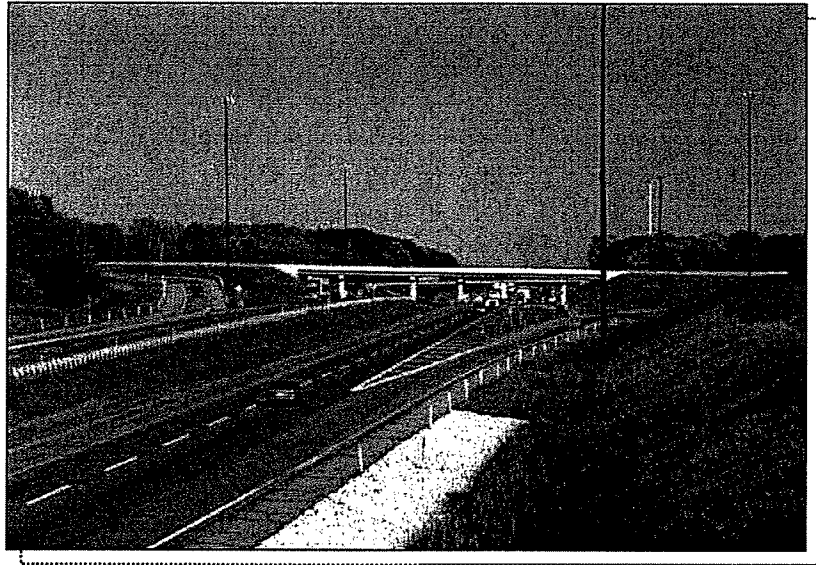


# CONCESSION AND LEASE AGREEMENT FOR THE INDIANA TOLL ROAD

## Volume I of III MAINTENANCE MANUAL



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# Indiana Finance Authority

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### **CHAPTER A: ORGANIZATION AND GENERAL INFORMATION**

#### **A.1 Purpose of Manual**

The purpose of this Volume I of the Operating Standards is to provide guidelines and criteria to the Concessionaire for performing maintenance activities on the Indiana Toll Road (ITR).

#### **A.2. Maintenance Objective**

The objective of maintenance work on the ITR is to provide a safe and pleasant passage on the ITR for ITR users, while maintaining the ITR as a capital asset. The major objectives of the Concessionaire's maintenance program include, but are not limited to, the following:

- ❖ Maintaining all ITR features, elements, components and systems in the best possible condition at all times.
- ❖ Improving sub-standard features, with the ultimate goal to meet and exceed the minimum standards.
- ❖ Preserving the rights-of-way and each type of roadway, structure, safety convenience or device, planting, illumination equipment and other facility, in a safe and usable condition to which it has been improved or constructed.
- ❖ Providing proper maintenance, safety and traffic devices for minimal disruptions and hazards to traffic.
- ❖ Identifying and correcting inadequate safety features and situations.
- ❖ Establishing an inventory of maintenance features, including a method of locating/referencing those features.
- ❖ Establishing maintenance procedures.
- ❖ Maintaining a regular program of maintenance for all aspects of the ITR.
- ❖ Providing immediate and proper response to emergency and third-party events.
- ❖ Performing routine, preventative, on-demand and emergency maintenance activities and work.
- ❖ Maintaining the toll revenue systems, special safety conveniences and devices, and illumination equipment.

**A.3. Review of Construction Projects & As-Built Drawings**

Whenever maintenance requires that a member, component, system or element be replaced, or significantly repaired, the Concessionaire shall create a set of original construction documents and drawings, sealed by a Professional Engineer licensed by the State of Indiana. The construction drawings and documents will be subject to review and permit by the Indiana Finance Authority (IFA), as appropriate for the work proposed.

Upon completion of construction, the Concessionaire shall prepare and submit to the IFA a complete set of original and as-built drawings in both hard copy and electronic format for the construction completed. In addition, the Concessionaire shall be responsible for creating and maintaining a separate original and as-built set of drawings for the record. The as-built drawings shall be stamped or marked "AS-BUILT", dated, and shall be placed in order with all other drawings that exist for the ITR.

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### **CHAPTER B: ROADWAY MAINTENANCE**

#### **B.1. Definitions**

Access Roads: Those roadways located on the ITR that are closed to the general public and are intended only for use by maintenance, inspection or utility traffic. These are low-type pavements constructed of gravel, grindings, or earth.

Asphalt: A brown to black solid material, soluble in gasoline or naphtha.

Bleeding: An area where the Asphalt mix is too rich, causing the Asphalt material to ooze to the surface in puddles and leaving a slick and slippery area.

Bridge: A structure consisting of single or multiple spans more than 20 feet in length that provides a means of transit for vehicles and/or pedestrians above the land, water surface, roadway, railroad or other obstruction.

Debris: Litter, rubbish, vegetation, rocks, dead animals, spilled materials, brush or other items which are not part of or which impede drainage.

Litter: Trash, Debris, waste, refuse, accident and construction residue.

Heave or Settle: Displacement of rigid type pavement by a combination of vertical and horizontal stresses due to expansion or contraction of the Subgrade. When Heave or Settlement in a concrete pavement is caused by pavement expansion from excessive heat, it is also commonly referred to as a pavement blowup.

Mainline: The portion of the multi-lane ITR traveled way extending from Shoulder line to Shoulder line or from curb line to curb line.

Pothole: An area where a piece of pavement has broken free and been removed, leaving a hole.

Ramp: The portion of the traveled way that provides access between the Mainline and the local street network, extending from Shoulder line to Shoulder line or from curb line to curb line.

Raveling: The progressive loosening of the material in the courses of a road as aggregates separate from the Asphalt binding material.

Resurfacing: Placing of one or more new layers of material on an existing pavement surface.

Rutted and Shoved Pavement: Deformations in which the surface of the pavement has worn into longitudinal ruts due to repetitive passes of vehicle tires, or transverse corrugations due to vehicle deceleration and acceleration.

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Shoulder: The portion of the roadway extending from edge of the Mainline or Ramp pavement to the unpaved top of earth embankment, or to the base of a barrier wall.

Subbase: An auxiliary course to furnish needed stability, usually due to poor Subgrade.

Subgrade: That portion of the roadbed on which pavement, surfacing, base, Subbase, or a layer of any other material which may be specified, is to be placed.

Toll Booth: A physical enclosure that includes protective cover and safe refuge for toll collectors toll-lane payment, processing equipment, communications and emergency response alarms.

Toll Plaza: A facility within which toll payments are collected from vehicles. The Toll Plaza includes, but is not limited to, the toll canopies, the Toll Booths, service buildings and vehicle lanes.

Travel Plaza: A facility that provides restaurant services, refueling services, limited shopping, public restrooms, RV dump station, pet walk, rest area, personal vehicle parking and RV and truck parking adjacent to the roadway that can only be accessed from the roadway.

Wedge and Level: Pavement surface treatment which consists of milling off approximately 1 ¼ " of surface and replacing it with new Asphalt surface material. This process is used to extend the life of relatively sound pavements that are beginning to show minor to moderate surface distresses.

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### **B.2. References**

All stated references shall be the most current version, or the document known to have succeeded or replaced the original stated herein:

- ❖ "Standard Specifications", INDOT.
- ❖ "Supplemental Specifications and Recurring Special Provisions", INDOT.
- ❖ "Standard Drawings", INDOT.
- ❖ "Indiana Design Manuals", INDOT.
- ❖ "Guide for Design of Pavement Structures, Volume I", AASHTO.
- ❖ "A Policy on Geometric Design of Highways and Streets", AASHTO.
- ❖ "Pavement Management Guide", AASHTO.
- ❖ "SHRP-H-348: Asphalt Pavement Repair Manuals of Practice", FHWA.
- ❖ "SHRP-H-349: Concrete Pavement Repair Manuals of Practice", FHWA.
- ❖ Indiana Law.
- ❖ Federal Law.
- ❖ "2005 Annual Report", INDOT, Toll Road District.
- ❖ Maintenance Quality Survey Manual & OPI Measures for the ITR (Draft - 11-1-05).
- ❖ Highway Performance Monitoring System Manual.
- ❖ Pavement Condition Manual, INDOT.

**B.3. Policy for Performing Pavement and Shoulder Maintenance Work**

**B.3.1. Objective**

The objective of ITR roadway maintenance is to ensure to the greatest extent reasonably possible that all pavements on the ITR remain safe, smooth, durable and stable, and that maintenance is conducted in a manner so as to prevent deterioration of the roadway and Shoulder pavement, thereby ensuring the safe and orderly movement of traffic.

Roadways require, without limitation: repairs to cracks, Spalls and Potholes, removal, repair and replacement of pavement sections, reconstruction of the pavement structure, continual maintenance and sweeping and cleaning of the roadway surfaces.

**B.3.2. Responsibility of Concessionaire**

In order to meet the requirements of this Chapter, the Concessionaire shall ensure to the greatest extent reasonably possible that all ITR pavements remain functional, carry the intended traffic, provide a safe means of passage to ITR users, and meet all Laws. The Concessionaire shall perform its obligations in accordance with this Chapter in a manner that maintains and/or improves the condition and functionality of the ITR.

The Concessionaire shall perform ITR roadside maintenance, inspection and work activities at a frequency that complies with all Laws, and the requirements specified within this Chapter.

From its routine inspections of the pavement, the Concessionaire shall develop a Resurfacing and Wedge and Level program that maintains the condition of pavements throughout the ITR. Where deficiencies have developed in the pavement, full depth Resurfacing shall be done to restore the pavements to a like-new condition. Wedge and Level Resurfacing may be utilized to extend the life of those pavements that are developing minor to moderate surface deterioration.

The ITR roadway pavements to be maintained include: Mainline, interchange Ramps, parking lots at all administrative and maintenance facilities, Travel Plazas, Toll Plazas, commuter parking lots and truck make-up/break-up lots, Access Roads and Mainline and Ramp Shoulders.

All materials and construction requirements for ITR roadway maintenance performed by the Concessionaire shall conform to the appropriate requirements of the INDOT Standard Specifications and the Referenced Documents noted in Section

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B.2 of this Chapter.

To the extent commercially reasonable, when performing Roadway maintenance the Concessionaire shall utilize the newest techniques approved state-wide for major highway contracts so as to provide longer pavement life, maximize the reuse of materials, and to minimize motorist inconvenience.

During all maintenance periods, the Concessionaire shall continually maintain traffic control and protection as provided for in Volume II - Operations and Procedures Manual, Chapter G, "Traffic and Travel Management Plan".

Once a particular repair has commenced, the repair shall continue during consecutive days as weather permits until a complete repair has been achieved. The objective of every repair is to cure all roadway deficiencies, to preserve the economic value of the ITR as a capital asset, and to restore a riding quality reasonably satisfactory to the ITR users.

The Concessionaire shall make routine roadway maintenance inspections part of its daily activities, and all Concessionaire staff who travel the ITR for any reason shall be instructed to report any roadway maintenance need that is observed.

Maintenance on the ITR that shall be conducted by the Concessionaire includes, without limitation, the following:

❖ General:

- ◆ Investigate and inspect the underlying cause or the origin of the defect or damage before commencing repair work.
- ◆ Perform all pavement repairs relating to structural thicknesses pursuant to applicable Law, construct pavement repairs to a minimum depth equal to that of the distressed pavement, and perform pavement repairs so as to provide a dense, smooth and level transition between the treated area and the adjacent undisturbed pavement surface.
- ◆ Repair all pavement surfaces in a manner to match the profile, grades and cross slopes of the ITR roadway; and ensure that all repair areas are free of depressions or humps and there is no separation at the adjacent undisturbed pavement joints.
- ◆ Perform temporary repairs and patching with appropriate materials and workmanship to withstand traffic loading until a permanent repair can be made.

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- ◆ Remove and dispose of all Debris and loose material in accordance with applicable Law, this Chapter and the Reference Documents noted in Section B.2 of this Chapter, and leave the work site in a clean condition.
- ❖ Bituminous Surface Repairs:
  - ◆ Repair bituminous surfaces and pavement when defects, including, but not limited to, the following, are present: Rutting, Raveling, Shoving, Bleeding, depressions, Settlements, Heave, weathering, fatigue and loss of traction.
  - ◆ Maintain all roadway bituminous surfaces as smooth, stable, durable and in a safe condition for ITR users.
  - ◆ Repair Shoulders that have been damaged by erosion, settlement or traffic use.
  - ◆ Resurface pavement surfaces that would be classified as slippery with a skid resistant pavement.
- ❖ Potholes:
  - ◆ Repair all Potholes with temporary and permanent repairs within the time frames indicated in Table B.3.3.1.
  - ◆ Monitor temporary Potholes and failed areas and re-treat them until the permanent work can be completed.
- ❖ Joints and Cracks:
  - ◆ Repair all pavement cracks in accordance with INDOT Standard Specifications and the Reference Documents noted in Section B.2 of this Chapter.
  - ◆ Repair all joint separations and joint failures in all pavements as they develop, within the time frames stated in Table B.3.3.1.
  - ◆ Monitor and reseal cracks and joints that do not withstand or that fail.
  - ◆ Assessment of cracks, holes and defects shall be pursuant to the Pavement Condition Rating identified in the INDOT Standard Specifications and the Pavement Condition Manual noted in Section B.2. Reports regarding cracks, holes and defects to pavement shall be provided to the IFA or its designee on an annual basis. If necessary, a

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remediation plan to correct the pavement or Bridge shall be submitted for approval to the IFA or its designee.

❖ Spalled Pavement:

- ◆ Repair all pits, chips, pop-outs, scaling or other surface defects that can be identified or classified as Spalls, as defined in the INDOT Standard Specifications and the Referenced Documents noted in Section B.2 of this Chapter.

❖ Settled and Heaved Pavement:

- ◆ Inspect, evaluate and perform repairs to pavements that have Settled or Heaved, as defined in the INDOT Standard Specifications and the Referenced Documents noted in Section B.2 of this Chapter.

❖ Pavement Smoothness:

- ◆ Pavement surface smoothness shall be maintained below an average of 150 in/mi as determined by the International Roughness Index (IRI). The IRI shall be measured annually on all traveled Mainline surfaces including Bridges and reported as an average IRI per 0.1 mile segment throughout the length of the ITR. IRI readings shall start at the 0 Mile Post. The average of any given one (1) mile section shall not exceed 170 IRI. No individual 1/10<sup>th</sup> mile segment average IRI shall exceed 190 in/mi. IRI data submissions regarding pavement smoothness shall be provided to the IFA or its designee on an annual basis. All IRI data submissions shall be in electronic format and shall be capable of being aggregated in various segment lengths. If necessary, a remediation plan to correct the pavement or Bridge shall be submitted for approval to the IFA or its designee.

❖ Asphalt Surfaced Pavement:

- ◆ Rutting in Asphalt pavement in the wheel paths shall be minimized to prevent steering and hydro-planing problems. The Rut depths in the wheel paths shall be measured in accordance with INDOT Standard Specifications, but more detailed methods are acceptable. The average Rut depth shall not exceed 3/8" average in a one (1) mile segment and no individual 1/10<sup>th</sup> mile segment shall exceed 5/8". Spot measures may be conducted using a 4' straight edge for determination of tolerable conditions. Reports regarding Asphalt shall be provided to the IFA or its designee on an annual basis. If necessary, a remediation plan to correct the pavement or Bridge shall be submitted for approval to the IFA or its

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designee.

❖ Pavement Strength:

- ◆ The IFA or its designee will periodically monitor and measure the strength of the pavement structure. The Concessionaire shall be provided with this information for planning and needs assessment. Excessive Deflections (as defined in the Pavement Management Guide (AASHTO)) will be reported to the Concessionaire and the Concessionaire shall strengthen such pavement in accordance with INDOT Standard Specifications and the Reference Documents note in Section B.2.

❖ Pavement Surface Friction:

- ◆ The IFA or its designee will periodically monitor and measure the pavement surface for the tire friction capabilities of the pavement surface. Any readings of the surface friction below 30 shall require investigation by INDOT for possible remediation and shall be reported to the Concessionaire. Investigation of safety incidents, extent of area effected and visual assessment of the area shall be conducted by the Concessionaire. If necessary, a remediation plan to correct the pavement or Bridge shall be submitted for approval to the IFA or its designee.

❖ Base and Subbase Repairs:

- ◆ Remove unsuitable materials, complete backfill and compact materials in accordance with the requirements of the Reference Documents noted in Section B.2 of this Chapter.
- ◆ Install drainage appliances or materials that will prevent conditions from redeveloping.
- ◆ Provide a base that reasonably drains the road base in areas where surface damage and/or frost heaving is evident.
- ◆ Provide support for imposed vehicle loadings where surface damage has resulted from insufficient strength of the road base.

❖ Grinding and Profiling:

- ◆ Grind and/or profile pavement to provide for a smooth and safe driving surface for ITR users, as required in the INDOT Standard Specifications and the Referenced Documents noted in Section B.2 of this Chapter.

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- ❖ Access Roads:
  - ◆ Maintain the integrity of the shape and driving surface of the Access Roads to provide smooth and safe passage.
  - ◆ Repair all voids, Potholes, erosion and Ruts in a manner and time frame so as to permit safe and continual passage across Access Roads.
  
- ❖ Sweeping and Cleaning:
  - ◆ Clean roadway surfaces by removing accumulations of dirt, Debris, sand and/or gravel from Shoulders, curbs, Toll Plaza lanes, Ramps, and along Medians and/or roadside barriers to provide a safe, clean free-draining condition.
  - ◆ Dispose of all waste from the sweeping and cleaning operations in accordance with applicable Law and as required by this Chapter and the Reference Documents noted in Section B.2 of this Chapter.

### **B.3.3. Performance Time Frames**

The Concessionaire, from the time a deficiency is or reasonably should be detected or reported, shall complete the maintenance, repair or replacement to the Roadway features within the maximum time duration set forth in Table B.3.3.1:

**Table B.3.3.1**

Roadway Pavement Work to be Performed	Maximum Time Duration
Bituminous Surface Repairs	14 Days
<u>Pothole Repairs:</u>	
- Temporary	24 Hours
- Permanent	1 Month
Joint & Crack Repairs	3 Months
Spalled Pavement Repairs	6 Months
Settled and Heaved Pavement Repairs	48 Hours
Base and Subbase Repairs	1 Month
Grinding and Profiling Repairs	3 Months
Access Roads	6 Months

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The Concessionaire shall complete the maintenance, set forth in Table B.3.3.2, according to the minimum frequency of occurrence provided therein:

**Table B.3.3.2**

Maintenance to be Performed	Minimum Frequency of Occurrence
<u>Sweeping &amp; Cleaning:</u>	
- Mainline (Not required on regular basis)	(Clean-up of spills only)
- Ramps	[6 Months]
- Shoulders	[12 Months]
- Curbs, Median and Roadside Barriers	[6 Months (or as needed)]
- Toll Plaza Lane	[1 Month (or as needed)]

### **B.3.4 Acceptance Criteria**

Pavement and Shoulder maintenance work shall be deemed acceptable by the IFA when it meets requirements of the INDOT Standard Specifications, including but not limited to, those listed below:

- ❖ All repairs shall be completed with the proper materials, methods and equipment, in full compliance with the requirements stated in the Reference Documents noted in Section B.2 of this Chapter and in accordance with current IFA guidelines for OPI as outlined in the 2005 Annual Report.
- ❖ The underlying causes for the pavement defects shall be thoroughly evaluated and examined, and the appropriate repairs and remedies shall be made.
- ❖ All repairs shall restore the integrity to the pavement so that it is safe and capable of supporting the applied loads.
- ❖ Repair work shall provide a continual smooth transition from new to existing pavements, free of all defects and deficiencies.
- ❖ Temporary repairs shall be replaced with the proper and correct permanent repairs in a timely manner, and such temporary repairs shall withstand the loads applied for as long as the temporary repair is required.
- ❖ The work sites shall be left in a clean and tidy condition.

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### **CHAPTER C: PAVEMENT DELINEATION MAINTENANCE**

#### **C.1. Definitions**

Barrier Walls: All concrete wall elements used as a protective barrier for vehicular or pedestrian traffic. Examples include Median barrier walls, permanent or temporary roadside concrete barrier, ground mounted barrier walls, and Parapets and barriers attached to retaining walls and MSE retaining walls.

Bridge: A structure consisting of single or multiple spans more than 20 feet in length that provides a means of transit for vehicles and/or pedestrians above the land, water surface, roadway, railroad or other obstruction.

Deck: The portion of a Bridge that supports the highway, from the top of the major structural members to the Wearing Surface, and is designed to distribute loads evenly across the Bridge.

Impact Attenuators: Protective systems that prevent errant vehicles from impacting hazards by either decelerating the vehicle to a stop after a frontal impact or by redirecting it away from the hazard after a side impact, accomplished by the use of either energy absorbing or energy transferring devices.

Median: The portion of the ITR forming the separation of the traveled ways for traffic in opposite directions.

Parapet: A wall-like member integrally connected to the fascia edge of a Deck to serve as a protective barrier for vehicular or pedestrian traffic.

Pavement Delineation: Devices designed and installed to assist in guiding motorists, or which express, by symbolism, certain traffic Laws and use prohibitions. Delineation includes pavement striping, Pavement Markings, Reflective Pavement Markers and Prismatic Reflectors.

Pavement Markings: Materials applied to the roadway surface, such as pavement striping, letters or symbols. Markings consist of paint, plastic tape and films, epoxy, or thermoplastic materials serving as a binder and substrate for reflective glass beading. Pavement Markings guide and control the movement of traffic.

Prismatic Reflectors: Products consisting of molded housings and reflective elements, applied to Parapets, metal posts (roadside delineators), Barrier Walls and temporary concrete barrier to improve the nighttime visibility of devices by reflecting light back toward the light source (i.e. vehicle headlamps).

Reflective Pavement Markers: Products consisting of metal or plastic castings and reflective elements set into the roadway surface as a lane delineation that work by reflecting a light pattern

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back toward the light source (i.e. vehicle headlamps).

Toll Booth: A physical enclosure that includes protective cover and safe refuge for toll collectors toll-lane payment, processing equipment, communications and emergency response alarms.

Toll Plaza: A facility within which toll payments are collected from vehicles. The Toll Plaza includes, but is not limited to, the toll canopies, the Toll Booths, service buildings and vehicle lanes.

Travel Plaza: A facility that provides restaurant services, refueling services, limited shopping, public restrooms, RV dump station, pet walk, rest area, personal vehicle parking and RV and truck parking adjacent to the roadway that can only be accessed from the roadway.

Wearing Surface: The portion of a Deck cross section which resists traffic wear.

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### **C.2. References**

All stated references shall be the most current version, or the document known to have succeeded or replaced the original stated herein:

- ❖ "Standard Specifications", INDOT.
- ❖ "Supplemental Specifications and Recurring Special Provisions", INDOT.
- ❖ "Standard Drawings", INDOT.
- ❖ "Guide for Design of Pavement Structure, Volume I", AASHTO.
- ❖ "A Policy on Geometric Design of Highways and Streets", AASHTO.
- ❖ "Pavement Management Guide", AAHTO.
- ❖ "Procedural Manual for Preparing Environmental Studies", INDOT.
- ❖ Indiana Manual on Uniform Traffic Control Devices (MUTCD).
- ❖ "Work Zone Safety Manual" (WZSM), INDOT.
- ❖ "Indiana Design Manuals", INDOT.
- ❖ "2005 Annual Report", INDOT, Toll Road District.
- ❖ Maintenance Quality Survey Manual & OPI Measures for the ITR (Draft - 11-1-05).

**C.3. Policy for Performing Pavement Delineation Maintenance**

**C.3.1. Objective**

The objective of Pavement Delineation maintenance is to ensure to the greatest extent reasonably possible that all pavement markings, pavement striping, Prismatic Reflectors and pavement markers are maintained so as to facilitate the safe and orderly movement of traffic on the ITR.

Pavement Delineation requires, without limitation: repairs due to wear, snow plow damage, construction and sunlight degradation, maintenance, removal, and replacement.

**C.3.2. Responsibility of Concessionaire**

In order to meet the requirements of this Chapter, the Concessionaire shall ensure to the greatest extent reasonably possible that all Pavement Delineation functions properly and is clearly displayed for the safe and orderly movement of traffic, and meets all Laws. The Concessionaire shall perform its obligations in a manner that maintains and/or improves the condition and functionality of the ITR and Pavement Delineation.

Each delineation shall be kept visible, legible and properly functioning under both day and nighttime conditions. The Concessionaire shall be responsible for all repair and replacement determinations, required resources, work assignments and oversight for all maintenance associated with or described for Pavement Delineation.

The Concessionaire shall make daily Pavement Delineation inspections and shall periodically inspect for missing, damaged and worn Pavement Delineation. Extra attention shall be placed during winter months when damage from snow plowing can be substantial.

Once maintenance on Pavement Delineation has started, the maintenance shall continue until a thorough and complete product has been produced. All maintenance that affects Pavement delineation shall conclude with a restoration of all delineation to a like-new condition.

All materials and construction requirements for Pavement Delineation maintenance performed by the Concessionaire shall conform to the applicable requirements of the INDOT Standard Specifications, and the Reference Documents noted in Section C.2 of this Chapter.

Pavement Delineation for public and private roadways that pass beneath the ITR and not defined by the Agreement are excluded.

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The Concessionaire shall perform the following with respect to the ITR and Permanent Delineation:

- ❖ Maintain all pavement striping and Pavement Markings so that they are well-defined, clear, legible, distinct and in accordance with the requirements of this Chapter and the Reference Documents noted in Section C.2 of this chapter.
- ❖ Repair and replace all faded, worn, debonded, damaged, non-reflective and/or missing pavement striping and Pavement Markings.
- ❖ Repair and replace all damaged, non-functioning, broken, missing or obstructed reflective Pavement Markings, Prismatic Reflectors, Barrier Wall reflectors, Impact Attenuator reflectors, and roadside delineators.
- ❖ Repair and replace all Pavement Markings so that the Pavement Markings are in compliance with Laws.
- ❖ Remove, repair and replace all pavement delineation as required by Law.
- ❖ Maintain the Pavement Delineation for all parking stall lines, handicap stall markings, and related pavement markings at all administrative and maintenance facilities, Travel Plazas, Toll Plazas, commuter parking lots and at truck make-up/break-up lots on the ITR.
- ❖ Maintain all replaced Pavement Delineation so that it matches the pre-existing Pavement Delineation, unless otherwise provided under the Reference Documents noted in Section C.2 of this Chapter, or by IFA.
- ❖ Install all new Pavement Delineation in compliance with the Reference Documents noted in Section C.2 of this Chapter, or as required by IFA.
- ❖ Dispose of all removed materials in compliance with all Laws and disposal and environmental Laws.
- ❖ Remove and destroy all Pavement Markings which are superfluous or obsolete, or as requested by IFA.
- ❖ Maintain pavement and other surfaces so that such surfaces are not damaged as a result of grinding or other eradication techniques. Maintain such surfaces

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in compliance with the Reference Documents noted in Section C.2 of this Chapter.

- ❖ Repair and replace all Pavement Markings and striping that are covered, obliterated or removed due to construction or maintenance work with temporary Pavement Delineation prior to reopening to traffic, and maintain the temporary delineation until permanent Pavement Delineation is installed.
- ❖ Maintain all temporary Pavement Delineation in compliance with the Reference Documents noted in Section C.2 of this Chapter.
- ❖ Install temporary Pavement Markings and striping to delineate traffic at locations where the absence of or deficiencies in the Pavement Delineations create unsafe conditions, or have the potential to become unsafe conditions for ITR users.

### **C.3.3. Performance Time Frames**

The Concessionaire, from the time a deficiency is or reasonably should be detected or reported, shall complete the maintenance, repair, replacement, and or relocation work to the Pavement Delineation, within the maximum time duration set forth below:

<b>Pavement Delineation Item</b>	<b>Maximum Time Duration</b>
Reflective Pavement Markers	30 Days
Roadside Delineators	45 Days
Prismatic Reflectors:	
- Attached to barriers, guardrails, etc.	30 Days
- Attached to Piers and Fenders In Various Waterways	30 Days
<u>Pavement Markings:</u>	
- Letters or symbols	45 Days
- Striping	30 Days

The Concessionaire shall, from the time a deficiency is detected by discovery or report, install temporary markings and striping within eight (8) hours.

The Concessionaire shall:

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- ❖ Maintain temporary Pavement Markings and striping so that they are clear, legible and bonded to the surface upon which they are placed for the length of time they are reasonably required.
- ❖ Remove and dispose of (in accordance with Laws) all waste materials from Pavement Delineation removal at the end of each day.
- ❖ Remove, repair and replace temporary Pavement Markings and striping with permanent delineation within seven (7) days after installation; unless temporary delineation is for a pre-planned construction work period which, when concluded, the above stated requirement applies.

### **C.3.4. Acceptance Criteria**

Pavement Delineation shall be deemed acceptable by the IFA when the following standards are met or exceeded:

- ❖ Prismatic Reflectors and Reflective Pavement Markers:
  - ◆ The pavement marker bases shall be flush with the pavement surface and shall be securely set into the pavement.
  - ◆ The reflector and markers shall be unbroken and visible to traffic.
  - ◆ The markers shall be at the prescribed interval and are at the prescribed alignment according to the IFA.
- ❖ Pavement Markings and Striping:
  - ◆ Markings and striping shall be applied at the prescribed application rates, location, color, size, alignment, and symbol, are free of distortion or damage, and have the prescribed reflectivity according to the IFA.
  - ◆ Glass beads for reflectivity shall be applied at the prescribed amounts and shall meet the requirements of the Reference Documents noted in Section B.2 of this Chapter.
  - ◆ Pavement and other surfaces shall not be damaged by installation or eradication.
  - ◆ Temporary markings and striping shall be present where the absence of or deficiencies of markings create unsafe conditions.
  - ◆ All Pavement Markings shall indicate full bond, with no separation from the applied surface.
  - ◆ Materials shall not deteriorate when in contact with sodium chloride, calcium chloride, or traffic residues.
  - ◆ Pavement Markings shall indicate no appreciable deformation or discoloration under exposed traffic and road temperatures between -40°C and 40°C.
  - ◆ Pavement Markings shall maintain their original dimension and

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placement without chipping, peeling or cracking.

❖ Roadside Delineation:

- ◆ Supports shall be plumb and level.
- ◆ Intervals and locations shall be in accordance with the requirements of the Reference Documents noted in Section C.2 of this Chapter.
- ◆ Reflectors shall be unbroken, reflective and visible to traffic.

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### **CHAPTER D : DRAINAGE MAINTENANCE & SLOPE REPAIR**

#### **D.1. Definitions**

Abutment: Earth retaining structures which support the Superstructure at the beginning and end of a Bridge.

Asphalt: A brown to black solid material, soluble in gasoline or naphtha.

Bridge: A structure consisting of single or multiple spans more than 20 feet in length that provides a means of transit for vehicles and/or pedestrians above the land, water surface, roadway, railroad or other obstruction.

Curb and Gutter: A concrete device with a given cross section, constructed along the edges of pavements or Shoulders that collects storm water runoff from the traveled way and conveys it to an intended discharge point.

Debris: Litter, rubbish, vegetation, rocks, dead animals, spilled materials, brush or other items which are not part of or which impede drainage.

Deck: The portion of a Bridge that supports the highway, from the top of the major structural members to the Wearing Surface, and is designed to distribute loads evenly across the Bridge.

Ditch: A trough-shaped excavation made to collect and transport water: includes unpaved and paved ditches. Unpaved Ditches are protected from erosion by Turf or grasses. Paved Ditches are protected from erosion by concrete or Asphalt.

Downspout: A pipe or conduit attached to a Bridge to direct water away from a Drain.

Drain: An aperture through a wall, curb or Deck to provide egress for water that would otherwise be trapped on the roadway.

Drainage System: An appurtenance that is intended to collect, convey, store or discharge storm water runoff. Drainage structures include systems in or under the roadway, such as Curb and Gutter, manholes, inlets and catch basins, Storm Sewers and Under-Drains; systems through the embankments such as culverts, and systems parallel to the embankments such as Ditches, berms, Erosion Control devices and outlet channels.

Earth Slope: An unpaved slope such as a Turf covered embankment, bare or stabilized Bridge cone, Ditch, or slope protected by riprap.

Erosion Control: A device used to limit the erosion of earth away from the site.

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Floor Beam: Transverse members which support the Stringers and transmit the loads to the main load carrying members of a structure.

Flow-Line: The bed or lowest point of a pipe, conduit, Ditch, stream or culvert.

Mainline: The portion of the multi-lane ITR traveled way extending from Shoulder line to Shoulder line or from curb line to curb line.

Piers: Substructure elements which support the Superstructure at intermediate points between the Abutments.

Ponding: An undesirable condition in which standing or slow draining water is trapped on the roadway surface or in Ditches.

Ramp: The portion of the traveled way that provides access between the Mainline and the local street network, extending from Shoulder line to Shoulder line or from curb line to curb line.

Scour: Erosive action of flowing water that removes soil and can undermine foundations, create void space behind walls or under slabs, lower river beds, and destabilize embankments.

Scupper: A drainage structure associated with Bridges, present in the deck, also referred to as floor Drains. Scuppers provide a means for rain or other water to drain off the Bridge roadway surface and lead to Downspouts and enclosed Drainage Systems.

Shoulder: The portion of the roadway extending from edge of the Mainline or Ramp pavement to the unpaved top of earth embankment, or to the base of a barrier wall.

Sign: A lettered board, message or other display which includes all regulatory, warning, guide or informational, advisory, construction and maintenance, route markers and all special or other messages/displays.

Storm Sewer: An underground conduit, pipe or Tunnel constructed to receive storm water from pavement and Bridge Drains and convey such water to a distinct outlet point.

Stringers: Longitudinal beams supporting the Deck, and in Truss Bridges framed into or upon the Floor Beams.

Substructure: The Pier and Abutment elements required to support the Superstructure.

Superstructure: The entire Bridge structure resting on the Piers and Abutments. consisting of Stringers, Decks, Floor Beams, Trusses, Wearing Surfaces and railings.

Truss: A jointed Bridge structure having open built web construction so arranged that the frame is divided into a series of triangular shaped figures.

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Turf: Surface earth ground cover containing a dense growth of grass and matted roots.

Under-Drain: A system built under pavements that collects storm waters that penetrate the roadway subbase through defects in the surface or percolating ground waters, and discharges the water into a drainage structure or onto an embankment slope.

Wearing Surface: The portion of a Deck cross section which resists traffic wear.

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### **D.2. References**

All stated references shall be the most current version, or the document known to have succeeded or replaced the original stated herein:

- ❖ "Standard Specifications", INDOT.
- ❖ "Supplemental Specifications and Recurring Special Provisions", INDOT.
- ❖ "Standard Drawings", INDOT.
- ❖ "Guide for Design of Pavement Structures, Volume I", AASHTO.
- ❖ "A Policy on Geometric Design of Highways and Streets", AASHTO.
- ❖ "Pavement Management Guide", AASHTO.
- ❖ "Procedural Manual for Preparing Environmental Studies", INDOT.
- ❖ Indiana Manual on Uniform Traffic Control Devices (MUTCD)
- ❖ "Work Zone Safety Manual" (WZSM), INDOT.
- ❖ "Indiana Design Manuals", INDOT.
- ❖ General National Pollutant Discharge Elimination System, IDEM.
- ❖ "2005 Annual Report", INDOT, Toll Road District.
- ❖ Maintenance Quality Survey Manual & OPI Measures for the ITR (Draft - 11-1-05).

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### **D.3. Policy for Performing Drainage Maintenance and Slope Repair Work**

#### **D.3.1. Objective**

The objective of drainage maintenance and slope repairs is to ensure to the greatest extent reasonably possible that all elements of the Drainage System (Curb and Gutter, inlets, catch basins, manholes, sewers, Scuppers, Downspouts, Ditches, outlet structures, miscellaneous drainage devices and Earth Slopes and Erosion Control features) are maintained so as to eliminate Ponding, flooding, Scour and erosion as potential hazards to the safe and orderly movement of traffic, and all ITR roadway and Bridge surfaces are efficiently, properly and continually drained.

Drainage Systems require: repairs due to aging, corrosion, soil loading, traffic weight or impact and flood damage, maintenance, cleaning to remove blockage caused by Debris, Litter or sediment and replacement.

Earth Slopes require repairs due to erosion, soil consolidation and Scour. Erosion Control devices are classified as permanent installations, or temporary installations erected during construction to limit erosion from disturbed, stripped surfaces. These devices require maintenance to remove trapped sediment.

#### **D.3.2. Responsibility of Concessionaire**

In order to meet the requirements of this Chapter, the Concessionaire shall ensure to the greatest extent reasonably possible that all roadway and Bridge drainage devices, Earth Slopes and Erosion Control systems are maintained in a functional manner and otherwise meet all Laws.

The Concessionaire shall be responsible for any maintenance required to alleviate flooding, repair flood damage, or to solve any drainage problems that arise from time to time on the ITR.

To the extent commercially reasonable, when performing drainage maintenance and Earth Slope repairs, the Concessionaire shall utilize the newest techniques that have been approved and implemented state-wide for major highway contracts so as to minimize the environmental impact of the ITR on adjacent lands and waters.

All materials and construction requirements for Drainage System and Earth Slope repair maintenance performed by the Concessionaire shall conform to the requirements of the INDOT Standard Specifications, and the Reference Documents noted in Section D.2 of this Chapter.

Work on Drainage Systems, Earth Slopes, and Erosion Control systems on the ITR that shall be performed by the Concessionaire include the following:

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- ❖ Roadway Drainage System:
  - ◆ Maintain frames and grates so that they are properly and securely fastened, set and anchored.
  - ◆ Clean, repair or replace all frames, grates, structures and pipes that are clogged, damaged or missing.
  - ◆ Clean catchment areas that are clogged.
  - ◆ Remove trapped or Ponding water on the ITR roadway.
  - ◆ Repair and replace the Drainage System components that have deteriorated to a condition that is unsafe or have the potential to become unsafe for ITR users, and repair and replace Drainage System components to prevent further deterioration of the pavement and the pavement structure.
  
- ❖ Bridge Drainage System:
  - ◆ Maintain frames and grates so that they are properly and securely fastened, set and anchored.
  - ◆ Clean, repair or replace all frames, grates, Downspouts, pipes reducers that are clogged, rusted, damaged, separated or missing.
  - ◆ Clean catchment areas that are clogged.
  - ◆ Remove trapped or Ponding water to prevent damage to Decks, bearings, Superstructure and Substructure.
  - ◆ Repair and replace Bridge Drainage System components that have deteriorated to a condition that is unsafe or have the potential to become unsafe for ITR users; and repair and replace Bridge Drainage System components to prevent further deterioration of the Bridge structure.
  
- ❖ Earth Slopes:
  - ◆ Repair, restore, contain and stabilize all Earth Slopes that have Scoured, eroded and/or slumped, and that have deteriorated to a condition that is unsafe or has the potential to become unsafe for ITR users.
  - ◆ Remove all obstructions that create or have the potential to create adverse erosion situations.
  - ◆ Inspect Earth Slopes during periods of heavy rainfall and/or rapid melting to so as to maintain containment of the Earth Slope, and the Earth Slopes are not undergoing Scour or erosion.
  - ◆ Dispose of waste materials from Earth Slope maintenance in a manner that is in compliance with all Laws and with the Reference Documents noted in Section D.2 of this Chapter.
  
- ❖ Ditches:
  - ◆ Remove and clean Debris, dams and all other obstructions from Ditches.
  - ◆ Restore, repair and stabilize Ditches that have eroded, Scoured and/or slumped, or have the potential to do so if not remedied.

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- ◆ Restore and maintain the full capacity and/or profile of Ditches on the ITR.
  - ◆ Inspect Ditches during periods of heavy rainfall and/or rapid melting to ensure the Ditch shape is maintained, and the Flow-Lines are not undergoing Scour or erosion.
  - ◆ Dispose of waste materials from Ditch operations in a manner and location that is in compliance with all Laws and the Reference Documents noted in Section D.2 of this Chapter.
- ❖ Curb and Gutter:
- ◆ Maintain all Curb and Gutter as unobstructed and capable of providing drainage as designed and intended.
  - ◆ Repair and replace all broken, settled, damaged, cracked, spalled and deteriorated sections of Curb and Gutter.
  - ◆ Replace curb sections to conform to INDOT standards for the type of Curb and Gutter; and match the section type with the adjacent Curb and Gutter.
- ❖ Under-Drain System:
- ◆ Maintain the roadway and Bridge Under-Drain so that it is free from silt deposits, clogs or other defects that would impede the Under-Drain from functioning as designed.
- ❖ Erosion Control Systems:
- ◆ Maintain, clean, repair, restore, replace and monitor all temporary and permanent Erosion Control features and systems on the ITR.

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### **D.3.3. Performance Time Frames**

The Concessionaire, from the time a deficiency is or reasonably should be detected or reported, shall complete the cleaning, adjustment, repair or replacement of the deficient element or component to full operation within the maximum time duration set forth below:

<b>Item</b>	<b>Maximum Time Duration</b>
<u>Roadway Drainage System:</u>	
- Frames & Grates	48 Hours
- Structures	30 Days
- Pipes & Conduits	30 Days
Bridge Drainage System	48 Hours
Earth Slopes	30 Days
Curb & Gutter	60 Days
Ditches	60 Days
<u>Under-Drain System:</u>	
- Roadway	30 Days
<u>Erosion Control System:</u>	
- Temporary	24 Hours
- Permanent	60 Days

