

321000 Bases, Ballasts, and Paving

Sections Included In This Standard:

- 1.1 Paving and Surfacing
- 1.2 Protection of the Work
- 1.3 Repair of Pavement
- 1.4 Pavement Marking

1.1 PAVING AND SURFACING

A. DESIGN REQUIREMENTS

1. Applicable Design Standard: Roadway construction shall be designed in accordance with the latest edition of the "Design Standards for the Design, Construction, Maintenance and Utility Operations on the State Highway System" and the "Manual of Uniform Minimum Standards for Design, Construction, and Maintenance for Streets and Highways (commonly referred to as the "Florida Greenbook")," Florida Department of Transportation. To minimize the impact of thermal gradient differences between developed and undeveloped areas, designs shall incorporate a minimum of 50% of the site hardscape (roads, sidewalks, parking lots, etc.) in high-albedo or open grid paving materials or be shaded within five years of occupancy. Combinations of these strategies are permitted. The use of recycled asphalt paving and landscaping materials is encouraged to maximize the reuse of materials.
2. Design Guide For Bicycle Facilities: Bicycle lanes and paths should be designed in accordance with the latest edition of the "Florida Bicycle Facilities Planning and Design Handbook," issued by the Florida Department of Transportation and the "Guide for the Development of Bicycle Facilities" published by the American Association of State Highway Officials (AASHTO).
3. Design Guide for Pedestrian Facilities: Pedestrian pathways, crossings and other facilities should be designed in accordance with the latest edition of the "Florida Pedestrian Facilities Planning and Design Handbook," Florida Department of Transportation.
4. Design Guide for Traffic Control Devices: As required by Title 23 of the Code of Federal Regulations, Part 655.603, all traffic control devices including signs, signals, markings and other devices used to regulate, warn or guide traffic placed on, over, or adjacent to a street, highway, pedestrian facility, or bikeway shall be designed and installed in accordance with the latest edition of the "Manual on Uniform Traffic Control Devices (MUTCD)," U.S. Department of Transportation. Additional guidance for Florida-specific applications can be found in the "Traffic Engineering Manual," Florida Department of Transportation.
5. Online Resources: Most publications of the Florida Department of Transportation (FDOT) are available at www2.dot.state.fl.us/proceduraldocuments.
6. Requirement for Design By Professional: Roadway design, including bicycle lanes (on-road) and paths (off-road), shall be by a Florida-licensed professional engineer.

B. ROADWAY CONSTRUCTION

1. Applicable Technical Specifications for Construction: Construction procedures shall follow the usual practices of the Florida Department of Transportation for work of similar

character and extent. The provisions and specifications of the latest versions of the "Standard Specifications for Road and Bridge Construction, Division II and Division III," and "Plans Preparation Manual, Volume I and II," Florida Department of Transportation shall apply, where applicable, except where modified herein or specifically designated otherwise. References to compensation do not apply. Where reference is made to the "engineer," substitute the appropriate representative of the Physical Plant Division.

2. Minimum Requirements: New pavement sections should have a minimum 6" base of Florida Limerock, compacted to 95% of maximum density. Paving should be 1 1/4" (minimum) Type S-I Asphaltic Concrete.

C. ROAD CLOSURES AND TRAFFIC MAINTENANCE

1. In no case shall a road be closed in its entirety. At least one lane of traffic will be maintained at all times. Special permission for an off-road detour may be granted in some cases; permission shall be obtained through the University's Project Manager. Refer to www.facilities.ufl.edu for the Road Closure Notification Form.
2. Traffic control measures such as barricades and flagman shall be provided in accordance with maintenance of traffic standards of the Florida Department of Transportation and Part 6 of the MUTCD.
3. Pedestrian Traffic: Pedestrian traffic affected by roadway construction shall be guided as necessary toward a safe alternate route as required by the Manual on Uniform Traffic Control devices for Streets and Highways.
4. An ADA-compliant alternate path of travel shall be operational prior to the start of any project and shall be maintained throughout the duration of any construction project.
5. An alternate path of bicycle travel shall be maintained throughout the duration of any construction project.

D. BICYCLE LANES AND PATHS

1. Provision Requirement: All new road construction, or major reconstruction of existing roads, shall accommodate bicycle traffic through the provision of on-road bicycle lanes or off-road bicycle paths. On-road bicycle lanes are preferred.
2. Connection Requirement: New bicycle lanes and paths shall connect to existing bicycle lanes and paths.
3. Lighting Requirement: New bicycle lanes and paths shall be adequately lit. Consult with Section 16500 within these Standards regarding lighting design.
4. Bicycle Lane Construction: On-road bicycle lane construction shall not differ in construction (i.e. type of materials used, level of compaction, or cross-sectional thickness of materials) from adjacent vehicle traffic lanes. Bicycle lanes shall be designed and constructed in accordance with the "Guide for the Development of Bicycle Facilities" published by the American Association of State Highway Officials (AASHTO) and the "Florida Bicycle Facilities Planning and Design Handbook," issued by the Florida Department of Transportation.
5. Bicycle Path Construction: Off-street shared-use paths for use by bicyclists shall be a minimum 10' wide path consisting of a minimum 4" thick Florida Limerock base with a minimum 1" thick Type S-III asphaltic concrete surface course. Although the above-

described section is acceptable, a concrete bicycle path is preferred due to its durability and ease of maintenance. Bicycle paths that are anticipated to carry some degree of motor vehicle traffic for service, emergency or other purposes, shall be constructed with surface and base specifications provided in this section for service drives. Off-street shared-use paths for use by bicyclists shall be designed and constructed in accordance with the "Guide for the Development of Bicycle Facilities" published by the American Association of State Highway Officials (AASHTO) and the "Florida Bicycle Facilities Planning and Design Handbook," issued by the Florida Department of Transportation.

6. Bicycle Parking and Storage Facilities: Refer to Section 02840 for the requirements relating to bicycle facilities for parking and on-site storage.

E. SERVICE DRIVES

1. Concrete Construction

- (a) Concrete service drive roadways shall be a minimum 6" thick.
- (b) A light broom finish is standard.

2. Asphalt Construction: Asphalt service drives shall have a minimum 8" base of Florida Limerock, compacted to 95% of maximum density. Paving shall be a 2" minimum of Type S-I Asphaltic Concrete.

F. SIDEWALKS

1. General: Separate sidewalks shall be provided with all new road construction, or major reconstruction.

2. Construction Requirements:

- (a) Concrete sidewalks shall to be a minimum of 4" thick (6" thick in areas subject to traffic), with welded wire mesh reinforcement. Edge dimensions shall be 6" X 6", with one #5 continuous reinforcing bar in each side.
- (b) Sidewalk width shall be a minimum of 5', and shall match surrounding sidewalk patterns and widths. Sidewalks adjacent to roadways shall be separated by a minimum 3' wide planting strip. Where physical constraints require that sidewalks be constructed immediately adjacent to roadways, they shall be constructed of a minimum 6' width.
- (c) Expansion joints shall be a maximum of 15' apart, with saw cuts a maximum of 5' apart.
- (d) Brick and precast unit paving materials are encouraged in public spaces such as major entry areas, important connector zones and as visual extension of architectural surface and color in contrast to expanses of concrete. Materials and colors shall be selected that are compatible with the surrounding architecture and promote continuity.
- (e) Special attention shall be paid to ADA compliance when these materials are used in order to ensure uniformity of surface, necessary curb ramp treatments, and other such provisions. High compressive strength pavers with minimum water absorption are recommended. Adequate base materials need to be provided under all pavement as needed for stabilization and to support anticipated loads. Use of

removable interlocking pavers set without mortar joints is recommended in areas where future repairs or access to underground utilities is anticipated.

- (f) Annunciators: Annunciators shall be red brick or red pavers in the Historic District Impact Area (HDIA). Outside the HDIA, red or orange mats are acceptable. For more information, refer to Appendix B and the Florida Accessibility Code for Building Construction (Florida Building Code, Chapter 11).

G. SURFACE PARKING LOTS

1. While surface parking lots will typically be constructed of asphalt, alternative permeable surfaces such as turf blocks should be considered wherever practical to mitigate stormwater impacts.
2. To provide a landscape area for parking lot canopy shade trees and to reduce the expanse and visual impact of parked cars, planting medians shall be integrated into parking lots. Such planted medians can be placed on the end of parking aisles or designed as interior and median islands, but their placement shall be coordinated with the parking lot lighting plan in order to minimize disruption of the lighting distribution due to planted islands with shade trees. Planted islands and medians should accommodate shade trees and be delineated with curbs to prevent vehicles from parking on the planting island.
3. A continuous shrub hedge or combination shrub hedge and earthen berm shall be required to obtain a two-foot high barrier to visually screen seventy-five percent of the parking area as viewed from the parking area exterior. Wall elements or fence integral with the architectural character of the building may be used in combination with the landscape screening.
4. Surface parking lots shall include a pedestrian circulation system that provides access from the parking area to the building entrance, major bus stops or other critical access points. The circulation system shall be adequately lit and appropriately signed and marked in accordance with this and other sections of these Standards. Shrub material taller than two-feet in height is not recommended along pedestrian walkways within surface parking lots.

1.2 **PROTECTION OF THE WORK**

- A. **TEMPORARY BARRICADES:** Throughout the duration of the Contract, the Constructor shall provide temporary barricades, properly lighted, to keep traffic off the current portion of the work. Barricades must be rigid. Tape or ribbon barricades allowed only as a supplement to rigid barricades.
- B. **PROTECTION OF ADJACENT SURFACES:** The Constructor shall protect exposed surfaces adjacent to the work from physical damage resulting from construction activities, and from becoming stained during application of paving materials. The Constructor shall clean, repair, or replace, as required, surfaces damaged during the course of the work at no additional expense to the University.
- C. **PROTECTION FROM GRAFFITI:** Newly poured concrete roads, streets, curbs, or sidewalks shall be protected AND guarded from graffiti from passersby until the concrete has cured to resist such molestation. Failure to prevent graffiti, or other such vandalism, shall result in the new concrete being removed and replaced. This requirement shall warrant the Constructor in taking the necessary steps in preventing such incidents, which shall

include guarding the project after normal working hours.

1.3 **REPAIR OF PAVEMENT**

A. GENERAL

1. All roads, streets, service drives, or sidewalks, whether concrete or asphalt construction, shall be restored (repaved) within 3 days from the time of backfilling and compaction.
2. Cuts made through any paved surface shall be made by saw cutting and must be repaired in a non-discernible fashion.
3. The cross sectional thickness of materials used in repairing a section of roadway shall match the adjacent roadway.

B. CONCRETE PAVEMENT: Cuts through concrete shall be repaired by replacing the section between the nearest two joints - either construction or expansion.

C. ASPHALT PAVEMENT

1. Cuts through asphalt shall be repaired so that depressions or humps do not develop. If they do, they shall be corrected, at the Constructor's expense.
2. Asphalt and base compaction by "normal traffic" is not permitted. Proper compaction for the depth of the cut is required.

D. REPAIR OF PAVEMENT MARKINGS: When cuts are made through any paved surface and the cuts extend through the pavement markings, the replaced pavement shall be marked to match the existing.

1.4 **PAVEMENT MARKING**

A. GENERAL

1. Applicable Design Standards: All pavement marking shall be in accordance with the latest edition of the "Manual on Uniform Traffic Control Devices (MUTCD)," U.S. Department of Transportation.
2. Type: Exterior Grade Latex Paint shall be used for all pavement markings, except in areas protected from weather or otherwise specified herein where thermoplastic striping is permitted.
3. Thermoplastic Striping: All thermoplastic striping shall be a Florida Department of Transportation approved mix that minimizes the slipperiness of the marking surface.
4. Striping Details: Typical striping details are shown at the end of this section in Drawing **02500-A**. Refer to Appendix B for Accessible Parking Details.

B. ROADS

1. Traffic Markings: Six-inch (6") wide painted striping shall be used for traffic markings on all Campus roads, drives, and service drives. Paint shall be applied at a minimum wet film thickness of 15 mils. Materials and application methods for all traffic markings shall be in accordance with FDOT "Standard Specifications for Road and Bridge Construction," latest revision.

2. Markings For On-Road Parking: To accommodate the possibility of future adjustments to the parking layout, pavement markings for on-road parking shall be made with white latex paint. Typical striping details for parking are shown at the end of this section.

3. Crosswalks:

(a) General: Crosswalk placement and design shall be in accordance with the MUTCD. To help ensure the use of marked crosswalks in heavy pedestrian concentration areas, special consideration shall be given to their location relative to construction or proximity of sidewalks, paths, guardrails, retaining walls, or shrubbery as a means for controlling existing pedestrian crossing movements within a defined path. (from FDOT's Traffic Engineering Manual) Typical crosswalk details are shown at the end of this section in Drawing [02500-B](#).

(b) Policy on Placement of Crosswalks: Prior to approval of a new crosswalk, an engineering study shall be conducted by PPD to determine if the conditions described below are satisfied.

- 1) Pedestrian volume should be sufficient to justify placement.
- 2) The crosswalk should fulfill a reasonable need to direct pedestrians across traffic lanes.
- 3) Crosswalk location should be illuminated.
- 4) Crosswalk location should be visible to traffic for 200 feet in both directions.
- 5) The crosswalk should convey a clear and simple meaning to pedestrians and drivers.
- 6) There should be no existing marked crosswalk within 500 feet of the proposed location.

(c) Standards for Crosswalks

1) Minimum Configuration At Signalized Intersections: Marked ladder-style crosswalks on all roadways of the intersection configured in accordance with standard 321000 (see drawing [02500-B](#)). ADA compliant curb cuts at the end point of all crosswalks, pedestrian WALK/DON'T WALK signals at intersections.

2) Minimum Configuration at Stop Sign Intersections: Marked ladder-style crosswalks on all roadways of the intersection configured in accordance with standard 321000 (see drawing [02500-B](#)). ADA compliant curb cuts at the end point of all crosswalks, crosswalk signs placed on the through roadway.

Possible enhancements: Raised pavement markers placed an appropriate distance in front of the crosswalk on the through roadway. Flashing lights on crosswalk signs.

3) Minimum Configuration at Mid-block Locations: Marked crosswalk in accordance with standard, ladder-style crosswalk (Refer to Drawing), ADA compliant curb cuts at the end points of crosswalk, advanced crossing warning signs, raised pavement markers placed an appropriate distance in front of the crosswalk, restrict parking on roadway to ensure visibility.

4) Signage: A Crossing Sign (W11-2 in the MUTCD) shall be installed immediately adjacent to each mid-block marked pedestrian location. The

crossing sign may be enhanced with a diagonal downward pointing arrow plaque (W16-7P in the MUTCD) in areas where a high degree of activity and distraction may require enhanced signage. An additional crossing sign may be installed in advance of a series of marked crosswalks or may be installed in advance of each crosswalk location within a heavy pedestrian concentrations area. The need for advance crossing signs shall be based on engineering judgment considering the relative spacing of crosswalks, roadside development and other factors. (From FDOT Traffic Engineering Manual)

- 5) Possible enhancements: Overhead crosswalk signs, flashing lights on crosswalk signs, pedestrian refuge island, stop sign and stop bar painted upstream from crosswalk, speed tables or humps, light guard system of strobe lights.
4. Minimum Configuration at Parking Lot and Service Drive Locations: Marked ladder-style crosswalk in accordance with standard (see drawing 02500-B) ADA compliant curb cuts at the end points of crosswalk.
 5. The engineer conducting the crosswalk study shall consider pedestrian and vehicular volume, the number of traffic lanes the crosswalk will cross, visibility, lighting and other safety factors in order to make recommendations for the use of possible crosswalk enhancements.
- C. PARKING GARAGES: Thermoplastic striping shall be used for traffic markings and for designating parking spaces in all Campus parking garages. Material and application shall be in accordance with the Florida D.O.T.'s "Standard Specifications for Road and Bridge Construction", latest revision. Typical striping details for parking are shown at the end of this section.
- D. SURFACE PARKING LOTS: To accommodate the possibility of future adjustments to the parking layout, pavement markings in surface parking lots should be made with white latex paint. Typical striping details for parking are shown at the end of this section.
- E. BIKE PATHS AND LANES
1. Bicycle Lane Markings: Pavement marking dimensions and placement shall be consistent with Part 9, MUTCD and include lane edge lines, a bike symbol (rather than the optional word "Bike"), the word "Lane", and a directional arrow. The University requires painted (white latex) bicycle lane markings. Latex paint is preferred due to possible slip hazard. "No Parking" signs (R8-3a in the MUTCD) shall be installed as a subplate to the bicycle lane sign (R3-17 in the MUTCD). The dotted line lane edge marking as indicated in the MUTCD shall be used for all bus stops and locations with heavy right turn motor vehicle volumes. Installation of bicycle lane markings along campus roads is normally accomplished by the Physical Plant Division, Facilities Department and in all cases shall be coordinated with PPD.
 2. Bicycle Path Markings: Pavement marking dimensions and placement shall be consistent with Part 9, MUTCD. Additional guidance can be found in the FDOT and AASHTO references already cited, along with the Trail Intersection Design Handbook and Designing Trail Termini reference report produced by the Florida Department of Transportation.
 3. Curb Inlets, Storm Drains, and Other Potential Hazards: Where hazards to bicyclists cannot be eliminated, the typical obstruction pavement marking is required to make the

hazard more visible as depicted in Figure 9C-7 of the MUTCD.

- F. ADA COMPLIANCE: Refer to Appendix B accessible parking details. Also reference the Florida Accessibility Code for Building Construction (Florida Building Code, Chapter 11.)

INSERT TYPICAL STRIPING DETAIL (Dwg. 02500-A)

INSERT TYPICAL CROSSWALK DETAILS (Dwg. 02500-B)

The diagram to be inserted from the former APPENDIX J needs to be modified to show a distance of 2' rather than 3' between the longitudinal lines of the crosswalk in order to be consistent with the MUTCD.

END OF SECTION