

## Comments for Planning Application: A/YL-KTN/1252

| <b><u>DSD Comments</u></b>                                                                                                                                                                        | <b><u>Response</u></b>                           |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|
| 1. Show the cover level and invert level at the starting point (Point 2) of proposed U-channels, ensuring invert levels follow the 1:100 gradient toward Point 3.                                 | 1. Noted and See attached Drainage Plan          |
| 2. Clearly indicate the location of proposed catchpit CP5 on the layout plan.                                                                                                                     | 2. Noted and See attached Drainage Plan          |
| 3. Maintain a 3m setback from the top bank of the stream course/channel for all proposed works. Indicate the 3m setback zone clearly on the plan and provide necessary flood mitigation measures. | 3. Noted and See attached Drainage Plan          |
| 4. Provide hydraulic calculations for the proposed 150mm and 300mm U-channels.                                                                                                                    | 4. Noted and See attached Hydraulic calculations |
| 5. Indicate how surface runoff within the site is directed to the proposed U-channels.                                                                                                            | 5. Noted and See attached Drainage Plan          |

# **Stormwater Drainage Design**

For

Temporary Open Storage of Metal Scaffolding

with Service Office at Lots 1198ARP(Part), 1198Ass1 & 1198Ass2

in DD109, Kam Tin North, Yuen Long, N.T.

Report No.: **LD/L1198A1/DS01(A)**  
Date: **3/9/2026**

## 1. Equations and Assumptions

1.1 Surface drainage design is in accordance with Geotechnical Manual for Slopes (2nd Edition, 1984).

1.2 Slope drainage is designed to a frequency of 1 in 50 rainfall return period.

1.3 Time of Concentration = time of entry + time of flow  
i.e.  $t_c = t_e + t_f$

1.4 Time of entry is calculated based on the modified form of Bransby-Williams Equation:

$$t_e = 0.14465 \times L / (H^{0.2} \times A^{0.1})$$

Eqn. 8.2  
Geotechnical  
Manual for Slopes

where  $t_e$  = time of entry (min) ,  
 $A$  = area of catchment ( $m^2$ ) ,  
 $H$  = average fall (m per 100m) from the summit of catchment to the point of design,  
 $L$  = distance in metre measured on the line of natural flow between the design section and that point of catchment from which water would take the longest time to reach the design section (m)

1.5 Time of flow is calculated from the measured water flow length in channel divided by the assumed flow velocity.

i.e.  $t_f = w / v$

where  $t_f$  = time of flow (min) ,

$w$  = measured water flow length in channel (m) ,

$v$  = assumed water flow velocity (m/s)

Geotechnical  
Manual for  
Slopes (p. 96)

1.6 Runoff coefficient for the slope is assumed to be 1.0 for paved [ground surface](#).

1.7 Peak stormwater is determined by the "Rational Method" using the following formula:

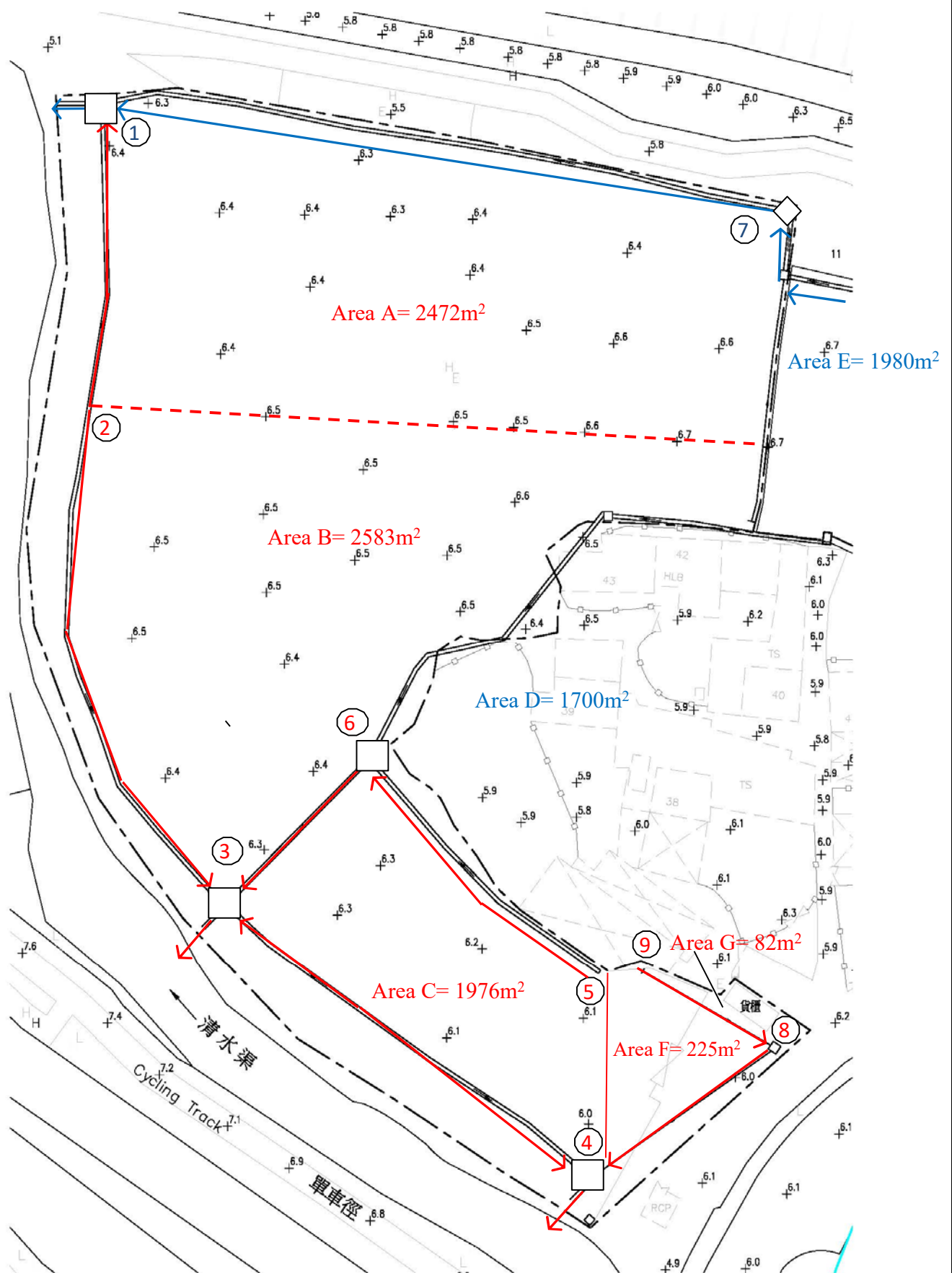
$$Q = KiA/60$$

Eqn. 8.7  
Geotechnical  
Manual for Slopes

where  $Q$  = maximum runoff (litres/min) ,  
 $K$  = runoff coefficient ( $K = 1.0$ ) ,  
 $i$  = design mean intensity of rainfall (mm/hr) ,  
 $A$  = area of catchment ( $m^2$ ) .

## 2. Catchment Area

The catchment area for the design of surface channels is shown below :



### 3. Checking requirement width by rainwater through between 1 and 7

a. Catchment Area  $A + E$  to Existing Drainage ( 450 UC)

$$\begin{aligned} \text{Area } A \& E &= 4452 \text{ m}^2 \\ L &= 82 \text{ m} \end{aligned}$$

$$\delta h = 6.7 - 6.3 = 0.4 \text{ m}$$

$$H = 0.4 * 100 / 82 = 0.49 \text{ m} \quad (\text{average fall per 100m run})$$

$$t_c = 0.14465 \times 82 / (0.49^{0.2} \times 4452^{0.1}) = 5.905 \text{ min}$$

$$\text{For } t_f, \quad w = 30 \text{ m}, \quad v = 3 \text{ m/s} \quad (\text{assumed})$$

$$t_{fl} = 30 / (3 \times 60) = 0.167 \text{ min}$$

$$t_l = 5.905 + 0.167 = 6.072 \text{ min}$$

$$\text{From rainfall curve, use } t = 6.1 \text{ min}$$

$$\begin{aligned} i_{50} &= 290 \text{ mm/hr} \\ K &= 1 \end{aligned}$$

Flow for 50 years return periods,

$$Q_{50} = 1 * 290 \times 4452 / 60 = 21518 \text{ litres/min}$$

$$\text{Drop of channel} = 5.800 - 5.500 = 0.30 \text{ m}$$

$$\text{Gradient} = 0.3 / 30 = 1 \text{ in } 100$$

$$\text{Existing channel size} = 450 \text{ UC}$$

$$\text{Capacity} = 24000 > Q_{50} \quad \text{OK}$$

$$\text{Read } v_{\max} = 2.25 \text{ m/s} < 4 \text{ m/s} \quad \text{OK}$$

Therefore, existing 450mm UC is adequate for catchment Area of A and E.

Fig. 1, TGN 30

Fig. 8.7  
Geotechnical  
Manual for Slopes

#### 4. Checking requirement width by rainwater through between 2 and 3

a. Catchment Area B to Existing Drainage ( 450 UC)

$$\begin{aligned} \text{Area B} &= 2583 \text{ m}^2 \\ L &= 79 \text{ m} \end{aligned}$$

$$\delta h = 6.6 - 6.3 = 0.3 \text{ m}$$

$$H = 0.3 * 100 / 79 = 0.38 \text{ m} \quad (\text{average fall per 100m run})$$

$$t_c = 0.14465 \times 79 / (0.38^{0.2} \times 2583^{0.1}) = 6.321 \text{ min}$$

$$\text{For } t_f, \quad w = 62 \text{ m}, \quad v = 3 \text{ m/s} \quad (\text{assumed})$$

$$t_{fl} = 62 / (3 \times 60) = 0.344 \text{ min}$$

$$t_l = 6.321 + 0.344 = 6.665 \text{ min}$$

$$\text{From rainfall curve, use } t = 6.7 \text{ min}$$

$$\begin{aligned} i_{50} &= 280 \text{ mm/hr} \\ K &= 1 \end{aligned}$$

Flow for 50 years return periods,

$$Q_{50} = 1 * 280 \times 2583 / 60 = 12054 \text{ litres/min}$$

$$\text{Drop of channel} = 6.200 - 5.600 = 0.60 \text{ m}$$

$$\text{Gradient} = 0.6 / 62 = 1 \text{ in } 104$$

$$\text{Existing channel size} = 450 \text{ UC}$$

$$\text{Capacity} = 23000 > Q_{50} \quad \text{OK}$$

$$\text{Read } v_{\max} = 2.2 \text{ m/s} < 4 \text{ m/s} \quad \text{OK}$$

Therefore, existing 450mm UC is adequate for catchment Area of B.

Fig. 1, TGN 30

Fig. 8.7  
Geotechnical  
Manual for Slopes

### 5. Checking requirement width by rainwater through between 3 and 4

a. Catchment Area C to Existing Drainage ( 450 UC)

$$\begin{aligned} \text{Area C} &= 1976 \text{ m}^2 \\ L &= 53 \text{ m} \end{aligned}$$

$$\delta h = 6.3 - 6 = 0.3 \text{ m}$$

$$H = 0.3 * 100 / 53 = 0.57 \text{ m} \quad (\text{average fall per 100m run})$$

$$t_c = 0.14465 \times 53 / (0.57^{0.2} \times 1976^{0.1}) = 4.016 \text{ min}$$

$$\text{For } t_f, \quad w = 51 \text{ m}, \quad v = 3 \text{ m/s} \quad (\text{assumed})$$

$$t_{f1} = 51 / (3 \times 60) = 0.283 \text{ min}$$

$$t_l = 4.016 + 0.283 = 4.299 \text{ min}$$

$$\text{From rainfall curve, use } t = 4.3 \text{ min}$$

$$\begin{aligned} i_{50} &= 315 \text{ mm/hr} \\ K &= 1 \end{aligned}$$

Flow for 50 years return periods,

$$Q_{50} = 1 * 315 \times 1976 / 60 = 10374 \text{ litres/min}$$

$$\text{Drop of channel} = 5.600 - 5.400 = 0.20 \text{ m}$$

$$\text{Gradient} = 0.2 / 51 = 1 \text{ in } 255$$

$$\text{Existing channel size} = 450 \text{ UC}$$

$$\text{Capacity} = 16000 > Q_{50} \quad \text{OK}$$

$$\text{Read } v_{\max} = 1.4 \text{ m/s} < 4 \text{ m/s} \quad \text{OK}$$

Therefore, existing 450mm UC is adequate for catchment Area of C.

Fig. 1, TGN 30

Fig. 8.7  
Geotechnical  
Manual for Slopes

## 6. Checking requirement width by rainwater through between 5 and 6

a. Catchment Area D to Existing Drainage ( 450 UC)

$$\begin{aligned} \text{Area D} &= 1700 \text{ m}^2 \\ L &= 55 \text{ m} \end{aligned}$$

$$\delta h = 6.2 - 5.9 = 0.3 \text{ m}$$

$$H = 0.3 * 100 / 55 = 0.55 \text{ m} \quad (\text{average fall per 100m run})$$

$$t_c = 0.14465 \times 55 / (0.55^{0.2} \times 1700^{0.1}) = 4.262 \text{ min}$$

$$\text{For } t_f, \quad w = 36 \text{ m}, \quad v = 3 \text{ m/s} \quad (\text{assumed})$$

$$t_{fl} = 36 / (3 \times 60) = 0.200 \text{ min}$$

$$t_l = 4.262 + 0.2 = 4.462 \text{ min}$$

$$\text{From rainfall curve, use } t = 4.5 \text{ min}$$

$$\begin{aligned} i_{50} &= 330 \text{ mm/hr} \\ K &= 1 \end{aligned}$$

Flow for 50 years return periods,

$$Q_{50} = 1 * 330 \times 1700 / 60 = 9350 \text{ litres/min}$$

$$\text{Drop of channel} = 5.800 - 5.600 = 0.20 \text{ m}$$

$$\text{Gradient} = 0.2 / 36 = 1 \text{ in } 180$$

$$\text{Existing channel size} = 450 \text{ UC}$$

$$\text{Capacity} = 17000 > Q_{50} \quad \text{OK}$$

$$\text{Read } v_{\max} = 1.65 \text{ m/s} < 4 \text{ m/s} \quad \text{OK}$$

Therefore, existing 450mm UC is adequate for catchment Area of D.

Fig. 1, TGN 30

Fig. 8.7  
Geotechnical  
Manual for Slopes

Fig. 8.7  
Geotechnical  
Manual for Slopes

Fig. 8.7  
Geotechnical  
Manual for Slopes

**Geotechnical Engineering Office, Civil Engineering and Development Department  
The Government of the Hong Kong Special Administrative Region**

**GEO Technical Guidance Note No. 30 (TGN 30)  
New Intensity-Duration-Frequency Curves for Slope Drainage Design**

|              |             |                 |              |
|--------------|-------------|-----------------|--------------|
| Issue No.: 1 | Revision: - | Date: 21.3.2011 | Page: 3 of 4 |
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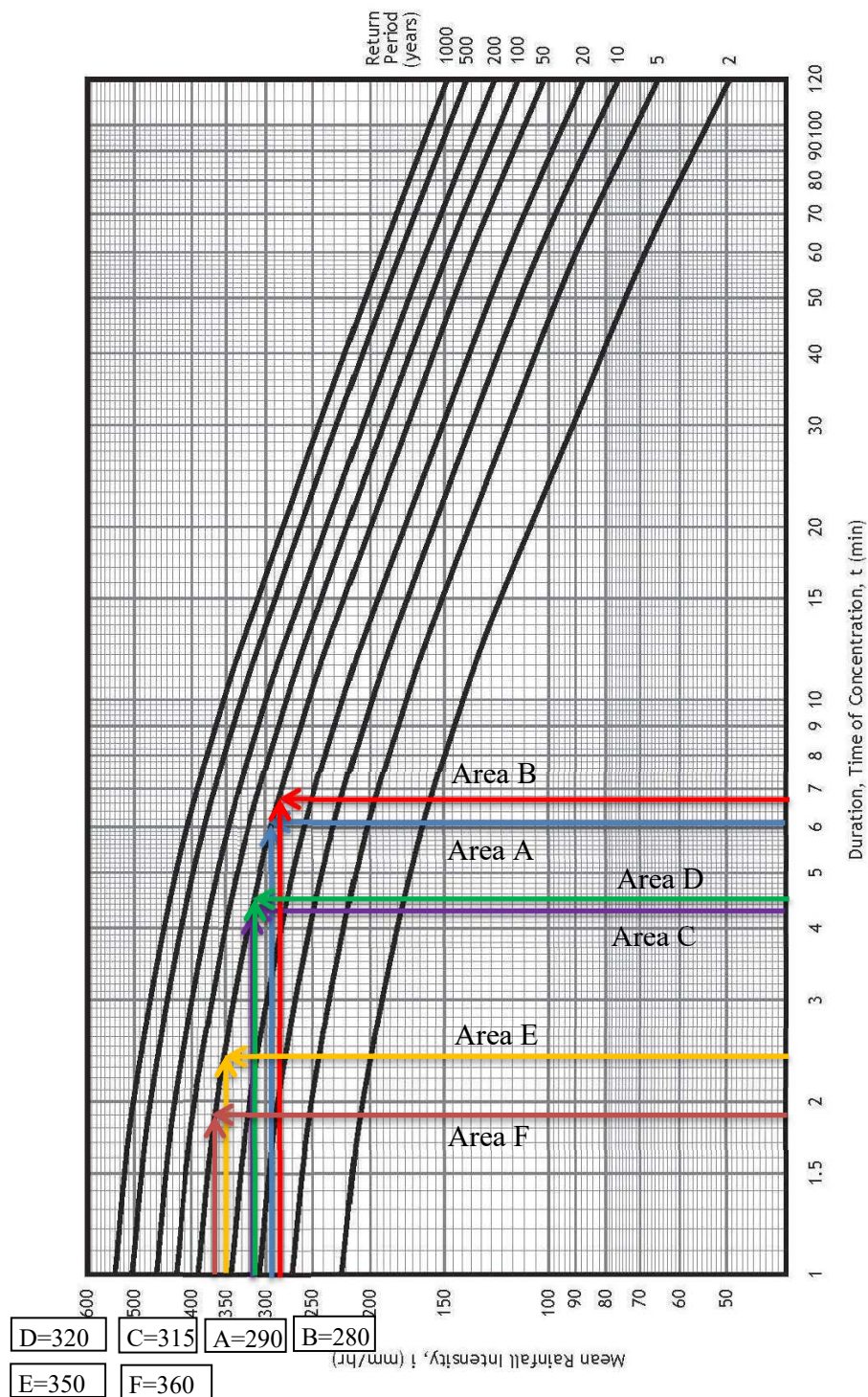


Figure 1 – New Intensity-Duration-Frequency (IDF) Curves (Tang & Cheung, 2011)

Note: These IDF curves are to supersede those given in Figure 8.2 of the Geotechnical Manual for Slopes (GCO, 1984).

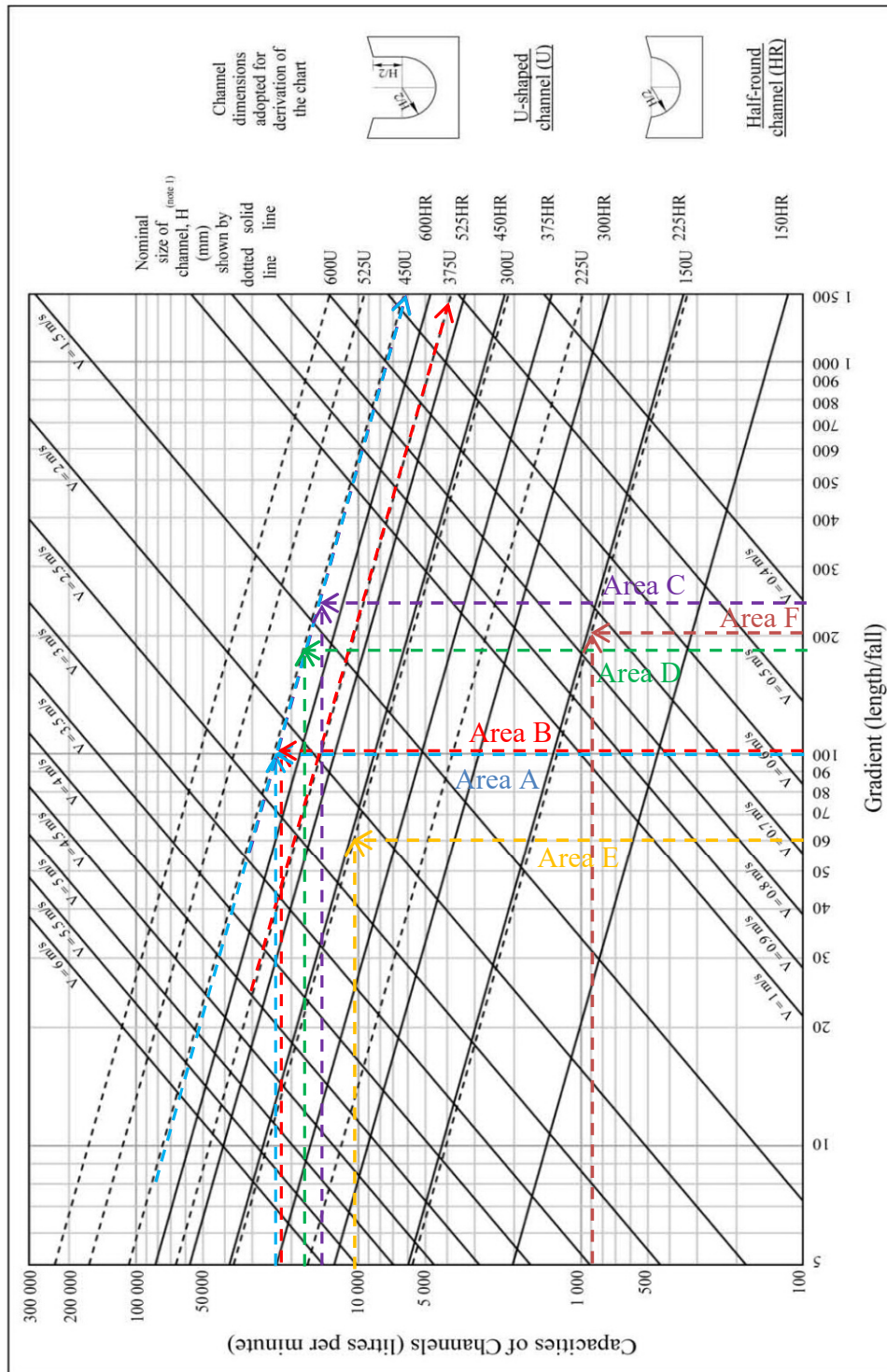
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**GEO Technical Guidance Note No. 43 (TGN 43)**

**Guidelines on Hydraulic Design of U-shaped and Half-round Channels on Slopes**

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Figure 1 - Chart for the rapid design of U-shaped and half-round channels up to 600 mm



Note: (1) Refer to the latest CEDD Standard Drawings for the details of U-shaped (U) and half-round (HR) channels.