

SECTION 32 13 13**CONCRETE PAVING****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Concrete sidewalks. See Alternate G-2, Site Improvements for additional work.

1.02 RELATED REQUIREMENTS

- A. Section 31 22 00 - Grading: Preparation of site for paving and base and preparation of subsoil at pavement perimeter for planting.
- B. Section 31 23 23 - Fill: Compacted subbase for paving.

1.03 REFERENCE STANDARDS

- A. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; American Concrete Institute International; 1991 (Reapproved 2002).
- B. ACI 301 - Specifications for Structural Concrete for Buildings; American Concrete Institute International; 2005.
- C. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; American Concrete Institute International; 2000.
- D. ACI 305R - Hot Weather Concreting; American Concrete Institute International; 1999.
- E. ACI 306R - Cold Weather Concreting; American Concrete Institute International; 1988 (Reapproved 2002).
- F. ASTM A 185/A 185M - Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete; 2007.
- G. ASTM A 497/A 497M - Standard Specification for Steel Welded Wire Reinforcement, Deformed, for Concrete; 2007.
- H. ASTM A 615/A 615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement; 2007.
- I. ASTM C 33 - Standard Specification for Concrete Aggregates; 2007.
- J. ASTM C 39/C 39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2005.
- K. ASTM C 94/C 94M - Standard Specification for Ready-Mixed Concrete; 2007.
- L. ASTM C 150 - Standard Specification for Portland Cement; 2007.
- M. ASTM C 173/C 173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method; 2008a.
- N. ASTM C 260 - Standard Specification for Air-Entraining Admixtures for Concrete; 2006.
- O. ASTM C 309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete; 2007.
- P. ASTM C 494/C 494M - Standard Specification for Chemical Admixtures for Concrete; 2008a.
- Q. ASTM C 618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete; 2008a.

- R. ASTM C 685/C 685M - Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing; 2007.
- S. ASTM D 1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (nonextruding and Resilient Bituminous Types); 2004 (Reapproved 2008).
- T. ASTM D 1752 - Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction; 2004a (Reapproved 2008).

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on joint filler, admixtures, and curing compound.
- C. Design Data: Indicate pavement thickness, designed concrete strength, reinforcement, and typical details.

1.05 QUALITY ASSURANCE

- A. Perform work in accordance with ACI 301.
- B. Obtain cementitious materials from same source throughout.
- C. Follow recommendations of ACI 305R when concreting during hot weather.
- D. Follow recommendations of ACI 306R when concreting during cold weather.

1.06 ENVIRONMENTAL REQUIREMENTS

- A. Do not place concrete when base surface temperature is less than 40 degrees F, or surface is wet or frozen.

PART 2 PRODUCTS

2.01 FORM MATERIALS

- A. Form Materials: Conform to ACI 301.
- B. Wood form material, profiled to suit conditions.
- C. Joint Filler: Preformed; non-extruding bituminous type (ASTM D 1751) or sponge rubber or cork (ASTM D 1752).
 - 1. Thickness: 1/2 inch.

2.02 REINFORCEMENT

- A. Reinforcing Steel and Welded Wire Reinforcement: Types specified in Section 03 20 00.
- B. Reinforcing Steel: ASTM A 615/A 615M Grade 40 (280); deformed billet steel bars; unfinished finish.
- C. Steel Welded Wire Reinforcement: Plain type, ASTM A 185/A 185M; in flat sheets; unfinished.
- D. Dowels: ASTM A 615/A 615M Grade 40 (280); deformed billet steel bars; unfinished finish.

2.03 CONCRETE MATERIALS

- A. Concrete Materials: Provide in accordance with State of Ohio Highways standards.
- B. Cement: ASTM C 150 Normal - Type I portland type, grey color.
- C. Fine and Coarse Mix Aggregates: ASTM C 33.

- D. Fly Ash: ASTM C 618, Class C or F.
- E. Calcined Pozzolan: ASTM C 618, Class N.
- F. Silica Fume: ACI 211.1
- G. Water: Clean, and not detrimental to concrete.
- H. Fiber Reinforcement: Synthetic fibers shown to have long-term resistance to deterioration when in contact with alkalis and moisture; 1/2 inch length.
- I. Air Entrainment Admixture: ASTM C 260.
- J. Chemical Admixtures: ASTM C 494/C 494M, Type A - Water Reducing, Type C - Accelerating, and Type G - Water Reducing, High Range and Retarding.
 - 1. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.

2.04 ACCESSORIES

- A. Curing Compound: ASTM C 309, Type 1, Class A.

2.05 CONCRETE MIX DESIGN

- A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.
- B. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.
 - 1. For trial mixtures method, employ independent testing agency acceptable to Jester Jones Schifer Architects for preparing and reporting proposed mix designs.
- C. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended by manufacturer.
- D. Fiber Reinforcement: Add to mix at rate of 1.5 pounds per cubic yard, or as recommended by manufacturer for specific project conditions.
- E. Concrete Properties:
 - 1. Compressive Strength, when tested in accordance with ASTM C 39/C 39M at 28 days: 400 psi.
 - 2. Fly Ash Content: Maximum 15 percent of cementitious materials by weight.
 - 3. Calcined Pozzolan Content: Maximum 10 percent of cementitious materials by weight.
 - 4. Silica Fume Content: Maximum 5 percent of cementitious materials by weight.
 - 5. Water-Cement Ratio: Maximum 40 percent by weight.
 - 6. Total Air Content: 4 percent, determined in accordance with ASTM C 173/C 173M.
 - 7. Maximum Slump: 3 inches.
 - 8. Maximum Aggregate Size: #57.

2.06 MIXING

- A. On Project Site: Mix in drum type batch mixer, complying with ASTM C 685. Mix each batch not less than 1-1/2 minutes and not more than 5 minutes.
- B. Transit Mixers: Comply with ASTM C 94/C 94M.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify compacted subgrade is acceptable and ready to support paving and imposed loads.
- B. Verify gradients and elevations of base are correct.

3.02 SUBBASE

- A. See Section 32 11 23 for construction of base course for work of this Section.
- B. Prepare subbase in accordance with State of Ohio Highways standards.

3.03 PREPARATION

- A. Moisten base to minimize absorption of water from fresh concrete.
- B. Coat surfaces of manhole frames with oil to prevent bond with concrete pavement.
- C. Notify Jester Jones Schifer Architects minimum 24 hours prior to commencement of concreting operations.

3.04 FORMING

- A. Place and secure forms to correct location, dimension, profile, and gradient.
- B. Assemble formwork to permit easy stripping and dismantling without damaging concrete.
- C. Place joint filler vertical in position, in straight lines. Secure to formwork during concrete placement.

3.05 REINFORCEMENT

- A. Place reinforcement as indicated.
- B. Interrupt reinforcement at contraction joints.
- C. Place dowels to achieve pavement and curb alignment as detailed.

3.06 PLACING CONCRETE

- A. Place concrete in accordance with ACI 304R.
- B. Ensure reinforcement, inserts, embedded parts, formed joints are not disturbed during concrete placement.
- C. Place concrete continuously over the full width of the panel and between predetermined construction joints. Do not break or interrupt successive pours such that cold joints occur.

3.07 JOINTS

- A. Place 3/8 inch wide expansion joints at 20 foot intervals and to separate paving from vertical surfaces and other components and in pattern indicated.
 - 1. Form joints with joint filler extending from bottom of pavement to within 1/2 inch of finished surface.
 - 2. Secure to resist movement by wet concrete.
- B. Provide scored joints:
 - 1. At maximum 5 feet intervals in sidewalks.
- C. Provide keyed joints as indicated.
- D. Saw cut contraction joints in paving 3/16 inch wide at an optimum time after finishing. Cut 1/3 into depth of slab.

3.08 FINISHING

- A. Area Paving: Light broom, texture perpendicular to pavement direction.
- B. Sidewalk Paving: Light broom, texture perpendicular to direction of travel with troweled and radiused edge 1/4 inch radius.

- C. Place curing compound on exposed concrete surfaces immediately after finishing. Apply in accordance with manufacturer's instructions.

3.09 TOLERANCES

- A. Maximum Variation of Surface Flatness: 1/4 inch in 10 ft.
- B. Maximum Variation From True Position: 1/4 inch.

3.10 FIELD QUALITY CONTROL

- A. Engage an independent testing agency to perform field quality control tests.
 - 1. Provide free access to concrete operations at project site and cooperate with appointed firm.
 - 2. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.
 - 3. Tests of concrete and concrete materials may be performed at any time to ensure conformance with specified requirements.
- B. Compressive Strength Tests: ASTM C 39/C 39M. For each test, mold and cure three concrete test cylinders. Obtain test samples for every 100 cu yd or less of each class of concrete placed.
 - 1. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.
 - 2. Perform one slump test for each set of test cylinders taken.
- C. Maintain records of placed concrete items. Record date, location of pour, quantity, air temperature, and test samples taken.

3.11 PROTECTION

- A. Immediately after placement, protect pavement from premature drying, excessive hot or cold temperatures, and mechanical injury.
- B. Do not permit pedestrian traffic over pavement for 7 days minimum after finishing.
- C. Do not permit pedestrian traffic over pavement until 75 percent design strength of concrete has been achieved.

END OF SECTION

SECTION 32 92 19**SEEDING****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Preparation of subsoil.
- B. Placing topsoil.
- C. Seeding, mulching and fertilizer.
- D. Maintenance.

1.02 RELATED REQUIREMENTS

- A. Section 31 22 00 - Grading: Topsoil material.
- B. Section 31 22 00 - Grading: Preparation of subsoil and placement of topsoil in preparation for the work of this section.
- C. Section 31 23 23 - Fill: Topsoil material.

1.03 DEFINITIONS

- A. Weeds: Include Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry, Tansy Ragwort, Bermuda Grass, Johnson Grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Perennial Sorrel, and Brome Grass.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Topsoil samples.
- C. Maintenance Data: Include maintenance instructions, cutting method and maximum grass height; types, application frequency, and recommended coverage of fertilizer; and herbicides.

1.05 REGULATORY REQUIREMENTS

- A. Comply with regulatory agencies for fertilizer and herbicide composition.
- B. Provide certificate of compliance from authority having jurisdiction indicating approval of seed mixture.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver grass seed mixture in sealed containers. Seed in damaged packaging is not acceptable. Deliver seed mixture in containers showing percentage of seed mix, year of production, net weight, date of packaging, and location of packaging.
- B. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.
- C. Furnish maintenance of seeded areas for three months from Date of Substantial Completion.
- D. Maintain seeded areas immediately after placement until grass is well established and exhibits a vigorous growing condition.

PART 2 PRODUCTS**2.01 SEED MIXTURE**

- A. Seed Mixture:
 - 1. Victa Kentucky Blue Grass: 25 percent.
 - 2. Abbey Kentucky Blue Grass: 25 percent.
 - 3. Acheiver Perennial Rye: 25 percent.
 - 4. Accolade Perennial Rye: 25 percent.

2.02 SOIL MATERIALS

- A. Topsoil: Fertile, agricultural soil, typical for locality, capable of sustaining vigorous plant growth, taken from drained site; free of subsoil, clay or impurities, plants, weeds and roots; pH value of minimum 5.4 and maximum 7.0.
- B. Topsoil: Excavated from site and free of weeds.

2.03 ACCESSORIES

- A. Mulching Material: Oat or wheat straw, free from weeds, foreign matter detrimental to plant life, and dry. Hay or chopped cornstalks are not acceptable.
- B. Fertilizer: Commercial grade complete fertilizer of a neutral character consisting of fast and slow release nitrogen, phosphorous, and potassium; Provide fertilizer recommended for grass, with fifty percent of the elements derived from organic sources; of proportion necessary to eliminate any deficiencies of topsoil, as indicated by analysis.
- C. Water: Clean, fresh and free of substances or matter that could inhibit vigorous growth of grass.
- D. Erosion Fabric: Jute matting, open weave.
- E. Herbicide: EPA required and approved, of type recommended by manufacturer.
- F. Stakes: Softwood lumber, chisel pointed.
- G. String: Inorganic fiber.
- H. Edging: Galvanized steel.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that prepared soil base is ready to receive the work of this Section.

3.02 PREPARATION

- A. Prepare subgrade in accordance with Section 31 22 00.
- B. Place topsoil in accordance with Section 31 22 00.
- C. Install edging at periphery of seeded areas in straight lines to consistent depth.

3.03 FERTILIZING

- A. Apply fertilizer in accordance with manufacturer's instructions.
- B. Apply after smooth raking of topsoil and prior to roller compaction.
- C. Do not apply fertilizer at same time or with same machine as will be used to apply seed.
- D. Mix thoroughly into upper 2 inches of topsoil.
- E. Lightly water to aid the dissipation of fertilizer.

3.04 SEEDING

- A. Apply seed at a rate of 5 to 8 lbs per 1000 sq ft (2.5 to 4 Kg per 100 sq m) evenly in two

intersecting directions. Rake in lightly.

- B. Do not seed areas in excess of that which can be mulched on same day.
- C. Planting Season: April 15 to June 15, September 1 to October 15.
- D. Do not sow immediately following rain, when ground is too dry, or during windy periods.
- E. Roll seeded area with roller not exceeding 112 lbs.
- F. Immediately following seeding and compacting, apply mulch to a thickness of 1/8 inches. Maintain clear of shrubs and trees.
- G. Apply water with a fine spray immediately after each area has been mulched. Saturate to 4 inches of soil.
- H. Following germination, immediately re-seed areas without germinated seeds that are larger than 4 by 4 inches.

3.05 PROTECTION

- A. Identify seeded areas with stakes and string around area periphery. Set string height to 12 inches (304 mm). Space stakes at 36 inches (914 mm).
- B. Cover seeded slopes where grade is 4 inches per foot or greater with erosion fabric. Roll fabric onto slopes without stretching or pulling.
- C. Lay fabric smoothly on surface, bury top end of each section in 6 inch deep excavated topsoil trench. Provide 12 inch overlap of adjacent rolls. Backfill trench and rake smooth, level with adjacent soil.
- D. Secure outside edges and overlaps at 36 inch intervals with stakes.
- E. Lightly dress slopes with topsoil to ensure close contact between fabric and soil.
- F. At sides of ditches, lay fabric laps in direction of water flow. Lap ends and edges minimum 6 inches.

3.06 MAINTENANCE

- A. Mow grass at regular intervals to maintain at a maximum height of 2-1/2 inches. Do not cut more than 1/3 of grass blade at any one mowing.
- B. Neatly trim edges and hand clip where necessary.
- C. Immediately remove clippings after mowing and trimming.
- D. Water to prevent grass and soil from drying out.
- E. Roll surface to remove minor depressions or irregularities.
- F. Control growth of weeds. Apply herbicides in accordance with manufacturer's instructions. Remedy damage resulting from improper use of herbicides.
- G. Immediately reseed areas that show bare spots.
- H. Protect seeded areas with warning signs during maintenance period.

END OF SECTION