

# SANDHILLS WETLAND DETAILED DESIGN PACKAGE

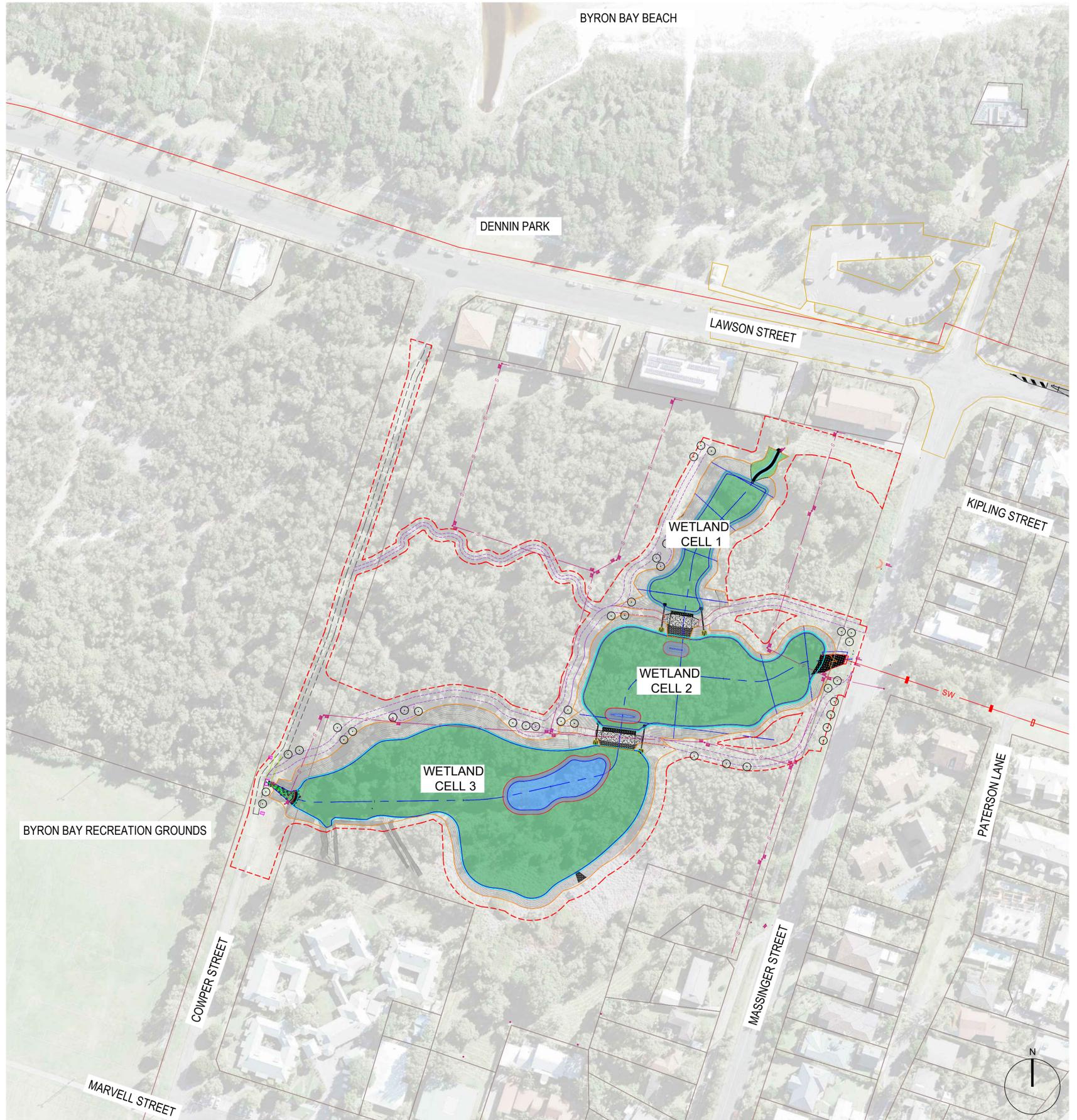
REV F - FOR TENDER 25.08.2023 100%



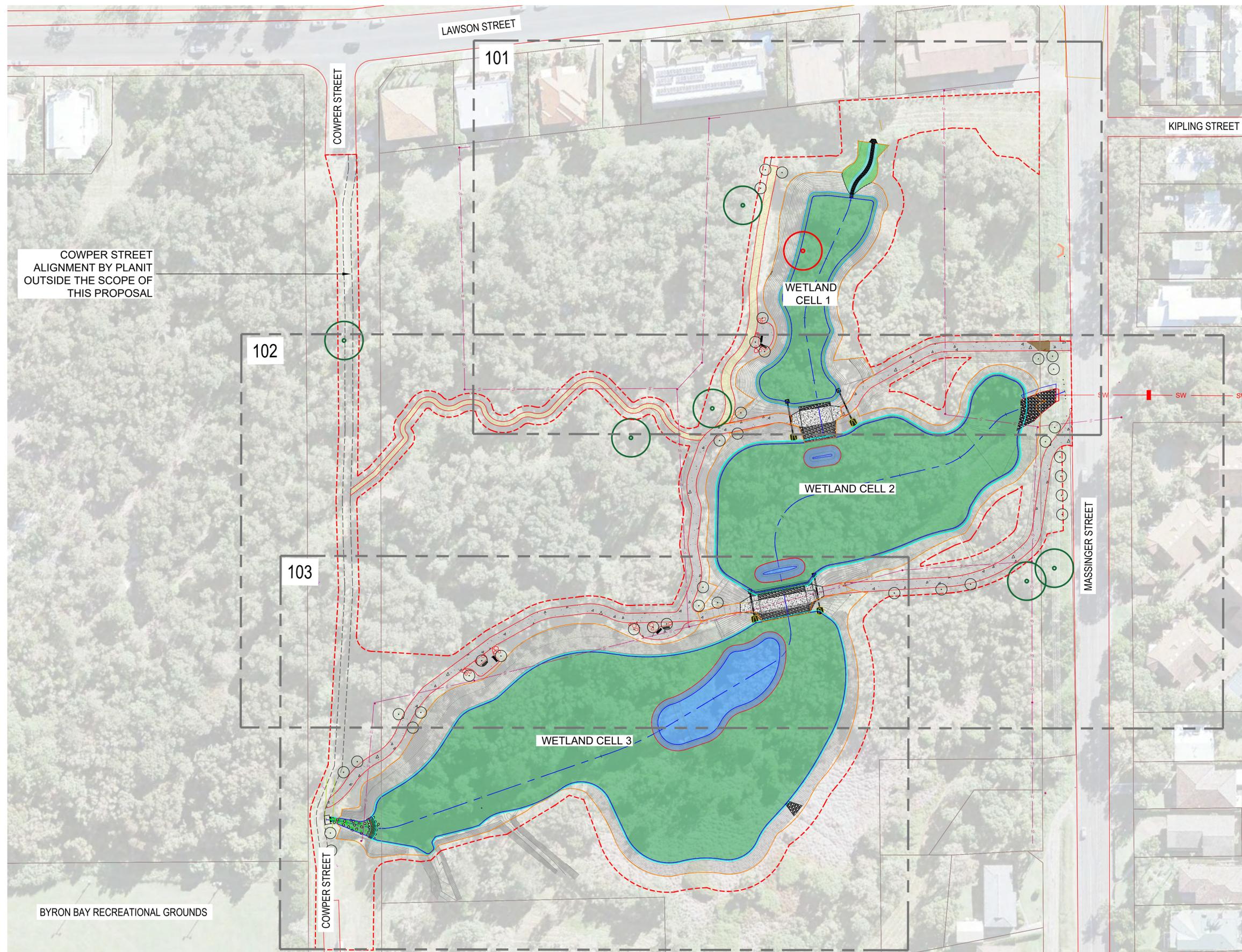
SHEET NO.	DRAWING NAME	SCALE
1-191194_DD_001	COVER SHEET & LOCALITY PLAN	1:1000@A1
1-191194_DD_002	SITE CONTEXT & SHEET LAYOUT PLAN	1:600@A1
1-191194_DD_003	SITE CUT & FILL PLAN	1:600@A1
1-191194_DD_004	SITE EXTENTS	1:600@A1
1-191194_DD_101	EARTHWORKS & LAYOUT PLAN 01	1:250@A1
1-191194_DD_102	EARTHWORKS & LAYOUT PLAN 02	1:250@A1
1-191194_DD_103	EARTHWORKS & LAYOUT PLAN 03	1:250@A1
1-191194_DD_201	EARTHWORKS - SECTIONS CELL 1	AS SHOWN
1-191194_DD_202	EARTHWORKS - SECTIONS CELL 2	AS SHOWN
1-191194_DD_203	EARTHWORKS - SECTIONS CELL 3	AS SHOWN
1-191194_DD_301	CIVIL DETAILS - CELL 1 INLET	AS SHOWN
1-191194_DD_302	CIVIL DETAILS - CELL 1 OUTLETS	AS SHOWN
1-191164_DD_303	CIVIL DETAILS - CELL 2 OUTLETS	AS SHOWN
1-191164_DD_304	CIVIL DETAILS - CELL 3 OUTLET	AS SHOWN
1-191164_DD_305	CIVIL DETAILS - GENERAL	AS SHOWN
1-191194_DD_401	CIVIL & LANDSCAPE SPECIFICATION	NA
1-191194_DD_402	CIVIL & LANDSCAPE SPECIFICATION	NA
1-191194_DD_500	LANDSCAPE PLANTING SCHEDULES	NA
1-191194_DD_501	LANDSCAPE MATERIALS & PLANTING PLAN 01	1:250@A1
1-191194_DD_502	LANDSCAPE MATERIALS & PLANTING PLAN 02	1:250@A1
1-191194_DD_503	LANDSCAPE MATERIALS & PLANTING PLAN 03	1:250@A1
1-191194_DD_601	LANDSCAPE SECTIONS	1:50@A1
1-191194_DD_602	LANDSCAPE SECTIONS	1:50@A1
1-191194_DD_603	LANDSCAPE SECTIONS	1:50@A1
1-191194_DD_701	LANDSCAPE DETAILS - SEATING NODES	AS SHOWN
1-191194_DD_702	LANDSCAPE DETAILS - HARDWORKS	AS SHOWN
1-191194_DD_703	LANDSCAPE DETAILS - SOFTWORKS	AS SHOWN
1-191194_DD_704	LANDSCAPE DETAILS - PLANTING MATRIXES	AS SHOWN
1-191194_DD_801	LANDSCAPE PLANTING SPECIFICATION	NA

**NOTES:**  
Not for Construction. Do not scale off drawings.

SCALE 1:1000 @ A1



01 LOCALITY PLAN  
001



COWPER STREET ALIGNMENT BY PLANT OUTSIDE THE SCOPE OF THIS PROPOSAL

**LEGEND**

-  CONCRETE CYCLEWAY  
REFER DETAIL 02\_702
-  DECOMPOSED GRANITIC SAND PATH  
REFER DETAIL 01\_702
-  EXISTING TREE RETAINED  
PROTECTED TO MEET AS 4970-2009
-  PROPOSED FEATURE TREE  
REFER PLANTING PLANS 501-503
-  EXTENT OF EARTH WORKS
-  OPERATING WATER LEVEL (OWL)
-  FINISHED FLOOR LEVEL (FFL)
-  EXTENT OF WORKS
-  PROPOSED 0.2m CONTOURS
-  SEWER INFRASTRUCTURE
-  SEWER ACCESS HOLE
-  SW PIPE HEADWALL
-  CADESTRAL BOUNDARIES
-  COWPER STREET ALIGNMENT
-  EXISTING TREE REMOVED

BYRON BAY RECREATIONAL GROUNDS



**AWC**  
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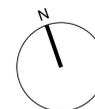


Byron Shire Council

DRAWING: **SITE CONTEXT & SHEET LAYOUT PLAN**

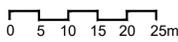
PROJECT: **SANDHILLS WETLAND DETAILED DESIGN PACKAGE**

REV.	ISSUE / AMENDMENTS	DATE
A	PRE-DETAILED DESIGN PACKAGE COUNCIL REVIEW	17.11.2021
B	DETAILED DESIGN PACKAGE 70%	28.02.2022
C	DETAILED DESIGN PACKAGE 100%	02.11.2022
D	DETAILED DESIGN PACKAGE AMENDMENTS 100%	17.11.2022
E	DETAILED DESIGN PACKAGE AMENDMENTS 100%	13.12.2022
F	FOR TENDER	25.08.2023



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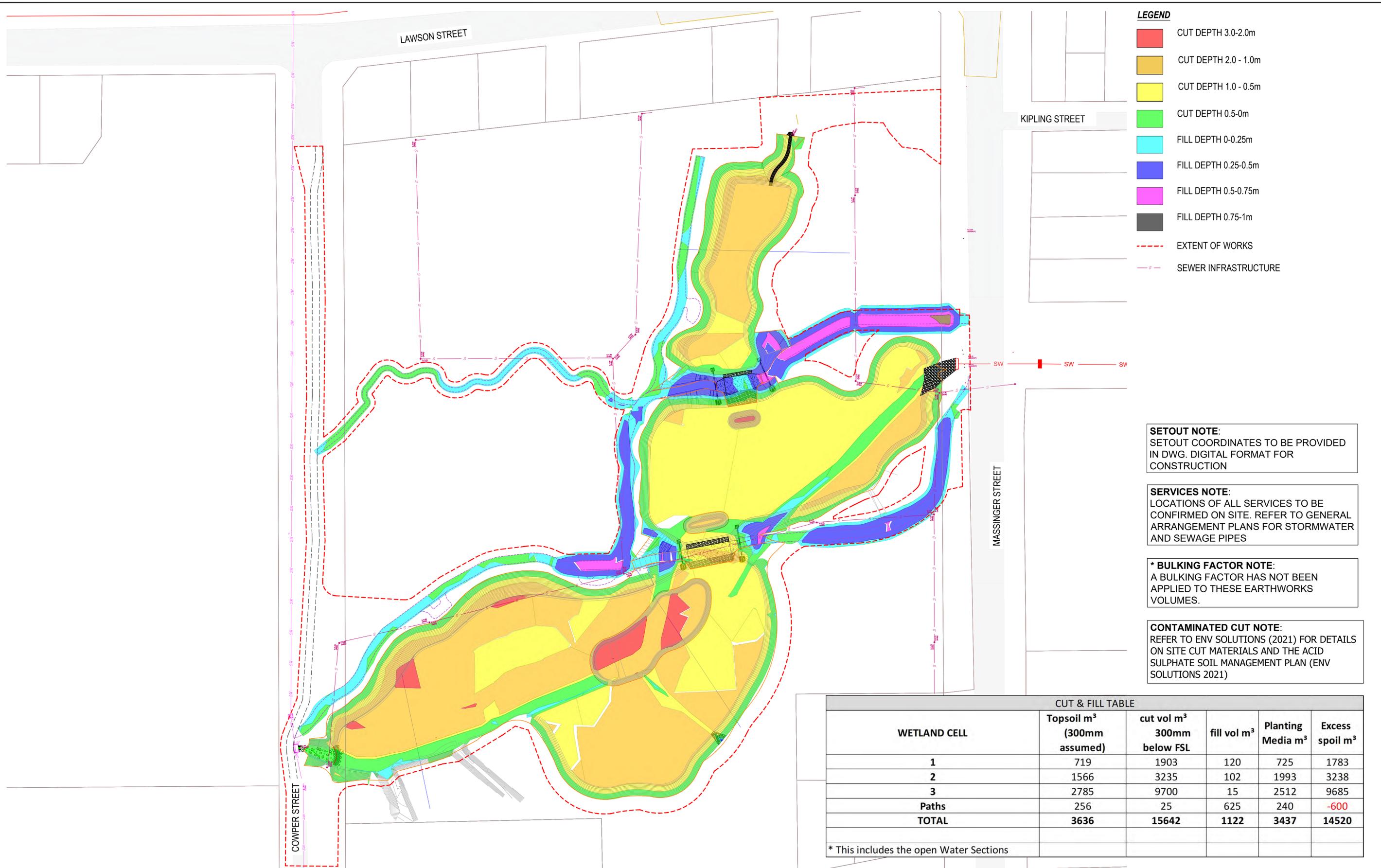
SCALE: 1:600 @ A1



DESIGNED: KC  
DRAWN: RS/TC  
CHECKED: DM

CAD FILE No. **1-91194\_SANDHILLS\_DD.DWG**  
SHEET No. **1-191194\_DD\_002**

REV. **F**





COWPER STREET ALIGNMENT BY PLANT OUTSIDE THE SCOPE OF THIS PROPOSAL

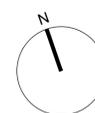
CONTRACTOR SHALL RECTIFY ANY IMPACT TO EXISTING LANDSCAPE ALONG COWPER STREET AND WHERE SHOULDER PLANTING IS NOT SHOWN

**LEGEND**

- - - EXTENT OF WORKS
- △ CONCRETE CYCLE WAY REFER DETAIL 02\_702
- DECOMPOSED GRANITIC SAND PATH REFER DETAIL 01\_702
- EXISTING TREE REMOVED
- EXISTING TREE RETAINED PROTECTED TO MEET AS 4970-2009
- EXTENT OF EARTH WORKS
- OPERATING WATER LEVEL (OWL)
- FINISHED FLOOR LEVEL (FFL)
- PROPOSED 0.2m CONTOURS
- SEWER INFRASTRUCTURE
- SEWER ACCESS HOLE
- S/W PIPE HEADWALL
- CADESTRAL BOUNDARIES
- COWPER STREET ALIGNMENT

- P1 MACROPHYTE ZONE 2.6-2.9m AHD 6/m<sup>2</sup> REFER 01\_500 & 05\_703
- P2 MACROPHYTE ZONE 2.6-2.9m AHD 6/m<sup>2</sup> REFER 01\_500 & 05\_703
- P3 EPHEMERAL ZONE 2.9-3.2m AHD 6/m<sup>2</sup> REFER 04\_500 & 02\_703
- P4 DRY BATTER ZONE >3.2m AHD 4/m<sup>2</sup> REFER 04\_500 & 03\_703
- P4 DRY BATER ZONE LOW PLANTING NO TREES OR LARGE SHRUBS
- P5 MACROPHYTE ZONE 2.0-2.2m AHD 6/m<sup>2</sup> REFER 02\_500 & 05\_703
- P6 MACROPHYTE ZONE 2.0-2.2m AHD 6/m<sup>2</sup> REFER 02\_500 & 05\_703
- P7 MACROPHYTE ZONE 1.8-1.9m AHD 6/m<sup>2</sup> REFER 03\_500 & 05\_703
- P8 MACROPHYTE ZONE 1.8-1.9m AHD 6/m<sup>2</sup> REFER 03\_500 & 05\_703
- P9 FROG MARSH ZONE 1.8-1.9m AHD 6/m<sup>2</sup> REFER 03\_500 & 05\_703
- P10 FOREST PLANTING ZONE >1.8m AHD 4/m<sup>2</sup> REFER 03\_500 & 05\_703
- P10 FOREST PLANTING ZONE LOW NO TREES OR LARGE SHRUBS
- P11 SHOULDER PLANTING ZONE 4/m<sup>2</sup> REFER SCHEDULES 04\_500 & 03\_703
- SHADE FEATURE TREE REFER DETAIL 01\_703 & 05\_500

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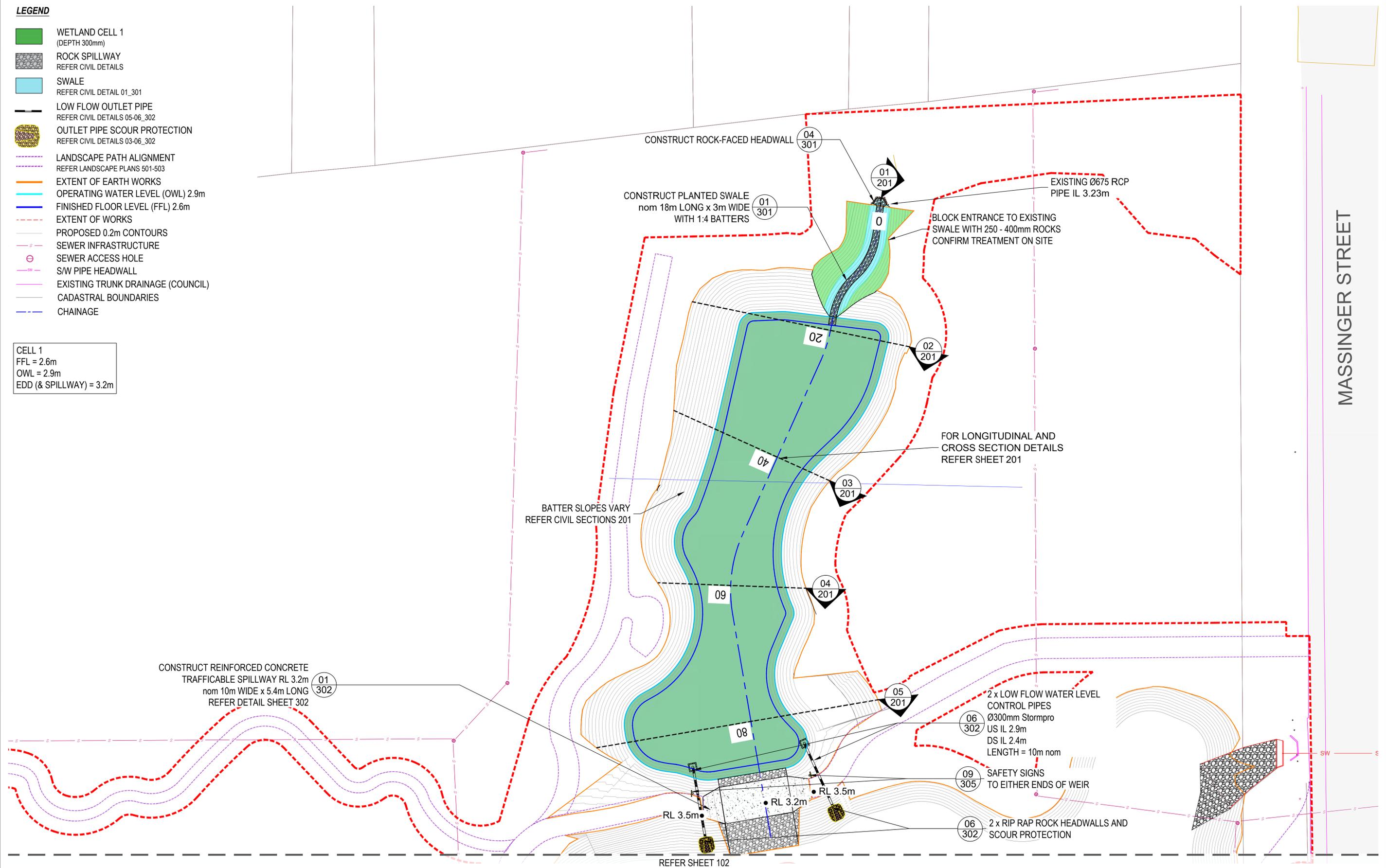


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**LEGEND**

- WETLAND CELL 1  
(DEPTH 300mm)
- ROCK SPILLWAY  
REFER CIVIL DETAILS
- SWALE  
REFER CIVIL DETAIL 01\_301
- LOW FLOW OUTLET PIPE  
REFER CIVIL DETAILS 05-06\_302
- OUTLET PIPE SCOUR PROTECTION  
REFER CIVIL DETAILS 03-06\_302
- LANDSCAPE PATH ALIGNMENT  
REFER LANDSCAPE PLANS 501-503
- EXTENT OF EARTH WORKS
- OPERATING WATER LEVEL (OWL) 2.9m
- FINISHED FLOOR LEVEL (FFL) 2.6m
- EXTENT OF WORKS
- PROPOSED 0.2m CONTOURS
- SEWER INFRASTRUCTURE
- SEWER ACCESS HOLE
- S/W PIPE HEADWALL
- EXISTING TRUNK DRAINAGE (COUNCIL)
- CADASTRAL BOUNDARIES
- CHAINAGE

CELL 1  
FFL = 2.6m  
OWL = 2.9m  
EDD (& SPILLWAY) = 3.2m



**AWC**  
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25 LESLIE ST, BANGALOW NSW 2479  
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www.awconsult.com.au

CLIENT: Byron Shire Council

DRAWING: **EARTHWORKS & LAYOUT PLANS 01**

PROJECT: **SANDHILLS WETLAND DETAILED DESIGN PACKAGE**

REV.	ISSUE / AMENDMENTS	DATE
A	PRE-DETAILED DESIGN PACKAGE COUNCIL REVIEW	17.11.2021
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F	FOR TENDER	25.08.2023

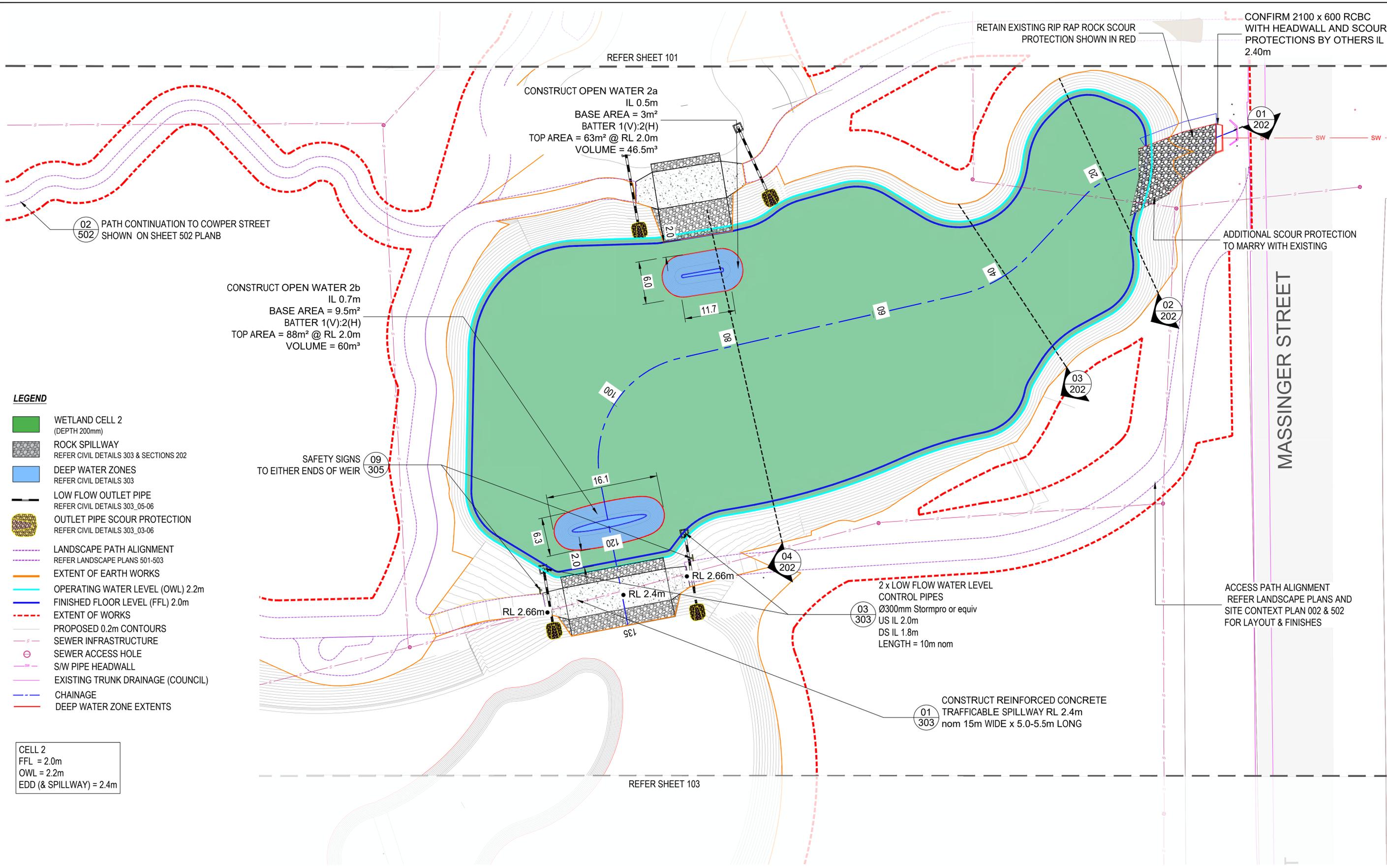
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SCALE: 1:250 @ A1

DESIGNED: KC  
DRAWN: RS/TC  
CHECKED: DM

CAD FILE No. **1-91194\_SANDHILLS\_DD.DWG**  
SHEET No. **1-191194\_DD\_101**

REV. **F**



- LEGEND**
- WETLAND CELL 2 (DEPTH 200mm)
  - ROCK SPILLWAY REFER CIVIL DETAILS 303 & SECTIONS 202
  - DEEP WATER ZONES REFER CIVIL DETAILS 303
  - LOW FLOW OUTLET PIPE REFER CIVIL DETAILS 303\_05-06
  - OUTLET PIPE SCOUR PROTECTION REFER CIVIL DETAILS 303\_03-06
  - LANDSCAPE PATH ALIGNMENT REFER LANDSCAPE PLANS 501-503
  - EXTENT OF EARTH WORKS
  - OPERATING WATER LEVEL (OWL) 2.2m
  - FINISHED FLOOR LEVEL (FFL) 2.0m
  - EXTENT OF WORKS
  - PROPOSED 0.2m CONTOURS
  - SEWER INFRASTRUCTURE
  - SEWER ACCESS HOLE
  - S/W PIPE HEADWALL
  - EXISTING TRUNK DRAINAGE (COUNCIL)
  - CHAINAGE
  - DEEP WATER ZONE EXTENTS

CELL 2  
 FFL = 2.0m  
 OWL = 2.2m  
 EDD (& SPILLWAY) = 2.4m

CONSTRUCT OPEN WATER 2a  
 IL 0.5m  
 BASE AREA = 3m<sup>2</sup>  
 BATTER 1(V):2(H)  
 TOP AREA = 63m<sup>2</sup> @ RL 2.0m  
 VOLUME = 46.5m<sup>3</sup>

CONSTRUCT OPEN WATER 2b  
 IL 0.7m  
 BASE AREA = 9.5m<sup>2</sup>  
 BATTER 1(V):2(H)  
 TOP AREA = 88m<sup>2</sup> @ RL 2.0m  
 VOLUME = 60m<sup>3</sup>

2 x LOW FLOW WATER LEVEL CONTROL PIPES  
 Ø300mm Stormpro or equiv  
 US IL 2.0m  
 DS IL 1.8m  
 LENGTH = 10m nom

CONSTRUCT REINFORCED CONCRETE TRAFFICABLE SPILLWAY RL 2.4m  
 nom 15m WIDE x 5.0-5.5m LONG

CONFIRM 2100 x 600 RCBC WITH HEADWALL AND SCOUR PROTECTIONS BY OTHERS IL 2.40m

ADDITIONAL SCOUR PROTECTION TO MARRY WITH EXISTING

ACCESS PATH ALIGNMENT REFER LANDSCAPE PLANS AND SITE CONTEXT PLAN 002 & 502 FOR LAYOUT & FINISHES

MASSINGER STREET

REFER SHEET 101

REFER SHEET 103

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DRAWING: **EARTHWORKS & LAYOUT PLANS 02**

PROJECT: **SANDHILLS WETLAND DETAILED DESIGN PACKAGE**

REV.	ISSUE / AMENDMENTS	DATE
A	PRE-DETAILED DESIGN PACKAGE COUNCIL REVIEW	17.11.2021
B	DETAILED DESIGN PACKAGE 70%	28.02.2022
C	DETAILED DESIGN PACKAGE 100%	02.11.2022
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F	FOR TENDER	25.08.2023



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SCALE: 1:250 @ A1

DESIGNED: KC  
 DRAWN: RS/TC  
 CHECKED: DM

CAD FILE No. **1-91194\_SANDHILLS\_DD.DWG**  
 SHEET No. **1-191194\_DD\_102**

**LEGEND**

- WETLAND CELL 3  
(DEPTH 100mm)
- ROCK SPILLWAY  
REFER CIVIL DETAILS SHEET 303
- DEEPWATER ZONE  
REFER SECTIONS 203
- EARTH BUND  
REFER CIVIL DETAILS 304
- OUTLET SWALE  
REFER CIVIL DETAILS 304
- LOW FLOW OUTLET PIPE  
REFER CIVIL DETAILS 303\_05-06
- OUTLET PIPE SCOUR PROTECTION  
REFER CIVIL DETAILS 303\_03-06
- LANDSCAPE PATH ALIGNMENT  
REFER LANDSCAPE PLANS 501-503
- EXTENT OF EARTH WORKS
- OPERATING WATER LEVEL (OWL) 2.9m
- FINISHED FLOOR LEVEL (FFL) 2.6m
- EXTENT OF WORKS
- PROPOSED 0.2m CONTOURS
- SEWER INFRASTRUCTURE
- SEWER ACCESS HOLE
- S/W PIPE HEADWALL
- CHAINAGE
- DEEP WATER ZONE EXTENTS
- COWPER STREET ALIGNMENT BY OTHERS

CELL 3  
FFL = 1.8m  
OWL = 1.9m



AVOID IMPACTING SEWER  
MAINS WHEN GRADING  
THIS SLOPE

COWPER STREET

AVOID IMPACTING SEWER  
MAINS WHEN GRADING  
THIS SLOPE

MAKE GOOD CONNECTION TO  
EXISTING STORMWATER PIT  
REFER SHEET 304  
BALUSTRADE INSTALLED ON TOP TO  
MEET NON-FALL REQUIREMENTS

CONSTRUCT OPEN WATER 3  
IL 0.8m  
BASE AREA = 575m<sup>2</sup>  
BATTER 1(V):2(H)  
TOP AREA = 805m<sup>2</sup> @ RL 1.8m  
VOLUME = 680m<sup>3</sup>

CONSTRUCT LOCAL SCOUR  
PROTECTION DOWN THE  
PROPOSED BATTER FROM THE  
EXISTING DRAINAGE SWALE  
RIP RAP ROCK D<sub>50</sub> = 150mm ON  
100mm THICK UNDERLAYER  
ROCK D<sub>50</sub> = 50mm ON  
GEOTEXTILE UNDERLAY BIDIM A44  
OR EQUIVALENT



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DRAWING: **EARTHWORKS & LAYOUT PLANS 03**

PROJECT: **SANDHILLS WETLAND  
DETAILED DESIGN PACKAGE**

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C	DETAILED DESIGN PACKAGE 100%	02.11.2022
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E	DETAILED DESIGN PACKAGE AMENDMENTS 100%	13.12.2022
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SCALE: 1:250 @ A1

DESIGNED: KC

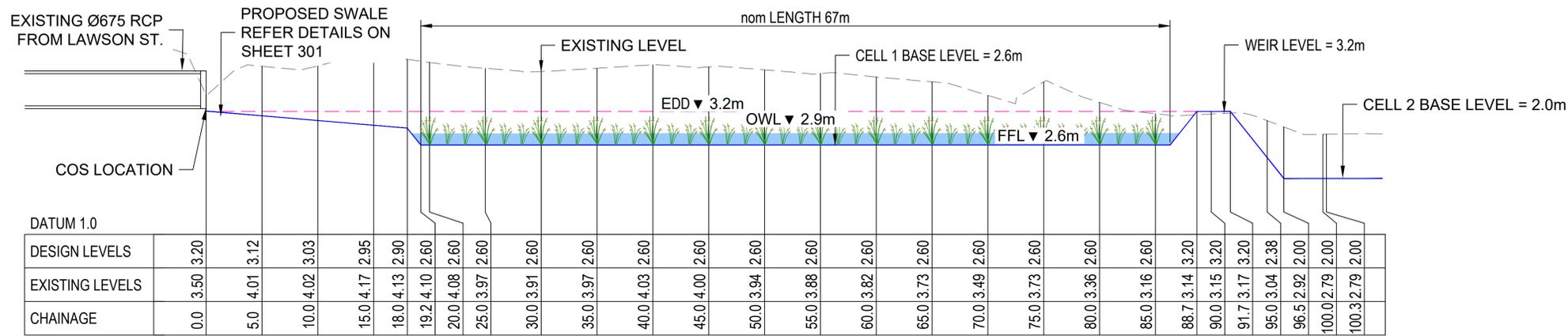
DRAWN: RS/TC

CHECKED: DM

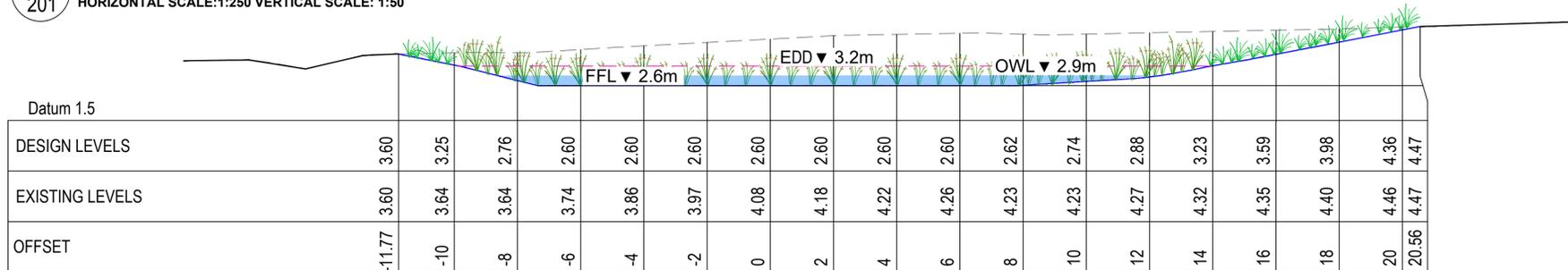
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SHEET No. **1-191194\_DD\_103**

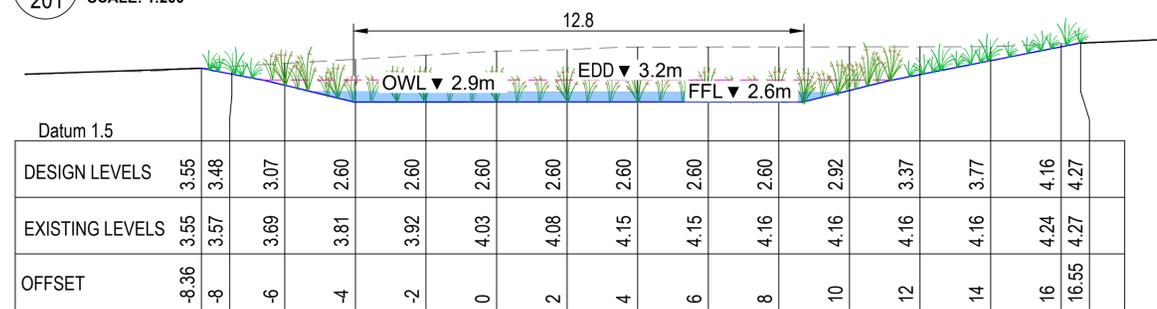
REV. **F**



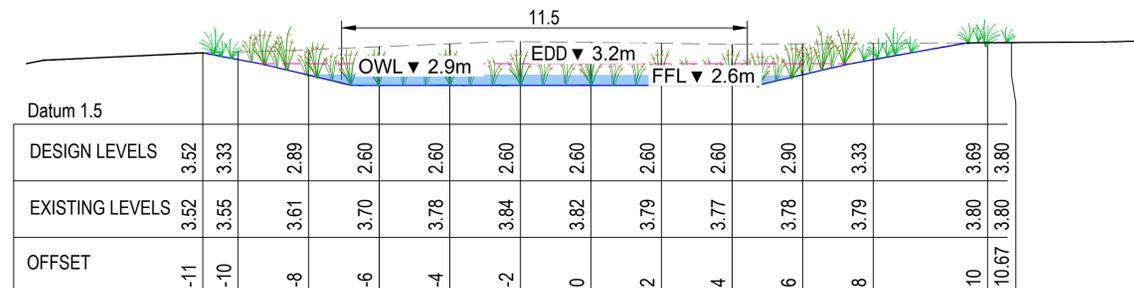
**01 LONGITUDINAL SECTION**  
 201 HORIZONTAL SCALE: 1:250 VERTICAL SCALE: 1:50



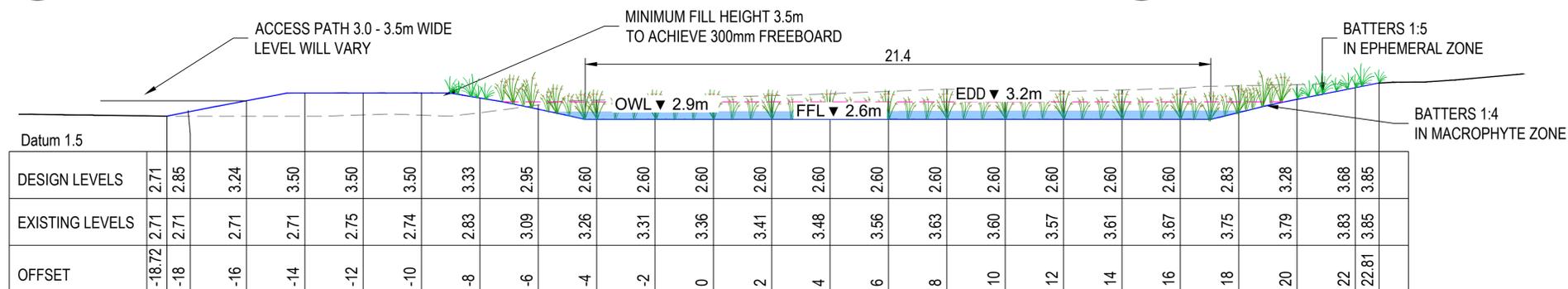
**02 CROSS SECTION CHAINAGE 20**  
 201 SCALE: 1:200



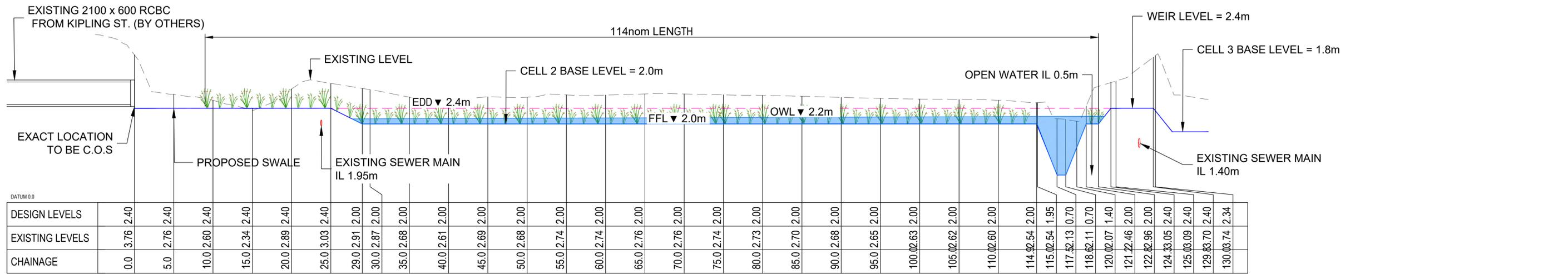
**03 CROSS SECTION CHAINAGE 40**  
 201 SCALE: 1:200



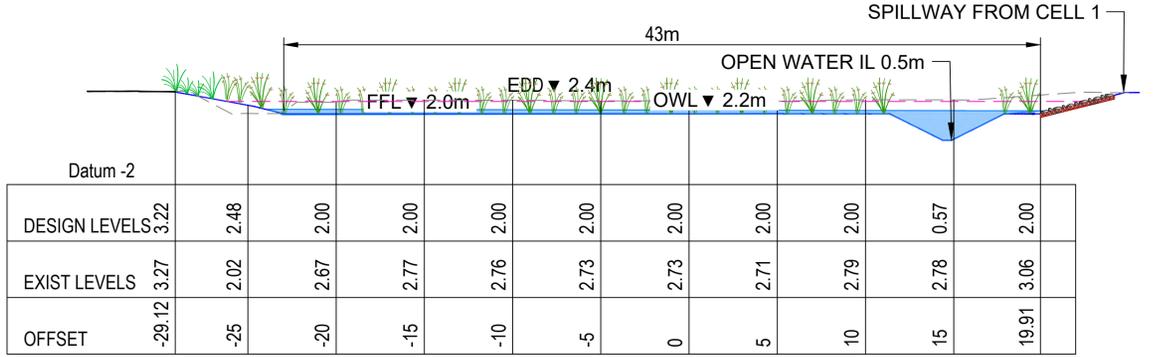
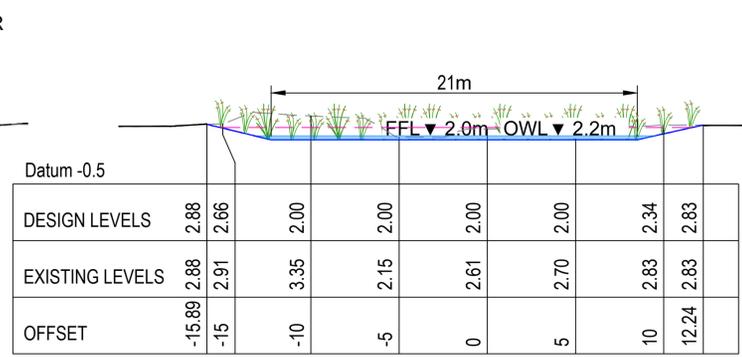
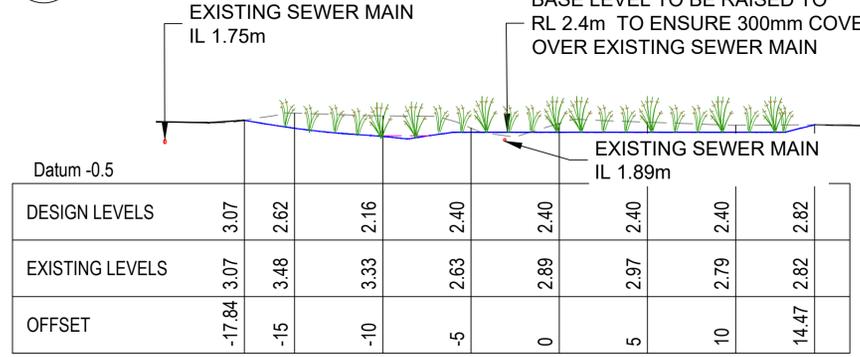
**04 CROSS SECTION CHAINAGE 60**  
 201 SCALE: 1:200



**05 CROSS SECTION CHAINAGE 80**  
 201 SCALE: 1:200



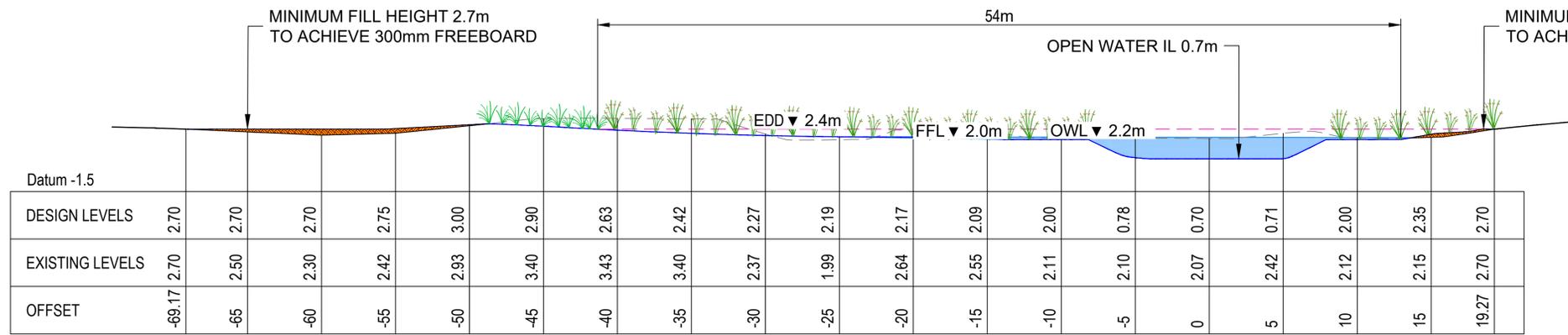
01 LONGITUDINAL SECTION  
202 HORIZONTAL SCALE: 1:250 VERTICAL SCALE: 1:50



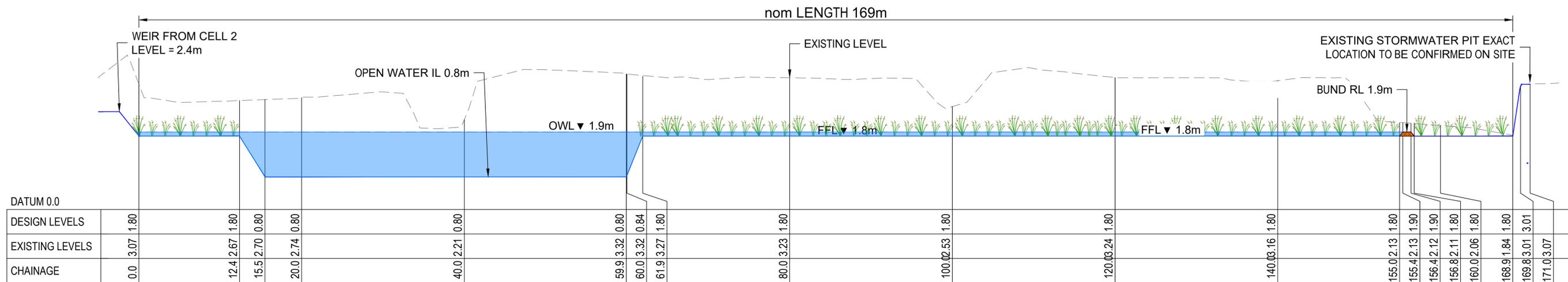
02 CROSS SECTION CHAINAGE 20  
202 SCALE: 1:200

03 CROSS SECTION CHAINAGE 40  
202 SCALE: 1:200

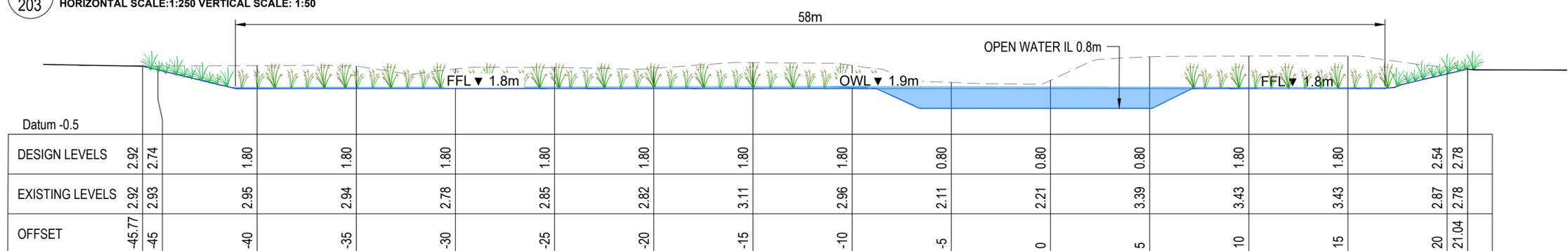
04 CROSS SECTION CHAINAGE 80  
202 SCALE: 1:200



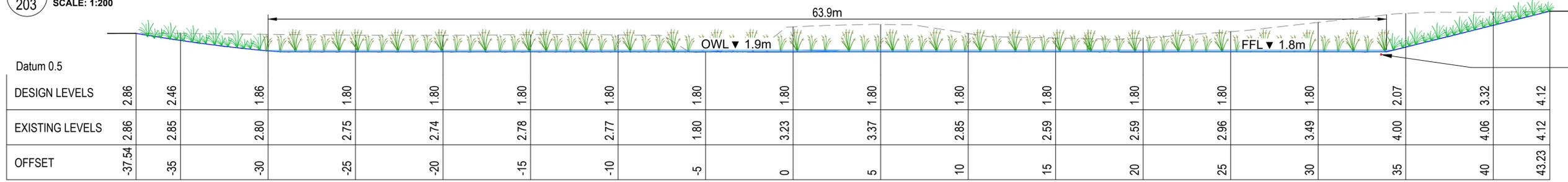
05 CROSS SECTION CHAINAGE 120  
202 SCALE: 1:200



01 LONGITUDINAL SECTION  
203 HORIZONTAL SCALE: 1:250 VERTICAL SCALE: 1:50

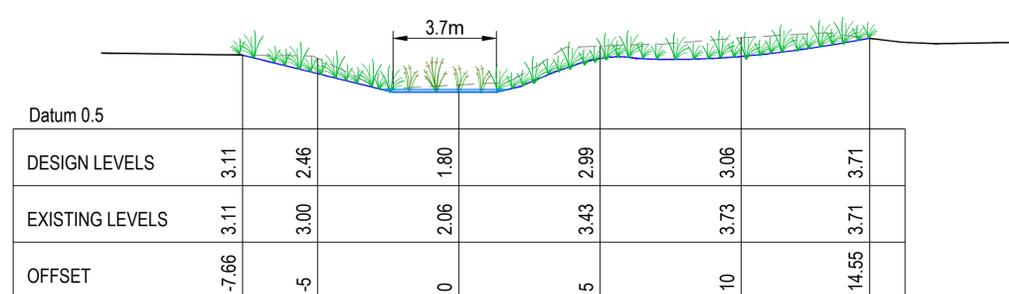
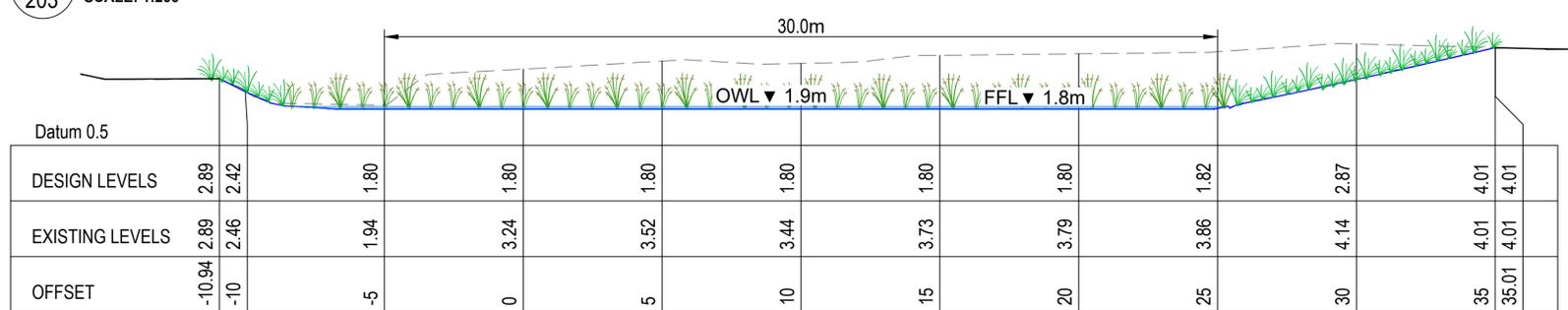


02 CROSS SECTION CHAINAGE 40  
203 SCALE: 1:200



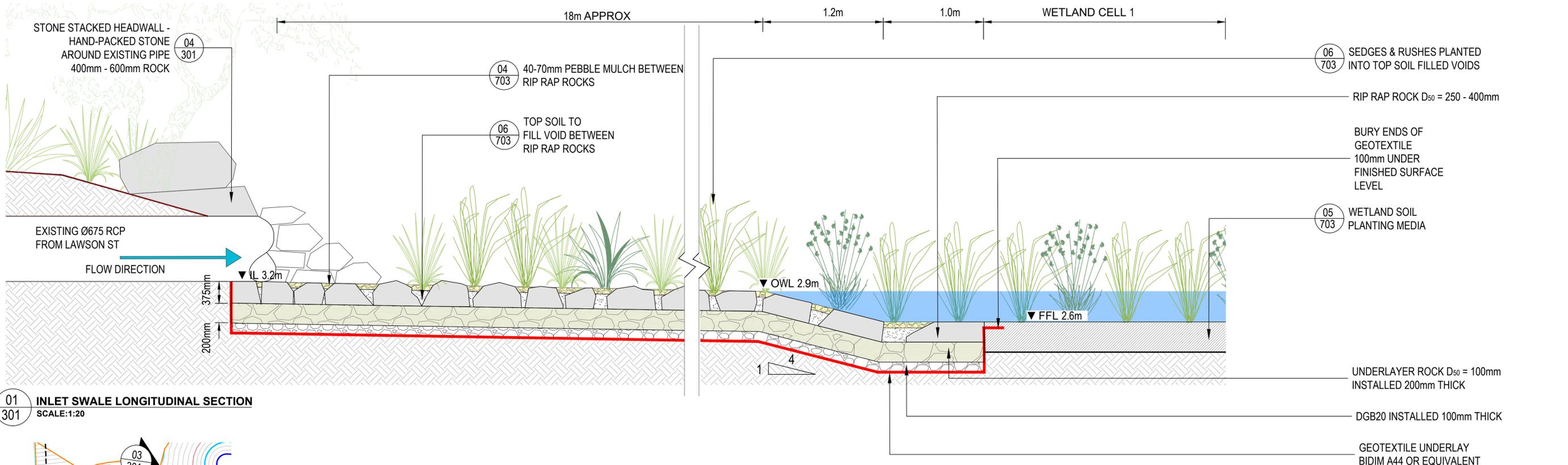
EXISTING SEWER MAIN IL 1.2m INDICATIVE INLET LEVEL AND LOCATION ONLY CONTRACTOR TO CONFIRM ON SITE

03 CROSS SECTION CHAINAGE 80  
203 SCALE: 1:200

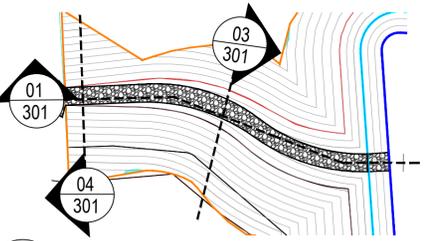


04 CROSS SECTION CHAINAGE 120  
203 SCALE: 1:200

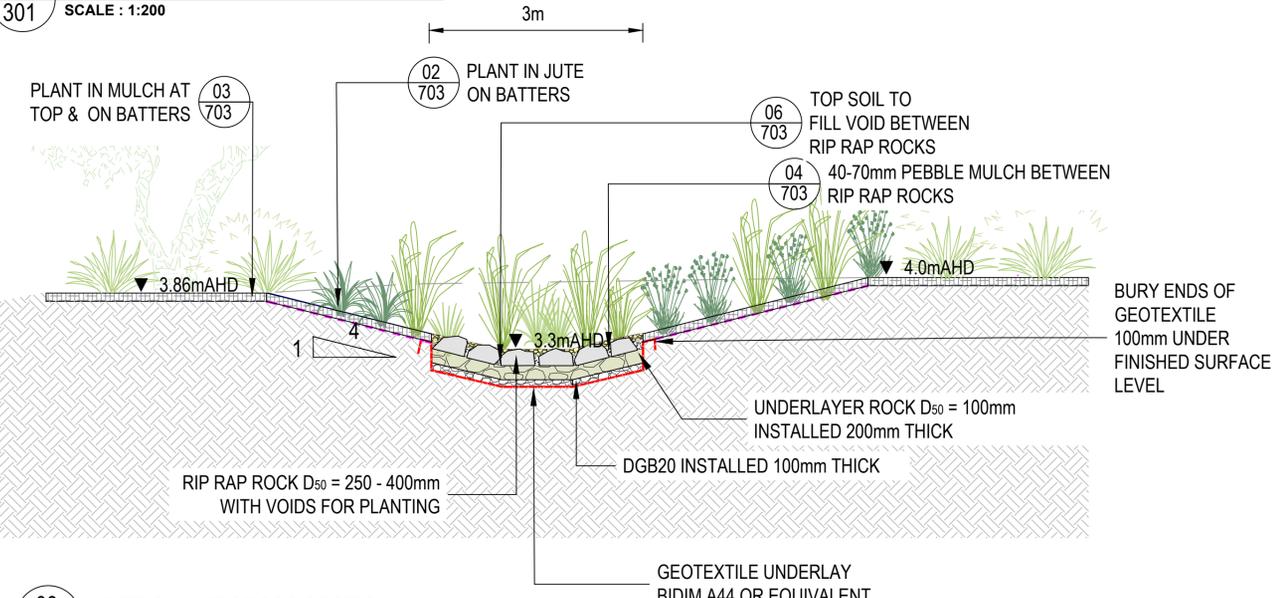
05 CROSS SECTION CHAINAGE 160  
203 SCALE: 1:200



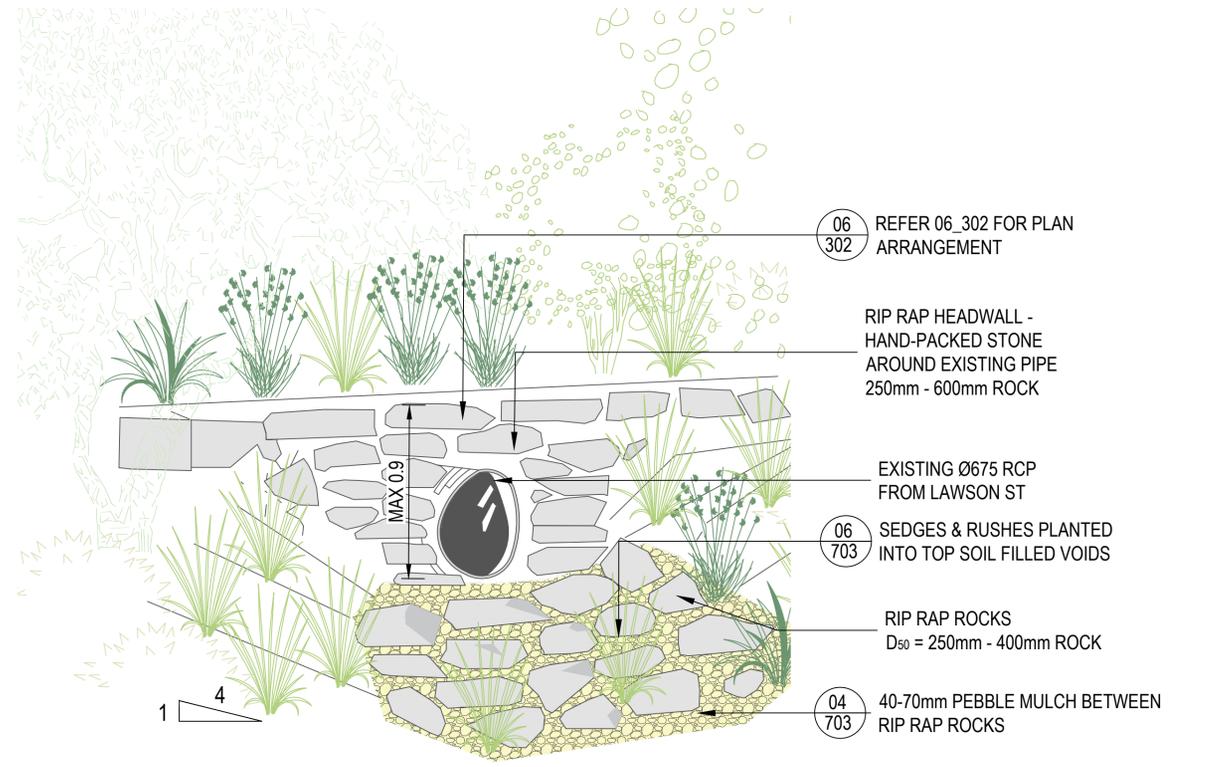
**01 INLET SWALE LONGITUDINAL SECTION**  
SCALE: 1:20



**02 SECTION REFERENCE PLAN**  
SCALE: 1:200



**03 INLET SWALE CROSS SECTION**  
SCALE: 1:50



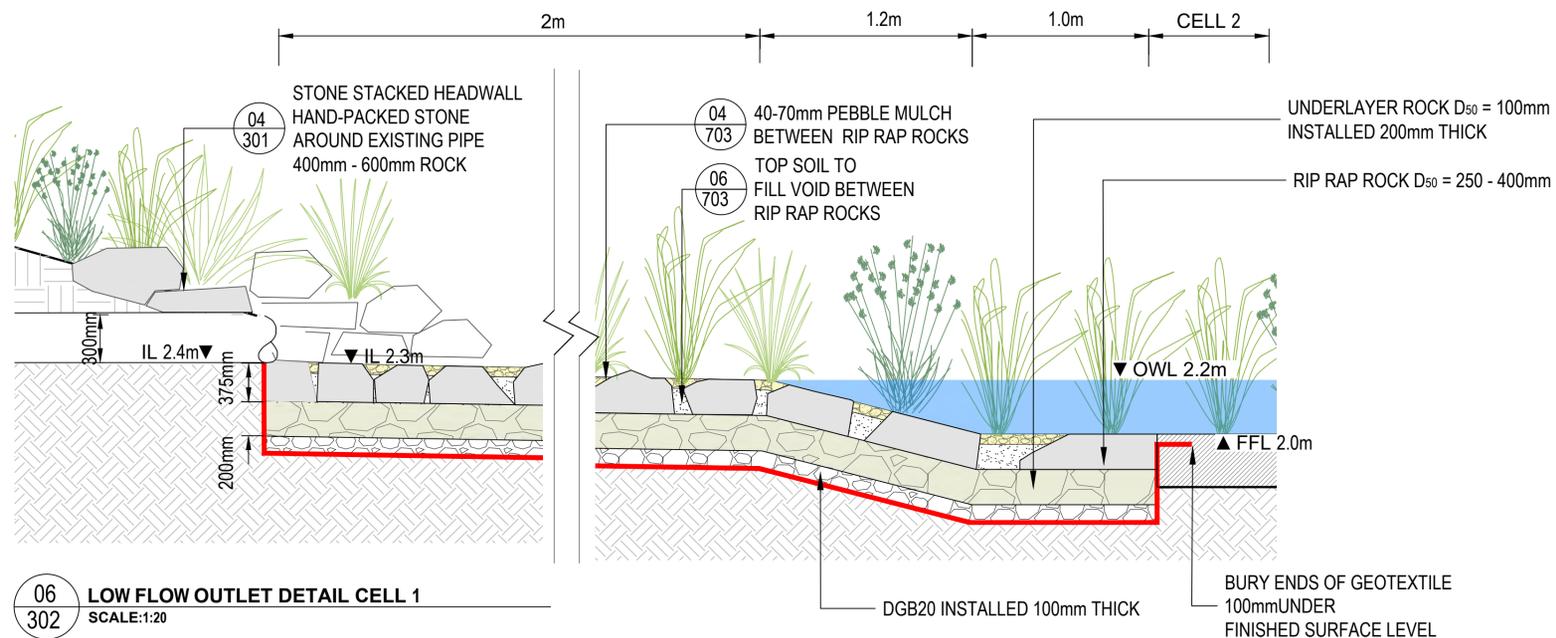
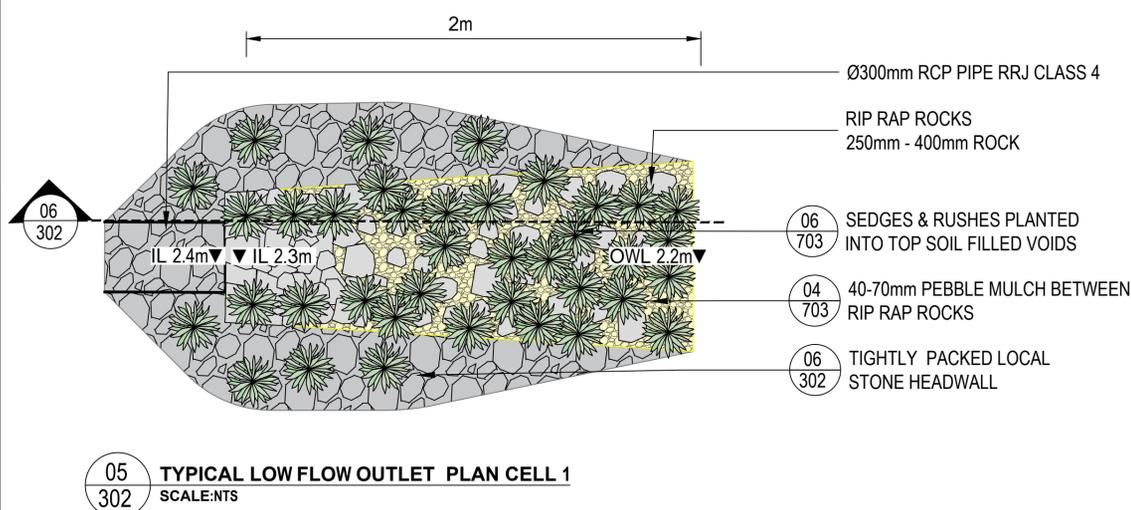
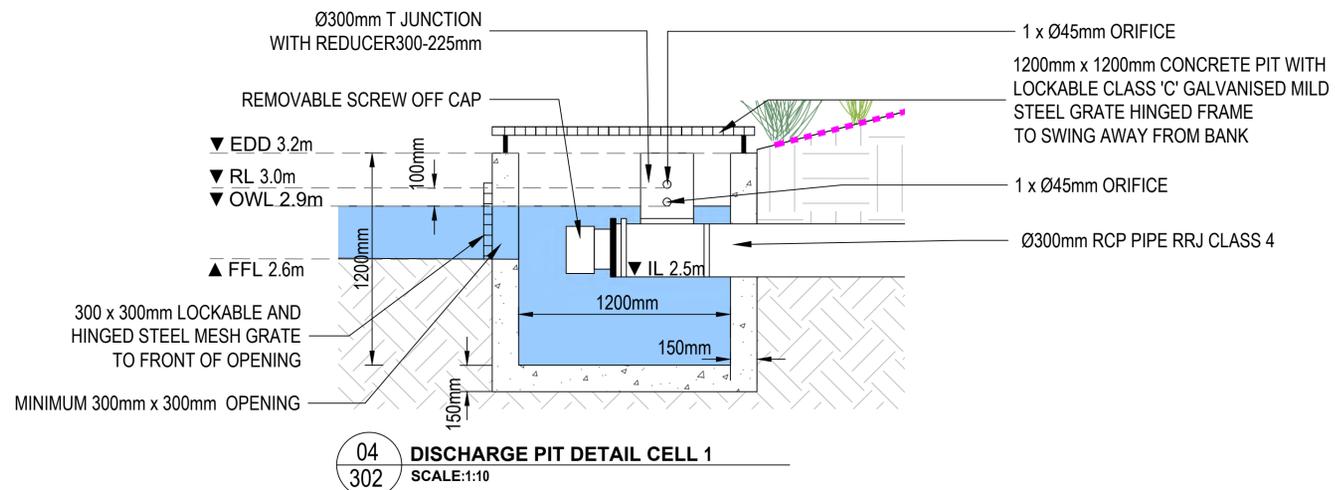
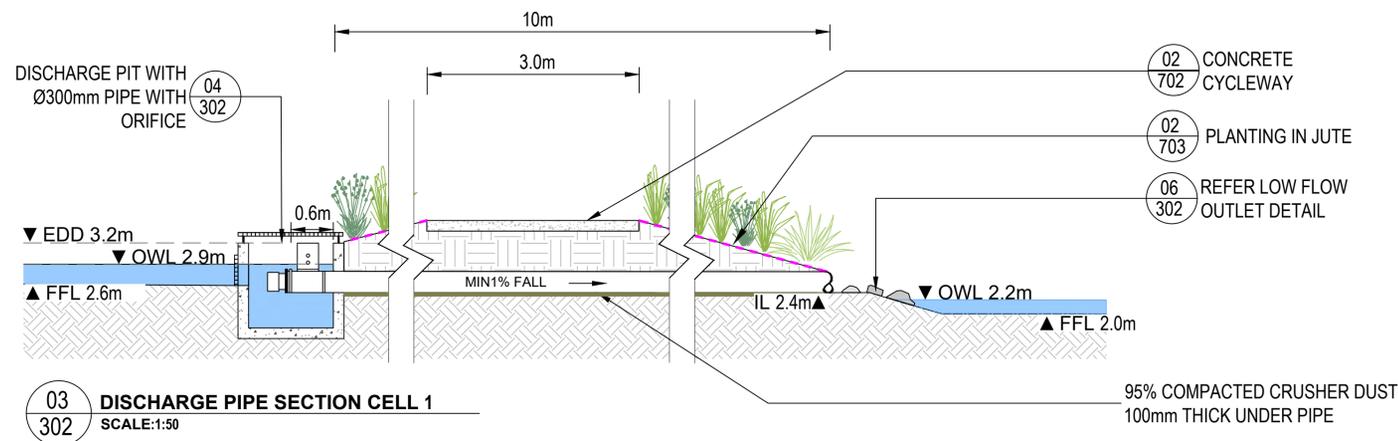
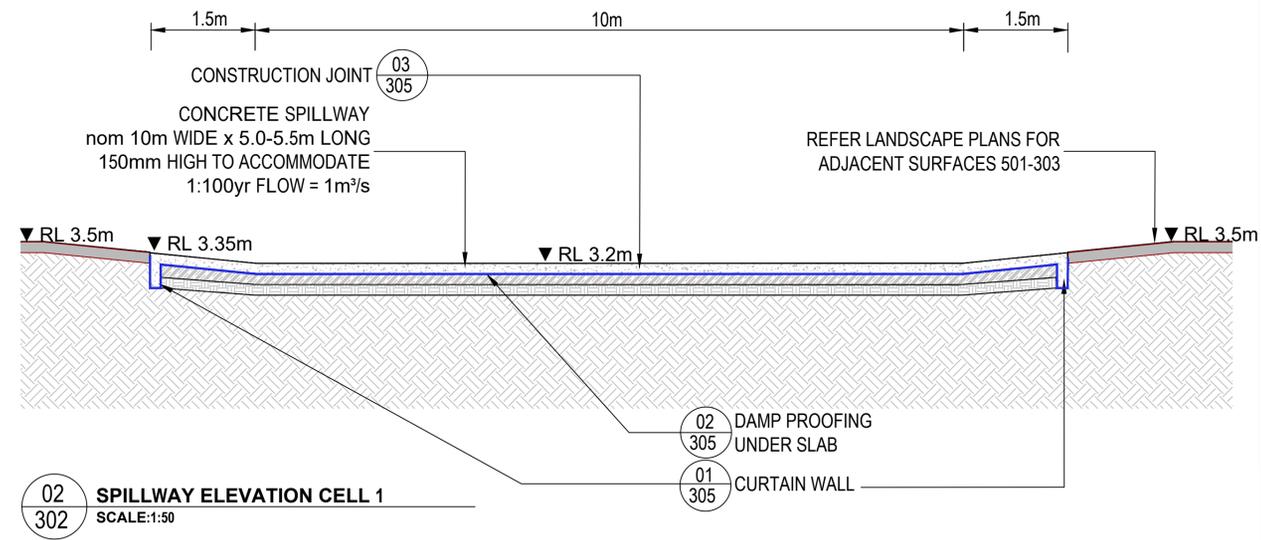
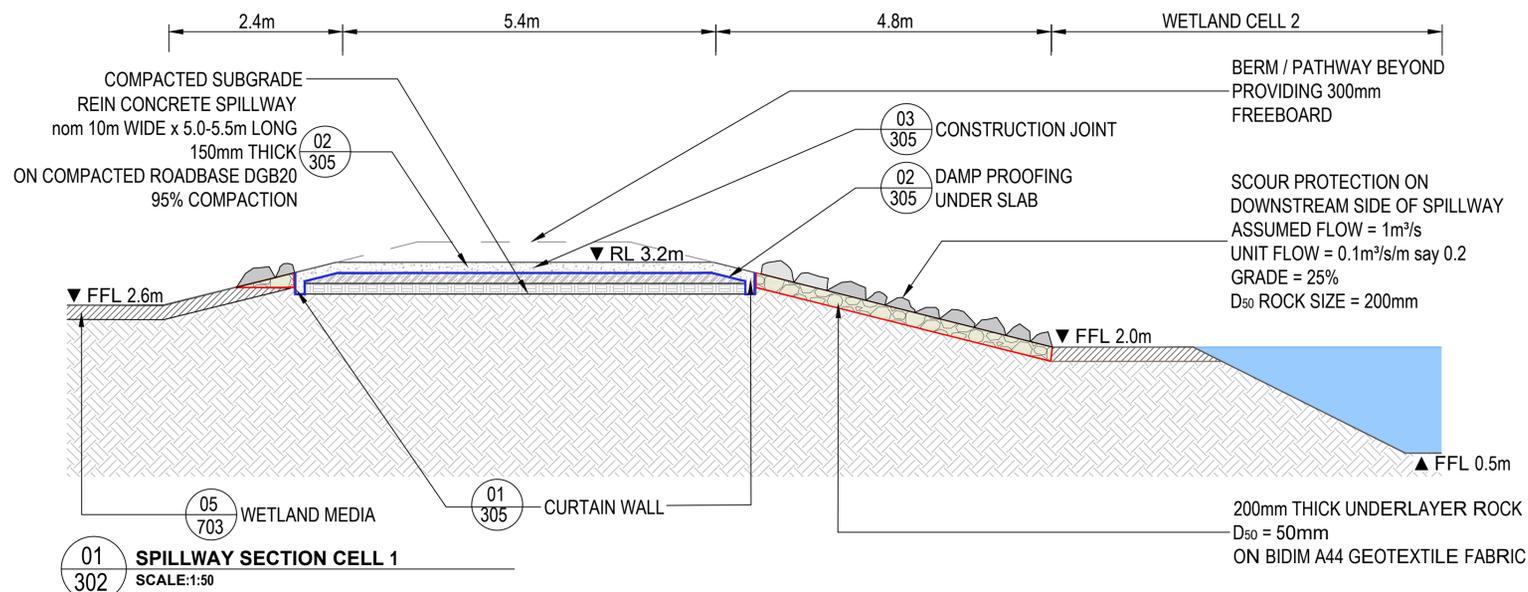
**04 STONE STACKED HEADWALL PERSPECTIVE**  
SCALE: NTS

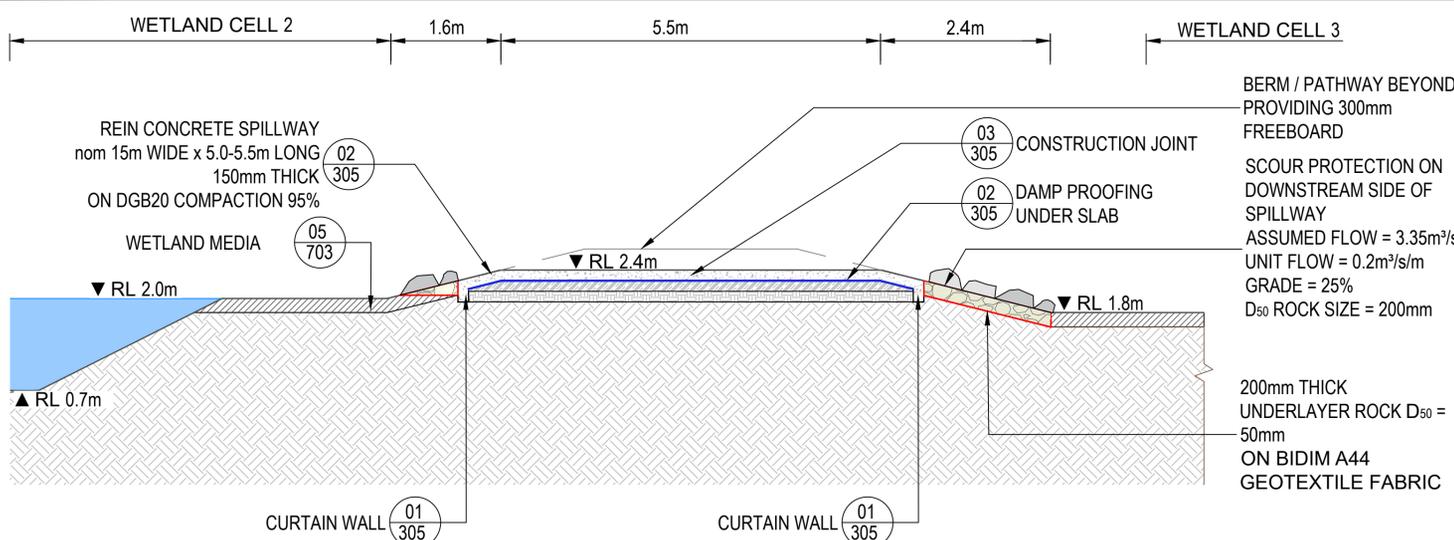
- 06 703 SEDGES & RUSHES PLANTED INTO TOP SOIL FILLED VOIDS
- RIP RAP ROCK D<sub>50</sub> = 250 - 400mm
- BURY ENDS OF GEOTEXTILE 100mm UNDER FINISHED SURFACE LEVEL
- 05 703 WETLAND SOIL PLANTING MEDIA
- UNDERLAYER ROCK D<sub>50</sub> = 100mm INSTALLED 200mm THICK
- DGB20 INSTALLED 100mm THICK
- GEOTEXTILE UNDERLAY BIDIM A44 OR EQUIVALENT

- 06 302 REFER 06\_302 FOR PLAN ARRANGEMENT
- RIP RAP HEADWALL - HAND-PACKED STONE AROUND EXISTING PIPE 250mm - 600mm ROCK
- EXISTING Ø675 RCP FROM LAWSON ST
- 06 703 SEDGES & RUSHES PLANTED INTO TOP SOIL FILLED VOIDS
- RIP RAP ROCKS D<sub>50</sub> = 250mm - 400mm ROCK
- 04 703 40-70mm PEBBLE MULCH BETWEEN RIP RAP ROCKS

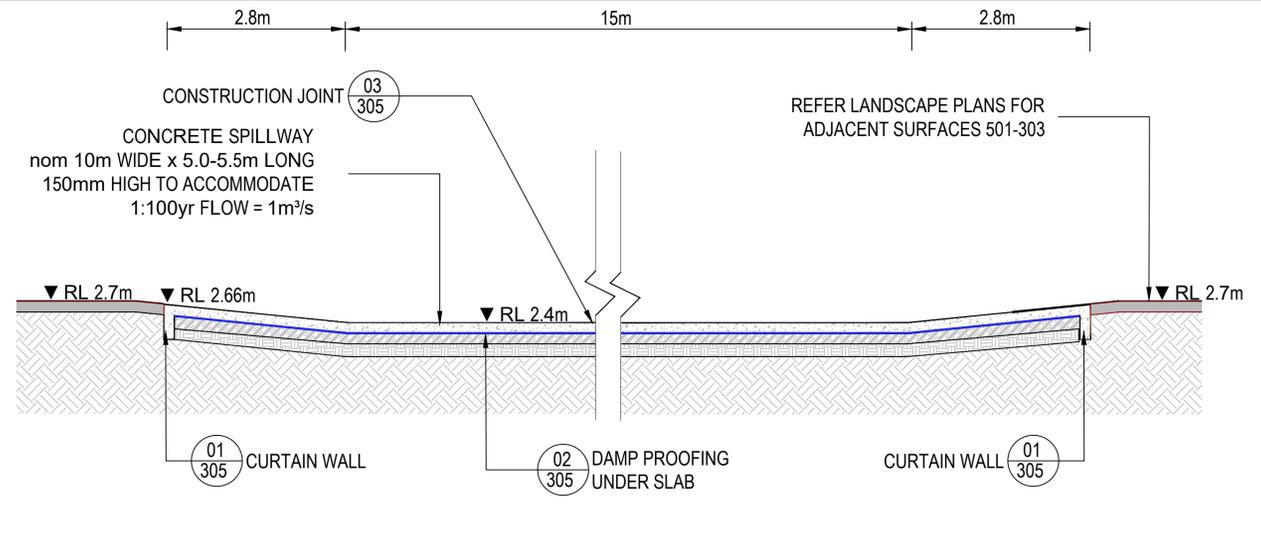
REV.	ISSUE / AMENDMENTS	DATE
A	PRE -DETAILED DESIGN PACKAGE COUNCIL REVIEW	17.11.2021
B	DETAILED DESIGN PACKAGE 70%	28.02.2022
C	DETAILED DESIGN PACKAGE 100%	02.11.2022
D	DETAILED DESIGN PACKAGE AMENDMENTS 100%	17.11.2022
E	DETAILED DESIGN PACKAGE AMENDMENTS 100%	13.12.2022
F	FOR TENDER	25.08.2023

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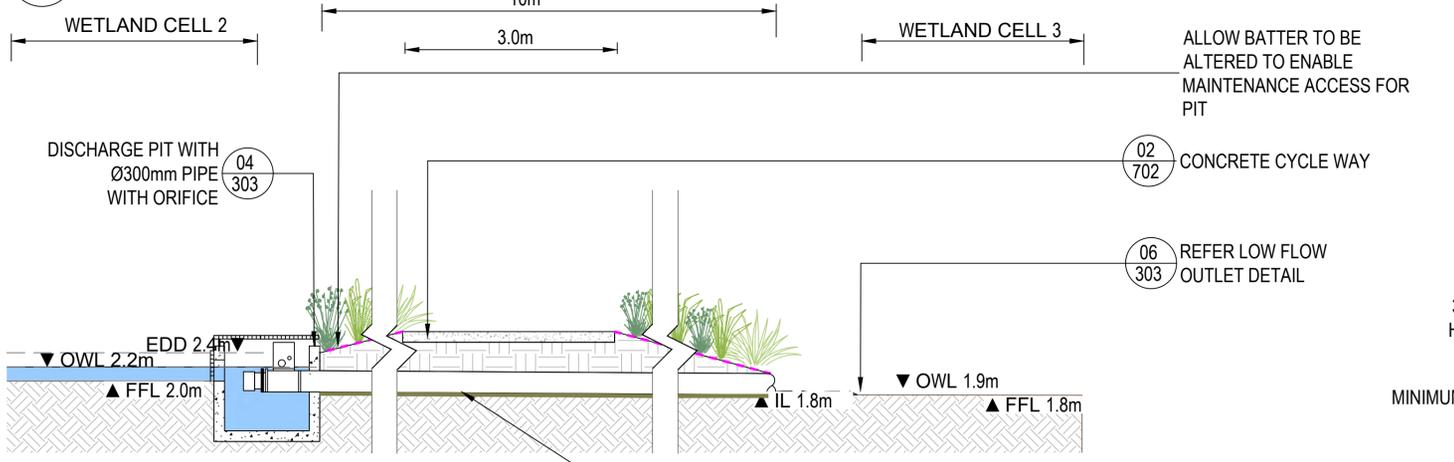




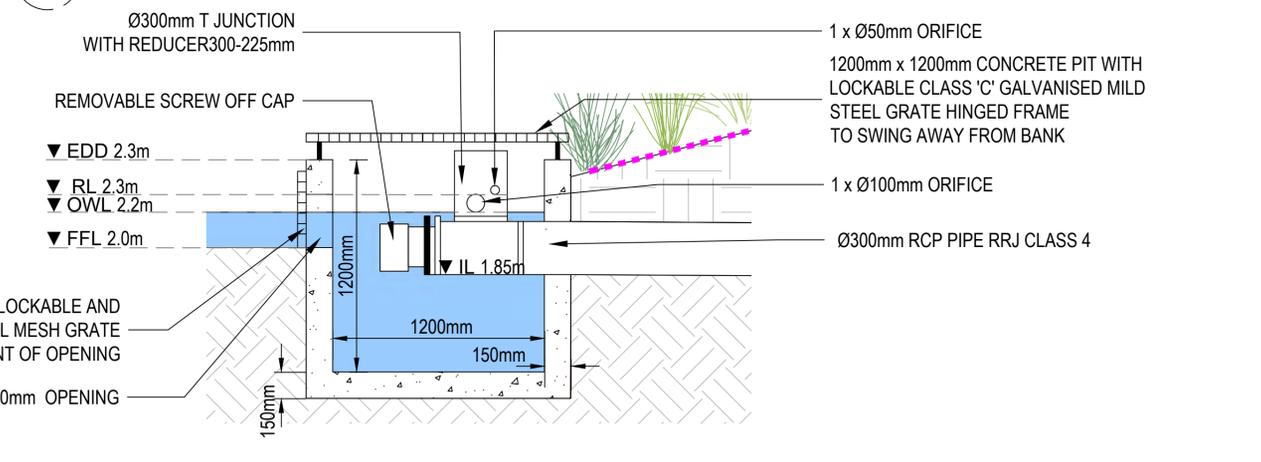
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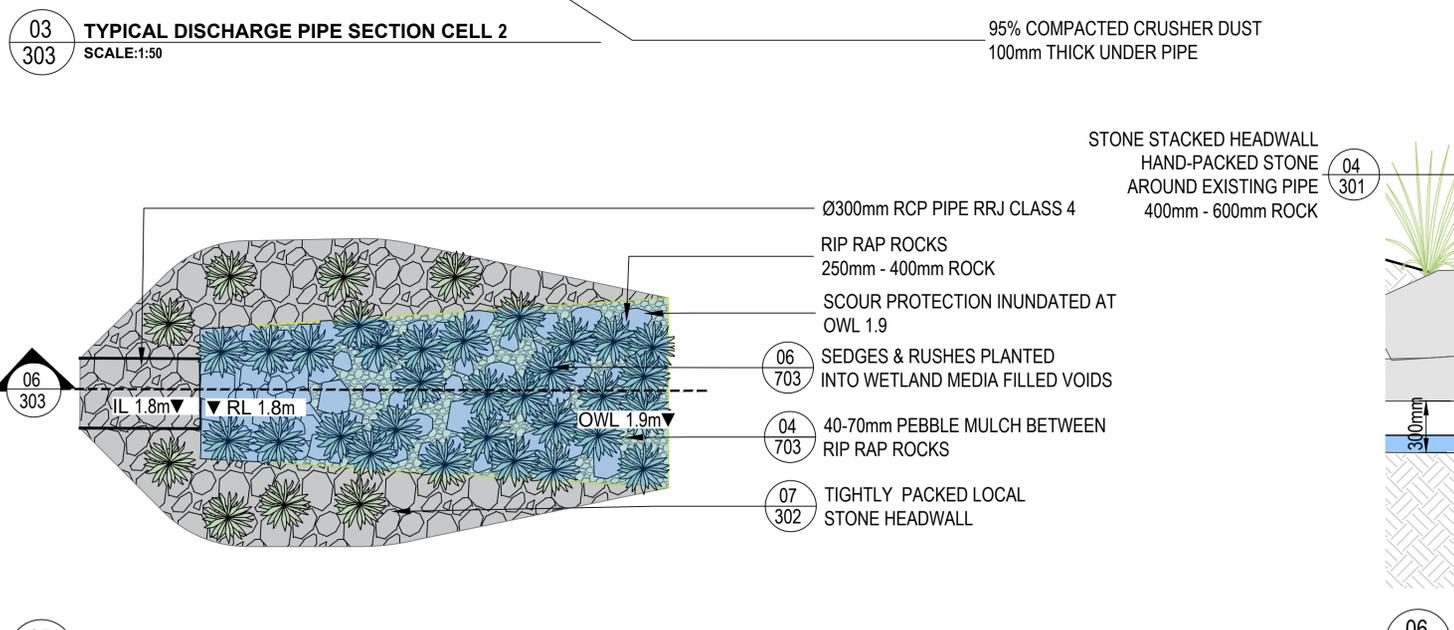
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SCALE: 1:50



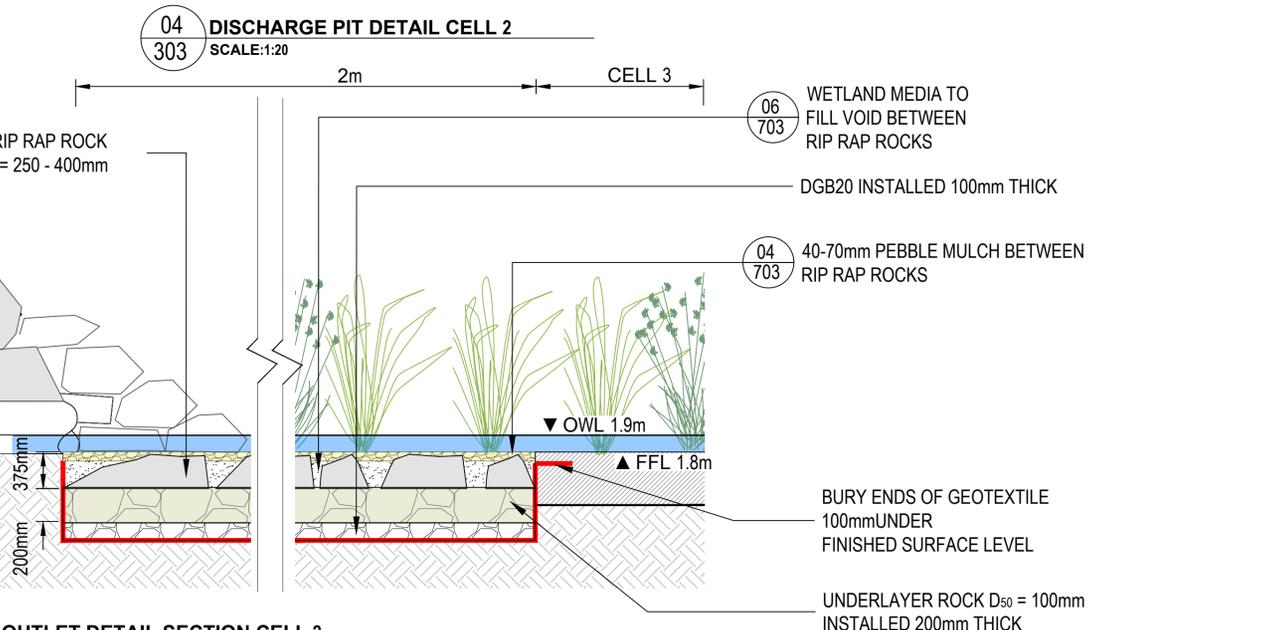
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SCALE: 1:50



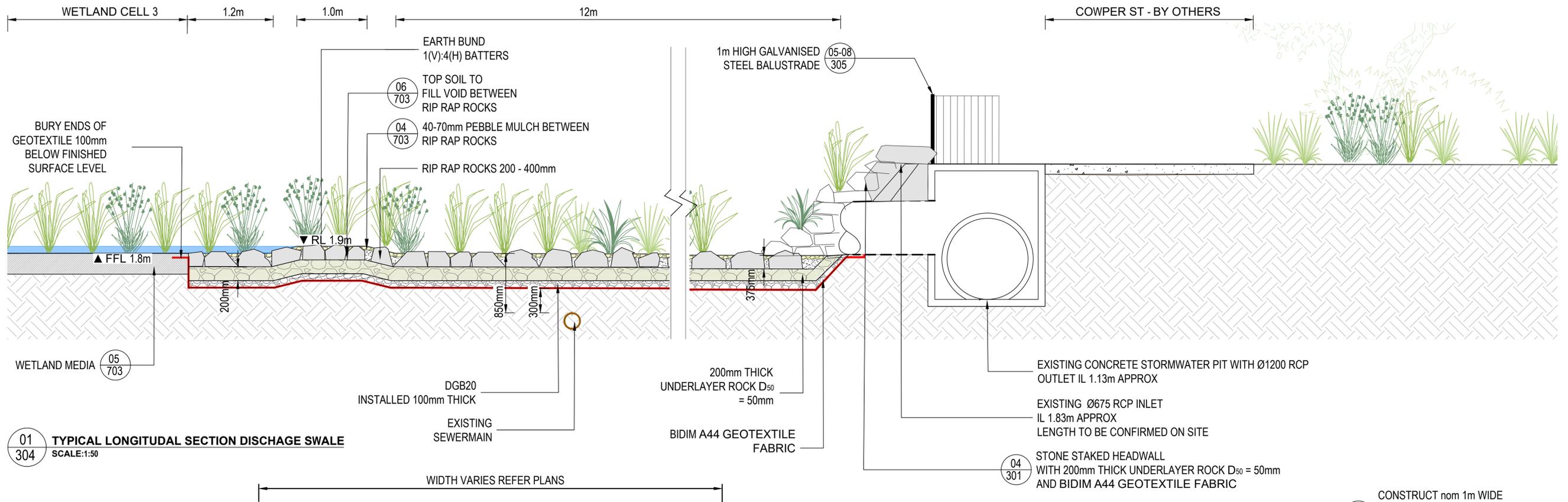
04 DISCHARGE PIT DETAIL CELL 2  
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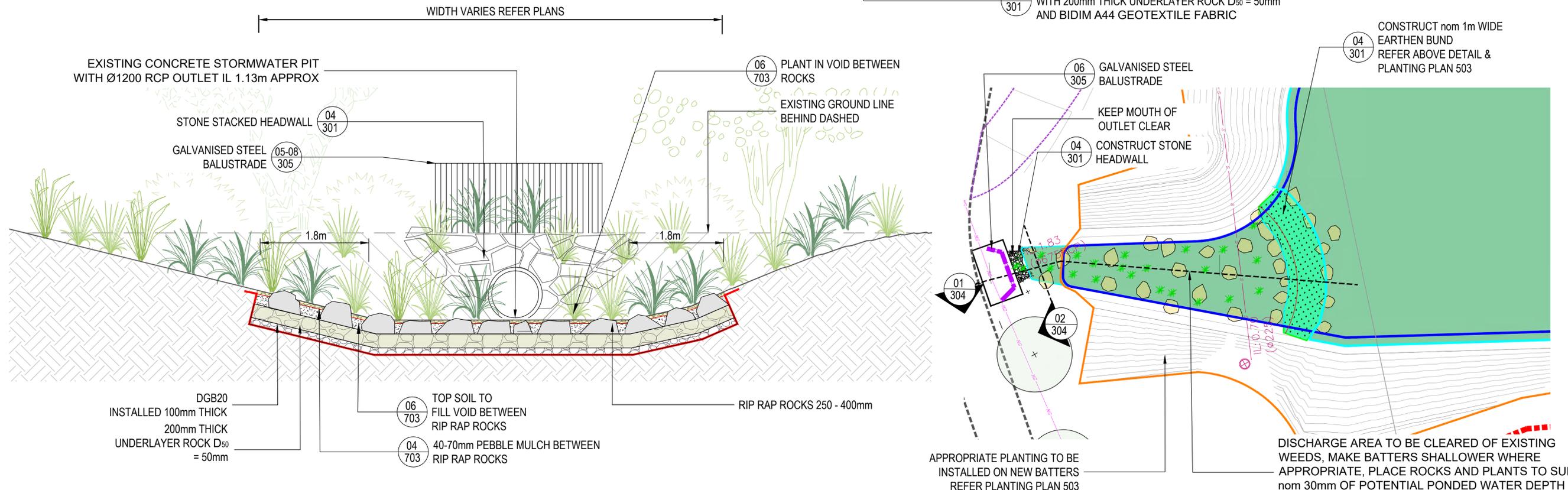
05 TYPICAL LOW FLOW OUTLET PLAN CELL 2  
SCALE: NTS



06 LOW FLOW OUTLET DETAIL SECTION CELL 2  
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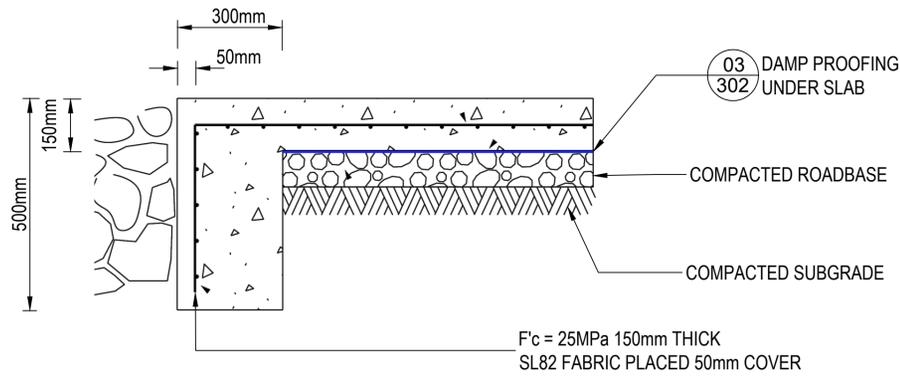


**01**  
**304** TYPICAL LONGITUDINAL SECTION DISCHARGE SWALE  
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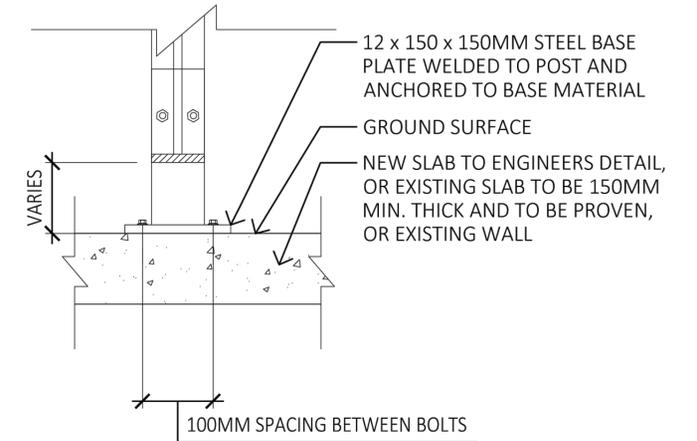
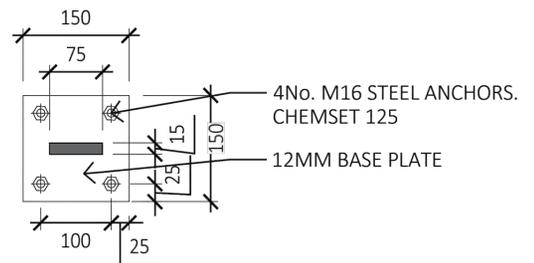


**02**  
**304** TYPICAL CROSS SECTION DISCHARGE SWALE  
SCALE:1:50

**03**  
**304** DISCHARGE SWALE OUTLET PLAN  
SCALE:1:100

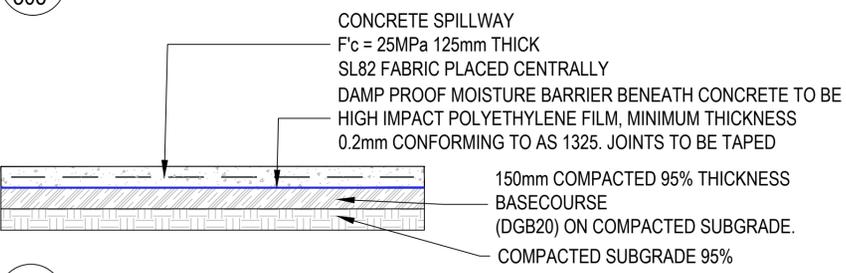


05 HOT DIP GALVANISED STEEL BALUSTRADE BASE PLATE PLAN  
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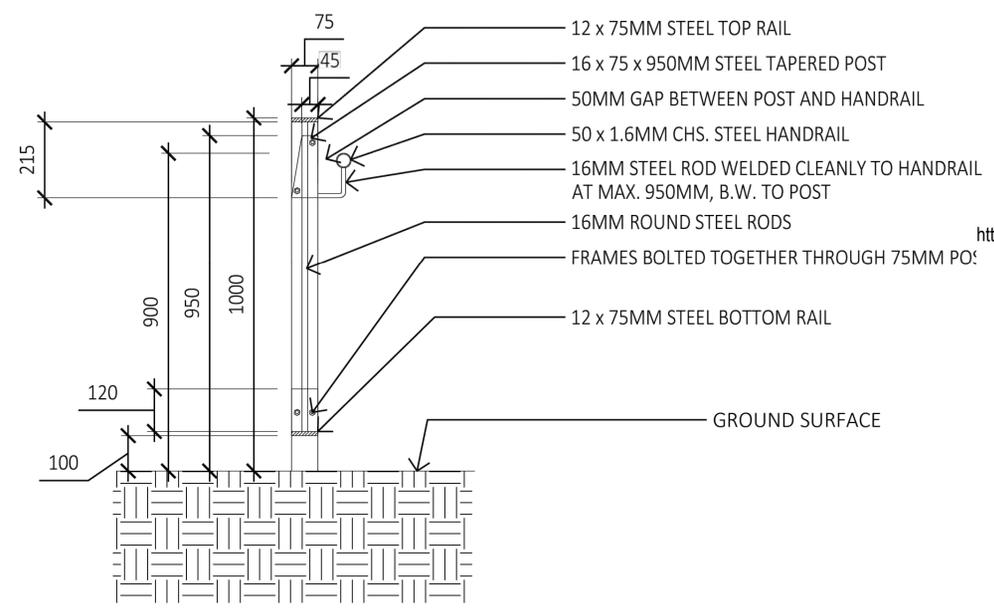


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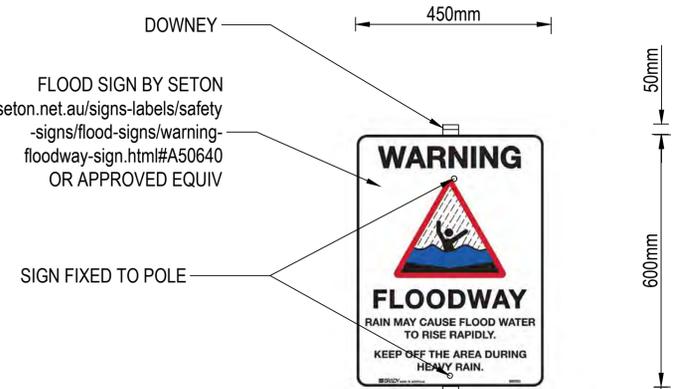
01 CURTAIN WALL DETAIL CELL 1 & 2  
SCALE:1:10



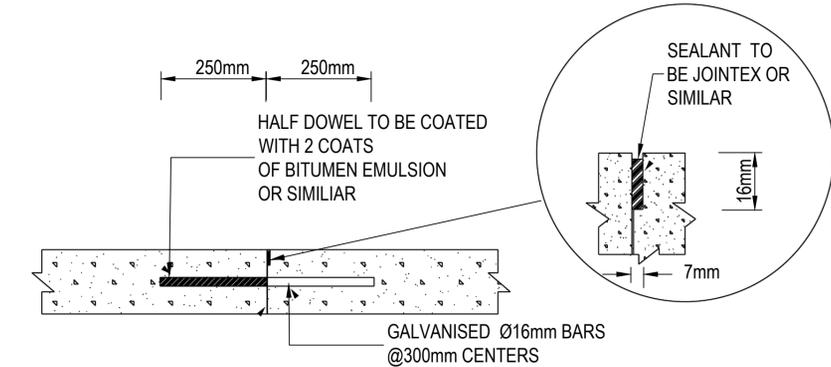
02 CONCRETE SPILLWAY DETAIL CELL 1 & 2  
SCALE:1:50



07 HOT DIP GALVANISED STEEL BALUSTRADE SECTION  
SCALE:1:10

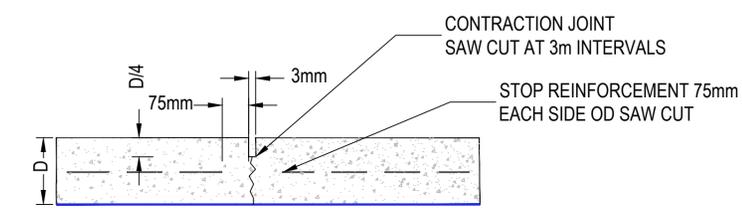


09 FLOOD WARNING SIGNAGE DETAIL  
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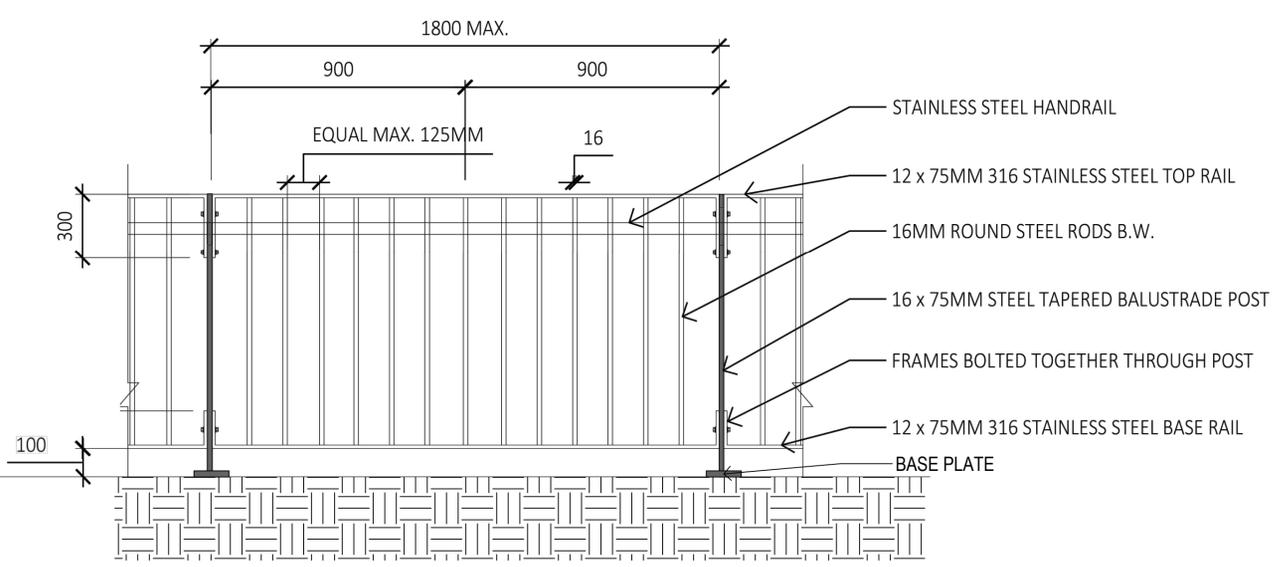


03 CONSTRUCTION JOINT  
SCALE:1:10

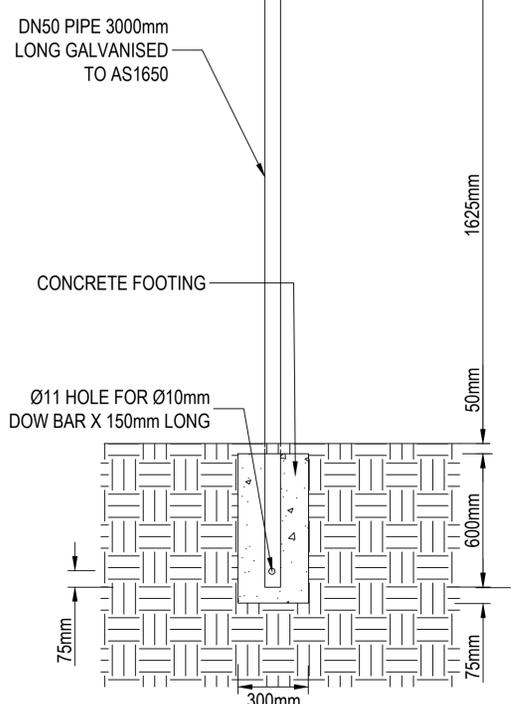
NOTE: DOWELLED JOINTS ARE TO BE PROVIDED AT MAXIMUM OF 12m SPACINGS EXPANSION JOINTS CAN BE REPLACED WITH CONNELLY OR DANLEY EXPANSION JOINTS OR APPROVED SIMILAR



04 CONTRACTION JOINT - SAWN NOT TOOLED  
SCALE:NTS



08 HOT DIP GALVANISED STEEL BALUSTRADE ELEVATION  
SCALE:1:10



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SCALE AS SHOWN		REV. <b>F</b>
DESIGNED	KC	CAD FILE No. <b>1-91194_SANDHILLS_DD.DWG</b>
DRAWN	RS/TC	SHEET No. <b>1-191194_DD_305</b>
CHECKED	DM	

## 1 INTRODUCTION AND BACKGROUND

The Sandhills reserve is a vegetated reserve located behind Clarkes beach at the parcel of land identified as Lot 383 DP728202 and Lot 457 DP 1087879 ('the site' herein). Byron Shire Council (BSC) seek to reinstate a wetland system within and around existing drainage features in the eastern portion of the site to achieve a range of environmental objectives including, improving the site's environmental and cultural values, mitigating flood impacts, stormwater treatment, integration with catchment water cycle management objectives, provide education and recreation opportunities and creating pedestrian connectivity between key sites in and around the town centre.

The Sandhills site is currently undeveloped with the exception of a pedestrian track connecting Cowper Street to Lawson Steet and underground services (sewer, stormwater and recycled water main).

AWC have prepared detailed design for the wetland which will consider additional studies and information that have been undertaken since the development of the wetland concept design (AWC, 2019). The detailed design drawings are provided in Appendix A.

### 1.1 Project Overview

The aim of this project is to develop a stormwater management system including constructed wetland at the site that provide flood storage, improve water quality at the Clarkes beach outlet and enhances local environmental and cultural values.

The objectives for the Sandhills wetland project are:

- Protect and enhance Aboriginal cultural values of the area
- Allow access to water and sewer infrastructure for maintenance and emergency purposes
- Showcase best practice water sensitive urban design
- Improve water quality including at the stormwater outlet to Clarkes beach
- Maximise flood storage to mitigate flooding
- Improve visual and environmental amenity of the site
- Ensure acid sulfate soils (actual and potential) are appropriately accounted for and managed
- Protect and enhance environmental values at the site
- Provide an accessible pedestrian link to the Arakwal Cultural Heritage Centre site
- Provide an accessible open space recreational area that supports passive activation, social connection and community well being
- Support delivery of the key actions from the Belongil Creek Floodplain Risk Management Plan (WBM BMT, 2015), Byron Bay Town Centre Masterplan (Macgregor Coxall, 2015) and Byron Shire Council and Arakwal Memorandum of Understanding.

### 1.2 Reference Documents

The following table (Table 1\_1) details the key documents to be read in combination with this specification document.

Study / Information	Description / Relevant findings	Authors	Date
Concept Design	A concept design for a constructed stormwater wetland system at the site was developed and, following consultation with Council and Arakwal Aboriginal Lands Council, revised to include three layout options and a preferred option chosen.	AWC	June 2019
Revised Concept Design		AWC	2021
Detailed Design Report	Summarises the detailed design, the information used to prepare the detailed design and relevant information	AWC	November 2022
Contamination Assessment	The site is considered suitable from a contamination perspective for the proposed wetland development (i.e. recreational use).	ENV solutions	July 2021
Acid Sulfate Management Plan	Laboratory analysis of 6 boreholes within the site indicated the presence of Actual Acid Sulfate Soil (AASS) and Potential Acid Sulfate Soil (PASS). The plan provides management and treatment measures to be employed during excavation at the site.	ENV solutions	August 2021
Biodiversity Development Assessment Report (BDAR)	Outlines the measures taken to avoid, minimise and mitigate impacts to the vegetation and habitats present within the development site during the design, construction, and operation of the development.  The residual unavoidable impacts of the proposed development were calculated using the Biodiversity Assessment Method Credit Calculator (BAM-C).	Planit Consulting	August 2022

## 2 GENERAL NOTES

1. All works and materials shall be in accordance with Byron Shire Council (BSC) policies then relevant Australian Standards;
2. The contractor will prepare a Construction Phase Environmental Management Plan (CEMP) at least two weeks prior to the start up meeting. Any requests for changes will be compiled by the Superintendent and incorporated by the Contractor.
3. The contractor may be required to undertake an Aboriginal Cultural Heritage Site Induction (which will be arranged by Byron Shire Council) prior to commencement of any works. During excavation and tree/weed removal works the contractor is required to ensure that its staff are experienced and skilled to ensure compliance with legal obligations to identify and protect Aboriginal Cultural Heritage. Should an Aboriginal Cultural Heritage item or object be identified during works, the contractor will immediately cease work and report it to BSC and, will no recommence work without BSC approval. The contractor will need to accommodate any Aboriginal Cultural Heritage monitors to be present on site to observe components of the works, particularly during excavation or vegetation management works. Aboriginal Cultural Heritage Monitors can arise at the request of a Local Aboriginal Land Council to independently observe works or be contracted directly by BSC (under a separate contract)
4. The contractor shall take all necessary measures to protect nearby property owners from dust pollution during all phases of works construction. Finished areas of earthworks shall be kept watered where necessary until a satisfactory grass cover is achieved.
5. All construction works are to be joined neatly to existing works.
6. Public utilities - Notwithstanding that the positions of public utilities, fittings, pipes, poles, manholes etc may be indicated on the drawings, no responsibility will be accepted by the principal for the accuracy of the representation or the omission thereof.
7. Location and level of existing services and structures has been plotted from available records and is indicative only. The contractor shall accurately locate these on site prior to commencing works and shall protect all existing services during construction. Any damage to existing services shall be repaired at the contractors expense;

8. Vegetation outside work areas shall not be disturbed unless specifically authorised by the superintendent.
9. It is the contractor's responsibility to comply with all relevant legislation.
10. It is the responsibility of the contractor to maintain the stability of any temporary works on the site.
11. The contractor shall confirm the currency of the set out & levels with the superintendent prior to commencing construction.
12. These drawings are to be read in conjunction with the local authority specifications and the project specifications. In the event of a discrepancy refer to the superintendent for clarification.
13. All dimensions relevant to setting out and off-site work shall be as indicated on drawings and shall be verified by the contractor before construction and/or fabrication is commenced. The engineers' drawings shall not be scaled, unless specifically noted otherwise.
14. During construction, the contractor shall be responsible for maintaining proposed and existing works in a stable condition and ensuring no part shall be over stressed under construction activities. In particular in the zone of influence of sewer network.
15. The approval for a substitution shall be sought from the superintendent but is not an authorisation for a variation. Any variation must be approved by the superintendent before work commences.
16. Site access must be confirmed and determined in discussion with Byron Shire Council and the contractor shall obtain all necessary and relevant permits.
17. The contractor's compound shall be located as approved by superintendent.
18. The contractor shall undertake all works in proximity to existing services and infrastructure in accordance with the relevant utility/authority policies and procedures.
19. It is the responsibility of the contractor to ensure that any relevant council approvals or work permits relating to the works documented in these drawings have been obtained prior to commencing the related works
20. These works are to be adopted by a local authority / adopting authority, all works are to be completed to their satisfaction and accepted on maintenance prior to practical completion being issued.

### 2.2 As Constructed Information

1. As constructed information is to reflect the actual construction and is to be endorsed by a licensed surveyor - the survey points and levels shall be taken at least the same points and levels locations shown on construction drawings and any other relevant points to allow assessment against the proposed design intent;
2. The contractor is to supply an 'as constructed' survey plan in 3d dwg and pdf format and in accordance with the local council and authority standards, detailing location and levels of all civil works detailed in these drawings, including but not limited to stormwater, sewer and finished pavement and hardstand areas.
3. No more than 2 weeks prior to the 'on maintenance' inspection, the contractor shall undertake a condition report to demonstrate that the stormwater systems are in accordance with the design and specification and acceptable to council and the engineer.

### 2.3 Groundworks

A Contamination Assessment for the project referred to in the notes and an Acid Sulphate Soil Management Plan has been prepared by Env Solutions (2021).

1. All earthworks shall be carried out in accordance with AS3798 and supervision to level 1 shall be supplied by the contractor. The contractor shall employ a qualified geotechnical engineer who is a certified practicing engineer of with a minimum \$10 million professional indemnity insurance, to undertake level 1 supervision of earthworks and whose certification in writing shall include the following:
  - Engineering certification that all general earthworks operations (ie. stripping, proof rolling of subgrade, subgrade treatment, etc) have been carried out in accordance with earthworks specifications and recommendations provided by Env Solutions
  - Engineering certification that fill has been placed and compacted to the required minimum density in accordance with the earthwork's specification
  - Engineering certification that any areas of cut have been compacted to the required minimum density in accordance with the earthwork's specification
  - If required, engineering certification that the controlled fill material is suitable to support a conventional slab on ground floor or pavement system
  - Engineering certification that the areas of cut have been subject to proof roll and compacted under geotechnical supervision to the same standards as fill areas

2. The contractor shall employ a qualified geotechnical engineer who is a certified practising engineer with a minimum \$10 million professional indemnity insurance, to undertake geotechnical supervision for duration of earthworks, who shall provide regular site reports detailing:
  - That the stability of all cut-fill batters is adequate
  - That contractors temporary works do not compromise the stability of any temporary or permanent slopes, buildings, or site features
3. Notwithstanding the requirement for the builder to obtain geotechnical certification, the builder is to advise the superintendent and seek approval before proceeding with any earthworks or pavement construction that is likely to give rise to a variation claim.
4. Unless directed otherwise by the geotechnical engineer on site or by the relevant local authority specification (for works subject to approval adoption by the local authority) filling shall be compacted to appropriate standards as determined by Byron Shire Council.
5. Unless directed otherwise in the Geotechnical Report for the project, or by the geotechnical engineer on site, filling and subgrade areas shall be compacted in maximum lifts of 250mm loose thickness.
6. Compaction to 95% standard Maximum Dry Density is required for subgrade and base layers
7. The contractor must provide a Sediment and Erosion Control Plan and implement sediment and erosion control measures prior to commencing works on site. The contractor must maintain sediment and erosion control mechanisms in working order.
8. Topsoil and other organic matter is to be stripped from groundwork areas prior to commencing groundworks and shall be stockpiled on site. Earth stockpiles shall be suitably protected from erosion and weed infestation by covering with weed mat or other means. Topsoil is to be respread to finished surface levels and vegetated to specification prior completion. Excess topsoil is to be removed from site.
9. Unless confirmed by the supervising geotechnical engineer, maximum batter slopes should be as Detailed Design Drawings
10. Contractor shall allow for addressing site trafficability considering weather conditions likely to prevail during the earthworks period.
11. Contractor to consider the implications of disturbed ground conditions when working in close proximity to existing services and shall employ a suitable methodology to address service stability.

## 3 PRELIMINARY WORKS

### 3.1 Mobilisation

A pre contract meeting will be held with Byron Shire Council before works commence on the site. The location and establishment and demarcation of works compound, site office, temporary fencing, power supply, traffic management plans, security surveillance etc will be discussed and a draft CEMP including all planned sediment and erosion controls discussed. The works program and key issues such as management of water movement through the site during construction covered.

### 3.2 Start Up

An inception meeting will be held prior to construction commencing with minutes recorded and circulated by the head contractor. The Landscape Contractor shall attend to ensure timing and communication with the other contractors

- Responsibilities and scope of works are to be delineated
- Once all bulk earthworks and hydraulic structures have been completed a meeting will occur at a nominated hold point with the Principal Contractor to assess site and design details
- Prior to commencement of the construction, landscaping and planting the following details shall be defined:

- Verify existing site and design levels
- Services locations where relevant
- Fencing
- Amenities
- Safety issues and WHS (OHS) requirements
- Sensitive environmental zones
- Sediment and erosion controls
- Any other design features, concerns, problems or other information that may arise

### 3.3 Erosion and Sediment Control

Appropriate sediment and erosion and sediment control must be clearly documented in the CEMP - Site access, sediment fences, controlled stockpile areas, wheel wash water supply, etc will be detailed by the contractor.

### 3.4 Site Setout

The contractor must engage surveyor to set out datums and project parameters.

### 3.5 Clearing and Demolition

Demolition will follow the sequence below in Table 1\_1 unless confirmed otherwise with the Superintendent.

Item	Stage	Tasks
1	Pre-clearing tree survey	Identify and locate extent of works and trees to be retained and removed
2	Fauna clearance	Capture and relocate fauna in trees/vegetation to be removed
3	Tree clearing	Removal of nominated trees - stockpile for re-use within works
4	Weed removal	Remove weed material and dispose of at an approved waste facility
5	Rubbish and debris	Remove rubbish and debris from within works area

Only contractors that are experienced and trained in plant identification and weed removal techniques shall be employed to remove native vegetation and weeds

### 3.6 Public Access /Safety

Public access to be maintained throughout existing thoroughfares. If not possible provide alternate routes in consultation with the Superintendent.

### 3.7 Construction Access

Construction access will be via existing public roads however a detailed site access and traffic management plan will be prepared by the Contractor and submitted to the Superintendent at the inception meeting. The plan will be reviewed and the contractor will make any amendments requested by the Superintendent prior to construction commencing.

## 4 CIVIL AND LANDSCAPING

### 4.1 Sediment & Erosion Control

Appropriate sediment and erosion control measures must be installed and maintained throughout the construction and establishment phase of the wetland in accordance with the "Blue Book", Managing Urban Stormwater: Soils and Construction.

### 4.2 Earthworks

Earthworks levels must be in accordance with the Civil Design and Northern Rivers Development Construction Specifications, allowing for a minimum of 300mm lightly compacted topsoil as the finished design level. Local depressions must be minimised so that small puddles do not develop on the wetland cell floors.

### 4.3 Hydraulic structures

All structures must be constructed in accordance with the design documentation. Any potential changes to the design must be confirmed in writing with BSC before construction starts. Once constructed, the hydraulic structures should be surveyed and reviewed by BSC before finer shaping of the earthworks are undertaken.

All concrete pits are to be as per the dimensions shown in the drawings unless approved by the Superintendent including pipework, openings and orifices.

### 4.4 Pipework

All connections to existing and newly installed structures are to be sealed to the satisfaction of the superintendent.

The contractor shall make adequate provision for runoff flows during construction to prevent damage avoid, scour, sedimentation, and erosion.

Pipework is to be 250mmPVC or smaller to allow for access, maintenance and water level control of the wetland.

Screw on end caps as shown on the drawings are required to allow for maintenance draining of wetlands.

Orifice holes are to be drilled in pipework as shown on the drawings to control the flow of water through the wetland cells. The level at which the orifice is drilled is critical to the operation of the wetland.

Note: very fine tolerances are required for all hydraulic structures (See Section 4.4)

### 4.5 Holdpoint

Once all bulk earthworks and hydraulic structures have been completed a meeting will occur at a nominated hold point with the Principal Contractor to assess site and design details

### 4.6 Tolerances

Hydraulic structures within the wetlands control the movement of stormwater through the system. The construction of these structures must ensure that design levels are achieved. A vertical tolerance of +/-25mm and horizontal tolerance of +/- 200mm applies to all pipework and hydraulic structures including:

- inlet pipes
- inlet zone connections (pit and pipe)
- outlet riser
- outlet pipes (upstream and downstream)
- bypass weirs

A vertical tolerance of +/-50mm applies to earthworks including the wetland cell floors and all earthen embankments and bunds.

### 4.7 Rockwork

The contractor shall import rock sizes as specified on the drawings or as outlined in this section if not shown on the drawings. Rock and granular materials for vehicular access tracks should be DGB20.

The contractor should provide samples to BSC for approval of the rock mulch for headwalls, rip rap, outlets and swales.

The rock lining for the swale is to consist of

- Rip rap rock D50 250 -400mm
- Pebble mulch 40-70mm between rip rap
- Underlain by 100mm crushed rock
- Underlain by 20mm of fine crushed rock

The hand pack stone headwall swale rock size is to meet the following size requirements (unless otherwise stated on the drawings):

- D50: 250-600mm

All rockwork must be from a locally derived source.

### 4.6 Soils

Within the wetland macrophyte zones, topsoil should be placed to a minimum depth of 300 mm. Design levels for wetlands are inclusive of topsoil, therefore, when earthworks are occurring, allowance for topsoil is required.

Soils for planting must be of loose, friable consistency and of suitable fertility for plant growth. Soil lumps must be of a maximum 50mm dimension.

Soils for planting must be free from weeds, rocks, debris, and contaminants.

The application of lime may be required where the soil testing identifies a potential soil pH problem (pH < 5) or where acid sulphate soils are detected. The rate of application should be guided by soil test results, and the Acid Sulphate Management Plan (Env Solutions, 2021).

Stockpiled topsoil should be tested and approved by a certified laboratory and wetland designer and may need to be screened to remove any coarse organic matter.

#### 1.1.1 Contamination

In the scenario that fuel, oil, cement or other phytotoxic material is spilt on subsoil or topsoil, excavate the contaminated soil, dispose of to the satisfaction of Byron Shire Council and replace with site soil or imported topsoil.

#### 1.1.2 Installation and Aeration

Spread the media on the prepared surface and grade evenly.

- Fill areas of subsistence to achieve finished levels
- Avoid over compaction
- In areas of high compaction de-compact (rip to 100mm prior to planting)

### 4.9 Mulch and Jute Mesh

Mulch is to be used as specified to retain moisture in the soil and suppress weeds. Jute mesh is to be installed and used on batters,

A sample of the woodchip mulch is to be provided to BSC for approval prior to supply and installation.

- Wood chip mulch is to be used in areas of dry batter and shoulder planting, or as outlined within the construction drawings. Above top of bank. Approx 75mm thick
- It is not to be used in areas of overland flow or within flood prone areas. In these instances, replace with specified jute matting.
- Recycled woodchip mulch from chipped trees on site may be used if agreed with council representative
- Wood chip mulch should be a 15.40 forest blend and if it is to be imported, a sample is to be provided to BSC for approval prior to supply and installation
- Ensure mulch is free of deleterious fungus, pest, disease, soil, weeds and toxins
- 700gsm minimum jute matt should be installed on berms and batters. Overlap adjacent sections of jute by 200mm min and fix using 4mm x 300mm long pins at 6 per m<sup>2</sup>
- Jute matt must have a minimum of 6 slits per sqm. Purchase of Jute matt with 8 slits is preferable if available

### 4.10 Seating Nodes

Each seating node is a varying shape. Refer to drawings for location and dimension. Final extents to be determined on site. Adjustment may be made in response to site constraints and agreed with BSC and the site superintendent.

### 4.11 Pathways

Concrete pathways are to be constructed as shown on the site layout plan (1-191194\_DD\_02) and as detailed in 1-191194\_DD\_02/702.

Concrete paths are to be white in colour with a broom finish.

Concrete paths are to be rated to 32MPa and 150mm thick and laid over compacted subgrade as detailed in 1-191194\_DD\_02/702.

#### 1.1.1 Deco Granitic Sand

The finished surface material within pathways as shown on site layout plan (1-191194\_DD\_002) and seating node areas (1-191194\_DD\_701) is to be decomposed granitic sand.

- Colour to be a consistent golden yellow.
- Size to be fines and sand to 5mm.
- Compact the ground to 95% Standard Maximum Dry Density to AS 1289.5.4.1, prior to installation.
- Deco granitic sand to be rolled and compacted in layers 30mm thick to a depth of 150mm.
- Ensure granitic surface is even with 1% cross fall responding to finished levels of each location.
- Paths shall be retained by Corten steel edging as detailed on sheet 702

P1 - Macrophyte planting (300mm Deep, Density 6 plants/m²)				TOTAL	1043
Botanical Name	Common Name	% Prop	Qty		
<b>AQUATIC PLANTS (tubestock)</b>					
<i>Baumea articulata</i>	Jointed Rush	30%	1877		
<i>Baumea rubiginosa</i>	Soft Twig Rush	35%	2190		
<i>Bolboschoenus fluviatilis</i>	River bulrush	10%	626		
<i>Eleocharis dulcis</i>	Spike Rush	25%	1565		
		<b>100%</b>	<b>6258</b>		

P2 - Macrophyte planting (300mm Deep, Density 6 plants/m²)				TOTAL	180
Botanical Name	Common Name	% Prop	Qty		
<b>AQUATIC PLANTS (tubestock)</b>					
<i>Baumea articulata</i>	Jointed Rush	10%	108		
<i>Eleocharis sphacelata</i>	Spike Rush	20%	216		
<i>Lepironia articulata</i>	Grey Sedge	70%	756		
		<b>100%</b>	<b>1080</b>		

P3 - Shrub & Grass like plantings (Density 4 plants/m²)				TOTAL	415
Botanical Name	Common Name	% Prop	Qty		
<b>SHRUBS, FERNS and LILLIES (tubestock)</b>					
<i>Banksia robur</i>	Swamp Banksia	5%	83		
<i>Christella dentata</i>	Binung	10%	166		
<i>Crinum pedunculatum</i>	Swamp Lily	5%	83		
<i>Dianella caerulea</i>	Blue Flax-lily	5%	83		
<i>Melastoma affine</i>	Blue Tongue	5%	83		
		<b>30%</b>	<b>498</b>		

NATIVE GRASSES & SEDGES (tubestock)					
<i>Bolboschoenus fluviatilis</i>	River bulrush	5%	83		
<i>Carex appressa</i>	Tall Sedge	10%	166		
<i>Ficinia nodosa</i>	Knobby Club Rush	10%	166		
<i>Gahnia sieberiana</i>	Red-fruit Saw-sedge	5%	83		
<i>Juncus usitatus</i>	Salt Marsh Rush	5%	83		
<i>Leersia hexandra</i>	Cutgrass	5%	83		
<i>Lomandra confertifolia</i>	Mat Rush	5%	83		
<i>Lomandra longifolia</i>	Spiny-head Mat-rush	10%	166		
<i>Philydrum lanuginosum</i>	Frogsmouth	5%	83		
<i>Themeda australis</i>	Kangaroo Grass	5%	83		
		<b>65%</b>	<b>1079</b>		

GROUNDCOVERS (150mm pot size)					
<i>Tetragonia tetragonioides</i>	Native Spinach	5%	83		
		<b>5%</b>	<b>83</b>		
		<b>100%</b>	<b>1660</b>		

P4 - Terrestrial Planting Zone Dry Batter (Density 4 plants/m²)				TOTAL	2626
Botanical Name	Common Name	% Prop	Qty		
<b>TREES (forestry tubestock)</b>					
<i>Banksia integrifolia</i>	Coastal Banksia	1%	105		
<i>Casuarina glauca</i>	Swamp Sheoak	0.50%	53		
<i>Cryptocarya foetida</i>	Stinking Cryptocarya	0.50%	53		
<i>Ficus coronata</i>	Sandpaper Fig	1%	105		
<i>Lophostemon suaveolens</i>	Swamp Box	1%	105		
<i>Melaleuca quinquenervia</i>	Broad-leaved Paperbark	1%	105		
		<b>5%</b>	<b>525</b>		

SHRUBS (tubestock)					
<i>Astromyrtus dulcis</i>	Midgen Berry	2%	210		
<i>Banksia robur</i>	Swamp Banksia	5%	525		
<i>Callistemon pachyphyllus</i>	Wallum Bottlebrush	5%	525		
<i>Christella dentata</i>	Binung	2%	210		
<i>Crinum pedunculatum</i>	Swamp Lily	2%	210		
<i>Dianella caerulea</i>	Blue Flax-lily	5%	525		
<i>Melastoma affine</i>	Blue Tongue	3%	315		
		<b>24%</b>	<b>2521</b>		

NATIVE GRASSES & SEDGES (tubestock)					
<i>Carex appressa</i>	Tall Sedge	2%	210		
<i>Ficinia nodosa</i>	Knobby Club Rush	2%	210		
<i>Gahnia sieberiana</i>	Red-fruit Saw-sedge	5%	525		
<i>Imperata cylindrica</i>	Cogon Grass	10%	1050		
<i>Juncus kraussii</i>	Salt Marsh Rush	2%	210		
<i>Leersia hexandra</i>	Cutgrass	10%	1050		
<i>Lomandra confertifolia</i>	Mat Rush	10%	1050		
<i>Lomandra longifolia</i>	Spiny-head Mat-rush	5%	525		
<i>Themeda australis</i>	Kangaroo Grass	10%	1050		
		<b>56%</b>	<b>5882</b>		

GROUNDCOVERS (150mm pot size)					
<i>Hibbertia scandens</i>	Snake Vine	5%	525		
<i>Carpobrotus glaucescens</i>	Native Pig Face	5%	525		
<i>Tetragonia tetragonioides</i>	Native Spinach	5%	525		
		<b>15%</b>	<b>1576</b>		
		<b>100%</b>	<b>10504</b>		

P5 - Macrophyte planting (200mm Deep, Density 6 plants/m²)				TOTAL	573
Botanical Name	Common Name	% Prop	Qty		
<b>AQUATIC PLANTS (tubestock)</b>					
<i>Baumea articulata</i>	Jointed Rush	10%	344		
<i>Eleocharis sphacelata</i>	Spike Rush	20%	688		
<i>Lepironia articulata</i>	Grey Sedge	70%	2407		
		<b>100%</b>	<b>3438</b>		

P6 - Macrophyte planting (200mm Deep, Density 6 plants/m²)				TOTAL	3126
Botanical Name	Common Name	% Prop	Qty		
<b>AQUATIC PLANTS (tubestock)</b>					
<i>Baumea articulata</i>	Jointed Rush	25%	4689		
<i>Baumea rubiginosa</i>	Soft Twig Rush	25%	4689		
<i>Baloskion tetraphyllum</i>	Tassel Cord Rush	10%	1876		
<i>Eleocharis dulcis</i>	Spike Rush	20%	3751		
<i>Lepironia articulata</i>	Grey Sedge	20%	3751		
		<b>100%</b>	<b>18756</b>		

P7 - Macrophyte plantings (100mm Deep, Density 6 plants/m²)				TOTAL	258
Botanical Name	Common Name	% Prop	Qty		
<b>AQUATIC PLANTS (tubestock)</b>					
<i>Baumea articulata</i>	Jointed Rush	25%	387		
<i>Baumea rubiginosa</i>	Soft Twig Rush	25%	387		
<i>Bolboschoenus fluviatilis</i>	River bulrush	25%	387		
<i>Eleocharis dulcis</i>	Spike Rush	25%	387		
		<b>100%</b>	<b>1548</b>		

P8 - Shallow Macrophyte Plantings (100mm Deep, Density 6 plants/m²)				TOTAL	1578
Botanical Name	Common Name	% Prop	Qty		
<b>AQUATIC &amp; GRASS LIKE PLANTS (tubestock)</b>					
<i>Baumea rubiginosa</i>	Soft Twig Rush	20%	1894		
<i>Baloskion tetraphyllum</i>	Tassel Cord Rush	20%	1894		
<i>Eleocharis dulcis</i>	Spike Rush	20%	1894		
<i>Juncus utistatus</i>	Marsh Rush	20%	1894		
<i>Rhynchospora brownii</i>	Beak Rush	20%	1894		
		<b>100%</b>	<b>9468</b>		

P9 - Frog Marsh Plantings (100mm Deep, Density 6 plants/m²)				TOTAL	2620
Botanical Name	Common Name	% Prop	Qty		
<b>NATIVE GRASSES &amp; SEDGES (tubestock)</b>					
<i>Baloskion tetraphyllum</i>	Tassel Cord Rush	20%	3144		
<i>Blechnum indicum</i>	Swamp Water Fern	20%	3144		
<i>Baumea rubiginosa</i>	Soft Twig Rush	20%	3144		
<i>Rhynchospora brownii</i>	Beak Rush	30%	4716		
<i>Philydrum lanuginosum</i>	Frogsmouth	10%	1572		
		<b>100%</b>	<b>15720</b>		

P10 - Wetland Forest Plantings (100mm Deep, Density 4 plants/m²)				TOTAL	4759
Botanical Name	Common Name	% Prop	Qty		
<b>TREES (45L)</b>					
<i>Lophostemon suaveolens</i>	Swamp Box	2.5%	476		
<i>Melaleuca quinquenervia</i>	Broad-leaved Paperbark	2.5%	476		
		<b>5%</b>	<b>952</b>		

SHRUBS, FERNS and LILLIES (tubestock)					
<i>Banksia robur</i>	Swamp Banksia	3%	571		
<i>Blechnum indicum</i>	Swamp Water Fern	3%	571		
<i>Christella dentata</i>	Binung	2%	381		
<i>Crinum pedunculatum</i>	Swamp Lily	2.5%	476		
<i>Melastoma affine</i>	Blue Tongue	2%	381		
		<b>12.5%</b>	<b>2380</b>		

NATIVE GRASSES & SEDGES (tubestock)					
<i>Baumea articulata</i>	Jointed Rush	10%	1904		
<i>Carex appressa</i>	Tall Sedge	15%	2855		
<i>Ficinia nodosa</i>	Knobby Club Rush	14.5%	2760		
<i>Gahnia sieberiana</i>	Red-fruit Saw-sedge	13%	2475		
<i>Juncus kraussii</i>	Salt Marsh Rush	12%	2284		
<i>Lomandra confertifolia</i>	Mat Rush	9%	1713		
<i>Philydrum lanuginosum</i>	Frogsmouth	9%	1713		
		<b>82.5%</b>	<b>15705</b>		
1 tree / 5m2, 1 shrub / 2m2, grasses & sedges @ 4/m2		<b>100%</b>	<b>19036</b>		

P11- Shoulder Planting (Density 5 plants/m²)				TOTAL	2681
Botanical Name	Common Name	% Prop	Qty		
<b>Shrubs (tubestock)</b>					
<i>Astromyrtus dulcis*</i>	Midgen Berry	1%	134		
<i>Banksia robur*</i>	Swamp Banksia	1%	134		
		<b>2%</b>	<b>268</b>		

NATIVE GRASSES, SEDGES & FERNS (tubestock)					
<i>Christella dentata</i>	Binung	5%	670		
<i>Carex appressa</i>	Tall Sedge	10%	1341		
<i>Dianella caerulea</i>	Blue Flax-lily	20%	2681		
<i>Ficinia nodosa</i>	Knobby Club Rush	15%	2011		
<i>Imperata cylindrica</i>	Cogon Grass	15%	2011		
<i>Lomandra confertifolia</i>	Mat Rush	15%	2011		
<i>Lomandra longifolia</i>	Spiny-head Mat-rush	10%	1341		
		<b>90%</b>	<b>12065</b>		

GROUNDCOVERS (150mm pot size)					
<i>Hibbertia scandens</i>	Snake Vine	4%	536		
<i>Carpobrotus glaucescens</i>	Native Pig Face	4%	536		
		<b>8%</b>	<b>1072</b>		
		<b>100%</b>	<b>13405</b>		

\* Plant min 2m from any path, access track or seating node

FEATURE TREES 100L			CODE	37
Botanical Name	Common Name			Qty
<i>Banksia integrifolia</i>	Coastal Banksia		Bi	11
<i>Cryptocarya foetida</i>	Stinking Cryptocarya		Cf	4
<i>Ficus coronata</i>	Sandpaper Fig		Fc	5
<i>Lophostemon suaveolens</i>	Swamp Box		Ls	7
<i>Melaleuca quinquenervia</i>	Broad-leaved Paperbark		Mq	10
				<b>37</b>

\*Plant in locations shown on plans 501-503

\*Minimum 5m spacing between feature trees

**LEGEND**

-  **P1** MACROPHYTE ZONE  
2.6-2.9m AHD 6/m<sup>2</sup> REFER 01\_500 & 05\_703
-  **P2** MACROPHYTE ZONE  
2.6-2.9m AHD 6/m<sup>2</sup> REFER 01\_500 & 05\_703
-  **P3** EPHEMERAL ZONE  
2.9-3.2m AHD 6/m<sup>2</sup> REFER 04\_500 & 02\_703
-  **P4** DRY BATTER ZONE  
>3.2m AHD 4/m<sup>2</sup> REFER 04\_500 & 03\_703
-  **P4** DRY BATER ZONE LOW PLANTING  
NO TREES OR LARGE SHRUBS
-  **P11** SHOULDER PLANTING ZONE  
4/m<sup>2</sup> REFER 04\_500 & 03\_703
-  SHADE FEATURE TREE  
REFER DETAIL 01\_703 & 05\_500
-  **BI** *Banksia integrifolia*
-  **CF** *Cryptocarya foetida*
-  **FC** *Ficus coronata*
-  **LS** *Lophostemon suaveolens*
-  **MQ** *Melaleuca quinquenervia*
-  CONCRETE CYCLEWAY  
REFER DETAIL 02\_702
-  DECOMPOSED GRANITIC SAND PATH  
REFER DETAIL 01\_702
-  EXISTING TREE RETAINED  
PROTECTED TO MEET AS 4970-2009
-  EXISTING TREE REMOVED
-  EXTENT OF EARTH WORKS
-  OPERATING WATER LEVEL (OWL) 2.9m
-  FINISHED FLOOR LEVEL (FFL) 2.6m
-  EXTENT OF WORKS
-  PROPOSED 0.1m CONTOURS
-  SEWER INFRASTRUCTURE
-  SEWER MAN HOLE

CELL 1  
FFL = 2.6m AHD  
OWL = 2.9m AHD  
EDD (& SPILLWAY) = 3.2m AHD



REFER SHEET 502

MASSINGER STREET

**AWC**  
Australian Wetlands Consulting Pty Ltd  
25 LESLIE ST, BANGALOW NSW 2479  
P (02) 6687 1550 | 1300 998 514  
www.awconsult.com.au

CLIENT:   
Byron Shire Council

DRAWING: **LANDSCAPE MATERIALS & PLANTING 01**  
PROJECT: SANDHILLS WETLAND DETAILED DESIGN PACKAGE

REV.	ISSUE / AMENDMENTS	DATE
A	PRE -DETAILED DESIGN PACKAGE COUNCIL REVIEW	17.11.2021
B	DETAILED DESIGN PACKAGE 70%	28.02.2022
C	DETAILED DESIGN PACKAGE 100%	02.11.2022
D	DETAILED DESIGN PACKAGE AMENDMENTS 100%	17.11.2022
E	DETAILED DESIGN PACKAGE AMENDMENTS 100%	13.12.2022
F	FOR TENDER	25.08.2023



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SCALE: 1:250 @ A1

DESIGNED: KC  
DRAWN: RSTC  
CHECKED: DM

CAD FILE No. **1-91194\_SANDHILLS\_DD.DWG**  
SHEET No. **1-191194\_DD\_501**

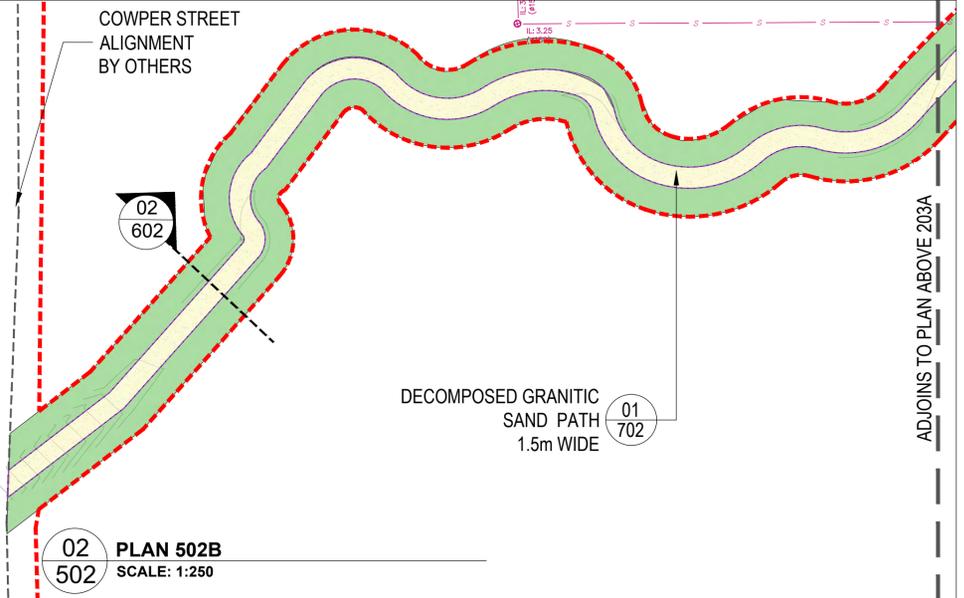
REV. **F**



- LEGEND**
- P5** MACROPHYTE ZONE  
2.0-2.2m AHD 6/m<sup>2</sup> REFER 02\_500 & 05\_703
  - P6** MACROPHYTE ZONE  
2.0-2.2m AHD 6/m<sup>2</sup> REFER 02\_500 & 05\_703
  - P3** EPHEMERAL ZONE  
2.2-2.4m AHD 6/m<sup>2</sup> REFER 04\_500 & 02\_703
  - P4** DRY BATTER ZONE  
>2.4m AHD 4/m<sup>2</sup> REFER 04\_500 & 03\_703
  - P4** DRY BATER ZONE LOW PLANTING  
NO TREES OR LARGE SHRUBS
  - P11** SHOULDER PLANTING ZONE  
4/m<sup>2</sup> REFER 04\_500 & 03\_703
  - SHADE FEATURE TREE  
REFER DETAIL 01\_703 & 05\_500
  - BI** *Banksia integrifolia*
  - CF** *Cryptocarya foetida*
  - FC** *Ficus coronata*
  - LS** *Lophostemon suaveolens*
  - MQ** *Melaleuca quinquenervia*
  - CONCRETE CYCLEWAY  
REFER DETAIL 02\_702
  - DECOMPOSED GRANITIC SAND PATH  
REFER DETAIL 01\_702
  - EXISTING TREE RETAINED  
PROTECTED TO MEET AS 4970-2009
  - EXTENT OF EARTH WORKS
  - OPERATING WATER LEVEL (OWL) 2.2m
  - FINISHED FLOOR LEVEL (FFL) 2.0m
  - EXTENT OF WORKS
  - PROPOSED 0.1m CONTOURS
  - SEWER INFRASTRUCTURE
  - SEWER MAN HOLE

**01 PLAN 502A**  
SCALE: 1:250

**CELL 2**  
FFL = 2.0m  
OWL = 2.2m  
EDD (& SPILLWAY) = 2.4m



**02 PLAN 502B**  
SCALE: 1:250

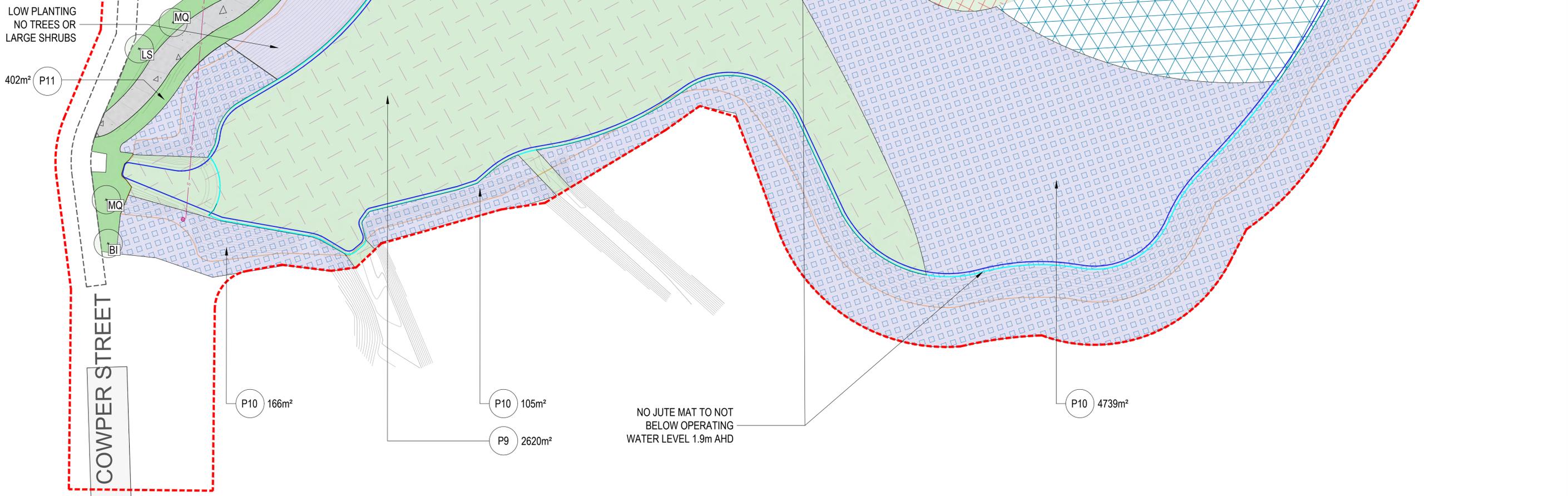
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A	PRE-DETAILED DESIGN PACKAGE COUNCIL REVIEW	17.11.2021
B	DETAILED DESIGN PACKAGE 70%	28.02.2022
C	DETAILED DESIGN PACKAGE 100%	02.11.2022
D	DETAILED DESIGN PACKAGE AMENDMENTS 100%	17.11.2022
E	DETAILED DESIGN PACKAGE AMENDMENTS 100%	13.12.2022
F	FOR TENDER	25.08.2023



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**LEGEND**

-  P7 MACROPHYTE ZONE  
1.8-1.9m AHD 6/m<sup>2</sup> REFER 03\_500 & 05\_703
-  P8 MACROPHYTE ZONE  
1.8-1.9m AHD 6/m<sup>2</sup> REFER 03\_500 & 05\_703
-  P9 FROG MARSH ZONE  
1.8-1.9m AHD 6/m<sup>2</sup> REFER 03\_500 & 05\_703
-  P10 FOREST PLANTING ZONE  
>1.8m AHD 4/m<sup>2</sup> REFER 03\_500 & 05\_703
-  P10 FOREST PLANTING ZONE LOW  
NO TREES OR LARGE SHRUBS
-  P11 SHOULDER PLANTING ZONE  
4/m<sup>2</sup> REFER SCHEDULES 04\_500 & 03\_703
-  SHADE FEATURE TREE  
REFER DETAIL 01\_703 & 05\_500
-  **BI** *Banksia integrifolia*
-  **CF** *Cryptocarya foetida*
-  **FC** *Ficus coronata*
-  **LS** *Lophostemon suaveolens*
-  **MQ** *Melaleuca quinquenervia*
-  CONCRETE CYCLE WAY  
REFER DETAIL 02\_702
-  DECOMPOSED GRANITE SAND PATH  
REFER DETAIL 01\_702
-  DEEP WATER ZONES  
NO PLANTING
-  EXISTING TREE RETAINED  
PROTECTED TO MEET AS 4970-2009
-  EXTENT OF EARTH WORKS
-  OPERATING WATER LEVEL (OWL) 2.9m
-  FINISHED FLOOR LEVEL (FFL) 2.6m
-  EXTENT OF WORKS
-  PROPOSED 0.2m CONTOURS
-  SEWER INFRASTRUCTURE
-  SEWER MAN HOLE




**AWC**  
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25 LESLIE ST, BANGALOW NSW 2479  
P (02) 6687 1550 | 1300 998 514  
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CLIENT:

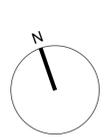


Byron Shire Council

DRAWING: **LANDSCAPE MATERIALS & PLANTING 03**

PROJECT: **SANDHILLS WETLAND DETAILED DESIGN PACKAGE**

REV.	ISSUE / AMENDMENTS	DATE
A	PRE -DETAILED DESIGN PACKAGE COUNCIL REVIEW	17.11.2021
B	DETAILED DESIGN PACKAGE 70%	28.02.2022
C	DETAILED DESIGN PACKAGE 100%	02.11.2022
D	DETAILED DESIGN PACKAGE AMENDMENTS 100%	17.11.2022
E	DETAILED DESIGN PACKAGE AMENDMENTS 100%	13.12.2022
F	FOR TENDER	25.08.2023



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SCALE: 1:250 @ A1

DESIGNED: KC

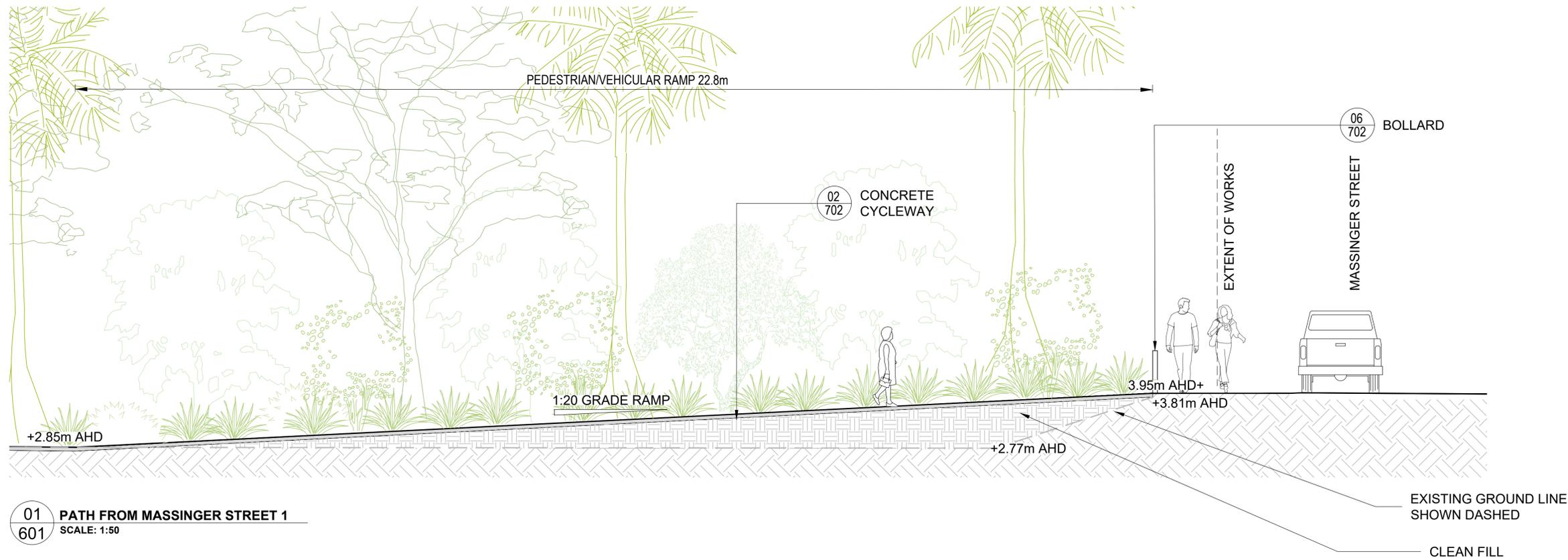
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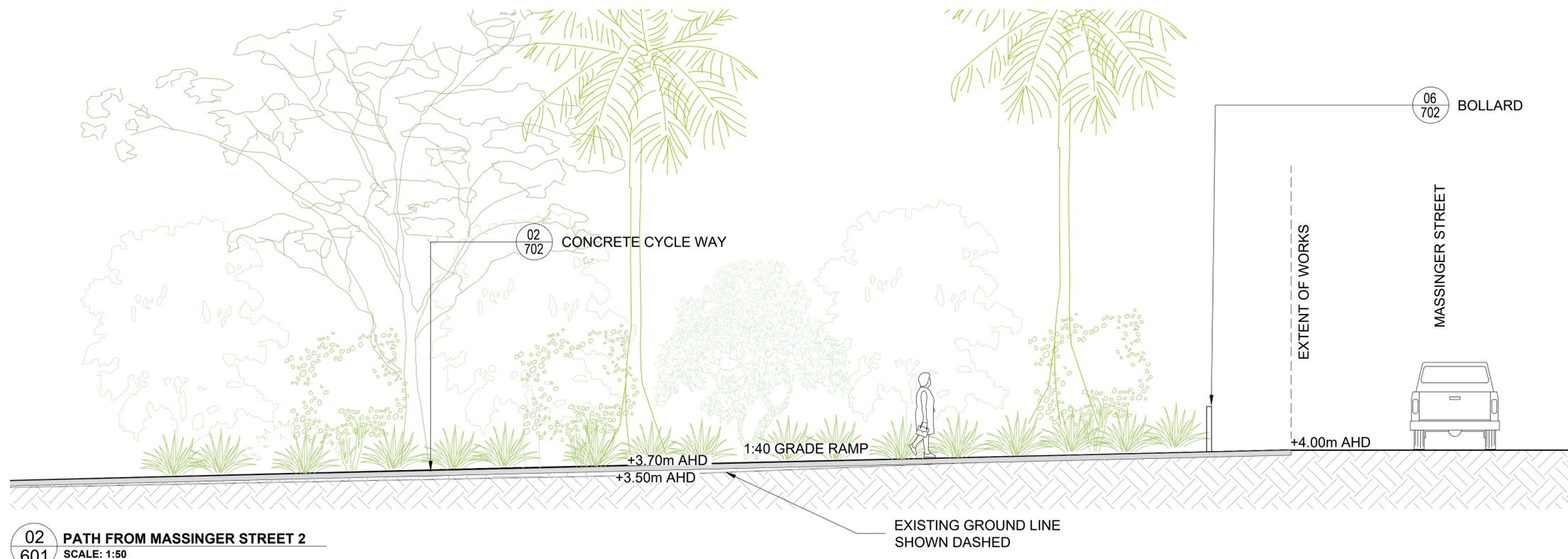
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SHEET No. **1-191194\_DD\_503**

REV. **F**



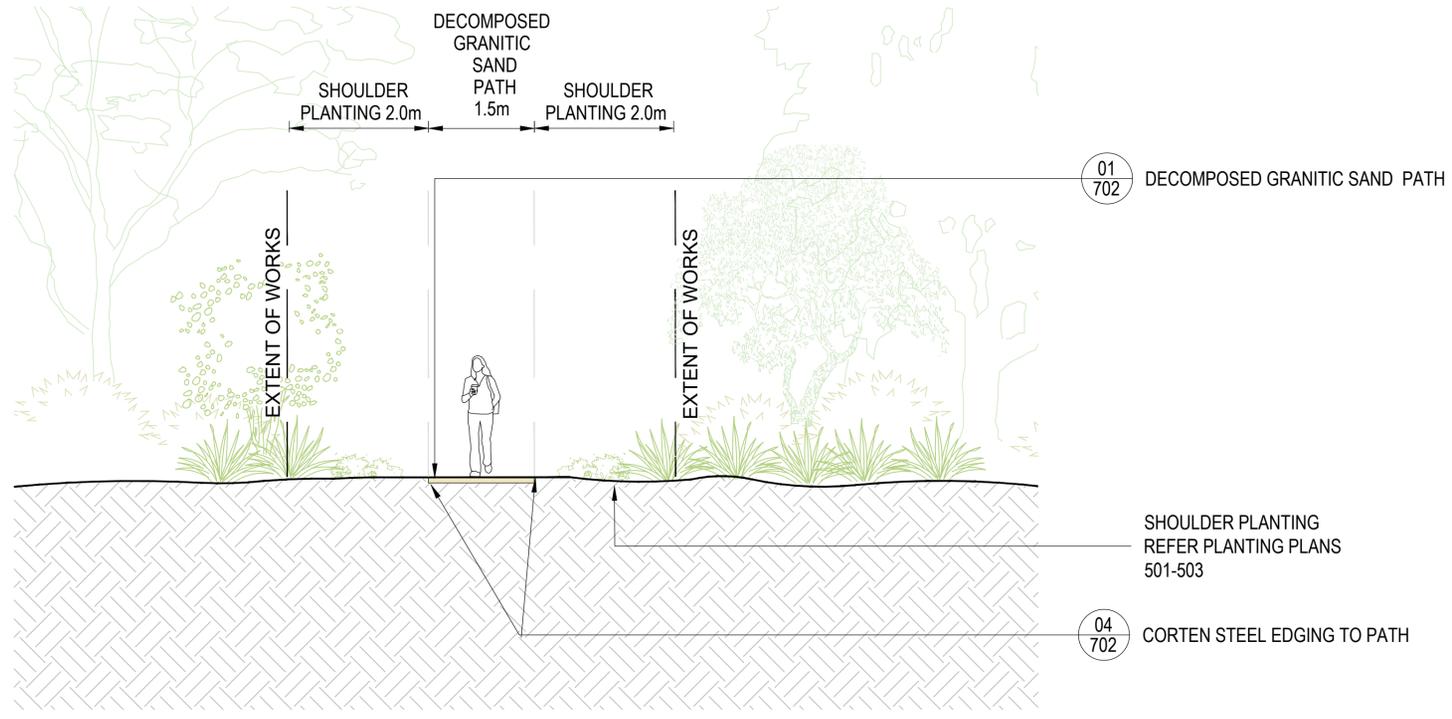
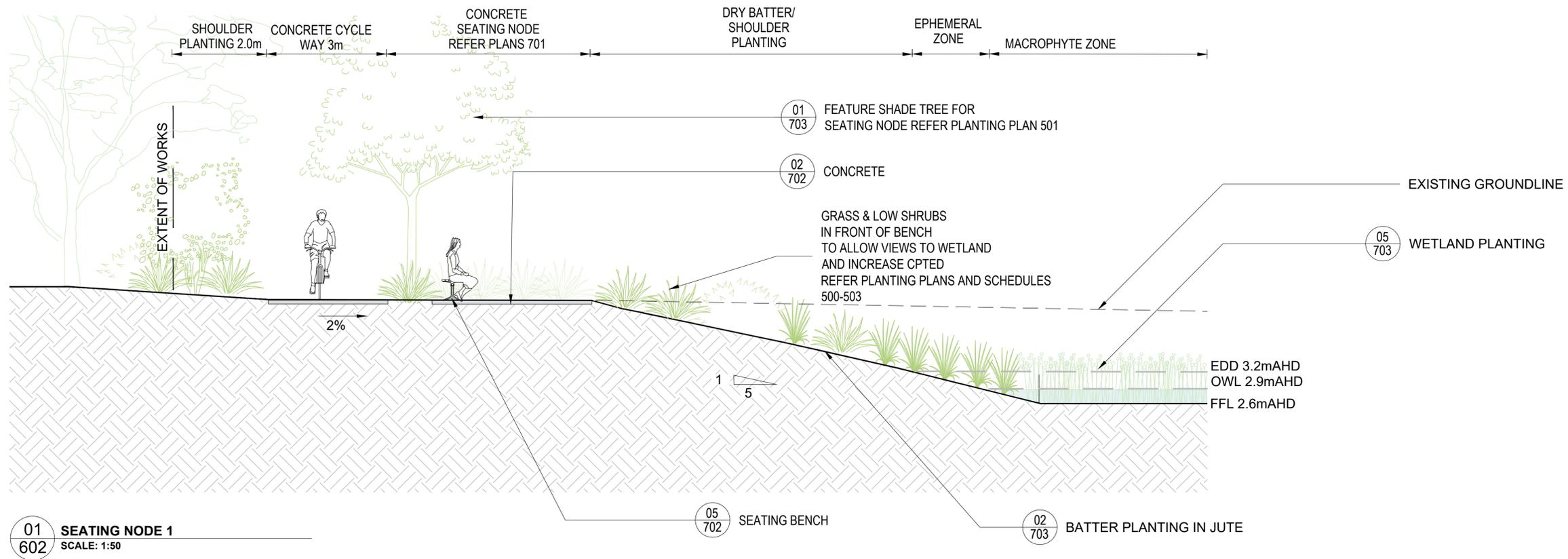
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**601** SCALE: 1:50



**02** PATH FROM MASSINGER STREET 2  
**601** SCALE: 1:50

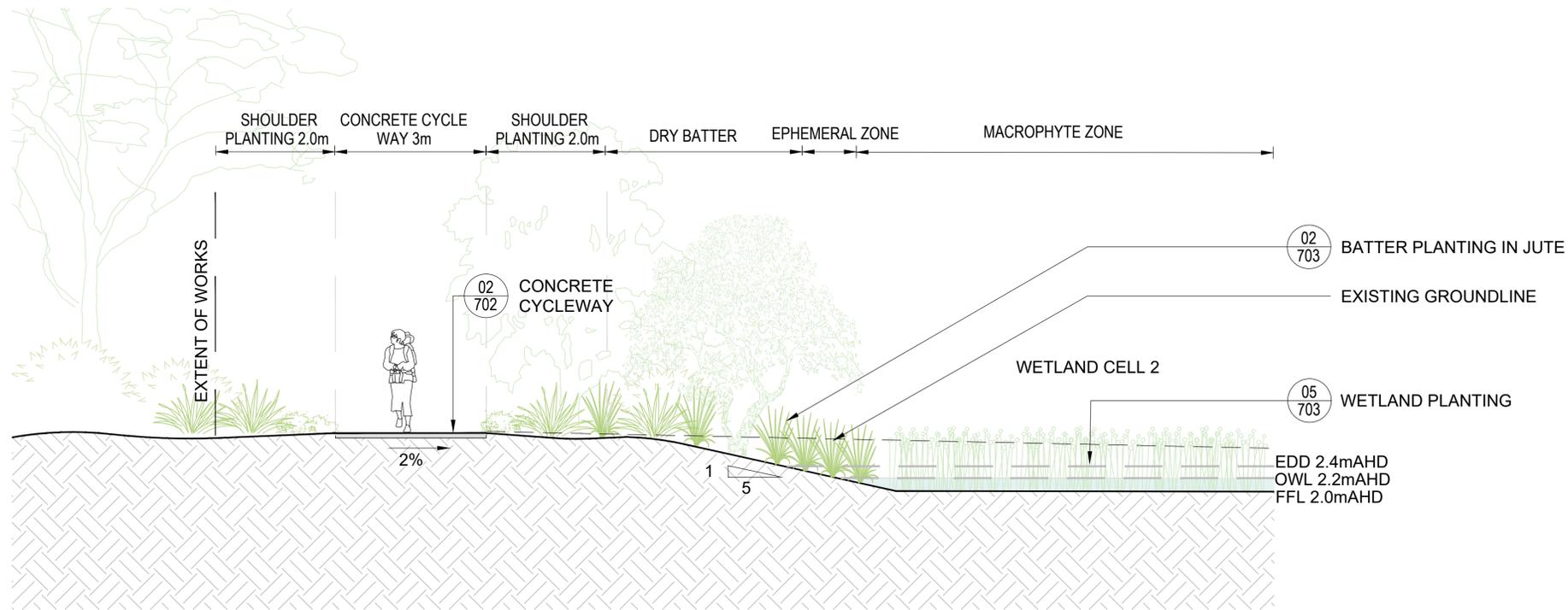
REV.	ISSUE / AMENDMENTS	DATE
A	PRE-DETAILED DESIGN PACKAGE COUNCIL REVIEW	17.11.2021
B	DETAILED DESIGN PACKAGE 70%	28.02.2022
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F	FOR TENDER	25.08.2023

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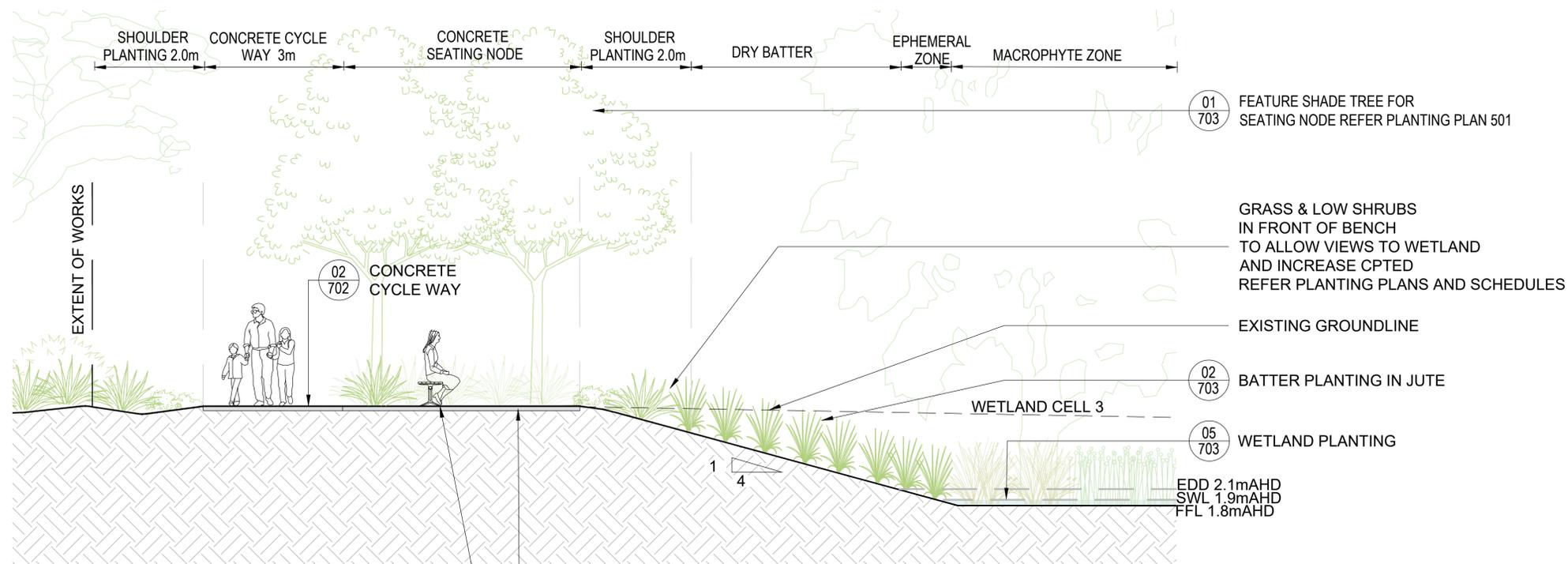


02 DECOMPOSED GRANITIC SAND PEDESTRIAN PATH  
SCALE: 1:50

REV.	ISSUE / AMENDMENTS	DATE
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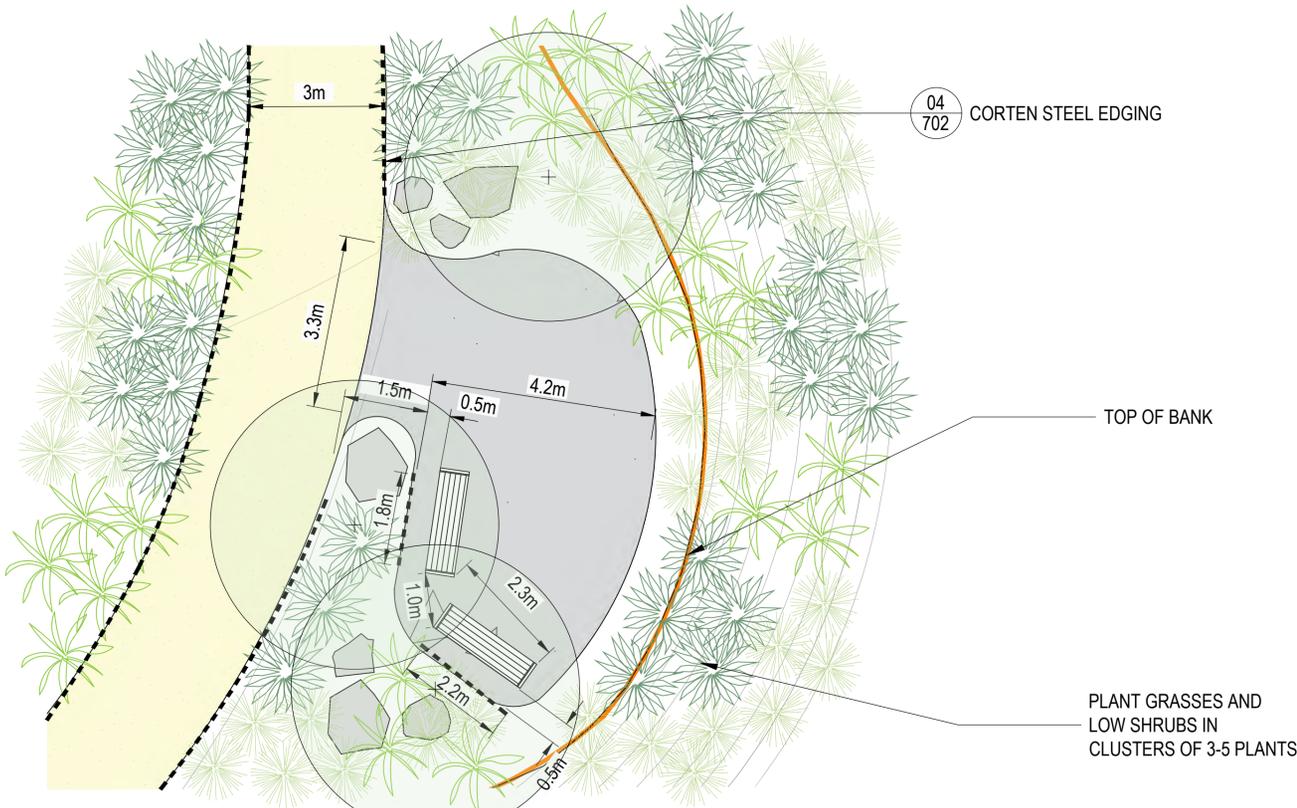


**01**  
**603** CONCRETE PATH WETLAND CELL 2  
SCALE: 1:50



**02**  
**603** SECTION SEATING NODE 3 WETLAND CELL 3  
SCALE: 1:50

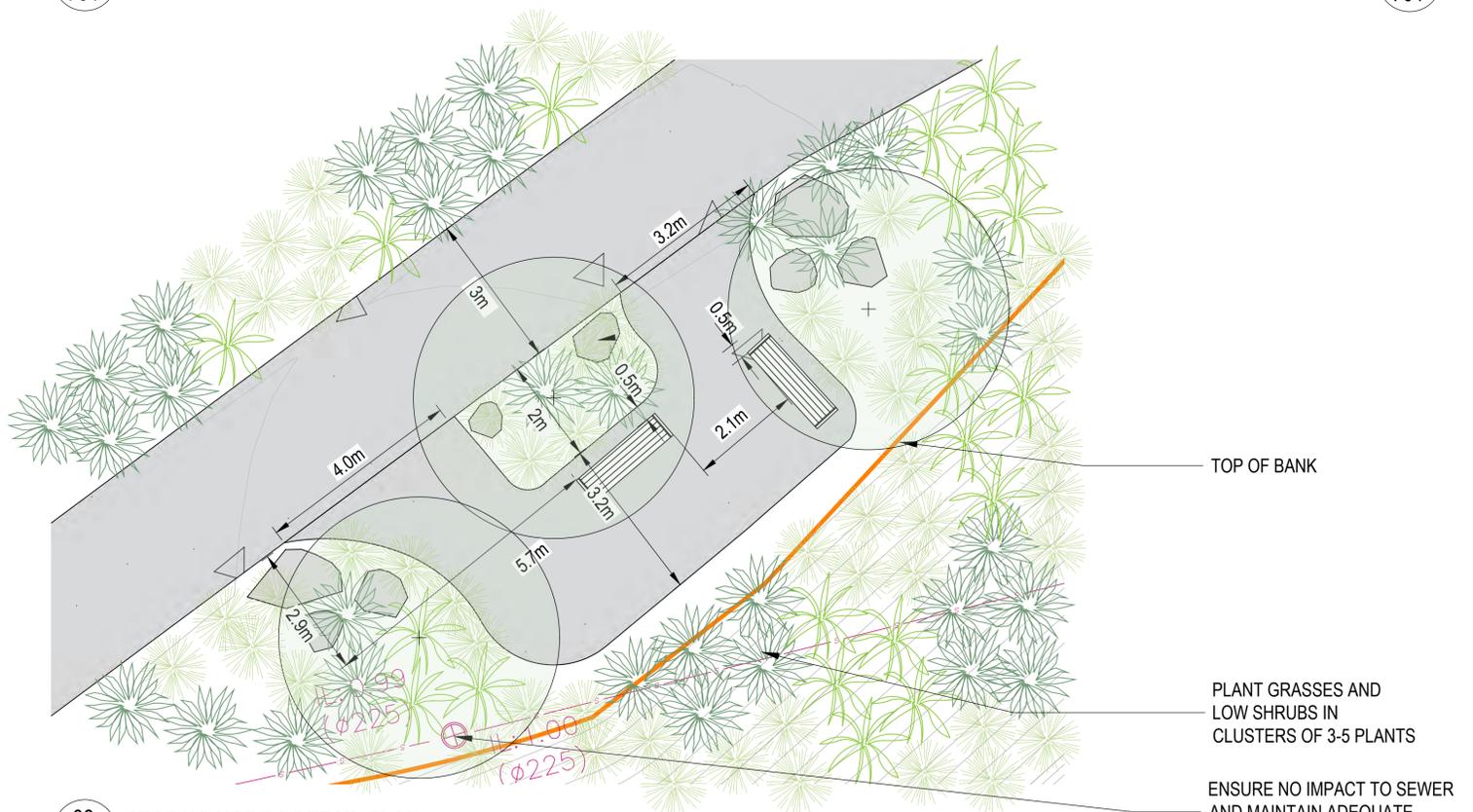
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F	FOR TENDER	25.08.2023



01 SEATING NODE 1 DETAIL PLAN  
701 SCALE:1:75



02 SEATING NODE 2 DETAIL PLAN  
701 SCALE:1:75



03 SEATING NODE 3 DETAIL PLAN  
701 SCALE:1:75

**PLANTING PLAN NOTE:**  
REFER SHEETS 501 - 503 FOR PLANTING ZONES.  
ONLY LOW GROWING SPECIES TO 1.2m HIGH SHALL BE PLANTED IN FRONT OF THE SEATING NODE BENCHES

**CORTEN STEEL EDGING NOTE:**  
CORTEN STEEL EDGING TO BE INSTALLED TO THE SIDE OF ALL DECOMPOSED GRANITIC SAND PATHS  
REFER PLANS 501-503 AND DETAILS 702\_03/04

**SETOUT NOTE:**  
FINAL SETOUT TO THE PROJECT SURVEYOR THROUGH GPS COORDINATES  
ANY DISCREPANCIES IN MEASUREMENTS SHALL REPORTED TO THE PROJECT LANDSCAPE ARCHITECT BEFORE INSTALLATION

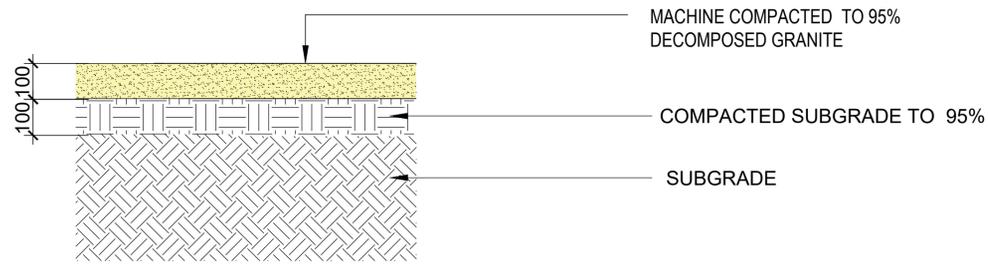
- LEGEND**
- PROSED FEATURE SHADE TREE  
REFER DETAIL 01\_703
  - GRASS + LOW SHRUB PLANTING  
REFER PLANTING SCHEDULES SHEET 500
  - FEATURE ROCKS  
REFER DETAIL 03\_702
  - SEATING BENCH  
REFER DETAIL 05\_702
  - CONCRETE CYCLE WAY/SEATING NODE  
REFER DETAIL 02\_702
  - DECOMPOSED GRANITIC SAND PATH  
REFER DETAIL 01\_702
  - CORTEN STEEL EDGING  
REFER DETAIL 04\_702
  - EXTENT OF EARTH WORKS (TOP OF BANK)
  - PROPOSED 0.2m CONTOURS
  - SEWER INFRASTRUCTURE
  - SEWER ACCESS HOLE

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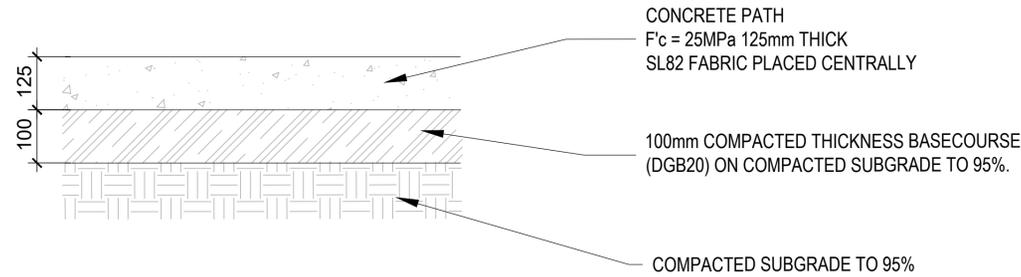
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SCALE AS SHOWN		REV. <b>F</b>
DESIGNED	KC	CAD FILE No. <b>1-91194_SANDHILLS_DD.DWG</b>
DRAWN	RS/TC	SHEET No. <b>1-191194_DD_701</b>
CHECKED	DM	



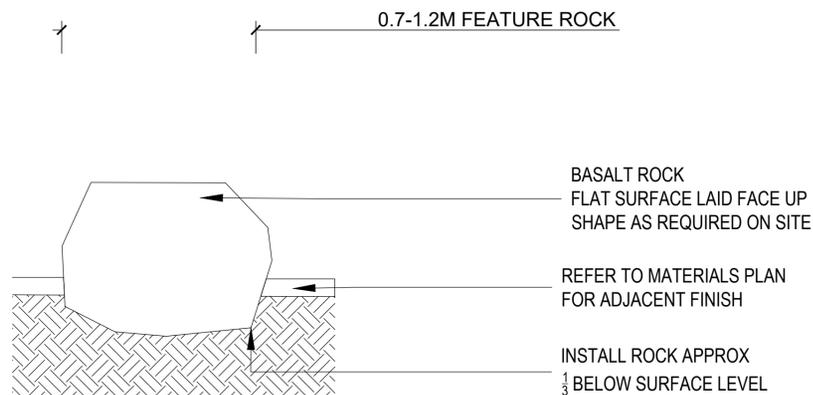
- NOTES:
1. COLOUR TO BE CONSISTENT GOLDEN YELLOW
  2. SIZE - FINES AND SAND TO 5mm
  3. DECOMPOSED GRANITIC SAND TO BE ROLLED AND COMPACTED IN LAYERS 30mm THICK TO A DEPTH OF 100mm.
  4. ENSURE SURFACE EVEN WITH 1:100 CROSS FALL RESPONDING TO FINISHED LEVELS OF LOCATION.
  5. MIX STABILIZER A01 BINDER AT RATE OF 3% DRY WEIGHT
  6. ALL DECO PATHS TO HAVE STEEL EDGING REFER DETAIL 04\_702

**01 DECOMPOSED GRANITIC SAND PATH**  
702 SCALE: 1:10

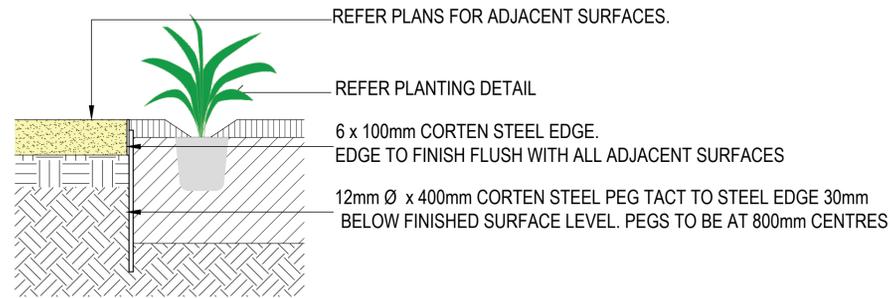


- NOTES:
1. COLOUR: WHITE
  2. BROOM FINISH
  3. CONTRACTION JOINTS SHALL BE INSTALLED EVERY 3m TO PREVENT CRACKING.
  4. EXPANSION JOINTS TO BE INSTALLED AT EVERY 12m.
  5. ENSURE SURFACE EVEN WITH 1:100 CROSS FALL RESPONDING TO FINISHED LEVELS OF LOCATION.

**02 CONCRETE CYCLE WAY**  
702 SCALE: 1:10



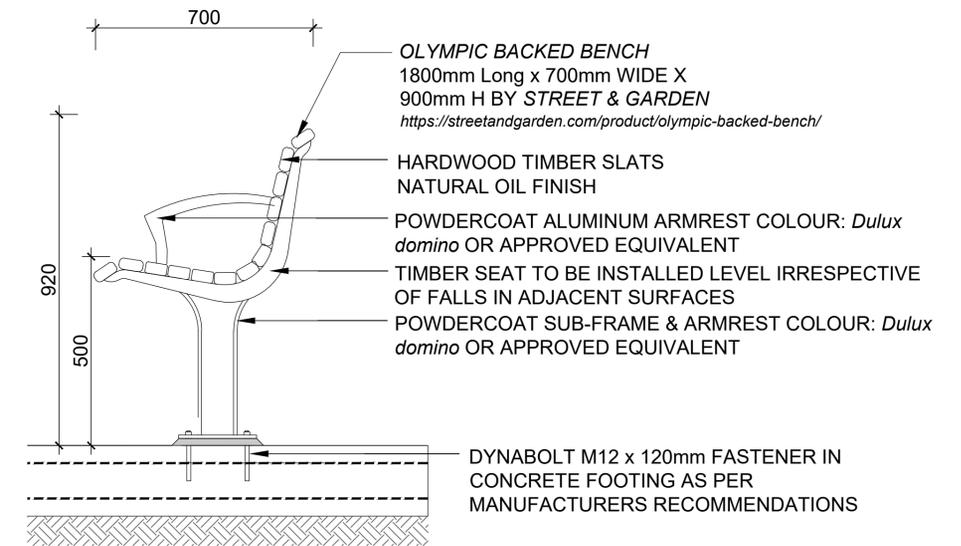
**03 FEATURE ROCKS**  
702 SCALE: 1:10



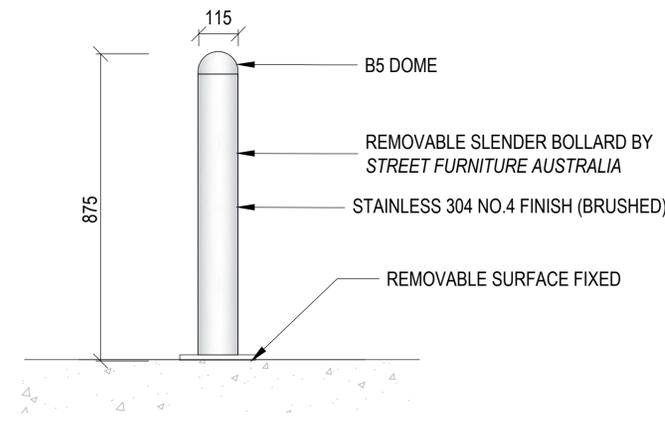
**04 CORTEN STEEL EDGE DETAIL**  
702 SCALE: 1:10



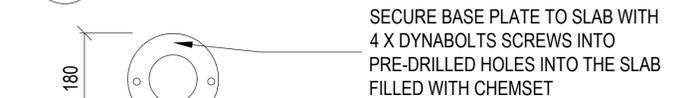
**05 TIMBER SEATING BENCH RENDER**  
702 SCALE: NTS



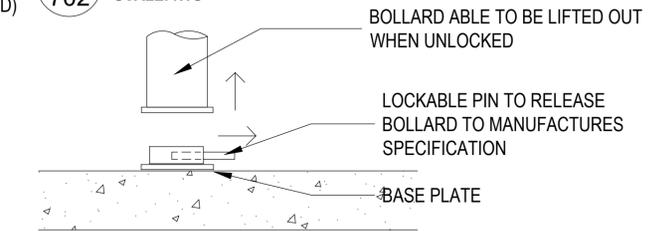
**06 TIMBER SEATING BENCH DETAIL**  
702 SECTION: 1:10



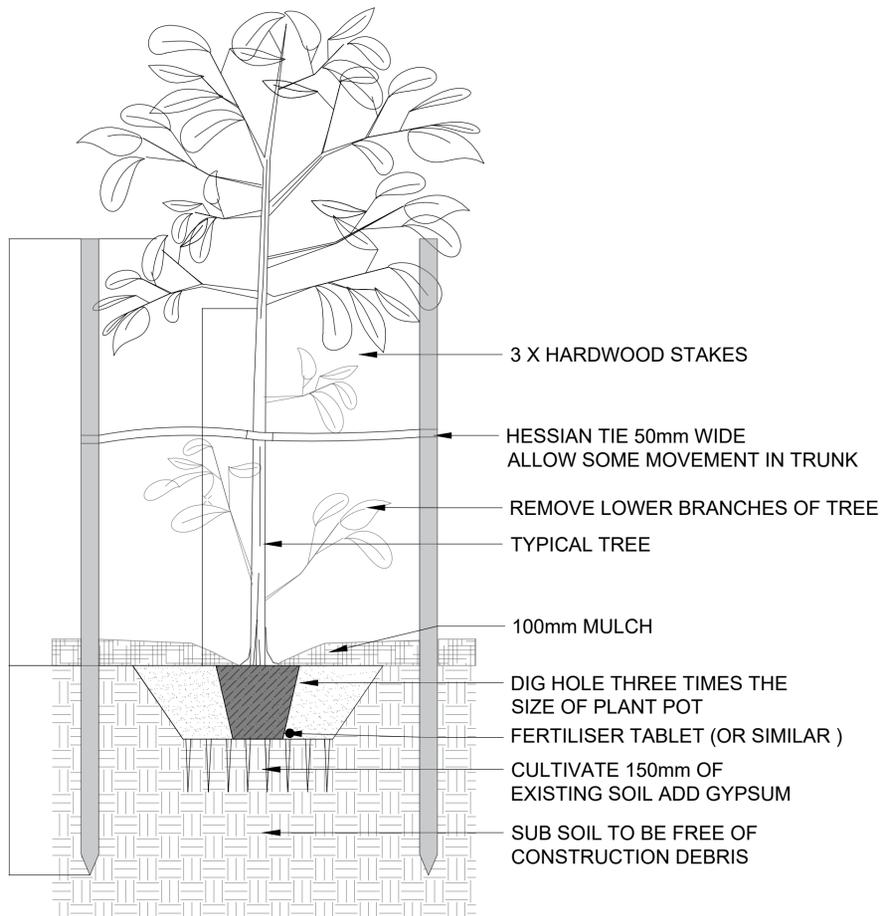
**06 REMOVABLE BOLLARD**  
702 SCALE: NTS



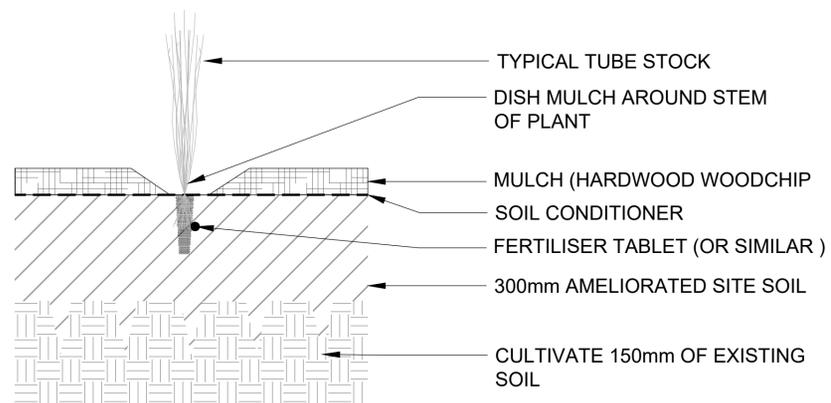
**07 BOLLARD BASE PLATE PLAN**  
702 SCALE: NTS



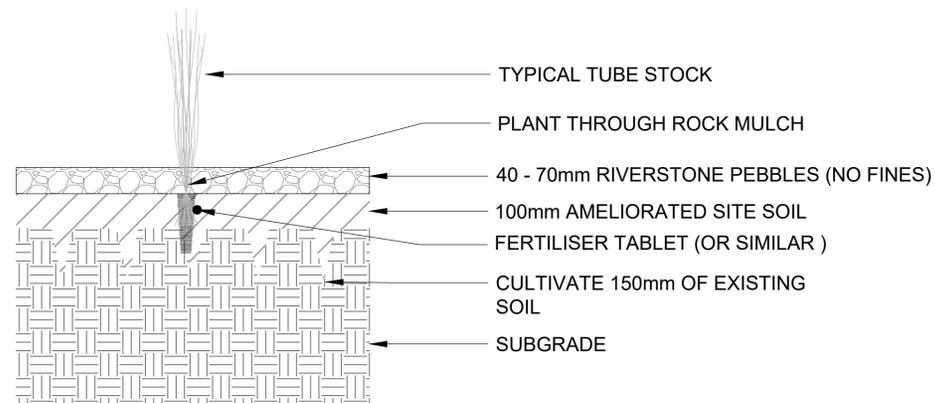
**08 REMOVABLE SURFACE FIXED**  
702 SCALE: NTS



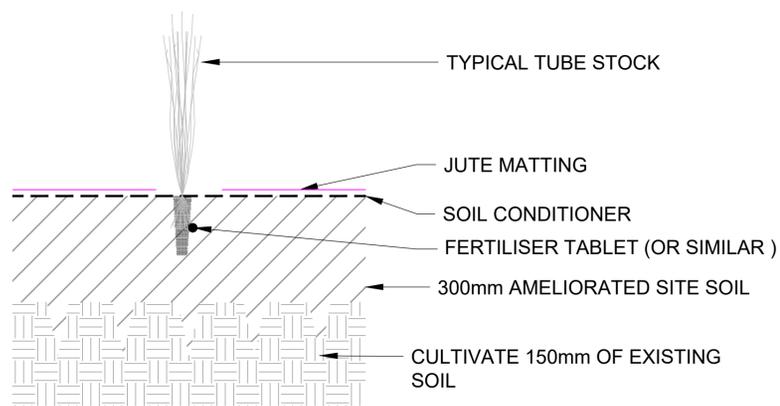
**01 FEATURE TREE PLANTING**  
SCALE: 1:10



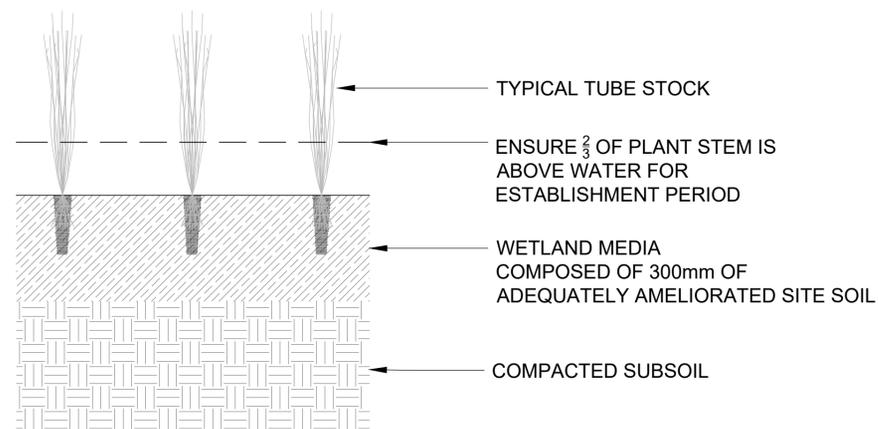
**03 PLANTING IN MULCH**  
SCALE: 1:10



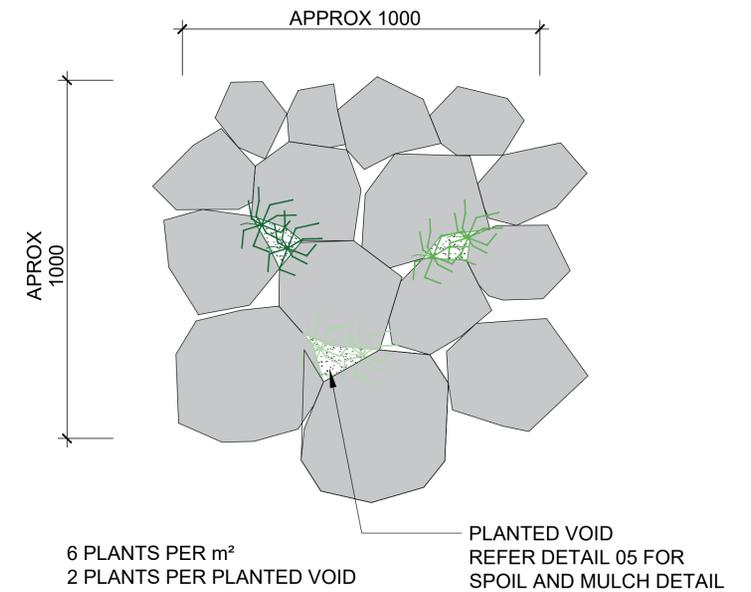
**04 PLANTING IN ROCK MULCH**  
SCALE: 1:10



**02 PLANTING IN JUTE**  
SCALE: 1:10

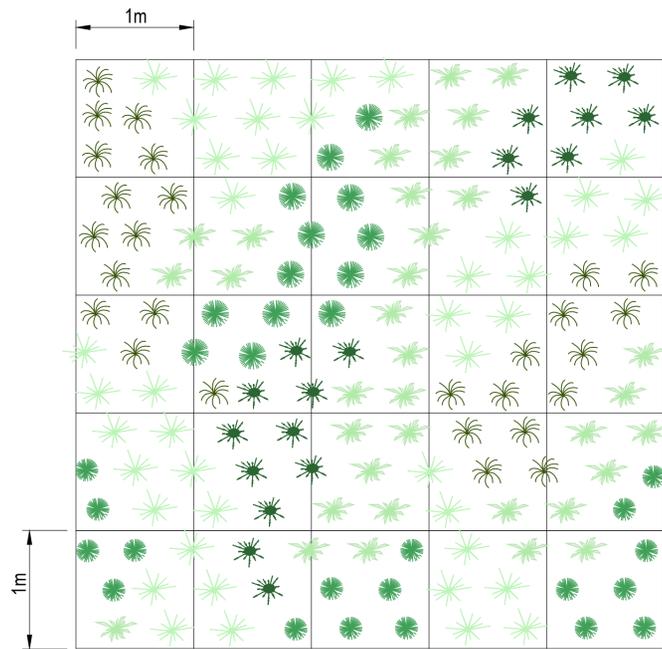


**05 PLANTING IN WETLAND**  
SCALE: 1:10



**06 PLANTING IN ROCK VOIDS**  
SCALE: 1:10

**PLANTING NOTE:**  
ALL PLANTING ON BATTERS IS TO BE JUTTED  
ALL PLANTING ABOVE THE TOP OF BATTERS IS TO BE MULCHED

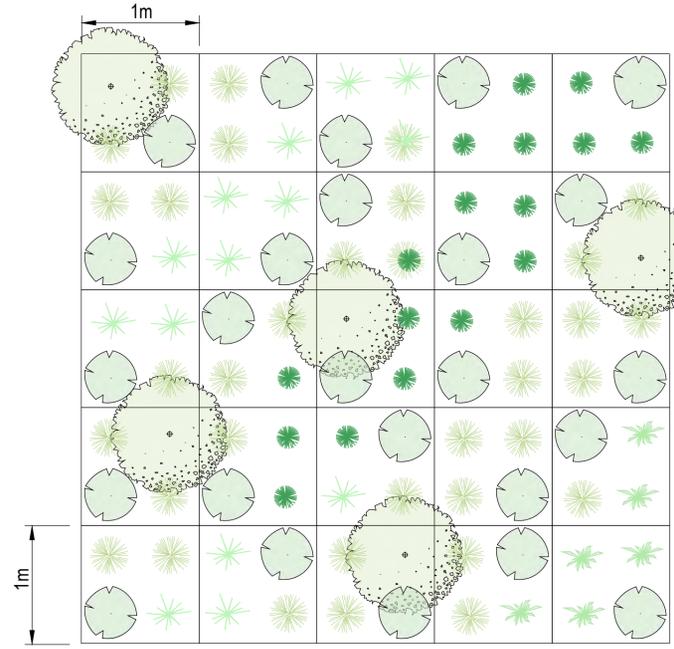


**LEGEND**

 6 X PLANTS/1m<sup>2</sup>

DENSITY 6 PLANTS/m<sup>2</sup>  
GROUP SPECIES in APPROXIMATELY 10 - 20 PLANTS

**01** PLANTING MATRIX ZONES P1, P2, P5, P6, P7, P8, P9  
704 SCALE: 1:30

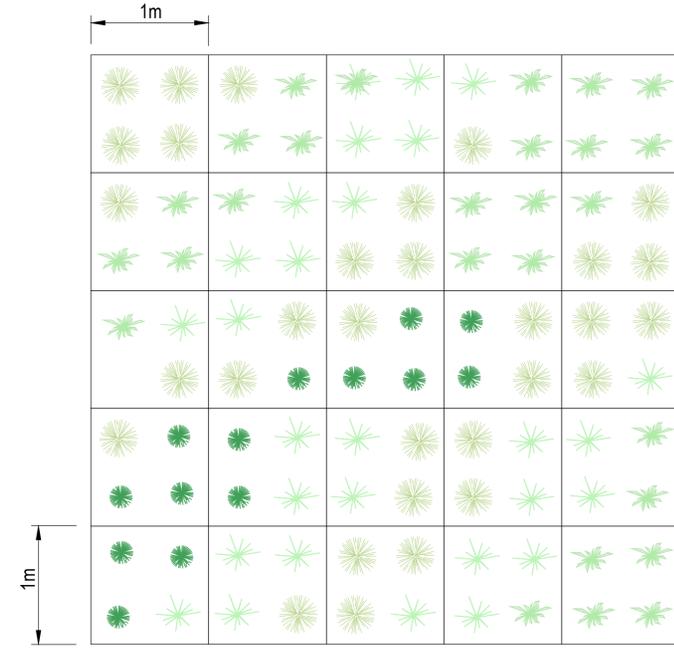


**LEGEND**

-  1 X TREE/5m<sup>2</sup> (APPROXIMATELY)
-  1 X SHRUB/1m<sup>2</sup> (APPROXIMATELY)
-  3 X GRASS/GROUNDCOVER/1m<sup>2</sup> (APPROXIMATELY)

DENSITY 4 PLANTS/m<sup>2</sup>  
GROUP SPECIES in APPROXIMATELY 10 - 20 PLANTS

**02** PLANTING MATRIX ZONES P4 & P10  
704 SCALE: 1:30



**LEGEND**

 4 X PLANTS /1m<sup>2</sup>

DENSITY 4 PLANTS/m<sup>2</sup>  
GROUP SPECIES APPROXIMATELY 10 - 20 PLANTS

**03** PLANTING MATRIX ZONE P3 & P11  
704 SCALE: 1:30

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SCALE  
**AS SHOWN**

DESIGNED	KC
DRAWN	RS/TC
CHECKED	DM

CAD FILE No.  
**1-91194\_SANDHILLS\_DD.DWG**

SHEET No.  
**1-191194\_DD\_704**

REV. **F**

# 1 Planting specification

- The planting is to be carried out by qualified and experienced contractors and all plants are to be sourced from local provenance.
- All plants material is to be in accordance with the species, variety, height and container size specified.

## 1.1 Planting

Specification as per drawing details and reiterated below.

- The contractor is to supply all plants and turf shown on the drawings (refer to design drawings) and as required to make good all disturbed surfaces
  - The contractor is responsible for undertaking planting of all plants shown on the planting plan as well as replacing all other surfaces that have been damaged due to construction works with 'like for like'
- All plants to be used are required to have a normal growth habit and must be sound, healthy and vigorous and free from pests and infections
- All turf must be provided by the Contractor to make good all disturbed turf areas
- Plants must be grown in the containers of the size stated in the planting schedule and must have sufficient roots to hold earth together intact after removal from containers without being rootbound
- Plants/turf must have large healthy root systems with no evidence of root curl, restriction or damage
- Plants that meet the measurements specified but do not possess a normal balanced height and spread will be rejected
- Plants must be hardened off, not soft or forced, and suitable for planting in the natural climate conditions existing at the site

## 1.2 Plant Supply

- The contractor is to supply all plants in required species in the available numbers with sufficient time prior to undertaking planting
- The contractor should liaise with the Superintendent to replace any plants that fail or are damaged at any stage of the work under the contract
- Provenance: Plants supplied will be of local provenance, and from the appropriate vegetation community, and as close to site as practical, preferably within a 20 km radius of the site
  - Certificate of provenance: Supply confirmation of provenance of the species as seed is collected/sown, so acceptability of sourced material can be confirmed

## 1.3 Plant Schedule

- Refer to the planting plans for details

## 1.4 Execution

- The plants are to be planted by suitably landscape specialists with knowledge of planting methods and be able to identify species to allow for the landscaping plan to be properly implemented

## 1.5 Planting Set out

- The Contractor must install plants to the extent as shown on drawings
- The zones to be planted are to be marked out on site prior to planting and the set out is to be approved by the Superintendent prior to any planting commencing
- The Contractor is to confirm extent of areas to be planted on site after completion of civil works. Refer to drawings for locations, species, quantities and container sizes.

## 1.6 Planting conditions

- Planting should be carried out when weather and soil conditions are favourable to plant establishment
  - Do not plant in unsuitable weather conditions including such as extreme heat, cold, frost, wind or rain
- The plants must be planted using appropriate horticultural techniques and in accordance with the drawings

## 1.7 Storage

- All delivered plants are to be maintained by the Contractor
  - The storage of plants is to be approved by the superintendent, to suit the plant delivery program
    - Where possible plant immediately after delivery
- Protect plants at all times from sun or drying winds
- Plants that cannot be planted immediately on delivery must be kept in the shade, well protected and adequately watered
- Plants must be handled in such a manner to avoid any damage

## 1.8 Placing

- Planting holes should be at least twice the size of the plant root ball
- The hole should be heavily watered immediately prior to planting and should have ample loose soil to ensure that root soil contact is complete and that no air gaps exist
- A slight depression should be made around the plant to assist in the trapping and infiltration of water
- Install plant stock to the areas indicated at the densities shown, in random pattern, insuring complete coverage

## 1.9 Fertilising and additives

- Appropriate fertiliser may be added to the plantings at the discretion of the contractor to ensure successful establishment.

## 1.10 Plant Establishment

- The Contractor is to maintain all plants for an establishment/maintenance period of 6 months from the date that all plants have been installed
- Records of all watering and maintenance carried out during the establishment period are to be maintained by the Contractor and supplied to the Superintendent
- Irrigate plantings throughout the establishment period unless the site receives adequate rainfall
- Plants should be irrigated as required to maintain growth rates free of stress
- Less frequent heavy watering is preferable to light watering
- The soil moisture content needs to be assessed daily and watering regime adjusted accordingly

## 1.11 Replacement

- Replace damaged or failed plants with plants of the same type and size
- Plant replacement will be at the cost of the contractor during the establishment/maintenance period.

## 1.12 Soil

Within the wetland macrophyte zones, topsoil should be placed to a minimum depth of 300 mm. Design levels for wetlands are inclusive of topsoil, therefore, when earthworks are occurring, allowance for topsoil is required.

Soils for planting must be of loose, friable consistency and of suitable fertility for plant growth. Soil lumps must be of a maximum 50mm dimension.

Soils for planting must be free from weeds, rocks, debris, and contaminants.

The application of lime may be required where the soil testing identifies a potential soil pH problem (pH < 5) or where acid sulphate soils are detected. The rate of application should be guided by soil test results, and the Acid Sulphate Management Plan (Env Solutions, 2021).

Stockpiled topsoil should be tested and approved by a certified laboratory and wetland designer and may need to be screened to remove any coarse organic matter.

### 1.1.1 Contamination

In the scenario that fuel, oil, cement or other phytotoxic material is spilt on subsoil or topsoil, excavate the contaminated soil, dispose of to the satisfaction of Byron Shire Council and replace with site soil or imported topsoil.

### 1.1.2 Installation and Aeration

Spread the media on the prepared surface and grade evenly.

- Fill areas of subsistence to achieve finished levels
- Avoid over compaction
- In areas of high compaction de-compact (rip to 100mm prior to planting)