Rijkswaterstaat
Ministerie van Infrastructuur en Waterstaat

Vraagspecificatie Eisen

Het ontwerpen en uitvoeren van de vernieuwing van de Aeronautical Ground Lighting op Bonaire International Airport
Zaaknummer: 31180508

Datum	13-4-2023
Status	Definitief

Colofon

1.1

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Inhoud

Introduction

This Employer's Requirements (Vraagspecificatie Eisen) describes the work, consisting of the design and construction of the Aeronautical Ground Lighting (AGL) of Bonaire International Airport (BIA) (IATA: BON). The work is arranged in the form of a set of requirements, a description of the system in its immediate vicinity and the already made design choices. This Employer's Requirements is the "Vraagspecificatie Eisen" (Employer's Requirements) as mentioned in the "Basisovereenkomst" (Basic Agreement).

Chapter 1 System definition contains a description and demarcation of the system, changing in time, and the relationship it has with its immediate vicinity. It gives a definition of the scope and the already made choices to the customers demand.

Chapter 2 System requirements contains the requirements for the System.

Chapter 3 contains a table of documents to which the requirements or verification refers to. The requirement only mentions the name of the document. This table provides the additional information of the declared applicable version, date and publisher of the document.

Chapter 4 Definitions and abbreviations table contains definitions and gives the meaning of terms and abbreviations used in this document.

1 System Definition

The main goal for this project is to design and replace the Aeronautical Ground Lighting (AGL) of Bonaire International Airport (BIA).

This main goal will be achieved by the following three underlying project goals:

1. Design the AGL in compliance with current ICAO regulations;
2. Replace the AGL with minimal hindrance for air traffic.
3. Maintainable AGL for trained airport personnel.

This Employer's Requirements applies to Aeronautical Ground Lighting (AGL) of Bonaire International Airport (BIA). The BIA AGL System can be decomposed into objects. The general decomposition for this renovation project to the level of the main objects is given in figure 1-1 of the System Breakdown Structure (SBS) BIA AGL. Objects, such as the air traffic control tower, weather station, that are not part of this project scope will have interfaces with this project, and are shown in Bijlage B.

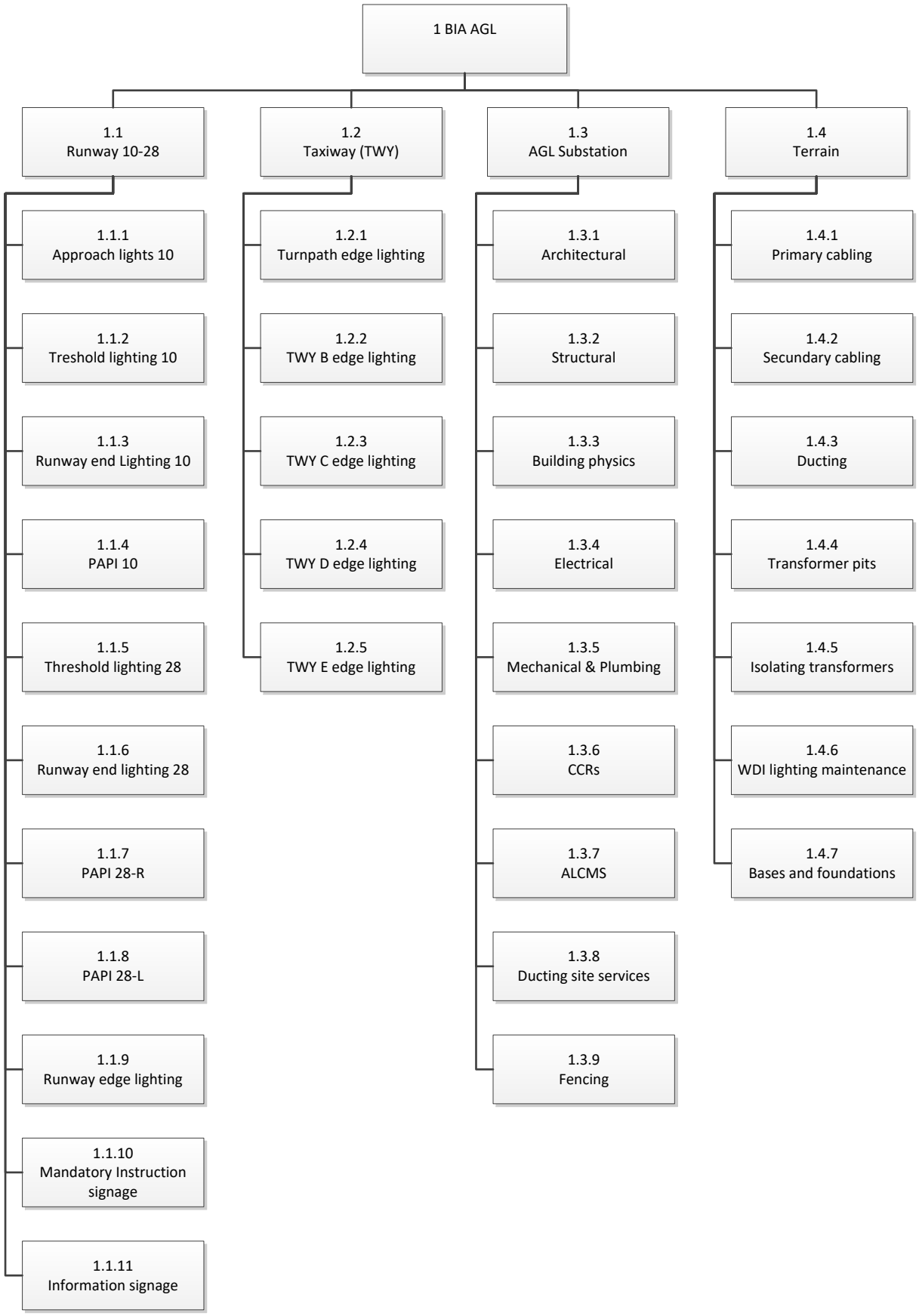


Figure 1-1: SBS BIA AGL

1.1 Initial situation

This paragraph contains a description of the existing System initial to the realization phase in advance of the work. This contains the basis for the transformation during the realization phase.

Bonaire International Airport has a non-precision approach runway (RWY 10-28). The full-strength pavement is 3057 m long and 45 m wide. RWY 10 has a 177 m displaced threshold and RWY 28 has a runway end lighting that is not placed at the extremity of the pavement but is co-located with the displaced threshold of RWY 10.

The runway has 4 taxiways associated and 3 operational turn pads, one at each runway end and an intermediate turn pad. TWY Alpha is out of function and has been disabled (code A). TWY Bravo has a width of 17 m and are suitable for small aircrafts only (code B). TWY Charlie and TWY Delta have a width of 24 m with medium strength and are suitable for larger aircrafts (code C). TWY Echo has a width of 28.5 m with a higher strength and is suitable for widebody aircrafts (code D and E).
Turn pads located at each runway end are mandatory for aircraft equal or greater than 35.8 m in wingspan, whereas the intermediate turn pad may be used by aircrafts with a smaller wingspan.

The existing AGL system is serviced from one substation as shown with a red arrow in figure 4.1. The substation is equipped with 5 CCRs.

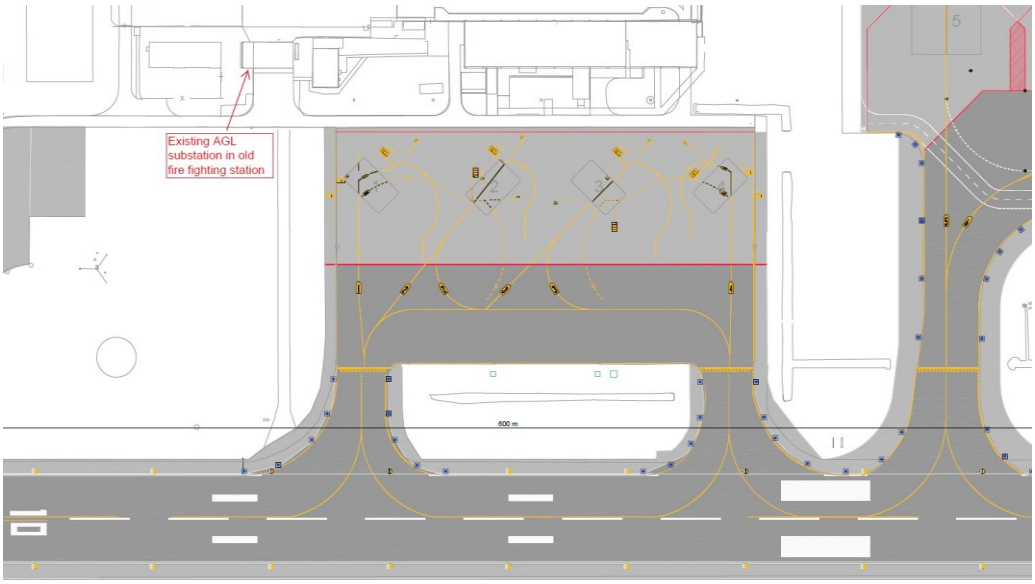


Figure **Fout! Geen tekst met de opgegeven stijl in het document.**1: Current location of the AGL substation building

The existing CCRs are sized to suit halogen technology lighting, ranging from 7.5 to 20 kW. Interleaving is used for all lighting except for runway end lighting on RWY 28, the PAPIs and the lights on top of the wind direction indicators. Currently, 90% of all luminaires are powered by two circuits.
The CCRs are powered by a back-up generator as a secondary power supply. In case of primary power failure, the switch over-time for the lighting will not exceed 15 seconds.

The current AGL system consists of inset and elevated light fixtures. Inset lights are installed in shallow bases. The current signage system consists of non-illuminated

signs and illuminated signs. The illuminated signs are illuminated by halogen lamps or fluorescent tubes. Only the illuminated signs will be considered in the AGL design.

The airport is currently equipped with two illuminated Wind Direction Indicators (WDI), one for approach 10 and one for approach 28. The lighting for both WDIs is LED type, for this reason the scope of works does not include the renewal of these lights but only the maintenance of the Wind Direction Indicators.

The airport has two PAPIs for approach 28, one at each side of the runway, and a PAPI on the right side of the runway for approach 10.

The airport is exposed to harsh environmental conditions that can be damaging for the systems, such as corrosion and constant exposure to high temperatures and humidity.

In addition, the existing soil condition at the approach 28 side is composed of coral limestone (‘klip’) which is very hard and might impede earthworks in that area. Available information about soil condition is provided in Annex XIII Informatie.

The documentation of the existing situation is added to the Final design drawings.

1.2 Realization phase

This section provides a description of the System during the Realization phase. It describes the required solutions for as far as those have been determined and need to be sustained.
The decomposition of the System during the Realization phase is shown in appendix C of this Employer’s Requirements.
In general, Bonaire International Airport (BIA) has to be able to accommodate existing volumes of air traffic during opening hours, at existing levels of safety during the Realization phase. Realization of the project near the runway and strip will take place outside of opening hours as specified in the Vraagspecificatie Proces (VSP).

1.3 Use phase

This section provides a description of the System during the Use phase. It describes the desired new System realized by delivery in accordance with the provisions of Article 2 of the Basic Agreement, in terms of prescribed solutions to the extent that they are already determined.

The decomposition of the system during the Use phase is shown in Bijlage B: SBS BIA. In the Use phase the airports Aeronautical Ground Lighting (AGL) is fully compliant to existing ICAO regulations and fully maintained.

Scope of Work:
The Work required to achieve the Use phase situation concerns the following main components and activities. These activities are not exhaustively defined; the requirements in this Employer’s Requirements prevail.

The airport is the primary gateway to and from the island of Bonaire. Installing a new energy efficient LED lighting system will accommodate safe air traffic during day and night.

The scope entails runway 10-28 including the approaches and taxiways.
Future platform and taxiway extensions will also be considered as per the masterplan, conditioning the location of the new substation and its equipment.

The initial development comprises the renewal or modification of the components listed below:

1. BIA AGL
    1.1. Runway (RWY) 10-28
        1.1.1. Approach lights 10
        1.1.2. Threshold lighting 10
        1.1.3. Runway end lighting 10
        1.1.4. PAPI 10 R
        1.1.5. Threshold lighting 28
        1.1.6. Runway end lighting 28
        1.1.7. PAPI 28-R
        1.1.8. PAPI 28-L
        1.1.9. Runway edge lighting
        1.1.10. Mandatory Instruction signage
        1.1.11. Information signage
    1.2. Taxiway (TWY)
        1.2.1. Turn Pad edge lighting
        1.2.2. TWY B edge lighting
        1.2.3. TWY C edge lighting
        1.2.4. TWY D edge lighting
        1.2.5. TWY E edge lighting
    1.3. AGL Substation
        1.3.1. Architectural
        1.3.2. Structural
        1.3.3. Building physics
        1.3.4. Electrical
        1.3.5. Mechanical & Plumbing
        1.3.6. CCRs
        1.3.7. ALCMS, in combination with equipment in the tower and the maintenance department
        1.3.8. Ducting site services
        1.3.9. Fencing
    1.4. Terrain
        1.4.1. Primary cabling
        1.4.2. Secondary cabling
        1.4.3. Ducting
        1.4.4. Transformer pits
        1.4.5. Isolating transformers
        1.4.6. WDI lighting maintenance
        1.4.7. Base and Foundations

1.4 Context description

1.4.1 System of Systems

A way to define a specified system is to position it within the whole of the systems. In the following figure the distribution of the system is defined with the relations of a specific system with its related systems these are specified in Bijlage A Contextdiagram and Bijlage B SBS BIA.

1.4.2 System boundary

This project distinguishes three types of boundaries;
1. Airside boundary

2. Renovation scope boundary
3. System boundary
All three boundaries define a spatial demarcation.
The airside boundary is the physical boundary of airside part of the Airport. This is the part of the airport directly involved in the arrival and departure of aircraft. The boundary is in most parts defined by the position of the airport boundary fence.
A small part of the scope is outside the airport boundary fence.

The combination of the airside boundary and renovation scope boundary is the System boundary. The physical boundaries of System Bonaire International Airport (BIA) are defined by this System boundary.

2 System requirements

This chapter describes the requirements for the system or part of the system for a specific phase or moment of the implementation.
Per requirement the corresponding information given in the table below:

<Requirement-ID>	**Period(s) of Validity:**		<R>	<U>
<Requirement Title>	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
<Requirement Text>	<Requirement-ID's of overlying requirement. Overlying requirements indicate the origin and thus the background of this requirement>.	<Requirement-ID of underlying requirements. Underlying requirments are deducted from this requirement.>		
Required Method of Verification	**Stakeholder(s)**	**Source document**		
<Specific conditions regarding Verification & Validation of this requirement.>	<Name or abbreviation of the party in Appendix A, which has an interest in this requirement>.	<Title of the source document from Annex XIII "Informatie" which this requirement is deducted.>.		

The period of validity refers to the periods as defined in Appendix D in which the requirements are validated. Where: R = Realization phase, U = Use Phase (incl. delivery).
The requirements identified with a period of validity of "R" impose conditions on the system as is has be maintained during the realization phase.
The requirements identified with a validity period of "U" impose conditions on the desired new system realized at delivery in accordance with the provisions of Article 2 of the Basic Agreement. These requirements are thus critical for whether or not being ready for acceptance by the Client.

Types of Requirements:
Four different types of requirements are used. These types include:

1. Functional requirements; these requirements result from a function analysis and describe the desired performance concerning a (primary) functions of the System
2. Aspect Requirements; these requirements describe specific properties of the System.
3. Interface Requirements; these requirements describe specific properties of the System on either internal or external interfaces;
4. Design Constraints; these requirements describe constraints on the solution space that anticipate the design.

2.1 BIA AGL

Functional Requirements

E1-1	**Period(s) of Validity:**			<U>
BIA AGL – Guide pilots	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
BIA AGL shall guide pilots during take-off, landing and taxiing of all types of aircraft up to and including ICAO Code E aircraft.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1-2	**Period(s) of Validity:**			<U>
BIA AGL – Accommodate air traffic 24/7	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
BIA AGL shall facilitate air traffic on a Non-Precision approach runway (according to ICAO) safely, 24 hours a day, 7 days a week.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1-3	**Period(s) of Validity:**			<U>
BIA AGL – Comply to standards	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
BIA AGL shall comply with the relevant international and local applicable laws, codes and requirements. At least the following codes and standards need to be taken into consideration: • International Civil Aviation Organization (ICAO) documents: o Annex 14, Volume I, Aerodrome design and operations, Ninth Edition, July 2022; o Relevant Aerodrome Design Manuals, DOC. 9157. The referred design is based on the latest version of the ICAO documents. Federal Aviation Administration (FAA) Advisory Circulars (current version): • AC 150/5300-13B: Airport Design; • AC 150/5340-18G: Standards for airport sign systems; • AC 150/5340-30J: Design and installation details for Airport Visual Aids; • AC 150/5345-44K: Specification for runway and taxiway signs; • AC 150/5345-46E: Specification for Runway and Taxiway Light Fixtures; • AC 150/5370-10H: Standard Specifications for Construction of Airports. *Note: Whenever in the FAA Advisory Circulars a reference is made to a "method of measurement" or "basis of payments", the*				

clauses shall not apply. If the ICAO and the FAA are contradicting, the ICAO will prevail.		
Required Method of Verification	**Stakeholder(s)**	**Source document**
	RWS, BIA	

E1-4	**Period(s) of Validity:**			<U>
BIA AGL – according with design	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
BIA AGL shall be in accordance with the final design as given on drawings as added to Bijlage C.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1-5	**Period(s) of Validity:**			<U>
BIA AGL – integrated system	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
BIA AGL shall be integrated with the existing installations and controls and will be connected to the Air Traffic Control Tower and to the public power supply.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1-6	**Period(s) of Validity:**			<U>
BIA AGL – comly with legislation	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
BIA AGL shall comply with the relevant international and local applicable laws, codes and requirements during operational hours. *Note: Operational hours according to the VSP.*				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

Requirements from aspect analysis

E1-7	**Period(s) of Validity:**			<U>
BIA AGL – Design life	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
BIA AGL shall have a design life of at least 20 years and cables shall have a design life of at least 30 years, unless specified otherwise in underlying requirements.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1-8	**Period(s) of Validity:**			<U>
BIA AGL - Maintainability	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
BIA AGL shall be maintainable by personnel of BIA. Contractor should be available to (help) repair failures of the existing or new system.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1-9	**Period(s) of Validity:**			<U>
BIA AGL – Object removal	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
Existing Objects which function is canceled must be removed to at least 1.5 meters below the surface. Cable ducts underneath pavements should be preserved.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1-10	**Period(s) of Validity:**			<U>
BIA AGL – base renewal	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
All inset lights shall be provided with new shallow bases.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1-11	**Period(s) of Validity:**			<U>
BIA AGL – fixtures 6.6A	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
All fixtures shall be replaced with new fixtures rated for constant 6.6A circuits.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1-12	**Period(s) of Validity:**			<U>
BIA AGL – fixtures LED	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
All light fixtures will be LED. PAPI fixtures shall be Halogen				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1-13	**Period(s) of Validity:**			<U>
BIA AGL – ICAO standards frangibility and obstacle clearance	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
Elevated lighting fixtures, PAPI's and signs will be installed according to the ICAO requirements for frangibility and obstacle clearance.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1-14	**Period(s) of Validity:**			<U>
BIA AGL – Elevated fixtures	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
Masts for the approach lights shall remain at current location.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1-15	**Period(s) of Validity:**			<U>
BIA AGL - Earthing Safeguard AGL and people	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The Earthing of BIA AGL shall safeguard AGL and people near to it from electrocution.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1-16	**Period(s) of Validity:**			<U>
BIA AGL - Counterpoise Earthing	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The Earthing of BIA AGL shall safeguard AGL from damage due to lightning through counterpoise earthing on top of the entire AGL cable routing.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

Requirements from interface analysis

E1-18	**Period(s) of Validity:**			<U>
BIA AGL – internal interfaces	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
BIA AGL is to function as a whole.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1-19	**Period(s) of Validity:**			<U>
BIA AGL – external interfaces	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
BIA AGL shall accommodate cross-border functions at the external interface without hindrance.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

Design Constraints

E1-20	**Period(s) of Validity:**			<U>
BIA AGL – renewed	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The lighting, equipment and cabling of AGL shall be renewed completely.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1-21	**Period(s) of Validity:**			<U>
BIA AGL – removing parts without function	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The BIA AGL system parts that will no longer have a function should be removed. Except for cabling: Cables without a function in the new situation shall be marked accordingly. So BIA can identify and remove them in the future.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1-22	**Period(s) of Validity:**			<U>
BIA AGL – Regulations for electrical works	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The BIA AGL electrical work shall be carried out in accordance with: 1. ICAO 2. IEE wiring Regulations				

3. I.E.C codes 4. the current issue of the local codes of practice and local power authority regulations. Legislations are listed in in hierarchical order.		
Required Method of Verification	**Stakeholder(s)**	**Source document**
	RWS, BIA	*MFS*

E1-23 **BIA AGL – Standards for electrical works**	**Period(s) of Validity:**			<U>
	Overlying Requirement(s)	**Underlying Requirement(s)**		
The BIA AGL equipment and materials are to be manufactured and installed in compliance with the relevant recommendations of the following or other equal and approved standards (Unless otherwise specified): 1. ICAO: International Civil Aviation Authority. 2. IEE: Institution of Electrical Engineers. 3. IEC: The International Electrotechnical Commission. 4. ISO: The International Standardization Organization. 5. Local Power Authority, WEB. Legislations are listed in in hierarchical order.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA	*MFS*		

E1-24 **BIA AGL – Climate conditions**	**Period(s) of Validity:**			<U>
	Overlying Requirement(s)	**Underlying Requirement(s)**		
The BIA AGL Indoor equipment shall be certified for IP44 minimum unless stated otherwise. Equipment, apparatus, material accessories outdoors is to be corrosion proof. UV stabilized requirement shall be applied for outdoor installations and their surface finish and due certification be provided by manufacturer as necessary. All equipment are to have ratings suitable for 50 deg. C (122 deg. F) indoor ambient and 70 deg. C (158 deg. F) outdoor ambient under direct sunlight, regardless of their installation location. All outdoor equipment shall be provided with IP protection as follows, unless specified otherwise: 1. Smaller devices/panels to be IP 65. 2. Bigger panels/equipment IP 54 with additional outer housing.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA	*MFS*		

E1-25 **BIA AGL – AGL system**	**Period(s) of Validity:**			<U>
	Overlying Requirement(s)	**Underlying Requirement(s)**		
The BIA AGL lighting system design shall utilize high-voltage (5kV), 6.6-ampere series loop circuits with a series isolating transformer feeding a single fixture or a set of fixtures. The airfield lighting system shall be supplied from constant current regulators located in the				

airfield lighting substation.		
Required Method of Verification	**Stakeholder(s)**	**Source document**
	RWS, BIA	*MFS*

E1-26 **BIA AGL – Factory testing**	**Period(s) of Validity:**			<U>
	Overlying Requirement(s)	**Underlying Requirement(s)**		
The BIA AGL locally and overseas manufactured/assembled equipment shall comply with the relevant standards and recommendations and tests shall be witnessed by the Client and the Consultant. If the manufacturer's test certificates/tests do not comply with the standards,then independent laboratory tests are to be carried out on equipment in accordance with the Specification and the Standards, and as required by the Engineer. All factory tests required per relevant IEC shall be carried out including optional ones. The Engineer’s decision in that respect is final and not subject to discussion.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA	*MFS*		

E1-27 **BIA AGL – Spare parts schedules**	**Period(s) of Validity:**			<U>
	Overlying Requirement(s)	**Underlying Requirement(s)**		
Submit itemized schedules of commissioning spares and spare parts (recommended for 5 years) to be provided, as required by the Specification, and state against each item the manufacturer's unit price including packaging and delivery to site.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA	*MFS*		

E1-28 **BIA AGL – Spare parts**	**Period(s) of Validity:**			<U>
	Overlying Requirement(s)	**Underlying Requirement(s)**		
BIA AGL spare parts, consumable items and maintenance special tools, for three years of operation must be delivered as part of the project. The spare parts list is added to Bijlage E Spare parts list.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA	*MFS*		

E1-29 **BIA AGL – Tools and instruments schedules**	**Period(s) of Validity:**			<U>
	Overlying Requirement(s)	**Underlying Requirement(s)**		
Submit itemized schedules of tools and instruments to be provided for installation, operation and maintenance, as recommended by the manufacturer.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA	*MFS*		

E1-30	**Period(s) of Validity:**			<U>

BIA AGL – Field tests	**Overlying Requirement(s)**	**Underlying Requirement(s)**
BIA AGL shall be field tested. Field tests shall, in addition to those specified by regulation, specifically include the following: 1. Insulation resistance tests for all parts of the electrical system, irrespective of voltage class and shall include individual measurement between the various live conductors as also between the individual live conductors and ground. 2. Loop resistance of each circuit. 3. Testing of the earth leakage protection device.		
Required Method of Verification	**Stakeholder(s)**	**Source document**
	RWS, BIA	*MFS*

E1-31	**Period(s) of Validity:**			<U>
BIA AGL – Flight check	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
BIA AGL Shall be flight checked. Carry out flight check(s) to confirm the setting (including checking of failures and alignment) of threshold lights, runway edge lights, runway end lights, approach lights and PAPI units. The flight check shall be carried out by a competent third party in accordance with ICAO Aerodrome Design Manual, Part 4, Chapter 8, and ICAO Airport Service Manual doc.9137-AN/898 part 9 airport maintenance practices.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
Report of flight check and results	RWS, BIA	*MFS*		

E1-32	**Period(s) of Validity:**			<U>
BIA AGL – Photometric testing	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
BIA AGL shall be photometric tested. Carry out the onsite comprehensive photometric testing of the installed lighting systems utilizing a mobile light intensity measurement unit.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA	*MFS*		

E1-33	**Period(s) of Validity:**			<U>
BIA AGL – Database	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The installed BIA AGL equipment/fixtures, circuits, etc. with extensive technical details shall be provided as one complete database.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA	*MFS*		

2.1.1 Runway (RWY) 10-28

Functional Requirements

E1.1-1	**Period(s) of Validity:**			<U>
BIA AGL – Guide pilots	**Overlying Requirement(s)**	**Underlying Requirement(s)**		

RWY 10-28 shall guide pilots during take-off, landing and taxiing of all types of aircraft up to and including ICAO Code E aircraft.		
Required Method of Verification	**Stakeholder(s)**	**Source document**
	RWS, BIA	

E1.1-2	**Period(s) of Validity:**			<U>
BIA AGL – according with design	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
RWY 10-28 shall be in accordance with the final design as given on drawings as added to Bijlage C.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

2.1.1.1. Approach lights 10

Functional Requirements

E1.1.1-1	**Period(s) of Validity:**			<U>
Approach lights 10 – Guide pilots	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The Simple Approach Light System shall guide pilots during landing on approach 10, (ICAO annex 14 chapter 5.3.4 figure A-7 – single source). The Approach lights on 420 m. from the threshold are not possible at BIA, the lights start on 360 m. from the threshold.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.1.1-2	**Period(s) of Validity:**			<U>
Approach lights 10 – according with design	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
RWY 10-28 shall be in accordance with the final design as given on drawings as added to Bijlage C.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.1.1-3	**Period(s) of Validity:**			<U>
Approach lights 10 – Type	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The Approach lights 10 at Approach 10 shall be inset and elevated type.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

2.1.1.2. Threshold lighting 10

Functional Requirements

E1.1.2-1	**Period(s) of Validity:**			<U>
Treshold Lighting 10 – Guide pilots	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The Threshold Lighting 10 shall guide pilots before take-off, before and during landing and while taxiing.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.1.2-2	**Period(s) of Validity:**			<U>
Treshold Lighting 10 – according with design	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The Threshold Lighting 10 shall be in accordance with the final design as given on drawings as added to Bijlage C.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.1.2-3	**Period(s) of Validity:**			<U>
Treshold Lighting 10 – Type	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The Threshold Lighting 10 at Threshold 10 shall be inset type.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

2.1.1.3. Runway end lighting 10

Functional Requirements

E1.1.3-1	**Period(s) of Validity:**			<U>
Runway End Lighting 10 – Guide pilots	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The Runway End Lighting 10 shall guide pilots before take-off and after landing and while taxiing.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.1.3-2	**Period(s) of Validity:**			<U>
Runway End Lighting 10 – according with design	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
Runway End Lighting 10 shall be in accordance with the final design as given on drawings as added to Bijlage C.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.1.3-3	**Period(s) of Validity:**			<U>
Runway End Lighting 10 – Type	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The Runway End Lighting 10 shall be elevated type.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

2.1.1.4. PAPI 10 R

Functional Requirements

E1.1.4-1	**Period(s) of Validity:**			<U>
PAPI 10 R– Guide pilots	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The Precision Approach Path Indicator 10 R should be provided to serve pilots on approach 10.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.1.4-2	**Period(s) of Validity:**			<U>
PAPI 10 R – according with design	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The Precision Approach Path Indicator 10 shall be in accordance with the final design as given on drawings as added to Bijlage C.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.1.4-3	**Period(s) of Validity:**			<U>
PAPI 10 – Approach path	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The Precision Approach Path Indicator 10 shall comply with a 3.00 degrees approach path (ICAO annex 14). The Precision Approach Path Indicator 10 shall comply with the distance to the aiming point marking according to figure 5-19 van de ICAO Annex 14. No ILS harmonisation is applicable.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.1.4-4	**Period(s) of Validity:**			<U>
PAPI 10 – obstacle protection surface	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The Contractor shall verify that the Obstacle Protection Surface (OPS) as defined in ICAO Annex 14, par. 5.3.5.42 to 5.2.5.43 is not penetrated by fixed obstacles. If the verification shows that there are fixed obstacles penetrating the OPS, the Contractor shall propose for approval one or more mitigating measures following the procedures as described in ICAO Annex 14, par. 5.3.5.44 to 5.3.5.46				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

2.1.1.5. Threshold lighting 28

Functional Requirements

E1.1.5-1	**Period(s) of Validity:**			<U>
Treshold Lighting 28 – Guide pilots	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The Threshold Lighting 28 shall guide pilots before and during landing.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.1.5-2	**Period(s) of Validity:**			<U>
Treshold Lighting 28 – according with design	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The Threshold Lighting 28 shall be in accordance with the final design as given on drawings as added to Bijlage C.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.1.5-3	**Period(s) of Validity:**			<U>
Treshold Lighting 28 – Type	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The Threshold Lighting 28 shall be elevated type.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

2.1.1.6. Runway end lighting 28

Functional Requirements

E1.1.6-1	**Period(s) of Validity:**			<U>
Runway End Lighting 28 – Guide pilots	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The Runway End Lighting 28 shall guide pilots before take-off and after landing and while taxiing.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.1.6-2	**Period(s) of Validity:**			<U>
Runway End Lighting 28 – according with design	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The Runway End Lighting 28 shall be in accordance with the final design as given on drawings as added to Bijlage C.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.1.6-3	**Period(s) of Validity:**			<U>
Runway End Lighting 28 – Type	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The Runway End Lighting 28 shall be inset type.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

2.1.1.7. PAPI 28-R

Functional Requirements

E1.1.7-1	**Period(s) of Validity:**			<U>
PAPI 28-R – Guide pilots	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The Precision Approach Path Indicator 28-R should be provided to serve pilots on approach 28.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.1.7-2	**Period(s) of Validity:**			<U>
PAPI 28-R – according with design	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The Precision Approach Path Indicator 28-R shall be in accordance with the final design as given on drawings as added to Bijlage C.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.1.7-3	**Period(s) of Validity:**			<U>
PAPI 28-R – Approach path	**Overlying Requirement(s)**	**Underlying Requirement(s)**		

The Precision Approach Path Indicator 28-R shall comply with a 3.00 degrees approach path. (ICAO annex 14). The Precision Approach Path Indicator 28-R shall comply with the distance to the aiming point marking according to figure 5-19 van de ICAO Annex 14. No ILS harmonisation is applicable.		
Required Method of Verification	**Stakeholder(s)**	**Source document**
	RWS, BIA	

E1.1.7-4 **PAPI 28-R – obstacle protection surface**	**Period(s) of Validity:** **Overlying Requirement(s)**			<U> **Underlying Requirement(s)**
The Contractor shall verify that the Obstacle Protection Surface (OPS) as defined in ICAO Annex 14, par. 5.3.5.42 to 5.2.5.43 is not penetrated by fixed obstacles. If the verification shows that there are fixed obstacles penetrating the OPS, the Contractor shall propose for approval one or more mitigating measures following the procedures as described in ICAO Annex 14, par. 5.3.5.44 to 5.3.5.46				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

2.1.1.8. PAPI 28-L

Functional Requirements

E1.1.8-1 **PAPI 28-L– Serve pilots**	**Period(s) of Validity:** **Overlying Requirement(s)**			<U> **Underlying Requirement(s)**
The Precision Approach Path Indicator 28-L should be provided to serve pilots on approach 28.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.1.8-2 **PAPI 28-L – according with design**	**Period(s) of Validity:** **Overlying Requirement(s)**			<U> **Underlying Requirement(s)**
The Precision Approach Path Indicator 28-L shall be in accordance with the final design as given on drawings as added to Bijlage C.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.1.8-3 **PAPI 28-L – approach path**	**Period(s) of Validity:** **Overlying Requirement(s)**			<U> **Underlying Requirement(s)**
The Precision Approach Path Indicator 28-L shall comply with a 3.00 degrees approach path. (ICAO annex 14). The Precision Approach Path Indicator 28-R shall comply with the distance to the aiming point marking according to figure 5-19 van de ICAO Annex 14. No ILS harmonisation is applicable.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		

	RWS, BIA	

E1.1.8-4	**Period(s) of Validity:**			<U>
PAPI 28-L – obstacle protection surface	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The Contractor shall verify that the Obstacle Protection Surface (OPS) as defined in ICAO Annex 14, par. 5.3.5.42 to 5.2.5.43 is not penetrated by fixed obstacles. If the verification shows that there are fixed obstacles penetrating the OPS, the Contractor shall propose for approval one or more mitigating measures following the procedures as described in ICAO Annex 14, par. 5.3.5.44 to 5.3.5.46				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

2.1.1.9. Runway edge lighting
Functional Requirements

E1.1.9-1	**Period(s) of Validity:**			<U>
Runway Edge Lighting – Guide pilots	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The Runway Edge Lighting shall guide pilots before and after take-off and landing and while taxiing.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.1.9-2	**Period(s) of Validity:**			<U>
Runway Edge Lighting – according with design	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The Runway Edge Lighting shall be in accordance with the final design as given on drawings as added to Bijlage C.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.1.9-3	**Period(s) of Validity:**			<U>
Runway Edge Lighting – type	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The Runway Edge Lighting shall be elevated type, high intensity, bi-directional. In cases a runway exit, road, taxiway or turnpath coincides with Runway Edge Lighting, the Runway Edge Lighting shall be inset type.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

2.1.1.10. Mandatory Instruction signage
Functional Requirements

E1.1.10-1	**Period(s) of Validity:**			<U>
Mandatory Instruction signage – Instruct pilots	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The mandatory instruction signage shall instruct				

pilots taxiing of aircrafts.		
Required Method of Verification	**Stakeholder(s)**	**Source document**
	RWS, BIA	

E1.1.10-2 **Mandatory Instruction signage – according with design**	**Period(s) of Validity:** **Overlying Requirement(s)**			<U> **Underlying Requirement(s)**
The mandatory instruction signage shall be in accordance with the final design as given on drawings as added to Bijlage C.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.1.10-3 **Mandatory Instruction signage – Illuminated**	**Period(s) of Validity:** **Overlying Requirement(s)**			<U> **Underlying Requirement(s)**
The mandatory instruction signage shall be illuminated with LED.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.1.10-4 **Mandatory Instruction signage – Designation signs**	**Period(s) of Validity:** **Overlying Requirement(s)**			<U> **Underlying Requirement(s)**
Location/Runway designation signs shall be installed at the holding position on taxiway "B", "C", "D", "E".				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

2.1.1.11. Information signage
Functional Requirements

E1.1.11-1 **Information Signage – Guide pilots**	**Period(s) of Validity:** **Overlying Requirement(s)**			<U> **Underlying Requirement(s)**
The Information signage shall guide pilots during taxiing of aircrafts. Note: Runway vacated signs and Intersection take off signs will not be installed.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.1.11-2 **Information Signage – according with design**	**Period(s) of Validity:** **Overlying Requirement(s)**			<U> **Underlying Requirement(s)**
The Information signage shall be in accordance with the final design as given on drawings as added to Bijlage C.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.1.11-3 **Information Signage – Illuminated**	**Period(s) of Validity:** **Overlying Requirement(s)**			<U> **Underlying Requirement(s)**
The Information signage shall be illuminated with LED.				

Required Method of Verification	Stakeholder(s)	Source document
	RWS, BIA	

E1.1.11-4 Information Signage – Exit signs	Period(s) of Validity:			<U>
	Overlying Requirement(s)	Underlying Requirement(s)		
Runway exit signs shall be installed to indicate taxiways "B", "C", "D", "E" from both approach directions.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

2.1.2 Taxiway (TWY)
Functional Requirements

E1.2-1 TWY Edge Lighting – Guide pilots	Period(s) of Validity:			<U>
	Overlying Requirement(s)	Underlying Requirement(s)		
Taxiway edge lighting shall guide pilots during taxiing of aircrafts				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.2-2 TWY Edge Lighting – according with design	Period(s) of Validity:			<U>
	Overlying Requirement(s)	Underlying Requirement(s)		
Taxiway edge lighting shall be in accordance with the final design as given on drawings as added to Bijlage C.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.2-3 TWY Edge Lighting – Light type	Period(s) of Validity:			<U>
	Overlying Requirement(s)	Underlying Requirement(s)		
Taxiway Edge Lighting shall consist of elevated lights and inset lights. In cases of a road crossing the Taxiway Edge Lighting shall be inset type.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

2.1.2.1. Turn Pad edge lighting
Functional Requirements

E1.2.1-1 Turn Pad Edge Lighting – Guide pilots	Period(s) of Validity:			<U>
	Overlying Requirement(s)	Underlying Requirement(s)		
The turn pad edge lighting shall guide pilots during taxiing of aircrafts				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.2.1-2 Turn Pad Edge Lighting – according with design	Period(s) of Validity:			<U>
	Overlying Requirement(s)	Underlying Requirement(s)		
The turn pad edge lighting shall be in				

accordance with the final design as given on drawings as added to Bijlage C. The Drawings contain if the lights are inset or elevated.		
Required Method of Verification	**Stakeholder(s)**	**Source document**
	RWS, BIA	

2.1.2.2. TWY B edge lighting
Functional Requirements

E1.2.2-1	**Period(s) of Validity:**			<U>
TWY B Edge Lighting – Guide pilots	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
TWY B edge lighting shall guide pilots during taxiing of aircrafts				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.2.2-2	**Period(s) of Validity:**			<U>
TWY B Edge Lighting – according with design	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
TWY B edge lighting shall be in accordance with the final design as given on drawings as added to Bijlage C. The Drawings contain if the lights are inset or elevated.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

2.1.2.3. TWY C edge lighting
Functional Requirements

E1.2.3-1	**Period(s) of Validity:**			<U>
TWY C Edge Lighting – Guide pilots	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
TWY C edge lighting shall guide pilots during taxiing of aircrafts				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.2.3-2	**Period(s) of Validity:**			<U>
TWY C Edge Lighting – according with design	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
TWY C edge lighting shall be in accordance with the final design as given on drawings as added to Bijlage C. The Drawings contain if the lights are inset or elevated.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

2.1.2.4. TWY D edge lighting
Functional Requirements

E1.2.4-1	**Period(s) of Validity:**			<U>
TWY D Edge Lighting – Guide pilots	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
TWY D edge lighting shall guide pilots during taxiing of aircrafts				
Required Method of Verification	**Stakeholder(s)**	**Source document**		

	RWS, BIA	

E1.2.4-2	**Period(s) of Validity:**			<U>
TWY D Edge Lighting – according with design	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
TWY D edge lighting shall be in accordance with the final design as given on drawings as added to Bijlage C. The Drawings contain if the lights are inset or elevated.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

2.1.2.5. TWY E edge lighting

Functional Requirements

E1.2.5-1	**Period(s) of Validity:**			<U>
TWY E Edge Lighting – Guide pilots	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
TWY E edge lighting shall guide pilots during taxiing of aircrafts				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.2.5-2	**Period(s) of Validity:**			<U>
TWY E Edge Lighting – according with design	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
TWY E edge lighting shall be in accordance with the final design as given on drawings as added to Bijlage C. The Drawings contain if the lights are inset or elevated.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

2.1.3 AGL Substation

Functional Requirements

E1.3-1	**Period(s) of Validity:**			<U>
AGL Substation – facilitate AGL equipment installation	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The AGL Substation shall facilitate all AGL equipment installations.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.3-2	**Period(s) of Validity:**			<U>
AGL Substation – according to final design	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The AGL Substation shall be realized according to the final design as given on drawings as added to Bijlage C. Specifically: • AGL Substation - LV Cable routing, duct & pits – Layout • AGL Substation - Architectural - Floor plans, 3D views and Details • AGL Substation - Architectural - Facades, Sections and Details				

• AGL Substation - Mechanical systems – Layout • AGL Substation - Electrical systems – Layout • AGL Substation - Diagram - Main Distribution Board		
Required Method of Verification	**Stakeholder(s)**	**Source document**
	RWS, BIA	

E1.3-3 **AGL Substation - Substation Basis of Design Report**	**Period(s) of Validity:** **Overlying Requirement(s)**			<U> **Underlying Requirement(s)**
The AGL Substation shall comply with the Substation Basis of Design Report.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.3-4 **AGL Substation – working environment**	**Period(s) of Validity:** **Overlying Requirement(s)**			<U> **Underlying Requirement(s)**
The AGL Substation shall provide a suitable working environment to operate and maintain all AGL equipment installations.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.3-5 **AGL Substation – provide access to personnel**	**Period(s) of Validity:** **Overlying Requirement(s)**			<U> **Underlying Requirement(s)**
The AGL Substation shall only provide access to authorized personnel.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.3-6 **AGL Substation – Landside**	**Period(s) of Validity:** **Overlying Requirement(s)**			<U> **Underlying Requirement(s)**
The AGL Substation shall function completely on airside.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

Requirements from interface analysis

E1.3-7 **AGL Substation – control existing systems**	**Period(s) of Validity:** **Overlying Requirement(s)**			<U> **Underlying Requirement(s)**
The AGL Substation shall maintain the operability and controllability by the existing touch screen operated remote control system of the following (existing) systems on BIA: i. Floodlighting ii. Obstruction lights Existing systems are controlled by Air Traffic Control using the touch screen operated remote control system in the Air Traffic Control Tower.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		

	RWS, BIA	

E1.3-8	**Period(s) of Validity:**			<U>
AGL Substation – control new systems	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The AGL Substation shall provide the operability and controllability by the existing touch screen operated remote control system of the new systems on BIA: New systems are controlled by Air Traffic Control using the touch screen operated remote control system in the Air Traffic Control Tower.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.3-9	**Period(s) of Validity:**			<U>
AGL Substation – function as a whole	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The AGL Substation is to function as a whole.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.3-10	**Period(s) of Validity:**			<U>
AGL Substation – new location	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The AGL Substation shall be realized completely new at the location given in the drawings added to Bijlage C. Specifically: • AGL Substation - Architectural - Floor plans, 3D views and Details • AGL Substation - Architectural - Facades, Sections and Details				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

2.1.3.1. Architectural
Functional Requirements

E1.3.1-1	**Period(s) of Validity:**			<U>
AGL SS – Architectural	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The AGL Substation shall have an architectural expression as per design intent given on the drawings added to Bijlage C. Specifically: • AGL Substation - Architectural - Floor plans, 3D views and Details • AGL Substation - Architectural - Facades, Sections and Details				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

2.1.3.2. Structural
Functional Requirements

E1.3.2-1	**Period(s) of Validity:**			<U>

AGL SS – Structural	Overlying Requirement(s)	Underlying Requirement(s)
The structural of the AGL Substation shall be in accordance with the final design as given on drawings as added to Bijlage C.		
Required Method of Verification	**Stakeholder(s)**	**Source document**
	RWS, BIA	

2.1.3.3. Building physics
Functional Requirements

E1.3.3-1	Period(s) of Validity:			<U>
AGL SS – Building physics	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The building physics of the AGL Substation shall be in accordance with the final design as given on drawings as added to Bijlage C.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

2.1.3.4. Electrical
Functional Requirements

E1.3.4-1	Period(s) of Validity:			<U>
AGL SS – Electrical systems	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The electrical systems of the AGL Substation shall facilitate AGL through: i Power supply ii Earthing iii Cable ways iv Lighting (including emergency lighting) v Communication; data vi Security; access control system vii Fire detection viii Lightning protection				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.3.4-2	Period(s) of Validity:			<U>
AGL SS Electrical system drawings	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The Electrical systems of the AGL Substation shall facilitate AGL in accordance to the final design as given in drawings added to Bijlage C. Specifically: • AGL Substation - Electrical systems – Layout				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.3.4-3	Period(s) of Validity:			<U>
AGL SS – Electrical system design report	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The electrical systems of the AGL Substation shall facilitate AGL in accordance to the final design as given in the Substation Basis of				

Design Report.		
Required Method of Verification	**Stakeholder(s)**	**Source document**
	RWS, BIA	

Requirements from aspect analysis

E1.3.4-4	**Period(s) of Validity:**			<U>
AGL SS – Electrical system Evacuation lighting	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The electrical systems of the AGL Substation shall provide evacuation lighting through illuminated evacuation pictograms at escape routes and doors.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.3.4-5	**Period(s) of Validity:**			<U>
AGL SS – Electrical system Lightning protection	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The electrical systems of the AGL Substation shall protect the AGL and AGL Substation from lighting strike.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

2.1.3.5. Mechanical & Plumbing

Functional Requirements

E1.3.5-1	**Period(s) of Validity:**			<U>
AGL SS – Mechanical & Plumbing drawings	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The Mechanical & plumbing of the AGL Substation shall facilitate AGL in accordance to the final design as given in drawings added to Bijlage C. Specifically: • AGL Substation - Mechanical systems – Layout				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.3.5-2	**Period(s) of Validity:**			<U>
AGL SS – Mechanical & Plumbing design report	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The Mechanical & plumbing of the AGL Substation shall facilitate AGL in accordance to the final design as given in the Substation Basis of Design Report.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.3.5-3	**Period(s) of Validity:**			<U>
AGL SS – cooling system	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The Mechanical & plumbing of the AGL Substation shall facilitate a cooling system.				

Required Method of Verification	Stakeholder(s)	Source document
	RWS, BIA	

E1.3.5-4	Period(s) of Validity:			<U>
AGL SS – plumbing system	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The plumbing of the AGL Substation shall facilitate storm water collection and discharge system.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

Design Constraints

E1.3.5-5	Period(s) of Validity:			<U>
AGL SS – Cooling of LCR	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The cooling system shall provide the occupants of the LCR room thermal comfort according to PMV-requirement class C or "NEN-EN ISO 7730".				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

2.1.3.6. CCRs

Functional Requirements

E1.3.3-1	Period(s) of Validity:			<U>
AGL SS CCR – Provide constant electrical current	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The Constant Current Regulators shall provide a constant electrical current to the following AGL-components: i Runway Edge Lighting ii Runway End lighting iii Runway Threshold lighting iv Precision Approach Path Indicator v Simple Approach Light System vi Illuminated Signs vii Illuminated Windcones		E1.2.3-2, E1.3.4-3		
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.3.3-2	Period(s) of Validity:			<U>
AGL SS CCR – In Old Fire Station	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The Constant Current Regulators (CCR) shall be installed in the New Substation building.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.3.3-3	Period(s) of Validity:			<U>
AGL SS CCR – Spare Capacity	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
Each Constant Current Regulator shall have 20% spare capacity.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.3.3-4	**Period(s) of Validity:**			<U>
AGL SS CCR – double safety lock	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The Constant Current Regulator shall be equipped with a provision to install a double safety lock system. This double safety lock system is to prevent unauthorized switching on of the CCR.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

2.1.3.7. ALCMS, in combination with equipment in the tower and the maintenance department

Functional Requirements

E1.3.7-1	**Period(s) of Validity:**			<U>
AGL SS ALCMS – Enable ATC to control	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The ALCMS shall enable BIA to control the following systems by a touch screen operated remote control system: i Runway lights; ii Taxiway lights; iii Illuminated signs; iv Illuminated Windcones; v Approach lights.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.3.7-2	**Period(s) of Validity:**			<U>
AGL SS Remote Control – Two systems	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The ALCMS shall enable BIA to control the systems through touch screen operated remote control from the Substation, ATC-tower and ADO-room. The system shall be monitored from the Maintenance room with a touch screen for monitoring purposes only. The system shall be adjusted as following: • There shall be a new touch screen operated remote control (ALCMS) in the AGL substation; • The ALCMS shall be connected to the Patch panel in the ATC-tower; • The existing fiber optic connection between the ATC-tower and the Server room in the Terminal and the existing CCR-room shall be used for Data connections; • The ADO-room is located below the Server room in the Terminal building. The ADO-room shall be equipped with a new touch screen operated remote control (ALCMS), which shall be connected to the Patch panel in the Server room.				

• The fiber optic cable in the current CCR-room shall be extended to the Maintenance room. The Maintenance room shall be equipped with a Monitor panel for monitoring the AGL system and all other relevant siggnals only. The Monitor panel shall be connected to the extended fiber optic cable. The system will only allow control from one location at the same time.		
Required Method of Verification	**Stakeholder(s)**	**Source document**
	RWS, BIA	

E1.3.7-3	**Period(s) of Validity:**			<U>
AGL SS Remote Control – Operate items and AGL groups	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The ALCMS shall be able to operate the following items and AGL groups separately: i Runway Edge, Threshold & End Lighting, illuminated signs and Illuminated Windcones ii Taxiway and Illuminated Signs iii Precision Approach Path Indicator (PAPI) iv Simple Approach Light System (SALS) v Landing and take-off direction vi Apron Flood Lighting (AFL) on the General Aviation (GA) apron, the main apron and the wide body apron. Note: The interface cabling between the Apron Flood Lighting (AFL) and the ALCMS is already in place.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.3.7-4	**Period(s) of Validity:**			<U>
AGL SS Remote Control – BON specifications	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The ALCMS shall have at least the same specifications as existing remote control equipment used at BIA.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.3.7-5	**Period(s) of Validity:**			<U>
AGL SS Remote Control – potential free contacts	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The ALCMS interface in the AGL Substation shall be equipped with at least 10 potential-free input contacts. The following input signals shall be connected with a signal cable to the potential-free input contacts: From the Emergency Power Supply unit:				

1. WEB net operational; 2. Emergency Power Supply unit operational; 3. Emergency Power Supply unit malfunction; 4. Fuel level too low. From the building management system (or from the air conditioning units if no building management system is present): 5. CCR room temperature too high; 6. Airco unit malfunction. From the Fire alarm system: 7. Fire alarm malfunction; 8. Fire alarm. General 9. Spare; 10. Spare. The spare potential free input contexts shall be shown on the ALCMS interface as a symbol or as text.		
Required Method of Verification	**Stakeholder(s)**	**Source document**
	RWS, BIA	

E1.3.7-6	**Period(s) of Validity:**			<U>
AGL SS Remote Control – display for power suply	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The ALCMS display for power supply shall in addition to the text or the symbol indicated at least with large and clearly visible symbols whether the AGL substation is running on main power (also called grid operation, Emergency power supply unit not active) or on emergency power (Emergency power supply unit is active and supplies the required energy for the AGL lighting). This should be visible at first glance on the main screen.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

2.1.3.8. Ducting site services

Functional Requirements

E1.3.8-1	**Period(s) of Validity:**			<U>
AGL SS Ducting site services – facilitate distribution	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The Ducting site services shall provide adequate space for and access to cables for de distribution of the following systems between the Air traffic Control Tower, the AGL substation and the operational locations of (not limited to): i Electrical systems; ii Data systems; iii Site Security systems; iv Storm water collection and discharge systems; v AGL.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		

	RWS, BIA	

E1.3.8-2	**Period(s) of Validity:**			<U>
AGL SS – AGL SS Ducting site services drawings	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The Ducting site services of the AGL Substation shall facilitate AGL in accordance to the final design as given in drawings added to Bijlage C. Specifically: • AGL Substation - LV Cable routing, duct & pits – Layout • AGL Substation - Architectural - Floor plans, 3D views and Details • AGL Substation - Architectural - Facades, Sections and Details • AGL Substation - Mechanical systems – Layout • AGL Substation - Electrical systems – Layout • AGL Substation - Diagram - Main Distribution Board				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.3.8-3	**Period(s) of Validity:**			<U>
AGL SS – AGL SS Ducting site services design report	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The Ducting site services of the AGL Substation shall facilitate AGL in accordance to the final design as given in the Substation Basis of Design Report.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.3.8-4	**Period(s) of Validity:**			<U>
AGL SS Ducting site services – public power network	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The AGL substation shall be connected to the public power network in the transformer station which is located just outside the entrance gate of the Air Traffic Control tower premises and have a dedicated power metering.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.3.8-5	**Period(s) of Validity:**			<U>
AGL SS Ducting site services – spare capacity	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The Ducting site services of the AGL Substation shall provide a spare capacity of 25% for future needs.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

2.1.3.9. Fencing

Functional Requirements

E1.3.9-1	**Period(s) of Validity:**			<U>
AGL SS – Fencing functions	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The Fencing of the AGL Substation shall withhold unauthorized persons, vehicles and cattle from accessing BIA or the AGL substation.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.3.9-2	**Period(s) of Validity:**			<U>
AGL SS – Fencing drawings	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The Fencing of the AGL Substation shall facilitate AGL in accordance to the final design as given in drawings added to Bijlage C. Specifically: • AGL Substation - Architectural - Floor plans, 3D views and Details • AGL Substation - Architectural - Facades, Sections and Details				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.3.9-3	**Period(s) of Validity:**			<U>
AGL SS – Fencing design report	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The Fencing of the AGL Substation shall facilitate AGL in accordance to the final design as given in the Substation Basis of Design Report.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.3.9-4	**Period(s) of Validity:**			<U>
AGL SS – fencing closed system	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The Fencing of the AGL Substation shall be a closed system and connected to existing fencing.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.3.9-5	**Period(s) of Validity:**			<U>
AGL SS – Fencing FAA	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The Fencing of the AGL Substation shall comply with item F-162 of FAA Advisory Circular No150/5370-10H.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

2.1.4 Terrain

Functional Requirements

E1.4-1	**Period(s) of Validity:**			<U>

Terrain – according design	**Overlying Requirement(s)**	**Underlying Requirement(s)**
The Terrain of the BIA AGL shall be in accordance with the final design as given on drawings as added to Bijlage C.		
Required Method of Verification	**Stakeholder(s)**	**Source document**
	RWS, BIA	

E1.4-2	**Period(s) of Validity:**			<U>
Terrain – pavement ATC & AGL SS	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The new pavement between the existing block pavement around the ATC-tower and the new fence around the AGL building shall provide access to a fuel truck to fill the fuel tank of the generator located in the AGL building in accordance to drawing "'BI2286-NAC-AS-XX-DR-C-CE75-30001'.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.4-3	**Period(s) of Validity:**			<U>
Terrain – no stormwater accumulation	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
Accumulation of stormwater on the paved surface may not occur.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.4-4	**Period(s) of Validity:**			<U>
Terrain – concrete block pavement	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
Concrete block pavement shall comply with 'NEN-EN1338'.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.4-5	**Period(s) of Validity:**			<U>
Terrain – manhole ID's	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
All manholes (AGL-pits) shall be provided with an ID-tag containing the ID-number as indicated on the drawings in Bijlage C. The ID-tag shall be fixed to the manhole so that it is resistant to jet blast.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

2.1.4.1. Primary cabling

Functional Requirements

E1.4.1-1	**Period(s) of Validity:**			<U>
Primary cabling – according design	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The primary cabling shall be in accordance with				

the final design as given on drawings as added to Bijlage C.		
Required Method of Verification	**Stakeholder(s)**	**Source document**
	RWS, BIA	

Requirements from aspect analysis

E1.4.1-2	**Period(s) of Validity:**			<U>
Primary cabling – labelling	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
Where cables run through manholes, they shall be clearly identified using labels at all manholes.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA	*MFS*		

E1.4.1-3	**Period(s) of Validity:**			<U>
Primary cabling – connectors	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
Primary connectors to be used must be resin filled. The male/female joint must be made fully watertight with Schotch tape 23 and 33 or Schothch tape VM. Tighten electrical connectors and terminals including screws, nuts and bolts, in accordance with manufacturers published torque-tightening values. Where manufacturer's torquing requirements are not indicated, tighten connectors and terminals to comply with international standards. Connectors should be suited for at least 5000volt.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA	*MFS*		

E1.4.1-4	**Period(s) of Validity:**			<U>
Primary cabling – Protective bonding	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
Remove any non-conductive paint, enamel or similar coating at threads, contact points and surfaces and ensure that bonding is made by fittings designed to make secure bonds.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA	*MFS*		

E1.4.1-5	**Period(s) of Validity:**			<U>
Primary cabling – Protection against Corrosion	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
Protect bolted connections against corrosion either by coating with a special anti-corrosion compound and proper capping.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA	*MFS*		

E1.4.1-6	**Period(s) of Validity:**			<U>
Primary cabling – connections inside manhole	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
All connectors shall be located inside manholes				

Required Method of Verification	Stakeholder(s)	Source document
	RWS, BIA	*MFS*

Design Constraints

E1.4.1-7 Primary cabling – Shielded	Period(s) of Validity:			<U>
	Overlying Requirement(s)	Underlying Requirement(s)		
The primary cabling shall be shielded and suited for at least 5000volt.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

2.1.4.2. Secondary cabling

Functional Requirements

E1.4.2-1 Secondary cabling – according design	Period(s) of Validity:			<U>
	Overlying Requirement(s)	Underlying Requirement(s)		
The secondary cabling shall be in accordance with the final design as given on drawings as added to Bijlage C.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

Requirements from aspect analysis

E1.4.2-2 Secundary cabling – labelling	Period(s) of Validity:			<U>
	Overlying Requirement(s)	Underlying Requirement(s)		
Where cables run through manholes, they shall be clearly identified using labels at all manholes.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA	*MFS*		

E1.4.2-3 Secundary cabling – connections inside manhole	Period(s) of Validity:			<U>
	Overlying Requirement(s)	Underlying Requirement(s)		
All connectors shall be located inside manholes				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA	*MFS*		

Design Constraints

E1.4.2-4 Secondary cabling – 4 mm²	Period(s) of Validity:			<U>
	Overlying Requirement(s)	Underlying Requirement(s)		
The secondary cabling of BIA AGL shall be 4 mm^2. The BIA AGL system should be adjusted to this.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

2.1.4.3. Ducting

Functional Requirements

E1.4.3-1	**Period(s) of Validity:**			<U>
Ducting – provide space and access	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The Ducting shall provide adequate space for and access to cables of (not limited to): i Visual Aids & Control ii Power supply iii Communication				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.4.3-2	**Period(s) of Validity:**			<U>
Ducting – according design	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The ducting shall be in accordance with the final design as given on drawings as added to Bijlage C.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.4.3-3	**Period(s) of Validity:**			<U>
Ducting – Spare capacity	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
When new Ducting is provided, a spare capacity of 50% extra duct is required to cater for future needs				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.4.3-4	**Period(s) of Validity:**			<U>
Ducting – comply FAA	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The Ducting shall comply with item L-110 FAA Advisory Circular No15/5370-10-H				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.4.3-5	**Period(s) of Validity:**			<U>
Ducting – provide pits and pull-holes	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The Ducting shall be provided with all the necessary pits and pull-holes.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.4.3-6	**Period(s) of Validity:**			<U>
Ducting – bear loads graded area	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The Ducting within the graded area of the runway strip and taxiway strip shall, in regard to bearing strength and deformation, be in accordance with ICAO.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.4.3-7	**Period(s) of Validity:**			<U>
Ducting – bear loads crash tender	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The Ducting outside the graded area of the strip shall, in regard to bearing strength and deformation, be able to withstand the loading of				

a crash tender with a load of 12.5 tons per axis.		
Required Method of Verification	**Stakeholder(s)**	**Source document**
	RWS, BIA	

2.1.4.4. Transformer pits

Functional Requirements

E1.4.4-1 **Transformer pits – according design**	**Period(s) of Validity:**			<U>
	Overlying Requirement(s)	**Underlying Requirement(s)**		
The transformer pits shall be in accordance with the final design as given on drawings as added to Bijlage C.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.4.4-2 **Transformer pits – D400**	**Period(s) of Validity:**			<U>
	Overlying Requirement(s)	**Underlying Requirement(s)**		
The transformer pits shall be able to bear the loads belonging to traffic class D400.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.4.4-3 **Transformer pits – Drainage**	**Period(s) of Validity:**			<U>
	Overlying Requirement(s)	**Underlying Requirement(s)**		
The transformer pits shall be provided with a drainage facility.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

2.1.4.5. Isolating transformers

Functional Requirements

E1.4.5-1 **Isolating transformers – according design**	**Period(s) of Validity:**			<U>
	Overlying Requirement(s)	**Underlying Requirement(s)**		
The transformers shall be in accordance with the final design as given on drawings as added to Bijlage C.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

2.1.4.6. WDI lighting maintenance

Functional Requirements

E1.4.6-1 **Isolating transformers – according design**	**Period(s) of Validity:**			<U>
	Overlying Requirement(s)	**Underlying Requirement(s)**		
The existing WDI shall be maintained and partly renewed to remain functional for 20 years.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

2.1.4.7. Bases and Foundations

Functional Requirements

E1.4.7-1	**Period(s) of Validity:**			<U>
Bases and Foundations – Bear loads	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The Bases and Foundations shall transfer the occurring loads to the soil from the objects they support.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

E1.4.7-2	**Period(s) of Validity:**			<U>
Bases and Foundations – according design	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The bases and foundation shall be in accordance with the final design as given on drawings as added to Bijlage C.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

Interface Requirements

E1.4.7-3	**Period(s) of Validity:**			<U>
Bases and Foundations – Encased cabling	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
Conduits for cabling shall be encased in the Bases and Foundations.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

Design Constraints

E1.4.7-4	**Period(s) of Validity:**			<U>
Bases and Foundations – FAA	**Overlying Requirement(s)**	**Underlying Requirement(s)**		
The concrete for Bases and Foundations shall comply with ”FAA Advisory Circular No150/5370-10H Item P-610”.				
Required Method of Verification	**Stakeholder(s)**	**Source document**		
	RWS, BIA			

3 Definitions and abbreviations

Definitions

Definition	Meanings
Function	Intended action and performance of a product or service
Object	Separately identifiable part of a physical entity
System	One, depending on the aim, distinct set of elements within the overall reality, that have mutual relations
System Breakdown Structure	Hierarchical object structure of the system
Initial Situation	Situation at the start of the Work.
Realization Phase	Period from the start of the Work up to the date of completion and acceptance
Use Phase	The period in which the new system to be realized is in use beginning on the date of delivery
Design	The, in documents captured, preparation of the solution of a system.
Interface	Functional and physical properties that should exist for the cohesive functioning of parts on a common border
Aspect	Specific property of the system to be developed
Availability	The probability that the required function can be carried out under given conditions on a given arbitrary time
Reliability	The probability that the required function is carried out under given conditions for a given time interval.
Execution	The manner in which the Work is to be carried out.
Environmental Annoyance	The degree of annoyance that the system or the use of the system is to its environment (think eg. of dust, noise, vibration and odour).
Maintainability	The likelihood that maintenance can be performed within the times set for this purpose under the given circumstances. With maintenance is meant: Activities carried out with the aim to keep the functions of the system during the use phase at the required quality level.
Safety	The extent to which someone (or something) is safeguarded from (the effects of) dangerous situations.
Aesthetics	The degree of aesthetic quality of the system in coherence with its environment, and matching the desired ambition.
Requirement	Description of the required property of the product to be delivered, or the service to be rendered
Existing	As given in the Initial situation
New	Not present in the Initial situation
Work	All Design and Construction Work, which the Contractor shall carry out in order to ensure that the Works are in accordance with the requirements of the Contract on the date of completion and acceptance.
Design Work	The Work stated as such in the Agreement, that shall be realised by the Contractor

Construction Work	All activities, including the supply of goods, that have to be carried out by the Contractor in order to realise the Works, next and in addition to the Design Work
Works	The works described in the Agreement, which the Contractor shall realise on the basis of the Employer's Requirements and the Tender by means of Design and Construction Work
Employers Requirements	Document containing the ordered collection of requirements and description of the available solution space, or the solution with the solution margin applicable to a system (product or service)
Terrain	All ground surfaces outside the pavements, including the Runway Strip and the Taxiway Strip
Ducting	All elements used to provide adequate space for and access to cables, including auxiliary constructions such as pits, manholes and pull holes
Civil works for utilities	All ducting, including auxiliary constructions such as pits, manholes and pull holes. And all Bases and Foundations for signs, lights and light poles.

Abbreviations

Abbreviations	**Meaning**
ADM	Aerodrome Design Manual
AGL	Aeronautical Ground Lighting
ALCMS	Airfield Lighting Control and Monitoring System
ASDA	Accelerate-Stop Distance Available
ATC	Air Traffic Control
ATS	Automatic Transfer Switch
AWOS	Automated Weather Observing System
BIA	Bonaire International Airport N.V.
BON	IATA Airport code for Flamingo International Airport / Bonaire International Airport
CARNA	Civil Aviation Regulation Netherlands Antilles
CAT	Category
CCR	Constant Current Regulators
ERESA	Extended Runway End Safety Area
FAA	U.S. Federal Aviation Administration
FISO	Fight Information Safety Officer
FOD	Foreign Object Debris
GA	General Aviation
HV	High Voltage
I/O	Input/Output
ICAO	International Civil Aviation Organization
ILT	Inspectie Leefomgeving en Transport
LED	Light Emitting Diode
LV	Low Voltage
MDB	Main Distribution Board
MEP	Mechanical, Electrical and Plumbing

MV	Medium Voltage
NACO	Netherlands Airport Consultants
PAPI	Precision Approach Path Indicator
RBML	Wet Regelgeving Burgerluchthavens en Militaire Luchthavens
REILS	Runway End Identification Lighting System
RESA	Runway End Safety Area
RFF	Rescue & Fire Fighting
RMU	Ring Main Unit
ROM	Rough Order of Magnitude
RWS	Rijkswaterstaat, Grote Projecten en Onderhoud
RWY	Runway
SALS	Simple Approach Lighting System
SBD	Sub-Distribution Boards
SBS	System Breakdown Structure
SLD	Single Line Diagram
SoW	Scope of Works
TODA	Take Off Distance Available
TORA	Take Off Runway Available
TWY	Taxiway
UPS	Uninterruptable Power Supply
VCR	Visual Control Room
WDI	Wind Direction Indicator
WEB	Water & Energy company Bonaire

4 Referred documents

The table below lists the documents which the requirements or verifications refer to. The requirement only mentions the name of the document. This table lists the additional information of the declared applicable version, date and publisher of the document. The last column indicates the appendix of this Requirement the document is attached (if so).

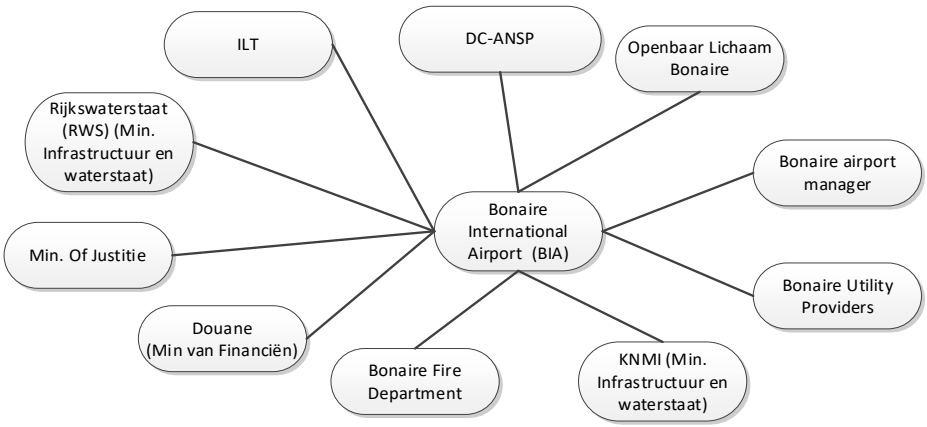
Referred Documents

Title	File Naming	publisher	attached
Substation Basis of Design Report	BI2286-NAC-AS-XX-RP-E-ZZ05-0001 - Substation Basis of Design Report	OG	Yes
International Civil Aviation Organization (ICAO); Annex 14, Volume I, Aerodrome design and operations, Ninth Edition, July 2022;		ICAO	No
International Civil Aviation Organization (ICAO); Relevant Aerodrome Design Manuals, DOC. 9157.		ICAO	No
International Civil Aviation Organization (ICAO) Airport Service Manual doc.9137-AN/898 part 9 airport maintenance practices.		ICAO	No
Federal Aviation Administration (FAA) Advisory Circulars (current version); AC 150/5300-13B: Airport Design	AC 150/5300-13B: Airport Design	FAA	No
Federal Aviation Administration (FAA) Advisory Circulars (current version); AC 150/5340-18G: Standards for airport sign systems	AC 150/5340-18G: Standards for airport sign systems	FAA	No
Federal Aviation Administration (FAA) Advisory Circulars (current version); AC 150/5340-30J: Design and installation details for Airport Visual Aids	AC 150/5340-30J: Design and installation details for Airport Visual Aids	FAA	No
Federal Aviation Administration (FAA) Advisory Circulars (current version); AC 150/5345-44K: Specification for runway and taxiway signs	AC 150/5345-44K: Specification for runway and taxiway signs	FAA	No

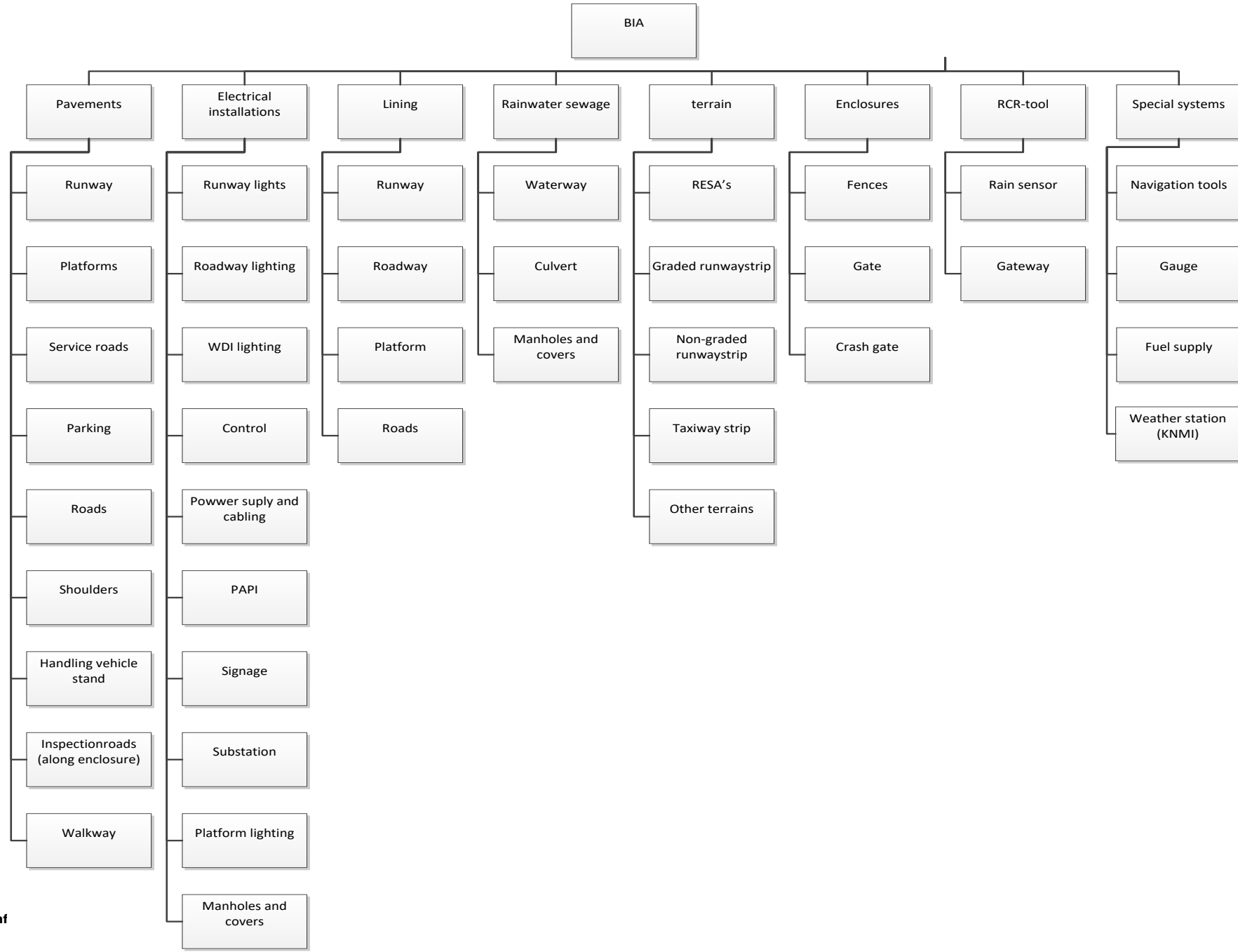
Federal Aviation Administration (FAA) Advisory Circulars (current version); AC 150/5345-46E: Specification for Runway and Taxiway Light Fixtures	AC 150/5345-46E: Specification for Runway and Taxiway Light Fixtures	FAA	No
Federal Aviation Administration (FAA) Advisory Circulars (current version); AC 150/5370-10H: Standard Specifications for Construction of Airports	AC 150/5370-10H: Standard Specifications for Construction of Airports	FAA	No
Spare parts list	Spare parts Bonaire.doc	OG	Yes

Referred Drawings
Refer to Bijlage C.

Bijlage A Contextdiagram



Bijlage B System Breakdown Structure BIA (SBS)



Bijlage C Drawings

Bijlage D AGL Substation Design Report v3.0

Bijlage E Spare parts list