

## APPENDIX C

### SHEETS FOR PERFORMANCE INDICATORS

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### **SHEETS FOR PERFORMANCE INDICATORS**

INTERNATIONAL TENDER No 01/2019

**CONCESSION TO PROVIDE PUBLIC SERVICES FOR OPERATION, MAINTENANCE AND  
MAKING OF INVESTMENTS REQUIRED FOR EXPLOITATION OF THE HIGHWAY SYSTEM  
CALLED THE PIRACICABA-PANORAMA LOT**

Indicator	1.1	Pavement Management System Periodic Update Compliance Indicator (ICASGP)		
Frequency	Monthly		Data source	Pavement Management System (SGP)
Composition	Performing updates of the special pavement conservation indicators according to the measurement periodicity of each one.			

Description
The CONCESSIONAIRE shall carry out field tests / verifications / surveys to collect data regarding the special conservation of the pavement, according to the definitions
After conducting the full field survey of the special conditions of the pavement, the CONCESSIONAIRE shall update all data collected (regarding surface conditions, comfort, deformability, safety, noise) in the SGP. These data must be lagged between field collection and SGP updating by a maximum of 45 days (subject to the exceptions provided for in ANNEX 3).
and periodicity contained in ANNEX 6, item 3.21.

Indicator Formula	Performance ranges	Grade
	Binary indicator	
Not applicable	If the CONCESSIONAIRE has complied with all updates of the indicators in the SGP provided in the period.	1
	In cases of total or partial non-compliance with planned updates.	0

Comments and Considerations
<p>(1) The CONCESSIONAIRE shall carry out a complete survey of the conditions of special conservation of the pavement throughout the road, and shall obey, for each one:</p> <ul style="list-style-type: none"> <li><b><u>Control of deflectometric (or deformability) conditions:</u></b> It is held once a year. The data collection and delivery period shall be accounted for from the date marking the beginning of the Second Phase of Performance Indicator Monitoring (as per Annex 3 guidelines). Therefore, 1 year after the date that marks the commencement of the commercial operation of the TOLL STATIONS, the CONCESSIONAIRE shall submit to ARTESP all data relating to the deflectometric tests performed, with a maximum delay between the field survey and the delivery / updating of the data up to 45 days. From the delivery of this data to ARTESP, an additional 1 year will be counted, which is the reference for the new data delivery. The process will remain in this cycle until the end of the CONTRACT. For the REMAINING SYSTEM the surveys will start to be made</li> </ul>

after the deadlines set out in P.A.I (as per Annex 3 guidelines), following the same reference periods for the data collection of the EXISTING SYSTEM, which were previously described.

- **Control of surface conditions:**

It is held once per semester for the first 20 years of CONTRACT and once per quarter from 21st year onwards. The data collection and delivery period shall be accounted for from the date that marks the beginning of the Second Phase of Performance Indicator Monitoring (as per Annex 3 guidelines). Therefore, 6 months after the date that marks the commencement of COMMERCIAL OPERATION OF TOLL STATIONS, the CONCESSIONAIRE shall submit to ARTESP all data relating to the surface conditions of the pavement, with a maximum lag between field collection and delivery / data update up to 45 days. From the delivery of this data to ARTESP will be accounted for another 6 months, which is the reference for the new delivery of data. The process will remain in this cycle until the 20th year of CONTRACT. From the 21st year, the period between data deliveries must be 3 months. For the REMAINING SYSTEM, surveys will start to be made after the deadlines set out in the P.A.I (INITIAL SUITABILITY PROGRAM OF THE TRANSFERED SYSTEM) (according to the guidelines of ANNEX 3), following the same reference periods for data collections from the EXISTING SYSTEM, which were previously described.

- **Control of comfort conditions:**

It is held once per semester for the first 20 years of CONTRACT and once per quarter from 21st year onwards. The data collection and delivery period shall be accounted for from the date that marks the beginning of the Second Phase of Performance Indicator Monitoring (as per Annex 3 guidelines). Therefore, 6 months after the date that marks the commencement of COMMERCIAL OPERATION OF TOLL STATIONS, the CONCESSIONAIRE shall submit to ARTESP all data relating to the comfort conditions of the pavement, with a maximum lag between field collection and delivery / update of data 45 days. From the delivery of this data to ARTESP, an additional 6 months will be counted, which is the reference for the new delivery of the data. The process will remain in this cycle until the 20th year of CONTRACT. From the 21st year the period between data deliveries must be 3 months. For the REMAINING SYSTEM, surveys will start from the deadline P.A.I (INITIAL SUITABILITY PROGRAM OF THE TRANSFERED SYSTEM) (as per Annex 3 guidelines), following the same reference periods for data collection of the EXISTING SYSTEM that were described previously.

- **Security control (laser scanning and grip tester):**

It is held once a year for the first 20 years of CONTRACT and once a semester from the 21st year onwards. The data collection and delivery period shall be accounted for from the date that marks the beginning of the Second Phase of Performance Indicator Monitoring (as per Annex 3 guidelines). Thus, 1 year after the date that marks the commencement of COMMERCIAL OPERATION OF TOLL STATIONS, the CONCESSIONAIRE shall submit to ARTESP all data relating to the safety of the pavement, with a maximum lag between field collection and delivery of 45-day data. From the delivery of this data to ARTESP, an additional 1 year will be counted, which is the reference for the new data delivery. The process will remain in this cycle until the 20th year of CONTRACT. From the 21st year, the period between data deliveries must be 6 months. For the REMAINING SYSTEM, surveys will start from the deadlines set out in the P.A.I (INITIAL SUITABILITY PROGRAM OF THE TRANSFERED SYSTEM) (as per Annex 3 guidelines), following the same reference periods from the EXISTING SYSTEM, that were described earlier.

- **Control of rolling noise conditions:**

It is performed once a year. The data collection and delivery period shall be accounted for from the date that marks the beginning of the Second Phase of

Monitoring of PERFORMANCE INDICATORS (according to Annex 3 guidelines). Thus, 1 year after the date that marks the commencement of COMMERCIAL OPERATION OF TOLL STATIONS, the CONCESSIONAIRE shall submit to ARTESP all data relating to the noise conditions of the pavement, with a maximum delay between field survey and delivery / 45-day data update. From the delivery of this data to ARTESP, an additional 1 year will be counted, which is the reference for the new data delivery. The process will remain in this cycle until the end of the CONTRACT. For the REMAINING SYSTEM, surveys will start from the deadlines set out in the P.A.I (INITIAL SUITABILITY PROGRAM OF THE TRANSFERED SYSTEM) (as per Annex 3 guidelines), following the same reference periods from the EXISTING SYSTEM, which were previously described.

Although the INDICATOR has monthly periodicity, the verification of the SGP update will occur shortly after the period scheduled for the survey of the special pavement conditions, delivery and data update (considering a maximum delay of 45 days of field collection). Therefore, the ICASGP grade will be calculated in the scheduled period and will be valid for subsequent months until the next scheduled data collection period. In case of not updating the forecasted data for the period, the score for the INDICATOR will be zero and will remain for each subsequent month as zero until the next scheduled data collection period

For the purpose of monitoring and verification of the INDICATOR, in the first months after the start of the Second Monitoring Phase (prior to the delivery of the first Pavement Monitoring Report) the ICASGP score will be 1, until the first survey of the special pavement conditions and planned updates.

Indicator	1.2	Pavement Comfort Condition Indicator (ICCP)		
Frequency	Monthly		Data source	On-Site Survey / SGP / Report delivered by CONCESSIONAIRE
Composition	IRI values ( <i>International Roughness Index</i> ) or IQ (Irregularity Quotient) of the segments.			

Description
<p>The bearing comfort conditions shall be determined by measuring irregularities following the procedures described in ANNEX 6, item 3.2 - Description and Service Standards and the specifications of the current and / or succeeding Road Regulations.</p> <p>The value to be considered will be the average of the measurement values of irregularity in the homogeneous segment of a maximum of 1km (one kilometer). Individual measurement values that are very discrepant from the mean shall be treated as specified in ANNEX 6, item 3.2 - Required minimum parameters.</p> <p>For the measurement, the road will be divided longitudinally into homogeneous segments of a maximum of 1km (one kilometer) as described and detailed in Annex 6, item 3.2. The segment will be considered “compliant” if it meets the criteria set out in column “Segmento é conforme se”. Similarly, the segment will be considered “non-compliant” if it does not meet this same criterion.</p>

Indicator's Formula	Performance ranges	Grade	Assessment form - According to ANNEX 6, item 3.2		
			Year	Road Type	Segment is as follows:
$\frac{\text{Number of Compliant Segments}}{\text{(Total number of segments considered in batch for evaluation)}} \times 100$	ICCP ≥ 95%	1	Until the 10 <sup>o</sup> grade *	SP, SPAs, SPIs and Marginal Roads - Paved	IRI ≤ 2.69 m / km or IQ ≤ 35 counts / km
				SP, SPAs, SPIs and Marginal Roads - Onshore / Primary Coating	IRI ≤ 6 m / km or IQ ≤ 78 counts / km
	90% ≤ ICCP < 95%	0,8	From the 11th grade	SP, SPAs, SPIs and Marginal Roads - Paved	IRI ≤ 2.46 m / km or IQ ≤ 32 counts / km
				SP, SPAs, SPIs and Marginal Roads - Onshore / Primary Coating	IRI ≤ 6 m / km or IQ ≤ 78 counts / km
	85% ≤ ICCP < 90%	0,6	Throughout the Concession	Branches and Devices - Paved	IRI ≤ 3.46 m / km or IQ ≤ 45 counts / km
				Branches and Devices - On shore / Primary Coating	IRI ≤ 6 m / km or IQ ≤ 78 counts / km

	$80\% \leq \text{ICCP} < 85\%$	0,4	
	$\text{ICCP} < 80\%$	0	

#### Comments and Considerations

\*For the Existing System, upon completion of the implementation of all PII investments and services up to the first scheduled intervention in the system, the segment will conform to whether  $\text{IRI} \leq 3.46 \text{ m / km}$  or  $\text{IQ} \leq 45 \text{ counts / km}$ . After the first intervention programmed into the EXISTING SYSTEM the IRI parameter must be considered according to the year in question.

After carrying out the surveys, the CONCESSIONAIRE shall update all results in the SGP and deliver to ARTESP, by the 5th business day of the month, the Pavement Monitoring Report, considering a maximum gap between the field survey and the delivery / update. 45-day data, as described in ANNEX 6, item 3.2. The INDICATOR may be analyzed, as described above in this form, from the Report submitted by the CONCESSIONAIRE regarding the field surveys or through an extract from the SGP containing all records of the results of the verification performed by the CONCESSIONAIRE. The Report must be sufficient to calculate this INDICATOR.

According to what it was described in ANNEX 6, item 3.2, the full survey of the comfort conditions of the pavement shall occur at all times at least once per semester, during the first 20 years of CONTRACT, and once per quarter, from the 21st year onwards. The data collection and delivery period shall be accounted for from the date marking the beginning of the Second Phase of Performance Indicator Monitoring (as per Annex 3 guidelines). Therefore, 6 months after the date that marks the commencement of COMMERCIAL OPERATION OF TOLL STATIONS, the CONCESSIONAIRE shall submit to ARTESP all data relating to the comfort conditions of the pavement, with a maximum lag between field collection and delivery. 45-day data update. From the delivery of this data to ARTESP, an additional 6 months will be counted, which is the reference for the new delivery of the data. The process will remain in this cycle until the 20th year of CONTRACT. From the 21st year the period between data deliveries must be 3 months. For the REMAINING SYSTEM, surveys will start to be made after the deadlines set in the P.A.I (INITIAL SUITABILITY PROGRAM OF THE TRANSFERED SYSTEM) (according to the guidelines of ANNEX 3), following the same reference periods for data collections of the EXISTING SYSTEM that were described previously.

For the purpose of monitoring and ascertaining the INDICATOR, as it has monthly periodicity, in the first months after the start of the Second Phase of Monitoring of PERFORMANCE INDICATORS (according to the guidelines of ANNEX 3), and preceding the first scheduled survey of comfort conditions. For the period, the values considered for the ICCP measurements will be those presented in the "PII Completion Report" for the EXISTING SYSTEM and the values presented in the INITIAL SUITABILITY PROGRAM OF THE TRANSFERED SYSTEM) (Pavement) "for REMAINING SYSTEM.

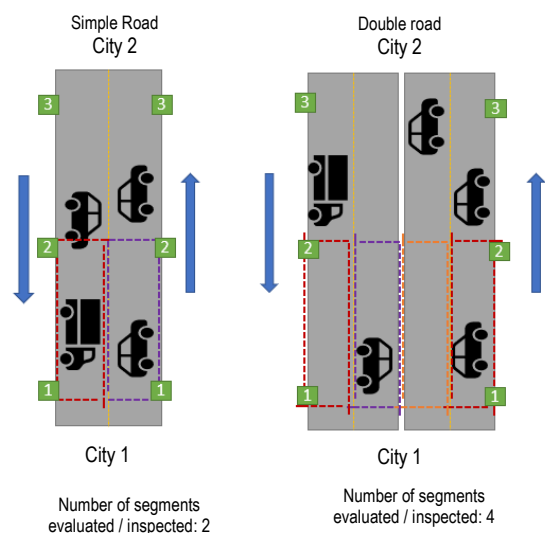
If the CONCESSIONAIRE feels the need to carry out other field surveys beyond those already required and planned, in order to try to improve its score in the INDICATOR

for example, it may perform them in the segments where they are needed, provided that it informs ARTESP about the update the SGP with the new data collected and forward the new Pavement Monitoring Report, with the results up to the 5th working day of the month, respecting the deadline for the data lag (45 days, subject to the exceptions provided in Annex 3). Eventual parameter updates will be considered only in evaluations of periods after data delivery, ie previously calculated INDICATORS will not be changed.

The 'Total number of segments considered in the Lot for evaluation' will, by definition, be the total number of homogeneous segments considered valid by the ARTESP technical team as part of the review of the Periodic Pavement Monitoring Reports and SGP updates and projections. The segment will not be considered in this total when, for a fair reason and recognized by the Agency's technicians, it has been exempted \* from the survey (example: segment actually under construction when field surveys are performed).

\*Eventually, if there are previous survey data valid for the waived segment, the values for the last valid survey must be considered.

**Illustrative** figure to illustrate the delimitation of the segment to be evaluated / inspected to calculate the ICCP between km 1 and 2 of a road:



1: Specific road rules, according to ANNEX 6, item 3.2, without prejudice to those that followed them:

- DNER PRO-159/85 - Restoration Project of Flexible and Semi-Rigid Pavements, chapters referring to the procedures for evaluation of irregularities.



- DNER PRO-164/94 - Calibration and Control of Pavement Surface Irregularity Metering Systems (IPR / USP and Maysmeter Integrating Systems). Calibration sections must be approved by ARTESP.
- DNER ES-173/86 - Level and Sight Method for System Calibration Response Type Irregularity Meter.
- DNER PRO-182/94 - Pavement Surface Irregularity Measurement with IPR / USP and Maysmeter Integrating Systems.

Indicator	1.3	Indicator of Pavement Safety Conditions (ICSP)		
Frequency	Monthly		Data source	On-Site Survey / SGP / Report delivered by CONCESSIONAIRE
Composition	Valores de Macrotextura (HS*) e Coeficiente de Atrito (VRD** ou GN*** e IFI****) dos segmentos.			

#### Description

For the determination of pavement safety conditions, methods and equipment of texture and slip resistance measurements will be employed as specified in ANNEX 6, item 3.2 - Description and Service Standards.

The value to be considered for each condition analyzed will be the average of the measurement values in the kilometer.

For the measurement, the road will be divided longitudinally into segments of 1km (one kilometer), according to Description and detailing established in ANNEX 6, item 3.2 - Required minimum parameters. The segment will be considered “compliant” if it meets the criteria set out in the “Segment is as if” column. Similarly, the segment will be considered “non-compliant” if it does not meet this same criterion.

Indicator's Formula	Performance ranges	Grade	Assessment form - According to ANNEX 6, item 3.2
			Segment is as it follows:
$\frac{\text{Number of Compliant Segments}}{\text{(Total number of segments considered in batch for evaluation)}} \times 100$	ICSP $\geq$ 95%	1	<ul style="list-style-type: none"> <li>0.6mm &lt; HS &lt; 1.2mm</li> <li>Skid resistance value measured by British Pendulum test = VRD &gt; 55 or Skid resistance value measured by Grip Tester equipment = GN &gt; 0.42</li> <li>IFI <math>\geq</math> 0.22 for new road works</li> <li>IFI <math>\geq</math> 0.15 for restored pavements</li> </ul> <p>All conditions must be met for the segment to be considered compliant.</p> <p>Grade: for segments where VRD, GN and IFI indices are not measured (considering that the verification of these indices is sample), only the HS index criterion will be considered.</p>
	90% $\leq$ ICSP < 95%	0,8	
	85% $\leq$ ICSP < 90%	0,6	
	80% $\leq$ ICSP < 85%	0,4	
	ICSP < 80%	0	

#### Comments and Considerations

\* HS: Sand Height, measured with surface scanning (laser) equipment and / or Sand Stain Test.

\*\* VRD: Skid resistance value measured by British Pendulum test.

\*\*\* GN: Skid resistance value measured by Grip Tester equipment.

\*\*\*\* IFI: International Friction Index.

After performing the surveys, the CONCESSIONAIRE shall update all results in the SGP and deliver to ARTESP, by the 5th business day of the month, the Pavement Monitoring Report, considering a maximum gap between the field survey and the delivery / update. 45-day data, as described in ANNEX 6, item 3.2. The INDICATOR may be analyzed, as described above in this form, from the Report delivered by the CONCESSIONAIRE regarding the field surveys or through an extract from the SGP containing all records of the results of the verification performed by the CONCESSIONAIRE. The Report must be sufficient to calculate this INDICATOR.

According to the description in ANNEX 6, item 3.2, the complete survey of the pavement safety conditions shall occur at all times at least once a year, during the first 20 years of CONTRACT, and once a semester, from the 21st year onwards. The data collection and delivery period shall be accounted for from the date that marks the beginning of the Second Phase of Monitoring of PERFORMANCE INDICATORS (according to the guidelines of ANNEX 3). Therefore, 1 year after the date that marks the commencement of the commercial operation of the toll stations, the CONCESSIONAIRE shall submit to ARTESP all data relating to the safety conditions of the pavement, with a maximum lag between field collection and delivery of the toll stations. 45-day data. From the delivery of this data to ARTESP, an additional 1 year will be counted, which is the reference for the new data delivery. The process will remain in this cycle until the 20th year of CONTRACT. From the 21st year the period between data deliveries must be 6 months. For the REMAINING SYSTEM, surveys will commence upon the expiration of the deadlines provided for in the Initial Transferred Program of Suitability Program (P.A.I) (as per Annex 3 guidelines), following the same reference periods for data collections of the EXISTING SYSTEM that were previously described

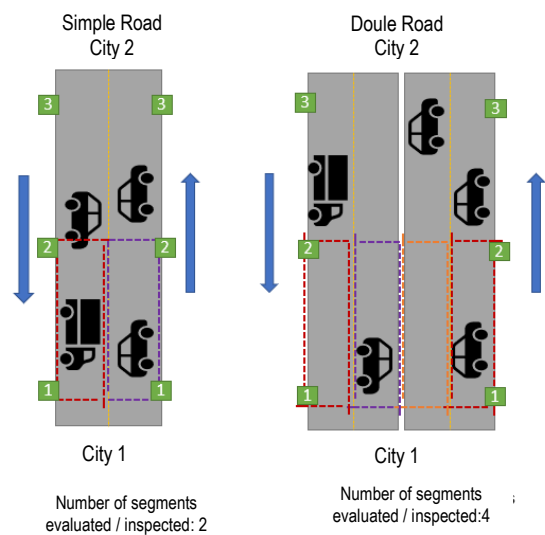
For the purpose of monitoring and ascertaining INDICATOR, as it has Frequency Monthly, in the first months after the beginning of the Second Phase of Monitoring of Performance Indicators (according to the guidelines of ANNEX 3) and preceding the first scheduled survey of safety conditions. In the period, the values considered for the ICSP measurements will be those presented in the “PII Completion Report” for the EXISTING SYSTEM and the values presented in the INITIAL SUITABILITY PROGRAM OF THE TRANSFERED SYSTEM) (Pavement) for REMAINING SYSTEM.

If the CONCESSIONAIRE feels the need to perform other field surveys beyond those already required and planned, in order to try to improve its INDICATOR Grade for example, it may perform them in the segments where they are needed, provided that it informs ARTESP. the procedure, to update the GSP with the new data collected and to forward the new Pavement Monitoring Report, with the results up to the 5th working day of the month, respecting the deadline for the data lag (45 days, observing the exceptions provided for in Annex 3). Eventual parameter updates will be considered only in evaluations of periods after data delivery, ie Indicators previously calculated will not be changed.

The ‘Total number of segments considered in the Lot for evaluation’ will, by definition, be the total number of homogeneous segments considered valid by the ARTESP technical team as part of the analysis of periodic pavement monitoring reports and SGP updates and projections. The segment will not be considered in this total when, for a fair reason and recognized by the Agency's technicians, it has been exempted \* from the survey (example: segment actually under construction when field surveys are performed).

\* Eventually, if there are previous survey data valid for the waived segment, the values for the last valid survey must be considered.

**Illustrative** figure to illustrate the delimitation of the segment to be evaluated / inspected for ICSP calculation between km 1 and 2 of a road:



Indicator	1.4	Pavement Surface Conditions Indicator(ICSP)		
Frequency	Monthly		Data source	On-Site Survey / SGP / Report delivered by CONCESSIONAIRE
Composition	Calculated IGG * / ICP ** / URCI *** values for segments.			

#### Description

For the determination of pavement surface conditions, methods and equipment shall be employed following the procedures described in ANNEX 6, item 3.2 - Description and Service Standards and the specifications of the current Road Regulations1. and / or who come to succeed them.

The value to be considered for each condition analyzed will be the average of the measurement values in the kilometer.

For the measurement, the road (including the shoulder) will be divided longitudinally into segments of 1km (one kilometer) according to Description and details set forth in ANNEX 6, item 3.2 - Minimum required parameters. The segment will be considered “compliant” if it meets the criteria set out in the “Segment is as if” column. Similarly, the segment will be considered “non-compliant” if it does not meet this same criterion.

Indicator's Formula	Performance ranges	Grade	Assessment form - According to ANNEX 6, item 3.2	
			Pavement Type	Segment is as it follows:
$\frac{\text{Number of Compliant Segments}}{\text{(Total number of segments considered in batch for evaluation)}} \times 100$	ICSP $\geq$ 95%	1	Flexible and semi-rigid pavements ****	IGG $\leq$ 30*****
	90% $\leq$ ICSP < 95%	0,8		
	85% $\leq$ ICSP < 90%	0,6	Coated pavements with cement Concrete: Portland	ICP $\geq$ 75*****
	80% $\leq$ ICSP < 85%	0,4		
	ICSP < 80%	0	Roads on shore or primary coating	URCI $\geq$ 75

#### Comments and Considerations

\* IGG: Global Severity Index.

\*\* ICP: Pavement Condition Index.

\*\*\* URCI: Unsurfaced Road Condition Index.

\*\*\*\* For the Existing System, upon completion of the implementation of all PII investments and services up to the first scheduled intervention in the system, the segment will conform to if  $IGG \leq 40$ . After the first scheduled intervention in the existing system it must be considered the IGG parameter  $\leq 30$ .

\*\*\*\*\* After the completion of the works of the first special conservation cycle, the pavement, including shoulders and safety roads, shall have  $IGG \leq 5$  for asphalt pavements,  $ICP \geq 75$  for Cement Concrete pavements: Portland.

After carrying out the surveys, the CONCESSIONAIRE shall update all results in the SGP and deliver to ARTESP, by the 5th business day of the month, the Pavement Monitoring Report, considering a maximum gap between the field survey and the delivery / update. 45-day data, as described in ANNEX 6, item 3.2. The INDICATOR may be analyzed, as described above in this form, from the Report delivered by the CONCESSIONAIRE regarding the field surveys or through an extract from the SGP containing all records of the results of the verification performed by the CONCESSIONAIRE. The Report must be sufficient to calculate this INDICATOR.

According to Description in ANNEX 6, item 3.2, the full survey of the surface conditions of the pavement shall occur at least once per semester for the first 20 years of CONTRACT and once per quarter from the 21st year onwards. The data collection and delivery period shall be accounted for from the date that marks the beginning of the Second Phase of Monitoring of PERFORMANCE INDICATORS (according to the guidelines of ANNEX 3). Therefore, 6 months after the date that marks the commencement of COMMERCIAL OPERATION OF TOLL STATIONS, the CONCESSIONAIRE shall submit to ARTESP all data relating to the surface conditions of the pavement, with a maximum lag between field collection and delivery / data update up to 45 days. From the delivery of this data to ARTESP will be accounted for another 6 months, which is the reference for the new data delivery. The process will remain in this cycle until the 20th year of CONTRACT. From the 21st year the period between data deliveries must be 3 months. For the REMAINING SYSTEM, the surveys will begin to be made after the deadlines set in the INITIAL SUITABILITY PROGRAM OF THE TRANSFERED SYSTEM (according to Annex 3 guidelines), following the same reference periods for data collections of the EXISTING SYSTEM that were previously described.

For the purpose of monitoring and ascertaining the INDICATOR, as it has Frequency Monthly, in the first months after the beginning of the Second Monitoring Phase of PERFORMANCE INDICATORS (according to Annex 3 guidelines), and prior to the first scheduled survey of surface conditions. In the period, the values considered for ICSP measurements will be those presented in the "PII Completion Report" for the EXISTING SYSTEM and the values presented in the INITIAL SUITABILITY PROGRAM OF THE TRANSFERED SYSTEM) (Pavement) "for REMAINING SYSTEM.

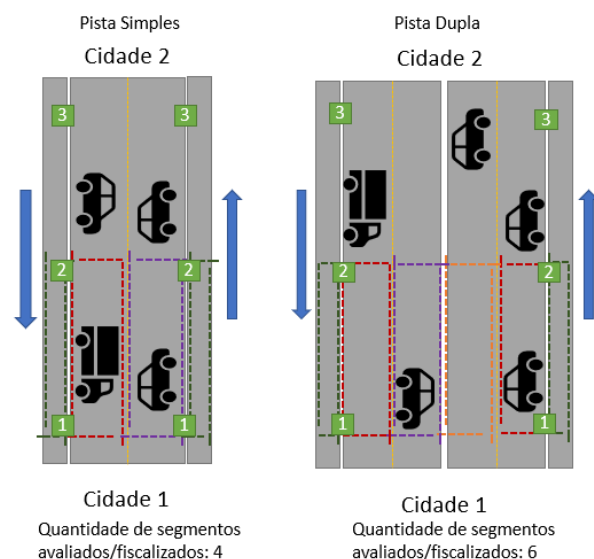
If the CONCESSIONAIRE feels the need to carry out other field surveys beyond those already required and planned, in order to try to improve its INDICATOR Grade for example, it may perform them in the segments where they are needed, provided that it informs ARTESP about the update the SGP with the new data collected and forward the new Pavement Monitoring Report, with the results up to the 5th working day of the month, respecting the deadline for the data lag (45 days, subject to the exceptions provided in Annex 3). Eventual parameter updates will be considered only in evaluations of periods after data delivery, ie Indicators previously calculated will not be changed.

The 'Total number of segments considered in the Lot for evaluation' will, by definition, be the total number of homogeneous segments considered valid by the ARTESP technical team as part of the analysis of periodic pavement monitoring reports and SGP updates and projections. The segment will not be considered in this total when, for

a fair reason and recognized by the Agency's technicians, it has been exempted \* from the survey (example: segment actually under construction when field surveys are performed).

\*Eventually, if there are previous survey data valid for the waived segment, the values for the last valid survey must be considered.

**Illustrative** figure to illustrate the delimitation of the segment to be evaluated / inspected for ICSP calculation between km 1 and 2 of a road:



1: Specific road rules, according to ANNEX 6, item 3.2, without prejudice to those that may follow them:

- DNIT 006/2003-PRO - "Objective surface assessment of flexible and semi-rigid pavements".
- DNIT 062/2004-PRO - "Rigid Pavement - Objective Evaluation".
- DNIT 007/2003-PRO - "Survey to assess the surface condition of homogeneous sub-stretch of flexible and semi-rigid pavement roads for pavement management and studies and projects".
- Rigid Pavement Manual - DNIT 2005 for Portland cement concrete pavements of Tolls, Scales, Special Works of Art, Roads, Shoulders, Access and Marginals.
- USDA TM 5-626 / 1995 - "Unsurfaced Road Maintenance Management" for Dirt Roads or Primary Coating within System DOMAIN RANGE limits

Indicator	2.1.	Arrival Time Indicator of the Winch Service (ITCSG)		
Frequency	Monthly		Data source	MITS System - B.I / Local or Remote Verification
Composition	All times of arrival of the winch service to the service center in the month.			

Description
<p>All arrival times for the calls made by the Winch service in the month are checked as it follows:</p> <ol style="list-style-type: none"> <li>1. The events foreseen in the PUBLIC NOTICE and in the Technical Specifications will be expunged;</li> <li>2. The remaining events of the month, it will be sorted by time of attendance increasing;</li> <li>3. From the previously ordered group, it will be separated a subgroup, called subgroup 01, containing the 90% shorter arrival times;</li> <li>4. Subgroup 01 analysis must then be performed, accounting for all occurrences exceeding 30 minutes. These occurrences will be called Surpluses;</li> <li>5. To verify the proportion of Surpluses in relation to the total number of calls made, as detailed below:</li> </ol>

Formula	Performance ranges	Grade
$\frac{\text{Surplus Amount}}{\text{Total number of Winch calls performed in the month}} \times 100$	ITCSG = 0%	1
	0% < ITCSG ≤ 0,5%	0,5
	0,5% < ITCSG ≤ 1%	0,4
	1% < ITCSG ≤ 3%	0,3
	ITCSG < 3%	0

Comments and Considerations
<p>For each registered single ticket, the start date and time, which corresponds to the activation of the service by the user, and the service hours, which corresponds to the arrival time of the vehicle for user service, it must be accounted for at a minimum. From the Telecommunications and Monitoring / Geo-positioning Systems integrated between CCO, users, operational vehicles and ARTESP, it will be possible to open calls by users (and sharing their location, in case of using the application to trigger the services), the mobilization of the vehicle by the CCO and monitoring of the vehicle's route by all parties (ARTESP, CCO and user - if the call was opened by the application). For tickets that have been opened by other means, the same call-related data must be recorded and accounted for by the CCO. All data must be shared in real time with ARTESP as per Annex 5 guidelines.</p>



For the calculation of INDICATOR, in the second week of the month following the month analyzed, a report will be extracted from the ARTESP systems containing the extract of all calls registered and maturing between 00:00:00 hrs of the first day of the month and 23 : 59: 59 hrs of the last day of the month. This report may be supplemented by data obtained through local or remote enforcement activities, where available.

The CONCESSIONAIRE shall also send to ARTESP, by the 5th (fifth) business day of the month following the analyzed, a report containing the same data related to the times of the calls made in the month. This report may be used by the ARTESP Team for verification.

Indicator	2.2	Mechanical helpService Arrival Time Indicator (ITCSM)	
Frequency	Monthly	Data source	MIT System - B.I / Local or Remote Verification
Composition	All arrival times of the Mechanical help to the place of care in the month.		

Description
<p>All arrival times regarding the calls made by the Mechanical helpservice in the month are checked as follows:</p> <ol style="list-style-type: none"> <li>1. The events provided for in the Public Notice and the Technical Specifications will be expunged;</li> <li>2. The remaining events of the month will be sorted by time of attendance increasing;</li> <li>3. From the previously ordered group, it will be separated a subgroup, called subgroup 01, containing the 90% shorter arrival times;</li> <li>4. Subgroup 01 analysis must then be performed, accounting for all occurrences exceeding 30 minutes. These occurrences will be called Surplus.</li> <li>5. To verify the proportion of Surpluses in relation to the total number of calls made, as detailed below:</li> </ol>

Formula	Performance ranges	Grade
$\frac{\text{Surplus Amount}}{\text{Total number of calls from mechanical help performed in the month}} \times 1$	ITCSM = 0%	1
	0% < ITCSM ≤ 0,5%	0,5
	0,5% < ITCSM ≤ 1%	0,4
	1% < ITCSM ≤ 3%	0,3
	ITCSM < 3%	0

Comments and Considerations
<p>For each registered single ticket must be minimally accounted for the start date and time, which corresponds to the activation of the service by the user, and the service hours, which corresponds to the arrival time of the vehicle for service to the USER. From the Telecommunications and Monitoring / Geo-positioning Systems integrated between CCO, USERS, operational vehicles and ARTESP, it will be possible to open calls by users (and sharing their location, in case of using the application to trigger the services), the mobilization of the vehicle by the CCO and monitoring of the vehicle's route by all parties (ARTESP, CCO and user - if the call was opened by the application). For tickets that have been opened by other means, the same call-related data must be recorded and accounted for by the CCO. All data must be shared in real time with ARTESP as per Annex 5 guidelines.</p>

For the calculation of INDICATOR, in the second week of the month following the month analyzed, a report will be extracted from the ARTESP systems containing the extract of all calls registered and maturing between 00:00:00 hrs of the first day of the month and 23 : 59: 59 hrs of the last day of the month. This report may be supplemented by data obtained through local or remote enforcement activities, where available.

The CONCESSIONAIRE shall also send to ARTESP, by the 5th (fifth) business day of the month following the analyzed, a report containing the same data related to the times of the calls made in the month. This report may be used by the ARTESP Team for verification.

Indicator	2.3	Arrival Time Indicator of the Prehospital Care Services (ITCSAPH)		
Frequency	Monthly		Data source	MITS System - B.I / Local or Remote Verification
Composition	All arrival times of the Prehospital Care service at the place of care in the month.			

#### Description

All arrival times related to the calls made by the Prehospital Care (APH) service in the month are checked as follows:

1. The events foreseen in PUBLIC NOTICE and in the Technical Specifications will be expunged;
  2. The remaining events of the month will be sorted by time of attendance increasing;
  3. From the previously ordered group will be separated a subgroup, called subgroup 01, containing the 90% shorter arrival times;
  4. Subgroup 01 analysis must then be performed, accounting for all occurrences exceeding 10 minutes. These occurrences will be called Surplus.
- To verify the proportion of Surplus in relation to the total number of calls made, as detailed below:

Formula	Performance range	Grade
$\frac{\text{Surplus Amount}}{\text{Total number of PHC calls performed in the month}} \times 100$	ITCSAPH = 0%	1
	0% < ITCSAPH ≤ 0,5%	0,5
	0,5% < ITCSAPH ≤ 1%	0,4
	1% < ITCSAPH ≤ 3%	0,3
	ITCSAPH < 3%	0

#### Comments and Considerations

For each registered single ticket must be minimally accounted for the start date and time, which corresponds to the activation of the service by the user, and the service hours, which corresponds to the arrival time of the vehicle for user service. From the Telecommunications and Monitoring / Geo-positioning Systems integrated between CCO, users, operational vehicles and ARTESP, it will be possible to open calls by users (and sharing their location, in case of using the application to trigger the services), the mobilization of the vehicle by the CCO and monitoring of the vehicle's route by all parties (ARTESP, CCO and user - if the call was opened by the application). For tickets that have been opened by other means, the same call-related data must be recorded and accounted for by the CCO. All data must be shared in real time with ARTESP as per Annex 5 guidelines.

For the calculation of INDICATOR, in the second week of the month following the month analyzed, a report will be extracted from the ARTESP systems containing the

extract of all calls registered and maturing between 00:00:00 hrs of the first day of the month and 23 : 59: 59 hrs of the last day of the month. This report may be supplemented by data obtained through local or remote enforcement activities, where available.

The CONCESSIONAIRE shall also send to ARTESP, by the 5th (fifth) business day of the month following the analyzed, a report containing the same data related to the times of the calls made in the month. This report may be used by the ARTESP Team for verification.

Indicator	3.1	Socioenvironmental Indicator: Recovery of Environmental Nonconformities (ISA)		
Frequency	Monthly		Data source	Local Verification
Composition	Performed recoveries of Environmental Nonconformities in the month.			

#### Description

The timely recovery of environmental nonconformities that occurred in the month, such as: nonconformities of works, environment, among others, as described in ANNEX 6, is observed. The verification of such INDICATOR is made *in loco* across the road.

Formula:	Performance range	Grade
$\frac{\text{Number of recoveries performed in the month}}{\text{(Quantity of environmental nonconformities scheduled for execution in the month)}(*)} \times 100$ <p>(*)The term “environmental non-conformities scheduled for execution in the month” refers to all those originally scheduled for the month (due date), added and those accumulated due to possible delays or non-compliance with deadlines set for the previous months</p>	ISA ≥ 70%	1
	60% ≤ ISA < 70%	0,75
	50% ≤ ISA < 60%	0,5
	ISA < 50%	0

#### Comments and Considerations

In order to verify this INDICATOR, monthly on-site checks will be carried out by ARTESP Support Teams and / or technicians, in each and every segment of the extension granted. Nonconformities will be identified from the visits, and forwarded to CONCESSIONAIRE and ARTESP. The deadline for resolution of each identified environmental nonconformity shall be established between CONCESSIONAIRE and ARTESP, with a maximum period of 15 days or as otherwise agreed between the parties, in accordance with the guidelines set forth in ANNEX 6 - Chapter 5. The conditions for determining the conclusion of the Treatment of nonconformities involves the submission of evidence of redress by the CONCESSIONAIRE to ARTESP and / or other forms established by ARTESP, such as local visits if deemed necessary. For ISA calculation, in the second week of the month following the month analyzed, the descriptions established in this sheet will be followed.

Some examples of Environmental Non-Compliance, as per the ARTESP Environmental Performance Assessment (ADA) document:

- Non-compliance of works (examples: noise, atmospheric emissions, work signaling, erosion, slipping, siltation and liquid effluents);
- Non-compliance with the environment (examples: siltation, erosion, landslides, lack of vegetation cover and soil contamination);
- Non-compliance with conservation (examples: ant outbreaks, termites and pests in general in the DOMAIN RANGE);

- Non-compliance of improper waste deposit in DOMAIN ROAD;
- Non-compliance in using standby boot for milled material;
- Non-compliance of herbicide application.

Indicator	4.1	Weighing System Operational Indicator (IOSP)		
Frequency	Monthly		Data source	Electronic Systems - Local or Remote Telemetry / Verification System
Composition	Hours that all Precision Weighing System equipment remained operational and total forecasted hours in the month.			

Description
<p>The operation of the Precision Weighing System is measured by accounting for the availability hours, in a given month, of the elements / equipment that make up the Precision Weighing System, according to Description and specifications in ANNEX 5. In cases where the request If any equipment deactivation is accepted, the hours that the equipment was deactivated will not be counted in the calculation base since the request of the deactivation by the CONCESSIONAIRE.</p> <p>For INDICATOR calculation, the period of operation comprises the expected full time of operation in the month, regardless of the presence of the GRANTING POWER Agent at the inspection post (PGF).</p>

Formula	Performance ranges	Grade
$\frac{\text{Total number of hours the equipment was operational}}{\text{Total expected hours of operation in the month}} \times 100$	IOSP ≥ 98%	1
	IOSP < 98%	0

Comments and Considerations
<p>For the calculation of this INDICATOR, the CONCESSIONAIRE shall implement an electronic system to record, collect and store the operation data of all equipment that make up the Precision Weighing System, and this data shall be made available to ARTESP in real time according to the guidelines of the ANNEX 5. The operation of each system module, as well as its Composition and specifications, shall follow the Description of ANNEX 5.</p> <p>For the calculation of INDICATOR, in the second week of the month following the month analyzed, a report will be extracted from the ARTESP systems containing the extract of the entire operation of the weighing system between 00:00:00 hrs of the first day of the month and 23:59. : 59 hrs of the last day of the month. This report may be supplemented by data obtained through local or remote enforcement activities, where available.</p> <p>Operational equipment shall be defined for the purposes of calculating this INDICATOR to fully and simultaneously comply with all functional requirements established for such purposes, in accordance with the specifications of ANNEX 5.</p>



Indicator	5.1	Indicator of Compliance of Routine Conservation Programs (ICPCR)		
Frequency	Monthly		Data source	Local Verification / SIGECON
Composition	It is formed by 7 Routine Conservation Indexes that comprises the following programs: Pavement, Domain Range, Drainage, Road Containment Devices, Structures, Buildings and Yards and Lighting.			

#### Description - Pavement Routine Conservation Index (ICRP)

The CONCESSIONAIRE shall comply with all activities described in APPENDIX 6, Item 2.3.a, "Pavement" program, in order to guarantee the quality and conservation of the asset. Any non-compliance with any of these activities will be considered as a "non-compliance" for ICRP calculation purposes. It is noteworthy that the mere finding of a "nonconformity" shall be sufficient for accounting in the calculation of this index, regardless of whether the "nonconformity" is corrected / repaired, within or beyond the deadline set forth in the corresponding item. All route awarded, as well as other areas and structures within the DOMAIN RANGE, in both directions, will be routinely evaluated by ARTESP Support Teams and / or technicians. The information collected in these checks will be cleared Monthly.

For the purpose of allocating the "nonconformity" found, the road will be divided longitudinally into segments of 1km (one kilometer), delimited by the milestones, and transversely by the DOMAIN RANGE. Findings in the central areas, where there are any, will be allocated in the follow-up corresponding to the field inspector's finding.

The segment will be considered "compliant" if it meets the criteria set out in the "Segment Conforms to If" column. Similarly, the segment will be considered "non-compliant" if it does not meet this same criterion. In addition, if, in addition to being considered "non-compliant", the segment meets the criteria set out in the "aggravating factor if" column, a unit will be deducted from the "total of compliant segments" (Formula numerator).

Formula: Pavement Routine Conservation Index (ICRP) (ICRP)	Performance ranges	Grade	Assessment form	
			The segment is compliant if....	The aggravating factor will be applied if
$\frac{\text{Number of Compliant Segments}}{\text{Total Number of Inspected Segments}} \times 100$	ICRP ≥ 99%	1	Number of nonconformities per segment < 3	Number of nonconformities by segment ≥ 6
	98% ≤ ICRP < 99%	0,8		
	97% ≤ ICRP < 98%	0,6		
	96% ≤ ICRP < 97%	0,4		
	ICRP < 96%	0		

#### Description - Domain Range Routine Conservation Index (ICRFD)

The CONCESSIONAIRE shall comply with all activities described in APPENDIX 6, Item 2.3.b, “Domain Range” program, in order to guarantee the quality and conservation of the asset. Any non-compliance with any of these activities will be considered as a “non-compliance” for ICRFD calculation purposes. It is important to emphasize that the mere finding of a “nonconformity” shall be sufficient for accounting in the calculation of this index, regardless of whether the “nonconformity” is corrected / repaired, within or beyond the deadline set forth in the corresponding item. All route awarded, as well as other areas and structures within the DOMAIN RANGE, in both directions, will be routinely evaluated by ARTESP Support Teams and / or technicians. The information collected in these checks will be cleared Monthly.

For the purpose of allocating the “nonconformity” found, the road will be divided longitudinally into segments of 1km (one kilometer), delimited by the milestones, and transversely by the DOMAIN RANGE. Findings in the central areas, where there are any, will be allocated in the follow-up corresponding to the field inspector’s finding.

The segment will be considered “compliant” if it meets the criteria set out in the “The segment is compliant if ...” column. Similarly, the segment will be considered “non-compliant” if it does not meet this same criterion. In addition, if, in addition to being considered “non-compliant”, the segment meets the criteria set out in the “aggravating factor if” column, a unit will be deducted from the “total of compliant segments” (Formula numerator).

Formula: Domain Range Routine Conservation Index (ICRFD)	Performance range	Grade	Assessment form	
			The segment is compliant if...	It will be considered as an aggravating factor if...
$\frac{\text{Number of Compliant Segments}}{\text{Total Number of Inspected Segments}} \times 100$	ICRFD $\geq$ 99%	1	Number of nonconformities per segment < 4	Number of nonconformities per segment $\geq$ 8
	98% $\leq$ ICRFD < 99%	0,8		
	97% $\leq$ ICRFD < 98%	0,6		
	96% $\leq$ ICRFD < 97%	0,4		
	ICRFD < 96%	0		

#### Description - Conservation Index of Drainage Routine (ICRD)

The CONCESSIONAIRE shall comply with all activities described in APPENDIX 6, Item 2.3.c, “Drainage” program, in order to guarantee the quality and conservation of the asset. Any non-compliance with any of these activities will be considered a “non-compliance” for ICRD calculation purposes. It is noteworthy that the mere finding of a “nonconformity” shall be sufficient for accounting in the calculation of this index, regardless of whether the “nonconformity” is corrected / repaired, within or beyond the deadline set forth in the corresponding item. All route awarded, as well as other areas and structures within the DOMAIN RANGE, in both directions, will be routinely evaluated by ARTESP Support Teams and / or technicians. The information collected in these checks will be cleared Monthly.

For the purpose of allocating the “nonconformity” found, the road will be divided longitudinally into segments of 1km (one kilometer), delimited by the milestones, and transversely by the DOMAIN RANGE. Findings in the central areas, where there are any, they will be allocated in the follow-up corresponding to the field inspector's finding.

The segment will be considered “compliant” if it meets the criteria set out in the “The segment is compliant if ...” column. Similarly, the segment will be considered “non-compliant” if it does not meet this same criterion. In addition, if, in addition to being considered “non-compliant”, the segment meets the criteria set out in the “aggravating factor if” column, a unit will be deducted from the “total of compliant segments” (Formula numerator).

Formula: Drainage Routine Conservation Index (ICRD)	Performance range	Grade	Assessment form	
			The segment is compliant if...	An aggravating factor will be incurred if
$\frac{\text{Number of Compliant Segments}}{\text{Total Number of Inspected Segments}} \times 100$	ICRD $\geq$ 99%	1	Number of nonconformities per segment < 3	Number of nonconformities per segment $\geq$ 5
	98% $\leq$ ICRD < 99%	0,8		
	97% $\leq$ ICRD < 98%	0,6		
	96% $\leq$ ICRD < 97%	0,4		
	ICRD < 96%	0		

#### Description - ÍRoutine Conservation Index of Road Containment Devices (ICRDCV)

The CONCESSIONAIRE shall comply with all activities described in APPENDIX 6, Item 2.3.d, program “Road Restraint Devices”, in order to ensure the quality and conservation of the asset. Any non-compliance with any of these activities will be considered as a “non-compliance” for ICRDCV calculation purposes. It is noteworthy that the mere finding of a “nonconformity” shall be sufficient for accounting in the calculation of this index, regardless of whether the “nonconformity” is corrected / repaired, within or beyond the deadline set forth in the corresponding item. All route awarded, as well as other areas and structures within the DOMAIN RANGE, in both directions, will be routinely evaluated by ARTESP Support Teams and / or technicians. The information collected in these checks will be cleared monthly.

For the purpose of allocating the “nonconformity” found, the road will be divided longitudinally into segments of 1km (one kilometer), delimited by the milestones, and transversely by the DOMAIN RANGE. Findings in the central areas, where there are any, they will be allocated in the follow-up corresponding to the field inspector's finding.

The segment will be considered “compliant” if it meets the criteria set out in the “The segment is compliant if ...” column. Similarly, the segment will be considered “non-compliant” if it does not meet this same criterion. In addition, if, in addition to being considered “non-compliant”, the segment meets the criteria set out in the “aggravating factor if” column, a unit will be deducted from the “total of compliant segments” (Formula numerator).

Formula: Routine Conservation Index of Road Containment Devices (ICRDCV)	Performance range	Grade	Assessment form	
			The segment is compliant if...	It will be considered as an aggravating factor if...
$\frac{\text{Number of Compliant Segments}}{\text{Total Number of Inspected Segments}} \times 100$	ICRDCV $\geq$ 99%	1	Number of nonconformities per segment = 0	Number of nonconformities per segment $\geq$ 2
	98% $\leq$ ICRDCV < 99%	0,8		
	97% $\leq$ ICRDCV < 98%	0,6		
	96% $\leq$ ICRDCV < 97%	0,4		
	ICRDCV < 96%	0		

#### Description - Conservation Index of Routine Structures (ICRE)

The CONCESSIONAIRE shall comply with all activities described in ANNEX 6, Item 2.3.f, “Structures” program and Technical Specification of ARTESP ET-00.000.000-0-C21 / 002, in order to guarantee the quality and conservation of the asset. Any non-compliance with any of these activities will be considered as a “non-compliance” for ICRE calculation purposes. Importantly, the mere finding of a “nonconformity” will be sufficient to account for the calculation of this index, regardless of whether the “nonconformity” was corrected / repaired, within or beyond the deadline set forth in the corresponding item. All route awarded, as well as other areas and structures within the DOMAIN RANGE, in both directions, will be routinely evaluated by ARTESP Support Teams and / or technicians. The information collected in these checks will be cleared Monthly.

For the purpose of allocating the “nonconformity” found, the road will be divided longitudinally into segments of 1km (one kilometer), delimited by the milestones, and transversely by the DOMAIN RANGE. Findings in the central areas, where there are any, they will be allocated in the follow-up corresponding to the field inspector's finding.

The segment will be considered “compliant” if it meets the criteria set out in the “The segment is compliant if ...” column. Similarly, the segment will be considered “non-compliant” if it does not meet this same criterion. In addition, if, in addition to being considered “non-compliant”, the segment meets the criteria set out in the “aggravating factor if” column, a unit will be deducted from the “total of compliant segments” (Formula numerator).

Formula: Conservation Index of Routine Structures (ICRE)	Performance range	Grade	Assessment form	
			The segment is compliant if...	It will be considered as an aggravating factor if...
$\frac{\text{Number of Compliant Segments}}{\text{Total Number of Inspected Segments}} \times 100$	ICRE $\geq$ 99%	1	Number of non-conformities per segment < 2	Number of non-conformities per segment $\geq$ 3
	98% $\leq$ ICRE < 99%	0,8		
	97% $\leq$ ICRE < 98%	0,6		
	96% $\leq$ ICRE < 97%	0,4		
	ICRE < 96%	0		

#### Description - Routine Conservation Index of Buildings and Yards(ICRPP)

The CONCESSIONAIRE shall comply with all activities described in APPENDIX 6, Item 2.3.g, “Buildings and Yards” program, in order to guarantee the quality and conservation of the asset. Any non-compliance with any of these activities will be considered a “non-compliance” for ICRPP calculation purposes. It is important to note that the mere finding “non-compliance” shall be sufficient for accounting in the calculation of this index, regardless of regularization / correction / repair of “non-compliance”, within or beyond the deadline set forth in the corresponding item. All route awarded, as well as other areas and structures within the DOMAIN RANGE, in both directions, will be routinely evaluated by ARTESP Support Teams and / or technicians. The information collected in these checks will be cleared Monthly.

For the purpose of allocating the “nonconformity” found, the road will be divided longitudinally into segments of 1km (one kilometer), delimited by the milestones, and transversely by the DOMAIN RANGE. Findings in the central areas, where there are any, will be allocated in the follow-up corresponding to the field inspector's finding.

The segment will be considered “compliant” if it meets the criteria set out in the “The segment is compliant if ...” column. Similarly, the segment will be considered “non-compliant” if it does not meet this same criterion. In addition, if, in addition to being considered “non-compliant”, the segment meets the criteria set out in the “aggravating factor if” column, a unit will be deducted from the “total of compliant segments” (Formula numerator).

Formula: Conservation Index of Routine Buildings and yards (ICRPP)	Performance range	Grade	Assessment form	
			The segment is compliant if...	It will be considered as an aggravating factor if...
$\frac{\text{Number of Compliant Segments}}{\text{Total Number of Inspected Segments}} \times 100$	ICRPP $\geq$ 99%	1	Number of non-conformities per segment < 5	Number of non-conformities per segment $\geq$ 10
	98% $\leq$ ICRPP < 99%	0,8		
	97% $\leq$ ICRPP < 98%	0,6		
	96% $\leq$ ICRPP < 97%	0,4		
	ICRPP < 96%	0		

#### Description - Conservation Index of Routine Lighting (ICRI)

The CONCESSIONAIRE shall comply with all activities described in ANNEX 6, Item 2.3.I, “Lighting” program, in order to guarantee the quality and conservation of the asset. Any non-compliance with any of these activities will be considered as a “non-compliance” for ICRI calculation purposes. It is important to note that the mere finding of a “nonconformity” shall be sufficient for accounting in the calculation of this index, regardless of whether the “nonconformity” is corrected / repaired, within or beyond the deadline set forth in the corresponding item. All route awarded, as well as other areas and structures within the DOMAIN RANGE, in both directions, will be routinely

evaluated by ARTESP Support Teams and / or technicians. The information collected in these checks will be cleared Monthly.

For the purpose of allocating the “nonconformity” found, the road will be divided longitudinally into segments of 1km (one kilometer), delimited by the milestones, and transversely by the DOMAIN RANGE. Findings in the central areas, where there are any, they will be allocated in the follow-up corresponding to the field inspector's finding.

The segment will be considered “compliant” if it meets the criteria set out in the “The segment is compliant if ...” column. Similarly, the segment will be considered “non-compliant” if it does not meet this same criterion. In addition, if, in addition to being considered “non-compliant”, the segment meets the criteria set out in the “aggravating factor if” column, a unit will be deducted from the “total of compliant segments” (Formula numerator).

Formula: Conservation Index of Routine Lighting (ICRI)	Performance range	Grade	Assessment form	
			The segment is compliant if...	It will be considered as an aggravating factor if...
$\frac{\text{Number of Compliant Segments}}{\text{Total Number of Inspected Segments}} \times 100$	ICRI ≥ 99%	1	Number of non-conformities per segment = 0	Number of non-conformities per segment ≥ 2
	98% ≤ ICRI < 99%	0,8		
	97% ≤ ICRI < 98%	0,6		
	96% ≤ ICRI < 97%	0,4		
	ICRI < 96%	0		

#### Formula: Indicator Compliance of Routine Conservation Programs (ICPCR)

$$\begin{aligned} \text{Final Grade}_{ICPCR} = & (\text{Weight}_{ICRP} \times \text{Performance Grade}_{ICRP}) + (\text{Weight}_{ICRFD} \times \text{Performance Grade}_{ICRFD}) + (\text{Weight}_{ICRD} \times \text{Performance Grade}_{ICRD}) \\ & + (\text{Weight}_{ICRDCV} \times \text{Performance Grade}_{ICRDCV}) + (\text{Weight}_{ICRE} \times \text{Performance Grade}_{ICRE}) \\ & + (\text{Weight}_{ICRPP} \times \text{Performance Grade}_{ICRPP}) + (\text{Weight}_{ICRI} \times \text{Performance Grade}_{ICRI}) \end{aligned}$$

:

For purposes of calculating the ICPCR, the indices have the following weights:

- $\text{Weight}_{ICRP} = 0,45$
- $\text{Weight}_{ICRFD} = 0,20$
- $\text{Weight}_{ICRD} = 0,10$
- $\text{Weight}_{ICRDCV} = 0,05$
- $\text{Weight}_{ICRE} = 0,05$
- $\text{Weight}_{ICRPP} = 0,05$
- $\text{Weight}_{ICRI} = 0,10$

#### Comments and Considerations

For the verification of this INDICATOR, local checks will be performed by ARTESP Support Companies and / or technicians, in all segments of the extension granted, in both directions, as well as other areas and structures within the DOMAIN RANGE. Nonconformities refer to non-compliance with any activity related to the indicated programs, as described in ANNEX 6, item 2.2. In this case, non-compliance during the verifications shall be recorded in each index, regardless of the repair / correction time that is established for each item in APPENDIX 6.

Each distinct nonconformity<sup>1</sup> found during verifications shall be evidenced from photos and then all shall be stored and managed through the Integrated Digital



Conservation Function Management System (SIGECON) - the system to be implemented by the CONCESSIONAIRE and shall provide access to the facility. ARTSP

For the calculation of INDICATOR, on the second week of the month following the month analyzed, ARTESP will extract a report from SIGECON containing the extract of all nonconformities recorded in each segment of analysis between 00:00:00 hrs of the first day of the month and 23:59:59 hrs of the last day of the month. The extracted report must be sufficient for the calculation of the indices and the Indicator as detailed in this sheet. This report may be supplemented by data obtained through local or remote enforcement activities, where available. The Supporting Companies will send ARTESP a report with the results of the field checks to calculate INDICATOR.

For cases of nonconforming segments that have the number of distinct nonconformities identified in the surveys performed in the month, equal to or greater than the value indicated in the column "It will be considered as an aggravating factor if ..." for each index evaluated, there will be deduction of one unit for each segment in the total of compliant segments. If, for example, at the end of the analysis it was found that in a universe of 100 segments, 90 of them are compliant and 10 nonconforming, 3 of them with the number of nonconformities equal to the largest stipulated in the column "It will be considered as an aggravating factor if ...", the number of conforming segments to be considered for calculation is 87.

### Grades

1) The term "distinct nonconformities" means all those nonconformities which are not identical, that is, of a different nature and location. By way of example, in this definition, the same hole checked 2 (twice) in the same segment cannot be counted twice for INDICATOR measurement purposes. However, if the same segment has two distinct holes, both must be accounted for.

(2) The Indices provided for in this INDICATOR shall only be considered valid when at least 700 (seven hundred) road segments have been inspected. If a certain index is considered invalid, its weight shall be redistributed among the others, maintaining the proportionality originally foreseen.

Indicator	6.1	Maximum Extension Time Indicator in the toll line (ITEMFP)		
Frequency	Monthly		Data source	Maximum Queue Detection System / Local or Remote Verification
Composition	Composed of Toll Queue Maximum Length Indexes, by toll station			

#### Description - Maximum Toll Queue Extension Time Index (per STATIONS) (ITEMFPP)

Through the implementation of a monitoring system composed of cameras integrated with intelligent video analysis algorithms, which enables maximum queue detection, the CONCESSIONAIRE shall monitor the queues at the toll stations of the entire road system full time. The maximum row size for all toll booths and STATIONS is 60 meters from the collection position in the TOLL STATIONS hand-held booths. Once this limit is exceeded, the system must automatically account for how long this queue has remained under these conditions. Thus, Monthly, will be computed the number of hours that any queue, for each TOLL STATIONS, remained higher than the previously established limit, causing a long wait time for the user. A Performance Grade will be established for each TOLL STATIONS, and thereafter, the final INDICATOR Grade (ITEMFP) will be the one corresponding to the lowest Grade assigned to a STATIONS's performance. For the calculation of INDICATOR, TOLL STATIONS monitoring systems must have 100% operability \* (per STATIONS), otherwise the Grade will be automatically 0 (zero).

Formula: Maximum Toll Queue Extension Time Index (per STATIONS) (ITEMFPP)	Performance ranges	Grade
<i>Count of hours that any queue remained longer than the limit</i>	$ITEMFPP \leq 6$ hours	1
	$6 < ITEMFPP \leq 8$ hours	0,8
	$8 < ITEMFPP \leq 10$ hours	0,6
	$10 < ITEMFPP \leq 12$ hours	0,4
	$ITEMFPP > 12$ hours	0

#### Formula: Indicator Maximum Extension Time in the toll line (ITEMFP)

$$Final\ Grade_{ITEMFP} = Min ( Grades\ ITEMFPP )$$

#### Comments and Considerations

For each TOLL STATIONS, a camera monitoring system shall be installed to enable the viewing of the maximum allowable size of all cabin rows. This system must, through intelligent video analysis algorithms, monitor the toll queue limit. Each time any queue exceeds the preset limit, the system will count the time the queue remained in these conditions. The accounting of this time is independent of the simultaneous occurrence of multiple exceeded maximum queues, in the same TOLLGIO STATIONS.

These data must be stored in a proprietary system of the CONCESSIONAIRE, with access available online and in real time by ARTESP.

For the INDICATOR calculation, until the 5th business day of the month following the month analyzed, it will be extracted from the CONCESSIONAIRE's collection system, a report containing the extract of all the times that any row, for each TOLL STATIONS, remained higher than the limit that was previously established (60 meters counted from the toll position in the manual toll booths), recorded between 00:00:00 hrs on the first day of the month and 23:59:59 hrs on the last day of the month. This report may be supplemented by data obtained through local or remote enforcement activities, where available.

The CONCESSIONAIRE shall also send to ARTESP, by the 5th business day of the month following the month analyzed, a report containing the data related to the times when the queues operated above the maximum extension limit. This report must compile data for each system toll station and may be used by the ARTESP Team for verification.

In cases where the queue is longer than 60 meters for a period of more than one (1) consecutive hour, this period shall be disregarded for ITEMFP calculations and shall be considered in accordance with the rule set out in ANNEX 11.

For cases in which the queue at TOLL STATIONS has exceeded its maximum limit due to post-STATIONS factors (that is, when there is a systemic congestion after the toll station), the time counted will be purged. To prove these cases, cameras must be implanted that allow the visualization of traffic immediately after the TOLL STATIONS. This system must, by means of intelligent video analysis algorithms, monitor the traffic condition, from the occuyardn by vehicles, of the delimited space just after the toll station. Whenever a high occupancy is found that makes it impossible for any vehicle to flow normally after payment on any road, the system will count the times at which it occurred. From the comparison with the data collected in the maximum allowed queue monitoring system, such situations will be disregarded in the INDICATOR calculations. \* The monitoring systems implemented in TOLL STATIONS must support telemetry integrated with ARTESP systems in order to allow consultation. remote and real-time operation of the equipment by the JRC.

The CONCESSIONAIRE shall keep stored for at least 15 (fifteen) months the image data used for the calculation of this INDICATOR.

Indicator	7.1	Delay Time Indicator Due to Interventions (ITAFI)		
Frequency	Monthly		Data source	PISR / Report delivered by CONCESSIONAIRE
Composition	Composed of Intervention Delay Time Indices, by homogeneous segment			

**Description: Intervention Delay Time Index (by homogeneous segment) (ITAFIPI)**

It must be measured the travel time of vehicles in homogeneous segments through the use of technologies (systems, cameras, wifi, among others) that enable the measurement of this data. It will be used to calculate and verify the characteristic delay time caused by the set of interventions within the stretch. This information must be sent in the form of a Monthly report prepared by CONCESSIONAIRE and will be compared with the estimates provided in the Highway System Intervention Plan (PISR), delivered by CONCESSIONAIRE to ARTESP, according to the guidelines of ANNEX 5, Item 7.3. A Performance Grade will be established for each segment and thereafter an average of the segment Grades with interventions for the final INDICATOR will be performed as described below. The technology chosen by the CONCESSIONAIRE to perform the measurement of intervention times must be audited and previously validated by ARTESP.

Formula: Intervention Delay Time Index (by homogeneous segment) (ITAFIPI)	Performance ranges	Grade
<i>Predicted PISR Delay / Field Measured Delay</i>  (*) INDICATOR delay corresponds to the arithmetic mean, over the period of interventions in the homogeneous segment, of the one-hour delays. (**) If interventions are observed within a homogeneous segment that were not observed in the PISR, the homogeneous segment grade will be automatically zero.	ITAFIPI $\geq$ 95%	1
	90% $\leq$ ITAFIPI < 95%	0,8
	85% $\leq$ ITAFIPI < 90%	0,6
	80% $\leq$ ITAFIPI < 85%	0,4
	ITAFIPI < 80%	0

Formula: Delay Time Indicator, due to Interventions (ITAFI)

$$Final\ Grade_{ITAFI} = \frac{\sum_n Grades\ ITAFIPI}{n}$$

In which:

n = Number of homogeneous segments under road intervention.

Comments and Considerations

Homogeneous segment is defined as the segment with similar physical and operational characteristics in its extension, which shall be defined by the CONCESSIONAIRE and approved by ARTESP.

For each homogeneous segment, the CONCESSIONAIRE shall use a technology (cameras, wifi, systems, among others) at specific points before and after, to be determined by the CONCESSIONAIRE and approved by ARTESP, which can measure the average travel time within the homogeneous segment. .

The travel time of the vehicles traveling the stretch must be accounted for and these data must be stored in a database for the verification of the delay time and comparison with the estimated in the PISR. This database must be made available to ARTESP.

To calculate INDICATOR, by the 5th business day of the month following the month analyzed, ARTESP must receive from the CONCESSIONAIRE a report containing the extract of all travel times recorded by the cameras in the stretch, between 00:00:00 hrs of the 1st day. of the month and 23:59:59 hrs of the last day of the month. The report shall compile the data for each homogeneous segment and generate sufficient information for the calculation of this INDICATOR as detailed in this sheet. The report delivered by CONCESSIONAIRE may be supplemented by data obtained through local or remote surveillance activities, when available.

The technical analysis of whether or not to waive the PISR plan is the responsibility of the ARTESP technical team. If there is no intervention governed by a PISR in the month under review INDICATOR will be maximum in the period.

General grades:

(1) Works and interventions that are the subject of intervention plans - PISR:

Stop and follow operation on simple roads;

Partial or total ban on scrollways and works within the DOMAIN RANGE affecting service level.

(2) The hours when interference with the exclusive operation by PMRv must be purged.



Indicator	8.1	Indicator of Integrity and Conservation of Vertical Signage (IICSV)		
Frequency	Monthly		Data source	Local Verification / Plate Registration
Composition	Availability of vertical signage provided for under conditions suitable for operation of the granted roads.			

Description
It will be verified by visual inspection and / or retroreflectance measurement, carried out in the field, the conservation status of the vertical signaling on all roads in relation to the total number of plates registered in the system as updated register (number of plates unavailable). Signs that are not available in the month will be considered plates in the granted stretch that do not comply with the technical specifications, standards and manuals in force, as detailed in ANNEX 6, item 2.3 e, program "Signaling and Auxiliary Devices". Any failure to comply with any of these specifications / activities will be considered a "non-compliance" and unavailability of signaling for IICSV calculation purposes. It is important to note that mere <u>finding</u> during the field checks of a "nonconformity" will be sufficient to account for the availability of plaques in the calculation of this INDICATOR, regardless of whether / not the "nonconformity" has been rectified / corrected within or beyond the deadline set forth in the corresponding item. For the composition of this INDICATOR, all types of vertical, regulatory, warning, educational, institutional and indication signals, and auxiliary devices of the type hazard and alignment markers will be considered.

Formula:	Performance ranges	Grade
$= \frac{\text{Total Number of System Boards} - \text{Number of Boards Unavailable Throughout the Month}}{\text{Total number of system boards}} \times 100$	IICSV $\geq$ 99%	1
	97% $\leq$ IICSV < 99%	0,8
	95% $\leq$ IICSV < 97%	0,6
	93% $\leq$ IICSV < 95%	0,4
	IICSV < 93%	0
* If the CONCESSIONAIRE does not send the updated registration, according to guidelines established by ARTESP, the Grade in INDICATOR will be 0.		

#### Comments and Considerations

The CONCESSIONAIRE shall comply with all routine conservation programs for vertical signaling and auxiliary signaling devices as described in APPENDIX 6, item 2.3e, in order to ensure the quality and conservation of the asset and in compliance with technical specifications, standards, manuals, public notices in force for the passage. Failure to comply with any of these standards characterizes a signaling unavailability for IICSV calculation purposes, regardless of the repair / correction time that is established for each item in ANNEX 6.

All route awarded, in both directions, will be routinely evaluated by ARTESP Support Teams and / or technicians. Support Companies will send ARTESP a report with the results of the field checks to calculate INDICATOR. The information collected in these checks will be ascertained Monthly (in the second week of the month following the month analyzed), determining the sum of unavailable plaques, and then the number of plaques available throughout the month will be compared with the number of plaques registered throughout the road system. Surveys will occur during the month of analysis.

It will be considered that the register is updated when 100% of the existing signs in the ROAD SYSTEM are registered, after the deadline established for its implementation.



Indicator	8.2	Horizontal Signaling Integrity and Conservation Indicator (IICSH)		
Frequency	Monthly	Data source	Local Verification	
Composition	Availability of the planned horizontal signs under conditions suitable for the operation of the granted roads.			

Description
<p>It will be verified through visual inspection and / or retro-reflectance measurement, performed in the field, the integrity of the horizontal signs considering aspects such as existence, accuracy, cleanliness and visibility of the painting and the tacks, as described in ANNEX 6, item 2.3e, "Signaling and Auxiliary Devices" program. Any non-compliance with any of these activities will be considered as a "non-compliance" for IICSH calculation purposes. It is important to note that the mere <u>finding</u> during the field checks of a "nonconformity" will be sufficient to account for segment compliance in the calculation of this INDICATOR, regardless of whether the "nonconformity" has been corrected / repaired within or beyond the deadline set in the corresponding item. For this INDICATOR, consideration will be given to the availability of the analysis of horizontal signaling and tacks along the road divided into segments of 1 km (one kilometer), delimited longitudinally by the milestones. The segment will be considered compliant if it has no "non-compliance" related to horizontal signage and tacks.</p>

Formula:	Performance ranges	Grade
$\frac{\text{Numero de segmentos conformes no mês} = \text{Total number of segments inspected} - \text{Number of "non - compliant" segments in the month}}{\text{Total number of segments inspected}} \times 100$	IICSH $\geq$ 97%	1
	95% $\leq$ IICSH < 97%	0,8
	93% $\leq$ IICSH < 95%	0,6
	90% $\leq$ IICSH < 93%	0,4
	IICSH < 90%	0
Comments and Considerations		

The CONCESSIONAIRE shall comply with all routine conservation programs for horizontal signaling and tacks as described in Annex 6, item 2.3e, in order to ensure the quality and conservation of the asset. Failure to comply with any of the standards that may cause problems in horizontal roadway signaling will be considered "nonconformities" for IICSH calculation purposes, regardless of the repair / correction time that is established for each item in ANNEX 6. All roadway granted , in both directions, will be routinely evaluated by ARTESP Support Teams and / or technicians. Support Companies will send ARTESP a report with the results of the field checks to calculate INDICATOR. The information collected in these checks will be collected Monthly (in the second week of the month following the month under review). Surveys

will occur during the month of analysis.

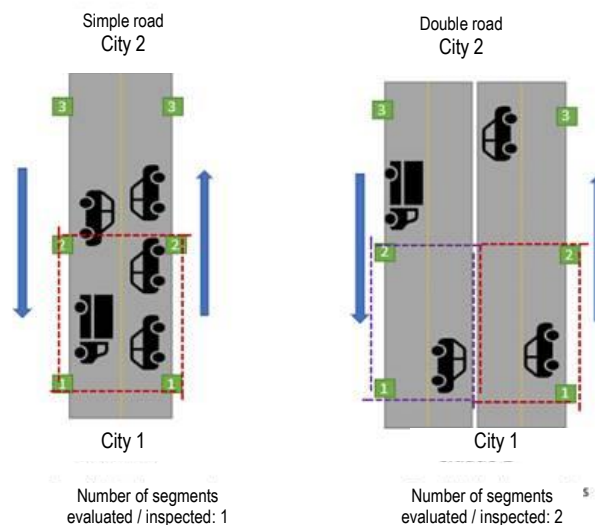
The roads will be divided into segments of 1 km (one kilometer), delimited longitudinally between kilometers. A nonconforming segment will be considered as one that has any “non-compliance” related to horizontal signaling or tacks in the month under analysis, leading to the deduction of one unit in the total of compliant segments (Formula numerator).

The number of segments will be calculated according to the formula below:

$$\text{Total number of segments inspected} = (1 \times \text{single road length}) + (2 \times \text{double road length}) + \text{marginal road length}^{(*)}$$

(\*) Marginal roads are local transit roads that allow vehicles to travel parallel to the highway without having to enter it.

**Illustrative** figure to illustrate the delimitation of the segment to be evaluated / inspected for IICSH calculation between km 1 and km 2 of a road:



**Grade:** For INDICATOR to be valid, a minimum of 60% (sixty percent) of the ROAD SYSTEM must be inspected. If not, the weight of the INDICATOR in question must be redistributed among the others, maintaining the proportionality due.

Indicator	9.1	Operational Indicator of Fixed PMVs (IOPMV)		
Frequency	Monthly		Data source	Electronic Systems - Local or Remote Telemetry / Verification System
Composition	Hours when all equipment with fixed PMVs of the Granted Highway System, these equipments remained operational and total hours scheduled in the month.			

Description
The Suitability of Initial Fixed Variable Messaging (PMV) system is verified by means of the percentage of hours that the equipment became operational in a given month, as described in ANNEX 5. If the request for the deactivation of the equipment is accepted, will not be counted in the calculation base the hours when it was deactivated, from the moment of the request of the deactivation by the CONCESSIONAIRE until the expected time for the reactivation of the equipment, under the terms of the mentioned solicitation.

Formula: PMV Operability Indicator (IOPMV)	Performance ranges	
	Binary index	Grade
$\frac{\text{Total number of hours that the equipments were operational}}{\text{Total expected hours of operation in the month}} \times 100$	IOPMV $\geq$ 97%	1
	IOPMV < 97%	0

Comments and Considerations
For the calculation of this INDICATOR, the CONCESSIONAIRE shall implement an electronic system to record, collect and store the operation data of all PMV equipment installed in the road system, which data shall be made available to ARTESP in real time according to the guidelines of ANNEX 5.
For the calculation of INDICATOR, on the second week of the month following the month analyzed, a report will be extracted from the ARTESP systems containing a statement of all equipment operation between 00:00:00 hrs on the first day of the month and 23:59: 59 hrs of the last day of the month. This report may be supplemented by data obtained through local or remote enforcement activities, where available.
As it is not possible to identify all equipment failure events in the month, the calculated value for INDICATOR represents a better case (or maximum value), ie, it is possible to show that the operability was not higher than the value represented by INDICATOR.
Operating equipment is defined for the purposes of calculating this INDICATOR, the full and simultaneous fulfillment of all functional requirements established for fixed PMV in the item corresponding to this type of equipment in ANNEX 5 of the Public Notice.

Indicator	9.2	CCTV Operational Indicator (IOCFTV)		
Frequency	Monthly		Data source	Electronic Systems - Local or Remote Telemetry / Verification System
Composition	Hours that all CCTV equipment in the ROAD SYSTEM remained operational and total hours forecast for the month.			

Description
The operation of the CCTV System is verified by the percentage of hours the CCTV equipment became operational in a given month, as described in ANNEX 5. In cases where the request for deactivation of the equipment is accepted, they will not be accounted for on a daily basis. calculating the hours that it was deactivated, from the moment of the request of deactivation by the CONCESSIONAIRE until the expected time for the reactivation of the equipment, under the terms of the mentioned request.

Formula: Indicator Operacionalidade de CFTV (IOCFTV)	Performance ranges	
	Binary Index	Grade
$\frac{\text{Total number of hours that the equipments were operational}}{\text{Total expected hours of operation in the month}} \times 100$	IOCFTV ≥ 97%	1
	IOCFTV < 97%	0

Comments and Considerations
For the calculation of this INDICATOR, the CONCESSIONAIRE shall implement an electronic system to record, collect and store the operation data of all CCTV equipment installed in the road system, which data must be made available to ARTESP in real time according to the guidelines of ANNEX 5.
For the calculation of INDICATOR, on the second week of the month following the month analyzed, a report will be extracted from the ARTESP systems containing a statement of all equipment operation between 00:00:00 hrs on the first day of the month and 23:59: 59 hrs of the last day of the month. This report may be supplemented by data obtained through local or remote enforcement activities, where available.
Seeing that it is not possible to identify all equipment failure events in the month, the calculated value for INDICATOR represents a better case (or maximum value), ie, it is possible to show that the operability was not higher than the value represented by INDICATOR.
Operational equipment is defined for the purposes of calculating this INDICATOR, the full and simultaneous fulfillment of all functional requirements established for CCTV in the item corresponding to this type of equipment in ANNEX 5 of the PUBLIC NOTICE.

Indicator	9.3	Communication System Availability Compliance Indicator with the user via wireless data network (ICDRD)		
Frequency	Monthly	Data source		Electronic Systems - Local or

			Remote Telemetry / Verification System
Composition	Hours in the month that the Wireless Data Network User Communication System met the contractual availability requirement of 90% or over this number.		

Description
<p>The availability of the User Communication System via Wireless Data Network is verified every 01 (one) minute, by means of the percentage of Wireless Access Points that became operational, according to Description of ANNEX 5. In cases where If the request for equipment deactivation is accepted, the equipment will not be considered in the availability calculations of the period corresponding to the deactivation, considering the period from the request of deactivation by the CONCESSIONAIRE until the expected time for the reactivation of the equipment, pursuant to the mentioned request.</p> <p>From the availability data of each minute, the availability compliance is verified by the percentage of hours that the System remained with availability greater than or equal to 90% (ninety percent).</p>

Formula: Indicator System Availability Compliance of communication with the wireless network (ICDRD)	Performance ranges	
	Binary Index	Grade
$\frac{\sum \text{Hours that the System remained with availability greater than or equal to 90\%}}{\sum \text{Estimated valid hours for the month}}$	ICDRD $\geq$ 99,5%	1
	ICDRD $<$ 99,5%	0

Comments and Considerations
<p>For the calculation of this INDICATOR, the CONCESSIONAIRE shall implement an electronic system to record, collect and store the operation data of all Wireless Access Points installed in the road system, which data shall be made available to ARTESP in real time according to the guidelines of the ANNEX 5</p> <p>For the calculation of INDICATOR, on the second week of the month following the month analyzed, a report will be extracted from the ARTESP systems containing a statement of all equipment operation between 00:00:00 hrs on the first day of the month and 23:59: 59 hrs of the last day of the month. This report may be supplemented by data obtained through local or remote enforcement activities, where available.</p> <p>As it is not possible to identify all equipment failure events in the month, the calculated value for INDICATOR represents a better case (or maximum value), ie, it is possible to show that the operability was not higher than the value represented by INDICATOR.</p> <p>Operational equipment is defined for the purposes of calculating this index to fully and simultaneously meet all functional requirements established for the Wireless Communication Network User Access Point, in the item corresponding to this type of equipment in ANNEX 5 of the Public Notice.</p>

Indicator	9.4	Traffic Sensor Operability Indicator – SAT (IOSAT)		
Frequency	Monthly		Data source	Electronic Systems - Local or Remote Telemetry / Verification System
Composition	Hours that all SAT equipment of the Granted Road System remained operational and total hours forecast in the month.			

#### Description

The operation of the Traffic Sensing System is verified by the percentage of hours that the SAT equipment became operational in a given month, as described in ANNEX 5. In cases where the request for equipment deactivation is accepted, they will not be accounted for. In the calculation basis the hours that it was deactivated, from the moment of the request of the deactivation by the CONCESSIONAIRE until the expected time for the reactivation of the equipment, under the terms of the mentioned request.

Formula: Availability Indicator of the traffic sensor data – SAT (IOSAT)	Performance ranges	
	Binary Index	Grade
$\frac{\text{Availability Indicator of the traffic sensor data}}{\text{Total expected hours of operation in the month}} \times 100$	IOSAT ≥ 97%	1
	IOSAT < 97%	0

#### Comments and Considerations

For the calculation of this INDICATOR, the CONCESSIONAIRE must implement an electronic system to record, collect and store the operation data of all traffic sensors - SAT installed in the road system, which data must be made available to ARTESP in real time according to the guidelines of the ANNEX 5

For the calculation of INDICATOR, on the second week of the month following the month analyzed, a report will be extracted from the ARTESP systems containing a statement of all equipment operation between 00:00:00 hrs on the first day of the month and 23:59:59 hrs of the last day of the month. This report may be supplemented by data obtained through local or remote enforcement activities, where available.

Seeing that it is not possible to identify all equipment failure events in the month, the calculated value for INDICATOR represents a better case (or maximum value), that is, it is possible to show that the operability was not higher than the value represented by INDICATOR.

Operational equipment is defined for the purposes of calculating this INDICATOR, the simultaneous fulfillment of all functional requirements established for the SAT in the item corresponding to this type of equipment in ANNEX 5 of the Public Notice.

Indicator	10.1	Methodology Indicator of Road Safety Inspection		
Frequency	Quadrennial	Data source		ISR Final Report
Composition	Seventy-five percent (75%) of homogeneous sections with 3 or more stars (according to Road Safety methodology) in relation to the applicable sections of the ROAD SYSTEM			

#### Description

Road safety of homogeneous sections of the ROAD SYSTEM is verified by means of minimum inspection / audit requirements set out in ANNEX 5.

**Table - Percentage of homogeneous sections with 3 (three) stars or more in ISR road safety methodology**

Users	YEAR 0	YEAR 2	YEAR 6	YEAR 10	YEAR 14	YEAR 18	YEAR 22	YEAR 26	YEAR 30
Vehicle Occupant	77%	78%	96%	96%	96%	94%	90%	90%	88%
Motorcyclists	61%	60%	75%	75%	69%	73%	72%	73%	64%
Pedestrians	64%	63%	77%	77%	78%	76%	76%	76%	76%
Cyclists	67%	66%	82%	82%	80%	74%	71%	71%	68%

#### Comments and Considerations

For the calculation of this INDICATOR, the CONCESSIONAIRE must consider the road segments. However, the following situations must not be considered for INDICATOR calculation purposes:

- (i) if ARTESP determines the adoption of a countermeasure, pursuant to the ISR report, applying the SISDEMANDA procedure provided for in APPENDIX H, the homogeneous section (s) with this occurrence shall be automatically excluded from the two (2) upcoming ISR INDICATOR assessments; and
- (ii) excerpts still under intervention under the terms described in the POI and physical-executive schedule prepared by CONCESSIONAIRE.

For Cyclist and Pedestrian users, the homogeneous sections recommended in the methodology will be considered in the denominator, with the addition of sections whenever the presence of these users is identified.

If the index obtained in the first calculation (Year 3 of the Concession) of the methodology by the CONCESSIONAIRE is equal to or higher than the index provided in the Table for the same year, new targets will be defined for subsequent periods, by applying, on the result obtained, growth rates originally observed in the Table until INDICATOR reaches 95%.