# APPENDIX - VIII : APPROXIMATE SURVEY OF BUND SITE

Ideally a contour survey should be done with a Dumpy level or a Total Station so that cross – section and longitudinal section of the drainage channel at the bund site may be drawn as also the area-capacity table or curve for the pond. However, a rough survey can also be done if the planning and construction is to be done by the village community or an NGO who do not have the requisite technical skills or resources for elaborate contour survey. The procedure is discussed in the following paras :
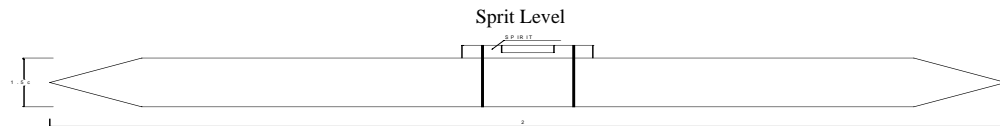
Equipment/ Tools Required

The equipment/ tools required are rudimentary and can be obtained/ made locally.
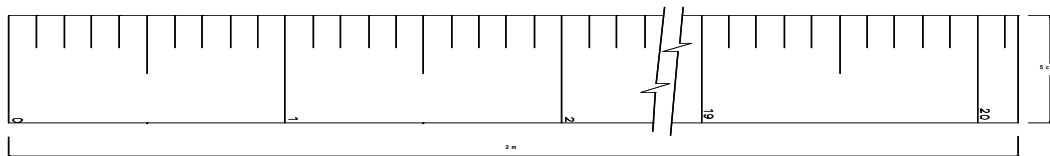
(i)   Two straight wooden stakes each 2 metres long, 5 cm wide and 1.5 cm thick,

      (a)   Both ends of one stake may be sharpened as shown below :
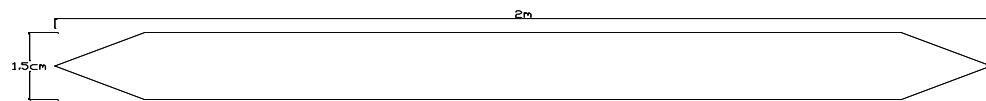
      (b)   A mason's level (spirit Level) may be securely tied in the middle of this stake as shown below

(ii)   The second stake may be marked along the length in centimeters and millimeters as shown below :
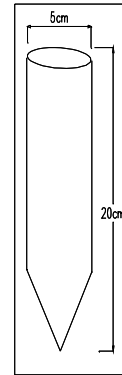

(iii)   Measuring Tapes

      (a)   Carpenter's steel tape 1.5 or 2.00 m long

      (b)   Metallic tape – 30 metres long

(iv)   Bamboo Poles – 3 No. each 3 m long (For ranging purposes)

(v)   Wooden Pegs – about 10-15 No.

      Length   – 20 cm
      Diameter – 5 cm
      Pointed at one end

(vi)   Paint and brush for marking

(vii) Lime/ Chalk powder

Procedure for Survey

(A)   Bund Alignment

Bund Alignment is first decided approximately by visual observation and judgement and is marked with the wooden pegs firmly driven into the ground with suitable markings. Where the surface is rocky, marking is done with paint and brush. The alignment is then suitably adjusted by ranging with the three bamboo poles. In case of curved alignment, the curve is made smooth by adjusting the location of pegs/ paint marks. The alignment is then firmly marked with lime/ chalk power.

The alignment is marked upto high banks on either side upto a level about 1 meter above the expected top of the bund or about 25 metres beyond the bund on either side depending upto the land slope.

As far as possible the bund alignment should be perpendicular to the main drainage channel or the direction of high monsoon flow.

(B)   Demarcation of Main Drainage Channel

In situations where the main drainage has no defined channel, it is necessary to demarcate it based on the local knowledge.

(C)   Longitudinal Section of Bund Alignment

A small masonry pillar is built at each end of the bund alignment. The top of one of the pillars is assigned an arbitrary level (say 100.00 m) since this is the starting point its reduced distance is assigned the value 0.00.

Measure the height of the pillar above the ground (say 0.3 m) and deduct this from 100.00 to get the ground level at point A. Thus the position of point A is defined as follows :

RD = 0.00

RL = 100.00 – 0.30 = 99.70
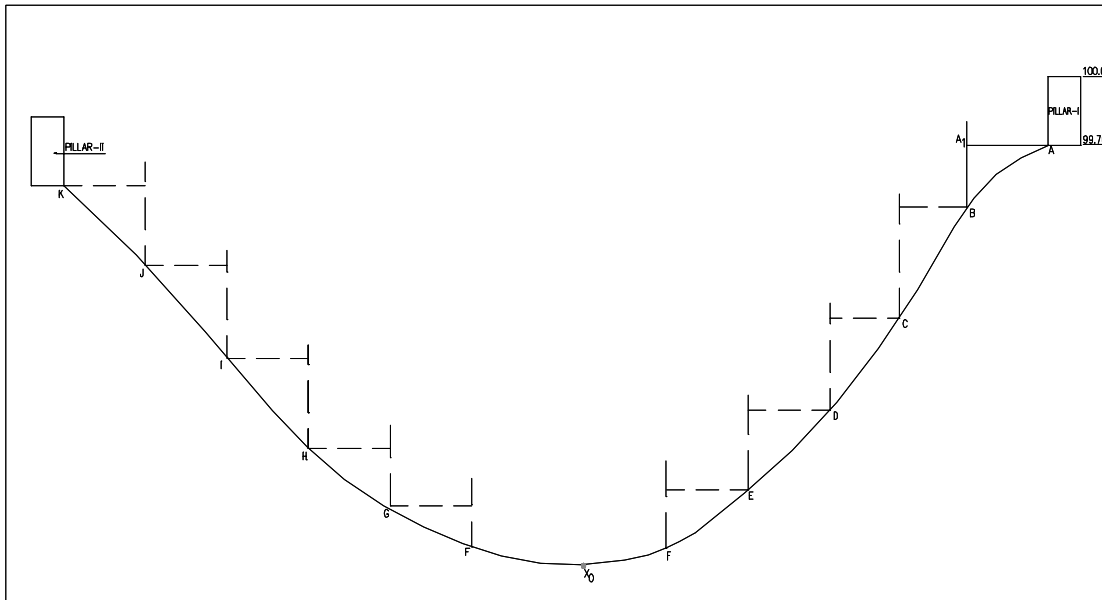
By using the two wooden stakes measure the fall in level between point A and Point B. The first stake with spirit level is held horizontally with one end placed at A. The second stake with graduation is held vertically at point B such that its graduated face just touches the other end of the horizontal stake. Thus the position of point B with respect to the known position of point A is worked out as follows :

$AA_1 = 2$ m (Length of the stake)

Assuming $A_1B = 0.45$ m (Read from Vertical stake)

RL of B $= 99.70 - 0.45 = 99.25$m

RD of B $= 0.00 + AA_1$
$\qquad = 0.00 + 2.00 = 2.00$

Similarly, the positions of points C, D and E are found using the same STEP METHOD in succession.

If E and F are the two points in the bed of the channel and there is no appreciable difference in their levels, then only the horizontal distance between E and F is measured with the tape.

The "Step Method" is then repeated in succession to determine the position of points G, H, I, J and K. By adding the height of Pillar II to the level of point K, the level of the top of Pillar II is determined.

(D)   Longitudinal Section of the Channel

Assuming that X_0 is a point in the middle of the channel (between E and F) the longitudinal section of the channel from X_0 to X_n is similarly determined by STEP METHOD.
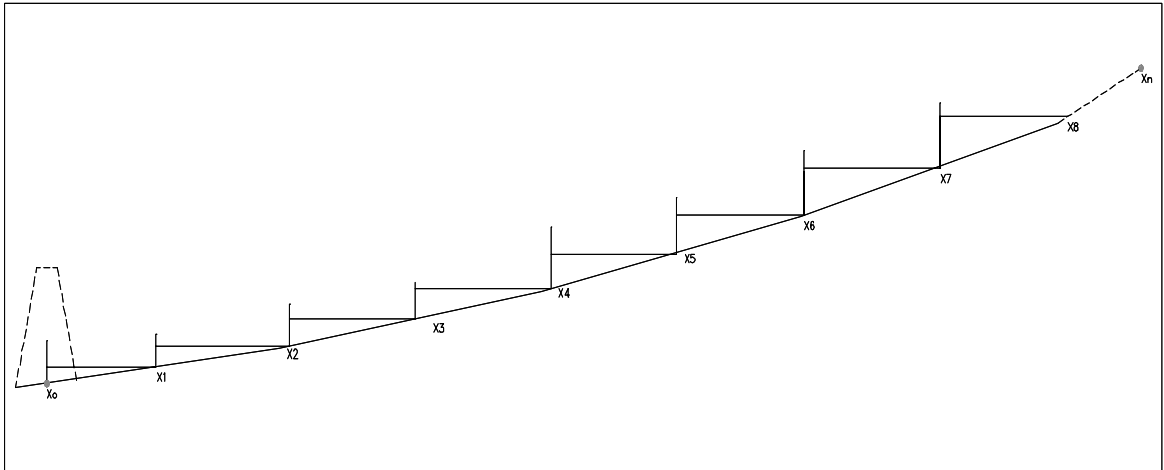
This survey should be continued upto about 1 to 2 m above the expected top of the bund.

Data for Project Planning

(i)   Channel Width = EF

(ii)   Bank Slopes :

$$\text{Right Bank} = \frac{\text{RL of A} - \text{RL of E}}{\text{RD of E} - \text{RD of A}}$$

$$\text{Left Bank} = \frac{\text{RL of K} - \text{RL of F}}{\text{RD of K} - \text{RD of F}}$$

(iii)   Bed Slope of Channel $= \dfrac{\text{RL of } X_n - \text{RL of } X_0}{\text{RD of } X_n - \text{RD of } X_0}$