



# Infrastructure Design Manual

June 2010 Version 3.0

## South Gippsland Shire Council Addendum

Revision 1	17 March 2010
Revision 2	1 July 2010
Revision 3	23 June 2011



This addendum contains specific performance criteria for South Gippsland Shire Council. Where there is a conflict with the Infrastructure Design Manual (Version 3.0, June 2010) this addendum will take precedence.

ITEM	PAGE #	AMEND	ACTION
1.	Appendix K – Engineering Principles	Development Service Levels	Service levels defined by South Gippsland Shire Council.  <a href="#">Click here</a>
2.	Page 13	NBN Co Broadband Australia	National Broadband Network (NBN) New Developments: Deployment of the NBN Co Conduit and Pit Network – Guidelines for Developers  <a href="#">Click here</a>
3.	Page 13	NBN Co Broadband Australia	National Broadband Network (NBN) NBN Coverage Victoria Map  <a href="#">Click here</a>
4.	Page 47	12.4.2. Road Reserves  Table 6 - Rural Road Characteristics	Low Density Residential Collector Road  Minimum seal width shall be 6.2m.
5.	Page 69	16.5. Rainfall Data	Intensity/Frequency/Duration curves (IFD) for the South Gippsland Region shall be used for drainage design purposes. Bureau of Meteorology website <a href="http://www.bom.gov.au">http://www.bom.gov.au</a>



ITEM	PAGE #	AMEND	ACTION
6.	Page 97	20. Stormwater Treatment.	Water Sensitive Urban Design shall be undertaken in accordance with the latest version of South Gippsland Shires – Water Sensitive Urban Design Guidelines for South Gippsland Shire Council.
7.	Page 125	26. Public Lighting	The Developer shall obtain written agreement from the Public Lighting Service Provider for South Gippsland.  Decorative lighting shall be in accordance with South Gippsland Shire Council Street lighting policy.

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Approved for Issue	Full Name	Signed	Date
Manager Engineering	Antony Price		1 July 2010
Director Infrastructure	Anthony Seabrook		1 July 2010



# ADDENDA ITEM 1

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## **DEVELOPMENT SERVICE LEVELS**

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## DEVELOPMENT SERVICE LEVELS

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The following service levels provide developers and consultants with proposed timelines for Council Engineers to process each stage identified.

**Planning Permit Conditions:**

Working Days: 10

**Certification:**

Working Days: 12

**Plan Checking:**

Working Days: 20

**Statement of Compliance:**

Working Days: 10

**Inspections:**

Council require 48 Hours notice

**Practical Completion:**

Council require 72 Hours



## ADDENDA ITEM 2

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# **NATIONAL BROADBAND NETWORK (NBN)**

# **NEW DEVELOPMENTS: DEPLOYMENT OF THE NBN CO CONDUIT AND PIT NETWORK – GUIDELINES FOR DEVELOPERS**

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# New Developments: Deployment of the NBN Co Conduit and Pit Network – Guidelines for Developers

## Network Operations

**Document Number:** NBN-TE-CTO-194

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#### Disclaimer

NBN Co has prepared this document as a guideline to the installation of pit and conduit infrastructure in new developments (also known as greenfields developments). At the time of publication, the *Telecommunications Legislation Amendment (Fibre Deployment) Bill 2011* has been proposed but has not yet been passed by the Federal Parliament.

NBN Co has no control over new laws. NBN Co cannot and does not make any promises about the contents of new laws and how they will affect you. NBN Co has used its best efforts to prepare this document to provide you with an indication as to how installation of pit and conduit infrastructure may occur. If new laws are passed, substantial changes may be required to the guidelines and technical details set out in this document.

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**This document is accurate as at 31 March 2011.**

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#### Environment

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About this document

## 1 About this document

<b>Who is it for?</b>	<ul style="list-style-type: none"> <li>New Development site developers</li> <li>New Development site designers</li> </ul> <p>This document, in conjunction with documents listed in <b>Appendix B – Key Documents</b>, provides guidelines for developers installing NBN Co pit and conduit infrastructure in real estate Development projects.</p>
<b>Purpose</b>	<p>This document provides guidelines and technical details for New Development site developers and designers to install the pit and conduit infrastructure required for the NBN Co Fibre to the Premises (FTTP) network.</p> <p><b>Note:</b> The developer is responsible for installing pit and conduit to NBN Co specifications. NBN Co will only supply the fibre and other elements of a complete FTTP solution once fibre ready facilities are prepared to NBN Co specifications.</p>
<b>In scope</b>	<p>These Guidelines include:</p> <ul style="list-style-type: none"> <li>Defining asset types and network terms</li> <li>Pit specifications and recommended types</li> <li>Conduit specifications and recommended types.</li> </ul>
<b>Out of scope</b>	<p>These Guidelines exclude:</p> <ul style="list-style-type: none"> <li>The installation of the fibre optic cabling and other associated items</li> <li>The connectivity requirements within New Developments</li> <li>The operation of the fibre network</li> <li>Any changes required because of the laws made by Parliament after 22 March 2011.</li> </ul>

<b>Important Note</b>		<p>These Guidelines are a guide for undertaking Pit and Conduit Works installation for the National Broadband Network in New Developments.</p> <p>These Guidelines are, for the purposes of the Developer Agreement, the NBN Co's Pit and Conduit Specifications and must be complied with to the extent specified in the Developer Agreement.</p> <p>These Guidelines should not be relied upon by any Contractor or any other person as a substitute for knowledge, experience, care and skill or any other contractual obligation or as a guide to your rights and obligations under laws concerning the roll out of fibre by NBN Co to new developments.</p> <p>The regulatory environment in connection with the installation of fibre ready facilities in real estate development projects is not yet settled. It is the responsibility of the Developers and their contractors to become familiar and comply with all applicable laws and contractual obligations.</p> <p>Nothing in these Guidelines will affect any rights NBN Co has (whether at law or under contract), or any obligations or warranties given by the Contractors to NBN Co.</p>
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## 2 Before You Start

### 2.1 Safety

NBN Co is subject to the *Occupational Health and Safety Act 1991* (Cth). However, it is recognised that Developers and their contractors will be subject to different health and safety legislation that is in place across each of the jurisdictions in Australia. This includes relevant regulations, standards and codes of practice.

These Guidelines provide guidance to assist NBN Co, the Developers and their contractors to exercise due diligence in relation to safety practices. To this end:

- Developers are expected to have developed, to understand and comply with their own Health Safety and Environment policies and procedures.
- Consistent with Commonwealth and State and Territory Occupational Health and Safety legislation, it is expected that Developers and their contractors consider the risks associated with development that may impact on later stages of the asset lifecycle (including inspection/assurance, use, operation and maintenance). Specific aspects which the Developer and their contractors must consider include (but are not limited to) risks associated with the selection of pit and conduit components, and risks associated with the method of construction/installation.

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### 3 Assets

#### 3.1 Asset Availability

NBN Co is currently evaluating suitable products (for example, conduits and pits) for inclusion in New Developments. These will be listed on the NBN Co website for your information.

These Guidelines provide *preliminary* dimensions for conduits and pits and will be updated as and when the specific information becomes available.

#### 3.2 Asset Protection

##### 3.2.1 Verification

Prior to any excavation work being undertaken, all existing underground services within the proposed work zone must be identified via Dial Before you Dig, council plans and all other parties, services or contacts that may not be represented by the Dial Before You Dig services.

These may include:

- Main road authorities
- Rail services
- Gas suppliers
- Water utilities.

Any pre-existing services in an area where Pit and Conduit Works are to be deployed must be identified visually prior to commencement of the Pit and Conduit Works in that area, using methods such as strip exposure and non-destructive digging.

##### 3.2.2 Installation

All NBN Co assets must be installed within the designated telecommunications alignment, established by any of the following:

- State and Federal Government
- Street Opening Conference/Bodies
- Local Council/s
- A Shared Trench Agreement, as approved by NBN Co.

**Note:** For the time being, while the installation of fibre ready facilities in New Developments are in the early stages, shared trench approval will only be granted by NBN Co on a case-by-case basis.

#### 3.3 Asset Identification

All design documentation (including Initial Development Documentation, pit and conduit design and as-built documentation) prepared by the Developer and its contractors must identify the proposed location of all Network Infrastructure and address, as a minimum, the following:

- The location of pits and conduits, including measurements in metre or part thereof
- Positioning information relative to known fixed assets, for example, kerb lines and property boundaries
- Depth of cover for conduits.

**Note:** Depth of cover is the actual soil/backfill from top of the conduit, not including the finishing surfaces of things such as concrete, tiles and pavers.

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Assets

- Trench cross sections, showing all services within the same alignment
- Identification of conduits, for example, local or distribution
- Service drop locations and either local pit or boundary pit pre-allocations.

Further guidance on CAD standards, NBN Co's requirements for the Initial Development Documentation, Pit and Conduit design, as-built documentation and identification symbols will be published on the NBN Co website from time to time.

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## 4 FTTP Network Overview

The NBN Co New Development Fibre to the Premises (FTTP) network is designed to provide fibre connectivity to premises, including New Development projects.

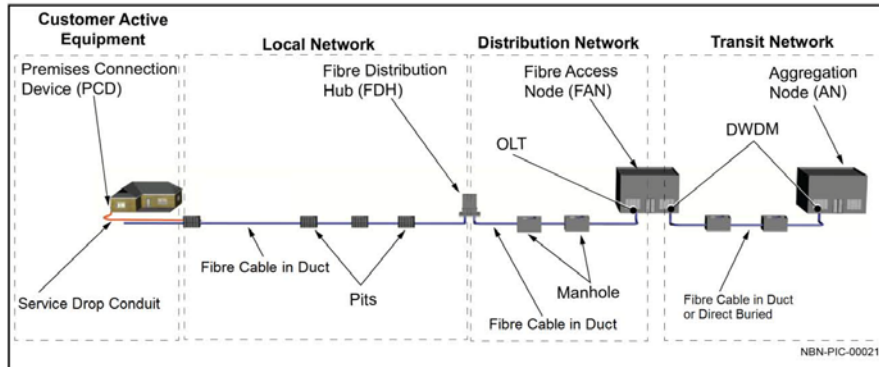


Figure 1 – Fibre to the Premises network

The FTTP network is divided into hierarchical components which assist in the planning, design, and implementation of the FTTP network.

Network components shown in **Figure 1** (above) that are relevant to New Development project deployment of fibre ready facilities are set out below.

### 4.1 Distribution Network

The Distribution Network (DN) provides connectivity between the NBN Co Fibre Access Nodes (FANs), where the active equipment is located, and the Fibre Distribution Hubs (FDHs) which connect the DN to the local network.

The DN is installed between the FAN and the FDH(s).

**Note:** The DN will also be installed between all FDHs and the first and last FDH to loop connect to the FAN in new developments as shown in **Figure 2**. This DN will eventually form a loop within the development even though the land will often not be developed for some years after the first FDH needs to be brought into service.

FTTP Network Overview

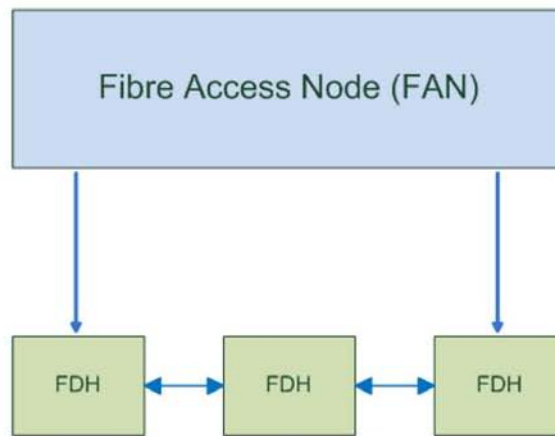


Figure 2 – Distribution Network and FDH Loop Topology

#### 4.2 Fibre Distribution Hub

Fibre Distribution Hubs (FDHs) are unpowered, street-side cabinets used to provide an optical connection point between the distribution (DN) and local network.



Figure 3 – Example FDH Cabinet

#### 4.3 Local Network

The local network is installed between the FDH and the associated telecommunication pits located outside property boundaries.

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#### 4.4 Telecommunication Pits

NBN Co requires pits for several distinct purposes including:

- Managing connections between conduits
- Housing fibre optic cabling and splice closures
- Housing Multiport Terminal (MPTs) required to connect end-users' premises to the local network.

#### 4.5 Telecommunication Conduits

Conduits provide the pathways for the subsequent installation of fibre optic cabling.

**Note:** The Distribution Network fibre and the Local Network fibre might be contained within the same conduit.

##### 4.5.1 Telecommunication Service Drop Conduit

The service drop conduit is located between the telecommunication pits and either the property boundary location or the end-user premises.

#### 4.6 Network Design Guidelines

The design of the network ideally begins at individual lots and follows a modular approach. That is:

- Lots (typically four but up to a maximum of eight) are allocated to a local access pit accessible by the local conduit network.

This location will house the Multiport Terminal (MPT) when the Fibre Network is installed.

**Note:** It is not always possible to get four lots per pit. Conversely, there will be situations where the trenching is designed (for electrical reticulation, etc) such that it may be expedient to service a fifth or sixth lot from a pit.

- A maximum of ten MPT locations are connected back into a local network splice closure. The local network splice closure will splice the MPT cables into the Local Fibre Network.
- Typically, a maximum of five local network splice closures are connected to an FDH.

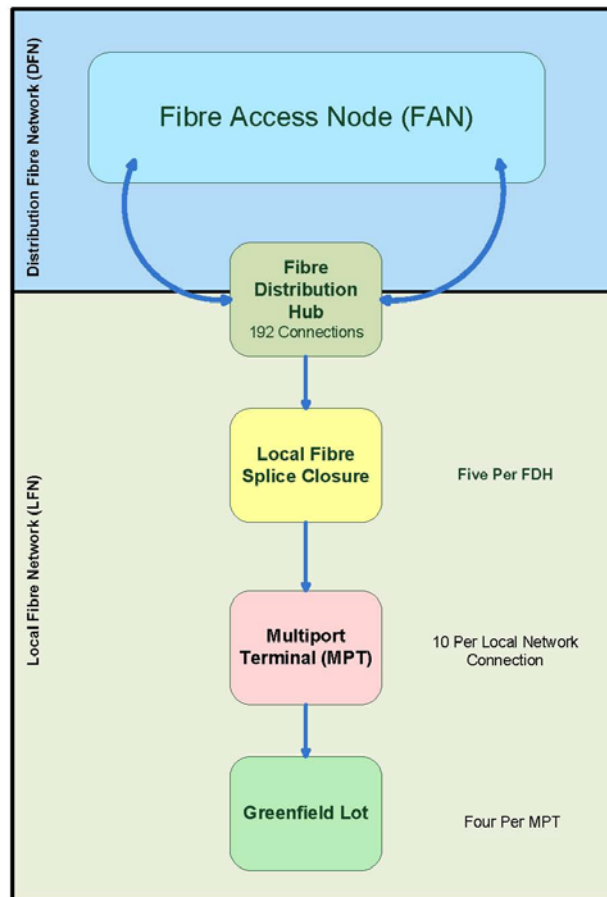


Figure 4 – Network Components

#### 4.7 Local Network Guidelines

The local network requires a minimum of 1 X 100 mm conduit. The conduit is installed along the property boundary before connecting into pits situated at, or near, each shared property boundary.

##### 4.7.1 Road Crossing Guidelines

- All road crossings associated with the local network use 100 mm conduits
- All road crossing conduits that are used solely for service drops are 50 mm.

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#### 4.7.2 Local Duct Network Methods

There are two methods permitted for deploying the local duct network, depending on available trenches in the development:

- Single side deployment
- Dual side deployment.

##### 4.7.2.1 Single Side Deployment

A 100 mm local network conduit is installed on one side of the road *only*. This conduit is installed into pits located between property boundaries.

A local lateral 50 mm conduit is installed under the road between the local network pits on one side of the road and smaller boundary pits on the opposite side.

The Local Fibre MPTs are housed within the Local Network pits. The service drop cable fibres are then extended through the Local Network lateral conduits through to the MPTs in the Local Network pits.

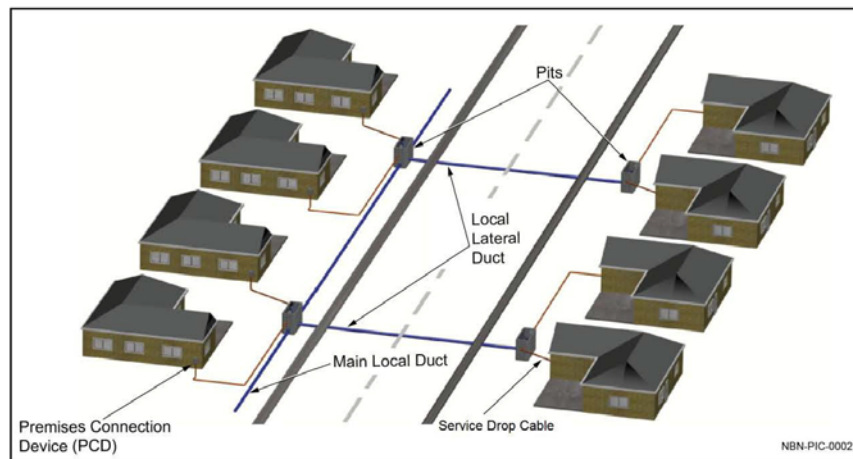


Figure 5 – Single Side Deployment

##### 4.7.2.2 Dual Side Deployment

A 100 mm local network conduit is installed in the following locations:

- On both sides of the road
- Into the local network pits located between property boundaries.

The local network MPTs are housed in every second pit within the local network. The service drop cable fibres are then extended through the local conduits to the MPT.

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## FTTP Network Overview

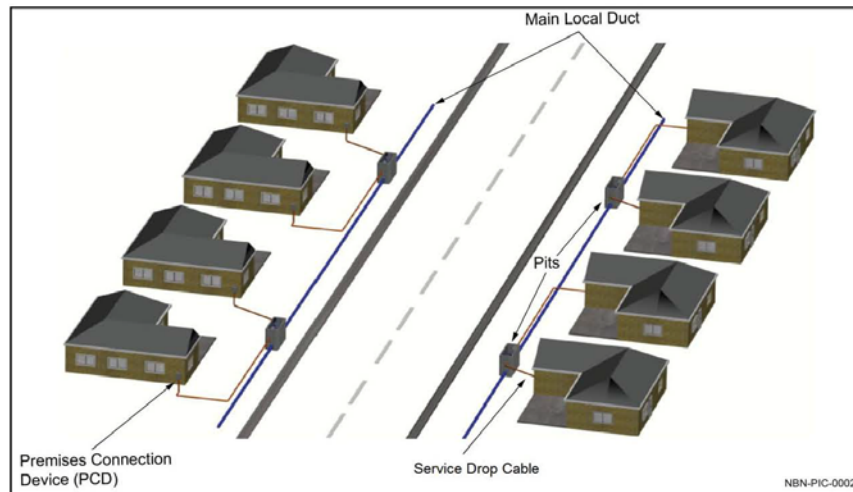


Figure 6 – Dual Side Deployment

#### 4.7.3 Fibre Distribution Hubs

Each FDH provides connectivity for a maximum of 192 Single Dwelling Unit (SDU) premises and is located as centrally as possible within a 192 lot catchment area. The final location is dependent on both the total number of lots to be serviced and the New Development build stage.

The FDH is generally located in an unobtrusive location and set back at least five metres from any road intersections, and at a minimum of at least 1.2 metres from any kerb.

A distribution pit is installed within five metres of the final position of the FDH and a single 100 mm conduit is installed between the FDH pit and the final FDH location.

The space allocation for the FDH mounting plinth is approximately 1 m<sup>2</sup>.

**Note:** The cement plinth is not installed by the Developer, but rather by the FTTP solution provider. That is, NBN Co or NBN Co's appointed Supplier.

The following should be put in place:

- A single, 100 mm conduit (and required bends) should be installed between the FDH Pit and the allocated location of the FDH
- At the plinth location, the FDH duct should be extended a minimum of one metre above the finished ground level and capped.

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#### 4.7.4 Distribution Network Guidelines

The Distribution Network requires a single 100 mm conduit installed between the entrance to the Development and the first FDH. Further FDHs require a separate 100 mm conduit installed between them, with the last planned FDH requiring a 100 mm conduit to the Development exit.

**Important  
Note**



This topology guideline allows for the FDHs to be connected in a loop back to the FAN and is critical for the Distribution Network as shown in *Figure 2*.

#### 4.7.5 Distribution Entry and Exit Locations

A distribution pit will be installed at the DN entry and exit boundary locations of the Development to provide a connection location between the Development DN and the NBN Co DN, when available.

For Developments that have an entry and exit on the same road, a minimum of 1 X 100 mm ducts should be installed between the two pits to allow for cables to be installed past the Development.

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## 5 Underground Network Components

### 5.1 Overview

All pits and conduits must be installed within the designated telecommunications alignment established by any of:

- State and Federal Governments
- Street Opening Conference(s)/ Local Council(s)
- In any shared trench subject to NBN Co approval.


If for any reason this alignment cannot be used, a suitable alternative must be determined prior to design and installation, and approved by NBN Co.

### 5.2 Conduit Guidelines

#### 5.2.1 Distribution and Local Network Conduits

NBN Co requires the following in connection with both distribution and local network conduits:

- 100 mm and 50 mm nominal diameter conduits as detailed in *AS/NZS 1477:2006* table 4.2(A) for wall thickness tabled under **PN12** nominal sizes (DN) of 20, 50 and 100 mm.
- The conduit is white, and labelled as required by *AS/ACIF S008: 2006* as it applies to customer cabling products with the added descriptor of "NBN Co"
- The conduit meets the minimum requirements of:
  - *AS/ACIF S008:2006* (Requirements for Customer Cabling) as it applies to customer cabling products
  - *ACIF C524:2004* (External Telecommunication Networks).
- All road crossing conduit installations are installed as close to 90 degrees to the road in or under which the conduits are being installed.

<b>Important Note</b>		<p>Conduits should not be installed in runs greater than <i>250 metres</i> without transitioning through either local or distribution pits.</p> <p>If the distance is greater, too much stress might be placed on cable when it is hauled through the conduits.</p>
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#### 5.2.2 Lateral Conduits

NBN Co requires the following in connection with lateral conduits, that is, conduits that feed across streets for service drop cables:

- The lateral conduits are 50 mm diameter
- The conduit is white and labelled as per *AS/ACIF S008: 2006* as it applies to customer cabling products with the added descriptor of "NBN Co"
- The conduit meets the minimum requirements of:
  - *AS/ACIF S008:2006* (Requirements for Customer Cabling) as it applies to customer cabling products
  - *ACIF C524:2004* (External Telecommunication Networks).
- All road crossing conduit installations are installed as close to 90 degrees to the line of the road under which the conduits are being installed.

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### 5.2.3 Conduit Bends

NBN Co requires the following for conduit bends:

- All conduit bends are prefabricated
- Combinations of bends with angles of 15°, 22.5° and 30° are used to change the direction of the 100 mm conduit where required
- 50 mm conduit bends utilised for local lateral conduits use a 90° bend where required
- A maximum sum of 180° of bend is allowed between pits. If this figure is exceeded, a pit needs to be installed as centrally as possible in the conduit run in order to bring the sum of bend angles into compliance.
- The radius of the conduit bends is a minimum of 8 X the outer diameter of the conduit
- Conduit bends need to be of the same material and structure as the conduit.

### 5.2.4 Conduit Joints

Conduit joints for PVC pipes are achieved using 'socket and spigot' or 'coupler' and sealed with solvent cement.

**Note:** Soil that is prone to abnormal movement (sometimes known as 'expansive' soil) might require the use of flexible joints as approved by NBN Co.

### 5.2.5 Conduit Installation

NBN Co requires the following when installing a conduit:

- Conduit/s are installed into trenches, with appropriate bedding and fill, in accordance with the following guidelines:
  - AS/NZS 2032:2006 (Installation of PVC Pipe Systems)
  - ACIF C524:2004 (External Telecommunication Networks)
  - AS/ACIF S009:2006 (Installation Requirements for Customer Cabling (Wiring Rules) as it applies to customer cabling products)
- 100 mm conduits are installed in trenches with the minimum separation from other utilities, as per any applicable local utility requirements, legislative requirements and shared trenching agreements
- When multiple conduits are installed in one trench, the largest conduits are installed on the bottom of the trench
- To facilitate future cable installation, conduits are placed as straight as possible within the trench
- Use of shared trenches must be approved by NBN Co, which approval will be, among other things, dependent on achieving the required level of cover of the NBN Co conduit.

### 5.2.6 Service Drop Conduits

NBN Co requires the following when dealing with service drop conduits in general:

- For Single Dwelling Units (SDUs) the conduit is a white 23 mm (nominal Internal Diameter) PVC conduit
- For Multi Dwelling Units (MDUs) the conduit is a white 50 mm (nominal Internal Diameter) PVC conduit
- This conduit should meet the minimum requirements of:

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Underground Network Components

- AS/ACIF S008:2006 (Requirements for Customer Cabling) as it applies to customer cabling products
- ACIF C524:2004 (External Telecommunication Networks).
- The conduit is labelled as per AS/ACIF S008: 2006 as it applies to customer cabling products with the added descriptor of "NBN Co"
- The conduit is sealed at both ends and is fitted with draw tape.

Specifically for New Development deployment:

- The service drop conduit is extended from either the local network or boundary pit (depending on whether it is a single or a dual side deployment) to the lot boundaries
- The conduit is not installed more than one metre inside the lot. The location of the service drop stub should be marked for builders to locate or by installing a bend that points upwards so that it protrudes through the surface of the ground.
- Where practical, multiple, individual service drop conduit should share boundaries
- The conduit is extended to the premises at a future date and, therefore, should be located in a position to facilitate this.

5.2.7 Conduit Testing

All installed conduits (except the service drop conduit) require testing via the installation of a mandrel with a diameter of no less than 80% of the internal duct diameter. This mandrel is hauled through to check for conduit concentricity and continuity.

After conduit testing has been performed, a draw tape or similar (suitable for use as a cable hauling aid), shall be installed within each conduit (except the service drop cable) and the conduit ends sealed.


**Note:** Where the service drop conduit is longer than three metres or contains bends in excess of 15 degrees the service drop conduit shall be fitted with a draw cord.

5.2.8 Conduit Sealing

Once testing is finished and the conduit integrity is identified as acceptable, all conduits are sealed using plastic duct covers.

5.2.9 Identification Tape

Where a conduit is installed in an open trench, identification tape – clearly denoting telecommunication conduits or services – is installed 300 mm below final ground cover.

<b>Important Note</b>		No metallic tracer wire or tape is to be installed within the NBN Co network.
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**5.2.10 Conduit Depths and Cover**

The NBN Co minimum depth and cover of conduits in New Development sites are listed below.

Local Council or State requirements might dictate a different minimum cover depth is used. In this case, Local and/or State requirements overrule NBN Co guidelines.

Location	Minimum Cover
Service Drop Conduit	300 mm
Verge	450 mm
Road	600 mm
Road (controlled by State or Territory Road Authority)	800 mm to 1200 mm (as per local jurisdiction)

**5.2.11 Clearance from Other Carriers and Services**

Service Item	Minimum Radial Clearances	
Gas Pipe	Over 110 mm	300 mm
	110 mm or Less	150 mm
Power	High Voltage	300 mm* <sup>1</sup>
	Low Voltage	100 mm* <sup>2</sup>
Water Mains	High Pressure/Capacity	300 mm
	Local Reticulation	150 mm
Sewer	Main	300 mm
	Connection Pipe	150 mm
Other Telecommunications	100 mm* <sup>1</sup>	

\* 1 – Only where protection barriers are used, for example, conduit, bedding, marker tape and cover batten.

\* 2 – Reduced separation is possible where all parties (including NBN Co) are consulted and / or agree, for example, in full (FAA) and Shared Trench Agreements.

**5.3 Pit Guidelines**

**5.3.1 Pit Types and Definitions**

The following table lists the pit types and definitions as a guide only.

Location / Descriptor	Length
Boundary Pit	The boundary pit provides an access location between the local network conduit and the service drop conduit.
Local Network Pit (for MPTs)	The local network pit is located on the local network duct (100 mm ID) and provides an access location between the local network conduit, the local lateral conduit, and the service drop conduit. This location will also house a MPT.
Local Network Connection Pit	The local network connection point is located on the local duct network and houses a fibre splice closure.

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Location / Descriptor	Length
<b>Distribution Pit</b>	The distribution pit is installed on the Distribution Network conduit and is used to provide mid-point hauling locations and housing of distribution splice closures. The entry and exit locations of the development have a distribution pit installed to facilitate cable installation.
<b>Fibre Distribution Hub (FDH) Pit</b>	An FDH Pit is installed within five metres of the final position of the FDH, and a single 100 mm conduit is installed between the FDH Pit and the final FDH location.

5.3.2 Network Pits and Lids

The following table lists the pit sizes as a *guide only*.

**Note:** These sizes are the *nominal exterior dimensions* you should consider when sourcing appropriate pits for New Developments.

More information can be found on the NBN Co website.

Location / Descriptor	Length	Width	Depth
<b>Local Network Pit / Boundary Pit</b> (for Premises Connection Points)	700 mm	450 mm	650 mm
<b>Local Network Connection Pit</b>	1360 mm	555 mm	860 mm
<b>Distribution Pit</b>	1360 mm	555 mm	860 mm
<b>Fibre Distribution Hub Pit</b>	2000 mm	555 mm	900 mm

Pits and lids selected must meet the following *minimum* requirements:

- The pit construction must ensure that the top rim of the lid will not warp or bend when installed as per the manufacturer’s specifications
- The pit and its fittings must not have exposed sharp edges
- Pit lids must weigh no more than 30 kg each (which may mean larger pits have split-lids), with the weight of the lid clearly labelled on the lid
- Pit lids must have a pit lid lifting tool hole at each end of the lid (or at each end of each split-lid part) capable of being used with an industry accepted lifting tool
- Pit lid lifting holes must be designed to prevent the insertion of materials including needle sharps (for example, fitting a gasket)
- Pit lid to surface must be designed to prevent water gathering/pooling and have a slip resistance rating for wet conditions compliant with *AS/NZS 4586* (Slip resistance classification of new pedestrian surface materials). A certificate of compliance from an independent laboratory must be available as evidence.

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- Pit lids must have a load rating of at least **Class B** as per AS 3996 (Access covers and grates). A certificate of compliance from an independent laboratory must be available as evidence.
- The pit lids shall be labelled as a communication pit.

### 5.3.3 Pit Installation

NBN Co requires the following for pit installation:

- Install pits in an easily-accessible location to facilitate installation and operational tasks
  - Position pits with their long side parallel to the adjacent property boundary or roadway
  - Use pit bedding and backfill as per specification
- Note:** Use compact soil in compliance with this specification, otherwise pits may buckle as soil subsides. If pits buckle, pit lids no longer fit. Where a concrete collar surrounds the upper rim of the pit, it is important that its depth is constant.
- Conform to slope and ground level when reinstating
  - Ensure the correct pit is installed for the intended use
  - Ensure a pit is installed where conduit changes direction.

Pits should *not* be installed:

- In unmade sections of carriageways
- Within five metres of a corner of a street or in vehicular access ways
- Within 1.2 metres of any kerb
- Within three metres from any pole
- Outside a doorway
- In driveways
- In roadways areas
- On road edges
- In a hazardous area.

### 5.3.4 Conduit Installation into NBN Co Pits

NBN Co requires the following when installing conduits into NBN Co pits:

- Seal all entries between the conduit exterior and the pit wall
- Install all conduits within a single trench into the pits located in that trench. Avoid bypassing the pit with a conduit
- Conduits:
  - That are distribution or local through conduits, are placed at lowest point of pit end wall
  - That are road crossing or direction change conduits, are placed roadside
  - That are service drop conduits, are placed property side and above all local and distribution conduits
  - Enter the pits via the end of the pits only
  - Are located centrally with at least 50 mm of space between the conduit exterior and the pit floor
  - Where multiple ducts enter a pit, 25 mm minimum separation is required between each duct
  - Have a cable draw tape or similar installed (suitable for use as a cable hauling aid)
  - Are sealed with plastic duct plugs

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- Where required, conduits from the trench should be gradually reduced from the minimum cover to align with the pit wall entry
- Conduit ends:
  - Finish square and flush with the pit end walls
  - Are fitted with bushes flush with the pit wall ends.

**5.3.5 FDH Plinth Location**

NBN Co requires the following when locating the FDH plinth:

- Ensure FDH plinth location can be made level to eliminate any trip hazard
- Align as per local council requirements for street furniture
- Ensure the distance from the corner is five metres Back of Kerb (BoK)
- Ensure the distance from roadway is as per local council requirements for street furniture or one metre BoK
- Ensure working conditions at the cabinet are safe. For example:
  - No worker should be standing on or very close to a roadway or driveway
  - It should be unlikely for the cabinet to be struck by an out-of-control vehicle, for example, do not place the cabinet at the corner of an intersection
- Plan FDH sites where the cabinet will be placed on a legal road reserve or within Existing Easement in Gross
- Locate the cabinet within sight of dwellings / buildings and is reasonably lit by street lighting. This is for cabinet security to discourage vandalism.
- Locate the cabinet where it will be visually unobtrusive and not interrupt pedestrian flow
- Ensure the cabinet location will not obstruct traffic visual lines-of-sights, for example, at intersections / drives
- Plan FDH sites where the cabinet will be placed on stable ground and is unlikely to slip
- Ensure the cabinet's location is unlikely to be affected by future road works, for example, road-widening
- Locate the cabinet where it is unlikely to get flooded after heavy rainfall
- **Note:** It is acceptable to be in a 50-year-flood area but avoid areas that encounter regular flooding.
- Minimise exposure to extreme weather, for example, high winds and lightning on hill tops
- Do not locate an FDH in an Earth Potential Rise (EPR) area and ensure a minimum distance of 10 metres from any existing or known Substations, HV Earths and transformers
- Ensure doors can be fully opened without obstruction
- Install in a low traffic area
- Install in an accessible location where there will be adequate, safe parking for staff
- Ensure there will be no visual or physical obstructions to pedestrians and vehicles
- No not install the FDH on a street corner or T-intersection
- Plan FDH sites where the cabinet will not block future driveways on undeveloped land
- Ensure easy access to the cabinet. For example, ensure the cabinet is not situated behind security gates in a subdivision when the cabinet also serves premises outside that subdivision.
- Ensure the cabinet is not placed within the future root-zone of any trees

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- Ensure the cabinet is not placed adjacent to a planned Recreation 1 area (resource consent is required).

<b>Important Note</b>		While FDH installation is not required as part of the pit and conduit deployment, the location and allocation of sufficient space is vital to the future installation of the passive fibre network.
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## 6 Appendix A – Key Terms

Term	Description
<b>Access Seeker</b>	A customer acquiring NBN Co wholesale services with the intention to supply internet services to Retail Service Providers (RSPs) or End-Users.
<b>BoK</b>	Back of Kerb
<b>CAD Computer-aided design</b>	A format developed by Autodesk and used by the AutoCAD software application for 2D and 3D design and drafting.
<b>DN Distribution Network</b>	The part of the network that connects the FAN to the FDH.
<b>FAN Fibre Access Node</b>	A facility that houses the active equipment providing services to a Fibre Serving Area (FSA). Note that Urban FANs may also provide a Point of Interconnection to Access Seekers.
<b>FDA Fibre Distribution Area</b>	The area served via a single Fibre Distribution Hub (FDH).
<b>FDH Fibre Distribution Hub</b>	The equipment located in a Fibre Distribution Area where Distribution Fibre is split to provide Local Fibre that runs down each street.
<b>FTTP Fibre to the Premises</b>	The network design in which the fibre network is deployed to each premises.
<b>LF Local Fibre</b>	Connection between the Fibre Distribution Hubs (FDHs) and the individual lots via a series of fibre cables, splice closure, MPTs, and service drop cables.
<b>LN Local Network</b>	The part of the network from the Fibre Distribution Hub (FDH) down each street.
<b>MDU Multi Dwelling Unit</b>	A premise that contains more than one dwelling unit, which can range from duplexes to 200+ unit apartment blocks
<b>MPT</b>	Multipoint Terminal
<b>New Developments</b>	A new or undeveloped piece of land that represents the growth of the premises market.
<b>NTU Network Termination Unit</b>	NBN Co's termination point, for residential fibre services (typically) featuring 4 Ethernet and 2 telephone interfaces.
<b>PCD Premises Connection Device</b>	A unit to terminate the service drop cable to the side of the premises.
<b>SDU Single Dwelling Unit</b>	Premises that contains only one dwelling unit.

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## 7 Appendix B – Key Documents

The following documents were used as reference when writing this document.

Document No	Document Title	Owner/Link
1.	<b>AS/ACIF S008:2006:</b> Requirements for Customer Cabling	<a href="#">Communications Alliance</a>
2	<b>AS/NZS 4129:2008:</b> Fittings for Polyethylene Pipes for Pressure Applications	<a href="#">Standards Australia</a>
3.	<b>AS/NZS 4130:2003:</b> Polyethylene Pipes for Pressure Applications	<a href="#">Standards Australia</a>
4.	<b>AS/NZS 2032:2006:</b> Installation of PVC Pipe Systems	<a href="#">Standards Australia</a>
5.	<b>ACIF C524:2004:</b> External Telecommunication Cable Networks	<a href="#">Communications Alliance</a>
6.	<b>AS/ACIF S009:2006:</b> Installation Requirements for Customer Cabling (Wiring Rules)	<a href="#">Communications Alliance</a>
7.	<b>G591:2006:</b> Telecommunications in Road Reserves-Operational Guidelines for Installations	<a href="#">Communications Alliance</a>
8.	<b>AS/NZS 4586</b> Slip resistance classification of new pedestrian surface materials	<a href="#">Standards Australia</a>
9.	<b>AS 3996</b> Access covers and grates	<a href="#">Standards Australia</a>

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## ADDENDA ITEM 3

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# **NATIONAL BROADBAND NETWORK (NBN) VICTORIA MAP**

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# Victoria

These maps provide an indicative representation of the fibre and wireless components of the National Broadband Network. The information in these maps is based on initial detailed modelling work done by NBN Co which may be subject to change following more detailed planning and design work. The fibre modelling is based on NBN Co's current optical fibre design rules rather than detailed premise location and density and may not result in contiguous coverage of all locations within the indicated fibre footprint. The wireless modelling does not take into account terrain modelling and clutter, and may not result in contiguous coverage of all locations within the indicated wireless footprint; these maps also assume that satellite services will be provided to remaining premises. The Transit links represent indicative connectivity. The physical path will vary depending on the geography and the presence of existing infrastructure.



- Optic Fibre Footprint
- Fixed Wireless Footprint
- Satellite Footprint
- Transit Links

