

ATTACHMENT 8
PERFORMANCE MEASUREMENT SYSTEM

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1. INTRODUCTION

The PERFORMANCE MEASUREMENT SYSTEM (SMD) described herein aims to assess the quality of the SERVICES rendered by the CONCESSIONAIRE.

The aforementioned assessment will be carried out through the GENERAL PERFORMANCE INDEX (IDG), composed of 05 (five) specific performance criteria, which are:

- i. Availability Criterion (CD): Evaluates the availability of lighting during the night;
- ii. Quality Criterion (QC): Evaluates the quality of the SERVICES rendered and the lighting levels;
- iii. Operations Criterion (CO): Evaluates the availability of infrastructure and SERVICES, as well as meeting the deadlines established for them;
- iv. Compliance Criterion (CC): Evaluates compliance with the deadlines and requirements for the presentation of certificates and reports;
- v. Efficiency Criterion (CE): Evaluates the maintenance of the efficiency levels reached by the CONCESSIONAIRE according to the CONCESSION MILESTONES.

From the calculation of the IDG, the PERFORMANCE PARAMETER (FD) will be accounted for the calculation of the EFFECTIVE MONTHLY PAYMENT to be paid by the CONCESSION AUTHORITY to the CONCESSIONAIRE, as provided in ATTACHMENT 9 (PAYMENT MECHANISM).

This ATTACHMENT presents the general structure of the SMD and details of the performance parameters, for the understanding of the index and indicators calculation mechanism.

2. GENERAL PERFORMANCE INDEX

The CONCESSIONAIRE's performance evaluation will be carried out through the determination, calculation and application of the GENERAL PERFORMANCE INDEX - IDG, a number that will vary between 0 (zero) and 1 (one), representative of the quality delivered by the CONCESSIONAIRE in the execution of the services belonging to the CONCESSION scope, quantified according to the evaluations of the criteria, indexes and, when applicable, of the performance indicators, with 0 (zero) representing the worst possible assessment to be obtained by the CONCESSIONAIRE and 1 (one) the fulfillment of all established goals.

The GENERAL PERFORMANCE INDEX - IDG will have the function of determining, from several indexes and indicators, the services actually provided, serving as a benchmark for the calculation of the PERFORMANCE PARAMETER - FD that will impact the final composition of the EFFECTIVE MONTHLY PAYMENT to be paid to the CONCESSIONAIRE.

The composition of the GENERAL PERFORMANCE INDEX was based on the weighting of 5 (five) main criteria, as detailed below:

- i. **Availability Criterion (CD):** Evaluates the availability of lighting, formed by:
 - a. Light Availability Index - IDL: Checks if the PUBLIC LIGHTING POINTS are actually lit at night;
- ii. **Quality Criterion (QC):** Evaluates the quality of the service rendered and the lighting levels, formed by:
 - a. Lighting Adequacy Index - IAL: Monitors the CONCESSIONAIRE regarding compliance with the minimum levels of illuminance and uniformity defined in the norm, in addition to color temperature and IRC, in PUBLIC LIGHTING POINTS;
 - b. Data Quality Index - IQD: Checks whether the REGISTRY, prepared and maintained by the CONCESSIONAIRE, reliably represents the PUBLIC LIGHTING assets installed in the field.
- iii. **Operation Criterion - CO:** Evaluates the availability of infrastructure and SERVICES, as well as compliance with the deadlines established for its execution, formed by:
 - a. Daytime Light Index - IAD: Checks if the PUBLIC LIGHTING POINTS are effectively off during daytime;
 - b. Call Center Availability Index - IDC: Checks if the call center system is available continuously and evaluates the service rendered;
 - c. Telemangement Availability Index - IDT: Checks if the TELEMAGEMENT SYSTEM implemented by the CONCESSIONAIRE, as well as if the basic functionalities of the system, are available continuously and in full operation;
 - d. Index of Compliance with Operation and Maintenance Deadlines - IC POM: Monitors the CONCESSIONAIRE's service to the deadlines for the solution of the CORRECTIVE MAINTENANCE calls, according to the type of call.
- iv. **Compliance Criterion - CC:** Evaluates compliance with the deadlines and requirements for the presentation of certificates and reports, formed by:

- a. Certificate Compliance Index - ICC: Evaluates the compliance of documents that prove the services related to environmental management and decontamination and final destination of polluting waste.
 - b. Information Compliance Index - ICI: Evaluates compliance with the monthly delivery to the CONCESSION AUTHORITY/INDEPENDENT VERIFIER of the Service Execution Reports by the CONCESSIONAIRE and the advertising of PPP information.
- v. **Efficiency Criterion - CE:** Evaluates the energy efficiency levels reached by the CONCESSIONAIRE.

2.1. General Considerations

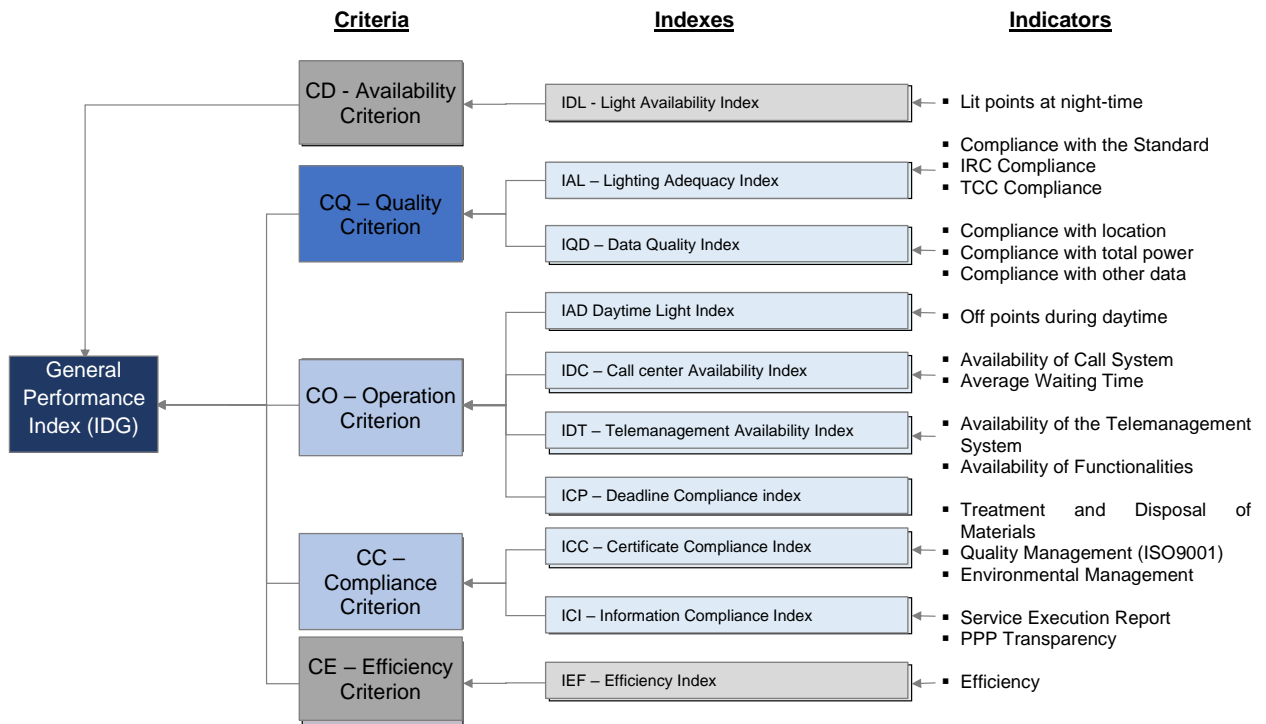
All calculations presented in this ATTACHMENT, including the criteria, indexes and indicators, must be carried out considering only two decimal places, and the following rounding rule must be followed:

- i. If the digit in the third decimal place is less than 5, the digit in the second decimal place does not change. Example: $0.642 = 0.64$.
- ii. If the number of the third decimal place is greater than or equal to 5, the number of the second decimal place is increased by one. Example: $0.647 = 0.65$.
- iii. The same is true for cases where the calculation results in a figure with more than three decimal places. The operations presented above should be applied progressively until reaching the 2nd decimal place in the result, only.

2.2. Evaluation Procedure

The GENERAL PERFORMANCE INDEX will be calculated based on the evaluation and weighing of 5 (five) criteria - CD, CQ, CO, CC and CE - according to the terms hereof. Each of the 5 (five) criteria will be obtained through the evaluation of their respective indexes and corresponding indicators, when applicable, multiplied by the respective weights. The table below illustrates the structure of the IDG and the weighing of the respective criteria, indexes and indicators:

Figure 1 - Composition of the GENERAL PERFORMANCE INDEX



From the results obtained for the Criteria, the GENERAL PERFORMANCE INDEX - IDG will be calculated, according to the following formulas and CONCESSION period:

$$IDG = CD * (40%*CQ + 50%*CO + 5%*CC + 5%*CE)$$

Where:

IDG = GENERAL PERFORMANCE INDEX;

CD = Availability Criterion;

CQ = Quality Criterion;

CO = Operation Criterion;

CC = Compliance Criterion;

CE = Efficiency Criterion.

The calculation of the GENERAL PERFORMANCE INDEX will be made based on the QUARTERLY INDICATORS REPORT that will be prepared and delivered by the INDEPENDENT VERIFIER to the CONCESSION AUTHORITY and to the CONCESSIONAIRE. The report will contain the results of the measurement of all indicators, which will be carried out by the INDEPENDENT VERIFIER and evaluated by the CONCESSION AUTHORITY and by the CONCESSIONAIRE

For the final composition of the CONCESSIONAIRE'S GENERAL PERFORMANCE INDEX, the criteria CQ, CO, CC and CE will be evaluated separately. In the event that the CONCESSIONAIRE obtains a score lower than 0.5 (five tenths) for CQ, CO, CC or CE, the final value of the IDG will be reduced, further, by 0.1 (one tenth) for each index below this level. Thus, the IDG score may be reduced by up to 0.4 (four tenths), if the individual score of the four criteria is less than 0.5 (five tenths). It should be noted that the minimum IDG value is 0 (zero), i.e., if the reduction treated in this paragraph results in an IDG value less than or equal to 0 (zero), the value considered for IDG will be 0 (zero).

2.2.1. Start of determination

The INDEPENDENT VERIFIER shall begin to determine the criteria, indexes and indicators presented herein from the beginning of Stage I (one), presenting the first QUARTERLY INDICATORS REPORT, according to the AGREEMENT, until the 5th (fifth) business day after closing of the quarter.

Only for the first QUARTERLY INDICATORS REPORT, there will be no impact on the CONCESSIONAIRE'S EFFECTIVE MONTHLY PAYMENT, being used to align the guidelines and procedures between the parties.

2.2.2. Form and Content of the QUARTERLY INDICATORS REPORT

The QUARTERLY INDICATORS REPORT must contain, at least:

- i. Consolidation of the record of measurements carried out in the three months of the respective period, as well as the source of the data, responsible for the collection and other pertinent information;
- ii. Result and calculation memory of indicators;
- iii. Complete information on the calculation of the IDG, according to the details contained herein;
- iv. History with the evolution of each indicator.

The indicator calculation memory must be provided in a digital format that is wide and easy to use, preferably in an electronic spreadsheet compatible with Microsoft Excel or Open Document, in such a way that the calculation of each indicator can be audited and tracked in its entirety.

The presentation format and standard of the QUARTERLY INDICATORS REPORT must be previously presented and approved by the CONCESSION AUTHORITY before the beginning of the first computation period. The presentation of the QUARTERLY INDICATORS REPORT may be modified during the CONCESSION at the request of the CONCESSION AUTHORITY with the aim of making the determination of the results clearer and more accurate.

The INDEPENDENT VERIFIER will be responsible for all field measurements necessary to measure the CONCESSIONAIRE performance in accordance with the guidelines and definitions in this ATTACHMENT.

The INDEPENDENT VERIFIER will analyze any information presented by the CONCESSIONAIRE and the CONCESSION AUTHORITY, in order to promote the necessary steps to prepare a final opinion on the real performance presented by the CONCESSIONAIRE and verified in the reference period. Among the forms of diligence of information, the INDEPENDENT VERIFIER may use, among others:

- i. Analysis of the documentation produced and presented by the CONCESSIONAIRE;
- ii. Analysis of information provided by the CONCESSION AUTHORITY;
- iii. Sample inspections to check quality and availability aspects.

The CONCESSIONAIRE has the obligation to provide the necessary information for the preparation of the QUARTERLY INDICATORS REPORT by the INDEPENDENT VERIFIER, granting the latter the freedom to carry out the necessary inspections to check the notes whenever necessary, including through unrestricted access to the information systems used by the CONCESSIONAIRE.

2.2.3. Evaluation procedure during the period of modernization and efficiency improvement of PUBLIC LIGHTING POINTS

The effective measurement and calculation of the Efficiency Criterion - CE will take place from the date of fulfillment of the CONCESSION MILESTONE I by the CONCESSIONAIRE. Therefore, during the period prior to the conclusion of CONCESSION MILESTONE I, the value will be fixed at 1 (one).

3. Availability Criterion

The Availability Criterion - CD portrays the availability of PUBLIC LIGHTING POINTS during the night.

The CD is given by the evaluation of the correlated items, formed by the index:

- i. Light Availability Index - IDL.

3.1. Evaluation Procedure

The Availability Criterion will be represented by a number from 0 (zero) to 1 (one), calculated by the value measured by the respective index, obtained by the result of the equation below:

$$CD = (100\% * IDL)$$

Where:

CD = Availability Criterion;

IDL = Light Availability Index

The IDL Index, in turn, will be calculated from the score of its performance indicator, as described in the subsequent item hereof.

3.1.1. Light Availability Index – IDL

The objective of the Light Availability Index is to determine if the PUBLIC LIGHTING POINTS are available during the periods in which they should be, i.e., if they are actually lit at night.

The measurement of the availability of light for PUBLIC LIGHTING POINTS, will be carried out through the TELEMANAGEMENT SYSTEM or by means of on-the-spot checks, by the INDEPENDENT VERIFIER, in the Municipality, during the evaluation quarter. The sample to be checked on a quarterly basis must have a minimum size as established in ABNT NBR 5426 Standard, general inspection level 2 (two) and normal simple sampling plan.

The PUBLIC LIGHTING POINTS that will be evaluated must be defined at random by the INDEPENDENT VERIFIER. The measurements may be monitored by the CONCESSIONAIRE and CONCESSION AUTHORITY.

About the sample of PUBLIC LIGHTING POINTS randomly defined for verification, for PUBLIC LIGHTING POINTS where the TELEMAGEMENT SYSTEM has not been implemented, the measurement will be carried out by means of on-the-spot checks at night time (between 9:00 pm and 4:00 am).

For PUBLIC LIGHTING POINTS monitored and controlled by the TELEMAGEMENT SYSTEM, the measurement will be performed by collecting sample data from the implemented TELEMAGEMENT SYSTEM, only if the score obtained by the CONCESSIONAIRE in the evaluation quarter for the Telemagement Availability Index - IDT was equal to 1 (one), as provided in item 5.1.3 hereof. The recorded data will be collected in real time, in day and night time drawn at random within the period of the evaluation quarter, in the TELEMAGEMENT SYSTEM regarding the state of the PUBLIC LIGHTING POINTS with TELEMAGEMENT SYSTEM, lit during the night.

If the score obtained by the CONCESSIONAIRE for the Telemagement Availability Index - IDT was different than 1 (one) in the evaluation quarter, as provided for in item 5.1.3 hereof, the measurement of the PUBLIC LIGHTING POINTS contemplated by the TELEMAGEMENT SYSTEM will be the same as defined in this topic for PUBLIC LIGHTING POINTS without TELEMAGEMENT SYSTEM, i.e., through on-the-spot checks.

It should be noted that, at the discretion of the CONCESSION AUTHORITY, throughout the term of the CONCESSION, it may carry out on-the-spot checks in order to prove that the condition (on/off) of the PUBLIC LIGHTING POINTS indicated and registered in the TELEMAGEMENT SYSTEM implemented by the CONCESSIONAIRE is in fact the one observed in the field.

The index is composed of an indicator that assesses the availability of the night time. The verifiable index with its respective description and calculation formula is presented below:

Index	Light Availability Index (IDL)		
Periodicity	Quarterly	Measurer	INDEPENDENT VERIFIER

Description: Light Availability Index (IDL)			
Ensure that the PUBLIC LIGHTING POINTS are available during the periods in which they should be, i.e., if they are actually lit at night.			
The IDL is formed by an indicator:			
<ul style="list-style-type: none"> Indicator of lit points at night (IPAN). 			
<u>Analysis Universe:</u>			
<ul style="list-style-type: none"> IPAN: Totality of PUBLIC LIGHTING POINTS registered. 			

Formula: Indicator of lit points at night (IPAN).	Performance ranges	Score	Evaluation
			The PUBLIC LIGHTING POINT is compliant if:
$\frac{\text{No. of compliant IP points}}{\text{Total quantity of inspected IPs}}$	% IPAN ≥ 98%	1.0	A “compliant PUBLIC LIGHTING POINT” means an PUBLIC LIGHTING POINT that is actually lit at night, as verified on the spot or by TELEMAGEMENT SYSTEM.
	96% ≤% IPAN < 98%	0.95	
	94% ≤% IPAN < 96%	0.9	
	90% ≤% IPAN < 94%	0.85	
	85% ≤% IPAN < 90%	0.8	
	80% ≤% IPAN < 85%	0.7	
	75% ≤% IPAN < 80%	0.6	
	70% ≤% IPAN < 75%	0.5	
	65% ≤% IPAN < 70%	0.4	
	60% ≤% IPAN < 65%	0.3	
	55% ≤% IPAN < 60%	0.2	
	50% ≤% IPAN < 55%	0.1	
	% IPAN < 50%	0.0	

Notes and Considerations (IPAN)

For the gauging of the Indicator, on-the-spot nightly checks (between 9:00 pm and 4:00 am) of *PUBLIC LIGHTING POINTS* without TELEMANAGEMENT SYSTEM or data collection (in real time, on a day and time) randomly drawn within the evaluation quarter period), nightly (between 9:00 pm and 4:00 am), of the TELEMANAGEMENT SYSTEM over the PUBLIC LIGHTING POINTS with TELEMANAGEMENT SYSTEM (if the Telemangement Availability Index in the quarter has been equal to 1) must be performed.

Formula: Light Availability Index (IDL)

$$Final\ Score_{IDL} = (Weight_{IPAN} \times Score_{IPAN})$$

For purposes of calculation of the IDL score, the indicators have the following weights:

$$Weight_{IPAN} = 1,0$$

4. Quality Criterion

The Quality Criterion - CQ portrays the quality of the lighting and services of the PUBLIC LIGHTING POINTS, covering compliance with the PUBLIC LIGHTING POINTS to the minimum levels of illuminance and uniformity defined in the standard and the adequacy of the REGISTRY to the assets actually present in the MUNICIPAL PUBLIC LIGHTING NETWORK.

The CQ is given by the evaluation of the correlated items, formed by the indexes:

- i. Lighting Adequacy Index - IAL:
- ii. Data Quality Index - IQD.

4.1. Evaluation Procedure

The Availability Criterion will be represented by a number from 0 (zero) to 1 (one), calculated by the weighted average of its respective indexes, obtained by the result of the equation below:

$$CQ = (80\% * IAL + 20\% * IQD)$$

Where:

CQ = Quality Criterion;

IAL = Lighting Adequacy Index;

IQD = Data Quality Index.

The IAL and IQD indexes, in turn, will be calculated from the score of its component performance indicators, as described in the subsequent items hereof.

4.1.1. Lighting Adequacy Index - IAL

The purpose of the Lighting Adequacy Index is to monitor the CONCESSIONAIRE for compliance with the minimum levels of illuminance and uniformity, defined in the Minimum Average Illuminance and Uniformity Table for each LIGHTING CLASS, in accordance with ATTACHMENT 5 (SERVICES SPECIFICATIONS), at PUBLIC LIGHTING POINTS. Moreover, this index also includes the analysis of Color Temperature and Color Rendering Index (IRC).

The measurement will be carried out by means of on-the-spot checks, by the INDEPENDENT VERIFIER, during the evaluation quarter. The sample to be checked on a quarterly basis must have a minimum size as established in ABNT NBR 5426 Standard, general inspection level 2 (two) and normal simple sampling plan.

The PUBLIC LIGHTING POINTS that will be evaluated must be defined at random by the INDEPENDENT VERIFIER. The measurements must be carried out by the INDEPENDENT VERIFIER, in accordance with the inspection guidelines of the ABNT NBR 5101 Standard and may be monitored by the CONCESSIONAIRE and CONCESSION AUTHORITY.

The verifiable index with its respective description and calculation formula is presented below:

Index	Lighting Adequacy Index (IAL)		
Periodicity	Quarterly	Measurer	INDEPENDENT VERIFIER

Description: Lighting Adequacy Index (IAL)

Ensure compliance, by PUBLIC LIGHTING POINTS, to the minimum lighting parameters, according to the LIGHTING CLASS of the road (V1, V2, V3, V4, V5) and (P1, P2, P3, P4), defined in the Average Minimum Illumination and Uniformity Table¹. The measurements must be carried out on a quarterly basis by the INDEPENDENT VERIFIER, in accordance with the inspection guidelines of the ABNT NBR 5101. The final score of the IAL will be given by the percentage of PUBLIC LIGHTING POINTS with checks carried out throughout the quarter, which reach the minimum standards presented in Table².

The Lighting Adequacy Index is composed of 03 indicators:

- Illuminance and Uniformity Indicator (IIL);
- Color Temperature Indicator (ITC);
- Color Rendering Indicator (IRC).

Analysis Universe: Totality of MODERNIZED PUBLIC LIGHTING POINTS. PUBLIC LIGHTING POINTS from SUPPLEMENTARY SERVICES or installed by the CONCESSIONAIRE to adapt the MUNICIPAL PUBLIC LIGHTING NETWORK, are part of the universe of analysis of IAL indicators.

Formula: Illuminance and Uniformity Indicator (IIL);	Performance ranges	Final Score	Evaluation
			The PUBLIC LIGHTING POINT is compliant if:
$\frac{\text{No. of compliant PUBLIC LIGHTING POINTS}}{\text{Total quantity of inspected PUBLIC LIGHTING POINTS}}$	% IIL \geq 95%	1.0	<p>A “compliant PUBLIC LIGHTING POINT” means:</p> <ul style="list-style-type: none"> • a verified MODERNIZED PUBLIC LIGHTING POINT, which meets the level of Illuminance and Uniformity as specified in Average Minimum Illuminance and Uniformity Table¹ for the vehicle and pedestrian street lighting classes. • A verified MODERNIZED PUBLIC LIGHTING POINT, which through documentary analysis, all parameters evaluated are in accordance with the Executive Project.
	92.5% \leq % IIL < 95%	0.9	
	90% \leq % IIL < 92.5%	0.8	
	87.5% \leq % IIL < 90%	0.7	
	85% \leq % IIL < 87.5%	0.6	
	80% \leq % IIL < 85%	0.5	
	75% \leq % IIL < 80%	0.4	
	70% \leq % IIL < 75%	0.3	
	60% \leq % IIL < 70%	0.2	
	50% \leq % IIL < 60%	0.1	
	% IIL < 50%	0.0	

Notes and Considerations

Measurement in the field of Illuminance and Uniformity

- The conformity assessment of each PUBLIC LIGHTING POINT is binary, i.e., if the lighting parameters evaluated on the road fully meet the minimum standard established in the Minimum Average Illuminance and Uniformity Table, the PUBLIC LIGHTING POINT is considered as compliant and then the unit value is added to the numerator and denominator of the formula. Otherwise, the PUBLIC LIGHTING POINT is only counted in the formula denominator.
- The measurement of the illuminance and the uniformity factor must be performed in the two spans adjacent to the conventional PUBLIC LIGHTING POINT. If a point selected for verification is a TERMINAL PUBLIC LIGHTING POINT, the measurement should be carried out only in a span adjacent to the point in the direction of the post less than 90 (ninety) meters on the same road. If the point is an ISOLATED PUBLIC LIGHTING POINT, the measurement must be carried out considering a measurement grid at 17.5 meters from the point for each direction of the road. In this case, the levels of illuminance and uniformity to be met by the CONCESSIONAIRE must be at least 50% of the levels foreseen for the road according to the Minimum Average Illuminance

and Uniformity Table for each lighting class presented below. (e.g. An ISOLATED PUBLIC LIGHTING POINT on a V5 road must meet Minimum Average Illuminance = 2.5 and Uniformity Factor = 0.1)

- If the INDEPENDENT VERIFIER identifies, in the field, the obstruction of the luminous flux of the PUBLIC LIGHTING POINT by tree individuals and this information is not included in the REGISTRY for the PUBLIC LIGHTING POINT under analysis, the INDEPENDENT VERIFIER must carry out the field measurements of the levels of illuminance and uniformity, the document analysis method is not applied in this situation

(1) Minimum Average Illuminance and Uniformity Table for each LIGHTING CLASS

Vehicle Road LIGHTING CLASS	Minimum Average Illuminance	Minimum Uniformity Factor
	<i>E_{med,min}</i> (lux)	$U = E_{min} / E_{med}$
V1	30	0.4
V2	20	0.3
V3	15	0.2
V4	10	0.2
V5	5	0.2

Pedestrian Lane LIGHTING CLASS	Minimum Average Illuminance	Minimum Uniformity Factor
	<i>E_{med,min}</i> (lux)	$U = E_{min} / E_{med}$
P1	20	0.3
P2	10	0.25
P3	5	0.2
P4	3	0.2

Field measurement of parameters and document analysis

- This method of document analysis will only be applied if it is identified, at the discretion of the INDEPENDENT VERIFIER, obstruction of the luminous flux of the PUBLIC LIGHTING POINT by external elements (tree individuals, signposts, private lighting, etc.). For this occurrence, no on-the-spot measurements will be made of the parameters of illuminance and uniformity. In this case, the following information of the PUBLIC LIGHTING POINT will be collected in the field:
 - LUMINAIRE model;
 - LUMINAIRE Power;
 - Height of LUMINAIRE installation (divergence of up to 5% (five percent) between the information of the Executive Project and on-the-spot verification will be considered as compliant);
 - Horizontal projection of the LUMINAIRE (divergence of up to 10% (ten percent) between the information of the Executive Project and on-the-spot verification will be considered as compliant);
 - Width of the road (divergence of up to 10% (ten percent) between the information of the Executive Project and on-the-spot verification will be considered as compliant);
 - Distance between the PUBLIC LIGHTING POINT and the adjacent posts (divergence of up to 5% (five percent) between the information of the Executive Project and on-the-spot verification will be considered as compliant).
- The information collected in the field will be compared with the information registered in the MODERNIZATION AND STREAMLINING ENERGY Executive Project for the PUBLIC LIGHTING POINT. For this analysis, the Executive Project approved by the CONCESSION AUTHORITY will be used. The conformity assessment of each PUBLIC LIGHTING POINT is binary, i.e., if all 6 (six) information evaluated are in accordance with the Executive Project, it is assumed to be compliant with the PUBLIC LIGHTING POINT and then the unit value is added to the numerator and the formula denominator. Otherwise, if at least one of the information is not in conformity, the PUBLIC LIGHTING POINT is only counted in the formula denominator.
- If the INDEPENDENT VERIFIER identifies, in the field, the obstruction of the luminous flux of the PUBLIC LIGHTING POINT by tree individuals and this information is not included in the REGISTRY for the PUBLIC LIGHTING POINT under analysis, the INDEPENDENT VERIFIER must carry out the field measurements of the levels of illuminance and uniformity, the document analysis method is not applied in this situation.

Formula: Color Temperature Indicator (ITC);	Performance ranges	Score	Evaluation
			The PUBLIC LIGHTING POINT is compliant if:
$\frac{\text{No. of compliant PUBLIC LIGHTING POINTS}}{\text{Total Quantity of inspected PUBLIC LIGHTING POINTS}}$	% ITC \geq 98%	1.0	<p>A “compliant PUBLIC LIGHTING POINT” means a modernized verified PUBLIC LIGHTING POINT that meets the Color Temperature level. For Color Temperature, it is considered compliant when the Color Temperature value measured in the field shows a maximum variation of + - 300K over the value defined for the PUBLIC LIGHTING POINT according to ATTACHMENT 5 (SERVICES SPECIFICATIONS)</p>
	97% \leq ITC <98%	0.9	
	96% \leq ITC <97%	0.8	
	95% \leq ITC <96%	0.7	
	94% \leq ITC <95%	0.6	
	93% \leq ITC <94%	0.5	
	91% \leq ITC <93%	0.4	
	89% \leq ITC <91%	0.3	
	87% \leq ITC <89%	0.2	
	85% \leq ITC <87%	0.1	
% ITC <85%	0.0		

Formula: Color Rendering Indicator (IRC).	Performance ranges	Score	Evaluation
			The PUBLIC LIGHTING POINT is compliant if:
$\frac{\text{No. of compliant PUBLIC LIGHTING POINTS}}{\text{Total Quantity of inspected PUBLIC LIGHTING POINTS}}$	% IRC ≥ 98%	1,0	A “compliant PUBLIC LIGHTING POINT” means a verified MODERNIZED PUBLIC LIGHTING POINT that meets the Color Rendering Index (IRC) level. For IRC, an IRC greater than or equal to 70 (seventy) is considered compliant.
	97% ≤% IRC <98%	0,9	
	96% ≤% IRC <97%	0,8	
	95% ≤% IRC <96%	0,7	
	94% ≤% IRC <95%	0,6	
	93% ≤% IRC <94%	0,5	
	91% ≤% IRC <93%	0,4	
	89% ≤% IRC <91%	0,3	
	87% ≤% IRC <89%	0,2	
	85% ≤% IRC <87%	0,1	
	% IRC <85%	0,0	

Formula: Lighting Adequacy Index (IAL)
$\text{Final Score}_{IAL} = (\text{Weight}_{IIL} \times \text{Score}_{IIL}) + (\text{Weight}_{ITC} \times \text{Score}_{ITC}) + (\text{Weight}_{IRC} \times \text{Score}_{IRC})$
<p>For purposes of calculation of the IDL score, the indicators have the following weights:</p> <p>Weight_{IIL} = 0,8 Weight_{ITC} = 0,1 Weight_{IRC} = 0,1</p>

4.1.2. Data Quality Index – IQD

The purpose of the Data Quality Index is to assess whether the REGISTRY, prepared and maintained by the CONCESSIONAIRE, reliably represents the PUBLIC LIGHTING assets of the MUNICIPALITY.

The measurement will be carried out on a quarterly basis by means of on-the-spot checks, by the INDEPENDENT VERIFIER, during the evaluation quarter. The sample to be checked on a quarterly basis must have a minimum size as established in ABNT NBR 5426 Standard, general inspection level 02 (two) and normal simple sampling plan.

The PUBLIC LIGHTING POINTS that will be evaluated must be defined at random by the INDEPENDENT VERIFIER. The measurements may be monitored by the CONCESSIONAIRE and CONCESSION AUTHORITY.

Whereas there is different information in the REGISTRY and that each one has different relevance, each PUBLIC LIGHTING POINT of the sample will be verified by evaluating:

- i. Conformity of the location characterization (neighborhood, street, georeferencing, etc.), through the comparison between the REGISTRY data and information verified on-the-spot;
- ii. Conformity of the total power of the PUBLIC LIGHTING POINT, through comparison between the REGISTRY data and information verified on-the-spot;
- iii. Conformity of the following registry information of the PUBLIC LIGHTING POINTS, through the comparison between the REGISTRY data and information verified on-the-spot:
 - a. Characterization of the PUBLIC LIGHTING POINT in conventional, TERMINAL PUBLIC LIGHTING POINT or ISOLATED PUBLIC LIGHTING POINT;
 - b. LUMINAIRE model;
 - c. Lamp technology;
 - d. Type of post with information regarding the nature of its composition;
 - e. Installation height of the LUMINAIRE;
 - f. Arm type;
 - g. Number of PUBLIC LIGHTING POINTS on the post;
 - h. Type of power supply network.

Each of the evaluated aspects corresponds to an indicator that composes the IQD. The verifiable index with its respective description and calculation formula is presented below:

Index	Data Quality Index (IQD)		
Periodicity	Quarterly	Measurer	INDEPENDENT VERIFIER

Description - Data Quality Index (IQD)
<p>Ensure the convergence of the REGISTRY data in relation to the PUBLIC LIGHTING POINT assets actually installed in each of the PUBLIC LIGHTING POINTS.</p> <p>The IQD consists of three indicators:</p> <ul style="list-style-type: none"> • Location Characterization Compliance Indicator (ICL); • Total Power Compliance Indicator (ICP); • Compliance Indicator for Other Registry Information (ICIC). <p>Each of the PUBLIC LIGHTING POINTS inspected must be evaluated considering the three previous indicators, generating a Score per PUBLIC LIGHTING POINT (NP). The final score of the IQD will be given through the performance ranges based on the average of the grades obtained for each PUBLIC LIGHTING POINT in the sample of the quarter</p> <p><u>Analysis Universe:</u></p> <ul style="list-style-type: none"> • For the three indicators: Totality of PUBLIC LIGHTING POINTS registered.

Formula: Location Characterization Compliance Indicator (ICL)	Performance ranges	Score
Not applicable	Binary Indicator	
	If conformity of the location characterization (street address, neighborhood, number of PUBLIC LIGHTING POINT and georeferenced position) is verified, through the comparison between the REGISTRY data and verified information on-the-spot.	1
	Otherwise	0
Formula: Total Power Compliance Indicator (ICP);	Performance ranges	Score
Not applicable	Binary Indicator	
	If conformity of the total power of the PUBLIC LIGHTING POINT is verified, through comparison between the REGISTRY data and information verified on-the-spot.	1

	Otherwise	0
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Formula: Compliance Indicator for Other Registry Information (ICIC)	Performance ranges	
	Binary Indicator	Score
Not applicable	<p>If conformity of the following registry information of the PUBLIC LIGHTING POINTS is verified through the comparison between the REGISTRY data and information verified on-the-spot:</p> <ul style="list-style-type: none"> • Characterization of the PUBLIC LIGHTING POINT in conventional, TERMINAL PUBLIC LIGHTING POINT or ISOLATED PUBLIC LIGHTING POINT; • LUMINAIRE model; • Lamp technology; • Type of post with information regarding the nature of its composition; • Height of LUMINAIRE installation (divergence of up to 5% (five percent) between the REGISTRY information and on-the-spot verification will be considered as compliant); • Arm type; • Number of PUBLIC LIGHTING POINTS on the post; • Type of power supply network. 	1
	Otherwise	0

Formula: Data Quality Index (IQD)	Performance ranges	Final Score
<p>1) <i>Public Lighting Point Score (NP)</i> = (Weight_{ICL} × Score_{ICL}) + (Weight_{ICP} × Score_{ICP}) + (Weight_{ICIC} × Score_{ICIC})</p> <p>For the purpose of calculating the Score by Lighting Point (NP), the indicators have the following weights:</p> <ul style="list-style-type: none"> • Weight_{ICL} = 0,2 • Weight_{ICP} = 0,7 • Weight_{ICIC} = 0,1 <p><i>IQD = Average score of the Public Lighting Points (NP) for the evaluated sample</i></p>	% IQD ≥ 98%	1,0
	96% ≤% IQD <98%	0,9
	94% ≤% IQD <96%	0,8
	92% ≤% IQD <94%	0,7
	90% ≤% IQD <92%	0,6
	88% ≤% IQD <90%	0,5
	86% ≤% IQD <88%	0,4
	84% ≤% IQD <86%	0,3
	82% ≤% IQD <84%	0,2
	80% ≤% IQD <82%	0,1
% IQD <80%	0,0	

5. Operation Criterion

The Operation Criterion (CO) will portray aspects related to the operation and maintenance of PUBLIC LIGHTING POINTS, covering the availability and compliance with the deadlines for service and solution of maintenance calls, according to the deadlines established in ATTACHMENT 5 (SERVICES SPECIFICATIONS), approved by the CONCESSION AUTHORITY.

The CO is given by the evaluation of the correlated items, formed by the indexes:

- i. Daytime Light Index - IAD:
- ii. Call Center Availability Index - IDC:
- iii. Telemanagement Availability Index - IDT:
- iv. Index of Compliance with Operation and Maintenance Deadlines - ICPOM:

5.1. Evaluation Procedure

The Operation Criterion will be represented by a number from 0 (zero) to 1 (one), calculated by the weighted average of its respective indexes, obtained by the result of the equation below:

$$CO = (20\%*IAD + 20\%*IDC + 10\%*IDT + 50\%*ICPOM)$$

Where:

CO = Operation Criterion;

IAD = Daytime Light Index;

IDC = Call Center Availability Index;

IDT = Telemanagement Availability Index;

ICPOM = Index of Compliance with Operation and Maintenance Deadlines.

The IAL, IDC, IDT and ICPOM indexes, in turn, will be calculated from the score of its component performance indicators, as described in the subsequent items hereof.

5.1.1. Daytime Light Index - IAD

The objective of the Daytime Light Index is to determine if the PUBLIC LIGHTING POINTS are available during the periods in which they should be, i.e., if they are actually off at daytime.

The measurement of the daytime light for PUBLIC LIGHTING POINTS, will be carried out through the TELEMANAGEMENT SYSTEM or by means of on-the-spot checks, by the INDEPENDENT VERIFIER, in the Municipality, during the evaluation quarter. The sample to be checked on a quarterly basis must have a minimum size as established in ABNT NBR 5426 Standard, general inspection level 2 (two) and normal simple sampling plan.

The PUBLIC LIGHTING POINTS that will be evaluated must be defined at random by the INDEPENDENT VERIFIER. The measurements may be monitored by the CONCESSIONAIRE and CONCESSION AUTHORITY.

About the sample of PUBLIC LIGHTING POINTS randomly defined for verification, for PUBLIC LIGHTING POINTS where the TELEMANAGEMENT SYSTEM has not been implemented, the measurement will be carried out by means of on-the-spot checks at daytime.

For PUBLIC LIGHTING POINTS monitored and controlled by the TELEMANAGEMENT SYSTEM, the measurement will be performed by collecting sample data from the implemented TELEMANAGEMENT SYSTEM, only if the score obtained by the CONCESSIONAIRE in the evaluation quarter for the Telemangement Availability Index - IDT was equal to 1 (one), as provided in item 5.1.3 hereof. The recorded data will be collected in real time, in day and night time drawn at random within the period of the evaluation quarter, in the TELEMANAGEMENT SYSTEM regarding the state of the PUBLIC LIGHTING POINTS with TELEMANAGEMENT SYSTEM, off during daytime.

If the score obtained by the CONCESSIONAIRE for the Telemangement Availability Index - IDT was different than 1 (one) in the evaluation quarter, as provided for in item 5.1.3 hereof, the measurement of the PUBLIC LIGHTING POINTS contemplated by the TELEMANAGEMENT SYSTEM will be the same as defined in this topic for PUBLIC LIGHTING POINTS without TELEMANAGEMENT SYSTEM, i.e., through on-the-spot checks.

It should be noted that, at the discretion of the CONCESSION AUTHORITY, throughout the term of the CONCESSION, it may carry out on-the-spot checks in order to prove that the condition (on/off) of the PUBLIC LIGHTING POINTS indicated and registered in the TELEMANAGEMENT SYSTEM implemented by the CONCESSION is in fact the one observed in the field.

The index is composed of an indicator that assesses the availability of the daytime. The verifiable index with its respective description and calculation formula is presented below

Index	Daytime Light Index (IAD)		
Periodicity	Quarterly	Measurer	INDEPENDENT VERIFIER

Description: Daytime Light Index (IAD)			
Ensure that the PUBLIC LIGHTING POINTS are available during the periods in which they should be, i.e., if they are actually off at daytime.			
The IAD is formed by an indicator:			
<ul style="list-style-type: none"> Indicator of points turned off during the day (IPAD). 			
<u>Analysis Universe:</u>			
<ul style="list-style-type: none"> IPAD: Totality of PUBLIC LIGHTING POINTS registered. 			

Formula: Indicator of points turned off during the day (IPAD).	Performance ranges	Score	Evaluation
			The PUBLIC LIGHTING POINT is compliant if:
$\frac{\text{No. of compliant PUBLIC LIGHTING POINTS}}{\text{Total quantity of inspected PUBLIC LIGHTING POINTS}}$	% IPAD ≥ 98%	1,0	A “compliant PUBLIC LIGHTING POINT” means a PUBLIC LIGHTING POINT that is actually off during daytime, as verified on the spot or by TELEMANAGEMENT SYSTEM.
	96% ≤% IPAD <98%	0,9	
	94% ≤% IPAD <96%	0,8	
	92% ≤% IPAD <94%	0,7	
	90% ≤% IPAD <92%	0,6	
	88% ≤% IPAD <90%	0,5	
	86% ≤% IPAD <88%	0,4	
	84% ≤% IPAD <86%	0,3	
	82% ≤% IPAD <84%	0,2	
	80% ≤% IPAD <82%	0,1	
% IPAD <80%	0,0		

Notes and Considerations (IPAD)

For the gauging of the Indicator, on-the-spot daytime checks (between 08:00 am and 4:00 pm) of PUBLIC LIGHTING POINTS without TELEMAGEMENT SYSTEM or there may be data collection (in real time, on a date and time randomly drawn within the evaluation quarter period), during daytime (between 08:00 am and 4:00 pm), of the TELEMAGEMENT SYSTEM over the PUBLIC LIGHTING POINTS with TELEMAGEMENT SYSTEM (if the Telemangement Availability Index in the quarter has been equal to 1) must be performed.

Formula: Daytime Light Index (IAD)

$$Final\ Score_{IAD} = (Weight_{IPAD} \times Score_{IPAD})$$

For purposes of calculation of the IAD score, the indicators have the following weights:

$$Weight_{IPAD} = 1,0$$

5.1.2. Call Center Availability Index – IDC

The purpose of the Service Center Availability Index is to verify that the Service Center, operated by the CONCESSIONAIRE, is available uninterruptedly for the receipt of calls, whether made by USERS, CONCESSION AUTHORITY or INDEPENDENT VERIFIER, for execution of SERVICES related to PUBLIC LIGHTING. Moreover, the IDC will also serve as an instrument for assessing the answering of calls.

The measurement will be carried out by verifying the total hours in which the Call Center System was available in the determination quarter, information that must be recorded in the system itself. As stipulated in ATTACHMENT 5 (SERVICES SPECIFICATIONS), the Call Center System shall operate 24 (twenty-four) hours a day, during the 07 (seven) days of the week, throughout the CONCESSION. Moreover, the CONCESSIONAIRE will be evaluated as to the attendance of the calls, by determining the time for attendance, which must also be registered in the system implemented by the CONCESSIONAIRE at the Call Center.

The index consists of two indicators, which assess the availability of the call center and the waiting time for assistance. The verifiable index with its respective description and calculation formula is presented below:

Index	Call Center Availability Index (IDC)		
Periodicity	Quarterly	Measurer	INDEPENDENT VERIFIER

Description: Call Center Availability Index (IDC)

Ensure that the Call Center, operated by the CONCESSIONAIRE, is available uninterruptedly for the receipt of calls, whether made by USERS, CONCESSION AUTHORITY or INDEPENDENT VERIFIER, for execution of SERVICES related to PUBLIC LIGHTING. Moreover, the IDC will also serve as an instrument for assessing the waiting time for answering calls.

The IDC consists of two indicators:

- Call Center System Availability Indicator (IDSGC);
- Waiting Time Compliance Indicator (ITM).

The final IDC score will be given by the sum of the score of both indicators weighted by the respective weight of each one.

Formula: Call Center System Availability Indicator (IDSGC);	Performance ranges	Score
$\frac{\text{Total Actual Availability Hours of the system for receiving calls}}{\text{Total quantity of operation hours provided in the quarter}}$	% IDSGC ≥ 98%	1.0
	97% ≤% IDSGC <98%	0.9
	96% ≤% IDSGC <97%	0.8
	95% ≤% IDSGC <96%	0.7
	92.5% ≤% IDSGC <95%	0.6
	90% ≤% IDSGC <92.5%	0.5
	87.5% ≤% IDSGC <90%	0.4
	85% ≤% IDSGC <87.5%	0.3
	80% ≤% IDSGC <85%	0.2
	70% ≤% IDSGC <80%	0.1
	% IDSGC <70%	0.0

Notes and Considerations (IDSGC)

For gauging of the Indicator, checks must be performed through the Call Center System Log.

The “Total number of hours of operation planned for the quarter” is that specified for the Call Center System in ATTACHMENT 5 (SERVICES SPECIFICATIONS).

Formula: Waiting time compliance indicator (ITM).	Performance ranges	Score
$\frac{\text{Quantity of calls served within 60 seconds}}{\text{Total quantity of calls received in the period}}$	% ITM ≥ 95%	1.0
	92.5% ≤ % ITM < 95%	0.9
	90% ≤ % ITM < 92.5%	0.8
	87.5% ≤ % ITM < 90%	0.7
	85% ≤ % ITM < 87.5%	0.6
	80% ≤ % ITM < 85%	0.5
	75% ≤ % ITM < 80%	0.4
	70% ≤ % ITM < 75%	0.3
	60% ≤ % ITM < 70%	0.2
	50% ≤ % ITM < 60%	0.1
	% ITM < 50%	0.0

Notes and Considerations (ITM)

For gauging of the Indicator, checks must be performed through the Call Center System Log.

The waiting time is counted from the entry of the call until the transfer, via URA - Audible Response Unit, to the attendant, or until the end of the call, if it does not reach the attendant due to the caller's withdrawal.

Formula: Call Center Availability Index (IDC)

$$Final\ Score_{IDC} = (Weight_{IDSGC} \times Score_{IDSGC}) + (Weight_{ITM} \times Score_{ITM})$$

For purposes of calculation of the IDC score, the indicators have the following weights:

- Weight_{IDSGC} = 0.7
- Weight_{ITM} = 0.3

5.1.3. Telemangement Availability Index - IDT

The purpose of the Telemangement Availability Index is to verify whether the TELEMANAGEMENT SYSTEM implemented by the CONCESSIONAIRE, as well as the basic functionalities of the system, are available continuously and in full operation, according to ATTACHMENT 5 (SERVICES SPECIFICATIONS).

The measurement will be performed by verifying the total of PUBLIC LIGHTING POINTS that are manageable remotely in the verification period, which had their data scanned/collected by the TELEMANAGEMENT SYSTEM at least once a day. Sweeping/data collection occurs when there is an exchange of information between the PUBLIC LIGHTING POINT, through the concentrator, with the TELEMANAGEMENT SYSTEM software. The information needed to measure these indicators will be recorded in the TELEMANAGEMENT SYSTEM itself.

The measurement of the availability of the TELEMANAGEMENT SYSTEM functionalities will be by means of on-the-spot checks and by means of the TELEMANAGEMENT SYSTEM, by the INDEPENDENT VERIFIER, in the Municipality during the evaluation period.

The sample to be checked on a quarterly basis must have a minimum size as established in ABNT NBR 5426 Standard, general inspection level 2 (two) and normal simple sampling plan. For each PUBLIC LIGHTING POINT remotely manageable, the functioning and compliance of the following basic functionalities must be analyzed, as detailed in ATTACHMENT 5 (SERVICES SPECIFICATIONS):

- i. Conformity between the geographical location of the PUBLIC LIGHTING POINT registered in the TELEMANAGEMENT SYSTEM and that verified on the spot;
- ii. Conformity between the status of field devices (light on, light off, online, offline and dimmed) registered in the TELEMANAGEMENT SYSTEM and verified on the spot;
- iii. Updated record in the TELEMANAGEMENT SYSTEM of the actual energy consumption of the PUBLIC LIGHTING POINT inspected;
- iv. Remote operation via TELEMANAGEMENT SYSTEM (allowing to switch on/off and dim the PUBLIC LIGHTING POINTS inspected at the time of verification).

The PUBLIC LIGHTING POINTS that will be evaluated must be defined at random by the INDEPENDENT VERIFIER. The measurements must be carried out by the INDEPENDENT VERIFIER and may be monitored by the CONCESSIONAIRE and CONCESSION AUTHORITY.

The index consists of two indicators, which assess the availability of system data and basic functionalities. The verifiable index with its respective description and calculation formula is presented below:

Index	Telemangement Availability Index (IDT)		
Periodicity	Quarterly	Measurer	INDEPENDENT VERIFIER

Description: Telemangement Availability Index (IDT)			
Ensure if the TELEMAGEMENT SYSTEM implemented by the CONCESSIONAIRE, as well as if the basic functionalities of the system, are available continuously and in full operation.			
The IDT consists of two indicators:			
<ul style="list-style-type: none"> • TELEMAGEMENT SYSTEM Data Availability Indicator (IDST); • TELEMAGEMENT SYSTEM Functionalities Availability Indicator (IDFST). 			
The final IDT score will be given by the sum of the score of both indicators weighted by the respective weight of each one.			
<u>Analysis Universe:</u>			
<ul style="list-style-type: none"> • IDST: Totality of the PUBLIC LIGHTING POINTS remotely manageable during the verification period. • IDFST: Totality of the PUBLIC LIGHTING POINTS remotely manageable during the verification period. 			

Formula: Telemangement System Data Availability Indicator (IDST)	Performance ranges	Score
$\frac{\text{No. of PUBLIC LIGHTING POINTS remotely manageable that had their data collected by the TELEMANAGEMENT SYSTEM at least once throughout the quarter}}{\text{Total quantity of PUBLIC LIGHTING POINTS remotely manageable within the verification period}}$	% IDST \geq 98%	1.0
	95% \leq IDST <98%	0.9
	92% \leq IDST <95%	0.8
	89% \leq IDST <92%	0.7
	86% \leq IDST <89%	0.6
	83% \leq IDST <86%	0.5
	80% \leq IDST <83%	0.4
	70% \leq IDST <80%	0.3
	60% \leq IDST <70%	0.2
	50% \leq IDST <60%	0.1
	% IDST <50%	0.0

Notes and Considerations (IDST)

For gauging of the Indicator, checks must be performed through the TELEMANAGEMENT SYSTEM Log.

For the first quarter in which the indicator measurement (IDST) occurs, the indicator score will be equal to 1 (one), regardless of the measurement result. For the other quarters, the calculation and note should occur as specified herein.

Formula: Telemangement System Functionalities Availability Indicator (IDFST).	Performance ranges	Score	Evaluation
			The PUBLIC LIGHTING POINT is compliant if:
$\frac{\text{No. of compliant PUBLIC LIGHTING POINTS remotely manageable}}{\text{Total quantity of PUBLIC LIGHTING POINTS contained in the sample}}$	% IDFST \geq 95%	1.0	A “compliant PUBLIC LIGHTING POINT” means a PUBLIC LIGHTING POINT remotely manageable that has all four basic functionalities in operation ¹ .
	92.5% \leq % IDFST < 95%	0.9	
	90% \leq % IDFST < 92.5%	0.8	
	87.5% \leq % IDFST < 90%	0.7	
	85% \leq % IDFST < 87.5%	0.6	
	80% \leq % IDFST < 85%	0.5	
	75% \leq % IDFST < 80%	0.4	
	70% \leq % IDFST < 75%	0.3	
	60% \leq % IDFST < 70%	0.2	
	50% \leq % IDFST < 60%	0.1	
	% IDFST < 50%	0.0	

Notes and Considerations (IDFST)

In order to check the Indicator, *on-the-spot checks* of PUBLIC LIGHTING POINTS with TELEMANAGEMENT SYSTEM must be carried out.

For the first quarter in which the indicator measurement (IDFST) occurs, the indicator score will be equal to 1 (one), regardless of the measurement result. For the other quarters, the calculation and note should occur as specified herein.

Basic functionalities that must be in operation when checking the PUBLIC LIGHTING POINT:

- Conformity between the geographical location of the PUBLIC LIGHTING POINT registered in the TELEMANAGEMENT SYSTEM and that verified on the spot;
- Conformity between the status of field devices (light on, light off, online, offline and dimmed) registered in the TELEMANAGEMENT SYSTEM and verified on the spot;
- Updated record in the TELEMANAGEMENT SYSTEM of the actual energy consumption of the PUBLIC LIGHTING POINT inspected;

- Remote operation via TELEMAGEMENT SYSTEM (allowing to switch on/off and dim the PUBLIC LIGHTING POINTS inspected at the time of verification).

Formula: Telemangement Availability Index (IDT)

$$Final\ Score_{IDT} = (Weight_{IDST} \times Score_{IDST}) + (Weight_{IDFST} \times Score_{IDFST})$$

For purposes of calculation of the IDT score, the indicators have the following weights:

- $Weight_{IDST} = 0.5$
- $Weight_{IDFST} = 0.5$

5.1.4. Index of Compliance with Operation and Maintenance Deadlines - ICPOM

The purpose of the Index of Compliance with Operation and Maintenance Deadlines is to monitor the CONCESSIONAIRE's compliance with the deadlines for solution of CORRECTIVE MAINTENANCE calls, depending on the type of call.

The measurement will be carried out by checking the record in the Call Center System of the time for solution of the CORRECTIVE MAINTENANCE calls received in the Call Center operated by the CONCESSIONAIRE. The data must be collected during the calculation quarter, according to the deadlines specified in ATTACHMENT 5 (SERVICES SPECIFICATIONS), as well as in the OPERATION AND MAINTENANCE PLAN, approved by the CONCESSION AUTHORITY.

The verifiable index with its respective description and calculation formula is presented below:

Index	Index of Compliance with Operation and Maintenance Deadlines (ICPOM)		
Periodicity	Quarterly	Measurer	INDEPENDENT VERIFIER

Description: Index of Compliance with Operation and Maintenance Deadlines (ICPOM)

Ensure that the deadlines for solving the CORRECTIVE MAINTENANCE calls are being met by CONCESSIONAIRE. ICPOM's final score will be given by the percentage of calls corrected within the deadline, in the evaluation period, and the determination of compliance with the deadlines will be according to the type of call made, as detailed in ATTACHMENT 5 (SERVICES SPECIFICATIONS).

The Index of Compliance with Operation and Maintenance Deadlines is composed only by the Indicator of Compliance with Operation and Maintenance Deadlines (IPOM).

Formula: Indicator of Compliance with Operation and Maintenance Deadlines (IPOM)	Performance ranges	Final Score
$\frac{\text{No. of corrective maintenance calls solve within the deadline in the quarter}}{\text{Total quantity of corrective maintenance calls opened in the quarter}}$	% IPOM ≥ 95%	1.0
	92.5% ≤ % IPOM < 95%	0.9
	90% ≤ % IPOM < 92.5%	0.8
	87.5% ≤ % IPOM < 90%	0.7
	87.5% ≤ % IPOM < 87.5%	0.6
	87.5% ≤ % IPOM < 85%	0.5
	75% ≤ % IPOM < 80%	0.4
	70% ≤ % IPOM < 75%	0.3
	60% ≤ % IPOM < 70%	0.2
	50% ≤ % IPOM < 60%	0.1
	% IPOM < 50%	0.0

Notes and Considerations

For gauging of the Indicator, checks must be performed through the Call Center System Log.

The service time (resolution period) will start to be measured from the moment the call is received at the Call Center and will be finished from a communication sent to the requester after the resolution and informing the closing of the call.

Formula: Index of Compliance with Operation and Maintenance Deadlines (ICPOM)

$$Final\ Score_{ICPOM} = (Weight_{IPOM} \times Score_{IPOM})$$

For purposes of calculation of the ICPOM, the indicators have the following weights:

- $Weight_{IPOM} = 1,0$

6. Compliance Criterion

The Compliance Criterion - CC portrays the SERVICES' compliance with applicable regulatory, legal and contractual obligations. It is obtained through the presentation of certificates and reports with the services performed by the CONCESSIONAIRE in the period.

The CC is given by the evaluation of the correlated items, formed by the indexes:

- i. Certificate Compliance Index - ICC:
- ii. Information Compliance Index - ICI:

6.1. Evaluation Procedure

The Compliance Criterion will be represented by a number from 0 (zero) to 1 (one), calculated by the weighted average of its respective indexes, obtained by the result of the equation below:

$$CC = (70\% * ICC + 30\% * ICI)$$

Where:

CC = Compliance Criterion;

ICC = Certificate Compliance Index;

ICI = Information Compliance Index.

The ICC and ICI indexes, in turn, will be calculated from the score of its component performance indicators, as described in the subsequent items hereof.

6.1.1. Certificate Compliance Index - ICC

The purpose of the Certificate Compliance Index is to assess the conformity of the SERVICES performed by the CONCESSIONAIRE with the applicable legal and regulatory requirements, by presenting the documents/certificates regarding decontamination and final destination of polluting waste, as detailed in ATTACHMENT 7 (MINIMUM ENVIRONMENTAL GUIDELINES).

The indicator related to the treatment and disposal of materials, will have its calculation started together with the other indicators detailed herein. For purposes of calculating the amount of polluting waste decontaminated and correctly disposed, the CONCESSIONAIRE shall enter in the REGISTRY, immediately after the execution of any of the SERVICES under its responsibility, all components removed from the PUBLIC LIGHTING POINTS, which present polluting residues. Thus, when the related compliance indicator is checked, the amount of services of decontamination and destination of polluting waste certified by the CONCESSIONAIRE will be compared with the total number of components that had polluting waste and were removed from the MUNICIPAL PUBLIC LIGHTING NETWORK in the period. During Stages 1 and 2, the contaminating waste generated must be certified on a quarterly basis. From Stage 3, the certification presented by the CONCESSIONAIRE may be performed on an annual basis.

The verifiable index with its respective description and calculation formula is presented below:

Index	Certificate Compliance Index - ICC		
Periodicity	Quarterly	Measurer	INDEPENDENT VERIFIER

Description: Certificate Compliance Index (ICC)

Ensure the conformity of the services performed by the CONCESSIONAIRE with the applicable legal and regulatory requirements, by presenting the documents/certificates regarding decontamination and final destination of polluting waste.

The ICC comprises only the Indicator of Compliance with Treatment and Disposal of Materials (ICDM).

Formula: Indicator of Compliance with Treatment and Disposal of Materials (ICDM).	Performance ranges	
	Binary Indicator	Score
Not applicable	If a valid certificate for the quarter, issued by an accredited and authorized company, is presented for decontamination and final destination of 100% (one hundred percent) of the polluting residues removed from the MUNICIPAL PUBLIC LIGHTING NETWORK, according to the guidelines of ATTACHMENT 7 (MINIMUM ENVIRONMENTAL GUIDELINES).	1
	Otherwise	0

Formula: Certificate Compliance Index (ICC)

$$Final\ Score_{ICC} = (Weight_{ICDM} \times Score_{ICDM})$$

For purposes of calculation of the ICC, the indicators have the following weights:

- $Score_{ICDM} = 1,00$

6.1.2. Information Compliance Index - ICI

The purpose of the Information Compliance Index is to assess compliance in relation to the monthly delivery to the CONCESSION AUTHORITY of the Service Execution Report by the CONCESSIONAIRE and the publicity of PPP documents, as detailed in ATTACHMENT 5 (SERVICES SPECIFICATIONS).

The index consists of two indicators, which assess compliance with the delivery of the report and the publicity of the documents, according to item “PPP Transparency Process” in ATTACHMENT 5. The verifiable index with its respective description and calculation formula is presented below:

Index	Information Compliance Index - ICI		
Periodicity	Quarterly	Measurer	INDEPENDENT VERIFIER

Description: Information Compliance Index (ICI)			
Ensure compliance with the monthly delivery to the CONCESSION AUTHORITY of the Service Execution Report and the publicity of PPP documents (item "PPP Transparency Process") provided for in ATTACHMENT 5 (SERVICES SPECIFICATIONS).			
The ICI consists of two indicators:			
<ul style="list-style-type: none"> • Indicator of Compliance with Service Execution Reports (ICRES). • PPP Transparency Indicator (ITPPP). 			

Formula: Indicator of Compliance with Service Execution Reports (ICRES)	Evaluation
	A Report is compliant if:
$Score = \frac{\text{No. of Compliant Reports}}{\text{Total quantity of Reports that should have been delivered in the quarter}}$	A Service Execution Report will be considered compliant if it is delivered on time and in full, in accordance with the requirements of ATTACHMENT 5 (SERVICES SPECIFICATIONS).

Formula: PPP Transparency Indicator (ITPPP).	Performance ranges	
	Binary Indicator	Score
Not applicable	If it is verified that the PPP transparency process was carried out in the quarter, as detailed in item "PPP Transparency Process" of ATTACHMENT 5 (SERVICES SPECIFICATIONS).	1
	Otherwise	0

Formula: Information Compliance Index (ICI)

$$Final\ Score_{ICI} = (Weight_{ICRES} \times Score_{ICRES} + Weight_{ITPPP} \times Score_{ITPPP})$$

For purposes of calculation of the ICI, the indicators have the following weights:

- $Weight_{ICRES} = 0.8$
- $Weight_{ITPPP} = 0.2$

7. Efficiency Criterion

The Efficiency Criterion (EC) will portray aspects related to compliance with the minimum efficiency levels, as defined by the CONCESSION MILESTONES and Efficiency goals, based on the power of PUBLIC LIGHTING POINTS, according to information provided by the CONCESSIONAIRE in the REGISTRY.

The CE is formed only by the Efficiency Index.

7.1. Evaluation Procedure

The Efficiency Criterion will be represented by a number from 0 (zero) to 1 (one), which will be equivalent to the note related to the Efficiency Index, as shown in the equation below:

$$**CE = IEF**$$

Where:

CE = Efficiency Criterion.

IEF = Efficiency Index.

The IE index, in turn, will be calculated as described in the subsequent item hereof.

7.1.1. Efficiency Index – IEF

The purpose of the Efficiency Index is to monitor compliance with the minimum efficiency levels, in accordance with the CONCESSION MILESTONES defined in ATTACHMENT 5 (SERVICES SPECIFICATIONS). The effective measurement of this index and, consequently, the CE, will be from the date provided for the fulfillment of the CONCESSION MILESTONE I by the CONCESSIONAIRE.

For the purposes of calculating this index, all PUBLIC LIGHTING POINTS, whether modernized or not, will be checked, according to information provided by the CONCESSIONAIRE in the REGISTRY, with the exception of the PUBLIC LIGHTING POINTS located in the locations that will receive SPECIAL LIGHTING projects and PUBLIC LIGHTING POINTS installed as a result of the execution of SUPPLEMENTARY SERVICES.

The measurement will be performed by the INDEPENDENT VERIFIER, from the comparison of the sum of the power of the PUBLIC LIGHTING POINTS in the REGISTRY at the end of the evaluation quarter, with the previous power measured in the BASIC REGISTRY.

The verifiable index with its respective description and calculation formula is presented below:

Index	Efficiency Index – IEF		
Periodicity	Quarterly	Measurer	INDEPENDENT VERIFIER

Description: Efficiency Index (IEF)			
<p>Ensure compliance with the minimum levels of energy efficiency, according to the CONCESSION MILESTONES defined in ATTACHMENT 5 (SERVICES SPECIFICATIONS), and for the purposes of calculating the Efficiency Indicator (IE), after the fulfillment of the CONCESSION MILESTONE III, it will be considered 100% (one hundred percent) of the ENERGY EFFICIENCY TARGET. The final grade of the IE will be given by comparing the percentage of efficiency generated with the expected value of ENERGY EFFICIENCY TARGET in the CONCESSION MILESTONES, at the time of the evaluation.</p> <p>The Efficiency Index is composed only by the Efficiency Indicator (IE).</p> <p><u>Analysis Universe:</u> All <u>PUBLIC LIGHTING POINTS</u>, modernized or not, excluding:</p> <ul style="list-style-type: none"> • the PUBLIC LIGHTING POINTS located in the places that will receive SPECIAL LIGHTING projects; • PUBLIC LIGHTING POINTS installed as COMPLEMENTARY SERVICES. 			

Formula: Efficiency Indicator (IE)	Performance ranges	Final Score
$\text{Score} = \left(\frac{1 - \frac{CI_f}{CI_i}}{\text{Efficiency Target}} \right) \times 100\%$ $CI_{initial} = (QPIP_{initial} \times 215,85)$ <p>Where: <i>CI_f</i> = Final Installed Power: Sum of the total installed power of the PUBLIC LIGHTING POINTS, based on the information contained in the updated REGISTRY, including the power of complementary equipment. <i>CI_i</i> = Initial Installed Power: Multiplication of the quantity of PUBLIC LIGHTING POINTS registered in the BASE REGISTRY by 215.85 Watts. Efficiency Target = ENERGY EFFICIENCY TARGET foreseen in ATTACHMENT 5 (SERVICES SPECIFICATIONS) for the CONCESSION MILESTONES. For the purposes of calculating the Efficiency Indicator (IE), after the fulfillment of the CONCESSION MILESTONE III, 100% (one hundred percent) of the ENERGY EFFICIENCY TARGET will be considered.</p>	% IE ≥ 100%	1.0
	99.5% ≤ % IE < 100%	0.9
	99% ≤ % IE < 99.5%	0.8
	98,5% ≤ % IE < 99%	0.7
	98% ≤ % IE < 98.5%	0.6
	97,5% ≤ % IE < 98%	0.5
	97% ≤ % IE < 97.5%	0.4
	96.5% ≤ % IE < 97%	0.3
	96% ≤ % IE < 96.5%	0.2
	95% ≤ % IE < 96%	0.1
% IE < 95%	0.0	

Notes and Considerations

To calculate the installed power (*CI_f* and *CI_i*) the SPECIAL LIGHTING POINTS located in the places that will receive SPECIAL LIGHTING projects and the PUBLIC LIGHTING POINTS resulting from SUPPLEMENTARY SERVICES shall not be considered.

Formula: Efficiency Index (IEF)

$$\text{Final Score}_{IEF} = (\text{Weight}_{IE} \times \text{Score}_{IE})$$

For purposes of calculation of the IEF, the indicators have the following weights:

- Weight_{IE} = 1,0