LANGTREE
CONSULTING ENGINEERS

60 Penelope Road, Stuart
Lot 82 on SP345445

STORMWATER MANAGEMENT PLAN

ICM Construction

LANGTREE CONSULTING

Project No.: 1007

Reference No.: R-NP0332

Date: 13/05/2025

Controlled Copy No.: 1

Revisions: A

Revision Record:

Rev	Review Date	Description	Prepared	Checked	Approved
A	13/05/2025	Issued for Client Comment	Natalie Pham	Brett Langtree	Brett Langtree

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APPENDICIES

1.0 INTRODUCTION

Langtree Consulting has been engaged by ICM Construction to undertake this Stormwater Management Plan (SMP) for 60 Penelope Road, Stuart (Lot 82 on SP345445) at Cleveland Bay Industrial Park (CBIP) development within the Townsville State Development Area (TSDA).

This report addresses the following:

- Investigates potential to increase the stormwater discharge from the site due to increase in impervious area;
- Determines any potential impact on as a direct result of the development;
- Best practice solution with respects to Stormwater Quality Management to meet Townville City Council (TCC) and State Planning Policy (SPP); and
- Determines any mitigation measures required, if any.

2.0 THE SITE

The development is located at 60 Penelope Road, Stuart (Lot 82 on SP345445) at Cleveland Bay Industrial Park (CBIP) and is currently 1ha in area. Refer to in **Figure 1** for Locality (hereon in referred to as the subject site). The subject site is bound to the north and south by neighbouring industrial lots, Penelope Road to the west and Townsville Port Access Road (also known as Ron McLean Drive) to the east.

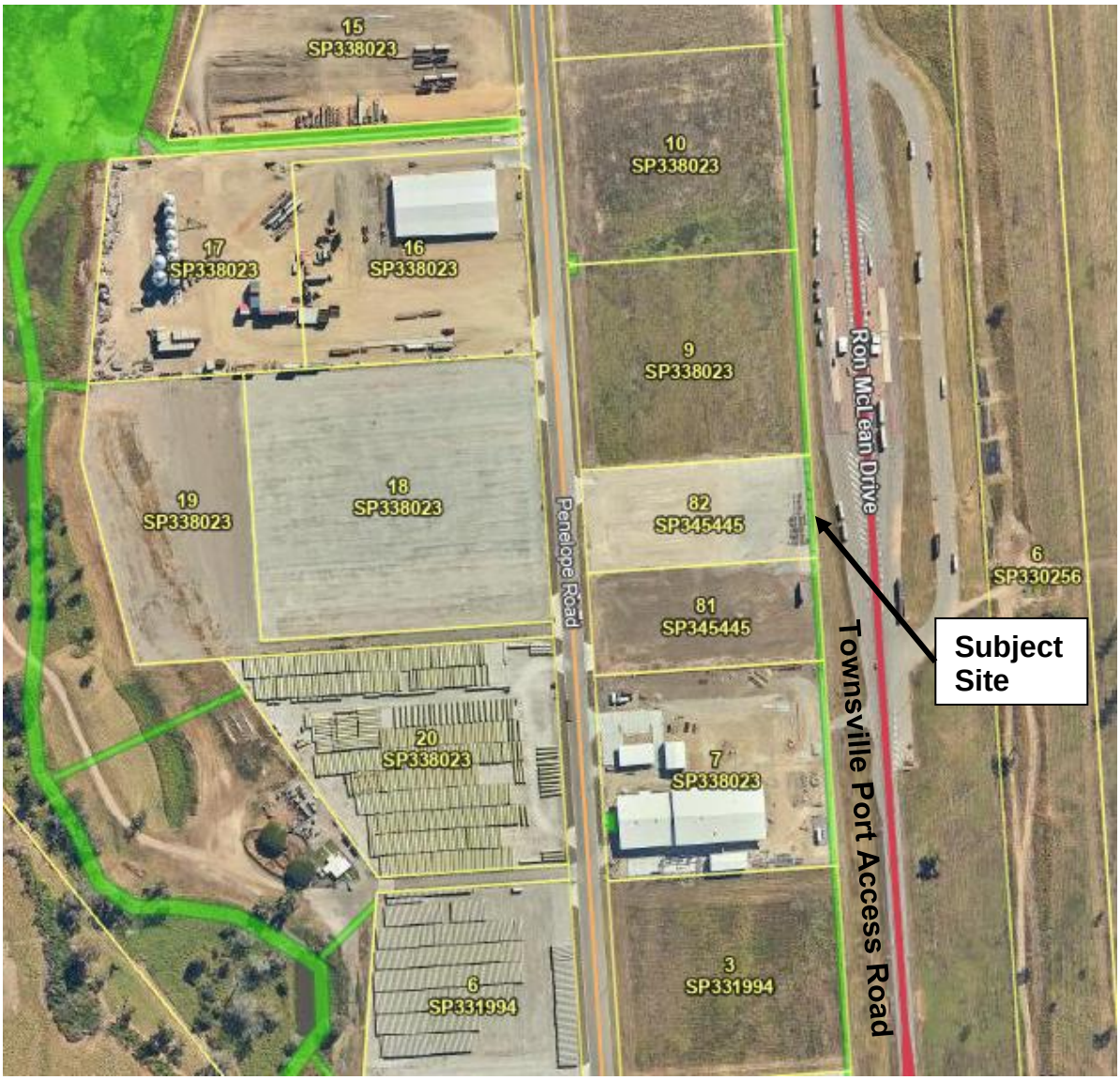

Figure 1. Development Site Locality (Source: Queensland Globe)

3.0 EXISTING STORMWATER REGIME

4.0 Currently stormwater on the site overland flows from southwest to northeast before being captured in a table drain parallel to Townsville Port Access Road. The existing stormwater network for the Cleveland Bay Industrial Estate (CBIP) has been designed to accommodate am ARI 2 event with a stormwater outlet within each lot.

From Council infrastructure records an existing stormwater pit is located in the northeastern corner of the subject site. Refer to **Figure 2**.

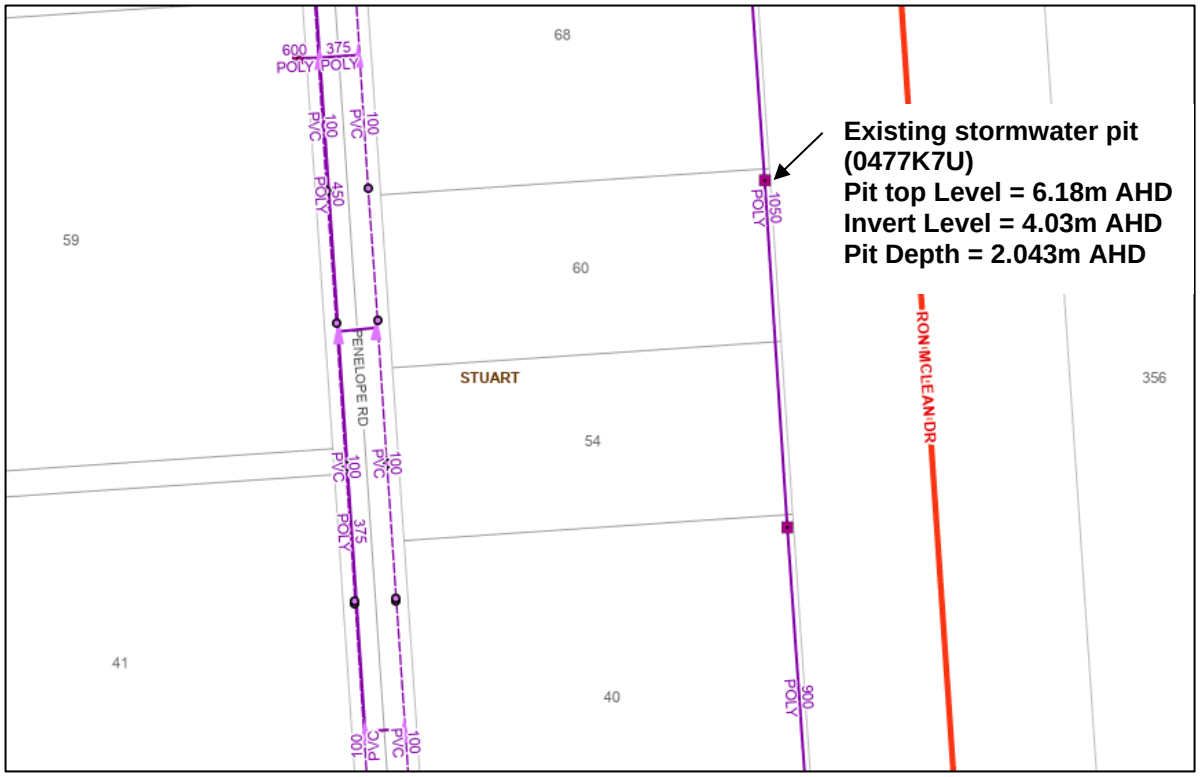

Figure 2. Existing stormwater network (Source: TownsvilleMAPS Communities)

Following the construction of the industrial estate the subject site has subsequently been subdivided from one lot into two lots. From aerial imagery two field inlet pits appear to have been constructed as part of the subdivision form one lot into two lots, one within Lot 82 on SP345445 (subject site) and one within Lot 80 on SP345445. As such two stormwater field inlet pits exist on the subject site, one in the northeast corner of the subject site and one in the southeast corner. Refer to **Figure 3** and **Figure 4** for existing field inlet pit locality.

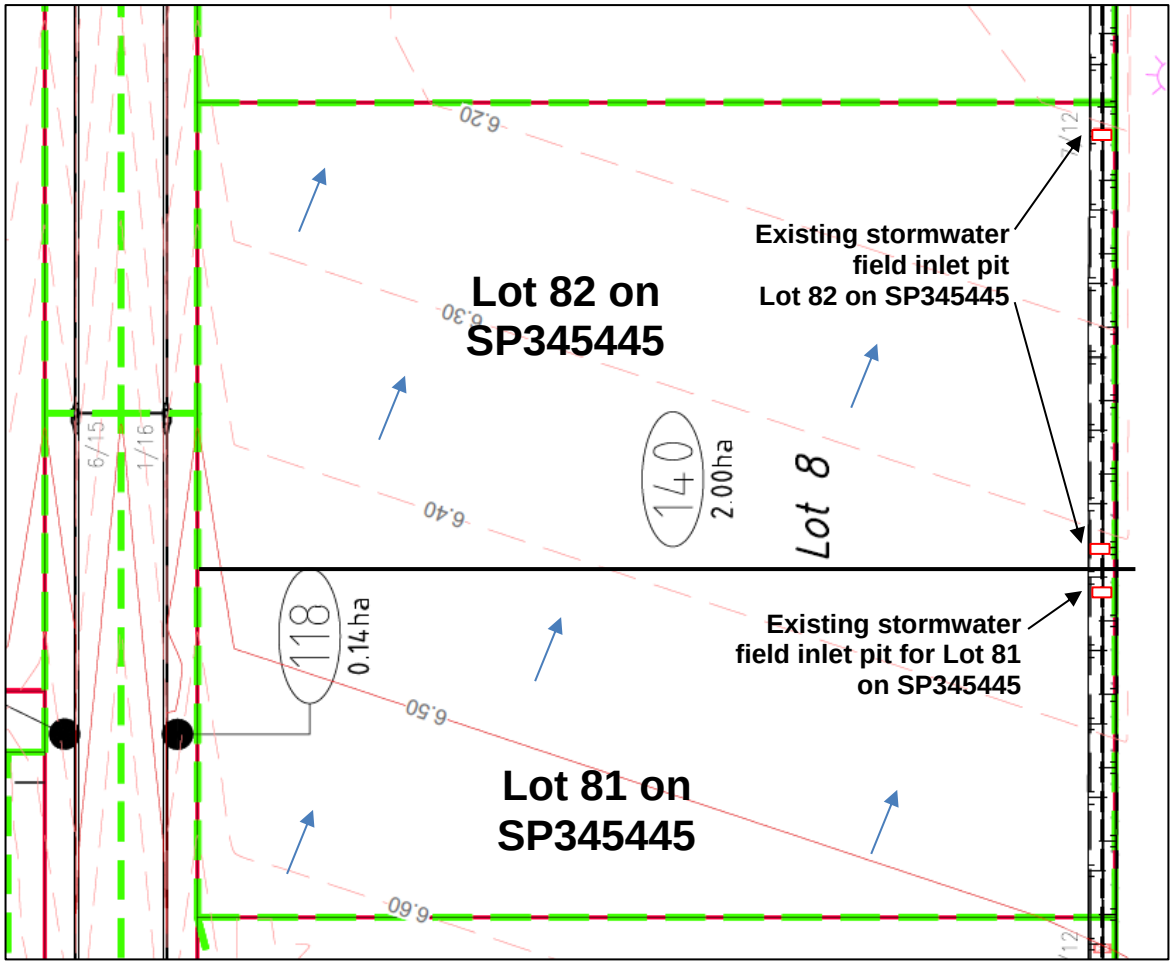

Figure 3. *Site contours and existing stormwater regime*

Figure 4. *Existing stormwater discharge locations (Source: Queensland Globe)*

4.1 FLOODING

From TownsvileMaps Flooding, the subject site is not affected by flooding in a ARI 100 (1% AEP) event, however, it is noted that the newer Townsville City Council (TCC) Flood Information Portal indicates that the subject site may be affected with the following noted:

- flood height of 6.53m AHD (depth 0.12m) in the southwestern corner
- flood height of 6.45m AHD (depth 0.35m) in the southeastern corner; and
- flood height of 6.50m AHD (depth 0.33m) in the southeastern corner.

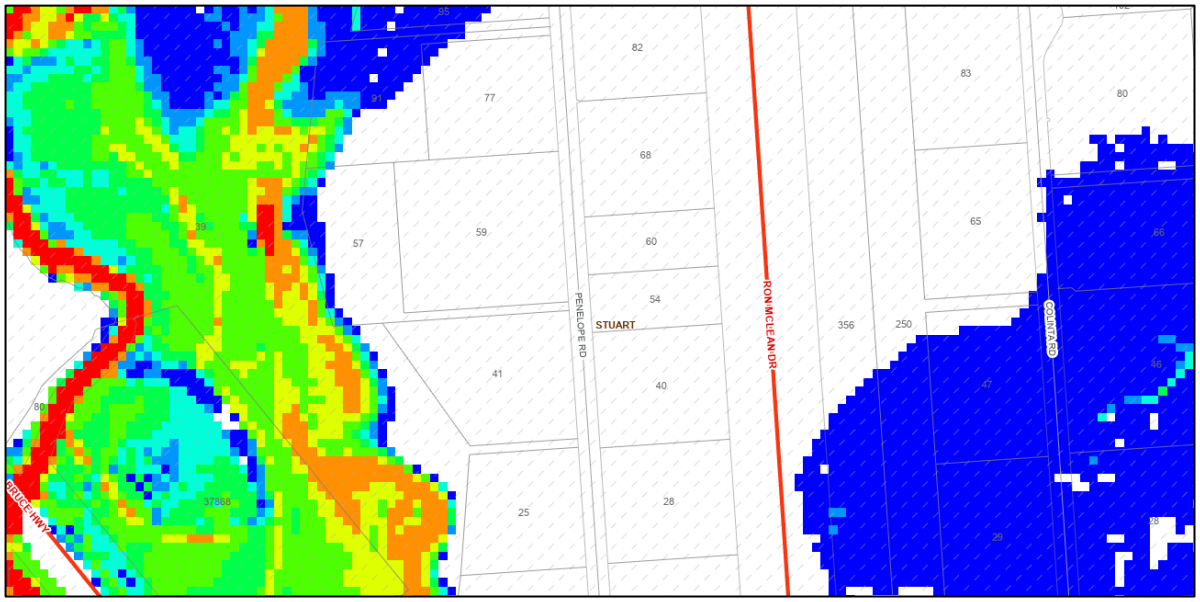

Figure 5. *ARI 100 (1% AEP) Flood depth (Source: TownsvilleMAPS Flooding)*

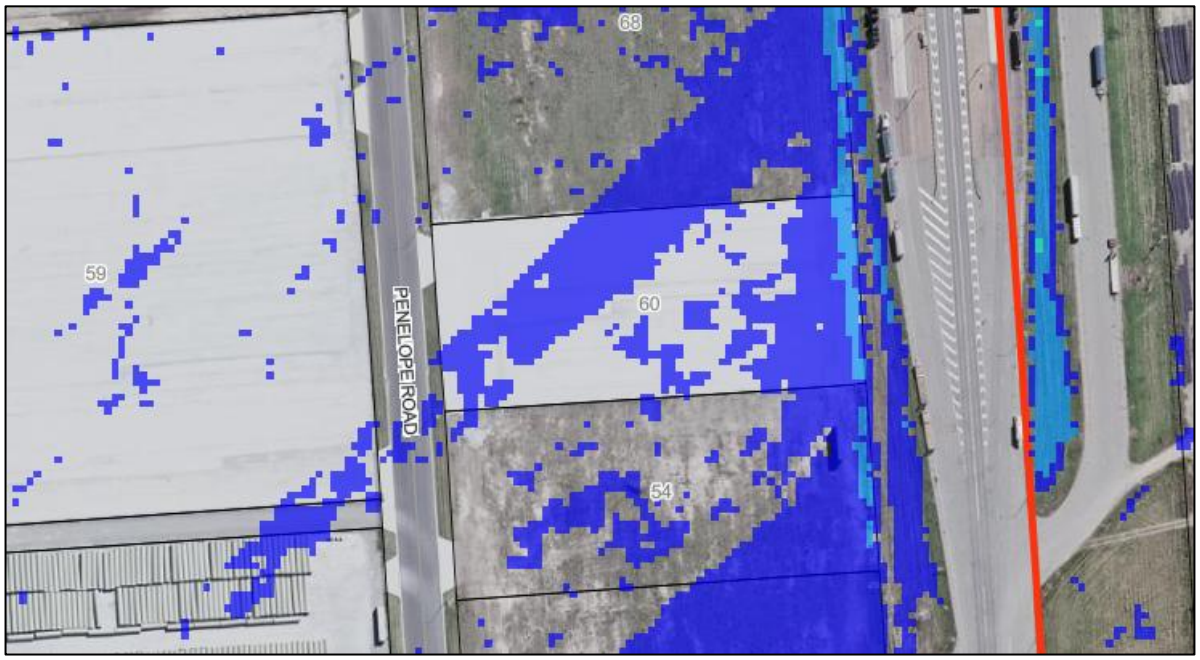

Figure 6. *ARI 100 (1% AEP) Flood depth (Source: TCC Flood Information Portal)*

5.0 PROPOSED DEVELOPMENT

The proposed development is for an industrial warehouse and office facility. Refer to **Figure 2** or **Appendix A** for proposed development plan.

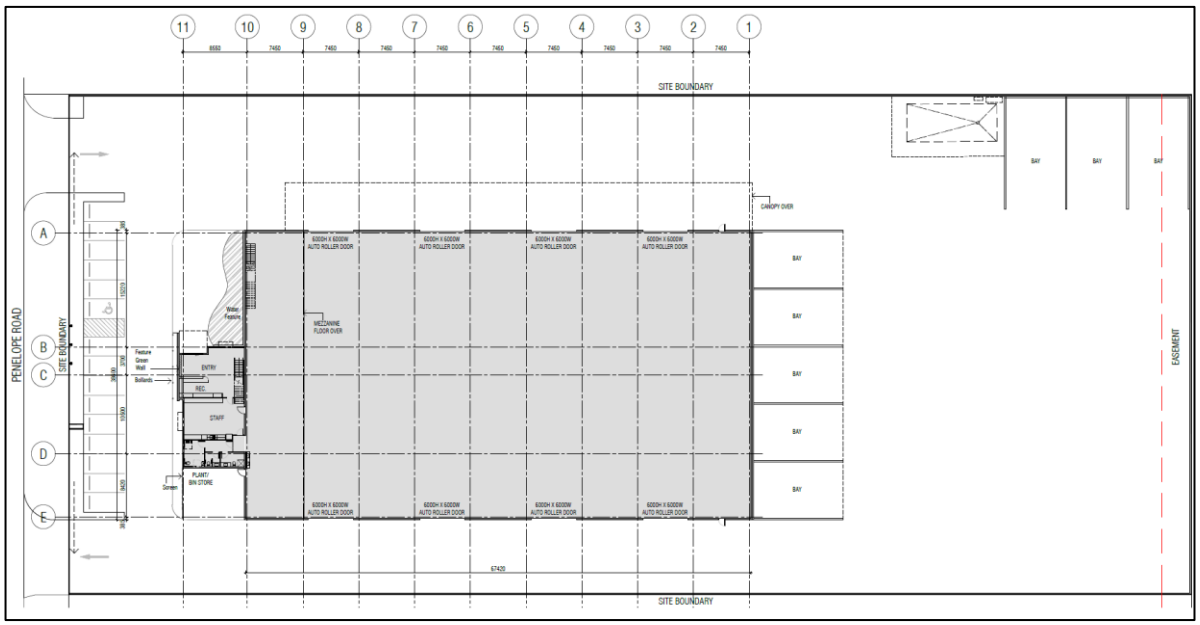

***Figure 7**. Proposed Lot reconfiguration*

5.1 PROPOSED SITE DRAINAGE

The legal point of discharge for the subject site is to the existing stormwater pits shown in **Figure 3** and **Figure 4**. All stormwater is proposed to be treated prior to discharge, as such all stormwater shall be discharged to the stormwater pit in the northeastern corner of the subject site. Refer to Section 7.0 of this report for the proposed stormwater quality treatment train and devices.

The proposed internal stormwater network is shown in **Figure 8** or **Appendix B**.

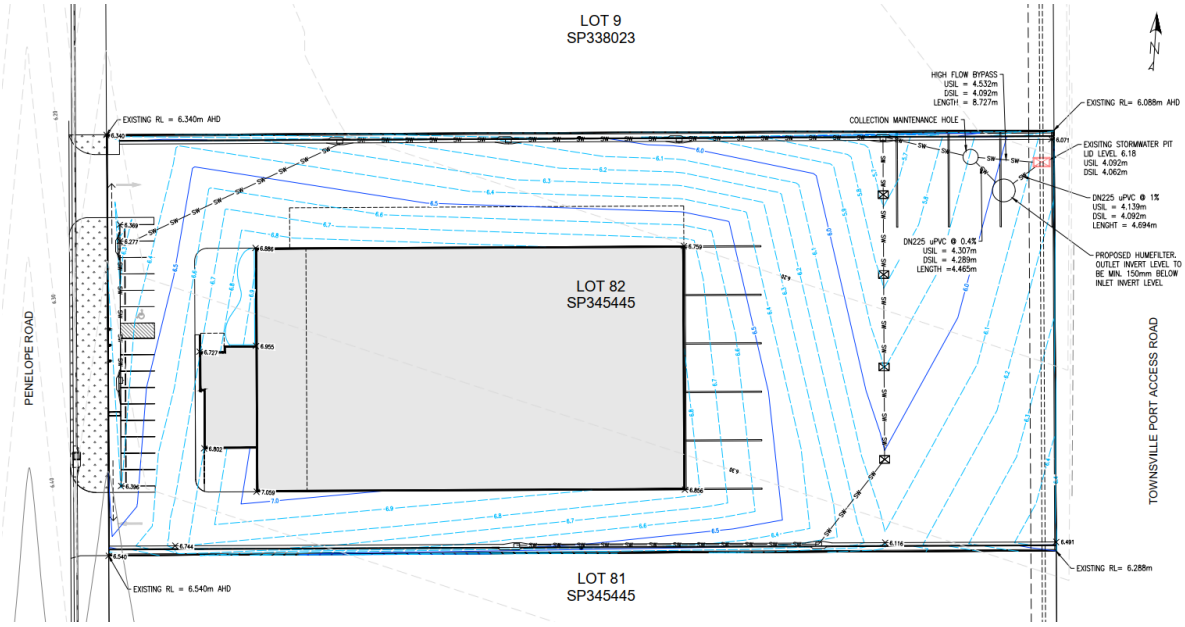

***Figure 8**. Proposed internal stormwater network*

Kerb and channel are proposed along the northern and southern boundaries to contain site stormwater runoff and prevent any inter-allotment drainage to and from neighbouring sites.

5.2 POST-DEVELOPMENT CATCHMENTS

The post-development catchment has been considered to be the area of the subject site, 1ha and the discharge existing pit in the northeastern corner of the lot.

6.0 SITE STORMWATER MANAGEMENT

6.1 HYDROLOGICAL ASSESSMENT

Design of the stormwater network has been analysed using the Rational Method. The guideline utilised for the calculation of the rational method is as per the Queensland Urban Drainage Manual (QUDM) 2017.

$$Q_y = (C_y \,.\, {}^{t}I_y \,.\, A) / 360$$

Where:

Q_y = peak flow rate (m^3/s) for average recurrence interval (ARI) of ''y' years

C_y = coefficient of discharge (dimensionless) for ARI of 'y' years

A = area of catchment (Hectares)

${}^{t}I_y$ = average rainfall intensity (mm/h) for a design duration of 't' hours and an ARI of 'y' years

t = the nominal design storm duration as defined by the time of concentration

The design ARI rainfall event for the internal stormwater drainage network is an ARI 2 (39.35% AEP).

The following steps have been undertaken for calculation of peak flow rates:

a) Analysis of possible flow paths based on available contours;
b) Determination of the time of concentration of each flow path;
c) Adoption of the flow path with the longest time of concentration (t_c) for design;
d) Determination of the runoff coefficients; and
e) Calculation of peak flow rate for structure.

6.2 POST-DEVELOPMENT HYDRAULIC ASSESSMENT

Hydraulic assessment of the proposed post-development stormwater network is provided in **Appendix C.** The ARI 2 (39.35% AEP) discharge flow for the subject site is 0.254m^3/s and 0.766m^3/s during an ARI 100 (1% AEP) event.

6.3 POST-DEVELOPMENT STORMWATER REGIME

The CBIP stormwater network has been designed to accommodate an ARI 2 (39.35% AEP) event in a fully developed industrial estate scenario. During higher events the stormwater will travel to the Townsville Port Access Road table drain to the east of the subject site. Flood modelling has been conducted for the industrial estate at the development stage and has generally been constructed to have at least an ARI 100 (39.35% AEP) flood immunity.

It is noted from **Figure 6** that subsequent flood modelling has been conducted since the construction of the estate which notes potential ponding of up to 0.33m on the subject site with the water surface level of between 6.53m to 6.45m AHD. This result is likely derived from the existing ground level. Preliminary grading of the subject site provided in **Appendix B** demonstrates that the hard areas around the proposed building can be graded away from the building to prevent any water ingress and that the building will be above any defined potential flooding during a major event (ARI 100 / 1% AEP).

7.0 STORMWATER QUALITY ASSESSMENT

7.1 OBJECTIVE

The objective of this report is to assess the best practice stormwater quality management for 60 Penelope Road, Stuart. The intent of this report is to assists implementation of best practice stormwater quality management to ensure the health of the receiving waters of Stuart Creek, during the operational phase of the development (i.e. post-development).

The best practice stormwater quality management measure is to be designed to meet the requirements and principles outlined within:

- Healthy Water Code of Townsville City Council City Plan;
- Table B (Appendix 2) of the State Planning Policy July 2017 (SPP);
- WSUD Design Objectives for Urban Stormwater Management;
- Construction and Establishment Guidelines, Swales, Bioretention Systems and Wetlands;
- Concept Design Guidelines for Water Sensitive Urban Design;
- Standard Drawings for Water Sensitive Urban Design;
- Environmental Protection (Water) Policy 2009 (Townsville region); and
- Water Quality Guidelines for the Great Barrier Reef Marine Park (2010).

7.2 MUSIC MODELLING

Water quality modelling has been conducted using the Model for Urban Stormwater Improvement Conceptualisation (MUSIC) software to demonstrate the TCC target reduction criteria. Stormwater treatment trains were developed and modelled for the sites to determine the effectiveness of the water quality measures in achieving the relevant water quality objectives.

The existing modelled stormwater treatment trains for each catchment within the Western Precinct can be represented as shown in **Figure 9.** The MUSIC Modelling Diagram is Shown in **Figure 10**.

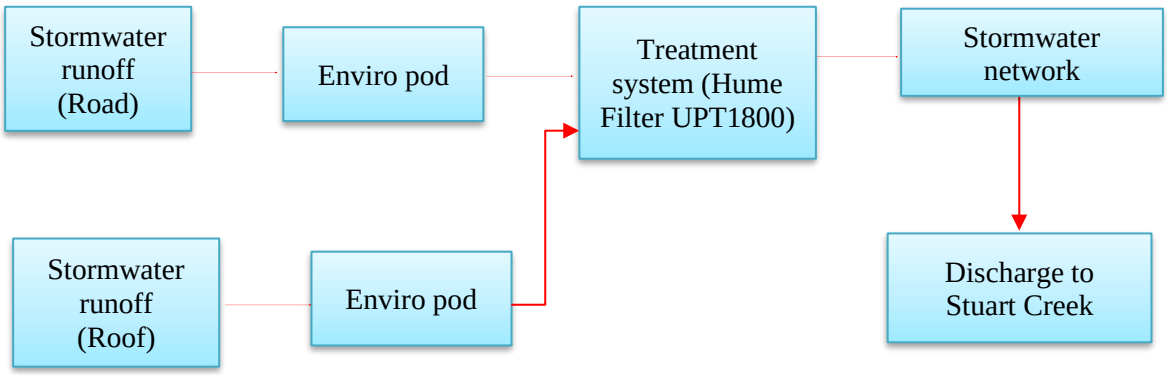

Figure 9. *Typical stormwater treatment train*

As layout plans have only been developed for proposed Lot 2 at this stage, as such proposed Lot 2 has been modelled to demonstrate compliance. Proposed Lot 1 is assumed to have similar site properties and whilst final layout for proposed Lot 1 will need to be modelled, due the sites being similar demonstration of compliance on proposed Lot 2, indicates that compliance can also be met on proposed Lot 1.

7.3 POLLUTANTS OF CONCERN

The key pollutants generated by an urban industrial development during the operational (post-development) phase are listed in Urban Stormwater Quality Planning Guidelines 2010 by the Department of Environment and Resource Management (DERM) which generally included the following:

- Sediment
- Nutrients
- Oxygen-demanding substances
- pH (acidity)
- Micro-organisms
- Toxic organics
- Metals
- Gross pollutants (litter and debris)
- Oils and surfactants
- Increased water temperature

Considering that the proposed development involves transportation facilities, the general key pollutants of concern in runoff generated from this type of development include:

- Sediment
- Nutrients
- Gross pollutants
- Oils and surfactants

7.4 WATER QUALITY OBJECTIVES (WQO)

Townsville City Council (TCC) set the following design objectives for stormwater treatments set out by for Industrial Developments:

- ≥80% reduction in total suspended solids load
- ≥ 65% reduction in total phosphorus load
- ≥ 40% reduction on total nitrogen load
- ≥ 90% reduction in gross pollutant load.

The above design objectives are in accordance with *TCC City Plan – Schedule SC6.4.3.9.2, Section 2: Design Objectives for Stormwater Management.* The rainfall, runoff and pollutant parameters adopted within the MUSIC Modell are detailed in Tables 2, 3 and 4.

***Table 2:** Rainfall Parameters*

Input Parameter	Data Used in Modelling
Rainfall station	032040 TOWNSVILLE AERO
Time step	6 minutes
Modelling period	1970 – 1983
Mean annual rainfall (mm)	1152mm
Evapotranspiration	1734mm
Rainfall runoff parameters	Industrial (90% Impervious)
Pollutant export parameters	Industrial

***Table 3:** Runoff Parameters*

Input Parameter	Data Used in Modelling
Land use	Industrial
Rainfall threshold (mm)	1.0
Soil storage capacity (mm)	18
Initial storage (% capacity)	10
Field capacity (mm)	80
Infiltration capacity coefficient (a)	243
Infiltration capacity coefficient (b)	0.6
Initial depth (mm)	50
Daily recharge rate (%)	0
Daily baseflow rate (%)	31
Daily deep seepage rate (%)	0

Table 4: *Pollutant Export Parameters for Industrial land use*

Surface Type	Flow Type	Total Suspended Solids (log mg/L)		Total Phosphorous (log mg/L)		Total Nitrogen (log mg/L)	
		Mean	Std Dev.	Mean	Std Dev.	Mean	Std Dev.
Roof	Baseflow parameters	N/A	N/A	N/A	N/A	N/A	N/A
	Stormwater parameters	1.3	0.44	-0.89	0.36	0.25	0.32
Roads	Baseflow parameters	0.78	0.45	-1.11	0.48	0.14	0.20
	Stormwater parameters	2.43	0.44	-0.30	0.36	0.25	0.32

Ocean Protect devices have been adopted for modelling with the following treatment devices modelled are as follows:

- 10 x Enviropods
- HumeFilter-UPT1800

The MUSIC pollutant load results for proposed Lot 2 are shown in **Figure 10** and comparison against WQO's is shown in **Table 5**.

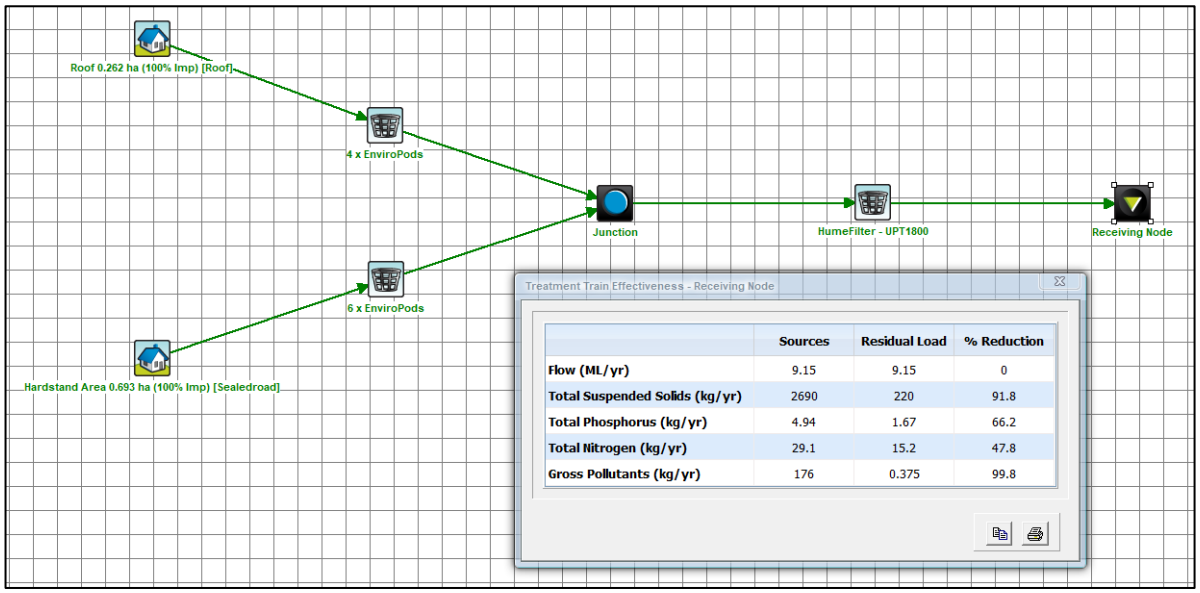

Figure 10. *MUSIC Modelling Diagram*

Table 5: *MUSIC Modelling Results*

Parameters	TCC Target Reduction Criteria	MUSIC Results	Objective Achieved?
TSS	80%	91.7	Yes
TP	65%	66.2	Yes
TN	40%	47.8	Yes
GP	90%	99.8	Yes

Based on the MUSIC Modelling Results summarised in **Table 5,** the anticipated load-based pollutant outcomes for the 60 Penelope Road, Stuart (Lot 82 on SP345445) are better than those identified in **Section 7.4** of this report and thus, meets the overall design objectives. Stormwater from the development will be treated prior to discharge and will not exceed allowable pollutant load levels prior discharging into Stuart Creek.

7.5 PROPOSED TREATMENT DEVICES

All stormwater pits are proposed to be treated with enviropods, whilst all stormwater is proposed to be directed into a HumeFilter (UPT1800) prior to discharge. The proposed HumeFilter arrangement is shown in **Figure 11**. General arrangement details have also been included in **Appendix D**.

Table 1 – HumeFilter® model range and details

HumeFilter® Model	Inlet Pipe Diameter	Inlet Pipe Grade	Outlet Pipe Diameter	Outlet Pipe Grade
UPT1200	150mm uPVC	0.5%	150mm uPVC	1.0%
UPT1800	225mm uPVC	0.4%	225mm uPVC	1.0%
UPT2400	225mm uPVC	1.0%	225mm uPVC	1.5%
UPT3000	300mm uPVC	0.8%	300mm uPVC	1.25%
UPT3000	300mm RCP	1.1%	300mm RCP	1.5%
UPT3600	375mm uPVC	0.55%	375mm uPVC	0.9%
UPT3600	375mm RCP	0.8%	375mm RCP	1.25%

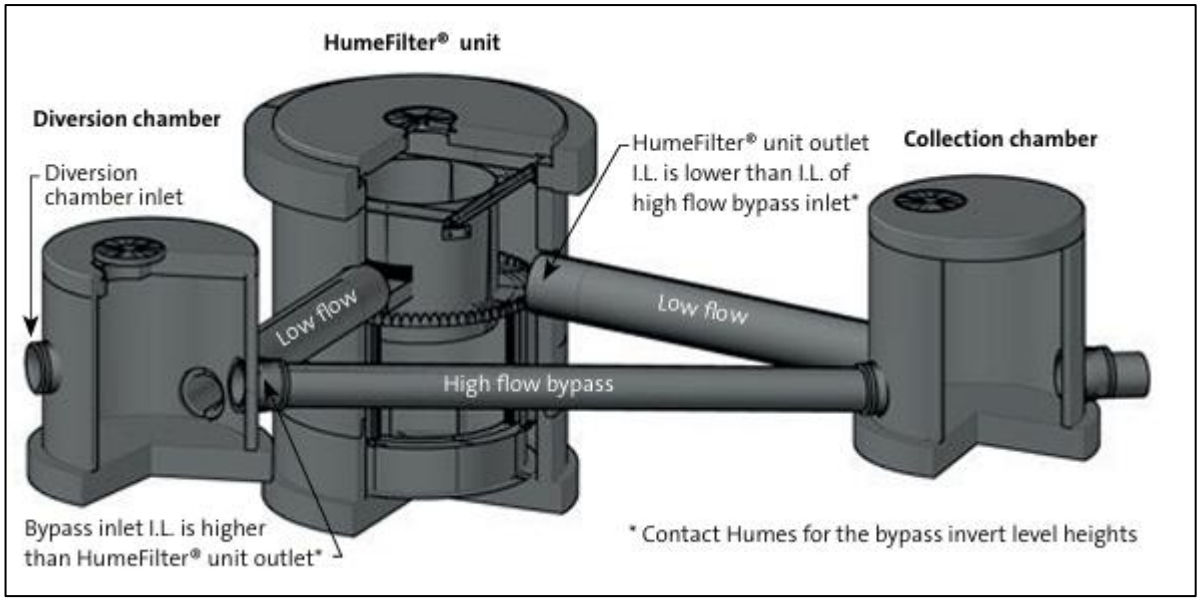

Figure 11. *HumeFilter UPT offline arrangement without diversion weir*

7.6 STORMWATER QUALITY OPERATIONS AND MAINTENANCE

The general water quality operations and maintenance of the site shall include but not limited to the following:

- No maintenance of any plant or equipment or refuelling equipment is to occur within 50m of an existing waterway;
- Waste materials are not to be dumped into any receiving waters or waterways;
- Observed litter or other materials surrounding waterways shall be removed from the water as soon as practicable;
- Plant refuelling or vehicle washing, or maintenance shall only take place where spillages will not discharge to waters or stormwater drains;
- All spillages shall be cleaned up as soon as practicable. Hosing down or releasing waste to stormwater drains or receiving waters will not be permitted;
- All turf strips and concrete drains shall be maintained at regular intervals or after significant rain events to ensure their function (i.e. removal of silt and debris); and
- Any fuels, herbicides, oils, paints or chemicals shall not be stored in a manner that spillages may enter waters or be subject to stormwater runoff. All fuels, herbicides, oils, paints and other chemicals must be stored within a bunded area which will contain the volume of materials stored.

8.0 CONCLUSION

The stormwater network at Cleveland Bay Industrial Estate (CBIP) has been designed to accommodate an ARI 2 (39.35% AEP) event as such no impact or migration measures are anticipated to the existing stormwater network to accommodate the proposed development. The finished floor level is proposed to be above any flood levels indicated by TCC mapping and as such is not anticipate to be affected by the ARI 100 (1% AEP) flood event. It is noted that during a major event stormwater from the subject site will be allowed to discharge to the Townsville Port Access Road table drain along the eastern boundary of the subject site.

Assessment of the site has found that building can be sited above the ARI 100 (1% AEP) flood event with adequate fall away from the building. All stormwater shall be discharged to the sites level point of discharge which is the stormwater pit to the northeast of the subject site during a minor event and Townsville Port Access Road table drain during a major event.

Best practice stormwater quality management measure for 60 Penelope Road, Stuart (Lot 82 on SP345445) have been assessed with pollutant parameters of the subject site reviewed and the impact of the proposed lot on receiving waters investigated. Based on the assessment, the WQO's specified for TSS, TN, TP, GP in the TCC Planning Scheme can be achieved provided that gross pollutant traps (Enviropods) and a stormwater treatment device (HumeFilter) is provided.

APPENDIX A

PROPOSED DEVELOPMENT PLANS

PLANNING PERMIT AMENDMENT APPLICATION

Proposed E-Waste Facility & Office

Lot 8 Cleveland Bay Industrial Park, Townsville

Project No. 24021
January 2025 - Rev 5

SHEET LIST

Subject Site

Rev	Description	Date

mccabe architects
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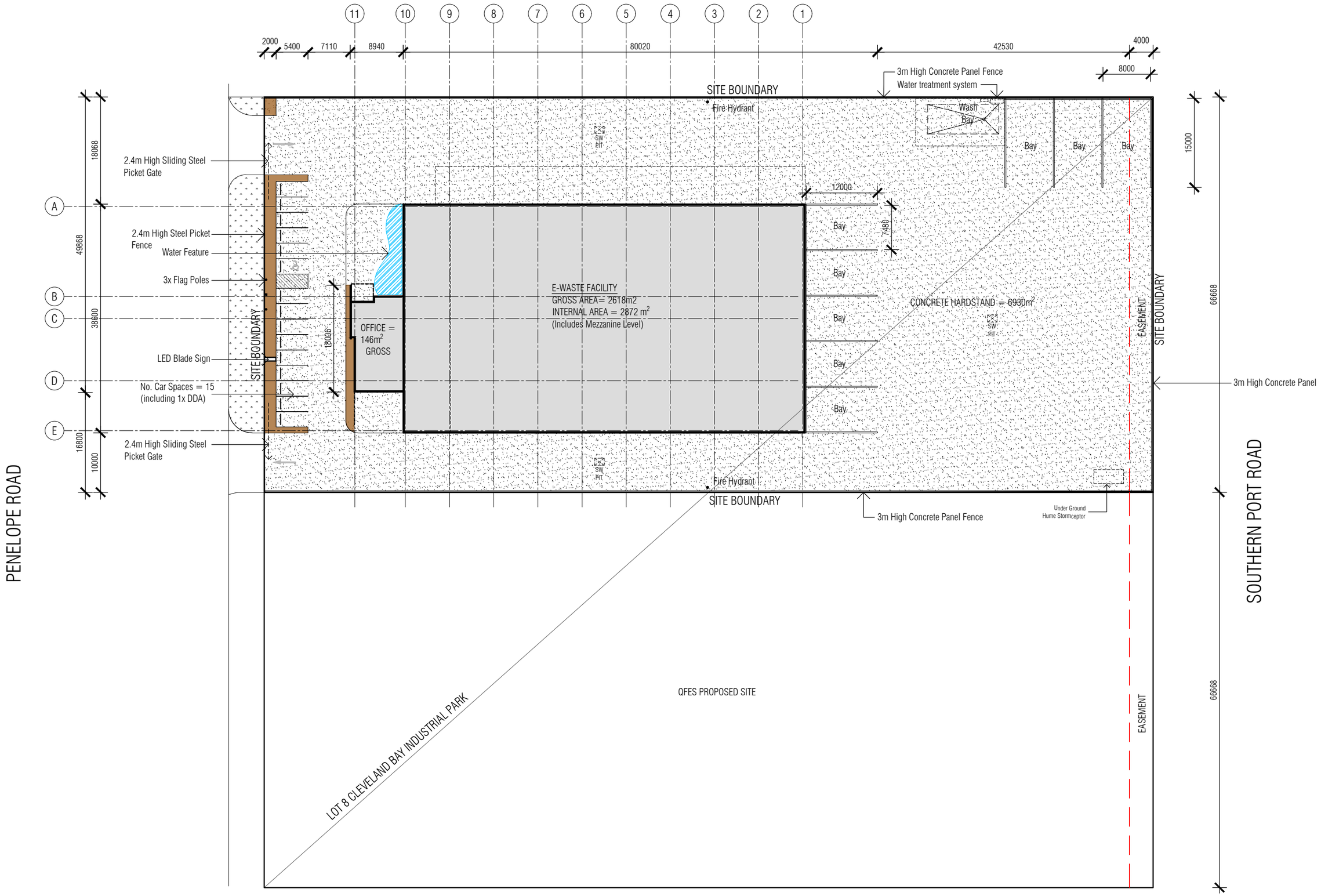
Proposed E-Waste Facility & Office
Lot 8 Cleveland Bay Industrial Park

Project No 24021
Drawn By CK

Cover Sheet

Date 16/01/2025

Dwg No **TP.001** REV 5



KEY

EXTENT OF LANDSCAPE

Rev	Description	Date

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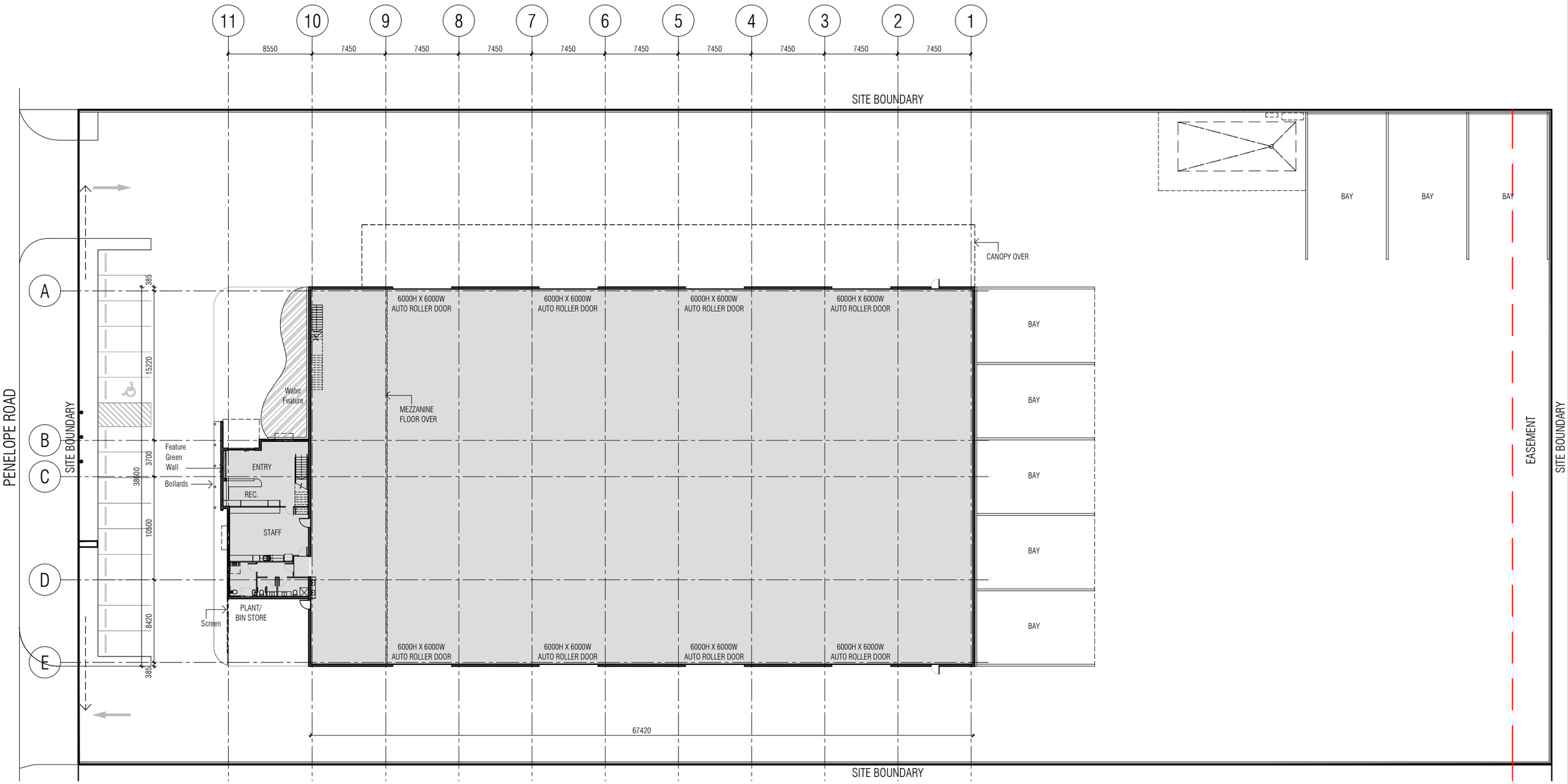
1:300@A1
1:600@A3

Proposed E-Waste Facility & Office
Lot 8 Cleveland Bay Industrial Park

Site Plan

Project No 24021
Drawn By CK
Date 21/01/2025

Dwg No **TP.02** **REV 5**



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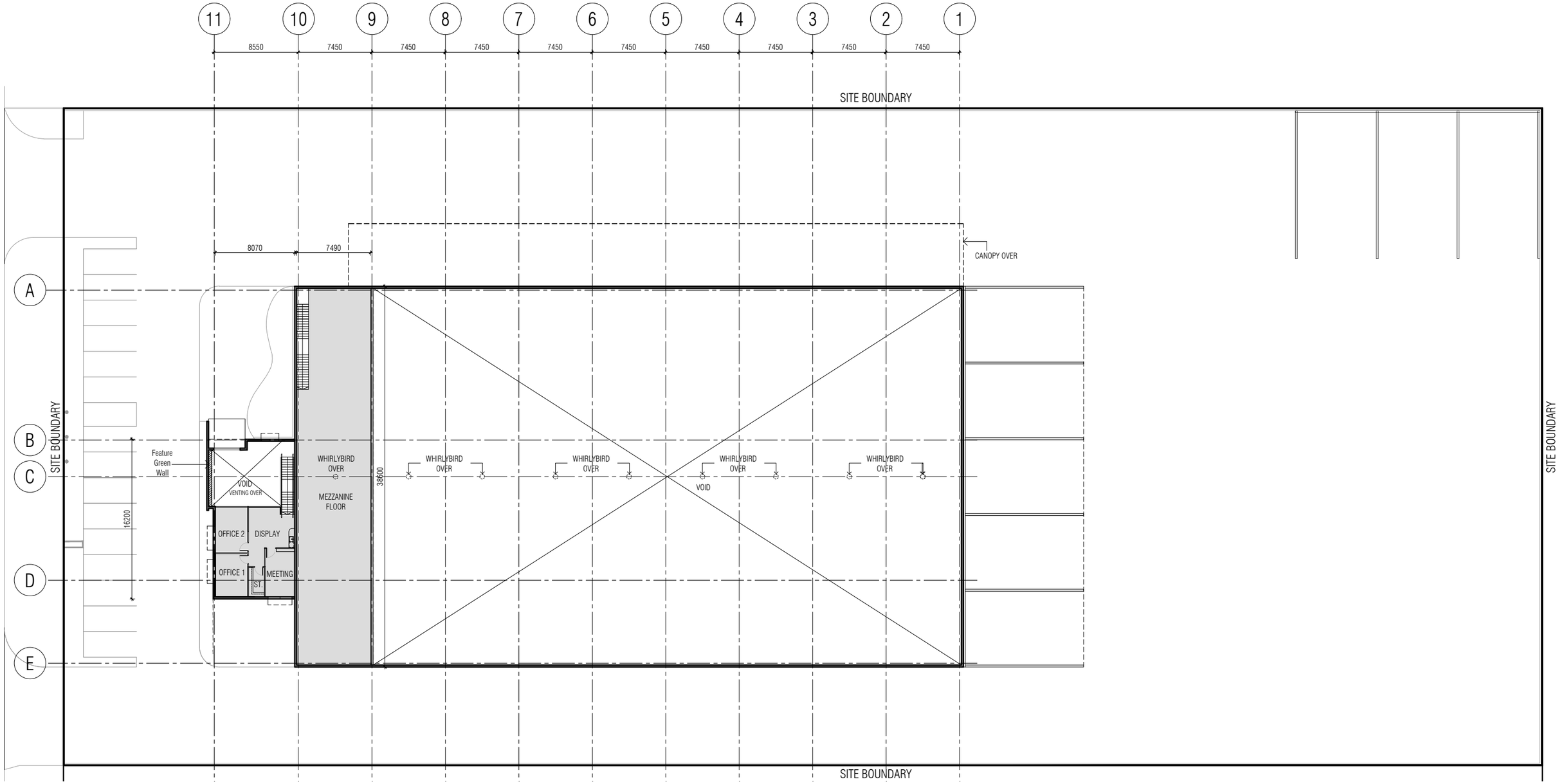
1:200@A1
1:400@A3

Proposed E-Waste Facility & Office
Lot 8 Cleveland Bay Industrial Park

Ground Floor Plan

Project No 24021
Drawn By CK
Date 21/01/2025

Dwg No **TP.03** REV 5



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1:200@A1
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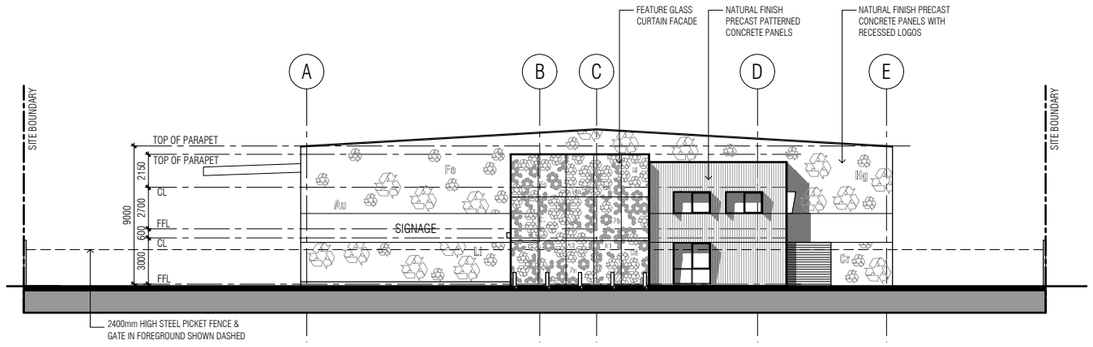
Proposed E-Waste Facility & Office
Lot 8 Cleveland Bay Industrial Park

First Floor Plan

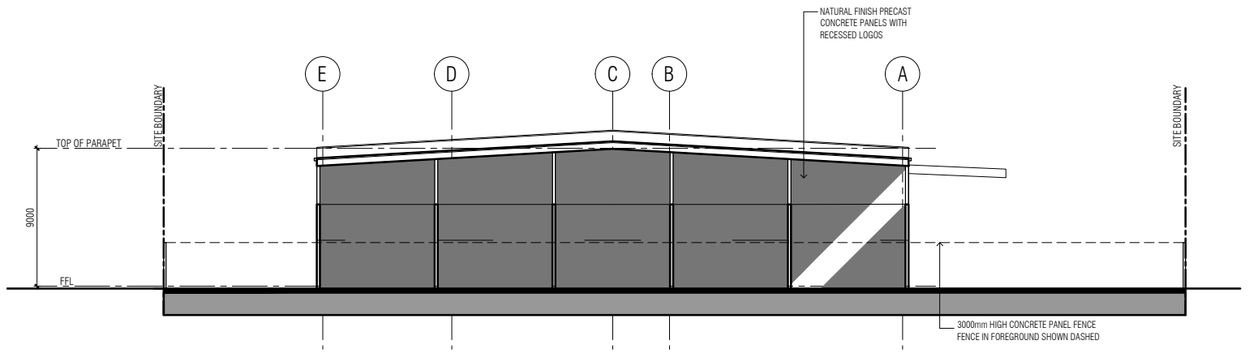
Project No 24021
Drawn By CK

Date 21/11/2024

Dwg No **TP.03.1** REV 5



ELEV 1 - WEST ELEVATION



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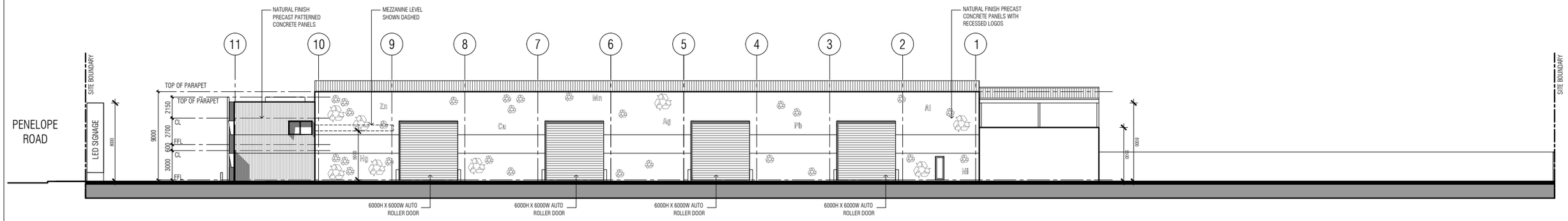
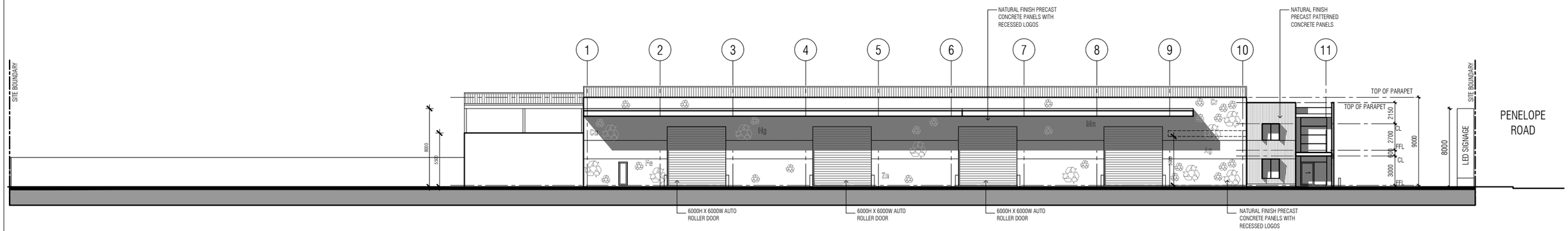


ELEV 2 - SOUTH ELEVATION



ELEV 4 - NORTH ELEVATION

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1:200@A1
1:400@A3

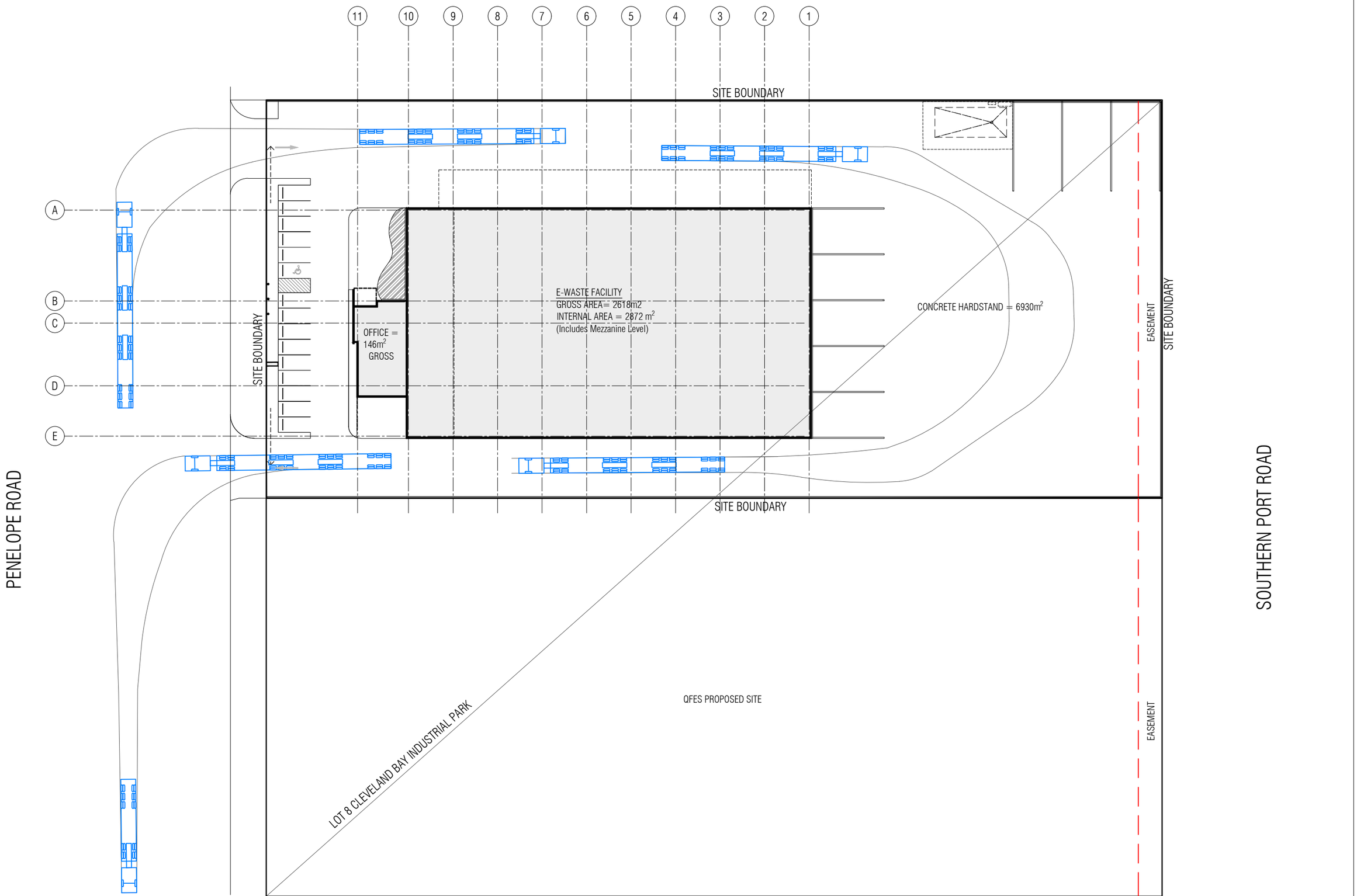
Proposed E-Waste Facility & Office
Lot 8 Cleveland Bay Industrial Park

Elevations

Project No 24021
Drawn By CK

Date 17/01/2025

Dwg No **TP.04** REV 5



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1:300@A1
1:600@A3

Proposed E-Waste Facility & Office
Lot 8 Cleveland Bay Industrial Park

Swept Paths

Project No 24021
Drawn By CK
Date 21/01/2025

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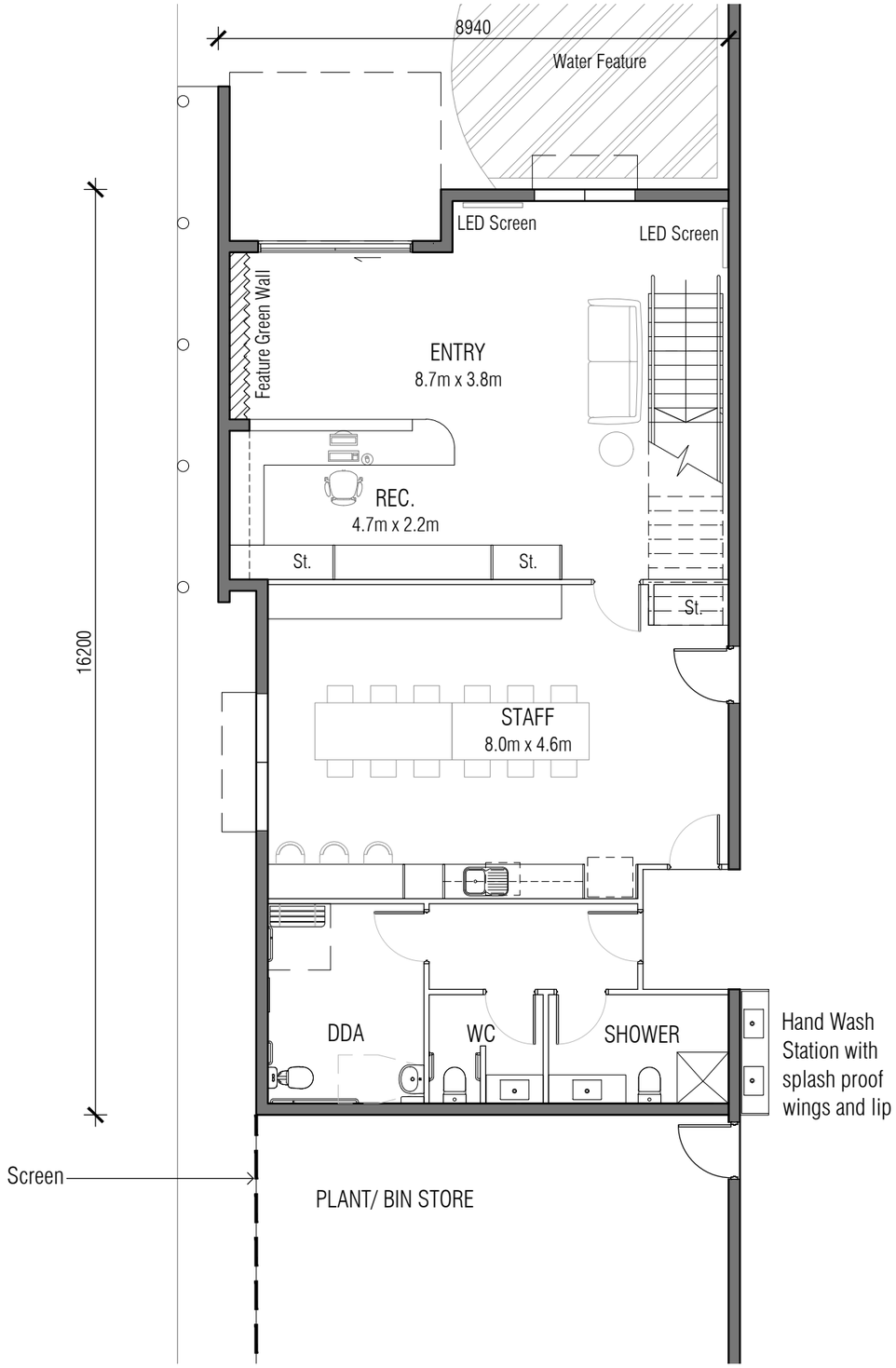
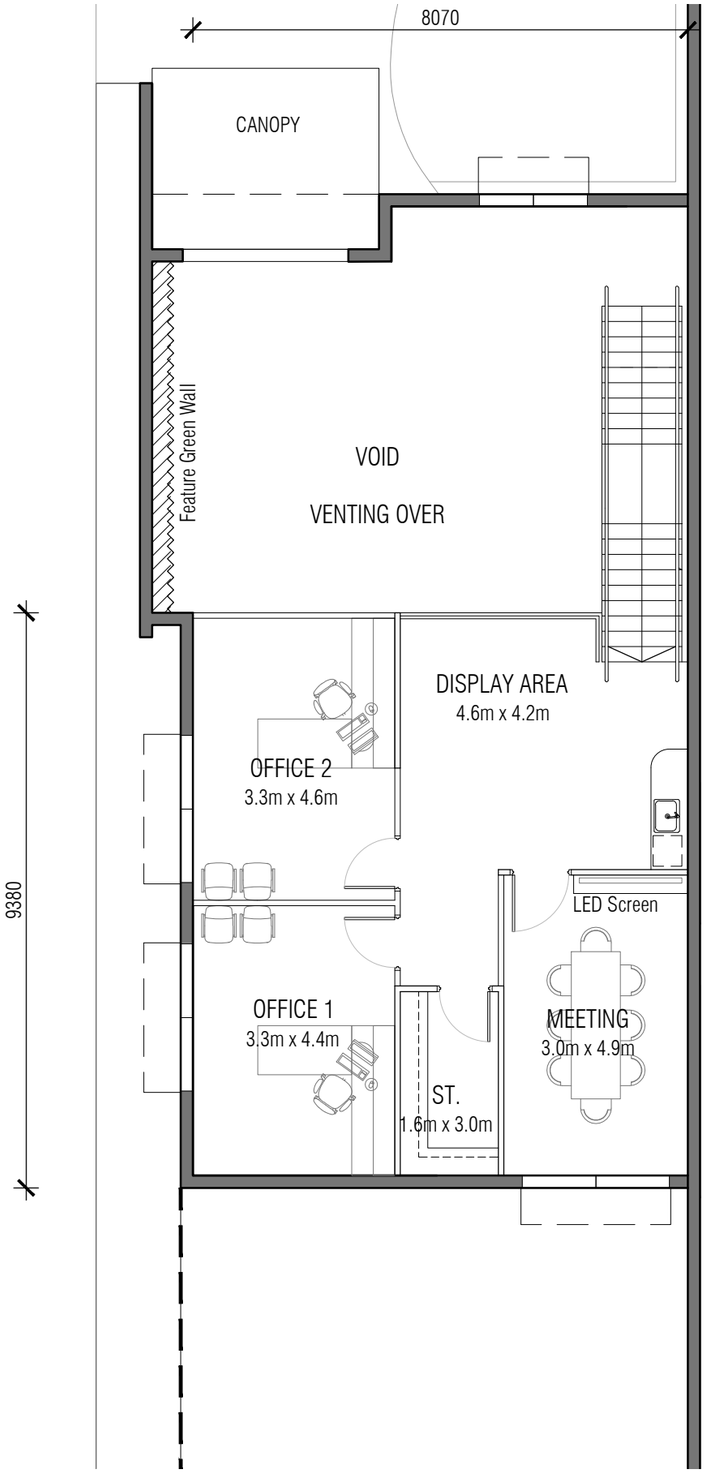


GROUND FLOOR PLAN



FIRST FLOOR PLAN

Rev	Description	Date

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1:50@A1
1:100@A3

Proposed E-Waste Facility & Office
Lot 8 Cleveland Bay Industrial Park

Office Floor Plans

Project No 24021
Drawn By CK
Date 21/01/2025
Dwg No **TP.06** REV 5

APPENDIX B

PROPOSED SITE GRADING AND GENERAL STORMWATER ARRANGEMENT

LOT 9
SP338023

N

HIGH FLOW BYPASS
USIL = 4.532m
DSIL = 4.092m
LENGTH = 8.727m

EXISTING RL= 6.088m AHD

COLLECTION MAINTENANCE HOLE

EXISITNG STORMWATER PIT
LID LEVEL 6.18
USIL 4.092m
DSIL 4.062m

DN225 uPVC @ 1%
USIL = 4.139m
DSIL = 4.092m
LENGHT = 4.694m

PROPOSED HUMEFILTER.
OUTLET INVERT LEVEL TO
BE MIN. 150mm BELOW
INLET INVERT LEVEL

DN225 uPVC @ 0.4%
USIL = 4.307m
DSIL = 4.289m
LENGTH =4.465m

EXISTING RL = 6.340m AHD

PENELOPE ROAD

TOWNSVILLE PORT ACCESS ROAD

LOT 82
SP345445

LOT 81
SP345445

EXISTING RL = 6.540m AHD

EXISTING RL= 6.288m

LEGEND

- 6.0 — EXISTING MAJOR CONTOUR
- 6.1 — EXISTING MINOR CONTOUR
- 6.0 — PROPOSED MAJOR CONTOUR
- 6.1 — PROPOSED MINOR CONTOUR
- SW SW SW — STORMWATER

REVISIONS				
No.	BY	DATE	DESCRIPTION	
A	N.P	13/05/25	ISSUED FOR OPW APPROVAL	

HORIZ. DATUM		
VERT. DATUM		
DRG. FILE		DATE
DESIGN	N.P	13/05/25
DRAWN	N.P	13/05/25

CERTIFICATION

LANGTREE CONSULTING ENGINEERS
m 0400 699 979
e brett@langtreeconsulting.com.au

ICM CONSTRUCTIONS

60 PENELOPE ROAD, STUART
LOT 82 ON SP345445
PROPOSED GRADING AND STORMWATER ARRANGMENT PLAN

SCALE	AS SHOWN
SHEET	SHEET 1 OF 1
REVISION	A
DRG No.	1383-SK01

APPENDIX C

POST-DEVELOPMENT DISCHARGE

CATCHMENT HYDROLOGY
(RATIONAL METHOD - RURAL CATCHMENT)

LANGTREE CONSULTING ENGINEERS

Project Name: 60 Penelope Road, Stuart
Project Location: Lot 82 on SP345445

Input
Output

(1) Guidelines
- Queensland Urban Drainage Manual (QUDM) 2017
- Bureau of Meteorology (BOM)

(2) Time of Concentration (t_c)
a) Overland Flow time — *- refer QUDM 2017, Section 4.6.6*

Length, L (m) =	36
n =	0.015
Surface Slope, S (%) =	2.0

Using Overland Flow Time

t (mins) =	4.6

b) Channel flow — *- refer QUDM 2017, Section 4.6.8*

Using kerb flow formula:

$t = 0.025\ L / S^{0.5}$

where:

t = time of gutter flow in minutes
S = slope of gutter (%)
L = length of gutter flow in metres

Channel length, L (m) =	150
Channel slope, S (%) =	0.5
t (mins) =	5.3

c) Total t_c

t_c (mins) =	**9.9**

(3) Design Flow (Q)
$Q_y = 0.00278 \times C_y \times {}^{t}I_y \times A$ — *- refer QUDM 2017, Section 4.3*

where:

Q_y = peak flow rate (m^3/s) for annual exceedence probability (AEP) of 1 in 'y' years
C_y = coefficient of discharge (dimensionless) for AEP of 1 in 'y' years
A = area of catchment (ha)
${}^{t}I_y$ = average rainfall intensity (mm/h) for a design duration of 't' hours and an AEP of 1 in 'y' years
t = the nominal design storm duration as defined by the time of concentration (t_c)

Design ARI, y =	2	
A (ha) =	1	
t_c (mins) =	9.9	
Rainfall intensity, I (mm/hr) =	119.3	
${}^{1}I_{10}$ (mm/hr) =	80.2	
Fraction impervious, f_i =	1	*- refer QUDM 2017, Table 4.5.1*
Frequency Factor, F =	0.85	*- refer QUDM 2017, Table 4.5.2*
C_{10} =	0.90	*- refer QUDM 2017, Table 4.5.3 & 4.5.4*
C_y =	0.77	
Q (m^3/s) =	**0.254**	

CATCHMENT HYDROLOGY
(RATIONAL METHOD - RURAL CATCHMENT)

LANGTREE CONSULTING ENGINEERS

Project Name: 60 Penelope Road, Stuart
Project Location: Lot 82 on SP345445

Input
Output

(1) Guidelines
- Queensland Urban Drainage Manual (QUDM) 2017
- Bureau of Meteorology (BOM)

(2) Time of Concentration (t_c)
a) Overland Flow time — *- refer QUDM 2017, Section 4.6.6*

Length, L (m) =	36
n =	0.015
Surface Slope, S (%) =	2.0

Using Overland Flow Time

t (mins) =	4.6

b) Channel flow — *- refer QUDM 2017, Section 4.6.8*

Using kerb flow formula:

$t = 0.025\ L / S^{0.5}$

where:
t = time of gutter flow in minutes
S = slope of gutter (%)
L = length of gutter flow in metres

Channel length, L (m) =	150
Channel slope, S (%) =	0.5
t (mins) =	5.3

c) Total t_c

t_c (mins) =	**9.9**

(3) Design Flow (Q)
$Q_y = 0.00278 \times C_y \times {}^{t}I_y \times A$ — *- refer QUDM 2017, Section 4.3*

where:
Q_y = peak flow rate (m^3/s) for annual exceedence probability (AEP) of 1 in 'y' years
C_y = coefficient of discharge (dimensionless) for AEP of 1 in 'y' years
A = area of catchment (ha)
${}^{t}I_y$ = average rainfall intensity (mm/h) for a design duration of 't' hours and an AEP of 1 in 'y' years
t = the nominal design storm duration as defined by the time of concentration (t_c)

Design ARI, y =	100	
A (ha) =	1	
t_c (mins) =	9.9	
Rainfall intensity, I (mm/hr) =	275.4	
${}^{1}I_{10}$ (mm/hr) =	80.2	
Fraction impervious, f_i =	1	*- refer QUDM 2017, Table 4.5.1*
Frequency Factor, F =	1.20	*- refer QUDM 2017, Table 4.5.2*
C_{10} =	0.90	*- refer QUDM 2017, Table 4.5.3 & 4.5.4*
C_y =	1.00	
Q (m^3/s) =	**0.766**	

APPENDIX D

HUMEFILTER UNIVERSAL POLLUTANT TRAP (UPT)

UNIVERSAL POLLUTANT TRAP (UPT1800) PARTS TABLE

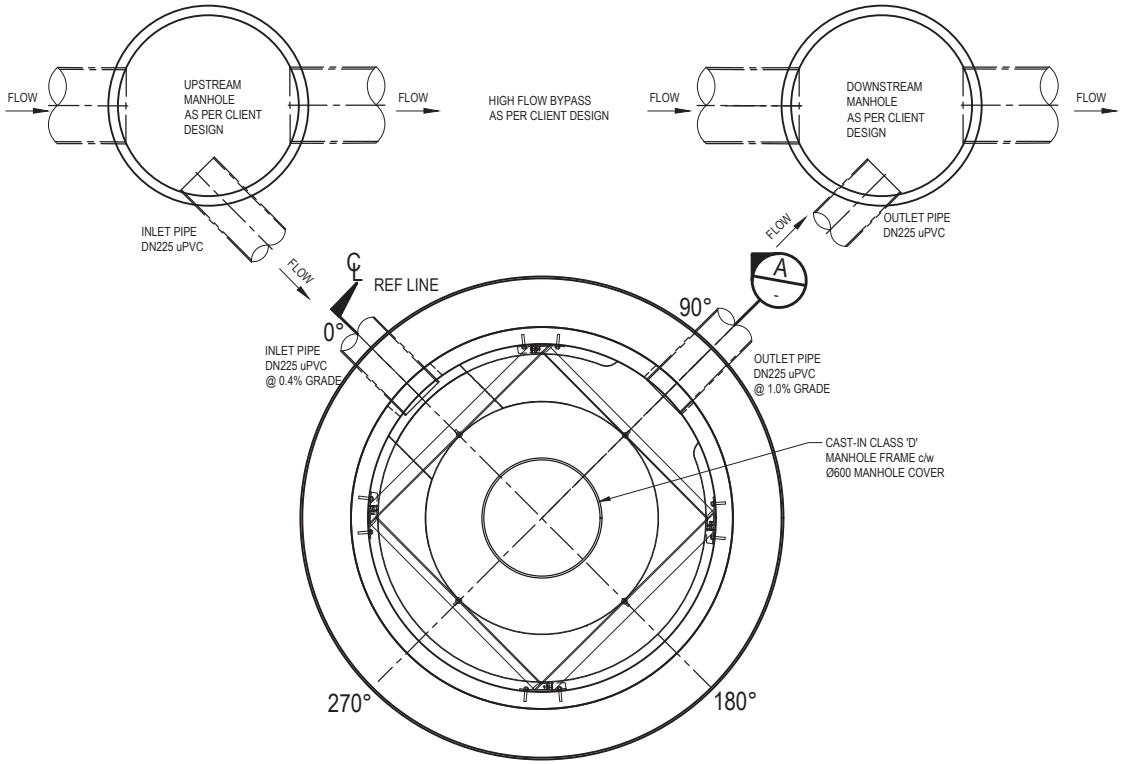
ITEM No.	PART	MANUF'T	SUPPLIED BY	No OFF.	APPROX MASS (t)	COMMENTS
1	BASE UNIT	HUMES	HUMES	1	3.80	INSTALLED BY CONTRACTOR ON-SITE
2	PLINTH	BY OTHERS	HUMES	1	BY OTHERS	INSTALLED BY HUMES IN FACTORY
3	FILTER MEDIUM CARTRIDGE	BY OTHERS	HUMES	1	BY OTHERS	INSTALLED BY CONTRACTOR ON-SITE
4	TREATMENT CHAMBER SHAFT	HUMES	HUMES	1	2.05 (SHAFT ONLY)	INSTALLED BY CONTRACTOR ON-SITE
5	TREATMENT CHAMBER INSERT	BY OTHERS	HUMES	1	BY OTHERS	INSTALLED BY CONTRACTOR ON-SITE
6	T.C. SUPPORT FRAME	BY OTHERS	HUMES	1	BY OTHERS	
7	T.C. SUPPORT FRAME BRACKET	BY OTHERS	HUMES	4	BY OTHERS	INSTALLED BY HUMES IN FACTORY
8	CONCRETE SURROUND RING	HUMES	HUMES	1	2.20	INSTALLED BY CONTRACTOR ON-SITE
9	RUBBER RING	HUMES	HUMES	1	0.02	INSTALLED BY CONTRACTOR ON-SITE
10	CONCRETE LID	HUMES	HUMES	1	1.30	INSTALLED BY CONTRACTOR ON-SITE
	ANCON 1.3t "UNILIFT" CONE ANCHOR CLUTCHES	ANCON	CONTRACTOR	4	-	PROVIDED BY CONTRACTOR FOR LIFTING
	ANCON 2.5t "UNILIFT" CONE ANCHOR CLUTCHES	ANCON	CONTRACTOR	4	-	PROVIDED BY CONTRACTOR FOR LIFTING
	MEGAPOXY / EPOXY / MASTIC SEALANT	-	HUMES		-	INSTALLED BY CONTRACTOR ON-SITE
	STAINLESS STEEL CLEVIS PIN / R-CLIP	WHITWORTHS	HUMES	4xEACH		USED TO REMOVE AND SECURE INSERT

GENERAL NOTES:

1. CONCRETE DESIGNED TO AS3600
2. EXPOSURE CLASSIFICATION: B2 AS PER AS3600. SELF COMPACTING CONCRETE WITH RIGID FORMWORK
3. TRAFFIC LOADING: SM1600 VEHICLE TO AS5100 AND LIVE LOAD FACTOR 1.5 WITH 1.25 DYNAMIC ALLOWANCE
4. MINIMUM COVER TO REINFORCEMENT = 25mm (NOMINAL COVER = 30mm ± 5 UNO)
5. FOUNDING MATERIAL TO BE A MINIMUM 150kPa (WORKING LOAD) AND 150mm THICK COMPACTED GRAVEL TO 95% MDD
6. SEALANT: PU MASTIC OR SIKAFLEX 11FC
7. ABBREVIATIONS:
   O/A = OVERALL
   I/D = INTERNAL DIAMETER
   O/D = OUTSIDE DIAMETER
   TC = TREATMENT CHAMBER
   MU = MAKEUP (SHAFT)

PIPES CONNECTION TABLE

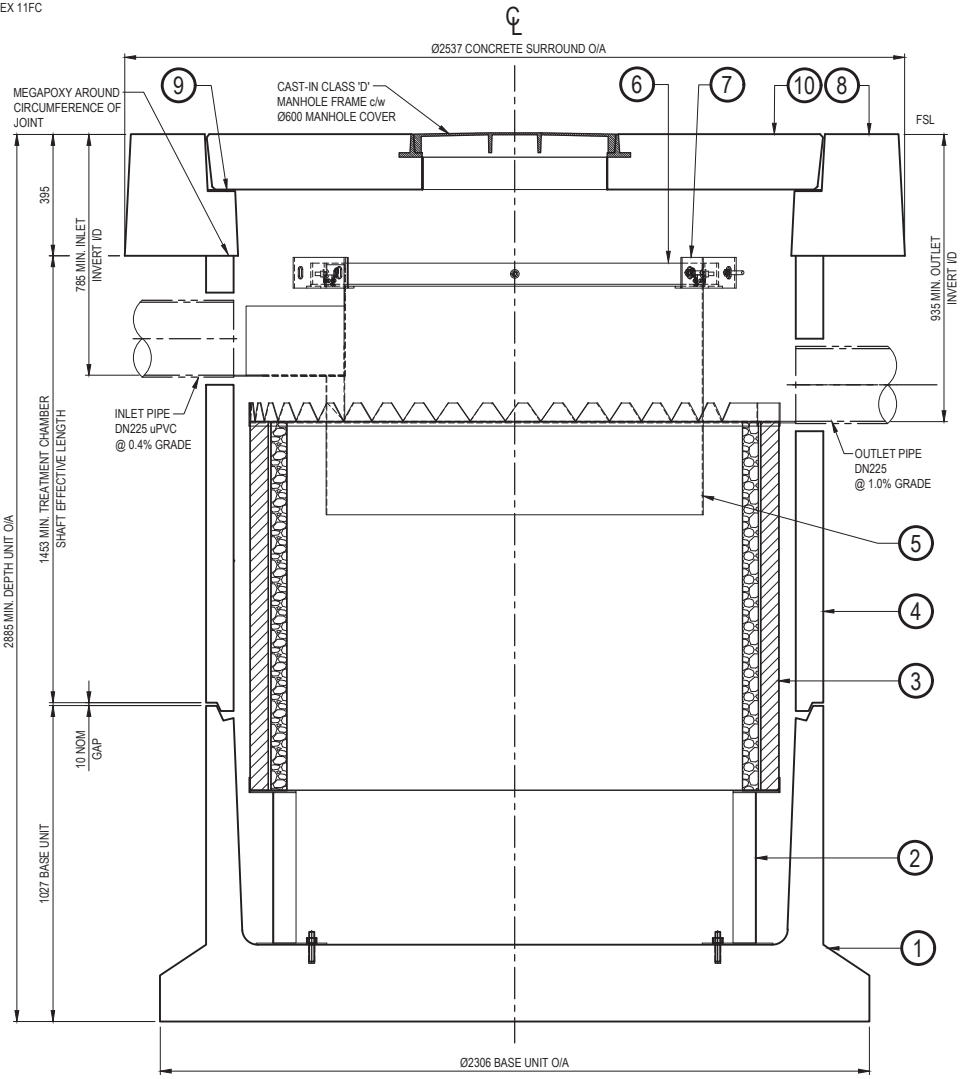
	SIZE / TYPE	CONNECTION	COMMENTS
INLET	DN225 uPVC CLASS TBC CONSULTANT	EPOXY JOINT	uPVC SUPPLIED AND INSTALLED BY CONTRACTOR ON-SITE.
OUTLET	DN225 uPVC CLASS TBC CONSULTANT	EPOXY JOINT	uPVC SUPPLIED AND INSTALLED BY CONTRACTOR ON-SITE.



HUMEFILTER UPT1800

PLAN - SITE ARRANGEMENT

SCALE 1: NTS



SECTION A - AS INSTALLED

SCALE 1: NTS

DESIGN IS A CONCEPT ONLY.
DRAWING MAY VARY
SUBJECT TO DETAIL DESIGN

REV	DETAILS OF ALTERATIONS	DWN	DATE ISS.	CHKD BY
B	MINOR AMENDMENTS - REISSUED FOR INFORMATION	CMT	--	--
A	ISSUED FOR CONCEPTUAL DESIGN	CMT	02-02-22	CK

REVISIONS

ALL DIMENSIONS ARE IN MILLIMETRES (mm) UNLESS NOTED OTHERWISE. DO NOT SCALE

DWG STATUS: FOR INFORMATION ONLY					
DWG PROD. BY: NAT. WATER SOLUTIONS	ENG DSN BY: KRB	ENG DSN CHK: N/A	DRAFT BY: CMT	DRAFT CHK: GJH	APP.: CK
QR / QA CODE:	ENG DSN BY DATE: 02-02-22	ENG DSN CHK DATE: N/A	DRAFT BY DATE: 01-02-22	DRAFT CHK DATE: 02-02-22	APP. DATE: 02-02-22

CLIENT:	HUMES WATER SOLUTIONS
PROJ ADD:	HUMEFILTER TECHNICAL MANUAL
TITLE 1:	HUMEFILTER UPT1800
TITLE 2:	uPVC INLET & OUTLET
DWG DES:	GENERAL ARRANGEMENT
DWG No.:	EP-UPT-1800-PVC-NAT-B2-GA
PDF SHEET SIZE:	A2
ISSUE:	B

C:\USERS\DTA\DOCUMENTS\HUMES-MIL\KNUP\CAD\DOCKEEP-UPT-B\MANUAL-GP-A.DWG PRINTED: 10/2/2022 4:23:08 PM