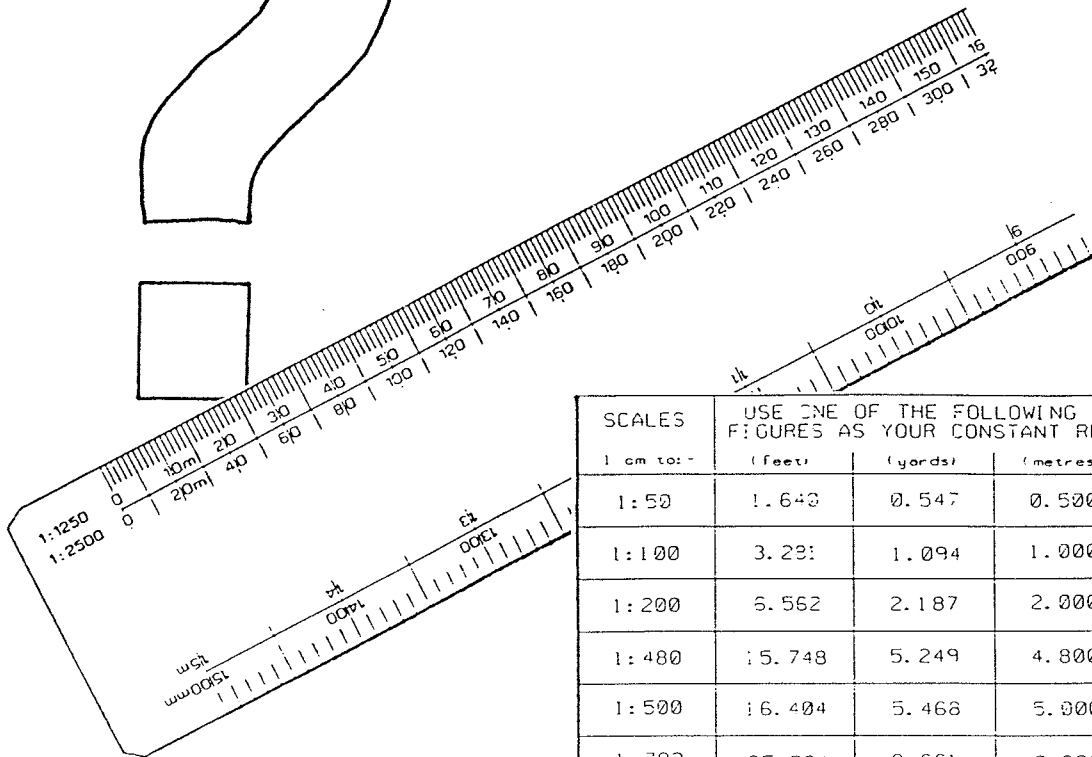
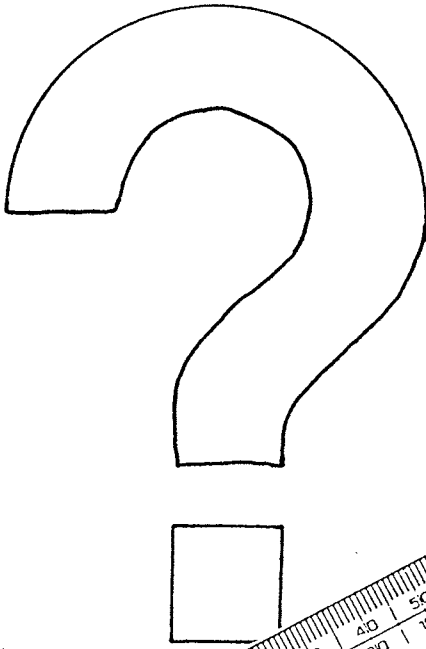


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WEST MIDLANDS PROJECTS GROUP.

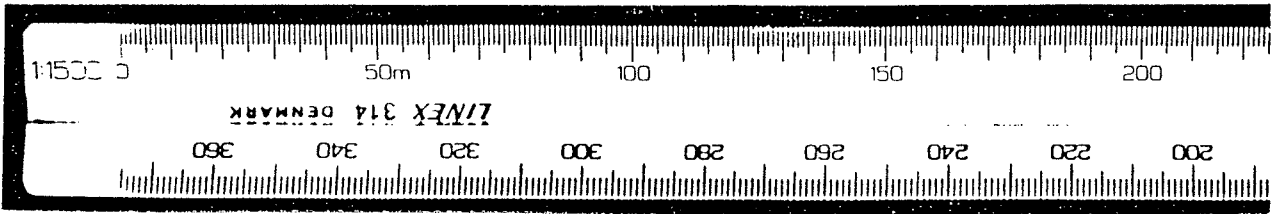
USE OF SCALE RULES



| SCALES | USE ONE OF THE FOLLOWING FIGURES AS YOUR CONSTANT REF. | | |
|-----------|--|---------|----------|
| | (feet) | (yards) | (metres) |
| 1 cm to:- | | | |
| 1:50 | 1.640 | 0.547 | 0.500 |
| 1:100 | 3.281 | 1.094 | 1.000 |
| 1:200 | 6.562 | 2.187 | 2.000 |
| 1:480 | 15.748 | 5.249 | 4.800 |
| 1:500 | 16.404 | 5.468 | 5.000 |
| 1:792 | 25.994 | 8.661 | 7.920 |
| 1:1000 | 32.808 | 10.935 | 10.000 |
| 1:1250 | 41.010 | 13.670 | 12.500 |
| 1:1584 | 51.363 | 17.223 | 15.840 |
| 1:2500 | 82.021 | 27.340 | 25.000 |
| 1:5000 | 164.042 | 54.680 | 50.000 |

USE OF SCALE RULES

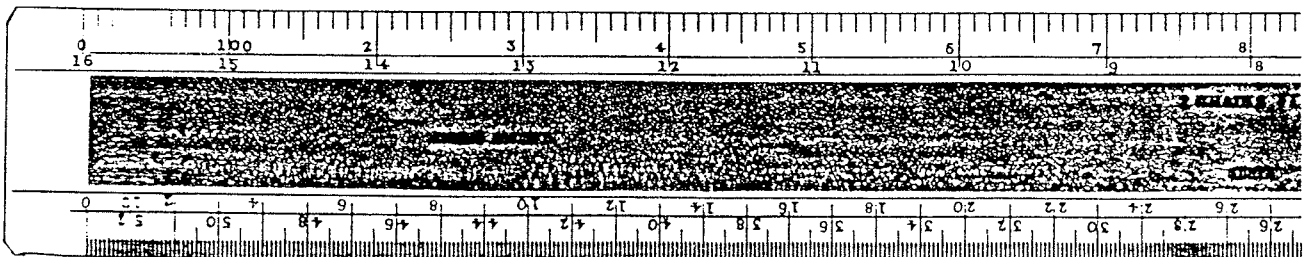
In the design office we occasionally require to use a Scale Rule. Illustrated below is a typical graduated Scale Rule.



The rule happens to be a scale of 1:1500, so for every inch on the diagram the distance actually out on site is 1500 inches, or for every centimetre on the diagram the distance actually on site is 1500 centimetres (15 metres).

Most Scale Rules are graduated to allow you to “read off” in convenient dimensions. The scale illustrated above reads off in metres and is therefore known as a Metric Scale Rule, remember a scale is a ratio and can be related to either Metric or Imperial measurements.

Shown below is an example of an Imperial Scale Rule.

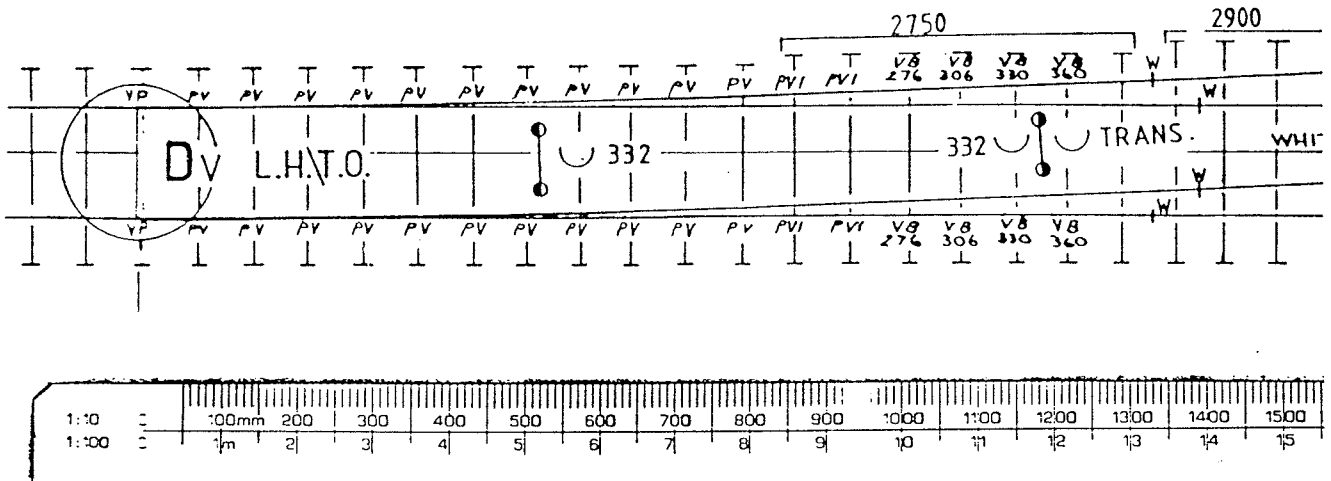


This rule is 1 inch to 2 Chains, which is 1:1584 (a Chain is 22 yards or 66 feet). The scale rule is graduated so as to “read off” in feet or yards. These scales are now dying out and more uniform scales are being used 1:5, 1:20, 1:100, 1:1000 etc. Scale rules are produced to read the scales off in Metric or Imperial dimensions but generally the Imperial rules have to be specially manufactured as there is little demand for this type of rule (although we still produce Signalling Scheme Plans that require to be read with Imperial Scale Rules).

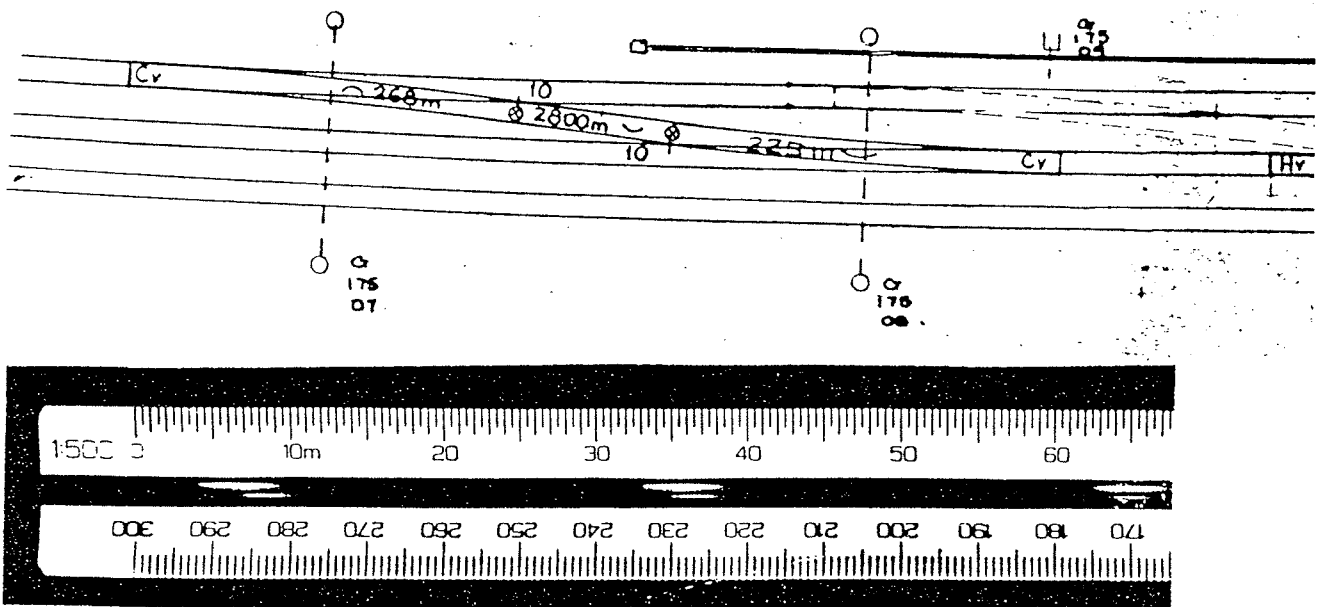
USE OF SCALE RULES

Here are a few common examples of Plans we come into contact with and the Scale Rule to use when reading the Plan.

Civil Engineers 1:100 Scale Plan



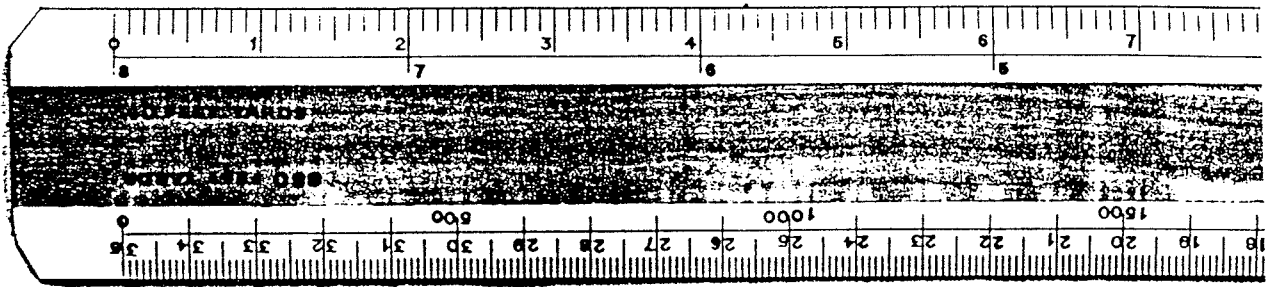
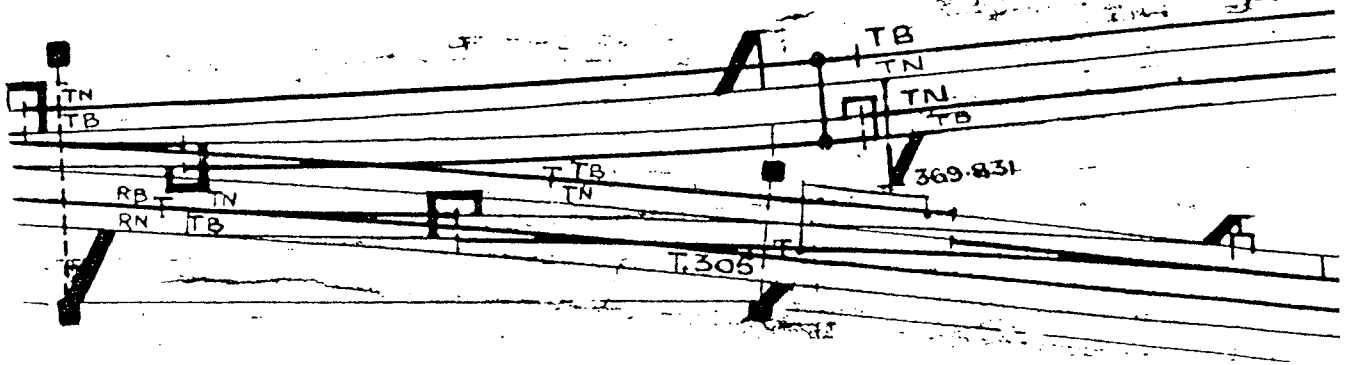
Civil Engineers 1:500 Scale Plan



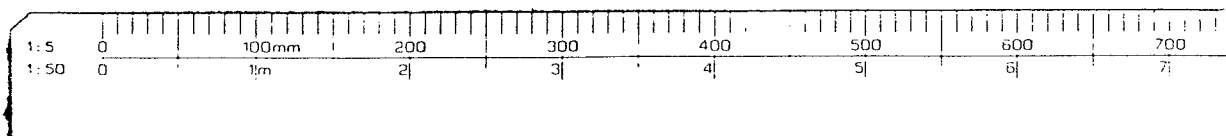
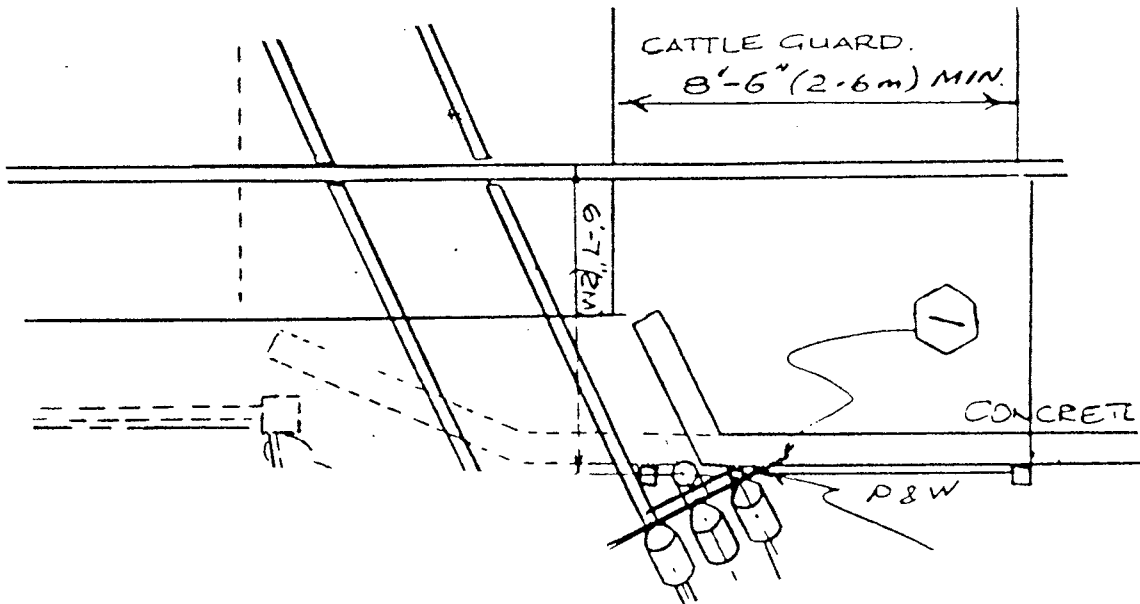
USE OF SCALE RULES

Electrification Bonding Plans

1 inch to 40 feet or 1:480

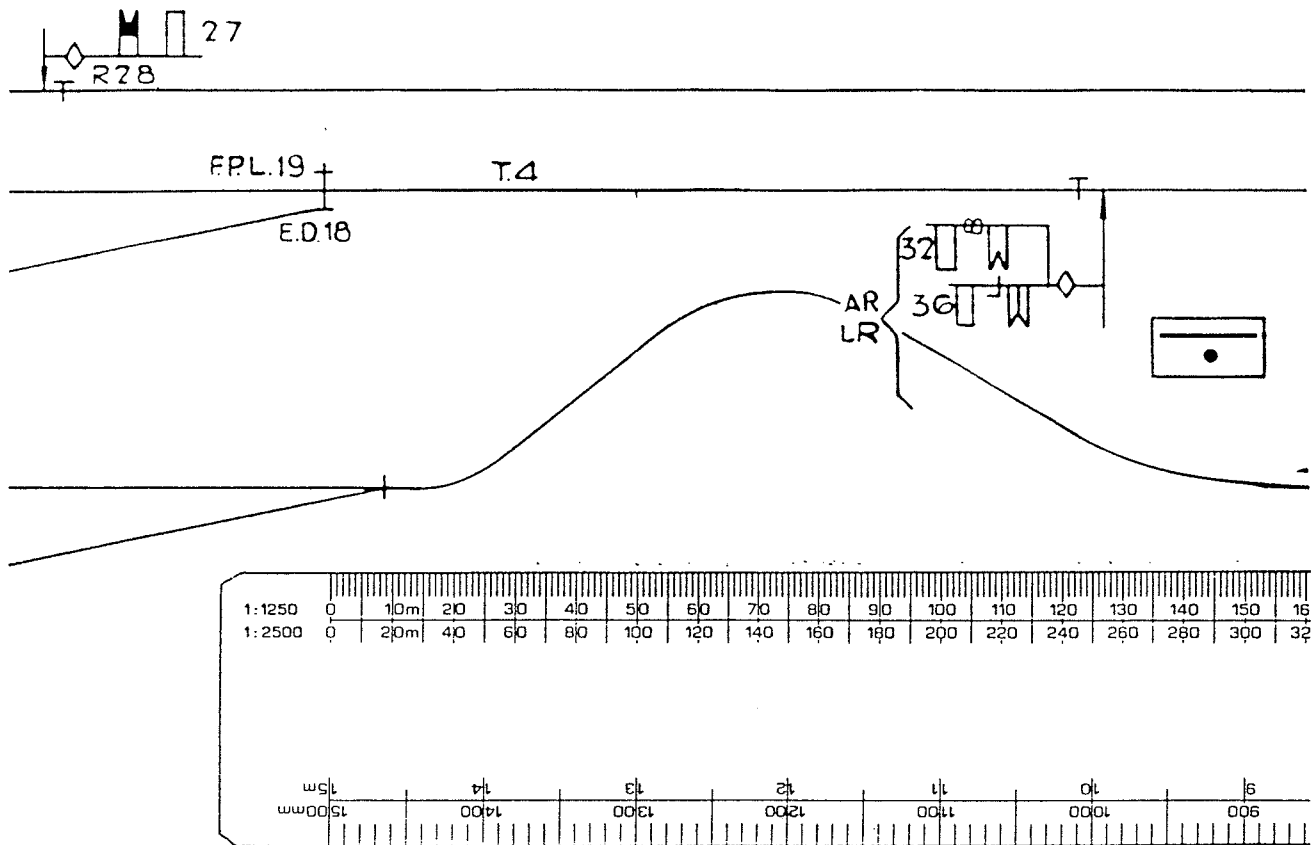


Level Crossing Layout Plan 1:50



USE OF SCALE RULES

Signalling Scheme Plan 1:1250



General Scale Information

If we look at the scale of 1:100 then:-

1 inch is to 100 inches

or

1 foot is to 100 feet

or

1 yard is to 100 yards

or

1 metre is to 100 metres

continued

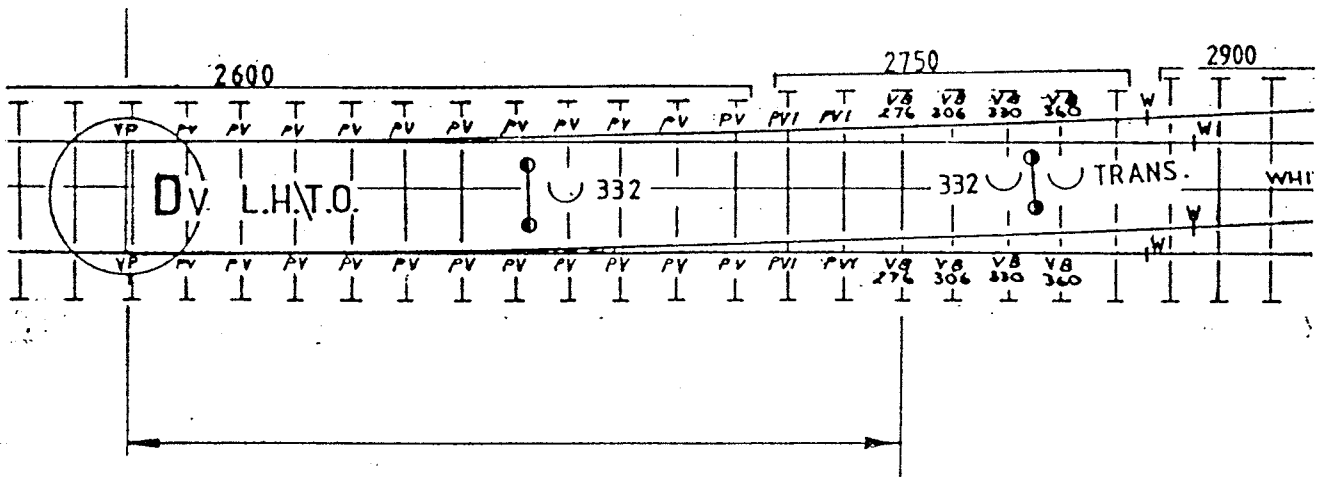
USE OF SCALE RULES

Therefore when considering the scale of 1:100 1 inch on an Imperial rule is the equivalent of 100 inches when reading the scale plan ie. 8 feet 4 inches (8.333 feet) and 1 tenth of an inch is equal to 0.833 feet.

If you were to place 8.333 into the memory of a calculator you have the constant "stored" to multiply by when reading a 1:100 scale plan with an Imperial Rule and the reading given will be in feet.

If you entered 2.778 into the memory of the calculator you would be reading off the plan in yards. It is obviously more advantageous to use an Imperial Rule with tenths of an inch graduations when measuring from the scale plan.

eg. The plan below is at 1:100 scale.



If we required to know the distance between the TOE of the points and the sleeper with the first "double baseplate" on it the distance between these two positions is required in feet follow these steps:-

- 1) Place 8.333 in the memory of the calculator (normally you will have more than one measurement to find).
- 2) Measure the distance in inches from Toe to Baseplate.
- 3) Multiply the measurement taken from the plan by your "constant" 8.333.
- 4) This gives you the actual distance required.

USE OF SCALE RULES

Rather than having to work out the constants required a Table can be referred to that covers the most common scales (FIGURES 1 & 2).

The Tables allow you to use an Imperial or Metric rule and with the aid of a calculator measurements can be read off in feet, yards or metres, dispensing with the use of a particular dedicated Scale Rule.

USE OF SCALE RULES

Imperial Rule Using Units of 1 Inch as Reference

| SCALES | USE ONE OF THE FOLLOWING FIGURES AS YOUR CONSTANT REF. | | | |
|--------|---|---------|---------|----------|
| | 1 inch to:- | (feet) | (yards) | (metres) |
| | 1:50 | 4.167 | 1.389 | 1.270 |
| | 1:100 | 8.333 | 2.778 | 2.540 |
| | 1:200 | 16.667 | 5.555 | 5.080 |
| #1 | 1:480 | 40.000 | 13.333 | 12.192 |
| | 1:500 | 41.667 | 13.889 | 12.700 |
| #2 | 1:792 | 66.000 | 22.000 | 20.117 |
| | 1:1000 | 83.333 | 27.778 | 25.400 |
| | 1:1250 | 104.167 | 34.722 | 31.750 |
| #3 | 1:1584 | 132.000 | 44.000 | 40.233 |
| | 1:2500 | 208.333 | 69.444 | 63.500 |
| | 1:5000 | 416.666 | 138.888 | 127.000 |

#1 1" to 40'

#2 1" to 66' or 1 chain

#3 1" to 132' or 2 chains

FIGURE 1.

continued

USE OF SCALE RULES

Metric Rule Using Units of 1 Centimetre as Reference

| SCALES | USE ONE OF THE FOLLOWING FIGURES AS YOUR CONSTANT REF. | | | |
|--------|---|---------|---------|----------|
| | 1 cm to:- | (feet) | (yards) | (metres) |
| #1 | 1:50 | 1.640 | 0.547 | 0.500 |
| | 1:100 | 3.281 | 1.094 | 1.000 |
| | 1:200 | 6.562 | 2.187 | 2.000 |
| | 1:480 | 15.748 | 5.249 | 4.800 |
| | 1:500 | 16.404 | 5.468 | 5.000 |
| #2 | 1:792 | 25.984 | 8.661 | 7.920 |
| | 1:1000 | 32.808 | 10.936 | 10.000 |
| | 1:1250 | 41.010 | 13.670 | 12.500 |
| #3 | 1:1584 | 51.968 | 17.323 | 15.840 |
| | 1:2500 | 82.021 | 27.340 | 25.000 |
| | 1:5000 | 164.042 | 54.680 | 50.000 |

#1 1" to 40'

#2 1" to 66' or 1 chain

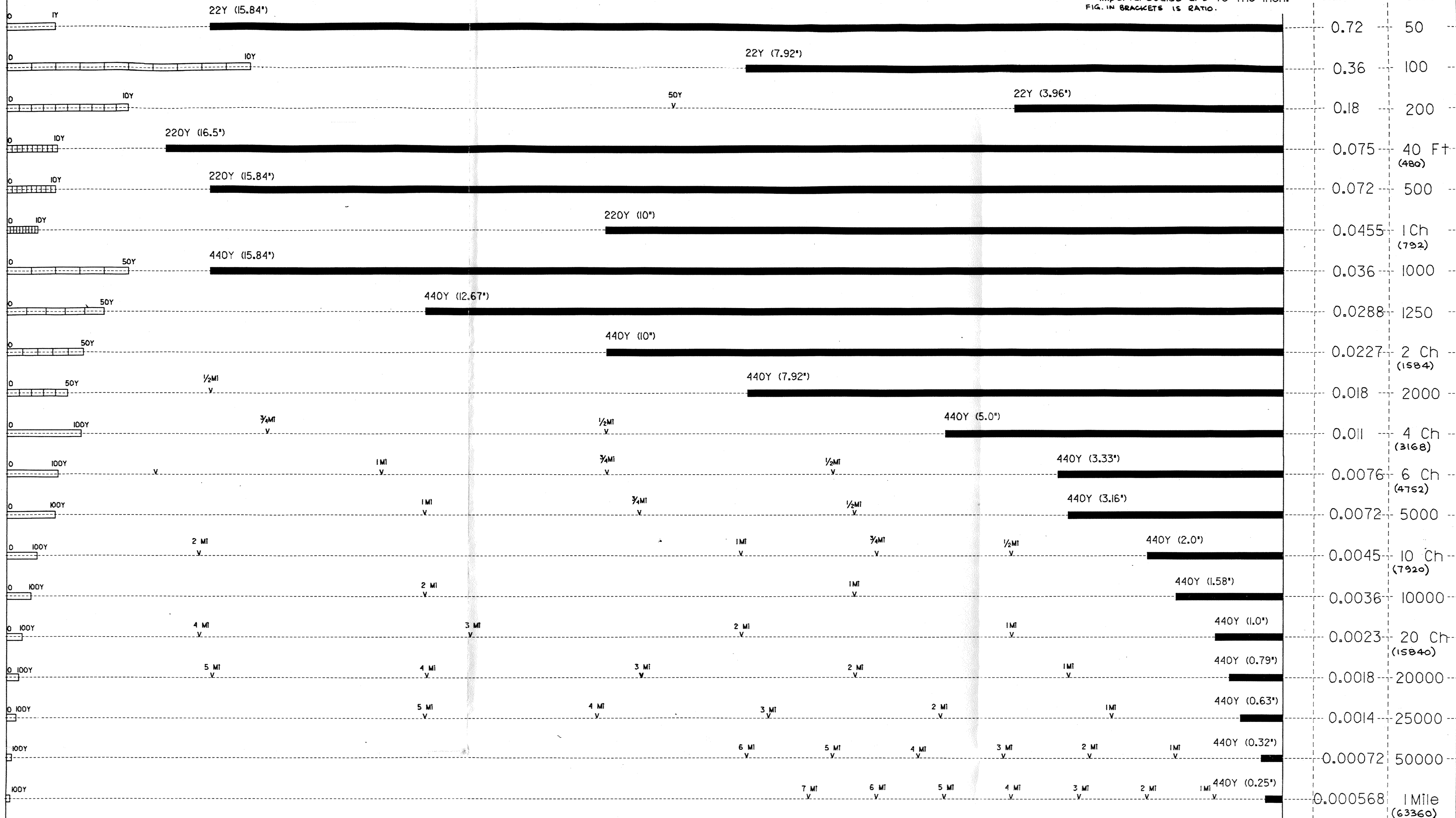
#3 1" to 132' or 2 chains

FIGURE 2.

end

* Imperial scales are to the inch.
FIG. IN BRACKETS IS RATIO.

Scaled YD = Ins. Scale *



NOTE : THE MAXIMUM DRAWING LENGTH AVAILABLE FOR CAD PRODUCED PLANS IS 152 INS (12FT 8INS)
THE PREFERRED (DEFAULT) VERTICAL DISTANCE BETWEEN TRACKS ON C.A.D PRODUCED PLANS IS 12mm (0.47")

| | | | | | | | | | | | | | | | | | | | | | |
|--------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| Revisions | | | | | | | | | | | | | | | | | | | | | |
| Drawn | | | | | | | | | | | | | | | | | | | | | |
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| Neg. Checked | | | | | | | | | | | | | | | | | | | | | |
| Date | | | | | | | | | | | | | | | | | | | | | |

British Railways Western Region
Reg. Signal & Telecommunications Engineer

COMPARATIVE SCALES
FOR S&T DEPT. PLANS

Reg. S & T Engineer
No. **CAD 3**

British Rail

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