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321216 - Asphalt Paving

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SECTION 32 1216 - ASPHALT PAVING

1.1 SUMMARY

A. Section Includes:

1. Cold milling of existing hot-mix asphalt pavement.
2. Hot-mix asphalt patching.
3. Hot-mix asphalt paving.
4. Hot-mix asphalt paving overlay.
5. Porous Asphalt: Shall be considered on a case by case basis. Please visit for specifications:
 - a. http://www.unh.edu/erg/cstev/pubs_specs_info/unhsc_pa_spec_10_09.pdf
6. Pavement markings and paint.
7. Bicycle lanes.
8. Bus Stop Pull-Outs.
9. Crossings and Sidewalks.
10. ADA Tactile Warning Strips.

B. General: All sitework performed in the preparation and installation of asphalt pavement including sidewalks, fire lanes, streets, and parking lots shall be in accordance with most current version of "The Asphalt Institute." This standard shall be used for all subgrade preparation, surface type, composition of mix, compaction, pavement structure and drainage work. In all case existing Asphalt should be reclaimed ground and re-used wherever and whenever possible. Every effort shall be made to use porous parking surfaces as an alternative to standard asphalt for new parking areas.

1. The use of islands shall be limited to areas where it is necessary to control safe flow of vehicle traffic.
2. Locate islands so as not to hinder snow removal operations.
3. Islands shall not be placed in areas such as parking lots for the sole purpose of aesthetics.

1.2 QUALITY ASSURANCE

- #### A. Manufacturer Qualifications: A paving-mix manufacturer registered with and approved by authorities having jurisdiction or the New Hampshire DOT.
- #### B. Regulatory Requirements: Comply with materials, workmanship, and other applicable requirements of The Asphalt Institute and Department of Transportation of New Hampshire for asphalt paving work.

1.3 PROJECT CONDITIONS

- A. Environmental Limitations: Do not apply asphalt materials if subgrade is wet or excessively damp, if rain is imminent or expected before time required for adequate cure, or if the following conditions are not met:
 - 1. Tack Coat: Minimum surface temperature of 60 deg F (15.6 deg C).
 - 2. Asphalt Base Course: Minimum surface temperature of 40 deg F (4.4 deg C) and rising at time of placement.
 - 3. Asphalt Surface Course: Minimum surface temperature of 60 deg F (15.6 deg C) at time of placement.
- B. Pavement-Marking Paint: Proceed with pavement marking only on clean, dry surfaces and at a minimum ambient or surface temperature of 40 deg F (4.4 deg C) for oil-based materials and 55 deg F (12.8 deg C) for water-based materials, and not exceeding 95 deg F (35 deg C).

1.4 AGGREGATES

- A. Coarse Aggregate: ASTM D 692, sound; angular crushed stone, crushed gravel, or cured, crushed blast-furnace slag.
- B. Fine Aggregate: ASTM D 1073 or AASHTO M 29, sharp-edged natural sand or sand prepared from stone, gravel, cured blast-furnace slag, or combinations thereof.
- C. Mineral Filler: ASTM D 242 or AASHTO M 17, rock or slag dust, hydraulic cement, or other inert material.

1.5 ASPHALT MATERIALS

- A. Asphalt Binder: AASHTO M 320 or AASHTO MP 1a, PG 64-22, PG 58-28, or PG 70-22.
- B. Tack Coat: ASTM D 977 or AASHTO M 140 emulsified asphalt, or ASTM D 2397 or AASHTO M 208 cationic emulsified asphalt, slow setting, diluted in water, of suitable grade and consistency for application.

1.6 AUXILIARY MATERIALS

- A. Herbicide: Commercial chemical for weed control, registered by the EPA. Provide in granular, liquid, or wettable powder form. Product should be Green approved.
 - 1. Color: White, Yellow
- B. Pavement-Marking Paint: MPI #97 Latex Traffic Marking Paint. Product should be Green approved.
 - 1. Color: White, Yellow

- C. Pavement Line and Markings: For durability, maximum visibility and enhanced public safety, unless waived, the University uses NHDOT and Town of Durham reflectorized paint and thermoplastic pavement markings and lines. Ideally, dual centerlines and single fog line/lane mark lines are installed. On core campus low volume streets, single center line and fog line omission may be considered if approved by the Traffic Safety Committee. Resurfaced pavement suggests the preferred use of thermoplastic pavement markings. Ongoing maintenance or over-painting of existing paint or thermoplastic markings requires the use of reflectorized paints to DOT standard. If required, obliteration of existing markings shall be by grinding or abrasion and not overpainting with paint, asphalt or any other material. In general, all pavement lines excluding crosswalks and stop lines should be 4" in width, applied in one pass and in single width. Stop lines shall be 18" in width. Crosswalks shall be standard continental bar style. See Attachment E.

On thermoplastic pavement line and marking installations special care should be taken to ensure application on well cured pavement, above minimum ambient temperature application and conforming material mix. Thermoplastic pavement marking standards can be found in detail in 2006 NHDOT Standard Specifications Section 632 - construction requirements.

On reflectorized paint pavement markings or over markings, the street should be swept clean and install lines be continuous, straight and pre-marked. The University mandates the use of ASTM approved standard 100% acrylic type, low VOC, fast drying white or yellow suitable for bituminous or concrete surfaces. Reflective beads should be added for street applications. Pavement marking paint standards can be found in detail in 2006 NHDOT Standard Specifications Section 708 – traffic paint identification.

1. All roads shall be striped with a double yellow line in the center.
2. All roads with or without curbing shall be striped on each outside edge with a white line.
3. All parking lots shall be striped with white traffic paint.
4. All paint used for striping shall meet requirements of State of New Hampshire specifications. Paint shall comply with Green Standards for application.

D. Miscellaneous Pavement Markings

1. Bike lane symbols and text see Chapter 5, Division 32, Section 321216 Attachments B and C.
2. Given the low speed nature of our streets, the University does not typically install other lane designation, advance stop, yield or similar in-lane surface pavement markings on UNH maintained streets. In the few cases where such markings exist or are proposed and approved by the UNH Traffic Safety Committee, markings should comply with standard MUTCD dimensions and styles and be compatible with Town of Durham use standards.

E. Glass Beads: AASHTO M 247, Type 1.

- F. Wheel Stops: Precast, air-entrained concrete, 2500-psi (17.2-MPa) minimum compressive strength, 4-1/2 inches (115 mm) high by 9 inches (225 mm) wide by 72

inches (1800 mm) long. Provide chamfered corners, drainage slots on underside, and holes for anchoring to substrate.

1. Dowels: Galvanized steel, 3/4-inch (19-mm) diameter, 10-inch (254-mm) minimum length.

- G. Wheel Stops: Solid, integrally colored, 96 percent recycled HDPE or commingled postconsumer and postindustrial recycled plastic; UV stabilized; 4 inches (100 mm) high by 6 inches (150 mm) wide by 72 inches (1800 mm) long. Provide chamfered corners, drainage slots on underside, and holes for anchoring to substrate.

1. Dowels: Galvanized steel, 3/4-inch (19-mm) diameter, 10-inch (254-mm) minimum length.
2. Adhesive: As recommended by wheel-stop manufacturer for application to asphalt pavement.

1.7 MIXES

- A. Hot-Mix Asphalt: Dense, hot-laid, hot-mix asphalt plant mixes approved by authorities having jurisdiction; designed according to procedures in AI MS-2, "Mix Design Methods for Asphalt Concrete and Other Hot-Mix Types."

- B. Porous Asphalt mixes shall be considered for all new parking areas on a case by case basis. All new parking areas will need to demonstrate the need for why porous pavements are not feasible prior to selection of standard hot-mix asphalt. In general, porous asphalt projects can be cost effective for new parking areas and are not limited by soil type. Porous asphalt pavement type will be selected based on durability needs. For parking lot reconstruction, the use of porous pavements may be limited due to cost associated with base preparation. Attachment A includes specifications for porous asphalt. Please visit the UNH Stormwater Center website to check for updates on application and specification details.

1. http://www.unh.edu/erg/cstev/pubs_specs_info/unhsc_pa_spec_10_09.pdf

1.8 UNIVERSITY GUIDELINES

- A. Sidewalks: All sidewalks around and leading to a facility shall be a minimum of 6 feet wide and a minimum of 3 inches thick, applied in two (2) lifts. Pavers may be considered for sidewalks and installed only with University signed approval. ADA indicator pads shall be installed at all sloped transitions.

- B. Fire Lanes and Driveways: Provide a minimum of 12 feet wide, 4 inches thick, applied in two (2) lifts.

- C. Streets: Provide a minimum of 32-foot curb to curb wide, thickness determined by proposed usage of road as indicated in "The Asphalt Institute's" specifications. Streets shall include a marked bike lane.

- D. Parking Lots: Provide in a square or rectangular pattern, with minimum 4 inch thick asphalt, applied in two (2) lifts.
- E. Curbing: All curbing shall be granite with a 4-inch reveal where vehicle climbing occurs, all other reveals 6-inches. Curbing shall be vertical or sloping with application approved by University of New Hampshire Plant Maintenance.
- F. Gravel:
 - 1. All gravel utilized in the preparation of sidewalks, fire lanes and driveways shall be minimum 6 inch of 3/4-inch bank run crushed gravel.
 - 2. All gravel utilized for parking lots and roads shall be minimum 12 inch of 1-1/2 inch bank run crushed gravel.
- G. Islands:
 - 1. Provide islands with vertical granite curbing no more than 5 inches high.
 - 2. Interior of islands shall be paved or filled with crushed stone no smaller than 1-inch in size.
 - 3. Islands located by roadways shall contain no plant material, such as grass or shrubs.
 - 4. Islands located away from roads and parking lots, and used to direct foot traffic, or are used for aesthetic purposes, shall be landscaped with trees, shrubs, and mulch or stone BUT MAY NOT CONTAIN GRASS. Ornamental grass shall be considered.
 - 5. Islands utilized to separate parking lots from roadways shall not contain guardrails, fences, or any other like material which would hinder snow removal.
 - 6. Islands located in parking lots shall be considered for use as bioretention systems or bioswales by use of curb cuts or drop inlets.
 - 7. Bioretention and bioswales shall pond a maximum of 6" of water, and will be designed to promote detention time and infiltration. Soils must be designed for infiltration and evaluated for need of amendments. Overflow bypass shall be provided and plumbed to adjacent drainage network if necessary.
 - 8. All areas that receive rainfall must be designed to drain within a maximum of 72 hours for vector control.
- H. Bicycle Lanes:
 - 1. See Attachment B and C for Bicycle Lane Markings.
- I. Bus Stop Pull-Outs:
 - 1. See Attachment D for Bus Stop options.
- J. Mobility Impaired: Comply with ADA Requirements for handicap access where applicable.

1.9 DISPOSAL

- A. Except for materials indicated to be recycled, remove excavated materials from project site and legally dispose of them in an EPA-approved landfill.
 - 1. Do not allow milled materials to accumulate on-site.

ATTACHMENT:

Attachment A: UNHSC Design Specifications for Porous Asphalt Pavement & Infiltration Beds

Attachment B: Standard Bicycle Lane Marking

Attachment C: Shared Bicycle Lane Marking

Attachment D: Bus Stop Options

Attachment E: Crosswalk Striping

END OF SECTION 32 1216