DRAINAGE PROPOSAL FOR

S.12A PLANNING APPLICATION FOR KOON YAM TONG, NO. 13 NIM WAN ROAD HA PAK NAI, LAU FAU SHAN, YUEN LONG, N.T. (LOT NO.118 IN DD135)

Date: 2025 Dec 16
Version: 3
Prepared by: Fotton ELA Architects Ltd.

1. Introduction

1.1 Fotton ELA Architects Limited is appointed to act as an engineering consultant to prepare a drainage proposal for a Temporary S.12A Planning Application for a Columbarium known as Koon Yam Tong at No. 13 Nim Wan Road, Lau Fau Shan, Yuen Long, New Territories (Lot No. 118 in D.D. 135)

2. Location and the Environs of the Application Site

2.1 The Site lies within the Coastal Protection Area (CPA). With reference to drawing no. SK-02, the Site is situated approximately 15 meters from Nim Wan Road, with the nearest shoreline of Deep Bay (Shenzhen Bay) located about 130 meters to its west.

2.2 The application area consists solely of the columbarium building and a small forecourt, both of which are directly bordered by paved surfaces enclosed by vegetated land.

2.3 Immediately west of the Site, there is a small sandy hill with scattered large rocks and clusters of trees.

2.4 From a broader perspective, the Site is surrounded by substantial tree coverage and unpaved land.

3. Proposed Operational Nature of the Site

3.1 The Site is proposed to be used as a columbarium, providing a resting place for the deceased and a space for mourners to pay their respects.

3.2 Air and noise controls will be implemented where no joss sticks, incense, or candles will be allowed in the Site.

4. Site Survey

4.1 In order to better understand the topography and hydrology of the Site and its surrounding, a survey of the site and its surrounding was conducted on 18 June 2025 from 12:30 p.m. to 1:30 p.m., utilizing both drone-based aerial survey and on-ground inspection. Notably, approximately 46.3 mm of rainfall had been recorded on the preceding day, providing a valuable opportunity to observe post-rainfall drainage behavior. The following observations were made:

4.1.1 With reference to drawings SK-01, the Site is generally surrounded by vegetated government land, sparsely scattered buildings, and paved roads.

4.1.2 The roof of the columbarium building was identified as the primary source of surface runoff. It was found to be clean, with only several outdoor air-conditioning units placed on it.

4.1.3 Existing downpipes are found connecting from the roof to ground level to discharge collected runoff.

4.1.4 No surface ponding was observed in the surrounding areas, whether vegetated or paved.

4.1.5 The drone-based aerial survey allowed for a more accurate determination of the gravitational flow of surface runoff. The estimated flow directions are marked on drawings SK-01 to SK-03 for easy reference. The sections of the Site and its surroundings can be found in drawings SK-04.

4.1.6 The upland catchment area was estimated and denoted as Area A on drawing SK-02.

4.1.7 The catchment area sharing the same natural gravitational flow paths as the Site was also determined and denoted as Area B on drawing SK-02.

4.1.8 Considering the Site catchment (Area C) only comprised of a columbarium building and a small forecourt totaling an area of approximately 92.9m, it does

not block the flow of surface runoff from the upland catchment (Area A) and surrounding area (Area B).

4.1.9 In order to better understand the existing runoff discharge pathways at the broader scale, the surrounding drainage facilities were also investigated.

4.1.10 With reference to drawings SK-01 and SK-02, a U-channel was identified near the Site along Nim Wan Road. Although partially obstructed by debris, it remains structurally serviceable and is proposed for reuse following improvement works.

4.1.11 Moreover, an open pit with discharging point and catch basin was found about 60m from the Site diverting collected runoff by a section of U-channel along Nim Wan Road into the sea.

4.1.12 The forest-covered upland to the east of the Site is also found to be relatively flat and there are only small hills with mild steepness, surface runoff is expected to be fairly low due to high level of interception by vegetation and infiltration into the soil.

4.1.13 Other parts of the Site surrounding exhibits substantial arboreal coverage and unpaved lands, strong interception by vegetation and infiltration into the soil were expected. Moreover, a very high proportion of these lands are Government lands.

4.1.14 No flooding has been observed near the close vicinity of the Site due to its relatively elevated location and high surrounding arboreal coverage. This area is also not within flooding black spot.

4.1.15 A search for government-constructed and maintained drainage facility drawings was conducted, and no relevant records could be retrieved.

4.1.16 Based on the above, it was found that the surface runoff in the area of Ha Pak Nai is not systematically collected and is allowed to either freely flow down the gradient into the sea or absorbed by the soil of which mostly fall within government lands.

4.1.17 Based on the above survey results, it is proposed to reuse a section of the existing U-channel near the Site for discharging runoff collected on-site.

4.1.18 Since a U-channel is proposed to pass through the sandy grassland to the east of the Site, the catchment area of this area is also estimated and denoted as Area D as marked on drawing SK-02.

4.1.19 Since the existing 300 mm channel is proposed for reuse, the runoff collected from its surrounding catchment must be estimated. This includes the relevant catchment area of the rolling forest located east of the Site, identified as Area E on drawing SK-02.

5. Evaluations and Calculations

5.1 To support the conclusion made in 4.1.18, the following is proposed:

5.1.1 The flow from the existing downpipes which collect surface runoff from the roof will be collect by the proposed U-channels.

5.1.2 Surface runoff collected by the Site and the surrounding catchments are proposed to be discharged to the existing 300mm U-channel with reference to drawings SK-02 and SK-03.

5.1.3 The catchpit and manhole standard drawings are shown on drawings D-02 and D-03.

5.1.4 As the condition of the existing 300 mm U-channel is currently suboptimal, improvement works will be undertaken to restore its capacity to the intended design level. And to support the proposal with calculations:

5.1.5 For simplicity, rational method is chosen to estimate the peak runoff.

5.1.6 For Area A, it can be regarded as a sandy rolling forest with some large stones on the slopes. A runoff coefficient of 0.25 is chosen.

5.1.7 For the concrete paved area (Area B) around the site, a runoff coefficient of 0.9 is chosen.

5.1.8 Since the Site is paved, a runoff coefficient of 0.9 is chosen.

5.1.9 Area D is regarded as flat sandy grassland and a runoff coefficient of 0.15 is chosen.

5.1.10 For the rolling forest to the East of the site (Area E), the soil was found to be sandy and mild in steepness and a small total area of land paved, a runoff coefficient of 0.25 is chosen.

5.1.11 Considering the very small catchment area, the elevated location of the Site and its surroundings, and the lack of maintained drainage infrastructure in the Ha Pak Nai area, a duration of 60 minutes and a return period of 10 years have been chosen to provide a more realistic rainfall intensity for calculations. According to Table 2a of the Stormwater Drainage Manual (with Eurocodes incorporated), Fifth Edition, May 2018, issued by the Drainage Services Department, Government of Hong Kong (the 'Manual'), this corresponds to a rainfall intensity of 104 mm/h.

5.1.12 With reference to Table 28 of the Corrigendum No. 1/2022 of the Manual, a rainfall increase due to Climate Change for projection towards end of 21st Century of 16% plus an allowance of 12.1% due to climate change are applied to the estimated intensity above giving an adjusted 60-minute duration and 10-year return period rainfall intensity *i* of 133mm/h.

5.1.13 By rational method, with reference to Manual:

Given $Q_p = 0.278\ CiA$
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

5.1.14 With reference to drawing SK-02, the catchment area of the Site and its surrounding is determined and their peak runoff values are tabulated below:

Catchment Area	**C**	**i (mm/h)**	**A (km^2)**	**Q_p (m^3/s)**
A – Rolling forest to the west of Site	0.25	133	0.000225	0.00208
B – Paved land surrounding the Site	0.9	133	0.0003	0.00998
C – Site columbarium building and forecourt	0.9	133	0.0000929	0.00309
D – Sandy grassland to the east of the Site	0.15	133	0.000494	0.00274
E – Rolling forest to the East of the Site	0.25	133	0.011899	0.10999
			Total	0.12788

5.2 The following conclusions can be drawn:

5.2.1 Due to the very small size of the upland, Site and the surrounding catchments, the estimated volumetric peak runoff rates **Q_p** are very low.

5.2.2 Considering the low **Q_p** of Area A, it can reasonably be assumed that most of the runoff is absorbed into the soil and thus very little runoff will enter Area B and the Site.

5.2.3 The low $\mathbf{Q_p}$ of Area B ensures that there will not be any significant addition to the surface runoff collected by the surrounding catchments of the Site.

5.2.4 Similarly the Site $\mathbf{Q_p}$ is also very low and there will be a very insignificant addition to the runoff collected by the surrounding catchments.

5.2.5 Since surface channels are proposed to be installed around the Site, surface runoff from Area A, B, D and the Site will be collected and discharged through the proposed drainage system.

5.2.6 The capacities of the proposed and existing U-channels as well as the proposed underground pipe surrounding the Site is estimated as follows:

With Manning's Formula for discharge capacity of drain

$$Q_C = \frac{1}{n} A R^{\frac{2}{3}} S^{\frac{1}{2}}$$

where Q_c = *discharge capacity of drain in* m^3/s
n = *roughness coefficient*
A = *flow area in* m^2
P = *wetted perimeter in m*
$R = A/P$ = *hydraulic radius in m*
S = *bed gradient*

5.2.7 For the 225m U-channel,

n = 0.011 for concrete channel with neat cement finish
A = 0.01988 m^2 (225mm U-channel, 225mm height)
P = 0.353429 m
R = 0.05625 m
S = 1/100

⇨ *Q_{c225mm} = 0.02653 m^3/s (fig 5.1)*

Sum of peak flow rate of collected runoff in Area A, B, C and D = 0.01789m^3/s < Q_{c225mm}

Therefore, the proposed 225mm U-channel will provide enough capacity.

5.2.8 For the proposed 160mm underground pipes at 85% bore,

n = 0.009 for uPVC pipe
A = 0.0182m^2
P = 0.375m
R = 0.0485m
S = 0.04

⇨ *Q_{c160mm} = 0.0538m^3/s (fig 5.2)*

Sum of peak flow rate of collected runoff in Area A, B, C and D = 0.01789m^3/s < Q_{c160mm}

Therefore, the proposed 160mm underground uPVC pipe will provide enough capacity.

5.2.9 For the Existing 1:25 300mm U-channel

n = 0.011 for concrete channel with neat cement finish (after restoration)
A = 0.0353 m^2 (300mm U-channel, 100mm height)
P = 0.471 m
R = 0.075 m

S = 1:25

⇨ *Q_{c300mm} = 0.286 m^3/s (fig 5.1)*

Sum of peak flow rate of collected runoff in Area A, B, C, D and E

= 0.12788m^3/s < Q_{c300mm}

Therefore, the proposed restoration of the existing 300mm U-channel will provide enough capacity.

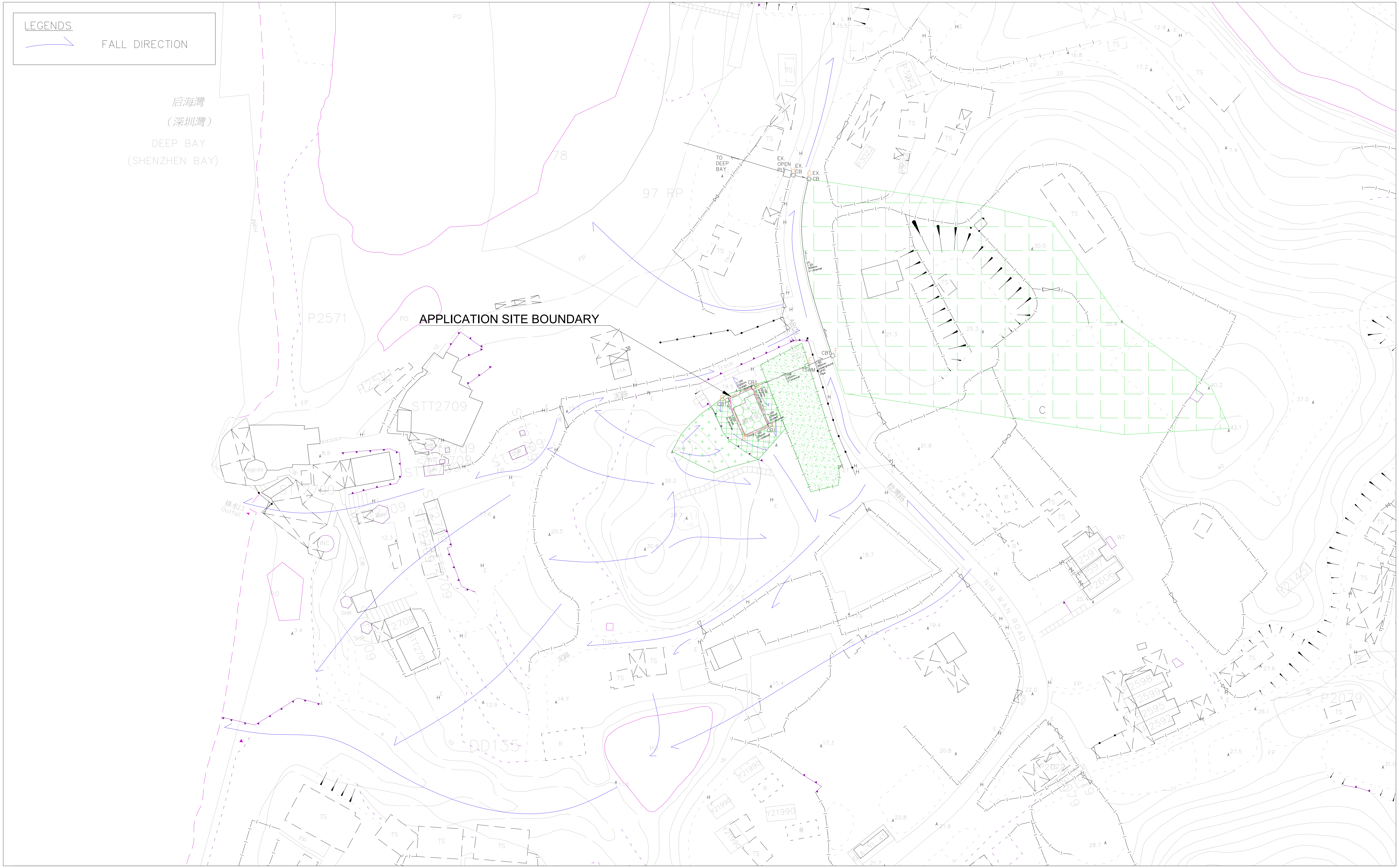
6. Conclusions and Recommendations

6.1 The existing U-channel and the proposed U-channel and underground pipe shown on drawings SK-02 and SK-03 have proven to provide enough capacity for the design peak flow.

6.2 However, since the existing U-channel has not been properly maintained, improvement works will be carried out by the Applicant to allow it to restore its functionality to the design capacity.

6.3 Considering the very low peak flow rate contributed by the Site's runoff, and that improvement works will be carried out to the existing U-channel near the Site, a positive drainage impact is expected.

6.4 As of the date of this report, the Yuen Long District Office (HAD), Yuen Long District Land Office (DLO), and the Drainage Services Department (DSD) have indicated that they are not responsible for the maintenance of the existing drainage components. In the absence of any government department assuming maintenance responsibility, it is proposed that restoration works be undertaken, with the assignment of future maintenance responsibilities to be clarified at a later stage.



FOTTON ELA ARCHITECTS LTD.
李兆民建築師有限公司

ALL MEASUREMENTS MUST BE CHECKED AT THE SITE – DO NOT SCALE DRAWINGS – ALL DRAWING SPECIFICATIONS AND THEIR COPY RIGHT ARE THE PROPERTY OF ENGINEERS, ARCHITECTS, DESIGNERS, AND SHALL BE RETURNED AT THE COMPLETION OF THE WORK – THIS DRAWING IS NOT VALID FOR CONSTRUCTION PURPOSES UNLESS EXPRESSEDLY CERTIFIED.

PROJECT: DRAINAGE PROPOSAL FOR TEMPORARY S.12A PLANNING APPLICATION FOR KOON YAM TONG, NO. 13 NIM WAN ROAD HA PAK NAI, LAU FAU SHAN, YUEN LONG, N.T. (LOT NO.118 IN DD135)

DRAWING TITLE: GENERAL SURROUNDING OF SITE AND FALL DIRECTION

DRAWING NO.: SK-01

SCALE: 1:1000

PROJECT REF.:

CAD REF.: Z:\Fotton ELA Project\Fotton Project\New Territories\19067146 白泥觀音堂 Longlife\2025 Drainage Proposal\Drainage Proposal – U Channel Approach\combined topo maps u channel.dwg

Rev.	Date	Description	Drawn by	Checked by	Approved by
A	10SEP2025	SUBMISSION			

LEGENDS

- CATCHMENT AREA A
  AREA = 0.0002249 km²
- CATCHMENT AREA B
  AREA = 0.0003 km²
- CATCHMENT AREA C (SITE)
  AREA = 0.0000929 km²
- CATCHMENT AREA D
  AREA = 0.0004396 km²
- CATCHMENT AREA E
  AREA = 0.011899 km²
- FALL DIRECTION

Component	Type	Cover Level (mPD)	Invert Level (mPD)
A	U-channel	19.5	19.49
B	Catchpit	19.5	19.39
C	Catchpit	19.5	19.43
D	Catachpit	19.5	19.32
E	Catchpit with trap	19.5	17.75
F	Catachpit	18.62	17.61
G	Catachpit	16.1	15.2
H	Ex. Manhole	16.1	13.9 (Approx.)

FOTTON ELA ARCHITECTS LTD.
李兆民建築師有限公司

PROJECT: DRAINAGE PROPOSAL FOR TEMPORARY S.12A PLANNING APPLICATION FOR KOON YAM TONG, NO. 13 NIM WAN ROAD HA PAK NAI, LAU FAU SHAN, YUEN LONG, N.T. (LOT NO.118 IN DD135)

DRAWING TITLE: CATCHMENT DELINEATION PLAN

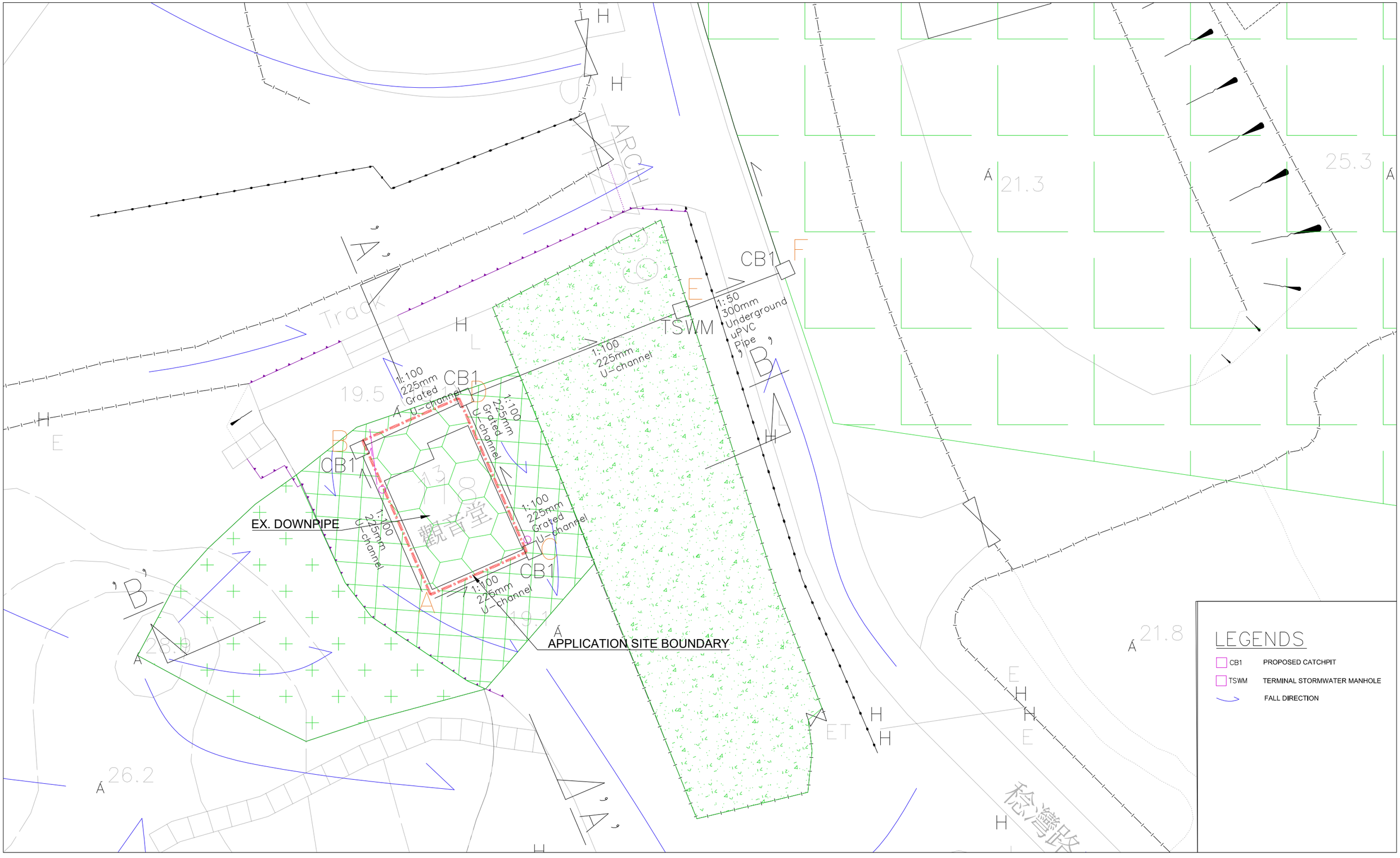
DRAWING NO.: SK-02

SCALE: 1:500 (A3)

PROJECT REF.:

CAD REF.: Z:\Fotton ELA Project\Fotton Project\New Territories\19067146 白泥觀音堂 Longlife\2025 Drainage Proposal\Drainage Proposal – U Channel Approach\combined topo maps u channel.dwg

Rev.	Date	Description	Drawn by	Checked by	Approved by
B	10SEP2025	SUBMISSION			
C	4DEC2025	INVERT LEVEL UPDATE			



FOTTON ELA ARCHITECTS LTD.
李兆民建築師有限公司

ALL MEASUREMENTS MUST BE CHECKED AT THE SITE – DO NOT SCALE DRAWINGS – ALL DRAWING SPECIFICATIONS AND THEIR COPY RIGHT ARE THE PROPERTY OF ENGINEERS, ARCHITECTS, DESIGNERS, AND SHALL BE RETURNED AT THE COMPLETION OF THE WORK – THIS DRAWING IS NOT VALID FOR CONSTRUCTION PURPOSES UNLESS EXPRESSEDLY CERTIFIED.

PROJECT: DRAINAGE PROPOSAL FOR TEMPORARY S.12A PLANNING APPLICATION FOR KOON YAM TONG, NO. 13 NIM WAN ROAD HA PAK NAI, LAU FAU SHAN, YUEN LONG, N.T. (LOT NO.118 IN DD135)

DRAWING TITLE: BLOWN UP PLAN

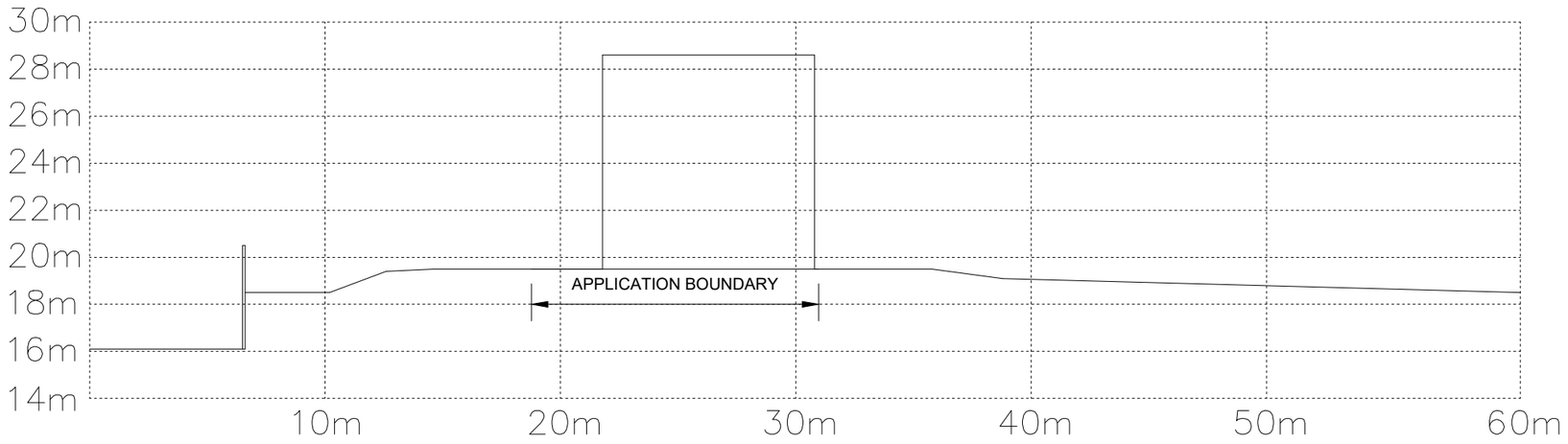
DRAWING NO. SK-03

SCALE 1:250

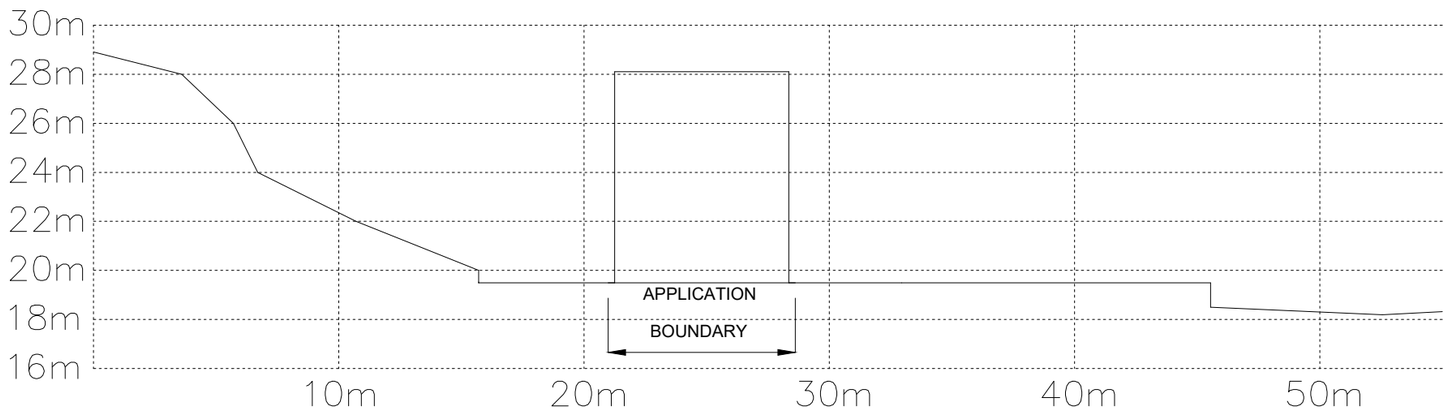
PROJECT REF.

CAD REF. Z:\Fotton ELA Project\Fotton Project\New Territories\19067146 白泥觀音堂 Longlife\2025 Drainage Proposal\Drainage Proposal – U Channel Approach\combined topo maps u channel.dwg

Rev.	Date	Description	Drawn by	Checked by	Approved by
A	10SEP2025	SUBMISSION			



SECTION A–A



SECTION B–B

FOTTON ELA ARCHITECTS LTD.
李兆民建築師有限公司

PROJECT	DRAINAGE PROPOSAL FOR TEMPORARY S.12A PLANNING APPLICATION FOR KOON YAM TONG, NO. 13 NIM WAN ROAD HA PAK NAI, LAU FAU SHAN, YUEN LONG, N.T. (LOT NO.118 IN DD135)
DRAWING TITLE	SECTIONS
DRAWING NO.	SK–05
SCALE	NTS
PROJECT REF.	
CAD REF.	Z:\Fotton ELA Project\Fotton Project\New Territories\19067146 白泥觀音堂 Longlife\2025 Drainage Proposal\combined topo maps u channel.dwg

Rev.	Date	Description	Drawn by	Checked by	Approved by
–	–	SUBMISSION			