WESTERN POWER DISTRIBUTION

Serving the Midlands, South West and Wales

Company Directive

STANDARD TECHNIQUE : DO6A/4

Relating to Standards for Recording Techniques and Procedures of the Company's Underground Assets

Author:	**Kate Tighe**
Implementation Date:	**January 2019**
Approved by	
	Policy Manager
Date:	4 January 2019

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IMPLEMENTATION PLAN

Introduction

This document specifies the standards for recording techniques and procedures of the Company's Underground Assets.

Main Changes

Contact details changed to reflect changes to WPD Mapping Centre structure

Additional Standard Techniques referenced to work undertaken by an ICP under Competition in Connections

Impact of Changes

Minimal impact on individuals

Implementation Actions

Where this change impacts those submitting information we will advise at the appropriate time.

Implementation Timetable

This document can be implemented immediately.

REVISION HISTORY

Document Revision & Review Table		
Date	**Comments**	**Author**
Jan 2019	• Recording Techniques and Procedures - Edition 5.09	Kate Tighe
Sep 2017	• Recording Techniques and Procedures - Edition 5.08	Andrew Bennett
Aug 2015	• Recording Techniques and Procedures - Edition 5.07	Andrew Bennett
Oct 2013	• Recording Techniques and Procedures - Edition 5.06	Andrew Bennett
July 2013	• Recording Techniques and Procedures - Edition 5.05	Andrew Bennett

WESTERN POWER DISTRIBUTION

Serving the Midlands, South West and Wales

Recording Techniques and Procedures

Edition 5.09
October 2018

Contents Page

1.0 INTRODUCTION

The basic techniques and procedures in this document will ensure that when correctly applied, the position of the Company's plant is accurately recorded.

1.1 It is important that accurate records are maintained for three main reasons: -

- There are *statutory* requirements upon the Company –**The Electricity Safety Quality and Continuity Regulations**, **New Roads and Street Works Act (NRSWA)** **and it's associated Codes of practice: The code of Practice for Recording of Underground Apparatus in Streets (November 2002)** , **Electricity Act 1989(as amended)** and any other legislation where applicable.

- To ensure safety for all users of our mapping data set.

- Company operational and planning requirements.

1.2 Whilst this document contains notes and sketches which explain the fundamental task of taking dimensions; if staff or contractors have queries, these should be raised in the first instance with the relevant Team Managers.

1.3 Any requests for additions or edits to this document must be forwarded for consideration to:

Mapping Centre Manager
Western Power Distribution
Toll End Road
Tipton
DY4 0HH

2.0 PRINCIPLES OF RECORDING CABLES

2.1 The position of all underground plant must be accurately recorded on site on the day of installation and by a suitably skilled individual.

2.2 Plant in the highway, must be recorded to an accuracy of plus or minus 100mm with all dimensions shown in metric – **not** imperial.

2.3 All measurements to be taken from, or related to Ordnance Survey recognised features. (Do not take measurements from doors, windows etc – they do not appear on maps). The frequency of measurements taken is determined by the amount of detail required to provide an accurate record of the route of the plant installed, even with straight runs the maximum distance between measurements should be no greater than 10.0m

2.4 Assets laid in ducts or alkathene tube installed by 3rd parties in advance of the cable laying operation should have the cable route identified using industry recognised cable tracing procedures, recorded to "Recording Techniques and Procedures" standards and clearly marked as route recorded using "Cable Tracing Procedures"

2.5 Recording techniques to include a combination of 'triangulation' and 'off-set' measurements.

2.6 Measurements to be taken in such a way as to enable reconstruction both on the ground and on the digital map data base.

2.7 All measurements taken must be straight and horizontal (with the exception of depths).

2.8 Dimensions and the position of plant are to be drawn onto an appropriate Ordnance Survey map base (as regulated by the Mapping Centre Manager) and printed at the required scale. Additional sketches on the Company's recording sheets may be added for clarification.

2.9 Depth of plant to be shown on plan.

2.10 For new developments, recording detail must be added to a copy of the developer's plan. If during the survey, buildings do not appear in their correct position on the plan, please amend and show sufficient dimensions to enable an accurate revision to be made to the estate layout.

2.11 If, during excavation, existing plant is exposed and is either not recorded or recorded in the incorrect position, please capture that detail.

2.12 WPD staff should forward measured drawings to the appropriate Mapping Centre (Item 16.20A) within five working day of the job being completed on site.

2.13 Contractors should forward measured drawings to the appropriate Mapping Centre (Item 16.20A) within five working days of the job being completed on site.

2.14 Data from Independent Connection Providers (ICPs) working under Competition in Connections is subject to procedures described in New Connection (NC) policy Series and in particular ST:NC2H, ST:NC2L and ST:NC2M (latest edition).

2.15 Assets installed using directional drill techniques must be accompanied by a geographic route plan and drill profile section supplied by the directional drill company.

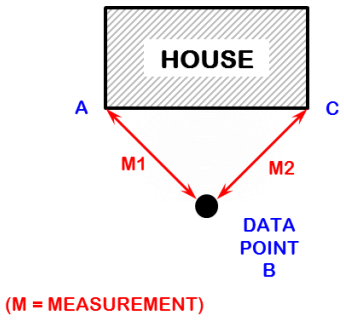
3.0 TAKING MEASUREMENTS USING TRIANGULATION

3.1 ***Triangulation is the most accurate method of recording a position of a joint or point on a cable. This method should be used whenever possible.***

3.2 Triangulation requires a minimum of two dimensions to be taken from features that also appear on the map.

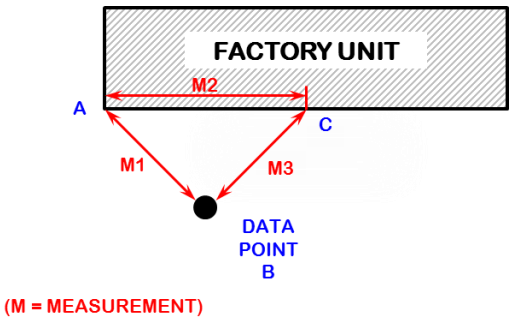
3.3 Example 1

3.3.1 In this example, a measurement is taken from points A and C which will confirm the position of point B (Data point)



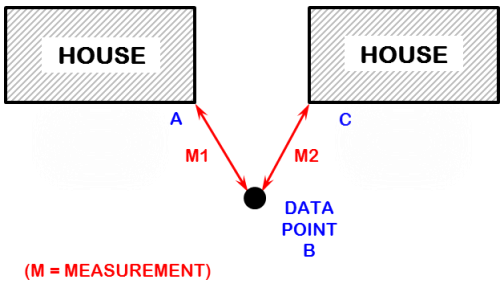
3.4 Example 2

3.4.1 As in Example 1, Point A is known but in this example, an additional measurement (M2) is required to fix Point C. Measurements can then be taken from Points A and C to Point B (Data point).



3.5 Example 3

3.5.1 Here, two separate buildings can be used if it is the only alternative. Again, Points A and C are known requiring a measurement from each to confirm Point B (Data point).



4.0 EXTENDED SIGHT LINES AND RIGHT ANGLES

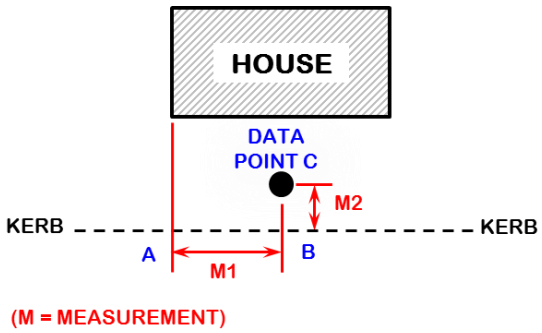
4.1 As previously mentioned, triangulation is the preferred method for recording plant position. If this is not possible because of, for example, obstructions, measurements can be taken at right angles to buildings.

4.2 Example 4

4.2.1 Project a single line at right angles to the building as far as the kerb – Point A.

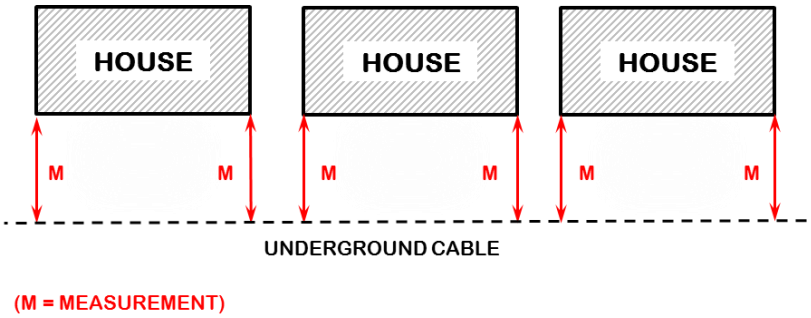
4.2.2 Measure from Point A along the kerb to Point B which is in turn at right angles to the Data point C (M1)

4.2.3 From point B, take a measurement at right angles to the kerb to point C (M2)



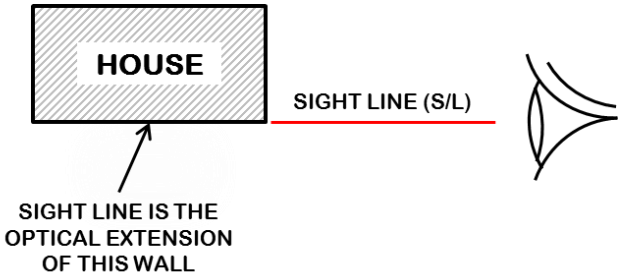
4.3 Example 5

4.3.1 If there are no other deviations along its route, dimensions are taken at right angles to features if there position is known (interim points of deviation require additional dimensioning using method shown in example 4).



4.4 Example 6

4.4.1 A sight line is the extension of an existing straight feature and is constructed by eye or optical prism.

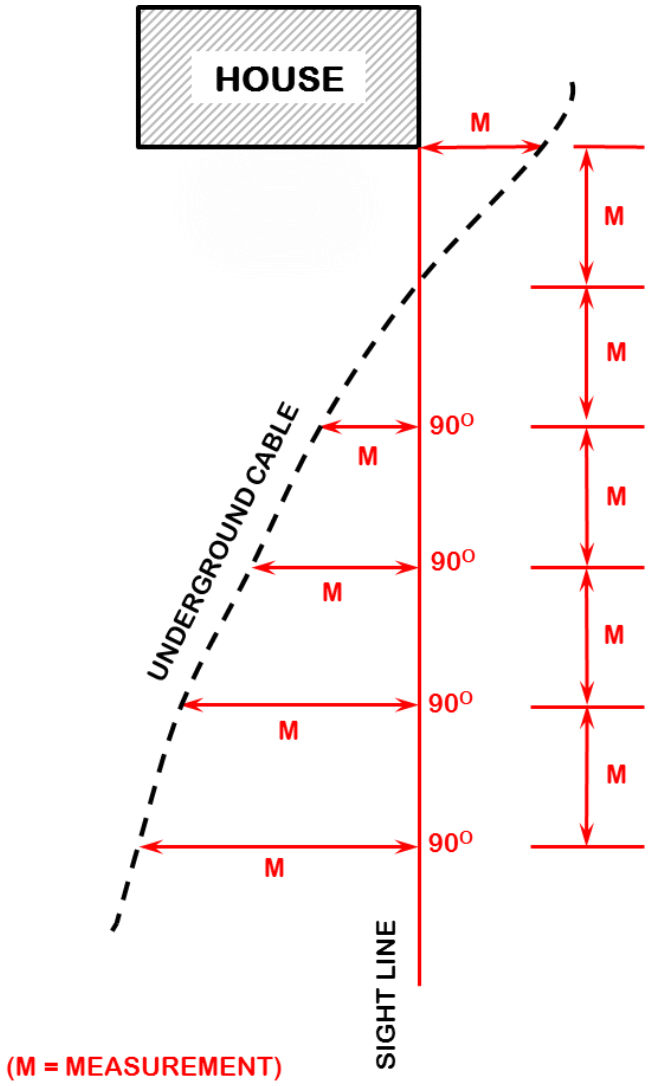


Example 7 MEASUREMENTS FROM A SIGHT LINE USING OFF-SETS

4.5.1 The position, once established, of the sight line on the ground, is confirmed by the placing of pegs, ranging rods, chain or tape measure.

4.5.2 Off-set measurements are taken at right angles (90°) to the sight line to the required Data point on the asset. The frequency of those dimensions will be determined by the extent of the cable deviation.

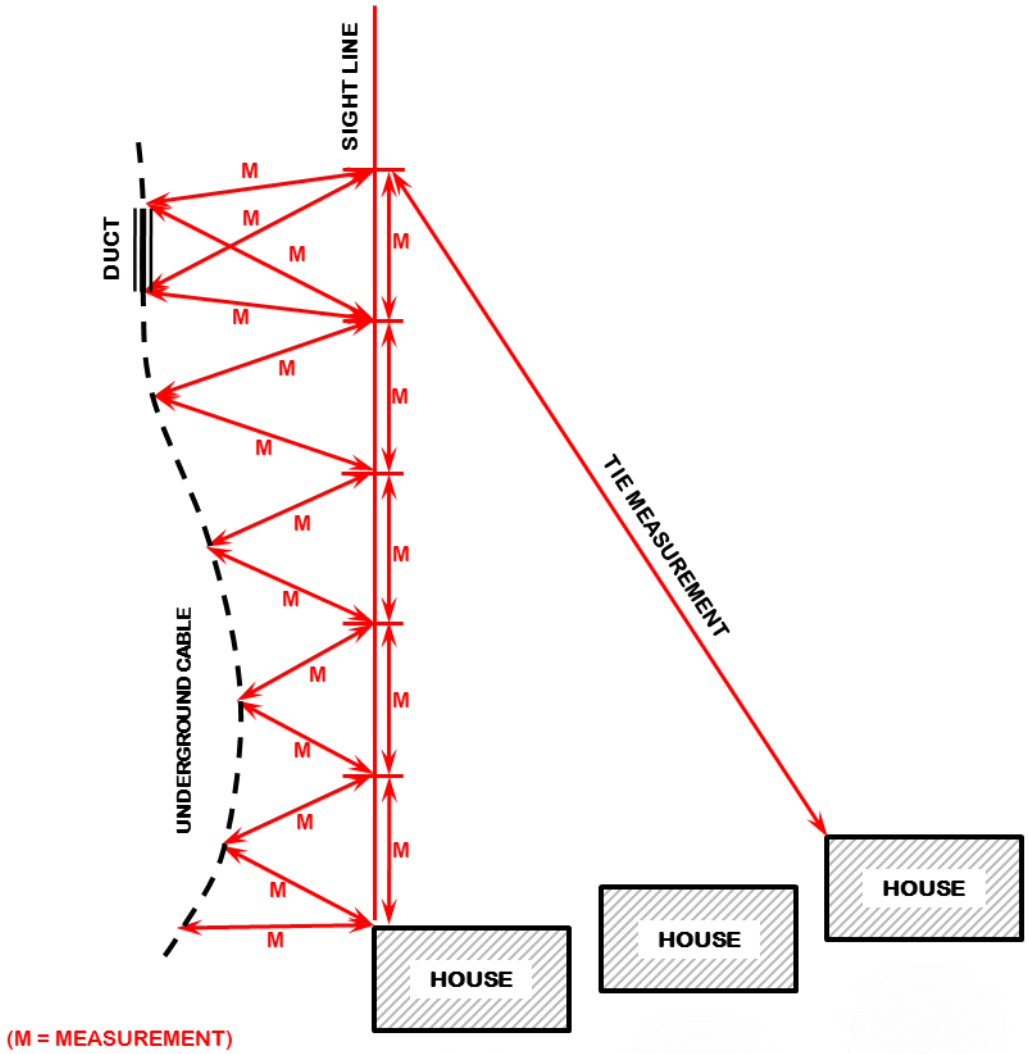
4.5.3 Off-set measurements should not exceed 15 metres as inaccuracies will occur over greater distances. Triangulation techniques referred to in 4.6 will therefore apply.



Example 8 MEASUREMENTS FROM A SIGHT LINE USING TRIANGULATION

4.6.1 Again, from the sight line, dimensions using the principles of triangulation can be taken. The frequency of those dimensions will be determined by the extent of the cable deviation.

4.6.2 Wherever possible, 'tie measurements' should be taken from recognised Ordnance Survey features as shown in example 8. This will enable the position of the sight line to be 'fixed' and ensure accurate reconstruction.



5.0 CHAIN LINES

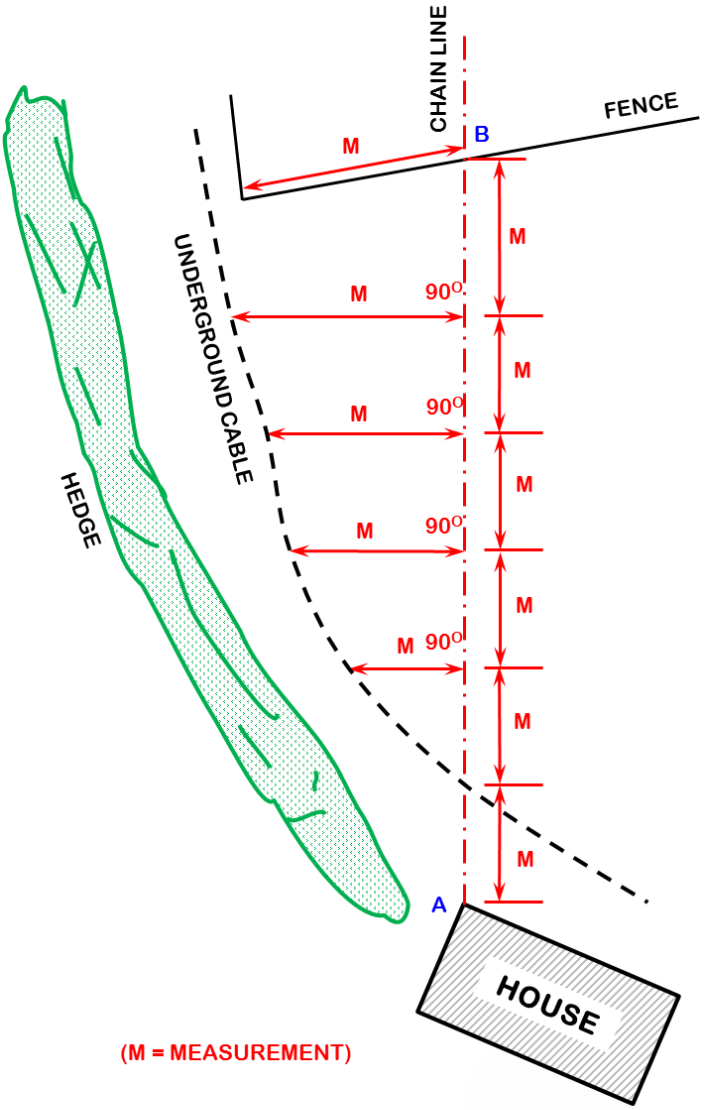
5.1 Whenever possible, dimensions must be taken directly from Ordnance Survey features. On occasions, when this is not possible, a chain line between two fixed points can be constructed.

Example 9 MEASUREMENTS FROM A CHAIN-LINE USING OFF-SETS

5.2.1 Point A is the fixed corner of a building and the chain extends to fixed point B which has been constructed but is still related to an Ordnance Survey feature.

5.2.2 The position of the chain on the ground is confirmed by placing a tape measure or a surveyor's chain.

5.2.3 From the chain line, off-set measurements at right angles (90°) are taken to the Data point on the asset. The frequency of those dimensions is again determined by the extent of the cable deviation.

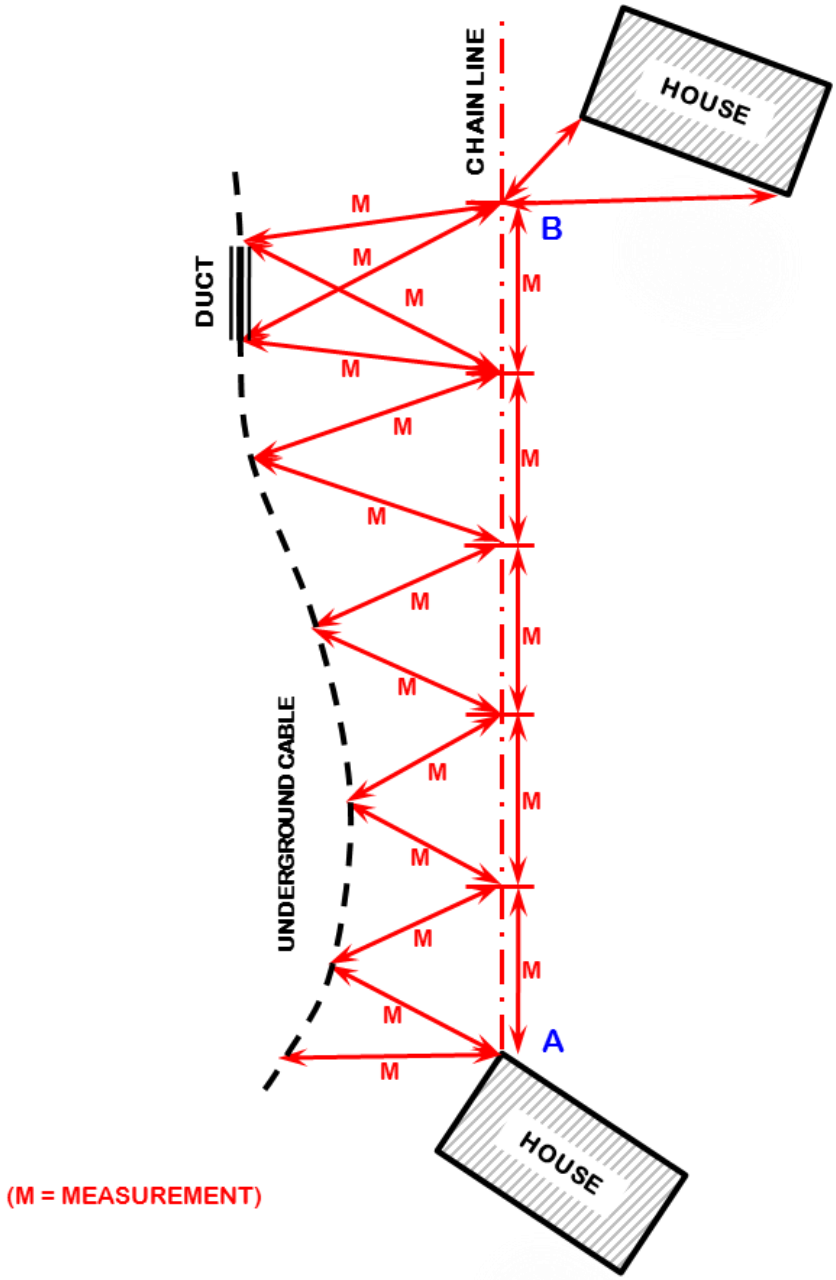


Example 10 MEASUREMENTS FROM A CHAIN-LINE USING OFF-SETS

5.3.1 Point A is the fixed corner of a building and the chain line extends to fixed point B which was constructed using triangulation. This consisted of two measurements being taken from each corner of the building.

5.3.2 The position of the chain on the ground is confirmed by placing a tape or surveyor's chain.

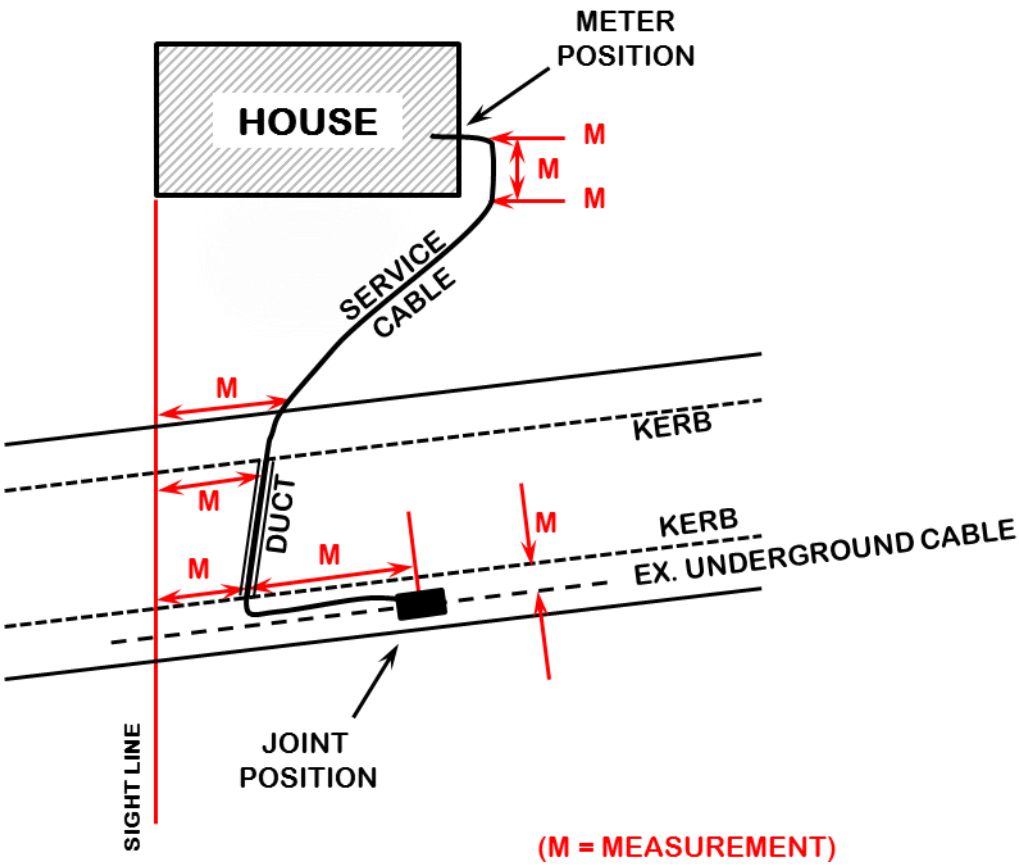
5.3.3 Using the chain line, dimensions based on the principles of triangulation can be taken.



6.0 SAME FEATURE RECORDING

6.1 Example 11

6.1.1 By utilising the same Ordnance Survey feature (i.e. building) in the one localised area and relating dimensions to it, continuity is maintained and the possibilities of inaccuracies avoided.



7.0 RECORDING OF JOINTS, LIVE ENDS ETC (ALL VOLTAGES)

Information to be recorded

7.1 Position of joint, live ends etc (measurements to be taken as per recording procedure instruction)

Additional Information

7.2 Size of existing cable (if applicable)

7.3 Size of new cable

7.4 Voltage

7.5 Joint Type BJ, SJ Trif Joint, Live end etc

7.6 Phase identification markers L1, L2, L3, etc (EPR Cables)

7.7 Single or 3 Phase

7.8 Date work undertaken

7.9 Name of jointer

7.10 GLC Code

Forms to be completed

Asset Risk Management (along with one of the following)

- Fault Repair Commissioning Report
- LV or HV Main Work Instruction
- Work Instruction Service Forms
- Work Instruction

8.0 RECORDING OF SERVICE CUTOUTS

Information to be recorded

8.1 Position of cut out (measurements to be taken as per recording procedure instruction)

Additional Information to be recorded

8.2 Size of cable

8.3 Phase identification markers L1, L2, L3, N

8.4 Single or 3 Phase

8.5 Date work undertaken

8.6 Name of jointer / Linesman

Forms to be completed

- Work Instruction Service Forms

9.0 RECORDING OF LINK BOX TERMINATIONS

Information to be recorded

9.1 Position of link box (measurements to be taken as per recording procedure instruction)

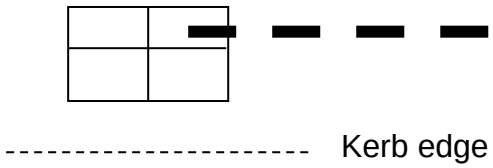
Additional Information to be recorded

9.2 Size of cable

9.3 Number of ways in the link box

9.4 Position of cable termination within link box relative to kerb edge

e.g.



9.5 Links In or Out

9.6 Date work undertaken

9.7 Name of jointer

Forms to be completed

Asset Risk Management (along with one of the following)

- Fault Repair Commissioning Report
- LV or HV Main Work Instruction

10.0 RECORDING OF LV DISTRIBUTION PILLAR TERMINATIONS

Information to be recorded

10.1 Position of Distribution Pillar (measurements to be taken as per recording procedure instruction)

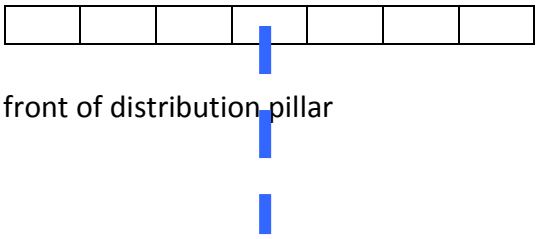
Additional Information

10.2 Size of cable

10.3 Number of ways in the distribution pillar

10.4 Position of cable termination within distribution pillar

e.g.



10.5 Links In or Out

10.6 Customer Ref Number

10.7 Date work undertaken

10.8 Name of jointer

Forms to be completed

Asset Risk Management (along with one of the following)

- Fault Repair Commissioning Report
- LV or HV Main Work Instruction

11.0 RECORDING OF SWITCH TERMINATIONS (11KV AND ABOVE)

Information to be recorded

11.1 Position of Switch Termination (measurements to be taken as per recording procedure instruction)

Additional Information

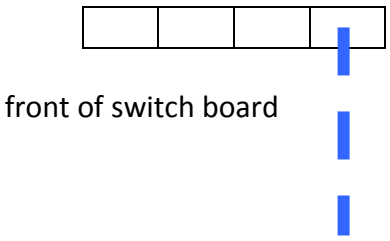
11.2 Size of cable

11.3 Voltage

11.4 Number of ways in the switch board

11.5 Position of cable termination within switch board

e.g.



11.6 Links In or Out

11.7 Switch Label Details (A,B,C etc)

11.8 Date work undertaken

11.9 Name of jointer

Forms to be completed

Asset Risk Management (along with one of the following)

- Fault Repair Commissioning Report
- LV or HV Main Work Instruction

12.0 RECORDING OF POLE BOXES (ALL VOLTAGES)

Information to be recorded

12.1 Position of Pole (measurements to be taken as per recording procedure instruction)

Additional Information

12.2 Size of cable

12.3 Voltage

12.4 Pole Number

12.5 Links In or Out

12.6 Date work undertaken

12.7 Name of Linesman / Jointer

13.0 FIBRE OPTICS

When recording Telecom assets, the following need to be recorded. (If laying cable)

13.1 Cable specifications

13.1.1 Fibre count

13.1.2 Chamber type

13.1.3 Section lengths

13.1.4 Section number

13.1.5 Duct configuration

13.1.6 Cable location by duct (Reference to 13.15 above)

14.0 ICP MAPPING MAINS AND JOINTING SUBMISSION REQUIREMENTS

When submitting records the Independent Connection Provider (ICP) will be required to provide the following information when completing the ICP Mains and Jointing Information Form (Item 14.1)

- All fields on the form are mandatory
- Yellow fields must be populated by the ICP
- Blue fields must be populated by the responsible WPD technician.
- Sketches are preferred on an Ordnance Survey or Webmap background
- If the map background is hand drawn, a blank Ordnance Survey plan or Webmap plan must be provided with the work area highlighted.
- Two clear dimensions must be provided to a joint position, one from a fixed point (e.g. building line) and another from a kerb line or fence line.
- Cable dimensions must be provided. Any deviations should be clearly marked.
- Valid entry and exit points must be provided for network laid in duct.
- Network positions should not be marked as Assumed Position.

14.1 ICP MAINS AND JOINTING INFORMATION FORM

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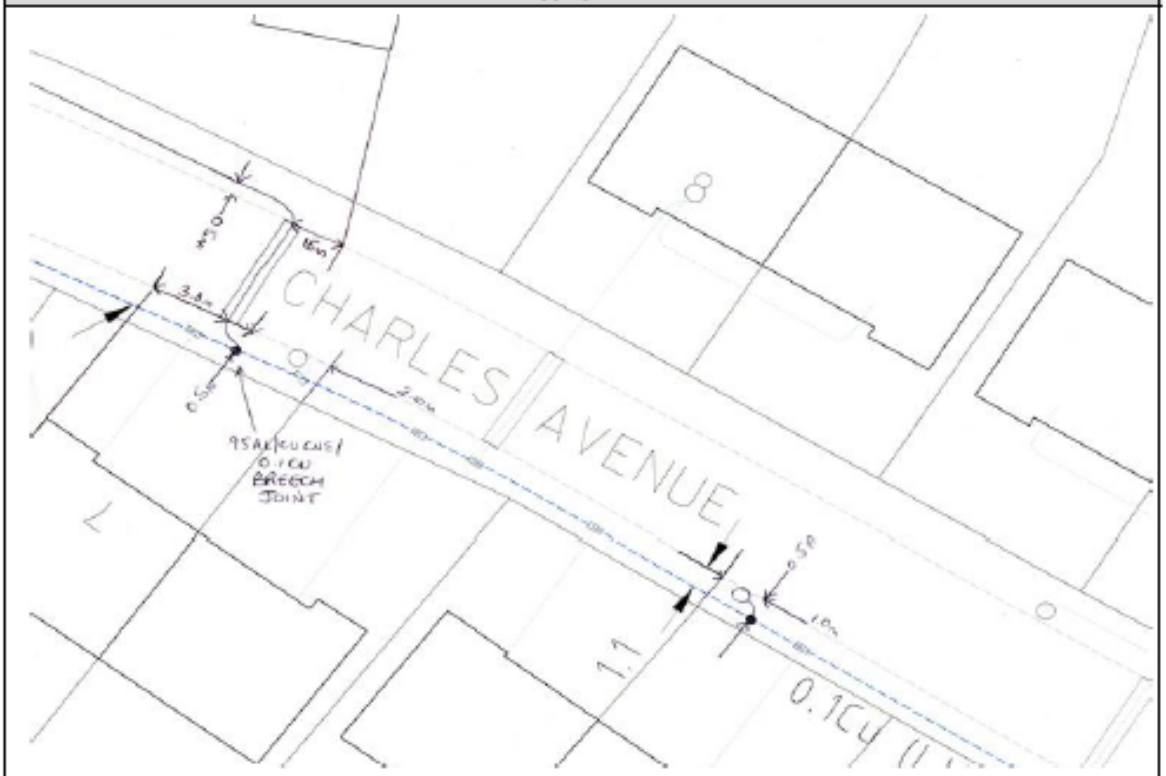
ICP Mains and Jointing Information Form

Site Address	O/S No. 7 Charles Avenue, Goldthorn Park, Wolverhampton, WV4 5BB
ICP Name	Dragon Infrastructure Solutions
MPAN No.	N/A

Existing Cable Condition		New Cable Details		
Cable Size	0.1 Cu	Metered Connection	YES / NO	No
Good or Defective?	Good	OH or UG	UG	
Defect Type:	N/A	New Cable Size	95 Al/Cu CNE	
Damage/Corrosion	N/A	Joint Type	Breech Joint	
Water Absorption	N/A	Joint Depth	0.6m	
Paper Waxing	N/A	Grid Reference	X: 390817	Y: 296437
Deterioration of Asset	N/A	Activity ID	1234567_1	
Discharge Activity	N/A	WPD Crown Reference	1234567	
Electrical Treeing	N/A	WPD Managed Unit	4122	
Drying Out	N/A	WPD Project Number	12345	

Plan of Connection Arrangements on a WPD background (EMU). This can be provided below or on a separate plan where appropriate



ICP Craftsperson / Jointers Name	Name A.N. Other	Signature	Date 07/06/2013
ICP Supervisor	Name L. Walker	Signature	Date 07/06/2013
WPD Technician	Name Tim Smith		

Please note that any documents that do not comply with WPD's policy will be returned

15.0 ICP LV SERVICE INFORMATION FORM

When submitting records the Independent Connection Provider (ICP) will be required to provide the following information when completing the ICP LV Service Information Form

- Yellow fields indicate mandatory information required.
- For metered supplies, an MPAN number must be provided. Number of phases and colour must be provided for metered supplies.
- Sketches are preferred on an Ordnance Survey or Webmap background.
- Two clear dimensions must be provided to a joint position. One from a fixed point (e.g.building edge) and another from a kerb line or fence line.
- If cable condition is defective, defect type must be provided.
- A grid reference must be provided
- If map background is hand drawn, a blank Ordnance Survey plan or Webmap plan must be provided with the work area highlighted.
- Jointer/Craftspersons name and date of connection must be provided.

Examples of completed forms

- 15.1 = New Connection
- 15.2 = Transfer
- 15.3 = Disconnection
- 15.4 = New Connection on Hand Drawn Map Background

15.1 ICP MAPPING SERVICE SUBMISSION REQUIREMENT (New Connection)

WESTERN POWER DISTRIBUTION

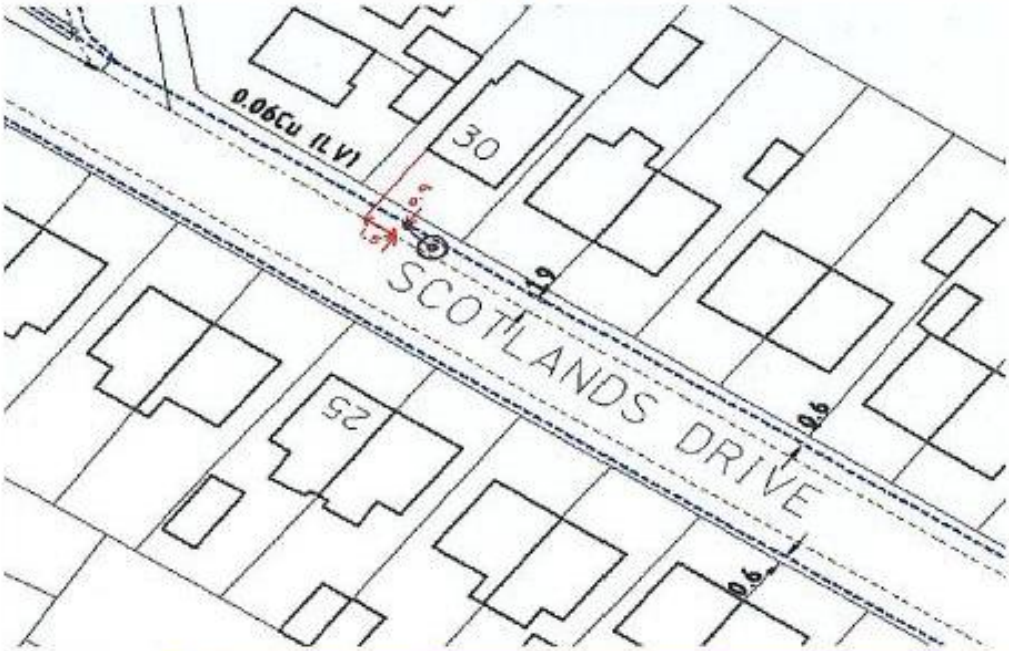
Serving the Midlands, South West and Wales

ICP LV Service Information Form

Site Address	O/S 30 SCOTLANDS DRIVE, COALVILLE LE67 3SU			
ICP Name	SEHL			
Crown Reference	1614948	Metered Connection	YES / NO	NO
Activity ID	NEW CONNECTION	Unmetered Connection	YES / NO	YES
MPAN No.		Service OH or UG	UG	
Existing Cable Condition		New Cable Type	HYB	
Good or Defective?	SATISFACTORY	New Cable Size	25	
Defect Type:		Joint Type	SERVICE BREECH	
Damage/Corrosion		Joint Depth	600	
Water Absorption		Cut-Out Type Installed	Manufacturer	
Paper Waxing			Rating (amps)	
Deterioration of Asset			Fuse Size	
Discharge Activity		External Meter Box	YES / NO	
Electrical Treeing		Grid Reference	442882:313718	
Drying Out				

Insulation Resistance (value)			Voltage (on completion)	
Polarity (existing)			Polarity (on completion)	
Earth Loop Imp (existing)			Earth Loop Imp (on completion)	
Service	3Ph or 1Ph		Phase Connected To	

Plan of Connection Arrangements on a WPD background (EMU). This can be provided below or on a separate plan where appropriate



Craftsperson	Name	Signature	Date
Supervisor	Name	Signature	Date

Please note that any documents that do not comply with WPD's policy will be returned

15.2 ICP MAPPING SERVICE SUBMISSION REQUIREMENTS (Transfer)

WESTERN POWER DISTRIBUTION

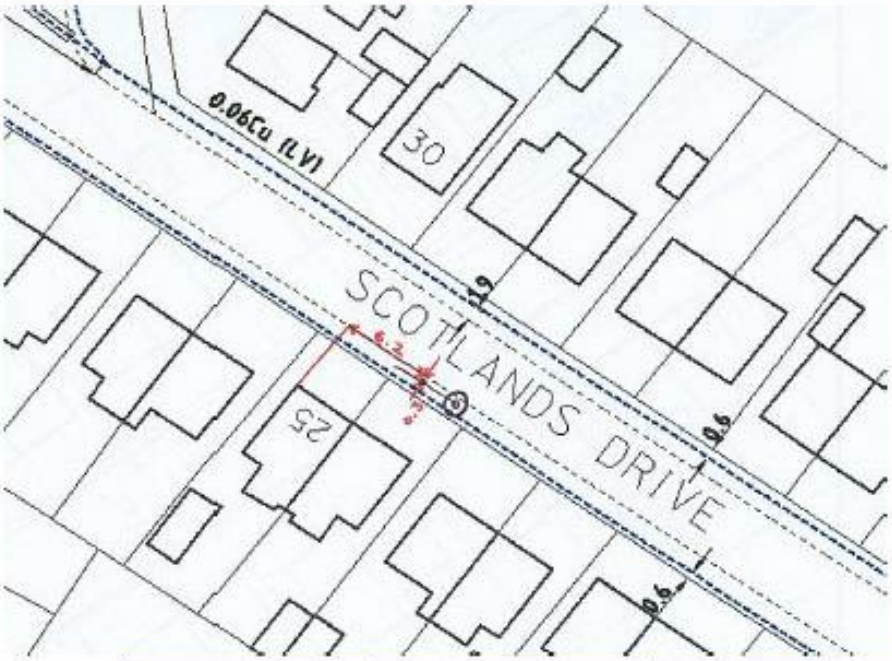
Serving the Midlands, South West and Wales

ICP LV Service Information Form

Site Address	O/S 30 SCOTLANDS DRIVE, COALVILLE LE67 3SU			
ICP Name	SEHL			
Crown Reference	1614948	Metered Connection	YES / NO	NO
Activity ID	SERVICE TRANSFER	Unmetered Connection	YES / NO	YES
MPAN No.		Service OH or UG	UG	
Existing Cable Condition		New Cable Type	HYB	
Good or Defective?	SATISFACTORY	New Cable Size	25	
Defect Type:		Joint Type	SERVICE STRAIGHT	
Damage/Corrosion		Joint Depth	600	
Water Absorption		Cut-Out Type Installed	Manufacturer	
Paper Waxing			Rating (amps)	
Deterioration of Asset			Fuse Size	
Discharge Activity		External Meter Box	YES / NO	
Electrical Treeing		Grid Reference	442882:313718	
Drying Out				

Insulation Resistance (value)			Voltage (on completion)	
Polarity (existing)			Polarity (on completion)	
Earth Loop Imp (existing)			Earth Loop Imp (on completion)	
Service	3Ph or 1Ph		Phase Connected To	

Plan of Connection Arrangements on a WPD background (EMU). This can be provided below or on a separate plan where appropriate



Craftsperson	Name	Signature	Date
Supervisor	Name	Signature	Date

Please note that any documents that do not comply with WPD's policy will be returned

15.3 ICP MAPPING SERVICE SUBMISSION REQUIREMENTS (Disconnection)

WESTERN POWER DISTRIBUTION

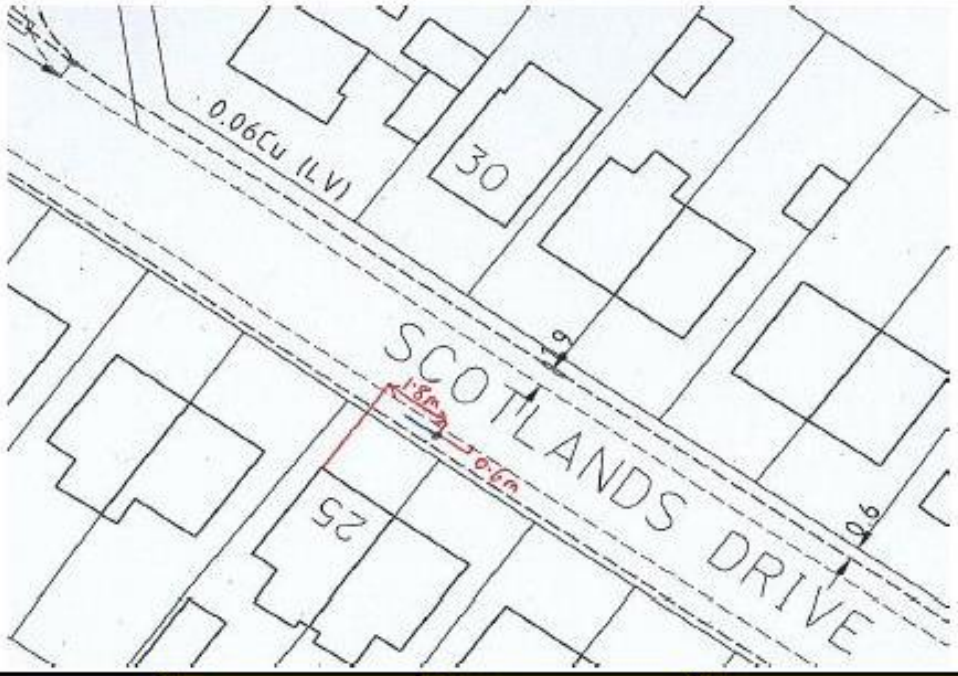
Serving the Midlands, South West and Wales

ICP LV Service Information Form

Site Address	O/S 30 SCOTLANDS DRIVE, COALVILLE LE67 3SU			
ICP Name	SEHL			
Crown Reference	1614948	Metered Connection	YES / NO	NO
Activity ID	DISCONNECTION	Unmetered Connection	YES / NO	YES
MPAN No.		Service OH or UG	UG	
Existing Cable Condition		New Cable Type		
Good or Defective?	DEFECTIVE	New Cable Size		
Defect Type:		Joint Type	STOP END	
Damage/Corrosion	X	Joint Depth	600	
Water Absorption		Cut-Out Type Installed	Manufacturer	
Paper Waxing			Rating (amps)	
Deterioration of Asset			Fuse Size	
Discharge Activity		External Meter Box	YES / NO	
Electrical Treeing		Grid Reference	442882:313718	
Drying Out				

Insulation Resistance (value)			Voltage (on completion)	
Polarity (existing)			Polarity (on completion)	
Earth Loop Imp (existing)			Earth Loop Imp (on completion)	
Service	3Ph or 1Ph		Phase Connected To	

Plan of Connection Arrangements on a WPD background (EMU). This can be provided below or on a separate plan where appropriate



Craftsperson	Name	Signature	Date
Supervisor	Name	Signature	Date

Please note that any documents that do not comply with WPD's policy will be returned

15.4 ICP MAPPING SERVICE SUBMISSION REQUIREMENTS (New Connection on Hand Drawn Map Background)

WESTERN POWER DISTRIBUTION

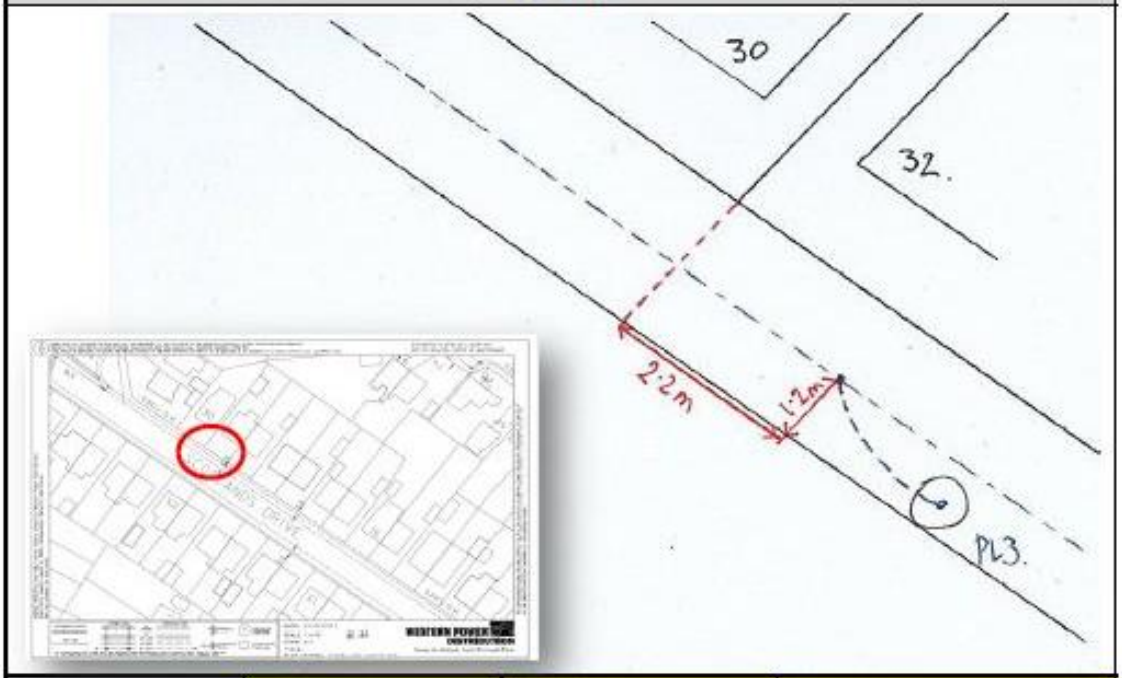
Serving the Midlands, South West and Wales

ICP LV Service Information Form

Site Address	O/S 30 SCOTLANDS DRIVE, COALVILLE LE67 3SU			
ICP Name	SEHL			
Crown Reference	1614948	Metered Connection	YES / NO	NO
Activity ID	NEW CONNECTION	Unmetered Connection	YES / NO	YES
MPAN No.		Service OH or UG	UG	
Existing Cable Condition		New Cable Type	hyb	
Good or Defective?	DEFECTIVE	New Cable Size	25	
Defect Type:		Joint Type	SERVICE BREECH	
Damage/Corrosion		Joint Depth	600	
Water Absorption		Cut-Out Type Installed	Manufacturer	
Paper Waxing	x		Rating (amps)	
Deterioration of Asset			Fuse Size	
Discharge Activity		External Meter Box	YES / NO	
Electrical Treeing		Grid Reference	442882:313718	
Drying Out				

Insulation Resistance (value)		Voltage (on completion)	
Polarity (existing)		Polarity (on completion)	
Earth Loop Imp (existing)		Earth Loop Imp (on completion)	
Service	3Ph or 1Ph	Phase Connected To	

Plan of Connection Arrangements on a WPD background (EMU). This can be provided below or on a separate plan where appropriate



Craftsperson	Name	Signature	Date
Supervisor	Name	Signature	Date

Please note that any documents that do not comply with WPD's policy will be returned

16.0 SUMMARY: OTHER DATA TO BE RECORDED ON SITE

16.1 Size, type and manufacturer of jointing chambers

16.1.1 Cable drum number and manufacturer

16.1.2 Cable length

16.1.3 Duct and sub duct sizes. (Sections to be shown where multiple ducts are laid – see section 17.0)

16.1.4 Cable laid by and when. (if applicable)

16.1.5 Map number or reference and scale
EMU Print to be used wherever possible – minimum scale 1/500 for underground cable recording

16.1.6 Site location / address

16.1.7 Recorded by (name and contractor) and when. (WPD staff to include MU number)

16.1.8 Order number / Invoice number

16.1.9 Depth of plant below final ground level

16.1.10 Position of Poles / Towers

16.1.11 Size, Type and Route of overhead conductor

16.1.12 All recording plans and additional information to be sent to quality control at the appropriate mapping centre (See Item 16.2 Mapping Centre Contact Details)

16.2 MAPPING CENTRE CONTACT DETAILS

For South West England -

Western Power Distribution
Mapping Centre – Quality Control
Osprey Road
Sowton Industrial Estate
EXETER
Devon, EX2 7WP
mailto:wpdmappingqaswest@westernpower.co.uk

For Wales -

Western Power Distribution
Mapping Centre – Quality Control
Lamby Way
Rumney
CARDIFF, CF23 2EQ
mailto:wpdmappingqaswales@westernpower.co.uk

For Midlands -

Western Power Distribution
Mapping Centre – Quality Control
4th Floor, Toll End Road
TIPTON
West Midlands, DY4 0HH

Area covered by:

- Hereford/Ludlow (18)
- Gloucester (19)
- Telford (20)
- Worcester (21)
- Stoke (22)
- Birmingham (23)
- Tipton (24)

Mailto:wpdmidlandsmcqadm1@westernpower.co.uk

Area covered by:

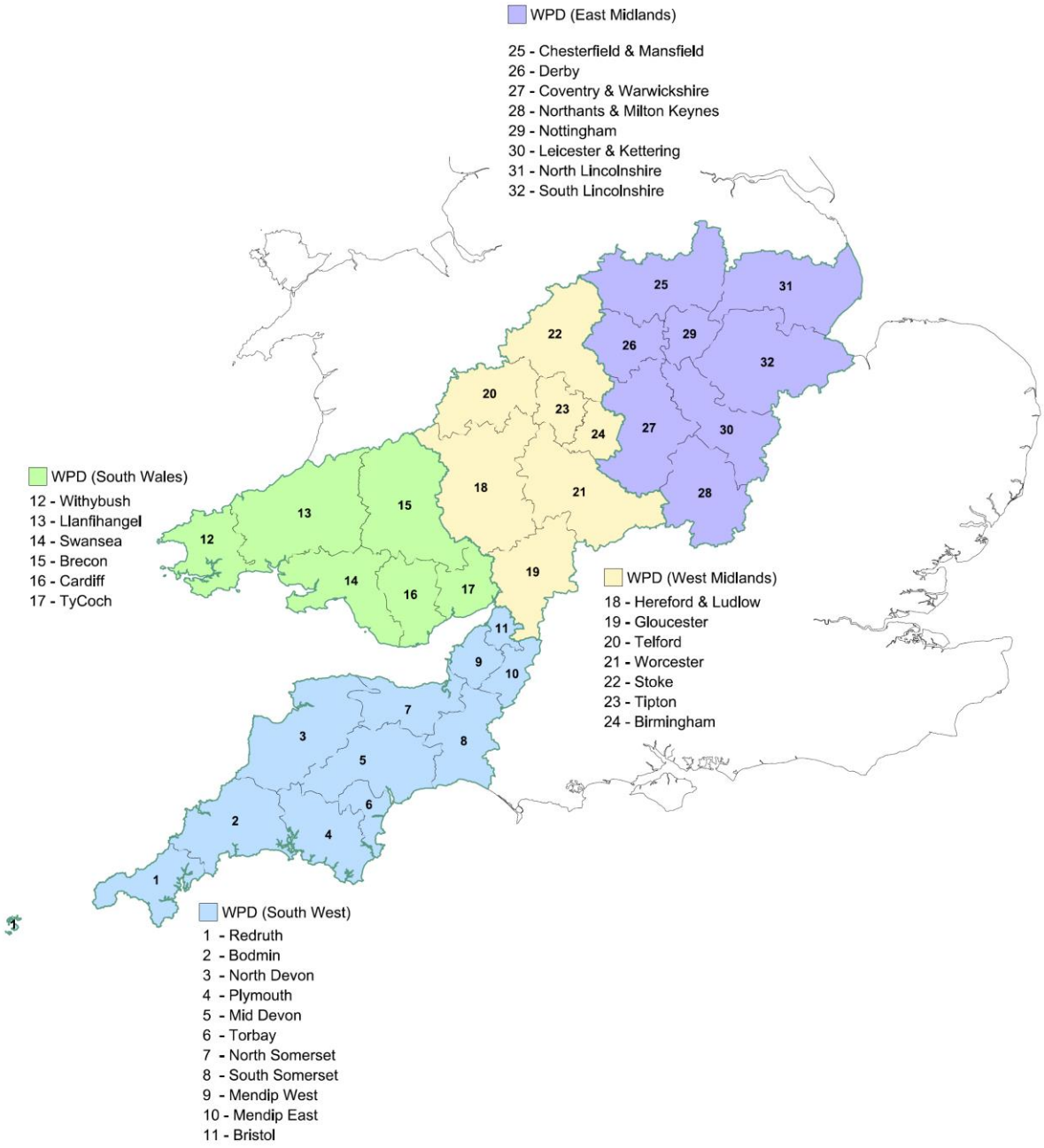
- Chesterfield & Mansfield (25)
- Derby (26)
- Coventry & Warwickshire (27)
- Northamptonshire & Milton Keynes (28)
- Nottingham (29)
- Leicester & Kettering (30)
- North Lincs (31)
- South Lincs (32)

Mailto:wpdmidsmcqadm2@westernpower.co.uk

Please see WPD DNO & Team Area Map overleaf for guidance on locations.

WESTERN POWER DISTRIBUTION
Serving the Midlands, South West and Wales

WPD DNO & TEAM AREA MAP



Based upon the Ordnance Surveys map with the permission of the Controller of Her Majesty's Stationery Office, Crown Copyright Reserved.Western Power Distribution, Avonbank, Feeder Road, Bristol, BS2 0TB. Licence Nos. 100022488, 100024877 & 100021807.
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17.0 RECORDING OF CABLE SECTIONS

17.1 When recording sections, please use the following method:

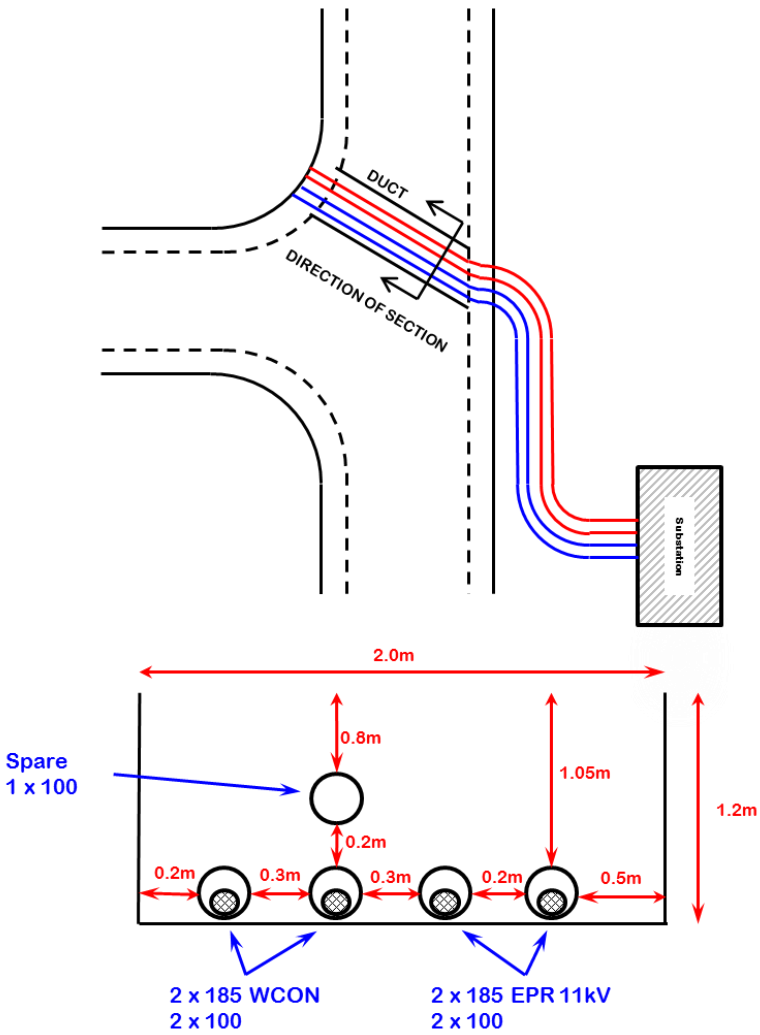
17.1.1 Record all duct sizes and colour in order

17.1.2 Record all cable sizes and indicate which duct they are in

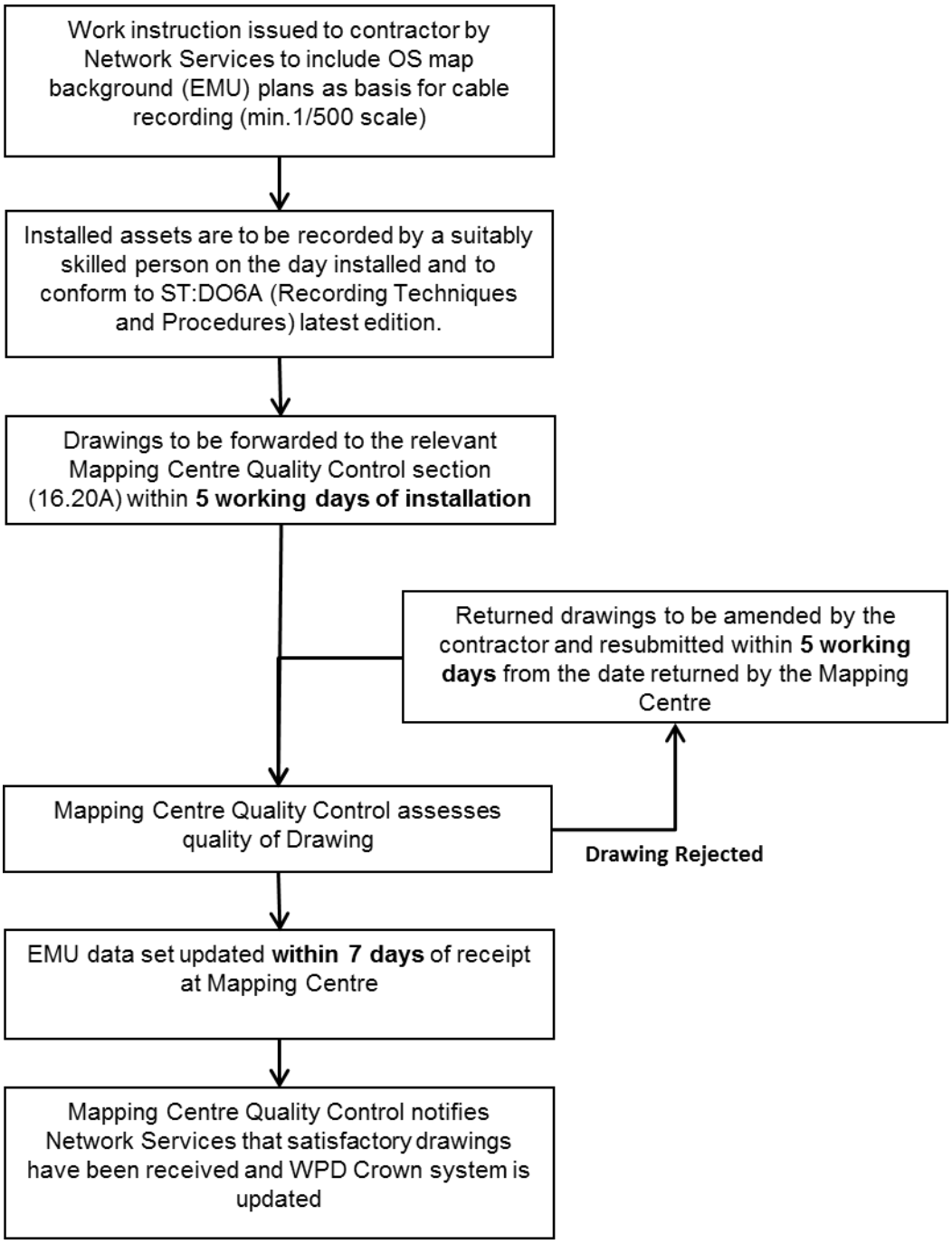
17.1.3 Record all dimensions of the trench (depth and width)

17.1.4 Record the direction of the section

EXAMPLE OF A SECTION SKETCH



18.0 PROCESS OF CABLE RECORD SUBMISSION FOR WORK UNDERTAKEN BY TERM CONTRACTORS OR CONTRACTORS EMPLOYED ON AD HOC MAJOR WORKS

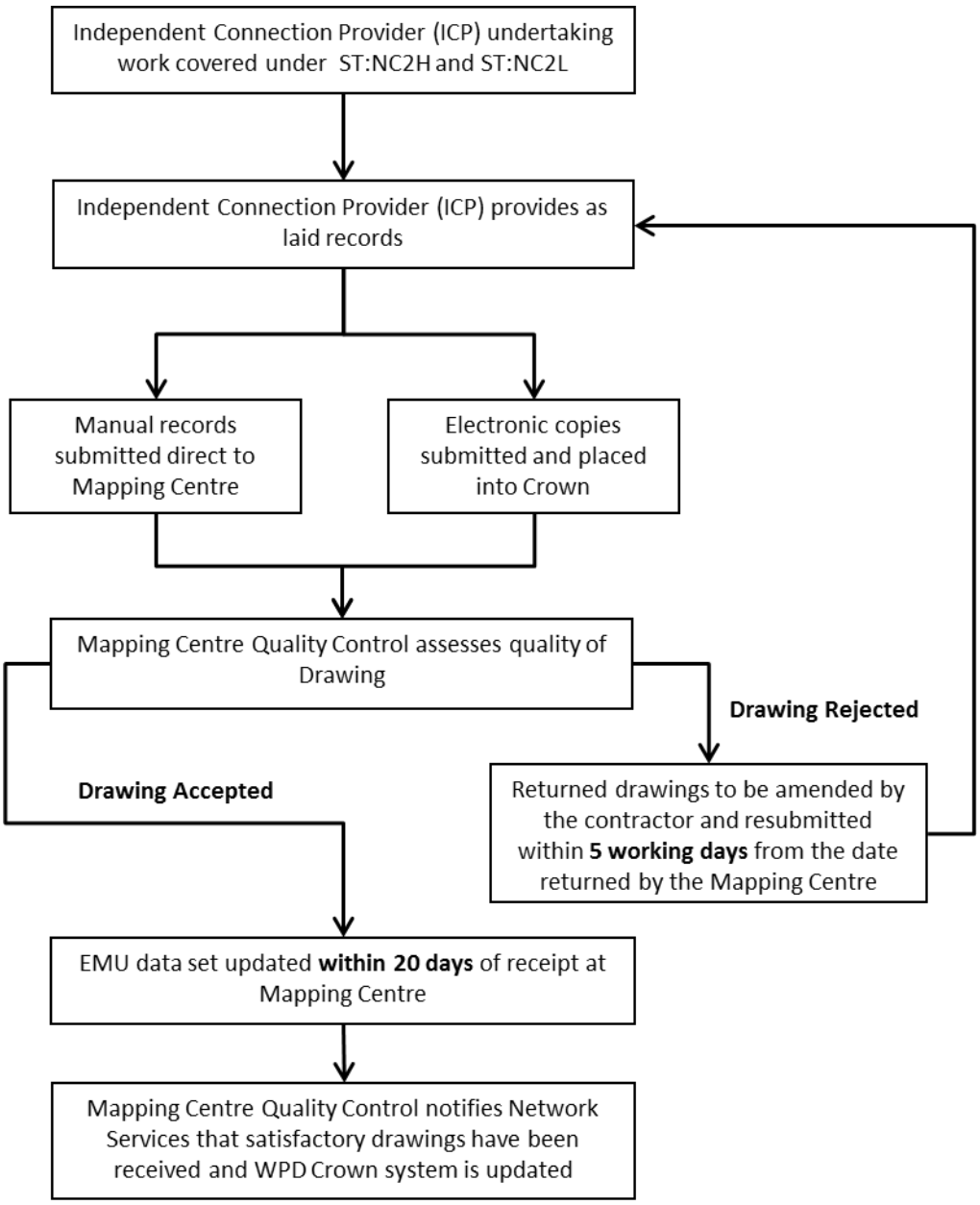


18.1 PROCESS OF CABLE RECORD SUBMISSION FOR WORK UNDERTAKEN UNDER:-

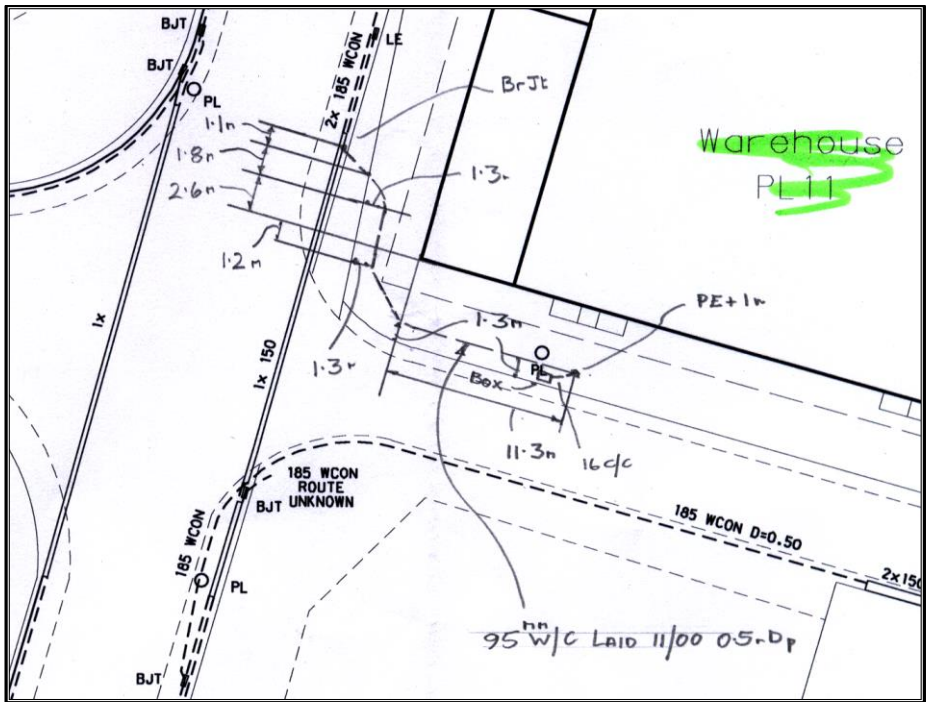
ST:NC2H
Relating to Inspection, Recording and Commissioning of work under Competition in Connection

And

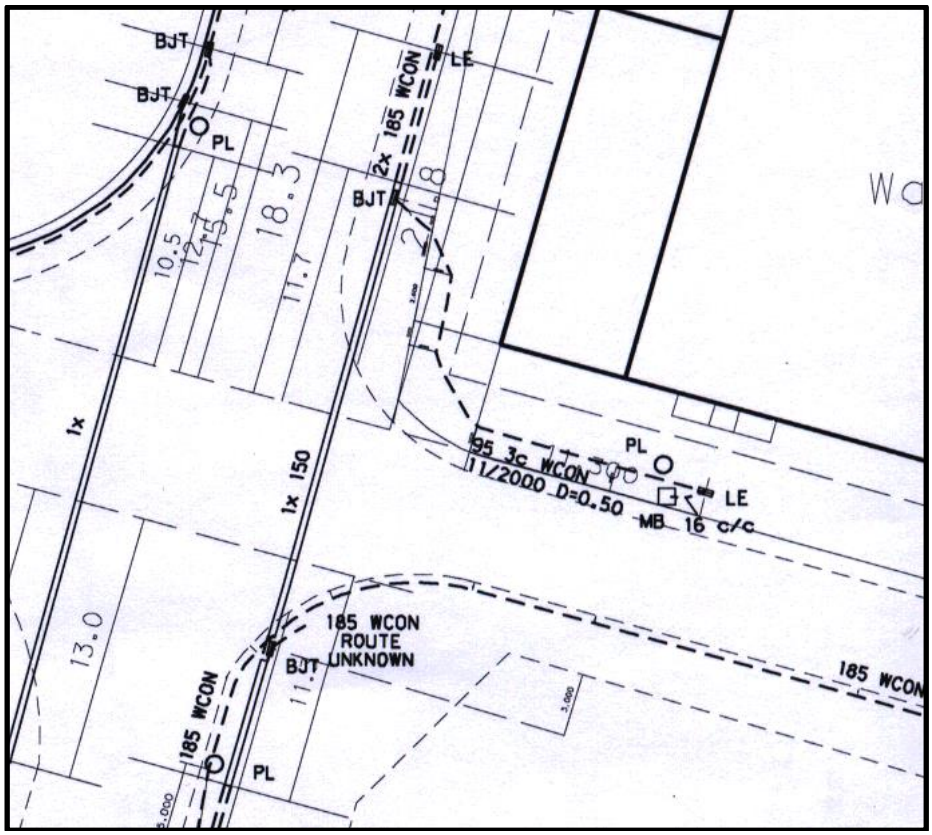
ST:NC2L
Independent Connection Provider (ICP) high and Low Voltage Connections Under ICP DSRs



19.0 Example of a sketch plotted by a cable recorder on OS map background



19.1 Example of same cable sketch plotted on digital mapping



20.0 Recording of Assets using Geographical Positioning Systems (GPS)

20.1 Minimum Standards for Supplying Cable Position Information Recorded by GPS

All cable position information, regardless of how it is gathered, is to be recorded to an accuracy of 0.1m to comply with Western Power Distribution's Standard Technique documents DO6A/1 and DO6/3 which in turn comply with all relevant UK legislation.
Note: GPS is the commonly used generic term for Global Navigation Satellite Systems or GNSS which is the correct name for all constellations of satellites used for the purpose of three-dimensional positioning. GNSS systems include GPS (the USA system), GLONASS (the Russian system), COMPASS (the Chinese system) and GALILEO (the European system)

20.2 Standards of Accuracy

Different grades of GPS equipment provide a range of different accuracies. Equipment used for cable recording must comply with a minimum accuracy as determined by Western Power Distribution.

GPS Equipment / method	Description of Accuracy	Accuracy	Acceptable method to WPD
Survey grade GPS with live RTK (Real Time Kinematic) updates. Usually tracks GPS and GLONASS and has a SIM card to receive RTK data	As long as a fixed solution* is achieved, the accuracy can be less than 0.05m to OS mapping.	<0.05m	Yes
Survey Grade GPS using a base station and rover method. Usually tracks GPS and GLONASS. No live updates are received.	This method of survey is highly accurate within itself (<0.05m) but the whole survey can be positioned 1-2m away from OS mapping. Fixed solution required*	<0.05m providing tie-in measurements are shown	Yes, if tie in measurements to OS features are provided no less than every 200m and at the start and end of the cable
GPS hand held receiver. Usually tracks just one of the major GPS networks. No live updates	The receiver generates an autonomous position.	<1.0m	No

*A fixed solution means that the device is showing the user that the highest possible accuracy has been achieved. This is dependent on location, satellite availability and obstructions.

20.3 Data Format

We can accept the raw GPS data in one of the following file formats:

.TXT	Text file format
.CSV	Comma Separated Variable file format
.XLS / .XLSX	Microsoft Excel Spreadsheet file format

The data must contain a minimum of the following:

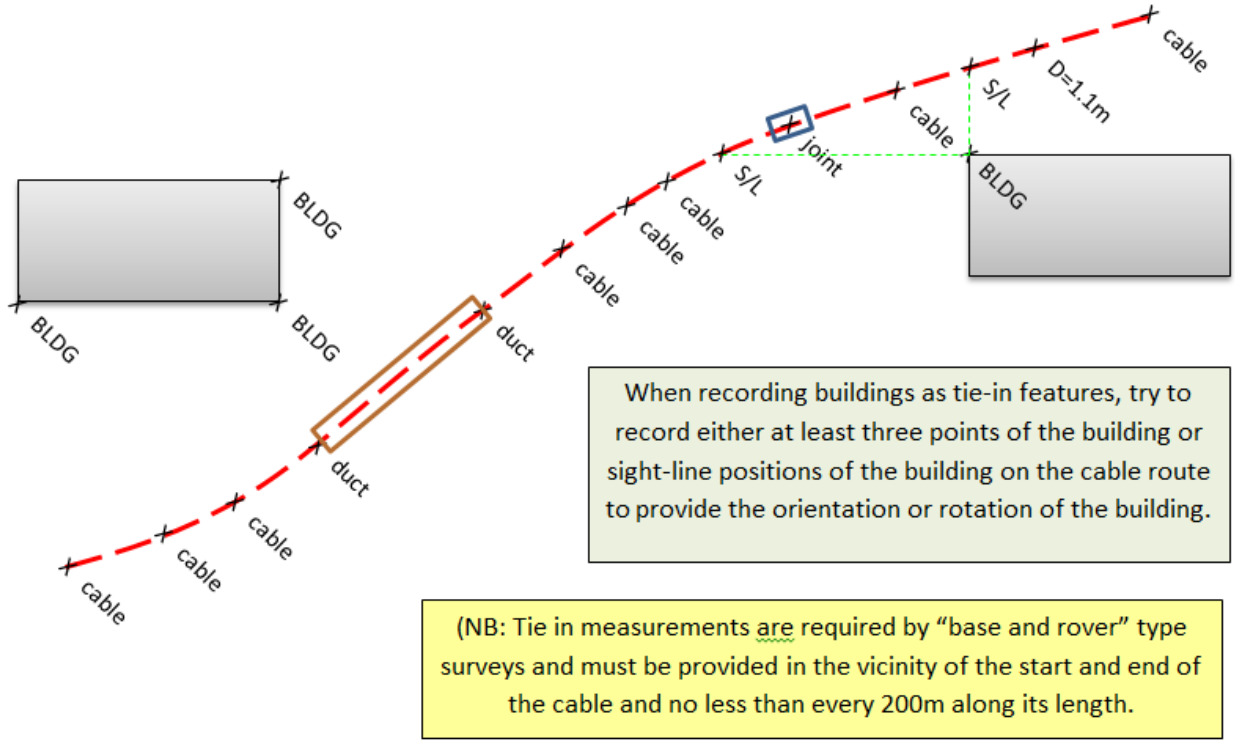
- Description – A short identifier of the content of that point. e.g. CABLE, JOINT, DUCT, HEDGE, ROAD, DEPTH=0.9m, etc.
- If using the base and rover method, tie in points must be identified in this way
- Depths must be included here
- Joint positions must be included here
- Start and end of ducts must be included here
- Easting – the geographic Cartesian measured eastward distance, the x co-ordinate
- Northing – the geographic Cartesian measured northward distance, the y co-ordinate

The co-ordinates are 12 figure grid references with 3 decimal places which give accuracy to 1mm.

Example:

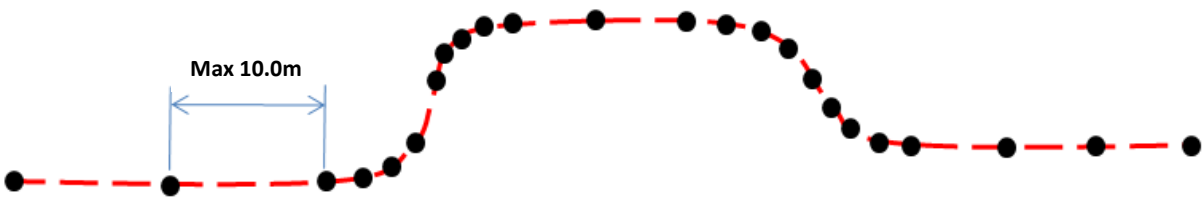
```
cable,181006.589,49125.587
cable,181008.854,49110.217
duct,181009.019,49101.135
duct,181007.961,49087.967
duct,181006.288,49073.696
duct,181001.632,49069.062
cable,181001.421,49064.373
cable,181000.923,49055.699
cable,181000.694,49046.649
cable,180999.495,49035.938
joint,180998.146,49030.886
cable,180995.761,49024.177
cable,180994.325,49018.648
D=1.1m,180993.997,49016.808
cable,180993.178,49012.369
```

Example of recording showing joint, duct and tie-in positions.



20.4 Data Frequency

Data points must be recorded along the cable's length frequently enough to provide an accurate record of the cable in the ground. As with traditional recording methods, frequency increases when more detail is required, and less frequency is required for perfectly straight lengths of cable. However, even with straight runs, the *maximum* frequency should be 10.0m.



20.5 Depth Information

The depth of cables must be supplied with any recording. The frequency of the depth information must be sufficient to show changes in depth along the length of the cable.

Depth information should be accurate to 0.1m and shown relative to a map background feature that represents a finished ground level e.g. a kerb stone.

The depth information should be included either:

- As a recorded data item, i.e. in a data point description e.g. D=0.9, 123456.789, 123456.789 (see example in sample data above)
- Or, annotated on an accompanying hard copy, drawing or pdf file of the route.

Depth information must NOT be provided as an AOD (Above Ordnance Datum) level. Recordings featuring AOD levels will be rejected.

20.6 Supporting Documents

All GNSS surveys should be accompanied by a section of mapping to show the location of the survey and the position of the cable. If this is sent by email then a pdf file would be appropriate.

All documents that would accompany a traditional cable recording must be received with a GNSS recording. Cable Condition Statement etc…

If the survey data is sent by email then the recorder must state the project number, the name of the project, the method used and the accuracy achieved.
If the survey data is received by hand, i.e. by memory stick or data card, then a form should be completed to include the project number and name and clearly state the method of survey and accuracy achieved.

Supplementary information required for recordings including cable jointing:

- Position of joint, live ends etc (measurements to be taken as per recording procedure instruction)
- Size of existing cable (if applicable)
- Size of new cable
- Voltage
- Joint Type BJ, SJ Trif Joint, Live end etc
- Phase identification markers L1, L2, L3, etc (EPR Cables)
- Single or 3 Phase
- Date work undertaken
- Name of jointer
- GLC Code

20.7 Compliance

Recordings made using GPS equipment that do not conform to our minimum standards contained within this document will be rejected by the Mapping Centre's Quality Assurance team.

All recordings must comply with the company standard technique documents DO6/3 and DO6A/1 and reference should be made to those documents for further detail.

This document is not a formal policy document but aims to provide users with guidance to acceptability of recordings made using GPS and their submission to the Mapping Centre.

APPENDIX A

SUPERSEDED DOCUMENTATION

This document supersedes ST: DO6A/3 dated September 2017 which has now been withdrawn.

APPENDIX B

ANCILLARY DOCUMENTATION

The following regulations have an impact on and apply to this policy document.

New Roads and Street Works Act (NRSWA) (and associated Codes of Practices)
The Electricity Safety Quality & Continuity Regulations (ESQCRs)
Code of Practice for recording of underground apparatus in Streets
Electricity Acts 1989 as amended by the Utilities Act 2000
Health and Safety at Work Act
WPD Policies ion 'NC' series relating to 'Competition in Connections' in particular ST:NC2H, ST:NC2L and ST:NC2M.

APPENDIX C

ASSOCIATED DOCUMENTATION

"Basic Recording Techniques and Procedures".

APPENDIX D

IMPACT ON COMPANY POLICY

This Standard Technique documents existing processes and impacts on Network Services, Design Services (the Mapping Centre) and WPD Contractors.

APPENDIX E

KEY WORDS

Recording, underground, assets