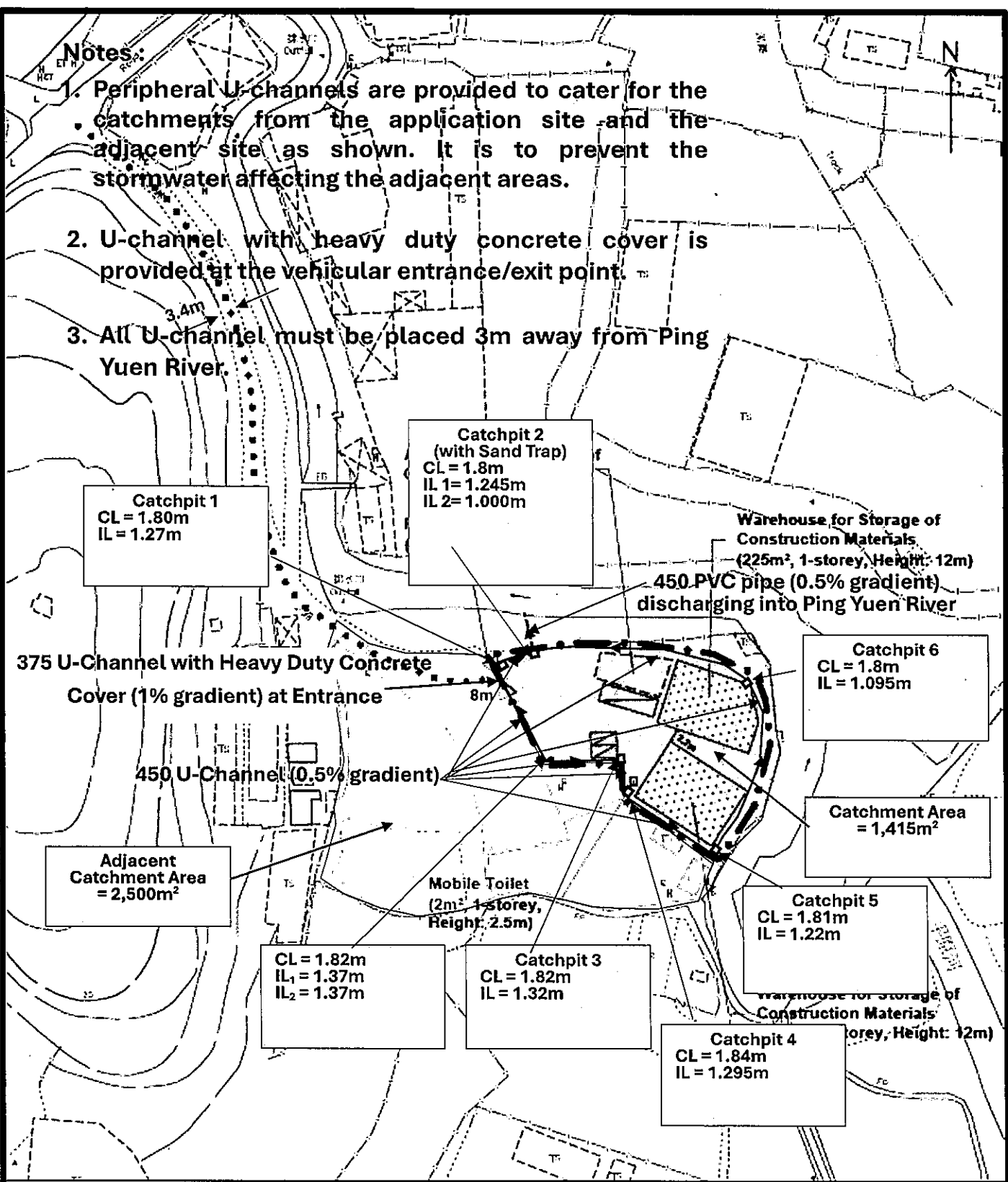


**Notes:**

1. Peripheral U-channels are provided to cater for the catchments from the application site and the adjacent site as shown. It is to prevent the stormwater affecting the adjacent areas.
2. U-channel with heavy duty concrete cover is provided at the vehicular entrance/exit point.
3. All U-channel must be placed 3m away from Ping Yuen River.



Catchpit 1  
CL = 1.80m  
IL = 1.27m

Catchpit 2  
(with Sand Trap)  
CL = 1.8m  
IL 1 = 1.245m  
IL 2 = 1.000m

Catchpit 6  
CL = 1.8m  
IL = 1.095m

Catchment Area  
= 1,415m<sup>2</sup>

Catchpit 5  
CL = 1.81m  
IL = 1.22m

CL = 1.82m  
IL<sub>1</sub> = 1.37m  
IL<sub>2</sub> = 1.37m

Catchpit 3  
CL = 1.82m  
IL = 1.32m

Catchpit 4  
CL = 1.84m  
IL = 1.295m

**Legend:**

- Application Site (about 1,415 sq.m.)
- Warehouse for Storage of Construction Materials
- Loading/Unloading Space for Medium Goods Vehicle (3.5m x 11m) (1 no.)
- Parking Spaces for Staff/Visitors (2.5m x 5m) (2 nos.)

For Identification Purpose

**Drainage Plan**

**Drawing No. D - 001A**

# Drainage Design for the site near Ping Yuen River

## DSD - STORMWATER DRAINAGE MANUAL

### 7.5.2 Rational Method

$$Q_p = 0.278CiA$$

where  $Q_p$  = peak runoff in  $m^3/s$

$C$  = runoff coefficient (dimensionless)

$i$  = rainfall intensity in mm/hr

$A$  = catchment area in  $km^2$

In Hong Kong, a value of  $C = 1.0$  is commonly used in developed urban areas. In less developed areas, appropriate  $C$  values in order to ensure that the design would be fully cost-effective.

#### Surface Characteristics Runoff coefficient, $C^*$

Asphalt	0.70 - 0.95
Concrete	0.80 - 0.95
Brick	0.70 - 0.85
Grassland (heavy soil**)	
Flat	0.13 - 0.25
Steep	0.25 - 0.35
Grassland (sandy soil)	
Flat	0.05 - 0.15
Steep	0.15 - 0.20

The surface of the application site and the adjacent site will be hard paved, the  $C$  should be 0.85.

### 6.6.1 Village Drainage and Main Rural Catchment Drainage Channels

'Village Drainage' refers to the local stormwater drainage system within a village. A stormwater drain conveying stormwater runoff from an upstream catchment but happens to pass through a village may need to be considered as either a 'Main Rural Catchment Drainage Channel' or 'Village Drainage', depending on the nature and size of the upstream catchment. In any case, the impact of a 50-year event should be assessed in the planning and design of village drainage system to check whether a higher standard than 10 years is justified. **50 Years is used.**

Table 2d – Intensity-Duration-Frequency (IDF) Relationship of North District Area for durations not exceeding 240 minutes

Duration (min)	Extreme Intensity (mm/h) for various Return Periods T (year)						
	2	5	10	20	50	100	200
240	29.0	38.2	44.5	50.7	59.1	65.6	72.3
120	42.4	54.9	63.2	71.2	81.8	89.8	97.8
60	62.0	77.1	86.1	94.3	104	111	118
30	85.7	103	113	122	133	141	148
15	108	129	141	151	164	173	182
10	120	141	155	168	187	203	219
5	139	162	177	192	214	231	251

Notes:

1. based on continuous rainfall recorded at GEO rain gauges N05 (40 years), N34 (24 years), N46 (24 years), N33 (24 years), N35 (24 years), N36 (24 years), N45 (24 years) and HKO rain gauges EPC (31 years), SSH (20 years), TKL (38 years), R24 (40 years), R29 (39 years), R30\_KAT (34 years), SEK (27 years) up to 2023.
2. rainfall IDF relationships are derived from regional frequency analysis of extreme rainfall of local rain gauges.
3. the trends of the extreme rainfalls observed at HKO Headquarters are used to infer the trends at other locations.

i (rainfall intensity) = 187mm/hr (Duration of 10min is used)

### Calculations of U-channel

$$Q_p = 0.278C_iA$$

$$C_1 = 0.15 \text{ (Grass Land (Sandy Soil) (Application Site))}$$

$$C_2 = 0.85 \text{ (Hard Paved) (Adjacent Area)}$$

$$i = 187\text{mm/hr}$$

$$A = 1,415\text{m}^2 \text{ (0.00142km}^2\text{) (Application Site)}$$

$$+ 2,500\text{m}^2 \text{ (0.00250km}^2\text{) (Adjacent Area)}$$

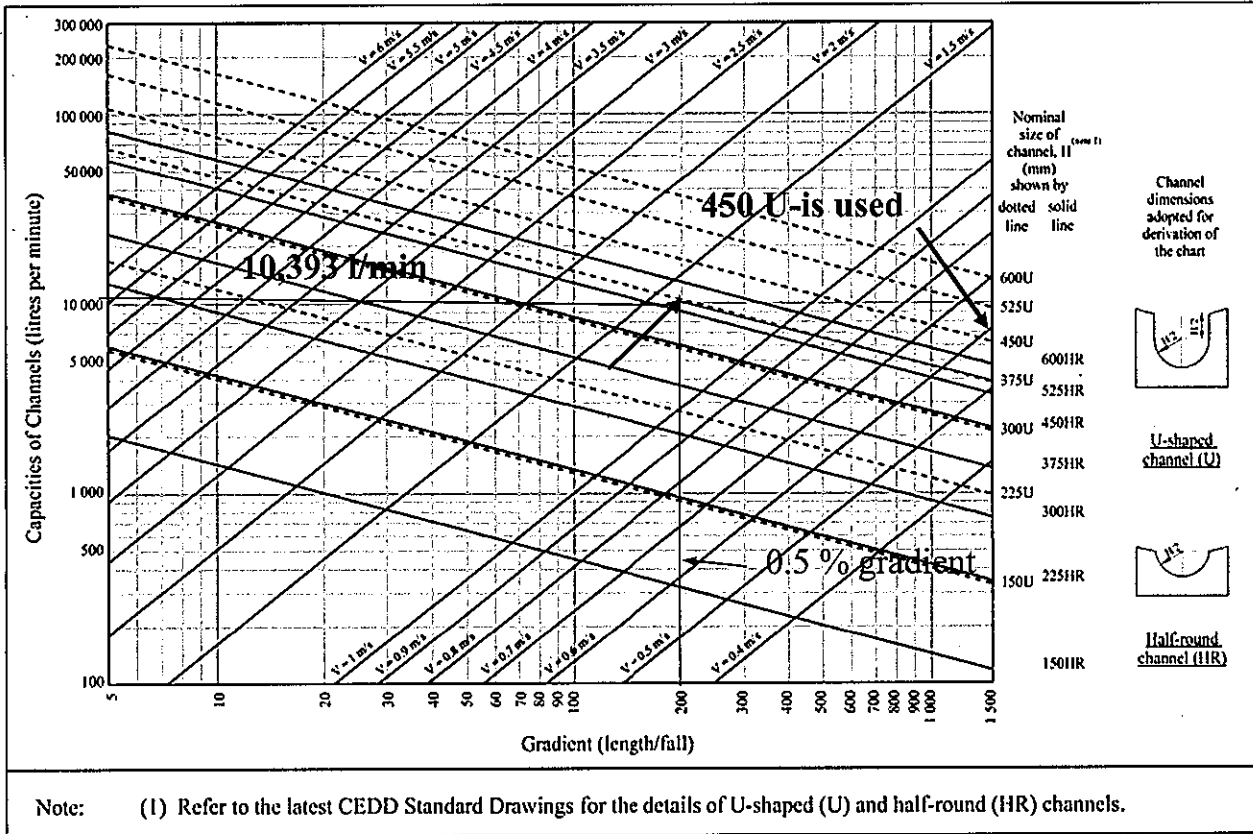
$$Q_p = 0.278 \times 187 \times ((0.85 \times 0.00142) + (0.85 \times 0.00250))$$

$$Q_p = 0.1732\text{m}^3/\text{s or } 10,393 \text{ l/min}$$

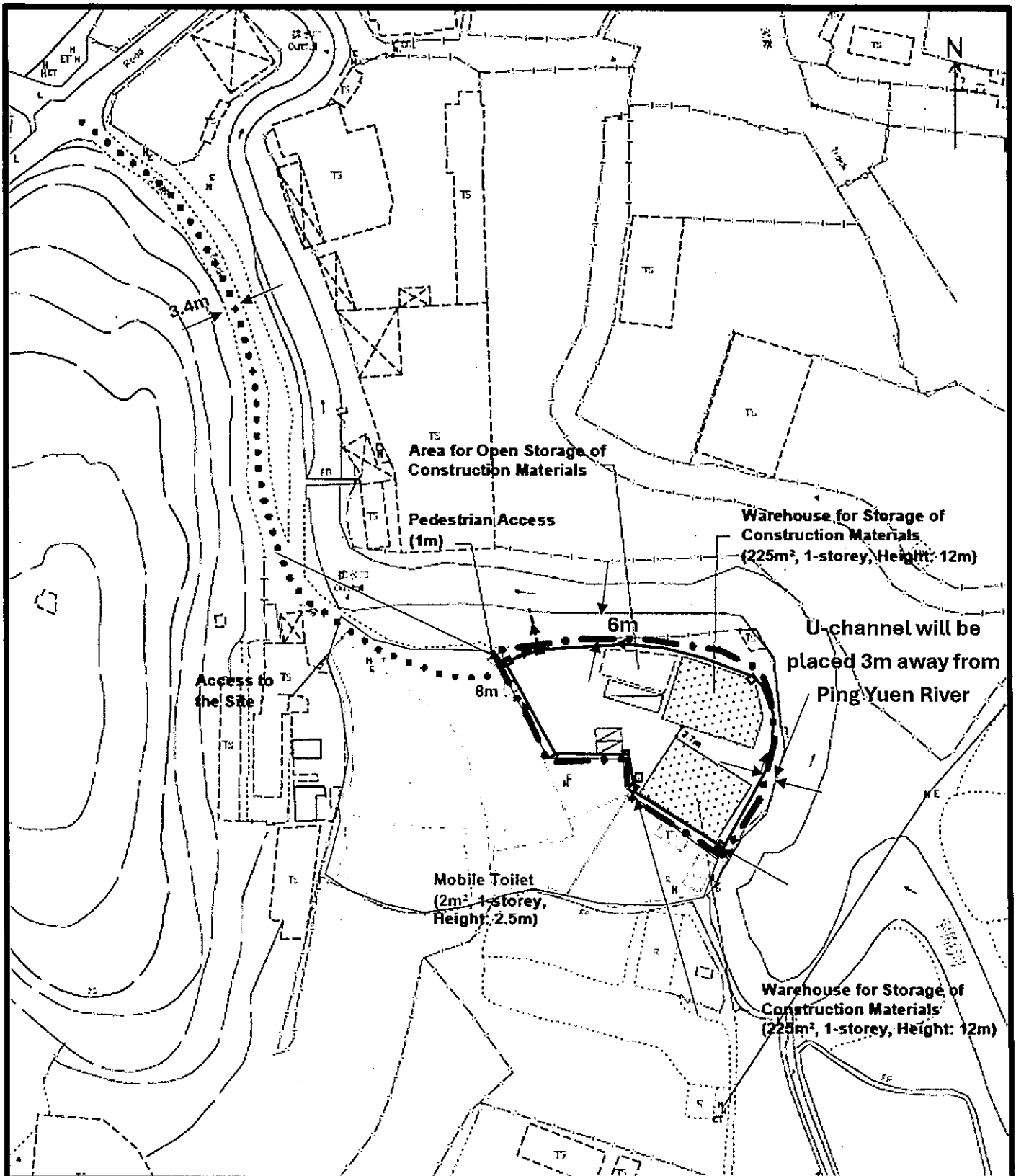
For conservative calculations, all catchment areas are combined for calculation of all U-Channels.

# GEO Technical Guidance Note No. 43 (TGN 43) Guidelines on Hydraulic Design of U-shaped





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



For 10,393 l/min, 450 U-channel is used.



**Legend:**

-  Application Site (about 1,415 sq.m.)
-  Warehouse for Storage of Construction Materials
-  Loading/Unloading Space for Medium Goods Vehicle (3.5m x 11m) (1 no.)
-  Parking Spaces for Staff/Visitors (2.5m x 5m) (2 nos.)

For Identification Purpose

Distance from Ping Yuen River

Drawing No. D - 002

