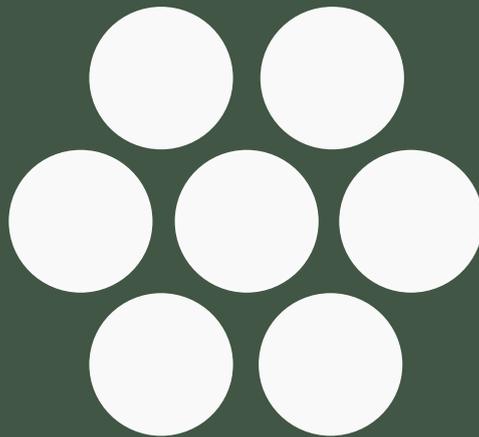


# INSTRUCTIONS ROBUST FIBRE

## Appendix 7 - Network Infrastructure Design

*Version 1.8*





# **INSTRUCTIONS ROBUST FIBRE**

## **Appendix 7 - Network Infrastructure Design**

*Version 1.8*

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# 1. Network Infrastructure Design

The purpose of this appendix is to define the overall framework for the design, procurement, implementation, documentation and handover of robust and operationally reliable fibre infrastructure. It links Sub-Appendix 7.1 – Fibre Infrastructure Deployment Project and Sub-Appendix 7.2 – Site Deployment Project and ensures a consistent process from initial concept to commissioned and documented facility.

This appendix shall be applied by municipal network operators, network owners, contractors and consultants in new construction, network expansion and modification of existing networks.

The appendix governs process, decision points and responsibilities. Detailed technical requirements are specified in the respective sub-appendices.

The work is divided into two main parts:

- **Fibre Infrastructure Deployment Project (Sub-Appendix 7.1)**  
Planning, dimensioning and design of passive infrastructure, including duct systems, fibre optic cables, splice points, distribution points, connection points, as well as surveying and documentation.
- **Site Deployment Project (Sub-Appendix 7.2)**  
Design and implementation of sites and technical areas for active equipment, including power supply, backup power, environmental control (cooling/ventilation), physical security, monitoring and controlled access.

Together, the appendices define a complete model for delivering infrastructure that meets requirements for robustness, availability, security, traceability and long-term maintainability.

In addition to this appendix and its sub-appendices, the client may apply local or project-specific technical requirements. Such requirements are supplementary and shall not modify the defined process, decision points or allocation of responsibilities described in this appendix.

## 2. Reference Material

This appendix shall be applied together with applicable legislation, regulations, standards and industry guidelines. The documents listed below form the reference framework for design and implementation.

The project designer is responsible for ensuring that applicable versions are used and that relevant requirements are incorporated into the design.

### 2.1 Applicable Legislation and Regulations

The following legislation and regulations may apply depending on project scope and location:

- Electronic Communications Act (SFS 2022:482)
- Cybersecurity Act (SFS 2025:1506)
- Regulations issued by PTS / MCF (where applicable)
- Planning and Building Act (PBL)
- Swedish Building Regulations (BBR)
- Environmental Code
- Utility Easements Act
- Electrical Safety Act
- Work Environment Act

It is the responsibility of the project organisation to identify which regulations are applicable to the specific project.

### 2.2 Standards, Instructions and Guidelines

In addition to legislation, the following standards and industry documents shall be applied where relevant:

- Robust Fibre - in particular Appendix 2 (Robust Networks) and Appendix 4 (Robust Site and Node)
- Facilities with Enhanced Security - Appendix 1 and 2 (where applicable)
- AMA Civil Engineering
- AMA Electrical
- SS-EN 50173-6
- EN 50600
- ITU-T G.652D
- ITU-T G.657A

These documents define technical requirements for design, installation, site environments, fibre performance and infrastructure robustness.

Where conflicts arise between referenced documents, the client shall clarify which requirement takes precedence.

## **3. Design Process - Overall Governance**

### **3.1 Processes**

Appendix 7 is normative with regard to process, decision points and responsibilities, while Sub-Appendices 7.1 and 7.2 are normative with regard to content and technical requirements within their respective domains.

Appendix 7 defines when each sub-appendix shall be applied but does not replace or modify the requirements specified therein.

The design process comprises the following main stages:

- Concept and initiation
- Feasibility study
- Preliminary design
- Detailed design
- Procurement
- Implementation
- Documentation and handover to operations

The process is common to both network and site projects.

Site design shall only be initiated if a decision in the feasibility study or preliminary design establishes that a site is affected.

### **3.2 Project Roles**

The client is responsible for ensuring that the project is organised with clearly defined roles, responsibilities and authorities.

Governing roles have the mandate to make decisions at stage gates (BP), while other roles are responsible for preparation, implementation and follow-up.

The following roles may occur in projects covered by this appendix. Not all roles need to be included in every project; however, all areas of responsibility shall be clearly assigned and documented by the client.

The same organisation or function may hold multiple roles, provided that responsibilities and authorities are clearly defined.

#### **Client and Governing Roles (decision authority)**

- Client
- Project Manager
- Operations Manager (Network Operation)

### **Design and Planning**

- Designer
- Health and Safety Coordinator (Design Phase - Bas P)
- Environmental Manager
- Work Environment Manager

### **Permits and Agreements**

- Signatory for land access agreements, building permits and traffic management plans (TA plans)
- Signatory for materials, contracts and construction

### **Procurement**

- Procurement Officer for materials, contracts and/or construction

### **Implementation**

- Contractor / Construction Contractor
- Health and Safety Coordinator (Construction Phase - Bas U)
- Environmental Manager
- Sustainability Manager
- Quality Manager
- Work Environment Manager
- Construction Inspector (client's control function)

### **Documentation and Completion**

- Documentation Manager
- Inspector

Roles and responsibilities shall be established no later than BP 2 and updated as necessary during the course of the project.

## 4. Stage Gates (BP)

The following decision points apply to all projects covered by this appendix:

**BP 1 - Start Decision:**

Decision to initiate the feasibility study.

**BP 2 - Approved Feasibility Study:**

Decision to proceed to preliminary design and preliminary assessment of site impact.

**BP 3 - Approved Preliminary Design:**

Approval of the network's principal topology and decision whether:

- no site is affected,
- an existing site is affected,
- modification of an existing site is required, or
- establishment of a new site is required.

**BP 4 - Approved Detailed Design:**

Design documents approved prior to construction start.

**BP 5 - Required agreements for project implementation signed.**

For example:

- construction contract and/or design-build contract,
- design agreement (if a separate assignment),
- land access agreement, utility easement or right-of-use agreement,
- site/premises agreement in the case of a new or modified site.

**BP 6 - Approved Final inspection and Handover to operations.**

The decision regarding site at BP 3 is governing with respect to whether Sub-Appendix 7.2 shall be applied.

## 5. Application of Sub-Appendices 7.1 and 7.2

- **Sub-Appendix 7.1** shall always be applied in the design of fibre infrastructure.
- **Sub-Appendix 7.2** shall only be applied when, in accordance with BP 3, the project involves modification of an existing site or establishment of a new site.

If the project does not affect a site, this shall be documented in the feasibility study and in the preliminary design, and no further site design shall be carried out.

## 6. Procurement and Form of Contract

Appendix 7 applies to all forms of design assignments, regardless of commercial or contractual structure. This includes design carried out within the framework of execution contracts (AB), design-build contracts (ABT), consultancy assignments under ABK, framework agreements, call-off assignments, and in-house design performed by the network owner.

The choice of contract or form of procurement affects the allocation of responsibilities between client, designer and contractor, but does not affect the requirements regarding the design process, stage gates, documentation or the application of this appendix and its associated sub-appendices.

In execution contracts (AB), the detailed design shall be fully completed and approved prior to procurement.

In design-build contracts (ABT), functional and robustness requirements shall be established during the preliminary design stage and verified through review of the contractor's detailed design.

When design is carried out as a consultancy assignment, through ongoing call-off agreements or in-house, the corresponding design stages, stage gates and documentation requirements shall be applied in accordance with this appendix.

Site measures that are a direct consequence of a network project shall be coordinated with the network design and implementation, regardless of the procurement or execution model.

When design is performed as a consultancy assignment, ABK 09 shall apply in relevant parts unless otherwise specifically agreed.

# 7. Documentation, Operations- and Change Management

All design and implementation carried out in accordance with this appendix shall result in complete and traceable documentation adapted for operations and asset management.

Modification work in existing infrastructure shall be managed in accordance with the same fundamental process as new construction and shall include:

- initiation and risk and vulnerability analysis (RSA),
- design in accordance with Sub-Appendix 7.1 and, where applicable, Sub-Appendix 7.2,
- applicable decision points,
- documentation and updating of network and asset registers.

The purpose is to ensure that robustness, security and availability are maintained throughout the entire lifecycle of the infrastructure.

This appendix governs process and decision gates and takes precedence over Sub-Appendices 7.1 and 7.2 with regard to process and decision gates, but not with regard to detailed technical requirements.