

Town of Fortville
Utility Street Standards

SECTION 02500 - PAVING AND SURFACING

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Scope: This section covers all work involved in the installation of new pavement, walks, and curbs, and the repair and replacement of existing streets, roads, highways, drives, parking areas, curbs, gutters, sidewalks, and other paved areas damaged or destroyed during construction of the work included in this Contract.

- B. Related Work Specified in Other Sections
 - 1. Section 02222 Earthwork for Utilities
 - 2. Section 02902 Landscaping for Utilities

- C. Codes, specifications, and standards referred to by number or title shall form a part of this specification to the extent required by the reference thereto. Except as specifically modified in this specification, paving and surfacing operations, materials and testing will comply with the most current revisions of applicable sections of the Indiana Department of Transportation Standard Specifications, latest revision

- D. Definitions
 - 1. Abbreviations
 - a. INDOTSS Indiana Department of Transportation's Standard Specifications, latest revision.
 - b. AASHTO American Association of State Highway & Transportation Officials.
 - c. ACI American Concrete Institute.
 - d. ASTM American Society for Testing & Materials.
 - e. NRMCA National Ready Mix Concrete Association.

 - 2. Rock: A natural aggregate of mineral particles connected by strong and permanent cohesive forces. Rock includes limestone, sandstone, dolomite, granite, marble, and lava.

 - 3. Subgrade: The prepared and compacted soil immediately below the pavement or walk system and extending to such depth as will affect the structural design.

 - 4. Subbase: The layer of specified or selected material of designed thickness placed on a subgrade to support a base course and surface course.

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5. Base Course: The layer of specified or selected material of designed thickness placed on a subbase to support a binder or surface course.
6. Binder Course: The layer of specified or selected material or designed thickness placed on a base course to support a surface course.
7. Surface Course: The layer of specified or selected material of designed thickness placed on a subbase or base course to support the traffic load.

1.2 QUALITY ASSURANCE

- A. The Contractor shall employ and pay for the services of an independent testing laboratory (unless otherwise noted) to perform specific services and necessary field density tests. The Contractor shall demonstrate to the Town's Representative that proper compaction has been obtained and proper asphalt and concrete mix designs are in compliance with the specifications.
- B. Mixing Plant: Prior to placing any hot asphalt concrete pavement or Portland cement concrete pavement, the Contractor shall provide to the Town the name and location of the bituminous mixing or concrete mixing plant and the type and composition of mixes the Contractor proposes to use in the work.
- C. Paving and surfacing shall comply with the tolerances specified in applicable Sections of INDOTSS.
 1. Subgrade and subbase shall be within ½ inch of dimensions indicated on drawings.
 2. Bituminous base shall not vary longitudinally more than ¼ inch from a 10-foot straightedge. Bituminous and concrete surfaces shall not vary more than 1/8 inch from a 10-foot straightedge.
 3. Finished surface shall be within ¼ inch of dimensions indicated on drawings.
- D. Asphalt and concrete pavement shall be installed by a contractor whose prime business is asphalt or concrete paving.

1.3 SUBMITTALS

- A. Submittals shall be as specified in the General Conditions and Section 01001, General Requirements.
- B. Submit the following:
 1. Name and location of bituminous mixing plant or concrete ready-mix plant. Mixing plants and equipment shall meet the applicable requirements of INDOTSS.

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2. Type and composition of proposed materials and mixes. Job mix formulas shall be prepared and submitted for approval to the Town Superintendent and shall be in accordance with INDOTSS. The formula shall include standard bituminous information such as aggregate gradation, binder content, maximum specific gravity, and air voids.
3. Certified copies of reports of tests specified in this Section and required by the referenced standards

1.4 JOB CONDITIONS

- A. Do not place paving and surfacing materials on a wet surface, pumping subbase or when weather conditions would prevent the proper construction of paving and surfacing.
- B. Do not place aggregates on frozen subgrade. Do not place aggregates when air temperature is below 35°F.
- C. Bituminous materials are to be placed in accordance with applicable requirements of INDOTSS.
- D. Discontinue placing concrete when a descending air temperature away from artificial heat reaches 40°F, and do not resume placing concrete until an ascending air temperature away from artificial heat reaches 35°F.
- E. Do not place paving and surfacing materials when natural light is not sufficient to properly observe work or operations.

1.5 CONSTRUCTION ENGINEERING

The Town will furnish the Contractor with necessary information relating to lines and grades, including temporary bench marks and reference points. The Contractor will be responsible for setting necessary construction stakes to establish the specified roadway line and grade. The Contractor shall be held responsible for the reasonable preservation of references points set by the Town. Reestablishment of reference points due to the Contractor's negligence will be done by the Contractor at his expense.

1.6 GRADE ADJUSTMENT OF EXISTING STRUCTURES

- A. When grade adjustment of existing structures is required, the manhole frames, covers and gratings, and the gas and water valve boxes and covers, shall be removed and reconstructed to grade as required.
- B. On resurfacing work, the castings and boxes shall be adjusted to grade after the last binder course has been laid and before placing the surface course.

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- C. All castings, frames and valve boxes adjusted to grade shall be done in advance of the final paving and shall be paid for by the Contractor as part of the project, unless specifically identified as an item for payment in unit price contracts.

1.7 CONTRACTOR'S QUALIFICATIONS

- A. The Contractor shall be a firm who's prime business is asphalt or concrete paving. The Contractor shall have a competent supervisor on the site during the progress of the work, acting for the Contractor in all matters concerning the work. He shall have the authority to receive directions and act upon them for the Town through the Town's authorized representative.
- B. The Contractor shall keep a set of Plans and Specifications available on the site and in good condition.

1.8 TRAFFIC CONTROL

The Contractor shall plan construction operations so that existing local traffic access can be maintained. During the construction, he will also maintain appropriate use of barricades, lights, flagmen and other protective devices, whether specified for the project or required by the local governing authority. Traffic control devices used for maintenance of Traffic shall comply with the Indiana Manual on Uniform Traffic Control Devices.

PART 2 - PRODUCTS

2.1 AGGREGATE

- A. Fine aggregates shall consist of natural sand or manufactured sand produced by crushing rock, shells, air-cooled blast furnace slag, or wetbottom boiler slag.
 - 1. Fine aggregates used in Portland cement concrete and bituminous pavements shall be free from injurious amounts of organic impurities. When subjected to the colorimetric test for organic impurities and a color darker than the standard is produced, it shall be tested for effect of organic impurities on strength of mortar in accordance with AASHTO T 71. If the relative strength at 7 and 28 days, calculated in accordance with section 10 of T 71, is less than 95%, it shall be rejected.
- B. Coarse aggregates shall consist of clean, tough, durable fragments of crushed rock, crushed or uncrushed gravel or shells, or crushed and processed air-cooled blast furnace slag. These materials shall not contain more than 15% flat or elongated pieces and shall not contain particles with an adherent coating. Flat or elongated pieces will be described as pieces having a length in excess of four times its width.

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- C. Coarse aggregates and fine aggregates shall comply with applicable requirements of INDOTSS.

2.2 BITUMINOUS MATERIALS

- A. Petroleum asphalt cement shall be homogeneous, free from water, and shall not foam when heated to 347°F.

- 1. Petroleum asphalt cement shall be PG Binder, grade PB 64-22.
- 2. Petroleum asphalt emulsion shall be AE-60.

- B. Bituminous materials for prime coat shall consist of:

- 1. Cut-back asphalt - MC-70; or
- 2. Asphalt emulsion - AE-P.
- 3. Materials shall conform to applicable requirements of INDOTSS.

- C. Bituminous materials for tack coat shall consist of:

- 1. Asphalt emulsion - AE-T.
- 2. Materials shall conform to applicable requirements of INDOTSS.

- D. Bituminous materials for seal coat shall consist of:

- 1. Asphalt emulsion - RS-2, AE-90, AE-150, HFRS-2.
- 2. Materials shall conform to applicable requirements of INDOTSS.

- E. Cover aggregate shall consist of:

- 1. Coarse aggregates, Class A or B, size no. 8, 9, 11 or 12.
- 2. Fine aggregate (natural sand only), size no. 23 or 24.
- 3. Materials shall conform to applicable requirements of INDOTSS.

2.3 HOT MIX ASPHALT (HMA)

- A. Hot mix asphalt (HMA) shall consist of an intimate mixture of coarse aggregate, fine aggregate (including mineral filler if required), and asphalt cement or emulsion combined in proportions specified in applicable requirements of INDOTSS Section.

- B. When the use of one type or source of aggregate or binder is started, the use of the same type or source shall be continued for the entire lift being constructed, unless otherwise directed by the Town.

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- C. The use of recycled materials, RAP or ARS, shall not be permitted unless otherwise directed and approved by Engineer.
- D. Preparation of HMA mixtures shall comply with the applicable requirements of INDOTSS.

2.4 PORTLAND CEMENT CONCRETE

- A. Cement shall be Portland cement and shall meet the requirements of ASTM Specification C 150, ACI 201, and ACI 318. Cement shall be Type 1 for normal use, Type 1A where air entrainment is desired, or Type III or Type IIIA where high early strength is desired and authorized by the Engineer. Blended hydraulic cements which meet the requirements of ASTM Specification C595 Type 1P Portland pozzolan cement may be used where a more watertight concrete is required. Fly ash may also be used as a partial cement replacement for Types 1 or 1A. Cement shall meet requirements specified in INDOTSS.
- B. Regular fine and coarse aggregates shall meet the requirements of ASTM Specification C 33. Aggregate shall be crushed limestone with a maximum size of $\frac{3}{4}$ inch, except in mass concrete the maximum size may be 1-1/2 inches.
 - 1. Lightweight fine and coarse aggregates shall meet the requirements of ASTM Specification C 330.
 - 2. Insulating fine and coarse aggregates shall meet the requirements of ASTM Specification C 332.
- C. Water shall be potable, clean, and free from injurious amounts of oils, acids, alkalis, organic materials, or other substances that may be deleterious to concrete or steel. A maximum of 500 mg/L of chloride ion may be present in the water.
- D. Air entraining admixtures shall meet the requirements of ASTM Specifications C 260.
 - 1. Water reducing and retarding admixtures shall meet the requirements of ASTM C494, Type A or Type D; however, they shall contain no chlorides, be nontoxic after 30 days and compatible with the air entraining admixtures. The amount of admixture added to the concrete shall be in accordance with the manufacturer's requirements. Furnish a compliance statement that the admixture used satisfies all requirements of this specification. Evidence that the admixture is included in the approved list of the INDOTSS Division of Materials and Tests, and in accordance with all requirements of applicable sections of INDOTSS, will satisfy the requirement for a compliance statement.
 - 2. Fly ash shall meet the chemical and physical requirements of ASTM C 618 for mineral admixture Class F, except loss on

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ignition shall not exceed 6%. Fly ash shall be sampled and tested in accordance with ASTM C 311 prior to use.

- E. Reinforcing steel shall meet the requirements of ASTM Specification A 615, Grade 60.
 - 1. Welded wire fabric or wire mesh shall meet the requirements of ASTM A 185.
 - 2. Reinforcing steel and appurtenances shall follow applicable requirements of INDOTSS.
- F. Preformed expansion joint filler shall meet the requirements of ASTM Specification D 1752, Type III.
 - 1. Hot-poured elastic joint filler shall meet the requirements of ASTM Specification D 1190.
 - 2. Waterproof expansion joint filler shall meet the requirements of ASTM Specification D 1850.
 - 3. Joint materials specified in INDOTSS Section 906 may be used, approved by the Engineer.
- G. Concrete pavement shall be wet cured by using burlap, waterproof blankets, or ponding; or by using a membrane compound. If the membrane method is used, the compound shall be Type 2, complying with AASHTO M148 for white pigmented compound. A pressure sprayer capable of applying a continuous uniform film to the pavement surfaces will be required.
- H. Dowel bars shall be smooth, round bars of plain billetsteel conforming to ASTM A615, Grade 40, and free of any deformation or foreign material that would restrict slippage in concrete. Dowel bars shall be coated as required by INDOTSS. For expansion joints, each bar shall be provided with a metal cap, or approved plastic cap, on one end that will provide for ample movement of the slabs.
 - 1. Dowel bars and assemblies shall conform to the requirements of INDOTSS Section 501.14 (f).
- I. Concrete base shall meet the requirements of INDOTSS Section 307.
- J. Reinforced concrete pavement shall meet the requirements of INDOTSS Section 501.
- K. Reinforced concrete for sidewalks and steps shall meet the requirements of INDOTSS Section 604.

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L. Reinforced concrete for curbing shall meet the applicable requirements of INDOTSS.

2.5 UNDERDRAINS

Underdrain material shall be 4-inch polyethylene perforated pipe meeting ASTM F405 specification and shall be per INDOT standard specification for "Underdrain."

PART 3 - EXECUTION

3.1 GENERAL

- A. The Contractor is responsible to provide equipment, workmanship and materials required to achieve a finished product that meets these specifications.
- B. Use compaction equipment suitable to the material being placed. Compacting equipment shall include at least one piece of equipment capable or providing a smooth even surface on the pavement surface course.
- C. Prior to placing paving and surfacing materials, shape subgrade as required to produce finished pavement grades and cross-sections shown on drawings.
- D. Do not place paving and surfacing material before subgrade is reviewed and accepted by the Town. Do not place paving and surfacing materials on a frozen or muddy subgrade.
- E. Compact subgrade to not less than 100% of its maximum density as determined in accordance with AASHTO T99.
- F. Provide adequate drainage at all times to prevent water from standing on subgrade, pavement or walks.

3.2 SUBGRADE

The subgrade material and testing shall comply with applicable requirements of INDOTSS, before placement of subbase.

3.3 SUBBASE PREPARATION

Provide 8 inches of subbase in locations where pavement is to be placed on a material other than Special Backfill. Subbase shall meet the applicable requirements of INDOTSS.

Proof roll prepared subbase surface to check for unstable areas. Remove loose material and soft spots, replace with stable material and re-proof. The Town Superintendent or Representative may require a 10" lime-treated subbase in areas that cannot be adequately stabilized. Do not begin paving work until deficient areas have been corrected.

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3.4 AGGREGATE BASE, SURFACE, OR SHOULDERS

- A. Aggregate base, surface, or shoulders shall consist of crushed rock or gravel. The aggregate type shall be suitable for the area in which the project is located. The aggregate thickness shall be as shown on the drawings and as specified herein.
- B. Aggregate shall be Type “O” mix, unless otherwise specified by the Town.
- C. Compacted aggregate materials and construction shall conform to applicable requirements of INDOTSS.
- D. If the required thickness of the aggregate (Type O) exceeds 4 inches, the material shall be placed and compacted in separate lifts no less than 2 inches nor more than 4 inches of compacted depth. If Type P aggregate is used, it may be placed in individual lifts with a thickness of up to 6 inches.
- E. If spreading devices are used which will ensure proper depth and alignment forms will not be required; otherwise, forms shall be required. Forms shall be of wood or steel, adequate in depth, straight, of uniform dimensions and equipped with positive means for holding the form ends rigidly together and in line. Segregation of material shall be avoided by any spreading method used. No payment will be made for aggregate placed beyond the dimensions shown on the drawings.
- F. Compact material in each lift after material is spread and shaped. Compact material to not less than 100% of maximum dry density as determined by AASHTO T99. Use construction procedures, including sufficient wetting and number of passes, to ensure specified density is attained.
- G. The Contractor shall employ an independent testing laboratory to perform field density tests to demonstrate proper compaction of aggregate surface pavement, upon request by the Town.
- H. In a brick surfaced street, unless specifically excepted and pending the structural adequacy of any remaining brick, the Contractor may remove all brick and enough base material to allow full width repaving using either a bituminous or concrete pavement; or of providing a HMA base and HMA intermediate for the full depth of the brick across the trench and then replace the entire street with 1 inch of HAC surface.
- I. Unless otherwise shown on the drawings, the minimum section (excluding subgrade) of reinforced concrete shall be 6 inches of compacted #53, Type “O” aggregate base and 6 inches of 4,000 psi reinforced concrete.

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- J. Unless otherwise shown on the drawings, for a street with a brick base and an asphalt surface, the replacement section shall be full depth asphalt from the bottom of the brick base to the top of the asphalt surface. The top 1 inch shall be #11 HMA surface.
- K. Unless otherwise shown on the drawings, for a street with a concrete base and an asphalt surface, the replacement section shall be a new concrete base, not less than 6 inches thick with #5 HMA base to within 1 inch of the existing grade and then 1 inch of #11 HMA surface.
- L. Unless otherwise shown on the drawings, chip and seal pavements shall have 8 inches of compacted aggregated base (#53, Type "O" crushed stone) and 1 inch process bituminous coated aggregate pavement placed and rolled as specified in applicable Sections of INDOTSS.
- M. Unless otherwise shown on the drawings, gravel pavement shall be replaced with 6 inches of #53, Type "O" compacted stone or gravel aggregate as specified in applicable Sections of INDOTSS.

3.5 HOT MIX ASPHALT

- A. This work shall consist of constructing one or more courses of HMA base, intermediate, and wedge leveling or surface mixtures on a prepared foundation in accordance with these specifications and in reasonably close conformance with the lines, grades, thicknesses, and typical cross sections shown on the plans or established by the Town.
 - 1. If the required finished depth of any course is to exceed three times the top size of the aggregate used as shown by actual screen analysis, the course shall be constructed in two or more lifts, as directed.
 - 2. Mix type shall be as indicated on the drawings, without exception, unless otherwise approved in writing by the Town.
 - a. Job mix formulas shall be prepared and submitted for approval to the Town in accordance with applicable sections of INDOTSS. The job mix formula shall include standard bituminous mixture information including, but not limited to, aggregate gradation, binder content, maximum specific gravity, and air voids.
 - 3. Materials and construction requirements shall comply with applicable requirements of INDOTSS.

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- B. If the previously constructed course is granular, a prime coat will be required.
 - 1. Apply prime coat uniformly at a rate of 0.25 to 0.80 gallon per square yard depending on condition of surface and amount of loose aggregate.
 - 2. Apply prime coat with a pressure distributor. Temperature of prime coat shall not exceed 150°F.
 - 3. Squeegee excess prime coat from the subbase surface. Correct deficient or skipped area.
 - 4. Prime coat shall be placed in accordance with applicable sections of INDOTSS.
- C. Place and spread bituminous base mixture with a bituminous paver. In areas inaccessible to a paving machine, place and spread bituminous base mixture by other acceptable mechanical or hand methods.
- D. Tack coat shall be placed on existing bituminous or concrete surfaces before a new lift of bituminous material is added. Apply tack coat uniformly at a rate of 0.06 gallon per square yard (0.000252 ton per square yard).
 - 1. Patch and clean existing surface. The surface shall be free of irregularities and provide a reasonably smooth and uniform surface to receive the tack coat. Remove and replace unstable corrugated areas with suitable patching materials.
 - 2. Tack coat shall be placed in accordance with applicable sections of INDOTSS.
- E. Placement and compaction of hot mix asphalt (HMA) shall conform to applicable requirements of INDOTSS.
- F. Place binder used for wedging or leveling, approaches and feathering by mechanical methods or acceptable hand methods for placing and spreading in accordance with applicable requirements of INDOTSS.

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3.6 SEAL COAT AND COVERING AGGREGATE (CHIP AND SEAL)

A. Application shall be as follows:

Seal Type	Cover Aggregate Size Number	Rate of Application Per Square Yard	
		Aggregate Pounds	Bituminous Material Gallons at 60°F
1 - Single Application (Only AE-90 or AE - 150)	23,24	12-15	0.12 – 0.16
2 – Single Application	12	14 – 17	0.29 – 0.33
5 – First Application	11	16 – 20	0.36 – 0.40
Second Application	12	16 – 19	0.33 – 0.37

B. Seal coat and covering aggregate shall be placed in accordance with applicable sections of INDOTSS.

3.7 PORTLAND CEMENT CONCRETE PAVEMENT

A. Portland cement concrete pavement shall consist of a coarse aggregate base (if required) and a reinforced or unreinforced Portland cement concrete surface, as shown on the drawings.

1. Use No. 53, Type “O” coarse aggregate for subbase, unless otherwise shown or specified.
2. Pavement cross-section shall be as shown on drawings.

B. Where an aggregate base course is shown or specified, it shall be constructed in accordance with Article 3.3 of this specification.

C. Portland cement concrete pavement operations and materials shall comply with applicable sections of INDOTSS unless otherwise specified by the Town.

1. Alternate equipment to that specified in INDOTSS, shall be allowed provided that line, grade, surface, smoothness and other requirements of the specifications are met. The equipment used shall be subject to the approval of the Town.
2. Expansion and contraction joints shall be installed as indicated on the drawings or as required by INDOTSS. Expansion joints shall be required whenever new concrete abuts fixed objects or existing concrete surfaces, whether or not shown on the drawings.
3. Keyway construction, load transfer devices, tie bars and slab and ear reinforcement shall be installed as indicated on the drawings.

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4. Unless otherwise shown on the drawings, the final finish of concrete pavement shall be by brooming, as set out in INDOTSS, to form a transverse skid-resistant finish.
5. The Contractor shall always have materials available to protect the surface of concrete against rain. These materials shall consist of burlap, curing paper or plastic sheeting.
6. New concrete pavement shall be protected by the Contractor until opening to traffic is approved by the Town. It shall not be opened to traffic until the field-cured concrete has attained a flexural strength of 550 psi, or a compressive strength of 3,500 psi. If such tests are not conducted, the pavement shall not be opened to traffic until 14 days after the concrete was placed. Before opening to traffic, the pavement shall be cleaned and permanent lane markings applied to the pavement.

3.8 WALKS

- A. Walks shall consist of a coarse aggregate subbase and a reinforced concrete surface. Use No. 53 crushed stone for subbase, unless otherwise shown. Concrete shall be Class "A" 4,000 psi concrete.
- B. Subbase shall be 2 inches thick, and concrete shall be 4 inches thick, unless otherwise shown. Sidewalks that cross driveway approaches shall be 6 inches thick.
- C. Compact subbase to not less than 95% of maximum dry density, as determined in accordance with AASHTO T99.
- D. Proportion, mix, and place concrete as specified in applicable sections of INDOTSS. Walks shall have a broom surface finish. Edge all outside edges of walk and all joints with a ¼ inch radius edging tool.
- E. Unless otherwise shown on the drawings, walks shall be divided into sections not more than five feet in length by dummy joints formed by a jointing tool with a ¼ inch radius.
- F. Form construction joints around all abutting structures and appurtenances such as manhole, utility poles, hatches, and hydrants. Install ½ inch thick pre-molded expansion joint filler in construction joints. Expansion joint material shall extend for the full depth of the walk.
- G. If existing sidewalk is to be removed and replaced with new sidewalk or new sidewalk extended from existing sidewalk, the existing sidewalk shall be removed to the nearest joint of suitable quality or as directed by the Town Representative.

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3.9 CURBS

- A. The construction of curbs, combination curb and gutter, and integral curb and gutter shall be in accordance with these specifications and as shown on the plans and shall be in reasonably close conformance with the lines and grades shown on the plans or as directed by the Town.
- B. Excavation for curbs shall be made to the required depth, and the subgrade or base upon which the curb is constructed shall be compacted to a firm, even surface to not less than 95% of maximum dry density as determined in accordance with AASHTO T99.
- C. Concrete for curbs shall be Class A, 4,000 psi, as specified previously for Concrete Pavement.
- D. The curbs shall be constructed by the use of wood or metal forms; or, if approved by the Town, the curb may be constructed using a curb slipform machine. Forms, if used, shall be straight, free from warped or bent sections, and shall extend for the entire depth of the curb and shall be securely held in place so that no deviation from alignment and grade will occur during placement of concrete. The concrete shall be consolidated by vibration or other acceptable methods. The top of the curb shall be floated smooth and the top outer corner rounded to a 1 inch radius.
- E. The face, top, and gutter of curbs shall not have deviations or irregularities of more than ¼ inch when checked with a 10-foot straightedge.
- F. Construction joints shall be placed at 10-foot intervals, unless otherwise shown or directed by the Town. The joint shall be uniform, of 1/8 to 1/4 inch in width, and to a depth of approximately 2-1/2 inches. The joint may be saw cut or formed by approved removable strips providing a straight joint at right angles to the length of curb. Joints shall be filled with specified bituminous joint filler material. Construction joints shall be formed around all abutting structures such as inlets and shall be as specified previously.
- G. As soon as possible after placing and finishing of concrete, the curbing shall be moistened and kept moist for three days, or cured with the use of a specified membrane compound.
- H. If existing curb is to be removed and replaced with new curb or new curb extended from existing curb, the existing curb shall be removed to the nearest joint of suitable existing curb or as directed by the Town.

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3.10 LANE STRIPPING

- A. Lane striping is to be in accordance with all applicable standards in INDOTSS and the construction plans.
- B. Parking lots are to be striped with standard white road paint. Spaces to be striped shall be 9 feet 0 inches wide by 18 feet 0 inches long with 4 inch wide stripes.
- C. Contractor will not permit traffic on any new pavement surface prior to striping.
- D. Contractor will clean the new pavement surface to remove all dust, dirt, mud and debris prior to striping.

3.11 TESTING FOR HOT MIX ASPHALT (HMA)

- A. The Contractor shall employ and pay for the services of a competent independent testing laboratory to take cores at selected locations and perform described tests. Compaction requirements for HMA mixtures placed in accordance with applicable sections of INDOTSS shall be controlled by in place density determined from cores cut from the compacted pavement. A minimum of two cores per section shall be cut for each course of each material or as directed by the Town Representative. Sections are defined as a maximum of 1000 Mg (1041 ton) of HMA base or intermediate or 600 Mg (624 ton) of HMA surface. The transverse core location shall be located so that the edge of the core will be no closer than 75 mm (3 inches) from a confined edge or 150 mm (6 inches) from a non-confined edge of the course being placed.
- B. For compaction of HMA mixtures with quantities less than 100 Mg (104 ton) per day, acceptance may be visual as determined by the Town.
- C. The Contractor along with their independent testing lab representative shall obtain cores in the presence of the Town's Representative with a device that shall produce a uniform 150 mm (6 inches) in diameter pavement sample. Each HMA course shall be cored within one work day of placement. Damaged core(s) shall be discarded and replaced with a core from a nearby location as selected by the Town.
- D. The Contractor, in the presence of the Town's Representative, shall mark the core to define the course to be tested. If the defined area is less than 1.5 times the maximum particle size, the core will be discarded and a core from a new random location will be selected for testing as determined by the Town's Representative. Within one work day of coring operations the Contractor shall clean, dry, refill and compact the core holes with suitable material approved by the Town.

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- E. The Contractor's testing lab representative shall take immediate possession of the cores. If the cores are subsequently damaged, additional coring within the specific section(s) will be required at locations to be determined by the Town.
- F. Each core shall be tested within one work day of coring operation to determine thickness, bulk specific gravity, aggregate gradation and binder content. Test results shall then be transmitted either verbally or by other means to both the Contractor and the Town for verification before each subsequent bituminous lift is placed.
1. Average thickness of the cores shall not vary from the plan thickness more than 12.5 mm (0.5 inch) for HMA base and intermediate course(s) and 6.25 mm (0.25 inch) for HMA surface course(s) for acceptance in accordance with INDOTSS section 105.03.
 2. The bulk specific gravity shall be determined in accordance with AASHTO T166 or AASHTO T 275. The in place density of a section for a mixture shall be expressed as :
$$\text{Density \%} = (\text{BSG}/\text{MSG}) * 100$$

Where:

BSG = bulk specific gravity as determined from independent testing laboratory.
MSG = maximum specific gravity as reported on job mix formula.
 3. The calculated density of the cores shall not be less than 90% nor more than 96% as set out above. Test results which are outside stated limits shall be considered and adjudicated as a failed material in accordance with INDOTSS.
- G. The Contractor's independent testing laboratory representative shall determine the aggregate gradation and binder content of the core samples in accordance with ITM 571. Aggregate gradation shall be within tolerances set forth in applicable sections of INDOTSS and binder content shall be within ± 0.5 percent from the job mix formula. Test results which are outside the stated limits shall be considered and adjudicated as a failed material in accordance with INDOTSS.
- H. A copy of all core test results shall be submitted to the Town's Superintendent for verification of specification compliance within one calendar week of core testing.
- I. The Contractor shall make the following tests at no additional cost to the Town, and they shall be as specified in this Article and as requested by the Town. Perform tests in accordance with the following ASTM Specifications:

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Test	ASTM Specification
Slump	C143
Air Content	C173
Test Cylinder	C313 or C513
Core Samples	C42
Fly Ash	C311

1. Measure slump each time test beams or cylinders are to be made and at any other time requested by the Town's Representative. The slump shall be as specified in applicable sections of INDOTSS, or as otherwise specified herein, unless specifically excepted by the Town's Superintendent.
2. Measure air content each time test beams or cylinders are to be made and at any other time requested by the Town. The field test may be omitted if the air content is known prior to taking samples. The field test may not be omitted if fly ash is used in the mix.
3. Concrete paving mixes shall comply with guidelines of INDOTSS Section 501.03 and shall meet the testing requirements of Section 501.03 (a). However, in lieu of forming test beams as described in Section 501.03 (a) 2, the Contractor may substitute cylinder tests as follows:
 - a. Make test cylinders in sets of four. Field cure one cylinder and break at seven days. Laboratory cure the remaining three cylinders and break at 28 days. The Contractor shall be responsible for handling and transportation of cylinders.
 - b. If fly ash is used in the mix, a total of seven cylinders shall be taken. The additional three cylinders shall be laboratory cured and broken at 56 days, if the 28-day strength does not meet specifications.
 - c. Make one set of test cylinders for each 100 cubic yards, or fraction of 100 cubic yards, of concrete placed; or at other times requested by the Town.
 - d. Unless otherwise specified, concrete shall have a 28-day compressive strength of 4,000 psi, as demonstrated by laboratory tests of cylinders.

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3.12 PROTECTION

- A. Maintain compacted aggregate subbase and surface true to line and grade and required density. Maintain subbase until prime coat is placed. Maintain surface until job is complete.
- B. Do not permit vehicular traffic of any kind on any bituminous course until the bituminous mixture has hardened sufficiently not to be distorted beyond specified tolerances. Remove any foreign material which is on the surface of any course before the course is rolled or any subsequent course is placed.
- C. Do not permit traffic on concrete pavement or walks until concrete has developed sufficient strength not to be marked or damaged. Do not permit vehicular traffic on concrete for at least 14 days.
- D. Repair or replace damaged pavement and walks to the satisfaction of the Town.

3.13 CLEANUP

Clean up the job site following pavement and surfacing restoration. Remove all rubbish, excess materials, temporary structures, and equipment. Leave the work in a neat and presentable condition.

PART 4 - FIGURES

4.1 STANDARD PAVEMENT DETAILS

<u>FIGURE</u>	<u>DESCRIPTION</u>
2500A	Typical Section - Collector Street
2500B	Minimum Residential Subdivision Entrance from a Thoroughfare
2500C	Typical Pavement Sections, Collector Streets
2500D	Typical Pavement Sections, Industrial & Arterial Streets
2500E	Typical Pavement Sections, Local Streets
2500F	Joint Detail
2500G	Joint and Structure Detail
2500H	Joint Location, Street Plan
2500I	Roll Curb
2500J	Integral Curb and Gutter
2500K	Integral Curb and Gutter, Reverse Slope
2500L	Pipe Underdrain
2500M	Sidewalk Details
2500N	Handicapped Accessible Sidewalk
2500O	Subdivision Cul-de-sac

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2500P	Subdivision Temporary Cul-de-sac
2500Q	Standard Barricade
2500R	Street Signs
2500S	Residential Driveways
2500S.1	Old Town Minimum Commercial Drive
2500S.2	Commercial Drive – Class III
2500S.3	Commercial Drive Class IV
2500T	Typical Driveway Section
2500U	Repair of Cuts within Pavement Limits, Limits of Patch
2500V	Repair of Cuts within Pavement Limits, Bituminous and Concrete Patches
2500W	Repair of Cuts within Pavement Limits, Temporary Patch
2500X	Bicycle/Jogging Path

END OF SECTION 02500