



NS162

Specification for the Installation of Communication Cables in Ductlines and Substations

May 2004

Amendments included from NSA 1337 July 2004



SUMMARY

Network Standard NS162 details the requirements for installing third party fibre optic or conductive communications cables in Ausgrid's ductlines and extending them through Ausgrid substations.

ISSUE

Ausgrid staff: This Standard is for staff associated with the recording of site specific details on field recording sheets and for staff responsible for approving installation of fibre optic systems by telecommunications companies with agreements to install such systems.

Contractors: This document is issued on an uncontrolled basis. Users are responsible for ensuring that the document they are using is current and includes any amendments issued since the date on the document.

Ausgrid maintains a copy of this and other Network Standards together with updates and amendments on www.ausgrid.com.au.

Where this standard is issued as a controlled document replacing an earlier edition; remove and destroy the superseded document.

Ausgrid also offers a subscription service which provides for updates and amendments to standards on payment of an annual fee.

DISCLAIMER

As Ausgrid's standards are subject to ongoing review, the information contained in this document may be amended by Ausgrid at any time.

It is possible that conflict may exist between standard documents. In this event, the most recent standard is to prevail.

This document has been developed using information available from field and other sources and is suitable for most situations encountered in Ausgrid. Particular conditions, projects or localities may require special or different practices. It is the responsibility of the local manager, supervisor, assured quality contractor and the individuals involved to ensure that a safe system of work is employed and that statutory requirements are met.

Ausgrid disclaims any and all liability to any person or persons for any procedure, process or any other thing done or not done, as a result of this Network Standard.

INTERPRETATION

In the event that any user of this Standard considers that any of its provisions is uncertain, ambiguous or otherwise in need of interpretation, the user should request Ausgrid to clarify the provision. Ausgrid's interpretation shall then apply as though it was included in the Standard, and is final and binding. No correspondence will be entered into with any person disputing the meaning of the provision published in the Standard or the accuracy of Ausgrid's interpretation.

Network Standard
NS162
Specification for the Installation of Communication
Cables in Ductlines and Substations
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1 INTRODUCTION

This Network Standard details the policy and operational requirements for the installation of third party fibre optic communication cables in Ausgrid's ductlines and substations. The third party, being a party to an agreement with Ausgrid to use available ductlines, will be referred to in this standard as a Telco.

The Standard may also be used as a guide to installation of communications cables for Ausgrid either by Ausgrid contractors, or as part of contestable works. In this case, the reference to the Telco shall mean either the contestable works customer or Ausgrid as appropriate, and references to 'third party' shall be read as referring to Ausgrid.

2 OTHER STANDARDS AND REFERENCES

This standard should be read in conjunction with the following network standards, which contain information supporting or relevant to this Network Standard:

NUS100 *Field Recording of Network Assets*

NS104 *Network Project Design Plans*

NS113 *Site Selection and Construction Design Requirements for Chamber Substations*

NS130 *Specification for Laying of Underground Cables Up to 22KV*

NS156 *Working Near or Around Underground Cables*

NS171 *Fire Stopping in Substations*

NEG-EP07 *Network Access and Security - Locks and Keys*

Other reference documents include:

AS/ACIF S009:2001 *Installation Requirements for Customer Cabling (wiring rules)*

SAA HB29 *Telecommunications Cabling Handbook*

Ausgrid's *Electrical Safety Rules*

Ausgrid's *Network Management Plan*

EC 14 – *Guide to Electrical Worker's Safety Equipment*,

Australian Standard AS/NZS 2865 – *Safe Working in a Confined Space*

AS 1742 – *Manual of Uniform Traffic Control Devices*

Roads and Traffic Authority guide *"Traffic Control at Worksites"*

3 RESPONSIBILITIES

The Telco is responsible for ensuring that the following requirements are met.

3.1 Authorisation to work on or near Ausgrid Assets

The Telco is responsible for ensuring the safety of their employees, contractors and the public in general whilst carrying out the installation of communication cables. It is essential that all work on Ausgrid sites is performed in a safe manner and to no less a standard than that specified in Ausgrid's:

- Network Management Plan
- Electrical Safety Rules
- The relevant Network Standards

as well as any relevant Act, Regulation and NSW WorkCover requirement applicable at the time. The conditions stated as a requirement of accreditation under the '*Accredited Service Provider Scheme*', administered by the NSW Department of Energy, Utilities and Sustainability (DEUS) must be adhered to.

Other relevant safety guidelines are also available from the Energy Supply Association of Australia such as:

- EC 14 - Guide to Electrical Worker's Safety Equipment.

The Telco must also ensure that their employees' authorisations are current at all times.

3.2 Electrical Safety Rules

All authorised personnel will be required to be appropriately trained for the work concerned, and will need to have a thorough knowledge of the applicable parts of Ausgrid's Electrical Safety Rules. Training requirements are covered more fully in the Training Matrix for Telco works (available from Network).

Ausgrid's Electrical Safety Rules are designed to ensure compliance with statutory requirements which apply to all works on high voltage and low voltage electrical apparatus or near exposed high voltage conductors. They apply to persons who enter electrical substations, to people employed by electricity supply authorities, electrical contractors and Accredited Service Providers working on electrical apparatus, and to any other employee or person, including visitors.

3.3 Confined Spaces

Entry to and work in a confined space must comply with Chapter 4, Part 4.3, Division 9 of the Occupational Health and Safety Regulation 2001 and the requirements of the Australian Standard AS 2865 – 'Safe Working in a Confined Space'.

Some examples of confined spaces within Ausgrid are listed in the Electrical Safety Rules.

Network Universal Standard NUS151 identifies the procedures, training and rescue equipment required to assure the safety of people required to enter or work in a confined space associated with Ausgrid's Assets.

3.4 Fall Arrest

Many pits and substations require access by vertical ladders. Suitable controlled descent equipment must be used when there is a risk of falling more than 2 meters.

The use of fall arrest equipment must comply with chapter 4, Part 4.3, Division 6 of the Occupational Health and Safety Regulation 2001.

3.5 Asbestos Hazards

Persons working on the installation of communications cables should be aware that asbestos materials may have been used in the construction of ducts and as insulation on electrical equipment in substations. Appropriate care should be taken in the identification and safe handling of asbestos, by suitably qualified persons.

3.6 Admittance to Ausgrid Premises

Telco staff and contractors shall only be permitted to enter and work in Ausgrid substations subject to the conditions set out in Section 5.

Note: Only persons approved in writing by Ausgrid Network division may work in Ausgrid substations pit and duct systems.

3.7 Traffic Management

All third party communication cable installations must be carried out safely with the least possible obstruction to traffic, both vehicular and pedestrian. The Telco (or their employee or contractor) must prepare and implement a traffic management plan for each project in accordance with statutory requirements.

Vehicular and pedestrian access to properties must be maintained wherever possible. Notice of 48 hours shall be provided to residents whose access will be restricted by the proposed works.

Useful references to traffic related guides are:

- AS 1742 – *Manual of Uniform Traffic Control Devices*
- Roads and Traffic Authority guide '*Traffic Control at Worksites*'

4 INSTALLATION OF COMMUNICATION CABLES

4.1 Planning the Installation

In order to ensure the smooth operation of a communication cable installation, the proposed route of a new line shall be planned in advance. The preferred duct shall be chosen, along with an alternative in case the preferred duct is blocked. Where it is necessary to obtain Network Engineering (Planning) approval (see below), or to check whether LV ducts are reserved for some other use, a request for clarification shall be submitted to Customer Supply Planning or Network Engineering (Systems Engineering - Distribution) at least two weeks prior to the proposed starting date for the work. Such ducts must not be used until the necessary approval has been obtained. If such ducts are used without approval and it is later found that they are required for other uses, then the Telco or its contractor shall meet the cost of removal or relocation of the communication cables.

4.2 Sub-ducts

When installing conductive communication cables into ductlines, each cable must be installed in its own HDPE sub-duct. The sub-duct must be continuous throughout the ductline, with all sub-duct joints being made in pits using approved sub-duct joiners.

All installed sub-ducts must have their ends sealed against the ingress of water. Seals on ductlines, which have been removed for the installation of sub-ducts, must be reinstated using approved conduit sealing putty.

The installation of sub-ducts must not impede work on Ausgrid's cable installations in the pits through which the sub-ducts run. If installation of sub-ducts is likely to restrict work to an unacceptable extent, then the installation of the communications cable system is not to proceed and another route is to be found.

4.3 Shared Ducts

Where communications cables are to be installed in a duct already used or reserved for use by power cables, the size of sub-duct or fibre optic cable shall be such that it does not prevent the subsequent removal or installation of power cables in the same duct. As a guide, the maximum outside diameter of communication cable/sub-duct for various size ducts shall be as follows:

Duct diameter (mm)	Maximum sub-duct/communication cable outside diameter (mm)	Maximum number of communication cables/sub-ducts
100	20 mm	1
125	20 mm	2
150	20 mm	3

4.4 Duct Selection

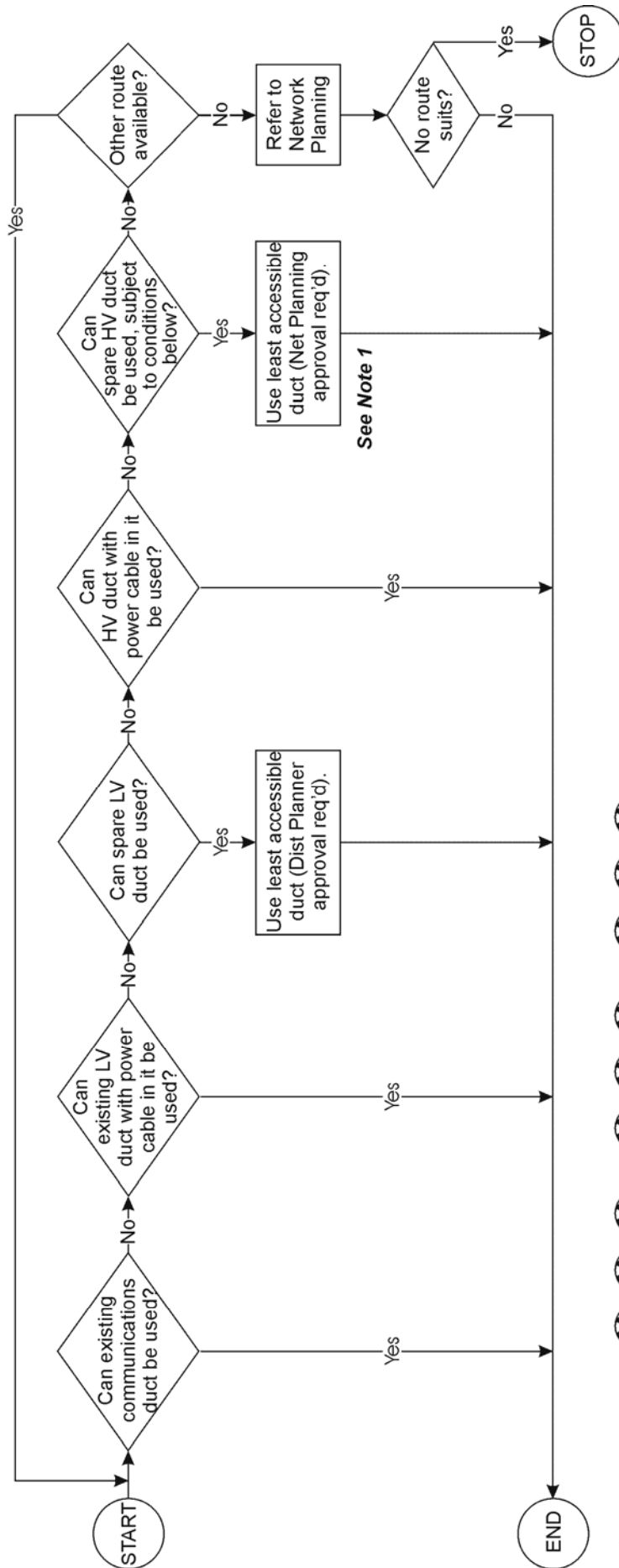
Ausgrid's Network Subsidiary (or a nominated person) shall approve the selection of ducts to be used for the installation of communications cables. The process for selection of the duct to be used shall follow the sequence of the flow chart following.

Note: Use of sub-transmission pit and duct systems shall not generally be permitted. Where exceptional circumstances indicate that use of sub-transmission ducts is the only practicable option, written request for their use, nominating the preferred duct and justifying such use shall be submitted to Network Engineering branch (Systems Engineering – Transmission) with two weeks notice. Use of sub-transmission ducts shall not commence until written approval has been received from Network Engineering. Only the duct reserved for pilot cables shall be considered for installation of third party communications cables.

Conductive communications cables shall not be used in either sub-transmission pit and duct systems, or in HV ducts (with or without the use of sub-ducts – they may, however, be run in the communications duct of a HV pit and duct system as below). High induced or transferred voltages may arise in these circumstances posing hazards to third party workers.

Communication ducts are presently used exclusively for Ausgrid communication/pilot cables. Where no cables are installed, evidence that this duct was intended for installation of communications cables may include it being the fourth duct in a system designed for use of three single core cables. It may be a smaller diameter than other ducts in the ductline.

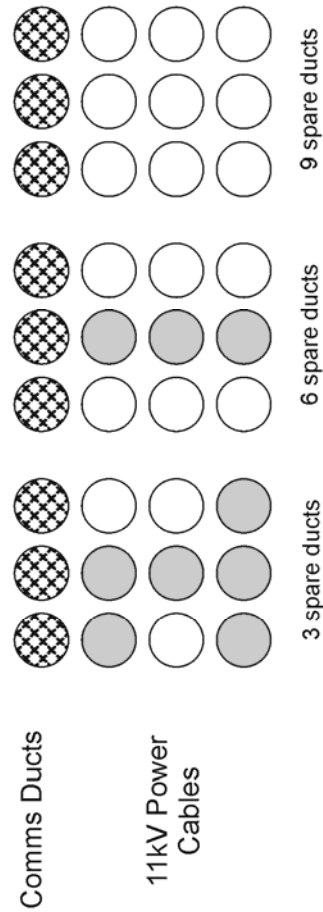
DUCT SELECTION: For 3rd Party Comms Cables



NOTE 1: in no case will cable be installed where it will be in one of a set of 3 HV ducts without explicit written approval of Network Planning

3, 6 or 9 spare ducts to be reserved for future City Circuits - there are three feeder cables to a City Circuit, eg

1A 1B 1C



4.5 Blocked Ducts

All reasonable attempts must be made to clear out the selected ducts of any defects or obstructions before any attempt is made to pull cables through them.

If a selected duct is blocked, the Telco's contractor shall be responsible for clearing the blockage using methods approved by Ausgrid. Details of the proposed method must be submitted to Ausgrid Network Engineering branch for approval. If a blocked duct cannot be cleared, the Telco's contractor must identify an alternative duct complying with the above criteria.

4.6 Installing Cable

The cable is to be installed in one continuous length to avoid splicing in cable pits.

Communications cables must be kept clear of power cables in pits to maintain clear access to the power cables and for jointing work on the power cables. This includes avoiding the creation of restrictions to access to the pit, such as cables being passed too close to access ladders.

The communications cables shall be attached to the walls or roof of pits by use of a re-enterable fixture, such as a loop or cable cleat (see Figure 2). The fixture should be capable of holding more than one cable, and future communications cables shall use existing fixtures where possible.

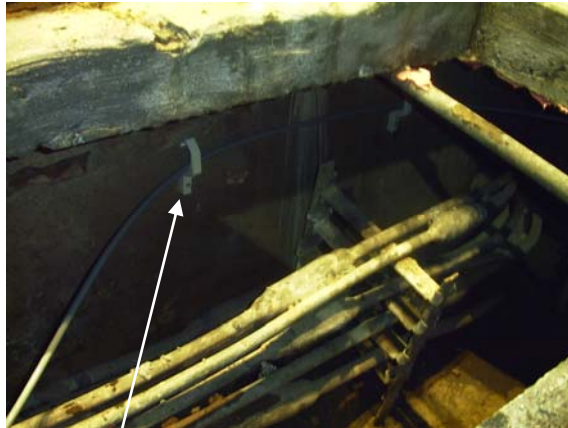


Figure 2: Fibre optic clipped to pit wall

4.7 Cable Identification

Third party communication cables must be clearly identified by embossing or indelibly marking the cable owner's name onto a label permanently fixed to the cable. Such a label shall be attached to the cable in each pit or substation through which it passes. Each cable shall also be uniquely identified, preferably by the inclusion of an identifying number on each label.

Labels could also be marked with the source and destination, provided that in the event that the cable is re-routed in future, all labels in the affected section be re-marked to correctly identify the route.

5 LOCATION OF COMMUNICATION EQUIPMENT IN SUBSTATIONS

5.1 Zone Substations

No new installations will be permitted in zone or sub-transmission substations unless a segregated (through appropriate fencing and locks) communications room has been provided for this equipment. Staff and contractors of the Telco shall only have access to the communications room.

5.2 Distribution Centres

No new installations of splices, termination cabinets or other Telco equipment shall be permitted in distribution centres. However, access to the building which houses the distribution centre shall generally be permitted as follows. Optical fibre passing through the substation to the Telco equipment within the main building shall be fully encased in conduit or subduct for the whole passage through the substation. The conduit shall be located so as to maintain all specified clearances and to avoid interfering with or restricting access to any Ausgrid equipment within the substation. Refer to NS113 *Site Selection and Construction Design Requirements for Chamber Substations* and associated CIAs and NSAs for details of required clearances.

Where the ducts housing optical fibre enter and leave the substation, Ausgrid's specifications for fire stopping and moisture blocking shall be followed (refer to NS171 *Fire Stopping in Substations*).

Work installing conduit or sub-duct through a substation shall be performed by Ausgrid or authorised contractors employed by the Telco, with all work within the substation continuously supervised by an Ausgrid safety observer.

IMPORTANT: No work is to be performed behind or within 1000 mm of the front or sides of the LV board or within the minimum safe distances for Instructed Persons (see column in Table 5.1 of the Electrical Safety Rules) to live exposed HV conductors unless the live exposed equipment is either fully screened in accordance with Ausgrid's procedures or the equipment is isolated in accordance with Ausgrid's Electrical Safety Rules (All costs to Telco for screening and/or isolation).

5.3 Existing Installations in Distribution Centres or Zone Substations

Telco owned optical fibre equipment has already been installed in several distribution centres throughout the Sydney Central Business District and North Sydney. This equipment may remain in place, and Telco staff and contractors may be permitted to enter the substations using Ausgrid Telco keys (see NEG EP07 *Network Access and Security - Locks and Keys*). Only Telco staff or contractors who have received specified training and authorisation shall work in these substations.

Refer to NEG EP07 for details of locking of these substations and control of issue and use of Ausgrid keys.

6 RECORDING

Details of the cable route shall be clearly marked on a plan or Field Recording Sheet in accordance with NUS100 or NS104 as appropriate. This copy must be marked "Record of Third Party Communication Cable Installation", and forwarded to Ausgrid in accordance with the requirements of NUS100. The drawing must clearly show:

- the start and finish points of every used and unused duct or sub-duct
- location of any splices
- the cable route and any pits which the sub-ducts or cables pass through
- the duct section indicating which duct the sub-ducts or cables have been installed in.



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