

## 1. Scope

**1.1.** The scope of this **Specifications Book** is to define the **Annual Monitoring Report (RAA)**, the **Investment Plan**, the **Minimum Technical Specifications**, and the **Complementary Obligations**, which are of mandatory compliance by the **Sub-Concessionaire**, in order to ensure the adequate infrastructure management and service provision of railway transportation, the preservation of conceded or leased assets, as well as the reduction and mitigation of environmental impacts, and the constructions under the **Subcontracting Interventient's** responsibility.

**1.2.** The **Investment Plan** consists in interventions to be done by the **Sub-Concessionaire**, as detailed in Appendix A.

- i. **Fixed Term Investments.**
- ii. **Demand-driven Investments.**

**1.3.** The **Minimum Technical Specifications** consist of:

- i. **Technical Parameters** for the railway's infrastructure operation, as detailed in Appendix B:
  - a. Railway **Infrastructure's Technical Parameters**;
  - b. Railway **Superstructure's Technical Parameters**;
  - c. **Grade Crossing's Technical Parameters**; and
  - d. **Supporting Installation's Technical Parameters** .
- ii. Indicators for the provision of the rail transport service, as detailed in Appendix C:
  - a. Severe Rail Accidents Index (IAFG);
  - b. Average Route Speed (VMP); and
  - c. Maximum Age of the **Locomotive Fleet (IMFL)**.

**1.4.** The **Complementary Obligations** are essential determinations for the adequate provision of the rail transport service and are detailed in Appendix D.

**1.5.** The constructions under the **Subcontracting Interventient's** responsibility consist in constructions in batches of the **South Extension**, as detailed in Appendix E.

## 2. Glossary

**2.1.** For the purposes of the **Specifications Book**, and without prejudice to other definitions established in the **Sub-Concession Contract**, the expressions are defined as follows:

- i. **ABNT:** Brazilian Association of Technical Standards.
- ii. **Ballast:** part of the railway **Superstructure** which consists in a layer of gravel seated on the **Platform** to support the **Sleepers**.
- iii. **Derailment Detector:** device installed along a **Railway Segment** to detect a **Railway Vehicle** derailment.
- iv. **Dolphins:** protection system pillar's bridge composed by hexagonal rings of structural materials fixed on the riverbed through a group of foundation piles.
- v. **Drainage Device:** A set of structures and installations that aim to intercept, capture and drain surface and/or groundwater, leading to adequate outflow points.
- vi. **Environmentally Sensitive Areas:** areas that contain natural or cultural features of great value for the functioning of ecosystems which may be adversely affected by human activities.
- vii. **Frog:** part of the **Turnout** that directs the wheels of vehicles from one **Line** to another.
- viii. **Gauge:** distance between the inner faces of the **Railheads**, taken 16 mm (sixteen millimeters) below the upper surface of the **Rail** in the normal line.
- ix. **Grade Crossing:** an intersection at the same elevation of road and one or more rail tracks.
- x. **Infrastructure:** the lower part of the **Railway Line** structure that supports the **Superstructure**, being composed of earthworks, **Drainage Devices**, culverts, **OAEs**.
- xi. **Locomotive:** **Railway Vehicle** with traction.
- xii. **Main Fleet:** **Locomotives** and wagons for freight transport activities. **Locomotives** and wagons used specifically to support **Railway Maintenance** services, as well as those acquired or mobilized exclusively for the purpose of maneuvering or fixed assets by disposal or loss by accident, are not considered **Main Fleet**.

- xiii. **Maintenance:** a set of activities and resources applied to systems, equipment and physical structures, aiming to ensure the continuity of their function within appropriate parameters of performance, availability, quality and service life.
- xiv. **Ombudsman:** it is the means of communication with the **Sub-Concessionaire** and its purpose is to receive, register, analyze, make decisions and respond to complaints and suggestions.
- xv. **Overpass:** consists of **OAE** destined to permit the transposition of railway line upper the public road or highway.
- xvi. **Rail License and Signaling System:** systems employed in the **Railway** to carry out dispatch of **Rail Vehicles** with security.
- xvii. **Rail Vehicle:** vehicle, self-propelled or not, suitable for traffic on a **Railway Line**.
- xviii. **Rail:** long metal part with double cross-section similar to double T and with beam characteristics, which is seated and fastened to **Sleepers** and connected or welded end to end with other equal parts, forming parallel rows, which support and guide the wheels of **Rail Vehicles** and constitute the rolling surface of the **Railway Line**.
- xix. **Railhead:** Upper part of the **Rail**, on which the **Rail Vehicle** wheels slide.
- xx. **Railway Line:** set of **Rails** set on **Sleepers**, separated by a certain distance, fasteners, **Turnout** and deviations, where the **Rail Vehicles** circulate.
- xxi. **Railway Segment:** defined extension of the **Railway Line**, comprised by a set of **Railway Sections**.
- xxii. **Right-of-Way:** Section of land intended to accommodate the **Railway**.
- xxiii. **Sleeper:** piece of concrete, steel, polymer composites, wood or other material that has appropriate characteristics to support a load. Installed in the transverse direction to the **Railway Line** on which the **Rails** are fixed. Its function is to transmit to **Ballast** part of the efforts produced by the **Railway Vehicles** and maintain the **Gauge of the Track**.
- xxiv. **South Extension: Railway Segment** between Km 000 + 000, in the city of Ouro Verde de Goiás/GO and Km 699 + 550, in the city of Estrela d'Oeste/SP.
- xxv. **Special Constructions - OAE:** the work of railway infrastructure is defined as one that must be the subject of a specific project, especially tunnels, bridges, viaducts, walkways and embankment containment structures.

- xxvi. **Superstructure:** upper part of the **Railway Line** structure that directly supports the efforts of the **Railway Vehicles** and transmits them to the Infrastructure. It's, composed of **Rails**, fasteners, **Turnout**, **Sleepers** and **Ballast**.
- xxvii. **Supporting Installations: Immovable Assets'** of the **Sub-Concession**.
- xxviii. **Technical Parameters:** elements or characteristics used as reference for compliance with the **Minimum Technical Specifications** established for the operation of the railway infrastructure.
- xxix. **Track:** set of existing **Railway Lines** in the **Right-of-Way**.
- xxx. **Train:** composition formed by **Railway Vehicles** with at least one traction or self-propelled vehicle.
- xxxi. **Turnout:** Equipment formed by a set of parts that allows the passage of a **Rail Vehicle** from one **Railway Line** to another.
- xxxii. **Under Crossing:** consists of **OAE** destined to permit the transposition of railway line under the public road or highway.
- xxxiii. **Urban Area:** internal area to the urban perimeter, established by municipal law.

### 3. Annual Monitoring Report (RAA)

**3.1.** By 30<sup>th</sup> March of each year, the **Sub-Concessionaire** must submit to **ANTT** the Annual Monitoring Report (RAA) of the previous year.

**3.2.** The RAA must ensure **ANTT** and other stakeholders that the **Sub-Concessionaire** has carried out the appropriate planning and executed the corresponding actions for the compliance with the obligations set out in the **Specifications Book** and other contractual rules.

**3.3.** The **Sub-Concessionaire** is responsible for selecting, hiring and remunerating an independent specialized company to perform the surveys, collect information, research and calculate the items described in the Appendices of the **Specifications Book**, as well as in the elaboration of the RAA. The company's name and qualification must be submitted for previous authorization from **ANTT**.

**3.4.** The RAA must include:

- i.** **Investment Plan's** Monitoring Report (RAPI);
- ii.** Technological Development Resource's Monitoring Report (RADT);
- iii.** Preservation of the Railway Memory Resource's Monitoring Report (RAMF);
- iv.** Railway Saturation Level's Monitoring Report (RASF);
- v.** Railway Infrastructure's Monitoring Report (RAIF); and
- vi.** Railway Transportation Service Provision's Monitoring Report (RAPS).

**3.5.** The **Investment Plan's** Monitoring Report (RAPI) must contain, at least, the following information:

- i.** Description of investments made in the previous year, separated by group and intervention, as provided in Appendix A; and
- ii.** Expenditures made by the **Sub-Concessionaire**, for each intervention, as well as the physical progress of the constructions.

**3.6.** The **Technological Development Resource's** Monitoring Report (RADT), must contain, at least, the following information:

- i.** Description of the projects made in the previous year, with their scope and obtained results;

- ii. Expenditures made by the **Sub-Concessionaire** for each project.

**3.7. The Preservation of the Railway Memory Resource's** Monitoring Report (RAMF), must contain, at least, the following information:

- i. Description of the interventions made in the previous year, describing the asset, it's location and obtained results;
- ii. Expenditures made by the **Sub-Concessionaire** for each intervention.

**3.8. The Railway Saturation Level's** Monitoring Report (RASf), must contain, at least, the following information:

- i. Means of obtaining and establishing the necessary data to calculate the following indicators, detailed in Appendix A:
  - a. Saturation Level of Railway Segments (NSSF); and
  - b. Railway Saturation Index (ISF).
- ii. The result obtained for the NSSF of each **Rail Segment** which composes the Railway; and
- iii. NSSF and ISF's Calculation Memorial.

**3.9. The Railway Infrastructure's** Monitoring Report (RAIF), must contain the following elements of the **Railway**:

- i. Regarding the **Rail** infrastructure:
  - a. **Drainage Devices**;
  - b. **Special Constructions (OAEs)**;
  - c. Cut and embankment's slopes;
  - d. **Right-of-Way**; and
  - e. **Track's Platform**.
- ii. Regarding the Railway **Superstructure**:
  - a. **Ballast**;

- b. **Sleepers;**
- c. **Rails;** and
- d. **Turnout.**
- iii. **Railway geometry inspection's results;**
- iv. **Grade Crossing;** and
- v. **Supporting Installations.**

**3.10.** The evaluation of the elements that make up the RAIF must contain the classification of the previously listed elements, according to the categories described in Table 1.

**Table 1: Categories for the characterization of the infrastructure management elements**

<b>Category</b>	<b>Description</b>
<b>Excellent</b>	No functional defects, exceeding minimum specifications.
<b>Good</b>	No functional defects, within the limits of minimum specifications.
<b>Reasonable</b>	Few functional defects, with most of the minimum specifications met, however, with the need for punctual corrective actions.
<b>Bad</b>	Significant functional deficiencies, with most minimum specifications compromised and the need for comprehensive corrective actions.
<b>Critical</b>	Functionality compromised, without meeting the minimum specifications and need for general corrective actions.

**3.11.** The Rail Transport Service Provision's Monitoring Report (RAPS), must contain, at least, the following information:

- i. Method of obtaining and establishing the necessary data to calculate the following indicators, detailed in Appendix C:
  - a. Severe Rail Accidents Index (IAFG);
  - b. Average Route Speed (VMP); and
  - c. Maximum Age of the **Locomotive** Fleet (IMFL).
- ii. The indicators result and its Calculation Memorial, and
- iii. The property and characteristics of each wagons and **Locomotive** fleet's units, classifying them as own or third parties.

## APPENDIX A

### Investment Plan

- 4 The **Investment Plan** consists in **Fixed Term Investments** and **Demand-driven Investments**
- 4.1 **Fixed Term Investments** are mandatory and must be fully operational with all functional elements required, within the period stipulated in this **Specifications Book**.
- 4.2 The **Fixed Term Investments** must be carried out in accordance with technical standards, with this **Specifications Book** and with other rules of the **Notice of Auction**, the **Contract** and its **Annexes**.
- 4.3 **Fixed Term Investments** are classified into the following groups:
- i. Investments for implementation of **Under Crossing**;
  - ii. Investments for relocation of transmission lines;
  - iii. Investments for implementation of mileposts;
  - iv. Investments for implementation of protection system of bridge columns ;
  - v. Investments for completion of the Estrela d'Oeste Yard;
  - vi. Investments for installation of **Derailment Detectors**;
  - vii. Investments for the implementation of the **Rail System of Licensing and Signaling**;
  - viii. Investments for the implementation of a terminal for the storage, loading and unloading of solid agricultural bulk; and
  - ix. Investments for completion of remaining constructions of **South Extension**.
- 4.4 Investments for implementation of **Under Crossing** consists in the construction of 03 (three) **Under Crossings**, located in the **South Extension**.
- i. The **Sub-Concessionaire** must implement, within a period of up to two (2) years from the **Assumption Date**, one (1) **Under Crossing** at Lot 3S of the South Extension, at Km 285.695, considering an estimated and indicative value of BRL 977.713,19 (nine hundred and seventy-seven thousand, seven hundred and thirteen reais and nineteen cents), which includes the benefit of REIDI, at base date of December 2017.



- ii.** The **Sub-Concessionaire** must implement, within a period of up to two (2) years from the **Assumption Date**, one (1) Under Crossing at Lot 4S of the **South Extension**, at Km 424.135, with estimated and indicated value of BRL 1.116.329,45 (one million, one hundred sixteen thousand, three hundred and twenty-nine reais and forty-five cents), considering the benefit of REIDI, at base date of December 2017.
- iii.** The **Sub-Concessionaire** must implement, within a period of up to two (2) years from the **Assumption Date**, one (1) Under crossing at Lot 5S of the **South Extension**, at Km 660.805, considering an estimated and indicated value of BRL 1.129.643,06 (one million, one hundred and twenty-nine thousand, six hundred and forty-three reais and six cents), which the benefit of REIDI, at base date of December 2017.
- 4.5** Investments for relocation of transmission lines consists in the relocation of 16 (sixteen) existing transmission lines, in the **South Extension**.
- i.** The **Sub-Concessionaire** must relocate, within a period of up to two (2) years from the **Assumption Date**, sixteen (16) transmission lines located at Lots 2S, 3S and 5S of the **South Extension**, as indicated in Table 2: Location of transmission lines, considering an estimated and indicative value of BRL 7.654.353,72 (seven million, six hundred and fifty-four thousand, three hundred and fifty-three reais and seventy-two cents), which includes the benefit of REIDI, at base date of December 2017.

**Table 2: Location of transmission lines**

<b>Relocation of Transmission Lines</b>		
<b>Lot</b>	<b>Transmission Line</b>	<b>km</b>
2S	Transmission Line of 230 kva	119,394
3S	Transmission Line of 69 kva	281,055
3S	Transmission Line of 500 kva	284,271
3S	Transmission Line of 230 kva	286,310
3S	Transmission Line of 500 kva	289,756
3S	Transmission Line of 230 kva	293,252
3S	Transmission Line of 138 kva	293,320
3S	Transmission Line of 230 kva	293,483
3S	Transmission Line of 138 kva	304,321
5S	Transmission Line of 500 kva	577,600

<b>Relocation of Transmission Lines</b>		
<b>Lot</b>	<b>Transmission Line</b>	<b>km</b>
5S	Transmission Line of 69 kva	586,606
5S	Transmission Line of 69 kva	587,169
5S	Transmission Line of 500 kva	587,595
5S	Transmission Line of 440 kva	619,214
5S	Transmission Line of 138 kva	626,934
5S	Transmission Line of 69 kva	629,509

**4.6** Investments for implementation of milepost is the implementation of kilometer and reference marks, with distance indication of the **Railway at South Extension**.

- i. The **Sub-Concessionaire** must implement, within a period of up to two (2) years from the **Assumption Date**, at least 3 (three) kilometer marks and 466 (four hundred and sixty-six) reference marks, to be located at Lot 3S of the **South Extension**, with indicative and estimated value of BRL 248.023,10 (two hundred and forty-eight thousand, twenty-three reais and ten cents), considering the benefit of REIDI, at base date December 2017.

**4.7** Investments for the protection system pillar's bridge is the build of *Dolphins* at pillars' bridge over Rio Grande, located in the **South Extension**.

- i. The **Sub-Concessionaire** must implement, within a period of up to two (2) years from the **Assumption Date**, *Dolphins* at the Bridge over Rio Grande, located in Lot 5S of **South Extension**, at the Km 603,180, with indicative and estimated value of BRL 1.196.966,67 (one million, one hundred ninth-six thousand, nine hundred and sixty-six reais and sixty-seven cents), considering the benefit of REIDI, at base date December 2017.

**4.8** The *Dolphins* protection system of columns must be implemented in order to enable the navigability of the river.

**4.9** Investments for the completion of Estrela d'Oeste Yard is the build of the **Superstructure** of 1 (one) Yard, located in the **South Extension**.

- i. The **Sub-Concessionaire** must complete, within a period of up to two (2) years counted from the **Assumption Date**, the execution of Estrela d'Oeste Yard's **Superstructure**, located between the Km 662,342 and Km 664,678, in Lote 5S of **South Extension**. The

yard must have useful extension of 2,218 km, besides a third line and one branch. The indicative and estimated value of all these interventions, considering the benefit of REIDI at base date December 2017, is of BRL 11.070.244,29 (eleven million, seventy thousand, two hundred and forty-four reais and twenty-nine cents).

**4.10** The investments for **Derailment Detectors** consist in the installation of detector devices along all of the **Sub-Concession**'s extension.

- i. The **Sub-Concessionaire** must complete, within 3 (three) years of the **Assumption Date**, **Derailment Detectors** in **Environmentally Sensible Areas**, at the entrance and exit of all **OAEs** and Track Passing. The indicative and estimated value is BRL 3.732.640,75 (three million, seven hundred and thirty-two thousand, six hundred and forty reais and seventy-five centavos), considering the benefit of REIDI, in a base date of December 2017.

**4.11** The **Derailment Detectors** must be installed in **Environmentally Sensitive Areas** at the entrance and exit of **OAEs** and of passing siding.

**4.12** The investments for implementation of the **Rail System of Licensing and Signaling** covers the entire extension of the **Sub-Concession**.

- i. The **Sub-Concessionaire** must install, within the period of up to three (3) years counted from the **Assumption Date**, **Rail System of Licensing and Signaling** in all the **Railway Segments** of the **Sub-Concession**. The estimated cost for these interventions, considering the benefit of REIDI and the base date of December 2017, is BRL 92.410.704,03 (Ninety-two million, four hundred and ten thousand, seven hundred and four reais and three cents).

**4.13** The **Rail System of Licensing and Signaling** must contain, at least:

- i. Indication of the license in the cabin of the **Locomotive**, through the telecommunications network, containing speed restrictions, authorization limits and other pertinent safety information;
- ii. Control of the **Rail Vehicles**' authorization limits, which prevents the entry of **Rail Vehicles** into unauthorized block sections;
- iii. Adaptive speed control considering track profile and speed restrictions sent by the control center through the communication network;
- iv. Indication of occupancy and inoccupation of a block section by a **Train** or service vehicle to the control center through the on-board computer;

- v. Train integrity control through telemetric tail equipment;
  - vi. Indication of the switch spring position in the **Locomotive's** cabin through the implemented telecommunication network, without the need of field signals installation;
  - vii. Automatic and instant recognition of **Rail Vehicles**;
  - viii. Installation of electrical switch in terminal yards that can be controlled from the **Operational Control Center**;
  - ix. Installation of switch spring in track passing with visualization of the switch **Turnout's** position from the Operational Control Center (CCO);
  - x. Indication of the **Rail Vehicles'** position in the block sections and its passage on **Turnout** through detection system with axis counters;
  - xi. Prevent the entrance of the **Railway Vehicle** in a different line from that indicated in the license;
  - xii. Allow interoperability with adjacent railways;
  - xiii. **Rail Vehicles** control by centralized interlocking with probability of unsafe failure in the ratio 1:100.000 years, corresponding to Safety Integrity Level 2 (SIL 2);
  - xiv. Implementation of Operational Control Center (CCO) to control the circulation of the Rail Vehicles, maintaining the operational efficiency and safety of the Railway.
- 4.14** The **Sub-Concessionaire** must acquire and install on-board equipment in the **Locomotive** to be acquired throughout the period of the **Sub-Concession**.
- 4.15** The **Sub-Concessionaire** must install a terminal for the storage, loading and unloading of solid agricultural bulk, within a period of up to two (2) years counted from the **Assumption Date**, with a minimum storage capacity of 100.000 t (one hundred thousand tons), minimum discharge capacity of 525 t/h (five hundred and twenty-five tons per hour), minimum load capacity of 1.197 t/h (one thousand one hundred and ninety-seven tons per hour) and a daily operating efficiency ratio of 83.3% (eighty-three point three percent), with indicative and estimated value for BRL 113.031.751,39 (one hundred thirteen million, thirty-one thousand, seven hundred and fifty-one reais and thirty-nine centavos), considering the benefit of REIDI, with a base date of December 2017.
- 4.16** The location of the terminal of storage, loading and unloading must be set out by the **Sub-Concessionaire** based on technical criteria.

**4.17** The Investments for completion of remaining constructions of **South Extension** is the completion of 5 (five) lots of the **South Extension**.

- i.** The **Sub-Concessionaire** must complete, within a period of up to two (2) years counted from the **Assumption Date**, the construction of Lots 1S and 1SA, located in the **Rail Segment** between the Km 0,000 and Km 111,020. The indicative and estimated cost of these interventions, considering the benefit of REIDI at base date December 2017, is of BRL 109.284.674,94 (one hundred and nine million, two hundred and eighty-four thousand, six hundred and seventy-four reais and ninety-four cents).
- ii.** The **Sub-Concessionaire** must complete, within a period of up to one (1) year counted from the **Assumption Date**, the construction of Lot 3SA, located in the **Rail Segment** between the Km 315,800 and Km 386,660. The indicative and estimated cost of these interventions, considering the benefit of REIDI at base date December 2017, is of BRL 4.793.434,45 (four million, seven hundred and ninety-three thousand, four hundred and thirty-four reais and forty-five cents).
- iii.** The **Sub-Concessionaire** must complete within a period of up to two (2) years counted from the **Assumption Date**, the works of Lot 4S, located in the **Rail Segment** between the Km 386,600 and Km 527,640. The indicative and estimated cost of these interventions, considering the benefit of REIDI at base date December 2017, is of BRL 216.594.949,20 (two hundred and sixteen million, five hundred and ninety-four thousand, nine hundred and forty-nine reais and twenty cents).
- iv.** The **Sub-Concessionaire** must complete, within a period of up to one (1) year counted from the **Assumption Date**, the construction of Lot 5S, located in the **Rail Segment** between the Km 527,640 and Km 669,550 and the conclusion of the bridge over the Rio Grande located at Km 603,180. The indicative and estimated cost of these interventions, considering the benefit of REIDI at base date December 2017, is of BRL 19.634.464,19 (nineteen million, six hundred and thirty-four thousand, four hundred and sixty-four reais and nineteen cents).
- v.** The **Sub-Concessionaire** must conclude, within a period of up to one (1) year counted from the **Assumption Date**, the construction of Lot 5SA, located in the **Rail Segment** between the Km 0,000 and Km 2,994 of the FNS link with the Rumo Malha Paulista Railway. The indicative and estimated cost of these interventions, considering the benefit of REIDI at base date December 2017, is of BRL 1.818.773,13 (one million, eight hundred and eighteen thousand, seven hundred and seventy-three reais and thirteen cents).

**4.18 Demand-driven Investments** consist in interventions to be implemented by the **Sub-Concessionaire**, for Railway operational capacity's adequacy for demand in rail freight transport, in order to maintain the **Railway Saturation Index** always below ninety percent (90%).

**4.19 Demand-driven Investments** will not lead to the economical-financial balance of the **Sub-Concession Contract**.

**4.20** ISF is the indicator of Railway saturation capacity, obtained from the Saturation Level's Railway Segments (NSSF).

**4.21** The NSSF of the Railway Segment (i) consists in the coefficient between the used capacity (CAP UTIL) and installed capacity (CAP INST), for the period of verification.

$$NSSF, i = \frac{CAP_{UTIL, i}}{CAP_{INST, i}} \quad (1)$$

where:

CAP INST, i = is the installed capacity, within terms of the specific regulation of ANTT, of **Railway Segment**.

CAP UTIL, i = is the used capacity, within terms of the specific regulation of ANTT, of the **Railway Segment i**.

**4.22** The periodicity of the NSSF's verification is annually.

**4.23** The **Railway Saturation Index (ISF)** is understood as the greatest value of NSSF obtained for each segments that composes the **Railway**.

$$ISF = [Max(NSSF, i)] \quad (2)$$

Where:

ISF = Railway Saturation's Index; and

Max (NSSF, i) = the greatest value of Level Saturation of the set of segments that compose the **Railway**;

**4.24** The periodicity of the ISF's verification is annually.

## APPENDIX B

### Minimum Technical Specifications – Technical Parameters

5. The assumptions, reference values and other parameters stipulated in this Appendix are valid for the evaluation of the adequate exploration of the infrastructure and refer to the **Technical Parameters of Railway Infrastructure, Technical Parameters of Railway Superstructure; Technical Parameters of Grade Crossings (PNs); and Technical Parameters of Support Facilities.**
  - 5.1. The **Technical Parameters** for operation of the **Railway's Infrastructure** refer to the following elements:
    - i. **Drainage Devices;**
    - ii. **Special Structures (OAEs);**
    - iii. **Cuts and embankment's slopes;**
    - iv. **Right-of-Way; and**
    - v. **Track's Platform.**
  - 5.2 The **Technical Parameters** for **Drainage Devices** state that they must be maintained:
    - i. Under full conditions, without ruptures, cracks or defects that compromise their operation, with consequent emergence of deformations, landslides or erosion of the slopes or embankment;
    - ii. Under suitable conditions for the effective achievement of its essential purpose of drainage, flow and disposal of surface or underground water; and
    - iii. Free of sediments or siltstones that compromise their flow capacity.
  - 5.3 The **Technical Parameters** for **OAEs** state that they must be maintained with their structural and functional characteristics preserved in order to guarantee the operational safety of the **Railway** and people who travel on the roads that they transpose, as well as the environmental preservation of rivers, streams and valleys located under these constructions.
  - 5.4 The **Technical Parameters** for slopes and embankments establish that they must be kept stable, without evidence of landslides or destabilization, and when contemplated by erosion processes initiated or already consolidated, that these are under control through a

monitoring plan and stabilization, so that they do not evolve or compromise the integrity of the slopes and the operational safety of the **Railway**.

**5.5** The **Technical Parameters** for the **Right-of-Way** state that it must be maintained:

- i.** With vegetation control so as not to compromise the visibility and safety of the **Railway** operation, minimize road degradation, to ensure the free flow of surface water, to allow safe access of maintenance and inspection teams, and to prevent the concealment of materials which are unnecessary to the operation of the **Railway** and which may cause risks to the safety of track employees, the environment and public health;
- ii.** With control of waste disposal, debris or unnecessary materials to the **Railway** operation and that may cause risks to the environment and public health, such as scrap **Rails**, fasteners and **Sleepers**;
- iii.** With control of actions against vandalism and sabotage in the track and **Right-of-Way**;
- iv.** Free from unauthorized occupations (intrusions); and
- v.** Preserved throughout the **Railway** and with security control at intersections with **Urban Areas**, being the responsibility of the **Sub-Concessionaire** to implement improvements appropriate to the characteristics of each municipality.

**5.6** The **Technical Parameters** for the track platform state that it must be maintained:

- i.** Clean and free from debris and rubbish;
- ii.** Free of ballast water pockets;
- iii.** Free of vegetation in the **Railway Superstructure** and in the width of the platform to the **Drainage Devices**;
- iv.** Free from erosive processes; and
- v.** Free from obstructions in **Drainage Devices** that compromise its good functionality.

**5.7** The **Technical Parameters** of the Railway **Superstructure** refer to the following infrastructure elements:

- i. Ballast;**
- ii. Sleepers;**



**iii. Rails;**

**iv. Turnouts;** and

**v. Railway geometry inspection's results.**

**5.8** The parameters for the **Ballast** establish that it must be maintained:

- i.** Without evidence of pumping of fines from the sub-ballast or granular base, problems of visual inconformity regarding its granulometric aspects or failure to meet the geometric parameters recommended in Table 10, due to problems of ballast aggradation, contamination or deficiency in the maintenance of **Ballast**;
- ii.** Height, whose minimum dimension considered under the underside of the **Sleepers**, must follow the values recommended in Table 3.
- iii.** Muster width in accordance with the limits set forth in Table 4.

**Table 3: Parameters for Ballast height**

Description	Up to 20 ton axle load	Above 20 ton axle load
<b>Minimum Ballast Height</b>	25 cm	30 cm

**Table 4: Parameters for the Ballast muster width – Broad Gauge**

<b>Integrity of Ballast</b>	Ballast muster width (anchoring of the grid) $\geq 0,30$ m.
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**5.9 Sleepers** must be maintained in such a way as to:

- i.** Ensure proper **Track Gauge**, supporting **Rails** fixation devices and the structural capacity to transmit forces from **Rails** to **Ballast**;
- ii.** Ensure the leveling, allowing the service of tamping in their base;
- iii.** Not show signs of rot, in case of wooden **Sleepers**;
- iv.** Not present cracks that go beyond the limits of current standards or that make fasteners ineffective in case of wooden **Sleepers**;

- v. Not show cracks or breaks in the central region of the fixation, in the case of concrete **Sleepers** ;
- vi. Not present cracks or breaks that cause the partial sectioning of the part, in the case of steel **Sleepers**; and
- vii. Not present defects generated by the wheels of wagons or **Locomotives** that damaged the **Sleepers** in occurrences of derailments, causing the reduction of its useful life or impairment of **Track Gauge**.

**5.10 Sleepers** are considered unserviceable when they fail to meet the specifications set forth in the current standards regarding the requirements "5.9.i" to "5.9.vii" valid to Item 5.9.

**5.11** The **Technical Parameters** for **Sleepers** are related to their conservation and **Track Gauge** limits presented in Table 6 and Table 7.

**Table 5: Group of line due to gross ton limits transported per day**

Line group	Limits (TBT/Day)
1	Ton > 120.000
2	120.000 > Ton > 70.000
3	70.000 > Ton > 40.000
4	40.000 > Ton > 25.000
5	25.000 > Ton > 12.500
6	12.500 > Ton > 6.000
7	6.000 > Ton > 3.000
8	3.000 > Ton > 1.500
9	Ton < 1.500

**Table 6: Parameters for Sleepers – Conservation**

Equivalence to line group	Track type (TR / UIC)	Axle load (ton)	% Admissible of damaged sleepers		
			Tangent	R>=350	250<R<350
1,2,3	TR 68	30	20%	20%	15%
	TR 57 / UIC 60	30	10%	10%	5%

Equivalence to line group	Track type (TR / UIC)	Axle load (ton)	% Admissible of damaged sleepers		
			Tangent	R>=350	250<R<350
Other groups	TR 57 / UIC 60	< 30	15%	15%	10%

**Table 7: Parameters for Sleepers – Limits for broad gauge**

Description of the Parameter	Speed of Freight Train - Km/h			
	0 - 15 km/h	16 - 40 km/h	41 - 64 km/h	65 - 96 km/h
Wide Gauge Limit (mm)	1635	1632	1632	1625
Tight Gauge Limit (mm)	1587	1587	1587	1587

**5.12** Unserviceable **Sleepers** will not be allowed at the following locations:

- i.** In **Turnout** entrances, in the switch point region to the switch heel and in Frog region;
- ii.** In tunnels, viaducts and bridges; and
- iii.** For **Segments** with dangerous products transportation, the **Sub-Concessionaire** must follow **ANTT** specific regulations.

**5.13** The **Technical Parameters** for **Rails** are split in two types of railways:

- i.** Railways that do not perform reprofiling and grinding services by Large Equipment (EGPs) and do not have track geometric parameter recording equipment, including laser wear measurement system for **Rails**.
- ii.** Railways that perform reprofiling and grinding services by Large Equipment (EGPs) and have track geometric parameters recorders, including laser wear for **Rails**.

**5.14** The **Rails** parameters, in the case of Item 5.13.i, state that they must be maintained within the limits shown in Table 8.

**Table 8: Parameters for horizontal and vertical wear of Rails – Without reprofiling and grinding**

Track type (TR and UIC)	Annual gross tonnage	Total maximum wear (mm)	Vertical maximum wear (mm)
TR 68	>14	11	-
	2 to 14	13	-
	Up to 2	16	14
TR 57 and UIC 60	>14	10	10
	2 to 14	12	10
	Up to 2	15	10

**5.15 Rail Parameters**, in the case of Item 5.13.ii, provide that these must be maintained within the limits shown in **Erro! Fonte de referência não encontrada. 9**.

**Table 9: Parameters for horizontal and vertical wear of the Tracks – with reprofiling and grinding services**

Limit Parameter				
Profile	Equals to or Superior than 25 ton (Axle load)			
	Head loss (%) (with grinding and monitoring)	Vertical wear limit	Horizontal wear limit	Maximum total wear limit
		(mm)	(mm)	(mm)
TR57/UIC 60	37%	15	14	22
TR68	54%	20	16	28

**5.16 Turnout** must be maintained in order:

- i. To securely perform the transposition of **Rolling Stock**; and
- ii. Not to have signs of fracture in their main components, such as check rails, **Frogs** and switches.

**5.17** The parameters for **Turnout** state that they must be maintained:

- i. Free from **Sleepers** spliced to achieve the required length or dimensionally in non-compliance with the standard designs ;
- ii. Provisioned of all the screws and fasteners specially in the region of the Frog;
- iii. Exempt from unusable **Sleepers** in sequence, especially in the region of the **Frog** and the Switch machine in which the sleepers must have perfect square, correct and uniform space.
- iv. Exempt from geometry problems such as unevenness in relation to the guard rails and stock rails that may compromise operational safety;
- v. Exempt from components and **Rails** with signs of fatigue, warping, cracking, fracture, malfunction and excessive wear that may compromise operational safety;
- vi. Exempt from cracks, bends or crunches at the switch point that could compromise the perfect fit to the abutment rail; and
- vii. In accordance with current **ABNT** standards for metal component wear, related to safeguard limits, and inspection reports of limits may be requested to the **Sub-Concessionaire**.

**5.18** The **Technical Parameters** for joint bars establish that they must be maintained in order to:

- i. Be supported by 4 (four) serviceable Sleepers;
- ii. Be fastened by at least 4 (four) screws, 2 (two) screws being in each **Rail**;
- iii. Have a transverse leveling difference at the 2.0 m (two meter) base that corresponds to the speed range of Table 10; and
- iv. Not having Junction **Joints** with spacing less than 6.0 m (six meters) in the same row of **Rails**.

**5.19** The **Technical Parameters** for **Railway** geometry state that it must be maintained within the limits shown in Table .

**Table 10: Parameters for the Railway Geometry – Broad Gauge**

Description of the road geometry parameter		Authorized speed Range – broad gauge				
		Class I (0 - 15 km/h)	Class II (16 - 40 km/h)	Class III (41 - 64 km/h)	Class IV (65 - 96 km/h)	Class V (96 - 128 km/h)
Transversal Leveling	Variation of transversal leveling	76	51	44	32	25
	In tangent or circular curve					
	Warp (mm)					
	Variation of transversal leveling every 10 m on the transition curves	51	44	32	25	19
	Twist (mm)					
Alignment	10m curve misalignment	NA	NA	31	25	12
	Maximum variation of the horizontal arrow in relation to the average of the arrows					
	- 10m Chord (mm)					
	Alignment defect in tangent	128	76	44	36	19
	Maximum horizontal arrow variation in relation to the tangent					
	- 20m Chord					
	(mm)					
Curvature	Excess of super elevation on the tangent or on the circular curve	X + 76	X + 51	X + 45	X + 32	X + 25

Description of the road geometry parameter	Authorized speed Range – broad gauge				
	Class I (0 - 15 km/h)	Class II (16 - 40 km/h)	Class III (41 - 64 km/h)	Class IV (65 - 96 km/h)	Class V (96 - 128 km/h)
Regarding the zero level or super elevation (X) projected for the circular curve					
(mm)					

**5.20** The **Sub-Concessionaire** must carry out, at least once a year, inspection of the geometry of the line, using equipment with **Permanent Way** geometry monitoring system and parameter analysis.

**5.21** The parameters for the **Grade Crossings** refer to their elements, such as:

- i. Functional and structural characteristics;
- ii. Road pavement (adjacent and between **Rails**);
- iii. Signaling devices (active, passive and auxiliary protections); and
- iv. Pedestrian crossing.

**5.22** **Grade Crossings** must present asphalt or concrete pavement in the area located on the **Ballast**, in order to reduce the risk of blocking or retaining road vehicles between the **Rails**.

**5.23** The pavement level must be the same as that of the running surface of the **Rails** and must allow road traffic without speed reduction, collision or skidding.

**5.24** The placing of soil or other material on the **Ballast** that may reduce its elastic and drainage capacity or that hinders the passage of vehicles due to irregularities in the surface of **Grade Crossings** is not allowed.

**5.25** The access to the **Grade Crossings** must follow the existing road pattern.

**5.26** In **Urban Areas**, **Grade Crossings** must ensure pedestrians traffic without vehicle interference, in accordance with current Brazilian technical standards.

**5.27 All Grade Crossings** must be implemented in accordance with current Brazilian technical standards.

**5.28** Table 11 presents the **Technical Parameters** for the **Supporting Installations**.

**Table 10: Parameters for Supporting Installations**

<b>Classification</b>	<b>Physical Conditions</b>	<b>Characteristics</b>
Great	Neither undergo nor require repairs	Building that is either new or has undergone substantial general repair, less than two years old, showing only signs of natural wear and tear on the exterior paint.
Very Good		Construction that is either new or has undergone substantial general repair, less than two years old, and needs only a light coat of paint to restore its appearance.
Good	Requires/received small repairs	Construction that is either Semi-new or has undergone substantial general repair between 2 and 5 years, whose general condition can be restored by repairing localized superficial cracks and/or by external and internal paint.
Intermediate		Construction that is either Semi-new or has undergone general repair between 2 and 5 years, whose general condition can be restored by repairing localized superficial cracks and/or by internal and external painting.
Regular	Requires simple repair	Construction whose general state can be restored by internal and external paint and repair of generalized superficial cracks, without recovery of the structural system. Eventually, revision of the hydraulic and electrical system.
Deficient		Construction whose general state can be restored by internal and external paint, repair of cracks and fissures and stabilization and/or localized recovery of the structural system. Hydraulic and electrical installations can be restored by overhauling and replacing some naturally worn parts. Eventually, the replacement of floor and wall coverings of same rooms may be necessary. Revision of waterproofing or replacement of roofing tiles.



Classification	Physical Conditions	Characteristics
Bad	Requires important repairs	Construction whose general condition can be recovered with internal and external paint, with replacement of masonry cloths and cracks repairs, with stabilization and/or recovery of a large part of the structural system. The hydraulic and electrical installations can be restored by replacing the apparent parts. Replacement of floor coverings and walls, of most rooms, is necessary. Replacement or major repairs to the waterproofing or roof.
Very Bad		Construction whose general condition can be recovered with stabilization and/or recovery of the structural system, replacement of masonry regularization and cracking repairs. Replacement of hydraulic and electrical installations. Replacement of floor coverings and walls. Replacement of waterproofing or roofing.
Demolition	Demolition value (residual)	Construction in state of ruin.

**5.29 Railway Supporting Installations** must be maintained at least in regular classification.

## APPENDIX C

### Minimum Technical Specifications - Indicators for the service provision of public rail freight transportation

6. The premises, reference values and further parameters stipulated in this Appendix are valid for the evaluation of adequate service provision. Refers to the Minimum Technical Specifications for the service provision of railway transportation: Severe Rail Accidents Index (IAFG); Average Route Speed (VMP); and Maximum Age of the Locomotive Fleet (IMFL).

6.2 The **Minimum Technical Specifications** for the provision of rail transport services include the following Indicators:

i. Severe Rail Accidents Index (IAFG);

ii. Average Route Speed (VMP); and

iii. Maximum Age of the **Locomotive** Fleet (IMFL).

6.3 IAFG, VMP, and IMFL Indicators must be determined in the sections whose opening to rail traffic had been authorized by **ANTT**.

6.4 The Severe Rail Accidents Index (IAFG) consists in the coefficient between the number of severe rail accidents occurred and the number of trains formed during the calculation period, multiplied by the distance crossed in kilometers.

$$IAFG = \frac{\sum_{t=1}^n AFG_i}{\sum_{t=1}^n (TREM_i * DIST_i)} \quad (3)$$

where:

$AFG_i$ : Severe railway accidents occurring during the calculation period, within the terms of the specific regulations of **ANTT**;

$TREM_i$ : Number of trains formed during the calculation period;

$DIST_i$ : Distance traveled by the trains formed, in kilometers, during the calculation period;

$n$ : End of calculation period.

6.5 The periodicity of the IAFG is annual.

6.6 Table 12 presents the reference values for IAFG.

**Table 12: Severe Rail Accidents Index (IAFG)**

Stage of the Sub-Concession Agreement	IAFG – Severe Rail Accidents Index
Assumption Date up to the 5 <sup>th</sup> year	< than or equal to 2,65
As of the 5 <sup>th</sup> year	< than or equal to 2,15

6.7 Average Route Speed (VMP) is the ratio of formed trains' number during the calculation period, multiplied by the distance traveled in kilometers and the sum of transit times, from the point of origin to the point of destination, in hours. Km/h is the unit of representation.

6.8 The VMP must be determined by the Average Route Speed Indicator (IVMP):

$$IVMP = \frac{\sum_{i=1}^n (TREM_i * DIST_i)}{\sum_{i=1}^n T_i} \quad (4)$$

where:

$TREM_i$ : Number of formed trains during the calculation period;

$T_i$  = Transit time of the trains in the calculation period;

$DIST_i$  = Distance traveled by the trains, in kilometers, during the calculation period; and

$n$  = Number of trains that traveled the **Railway** during the calculation period.

6.9 The periodicity of calculation of VMP is annual.

6.10 Tab13 shows the reference values for IVMP. The **Sub-Concessionaire** must have an IVMP greater or equal to 40 (forty) kilometers per hour for the first five (5) years of the **Sub-Concession Contract**, and more than forty-five (45) kilometers per hour for the remainder.

**Table 13: Parameters of the Average Route Speed Rate (IVMP)**

Sub-Concession Agreement Stage	IVMP (km/h)
Assumption Date up to the 5 <sup>th</sup> year	> than or equal to 40,0
As of the 5 <sup>th</sup> year	> than or equal to 45,0

- 6.11** For **Locomotives**, the indicator is the Maximum Age of the Locomotive Fleet (IMFL).
- 6.12** The IMFL consists in the greater value of age of the **Main Fleet Locomotives**.
- 6.13** The **Main Fleet of Locomotives** is comprised by the ones that are at the disposal of the traffic, being used or not, excepting those unavailable for total losses caused by accidents.
- 6.14** The periodicity of calculation of IMFL is annual.
- 6.15** The **Sub-Concessionaire** must have IMFL less than forty (40) years for the whole effective term of the **Sub-Concession Agreement**.

## APPENDIX D

### Complementary Obligations

7. The Complementary Obligations described in this Appendix D consist in essential obligations for the adequate service provision of rail transport, an integral part of the **Specifications Book**.
  - 7.1. The **Sub-Concessionaire** must implement, within 12 months of the **Assumption Date**, **Ombudsman Service**.
  - 7.2. The **Sub-Concessionaire** must respond and seek a solution to all communications made through the **Ombudsman** service.
  - 7.3. The **Sub-Concessionaire** must provide logistic support for **ANTT's** inspection activities.

## APPENDIX E

### Constructions under Subcontracting Intervent Responsibility

**8.** The **Subcontracting Intervent**'s construction obligations of conclusion described in this Appendix E are mandatory and they must be fully operational, with its functional elements, at the term stipulated in the **Specifications Book**.

**8.1.** The **Subcontracting Intervent**'s constructions at the **South Extension** have scope and location as presented below:

- i.** The **Subcontracting Intervent** must conclude, until December 31st, 2018, all the remaining constructions of Lot 02S in South Extension, comprehended between Km 111+129, at the city of Palmeiras de Goiás/GO, and Km 250+720, at the city of Turvelândia/GO.
- ii.** The **Subcontracting Intervent** must conclude, until December 31, 2018, all the remaining infrastructure constructions of Lot 05S in South Extension, comprehended between Km 527+640, at the city of União de Minas/MG, and Km 669+550, at the city of Estrela d'Oeste/SP.
- iii.** The **Subcontracting Intervent** must conclude, until December 31, 2018, all the remaining infrastructure constructions of Lot 05SA in South Extension, comprehended between the Estrela d'Oeste Yard and the interconnection with Malha Paulista, at the city of Estrela d'Oeste/SP.

**8.2.** Besides the completion of the described constructions scope, the **Subcontracting Intervent** must repass these segments to the **Sub-Concessionaire** until June 30, 2019, with all the contractual procedures finished with the responsible construction companies.