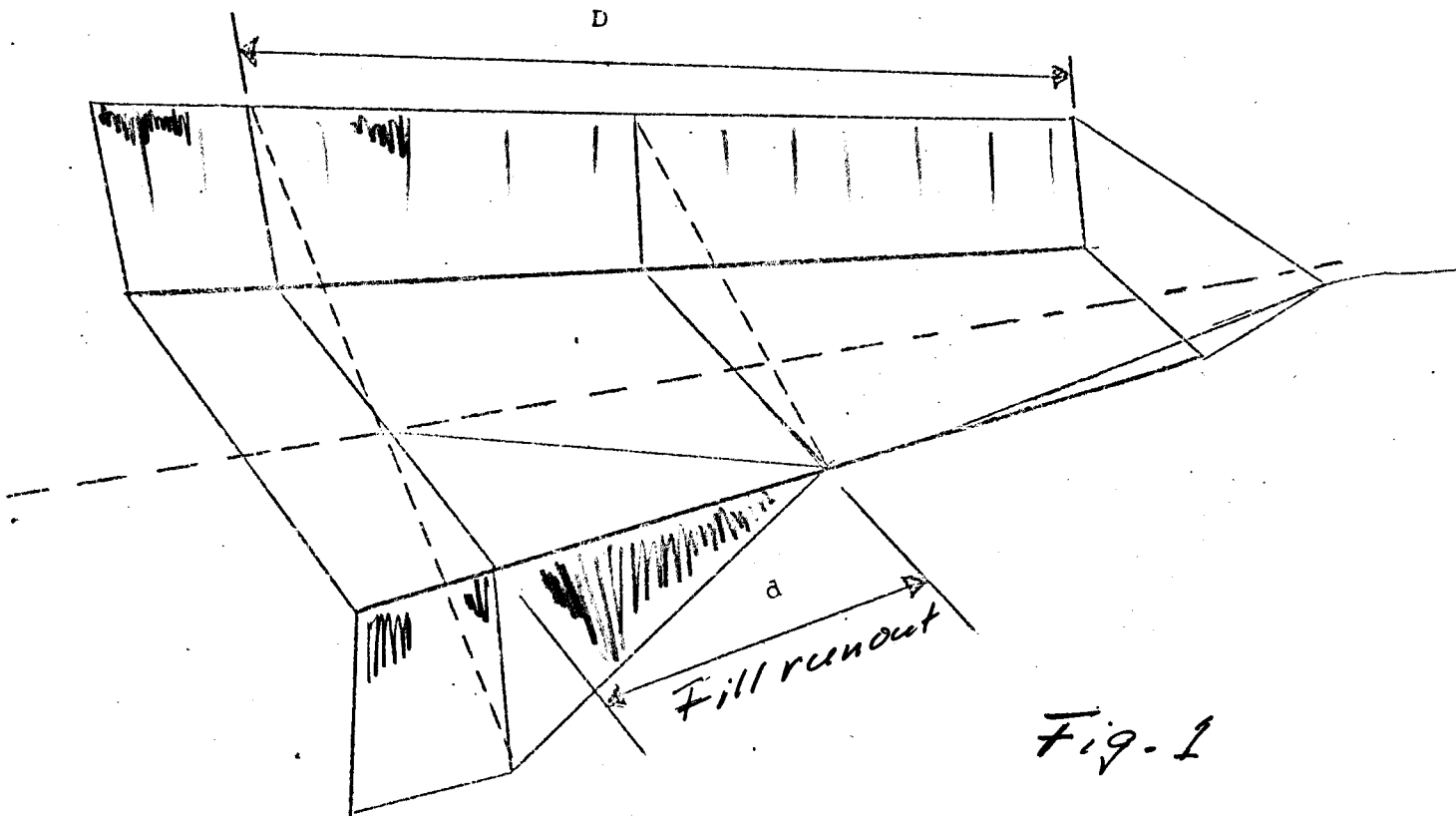# APPENDIX 1

RUN-OUT DISTANCES

When the roadway cross-section transitions from a cut-fill section at one station to a through cut at the next section, the distance over which the fill area tapers out must be determined. This is referred to as the fill run out.

Fig. 1

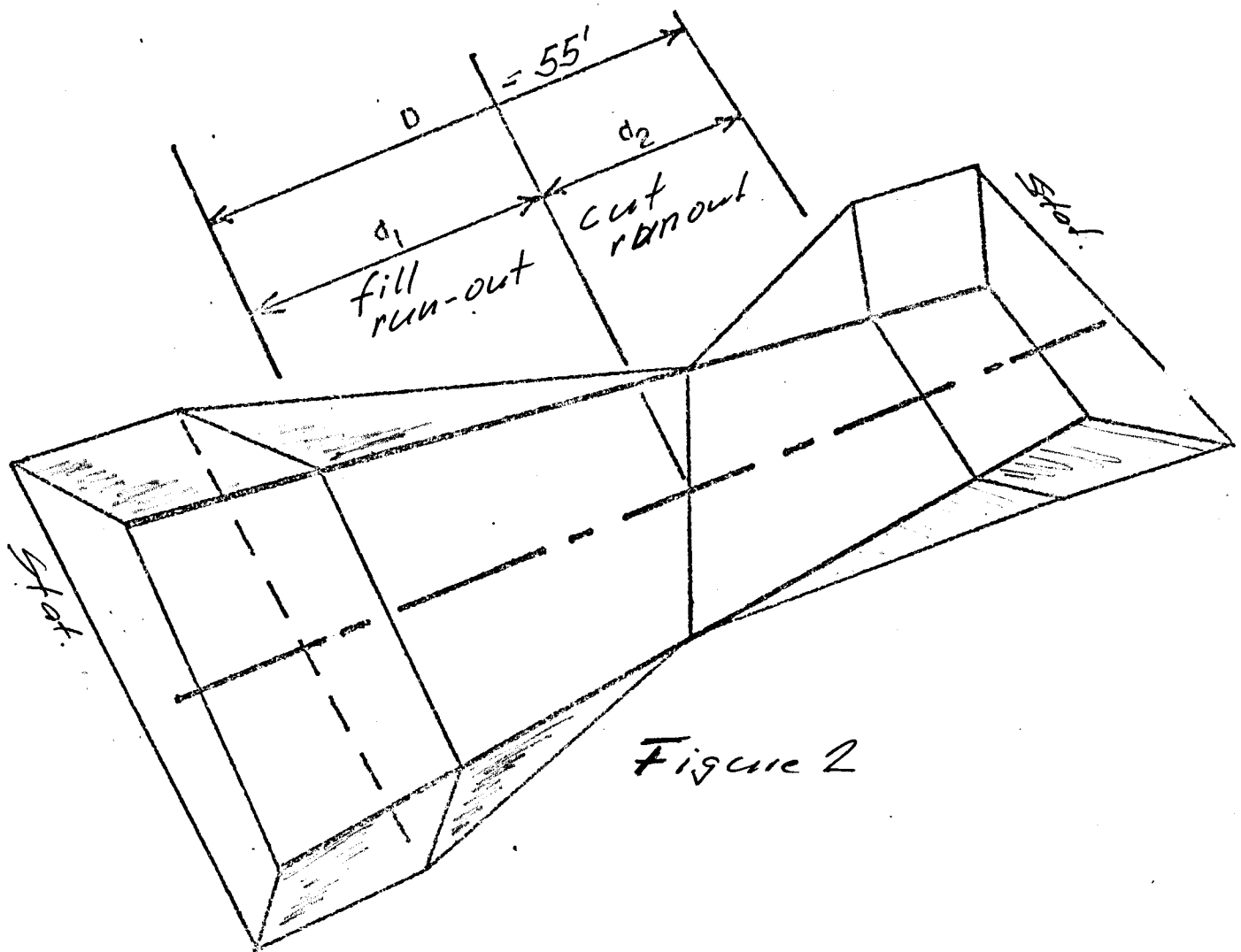A similar distance can be figured for the cut-fill to through fill transition.

Figure 2

For lack of a better method, a simple pro-ration system is usually used. Refer to the sample EARTHWORK QUANTITY SHEET for the data in the following example. (Figure 1)

Station 6+40 fill end area; 113 ft^2

Station 6+95 cut end area; 130 ft^2

Distance between stations; 55 ft

Fill run-out distance, x

$$\frac{x}{55} = \frac{113}{113+130}$$

x = 25.0 feet. Use 26 feet.

Volume (prism formula) $= \dfrac{(113\ ft^2)\,(26\ ft)}{81}\ \dfrac{(cy)}{(ft^3)} = 36\ cy$

A runout distance must also be computed when the cross section transitions from through fill to a through cut or vice versa. (*Figure 2*)

Station 7+70 fill and area; 190 ft^2

Station 8+50 cut and area; 110 ft^2

Distance between stations; 80 ft

Fill run out distance; x

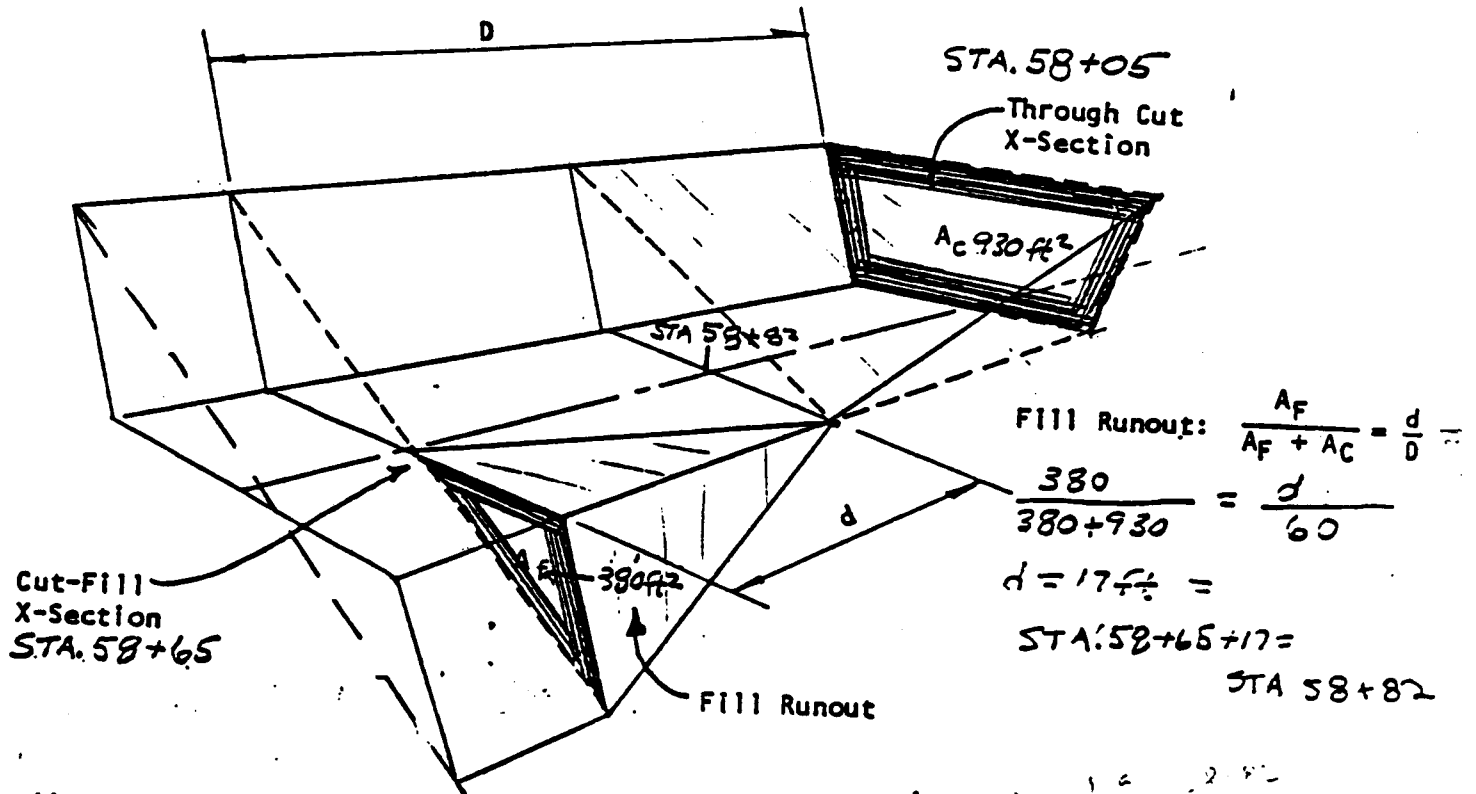$$\frac{x}{80} = \frac{190}{190+110}$$

x = 50.7 feet; use 51 feet

Fill volume (prism formula) $= \dfrac{(190\ ft^2)\,(51\ ft)}{81}\ \dfrac{(cy)}{(ft^3)} = 120\ cy$

Cut volume (prism formula) $= \dfrac{(110\ ft^2)\,(29\ ft)}{81}\ \dfrac{(cy)}{(ft^3)} = 39\ cy$

RUNOUT

I. Cut Fill to Through Cut:

STA. 58+05

Through Cut
X-Section

A_c 930 ft²

STA 58+82

Cut-Fill
X-Section
STA. 58+65

A_F 380 ft²

Fill Runout

d

Fill Runout: $\dfrac{A_F}{A_F + A_C} = \dfrac{d}{D}$

$\dfrac{380}{380+930} = \dfrac{d}{60}$

$d = 17$ ft

STA. 58+65+17 =

STA 58+82

II. Through Cut to Through Fill:

Roadway

Through Fill
X-Section

D

d^2

d^1

A_f

Fill-Runout

Cut Runout

A_c

Through Cut
X-Section

Cut Runout: $\dfrac{A_C}{A_C + A_F} = \dfrac{d^1}{D}$

Fill Runout: $\dfrac{A_F}{A_F + A_C} = \dfrac{d_2}{D}$

095