Specification CP13 – Specification for Underground Civils and Associated Work

For Communication Providers (CPs) – Civils

The purpose of this specification is to provide CPs with details of the Engineering Principles that apply where they want to use Openreach's ducts pursuant to and in accordance with the terms of Openreach's Physical infrastructure Access (PIA) product. This specification contains details of the Engineering Principles and standards for duct installation, blockages, chamber entries and lead-ins when using PIA. Nothing in this document removes obligations on the CP to comply with any and all health, safety and other laws and regulations and to comply with Good Industry Practice.

Contents

1 General

1.1 Issue 1 suffixes the first issue of a specification. When a specification is re-issued, the issue number is advanced sequentially.

1.2 Except when a specification is completely re-written, an amended clause is indicated by a star adjacent to the clause number and the particular portion amended is indicated by a vertical line in the margin.

1.3 When a supplementary specification is quoted by number only the latest issue of that specification shall be followed, but if in addition to the number, a particular issue is quoted, that issue of the specification shall be followed.

1.4 If any further information in connection with this specification is required then you must submit a full written application to the Specifying Authority (SA) found in Section 23 setting out the information required and the reasons.

1.5 In this document where we use words "shall" and "must" then these are obligations which a CP has to satisfy when using PIA. If we use the word "should" then a CP must use all reasonable endeavours to satisfy the requirement but may deviate subject to the other requirements set out

2 Scope

This document forms part of the Engineering Principles range of documents and is applicable to external PIA CP's. The following describes and details the requirements for PIA CP's working on or in the BT Underground Duct Network.

This document is meant to be used by appropriately trained and competent personnel who have good experience of working below and underground as set out in Schedule 3 of the PIA contract and the Accreditation Guidelines.

3 Materials

3.1 Specifications

Where British Standards, or other specifications, are quoted these will be the current issues adopted by the British Standard Institution or other Authority. Where equivalent European standards, to those quoted, exist, then the European Standards must be adhered to insofar as they are deemed to apply.

All materials not otherwise specified shall be in accordance with the conditions above.

3.2 Cement

1) All cement used shall comply with the requirements of the following;

BS EN 197 Specification for Portland Cement.

BS4027 Specification for sulphate-resisting Portland cement.
BS EN 450-1:2005+A1 Specification for Fly ash for concrete. Definition, specifications and conformity criteria.

BS5838-1 Specification for dry packaged cementitious mixes. Prepacked concrete mixes. BS EN 998-2 Specification for mortar for masonry. Masonry mortar.

BS EN 15167-1 & 2 Ground granulated blast furnace slag for use in concrete, mortar and grout. Definitions, specifications and conformity criteria

2) The use of High Alumina (HA) cement shall not be permitted.

3) The CP's may employ rapid hardening Portland cement in lieu of ordinary Portland cement for their own convenience and acceleration of progress.

4) Cements of different types shall not be mixed one with another.

5) Where cement is kept on site it shall be stored according to BS EN 197.

3.3 Reinforcement

1) All reinforcement shall comply with the requirements of BS4449 - Steel for Reinforcement of Concrete with the exception of plain round bar. For sizes up to and including 12mm in coil, plain round wire of Grade 25 MPa shall be to BS4482. BS EN10025-1 shall be used for larger sizes and dowel bar applications. BS EN 13877-3 is to be used for dowel bars for use in concrete pavements.

2) Unless otherwise specified all main reinforcement to be Type 2 with a specified characteristic strength of 500 N/mm2. Secondary reinforcement to be plain round steel bars with a specified characteristic strength of 250 N/mm2.

3) All reinforcement material supplied must be supported by test certificates, which certify compliance to BS4449.

4) All reinforcement steel scheduling, bending and cutting shall comply with the requirements of BS8666.

3.4 Aggregates

1) All aggregates used shall comply with the requirements of BS EN12620 - Aggregates for concrete.

2) Course aggregate shall be in accordance with the requirements of BS EN12620 Table 2. Unless otherwise stated grading should be up to and including 20mm.

3) Fine aggregate shall be in accordance with the requirements of BS EN 12620 Table 4.

4) All aggregate supplied must be supported by supplier information as defined within sections 7, 8 & 9 of BS EN12620.

3.5 Additives

1) The use of additives in cement or concrete for works carried out exclusively under this Specification may only be employed in ready mixed concrete and guaranteed by the ready-mix concrete supplier. Placing times must be adjusted to suit suppliers' recommendations.

Prior approval for the use of any additives in site mixed concrete must be obtained from the Openreach Chief Engineering, Civils Standards Team.

3.6 Concrete

1) All concrete used shall comply with this specification and the requirements of:

BS EN206 - Part 1: Concrete. Specification, performance, production and conformity

BS8500 – Concrete

Where test results indicate that the concrete is non-compliant, the CP's may, at BT's discretion, be instructed to remove all non-compliant material and to replace it with material of suitable quality according to this specification.

2) Care must be taken prior to, during and after mixing to ensure that the concrete or mortar ingredients, collectively or separately, are not allowed to enter gullies or drains. All highway surfaces footway or carriageway should be protected from concrete staining.
Sand and aggregate, shall be stored separately on site. All other materials must be kept dry and free from any deleterious materials.

The standard of cleanliness of water for mixing is that it shall be fit for drinking.

3) Unless otherwise specified all concrete used for ancillary work shall be Grade 8/10 ready mixed to mix designation ST 2 as defined within Annex A of BS8500: Part 1. Tables A.9 and A.17.

4) Concrete used as surround to duct apparatus shall be a minimum Grade 16/20, with a nominal maximum 10mm aggregate size, in accordance with BS EN12620

3.7 Bricks

1) Bricks shall be in accordance with BS EN771 & BS EN772 - Clay Bricks.

2) Bricks shall be Class A or B Engineering Bricks in accordance with Table NA.6 of BS EN771-1. They shall be type FL in accordance with Table NA.5 of BS EN 771-1.

3) Bricks shall be marked in accordance with ZA.3 of BS EN 771-1.

4) Bricks for the use of corbelling shall be Class A or B Engineering Bricks but without holes or frogs. (HA-104)

3.8 Masonry & Mortar

1) Unless otherwise specified materials and workmanship shall be in accordance with BS 5628 - Use of Masonry - Parts 1 and 3.

2) Mortar shall be as designated within BS 5628; Part 1 - Requirements for Mortar Table 1; Type (i)

3.9 Earth Free From Stones

Material surround to duct apparatus:-

1) A material which must be graded, pass a 14.0mm sieve and otherwise comply with the requirements of Appendix A1 of the Specification for Reinstatements of Openings in Highways, a Code of Practice under sections 71 and 130 of The New Roads and Street Works Act 1991.

2) Coarse aggregates that meet the criteria for (1) above and mainly retained on a 5mm BS410 test sieve, and in accordance with BS EN 12620.

3) Materials in Par 3.9 (1) & (2), shall be capable of being thoroughly compacted around and between, ducts of any type. In either case the material shall not cause damage to the ducts during compaction and backfilling, and shall not leave voids or form a watercourse.

4 Excavation

4.1 General

The CP's shall excavate in the Highway, in strict accordance with the requirements of the New Roads and Street Works Act 1991, and, in accordance where applicable to BS 6031; (Code of Practice for Earth Works).

4.2 Excavated Material

Excavated material shall be protected in accordance with the New Roads and Street Works Act 1991- Highways Authorities and Utilities Committee (HAUC) Specification for the Reinstatement of Opening in Highways. Unsuitable excavated material shall be removed from site and suitable backfill material shall be imported and reinstated as per the above specification.

4.3 Excavations

1) **Mechanical Excavation**. Any mechanical excavator must be capable of allowing for, and, should be used in such a manner as to fulfil the requirements of segregation /separation of materials and width of trench obtainable by using manual excavation or, any other requirements of this Specification.

2) **Excavation**. Excavation shall be carried out in a controlled manner using equipment and methods appropriate for the task.

3) **Excavation in the vicinity of trees**. Special care must be taken when excavating in the proximity of trees to ensure that damage to primary roots or body of the tree does not occur. Hand excavation, wherever possible, is to be carried out in such locations. When the following guidelines cannot be followed, advice must be sought from the Local Authority Agricultural Officer and reference made to NJUG publication Volume 4 titled "Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees".

4) **Cutting of Tree Roots**, roots of 25mm diameter or more should not be cut. (NJUG 4)

   Where damage has been proved to be as a direct result of excavation or reinstatement works, the CP's shall bear all costs incurred for any remedial action required.

4.4 Silencers

The CP's shall comply with any national or local regulation or by-law, to ensure that equipment used during works is fitted with suitable silencing devices, which minimise and eliminate undue noise.

4.5 Protection of Paving

The CP's shall take all necessary steps to prevent damage or contamination to paving by their plant and equipment.

4.6 Excavation Support

1) The excavation shall include all necessary timbering, sheet piling and shoring to maintain stability of the excavation.
2) The supports of an excavation shall be so designed and placed to prevent loss of any ground and to permit, wherever practicable, withdrawal of such supports and consolidation of the space occupied. Prior written agreement must be obtained from BT and formally recorded where the withdrawal of supports is considered impractical.
3) Existing mains and other services shall be adequately supported by temporary slinging or strutting or, by brick or concrete piers.

4.7 Width of Trench

In no case shall the width of trench excavated be greater than is reasonably necessary for satisfactory execution of the work.

4.8 Ground Water Lowering

The CP's shall take all reasonable measures to keep all excavations in dry condition and:

1) Supply all necessary equipment and temporary drainage as required.
2) Ensure that no fines, silt or other soils are drawn from the existing soil through the riser pipes in order to eliminate subsidence due to soil migration or shrinkage.
3) The CP's must attain any prior approval necessary from the promoting authority for the discharge of water into their system
4) All extracted water shall be properly disposed of.

5 Duct Blockages and Repair

5.1 Repairing Ducts (Clearing Blockages)

All duct shall be repaired using the appropriate BT items listed below.

NOTE : Cast Iron Ducts, Duct 100 (¾" PE), older Iron/Steel Alloy smallbore variants and Duct 102 (27mm ID LDPE) are subject to ongoing development trials. Currently, they are not part of the approved range of repair options. These scenarios should be resolved by an 'overlay solution'.

Debris shall be removed from the affected area, ensuring that there are no sharp edges or burrs that may cause damage to in-situ cables or during future cabling operations.

When a duct repair is to be performed on SAD or Earthenware duct, the damaged duct must be cut back to a clean square edge or the spigot and socket ends, to enable the repair kit to be installed.

TYPE OF DUCT	ITEMS TO BE USED	ITEM CODE
Duct 56 Nominal bore 49mm	Duct 56 split, 3 metre lengths, and straps cabling fixing 10A.	095086
Self-Aligning Duct (SAD) 11 Nominal bore 76mm (3 inch) NB. The repaired bore will be reduced to 67mm.	Duct Repair Kit No.2A Duct 59A split supplied in 3 metre lengths.	095089 095088

Duct 54, 54D & 55 Nominal Bore 90mm SAD 5, 6, 7, 8, 9 & 10. Duct 15, 16 Nominal Bore 92mm (35/8inch) NB. The repaired bore will be reduced to 82mm.	Duct Repair Kit 3A Duct 54D split, supplied in 3 metre lengths.	095051 095039
SAD 12 Duct 57 Both of nominal bore 102mm NB. The repaired bore will be reduced to 92mm.	Duct Repair Kit 4A Duct 57 split, supplied in 3 metre lengths.	095090 095087
Duct Bends	Duct Bend cut longitudinally on site Straps Cable Fixing 10A Strip Duct fitted longitudinally	as required 094979

Duct Repair (issue 1).pdf

The attached method statement shall be followed for the repair of a damaged duct.

5.2 Completion of Duct Blockage

Unless otherwise specified, all duct shall be covered by a layer of "Earth, Free from Stones" and compacted in layers - providing a finished thickness of not less than 75mm. Any spaces between the duct and the sides of the trench shall be filled with well compacted "Earth, Free from Stones". Compaction shall be by hand or mechanical methods, to suit site conditions.

5.3 Draw Rope

Unless otherwise specified a draw rope shall be threaded through and left in every "way" following duct blockage clearance. Draw rope shall not be joined for the purpose of conserving lengths shorter than 50 metres.

6 Jointing Chambers

6.1 Protection of Cables and Associated Equipment

During the cutting of duct entries into an existing structure, the CP's shall take all reasonable measures to protect cables and associated equipment. Such measures shall include any or all of the following requirements-

1) **All movement of cables** shall be carried out in a controlled manner such that all cables are evenly supported throughout their length.
2) **For access into and out of manhole excavations** Under no circumstances may cables, joints and equipment be used for climbing, standing or sitting on.
3) **Sufficient pumping capacity** shall be made available and operated to ensure that when cables are removed from their bearers they shall not be immersed in water at any time.
4) **All cables shall be protected** at duct entries by shielding as necessary against mechanical damage.
5) **CP's plant or materials** shall not be supported on cables or associated equipment at any time.
6) **On Completion** all cables shall be left adequately supported on the ironwork.

6.2 Duct Entries

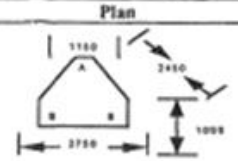
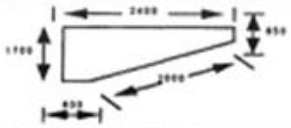
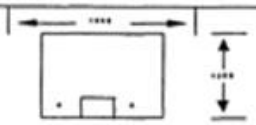
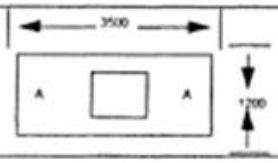
1) **Clearance of Ducts**
Ducts shall enter Manholes. The ducts shall enter a manhole at such depths that will ensure a minimum clearance of 350 mm above the floor, 450 mm below the roof and 100mm from any adjacent wall.
Duct entries must not be made in a manhole access shaft, roof or floor.
Duct entries shall be 150mm from any chamber access step.
Ducts shall enter joint boxes. The ducts shall enter the Joint box a minimum 150mm above the floor, and 75mm from any adjacent wall.

2) **Duct Entries Into Existing Structures**
   i. **General** - existing structures, such as Manholes and Jointing Chambers, shall have new duct entries cut by core drilling techniques only. Where the duct enters the chamber the finish shall be flush and smooth. The gap around the duct shall be filled for the full depth of the wall with cement grout, cement mortar or, suitable mastic or silicone, with no protrusions that may cause damage to cables.
   ii. **Position of Entry** - Where practicable the structural reinforcement shall not be cut or exposed. If steel bars are cut or exposed they shall be treated with a rust inhibitor.
   iii. **Protection** - the CP's shall protect BT (and other CPs) cables and/or equipment, prior to drilling operations.

Note: Cover Connecting Pins must be fitted prior to the installation of triangular covers.

Manholes may be identified by the standard CW1 access cover. A range of types and sizes exist in the network.

Code	Type	Construction: Walls: Brickwork (in. thick)	Construction: Walls: Reinforced concrete (in. thick)	Construction: Roofs: Reinforced concrete (in. thick)	Internal dimensions: Length (ft. in.)	Internal dimensions: Breadth (ft. in.)	Internal dimensions: Depth (ft. in.)	Type of cover	Date of origin
BWC1	C/way	9	-	5	6 0	4 0	5 6)	Frame M/H No 8	Apr 1933
BWC2A	C/way	14	-	7	10 0	4 0	6 0)	and Cover M/H	Apr 1933
BWC2B	C/way	14	-	7	10 0	4 0	6 6)	No 4 Later	Apr 1933
BWC2C	C/way	14	-	7	10 0	4 0	7 0)	changed to Frame	Apr 1933
BWC2D	C/way	14	-	7	10 0	4 0	7 6)	and Cover M/H	Apr 1933
BWC2E	C/way	14	-	7	10 0	4 0	8 0)	No 3	Apr 1933

Manhole: Code	Manhole: Drg	Excavated Volume (M³): F/W	Excavated Volume (M³): C/W	Excavated Depth: F/W	Excavated Depth: C/W	Internal Dimensions: Plan	Internal Dimensions: Height	Maximum Number of Ducts to Enter Through Walls A, B & C
MRT8B	CN1956	25 48	26 80	2730	2870		2150	A36 B18
MRT8C		28 28	29 60	3030	3170		2450	A48 B24
MRT9	CN1957	11 47	12 10	2530	2670		2000	A24 B18 C24
MRX1	CN14101	9 0	9 5	2550	2690		2000	A6
MRX2A	CN14102	15 5	16 4	2550	2690		2000	A24
MRX2B		16 9	17 8	2765	2915		2225	A28
MRX2C		13 3	19 1	3000	3140		2450	A32

6.3 Reinstatement of the carriageway and footway

This shall be commenced, in accordance with the relevant reinstatement specification, Specification for the Reinstatement of Openings in Highways (SROH)

6.4 Prior to Opening to Traffic

Before opening to pedestrian or vehicular traffic the following conditions must be met:

1) The seating's of the Frame and Cover(s) shall be clean and the covers shall fit firmly, flush and level within the Frame. The covers shall not rock or foul any existing removable grids or the sides of the shaft or joint box walls.

2) If there is evidence of rocking or fouling, the cover shall be removed and remedial action taken to correctly fit the cover. The site shall not be left unguarded until the covers are correctly seated within the frame, in a manner acceptable to BT.

6.5 Lifting Tools for BT covers

For Footway covers, use Keys Joint Box No 5
For Carriageway covers, use Lifter Manhole Cover No 4A.

In exceptional cases, after on site risk assessments have been carried out and the appropriate precautions taken, T keys may be used for Carriageway covers.

N.B. BT does not supply keys or lifting tools, but they can be purchased from: T W Engineering
Angular House
Eagle Road
Quarry Hill Industrial Park
Ilkeston
Derbyshire
DE7 4RB
Tel 0115 932 3223

6.6 Jointing Chamber construction

6.6.1 Overbuild

CP's may build a joint chamber over any existing section of Openreach duct using suitable qualified and accredited operatives or contractors in accordance with the construction Engineering Principles (Appendix 1), excluding sections of multiway duct with a manhole on each end. The jointing chamber must pick up all the ducts in nest and be of an appropriate size to do so.

You must use approved Openreach branded materials. You will be required to 'gift' the joint chamber to Openreach on completion of build and this will then become our equipment and part of the Openreach network.

6.6.2 Positioning

Jointing Chambers shall conform to the standard drawing(s) and/or other drawing(s) in Appendix 1.

To enable access for future Pole Testing, a Brickwork, Concrete or JMF Series of Modular Jointing Chambers should be sited a minimum distance of 300mm from a Telephone Pole. Prefabricated boxes other than Brickwork, Concrete or Modular construction shall be sited a minimum distance of 1000mm from the pole.

The frame and cover of a jointing chamber shall be installed flush and level with the surrounding ground. The construction tolerance between the levels of the fixed feature and immediately adjacent surfaces shall not exceed +/- 6mm. All covers shall be located so that they may be removed safely with BT standard equipment.

6.6.3 Joint Box Standard Types

The standard types of joint boxes with their code references are as follows: -

(i) **Concrete joint boxes:**

Item	**Drawing Number**	**Reinforced Concrete Code**	**Drawing Number**	**Unreinforced Concrete Code**
Carriageway				
No.4 No.11	CN15644 CN14159	JRC4# JRCX11#	N/A N/A	
No.12	CN14160	JRCX12#	N/A	
No.14	CN14161	JRCX14#	N/A	
Footway				
No.102	N/A		CN14979	JUF102#
No.104	N/A		CN14980	JUF104#

No.106	CN14981	JRF106#	N/A	
No.110	CN14982	JRF110#	N/A	
No.111	CN14983	JRF111#	N/A	

These joint boxes have a range of internal depths.

(ii) **Brickwork joint boxes:**

Item	Drawing Number	Code
Footway		
No. 102	CN14979	JBF102#
No. 104	CN14980	JBF104#
No. 106	CN14981	JBF106#
No. 110	CN14982	JBF110#
No. 111	CN14983	JBF111#
Carriageway (for Newsites only)		
No. 3N	CN15648	JBC3N
No.4	CN15644	JBC4

These joint boxes have a range of internal depths.

Footway joint boxes (both brickwork & concrete) Where there is evidence or significant risk of vehicles using a soft verge e.g. as an undertaking area opposite a T-Junction, a passing point on a narrow road or a parking area, it will be necessary to install a Carriageway Chamber, Frame & Cover.

Carriageway joint box JBC3N is a brick based chamber designed for use in **New Site locations only**, where kerb lines are not clearly defined or where vehicular traffic is likely to exceed 5mph. The chamber does not come in variable depths.

(iii) **Modular joint boxes**

Item	Drawing Number and installation procedure	Drawing No.	Code
Footway			
No. 101	see JMF 101 section below & Appendix 1	JMF101	JMF101
No. 102	see JMF 102 section below & Appendix 1	CN14979-03	JMF 102
No. 104	see JMF 104 section below & Appendix 1	CN14980-05	JMF 104
No. 106	see JMF 106 section below & Appendix 1	CN14981-04	JMF 106
No. 110	see JMF 110 section below & Appendix 1	CN14982-04	JMF 110

These joint boxes have a range of internal depths dependent on the number of rings used.

The JMF series of footway joint boxes can be used similarly as their brick and concrete counterparts. This includes footways, grassed and pedestrian areas which may include occasional slow moving vehicular traffic. (Up to 5mph)

Where there is evidence or significant risk of vehicles using a soft verge e.g. as an undertaking area opposite a T-Junction, a passing point on a narrow road or a parking area, it will be necessary to install a Carriageway Chamber, Frame & Cover.

Details of the Joint box Modular Footway 101, 102, 104, 106 and 110 are available in Appendix 1.

Drawing specification CN14982S04 Rev B should be used for the installation of the JMF 110 chamber. The Cubis Industries installation guide is available in Appendix 1.

The **JMF101** is an alternative, small jointing chamber used to provide access to buried joints in the soft verge, supplied with a frame & cover. It is often built as a shallow chamber where the JB23 or JB26 are too deep. The JMF101 may also be used in the footway where congestion is an issue but full depth and a concrete base can still be provided. This is a non-standard build but uses the same build principle of the standard modular chamber range. Installation instructions are available from the supplier, Cubis Industries Ltd.

For All Chamber Drawings See Appendix 1

6.6.4 Joint Box Furniture

Chamber furniture can be obtained from the following suppliers.

Item Code	Description	Supplier
070281 070282 070283 070284 070285 070286 070287	Cable Bearer Wall Type 1 Cable Bearer Wall Type 2 Cable Bearer Wall Type 3 Cable Bearer Wall Type 5 Cable Bearer Wall Type 8 Cable Bearer Wall Type 10 Cable Bearer Wall Type 12	CUBIS Industries 4 Silverwood Industrial Estate, Lurgan, Craigavon, Co. Armagh, BT66 6LN +44 (0)28 38 313100
070210	Bracket Cable Bearer 3	BIRMINGHAM STOPPER Ltd, T: 0121 551 7781
070211 070212 070213	Bracket Cable Bearer 5 Bracket Cable Bearer 8 Bracket Cable Bearer 12	BC Barton Tel: 01902 402742
070214 070215	Bracket Cable Bearer 18 Bracket Cable Bearer 24	CUBIS Industries
070858 070131	Pin locking Cable Bearer Foundation Bolts No. 1	BC Barton
071236 073132	Step Manhole 1 Step Manhole 2 (Bolt-on)	SAINT-GOBAIN CONST PRODS UK LTD 0115 930 0697
070724	Iron Anchor 4	BIRMINGHAM STOPPER LIMITED
070291 075851 070302 070301 070298	CABLE SUPPORT 4 CABLE SUPPORT NO 9 CABLE SUPPORT ADJ END 2 CABLE SUPPORT ADJ END 1 CABLE SUPPORT ADJ CENTRE 2	CUBIS Industries
070292	CABLE SUPPORT 5	B C BARTON
070297 070288	CABLE SUPPORT ADJ CENTRE 1 CABLE SUPPORT 1	CUBIS Industries

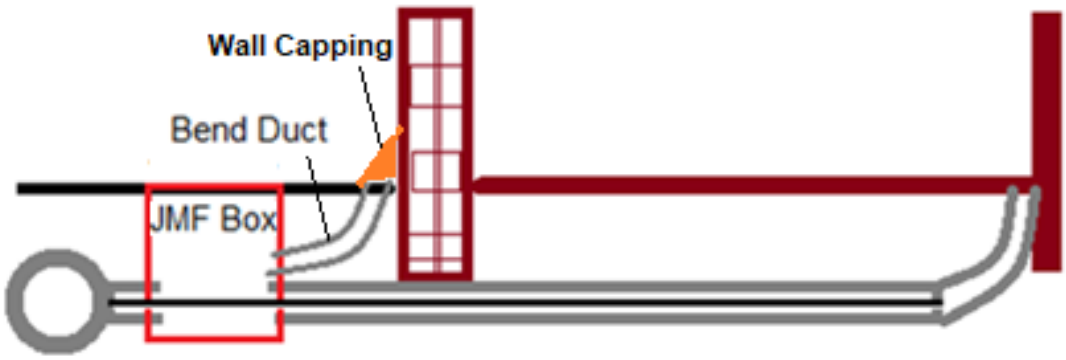
082358 075874 075875 075876 075877 075878 075879	JMF101 JMF102 JMF104 JMF106 JMF110 Frame & Cover Footway 2C Frame & Cover Footway 4C Frame & Cover Footway 5C Frame & Cover Footway 6C Frame & Cover Footway 10C Frame & Cover Footway 11C	CUBIS Industries
095088 095087 094984 095039 095089 095051 095090	Duct 59A Split (3M lengths) Duct 57 Split (3M lengths) Duct 58A Split (3M lengths) Duct 54D Split (3M lengths) Duct Repair Kit 2A Duct Repair Kit 3A Duct Repair Kit 4A	Tatra Plastics Manufacturing Limited 0161 946 9460
100268 095070 100271 094958 094937 095065 095265 090126 094929 095002	Duct 54D (3M Lengths) Duct 54D (1.5M engths) Duct 56 Duct Bend 54 Duct Bend 54A Duct Bend 54B Duct Bend 54C Duct bend 56 Duct bend 56A Duct bend 56 B	Emtelle +44(0)1450 364000
095665 095666 095667 095671	Carriageway Frame & Cover 1 Carriageway Frame & Cover 2 Carriageway Frame & Cover 3 Carriageway Frame & Cover 4	Saint-Gobain Pam UK 0115 930 0697 sales.uk.pam@saint-gobain.com

6.7 Interception of Lead-In duct to Curtilage Wall

The only method of providing lead-in service to customer is via the existing lead-in duct to the consumer building wall. This will avoid all excavation unless unlikely blockages are met. The most likely location of blockages will be found in the invert of lead-in duct bend to customer wall. There are methods to clear these blockages without excavation using the flexible drill method. **See Appendix 2, Civils Avoidance.**

Where it is not possible to use the lead-in duct to the building wall and there is no alternative but to intercept the BT lead-in duct, then this is permitted so long as a jointing chamber (JMF101 or 102) is placed over the duct lead-in. From this box the CP may take out own ductwork to curtilage wall/boundary for

exclusive use. The Bend Duct opening must be covered with suitable wall capping. The Joint box will also satisfy other CP's use to facilitate their own ductwork.



JMF101 on occupied D56 lead-in with spur to curtilage (Method)

The method that CPs shall follow is as follows:

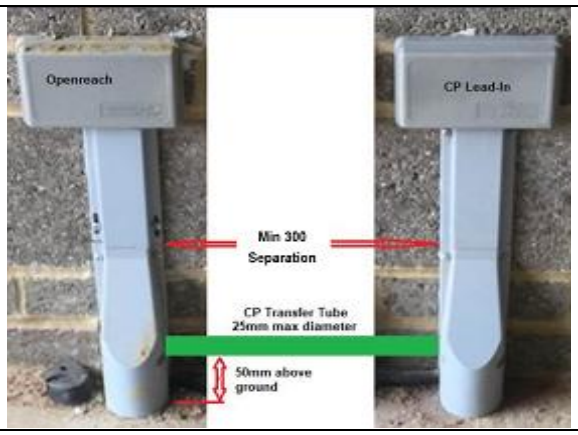
1) Check for other services (Safe Dig prints, CAT)
2) Mark out site
3) Excavate to expose duct which was at 350mm depth of cover (typical depth of BT duct)
4) Make 2 x transverse and 1 x longitudinal cuts in duct section within (using oscillating cutter)
5) Install sub base, first ring and floor
6) Make cut outs second ring to facilitate ducts to JMF101 and boxes (using oscillating cutter)
7) Install second ring
8) Back fill and compact
9) Reinstate
10) Clear site

Duct entries into joint box must be by core drill methods only.

It will be possible to fit additional duct out of the end and side walls of the box if this was required, subject to there being no obstructions (e.g. other services).

6.8 Interception of the Lead-in at the Property Wall

The existing Openreach lead-in may be intercepted by the CP for an **adjacent** or **remote** CP lead-in to the customer property but only where it follows the guide below.

PIA Newsites Awareness Guide (Is		

6.9 Cutting Openreach Duct

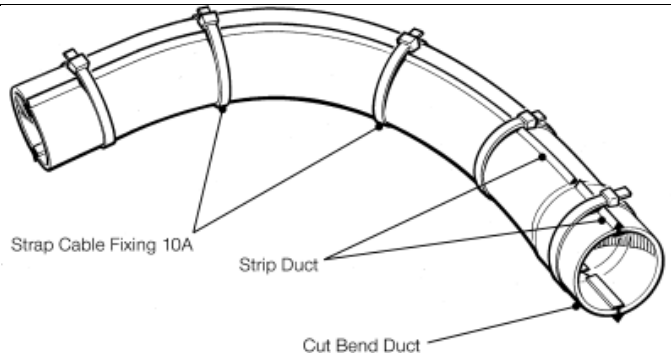
A powered oscillating cutter must be used to cut into the lead in duct has a depth of cut gauge to ensure that any cables inside the duct are not damaged.

6.10 CP Technical Departure from Specification (TDFS)

The specific provision for any departures from specification can be found in Engineering Principles CP16.

6.11 Pole Feeds

When using duct that leads to a Pole, the following apply:

A split duct bend, must only be used for repairing or overlaying direct-in-ground feeds to poles, is not a stores item, but a suitable item can be produced by cutting a standard Bend Duct along its length. The split bend can then be placed around the cables and the edges held together with two lengths of Strip Duct. The two halves can then be held together with Straps Cable Fixing 10A. For a more secure fixing the Bend and Strip Duct may be bonded with Compound 21 as well.	
1) Using masking tape to establish cutting line along the longitudinal length of the duct 2) Using Tenon saw, carefully cut along edge of masking tape to form a split duct 54 bend 3) The duct can be pulled open with sufficient gap to allow existing cables to be inserted.	

4) Use Duct Strip 54 to close the split duct. The duct strip can be pushed the length of the split duct including the collar end of the duct.
5) On the spigot end of the split duct, the duct strip 54 will need to be cut short to facilitate the duct collar or stand-alone collar to form a join
6) With strip attached at the collar end it is still possible to engage the spigot end of an adjoining duct 54.
7) The strip duct forms a reasonable smooth continuation to the duct bore
8) Using cabling straps tighten the split duct together

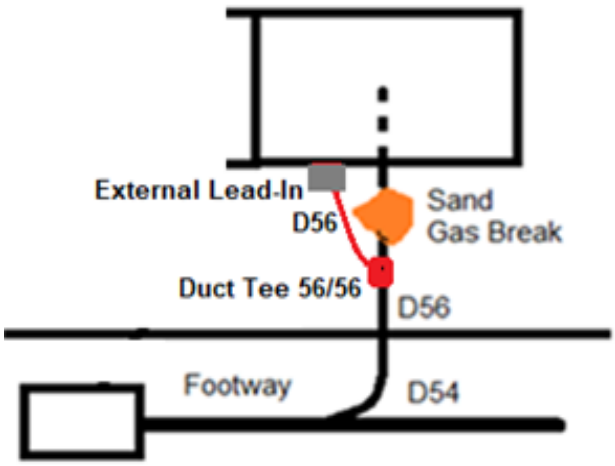
6.12 Sand Gas Breaks and D56 Swept Tees

This process should be used where encountering Gas Break Seals (only for the purposes of gas sealed, buried cable installations in Northern Ireland).

The Gas Break must not be disturbed and must not be cabled through

However, if accessible, rod from property to locate position of gas break in order to fit 'swept tee' beyond it and minimize distance from property for new route to outside wall. Otherwise, assume 2m distance, dig and test rod back to network before fitting swept tee.

A modified Duct Tee 56/56 (i/c 095004) may be fitted at a suitable point on the network side of the 'sand gas break'. This tee can feed a Duct 56 to a suitable point on the outside of the property for a conventional lead-in solution.

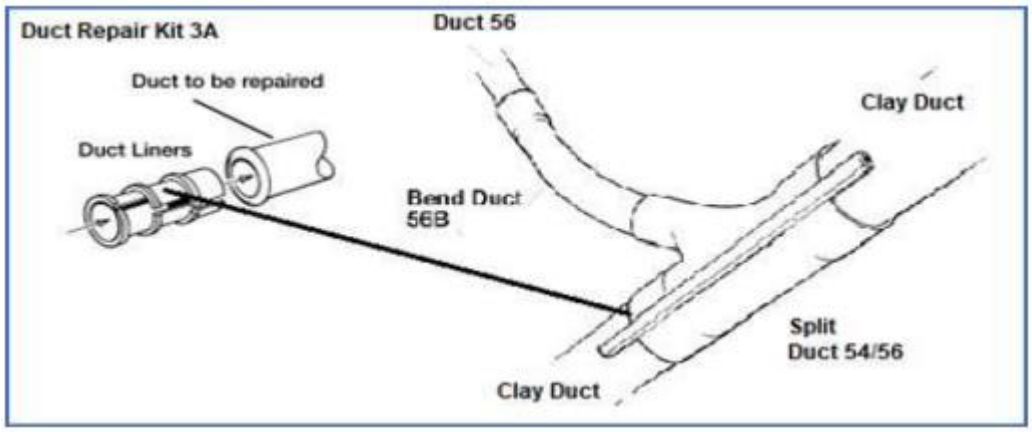


Modified Single Cut Duct 56 Split Tee

1) Use masking tape to offer a straight longitudinal cutting line.
2) Using a Tenon saw carefully cut along edge of masking tape to complete a longitudinal cut the length of the swept tee
3) Using gloves rub off any PVC swarf along the cut
4) Open the cut side and insert existing cables as necessary.
5) Take length of Strip duct 54 and push along longitudinal cut up to the duct collar. Cut off excess strip duct 54 – 2 pieces needed
6) On the collar end of D56 swept tee, push along longitudinal cut length of collar. To enable to slide a D56 collar over the swept tee spigot end, the duct strip 54 will need to be cut short the length of collar.
7) Secure the split swept tee with cable straps.

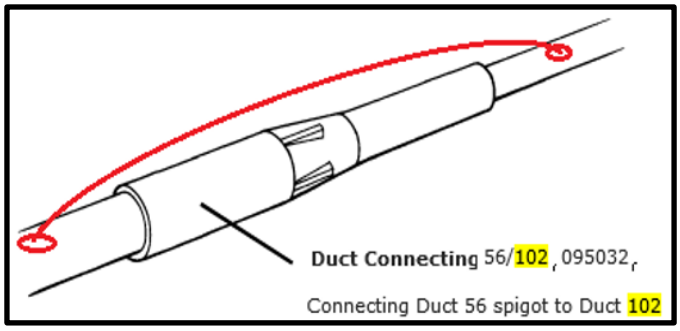
6.13 Earthenware Ducts

Earthenware or Self Aligning Duct (SAD) comes in 1 metre lengths therefore must be dealt with in sections, collar to collar. The opening shall be made good by a combining the Repair Kit and a split Duct 54/56 tee.



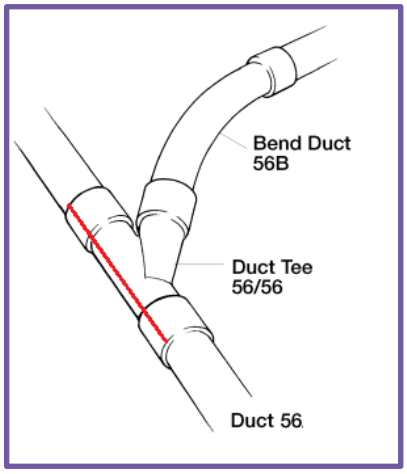
6.14 Duct 56 Pre-terminated

Where a Duct 56 has been Pre-terminated in the footway, curtilage or on private ground and does not provide a continuous duct connection to a Duct 102 feeding the property, the existing copper cable may be routed outside of a new duct connection, allowing for a new fibre cable and subsequent cabling operations. A Duct Connecting 56/102 (i/c 095032) is used to joint the two separated ducts.



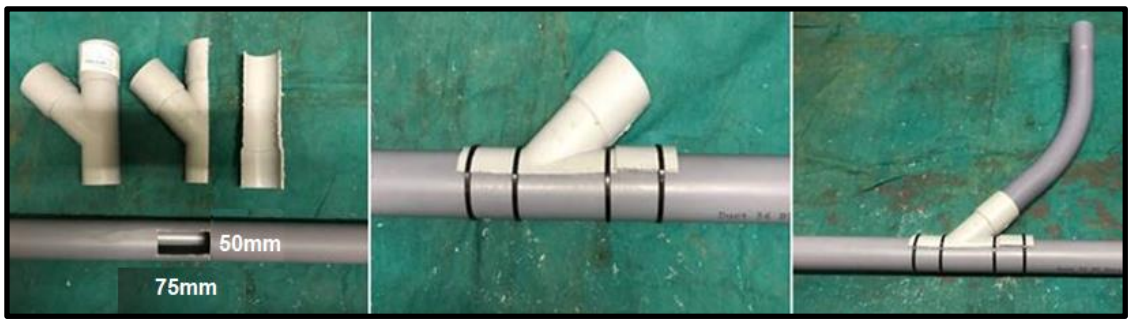
6.15 Duct 56 Trunk Tee

Where a trunk tee is required, it is permissible to modify and fit a Split Swept tee 54/56

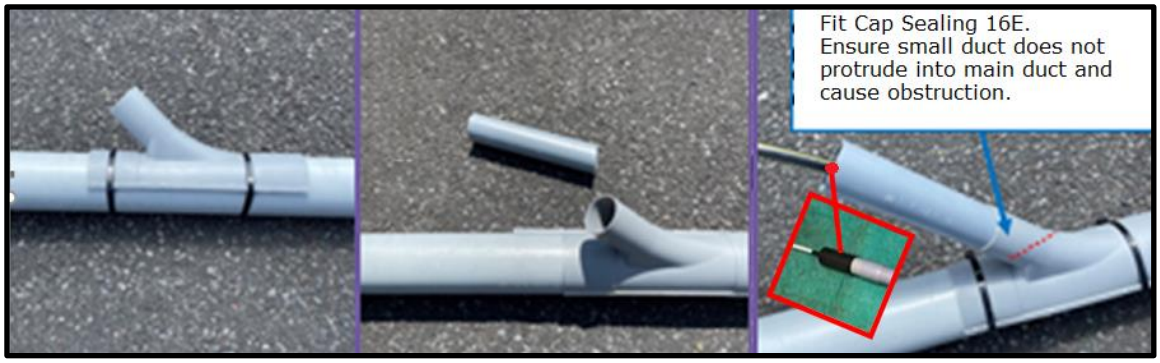


For Duct 54 Spine/Trunk, use complete/standard Split Swept 54/56 tee. However, half-section ducts may be used if insufficient room for full Tee, under 'evidenced TDFS' . Both are Zip tied & Compound 21 sealed (i/c 071821)

Duct 56 half section



Split Swept Tee 54/56 half section



Note: Where a duct smaller than Duct 56, enters the Swept Tee, a Capping Seal 16E must be used to secure and seal the end of the duct

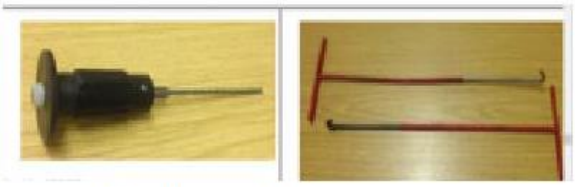
6.16 MDU Internal Blockages

Where an internal blockage exists due to the duct being obstructed and hidden by a 'screed floor' covering, the 'modified Duct 56 Split Tee for Gas Breaks' solution above, may be used to provide a separate lead-in to the external wall.

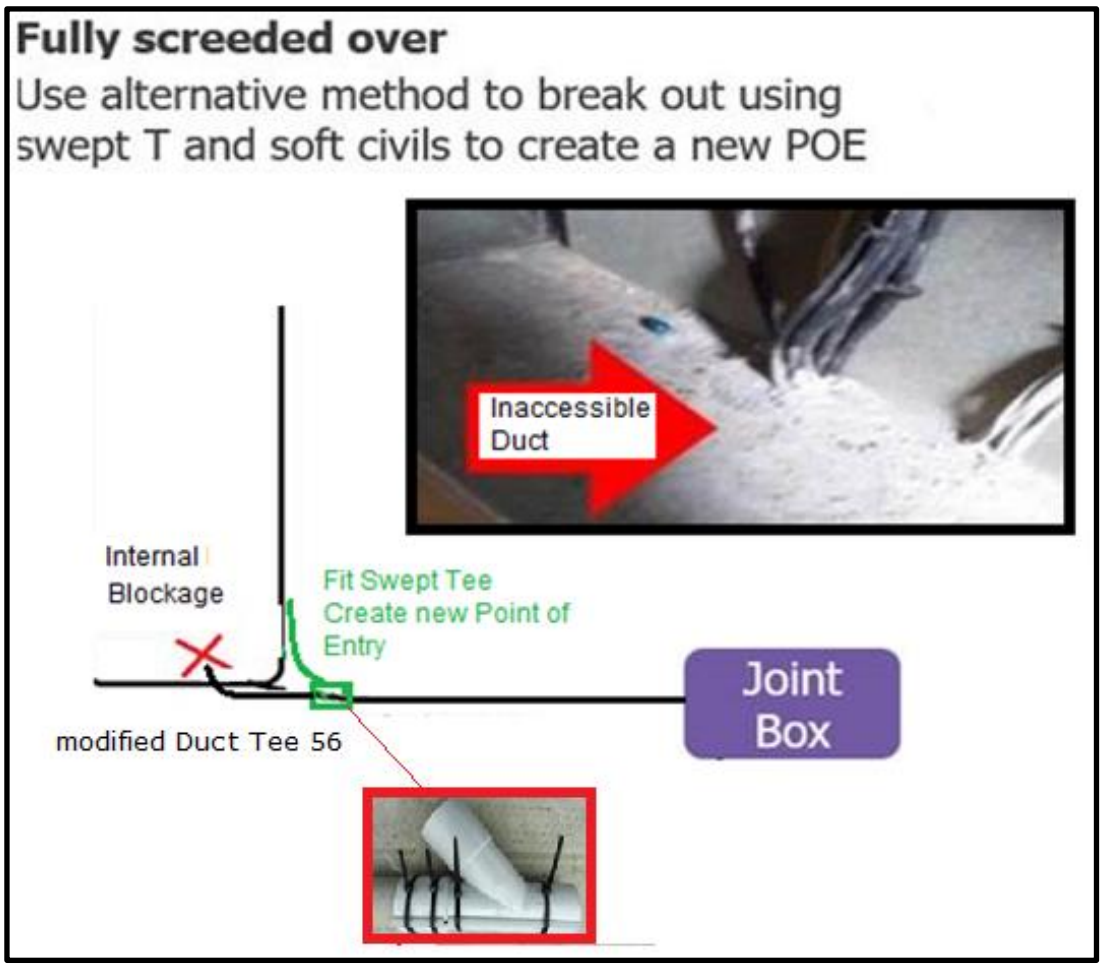
Where the duct is blocked by concrete (or other hard materials) but the duct is clearly visible, the Resin 14 Removal Toolkit may be used to break down and remove the blockage to facilitate cable installation.

Duct mouth slightly screeded over

RAMS to safely break into duct referencing practice outlined in EPT/UGP/B033 and fire sea afterwards appropriately

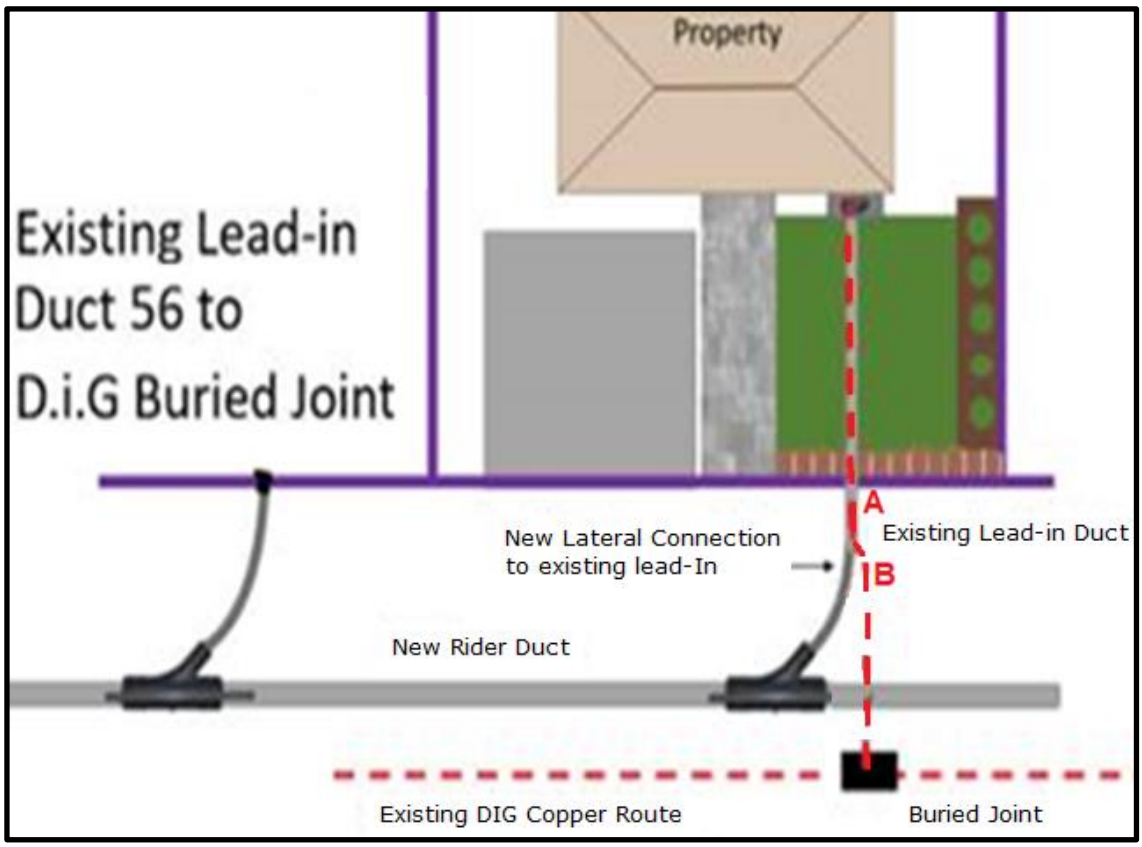


Manual Impact Drill & Extraction Hooks

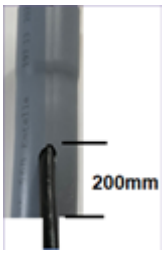
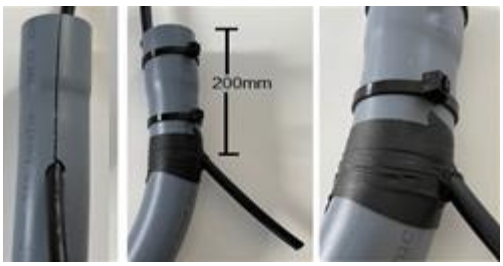


6.17 Buried Joints with Existing D56 Lead-In

Where a property has a Duct 56 duct fee terminated in the footway, or private ground, the existing copper cable may be routed outside of the duct, providing room for a new Rider Duct 56 lateral connection.



There are two break-out points:–

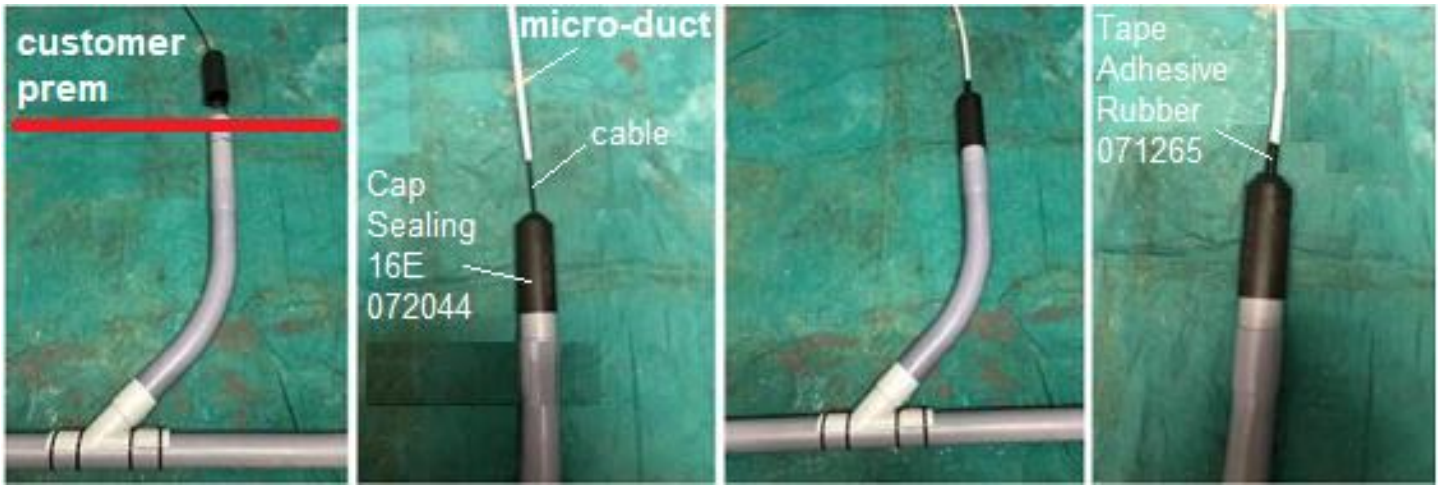
A. Break-out from existing D56 Lead-In, making a hacksaw split for approx. 200mm and a cable hole. 	B. Break-out from newly fitted Duct Bend 200mm (before bend) 

6.18 Buried Duct 56 at Curtilge on DIG Estates

Where new network is provided using a Buried Duct 56 on a previously DIG copper estate, either a Toby Box will be fitted at the curtilage wall, or a Cap Sealing 16E will seal the end of the buried duct which is located under a 'FTTP Marker Pin'.

Toby Box at garden wall and **FTTP Marker Pin** showing location of buried Duct 56

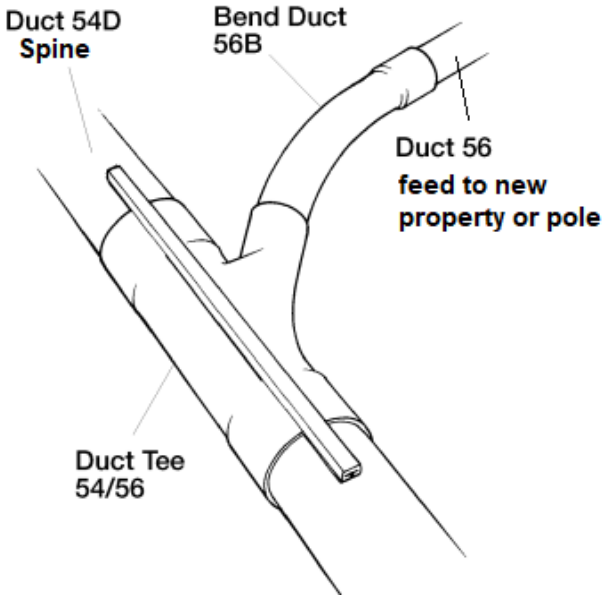
The Capping Sealing 16E must be drilled to accept cables or micro-duct and sealed using Tape Adhesive Rubber (i/c 071265). The micro-duct must terminate inside the cap, and not be pushed towards the trunk duct.



6.19 Duct 54/56 Split Swept Tees

Duct 54/56 Split Swept tees can only be fitted onto the spine duct where;

1) A new property (which does not already have a comms feed) or pole requires connection to the Openreach Network i.e. where an existing duct feed does not exist.
2) An overhead served property is being provided with a fibre-based service and the end-user has requested an underground feed into the property, e.g. due to resilience/ security.
3) Where the PIA CP is deploying a cable that is not permitted to be deployed aerially due to not meeting the specifications as defined in Engineering Principles CP08.



6.20 Gas Seals

If disturbed, Gas Seals must be replaced immediately using products listed below.

Safety: New duct installs must not enter directly into residential living spaces, however, it may terminate in MDU service cupboards and commercial premises.

Application	Seal
Duct 54D whilst laying	Plug Duct 4B, socket end or 4C, spigot end
Duct 54D open ended without cable	Duct Seal 1A. If the duct is to be cabled within 30 days then use a Plug Pressure 1
Duct 54D open ended with cable	Duct Seal 1A or 1B, depending on cable diameter and quantity of cables
Duct 56 as external lead-in	Plug Duct 1A
Duct 56 open ended without cable	Duct Seal 1C. If the duct is to be cabled within 30 days then use a Plug Pressure 3
Duct 56 open ended with cable	Duct Seal 1C
For **any duct** entries where none of the above may be utilised	Duct Seal Silicone 1A (048330) suitable for MDU and commercial premises with direct internal lead-ins
Supplier Duct seals 1A,B&C may be obtained from Commscope, via Passcomm Ltd, 24 Tatton Ct, Kingsland Grange, Woolston, Warrington WA1 4RR. Tel: 01925 821333 Plugs and Silicone 1A may be obtained from: Comtec Cable Accessories, Over Industrial Park, Over, Cambridge, CB4 5QE. Tel: 01480-415400	

7 Reinstatement of Highways

7.1 General

The CP's shall execute the interim and permanent reinstatement in accordance with the provisions of The New Roads and Street Works Act 1991 and associated HAUC Specification for the Reinstatement of Openings in Highways.

In problematic locations where it is difficult to achieve a good reinstatement around carriageway covers (e.g where the quality of the road is poor), liquid mastic asphalt may be used, with the prior approval of BT and the Highway Authority.

7.2 Compaction

All spaces outside the walls of jointing chambers, shall be carefully filled in with granular material or concrete and compacted, care being taken to ensure that compaction does not disturb recently completed work.

7.3 Frame and Cover Sealing

Prior to reinstatement in a bituminous surface, the outside of any BT Frames shall be cleaned of all loose material and primed with an approved edge sealant. Edge Sealant should not be used for Overbanding.

7.4 Obligations

Whatever method is used, the filling-in and restoration of Streets shall comply with the obligations imposed by the New Roads and Streets Works Act 1991 or in Northern Ireland by the Street Works Northern Ireland Order 1995.

8 Safety Precautions

8.1 General

1) Paraffin lamps shall not be used within the vicinity of any excavation or structure. Only Battery operated lamps are permissible in such circumstances.
2) Smoking is not permitted as per the par above.
3) All chambers should be tested and monitored for gas. **Mandatory**

8.2 PVC Adhesives and Methylated Spirits

When using or working with either of these materials, care should be taken to ensure that working areas are adequately ventilated. Naked flames should not be used under any circumstances, this to include smoking.

8.3 Specification Authority

Openreach, Chief Engineer's Office, Civils Team

8.4 Asbestos ducts and pre-fabricated jointing chambers

The damping and trimming of asbestos ducts to facilitate a repair is permitted. Prior to undertaking this work a suitable Risk Assessment should be completed.

Where a pre-fabricated asbestos jointing chamber (very rare JF4 size) is found and it is damaged or the CP wants to core drill into it, please notify the PIA Team who will take the appropriate action.

9 Appendices

9.1 Appendix 1 Jointing Chamber drawings and Installation guides

Chamber Type	Drawing Nos	Drawings
Footway		
JMF101	JMF101 (Suppliers Drawing)	JMF101.pdf
JBF102 JUF102 JMF102	CN14979 shts 1-3	cn14979s01.tif cn14979s02.tif cn14979s03.tif
JBF104 JUF104 JMF104	CN14980 shts 1-2 CN15571 sht 1	cn14980s01.tif cn14980s02.tif cn15571s01.tif
JBF106 JRF106 JMF106	CN14981 shts 1-4	cn14981s01.tif cn14981s02.tif cn14981s03.tif cn14981s04.tif
JBF110 JRF110 JMF110	CN14982 shts 1-4	cn14982s01.tif cn14982s02.tif cn14982s03.tif cn14982s04.tif
JBF111 JRF111	CN14983 shts 1-3	cn14983s01.tif cn14983s02.tif cn14983s03.tif
JB23 JB26	CN10941 Sht 1 CN13917 Sht 1	cn10941s01.tif cn13917s01.tif
Carriageway		
JRCX111	CN14159 Shts 1-3	cn14159s01.tif cn14159s02.tif cn14159s03.tif
JRCX112	CN14160 Shts 1-3	cn14160s01.tif cn14160s02.tif cn14160s03.tif
JRCX114	CN14161 Shts 1-3	cn14161s01.tif cn14161s02.tif cn14161s03.tif
JRCX4	CN15644 Sht 1-3	cn15644s01.tif cn15644s02.tif cn15644s03.tif

Chamber Furniture		
STEP MANHOLE No 1 BOLT FOUNDATION No.1 ANCHOR IRON GRATING SUMP 2A CABLE BEARER WALL TYPE CABLES BEARER PINS LOCKING	CN1168 CN1166 CN1162 CN9165 CN1061 CN1069 CN1301	 cn1168s01.tif  cn1166.tif  cn1162.tif  CN9165.tif  cn1061s01.tif  CN1069.tif  CN1301.tif

Installation Guides	Links
JMF101	 3sal01.pdf
JMF102 JMF104 JMF106	 1sal01.pdf
JMF110	 5sal01.pdf

9.2 Appendix 2 - Civils Avoidance Tools & Techniques


CP Civils Avoidance and Cost Reduction

9.2.1 Civils Avoidance Guide

The document entitled 'CP Civils Avoidance and Cost Reduction' details useful considerations, tools and techniques that you need to have considered before you request a Network Adjustment. Using the information in the guide will help avoid invalid Network Adjustment requests and the delays to your network build waiting for civils to be implemented.

9.2.2 Rodding Techniques

Rodding can be carried out with a Ductmotor, by machine rodding, 25mm and 14mm sectional hand rods and Cobra rods which come in a variety of sizes. Smaller diameter (e.g. 6mm) Cobra and 14mm Sectional Rods are useful, particularly for short sections, or in Duct 56, however they tend to be less effective on longer duct sections due to flexing. Long duct sections are best rodded by mechanical means or with more rigid 25mm hand rods. Longer hand rodding distances are best achieved by rodding from each end of the duct section and using a marrying set.

Network Adjustment requests should only be submitted where best efforts have been made using the appropriate approach and equipment.

9.2.3 Alternative Route

Before laying duct, alternative duct routes should be considered. Often the same point can be reached with a slightly longer cable run. Obviously this should not be taken to extremes as the longer run may not be as cost effective as laying a small amount of duct. Where an alternative route does not link with the destination chamber laying a small amount of duct may resolve this. For example where there is plenty of duct space on one side of a road but the other side is full a single road crossing may offer an alternative to laying duct along the full length of the road.

9.2.4 Alternative Cable

Consider an alternative cable type as, for example smaller cables or sometimes a sub duct can be installed in short sections and then cabled.

9.2.5 Overhead

An Overhead solution (OH) uses poles instead of ducts in the ground. For an OH solution consider using existing poles.

There are currently 100,000's of existing poles across the BT network and so to add further capacity in most cases is a simple task. If however a new pole is required it is less intrusive than open trenching and therefore less disruptive meaning cable can be installed quicker. This means that in some cases a suitable and valid option or alternative to the Network Adjustment is a new pole and the use of an overhead route.

Additionally a poling solution can sometimes allow us to reach places and positions that a ducted solution can't due to local site conditions.

Criteria and considerations for identifying if an overhead solution is possible are:
- Pole loading
- Any carriageway clearance and wire/cable height.
- Route stability
- Pedestrian footway clearances
- Power clearances

END OF SPECIFICATION