall be in accordance with the following Indiana Department of Transportation Standard Specification (INDOTSS).
 - 1. Fertilizer 914.03
 - 2. Grass Seed 914.04
 - 3. Leguminous Inoculants 914.06
 - 4. Mulch 914.05(a), 914.05(c), 914.05(d), 914.05(e)
 - 5. Plastic Net 914.09(g)
 - 6. Top Soil 914.01
 - 7. Water 914.09(a)
 - 8. Wire Staples 914.09(f)

PART 3 EXECUTION

3.01 PREPARATION OF GROUND BEFORE SEEDING

- A. The area to be seeded shall be made smooth and uniform and shall be in accordance with the finished grade and cross section shown on the plans or as otherwise designated.
- B. The seed bed, if not loose, shall be loosened to a minimum depth of 6 in. before fertilizer or seed is applied.
- C. Areas to be covered with topsoil shall be milled or disked slightly before the topsoil is placed. A disk, spike-toothed harrow, or other similar device may be used for this purpose. Such loosening will be required to ensure bond of the

topsoil with the surface on which it is put and to form a uniform surface. The topsoil shall then be spread to a sufficient depth to produce the thickness specified after it has been compacted lightly with an approved roller, tamping device, or other method.

3.02 PREPARATION OF GROUND BEFORE APPLYING EROSION CONTROL BLANKETS

- A. Prior to placing the blankets, the area to be covered shall be relatively free of all rocks or clods over 1.5 in. in diameter, and all sticks or other foreign material.

3.03 APPLYING FERTILIZER

- A. Fertilizer as specified shall be spread uniformly over the area to be seeded. Fertilizer shall be spread at the rate of 800 lb/acre unless otherwise specified.

3.04 APPLYING SEED

- A. Seed may be drilled in or mixed with water. The mixture shall be sprayed over the area to be seeded. An approved mechanical method which shall place the seed in direct contact with the soil may be used.
- B. In places inaccessible to mechanical equipment, or where the area to be seeded is small, a hand operated cyclone seeder or other approved equipment may be used.
- C. Seed of warm season grasses, forbs, or aquatic species shall not be covered more than 0.125 in.. All other seed shall not be covered more than 0.5 in.. Leguminous seeds, unless otherwise specified, shall be inoculated with a culture in accordance with 914.06 Indiana Department of Transportation Standard Specification (INDOTSS).

3.05 APPLYING MULCH

- A. Mulching material shall be applied uniformly in a continuous blanket at the rate of 2 tons per acre. Mulch shall be placed within 24 h after seeding.
- B. The mulch may be held in place by means of a commercially produced mulch binder or by spraying it with a satisfactory liquid asphalt or asphalt emulsion or by other means if approved by the Engineer.

END OF SECTION

SECTION 02486 SODDING

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Prepare sub-grade to receive topsoil.
- B. Place, rake and level topsoil as required to prepare for sod.
- C. Place sod.
- D. Maintain sod.

1.02 RELATED WORK

- A. Section 02260 – Finish Grading

PART 2 PRODUCTS

2.01 MATERIALS

- A. Sod: Shall be fibrous, well-rooted Warren's Frontrunner turf-type tall Fescue Sod, complying with ASPA Specifications, and nursery grown on clay loam soil. Sod shall not be grown on peat soil. Sod shall be free from stones, weeds, undesirable native grasses, and burned or bare spots. Edges of sod to be cleanly and unevenly cut to a uniform width of not less than 18 inches and thickness of not less than 1-1/2 inches. Grass shall be cut to a height of not more than 2 inches. Sod shall be properly protected from drying out and shall be laid within 48 hours after cutting at the nursery.
- B. Topsoil: Fertile, agricultural soil typical of locality and capable of sustaining vigorous plant growth; from well drained site that is free of flooding; free from admixture of subsoil, slag or clay, stones, lumps, live plants and their roots, sticks and other extraneous matter; pH value of minimum 5.9 and maximum 7.0 and as specified in Section 02260.
- C. Fertilizer: Commercial slow release type recommended for grass, with fifty percent of the elements derived from organic sources; to the following proportions: nitrogen 10%, phosphoric acid 8%, soluble potash 4%.

PART 3 EXECUTION

3.01 NOTIFICATION

- A. The Landscape Contractor shall be notified when other divisions of the work have progressed sufficiently to commence work on the lawn areas. Upon receipt of such notice, he/she shall commence placing topsoil to finish grade. Thereafter the finished grade shall be maintained through completion of the lawns. He/she shall be responsible for notifying and insuring that this final grade is not disturbed by other contractors working at the site.

3.02 PREPARATION OF LAWN AREAS

- A. Refer to plans for location of sodden areas.

- B. The Landscape Contractor shall inspect the prepared subgrade to insure the elevation is parallel with the desired finished grade and that the subgrade is uniformly compacted. Report any defects to the Owner's Representative before beginning placement of any topsoil.
- C. After the subgrade has been determined to be satisfactory, the placement of topsoil may commence. The topsoil shall be spread evenly on the subgrade and lightly compacted. No topsoil shall be spread in a frozen or muddy condition. Areas to be sodded shall be brought to finished grade and raked smooth.
- D. All uneven surfaces shall be raked until a uniform surface is established. All stones over $\frac{3}{4}$ inches shall be raked out and removed from the site. Areas to be sodded shall be brought to within the thickness of sod to the finished grade. Allowance for settlement shall be made in either case.

3.03 APPLYING LIME

- A. Lime shall be added at the rate indicated in "Soil Sample Tests", Section 02260, and when added shall be thoroughly mixed in the soil prior to placing the soil on the site.

3.04 APPLYING FERTILIZER

- A. Fertilizer shall be applied at the rate of 25 pounds to 1,000 square feet to all areas being prepared for lawn; however, this rate may be increased, at the direction of the Landscape Architect, based upon the analysis of the soil sample tests.

3.05 RECONDITIONING LAWN

- A. Use sod to recondition existing lawn areas damaged by Contractor's operations including storage of materials or equipment and movement of vehicles.

3.06 LAYING SOD

- A. Before any sod is laid, all soft spots and inequalities in grade shall be corrected. Fertilizer spread shall be raked in. The first row of sod shall be laid in a straight line with subsequent rows placed parallel to and tightly against each other. Lateral joints shall be staggered to promote more uniform growth and strength. Care shall be exercised to insure the sod is not stretched or overlapped and that all joints are butted tight, in order to prevent voids, which would cause air drying of the roots.
- B. On 3:1 rounded slopes or greater, sod shall be laid with staggered joints and secured by wood peg and tamping.
- C. The Landscape Contractor shall water sod immediately after transplanting to prevent excessive drying during progress or work. As sodding is completed in any one section, the entire area shall be rolled. It shall then be thoroughly watered to a depth sufficient that the underside of the new sod pad and soil immediately below are thoroughly wet. The Contractor shall be responsible

for having adequate water available at the site prior to and during the transplanting of the sod.

3.07 INSPECTION AND MAINTENANCE

- A. Maintenance shall begin immediately after each portion of lawn is planted. Maintenance prior to inspection shall be the Contractor's responsibility. A two to three (2-3) day notice shall be given to the Owner indicating an inspection/approval date. After inspection and acceptance by Owner, all maintenance shall be taken over by Owner.
- B. Lawns shall be protected and maintained by watering, weeding, mowing and replanting as necessary until acceptance by Owner.
- C. The Landscape Contractor shall provide adequate protection during installation in all lawn areas, against trespassing and damage, including erosion.
- D. Damage to the lawn areas due to vandalism or on the part of others prior to occupancy or acceptance by the Owner will be the responsibility of the Landscape Contractor.

END OF SECTION

SECTION 02511 CRUSHED STONE

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Crushed stone.

1.02 STANDARD SPECIFICATION

- A. Indiana Department of Transportation Standard Specification (INDOTSS).

PART 2 PRODUCTS

2.01 PAVING MATERIALS

- A. Aggregate materials shall conform to the requirements of Section 904, INDOTSS and to the requirements of subsections referenced therein.
- B. Asphalt sub-base course: #53 aggregate. Eight (8) inches of aggregate is to be placed under asphalt pavement.
- C. Concrete sidewalk sub-base course: Four (4) inches of #53 aggregate.
- D. Concrete driveway apron sub-base course: Six (6) inches of #53 aggregate.

PART 3 EXECUTION

3.01 SUBGRADE

- A. The subgrade shall be shaped to true lines and elevations. Adequate drainage shall be provided at all times to prevent water from standing on the subgrade. Work shall conform to the requirements of Section 207, INDOTSS.
- B. All boulders, organic materials, soft clay, spongy material and any other objectionable material shall be removed and replaced with approved materials. Subgrade shall be properly shaped, rolled and uniformly compacted to conform with the accepted cross-section.

3.02 GRANULAR BASE CONSTRUCTION

- A. Placement: The Contractor shall use skilled workers, up to date methods and modern equipment suitable to the size of the work in spreading, compacting and finishing the gravel base. Other requirements are as follows:
- B. Section 303, INDOTSS. Compacted to 95% of maximum dry density.
- C. An approved vibrating device shall be used to compact gravel base. It may be supplemented by a 10 ton, three wheel, tandem or pneumatic-tire roller conforming to Section 401.09 of the INDOTSS. Contractor shall use such construction procedures, including sufficient wetting and number of passes to insure that the above density is attained.
- D. All edges should be neatly cut and made uniform. All surplus and remainders should be carried away from the work site.
- E. Include placement of aggregate reinforcement structures as directed by the Engineer.

3.03 REPAIRING FINAL WORK

- A. The gravel pavement shall be checked as specified herein.
- B. Granular base shall be free of low spots, pockets or high spots and shall be sloped as required for proper drainage.

END OF SECTION

SECTION 02513 ASPHALT CONCRETE PAVING

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Publications of the following institutes, associations, societies and agencies are referred to in this Section.
 - 1. Indiana Department of Transportation Standard Specifications, Latest Edition, (INDOTSS).
 - 2. American Society for Testing and Materials, ASTM.
 - 3. Federal Specifications, FS.

1.02 QUALITY REQUIREMENTS

- A. Provide final surface of uniform texture conforming to required grades and cross sections.
- B. Surface smoothness, when tested with 10 foot straight-edge:
 - 1. Base Course: 1/4" in 10' max.
 - 2. Surface Course: 1/4" in 10' max.
- C. Provide Owner with duplicate copy of all crushed stone base and asphalt delivery tickets.

1.03 RELATED WORK

- A. Section 02511 Crushed Stone.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Materials shall conform with the following requirements:
 - 1. Coarse Aggregates: Class A or B, crushed or uncrushed gravel or;
 - 2. Fine Aggregates: Natural sand, well graded from coarse to fine conforming to INDOTSS, Section 913.01.
 - 3. Tack: Raped cure liquid asphalt or asphalt emulsion conforming to ISHC Standard Specification, Section 409.
 - 4. Bituminous Materials: Petroleum asphalt cement conforming to INDOTSS, Section 902.

2.02 PAVING MIXES

- A. Asphalt materials shall conform to the requirements of Section 403 Hot Asphaltic Concrete Pavement (HAC), INDOTSS and to the requirements of subsections referenced therein.
- B. The HAC mixtures shall be made using suitably graded coarse aggregate and fine aggregate of the size and combination as indicated in Table 1 and 3, Section 403.04, preparation of mixtures, INDOTSS.
 - 1. Surface course overlay: HAC Type 11.
 - 2. Base course: HAC Type 5.

PART 3 EXECUTION

3.01 ASPHALT PAVEMENT CONSTRUCTION

- A. Subgrade shall be proof-rolled using pneumatic tired roller capable of exerting minimum of 90 psi pressure uniformly over the subgrade surface. Conforming to INDOTSS, Section 401.09.
- B. Proof-rolling shall provide two complete coverages.
- C. Remove and replace soft spots with stable material, compact and re-proof.
- D. All materials shall be spread using approved spreading equipment. Tailgating of aggregates directly onto subgrade will not be accepted.
- E. Asphalt pavers shall be self-propelled with receiving hopper of sufficient capacity to provide a uniform spreading operation.
- F. Contact surfaces of curbs, manholes, catch basins, etc., shall be painted with thin uniform coating of bituminous material prior to placing mixture against them.
- G. The mix temperature at the site shall be a minimum of 285° F. - maximum of 325° F.
- H. All joints shall be carefully made in such a manner as to insure a neat junction, thorough compaction, continuous band and seal.
- I. The pavement shall be compacted to 95%
- J. All edges shall be neatly cut and made uniform. All asphalt surplus and remainders shall be removed from work site.
- K. Contractor shall have on hand at the site prior to paving operations, all necessary portable and hand tools and one stand-by-roller.

3.02 COMPACTION

- A. Subgrade and compacted aggregate base courses shall be compacted to 95% of maximum dry density in accordance with ASTM designation D698.
- B. Each lift of aggregate base shall be compacted to density specified above.
- C. Soft spots found during proof rolling which are replaced with fill material, shall be compacted to density specified above.

3.03 SPREADING AND ROLLING

- A. Base Course:
 - 1. Spread and roll to minimum finish depths indicated on details.
- B. Surface Course:
 - 1. Spread and roll to minimum finish depths indicated on details.
- C. Finish installation shall be true to line and grade and within 1/2" true elevation.

3.04 COMPACTING

- A. Compacting shall conform to requirements of INDOTSS Section 401.12. Compaction shall be completed before temperature of the mixture has dropped below 180° F.
- B. Density tests shall be made at each lift if so directed by the Engineer.
- C. Tests shall be made by soils engineer approved by the Engineer.

- D. Results of each test shall be certified to the Engineer within 72 hours after tests are made.

3.05 SURFACE TOLERANCES

- A. Surface of pavement shall meet requirements of INDOTSS Section 401.15.
- B. Paving shall be free of low spots, pockets, or high spots and shall be sloped as required for proper drainage.
- C. Any areas which develop an excess of bitumen shall be removed and replaced with proper materials.
- D. Contractor shall maintain courses during the curing period.

END OF SECTION

SECTION 02580 PAVEMENT MARKING

PART 1 GENERAL

1.01 SUMMARY

- A. This section includes the following:
- B. Pavement markings for driving lanes and islands.

1.02 SUBMITTALS

- A. Manufacturer's product literature and instruction sheet for thermoplastic markings.

1.03 QUALITY ASSURANCE

- A. Applicator Qualifications.
 - 1. Striping contractor shall be experienced in this trade and shall have completed 20 jobs within the last 3 years. At least 10 jobs shall include public road projects.

1.04 REFERENCES

- A. The latest issues of the following documents form a part of this specification to be extent indicated hereinafter.
- B. Indiana Department of Transportation Standard Specification (INDOTSS).

1.05 PROJECT/SITE CONDITIONS

- A. Environmental Requirements.
 - 1. Thermoplastic shall not be applied on wet surfaces, during wet or damp weather.
 - 2. Temperature during application shall be consistent with INDOTSS Section 808.06.

1.06 SEQUENCING/SCHEDULING

- A. Time of application: Elapsed time between pavement placement and application of thermoplastic shall be 7 days minimum.
- B. Contractor shall notify Owner in advance of pavement markings and coordinate with the Owner's representative.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Performed reflective thermoplastic markings.
- B. Standard: Product shall comply with INDOTSS 913.14.
- C. Sizes, shapes, and colors: As indicated on the Drawings, thickness 1.5 mm.

PART 3 EXECUTION

3.01 PREPARATION

- A. All lines shall be laid out by the striping contractor and then inspected by the Engineer before application.
- B. Surfaces which are to receive painted stripes or markings shall be thoroughly cleaned of all dirt, dust, grease, oil, curing compounds if used, and other foreign substances and shall be completely dry before paint is applied, per INDOTSS Section 808.03.

3.02 APPLICATION

- A. Application of thermoplastic shall comply with INDOTSS Section 808.06.
- B. Size and shape of markings shall be as indicated on the drawings.

3.03 PROTECTION

- A. All markings shall be protected from traffic until they have dried sufficiently to prevent tracking.

3.04 CLEAN UP

- A. Waste materials shall be removed at the end of each work day. Upon completion of the work, all containers and debris shall be removed from the site. Striping material spots upon adjacent surfaces shall be removed and the entire job left clean and acceptable.

END OF SECTION

SECTION 02720 STORM SEWERAGE

PART 1 GENERAL

1.01 SUMMARY

- A. This section includes the following:
- B. Storm sewerage system piping and appurtenances.

1.02 SUBMITTALS

- A. Certificates.
 - 1. Prior to delivery, submit two copies of all certificates specified herein.
 - 2. Certificates shall be notarized and attest to compliance with the applicable specifications for grades, types or classes.
- B. Shop Drawings.
 - 1. Precast concrete structures indicating dimension, reinforcing steel size and placement and location of all pipe openings, sizes and inverts.
- C. Product Data.
 - 1. Submit manufacturers or trade association installation instructions for the following items:
 - a) Pipe.
 - b) Jointing method.
 - c) Manhole gaskets.

1.03 QUALITY ASSURANCE

- A. Testing.
 - 1. Testing laboratory services responsibility shall be as specified in Division 1.

1.04 REFERENCES

- A. The latest issues of the following documents form a part of this specification to the extent indicated hereinafter.
 - 1. American Society of Testing and Materials (ASTM).
 - 2. C55 Concrete Building Brick.
 - 3. C270 Mortar for Unit Masonry.
 - 4. C478 Precast Reinforced Concrete Manhole Section.
 - 5. Indiana Department of Transportation Standard Specification (INDOTSS).
 - 6. Manufacturer's Associations.
 - 7. Corrugated Polyethylene Pipe Association (CPPA).
 - 8. The City of Bloomington Utilities Construction Specifications for Sanitary, Water, and Storm Project (CBUCS).

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Pipe delivery, storage and handling shall comply with latest edition of the installation manual of the following organizations:

1. CPPA.

1.06 PROJECT/SITE CONDITIONS

- A. Protection of people and work.
 1. Place protective fencing around all excavations.
 2. Shore and brace excavations as necessary to prevent cave-ins.
 3. Cover holes and trenches when work is not in progress.
 4. Keep trenches and excavated areas free of water.
 5. Grade to drain surface water away from excavations.
 6. Keep bottom of trenches free of water by use of sump pits and pumps. Provide a standby pump.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Pipe.
 1. Corrugated polyethylene/high density polyethylene (HDPE) pipes with smooth interiors liners, up to 36" diameter.
 2. Hancor, Inc., P.O. Box 1047, Findlay, OH 45839, (419)422-6521.
 3. Or approved equal.
 4. Contractor shall submit list of pipe to be used including certificate that confirms that pipe meets applicable local, city, state and federal codes.
- B. Precast reinforced concrete manholes and inlets shall conform to INDOTSS 907.04, air entrained concrete is required, certificate required.
- C. Sealant for precast reinforced concrete manholes shall be performed, vulcanized butyl rubber, complying with the requirements of FS SS-S-00210. Size shall be ¾ inch diameter and of the manufacturer's standard length.
- D. Precast concrete segmental blocks shall be at least five (5) inches, but not more than eight (8) inches, in length and such shape that the joints can be effectively sealed and bonded with cement mortar. Units shall be solid.
- E. Brick shall conform to ASTM Specification C62, Grade SW or ASTM C55, grade N-1 or N-11.
- F. Mortar shall conform to ASTM Specification C270, type M.
- G. Concrete shall conform to Division 3 – Concrete.
- H. Waterproofing.
 1. Material shall comply with INDOTSS 902.06.
 2. Manhole steps shall be galvanized steel, vinyl coated steel, nylon coated steel, or cast iron. Size and shape as indicated on the drawings.
- I. Frames and covers or gratings shall be cast iron conforming to FS QQ-1-652, with tensile-strength test not less than class 25. Weight, shape, size, and waterway openings for grates and curb inlets shall be as indicated. Frames and covers for curb inlets and for areas not subject to vehicular traffic or storage may be of malleable iron. Malleable iron frames and covers shall conform to ASTM Specification a47 and shall be of the weight, shape and size indicated.

PART 3 EXECUTION

3.01 PREPARATION

- A. Locate and mark all existing underground utilities in the area of operations.
- B. Establish line and grade by offset control point stakes, grade stakes and grade boards as per ACPA installation manual.
- C. Inspection of layout is required by the Engineer before proceeding.

3.02 INSTALLATION

- A. Excavating, backfilling and compacting for utilities shall be as detailed on the drawings and as recommended by CPPA and the pipe manufacturer.
- B. Drainage structures shall be of the following types, constructed of the materials specified for each type and in accordance with the drawings.
- C. Manholes and inlets shall be constructed in accordance with the drawings. All manholes and inlets shall be complete with frames and covers or gratings and with rungs where deeper than 4 feet.
- D. Holes for connection of storm sewer pipes shall be preformed by the manufacturer, or field cut or drilled. At no time shall the pipe hole exceed the outer pipe diameter plus two (2)-inches. The annular space between the pipe and the precast manhole or box inlet wall shall be filled inside and outside with a grout mixture composed of 2 parts of No. 23 fine aggregate and one part of Portland cement.
- E. Precast concrete structures shall have riser joints sealed with preformed sealant in accordance with the manufacturer's instructions.
- F. Brick and segmental concrete block structures shall be laid with joints completely filled and shall be smooth and free of surplus mortar on the inside of the structure. The outside of the structure shall be plastered with ½ inch of mortar over the entire surface of the walls.
- G. Raise or lower existing manhole and inlet casting to new grade as indicated.
- H. Placing Pipe.
 - 1. Each pipe shall be carefully examined before being laid, and defective or damaged pipe shall not be used. Pipelines shall be laid to the grades and alignment indicated. Proper facilities shall be provided for lowering sections of pipe into trenches. Pipe shall not be laid in water, nor when trench conditions or weather are unsuitable for such work. Diversion of drainage or dewatering of trenches during construction shall be provided as necessary.
 - 2. All pipe in place, including joints, shall have been inspected before backfilling.
 - 3. Pipe laying shall proceed upgrade with the spigot ends of bell and spigot pipe and the tongue ends of tongue and groove pipe pointing in the direction of the flow.
- I. Pipe Joints.
 - 1. Pipes shall be joined in accordance with CPPA and pipe manufacturer's recommendations.

2. Do not lay storm sewer lines closer horizontally than 10' from water line(s). Where storm sewers and water line cross with a vertical of less than 18", construct storm sewer of "Water Works" grade mechanical joint pipe and extend mechanical joint storm sewer construction not less than 10' on each side of the crossing and/or entire parallel length of run which does not maintain the 10' minimum horizontal dimension.

3.03 FIELD QUALITY CONTROL

- A. The Contractor shall meet the elevations and dimensions shown on the plans. Construction tolerances shall be .05 feet horizontally and .02 feet vertically. All work not meeting tolerances shall be removed and replaced at the Contractor's expense.
- B. All concrete testing shall comply with the requirements of Division 3 – Concrete.
- C. Do not backfill any pipe or structures until pipe and joints are inspected and approved.
- D. Once constructed, all storm sewer pipes and manholes shall be soil tight. The contractor shall repair to the satisfaction of the Department all visible points of possible bedding and/or backfill infiltration into the system. The method of repair shall be per the approval of the Department. When necessary, the Contractor shall remove and reconstruct as much of the work as is necessary to obtain a system that passes the minimum tests prescribed herein.
- E. HDPE Inspections.
- F. Manhole and Box Inlet Inspection.

3.04 WORK WITHIN PUBLIC RIGHTS-OF-WAY

- A. All work shall comply with the latest edition of CBUCS.
- B. Contact the City of Bloomington Utilities (CBU) a minimum of seven (7) days prior to beginning work.
- C. Schedule inspections with CBU before backfilling.
- D. Pay for permits, bonds, etc. as required by CBU and the City of Bloomington.

END OF SECTION

SECTION 03300 CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Poured-in-place concrete.
- B. Concrete form work.
- C. Concrete reinforcement.
- D. Sealing concrete.

1.02 RELATED WORK

- A. Section 02200 – Earthwork
- B. Section 02511 – Crushed Stone

1.03 DESCRIPTION OF WORK

- A. Provide concrete paving as shown and indicated, including curbs, slabs, walks, and pavement.

1.04 QUALITY ASSURANCE

- A. ACI-347 - Recommended Practice for Concrete Form work.
- B. ACI-318 – Reinforced Concrete; ACI-315 Manual of Standard Practice; CRSI-63; ASTM-A615.
- C. ASTM-C94 – Ready-Mixed Concrete; ACI-304, 305, 306; ASTM-C150; ASTM-C260; ASTM-C33.
- D. Codes and Standards: Comply with Indiana Department of Transportation, Standard Specifications Section 501, unless more stringent requirements are herein indicated.
- E. All cast-in-place concrete to be installed by a concrete contractor with at least five (5) years experience in similar concrete work.

1.05 SUBMITTALS

- A. Furnish samples, manufacturer's product data, mix designs, test reports, and materials' certifications of all materials used in this section and as required by Division One Specifications.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Forms: Steel, wood or other suitable material of size and strength to resist movement during concrete placement and to retain horizontal and vertical alignment until removal. Use straight forms, free of distortion and defects.
- B. Use flexible spring steel forms or laminated boards to form radius bends as required. Coat forms with a nonstaining form release agent that will not discolor or deface surface of concrete.
- C. Fine and Coarse Aggregate: ASTM C33. ¾" max. size of coarse aggregate.

- D. Concrete Reinforcing Fibers: Polypropylene, collated, fibers from Fiber Mesh, Inc., 4019 Industry Drive, Chattanooga, TN 37417, or equal.
- E. Air Entraining – ASTM C260; equal to W.R. Meadows Air Entraining Agent.
- F. Expansion Joint Materials: ½” x respective thickness resilient, closed cell polyurethane foam material; equal to W.R. Meadows Sealtight Rescore Expansion Joint Filler.
- G. Sealant: One part self-leveling polyurethane sealant like Sonneborn’s “Sonolastic SL1”, ASTM C-920, Type S, Grade P, Class 25, Limestone color.
- H. Liquid-Membrane Forming Curing Compound: Complying with ASTM C309, Type 1, Class A, clear unless other type acceptable to Engineer/Engineer. Moisture loss not more than 0.055 gr./sq. cm. When applied at 200 sq. ft./gal.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a) “Masterseal”; Master Builders
 - b) “A-H 3 Way Sealer”; Anti-Hydro Waterproofing Co.
 - c) “Ecocure”; Euclid Chemical Co.
 - d) “Clear Seal”; A.C. Horn
 - e) “J-20 Acrylic Cure”; Dayton Superior
 - f) “Sure Cure”; Kaufman Products, Inc.
 - g) Spartan-Cote”; The Burke Co.
 - h) “Sealkure” Toch Div.-Carboline
 - i) “Kure-N-Seal”; Sonneborn-Contech
 - j) “Polyclear”; Upco. Chemical/USM Corp.
 - k) “L&M Cure”; L&M Construction Chemicals
 - l) “Klearseal”; Setcon Industries
 - m) “LR-152”; Protex Industries
 - n) “Hardtop”; Gifford-Hill
 - 2. Refer to paragraph 3.08 for integral color concrete curing.
- I. Epoxy Bonding Adhesive: Unitex Pro-Poxy 284.
- J. Welded Wire Fabric: ASTM A 185, Welded Steel Wire Fabric.
- K. Reinforcing Bars: ASTM A 615, grade 60, deformed.

2.02 CONCRETE MIX, DESIGN AND TESTING

- A. Design mix to produce standard weight concrete consisting of Portland cement, aggregate, water reducing, or high range water reducing admixture (superplasticize), air entrancing admixture and water to produce the following properties:
 - 1. Compressive Strength: 4000psi, minimum at 28 days.
 - 2. Slump Range: 8” for concrete containing high range water reducing (superplasticizer); 3” for other concrete.
 - 3. Air Content: Type 1A (5-7% air), Portland Type, ASTM C150.
- B. Mix concrete in accordance with ASTM C94.
- C. Provide the specified reinforcing fibers in all concrete. Add fibers to mix at a rate of 1.0 lb. Per cubic yard, unless otherwise recommended by Manufacturer.

PART 3 EXECUTION

3.01 WORKMANSHIP AND INSTALLATION

- A. Inspect prepared subgrade surface to check for unstable areas and need for additional compaction. Do not begin concrete work until such conditions have been corrected and are ready to proceed.

3.02 AGGREGATE BASE

- A. Place aggregate base where required to conform with Section 02200 Earthwork and Section 02511 Crushed Stone.
- B. Remove loose material from compacted subgrade or aggregate base surface immediately before placing concrete.

3.03 FORM CONSTRUCTION

- A. Set forms to required grades and lines, rigidly braced and secured. Install sufficient quantity of forms to allow continuous progress of work and so that forms can remain in place at least 24 hours after concrete placement.
- B. Check completed form work for grade and alignment to following tolerances:
- C. Top of forms not more than 1/8" in 10'.
- D. Vertical face on longitudinal axis, not more than 1/4" in 10'.
- E. Clean forms after each use, and coat with form release agent as often as required to ensure separation from concrete without damage.

3.04 REINFORCEMENT

- A. Place reinforcing supported and secured against displacement. Before placing concrete, ensure reinforcing is clean, free of loose scale, dirt or other foreign coating which would reduce bond to concrete.

3.05 CONCRETE PLACEMENT

- A. Do not place concrete until forms have been checked for line and grade. Moisten subgrade or aggregate base if required to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.
- B. Place concrete using methods which prevent segregation of mix. Consolidate concrete along face of forms and adjacent to traverse joints with internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocation of reinforcing, dowels, and joint devices.
- C. Deposit and spread concrete in a continuous operation between transverse joints, as far as possible. If interrupted for more than 1/2 hour, place a construction joint.

3.06 JOINTS

- A. General: Construct expansion, weakened plane (contraction), and construction joints true to line with face perpendicular to surface of concrete.

Construct transverse joints at right angles to the centerline, unless otherwise indicated.

1. When joining existing structures, place transverse joints to align with previously placed joints, unless otherwise indicated.
- B. Weakened Plane (Contraction) Joints: Provide weakened plane (contraction) joints, sectioning concrete into areas as shown on drawings. Construct weakened plane joints for a depth equal to at least $\frac{1}{4}$ concrete thickness, as follows:
 - C. Tooled Joints: Form weakened plane joints in fresh concrete by grooving top portion with a recommended cutting tool and finishing edges with a jointer.
 - D. Sawed Joints: Form weakened plane joints using powered saws equipped with shatterproof abrasive or diamond rimmed blades. Cut joints into hardened concrete as soon as surface will not be torn, abraded, or otherwise damaged by cutting action.
 - E. Inserts: Use embedded strips of metal or sealed wood to form weakened plane joints. Set strips into plastic concrete and carefully remove strips after concrete has hardened.
 - F. Construction Joints: Place construction joints where placement operations are stopped for a period of more than $\frac{1}{2}$ hour, except where such pours terminate at expansion joints.
 - G. Construct joints as shown or, if not shown, use standard metal keyway section forms.
 - H. Where load transfer slip dowel devices are used, install so that one end of each dowel bar is free to move.
 - I. Expansion Joints: Provide expansion joints of pre-molded joint filler at a maximum of 30' O.C., unless otherwise indicated, and at all curb radii and locations abutting concrete curbs, catch basins, manholes, inlets, structures, walks, or other fixed objects.
 1. Extend joint filler full width and depth of joint, and not less than $\frac{1}{2}$ " or more than 1" below finished surface.
 2. Furnish joint fillers in one piece lengths for full width being placed, wherever possible. Where more than one length is required, lace or clip joint filler sections together.
 3. Protect top edge of joint filler during concrete placement with a metal cap or other temporary material. Remove protection after concrete has been placed on both sides of joint.
 4. Install Fillers and Sealants: Comply with the requirements of this Section Paragraph 2.01 E & F.

3.07 CONCRETE FINISHING

- A. After striking off and consolidating concrete, smooth surface by screeding and floating. Use hand method only where mechanical floating is not possible. Adjust floating to compact surface and produce uniform texture.
- B. After floating, test surface for trueness with a 10' straightedge. Distribute concrete as required to remove surface irregularities, and refloat repaired areas to provide a continuous smooth finish.

- C. Work edges of slabs and formed joints with an edging tool, and round to ½” radius, unless otherwise indicated. Eliminate tool marks on concrete surface.
- D. After completion of floating and troweling when excess moisture or surface sheen has disappeared, complete surface finishing as indicated on plans or, if not shown, finish as follows:
- E. Trowel Finish:
 - 1. Initial troweling shall be delayed as long as practicable to avoid troweling while concrete is too soft. Water sheet shall have disappeared from the surface. Dry cement and sand shall not be used to take up surface moisture.
 - 2. First troweling shall be sufficient to produce a smooth surface.
 - 3. Final troweling shall be done with a tilted trowel and heavy pressure after the concrete has become hard enough to give a ringing sound under the trowel and shall produce a smooth plane surface free of defects.
- F. Sweat Finish: After screeding and floating, an initial troweling shall be given surface when it has hardened enough so that water and fine material are not worked to the top.
 - 1. Final troweling shall be done with the trowel worked flat on the surface producing a fine, non-slip, swirled sandy texture.
 - 2. Walks and Steps Finish; medium broom finish, perpendicular to the line of traffic. Repeat operation if required to provide texture acceptable to the Engineer.
 - 3. On entrance drive surfaces, provide a coarse, non-slip finish by scoring surface with a stiff bristled broom, perpendicular to the line of traffic.
- G. Exposed concrete light bases: Remove all form marks and rub to a smooth finish.
- H. Do not remove forms for 24 hours after concrete has been placed unless otherwise approved by the Engineer. After form removal, clean ends of joints and point up any minor honeycombed areas. Remove and replace areas or sections with major defects, as directed by the Engineer.

3.08 CONCRETE CURING AND PROTECTION

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. In hot, dry, and windy weather, protect concrete from rapid moisture loss before and during finishing operations with an evaporation control material. Apply, according to manufacturer's instructions after screeding and bull floating, but before power floating and troweling.
- B. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than 7 days.
- C. Curing Methods: Cure concrete by curing compound, by moist curing, by moisture-retaining cover curing, or by combining these methods, as specified.
- D. Provide moisture curing by the following methods:
 - 1. Keep concrete surface continuously wet by covered with water.

2. Use continuous water-fog spray.
3. Cover concrete surface with specified absorptive cover, thoroughly saturate cover with water, and keep continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with a 4-inch lap over adjacent absorptive covers.
4. Provide moisture-retaining cover curing as follows:
5. Cover concrete surface with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3 inches and sealed by waterproofed tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
6. Apply curing compound on exterior slabs, walks, and steps as follows:
7. Apply curing compound to concrete as soon as final finishing operations are complete (within 2 hours and after surface water sheen has disappeared). Apply uniformly in continuous operation by power spray or roller according to manufacturer's directions. Re-coat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.
8. Use membrane curing compounds that will not affect surfaces to be covered with finish materials applied directly to concrete.

3.09 REPAIRS AND PROTECTIONS

- A. Repair or replace broken or defective concrete, as directed by Engineer.
- B. Drill test cores where directed by Engineer, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory pavement areas with Portland cement concrete bonded to pavement with epoxy resin grout.
- C. Protect concrete from damage and graffiti until acceptance of work. Exclude traffic from pavement for at least 14 days after placement. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials as they occur.
- D. Sweep concrete pavement and wash free of stains, discolorations, dirt and other foreign material just prior to final inspection.

END OF SECTION