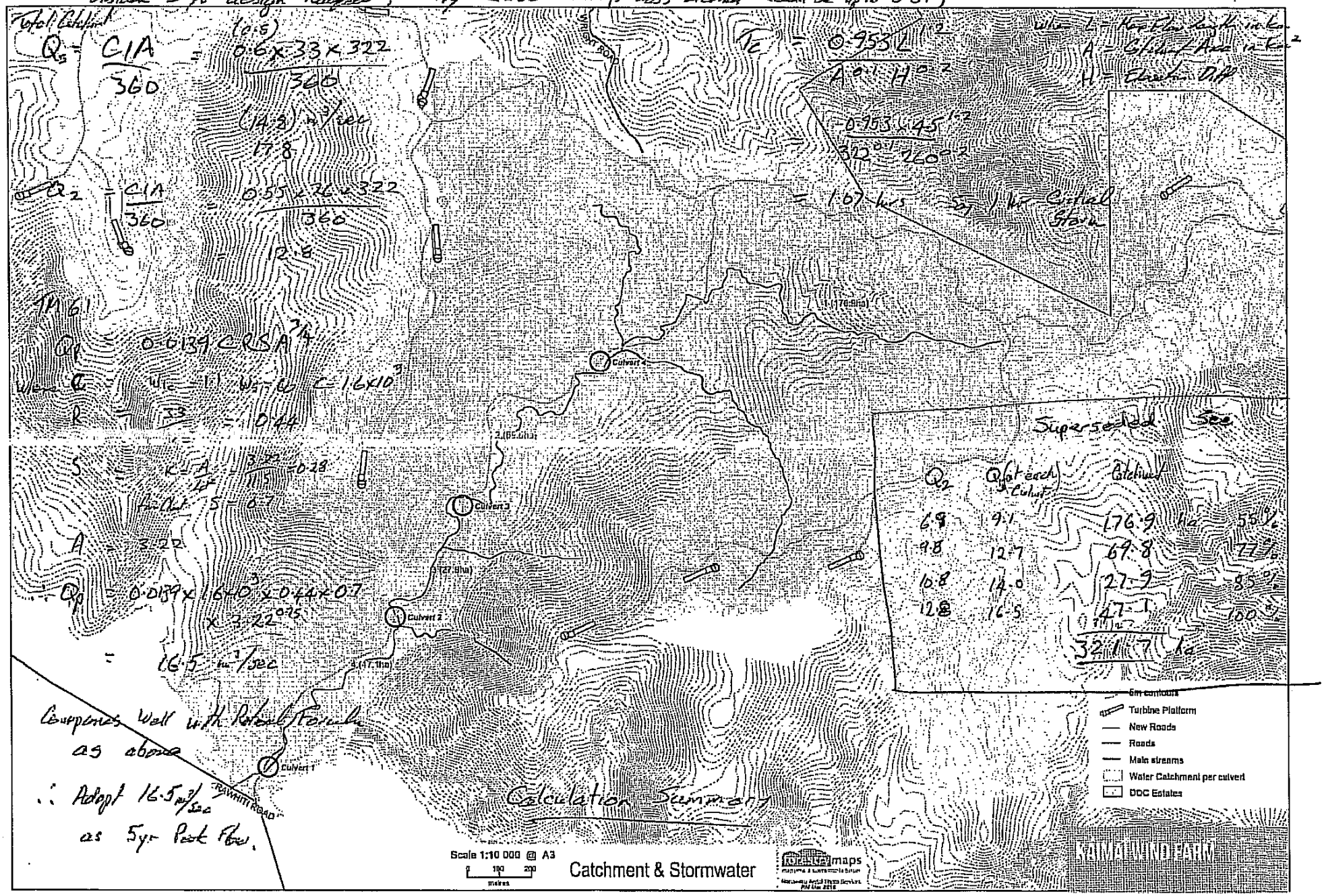
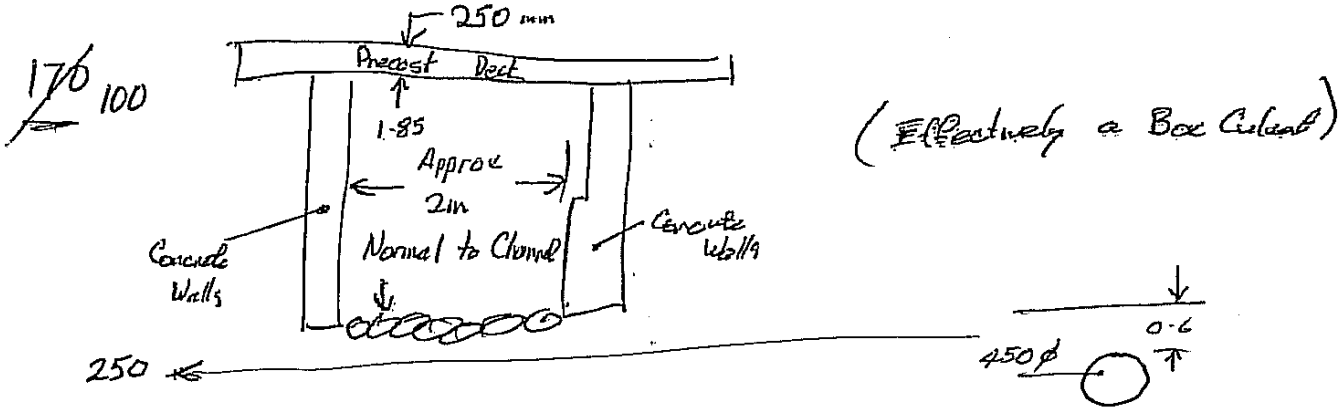
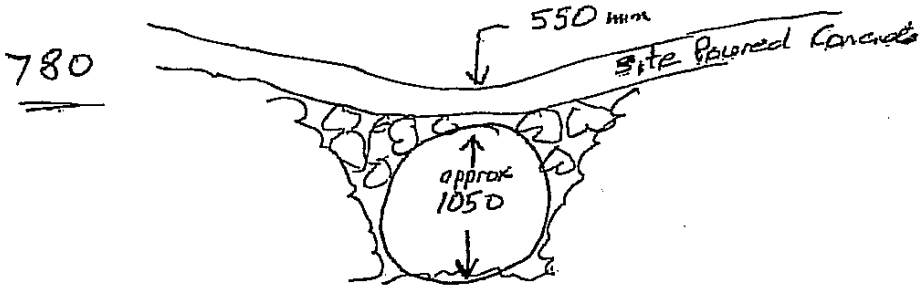

Consider 5yr design Rainfall, Try C=0.5 - Steep Grass Catchment (could be up to 0.6+)
Total Catchment
$Q_5 = \frac{CIA}{360} = \frac{0.6 \times 33 \times 322}{360}$
$= (14.8)\ m^3/sec$
17.8
$Q_{25} = \frac{CIA}{360} = \frac{0.5 \times 26 \times 322}{360}$
$= 12.8$
TM61
$Q_p = 0.0139 C R S A^{3/4}$
Where C $W_1 = 1$ $W_2 = 1$ $W_3 = 0$ $C = 1.6 \times 10^3$
$R = \frac{33}{75} = 0.44$
$S = \frac{K \cdot A}{L^2} = \frac{322}{115} = 0.28$
Use S = 0.7
$A = 3.2R$
$Q_p = 0.0139 \times 1.6 \times 10^3 \times 0.44 \times 0.7 \times 3.22^{0.75}$
$= 16.5\ m^3/sec$
Compares well with Rational Formula as above
∴ Adopt 16.5 m^3/sec as 5yr Peak Flow.
$T_c = \frac{0.953 L^{1.2}}{A^{0.1} H^{0.2}}$
$= \frac{0.953 (4.5)^{1.2}}{322^{0.1} 260^{0.2}}$
$= 1.07$ hrs
Where L = Flow Length in km
A = Catchment Area in km^2
H = Elevation Diff
5% / hr Catchment Slope
Superseded See Catchment
Q_{25} | Q_p for each Culvert | Catchment
6.9 | 9.1 | 176.9 ha | 55%
9.8 | 12.7 | 69.8 | 77%
10.8 | 14.0 | 27.9 | 85%
12.8 | 16.5 | 47.1 | 100%
321.7 ha
Culvert 1
Culvert 2
Culvert 3
Culvert 4
RAWHITI ROAD
WRIGHT ROAD
Calculation Summary
5m contours
Turbine Platform
New Roads
Roads
Main streams
Water Catchment per culvert
DOC Estates
Scale 1:10 000 @ A3
Catchment & Stormwater
TAMAHUNA FARM

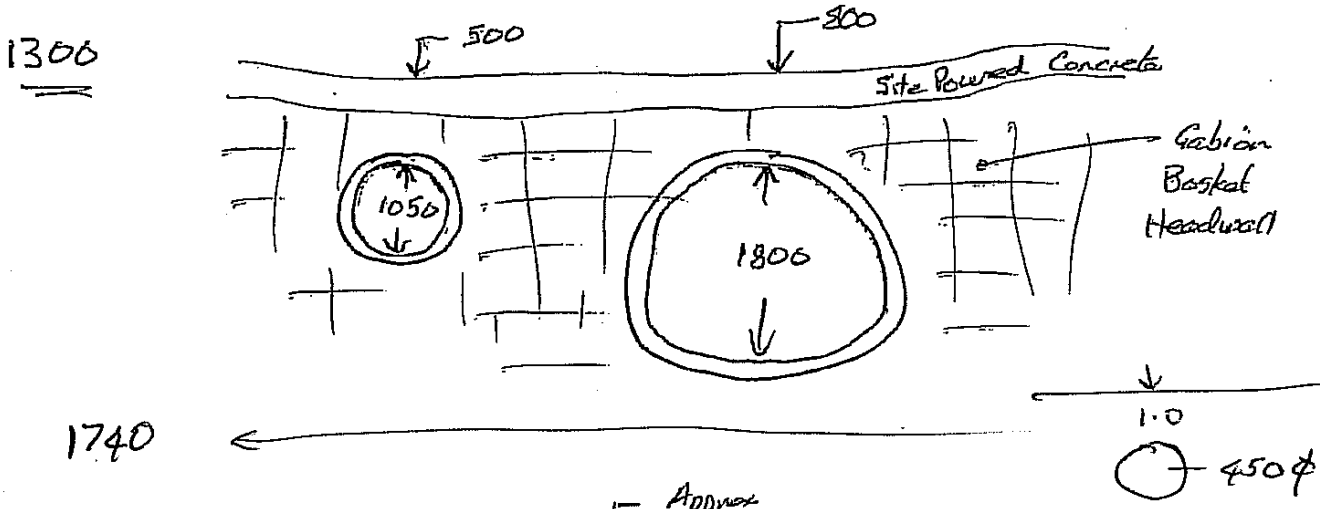


(Effectively a Box Culvert)

170 100

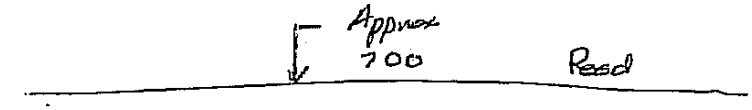


780

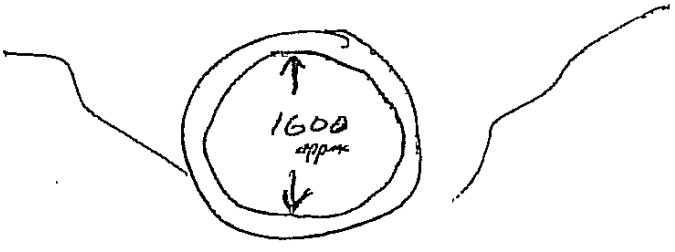


1300

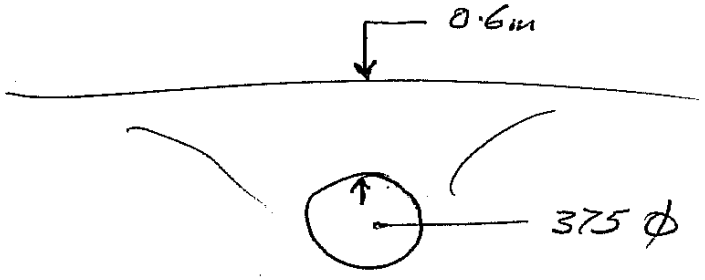
1740



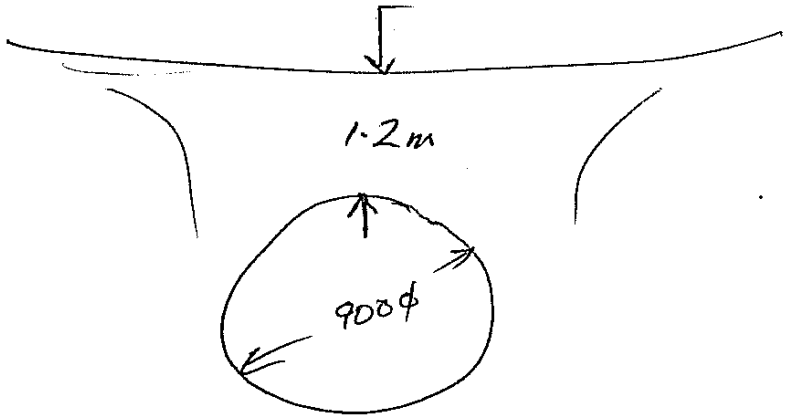
2000 2060



2260



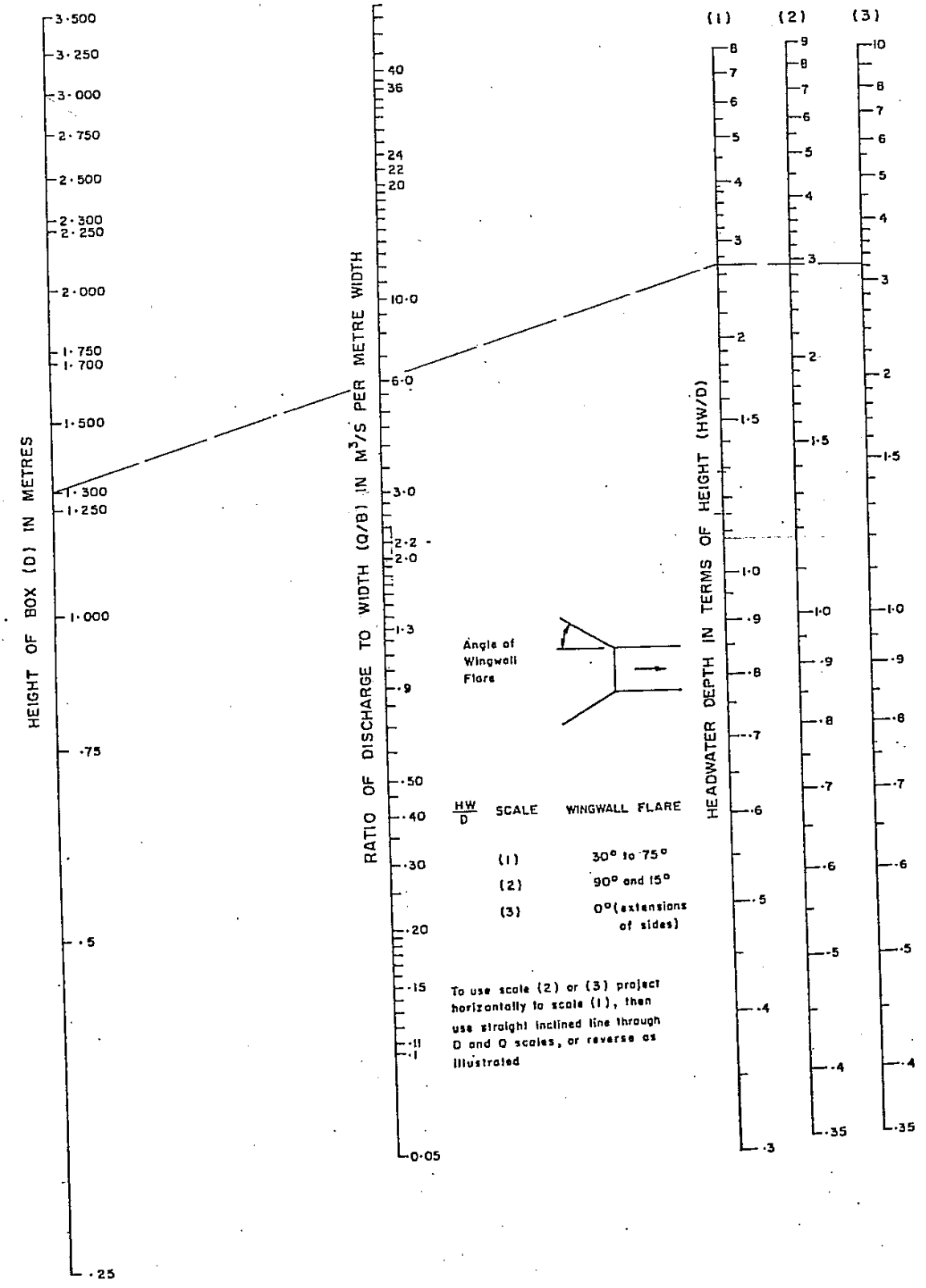
2420



All other Culverts are small as below

Chainage	
100	Box
250	450 ϕ
420	300 ϕ Plastic
780	1050 ϕ
910	375 ϕ
1070	375 ϕ
1130	? Not Found (Covered)
1300	1800 + 1050
1330	375 ϕ
1420	300 ϕ Plastic
1580	375 ϕ
1640	375 ϕ
1740	450 ϕ
1910	375 ϕ
2060	1650 ϕ
2200	Gate

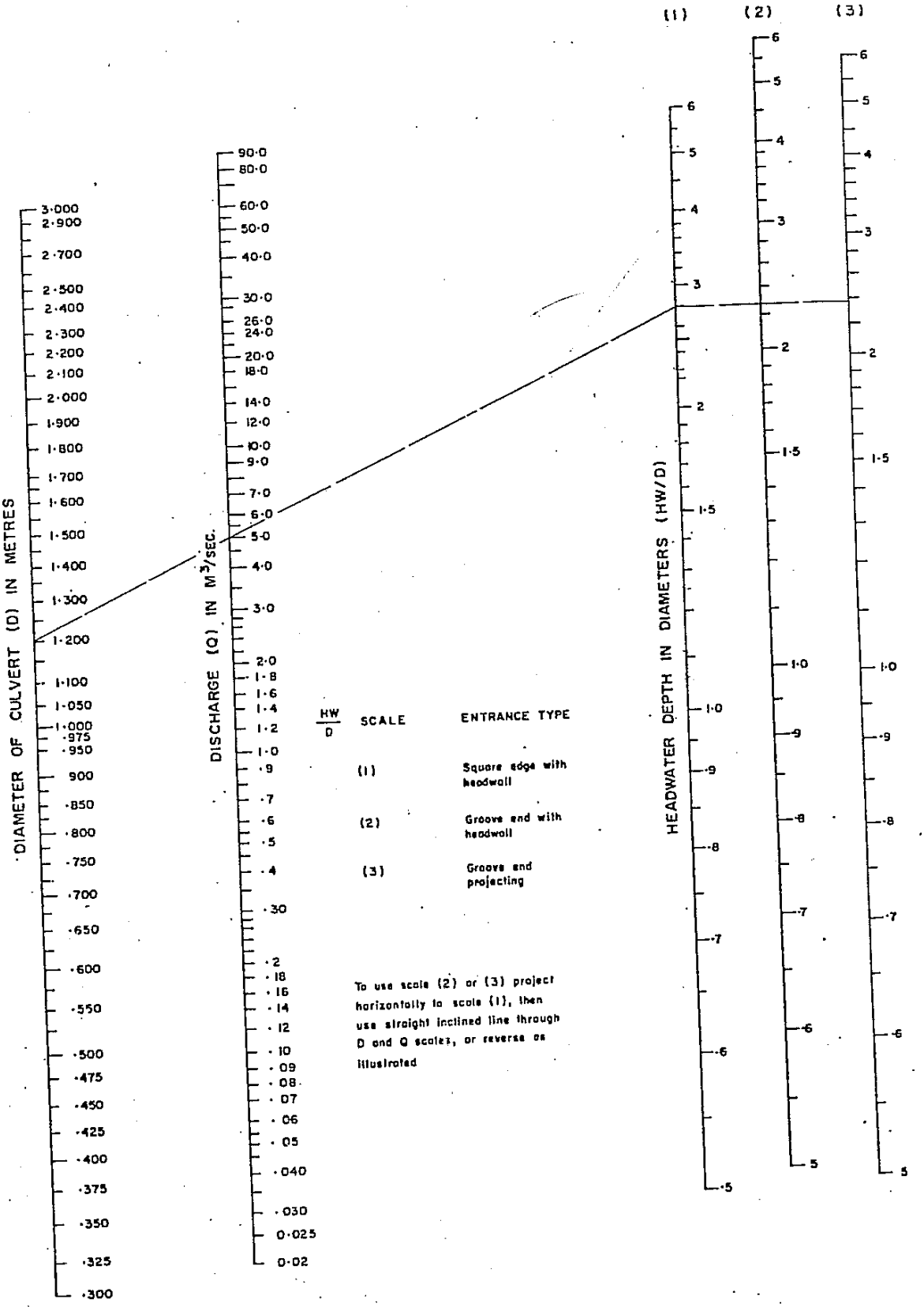
Chainage Cont.	
2260	375 ϕ
2420	900 ϕ
2600	300 ϕ Plastic
2900	Gate



HEADWATER DEPTH FOR BOX CULVERTS

WITH INLET CONTROL

CHART N° 5·5·3



HEADWATER DEPTH FOR
CIRCULAR PIPE CULVERTS
WITH INLET CONTROL
CHART No. 5·5·1