

Sorell Council Southern Beaches CERMP Outfall Project

Outfall Project 1_SE112534

96 Lewisham Scenic Drive
Anna Wilson September 2023



Brief

Manage Sorell Southern beach stormwater outfalls to protect dunes and beaches from erosion and pollutants as per the Sorell Council Coastal and Estuarine Risk Mitigation Project.

Each outfall project will follow a number of overarching principles to ensure that works are good for the community and will tie in with overall stormwater and pollution management objectives.

SE112534 Brief

Concerns from Council to address are:

- Contamination possible from Service Station located above outfall
- No headwall at outlet
- Thick weeds
- Discharges on rocky foreshore.

Further discussions with Council indicated the potential benefits of combining outfalls if possible.



Infiltrate water into the ground



Maintain Native Environment



Create Maintainable Systems



Manage Pollutants



Consider Community

SE112534 96 Lewisham Scenic Drive Existing conditions

The outfall SE112534 is situated in a wide piece of public land between Lewisham Scenic Drive and Clarks Bay. There is an existing 600mm dia outfall with a large fall between the road level and the outfall.

Upstream of the outfall is a local shop and service station and a small stormwater network.



Figure 1 Aerial Photo of Outfall Location and sections



Figure 3 PHOTO 1 Outfall photo.

This image shows the existing outfall. Access to the outfall is difficult.



Figure 2 PHOTO 3 Bund area - markers showing pipe location

This is the existing bund – may be an old access track. Overgrown with 300 mm dia pipe as culvert under bund.



Figure 5 PHOTO 2 Section 1 - area between outfall and Willow Tree.

This image shows the view towards the outfall from the edge of the willow tree. Weeds cover this area.



Figure 4 PHOTO 4 - beach outfall area

This shows where the water outfall onto the beach. There is some erosion at the edge of the grass. The grass is a thick mat through this lower area.

Existing Issues

There are several issues that need to be addressed in this area as described below. This project creates the opportunity to address multiple problems.

Table 1 Tables of Issues


No.	Issue	Notes
11.	Extensive weeds between outfall and bay	Entire zone between outfall and willow tree covered in exotic weeds. Downstream of willow tree problem is few weeds present and extensive established coastal grass present.
12.	Some erosion at outfall and past culvert	Hidden under weeds a small erosion gully is forming.
13.	No maintenance access	Likely that weeds have established due to a lack of maintenance access meaning this area has been ignored as a public/ Council owned area.
14.	Uncontrolled pollutant loading from service station	Some litter and pollutants are making it into the network and likely eventually into the bay.
15.	Deep roadside drains outside 98 Lewisham Scenic Dr	May not be a problem but the drain in the front of 98 Lewisham Scenic Drive is a significant "hole" in the landscape.



Figure 6 Street view capture of 98 Lewisham Scenic Dr showing deep drain between road and property.

Opportunities

The location of the project creates opportunities to benefit the environment and surrounding community.

No.	Opportunity	Notes	Image
O1.	Size of Council Lot - Natural Values creation	The large area available to Council downstream of the outlet provides opportunity to create a natural treatment solution	
O2.	Road Casement – Access Opportunity	The area of road casement should be sufficient to create a small access track for ongoing maintenance. The success of the project depends on adequate maintenance. A track here may also provide local community access to the local foreshore and crown land. Road casement (white) Crown land (orange)	
O3.	Consolidate outfalls	The grade of the road across the hillside lends itself to doing some works on the existing table drain between the outfall at the boat ramp lot and the SE112534 outfall to direct the fall north into the proposed works. This would allow additional flow to be treated by the proposed works.	

Treatment Modelling

A treatment model was created in CleanStormwater JCO software using the below data and catchments. It was assumed that the southern catchment outfalling towards the boat ramp could be diverted into the main SE 112534 outfall.

Table 2 Input data for stormwater treatment model

Catchment	Area (ha)	Top elevation	Base elevation	Distance	Grade %	impervious fraction	total impervious	roof area m2	road area m2	pervious area m2	check area m2	swale length
1	8.4	80	15	670	9.70		37800	18900	18900	46200	84000	
2	5.58	80	15	730	8.90		25110	12555	12555	30690	55800	
1A	5	80	42	467	8.14	0.10	5000	2500	2500	45000	50000	226
1B	0.48	42	35	48	14.58	0.3	1440	720	720	3360	4800	195
1C	0.635	45	19	174	14.94	0.3	1905	952.5	952.5	4445	6350	125
1D	1.65	35	20	162	9.26	0.30	4950	2475	2475	11550	16500	98
1E	0.48	19	12	61	11.48	0.60	2880	1152	1728	1920	4800	25
2A	3.35	80	42	487	7.80	0.10	3350	1340	2010	30150	33500	140
2B	0.86	42	30	91	13.19	0.30	2580	1290	1290	6020	8600	102
2C	1.14	30	15	123	12.20	0.30	3420	1710	1710	7980	11400	120



Figure 7 Catchments used in model. Catchment 1 - existing into outfall. Catchment 2 possible addition to outfall.

The results from the treatment model show that standard treatment results are gained from the arrangement and are acceptable once the additional catchment is added. (Wilson, et al., 2021)

	Gross Pollutants	TSS	TP	TN
% Reduction required	90	80	45	45
%Reduction achieved	100	82.05	58.67	47.34

However analysis of the results shows that the **majority of the treatment in the system comes from the network of roadside drains** (modelled in as swale drains). This means that the outfall arrangements are predominantly for erosion mitigation and to create a natural environment.

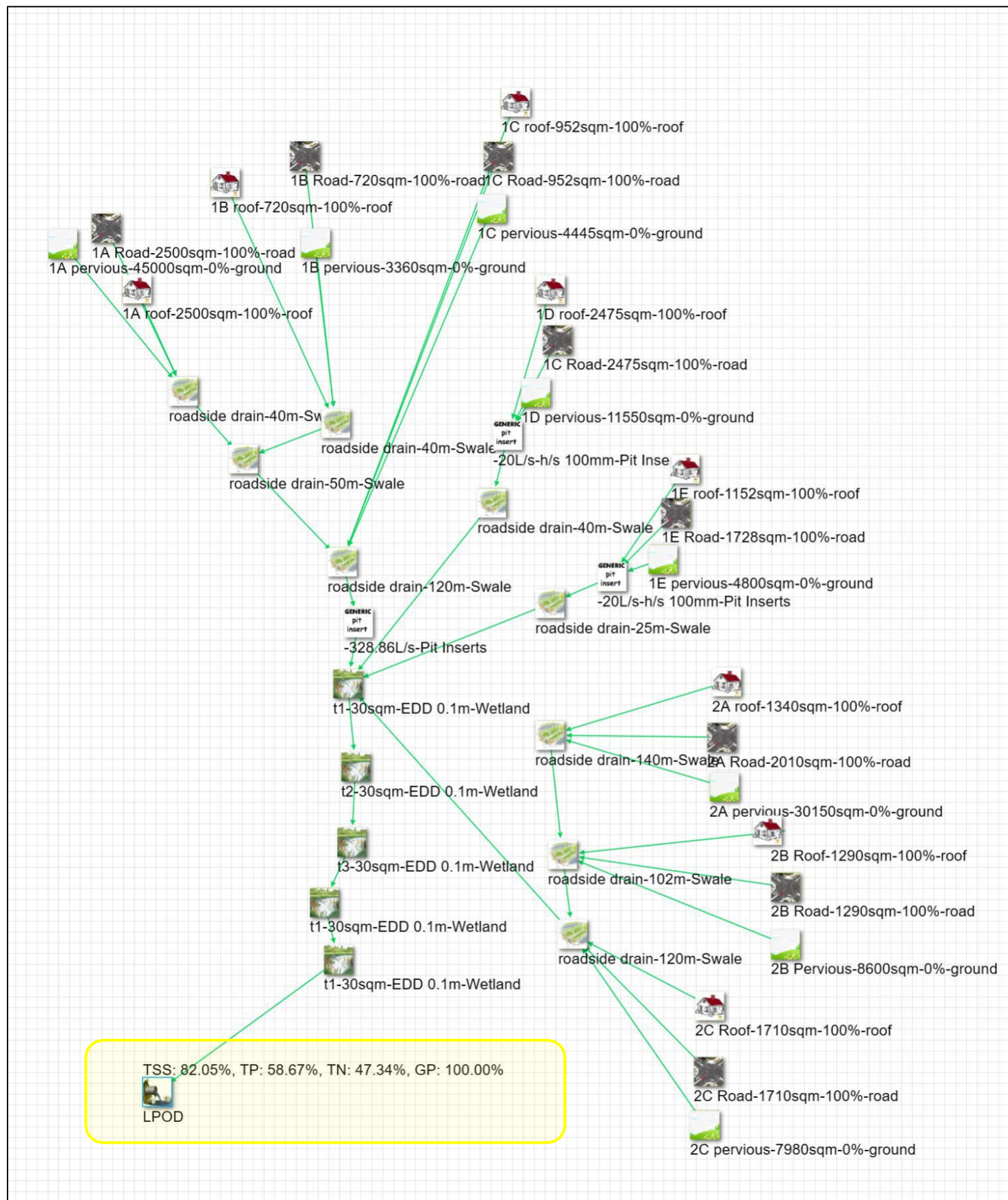


Figure 8 Cleanstormwater stormwater treatment model showing treatment results.

Individual Treatment Performance

	Flow Reduction (%)	Suspended Solid Reduction (%)	Phosphorus Reduction (%)	Nitrogen Reduction (%)	Gross Pollutant Reduction (%)	Percentage of inflow Treated (%)
-328.86L/s-Pit Inserts	0.00	28.39	17.49	12.72	0.00	98.12
roadside drain-40m-Swale	0.00	58.99	46.37	25.04	100.00	99.19
t1-30sqm-EDD 0.1m-Wetland	0.12	0.17	0.63	0.22	0.00	2.06
t2-30sqm-EDD 0.1m-Wetland	0.12	0.40	0.50	0.19	0.00	2.22
t3-30sqm-EDD 0.1m-Wetland	0.12	0.45	0.34	0.15	0.00	1.60
t1-30sqm-EDD 0.1m-Wetland	0.12	0.67	0.50	0.20	0.00	2.40
t1-30sqm-EDD 0.1m-Wetland	0.12	0.70	0.47	0.20	0.00	2.48
roadside drain-40m-Swale	-0.00	84.99	57.18	37.73	100.00	99.83
roadside drain-50m-Swale	-0.00	19.15	6.67	16.03	0.00	99.11
roadside drain-120m-Swale	-0.01	47.12	17.52	20.21	100.00	94.98
-20L/s-h/s 100mm-Pit Inserts	0.00	28.35	16.86	12.33	97.00	93.20
-20L/s-h/s 100mm-Pit Inserts	0.00	29.98	17.36	12.61	98.93	96.20
roadside drain-40m-Swale	-0.00	71.61	44.65	25.77	100.00	98.29
roadside drain-25m-Swale	-0.00	76.33	48.61	23.78	100.00	99.53
roadside drain-140m-Swale	-0.01	76.72	53.83	44.98	100.00	99.68
roadside drain-102m-Swale	-0.00	58.39	27.19	19.93	100.00	99.50
roadside drain-120m-Swale	-0.00	57.38	25.00	15.93	100.00	99.22

Figure 9 Individual Treatment Performance results for each treatment section of model.

Recommendations

No.	Recommendation	Notes
OP1. R1	Install pit baskets in SW pits upstream of outfall.	Ocean protect OceanGuard recommended. Recommend initial installation of 5 pit baskets.
OP1.R2	Remove weeds downstream of outfall	As per NVA – to be supplied.
OP1.R3	Install a series of bunds to slow velocity. Plant out area with natives.	See attached plan.
OP1. R4	Formalise a construction access and maintenance pathway in the road reserve to maintain the installation.	The ongoing success of this outfall is dependent on regular maintenance and will incur a higher maintenance load during establishment. A track to the installation will set this project up for success.
OP1.R6	Divert flow from southern outfall into this outfall	Survey data will be required to ensure this possibility however LiDAR data indicates it is likely.
OP1.R6	Formally recognise the value of open drains in the Southern Beaches area for water treatment.	This would require creating maintenance guidelines in conjunction with maintenance crews to ensure that the drains are maintained for water treatment outcomes as well as for drainage outcomes.

This project will prevent the existing erosion issues increasing, stabilise the outfall to withstand future erosion pressures, provide opportunity to remove the significant weed loading on the area and install device to prevent litter entering the ocean . Installing access for maintenance will ensure the site is not overcome by weeds and dumping into the future and creates an attractive native zone improving the area for the environment and for the community.

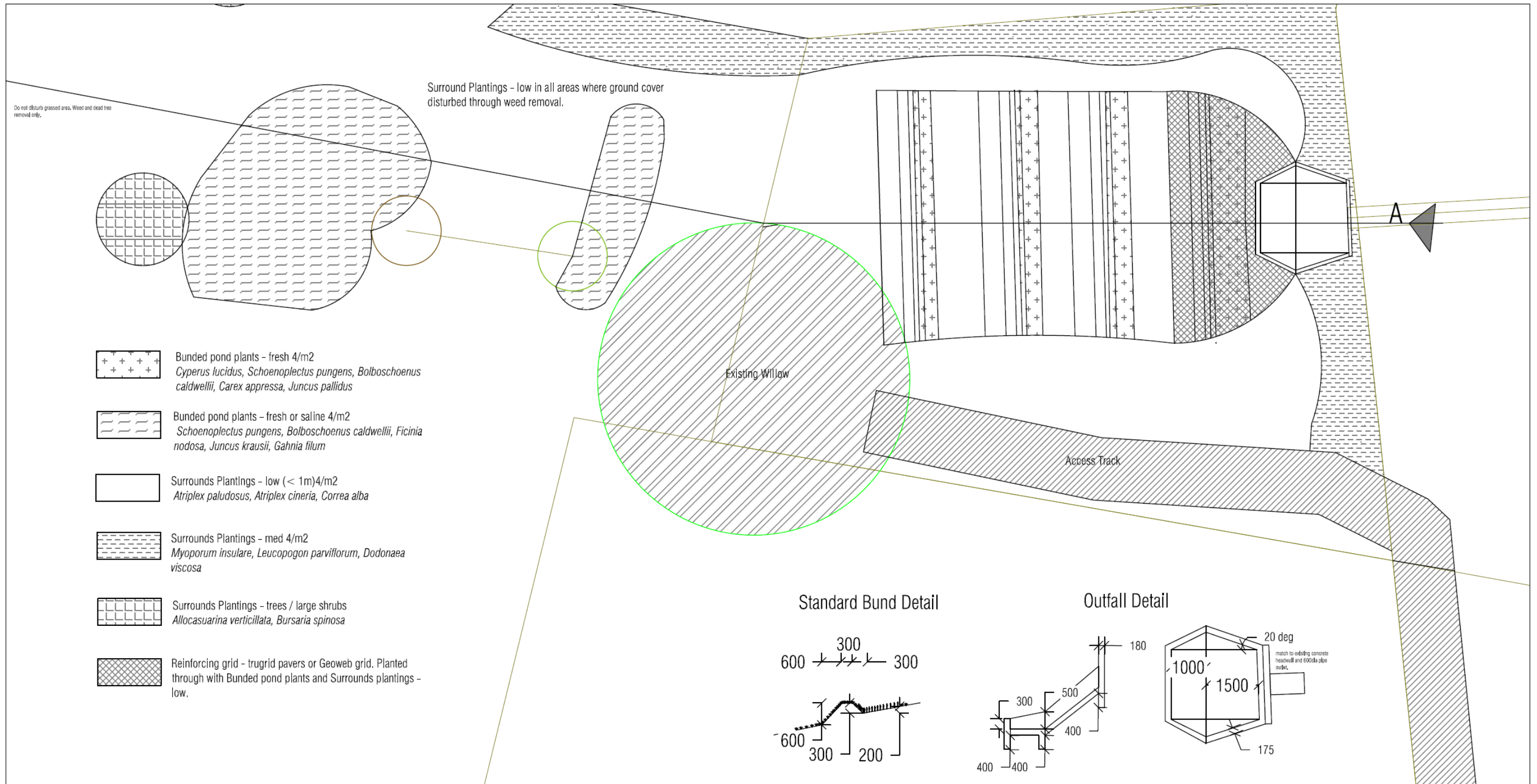
References

Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand, 2000. *Australian and New Zealand guidelines for fresh and marine water quality. Volume 1 , The guidelines. National water quality management strategy no.4.*, s.l.: Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand.

Engineers Australia, 2006. *Australian Runoff Quality - A Guide to Water Sensitive Urban Design*. Crows Nest: Engineers Media.

Wilson, A. et al., 2021. *Tasmanian Stormwater Policy Guidance and Standards for Development*, Hobart: Derwent Estuary Program and Local Government Association of Tasmania.

Construction Plan

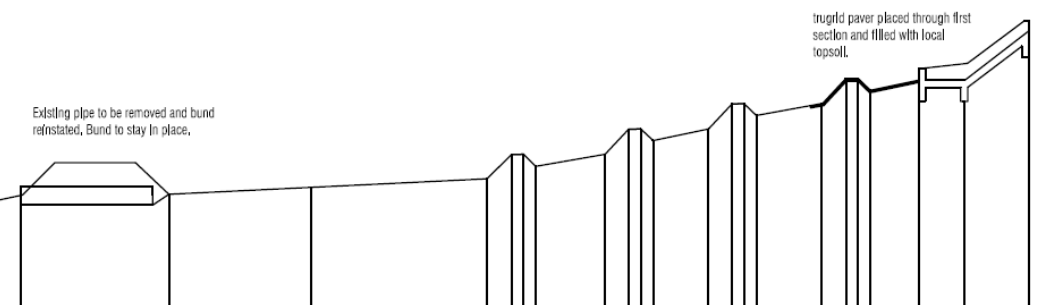


NOTES:

Erosion and sediment control to be in place during construction and establishment. A sediment fence across full width of works prior to the beach edge to be installed.

Jute matting to be installed through bund area.

INDICATIVE SECTION A-A.
to be updated with levels
when survey provided.



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CLIENT SORELL COUNCIL

PROJECT OP1_SE112534

DRAWING OP1_SE112534_1 Outfall works

DATE

07/11/23

VERSION

V1.0