Technical Memorandum

22 September 2023

To	Acting Corporate Services Executive Manager Wathaurong Aboriginal Co-operative	**Contact No.**	
Copy to		**Email**	
From		**Project No.**	12613952
Checked by		**Revision no.**	P01
Project Name	Wathaurong Hub Redevelopment		
Subject	Stormwater Management Plan		

1. Introduction

GHD has been engaged by Wathaurong Aboriginal Co-operative to prepare a Stormwater Management Plan for the proposed redevelopment of Wathaurong Hub in North Geelong, Victoria. The redevelopment is proposed to encompass current owned land in 60-62 Morgan Street, current leased land at 21 Birdwood Avenue, a future extension of this leased land, and the proposed future acquisition of Council owned land in Parcel A, 43 The Boulevard, North Geelong.

1.1 Purpose of this document

The purpose of this technical memorandum is to serve as a Stormwater Management Plan (SWMP) for submission to council and will support a town planning application. The document will assess existing drainage conditions and proposed stormwater management strategies for the capture, discharge, and treatment of stormwater for the proposed development against best practice benchmarks, defined in City of Geelong and state policy.

1.2 Site context

The subject sites are 60-62 Morgan Street, 21 Birdwood Avenue, Parcel A 43 The Boulevard, North Geelong. North Geelong is part of the LGA of the City of Greater Geelong. It is noted that a section of existing carpark which services the Wathaurong Aboriginal Co-operative site is built upon land leased from 21 Birdwood Avenue, an adjacent site occupied by VicRoads. The lease is understood to be a long-term lease. The total site area across all owned, leased and future acquired land is approx. 15,280m^2.

Refer Figure 1 for the site context. Refer Figure 2 for an aerial photograph of existing conditions and depiction of approximate title boundaries.

Figure 1 Site context on aerial photography (image source: Metromap)

1.2.1 Site 1 (60 – 62 Morgan Street)

60-62 Morgan Street is a brownfield site approx. 8,744 m^2 in area. Owned by the Wathaurong Aboriginal Co-operative, it hosts the existing buildings and carparking are currently situated on the site.

The site land profile falls steeply into the adjacent Cowie's Creek.

1.2.2 Site 2 (21 Birdwood Avenue)

This land is currently leased from the adjacent VicRoads site to serve as a roadway and carparking for the existing building to the south. This site is intended to be retained as is within the proposed works.

The current lease is approx. 900m^2 and is understood to be expanded to 1,042m^2 to facilitate a new footway.

1.2.3 Site 3 (Parcel A 43 The Boulevard)

The site located at Parcel A, 43 The Boulevard is a brownfields site and has area of approx. 5,500 m^2. It is currently open grassland / public space, although it is understood that the site was formally a quarry and has since been filled with material of unknown composition.

The site is currently part of larger land title owner by the Council, and it is understood that the approx. 5,500m^2 site will be acquired and sub-divided to facilitate the proposed carpark.

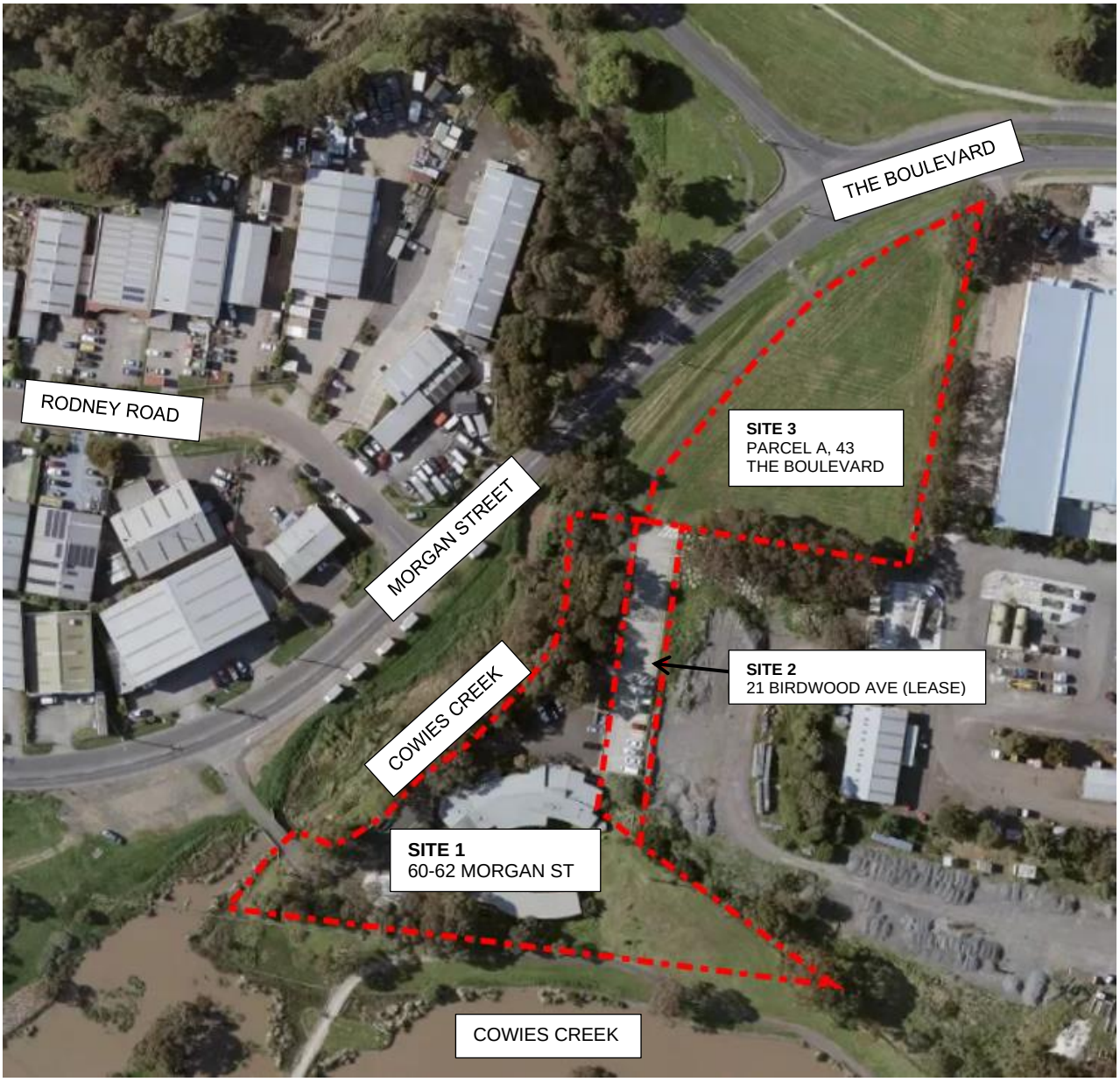

Figure 2 *Approximate site boundaries on aerial photography*

2. Existing conditions

There is minimal existing drainage infrastructure and digital information available about the infrastructure is sparse. It is also understood that there is no documented and approved Legal Point of Discharge (LPoD) for the existing site at 60-62 Morgan Street, North Geelong. The LPoD report from Greater Geelong City Council has been attached in Appendix A.

From site inspections, there is understood to be an existing outfall (labelled Outfall 1) to Cowies Creek at the southern boundary of the Morgan Street title. The outfall is not registered with council and is likely inadequate for existing stormwater flows.

The existing building is understood to direct stormwater from the roof into a series of rainwater tanks via downpipes and guttering. It is unclear if the rainwater tanks overflow to Outfall 1. From visual inspection less than half of the stormwater flows from hardstand and pavement areas appeared to formally captured and directed to Outfall 1. The remaining hardstand / pavement areas are not captured formally within a drainage system and overland flow directly into Cowies Creek.

Another outfall (labelled Outfall 2) is located near the north-western boundary of the Morgan Street site which discharges into Cowies Creek. It is understood that stormwater from the leased road and carpark area of 21 Birdwood Avenue is captured in a grated trench drain a direct via a gross pollutant trap, and a pit at the south west corner of the raised car park, prior to discharge via Outfall 2.

The site at 43 The Boulevard has no formal drainage infrastructure other than an existing swale drain which grades adjacent to the roadway towards Cowies Creek. The site is sloped towards the swale drain such that drainage of run-off occurs via overland flow. The swale also serves the existing local road network and remain outside the proposed subdivision boundary post-development.

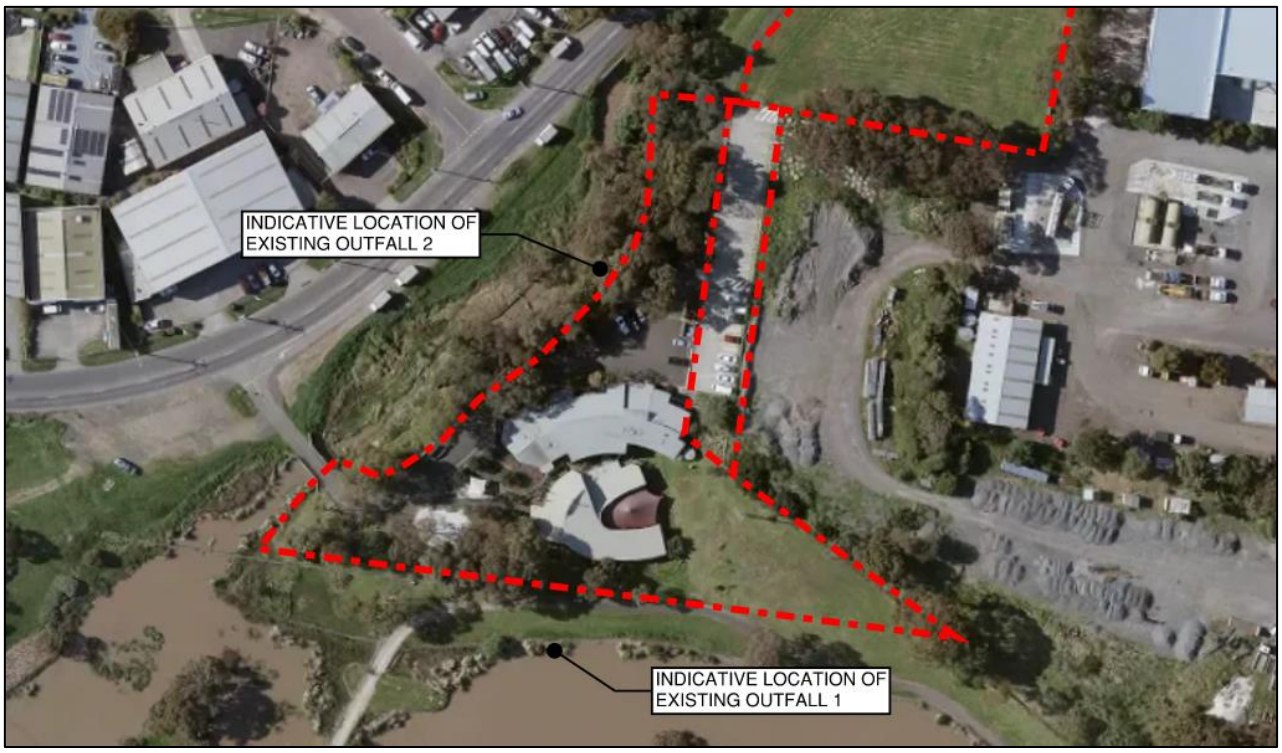

Figure 3 Location of existing outfalls on aerial photography

3. Proposed works

The proposed works include a new building, carparking areas and vehicle accessways. The triangular site at 43 The Boulevard will be developed to provide additional carparking and cycle path connectivity .

A layout of the proposed site has been included in Figure 4 below and Architectural drawings are included in Appendix B.

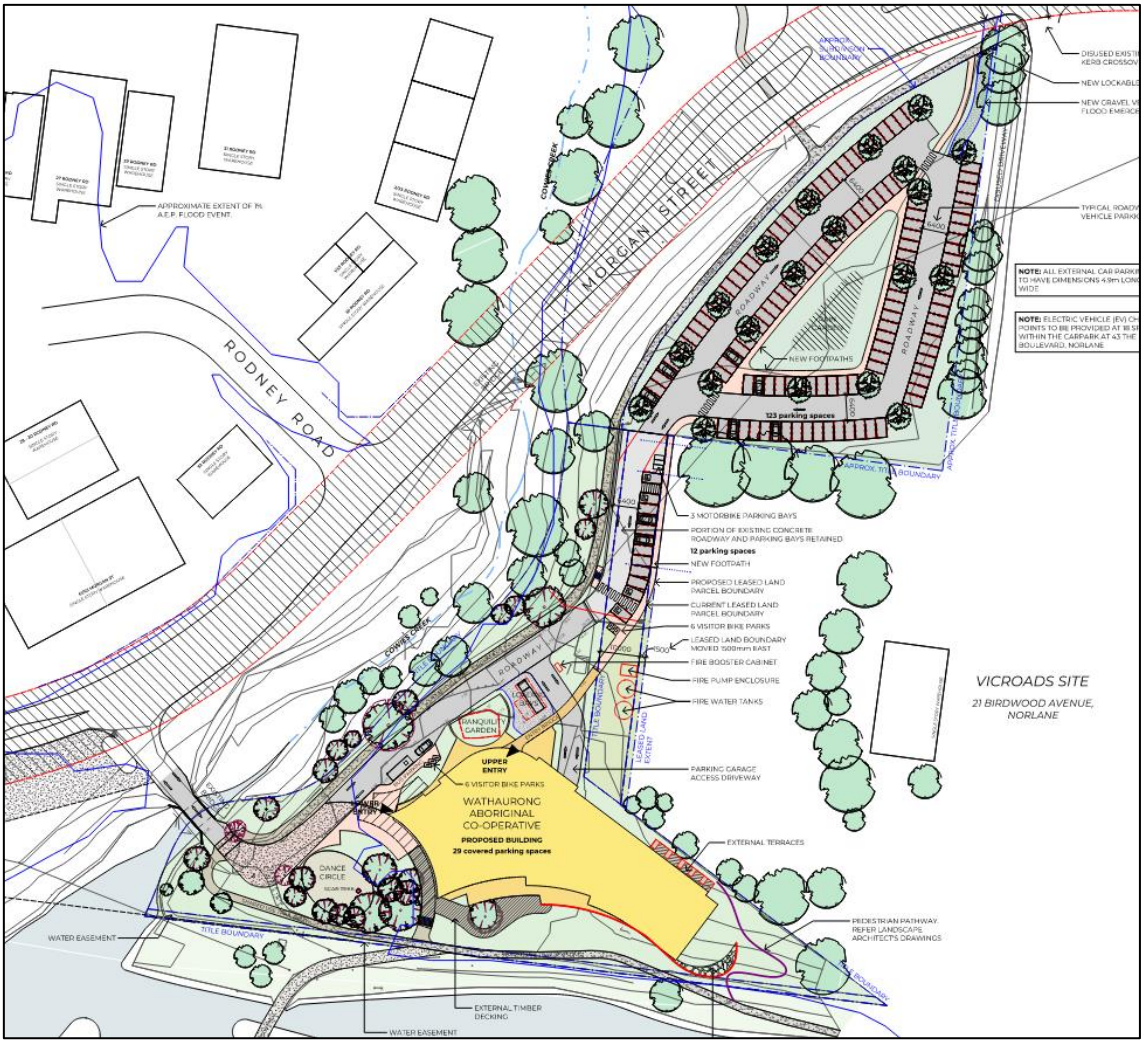

Figure 4 Architectural layout plan (A-TP-1101 Rev D)

4. Stormwater strategy

The following section discusses the proposed development, including: pre and post development catchment areas; proposed stormwater management strategy; assessment of pre and post development flows; MUSIC modelling inputs; authority requirements, and; evaluation of the proposal against authority requirements.

4.1 Catchment areas

For the purpose of stormwater management, the stormwater management will be split into the three catchments to provide future flexibility to any leased and/or acquired land.

Catchment 1 - 60-62 Morgan Street, Norlane.

Catchment 2 – Existing leased land at 21 Birdwood Avenue and a small catchment of 60-62 Morgan Street. (To be retained as existing)

Catchment 3 – 43 The Boulevard Site.

Table 1 below describes the catchment areas, ownership of the sites, and their outfall locations for pre- and post- development. Refer Figure 5 for plans representing post-development catchment areas, respectively. Detailed catchment plans are provided in Appendix C.

Table 1 Catchment areas and corresponding outfall locations

Scenario	Ref.	Area (m^2)	Title	Ownership	Discharge Location
Existing	1	8,745	60-62 Morgan Street	Wathaurong Aboriginal Co-operative	Unregistered 150 dia. outfall (No. 1) pipe located at southern boundary of title, discharge into Cowies Creek. No LPoD.
Existing	2	900	21 Birdwood Avenue	Vicroads [1]	150 dia. outfall pipe (No. 2) located at eastern boundary of title, discharge into Cowies Creek.
Existing	3	5,500	Parcel A, 43 The Boulevard	Greater Geelong City Council	Overland flow (no LPoD).
Proposed	1	8,745	60-62 Morgan Street	Wathaurong Aboriginal Co-operative	Upsize existing outfall pipe and register as LPoD.
Proposed	2	1,045 [2]	21 Birdwood Avenue	Vicroads [1]	No change to existing conditions.
Proposed	3	5,500	Parcel A, 43 The Boulevard	Wathaurong Aboriginal co-operative	Proposed outfall to swale drain at frontage to The Boulevard as LPoD.

[1] : Leased by Wathaurong Aboriginal Co-operative.

[2] : Area increase attributable to extension of existing lease width.

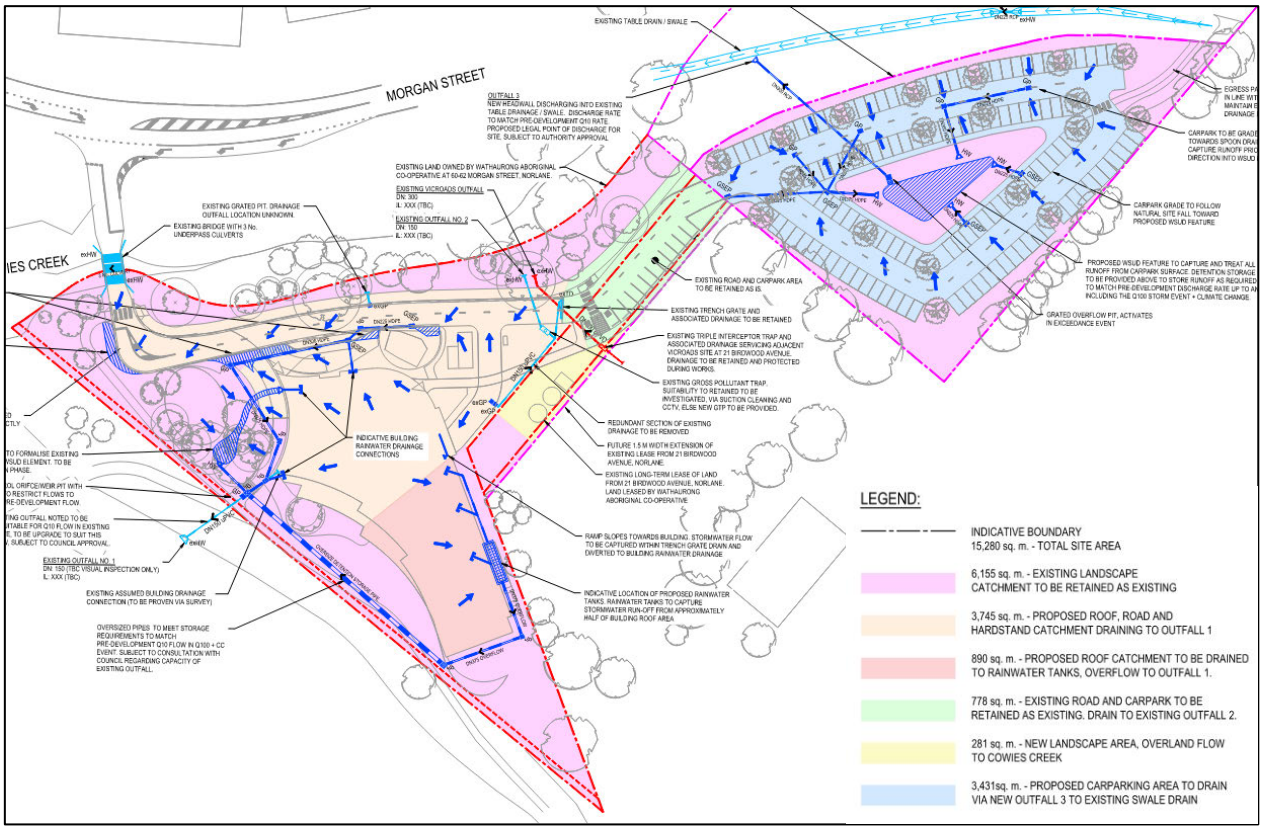

Figure 5 Post-development catchment areas

4.2 Stormwater flows

Pre- and post- development flows were calculated using the Rational Method. The Rational Method uses the formula described in Figure 6 for calculations.

$$Q = \frac{C * I * A}{3600}$$

where:

Q = discharge (L/s)
C = runoff coefficient
I = rainfall intensity (mm/hr)
A = catchment area (m^2)

Figure 6 Formula used in calculations for peak flow discharge per the Rational Method

Table 2 following describes values used in calculations and outputs, as well as storage requirements based on the flow calculations. The storage requirements were calculated using the Boyd Method.

Table 2 Summary of calculations of stormwater flows

Scenario	Catchment	Effective Drained Area (Ha)	Q5 (5 min, 20% AEP) [L/s]	Q10 (5 min, 10% AEP) [L/s]	Q100 Flow (5 min, 1% AEP) [L/s]	Storage (m3)[c]
Existing	Site 01	0.39	95.0	95.0	169.0	-
Existing	Site 02	0.11	27.0	27.0	48.0	-
Existing	Site 03	0.17	41.0 [a]	41.0 [a]	72.0 [a]	-
Proposed	Site 01	0.47	97.0	115.0	204.0	49.2
Proposed	Site 02	0.07	14.0	17.0	30.0	Not required [b]
Proposed	Site 03	0.34	70.0	83.0	147.0	57.0

[a]: Site 03 does not have a designated LPoD under existing conditions - run-off is discharged via overland flow.

[b]: The post-development catchment area for Site 02 is reduced from existing conditions. No other works are proposed for Site 02.

[c]: Storage calculation based on critical storage value for restriction to pre-development Q5 flow for all events up to the 1% AEP event with 18.5% allowance for climate change.

4.3 Stormwater management techniques

The proposed strategy involves formalising the fragmented nature of the existing drainage onsite into a target system. Runoff from roofs and hardstand areas will be captured stormwater drainage system utilising pit and pipes with at source WSUD elements and oversize pipes for detention storage.

Rainwater capture from the proposed building will be implemented by directing roof catchments to a rainwater tank at the rear of the building.

A separate stormwater strategy will be applied to each site and will be discussed in following subsections. A plan of the proposed stormwater management strategy has been prepared – refer drawings CI-00200 and CI-00201 in Appendix C .

4.3.1 Site 01

Site 01 will use rainwater tanks, tree pits, an overflow pit, oversized pipe and a standard pit and pipe system to manage stormwater. The site's stormwater flow will be ultimately directed to the existing outfall at the southern boundary of the title, which is required to be upsized.

Stormwater flow from approximately half of the building's roof area will be directed to the rainwater tanks. The rainwater will be re-used for gardening and other purposes. Pipes will provide overflow from the rainwater tanks to the oversized pipe and overflow pit.

Stormwater flow from the rest of the site (including approximately half the building's roof area) will be directed to the oversized pipe and overflow pit. Treatment and reduction of flow velocity will be achieved via

pocket WSUD bio-retention features at the road edge. The exact nature specification of these features is still being developed in conjunction with the Landscape Architect around some of the sensitivities around the existing high importance tree on the site. Restriction of flow to pre-development conditions will be is proposed to be achieved via a flow control pit and detention storage through a combination of the WSUD storage, oversize pipes and rainwater tanks. This is assuming the existing outfall can be upsized to be the minimum pre-development Q5 flow, which require further Council consultation.

A potential option for formalise an existing landscape gully has been identified, this requires further survey to determine the feasibility of this and will be explored in later design phases pending impact of the nearby scar tree. This feature is not strictly necessary to achieve treatment requirements.

4.3.2 Site 02

The overall impermeable catchment area for Site 02 (which discharges to Outfall 02) is proposed to be reduced from pre-development conditions. The existing drainage system and outfall will retained and the redundant section of pipe and pipe serving the southern extent of this catchment which is returning to landscape will be capped and abandoned.

Due to the intent to undertake only very limited road and footway resurfacing and relining works in this area of site, no new stormwater management techniques are proposed.

4.3.3 Site 03

The proposed strategy for stormwater management at Site 03 is to direct all flow from the carparking area into a bio-retention basin taking the form of a rain garden located centrally with the carpark. Runoff will initially before captured using a standard pit and pipe system before being directed to the basis.

The bio-retention basin will serve as both the treatment mechanism for the site but also will double as detention storage. Reduction of flows to match the pre-development Q5 rate, induces a requirement for a modest amount of detention storage. A new proposed outfall pipe that is connected to the existing swale at the frontage to The Boulevard has been proposed discharging at this restricted rate.

As the site does not have any formal LPoD this connection requires Council approval as part of the land acquisition and sub-division works.

4.4 MUSIC Modelling

4.4.1 Performance Criteria

In order to comply with Melbourne Water's Drainage Scheme, stormwater runoff from the site must achieve State Environment Protection Policy (Waters of Victoria) objectives for environmental management of stormwater as set out in the 'Urban Stormwater Best Practice Environmental Management Guidelines (CSIRO) 1999'.

Best Practice Environment Management (BPEM) standards were used as the performance criteria for the assessment of this site. These are presented in the table below:

Table 3 BPEM Water Quality Performance Criteria

Pollutant	% Reduction Target
Total Suspended Solids (TSS)	80
Total Nitrogen (TN)	45
Total Phosphorous (TP)	45
Gross Pollutants	70

The performance of the treatment treat was assessed using MUSIC (Model for Urban Stormwater Improvement Conceptualisation).

4.4.2 Catchment Delineation

For the purposes of the water quality modelling, the following catchment parameters were adopted:

– Catchment delineation based on design drawings and proposed flow paths
– Impervious fraction based on the following assumptions:
  - Site 1 Roof to rainwater tanks 100% impervious
  - Site 1 remaining area 75% impervious
  - Site 3 (new carpark) 75% impervious
  - Site 2 (existing car park) 100% impervious
– Urban pollutant loads stochastically generated

4.4.3 Meteorological Data Input

The model runs were based on Bureau of Meteorology (BOM) rainfall data for Geelong North (City of Greater Geelong MUSIC – Modelling Approach and Parameters 2019). For the water quality modelling the rainfall data for Geelong North supplied by the City of Greater Geelong for the years 1971 - 1980 was adopted. In addition, the monthly average areal potential evaporation data for Geelong North were also sourced from this data (Table 2).

Table 4 Monthly Potential Evapotranspiration for Geelong North adopted for MUSIC Modelling

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Et (mm)	5.32	4.80	3.44	2.28	1.31	1.00	1.09	1.52	2.34	3.84	4.81	4.74

4.4.4 Site 1 – Model Development

4.4.4.1 Model Layout

As illustrated in Figure 7, the proposed works are represented in MUSIC as a treatment train with 2 catchments, 1 rainwater tank node and 2 bioretention features (tree pit) nodes.

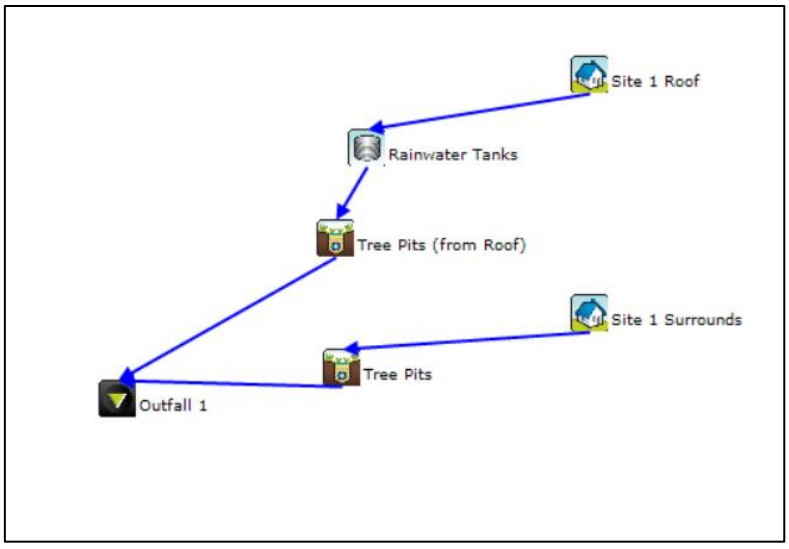

Figure 7 Site 1 MUSIC Model Layout

4.4.4.2 Model Input Parameters

The bioretention nodes representing has been modelled as tree pits to represent the pcket nature of these feature. Modelling parameters as listed below have been taken from Urban Asset Solutions' "Eosol Tree Pit

Technical Specifications" (https://urbanassetsolutions.com.au/wp-content/uploads/UAS-Tree-Pit-Technical-Specifications-2018.pdf). For multiple pocket WSUD elements, the surface area, filter area and weir widths are multiplied by the number of features. There are 2 features represented in the "Tree Pits (from Roof)" node and 16 represented in the "Tree Pits" node. It is important to note that so long as the minimum filter and surface area of treatment is provided as below, the number of pocket WSUD features can be modified to meet this requirement while still fitting within the site (i.e. by providing larger features or duplicating).

PARAMETER	TREE PITS	TREE PITS (FROM ROOF)
Extended detention depth (m)	0.1	0.1
Surface Area (m^2)	23.04	2.88
Filter Area (m^2)	23.04	2.88
Filter Depth (m)	0.75	0.75
Filter Media Saturated hydraulic conductivity (mm/hr) (modelled)	224	224
Exfiltration rate (mm/hr)	Not Applicable	Not Applicable
Total nitrogen content of filter media (mg/kg)	500	500
Orthophosphate content of filter media (mg/kg)	40	40
Overflow weir width (m)	19.2	2.4
Submerged Zone Depth (m)	0.2	0.2
High flow bypass (m^3/s)	0.0156	0.0156

The demands for the rainwater tanks were estimated based on the City of Greater Geelong's MUSIC modelling parameters for watering 'Warm Season Turf' as the more conservative reuse demand. The monthly distribution was also adopted from the City of Greater Geelong's guidelines. The sizing of the Rainwater Tanks was based off three 7 KL water tanks. The overflow pipe diameter of 0.39 m was calculated by MUSIC based on 3 separate tanks with an overflow pipe diameter of 0.225 m.

Table 5 Modelled Rainwater Tank Parameters

PARAMETER	RAINWATER TANKS
Number of Tanks	3
Volume below overflow (m^3)	21
Depth above overflow (m)	0.2
Surface area (m^2)	11.385
Initial Volume (m^3)	0
Overflow Pipe Diameter (m)	0.39
Annual demand for re-use (kL/y)	2608

Table 6 Modelled Rainwater Tank Annual Demand (for re-use) Monthly Pattern Properties

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Requirement (%)	29	19	13	1	0	0	0	0	0	1	13	24

4.4.5 Site 3 – Model Development

4.4.5.1 Model Layout

As illustrated in Figure 8, the proposed works are represented in MUSIC as a treatment train with 1 catchment and 1 raingarden.

Figure 8 Site 3 MUSIC Model Layout

4.4.5.2 Model Input Parameters

The bioretention model parameters for the treatment train is summarised in Table below.

Table 7 Modelled Bioretention Parameters

PARAMETER	CARPARK RAINGARDEN
Extended detention depth (m)	0.2
Surface Area (m^2)	32
Filter Area (m^2)	32
Filter Depth (m)	0.4
Filter Media Saturated hydraulic conductivity (mm/hr) (modelled)	100
Exfiltration rate (mm/hr)	Not Applicable
Total nitrogen content of filter media (mg/kg)	800
Orthophosphate content of filter media (mg/kg)	55
Overflow weir width (m)	2.0
Submerged Zone Depth (m)	0.15
High flow bypass (m^3/s)	0.018

4.4.6 MUSIC Model Results

The MUSIC models were run for both Sites 1 and 3 to estimate the treatment performance of the systems provided. Table summarises the treatment train effectiveness of the proposed water quality works versus BPEM targets. The targets aim for reduced pollutant loads entering the receiving environment of:

– 80% reduction in Total Suspended Solids (TSS)
– 45% reduction in Total Phosphorus (TP)
– 45% reduction in Total Nitrogen (TN)
– 70% reduction in Gross Pollutants (GP)

Table 8 Site 1 Modelled Treatment Train Performance

	TSS (KG/YR)	TP (KG/YR)	TN (KG/YR)	GP (KG/YR)
Best Practice Target (%)	**80%**	**45%**	**45%**	**70%**
Tree Pits				
Sources	428.60	0.88	6.20	94.92
Residual load	89.23	0.37	3.26	3.60
Percent reduction	79.18	57.87	47.3	96.21
Tree Pits (from Roof)				
Sources	154.10	0.31	2.14	30.42
Residual load	24.19	0.09	0.92	0.00
Percent reduction	84.30	71.04	56.82	100
Total				
Sources	582.80	1.19	8.34	125.30
Residual load	113.40	0.46	4.19	3.60
Percent reduction	**80.54**	**61.28**	**49.75**	**97.13**
Target Met?	**Yes**	**Yes**	**Yes**	**Yes**

Table 9 Site 3 Modelled Treatment Train Performance

	TSS (KG/YR)	TP (KG/YR)	TN (KG/YR)	GP (KG/YR)
Best Practice Target (%)	**80%**	**45%**	**45%**	**70%**
Raingarden				
Sources	515.40	1.05	7.20	111.20
Residual load	102.20	0.50	3.80	4.32
Percent reduction	80.17	52.05	47.17	96.11
Total				
Sources	515.40	1.05	7.20	111.20
Residual load	102.20	0.50	3.80	4.32
Percent reduction	**80.17**	**52.05**	**47.17**	**96.11**
Target Met?	**Yes**	**Yes**	**Yes**	**Yes**

The tables above show that the treatment train meets the required water quality targets for both sites.

5. Summary

GHD has prepared a SWMP on behalf of Wathaurong Aboriginal Co-operative for a proposed redevelopment of the existing site and shown that the stormwater modelling complies with our understanding of the council requirements.

Regards

Civil Engineer

Appendix A

Legal point of discharge report

POINT OF DISCHARGE REPORT

Stormwater Drainage, Easement, and Allotment Information

A. APPLICANT:

APPLICATION NO. 1333-2023-SRFI
Reference: AP:
APP Ref: Reference No

GHD Pty Ltd
Level 8
180 Lonsdale Street
MELBOURNE VIC 3000

CONTACT NAME:

CONTACT NUMBER 86878784

CONTACT EMAIL:

B. PROPERTY DETAILS

Proposed Development
- Commerical/Industrial

Property Address: **60-62 Morgan Street, NORTH GEELONG VIC 3215**
191m2 Lot 2 TP 26798578m2 Lot 1 TP 2679

C STORMWATER DRAINAGE, EASEMENT AND ALLOTMENT INFORMATION

(i) **LOCATION OF STORMWATER DISCHARGE (REGULATION 133 (2)) - Refer Note 1 & 3**

- Discharge on-site, directing all stormwater away from adjoining properties
- Refer to Planning Permit once issued for proposed works drainage conditions

(ii) ALLOTMENT BOUNDARY DIMENSIONS - Refer Note 3

- Refer to Plan of Subdivision

(iii) DRAINAGE EASEMENTS ON ALLOTMENT - Refer Note 2 &3

- Refer to Plan of Subdivision

(iv) SIZE, DEPTH AND OFFSET OF STORMWATER DRAINAGE PIPES WITHIN EASEMENTS - Refer to No. 3

- Stormwater not applicable
- Sewer in-surrounds

(v) DETAILS OF FILL ON ALLOTMENT [IF KNOWN] – Refer to Note 3

- Unknown

Notes:
1. The information in relation to the location of stormwater discharge is provided as consent and a report of Council pursuant to the provisions of Regulation 133(2) of the Building Regulations 2018.

2. If it is proposed to carry out any building works over any drainage easement the consent and report of Council pursuant to Regulation 130 of the Building Regulations – 2018 is required.
3. The information provided has been drawn from records held by the City of Greater Geelong. It is believed that the information is correct but if you intend relying on it, you should make on-site investigations and enquiries of all other sources to verify accuracy. The City of Greater Geelong accepts no liability if this information is subsequently found to be in error or incomplete.

Authorised Officer: Issued: **27-Jun-2023**

Appendix B

Architectural layouts

NOTE: ALL EXTERNAL CAR PARKING BAYS TO HAVE DIMENSIONS 4.9m LONG BY 2.6m WIDE

NOTE: ELECTRIC VEHICLE (EV) CHARGING POINTS TO BE PROVIDED AT 18 SPACES WITHIN THE CARPARK AT 43 THE BOULEVARD, NORLANE

COLOUR KEY

- SHARED USER / BITUMEN - EXISTING
- SHARED USER / BITUMEN - NEW (UPGRADED)
- PEDESTRIAN - PAVED
- SHARED USER / GRAVEL
- MAIN SITE
- VICROADS LEASE
- TRIANGLE
- LAKESIDE PLANTING - PPRZ
- EXISTING TREE BOTH SURVEYED & ASSESSED BY ARBORIST AS *"HIGH VALUE"*

MASTERPLAN PARKING SCHEDULE

EXISTING CONDITIONS	
EXISTING SITE CAPACITY 62 MORGAN ST + LEASED LAND	40 CARS
PROPOSED PRECINT MASTERPLAN	
62 MORGAN STREET, NORLANE	29 CARS
21 BIRDWOOD AVENUE, NORLANE (LEASED LAND)	12 CARS
43 THE BOULEVARD, NORLANE	123 CARS
TOTAL	164 CARS
CALCULATED PARKING DEMAND REFER TRAFFIC ENGINEERING REPORT	164 CARS
MASTERPLAN SURPLUS / SHORFALL	0 CARS

Recent revision history

#	Status	Description	Date
A		Draft Town Planning	01-09-23
B		FOR INFORMATION	12-09-23
C		TOWN PLANNING	15-09-23

Notes
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Contractor must verify all dimensions on site before commencing work or preparing shop drawings.

Do not scale drawings.

Project
MORGAN ST REDEVELOPMENT

Client
WATHAURONG ABORIGINAL CO-OPERATIVE

Issuer
W–B
WOODS BAGOT

Project number 130882
Size check 25mm
Checked MP
Approved BM
Sheet size A0
Scale 1 : 500

Sheet title
Site Plan
Project Masterplan

Sheet number A-TP- 1101
Revision C
Status Town Planning

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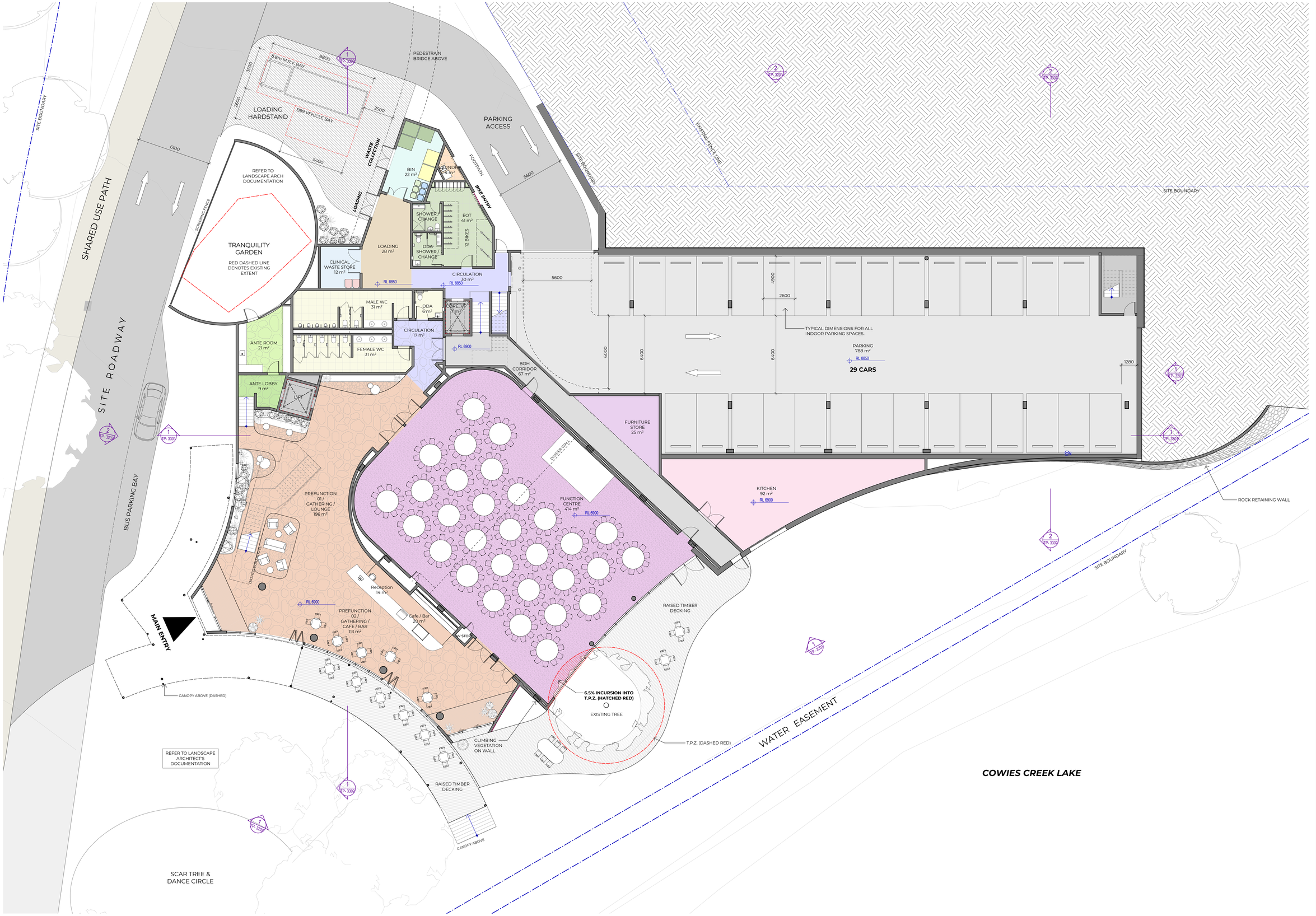

Recent revision history

#	Status	Description	Date
A		Draft Town Planning	01-09-23
B		TOWN PLANNING	15-09-23

Notes

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Project
MORGAN ST REDEVELOPMENT

Client
WATHAURONG ABORIGINAL CO-OPERATIVE

Issuer
W–B
WOODS BAGOT

Project number	Size check
130882	25mm

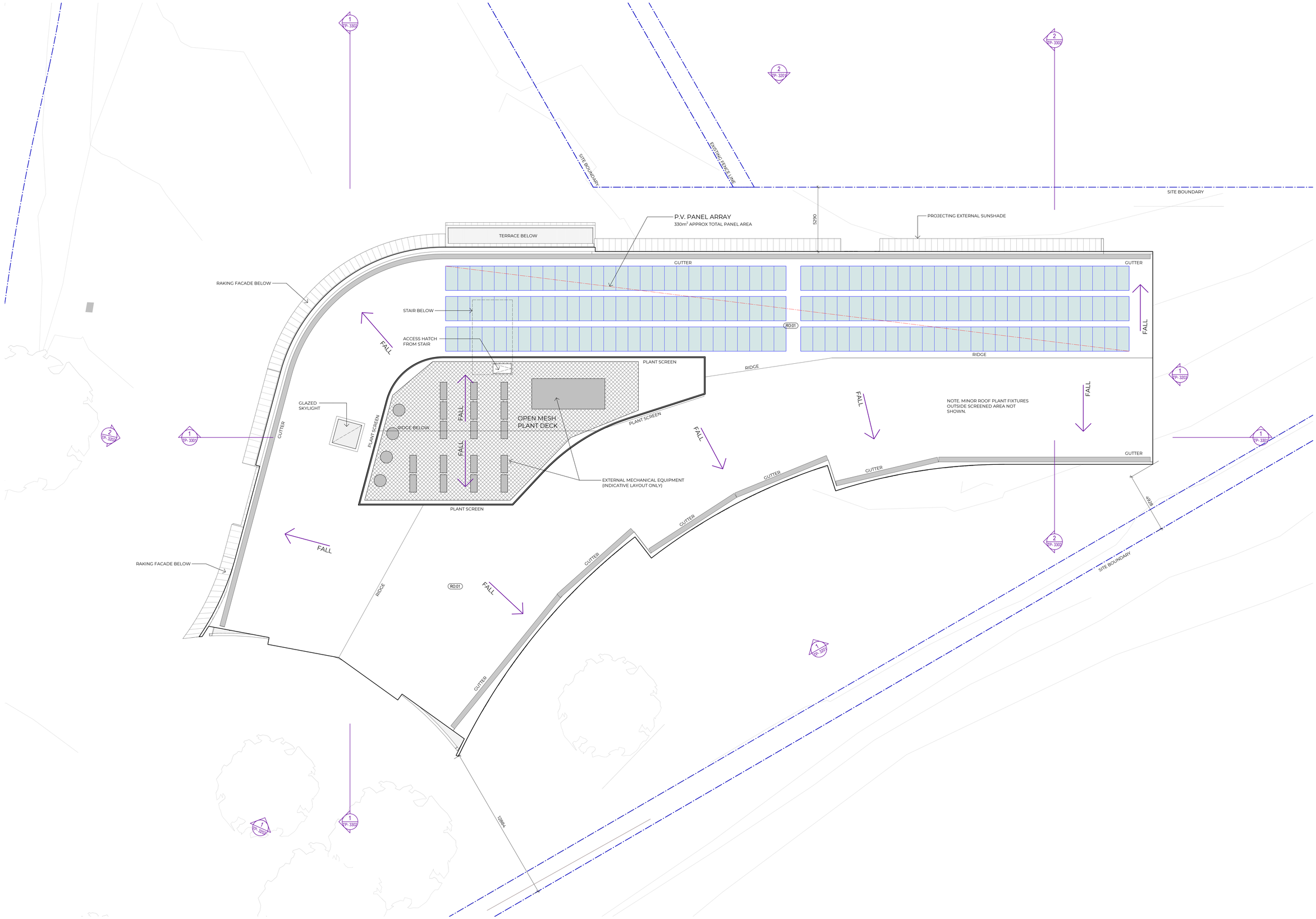
Checked	Approved	Sheet size	Scale
MP	BM	A0	1 : 100

Sheet title
Floor Plan
Ground

Sheet number	Revision
TP- 2200	B

Status
Town Planning

Date generated 15/09/2023 5:20:01 PM



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Recent revision history

#	Status	Description	Date
A		Draft Town Planning	01-09-23
B		TOWN PLANNING	15-09-23

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Project
MORGAN ST REDEVELOPMENT

Client
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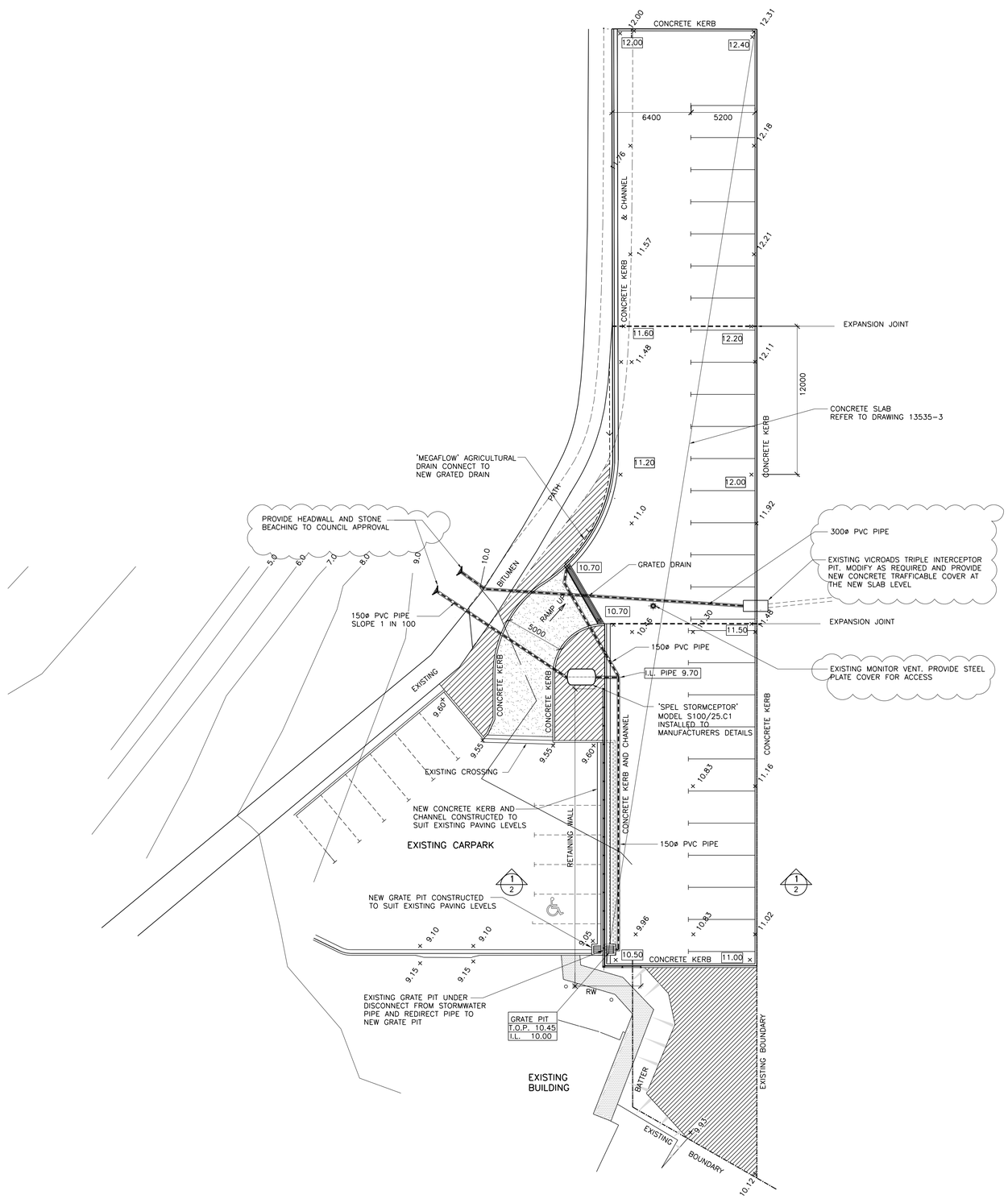
W–B
WOODS BAGOT

Project number	Size check		
130882	35mm		
Checked	Approved	Sheet size	Scale
MP	BM	A0	1 : 100

Sheet title
Floor Plan
Roof

Sheet number	Revision
A-TP- 2203	B

Status
Town Planning



Site Plan

170 R C SLAB
SL81 BOTTOM THROUGHOUT (25 COVER)
SL102 TOP THROUGHOUT (35 COVER)
N12 BARS x 2000 @ 300 CTS BOTH WAYS
OVER EACH PILE
.02 POLYTHENE MEMBRANE

25mm HOTMIX
150 MINIMUM DEPTH OF CLASS 2 CRUSHED
ROCK COMPACTED TO 100% STANDARD
REMOVE ALL VEGETATION AND ROOT
AFFECTED TOPSOIL FROM AREA OF PAVING
ANY FILLING TO BE SELECTED APPROVED
GRANULAR MATERIAL COMPACTED TO 100% STANDARD
PROOF ROLL EXCAVATED SURFACE

FILL WITH SITE EXCAVATED MATERIAL TO
MATCH THE NEW ADJACENT PAVING LEVELS

75 COMPACTED THICKNESS OF "TOOBERAC" GRAVEL
FULLY COMPACT EXISTING FILLING

ALL GRATE PITS ARE TO BE PRECAST CONCRETE 450 x 450

ALL STORMWATER PIPES ARE TO BE SEWER QUALITY UPVC

× 10.83 DENOTES EXISTING LEVELS

× 11.50 DENOTES FINISHED LEVELS

No.	Date	Amendment
C	25-07-13	CARPARK CHANGED TO CONCRETE
B	4-04-13	GENERAL AMENDMENTS
A	14-10-10	STORMCEPTOR AMENDED

Page-Green & Associates Pty Ltd
CONSULTING ENGINEERS
5 Villamanta St, Geelong West
Phone (03) 52 221899 Fax (03) 52 298382
Email pga@pipeline.com.au

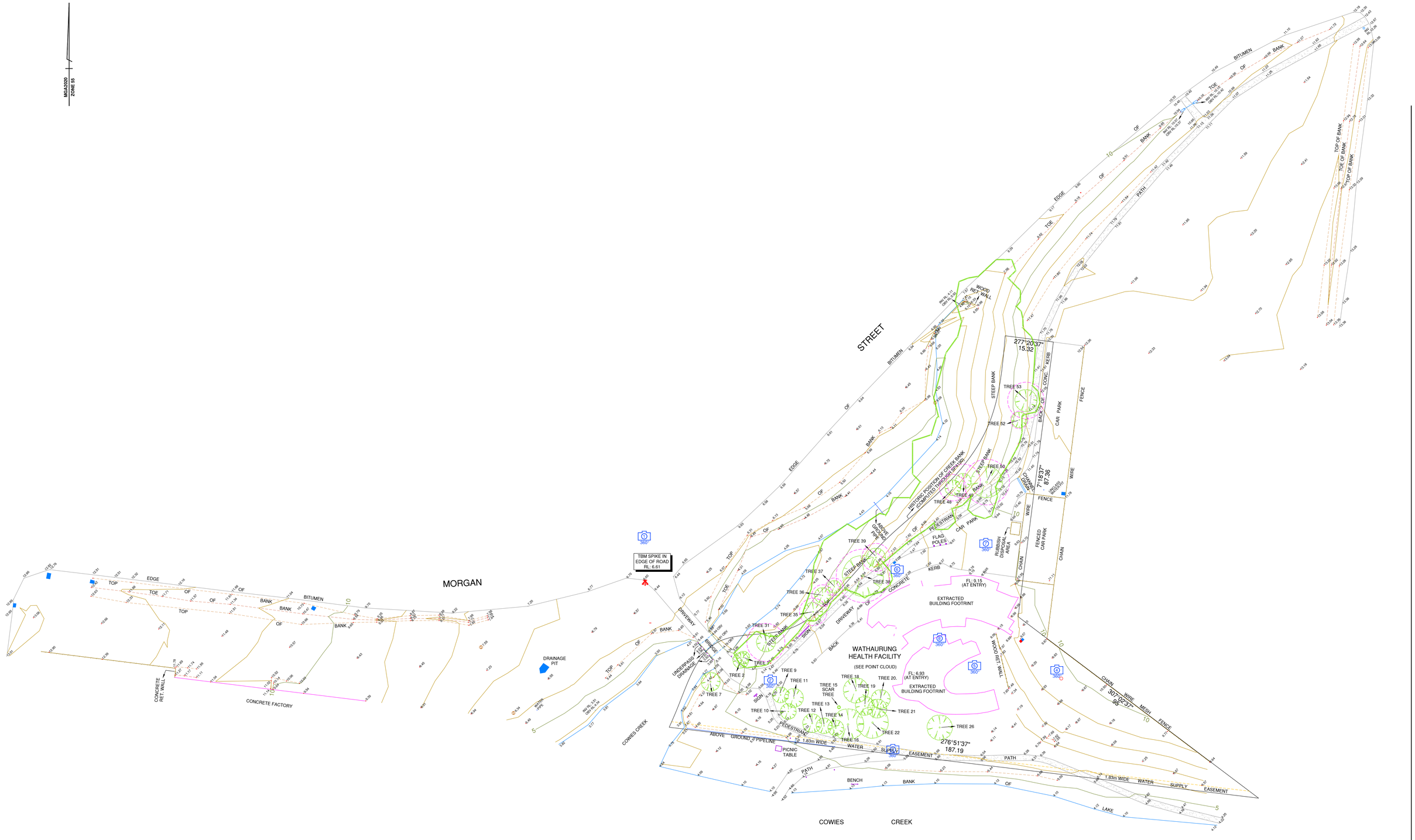
Proposed New Carpark on Lease Land
Wathaurong Aboriginal Co-Operative Ltd
Lot 62 Morgan Street North Geelong

Client
Cirillo Architects

Design	Drawn
d.g.p.	d.g.p.
Date	Scale
April 13	1:200

AutoCad Filename
13535-Plan
Ref No.
13535-1 C

MGA2020
ZONE 55



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04	TREE NUMBER AND TPZ ADDED	14/07/2022	NC	GT
03	UPDATED W/ ONLY HIGH RET. TREES	06/07/2022	NC	GT
02	TITLE & BLDG FOOTPRINT ADDED	24/05/2022	BT	MM

- ELEC. PIT
- ELEC. POLE W LIGHT
- SEWER PIT
- SIGN
- TELSTRA PIT
- UNIDENTIFIED PIT
- GRATED PIT
- JUNCTION PIT
- EDGE OF CREEK
- DRIP LINE OF GROUP OF TREES
- TREE PROTECTION ZONE

NOTATIONS

This plan is prepared from a combination of field survey and existing records for the purpose of designing new constructions on the land and should not be used for any other purpose. The title boundaries shown dimensioned hereon were re-established and marked by St Quentin Consulting Pty.Ltd.. See Record of Re-establishment for further details. Services shown hereon have been located where possible by field survey.

Prior to any demolition, excavation or construction on the site, the relevant authority should be contacted for possible location of further underground services and detailed locations of all services. This note is an integral part of this plan.

ST. QUENTIN
Surveyors - Town Planners - Engineers
51 LITTLE FYANS STREET,
P.O. BOX 919, GEELONG 3220
TELEPHONE (03) 5201 1811 FAX (03) 5229 2909

Project Name: 60-62 MORGAN STREET NORLANE, VIC 3214

Drawing Title: PLAN OF FEATURE & RE-ESTABLISHMENT LOT 1 TP2679K (C/T V.10194 F.568)

Level Datum	AHD (PM203)
Contour Interval	0.20m
Date of Survey	21/07/2021
Surveyed By	NC/CS
Drawn By	BT
Date Drawn	26/07/2021
Scale	1:400 @ A0

SCALE 0 4 8 12 16 20 LENGTHS ARE IN METRES

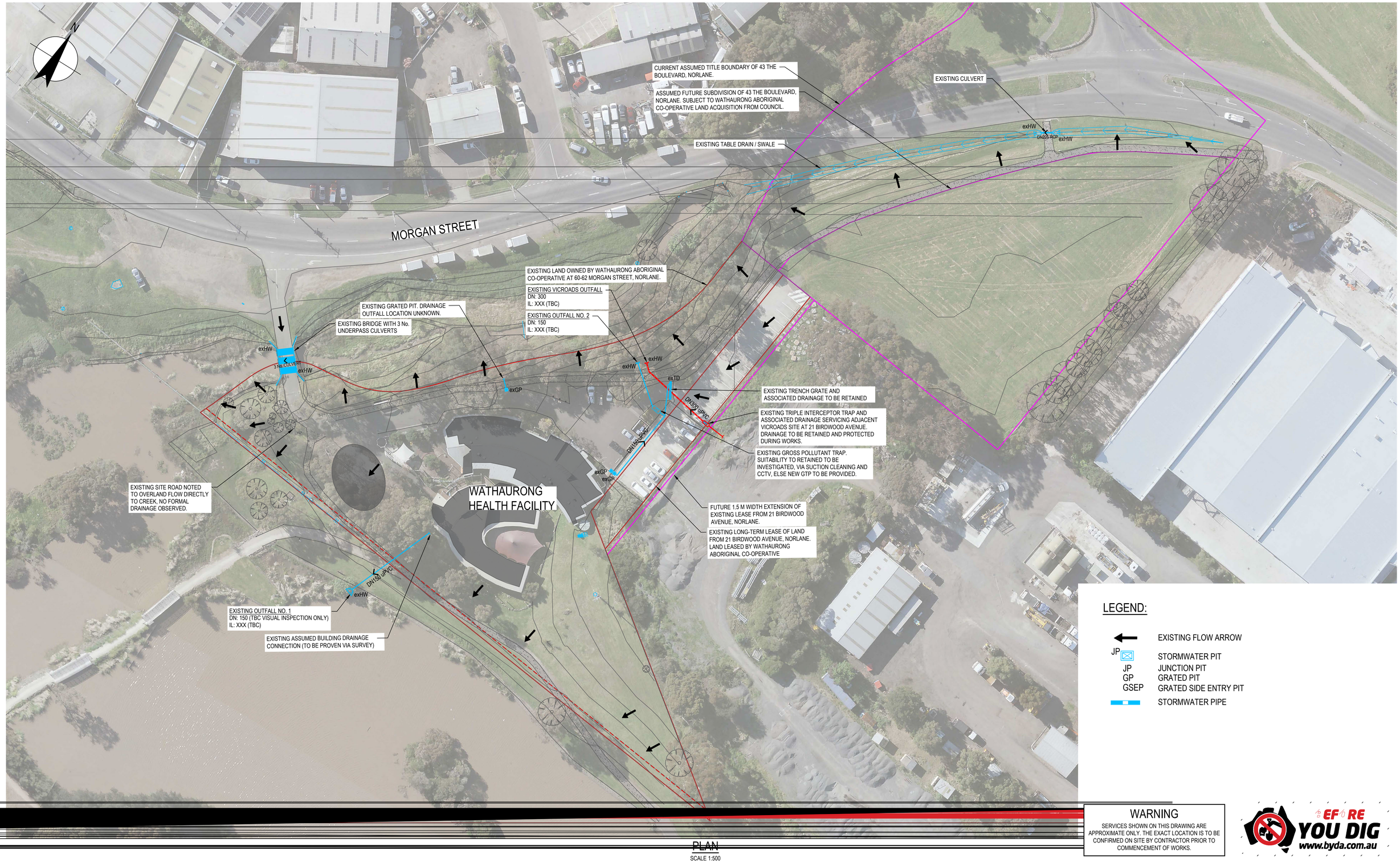
Licensed Surveyor Approved

Project Ref.	Sheet No.	Rev.
17184	1 OF 1	04

MGA2020 ZONE 55

Appendix C

Drainage strategy drawings



LEGEND:

- EXISTING FLOW ARROW
- JP — STORMWATER PIT
- JP — JUNCTION PIT
- GP — GRATED PIT
- GSEP — GRATED SIDE ENTRY PIT
- STORMWATER PIPE

PLAN

SCALE 1:500

WARNING

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Rev	Description	Checked	Approved	Date
P01	TOWN PLANNING ISSUE	M.W.	A.V.	22.09.23

Author C. MENCHAVEZ **Drafting Check** M. WOOTTEN
Designer R.BON **Design Check** A. VAN EEDEN

0 5 10 15 20 25m
SCALE 1:500 AT ORIGINAL SIZE

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Project No. 12613952

Client: WATHAURONG ABORIGINAL CO-OPERATIVE
Project: MORGAN STREET REDEVELOPMENT
Status: TOWN PLANNING

Drawing Title: DRAINAGE LAYOUT PLAN EXISTING CONDITIONS

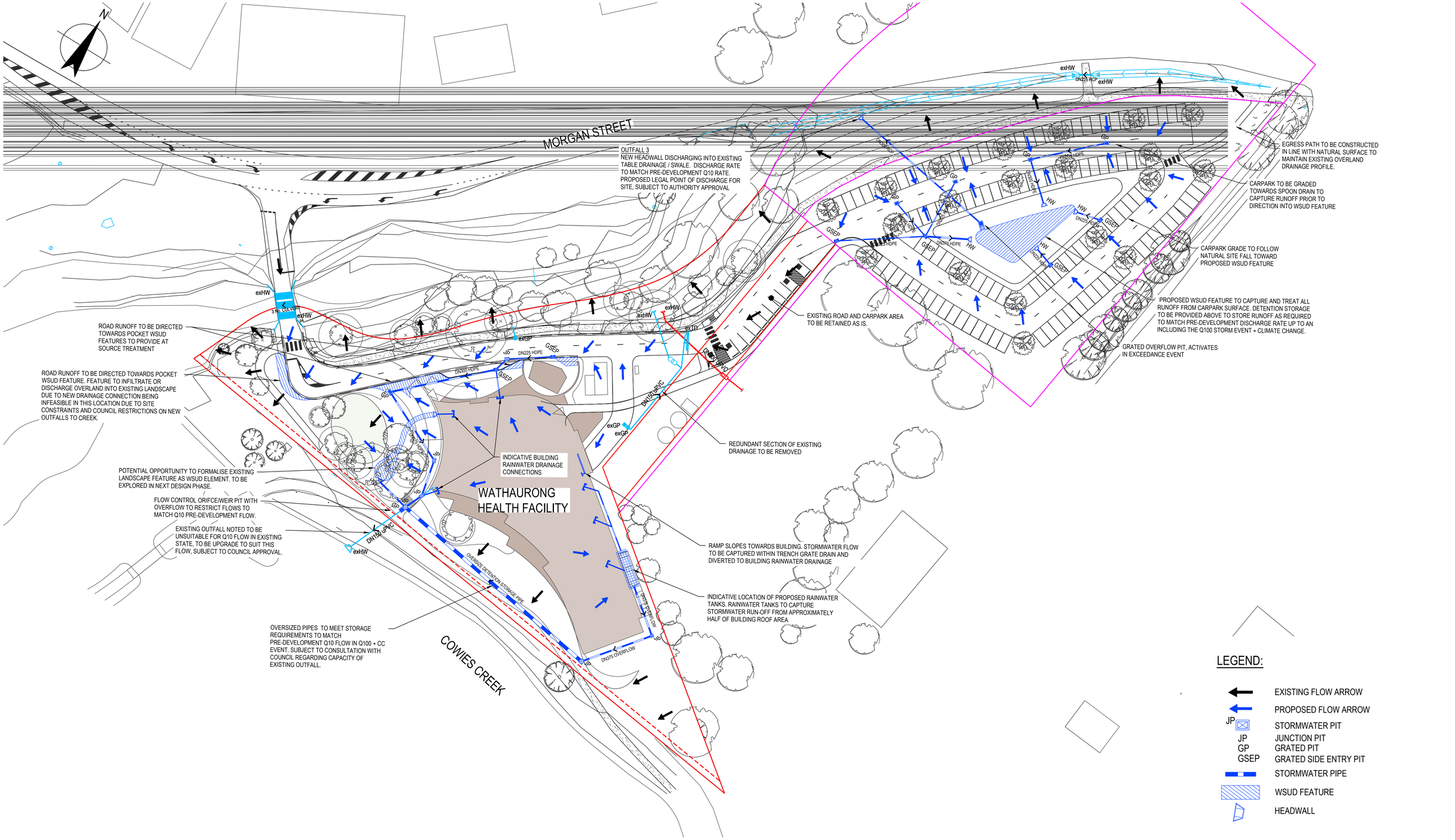
Drawing No. 12613952-GHD-00-00-DRG-CI-00200

Size A1

Rev P01

Plot Date: 12 May 2020 - 10:48 AM Plotted by: Damir Kokotovic

File Name: C:\12d\SW\data\P-00-12D-001\31-12613952 - Wathaurong Hub Redevelopment_2569\CADD\Drawings\TB-GHD-A1-HORIZONTAL-2023.dwg



PLAN

SCALE 1:500

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Author C. MENCHAVEZ **Drafting Check** M. WOOTTEN
Designer R.BON **Design Check** A. VAN EEDEN

0 5 10 15 20 25m
SCALE 1:500 AT ORIGINAL SIZE

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Project No. 12613952

Client WATHAURONG ABORIGINAL CO-OPERATIVE
Project MORGAN STREET REDEVELOPMENT
Status TOWN PLANNING

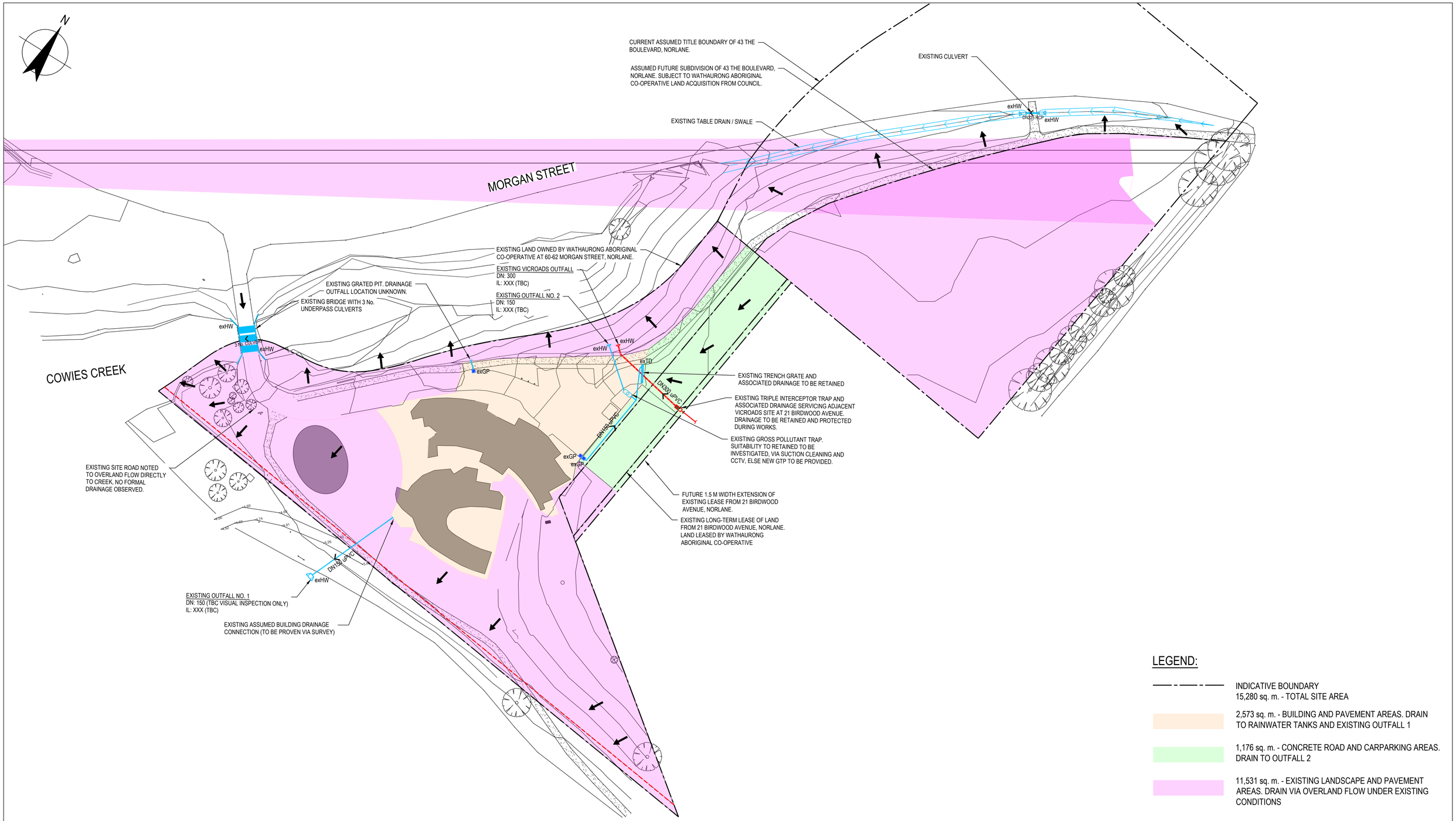
Drawing Title DRAINAGE LAYOUT PLAN PROPOSED STRATEGY

Size A1

Drawing No. 12613952-GHD-00-00-DRG-CI-00201

Rev P01

Plot Date: 12 May 2020 - 10:48 AM Plotted by: Damir Kokotovic File Name: C:\12d\SW\data\P-00-12D-001\31-12613952 - Wathaurong Hub Redevelopment_2569\CADD\Drawings\TB-GHD-A1-HORIZONTAL-2023.dwg



LEGEND:

- INDICATIVE BOUNDARY
  15,280 sq. m. - TOTAL SITE AREA
- 2,573 sq. m. - BUILDING AND PAVEMENT AREAS. DRAIN TO RAINWATER TANKS AND EXISTING OUTFALL 1
- 1,176 sq. m. - CONCRETE ROAD AND CARPARKING AREAS. DRAIN TO OUTFALL 2
- 11,531 sq. m. - EXISTING LANDSCAPE AND PAVEMENT AREAS. DRAIN VIA OVERLAND FLOW UNDER EXISTING CONDITIONS

NOTES:

1. ~~DRAINAGE OUTFALL PIPE ON 60-62 MORGAN STREET SITE.~~
3. ~~A DRAINAGE PIPE TO COWIES CREEK PROVIDES OUTFALL FOR CATCHMENT OF LEASED LAND FROM 21 BIRDWOOD AVENUE SITE.~~

PLAN
SCALE 1:500

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Project No. 12613952

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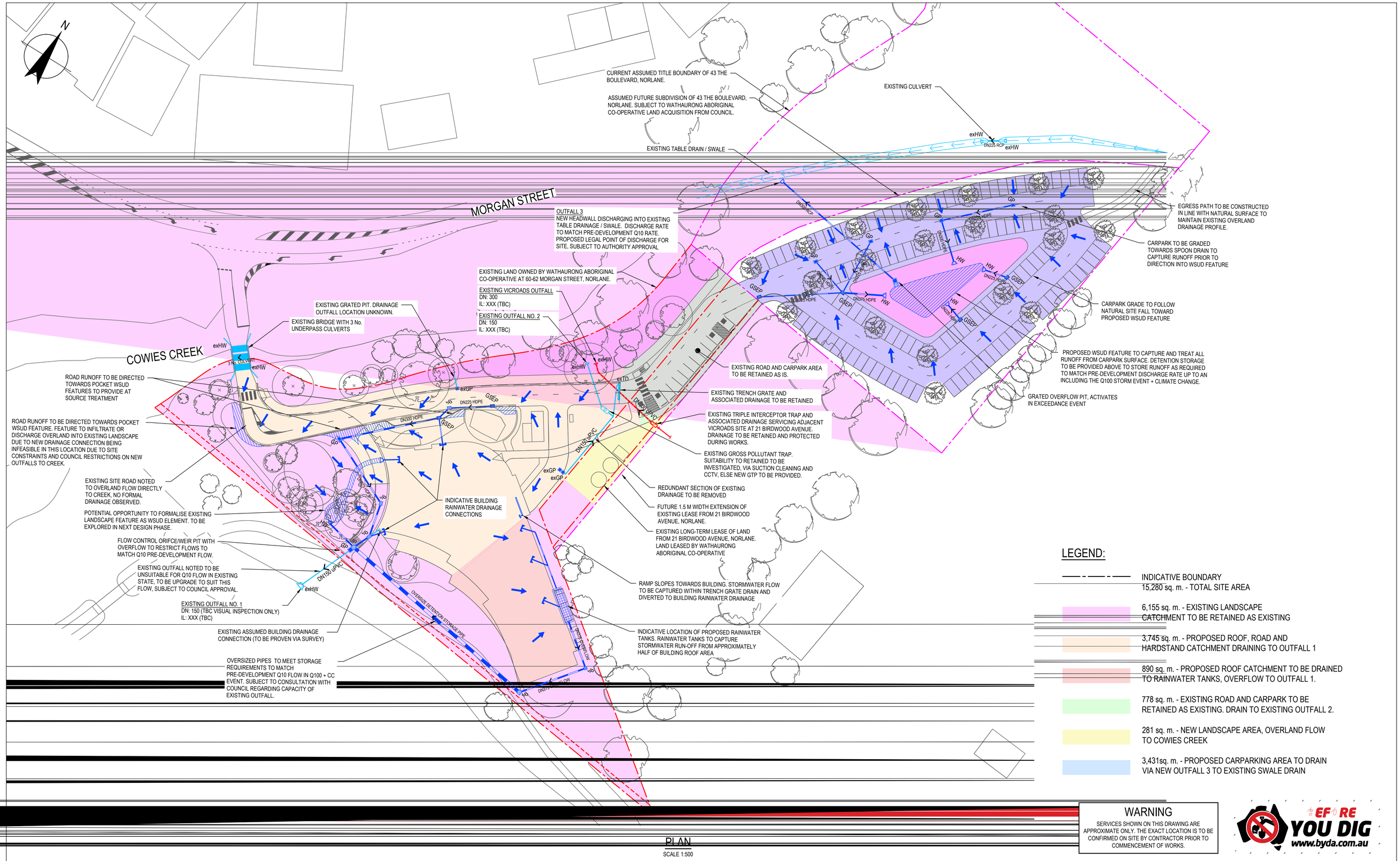
Project MORGAN STREET REDEVELOPMENT
Status TOWN PLANNING

Drawing Title DRAINAGE CATCHMENT PLAN EXISTING CONDITIONS
Drawing No. 12613952-GHD-00-00-DRG-CI-00202
Size A1
Rev P01

Plot Date: 12 May 2020 - 10:48 AM Plotted by: Damir Kokotovic
File Name: C:\12d\SW\data\P-00-12D-001\31-12613952 - Wathaurong Hub Redevelopment_2569\CADD\Drawings\TB-GHD-A1-HORIZONTAL-2023.dwg



PLAN

SCALE 1:500

LEGEND:

- INDICATIVE BOUNDARY
  15,280 sq. m. - TOTAL SITE AREA
- 6,155 sq. m. - EXISTING LANDSCAPE CATCHMENT TO BE RETAINED AS EXISTING
- 3,745 sq. m. - PROPOSED ROOF, ROAD AND HARDSTAND CATCHMENT DRAINING TO OUTFALL 1
- 890 sq. m. - PROPOSED ROOF CATCHMENT TO BE DRAINED TO RAINWATER TANKS, OVERFLOW TO OUTFALL 1.
- 778 sq. m. - EXISTING ROAD AND CARPARK TO BE RETAINED AS EXISTING. DRAIN TO EXISTING OUTFALL 2.
- 281 sq. m. - NEW LANDSCAPE AREA, OVERLAND FLOW TO COWIES CREEK
- 3,431sq. m. - PROPOSED CARPARKING AREA TO DRAIN VIA NEW OUTFALL 3 TO EXISTING SWALE DRAIN

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Project No. 12613952

Client WATHAURONG ABORIGINAL CO-OPERATIVE
Project MORGAN STREET REDEVELOPMENT
Status TOWN PLANNING

Drawing Title DRAINAGE CATCHMENT PLAN POST DEVELOPMENT

Size A1
Drawing No. 12613952-GHD-00-00-DRG-CI-00203
Rev P01

Plot Date: 12 May 2020 - 10:48 AM Plotted by: Damir Kokotovic
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