WESTERN POWER DISTRIBUTION

Framework Document on cable recording techniques to be read in conjunction with other Western Power Distribution Framework Document Appendices relating to Housing and to Industrial and Commercial Developments, and ENA Engineering Recommendation G81 Framework Documents Parts 1 – 6, versions agreed at Ofgem ECSG on 12th October 2004

WESTERN POWER DISTRIBUTION

CABLE RECORDING TECHNIQUES FRAMEWORK DOCUMENTS APPENDIX

1. CABLE RECORDING TECHNIQUES AND RECORDS

1.1 Further WPD requirements covering underground assets recording techniques, procedures and records are detailed in this section* of the Framework Document Appendix; it is an extract from a handbook issued to WPD Contractors. *(separated out to reduce individual files sizes when downloading this document from the Internet)

1.2 Principles of recording cables

The position of all underground plant must be accurately recorded on site. Plant in the highway, must be recorded to an accuracy of plus or minus 100mm with all dimensions shown in metric – **not** imperial.

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).

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

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

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

Dimensions and the position of plant to be drawn onto an Ordnance Survey map base (e.g. EMU) printed at the required scale. Additional sketches on the Company's recording sheets may be added for clarification.

Depth of plant to be shown on plan.

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.

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

Contractors staff should forward data to the appropriate Mapping Centre within five working days of the job being completed on site. (or shorter period if earlier adoption is being sought).

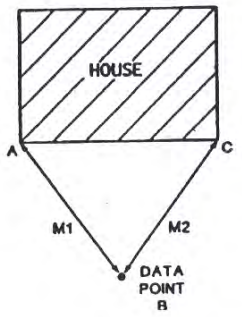
1.3 Taking measurements using triangulation

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.

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

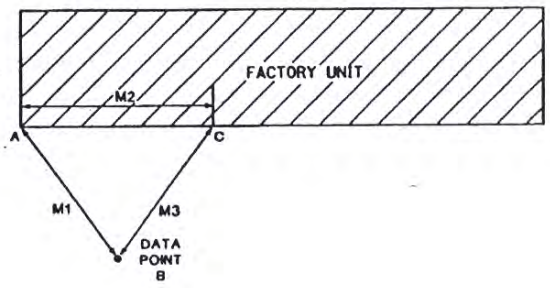
In this example, a measurement is taken from points A and C which will confirm the position of point B (Data point)

Example 1



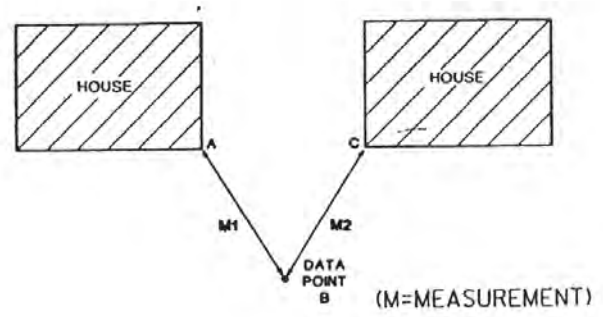
Example 2

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).



Example 3

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).



1.4 Extended sight lines and right angles

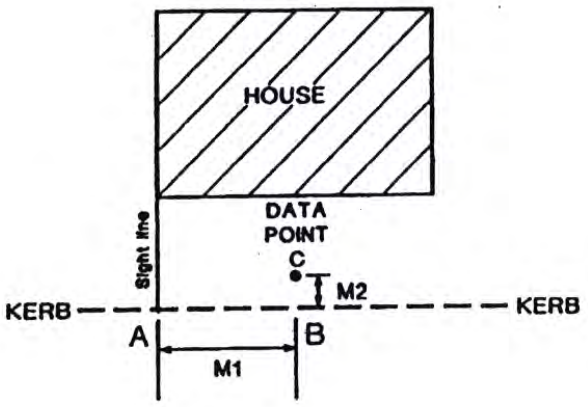
As previously mentioned, triangulation is the preferred method for recording plant position. If this is not possible because of, for example, obstructions, measurements can be taken at right angles to buildings.

Example 4

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

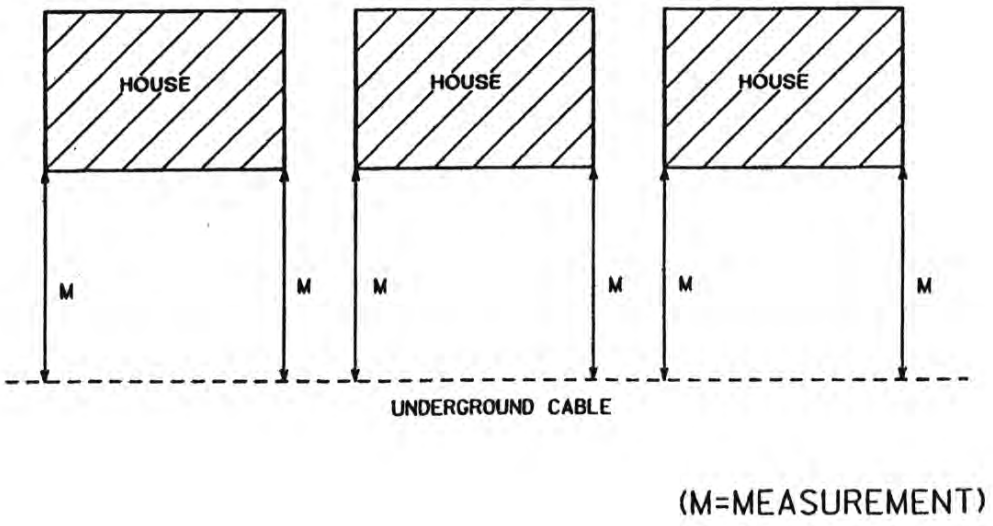
Measure from Point A along the kerb to Point B which is in turn at right angles to the Data point C (M1)

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



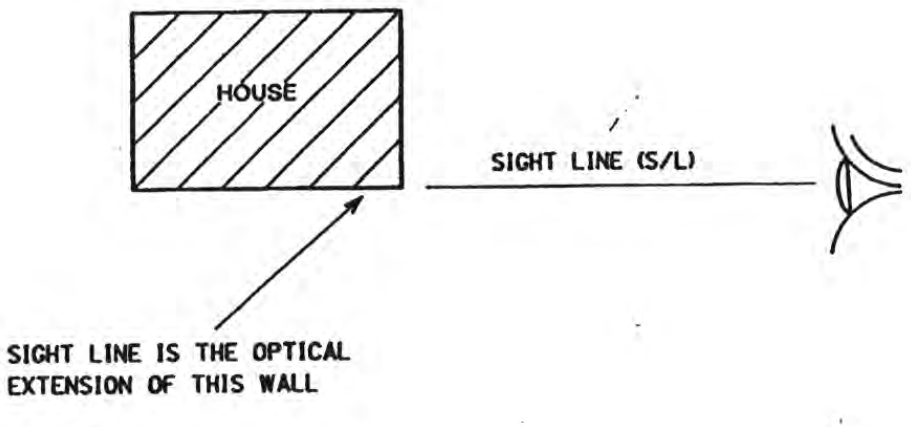
Example 5

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).



Example 6

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

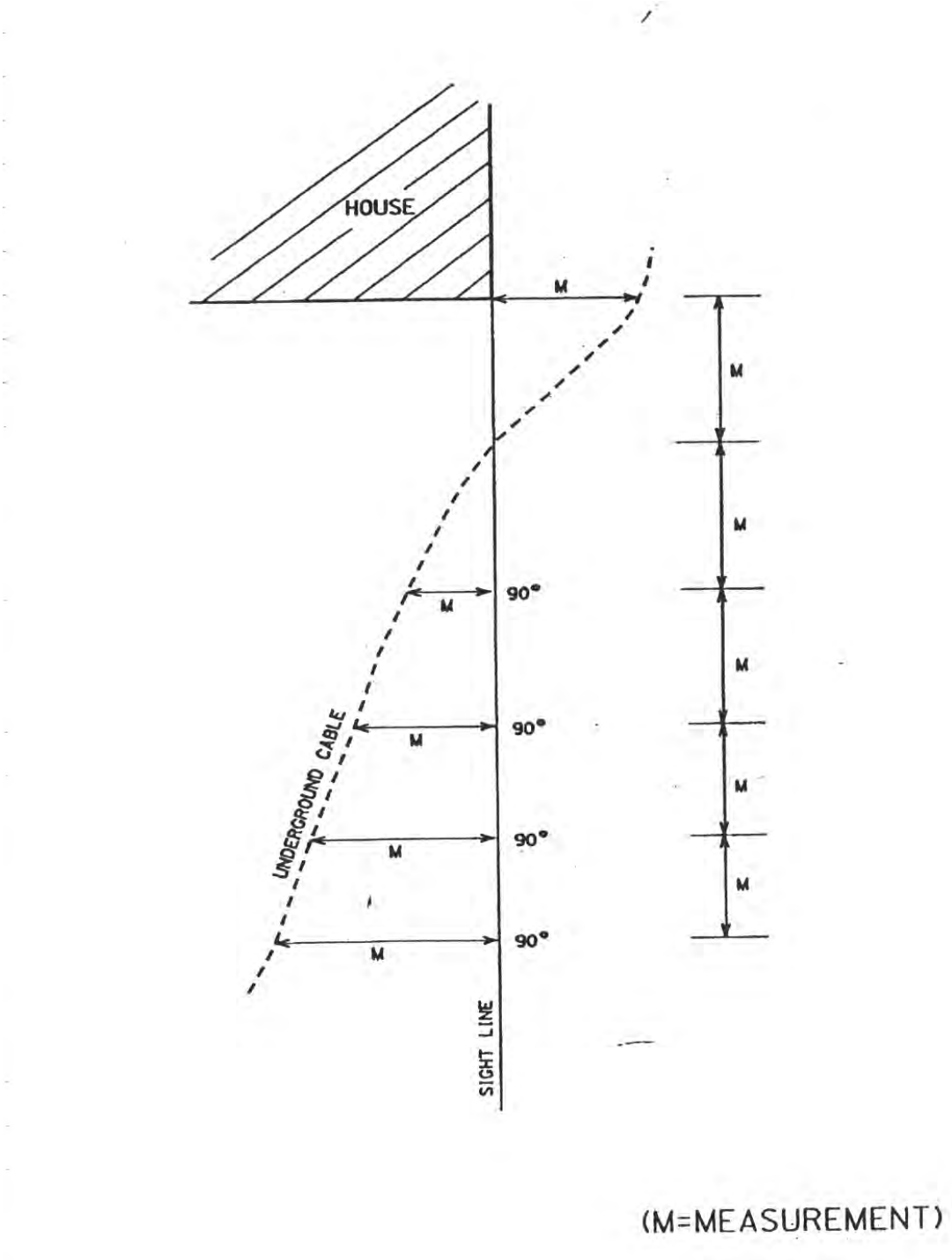


Example 7

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

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.

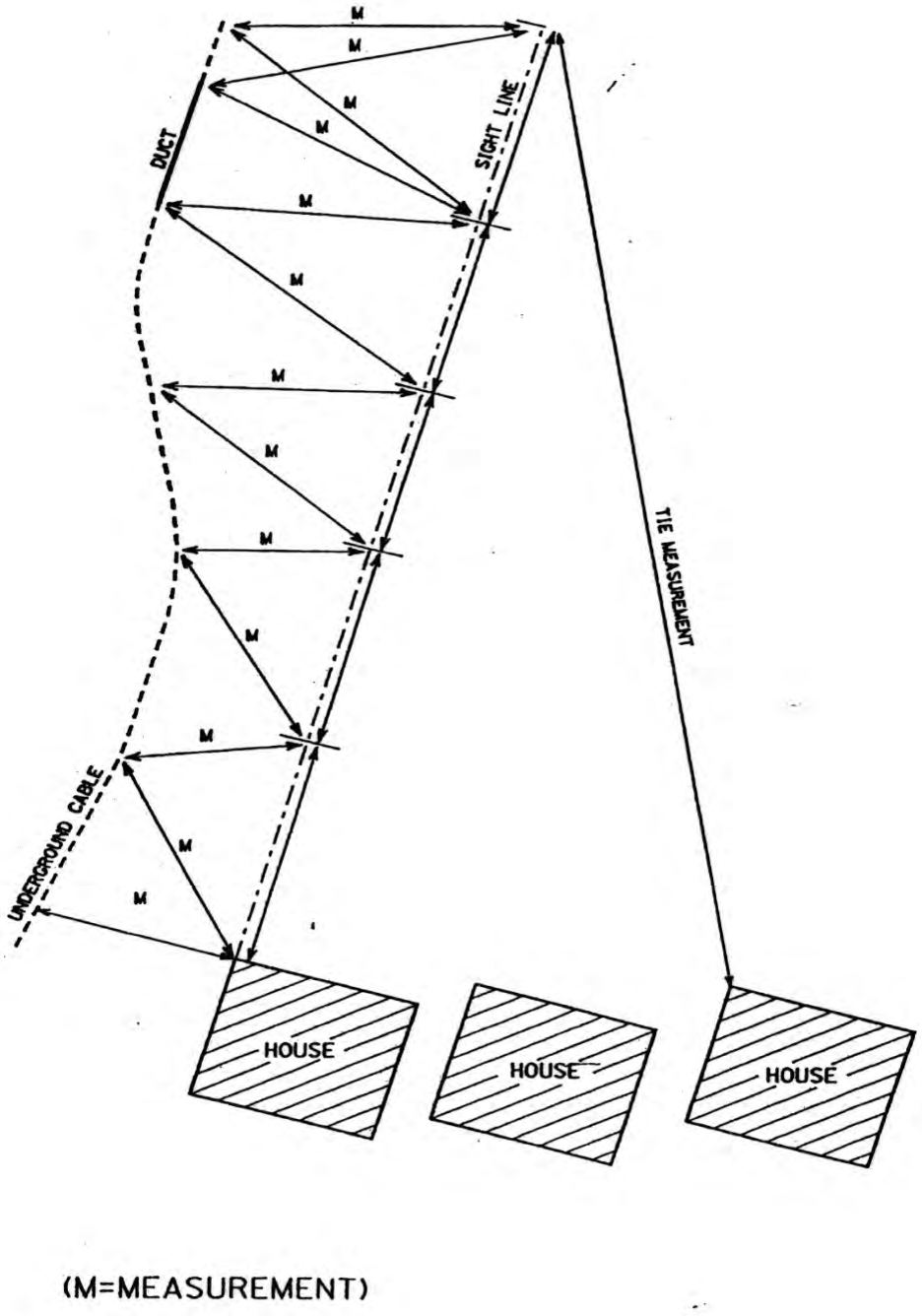
Off-set measurements should not exceed 15 metres as inaccuracies will occur over greater distances. Triangulation techniques referred to in 4.6 will therefore apply.



Example 8

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.

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.



1.5 **Chain lines**

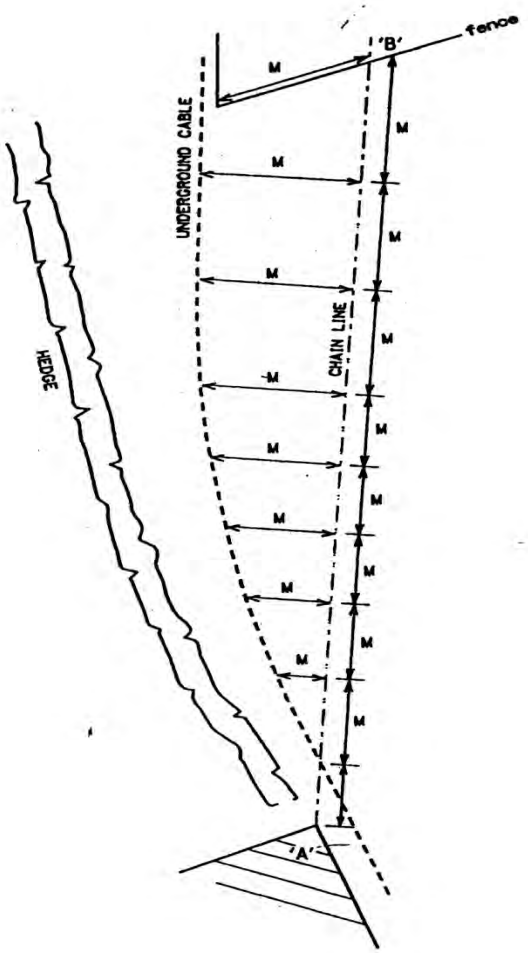
Whnever possible, dimensions must be taken directly from Ordnance Survey features. On occasions, when this is not possible, a chain line between two fixed points can be constructed.

Example 9

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

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.

FIGURE 9
MEASUREMENTS FROM A CHAIN LINE USING OFF - SETS



(M=MEASUREMENT)

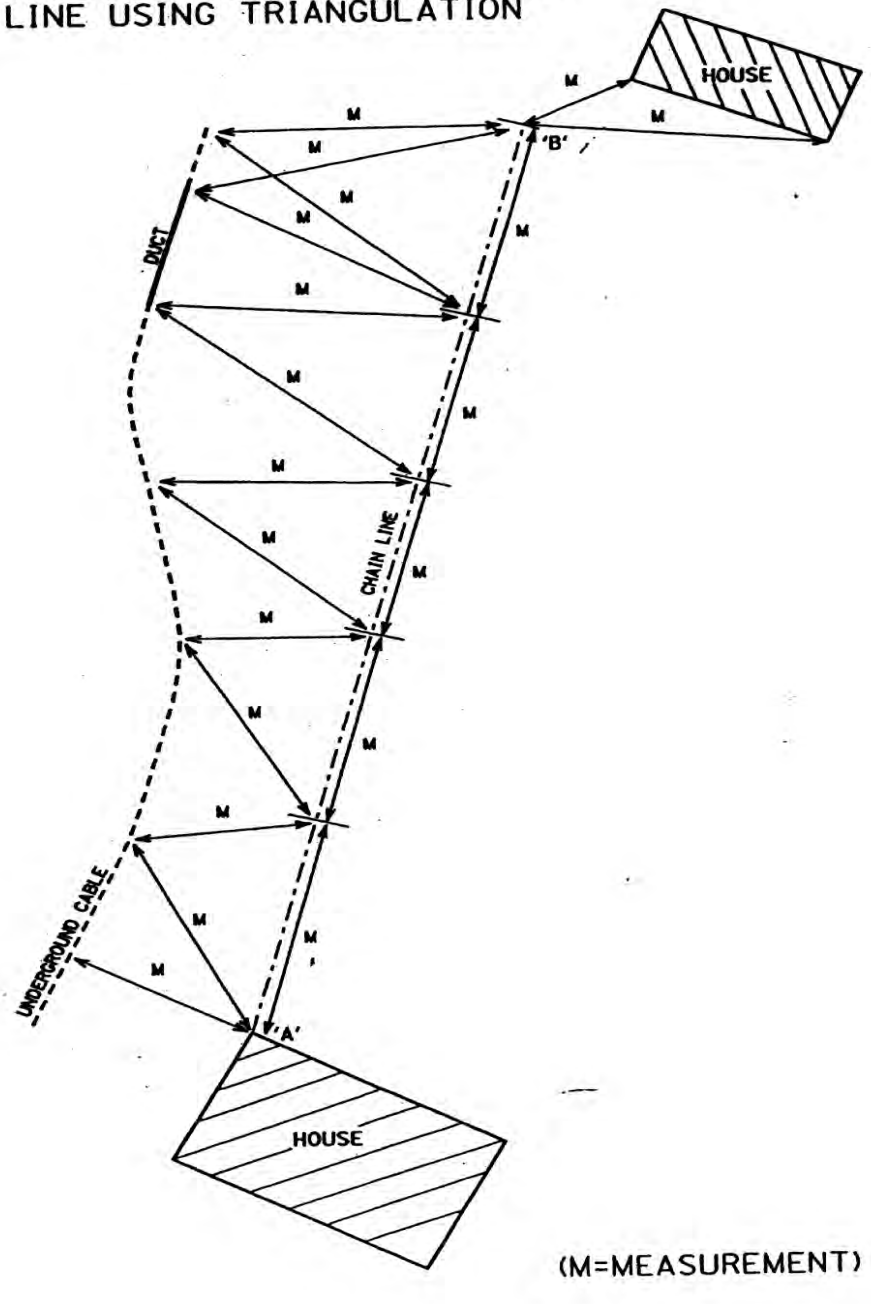
Example 10

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.

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

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

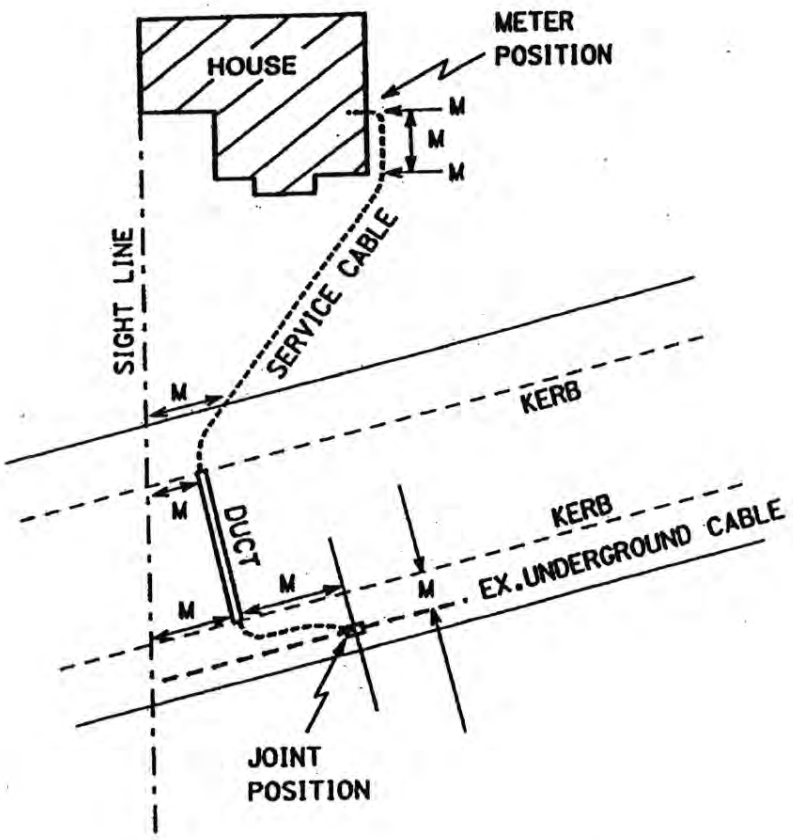
FIGURE 10
MEASUREMENTS FROM A CHAIN LINE USING TRIANGULATION

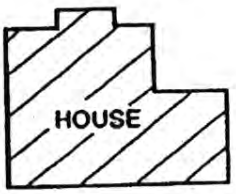


1.6 **Same feature recording**

Example 11

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.





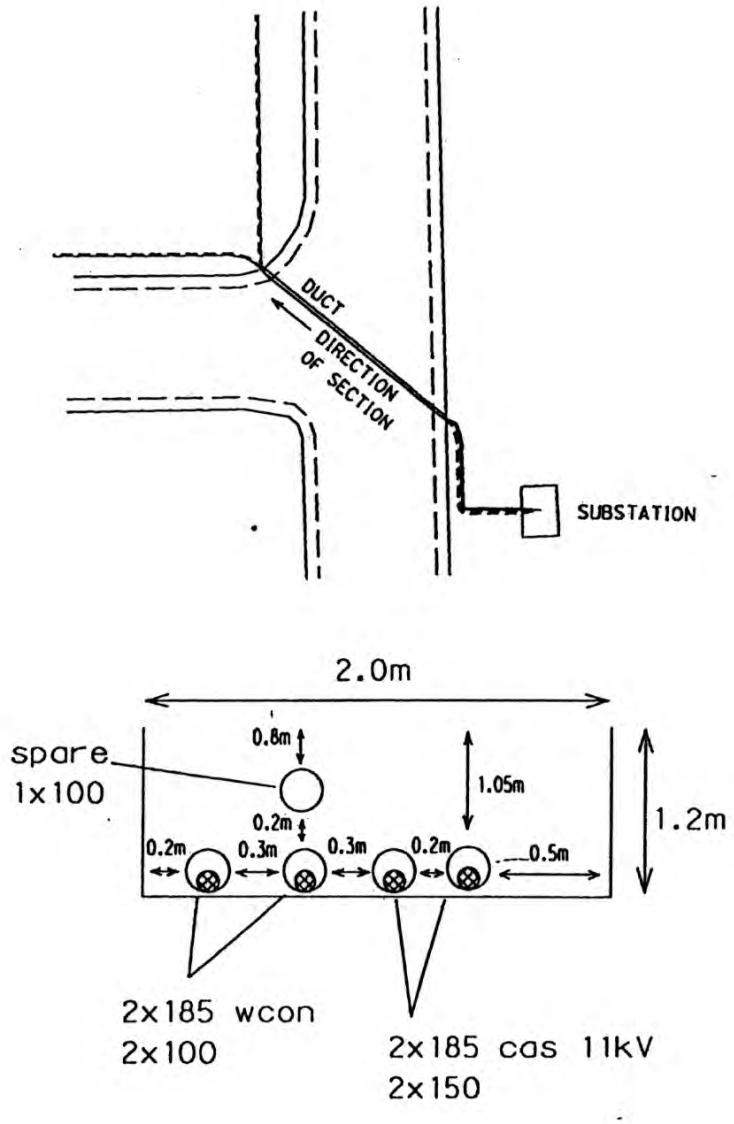
(M=MEASUREMENT)

1.7 **Recording of cable sections**

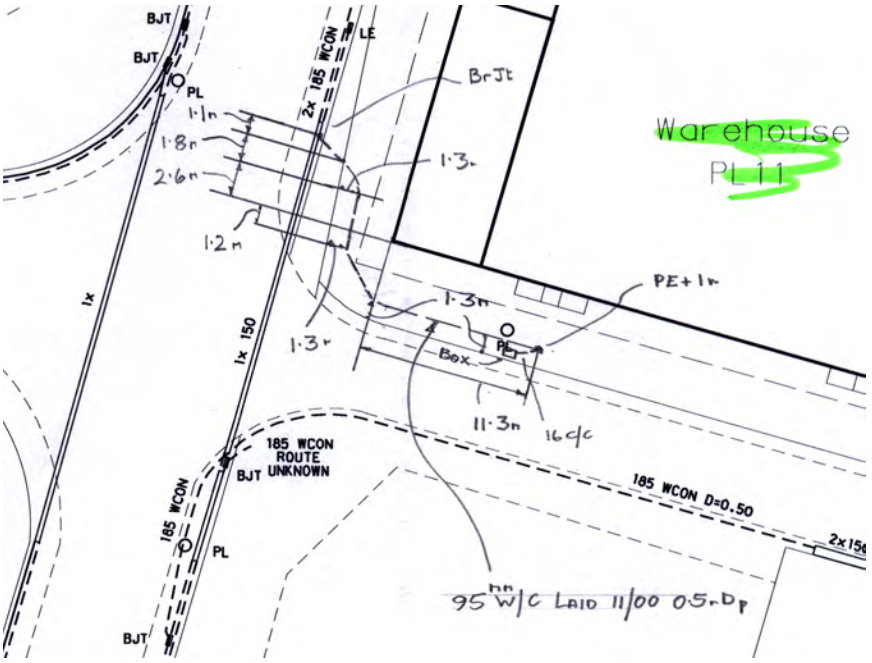
When recording sections, please use the following method:

Record all duct sizes in order
Record all cable sizes and indicate which duct they are in
Record all dimensions of the trench (depth and width)
Record the direction of the section

EXAMPLE OF A SECTION SKETCH



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



Example of same cable sketch plotted on digital mapping