Central Coast Council

Ordinary Council Meeting

ATTACHMENTS PROVIDED UNDER SEPARATE COVER

Tuesday 23 April 2024

Central Coast Council

ATTACHMENTS PROVIDED UNDER SEPARATE COVER to the

Ordinary Council Meeting

To be held in the Central Coast Council Chambers,
2 Hely Street, Wyong
on Tuesday 23 April 2024
Commencing at 6:30 PM

INDEX

Central Coast Council

Ordinary Council Meeting

Held in the Council Chambers
2 Hely Street, Wyong

26 March 2024

MINUTES

Present

Rik Hart

In Attendance

David Farmer	Chief Executive Officer
Boris Bolgoff	Director Infrastructure Services
Luke Sulkowski	Director Environment and Planning (Acting)
Jamie Loader	Director Water and Sewer
Marissa Racomelara	Director Corporate Services
Melanie Smith	Director Community and Recreation Services

Notes

The Administrator, Rik Hart, declared the meeting open at 6:31pm and advised in accordance with the Code of Meeting Practice that the meeting was being recorded.

The Administrator acknowledged the Traditional Custodians of the land on which we live, work and play. We pay our respects to Darkinjung country, and Elders past and present. We recognise the continued connection to these lands and waterways and extend this acknowledgement to the homelands and stories of those who also call this place home. We recognise our future leaders and the shared responsibility to care for and protect our place and people.

The Administrator updated the meeting on recent activities of Council.

PROCEDURAL ITEMS

1.1 Confirmation of Minutes of Previous Meeting

Time Commenced 6:35pm

Summary

Confirmation of minutes of the Ordinary Meeting of Council held on 27 February 2024.

50/24 RESOLVED on the motion of RIK HART:

That Council confirms the minutes of the Ordinary Meeting of Council held on 27 February 2024.

1.2 Disclosures of Interest

Time Commenced 6:35pm

Rik Hart declares his significant non-pecuniary interest. Administrator's comments being:

> *I declare a significant non-pecuniary interest against item 3.7 - Staff Submission on DPHI Discussion Paper on Short- and Long-Term Rental Accommodation. My relative owns a property on the Central Coast which they operate as a hosted short-term rental accommodation offering. For this reason, I will move a procedural motion when this item is due to be considered.*

51/24 RESOLVED on the motion of RIK HART:

That Council notes the report on Disclosures of Interest and advice of disclosures.

1.3 Notice of Intention to Deal with Matters in Confidential Session

Time Commenced 6:36pm

52/24 RESOLVED on the motion of RIK HART:

That Council notes that no matters have been tabled to deal with in a closed session.

ADMINISTRATOR MINUTE

2.1 Administrator's Minute – NSW Central Coast wins international tourism award

Time Commenced 6:36pm

53/24 RESOLVED on the motion of RIK HART:

That the Administrator Minute be received and noted.

REPORTS

3.1 Monthly Finance Report February 2024

Time Commenced 6:42pm

54/24 RESOLVED on the motion of RIK HART:

That Council receives the Monthly Financial Report – February 2024.

3.2 Investment Report for February 2024

Time Commenced 6:42pm

RESOLVED on the motion of RIK HART:

That Council:

55/24 Notes the Investment Report for February 2024.

56/24 Allocates the required unrestricted funds available in the General Fund to meet its February 2024 unrestricted funds deficit of $33.11M in the Drainage Fund.

3.3 Adoption of Central Coast Regulatory Policy

Time Commenced 6:48pm

RESOLVED on the motion of RIK HART:

That Council:

57/24 Notes that the public exhibition period for the Draft Central Coast Regulatory Policy was run for a period of not less than 28 days being 7 December 2023 to 7 February 2024.

58/24 Notes that no submissions were received during the exhibition period.

59/24 Notes that a final review of the Draft Central Coast Regulatory Policy has been undertaken to ensure that the document is editorially correct and complies with current document control conventions. Limited changes have been made to the content/intent (text alignment changes and removal of references to state government departments due to recent name changes).

60/24 Endorses the finalisation and adoption of the Central Coast Regulatory Policy.

61/24 Endorses the following actions in relation to the 6 below mentioned Policy's:

- ***a. Council's Policy for Compliance and Enforcement – Revoke.***
- ***b. Wyong Shire Council's Policy for Parking Enforcement – Revoke.***
- ***c. Council's Smoke-Free Outdoor Public Spaces Policy – Revoke.***
- ***d. Council's Tree and Vegetation Vandalism Management Policy – Revoke.***
- ***e. Gosford City Council's Open Space Encroachment Policy – Revoke.***
- ***f. Council's Water-Craft Storage on Public Land Policy – Retain and update.***

3.4 Outcomes of Public Exhibition and Finalisation of Planning Proposal and Planning Agreement, Narara Eco Village

Time Commenced 6:51pm

RESOLVED on the motion of RIK HART:

That Council:

62/24 Endorses finalisation of the Planning Proposal for Narara Eco Village (RZ/115/2021).

63/24 Requests the Chief Executive Officer to exercise delegation issued by the

Department of Planning and Environment for RZ/115/2021 or if required request the Minister for Planning and Public Spaces to proceed with the steps for drafting and making of the amendment to Central Coast Local Environmental Plan.

64/24 Endorses the amendments recommended by Council staff being:

- ***a Include 'attached dwellings' as an additional permitted use in the R2 zone.***
- ***b Remove reference to 'commercial premises' as an additional permitted use in the R2 zone and replace with 'restaurants or cafes, take-away food and drink premises, shop, markets and business premises.'***
- ***c Update Schedule 5 of CCLEP 2022 to reflect updated descriptions and Lot and DP references of heritage items.***
- ***d Amend the exhibited site-specific DCP (Attachment C) to:***
  - ensure the definition of flood liable land is consistent with the Flood Risk Management Manual.
  - clarify the flood controls apply to all flood liable land.
  - insert additional heritage provisions to reflect the updated Conservation Management Plan.

65/24 Endorses the amendments to the exhibited Planning Agreement and associated documents as follows:

- ***a Remove Lots 51, 52, 53, 54, 55, 56, 57. 58. 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, and 93 in DP 270882.***
- ***b Register the Planning Agreement on Lots 1, 38, 39 and 95 DP 270882.***

66/24 Endorses the site-specific Development Control Plan subject to the amendments outlined above.

67/24 Requests the Chief Executive Officer exercise his Delegation to execute the draft Planning Agreement, Deed of Amendment and associated documents, prior to the finalisation of the rezoning.

68/24 Advises all those who made submissions during the public exhibition of Council's decision.

3.5 Request to prepare Planning Proposal relating to 310 Terrigal Drive, Terrigal

Time Commenced 6:53pm

RESOLVED on the motion of RIK HART:

That Council:

69/24 Endorses the Draft Planning Proposal provided in Attachment 1, in relation to Lot 27 DP 1223375, 310 Terrigal Drive, Terrigal which seeks to amend the Central Coast Local Environmental Plan 2022 to:

- ***a. Amend the maximum height of buildings from 8.5m to 25m.***
- ***b. Amend the maximum floor space ratio from 0.5:1 to 1.3:1.***
- ***c. Amend Schedule 1 Additional Permitted Use to enable retail premises limited to 150m^2.***
- ***d. Amend Location Specific Development Controls of the Central Coast Development Control Plan, Chapter 5.11 Terrigal: Corner Charles Kay Drive and Terrigal Drive, to include site specific controls.***

70/24 Submits the Planning Proposal to the Minister for Planning and Public Spaces in accordance with Section 3.35(2) of the Environmental Planning and Assessment Act 1979, requesting a Gateway Determination, pursuant to Section 3.34 of the Environmental Planning and Assessment Act 1979.

71/24 Requests delegation for Council to finalise and make the draft Local Environmental Plan, pursuant to Section 3.36 of the Environmental Planning and Assessment Act 1979.

72/24 Prepares a site-specific Development Control Plan to support the Planning Proposal to ensure appropriate built form guidelines are applied in the development design for the site.

73/24 Undertakes community and public authority consultation in accordance with the Gateway Determination requirements.

3.6 Adoption of Privacy Management Plan Policy and Data Breach Policy

Time Commenced 6:57pm

RESOLVED on the motion of RIK HART:

That Council:

74/24 Adopts the draft Privacy Management Plan Policy and Data Breach Policy.

3.7 Staff submission on DPHI Discussion paper on short and long term rental accommodation

Time Commenced 6:59pm

75/24 A procedural motion was moved and RESOLVED by RIK HART:

That this matter will not be considered.

3.8 Request to Proceed with Domestic Water Booster Pump System Trial

Time Commenced 6:59pm

RESOLVED on the motion of RIK HART:

76/24 That Council notes the contents of the report and approves the implementation of a domestic booster pump trial including works on private property.

3.9 Fire Safety Inspection Report - Bateau Bay Square - 12 Bay Village Road, Bateau Bay

Time Commenced 7:00pm

RESOLVED on the motion of RIK HART:

That Council:

77/24 Note the content of the Fire Safety Report from Fire and Rescue NSW (Attachment 1), in accordance with Section 17(2)(a) of Part 8 of Schedule 5 of the Environmental Planning and Assessment Act 1979.

78/24 Receive a further report in accordance with Section 17(2)(b) of Part 8 of Schedule 5 of the Environmental Planning and Assessment Act 1979, following staff review of Attachment 1.

3.10 Fire Safety Inspection Report - Strathavon Resort - 31 Boyce Avenue, Wyong

Time Commenced 7:00pm

RESOLVED on the motion of RIK HART:

That Council:

79/24 ***Notes the content of the Fire Safety Report from Fire and Rescue NSW (Attachment 1), in accordance with Section 17(2)(a) of Part 8 of Schedule 5 of the Environmental Planning and Assessment Act 1979.***

80/24 ***Receives a further report in accordance with Section 17(2)(b) of Part 8 of Schedule 5 of the Environmental Planning and Assessment Act 1979, following staff review of Attachment 1.***

3.11 Gosford Regional Library Project Status Update

Time Commenced 7:01pm

RESOLVED on the motion of RIK HART:

81/24 ***That Council notes the progress on the Gosford Regional Library outlined in this report.***

3.12 Destination Management Plan 2022-2025 Progress Report

Time Commenced 7:03pm

RESOLVED on the motion of RIK HART:

That Council:

82/24 ***Receives the 2023 Report and Attachment 1 on the Progress of Actions of the Central Coast Destination Management Plan 2022-2025.***

83/24 ***Receives a further Report on the progress of the Destination Management Plan in twelve months.***

3.13 Community Support Grant Program - January 2024

Time Commenced 7:07pm

RESOLVED on the motion of RIK HART:

That Council:

84/24 ***Allocates* $20,082.00 *(inclusive of GST where applicable) from the 2023/24 grants budget to the Community Support Grant program, as outlined below and in Attachment 1.***

- ***a. Rotary Club of Erina Incorporated - CC Heat of Australian National Busking Championship - $4,791.00.***
- ***b. Rotary Club of Erina Incorporated - Youth Arts Exhibition 2024 - $400.00.***
- ***c. Tuggerah Rural Fire Brigade - Firefighting & Support Equipment - $4,891.00.***
- ***d. Curtain Bounce Incorporated - The Phantom of the Opera - $5,000.00.***
- ***e. Terrigal Surf Life Saving Club Incorporated - Terrigal Annual Ocean Swim 2024-$5,000.00.***

85/24 ***Declines applications as outlined below, for the reasons indicated in Attachment 1, and the applicants be advised and where relevant, directed to alternate funding sources.***

- ***a. Green Point-Terrigal Community Services Incorporated - application is ineligible***
- ***b Kariong Progress Association – broader community benefit is not demonstrated.***
- ***c. Toukley Neighbourhood Centre Incorporated – application is ineligible.***

The Meeting closed at 7:09pm.

Central Coast Council
Summary of Investments as at 31-March-2024

Financial Institution	Type of Investment	Short Term Rating	Long Term Rating	Maturity Date	Portfolio Balance $	As a % of the total Portfolio	Interest Rate %
CASH AT CALL:							
Macquarie Bank	At Call	A-1	A	Daily	6,519,463	0.98%	3.35%
Commonwealth Bank of Australia	Business On-line Saver	A-1+	AA	Daily	15,596,829	2.35%	3.20%
AMP limited	At Call	A-2	BBB	Daily	6,206	0.00%	3.80%
Total Cash At Call					**22,122,499**	**3.34%**	
TERM DEPOSITS, FLOATING RATE NOTES & BONDS:							
Commonwealth Bank of Australia	Term Deposit	A-1+	AA	03-Apr-2024	5,000,000	0.75%	5.35%
Commonwealth Bank of Australia	Term Deposit	A-1+	AA	10-Apr-2024	5,000,000	0.75%	5.36%
Commonwealth Bank of Australia	Term Deposit	A-1+	AA	17-Apr-2024	5,000,000	0.75%	5.37%
Commonwealth Bank of Australia	Term Deposit	A-1+	AA	24-Apr-2024	5,000,000	0.75%	5.37%
National Australia Bank	Term Deposit	A-1+	AA	14-Jun-2024	10,000,000	1.51%	1.15%
National Australia Bank	Floating Rate Note	A-1+	AA	19-Jun-2024	5,007,639	0.76%	5.27%
Bank of Queensland	Floating Rate Note	A-2	A	22-Jul-2024	4,000,000	0.60%	4.75%
SunCorp Bank	Bonds	A	A	30-Jul-2024	2,476,721	0.37%	1.85%
AMP limited	Term Deposit	A-2	BBB	01-Aug-2024	5,000,000	0.75%	5.45%
Macquarie Bank	Bonds	A-1	A	07-Aug-2024	11,878,307	1.79%	1.75%
Macquarie Bank	Floating Rate Note	A-1	A	07-Aug-2024	4,006,573	0.60%	5.15%
Westpac Banking Corporation	Bonds	A-1+	AA	16-Aug-2024	2,774,961	0.42%	2.25%
Bendigo and Adelaide Bank	Bonds	A-2	A	06-Sep-2024	9,258,687	1.40%	1.70%
Bendigo and Adelaide Bank	Floating Rate Note	A-2	A	06-Sep-2024	6,010,025	0.91%	5.31%
Bank of Queensland	Term Deposit	A-2	A	26-Sep-2024	10,000,000	1.51%	2.00%
HSBC Sydney Branch	Bonds	A-1	AA	27-Sep-2024	1,456,698	0.22%	1.50%
Bank of Queensland	Floating Rate Note	A-2	A	30-Oct-2024	7,019,959	1.06%	5.44%
MyState Bank	Floating Rate Note	P-2	BBB	22-Nov-2024	11,993,638	1.81%	4.94%
Macquarie Bank	Bonds	A-1	A	12-Feb-2025	24,362,610	3.67%	1.70%
Auswide Bank	Floating Rate Note	A3	BBB	14-Feb-2025	4,992,389	0.75%	5.10%
Auswide Bank	Floating Rate Note	A3	BBB	17-Mar-2025	4,997,994	0.75%	5.25%
NSW Treasury Corporation	Bonds	A-1+	AA	20-Mar-2025	1,945,287	0.29%	1.25%
QPCU LTD t/a QBANK	Floating Rate Note	A3	BBB	19-May-2025	5,006,492	0.75%	5.69%
Auswide Bank	Floating Rate Note	A3	BBB	10-Jun-2025	5,014,983	0.76%	5.65%
Bank of Queensland	Term Deposit	A-2	A	16-Jun-2025	10,000,000	1.51%	1.53%
MyState Bank	Floating Rate Note	P-2	BBB	16-Jun-2025	9,472,999	1.43%	5.00%
UBS Australia Limited	Bonds	A	A	30-Jul-2025	3,806,898	0.57%	1.20%
UBS Australia Limited	Floating Rate Note	A	A	30-Jul-2025	9,982,157	1.51%	5.21%
MyState Bank	Floating Rate Note	P-2	BBB	13-Oct-2025	10,049,952	1.52%	5.65%
Credit Union Australia Ltd t/as Great Southern Bank	Floating Rate Note	A2	BBB	01-Dec-2025	3,525,047	0.53%	5.92%
Bendigo and Adelaide Bank	Floating Rate Note	A-2	A	02-Dec-2025	35,318,094	5.33%	4.86%
QPCU LTD t/a QBANK	Floating Rate Note	A3	BBB	06-Dec-2025	10,075,165	1.52%	6.09%
Macquarie Bank	Floating Rate Note	A-1	A	09-Dec-2025	19,964,517	3.01%	4.83%
SunCorp Bank	Floating Rate Note	A	A	24-Feb-2026	4,982,811	0.75%	4.79%
UBS Australia Limited	Floating Rate Note	A	A	26-Feb-2026	18,687,493	2.82%	4.84%
Newcastle Permanent Building Society	Floating Rate Note	A-2	BBB	04-Mar-2026	989,055	0.15%	4.97%
Credit Union Australia	Floating Rate Note	A2	BBB	22-Apr-2026	10,882,391	1.64%	5.03%
Bank of Queensland	Floating Rate Note	A-2	A	06-May-2026	4,967,279	0.75%	4.98%
Teachers Mutual Bank	Floating Rate Note	A2	BBB	16-Jun-2026	1,679,901	0.25%	5.03%
QPCU LTD t/a QBANK	Floating Rate Note	A3	BBB	16-Jun-2026	4,534,622	0.68%	6.05%
Bendigo and Adelaide Bank	Floating Rate Note	A-2	A	18-Jun-2026	15,201,281	2.29%	5.00%
Bank of Queensland	Term Deposit	A-2	A	08-Jul-2026	5,000,000	0.75%	4.94%
Bank of Queensland	Floating Rate Note	A-2	A	22-Jul-2026	3,000,000	0.45%	4.93%
National Australia Bank	Floating Rate Note	A-1+	AA	24-Aug-2026	6,966,746	1.05%	4.75%
Suncorp Bank	Floating Rate Note	A	A	15-Sep-2026	12,825,374	1.93%	4.82%

Central Coast Council
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Financial Institution	Type of Investment	Short Term Rating	Long Term Rating	Maturity Date	Portfolio Balance $	As a % of the total Portfolio	Interest Rate %
Bank of Queensland	Floating Rate Note	A-2	A	27-Oct-2026	21,878,146	3.30%	5.16%
Northern Territory Treasury Corporation	Bonds	A	AA	15-Dec-2026	4,999,979	0.75%	1.40%
Commonwealth Bank of Australia	Floating Rate Note	A-1+	AA	14-Jan-2027	6,505,034	0.98%	5.05%
Suncorp Bank	Floating Rate Note	A	A	25-Jan-2027	13,000,015	1.96%	5.13%
Westpac Banking Corporation	Floating Rate Note	A-1+	AA	25-Jan-2027	16,004,252	2.41%	5.05%
Bank Australia Limited	Floating Rate Note	A2	BBB	22-Feb-2027	9,279,422	1.40%	5.89%
Auswide Bank	Floating Rate Note	A3	BBB	17-Mar-2027	4,508,798	0.68%	5.85%
Bank of Queensland	Floating Rate Note	A-2	A	09-May-2028	5,023,971	0.76%	5.54%
NSW Treasury Corporation	Bonds	A-1+	AA	15-Nov-2028	14,408,846	2.17%	3.00%
National Australia Bank	Term Deposit	A-1+	AA	13-May-2024	5,000,000	0.75%	5.11%
National Australia Bank	Term Deposit	A-1+	AA	06-May-2024	5,000,000	0.75%	5.11%
UBS Australia Limited	Floating Rate Note	A	A	12-May-2028	7,729,312	1.17%	5.90%
QPCU LTD t/a QBANK	Floating Rate Note	A3	BBB	18-Sep-2026	9,565,660	1.44%	6.00%
Illawarra Credit Union Ltd	Floating Rate Note	A3	BBB	21-Sep-2026	9,000,105	1.36%	6.05%
Bank of Queensland	Term Deposit	A-2	A	01-May-2024	5,000,000	0.75%	5.19%
Bank of Queensland	Term Deposit	A-2	A	22-May-2024	5,000,000	0.75%	5.24%
Bank of Queensland	Term Deposit	A-2	A	29-May-2024	5,000,000	0.75%	5.24%
Teachers Mutual Bank	Floating Rate Note	A2	BBB	28-Oct-2025	2,012,364	0.30%	5.86%
Credit Union Australia Ltd t/as Great Southern Bank	Floating Rate Note	A2	BBB	09-Feb-2027	12,602,192	1.90%	5.99%
Judo Bank	Term Deposit	A3	BBB	11-Apr-2024	10,000,000	1.51%	5.20%
Auswide Bank	Term Deposit	A3	BBB	21-Aug-2024	5,000,000	0.75%	5.45%
Police and Nurses bank	Term Deposit	A2	BBB	05-Jun-2024	5,000,000	0.75%	5.45%
Police and Nurses bank	Term Deposit	A2	BBB	26-Jun-2024	5,000,000	0.75%	5.45%
MyState Bank	Term Deposit	P-2	BBB	03-Jul-2024	5,000,000	0.75%	5.45%
MyState Bank	Term Deposit	P-2	BBB	10-Jul-2024	5,000,000	0.75%	5.45%
Police Bank Ltd	Floating Rate Note	A2	BBB	17-Nov-2026	5,018,269	0.76%	5.89%
QPCU LTD t/a QBANK	Floating Rate Note	A3	BBB	01-Dec-2026	10,064,288	1.52%	5.99%
Beyond Bank	Term Deposit	A2	BBB	17-Jul-2024	5,000,000	0.75%	5.42%
Beyond Bank	Term Deposit	A2	BBB	28-Aug-2024	5,000,000	0.75%	5.42%
Beyond Bank	Term Deposit	A2	BBB	13-Sep-2024	5,000,000	0.75%	5.42%
Members Banking Group Limited t/as RACQ Bank	Floating Rate Note	A2	BBB	24-Feb-2026	6,511,337	0.98%	5.84%
Auswide Bank	Floating Rate Note	A3	BBB	07-Nov-2025	9,790,920	1.48%	5.85%
National Australia Bank	Term Deposit	A-1+	AA	18-Sep-2024	5,000,000	0.75%	5.11%
National Australia Bank	Term Deposit	A-1+	AA	02-Oct-2024	5,000,000	0.75%	5.11%
National Australia Bank	Term Deposit	A-1+	AA	09-Oct-2024	5,000,000	0.75%	5.11%
Judo Bank	Bonds	A3	BBB	26-Sep-2025	8,606,814	1.30%	6.40%
Newcastle Permanent Building Society	Floating Rate Note	A-2	BBB	10-Feb-2027	12,961,770	1.95%	5.35%
Credit Union Australia Ltd t/as Great Southern Bank	Floating Rate Note	A2	BBB	23-Oct-2026	2,518,461	0.38%	5.94%
Total Term Deposit & Bonds:					**641,104,699**	**96.66%**	
TOTAL PORTFOLIO					**663,227,198**	**100.00%**	
Current					259,303,986	39.10%	
Non-Current					403,923,212	60.90%	
TOTAL PORTFOLIO					**663,227,198**	**100.00%**	

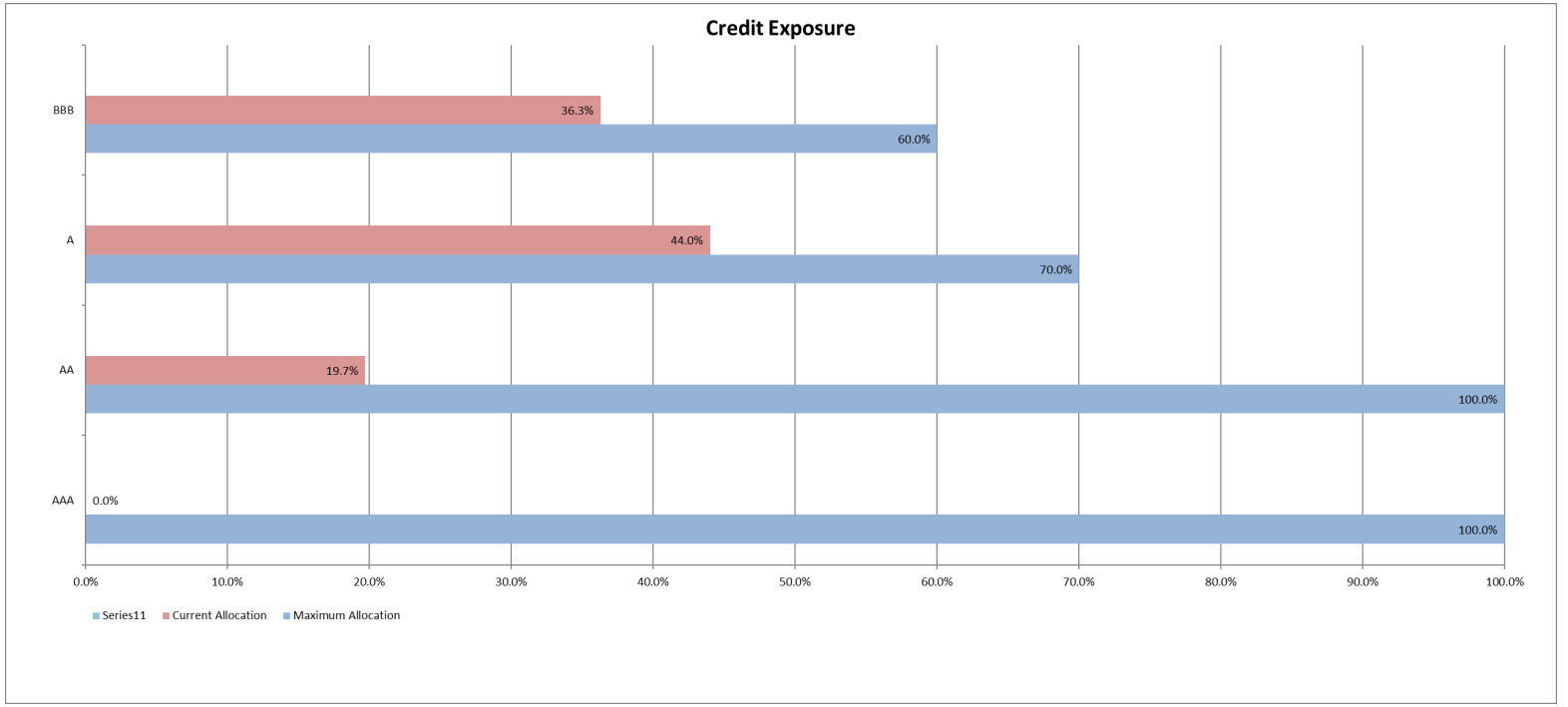
Green Investments

Central Coast Council
External and Internal Restrictions as at 31 March 2024

Natural Account	2023/24 Opening Balance	2023/24 YTD Actuals	2023/24 Trial Balance
3.1.1.02. External Restrictions			
120001. External Restrictions (Developer Contributions General)	26,292,295	(10,113,847)	16,178,448
120002. External Restrictions (Developer Contributions Drainage)	7,386,849	(254,823)	7,132,026
120003. External Restrictions (Developer Contributions Water Supply)	486,836	288,997	775,833
120004. External Restrictions (Developer Contributions Sewerage Services)	12,614,983	(2,635,768)	9,979,215
120006. External Restrictions (Developer Contributions Bonus Provisions)	4,605,545	0	4,605,545
120007. External Restrictions (Developer Contributions Section 94A Levy)	9,642,835	(2,429,797)	7,213,038
120101. External Restrictions (VPA Wyong)	3,570,000	0	3,570,000
122001. External Restrictions (Unexpended Grants)	28,851,748	2,974,113	31,825,861
122801. External Restrictions (Transport for NSW advances)	0	906,048	906,048
122901. External Restrictions (Self Insurance Claims)	11,117,000	0	11,117,000
123001. External Restrictions (Stormwater Levy)	569,662	(22,518)	547,144
123101. External Restrictions (Caravan Park Surplus)	13,688,214	1,263,893	14,952,107
123201. External Restrictions (Cemeteries Surplus)	510,040	72,876	582,916
123202. External Restrictions (Coastal Open Space)	6,896,358	189,881	7,086,239
123204. External Restrictions (Biobanking)	320,608	4,201	324,810
123207. External Restrictions (Crown Land Business Enterprises)	1,947,327	192,385	2,139,712
123208. External Restrictions (Crown Land Patonga Camping Ground)	1,067,489	203,769	1,271,258
123210. External Restriction (Toukley Town Centre Special Rate Levy)	0	44,531	44,531
123213. External Restrictions (Tourism Special Rate Levy)	2,895,096	231,510	3,126,606
123214. External Restrictions (Gosford CBD Special Rate Levy)	0	35,468	35,468
123215. External Restrictions (Gosford Parking Station Special Rate Levy)	1,276,604	336,388	1,612,992
124001. External Restrictions (Other External Restrictions)	478,491	(35,562)	442,929
220001. External Restrictions (Developer Contributions General NC)	73,750,417	15,656,958	89,407,375
220002. External Restrictions (Developer Contributions Drainage NC)	26,106,136	1,829,117	27,935,253
220003. External Restrictions (Developer Contributions Water Supply NC)	9,801,138	2,285,600	12,086,738
220004. External Restrictions (Developer Contributions Sewerage Services NC)	5,471,064	2,432,431	7,903,495
220006. External Restrictions (Developer Contributions Bonus Provisions NC)	1,215,988	486,797	1,702,785
220007. External Restrictions (Developer Contributions Section 94A Levy NC)	41,982,459	731,742	42,714,201
220101. External Restrictions (VPA Wyong NC)	2,243,465	156,122	2,399,587
222001. External Restrictions (Unexpended Grants NC)	2,254,723	0	2,254,723
223011. External Restrictions (Domestic Waste Management NC)	105,329,171	672,129	106,001,299
Total 3.1.1.02. External Restrictions	**402,372,542**	**15,502,639**	**417,875,181**

3.1.1.03. Internal Restrictions			
130001. Internal Restrictions (Employee Leave Entitlements)	11,102,680	0	11,102,680
130100. Internal Restrictions (Tip Rehabilitation)	688,873	(183,210)	505,664
130200. Internal Restrictions (Land Development)	4,862,542	(881,411)	3,981,132
131008. Internal Restrictions (Davistown Wetland)	1,436,049	0	1,436,049
131025. Internal Restrictions (Regional Library)	11,569,666	0	11,569,666
131035. Internal Restrictions (St Huberts Drainage Licence Fee)	695,790	62,637	758,427
131037. Internal Restrictions (Waste Disposal Facility)	29,962,700	6,159,904	36,122,603
131038. Internal Restrictions (Emergency Services Levy savings)	338,854	(61,742)	277,112
131039. Internal Restrictions (Employment Generating Projects)	2,816,103	(78,140)	2,737,964
131040. Internal Restrictions (Emergency Loans Repayments)	43,000,000	(36,400,000)	6,600,000
131041. Internal Restrictions (Future Projects Reserve)	5,000,000	0	5,000,000
131042. Internal Restrictions (Multi Year Projects)	1,133,074	0	1,133,074
133001. Internal Restrictions (Section 355 Advances and Deposits)	367,651	(16,896)	350,755
230100. Internal Restrictions (Tip Rehabilitation NC)	36,829,080	0	36,829,080
Total 3.1.1.03. Internal Restrictions	**149,803,063**	**(31,398,857)**	**118,404,205**
Grand Total	**552,175,604**	**(15,896,218)**	**536,279,386**

Graph 1 – Credit Exposure



Graph 2 – Counter Party Exposure

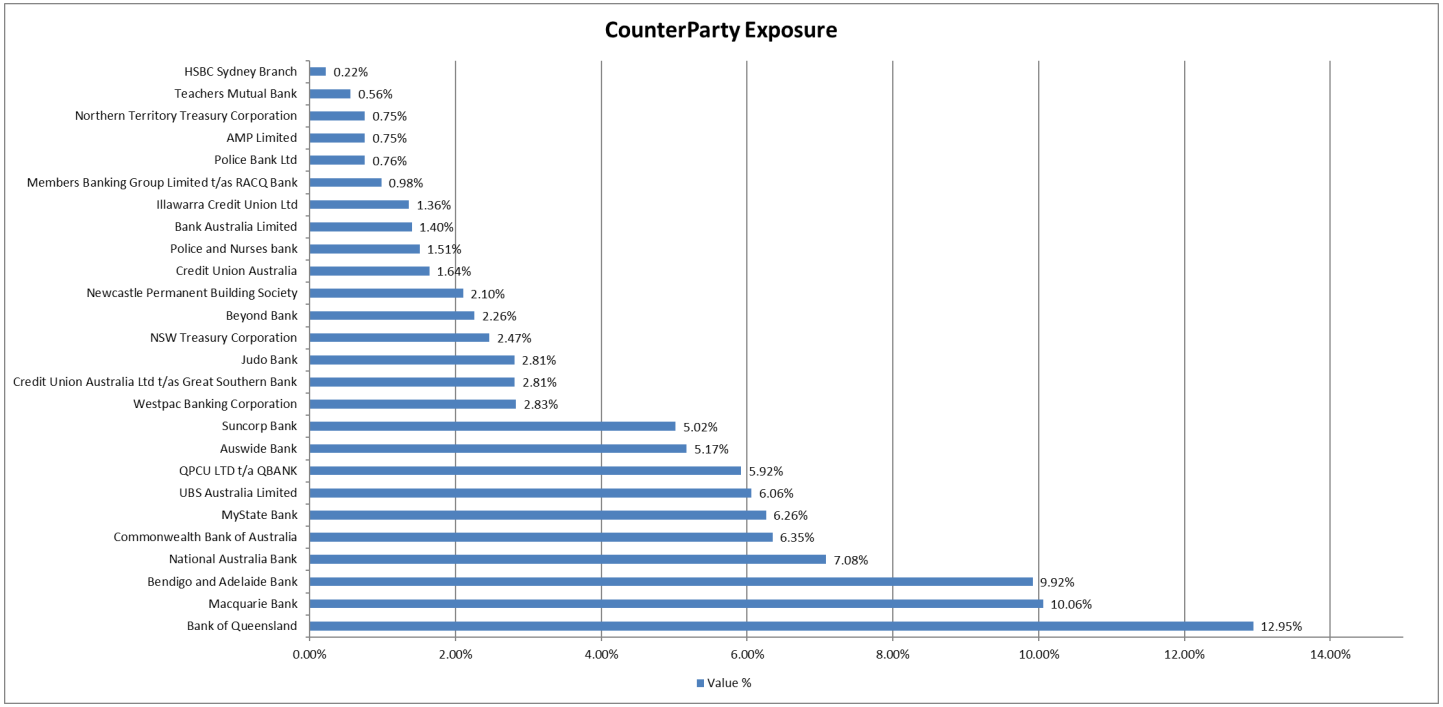


Table 1 – Performance Statistics

Trading Book		1 Month	3 Month	12 Month	Since Inception
Central Coast Council					
	Portfolio Return (1)	0.46%	1.37%	4.95%	1.91%
	Performance Index (2)	0.37%	1.09%	4.19%	1.78%
	Excess Performance (3)	0.09%	0.28%	0.76%	0.13%

Notes

1 Portfolio performance is the rate of return of the portfolio over the specified period

2 The Performance Index is the Bloomberg AusBond Bank Bill Index (Bloomberg Page BAUBIL)

3 Excess performance is the rate of return of the portfolio in excess of the Performance Index

Trading Book	Weighted Average Running Yield
Central Coast Council	4.69

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Central Coast Council
As At 31 March 2024

1 Issuer Trading Limits

Issuer	Issuer Rating Group (Long Term)	Issuer Parent	Already Traded (with Issuer Group) Face Value Notional	Limit For Book or Entity	Trading Limit	Trading Limit Type	Trading Limit Value	Trading Limit Used (%)	Trading Limit Available (%)	Trading Limit Available (Value)	Trading Limit Exceeded (%)	Trading Limit Exceeded ($)
AMP Bank Ltd	BBB+ to BBB-		5,006,206.37	Book	10.00	% of 665,322,498.97	66,532,249.90	8.00	92.00	61,526,044	0.00	0
ANZ Banking Group Ltd	AA+ to AA-		0.00	Book	30.00	% of 665,322,498.97	199,596,749.69	0.00	100.00	199,596,750	0.00	0
Auswide Bank Limited	BBB+ to BBB-		34,250,000.00	Book	10.00	% of 665,322,498.97	66,532,249.90	52.00	48.00	32,282,250	0.00	0
Bank Australia Limited	BBB+ to BBB-		9,250,000.00	Book	10.00	% of 665,322,498.97	66,532,249.90	14.00	86.00	57,282,250	0.00	0
Bank of China (Australia) Limited	A+ to A-		0.00	Book	20.00	% of 665,322,498.97	133,064,499.79	0.00	100.00	133,064,500	0.00	0
Bank of China Limited	A+ to A-		0.00	Book	20.00	% of 665,322,498.97	133,064,499.79	0.00	100.00	133,064,500	0.00	0
Bank of Communications Co. Ltd. Sydney Branch	A+ to A-		0.00	Book	20.00	% of 665,322,498.97	133,064,499.79	0.00	100.00	133,064,500	0.00	0
Bank of Melbourne	AA+ to AA-	Westpac Banking Corporation Ltd	18,800,000.00	Book	30.00	% of 665,322,498.97	199,596,749.69	9.00	91.00	180,796,750	0.00	0
Bank of Queensland Ltd	A+ to A-		86,000,000.00	Book	20.00	% of 665,322,498.97	133,064,499.79	65.00	35.00	47,064,500	0.00	0
BankSA	AA+ to AA-	Westpac Banking Corporation Ltd	18,800,000.00	Book	30.00	% of 665,322,498.97	199,596,749.69	9.00	91.00	180,796,750	0.00	0
BankVic	BBB+ to BBB-		0.00	Book	10.00	% of 665,322,498.97	66,532,249.90	0.00	100.00	66,532,250	0.00	0
BankWest Ltd	AA+ to AA-	Commonwealth Bank of Australia Ltd	42,096,829.19	Book	30.00	% of 665,322,498.97	199,596,749.69	21.00	79.00	157,499,921	0.00	0
Bendigo & Adelaide Bank Ltd	A+ to A-		66,190,000.00	Book	20.00	% of 665,322,498.97	133,064,499.79	50.00	50.00	66,874,500	0.00	0
Beyond Bank Australia Ltd	BBB+ to BBB-		15,000,000.00	Book	10.00	% of 665,322,498.97	66,532,249.90	23.00	77.00	51,532,250	0.00	0
Canadian Imperial Bank of Commerce	AA+ to AA-		0.00	Book	30.00	% of 665,322,498.97	199,596,749.69	0.00	100.00	199,596,750	0.00	0
China Construction Bank	A+ to A-		0.00	Book	20.00	% of 665,322,498.97	133,064,499.79	0.00	100.00	133,064,500	0.00	0
Commonwealth Bank of Australia Ltd	AA+ to AA-		42,096,829.19	Book	30.00	% of 665,322,498.97	199,596,749.69	21.00	79.00	157,499,921	0.00	0
Credit Union Australia Ltd t/as Great Southern Bank	BBB+ to BBB-		29,500,000.00	Book	10.00	% of 665,322,498.97	66,532,249.90	44.00	56.00	37,032,250	0.00	0
Greater Bank - a division of Newcastle Greater Mutual Group Limited	BBB+ to BBB-	Newcastle Greater Mutual Group Ltd	14,100,000.00	Book	10.00	% of 665,322,498.97	66,532,249.90	21.00	79.00	52,432,250	0.00	0
HSBC Bank Australia Ltd	A+ to A-		0.00	Book	20.00	% of 665,322,498.97	133,064,499.79	0.00	100.00	133,064,500	0.00	0
HSBC Sydney Branch	A+ to A-		1,480,000.00	Book	20.00	% of 665,322,498.97	133,064,499.79	1.00	99.00	131,584,500	0.00	0
Illawarra Credit Union Ltd	BBB+ to BBB-		9,000,000.00	Book	10.00	% of 665,322,498.97	66,532,249.90	14.00	86.00	57,532,250	0.00	0
Industrial & Commercial Bank of China Ltd	A+ to A-		0.00	Book	20.00	% of 665,322,498.97	133,064,499.79	0.00	100.00	133,064,500	0.00	0
Judo Bank	BBB+ to BBB-		18,630,000.00	Book	10.00	% of 665,322,498.97	66,532,249.90	28.00	72.00	47,902,250	0.00	0
Macquarie Bank Ltd	A+ to A-		67,519,463.41	Book	20.00	% of 665,322,498.97	133,064,499.79	51.00	49.00	65,545,036	0.00	0
ME Bank - a division of Bank of Queensland Ltd	A+ to A-	Bank of Queensland Ltd	86,000,000.00	Book	20.00	% of 665,322,498.97	133,064,499.79	65.00	35.00	47,064,500	0.00	0
Members Banking Group Limited t/as RACQ Bank	BBB+ to BBB-		6,500,000.00	Book	10.00	% of 665,322,498.97	66,532,249.90	10.00	90.00	60,032,250	0.00	0
MyState Bank Ltd	BBB+ to BBB-		41,500,000.00	Book	10.00	% of 665,322,498.97	66,532,249.90	62.00	38.00	25,032,250	0.00	0
National Australia Bank Ltd	AA+ to AA-		47,000,000.00	Book	30.00	% of 665,322,498.97	199,596,749.69	24.00	76.00	152,596,750	0.00	0
Newcastle Greater Mutual Group Ltd	BBB+ to BBB-		14,100,000.00	Book	10.00	% of 665,322,498.97	66,532,249.90	21.00	79.00	52,432,250	0.00	0

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Central Coast Council
As At 31 March 2024

1 Issuer Trading Limits

Issuer	Issuer Rating Group (Long Term)	Issuer Parent	Already Traded (with Issuer Group) Face Value Notional	Limit For Book or Entity	Trading Limit	Trading Limit Type	Trading Limit Value	Trading Limit Used (%)	Trading Limit Available (%)	Trading Limit Available (Value)	Trading Limit Exceeded (%)	Trading Limit Exceeded ($)
Northern Territory Treasury Corporation	AA+ to AA-		5,000,000.00	Book	30.00	% of 665,322,498.97	199,596,749.69	3.00	97.00	194,596,750	0.00	0
NSW Treasury Corporation	AA+ to AA-		17,000,000.00	Book	30.00	% of 665,322,498.97	199,596,749.69	9.00	91.00	182,596,750	0.00	0
P&N Bank Ltd	BBB+ to BBB-		10,000,000.00	Book	10.00	% of 665,322,498.97	66,532,249.90	15.00	85.00	56,532,250	0.00	0
Police Bank Ltd	BBB+ to BBB-		5,000,000.00	Book	10.00	% of 665,322,498.97	66,532,249.90	8.00	92.00	61,532,250	0.00	0
Police Credit Union	N/R		0.00	Book	10.00	% of 665,322,498.97	66,532,249.90	0.00	100.00	66,532,250	0.00	0
QPCU LTD t/a QBANK	BBB+ to BBB-		39,000,000.00	Book	10.00	% of 665,322,498.97	66,532,249.90	59.00	41.00	27,532,250	0.00	0
Rabobank Australia Ltd	A+ to A-		0.00	Book	20.00	% of 665,322,498.97	133,064,499.79	0.00	100.00	133,064,500	0.00	0
Rural Bank Ltd	A+ to A-	Bendigo & Adelaide Bank Ltd	66,190,000.00	Book	20.00	% of 665,322,498.97	133,064,499.79	50.00	50.00	66,874,500	0.00	0
St George Bank Limited	AA+ to AA-	Westpac Banking Corporation Ltd	18,800,000.00	Book	30.00	% of 665,322,498.97	199,596,749.69	9.00	91.00	180,796,750	0.00	0
Suncorp-Metway Ltd	A+ to A-		33,400,000.00	Book	20.00	% of 665,322,498.97	133,064,499.79	25.00	75.00	99,664,500	0.00	0
Teachers Mutual Bank Ltd	BBB+ to BBB-		3,700,000.00	Book	10.00	% of 665,322,498.97	66,532,249.90	6.00	94.00	62,832,250	0.00	0
UBS Australia Ltd	AA+ to AA-		40,400,000.00	Book	30.00	% of 665,322,498.97	199,596,749.69	20.00	80.00	159,196,750	0.00	0
Westpac Banking Corporation Ltd	AA+ to AA-		18,800,000.00	Book	30.00	% of 665,322,498.97	199,596,749.69	9.00	91.00	180,796,750	0.00	0
			930,109,328.16				5,389,112,241.66			4,459,002,922		0
		(Excluding Parent Group Duplicates)	665,322,498.97									

2 Security Rating Group Trading Limits

Security Rating Group	Already Traded Face Value Notional	Limit For Book or Trading Entity	Trading Limit	Trading Limit Type	Trading Limit Value	Trading Limit Used (%)	Trading Limit Available (%)	Trading Limit Available (Value)	Trading Limit Exceeded (%)	Trading Limit Exceeded ($)
AAA	20,000,000.00	Book	100.00	% of 665,322,498.97	665,322,498.97	3.00	97.00	645,322,499	0.00	0
AA+ to AA-	72,896,829.19	Book	100.00	% of 665,322,498.97	665,322,498.97	11.00	89.00	592,425,670	0.00	0
A+ to A-	93,019,463.41	Book	70.00	% of 665,322,498.97	465,725,749.28	20.00	80.00	372,706,286	0.00	0
A1+	64,800,000.00	Book	100.00	% of 665,322,498.97	665,322,498.97	10.00	90.00	600,522,499	0.00	0
A1	44,980,000.00	Book	70.00	% of 665,322,498.97	465,725,749.28	10.00	90.00	420,745,749	0.00	0
A2	118,390,000.00	Book	60.00	% of 665,322,498.97	399,193,499.38	30.00	70.00	280,803,499	0.00	0
A3	10,000,000.00	Book	60.00	% of 665,322,498.97	399,193,499.38	3.00	97.00	389,193,499	0.00	0
BBB+ to BBB-	241,236,206.37	Book	60.00	% of 665,322,498.97	399,193,499.38	60.00	40.00	157,957,293	0.00	0
	665,322,498.97				4,124,999,493.61			3,459,676,994		0

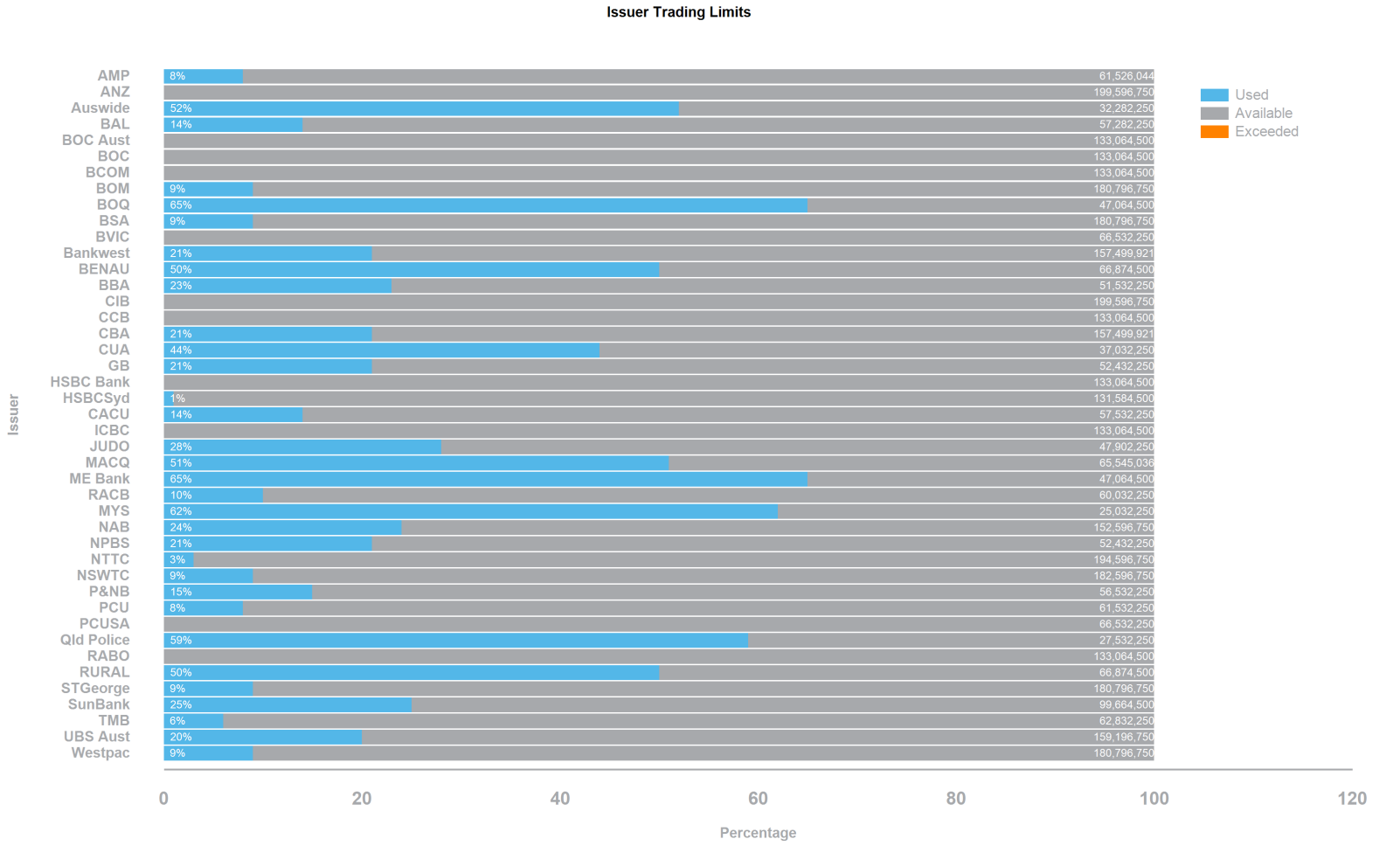
Notes
1. In instances where long securities have a term remaining which is less than 365 days, the issuer's short term rating is used instead of the security's (presumably long term) rating.

3 Term Group Trading Limits

Term Group	Already Traded Face Value Notional	Limit For Book or Trading Entity	Trading Limit	Trading Limit Type	Trading Limit Value	Trading Limit Used (%)	Trading Limit Available (%)	Trading Limit Available (Value)	Trading Limit Exceeded (%)	Trading Limit Exceeded ($)
0-1 Year	260,292,498.97	Book	100.00	% of 665,322,498.97	665,322,498.97	39.00	61.00	405,030,000	0.00	0
1-3 Year	377,430,000.00	Book	70.00	% of 665,322,498.97	465,725,749.28	81.00	19.00	88,295,749	0.00	0
3-5 Year	27,600,000.00	Book	40.00	% of 665,322,498.97	266,128,999.59	10.00	90.00	238,529,000	0.00	0
5+ Year	0.00	Book	5.00	% of 665,322,498.97	33,266,124.95	0.00	100.00	33,266,125	0.00	0
	665,322,498.97				1,430,443,372.79			765,120,874		0

Central Coast Council

Trading Limit Report 125
Central Coast Council
As At 31 March 2024



Central Coast Council

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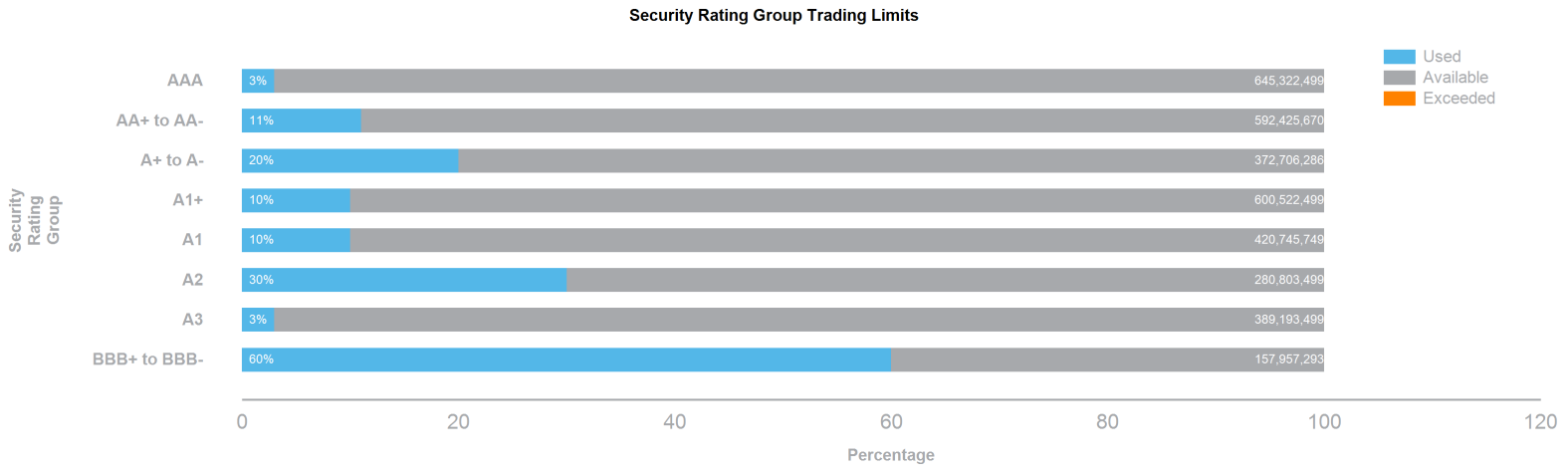
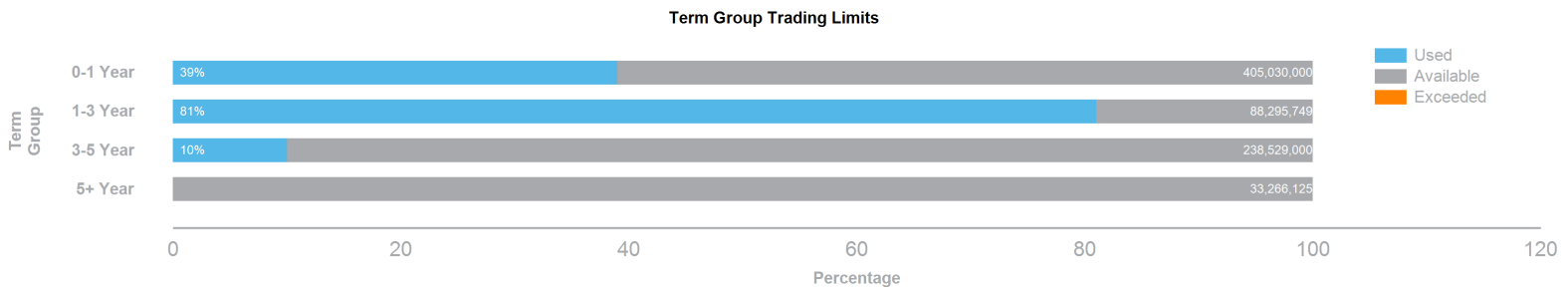
Central Coast Council
As At 31 March 2024



Central Coast Council

Trading Limit Report 125
Central Coast Council
As At 31 March 2024



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Central Coast Council
As At 31 March 2024

LAMINAR CAPITAL PTY LTD
ACN 134 784 740
WWW.LAMINARCAPITAL.COM.AU

MELBOURNE OFFICE: LEVEL 5 RIALTO NORTH, 525 COLLINS STREET, MELBOURNE, VIC 3000 T 61 3 9001 6990 F 61 3 9001 6933
SYDNEY OFFICE: LEVEL 18 ANGEL PLACE, 123 PITT STREET, SYDNEY NSW, 2000 T 61 2 8094 1230
BRISBANE OFFICE: LEVEL 15 CENTRAL PLAZA 1, 345 QUEEN STREET, BRISBANE QLD, 4000 T 61 7 3123 5370

Report Code: TBSBP125EXT-00.16
Report Description: Trading Limit Performance As At Date
Parameters:
As At/Scenario Date: 31 March 2024
Balance Date: 8 April 2024 (but 31 Mar 2024 used instead)
Trading Entity: Central Coast Council
Trading Book: Central Coast Council
Report Mode: BalOnly
Using Face Value
Trading Entity and Book Limits
Effects of Parent/Child Issuers Not Ignored

Investment Report Pack

Central Coast Council

1 March 2024 to 31 March 2024

Contents

1. Securities Held By Trading Book Maturing Post 31 March 2024

Latest Deal Code	Latest Deal Settlement Date	Issuer	ISIN	WAL / Interim Maturity Date	Next Coupon Date	Coupon Rate/Latest Yield	Coupon Frequency	Security Type	Security Rating	Face Value Notional	Current Face Value Notional	Market Value
Central Coast Council												
LC203008	28 Mar 2024	Macquarie Bank Ltd		1 Apr 2024		4.50	Nil	At Call In	Moodys A2	6,519,463.41	6,519,463.41	6,519,463.41
LC200076	1 Mar 2024	AMP Bank Ltd		1 Apr 2024		0.55	Nil	At Call	S&P BBB	6,206.37	6,206.37	6,206.37
LC202719	1 Mar 2024	Commonwealth Bank of Australia Ltd		1 Apr 2024		0.00	Nil	At Call	S&P AA-	15,596,829.19	15,596,829.19	15,596,829.19
LC178933	25 Aug 2023	Commonwealth Bank of Australia Ltd		3 Apr 2024	3 Apr 2024	5.35	Maturity	TD	S&P ST A1+	5,000,000.00	5,000,000.00	5,160,500.00
LC178932	25 Aug 2023	Commonwealth Bank of Australia Ltd		10 Apr 2024	10 Apr 2024	5.36	Maturity	TD	S&P ST A1+	5,000,000.00	5,000,000.00	5,160,800.00
LX182550	11 Oct 2023	Judo Bank		11 Apr 2024	11 Apr 2024	5.20	Maturity	TD	S&P ST A3	10,000,000.00	10,000,000.00	10,245,041.10
LC178931	25 Aug 2023	Commonwealth Bank of Australia Ltd		17 Apr 2024	17 Apr 2024	5.37	Maturity	TD	S&P ST A1+	5,000,000.00	5,000,000.00	5,161,100.00
LC178930	25 Aug 2023	Commonwealth Bank of Australia Ltd		24 Apr 2024	24 Apr 2024	5.37	Maturity	TD	S&P ST A1+	5,000,000.00	5,000,000.00	5,161,100.00
LX181154	27 Sep 2023	Bank of Queensland Ltd		1 May 2024	1 May 2024	5.19	Maturity	TD	Moodys ST P-2	5,000,000.00	5,000,000.00	5,132,238.35
LX179280	4 Sep 2023	National Australia Bank Ltd		8 May 2024	8 May 2024	5.11	Maturity	TD	S&P ST A1+	5,000,000.00	5,000,000.00	5,146,300.00
LX179278	4 Sep 2023	National Australia Bank Ltd		13 May 2024	13 May 2024	5.11	Maturity	TD	S&P ST A1+	5,000,000.00	5,000,000.00	5,146,300.00
LX181155	27 Sep 2023	Bank of Queensland Ltd		22 May 2024	22 May 2024	5.24	Maturity	TD	Moodys ST P-2	5,000,000.00	5,000,000.00	5,133,512.35
LX181156	27 Sep 2023	Bank of Queensland Ltd		29 May 2024	29 May 2024	5.24	Maturity	TD	Moodys ST P-2	5,000,000.00	5,000,000.00	5,133,512.35
LX185383	9 Nov 2023	P&N Bank Ltd		5 Jun 2024	5 Jun 2024	5.45	Maturity	TD	S&P ST A2	5,000,000.00	5,000,000.00	5,106,760.25
LC96635	16 Jun 2020	National Australia Bank Ltd		14 Jun 2024	14 Jun 2024	1.15	Annual	TD	S&P AA-	10,000,000.00	10,000,000.00	10,091,054.80
LC112880	28 Sep 2021	National Australia Bank Ltd	AU3FN0048724	19 Jun 2024	19 Jun 2024	5.27	Quarterly	FRN	S&P AA-	5,000,000.00	5,000,000.00	5,016,300.00
LX185395	9 Nov 2023	P&N Bank Ltd		26 Jun 2024	26 Jun 2024	5.45	Maturity	TD	S&P ST A2	5,000,000.00	5,000,000.00	5,106,760.25
LX185400	9 Nov 2023	MyState Bank Ltd		3 Jul 2024	3 Jul 2024	5.45	Maturity	TD	Moodys ST P-2	5,000,000.00	5,000,000.00	5,106,760.25
LX185404	9 Nov 2023	MyState Bank Ltd		10 Jul 2024	10 Jul 2024	5.45	Maturity	TD	Moodys ST P-2	5,000,000.00	5,000,000.00	5,106,760.25
LX188408	8 Dec 2023	Beyond Bank Australia Ltd		17 Jul 2024	17 Jul 2024	5.42	Maturity	TD	S&P ST A2	5,000,000.00	5,000,000.00	5,085,383.55
LX109584	22 Jul 2021	Bank of Queensland Ltd		22 Jul 2024	22 Apr 2024	4.75	Quarterly	FRD	Moodys A3	4,000,000.00	4,000,000.00	4,035,889.84
LC112603	20 Sep 2021	Suncorp-Metway Ltd	AU3CB0265403	30 Jul 2024	30 Jul 2024	1.85	Semi Annual	Fixed	S&P A+	2,500,000.00	2,500,000.00	2,484,450.00
LC176431	3 Aug 2023	AMP Bank Ltd		1 Aug 2024	1 Aug 2024	5.45	Maturity	TD	S&P ST A2	5,000,000.00	5,000,000.00	5,179,924.65
LC137826	1 Apr 2022	Macquarie Bank Ltd	AU3FN0049367	7 Aug 2024	7 May 2024	5.15	Quarterly	FRN	S&P A+	4,000,000.00	4,000,000.00	4,036,480.00
LC111489	27 Aug 2021	Macquarie Bank Ltd	AU3CB0265593	7 Aug 2024	7 Aug 2024	1.75	Semi Annual	Fixed	S&P A+	12,000,000.00	12,000,000.00	11,908,800.00
LC112606	20 Sep 2021	Westpac Banking Corporation Ltd	AU3CB0263275	16 Aug 2024	16 Aug 2024	2.25	Semi Annual	Fixed	S&P AA-	2,800,000.00	2,800,000.00	2,782,556.00
LX185379	9 Nov 2023	Auswide Bank Limited		21 Aug 2024	21 Aug 2024	5.45	Maturity	TD	Moodys ST P-2	5,000,000.00	5,000,000.00	5,106,760.25
LX188410	8 Dec 2023	Beyond Bank Australia Ltd		28 Aug 2024	28 Aug 2024	5.42	Maturity	TD	S&P ST A2	5,000,000.00	5,000,000.00	5,085,383.55
LC116230	10 Dec 2021	Bendigo & Adelaide Bank Ltd	AU3FN0050019	6 Sep 2024	6 Jun 2024	5.31	Quarterly	FRN	Moodys Baa1	6,000,000.00	6,000,000.00	6,031,860.00
LC112605	20 Sep 2021	Bendigo & Adelaide Bank Ltd	AU3CB0266377	6 Sep 2024	6 Sep 2024	1.70	Semi Annual	Fixed	Moodys Baa1	9,390,000.00	9,390,000.00	9,269,620.20

Latest Deal Code	Latest Deal Settlement Date	Issuer	ISIN	WAL / Interim Maturity Date	Next Coupon Date	Coupon Rate/Latest Yield	Coupon Frequency	Security Type	Security Rating	Face Value Notional	Current Face Value Notional	Market Value
LX188411	8 Dec 2023	Beyond Bank Australia Ltd		13 Sep 2024	13 Sep 2024	5.42	Maturity	TD	S&P ST A2	5,000,000.00	5,000,000.00	5,085,383.55
LX190928	17 Jan 2024	National Australia Bank Ltd		18 Sep 2024	18 Sep 2024	5.11	Maturity	TD	S&P ST A1+	5,000,000.00	5,000,000.00	5,051,800.00
LC96636	26 Sep 2019	Bank of Queensland Ltd		26 Sep 2024	26 Sep 2024	2.00	Annual	TD	Moodys A3	10,000,000.00	10,000,000.00	10,102,465.80
LC100324	14 Jan 2021	HSBC Sydney Branch	AU3CB0267078	27 Sep 2024	27 Sep 2024	1.50	Semi Annual	Fixed	S&P AA-	1,480,000.00	1,480,000.00	1,456,941.60
LX190931	17 Jan 2024	National Australia Bank Ltd		2 Oct 2024	2 Oct 2024	5.11	Maturity	TD	S&P ST A1+	5,000,000.00	5,000,000.00	5,051,800.00
LX190932	17 Jan 2024	National Australia Bank Ltd		9 Oct 2024	9 Oct 2024	5.11	Maturity	TD	S&P ST A1+	5,000,000.00	5,000,000.00	5,051,800.00
LC137827	1 Apr 2022	Bank of Queensland Ltd	AU3FN0051272	30 Oct 2024	30 Apr 2024	5.44	Quarterly	FRN	S&P BBB+	7,000,000.00	7,000,000.00	7,083,650.00
LC114925	22 Nov 2021	MyState Bank Ltd	AU3FN0064705	22 Nov 2024	22 May 2024	4.94	Quarterly	FRN	Moodys Baa2	12,000,000.00	12,000,000.00	12,055,320.00
LC100354	14 Jan 2021	Macquarie Bank Ltd	AU3CB0270387	12 Feb 2025	12 Aug 2024	1.70	Semi Annual	Fixed	S&P A+	25,000,000.00	25,000,000.00	24,418,500.00
LC133971	14 Feb 2022	Auswide Bank Limited	AU3FN0066320	14 Feb 2025	14 May 2024	5.10	Quarterly	FRN	Moodys Baa2	5,000,000.00	5,000,000.00	5,024,500.00
LC136560	17 Mar 2022	Auswide Bank Limited	AU3FN0067393	17 Mar 2025	17 Jun 2024	5.25	Quarterly	FRN	Moodys Baa2	5,000,000.00	5,000,000.00	5,007,350.00
LC141827	21 Nov 2019	NSW Treasury Corporation	AU3SG0002025	20 Mar 2025	20 Sep 2024	1.25	Semi Annual	Fixed	S&P AA+	2,000,000.00	2,000,000.00	1,946,040.00
LC143209	17 May 2022	QPCU LTD t/a QBANK	AU3FN0069175	19 May 2025	17 May 2024	5.69	Quarterly	FRN	S&P BBB-	5,000,000.00	5,000,000.00	5,038,450.00
LC145373	10 Jun 2022	Auswide Bank Limited	AU3FN0069555	10 Jun 2025	10 Jun 2024	5.65	Quarterly	FRN	Moodys Baa2	5,000,000.00	5,000,000.00	5,030,450.00
LC96637	16 Jun 2020	Bank of Queensland Ltd		16 Jun 2025	16 Jun 2024	1.53	Annual	TD	Moodys A3	10,000,000.00	10,000,000.00	10,121,142.50
LC107738	16 Jun 2021	MyState Bank Ltd	AU3FN0061024	16 Jun 2025	17 Jun 2024	5.00	Quarterly	FRN	Moodys Baa2	9,500,000.00	9,500,000.00	9,489,930.00
LC100329	14 Jan 2021	UBS Australia Ltd	AU3CB0273407	30 Jul 2025	30 Jul 2024	1.20	Semi Annual	Fixed	Moodys Aa3	4,000,000.00	4,000,000.00	3,814,920.00
LC104737	7 Apr 2021	UBS Australia Ltd	AU3FN0055307	30 Jul 2025	30 Apr 2024	5.21	Quarterly	FRN	S&P A+	10,000,000.00	10,000,000.00	10,069,300.00
LC190925	19 Jan 2024	Judo Bank	AU3CB0292480	26 Sep 2025	26 Sep 2024	6.40	Semi Annual	Fixed	S&P BBB-	8,630,000.00	8,630,000.00	8,614,379.70
LC155063	13 Oct 2022	MyState Bank Ltd	AU3FN0072369	13 Oct 2025	15 Apr 2024	5.65	Quarterly	FRN	Moodys Baa2	10,000,000.00	10,000,000.00	10,167,600.00
LC181158	29 Sep 2023	Teachers Mutual Bank Ltd	AU3FN0072740	28 Oct 2025	29 Apr 2024	5.86	Quarterly	FRN	Moodys Baa1	2,000,000.00	2,000,000.00	2,032,260.00
LC188385	11 Dec 2023	Auswide Bank Limited	AU3FN0073037	7 Nov 2025	7 May 2024	5.85	Quarterly	FRN	Moodys Baa2	9,750,000.00	9,750,000.00	9,873,727.50
LC157929	1 Dec 2022	Credit Union Australia Ltd t/as Great Southern Bank	AU3FN0073961	1 Dec 2025	3 Jun 2024	5.92	Quarterly	FRN	Moodys Baa1	3,500,000.00	3,500,000.00	3,542,070.00
LC112609	20 Sep 2021	Bendigo & Adelaide Bank Ltd	AU3FN0057634	2 Dec 2025	3 Jun 2024	4.86	Quarterly	FRN	Moodys Baa1	35,500,000.00	35,500,000.00	35,445,685.00
LC157906	6 Dec 2022	QPCU LTD t/a QBANK	AU3FN0073979	6 Dec 2025	6 Jun 2024	6.09	Quarterly	FRN	S&P BBB-	10,000,000.00	10,000,000.00	10,116,900.00
LX105597	19 Apr 2021	Macquarie Bank Ltd	AU3FN0057709	9 Dec 2025	11 Jun 2024	4.83	Quarterly	FRN	S&P A+	20,000,000.00	20,000,000.00	20,017,400.00
LC112608	20 Sep 2021	Suncorp-Metway Ltd	AU3FN0058343	24 Feb 2026	24 May 2024	4.79	Quarterly	FRN	S&P A+	5,000,000.00	5,000,000.00	5,005,100.00
LC188379	11 Dec 2023	Members Banking Group Limited t/as RACQ Bank	AU3FN0075453	24 Feb 2026	24 May 2024	5.84	Quarterly	FRN	Moodys Baa1	6,500,000.00	6,500,000.00	6,546,670.00
LC103543	11 Mar 2021	UBS Australia Ltd	AU3FN0058608	26 Feb 2026	27 May 2024	4.84	Quarterly	FRN	Moodys Aa3	18,800,000.00	18,800,000.00	18,772,176.00
LC103141	4 Mar 2021	Newcastle Greater Mutual Group Ltd	AU3FN0058699	4 Mar 2026	4 Jun 2024	4.97	Quarterly	FRN	S&P BBB	1,000,000.00	1,000,000.00	992,730.00
LC164300	17 Mar 2023	Auswide Bank Limited	AU3FN0076352	17 Mar 2026	17 Jun 2024	5.85	Quarterly	FRN	Moodys Baa2	4,500,000.00	4,500,000.00	4,518,180.00
LC105450	22 Apr 2021	Credit Union Australia Ltd t/as Great Southern Bank	AU3FN0059721	22 Apr 2026	22 Apr 2024	5.03	Quarterly	FRN	Moodys Baa1	11,000,000.00	11,000,000.00	10,986,910.00

Latest Deal Code	Latest Deal Settlement Date	Issuer	ISIN	WAL / Interim Maturity Date	Next Coupon Date	Coupon Rate/Latest Yield	Coupon Frequency	Security Type	Security Rating	Face Value Notional	Current Face Value Notional	Market Value
LC109088	9 Jul 2021	Bank of Queensland Ltd	AU3FN0060406	6 May 2026	7 May 2024	4.98	Quarterly	FRN	S&P BBB+	5,000,000.00	5,000,000.00	5,004,100.00
LC137828	1 Apr 2022	Teachers Mutual Bank Ltd	AU3FN0061016	16 Jun 2026	17 Jun 2024	5.03	Quarterly	FRN	Moodys Baa1	1,700,000.00	1,700,000.00	1,682,949.00
LC169762	16 Jun 2023	QPCU LTD t/a QBANK	AU3FN0078895	16 Jun 2026	17 Jun 2024	6.05	Quarterly	FRN	S&P BBB-	4,500,000.00	4,500,000.00	4,544,325.00
LC109586	23 Jul 2021	Bendigo & Adelaide Bank Ltd	AU3FN0061081	18 Jun 2026	18 Jun 2024	5.00	Quarterly	FRN	Moodys Baa1	15,300,000.00	15,300,000.00	15,228,549.00
LX109029	8 Jul 2021	Bank of Queensland Ltd		8 Jul 2026	8 Apr 2024	4.94	Quarterly	FRD	Moodys A3	5,000,000.00	5,000,000.00	5,056,200.10
LX109587	22 Jul 2021	Bank of Queensland Ltd		22 Jul 2026	22 Apr 2024	4.93	Quarterly	FRD	Moodys A3	3,000,000.00	3,000,000.00	3,027,938.19
LC112610	20 Sep 2021	National Australia Bank Ltd	AU3FN0062659	24 Aug 2026	24 May 2024	4.75	Quarterly	FRN	S&P AA-	7,000,000.00	7,000,000.00	6,997,690.00
LC113804	15 Oct 2021	Suncorp-Metway Ltd	AU3FN0062964	15 Sep 2026	17 Jun 2024	4.82	Quarterly	FRN	S&P A+	12,900,000.00	12,900,000.00	12,852,657.00
LC180295	18 Sep 2023	QPCU LTD t/a QBANK	AU3FN0081295	18 Sep 2026	18 Jun 2024	6.00	Quarterly	FRN	S&P BBB-	9,500,000.00	9,500,000.00	9,585,975.00
LC180163	20 Sep 2023	Illawarra Credit Union Ltd	AU3FN0081287	21 Sep 2026	21 Jun 2024	6.05	Quarterly	FRN	S&P BBB-	9,000,000.00	9,000,000.00	9,015,030.00
LC190930	23 Jan 2024	Credit Union Australia Ltd t/as Great Southern Bank	AU3FN0084299	23 Oct 2026	23 Apr 2024	5.94	Quarterly	FRN	Moodys Baa1	2,500,000.00	2,500,000.00	2,546,150.00
LC116445	17 Dec 2021	Bank of Queensland Ltd	AU3FN0063764	27 Oct 2026	29 Apr 2024	5.16	Quarterly	FRN	S&P BBB+	22,000,000.00	22,000,000.00	22,070,840.00
LX185851	17 Nov 2023	Police Bank Ltd	AU3FN0083028	17 Nov 2026	17 May 2024	5.89	Quarterly	FRN	S&P BBB	5,000,000.00	5,000,000.00	5,051,350.00
LC187340	1 Dec 2023	QPCU LTD t/a QBANK	AU3FN0083549	1 Dec 2026	3 Jun 2024	5.99	Quarterly	FRN	S&P BBB-	10,000,000.00	10,000,000.00	10,113,500.00
LC111486	26 Aug 2021	Northern Territory Treasury Corporation		15 Dec 2026	15 Jun 2024	1.40	Semi Annual	Fixed	Moodys Aa3	5,000,000.00	5,000,000.00	5,020,500.00
LC116992	14 Jan 2022	Commonwealth Bank of Australia Ltd	AU3FN0065579	14 Jan 2027	15 Apr 2024	5.05	Quarterly	FRN	S&P AA-	6,500,000.00	6,500,000.00	6,573,385.00
LC117127	25 Jan 2022	Suncorp-Metway Ltd	AU3FN0065694	25 Jan 2027	26 Apr 2024	5.13	Quarterly	FRN	S&P A+	13,000,000.00	13,000,000.00	13,120,640.00
LC117174	25 Jan 2022	Westpac Banking Corporation Ltd	AU3FN0065702	25 Jan 2027	26 Apr 2024	5.05	Quarterly	FRN	S&P AA-	16,000,000.00	16,000,000.00	16,150,400.00
LC181165	29 Sep 2023	Credit Union Australia Ltd t/as Great Southern Bank	AU3FN0074787	9 Feb 2027	9 May 2024	5.99	Quarterly	FRN	Moodys Baa1	12,500,000.00	12,500,000.00	12,706,875.00
LX190938	19 Jan 2024	Newcastle Greater Mutual Group Ltd	AU3FN0066221	10 Feb 2027	10 May 2024	5.35	Quarterly	FRN	S&P BBB	13,100,000.00	13,100,000.00	13,053,888.00
LC169102	2 Jun 2023	Bank Australia Limited	AU3FN0075461	22 Feb 2027	22 May 2024	5.89	Quarterly	FRN	S&P BBB	9,250,000.00	9,250,000.00	9,336,117.50
LC167397	9 May 2023	Bank of Queensland Ltd	AU3FN0077798	9 May 2028	9 May 2024	5.54	Quarterly	COVERED FLO	S&P AAA	5,000,000.00	5,000,000.00	5,062,700.00
LC179277	6 Sep 2023	UBS Australia Ltd	AU3FN0077970	12 May 2028	13 May 2024	5.90	Quarterly	FRN	S&P A+	7,600,000.00	7,600,000.00	7,788,252.00
LC142120	15 Nov 2018	NSW Treasury Corporation	AU3SG0001878	15 Nov 2028	15 May 2024	3.00	Semi Annual	Fixed	Moodys Aaa	15,000,000.00	15,000,000.00	14,577,750.00
										665,322,498.97	665,322,498.97	668,943,699.40
Total										665,322,498.97	665,322,498.97	668,943,699.40

Coupon Rate is the full coupon rate at the next coupon date if that next coupon exists.

2. Interest and Distribution Income Received For 1 March 2024 to 31 March 2024

Security ISIN	Security	Issuer	Income Expense Code	Settlement Date	Face Value (Basis of Interest Calculation)	**Consideration Notional**	Income Type	Trading Book
	AMP At Call	AMP Bank Ltd	IEI344385	1 Mar 2024		**25.54**	Bank Interest	Central Coast Council
	CBA At Call	Commonwealth Bank of Australia Ltd	IEI344296	1 Mar 2024		**51,938.03**	Bank Interest	Central Coast Council
AU3FN0073961	CUA 1.58 01 Dec 2025 FRN	Credit Union Australia Ltd t/as Great Southern Bank	IEI344349	1 Mar 2024	3,500,000.00	**51,916.37**	Security Coupon Interest	Central Coast Council
AU3FN0083549	Qld Police 1.65 01 Dec 2026 FRN	QPCU LTD t/a QBANK	IEI344350	1 Mar 2024	10,000,000.00	**150,077.70**	Security Coupon Interest	Central Coast Council
AU3FN0057634	BENAU 0.52 02 Dec 2025 FRN	Bendigo & Adelaide Bank Ltd	IEI344429	4 Mar 2024	35,500,000.00	**432,515.27**	Security Coupon Interest	Central Coast Council
	MYS 1.7 04 Mar 2024 739DAY TD	MyState Bank Ltd	IEI344431	4 Mar 2024	5,000,000.00	**2,095.89**	Security Coupon Interest	Central Coast Council
AU3FN0058699	NPBS 0.63 04 Mar 2026 FRN	Newcastle Greater Mutual Group Ltd	IEI344430	4 Mar 2024	1,000,000.00	**12,457.78**	Security Coupon Interest	Central Coast Council
AU3FN0050019	BENAU 0.97 06 Sep 2024 FRN	Bendigo & Adelaide Bank Ltd	IEI344596	6 Mar 2024	6,000,000.00	**79,653.17**	Security Coupon Interest	Central Coast Council
AU3CB0266377	BENAU 1.7 06 Sep 2024 Fixed	Bendigo & Adelaide Bank Ltd	IEI344597	6 Mar 2024	9,390,000.00	**79,815.00**	Security Coupon Interest	Central Coast Council
AU3FN0073979	Qld Police 1.75 06 Dec 2025 FRN	QPCU LTD t/a QBANK	IEI344598	6 Mar 2024	10,000,000.00	**152,201.86**	Security Coupon Interest	Central Coast Council
AU3FN0069555	Auswide 1.3 10 Jun 2025 FRN	Auswide Bank Limited	IEI344880	11 Mar 2024	5,000,000.00	**70,558.66**	Security Coupon Interest	Central Coast Council
AU3FN0057709	MACQ 0.48 09 Dec 2025 FRN	Macquarie Bank Ltd	IEI344878	11 Mar 2024	20,000,000.00	**241,346.96**	Security Coupon Interest	Central Coast Council
	MYS 1.7 11 Mar 2024 746DAY TD	MyState Bank Ltd	IEI344879	11 Mar 2024	5,000,000.00	**3,726.03**	Security Coupon Interest	Central Coast Council
AU3FN0062964	SunBank 0.48 15 Sep 2026 FRN	Suncorp-Metway Ltd	IEI346582	15 Mar 2024	12,900,000.00	**155,340.74**	Security Coupon Interest	Central Coast Council
AU3FN0067393	Auswide 0.9 17 Mar 2025 FRN	Auswide Bank Limited	IEI348383	18 Mar 2024	5,000,000.00	**65,601.03**	Security Coupon Interest	Central Coast Council
AU3FN0076352	Auswide 1.5 17 Mar 2026 FRN	Auswide Bank Limited	IEI348384	18 Mar 2024	4,500,000.00	**65,772.43**	Security Coupon Interest	Central Coast Council
AU3FN0061081	BENAU 0.65 18 Jun 2026 FRN	Bendigo & Adelaide Bank Ltd	IEI348381	18 Mar 2024	15,300,000.00	**191,202.84**	Security Coupon Interest	Central Coast Council
	CBA 5.33 18 Mar 2024 206DAY TD	Commonwealth Bank of Australia Ltd	IEI313270	18 Mar 2024	5,000,000.00	**150,408.22**	Security Coupon Interest	Central Coast Council
AU3FN0061024	MYS 0.65 16 Jun 2025 FRN	MyState Bank Ltd	IEI348380	18 Mar 2024	9,500,000.00	**118,720.72**	Security Coupon Interest	Central Coast Council
AU3FN0081295	Qld Police 1.65 18 Sep 2026 FRN	QPCU LTD t/a QBANK	IEI348386	18 Mar 2024	9,500,000.00	**142,405.65**	Security Coupon Interest	Central Coast Council
AU3FN0078895	Qld Police 1.7 16 Jun 2026 FRN	QPCU LTD t/a QBANK	IEI348385	18 Mar 2024	4,500,000.00	**68,016.27**	Security Coupon Interest	Central Coast Council
AU3FN0061016	TMB 0.68 16 Jun 2026 FRN	Teachers Mutual Bank Ltd	IEI348382	18 Mar 2024	1,700,000.00	**21,371.91**	Security Coupon Interest	Central Coast Council
AU3FN0048724	NAB 0.92 19 Jun 2024 FRN	National Australia Bank Ltd	IEI348543	19 Mar 2024	5,000,000.00	**65,905.19**	Security Coupon Interest	Central Coast Council
AU3SG0002025	NSWTC 1.25 20 Mar 2025 Fixed	NSW Treasury Corporation	IEI348769	20 Mar 2024	2,000,000.00	**12,500.00**	Security Coupon Interest	Central Coast Council
AU3FN0081287	CACU 1.7 21 Sep 2026 FRN	Illawarra Credit Union Ltd	IEI348980	21 Mar 2024	9,000,000.00	**136,050.48**	Security Coupon Interest	Central Coast Council
AU3FN0059317	Auswide 0.6 22 Mar 2024 FRN	Auswide Bank Limited	IEI349140	22 Mar 2024	12,000,000.00	**148,670.56**	Security Coupon Interest	Central Coast Council
AU3FN0059416	Qld Police 0.75 22 Mar 2024 FRN	QPCU LTD t/a QBANK	IEI349141	22 Mar 2024	4,500,000.00	**57,434.34**	Security Coupon Interest	Central Coast Council
AU3CB0292480	JUDO 6.4 26 Sep 2025 Fixed	Judo Bank	IEI350299	26 Mar 2024	8,630,000.00	**276,160.00**	Security Coupon Interest	Central Coast Council
AU3CB0267078	HSBCSyd 1.5 27 Sep 2024 Fixed	HSBC Sydney Branch	IEI350449	27 Mar 2024	1,480,000.00	**11,100.00**	Security Coupon Interest	Central Coast Council
	MACQ At Call In	Macquarie Bank Ltd	IEI351033	28 Mar 2024		**23,110.08**	Bank Interest	Central Coast Council
						3,038,098.72		

3. Acquisitions, Disposals and Maturities Between 1 March 2024 and 31 March 2024

Security	Issuer	Security ISIN	Deal Code	Acquisition/ Disposal	Transaction Date	Settlement Date	Face Value Original	Face Value Current	Bond Factor	Capital Price	Accrued Interest Price	Gross Price	**Consideration Notional**
CBA At Call	Commonwealth Bank of Australia Ltd		LC199864	Acquisition	1 Mar 2024	1 Mar 2024	51,938.03	51,938.03	1.00000000	100.000	0.000	100.000	**51,938.03**
CBA At Call	Commonwealth Bank of Australia Ltd		LC200075	Acquisition	1 Mar 2024	1 Mar 2024	51,938.03	51,938.03	1.00000000	100.000	0.000	100.000	**51,938.03**
AMP At Call	AMP Bank Ltd		LC200076	Acquisition	1 Mar 2024	1 Mar 2024	25.54	25.54	1.00000000	100.000	0.000	100.000	**25.54**
CBA At Call	Commonwealth Bank of Australia Ltd		LC202719	Disposal	1 Mar 2024	1 Mar 2024	51,938.03	51,938.03	1.00000000	100.000	0.000	100.000	**(51,938.03)**
MACQ At Call In	Macquarie Bank Ltd		LC203007	Disposal	1 Mar 2024	1 Mar 2024	256.43	256.43	1.00000000	100.000	0.000	100.000	**(256.43)**
MYS 1.7 04 Mar 2024 739DAY TD	MyState Bank Ltd		LX135383	Maturity	4 Mar 2024		5,000,000.00	5,000,000.00	1.00000000	100.000	0.000	100.000	**(5,000,000.00)**
MYS 1.7 11 Mar 2024 746DAY TD	MyState Bank Ltd		LX135384	Maturity	11 Mar 2024		5,000,000.00	5,000,000.00	1.00000000	100.000	0.000	100.000	**(5,000,000.00)**
CBA 5.33 18 Mar 2024 206DAY TD	Commonwealth Bank of Australia Ltd		LC178934	Maturity	18 Mar 2024		5,000,000.00	5,000,000.00	1.00000000	100.000	0.000	100.000	**(5,000,000.00)**
Auswide 0.6 22 Mar 2024 FRN	Auswide Bank Limited	AU3FN0059317	LC103795	Maturity	22 Mar 2024		12,000,000.00	12,000,000.00	1.00000000	100.000	0.000	100.000	**(12,000,000.00)**
Qld Police 0.75 22 Mar 2024 FRN	QPCU LTD t/a QBANK	AU3FN0059416	LC103940	Maturity	22 Mar 2024		4,500,000.00	4,500,000.00	1.00000000	100.000	0.000	100.000	**(4,500,000.00)**
MACQ At Call In	Macquarie Bank Ltd		LC203008	Acquisition	28 Mar 2024	28 Mar 2024	23,110.08	23,110.08	1.00000000	100.000	0.000	100.000	**23,110.08**
													(31,425,182.78)

Notes
1. The maturity of 'MBS' type securities are excluded from the above list
2. At maturity, securities are assumed to be priced at capital price = 100, accrued interest = 0
3. To avoid misleading maturity data, the reporting period should start immediately after a month end and the reporting period should be kept small (e.g. 1 month).

4. Interest Income Accrued As At 31 March 2024

Latest Deal Code	Security	WAL / Interim Maturity Date	Issue Date	Prior Coupon Date	Next Coupon Date	Accrual Period (Days)	Coupon Rate	Franking Credit Rate	Coupon Frequency	**Face Value Notional**	**Current Face Value Notional**	Latest Purchase Consideration	Market Value	Accrued Interest
LC203008	MACQ At Call In	1 Apr 2024	12 Nov 2020	17 Nov 2023		135	4.7000		Nil	**6,519,463.41**	**6,519,463.41**	23,110.08	6,519,463.41	113,331.49
LC200076	AMP At Call	1 Apr 2024	31 Oct 2020	2 Feb 2023		423	3.8000		Nil	**6,206.37**	**6,206.37**	25.54	6,206.37	273.32
LC202719	CBA At Call	1 Apr 2024	31 Oct 2020	30 Sep 2023		183	4.1000		Nil	**15,596,829.19**	**15,596,829.19**	51,938.03	15,596,829.19	320,610.98
LC178933	CBA 5.35 03 Apr 2024 222DAY TD	3 Apr 2024	25 Aug 2023		3 Apr 2024	219	5.3500		Maturity	**5,000,000.00**	**5,000,000.00**	5,000,000.00	5,160,500.00	160,500.00
LC178932	CBA 5.36 10 Apr 2024 229DAY TD	10 Apr 2024	25 Aug 2023		10 Apr 2024	219	5.3600		Maturity	**5,000,000.00**	**5,000,000.00**	5,000,000.00	5,160,800.00	160,800.00
LX182550	JUDO 5.2 11 Apr 2024 183DAY TD	11 Apr 2024	11 Oct 2023		11 Apr 2024	172	5.2000		Maturity	**10,000,000.00**	**10,000,000.00**	10,000,000.00	10,245,041.10	245,041.10
LC178931	CBA 5.37 17 Apr 2024 236DAY TD	17 Apr 2024	25 Aug 2023		17 Apr 2024	219	5.3700		Maturity	**5,000,000.00**	**5,000,000.00**	5,000,000.00	5,161,100.00	161,100.00
LC178930	CBA 5.37 24 Apr 2024 243DAY TD	24 Apr 2024	25 Aug 2023		24 Apr 2024	219	5.3700		Maturity	**5,000,000.00**	**5,000,000.00**	5,000,000.00	5,161,100.00	161,100.00
LX181154	BOQ 5.19 01 May 2024 217DAY TD	1 May 2024	27 Sep 2023		1 May 2024	186	5.1900		Maturity	**5,000,000.00**	**5,000,000.00**	5,000,000.00	5,132,238.35	132,238.36
LX179280	NAB 5.11 08 May 2024 247DAY TD	8 May 2024	4 Sep 2023		8 May 2024	209	5.1100		Maturity	**5,000,000.00**	**5,000,000.00**	5,000,000.00	5,146,300.00	146,300.00
LX179278	NAB 5.11 13 May 2024 252DAY TD	13 May 2024	4 Sep 2023		13 May 2024	209	5.1100		Maturity	**5,000,000.00**	**5,000,000.00**	5,000,000.00	5,146,300.00	146,300.00
LX181155	BOQ 5.24 22 May 2024 238DAY TD	22 May 2024	27 Sep 2023		22 May 2024	186	5.2400		Maturity	**5,000,000.00**	**5,000,000.00**	5,000,000.00	5,133,512.35	133,512.33
LX181156	BOQ 5.24 29 May 2024 245DAY TD	29 May 2024	27 Sep 2023		29 May 2024	186	5.2400		Maturity	**5,000,000.00**	**5,000,000.00**	5,000,000.00	5,133,512.35	133,512.33
LX185383	P&NB 5.45 05 Jun 2024 209DAY TD	5 Jun 2024	9 Nov 2023		5 Jun 2024	143	5.4500		Maturity	**5,000,000.00**	**5,000,000.00**	5,000,000.00	5,106,760.25	106,760.27
LC96635	NAB 1.15 14 Jun 2024 1459DAY TD	14 Jun 2024	16 Jun 2020	16 Jun 2023	14 Jun 2024	289	1.1500		Annual	**10,000,000.00**	**10,000,000.00**	10,000,000.00	10,091,054.80	91,054.79
LC112880	NAB 0.92 19 Jun 2024 FRN	19 Jun 2024	19 Jun 2019	19 Mar 2024	19 Jun 2024	12	5.2685		Quarterly	**5,000,000.00**	**5,000,000.00**	5,091,550.00	5,016,300.00	8,660.55
LX185395	P&NB 5.45 26 Jun 2024 230DAY TD	26 Jun 2024	9 Nov 2023		26 Jun 2024	143	5.4500		Maturity	**5,000,000.00**	**5,000,000.00**	5,000,000.00	5,106,760.25	106,760.27
LX185400	MYS 5.45 03 Jul 2024 237DAY TD	3 Jul 2024	9 Nov 2023		3 Jul 2024	143	5.4500		Maturity	**5,000,000.00**	**5,000,000.00**	5,000,000.00	5,106,760.25	106,760.27
LX185404	MYS 5.45 10 Jul 2024 244DAY TD	10 Jul 2024	9 Nov 2023		10 Jul 2024	143	5.4500		Maturity	**5,000,000.00**	**5,000,000.00**	5,000,000.00	5,106,760.25	106,760.27
LX188408	BBA 5.42 17 Jul 2024 223DAY TD	17 Jul 2024	7 Dec 2023		17 Jul 2024	115	5.4200		Maturity	**5,000,000.00**	**5,000,000.00**	5,000,000.00	5,085,383.55	85,383.56
LX109584	BOQ 0.4 22 Jul 2024 1096DAY FRD	22 Jul 2024	22 Jul 2021	22 Jan 2024	22 Apr 2024	69	4.7463		Quarterly	**4,000,000.00**	**4,000,000.00**	4,000,000.00	4,035,889.84	35,889.83
LC112603	SunBank 1.85 30 Jul 2024 Fixed	30 Jul 2024	30 Jul 2019	30 Jan 2024	30 Jul 2024	61	1.8500		Semi Annual	**2,500,000.00**	**2,500,000.00**	1,554,390.00	2,484,450.00	7,729.45
LC176431	AMP 5.45 01 Aug 2024 364DAY TD	1 Aug 2024	3 Aug 2023		1 Aug 2024	241	5.4500		Maturity	**5,000,000.00**	**5,000,000.00**	5,000,000.00	5,179,924.65	179,924.66
LC137826	MACQ 0.8 07 Aug 2024 FRN	7 Aug 2024	7 Aug 2019	7 Feb 2024	7 May 2024	53	5.1490		Quarterly	**4,000,000.00**	**4,000,000.00**	1,004,010.00	4,036,480.00	29,906.52
LC111489	MACQ 1.75 07 Aug 2024 Fixed	7 Aug 2024	7 Aug 2019	7 Feb 2024	7 Aug 2024	53	1.7500		Semi Annual	**12,000,000.00**	**12,000,000.00**	2,062,420.00	11,908,800.00	30,493.15
LC112606	Westpac 2.25 16 Aug 2024 Fixed	16 Aug 2024	16 May 2019	16 Feb 2024	16 Aug 2024	44	2.2500		Semi Annual	**2,800,000.00**	**2,800,000.00**	2,940,476.00	2,782,556.00	7,594.52
LX185379	Auswide 5.45 21 Aug 2024 286DAY TD	21 Aug 2024	9 Nov 2023		21 Aug 2024	143	5.4500		Maturity	**5,000,000.00**	**5,000,000.00**	5,000,000.00	5,106,760.25	106,760.27
LX188410	BBA 5.42 28 Aug 2024 265DAY TD	28 Aug 2024	7 Dec 2023		28 Aug 2024	115	5.4200		Maturity	**5,000,000.00**	**5,000,000.00**	5,000,000.00	5,085,383.55	85,383.56
LC116230	BENAU 0.97 06 Sep 2024 FRN	6 Sep 2024	6 Sep 2019	6 Mar 2024	6 Jun 2024	25	5.3133		Quarterly	**6,000,000.00**	**6,000,000.00**	6,084,180.00	6,031,860.00	21,835.48
LC112605	BENAU 1.7 06 Sep 2024 Fixed	6 Sep 2024	6 Sep 2019	6 Mar 2024	6 Sep 2024	25	1.7000		Semi Annual	**9,390,000.00**	**9,390,000.00**	1,542,195.00	9,269,620.20	10,933.56
LX188411	BBA 5.42 13 Sep 2024 281DAY TD	13 Sep 2024	7 Dec 2023		13 Sep 2024	115	5.4200		Maturity	**5,000,000.00**	**5,000,000.00**	5,000,000.00	5,085,383.55	85,383.56
LX190928	NAB 5.11 18 Sep 2024 245DAY TD	18 Sep 2024	17 Jan 2024		18 Sep 2024	74	5.1100		Maturity	**5,000,000.00**	**5,000,000.00**	5,000,000.00	5,051,800.00	51,800.00
LC96636	BOQ 2 26 Sep 2024 1827DAY TD	26 Sep 2024	26 Sep 2019	26 Sep 2023	26 Sep 2024	187	2.0000		Annual	**10,000,000.00**	**10,000,000.00**	10,000,000.00	10,102,465.80	102,465.75

Latest Deal Code	Security	WAL / Interim Maturity Date	Issue Date	Prior Coupon Date	Next Coupon Date	Accrual Period (Days)	Coupon Rate	Franking Credit Rate	Coupon Frequency	**Face Value Notional**	**Current Face Value Notional**	Latest Purchase Consideration	Market Value	Accrued Interest
LC100324	HSBCSyd 1.5 27 Sep 2024 Fixed	27 Sep 2024	27 Sep 2019	27 Mar 2024	27 Sep 2024	4	1.5000		Semi Annual	**1,480,000.00**	**1,480,000.00**	1,533,132.00	1,456,941.60	243.29
LX190931	NAB 5.11 02 Oct 2024 259DAY TD	2 Oct 2024	17 Jan 2024		2 Oct 2024	74	5.1100		Maturity	**5,000,000.00**	**5,000,000.00**	5,000,000.00	5,051,800.00	51,800.00
LX190932	NAB 5.11 09 Oct 2024 266DAY TD	9 Oct 2024	17 Jan 2024		9 Oct 2024	74	5.1100		Maturity	**5,000,000.00**	**5,000,000.00**	5,000,000.00	5,051,800.00	51,800.00
LC137827	BOQ 1.1 30 Oct 2024 FRN	30 Oct 2024	30 Oct 2019	30 Jan 2024	30 Apr 2024	61	5.4443		Quarterly	**7,000,000.00**	**7,000,000.00**	3,031,830.00	7,083,650.00	63,690.85
LC114925	MYS 0.6 22 Nov 2024 FRN	22 Nov 2024	22 Nov 2021	22 Feb 2024	22 May 2024	38	4.9373		Quarterly	**12,000,000.00**	**12,000,000.00**	12,000,000.00	12,055,320.00	61,682.43
LC100354	MACQ 1.7 12 Feb 2025 Fixed	12 Feb 2025	12 Feb 2020	12 Feb 2024	12 Aug 2024	48	1.7000		Semi Annual	**25,000,000.00**	**25,000,000.00**	10,510,000.00	24,418,500.00	55,890.41
LC133971	Auswide 0.75 14 Feb 2025 FRN	14 Feb 2025	14 Feb 2022	14 Feb 2024	14 May 2024	46	5.0959		Quarterly	**5,000,000.00**	**5,000,000.00**	5,000,000.00	5,024,500.00	32,111.15
LC136560	Auswide 0.9 17 Mar 2025 FRN	17 Mar 2025	17 Mar 2022	18 Mar 2024	17 Jun 2024	13	5.2539		Quarterly	**5,000,000.00**	**5,000,000.00**	5,000,000.00	5,007,350.00	9,356.26
LC141827	NSWTC 1.25 20 Mar 2025 Fixed	20 Mar 2025	21 Nov 2019	20 Mar 2024	20 Sep 2024	11	1.2500		Semi Annual	**2,000,000.00**	**2,000,000.00**	2,004,760.00	1,946,040.00	753.42
LC143209	Qld Police 1.35 19 May 2025 FRN	19 May 2025	17 May 2022	19 Feb 2024	17 May 2024	41	5.6900		Quarterly	**5,000,000.00**	**5,000,000.00**	5,000,000.00	5,038,450.00	31,957.53
LC145373	Auswide 1.3 10 Jun 2025 FRN	10 Jun 2025	10 Jun 2022	11 Mar 2024	10 Jun 2024	20	5.6456		Quarterly	**5,000,000.00**	**5,000,000.00**	5,000,000.00	5,030,450.00	15,467.40
LC96637	BOQ 1.53 16 Jun 2025 1826DAY TD	16 Jun 2025	16 Jun 2020	16 Jun 2023	16 Jun 2024	289	1.5300		Annual	**10,000,000.00**	**10,000,000.00**	10,000,000.00	10,121,142.50	121,142.47
LC107738	MYS 0.65 16 Jun 2025 FRN	16 Jun 2025	16 Jun 2021	18 Mar 2024	17 Jun 2024	13	5.0039		Quarterly	**9,500,000.00**	**9,500,000.00**	9,500,000.00	9,489,930.00	16,931.00
LC100329	UBS Aust 1.2 30 Jul 2025 Fixed	30 Jul 2025	30 Jul 2020	30 Jan 2024	30 Jul 2024	61	1.2000		Semi Annual	**4,000,000.00**	**4,000,000.00**	4,120,240.00	3,814,920.00	8,021.92
LC104737	UBS Aust 0.87 30 Jul 2025 FRN	30 Jul 2025	30 Jul 2020	30 Jan 2024	30 Apr 2024	61	5.2143		Quarterly	**10,000,000.00**	**10,000,000.00**	5,083,750.00	10,069,300.00	87,143.10
LC190925	JUDO 6.4 26 Sep 2025 Fixed	26 Sep 2025	26 Sep 2022	26 Mar 2024	26 Sep 2024	5	6.4000		Semi Annual	**8,630,000.00**	**8,630,000.00**	3,705,830.70	8,614,379.70	7,566.03
LC155063	MYS 1.3 13 Oct 2025 FRN	13 Oct 2025	13 Oct 2022	15 Jan 2024	15 Apr 2024	76	5.6502		Quarterly	**10,000,000.00**	**10,000,000.00**	10,000,000.00	10,167,600.00	117,648.00
LC181158	TMB 1.5 28 Oct 2025 FRN	28 Oct 2025	28 Oct 2022	29 Jan 2024	29 Apr 2024	62	5.8564		Quarterly	**2,000,000.00**	**2,000,000.00**	2,033,180.00	2,032,260.00	19,895.72
LC188385	Auswide 1.5 07 Nov 2025 FRN	7 Nov 2025	7 Nov 2022	7 Feb 2024	7 May 2024	53	5.8490		Quarterly	**9,750,000.00**	**9,750,000.00**	2,518,275.00	9,873,727.50	82,807.42
LC157929	CUA 1.58 01 Dec 2025 FRN	1 Dec 2025	1 Dec 2022	1 Mar 2024	3 Jun 2024	30	5.9175		Quarterly	**3,500,000.00**	**3,500,000.00**	3,500,000.00	3,542,070.00	17,022.95
LC112609	BENAU 0.52 02 Dec 2025 FRN	2 Dec 2025	2 Dec 2020	4 Mar 2024	3 Jun 2024	27	4.8587		Quarterly	**35,500,000.00**	**35,500,000.00**	4,512,240.00	35,445,685.00	127,590.79
LC157906	Qld Police 1.75 06 Dec 2025 FRN	6 Dec 2025	6 Dec 2022	6 Mar 2024	6 Jun 2024	25	6.0933		Quarterly	**10,000,000.00**	**10,000,000.00**	10,000,000.00	10,116,900.00	41,734.93
LX105597	MACQ 0.48 09 Dec 2025 FRN	9 Dec 2025	9 Dec 2020	11 Mar 2024	11 Jun 2024	20	4.8256		Quarterly	**20,000,000.00**	**20,000,000.00**	9,979,100.00	20,017,400.00	52,883.29
LC112608	SunBank 0.45 24 Feb 2026 FRN	24 Feb 2026	24 Feb 2021	26 Feb 2024	24 May 2024	34	4.7856		Quarterly	**5,000,000.00**	**5,000,000.00**	5,010,350.00	5,005,100.00	22,289.10
LC188379	RACB 1.5 24 Feb 2026 FRN	24 Feb 2026	24 Feb 2023	26 Feb 2024	24 May 2024	34	5.8356		Quarterly	**6,500,000.00**	**6,500,000.00**	2,758,855.00	6,546,670.00	35,333.36
LC103543	UBS Aust 0.5 26 Feb 2026 FRN	26 Feb 2026	26 Feb 2021	26 Feb 2024	27 May 2024	34	4.8356		Quarterly	**18,800,000.00**	**18,800,000.00**	12,013,800.00	18,772,176.00	84,682.62
LC103141	NPBS 0.63 04 Mar 2026 FRN	4 Mar 2026	4 Mar 2021	4 Mar 2024	4 Jun 2024	27	4.9687		Quarterly	**1,000,000.00**	**1,000,000.00**	1,002,420.00	992,730.00	3,675.48
LC164300	Auswide 1.5 17 Mar 2026 FRN	17 Mar 2026	17 Mar 2023	18 Mar 2024	17 Jun 2024	13	5.8539		Quarterly	**4,500,000.00**	**4,500,000.00**	4,500,000.00	4,518,180.00	9,382.28
LC105450	CUA 0.68 22 Apr 2026 FRN	22 Apr 2026	22 Apr 2021	22 Jan 2024	22 Apr 2024	69	5.0263		Quarterly	**11,000,000.00**	**11,000,000.00**	11,000,000.00	10,986,910.00	104,519.50
LC109088	BOQ 0.63 06 May 2026 FRN	6 May 2026	6 May 2021	6 Feb 2024	7 May 2024	54	4.9777		Quarterly	**5,000,000.00**	**5,000,000.00**	5,026,950.00	5,004,100.00	36,821.34
LC137828	TMB 0.68 16 Jun 2026 FRN	16 Jun 2026	16 Jun 2021	18 Mar 2024	17 Jun 2024	13	5.0339		Quarterly	**1,700,000.00**	**1,700,000.00**	1,674,194.00	1,682,949.00	3,047.92
LC169762	Qld Police 1.7 16 Jun 2026 FRN	16 Jun 2026	16 Jun 2023	18 Mar 2024	17 Jun 2024	13	6.0539		Quarterly	**4,500,000.00**	**4,500,000.00**	4,500,000.00	4,544,325.00	9,702.83
LC109586	BENAU 0.65 18 Jun 2026 FRN	18 Jun 2026	18 Jun 2021	18 Mar 2024	18 Jun 2024	13	5.0039		Quarterly	**15,300,000.00**	**15,300,000.00**	3,019,110.00	15,228,549.00	27,267.83
LX109029	BOQ 0.58 08 Jul 2026 1826DAY FRD	8 Jul 2026	8 Jul 2021	8 Jan 2024	8 Apr 2024	83	4.9429		Quarterly	**5,000,000.00**	**5,000,000.00**	5,000,000.00	5,056,200.10	56,200.10
LX109587	BOQ 0.58 22 Jul 2026 1826DAY FRD	22 Jul 2026	22 Jul 2021	22 Jan 2024	22 Apr 2024	69	4.9263		Quarterly	**3,000,000.00**	**3,000,000.00**	3,000,000.00	3,027,938.19	27,938.19

Latest Deal Code	Security	WAL / Interim Maturity Date	Issue Date	Prior Coupon Date	Next Coupon Date	Accrual Period (Days)	Coupon Rate	Franking Credit Rate	Coupon Frequency	**Face Value Notional**	**Current Face Value Notional**	Latest Purchase Consideration	Market Value	Accrued Interest
LC112610	NAB 0.41 24 Aug 2026 FRN	24 Aug 2026	24 Aug 2021	26 Feb 2024	24 May 2024	34	4.7456		Quarterly	**7,000,000.00**	**7,000,000.00**	7,012,180.00	6,997,690.00	30,943.91
LC113804	SunBank 0.48 15 Sep 2026 FRN	15 Sep 2026	15 Sep 2021	15 Mar 2024	17 Jun 2024	16	4.8248		Quarterly	**12,900,000.00**	**12,900,000.00**	9,989,800.00	12,852,657.00	27,283.25
LC180295	Qld Police 1.65 18 Sep 2026 FRN	18 Sep 2026	18 Sep 2023	18 Mar 2024	18 Jun 2024	13	6.0039		Quarterly	**9,500,000.00**	**9,500,000.00**	9,500,000.00	9,585,975.00	20,314.57
LC180163	CACU 1.7 21 Sep 2026 FRN	21 Sep 2026	20 Sep 2023	21 Mar 2024	21 Jun 2024	10	6.0528		Quarterly	**9,000,000.00**	**9,000,000.00**	9,000,000.00	9,015,030.00	14,924.71
LC190930	CUA 1.6 23 Oct 2026 FRN	23 Oct 2026	23 Jan 2024		23 Apr 2024	68	5.9450		Quarterly	**2,500,000.00**	**2,500,000.00**	2,506,975.00	2,546,150.00	27,689.04
LC116445	BOQ 0.8 27 Oct 2026 FRN	27 Oct 2026	27 Oct 2021	29 Jan 2024	29 Apr 2024	62	5.1564		Quarterly	**22,000,000.00**	**22,000,000.00**	15,059,400.00	22,070,840.00	192,693.96
LX185851	PCU 1.55 17 Nov 2026 FRN	17 Nov 2026	17 Nov 2023	19 Feb 2024	17 May 2024	41	5.8900		Quarterly	**5,000,000.00**	**5,000,000.00**	5,000,000.00	5,051,350.00	33,080.82
LC187340	Qld Police 1.65 01 Dec 2026 FRN	1 Dec 2026	1 Dec 2023	1 Mar 2024	3 Jun 2024	30	5.9875		Quarterly	**10,000,000.00**	**10,000,000.00**	10,000,000.00	10,113,500.00	49,212.33
LC111486	NTTC 1.4 15 Dec 2026 - Issued 26 August 2021 - CCC Fixed	15 Dec 2026	26 Aug 2021	15 Dec 2023	15 Jun 2024	107	1.4000		Semi Annual	**5,000,000.00**	**5,000,000.00**	5,000,000.00	5,020,500.00	20,520.55
LC116992	CBA 0.7 14 Jan 2027 FRN	14 Jan 2027	14 Jan 2022	15 Jan 2024	15 Apr 2024	76	5.0502		Quarterly	**6,500,000.00**	**6,500,000.00**	6,500,000.00	6,573,385.00	68,350.65
LC117127	SunBank 0.78 25 Jan 2027 FRN	25 Jan 2027	25 Jan 2022	25 Jan 2024	26 Apr 2024	66	5.1315		Quarterly	**13,000,000.00**	**13,000,000.00**	13,000,000.00	13,120,640.00	120,625.40
LC117174	Westpac 0.7 25 Jan 2027 FRN	25 Jan 2027	25 Jan 2022	25 Jan 2024	26 Apr 2024	66	5.0515		Quarterly	**16,000,000.00**	**16,000,000.00**	16,000,000.00	16,150,400.00	146,147.51
LC181165	CUA 1.65 09 Feb 2027 FRN	9 Feb 2027	9 Feb 2023	9 Feb 2024	9 May 2024	51	5.9936		Quarterly	**12,500,000.00**	**12,500,000.00**	7,646,550.00	12,706,875.00	104,682.74
LX190938	NPBS 1 10 Feb 2027 FRN	10 Feb 2027	10 Feb 2022	12 Feb 2024	10 May 2024	48	5.3472		Quarterly	**13,100,000.00**	**13,100,000.00**	9,991,700.00	13,053,888.00	92,118.34
LC169102	BAL 1.55 22 Feb 2027 FRN	22 Feb 2027	22 Feb 2023	22 Feb 2024	22 May 2024	38	5.8873		Quarterly	**9,250,000.00**	**9,250,000.00**	4,287,995.00	9,336,117.50	56,695.51
LC167397	BOQ 1.2 09 May 2028 COVEREDFLO	9 May 2028	9 May 2023	9 Feb 2024	9 May 2024	51	5.5436		Quarterly	**5,000,000.00**	**5,000,000.00**	5,022,250.00	5,062,700.00	38,729.26
LC179277	UBS Aust 1.55 12 May 2028 FRN	12 May 2028	12 May 2023	12 Feb 2024	13 May 2024	48	5.8972		Quarterly	**7,600,000.00**	**7,600,000.00**	5,090,950.00	7,788,252.00	58,939.69
LC142120	NSWTC 3 15 Nov 2028 Fixed	15 Nov 2028	15 Nov 2018	15 Nov 2023	15 May 2024	137	3.0000		Semi Annual	**15,000,000.00**	**15,000,000.00**	14,700,900.00	14,577,750.00	168,904.11
										665,322,498.97	**665,322,498.97**		668,943,699.40	6,150,717.46

Notes:
1. Coupon Rate is the full coupon rate at the next coupon date if that next coupon exists.
2. Accrued Interest is calculated as Current Face Value x Coupon Rate (Adjusted by Franking Credit Rate) x (Days Since Prior Coupon or Issue Date / 365).
3. The accrued interest component of the Market Value does not consider the franking credit rate and is instead based upon market prices.
4. Immaterial differences in Accrued Interest and the accrued interest portion of Market Value may arise because Market Value is calculated using a rounded "price per 100" value.

5. Portfolio Valuation As At 31 March 2024

	Security	Security Rating	ISIN	Face Value Original	Face Value Current	FI Cap Price/ Unit Price/ Share Price	Unit Count/ Share Count	Accrued Interest Price	**Market Value**	% Total Value	Running Yield	Weighted Running Yield
At Call Deposit												
	AMP At Call	S&P BBB		6,206.37	6,206.37	100.000		0.000	**6,206.37**	0.00%	3.80%	
	CBA At Call	S&P AA-		15,596,829.19	15,596,829.19	100.000		0.000	**15,596,829.19**	2.33%	4.10%	
				15,603,035.56	15,603,035.56				**15,603,035.56**	2.33%		4.10%
At Call Investment												
	MACQ At Call In	Moodys A2		6,519,463.41	6,519,463.41	100.000		0.000	**6,519,463.41**	0.97%	4.70%	
				6,519,463.41	6,519,463.41				**6,519,463.41**	0.97%		4.70%
Covered Floating Bond												
	BOQ 1.2 09 May 2028 COVEREDFLO	S&P AAA	AU3FN0077798	5,000,000.00	5,000,000.00	100.479		0.775	**5,062,700.00**	0.76%	5.52%	
				5,000,000.00	5,000,000.00				**5,062,700.00**	0.76%		5.52%
Fixed Rate Bond												
	BENAU 1.7 06 Sep 2024 Fixed	Moodys Baa1	AU3CB0266377	9,390,000.00	9,390,000.00	98.603		0.115	**9,269,620.20**	1.39%	1.64%	
	HSBCSyd 1.5 27 Sep 2024 Fixed	S&P AA-	AU3CB0267078	1,480,000.00	1,480,000.00	98.426		0.016	**1,456,941.60**	0.22%	1.45%	
	JUDO 6.4 26 Sep 2025 Fixed	S&P BBB-	AU3CB0292480	8,630,000.00	8,630,000.00	99.732		0.087	**8,614,379.70**	1.29%	6.36%	
	MACQ 1.75 07 Aug 2024 Fixed	S&P A+	AU3CB0265593	12,000,000.00	12,000,000.00	98.985		0.255	**11,908,800.00**	1.78%	1.70%	
	MACQ 1.7 12 Feb 2025 Fixed	S&P A+	AU3CB0270387	25,000,000.00	25,000,000.00	97.450		0.224	**24,418,500.00**	3.65%	1.63%	
	NTTC 1.4 15 Dec 2026 - Issued 26 August 2021 - CCC Fixed	Moodys Aa3		5,000,000.00	5,000,000.00	100.000		0.410	**5,020,500.00**	0.75%	1.40%	
	NSWTC 1.25 20 Mar 2025 Fixed	S&P AA+	AU3SG0002025	2,000,000.00	2,000,000.00	97.265		0.037	**1,946,040.00**	0.29%	1.25%	
	NSWTC 3 15 Nov 2028 Fixed	Moodys Aaa	AU3SG0001878	15,000,000.00	15,000,000.00	96.056		1.129	**14,577,750.00**	2.18%	3.06%	
	SunBank 1.85 30 Jul 2024 Fixed	S&P A+	AU3CB0265403	2,500,000.00	2,500,000.00	99.068		0.310	**2,484,450.00**	0.37%	1.79%	
	UBS Aust 1.2 30 Jul 2025 Fixed	Moodys Aa3	AU3CB0273407	4,000,000.00	4,000,000.00	95.172		0.201	**3,814,920.00**	0.57%	1.17%	
	Westpac 2.25 16 Aug 2024 Fixed	S&P AA-	AU3CB0263275	2,800,000.00	2,800,000.00	99.105		0.272	**2,782,556.00**	0.42%	2.15%	
				87,800,000.00	87,800,000.00				**86,294,457.50**	12.90%		2.31%
Floating Rate Deposit												
	BOQ 0.4 22 Jul 2024 1096DAY FRD	S&P ST A2		4,000,000.00	4,000,000.00	100.000		0.897	**4,035,889.84**	0.60%	4.75%	
	BOQ 0.58 08 Jul 2026 1826DAY FRD	S&P BBB+		5,000,000.00	5,000,000.00	100.000		1.124	**5,056,200.10**	0.76%	4.94%	
	BOQ 0.58 22 Jul 2026 1826DAY FRD	S&P BBB+		3,000,000.00	3,000,000.00	100.000		0.931	**3,027,938.19**	0.45%	4.93%	
				12,000,000.00	12,000,000.00				**12,120,028.13**	1.81%		4.87%
Floating Rate Note												
	Auswide 0.75 14 Feb 2025 FRN	Moodys Baa2	AU3FN0066320	5,000,000.00	5,000,000.00	99.848		0.642	**5,024,500.00**	0.75%	5.10%	
	Auswide 0.9 17 Mar 2025 FRN	Moodys Baa2	AU3FN0067393	5,000,000.00	5,000,000.00	99.960		0.187	**5,007,350.00**	0.75%	5.25%	
	Auswide 1.3 10 Jun 2025 FRN	Moodys Baa2	AU3FN0069555	5,000,000.00	5,000,000.00	100.300		0.309	**5,030,450.00**	0.75%	5.65%	
	Auswide 1.5 07 Nov 2025 FRN	Moodys Baa2	AU3FN0073037	9,750,000.00	9,750,000.00	100.420		0.849	**9,873,727.50**	1.48%	5.85%	

Security	Security Rating	ISIN	Face Value Original	Face Value Current	FI Cap Price/ Unit Price/ Share Price	Unit Count/ Share Count	Accrued Interest Price	**Market Value**	% Total Value	Running Yield	Weighted Running Yield
Auswide 1.5 17 Mar 2026 FRN	Moodys Baa2	AU3FN0076352	4,500,000.00	4,500,000.00	100.196		0.208	**4,518,180.00**	0.68%	5.85%	
BAL 1.55 22 Feb 2027 FRN	S&P BBB	AU3FN0075461	9,250,000.00	9,250,000.00	100.318		0.613	**9,336,117.50**	1.40%	5.85%	
BOQ 1.1 30 Oct 2024 FRN	S&P BBB+	AU3FN0051272	7,000,000.00	7,000,000.00	100.285		0.910	**7,083,650.00**	1.06%	5.37%	
BOQ 0.63 06 May 2026 FRN	S&P BBB+	AU3FN0060406	5,000,000.00	5,000,000.00	99.346		0.736	**5,004,100.00**	0.75%	4.96%	
BOQ 0.8 27 Oct 2026 FRN	S&P BBB+	AU3FN0063764	22,000,000.00	22,000,000.00	99.446		0.876	**22,070,840.00**	3.30%	5.14%	
BENAU 0.97 06 Sep 2024 FRN	Moodys Baa1	AU3FN0050019	6,000,000.00	6,000,000.00	100.167		0.364	**6,031,860.00**	0.90%	5.24%	
BENAU 0.52 02 Dec 2025 FRN	Moodys Baa1	AU3FN0057634	35,500,000.00	35,500,000.00	99.488		0.359	**35,445,685.00**	5.30%	4.85%	
BENAU 0.65 18 Jun 2026 FRN	Moodys Baa1	AU3FN0061081	15,300,000.00	15,300,000.00	99.355		0.178	**15,228,549.00**	2.28%	4.98%	
CBA 0.7 14 Jan 2027 FRN	S&P AA-	AU3FN0065579	6,500,000.00	6,500,000.00	100.077		1.052	**6,573,385.00**	0.98%	5.05%	
CUA 1.58 01 Dec 2025 FRN	Moodys Baa1	AU3FN0073961	3,500,000.00	3,500,000.00	100.716		0.486	**3,542,070.00**	0.53%	5.92%	
CUA 0.68 22 Apr 2026 FRN	Moodys Baa1	AU3FN0059721	11,000,000.00	11,000,000.00	98.931		0.950	**10,986,910.00**	1.64%	5.03%	
CUA 1.6 23 Oct 2026 FRN	Moodys Baa1	AU3FN0084299	2,500,000.00	2,500,000.00	100.738		1.108	**2,546,150.00**	0.38%	5.93%	
CUA 1.65 09 Feb 2027 FRN	Moodys Baa1	AU3FN0074787	12,500,000.00	12,500,000.00	100.818		0.837	**12,706,875.00**	1.90%	5.93%	
CACU 1.7 21 Sep 2026 FRN	S&P BBB-	AU3FN0081287	9,000,000.00	9,000,000.00	100.001		0.166	**9,015,030.00**	1.35%	6.05%	
MACQ 0.8 07 Aug 2024 FRN	S&P A+	AU3FN0049367	4,000,000.00	4,000,000.00	100.164		0.748	**4,036,480.00**	0.60%	5.09%	
MACQ 0.48 09 Dec 2025 FRN	S&P A+	AU3FN0057709	20,000,000.00	20,000,000.00	99.823		0.264	**20,017,400.00**	2.99%	4.83%	
RACB 1.5 24 Feb 2026 FRN	Moodys Baa1	AU3FN0075453	6,500,000.00	6,500,000.00	100.174		0.544	**6,546,670.00**	0.98%	5.83%	
MYS 0.6 22 Nov 2024 FRN	Moodys Baa2	AU3FN0064705	12,000,000.00	12,000,000.00	99.947		0.514	**12,055,320.00**	1.80%	4.94%	
MYS 0.65 16 Jun 2025 FRN	Moodys Baa2	AU3FN0061024	9,500,000.00	9,500,000.00	99.716		0.178	**9,489,930.00**	1.42%	5.00%	
MYS 1.3 13 Oct 2025 FRN	Moodys Baa2	AU3FN0072369	10,000,000.00	10,000,000.00	100.500		1.176	**10,167,600.00**	1.52%	5.65%	
NAB 0.92 19 Jun 2024 FRN	S&P AA-	AU3FN0048724	5,000,000.00	5,000,000.00	100.153		0.173	**5,016,300.00**	0.75%	5.17%	
NAB 0.41 24 Aug 2026 FRN	S&P AA-	AU3FN0062659	7,000,000.00	7,000,000.00	99.525		0.442	**6,997,690.00**	1.05%	4.74%	
NPBS 0.63 04 Mar 2026 FRN	S&P BBB	AU3FN0058699	1,000,000.00	1,000,000.00	98.905		0.368	**992,730.00**	0.15%	4.96%	
NPBS 1 10 Feb 2027 FRN	S&P BBB	AU3FN0066221	13,100,000.00	13,100,000.00	98.945		0.703	**13,053,888.00**	1.95%	5.40%	
PCU 1.55 17 Nov 2026 FRN	S&P BBB	AU3FN0083028	5,000,000.00	5,000,000.00	100.365		0.662	**5,051,350.00**	0.76%	5.89%	
Qld Police 1.35 19 May 2025 FRN	S&P BBB-	AU3FN0069175	5,000,000.00	5,000,000.00	100.130		0.639	**5,038,450.00**	0.75%	5.69%	
Qld Police 1.75 06 Dec 2025 FRN	S&P BBB-	AU3FN0073979	10,000,000.00	10,000,000.00	100.752		0.417	**10,116,900.00**	1.51%	6.09%	
Qld Police 1.7 16 Jun 2026 FRN	S&P BBB-	AU3FN0078895	4,500,000.00	4,500,000.00	100.769		0.216	**4,544,325.00**	0.68%	6.05%	
Qld Police 1.65 18 Sep 2026 FRN	S&P BBB-	AU3FN0081295	9,500,000.00	9,500,000.00	100.691		0.214	**9,585,975.00**	1.43%	6.00%	
Qld Police 1.65 01 Dec 2026 FRN	S&P BBB-	AU3FN0083549	10,000,000.00	10,000,000.00	100.643		0.492	**10,113,500.00**	1.51%	5.99%	
SunBank 0.45 24 Feb 2026 FRN	S&P A+	AU3FN0058343	5,000,000.00	5,000,000.00	99.656		0.446	**5,005,100.00**	0.75%	4.78%	
SunBank 0.48 15 Sep 2026 FRN	S&P A+	AU3FN0062964	12,900,000.00	12,900,000.00	99.422		0.211	**12,852,657.00**	1.92%	4.83%	
SunBank 0.78 25 Jan 2027 FRN	S&P A+	AU3FN0065694	13,000,000.00	13,000,000.00	100.000		0.928	**13,120,640.00**	1.96%	5.13%	
TMB 1.5 28 Oct 2025 FRN	Moodys Baa1	AU3FN0072740	2,000,000.00	2,000,000.00	100.618		0.995	**2,032,260.00**	0.30%	5.82%	
TMB 0.68 16 Jun 2026 FRN	Moodys Baa1	AU3FN0061016	1,700,000.00	1,700,000.00	98.818		0.179	**1,682,949.00**	0.25%	5.11%	
UBS Aust 0.87 30 Jul 2025 FRN	S&P A+	AU3FN0055307	10,000,000.00	10,000,000.00	99.822		0.871	**10,069,300.00**	1.51%	5.12%	

	Security	Security Rating	ISIN	Face Value Original	Face Value Current	FI Cap Price/ Unit Price/ Share Price	Unit Count/ Share Count	Accrued Interest Price	**Market Value**	% Total Value	Running Yield	Weighted Running Yield
	UBS Aust 0.5 26 Feb 2026 FRN	Moodys Aa3	AU3FN0058608	18,800,000.00	18,800,000.00	99.402		0.450	**18,772,176.00**	2.81%	4.83%	
	UBS Aust 1.55 12 May 2028 FRN	S&P A+	AU3FN0077970	7,600,000.00	7,600,000.00	101.701		0.776	**7,788,252.00**	1.16%	5.83%	
	Westpac 0.7 25 Jan 2027 FRN	S&P AA-	AU3FN0065702	16,000,000.00	16,000,000.00	100.027		0.913	**16,150,400.00**	2.41%	5.05%	
				393,400,000.00	393,400,000.00				**395,323,671.00**	59.10%		5.29%
Term Deposit												
	AMP 5.45 01 Aug 2024 364DAY TD	S&P ST A2		5,000,000.00	5,000,000.00	100.000		3.598	**5,179,924.65**	0.77%	5.45%	
	Auswide 5.45 21 Aug 2024 286DAY TD	Moodys ST P-2		5,000,000.00	5,000,000.00	100.000		2.135	**5,106,760.25**	0.76%	5.45%	
	BOQ 5.19 01 May 2024 217DAY TD	S&P ST A2		5,000,000.00	5,000,000.00	100.000		2.645	**5,132,238.35**	0.77%	5.19%	
	BOQ 5.24 22 May 2024 238DAY TD	S&P ST A2		5,000,000.00	5,000,000.00	100.000		2.670	**5,133,512.35**	0.77%	5.24%	
	BOQ 5.24 29 May 2024 245DAY TD	S&P ST A2		5,000,000.00	5,000,000.00	100.000		2.670	**5,133,512.35**	0.77%	5.24%	
	BOQ 2 26 Sep 2024 1827DAY TD	S&P ST A2		10,000,000.00	10,000,000.00	100.000		1.025	**10,102,465.80**	1.51%	2.00%	
	BOQ 1.53 16 Jun 2025 1826DAY TD	S&P BBB+		10,000,000.00	10,000,000.00	100.000		1.211	**10,121,142.50**	1.51%	1.53%	
	BBA 5.42 17 Jul 2024 223DAY TD	S&P ST A2		5,000,000.00	5,000,000.00	100.000		1.708	**5,085,383.55**	0.76%	5.42%	
	BBA 5.42 28 Aug 2024 265DAY TD	S&P ST A2		5,000,000.00	5,000,000.00	100.000		1.708	**5,085,383.55**	0.76%	5.42%	
	BBA 5.42 13 Sep 2024 281DAY TD	S&P ST A2		5,000,000.00	5,000,000.00	100.000		1.708	**5,085,383.55**	0.76%	5.42%	
	CBA 5.35 03 Apr 2024 222DAY TD	S&P ST A1+		5,000,000.00	5,000,000.00	100.000		3.210	**5,160,500.00**	0.77%	5.35%	
	CBA 5.36 10 Apr 2024 229DAY TD	S&P ST A1+		5,000,000.00	5,000,000.00	100.000		3.216	**5,160,800.00**	0.77%	5.36%	
	CBA 5.37 17 Apr 2024 236DAY TD	S&P ST A1+		5,000,000.00	5,000,000.00	100.000		3.222	**5,161,100.00**	0.77%	5.37%	
	CBA 5.37 24 Apr 2024 243DAY TD	S&P ST A1+		5,000,000.00	5,000,000.00	100.000		3.222	**5,161,100.00**	0.77%	5.37%	
	JUDO 5.2 11 Apr 2024 183DAY TD	S&P ST A3		10,000,000.00	10,000,000.00	100.000		2.450	**10,245,041.10**	1.53%	5.20%	
	MYS 5.45 03 Jul 2024 237DAY TD	Moodys ST P-2		5,000,000.00	5,000,000.00	100.000		2.135	**5,106,760.25**	0.76%	5.45%	
	MYS 5.45 10 Jul 2024 244DAY TD	Moodys ST P-2		5,000,000.00	5,000,000.00	100.000		2.135	**5,106,760.25**	0.76%	5.45%	
	NAB 5.11 08 May 2024 247DAY TD	S&P ST A1+		5,000,000.00	5,000,000.00	100.000		2.926	**5,146,300.00**	0.77%	5.11%	
	NAB 5.11 13 May 2024 252DAY TD	S&P ST A1+		5,000,000.00	5,000,000.00	100.000		2.926	**5,146,300.00**	0.77%	5.11%	
	NAB 1.15 14 Jun 2024 1459DAY TD	S&P ST A1+		10,000,000.00	10,000,000.00	100.000		0.911	**10,091,054.80**	1.51%	1.15%	
	NAB 5.11 18 Sep 2024 245DAY TD	S&P ST A1+		5,000,000.00	5,000,000.00	100.000		1.036	**5,051,800.00**	0.76%	5.11%	
	NAB 5.11 02 Oct 2024 259DAY TD	S&P ST A1+		5,000,000.00	5,000,000.00	100.000		1.036	**5,051,800.00**	0.76%	5.11%	
	NAB 5.11 09 Oct 2024 266DAY TD	S&P ST A1+		5,000,000.00	5,000,000.00	100.000		1.036	**5,051,800.00**	0.76%	5.11%	
	P&NB 5.45 05 Jun 2024 209DAY TD	S&P ST A2		5,000,000.00	5,000,000.00	100.000		2.135	**5,106,760.25**	0.76%	5.45%	
	P&NB 5.45 26 Jun 2024 230DAY TD	S&P ST A2		5,000,000.00	5,000,000.00	100.000		2.135	**5,106,760.25**	0.76%	5.45%	
				145,000,000.00	145,000,000.00				**148,020,343.80**	22.13%		4.53%
Total Portfolio				665,322,498.97	665,322,498.97				**668,943,699.40**	100.00%		4.69%

6. Portfolio Valuation By Categories As At 31 March 2024

Short Term Issuer/Security Rating Group	Market Value	% Total Value
A3	**10,245,041.10**	1.53%
A2	**75,507,495.24**	11.29%
A1+	**56,182,554.80**	8.40%
Portfolio Total	**141,935,091.14**	21.22%

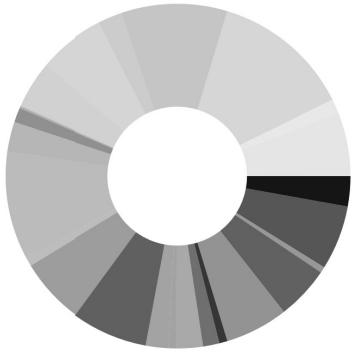
Market Value by Security Rating Group (Short Term)

Long Term Issuer/Security Rating Group	Market Value	% Total Value
BBB+ to BBB-	**305,019,378.06**	45.60%
A+ to A-	**118,221,042.41**	17.67%
AA+ to AA-	**84,127,737.79**	12.58%
AAA	**19,640,450.00**	2.94%
Portfolio Total	**527,008,608.26**	78.78%

Market Value by Security Rating Group (Long Term)

Issuer	Market Value	% Total Value
AMP Bank Ltd	**5,186,131.02**	0.78%
Auswide Bank Limited	**34,560,967.75**	5.17%
Bank Australia Limited	**9,336,117.50**	1.40%
Bank of Queensland Ltd	**86,964,189.48**	13.00%
Bendigo & Adelaide Bank Ltd	**65,975,714.20**	9.86%
Beyond Bank Australia Ltd	**15,256,150.65**	2.28%
Commonwealth Bank of Australia Ltd	**42,813,714.19**	6.40%
Credit Union Australia Ltd t/as Great Southern Bank	**29,782,005.00**	4.45%
HSBC Sydney Branch	**1,456,941.60**	0.22%
Illawarra Credit Union Ltd	**9,015,030.00**	1.35%
Judo Bank	**18,859,420.80**	2.82%
Macquarie Bank Ltd	**66,900,643.41**	10.00%
Members Banking Group Limited t/as RACQ Bank	**6,546,670.00**	0.98%
MyState Bank Ltd	**41,926,370.50**	6.27%
National Australia Bank Ltd	**47,553,044.80**	7.11%
Newcastle Greater Mutual Group Ltd	**14,046,618.00**	2.10%
Northern Territory Treasury Corporation	**5,020,500.00**	0.75%
NSW Treasury Corporation	**16,523,790.00**	2.47%
P&N Bank Ltd	**10,213,520.50**	1.53%
Police Bank Ltd	**5,051,350.00**	0.76%
QPCU LTD t/a QBANK	**39,399,150.00**	5.89%
Suncorp-Metway Ltd	**33,462,847.00**	5.00%
Teachers Mutual Bank Ltd	**3,715,209.00**	0.56%
UBS Australia Ltd	**40,444,648.00**	6.05%
Westpac Banking Corporation Ltd	**18,932,956.00**	2.83%
Portfolio Total	**668,943,699.40**	100.00%

Market Value by Issuer



- AMP Bank Ltd
- Auswide Bank Limited
- Bank Australia Limited
- Bank of Queensland Ltd
- Bendigo & Adelaide Bank Ltd
- Beyond Bank Australia Ltd
- Commonwealth Bank of Australia Ltd
- Credit Union Australia Ltd t/as Great Southern Bank
- HSBC Sydney Branch
- Illawarra Credit Union Ltd
- Judo Bank
- Macquarie Bank Ltd
- Members Banking Group Limited t/as RACQ Bank
- MyState Bank Ltd
- National Australia Bank Ltd
- Newcastle Greater Mutual Group Ltd
- Northern Territory Treasury Corporation
- NSW Treasury Corporation
- P&N Bank Ltd
- Police Bank Ltd
- QPCU LTD t/a QBANK
- Suncorp-Metway Ltd
- Teachers Mutual Bank Ltd
- UBS Australia Ltd
- Westpac Banking Corporation Ltd

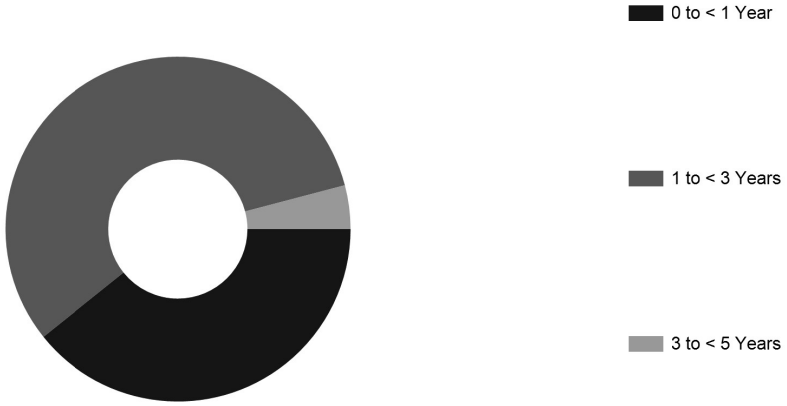
Security Type	Market Value	% Total Value
At Call Deposit	**15,603,035.56**	2.33%
At Call Investment	**6,519,463.41**	0.97%
Covered Floating Bond	**5,062,700.00**	0.76%
Fixed Rate Bond	**86,294,457.50**	12.90%
Floating Rate Deposit	**12,120,028.13**	1.81%
Floating Rate Note	**395,323,671.00**	59.10%
Term Deposit	**148,020,343.80**	22.13%
Portfolio Total	**668,943,699.40**	100.00%

Market Value by Security Type

Term Remaining	Market Value	% Total Value
0 to < 1 Year	**262,579,957.91**	39.25%
1 to < 3 Years	**378,935,039.49**	56.65%
3 to < 5 Years	**27,428,702.00**	4.10%
Portfolio Total	**668,943,699.40**	100.00%

Note: Term Remaining is calculated using a weighted average life date (WAL) where appropriate and available otherwise the interim (initial) maturity date is used.

Market Value by Term Remaining



7. Performance Statistics For Period Ending 31 March 2024

Trading Book		1 Month	3 Month	12 Month	Since Inception
Central Coast Council					
	Portfolio Return (1)	0.46%	1.37%	4.95%	1.91%
	Performance Index (2)	0.37%	1.09%	4.19%	1.78%
	Excess Performance (3)	0.09%	0.28%	0.76%	0.13%

Notes

1 Portfolio performance is the rate of return of the portfolio over the specified period

2 The Performance Index is the Bloomberg AusBond Bank Bill Index (Bloomberg Page BAUBIL)

3 Excess performance is the rate of return of the portfolio in excess of the Performance Index

Trading Book	Weighted Average Running Yield
Central Coast Council	4.69

9. Realised Gains (Losses) - Fixed Interest Dealing For 1 March 2024 to 31 March 2024

No realised gains or losses from fixed interest dealing to report for entered period.

9b. Realised Gains (Losses) - Share Dealing For 1 March 2024 to 31 March 2024

No realised gains or losses from share dealing to report for entered period.

10. Realised Gains (Losses) - Principal Repayments For 1 March 2024 to 31 March 2024

No realised gains or losses from principal repayments to report for entered period.

Total Realised Gains (Losses)

Fixed Interest Dealing	Principal Repayments	Total	Notes (1) The Acquisition Gross Price includes any accrued interest included in the purchase price.
		0.00	

11. Unrealised FI Capital Gains (Losses) As At 31 March 2024

Security	Acquisition Deal	Acquisition Date	Acquisition Yield/ Interest Rate	Acquisition Face Value Original	Balance Face Value Original	Bond Factor Current	Balance Face Value Current	Acquisition Capital Price	Acquisition Capital Consideration	Current Capital Price	CCP For Discount Securities	Current Capital Consideration	Current Capital Consideration Adjusted	**Unrealised Capital Gain (Loss)**
Auswide 0.75 14 Feb 2025 FRN														
	LC133971	7 Feb 2022	0.750000	5,000,000.00	5,000,000.00	1.00000000	5,000,000.00	100.000	5,000,000.00	99.848000	99.848000	4,992,400.00	4,992,400.00	**(7,600.00)**
					5,000,000.00		5,000,000.00	100.000	5,000,000.00			4,992,400.00	4,992,400.00	**(7,600.00)**
Auswide 0.9 17 Mar 2025 FRN														
	LC136560	10 Mar 2022	0.900000	5,000,000.00	5,000,000.00	1.00000000	5,000,000.00	100.000	5,000,000.00	99.960000	99.960000	4,998,000.00	4,998,000.00	**(2,000.00)**
					5,000,000.00		5,000,000.00	100.000	5,000,000.00			4,998,000.00	4,998,000.00	**(2,000.00)**
Auswide 1.3 10 Jun 2025 FRN														
	LC145373	6 Jun 2022	1.300000	5,000,000.00	5,000,000.00	1.00000000	5,000,000.00	100.000	5,000,000.00	100.300000	100.300000	5,015,000.00	5,015,000.00	**15,000.00**
					5,000,000.00		5,000,000.00	100.000	5,000,000.00			5,015,000.00	5,015,000.00	**15,000.00**
Auswide 1.5 07 Nov 2025 FRN														
	LC156239	27 Oct 2022	1.500000	7,250,000.00	7,250,000.00	1.00000000	7,250,000.00	100.000	7,250,000.00	100.420000	100.420000	7,280,450.00	7,280,450.00	**30,450.00**
	LC188385	7 Dec 2023	1.400000	2,500,000.00	2,500,000.00	1.00000000	2,500,000.00	100.184	2,504,600.00	100.420000	100.420000	2,510,500.00	2,510,500.00	**5,900.00**
					9,750,000.00		9,750,000.00	100.047	9,754,600.00			9,790,950.00	9,790,950.00	**36,350.00**
Auswide 1.5 17 Mar 2026 FRN														
	LC164300	9 Mar 2023	1.500000	4,500,000.00	4,500,000.00	1.00000000	4,500,000.00	100.000	4,500,000.00	100.196000	100.196000	4,508,820.00	4,508,820.00	**8,820.00**
					4,500,000.00		4,500,000.00	100.000	4,500,000.00			4,508,820.00	4,508,820.00	**8,820.00**
BAL 1.55 22 Feb 2027 FRN														
	LC164137	8 Mar 2023	1.400000	5,000,000.00	5,000,000.00	1.00000000	5,000,000.00	100.512	5,025,600.00	100.318000	100.318000	5,015,900.00	5,015,900.00	**(9,700.00)**
	LC169102	31 May 2023	1.330000	4,250,000.00	4,250,000.00	1.00000000	4,250,000.00	100.729	4,280,982.50	100.318000	100.318000	4,263,515.00	4,263,515.00	**(17,467.50)**
					9,250,000.00		9,250,000.00	100.612	9,306,582.50			9,279,415.00	9,279,415.00	**(27,167.50)**
BENAU 0.52 02 Dec 2025 FRN														
	LC100679	22 Jan 2021	0.430000	10,000,000.00	10,000,000.00	1.00000000	10,000,000.00	100.427	10,042,700.00	99.488000	99.488000	9,948,800.00	9,948,800.00	**(93,900.00)**
	LC103542	9 Mar 2021	0.470000	10,000,000.00	10,000,000.00	1.00000000	10,000,000.00	100.229	10,022,900.00	99.488000	99.488000	9,948,800.00	9,948,800.00	**(74,100.00)**
	LC104738	1 Apr 2021	0.480000	10,000,000.00	10,000,000.00	1.00000000	10,000,000.00	100.183	10,018,300.00	99.488000	99.488000	9,948,800.00	9,948,800.00	**(69,500.00)**
	LC112607	16 Sep 2021	0.460000	1,000,000.00	1,000,000.00	1.00000000	1,000,000.00	100.246	1,002,460.00	99.488000	99.488000	994,880.00	994,880.00	**(7,580.00)**
	LC112609	16 Sep 2021	0.460000	4,500,000.00	4,500,000.00	1.00000000	4,500,000.00	100.246	4,511,070.00	99.488000	99.488000	4,476,960.00	4,476,960.00	**(34,110.00)**
					35,500,000.00		35,500,000.00	100.274	35,597,430.00			35,318,240.00	35,318,240.00	**(279,190.00)**
BENAU 0.65 18 Jun 2026 FRN														
	LC108717	30 Jun 2021	0.580000	10,000,000.00	10,000,000.00	1.00000000	10,000,000.00	100.334	10,033,400.00	99.355000	99.355000	9,935,500.00	9,935,500.00	**(97,900.00)**
	LC109084	7 Jul 2021	0.570000	2,300,000.00	2,300,000.00	1.00000000	2,300,000.00	100.382	2,308,786.00	99.355000	99.355000	2,285,165.00	2,285,165.00	**(23,621.00)**
	LC109586	21 Jul 2021	0.530000	3,000,000.00	3,000,000.00	1.00000000	3,000,000.00	100.573	3,017,190.00	99.355000	99.355000	2,980,650.00	2,980,650.00	**(36,540.00)**
					15,300,000.00		15,300,000.00	100.388	15,359,376.00			15,201,315.00	15,201,315.00	**(158,061.00)**

Security	Acquisition Deal	Acquisition Date	Acquisition Yield/ Interest Rate	Acquisition Face Value Original	Balance Face Value Original	Bond Factor Current	Balance Face Value Current	Acquisition Capital Price	Acquisition Capital Consideration	Current Capital Price	CCP For Discount Securities	Current Capital Consideration	Current Capital Consideration Adjusted	**Unrealised Capital Gain (Loss)**
BENAU 0.97 06 Sep 2024 FRN														
	LC116230	8 Dec 2021	0.450000	6,000,000.00	6,000,000.00	1.00000000	6,000,000.00	101.392	6,083,520.00	100.167000	100.167000	6,010,020.00	6,010,020.00	**(73,500.00)**
					6,000,000.00		6,000,000.00	101.392	6,083,520.00			6,010,020.00	6,010,020.00	**(73,500.00)**
BENAU 1.7 06 Sep 2024 Fixed														
	LC100360	12 Jan 2021	0.600000	5,390,000.00	5,390,000.00	1.00000000	5,390,000.00	103.956	5,603,228.40	98.603000	98.603000	5,314,701.70	5,314,701.70	**(288,526.70)**
	LC112604	16 Sep 2021	0.710000	2,500,000.00	2,500,000.00	1.00000000	2,500,000.00	102.896	2,572,400.00	98.603000	98.603000	2,465,075.00	2,465,075.00	**(107,325.00)**
	LC112605	16 Sep 2021	0.760000	1,500,000.00	1,500,000.00	1.00000000	1,500,000.00	102.747	1,541,205.00	98.603000	98.603000	1,479,045.00	1,479,045.00	**(62,160.00)**
					9,390,000.00		9,390,000.00	103.481	9,716,833.40			9,258,821.70	9,258,821.70	**(458,011.70)**
BOQ 0.63 06 May 2026 FRN														
	LC109088	7 Jul 2021	0.540000	5,000,000.00	5,000,000.00	1.00000000	5,000,000.00	100.422	5,021,100.00	99.346000	99.346000	4,967,300.00	4,967,300.00	**(53,800.00)**
					5,000,000.00		5,000,000.00	100.422	5,021,100.00			4,967,300.00	4,967,300.00	**(53,800.00)**
BOQ 0.8 27 Oct 2026 FRN														
	LC115705	25 Nov 2021	0.770000	7,000,000.00	7,000,000.00	1.00000000	7,000,000.00	100.142	7,009,940.00	99.446000	99.446000	6,961,220.00	6,961,220.00	**(48,720.00)**
	LC116445	15 Dec 2021	0.740000	15,000,000.00	15,000,000.00	1.00000000	15,000,000.00	100.278	15,041,700.00	99.446000	99.446000	14,916,900.00	14,916,900.00	**(124,800.00)**
					22,000,000.00		22,000,000.00	100.235	22,051,640.00			21,878,120.00	21,878,120.00	**(173,520.00)**
BOQ 1.1 30 Oct 2024 FRN														
	LC116228	8 Dec 2021	0.500000	4,000,000.00	4,000,000.00	1.00000000	4,000,000.00	101.696	4,067,840.00	100.285000	100.285000	4,011,400.00	4,011,400.00	**(56,440.00)**
	LC137827	30 Mar 2022	0.750300	3,000,000.00	3,000,000.00	1.00000000	3,000,000.00	100.868	3,026,040.00	100.285000	100.285000	3,008,550.00	3,008,550.00	**(17,490.00)**
					7,000,000.00		7,000,000.00	101.341	7,093,880.00			7,019,950.00	7,019,950.00	**(73,930.00)**
BOQ 1.2 09 May 2028 COVEREDFLO														
	LC167397	4 May 2023	1.100000	5,000,000.00	5,000,000.00	1.00000000	5,000,000.00	100.445	5,022,250.00	100.479000	100.479000	5,023,950.00	5,023,950.00	**1,700.00**
					5,000,000.00		5,000,000.00	100.445	5,022,250.00			5,023,950.00	5,023,950.00	**1,700.00**
CACU 1.7 21 Sep 2026 FRN														
	LC180163	7 Sep 2023	1.700000	9,000,000.00	9,000,000.00	1.00000000	9,000,000.00	100.000	9,000,000.00	100.001000	100.001000	9,000,090.00	9,000,090.00	**90.00**
					9,000,000.00		9,000,000.00	100.000	9,000,000.00			9,000,090.00	9,000,090.00	**90.00**
CBA 0.7 14 Jan 2027 FRN														
	LC116992	12 Jan 2022	0.700000	6,500,000.00	6,500,000.00	1.00000000	6,500,000.00	100.000	6,500,000.00	100.077000	100.077000	6,505,005.00	6,505,005.00	**5,005.00**
					6,500,000.00		6,500,000.00	100.000	6,500,000.00			6,505,005.00	6,505,005.00	**5,005.00**
CUA 0.68 22 Apr 2026 FRN														
	LC105450	13 Apr 2021	0.680000	11,000,000.00	11,000,000.00	1.00000000	11,000,000.00	100.000	11,000,000.00	98.931000	98.931000	10,882,410.00	10,882,410.00	**(117,590.00)**
					11,000,000.00		11,000,000.00	100.000	11,000,000.00			10,882,410.00	10,882,410.00	**(117,590.00)**
CUA 1.58 01 Dec 2025 FRN														
	LC157929	25 Nov 2022	1.580000	3,500,000.00	3,500,000.00	1.00000000	3,500,000.00	100.000	3,500,000.00	100.716000	100.716000	3,525,060.00	3,525,060.00	**25,060.00**
					3,500,000.00		3,500,000.00	100.000	3,500,000.00			3,525,060.00	3,525,060.00	**25,060.00**

Security	Acquisition Deal	Acquisition Date	Acquisition Yield/ Interest Rate	Acquisition Face Value Original	Balance Face Value Original	Bond Factor Current	Balance Face Value Current	Acquisition Capital Price	Acquisition Capital Consideration	Current Capital Price	CCP For Discount Securities	Current Capital Consideration	Current Capital Consideration Adjusted	**Unrealised Capital Gain (Loss)**
CUA 1.6 23 Oct 2026 FRN														
	LC190930	17 Jan 2024	1.490000	2,500,000.00	2,500,000.00	1.00000000	2,500,000.00	100.279	2,506,975.00	100.738000	100.738000	2,518,450.00	2,518,450.00	**11,475.00**
					2,500,000.00		2,500,000.00	100.279	2,506,975.00			2,518,450.00	2,518,450.00	**11,475.00**
CUA 1.65 09 Feb 2027 FRN														
	LC179275	4 Sep 2023	1.300000	5,000,000.00	5,000,000.00	1.00000000	5,000,000.00	101.100	5,055,000.00	100.818000	100.818000	5,040,900.00	5,040,900.00	**(14,100.00)**
	LC181165	27 Sep 2023	1.280000	7,500,000.00	7,500,000.00	1.00000000	7,500,000.00	101.140	7,585,500.00	100.818000	100.818000	7,561,350.00	7,561,350.00	**(24,150.00)**
					12,500,000.00		12,500,000.00	101.124	12,640,500.00			12,602,250.00	12,602,250.00	**(38,250.00)**
HSBCSyd 1.5 27 Sep 2024 Fixed														
	LC100324	12 Jan 2021	0.640000	1,480,000.00	1,480,000.00	1.00000000	1,480,000.00	103.138	1,526,442.40	98.426000	98.426000	1,456,704.80	1,456,704.80	**(69,737.60)**
					1,480,000.00		1,480,000.00	103.138	1,526,442.40			1,456,704.80	1,456,704.80	**(69,737.60)**
JUDO 6.4 26 Sep 2025 Fixed														
	LC165395	28 Mar 2023	6.000000	5,000,000.00	5,000,000.00	1.00000000	5,000,000.00	100.911	5,045,550.00	99.732000	99.732000	4,986,600.00	4,986,600.00	**(58,950.00)**
	LC190925	17 Jan 2024	6.350000	3,630,000.00	3,630,000.00	1.00000000	3,630,000.00	100.067	3,632,432.10	99.732000	99.732000	3,620,271.60	3,620,271.60	**(12,160.50)**
					8,630,000.00		8,630,000.00	100.556	8,677,982.10			8,606,871.60	8,606,871.60	**(71,110.50)**
MACQ 0.48 09 Dec 2025 FRN														
	LC103204	2 Mar 2021	0.470000	10,000,000.00	10,000,000.00	1.00000000	10,000,000.00	100.046	10,004,600.00	99.823000	99.823000	9,982,300.00	9,982,300.00	**(22,300.00)**
	LX105597	15 Apr 2021	0.540000	10,000,000.00	10,000,000.00	1.00000000	10,000,000.00	99.733	9,973,300.00	99.823000	99.823000	9,982,300.00	9,982,300.00	**9,000.00**
					20,000,000.00		20,000,000.00	99.890	19,977,900.00			19,964,600.00	19,964,600.00	**(13,300.00)**
MACQ 0.8 07 Aug 2024 FRN														
	LC111488	25 Aug 2021	0.300000	3,000,000.00	3,000,000.00	1.00000000	3,000,000.00	101.459	3,043,770.00	100.164000	100.164000	3,004,920.00	3,004,920.00	**(38,850.00)**
	LC137826	30 Mar 2022	0.680000	1,000,000.00	1,000,000.00	1.00000000	1,000,000.00	100.275	1,002,750.00	100.164000	100.164000	1,001,640.00	1,001,640.00	**(1,110.00)**
					4,000,000.00		4,000,000.00	101.163	4,046,520.00			4,006,560.00	4,006,560.00	**(39,960.00)**
MACQ 1.7 12 Feb 2025 Fixed														
	LC100341	12 Jan 2021	0.610000	15,000,000.00	15,000,000.00	1.00000000	15,000,000.00	104.384	15,657,600.00	97.450000	97.450000	14,617,500.00	14,617,500.00	**(1,040,100.00)**
	LC100354	12 Jan 2021	0.610000	10,000,000.00	10,000,000.00	1.00000000	10,000,000.00	104.384	10,438,400.00	97.450000	97.450000	9,745,000.00	9,745,000.00	**(693,400.00)**
					25,000,000.00		25,000,000.00	104.384	26,096,000.00			24,362,500.00	24,362,500.00	**(1,733,500.00)**
MACQ 1.75 07 Aug 2024 Fixed														
	LC110793	11 Aug 2021	0.780000	10,000,000.00	10,000,000.00	1.00000000	10,000,000.00	102.855	10,285,500.00	98.985000	98.985000	9,898,500.00	9,898,500.00	**(387,000.00)**
	LC111489	25 Aug 2021	0.710000	2,000,000.00	2,000,000.00	1.00000000	2,000,000.00	103.026	2,060,520.00	98.985000	98.985000	1,979,700.00	1,979,700.00	**(80,820.00)**
					12,000,000.00		12,000,000.00	102.884	12,346,020.00			11,878,200.00	11,878,200.00	**(467,820.00)**
MYS 0.6 22 Nov 2024 FRN														
	LC114925	10 Nov 2021	0.600000	12,000,000.00	12,000,000.00	1.00000000	12,000,000.00	100.000	12,000,000.00	99.947000	99.947000	11,993,640.00	11,993,640.00	**(6,360.00)**
					12,000,000.00		12,000,000.00	100.000	12,000,000.00			11,993,640.00	11,993,640.00	**(6,360.00)**

Security	Acquisition Deal	Acquisition Date	Acquisition Yield/ Interest Rate	Acquisition Face Value Original	Balance Face Value Original	Bond Factor Current	Balance Face Value Current	Acquisition Capital Price	Acquisition Capital Consideration	Current Capital Price	CCP For Discount Securities	Current Capital Consideration	Current Capital Consideration Adjusted	**Unrealised Capital Gain (Loss)**
MYS 0.65 16 Jun 2025 FRN														
	LC107738	7 Jun 2021	0.650000	9,500,000.00	9,500,000.00	1.00000000	9,500,000.00	100.000	9,500,000.00	99.716000	99.716000	9,473,020.00	9,473,020.00	**(26,980.00)**
					9,500,000.00		9,500,000.00	100.000	9,500,000.00			9,473,020.00	9,473,020.00	**(26,980.00)**
MYS 1.3 13 Oct 2025 FRN														
	LC155063	6 Oct 2022	1.300000	10,000,000.00	10,000,000.00	1.00000000	10,000,000.00	100.000	10,000,000.00	100.500000	100.500000	10,050,000.00	10,050,000.00	**50,000.00**
					10,000,000.00		10,000,000.00	100.000	10,000,000.00			10,050,000.00	10,050,000.00	**50,000.00**
NAB 0.41 24 Aug 2026 FRN														
	LC112610	16 Sep 2021	0.380000	7,000,000.00	7,000,000.00	1.00000000	7,000,000.00	100.143	7,010,010.00	99.525000	99.525000	6,966,750.00	6,966,750.00	**(43,260.00)**
					7,000,000.00		7,000,000.00	100.143	7,010,010.00			6,966,750.00	6,966,750.00	**(43,260.00)**
NAB 0.92 19 Jun 2024 FRN														
	LC112880	24 Sep 2021	0.250000	5,000,000.00	5,000,000.00	1.00000000	5,000,000.00	101.811	5,090,550.00	100.153000	100.153000	5,007,650.00	5,007,650.00	**(82,900.00)**
					5,000,000.00		5,000,000.00	101.811	5,090,550.00			5,007,650.00	5,007,650.00	**(82,900.00)**
NPBS 0.63 04 Mar 2026 FRN														
	LC103141	2 Mar 2021	0.580000	1,000,000.00	1,000,000.00	1.00000000	1,000,000.00	100.242	1,002,420.00	98.905000	98.905000	989,050.00	989,050.00	**(13,370.00)**
					1,000,000.00		1,000,000.00	100.242	1,002,420.00			989,050.00	989,050.00	**(13,370.00)**
NPBS 1 10 Feb 2027 FRN														
	LC137829	30 Mar 2022	1.050000	3,100,000.00	3,100,000.00	1.00000000	3,100,000.00	99.781	3,093,211.00	98.945000	98.945000	3,067,295.00	3,067,295.00	**(25,916.00)**
	LX190938	17 Jan 2024	1.400300	10,000,000.00	10,000,000.00	1.00000000	10,000,000.00	98.879	9,887,900.00	98.945000	98.945000	9,894,500.00	9,894,500.00	**6,600.00**
					13,100,000.00		13,100,000.00	99.092	12,981,111.00			12,961,795.00	12,961,795.00	**(19,316.00)**
NSWTC 1.25 20 Mar 2025 Fixed														
	LC141827	14 Nov 2019	1.245300	2,000,000.00	2,000,000.00	1.00000000	2,000,000.00	100.025	2,000,500.00	97.265000	97.265000	1,945,300.00	1,945,300.00	**(55,200.00)**
					2,000,000.00		2,000,000.00	100.025	2,000,500.00			1,945,300.00	1,945,300.00	**(55,200.00)**
NSWTC 3 15 Nov 2028 Fixed														
	LC142120	15 Nov 2018	3.235000	15,000,000.00	15,000,000.00	1.00000000	15,000,000.00	98.006	14,700,900.00	96.056000	96.056000	14,408,400.00	14,408,400.00	**(292,500.00)**
					15,000,000.00		15,000,000.00	98.006	14,700,900.00			14,408,400.00	14,408,400.00	**(292,500.00)**
NTTC 1.4 15 Dec 2026 - Issued 26 August 2021 - CCC Fixed														
	LC111486	26 Aug 2021	1.400000	5,000,000.00	5,000,000.00	1.00000000	5,000,000.00	100.000	5,000,000.00	100.000000	100.000000	5,000,000.00	5,000,000.00	**0.00**
					5,000,000.00		5,000,000.00	100.000	5,000,000.00			5,000,000.00	5,000,000.00	**0.00**
PCU 1.55 17 Nov 2026 FRN														
	LX185851	14 Nov 2023	1.550000	5,000,000.00	5,000,000.00	1.00000000	5,000,000.00	100.000	5,000,000.00	100.365000	100.365000	5,018,250.00	5,018,250.00	**18,250.00**
					5,000,000.00		5,000,000.00	100.000	5,000,000.00			5,018,250.00	5,018,250.00	**18,250.00**
Qld Police 1.35 19 May 2025 FRN														
	LC143209	10 May 2022	1.350000	5,000,000.00	5,000,000.00	1.00000000	5,000,000.00	100.000	5,000,000.00	100.130000	100.130000	5,006,500.00	5,006,500.00	**6,500.00**
					5,000,000.00		5,000,000.00	100.000	5,000,000.00			5,006,500.00	5,006,500.00	**6,500.00**

Security	Acquisition Deal	Acquisition Date	Acquisition Yield/ Interest Rate	Acquisition Face Value Original	Balance Face Value Original	Bond Factor Current	Balance Face Value Current	Acquisition Capital Price	Acquisition Capital Consideration	Current Capital Price	CCP For Discount Securities	Current Capital Consideration	Current Capital Consideration Adjusted	**Unrealised Capital Gain (Loss)**
Qld Police 1.65 01 Dec 2026 FRN														
	LC187340	27 Nov 2023	1.650000	10,000,000.00	10,000,000.00	1.00000000	10,000,000.00	100.000	10,000,000.00	100.643000	100.643000	10,064,300.00	10,064,300.00	**64,300.00**
					10,000,000.00		10,000,000.00	100.000	10,000,000.00			10,064,300.00	10,064,300.00	**64,300.00**
Qld Police 1.65 18 Sep 2026 FRN														
	LC180295	12 Sep 2023	1.650000	9,500,000.00	9,500,000.00	1.00000000	9,500,000.00	100.000	9,500,000.00	100.691000	100.691000	9,565,645.00	9,565,645.00	**65,645.00**
					9,500,000.00		9,500,000.00	100.000	9,500,000.00			9,565,645.00	9,565,645.00	**65,645.00**
Qld Police 1.7 16 Jun 2026 FRN														
	LC169762	8 Jun 2023	1.700000	4,500,000.00	4,500,000.00	1.00000000	4,500,000.00	100.000	4,500,000.00	100.769000	100.769000	4,534,605.00	4,534,605.00	**34,605.00**
					4,500,000.00		4,500,000.00	100.000	4,500,000.00			4,534,605.00	4,534,605.00	**34,605.00**
Qld Police 1.75 06 Dec 2025 FRN														
	LC157906	23 Nov 2022	1.750000	10,000,000.00	10,000,000.00	1.00000000	10,000,000.00	100.000	10,000,000.00	100.752000	100.752000	10,075,200.00	10,075,200.00	**75,200.00**
					10,000,000.00		10,000,000.00	100.000	10,000,000.00			10,075,200.00	10,075,200.00	**75,200.00**
RACB 1.5 24 Feb 2026 FRN														
	LC169099	31 May 2023	1.500000	3,750,000.00	3,750,000.00	1.00000000	3,750,000.00	99.988	3,749,550.00	100.174000	100.174000	3,756,525.00	3,756,525.00	**6,975.00**
	LC188379	7 Dec 2023	1.480000	2,750,000.00	2,750,000.00	1.00000000	2,750,000.00	100.048	2,751,320.00	100.174000	100.174000	2,754,785.00	2,754,785.00	**3,465.00**
					6,500,000.00		6,500,000.00	100.013	6,500,870.00			6,511,310.00	6,511,310.00	**10,440.00**
SunBank 0.45 24 Feb 2026 FRN														
	LC112608	16 Sep 2021	0.410000	5,000,000.00	5,000,000.00	1.00000000	5,000,000.00	100.173	5,008,650.00	99.656000	99.656000	4,982,800.00	4,982,800.00	**(25,850.00)**
					5,000,000.00		5,000,000.00	100.173	5,008,650.00			4,982,800.00	4,982,800.00	**(25,850.00)**
SunBank 0.48 15 Sep 2026 FRN														
	LC112472	9 Sep 2021	0.406300	2,900,000.00	2,900,000.00	1.00000000	2,900,000.00	100.340	2,909,860.00	99.422000	99.422000	2,883,238.00	2,883,238.00	**(26,622.00)**
	LC113804	13 Oct 2021	0.510000	10,000,000.00	10,000,000.00	1.00000000	10,000,000.00	99.858	9,985,800.00	99.422000	99.422000	9,942,200.00	9,942,200.00	**(43,600.00)**
					12,900,000.00		12,900,000.00	99.966	12,895,660.00			12,825,438.00	12,825,438.00	**(70,222.00)**
SunBank 0.78 25 Jan 2027 FRN														
	LC117127	18 Jan 2022	0.780000	13,000,000.00	13,000,000.00	1.00000000	13,000,000.00	100.000	13,000,000.00	100.000000	100.000000	13,000,000.00	13,000,000.00	**0.00**
					13,000,000.00		13,000,000.00	100.000	13,000,000.00			13,000,000.00	13,000,000.00	**0.00**
SunBank 1.85 30 Jul 2024 Fixed														
	LC111490	25 Aug 2021	0.700000	1,000,000.00	1,000,000.00	1.00000000	1,000,000.00	103.322	1,033,220.00	99.068000	99.068000	990,680.00	990,680.00	**(42,540.00)**
	LC112603	16 Sep 2021	0.660000	1,500,000.00	1,500,000.00	1.00000000	1,500,000.00	103.365	1,550,475.00	99.068000	99.068000	1,486,020.00	1,486,020.00	**(64,455.00)**
					2,500,000.00		2,500,000.00	103.348	2,583,695.00			2,476,700.00	2,476,700.00	**(106,995.00)**
TMB 0.68 16 Jun 2026 FRN														
	LC137828	30 Mar 2022	1.079900	1,700,000.00	1,700,000.00	1.00000000	1,700,000.00	98.445	1,673,565.00	98.818000	98.818000	1,679,906.00	1,679,906.00	**6,341.00**
					1,700,000.00		1,700,000.00	98.445	1,673,565.00			1,679,906.00	1,679,906.00	**6,341.00**

Security	Acquisition Deal	Acquisition Date	Acquisition Yield/ Interest Rate	Acquisition Face Value Original	Balance Face Value Original	Bond Factor Current	Balance Face Value Current	Acquisition Capital Price	Acquisition Capital Consideration	Current Capital Price	CCP For Discount Securities	Current Capital Consideration	Current Capital Consideration Adjusted	**Unrealised Capital Gain (Loss)**
TMB 1.5 28 Oct 2025 FRN														
	LC181158	27 Sep 2023	1.170000	2,000,000.00	2,000,000.00	1.00000000	2,000,000.00	100.661	2,013,220.00	100.618000	100.618000	2,012,360.00	2,012,360.00	**(860.00)**
					2,000,000.00		2,000,000.00	100.661	2,013,220.00			2,012,360.00	2,012,360.00	**(860.00)**
UBS Aust 0.5 26 Feb 2026 FRN														
	LC103200	2 Mar 2021	0.480000	6,800,000.00	6,800,000.00	1.00000000	6,800,000.00	100.098	6,806,664.00	99.402000	99.402000	6,759,336.00	6,759,336.00	**(47,328.00)**
	LC103543	9 Mar 2021	0.480000	12,000,000.00	12,000,000.00	1.00000000	12,000,000.00	100.096	12,011,520.00	99.402000	99.402000	11,928,240.00	11,928,240.00	**(83,280.00)**
					18,800,000.00		18,800,000.00	100.097	18,818,184.00			18,687,576.00	18,687,576.00	**(130,608.00)**
UBS Aust 0.87 30 Jul 2025 FRN														
	LC100676	22 Jan 2021	0.403100	5,000,000.00	5,000,000.00	1.00000000	5,000,000.00	102.081	5,104,050.00	99.822000	99.822000	4,991,100.00	4,991,100.00	**(112,950.00)**
	LC104737	1 Apr 2021	0.510000	5,000,000.00	5,000,000.00	1.00000000	5,000,000.00	101.511	5,075,550.00	99.822000	99.822000	4,991,100.00	4,991,100.00	**(84,450.00)**
					10,000,000.00		10,000,000.00	101.796	10,179,600.00			9,982,200.00	9,982,200.00	**(197,400.00)**
UBS Aust 1.2 30 Jul 2025 Fixed														
	LC100329	12 Jan 2021	0.650000	4,000,000.00	4,000,000.00	1.00000000	4,000,000.00	102.458	4,098,320.00	95.172000	95.172000	3,806,880.00	3,806,880.00	**(291,440.00)**
					4,000,000.00		4,000,000.00	102.458	4,098,320.00			3,806,880.00	3,806,880.00	**(291,440.00)**
UBS Aust 1.55 12 May 2028 FRN														
	LC169097	31 May 2023	1.400000	2,600,000.00	2,600,000.00	1.00000000	2,600,000.00	100.635	2,616,510.00	101.701000	101.701000	2,644,226.00	2,644,226.00	**27,716.00**
	LC179277	4 Sep 2023	1.200000	5,000,000.00	5,000,000.00	1.00000000	5,000,000.00	101.459	5,072,950.00	101.701000	101.701000	5,085,050.00	5,085,050.00	**12,100.00**
					7,600,000.00		7,600,000.00	101.177	7,689,460.00			7,729,276.00	7,729,276.00	**39,816.00**
Westpac 0.7 25 Jan 2027 FRN														
	LC117174	19 Jan 2022	0.700000	16,000,000.00	16,000,000.00	1.00000000	16,000,000.00	100.000	16,000,000.00	100.027000	100.027000	16,004,320.00	16,004,320.00	**4,320.00**
					16,000,000.00		16,000,000.00	100.000	16,000,000.00			16,004,320.00	16,004,320.00	**4,320.00**
Westpac 2.25 16 Aug 2024 Fixed														
	LC112606	16 Sep 2021	0.580000	2,800,000.00	2,800,000.00	1.00000000	2,800,000.00	104.803	2,934,484.00	99.105000	99.105000	2,774,940.00	2,774,940.00	**(159,544.00)**
					2,800,000.00		2,800,000.00	104.803	2,934,484.00			2,774,940.00	2,774,940.00	**(159,544.00)**
														(4,901,936.30)

Note: The summary values for Acquisition Capital Price are the weighted average acquisition capital prices based upon the Balance Face Value Current for each security.

11b. Unrealised Unit/Share Capital Gains (Losses) As At 31 March 2024

No unrealised gains or losses (for unit trusts and shares) to report for entered period.

12. Associated Cash Statement for Settlement Period 1 March 2024 to 31 March 2024 inclusive

No associated cash transactions to report for entered period.

13. Tax Summary For 1 March 2024 to 31 March 2024

Interest Income	**3,038,098.72**
Realised Gains (Losses) - Fixed Interest Dealing	**0.00**
Realised Gains (Losses) - Principal Repayments	**0.00**
Total	**3,038,098.72**

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Report Code: TEPACK020EXT-01.87
Report Description: Investment Report Pack
Parameters:
Trading Entity: Central Coast Council
Trading Book: Central Coast Council
Settlement Date Base
History Start Date: 1 Jan 2000
Income Expense Status: Authorised
FI Deal Status: Contract
Exclude Cash
Exclude Unallocated Cash
Exclude Negative Unit Holdings

Structured Community Telephone Poll – Draft Airport Masterplan – March 2024

Prepared by: Micromex Research
Date: April 10, 2024

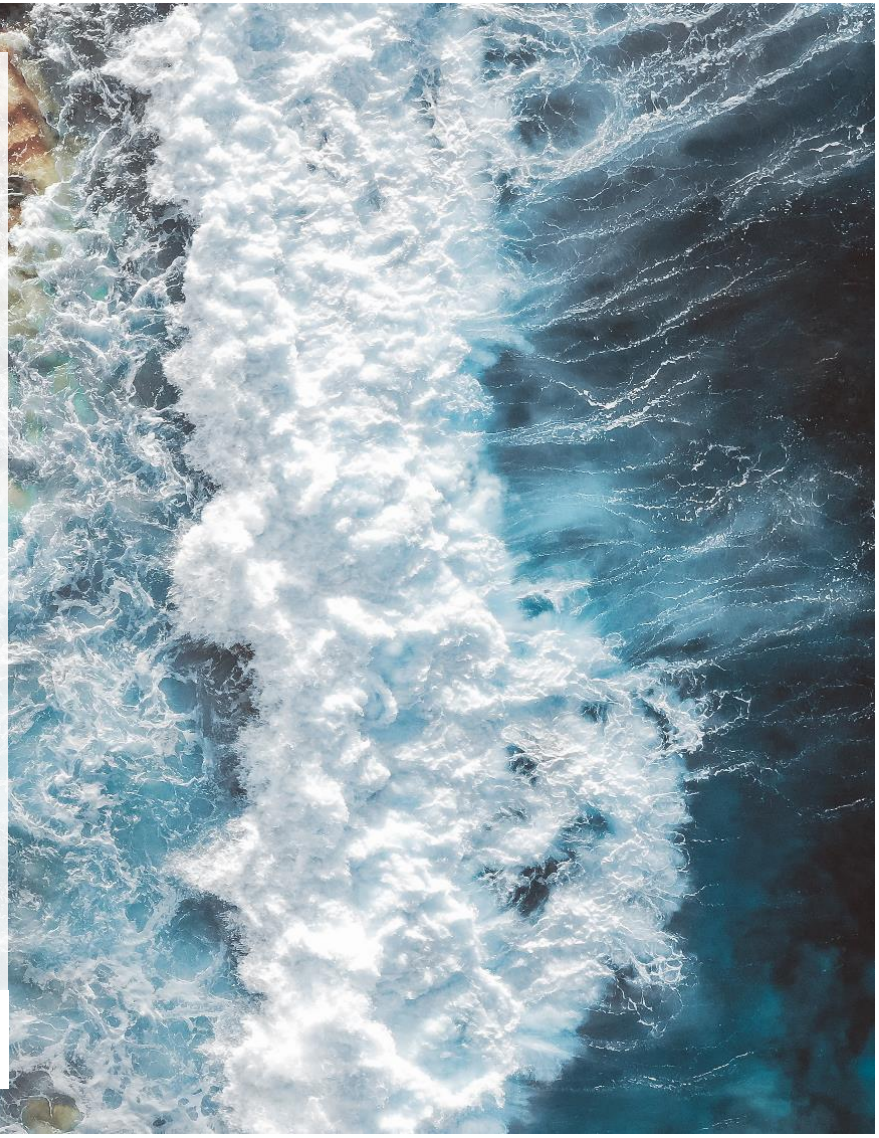
micromex research

Central Coast Council

Report Outline

micromex research

Central Coast Council



Executive Summary

Central Coast Council placed a draft Airport Masterplan on public exhibition, which ended on February 13, 2024.

Council commissioned Micromex Research to conduct a systematic telephone survey (using a stratified random sample design) with residents living in the Central Coast local government area (LGA) to assess awareness of the public exhibition, reactions to the proposed development, and broader measures of community attitudes towards the airport in general and the role of the Masterplan.

Telephone interviewing was conducted between the 14th and 20th March 2024 with 294 Central Coast residents (landline N=72 and mobile N=222).

Methodology and Sample

Sample selection and error

A total of 294 resident telephone interviews were completed. Respondents were selected by means of a computer based random selection process using commercially available lists (Sample Pages and Australian Marketing Lists):

- 32 suburbs were flagged as potentially 'Affected suburbs' (see list overleaf) – that is, they are in the north/north east of the LGA and are therefore closer to Central Coast Airport (and could arguably benefit from more employment/business opportunities at the site) and/or closer to some of the more common light aircraft flight paths along the coast and over Tuggerah Lakes.
- Based on ProfileID, we estimated these 32 suburbs accounted for approximately 42% of the LGA population. We marginally increased our sample in this area to represent 47% of the 294 interviews, in order to provide more analytical power in the most impacted region.

A sample size of 294 residents provides a maximum sampling error of plus or minus 5.7% at 95% confidence. This means that if the survey was replicated with a new universe of N=294 residents, 19 times out of 20 we would expect to see the same results, i.e. +/- 5.7%. For example, an answer such as 'yes' (50%) to a question could vary from 44% to 56%.

Interviewing

Interviewing was conducted in accordance with The Research Society Code of Professional Behaviour.

Data analysis

The data within this report was analysed using Q Professional.

Reporting conventions

- ***Tests of significance***: Within the report, blue and red font colours are used to identify statistically significant differences between groups, i.e. gender, age, etc.

  Significance testing is a statistical test performed to evaluate the difference between two measurements. To identify the statistically significant differences between the groups of means, 'One-Way Anova tests' and 'Independent Samples T-tests' were used. 'Z Tests' were also used to determine statistically significant differences between column percentages.

- ***Rounding of results:*** All percentages are calculated to the nearest whole number and therefore the total may not exactly equal 100%.

Definitions

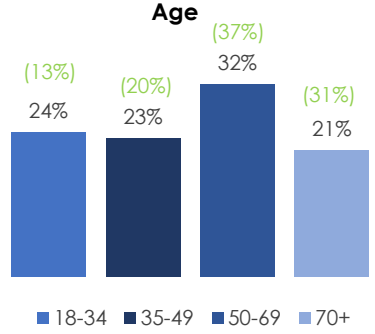
- ***'Base'***: The term 'Base' (which appears at the bottom left of most slides with charts – or at the bottom of each column of a data table) is used to represent the weighted sample size (number of respondents) within particular cohorts who answered a question.
- **'Top 2 (T2) Box':** refers to the aggregate percentage (%) score of the top two scores for importance or agreement. (i.e. important/ very important and agree/ strongly agree)
- **'Top 3 (T3) Box'**: refers to the aggregate percentage (%) score of the top three scores for support. (i.e. somewhat supportive, supportive or very supportive)

Sample Profile

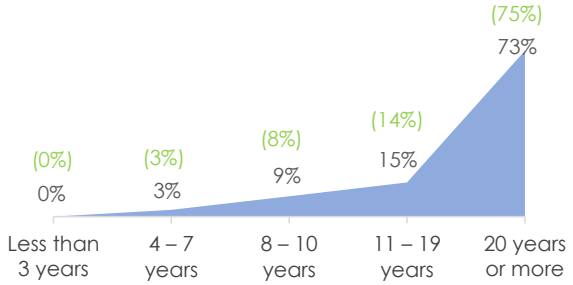
The sample was weighted by age and gender to reflect the 2021 ABS Census data for Central Coast Council. Results in **green** brackets represent 'unweighted' results to show original sample distribution, whereas percentages in black are based on the weighted sample. For instance, **51%** of our 294 survey respondents were female – for reporting purposes this has been weighted to **52%** to reflect the known population incidence of females.

Gender

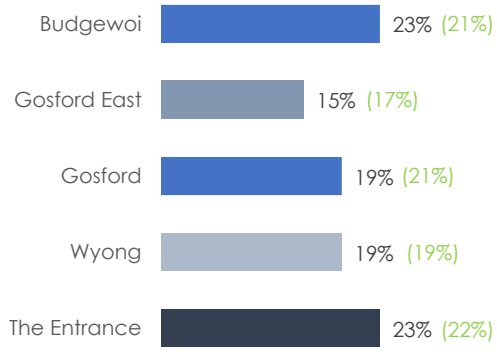
Age



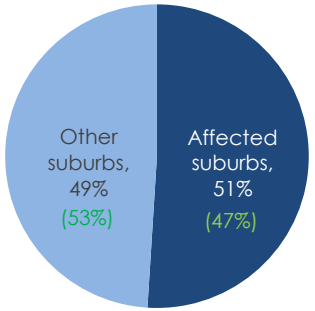
Time lived in the area



Ward



Suburb split*



List of 'affected suburbs'

Bateau Bay	Hamlyn Terrace	Toowoon Bay
Berkeley Vale	Kanwal	Toukley
Blue Bay	Killarney Vale	Tuggerah
Blue Haven	Lake Haven	Tuggerawong
Budgewoi	Long Jetty	Tumbi Umbi
Canton Beach	Mardi	Wadalba
Chittaway Bay	Norah Head	Warnervale
Chittaway Point	Noraville	Watanobbi
Glenning Valley	San Remo	Woongarrah
Gorokan	Tacoma	Wyong
Halekulani	The Entrance	

Base: N = 294

*See Appendix 1 for detailed list of suburbs

Summary Findings

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Central Coast Council

Summary Findings – Commentary

Key themes to emerge from the research are:

Noise:

31% of residents indicated they had experienced airport noise at their home. However, when asked to comment on their experiences, the majority of those affected did not appear overly concerned, stating 'Minimal impact/doesn't really bother me' and 'Mainly just helicopters/emergency situations'.

Support for Draft Masterplan:

83% of residents indicated they are at least somewhat supportive of the Plan:

- Support is somewhat higher amongst those who were already aware of the Masterplan than it is for those who were not previously aware, suggesting support levels may increase if more within the community become aware of the Masterplan

Themes that Resonate with the Community:

Based on a range of direct and indirect questions, main airport-related themes that appear to resonate most with residents are centred on sustainable growth – a balance of employment/business opportunities whilst managing the natural environment (and these themes emerged before the Masterplan summary was mentioned).

- Note that tourism opportunities (as opposed to business opportunities more broadly) are not seen as being as important by the community.

Those Living in the Affected Area:

Support for the Masterplan is marginally (but not significantly) higher for those living in the 'affected suburbs' compared to other residents – and those in the 'affected suburbs' have slightly higher agreement with the statement 'access to local aviation services is important for local trade and tourism to be able to compete with other major centres'.

Summary Findings – Key Results

What's important?

Sustainable growth – local employment/business opportunities and managing the natural environment.

Awareness

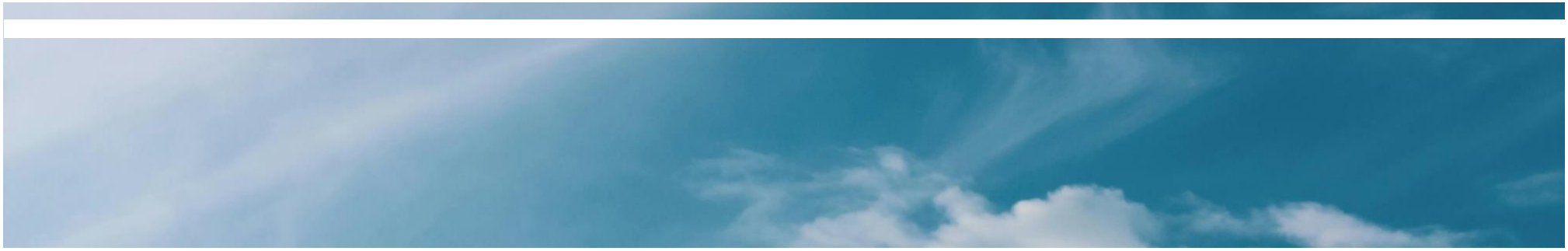
72% of residents are aware that Council owns and operates an airport at Warnervale.
1 in 3 (32%) are aware of Council's Draft Masterplan to develop the airport.

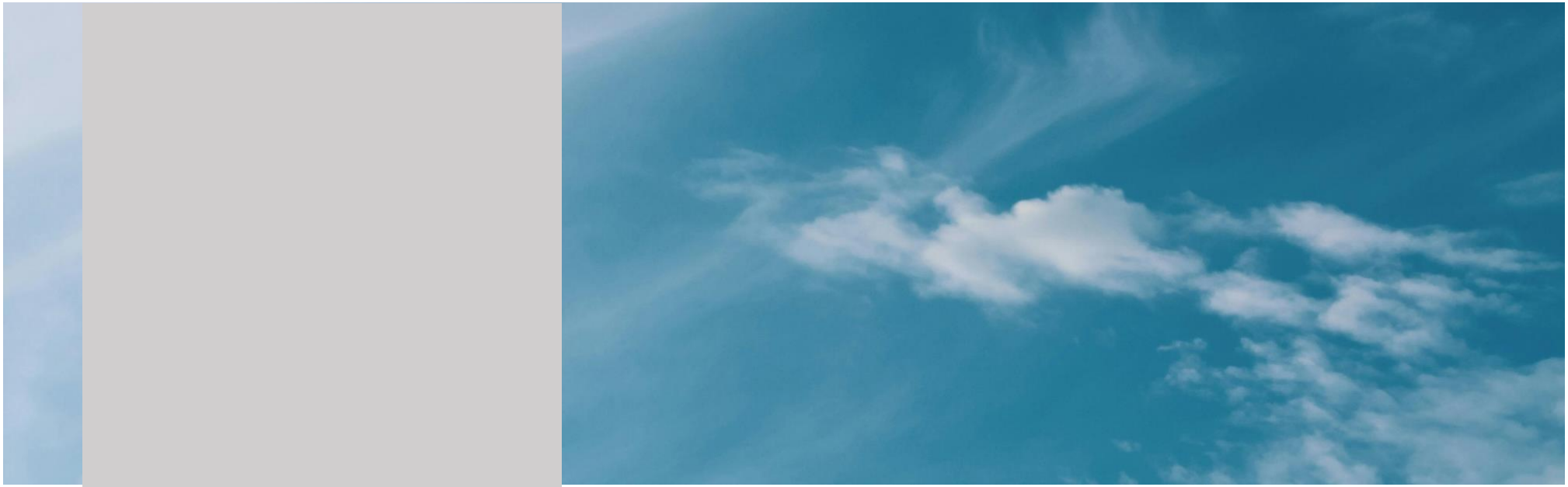
Support for the Plan

83% of residents are at least somewhat supportive of the Plan.
Main reasons for support included economy/business/ employment opportunities and convenient location.

Concerns

Concerns were raised in regards to not knowing enough about the Plan, environmental protection and noise pollution.





Section One

Community Priorities

This section explores residents' level of importance for a range of different priority areas for the local area – which allows us to identify the relative importance of airport-related issues (such as employment opportunities, business opportunities, etc.) versus other issues (such as supporting vulnerable community members, youth services, etc.).

Note that these priorities were rated prior to any discussion about the Draft Masterplan, so they have not been influenced by the airport questions.

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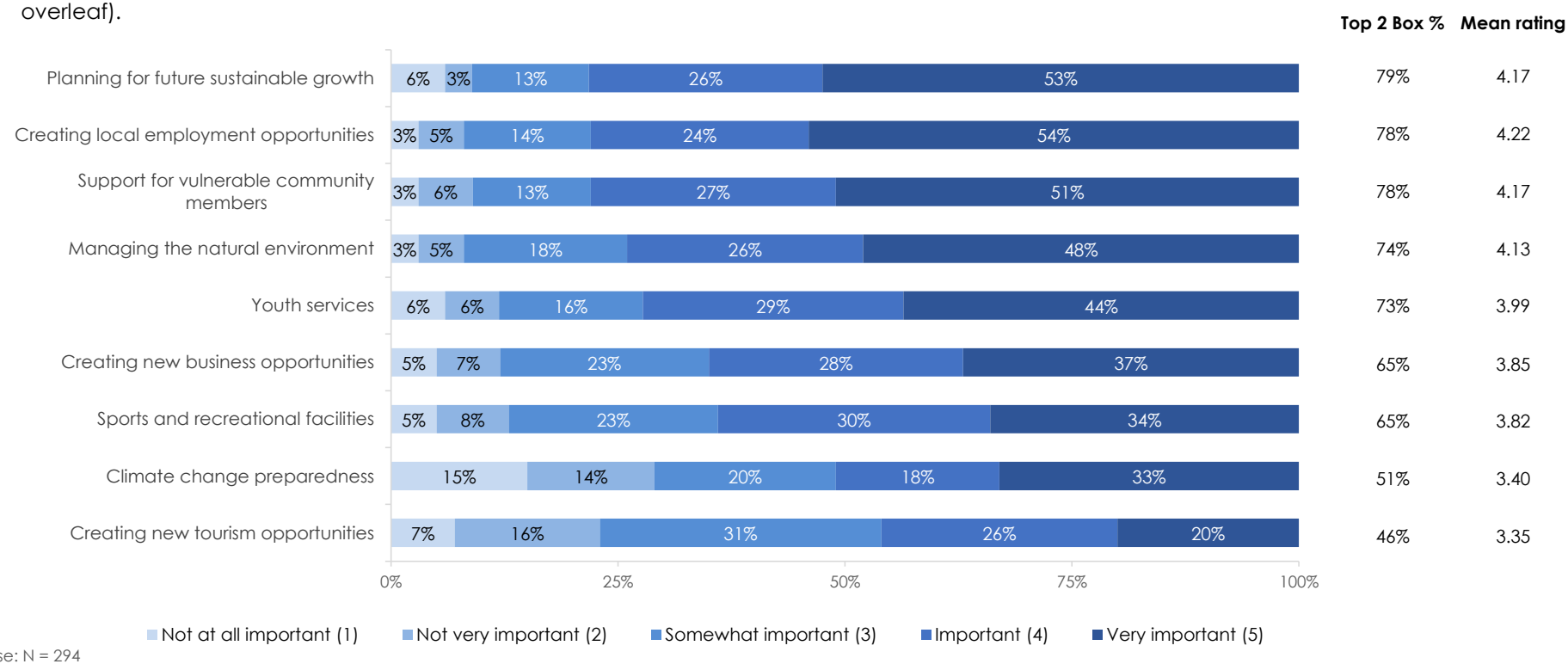
Central Coast Council

Community Priority Areas

Community priorities that are potentially airport-related and generated the highest Importance scores include: 'Planning for future sustainable growth', 'Creating local employment opportunities' and 'Managing the natural environment'. 'Creating new business opportunities' has a substantial level of support as a priority, but 'Creating new tourism opportunities' does not. This should be taken into account when communicating the potential benefits of the airport upgrade.

Although not statistically significant, those in the 'affected suburbs' provided marginally lower Importance scores than did those living elsewhere (see overleaf).



Base: N = 294

Q1. *In order to develop a delivery program for the local community, Council is looking to better understand what the community perceives to be the priority areas for Council. I will read out a list of different topics, can you please rate these on a scale of 1-5, where 1 is not at all important and 5 is very important.* Scale: 1 = Not at all important, 5 = Very important 10

Community Priority Areas

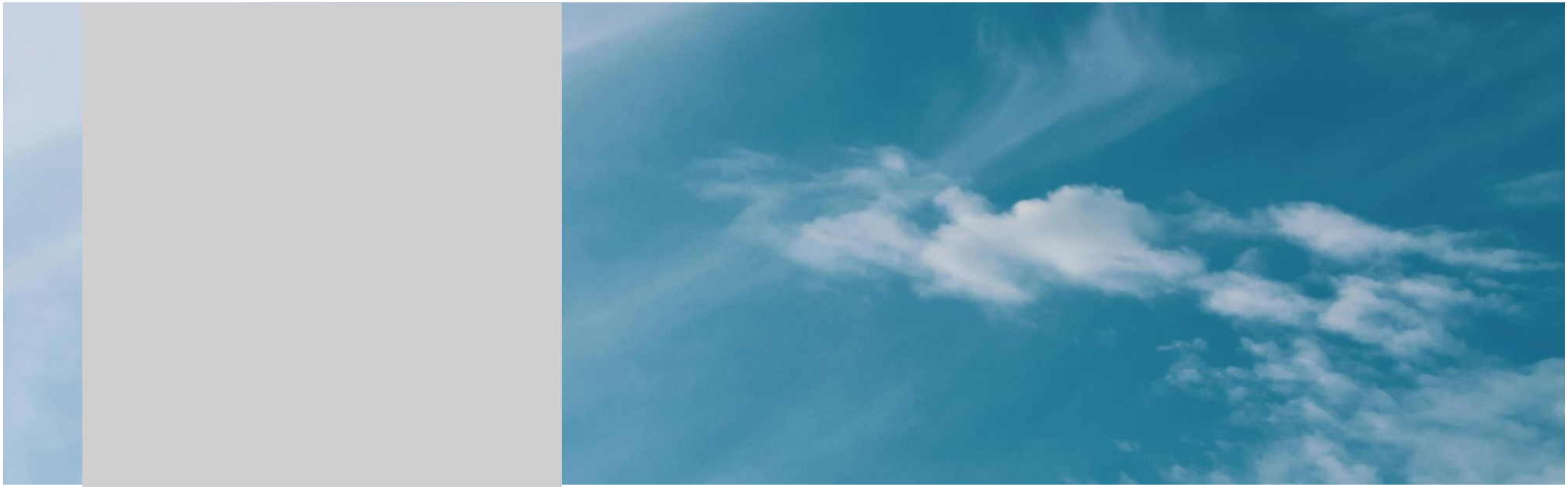
The tables below summarise the priority ratings from the previous slide, by demographics.

Top 2 Box % (Important/ Very important)	Overall	Gender		Age				Affected suburbs	
		Male	Female	18-34	35-49	50-69	70+	Affected suburbs	Other suburbs
Planning for future sustainable growth	79%	71%	85%	78%	85%	77%	73%	75%	82%
Creating local employment opportunities	78%	69%	86%	79%	78%	80%	75%	76%	80%
Support for vulnerable community members	78%	64%	90%	79%	82%	75%	77%	77%	78%
Managing the natural environment	74%	69%	79%	84%	68%	74%	70%	73%	76%
Youth services	73%	59%	85%	73%	73%	75%	68%	71%	74%
Creating new business opportunities	65%	58%	72%	62%	67%	69%	61%	61%	69%
Sports and recreational facilities	65%	57%	72%	70%	68%	59%	64%	67%	63%
Climate change preparedness	51%	37%	64%	60%	53%	46%	46%	45%	57%
Creating new tourism opportunities	46%	41%	50%	43%	44%	47%	47%	43%	48%
Base	294	140	154	70	69	95	61	150	144

Mean rating	Overall	Gender		Age				Affected suburbs	
		Male	Female	18-34	35-49	50-69	70+	Affected suburbs	Other suburbs
Planning for future sustainable growth	4.17	3.94	4.37	4.33	4.23	4.11	3.99	4.08	4.25
Creating local employment opportunities	4.22	3.98	4.44	4.12	4.28	4.26	4.20	4.17	4.26
Support for vulnerable community members	4.17	3.81	4.50	4.18	4.28	4.10	4.15	4.13	4.22
Managing the natural environment	4.13	3.95	4.29	4.33	4.06	4.09	4.03	4.07	4.18
Youth services	3.99	3.65	4.31	3.92	4.00	4.04	3.99	3.91	4.08
Creating new business opportunities	3.85	3.68	4.00	3.80	3.82	3.95	3.78	3.77	3.93
Sports and recreational facilities	3.82	3.65	3.96	3.90	3.97	3.67	3.77	3.80	3.84
Climate change preparedness	3.40	2.93	3.82	3.72	3.43	3.26	3.20	3.24	3.56
Creating new tourism opportunities	3.35	3.21	3.48	3.24	3.31	3.37	3.50	3.29	3.41
Base	294	140	154	70	69	95	61	150	144

Q1. *In order to develop a delivery program for the local community, Council is looking to better understand what the community perceives to be the priority areas for Council. I will read out a list of different topics, can you please rate these on a scale of 1-5, where 1 is not at all important and 5 is very important.*

Significantly higher/lower by group
Scale: 1 = Not at all important, 5 = Very important 11



Section Two

Awareness

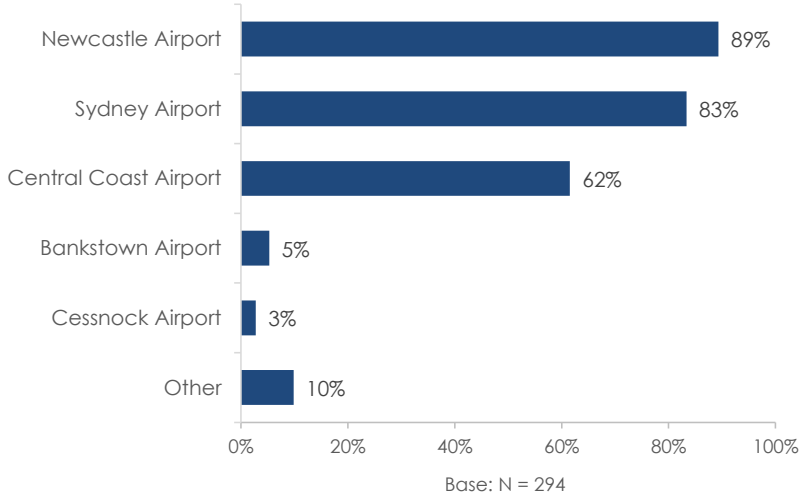
This section explores resident awareness of airports that are relatively close (including Central Coast Airport), their experience with aircraft noise at their home, and awareness of the Draft Masterplan.

Awareness of Airports Close By – Unprompted

Based on an unprompted question, Central Coast residents are most aware of the Newcastle (89% aware) and Sydney Airports (83%), with 62% aware of the Central Coast Airport**.

Those currently living in the 'affected suburbs' are significantly more aware than other residents of Central Coast Airport.

Males are significantly more aware than are females of Central Coast, Bankstown and Cessnock Airports.



Base: N = 294

	Overall	Gender		Age				Affected suburbs	
		Male	Female	18-34	35-49	50-69	70+	Affected suburbs	Other suburbs
Newcastle Airport	89%	89%	89%	94%	92%	87%	85%	91%	87%
Sydney Airport	83%	85%	82%	92%	91%	78%	73%	87%	80%
Central Coast Airport	62%	73%	51%	62%	66%	64%	52%	70%	53%
Bankstown Airport	5%	10%	1%	3%	7%	6%	5%	7%	4%
Cessnock Airport	3%	5%	0%	3%	5%	2%	2%	4%	2%
Other	10%	13%	7%	5%	12%	11%	11%	12%	8%
Base	294	140	154	70	69	95	61	150	144

Other specified	Count
Lake Macquarie Airport	16
Western Sydney Airport	6
Somersby Airport	5
RAAF Base Richmond	2
Camden Airport	1
Heli pad at Erina	1
Mangrove Airport	1
Telecom Airport	1
Not aware of any	3

**Note: a few respondents referred to 'Warnervale Airport', which we have included in the 'Central Coast Airport' result above.

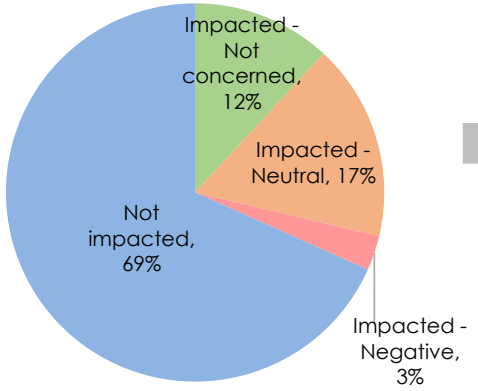
Q2a. Which airports are you aware of that operate either on the Central Coast, or within 2 hours' drive?

13

Exposure to Aircraft Noise

Almost 1 in 3 residents stated they have experienced or been exposed to aircraft noise – this is marginally, but not significantly, higher for those living in the 'affected suburbs' (see highlighted blue cells in table below), who as noted on the previous slide were significantly more aware of the airport unprompted.

However, the majority of those who are impacted do not appear to be particularly affected by the noise. For instance, only 2% of the total sample mentioned 'Can be annoying/a lot of noise/it is increasing' – and only <1% mentioned 'Not to fly planes over so early in the morning'. In contrast, 12% mentioned 'Minimal impact/doesn't really bother me'.



Base: N = 294

	Overall	Gender		Age				Affected suburbs	
		Male	Female	18-34	35-49	50-69	70+	Affected suburbs	Other suburbs
Yes %	31%	31%	32%	30%	35%	32%	28%	34%	29%
Base	294	140	154	70	69	95	61	150	144

Comments on experience with noise	**Total sample** N = 294
Impacted – Not concerned	Net: 12%
Minimal impact/doesn't really bother me	12%
I love it	<1%
Impacted - Neutral	Net: 17%
Mainly just helicopters/emergency situations	8%
Hear certain aircrafts/on certain days	1%
No comment/don't know	8%
Impacted - Negative	Net: 3%
Can be annoying/a lot of noise/it is increasing	2%
Not to fly planes over so early in the morning	<1%

Q3a. Have you experienced, or been exposed to, aircraft noise at your home?
Q3b. (If yes) Do you have any comments to make regarding the aircraft noise experienced?

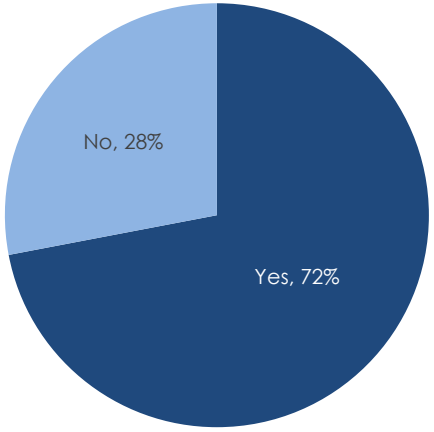
Awareness of the Central Coast Airport – Prompted

Although awareness of Central Coast Airport on the earlier unprompted question (Q2a) was at 62%, based on a prompted awareness question awareness has now increased to 72% - importantly though, this is prompted awareness that Council owns and operates the airport at Warnervale (so it is more than just awareness of the airport's existence). Based on the three highlighted cells in the table at right, 87% of residents are aware of the airport unprompted and/or are aware based on a prompted question that Council owns and operates an airport at Warnervale.

As with the earlier unprompted question, prompted awareness is significantly higher amongst those who live in the 'affected suburbs'.

Q2a unprompted awareness by Q4 prompted awareness

Aware of Central Coast Airport (Q2a) unprompted ↓	**Aware Council owns and operates an airport at Warnervale (Q4) →** Yes, aware	Not aware	Net
Yes, aware	46%	15%	62%
Not aware	25%	13%	38%
Net	72%	28%	100%
Base	211	83	294



Base: N = 294

	Overall	Gender		Age				Affected suburbs	
		Male	Female	18-34	35-49	50-69	70+	Affected suburbs	Other suburbs
Yes %	72%	76%	68%	62%	75%	80%	66%	83%	61%
Base	294	140	154	70	69	95	61	150	144

Q4. *Did you know that Central Coast Council owns and operates an airport at Warnervale to the north of Tuggerah Lakes?*

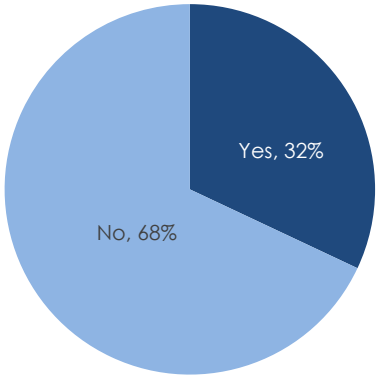
Significantly higher/lower by group

Awareness of Draft Airport Masterplan

Approximately 1 in 3 residents are aware that Central Coast Council has recently completed a Draft Masterplan to guide future development of Central Coast Airport. Awareness of the Draft Masterplan did not differ significantly between respondents in 'affected suburbs' and respondents in other areas. Respondents living in 'affected suburbs' were slightly more aware.

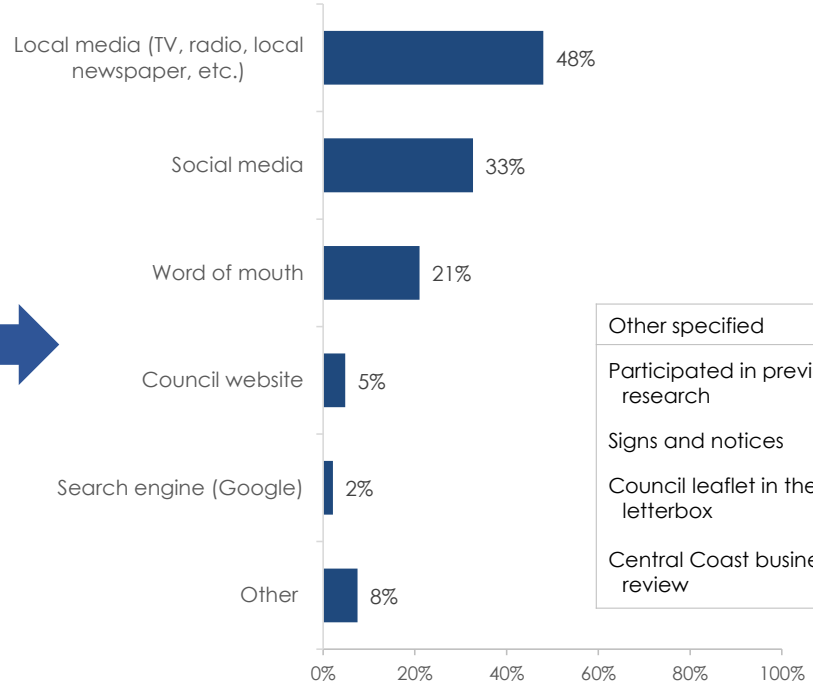
Local media and social media are the most common ways in which residents became aware of the Plan.

Awareness of the Plan



Base: N = 294

Method of Awareness



Other specified	Count
Participated in previous research	3
Signs and notices	3
Council leaflet in the letterbox	1
Central Coast business review	1

Base: N = 95

Q5a. Are you aware that Central Coast Council has recently completed a draft masterplan to guide future development of the airport?
Q5b. How did you become aware of this?

Awareness of Draft Airport Masterplan

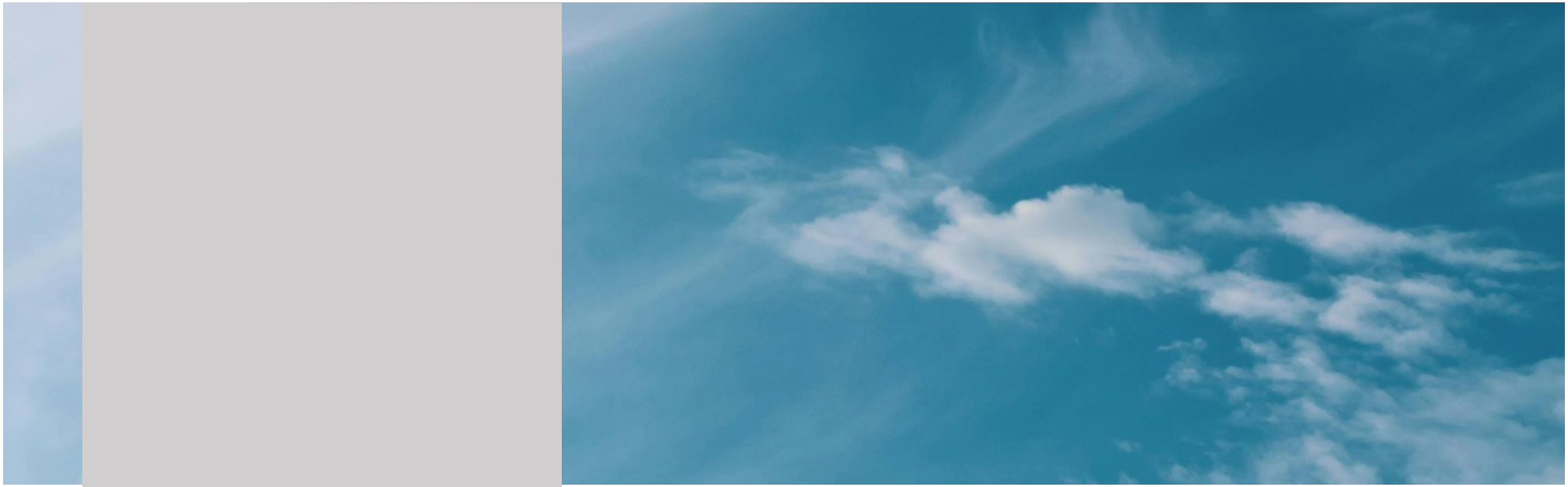
The tables below summarise the awareness results from the previous slide, by demographics.

Awareness (Q5a)	Overall	Gender		Age				Affected suburbs	
		Male	Female	18-34	35-49	50-69	70+	Affected suburbs	Other suburbs
Yes %	32%	38%	27%	25%	32%	38%	32%	38%	27%
Base	294	140	154	70	69	95	61	150	144

Method of awareness (Q5b)	Overall	Gender		Age				Affected suburbs	
		Male	Female	18-34	35-49	50-69	70+	Affected suburbs	Other suburbs
Local media (TV, radio, local newspaper, etc.)	48%	46%	50%	22%	27%	53%	86%	41%	58%
Social media	33%	36%	29%	55%	47%	31%	0%	40%	22%
Word of mouth	21%	22%	20%	0%	37%	22%	21%	21%	21%
Council website	5%	7%	2%	0%	5%	10%	0%	5%	5%
Search engine (Google)	2%	2%	2%	0%	5%	3%	0%	4%	0%
Other	8%	4%	11%	23%	0%	7%	3%	10%	5%
Base	95	53	42	17	22	37	19	56	39

Q5a. Are you aware that Central Coast Council has recently completed a draft masterplan to guide future development of the airport?
Q5b. How did you become aware of this?

Significantly higher/lower by group



Section Three

The Draft Masterplan

This section explores the level of support for the Draft Masterplan and agreement with development considerations.

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About the Draft Masterplan

Respondents were read the following explanation of the Masterplan:

"The Masterplan for the Central Coast Airport details the development of land surrounding the Airport.

The focus of the development will be on general aviation uses like hangars, maintenance, charters, training, sales, intermodal logistics and research.

Over the next 10 years. It is proposed that the runway and taxiways will also be upgraded to a higher standard. This will allow the airport to accommodate a wider variety of aircraft up to a maximum take-off weight of 10 tonnes.

Land surrounding the airport will be environmentally protected, and a biodiversity stewardship site will be incorporated onto the Porters Creek Wetland."

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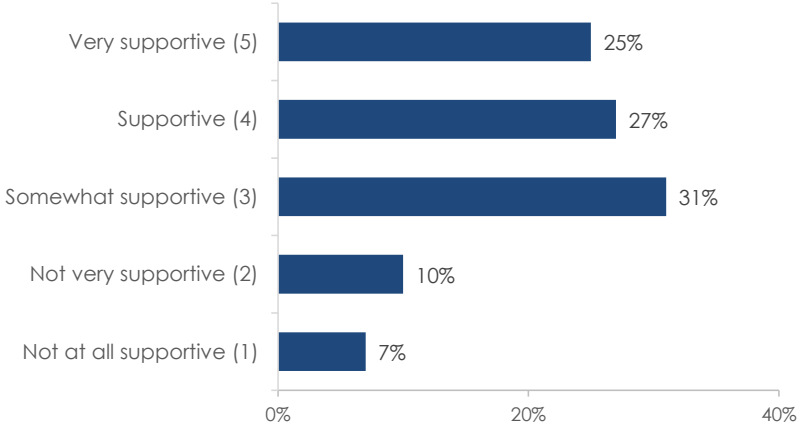
Support for the Draft Masterplan

Residents were asked to rate their level of support for the Draft Masterplan:

- 83% are at least somewhat supportive, with 1 in 4 committing to the top box 'very supportive' and just over 1 in 2 committing to the top two boxes.
- In contrast, only 17% indicated they were not supportive.

Importantly, support is somewhat higher amongst those who were already aware of the Masterplan than it is for those who were not previously aware, suggesting support levels may increase if more within the community become aware of the Masterplan.

Those living in the 'affected suburbs' and those who are exposed to aircraft noise are slightly (but not significantly) more supportive of the Masterplan.



Base: N = 294

	Overall	Gender		Age				Affected suburbs	
		Male	Female	18-34	35-49	50-69	70+	Affected suburbs	Other suburbs
Top 3 Box %	83%	84%	83%	95%	77%	83%	79%	87%	80%
Mean rating	3.53	3.59	3.47	3.55	3.34	3.61	3.58	3.58	3.48
Base	294	140	154	70	69	95	61	150	144

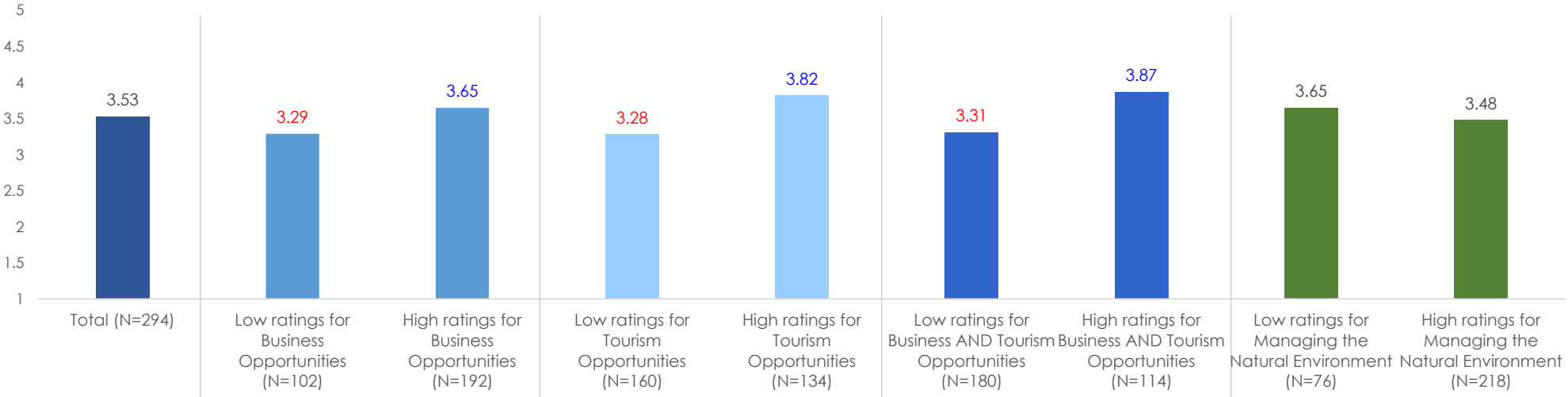
	Overall	Aware of the Plan		Aware of Central Coast Airport		Exposure to aircraft noise	
		Aware	Not aware	Aware	Not aware	Yes	No
Top 3 Box %	83%	86%	82%	85%	82%	85%	83%
Mean rating	3.53	3.73	3.43	3.63	3.37	3.65	3.47
Base	294	95	199	181	113	92	202

Q6. *How supportive are you of this plan?*

Significantly higher/lower by group
Scale: 1 = Not at all supportive, 5 = Very supportive

Support for the Draft Masterplan

The below analysis takes a closer look at the mean level of support for the Plan (Q6) crossed by Low (rated 1-3) and High (rated 4-5) importance ratings for Business Opportunities, Tourism Opportunities and Managing the Natural Environment (Q1). The mean ratings show a numeric distribution for the ratings on a scale of 1 to 5. The overall mean rating is 3.53/5 and we can see the differentiation and movement once we cross this by the importance measures e.g. those who rated Business and Tourism Opportunities high in importance were significantly more supportive of the plan (3.87/5).



Those who rated 'Creating new business opportunities' as being highly important were significantly more supportive.

Those who rated 'Creating new tourism opportunities' as being highly important were significantly more supportive – although there were fewer in the community who rated tourism opportunities as highly important.

Those who rated both business and tourism opportunities as highly important were the most supportive of the Masterplan (mean score of 3.87).

Those who rated 'Managing the natural environment' as being highly important were marginally (but not significantly) less supportive – although their mean score of 3.48 is very close to the overall mean score of 3.53, so still a positive result.

Q6. *How supportive are you of this plan?*

Significantly higher/lower by group
Scale: 1 = Not at all supportive, 5 = Very supportive 21

Reason for Level of Support for the Draft Masterplan

Residents who are supportive of the Plan explained that they believe the development is good for the area/economy, it is in a convenient location and will be good for employment (these economy/business/employment mentions are consistent with the Importance ratings on Slide 10).

9% of residents stated they are somewhat supportive as they don't know enough about the Plan and others don't believe it will impact them or they have environmental/noise concerns.

Lower levels of support are driven by a perceived lack of need for the airport in the area and issues involving planes/aircraft noise.

Example verbatims

"Will utilise the area much better i.e. revitalise the businesses across the LGA wanting to grow, especially food manufacturing"

"It would be good to have an airport for many reasons - create jobs, medical emergencies, easier access to travel"

"No transparency, because it isn't understood what kind of airport it is. Is it for the betterment of the area?"

"I'm all for growth and sustainability, however I cannot make an informed comment as I don't know too much about this"

"Flight plan is going over residential development at low levels with high noise impact"

"Supportive if this Masterplan is environmentally sound and sustainable"

Supportive/ Very supportive	N = 294
Good for the area/economy e.g. more people, more business, more services	20%
Convenient location	12%
It will be good for employment	12%
Increases travel availability	8%
Upgrades are needed/more infrastructure	6%
Necessary for the area	5%
It will be good for tourism	4%
Ensure environmental protection	3%
Somewhat supportive	N = 294
Don't know enough about it/just hearing about it/more information needed	9%
I don't think it will impact me	5%
Concerned about negative wildlife/environmental impacts	3%
Noise pollution concerns	3%
Not at all supportive/ Not very supportive	N = 294
Don't feel it's necessary/valuable to area	4%
Don't want planes flying over residential areas	4%
Noise pollution concerns	4%
Concerned about negative wildlife/environmental impacts	3%
Funds should be focused on other areas	3%

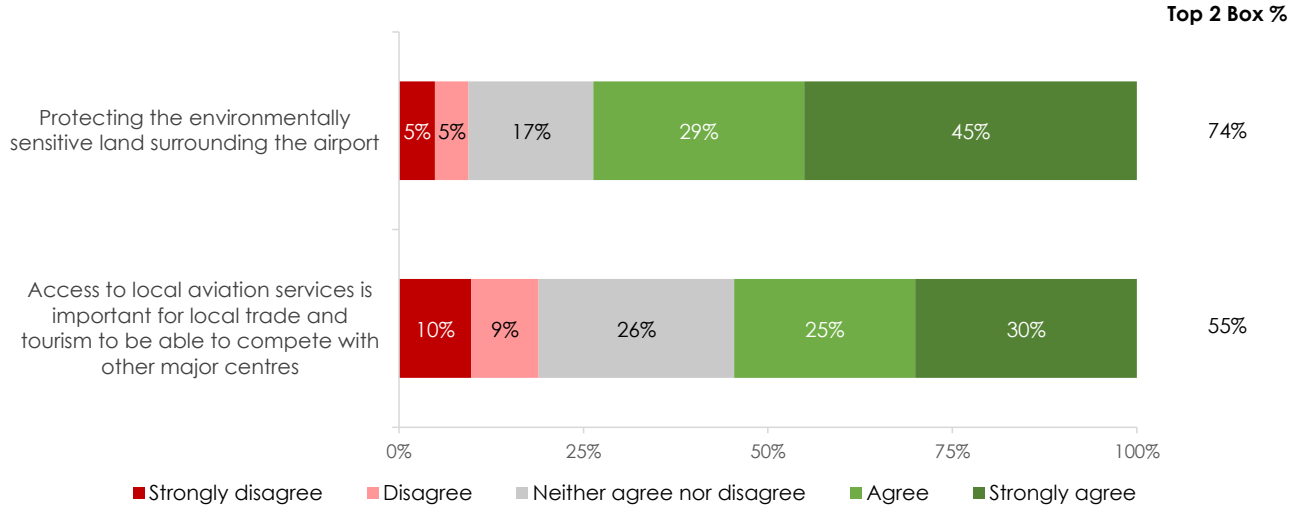
Q6. How supportive are you of this plan?
Q6i. Why do you say that?

Please see Appendix 1 for complete list of responses

What Matters Most to Residents?

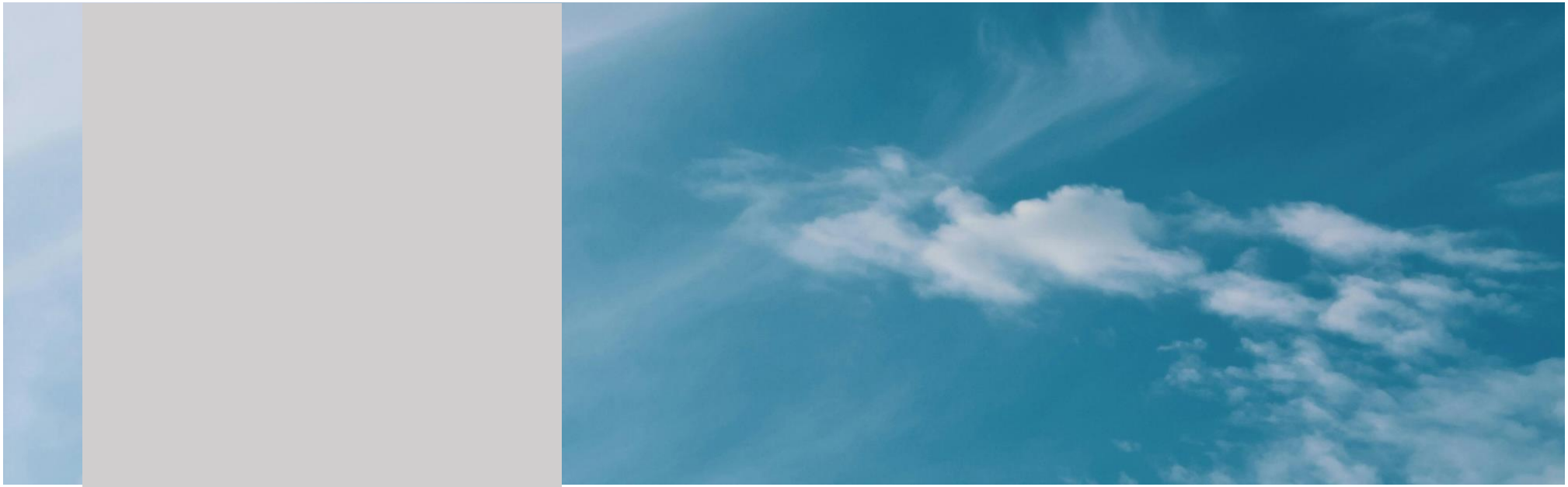
74% of residents agree/ strongly agree that Council should be 'protecting the environmentally sensitive land surrounding the airport…' (almost half 'strongly agree'). Higher agreement amongst those aged 18-34.

55% agree/ strongly that 'access to local aviation services is important for local trade and tourism to be able to compete with other major centres'.



Top 2 Box % (Agree/ Strongly agree)	Overall	Gender		Age				Affected suburbs	
		Male	Female	18-34	35-49	50-69	70+	Affected suburbs	Other suburbs
Protecting the environmentally sensitive land surrounding the airport	74%	68%	79%	81%	75%	72%	66%	71%	77%
Access to local aviation services is important for local trade and tourism to be able to compete with other major centres	55%	54%	55%	52%	61%	51%	56%	58%	51%
Base	294	140	154	70	69	95	61	150	144

Q7. Please rate the following statements on the scale of 1-5, where 1 is strongly disagree and 5 is strongly agree?



Appendix 1

Additional Analyses

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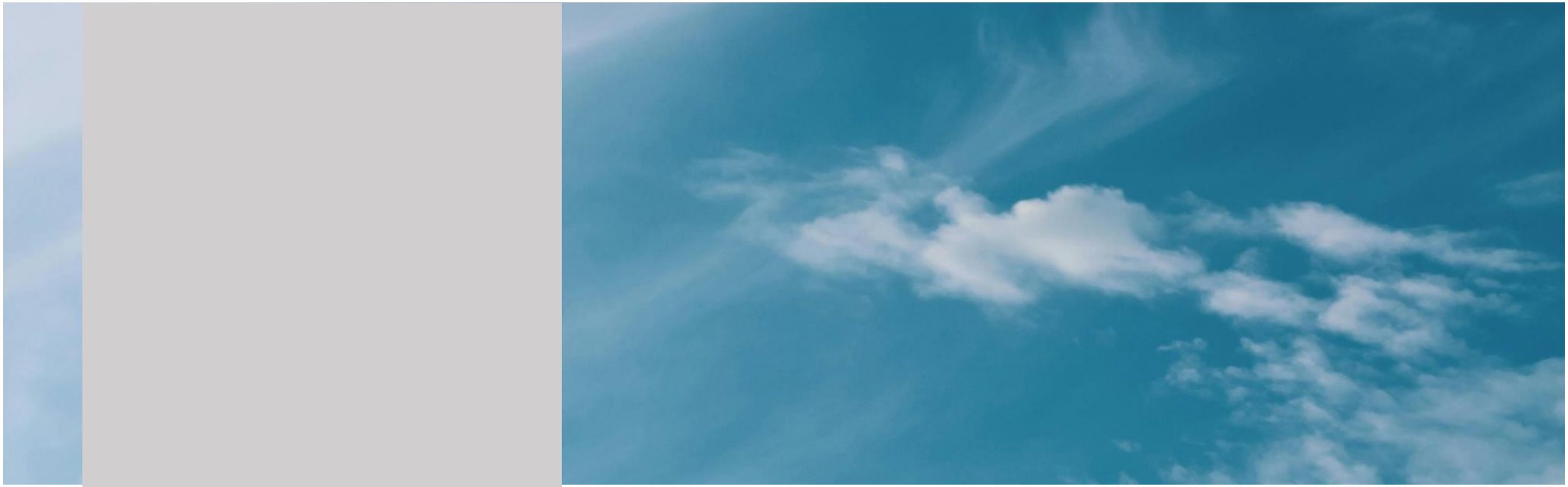
Suburb

Suburb	N = 294	Suburb	N = 294	Suburb	N = 294
Terrigal	8%	Gosford	1%	Chittaway Bay	<1%
Woy Woy	7%	Halekulani	1%	Chittaway Point	<1%
Blue Haven	6%	Hamlyn Terrace	1%	Davistown	<1%
Umina Beach	4%	Kanwal	1%	Doyalson	<1%
Long Jetty	4%	Kariong	1%	Erina	<1%
Bateau Bay	3%	Killcare	1%	Erina Heights	<1%
Berkeley Vale	3%	Kincumber	1%	Forresters Beach	<1%
The Entrance	3%	Lake Munmorah	1%	Green Point	<1%
Tumbi Umbi	3%	MacMasters Beach	1%	Gunderman	<1%
Gwandalan	2%	Mannering Park	1%	Hardys Bay	<1%
Killarney Vale	2%	Niagara Park	1%	Jilliby	<1%
Lake Haven	2%	Norah Head	1%	Lower Mangrove	<1%
Lisarow	2%	Ourimbah	1%	Mangrove Mountain	<1%
Mardi	2%	Point Clare	1%	Narara	<1%
Noraville	2%	Point Frederick	1%	North Avoca	<1%
North Gosford	2%	San Remo	1%	Patonga	<1%
Toukley	2%	Springfield	1%	Pearl Beach	<1%
Wamberal	2%	Tascott	1%	Pretty Beach	<1%
Wyoming	2%	Tuggerawong	1%	Somersby	<1%
Wyong	2%	Wadalba	1%	St Huberts Island	<1%
Avoca Beach	1%	Warnervale	1%	Tacoma	<1%
Blue Bay	1%	Watanobbi	1%	Toowoon Bay	<1%
Budgewoi	1%	Woongarrah	1%	Tuggerah	<1%
Canton Beach	1%	Woy Woy Bay	1%	Wagstaffe	<1%
Ettalong Beach	1%	Wyong Creek	1%	Wallarah	<1%
Glenning Valley	1%	Bouddi	<1%	West Gosford	<1%
Gorokan	1%	Chain Valley Bay	<1%	Wybung	<1%

Support for the Draft Masterplan

Supportive/ Very supportive	N = 294	Somewhat supportive	N = 294	Not at all/ Not very supportive	N = 294
Good for the area/economy e.g. more people, more business, more services	20%	Don't know enough about it/just hearing about it/more information needed	9%	Don't feel it's necessary/valuable to area	4%
Convenient location	12%	I don't think it will impact me	5%	Don't want planes flying over residential areas	4%
It will be good for employment	12%	Concerned about negative wildlife/environmental impacts	3%	Noise pollution concerns	4%
Increases travel availability	8%	Noise pollution concerns	3%	Concerned about negative wildlife/environmental impacts	3%
Upgrades are needed/more infrastructure	6%	Beneficial for the area e.g. employment, ease of use	2%	Funds should be focused on other areas	3%
Necessary for the area	5%	Convenient location	2%	Don't know enough about it/just hearing about it/more information needed	2%
It will be good for tourism	4%	Could be good/not sure how it will affect the area	2%	Beneficial for the area e.g. employment, ease of use	1%
Ensure environmental protection	3%	Don't want planes flying over residential areas	2%	Infrastructure/area isn't suitable	1%
Council management/delivery	2%	Funds should be focused on other areas	2%	Negative impact on the area e.g. traffic increase, residential impact	1%
Ensure minimal disruption to residents/area	2%	Not important/doesn't care/won't use it	2%	Unhappy with Council decisions/performance	1%
Good idea/supportive	2%	Unhappy with Council decisions/performance	2%	Not important/don't care	<1%
Allow commercial planes/further development	1%	Allow commercial planes/further development	1%	Don't know	<1%
Concerned about noise pollution	1%	Don't feel it's necessary/valuable to area	1%		
Don't know enough about it/just hearing about it/more information needed	1%	Negative impact on the area e.g. traffic increase, residential impact	1%		
Don't think it will have an impact	1%	Infrastructure/area needs upgrading	<1%		
Good for training/pilots	1%	Restricted take off/landing times	<1%		
Keep development minimal	1%	Other comments	3%		
Other comments	1%	Don't know	1%		
Don't know	1%				

Q6. How supportive are you of this plan?
Q6i. Why do you say that?



Questionnaire

Appendix 2

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Central Coast Council
Airport Master Plan
February 2024

Instructions	
(SR)	Single Response
(MR)	Multiple Responses
(TEXT)	Textbox
(DROP)	Dropdown
(SCALE)	Scale
(SCALE MR)	3D Matrix
(RAND)	Randomise
(ROT)	Rotate
(FLIP)	Flip

Instructions	
Position	Order
Value	Rating
[directions]	Logic

NOTABLE PROGRAMMING CODES	
Red	
Blue	
White	
Gray 95	
Alice Blue	
Underline	<u></u>
Bold	
Exclusive	<exclusive/>
Screen Out	<block/>

Good morning/afternoon/evening, my name is _____ and I'm calling on behalf of Central Coast Council from a company called Micromex. We are conducting a survey on a range of local issues – the survey will take about 10 minutes, would now be a good time to share your opinions?

S1. Which suburb do you live in? (SR)

Budgewoi Ward

Position	Answers	Ward
1	Blue Haven	Budgewoi
2	Budgewoi	Budgewoi
3	Budgewoi Peninsula	Budgewoi
4	Buff Point	Budgewoi
5	Canton Beach	Budgewoi
6	Chain Valley Bay	Budgewoi
7	Charmhaven	Budgewoi
8	Colongra	Budgewoi
9	Doyalson	Budgewoi
10	Frazer Park	Budgewoi
11	Freemans	Budgewoi
12	Gwandalan	Budgewoi
13	Halekulani	Budgewoi
14	Kingfisher Shores	Budgewoi
15	Lake Haven	Budgewoi
16	Lake Munmorah	Budgewoi
17	Norah Head	Budgewoi
18	Noraville	Budgewoi
19	Point Wolstoncroft	Budgewoi
20	San Remo	Budgewoi
21	Summerland Point	Budgewoi
22	Toukley	Budgewoi
23	Woongarrah	Budgewoi
24	Wybung	Budgewoi
25	Mannering Park	Budgewoi
26	Gorokan	Crosses
27	Hamlyn Terrace	Crosses

Gosford East Ward

Scale	Answers	Ward
1	Green Point	Gosford East
2	Avoca Beach	Gosford East
3	Bensville	Gosford East
4	Bouddi	Gosford East
5	Box Head	Gosford East
6	Copacabana	Gosford East
7	Daleys Point	Gosford East
8	Davistown	Gosford East
9	Empire Bay	Gosford East
10	Erina	Gosford East
11	Erina Heights	Gosford East
12	Hardys Bay	Gosford East
13	Holgate	Gosford East
14	Killcare	Gosford East
15	Killcare Heights	Gosford East
16	Kincumber	Gosford East
17	Kincumber South	Gosford East
18	MacMasters Beach	Gosford East
19	Matcham	Gosford East
20	North Avoca	Gosford East
21	Picketts Valley	Gosford East
22	Pretty Beach	Gosford East
23	Saratoga	Gosford East
24	Spencer	Gosford East
25	St Huberts Island	Gosford East
26	Ten Mile Hollow	Gosford East
27	Terrigal	Gosford East
28	Wagstaffe	Gosford East
29	Yattalunga	Gosford East
30	Springfield	Crosses
31	Wamberal	Crosses
32	Mount Elliot	Crosses

Gosford West Ward

Scale	Answers	Ward
1	Bar Point	Gosford
2	Blackwall	Gosford
3	Booker Bay	Gosford
4	Calga	Gosford
5	Central Mangrove	Gosford
6	Cheero Point	Gosford
7	Chittaway Point	Gosford
8	Cogra Bay	Gosford
9	East Gosford	Gosford
10	Ettalong Beach	Gosford
11	Glenworth Valley	Gosford
12	Gosford	Gosford
13	Greengrove	Gosford
14	Gunderman	Gosford
15	Horsfield Bay	Gosford
16	Kariong	Gosford
17	Koolewong	Gosford
18	Little Wobby	Gosford
19	Lower Mangrove	Gosford
20	Mangrove Creek	Gosford
21	Mangrove Mountain	Gosford
22	Marlow	Gosford
23	Mooney Mooney	Gosford
24	Mooney Mooney Creek	Gosford
25	Mount White	Gosford
26	Patonga	Gosford
27	Pearl Beach	Gosford
28	Peats Ridge	Gosford
29	Phegans Bay	Gosford
30	Point Clare	Gosford
31	Point Frederick	Gosford
32	Somersby	Gosford
33	Tascott	Gosford
34	Umina Beach	Gosford
35	Upper Mangrove	Gosford
36	Wendoree Park	Gosford
37	West Gosford	Gosford
38	Wisemans Ferry	Gosford
39	Wondabyne	Gosford
40	Woy Woy	Gosford
41	Woy Woy Bay	Gosford

Wyong Ward

Scale	Answers	Ward
1	Alison	Wyong
2	Bushells Ridge	Wyong
3	Cedar Brush Creek	Wyong
4	Dooralong	Wyong
5	Durren Durren	Wyong
6	Gorokan	Crosses
7	Halloran	Wyong
8	Hamlyn Terrace	Crosses
9	Jilliby	Wyong
10	Kangy Angy	Wyong
11	Kanwal	Wyong
12	Kiar	Wyong
13	Kulnura	Wyong
14	Lemon Tree	Wyong
15	Lisarow	Wyong
16	Little Jilliby	Wyong
17	Mardi	Wyong
18	Mount Elliot	Crosses
19	Narara	Wyong
20	Niagara Park	Wyong
21	North Gosford	Wyong
22	Ourimbah	Wyong
23	Palm Grove	Wyong
24	Palmdale	Wyong
25	Ravensdale	Wyong
26	Rocky Point	Wyong
27	Tacoma	Wyong
28	Tacoma South	Wyong
29	Tuggerah	Wyong
30	Tuggerawong	Wyong
31	Wadalba	Wyong
32	Wallarah	Wyong
33	Warnervale	Wyong
34	Watanobbi	Wyong
35	Wyoming	Wyong
36	Wyong	Wyong
37	Wyong Creek	Wyong
38	Wyongah	Wyong
39	Yarramalong	Wyong

The Entrance Ward

Scale	Answers	Ward
1	Bateau Bay	The Entrance
2	Berkeley Vale	The Entrance
3	Blue Bay	The Entrance
4	Chittaway Bay	The Entrance
5	Forresters Beach	The Entrance
6	Fountaindale	The Entrance
7	Glenning Valley	The Entrance
8	Killarney Vale	The Entrance
9	Long Jetty	The Entrance
10	Magenta	The Entrance
11	Shelly Beach	The Entrance
12	The Entrance	The Entrance
13	The Entrance North	The Entrance
14	Toowoon Bay	The Entrance
15	Tumbi Umbi	The Entrance
16	Wamberal	Crosses

Community priority areas

Q1. In order to develop a delivery program for the local community, Council is looking to better understand what the community perceives to be the priority areas for Council. I will read out a list of different topics, can you please rate these on a scale of 1-5, where 1 is not at all important and 5 is very important. (SCALE)(RAND)

Position	Answers	Importance				
		Low 1	2	3	4	*High* 5
1	Creating local employment opportunities					
2	Creating new business opportunities					
4	Creating new tourism opportunities					
5	Managing the natural environment					
6	Planning for future sustainable growth					
7	Sports and recreational facilities					
8	Support for vulnerable community members					
9	Climate change preparedness					
10	Youth services					

Q2a. Which airports are you aware of that operate either on the Central Coast, or within 2 hours' drive? (Do not prompt) (MR)

Position	Answers	Notes
1	Sydney Airport	
2	Bankstown Airport	
3	Newcastle Airport	
4	Central Coast Airport	
5	Cessnock Airport	
6	Other	Go to Q2bi

Q2bi. Other (Please specify). (TEXT)

Position	Answers	Notes
1		

Q3a. Have you experienced, or been exposed to, aircraft noise at your home? (SR)

Position	Answers	Notes
1	Yes	Go to Q3b
2	No	

Q3b. Do you have any comments to make regarding the aircraft noise experienced? (TEXT)

Position	Answers	Notes
1		

Q4. Did you know that Central Coast Council owns and operates an airport at Warnervale to the north of Tuggerah Lakes? (SR)

Position	Answers	Notes
1	Yes	
2	No	

Q5a. Are you aware that Central Coast Council has recently completed a draft masterplan to guide future development of the airport? (SR)

Position	Answers	Notes
1	Yes	Go to Q5b
2	No	

Q5b. How did you become aware of this? Prompt (MR)

Position	Answers	Notes
1	Word of mouth	
2	Local media (TV, radio, local newspaper, etc.)	
3	Social media	
4	Council website	
5	Search engine (Google)	
6	Other (please specify)	Go to Q5bi

Q5bi. Other (Please specify). (TEXT)

Position	Answers	Notes
1		

About the Draft Masterplan

The Masterplan for the Central Coast Airport details the development of land surrounding the Airport.

The focus of the development will be on general aviation uses like hangars, maintenance, charters, training, sales, intermodal logistics and research.

Over the next 10 years. It is proposed that the runway and taxiways will also be upgraded to a higher standard. This will allow the airport to accommodate a wider variety of aircraft up to a maximum take-off weight of 10 tonnes.

Land surrounding the airport will be environmentally protected, and a biodiversity stewardship site will be incorporated onto the Porters Creek Wetland.

Q6. How supportive are you of this plan? Prompt (SR)

Value	Answers	Notes
5	Very supportive	
4	Supportive	
3	Somewhat supportive	
2	Not very supportive	
1	Not at all supportive	

Q6i. Why do you say that? (Please specify). (TEXT)

Position	Answers	Notes
1		

Q7. Please rate the following statements on the scale of 1-5, where 1 is strongly disagree and 5 is strongly agree?

Value	Answers	Notes
1	1 - Strongly disagree	
2	2 – Disagree	
3	3 – Neither agree nor disagree	
4	4 - Agree	
5	5 - Strongly agree	

Position	Answers	Notes
1	Access to local aviation services is important for local trade and tourism to be able to compete with other major centres	
2	Protecting the environmentally sensitive land surrounding the airport, including initiatives such as a biodiversity stewardship site, are an important part of the Masterplan	

Demographics

D1. Gender (by voice): (SR)

Position	Answers	Notes
1	Male	
2	Female	

D2. Please stop me when I read out your age group: Prompt (SR)

Position	Answers	Notes
1	18-34	
2	35-49	
3	50-69	
4	70+	

D3. How long have you lived on the Central Coast? (SR)

Position	Answers	Notes
1	Less than 12 months	
2	1-3 years	
3	4-7 years	
4	8-10 years	
5	11-19 years	
6	20 years or more	

Thank you for your time and assistance. This market research is carried out in compliance with the Privacy Act, and the information you provided will be used only for research purposes. Just to remind you, I am calling from Micromex Research on behalf of the Central Coast Council.


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Central Coast Council

Draft Central Coast Airport Masterplan

CONSULTATION REPORT

April 202

Contents

1 Introduction

1.1 Background

Central Coast Council prepared a draft Masterplan for the Central Coast Airport, informed by technical studies, feedback collected via a telephone survey and through industry engagement undertaken in 2021/22.

The draft Central Coast Airport Masterplan informs the development of a Central Coast Aviation Hub to provide an integrated aviation, manufacturing, research and education precinct that encompasses the airport and surrounding lands compatibly zoned to complement the primary aviation usage. The airport development will relieve general aviation demand and capacity constraints across the Greater Sydney Region by providing ongoing capacity and opportunities for the general aviation, corporate, business and training sectors.

Under the proposal, Council intends to confirm those areas of Porters Creek Wetland that can be established as a stewardship site, which would protect the biodiversity values of Porters Creek Wetland in perpetuity.

1.2 The plan

The strategic objective of the airport is to develop into a regional general aviation industry hub serving the Sydney, Central Coast and Hunter Regions. This objective is premised on the airport being developed as a:

- key driver for regional economic development
- key driver for the generation of regional employment opportunities, particularly in the skilled, professional and technology-based sectors
- stimulus for regional investment
- stimulus for the tourist industry
- key regional infrastructure project, which will provide enhanced air transport options and improve the region's economic competitiveness.
- benchmark for environmentally sensitive and sustainable development in the region.

The proposed masterplan can be viewed at yourvoiceourcoast.com.

2 Engagement Approach

2.1 Purpose of Engagement

The purpose engagement was to:

- inform the community about the development of the draft Central Coast Airport Masterplan
- seek feedback on the draft Masterplan
- understand community preferences for the Central Coast Airport
- work with stakeholders and the community to identify issues which may affect the proposal.

2.2 Our engagement framework

Consultation has been designed in accordance with Central Coast Council's Engagement Framework. This framework is available to view at https://www.yourvoiceourcoast.com/Central-Coast-CouncilEngagement-Framework

2.3 How we consulted

Consultation methods

Written submissions	All residents and stakeholders could make a written submission via email, the online submission form on yourvoiceourcoast.com, or post.
Interactive map	An interactive map was developed for the community where participants could drop comments.
Telephone survey	A random telephone survey of 294 Central Coast residents was conducted between the 14 and 20 March 2024 (Landline – 72 and mobile – 222). The respondents were selected on the criteria of 32 suburbs flagged as potentially 'affected suburbs "*...in the north/north east of the LGA and are therefore closer to Central Coast Airport (and could arguably benefit from more employment/business opportunities at the site) and/or closer to some of the more common light aircraft flight paths along the coast and over Tuggerah Lakes.*"

Promotion of activities

We carried out promotion of the public exhibition to ensure the community and stakeholders were aware of the opportunity to participate.

Media Releases	• 14 December 2023, Council seeks feedback on Central Coast Airport draft Masterplan • A copy of the media release can be found in **Appendix A**
Your Voice – Our Coast website	Online project page launched 14 December 2023 attracting **3,858 views** during the public exhibition period. https://www.yourvoiceourcoast.com/airport A copy of the Your Voice Our Coast Project page can be found in **Appendix B**
Social media	• Instagram and Facebook posts - 10 January 2024 • Instagram and Facebook posts - 7 February 2024 • A total of **64,308** people were reached across the four posts. • Copies of the posts can be found in **Appendix C**
Letterbox distribution of promotional flyers	**40,000** promotional flyers were letterbox dropped to suburbs surrounding the Central Coast Airport. A copy of the flyer and list of suburbs can be found in **Appendix D**

3 What we heard

Council sought feedback from the community between 14 December 2023 and 13 February 2024.

3.1 Method 1 - Online submission forms

A total of **118** written submissions were received during the consultation period. Submissions were provided as emails and online submissions through yourvoiceourcoast.com.

If an individual made more than one submission, these were combined and counted as a single submission.

Of the **118** submissions received, **76 were positive** towards the airport masterplan, **33 were negative**, and **9 were neutral**.

3.2 Method 2 – Interactive map

We launched an online interactive map of the masterplan and participants were encouraged to drop a pin on a location of interest and make a comment. Participants could also get involved in a under markers we embedded, which contained information on particular elements.

			Up votes	Down votes
	Something I like	10 comments	80	74
	Ideas and suggestions	16 comments	181	85
	Make a comment	54 comments	556	339
	Information marker (placed by us)	28 comments in the discussions	201	107

A total of 108 comments were made by 56 individuals.

You can view the map and feedback at
https://centralcoastcouncil.mysocialpinpoint.com/centralcoastairport/centralcoastairport-map#/

3.3 Telephone survey

A random telephone survey of 294 Central Coast residents was conducted between the 14 and 20 March 2024 (Landline – 72 and mobile – 222).

The respondents were selected on the criteria of 32 suburbs flagged as potentially affected suburbs in the north/north east of the LGA. These suburbs are therefore closer to Central Coast Airport (and could arguably benefit from more employment/business opportunities at the site) and/or closer to some of the more common light aircraft flight paths along the coast and over Tuggerah Lakes.

Themes from telephone survey	Description
Support for draft Masterplan	**83% of residents indicated they are at least somewhat supportive of the plan.** Support is somewhat higher amongst those who were already aware of the Masterplan than it is for those who were not previously aware, suggesting support levels may increase if more within the community become aware of the masterplan. Main reasons for support included economy/business/ employment opportunities and convenient location.
Themes that resonate with the community	Based on a range of direct and indirect questions, main airport-related themes that appear to resonate most with residents are centred on sustainable growth – a balance of employment/business opportunities whilst managing the natural environment (and these themes emerged before the masterplan summary was mentioned in the conversation). Note that tourism opportunities (as opposed to business opportunities more broadly) are not seen as being as important by the community.
Noise	31% of residents indicated they had experienced airport noise at their home. However, when asked to comment on their experiences, the majority of those affected did not appear overly concerned, stating 'minimal impact/doesn't really bother me' and 'mainly just helicopters/emergency situations'.
Those living in the affected area	Support for the masterplan is marginally (but not significantly) higher for those living in the 'affected suburbs' compared to other residents – and those in the 'affected suburbs' have slightly higher agreement with the statement 'access to local aviation services is important for local trade and tourism to be able to compete with other major centres'.
What's important?	Sustainable growth – local employment/business opportunities and managing the natural environment.

Concerns	Concerns were raised in regard to not knowing enough about the plan, environmental protection and noise pollution.
Awareness	72% of residents are aware that Council owns and operates an airport at Warnervale. 1 in 3 (32%) are aware of Council's Draft Masterplan to develop the airport.

3.4 Feedback from written consultation

The following summarises the themes, opinions and suggestions raised within written submissions, and comments on the interactive map. We have also provided examples of this feedback.

Council's response to feedback can be found in **Section 4**.

Economy and employment

You said:

- Investment in the airport will stimulate economic growth in the region and increase employment opportunities.
- The economic benefits are questionable.

Example comments:

~~*"Warnervale Air has experienced a remarkable 300% increase in both staff numbers and flying activity over the last seven years. Such growth is indicative of our region's heavy interest in aviation training and its potential as a driver of economic progress."*~~

"The aviation hub will create numerous job opportunities in aircraft maintenance, overhaul, and repair – fields requiring specialised skills. This not only provides employment but also encourages the development of a skilled workforce in the region, particularly on the Northern end of the Central Coast, an area which has traditionally been lacking in skilled employment opportunities."

"An airport should not be a priority for this council. We need to spend the money we have wisely and for the benefit of most people. An airport will benefit only a small proportion of the population, and yet will cost the whole. The financial cost is too much when most of us will not use it."

~~*"Council needs to use its scarce funds to focus on projects and facilities that benefit the majority of residents, such as creating safer roads, improving public transport, and protection our beautiful natural environment."*~~

Formatted: Pattern: Clear (Background 1)

Implementation and funding

You said:

- The costs and funding model to deliver the masterplan should be included masterplan.

- There is inadequate detail about Stage 2.

Example comments:

"...the CCA final masterplan [should] include financial viability, financial sustainability and profitability as objectives and provide insight as to how the master plan will support these objectives."

~~"The public has not been given the information to understand the financial implications to determine whether or not to support the draft masterplan as a proper use of public money."~~

Opportunities

You said:

- Constraints at Western Sydney Airport and the future closure of Bankstown Airport provides opportunity for the Central Coast Airport, with more businesses and other entities in the aviation sectors looking to relocate.
- Implementing the masterplan will help facilitate the training of new pilots, and the development aviation-based manufacturing, and avionic repair enterprises in the region.
- Selling the airport could be a pathway to more open up more capital investment to implement the masterplan and remove the financial liability from ratepayers.

Example comments:

"Allowing the airport to become a code 2B aerodrome will enhance the aero club's ability to train future pilots and will facilitate the development of the aerodrome into a general aviation hub. The Central Coast needs this type of development. It will provide opportunities to our children within the confines of the coast and have flow on effects for the economy."

"Central Coast Council [should] review ownership of CCA with a view to consider selling CCA via a competitive market tender in order to allow the masterplan to be delivered and allow the people of the Central Coast to benefit through the reinvestment of sale proceeds while releasing ratepayers from future capital investment, maintenance and operational cost requirements."

~~"I've watched the council spend $millions upon millions$ on the airport, I've heard about all these employers that are coming, yet none have moved here, NO JOBS.. Bankstown is still spending on its airport, IT WON'T BE CLOSING ANYTIME SOON."~~

Design

You said:

- Runway widening is needed and welcome.
- The runway should be lengthened.
- Upgrades are needed for ageing or inadequate infrastructure such as taxiways, lighting, stormwater, and refuelling facilities.
- More hangars are needed.

Example comments:

"Drainage improvements and stormwater/wastewater management, utility requirements and upgrades, aerodrome lighting including runway and taxiway lighting, and remediation and installation of new aircraft refuelling facilities."

"Provision of land assets for the development of hangers and hard stand areas outside of the CCAC precinct is crucial. Interconnection of the existing industrial development on the western side to the airport has huge economic potential for business development and economic growth. This should be an immediate consideration."

"The proposed widening of the runway will make the Airport safer for commercial and general use alike."

Passenger services

You said:

- Accommodating larger aircraft is a good opportunity for charter passenger flights.
- More passenger flights should not be an option as it will increase noise impacts on local residents.

Example comments:

"The availability of charter flights greatly benefits local businesses, offering them a flexible and efficient mode of transportation. This is particularly crucial for regions where access to larger airports is limited or inconvenient, such as the Central Coast, where it is over an hour to drive to the nearest airline-capable airport, with protracted entry and boarding procedures required before a departure can take place."

"Our Central Coast Region is experiencing unprecedented growth and with that will come demand for localised Air Transport Services. Having reliable air transport services available to business travellers will only further enhance the region's appeal and attract other businesses to our region."

"I am vehemently against even the possibility of this being an option in the future. This should not be an option and taken off the table. Mostly due to increase in the previously mentioned issues of noise pollution for the growing residential areas surrounding the airport. I feel that the inclusion of commercial passenger flights in the airspaces of the area would also dramatically impact negatively house prices on the area. It seems at odds that there is huge residential development in the same area that space is being reserved for a commercial airport."

Impact on residents

You said:

- Noise impacts on residents has increased over past several years due to the increase in flights.
- At times pilots fly in manner that increases noise unnecessarily.
- Early morning flights impact residential amenity.

- An increase in flight numbers and aircraft size will increase noise, impact quality of life and property values.
- Flight paths and noise forecasts should have been provided in the masterplan.

Example comments:

"As a pilot in training I am exceptionally glad to have an Airport close to my residence as this has helped facilitate my dream career of being a pilot for the Royal Flying Doctors Service (RFDS). Without this vital service on the Central Coast it would be almost impossible to conduct the vital training needed not only for my career but for the life saving need for more pilots across Australia."

~~"The number of light aircraft that swarm to the Tuggerah Lakes area not only from the Warnervale airport but numerous others airports is already noise and environment polluting enough without council now considering wanting to add to these issues."~~

~~"I find it disappointing when people take up residence near a facility like the airport only to complain about noise or inconvenience. The airport is not hidden, located as it is on a busy Sparks Road and is easily identifiable as an airport."~~

~~"Aircraft noise – inadequately addressed. Where are the maps? Where is projected data? This information package is far from complete. The same goes for flight paths – surely that is critical to making an informed decision."~~

" As I purchased my property with the understanding that the Warnervale Airport Restriction Act 1996 was never to be revisited. Now I find myself directly affected by the proposal with the noise and financial impacts of my fellow ratepayers and myself."

Environmental impacts and biodiversity stewardship

You said:

- The inclusion of a biodiversity stewardship area in the masterplan is a good outcome for the environment.
- The draft masterplan should be withdrawn due to unacceptable impacts on Porters Creek Wetlands, threatened species and vegetation communities.
- The previously drafted Conservation Agreement for Porters Creek with the NSW Biodiversity Conservation Trust should be signed and form part of the masterplan.
- The masterplan should be updated to illustrate conflicts between current land zonings, and the proposed core precinct, runway, and associated activities, such as vegetation trimming.
- Ensure current operations and any changes to land use to accommodate the masterplan comply with relevant legislation and planning instruments, such as the *NSW Environmental Planning and Assessment Act 1979* and the Central Coast Local Environment Plan.
- The surrounding area is susceptible to contaminated run-off.
- Implementing the masterplan will increase the use of fossil fuels/CO2 emissions through increased airport usage.
- A cultural heritage assessment should be carried out as there are recorded Aboriginal sites nearby.

Example comments:

"The plan calls for protection of the Porters Creek Wetlands via a stewardship agreement. This is an important consideration and one which should ensure that any environmental concerns from ratepayers is alleviated."

"PCW contains endangered ecological communities, threatened species, and provides wildlife corridors. All these will be at risk if the airport is developed as Council proposes. The airport will be developed to encroach on land zoned C2. C2 land is Environmental Conservation, the highest level of protection available under NSW law, to protect sensitive endangered ecological communities and their habitat."

~~*"My opposition to this Draft Masterplan is that it is incomplete and that a Conservation Agreement for Porters Creek should form part of this document."*~~

Decision making

You said:

- Elected Councillors should be making decisions about the airport, not the Administrator.

Example comments:

"I strongly implore Central Coast Council to reconsider such heavy handed development, especially as it is being done by an individual appointed to the role and not democratically elected by the residents of the Central Coast."

"I would prefer council elections to Be reintroduced before an administrator makes decisions on behalf of the residents of central coast council area. It is not appropriate that these ideas are floated by someone who is not democratically elected."

Emergency services

You said:

- The masterplan will be beneficial to emergency services operating from the airport.

Example comments:

"Having a wider pavement with better load carrying characteristics will enable mid-sized general aviation aircraft (eg of the scale used by RFDS and Air Ambulance) to use the airfield safely."

"Warnervale airport, with close access to the Sydney – Newcastle motorway, is ideally located to support the population of the Central Coast with aerial emergency services such as air ambulance and rural fire services. The last 10 years have seen Warnervale airport used as hub for water bombing and surveillance of bushfires in the Central Coast area."

Surrounding infrastructure

You said:

- Improved pedestrian and cycle links connecting the airport to local transport centres are needed.
- More and improved parking is needed along Sparks Road.
- Transport for NSW should fast track the duplication of Sparks Road.

"No issues with the airport and development proposed except for the fact that there is no ample parking whatsoever when it is directly off the main Sparks Road gateway to the freeway… the last air show that was held there, had cars parked all up and down the sides of Sparks Road, with pedestrians walking along Sparks Road. As this road is also the main artery to get to the freeway made it very dangerous and extremely congested."

"[There is] a lack of safe walking/cycling routes from the nearest public transport stop, Warnervale Station. Improving the link between the station and the airport is a sensible move, and will make the airport much more accessible to everyone, including people who fly in and don't have access to a car."

Safety

You said:

- Improved aviation safety technology is needed.
- Vegetation should be managed adjacent to the runway.

Example comments:

"Airport currently lacks safety technology. These upgrades will drive additional aircraft and traffic and will increase risks of these upgrades don't take place. Suggested additions include: AWIS system so real time local weather information and PAPI system on runway to better guide pilots in landing."

"Vegetation being kept under control should be seen as an essential risk mitigation measure."

Flight schools

You said:

- More flight schools should operate from the airport.
- No more flight schools should operate from the airport.

Example comments:

"The masterplan clearly emphasizes the current relationship between the Central Coast Aero Club (known as Warnervale Air) and the Warnervale Airport Infrastructure. This relationship is effectively a monopoly commercial relationship given the absence of any alternative access

arrangements. It would have been beneficial, as an objective, to examine a broader range of models of access that include freehold title site development not just lease arrangements."

"The airport already has a successful flight train operation which should be encouraged to expand."

~~*"The bulk of aircraft movements at most airports are done by Flight School aircraft – the circuit area has up to 6 aeroplanes at times currently in peak periods. It would make sense to limit the site to one Flying School. With one runway, aircraft movement densities would become dangerously high with more than one flying school onsite."*~~

4 Our response

Theme	Views and suggestions	Our response
Economy and employment	• Investment in the airport will stimulate economic growth in the region and increase employment opportunities. • The economic benefits are questionable.	A business case informed by land use, infrastructure investment and financial and economic modelling is underway and due for completion prior to presenting the final Central Coast Airport Masterplan to Council.
Implementation and funding	• The costs and funding model to deliver the masterplan should be included masterplan. • There is inadequate detail about Stage 2.	Following on from community feedback and further clarification of the airport land, Council engaged specialist services for the development of a financial feasibility analysis to support a business case for the airport. This report will identify economic delivery models for the proposed upgrades noted in the masterplan. This business case will be reviewed by the elected Council, when appointed.
Opportunities	• Constraints at Western Sydney Airport and the future closure of Bankstown Airport provides opportunity for the Central Coast Airport, with more businesses and other entities in the aviation sectors looking to relocate. • Implementing the masterplan will help facilitate the training of new pilots, and the development aviation-based manufacturing, and avionic repair enterprises in the region. • Selling the airport could be a pathway to more open up more capital investment to implement the masterplan and remove the financial liability from ratepayers.	An aviation consultation is currently underway. This consultation will engage with the commercial aviation sector to provide insight into future land use demand, leasing and commercial operations. The aviation consultation will help inform the Airport Masterplan business case and the associated investment models available to progress Central Coast Airport.

Theme	Views and suggestions	Our response
Design	• Runway widening is needed and welcome. • The runway should be lengthened. • Upgrades are needed for ageing or inadequate infrastructure such as taxiways, lighting, stormwater, and refuelling facilities. • More hangars are needed.	As part of the airport masterplan a series of upgrades will be considered to improve the operations and safety of the airport. Upgrades will be subject to endorsement of the airport business case by the elected Council body. **There is no proposal to lengthen the runway.**
Passenger services	• Accommodating larger aircraft is a good opportunity for charter passenger flights. • More passenger flights should not be an option as it will increase noise impacts on local residents.	The draft Airport Masterplan **does not** contemplate extension to the runway or regular passenger transport (RPT) services as part of the future operations. While widening the runway will allow for larger aircraft for local charter flights, it will **not allow for regular services between other regional airports using services such as Rex, Airlink or Jetstar.**
Impact on residents	• Noise impacts on residents has increased over past several years due to the increase in flights. • At times pilots fly in manner that increases noise unnecessarily. • Early morning flights impact residential amenity. • An increase in flight numbers and aircraft size will increase noise, impact quality of life and property values. • Flight paths and noise forecasts should have been provided in the masterplan.	In response to community feedback, Council has engaged a specialist to develop a 'fly neighbourly policy', as well as a preliminary Australian Noise Exposure Forecast (ANEF), and noise contour mapping for endorsement with the aviation authority. Both reports, including indicative flight circuits, will inform the adopted masterplan for Council endorsement.

Environmental impacts and biodiversity stewardship	• The draft masterplan should be withdrawn due to unacceptable impacts on Porters Creek Wetlands, threatened species and vegetation communities. • The inclusion of a biodiversity stewardship area in the masterplan is a good outcome for the environment. • The previously drafted Conservation Agreement for Porters Creek with the NSW Biodiversity Conservation Trust should be signed and form part of the masterplan. • The masterplan should be updated to illustrate conflicts between current land zonings, and the proposed core precinct, runway, and associated activities, such as vegetation trimming. • A cultural heritage assessment should be carried out as there are recorded Aboriginal sites nearby. • Ensure current operations and any changes to land use to accommodate the masterplan comply with relevant legislation and planning instruments, such as the NSW Environmental Planning and Assessment Act 1979 and the Central Coast Local Environment Plan. The surrounding area is susceptible to contaminated run-off. • Implementing the masterplan will increase the use of fossil fuels/CO2 emissions through increased airport usage.	Council has completed an exhaustive analysis of the surrounding biodiversity values adjacent to the airport. This work was completed by a specialist ecological consultant to inform the draft Central Coast Airport Masterplan. A number of state agency and Council studies have considered several ways to protect the ecologically sensitive environments adjacent to and surrounding the airport and are ongoing. These include the previous studies conducted during the preparation of the former Conservation Agreement for Porters Creek with the NSW Biodiversity Conservation Trust, and Council's recently proposed stewardship area for the masterplan. Additionally, the NSW Department of Planning and Environment is considering Central Coast-wide Strategic Biodiversity Certification for ecologically significant land across the region, which includes the land adjoining and surrounding the airport. Council will continue to work with stakeholders to ensure the environment surrounding the airport is appropriately protected. It is important to note that the independent survey conducted by Micromex on the current Draft Masterplan area indicates strong community support for the current proposal and that the

		balance between Airport upgrades and protection of surrounding environmental lands has been accepted.

Theme	Views and suggestions	Our response
Decision making	Elected Councillors should be making decisions about the airport, not the Administrator.	An adopted masterplan does not commit Council to any financial obligations. Once Councillors are elected, a business case and various investment options to progress the airport will be presented to the elected body for consideration. Any work associated with the master plan, including rezoning, would not proceed until a business plan is endorsed by the elected Council.
Emergency services	The masterplan will be beneficial to emergency services operating from the airport.	Emergency services, like RFS, CareFlight and POLAIR all deliver vital services to the Central Coast community. These services have 24/7 access to the airport. The proposed improvements to the airport will enable safer landing and take-off procedures for emergency services, which often operate in all weather conditions.
Surrounding infrastructure	• Improved pedestrian and cycle links connecting the airport to local transport centres are needed. • More and improved parking is needed along Sparks Road. • Transport for NSW should fast track the duplication of Sparks Road.	As part of the adopted airport masterplan, intermodal transport will be considered as part of a medium to long-term strategy. This will need to be undertaken in consultation with TfNSW.
Safety	• Improved aviation safety technology is needed. • Vegetation should be managed adjacent to the runway.	The draft masterplan proposes improved safety measures such as a widened runway and modern weather instrumentation. Council as the owner of the airport is required to meet the civil aviation authority's requirements for removing intrusions into the obstacle

Theme	Views and suggestions	Our response
		limitation surface (OLS). The management of the vegetation is an ongoing operation undertaken by Council.
Flight schools	• More flight schools should operate from the airport. • No more flight schools should operate from the airport.	Future leasing arrangements at the airport will be subject to a finalisation of the airport business case and approval to proceed with the preferred business model. If the future business model contemplates direct leasing with Council and the aviation sector, a precinct commercial leasing policy and procedure will be developed and adopted prior to commencing the leasing process.

5 Next steps

We have listened to your feedback and will now be carrying out further studies to give greater clarity into the future operations at the airport. These technical studies include:

- **a Noise Impact Assessment, including the development of a '*Fly Neighbourly Policy*' and Air Noise Exposure Forecast (ANEF) contour mapping.** The noise study will give greater transparency into the aviation movements and associated sound levels that occur in and around the airport for the community.
- **a review of the general arrangements with technical setouts to ensure compliance with civil aviation legislation**. Amended general arrangements will provide detailed diagrams for technical setouts and minimum offset requirements to safely operate the airport. These diagrams will inform the subdivision plan to finalise boundary requirements between the airport and Porters Creek Wetlands.
- **economic feasibility modelling to inform a business case to be considered by the newly elected Council.** The economic feasibility will be used to ascertain the economic models for the development and operation of Central Coast Airport. This report will provide clarity on the future economic outcomes the airport provides to the region and be included in a business case report. The conclusions of the business case and recommendations on delivery model will be presented to the elected Council for consideration.

Once these technical studies are completed, the Central Coast Airport Masterplan will be amended and presented to Council for adoption in June 2024.

An adopted masterplan does not commit Council to any financial obligations.

Once Councillors are elected, a business case and various investment options to progress the airport will be presented to the elected body for consideration.

Any work associated with the master plan, including rezoning, would not proceed until a business plan is endorsed by the elected body.

Commented [JD1]: Please get Jamie to check.

6 Appendices

Appendix A – Media Releases

Central Coast Council Media Release

14 December 2023

Council seeks feedback on Central Coast Airport draft Masterplan

Central Coast Council's draft Masterplan for the Central Coast Airport at Warnervale is now on public exhibition.

The draft Airport Masterplan, informed by feedback collected via a telephone survey and industry engagement undertaken in 2020 and 2021, is aimed at driving economic activity through employment, tourism and business development.

Work to support development of the draft Masterplan has also identified those areas of Porters Creek Wetland that can be established as a stewardship site. As a stewardship site, the biodiversity values of Porters Creek Wetland would be protected in perpetuity.

Council Director Environment and Planning, Alice Howe said airports form an integral part of the Australian economy and are critical in supporting communities and enhancing broader economic performance.

“Without access to local aviation services, the capacity for local trade and tourism to grow and compete with other major regional centres will be constrained. As the ninth largest region in Australia, the Central Coast is recognised as a substantial and significant growth corridor, yet it remains the only major population centre without a recognised and supported airport.

“There have been many technical, financial, social and environmental complexities worked through in the development of the draft Central Coast Airport Masterplan, and now we are seeking wider community feedback on it,” Dr Howe said.

The Central Coast Airport, situated on 44 hectares of land zoned E4 (General Industrial), is planned to be upgraded to a Code 2B aerodrome. The upgrades to the runway will not result in an extension of the current 1200 metre runway length, and the Airport would not support regular public airport transport use. The key focus of the Masterplan is to attract and support general aviation activities, including aerial work, instructional and recreational flying, as well as providing an important hub for emergency services.

“The decision by the NSW Government to repeal the Warnervale Airport (Restrictions) Act 1996 in February 2021 provided Council with a clear signal

regarding the future of the Central Coast Airport at Warnervale. Council is now getting on with the next steps to realise the potential of the aviation sector on the Central Coast."

Council Administrator Rik Hart said having an expanded airport capable of a higher level of general aviation use would give a real boost to the region – and be an attractor to investment into the area.

"The Central Coast is home to a diverse range of commercial businesses, many of which would benefit from expanded aviation activities. An upgraded airport would assist in achieving that," Mr Hart said.

Council will be exploring funding opportunities upon finalisation of the Masterplan.

The draft Masterplan is on exhibition until 14 February 2024.

Find out more and have your say online at:
https://www.yourvoiceourcoast.com/airport

ENDS

Photo caption: Conceptualised image if the Masterplan is delivered

Central Coast Council

Appendix B – Your Voice Our Coast project page

Draft Central Coast Airport Masterplan

Central Coast Airport RFI | Draft Central Coast Airport Masterplan

Public exhibition

Central Coast Council has prepared a draft Masterplan for the Central Coast Airport, informed by feedback collected via a telephone survey and through industry engagement undertaken in 2021/22.

The Masterplan details the development of land surrounding the Central Coast Airport at Warnervale and presents the Central Coast with a new economic sector that will stimulate employment and economic activity.

Under the proposal, Council intends to confirm those areas of Porters Creek Wetland that can be established as a stewardship site. As a stewardship site, the biodiversity values of Porters Creek Wetland will be protected in perpetuity.

Airports form an integral part of the Australian economy and are critical in connecting communities and enhancing the broader economic performance. Without access to local aviation services, the capacity for local trade and tourism to grow and compete with other major regional centres will be constrained. As the ninth largest region in Australia, the Central Coast is recognised as a substantial and significant growth corridor, yet it remains the only major population centre without a recognised and supported airport.

Links

- **Council Report 12 December 2023**
- **Make a submission**
- **Join the conversation on the interactive map**

There have been many technical, financial, social and environmental complexities worked through in the development of the draft Central Coast Airport Masterplan.

The draft masterplan provides a roadmap for development of the airport precinct over the next 10 years. Safeguarding the airport by upgrading the runway and taxiways to a Code 2B in accordance with aviation design authority classification, gives greater clarity to potential and future use of the airport.

The runway is recommended to be widened from 10 metres to 23 metres, with the length remaining at 1200m. This will allow the airport to accommodate a wider array of aircraft up to an initial maximum take of weight (MTOW) of 10,000 kg, including but not limited to commonly utilised aircraft such as Beech King Air, Cessna Citation and the Beechcraft 1900.

The length of the runway is not suitable for regular passenger transport (excluding charter), with the masterplan seeking to explore expanded general aviation uses which may include, hangars, aircraft maintenance, charter operations, pilot training, aircraft sales and leasing, airport-related intermodal logistics, research and development.

The draft masterplan allows for the opportunity to expand employment activities, encourage greater tourism and has been developed in consideration of the important ecological constraints surrounding the airport lands and Warnervale Employment Zone (WEZ). Future investigation into the potential land use is proposed to both the west and east of the airport.

Document Library

Draft Central Coast Airport Masterplan (5.23 MB)

Who's listening

Name: Property Development Team
Email: property@centralcoast.nsw.gov.au

Central Coast Council

Masterplan Stages

Core Precinct

Investigation Areas

The outcomes of these areas will be supported by a detailed analysis of the ecological constraints to determine the preferred land use. This information will be reported back to Council for further consideration:

Biodiversity-Stewardship Considerations

Legend
1. Central Coast Airport
2. Indicative boundary realignment for runway and indicative subdivision of aviation lands and employment lands from Porter's Creek Wetland
3. Porter's Creek Wetland area for Bio-Stewardship
4. Warnervale Business Precinct (subject to future draft masterplan)

Central Coast Council

Have your say

The community is invited to find out more by:

- viewing the draft Central Coast Airport Masterplan
- reading the Frequently Asked Questions available at the bottom of this page

You can also view detailed information on the Telephone Survey and Request for Information here.

The community can make submissions between 14 December 2023 and 13 February 2024 via:

- the interactive map
- the online submission form
- email: ask@centralcoast.nsw.gov.au
- Post: PO Box 20, Wyong NSW 2259

Your attention is drawn to the provisions of the Government Information (Public Access) Act 2009 which allows for possible access to certain public and personal documentation. View our privacy statement.

Join The Conversation

- Where is the Central Coast Airport located?
- Why has Council developed a masterplan for the Central Coast Airport?
- Will the existing runway be lengthened?
- How will the environment be protected as part of the Master planning process?
- How is the development of the Central Coast Airport Masterplan being funded?
- How can I have my say on the draft Central Coast Airport Masterplan?
- Council is exhibiting the draft Central Coast Airport Masterplan over the holiday period, how will it ensure everyone has an opportunity to have their say?

Appendix C – Social media

Appendix D – Postcard

Draft Central Coast Airport Masterplan

Central Coast Council has prepared a draft Masterplan for the Central Coast Airport located at Jack Grant Avenue, Warnervale. The draft Masterplan identifies upgrades to the airport to a Code 2B aerodrome. This would support additional aircraft landing on the existing 1200 metre runway. The runway is proposed to be widened and strengthened, and areas set aside for general aviation activity. Regular passenger transport is not proposed.

Council is also seeking feedback on a proposed stewardship site at Porters Creek Wetland, to the south and west of the airport precinct. This area is proposed for conservation in perpetuity.

Future investigation areas are also identified, which may support either airport or conservation outcomes. It is proposed to undertake these investigations over the next five years.

scan me

Have your say at **yourvoiceourcoast.com/airport**
Public exhibition closes 13 February 2024

Central Coast Council


Central
Coast
Council

Draft Central Coast Night-Time Economy Discussion Paper

https://www.yourvoiceourcoast.com/night

Public exhibition

Council has prepared a Draft Central Coast Night-Time Economy Discussion Paper which aims to identify interventions to create better places for businesses, the local community and visitors after dark in the Central Coast.

The discussion paper was developed through extensive stakeholder engagement including internal and industry workshops, business surveys as well as interviews with neighbouring Councils. It also aligns with actions from Council's Economic Development Strategy 2020-2040, the Central Coast Destination Management Plan 2022-2026 and the Safer Cities: Her Way program.

The Central Coast currently has a limited and dispersed night-time economy and the discussion paper details ways for us to support local businesses to increase after dark operations to deliver more opportunities for employment, tourism and the local economy.

Have your say

We're now inviting locals and visitors as well as business and tourism industry leaders to explore and provide feedback on the Central Coast Night-Time Economy Discussion Paper.

Submissions are to be addressed to the Chief Executive Officer, Mr David Farmer, between 29 November 2023 and 12 February 2023 via:

- our easy to use guided submission form
- email: ask@centralcoast.nsw.gov.au
- post: PO Box 20, Wyong NSW 2259

Your attention is drawn to the provisions of the Government Information (Public Access) Act 2009 which allows for possible access to certain public and personal documentation.
View our privacy statement.

Have Your Say

Timeline

- **28 Nov 2023** endorsed for Public Exhibition at Council Meeting
- **30 Nov 2023** Public Exhibition live date
- **12 February 2023** Public Exhibition close date

Document Library

Draft Central Coast Night Time Economy Discussion Paper

Who's listening

Name	Andrew Powrie, Business Economic Development Manager
Email	andrew.powrie@centralcoast.nsw.gov.au

Frequently asked questions

Why is a night-time economy important?

The range of activities and experiences within the night-time economy are important in terms of the expression of local identity, as well as investment, employment and consumer spending.

The character of the night-time economy and its attraction to different types of people differs across regional towns and cities depending on such variables as population catchment area, environment, safety, and infrastructure.

Establishing a successful and well-functioning night-time economy on the Central Coast is an important economic development objective for Council. Enhancing and activating the night-time economy will create better places for business, the local community, and visitors after dark on the Central Coast.

From an economic development perspective, the night-time economy provides a variety of jobs, particularly for younger people. An appealing night-time economy is equally an important factor in attracting a talented workforce, addressing the question - what is there to do at night?

What is the current state of Central Coast Night-Time Economy?

The Central Coast currently has a limited and dispersed night-time economy. It is a large regional location with no one significant CBD. It has five identified principal town centres (Gosford, Terrigal, The Entrance, Wyong, and Woy Woy) and a further seven major town centres, with 145 suburbs spread across the Local government Area (LGA). As such, the night-time economy across the Central Coast operates within spatial and geographical constraints.

However, there are identified opportunities to create a well-functioning night-time economy that can deliver business growth, employment, and cultural and community vitality in the years ahead.

A well-functioning night-time economy involves partnership, support and collaboration between government, private enterprise, and community interest groups. The successful facilitation of vibrant night-time economies and entertainment precincts can develop cultural and community vitality and improve local economies (through tourism and employment growth) while also offering opportunities for the production and consumption of art and culture.

What is the purpose of the discussion paper?

This Draft Discussion Paper details ways for Council to plan better places for businesses, the local community and visitors after dark. This document essentially outlines what Council can do to support the enhancement and activation of the night-time economy.

Community and industry representatives' feedback on this discussion paper will help us plan the next steps and chart a way forward for supporting the growth of the Central Coast's night-time economy.

How does it link into existing strategies and plans?

The Central Coast Council's Economic Development Strategy 2020-2040 identified for Council the opportunity to develop the Night-Time economy. It has a priority action to prepare a Night-Time economy discussion paper, exploring options for enhancing the diversity and size of our night-time economy.

The Central Coast Destination Management Plan 2022-2026 also has an action to carry out a Night-Time activation and enhancement strategy which identifies intervention concepts for Night-Time economy precincts, and understanding barriers to Night-Time activity (including zoning, compliance).

The Discussion Paper addresses these two strategic actions and details ways for Council to plan better places for businesses, the local community and visitors after dark.

What previous engagement has been conducted?

Consultants Urban Enterprise conducted key stakeholder engagement activities with local businesses from May to November 2023 in key areas.

The Discussion Paper is informed by independent research and analysis as well as consultation with industry representatives, businesses, Council staff, and local governments. It was developed incorporating feedback from:

- One council workshop
- Four business and industry workshops
- One business survey
- Two interviews with other local governments

Guided submission form

https://centralcoastcouncil.syd1.qualtrics.com/jfe/form/SV_8eRKCvQKzcKPvKK

Intro

Thank you for taking the time to share your thoughts on the Draft Central Coast Night-Time Economy Discussion Paper.

We greatly value your input into this document and your valuable feedback will help us chart a way forward for supporting the growth of the Central Coast's night-time economy.

About you

We would love to know a little more about you before you provide your feedback. This is so that we can better identify and incorporate your needs into our strategies and plans.

Q: Please select all that apply to you (select multiple)

- I live on the Central Coast
- I visit the Central Coast
- I own a business on the Central Coast
- I represent businesses on the Central Coast
- I represent the hospitality or tourism industry

Q: Please let us know your age (single selection)

- Under 10
- 10 - 24
- 25 - 39
- 40 - 54
- 33 -74
- 75 and over

Q: Which suburb do you live in? (select from drop down list)

Alison

Background

Urban Enterprise (Consultant) was engaged by Council to develop a discussion paper for the development of the night-time economyin the Central Coast region.

This discussion paper identifies interventions and concepts to enhance and activate night-time economy precincts on the Central Coast, based on identified constraints, industry needs, a strategic framework developed from consultation, as well as best practice initiatives across Australia.

The discussion paper aims to enhance and activate the night-time economy and create better places for business, the local community, and visitors after dark on the Central Coast.

Q: Have you read the discussion paper?

- Yes
- No

Q: Please select the precincts you have attended for an evening event or activity in the last 3 months: (select multiple)

- Terrigal
- Gosford
- Ettalong
- The Entrance
- Woy Woy
- Umina
- Wyong
- The Entrance
- Long Jetty
- Erina
- Tuggerah
- Other (please specify)
- OK so we have demographics and home suburb. How do we use this data set?

Findings

The discussion paper was informed by robust stakeholder engagement process, an analysis of development constraints in public policy and the built environment, as well as research on best practice night-time economy initiatives across Australia.

Q: Please indicate your level of agreement with the **key insights** uncovered through consultation and analysis: (Strongly disagree, Disagree, Neutral, Agree, Strongly Agree)

1. There is a lack of vibrancy and things to do at night, especially for families.
2. The region is highly dispersed with a lack of transport infrastructure and parking.
3. The public infrastructure in many areas is unattractive and poorly maintained.
4. There are concerns about security, safety and alcohol related antisocial behaviour.
5. Noise complaints prevent the progression of late-night economic activity.
6. Council policies are unclear and delays in approvals can prevent investment.

Strategic Framework & Priority Actions

The Strategic Framework developed in the discussion paper sets four themes and subsequent projects and actions that have been prioritised over short (1-2yrs), medium (2-4yrs), and long-term (4yrs+) timeframes. The four themes are:

1. **Policy & Leadership** - Policy, planning and governance structures to enable and support the night-time economy.
2. **Activation** - Cultural and social activity to create vibrancy.
3. **Visual Amenity** - An attractive, immersive, and vibrant public realm to bring places to life at night.
4. **Enabling Infrastructure** -Well-functioning infrastructure and services to ensure the night-time economy can be accessed and enjoyed safely.

Q: Please indicate your level of agreement with the short-term **priority actions** (1-2 years) identified for Council: (Strongly disagree, Disagree, Neutral, Agree, Strongly Agree)

- Deliver Safer Cities: Her Way pilot initiatives
- Establish a working group to encourage collaboration and guide project delivery.
- Create a roadmap for managing business enquiries within Council.
- Establish a business concierge to assist investment in the night-time economy.
- Maintain strong working relationships with state partners.
- Manage community expectations around noise in key night-time precincts.
- Establish 'Special Entertainment Precincts' in key locations on the Coast.
- Trial an extended business hour policy for Special Entertainment Precincts.
- Trial automatic outdoor dining permit approvals for Special Entertainment Precincts.
- Support delivery of live music micro-festival events at night-time.
- Advocate for funding through the Office of the 24-hour commissioner.
- Support night-time events and activities such as night markets.
- Facilitate live music and busking after dark across the coast.
- Encourage local food businesses to deliver late night meals to bars and live music venues.
- Collaborate with Transport for New South Wales to trial pilot on demand bus service.

Q: Please provide your email address so that we can send you project updates:

Q: Please share any thoughts or comments that you may have:

Q: Please feel free up upload a supporting attachment:

Next Steps

Industry professionals and business owners only Would you be interested in joining and regularly contributing to a night-time economy working group?

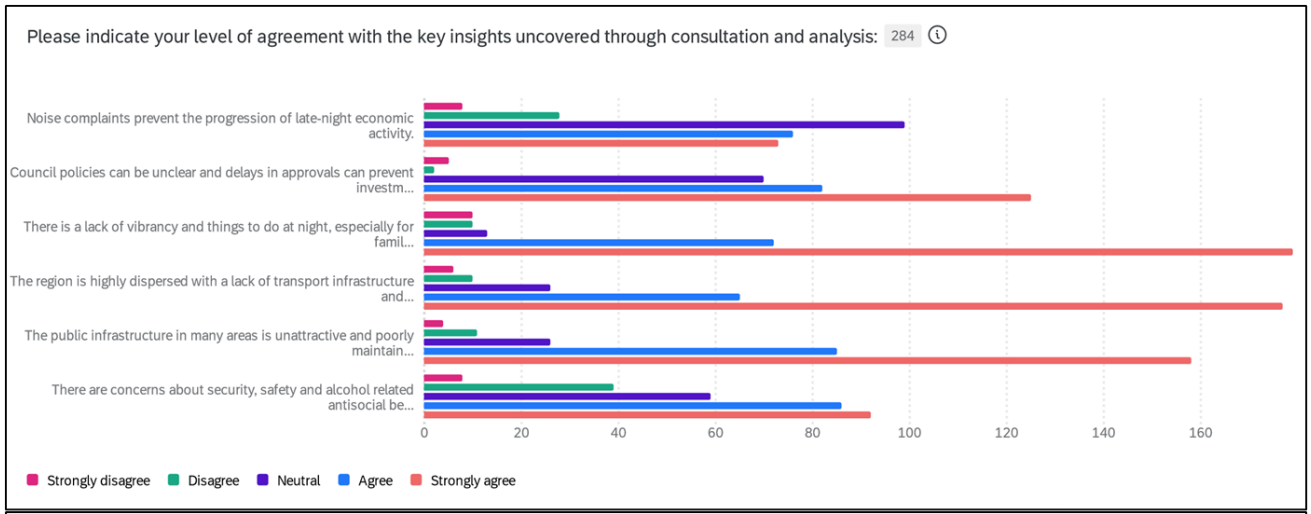
Response email

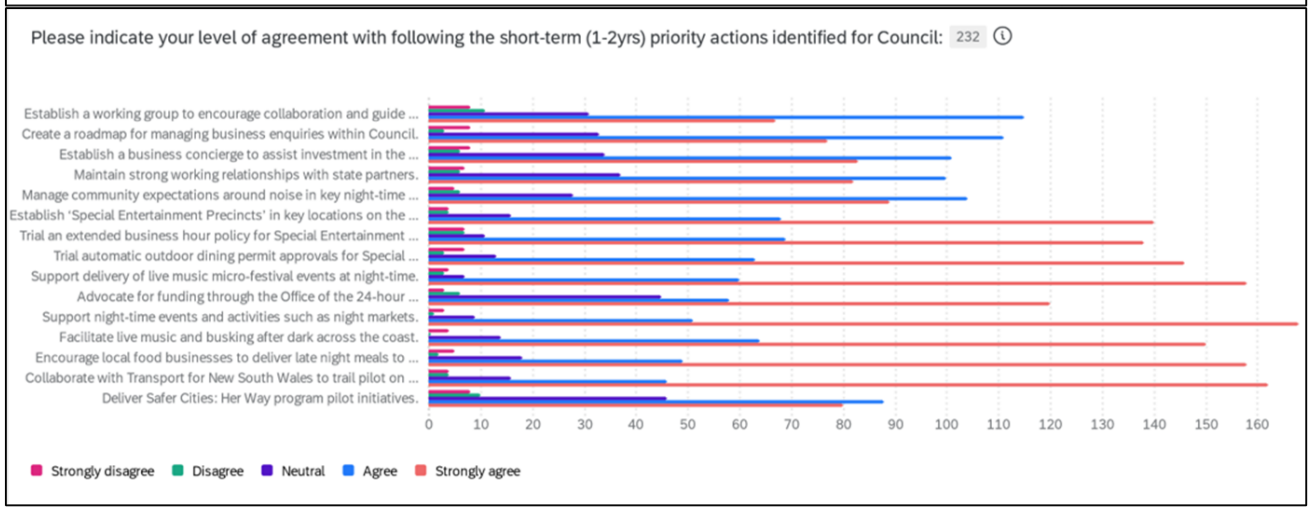
Thank you for providing feedback on the Draft Central Coast Night Time Economy Discussion Paper.

Please share with your networks and anyone who you know might be interested in having their say.

You can find a summary of the responses you provided listed below.

Attachment 2: NTE Discussion Paper Exhibition Online Survey Responses.





Attachment 3: Public Exhibition Submissions received on Draft Central Coast Night-Time Economy Discussion Paper via Your Coast Online

Submission Number	Comments
1.	The Entrance should be much more utilised by visitors and residents, it needs a good clean up and better planning of amenities. Why was Long Jetty not included in this, many restaurants, a bar and pubs.
2.	I used to live on the Central Coast and feel that it used to have a more vibrant nightlife than it does now. I would love to see late night cafes, and bars that are able to open later, rather than just loud night clubs that cater to young people.
3.	I grew up in the Central Coast and have run my own music events business in New York and Amsterdam for over a decade. Now I'm back in the Central Coast and keen to contribute to the culture. I'm considering opening a listing bar (like the Tokyo listening bars) in a *very* special location. So I'd love to be involved and work out how I can bring my experiences to bear for my hometown.
4.	to have better night light you also need to attract more population to the central coast either to live here or to travel here, either way you need better transport i.e. faster train, better roads, etc.
5.	More entertainment options are required in Gosford CBD
6.	you need to attract more population in order to boost the night time economy. that needs fast train and better roads. Also for gods sake increase the night time shopping hours. after 5pm all shopping centres are sad ghost town.
7.	Gosford lacks a place to listen to live music. Terrigal beach is where everyone heads to listen to live music. Wouldn't it be fun to have live music in Gosford? There are no shops you must travel to Erina or Tuggar for shopping... The station and buses were located in Gosford, not Erina, which was a mistake in planning. Everything comes to Gosford. A good planning decision would make Gosford a beautiful city. Just look at all the cities across NSW (Sydney, Penrith, Parramatta, Wollongong, and the list go on).... The decision to place a large shopping center in the middle of the beach with a lack of public transportation is foolish. It's difficult for people who don't have transportation to deal with their problems. Mental health and easy access make it a better decision. Gosford council keeps making bad decisions without consulting the community. I am optimistic that the new council, with its new leadership, can transform this community into a place where people would choose to reside, take vacations, or travel for shopping and entertainment.
8.	I am constantly amazed at the difference between, the nightlife & vibrancy of street food/markets and attached entertainment in various cities/towns in Thailand for example, in comparison to night time on the Peninsular. Sadly a chalk and cheese comparison and I don't know why, except to suspect there maybe far to many rules and regulations governing the provision of these facilities/services. I am reminded that the population of Thailand for example is 70 million odd and that in itself suggests that there cannot be to many health risks involved with the serving of cooked pork/fish/chicken etc from a gas powered street cart !! The Peninsular is such a wonderful location between Brisbane Waters and the Pacific Ocean but shopping centres excluded, activity is very ordinary, more particularly at night.
9.	I have kindly received a response to my suggestions outlined in an email from Andrew Powrie as follows- I appreciate your efforts in introducing a discussion paper on the potential opportunities for the night-time economy on the Central Coast. I would like to propose a thorough review of numerous streets with the goal of activating them for pedestrians and potentially making them car-free. In my view, the transformation of specific precinct streets into lively place-making areas, reclaimed for pedestrians, holds the potential to breathe new life into our night economy. Moreover, this initiative could contribute to a decrease in alcohol-related violence, foster intergenerational communities, and provide ideal spaces for cafes and food trucks (there are far too many clubs and fast food outlets on the Coast), music, dancing, ping pong, and various activities. A noteworthy illustration of this concept could involve dedicating segments of the main street in Ettalong and sections of Blackwall Road shopping precinct in Woy Woy to such multifaceted purposes. There is plenty of parking in both these locations. I'm sure there are other streets in the

	Central Coast that would also benefit from this transformation. Prominent streets globally are embracing car-free initiatives, and if London can successfully implement such changes in Oxford Street, there's certainly potential for us to achieve a similar transformation in placemaking on the Central Coast - https://www.timeout.com/news/famous-streets-all-over-the-world-are-going-car-free-070621. Broadway NY was closed to cars from 42nd St. to 47th St. and turned it into a quarter-mile long pedestrian plaza. It started just with some traffic cones and some beach chairs. It's now become a model for other cities to try things out. Perth is also bringing their streets to life - https://rac.com.au/home-life/info/state_bringing-perth-streets-to-life. Numerous examples abound. If the Council is truly committed to a vibrant night economy, appealing to both residents and visitors, it's high time to rethink and reimagine the possibilities. I'd be delighted to share my ideas with you if you're interested.
10.	I love living on the central coast (and love my house in Wyoming) but have always felt stuck when it comes to something to do on the weekends. I'm a 26 year old female and it feels really limited. We have a beautiful waterfront and a big Main Street in Gosford but it is all disappointing. Terrigal is where myself and my friends end up going, but it's so out of the way and transport options are limited. Terrigal has a super lively culture at night and I'd like to see that in Gosford.
11.	Think outside Gosford and Terrigal. Tuggerah, Wyong have growing populations and main thoroughfare to other areas and has links to public transport. Support thee areas - people are moving to this area. Give them a reason to stay.
12.	No one likes Gosford I don't see it ever being an icon to the central coast region it's a concrete jungle. Majority of people that live on the central coast enjoy going to the beach and dining and entertaining by the ocean. I believe that there should be more night life at the entrance given that it already has the infrastructure there. Everyone visits the gold coast for a city/beach holiday so why can't we have that on the central coast.
13.	We have been extremely limited with night time entertainment throughout the Central Coast for a while now. I feel that bringing more activities and places to go will stop a lot more crime on our streets
14.	Really important to consider the dispersed nature of the central coast - the report worried me a bit for its focus on Gosford, so ensuring we also include Toukley, Budgewoi, Wyong, the Entrance and other hub/ parts of the central coast will be key.
15.	Central Coast needs more establishments and dining places that we can enjoyed at night time. On the weekends , after 9pm Central Coast looks like a Ghost town. Young adults don't have place to enjoy themselves and meet new people and prospect partners.
16.	It would be good to allow bars/restaurants to take a more European approach and be open until 2/3 or even all night.
17.	The local daytime infrastructure is what needs attention. Council is wasting precious time and money on inventing a solution to a problem that doesn't exist. Please just fix the roads and lower the rates! Let us have our peaceful nights.
18.	Better transport absolutely necessary - shuttle bus on a loop would make the world of difference
19.	The Central coast most desperately needs more nightlife options for young adults and adults to enjoy. We only have one nightclub on the central coast, which limits many options after venues close at 12am.
20.	Parking and security will need to be addressed
21.	* Change liquor policies to extend late night venues at Cafes, pubs, restaurants, nightclubs etc. * Change footpath licencing to provide more al fresco outdoor/footpath dining and entertainment (similar to Darling harbour & Honeysuckle bay Newcastle) * Provide 24 hour public transport for the whole coast. With set times at venues & stops in between. * Close some streets off (no vehicles) to provide mall like atmosphere. Great for buskers & visitors alike.
22.	I think there should be a particular focus on waterfront venues
23.	Make all Pubs and clubs on the coast the ability to host live bands, without the fear of being shutdown to noise complaints. It will take some time, but people will be encouraged to enjoy the nightlife more often. Most Pubs and Clubs are empty after 9pm, due to no entertainment. Everyone is tired of the

	"person in the corner playing guitar" thing now. There's so many great bands here on the coast, but they rarely get a chance to play live.
24.	The NTE is an important missing component for the Central coast community. The gentrified areas are an inhibitor for the implementation of any strategy on this particularly around noise complaints, this needs to be addressed up front. Also whilst train transport is fine the connecting links to serviced areas along the rail corridor is very poor particularly of a night. I would also like to see a focus on other areas outside of Gosford cbd. Whilst this may be the regions capital the northern area of the coast needs attention as it is the growth corridor for the coast and with it proximity to Newcastle there needs to be an attraction at this end to mitigate the choose of travelling to Gosford or Newcastle. These two cities are about the same distance and travel time but I believe Newcastle has more to offer and will win out in the choice every time.
25.	The northern end of the coast (Wyong area) desperately needs night time entertainment options.. it really is a dismal situation
26.	Total lack of activities for families with pre-teens and teens; fun activities that don't involve alcohol like roller skating, karaoke, laser tag, go karts in a decent size scale
27.	There is currently no nightlife in the peninsular. We need more restaurants, bars and cafes - not just night venues but also day venues
28.	The Central Coast needs an elected council immediately. There is insufficient communication from the existing administrator. The council needs to focus on road repairs, library service & preventing the sale of council assets.
29.	Would be fantastic to see something other then live music with the same old pub vibe everywhere. Perhaps more sophisticated bars with different music genres on different nights for all generations and social types to enjoy.
30.	NSW has actively strangled any nighttime fun and having to travel hours to watch quality live music in Sydney or the Hunter Valley is inconvenient at any age. Anti-social behaviour has been allowed to take over any positive night time entertainment for the majority since nobody normal is out on the streets.
31.	I think more establishments/venues like Tropicana Social Club are a great look and bring out the best in the community. I also think that the Galleria/Cinema Paradiso complex in Ettalong hugely under appreciated and has so much potential for night life on the Central Coast.
32.	Central Coast is outdated and living in the past. Shops including major retails close early and should be open later. There us no night life for the growing young people and older people to enjoy with going on date nights or planning get togethers. It would be great to see the Central Coast take a huge step in providing a social night life to us to enjoy.
33.	I went out in Wyong with my husband a few months ago on a Saturday evening. Trying out the cocktail bar (awesome place BTW). We were responsible and left our car at home. It was a NIGHTMARE trying to get home to Gorokan. The last bus left before 10pm. We tried calling a taxi. The taxi hadn't arrived after half an hour. We walked to Wyong Station. There were no taxis there either. It took over an hour to get a single taxi. It was not a pleasant way to spend the evening. If you want anyone to be out and about in the evenings, start with making it actually possible to be out and about in the evenings. No public transport from 10pm to 7am doesn't really encourage people…
34.	We have a serious lack of arts and entertainment culture on the central coast. We have the talent and the space to enhance this aspect of our community. Doing so will draw more tourism and money to the area as well as enhancing the lifestyles of our locals.
35.	We need more dining options in Gosford CBD the dinning precinct is really lacking with no variety of price points. All food venues center around alcohol it would be nice to have less alcohol focus dinning venues
36.	Bring Back a venue like the rhythm hut! It was such an amazing collaborative, age friendly, creative, inclusive space!
37.	A light rail from Gosford to Terrigal via Erina that runs late at night to help with public transport congestion
38.	I live less than 10 minutes from Gosford, and yet I never go out at night there - I would rather travel to Sydney, there's absolutely nothing for me to do in Gosford. Parking is atrocious, public transport is extremely poor of a night and it feels unsafe and rough. I would love to be able to explore the

	coast and various areas of an evening but there's no transport to link various areas. We also need to develop places like Wyong - let's not repeat mistakes and focus just on Gosford.
39.	On top of night time activities, maybe make it easier for businesses to be open on Sundays. Currently if you want to do something on a Sunday you're basically accepting nothing is happening (especially in Gosford. Feels like a missed opportunity especially over the summer).
40.	Start small, think walking distance between places to attract people to an area and stay longer, spend more then yravel home I.e. Gosford Mitre 10, so before the Railway, to the Waterfront (Fredericos AND Iguana Joe's- showing my age here). Small bars with live music in East gosford would compliment Elanora and the restaurants there. Toukley has potential, as does Wyong between the 2x pubs, Budgewoi. Break the monopoly the pubs have and give some diversity to smaller areas. Ourimbah could have another bar between Tallies and the station too.
41.	Council parking in Gosford should open later so that people can park to attend night time activities. More lighting on streets in Gosford so that people can feel safe. Too many abandoned buildings in Gosford CBD- very creepy.
42.	We need better public transport/ taxis after dark.
43.	Need more cool places in the entrance it's a ghost town and so unappealing for a prime tourist location
44.	There is not enough for kids aged from 10 to 18. There past the point of playing in parks these kids especially boys need a place to go somewhere more financially accessible the coast just doesn't cater to this age bracket if something is done we will have a situation like Queensland where there running the streets causing mayhem
45.	The Central Coast needs to create a hive of entertainment our waterfronts are u see utilised and live music/concerts need to be encouraged on the coast. Central Coast Stadium and Hosford Race club could host wonderful music event
46.	A few suggestions movies under the stars in spring & summer. Turn the entrance into eats Street open at night like newton , the rocks and darling harbour, Oxford Street. Make it the place people want to be. More variety of stores to open up cocktail bars , more restaurants with music, jazz n blues bar, cocktail bars and tapas. Support local artists. Bean bags on the beach like bali with food and cocktails. Light up the lake have food and music along the water. Outdoor rollerskate rink Bring back the movie theatre Rides in the park night markets. Winter do a outdoor ice skating arena At the moment there are so many shops vacant they need to support these local businesses.
47.	Would love to see Gosford city's Mann street, revitalised with a "Newtown King St" vibe. Public transport is already established there. Would love it to have many cafes, bars, pubs and late night shops, theatres, arcades/kids activities as per King street.
48.	Why is Gosford Stadium not used for concerts??? It is the perfect venue for this. Lionel Ritchie some years ago is a perfect example, it was excellent! Especially for the older age groups.
49.	There used to be more for teenage kids - Blue light discos & roller skating discos, without those the teens can't socialise safely under the supervision of adults other than their parents so they are more destructive with boredom. More restaurants and surf clubs open over out beaches like they have in Queensland would bring tourists and keep our locals with variety of dining and socialising. Regular buses at night help stop drink driving and promote access to and from the entertainment areas.
50.	My biggest issue living in Lake Munmorah is a lake of transport options available if I want to go out and have a couple of drinks. I risk being stuck somewhere else and not able to get home because there are hardly any Ubers or taxis.
51.	The night life in the central coast suffers for three main reasons in my eyes. 1. Because the public transport at night is non existent so it's not worth going out because you can't get back. 2. The venue options are far two limited. In Gosford there really is only Gosford hotel and the leagues club open at night and they don't really provide entertainment. 3. Going out is far to expensive. The cost of a night out is more then a third of my weekly paycheck and I'm a tradesman. If a tradesman can't afford to go out at night what hope does anybody have that isn't earning $150,000 a year? Wages are too low and cost are too high
52.	Thanks for doing this - I think there's a lot of potential (and interest) for a decent nightlife on the coast. We're located at Woy Woy (walking distance to the pubs and shops.) and I haven't had any issues with noise or anti-social behaviour. Even walking home late from the station has been fine.

	I've also taken the late-night bus home from Ettalong a few times and was pleasantly surprised by the whole experience. I don't know if there's any scope to provide places like the Link and Pin with additional funding because it's been a real boon in terms of offering different things to do. Similarly, the Sunset Sessions up at Lions Park, they're not really my thing, but they get a good crowd, and I think it's a great way to use the public space. Centred Ceramics is another one at Umina - they do good classes/workshops in the evening and deserve support.
53.	Ettalong Beachfront (zoned recreation)needs to be changed to make it active and more welcoming for tourism and locals alike. Remove the man made vegetation, improve the area similar to that around the box and include lighting for nighttime safety/ fountains/BBQs/ and courts for games.(Volleyball , Pickleball , badminton etc) Opportunities are also then provided for the commercial properties located on the streetside to create local employment along with improving the nighttime experience.
54.	Please can this NOT focus on alcohol!! There is a dearth of alcohol-free venues, bars, and entertainment on the coats significantly contributing to the issues of addiction in our bored youth (I say this as a counsellor not a "Karen"!
55.	Business development application process and approval conditions set must be improved and made realistic for business to be able to function on the central coast. The current time consuming and restrictive nature is limiting any future growth.
56.	I found this report too Gosford centric. When families go out at night they want local, when teens go out they want to be able to get home (without parents having to pick them up at midnight or walk 2km from a train station). In Wyong all the local restaurants are packed on a saturday night - the report failed to show the contribution the Art House is making to Wyong. The festivals are well supported at night - especially Love Lanes, so why not do more. I avoid Gosford or Terrigal as parking and traffic is a nightmare.
57.	We have missed out of so many opportunities when it comes with creating a bigger and better Central Coast, instead of just focusing on a creasing the rate-payers by maximising housing, how about maximising infrastructure to support it, focus on community services such as those that would bring in Tourism and peak the interest of residents. Many cities all around the world have facilities that focused on the community and that then led to a massive influx of people wanting to live their and that means more investments, more jobs and more opportunities.
58.	Long time overdue and keep on track to make it happen and no just another promise
59.	The existing run-down buildings all need to be knocked down and rebuilt. In particular the old shopping complex next to imperial plaza and the abandoned building, and the empty space next to it, opposite the old council building. The roads into Gosford are unsuitable at the moment as they're mostly single lanes and intersections are often blocked by traffic. Parking is also unsuitable for events in Gosford as there are limited road side parking spots. More apartments keep being added to the area but no extra parking is added so existing community members are forced to adjust to even less parking being available. A centralised large parking structure with a pedestrian zone in the town would be awesome as it would encourage people to attend community events and improve business for local shops.
60.	This paper like most things on the central coast only seems to cover the southern end (Terrigal and Gosford). There is no space for new infrastructure yet the northern end of the central coast has the ability to forward plan layout parking transport and overall impacts to the environment. The northern end of the coast needs attention and investment as we do not want to have to commute 30 to 40 minutes to get to the southern end of the coast to have knowhere to park to then have the same commute home. Think bigger and plan for something that can be great not band aid solutions for the already poorly put together mess that we currently have and diversify to include and benefit all areas of the central coast not just Gosford and terrigal.
61.	Lake Munmorah shops. On Anita Ave lake Munmorah. I strongly recommend that shelter table and chairs be installed in this little strip of shops. Firstly, there is a large elderly community in this area. Secondly, I think families can come and hang out there while dinning,outdoors and enjoy the lake behind the house on Anita Ave. I believe tables and chairs under shelter will improve the social aspect of this area. There used to be shade from what I understand here. However the trees have been removed. It's a shame because there is also plenty of parking along these shops.

62.	I visit Parramatta evening's regularly and love it, we should be doing the same thing here on the Central Coast.
63.	I am extremely encouraged by this paper. As a local, who, granted is a full time mum - I have lived in Gosford/Somersby for over 5 years, but still have little awareness or excitement toward anything interesting to do near me in the evenings with my children besides the odd night market and club entertainment - which rarely appeals in diversity. Secondly as an entertainment professional (singer and entertainment provider of bands and tribute shows and events), I have found it prudent to continue to take bookings and create opportunities outside of the central coast for lack of adequate performances spaces and opportunities to showcase our roving bands/entertainment. My wish is that the developing Gosford Waterfront (amongst others on the central coast) become a key NSW landmark entertainment precinct with opportunities for larger events (indoor and outdoor) as well as ongoing entertainment (including live ambient music in restaurants or proposed waterfront strips) to both entertain and relax locals and visitors alike. If geared towards a largely family oriented approach into nightlife, I believe this will also work towards reducing the incidence of crime and alcohol related behaviour in adolescents on the coast - giving them something to do and places to be that are engaging, populated with people enjoying themselves in a healthy way, and full of music that has a proven ability to positively affect mental health. There are many published articles and studies showing the ability of music to break down barriers and encourage socialisation, which in many cases are part of the cause of violence and addictive behaviours in young people, and can be another way to give support and healthy opportunities for connection to those affected by domestic violence in our community. All in all, I would like to stay up to date with this initiative and would be keen to volunteer my time/services if needed in any working group or advisory capacity. With thanks, Lana Nesnas
64.	The empty shop fronts hinder night time activities and feel unsafe to be near
65.	I am currently launching a Premium Blend Non-alcoholic Cocktail Syrup brand (The Gypsy Soul) My friend has recently bought the Long Jetty Boatshed Having AlcoFree events at Long Jetty foreshore would create a vibrace in the community that is often sadly lacking He is applying for a grant but is finding it difficult to navigate I have had difficulty getting any help from media to publish an article to promote my brand We are individuals trying to address these issues and find ourselves hitting walls of bureaucracy. Every one talks No one acts Individuals can't do this alone
66.	I'd love to see more activity on the Central Coast, but I don't like there being so much focus on Gosford. I don't live in Gosford, nor would I go down there to go out. I want to see more happening around Wyong and Tuggerah. I think there is so much potential here for not just night time economy improvements, but any time of day.
67.	A night time show similiar to Pioneer Settlement shows, https://www.pioneersettlement.com.au/experiences/by-night/ Heartbeat of The Murray and Legends of The Mallee, would create a great waterside viewing option and opportunity for vendors in a family friendly environment.
68.	The Central Coast has an opportunity to become a vibrant community. The lack of direction, progress and investment is soley at the fault of council.
69.	I believe that council have not thought this out and are panicking beleiving that something needs to be done but does not know what.
70.	A Gosford Marina / Waterfront Entertainment Precinct would be a game changer for the Central Coast. Shellcove Marina should be looked at as an example of what a progressive Council can achieve, converted their former rubbish dump into an Harbour Precinct, at no cost to ratepayers. In fact ratepayers will receive @70 million dollars in JV Public Private proceeds Imagine celebrating a Mariners win in a Waterfront Tavern / Restaurant / Bar precinct directly opposite our Central Coast Stadium. Combined with the Leagues Club the Stadium' precinct should be the Central Coast major entertainment destination. No reason Shellcove Harbour Precinct success could not be replicated here with progressive political attitude. Bruce McLachan Fmr Independant Clr.
71.	We need actual late hour parties with no fear of noise complaints. A 4am finish shouldn't be taboo and is a normal night time finish. Residents who moves close to old piubs and venues have no recourse for noise complaints and need to be more aware when buying/leasing a property, rather than complaining after the fact.

72.	I have worked in the music industry, specifically for triple j, for almost 20 years and am a strong believer in increasing music and arts to the Central Coast. I have been involved in recent incentives such as Tubular Festival and would be happy to include my expertise during the construction of this plan
73.	Priority needs to be given to building Gosford town centre as a 24-hour destination. Council needs to force shop landlords to invest and clean up the stores. We're building apartment blocks which is great but other than two pubs there's nothing there to encourage residents and visitors to come to the 'capital' of the central Coast.
74.	Ideally I'd love to see a karaoke bar put in place where karaoke can be sung 7 nights a week. Hosted by professional sound technicians or at least someone who has many years experience running karaoke. It's something we are missing on the coast and is extremely popular in many cities around the world. We have the singers and if you do it right it will become well known as the place to sing. I'm happy for Chief Executive Officer, Mr David Farmer, to contact me and collaborate ideas for this. I currently run karaoke out of 4 venues on the coast and can show you how it's done. We just need to venue and funding to make it happen.
75.	The Haven in Terrigal should NOT have any night clubs or Bars approved or Live music or Discos. These should be concentrated in Main Street Terrigal
76.	The Naughty Noodle Factory in Gosford is an example of what can be done. Please support the Naughty Noodle Factory and Funhause.
77.	Safety and transport and limiting noise to very specific precincts are my most important concerns.
78.	Our coast is rapidly growing, largely from Sydney spiders moving up. A lot of these people do often say there is not much to do here at night etc. I really think an establishment like Miami Marketa on the Gold Coast would work well here. It's like a collective of restaurants and bars under the same roof essentially.
79.	It's not only night time entertainment that is the concern for the coast, the teens have next to nothing to do and most activities available for families are super expensive and not viable in this economy.
80.	we need reliable fast and regular public transport throughout the coast. At the moment apart from taxis and ubers there are no options to take public transport at night
81.	Shuttle bus service running from south to north. As in umina to Toukley. Via entrance. Hub at terrigal. Bus to somersby via Gosford. .bateau bay to Wyong. . The people on the coast with drink driving. Can't go to the good hubs. Gosford citywide go off soon. Free bus every hour to 2am.
82.	We need food places to be open later and more events to come to central coast atm it's boring and not attractive for people to move up here from Sydney and the council rates are so much more expensive then what people pay in Sydney.
83.	Simple, efficient transport around the coast is a big problem
84.	I often work at Pinocchios Wine and Pizza Bar (located opposite Kibble Park). I have on many occurrences noticed anti-social behaviour and Drug-affected individuals loitering around the area. As a female working late at night, it does often feel unsafe min the area. I would like to add that over the past couple of weeks, the Kibble park Christmas markets has brought out a lot more families, brings more positive vibes to the area and has increased trade. I think late-night markets or live music events in Kibble Park could bring a lot of positivity to the area.
85.	After dark coffee shop/book store with different entertainment e.g music, comedian
86.	It would be incredibly to see family friendly afternoon and nighttime events on the coast. The scenery is beautiful and vibrant and the potential is infuriating to see go to waste. The Entrance could be an absolute hub of activity, build on the Long Jetty vibrancy redo the street art, encourage restaurants, grants to update Long Jetty pub.
87.	Happy to collaborate with council on any projects
88.	Less events and focus on Gosford. There's no parking, and no one wants to take their families there now or in the near future. Reinvigorate events at hubs in the south end (Woy woy / Umina) and the northern end of the coast.
89.	Focus on safety and security has to be top priority. Perception of lack of safety in Gosford CBD is key.
90.	Would like to advocate for late night offerings that are not just live music or family related. These can include literary and other arts and culture gatherings. A big factor for events managers on the Coast is the difficulty in promoting across such a wide and

	dispersed area. Support for promotion would assist and attention to events and initiatives that aren't just for a younger demographic.
91.	Need more things to do on the peninsula and Gosford at night
92.	Not sure you intend on doing this with you trying to implement 15 minutes cities. Hopefully that ludicrous idea has been thrown out with the old ouncil members. Improving the coasts night-life has needed improving for a long time. The initiative is long needed.
93.	Lack of family friendly night time activities, especially next to beaches.
94.	All of your issues re Gosford being unattractive seem to focus on buildings etc when mostly it's the people. We aren't afraid of buildings attacking us - it's the undesirables we are concerned about. The council and planning depts have totally missed out on protecting the young against the spread of Vape Shops - absolutely failed. There are now now 3 highly visible in Gosford main-street - One Bright Yellow depicting The Mask - right near public transport where thousands of school children pass to get to school each morning. One right opposite Woy Woy train station. Again Highly visible aimed at Teens and 1 Bright Green (good old friendly Uncle Jakes) just 100mtrs from a Public School at Ettalong. If you guys can't even get on top of that one how are you going to fix the rest????
95.	There is more to the central coast than Terrigal and Gosford. The northern end of the central coast, particularly areas where council has allowed dense high volume housing to go in has nothing other than residential plans. Many commercial DAs are being knocked back and the land is then on sold as investors get frustrated with the council. In turn town centres which were meant to include entertainment options for residents disappear and just become more housing. Please consider the Woongarrah Town Centre and other areas in the northern sector for these projects. Coupled with the lack of transport options, we are too far away from the areas council deem more deserving for these projects. We have a very large population, the vast majority seem to be leaving Sydney and complaints in this area are often centred around the lack of anything to do including just basic wants like decent restaurants and licensed venues. Soon it will be more viable for us to spend our money in Lake Macquarie council areas with the growth that is happening in those areas, particularly Morisset.
96.	Transport and the lack of places to go to meet friends/socialise is a massive part of why people on the central coast dont go out and spend any money in the community. Its too expensive to travel 30-40 minutes to Terrigal if you dont live right in the hub, and even there isnt enough high quality places that provide diversity and keep people interested outside of Terrigal. I also believe though investing in Gosford is a step forward, investing in mutliple areas to cover travel all over central coast is a better initiative so anyone can socialise with travel within 15 - 20 minutes of where they live.
97.	About bloody time! Central Coast is a beautiful place, let's make it better...
98.	I believe that CCLHD & Police need to be consulted & a major part of any planning group. The Central Coast (Lower Hunter) has the worst road accident/citation statistics in the State. It would appear that little to no consideration has been given to these details when planning the Draft Central Coast Night-Time Economy Discussion Paper.
99.	Safe public transport options are lacking for the region for late night entertainment. There is a lack of nightclub settings for people to enjoy. Gosford cbd and waterfront are sitting dormant and could be an amazing precinct with the right management and refreshment of the areas.
100.	There seems to be an emphasis on "live music" however this excludes a segment of the community - those of us who like to dance to DJs. Does this fit the definition of "live music" ? i dont think it does. There is a huge community of electronic music lovers on the central coast and this report seems to have ignored them. If you are going to do this then the entire community should be supported. This includes the niche nights for artists, bands and DJs who have a small following. Its all well and good to have venues that can host hundreds of people but there are people on the coast who make, dj and perform music that dont get large numbers, making the cost of a large venue hire unfeasible. Look at Melbourne where loads of smaller niche bars and nightclubs exist and it is vibrant because of the support that the non-mainstream acts get. If you dont provide spaces where smaller, non-mainstream acts and djs can perform, then your "night time economy" will only service some of the community when it has the potential to be a lifeline for artists from all genres and all sizes
101.	Revamp The Entrance town centre & main street... Put a roller coaster & amusement park over the water between The Entrance & North Entrance like Santa Monica pier... we already have the

	restaurants, pubs, cafes & main stage in the park for outdoor concerts etc to support expansion but we need investors & money spent on our town & channel to bring back return tourists...Special Consideration MUST be given to Wheelchair Accessibility! Also, transport infrastructure needs to be addressed, light rail, buses after 10pm, bring back Night Rider services.
102.	I look forward to a more vibrant night life on the Central Coast, I'm especially keen to see more live music, and noise complaints managed more fairly to support live music venues rather than kowtowing to one or two neighbours, I would like to see a policy developed to give less important to 'nimby's' and more support to fantastic get up and go entrepreneurs who are actually having a crack.
103.	I would like to share a personal example of how Council acts as a barrier to economic development on the Central Coast, whilst recognising that Council isn't the only prohibitor to economic growth. I am working to launch a business that will run night-time kayak tours on the Central Coast. Without even asking for a risk assessment or business plan, Council rejected my request for an open space licence (which is needed to launch the kayaks from a public space) based on the legal team deeming the risk "too high". On page 32 of the discussion paper, the section titled Experiences, perfectly encapsulates why night-time kayak tours would be great for the Central Coast's NTE: "There has been a shift towards experiential night-time economy products in response to changing consumer preferences and demands. Traditional nightlife experiences that centre solely around alcohol consumption have given way for more immersive and engaging activities. Consumers now seek unique and memorable experiences that provide entertainment, social interaction and a sense of exploration. This trend has been accelerated by the rise of social media and the sharing economy. Consumers have a desire for novelty, engagement and memorable moments that are visually appealing and make for great content." Furthermore, night-time kayak tours are suitable for families, not only young adults.
104.	Water Front Project needs to be scaled back , there should be NO HIGH RISE BUILT should be left for public open space , restaurants , shops etc ,
105.	I've run successful nightlife businesses in New York and Amsterdam for the last 20 years. I've now moved by to my hometown, the Central Coast. I'm sorry to say that I'm disappointed in the many biases and overbearing solutions I see in the paper. I see lots of misreading of data, an unfortunate focus on "children and family", missing what nightlife is all about. Some questions on this very survey are biased and will lead to unusable data. Establishing Special Entertainment Precincts is just about the worst solution I can imagine. This well-intentioned but naive approach has hollowed out the culture of Sydney, subjected it to international ridicule, and demoted it to Australia's second city. It pushed REAL culture underground, or elsewhere, and replaced it with faux-luxury, artificial experiences with little connection with street-level culture and art. Instead there should be a focus on enabling and nurturing ORGANIC culture, created by the people of the Central Coast. There should also be smarter zoning, and limits on noise complaints amongst many other things. We can't let the complainers (the noisy minority) define our culture. People in the Central Coast want art, music, experiences, and they want them to happen freely in the town we all so love. You should know that there is a FLOURISHING underground scene in the Central Coast. Culture is happening, and it's very rich and diverse from an age, race and income perspective, but it all happens hidden away from complainers and government control. I've performed at some of these events. If your goal is to bring this culture into the light, then you need to engage with the reasons why people love these DIY popup events so much. They are fun, free, diverse, inclusive, and judgment free. They are created by real Coasties, they are at peace with their surroundings, and importantly, there are no complaints, guardrails or warning signs. Nobody wants to go to a government-run party inside the dotted line. I would love to chat more and offer my support in whatever way I can. I am personally determined to see Central Coast become the thriving cultural hub that it deserves to be. I would hate to see government funds wasted on making the Central Coast & Gosford more Sydney-like. Let's rise above Sydney! We are the place you move when you've had it with Sydney's nonsense. There is an opportunity to stamp our own cultural identity, let's not miss it!
106.	Other areas on the lower peninsula from Gosford down have night markets. To me it would be a good idea to trial this type of market at the entrance. They could be held in the summer months once a month. Just like movie nights with food trucks on attendance or other type of events that caters for both young ppl and families.

107.	The Discussion Paper and the NTE initiative from Council is a good one and has been well coordinated and presented. I'd be interested in assisting where possible to ensure State Government (Regional Development) engagement.
108.	Bring back Cinema complex to Gosford CBD to cater for the the residents who will occupy all the high rise apartment blocks. Gosford needs live music not poker machines. The Creigtons art decor is a perfect structure venue to upgrade into a theatre restaurant - cultural shame to destroy it, such potential to bring life! to CBD. Cultural economic is night-time economic - music, literature, dance show, theatre
109.	Come on lets get on with it. Let's get Gosford up to the world standard it should be.
110.	good on you for exploring this topic.
111.	There needs to be more nightlife throughout all areas of the coast. Everything is in terrigal but there is no transport out of terrigal. We need more bars and nightclubs in gosford and wyong so its close to the trainline. We have 1 nightclub and its in terrigal we need more so that we can have fun
112.	1 - Key is the DA approval process for venues, and events to be streamlied. 2 - Public transport improvements 3 - Information about events. Gosford Erina Business Chamber very much interested in being part of any working group for Gosford CBD and Erian venues
113.	Encourage better use of the waterfront in Gosford (and other locations). There is a wealth of waterfront land that has great views and isnt capitalised - Piers with restaurants and bars on them in gosford would be a great nightlife addition, Places like Umina with laneways just behind the beach should allow laneway bars/restaurants and other commercial activities. Work with surf clubs to offer late night bar/restaurants.
114.	Hyper consumption of alcohol is not in the community interest
115.	Excellent initiative by Council's Economic Development Team.
116.	I submitted A DA for a simple Cafe in June 2023, it is now February 2024 and it hasn't been approved. How do you expect to create a nighttime economy if you can't even process a cafe in 7 months? I think you should address this issue before you build peoples expectations
117.	Let's get on with it and get the central coast especially Gosford pumping
118.	I have traveled to fair few places with great night time areas. They all have one thing in common is that they are all have great lighting at night from where you park car to where the entertainment is. You and your family always feel safe going and coming with no dark spots and plenty of CCTV cameras.
119.	Approval process at Council is disastrous!!! Two years and waiting for a DA amendment!
120.	The approval processes could be a lot quicker. Many small businesses don't have funds available to hold them over waiting for approvals that can take months / 6mths / 12mths. Small business is way behind before the doors of their businesses open.
121.	Council is very slow on approvals, even for what they call "Minor Ammendments." This is slowing down the ability of businesses to respond to what is needed to stay relevant to our community.
122.	in summary Gosford should feel like a destination for all on the coast and afar. The stigma of "Gosford is full of drug addicts" needs to go. Relocate any drug rehab place away from this area. Consult with leading entertainment venue/restaurant and pub owners Australia wide. Fly them in and task them to solve the problems. Use alley ways to make permanent precincts full of little bars and food trucks that commuters can meet their family's/friends and have dinner at before they go home
123.	It is the little things that matter. What we need is experienced business operators who live in the nighttime economy. Unfortunately, when the research unveils gaping errors in the data, employing consultants who do not live in the area gives a great feeling of self-satisfaction without actually committing to actionable plans. Attempting to create and activate a nighttime economy should start with one locality that is fun and attractive for people to venture into the night. Where is the fun? Linking existing connections to build public awareness. Whilst Council employees may have an interest, if they are not invested in cooperating with the local community there will continue to be a disconnect. Do they know what is best for the residents of the Central Coast? Highly doubtful. It is fantastic that this initiative has been brought into the discussion sphere, but it needs to go to the people. Partner with the people of the Central Coast. Listen with your heart. And then maybe

	progress can be made to involve families, individuals of all ages and businesses to create a vibrant nighttime economy. Create a Rail Shuttle service stopping at Woy Woy, Gosford, Tuggerah and Wyong. Run the 2-carriage train back and forth during the night. You gotta have a go. And you gotta take risks. It is dangerous to be out at night without protection. Especially dead centres like Woy Woy, Gosfprd, Tuggerah and Wyong.
124.	There are concerns relating to the later opening times of licenced premises as the Lower Hunter has a bad record in relation to driving offences/accidents on the Central Coast. Allowing extended hours for licenced premises to operate on the Central Coast, potentially has safety consequences.
125.	Feedback from our customers attributes the lack of transport options (even limited number of Ubers) available in the Norah Head / Toukley area as to why people won't come out late or have more than one drink at our venues. We ran a courtesy bus service previously through a private local business but it wasn't financially sustainable long term. Our liquor licence trading time is also an issue for us at Soldiers Beach Surf Club (our location). We couldn't even offer a New Years event/promotion because we couldn't legally trade late enough and this also affects the times we can offer to private events & weddings at our venue.
126.	Please don't delay & drag out for years & years. Make meetings only when needed & can tick off items not meetings for sake of meetings. Be budget conscious & make Gosford the great Gossy good hub it can be….
127.	Stop wasting money on reports, support the people and producers in the know to get on with it Change of mindset in council from gatekeep of vibrancy and entertainment to supporting it
128.	Specifically in relation to all the possible and potential live entertainment, we have so much local talent based here in the Central Coast but unfortunately many of us get continuously ignored and brushed aside. From all the good things connected to live entertainment happening around, there are always the same usual faces, the same usual people, the same usual performers and the same community artists as well as friends/relatives of the people behind the scenes who get to have a go. Diversity is completely ignored and thrown out of the window in connection to talent being hired to perform. There are mainly European/Caucasian/Anglosaxon people working behind the scenes and sadly that is not welcoming to all and it is definitely not reflective of the local Gosford community. Everything done by local council is greatly appreciated but if feels like there are no hands on the execution and things may just get passed on to a third party who may simply do their own thing. You just need to communicate more with real artists and performers and please give multicultural people a chance. Also in some recent events although amazing and wonderful it has been a very poor attendance where not all cultures were made welcome and a lot of people just did not know about
129.	My concern is 15 minute cities and unable to visit in a free society. Monitoring of people's 24/7
130.	Ettalong beach has wonderful coffee shops by by around 2pm daily they have all closed. The Cinema Paradesio precinct has good restaurants but sadly one has to go into the market itself to use bathroom facilities. Location of these is dark. One coffee shop in the centre of Ettalong has trialed food trucks on Friday/Saturday nights but it's not consistent. Perhaps these coffee shops could be encouraged to open say from 6pm to around 9.30 on a roster system Friday and Daturdsy nights and more frequently during holiday periods. I often see families and young people searching for a coffee or dessert apart from the Club these are not available. Not everybody likes to visit Clubs anyway
131.	A night time show similiar to Pioneer Settlement's (Victoria) "Heartbeat of The Murray" or "Legends of The Mallee" would attract audiences into adjacent venues as they have done in countless other venues around the world, such as Singapore and Dubai.
132.	Gosford needs to be a safer place in order to attract people especially with families with children to spend night there.
133.	There was a very small number of people consulted with and narrow scope of stakeholders in the consultation. Noting the residents demographics (older, and financially disadvantaged) and those of the visitors the market for NTE, especially past 11pm appears to have a minimal potential. This would be worth considering and consulting with local residents and visitors rather than government employees and business owners. In the absence of democratically elected representatives CC Council need to ensure that residents and especially ratepayers are fully consulted and engaged in the issues that affect them and their quality of life. Reliance on the 'Her way' consultation findings are not fully transferrable due to the specific target and impact of this project. The issue of few

	transportation options at night, especially late at night is often when violence and intimidation can occur. Consideration is needed for measures put in place in Sydney and other metropolitan areas such as staggered closing times for Liscencing premises, as well as Liscencing measures that ensure responsible service of alcohol and measures such as tiered supply of eg alcohol shots etc. in the hours before closing, and venues providing their own curtesy busses. Assessment of Gosford NTE is from pre-COVID and pre- building/unit developments and could be out of date already. There is an incorrect assessment of existing Liscenced venues especially in The Entrance, which has at least 2 pubs and an RSL that are not identified in the report.
134.	We are writing to you today with regards to the discussion paper currently open for feedback regarding the Central Coast Night Time Economy (NTE) we have carefully reviewed discussion paper and would like to provide a detailed response addressing the various points raised within the document. Additionally we are also including an overview of the Community Drug Action Team (CDAT) program and the key objectives to demonstrates the value we are able to contribute to ensuring effective development and mitigation for a vibrant Central Coast night time economy. Community Drug Action Teams are comprised of volunteers, that include Community members as well as workers from government and non-government agencies who come together and pool their time, talent, and resources to make their local communities safer, healthier and stronger by reducing the harms associated with the use of alcohol and other drugs. CDATs meet regularly, focusing on the key concerns related to the legal and illegal use of alcohol and other drugs, within their local communities. With more than 60 active CDATs across NSW we look to support them to achieve evidence-based, primary prevention activities outcomes. CDAT programs and activities raise community awareness, cultivate resilience, and foster the development of protective factors that benefit individuals, families, and workplaces. The primary objectives of CDATs are to: i. Establish and strengthen partnerships among community members, local service providers and other stakeholders to develop common goals to address local, legal, and illegal drug and alcohol related issues ii. Identify problems related to the legal and illegal use of alcohol and other drugs in their community iii. Conduct evidence-based activities and initiatives within the community to increase the awareness of the harms experienced by individuals, families, workplaces, and the broader community arising from the use of alcohol and other drugs iv. Reduce the levels of alcohol and drug related harms by implementing local initiatives to prevent the uptake of illicit drug use and lessen the excessive use of legal and illegal alcohol and drugs. The following points encapsulate the concerns identified that necessitate careful consideration and attention for the night time economy discussion paper. The analysis is structured to cover key themes and concerns that we have that have been presented in the paper. • Police involvement in the consultation Absence of police involvement in the consultation process is noted on page 61. It's crucial to recognise that police concerns regarding safety act as both a barrier and an opportunity for improvement in the night time economy. Mitigating these concerns should be approached collaboratively to ensure a balance between fostering economic growth and maintaining public safety. Barriers to Progression It is essential to address these issues promptly to facilitate a smoother implementation of initiatives aimed at developing the night time economy. Stakeholder Engagement Our review of the document acknowledges a lack of robust stakeholder engagement, with only 46 representatives engaged out of a population of 350,000. Given the scale of the community, it is recommended to broaden the engagement process to ensure a more inclusive representation of diverse perspectives. Concerns raised by Industry and Community The discussion paper does not adequately reflect adequately reflect consultation across the whole

	community. A more transparent approach should be adopted to identify and address these concerns, ensuring a holistic understanding of the challenges faced by various sectors. Safety and Alcohol Management (barriers) Lack of a breakdown on safety and alcohol management, as well as the absence of references to liquor licensing, needs immediate attention. A comprehensive strategy should be developed to address both real and perceived concerns related to safety and alcohol management. Consultation with Emergency Responders It is evident that consultation with emergency responders, including police and health services, is crucial for a well-rounded understanding of the challenges and opportunities associated with the night time economy. Health and Hospital Services The absence of health and hospital services in the key findings is a notable gap. A thorough review and inclusion of crucial services impacted by alcohol and other drug (AOD) incidents, such as health and hospital emergency services, are necessary. Public Perspectives of Safety The paper mentions the Greater Sydney 24 initiative as the only place where public perspectives on community safety are raised. It is recommended to incorporate more community feedback throughout the document to provide a more comprehensive overview. In conclusion, addressing these concerns and incorporating the missing elements we trust will contribute to a more comprehensive and effective Central Coast Night Time Economy strategy. Recognising the significance of an inclusive and transparent consultation process, we are eager to contribute actively and participate collaboratively in the discussions. Our commitment to fostering a comprehensive understanding of the diverse perspectives within the community aligns with the goals of the working group. We believe that our involvement will bring valuable insights and perspectives to the table, contributing to the formulation of well-informed policies and strategies. To facilitate this collaboration, we kindly request the opportunity to join the working group, enabling us to directly contribute to the shaping of the night-time economy's future in the Central Coast region. We are committed to working collaboratively with other stakeholders and believe that a diverse range of voices will enhance the effectiveness of the decision-making process. We appreciate your consideration of our request and look forward to the opportunity to actively contribute to this important initiative. Please let us know if there are any formal processes or requirements for joining the working group.
135.	The NTE strategy is very welcomed and addresses a lot of the keys concerns. However it is imperative that all relevant stakeholders are aligned to make sure the strategy is realised, in particular the NSW Police as I they have heavy influcene on the outcome of D.A conditions especially in regards to licensed premises and NTE activities. So much so that I have had a planner tell me they will always adopt what conditions the police suggest regardless if the legislation or proven concern to warrant such conditions.
136.	There was a very small number of people consulted with and narrow scope of stakeholders in the consultation. Noting the residents demographics (older, and financially disadvantaged) and those of the visitors the market for NTE, especially past 11pm appears to have a minimal potential. This would be worth considering and consulting with local residents and visitors rather than government employees and business owners. In the absence of democratically elected representatives CC Council need to ensure that residents and especially ratepayers are fully consulted and engaged in the issues that affect them and their quality of life. Reliance on the 'Her way' consultation findings are not fully transferrable due to the specific target and impact of this project.The issue of few transportation options at night, especially late at night is often when violence and intimidation can occur. Consideration is needed for measures put in place in Sydney and other metropolitan areas such as staggered closing times for Liscencing premises, as well as Liscencing measures that ensure responsible service of alcohol and measures such as tiered supply of eg alcohol shots etc. in the hours before closing, and venues providing their own curtesy busses. Assessment of Gosford NTE is from pre-COVID and pre- building/unit developments and could be out of date already. There is an incorrect assessment of existing Liscenced venues especially in The Entrance, which has at least 2 pubs and an RSL that are not identified in the report.
137.	Business NSW thanks Central Coast Council for the opportunity to respond to the Central Coast Night-Time Economy Discussion Paper. As NSW's peak business organisation, Business NSW has

	almost 50,000 members across NSW, that include commercial entities of all sizes and sectors, NFPs and social vehicles, universities and training providers, local health districts and state government delivery agencies, and local governments. Business NSW operates offices in 11 NSW regions led by Regional Directors and guided by Regional Advisory Councils comprising of over 200 regional business members who contribute their time and knowledge towards advancing regional priorities on behalf of business. We are continuing to invest in Regional NSW through expanding our Regional Director networks and strengthening their facilities and staff. It is through our regional network that we can represent the needs and help unlock potential in current and emerging business across NSW. The BNSW teams work with local, state and federal government, daily to address business barriers. The release of the Central Coast Night-Time Economy discussion paper is welcomed by Business NSW. Business NSW strongly agrees with the recommendations outlined in the discussion paper including the establishment of a Night-Time Economy (NTE) working group which aims to encourage collaboration and guide the delivery of NTE projects. Business NSW has a wealth of experience in leading and supporting visitor economy projects across NSW. Many businesses involved in the NTE on the Central Coast are Business NSW members, enabling us to provide detailed insights into their opportunities and challenges. Business NSW would welcome the opportunity to participate in this working group. Business NSW Suite 13 / Level 2, 6 Reliance Drive, Tuggerah, NSW 2259 t 02 4391 0600 e centralcoast@businessnsw.com Items of specific feedback on the discussion paper include: Types of NTE businesses could include League and RSL clubs as these venues offer a unique combination of night-time entertainment services but are not specifically identified. Sports stadiums provide a unique drawcard for contributing to pre and post-game night-time economy visitors. In the policy review section of the paper Greater Sydney 24-Hour Economy programs are highlighted as potential funding sources for the Central Coast initiatives. The NSW government grant funding framework considers the Central Coast as part of Regional NSW. Council should seek clarification if the 24-Hour Economy Commissioner has included Central Coast as an eligible funding recipient. If it hasn't, council will need to advocate for funding through the Regional Development Trust Fund via the Department for Regional NSW. While the need for a NTE-specific business concierge is identified, the urgency of this should be prioritized given current difficulties experienced by the private sector in attempting to grow the night time economy. Business NSW has also completed the short online survey regarding key areas of the discussion paper. Please do not hesitate to contact us should you wish to discuss any of the feedback we have provided.
138.	We are writing to address the Central Coast Night-time Economy paper currently open for response. Our concerns lie in the identified gaps in the consultation process and the potential adverse impacts that may arise if the paper is accepted in its current form. Representing the members of the Kariong Peninsula CDAT, we would like to bring the following points to your attention. We believe these areas require additional consultation and consideration to ensure a more comprehensive outlook on enhancing the Night-time Economy (NTE) on the Central Coast. Simultaneously, we aim to address aspects that we believe could undermine the intended revitalisation of the economy in this region. Police involvement in the consultation Absence of police involvement in the consultation process is noted on page 61. It's crucial to recognise that police concerns regarding safety act as both a barrier and an opportunity for improvement in the nighttime economy. Mitigating these concerns should be approached collaboratively to ensure a balance between fostering economic growth and maintaining public safety. Stakeholder Engagement. The document acknowledges a lack of robust stakeholder engagement, with only 46 representatives engaged out of a population of 350,000. Given the scale of the community, it is recommended to broaden the engagement process to ensure a more inclusive representation of diverse perspectives. Concerns raised by Industry and Community. The discussion paper does not adequately reflect consultation across the whole community. A more transparent approach should be adopted to identify and address these concerns, ensuring a holistic understanding of the challenges faced by various sectors. Safety and Alcohol Management (barriers). Lack of a breakdown on safety and alcohol management, as well as the absence of references to liquor licensing, needs immediate attention. A comprehensive strategy should be developed to address both real and perceived concerns related to safety and alcohol management. Consultation with Emergency Responders It is evident that consultation with emergency responders, including police and health services, is crucial for a well-rounded understanding of the challenges and opportunities associated with the nighttime economy. In

	conclusion, addressing these concerns and incorporating the missing elements will contribute to a more comprehensive and effective Central Coast Nighttime Economy strategy. Additionally, ensuring a more inclusive and transparent consultation process will foster a collaborative approach to shaping the future of the night-time economy in the Central Coast region.
139.	We are writing to address the Central Coast Night-time Economy paper currently open for response. Our concerns lie in the identified gaps in the consultation process and the potential adverse impacts that may arise if the paper is accepted in its current form. Representing the members of the Northern Gosford CDAT, we would like to bring the following points to your attention. We believe these areas require additional consultation and consideration to ensure a more comprehensive outlook on enhancing the Night-time Economy (NTE) on the Central Coast. Simultaneously, we aim to address aspects that we believe could undermine the intended revitalisation of the economy in this region. Police involvement in the consultation Absence of police involvement in the consultation process is noted on page 61. It's crucial to recognise that police concerns regarding safety act as both a barrier and an opportunity for improvement in the nighttime economy. Mitigating these concerns should be approached collaboratively to ensure a balance between fostering economic growth and maintaining public safety. Stakeholder Engagement. The document acknowledges a lack of robust stakeholder engagement, with only 46 representatives engaged out of a population of 350,000. Given the scale of the community, it is recommended to broaden the engagement process to ensure a more inclusive representation of diverse perspectives. Concerns raised by Industry and Community The discussion paper does not adequately reflect consultation across the whole community. A more transparent approach should be adopted to identify and address these concerns, ensuring a holistic understanding of the challenges faced by various sectors. Safety and Alcohol Management (barriers) Lack of a breakdown on safety and alcohol management, as well as the absence of references to liquor licensing, needs immediate attention. A comprehensive strategy should be developed to address both real and perceived concerns related to safety and alcohol management. Consultation with Emergency Responders. It is evident that consultation with emergency responders, including police and health services, is crucial for a well-rounded understanding of the challenges and opportunities associated with the nighttime economy. In conclusion, addressing these concerns and incorporating the missing elements will contribute to a more comprehensive and effective Central Coast Nighttime Economy strategy. Additionally, ensuring a more inclusive and transparent consultation process will foster a collaborative approach to shaping the future of the night-time economy in the Central Coast region.

BUSINESS NSW

12 February 2024

Mr. David Farmer
Chief Executive Officer
Central Coast Council
PO Box 20
Wyong NSW 2259

Business NSW Submission: Central Coast Night-Time Economy discussion paper

Dear Mr. Farmer,

Business NSW thanks Central Coast Council for the opportunity to respond to the Central Coast Night-Time Economy Discussion Paper.

As NSW's peak business organisation, Business NSW has almost 50,000 members across NSW, that include commercial entities of all sizes and sectors, NFPs and social vehicles, universities and training providers, local health districts and state government delivery agencies, and local governments.

Business NSW operates offices in 11 NSW regions led by Regional Directors and guided by Regional Advisory Councils comprising of over 200 regional business members who contribute their time and knowledge towards advancing regional priorities on behalf of business.

We are continuing to invest in Regional NSW through expanding our Regional Director networks and strengthening their facilities and staff.

It is through our regional network that we can represent the needs and help unlock potential in current and emerging business across NSW.

The BNSW teams work with local, state and federal government, daily to address business barriers.

The release of the Central Coast Night-Time Economy discussion paper is welcomed by Business NSW.

Business NSW strongly agrees with the recommendations outlined in the discussion paper including the establishment of a Night-Time Economy (NTE) working group which aims to encourage collaboration and guide the delivery of NTE projects.

Business NSW has a wealth of experience in leading and supporting visitor economy projects across NSW. Many businesses involved in the NTE on the Central Coast are Business NSW members, enabling us to provide detailed insights into their opportunities and challenges. Business NSW would welcome the opportunity to participate in this working group.

Business NSW Suite 13 / Level 2, 6 Reliance Drive, Tuggerah, NSW 2259
t 02 4391 0600 e centralcoast@businessnsw.com

BUSINESS NSW

Items of specific feedback on the discussion paper include:

- Types of NTE businesses could include League and RSL clubs as these venues offer a unique combination of night-time entertainment services but are not specifically identified
- Sports stadiums provide a unique drawcard for contributing to pre and post-game night-time economy visitors
- In the policy review section of the paper Greater Sydney 24-Hour Economy programs are highlighted as potential funding sources for the Central Coast initiatives. The NSW government grant funding framework considers the Central Coast as part of Regional NSW. Council should seek clarification if the 24-Hour Economy Commissioner has included Central Coast as an eligible funding recipient. If it hasn't, council will need to advocate for funding through the Regional Development Trust Fund via the Department for Regional NSW.
- While the need for a NTE-specific business concierge is identified, the urgency of this should be prioritized given current difficulties experienced by the private sector in attempting to grow the night time economy.

Business NSW has also completed the short online survey regarding key areas of the discussion paper. Please do not hesitate to contact us should you wish to discuss any of the feedback we have provided.

Yours sincerely

Scott Goold
Regional Director
Business NSW

Business NSW Suite 13 / Level 2, 6 Reliance Drive, Tuggerah, NSW 2259
t 02 4391 0600 e centralcoast@businessnsw.com

CDAT
We're stronger together

Monday 12th February 2024

Mr. Andrew Powrie
Business Economic Development Manager
Central Cost Local Government

Subject: response to Central Coast Night Time Economy Discussion Paper

Dear Mr. Powrie,

We are writing to you today with regards to the discussion paper currently open for feedback regarding the Central Coast Night Time Economy (NTE) we have carefully reviewed discussion paper and would like to provide a detailed response addressing the various points raised within the document.

Additionally we are also including an overview of the Community Drug Action Team (CDAT) program and the key objectives to demonstrates the value we are able to contribute to ensuring effective development and mitigation for a vibrant Central Coast night time economy.

Community Drug Action Teams are comprised of volunteers, that include Community members as well as workers from government and non-government agencies who come together and pool their time, talent, and resources to make their local communities safer, healthier and stronger by reducing the harms associated with the use of alcohol and other drugs.

CDATs meet regularly, focusing on the key concerns related to the legal and illegal use of alcohol and other drugs, within their local communities. With more than 60 active CDATs across NSW we look to support them to achieve evidence-based, primary prevention activities outcomes.

CDAT programs and activities raise community awareness, cultivate resilience, and foster the development of protective factors that benefit individuals, families, and workplaces.

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The primary objectives of CDATs are to:

i. Establish and strengthen partnerships among community members, local service providers and other stakeholders to develop common goals to address local, legal, and illegal drug and alcohol related issues

ii. Identify problems related to the legal and illegal use of alcohol and other drugs in their community

iii. Conduct evidence-based activities and initiatives within the community to increase the awareness of the harms experienced by individuals, families, workplaces, and the broader community arising from the use of alcohol and other drugs

iv. Reduce the levels of alcohol and drug related harms by implementing local initiatives to prevent the uptake of illicit drug use and lessen the excessive use of legal and illegal alcohol and drugs.

The following points encapsulate the concerns identified that necessitate careful consideration and attention for the night time economy discussion paper. The analysis is structured to cover key themes and concerns that we have that have been presented in the paper.

- **Police involvement in the consultation**

Absence of police involvement in the consultation process is noted on page 61. It's crucial to recognise that police concerns regarding safety act as both a barrier and an opportunity for improvement in the night time economy. Mitigating these concerns should be approached collaboratively to ensure a balance between fostering economic growth and maintaining public safety.

- **Barriers to Progression**

It is essential to address these issues promptly to facilitate a smoother implementation of initiatives aimed at developing the night time economy.

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- **Stakeholder Engagement**

Our review of the document acknowledges a lack of robust stakeholder engagement, with only 46 representatives engaged out of a population of 350,000. Given the scale of the community, it is recommended to broaden the engagement process to ensure a more inclusive representation of diverse perspectives.

- **Concerns raised by Industry and Community**

The discussion paper does not adequately reflect adequately reflect consultation across the whole community. A more transparent approach should be adopted to identify and address these concerns, ensuring a holistic understanding of the challenges faced by various sectors.

- **Safety and Alcohol Management (barriers)**

Lack of a breakdown on safety and alcohol management, as well as the absence of references to liquor licensing, needs immediate attention. A comprehensive strategy should be developed to address both real and perceived concerns related to safety and alcohol management.

- **Consultation with Emergency Responders**

It is evident that consultation with emergency responders, including police and health services, is crucial for a well-rounded understanding of the challenges and opportunities associated with the night time economy.

- **Health and Hospital Services**

The absence of health and hospital services in the key findings is a notable gap. A thorough review and inclusion of crucial services impacted by alcohol and other drug (AOD) incidents, such as health and hospital emergency services, are necessary.

- **Public Perspectives of Safety**

The paper mentions the Greater Sydney 24 initiative as the only place where public perspectives on community safety are raised. It is recommended to incorporate more community feedback throughout the document to provide a more comprehensive overview.

In conclusion, addressing these concerns and incorporating the missing elements we trust will contribute to a more comprehensive and effective Central Coast Night Time Economy strategy.

CDAT
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Recognising the significance of an inclusive and transparent consultation process, we are eager to contribute actively and participate collaboratively in the discussions. Our commitment to fostering a comprehensive understanding of the diverse perspectives within the community aligns with the goals of the working group.

We believe that our involvement will bring valuable insights and perspectives to the table, contributing to the formulation of well-informed policies and strategies.

To facilitate this collaboration, we kindly request the opportunity to join the working group, enabling us to directly contribute to the shaping of the night-time economy's future in the Central Coast region. We are committed to working collaboratively with other stakeholders and believe that a diverse range of voices will enhance the effectiveness of the decision-making process.

We appreciate your consideration of our request and look forward to the opportunity to actively contribute to this important initiative. Please let us know if there are any formal processes or requirements for joining the working group.

Regards

Gail Easton
Community Drug Action Team (CDAT)
Program Manager

Kariong Peninsula
CDAT
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We are writing to address the Central Coast Night-time Economy paper currently open for response. Our concerns lie in the identified gaps in the consultation process and the potential adverse impacts that may arise if the paper is accepted in its current form.

Representing the members of the Kariong Peninsula CDAT, we would like to bring the following points to your attention. We believe these areas require additional consultation and consideration to ensure a more comprehensive outlook on enhancing the Night-time Economy (NTE) on the Central Coast. Simultaneously, we aim to address aspects that we believe could undermine the intended revitalisation of the economy in this region.

- **Police involvement in the consultation**

Absence of police involvement in the consultation process is noted on page 61. It's crucial to recognise that police concerns regarding safety act as both a barrier and an opportunity for improvement in the nighttime economy. Mitigating these concerns should be approached collaboratively to ensure a balance between fostering economic growth and maintaining public safety.

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- **Consultation with Emergency Responders**

It is evident that consultation with emergency responders, including police and health services, is crucial for a well-rounded understanding of the challenges and opportunities associated with the nighttime economy.

In conclusion, addressing these concerns and incorporating the missing elements will contribute to a more comprehensive and effective Central Coast Nighttime Economy strategy. Additionally, ensuring a more inclusive and transparent consultation process will foster a collaborative approach to shaping the future of the night-time economy in the Central Coast region.

Yours sincerely

Amanda Burfitt
Chair
Kariong Peninsula CDAT

gosford.rsl

Mr. David Farmer
Chief Executive Officer
Central Coast Council

21 December 2023

Re: Night-time Economy Discussion Paper

Dear Mr. Farmer,

I would like to start by applauding the intention and efforts of Council to recognise the importance of, and to reinvigorate, the night-time economy on the Central Coast. The discussion paper as presented contains a lot of sound research and very useful initiatives. I understand that the discussion paper does not identify or prioritise any specific venues however, I feel the paper is somewhat ignorant of the current, and more importantly the future, impact of Gosford RSL Club on the night-time economy of the Central Coast.

Gosford RSL Club Ltd consists of the Registered Club, the Galaxy Motel and the Ashwood Motel. We currently generate approximately $30M revenue annually, have over 25,000 members, employ over 140 staff whom we pay over $9.5M in wages annually. That is a significant local impact. As I am sure you are aware we are nearing the completion of our new Club building, a project costing almost $50M, being completed by a local Central Coast Builder – North Construction and Building. Gosford RSL Club is passionate and committed to supporting Gosford and the Central Coast and the brief to our architects was to create a building that makes a statement, at the gateway to the Central Coast, that our region is growing and developing and is something to be excited about. Hopefully you have seen the building since the scaffolding came down in late November, if you have, I am sure you would agree that the building meets those aims.

When the new Gosford RSL Club opens in mid-March 2024, I expect our employment numbers to rise at least 25%. The capacity of our venue will exceed 2,000 patrons and our Conference and Events Centre will be able to accommodate up to 450 people for a formal dinner or over 700 for live performances – a significant opportunity for attracting visitors to our region as well as enhancing opportunities for locals. Gosford RSL Club is committed to a program of live entertainment, featuring many local artists including DJs, Soloists, Duos and bands several nights a week. I am confident that the new Gosford RSL Club will be one of the most heavily patronized venues on the Central Coast. Once the existing Club has been demolished and that space made into carparking we will offer approximately 500 parking spaces with many more available on adjacent properties (Bunnings, Anaconda etc). Given these points, it is disappointing that Gosford RSL Club is not recognized in the Current Offering (p31), nor the Investment Context (p45).

I applaud the intention to enhance safety for women through "Safer Cities: Her Way". I note that providing a safe environment is a key goal for Gosford RSL Club and is a measure that our female customers rate us extremely highly on in customer surveys.

I would like to clarify that Gosford RSL Club strongly supports the growth and development of Gosford CBD as integral to the evolution of our region. We do not ask anything to be denied from Gosford CBD. All we ask is to be given due recognition, as a significant member of the night-time economy, and inclusion in excellent initiatives such as the "Shuttle Bus Loop" (p73).

Again, I applaud Council for supporting the night-time economy in Gosford and the Central Coast and look forward to Gosford RSL Club playing our role in the future of a vibrant and successful industry.

Yours sincerely

Russell Cooper
CEO

Gosford RSL Club Limited ABN 34 002 772 910

26 Central Coast Highway, West Gosford NSW 2250. PO Box 303, Gosford NSW 2250

Tel 02 4323-2311 **Fax** 02 4324-4644 **Email** gosrsl@grsl.com.au **Web** www.grsl.com.au

Northern Gosford
CDAT
We're stronger together

We are writing to address the Central Coast Night-time Economy paper currently open for response. Our concerns lie in the identified gaps in the consultation process and the potential adverse impacts that may arise if the paper is accepted in its current form.

Representing the members of the Northern Gosford CDAT, we would like to bring the following points to your attention. We believe these areas require additional consultation and consideration to ensure a more comprehensive outlook on enhancing the Night-time Economy (NTE) on the Central Coast. Simultaneously, we aim to address aspects that we believe could undermine the intended revitalisation of the economy in this region.

- **Police involvement in the consultation**

Absence of police involvement in the consultation process is noted on page 61. It's crucial to recognise that police concerns regarding safety act as both a barrier and an opportunity for improvement in the nighttime economy. Mitigating these concerns should be approached collaboratively to ensure a balance between fostering economic growth and maintaining public safety.

- **Stakeholder Engagement**

The document acknowledges a lack of robust stakeholder engagement, with only 46 representatives engaged out of a population of 350,000. Given the scale of the community, it is recommended to broaden the engagement process to ensure a more inclusive representation of diverse perspectives.

- **Concerns raised by Industry and Community**

The discussion paper does not adequately reflect consultation across the whole community. A more transparent approach should be adopted to identify and address these concerns, ensuring a holistic understanding of the challenges faced by various sectors.

- **Safety and Alcohol Management (barriers)**

Lack of a breakdown on safety and alcohol management, as well as the absence of references to liquor licensing, needs immediate attention. A comprehensive strategy should be developed to address both real and perceived concerns related to safety and alcohol management.

- **Consultation with Emergency Responders**

It is evident that consultation with emergency responders, including police and health services, is crucial for a well-rounded understanding of the challenges and opportunities associated with the nighttime economy.

In conclusion, addressing these concerns and incorporating the missing elements will contribute to a more comprehensive and effective Central Coast Nighttime Economy strategy. Additionally, ensuring a more inclusive and transparent consultation process will foster a collaborative approach to shaping the future of the night-time economy in the Central Coast region.

Community Development – Social Inclusion Officer
Gosford Regional Community Service

Mr David Farmer
Chief Executive Officer
Central Coast Council
PO Box 20
Wyong NSW 2259

10th February 2024

by email: ask@centralcoast.nsw.gov.au

SUBMISSION: Draft Central Coast Night-Time Economy Discussion Paper

Dear Mr Farmer,

The Peninsula Residents' Association would like to make the following submission to Central Coast Council's Night-Time Economy discussion paper.

The Association protests:

a) The Paper's failure to recognise the Peninsula as a local economy in its own right, supported by a Peninsula community with a strong sense of community identity.

b) The Paper's failure to recognise the Peninsula, with an annual turnover of $68M, as having a ***stronger night-time economy than any other area of the Central Coast***.

c) The Paper's failure to mention the Peninsula and that Woy Woy, Ettalong and Umina only appear in a map and a table, with the text of the Paper making no reference to them.

d) The Paper's lack of support for the Peninsula's night-time economy.

Treating each of the Peninsula's townships in isolation misrepresents the importance of the Peninsula to the region.

The Paper should not form the basis of a night-time economy strategy when it fails to comment on figures in its maps and tables, which would appear to contradict its conclusions, such as "the primacy of Gosford, Terrigal and Wyong".

The Association asks that the Paper include specific measures to protect the Peninsula's night-time economy, alongside its plans to expand facilities in Gosford.

Jennifer Wilder, Secretary
contact@peninsularesidents.org.au

Woy Woy Peninsula Residents Association Incorporated INC2101073
https://www.peninsularesidents.org.au/

Submission on Feedback to Central Coast Council Night-Time Economy Discussion Paper

Destination Central Coast would like to offer our feedback on the Central Coast Council Night-Time Economy (NTE) Discussion Paper.

Firstly, well done on the development of the discussion paper and effort in identifying project concepts to enhance and activate NTE precincts in the Central Coast.

Please see additional key areas for consideration to ensure the success and sustainability of the night-time economy in the region. These areas include:

1. **Pop-Up Dining and Food Trucks**: Explore options for pop-up dining and food trucks in select locations throughout the Central Coast. These initiatives can add diversity to the culinary offerings, activate underutilised spaces, and provide unique dining experiences for residents and visitors alike. This needs improvement in planning controls and regulations to make this an easy process for operators.
2. **Engagement with Live Performers and Interactive Art**: Actively engage with local performers and artists to bring live entertainment and interactive art installations to NTE precincts. Installing interactive illuminated art pieces and organizing live performances can enhance the cultural vibrancy of the region and create memorable experiences for the public.

   Development of a Live Music Action Plan: Explore the option of developing a live music action plan for the city in consultation with local artists, venues, community groups, and businesses.
3. **Further Exploration of Night-Time Events and Festivals**: Explore opportunities for hosting night-time events and festivals that celebrate the region's cultural heritage, culinary highlights and artistic talents. These events can attract visitors, stimulate economic activity, and showcase the Central Coast as a dynamic and diverse destination.

   Explore the feasibility of organizing night-time food markets, outdoor cinema screenings, and family-friendly events in public spaces across the Central Coast.
4. **Policy Guidance for Business**: Provide clear policy guidance and assistance for businesses seeking information on extending their trading hours and other aspects related to night-time activities. Establishing a dedicated business support centre or online portal can streamline the process for businesses and ensure compliance with regulations
5. **Community Engagement and Consultation**: While stakeholder engagement was mentioned in the development of the discussion paper, ongoing consultation should be prioritised throughout the implementation process. Engaging and working with businesses, and other stakeholders will ensure that NTE initiatives align with the needs and aspirations of the local community.
6. **Wellbeing**: Given the concerns about alcohol-related antisocial behavior and safety, it is essential to prioritize the health and wellbeing of residents and visitors. This could involve the promotion of alternative recreational activities, such as wellness events and outdoor fitness classes, to foster a more balanced and holistic night-time experience.

Suggestions to pages to link to current strategies that are in place:

7. Page 9: There is an issue with eateries and shops ceasing their operations mid-afternoon in towns such as Gosford, Wyong and The Entrance. Consideration needed to resolve this issue alongside the NTE strategy.
8. Page 29: This could be updated to reflect the more recent visitation numbers from TRA June 2023.
9. Page 31: A northern town to be considered. The overview skews heavily to the South.
10. Page 62: Opportunity to target and develop night - time bookable experiences. For example, night diving tours, guided stargazing tours and overnight cultural programs.
11. Page 68: **Change:** *As outlined in the Safer Cities: Her Way Project, develop a marketing strategy and website for events.* **To:** As outlined in the Safer Cities: Her Way Project, update current destination and corporate marketing strategies and the existing destination website to enable events to leverage established marketing infrastructure and channels.
12. Page 69: **Change:** Undertake a Tourism Branding and Marketing Strategy for Central Coast, with a focus on Gosford as a priority. **To:** Endorse new three year Destination Central Coast Marketing Strategy, with a focus on Gosford and sub regional propositions as a priority.
13. Page 70/71: **Add:** Enable and support local businesses connecting to Destination NSW's *NSW First Program* in order to establish bookable night time products and experiences.
14. Transport linkages i.e. new or existing, private and public to be considered across all potential activations.

Images: Love Lanes Festival 2023, The Bon Pavilion, Gosford
Source: Destination NSW

Central Coast Night-Time Economy

Discussion Paper

March 2024

urban enterprise planning economics+tourism

Acknowledgement of Country

We acknowledge the Traditional Custodians of the land on which we live, work and play. We pay our respects to Elders, past, present and emerging and recognise their continued connection to these lands and waterways. We acknowledge our shared responsibility to care for and protect our place and people.

Authors

- Julia Cretan (Senior Consultant, Urban Enterprise)
- Nancy Yoo (Senior Consultant, Urban Enterprise)
- **Reviewed by:** Mike Ruzzene (Director, Urban Enterprise)

Acronyms

ABS	Australian Bureau of Statistics
AAGR	Average Annual Growth Rate
IVS	International Visitor Survey
LEP	Local Environmental Plan
LGA	Local Government Area
NTE	Night-Time Economy
PA	Per Annum
NVS	National Visitor Survey
TRA	Tourism Research Australia

Contents

Executive Summary

Urban Enterprise was engaged by Central Coast Council to develop a discussion paper for the development of the night-time economy (NTE) in the Central Coast region. The report aims to identify interventions and project concepts to enhance and activate NTE precincts - creating better places for businesses, the local community and visitors after dark in the Central Coast.

The discussion paper was informed by robust stakeholder engagement process, an analysis of development constraints in public policy and the built environment, as well as research best practice NTE initiatives across Australia. Key insights uncovered through consultation and analysis were:

- There is an overall lack of vibrancy and things to do at night in the Central Coast towns, especially for families with children.
- The region is highly dispersed with a lack of transport infrastructure and parking.
- The public realm and streetscape is unattractive in many locations, and infrastructure is poorly maintained, particularly in Gosford.
- Alcohol related antisocial behaviour & concerns about security and safety have been raised by industry and community.
- Noise complaints associated with conflicting land uses prevent late night economic activity and NTE investment proposals.
- Existing Council NTE governance structure and policies are unclear – delaying approval times and preventing NTE investment. They also limit on-street economic activity, impeding the creation of vibrant public spaces.

A strategic framework was developed, centred around the following four themes:

- **Policy & Leadership**: Policy, planning and governance structures should enable and support night-time economy objectives.
- **Activation**: Cultural and social activity is integral in defining the night-time economy.
- **Attractiveness**: An attractive, immersive and vibrant public realm brings places to life at night.
- **Enabling Environment**: A successful night-time economy must be underpinned by well-functioning infrastructure and services, to ensure it can be accessed and enjoyed safely.

A total of 41 initiatives have been identified over short, medium and long term timeframes, to address issues and realise opportunities for enhancement of the NTE in the Central Coast. Priority actions , to be delivered in the short-term, include:

- Deliver the following *Safer Cities: Her Way* pilot initiatives:
    - **Burns Park Refresh** – Undertake landscaping upgrades, decorative lighting and public art installations and temporary activations at Burns Park.
    - **William St Plaza Refresh** – Undertake works including hut removal, painting and shade sail refresh, landscaping, seating upgrades and decorative lighting installations.
    - **Laneway Activations** – Activate Gosford's laneways with public artwork, live entertainment and decorative lighting. Priority locations include Kibble Park and the Mann St to Gosford City Carpark laneway.
    - **Good Times Summer –** Run a 6 week activation program aimed at promoting planned events and activities, as well as showcasing the local businesses across Gosford CBD including weekly markets in Kibble Park, live entertainment, workshops and activities, decorative lighting projections and public art.
    - **Wayfinding Signage** – Install updated decals and upgrades to identified existing signage to improve wayfinding throughout the Gosford CBD. Include directional, safety, interpretative and other general information for visitors and the community.
    - Investigate potential for a **Shuttle Bus Loop**. Seek interest from private operators to deliver a 'City Night-time Loop' linking towns across the coast on weekends. Explore funding support opportunities from Transport NSW (for ongoing operations, signage, and marketing activities) and negotiate inclusion of Central Coast branding on shuttle buses.
    - Investigate opportunities for **Vacant Property Activation**. Proactively engage the Gosford Erina Business Chamber, landowners and creative businesses and encourage them to activate Gosford's empty shopfronts.
    - Develop a **marketing strategy and website for events**.

Executive Summary

Other short term priority actions include:

- Establish an NTE working group for key stakeholders to meet regularly, with the aim to encourage collaboration and guide the delivery of NTE projects
- Create a business enquiry roadmap to display internal processes for managing business enquiries within Council.
- Establish an NTE business concierge to assist businesses looking to establish or invest in the Central Coast night-time economy.
- Ensure Council Economic Development Team maintains a strong relationship and ongoing communication with Liquor & Gaming NSW's Hospitality Concierge Service Team – including regularly referring local NTE businesses to the service and inclusion within the proposed NTE working group.
- Utilise Section 10.7 planning certificates (formerly s149) to manage community expectations around noise in key night-time economy precincts
- Establish 'Special Entertainment Precincts' in the LEP in key locations in the Central Coast LGA to manage amplified music,
    - Trial an extended business hour policy for Special Entertainment Precincts
    - Trial automatic outdoor dining permit approvals for Special Entertainment Precincts
- Leverage and collaborate with Council's Community & Culture Team to support delivery of live music micro-festival events at night-time through the Live & Local Strategic Initiative policy.
- Advocate for Central Coast funding through the Office of the 24-hour commissioner for the implementation of tools, resources and support programs to accelerate night-time economy's development on the Central Coast. Specifically target (a) Live music venue sound proofing improvements and (b) Investment in contemporary music facilities.
- Continue to carry out a recurring night market event at Kibble Park following the conclusion of the 'Good Times Summer' activation program (Safer Cities: Her Way Initiative).
- Introduce a roaming winter live music series across NTE venues in the Central Coast's small towns.
- Encourage live music and busking after dark across the coast. This could be achieved through waiving busker permit fees or directly funding buskers to perform
- Promote the concept of local food businesses delivering late night meals to bars and live music venues, in collaboration with relevant food safety stakeholders
- Collaborate with Transport for New South Wales to implement the bus on demand service pilot project across the LGA.

Background & Context

Introduction

Urban Enterprise was engaged by Central Coast Council to develop a discussion paper for the development of the night-time economy in the Central Coast.

This report aims to identify interventions and concepts to enhance and activate night-time economy precincts in the Central Coast, based on identified constraints, industry needs, a strategic framework developed from consultation, as well as best practice initiatives across Australia.

The aim of this process is to enhance and activate the night-time economy and create better places for business, the local community and visitors after dark in the Central Coast.

Methodology

The following process was undertaken to inform this Discussion Paper:

Stakeholder Engagement

- 1 council workshop (6 attendees)
- 4 business and industry workshops (15 attendees)
- 1 business survey (23 respondents)
- 2 interviews with other local governments

Background & Context

- Review of local, regional and state policies, strategies and governance

Existing Situation Analysis

- Demographic and Economic snapshot
- night-time economy profile
- Hierarchical product and experience gap analysis

Detailed Economic Assessment of Gosford

- Detailed industry sector analysis
- Identification of current and future demand driving projects
- Venues and environmental assessment on-ground audit

Discussion Paper

- Identification of issues and opportunities based on assessment, engagement, and product audits
- Development of strategic framework, including vision, objectives and identification of priority projects

What is the night-time economy?

The night-time economy (NTE) is defined as the range of leisure activities and experiences associated with patterns of collective night-time socialising and entertainment, including eating, drinking and creative practices.

The different phases of the night-time economy include:

Early evening	5pm – 7pm
Twilight	7pm – 10pm
Evening	10pm – 2am
Late night	2am – 5am

For the purposes of this report, the night-time economy generally includes the time period from 5pm to 2am.

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Why develop the NTE?

This discussion paper will focus on core activity that contributes to the vibrancy and activation of night-time precincts.

Establishing a successful and well-functioning night-time economy is an important economic development objective for Council, and requires partnership, support and collaboration between government, private enterprise and the community.

The range of benefits that a vibrant night-time economy can bring to a region include:

- Increased number and diversity of employment options, including for youth
- Increase economic output
- Achieve economic resilience through diversification
- Support the attraction of a young, professional and talented workforce
- Develop cultural and community vitality
- Grow the visitor economy; and
- Provide opportunities for the production and consumption of arts and culture.

Types of NTE businesses

Core night-time economy businesses are typically the types of businesses people would associate with a vibrant 'night life'. These are important for providing residents and visitors with places to go, to socialise and enjoy the night hours. They are supported by a range of supporting businesses.

Entertainment

- Performing arts, music and culture
- Live sports and recreation activities
- Cinema
- Night clubs
- Galleries and cultural institutions

Food Activities

- Cafes
- Restaurants
- Food trucks
- Food markets
- Food delivery services

Drink Activities

- Bars
- Pubs
- Hotels
- Liquor Retailing
- Wine Tasting

Supporting Activities

- Health – pharmacies, medical centres, gyms
- Groceries – supermarkets, convenience stores
- Retail and Accommodation
- Transport – public and on-demand
- Services - dry cleaning beauticians and spas

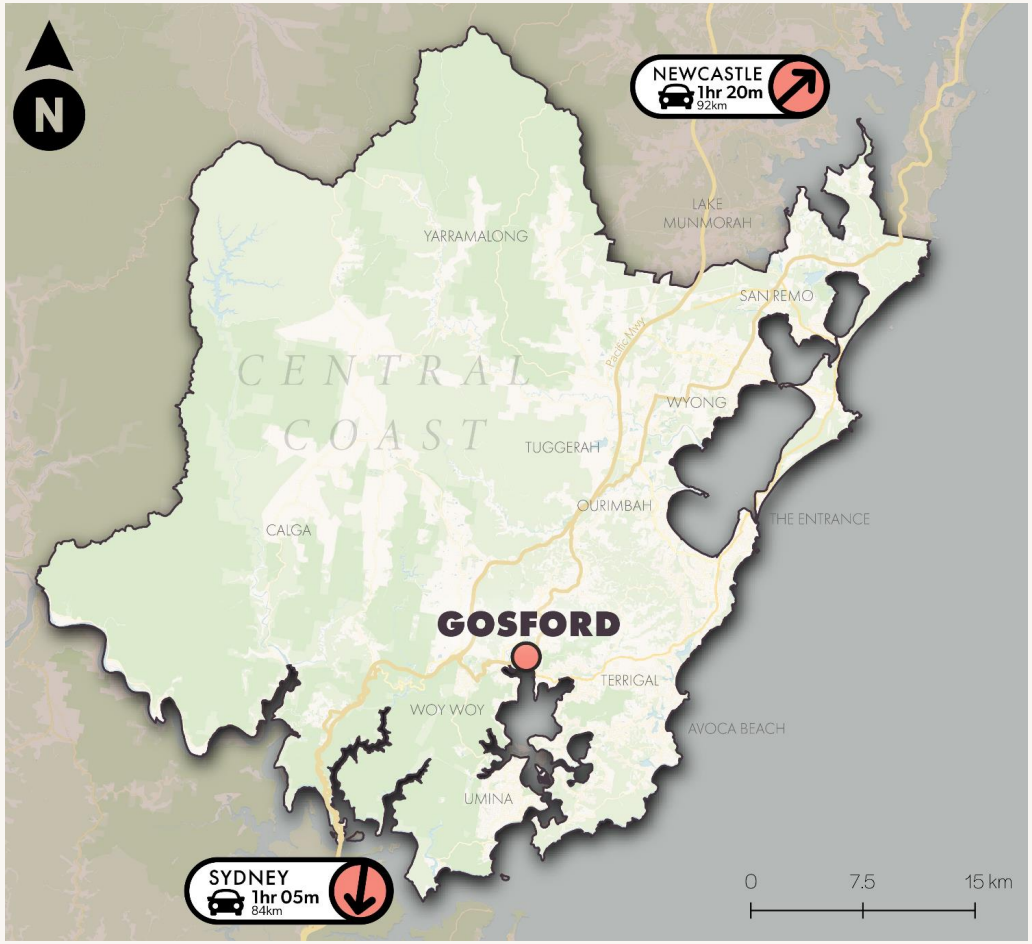
About Central Coast

The Central Coast is situated on the coastline of New South Wales, strategically located within 90 minutes of both Sydney and Newcastle, providing access to a market of almost 6 million people (see Figure 1).

Central Coast is a peri-urban LGA bordering the Northern Beaches and Hornsby to the South and Lake Macquarie to the North, with the Pacific Motorway dissecting the LGA. This provides convenient access to metropolitan Sydney, and disperses travellers into northern and western regional New South Wales via the Central Coast.

As of 2021, Central Coast has a population of 346,596 and is expected to grow substantially to 417,500 by 2036. The municipality is shown in adjacent.

Figure 1. Central Coast Context Map



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Consultation Summary

Stakeholder engagement and consultation undertaken to assist in the development of this feasibility study is summarised in the table below:

Format	Engagement
Business & Industry Workshop (4)	15 attendees
Business & Industry Survey	23 respondents
Business & Industry 1:1 Phone Calls	13 stakeholders
Council Workshop (1)	6 attendees
Local Government Interviews (2)	City of Newcastle and Lake Macquarie City Council

Key Findings

Consultation with business and industry highlighted the following as key constraints for NTE businesses:

- There is an overall lack of vibrancy and things to do at night in the Central Coast key townships
- The Coast's NTE products and experiences are not suited to families
- Council policies and procedures are confusing & slow planning permit approval times prevent investment in the NTE
- Central Coast is a highly dispersed region with a lack of transport infrastructure and parking
- The public realm and streetscape is unattractive, and infrastructure is poorly maintained infrastructure, particularly in Gosford.
- Alcohol related antisocial behaviour & concerns about security and safety
- Noise complaints associated with conflicting land uses prevent late night economic activity and NTE investment proposals.
- Economic development activities over-prioritise investment in Gosford over smaller towns

Strategy, Policy & Governance Review

NTE Governance

The governance of the night-time economy is highly complex, due to its interrelatedness with a range of government interests including economic development, planning, tourism, transport, infrastructure and health and safety. Stakeholders involved in the governance of the night-time economy are outlined in the table adjacent.

The inclusion of night-time economy management in the remit of a variety of government departments reflects the government's objective to drive night-time economy development in New South Wales. However, the range of stakeholders involved in night-time economy development could represent a barrier to investment, as potential business owners may be discouraged by the difficult to navigate governance and policy structure during the process of acquiring support, information or approvals.

Collaboration between stakeholders and alignment of their strategic direction, policy and activity will allow then to synergise and achieve positive outcomes for night-time economy development.

Central Coast Council

Discussions with Council staff revealed that internal governance procedures for handling business enquiries can serve as an impediment to fostering business investment.

Night-time economy businesses require approvals and permits that span across various departments within Council. Consequently, there are a number of points where a business request can be blocked or delayed.

Presently, there is no structured roadmap outlining these internal processes, from a business' initial contact with Council to the receipt of an approval.

The implementation of streamlined procedures or the creation of a defined process would greatly enhance the prospects for businesses, ensuring smoother interactions and more favourable economic outcomes.

Governance Stakeholders

Stakeholder	Role
Direct	
Central Coast Council	Economic development, tourism development & marketing, development approvals, strategic planning, town centre management, environmental compliance.
Investment NSW	Economic development and investment attraction.
24 Hour Economy Commissioner	Delivery of 24-hour Economy Strategy and facilitating collaboration between state government, local government and industry.
24 Hour Economy Advisory Group	Helps the NSW Government develop NTE ideas and implement the 24-hour economy strategy.
Liquor and Gaming NSW	Regulate liquor, wagering, gaming and registered clubs in NSW and manage incidents of loud music and patron noise.
Independent Liquor & Gaming Authority	Determine licensing and disciplinary matters under the gaming and liquor legislation.
Food Authority	Ensure effective food safety and food quality management.
Indirect	
Greater Cities Commission	Future planning, deliver key innovation districts and discussion on major city-shaping issues.
Dept. of Transport	Develop safe, integrated and efficient transport systems.
Destination NSW	Tourism and major events, marketing and promotion, events attraction, funding delivery.
Dept. of Planning and Environment	Long term planning, assessment of state significant developments, infrastructure priorities, natural resources, the environment and energy.

Office of the 24-Hour Economy Commissioner

The Office of the 24-Hour Economy Commissioner (O24HEC) was established in April 2021 to deliver the 24-Hour Economy Strategy for Greater Sydney.

The 2023 O24HEC program implemented a number of strategy projects and election commitments. A selection of projects, as relevant to night-time economy development in the Central Coast, are shown adjacent.

Where possible, Council should seek to leverage state government tools, resources and grant opportunities to accelerate night-time economy development in the Central Coast.

Greater Sydney 24-Hour Economy Strategy

Project	Description
Local Council Toolkit & Accelerator Program	• Practical tools for Councils to enhance the night-time economy • Masterclasses for Council staff (from late 2023)
Data After Dark	• A digital data tool to access, compare and visualise NTE data by area
Arts, Culture & Creative Industries	• NSW Government is developing a new arts, culture and creative industries policy • $103m committed for investment in NSW's contemporary music scene
Sound NSW	• Developing a 10-year Contemporary Music Strategy • Committed to establish an $8m fund to support soundproofing, ventilation and video screen technology upgrades

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Strategic Context

Ensuring Council activities align to NSW State strategic policy directions will be critical to developing a successful night-time economy in the Central Coast. The NSW Government's recent emphasis on the importance of developing Sydney's night-time economy provides pertinent timing to create activated and vibrant night-time precincts in the Central Coast.

The State Government is focussed on transforming planning, placemaking and precinct development in the Central Coast, to ensure it can become an attractive destination for both business and tourism. Major State Government infrastructure investments will drive demand for night-time economy uses in the Central Coast. The existence of a diverse, attractive and vibrant night-time offering will be crucial in attracting the business investment and workforce talent required to transform Central Coast into a globally competitive city.

Summary Of Documents Reviewed

Local

- Central Coast Regional Plan
- Greater Cities Commission
- Gosford City Centre Revitalisation
- Economic Development Strategy
- Community Strategic Plan
- Destination Management Plan
- Central Coast Regional Plan 2041
- Cultural Plan
- Tourism Opportunity Plan
- Wyong Settlement Strategy
- Tuggerah to Wyong Corridor Strategy
- Gosford Urban Design Framework
- The Entrance Town Centre Masterplan
- Graffiti Strategy
- Pedestrian and Access Strategy

Regional

- Greater Sydney 24 Hour Economy Strategy
- Central Coast and Lake Macquarie Regional Economic Development Strategy

State

- Visitor Economy Strategy 2030
- NSW Tourism and Transport Plan

Greater Sydney 24-Hour Economy Strategy

Greater Sydney's 24 Hour Economy Strategy, developed by Investment NSW in 2020, intends to enhance and develop the night-time economy to realise its huge economic potential. The Strategy recognises that the night is an integral part of Sydney's commercial, cultural and social fabric, providing huge potential and that with more business activity through the night comes more opportunities for employment and greater choice for how locals and visitors interact with the city.

Strategic pillars and considerations outlined in the Strategy have informed the development of this Discussion Paper and are summarised below.

Greater Sydney 24-Hour Economy Strategy

Strategic Pillar	Considerations
Integrated Planning and Placemaking	• Precinct-based streetscape atmospheres and activations; • Community and industry-led safety programs; • Under-utilised public and private spaces accommodating live performance and arts and culture events.
Diversification of night-time activities	• Better activity mix planning • Business diversification • Extend opening hours for retail businesses and cultural institutions. • Live music and noise regulations • Improve affordability and requirements for cultural events in public spaces. • Before and after game activities for major sporting precincts.
Industry and Cultural Development	• Affordable spaces for creative industries
Mobility & Improved Connectivity	• Late-night transport • Enhanced parking options • Safe options for end-of-trip connections • Arts program to activate transport links.
Changing The Narrative	• Improve public perceptions of health and safety. • Develop distinct branding for night-time hubs.

Central Coast Regional Plan 2041

The Central Coast Regional Plan is a 20-year land use plan for the municipality. The Plan recognises that the night-time economy can encourage people to dine out or enjoy entertainment or cultural experiences, and that communities and visitors expect cities and town centres to provide a safe and flourishing economy and community life from late afternoon to early morning.

A number of local strategic planning considerations outlined in the plan relate to the night-time economy:

- Promote the night-time economy in suitable centres and main streets where night-time public transport options are available;
- Improve access, inclusion and safety, and make public areas welcoming for consumers and workers;
- Diversify the range of night-time activities including extending opening hours for shops, cafes, libraries, galleries and museums.
- Address the cumulative impact of high concentrations of licensed premises and other noise generating activities to manage land use conflict; and
- Foster relationships between the creative industries, live performance and the night-time economy.

Gosford City Centre Revitalization

Revitalisation of Gosford City Centre as the capital of a healthy, prosperous and connected Central Coast, is a key priority of the Central Coast Regional Plan 2036.

The NSW Government Architect's Urban Design Framework provides the long-term vision for the continued development and renewal of the Gosford City Centre. The State Environmental Planning Policy (Precincts – Regional) 2021 and accompanying development control plan provides the planning controls for future development and requires that all development exhibit design excellence and contribute to the natural, cultural, visual and built character values of Gosford City Centre.

The key recommendations of the Urban Design Framework are:

- Foster a place-based approach and focus on public domain.
- Provide green infrastructure to improve the social wellbeing and health of the people living, working in, and using the city centre.
- Respect and enhance built form.
- Leverage regionally important sporting, health and transport infrastructure assets. That contribute to the identify and definition of Gosford as a regional capital.
- Streamline planning controls to remove complexity and create the best possible framework for investment and development.
- Provide strong leadership and governance, focussed on coordinated and integrated delivery.

Greater Cities Commission

The Central Coast was identified by the NSW Premier as part of the vision for a Six Cities Region in December 2021. The Greater Cities Commission was tasked with coordinating and facilitating the delivery of key investments and infrastructure to drive a globally competitive Six Cities Region.

The Greater Cities Commission is a NSW Government statutory body, with the role to coordinate and align the planning that will shape the future of the region, accelerate the delivery of key innovation districts and lead discussion on major city-shaping issues.

The NSW Government is focussed on seven priorities for the Central Coast City to grow jobs, industry, connectivity and opportunities for the community, including:

1. Driving innovation and industry collaboration.
2. Unlocking employment land and accelerating employment precincts.
3. Activating a university campus in a revitalised Gosford CBD.
4. Building on the Gosford Health and Wellbeing Precinct.
5. Improving transport within the Central Coast and with Sydney and Newcastle.
6. Delivering a high-speed internet network.
7. Improving planning processes to accelerate development approvals.

Local Strategic Documents

A list of all documents reviewed to inform this discussion paper can be found in Appendix A.

These documents provide a range of findings and strategic directions relevant to the development of the night-time economy, which are summarised adjacent.

Key Local Priorities

Foster **economic diversity and vibrancy** to increase economic resilience, visitation, creativity and participation.	**Attract and retain** people, jobs, investment and business.	**Enhance community safety** within neighbourhoods, public spaces and places.
Promote and provide more sporting, community and cultural events and festivals, day and night, throughout the year.	**Foster creative and performing arts** in the night-time economy through theatres, galleries and creative spaces, by **integrating art and performance into public life**.	Encourage night-time activation in key night-time economy precincts, including outdoor dining through streetscape design improvements and interventions.
Encouraging resilient, accessible and inclusive hubs with a range of uses including town centre uses, night-time activities and civic, community, social and residential uses.	Addressing the cumulative impact of high concentrations of licensed premises and other noise generating activities to **manage land use conflict** in these areas.	**Enable growth of music and the arts** in city and town centre planning, with a streamlined approach to procedures and urban design.
Promote imaginative use of the Central Coast Stadium and other non-traditional venues and spaces for creative programming.	Deliver activations to **encourage and facilitate visitor dispersal** across the region.	Approach the State Government and **advocate** for the return of Night Owl bus services.

Policy & Legislation Review

This section provides an overview and assessment of the planning scheme, state legislation and local policies in relation to night-time economy development.

The following policies and legislation have been reviewed as part of this process:

- Liquor Act 2007
- **Liquor Amendment (Night-Time Economy) Act 2020**
- Protection of the Environment Operations Act 1997
- **State Environmental Planning Policy (Precincts – Regional)**
- **Local Environment Plan**
- **Local Strategic Planning Statement**
- **Business Use of a Public Footpath Policy**
- **Busking Guidelines**
- Street Banner Policy
- Events on Open Space Areas Policy
- **Policy for Operation of Temporary Food Premises**
- Environmental Management Policy
- Landscape Management Policy
- Sustainable and Plastic Free Events Policy

Key documents as relevant to this discussion paper have been **marked in bold** in the list above.

Planning Policy

Local Environment Plan

The Local Environmental Plan (LEP) is the primary legal planning document for guiding land use and planning decisions made by Council.

Aims

- To protect and promote the use and development of land for arts and cultural activity, including music and other performance arts;
- To foster economic, environmental and social well-being so that the Central Coast continues to develop as a sustainable and prosperous place to live, work and visit,
- To encourage a range of housing, employment, recreation and services to meet the needs of existing and future residents of the Central Coast;
- To promote the efficient and equitable provision of public services, infrastructure and amenities;
- To provide for a range of local and regional community facilities for recreation, culture, health and education purposes;
- To conserve, protect and enhance the natural environment of the Central Coast, incorporating ecologically sustainable development;
- To conserve, protect and enhance the environmental and cultural heritage of the Central Coast;
- To minimise risk to the community in areas subject to environmental hazards, including flooding, climate change and bush fires
- To promote a high standard of urban design that responds appropriately to the existing or desired future character of areas;
- To promote design principles in all development to improve the safety, accessibility, health and well-being of residents and visitors;
- To concentrate intensive land uses and trip-generating activities in locations that are most accessible to transport and centres;
- To encourage the development of sustainable tourism that is compatible with the surrounding environment.

Local Strategic Planning Statement

The Central Coast Local Strategic Planning Statement provides a land use vision that will guide sustainable growth and development across the Region to 2036 and beyond.

Vision

The Central Coast of tomorrow will show leadership in placemaking, environmental protection, sustainability, infrastructure and community resilience.

Gosford City Centre will become the Capital of the Central Coast, providing regional-level facilities and a positive local identity. Our other Centres will thrive with more living and working opportunities, providing key services to surrounding communities.

Importantly, our communities will be physically connected through appropriate infrastructure and socially connected through strong relationships and a sense of unity.

Relevant Planning Priorities

Economics	• Enliven cultural spaces and places. • Grow regionally competitive tourism destinations across the Central Coast. • Facilitate economic development to increase local employment opportunities for the community.
Community & Culture	• Develop and implement a Central Coast Cultural Plan that identifies opportunities to strengthen creative industries and contribute to the night-time economy. • Identify cultural precincts or opportunities for cultural enhancement in our centres such as temporary performance and exhibition spaces to support creative industries. • Develop a Cultural Precinct in the City of Gosford with a Regional Library and Arts Centre, and a Cultural Hub in Wyong. • Enliven cultural spaces and places.
Transport	• Improve connectivity within and between our centres.

State Legislation

Liquor Act 2007

Objectives

- Regulate and control the sale, supply and consumption of alcohol in a way that is consistent with the expectations, needs and aspirations of the community.
- Facilitate the balanced development, in the public interest, of the liquor industry through a flexible and practical regulatory system with minimal formality and technicality.
- Contribute to the responsible development of related industries such as the live music, entertainment, tourism and hospitality industries.

Liquor Amendment (night-time economy) Act 2020 (Liquor Amendment Act)

The management of Sydney's night-time economy has historically been criticised for being too heavily centred on the consumption of alcohol and associated violent incidents. The decision to roll back some of these laws in 2020 has provided the foundation to invigorate the night-time economy and achieve a better balance between safety and vibrancy.

From December 2020, a range of changes to NSW liquor laws were introduced to support nightlife and encourage a vibrant and safe 24-hour economy. The changes encourage live music and entertainment, arts and cultural events, support small bars and make licensee obligations clearer.

Relevant Policy Changes:

- Automatic removal of live entertainment conditions from liquor licenses;
- Incentives for live music and performance venues
- Options for small bars to offer more diverse and family orientated services for customers, including allowing minors in bars and offering take away alcohol.
- Streamlining licensing timeframes for standard small bars to begin trading.
- Establishing 'Special Entertainment Precincts' for managing amplified music that allow Councils to decide requirements for amplified music, where requirements that would normally apply under the Liquor Act 2007 will not apply.
- Including live music and performance considerations in liquor licensing decision making

Local Policy

There are over 80 local policies and regulations administered by Central Coast Council. A recent review of Council policy documents identified an excessive number of policies and a lack of visibility and transparency, as well as inconsistencies with previous processes. As such a new policy framework has recently been adopted, with clear accountabilities and consistent process.

Key local policies relevant to the night-time economy are summarised overpage, noting that provisions relating to venue trading hours and noise requirements are generally outlined in individual license agreements.

Key Local Policy Constraints

Policy Document	Policy Objectives	Restrictive Policy Requirements

Business Use of a Public Footpath Policy	• To encourage establishment of appropriate outdoor dining areas throughout Gosford Local Government Area, which promote a safe, attractive and vibrant environment for local residents and visitors.
	• To permit limited business use of public footpath for street vending purposes, directly outside suitable businesses, throughout Gosford Local Government Area, to help retailers with promotion of their businesses in an ever increasing competitive field.
	• To minimise disruption to neighbouring businesses and surrounding environment by regulating and monitoring approved business activities on public footpath.
	• To ensure suitable pedestrian thoroughfare zone is available along the footpath for all road users.
	• To improve the amenity and character of business districts throughout the Gosford Local Government Area.
		• 4.21 Serving of Alcohol (and Alcohol-Free Zones)
		  • Selling and consumption of alcoholic or intoxicating liquor is only permitted in the public footpath area if the licensee has obtained an appropriate liquor licence and/or approval from Council. Approval shall only be granted after Council's Property Services and Engineering Services sections have assessed appropriateness of the application.
		  • Alcohol is only permitted to be sold and consumed with a meal.
		• No advertising signs (including display information and menu boards) are permitted on the footpath area.
		• No outdoor dining is permitted on neighbouring premises.
		• No provisions or policies relating to permanent or semi-permanent structures (i.e. parklets)

Busking Guidelines	• To outline the conditions for buskers to ensure maximum public safety, amenity and community harmony at all times; • To encourage and manage high quality performances that complement our existing communities and town centres.	• Busking Approval Cards only allow busking between 9am and 9pm

Local Approvals Policy (Draft)

Council is currently preparing a Local Approvals Policy (currently at draft stage) for Central Coast, with the aim to identify those activities under Section 68 of the Local Government Act 1993 that:

- Are exempt from requiring a separate approval from Council under section 68, subject to meeting specified criteria (where relevant); or
- Are required to obtain a section 68 approval, subject to meeting specified criteria (where relevant)

Activities that are covered by the Policy, as relevant to the night-time economy, are detailed in the table adjacent. The majority of these activities will still require Council approval under the new policy. However, the Policy will consolidate numerous Council policies, making it easier for businesses to navigate the approvals process.

Activity	Council Exemption?	Required Application to Council
Street Stalls on Public Land	No	• Events on Open Space Area Guidelines • Licensing of a Trade or Business on Open Space Areas
Hiring of Council Park, Reserve for an Event	Yes –for events less than 80 people	• Events on Open Space Area Guidelines • Licensing of a Trade or Business on Open Space Areas
Business UE of a Public Footpath for Outdoor Trading	No	• Outdoor Trading Area Application
Outdoor Dining and Associated Structures on Public Land or Footpaths	No	• Outdoor Trading Area Application
Busking or Street Theatre	Yes – does not need approvals with a valid busking license	• Busking Application Form S138 Roads Act Approval where in Road Reserve
Set Up, Operate or Use a Loudspeaker or Sound Amplifying Device	No	• Casual Open Space Hiring Enquiry Form • Special Event Application Form
Install or Operate Amusement Devices	No	• Events on Open Space Area Guidelines • Licensing of a Trade or Business on Open Space Areas
Mobile Food Vehicles on Council Land and Road Reserves	No	• Temporary and Mobile Food Business Notification

Key Policy & Governance Constraints

- Confusing and difficult to navigate NTE governance structure.
- Lack of reference within the State Environmental Planning Policy, Local Environment Plan or Strategic Planning Statement around supporting night-time activity in the Central Coast.
- Missed opportunity to encourage night-time activity through Council policies and permits.
- Council policies that limit on-street economic activity, impeding the creation of vibrant public spaces.
- Community or police objections to NTE proposals can result in permits or liquor licenses not being granted.

Recommended Policy & Governance Interventions

- Deliver an **NTE policy** to implement findings from the NTE strategy and to reinforce the primacy of Gosford, Terrigal and Wyong as key NTE locations
- Establish a dedicated NTE resource to provide NTE-specific **business concierge** services.
- Liquor & Gaming NSW provide a **Hospitality Concierge service** which offers businesses with personalised guidance on a range of government support such as 'Alfresco Dining' initiative, planning approvals, connections to the NSW Government's 24-hour Economy Commissioner, and advice on the development of special entertainment precincts. Council should endeavour to maintain a strong relationship with this department.
- Utilise **Section 10.7 planning certificates** (formerly s149) to manage community expectations around noise in key night-time economy precincts (*Precedent: City of Newcastle*)
- Include specific provisions allowing **street stalls, mobile vending and outdoor dining** in the LEP (*Precedent: City of Lake Macquarie*)
- Enforce the inclusion of a night-time component in events through the **event permit process** (*Precedent: City of Lake Macquarie*)
- Establish '**Special Entertainment Precincts**' in the LEP for managing amplified music, allowing Council to decide requirements for amplified music, where requirements that would normally apply under the Liquor Act 2007 will not apply
- Automatic **outdoor dining** permit approval program for NTE precincts
- Establish a **Business Hour Policy** to allow for extended opening hours in established NTE precincts, to be applied through the development assessment process (*Precedent: City of Wollongong*)
- Reinforce NTE objectives through other **Council strategic plans** (e.g. Council Plan, Arts and Culture Strategy) to ensure NTE objectives are considered in future strategic planning
- **Collaborate** with Lake Macquarie City Council on NTE project delivery to achieve cost efficiencies.

What is a Section 10.7 Planning Certificate?

A Section 10.7 Planning Certificate provides information about the development potential of a parcel of land. Information on a 10.7(2) Certificate includes:

- The zoning of the property
- The relevant state, regional and local planning controls and policies
- Which land uses are complying development on the land
- Constraints such as contamination, level of flooding and bushfire-risk.
- Advice from other authorities
- Development approvals and contributions plans.

They are usually required upon the sale or purchase of a property, thus providing a holistic view of all information required from early in the development process.

Existing Situation Analysis

Central Coast

Home to almost 350,000 people, Central Coast currently supports approximately 120,000 workers and 26,000 businesses. Employment in the Central Coast is concentrated in the population-driven industries of health care and social assistance, retail trade and construction.

Resident Profile

In 2021, the most common household type in the Central Coast was families (28%), followed by couples with children (27%) and lone person households (25%). Central Coast has an ageing population, typified by a high proportion of residents aged over 50, and a median age of 43 (compared to the metropolitan Sydney average of 37).

The Socio-Economic Index for Areas (SEIFA) Index measures the relative level of socio-economic disadvantage based on a range of Census characteristics (e.g. education, income, employment). With a SEIFA score below 1,000, Central Coast is relatively disadvantaged compared to the rest of NSW.

Central Coast has a relatively high job containment rate (71%), indicating that the majority of resident workers are employed in the municipality. This reflects the municipality's isolation from other areas of economic activity (Newcastle, Sydney). The onus is therefore on Central Coast to provide night-time economy product and experience for its residents, as well as visitors to the region.

Migration from Sydney

Between 2016 and 2021, the net number of migrants from Sydney to Central Coast was 17,365. This trend is a result of the rise of remote working and health and lifestyle advantages associated with living in a more sparsely populated peri-urban environment. New residents from metropolitan Sydney are accustomed to having access to a diverse night-time product and experience offering, and have high expectations of quality. Central Coast should aim to improve the quality of its experience in line with the likes of Sydney and Newcastle. This could be achieved through attracting investment from experienced investors from these areas.

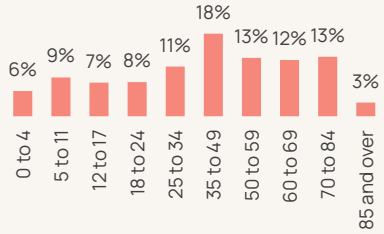
346,596
Population (2021)

5.3m
Visitors (2016-2019 4-year average)
71% domestic day trip
28% domestic overnight
1% international

119,780
Jobs (2021)
71% job containment rate

25,801
Businesses (2022)

Age Profile



Top Industries by Employment (2021)

19%
Health Care and Social Assistance

11%
Retail Trade

11%
Construction

43 **Median Age**

994 **SEIFA**

$1,507 **Median Weekly Household Income**

Household Type

28%
Couples with children

27%
Couples without children

25%
Lone person

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Visitor Profile

The Central Coast has a vibrant visitor economy, attracting 6.6 million domestic visitors in 2019 and 54,000 international visitors. Tourism Research Australia visitation data from 2019 has been used to reflect a business as usual scenario, prior to the COVID-19 pandemic.

The visitor economy is dominated by almost 5 million daytrip visitors (70%), owing to its peri-urban location adjacent to major population centres of Greater Sydney and Newcastle. Majority of the daytrip visitor economy on the Central Coast is driven by holiday visitors (41%) and visiting friends and relatives (38%). When benchmarked against Newcastle, the Central Coast has higher levels of holiday daytrip visitors, reflecting the appeal of the Central Coast's beaches and nature-based assets in driving holiday visitation.

Whilst overnight visitation is much lower at 1.9 million, it accounts for the majority of visitor spend ($847 million). Overnight spend is however significantly lower than Newcastle ($569), due to the high proportion of visitors staying with friends and relatives and engaging in low-yield outdoor activities.

Overnight visitation to the Central Coast is highly seasonal, which is likely to be largely driven by the VFR and holiday home markets during school holiday periods. Both daytrip and overnight visitation peaks across the height of summer in December and January.

A low number of both day trip and overnight visitors dine out in the Central Coast, when compared to Newcastle. This potentially reflects a lower supply of destination dining experiences on the Central Coast compared to Newcastle.

6.6m Visitors
70% day trip
29% overnight
1% international

$1.3b Expenditure
26% day trip
64% overnight
10% international

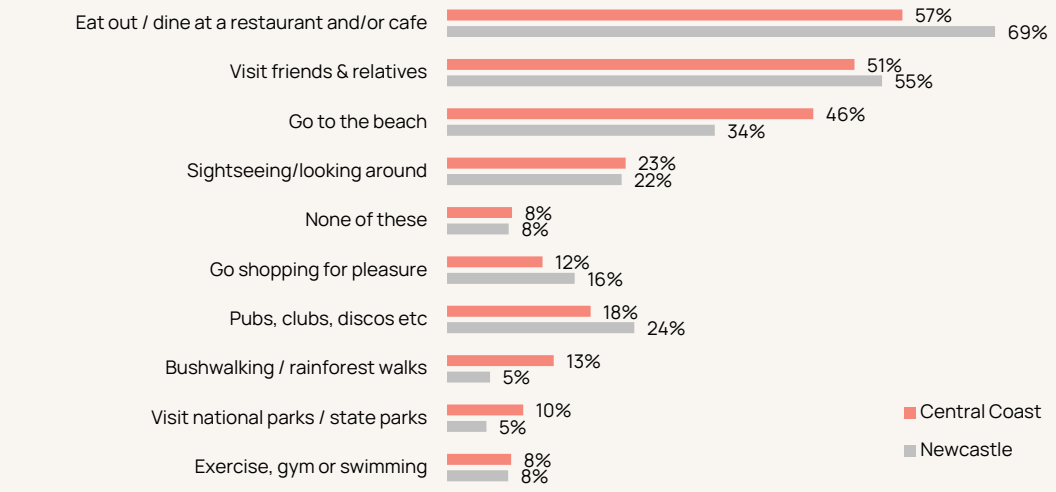
Purpose of Visit

Holiday
41% day trip
42% overnight

VFR
38% day trip
45% overnight

Business
12% day trip
8% overnight

Activity Profile (Overnight Visitors)



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The Night-Time Economy

Between April 2022 and March 2023, total expenditure on dining and entertainment at night (between 6pm and 6am) was almost $230 million. Terrigal attracted the highest proportion of visitor spend (29.3%), reflecting the concentration of restaurants and bars in the town, and its role as a popular tourist destination.

A low proportion of Central Coast's night-time economy spend was attributable to Gosford, relative to its population, despite its competitive advantage in the provision of key regional-level facilities, such as healthcare services, sporting infrastructure, and public transport connections to both Sydney and Newcastle. Given that current local and state strategic planning seek to position Gosford as the capital of the Central Coast, there is significant opportunity to grow its role as a hub for night-time economic activity, and as a result grow its contribution to the night-time economy.

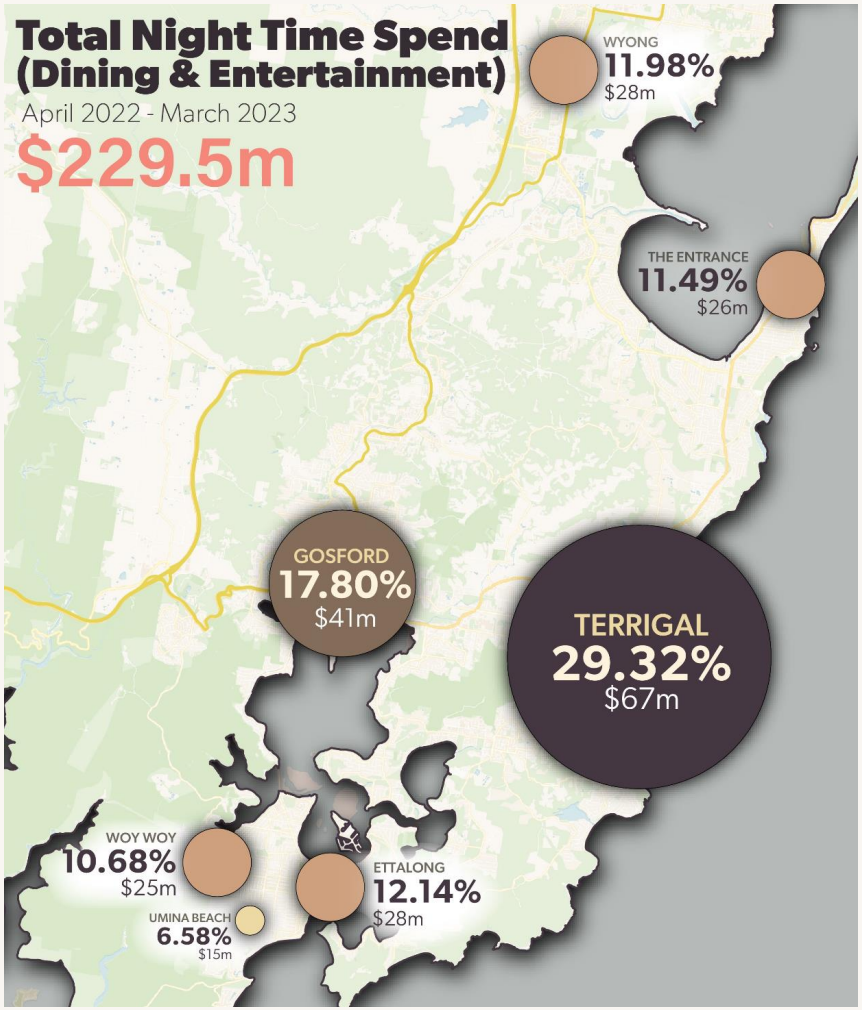

Figure 2. Central Coast Night Time Expenditure

Source: Urban Enterprise, based on Spendmapp, 2023.

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Current Offering

The table following shows the current products and experiences open from 7pm onwards across key locations in the Central Coast. The Coast's night-time offering predominantly includes restaurants, with some take away food, pub and bar options available at night.

The vast majority of the municipality's night-time offering is concentrated in Terrigal, where a number of restaurants, bars and take away food establishments are clustered along the foreshore in walking distance from each other. Additionally, Terrigal's product offering is more contemporary, which assists in attracting a younger market who are more likely engage with the night-time economy throughout the week.

There is a stark lack of arts, culture and live music-dedicated venues open at night in the Central Coast. These product typologies are needed to create vibrancy and attract a diverse range of resident and visitor groups. There is opportunity to likely attract flow-on investment into supporting activations and prioritise the delivery of live music, arts and cultural venues in the City (particularly in Gosford), which will ng product, such as bars, restaurants and late night meals.

Night-Time Product and Experience Offering

	Restaurant	Take Away Food	Pub	Bar	Leagues Club/ RSL	Arts/ Culture / Live Music	Total
Terrigal	24	1	1	4	-	-	30
Gosford	10	3	3	3	1	1	21
Ettalong Beach	15	2	1	1	-	1	20
The Entrance	17	1	-	-	-	-	18
Woy Woy	10	2	2	1	-	-	15
Wyong	7	-	2	2	2	1	14
Long Jetty	7	2	2	-	-	-	11
Erina	4	2	2	-	1	1	10
Toukley	10	7	1	-	-	3	21
Total	104	20	14	11	4	7	160

Night-Time Economy Trends

COVID-19

The COVID-19 pandemic and associated public health restrictions ignited an interest in how outdoor and public spaces are utilised, and how the economy functions throughout the 24 hours of the day. The pandemic had a disproportionately negative affect on the night-time industries, particularly hospitality and tourism related businesses. The recovery period has provided the NSW State Government with the opportunity to re-open the night-time economy and reconsider the night-time economy experience in New South Wales.

Food

- **Experiential Dining.** In a post COVID-19 environment, diners are looking for experiences when eating out. More diners are now willing to celebrate special occasions and are looking for foodservice venues that can deliver memorable experiences.
- **Food Halls.** Experiential dining trends and increased consumer awareness regarding supporting local, independent businesses has led to the rising popularity of food halls and shared spaces for dining. Examples include The Grounds, Alexandria, Spice Alley Chippendale.
- **Fast Casual & Solo Dining.** Fast paced and busy modern lifestyles have driven demand for affordable, quick and diverse dining options. A key driver of this segment is solo dining, which accounted for over 40% of traffic share within Sydney's food industry in 2019.

Drink

Australians are drinking less alcohol than at any point in the last 55 years , with a range of considerations such as health, faith, cost and culture driving this trend. Simultaneously, premiumisation is driving growth in the alcohol sector , with more Australians consuming premium or niche alcohol products (e.g. craft beer, high quality wines, spirits produced by independent distillers etc.).

The above reflects a trends of Australians purchasing more expensive alcohol but drinking less of it overall. This presents a suitable environment for small bars providing luxury, intimate drinking experiences, and drinking experiences that showcase small-scale and niche alcohol production, such as breweries, distilleries and urban wineries.

Experiences

There has been a shift towards experiential night-time economy products in response to changing consumer preferences and demands. Traditional nightlife experiences that centre solely around alcohol consumption have given way for more immersive and engaging activities. Consumers now seek unique and memorable experiences that provide entertainment, social interaction and a sense of exploration.

This trend has been accelerated by the rise of social media and the sharing economy. Consumers have a desire for novelty, engagement and memorable moments that are visually appealing and make for great content.

Local Insights

A survey **of 23 hospitality venues throughout Central Coast** was undertaken to understand business' experience with the night-time economy in the Central Coast. Key findings are as follows:

- As a primarily beachside, holiday destination, seasonality creates challenges for business operations midweek and during the winter months.
- Most respondents indicated having a heavier reliance on local markets, compared to visitors.
- The main constraints to night-time trading include: a lack of public transport services, property and planning constraints, and public realm infrastructure.
- With limited public transport options available, patrons are typically care dependent which places pressure on parking availability and creates conflicts with businesses wishing to implement outdoor dining in former parking areas.
- Alcohol related antisocial behaviour and crime discourage participation in the night-time economy, which creates challenges for businesses as they can face heightened patron management pressures at night, such as through the responsible service of alcohol.
- Central Coast's streetscape and public spaces are dates and lack suitable activation to encourage patronage, which causes a lack of vibrancy and economic activity at night.
- Respondents indicated that issues hiring and retaining staff is a major cause of daytime businesses struggling extending trading hours into the night. This is particularly prevalent in the hospitality industry, which tends to rely on younger cohorts who often leave the region in pursuit of more lively environments (e.g. Sydney, Newcastle).

Placemaking & Activation

Case Study Analysis

This Section provides an overview of Local Government night-time economic development initiatives from across Australia, to identify the attributes of a successful night-time economy and the types of infrastructure and product that could be delivered to enhance the Central Coast night-time economy.

With growing recognition of the economic, social, cultural, and community benefits that a vibrant and well-managed night-time environment can bring to a city, many municipalities have begun developing and implementing strategies to increase night-time trading.

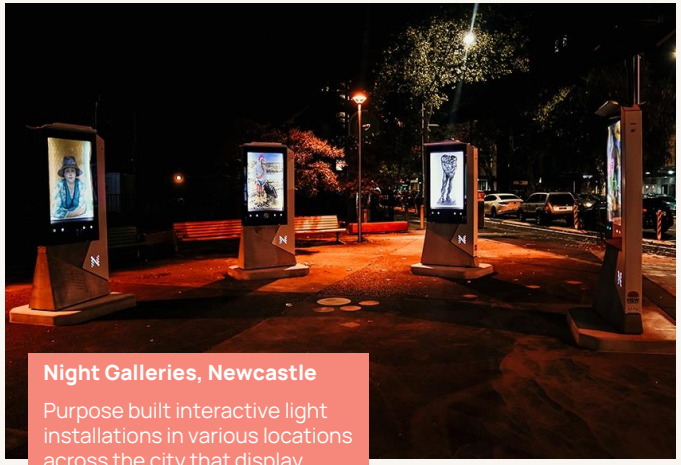
The aim of this case study analysis section is to identify best practice night-time economy initiatives relevant to regional locations that could be replicated on the Central Coast.

Case study initiatives for the following categories have been identified:

1. **Visual Amenity.** Projects that aim to create inviting public spaces to invoke a sense of vibrancy and safety in public after dark.
2. **Arts, Culture and Live Music.** Initiatives that promote creative and entertainment activities for residents and visitors.
3. **Food and Dining.** Projects that provide a vibrant and inviting atmosphere centred around food.
4. **Events.** To diversify the night-time offering and give residents and visitors a taste of the night-time economy.

This analysis has been used to inform the identification of potential projects, outlined later in this report.

1. Visual Amenity



Night Galleries, Newcastle

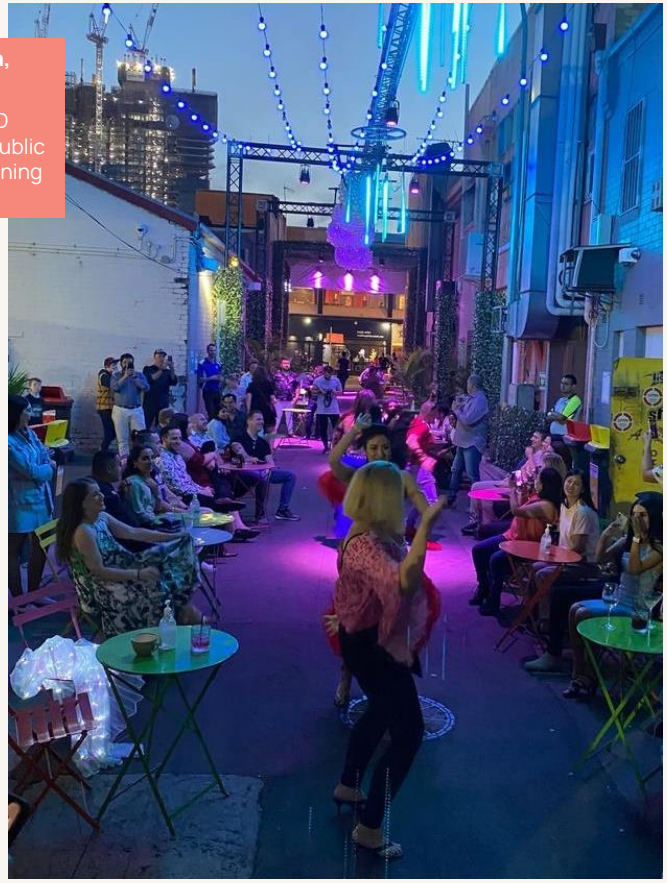
Purpose built interactive light installations in various locations across the city that display works of art from Newcastle Art Gallery. The light installations help to improve street lighting which is linked to a number of safety outcomes.

Neon Lighting Installations, Geelong

Instillation of illuminated artworks in various locations around central Geelong to activate outdoor areas and improve night-time lighting, improve safety and deter crime.

Phillip Lane Activation, Parramatta

Transformation of a CBD laneway into a shared public space with art, street dining and creative lighting.



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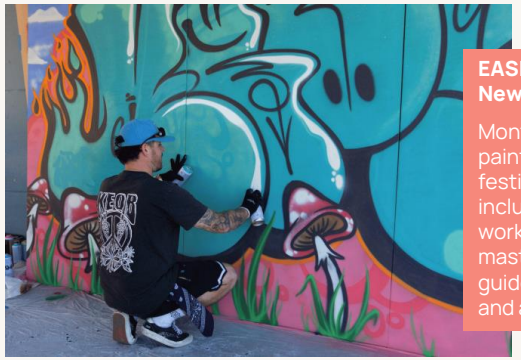
1. Visual Amenity (cont'd)

Float your Boat, Lake Macquarie City Council

An annual festival featuring illuminated boat parades, entertainment, food and family activities celebrating the waterfront and the



EASLE'D, Newcastle

Month-long live painting festival, including artist' workshops, masterclasses, guided tours and artist trail.

On water activation in Canary Wharf, London

On-water sculpture art to attract visitors to the area during the winter months.

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2. Arts, culture and live music

Newcastle West Walk

A food, art, music and wine walk featuring 4 contemporary art galleries, degustation, local beverages & live music

Hunter Street Stride

A collection of 12 venues in Newcastle that feature live music on a single Saturday.

West Best Bloc First

A collection of 12 venues in Newcastle that feature live music on a single Saturday

Raising the Bar

A one-night event featuring 30 free talks at 15 venues, with a theme of 'entrepreneurship and innovation'

Shakespeare in the Park

A popular outdoor theatre event where Shakesperean plays are performed in a public park or open air setting.

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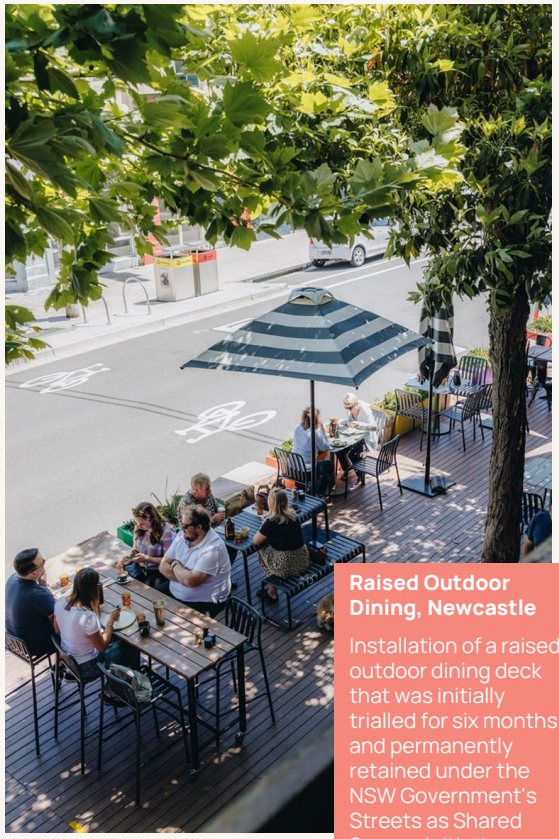
3. Food and dining



Raised Outdoor Dining, Newcastle

Installation of a raised outdoor dining deck that was initially trialled for six months and permanently retained under the NSW Government's Streets as Shared Spaces initiative.

Lucky Dumpling Market, Adelaide

An outdoor food festival featuring a wide array of Asian-inspired street food, as well as cultural performances and entertainment.

Vibrant Scene, Lake Macquarie City

Expand outdoor dining through:

- Encouraging hospitality businesses to create outdoor dining precincts in parks or car parks
- Offering Council owned land to food truck businesses to create food van hamlets.

Ramadan Nights Festival, City of Canterbury Bankstown

A vibrant, global food bazaar from dusk until 3am every night during Ramadan. This is an alcohol-free event.

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4. Events

Voyage: A New Kind of Storytelling *City of Newcastle*	A live music, spoken word and contemporary dance event that will form part of the 2023 Newcastle Writers Festival program delivered across two nights.
Newcastle Food Month *City of Newcastle*	Food events in the month of April running throughout days and evenings.
New Annual Festival *City of Newcastle*	A 10-day arts festival with more than 50 events that activates parks, places ad spaces across Newcastle. Featuring local and visiting artists sharing music, dance performance and visual art in a celebration of creativity.
Live & Local Parramatta *City of Paramatta*	Parramatta City Council proposed and delivered two events, one held in 2017 and one in 2018 in the Parramatta CBD. Council engaged a Live Music Coordinator, Stephen Griffiths, to oversee Live Music events and activations in Parramatta. This included the Live and Local program.
In Good Taste Festival *Georges River Council*	The festival celebrates food from around the globe, offering a variety of food stalls from many different cuisines representing the multicultural and diverse city we live in.
Un[contained] Arts Festival *Georges River Council*	Arts festival held across the weekend. Art, performances, food, drinks & music.
Live Music Lake Mac *Lake Macquarie City*	The series of events aims to give locals the chance to see other local acts and touring musicians from across NSW
Fast and Loud Festival *Lake Macquarie City*	Two weekends featuring an incredible lineup of action on and off the water including exclusive live performances, exhilarating boat races, gravity defying air shows and more.
Music in the Podium *Lake Macquarie City*	Free family friendly community entertainment at The Foreshore, Warners Bay, NSW. Every Friday evening for summer period.
Luminous Festival *Wollongong City Council*	Five-day festival taking the CBD by storm with a jampacked program of art, music, culture, dance and fun. All of the events happen mainly during the evening.

Spotlight on: City of Newcastle

Heralded as a success story of urban renewal and economic revitalisation, the City of Newcastle's transformation over the past decade has changed the city's employment landscape and created a distinct sense of place that leverages its industrial history. These changes were the result of substantial state and local government investment in infrastructure, strategic planning, and policy development. In particular, the City of Newcastle's work to revitalise the night economy through its Newcastle After Dark Strategy has helped the city to become a 24-hour urban centre with distinct precinct areas. This case study serves as a best practice example of integrated and collaborative night economy policy.

The City of Newcastle has undergone a remarkable urban transformation in recent years, moving from its industrial past to a vibrant, diverse, and modern city. This impressive transformation was driven by a range of innovative Council plans and strategies, along with several large major projects (shown adjacent)

Between 2011 and 2021, the population of the City of Newcastle grew at a similar rate to Central Coast (+0.9% p.a. and +0.8% p.a. respectively). However, over the same period, jobs growth in Newcastle (+2.0% p.a.) was much higher than in the Central Coast (+1.4% p.a.).

The delivery of these major infrastructure projects coincides with strong employment growth within the municipality, indicating their substantial contribution to the local economy.

The City of Newcastle is an excellent example of a historically industrial city transformed into an attractive, modern and economically diverse urban centre. This has been achieved through a combination of major infrastructure and transport investment, revitalisation of cultural assets and a targeted program of night-time economic development activities.

The story of Newcastle demonstrates the relationship between public realm amenity and night-time vibrancy. Importantly, the city's revitalisation has celebrated and drawn inspiration from its unique heritage buildings, coastal features and industrial, working class history.

This is particularly relevant to Gosford, where there is significant opportunity to leverage the tidal wave of infrastructure, public realm and residential development investment. Like Newcastle, the revitalisation of Gosford's night-time economy should consider ways to embrace its unique points of difference, such as its 'grungy' urban feel and anchor assets - e.g. hospital, stadium, train station etc.

Newcastle Light Rail
A 2.7-kilometer light rail line connecting the Newcastle Interchange to Newcastle Beach via the city centre.

Newcastle Inner City Bypass
A four-kilometre, four-lane road connecting the Pacific Highway with the Newcastle Inner City Bypass, aiming to alleviate traffic congestion and improve connectivity.

Honeysuckle Foreshore Redevelopment
A significant urban renewal project that transformed the former industrial area into a vibrant waterfront precinct.

Newcastle Museum
Major redevelopment of the Newcastle Museum, including a contemporary building and expanded exhibition spaces.

University of Newcastle New Space
The University of Newcastle's New Space is a state-of-the-art education precinct located in the heart of Newcastle.

Gosford

Overview

This Section provides a detailed assessment of Central Coast's capital city, Gosford, to identify issues and opportunities relating to the City's ability to cater for future night-time economic activity.

Gosford City Centre is the social and economic heart of the Central Coast, servicing the region for employment, housing, health and education, public transport and retail.

State Government policy supports the role of Gosford as the regional capital city and major service centre within the Central Coast. Gosford's role is therefore to provide a wide range of uses to the region, including commercial, government, retail, cultural, entertainment and recreational activities.

21,204
Population (2021)

1.2m
Visitors (2016-2019 4-year average)
82% domestic day trip
17% domestic overnight
1% international

20,629
Jobs (2021)

2,438
Businesses (2022)

Age Profile

39
Median Age

$1,460
Median Weekly Household Income

Top Industries by Employment (2021)

35%
Health Care & Social Assistance

11%
Public Administration & Safety

11%
Retail Trade

Strengths & Challenges

Gosford is growing and becoming increasingly urbanised, with a suite of public and private investments in health care, education, apartments, tourism and hospitality underway that will boost the number of workers, residents and students dwelling in the City.

However, the city is not the vibrant place it used to be, in part paralleled by the rise of major shopping centres throughout the region.

The opportunity to transform and enhance Gosford's night-time economy is ripe, with existing assets like the Central Coast Stadium, Gosford Train Station and Gosford Waterfront already attracting people to the City. The key opportunity and focus for this project will therefore be on nurturing and growing the night-time economy of Gosford, which will in turn support the broader vision of transforming the city into an iconic waterfront destination within the Central Coast.

Gosford assets, strengths and challenges, as they relate to night-time economic development, are shown adjacent. This information is informed by consultation with Council, local businesses, a review of strategic policy documents and a thorough on-ground audit of Gosford.

Gosford Assets, Strengths and Challenges

Assets & Strengths	Challenges
• Central Coast Stadium • Public transport connectivity to Sydney and Newcastle • Significant level of government and private sector investment planned and underway (hospital, TAFE, university, city centre revitalisation, waterfront, residential) • Growing cluster of NTE businesses who collaborate well • Strong market potential associated with future population and visitation growth driven by migrants from Sydney, university students and health care workers	• Insufficient provision of night-time economy product for a city of its size • Lacking diversity of product e.g. cultural experiences and entertainment • Lack of cultural anchors in the CBD to drive night-time visitation (e.g. theatre) • Dispersed products and lack of clustering (e.g. art gallery located outside of main activity centre) • Unattractive streetscape and public realm, which impacts amenity at all times of the day • Potential for noise, licensing and light conflicts associated with planned residential development • Unattractive development sites • Poor perceptions of safety, which impacts walkability • Limited public transport at night • Lack of venues for live music • Little activation around Central Coast stadium • The urban character of Gosford doesn't align with the Central Coast brand • Loss of retail market share following the opening of Erina Fair, which offers NTE products and experiences

Investment Context

A number of existing and planned infrastructure and major capital projects are likely to generate demand for night-time economy uses in Gosford.

Key demand driving projects are outlined below.

Residential Development

Gosford is currently experiencing historic levels of apartment development activity, with 920 apartments expected to be delivered in the next two years. These developments along will increase the population of Gosford by approximately 2,000 people.

The Archibald (pictured) will offer 323 residential apartments, 130 hotel rooms, food and beverage facilities, as well as a 960sqm rooftop sky bar.

Newcastle University Campus

A $40 million University of Newcastle campus is planned for Gosford, which will accommodate 900 students in its first decade of operation. The new facility is currently in the design phase, with construction expected to be completed in 2025.

TAFE

A new state of the art TAFE campus is planned for the heart of Gosford's CBD, encompassing the former Gosford Council Chamber building and the adjacent land. The project will create up to 3,000 tertiary and vocational education opportunities across a wider range of trades.

Gosford Hospital

Gosford Hospital underwent a major redevelopment to meet the needs of a growing Central Coast community, including new and upgraded facilities, enables new treatment models, and enhance the future capacity for high quality patient care. The redevelopment increased total employment at the hospital by 540 jobs.

Gosford Waterfront

Council's concept plan for the revitalisation of the Gosford Waterfront includes a mix of commercial, retail and accommodation options, along with a ferry terminal, outdoor recreational areas and an amphitheatre. The project will beautify Gosford's large tract of foreshore land, and will boost liveability and economic growth in the region.

Safer Cities: Her Way

Safer Cities: Her Way is a $30 million NSW Government collaborative partnership program between Transport for NSW and a number of pilot councils, including Central Coast. Council will receive $1 million to deliver demonstration projects aimed at improving the perception of safety for women, girls and gender diverse people when walking or moving to, through and within public spaces and transport hubs. Delivery of interventions will begin by November 2023

Community Improvement District Pilot Program (Purple Flag)

The Community Improvement District (CID) Pilot Program (formerly Business Improvement District Pilot Program) is an initiative led by the NSW Government, designed to fund trials of business-led, place-based partnerships and governance models across the state.

Gosford Erina Business Chamber and Business NSW Central Coast have submitted a joint application for funding to create a BID in Gosford, which will seek to emulate place marketing and branding components of the successful YCK (York, Clarence and Kent Streets) Purple Flag Accredited Precinct project recently delivered in Sydney's CBD, with the aim to transform Gosford into a thriving, diverse, and inclusive night-time destination.

Safer Cities: Her Way Findings

Safer Cities: Her Way is a $30 million NSW Government collaborative partnership program between Transport for NSW and a number of pilot councils across NSW.

Central Coast Council will receive $1 million to deliver demonstration projects aimed at improving the perception of safety for women, girls and gender diverse people when walking or moving to, through and within public spaces and transport hubs.

The demonstration projects are a way to test how to make public spaces feel safer. Each project will be developed through co-design workshops with local communities and designed to reflect local place identity and character. The projects will be evaluated for their effectiveness and insights will be used to build the case for longer-term change.

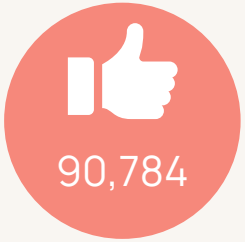
Responses to the in-depth in community survey.

Comments dropped on the interactive map.

Local community members and students joined **3 Walkshops** throughout Gosford.

Community members, key stakeholders and community staff joined our Co-Design Workshop.

Visits to the project page and interactive map.



Social media users reached generating more than **12,000** likes, comments, shares, clicks and video views.

Direct emails sent out to the community and key stakeholders.

Key Her Way survey findings and consultation insights, as relevant to the night-time economy in the Central Coast, are shown below.

Key Survey Findings

- 65% of participants changed their route or method of travel due to feeling unsafe
- 71% did not participate in an activity that was being held in Gosford due to not feeling safe.
- 76% of participants felt unsafe in Gosford at night
- Streetlights, passive surveillance, CCTV, well maintained pathways and security would improve participant's sense of safety in Gosford.
- Participants indicated that economic stimulation and activation is just as important as lighting when it comes to improving sense of safety.

Key Consultation Insights

- There is **a lack of things to do** in Gosford.
- Gosford needs to attract a **higher quality businesses** that open later and on weekend.
- **Restaurants and activations** such as night markets are needed to generate more foot traffic.
- **More lighting** is required to improve safety perceptions.
- **Derelict buildings** attract unsavoury crowds
- **night-time economic activity and hospitality** is needed to revitalise Gosford.

Gosford NTE Audit & Spatial Analysis

An audit of the night-time economy in Gosford CBD was undertaken to assess the existing situation, identify issues and opportunities and, where possible, provide a baseline for future assessment.

The audit assessed:

- Key Pedestrian Routes & Connectivity
- Street Interface Activation
- Footpath Width
- Public Space Lighting & Other Security Features
- General Amenity

This audit did not include activity associated with internal businesses and was focused primarily on the main streets, and only ground floor activity was observed.

The audit was undertaken over the 1st and 2nd of May 2023 between 7pm and 9pm.

The figure adjacent shows the audited area.

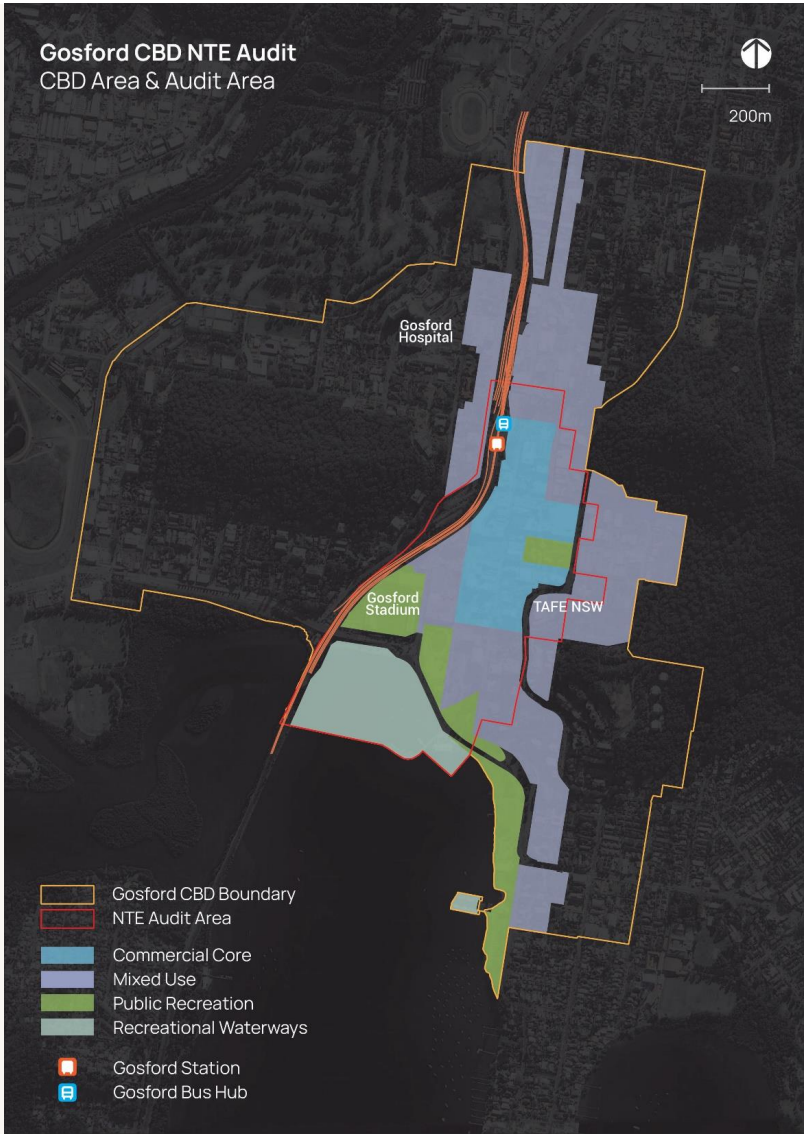


Figure 3. Gosford NTE Audit Area Boundaries

Key Pedestrian Routes & Connectivity

Figure 4 on page 50 shows key pedestrian thoroughfares in the Gosford CBD with consideration to:

Key pedestrian origin points:

- Car Parks (inc. Station Car Park, Leagues Club Car Park, Stadium Car Park)
- Gosford Station & Bus Terminal

Key pedestrian destinations include:

- Entertainment Venues (Gosford Stadium)
- Parks and Gardens (i.e. CC Leagues Club Park, Gosford Waterfront Park)
- Pubs, Bars & Restaurants (e.g. Drifters Wharf, Bay Rd Brewers)
- Visitor Accommodation (i.e. Hotel Gosford, Railway Hotel)

Potential areas for improvement include:

Car Parking and Public Transport Access

There is good access to public transport and sufficient supply of parking provided throughout Gosford.

There is potential for an additional bus stop located near the Gosford Waterfront Park and CC Leagues Club Park.

Wayfinding & Signage

Wayfinding signage is generally appropriately located throughout the CBD. Some directions are outdated and there is some inconsistency in terms of signage design.

Opportunities to improve wayfinding include:

- Upgrade signage so it reflects the destination branding of Gosford and is more targeted towards visitors.
- Use more lighting to enhance key landmarks for easy recognition at night.

Footpath Conditions

Footpaths along Mann St were generally in good condition.

Select streets between Mann St and Gosford Stadium and the foreshore including Georgiana Terrace, Baker Street, and Dane Drive are in poor condition.

Cycling Connections

There are currently no dedicated bike lanes within the Gosford CBD.

Street Interface Activation

Figure 5 on page 51 visualises which sections of Gosford CBD streets are typically active (yellow) or inactive (red) on a Friday or Saturday night at 7pm.

Most of Gosford CBD's street interfaces are inactive at night. Open businesses are scattered and highly disconnected from key visitor destinations such as the Gosford Stadium.

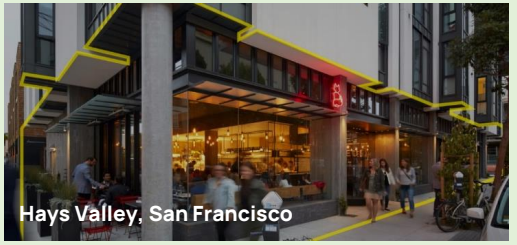
Of those businesses that were open, most were food and drink establishments.

These findings are reflective of the current business mix which is primarily professional and personal services (real estate agents, banks, tax agents, etc.) that typically operate only within standard business hours (9am- 5pm).

The closure of several large shopping plazas located on Mann Street is also a major contributor to the sudden drop-off in evening activity.

There are also several large at-grade car parks located at the periphery of the commercial core area which occupy long lengths of the street level.

What is the Street Interface or Street Edge?
The space which occurs between the building and the urban space demarcated (i.e. building façade).


Hays Valley, San Francisco

Example of Active Street Interface: Includes transparent shopfronts, on-street activity such as dining, high quality amenity


Donnison Street, Gosford CBD

Example of Inactive Street Interface:
Comprises shopfronts that are blank, opaque, unlit, closed for business or vacant.

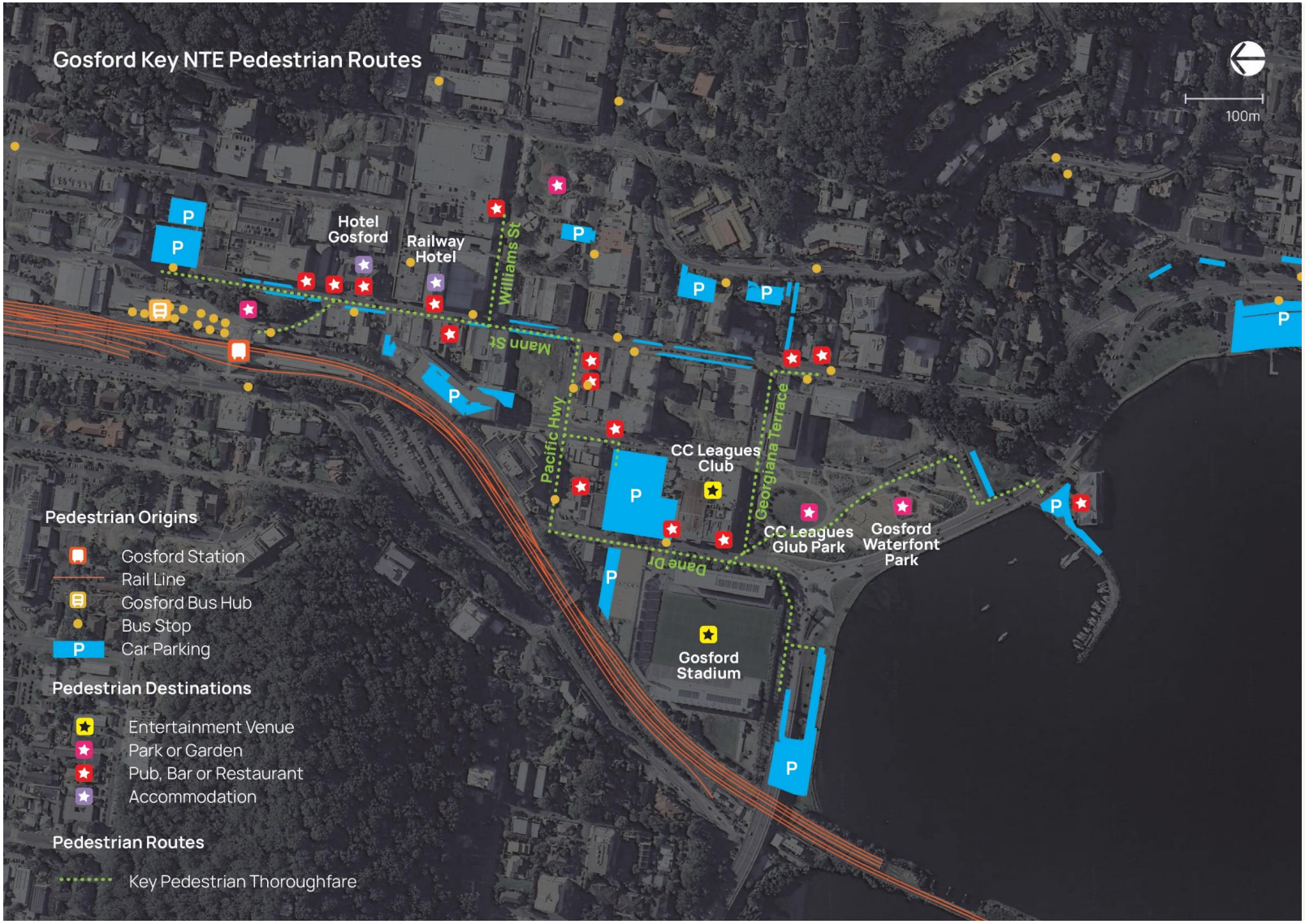


Figure 4. Gosford Key NTE Pedestrian Routes

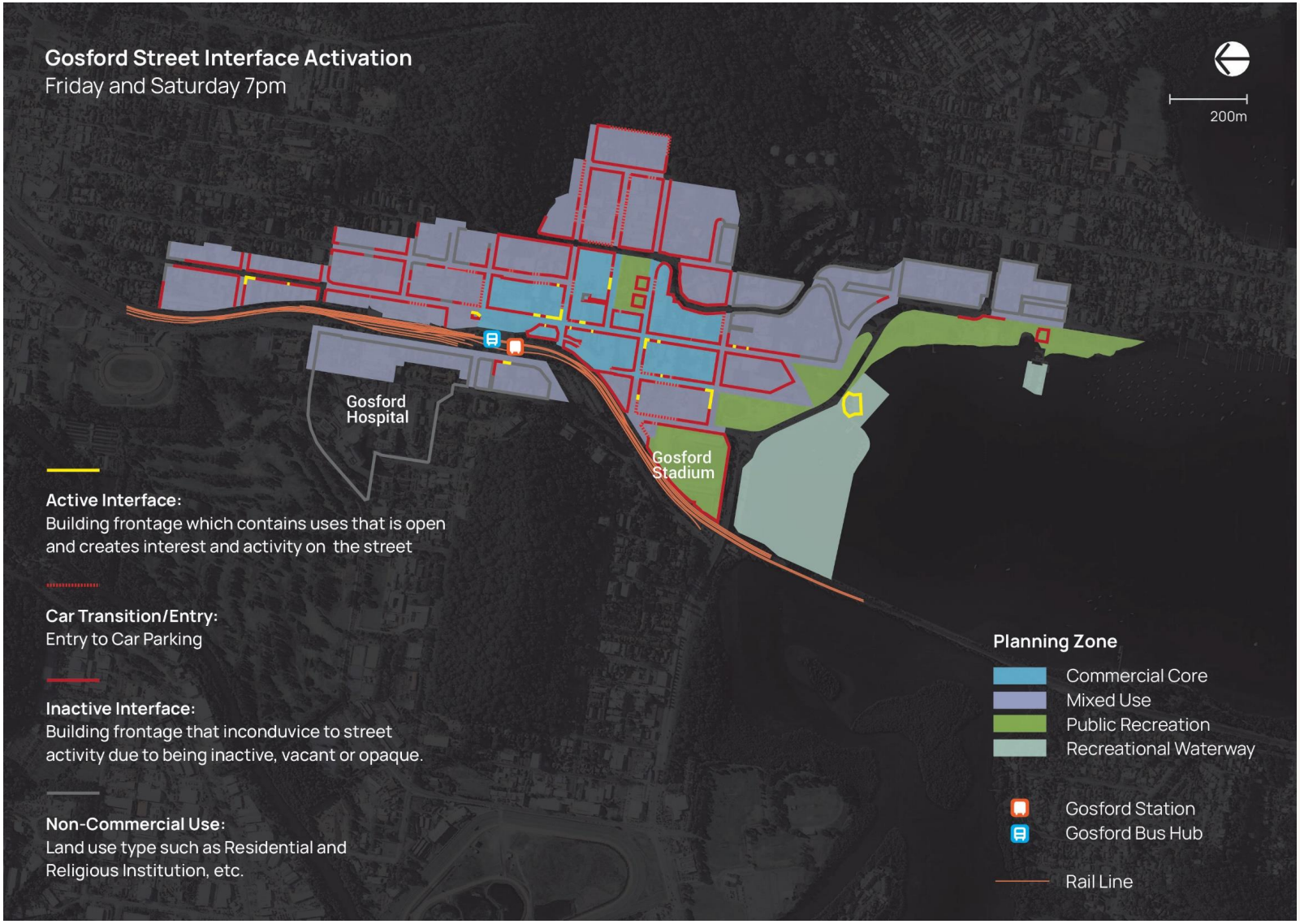


Figure 5. Gosford Street Interface Activation – Friday and Saturday 7pm.

Public Space Lighting & Security Features

Figure 6 on page 53 shows the primary light source of street edges and public open spaces in the commercial core of the Gosford CBD. Photographs taken during the NTE audit are shown on

Considered lighting design and visible security features are a key indicator of NTE activity and safety. Ideally, street edges should be well lit and come from a variety of sources including an active businesses, decorative lighting and street lighting for cars.

Most streets in Gosford are dimly lit. Select areas are well lit are only from a technical compliance perspective, sufficient for enabling orientation and wayfinding, but do not create a sense of comfort and safety for pedestrians.

The most dominant light source is from closed businesses. 58% of closed businesses keep some type of lighting on, either indoor or under awning, including:

- **Indoor Security Lighting** – Harsh, white, flood lighting designed to deter theft and trespassing. They often exaggerate the feeling of isolation and emptiness.
- **Advertisements** – This includes real estate sign boards and digital billboards. Many are aimed at passing vehicle traffic and use light that creates significant glare for pedestrians.
- **Awning Lights** – Many awning lights are left on in combination with security lighting or in transient spaces (usually with blank frontages) leading to car parks to building entrances.

Light sources without passive surveillance or activation are counterproductive in fostering a vibrant and safe night-time environment.

Ample street lights were observed, supporting visibility for road users but not providing sufficient light for footpaths. This is especially true for Gosford as most shops have under awnings and tree plantings frequently line the footpaths.

Additional observations regarding lighting and security features included:

- Less than 10 of 150 closed businesses had metal shutters pulled down over the shop frontage
- Approximately 1 in 3 business had visible CCTV or alarm systems.

Security features can be an effective deterrent of crime and other antisocial behaviours at night. However, without passive surveillance and activation from surrounding areas, security infrastructure tends to be less effective in creating an elevated sense of safety.

While lighting alone will not resolve the lack of pedestrian activity, there is opportunity to incorporate street lighting to increase the attractiveness of the CBD and enhance amenity for pedestrians.

Key areas for improvement include:

- Better lighting of bus stop signs and seating
- Implement feature lighting in shop windows or on blank facades
- Small scale and temporary decorative lighting in 'blackspots' within the CBD e.g. vacant or construction sites
- Improved lighting along streets connecting to the Stadium and Leagues Club Park i.e. Georgiana Terrace and Lower Mann St.

Footpath Widths

An analysis of footpaths widths and bus stop locations through the Gosford CBD is shown in Figure 7 on page 54.

The map assesses whether Gosford CBD streets are physically able to support on-street activities in compliance with existing on-street trading guidelines and policy.

3.6m – 3.9m is generally the recommended minimum footpath width for outdoor dining and other on-street activities*.

Analysis found that 81% of footpaths in the Gosford CBD are less than 3.6m wide. 39% are less than 2m wide.

The use of footpaths is also typically not permitted at bus / taxi areas, loading zones, intersections and entryways into shopping plazas – all which can be frequently found throughout the core commercial area.

In these existing conditions, there are few opportunities for businesses to conduct activities on the street in compliance with Council's outdoor trading policies.

Consideration of additional initiatives or public realm upgrades to support on-street activities such as the use of parklets or footpath widening, are required to enable on-street activation.

*Sources: Gosford City Council Guidelines for Business Use of Public Footpath & City of Sydney Outdoor Dining Guidelines June 2022

Figure 6. Gosford Street Interface Lighting – Friday and Saturday 7pm

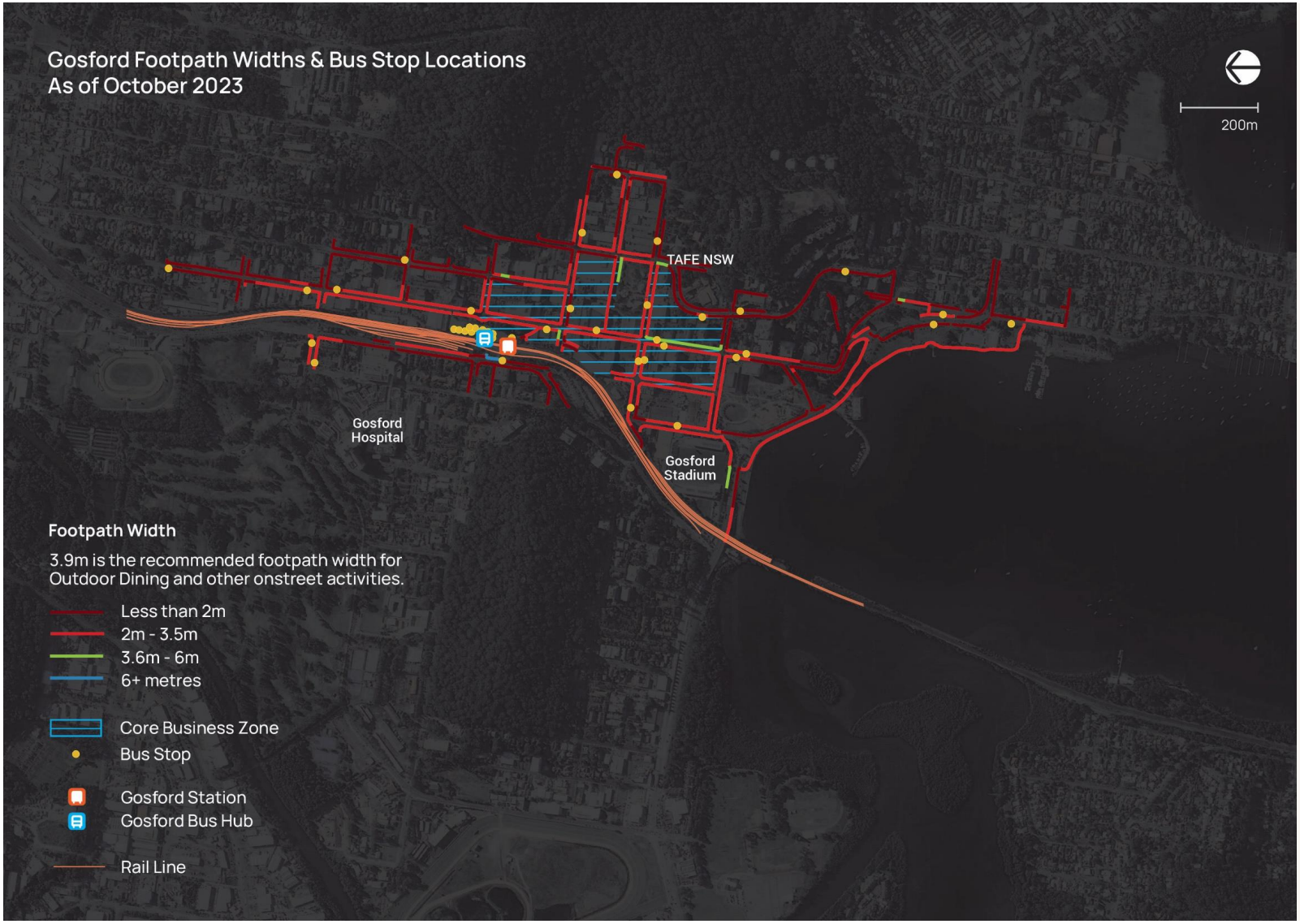


Figure 7. Gosford Footpath Widths & Bus Stop Locations (Oct 2023)

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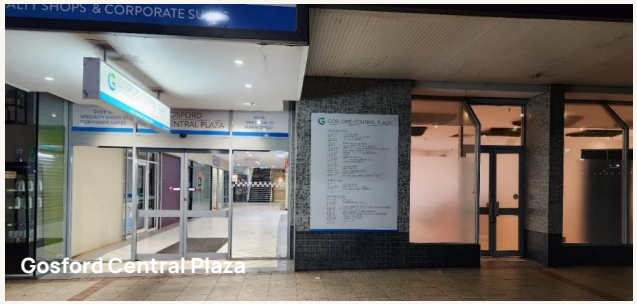
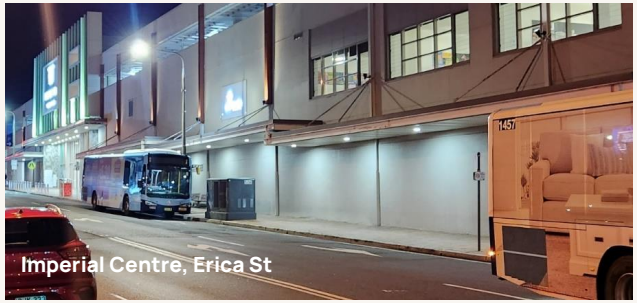
Figure 8. Gosford CBD NTE Audit Lighting, Security and Pedestrian Path Observations





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Other General Amenities

Figure 9 on the following page maps general amenities in Gosford core commercial area including public toilets, seating and shelter, bins and cycling amenities.

The presence, conditions and sufficiency of general amenities of the general amenities, and is further discussed below:

Public Toilets

There are many publicly accessible toilets located in shopping centres, which all close by late afternoon. There are only four public toilets in the Gosford CBD open at night time:

- Gosford Train Station;
- Gosford City Library;
- Leagues Club Park; and
- Gosford Rotary Park.

These locations are not easily visible at night with limited passive surveillance from surrounding areas, which could contribute to perception that they are not safe to use.

It is recommended that signage and lighting to direct visitors from Mann St to these locations be improved.

Seating and Shelter

Seating were sufficiently supplied in key locations such as at bus stops, public parks and pick up zones. More than 120 bench seats were counted in the audit.

Benches are generally in good condition and well sheltered by shop awnings.

Bins

28 public bins were counted in the audit – with an average of a bin located every 100 to 150 meters in along Mann Street.

Cycling Amenity

There was also limited bicycle parking observed in Gosford. Other than the Gosford Station bicycle shed, the majority of bicycle parking were located next to public bins (pictured below). Bicycle parking was found at a total of 7 locations.

Provision of more cycling amenity should be encouraged with the Gosford CBD.

Figure 9. Gosford CBD General Amenities Assessment

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Key Findings - Gosford NTE Audit and Spatial Analysis

- The principle contributing factor to the lack of vibrancy in Gosford is that most of the CBD's street interfaces are inactive at night. Open businesses are scattered and highly disconnected from key visitor destinations such as the Gosford Stadium. All night-time economic development activities should aim to facilitate and promote NTE business investment in the Gosford CBD.
- Additional sources of street lighting are needed to increase the attractiveness of the CBD and enhance amenity for pedestrians.
- There is an opportunity to utilise wayfinding signage and creative lighting to promote visitation and dispersal to key destinations within Gosford. Wayfinding and lighting should be delivered in a way that create a safe and inviting night-time experience.
- Passive surveillance and activation through increased visitation will increase the sense of safety in the Gosford CVD and increase the effectiveness of existing security infrastructure.
- The provision of bike lanes and additional bus stops would stimulate the use of active modes of transport, consequently facilitating night-time visitation and contributing to a sense of vibrancy through increased on-street patronage.
- Under Council's current outdoor trading policies, there are few opportunities for businesses to conduct compliant on-street activities (e.g. outdoor dining). As such, on-street activities such as the use of parklets or footpath widening, should be promoted to businesses.

Strategic Considerations

Overview

This section outlines the key considerations for the night-time economy, including the pertinent challenges and opportunities specific to Central Coast and Gosford.

This serves as the foundation for the strategic framework for night-time economic development in the Central Coast, drawing on consultation with business and industry, and the research and analysis detailed in earlier sections of this report.

Strategic considerations have been collated and categorised to help inform the night-time economic development process. Findings from consultation and background research have been distilled into four themes:

- Policy & Leadership
- Activation
- Attractiveness
- Enabling Environment

An overview of strategic considerations, as well as issues and opportunities for Gosford and Central Coast as a whole, are displayed in the following pages.

Policy & Leadership

Policy, planning and governance structures should enable and support night-time economy objectives.

With a number of competing interests at night, place planning should seek to balance safety with the need for flexibility and innovation. Policy and regulation regarding operating hours, noise control, responsible alcohol service should be sensible and aim to maintain a harmonious environment, whilst fostering business investment.

Collaboration between business, Council, law enforcement, community organisations and residents is vital to achieve these outcomes. Lines of communication between stakeholders should be open to address concerns about the night-time economy, share resources and create collaborative night-time initiatives.

Leadership is required to coordinate and manage the diverse elements of the night-time economy, advocate for investment and ensure all stakeholders have a positive and safe experience.

Issues & Opportunities for the Night-Time Economy

Central Coast	Gosford
• Strive to ensure Council policies have interconnected strategic objectives that actively bolster and advance the objectives of the night-time economy. • Policy and governance structures should seek to achieve a balance between Council's promotional and compliance responsibilities with regard to night-time economy management. • Consultation with local businesses revealed that Council policies and procedures can be confusing to navigate and can stifle innovation and night-time economy investment. There is a need to better consolidate existing policies to ensure they strategically align with Council's objectives for the night-time economy. • Deliver a streamlined business concierge process or night-time economy drop in centre to support businesses looking to invest in the night-time economy. This should be delivered with a pilot program that demonstrates to businesses how to navigate council policies and processes. • There is opportunity to include provisions relation to street stalls, mobile vending and outdoor dining in the Local Environment Plan. • Pursue funding to allocate dedicated resources to the effective management of night-time economy projects within Council. This may involve the appointment of a night mayor responsible for overseeing such initiatives and leading advocacy efforts. • There is a need to formulate an internal governance framework for efficiently managing the night-time economy. • Consider opportunities to collaborate with Lake Macquarie Council to deliver night-time economy initiatives, leveraging their similar locational and economic conditions. • There is opportunity to develop or support an online business wayfinding directory, which could be utilised for both day and night-time businesses.	• There is a strong level of collaboration between existing hospitality businesses in Gosford. • Noise complaints, which have increased with the high level of residential development, limit the city's late night entertainment potential. Consideration needs to be given to how noise, licensing and lighting conflicts with residential uses. • Police safety concerns have historically acted as a barrier to night-time economy investment. • There is a need to ensure appropriate sound proofing and acoustic protection mechanisms for live music businesses interacting residential areas. This should occur in line with the 'agent of change' principle whereby responsibility for noise attenuation is borne by the party delivering the new use or development.

Activation

Cultural and social activity is integral in defining the night-time economy.

The night-time economy is more than just alcohol led entertainment. A mix of night-time businesses catering to different interests and preferences is needed attract a wider audience and promote longer stays. Attracting a diverse crowd helps improve safety perceptions and achieve broader social objectives. Therefore, a range of night-time assets such as theatres, live music venues, clubs, bars, and restaurants are essential for a successful night-time economy.

Promoting venues that service a wide range of demographics and age groups is a key priority for night-time economy development. This includes showcasing live music and creative pursuits, as well as protecting and investing in existing cultural assets.

Issues & Opportunities for the Night-Time Economy

Central Coast

- Night-time arts and cultural product is limited across the municipality. There is opportunity to capitalise on Central Coast's existing arts and cultural institutions, such as Art House Wyong and the Gosford Regional Gallery, by utilizing them to host night-time experiences and deliver programs that foster growth in the creative industries.
- Expand the operational hours of Council-run facilities to include night-time offerings that complement their existing daytime operations.
- Night-time product largely comprises restaurants and pubs and there is a lack of diverse product and experience suitable to families.
- Central Coast's hospitality industry currently comprises a large number of small businesses, with very few big players who have the capacity to drive night-time investment and product development.
- The ongoing high level of residential development in the Central Coast is expected to significantly expand the size of the night-time market.
- Event operators are often discouraged from operating events at night due to increased costs associated with licensing, lighting and safety.
- There is opportunity to amend Council's event licensing process to require all operators to integrate night-time elements into their events, creating new opportunities for the night-time economy.
- Events should be organised outside of peak periods to help address seasonality in visitation.

Issues & Opportunities for the Night-Time Economy (cont'd)

Gosford

- Despite its potential, Gosford currently suffers from a lack of vibrancy due to a limited number of businesses operating at night.
- Gosford's current hospitality and tourism offering is largely day time focussed, and night-time product is largely generic and alcohol or gambling oriented. There is a need for a more diversified and experiential product and experience base, as well as cultural experiences and entertainment that create a more rich and complete experience.
- There is potential to expand the existing cluster of high quality bar and restaurant businesses at the southern end of the Gosford CBD, through attracting more private operators.
- Gosford lacks high-quality, branded accommodation supply that could promote overnight stays and appeal to new markets.
- There is an opportunity to establish clusters of night-time economic activity in key locations, facilitated by safe and well-signed active and public transport connections.
- Gosford's night-time economy product offering should be scaled to align with the expected population growth resulting from ongoing and planned residential development.
- Night-time product and experience in Gosford needs to meet the quality expectations of recent migrants from Sydney, as well as the future health care workforce and university student base.
- The Central Coast Stadium is a high quality stadium with good connectivity to Sydney. Currently, events at the stadium bring thousands of patrons into Gosford, with many people leaving the area immediately after the game due to a lack of things to do. A more vibrant and activated night-time economy will encourage greater dwell time and spend from these patrons. There is also opportunity to deliver international sporting events at the stadium.
- Roof top and shop top activations offer the potential to revitalise the urban landscape and provide a unique experience that will contribute to the growth of the night-time economy.
- Introducing boating and water-based experiences at night in Gosford could help offer a distinctive and untapped product, enriching the night-time economy with an exciting experiences in an underutilized part of the city.
- Gosford is currently perceived as a regional town and falls short of meeting the night-time economy standards expected of a city its size.
- While smaller towns and villages in the Central Coast focus on coastal and nature-based experiences, Gosford stands apart from this branding. There is opportunity to reinvest Gosford's image as a vibrant, urban live music visitor destination with a grungy appeal. Gosford-specific destination marketing could be driven by the business community.
- Short-term activations and pop-ups in targeted locations could help bridge the gap between the stadium and the existing night-time economy offering in Gosford. These initiatives should also emphasize promoting local businesses and their operating hours to enhance the overall night-time experience.
- Encouraging visitors to experience Gosford through events could help change perceptions of the region. Consideration should be given to delivery of the following event types:
    - Laneway events
    - Educational events and public talks suited to the healthcare workforce and the university student base.
    - Multi-day festival events supported by integrated transport

Attractiveness

An attractive, immersive and vibrant public realm brings places to life at night.

The public realm design of a place greatly influences the comfort and experience of individuals within it. Public spaces shape the overall character of a space, creating ambience and providing opportunities for social interaction. Adequate lighting, well-maintained public spaces, pedestrian friendly streets and public art help ensure the safety of patrons and encourage increased dwell time and participation in night-time activities.

Issues & Opportunities for the Night-Time Economy

Central Coast	Gosford
• In the short term, Council should prioritize 'quick wins' aimed at enhancing streetscape attractiveness and bolstering businesses' confidence to invest in the night-time economy. • On street dining and streetscape activations are required to invigorate public spaces and draw people into visibility.	• The scarcity of patrons in the Gosford CBD at night creates a sense of unsafety, discouraging pedestrians from walking between venues. • Derelict buildings and unattractive shop fronts along Mann Street diminish the overall streetscape amenity. • Gosford's current night-time offering is quite decentralised with poor connections and wayfinding between key anchors (e.g. train station, stadium, racecourse, waterfront) and night-time economy product. • There is very little public realm activation in the area surrounding the Central Coast Stadium, representing a missed opportunity to create a sense of vibrancy in an area that already attracts large numbers of people. • Technological advancements in lighting (i.e. 'smart lighting') could be better utilised to activate key areas. • Promoting the Gosford brand through street art offers an opportunity to enhance the streetscape while simultaneously showcasing the city's identity in a creative and immediate manner. • The existing lighting infrastructure in the Gosford CBD requires improvement. It is essential to adhere to best practices that incorporate a diverse array of lighting sources to create an inviting and well illuminated urban environment. • Implement gateway signage that resonates with the Gosford brand and creates a cohesive and welcoming identity for the city. • Embracing street music and encouraging busking in Gosford will invigorate the night-time economy, captivating residents and attracting visitors with lively performances.

Enabling Environment

A successful night-time economy must be underpinned by well-functioning infrastructure and services, to ensure it can be accessed and enjoyed safely.

A range of convenient transport options are needed to encourage people to travel to a night-time destination and between venues, particularly when engaging in the consumption of alcohol. This includes efficient and frequent public transportation with extended operating hours and affordable taxi and ride share services.

Access to essential services during late hours, such as pharmacies, convenience stores, and 24-hour healthcare facilities, can also enhance the appeal of a night-time economy, ensuring that people feel safe and supported even during the late hours.

Issues & Opportunities for the Night-Time Economy

Central Coast	Gosford
• Central Coast is highly dispersed, with no logical and accessible hub for people to access night-time offerings, such as restaurants and bars. • Limited public transport between towns at night discourages patrons from travelling to a destination and places added strain on ride-share and taxi services.	• Gosford faces a shortage of car parking facilities, hindering visitation from residents in the Central Coast's smaller towns. Addressing this issue presents an opportunity to offer additional 24-hour secure parking options to better accommodate local visitors. • There is a significant opportunity to cater to the expanding population residing in apartments in Gosford by offering late night or 24/7 retail services. • Introducing a privately-run 'night rider' bus service would establish vital connections between key towns and facilitate increased patronage of Gosford's night-time businesses for residents across the entire coast.

Strategic Framework

The following strategic framework includes the key themes for the Central Coast night-time economy, including relevant project priorities and other opportunities for Council, which are explored throughout this section.

Themes

1

Policy & Leadership

Policy, planning and governance structures to enable and support the night-time economy.

2

Activation

Cultural and social activity to create vibrancy.

3

Visual Amenity

An attractive, immersive and vibrant public realm to bring places to life at night.

4

Enabling Infrastructure

Well-functioning infrastructure and services to ensure the night-time economy can be accessed and enjoyed safely.

Project Opportunities

Type	Time Frame	Council Responsibility
Short-term	1-2 years	Lead
Medium-term	2-4 years	Lead/Support
Long-term	4-5 years +	Advocate

Theme 1: Policy & Leadership

1

Potential projects

As outlined in the *Safer Cities: Her Way Project*, develop a **marketing strategy and website for events**.	Short-term
Establish an **NTE working group** for key stakeholders to meet regularly (e.g. Business NSW, Central Coast Local Health District (CCLHD), Council, 24-hour commissioner, police, community etc.), with the aim to encourage collaboration and guide the delivery of NTE projects.	Short-term
Create a **business enquiry roadmap** to display internal processes for managing business enquiries within Council.	Short-term
Establish an **NTE business concierge** to assist businesses looking to establish or invest in the Central Coast night-time economy.	Short-term
Ensure Council Economic Development Team (including the proposed NTE business concierge) maintains a **strong relationship and ongoing communication with Liquor & Gaming NSW's Hospitality Concierge Service Team** – including regularly referring local NTE businesses to the service and including service representatives in NTE development initiatives (i.e. proposed NTE working group).	Short-Term
Utilise **Section 10.7 planning certificates** (formerly s149) to manage community expectations around noise in key night-time economy precincts (Case Study: City of Newcastle).	Short-term
Establish **'Special Entertainment Precincts'** in the LEP in key locations in the Central Coast to manage amplified music.	Short-term
Trial an **extended business hour policy** for Special Entertainment Precincts.	Short-term
Trial **automatic outdoor dining permit approvals** for Special Entertainment Precincts.	Short-term

1

Potential projects (cont'd)

Leverage and collaborate with Council's Community & Culture Team to support delivery of live music micro-festival events at night-time through the *Live & Local Strategic Initiative* policy.	Short-term
Advocate for Central Coast funding through the Office of the 24-hour commissioner for the implementation of tools, resources and support programs to accelerate night-time economy's development on the Central Coast. Specifically target (a) Live music venue sound proofing improvements and (b) Investment in contemporary music facilities.	Short-term
Use *Night-Time Activities Mapping Project* in conjunction with the CCLHD & the Police to help inform the extended business hours trial action for Special Entertainment Precincts.	Short-term
Deliver an **NTE policy** reflecting directions outlined in the NTE strategy.	Medium-term
Update **LEP and Council strategic plans** to reflect NTE objectives.	Medium-term
Implement a new **3-Year Destination Central Coast Marketing Strategy**, with a focus on Gosford and sub regional propositions priorities.	Medium-term

Theme 2: Activation

2

Potential projects

Deliver the *Safer Cities: Her Way* pilot initiative '**Burns Park Refresh'** including landscaping upgrades, decorative lighting and public art installations and temporary activations at Burns Park.	Short-term
Undertake improvement works identified in the *Safer Cities: Her Way* pilot initiative '**William St Plaza Refresh'** including hut removal, painting and shade sail refresh, landscaping, seating upgrades and decorative lighting installations.	Short-term
Deliver the **Good Times Summer** 6 week activation program aimed at promoting planned events and activities, as well as showcasing the local businesses across Gosford CBD including weekly markets in Kibble Park, live entertainment, workshops and activities, decorative lighting projections and public art.	Short-term
Implement **Laneway Activations** planned within the *Safer Cities: Her Way* pilot program – Activate Gosford's laneways with public artwork, live entertainment and decorative lighting. Priority locations include Kibble Park and the Mann St to Gosford City Carpark laneway.	Short-term
In support of the *Safer Cities: Her Way* pilot program, investigate opportunities for **Vacant Property Activation**. Proactively engage the Gosford Business Chamber, landowners and creative businesses and encourage them to activate Gosford's empty shopfronts.	Short Term
Continue to carry out a **recurring night market** event at Kibble Park following the conclusion of the 'Good Times Summer' activation program (*Safer Cities: Her Way Initiative*).	Short Term
Introduce a **roaming winter live music series** across NTE venues in the Central Coast's small towns.	Short-term
Facilitate collaboration between NTE businesses and local artists via an '**Artist in Business**' initiative, fostering shared spaces for creative expression.	Short-term

2

Potential projects (cont'd)

Encourage **live music and busking after dark** across the coast. This could be achieved through waiving busker permit fees or directly funding buskers to perform.	Short-term
Promote the concept of **local food businesses delivering late night meals to bars and live music venues**, in collaboration with relevant food safety stakeholders.	Short-term
Direct local businesses to Destination NSW's *NSW First Program* in order to **establish bookable night time products and experiences.**	Short-term
Work with industry and the Office of the 24-hour Commissioner to enrol businesses in the *Uptown Accelerator Program* and subsequent *Uptown Grant Programs.*	Short-term
Deliver an ongoing **Gameday Activation** (and other events) program for Central Coast Stadium at Leagues Club Park, with the potential to include: • Sports activities for kids • Participatory 'come and try' experiences for community groups • Pop-up bars and restaurants showcasing local products and hospitality businesses.	Medium-term
Create a **Gosford Regional Gallery satellite** in the town centre, showcasing prints and light displays of key artworks. This should be delivered alongside food and beverage stalls and live music.	Medium-term
Design and promote a **ticketed walking event** featuring live music, food, and bars, linking existing NTE products and experiences in each key town (Gosford, Wyong and Terrigal).	Medium-term
Create a **Friday night experience at Gosford Regional Gallery** by extending opening hours and introducing live music. Create links to Gosford centre encouraging formal dining etc.	Medium-term

2

Potential projects (cont'd)

Host **educational talks** at local NTE venues in partnership with Gosford Hospital and tertiary institutors, bringing together the healthcare workforce for interactive and social learning sessions.	Medium-term
Plan for a new cultural institution which acts a hub for the night-time economy in Gosford Town Centre (e.g. performing arts or exhibition centre).	Long-term

Theme 3: Visual Amenity

3

Potential projects

Implement **Wayfinding Signage** upgrades identified in the *Safer Cities: Her Way Pilot Program* – Install updated decals and upgrades to identified existing signage to improve wayfinding throughout the Gosford CBD. Include directional, safety, interpretative and other general information for visitors and the community.	Short-term
Expanding on the *Safer Cities: Her Way Pilot Program*, continue to **deliver a comprehensive lighting installation and improvement program in Gosford, with consideration of:** • Illuminating Gosford Wharf • Festoon lighting in Mann Street • Illuminated on-water sculptures • Permanent, interactive light art trail through Gosford • Coloured lighting and light art in Kibble Park and Burns Place • Illuminating major trees in small towns • Installation of solar panels to light bollards • Event Lighting.	Medium-term
Continue to work with local artists to decorate development site hoardings, car parks and other public spaces with **paste-up posters and street art**. Utilize street art creatively to promote upcoming local live music events.	Medium-term
Continue to undertake wayfinding and signage improvements, including: • Using coloured QR code decals providing directions to different destinations. • Increased **wayfinding signage** between key anchors and NTE products and experience. This includes linkages between Railway station, Central Coast Stadium, Mann Street and the Wharf. • Investigate opportunities for Dual Naming signage.	Medium-term

4

Theme 4: Enabling Infrastructure

Potential projects

In support of the *Safer Cities: Her Way* project, undertake preliminary investigation into a **Shuttle Bus Loop** opportunity. Seek interest from private operators to deliver a 'City Night-time Loop' linking towns across the coast on weekends. Explore funding support opportunities from Transport NSW (for ongoing operations, signage, and marketing activities) and negotiate inclusion of Central Coast branding on shuttle buses.	Short-term
Collaborate with Transport for New South Wales to implement a **bus on demand service project** across the LGA.	Short-term
Investigate potential delivery models for **shared transport** (e.g. bike hire, e-scooters).	Medium-term
Identify locations for **24-hour retail** to service residents living in apartment developments.	Medium-term
Install **digital displays** showing train arrival times at Central Coast stadium.	Medium-term
'Ramp it up' **accessibility program** – educate businesses on the importance of accessibility and provide funding to get temporary to permanent ramps to make them accessible.	Medium-term
Advocate to state government for increased and improved **public transport provision** throughout the LGA (i.e. between towns).	Long-term

urban enterprise planning economics+tourism

Due notice is given of this matter in accordance with Council's Code of Meeting Practice.
The report and any relevant attachments will be provided prior to the Ordinary Meeting of 23 April 2024.

Settlers Road Landslide Remediation

CH 60 m to 100 m Detailed Design Report

Central Coast Council (NSW)

31 October 2023

→ The Power of Commitment

Project name		CCC Wisemans Ferry Rd Landslide Remediation - Detailed Design Phase					
Document title		Settlers Road Landslide Remediation | CH 60 m to 100 m Detailed Design Report					
Project number		12599205					
File name		12599205-REP-Settlers Road Landslide CH 60-100 Remediation Design Report .docx					
Status Code	**Revision**	**Author**	**Reviewer**		**Approved for issue**		
			Name	**Signature**	**Name**	**Signature**	**Date**
S3	A	S. Amoroso	J. Sylvester		S Amoroso		19/9/23
S3	B	S. Amoroso	T. Nicholson		S Amoroso		31/10/23

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1. Introduction

1.1 Project background

Settlers Road between Thomas James Bridge and Wisemans Ferry has been impacted by landslides triggered by a significant rain event in February/March 2022. The most significant landside(s) within the Central Coast Council controlled section occurred in a section of cutting / natural hillside identified as CH250 to CH450. Following detailed design of remedial works for CH250 to CH450, it was highlighted that a previously overlooked landslide approximately 200m to south-east (towards Wisemans Ferry), known as CH 60 to 100, also required detailed design in order to reopen Settlers Road to its pre-existing condition and with an acceptable risk level.

While the two landslide areas (CH250 to CH450 and CH60 to CH100) are not identical, they have been deemed sufficiently similar to allow for the use of similar remedial design solutions for both sites. For this reason, an options assessment similar to that undertaken for CH250 to CH450 was not undertaken for CH60 to CH100 and a remedial design solution consistent with previous Option 1C was progressed to a concept level.

The Concept / 65% Detailed Design Report was presented as an earlier revision of this design report (Rev A dated 19/9/23). The solution presented and agreed upon by Central Coast Council (CCC) in an email dated 5 October 2023 comprised bulk removal of landslide debris with excavation back to the identified backscarp. Where the rear cut face of the excavation reveals an upper layer of colluvium, this layer will be retained using a soil nail wall; and where the cut face excavation reveals rock benches (sandstone and /or siltstone) these would be left in place and if necessary stabilised using rock bolts (to restrain potential block detachments associated with adverse jointing) and / or shotcrete facing (to protect highly erodible beds).

The purpose of the proposed remedial work will be to restore the pre-landslide functionality of the roadway (i.e., one lane each way) and decrease the pre-landslide assessed risk level (ARL) by up to 1 level. The site in its current condition was assessed at an ARL3 by Mark Hendrickx and Associates in 2022. Note that the current condition includes temporary control measures such as a single lane with controlled bi-directional flow, closure following a wet weather trigger level and use of a Jersey Kerb barrier at the toe of the slope. Based on the remedial design presented herein, it is anticipated that the site would be re-assessed at an ARL4 once works are completed. Due to the nature of the hazards at this site, assessment of the current or post-construction stability based on a factor of safety (FoS) is not considered applicable (except where a soil nail wall is required, in which case a long term FoS of 1.3 has been adopted in accordance with GTD2018/001).

Figure 1.1 Site location

Detailed design has been progressed under a direct engagement with CCC, with Hawkesbury City Council (HCC) as a stakeholder. The construction work will be undertaken as part of a road recovery project managed by HCC with funding to be provided by TfNSW.

1.2 Scope and purpose of this report

This report presents the 100% detailed design stage geotechnical assessment and design for remediation the landslide identified along Settlers Road north west of the Wisemans Ferry crossing at Wisemans Ferry, NSW, known as CH60 to CH100 m.

More specifically, the purpose of the report is to discuss and present:

- Relevant standards and specifications
- Geotechnical assessment
- Geotechnical and civil design
- Safety in design risk register
- Bill of quantities
- Detailed design drawings
- Erosion and sediment control plan

1.3 Assumptions and limitations

This report has been prepared by GHD for Central Coast Council (NSW) and may only be used and relied on by Central Coast Council (NSW) for the purpose agreed between GHD and Central Coast Council (NSW) as set out in this report.

GHD otherwise disclaims responsibility to any person other than Central Coast Council (NSW) arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on:

- Conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.
- Assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.
- Information obtained from, and testing undertaken at or in connection with, specific sample points. Site conditions at other parts of the site may be different from the site conditions found at the specific sample points. Investigations undertaken in respect of this report are constrained by the particular site conditions, such as the location of buildings, services and vegetation. As a result, not all relevant site features and conditions may have been identified in this report.

2. Geological assessment

2.1 General site description

It is noted that the longitudinal extent of site and thus the design is based on the surveyed extent of the landslide and the nominated design chainages rather than the approximation of the landslide location and extent undertaken during initial site inspections in 2022. As such, the proposed work will extend from CH 40 m to CH 105 m, while the naming protocol established for the site (CH 60 to CH 100) has been maintained to provide continuity of site identification.

Site mapping by a senior engineering geologist from GHD was initially undertaken along a 390 m length of Settlers Road (from Chainage 60 m to 450 m) on 18 April 2023, with more detailed mapping of the landslide section between Chainage 40 m to 105 m undertaken on 9 August 2023.

The design chainage system adopts a start at Chainage 0 (E:313045, N: 6304957) at the intersection of Settlers Road and Wiseman Ferry Road (at the centre of the ferry ramp), with chainages increasing to the north-west along Settlers Road towards the historic Thomas James Bridge. Approximate site chainages were marked in spray paint (by CCC) on the concrete jersey kerbs following the initial GHD site visit (August 2022) and mostly remained visible during subsequent site visits and drone survey.

The site comprises the southwest facing footslopes of a Hawkesbury Sandstone cliff line/escarpment and typically comprises a thick colluvial deposit, extending for about 40 m to 60 m from the toe of the escarpment down to Settlers Road (and the Hawkesbury River below). The colluvium material comprises a mixture of soil and rock, containing rock blocks up to typically about two m in maximum dimension. Some sandstone rock outcrops associated with partly buried rock benches were also observed within the footslopes.

The study area comprises an approximately 65 m long landslide, with a 1.5 m deep backscarp located between about 5 and 15 m offset from the upslope edge of bitumen. It is understood that the landslide was activated during the February / March 2022 rainfall event.

Settlers Road at this location is currently reduced to a single lane with concrete jersey kerbs running along the toe of the landslide between about chainage 40 m and 100 m.

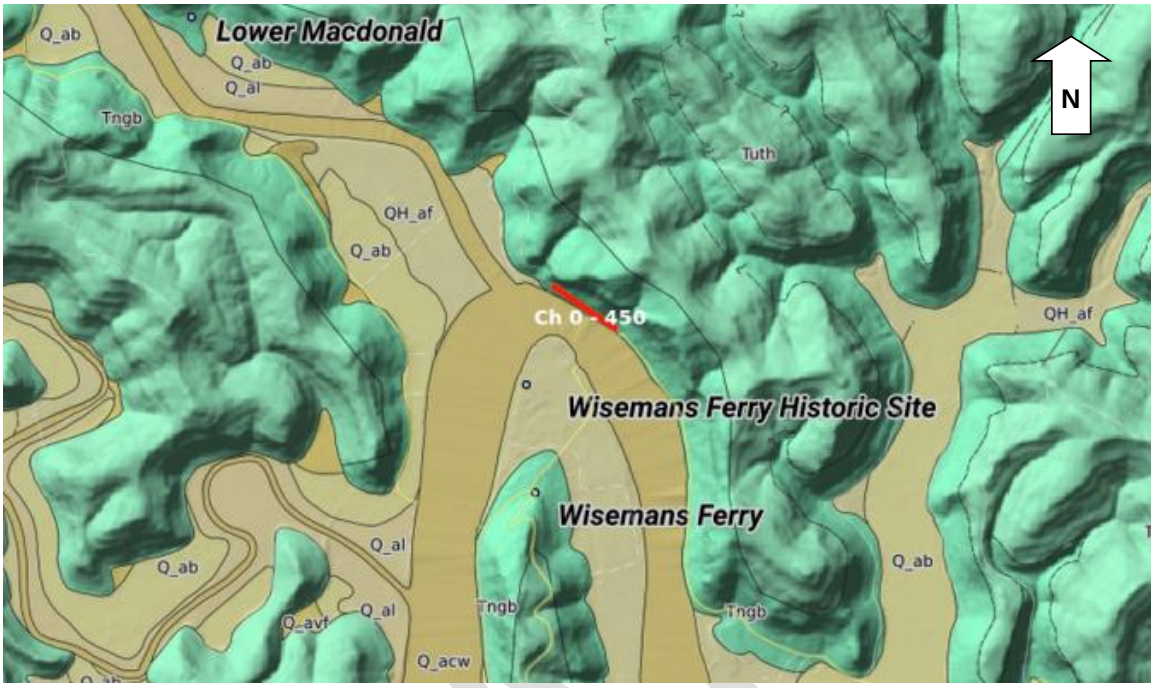
A more detailed breakdown of site description and site mapping observations is included in Section 2.4.

Figure 2.1 General view for south-eastern end of landslide – August 2023

2.2 Regional geology

Geology of the site (after Colquhoun G.P et al 2021 and Troedson A.L. & Deyssing L. 2016) comprises the following three units as shown in Figure 2.2.

– Hawkesbury Sandstone unit (Tuth), upslope of the road alignment forming the upper escarpment cliff lines extending up to 200 m above the site. This unit is described as medium to coarse sandstone with minor shale and laminate lenses.
– Burralow Formation (Tngb) of the Narrabeen Group / Gosford Subgroup, forming the middle to lower footslopes and underling Settlers Road. This unit is described as fine-grained sandstone, interbedded with siltstone, shale and claystone.
– Alluvial channel deposits (Q-acw) of sand, gravel silt and clay along parts of the foreshore downslope of Settlers Road, extending into the Hawkesbury River channel.



Source: NSW Minview, State of NSW through Department of Planning & Environment, 2019

Figure 2.2 Regional geology map

2.3 Aerial LiDAR and photogrammetry survey

In order to assess the site in areas not accessible by foot, drone based survey and photography was conducted by DioSpatial. The data capture included aerial imagery, drone LiDAR and GNSS ground control survey.

Aerial images were captured as raw data inputs to create a 3D reality model. Images were captured using a multirotor remotely piloted aircraft (RPA) equipped with a 45 MP camera. Photogrammetry software ingested the geolocated images and ground survey to produce a high-resolution textured mesh model of the site, which underwent significant editing to remove vegetation and improve visualisation of ground level features.

Drone LiDAR was captured and processed to create a point cloud. The point cloud was later classified and further processed to create a Digital Terrain Model (DTM) and elevation contours.

The completed model was used to observe selected areas of the slope and escarpment inaccessible by foot, to produce cross sections for rockfall analysis and as the basis for the design model.

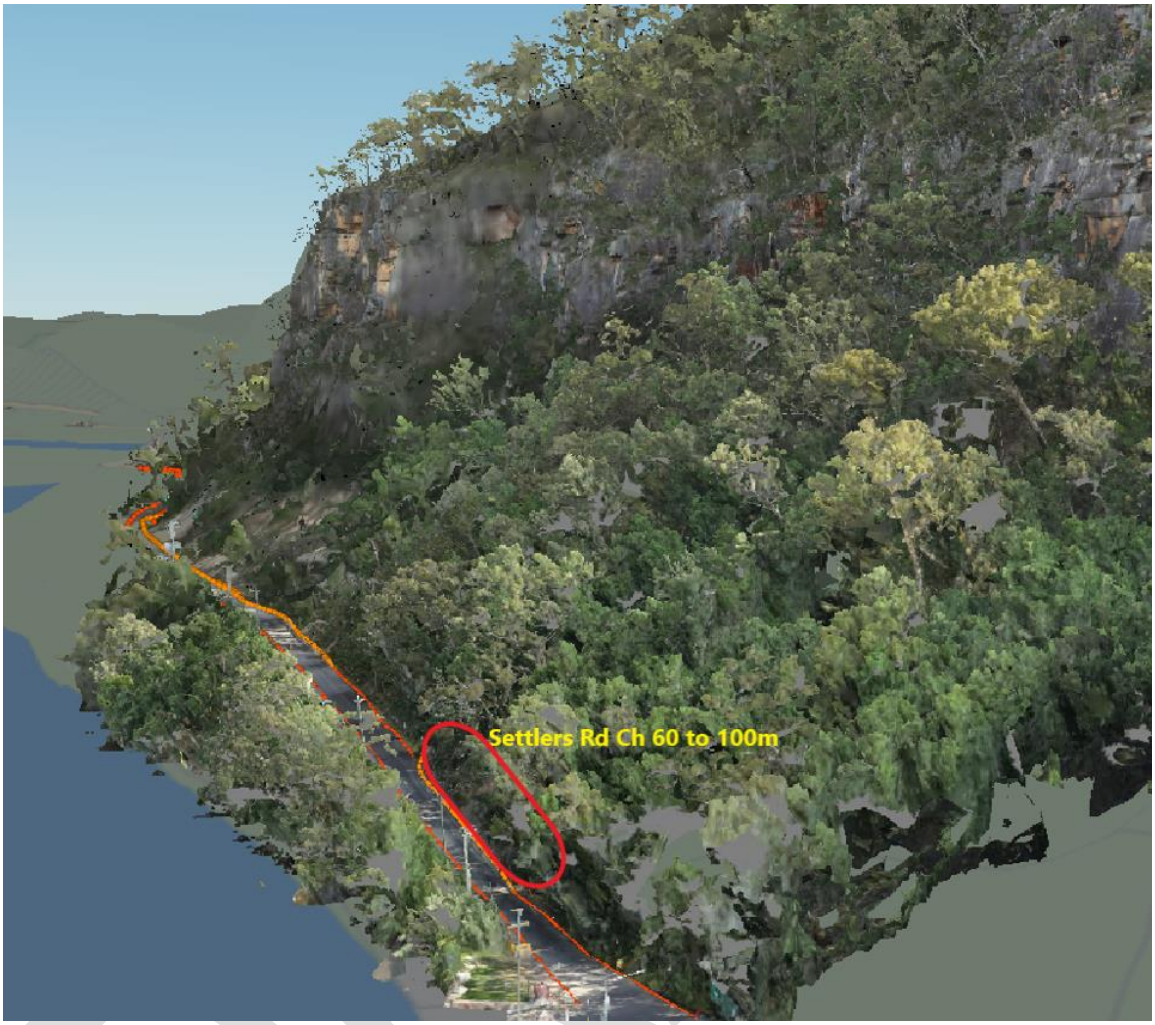


Figure 2.3 Extract from 3D model generated using drone survey and photogrammetry

Figure 2.4 Closeup of Subject landslide area, CH60 to 100 from3D model

2.4 Site visit

A site visit for the CH60 to CH100 landslide site was conducted by a senior engineering geologist, accompanied by a junior geologist, both from GHD, on 9 August 2023. During the site visit, an assessment of the geological site conditions in the areas accessible by foot was undertaken, mapping the location of possible bedrock outcrops, and taking a series of photographs.

The area covered by the site mapping exercise extended from the gate at approximately CH30 to the north-western end of the landslide at CH105. Site observations were recorded on the flowing 'mud map' and are summarised in Table 2.1 below. Note that chainages shown on Figure 2.5 and in Table 2.1 below are based on 2022 site markings and are approximately 10m less than the adopted design chainage system.

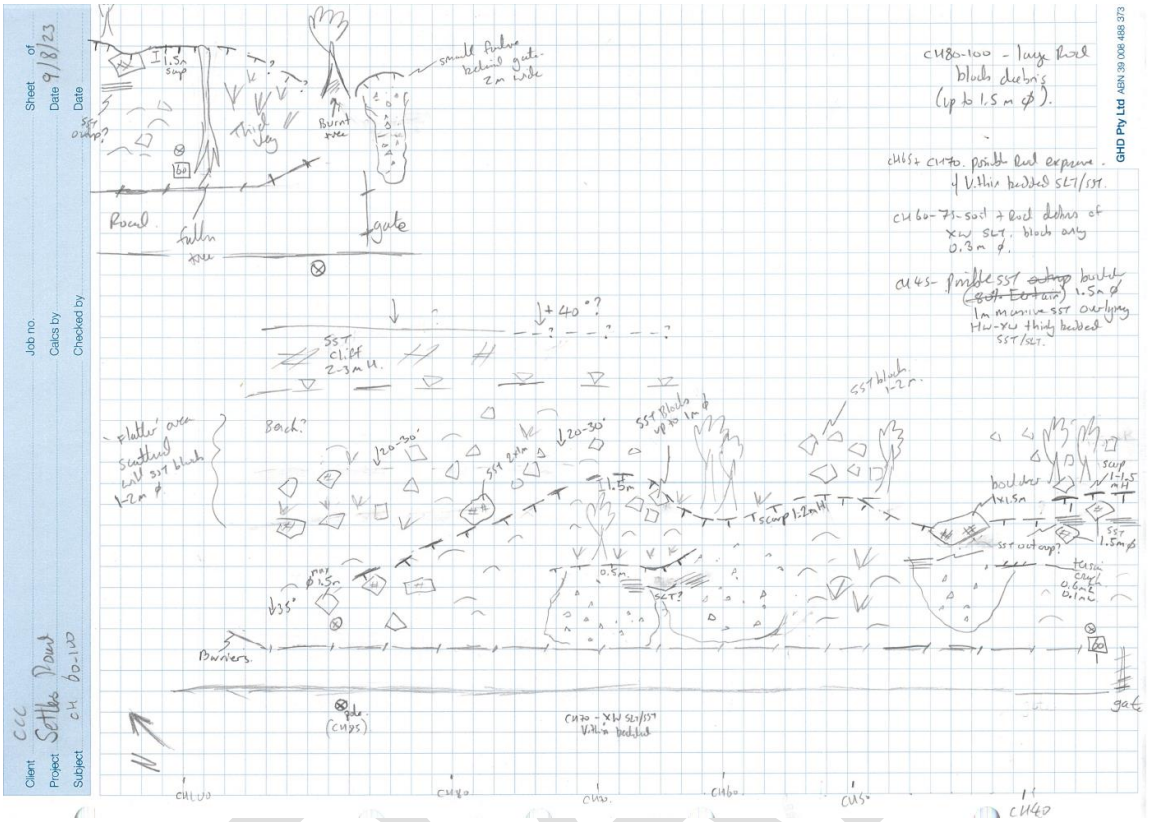


Figure 2.5 Site mud map for CH60 to CH100

Table 2.1 Summary of site observations

Chainage (m)	Observations
45 to 95	Area of landslide debris. The slope is partly vegetated. Landslide debris and colluvium observed behind the concrete jersey kerb. Concrete jersey kerbs between chainage 40-100.
45 to 95	'Wavey' shaped 50m long backscarp located up to 50m from edge of road. Backscarp height typically 1.5 m.
30 to 95	Colluvium material comprises rocky material with blocks up to 1.5 m size.
65 to 75	A couple of smaller scarps exist within the slope (between CH65 to CH75). The debris from these smaller scarps comprises mostly soil and small rock mixtures inferred to originate from extremely weathered siltstone. The backscarp height in these smaller landslides was about 0.5 m.
45 to 95	Slope angles of between 30° and 35° were measured within the landslide area. Slope angle above the backscarp were significantly lower at between 15° and 25°. Further upslope these increase to about 40° and steeper above a mid-slope sandstone cliff.
Upper escarpment	Comprises massive sandstone cliffs up to 70 m in height with near vertical, jointing orientated 70-90° (dip) / 200-220° (dip direction), with a secondary joint set at 80-90° (dip) / 350-000° (dip direction).

Selected photos from the mapping exercise are presented below:

Figure 2.6 CH40 – South-east end of site viewed from road

Figure 2.7 CH65 viewed from road

Figure 2.8 CH 80 viewed from road

Figure 2.9 View from CH 60 towards gates (SE)

Figure 2.10 CH 55 - backscarp

Figure 2.11 CH 40 – possible rock outcrop

Figure 2.12 CH70 – north-west view along backscarp

Figure 2.13 CH 70 south-east view along backscarp

Figure 2.14 rock outcrop below backscarp at CH80

Figure 2.15 Sandstone cliff above backscarp at CH85

Figure 2.16 CH85 boulder immediately behind backscarp

2.5 Geological model

Using a combination of the photogrammetry, LiDAR and site mapping data, a 3D model was developed using Leapfrog Works to consolidate the observations and help visualise the ground conditions at the site.

The model comprised data from multiple sources, including:

– Mapped rock outcrops from the site visit.
– Mapped rock outcrops visible from the photogrammetry data.
– Inferred rock outcrops/cliff lines based on surface expressions visible from the LiDAR data.
– Measured dip and dip directions of bedding planes recorded during the site visit.
– Mapped extent of the recent landslides from the site visit, photogrammetry and LiDAR data.
– Significant site features such as tension cracks and large boulders resting on the colluvial slope observed during both the site visit and review of the photogrammetry data.

Unlike the similar exercise undertaken for the nearby CH250 to CH450 section, the 3D model and site mapping was not able to provide a clear interpretation of a lower level 'rock bench' / lower cliff line adjacent to the road.

Some rock exposures were noted (refer previous site photos), but it could not be established if these were from an intact rock bench or associated with a section of rock that had detached and translated down the slope as part of the landslide.

The backscarp was also plotted (with a much higher degree of confidence) by combining site observation of the backscarp with features visible in the LiDAR survey model. An extract of the LiDAR model with a sketched backscarp location is provided as Figure 2.17 below.

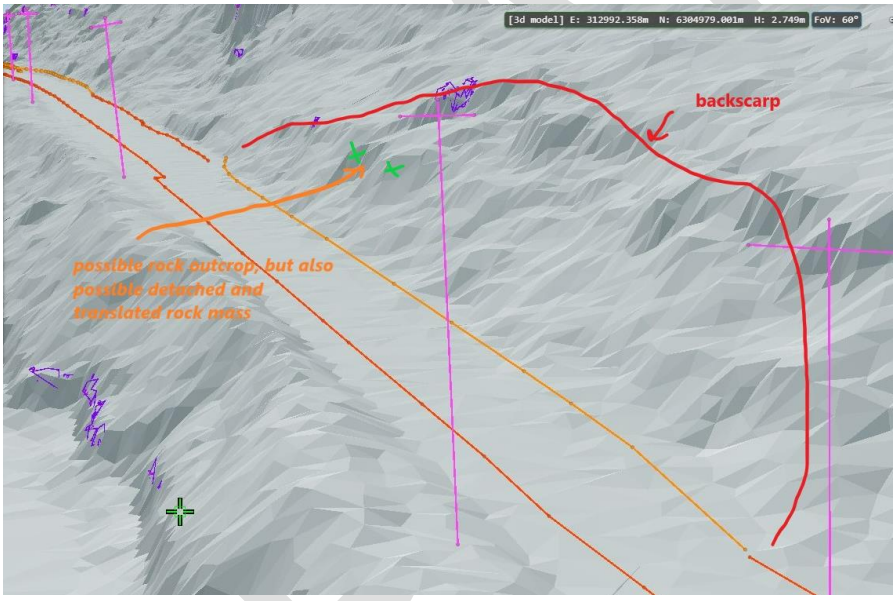


Figure 2.17 Possible rock outcrops and backscarp visible in the photogrammetry / LiDAR data

Based on the review of geological information described in Sections 2.1 to 2.4, a geological model to inform design was developed. The model is summarised in Table 2.2 below, with an idealised section shown in Figure 2.18.

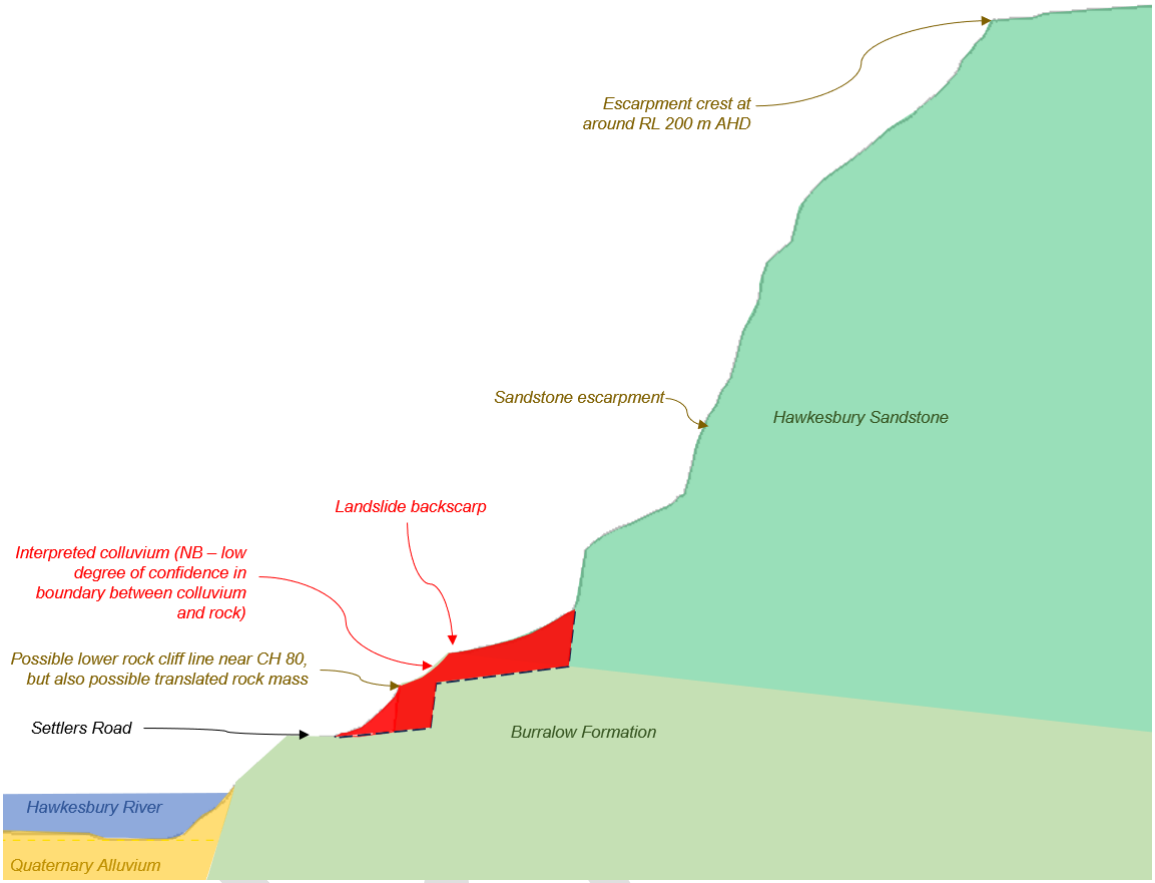


Figure 2.18 Typical geological section – not to scale

Table 2.2 Geological model units

Unit	Description	Extent
Hawkesbury Sandstone	Massive sandstone with near vertical jointing.	Escarpment cliff lines up to RL 200 m AHD above the site.
Burralow Formation	Thinly bedded sandstone, siltstone and shale with bedding at 05° dip/040° dip direction north-northeast and near vertical jointing.	Middle to lower footslopes of the escarpment and underlying Settlers Road, exposed in the lower partially buried cliff line to the north-west.
Colluvium / landslide debris	Mixture of soil and rock, containing rock blocks up to 3 m in size.	A thick colluvial deposit, extending for about 40 m from the toe of the escarpment and onto Settlers Road.
Quaternary alluvium	Alluvial channel deposits of sand, gravel silt and clay.	Downslope of Settlers Road, confined to the Hawkesbury River channel.

2.6 Rockfall analysis

In order to assess the behaviour of falling rocks, rockfall modelling was carried out using RocFall TM V7.003 produced by Rocscience Inc. at two representative sections across the site (Chainage CH55 m and CH85 m).

RocFall is a 2-dimensional (2D) rockfall simulation program for the prediction of rockfall behaviour on slopes. Input parameters were selected based on site observations and our experience on similar sites. The RocFall models are presented in Appendix B.

The purpose of the modelling was to:

– Estimate the travel distance of rockfalls.
– Estimate the potential rockfall bounce height.

By reviewing the modelling results it was possible to assess the percentage of detaching blocks likely to impact the roadway and thus assess the potential requirement for rockfall protection above the crest of the proposed excavation cut face(s).

Three scenarios were modelled for each section. These included:

a. The current slope geometry.
b. A discarded option which assumed excavation back to a buried rock bench / lower cliffline where possible rock exposures were noted by site mapping.
c. Excavation to a near vertical face at the mapped backscarp.

The rockfall modelling considered the following block sizes based on our site observations:

– Sandstone one m blocks – 'super ellipse 4 2:3' with mass up to 2,400 kg.
– Sandstone two m blocks – 'super ellipse 4 2:3' with mass up to 20,000 kg.

Larger hazards greater than two m in size were not modelled as it was assumed that this would represent a relatively unlikely occurrence. The rockfall model 'seeded' the rock blocks at the steepest sections in m the middle of the slope. This was generally considered to be the 'worst case' in terms of energy generated and for rocks reaching the road.

Trajectories of detaching rock blocks from the near vertical escarpment sections were not included as part of this assessment. Risks associated with such blocks are considered to have existed prior to the 2022 rainfall event which triggered the landslide adjacent to Settler Road. Reducing the risk associated with such blocks would be considered as 'betterment' of the site, which is not the purpose of the emergency relief funding which will be sought to reinstate the roadway to its pre 2022 flood / rainfall event condition.

The results of the rockfall model indicate that cutting back the slope geometry generally decreased the percentage of rocks impacting the roadway.

Table 2.3 Summary of rockfall modelling

Scenario		Rocks reaching crest of design cut / excavation (%)	Rocks reaching road (%)
CH55 1 m blocks	a. Existing slope	N/A	23%
	b. Design excavation to possible buried cliffline	26%	18%
	c. Design excavation to backscarp – preferred concept option	20%	0%
CH55 2 m blocks	a. Existing slope	N/A	0%
	b. Design excavation to possible buried cliffline	0%	0%
	c. Design excavation to backscarp – preferred concept option	0%	0%
CH85 1 m blocks	a. Existing slope	N/A	24%
	b. Design excavation to possible buried cliffline	47%	18%
	c. Design excavation to backscarp – preferred concept option	49%	4%
CH85 2 m blocks	a. Existing slope	N/A	0%
	b. Design excavation to possible buried cliffline	0%	0%
	c. Design excavation to backscarp – preferred concept option	0%	0%

The results suggest that the smaller blocks tend to travel further and with a higher number impacting the road. Although somewhat reduced when compared to the existing slope, a significant number of rocks reach the road after launching off the crest of the smaller design excavation that extended to a possible buried cliff (scenario b, i.e. 18% compared to 24%). However, a much lower percentage of the rocks launching over the crest of the large excavation that extends to the backscarp reach the road (scenario c, i.e. only 4%). This suggests that if an option to limit excavation to the 'buried cliffline' scenario were feasible, it would likely require a rock catch fence to reduce the risk to workers during construction and road users in the longer term. Scenario 'c' results shown that minimal rocks impact the roadway when launching from behind the larger excavation to the backscarp, which suggests that a catch fence is not expected to be required for this option, (i.e, since the majority of blocks are expected to land 'safely' with the rock catch zone provided by the excavation).

3. Design development

3.1 Summary of preferred concept option

A formal option development process incorporating options development, advantage / disadvantages assessments, preliminary costings and a multicriteria assessment, was not considered necessary during concept development given the similar scope of work conducted for the adjacent site at CH250 to CH450 (refer GHD 2022-2 report). While the two landslide areas (CH250 to CH450 and CH60 to CH100) are not identical, they are considered sufficiently similar to allow for the use of similar remedial design solutions for both sites.

For this reason, only remedial design solutions comprising bulk removal of landslide debris were considered at concept stage. Two bulk excavation options for the CH60 to CH100 landslide remediation were assessed. These included:

– Option 1A - excavation of landslide debris to a potential buried cliffline.
– Option 1B - excavation of all landslide debris to the backscarp of the landslide.

Images of proposed extents of excavation for the 3D site model are presented in Figure 3.1 and Figure 3.2.

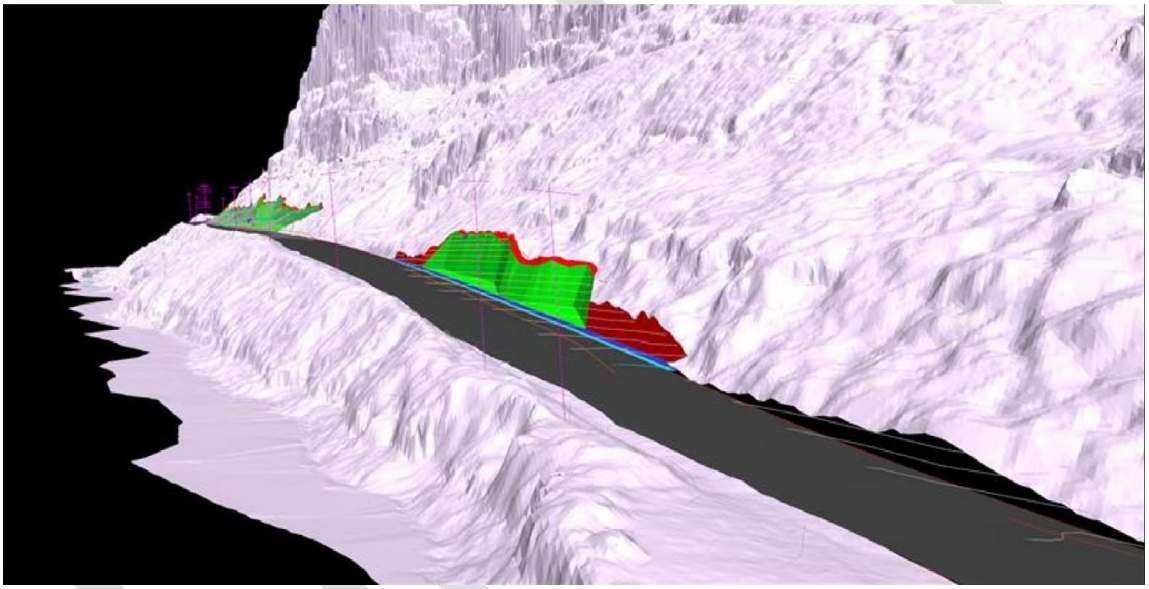


Figure 3.1 Option 1A, modelled extent of excavation

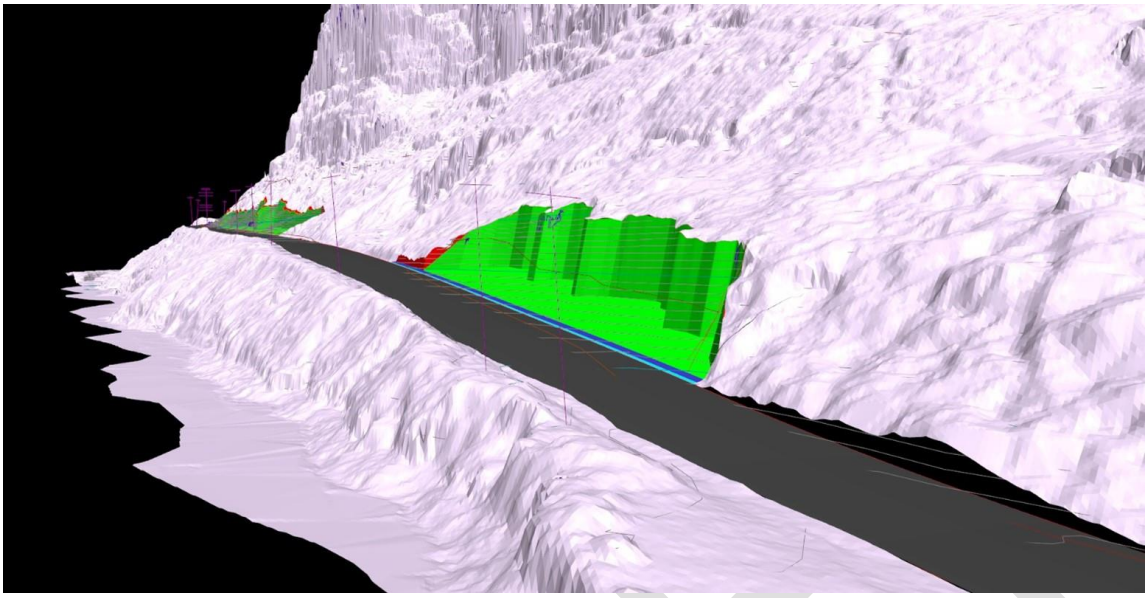


Figure 3.2 Option 1B, modelled extent of excavation

The key advantages and disadvantages of these two options as discussed in the concept / 65% detailed design report are reproduced in the following table:

Table 3.1 Advantages and disadvantages of bulk excavation options

Option	Key advantages	Key disadvantages
1A	Reduced excavation volume. Reduced cost compared with Option 1B (unless a soil nail wall is required).	High risk of not encountering rock bench / low cliffline, resulting in increased excavation and / or the need for a soil nail wall. If rock is not encountered and a soil nail wall is required, longer soil nail than Option 1B would be necessary, largely negating the cost savings afforded by reduced volumes of excavation. Likely need for a rock catch and / or landslide debris fence (similar to CH250 to CH450) based on rockfall modelling.
1B	Lower risk option – excavation extents are known and won't vary. Removes all landslide debris – no need for a landslide debris fence. No need for a rock catch fence – modelling shows most rocks will fall safely in the excavated catch zone.	Larger volume of excavation compared to Option 1. Likely more expense option (subject to conditions encountered during excavation). Extents of soil nail wall remains unknown – subject to thickness of colluvium exposed in excavation.

Based on the above, and largely due to uncertainties relating to the presence of the potential rock bench / lower level cliffline, it was agreed (by CCC in an email dated 5 October 2023) to progress Option 1B to detailed design.

A simplified concept section for Option 1B is provided in Figure 3.3 below.

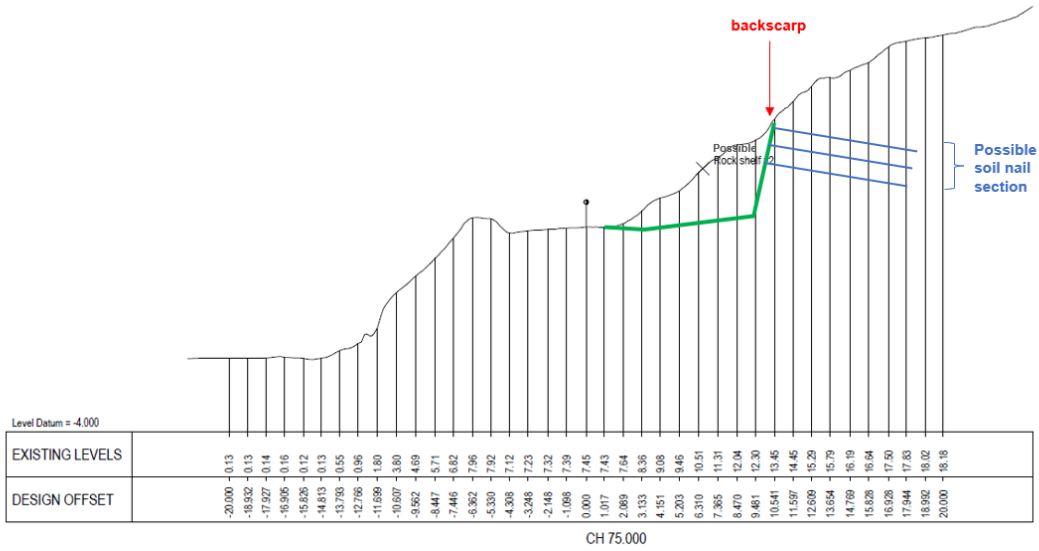


Figure 3.3 Option 1B, simplified concept section

3.2 Design standards

The design has been undertaken with reference to the following standards:

- AS1012 Methods of Testing Concrete.
- AS1214 Hot-Dipped Galvanised Coatings on Threaded Fasteners.
- AS1275 Metric Screw Threads for Fasteners.
- AS1252 High-strength Steel Bolts with Associated Nuts and Washers for Structural Engineering.
- AS1302 Steel Reinforcing Bars for Concrete.
- AS1313 Steel Tendons for Prestressed Concrete - Cold- Worked High Tensile Alloy Steel Bars for Pre-Stressed Concrete.
- AS1315 Portland Cement.
- AS1650 Hot-dipped Galvanized Coatings on Ferrous Articles.
- AS3678 Structural Steel.
- AS4678 Earth-retaining structures
- AS5100 Bridge Design.
- AS/NZS 4680 Hot-Dipped Galvanised (zinc) Coatings on Ferrous Articles.
- Central Coast Council (CCC) Civil Works Specification, 2020.
- TfNSW Guide to Slope Risk Analysis (Version 4.0).
- TfNSW QA Specification R64 – Soil Nailing (Ed 1 / Rev 5; November 2020).
- TfNSW QA Specification R68 – Shotcrete Work Without Steel Fibres (Ed 1 / Rev 4 June 2020).
- TfNSW GTD2018/001 - Geotechnical Design for Remediation of Existing Slopes and Embankments.

3.3 Detailed design summary

The design elements for the works comprise:

- Excavation and scaling / removal of the colluvium and landslide debris from the slope between design chainages CH40 and CH105, extending upslope to the backscarp of the landslide. While a near vertical cut face is shown on the concept sketch and design drawings based on a conservative assumption of a near vertical rock joint face parallel to the roadway at this location, the design intent is to only excavate horizontally from the toe back to the front of a stable rock bench. It is also recognised that the upper portion of the excavation up to the backscarp may not encounter such a rock face and that a soil nail wall is likely to be required to retain the colluvium at this location.
- Excavation will also comprise the creation of a 1:6 slope from the toe of the near vertical cut face to the existing road shoulder. Drainage of the 1:6 slope is provided by a concrete shoulder drain constructed at the shoulder of the existing road. *CCC may wish to include a subsoil drain below this shoulder drain (based on good engineering practice), but this has not been included in the design development as to do so would be considered 'betterment', which is not covered by proposed funding arrangements.*
- Soil nail wall with structural shotcrete facing to support colluvium in the upper portion of the excavated face, at locations to be identified by geotechnical assessment during construction.
- Rock bolts to support individual unstable rock blocks / wedges or defects in the lower rock cliff face at locations to be identified by geotechnical assessment during construction.
- Mesh reinforced shotcrete to protect erodible units at locations to be identified by geotechnical assessment during construction.
- Erosion and sediment control plan, provided as an indication of the works only. This will need to be confirmed and, if necessary, modified by the contractor when staging of the work is determined.
- Road repair or resurfacing (mill and re-sheet) to standard CCC specifications. CCC may wish to consider an upgrade to the road pavement in this area, but this has not been included in the design development as to do so would be considered 'betterment' unless the pavement has been significantly damaged by the landslide (which will only be evident following removal of landslide debris).

100% detailed design stage drawings are provided in Appendix H.

3.4 Excavation and scaling

Colluvial landslide debris between the level of Settlers Road and the backscarp of the landslide will be progressively removed from the top down to expose a near vertical face which is expected to comprise colluvial soil and rock material overlying weathered rock. The location of the colluvium / weathered rock contact has not been established, but is expected to vary across the length of the landslide. While it is anticipated that the excavation face will near vertical, excavation into intact buried weathered rock benches is not proposed, so the final rock excavation (where encountered) may be somewhat irregular, progressively benching down to the road level The basal excavation limit will include a 1 vertical to 6 horizontal surface between the toe of the excavated face and the edge of the roadway to facilitate drainage away from the toe of the excavated slope.

Removal of colluvium including loose material and rock blocks shall be reviewed onsite by the geotechnical designer / geotechnical representative at regular intervals throughout the excavation process to gauge that excessive material is not removed and that material removal occurs in a judicious, practical manner without further destabilising the slope or increasing the risk(s) to construction personnel or plant.

Top down construction of a soil nail wall will be required as excavation progresses through the upper colluvium (where encountered).

3.5 Soil nail wall with structural shotcrete

3.5.1 Adopted minimum factor of safety for global stability

TfNSW Technical Direction GTD 2018/001 provides a design guideline for the minimum factor of safety (FoS) to be used in the design for remediation of existing slopes and fill embankments. In contrast to new infrastructure projects, design for remediation of existing slopes/embankments (i.e., more than 10 years old since the completion of construction) only targets an Assessed Risk Level (ARL) of ARL3 or better in accordance with the Slope Asset Management Policy PN292. This is less stringent than that of new works, which requires an ARL4 or better.

The FoS adopted in the remedial design shall not be lower than the minimum values given in Table 1 of GTD 2018/001. A slope risk assessment was previously carried out by Hendrickx and Associates (2022). Based on the review of the risks for life and economic loss associated with the potential global failure mechanisms, the assessment indicated that the assessed consequence class is C3. As such, the adopted minimum FoS for the remedial designs are:

– Minimum FoS of 1.3 for long term
– Minimum FoS of 1.2 for short term

Table 3.2 Consequence class and minimum FOS (from Table 1 of GTD 2018/001)

Consequence Class	C1	C2	C3	C4	C5
Long Term FoS	1.5	1.4	1.3	1.25	1.25
Short Term FoS	1.25	1.25	1.2	1.2	1.2

3.5.2 Soil nail wall material assumptions

Material properties adopted in the analysis are summarised in Table 3.3 and further discussed in the sections below.

Table 3.3 Material assumptions for geotechnical analysis

Element	Material Assumptions
Soil Nail	i. Diameter = 24 mm (N500, constructed as per TfNSW R64 with sheathing etc.) ii. Spacing = 1.2 m (horizontal) iii. Spacing = 1.2 m (vertical) iv. Nail hole diameter = 0.15 m v. Nail yield tensile capacity = 226 kN vi. Nail working tensile capacity = 140 kN vii. Nail working shear capacity = conservatively assumed to be zero in analysis viii. Tensile Modulus, E = 200 GPa
Soil nail head plate	i. Height = width = 150 mm (Galvanised. grade 500 steel) ii. Thickness = 16 mm iii. Nail hole domed and suitably sized to allow nail penetration from 70 º to 90 º
Shotcrete Facing	i. Thickness = 160 mm ii. Ultimate concrete strength = 40 MPa iii. Reinforcement = SL81 (Min. yield 500 MPa, galvanised + sodium dichromate dipped)

3.5.3 Bond failure between grout and soil

In accordance with Appendix D Clause 4.2.3 of AS4678-2002, the design geotechnical strength for the soil nails has been calculated as the ultimate strength (R_{ug}) multiplied by an importance category reduction factor (ϕ_n) and a materials reduction factor for the bond, ϕ_b.

$$S = \phi_n \phi_b R_{ug}$$ (Applied to bond strength of soil nails)

The following reduction factors from AS4678 Table B1 and Table B2 were applied to the ultimate bond stress values to calculate the design bond stress values.

– Importance Category Reduction Factor (for permanent anchors) $Ø_n$ – 0.8.
– Geotechnical Strength Reduction Factor (bond) $Ø_b$ – 0.7.

Thus, the total applied bond strength reduction factor is 0.56. This value was reduced to 0.5 to also take an importance factor of 0.7 (as per AS5100.3 Tabel 7.3.3(A)) into account in the design.

For soil nails, the design assumes a uniform bond strength distribution along the nail. On the basis of a six m soil nail embedded behind the excavated cut face and the interpreted geological model, the soil nails will largely be controlled by the soil and grout bond within the colluvium and weathered siltstone and / or sandstone units.

The approximate boundary between colluvium and weathered rock is subject to variation along the extent of the slope. In light of this uncertainty, a conservative assessment of the an ultimate bond strength (R_{ug}) was undertaken utilising drained parameters back-analysed for an assumed non-cohesive colluvium material, with bond strength varying based on effective overburden pressure.

As a cross check for a cohesive soil / weathered rock, we took the average ultimate bond strength calculated for a non-cohesive colluvium and back-figured an equivalent undrained shear strength (s_u) of 58 kPa. This value is consistent with the lower end of a 'stiff' cohesive material (with a stiff material defined as having a s_u of 50 to 100 kPa), which is considered appropriate for the colluvial soil (when assume it to be cohesive) and conservative for the weathered rock material.

3.5.4 Bond failure between grout and nail

Ultimate bond stress between grout and nail was assessed using the following equation:

$b_n = \beta\sqrt{f'_c}$ BS8110 Table 3.28

Where f'_c = characteristic compressive strength of grout at 28 days

β = 0.4 for deformed bar

Therefore, the ultimate bond stress between grout and nail is 2.53 MPa for 40 MPa grout. A factor of safety of 3 was adopted to assess the allowable bond stress between grout and nail (deformed bar), resulting in an allowable bond stress between grout and nail of 840 kPa.

3.5.5 Tensile failure of the soil nails

In accordance with Clause 7.3.3 in AS5100.3:2017, the design structural strength ($R_{d,s}$) for the soil nails has been calculated as the ultimate strength (R_{us}) multiplied by an importance category reduction factor (ϕ_n) and the respective reduction factor, ϕ_s for structural strength.

Similarly, in accordance with Clause 7.3.3 in AS5100.3:2017, the design geotechnical strength for the soil nails has been calculated as the ultimate strength (R_{us}) multiplied by an importance category reduction factor (ϕ_n) and the reduction factors, $\phi\sigma$ for geotechnical strength.

$R_{d,s} = \phi_n \phi_s R_{us}$ (Applied to tensile strength of the soil nails)

The following reduction factors from AS5100.3 Table 7.3.3(A) and AS/NZS 5100.6 Table 3.2 were applied to the tensile strength values:

– Importance Category Reduction Factor (for permanent anchors) $Ø_n$ – 0.7
– Structural Strength Reduction Factor, $Ø_s$ – 0.9

Thus, the total applied tensile strength reduction factor is 0.63.

Adopting an ultimate tensile strength (R_{us}) of 500 MPa (for grade 500 steel), the factored yield strength for a 24 mm diameter bar is 140 kN.

3.5.6 Soil nail wall design methodology

Stability analyses for the proposed remedial soil nail design solution has been undertaken as part of the detailed design process using the commercially available software program GeoStudio Slope-W (2021) incorporating the Morgenstern-Price method for the factor of safety assessment. This allows for the proportioning of soil nails and incorporation of individual soil nail factors of safety, including pull out resistance and tensile strength.

Geotechnical design parameters for the colluvium were back analysed assuming a factor of safety of 1.0 for the 2022 landslide profile. Sensitivity analyses were undertaken for the assessed worst-case load condition using an alternative set of colluvium parameters (with a higher friction angle (ϕ') but lower apparent cohesion (c') assessed as part of the back analysis to consider both cohesive and non-cohesive material characteristics.

Due to uncertainties in the thickness of colluvium (and thus the wall height), design cases were considered for both a two m high and a three m high soil nail wall, noting that the maximum height of proposed excavation is in the order of six m.

Note that should a soil nail wall greater than three m in height be required, minor design modification, typically comprising lengthening of the soil nails, may be required. Further geotechnical advice should be sought immediately if initial trial excavations reveal the need for a soil nail wall in excess of three m in height.

The strength limit states have been considered for this design.

Shotcrete facing design has been undertaken adopting the maximum tensile force applied to the nail as calculated for individual soil nails during the stability analysis. Facing design has been carried out using both an in-house spreadsheet, and calculations following the FHWA-2015 method.

3.5.6.1 Adopted load cases

The design has considered the following load combinations:

– **Long term conditions:**
  - Load Case A1 - this load combination considers the permanent effect from soil loading conservatively in a 'dry' condition (ie adopting a pore pressure to overburden stress ratio, Ru, = 0 in soil and phreatic surface at top of rock).
– **Short term conditions:**
  - Load Case B1 – this load combination models a rainfall / stormwater flow saturated soil condition by adopting an Ru value of 0.3.
  - Load Case B2 - seismic load case with annual probability of exceedance of 1 in 500 years.

3.5.6.2 Strength limit state

Strength limit state (or Ultimate limit state) refers to failure or collapse modes in which the applied loads induce stresses that are greater than the strength of the whole system or individual components, and the structure becomes unstable. Strength limit states arise when one or more potential failure modes are realised. The design of the soil nail wall has therefore checked that the system is safe against:

– Global stability of the soil nail wall
– The following modes of failure were considered for the soil nail wall:
  - Bond failure between the grout and soil
  - Bond failure between the grout and nail
  - Tensile failure of the nail
– Structural design of the shotcrete wall including the assessment of the shotcrete thickness, reinforcement and plates. The following shotcrete facing design checks were undertaken:
  - Reinforcement capacity
  - Facing punching shear capacity
  - Facing flexural capacity

Table 3.4 Minimum recommended factors of safety

Failure mode	Resisting component	Minimum recommended factors of safety (permanent structure)
External stability	Slope stability (long term)	1.3[1]
	Slope stability (short term)	1.2[1]
Internal stability	Pull-out resistance (soil/grout)	2.0[2]
	Pull-out resistance (grout/nail)	3.0[3]
	Nail bar tensile strength	1.58[4]
Facing Strength	Facing flexure	1.5
	Facing punching shear	1.5

Notes:
1. As per Consequence Class C3 from RMS GTD 2018/001.
2. As outlined in Section 3.5.3 for bond failure between grout & soil.
3. As outlined in Section 3.5.4 for bond failure between grout & nail.
4. As outlined in Section 3.5.5 for tensile failure of soil nail.

3.5.7 Soil nail design analysis results

3.5.7.1 Results of parameter back-analysis

It is considered that a high moisture content within the existing colluvium, due to rainfall and surface water (runoff) infiltration from the 2022 storm event activated the subject Settlers Rd landslide between CH 60 m and CH 100 m. As such, a FoS close to 1.0 was targeted for the case where Ru (the pore pressure to overburden stress ratio) was equal to 0.3. For dry seasonal periods, a slightly higher FoS was envisaged.

The back analysed results are provided in Table 3.5 below. The table includes two combinations of soil strength parameters, i.e., drained cohesion (c') and friction angle (ϕ'), for the colluvium material.

Table 3.5 Sensitivity FoS results for colluvial material

	FoS for back-analysed slope, Ru=0.3		FoS for back-analysed slope (dry colluvium)
	c' = 3 kPa	c' = 5 kPa	
ϕ' = 36°	-	0.99	1.45
ϕ' = 40°	0.91	-	-

Figure 3.4 below shows the back analysed slope stability result for the C'= 5 kPa and ϕ' = 36 degrees, which was adopted for the soil nail wall analyses (nothing that design checks were also undertaken using the alternate set of parameters).

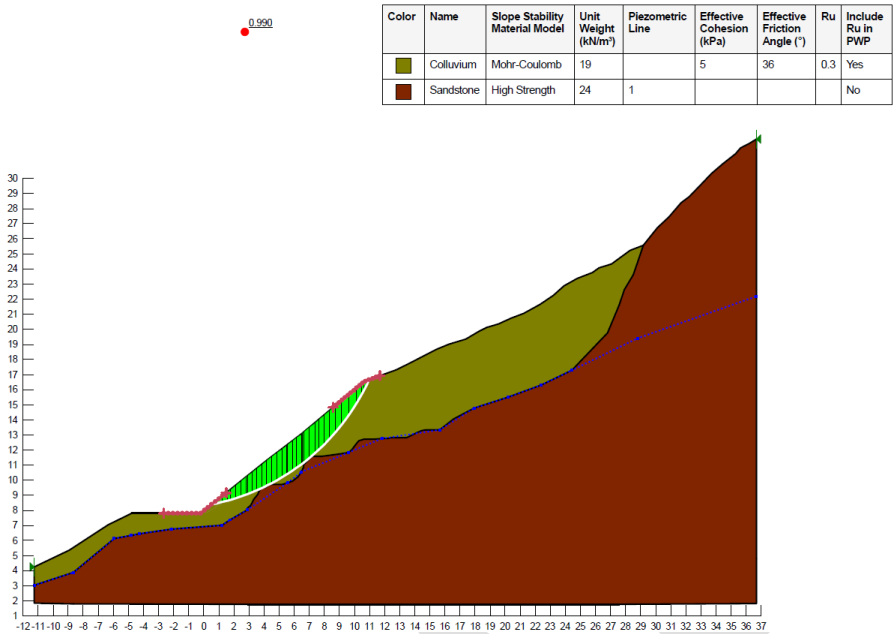


Figure 3.4 Back analysed slope stability result with Ru=0.3

3.5.7.2 Proposed permanent remedial soil nail configuration

Based on the design methodology input/assumptions listed above, the following soil nail arrangement has been adopted for the detailed design:

- Three (3) rows of soil nails for a three m high excavated colluvium face and two (2) rows for a two m high excavated colluvium face.
- Soil nails spaced at 1.2 m centres down slope and 1.2 m centres across the slope.
- Soil nail length = six m (each).
- Soil nail inclination = 15° below horizontal.
- Soil nail bond diameter = 150 mm (i.e. diameter of the grouted hole).
- Reinforcement bar = N24 grade 500N galvanised bar, with a minimum (unfactored) tensile capacity of 226 kN.

3.5.7.3 Stability analysis for permanent works

The soil nail arrangement has been assessed for global stability in several design cases as noted previously. The results are presented in Table 3.6 below:

Table 3.6 Summary of stability analysis for permanent works

Stability case		Required FoS	Achieved FoS	
			2m high wall	3m high wall
Long Term (Load Combination A)	A1 - long term, water table at top of rock	1.3	2.78	1.90
Transient (Load Combination B)	B1 – Ru = 0.3	1.2	1.62	1.21
	B1 – Ru = 0.3, with alternate parameters	1.2	-	1.24
	B2 - earthquake	1.2	2.24	1.60

Slope W output sheets for each of the analysed cases are provided in Appendix D.

3.5.8 Soil nail wall drainage

To manage possible water flows both during construction and after construction, the facing design includes 20 mm PVC lined weepholes at 1.5 m vertical and two m horizontal centres (between every nail in each row as shown in the design Drawings), and 150 mm wide strip drains at 2.4 m centres behind the shotcrete facing. Details are provided on the design drawings.

Our experience indicates that this arrangement is sufficient to prevent hydrostatic pressure buildup behind the facing.

3.5.9 Durability and corrosion protection

In accordance with the 'minor public works' classification, the soil nail wall has been designed for a 90-year design life.

3.5.9.1 Soil nails

The steel reinforcement bar must be hot-dip galvanized to AS/NZS 4680, except that the minimum average coating weight must be 600 g/m2 (equivalent to 85 microns thickness).

Additional corrosion protection is afforded to the soil nail by means of a HDPE corrugated sheathing. The sheathing is centrally located in the hole and the bar centrally located within the sheathing using spacers at regular intervals (as shown on the design drawings).

As per the requirement of TfNSW R64, a minimum 25 mm cover between the corrugated plastic sheathing and the drillhole; and 20 mm between the encapsulation sheathing and the bar, is to be maintained using centralisers. Such coverage is readily achievable using the nominated 150 mm drill hole diameter.

A minimum 50 mm shotcrete cover is also provided to the galvanised plate and nut assembly.

3.5.9.2 Shotcrete and mesh reinforcement

An 'exposure classification' of B1 has been adopted for durability purposes in accordance with AS5100.5 as the site lies in a 'near coastal' area between 1 km and 50 km from the coast.

In accordance with AS5100.5, the design has nominated a 50 mm external cover and a 75 mm cover internally (against the soil face). These cover requirements are also in accordance TfNSW R64. Cover pins must be used to indicate this prior to spraying and a cover block used to check cover at the read face of the reinforcement.

In addition, the steel mesh is to be hot dipped galvanised and passivated by dipping in a 2% solution of sodium dichromate to prevent any adverse reactions between the zinc coating and the cement grout. The zinc coating acts as both a chemical and physical barrier.

In accordance with TfNSW R64 shotcrete mix shall be designed and supplied as per B2 exposure classification, with the mix design as per TfNSW R68 Section 3, with a design compressive strength of 40 MPa.

3.5.10 Permanent facing and nail plate design

Shotcrete facing design calculations are summarised in Appendix D and include reinforcement and a flexural/bending moment check, punching shear failure and plate thickness assessment. Punching shear failure calculations adopt 100% of the maximum nail design load applied at the facing element interaction.

Shotcrete mix shall comprise B2 exposure classification and a minimum 40 MPa compressive strength (f'_c) for the shotcrete (necessary for punching shear capacity behind the soil nail bearing plate).

Based on 80 mm internal and 50 mm external cover requirements (AS5100.5), allowance for SL81 mesh with overlap, a minimum shotcrete thickness of 160 mm is to be maintained for the entire facing.

Nail bearing plates have been designed and must meet the following requirements:

– 150 mm square, 16 mm thick hot dipped galvanised grade 500 steel.

– Have nail hole of suitable diameter and geometry to accommodate up to 15 degrees plate rotation to bar/facing slope.
– Able to accommodate hemispherical domed nuts.
– Nail Head plates shall be fixed to ensure square bearing onto face, plate surface parallel to facing reinforcement.
– Nuts shall comprise a hemispherical domed nut, breaking capacity no less than 226 kN.

3.6 Spot rock bolts

Cement grouted rock bolts have been proposed for varying lengths (minimum 4 m) to support or restrain movement of jointed or undercut rock blocks based on geotechnical assessment during the scaling / excavation works. The number and length of rock bolts may vary depending on the effectiveness of the preceding scaling programme. The Geotechnical Representative will confirm rock bolt locations, lengths and orientations after scaling and vegetation removal are complete, via spray paint mark-up of the rock faces.

Rock bolts shall be 28 mm diameter galvanised threaded 500 N bar. Bearing plates shall be 200 mm square, 16 mm thick hot dipped galvanised grade steel. Nuts shall comprise a hemispherical domed nut, breaking capacity no less than 307 kN, fixed to ensure square bearing onto face, plate surface parallel to facing reinforcement. All rock bolts shall have the bar, nuts, washers and bearing plates hot-dip galvanised in conformance to the requirements of AS1214, AS1650 and AS4680.

3.7 Non-structural shotcrete

Non-structural shotcrete coverage is proposed over areas where the exposed lower rockface, comprising thinly bedded sandstone and siltstone, and is considered to be highly erodible (e.g. clay or extremely weathered seams / bands). Shotcrete is to be applied at locations requiring rock mass erosion protection secured to the face with relatively shallow dowels (one m long), with SL81 galvanised steel weldmesh reinforcement attached to the cogged dowels and shotcrete.

The design has nominated a minimum 50 mm cover to the mesh. With allowance for SL81 mesh with overlap, a minimum shotcrete thickness of 130 mm is to be maintained for the entire face with additional thickness in areas of overlaps etc.

In addition, the steel mesh is to be hot dipped galvanised and passivated by dipping in a 2% solution of sodium dichromate to prevent any adverse reactions between the zinc coating and the cement grout. The zinc coating acts as both a chemical and physical barrier.

In accordance with TfNSW R64 shotcrete mix shall be designed and supplied as per B2 exposure classification, with the mix design as per TfNSW R68 Section 3, with a design compressive strength of 40 MPa.

The shotcrete mix shall include an ochre pigment or similar, as agreed by CCC based on a series of trial panels to be provided by the contractor.

To manage seepage water flows both during construction and after construction, the erosion protection shotcrete design includes 20 mm PVC lined weepholes at 1.5 m centres, and 150 mm wide strip drains at 1.5 m centres behind the shotcrete facing and /or along seepage paths identified by the Designer's Geotechnical Representative during construction. Typical details are provided on the design drawings.

3.8 Erosion and sediment

Erosion and sediment controls has been based on the Bluebook (2004) and CCC standard drawings and specifications. The contractor will need to tailor the design to suit onsite conditions and requirements.

3.9 Pavement and drainage

At the completion of slope and drainage works the pavement shall be repaired and the east bound roadside open drain formalised as per CCC specifications.

Repairs to the existing pavement will be in the form of a mill and re-sheet of the pavement wearing course with 40 mm thick layer of asphaltic concrete (AC) in accordance with CCC specifications. More significant areas of pavement distress / failure induced by landside debris impacts or construction activities may require more comprehensive repair works including but not necessarily limited to replacement of base and / or subbase layers in accordance with CCC specifications.

Along the east bound pavement edge, a new CCC Standard shoulder channel Type 1 is proposed (as per CCC Standard drawing SD0501) to divert water away from the toe of the slope as well as from the pavement areas and direct it into the existing culverts. Note that no hydraulic capacity checks of the existing drainage have been undertaken, as drainage improvements were excluded from the scope of work since they could be considered as 'betterment', which is typically not allowed for in the remedial works funding. However, CCC may wish to review requirements for drainage improvements under a separate funding arrangement as the design / works progress.

Material and construction shall be in accordance with CCC Works Specification – Construction.

3.10 Slope Risk Assessment

A TfNSW slope risk assessment was undertaken for the pre-existing slope, initially by Mark Hendrickx and Associates in April 2022

The following five hazards were considered in the slope risk assessment by Mark Hendrickx for the pre-existing slope between CH60 and CH100:

– H1 - Shallow slump at the toe of the slope
– H2 - Boulder (>1m size) rock fall from the slope above
– H3 - Rock mass failure near the base of the cliffs (typical 4 x 3 x 2 m)
– H4 - Large rock mass failure/cliff collapse
– H5 - Large boulder (3 x 2 x 2 m) falling from cliff

The TfNSW slope risk assessments were undertaken following the rainfall event and an ARL3 was assigned for the road under its current (2022) condition, which included a temporary jersey barrier at the toe of the landslide debris (typically on the old centreline of the road), an associated single lane closure, road closure following a triggerable rainfall event and reduced a 40 km/hr speed limit.

Table 3.7 Summary of Marl Hendrickx's 2022 slope risk analysis to life with and without 40km/h speed limit and one lane closed

Hazard	Scale of failure	Likelihood	Vulnerability 40[3]	Temporal Probability	Consequence of failure 40[4]	Assessed Risk Level – 40 kph	Assessed Risk Level - 60-80 kph
H1	S4	L2 (pd 0.1, Pt 1)	V5	T3	C5	ARL4	ARL3
H2	S1	L3 (Pd 0.1, Pt 0.1)	V3	T3	C3	ARL3	ARL2
H3	S1/S2[1]	L3 (Pd 0.1, Pt 0.1)	V3	T3	C3	ARL3	ARL2
H4	S1/S2[2]	L4 (Pd 0.01, Pt 0.1)	V3	T3	C3	ARL4	ARL3
H5	S1	L3 (Pd 0.1, Pt 0.1)	V3	T3	C3	ARL3	ARL2

GHD notes:

1. - Mark Hendrickx, 2022 reported scale of failure as S1/S2, but his assessment appears to be based on S1
2. - Mark Hendrickx, 2022 reported scale of failure as S1/S2, but his assessment appears to be based on S1
3. - Vulnerability for 60-80 km/hr would be one order higher
4. - Resulting consequence level (risk to life) for 60-80 km/hr would be one order of magnitude higher (e.g. C3 at 40 kph becomes C2 at 60 kph)

It is noted that while the 2022 assessment by Mark Hendrix included H6 – reactivation of the large landslide, this reactivation appeared to relate to the larger landslide between CH250 and CH450. Reactivation of the smaller scale landslide between CH60 and CH100 was covered by H1, but we suggest that a large volume landslide between CH60 and CH100 is also possible (and is therefore considered below as H1').

A preliminary slope risk reassessment was undertaken following GHD's recent (August 2023) site visit. The preliminary re-assessment simplified the site hazard into four hazard categories as follows:

– H1 - Shallow slump at the toe of the slope (mixed soil and blocks < 0.5 m).
– H1' - Large slump at the toe of the slope (similar but smaller than 2022 H6) with blocks up to one m in size.
– H2' - Boulder (<1 m size) rock fall from the slope above the landslide backscarp.
– H3' - Boulder (>1 m size) rock fall from the slope above the landslide backscarp.

These reassessed hazards produced a worst-case assessed risk level rating of ARL3 under present (controlled) conditions and a worst-case ARL2 for an un-remediated site where controls are removed. These results are similar to the worst-case ARL from Mark Hendrickx's 2022 analysis (above).

Table 3.8 Summary of GHD 2023 slope risk analysis to life with and without 40 km/h speed limit and one lane closed

Hazard	Scale of failure	Likelihood	Vulnerability 40[1]	Temporal Probability	Consequence of failure 40[2]	Assessed Risk Level – 40 kph	Assessed Risk Level - 60-80 kph
H1	S4	L3 (Pd 0.1, Pt 0.1)	V5	T3	C5	ARL4	ARL3
H1'	S3	L2 (Pd 0.1, Pt 1)	V4	T3	C4	ARL3	ARL2
H2'	S2	L3 (Pd 0.1, Pt 0.1)	V4	T3	C4	ARL4	ARL3
H3'	S1	L3 (Pd 0.1, Pt 0.1)	V3	T3	C3	ARL3	ARL2
Notes: 1. - Vulnerability for 60-80 km/hr would be one degree higher 2. - Resulting consequence level (risk to life) for 60-80 km/hr would be one degree higher							

The following table provides a summary of the slope risk assessment post remediation. Note that post remediation conditions assume two open lanes and a reinstated speed limit of 60 km/hr.

Table 3.9 Summary of post remediation risk analysis to life at 60 km/h speed limit with two lanes open

Hazard	Scale of failure	Likelihood	Vulnerability	Temporal Probability	Consequence of failure	Assessed Risk Level
H1	NA	hazard removed	-	-	-	-
H1'	S3 – soil nail wall failure	L4	V3	T3	C3	ARL4
H2'	S2	L4 (Pd 0.1, Pt 0.01) Pt reduced due to larger fall zone	V3	T3	C3	ARL4
H3'	S1	L4 (Pd 0.1, Pt 0.01) Pt reduced due to larger fall zone	V2	T3	C3	ARL3

Following the completion of the remediation works described in this report, the assessed risk to life for the site is expected to reduce for the current ARL2 (without site controls) to ARL3. Note that this risk level relates to large untreated blocks (>1 m) above the landslide. Although these blocks remain untreated, the increased fall zone associated with the proposed remedial excavation works is expected to reduce the probability of such rockfalls impacting the roadway when compared to the pre-existing condition.

The slope risk analysis summary sheets are be provided in Appendix C.

4. Construction and maintenance

4.1 Geotechnical inspection, testing and monitoring

Geotechnical inspections of all cleared and excavated slopes faces will be required during construction to verify the design assumptions herein relating to ground conditions. It is anticipated that the geotechnical designer's presence would be required an average of three days per week for the duration of the construction works.

Soil nail 'suitability' and 'acceptance' testing will be required in accordance with TfNSW R64. These will be located as per TfNSW R64, and where QA/QC information from construction indicates testing is required.

Two soil nail suitability ('pullout') tests will be required at the beginning of construction to verify the design pullout resistance as per TfNSW R64. The location for suitability tests is to be discussed onsite with the designers geotechnical representative.

Acceptance tests will be required on production nails as per TfNSW R64. These will be located as per TfNSW R64, informed by QA/QC information from construction.

Spot rock bolts will not be subjected to suitability or acceptance testing requirements.

Shotcrete and grout cube testing (for soil nails, spot rock bolts and dowels) should be undertaken in accordance with relevant TfNSW QA specifications (R68 and R64), at a rate of one sample (three cubes) per batch per day. Every batch must be tested. Grout testing shall be as T375 and use steel moulds for casting the sample cubes (three per batch).

Monitoring of weather and site conditions in a similar philosophy to the current road closure protocols is recommended. Monitoring of ground movements should be recorded daily. The constructor's site engineer should undertake daily site walkovers to assess for movement. The walkover observations should be recorded in a diary and photographs collected. Daily rainfall and slope seepage (if observable) should also be recorded.

Recommended controls to reduce the risk to plant and personnel working along Settlers Road include:

– A rainfall trigger level for closure of the road and halting of construction works of 30 mm / 24 hrs of rainfall or 100 mm in a seven-day period based on data collected at Thomas James bridge. These trigger levels are considered reasonable with no other information available to complete more detailed analysis, but should be reviewed during the works. Road opening and recommencement of construction work should not occur until 48 hours after cessation of the heavy rainfall event and onsite review by a Geotechnical Representative.
– Construction plant and personnel working at the toe of the slope should be limited to only those required.
– A 'spotter' should be used to keep an eye on the slope and watch for any signs of movement in the debris slope and above during construction works.
– An emergency cease work procedure should be developed and discussed / understood by all on site.

Instrumentation could be considered to monitor the movement of colluvium and rock blocks above the rock bench to facilitate an ongoing live risk assessment. However, due to the number of potential hazards and the typically rapid nature of rockfall events (with velocities typically about 5 m / sec), it is not likely to be particularly useful for improving personnel safety.

4.2 Construction sequence

Following clearing and grubbing of the slope between the road the backscarp of the landslide, at least two trail pits should be undertaken in advance of bulk excavation to confirm the depth of colluvium and the required height of the soil nail wall. These trial pits should be located in the vicinity of the landslide crest at agreed spacing along the wall alignment.

The soil nail wall should be constructed adopting a top-down methodology, with excavation increments similar to the vertical spacing of the soil nails. Excavation should not progress more than 0.5 m below each proposed row of soil nails until such time as the row is fully complete and the shotcrete facing has attained sufficient strength to be self-supporting to permit further excavation to proceed. This period should not be less than 72 hrs. Depending on the overall height of the soil nail wall and access practicalities, the excavations, soil nail installations and shotcrete facing should be installed incrementally in horizontal sections not more than about 30 m wide.

Once the soil nails and shotcrete are installed and have cured for at least seven days the remainder of the bulk excavation to remove the colluvial to the rock can take place, again using a top-down approach. Depending on rock face conditions exposed during excavation, consideration may need to be given to progressive installation of required rock bolts to enable the safe progress of works. Consideration may also need to be given to progressive installation of non-structural shotcrete, although this is expected to be less critical to site safety and more a function of practical access to the area to install dowels, mesh and shotcrete.

4.3 Maintenance

Ongoing maintenance of the works is anticipated to be limited to general clearing and vegetation removal on the lower (excavated) rock face under normal conditions to reduce root jacking impact on the natural (excavated) rock slope.

Additionally, the design allows for collection of isolated detached blocks which may translated down from the slope(s) above the proposed works and landed in a rock fall catch zone between the roadway and the excavated / soil nailed face. These blocks should be cleared away as soon as possible so as not to present a hazard to road users.

Routine inspections of the slope should be undertaken by CCC annually or following significant storm events which result in landslide or rockfall activations in the area. If any concerns are raised by the inspection, these should be discussed with a TfNSW accredited slope risk assessor.

A more comprehensive risk assessment of slope, including the soil nail wall, the excavated rock face (including treatment) and the natural slope above should be undertaken by a TfNSW accredited slope risk assessor at least every five years.

5. Safety in Design (SiD)

As part of the safety in design process, hazards that are foreseeable during the construction, operation and maintenance of the works (excavation, rock face treatment and soil nail wall) have been identified. A process of risk assessment and identification has been carried out to enable the design process to eliminate or minimise these risks throughout the construction period and operational life.

The safety in design assessment / risk register is provided in Appendix F and has been generated using the SiD risk register for the adjacent site (CH 250 to 450 m - refer detailed design report, GHD 2023) as a template, and applying work area specific inclusions associated with the soil nail wall and deletions associated with removal of the debris catch fence.

Representatives from CCC, HCC and Delaney Civil will be invited to review and discuss the current register in an upcoming SID workshop.

6. Provisional schedule of quantities

An estimated provisional schedule of quantities is included in Appendix G.

The quantities have been estimated based on the survey, our model used in design and design assumption discussed in this report. The model does not include all design elements. Some calculations have necessarily been made by hand based on two dimensional design elements.

The indicative totals are provided for tendering purposes only.

7. References

AS 1012 Methods of Testing Concrete.

AS 1214 Hot-Dipped Galvanised Coatings on Threaded Fasteners.

AS 1275 Metric Screw Threads for Fasteners.

AS 1252 High-strength Steel Bolts with Associated Nuts and Washers for Structural Engineering.

AS 1302 Steel Reinforcing Bars for Concrete.

AS 1313 Steel Tendons for Prestressed Concrete - Cold- Worked High Tensile Alloy Steel Bars for Pre-Stressed Concrete.

AS 1315 Portland Cement.

AS 1650 Hot-dipped Galvanized Coatings on Ferrous Articles.

AS 1726-2017, Australian Standards – Geotechnical site investigation.

AS 4678-2002, Australian Standards – Earth-retaining structures.

AS 3600-2018, Australian Standards – Concrete structures.

AS 5100.3-2017, Australian Standards – Foundation and soil-supporting structures.

AS 5100.5-2017, Australian Standards – Bridge design concrete.

AS 3678 Structural Steel.

AS/NZS 4680 Hot-Dipped Galvanised (zinc) Coatings on Ferrous Articles.

AGS 2000, Landslide Risk Management Concepts and Guidelines, Australian Geomechanics, March 2000.

BS8110-1997, 'Structural use of concrete'.

Central Coast Council (CCC) Civil Works Specification, 2020.

Colquhoun G.P., Hughes K.S., Deyssing L., Ballard J.C., Folkes C.B, Phillips G., Troedson A.L. & Fitzherbert J.A. 2021. New South Wales Seamless Geology dataset, version 2.1 [Digital Dataset] Geological Survey of New South Wales, Department of Regional NSW, Maitland.

GHD (2022-1) – '12586638-REP-0-Wisemans Ferry Road and Settlers Road Landslides Site Prioritisation Report', dated 24/10/22.

GHD (2022-2) – '12586638-REP-0-Settlers Road Ch 250-450 Options Assessment' , dated 19/12/22.

GHD (2023) – '12599205-REP-0-Settlers Road Landslide Remediation Design', 8/08/2022.

Marc Hendrickx and Associates Pty Ltd (2022) - Settlers Road Slope Risk Analysis, Ref 20220404, dated 12/04/2022.

Managing Urban Stormwater: Soil and Construction Volume 1 – 4th Edition, March 2004 (The Bluebook).

Transport for NSW. (2020). Guide to Slope Risk Analysis (Version 4.0).

Transport for NSW. (2020). QA Specification R64: Soil Nailing (1st ed., 7th rev).

Transport for NSW. (2020). QA Specification R68 – Shotcrete Work Without Steel Fibres (Ed 1 / Rev 4).

Transport for NSW. (2018). Technical Direction – Geotechnology- Geotechnical Design for Remediation of Existing Slopes and Embankments (Version 1) 22 February 2018.

Troedson A.L. & Deyssing L. 2016. Newcastle-Hunter Area 1:100 000 and 1:25 000, Coastal Quaternary Geology Map Series. Geological Survey of New South Wales, Maitland.

Appendices

Appendix A

General Notes and Standard Sheets

GENERAL NOTES

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The report contains the results of a geotechnical investigation or study conducted for a specific purpose and client. The results may not be used or relied on by other parties, or used for other purposes, as they may contain neither adequate nor appropriate information. In particular, the investigation does not cover contamination issues unless specifically required to do so by the client.

To the maximum extent permitted by law, all implied warranties and conditions in relation to the services provided by GHD and the report are excluded unless they are expressly stated to apply in the report.

TEST HOLE LOGGING

The information on the test hole logs (boreholes, test pits, exposures etc.) is based on a visual and tactile assessment, except at the discrete locations where test information is available (field and/or laboratory results). The test hole logs include both factual data and inferred information. Moreover, the location of test holes should be considered approximate, unless noted otherwise (refer report). Reference should also be made to the relevant standard sheets for the explanation of logging procedures (Soil and Rock Descriptions, Core Log Sheet Notes etc.).

GROUNDWATER

Unless otherwise indicated, the water depths presented on the test hole logs are the depths of free water or seepage in the test hole recorded at the given time of measuring. The actual groundwater depth may differ from this recorded depth depending on material permeabilities (i.e. depending on response time of the measuring instrument). Further, variations of this depth could occur with time due to such effects as seasonal, environmental and tidal fluctuations or construction activities such as a change is ground surface level. Confirmation of groundwater levels, phreatic surfaces or piezometric pressures can only be made by appropriate surveys, instrumentation techniques and monitoring programmes.

INTERPRETATION OF RESULTS

The discussion or recommendations contained within this report normally are based on a site evaluation from discrete test hole data, often with only approximate locations (e.g. GPS). Generalised, idealised or inferred subsurface conditions (including any geotechnical cross-sections) have been assumed or prepared by interpolation and/or extrapolation of these data. As such these conditions are an interpretation and must be considered as a guide only.

Ref: 5.5.1 Issue 1 Date: 15/03/2022

CHANGE IN CONDITIONS

Local variations or anomalies in ground conditions do occur in the natural environment, particularly between discrete test hole locations or available observation sites. Additionally, certain design or construction procedures may have been assumed in assessing the soil-structure interaction behaviour of the site. Furthermore, conditions may change at the site from those encountered at the time of the geotechnical investigation through construction activities and constantly changing natural processes.

Any change in design, in construction methods, or in ground conditions as noted during construction, from those assumed or reported should be referred to GHD for appropriate assessment and comment.

GEOTECHNICAL VERIFICATION

Verification of the geotechnical assumptions and/or model is an integral part of the design process - investigation, construction verification, and performance monitoring. Variability is a feature of the natural environment and, in many instances, verification of soil or rock quality, or foundation levels, is required. There may be a requirement to extend foundation depths, to modify a foundation system and/or to conduct monitoring as a result of this natural variability. Allowance for verification by appropriate geotechnical personnel must be recognised and programmed for construction.

FOUNDATIONS

Where referred to in the report, the soil or rock quality, or the recommended depth of any foundation (piles, caissons, footings etc.) is an engineering estimate. The estimate is influenced, and perhaps limited, by the fieldwork method and testing carried out in connection with the site investigation, and other pertinent information as has been made available. The material quality and/or foundation depth remains, however, an estimate and therefore liable to variation. Foundation drawings, designs and specifications should provide for variations in the final depth, depending upon the ground conditions at each point of support, and allow for geotechnical verification.

REPRODUCTION OF REPORTS

Where it is desired to reproduce the information contained in our geotechnical report, or other technical information, for the inclusion in contract documents or engineering specification of the subject development, such reproductions must include at least all of the relevant test hole and test data, together with the appropriate Standard Description sheets and remarks made in the written report of a factual or descriptive nature.

SOIL DESCRIPTION AND CLASSIFICATION

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Soil is described in general accordance with Australian Standard AS 1726-2017 (Geotechnical Site Investigations) in terms of visual and tactile properties, with potential refinement by laboratory testing. AS 1726 defines soil as particulate materials that occur in the ground and can be disaggregated or remoulded by hand in air or water without prior soaking. Classification of the soil is undertaken following description.

SOIL DESCRIPTION

The soil description includes a) Composition, b) Condition, c) Structure, d) Origin and e) Additional observations. 'FILL', 'TOPSOIL' or a 'MIXTURE OF SOIL AND COBBLES / BOULDERS' (with dominant fraction first) is denoted at the start of a soil description where applicable.

a. Soil Composition (soil name, colour, plasticity or particle characteristics, secondary and then minor components)

Soil Name: A soil is termed a coarse grained soil where the dry mass of sand and gravel particles exceeds 65% of the total. Soils with more than 35% fines (silt or clay particles) are termed fine grained soils. The soil name is made up of the primary soil component (in BLOCK letters), prefixed by applicable secondary component qualifiers. Minor components are applied as a qualifiers to the soil name (using the words 'with' or 'trace').

Particles are differentiated on the basis of size. 'Boulders' and 'cobbles' are outside the soil particle range, though their presence (and proportions) is noted. While individual particles may be designated as silt or clay based on grain size, fine grained soils are characterised as silt or clay based on tactile behaviour or Atterberg Limits, and not the relative composition of silt or clay sized particles.

Colour: The prominent colour is noted, followed by (spotted, mottled, streaked etc.) then secondary colours as applicable. Roughly equally proportioned colours are prefixed by (spotted, mottled, streaked etc.). Colour is described in its moist condition, though both wet and dry colours may also be provided if appropriate.

Plasticity: Fine grained soils are designated within standard ranges of plasticity based on tactile assessment or laboratory assessment of the Liquid Limit.

Particle Characteristics: The particle shape, particle distribution and particle size range within a coarse grained soil is described using standard terms. Particle composition may be described using rock or mineral names, with specific terms for carbonate soils.

Secondary and Minor Components: The primary soil is described and modified by secondary and minor components, with assessed ranges as tabulated.

Carbonate Soils: Carbonate content can be assessed by use of dilute '10%' HCl solution. Resulting clear sustained effervescence is interpreted as a Carbonate soil (approximately >50% carbonate), while weak or sporadic effervescence indicates Calcareous soil (< 50% carbonate). No effervescence is interpreted as a non-calcareous soil.

Organic and Peat Soils: Where identified, organic content is noted. Organic soil (2% to 25% organic matter) is usually identified by colour (usually dark grey/black) and odour (i.e. 'mouldy' or hydrogen sulphide odour). Peat (>25% organic matter) is identified by a spongy feel and fibrous texture. Peat soils' decomposition may be described as 'fibrous' (little / no decomposition), 'pseudo- fibrous' (moderate decomposition) or 'amorphous' (full decomposition).

Fraction	Components		Particle Size (mm)
Oversize	BOULDERS		> 200
	COBBLES		63 - 200
Coarse grained soil particles	GRAVEL	Coarse	19 – 63
		Medium	6.7 – 19
		Fine	2.36 – 6.7
	SAND	Coarse	0.6 – 2.36
		Medium	0.21 – 0.6
		Fine	0.075 – 0.21
Fine grained soil particles	SILT		0.002 – 0.075
	CLAY		< 0.002

Plasticity Terms (Fine Grained Soils)		Laboratory Liquid Limit Range
Silt	**Clay**	
N/A	N/A	(Non Plastic)
Low Plasticity	*Low Plasticity*	≤ 35%
	Medium Plasticity	> 35% and ≤ 50%
High Plasticity	*High Plasticity*	> 50%

Particle Distribution Terms (Coarse Grained Soils)	
Well graded	Good representation of all particle sizes
Poorly graded	One or more intermediate sizes poorly represented
Gap graded	One or more intermediate sizes absent
Uniform	Essentially of one size

Particle Shape Terms (Coarse Grained Soils)		
Rounded	*Sub-angular*	*Flaky or Platy*
Sub-rounded	*Angular*	*Elongated*

Secondary and Minor Components for Coarse Grained Soils			
Fines (%)	**Modifier (as applicable)**	**Accessory coarse (%)**	**Modifier (as applicable**
≤ 5	*'trace silt/clay'*	≤ 15	*'trace sand/gravel'*
> 5, ≤ 12	*'with clay/silt'*	> 15, ≤ 30	*'with sand/gravel'*
> 12	*prefix 'silty/clayey'*	> 30	prefix '*gravelly/ sandy*'

Secondary and Minor Components for Fine Grained Soils	
% Coarse	**Modifier (as applicable)**
≤ 15	Add "*trace sand/gravel*"
> 15, ≤ 30	Add "*with sand/gravel*"
> 30	Prefix soil "*sandy/gravelly*"

SOIL DESCRIPTION AND CLASSIFICATION

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b. Soil Condition (moisture, relative density or consistency)

Moisture: Fine grained soils are described relative to plastic or liquid limits, while coarse grained soils are assessed based on appearance and feel. The observation of seepage or free water is noted on the test hole logs.

Moisture - Coarse Grained Soils		
Term		**Tactile Properties**
Dry	*('D')*	Non-cohesive, free running
Moist	*('M')*	Feels cool, darkened colour, tends to stick together
Wet	*('W')*	Feels cool, darkened colour, tends to stick together, free water forms when handling

Moisture - Fine Grained Soils		
Term		**Tactile Properties**
Moist, dry of plastic limit	*('w < PL')*	Hard and friable or powdery
Moist, near plastic limit	*('w ≈ PL')*	Can be moulded
Moist, wet of plastic limit	*('w > PL')*	Weakened, free water forms on hands with handling
Wet, near liquid limit	*('w ≈ LL')*	Highly weakened, tends to flow when tapped
Wet, wet of liquid limit	*('w > LL')*	Liquid consistency, soil flows

Relative Density (Non Cohesive Soils): The Density Index is inherently difficult to assess by visual or tactile means, and is normally assessed by penetration testing (e.g. SPT, DCP, PSP or CPT) with published correlations. Assessment may be affected by moisture and *in situ* stress conditions. Density Index assessment may be refined by combination of *in situ* density testing and laboratory reference maximum and minimum density ranges.

Consistency (Cohesive Soils): May be assessed by direct measurement (shear vane, CPT etc.), or approximate tactile correlations. Cohesive soils include fine grained soils, and coarse grained soils with sufficient fine grained components to induce cohesive behaviour. A 'design shear strength' must consider the mode of testing, the *in situ* moisture content and potential for variations of moisture which may affect the shear strength.

Relative Density (Non-Cohesive Soils)		
Term and (Symbol)		**Density Index (%)**
Very Loose	*(VL)*	≤ 15
Loose	*(L)*	> 15 and ≤ 35
Medium Dense	*(MD)*	> 35 and ≤ 65
Dense	*(D)*	> 65 and ≤ 85
Very Dense	*(VD)*	> 85
Consistency assessment can be influenced by moisture variation		

Consistency (Cohesive Soils)			
Term and (Symbol)		**Tactile Properties**	**Undrained Shear Strength**
Very Soft	*(VS)*	Extrudes between fingers when squeezed	< 12 kPa
Soft	*(S)*	Can be moulded by light finger pressure	12 - 25 kPa
Firm	*(F)*	Can be moulded by strong finger pressure	25 - 50 kPa
Stiff	*(St)*	Cannot be moulded by fingers	50 - 100 kPa
Very Stiff	*(VSt)*	Can be indented by thumb nail	100 - 200 kPa
Hard	*(H)*	Can be indented with difficulty by thumb nail	> 200 kPa
Friable	*(Fr)*	Easily crumbled or broken into small pieces by hand	

c. Structure (zoning, defects, cementing)

Zoning: The *in situ* zoning is described using the terms below. '*Intermixed*' may be used for an irregular arrangement.

'layer' (a continuous zone across the exposed sample)
'lens' (a discontinuous layer with lenticular shape)
'pocket' (an irregular inclusion of different material).
'interbedded' or *"interlaminated'* (alternating soil types)

Defects: Described using terms below, with dimension orientation and spacing described where practical.

'*parting*' (an open or closed surface or crack sub parallel to layering with little / no tensile strength - open or closed)

'*fissure*' (as per a parting, though not parallel or sub parallel to layering – may include desiccation cracks)

'*sheared seam*' (zone of sub parallel near planar closely spaced intersecting smooth or slickensided fissures dividing the mass into lenticular or wedge shaped blocks)

'*sheared surface*' (a near planar, curved or undulating smooth, polished or slickensided surface, indicative of displacement)

'*softened zone*' (in clayey soils, usually adjacent to a defect with associated higher moisture content)

'*tube*' (tubular cavity, singly or one of a large number, often formed from root holes, animal burrows or tunnel erosion)

'*tube cast*' (an infilled tube – infill may vary from uncemented through to cemented or have rock properties)

'*infilled seam*' (sheet like soil body cutting through the soil mass, formed by infilling of open defects)

Cementation: Soils may be cemented by various substances (e.g. iron oxides and hydroxides, silica, calcium carbonate, gypsum), and the cementing agent shall be identified if practical. Cemented soils are described as:

'weakly cemented' easily disaggregated by hand in air or water
'moderately cemented' effort required to disaggregate the soil by hand in air or water

Materials extending beyond '*moderately cemented'* are encompassed within the rock strength range. Where consistent cementation throughout a soil mass is identified as a duricrust, it is described in accordance with duricrust rock descriptors. Where alternate descriptors of cementation development are applied for consistency with regional practices or geology, or client requirements, these are outlined separately.

Ref: DS6.5.1.1 Rev 1 Date: 15/03/2022

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d. Origin

An interpretation is provided based on observations of landform, geology and fabric, and may further include assignment of a stratigraphic unit. The use of terms 'possibly' or 'probably' indicates a higher degree of uncertainty regarding the assessed origin or stratigraphic unit. Typical origin descriptors include:

Residual	Formed directly from in situ weathering with no visible structure or fabric of the parent soil or rock.
Extremely weathered	Formed directly from in situ weathering, with remnant and/or fabric from the parent rock.
Alluvial	Deposited by streams and rivers (may be applied more generically as transported by water).
Estuarine	Deposited in coastal estuaries, including sediments from inflowing rivers, streams, and tidal currents.
Marine	Deposited in a marine environment.
Lacustrine	Deposited in freshwater lakes.
Aeolian	Transported by wind.
Colluvial and slopewash	Soil and rock debris transported down slopes by gravity (with or without assistance of water). Colluvium is typically applied to thicker / localised deposits, and slopewash for thinner / widespread deposits.
TOPSOIL	Surficial soil, typically with high levels of organic material. Topsoils buried by other transported soils are termed 'remnant topsoil'. Tree roots within otherwise unaltered soil does not characterise topsoil.
FILL	Any material which has been placed by anthropogenic processes (i.e. human activity).

e. Additional Observations

Additional observations may be included to supplement the soil description. Additional observations may consist of notations relating to soil characteristics (odour, contamination, colour changes with time), inferred geology (with delineation of soil horizons or geological time scale) or notes on sampling and testing application (including the reliability, recovery, representativeness, or condition of samples or test conditions and limitations). If the material is assessed to be not representative, terms such as 'poor recovery', 'non-intact', 'recovered as' or 'probably' are applied.

SOIL CLASSIFICATION

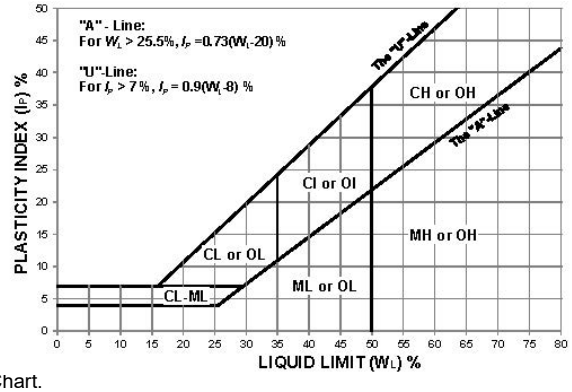
Classification allocates the material within distinct soil groups assigned a two character Group Symbol:

Coarse Grained Soils (sand and gravel: more than 65% of soil coarser than 0.075 mm)			**Fine Grained Soils** (silt and clay: more than 35% of soil finer than 0.075 mm)		
Major Division	**Group Symbol**	**Soil Group**	**Major Division**	**Group Symbol**	**Soil Group**
GRAVEL (more than half of the coarse fraction is > 2.36 mm)	GW	GRAVEL, well graded	SILT and CLAY (low to medium plasticity)	ML	SILT, low plasticity
	GP	GRAVEL, poorly graded		CL	CLAY, low plasticity
	GM	Silty GRAVEL		CI	CLAY, medium plasticity
	GC	Clayey GRAVEL		OL	Organic SILT
SAND (more than half of the coarse fraction is < 2.36 mm)	SW	SAND, well graded	SILT and CLAY (high plasticity)	MH	SILT, high plasticity
	SP	SAND, poorly graded		CH	CLAY, high plasticity
	SM	Silty SAND		OH	Organic CLAY / SILT
	SC	Clayey SAND	Highly Organic	Pt	PEAT

Coarse grained soils with fines contents between 5% and 12% are provided a dual classification comprising the two group symbols separated by a dash, e.g. for a poorly graded gravel with between 5% and 12% silt fines (poorly graded 'GRAVEL with silt'), the classification is GP-GM.

For the purpose of classification, poorly graded, uniform, or gap graded soils are all designated as poorly graded. Soils that are dominated by boulders or cobbles are described separately and are not classified.

Classification is routinely undertaken based on tactile assessment with the soil description. Refinement of soil classification may be applied using laboratory assessment, including particle size distribution and Atterberg Limits. Atterberg Limits testing is applied to the sample portion finer than 0.425 mm. Fine grained soil components are assessed on the basis of regions defined within the Modified Casagrande Chart.



ROCK DESCRIPTION AND CLASSIFICATION

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Rock is described in general accordance with Australian Standard AS 1726-2017 (Geotechnical site investigations) in terms of visual and tactile properties, with potential refinement by laboratory testing. AS 1726 defines rock as any aggregate of minerals and/or organic materials that cannot be disaggregated by hand in air or water without prior soaking. The rock description and classification distinguishes between rock material, defects, structure and rock mass.

ROCK DESCRIPTION AND CLASSIFICATION

a. Description of rock material (rock name, grain size and type, colour, texture and fabric, inclusions or minor components, moisture content and durability)

Rock Name: Simple rock names are used to provide a reasonable engineering description rather than a precise geological classification. The rock name is chosen on the basis of origin, with common types summarised below. Additional, non-exhaustive, terminology is included in AS 1726. Rock names not described within AS 1726 may be adopted, with geological characteristics typically noted within accompanying text.

<table>
<tr><th rowspan="2">Grain Size (mm)</th><th colspan="4">Sedimentary</th><th colspan="2">Metamorphic</th><th colspan="3">Igneous</th></tr>
<tr><th colspan="2">Clastic or Detrital</th><th colspan="2">Carbonate</th><th>Pyroclastic</th><th>Foliated</th><th>Non-Foliated</th><th>Felsic</th><th>↔</th><th>Mafic</th></tr>
<tr><td></td><td colspan="2"></td><td>Low Porosity</td><td>Porous</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>>2.0</td><td colspan="2">CONGLOMERATE (rounded grains in a finer matrix)
BRECCIA (angular or irregular fragments in a finer matrix)</td><td rowspan="4">LIMESTONE (predominantly $CaCO_3$)
Or
DOLOMITE (predominantly $CaMgCO_3$)</td><td>CALCIRUDITE</td><td>AGGLOMERATE (rounded grains in a finer matrix)
VOLCANIC BRECCIA (angular fragments in a finer matrix)</td><td>GNEISS</td><td rowspan="4">MARBLE (carbonate)
QUARTZITE
SERPENTINITE
HORNFELS</td><td>GRANITE</td><td>DIORITE</td><td>GABBRO</td></tr>
<tr><td>2.0 – 0.06</td><td colspan="2">SANDSTONE</td><td>CALCARENITE</td><td>TUFF</td><td>SCHIST</td><td>MICRO-GRANITE</td><td>MICRO-GRANITE</td><td>DOLERITE</td></tr>
<tr><td>0.06 – 0.002</td><td rowspan="2">MUDSTONE (silt and clay)</td><td>SILTSTONE (mostly silt)</td><td>CALCISILTITE</td><td rowspan="2">Fine grained TUFF</td><td rowspan="2">PHYLLITE or SLATE</td><td rowspan="2">RHYOLITE</td><td rowspan="2">ANDESITE</td><td rowspan="2">BASALT</td></tr>
<tr><td><0.002</td><td>CLAYSTONE (mostly clay)</td><td>CALCILUTITE</td></tr>
</table>

Reproduced with modification from Tables 15, 16 and 17, Clause 6.2.3.1, AS 1726-2017, Geotechnical site investigations.

Grain size: For rocks with predominantly sand sized grains the dominant or average grain size is described as follows:

Rock type	Coarse grained	Medium grained	Fine grained
Sedimentary rocks	Mainly 0.6 mm to 2 mm	Mainly 0.2 mm to 0.6 mm	Mainly 0.06 mm (just visible) to 0.2 mm
Igneous and metamorphic rocks	Mainly >2 mm	Mainly 0.06 mm to 2 mm	Mainly <0.6 mm (just visible)

Colour assists in rock identification and interpolation. Rock colour is generally described in a "moist" condition, using simple terms (e.g. grey, brown, etc.) and modified as necessary by "pale", "dark", or "mottled". Borderline colours may be described as a combination of these colours (e.g. red-brown).

Texture refers to the arrangement of, or the relationship between, the component grains or crystals (e.g. porphyritic, crystalline or amorphous).

Fabric refers to visible grain arrangement along a preferential orientation or a layering. Fabric may be noted as "indistinct" (little effect on strength) or "distinct" (rock breaks more easily parallel to the fabric). Common terms include "massive" or "flow banding" (igneous), "foliation" or "cleavage" (metamorphic). Sedimentary layering is described as "bedding" or (where thickness < 20 mm) "lamination". The typical orientation, spacing or thickness of these structural features can be described directly in millimetres and metres. Further quantification of bedding thickness applied by GHD is as follows:

Bedding Term	Thickness
Very thickly bedded	>2 m
Thickly bedded	0.6 to 2 m
Medium bedded	0.2 to 0.6 m
Thinly bedded	60 to 200 mm
Very thinly bedded	20 to 60 mm
Laminated	6 to 20 mm
Thinly laminated	<6 mm

Features, Inclusions and Minor Components are typically only described when those features could influence the engineering behaviour of the rock. Described features may include: gas bubbles in igneous rocks; veins of quartz, calcite or other minerals; pyrite crystals and nodules or bands of ironstone or carbonate; cross bedding in sandstone; clast or matrix support in conglomerates and breccia.

Moisture content may be described by the feel and appearance of the rock, as follows: "dry" (looks and feels dry), "moist" (feels cool, darkened in colour, but no water is visible on the surface), or "wet" (feels cool, darkened in colour, water film or droplets visible on the surface). The moisture content of rock cored with water may not represent in situ conditions.

Durability of rock samples is noted where there is an observed tendency of samples to crack, breakdown in water or otherwise deteriorate with exposure.

ROCK DESCRIPTION AND CLASSIFICATION

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b. Classification of the rock material condition (strength, weathering and/or alteration)

Estimated Strength refers to the rock material and not the rock mass. The strength is defined in terms of uniaxial compressive strength (UCS), though is typically estimated by either tactile assessment or Point Load Strength Index (Is(50)) (measured perpendicular to planar anisotropy). A correlation between Is(50) and UCS is adopted for classification, though is not intended for design purposes without appropriate supporting assessment. A field guide follows:

Term and (Symbol)		UCS (MPa)	$Is_{(50)}$ (MPa)	Field Guide
Very Low	*(VL)*	0.6 – 2	0.03 - 0.1	Material crumbles under firm blows with sharp end of geological pick; can be peeled with knife; too hard to cut a triaxial sample by hand. Pieces up to 30 mm thick can be broken by finger pressure.
Low	*(L)*	2 - 6	0.1 - 0.3	Easily scored with knife; indentations 1 to 3 mm show in the specimen with firm blows of a geological pick point; has dull sound under hammer. A piece of core 150 mm long by 50 mm diameter may be broken by hand. Sharp edges of core may be friable and break during handling.
Medium	*(M)*	6 - 20	0.3 - 1.0	Readily scored with a knife; a piece of core 150 mm long by 50 mm diameter can be broken by hand with difficulty.
High	*(H)*	20 - 60	1 - 3	A piece of core 150 mm long by 50 mm diameter cannot be broken by hand but can be broken by a geological pick with a single firm blow; rock rings under hammer.
Very High	*(VH)*	60 - 200	3 -10	Hand specimen breaks with geological pick after more than one blow; rock rings under hammer.
Extremely High	*(EH)*	>200	>10	Specimen requires many blows with geological pick to break through intact material; rock rings under hammer.

Based on Table 19, Clause 6.2.4.1, AS 1726-2017, Geotechnical site investigations. Refer to source document for further detail.

Material with strength less than "*very low*" is described using soil characteristics, with the presence of an original rock texture or fabric noted if relevant.

Weathering and Alteration: The process of weathering involves physical and chemical changes to the rock resulting from exposure near the earth's surface. A subjective scale for weathering is applied as follows:

Term and (Symbol)		Description
Residual Soil	*(RS)*	Material has weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are no longer visible, but the soil has not been significantly transported.
Extremely Weathered	*(XW)*	Material has weathered to such an extent that it has soil properties. Mass structure, material texture and fabric of original rock are still visible.
Highly Weathered	*(HW)*	The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognisable. Rock strength is significantly changed by weathering. Some primary minerals have weathered to clay minerals. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores.
Moderately Weathered	*(MW)*	The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognisable, but shows little or no change of strength from fresh rock.
Slightly Weathered	*(SW)*	Rock is partially discoloured with staining or bleaching along joints but shows little or no change of strength from fresh rock.
Fresh	*(Fr)*	Rock shows no sign of decomposition of individual minerals or colour changes.

Modified based on Table 20, Clause 6.2.4.2, AS 1726-2017, Geotechnical site investigations. Refer to source document for further detail.

Where physical and chemical changes to the rock are caused by hot gases or liquids at depth, the process is called alteration. Unlike weathering, the distribution of altered material may occur at any depth and show no relationship to topography. Where alteration minerals are identified the terms "extremely altered" (XA), "highly altered" (HA), "moderately altered" (MA) and "slightly altered" (SA) can be used to describe the physical and chemical changes described above.

ROCK DESCRIPTION AND CLASSIFICATION

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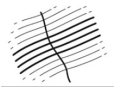
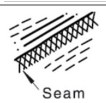
c. Description of defects (defect type, orientation, roughness and shape, coatings and composition of seams, spacing, length, openness and thickness, block shape)

Defects often control the overall engineering behaviour of a rock mass. AS 1726 defines a defect as “a discontinuity, fracture, break or void in the material or materials across which there is little or no tensile strength”. Describing the type, character and distribution of natural defects is an essential part of the description of many rock masses.

Commonly described characteristics of defects within a rock mass include type, orientation, roughness and shape, coatings and composition of seams, aperture, persistence, spacing and block shape.

The degree of detail required for defect descriptions depends on project requirements. All defects judged of engineering significance for the site and project are described individually. Where appropriate, generalised descriptions for less significant, or multiple similar, defects can be provided for delineated parts of rock core or exposures. A general description of delineated defect sets is provided when sufficient orientation data is available.

Defect Type is described using the terms summarised below. On core logs, only natural defects across which the core is discontinuous are described (i.e. inferred artificial fractures such as drill breaks are excluded). Incipient defects are described using the relevant texture or fabric terms. Healed defects (those that have been re-cemented by minerals such as chlorite or calcite) are described using the prefix “healed” (e.g. healed joint).

Type and (Symbol)		Description	Diagram
Parting	(Pt)	A surface or crack across which the rock has little or no tensile strength. Parallel or sub-parallel to layering (e.g. bedding) or a planar anisotropy in the rock material (e.g. cleavage). May be open or closed.	
Joint	(Jt)	A surface or crack with no apparent shear displacement and across which the rock has little or no tensile strength, but which is not parallel or subparallel to layering or to planar anisotropy in the rock material. May be open or closed.	
Sheared Surface	(SS)	A near planar, curved or undulating surface which is usually smooth, polished or slickensided and which shows evidence of shear displacement.	
Sheared Zone	(SZ)	Zone of rock material with roughly parallel near planar, curved or undulating boundaries cut by closely spaced joints, sheared surfaces or other defects. Some of the defects are usually curved and intersect to divide the mass into lenticular or wedge-shaped blocks.	
Sheared Seam	(SSm)	Seam of soil material with roughly parallel almost planar boundaries, composed of soil materials with roughly parallel near planar, curved or undulating boundaries cut by closely spaced joints, sheared surfaces or other defects. Some of the defects are usually curved and intersect to divide the mass into lenticular or wedge-shaped blocks.	
Crushed Seam	(CSm)	Seam of soil material with roughly parallel almost planar boundaries, composed of disoriented, usually angular fragments of the host rock material which may be more weathered than the host rock. The seam has soil properties.	
Infilled Seam	(ISM)	Seam of soil material usually with distinct roughly parallel boundaries formed by the migration of soil into an open cavity or joint, infilled seams less than 1 mm thick may be described as a veneer or coating on a joint surface.	
Extremely Weathered Seam	(WSM)	Seam of soil material, often with gradational boundaries. Formed by weathering of the rock material in place.	

Modified based on Table 22, Clause 6.2.5.2, AS 1726-2017, Geotechnical site investigations. Refer to source document for further detail.

Defect Orientation is recorded as the “dip” (maximum angle of the mean plane, measured from horizontal) and the “dip direction” (azimuth of the dip, measured clockwise from true north). Dip and dip direction is expressed in degrees, with two-digit and three-digit numbers respectively, separated by a slash (e.g. 45/090). For vertical boreholes, the defect dip is measured as the acute angle from horizontal. Rock core extracted from vertical boreholes is generally not oriented, so the dip direction cannot be directly measured. For non-oriented inclined boreholes, a defect “alpha” (α) angle is measured as the acute angle from the core axis. For vertical and non-oriented inclined boreholes, the dip direction can sometimes be estimated from the relationship of the defect to a well-defined site structure such as fabric. For oriented inclined boreholes, the measurement of the defect orientation is carried out and recorded in a form suited to the particular device being used and later processed to report true dip and dip direction.

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Ref: DS6.5.2.1 Issue 3 Date: 15/03/2022

Roughness and Shape of the defect surface combine to have significant influence on shear strength. Standard descriptions and abbreviations include:

Roughness and (Symbol)		Description
Very Rough	(VR)	Many large surface irregularities (amplitude generally more than 1 mm). Feels like, or coarser than very coarse sand paper.
Rough	(Rf)	Many small surface irregularities (amplitude generally less than 1 mm). Feels like fine to coarse sand paper.
Smooth	(So)	Smooth to touch. Few or no surface irregularities.
Polished	(Pol)	Shiny smooth surface.
Slickensided	(Slk)	Grooved or striated surface, usually polished.

Shape and (Symbol)		Description
Planar	(Pln)	The defect does not vary in orientation.
Curved	(Cu)	The defect has a gradual change in orientation.
Undulating	(Un)	The defect has a wavy surface.
Stepped	(St)	The defect has one or more well defined steps.
Irregular	(Ir)	The defect has many sharp changes of orientation.

Although the surface roughness of defects can be described at small (10-100 mm) scales of observation, the overall shape of the defect surface can usually be observed only at medium (0.1-1 m) and large (>1 m) scale.

Where it is necessary to assess the shear strength of a defect, observations are generally made at multiple scales. Surface roughness may also be characterised by using the joint roughness coefficient (JRC) profiles established by Barton and Choubey (1977). Where large-scale observations are possible, further measurement of defect "waviness" (angle of the asperities relative to the overall dip angle of the plane) is made.

Coatings and Composition of Seams: Many defects have surface coatings, which can affect their shear strength. Standard descriptions include:

Coating and (Symbol)		Description
Clean	(Cn)	No visible coating.
Stained	(Sn)	No visible coating but surfaces are discoloured.
Veneer	(Ve)	A visible coating of soil or mineral substance, but too thin to be measured may be patchy.
Coating	(Co)	A visible coating up to 1 mm thick. Soil material greater than 1 mm thick is described using defect terms (e.g. infilled seam). Rock material greater than 1 mm thick is described as a vein (Vn).

Common Minerals and (Symbol)	
Clay	(CLAY)
Calcite	(Ca)
Carbonaceous	(X)
Chlorite	(Kt)
Iron Oxide	(Fe)
Micaceous	(Mi)
Manganese	(Mn)
Pyrite	(Py)
Quartz	(Qz)

The composition of seams are described using soil description terms as given on the SOIL DESCRIPTION AND CLASSIFICATION Standard Sheet. Where possible the mineralogy of coatings is identified. Common mineral coatings include:

Aperture: Defects across which there is little or no tensile strength can be either "open" (Op) or "closed" (Cl). For rock core, the width of the "open" defect is measured whilst still in the core barrel splits. The descriptor "tight" (Ti) can only apply to healed or incipient defects (i.e. veins, foliation, etc.).

Persistence and Spacing of defects is described directly in millimetres and metres. If the measurement of defect persistence is limited by the extent of the exposure, the end conditions are noted (i.e. 0, 1 or 2 defect ends observed). The spacing between defects of similar orientation (i.e. within a specific defect set) is recorded when possible. The frequency of defects within rock core can be measured as either: the spacing between successive defects; or the "Fracture Index", which is the number of defects per metre of core.

Spacing Term	Thickness
Very wide	>2 m
Wide	0.6 to 2 m
Medium	0.2 to 0.6 m
Closely	60 to 200 mm
Very closely	20 to 60 mm
Extremely closely	6 to 20 mm

Block Shape: Where it is considered significant, block shape can be described using the subjective terms as follows:

Block Shape	Description
Polyhedral	Irregular discontinuities without arrangement into distinct sets, and of small persistence.
Tabular	One dominant set of parallel discontinuities, for example bedding planes, with other non-continuous joints; thickness of blocks much less than length or width.
Prismatic	Two dominant sets of discontinuities, approximately orthogonal and parallel, with a third irregular set; thickness of blocks much less than length or width.
Equidimensional	Three dominant sets of discontinuities, approximately orthogonal, with occasional irregular joints, giving equidimensional blocks.
Rhomboidal	Three (or more) dominant, mutually oblique, sets of joints giving oblique-shaped, equidimensional blocks.
Columnar	Several, usually more than three sets of continuous, parallel joints usually crossed by irregular joints; lengths much greater than other dimensions.

Modified based on Table 23, Clause 6.2.5.7, AS 1726-2017, Geotechnical site investigations. Refer to source document for further detail.

ROCK DESCRIPTION AND CLASSIFICATION

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d. Interpreted stratigraphic unit

Stratigraphic units may be interpreted and reported, in accordance with The Australian Stratigraphic Units Database (ASUD). The terms “possibly” or “probably” indicate increased uncertainty in this interpretation.

e. Geological structure

After describing the rock material and defects, an interpretation of the nature and configuration of rock mass defects may be presented in logs, charts, 2D sections and 3D models (e.g. dipping strata, folds, unconformities, weathering profiles, defect sets, geological faults, etc.).

PARAMETERS RELATED TO CORE DRILLING

Drill Depth and Core Loss: Drilling intervals are shown on GHD Core Log Sheets by depth increments and horizontal marker lines.

“Core loss”, or its inverse “total core recovery” (TCR), is measured as a percentage of the core run. If the location of the core loss is known, or strongly suspected, it is shown in a region of the column bounded by dashed horizontal lines. If unknown, core loss is assigned to the bottom of a core run.

Rock Quality Designation (RQD), described by Deere et al. (1989), may be recorded on GHD Core Log Sheets.

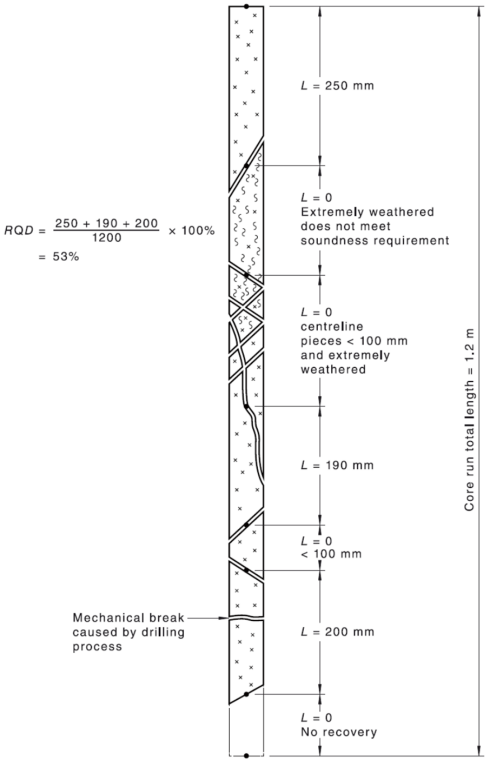
For certain projects, such as tunnelling or underground mining investigations, rock mass ratings or classifications can be required as part of the design process. The RQD forms a component of these rock mass ratings and provides a quantitative estimate of rock mass quality from rock core logs.

The rock core must be “N” sized (nominally 50 mm) or greater for derivation of RQD. The RQD is expressed as a percentage of intact rock core (excluding residual soil and extremely weathered rock) greater than 100 mm in length over the total selected core length.

Deere et al. (1989) recommends measuring lengths of core along the centreline, as shown right.

RQD is expressed as:

$$RQD = \frac{\sum Length\ of\ sound\ core\ pieces > 100\ mm\ in\ length}{Length\ of\ core\ run}\ x\,100\%$$



RQD measurement procedure
(reproduced from Figure 13, Clause 6.2.9.4, AS 1726- 2017, Geotechnical site investigations)

ROCK MASS CLASSIFICATION

Rock mass classification schemes may be used to represent the engineering characteristics of a rock mass. A large variety of classification schemes have been developed by various authors, ranging from simple to complex. All of the schemes are limited in their application and many rock mass classification systems assume that the rock mass is isotropic, which is rarely the case.

References

Standards Australia (2017). AS 1726-2017. Geotechnical Site Investigations.

Barton, N. and Choubey, V. (1977). The Shear Strength of Rock Joints in Theory and Practice. Rock Mechanics 10, 1-54. Springer. Deere, D.U. and Deere, D.W. (1989). Rock Quality Designation (RQD) After Twenty Years. Contract Report GL-89-1. Army Corps of Engineers. Washington DC, 1989.

Ref: DS6.5.2.1 Issue 3 Date: 15/03/2022

GLOSSARY OF SYMBOLS

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This standard sheet should be read in conjunction with all test hole log sheets and any idealised geological sections prepared for the investigation report.

GENERAL

Symbol	Description	Symbol	Description
D	Disturbed Sample	**R**	Rising Head Permeability Test
B	Bulk Sample	**F**	Falling Head Permeability Test
U(50)	Undisturbed Sampled (suffixed by sample size or tube diameter in mm if applicable)	**PBT**	Plate Bearing Test
CS	Core Sample (suffixed by diameter in mm)		Water Inflow (make)
ES	Soil sample for environmental sampling		Water Outflow (loss)
PID	Photoionisation Detector		Temporary Water Level
SPT	Standard Penetration Test (with blows per 0.15 m)		Final Water Level
N	SPT Value		Point Load Test (axial)
HB/HW	SPT Hammer Bouncing/Hammer Weight		Point Load Test (diametric)
PP/HP	Pocket/Hand Penetrometer (suffixed by value kPa)	**PL**	Point Load (kPa)
PK	Packer Test (kPa)	**IMP**	Impression Device Test
PZ	Piezometer Installation	**PM**	Pressuremeter Test
SV/VS	Shear Vane Test (suffixed by value in kPa)		

SOIL SYMBOLS

Main Components				Minor Components			
	SAND		FILL		Sandy		Vegetation, roots
	GRAVEL		SILT		Gravelly		silty
	CLAY		TOPSOIL		Clayey	*Note: Natural soils are generally a combination of constituents, e.g. sandy CLAY*	

ROCK SYMBOLS

Sedimentary						Igneous			
	SANDSTONE		SILTSTONE		CONGLOMERATE		GRANITIC ROCK		IGNEOUS DYKE
	CLAYSTONE		SHALE		COAL		BASALTIC ROCK		

Note: Additional rock symbols may be allocated for a particular project

NATURAL DEFECTS *(Coding)*

Defect Type		Orientation
Jt	Joint	For vertical non-oriented core ... “Dip” angle (e.g. 5°) measured relative to horizontal.
Pt	Parting	For inclined non-oriented core ... “Angle” measured relative to core axis.
SS	Sheared Surface	For inclined oriented core ... “Dip” angle and “Dip Direction” angle (e.g. 45°/225° mag.).
WSm	Weathered Seam	
SSm	Sheared Seam	
CSm	Crushed Seam	
ISm	Infilled Seam	
SZ	Sheared Zone	
VN	Vein	

Orientation (con’t)		Roughness		Coating	
VT	Vertical	**Pol**	Polished	**Cn**	Clean
HZ or 0°	Horizontal	**So**	Smooth	**Sn**	Stained
d / °	Degrees	**Rf**	Rough	**Ve**	Veneer
		VR	Very Rough	**Co**	Coating
		Slk	Slickensided		

Shape				Infilling / Common Materials			
Pln	Planar	**St**	Stepped	**CLAY**	Clay	**Mi**	Micaceous
Cu	Curved	**Ir**	Irregular	**Ca**	Calcite	**Mn**	Manganese
Un	Undulating	**Dis**	Discontinuous	**X**	Carbonaceous	**Py**	Pyrite
Others				**Kt**	Chlorite	**Qz**	Quartz
OP	Open	**CL**	Closed	**Ti**	Tight	**Fe**	Iron Oxide	**MU**	Unidentified Mineral

LANDSLIDE RISK ASSESSMENT AND RISK MANAGEMENT

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INTRODUCTION

Fundamental to Landslide Risk Assessment and Landslide Risk Management is an understanding of the slope-forming processes together with an appreciation of mechanisms of instability, be they soil or rock slopes, cuttings or embankments and fills. Accordingly, the assessment will be particular to a project wherein specific property or individuals most-at-risk are identified.

GHD encourages you to read the Australian Geomechanics Society guidelines on Landslide Risk Management (LRM) and slope management and maintenance. The guidelines are a series of benchmark papers that are collectively known as AGS (2007).

Please see the refences (below) and the website link from which the guidelines can be downloaded.

BASIS OF ASSESSMENT

Landslide risk assessment is initiated by observations of features on a site and its surrounds, and could include appraisal of historical data, or discovery by sub-surface investigation, which together with an interpretation of sub-surface conditions, and with an understanding of slope-forming processes, identifies natural and man-made features that may be geohazards. The assessment is conducted for a specific project and elements-at-risk.

Risk assessments are conventionally conducted to appraise the risk-to-property and risk-to-life. Risk-to-property may be conducted employing both qualitative and quantitative methods. Risk-to-life should be conducted with a quantitative component since reference to risk levels is based upon international experience with numeric values of risk included within the evaluation methodology.

The Risk Assessment process involves a series of tasks from risk analysis, to risk assessment and risk management. The process can be envisaged diagrammatically through such as Figure 1 in AGS (2007a) or AGS (2007c) – a copy of the flowchart is attached. Importantly, the process involves a feedback loop to verify the initial assumptions, the validity of the assessed risk outcome, the appropriateness of management methods, and performance of the site and intervention works (if and as may be required).

Note that a risk assessment does not preclude geohazards occurring, no matter their likelihood.

Ref: DS5.6.1 Issue 1.0 Date: June 2022

The risk assessment is based on certain expectations in terms of quality of: subsequent geotechnical investigation; geotechnical, civil & structural design; and construction of the development. These expectations are fundamental to the appraisal and assessment that has been conducted. Should these issues not be addressed nor occur, or be of lesser quality than reasonably expected, then risk conditions could well be more adverse, meaning that the assessment would need to be revised accordingly to more severe risk levels.

Note that local variations or anomalies in the generalised ground conditions do occur in the natural environment, which means that on-site verification of the nature and form of the geohazards prudently should be conducted during site development and construction. Furthermore, it should be appreciated that natural features in all likelihood will change and may deteriorate over time, which could change existing geohazards or create new ones. Should the nature of the geohazard change, the landslide risk assessment should be re-appraised and/or its validity be confirmed.

GHD's reports will outline our observations of geotechnical site features and assessment of landslide and rock fall hazards observable at the time of the fieldwork. The report will also explain the risk level appraisal.

RISK LEVELS

In our society, we do not live in a risk-free environment. There is risk, to varying degrees, in everything that we do throughout our existence – for example, the risk of fatality in driving a vehicle in NSW (2021) is approximately 1 in 30,000 per annum (3E-5pa).

The issue with risk assessment is to determine risk levels; and, in terms of landslide risk levels, to determine the likelihood of geohazards being realised and the consequences should that occur; and to appraise whether the risk levels are acceptable or are tolerable within our society.

This means that risk assessment is undertaken to compare the analysed risk levels with acceptable or tolerable levels. Should risk assessed risk levels not meet societal criteria, the aim of risk management is to reduce the assessed risk levels through their management and by implementation of remedial actions or intervention, as appropriate. Overall, the aim is to manage risk levels not only in the context of "forewarned is forearmed", but also to provide guidance to achieve risk levels acceptable to the Australian community – if not that, then to achieve tolerable risk levels.

In some situations, the management protocol may be to achieve a risk level that is 'As Low As Reasonably Practical' (ALARP). This approach can be considered in the context that risk reduction measures be carried out to the extent that the cost involved in reducing the risk further would be disproportionate to the benefit gained. It often applies to societal risk levels - being where more lives are at risk than a single individual-most-at-risk. An ALARP approach is not usually appropriate in a residential setting, principally due to the issue of transfer of risk in the event of sale of the property.

Risk levels may be determined as Acceptable or Tolerable. The appropriateness of these risk levels includes appreciation of the period of existence of the geohazard, together with the expected duration of exposure of the elements-at-risk. This is an issue that a community deems, through such as the council for a Local Government Area, to be a risk level appropriate for the overall cost to the community it represents. Whilst parties such as the property owner, the property occupier, parties around the property, developer, lender, services providers, and regulators could be involved in determination of acceptable or tolerable risk levels, pragmatically the regulator is the authority responsible for setting the tolerance criteria for risk levels, and doing so on behalf of its constituents.

There are many ways to manage adverse risk levels. The nature and extent of possible mitigation methods and techniques will be identified in our report to you. Risk avoidance is also a valid risk management approach; for example, such as wherein geohazards are removed or the elements-at-risk are re-located.

Note that whatever the assessed risk, and the appraised risk level, the event can still occur, no matter the assessed likelihood of occurrence.

PERSONS WHO SHOULD CONDUCT LANDSLIDE RISK ASSESSMENT

AGS (2007) recommends that LRM must be the responsibility of geotechnical practitioners who will be a Geotechnical Engineer or Engineering Geologist who is a specialist with core competencies in landslide risk management. These practitioners will be a professional engineer or registered professional engineering geologist, in both instances with chartered professional status (being either CPEng or CPGeo or RPGeo) with Landslide Risk Management as a core competency.

THIS REPORT

This report outlines our observations of geotechnical site features and our assessment of landslide hazards observable at the time that the observations were made. Note that natural features will change and may deteriorate over time, which could change existing hazards or create new ones. In that situation, additional investigations may be required to further assess landslide hazards, risk mitigation measures, on-going monitoring and maintenance requirements, all in the context of landslide risk management.

In regard to Landslide Risk Assessment and Landslide Risk Management, GHD follows the recommendations contained within AGS (2007).

REFERENCES

The cited references below provide detailed guidance on landslide risk management. The reader is encouraged to download copies for their own familiarisation of the concepts involved.

AGS (2007) – a generic term that covers the suite of 5 papers of which AGS (2007c, 2007d and 2007e) form part.

AGS (2007a) "Guideline for landslide susceptibility, hazard and risk zoning for land use planning", *Australian Geomechanics*, V42 N1, March 2007.

AGS (2007b) "Commentary on guideline for landslide susceptibility, hazard and risk zoning for land use planning", *Australian Geomechanics*, V42 N1, March 2007.

AGS (2007c) "Practice Note Guidelines for Landslide Risk Management 2007", Australian Geomechanics Society, Landslide Taskforce, Practice Note Working Group, *Australian Geomechanics,* V42 N1, March 2007.

AGS (2007d) "Commentary on Practice Note Guidelines for Landslide Risk Management 2007", Australian Geomechanics Society, Landslide Taskforce, Practice Note Working Group, *Australian Geomechanics,* V42 N1, March 2007.

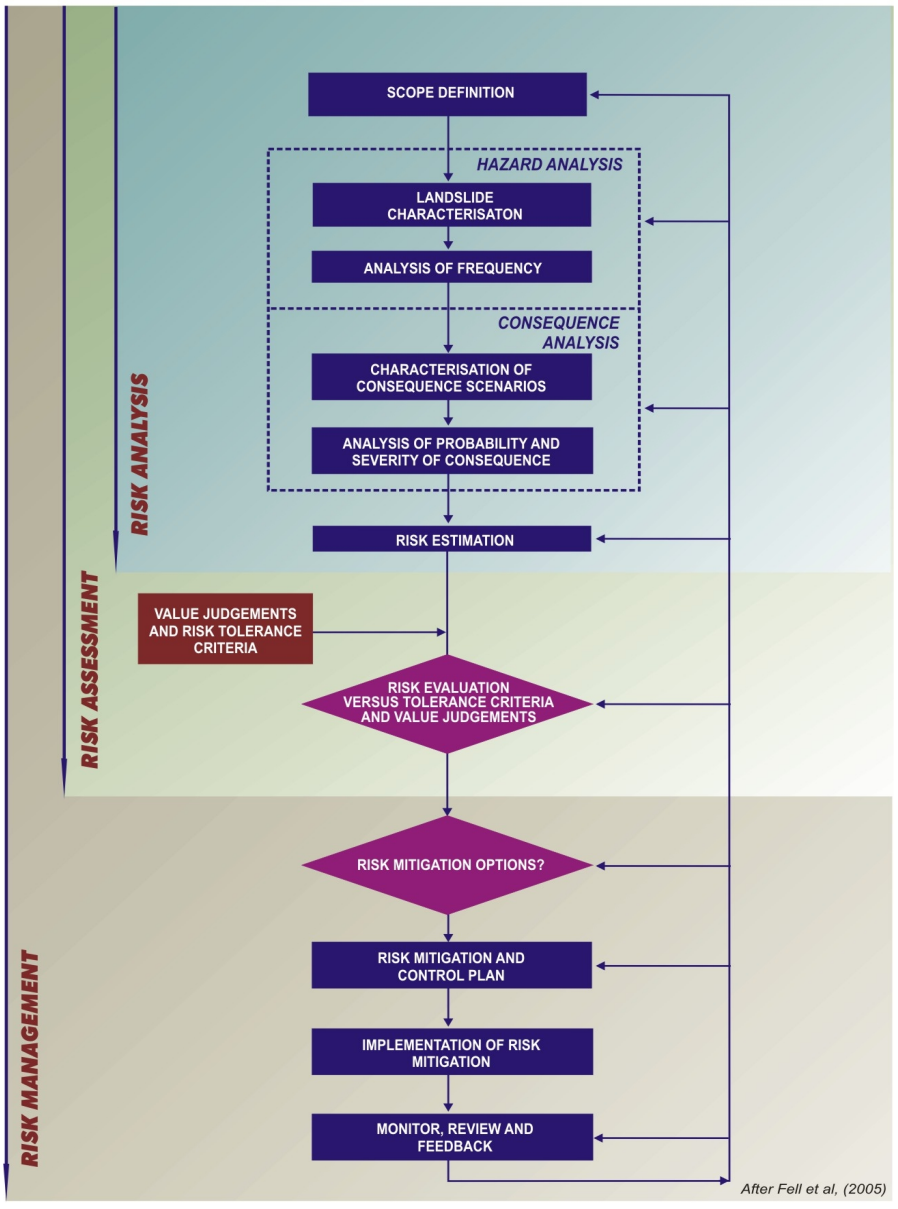
AGS (2007e) "Australian GeoGuides for slope management and maintenance". Australian Geomechanics Society, *Australian Geomechanics*, V42 N1, March 2007.

The cited AGS (2007) Guideline papers can be downloaded from: www.australiangeomechanics.org

ATTACHMENTS

Flowchart – Figure 1 from AGS (2007a) and (AGS 2007c)
Definitions of Terms
Risk matrix – (2 pages)
GeoGuides: LR1, LR2, LR7, LR8
Guidelines for hillside construction (extract from AGS (2007c, App G)

Figure 1. FRAMEWORK FOR LANDSLIDE RISK MANAGEMENT



DEFINITIONS OF TERMS

Acceptable Risk – A risk which, for the purposes of life or work, society is prepared to accept as it is with no regard to its management. Society does not generally consider expenditure in further reducing such risks justifiable.

Annual Exceedance Probability (AEP) – The estimated probability that an event of specified magnitude will be exceeded in any year.

Consequence – The outcomes or potential outcomes arising from the occurrence of a landslide expressed qualitatively or quantitatively, in terms of loss, disadvantage or gain, damage, injury or loss of life.

Danger – The natural phenomenon that could lead to damage, described in terms of its geometry, mechanical and other characteristics. The danger can be an existing one (such as a creeping slope) or a potential one (such as a rock fall). The characterisation of a danger does not include any forecasting.

Elements at Risk – The population, buildings and engineering works, economic activities, public services utilities, infrastructure and environmental features in the area potentially affected by landslides.

Frequency – A measure of likelihood expressed as the number of occurrences of an event in a given time. See also Likelihood and Probability.

Hazard – A condition with the potential for causing an undesirable consequence. The description of landslide hazard should include the location, volume (or area), classification and velocity of the potential landslides and any resultant detached material, and the probability of their occurrence within a given period of time.

Individual Risk to Life – The risk of fatality or injury to any identifiable (named) individual who lives within the zone impacted by the landslide or who follows a particular pattern of life that might subject him or her to the consequences of the landslide.

Landslide inventory – An inventory of the location, classification, volume, activity and date of occurrence of landsliding

Landslide activity – The stage of development of a landslide; *pre-failure* when the slope is strained throughout but is essentially intact; failure characterized by the formation of a continuous surface of rupture; *post-failure* which includes movement from just after failure to when it essentially stops and *reactivation* when the slope slides along one or several pre-existing surfaces of rupture. Reactivation may be occasional (eg: seasonal) or continuous (in which case the slide is "active")

Landslide Intensity – A set of spatially distributed parameters related to the destructive power of a landslide. The parameters may be described quantitatively or qualitatively and may include maximum movement velocity, total displacement, differential displacement, depth of the moving mass, peak discharge per unit width, kinetic energy per unit area.

Landslide Susceptibility – A quantitative or qualitative assessment of the classification, volume (or area) and spatial distribution of landslides which exist or potentially may occur in an area. Susceptibility may also include a description of the velocity and intensity of the existing or potential landsliding.

Likelihood – Used as a qualitative description of probability or frequency.

Probability – A measure of the degree of certainty. This measure has a value between zero (impossibility) and 1.0 (certainty). It is an estimate of the likelihood of the magnitude of the uncertain quantity or the likelihood of the occurrence of the uncertain future event.

There are two main interpretations:

(i) Statistical – frequency or fraction – The outcome of a repetitive experiment of some kind like flipping coins. It includes also the idea of population variability. Such a number is called an "objective" or relative frequentist probability because it exists in the real world and is in principle measurable by doing the experiment.

(ii) Subjective probability (degree of belief) – Quantified measure of belief, judgement, or confidence in the likelihood of a outcome, obtained by considering all available information honestly, fairly and with a minimum of bias. Subjective probability is affected by the state of understanding of a process, judgement regarding an evaluation or the quality and quantity of information. It may change over time as the state of knowledge changes.

Qualitative Risk Analysis – An analysis which uses word form, descriptive or numeric rating scales to describe the magnitude of potential consequences and the likelihood that those consequences will occur.

Quantitative Risk Analysis – an analysis based on numerical values of the probability, vulnerability and consequences, and resulting in a numerical value of the risk.

Risk – A measure of the probability and severity of an adverse affect to health, property or the environment. Risk is often estimated by the product of probability x consequences. However, a more general interpretation of risk involves a comparison of the probability and consequences in a non-product form.

Risk Analysis – The use of available information to estimate the risk to individuals, population, property or the environment from hazards. Risk analyses generally contain the following steps: scope definition, hazard identification and risk estimation.

Risk Assessment – The process of risk analysis and risk evaluation.

Risk Control or Risk Treatment – The process of decision making for managing risk and the implementation or enforcement of risk mitigation measures and the re-evaluation of its effectiveness from time to time, using the results of risk assessment as one input.

Risk Estimation – The process used to produce a measure of the level of health, property or environmental risks being analysed. Risk estimation contains the following steps: frequency analysis, consequence analysis and their integration.

Risk Evaluation – The stage at which values and judgements enter the decision process, explicitly or implicitly, by including consideration of the importance of the estimated risks and the associated social, environmental and economic consequences, in order to identify a range of alternatives for managing the risks.

Risk Management – The complete process of risk assessment and risk control (*or risk treatment*).

Societal Risk – The risk of multiple fatalities or injuries in society as a whole: one where society would have to carry the burden of a landslide causing a number of deaths, injuries, financial, environmental and other losses.

Susceptibility – see Landslide Susceptibility

Temporal-Spatial Probability – The probability that the element at risk is in the affected area at the time of the landslide.

Tolerable Risk – A risk within a range that society can live with so as to secure certain net benefits. It is a range of risk regarded as non-negligible and needing to be kept under review and reduced further if possible.

Vulnerability – The degree of loss to a given element or set of elements within the area affected by the landslide hazard. It is expressed on a scale of 0 (no loss) to 1 (total loss). For property, the loss will be the value of the damage relative to the value of the property; for persons, it will be the probability that a particular life (the element at risk) will be lost, given the person(s) is affected by the landslide.

Zoning – The division of land into homogeneous areas or domains and their ranking according to degrees of actual or potential landslide susceptibility, hazard or risk.

Australian Geomechanics Society

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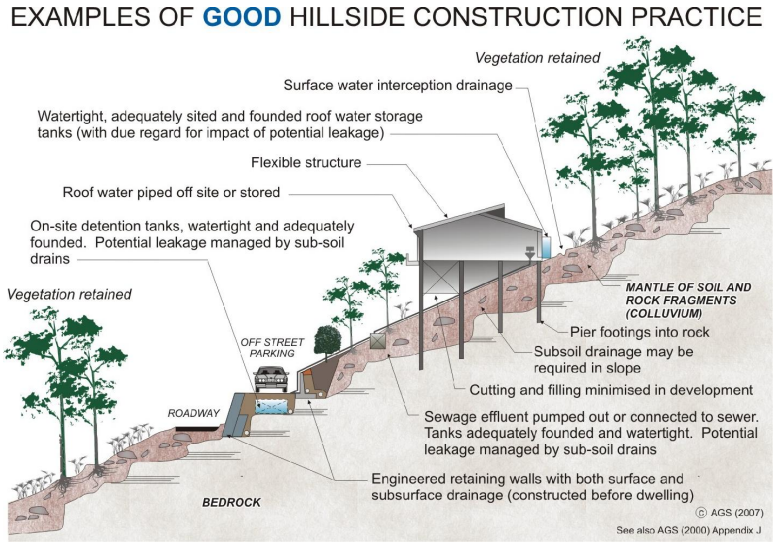
Volume 42 No 1 March 2007

Extract containing:

"Practice Note Guidelines for Landslide Risk Management 2007"
Ref: AGS (2007c)



Landslide Risk Management

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PRACTICE NOTE GUIDELINES FOR LANDSLIDE RISK MANAGEMENT 2007

APPENDIX C: LANDSLIDE RISK ASSESSMENT

QUALITATIVE TERMINOLOGY FOR USE IN ASSESSING RISK TO PROPERTY

QUALITATIVE MEASURES OF LIKELIHOOD

Approximate Annual Probability		Implied Indicative Landslide Recurrence Interval		Description	Descriptor	Level
Indicative Value	Notional Boundary					
10^{-1}	$5x10^{-2}$	10 years	20 years	The event is expected to occur over the design life.	ALMOST CERTAIN	A
10^{-2}	$5x10^{-3}$	100 years	200 years	The event will probably occur under adverse conditions over the design life.	LIKELY	B
10^{-3}	$5x10^{-4}$	1000 years	2000 years	The event could occur under adverse conditions over the design life.	POSSIBLE	C
10^{-4}	$5x10^{-5}$	10,000 years	20,000 years	The event might occur under very adverse circumstances over the design life.	UNLIKELY	D
10^{-5}	$5x10^{-6}$	100,000 years	200,000 years	The event is conceivable but only under exceptional circumstances over the design life.	RARE	E
10^{-6}		1,000,000 years		The event is inconceivable or fanciful over the design life.	BARELY CREDIBLE	F

Note: (1) The table should be used from left to right; use Approximate Annual Probability or Description to assign Descriptor, not *vice versa*.

QUALITATIVE MEASURES OF CONSEQUENCES TO PROPERTY

Approximate Cost of Damage		Description	Descriptor	Level
Indicative Value	Notional Boundary			
200%	100%	Structure(s) completely destroyed and/or large scale damage requiring major engineering works for stabilisation. Could cause at least one adjacent property major consequence damage.	CATASTROPHIC	1
60%	40%	Extensive damage to most of structure, and/or extending beyond site boundaries requiring significant stabilisation works. Could cause at least one adjacent property medium consequence damage.	MAJOR	2
20%	10%	Moderate damage to some of structure, and/or significant part of site requiring large stabilisation works. Could cause at least one adjacent property minor consequence damage.	MEDIUM	3
5%	1%	Limited damage to part of structure, and/or part of site requiring some reinstatement stabilisation works.	MINOR	4
0.5%		Little damage. (Note for high probability event (Almost Certain), this category may be subdivided at a notional boundary of 0.1%. See Risk Matrix.)	INSIGNIFICANT	5

Notes: (2) The Approximate Cost of Damage is expressed as a percentage of market value, being the cost of the improved value of the unaffected property which includes the land plus the unaffected structures.

(3) The Approximate Cost is to be an estimate of the direct cost of the damage, such as the cost of reinstatement of the damaged portion of the property (land plus structures), stabilisation works required to render the site to tolerable risk level for the landslide which has occurred and professional design fees, and consequential costs such as legal fees, temporary accommodation. It does not include additional stabilisation works to address other landslides which may affect the property.

(4) The table should be used from left to right; use Approximate Cost of Damage or Description to assign Descriptor, not vice versa

PRACTICE NOTE GUIDELINES FOR LANDSLIDE RISK MANAGEMENT 2007

APPENDIX C: – QUALITATIVE TERMINOLOGY FOR USE IN ASSESSING RISK TO PROPERTY (CONTINUED)

QUALITATIVE RISK ANALYSIS MATRIX – LEVEL OF RISK TO PROPERTY

LIKELIHOOD		CONSEQUENCES TO PROPERTY (With Indicative Approximate Cost of Damage)				
	Indicative Value of Approximate Annual Probability	1: CATASTROPHIC 200%	2: MAJOR 60%	3: MEDIUM 20%	4: MINOR 5%	5: INSIGNIFICANT 0.5%
A – ALMOST CERTAIN	10^{-1}	VH	VH	VH	H	M or **L** (5)
B - LIKELY	10^{-2}	VH	VH	H	M	**L**
C - POSSIBLE	10^{-3}	VH	H	M	M	**VL**
D - UNLIKELY	10^{-4}	H	M	**L**	**L**	**VL**
E - RARE	10^{-5}	M	**L**	**L**	**VL**	**VL**
F - BARELY CREDIBLE	10^{-6}	**L**	**VL**	**VL**	**VL**	**VL**

Notes: (5) For Cell A5, may be subdivided such that a consequence of less than 0.1% is Low Risk.
(6) When considering a risk assessment it must be clearly stated whether it is for existing conditions or with risk control measures which may not be implemented at the current time.

RISK LEVEL IMPLICATIONS

Risk Level		Example Implications (7)
VH	VERY HIGH RISK	Unacceptable without treatment. Extensive detailed investigation and research, planning and implementation of treatment options essential to reduce risk to Low; may be too expensive and not practical. Work likely to cost more than value of the property.
H	HIGH RISK	Unacceptable without treatment. Detailed investigation, planning and implementation of treatment options required to reduce risk to Low. Work would cost a substantial sum in relation to the value of the property.
M	MODERATE RISK	May be tolerated in certain circumstances (subject to regulator's approval) but requires investigation, planning and implementation of treatment options to reduce the risk to Low. Treatment options to reduce to Low risk should be implemented as soon as practicable.
L	LOW RISK	Usually acceptable to regulators. Where treatment has been required to reduce the risk to this level, ongoing maintenance is required.
VL	VERY LOW RISK	Acceptable. Manage by normal slope maintenance procedures.

Note: (7) The implications for a particular situation are to be determined by all parties to the risk assessment and may depend on the nature of the property at risk; these are only given as a general guide.

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Landslide Risk Management

ENGINEERS AUSTRALIA

AusIMM AUSTRALASIAN INSTITUTE OF MINING & METALLURGY

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THE AUSTRALIAN GEOGUIDES FOR SLOPE MANAGEMENT AND MAINTENANCE

AGS Landslide Taskforce, Slope Management and Maintenance Working Group

The Australian Geomechanics Society (AGS) presents on the following pages a guideline on slope management and maintenance, as part of the landslide risk management guidelines developed under the National Disaster Funding Program (NDMP). This Guideline is aimed at home owners, developers and local councils, but also has applicability to a larger audience which includes builders and contractors, consultants, insurers, lawyers, government departments and in fact any person, or organisation, with a responsibility for the management or maintenance of a slope. The objective is to inform those with little or no knowledge of geotechnical engineering about landslides.

Each GeoGuide is a stand-alone document, which is formatted so that it can be printed on two sides of a single A4 sheet. It is expected that the set of GeoGuides will increase with time to cover a range of topics. As things stand:

- **GeoGuide LR1** is an introductory sheet that should be read by all users, since it explains what the LR (landslide risk) series is about and defines terms.
- **GeoGuides LR2, 3 and 4** explain why landslides occur and provide information on different types of landslide.
- **GeoGuide LR5** discusses the critical part that water often plays in relation to landslide occurrence and discusses measures that can be adopted to limit its effect.
- **GeoGuide LR6** refers to retaining walls and their maintenance.
- **GeoGuide LR7** puts the concept of landslide risk into an everyday context, so users can relate a particular landslide risk to other risks that they know they are prepared to take, sometimes on a daily basis.
- **GeoGuide LR8** retains the ideas of good and poor hillside construction practice originally provided by an AGS sub-committee in 1985.
- **GeoGuide LR9** concentrates specifically on effluent and surface water disposal, which is an important topic in some development areas.
- **GeoGuide LR10** is specifically aimed at those who have property on the coast and could be susceptible to coastal erosion processes.
- **GeoGuide LR11** provides information about the benefits of keeping records on inspection and maintenance activities and provides a proforma record sheet for users.

It is recognised that the GeoGuides are likely to be upgraded from time to time. Feedback on use and suggested changes should be sent to the National Chair of the Australian Geomechanics Society. The latest versions of the GeoGuides will be downloadable from the AGS website www.australiangemechanics.org

Through the NDMP, Australian governments (at Commonwealth, State and Local Government levels) are also funding the development of a Landslide Zoning Guideline (AGS 2007a), and a Practice Note Guideline (AGS 2007c) to which interested readers seeking in-depth information should refer.

ACKNOWLEDGEMENTS

These guidelines have been prepared by The Australian Geomechanics Society with funding from the National Disaster Mitigation Program, the Sydney Coastal Councils Group, and The Australian Geomechanics Society.

The Australian Geomechanics Society established a Working Group within a Landslide Taskforce to develop the guidelines. The development of the guidelines was managed by a Steering Committee. Membership of the Working Group, Taskforce and Steering Committee is listed in the Appendix.

Drafts of these GeoGuides have been subject to review by members of the AGS Landslide Taskforce, members of the geotechnical profession and local government.

REFERENCES

AGS (2007a) Guideline for Landslide Susceptibility, Hazard and Risk Zoning for Land Use Management. Australian Geomechanics Society, *Australian Geomechanics*, Vol 42, No1.

AGS (2007c). Practice Note Guidelines for Landslide Risk Management. Australian Geomechanics Society. *Australian Geomechanics*, Vol 42, No1,

AGS (2007e). The Australian GeoGuides for slope management and maintenance –. Australian Geomechanics Society. *Australian Geomechanics*, Vol 42, No 1, - this paper.

AUSTRALIAN GEOGUIDE LR1 (INTRODUCTION)

INTRODUCTION TO LANDSLIDE RISK

Photographs courtesy of Greg Kotze and Tony Phillips

AUSTRALIAN GEOGUIDES

The **Australian GeoGuides (LR series)** are a set of information sheets on the subject of landslide risk management and maintenance, published by the Australian Geomechanics Society (AGS). They provide background information intended to help people without specialist technical knowledge understand the basic issues involved. Topics covered include:

LR1 - Introduction	LR2 - Landslides	LR3 - Landslides in Soil
LR4 - Landslides in Rock	LR5 - Water & Drainage	LR6 - Retaining Walls
LR7 - Landslide Risk	LR8 - Hillside Construction	LR9 - Effluent & Surface Water Disposal
LR10 - Coastal Landslides	LR11 - Record Keeping	

The GeoGuides explain why slopes and retaining structures can be a hazard and what can be done with appropriate professional advice and local authority approval (if required) to remove, or reduce, the risk they represent.

Preparation of the GeoGuides has been funded by Australian governments through the National Disaster Mitigation Program (NDMP). This is a national program aimed at identifying and addressing natural disaster risk priorities across Australia. Technical input has been provided by experienced geotechnical engineers, engineering geologists and local government and government agency representatives from around Australia.

BACKGROUND

A number of landslides and cliff collapses occurred in Australia in the 1980's and 1990's in which lives were lost. Of these the Thredbo landslide probably received the most publicity, but there were several others. During this period the AGS issued a number of advisory notes to practitioners in relation to the assessment of landslide risk and its reduction. Building on these notes, and responding to changes in technology, a technical paper known as AGS2000 was prepared. It was followed in 2002 by an intensive nation-wide educational campaign attended by a large number of interested professionals from government departments and private industry. This resulted in an increased awareness of the risks associated with unstable slopes and a changed approach in many government departments responsible for regional planning, domestic development, roads, railways and the maintenance of natural features such as cliffs.

STATUS OF THE GEOGUIDES

The GeoGuides reflect the essence of good practice as perceived by a large number of geotechnical engineers, engineering geologists and other practitioners such as local government planners. **The GeoGuides are generic and do not, and cannot, constitute advice in relation to a specific situation. This must be sought from a geotechnical practitioner with first hand knowledge of the site.** It is expected that some local councils will refer to the GeoGuides and their companion publications in planning and building legislation. Check with your local council to see how it regards these documents. Companion publications to the GeoGuides are:

- AGS (2007a) Guideline for Landslide Susceptibility, Hazard and Risk Zoning for Land Use Management Australian Geomechanics Society, *Australian Geomechanics*, Vol 42, No1 and its associated commentary (AGS 2007b).
- AGS (2007c). Practice Note Guidelines for Landslide Risk Management. Australian Geomechanics Society. *Australian Geomechanics*, Vol 42, No1 2007, and its associated "Commentary" (AGS 2007d).

Copies of the above documents are available on the AGS website www.australiangeomechanics.org

AUSTRALIAN GEOGUIDE LR1 (INTRODUCTION)

TERMINOLOGY

Terminology tends to change with time and place and with the context in which it is used. The terms listed below have the following meanings in the GeoGuides:

Consequence	the outcome, or potential outcome, arising from the occurrence of a landslide expressed quantitatively, or qualitatively, in terms of loss, disadvantage, damage, injury, or loss of life.
Discontinuity	in relation to the ground is a crack, a bedding plane (a boundary between strata) or fault (a plane along which the ground has sheared) which forms a plane of weakness and reduces the overall strength of the ground.
Equilibrium	the condition when the forces on a mass of soil or rock in the ground, or on a retaining structure, are equal and opposite.
Factor of safety (FOS)	theoretically the forces available to prevent a part of the ground, or a retaining structure, from moving divided by those trying to move it. A FOS of one or less indicates that failure is likely to occur, but not how likely it is. To allow for unknowns and to limit movements engineers always aim to achieve a FOS significantly larger than one.
Failure	when part of the ground experiences movement as a result of the out of balance forces on it. Failure of a retaining structure means it is no longer able to fulfil its intended function.
Geotechnical practitioner	when referred to in the Australian GeoGuides (LR series), is a professional geotechnical engineer, or engineering geologist, with chartered status in a recognised national professional institution and relevant training, experience and core competencies in landslide risk assessment and management. In some government departments, technical officers are specifically trained to undertake some of the functions of a geotechnical practitioner.
Hazard	a condition with the potential for causing an undesirable consequence. In relation to landslides this includes the location, size, speed, distance of travel and the likelihood of its occurrence within a given period of time.
Landslide	the movement, or the potential movement, of a mass of rock, debris, or earth down a slope.
Likelihood	a qualitative description of probability, or frequency, of occurrence.
Partial saturation	the condition in the ground above the water table where both air and water are present as well as soil, or rock.
Perched water table	a water table above the true water table supported by a low permeability stratum.
Permeability	a measure of the ability of the ground to allow water to flow through it.
Risk	a measure of the probability and severity of an adverse effect to life, health, property or the environment.
Slip failure	landslide.
Stable	the condition when failure will not occur. Over geological time no part of the ground can be considered stable. Over short periods (eg the life of a structure) stability implies a very low likelihood of failure.
Retaining structure	anything built by humans which is intended to support the ground and inhibit failure.
Structure	in relation to rock, or soil, means the spacing, extent, orientation and type of discontinuities found in the ground at a particular location.
Tension crack	a distinct open crack that normally develops in the ground around a landslide and indicates actual, or imminent , failure.
Water table	the level in the ground below which it is saturated and the voids are filled with water.

Photograph courtesy of Phil Flentje

AUSTRALIAN GEOGUIDE LR2 (LANDSLIDES)

LANDSLIDES

What is a Landslide?

Any movement of a mass of rock, debris, or earth, down a slope, constitutes a "landslide". Landslides take many forms, some of which are illustrated. More information can be obtained from Geoscience Australia, or by visiting its Australian Landslide Database at www.ga.gov.au/urban/factsheets/landslide.jsp. Aspects of the impact of landslides on buildings are dealt with in the book "Guideline Document Landslide Hazards" published by the Australian Building Codes Board and referenced in the Building Code of Australia. This document can be purchased over the internet at the Australian Building Codes Board's website www.abcb.gov.au .

Landslides vary in size. They can be small and localised or very large, sometimes extending for kilometres and involving millions of tonnes of soil or rock. It is important to realise that even a 1 cubic metre boulder of soil, or rock, weighs at least 2 tonnes. If it falls, or slides, it is large enough to kill a person, crush a car, or cause serious structural damage to a house. The material in a landslide may travel downhill well beyond the point where the failure first occurred, leaving destruction in its wake. It may also leave an unstable slope in the ground behind it, which has the potential to fail again, causing the landslide to extend (regress) uphill, or expand sideways. For all these reasons, both "potential" and "actual" landslides must be taken very seriously. They present a real threat to life and property and require proper management.

Identification of landslide risk is a complex task and must be undertaken by a geotechnical practitioner (GeoGuide LR1) with specialist experience in slope stability assessment and slope stabilisation.

What Causes a Landslide?

Landslides occur as a result of local geological and groundwater conditions, but can be exacerbated by inappropriate development (GeoGuide LR8), exceptional weather, earthquakes and other factors. Some slopes and cliffs never seem to change, but are actually on the verge of failing. Others, often moderate slopes (Table 1), move continuously, but so slowly that it is not apparent to a casual observer. In both cases, small changes in conditions can trigger a landslide with serious consequences. Wetting up of the ground (which may involve a rise in ground water table) is the single most important cause of landslides (GeoGuide LR5). This is why they often occur during, or soon after, heavy rain. Inappropriate development often results in small scale landslides which are very expensive in human terms because of the proximity of housing and people.

Does a Landslide Affect You?

Any slope, cliff, cutting, or fill embankment may be a hazard which has the potential to impact on people, property, roads and services. Some tell-tale signs that might indicate that a landslide is occurring are listed below:

- open cracks, or steps, along contours
- ground water seepage, or springs
- bulging in the lower part of the slope
- hummocky ground
- trees leaning down slope, or with exposed roots
- debris/fallen rocks at the foot of a cliff
- tilted power poles, or fences
- cracked or distorted structures

These indications of instability may be seen on almost any slope and are not necessarily confined to the steeper ones (Table 1). Advice should be sought from a geotechnical practitioner if any of them are observed. Landslides do not respect property boundaries. As mentioned above they can "run-out" from above, "regress" from below, or expand sideways, so a landslide hazard affecting your property may actually exist on someone else's land.

Local councils are usually aware of slope instability problems within their jurisdiction and often have specific development and maintenance requirements. **Your local council is the first place to make enquiries if you are responsible for any sort of development or own or occupy property on or near sloping land or a cliff.**

TABLE 1 - Slope Descriptions

Appearance	Slope Angle	Maximum Gradient	Slope Characteristics
Gentle	0° - 10°	1 on 6	Easy walking.
Moderate	10°- 18°	1 on 3	Walkable. Can drive and manoeuvre a car on driveway
Steep	18°- 27°	1 on 2	Walkable with effort. Possible to drive straight up or down roughened concrete driveway, but cannot practically manoeuvre a car.
Very Steep	27°- 45°	1 on 1	Can only climb slope by clutching at vegetation, rocks etc.
Extreme	45°- 64°	1 on 0.5	Need rope access to climb slope
Cliff	64°- 84°	1 on 0.1	Appears vertical. Can abseil down.
Vertical or Overhang	84° - 90±°	Infinite	Appears to overhang. Abseiler likely to lose contact with the face.

Some typical landslides which could affect residential housing are illustrated below:

AUSTRALIAN GEOGUIDE LR2 (LANDSLIDES)

Rotational or circular slip failures (Figure 1) - can occur on moderate to very steep soil and weathered rock slopes (Table 1). The sliding surface of the moving mass tends to be deep seated. Tension cracks may open at the top of the slope and bulging may occur at the toe. The ground may move in discrete "steps" separated by long periods without movement. More rapid movement may occur after heavy rain.

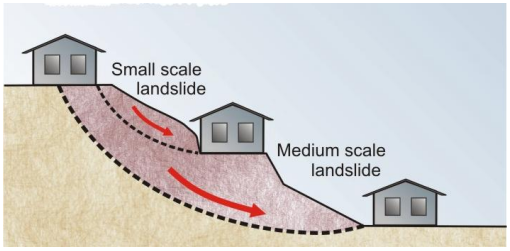

Figure 1

Translational slip failures (Figure 2) - tend to occur on moderate to very steep slopes (Table 1) where soil, or weak rock, overlies stronger strata. The sliding mass is often relatively shallow. It can move, or deform slowly (creep) over long periods of time. Extensive linear cracks and hummocks sometimes form along the contours. The sliding mass may accelerate after heavy rain.

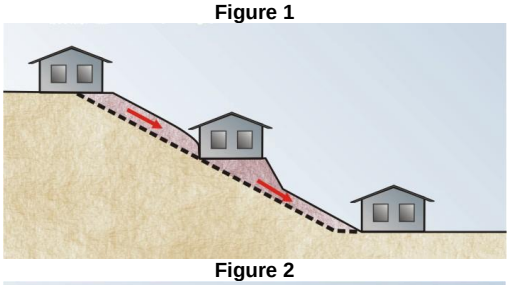

Figure 2

Wedge failures (Figure 3) - normally only occur on extreme slopes, or cliffs (Table 1), where discontinuities in the rock are inclined steeply downwards out of the face.

Rock falls (Figure 3) - tend to occur from cliffs and overhangs (Table 1).

Cliffs may remain apparently unchanged for hundreds of years. Collections of boulders at the foot of a cliff may indicate that rock falls are ongoing. Wedge failures and rock falls do not "creep". Familiarity with a particular local situation can instil a false sense of security since failure, when it occurs, is usually sudden and catastrophic.

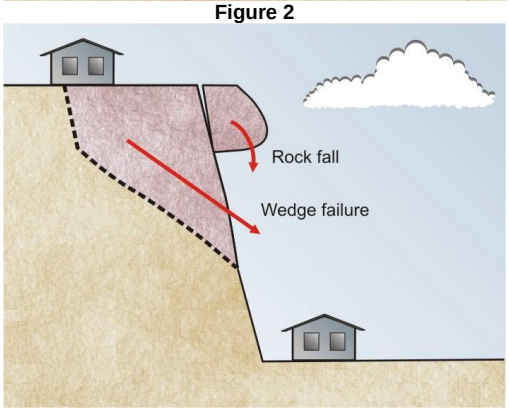

Figure 3

Debris flows and mud slides (Figure 4) - may occur in the foothills of ranges, where erosion has formed valleys which slope down to the plains below. The valley bottoms are often lined with loose eroded material (debris) which can "flow" if it becomes saturated during and after heavy rain. Debris flows are likely to occur with little warning; they travel a long way and often involve large volumes of soil. The consequences can be devastating.

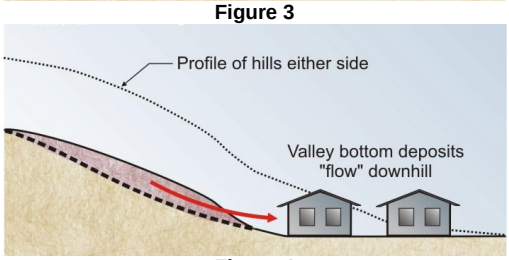

Figure 4

More information relevant to your particular situation may be found in other Australian GeoGuides:

- GeoGuide LR1 - Introduction
- GeoGuide LR3 - Soil Slopes
- GeoGuide LR4 - Rock Slopes
- GeoGuide LR5 - Water & Drainage
- GeoGuide LR6 - Retaining Walls
- GeoGuide LR7 - Landslide Risk
- GeoGuide LR8 - Hillside Construction
- GeoGuide LR9 - Effluent & Surface Water Disposal
- GeoGuide LR10 - Coastal Landslides
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AUSTRALIAN GEOGUIDE LR7 (LANDSLIDE RISK)

LANDSLIDE RISK

Concept of Risk

Risk is a familiar term, but what does it really mean? It can be defined as *"a measure of the probability and severity of an adverse effect to health, property, or the environment."* This definition may seem a bit complicated. In relation to landslides, geotechnical practitioners (GeoGuide LR1) are required to assess risk in terms of the likelihood that a particular landslide will occur and the possible consequences. This is called landslide risk assessment. The consequences of a landslide are many and varied, but our concerns normally focus on loss of, or damage to, property and loss of life.

Landslide Risk Assessment

Some local councils in Australia are aware of the potential for landslides within their jurisdiction and have responded by designating specific "landslide hazard zones". Development in these areas is often covered by special regulations. If you are contemplating building, or buying an existing house, particularly in a hilly area, or near cliffs, go first for information to your local council.

Landslide risk assessment must be undertaken by a geotechnical practitioner. It may involve visual inspection, geological mapping, geotechnical investigation and monitoring to identify:

- potential landslides (there may be more than one that could impact on your site)
- the likelihood that they will occur
- the damage that could result
- the cost of disruption and repairs and
- the extent to which lives could be lost.

Risk assessment is a predictive exercise, but since the ground and the processes involved are complex, prediction tends to lack precision. If you commission a landslide risk assessment for a particular site you should expect to receive a report prepared in accordance with current professional guidelines and in a form that is acceptable to your local council, or planning authority.

Risk to Property

Table 1 indicates the terms used to describe risk to property. Each risk level depends on an assessment of how likely a landslide is to occur and its consequences in dollar terms. "Likelihood" is the chance of it happening in any one year, as indicated in Table 2. "Consequences" are related to the cost of repairs and temporary loss of use if a landslide occurs. These two factors are combined by the geotechnical practitioner to determine the Qualitative Risk.

TABLE 2: LIKELIHOOD

Likelihood	Annual Probability
Almost Certain	1:10
Likely	1:100
Possible	1:1,000
Unlikely	1:10,000
Rare	1:100,000
Barely credible	1:1,000,000

The terms "unacceptable", "may be tolerated", etc. in Table 1 indicate how most people react to an assessed risk level. However, some people will always be more prepared, or better able, to tolerate a higher risk level than others.

Some local councils and planning authorities stipulate a maximum tolerable level of risk to property for developments within their jurisdictions. In these situations the risk must be assessed by a geotechnical practitioner. If stabilisation works are needed to meet the stipulated requirements these will normally have to be carried out as part of the development, or consent will be withheld.

TABLE 1: RISK TO PROPERTY

Qualitative Risk		Significance - Geotechnical engineering requirements
Very high	VH	**Unacceptable** without treatment. Extensive detailed investigation and research, planning and implementation of treatment options essential to reduce risk to Low. May be too expensive and not practical. Work likely to cost more than the value of the property.
High	H	**Unacceptable** without treatment. Detailed investigation, planning and implementation of treatment options required to reduce risk to acceptable level. Work would cost a substantial sum in relation to the value of the property.
Moderate	M	**May be tolerated** in certain circumstances (subject to regulator's approval) but requires investigation, planning and implementation of treatment options to reduce the risk to Low. Treatment options to reduce to Low risk should be implemented as soon as possible.
Low	L	**Usually acceptable** to regulators. Where treatment has been needed to reduce the risk to this level, ongoing maintenance is required.
Very Low	VL	**Acceptable**. Manage by normal slope maintenance procedures.

AUSTRALIAN GEOGUIDE LR7 (LANDSLIDE RISK)

Risk to Life

Most of us have some difficulty grappling with the concept of risk and deciding whether, or not, we are prepared to accept it. However, without doing any sort of analysis, or commissioning a report from an "expert", we all take risks every day. One of them is the risk of being killed in an accident. This is worth thinking about, because it tells us a lot about ourselves and can help to put an assessed risk into a meaningful context. By identifying activities that we either are, or are not, prepared to engage in we can get some indication of the maximum level of risk that we are prepared to take. This knowledge can help us to decide whether we really are able to accept a particular risk, or to tolerate a particular likelihood of loss, or damage, to our property (Table 2).

In Table 3, data from NSW for the years 1998 to 2002, and other sources, is presented. A risk of 1 in 100,000 means that, in any one year, 1 person is killed for every 100,000 people undertaking that particular activity. The NSW data assumes that the whole population undertakes the activity. That is, we are all at risk of being killed in a fire, or of choking on our food, but it is reasonable to assume that only people who go deep sea fishing run a risk of being killed while doing it.

It can be seen that the risks of dying as a result of falling, using a motor vehicle, or engaging in water-related activities (including bathing) are all greater than 1:100,000 and yet few people actively avoid situations where these risks are present. Some people are averse to flying and yet it represents a lower risk than choking to death on food. Importantly, the data also indicate that, even when the risk of dying as a consequence of a particular event is very small, it could still happen to any one of us any day. If this were not so, no one would ever be struck by lightning.

Most local councils and planning authorities that stipulate a tolerable risk to property also stipulate a tolerable risk to life. The AGS Practice Note Guideline recommends that 1:100,000 is tolerable in newly developed areas, where works can be carried out as part of the development to limit risk. The tolerable level is raised to 1:10,000 in established areas, where specific landslide hazards may have existed for many years. The distinction is deliberate and intended to prevent the concept of landslide risk management, for its own sake, becoming an unreasonable financial burden on existing communities. Acceptable risk is usually taken to be one tenth of the tolerable risk (1:1,000,000 for new developments and 1:100,000 for established areas) and efforts should be made to attain these where it is practicable and financially realistic to do so.

TABLE 3: RISK TO LIFE

Risk (deaths per participant per year)	**Activity/Event Leading to Death** (NSW data unless noted)
1:1,000	Deep sea fishing (UK)
1:1,000 to 1:10,000	Motor cycling, horse riding , ultra-light flying (Canada)
1:23,000	Motor vehicle use
1:30,000	Fall
1:70,000	Drowning
1:180,000	Fire/burn
1:660,000	Choking on food
1:1,000,000	Scheduled airlines (Canada)
1:2,300,000	Train travel
1:32,000,000	Lightning strike

More information relevant to your particular situation may be found in other AUSTRALIAN GEOGUIDES:

- GeoGuide LR1 - Introduction
- GeoGuide LR2 - Landslides
- GeoGuide LR3 - Landslides in Soil
- GeoGuide LR4 - Landslides in Rock
- GeoGuide LR5 - Water & Drainage
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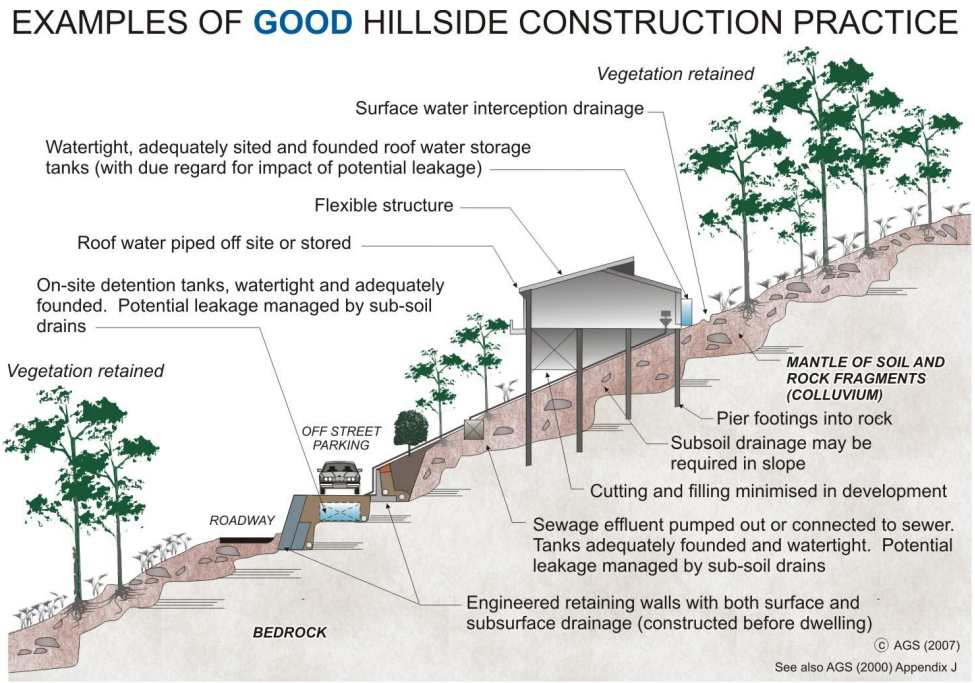
AUSTRALIAN GEOGUIDE LR8 (CONSTRUCTION PRACTICE)

HILLSIDE CONSTRUCTION PRACTICE

Sensible development practices are required when building on hillsides, particularly if the hillside has more than a low risk of instability (GeoGuide LR7). Only building techniques intended to maintain, or reduce, the overall level of landslide risk should be considered. Examples of good hillside construction practice are illustrated below.



WHY ARE THESE PRACTICES GOOD?

Roadways and parking areas - are paved and incorporate kerbs which prevent water discharging straight into the hillside (GeoGuide LR5).

Cuttings - are supported by retaining walls (GeoGuide LR6).

Retaining walls - are engineer designed to withstand the lateral earth pressures and surcharges expected, and include drains to prevent water pressures developing in the backfill. Where the ground slopes steeply down towards the high side of a retaining wall, the disturbing force (see GeoGuide LR6) can be two or more times that in level ground. Retaining walls must be designed taking these forces into account.

Sewage - whether treated or not is either taken away in pipes or contained in properly founded tanks so it cannot soak into the ground.

Surface water - from roofs and other hard surfaces is piped away to a suitable discharge point rather than being allowed to infiltrate into the ground. Preferably, the discharge point will be in a natural creek where ground water exits, rather than enters, the ground. Shallow, lined, drains on the surface can fulfil the same purpose (GeoGuide LR5).

Surface loads - are minimised. No fill embankments have been built. The house is a lightweight structure. Foundation loads have been taken down below the level at which a landslide is likely to occur and, preferably, to rock. This sort of construction is probably not applicable to soil slopes (GeoGuide LR3). If you are uncertain whether your site has rock near the surface, or is essentially a soil slope, you should engage a geotechnical practitioner to find out.

Flexible structures - have been used because they can tolerate a certain amount of movement with minimal signs of distress and maintain their functionality.

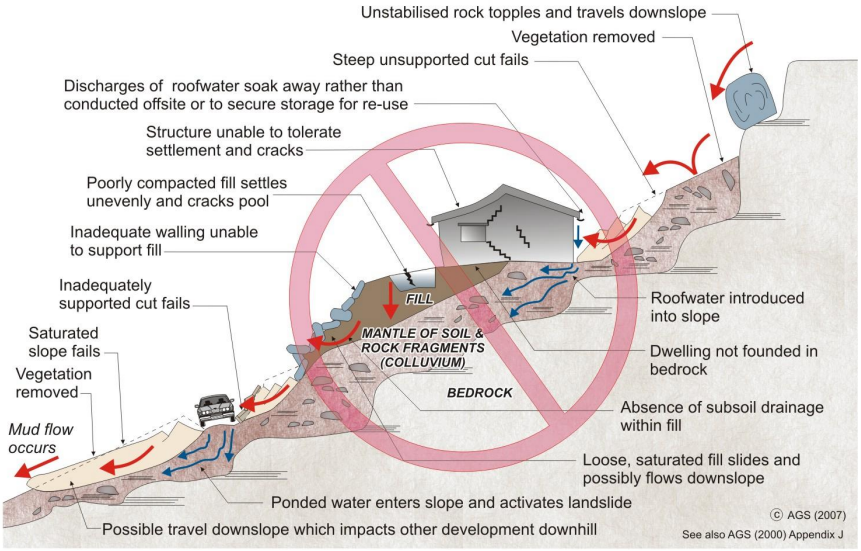
Vegetation clearance - on soil slopes has been kept to a reasonable minimum. Trees, and to a lesser extent smaller vegetation, take large quantities of water out of the ground every day. This lowers the ground water table, which in turn helps to maintain the stability of the slope. Large scale clearing can result in a rise in water table with a consequent increase in the likelihood of a landslide (GeoGuide LR5). An exception may have to be made to this rule on steep rock slopes where trees have little effect on the water table, but their roots pose a landslide hazard by dislodging boulders.

Possible effects of ignoring good construction practices are illustrated on page 2. Unfortunately, these poor construction practices are not as unusual as you might think and are often chosen because, on the face of it, they will save the developer, or owner, money. You should not lose sight of the fact that the cost and anguish associated with any one of the disasters illustrated, is likely to more than wipe out any apparent savings at the outset.

ADOPT GOOD PRACTICE ON HILLSIDE SITES

AUSTRALIAN GEOGUIDE LR8 (CONSTRUCTION PRACTICE)

EXAMPLES OF **POOR** HILLSIDE CONSTRUCTION PRACTICE



WHY ARE THESE PRACTICES POOR?

Roadways and parking areas - are unsurfaced and lack proper table drains (gutters) causing surface water to pond and soak into the ground.

Cut and fill - has been used to balance earthworks quantities and level the site leaving unstable cut faces and added large surface loads to the ground. Failure to compact the fill properly has led to settlement, which will probably continue for several years after completion. The house and pool have been built on the fill and have settled with it and cracked. Leakage from the cracked pool and the applied surface loads from the fill have combined to cause landslides.

Retaining walls - have been avoided, to minimise cost, and hand placed rock walls used instead. Without applying engineering design principles, the walls have failed to provide the required support to the ground and have failed, creating a very dangerous situation.

A heavy, rigid, house - has been built on shallow, conventional, footings. Not only has the brickwork cracked because of the resulting ground movements, but it has also become involved in a man-made landslide.

Soak-away drainage - has been used for sewage and surface water run-off from roofs and pavements. This water soaks into the ground and raises the water table (GeoGuide LR5). Subsoil drains that run along the contours should be avoided for the same reason. If felt necessary, subsoil drains should run steeply downhill in a chevron, or herring bone, pattern. This may conflict with the requirements for effluent and surface water disposal (GeoGuide LR9) and if so, you will need to seek professional advice.

Rock debris - from landslides higher up on the slope seems likely to pass through the site. Such locations are often referred to by geotechnical practitioners as "debris flow paths". Rock is normally even denser than ordinary fill, so even quite modest boulders are likely to weigh many tonnes and do a lot of damage once they start to roll. Boulders have been known to travel hundreds of metres downhill leaving behind a trail of destruction.

Vegetation - has been completely cleared, leading to a possible rise in the water table and increased landslide risk (GeoGuide LR5).

DON'T CUT CORNERS ON HILLSIDE SITES - OBTAIN ADVICE FROM A GEOTECHNICAL PRACTITIONER

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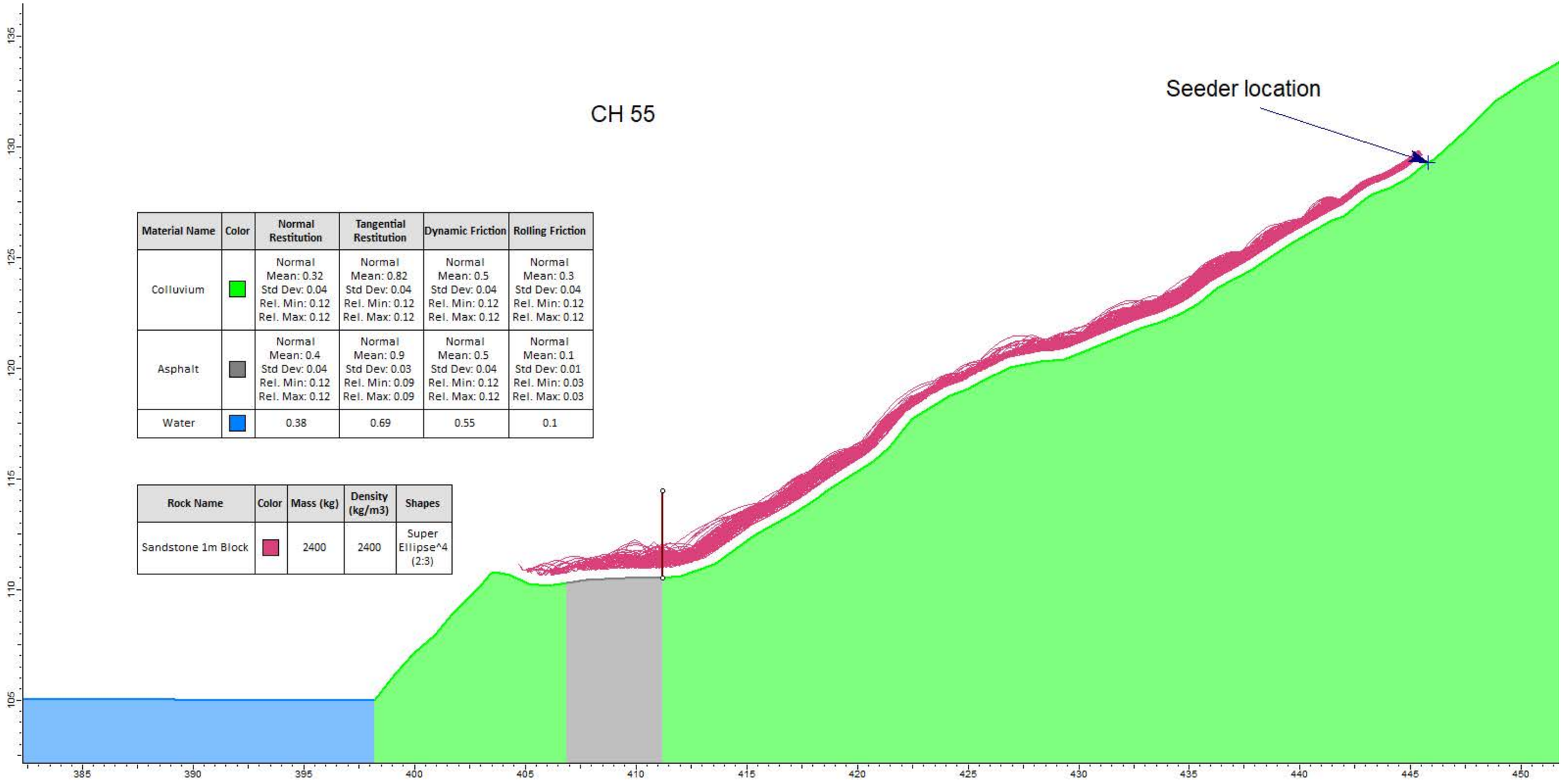
PRACTICE NOTE GUIDELINES FOR LANDSLIDE RISK MANAGEMENT 2007

APPENDIX G - SOME GUIDELINES FOR HILLSIDE CONSTRUCTION

	GOOD ENGINEERING PRACTICE	*POOR ENGINEERING PRACTICE*
ADVICE		
GEOTECHNICAL ASSESSMENT	Obtain advice from a qualified, experienced geotechnical practitioner at early stage of planning and before site works.	Prepare detailed plan and start site works before geotechnical advice.
PLANNING		
SITE PLANNING	Having obtained geotechnical advice, plan the development with the risk arising from the identified hazards and consequences in mind.	Plan development without regard for the Risk.
DESIGN AND CONSTRUCTION		
HOUSE DESIGN	Use flexible structures which incorporate properly designed brickwork, timber or steel frames, timber or panel cladding. Consider use of split levels. Use decks for recreational areas where appropriate.	Floor plans which require extensive cutting and filling. Movement intolerant structures.
SITE CLEARING	Retain natural vegetation wherever practicable.	Indiscriminately clear the site.
ACCESS & DRIVEWAYS	Satisfy requirements below for cuts, fills, retaining walls and drainage. Council specifications for grades may need to be modified. Driveways and parking areas may need to be fully supported on piers.	Excavate and fill for site access before geotechnical advice.
EARTHWORKS	Retain natural contours wherever possible.	Indiscriminatory bulk earthworks.
CUTS	Minimise depth. Support with engineered retaining walls or batter to appropriate slope. Provide drainage measures and erosion control.	Large scale cuts and benching. Unsupported cuts. Ignore drainage requirements
FILLS	Minimise height. Strip vegetation and topsoil and key into natural slopes prior to filling. Use clean fill materials and compact to engineering standards. Batter to appropriate slope or support with engineered retaining wall. Provide surface drainage and appropriate subsurface drainage.	Loose or poorly compacted fill, which if it fails, may flow a considerable distance including onto property below. Block natural drainage lines. Fill over existing vegetation and topsoil. Include stumps, trees, vegetation, topsoil, boulders, building rubble etc in fill.
ROCK OUTCROPS & BOULDERS	Remove or stabilise boulders which may have unacceptable risk. Support rock faces where necessary.	Disturb or undercut detached blocks or boulders.
RETAINING WALLS	Engineer design to resist applied soil and water forces. Found on rock where practicable. Provide subsurface drainage within wall backfill and surface drainage on slope above. Construct wall as soon as possible after cut/fill operation.	Construct a structurally inadequate wall such as sandstone flagging, brick or unreinforced blockwork. Lack of subsurface drains and weepholes.
FOOTINGS	Found within rock where practicable. Use rows of piers or strip footings oriented up and down slope. Design for lateral creep pressures if necessary. Backfill footing excavations to exclude ingress of surface water.	Found on topsoil, loose fill, detached boulders or undercut cliffs.
SWIMMING POOLS	Engineer designed. Support on piers to rock where practicable. Provide with under-drainage and gravity drain outlet where practicable. Design for high soil pressures which may develop on uphill side whilst there may be little or no lateral support on downhill side.	
DRAINAGE		
SURFACE	Provide at tops of cut and fill slopes. Discharge to street drainage or natural water courses. Provide general falls to prevent blockage by siltation and incorporate silt traps. Line to minimise infiltration and make flexible where possible. Special structures to dissipate energy at changes of slope and/or direction.	Discharge at top of fills and cuts. Allow water to pond on bench areas.
SUBSURFACE	Provide filter around subsurface drain. Provide drain behind retaining walls. Use flexible pipelines with access for maintenance. Prevent inflow of surface water.	Discharge roof runoff into absorption trenches.
SEPTIC & SULLAGE	Usually requires pump-out or mains sewer systems; absorption trenches may be possible in some areas if risk is acceptable. Storage tanks should be water-tight and adequately founded.	Discharge sullage directly onto and into slopes. Use absorption trenches without consideration of landslide risk.
EROSION CONTROL & LANDSCAPING	Control erosion as this may lead to instability. Revegetate cleared area.	Failure to observe earthworks and drainage recommendations when landscaping.
DRAWINGS AND SITE VISITS DURING CONSTRUCTION		
DRAWINGS	Building Application drawings should be viewed by geotechnical consultant	
SITE VISITS	Site Visits by consultant may be appropriate during construction/	
INSPECTION AND MAINTENANCE BY OWNER		
OWNER'S RESPONSIBILITY	Clean drainage systems; repair broken joints in drains and leaks in supply pipes. Where structural distress is evident see advice. If seepage observed, determine causes or seek advice on consequences.	

Appendix B

RocFall models



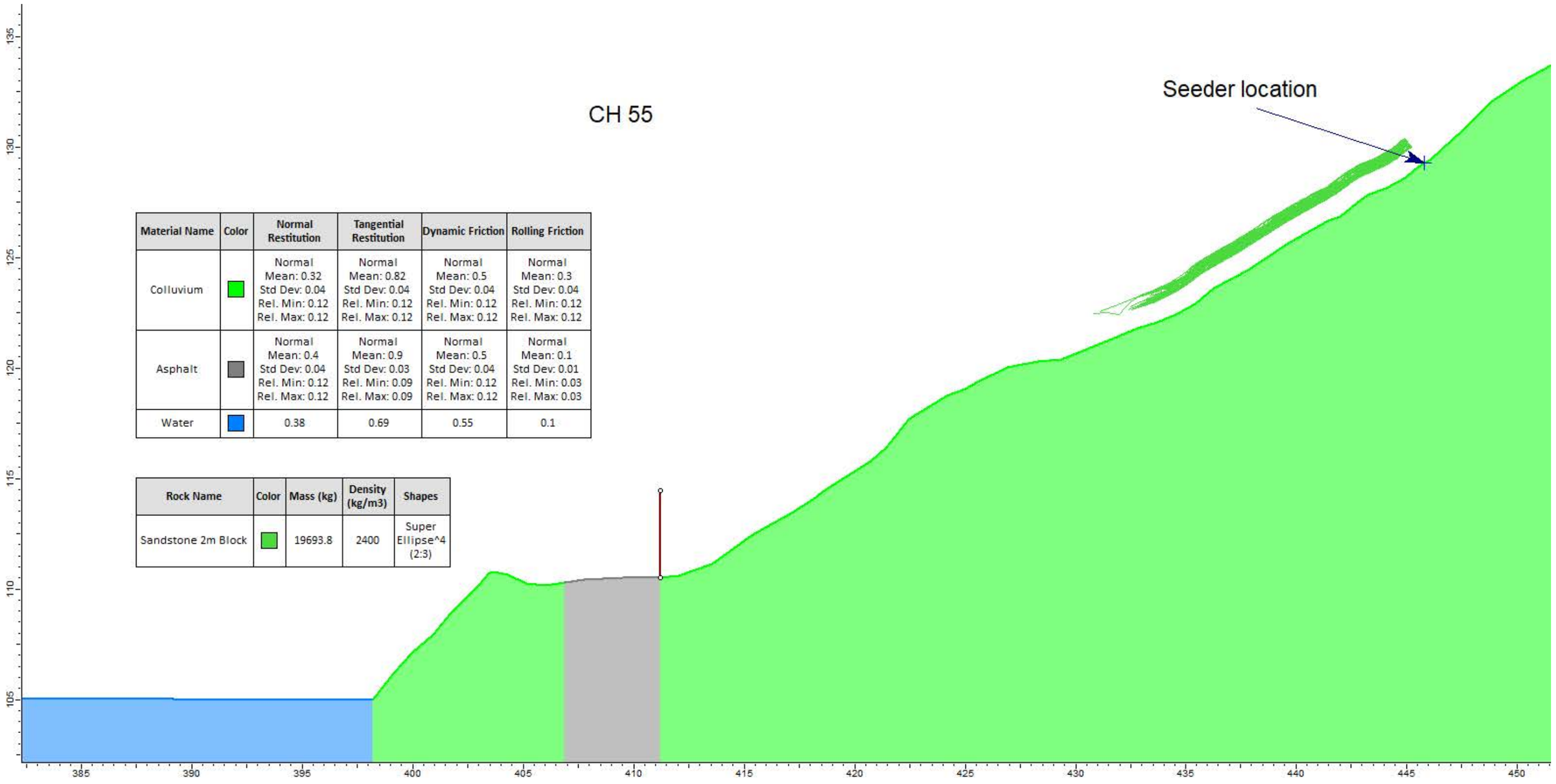
Material Name	Color	Normal Restitution	Tangential Restitution	Dynamic Friction	Rolling Friction
Colluvium		Normal Mean: 0.32 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12	Normal Mean: 0.82 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12	Normal Mean: 0.5 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12	Normal Mean: 0.3 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12
Asphalt		Normal Mean: 0.4 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12	Normal Mean: 0.9 Std Dev: 0.03 Rel. Min: 0.09 Rel. Max: 0.09	Normal Mean: 0.5 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12	Normal Mean: 0.1 Std Dev: 0.01 Rel. Min: 0.03 Rel. Max: 0.03
Water		0.38	0.69	0.55	0.1

Rock Name	Color	Mass (kg)	Density (kg/m3)	Shapes
Sandstone 1m Block		2400	2400	Super Ellipse^4 (2:3)

CH 55

Material Name	Color	Normal Restitution	Tangential Restitution	Dynamic Friction	Rolling Friction
Colluvium		Normal Mean: 0.32 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12	Normal Mean: 0.82 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12	Normal Mean: 0.5 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12	Normal Mean: 0.3 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12
Asphalt		Normal Mean: 0.4 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12	Normal Mean: 0.9 Std Dev: 0.03 Rel. Min: 0.09 Rel. Max: 0.09	Normal Mean: 0.5 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12	Normal Mean: 0.1 Std Dev: 0.01 Rel. Min: 0.03 Rel. Max: 0.03
Water		0.38	0.69	0.55	0.1

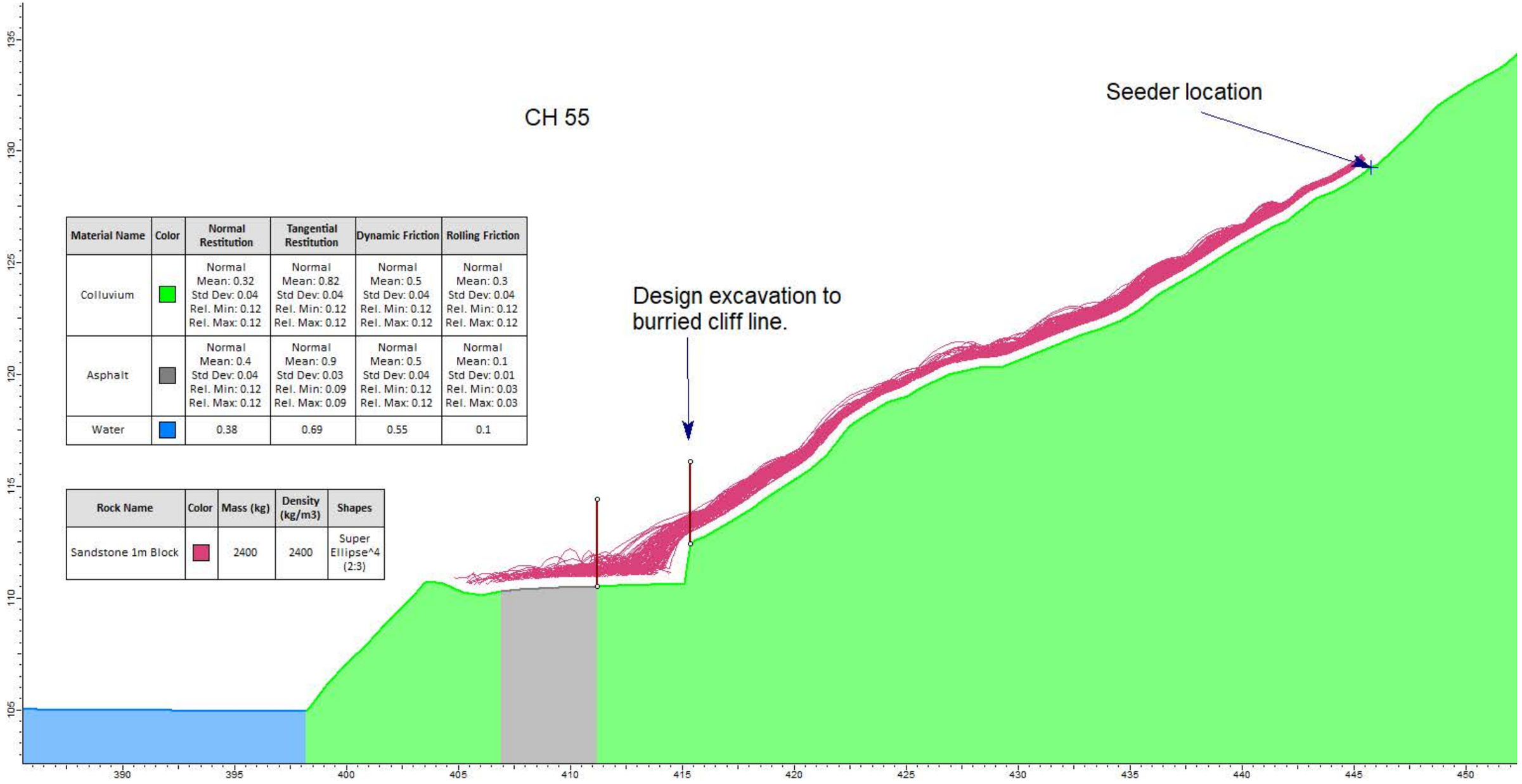
Rock Name	Color	Mass (kg)	Density (kg/m3)	Shapes
Sandstone 2m Block		19693.8	2400	Super Ellipse^4 (2:3)



CH 55

Material Name	Color	Normal Restitution	Tangential Restitution	Dynamic Friction	Rolling Friction
Colluvium		Normal Mean: 0.32 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12	Normal Mean: 0.82 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12	Normal Mean: 0.5 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12	Normal Mean: 0.3 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12
Asphalt		Normal Mean: 0.4 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12	Normal Mean: 0.9 Std Dev: 0.03 Rel. Min: 0.09 Rel. Max: 0.09	Normal Mean: 0.5 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12	Normal Mean: 0.1 Std Dev: 0.01 Rel. Min: 0.03 Rel. Max: 0.03
Water		0.38	0.69	0.55	0.1

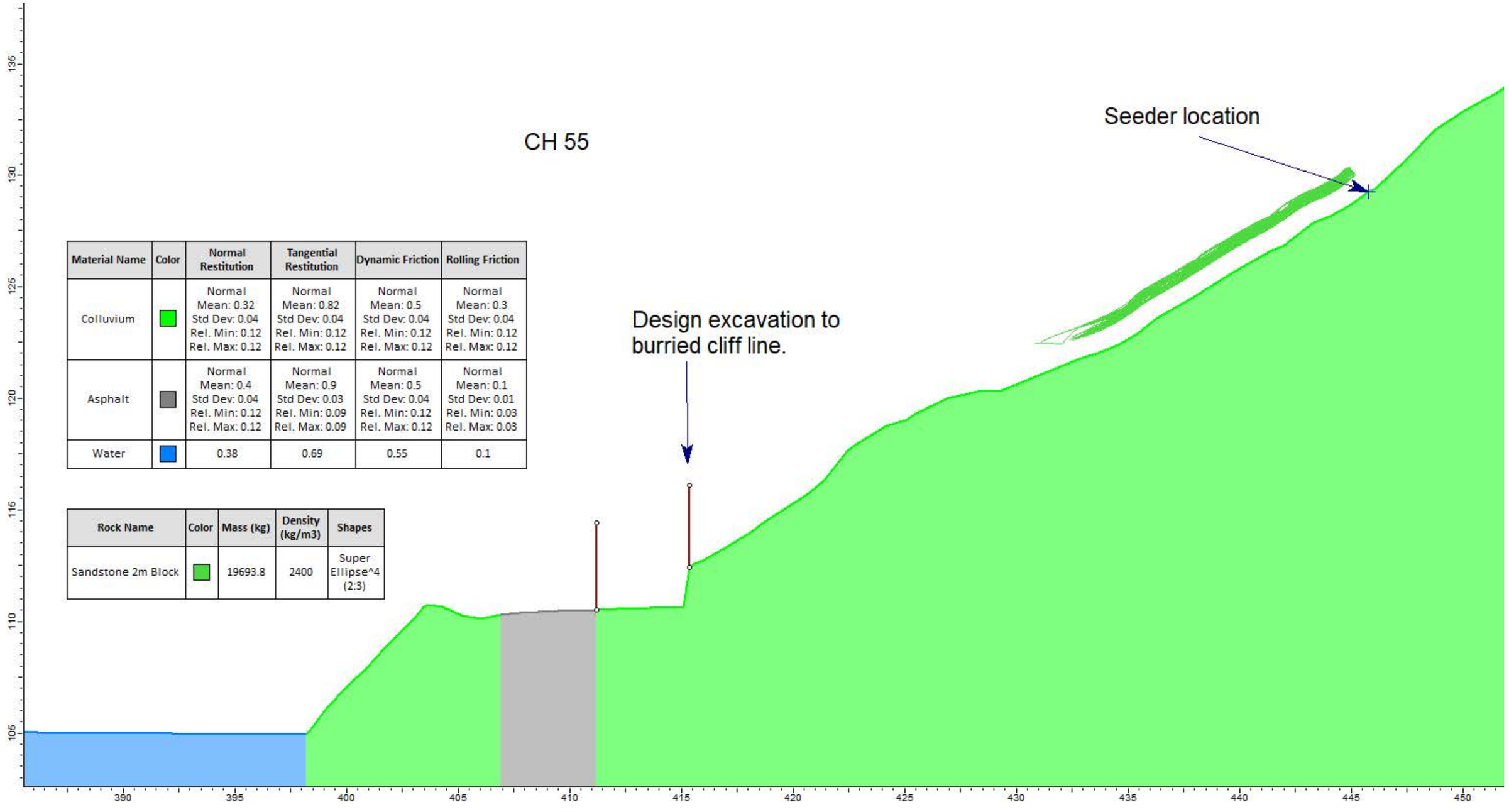
Rock Name	Color	Mass (kg)	Density (kg/m3)	Shapes
Sandstone 1m Block		2400	2400	Super Ellipse^4 (2:3)



CH 55

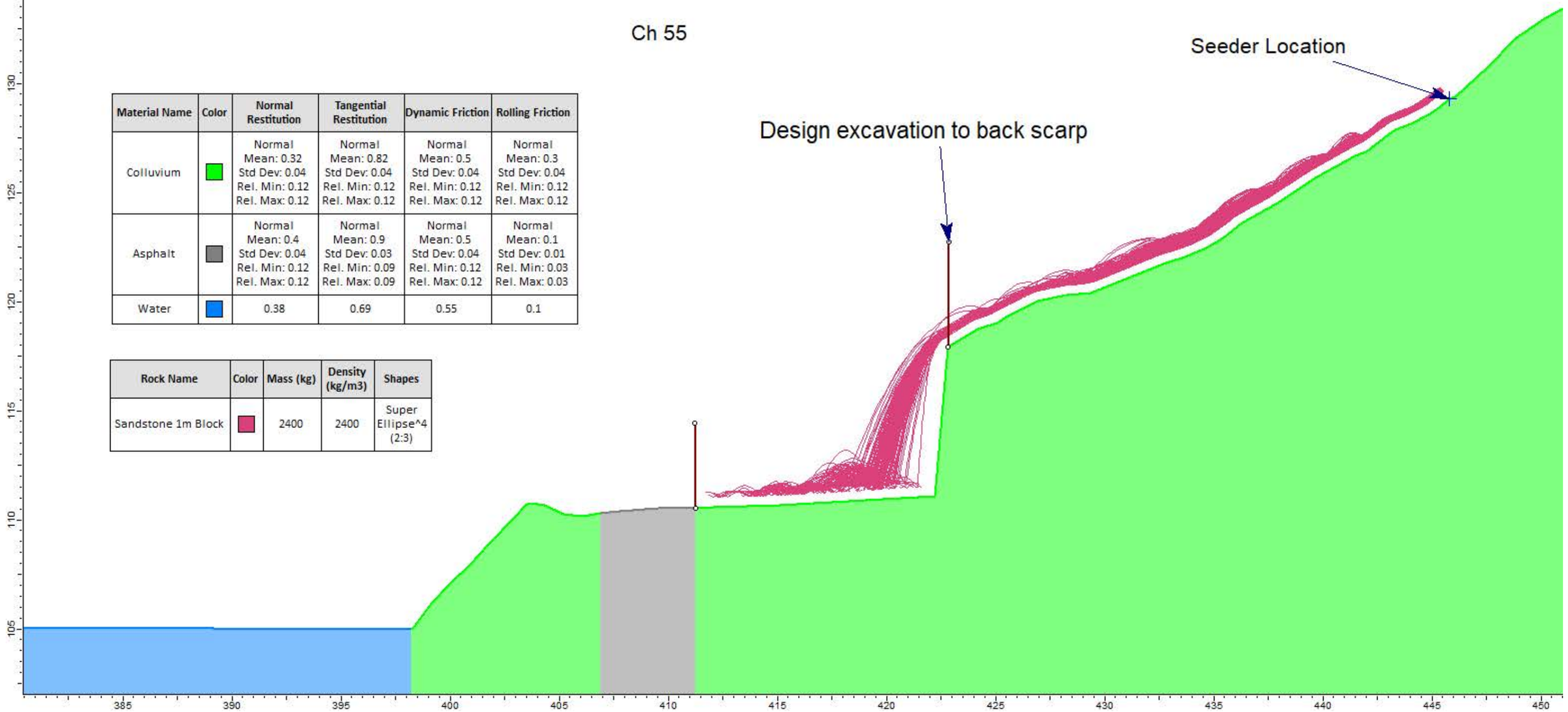
Material Name	Color	Normal Restitution	Tangential Restitution	Dynamic Friction	Rolling Friction
Colluvium		Normal Mean: 0.32 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12	Normal Mean: 0.82 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12	Normal Mean: 0.5 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12	Normal Mean: 0.3 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12
Asphalt		Normal Mean: 0.4 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12	Normal Mean: 0.9 Std Dev: 0.03 Rel. Min: 0.09 Rel. Max: 0.09	Normal Mean: 0.5 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12	Normal Mean: 0.1 Std Dev: 0.01 Rel. Min: 0.03 Rel. Max: 0.03
Water		0.38	0.69	0.55	0.1

Rock Name	Color	Mass (kg)	Density (kg/m3)	Shapes
Sandstone 2m Block		19693.8	2400	Super Ellipse^4 (2:3)



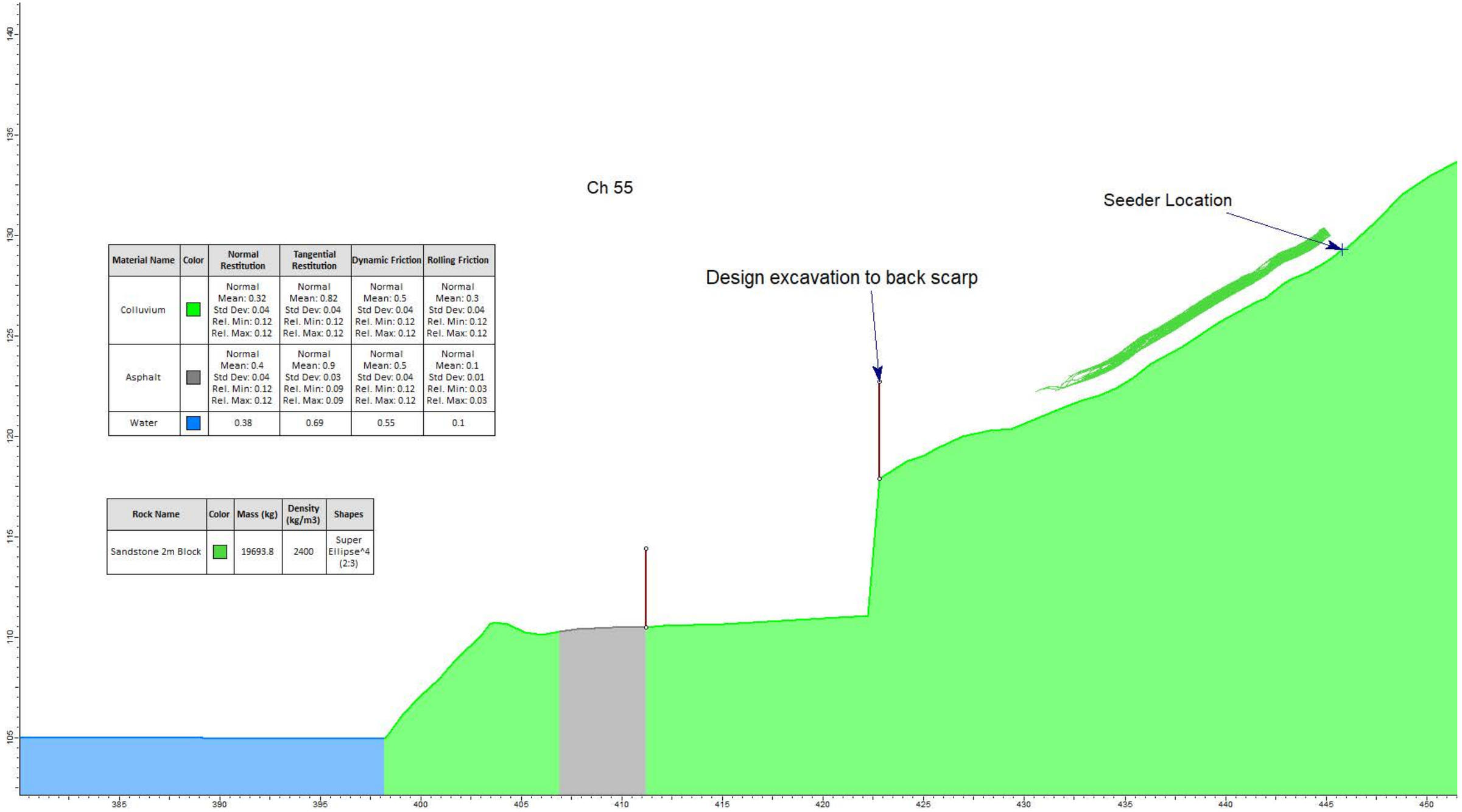
Material Name	Color	Normal Restitution	Tangential Restitution	Dynamic Friction	Rolling Friction
Colluvium		Normal Mean: 0.32 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12	Normal Mean: 0.82 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12	Normal Mean: 0.5 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12	Normal Mean: 0.3 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12
Asphalt		Normal Mean: 0.4 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12	Normal Mean: 0.9 Std Dev: 0.03 Rel. Min: 0.09 Rel. Max: 0.09	Normal Mean: 0.5 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12	Normal Mean: 0.1 Std Dev: 0.01 Rel. Min: 0.03 Rel. Max: 0.03
Water		0.38	0.69	0.55	0.1

Rock Name	Color	Mass (kg)	Density (kg/m3)	Shapes
Sandstone 1m Block		2400	2400	Super Ellipse^4 (2:3)



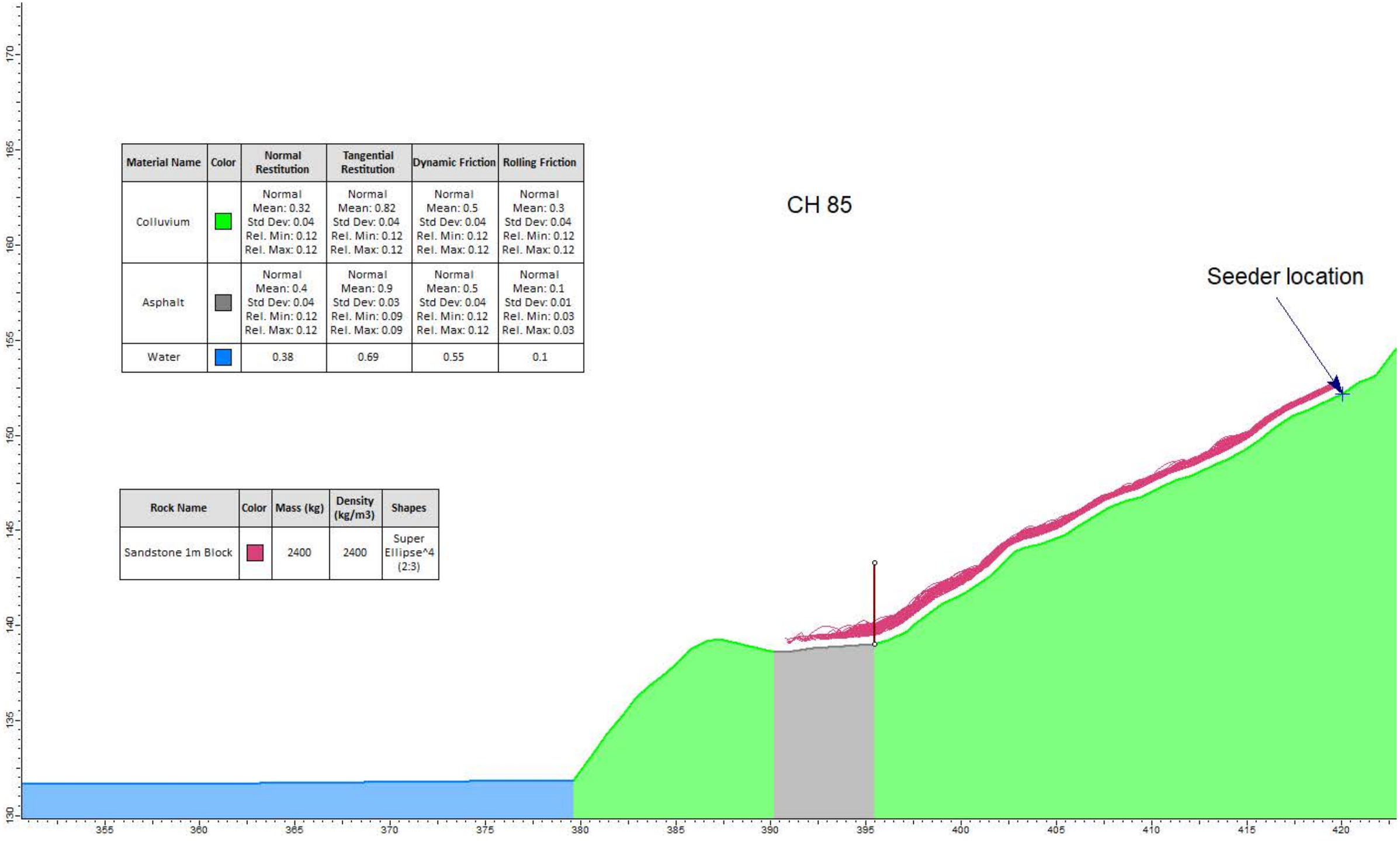
Material Name	Color	Normal Restitution	Tangential Restitution	Dynamic Friction	Rolling Friction
Colluvium		Normal Mean: 0.32 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12	Normal Mean: 0.82 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12	Normal Mean: 0.5 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12	Normal Mean: 0.3 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12
Asphalt		Normal Mean: 0.4 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12	Normal Mean: 0.9 Std Dev: 0.03 Rel. Min: 0.09 Rel. Max: 0.09	Normal Mean: 0.5 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12	Normal Mean: 0.1 Std Dev: 0.01 Rel. Min: 0.03 Rel. Max: 0.03
Water		0.38	0.69	0.55	0.1

Rock Name	Color	Mass (kg)	Density (kg/m3)	Shapes
Sandstone 2m Block		19693.8	2400	Super Ellipse^4 (2:3)



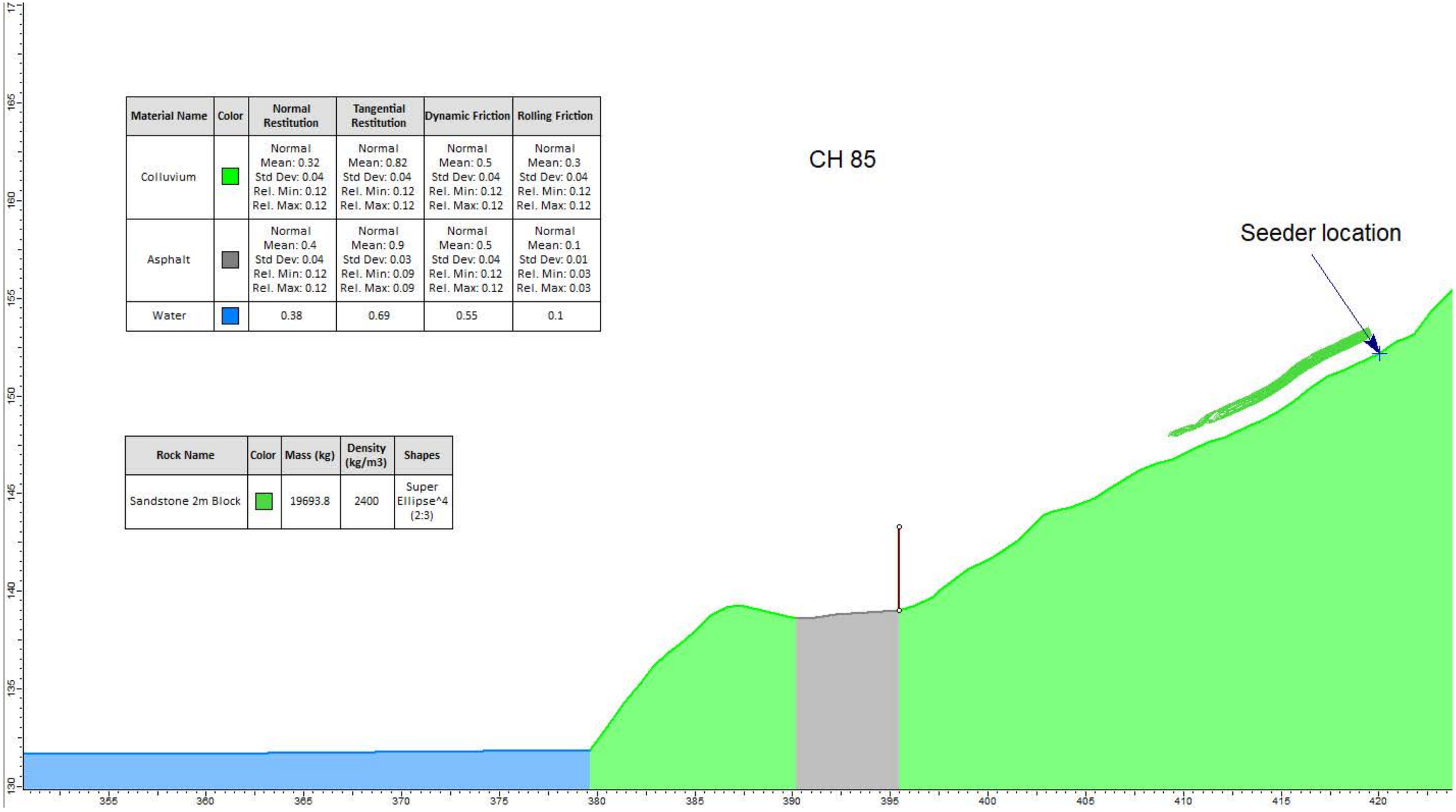
Material Name	Color	Normal Restitution	Tangential Restitution	Dynamic Friction	Rolling Friction
Colluvium		Normal Mean: 0.32 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12	Normal Mean: 0.82 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12	Normal Mean: 0.5 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12	Normal Mean: 0.3 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12
Asphalt		Normal Mean: 0.4 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12	Normal Mean: 0.9 Std Dev: 0.03 Rel. Min: 0.09 Rel. Max: 0.09	Normal Mean: 0.5 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12	Normal Mean: 0.1 Std Dev: 0.01 Rel. Min: 0.03 Rel. Max: 0.03
Water		0.38	0.69	0.55	0.1

Rock Name	Color	Mass (kg)	Density (kg/m3)	Shapes
Sandstone 1m Block		2400	2400	Super Ellipse^4 (2:3)



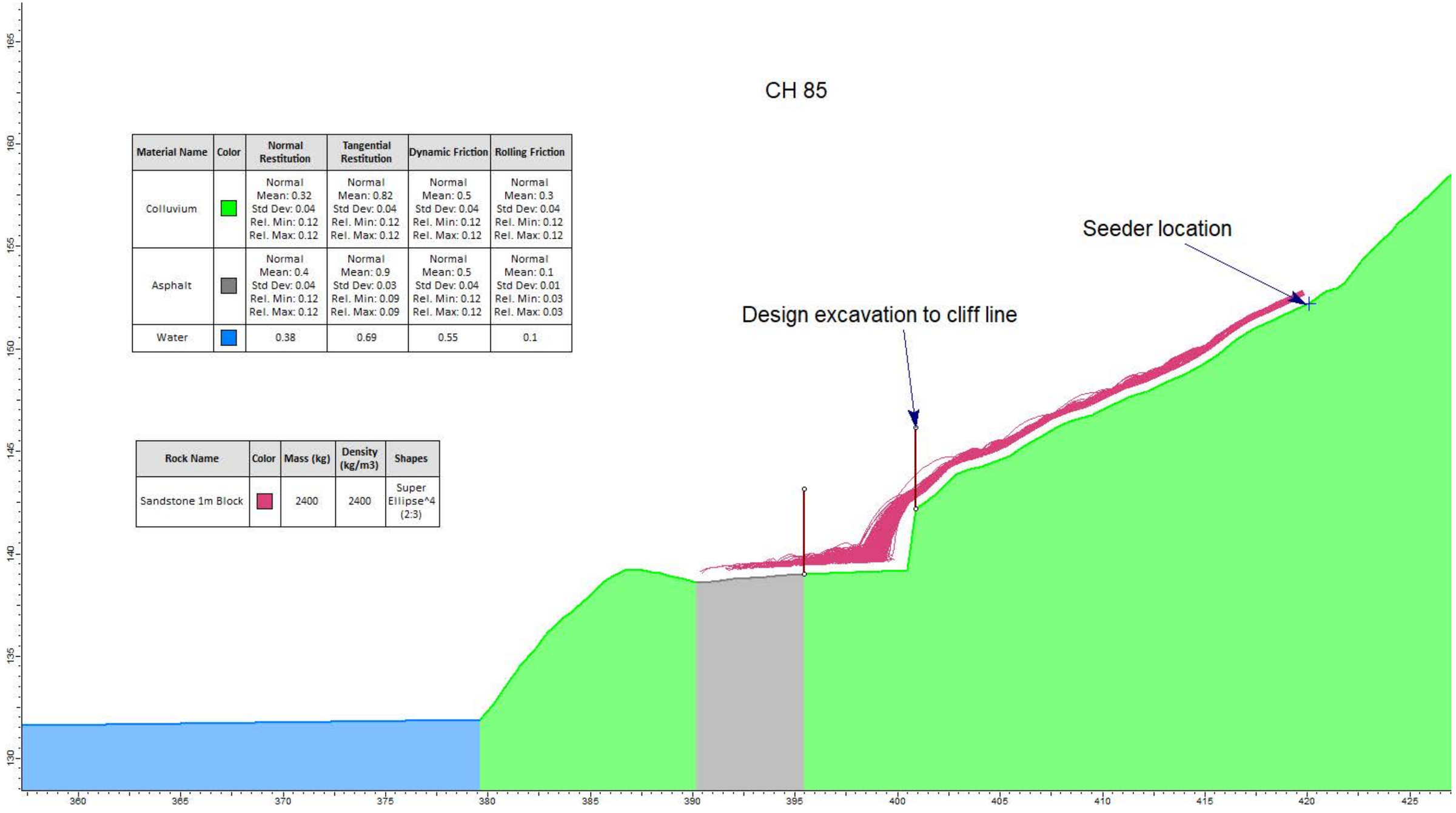
Material Name	Color	Normal Restitution	Tangential Restitution	Dynamic Friction	Rolling Friction
Colluvium		Normal Mean: 0.32 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12	Normal Mean: 0.82 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12	Normal Mean: 0.5 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12	Normal Mean: 0.3 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12
Asphalt		Normal Mean: 0.4 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12	Normal Mean: 0.9 Std Dev: 0.03 Rel. Min: 0.09 Rel. Max: 0.09	Normal Mean: 0.5 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12	Normal Mean: 0.1 Std Dev: 0.01 Rel. Min: 0.03 Rel. Max: 0.03
Water		0.38	0.69	0.55	0.1

Rock Name	Color	Mass (kg)	Density (kg/m3)	Shapes
Sandstone 2m Block		19693.8	2400	Super Ellipse^4 (2:3)



Material Name	Color	Normal Restitution	Tangential Restitution	Dynamic Friction	Rolling Friction
Colluvium		Normal Mean: 0.32 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12	Normal Mean: 0.82 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12	Normal Mean: 0.5 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12	Normal Mean: 0.3 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12
Asphalt		Normal Mean: 0.4 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12	Normal Mean: 0.9 Std Dev: 0.03 Rel. Min: 0.09 Rel. Max: 0.09	Normal Mean: 0.5 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12	Normal Mean: 0.1 Std Dev: 0.01 Rel. Min: 0.03 Rel. Max: 0.03
Water		0.38	0.69	0.55	0.1

Rock Name	Color	Mass (kg)	Density (kg/m3)	Shapes
Sandstone 1m Block		2400	2400	Super Ellipse^4 (2:3)



Material Name	Color	Normal Restitution	Tangential Restitution	Dynamic Friction	Rolling Friction
Colluvium		Normal Mean: 0.32 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12	Normal Mean: 0.82 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12	Normal Mean: 0.5 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12	Normal Mean: 0.3 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12
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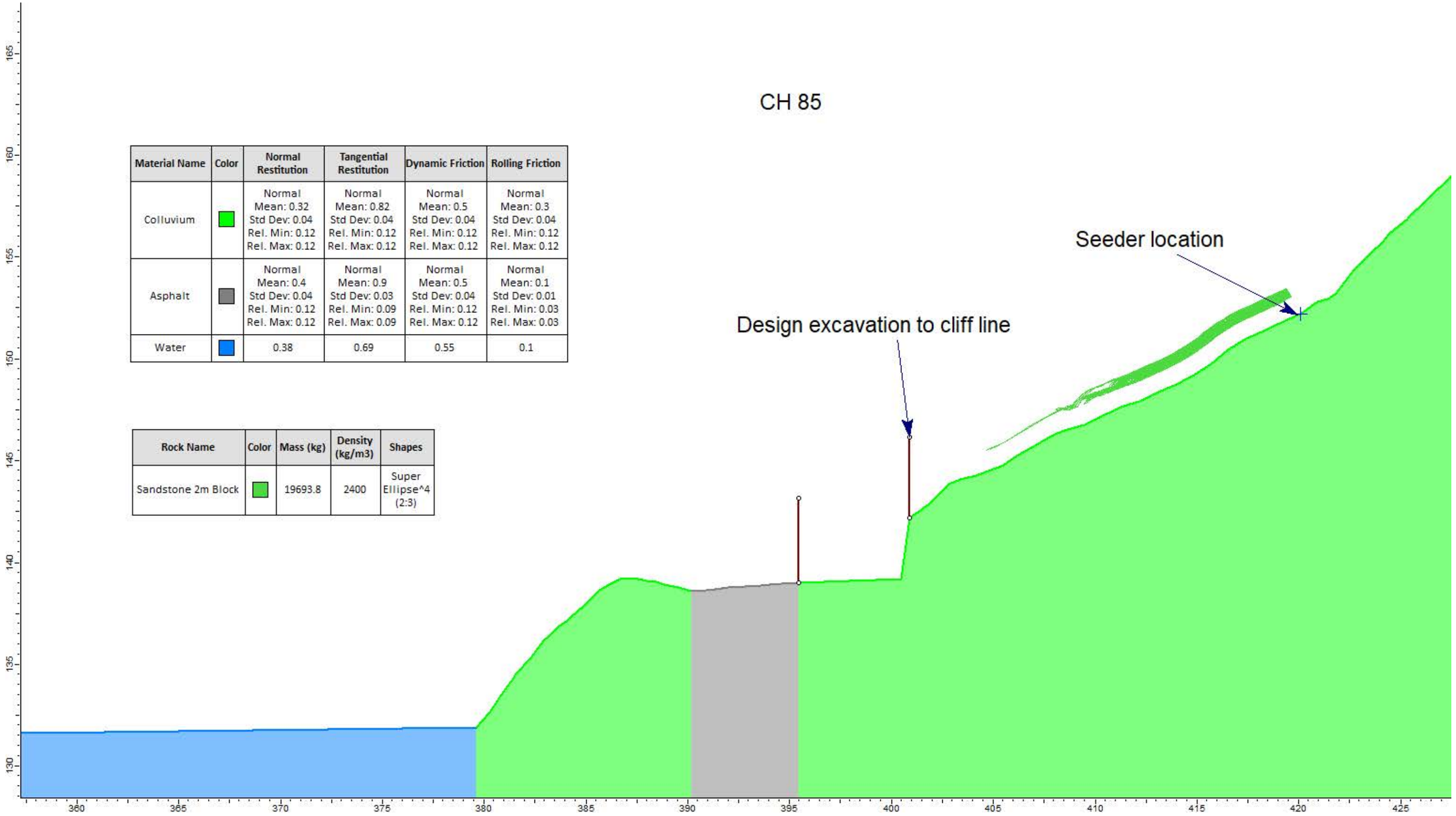
Water		0.38	0.69	0.55	0.1

Rock Name	Color	Mass (kg)	Density (kg/m3)	Shapes
Sandstone 2m Block		19693.8	2400	Super Ellipse^4 (2:3)



Material Name	Color	Normal Restitution	Tangential Restitution	Dynamic Friction	Rolling Friction
Colluvium		Normal Mean: 0.32 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12	Normal Mean: 0.82 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12	Normal Mean: 0.5 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12	Normal Mean: 0.3 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12
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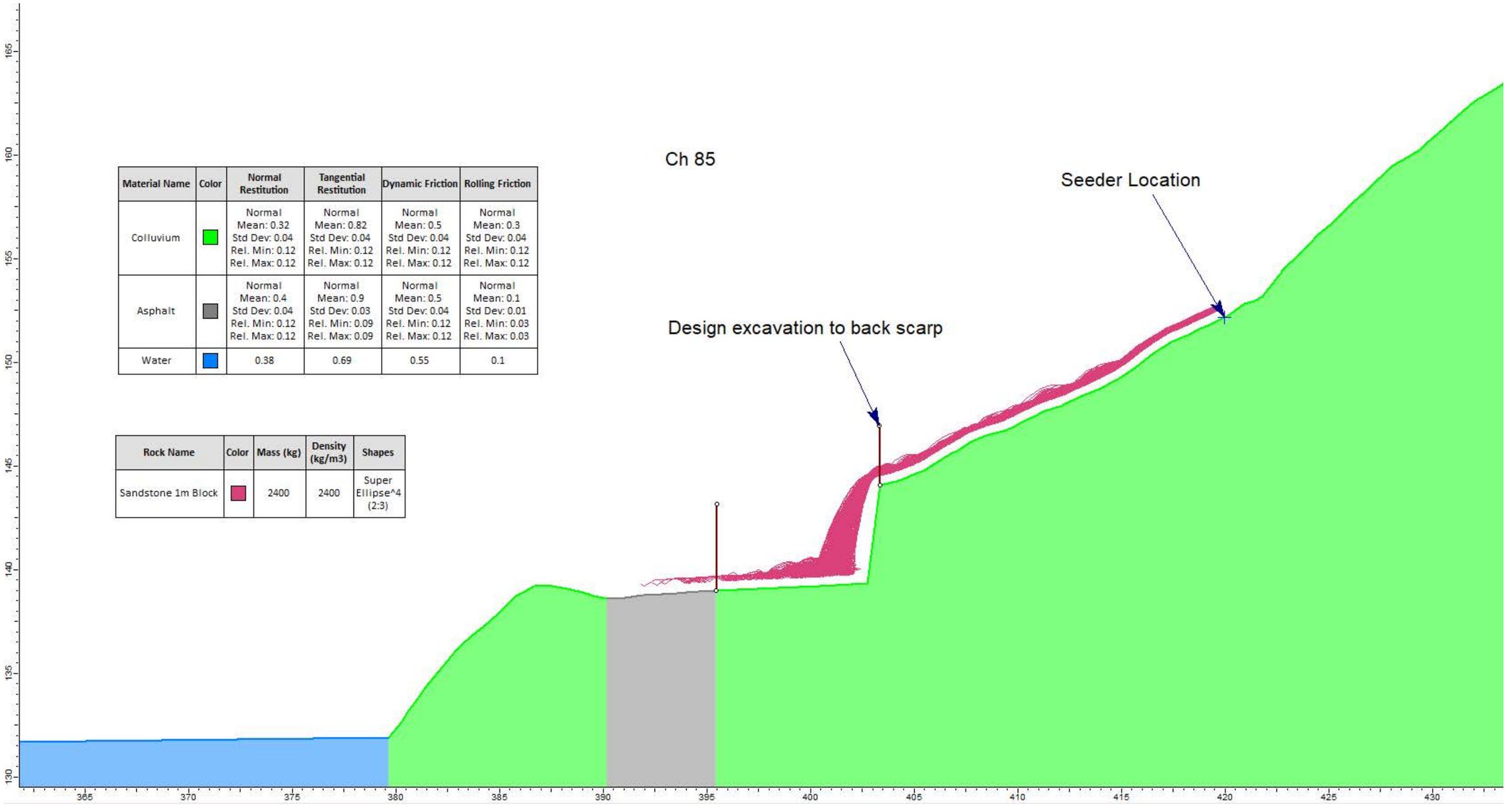
Water		0.38	0.69	0.55	0.1

Rock Name	Color	Mass (kg)	Density (kg/m3)	Shapes
Sandstone 1m Block		2400	2400	Super Ellipse^4 (2:3)



Material Name	Color	Normal Restitution	Tangential Restitution	Dynamic Friction	Rolling Friction
Colluvium		Normal Mean: 0.32 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12	Normal Mean: 0.82 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12	Normal Mean: 0.5 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12	Normal Mean: 0.3 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12
Asphalt		Normal Mean: 0.4 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12	Normal Mean: 0.9 Std Dev: 0.03 Rel. Min: 0.09 Rel. Max: 0.09	Normal Mean: 0.5 Std Dev: 0.04 Rel. Min: 0.12 Rel. Max: 0.12	Normal Mean: 0.1 Std Dev: 0.01 Rel. Min: 0.03 Rel. Max: 0.03
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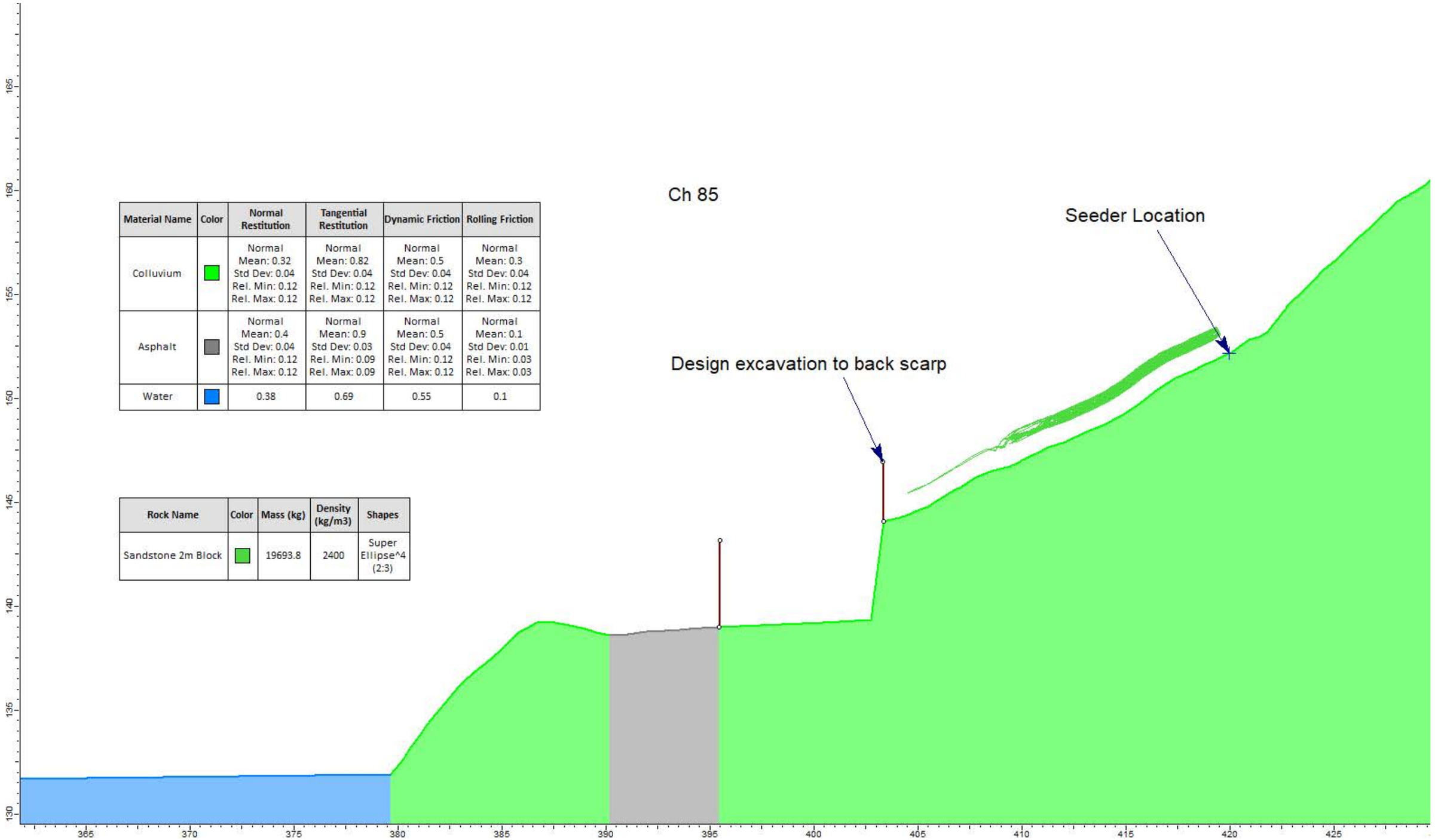
Rock Name	Color	Mass (kg)	Density (kg/m3)	Shapes
Sandstone 2m Block		19693.8	2400	Super Ellipse^4 (2:3)



Appendix C

Slope risk assessment sheets

Geotechnical Risk Analysis Summary
(Based on RMS SLA & CRA)

Asset Identification No.	**Settlers Rd CH60-100**		Asset Name	**Settlers Road - Pre-remediation**			Date	25-Aug-2023
Inspection Date	9-Aug-2023		Completed By:	AC		Checked By:	SA	
Asset Data	Asset Category		Max Slope Height (m)	>100m	Av. Slope Angle (°)	35-40	Material	Soil and rock
	Culvert No.		Capacity		Discharge		Depth of Cover	
	Description:		Slope failure					
Location								
Roadloc Coordinates	Road No		Start Link No		Finish Link No		L or R?	
	C/Way Code		Start Distance	CH60	Finish Distance	CH100	Length	40 m
GPS Coordinates (WGS84/GDA94)	Start		Latitude		Longitude		Elevation	
	Finish		Latitude		Longitude		Elevation	
MGA Coordinates	Start		Zone	56H	Easting	313008	Northing	6304984
	Finish		Zone	56H	Easting	312965	Northing	6305012
Plan Reference No.					Plan Start Chainage		L or R?	
Locality Name	Settlers Road, Wiseman Ferry NSW							
Road Data	AADT			Year of Count		Speed Limit (km/hr)		60-80
	No of Lanes	Prescribed Direction	1	Counter Direction		Site Distance Adequate? (Y/N)		Y
Risk Analysis								
Hazard/Failure Mechanism	**H1**	**H1'**	**H2'**	**H3'**	**H5**	**H6**	**H7**	**H8**
Hazard Type	Shallow slump (120 m3)	Large Slump (1,500 m3) with 1m blocks	Medium (0.5-1m) rockfall from upper colluvial slope	2m block above scarp (extra hazard SA 1Sept23)				
Slope Failure Dynamics Ratings								
Scale of Failure Rating - for Volume (S1 - S5)	S4	S3						
Scale of Failure Rating - for Block Size (S1 - S5)			S2	S1				
Velocity of Failure Rating (R1 - R5)	R2	R2	R1	R1				
Likelihood Rating (L1 - L6)	L3	L2	L3	L3				
Consequence Class Ratings								
Temporal Probability (T1 - T5)	T3	T3	T3	T3				
Vulnerability (V1 - V5)	V5	V3	V3	V2				
Consequence Class for Loss of Life (C1 - C5)	C5	C3	C3	C2				
Consequence Class for property damage etc (C1 - C5)	C3	C3	C3	C3				
Risk Analysis Ratings								
Event Magnitude (M1 - M5)	M3	M2	M2	M1				
Hazard Classification (H1 - H5)	H3	H2	H2	H2				
Assessed Risk Level (ARL1 - ARL5)	3	2	3	2				
Observations/Comments	H1 = pd 0.1, pt 0.1 H1' = pd 0.1, pt 1 H2' = pd 0.01, pt 0.1 H3' = pd 0.01, pt 0.1 NB - Current risk level ARL3 with 40 km/hr speed restrictions, single lane and wet weather closures.							

Geotechnical Risk Analysis Summary
(Based on RMS SLA & CRA)

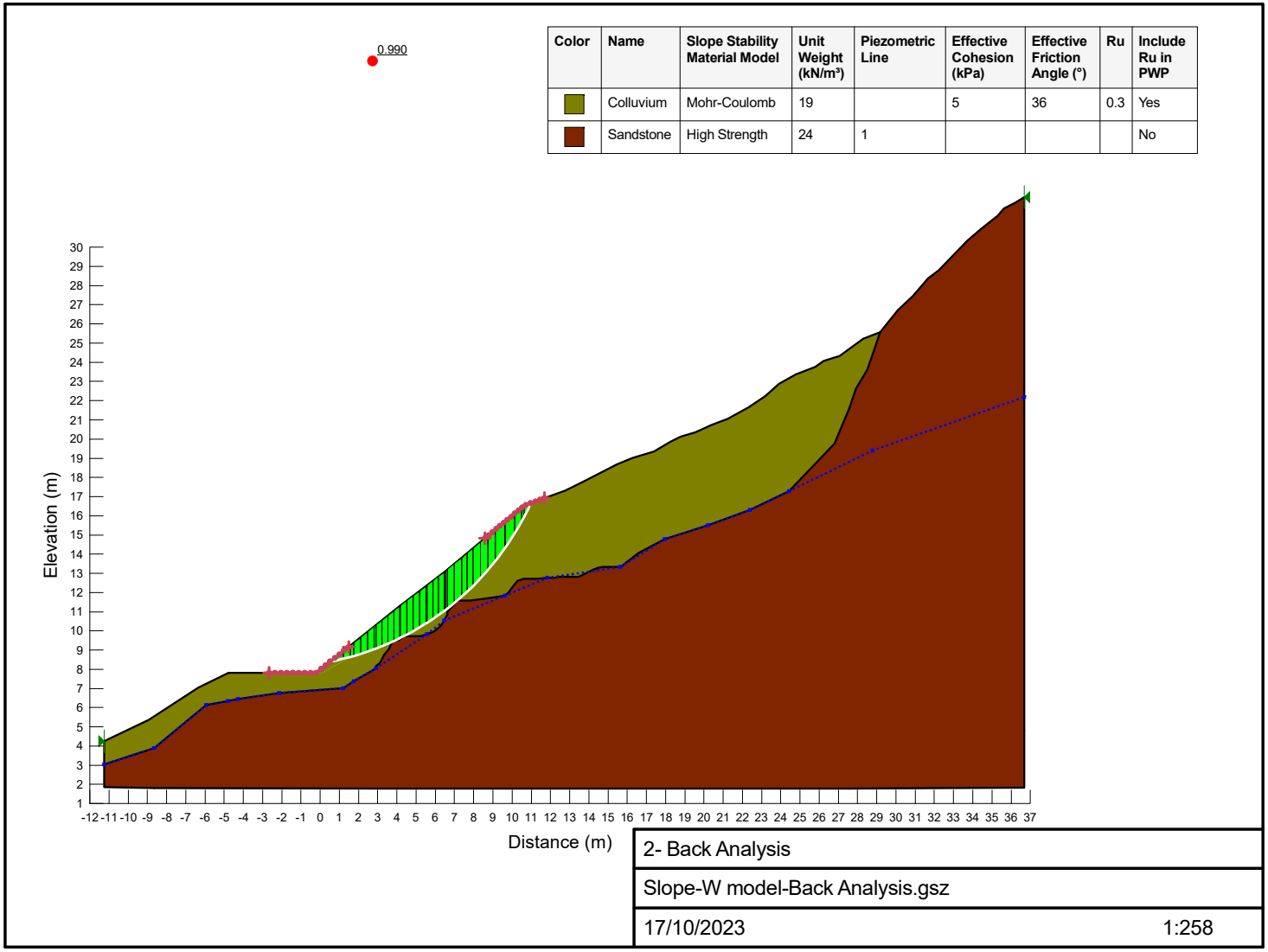
Asset Identification No.	**Settlers Rd CH60-100**		Asset Name	**ettlers Road - Currrent - with contro**			Date	25-Aug-2023
Inspection Date	9-Aug-2023		Completed By:	AC		Checked By:	SA	
Asset Data	Asset Category		Max Slope Height (m)	>100m	Av. Slope Angle (°)	35-40	Material	Soil and rock
	Culvert No.		Capacity		Discharge		Depth of Cover	
	Description:		Slope failure					
Location								
Roadloc Coordinates	Road No		Start Link No		Finish Link No		L or R?	
	C/Way Code		Start Distance	CH60	Finish Distance	CH100	Length	40 m
GPS Coordinates (WGS84/GDA94)	Start		Latitude		Longitude		Elevation	
	Finish		Latitude		Longitude		Elevation	
MGA Coordinates	Start		Zone	56H	Easting	313008	Northing	6304984
	Finish		Zone	56H	Easting	312965	Northing	6305012
Plan Reference No.					Plan Start Chainage		L or R?	
Locality Name	Settlers Road, Wiseman Ferry NSW							
Road Data	AADT			Year of Count		Speed Limit (km/hr)		40
	No of Lanes	Prescribed Direction	1	Counter Direction		Site Distance Adequate? (Y/N)		Y
Risk Analysis								
Hazard/Failure Mechanism	**H1**	**H1'**	**H2'**	**H3'**	**H5**	**H6**	**H7**	**H8**
Hazard Type	Shallow slump (120 m3)	Large Slump (1,500 m3) with 1m blocks	Medium (0.5-1m) rockfall from upper colluvial slope	2m block above scarp (extra hazard SA 1Sept23)				
Slope Failure Dynamics Ratings								
Scale of Failure Rating - for Volume (S1 - S5)	S4	S3						
Scale of Failure Rating - for Block Size (S1 - S5)			S2	S1				
Velocity of Failure Rating (R1 - R5)	R2	R2	R1	R1				
Likelihood Rating (L1 - L6)	**L4**	L2	L3	L3				
Consequence Class Ratings								
Temporal Probability (T1 - T5)	T3	T3	T3	T3				
Vulnerability (V1 - V5)	V5	**V4**	**V4**	**V3**				
Consequence Class for Loss of Life (C1 - C5)	C5	**C4**	**C4**	**C3**				
Consequence Class for property damage etc (C1 - C5)	C3	C3	C3	C3				
Risk Analysis Ratings								
Event Magnitude (M1 - M5)	M3	M2	M2	M1				
Hazard Classification (H1 - H5)	H3	H2	H2	H2				
Assessed Risk Level (ARL1 - ARL5)	**4**	**3**	**4**	**3**				
Observations/Comments	H1 = pd 0.1, **pt 0.01** H1' = pd 0.1, pt 1 H2' = pd 0.01, pt 0.1 H3' = pd 0.01, pt 0.1 NB - Current risk level ARL3 with 40 km/hr speed restrictions, single lane and wet weather closures.							

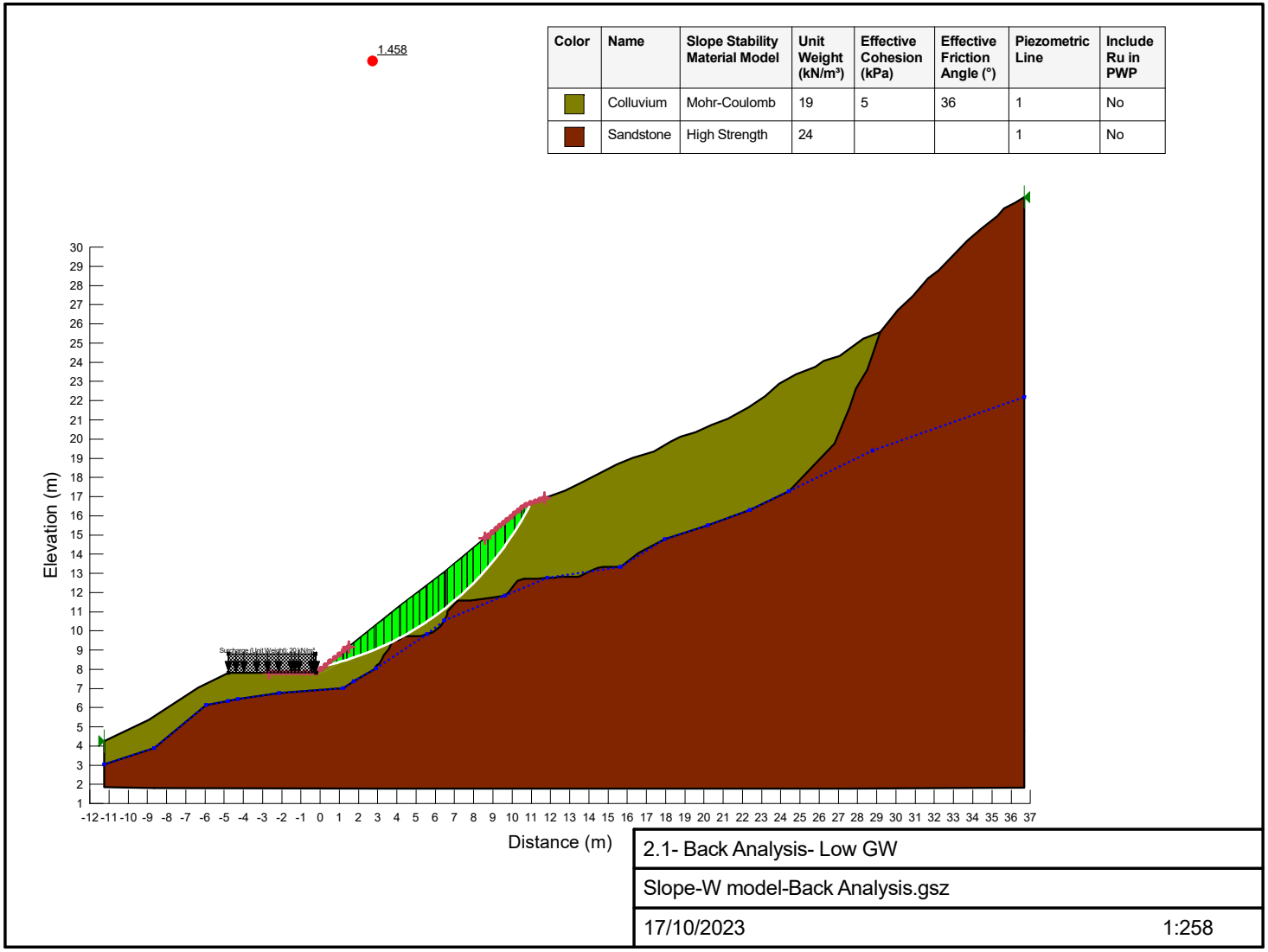
Geotechnical Risk Analysis Summary
(Based on RMS SLA & CRA)

Asset Identification No.	**Settlers Rd CH60-100**		Asset Name	**Settlers Road - current condition**			Date	23-Oct-2023
Inspection Date	**Post remediation assessment**		Completed By:	AC		Checked By:	SA	
Asset Data	Asset Category		Max Slope Height (m)	>100m	Av. Slope Angle (°)	35-40	Material	Soil and rock
	Culvert No.		Capacity		Discharge		Depth of Cover	
	Description:		Slope failure					
Location								
Roadloc Coordinates	Road No		Start Link No		Finish Link No		L or R?	
	C/Way Code		Start Distance	CH60	Finish Distance	CH100	Length	40 m
GPS Coordinates (WGS84/GDA94)	Start		Latitude		Longitude		Elevation	
	Finish		Latitude		Longitude		Elevation	
MGA Coordinates	Start		Zone	56H	Easting	313008	Northing	6304984
	Finish		Zone	56H	Easting	312965	Northing	6305012
Plan Reference No.					Plan Start Chainage		L or R?	
Locality Name	Settlers Road, Wiseman Ferry NSW							
Road Data	AADT			Year of Count		Speed Limit (km/hr)		60-80
	No of Lanes	Prescribed Direction	1	Counter Direction		Site Distance Adequate? (Y/N)		Y
Risk Analysis								
Hazard/Failure Mechanism	**H1**	**H1'**	**H2'**	**H3'**	**H5**	**H6**	**H7**	**H8**
Hazard Type	Shallow slump (120 m3)	Large Slump (1,500 m3) with 1m blocks	Medium (0.5-1m) rockfall from upper colluvial slope	2m block above scarp (extra hazard SA 1Sept23)				
Slope Failure Dynamics Ratings								
Scale of Failure Rating - for Volume (S1 - S5)	Hazard eliminated	S3						
Scale of Failure Rating - for Block Size (S1 - S5)			S2	S1				
Velocity of Failure Rating (R1 - R5)		R2	R1	R1				
Likelihood Rating (L1 - L6)		L4	L4	L4				
Consequence Class Ratings								
Temporal Probability (T1 - T5)		T3	T3	T3				
Vulnerability (V1 - V5)		V3	V3	V2				
Consequence Class for Loss of Life (C1 - C5)		C3	C3	C2				
Consequence Class for property damage etc (C1 - C5)		C3	C3	C3				
Risk Analysis Ratings								
Event Magnitude (M1 - M5)	N/A	M2	M2	M1				
Hazard Classification (H1 - H5)	N/A	H2	H2	H2				
Assessed Risk Level (ARL1 - ARL5)	N/A	ARL4	ARL4	ARL3				
Observations/Comments	H1 = removed H1' = Ret wall failure - pd 0.001, pt 1 H2' = pd 0.01, pt 0.01 - pt increased due to catch zone H3' = pd 0.01, pt 0.01 - pt increased due to catch zone							

Appendix D

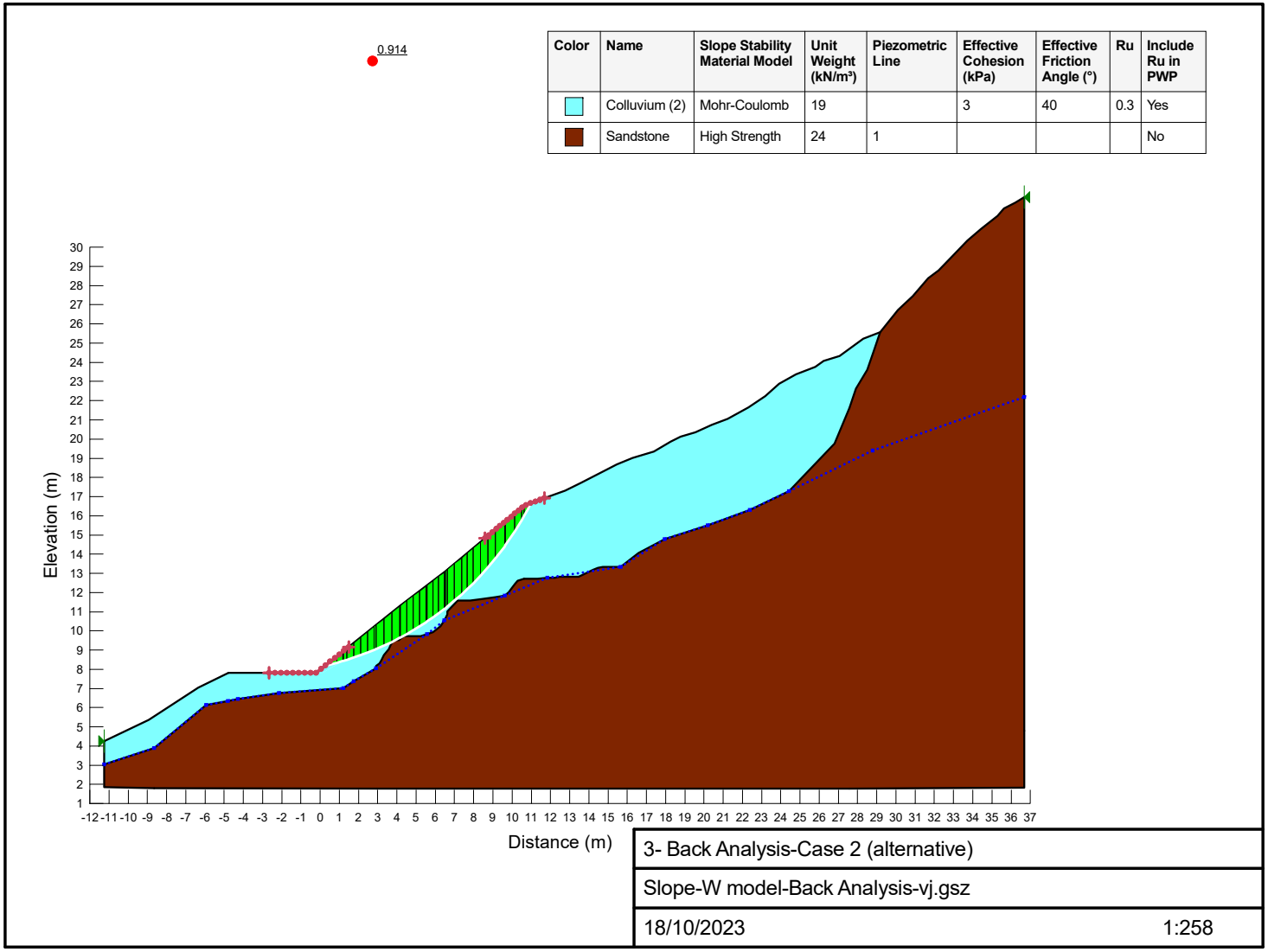
Soil nail analyses and design checks


0.990
Color
Name
Slope Stability Material Model
Unit Weight (kN/m³)
Piezometric Line
Effective Cohesion (kPa)
Effective Friction Angle (°)
Ru
Include Ru in PWP
Colluvium
Mohr-Coulomb
19
5
36
0.3
Yes
Sandstone
High Strength
24
1
No
Elevation (m)
Distance (m)
2- Back Analysis
Slope-W model-Back Analysis.gsz
17/10/2023
1:258



Color	Name	Slope Stability Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Piezometric Line	Include Ru in PWP
	Colluvium	Mohr-Coulomb	19	5	36	1	No
	Sandstone	High Strength	24			1	No

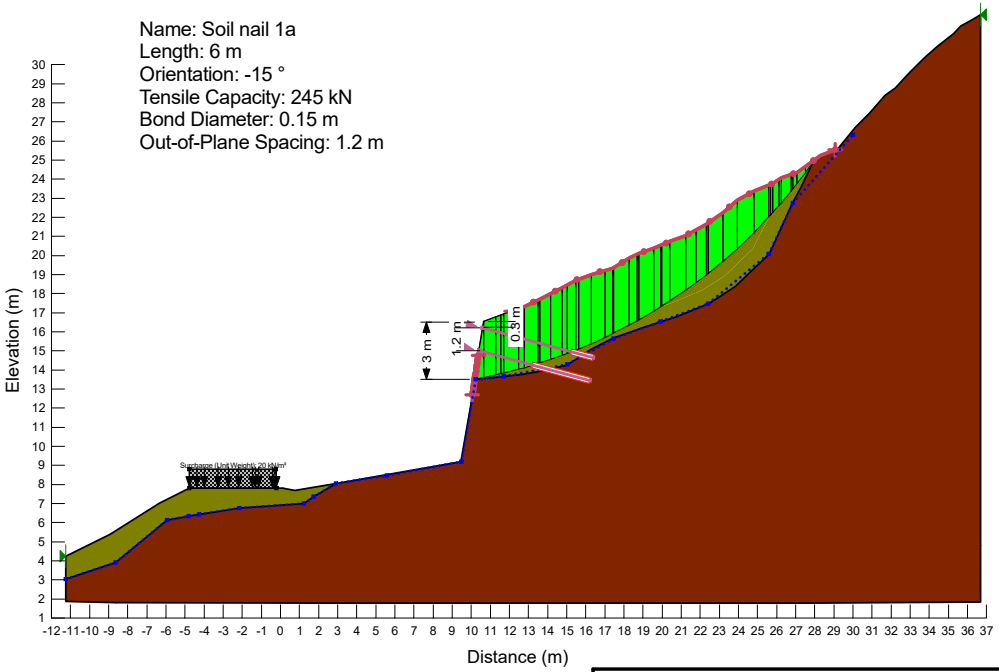
2.1- Back Analysis- Low GW	
Slope-W model-Back Analysis.gsz	
17/10/2023	1:258


0.914
Color | Name | Slope Stability Material Model | Unit Weight (kN/m³) | Piezometric Line | Effective Cohesion (kPa) | Effective Friction Angle (°) | Ru | Include Ru in PWP
Colluvium (2) | Mohr-Coulomb | 19 | | 3 | 40 | 0.3 | Yes
Sandstone | High Strength | 24 | 1 | | | | No
Elevation (m)
Distance (m)
3- Back Analysis-Case 2 (alternative)
Slope-W model-Back Analysis-vj.gsz
18/10/2023
1:258

1.904

Color	Name	Slope Stability Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Piezometric Line	Include Ru in PWP
	Colluvium	Mohr-Coulomb	19	5	36	1	No
	Sandstone	High Strength	24			1	No

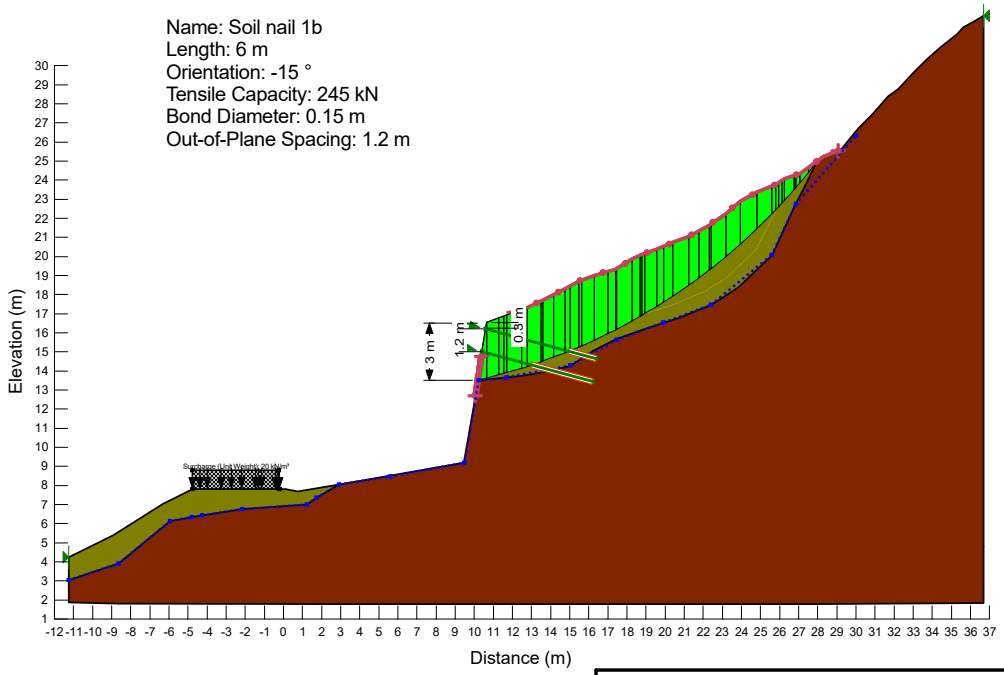
Name: Soil nail 1a
Length: 6 m
Orientation: -15 °
Tensile Capacity: 245 kN
Bond Diameter: 0.15 m
Out-of-Plane Spacing: 1.2 m



2.2a Soil nail_Long term- 3m height
Slope-W model-Soil Nail option.gsz
17/10/2023 1:300

1.217

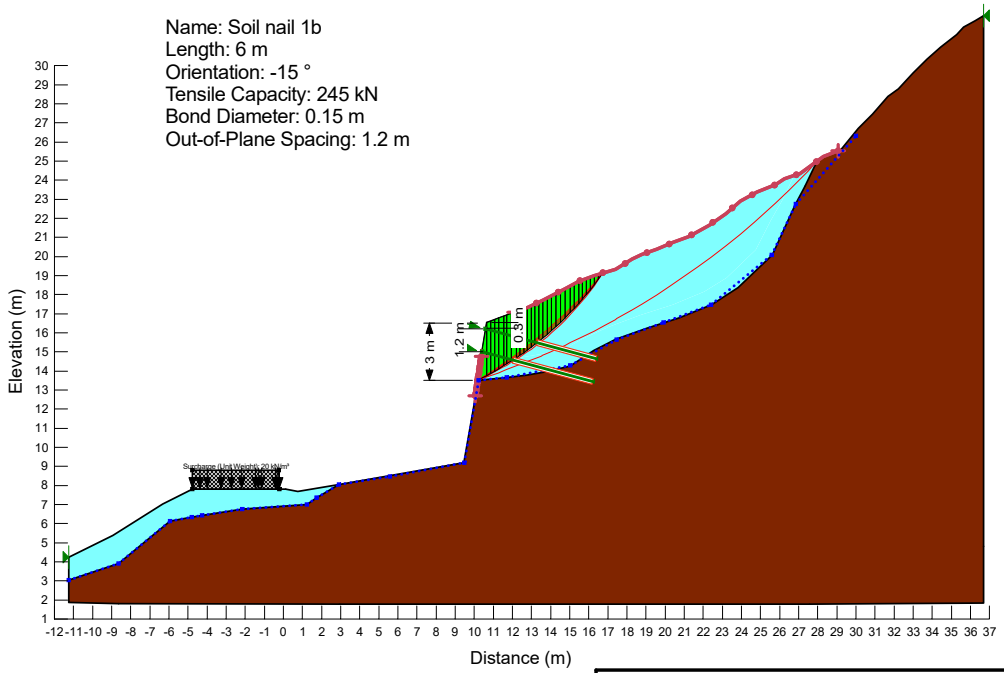
Color	Name	Slope Stability Material Model	Unit Weight (kN/m³)	Piezometric Line	Effective Cohesion (kPa)	Effective Friction Angle (°)	Ru	Include Ru in PWP
	Colluvium	Mohr-Coulomb	19		5	36	0.3	Yes
	Sandstone	High Strength	24	1				No



2.2b Soil nail_Short term- 3m height
Slope-W model-Soil Nail option.gsz
17/10/2023 1:300

1.240

Color	Name	Slope Stability Material Model	Unit Weight (kN/m³)	Piezometric Line	Effective Cohesion (kPa)	Effective Friction Angle (°)	Ru	Include Ru in PWP
	Colluvium (2)	Mohr-Coulomb	19		3	40	0.3	Yes
	Sandstone	High Strength	24	1				No

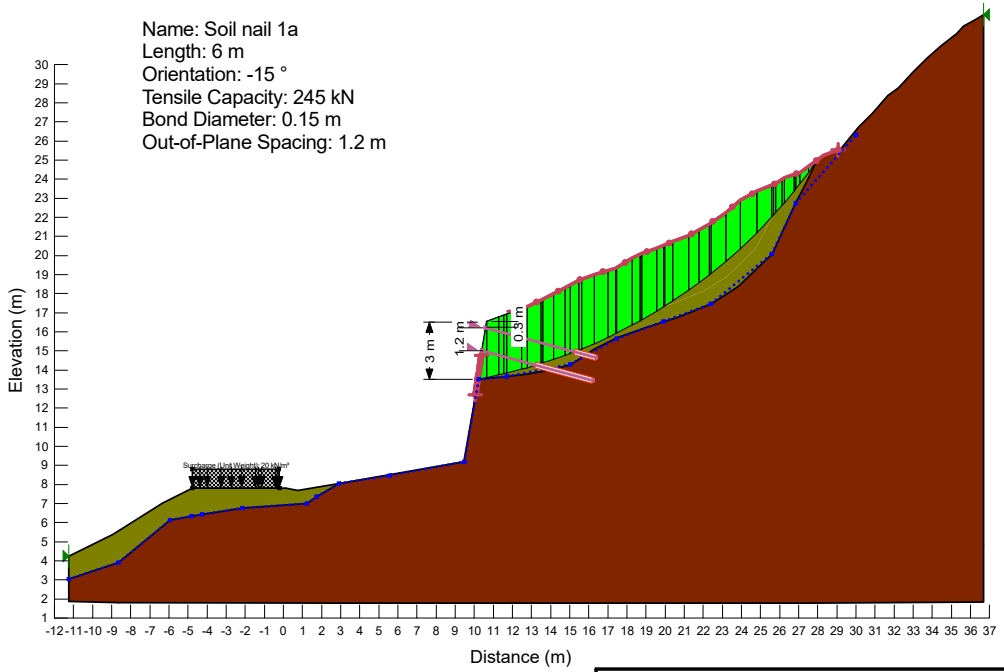


2.2b Soil nail_Short term- 3m height (c'=3kPa and f'=40deg)
Slope-W model-Soil Nail option.gsz
18/10/2023 1:300

1.596

Color	Name	Slope Stability Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Piezometric Line	Include Ru in PWP
	Colluvium	Mohr-Coulomb	19	5	36	1	No
	Sandstone	High Strength	24			1	No

Name: Soil nail 1a
Length: 6 m
Orientation: -15 °
Tensile Capacity: 245 kN
Bond Diameter: 0.15 m
Out-of-Plane Spacing: 1.2 m

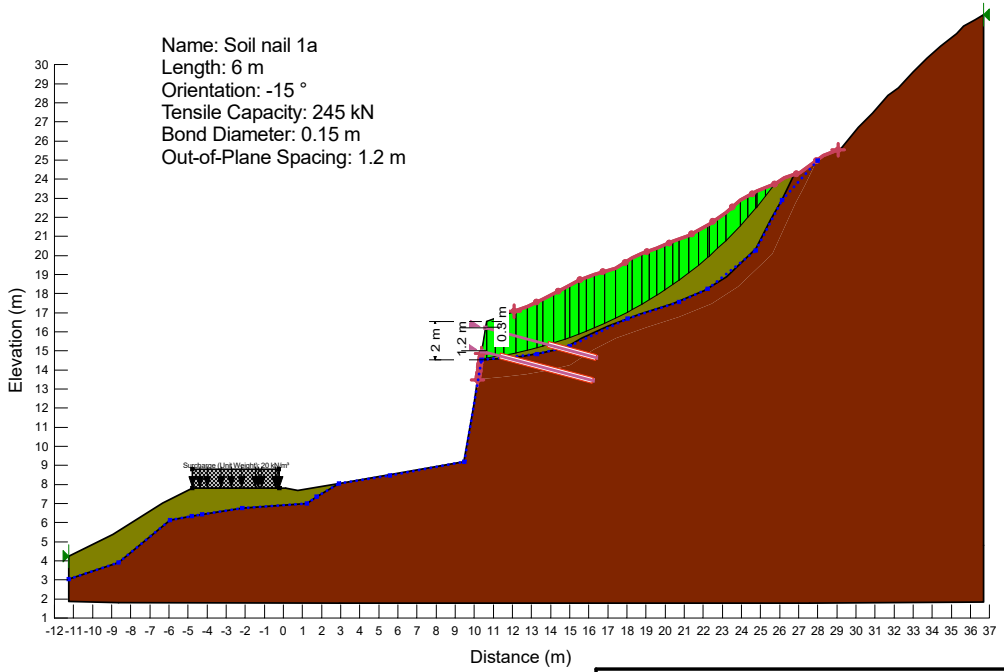


2.2a Soil nail_Seismic- 3m height
Slope-W model-Soil Nail option.gsz
18/10/2023 1:300

2.779

Color	Name	Slope Stability Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Piezometric Line	Include Ru in PWP
	Colluvium	Mohr-Coulomb	19	5	36	1	No
	Sandstone	High Strength	24			1	No

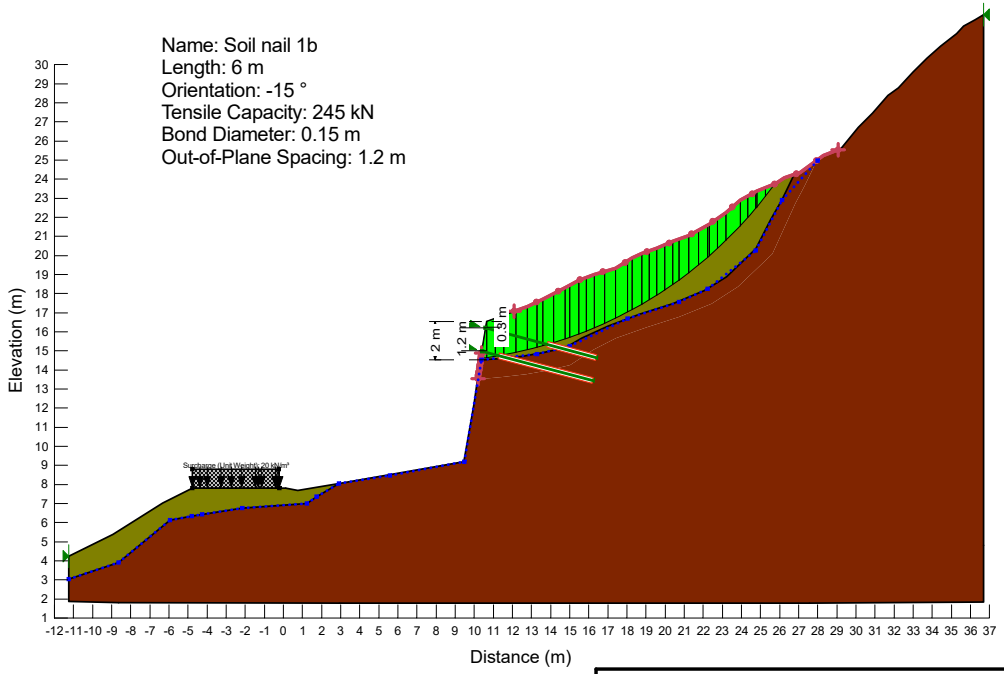
Name: Soil nail 1a
Length: 6 m
Orientation: -15 °
Tensile Capacity: 245 kN
Bond Diameter: 0.15 m
Out-of-Plane Spacing: 1.2 m



2.3a Soil nail_Long term-2m height
Slope-W model-Soil Nail option.gsz
17/10/2023 1:300

1.624

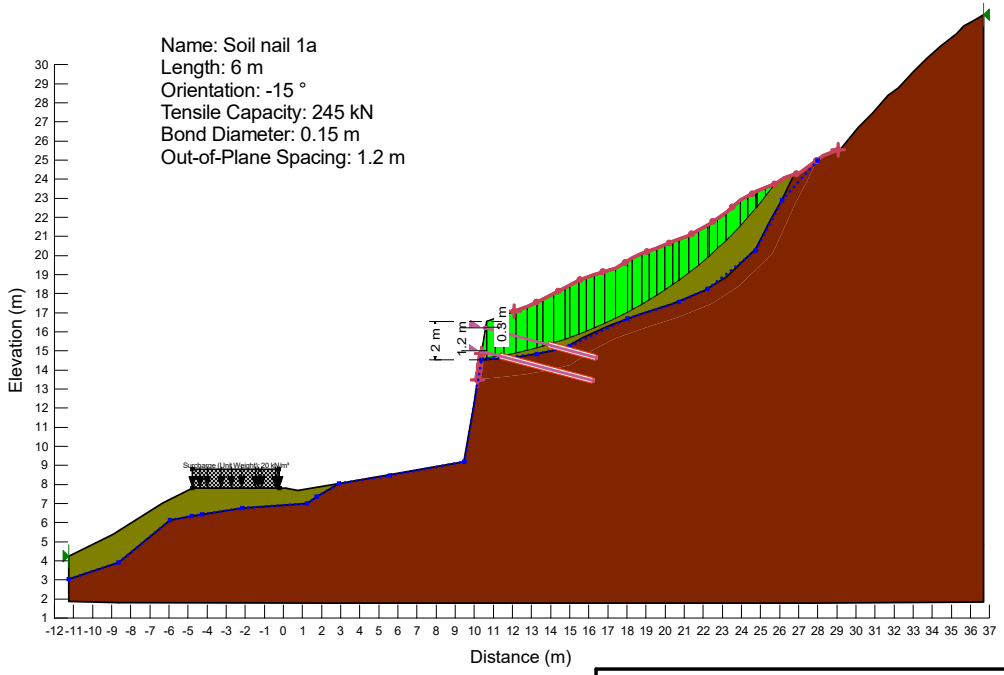
Color	Name	Slope Stability Material Model	Unit Weight (kN/m³)	Piezometric Line	Effective Cohesion (kPa)	Effective Friction Angle (°)	Ru	Include Ru in PWP
	Colluvium	Mohr-Coulomb	19		5	36	0.3	Yes
	Sandstone	High Strength	24	1				No



2.3b Soil nail_Short term-2m height	
Slope-W model-Soil Nail option.gsz	
17/10/2023	1:300

2.237

Color	Name	Slope Stability Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Piezometric Line	Include Ru in PWP
	Colluvium	Mohr-Coulomb	19	5	36	1	No
	Sandstone	High Strength	24			1	No



2.3c Soil nail_Seismic-2m height	
Slope-W model-Soil Nail option.gsz	
18/10/2023	1:300

SHOTCRETE DESIGN CALCULATIONS

Revision 0

Client:	Central Coast Council	**Job No.:**	12599205	**Calc. No.:**	
Project:	Settlers Rd CH 60-100	**Calcs by:**	SA	**Date:**	18/10/2023
Subject	Facing Design Check	**Checked:**	TGN	**Date**	27/10/2023

Summary results			
Check on reinforcement, punching and flexural strength:		PASS	
Input cells are highlighted as yellow, as follows:			
Limiting capacity:	Shotcrete flexural capacity	219	kN
Inputs			
RS2 resultant loads			
Axial force on bolt, A		70	[kN]
Factor of safety			
Adopted FoS		1.25	
Corresponding strength reduction, φr		0.8	
Shotcrete facing inputs			
Exposure Classification (external face)		B1	
Exposure Classification (to face in contact with the ground/internal face)		B1	
Concrete Strength (f_c')		40	MPa
Required internal cover (to RMS R64)		75	mm
Required external cover (to AS 5100.5)		50	mm
Required internal cover (to AS 5100.5)		75	mm
Initial shotcrete facing thickness to internal reinforcement (h_i)		75	mm
Final shotcrete facing thickness (h_f)		160	mm
Check external cover to mesh to AS 5100.5		50	mm
Check external cover to soil nail plate to AS 5100.5		50	mm
Steel reinforcing inputs			
Mesh or Rebar reinforcement		Mesh	
Mesh Code		SL81	
Reinforcing bar diameter, d_{bar}			mm
Bar Spacing, S_{bar}			mm
Wire Cross-Sectional Area per Unit Length,	$A_M = A_{bar} / (S_{bar} / 1000)$	453.6	mm^2/m
Steel reinforcement yield strength (f_y)		500	MPa
Soil nail inputs			
Soil nail horizontal spacing, S_H		1.2	m
Soil nail vertical spacing, S_V		1.2	m
Soil nail plate thickness		16.0	mm
Soil nail plate dimensions, L_{BC}		150 x 150	mm
Soil nail plate area, A_{BC}		0.023	m^2
Shotcrete capacity			
Verify reinforcement ratios			
Verify facing flexural resistance (R_{FF}) for temporary and permanent facing.			

	SHOTCRETE DESIGN CALCULATIONS			Revision
				0
Client:	Central Coast Council	**Job No.:** 12599205	**Calc. No.:**	
Project:	Settlers Rd CH 60-100	**Calcs by:** SA	**Date:**	18/10/2023
Subject	Facing Design Check	**Checked:** TGN	**Date**	27/10/2023

a. The minimum reinforcement ratio is calculated as:

$$\rho_{min}[\%] = 20\frac{\sqrt{f_c'[MPa]}}{f_y[MPa]} \qquad \text{(Equation 6.16)}$$

The maximum reinforcement ratio is calculated as:

$$\rho_{max}[\%] = 0.5\frac{f_c'[MPa]}{f_y[MPa]}\left(\frac{600}{600 + f_y[MPa]}\right) \qquad \text{(Equation 6.17)}$$

SHOTCRETE DESIGN CALCULATIONS

Revision 0

Client:	Central Coast Council	**Job No.:**	12599205	**Calc. No.:**	
Project:	Settlers Rd CH 60-100	**Calcs by:**	SA	**Date:**	18/10/2023
Subject	Facing Design Check	**Checked:**	TGN	**Date**	27/10/2023

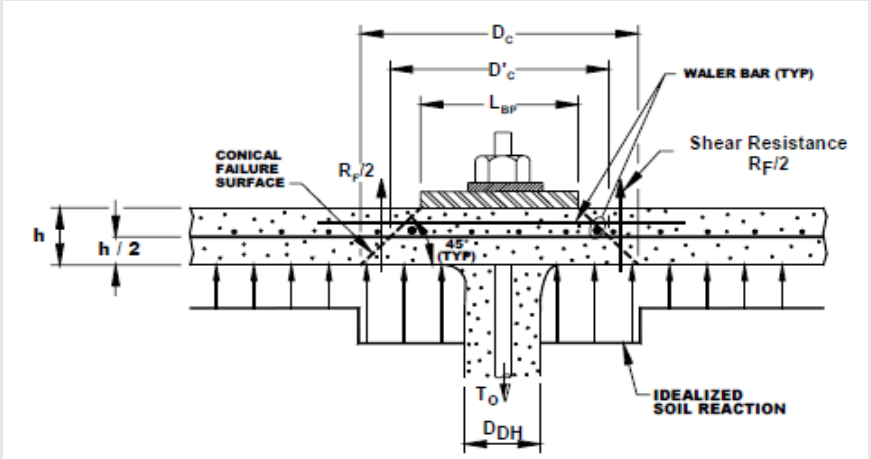
5.6.3.3 Limit Reinforcement in Facing

As with other reinforced concrete structures, the quantity of reinforcement placed in the facing of soil nail wall generally falls within prescribed limits. The amount of reinforcement can be expressed as the reinforcement ratio (ρ or ρ_{ij}) in the "i" direction (vertical or horizontal) and at location "j" (nail head or midspan):

$$\rho_{ij} = \frac{a_{ij}}{0.5\,h}\ 100 \qquad \text{(Equation 5.49)}$$

Minium reinforcement ratio (ρ_{min} [%])	0.25%	
Maximum reinforcement ratio (ρ_{max} [%])	2.18%	
Reinforcement ratio (ρ [%])	0.57%	
Reinforcement ratio check, $\rho_{min} < \rho < \rho_{max}$	PASS	

Facing Punching Shear Capacity



$$V_F\,[\text{kN}] = 330\sqrt{f'_c\,[\text{MPa}]}\ \pi\ D_c'[\text{m}]h_c[\text{m}] \qquad \text{(Equation 5.55)}$$

$$V_F\,[\text{kip}] = 0.58\sqrt{f'_c\,[\text{psi}]}\ \pi\ D_c'[\text{ft}]h_c[\text{ft}] \qquad \text{(Equation 5.56)}$$

where:

D'_C = effective diameter of conical failure surface at the center of section (i.e., an average cylindrical failure surface is considered); and

h_C = effective depth of conical surface.

Factored concrete strength $f_{c\_allowable}$' = fc x φ_s	32	MPa
Effective depth of conical surface (h_c) for punching shear	160	mm
Effective diameter of conical failure surface, $D_c = \min(h_c + L_{BC}, 2h_c)$	310	mm
Punching shear resistance, $R_{PS} = 330.\pi.D_c'.h_c.\sqrt{}.(f_{c\_allowable})$	291	kN
Punching resistance strength exceeds axial force (i.e. $R_{PS} > A$)	PASS	

	SHOTCRETE DESIGN CALCULATIONS			Revision
				0
Client:	Central Coast Council	**Job No.:** 12599205	**Calc. No.:**	
Project:	Settlers Rd CH 60-100	**Calcs by:** SA	**Date:**	18/10/2023
Subject	Facing Design Check	**Checked:** TGN	**Date**	27/10/2023

Shotcrete flexural capacity

$$R_{FF}[kN] = \frac{C_F}{265} \times (a_{vn} + a_{vm})[mm^2/m] \times \left(\frac{S_h h[m]}{S_v}\right) \times f_y\ [MPa] \qquad \text{(Equation 5.42a)}$$

$$R_{FF}[kN] = \frac{C_F}{265} \times (a_{hn} + a_{nm})[mm^2/m] \times \left(\frac{S_v h[m]}{S_H}\right) \times f_y\ [MPa] \qquad \text{(Equation 5.42b)}$$

Table 5.1: Factors C_F.

Type of Structure	Nominal Facing Thickness mm (in.)	Factor C_F
Temporary	100 (4)	2.0
	150 (6)	1.5
	200 (8)	1.0
Permanent	All	1.0

Factored steel strength $f_{y\_factored}$' = fy x φ_r	400	MPa
C_F = non-uniform soil pressure factor behind the facing	1.0	
Facing Flexural Capacity, R_{FF}	219.1	kN
Punching resistance strength exceeds axial force (i.e. R_{FF} > S)	PASS	

Appendix E

Technical specifications

Settlers Road Landslide Remediation and Design

Technical Specification Excluding Soil Nail Wall– CH60 to 100 m

Central Coast Council (NSW)

31 October 2023

→ **The Power of Commitment**

Project name		CCC Wisemans Ferry Rd Landslide Remediation - Detailed Design Phase					
Document title		Settlers Road Landslide Remediation and Design | Technical Specification Excluding Soil Nail Wall– CH60 to 100 m					
Project number		12599205					
File name		12599205-REP-Settlers Road Landslide Remediation-Technical Specification Excluding Soil Nail Wall - CH 60 to 100m.docx					
Status Code	**Revision**	**Author**	**Reviewer**		**Approved for issue**		
			Name	**Signature**	**Name**	**Signature**	**Date**
S3	A	J Sylvester/ S Amoroso	T Nicholson		S Amoroso		30/10/23

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→ The Power of Commitment

Contents

Table index

1. Introduction

1.1 Scope

This Specification has been prepared for the proposed landslide remediation located along Settlers Road, NSW west of the Wiseman's Ferry ramp. This technical specification covers bulk excavation of landslide debris and colluvium, scaling, installation of cement grouted passive rock bolts (also referred to as spot rock bolts) and non-structural shotcrete (also referred to as erosion protection shotcrete).

Note that this Specification does not include the Soil Nail Wall. Refer to TfNSW IC-QA-R64 and IC-QA-RT68 for specification relating to the soil nail wall and shotcrete facing requirements. Copies of these specifications are provided in Appendix E of GHD (2023) - Settlers Road Ch 60-100 Remediation Design Report.

This specification should be read in conjunction with the covering GHD report.

It is intended that the design report and its appendices will form the basis of the works. The works will be carried out under geotechnical supervision, with local modifications to the scope made where conditions vary and as agreed with the Principal's Representative.

The purpose of this (and other) project specifications is to describe the materials, performance standards, testing procedures, construction processes, Hold Points, Witness Points, milestones, to clearly define the construction requirements for excavation and scaling, rock bolt, non-structural shotcrete and soil nail wall components.

1.2 Limitations

This specification has been prepared by GHD for Central Coast Council (NSW) and may only be used and relied on by Central Coast Council (NSW) for the purpose agreed between GHD and Central Coast Council (NSW) as set out in this report.

GHD otherwise disclaims responsibility to any person other than Central Coast Council (NSW) arising in connection with this specification. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the covering GHD report and are subject to the scope limitations set out in the report.

~~The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.~~

~~The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.~~

1.3 Supporting specifications and manuals

Where noted in this Specification, the following shall form part of this Specification:

– Central Coast Council (CCC) Civil Works Specification, 2020
– Concrete Institute of Australia, Recommended Practice Shotcreting in Australia, 2nd edition
– TfNSW QA Specification R64 – Soil Nailing (Ed 1 / Rev 7, November 2020)
– TfNSW QA Specification R68 – Shotcrete Work Without Steel Fibres (Ed 1 Rev 4, June 2020)

Where the requirements of this Technical Specification specify a different standard or level of service, the requirements of this Technical Specification will prevail.

1.4 Standards

Standards are referred to in abbreviated form e.g. AS 1234. For convenience, the full titles of relevant standards are given below:

Australian Standards

AS1012	Methods of Testing Concrete
AS1214	Hot-Dipped Galvanised Coatings on Threaded Fasteners
AS1275	Metric Screw Threads for Fasteners
AS1252	High-strength Steel Bolts with Associated Nuts and Washers for Structural Engineering
AS1302	Steel Reinforcing Bars for Concrete
AS1313	Steel Tendons for Prestressed Concrete - Cold- Worked High Tensile Alloy Steel Bars for Pre-Stressed Concrete
AS1315	Portland Cement
AS1650	Hot-dipped Galvanized Coatings on Ferrous Articles
AS3678	Structural Steel
AS5100	Bridge Design
AS/NZS 4680	Hot-Dipped Galvanised (zinc) Coatings on Ferrous Articles

Unless otherwise stated, the applicable issue of any referenced standard shall be the issue current at the date one week before the closing date for tenders.

1.5 Project Roles

The Principal:	Central Coast Council (CCC)
The Contractor:	The contractor appointed to undertake the construction works. The contractor shall direct all queries regarding the works to the Principal and shall rely only on written instructions from the Principal with respect to the undertaking of the works.
The Geotechnical Representative:	The geotechnical consultant (GHD Pty Ltd) who designed the remedial works and/or a representative from CCC. The Geotechnical Representative shall advise the Principal on an as needed basis with site queries specific to the design. The Geotechnical Representative will provide geotechnical advice and direction to The Contractor during construction and will be responsible for the release of Hold Points.

2. Bulk excavation, scaling and vegetation removal

2.1 General

Treatment works include a combination of bulk excavation, scaling, grooming and tree lopping as specified below. The work is to include the disposal of removed rock, soil and vegetation to an approved disposal site. Preparatory works require review and approval from the Principal's Geotechnical Representative as works proceed and prior to the commencement of the specific treatments specified below and will constitute a **HOLD POINT**.

2.2 Vegetation removal / lopping

This activity applies to the removal of vegetation where required for construction of the Soil Nail Wall, in accordance with the relevant Review of Environmental Factors (REF).

The removal of vegetation shall require follow-up poisoning of any cut stumps, either immediately after lopping (within 20 seconds) or as a separate campaign via cuts or drilled holes into the stump.

2.3 Bulk excavation and scaling

This activity includes excavation of colluvial landslide debris and underlying colluvium as indicated in the Design Drawings and specific scaling and/or removal of identified unstable rock blocks or rock masses as directed by the Principal's Geotechnical Representative. The works are generally assumed to be undertaken by specialist contractors.

The following simplified definitions apply to this section:

– Scaling is the removal of potentially unstable rock blocks from the excavation rock face.
– Grooming is the removal of leaf litter, small rock fragments and soil accumulations from ledges.

Bulk excavation, scaling and grooming shall be undertaken as a top-down sequence of work in order to minimise the risk of potentially unstable features becoming dislodged directly onto and/or impacting personnel and/or plant and occur in manageable sections.

Materials that may be encountered include:

– Vegetation debris or remnant trees and stumps.
– Soil profiles (e.g. Topsoil, Residual, Colluvium).
– Rock Fragments (Detached Blocks, fractured and/or weathered zones, protrusions).

Scaling and grooming is typically undertaken by hand scaling, machine scaling, specialised methods or any combination of the above.

Spoil shall be removed from the faces or crest in a controlled and safe manner, and then safely transported to an approved stockpile area.

Scaling works shall not commence in any area without approval from The Principal as to the proposed equipment and method of scaling and this will constitute a **HOLD POINT.**

Any damage or disruption incurred to existing structures as a result of scaling shall be repaired/ reinstated to the same condition as prior to the commencement of works at the site.

2.3.1 Bulk excavation and machine scaling

These activities include:

– Bulk excavation: Excavation and removal of landslide debris and underlying colluvium comprising soil and rock by plant.
– Machine scaling: Specific scaling and/or removal of identified unstable rock blocks or rock masses by plant.

Works are as shown in the Design Drawings, or as directed by the Principal's Geotechnical Representative. Excavation and machine scaling shall not be undertaken without prior approval of the Geotechnical Representative as to the suitability of the proposed plant to the requirements of the area being considered. Plant suitable for excavation / scaling may include the following:

– Excavator - a variety of excavator capacity may be considered ranging from 2 tonne to 30 tonne, including long reach excavators. Bucket and tine size may also vary according to the requirements of the area to be scaled. Hammers shall not be used without approval of the Geotechnical Representative.
– Back Hoe.
– Bobcat.

2.3.2 Hand scaling

Hand scaling is typically required at the completion of machine scaling, to remove accumulations of soil and small rock fragments that cannot be removed using large plant.

This activity includes specific scaling and/or removal of identified unstable rock blocks or rock masses, as delineated on the photomosaic figures of the covering report, or as directed by the Principal's Geotechnical Representative. The works are generally assumed to be undertaken by specialist contractors accessing the rock faces by methods such as boom lift, crane and man box, or using twin rope access techniques to conduct the scaling / grooming work.

The works are assumed to be undertaken by a combination of hand scaling (e.g. large pinch bars, crow bars, 'pelican picks' and rakes etc.). The works shall involve the systematic removal of all loose rock material / blocks that are loose enough to be potentially dislodged with hand tools. If particular blocks are deemed to require removal after failed attempts by hand tools, the Principal's Geotechnical Representative shall determine if other measures such as jack hammers, rock splitting, air-bag removal or rock bolting may be applied.

2.3.3 Cleaning of cut surfaces in rock

Clean the cut batters in rock with slopes of 1H:1V or steeper, using compressed air, to allow inspection of the batter and assessment of its stability immediately following completion of excavation to the level of each bench. Do not use water jets and air-water jets unless specifically approved by the Principal's Geotechnical Representative for specific areas. Remove any loose or unstable blocks which are too large to be removed by the above means, by hand or machine, unless otherwise directed by the Principal's Geotechnical Representative.

Continue cleaning until all loose rock and soil material is removed, and all rock and joint surfaces are sufficiently exposed so that the Principal's Geotechnical Representative can assess their condition and likely effect on the stability of the batter.

3. Cement grouted passive rock bolts

3.1 General

This part of the Specification sets out the requirement for the supply, installation and grouting of permanent rock bolts. The Specification also includes the drilling of the holes to receive the rock bolts.

The Contractor shall furnish, install and grout rock bolts where directed or approved by the Geotechnical Representative.

The rock bolts and methods of installation of the rock bolts, including the details of the equipment necessary to drill the hole, effectively seat and tighten the anchorage in the hole, tighten the bolt and grout the rock bolt after installation shall be subject to the approval of the Geotechnical Representative.

The rock bolts are to be installed, as shown in the Design Drawings and directed by the Geotechnical Representative.

3.2 Alternative rock bolt systems

Any tender based on alternative types or capacities of rock bolts will be deemed to be non-conforming unless the tenderer also submits a tender based on the type and capacity of rock bolt required in this Specification.

Such alternative types or capacities of rock bolts will only be considered if the tenderer submits with his tender, all relevant details together with working drawings.

3.3 Lengths and location of bolts

The locations of the rock bolts shall be as directed or approved by the Geotechnical Representative. The rock bolts shall be four m or six m in length, extend at least 3 m in length into rock behind the rock mass being anchored or as directed by the Geotechnical Representative.

3.4 Skilled workers

The Contractor, or his/her proposed sub-contractor, shall produce evidence that his/her workers are skilled and have previously been engaged on the installation of rock bolts and that the equipment proposed is suitable for the intended use.

3.5 Rock bolts

The rock bolts shall consist of grade 500 steel reinforcing bars conforming to the requirements of AS 1302. Rock bolts shall be 28 mm diameter galvanised 500 N bar and extend at least two m into rock behind the rock mass being anchored or as directed by the Geotechnical Representative. Rock bolts shall be threaded and galvanised, and supplied complete with all fixtures and accessories, galvanised to match. The threaded bar shall have a minimum tensile capacity of 308 kN.

The bars shall be fitted with suitable centralising devices, at a maximum spacing along the bar of two m, to ensure that bars are located clear of the walls of the drill holes and to ensure compliance with minimum cover requirements. Centralisers shall be firmly fixed to the bar and shall be of a form which will not impair free flow of the grout. Centralisers shall be manufactured from material which is not corrodible and will not have deleterious effects on the bolt bar and the grout, as well as grout flow. Centralising devices shall be fitted equidistant from the ends of the rock bolts and from each other. Regardless of the minimum spacing specified above, all rock bolts shall be fitted with at least two such devices and rock bolts four m or greater in length shall be fitted with at least three (refer Design Drawings).

Bearing plates shall be steel Grade 500 to AS 3678. The bearing plates shall be domed, a minimum of 10 mm thick and have a minimum bearing surface area of 200 mm x 200 mm. Each plate shall have a hemispherical washer fitted so that the nut will bear evenly on the washer surface even though the bolt is not normal to the plane of the plate. Bearing plates shall have provision for the injection and bleeding of grout.

Nuts shall comply with the requirements of AS 1252. All nuts shall be tightened to apply 20 kN force. Threads on rock bolts and nuts shall be clean and free of scale and rust.

All rock bolts shall have the bar, nuts, washers and bearing plates hot-dip galvanised in conformance to the requirements of AS 1214, AS1650 and AS 4680.

The number and length of rock bolts will vary depending on the encountered conditions. The Geotechnical Representative will confirm rock bolt locations, lengths and orientations after bulk excavation and scaling are complete in each section, typically via spray paint mark-up of the rock face(s).

3.6 Drilling for rock bolts

Drilling for rock bolts should only be undertaken by an experienced drilling contractor. Holes may be advanced by either pneumatic hammer drills or rotary drills as approved by the Geotechnical Representative. Holes shall be slightly rough, clean, true to size and not deviate from the initial line of the bore by more than 25 mm per each two m depth of hole.

Drill hole diameter should be a minimum of 90 mm, dependent upon the drilling equipment employed at the site and the grouting procedures to be adopted. Unless otherwise directed by the Geotechnical Representative, holes for the rock bolts shall be drilled to a diameter sufficient to provide a minimum grout cover of 20 mm over the bars.

The holes shall be started at the locations as directed by the Geotechnical Representative. Maximum offsets to the marked location that may be permitted at the Geotechnical Representative's discretion are 100 mm vertically and horizontally.

The bearing of the hole shall be oriented generally perpendicular to the surface or as directed by the Geotechnical Representative. Any hole whose bearing is more than 5° from the required bearing shall not be acceptable and will need to be redrilled unless the Geotechnical Representative, at his sole discretion, accepts the hole.

The vertical direction of each hole shall be declined at 10 degrees below horizontal. Any hole whose initial direction (i.e., that of the first 0.5 m of the hole) lies more than $\pm$ 2 degrees outside of the range shall not be accepted.

The depth of each hole, from the finished surface of the rock face at the collar to the bottom of the hole, shall be determined by the Geotechnical Representative. An extra length of 50 mm shall be provided below the end of the bar to leave space for the deposition of cuttings that cannot be flushed out of the drill hole.

The Contractor shall include in his procedures proposed measures to check that the specified alignment and deviation from straight are being maintained.

In the case of drill holes penetrating through material likely to collapse, the Contractor shall give full details of proposed procedures for supporting this material during drilling, installation and grouting.

Drill holes shall be cleared of all deleterious material on completion of drilling and the opening sealed to prevent the entry of foreign matter. Cleaning shall be carried out by flushing with air or compressed air using side jet bits following drilling, to ensure removal of all drill cuttings from the walls and bottom of the drill holes. The Contractor shall submit details of its cleaning methods and equipment to suit variations in sub-surface conditions.

The Contractor shall submit conformance records for the drill holes prior to installing the rock bolts in the holes.

The submission of conformance records for drill holes shall constitute a **HOLD POINT.**

3.7 Installation of rock bolts

Unless otherwise approved by the Geotechnical Representative, installation of rock bolts shall commence within three (3) days of completion of drill holes.

The Contractor shall give at least one working day’s notice of his intention to commence installation.

Each drill hole shall be kept sealed until the rock bolt is ready to be installed.

Immediately, prior to installing the bolt, the walls of the drill hole into which it is to be installed shall be cleaned of all deleterious materials or accumulations which would impair the effectiveness of the rock bolt. Following cleaning the hole shall be gauged to confirm that it is unobstructed for the full depth and to the full diameter.

The rock bolt with centralisers shall be assembled and positioned in the hole in accordance with the manufacturer's instructions and the requirements of this document.

3.8 Grouting

3.8.1 General

Rock bolts and mesh support dowels shall be grouted in place as soon as practicable after installation, but in any event within three days of completion of drill holes, except as otherwise directed or approved by the Geotechnical Representative. Grouting shall be carried out in such a manner as to ensure that all bolts are fully encapsulated by grout, to the collar of the drill hole.

The Contractor shall give the Geotechnical Representative at least one working day's notice of his intention to commence grouting.

All grouting operations shall be carried out under the personal direction of a skilled supervisor experienced in this type of work.

The grouting supervisor shall also inspect the rock bolt assemblies prior to installation and verify that grouting tubes have been correctly installed.

3.8.2 Grout materials and mix design

Cement used for grouting rock bolts shall be Type GP cement complying with AS 1315.

Only fresh cement, free from lumps, shall be used. Cement shall be stored in dry weather-proof containers. Small stacks of bagged cement may be held in the open, but such stacks shall be thoroughly protected from the weather by tarpaulins and shall be placed on timber platforms above the ground. Adequate stocks of cement shall be held at the mixers to ensure no interruptions to the continuity of grouting operations.

The grout mix shall be designed to achieve a minimum of 40 MPa at 28 days. Early strength tests may be accepted based on results from trial mixes.

Water used in grout shall be clean and free from oil, acid, alkali, organic or vegetable matter and from any ingredients harmful to steel or cement grout. Water shall not contain more than 500 mg/l of chloride ions. Water temperatures measured at the mixer shall not be less than five degrees celsius nor more than 27 degrees celsius.

The grout shall comprise water and cement in a ratio (by weight) of not more than 0.45.

Bleeding shall not exceed 2 % of the volume at 90 minutes after mixing when measured at 20 degrees celsius in a covered cylinder of 100 mm internal diameter and with a grout depth of 300 mm. Also, bleeding shall not exceed 4% of the volume at any time. In addition, the separated water must be reabsorbed within 24 hours. An approved additive may be used to control bleeding.

Other additives shall not be used unless the Contractor can demonstrate that the additives will not be deleterious to the properties of the grout or any other rock bolt components.

3.8.3 Testing of grout

1. Properties of Hardened Grout
   a. Representative test specimens shall be 75 mm cubes stored under standard curing conditions of 23 degrees Celsius and 100% relative humidity.
   b. During production, pairs of cubes shall be taken at the following frequencies, with additional cubes if testing is required at other than seven days:

Grout Batches	Test Frequency
Each batch/day	one sample i.e. two cubes

   A typical batch size would be up 200 litres.

   Testing shall be carried out in accordance with TfNSW T375
2. Mix Characteristics
   a. The specific gravity and the bleed characteristics of the trial mix shall also be established, so that these values may be used to monitor the production process.

3.8.4 Grout mixing

Batching into mixers shall be carried out by measuring the water by volume and using whole bags of cement. Any additives shall be premeasured into individual doses per batch.

The grout shall be mixed in a high speed mixer (minimum 1000 rpm) capable of imparting a high shear to the grout components so that a colloidal grout of uniform consistency is produced in a mixing time of less than five minutes.

The grout mixing process shall utilise a recirculating system where the grout is continuously discharged and recharged into the mixing unit during the mixing period.

After the mixing the grout shall be kept continuously agitated.

The grout shall be passed through a nominal 1.2 mm sieve prior to injection. The grout shall be used as soon as possible after mixing and in any case within 30 minutes of adding cement.

3.8.5 Grout pumping equipment

Grout pumps shall be efficient and capable of running continuously for the duration of grouting of each rock bolt. They shall be capable of pumping the grout specified at a rate appropriate to the required rate of rise of grout in the holes.

Grouting shall be carried out by use of supply lines directly connecting the pumps to the down-hole tubes.

Grout fittings shall be appropriately located to control the injection of grout to the down-hole tubes. Fittings at the tops of holes shall include a valve discharging to waste and a pressure gauge. Pressure gauges shall be maintained in calibration.

3.8.6 Grouting procedure requirements

Prior to commencement of grouting, the Contractor shall determine the volume of the hole less the rock bolt over the full length of the drill hole as a basis for control of volumes and rates of grout injected.

The grout tubes must have a minimum internal diameter of 12 mm to ensure that blockages will not occur during grouting operations and must also be sufficiently robust to ensure that they are not damaged during handling.

Grouting shall proceed by injection through the feeder tubes to the bottom of the hole. Grouting shall be continuous until all the air and water is displaced from the collar and the emerging grout is the same consistency as the grout entering the feeder tubes.

Once the emerging grout has reached the specified consistency, observation shall be continued by an experienced operator, and the grout discharge shall be allowed to continue until there is no reasonable doubt that all zones of low quality grout have been displaced.

The grout which has over flowed from the hole shall be discarded to waste and disposed of to the satisfaction of the Geotechnical Representative. This shall include the cleaning off of any grout that has spilled onto the rock face. All rock faces must be left clean and with a natural rock appearance.

After the grout has hardened, the level of grout in each hole shall be checked and any fall in level made good by placement of additional grout so as to completely fill the rock bolt hole. This process should be repeated, if necessary, until final filling has been confirmed.

3.8.7 Conformance records

The Contractor shall submit conformance records for grouting of rock bolts within three working days of completion of grouting operations.

The Geotechnical Representative may direct the Contractor to expose the fully grouted rock bolts for inspection and/or to conduct pull-out tests on up to 5% of the bolts installed, except that where failures occur, the Geotechnical Representative may direct additional tests. When tested, the bolt shall be capable of withstanding, with a movement of not more than 0.2 % of the bolt length, a pull-out test load equal to 75% of the nominated average yield strength of the threaded section of the bolt shank.

Testing shall be carried out with a calibrated hydraulic jacking system capable of exerting an axial load up to 90% of average yield strength of the bolt, whilst not loading the ground within 1 m either side of the rock bolt.

3.9 Finishing

3.9.1 Dry-packing

On completion of grouting, rock bolts holes shall be prepared so that the shrinkage of the grout column at the top of the hole is to be completely filled with dry pack grout and the area behind the rock bolt bearing plate shall be prepared so that the plate will bear uniformly on the rock surface.

3.9.2 Surface plates and washers

The surface plates shall be a minimum of 10 mm thick and have a minimum bearing surface area of 4 x 10^4 sq mm. Each plate shall have a hemispherical washer fitted so that the nut will bear evenly on the washer surface, even though the bolt is not normal to the plane of the plate.

3.9.3 Nuts

Nuts shall comply with the requirements of AS 1275. The nut and thread shall be capable of holding a tensioning force at least equal to twice the Design Working Load.

The thread of the nut shall be clean and free of scale or rust.

3.9.4 Protective treatment

All rock bolts shall have the bar, nuts, washers and bearing plates hot-dip galvanised in conformance with the requirements of AS1214 and AS/NZS4680.

3.10 Conformance records

Records of grouting shall be kept by the Contractor on the site and shall be available for inspection at all times.

The Contractor shall submit conformance records for drilling and grouting of rock bolts within three (3) days of completion of the grouting and installation operation. Records shall include the following details:

– Hole location and reference number.
– Type of rock bolt.
– Depth of hole.

- Type of grout and grout mix proportions.
- Volume of grout injected.
- Grouting pressures.
- Times and details of any interruptions, leakages and equipment malfunctions.
- Compressive Strength Test results.

Submission of conformance records for the installation of rock bolts shall constitute a **HOLD POINT**.

4. Shotcrete (excluding soil nail facing)

4.1 General

This part of the Specification sets out the requirements for protection and structural support of excavation surfaces using sprayed concrete with mesh reinforcement. The areas of proposed shotcrete will be as specified by the Geotechnical Representative following bulk excavation of the landslide debris and colluvium.

The work includes the cutting back of loose, detached or protruding material as appropriate, the cleaning down of the face area to be treated, installation of dowels and reinforcing mesh, provision of weep holes and strip drains and the application of the sprayed concrete to the surface of excavations, to provide protection and structural support.

Unless otherwise specified or directed by the Geotechnical Representative the Contractor shall adopt the practices as described in Concrete Institute of Australia, Recommended Practice Shotcreting in Australia, 2nd edition. In accordance with TfNSW R64 (Cl. 2.3.3), shotcrete mix shall be designed and supplied as per B2 exposure classification, with the mix design as per TfNSW R68 Section 3 and with a design compressive strength of 40 MPa.

4.2 Set out

Mesh reinforced shotcrete shall be installed at locations directed and/or approved by the Superintendent.

The location of mesh support dowels, together with the associated weep holes and strip drains, shall be set out (within the identified shotcrete area) and clearly marked on the face with spray paint by the Contractor in accordance with this Specification.

The Geotechnical Representative may direct additional dowels, weep holes or strip drains to be installed where required due to the slope geometry or ground conditions. This shall constitute a **HOLD POINT**.

4.3 Excavation and preparation

4.3.1 Mesh support dowels

Support dowels shall be installed at approximately 1.5 metre centres in rows 1.5 m apart. Where shotcrete is to be applied to narrow areas, two rows of dowels shall be installed, parallel to the edges of the area, with the dowels in each row placed at 1.5 m centres.

Dowels shall consist of 16 mm diameter deformed steel bars Grade 410Y steel reinforcing bars. Dowels shall be 1,200 mm long with 200 mm of the protruding end bent over to provide bond with the shotcrete and hot dipped galvanised in accordance with AS 1650. Specific dowel lengths will be confirmed at each location as dictated by geological conditions and as directed/approved by the Principal or the Geotechnical Representative.

The bars shall be fully grout encapsulated into minimum 32 mm diameter holes, drilled at a declination of 15 degrees down from the square to the face and positioned so that the bent end is placed centrally within the shotcrete coatings. Grouting shall be in accordance with Clause 3.8.

At least 10 days prior to the commencement of grouting, the Contractor shall submit to the Principal or the Geotechnical Representative for approval details of the proposed procedure, plant and materials for grouting.

4.3.2 Weep holes

The arrangement of weep holes shall be in accordance with the typical set out elevation shown on Design Drawings and as directed onsite by the Superintendent. Generally, weep holes shall be installed at three m centres throughout the area to be covered by shotcrete. Additional weepholes may be installed to target zones of identified seepage.

Weep holes comprise 30 mm internal diameter slotted plastic pipe tubes with geotextile wrap, installed through the shotcrete to allow free movement of water from the strip drains or areas of rockface seepage to the outer shotcrete surface. The plastic pipe tube should be tied to the reinforcing mesh.

The outer end of the tube shall be capped or otherwise covered. After application of the shotcrete the tube shall be cut off to provide a 20 mm overhang in front of the shotcrete surface.

4.3.3 Strip drains

The arrangement of strip drains shall be in accordance with the typical set out elevation shown on design drawing and as directed onsite by the Superintendent.

A strip drain complying with RMS 3557 shall be installed. The geotextile shall be in contact with the face of the excavation and securely fixed to prevent it being dislodged during subsequent operations. The exposed surface shall be protected in such a way as to prevent penetration of shotcrete or other material into or behind the strip drain.

Strip drains should daylight at the toe of the shotcrete, or be connected to 30 mm diameter outlet pipes in such a way as to allow free movement of water from the strip drains to the outer shotcrete surface.

Strip drains shall be placed so as to allow a minimum 50 mm cover of shotcrete over any dowel or rock bolt. If necessary, the positions of strip drains shall be adjusted to meet this requirement.

4.3.4 Reinforcing mesh

The shotcrete shall be reinforced with galvanised steel reinforcing mesh. Unless otherwise directed by the Superintendent, the reinforcing mesh shall consist of SL81 galvanized steel weldmesh.

In addition, the steel mesh shall be hot dipped galvanised and passivated by dipping in a 2% solution of sodium dichromate to prevent any adverse reactions between the zinc coating and the cement grout.

The reinforcement shall be securely fastened to the rock face with pins/nails, staples or other means and supported with approved spacing devices so that the reinforcement is located centrally within the shotcrete coating and conforms as closely as possible to the rock surface.

The reinforcement shall be securely tied to the mesh support dowels, adjacent sheets, spacing devices and to any nails/pins which may be installed in conjunction with this treatment. Fibre or needle reinforced concrete is not an acceptable alternative to steel reinforcement.

A minimum cover of 50 mm of shotcrete shall be provided to the reinforcement at all places. Overlaps between reinforcement sheets shall be at least 400 mm in length and securely tied.

Where the thickness of shotcrete to be placed is 150 mm or more, one layer of mesh shall be installed for every 150 mm depth of shotcrete.

4.4 Materials

The supply and application of shotcrete shall be in accordance with RMS QA Specification R68. Testing of shotcrete shall be in accordance with TfNSW QA Specification R68 requirements.

No shotcrete shall be applied until the quality of workmanship, the compressive strength of the shotcrete and the colour of the shotcrete (as approved by the Principal) is approved. The shotcrete mix shall include an ochre pigment or similar, as agreed by Principal based on a series of trial panels to be provided by the Contractor. Acceptance of the quality of workmanship, compressive strength and colour of the shotcrete shall constitute a **HOLD POINT**.

5. Inspection and testing requirements

Prior to commencement of work, the Contractor shall submit a relevant Inspection and Testing Plans (ITP) and method statement addressing Contractor compliance with the below requirements.

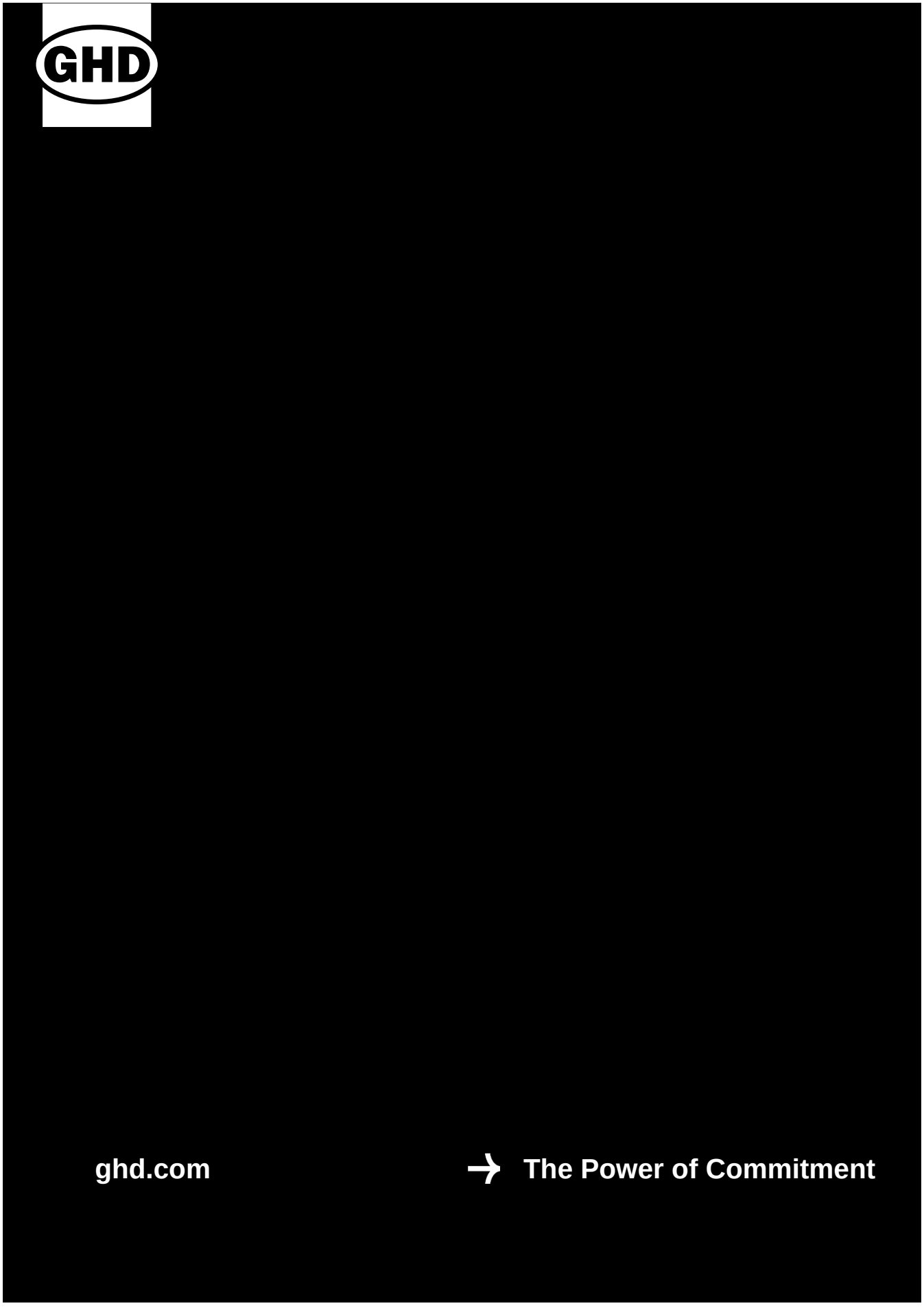
Hold points and/or Witness Points under the responsibility of the Designer shall apply to ensure compliance with the intent of the designs and with other specified requirements, and to ensure that critical or irreversible activities are not constructed incorrectly.

Table 1 Minimum Frequency of Testing

Clause	Characteristic analysed	Test method	Min. frequency of testing
3.8.3 4.3.1	Properties of Hardened Grout	TfNSW T375)	Every batch must be tested. Sample three cubes per batch, with 1 test at 7 days, 1 test at 28 days and hold the third cube for later testing if the 28 day fails.
3.8.7	Suitability and acceptance testing	TfNSW R64	As directed by Geotechnical Representative for rock bolts
4.4	Sprayed concrete strength	AS 1012	In accordance with RMS QA Specification R68 requirements

Table 2 Schedule of Hold POINTS

Clause	Description
2.1	Review and approval of preparatory works.
2.3	Review and approval of proposed equipment and methods for excavation and scaling
3.6	Submission of conformance records for rock bolt drill holes
3.9.4	Submission of conformance records for installation of rock bolts
4.2	Presentation of prepared area, with mesh support dowels, reinforcing mesh, strip drains and weep holes installed where required prior to application of shotcrete
4.4	Review and acceptance of quality of workmanship, compressive strength and colour of the shotcrete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TRANSPORT FOR NSW (TfNSW)

QA SPECIFICATION R64

SOIL NAILING

REVISION REGISTER

Ed/Rev Number	Clause Number	Description of Revision	Authorised By	Date
Ed 1/Rev 0		First issue	GM, IC	23.04.09
Ed 1/Rev 1	1.4	Fig 1 – definition of length of soil length changed.	GM, IC	26.06.09
	2.2.1	Requirement for reinforcement bar couplers changed.		
	3, 4	Clause on instrumented soil nail relocated to after "Construction"; clauses renumbered.		
	3.3 (a)	Requirement for "Geotechnical Engineer" to be engaged by designer of soil nail structure added.		
		Witness Point – Process witnessed reworded.		
	3.3 (e)	Wording changed to clarify intent. Time period for excavation of subsequent lift after completion of concrete facing of the previous lift changed from "48 hours" to "72 hours".		
	5.2.1	Individual sub-clauses within clause reordered.		
	5.2.1, 5.2.2	Debonding and test load requirements for soil nail testing clarified.		
		Test load increments and test load duration for Suitability and Acceptance Tests to determine creep characteristics under sustained loading revised.		
		Creep movement and creep rate criteria for assessing Suitability and Acceptance Test results changed.		
		Acceptance criteria clarified.		

Ed/Rev Number	Clause Number	Description of Revision	Authorised By	Date
Ed 1/Rev 1 (cont'd)	5.2.2	Note added to Table R64.4 clarifying that load sequence is one full cycle of testing.		
	5.4	Contents duplicating Hold Point details deleted.		
	6.3	Requirement for sealing of holes for anchor bar supporting the steel mesh changed from mandatory to optional. Purpose of sealing of anchor bar holes clarified.		
	6.4.2	Wording of 30° taper requirement changed to clarify intent.		
	Pay Item R64P1	Wording changed to emphasise that scope includes carrying out Suitability Testing		
	Annex R64/C	Schedule of Hold and Witness Points – Description of Clause 4 Witness Point updated.		
		Schedule of Identified Records - Clause references updated.		
Ed 1/Rev 2	Guide Notes	Measures to minimise problems during construction of soil nail walls added.	GM, IC (M Andrew)	15.03.12
	3.3	Statement added that no change to construction sequence be made without the approval of the Principal.		
Ed 1/Rev 3	Guide Notes	Added the following guide notes: G.1 - thermal diffusion galvanizing permitted as an alternative to hot-dip galvanizing for nuts, washers and bearing plates. G.2 - alternative to steel deformed bars and different thread types permitted.	GM, IC	21.11.12
		G.3 on adherence to specified construction sequence reworded.		
	2.2.1	Alternative to Grade 500N steel deformed bars and different thread profiles permitted.		
	2.2.2	New sub-heading "Couplers" inserted; subsequent clauses renumbered.		
	2.2.2, 2.2.3, 2.2.8	Alternative process to hot-dip galvanizing permitted for couplers, nuts, soil nail heads and bearing plates permitted, subject to Principal's approval.		
	2.3.5	Strip filter drains changed to flexible type, reference changed to new Materials spec 3557. Strength requirements for strip drain filter deleted (duplicated in 3557, or superfluous).		
	Annex M	Referenced documents updated.		
Ed 1/Rev 4	2.2.4, 2.2.6	References to AS 4130 changed to AS 4131.	MCQ	28.06.16
	Annex M	Referenced documents updated.		

Ed/Rev Number	Clause Number	Description of Revision	Authorised By	Date
Ed 1/Rev 5	1.4	Figure 1 amended.	MCQ	31.07.18
Ed 1/Rev 6	Global	References to "Roads and Maritime Services" or "RMS" changed to "Transport for NSW" or "TfNSW" respectively.	DCS	22.06.20
Ed 1/Rev 7	2.2.7 Annex M	"AS 1478" changed to "AS 1478.1". Referenced documents updated.	MCQ	04.11.20

GUIDE NOTES
(Not Part of Contract Document)

G.1 Protective Treatment of Couplers, Nuts, Washers and Bearing Plates

Refer Clauses 2.2.2, 2.2.3 and 2.2.8.

Thermal diffusion coating (TDC) galvanizing may be used as an alternative to hot-dip galvanizing for couplers, nuts, washers and bearing plates.

Thermal diffusion galvanizing has the following advantages over hot-dip galvanizing:

(i) it produces zinc alloy layers of similar thickness to hot-dip galvanizing, without being susceptible to hydrogen embrittlement; and

(ii) it produces more consistent coating thickness compared with hot-dip galvanizing, resulting in more reliable bolt preloads when tensioned using torque wrenches.

The thickness of the thermal diffusion galvanizing must not be less than the hot-dip galvanizing. Tapping of nuts following thermal diffusion galvanizing is not usually done because of the hardness of the coating.

Thermal diffusion galvanizing must meet the requirements of ASTM A1059M-08 "Standard Specification for Zinc Alloy Thermo-Diffusion Coatings (TDC) on Steel Fasteners, Hardware, and Other Products".

Hot-dip galvanizing must still be used for galvanizing of soil nail steel bars.

G.2 Soil Nail Thread

Refer Clauses 2.2.1 and 2.2.2.

Alternative to deformed bars and different thread profiles may be permitted provided that the threaded nut assembly of the soil nail exceeds the minimum breaking load of the bar.

Soil nail bar couplers using such threaded profiles may be permitted provided that the same requirements stated above are met.

G.3 Soil Nail Wall Design and Construction Sequence

Refer Construction Quality Technical Direction CQTD 2009/005.

In order to minimise problems during the construction of soil nail walls, TfNSW Project Managers should ensure that:

(i) The Drawings clearly detail the construction sequence for the soil nail walls.

(ii) The actual construction sequence by the Contractor conform strictly to the construction sequence specified in the Drawings and other requirements in this Specification.

(iii) No change to the construction sequence specified in the Drawings is made without the approval of the designer or TfNSW Manager Geotechnical Engineering (Ground Engineering).

G4 Contact for Technical Queries

Any technical queries regarding the specifications can be referred to:
Manager Geotechnical Engineering (Ground Engineering)
Telephone: (02) 8837 0764 Facsimile: (02) 8837 0059

Transport for NSW

QA SPECIFICATION R64

SOIL NAILING

IC-QA-R64

VERSION FOR:
DATE:

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CLAUSE **PAGE**

FOREWORD

TFNSW COPYRIGHT AND USE OF THIS DOCUMENT

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REVISIONS TO PREVIOUS VERSION

This document has been revised from Specification TfNSW R64 Edition 1 Revision 6.

All revisions to the previous version (other than minor editorial and project specific changes) are indicated by a vertical line in the margin as shown here, except when it is a new edition and the text has been extensively rewritten.

PROJECT SPECIFIC CHANGES

Any project specific changes are indicated in the following manner:

(a) Text which is additional to the base document and which is included in the Specification is shown in bold italics e.g. ***Additional Text***.

(b) Text which has been deleted from the base document and which is not included in the Specification is shown struck out e.g. ~~Deleted Text~~.

TfNSW QA SPECIFICATION R64

SOIL NAILING

1 GENERAL

1.1 SCOPE

This Specification sets out the requirements for soil nailing for the strengthening of earth slopes using grouted steel dowels (soil nails) installed at shallow inclination into the retained soil mass at nominated positions and levels shown on the Drawings.

It covers the requirements for supply and installation of soil nails including compliance testing, and the associated concrete facing work on the slope surface.

A reinforced, formed concrete or shotcrete facing, acting as 'diaphragm support' for the retained structure, forms part of the works.

1.2 STRUCTURE OF THE SPECIFICATION

This Specification includes a series of annexures that detail additional requirements.

1.2.1 Project Specific Requirements

Project specific details of work are shown in Annexure R64/A.

1.2.2 Measurement and Payment

The method of measurement and payment is detailed in Annexure R64/B.

1.2.3 Schedules of HOLD POINTS, WITNESS POINTS and Identified Records

The schedules in Annexure R64/C list the **HOLD POINTS** and **WITNESS POINTS** that must be observed. Refer to Specification TfNSW Q for the definitions of **HOLD POINTS** and **WITNESS POINTS**.

The records listed in Annexure R64/C are **Identified Records** for the purposes of TfNSW Q Annexure Q/E.

1.2.4 Planning Documents

The PROJECT QUALITY PLAN must include each of the documents and requirements shown in Annexure R64/D and must be implemented.

1.2.5 Referenced Documents

Unless specified otherwise, the applicable issue of a referenced document, other than a TfNSW Specification, is the issue current at the date one week before the closing date for tenders, or where no issue is current at that date, the most recent issue.

Standards, specifications and test methods are referred to in abbreviated form (e.g. AS 2350). For convenience, the full titles are given in Annexure R64/M.

1.3 DEFINITIONS

The terms "you" and "your" mean "the Contractor" and "the Contractor's" respectively.

The following definitions apply to this Specification:

Annulus: Radial space between the soil nail and the drillhole wall.

Batch of Grout: Any quantity of grout used for grouting in one continuous operation in one day.

Curing: The control of temperature and moisture in the concrete until the concrete has developed required properties.

Grout: A mixture, similar to mortar, but more workable and possibly without any sand or fine aggregate, proportioned to produce a pourable liquid which does not readily segregate into its constituents during pouring or pumping.

Instrumented Nail: A specially made soil nail in which strain gauges are installed to monitor the stress/ strain behaviour of the nail steel bar.

Mortar: A mixture of cement, water and sand (fine aggregate), with or without chemical admixtures with a characteristic compressive strength at 28 days of not less than 25 MPa.

Nail Head: The upper part of the nail composed of a bearing plate, nut and washer, and the portion of steel reinforcement protruding above the bearing plate. For permanent nails in certain projects, the nail head may consist of a bent reinforcement bar to be covered by concrete facing.

Permanent Nail: A soil nail installed on site as the permanent work of the site and will be selectively tested under 1.5 time design load via the Acceptance Test procedure.

Rebound: Shotcrete material that bounces off the receiving surface.

Sealed Curing: Curing at ambient temperature in which the concrete surface is sealed by at least two coats of a curing compound conforming to this Specification.

Shotcrete: A structural sprayed concrete containing fine and coarse aggregates, water and cement, with or without the addition of set accelerators. Compaction of the material is achieved by the force of the jet impacting on the surface. The shotcrete is reinforced by galvanized steel mesh.

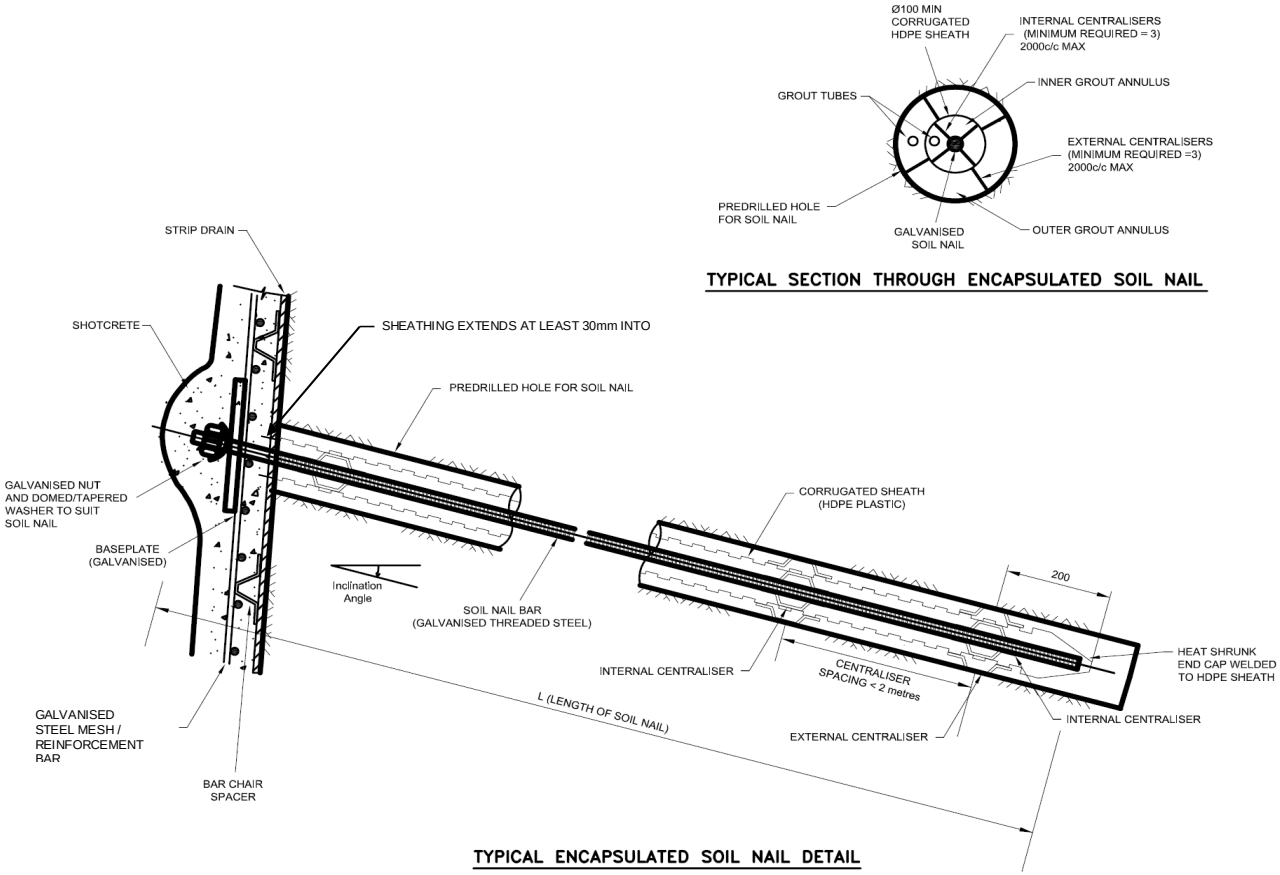
Soil Nail: A steel reinforcement bar inserted centrally into a pre-drilled hole and grouted in place.

Standard Moist Curing: Standard moist curing as defined in AS 1012, Part 8.

Test Nail: A soil nail specially installed on site for testing its ultimate pull out capacity through the Suitability Test procedure. It does not form part of the permanent works for the contract.

Wet Curing: Curing at ambient temperature in which the concrete surface is effectively covered with water or placed in a fog room/chamber with a relative humidity exceeding 98%.

1.4 TYPICAL SOIL NAIL DETAILS



(for illustration purposes only – refer to Drawings for construction details)

1.5 PLANNING DOCUMENTS

The PROJECT QUALITY PLAN must include each of the documents and requirements listed in Annexure R64/D and must be implemented.

If the Contract does not require you to implement a PROJECT QUALITY PLAN, the documents listed in Annexure R64/D must be submitted to the Principal for consideration at least 5 working days prior to work commencing and must be implemented.

In all cases where this Specification refers to the manufacturer's recommendations, these must be included in the PROJECT QUALITY PLAN.

2 MATERIALS

2.1 GENERAL

Materials used for manufacturing soil nails and concrete facing must be produced by manufacturers operating under a quality management system, which satisfies the requirements of AS/NZS ISO 9001.

All materials used for the construction of soil nails and concrete facing must be accompanied by a manufacturer's certificate of conformity, verifying that the proposed materials comply with all the requirements of this Specification.

Submit the certificate of conformity to the Principal at least 10 working days before the commencement of Works. Submission of this certificate constitutes a Hold Point.

HOLD POINT

Process Held:	Commencement of Works.
Submission Details:	At least 10 working days prior to the commencement of Works, submit to the Principal certificate of conformity for the materials used in the soil nailing works.
Release of Hold Point:	The Principal will consider the submitted documents prior to authorising the release of the Hold Point.

2.2 SOIL NAILS

2.2.1 Soil Nail Steel Bars

Steel reinforcement bars for soil nails must be Grade 500N deformed bar to AS 4671, or other carbon steel grades with a minimum characteristic yield strength of 500 MPa and which meet the requirements for ultimate strength and elongation for Grade 500N steel bars shown in Table 2 of AS 4671. Provide the relevant test certificates demonstrating conformity.

Each delivery of steel bars must be accompanied by documentation showing the mill certificate and Lot number.

The bars must be threaded at one end. The thread must be ISO coarse pitch thread to AS 1275, or other thread profiles where approved by the Principal.

The steel reinforcement bar must be hot-dip galvanized to AS/NZS 4680, except that the minimum average coating weight must be 600 g/m^2 (equivalent to 85 microns thickness).

Inspect all steel reinforcement bars carefully to ensure that it is true to size and free from defects that may impair strength and durability.

2.2.2 Couplers

Steel reinforcement bars longer than 12 m must be joined using mechanical couplers. The use of couplers to extend the steel reinforcement bars must not result in a decrease in the tensile strength of the joined bar assembly.

All couplers must be hot-dip galvanized to AS/NZS 4680, or galvanized by an alternative process approved by the Principal.

The couplers must be of dimensions that do not interfere with the grouting and installation of soil nails.

2.2.3 Nuts

Nuts for soil nails must be grade C complying with AS 1112.3 and property Class 5 complying with AS 4291.2 or equivalent to suit the threaded end of the soil nail. The thread must conform to the ISO coarse pitch thread in accordance with AS 1275.

All nuts must be hot-dip galvanized in accordance with AS 1214, or galvanized by an alternative process approved by the Principal.

2.2.4 Encapsulation (Corrugated Plastic Sheath)

Where specified on the Drawings, encapsulate soil nails in a corrugated plastic sheath sealed at the buried end.

The corrugated plastic sheath must be manufactured from high density polyethylene complying with AS 4131, with a minimum uniform wall thickness of 2.0 mm.

The corrugated sheathing must meet the requirements of either of the following:

- ASTM D3350 for HDPE with cell classification 335533C, or
- ASTM D1784 for rigid PVC with classification 13464B.

The pitch of corrugations must be within six to twelve times the sheath wall thickness, and amplitude of corrugations must be not less than three times the wall thickness.

The finished internal and external surfaces of the corrugated plastic sheath must be clean and free from flaws, pin holes, bubbles, cracks and other defects.

Where possible, corrugated plastic sheath must be unjointed for the full length of soil nail.

Where joints cannot be avoided, provide sheath joints by lapping of at least 100 mm together with liberal use of solvent glues appropriate for the sheathing material or with heat-shrink sealing. The strength of the joint must be at least 90% of the parent material. Joints must be such that the continuity of the protective system over the whole length of the nail is unimpaired with respect to the physical and electro-chemical barrier.

A screw-on cap or a heat-shrink boot must be placed on the end of the sheath in contact with the ground and bonded with an appropriate solvent glue or heat shrink sealing.

Provide a manufacturer's certificate of conformity to the Principal, which includes the following information about the corrugated plastic sheath to be used:

(a) manufacturer's name and current address;

(b) full product name;

(c) style, merge, or product code number;

(d) outer and inner diameter;

(e) wall thickness;

(f) amplitude and pitch.

2.2.5 Centralisers

Manufacture centralisers from materials which have no deleterious effects to the reinforcing system and will not corrode. The centralisers must be of a shape that permits the free flow of grout but still performs the centralising function. They must not be compressible, bulky or cause decoupling of the grout or de-bonding of the grout/steel reinforcement interface.

Do not use plastic slip-on centralisers, or rely on the grout tube spirally wound around the soil nail to act as centraliser.

Centralisers must be firmly fixed to the nails and to the encapsulation and must be provided both inside and outside of nail assemblies.

Provide centralisers at intervals not exceeding 2 m along the corrugated plastic sheath or reinforcement bar, with the first and last centraliser 0.3 m from the end of each nail, to ensure that it is centred within the drillhole. Provide a minimum of three (3) centralisers for each nail for the annulus between the drillhole and the corrugated plastic sheath/reinforcement bar, or between the bar and the drillhole.

Subject to the results of the soil nail design, maintain a minimum grout cover of 25 mm between the corrugated plastic sheath and the drillhole; and 20 mm between the reinforcement bar and the encapsulation sheath at any location along the length of the bar or sheath. Where reinforcement bars are not encapsulated, the minimum cover between the bar and the drillhole must be 30 mm at any location, unless otherwise specified on the Drawings.

2.2.6 Grout Tubes

Grout tubes must have a minimum internal diameter of 12 mm for the core and outer annulus grouting and must be made from high-density polyethylene with a wall thickness of at least 2.0 mm or its equivalent to AS 4131. Tubing must be of adequate strength to resist damage during both installation and grouting.

Grout tubes must extend to the lowest portion of the drilled hole to ensure thorough grout penetration and must be securely fixed to the steel reinforcement to prevent displacement or dislodging.

Provide separate grout tubes for grouting the inside and outside of the encapsulated soil nail and for likely second stage grouting.

2.2.7 Grout

Grouts must have high bleed resistance, low shrinkage and high fluidity and conform to Table R64.1 when tested as specified.

Table R64.1 – Performance Requirements for Grout

Property	Test Method	Criteria	Comments
Bleeding	ASTM C940	Final bleeding < 0.5%	Measured when two successive readings show no further expansion or bleeding.
Volume Change	ASTM C1090	Maximum height change @ 1 day & 28 days 0.1% and 0.3%	
Early Expansion	ASTM C940	< 2% at 3 hours.	Temperature tolerances are 20 ℃ ± 5 ℃.
Fluidity	ASTM C939 *	Immediately after mixing: Efflux time < 20 s 45 minutes after mixing: Change in efflux time < ± 3 s	Your target efflux time for the site conditions must not vary from nominated value by more than ± 2 s.
Minimum compressive Strength	TfNSW T375	32 MPa at 7 days 40 MPa at 28 days	Use 75 mm cubes

* A modification may be introduced to the test method as follows. Fill the flow cone to the top instead of to the standard level. Measure the efflux time as the time measured to fill the one litre container placed directly under the flow cone.

Cement for grout must be Type GP cement complying with Specification TfNSW 3211. Only use cement free from any lumps. Store cement in dry weatherproof containers. Small stacks of bagged cement may be held in the open, but such stacks must be thoroughly protected from the weather by tarpaulins and must be placed on timber platforms above the ground. Hold adequate stocks of cement at the mixers to ensure continuous and uninterrupted grouting operations.

Do not use additives or admixtures without the approval of the Principal, and such additives or admixtures must comply with the requirements of AS 1478.1, and must not be deleterious to the properties of the grout or any other soil nail components. Admixtures containing calcium chloride, methocell, ligno-sulphonate and aluminates must not be used. Expansive admixtures where used must be of the pre-hardening type and not include iron or aluminium powders. In general, do not use admixtures of more than 0.005% by weight of cement.

Any chemical reactions between grout constituents or materials in contact with the grout must not produce gases.

Water used in grout must be clean and free from oil, acid, alkali, organic or vegetable matter and from any ingredients harmful to steel or cement grout. Water must not contain more than 500 mg/l of chloride ions. Water temperature measured at the mixer must not be less than 5℃ nor more than 27℃.

The total sulphate (SO_3), chloride and nitrate contents of the grout must not exceed 4%, 0.1% and 0.1% respectively, expressed as a percentage between the respective ion content and the cement

content by mass in the grout. The total sulphate (SO_3) and chloride contents must be determined by the method described in AS 1012.20. The total nitrate content must be determined by the method described in ASTM D 4327-03.

Submit the grout mix proportions and types of additive or admixture (if used) together with test results for approval by the Principal at least 10 working days prior to the commencement of grouting. Submission of these documents constitutes a Hold Point.

HOLD POINT

Process Held:	Commencement of grouting
Submission Details:	At least 10 working days prior to the commencement of grouting, submit to the Principal the grout mix proportions, details of any additive or admixture proposed to be used and test certificates
Release of Hold Point:	The Principal will consider the submitted documents prior to authorising the release of the Hold Point

The above requirements are in general also applicable to the grouting for anchor bars used for holding the reinforcing mesh.

2.2.8 Nail Heads and Bearing Plates

Where shown on the Drawings, nail heads and bearing plates must conform to the following:

(i) Nail head and bearing plate components (including nuts, washers, etc) must be fabricated from Grade 250 steel in accordance with AS 3678;

(ii) All nail head components and the bearing plates must be hot-dip galvanized to AS/NZS 4680, or galvanized by an alternative process approved by the Principal, with a minimum average coating weight of 600 g/m^2 (equivalent to 85 microns thickness).

Where indicated, provide the bearing plate with holes for the secondary grout injection and the return flow which ensure that no void exists between the primary grout surface and the bearing plate.

For permanent protection, fully cover nail heads and bearing plates with shotcrete of 50 mm minimum thickness.

2.3 CONCRETE FACING

2.3.1 General

Construct the concrete facing with either formed concrete or shotcrete to the dimensions shown on the Drawings. The facing must be constructed following preparation of the cut face to the extent that the surface to be sprayed is devoid of loose or soft areas, overhangs, undercut zones or other voids, such that the facing will bond to the face and slip at the interface will not occur.

2.3.2 Formed Concrete

All materials and workmanship for formed concrete must be in accordance with Specification TfNSW B80. Unless specified on the Drawings or otherwise directed by the Principal, the 28 day compressive strength of concrete must be not less than 32 MPa.

2.3.3 Shotcrete

Materials and workmanship for shotcrete must comply with Specification TfNSW R68. Use Exposure Classification B2 for the shotcrete mix design.

2.3.3.1 Steel Reinforcement

(i) Steel Mesh Reinforcement

All shotcrete must be reinforced with steel reinforcing mesh using D500 SL81 mesh type (or as shown on the Drawings) complying with AS 4671 and hot-dip galvanized in accordance with AS/NZS 4680 except that minimum average coating weight must be 600 g/m^2 (equivalent to 85 microns thickness). Degreasing and abrasive blast cleaning or acid pickling of metal surfaces prepared for galvanizing must be in accordance with AS 1627.

(ii) Anchor Bar and Centralisers

Anchor bars for fixing the steel mesh reinforcements must be 800 mm long (which includes a 300 mm long cog), grade 500N, 16 mm deformed steel reinforcing bars complying with AS 4671. The anchor bars must be hot-dip galvanized in accordance with AS/NZS 4680 after bending.

Grout the anchor bars into holes with the cog end placing centrally within the concrete facing.

Provide not less than two centralisers along the full length of each anchor bar to maintain the bar centrally located within the drilled hole. Centralisers must be:

(a) positioned to provide an even spacing between consecutive centralisers;

(b) firmly fixed to the bar;

(c) of a form that will not impair the free flow of the grout.;

(d) manufactured from material that is not corrodible and will not have deleterious effects on the anchor bar and the grout.

2.3.4 Slotted Pipe Drains

Materials and workmanship for slotted pipe drains must be in accordance with Specification TfNSW R40.

2.3.5 Flexible Strip Filter Drains

Where specified on the Drawings, place flexible strip filter drains behind the concrete facing, at the spacing shown, which must not be more than 3 m.

Flexible strip filter drains must be in accordance with Specification TfNSW 3557.

The minimum one-third flow capacity of the core at 1% slope must be 60 litres per minute.

3 CONSTRUCTION

3.1 GENERAL

Provide the Principal for agreement with your full Construction Program and Method Statement at least 10 working days before the commencement of the works. The submission of the Construction Program and Method Statement constitutes a Hold Point.

HOLD POINT

Process Held:	Commencement of soil nailing work
Submission Details:	At least 10 working days before the commencement of works, submit to the Principal full Method Statement and Construction Program
Release of Hold Point:	The Principal will consider the submitted documents prior to authorising the release of the Hold Point.

The Method Statement and Construction Program must include, but not be limited to, the following information:

(i) names and resumes of suitably experienced personnel who will supervise and carry out the work;

(ii) method of installation of the soil nails, including drilling, cleaning, supporting the drillholes; and grouting and testing of the nails together with construction/excavation sequence. Only pneumatic, rotary and rotary percussion drilling with air as fluid and flushing agent are permitted;

(iii) method for installing instrumented soil nails with strain gauges if any, providing conduits for wires and avoiding damage to wires between soil nails and readout box;

(iv) proposed grout mix proportions and the method of grout production;

(v) results of the trial grouting mix for anchor bars and soil nails that verify your proposed grout mix proportions and the method of grout production;

(vi) detailed method of applying shotcrete; and

(vii) proposed construction program and construction sequence.

3.2 STORAGE AND HANDLING

Suitably protect steel reinforcement, UPVC pipes, nail head components and bearing plates against mechanical damage, weld splash, contamination by marine spray, gross industrial atmospheric contamination and aggressive wind blown sands. Store steel reinforcement and UPVC pipes in straight lengths.

Store all soil nail components in clean and dry conditions.

Handle galvanized steel reinforcement carefully to avoid punctures, fractures or wear of the galvanizing. Do not drag bare or galvanized steel reinforcement across abrasive surfaces or through deleterious materials such as surface soil.

When lifting long steel reinforcement and encapsulation, use cradles to prevent excessive bending.

3.3 CONSTRUCTION SEQUENCE

Installation of permanent nails can commence once testing of the Test Nails (refer to Clause 5) has been completed and associated Hold Points have been released. Unless otherwise shown on the Drawings or directed by the Principal, construct soil nail slopes in an incremental, "top-down" manner in accordance with the following sequence:

(a) For each construction stage, excavate the face of the cut over the width and depth as approved in the Method Statement.

Excavation of individual "lifts" must not exceed a total depth of 2 m, and must also not exceed a depth of 0.5 m below the row of soil nails to be installed, or the full depth of excavation in the case of the lowest row of soil nails.

The exposed slope face after each excavation "lift" must be inspected by a qualified Geotechnical Engineer engaged by the designer of the soil nail structure. This inspection constitutes a Witness Point.

WITNESS POINT

Process Witnessed:	Exposed slope face after each excavation "lift".
Submission Details:	At least 2 working days before completion of excavation of a "lift", advise the Principal of the availability of the excavated face for inspection by a qualified Geotechnical Engineer

(b) Installation and testing of soil nails together with installation of horizontal drains and flexible strip filter drains must commence immediately after excavation is completed. The time the exposed excavated face is left unsupported must be kept to a minimum to prevent any deterioration of the excavated face.

(c) Construction of the concrete facing over the exposed face at the current construction stage may commence once the soil nails and drainage have been installed. Make allowance for support of the facing during placement and for lapping of facing reinforcement to ensure a continuously reinforced face.

(d) Carry out construction of subsequent rows of soil nails and concrete facing in a similar manner, one row at a time.

(e) Excavation for subsequent rows of soil nails cannot commence until the installation of the preceding row is fully completed and the concrete facing has attained sufficient strength to be self-supporting to permit further excavation to proceed. Excavation of subsequent lifts can only take place when the completed concrete facing of the previous lift has achieved sufficient strength to be self supporting. This time period must not be less than 72 hours, unless otherwise approved by the Principal.

Do not change the construction sequence specified in the Contract Documents without the approval of the Principal.

3.4 SOIL NAIL INSTALLATION

3.4.1 General

Installation of the soil nails must be carried out by qualified and experienced personnel.

Assemble the soil nail (with or without encapsulation) in a workshop, or on site under cover, by trained personnel. Identify the assembled soil nails using clear markings and handle them with care.

3.4.2 Set Out and Drilling

Use rotary or rotary-percussion drilling equipment for drilling to ensure minimal remoulding of insitu materials within the drillholes. Do not use drilling fluids other than air, unless otherwise approved by the Principal.

Holes for galvanized soil nails must be at least 100 mm in diameter or as shown on the Drawings.

During the drilling operation, record the ground conditions encountered on a drillhole log together with all changes in ground type and notes on water levels encountered and drilling rates. Record also on the drillhole log the bearing and inclination of the formed drillhole as well as geometric details and the cleaning procedure.

On completion of drilling, clean the drillhole of all loose and deleterious material and protect or seal the drillhole opening to prevent the entry of foreign matter. Carry out cleaning by flushing with air or compressed air using side jet bits, so as to ensure removal of all drill cuttings from the walls and bottom of the drillhole and to avoid excessive air pressure. Reinforcement may only be installed in a clean hole free of debris and foreign matter.

The drillholes for the soil nails must have adequate clearance from the nearby structures and be constructed within the following tolerances:

(a) Deviation in alignment of the drillhole must not exceed 5°. Deviation from straight must not exceed 25 mm in any 1.5 m length of hole. Locate the entry point of the drillholes within ±50 mm of its design position on the cut face;

(b) The depth of the holes must be within a tolerance of –0, +100 mm;

(c) An allowance for overdrilling (300 mm maximum) must be added to the depth where debris cannot be removed from the bottom of the hole;

(d) The maximum deviation of the diameter of the drillholes from the design diameter is –0, +10 mm.

3.4.3 Insertion and Grouting

3.4.3.1 Insertion of Soil Nails

Prior to soil nail installation, clean the drillhole of debris by air flushing methods.

Insert soil nails in one careful operation at a controlled rate to avoid dislodgment of material from the wall of the drillhole and to ensure that centralisers and spacers are not displaced. Replace any soil nail or its galvanized coating which is damaged during installation. Insertion and grouting must occur as soon as practicable following drilling, but in any event must be completed within 24 hours after completion of drilling.

Do not carry out grouting without the prior approval of the Principal.

3.4.3.2 Grouting Equipment

Grouting equipment for soil nail installation must be of a type, quantity and size which is suitable for the grouting required and is approved by the Principal. Keep the equipment clean and in good working order.

The equipment must include:

(a) a purpose designed high speed mechanical stirrer capable of producing grout free of lumps within a mixing time of 2 minutes. Mixers must be fitted with a water volume measuring device for batching purposes;

(b) a holding tank fitted with an agitator to provide continuous agitation of the grout at 100 rpm. The tank must be fitted with a dipstick to allow continuous measurement of the volume of grout in the tank;

(c) flow meter and pressure gauge to check the intake grout volume and the required pressure.

The pump used for grout injection must be of the positive displacement type (i.e. it must be actuated by a piston or screw) fitted with a bypass back to the agitator tank to allow a standby pump to be brought into operation immediately in the event of breakdowns during grouting operations.

3.4.3.3 Grout Mixing

Batching of the dry materials must be by weight. Measure the amount of water used with a calibrated flowmeter or a measuring tank.

Mix the grout by adding initially approximately two-thirds of cement to the water, followed by the additive if any, and then the remaining one-third of cement. Mix the grout for a sufficient time to produce a grout of uniform consistency.

The grout mixing process must utilise a recirculating system where the grout is continuously discharged and recharged into the mixing unit during the mixing period. After mixing, keep the grout continuously agitated.

Pass the grout through a nominal 1.2 mm wire cloth to ensure a uniformly mixed grout prior to injection. Use the grout as soon as possible after mixing and in any case within 30 minutes of adding cement, unless approved retarding agents are used.

Grout pumps must be efficient and capable of running continuously for the duration of the grouting operation. They must be capable of pumping the specified grout at a rate appropriate to that required for the operation.

Any alternative mixing procedures proposed by you must be agreed with the Principal.

3.4.3.4 Grouting

Carry out grouting by use of supply lines directly connecting the pumps to the down-hole grout tubes. Inject grout through a grout tube to the bottom of the hole, at an injection pressure of not more than twice the overburden pressure measured at the top of the soil nail. The grout tubes must have a minimum internal diameter of 12 mm to ensure that blockages will not occur during grouting operations and must also be sufficiently robust to ensure that they are not damaged during handling.

During the grouting operation, the grout must displace all air and water and fill the hole in a continuous operation until the emerging grout is of the same consistency as the grout being pumped in. The grout level must then be checked by sitting for 5 minutes and top-up grout introduced if necessary to ensure that the soil nail is fully grouted.

Plug the remaining void at the top of the drillhole flush to the slope faces using a dry-packed 3:1 sand:cement mix. Discard and dispose of the grout that has overflowed from the hole as waste to the satisfaction of the Principal.

Alternative methods to ensure that soil nails are fully grouted may include overpouring the grout using a PVC tube extended sufficiently to allow for grout losses and prevent the formation of a horizontal construction joint in the grout. The choice of method must be adapted to the geology of the material and the extent of grout loss encountered. The degree of rock fracturing or presence of fill will affect grout loss.

During grouting of encapsulated soil nail, install a separated grout tube extending to the bottom of the assembly both inside and outside the encapsulation. Inject grout in a controlled manner from the bottom to the top both outside and inside until the encapsulation is completely filled without separation. Maintain the grout level between the outside and the inside sheathing to not greater than 1 m to ensure minimal pressure variation across the sheathing.

Discontinue grouting if the ambient and grout temperature falls below 5°C.

Protect the soil nail from accidental disturbance after grouting has been completed to ensure that damage of the grout/soil and grout/nail bond does not occur.

3.4.3.5 Loss or Leakage of Grout

If, during the grouting of any hole, the grout take increases suddenly by a significant amount, inform the Principal immediately.

If, during the grouting of any hole, grout is found to flow from adjacent grout holes in quantities which in the opinion of the Principal are sufficient to interfere seriously with the grouting operation or to cause appreciable loss of grout, cap the adjacent holes temporarily and remove the steel reinforcement bar from the grouted hole. Grout, re-drill and re-grout the hole.

If, during the grouting of any hole, grout is found to flow from joints in the geological formation at the Site or any other locations, plug or caulk the leaks in a manner agreed by the Principal.

3.4.3.6 Bleed Testing

Provide one sample of grout from each batch of grout to determine the amount of bleeding in accordance with ASTM C940 and the requirements specified in Clause 2.2.7.

Samples must be provided not more than 30 minutes after the grout has been mixed and must be protected from moisture content changes before the tests for amount of bleeding are carried out.

3.4.3.7 Fluidity Testing

Provide one sample of grout from each batch of grout to determine the fluidity in accordance with ASTM C939 and the requirements specified in Clause 2.2.7.

3.4.3.8 Compressive Strength Test

During the production of grout, take representative test specimens comprising cubes in accordance with Test Method TfNSW T375 at the frequencies shown in Table R64.2 below,

and additional cubes if testing is required at ages other than seven days. Store cubes under standard curing conditions of 23°C and 100% relative humidity, in accordance with Test Method TfNSW T375.

Table R64.2 – Sampling Frequency of Test Specimens

Grout Batches	Sampling Frequency
1 batch/day	1 pair of cubes
2 batches/day	2 pairs of cubes
3 – 5 batches/day	3 pairs of cubes
6 – 10 batches/day	4 pairs of cubes

Grout cubes must be tested at 7 days in accordance with Test Method TfNSW T375 and must achieve the compressive strength specified in Clause 2.2.7.

If the result of any test for compressive strength of grout does not comply with the specified requirements, submit particulars of the proposed changes to the materials, grout mix or methods of production to the Principal, make further trial mixes and carry out further grouting trials unless prior agreement is obtained from the Principal. Down-rate the capacity of the soil nails comprising the batch and install additional nails if necessary.

3.4.3.9 Fitting of Galvanized Nuts and Bearing Plates

Fit the bearing plate at the head of the soil nail concentrically to the steel reinforcement with a tolerance of 5 mm and perpendicular to the steel reinforcement with a tolerance of 3°.

The methods used for bedding the bearing plate must ensure void-free contact over the full area of the plate.

After the grout has attained a minimum compressive strength of 32 MPa, lock tight the nuts on soil nails.

3.4.3.10 Construction Conformity Record

Submit conformity records for each soil nail installation. The record must include the following:

(a) soil nail identification number;

(b) bearing, inclination, position, depth, and diameter of the formed drillhole;

(c) soil/rock type encountered with depth during drilling;

(d) water levels;

(e) drilling rates;

(f) cleaning procedure;

(g) type and age of cement;

(h) concentration and type of additive (if any);

(i) water/cement ratio;

(j) bleed characteristics of grout;

(k) mixing equipment used;

(l) mixing time;

(m) size of grout pipe and length;

(n) method of grouting;

(o) time intervals between completion of soil nail hole drilling and start of grout injection;

(p) time of completing grout injection;

(q) volume of grout injected;

(r) average injection pressure,

(s) times and details of any interruptions;

(t) test specimens taken and 7 day grout strength obtained;

(u) estimated elastic extension for Suitability Test and Acceptance Tests.

4 INSTRUMENTED SOIL NAIL

Where specified on the Drawings or where directed by the Principal, install instrumented soil nails with attached strain gauges. Refer to Annexure R64/E for a diagram of a typical soil nail structure with instrumentation, and typical soil nail instrumentation requirements.

Instrumented soil nails with attached strain gauges are installed to measure axial forces on the nails. The objective of the instrumentation is to ensure that the structure performs within the design requirements by measurement of tensile forces on selected soil nail bars.

The work must be carried out by a third party geotechnical instrumentation specialist with proven experience in this type of work.

Where appropriate, submit your proposed instrumentation plans for review by the Principal prior to purchase of the materials (i.e. datalogger or gauges).

Supply the instrumented soil nails at least 21 days before the commencement of soil nail installation. Protect and store these soil nails to prevent any damage to the gauges or associated cabling. Properly label each instrumented soil nail and identify its location (row and cross section detail).

Agree with the Principal a suitable location for the terminal box and concrete foundation pad if the location is not shown on the Drawings.

Provide 7 working days notice to the Principal of your intention to install a particular instrumented soil nail. Insert the instrumented soil nail into the borehole carefully to avoid damaging the strain gauges and do not grout the borehole until the Principal has tested the strain gauge circuits at the readout box.

WITNESS POINT

Process Witnessed:	Installation of instrumented soil nail
Submission Details:	Advise the Principal, at least 7 working days before the commencement of installation, your intended date of commencement

Progressively install 100 mm PVC tubes (containing the draw wires) in a trench to the readout box, as shown on the Drawings. Connect the clearly labelled wires to the readout box with the correct soil nail number and strain gauge location. Provide electric power necessary to operate the readout box for

the monitoring of soil nail instrumentation installed. Provide unrestricted and safe access throughout the Contract for the Principal or his representative for testing the instrumentation.

5 TESTING OF SOIL NAILS

5.1 GENERAL

Soil nails must undergo two types of testing, namely, Suitability Test for test nails and Acceptance Test for permanent nails.

The purpose of Suitability Test on test nails is to confirm that the bond strength is achieved and that the reinforcement will perform as designed prior to permanent soil nail installation. The Acceptance Test on permanent nails is a measure of quality control. Carry out tests for soil nails under the direction of a qualified and experienced engineer provided by you in the presence of your authorised representative who must record the work.

The number of test nails to be assessed by Suitability Test must be the greater of:

(i) the number specified on the Drawings; or

(ii) 1% of the permanent nails but not less than 2.

Subject a total of 3% of permanent nails to Acceptance Test (Clause 5.2.2).

The locations of the test nails must be approved by the Principal.

5.2 SOIL NAIL TESTS

5.2.1 Suitability Test

Prior to the installation of permanent nails, install Suitability Test nails to the satisfaction of the Principal. The tests must establish adequacy of the soil nail installation with respect to bond stresses between the nail and soil for the various ground conditions which apply and must involve subjecting soil nails to axial pull-out loads until failure occurs, or to 80% of the ultimate tensile strength (UTS) of the soil nail bar.

These nails must have a minimum bond length of 3 m unless otherwise shown on the Drawings. Provide a minimum debonded zone of 1 m length of soil nail immediately behind the facing in order to prevent influence on the test result from the load test reaction system. This debonded length requirement may be waived if the load test reaction system will not exert any pressure on the slope surface within a metre radius from the circumference of the test nail drill hole.

The soil nails subject to Suitability Test are additional to the permanent nails shown on the Drawings.

Submit to the Principal testing arrangements to suit your particular working method and equipment, and calculations to verify load transfer, reactions and load testing programme, in conjunction with actual Suitability Test bar extensions and adjusted extensions deducting the calculated elastic bar extension.

Give the Principal at least one working day notice of your intention to carry out Suitability Test.

Test the soil nails subject to Suitability Test to pull-out failure or to 200% of the design working load, whichever is lower.

Adjust the reinforced bar diameter or strength grade, if necessary, at your cost to ensure that the test load does not exceed 80% of the UTS of the soil nail bar. The test nails must be installed in an identical manner, including time delays between various operations, and at locations with ground conditions representative of that of the permanent nails and as approved by the Principal.

Injected grout must have achieved a compressive strength of 40 MPa before performing the Suitability Test.

Soil nails subjected to Suitability Tests must be loaded in the working load increments and held at these loads for the period specified in Table R64.3 below:

Table R64.3 – Suitability Test: Load Increments and Minimum Periods of Observation

Load Cycle No.	Test Loads (% of Design Working Load)	Minimum Period of Observation at Peak Test Load (minutes)
1	10 → 60 → 10	10
2	10 → 100 → 10	60
3	10 → 150 → 10	10
4	and thereafter the load is 200% of the Design Working Load. The test load must be limited to 80% of the ultimate tensile strength of soil nail bar.	180

The rate of load application must be in the range of 3 to 5 kN/minute. At each load cycle, hold the load at the peak test load for the period of observation as specified in Table R64.3. Record the head movement at 1, 2, 3, 5, 6, 10, 20, 30, 50, 60, 90, 120, 150 and 180 minutes.

The Suitability Test will be considered successful if all the following are satisfied:

(a) A total creep movement of less than 2 mm between the 6 and 60 minutes readings is measured during Cycle 4; and

(b) A total creep movement of less than 1mm between the 60 and 180 minutes readings is measured in Cycle 4; and

(c) The creep rate is linear or decreasing, when plotted against the logarithm of time throughout Cycle 4.

If the test nail cannot be pulled out within 80% of the ultimate tensile stress of the soil nail bar, cut-off the bar flush with the finishing ground and grout the remaining part of the drillhole.

When directed by the Principal, extract the entire test nail from the drillhole for inspection. Unless otherwise directed by the Principal, fill the void caused by the extraction of the soil nail with grout.

If the extracted soil nail indicates that full penetration of grout into the drillhole has not been achieved, or any other test result indicates that the soil nail has not been constructed in accordance with this Specification, submit revised soil nail construction procedures (such as drilling method, grout mix design and grouting techniques) to the Principal for approval.

Repeat the Suitability Test on a replacement test nail. Any modifications of construction procedures, replacement nails and associated tests must be at your cost.

The submission of the Suitability Test record as stipulated in Clause 5.4 constitutes a Hold Point.

HOLD POINT	
Process Held:	Installation of permanent nails
Submission Details:	Suitability Test record
Release of Hold Point:	The Principal will consider the submitted documents prior to authorising the release of the Hold Point

5.2.2 Acceptance Test

A total of 3% of permanent nails, unless otherwise approved by the Principal, must be subjected to Acceptance Test. Of these, half must be in the top row, a quarter in the middle row and a quarter in the bottom row. The Principal will nominate the locations of soil nails subject to Acceptance Test. The Principal may direct additional locations for Acceptance Test if necessary.

Provide a minimum debonded zone of 1 m length of soil nail immediately behind the facing in order to prevent influence on the test result from the load test reaction system. This debonded length requirement may be waived if the load test reaction system will not exert any pressure on the slope surface within a metre radius from the circumference of the test nail drill hole.

Carry out Acceptance Test in the presence of the Principal prior to the application of concrete facing to the exposed ground.

Injected grout must have achieved a compressive strength of 40 MPa before performing Acceptance Test.

The maximum applied load during the acceptance test must not exceed 80% of the ultimate tensile strength of the soil nail bar.

Provide actual acceptance test bar extensions and adjusted extensions deducting the calculated elastic bar extension.

Soil nails subject to acceptance tests must be loaded to the load increments and held at these loads for the periods specified in Table R64.4 below:

Table R64.4 - Acceptance Test: Load Increments and Minimum Periods of Observation

Load Increment (% of Working Load of each test nail as shown in Drawings)	Minimum Period of Observation (minutes)
25	5
50	5
100	5
150	180 (Creep Test)
100	5
50	5
25	5

Note: The above stages constitute one full cycle of testing.

The rate of load application must be in the range of 3 to 5 kN/minute. At each load increment, hold the load at the test load for the period of observation as specified in Table R64.4. Record the displacement at the beginning and the end of the observation period. For the creep portion of the test, record movements at 1, 2, 3, 5, 6, 10, 20, 30, 50, 60, 90, 120, 150 and 180 minutes.

The acceptance test will be considered successful if all of the following are satisfied:

(a) A total creep movement of less than 2 mm between the 6 and 60 minutes readings is measured in Creep Test hold period; and

(b) A total creep movement of less than 1 mm between the 60 and 180 minutes readings is measured in Creep Test hold period; and

(c) The creep rate is linear or decreasing, when plotted against the logarithm of time throughout Creep Test hold period.

Where a test nail does not meet the acceptance criteria, test an additional 2 soil nails in the vicinity of the nonconforming soil nail. If any soil nail fails an Acceptance Test, abandon the soil nail and completely remove it from the drillhole by a method acceptable to the Principal. Unless otherwise instructed by the Principal, fill the drillhole by grouting. If the failed soil nail cannot be pulled out within 80% of the UTS of the soil nail bar, cut-off the bar flush with the finishing ground and grout the remaining part of the drillhole. Install another soil nail adjacent to the abandoned one for additional test at your cost.

5.3 TESTING AND MEASURING EQUIPMENT

Measure displacements using two dial gauges mounted on a tripod or fixed to a rigid support that is independent of the jacking mechanism and the soil nail. The dial gauge must be capable of measuring to an accuracy of 0.01 mm. Dial gauges must be set up so as to avoid any misalignment and eccentricity to the direction of movement of the soil nail, and zeroed after alignment and initial load has been applied.

Establish a stable datum to measure the movement at the bar head. Measure movements of the bar head relative to the datum to an accuracy of ±0.1 mm.

Use a hydraulic jack, with a minimum travel of 150 mm, to apply the load. Apply the load to the soil nail via a load bridge to ensure that the surface reaction is clear of the soil nail. Measure the test load with an accuracy of ±1 kN. Add a centre hole load cell in series with the jack for use during tests.

Calibrate the hydraulic jack, pressure gauge and load cell as a set. Submit to the Principal the calibration certificates, which must be less than 12 months old, for the jack, pressure gauge and load cell prior to the soil nail testing. The calibration must be undertaken by a registered NATA laboratory. The identification numbers on the field test equipment must match the identification numbers on the calibration data sheets. Take care to ensure that the load cell is properly aligned with the axis of the soil nail bar and the jack.

The calibration certificate must be accompanied by the related calibration curve and tabulated record of hydraulic pressure against jack load. Perform the calibration for the loading and unloading operations of the jack over its full working range.

Submit details of the installation, load measuring and movement measuring devices and the method of calculating/defining the bar elastic extension, to the Principal for approval.

5.4 RECORDS OF TESTS

Keep records of any Suitability Test and Acceptance Test carried out. These records must include:

(a) Date;

(b) Soil nail number;

(c) Number of tests carried out;

(d) Load/ extension measurements;

(e) Any variations from the specified procedure;

(f) Details of test results;

(g) Any unforeseen or unusual conditions encountered;

(h) Time intervals between completion of test soil nail hole drilling and start of grout injection;

(i) Actual and calculated bar extensions, including and excluding elastic bar extension.

Tabulate and plot the soil nail head and bearing plate movements on a graph for assessment together with all other relevant information.

Submission of the testing records for the test nails constitutes a Hold Point.

HOLD POINT	
Process Held:	Acceptance of permanent nails
Submission Details:	Within one week of completion, submit to the Principal test results on permanent nails in a prior agreed format
Release of Hold Point:	The Principal will consider the submitted documents prior to authorising the release of the Hold Point

6 PLACEMENT OF CONCRETE FACING

6.1 GENERAL

Construct the concrete facing either from formed concrete or shotcrete, and reinforced with galvanized steel mesh/bars as shown on the Drawings.

Place formed concrete in accordance with Specification TfNSW B80.

Place shotcrete in accordance with Specification TfNSW R68.

6.2 SLOPE SURFACE PREPARATION

Carry out slope surface preparation in accordance with TfNSW R68.

During placement of concrete, protect the drainage system against contamination to ensure proper functioning.

Install thickness measuring pins on a 1.5 m square grid with a minimum 75 mm cover to reinforcement. These must be durable, non-corrosive and of sufficient length to provide adequate fixity during application of formed concrete or shotcrete.

Alternative methods for ensuring that the required minimum thickness of concrete is being applied may be approved by the Principal. Firmly fix steel reinforcement to prevent movement and vibration while the shotcrete is being applied.

6.3 DRILLING AND GROUTING OF STEEL MESH SUPPORT ANCHOR BARS

Give at least one working day notice of your intention to commence drilling of the steel anchor bar holes to support steel mesh.

Each anchor bar hole may be sealed until the anchor bar is ready to be installed to prevent the entry of foreign matter.

Immediately prior to installing the bar, clean the walls of the drillhole into which it is to be installed of all deleterious materials or accumulations, which would impair the effectiveness of the anchor bar. Following cleaning, gauge the hole to confirm that it is unobstructed for the full depth and diameter.

The anchor bar and centralisers must be assembled and positioned in the hole in accordance with the requirements of this Specification.

All grouting operations must be carried out by personnel skilled and experienced in this type of work.

The grouting supervisor must inspect the anchor bars assemblies prior to installation and verify that bars and grouting tubes have been correctly installed.

6.4 APPLICATION OF SHOTCRETE

6.4.1 General

Application of shotcrete must be in accordance with TfNSW R68.

Apply shotcrete in successive layers not exceeding 75 mm in thickness and with adequate adhesion to the surface or previous layers of shotcrete to prevent slumping or sagging. Unless approved otherwise, complete shotcreting to a whole panel (preferably not less than 10 m in length) prior to shotcreting the next panel.

Protect adjoining rock areas not required to be shotcreted from splash and spray rebound. Remove splash or rebound material on these adjoining surfaces by air-water jet or other suitable means as work proceeds.

Shotcrete must not cover or impair the function of slotted pipe drain or strip drain outlets which protrude through the shotcrete layer. You may use temporary plugs to protect such outlets during the shotcreting process.

6.4.2 Construction Joints

Keep construction joints to a minimum, and their types and locations must be approved by the Principal.

Form construction joints by one of the following methods:

(a) Placing or trimming the joint edge not more than 45° with the base;

(b) Forming an approximately square joint to part depth by placing the shotcrete against a former or making a cut to the depth of the reinforcement; or

(c) Forming a full-depth square joint placed against a former.

Where a 30° taper is adopted for a construction joint, it must not be used as an end of day joint. Such tapered joints must be thoroughly cleaned and wetted by air water jet before continuing application of the adjoining shotcrete layer.

Taper the shotcrete over approximately 500 mm from the edges of the mesh (where used). Completely backfill any cut back areas with the final layer of shotcrete flush with the adjacent slope face.

6.4.3 Curing of Shotcrete

Carry out curing of shotcrete in accordance with TfNSW R68.

6.4.4 Testing of Shotcrete

Carry out testing of shotcrete for conformity in accordance with TfNSW R68.

Holes created by removal of cores must be thoroughly cleaned and dampened and reinstated with mortar (or other approved product) to achieve the same durability as the shotcrete.

6.4.5 Checking Integrity of Shotcrete

Check the integrity of the shotcrete for hollow areas by sounding with a hammer not more than 24 hours after placement.

Alternative methods may be used with the approval of the Principal.

Rectify defective areas by removal and replacement with fresh material with the area to be treated being a minimum of 300 mm x 300 mm and subject to the approval of the Principal. Remove and replace shotcrete which lacks uniformity, exhibits segregation, honeycombing, or lamination or shows evidence of other defects (e.g. dry patches, sand pockets or sagged slumped material) with fresh shotcrete.

7 RECORDS FOR INSTALLATION

Submit records for the installation of anchor bars, strip drains, steel reinforcement and shotcrete test records within three working days of completion of installation. Within the said three working days from completion of installation and after submission of conformity records, present the slope area to be covered by shotcrete to the Principal for inspection.

ANNEXURE R64/A – PROJECT SPECIFIC REQUIREMENTS

Insert any project specific requirements here. If there are none, delete this comment and replace the title with "(NOT USED)"

ANNEXURE R64/B – MEASUREMENT AND PAYMENT

Payment will be made for all costs associated with completing the work detailed in this Specification in accordance with the following Pay Items.

Where no specific pay items are provided for a particular item of work, the costs associated with that item of work are deemed to be included in the rates and prices generally for the Work Under the Contract.

Unless specified otherwise, a lump sum price for any of these items will not be accepted.

Pay Item R64P1 - Supply, Installation and Testing of Test Nails

The unit of measurement is "each" test nail installed and tested, for each length nominated.

The schedule rate must include all materials and work associated with drilling holes, supply, installation and grouting of the soil nail and **conducting of Suitability Test**, as shown on the Drawings or directed by the Principal.

Pay Item R64P2 – Supply and Installation of Permanent Nails

The unit of measurement is "each" permanent nail installed, for each length nominated.

The schedule rate must include all materials and work associated with drilling holes, supply, installation and grouting of the permanent nail, as shown on the Drawings or directed by the Principal. This item is not applicable to permanent nails with strain gauges and cables attached.

Pay Item R64P3 – Permanent Nails with Strain Gauges and Cables (where directed)

Pay Item R64P3.1 – Supply and Installation of Permanent Nails with Strain Gauges and Cables

The unit of measurement is "each" permanent nail installed with strain gauges and cables attached, for each length nominated.

The schedule rate must include all materials and work associated with drilling holes, supply of soil nails, strain gauges, cables and readout box, attaching strain gauges and cables to soil nails, numbering of the cables, installation and grouting of the soil nails with strain gauges and cables attached, as shown on the Drawings or directed by the Principal.

Pay Item R64P3.2 – Supply and Installation of PVC Pipe for Strain Gauges

The unit of measurement is the linear metre of 100 mm PVC pipe installed.

The schedule rate must include all materials and work associated with excavation of slot into rock to house the PVC pipe in the cut face, excavation of surfaces trench to run pipes to readout

box, connecting and placing the pipe, and backfilling around the pipe, as shown on the Drawings or directed by the Principal.

Pay Item R64P3.3 – Other Miscellaneous Works for Instrumentation

This is a Lump Sum item.

This Pay Item covers the miscellaneous works necessary for the monitoring of soil nail instrumentation installed, including wiring connection to the readout box, concrete pad and the supply of electric power necessary to operate the readout box.

Pay Item R64P4 – Acceptance Tests of Permanent Nails

The unit of measurement is "each" acceptance test conducted on permanent nails, in accordance with Clause 5.2.2 and as directed by the Principal.

Pay Item R64P5 – Supply and Placing of Shotcrete

The unit of measurement is per square metre of surface covered by the full thickness of shotcrete, as shown on the Drawings or directed by the Principal.

The schedule rate must include all materials and work associated with surface preparation, supply and fixing of reinforcement, supply, application and curing of shotcrete and provision of drainage holes through the shotcrete facing from strip drains.

Pay Item R64P6 – Strip Drains

The unit of measurement is per linear metre of strip drain installed behind the shotcrete facing, as shown on the Drawings or directed by the Principal.

The schedule rate must include all materials and work associated with installation of the strip drains and their connection to the existing or newly constructed site drainage system as shown on the Drawings.

ANNEXURE R64/C – SCHEDULES OF HOLD POINTS, WITNESS POINTS AND IDENTIFIED RECORDS

Refer to Clause 1.2.3.

C1 SCHEDULE OF HOLD POINTS AND WITNESS POINTS

Clause	Type	Description
2.1	Hold	Submission of material certificates
2.2.7	Hold	Submission of grout mix proportions, additives and test results
3.1	Hold	Submission of Construction Program and Method Statement
3.3	Witness	Exposed slope face after each excavation "lift"
4	Witness	Installation of instrumented soil nail
5.2.1	Hold	Submission of Suitability Test record
5.4	Hold	Submission of test results on permanent nails

C2 SCHEDULE OF IDENTIFIED RECORDS

The records listed below are Identified Records for the purposes of TfNSW Q Annexure Q/E.

Clause	Description of Identified Record
2.1	Certificates of conformity of all materials used for the Works
2.2.1	Test certificates for soil nail steel bars
2.2.4	Documentary evidence from manufacturer that proposed sheathing complies with requirements
2.3	Conformity records for the supply of either the formed concrete facing or shotcrete materials used for the facing
3.3	Conformity records for the construction sequence
3.4.2	Details of hole set out, drilling method using specialised equipment, hole depth, description of materials drilled and method of ensuring hole cleanness
3.4.3	Conformity records for soil nail installation and grouting
4	Drawings and other information detailing instrumented soil nails for monitoring the performance of the completed works
5.4	Conformity records for soil nail tests
6.4	Conformity records for thickness of shotcrete applied as the facing
7.0	Set of fully completed records including details of any changes to the Drawings, additional soil nails installed or changes to the configuration of the soil nails such as spacing or length

ANNEXURE R64/D – PLANNING DOCUMENTS

Refer to Clause 1.2.4.

The following documents are a summary of documents that must be included in the PROJECT QUALITY PLAN. The requirements of this Specification and others included in the Contract must be reviewed to determine additional documentation requirements.

The information to be submitted as part of the PROJECT QUALITY PLAN must include, but is not limited to, the following:

(a) Nominated personnel to supervise and carry out the work together with evidence of relevant training and experience (Clause 3.1);

(b) Details of method of installation, grouting and testing of soil nails (Clauses 3.1, 3.4 and 5);

(c) Details of method of installation of instrumented soil nails with strain gauges (if any) (Clauses 3.1, 4 and Annexure R64/E);

(d) Proposed grout mix proportions, the method of grout production and the results of trial grouting mix (Clauses 2.2.7, 3.1 and 3.4.3.3);

(e) Details of method of applying shotcrete (Clause 3.1);

(f) Construction program and construction sequence including method of excavation and staging of works (Clauses 3.1 and 3.3);

(g) Details of method of storage and handling of soil nail components (Clause 3.2);

(h) Details of method of fitting of galvanized nuts and bearing plates (Clause 3.4.3.9).

ANNEXURE R64/E – INSTRUMENTED SOIL NAILS

A typical soil instrumented nail configuration is shown below in Figure R64/E.1.

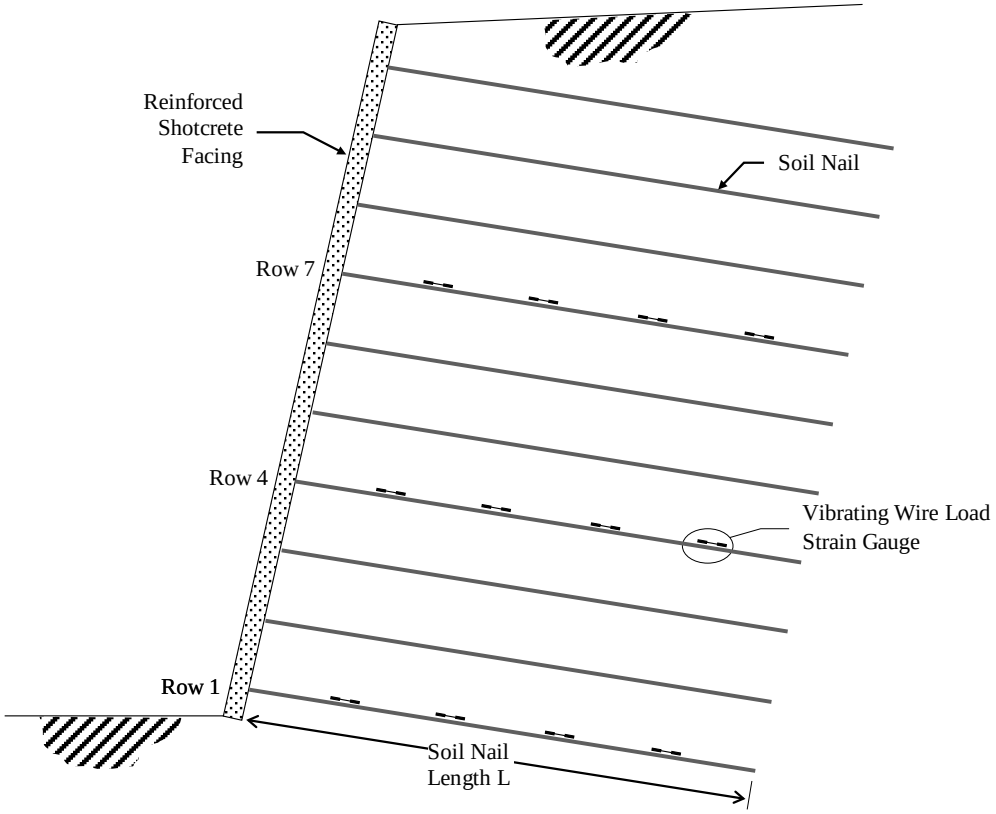


Figure R64/E.1 – Typical Soil Nail Structure with Instrumentation

Typical soil nail instrumentation requirements are given in Table R64/E.1 below.

Table R64/E.1 Typical Soil Nail Instrumentation Requirements

Item	Instrumentation	Details
1.	Strain gauge type	Weldable vibrating wire type strain gauges to measure directly axial tensile forces. Vibrating wire gauges to be calibrated over the expected range of forces to the soil nail bars calculated by the Designer. Output of the vibrating wire gauges to be in terms of frequency calibrated to load.
2.	Location of gauges	For each instrumented cross section, gauges must be installed on rows of soil nails as shown on the Drawings. Each nominated soil nail must have strain gauges installed along the bar at locations shown on the Drawings. A typical arrangement is shown in Figure R64/E.1.
3.	Temperature sensors	For each cross section one temperature sensor must be installed in the soil nailed structure approximately 3 metres behind the facing. The temperature sensor may be a thermocouple device
4.	Number of instrumented cross sections	The Designer will nominate the number of instrumented cross sections depending on the Project and the criticality of the structure.
5.	Total number of gauges	The Designer will nominate the number of vibrating wire type load – strain gauges. In addition, one pair of strain gauges must be installed near the front end of the soil nail to measure shotcrete facing effects.
6.	Gauge calibrations	Strain gauges must be calibrated on an instrumented soil nail test bar in the laboratory to determine the axial load/strain frequency response of the system.
7.	Sheath protection of gauges	All gauges must be waterproofed by protective heat shrink plastic and electrical tape.
8.	Installation of gauges	Gauges must be micro- welded securely onto the soil nail bars to ensure correct readout of load/strain. Gauges and wiring must not interfere with the installation or grouting process of the soil nails.
9.	Installation of instrumented soil nails	Instrumented soil nails must be carefully installed using dedicated lifting slings to eliminate bending or flexing of the soil nails during insertion into the drill holes. Flexing or mishandling of the instrumented soil nails may induce unwanted tension into the gauges which must be avoided.
10.	Installation gauge checks	After installation but prior to grouting for the particular soil nail, all gauges must be checked for correct readout and electrical continuity.

Item	Instrumentation	Details
11.	Monitoring of gauges during construction	Gauge readings must be taken at the following stages: (i) 24 hours after grouting, (ii) Prior to shotcreting, (iii) 24 hours after shotcreting, and (iv) 2 days after each excavation stage as shown on the PROJECT QUALITY PLAN.
12.	Ducts and cabling	Cabling must be housed in electrical PVC ducting placed under the shotcrete or concrete facing. The ducting must be waterproof. Sufficient cabling is required for all gauges to reach the datalogger device.
13.	Data logger	A multichannel datalogger device (48 channel) is required. The number of channels may vary depending on the actual instrumentation requirements of the Designer. The datalogger must be capable of continuously recording gauge data up to 6 months in internal memory. The datalogger must be capable of being programmed to taking readings from all gauges/sensors every 6 hours. Multiplexing may be used.
14.	Datalogger power supply	Either dedicated 240V mains voltage or power from solar cell panels is required. Solar cell panels must be installed on a separate mast above the readout box and vandal proof.
15.	Datalogger output	The datalogger must be supplied with modem facility for remote downloading of monitoring information.
16.	Datalogger labelling	All cabling from gauges must be clearly labelled to the datalogger to indicate gauge number, soil nail location and cross section details.
17.	Terminal box	A heavy duty steel terminal box (lockable and vandal proof) must be supplied to house the datalogger. The box must have a front door opening with steel hinges. Cabling must run in PVC ducting from the underside of the terminal box.
18.	Concrete pad	A reinforced concrete pad must be supplied as a foundation for the terminal box.
19.	Trenching requirements	All cabling from the instrumented sections must run through 100 mm PVC ducting to the terminal box. Trenching is required to lay the ducting to a depth of 300 mm. Trench backfill must be compacted to cover the ducting.

ANNEXURES R64/F TO R64/L – (NOT USED)

ANNEXURE R64/M – REFERENCED DOCUMENTS

Refer to Clause 1.2.5.

TfNSW Specifications

TfNSW Q	Quality Management System
TfNSW R40	Horizontal Drains
TfNSW R63	Geotextiles (Separation and Filtration)
TfNSW R68	Shotcrete Work Without Steel Fibres
TfNSW B80	Concrete Work for Bridges
TfNSW 3211	Cements, Binders and Fillers
TfNSW 3557	Flexible Strip Filter Drains

TfNSW Test Methods

TfNSW T375	Sampling and Testing for Grout

Australian Standards

AS 1012	Methods of testing concrete
AS 1112.3	ISO metric hexagon nuts – Product grade C
AS 1214	Hot-dip galvanized coatings on threaded fasteners (ISO metric coarse thread series)
AS 1275	Metric screw threads for fasteners
AS 1379	Specification and supply of concrete
AS 1478.1	Chemical admixtures for concrete, mortar and grout – Admixtures for concrete
AS 1627	Metal finishing – Preparation and pretreatment of surfaces – Method selection guide
AS 2758.1	Aggregates and rock for engineering purposes – Concrete aggregates
AS 3678	Structural steel – Hot-rolled plates, floorplates and slabs
AS 4131	Polyethylene (PE) compounds for pressure pipes and fittings
AS 4671	Steel reinforcing materials
AS/NZS 4680	Hot-dip galvanized (zinc) coatings on fabricated ferrous articles
AS/NZS ISO 9001	Quality management systems – Requirements

ASTM Standards

C939	Standard Test Method for Flow of Grout for Preplaced-Aggregate Concrete (Flow Cone Method)
C940	Standard Test Method for Expansion and Bleeding of Freshly Mixed Grouts for Preplaced-Aggregate Concrete in the Laboratory

C1090	Standard Test Method for Measuring Changes in Height of Cylindrical Specimens of Hydraulic-Cement Grout
D1784	Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds
D3350	Standard Specification for Polyethylene Plastics Pipe and Fittings Materials
D4327	Standard Test Method for Anions in Water by Chemically Suppressed Ion Chromatography

TRANSPORT FOR NSW (TfNSW)

QA SPECIFICATION R68

SHOTCRETE WORK WITHOUT STEEL FIBRES

REVISION REGISTER

Ed/Rev Number	Clause Number	Description of Revision	Authorised By	Date
Ed 1/Rev 0		First issue	GM, IC	20.04.09
Ed 1/Rev 1	4.1	Procedures for controlling water seepage at freshly placed shotcrete added.	GM, IC	08.02.10
	4.2	Preparation of earth surface revised, with inclusion of alternative option to prevent excessive absorption of water by earth surface.		
	5.5	Requirement for minimum cover depth amended.		
	7.3	Nozzle operator requirements included. Prohibition on use of rebound into works.		
	8.5	Referrence to Clause 7.2 inserted for thickness.		
	8.5.1	Requirement to identify reinforcement locations prior to coring added in first paragraph.		
	Annexure R68/L1	Table L1, Clause 6.3 – Test Method reference corrected to Clause 3.5.		
	Annexure R68/L2.2	Core diameter added in first paragraph. In third paragraph, “a” inserted, “concrete” replaced with “shotcrete” and repair of core holes to leave no visible cracks added.		
Ed 1/Rev 2	1.2.4	Previous Clause 1.3. Subsequent clauses renumbered.	GM, IC W Stalder	01.08.11
	2.3.1	New sub-clause heading “General” added.		
	2.3.2	New sub-clause “Corrosion Inhibitors” added.		
Ed 1/Rev 3	2.2	Requirement for taking of initial 5 kg cement sample deleted.	GM, CB	22.01.16
	2.7	Heat accelerated curing and corresponding sulfate limit deleted.		

Ed/Rev Number	Clause Number	Description of Revision	Authorised By	Date
	Table R68.3 Annex A, A1.3 Annex B	Maximum acid-soluble choride ion contents for unreinforced concrete, prestressed concrete and grout deleted. Durability provisions replaced by curing regimes. Pay item P1 introduced.		
Ed 1/Rev 4	Global	References to “Roads and Maritime Services” or “RMS” changed to “Transport for NSW” or “TfNSW” respectively.	DCS	22.06.20

GUIDE NOTES
(Not Part of Contract Document)

Using Specification R68

TfNSW R68 is a QA specification and the use of QA specifications requires the implementation of a quality management system by the Contractor that meets the quality system requirements specified in TfNSW Q. To comply with the intention of Government policy as well as TfNSW R68, shotcrete works constructed using TfNSW R68 require adequate surveillance and audit by the Principal.

Edition 1

The specification is based on TfNSW B82 Ed 2/Rev 3 and TfNSW B80 Ed 5/Rev 5, but with the requirements relating to steel fibres, including performance parameters relating to steel fibres, omitted.

The Specification is intended for shotcrete reinforced with conventional steel reinforcing bars and/or mesh.

Transport for NSW

QA SPECIFICATION R68

SHOTCRETE WORK WITHOUT STEEL FIBRES

IC-QA-R68

VERSION FOR:
DATE:

CONTENTS

CLAUSE **PAGE**

FOREWORD

TFNSW COPYRIGHT AND USE OF THIS DOCUMENT

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REVISIONS TO PREVIOUS VERSION

This document has been revised from Specification TfNSW R68 Edition 1 Revision 3.

All revisions to the previous version (other than minor editorial and project specific changes) are indicated by a vertical line in the margin as shown here, except when it is a new edition and the text has been extensively rewritten.

PROJECT SPECIFIC CHANGES

Any project specific changes are indicated in the following manner:

(a) Text which is additional to the base document and which is included in the Specification is shown in bold italics e.g. ***Additional Text***.

(b) Text which has been deleted from the base document and which is not included in the Specification is shown struck out e.g. ~~Deleted Text~~.

TfNSW QA SPECIFICATION R68

SHOTCRETE WORK WITHOUT STEEL FIBRES

1 GENERAL

1.1 SCOPE

This Specification sets out the requirements for the supply and application of structural shotcrete.

Shotcrete supplied and applied under this Specification must be conventionally reinforced wet-mix shotcrete not containing steel fibres.

The scope of this Specification does not include provisions for the structural design of the shotcrete, the supply and installation of rock bolts or the supply and installation of waterproofing and drainage elements.

1.2 STRUCTURE OF THE SPECIFICATION

This Specification includes a series of annexures that detail additional requirements.

1.2.1 Project Specific Requirements

Project specific details of work are shown in Annexure R68/A.

1.2.2 (Not Used)

1.2.3 Schedules of HOLD POINTS and Identified Records

The schedules in Annexure R68/C list the **HOLD POINTS** that must be observed. Refer to Specification TfNSW Q for the definition of **HOLD POINTS**.

The records listed in Annexure R68/C are **Identified Records** for the purposes of TfNSW Q Annexure Q/E.

1.2.4 Planning Documents

The PROJECT QUALITY PLAN must include each of the documents and requirements listed in Annexure R68/D and must be implemented.

In all cases where this Specification refers to the manufacturer's recommendations, these must be included in the PROJECT QUALITY PLAN.

1.2.5 Testing Procedures

The Inspection and Test Plan must nominate the proposed testing frequency to verify conformity of the item and it must not be less than that specified in Annexure R68/L. Where a minimum frequency is not specified, nominate an appropriate frequency.

The Principal may conditionally agree to your proposal to reduce the specified minimum frequency of testing. The proposal must be supported by a statistical analysis verifying consistent process

capability and product characteristics. The Principal may vary or restore the specified minimum frequency of testing, either selectively or permanently, at any time.

1.2.6 Referenced Documents

Unless specified otherwise, the applicable issue of a referenced document, other than a TfNSW Specification, must be the issue current at the date one week before the closing date for tenders, or where no issue is current at that date, the most recent issue.

Standards, specifications and test methods are referred to in abbreviated form (e.g. AS 2350). For convenience, the full titles are given in Annexure R68/M.

1.3 DEFINITIONS

The terms "you" and "your" mean "the Contractor" and "the Contractor's" respectively.

The following definitions apply to this Specification:

(a) **Cement:** Material conforming to Specification TfNSW 3211 Clause 6. It comprises cements, blended cements supplementary and other cementitious materials.

(b) **Concrete:** A thoroughly mixed combination of cement, aggregates and water, with or without the addition of chemical admixtures or other materials, all of which separately and when combined comply with the requirements of this Specification.

(c) **Cover:** The distance between the outside of the reinforcement and the nearest permanent surface of the shotcrete, or between the outside of the reinforcement and the nearest point on the receiving surface.

(d) **Curing:** The control of temperature and moisture in the concrete until the concrete has developed required properties.

  (i) **Sealed Curing:** Curing at ambient temperature in which the concrete surface is sealed by at least two coats of a curing compound conforming to this Specification.

  (ii) **Standard Moist Curing:** Standard Moist Curing as defined in AS 1012, Part 8.

  (iii) **Wet Curing:** Curing at ambient temperature in which the concrete surface is effectively covered with water or placed in a fog room/chamber with a relative humidity exceeding 98 %.

(e) **Exposure Classification:** The exposure classification for the surface of a member as determined in Clause 5.4.3 SAA HB77.

(f) **Nozzle:** Attachment at end of delivery hose from which shotcrete is projected.

(g) **Overspray:** Shotcrete material that is not intercepted by the receiving surface.

(h) **Panel:** A distinct section of the area for shotcreting (usually not less than 10m in length).

(i) **Rebound:** Shotcrete material that bounces off the receiving surface.

(j) **Shotcrete:**

  (i) **Shotcrete (generic):** Concrete projected onto a surface at high velocity.

  (ii) **Wet-mix Shotcrete**: Shotcrete in which cement, aggregate, and water are first mixed together before introduction as concrete into the delivery hose.

(k) **Shotcrete Mix:**

  (i) **Base Mix:** Concrete designed, tested and supplied independent from the shotcreting process, equipment and personnel.

(ii) **Shotcrete Mix**: The base mix after it is applied to the Works, or to Test Panels.

(l) **Sloughing:** Detachment or falling away of fresh shotcrete.

(m) **Water/Cement Ratio (w/c):** The ratio, by mass, of total free water, including water contained in admixture solutions, to total cement including all supplementary cementitious materials, in the concrete mix.

2 MATERIALS FOR CONCRETE

2.1 GENERAL

Materials for concrete must comply with Section 2 of AS 1379 and with the additional requirements of Clause 2 of this Specification.

2.2 CEMENT

Cement used in the Works must be Shrinkage Limited Type SL or General Purpose Blended cement Type GB conforming to this Specification and TfNSW 3211.

Blending of cement must be achieved either at the cement manufacturer's facilities and/or at the concrete batching plant, unless otherwise specified.

Supplementary cementitious materials (SCM) such as Fly Ash, Slag and Amorphous Silica and their proportions must conform to TfNSW 3211.

2.3 ADMIXTURES

2.3.1 General

Chemical admixtures, including corrosion inhibitors, and their use must conform to AS 1478.1. Admixtures must not contain calcium chloride. Where two or more admixtures are proposed for incorporation into a concrete mix, get their compatibility certified by the manufacturers. Submit details of the requirements for storage, preparation and mixing the admixtures.

Dispense accelerators and other admixtures that are added to concrete at the nozzle or at the delivery hose by calibrated mechanical means at dosage rates not exceeding the maximum recommended by the manufacturer.

Hydration control admixtures that suspend the hydration of shotcrete until the addition of the activator must not cause a decrease in concrete strength with age.

2.3.2 Corrosion Inhibitors

Corrosion inhibitors must contain a minimum of 30% of calcium nitrite solids. Where retarders additional to those already present in the corrosion inhibitor admixture are used to further modify the acceleration characteristics of the admixture, they must be added to the concrete before or with the admixture.

Where corrosion inhibitors are specified, the admixture application rate must be such that the concrete contains a minimum of 9 kg of calcium nitrite solids per cubic metre.

2.4 AGGREGATES

2.4.1 General

All aggregates used in the works must comply with AS 2758.1.

The combined grading of all coarse and fine aggregates in the base mix must be in accordance with Table R68.1

The Principal may approve the use of a particle size distribution outside the specified limits if evidence is provided that shotcrete made with this particle size distribution meets all other requirements of this Specification both in the fresh and hardened state. Supply additional evidence of acceptable performance for segregation, bleeding, plastic shrinkage and finishing properties.

Table R68.1 - Combined Coarse and Fine Aggregate Grading Requirements

Sieve aperture	Mass of sample passing, percent
13.2 mm	100
9.5 mm	90 – 100
6.7 mm	–
4.75 mm	70 – 85
2.36 mm	50 – 70
1.18 mm	35 – 55
600 μm	20 – 40
300 μm	8 – 20
150 μm	2 – 10

2.4.2 Additional Requirements for Coarse Aggregate

Do not use lightweight coarse aggregate.

Only use coarse aggregate with maximum nominal size of 10 mm.

Limit water absorption to a maximum of 2.5% except for slag aggregate where the maximum limit is 6%.

Use wet strength and wet/dry strength variation tests for aggregate durability assessment in accordance with AS 2758.1 with ‘duplicate testing’ being carried out in accordance with AS 1141.22.

2.4.3 Additional Requirements for Fine Aggregate

Limit water absorption to a maximum of 2.5%.

Any manufactured sand used as a fine aggregate must be crushed from rock from which is produced aggregate conforming to the requirements of Clause 2.4, and must be non-plastic when tested in accordance with AS 1289.3.

The requirements of Clause 8.2.2 of AS 2758.1 do not apply for manufactured sand. The water absorption of the combined fine aggregate must not exceed 2.5%

2.5 ALKALI-AGGREGATE REACTION (AAR)

2.5.1 Alkali - Reactive Materials

All aggregate used in the concrete to be incorporated into the Works must be:

(a) petrographically examined in accordance with Clause 2.5.2; and

(b) assessed and classified for AAR using the accelerated mortar bar test method in accordance with Test Method TfNSW T363.

2.5.2 Petrographic Examination

Petrographic examination must be in accordance with ASTM C295.

Aggregates containing obviously reactive components may be eliminated without further testing. Obviously reactive components include:

(a) Opaline material;

(b) Unstable silica minerals such as moderate amounts of tridymite and cristobalite; or

(c) Sheared rock containing moderate amounts of strained quartz and microcrystalline quartz.

Do not rely on petrographic examination alone to determine that an aggregate is non-reactive. Testing of the aggregate to Test Method TfNSW T363 is also required.

2.5.3 Actions Required for Control of AAR

For aggregates classified as non-reactive by TfNSW T363, no action for control of potential AAR is required.

Where any of the aggregates in a mix are classified as slowly reactive or reactive by TfNSW T363, actions required for control of potential AAR in the concrete must be in accordance with Table R68.2.

Blended cements used for control of potential AAR must be in accordance with TfNSW 3211.

Aggregates classified as reactive by Test Method TfNSW T364 in a particular concrete mix design must not be used. Use alternative aggregates and/or alternative concrete mix designs that conform to this Specification.

Table R68.2 - Actions Required for Control of Potential AAR Based on TfNSW T363 Testing

Mortar bar expansion (%) in 1M NaOH (80°C) at 21 days		Actions Required
Coarse aggregate	**Fine aggregate**	
≥ 0.10, < 0.40	≥ 0.15, < 0.45	Use blended cement
≥ 0.40	≥ 0.45	Use an alternative aggregate; or Use blended cement and assess aggregate reactivity in the concrete mix using TfNSW T364

2.6 FIBRES

2.6.1 Synthetic Fibres

Include synthetic fibres in the shotcrete mix to mitigate the effects of explosive spalling of shotcrete when subjected to high intensity hydrocarbon-fuelled fires. Add between 1 and 2 kg/m^3 of fine micro polypropylene monofilament fibres to the concrete.

The Principal may approve the use of other synthetic fibres if evidence is provided that the proposed fibres will give equivalent or better fire behaviour.

2.7 SOLUBLE SALTS

Determine the chloride ion content by testing ground samples of hardened concrete in accordance with AS 1012.20.

Take the samples from a minimum 1.2 kg portion of the hardened concrete. Crush and grind the 1.2 kg of hardened concrete to a maximum size of 150 microns and then oven dry at 110°C ± 5ºC for a minimum of one hour before taking the samples for analysis.

Analyse five (5) randomly selected samples of 20 ± 0.1 grams of the ground concrete for chloride ion content.

Use the Volhard method calibrated against a concrete with known chloride content for the tests. Modify the procedure of AS 1012.20 and use standard solutions for the analysis that bracket the expected chloride ion concentration.

Report the chloride ion content of each of the five samples and calculate and report the average chloride content and the standard deviation of the five samples.

The average mass of acid-soluble chloride ion per unit volume of concrete as placed must not exceed the values given in Table R68.3.

The sulfate content of concrete as placed, determined by calculation and expressed as the percentage by mass of acid-soluble SO_3 to cement, must not be greater than 5.0%.

Table R68.3 - Maximum Values of Acid-Soluble Chloride-Ion Content in Concrete

Exposure Classification *	Maximum acid-soluble chloride ion content for Reinforced Concrete (kg/m^3)
A	0.8
B1	0.4
B2	0.3
C	0.3
U	In accordance with Annexure R68/A

Note: Chloride ion content may be expressed in percentage weight of oven dried concrete.
(0.1 kg/m^3 ion content is approximately equivalent to 0.0042% by weight of oven dried concrete)
***** For information on exposure classifications, see AS 5100.5.

3 DESIGN OF SHOTCRETE MIX

3.1 GENERAL

Base the design and trial of the shotcrete mix on the anticipated conditions which will prevail on site so that, under these conditions and with the nominated application method and nozzle operators, the shotcrete meets all the requirements of this Specification.

Carry out the design of the shotcrete mix in two stages:

(i) First stage: design of a base mix; and

(ii) Second stage: trial of the shotcrete mix.

Where the shotcrete mix, during its trial stage, is found to require significant alteration to the base mix exceeding the variations specified in Clause 3.9, design and trial a modified base mix and assess for conformity.

Test results must be the average of a minimum of two specimens, unless specified otherwise in the applicable test method.

3.2 BASE MIX

3.2.1 Target Compressive Strength for Mix Design

Design the base mix to achieve a target strength $f_{c.md}$ such that:

$$\mathbf{f_{c.md} \geq f_{c.min} + M_{control}}$$

where $M_{control}$ is the margin nominated for variations in strength as defined in Clause 6.1 and $f_{c.min}$ is the specified minimum 28 day compressive strength as stated on the Drawings, or elsewhere in the Specification.

Unless specified otherwise on the Drawings, or approved by the Principal, the target strength $f_{c.md}$ must not exceed 45 MPa.

3.2.2 Proportioning for Durability

For the exposure classifications specified on the Drawings, the minimum cement content and maximum water/cement ratio of the base mix must be in accordance with Table R68.4.

Table R68.4 - Minimum Cement Content and Maximum Water/Cement Ratio

Exposure classification	**Minimum cement content** (kg/m^3)	**Maximum water/cement ratio** (by mass)
A	320	0.45
B1	320	0.45
B2	370	0.40
C	420	0.40
U	In accordance with Annexure R68/A Clause A1	

3.2.3 Trial Base Mix, Sampling and Testing

Prepare a trial base mix in accordance with AS 1012.2 using:

(a) the proposed materials and mix proportions;

(b) all admixtures including nozzle-added admixtures added at the highest dosages proposed by you; and

(c) the proposed fibres at proposed dosage.

Batch the trial base mix at the highest water/cement ratio conforming to the allowable slump range which must allow for batching tolerances specified for the nominated base mix.

Carry out sampling and testing for:

(i) slump;

(ii) shrinkage;

(iii) density; and

(iv) compressive strength.

3.3 SLUMP

Unless specified otherwise on the Drawings, or approved by the Principal, the base mix must have a slump between 75 mm and 120 mm.

3.4 SHRINKAGE

Prepare and measure shrinkage of specimens from the base mix in accordance with AS 1012.13.

Shrinkage of the specimens after either 3 or 8 week's drying must conform to Table R68.5. Where no exposure classification is stated on the Drawings or elsewhere in the Specification, apply exposure classification B1.

Table R68.5 - Maximum Shrinkage Strain of the Nominated Base Mix Specimens

Exposure Classification	Maximum shrinkage strain, micro strain	
	Drying period	
	3 weeks	8 weeks
A	680	900
B1, B2	560	800
C	530	700
U	In accordance with Annexure R68/A	

3.5 DENSITY OF HARDENED CONCRETE

The density, at 28 days, of hardened concrete included in the Works, determined in accordance with AS 1012.12 on representative samples cut from the Works in accordance with AS 1012.14, must not be less than 98% of:

(a) that of the corresponding samples taken from the transit mixer in accordance with AS 1012.8.1; and

(b) the nominated base mix.

Core diameters of less than 75 mm are acceptable.

3.6 COMPRESSIVE STRENGTH

Unless specified otherwise on the Drawings, the 28 day compressive strength of concrete determined in accordance with Annexure R68/L Clause L2 must not be less than 32 MPa.

3.7 PERMEABILITY

For the exposure classifications specified on the Drawings, the maximum permeability penetration depth, determined in accordance with DIN 1048, of shotcrete included in the Works must be in accordance with Table R68.6.

Table R68.6 - Permeability Requirements – Penetration Depth

Exposure classification	**Maximum Penetration Depth** (mm)
A	30
B1	30
B2	25
C	25
U	In accordance with Annexure R68/A

3.8 NOMINATED SHOTCRETE MIX

3.8.1 General

Submit to the Principal details of each nominated shotcrete mix, together with a certificate stating that the nominated shotcrete mix, its constituents, the proposed application and the proposed curing regime meet the requirements of this Specification.

HOLD POINT

Process Held:	Use of each nominated shotcrete mix in the Works.
Submission Details:	All details from Clause 3.2 to Clause 3.7 inclusive and certification, at least 5 working days prior to the proposed usage of each shotcrete mix.
Release of Hold Point:	The Principal will consider the submitted documents and may carry out surveillance and audits, prior to authorising the release of the Hold Point.

3.8.2 Submission Details for Base Mix

(a) Material Constituents

(i) Source;

(ii) Current test results not more than 12 months old providing evidence of conformity to Clause 2; and in particular

(iii) Method of controlling alkali-aggregate reaction specified in Clause 2.5.

(b) Mix Design

(i) Constituent quantities;

(ii) Trial mix water/cement ratio and corresponding nominated water/cement ratio;

(iii) Condition of constituents used in the mix design e.g. moisture condition of aggregates;

(iv) $f_{c.min}$ (refer Clause 3.2.1);

(v) Slump of the trial base mix and corresponding nominated slump; and

(vi) Maximum time for shotcrete application, where hydration-control admixtures are used.

(c) Batching, Mixing and Transport

(i) Methods;

(ii) Level of control and accuracy of batching;

(iii) Level of control and accuracy of determination of the aggregate moisture content;

(iv) Method of determination of $M_{control}$; and

(v) Minimum mixing time.

(e) Test Results of Hardened Concrete

(i) 28 day compressive strength in accordance with AS 1012.9;

(ii) Shrinkage in accordance with AS 1012.13; and

(iii) Sulfate and chloride ion contents in accordance with Clause 2.7.

(f) Trial mix "Report": in accordance with AS 1012.2.

3.8.3 Submission Details for Shotcrete Mix

(a) Test Panel Construction

(i) Number and sizes of Test Panels;

(ii) Base mix used in each Test Panel;

(iii) Type and dosages of nozzle-added admixtures;

(iv) Required and actual thickness;

(v) Description of finished product;

(vi) Description of internal cut surfaces; and

(vii) Degree of control required to achieve uniform shotcrete without excessive rebound, sloughing, partial or total collapsing during shotcreting.

(b) Hardened Shotcrete Characteristics

Test reports for:

(i) Compressive strength;

(ii) Density; and

(iii) Permeability.

3.8.4 Submission Details for Application Method and Curing Regime

(a) Application Method

(i) Procedures for shotcreting;

(ii) Equipment used for shotcreting;

(iii) Position of shotcreting; and

(iv) Names and experience of nozzle operators.

(b) Curing regime

(i) Method and duration of curing; and

(ii) Anticipated minimum ambient temperatures during the curing period.

If you propose to vary the curing regime, submit a new nominated base mix in accordance with Clause 3.11, unless otherwise approved by the Principal.

3.9 VARIATION TO NOMINATED MIXES

The quantities of the constituents in a nominated mix may be varied to improve the quality of the concrete. Variations to the quantities of constituents in the nominated mix must not exceed the following:

(a) Cement: 3% by mass of each constituent;

(b) Aggregates: 5% by mass of each constituent;

(c) Water: 3% by mass and/or volume of water.

Notify the Principal in writing and submit written details of such variations to a nominated mix before commencing production with the varied quantities.

Notwithstanding the above provisions, the varied mix must:

(i) not have a water/cement ratio exceeding that nominated for the concrete mix (refer to Clause 3.8);

(ii) conform to the requirements of Clause 3.2.2 for minimum cement content and maximum water/cement ratio; and

(iii) conform to the requirements of TfNSW 3211 for the range of SCM in Blended cement.

If you wish to vary the quantities of the constituents in excess of the above amounts, or wish to change the type or source of supply of any constituent, or vary the curing regime, submit a new nominated mix for approval in accordance with Clause 3.2.2, unless approved otherwise by the Principal.

3.10 COLOURING OF SHOTCRETE

Where required by the Principal, colour the shotcrete to blend the work with the surrounding slopes. The medium used must provide a permanent colour to the shotcrete.

The medium may be either:

(i) a pigment, included in the shotcrete mix; or

(ii) a coating, applied to the shotcrete.

At least seven working days prior to the application of the shotcrete, supply details of the proposed method, the medium to be used to colour the shotcrete, and examples of the proposed colour scheme to the Principal for approval.

3.11 TRIAL OF SHOTCRETE MIX

Prior to commencing construction, construct Test Panels using each proposed base mix, including any colouring as required, and for each nominated nozzle operator. Apply shotcrete normal to the surface of horizontal and vertical Test Panels. The Test Panels must be at least 750 mm x 750 mm, constructed to the same thickness as the Works, or 150 mm, whichever is the greater. Where reinforcement in the form of steel fabric or bars is used, provide the same reinforcement in at least half of the panel.

Carry out sampling and testing for compressive strength, density, and permeability.

Note: Where it is shown that same materials, mix designs, equipment, procedures and personnel have given satisfactory results in similar works, the Principal may exercise his discretion and accept the first shotcrete placed in the Works as the Test Panel.

3.12 ASSESSMENT FOR CONFORMITY

Assess the nominated shotcrete mix for conformity including assessment of the base mix, the curing regime and application method based on:

(a) the average result, for slump and shrinkage of specimens sampled from the trial mix;

(b) the average result, for compressive strength and permeability of specimens cut from Test Panels;

(c) the average result for concrete density and relative concrete density;

(d) thickness of panels, quality of its external surfaces and internal cut surfaces; and

(e) the degree of control required to achieve dense and homogeneous shotcrete without segregation, sloughing, collapsing, excessive rebound or other visible imperfections.

4 SURFACE PREPARATION

HOLD POINT	
Process Held:	Surface preparation.
Submission Details:	Notification of each intention to commence surface preparation with details of the method to be used at least two working days prior to commencing. Request to Principal for direction on the need for pressure grouting.
Release of Hold Point	The Principal will consider the submitted documents and may carry out surveillance and audits, prior to direction on pressure grouting and authorising the release of the Hold Point.

4.1 GENERAL

Prepare all surfaces to be shotcreted prior to application of shotcrete.

Prevent wash-out of freshly placed shotcrete due to water seepage by using conduits to channel the water away. On completion of shotcreting, plug the conduits using flash setting cement.

4.2 EARTH SURFACES

Prior to shotcreting, compact and trim the earth surface to line and grade to enable the designed shotcrete thickness to be achieved. Remove all loose soil or other material from the trimmed surface.

Prevent excessive absorption of mixing water from the shotcrete by:

(a) Prewetting all earth surfaces to be shotcreted but keep the surface free of free water; or

(b) Installing a moisture barrier system to stop the movement of moisture from the newly placed shotcrete into the earth. When sheet materials are used, prevent wrinkling or folding to stop voids being formed behind the moisture barrier. Take extra care in the sequence of application or apply a flashcoat to prevent shotcrete slippage.

4.3 ROCK SURFACES

Clear all rock surfaces to be shotcreted of loose material, debris, chips, mud, dirt, or other foreign matter prior to shotcreting.

Include the costs of preparing and clearing surfaces in the prices generally for shotcreting work.

After the loose material has been removed, wash the surface as required with a high-pressure air / water jet or by other means.

After the above preparation is carried out, pre-wet the rock surface prior to the application of shotcrete.

Remove any excess free water by blowing with oil-free dry compressed air.

4.4 CONCRETE SURFACES

Clear existing concrete surfaces to be shotcreted of any spalled, cracked, deteriorated, loose, unsound and/or chemically contaminated concrete until a sound and uncontaminated concrete is reached.

Where shotcrete is to be placed against a smooth concrete surface, roughen the surface by mechanical methods.

After the above preparation is carried out, pre-wet the concrete surface prior to the application of shotcrete.

Remove any excess free water by blowing with oil-free dry compressed air.

5 SUPPLY AND FIXING OF STEEL REINFORCEMENT AND EMBEDMENTS

5.1 QUALITY MANAGEMENT SYSTEM

The reinforcement material supplier must be certified by the Australian Certification Authority for Reinforcing Steels (ACRS) for the supply of reinforcement material.

The reinforcement fabricator must be certified by ACRS for fabricating reinforcement and implement and maintain a quality management system in accordance with AS/NZS ISO 9001, as a means of ensuring that the product conforms to the Specification requirements.

5.2 MATERIALS

5.2.1 Reinforcement

Reinforcement must be deformed bars or welded wire fabric except that plain bars or wire may be used for fitments (a fitment is a unit of reinforcement commonly known as a tie, stirrup, ligature or helix). All reinforcement must conform to AS/NZS 4671.

5.2.2 Protective Coatings

Unless specified otherwise, do not use reinforcement with a protective coating, including epoxy coating.

5.3 STORAGE

Support reinforcement above the surface of the ground, and protect it from damage and from deterioration due to exposure.

5.4 SURFACE CONDITION

At the time concrete is placed, the surface condition of reinforcement must be such as not to impair its bond to the concrete or its performance in the member.

5.5 PLACING AND FIXING OF REINFORCEMENT AND EMBEDMENTS

Support reinforcement and hold clear of surface to be shotcreted with the cover as stated on the Drawings. Where no cover is shown on the Drawings, maintain a minimum cover of 30 mm unless specified otherwise.

5.6 EMBEDMENTS FOR DRAINAGE

Relieve water pressure behind the completed Works by installation of a permanent pressure-relief drainage system where stated on the Drawings, or directed by the Principal.

6 SUPPLY AND DELIVERY OF CONCRETE

6.1 GENERAL

Produce and deliver concrete to the site of the Works in accordance with the requirements of AS 1379 and the additional requirements of this Specification.

Classify all concrete for use in the Works as Special Class and designate "**S**" in accordance with Clause 1.6.4 of AS 1379. Nominate the method of production assessment relevant to the plant in accordance with the criteria of AS 1379.

Nominate a margin for strength which is consistent with the nominated method of production assessment under which the plant operates. This margin for strength, referred to in this Specification as $M_{control}$, is the measure of the level of control for the nominated plant producing the nominated mix.

Dispose of water, contaminants, debris, excess concrete and other materials from concrete supply operations in accordance with Specification TfNSW G36.

6.2 MOISTURE CONTENT OF AGGREGATES

Determine the moisture content of the fine and coarse aggregates prior to concrete production for the day and whenever conditions change, either by a moisture meter or by other equivalent devices or methods. Make corrections to the mass of all aggregates and the volume of water used in the mix commensurate with the moisture content determined.

6.3 ADDITIONAL REQUIREMENTS FOR MIXING

6.3.1 Equipment

Do not use continuous mixers.

6.3.2 Discharging of Mixer

Discharge the entire contents of the mixer before charging it with a new batch.

6.3.3 Maximum Mixing Time

Where by reason of delay it is necessary to hold a batch in the mixer, mixing may be continued, for a maximum of ten successive minutes, except for split drum mixers where the maximum must be five minutes.

For longer periods, the batch may be held in the mixer and turned over at regular intervals, subject to the time limits specified for incorporation of the concrete into the work not being exceeded.

6.3.4 Delivery

Transport concrete produced at a remote central batching plant to the point of discharge by truck-mounted drum mixers conforming to the requirements of AS 1379 and this Specification. On completion of batching, continuously agitate the concrete until it is thoroughly mixed. On completion of mixing, continuously agitate the concrete until it is fully discharged. The agitation speed and duration to achieve thorough mixing must be as specified by the manufacturer of the equipment.

6.3.5 Period for Completion of Discharge

Place the shotcrete within 1.5 hours from the addition of the cement to the aggregates, unless hydration-control admixtures are used.

Do not incorporate concrete into the Works if its slump is outside the specified limits.

6.4 SLUMP

Check the slump of the concrete in accordance with AS 1379 except that the frequency of sampling must be in accordance with Annexure R68/L.

If the measured slump is not within the specified limits, immediately make one repeat test from another portion of the same sample. If the value obtained from the repeat test falls within the specified limits, the concrete represented by the sample is deemed to conform; otherwise reject it.

Check and record the slump of the concrete within 30 minutes of adding cement to the aggregate. Also check and record the slump immediately prior to discharge when the actual haul time exceeds 45 minutes and/or when water is added to a mixed batch.

6.5 ADDITION OF WATER TO A MIXED BATCH

You may add water to a mixed batch of concrete prior to the commencement of discharge subject to the following:

(a) Less than 45 minutes have elapsed since cement was added to the aggregate;

(b) Immediately after the addition of any water, operate the mixing mechanism at mixing speed for a time equivalent to at least 30 revolutions of the mechanism, and for such additional time as may be necessary to re-establish uniformity of the mix;

(c) The total quantity of water added is not more than 9 kg/m^3 and is such that the nominated water/cement ratio is not exceeded;

(d) The quantity of water added is measured and recorded;

(e) The slump is checked after the water has been added.

Once discharge of a batch has commenced, do not add further water to that batch.

6.6 TEMPERATURE AT POINT OF DELIVERY

Do not use concrete if its temperature at any time up to the time of discharge from transport vehicles is less than 10°C or more than 32°C.

7 APPLICATION OF SHOTCRETE

7.1 EQUIPMENT

The type and capacity of the proposed shotcrete equipment must have performance records of successful application.

Equipment must be capable of allowing the shotcrete to leave the nozzle in a continuous uninterrupted stream. Equipment must be capable of maximising compaction and quality while minimising rebound and overspray.

Dispensing devices for admixtures added at the nozzle must be mechanically regulated and have calibrated meters.

7.2 PROVISION FOR MONITORING SHOTCRETE THICKNESS

Utilise probes during application of shotcrete to enable monitoring of shotcrete thickness. You may propose alternative methods for the approval of the Principal for the monitoring of shotcrete thickness whilst shotcrete is being applied.

7.3 SHOTCRETING

HOLD POINT

Process Held:	Each application of shotcrete in the Works.
Submission Details:	At least 2 working days prior, give notice of each intention to shotcrete. At least 4 working hours prior to the proposed commencement of application (unless otherwise allowed by the Principal), submit a Certificate of Conformity in respect of surface preparation, reinforcement and embedments. Verification checklists and other details showing conformity with this Specification must accompany this certificate.
Release of Hold Point:	The Principal will consider the submitted documents and may carry out surveillance and audit, prior to authorising the release of the Hold Point.

The procedure, equipment and personnel involved in shotcreting must produce an end product which is dense, homogeneous, without segregation of aggregate or fibres, and without sloughing, collapsing, excessive rebound or other visible imperfections.

Use the same nozzle operator for the works as used for the production of conforming test panels as specified in Clause 3.11.

Apply shotcrete in successive layers not exceeding 75 mm in thickness and with adequate adhesion to the surface or previous layers of shotcrete to prevent sagging or slumping. Unless approved otherwise, complete the shotcreting to a whole panel (preferably not less than 10 m in length) prior to shotcreting the next panel.

Stop shotcreting in situations which may adversely affect the end product. Before shotcreting is resumed, prepare the hardened concrete surface in accordance with Clause 4.4.

Remove shotcrete that is segregated, loose, porous or uncompacted otherwise prior to the application of additional shotcrete. Do not incorporate rebound into the works.

Regulate the concrete pump to evenly deliver the wet mix shotcrete at the rate required for the particular shotcrete application.

The shotcrete must emerge from the nozzle in a steady, uninterrupted flow. Where the flow becomes intermittent for any reason, direct it away from the Work until it becomes constant.

The distance of manually held nozzles from the receiving surface must be between 0.5 m and 1.0 m. Hold the nozzle perpendicular to the receiving surface except that where necessary use an angle of 0° to 30° to the perpendicular.

Where a succeeding layer is to cover a layer of shotcrete, sharply taper the first layer at joints and do not feather the tapered joints. Prepare the first layer in accordance with Clause 4.4 and then place the second layer on the tapered surface.

Do not apply curing compounds and bond breaking materials to surfaces that will be covered by an additional layer of shotcrete.

For vertical and near vertical surfaces of a tunnel lining, commence application of shotcrete at the bottom of the surface with the full thickness applied before applying any shotcrete to overhead surfaces.

7.4 SURFACE FINISH

Unless specified otherwise, all completed shotcrete surfaces must be the undisturbed natural finish as applied from nozzle. Where specified on the Drawings, or as directed by the Principal, steel float the shotcrete surface.

7.5 TOLERANCES

The maximum variation in alignment, grade, and dimensions of the structures from the established alignment, grade and dimensions (excluding thickness) shown on the Drawings must be ± 50 mm, unless specified otherwise on the Drawings. The tolerance in thickness must be as shown on the Drawings.

7.6 TEMPERATURE AND RAIN

Unless adequate protection is provided, do not place shotcrete during rain or when rain appears imminent.

Do not apply shotcrete when the air temperature in the shade is below 5°C or above 38°C unless special precautions, approved by the Principal, are taken.

Any shotcrete which is exposed to rain, other precipitation or dripping water within the period from application to curing must be deemed nonconforming.

7.7 PLACING OUTSIDE DAYLIGHT HOURS

Do not place shotcrete outside daylight hours or underground unless adequate lighting is provided.

8 CURING

8.1 GENERAL

Cure all shotcrete surfaces by one, or more, of the following methods,

(a) wet curing, in accordance with Clause 8.2;

(b) use of curing compounds, in accordance with Clause 8.3; and/or

(c) using internal curing admixtures in accordance with Clause 8.3.1.

For all types of curing regimes, maintain the concrete surface at a temperature not less than 5°C throughout the curing period.

8.2 WET CURING

Apply wet curing to surfaces immediately after the completion of the application and finishing operations.

You may cover shotcrete by canvas, hessian or plastic sheets or other suitable materials provided it is kept continually wet. Water used for curing must conform to AS 1379.

8.3 CURING COMPOUNDS

Do not use spray-on curing compounds when additional layers of shotcrete or surface materials are to be applied to a shotcrete surface.

Curing compounds must conform to the requirements of AS 3799 for the classes and types specified in Table R68.8. Do not expose any curing compound remains on any shotcrete surface to view within a period of six (6) months after the date of application of the compound.

Table R68.8 - Classes and Types of Curing Compounds

Description of curing compound	Class (to AS 3799)	Type (to AS 3799)
Wax-based compounds (Wax emulsion)	A	1-D
Resin-based compounds (Hydrocarbon resin)	B	
Water-borne compounds	Z	

The curing compound supplier must implement and maintain a quality management system in accordance with AS/NZS ISO 9001, as a means of ensuring that the product conforms to the Specification requirements.

For each curing compound proposed for use in the Works, provide the Principal a Certificate of Conformity from the supplier, supported by test certificates from a laboratory with appropriate NATA registration, certifying that the curing compound conforms to this Specification.

This Certificate of Conformity must relate only to the formulation on which the tests were made and must be valid for not more than three years from the date of issue. The test certificates must report the non-volatile content, the efficiency index and the density and must provide a reference for the infrared spectrum as determined in accordance with Test Method TfNSW T1005.

For each batch delivered, provide to the Principal a Certificate of Uniformity from the supplier, supported by uniformity testing on both non-volatile content and density in accordance with AS 3799 Clause 3.2, and on viscosity in accordance with AS 3799 Clause 3.1.5. Additionally, provide an infrared spectrum and it must match the above mentioned reference infrared spectrum. The Certificate of Uniformity must state that the same formulation has been used for the batch as is represented by the Certificate of Conformity.

Sample and test at a rate of not less than one test per 3000 litres, or part thereof, supplied.

Apply the curing compound by a pressurised sprayer to give a uniform cover. The sprayer must incorporate a device for continuous agitation and mixing of the compound in its container during spraying.

Apply the curing compound using a fine spray at the rate stated on the certificate of conformity, or at a rate of 0.2 litres/m^2 per coat, whichever is the greater. Check the application rate by calculating the amount of curing compound falling on felt mats, each approximately 0.25 m^2 in area, placed on the concrete surface.

Apply two coats at the full rate.

The time between the first and second coat must be in accordance with the manufacturer's recommendation, or on the basis of a trial application.

Apply the curing compound to surfaces immediately after completion of all finishing operations.

Maintain the curing membrane intact after its initial application, for a minimum period of seven days. Make good any damage to the curing membrane due to your or others' activities by respraying of the affected areas.

8.3.1 Internal Curing Admixtures

Use internal curing admixtures in accordance with Clause 2.3. The admixture must not cause a decrease in concrete strength with age.

8.4 SHOTCRETE CRACKING

At the end of the curing period, the shotcrete must have no cracks of width greater than 0.15 mm, measured at the shotcrete surface. Where such cracks exist, identify them as nonconforming and seal them by an approved method to the satisfaction of the Principal.

8.5 QUALITY OF SHOTCRETE

Sample and test the shotcrete for conformity with this Specification and the Drawings during the progress of the work in accordance with Annexure R68/L for:

(a) thickness (Clause 7.2);

(b) compressive strength (Clause 3.6);

(c) permeability (Clause 3.7); and

(d) density (Clause 3.5).

Sample and test production Test Panels constructed with the Works in accordance with Clause 3.12 and, where specified in Annexure R68/L, from the completed Works.

8.5.1 Thickness and Visual Inspection

Determine the shotcrete thickness by taking core specimens of 25 mm diameter in randomly located positions within a representative area in accordance with Annexure R68/L. Prior to coring, locate the steel reinforcement positions using a cover meter, to prevent cutting the steel during coring.

Where production Test Panels are used for this purpose, saw each Test Panel into four parts for examination and evaluation of the internal cut surfaces, as well as the external surfaces, and total thickness.

In addition to the above requirement, visual inspection of all completed shotcrete work must ensure conformity with compaction and finish requirements.

ANNEXURE R68/A – PROJECT SPECIFIC REQUIREMENTS

Refer to Clause 1.2.1.

A1 MEMBERS IN EXPOSURE CLASSIFICATION U

A1.1 General

Shotcrete members in exposure classification U must conform to this Specification for the *Base Exposure Classification* and the additional requirements contained in this Annexure.

A1.2 Base Exposure Classification

The *Base Exposure Classification*, *Nature of Exposure* and s*hotcrete isolation* requirements are contained in Table R68/A.1 or as specified on the Drawings.

Shotcrete quality, cover and other durability requirements for the *Base Exposure Classification* must conform to those specified for the corresponding exposure classification of AS 5100.5.

Where full isolation of shotcrete surface from the aggressive environment is mandatory, include details of the proposed isolation method with the shotcrete mix design submission.

Table R68/A.1

Parameters	**Project Specific**
Base Exposure Classification: ❶ B1 ❷ B2 ❸ C	
Nature of Exposure: ❶ Acid sulfate soil ❷ Soft or running water ❸ Others	
Full Isolation of Shotcrete Surface from Aggressive Environment : ❶ Not required ❷ Optional ❸ Mandatory	

A1.3 Additional Requirements

Cement: .....

Aggregate: .....

Admixtures: .....

Curing Regime: .....

Others: .....

ANNEXURE R68/B – MEASUREMENT AND PAYMENT

Payment will be made for all costs associated with completing the work detailed in this Specification in accordance with the following Pay Items.

Where no specific pay items are provided for a particular item of work, the costs associated with that item of work are deemed to be included in the rates and prices generally for the Work Under the Contract.

Unless specified otherwise, a lump sum price for any of these items will not be accepted.

Pay Item R68P1 – Supply and Placing of Shotcrete

The unit of measurement is per square metre of surface covered by the full thickness of shotcrete, as shown on the Drawings or directed by the Principal.

The schedule rate must include all materials and work associated with the surface preparation, supply and fixing of reinforcement, supply, application, curing of shotcrete and the costs of testing where such costs are not paid under Primary Testing..

ANNEXURE R68/C – SCHEDULES OF HOLD POINTS AND IDENTIFIED RECORDS

Refer to Clause 1.2.3.

C1 SCHEDULE OF HOLD POINTS

Clause	Description
3.8.1	Submission of nominated shotcrete mix details and certification.
4	Submission of method of surface preparation and a notice of intention to commence surface preparation. Request to Principal for direction on need for pressure grouting.
7.3	Submission of Certificate of Conformity in respect of surface preparation, reinforcement and embedments and notice of intention to commence shotcreting.

C2 SCHEDULE OF IDENTIFIED RECORDS

The records listed below are Identified Records for the purposes of TfNSW Q Annexure Q/E.

Clause	Description of Identified Record
2.3	Details of the effect of hydration control admixtures.
4 & 5	Certificate of Conformity of surface preparation, reinforcement and embedments.
8.3	Certificate of Conformity of curing compound.
8.3.1	Details of the effect of internal curing admixtures.

ANNEXURE R68/D – PLANNING DOCUMENTS

Refer to Clause 1.2.4.

The following documents are a summary of documents that must be included in the PROJECT QUALITY PLAN. Review the requirements of this Specification and others included in the Contract to determine additional documentation requirements.

The information to be submitted as part of the PROJECT QUALITY PLAN must include the following:-

(a) Details of the methods to be used in determining the effect of hydration control admixtures on the properties of shotcrete in the Works over time (refer to Clause 2.3);

(b) Technical Procedures in accordance with TfNSW Q for the surface preparation processes in Clause 4. Include details of the personnel required to carry out the operations together with proof of their relevant training and experience;

(c) Technical Procedures in accordance with TfNSW Q for the shotcreting processes in Clause 7. Include details of the nozzle operators and other personnel required to carry out the operations together with proof of their relevant training and experience.

ANNEXURES R68/E TO R68/K – (NOT USED)

ANNEXURE R68/L – TESTING PROCEDURES

Refer to Clause 1.2.5.

L1 MINIMUM FREQUENCY OF TESTING

Clause	Property Tested	Test Method	Minimum Frequency of Testing
Supply and Delivery of Concrete			
2.4.1	Combined particle size distribution of coarse and fine aggregates - deviation from nominated particle size distribution	AS 1141.11.1	One per week
3.3	Slump	AS 1012.3.1	One per batch of concrete
Production of Test Panels			
3.11	Construction of production Test Panels	Clause 3.11	As required by the Principal
Thickness and Visual Inspection			
8.5.1	**From production Test Panels** Frequency of sawing	Clause 8.5.1	Each production Test Panel
	From the Works Frequency of drilling	Clause 8.5.1	Random core for each 50 m^2 or part thereof
Determination of 28 Day Compressive Strength, Density and Relative Density			
3.5 & 3.6	**From concrete supply** Frequency of moulding specimens and testing.	AS 1012.8.1 and AS 1012.9	One pair per 25 m^3 or part thereof
	From the Works Frequency of drilling test specimens	AS 1012.14	One pair per one day's production
Determination of Permeability			
3.7	**From the Works** Frequency of drilling test specimens	AS 1012.14 DIN 1048	One pair per one day's production

L2 COMPRESSIVE STRENGTH

L2.1 Moulding of Samples

Mould concrete specimens in standard cylinders in accordance with the requirements and procedure of AS 1012.8.1 using rodding only.

L2.2 Specimens Cut from the Works (Cores)

When permitted by the Principal, cut 75 mm diameter core specimens by means of a core drill, wet-condition and test in accordance with AS 1012.14. Adjust the corrected (for length to diameter ratio) strength so determined for age by dividing the result by the factors shown in Table R68/L.1.

Do not test cores containing reinforcement but cut replacement cores at new locations.

Clean and restore core holes using a concrete mix designed to produce the same shotcrete quality as the material from which the core was cut. Design the repair concrete mix, and place the concrete in such a manner, so as to produce no shrinkage or no visible cracks. The surface of the restored hole must be similar to the surrounding surface in texture and colour.

L2.3 Testing

The compressive strength of the concrete represented by a pair of specimens made and cured in accordance with AS 1012.8.1 and tested in accordance with AS 1012.9, is the average strength of the two specimens unless the two results differ by more than 10% of their average, in which case take the higher result as the strength of the concrete.

L2.4 Adjustment for Age of Specimen

Should any specimen be tested more than 28 days after moulding, the equivalent 28 day strength is the test strength divided by the age factor given in Table R68/L.1. Age adjustment factors are given for concrete made with Portland cement and Blended cement. For intermediate ages, determine the factor on a pro-rata basis.

Table R68/L.1 - Factors for Age of Specimens

Age of specimen at time of test (days)	Age factor	
	Portland cement	Blended cement
28	1.00	1.00
56	1.08	1.19
112	1.14	1.33
224	1.22	1.42
365 or greater	1.25	1.45

ANNEXURE R68/M – REFERENCED DOCUMENTS

Refer to Clause 1.2.6.

TfNSW Specifications

TfNSW G36	Environmental Protection
TfNSW Q	Quality Management System
TfNSW 3211	Cements, Binders and Fillers

TfNSW Test Methods

TfNSW T363	Accelerated Mortar Bar Test for AAR Assessment
TfNSW T364	Concrete Prism Test for AAR Assessment
TfNSW T1005	Quantitative Analysis Using the Infrared Spectrophotometer

Australian Standards

AS 1012	Methods of testing concrete
AS 1012.2	Method 2: Preparing concrete mixes in the laboratory
AS 1012.3.1	Method 3.1: Determination of properties related to the consistency of concrete – Slump test
AS 1012.8.1	Method 8.1: Method for making and curing concrete – Compression and indirect tensile test specimens
AS 1012.9	Method 9: Compressive strength test – Concrete, mortar and grout specimens
AS 1012.13	Method 13: Determination of the drying shrinkage of concrete for samples prepared in the field or in the laboratory
AS 1012.14	Method 14: Method for securing and testing cores from hardened concrete for compressive strength
AS 1012.20	Method 20: Determination of chloride and sulfate in hardened concrete and concrete aggregates
AS 1141	Methods for sampling and testing aggregates
AS 1141.11.1	Method 11.1: Particle size distribution – Sieving method
AS 1141.22	Method 22: Wet/dry strength variation
AS 1289.3	Methods of testing soils for engineering purposes – Soil classification tests
AS 1379	Specification and supply of concrete
AS 1478.1	Chemical admixtures for concrete, mortar and Grout – Admixtures for concrete
AS 2349	Method of sampling Portland and blended cements
AS 2758.1	Aggregates and rock for engineering purposes – Concrete aggregates
AS 3799	Liquid membrane – forming curing compounds for concrete
AS/NZS 4671	Steel reinforcing materials
AS 5100.5	Bridge design – Concrete

AS/NZS ISO 9001 Quality management systems – requirements

ASTM Standards

ASTM C 295 Standard Practice for Petrographic Examination of Aggregates for Concrete

DIN Standards

DIN 1048 Part 5 Testing Methods for Concrete – Permeability

Appendix F

Safety in design register

HSE040 Safety in Design Risk Assessment

Notes: *Designs with significant quantities of dangerous goods may require detailed risk assessments under Dangerous Goods or Major Hazard legislation
* Most industrial processes will require an industry specific assessment, e.g. HAZOP and/or Quantitative Risk Assessment for facilities that have chemical or high-pressure processes under Dangerous Goods or Major Hazard legislation.

Design Life Cycle:	Investigation and Design	Setup, Construction and Commissioning	Operation	Maintenance	Disposal		**Date:**	31/10/2023	**Revision No:** Rev A (100% Detailed Design)
Job Name:	Settlers Road CH60-100 Landslide Detailed Design		**Job No:**	12599205-007	**Client**	Central Coast Council (CCC)	**Design:**	Excavation, rock bolts, shotcrete, soil nail wall, drain and pavement resheeting for chainage 60-100 m	
People involved in Risk Assessment:	Joanna Sylvester (GHD), Steve Amoroso (GHD), Amy Campbell (GHD), (still to be workshopped with CCC, HCC and Delany Civil representatives)								

					Initial Risk Rating							Residual Risk Rating			
Design Ref	**Design Life Cycle Stage** (Select from Drop Down Box)	**Hazards** What could cause injury or ill health, damage to property or damage to the environment	**Risk** What could go wrong and what might happen as a result	**Existing Control Measures**	**C**	**L**	**RR**	**Potential Control Measures** (Consider Hierarchy of Control - Elimination, Substitution, Isolation, Engineering Controls, Administrative Controls, PPE)	**Responsibility**	**By When**	**Decision / Status**	**C**	**L**	**RR**	**Comments**
	Investigation and Design	Soil nail wall, rock bolt or shotcrete failure due to design.	Economic loss and/ or loss of life during or after construction	Follow internal design procedures and review process.	E- Catastrophic	2 - Unlikely	Significant	Designer/geotechnical engineer to review site work and undertake site inspections during construction as listed in the Technical Specifications. Principal to engage client to assist.	GHD /CCC	Design stage/ Construction stage		E- Catastrophic	1 - Very Unlikely	Moderate	
	Investigation and Design	Misunderstanding of construction method/ process used.	Reduced performance of remedial solution if incorrect diameter, length, bar size, shotcrete strength etc. adopted.	Detailed drawings and technical specifications including hold points	D - Critical	3 - Possible	Significant	Selection of an appropriately qualified and experienced contractor and regular checks of contractor performance and processes as construction continues.	CCC/ Contractor	Tender Stage		D - Critical	1 - Very Unlikely	Moderate	
	Setup, Construction and Commissioning	Site access and traffic movements	Vehicle accidents with construction movements along Wisemans Ferry Road and Settlers Road, which may cause hazards for community and other construction personnel.	Council management on site	D - Critical	3 - Possible	Significant	Develop and implement a Traffic Management Plan, TCP and CTCP during construction or road closure.	CCC/ Contractor	Prior to constrcution		D - Critical	1 - Very Unlikely	Moderate	
	Setup, Construction and Commissioning	Safe works area access	Economic loss and/ or significant injury during construction due to sloping site access. Hazard extends to operating construction equipment adjacent to failures.		D - Critical	3 - Possible	Significant	CCC to undertake pre-site meeting to agree access with contractors. Construction methodology to be reviewed and agreed upon by CCC prior to commencing construction work.	CCC/ Contractor	Construction stage		D - Critical	2 - Unlikely	Moderate	
	Setup, Construction and Commissioning	Construction interfaces (especially with CH250 to 450 and Thomas James Bridge works).	Interaction between adjacent work areas (within or adjacent to the project site) leads to injury to personnel or damage to equipment.		E- Catastrophic	2 - Unlikely	Significant	Separation of work areas (within and adjacent to site) to be considered in methodology and planning. Collaboration on methodology, communication and coordination of timing for streamlining activities (i.e. road closure).	CCC/ Contractor	Construction stage		E- Catastrophic	1 - Very Unlikely	Moderate	
	Setup, Construction and Commissioning	Emergency response	Emergency response increased due to restrictions of site, bridge load limits, road closures and state of failures.	Contractor to develop ERP.	C- Severe	3 - Possible	Moderate	CCC to periodically review and agree ERP with contractor. Coordination with Rural Fire Services (RFS) relating to load limits and works on Thomas James Bridge as part of Emergency Response Plan.	CCC/ Contractor	Construction stage		C- Severe	2 - Unlikely	Low	
	Setup, Construction and Commissioning	Public access into the construction site area	Community - unauthorised access	No public allowed on site. Fencing surrounds the site. Construction site management plan. Appropriate signage.	B - Major	3 - Possible	Low	Inspect controls daily. Incorporate into TCP. CCC to engage with community as required.	CCC/ Contractor	Construction stage		B - Major	2 - Unlikely	Negligible	
	Setup, Construction and Commissioning	Further instability or slope movement during construction	Loss of material on slope from further ground movement, burial of plant/ personnel. May lead to safety issues for construction personnel.	Rainfall triggered road closure.	D - Critical	3 - Possible	Significant	Wet weather protocol to be implemented. Construction methodology to be reviewed and agreed. Daily slope monitoring. Spotter used to observe slope above rock bench. Clearing of landslide debris to occur top down in sections with installation of soil nail wall, rock bolts and shotcrete in advance of plant and personnel using the area. Daily monitoring along slope for potential instability. Site assessment by Designer/Geotechnical Engineer of any identified dilapidation of site conditions and prior to recommencement of access to the site follow a rainfall triggered closure.	Contractor/ GHD	Construction stage		D - Critical	2 - Unlikely	Moderate	
	Setup, Construction and Commissioning	Construction controls	Mobile Plant movements, collision with passing traffic/persons.		C- Severe	3 - Possible	Moderate	CCC to periodically review and agree VMP with contractor.	Contractor	Construction stage		C- Severe	2 - Unlikely	Low	
	Setup, Construction and Commissioning	Steep site difficult access	Slips, fall down slope during construction.		C- Severe	4 - Likely	Moderate	Develop detailed risk management plan and appropriate controls including fall arrest systems and safe access paths.	Contractor	Construction stage		C- Severe	3 - Possible	Moderate	
	Setup, Construction and Commissioning	Machinery and personnel working along Settlers Road.	Downslope slip areas reducing width.		C- Severe	4 - Likely	Moderate	For areas where downslope slips have occurred, identify a 'No-Go" zone and limit machinery and loading to remaining within the road pavement.	Contractor	Construction stage		C- Severe	3 - Possible	Moderate	
	Setup, Construction and Commissioning	Clearing operations	Tree felling, mulching & removal, opportunity for personal injury and destabilisation of slopes.	Safe Work Method Statements.	C- Severe	3 - Possible	Moderate	Monitor WMS and ensure correct safety procedures are undertaken. Geotechnical Engineer to be notified once slopes are cleared to further inspect slope for damage. Dilapidation of site conditions to be monitored. Consider presence of overhead high voltage powerlines in methodology and SWMS.	Contractor/ GHD	Construction stage		C- Severe	2 - Unlikely	Low	

Design Ref	Design Life Cycle Stage (Select from Drop Down Box)	Hazards What could cause injury or ill health, damage to property or damage to the environment	Risk What could go wrong and what might happen as a result	Existing Control Measures	Initial Risk Rating C	L	RR	Potential Control Measures (Consider Hierarchy of Control - Elimination, Substitution, Isolation, Engineering Controls, Administrative Controls, PPE)	Responsibility	By When	Decision / Status	Residual Risk Rating C	L	RR	Comments
	Setup, Construction and Commissioning	Encountering existing underground services.	Damage existing services causing injury and economic loss.		C- Severe	3 - Possible	Moderate	Contractor to check for and physically locate buried services prior to undertaking excavation works.	Contractor	Construction stage		C- Severe	1 - Very Unlikely	Low	
	Setup, Construction and Commissioning	Encountering existing overhead services.	Damage existing services causing injury and economic loss including during tree lopping.		E- Catastrophic	3 - Possible	Extreme	Contractor to check for and provide suitable stand-off distances prior to undertaking excavation works. Contractor to consider presence and methodology associated with overhead services in planning and SWMS. This may include the use of 'tiger tags' or similar.	Contractor	Construction stage		C- Severe	1 - Very Unlikely	Low	
	Setup, Construction and Commissioning	Encountering overhead Telstra services buried in debris during landslide.	Contacting or damage existing services causing injury and economic loss. Line is understood to remain 'live' but may not be working.		C- Severe	3 - Possible	Moderate	Contractor to provide SWMS to manage excavations to safely remove Telstra service . Status and requirement relating to excavation and reinstatement (if required) to be confirmed with utility owner.	CCC/ Contractor	Construction stage		C- Severe	1 - Very Unlikely	Low	
	Setup, Construction and Commissioning	Incorrect survey resulting in errors to design set-out.	Economic loss from re-work or discrepancies in quantities. No site specific survey undertaken for emergency works, quantities are difficult to estimate given the undulating ground profiles.		C- Severe	3 - Possible	Moderate	Contractor to establish set-out during construction. Contractor to allow for some variance in quantities given the lack of survey required. Dimensions not to be scaled from drawings.	Contractor	Construction stage		C- Severe	2 - Unlikely	Low	
	Setup, Construction and Commissioning	Inconsistency between design and construction.	Reduced performance of end structure resulting in economic loss and/ or loss of life.	Detailed drawings and technical specifications including hold points	D - Critical	3 - Possible	Significant	Selection of an appropriately qualified and experienced contractor and regular checks of contractor performance and processes as construction continues.	CCC/ Contractor	Construction stage		D - Critical	1 - Very Unlikely	Moderate	
	Setup, Construction and Commissioning	Ground varies from design ground profile.	Design does not accommodate the variability in ground conditions encountered during construction resulting in economic loss and/ or loss of life. Design is currently based on assumptions and no site specific subsurface investigations undertaken for works.	Design based on assumptions defined in report.	C- Severe	3 - Possible	Moderate	Designer/geotechnical engineer to review site work and undertake site inspections during construction as listed in the Technical Specification. Contractor to advise CCC/ Designer as soon as differing ground conditions are encountered.	GHD/CCC/ Contractor	Construction stage		C- Severe	2- unlikely	Low	
	Setup, Construction and Commissioning	Falling Objects	Falling objects (e.g., loose blocks of rock) causes injury or death to workers, or damage to plant and equipment.		E- Catastrophic	3 - Possible	Extreme	Removal (or stabilisation) of loose crest blocks should be completed prior to works at the toe of the slope to mitigate the risk of falling loose blocks of rock and/or shotcrete.	CCC/ Contractor	Construction stage		D - Critical	2 - Unlikely	Moderate	
	Setup, Construction and Commissioning	Falling Objects	Unidentified falling rock block and debris caused by construction activities, leading to injury or death to workers, or damage to plant and equipment. Further road closure.		E- Catastrophic	3 - Possible	Extreme	Contractor shall monitor site conditions, implement rainfall triggered road/construction site closure protocols, limit personnel within fall zones, use of spotters, shield/barrier systems and/or armoured heavy plant. CCC should approve these details as part of construction methodology approval.	CCC/ Contractor	Construction stage		D - Critical	2 - Unlikely	Moderate	
	Setup, Construction and Commissioning	Falling Objects	Identified blocks intentionally released but falling in an uncontrolled manner from the backscarp region to the area below (including road and river bank).		E- Catastrophic	3 - Possible	Extreme	Contractor shall provide details in their construction methodology of managing release of such blocks. Control measures including limiting personnel within fall zones, use of spotters, shield/barrier systems and/or armoured heavy plant. CCC should approve these details as part of construction methodology approval.	CCC/ Contractor	Construction stage		D - Critical	1 - Very Unlikely	Moderate	
	Setup, Construction and Commissioning	Heavy lifts/cranage	Cranes and equipment could become unstable if a proper working pad is not established, leading to potential permanent injuries to workers		D - Critical	3 - Possible	Significant	Contractor shall provide details in their construction methodology of lifting plans for cranes (if required) including temporary works required to establish a stable working pad. CCC should approve these details as part of construction methodology approvals, and monitor during construction.	CCC/ Contractor	Construction stage		D - Critical	2 - Unlikely	Moderate	
	Setup, Construction and Commissioning	High pressure (low pressure)	High pressure in shotcreting equipment and pressure hoses used for cleaning down rock and defects could cause fatality(s) in extreme cases if equipment malfunctioned		E- Catastrophic	2 - Unlikely	Significant	Contractor to demonstrate how they will manage risks associated with high pressure equipment in their construction management plan. CCC to approve the management plan and monitor the application of nominated controls throughout construction.	CCC/ Contractor	Construction stage		E- Catastrophic	1 - Very Unlikely	Moderate	
	Setup, Construction and Commissioning	Manual handling	Lifting or handling materials (e.g. mesh) and equipment (e.g. shotcrete nozzle applicator) leads to manual handling lost time injury		B - Major	4 - Likely	Low	CCC to review and approve Contractors construction management plan which shall detail how manual handling risks will be mitigated. Contractor may be able to eliminate manual handling from some parts of the work by using mechanical or robotic equipment (e.g. shotcrete applicator on excavator boom) or by using mechanical lifting aids (e.g. cranes)	CCC/ Contractor	Construction stage		B - Major	3 - Possible	Low	

Design Ref	Design Life Cycle Stage (Select from Drop Down Box)	Hazards What could cause injury or ill health, damage to property or damage to the environment	Risk What could go wrong and what might happen as a result	Existing Control Measures	Initial Risk Rating C	L	RR	Potential Control Measures (Consider Hierarchy of Control - Elimination, Substitution, Isolation, Engineering Controls, Administrative Controls, PPE)	Responsibility	By When	Decision / Status	Residual Risk Rating C	L	RR	Comments
	Setup, Construction and Commissioning	Noise	Unsafe worker exposure to noise from plant and equipment could increase the risk of permanent injury to workers		C- Severe	3 - Possible	Moderate	Contractor to demonstrate how they will manage risks associated with noise in their construction management plan. CCC to approve the management plan and monitor the application of nominated controls throughout construction. Rerfer REF requirements.	CCC/ Contractor	Construction stage		C- Severe	2 - Unlikely	Low	
	Setup, Construction and Commissioning	Working at heights	Risk of fall from height resulting in injury or death		E- Catastrophic	3 - Possible	Extreme	1. Contractor to use fall arrest and/or fall prevention systems where required by regulations 2. CCC to review and approve Contractor's safe work method statement and monitor application throughout construction 3. Establish a "No-Go Zone" beyond which unauthorised access is prevented, or workers cannot access unless they have appropriate working from heights training and controls in place	CCC/ Contractor	Construction stage		E- Catastrophic	1 - Very Unlikely	Moderate	
	Setup, Construction and Commissioning	Fire	Bushfire poses risk to workers, plant and equipment - safety risk is smoke inhalation		D - Critical	3 - Possible	Significant	Monitor fire danger and comply with CCC procedures relating to work activities during periods of higher fire danger. Coordinate with RFS relating to access limitations and understanding of distance for response team.	CCC/ Contractor	Construction stage		D - Critical	2 - Unlikely	Moderate	
	Setup, Construction and Commissioning	Stability of drill holes	Collapse of hole during construction.		C- Severe	3 - Possible	Moderate	Monitor hole stability during construction, including difficulties installing and grout takes. GHD/ Geotechnical Engineer to be notified of any issues incurred during installation and to be present for installation to manage any issues observed.	Contractor	Construction stage		C- Severe	2 - Unlikely	Low	
	Setup, Construction and Commissioning	Dust/ fumes/ vapours	Crystalline silica dust generated by cutting/demolishing/grinding shotcrete may increase the risk of permanent health issues for workers in the medium to long term		C- Severe	3 - Possible	Moderate	Contractor to demonstrate how they will manage risks associated with crystalline silica dust in their construction management plan. CCC to approve the management plan and monitor the application of nominated controls throughout construction.	CCC/ Contractor	Construction stage		C- Severe	1 - Very Unlikely	Low	
	Setup, Construction and Commissioning	Curing of grout, shotcrete and concrete	Loading of element constructed without development of full strength may cause premature damage or cracking to the completed works.		C- Severe	3 - Possible	Moderate	Construction specifications to identify minimum curing times and concrete/ shotcrete/ grout strengths to maintain design philosophy and safety of site personnel and road users. Contractor to follow design procedures and provide grout/ shotcrete/ concrete testing results for review and identification of any further issues.	GHD/ Contractor	Construction stage		C- Severe	2 - Unlikely	Low	
	Maintenance	Working at heights	Inspection of stability elements - working at heights		D - Critical	3 - Possible	Significant	Maintain safe distance from edge of slope when inspecting or use other means of inspecting (e.g., rope access, EWP, drone). Do not work alone - use a buddy system for all maintenance inspections.	CCC	During routine and special inspections after remedial works		D - Critical	2 - Unlikely	Moderate	

Appendix G

Schedule of quantities

Item	Description	Unit	Quantity	Quantity incl. 25% contingency
Clearing and grubbing	Vegetation to be removed below landslide backscarp, as indicated on Drawings.	m^2	800	1000
		m^2	Rate only	
Bulk excavation	Material to be removed below landslisde backscarp, as indicated on Drawings. The volume is in-situ and is subject to change based on encountered conditions	m^3	1650	2063
		m^3	Rate only	
Scaling and grooming	Material to be removed from exposed rock face following bulk excavation. The volume is in-situ and is subject to change based on encountered conditions.	m^3	100	125
		m^3	Rate only	
Disposal	Disposal of material removed as part of bulk excavation, scaling and grooming operations at a licenced facility including any applicable tipping fees. The volume is insitu and subject to change based on encountered conditions.	m^3	1750	2188
		m^3	Rate only	
Spot rock bolts	Supply and installation of 28 mm galvanised and threaded 500N rock bolts with associated face plates, nuts and accessories Installation includes deliver, drilling, placement, grouting, dry packing, placeme and tightening of face plate and nuts in accordance with the project technical specification. Rock bolts are assumed to be 4 m and 6 m in length. The quantities are based on a nominal allowance of one per 25 m^2 of excavated rock face.	Each 4 m bolts	6	8
			Rate only	
		Each 6 m bolts	2	3
			Rate only	
	Suitability testing of spot rock bolts, where directed.	Per bolt	Rate only	
	Acceptance testing of spot rock bolts, where directed.	Per bolt	Rate only	
Non-Structral Shotcrete	Supply and installation of erosion protection shotcrete, mesh spacers, dowel weepholes, strip drains and stregth testing in accordance with project specification. Quantities are based on a nominal 35% coverage of the face below the low excavated rock bench comprising erodible sections of thinly bedded sandstone and siltstone.	m^2	70	88
		m^2 where <1.5 m width	30	38
Soil Nail Wall	Supply and installation of double encapsulated soil nails, including drilling, flushing, full soil nail assembly (N24 galavanised bar, centralisers, grout tubes, HDPE sheath, base plate, nut, bevelled washer), grout and grout testing, in accordance with Drawings and TfNSW Specifications R64.	Each 6 m nails	165	207
			Rate only	
	Supply and installation of structural shotcrete facing (min. 160 mm thickness), including tint, mesh, spacers, weepholes, strip drains and strength testing, in accordance with Drawings and TfNSW Specifications R68.	m^2	200	250
			Rate only	
	Suitability Testing of Soil Nails	per test	2	3
	Qaunatity based on 1% of the permanent nails but not less than 2.	per test	Rate only	
	Acceptance Testing of Soil Nails	per test	5	7
	Qaunatity based on 3% of the permanent nails but not less than 2.	per test	Rate only	
Pavement	Renewal of pavement assumed to be 6 m width for the length of the site plus 10 m at ends.	m^2	258	323
Drainage	Preparatory works including excavation.	m length	66	83
	Concrete drain along edge of road (east bound lane) in accordance with CCC Specifications.	m length	66	83
	Connecting drain to existing culvers (including pit, if required).	Each	Rate only	
Note:	*Rate only for variation quantities.*			

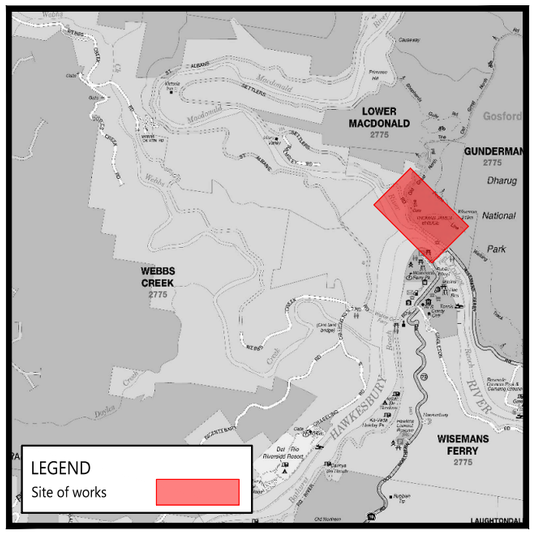
Appendix H

Detailed design drawings

Central Coast Council

SETTLERS ROAD (CH60 TO CH100) - WISEMANS FERRY LANDSLIDE REMEDIATION DESIGN

SUPPLEMENTARY DRAWINGS AND PLANS	
DESCRIPTION	DRAWING/PLAN
SOIL EROSION AND SEDIMENT CONTROL	SD0101
TYPICAL FLEXIBLE PAVEMENT DESIGNS	SD0302
KERB AND CHANNEL PROFILES	SD0501



LOCATION PLAN

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SHEET INDEX	
SHEET	DESCRIPTION
02-DRG-CI-20001	COVERSHEET INDEX AND LOCALITY PLAN
02-DRG-CI-20002	GENERAL ARRANGEMENT
02-DRG-CI-20005	NOTES
02-DRG-CI-20021	DETAIL PLAN - SHEET 1 OF 1
02-DRG-CI-20051	TYPICAL SECTION
02-DRG-CI-20061	SPOT ROCK BOLT AND SHOTCRETE DETAILS
02-DRG-CI-20062	SOIL NAIL DETAILS
02-DRG-CI-20071	EROSION AND SEDIMENT CONTROL NOTES
02-DRG-CI-20081	EROSION AND SEDIMENT CONTROL PLAN - SHEET 1 OF 1
02-DRG-CI-20301 TO 02-DRG-CI-20304	CROSS SECTIONS (5m INT) - 4 SHEETS

WATER AND SEWER APPROVAL

ORIGIN OF GROUND COORDINATES	ORIGIN OF LEVELS
PM 47545 E 312801.157 N 6304727.938 GDA2020/MGA56	PM 47545 RL 2.021 DATUM: AHD

REV	AMENDMENT	DATE	DRAWN	APRVD
B	100% DETAILED DESIGN	31.10.23	IS	SA
A	65% DETAILED DESIGN	19.09.23	IS	SA

SCALE ON ORIGINAL A3 SIZE DRAWING: NOT TO SCALE
DATUM: AHD
ALL DIMENSIONS IN m UNLESS OTHERWISE SHOWN

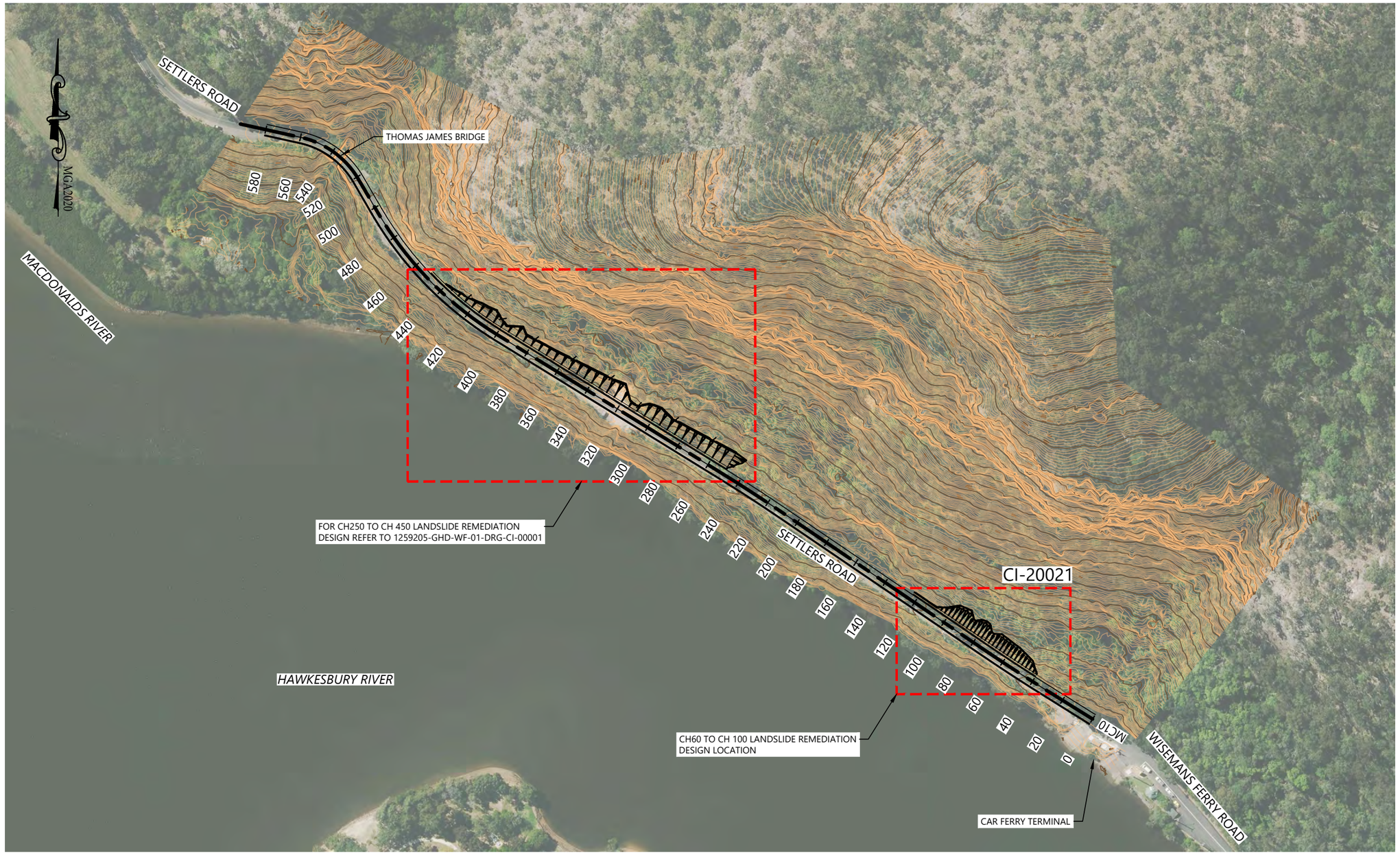
SURVEYED	DIOSPATIAL	SURV REF	23AU019
DESIGNED	S.AMOROSO	DRAWN	I.SMITH
STATUS	PRELIMINARY	DATE	31/10/2023

VERIFIED - SECTION MANAGER: PLANNING AND DESIGN
APPROVED - UNIT MANAGER: ROADS ASSETS PLANNING AND DESIGN
ROADS TRANSPORT DRAINAGE AND WASTE

Central Coast Council

SETTLERS ROAD - WISEMANS FERRY
CH60-CH100 LANDSLIDE REMEDIATION
COVERSHEET INDEX AND LOCALITY PLAN

EDMS NUMBER XXXXX/XXXXX
PROJECT NUMBER XXXXX
PLAN NUMBER XXXXX REV B
DRG-CI-20001 A3



REV	AMENDMENT	DATE	DRAWN	APRVD
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A	65% DETAILED DESIGN	19.09.23	IS	SA

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1:2000
DATUM: AHD
ALL DIMENSIONS IN m UNLESS OTHERWISE SHOWN

SURVEYED	DIOSPATIAL	SURV REF	23AU019
DESIGNED	S.AMOROSO	DRAWN	I.SMITH
STATUS	PRELIMINARY	DATE	31/10/2023

VERIFIED - SECTION MANAGER
APPROVED - UNIT MANAGER
PLANNING AND DESIGN
ROADS ASSETS PLANNING AND DESIGN
ROADS TRANSPORT DRAINAGE AND WASTE

Central Coast Council

SETTLERS ROAD - WISEMANS FERRY
CH60-CH100 LANDSLIDE REMEDIATION
GENERAL ARRANGEMENT

EDMS NUMBER	XXXXX/XXXXX
PROJECT NUMBER	XXXXX
PLAN NUMBER	XXXXX
REV	B
DRG-CI-20002	A3

GENERAL NOTES

1. THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH THE TECHNICAL SPECIFICATIONS PROVIDED IN APPENDIX E OF THE GHD DETAILED DESIGN REPORT AND WITH SUCH OTHER WRITTEN INSTRUCTIONS THAT MAY BE ISSUED DURING THE COURSE OF CONSTRUCTION. ANY DISCREPANCY OR VARIATION SHALL BE REFERRED TO THE SUPERINTENDENT BEFORE PROCEEDING WITH WORK.
2. THE DRAWINGS ARE DERIVED FROM DIODRONE UAV LIDAR DATA. AS IS TYPICAL FOR PROJECTS OF THIS TYPE, SOME VARIATIONS SHOULD BE ALLOWED FOR. THIS WILL PARTICULARLY BE THE CASE WHERE SLOPES ARE STEEP AND VEGETATION DENSE.
3. ALL LEVELS ARE IN METRES ON THE AUSTRALIAN HEIGHT DATUM.
4. LOCATIONS ARE BASED ON MGA20 GRID.
5. THE DRAWINGS ARE A DIAGRAMMATIC REPRESENTATION OF THE WORK TO BE CARRIED OUT ONLY AND DIMENSIONS SHALL NOT BE OBTAINED BY SCALING.
6. DATUM FOR ALL DRAWINGS IS RELATIVE. THE CONTRACTOR SHALL ESTABLISH AND SET OUT SUITABLE RELATIVE BENCH MARKS AND CALIBRATE THEM TO THE LEVELS IN THE DRAWINGS
7. BEFORE ANY OF THE GIVEN SURVEY MARKS ON THE BASE LINES ARE AFFECTED BY THE WORKS, THE CONTRACTOR SHALL TRANSFER SUCH SURVEY MARKS TO STABLE, SIDE POSITIONS CLEAR OF OPERATIONS AND SHALL NOTE, AND INFORM THE SUPERINTENDENT IN WRITING, OF THE NEW LOCATION AND SURVEYED CO-ORDINATES.
8. DIVERSION OF WATER AND THE PROTECTION OF WORKS IS THE CONTRACTOR'S RESPONSIBILITY.
9. THE CONTRACTOR SHALL PLAN AND CARRY OUT THE WORKS TO AVOID EROSION, CONTAMINATION AND SEDIMENTATION OF THE SITE AND ITS SURROUNDINGS. EROSION AND SEDIMENT CONTROL SHALL BE INSTALLED IN ACCORDANCE WITH THE BEST PRACTICE EROSION AND SEDIMENT CONTROL DOCUMENT INTERNATIONAL EROSION CONTROL ASSOCIATION (2008).
10. ALL WASTE OR DEMOLISHED MATERIALS SHALL BE DISPOSED OFF-SITE TO A LOCATION APPROVED BY COUNCIL. ALL FEES AND CHARGES SHALL BE BORNE BY THE CONTRACTOR.
11. THE CONTRACTOR SHALL SUPPLY THE SUPERINTENDENT WITH FULLY MARKED-UP AND CERTIFIED "WORK-AS-EXECUTED" DRAWINGS FOR THE WHOLE OF THE CONTRACT PRIOR TO ISSUE OF THE FINAL CERTIFICATE.
12. THE CONTRACTOR SHALL MONITOR THE SLOPE BY OBSERVING THE SLOPE DAILY PRIOR TO THE BEGINNING OF WORK ON THE SITE TO CHECK AND DOCUMENT:
    A. THE AMOUNT OF OVERNIGHT RAINFALL FROM THE SITE GAUGE.
    B. IF ANY CRACKS / BULGES HAVE APPEARED IN THE SLOPE / ROCK FACE SINCE THE PREVIOUS DAY.
    C. IF ANY CRACKS / BULGES HAVE APPEARED IN THE SLOPE / GROUND BELOW THE ROAD LEVEL SINCE THE PREVIOUS DAY.
13. THE CONTRACTOR SHALL HALT WORK AND MOVE CONSTRUCTION EQUIPMENT TO A DESIGNATED PLACE AWAY FROM THE WORKS WHEN HEAVY OR CONTINUED RAIN COMMENCES AND AT THE END OF EACH WORKING DAY AND MODIFY AND UPDATE RISK MITIGATION PLANS AS SITE CONDITIONS VARY THROUGHOUT THE PROJECT.
14. THE DESIGNER SHALL BE CONTACTED IMMEDIATELY IF ANY SLOPE MOVEMENTS OR UNEXPECTED CHANGES ARE OBSERVED. A COPY OF THE SLOPE MONITORING RECORDS IS TO BE SUBMITTED TO THE SUPERINTENDENT'S REPRESENTATIVE WEEKLY.
15. REMOVAL OF LANDSLIP MATERIAL AND CONSTRUCTION IS TO OCCUR FROM THE TOP DOWN.
16. REMOVAL OF OBSTRUCTIONS, E.G. BOULDERS AND LOGS ON SURFACE, IS TO BE UNDERTAKEN DURING SLOPE PREPARATION PROVIDED THE REMOVAL OF SUCH ITEMS DOES NOT CAUSE ANY DETRIMENTAL EFFECT TO THE SLOPE.
17. PLANT SHOULD BE POSITIONED ON STABLE GROUND, OR USING APPROPRIATE RESTRAINT / TETHERING. CAUTION SHOULD BE GIVEN TO POSITIONING PLANT, MATERIALS, STOCKPILES ETC. ON OR BELOW THE LANDSLIDE AREA.

SPOT ROCK BOLT

18. BOREHOLES SHALL BE MINIMUM 75 mm Ø, DRILLED PERPENDICULAR TO THE DEFECT PLANE BEHIND THE ROCK BLOCK, WITH A MINIMUM DECLINATION OF 10° BELOW HORIZONTAL.
19. ROCK BOLTS SHALL COMPRISE 28 mm Ø GALVANISED 500N BAR. BOLT LENGTH (L) AND LOCATION ARE TO BE SPECIFIED ON-SITE AT THE TIME OF CONSTRUCTION BY THE GEOTECHNICAL REPRESENTATIVE ENGAGED BY THE PRINCIPAL
20. PLATES SHALL BE 200 mm SQUARE 15 MM GALVANISED 250N STEEL, OR APPROVED LARGER / THICKER PLATES.
21. BARS SHALL BE CENTRALISED BY WRAPPING OF THE GROUT TUBE, AND PROVISION OF APPROVED CENTRALISERS.
22. ALL NUTS SHALL BE TIGHTENED TO APPLY 20 kN FORCE, ONCE GROUT ACHIEVES THE SPECIFIED STRENGTH.
23. ROCK BOLTS SHALL BE FULLY COLUMN GROUTED WITH 40 MPa CEMENT GROUT.
24. ALL GROUT SHALL BE INSTALLED BY USE OF TREMMIE PIPES EXTENDING TO THE END OF THE BAR AND AN ANNULAR BLEED PIPE USED TO CONFIRM FULL COLUMN GROUTING IS ACHIEVED.
25. NON SHRINK 'DRY PACK' SHALL BE USED TO PACK THE UN-GROUTED TOP END OF THE ROCK BOLT AND SEAT THE PLATE FIRMLY AGAINST THE ROCK SLOPE (SEE EXAMPLE IMAGE)
26. GROUT SHALL BE TESTED TO EXCEED THE DESIGN STRENGTH AT 28 DAYS.
27. THE FINAL REMEDIATION SHALL BE DOCUMENTED IN A WORK AS EXECUTED PHOTOGRAPHIC MOSAIC COVERING THE FULL EXTENT OF THE SLOPE CLEARLY SHOWING THE SITE WORKS. ANNOTATION OVER THE PHOTOGRAPHS MAY BE USED TO ASSIST INTERPRETATION.
28. AT COMPLETION WORK AS EXECUTED DOCUMENTS SHALL BE PREPARED AND EACH BOLT SHALL BE INDIVIDUALLY REFERENCED, WITH DRILL LOGS AND GROUT TAKES PROVIDED FOR EACH BOLT, ALONG WITH THE CORRESPONDING GROUT BATCH NUMBERS
29. USE ROTARY OR ROTARY-PERCUSSION DRILLING EQUIPMENT FOR DRILLING TO ENSURE MINIMAL REMOULDING OF IN-SITU MATERIALS WITHIN THE DRILL HOLES. DO NOT USE DRILLING FLUIDS OTHER THAN AIR OR CEMENTITIOUS GROUT, UNLESS OTHERWISE APPROVED BY THE GEOTECHNICAL REPRESENTATIVE ENGAGED BY THE PRINCIPAL.
30. PROVIDE CENTRALISER FOR ROCK BOLTS AT MAXIMUM 2000MM INTERVALS. FIRST AND LAST CENTRALISER MUST BE 300MM FROM ENDS OF ROCK BELT. PROVIDE MINIMUM OF 3 CENTRALISERS.

SOIL NAILS

31. GRADE 500 STEEL SOIL NAILS WITH CORRUGATED HDPE SHEATING SHALL BE CONSTRUCTED AS PER THE REQUIREMENTS OF TFNSW IC-QA-R64.
32. A SACRIFICIAL GROUT TUBE SHALL BE USED AS A TREMIE PIPE TO PUMP GROUT FROM THE BOTTOM END OF THE NAIL UNTIL THE GROUT REACHES THE SURFACE.
33. ANY COUPLERS USED SHALL NOT REDUCE THE STRENGTH OF THE SOIL NAIL BAR.
34. NAIL HEADS SHALL COMPRISE A SQUARE DOMED BASE PLATE SECURED BY A DOMED STEEL NUT ABOVE. THE NUT SHOULD BE IN FULL CONTACT WITH THE BASE PLATE, SUITABLE FOR USE WITH THE DESIGN SOIL NAILS.
35. NAILS SHALL BE INSTALLED INTO MINIMUM 150MM DIAMETER HOLES DRILLED TO AT LEAST 100MM LONGER THAN THE NAIL, ANGLED DOWN FROM THE HORIZONTAL AT 15 DEGREES UNLESS OTHERWISE SPECIFIED ON THE DRAWINGS OR AS DIRECTED BY THE DESIGNER.
36. CENTRALISERS SHALL BE PROVIDED TO ENSURE THAT THE NAIL IS CENTRALLY LOCATED WITHIN THE HOLE. CENTRALISERS SHALL BE PROVIDED AT BOTH ENDS (WITHIN 300MM FROM THE ENDS) OF THE NAIL AND AT 3000MM INTERVALS (MAXIMUM) ALONG THE NAIL BETWEEN THE END SPACERS. THE SPACERS SHALL BE FABRICATED FROM MATERIALS WHICH HAVE NO DELETERIOUS EFFECT ON THE SOIL NAIL SYSTEM AND DO NOT BLOCK PASSAGE OF GROUT. SPACERS SHALL BE MANUFACTURED TO PERMIT THE FREE FLOW OF GROUT.
37. WHERE NAIL PLATES ARE NOT FITTED TO WET SHOTCRETE A SAND-CEMENT MORTAR TO BE USED FOR LEVELLING SOIL NAIL HEADS AND FILLING BEHIND DOMED PLATE AND SHALL CONSIST OF A SAND-CEMENT RATIO OF 1:3.
38. ALL DEBRIS AND STANDING WATER SHALL BE REMOVED BY COMPRESSED AIR DURING THE HOLE DRILLING. WATER SHALL NOT BE USED.
39. NO DRILLING SHALL BE CARRIED OUT WITHIN 4.5 METRES RADIUS OF ANY FRESHLY GROUTED SOIL NAILS, INCLUDING SOIL NAILS FOR SUITABILITY TESTS, GROUTED LESS THAN 24 HOURS PREVIOUSLY.

SHOTCRETE

40. SHOTCRETE SHALL INCLUDE AT LEAST 50mm (FOR NON STRUCTURAL SHOTCRETE) AND AT LEAST 75mm (FOR STRUCTURAL SHOTCRETE) COVER BETWEEN GROUND SURFACE AND MESH AND AT LEAST 50mm ELSEWHERE OVER AND BELOW ALL METALLIC INCLUSIONS (MESH REINFORCEMENT, LAPS AND NAIL HEADS). APPROPRIATE CHAIRS OR FIXING PINS SHALL BE USED TO ENSURE COVER FROM THE GROUND AND OVER THE STEEL TO THE FACE OF THE SHOTCRETE.
41. SHOTCRETE SHALL BE IN ACCORDANCE WITH RMS SPECIFICATION R68, MIX DESIGN TO B2
42. SHOTCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 40 MPA AT 28 DAYS.
43. 20mm DIAMETER UPVC LINED WEEPHOLES SHALL BE INSTALLED ACROSS THE SHOTCRETED FACE AT 2.4m CENTRES FOR SOIL NAIL WALL FACING AND 3m OTHERWISE AND MORE FREQUENTLY OVER AND BELOW AREAS OF OBSERVED SEEPAGE. ADDITIONAL WEEP HOLES MAY BE NEEDED WHEN STRONG SEEPAGE IS OBSERVED. THIS WOULD BE ASSESSED BY THE DESIGNER ON SITE.
44. ALL WEEPHOLES SHALL EXTEND THROUGH THE FULL THICKNESS OF THE SHOTCRETE AND SHALL BE LAID WITH AN INCLINATION OF 1V:10H BELOW HORIZONTAL.
45. STRIP DRAINS SHALL COMPRISE 150mm WIDE GEOFABRIC WRAPPED STRIP DRAINS IN ACCORDANCE WITH RMS SPECIFICATION DC3557.
46. STRIP DRAINS SHALL BE CHASED INTO THE SOIL SLOPE BEHIND THE SHOTCRETE TO ENSURE MINIMUM SHOTCRETE COVER OVER STEEL IS MAINTAINED AND THE REAR FACE OF THE SHOTCRETE IS NOT INDENTED BY THE STRIP DRAINS.
47. STEEL REINFORCEMENT FOR SHOTCRETE SHALL BE FIXED SECURELY TO THE SLOPE BY SOIL NAILS AND SHALL BE LAID WITHOUT SHARP BENDS OR CREASES NOT ALLOWED FOR IN THE DESIGN. LAPS BETWEEN ADJACENT SHEETS SHALL BE AT LEAST 300mm. FIXINGS SHALL BE SUCH THAT THE MESH DOES NOT FLEX DURING SHOTCRETEING. IF FLEXING IS OBSERVED, STOP WORK AND SECURE THE MESH PRIOR TO CONTINUING WITH SHOTCRETING.

GROUT MIX AND TESTING

48. GROUT MIX DESIGN SHALL BE AS PER TfNSW SPECIFICATION R64 CL.2.2.7.
49. GROUT STRENGTH TESTING IS TO BE UNDERTAKEN BY A NATA-ACCREDITED TESTING LABORATORY, WITH EACH CERTIFICATE NATA ENDORSED.
50. GROUT SITE TESTING, SAMPLING AND CUBE CASTING SHALL BE PERFORMED BY A TRAINED SITE REPRESENTATIVE WITH PROFICIENCY CERTIFIED BY A NATA ACCREDITED SIGNATORY.

EROSION AND SEDIMENT CONTROL

51. EROSION AND SEDIMENT CONTROLS SHALL BE INSTALLED BY THE CONTRACTOR IN ACCORDANCE WITH CENTRAL COAST COUNCIL STANDARDS AND THE "BLUE BOOK", MANAGING URBAN STORMWATER: SOILS AND CONSTRUCTION, SUCH THAT ERODED SEDIMENT DOES NOT AFFECT WATERWAYS.
52. DURING WORKS COVER EXPOSED SOILS WITH JUTE MESH OR GEOFABRIC TO REDUCE THE CHANCE OF EROSION.

REV	AMENDMENT	DATE	DRAWN	APRVD
B	100% DETAILED DESIGN	31.10.23	IS	SA
A	65% DETAILED DESIGN	19.09.23	IS	SA

SCALE ON ORIGINAL A3 SIZE DRAWING: NOT TO SCALE
DATUM: AHD
ALL DIMENSIONS IN m UNLESS OTHERWISE SHOWN

SURVEYED	DIOSPATIAL	SURV REF	23AU019
DESIGNED	S.AMOROSO	DRAWN	I.SMITH
STATUS	PRELIMINARY	DATE	31/10/2023

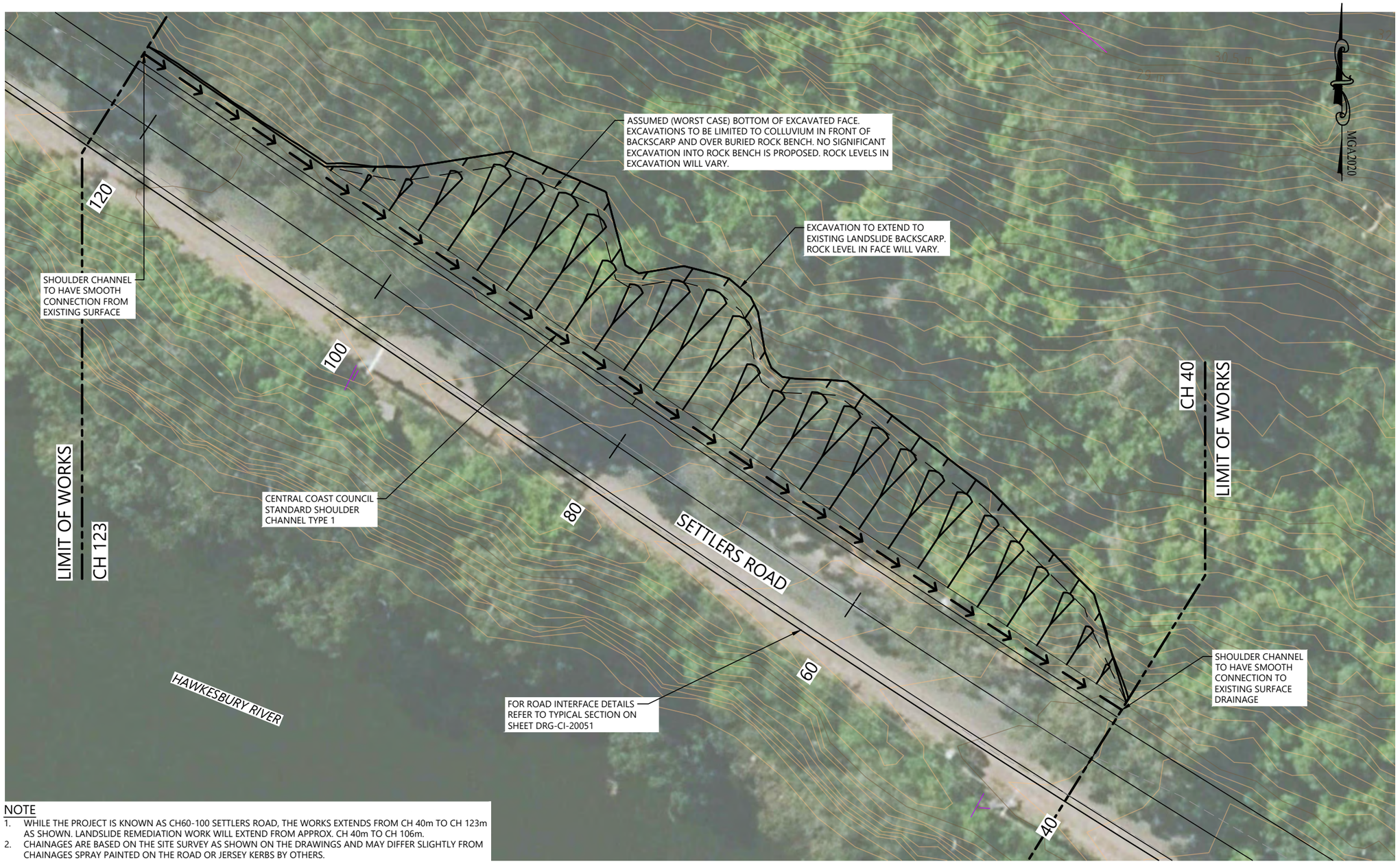
VERIFIED - SECTION MANAGER: PLANNING AND DESIGN
APPROVED - UNIT MANAGER: ROADS ASSETS PLANNING AND DESIGN
ROADS TRANSPORT DRAINAGE AND WASTE

Central Coast Council

Central Coast Council

SETTLERS ROAD - WISEMANS FERRY
CH60-CH100 LANDSLIDE REMEDIATION
NOTES

EDMS NUMBER	XXXXX/XXXXX
PROJECT NUMBER	XXXXX
PLAN NUMBER XXXXX	REV B
DRG-CI-20005	A3



NOTE
1. WHILE THE PROJECT IS KNOWN AS CH60-100 SETTLERS ROAD, THE WORKS EXTENDS FROM CH 40m TO CH 123m AS SHOWN. LANDSLIDE REMEDIATION WORK WILL EXTEND FROM APPROX. CH 40m TO CH 106m.
2. CHAINAGES ARE BASED ON THE SITE SURVEY AS SHOWN ON THE DRAWINGS AND MAY DIFFER SLIGHTLY FROM CHAINAGES SPRAY PAINTED ON THE ROAD OR JERSEY KERBS BY OTHERS.

REV	AMENDMENT	DATE	DRAWN	APRVD
B	100% DETAILED DESIGN	31.10.23	IS	SA
A	65% DETAILED DESIGN	19.09.23	IS	SA

SCALE ON ORIGINAL A3 SIZE DRAWING
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1:250
DATUM: AHD
ALL DIMENSIONS IN m UNLESS OTHERWISE SHOWN

SURVEYED	DIOSPATIAL	SURV REF	23AU019
DESIGNED	S.AMOROSO	DRAWN	I.SMITH
STATUS	PRELIMINARY	DATE	31/10/2023

VERIFIED - SECTION MANAGER
APPROVED - UNIT MANAGER
PLANNING AND DESIGN
ROADS ASSETS PLANNING AND DESIGN
ROADS TRANSPORT DRAINAGE AND WASTE

Central Coast Council

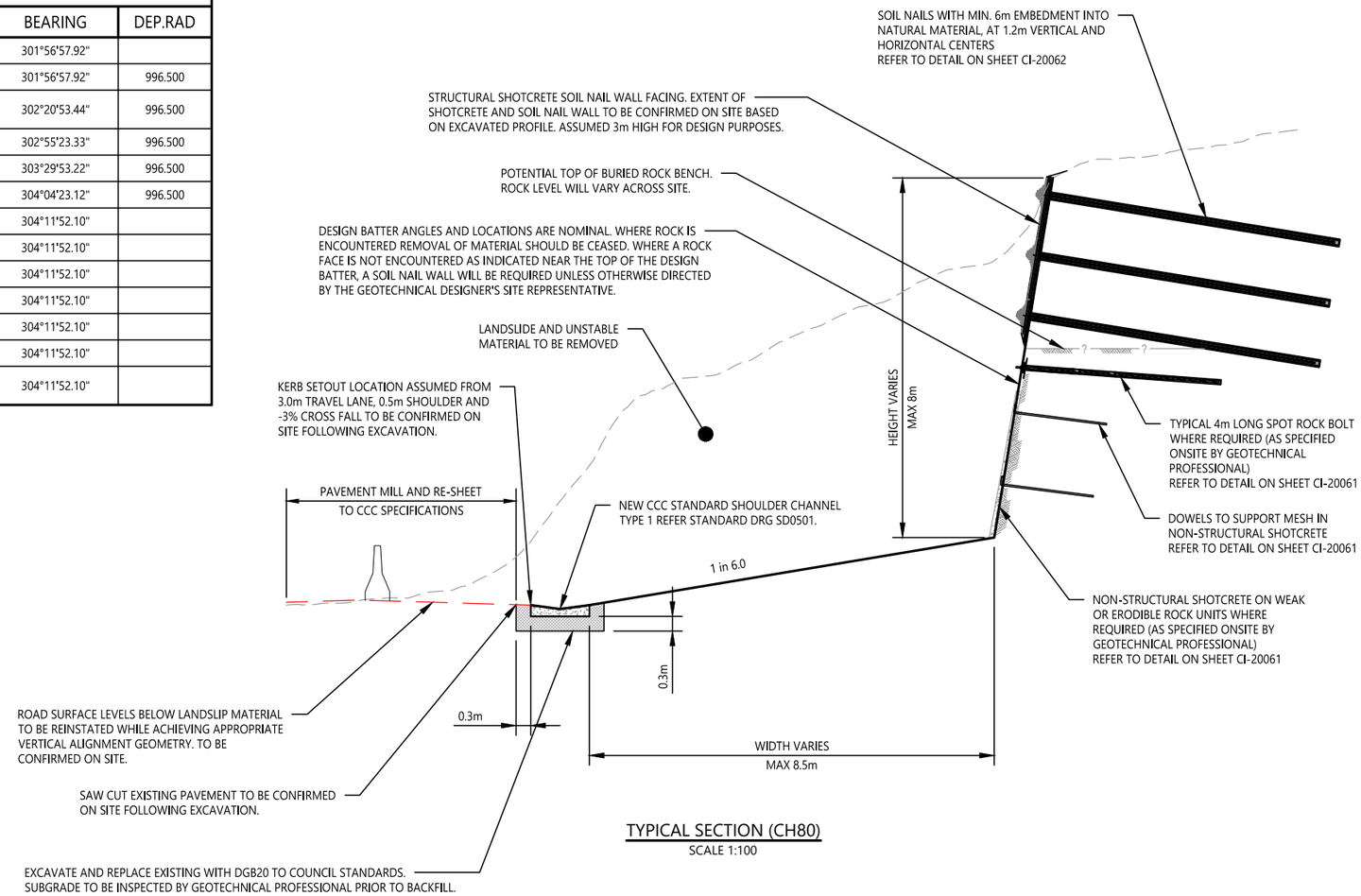
SETTLERS ROAD - WISEMANS FERRY
CH60-CH100 LANDSLIDE REMEDIATION
DETAIL PLAN - SHEET 1 OF 1

EDMS NUMBER	XXXXX/XXXXX
PROJECT NUMBER	XXXXX
PLAN NUMBER XXXXX	REV B
DRG-CI-20021	A3

NOTE

1. A GEOTECHNICAL PROFESSIONAL SHOULD PROVIDE AN ONSITE PRESENCE DURING REMOVAL OF LANDSLIDE MATERIAL AND IDENTIFY THE LOCATION AND QUANTITY OF SOIL NAILS, SPOT ROCKBOLTS AND SHOTCRETE ON THE EXCAVATED FACE.
2. ROAD SURFACE LEVELS AND KERB SETOUT HEIGHT TO BE CONFIRMED ON SITE FOLLOWING EXCAVATION AND REMOVAL OF LANDSLIDE MATERIAL
3. SOIL NAIL WORKING LOAD = 70 KN PER NAIL.

KERB SETOUT - SHOULDER CHANNEL TYPE 1						
PT	CHAINAGE	EASTING	NORTHING	HEIGHT	BEARING	DEP.RAD
S	0.000	313046.718	6304962.029	2.033	301°56'57.92"	
TC	33.065	313018.662	6304979.525	3.795	301°56'57.92"	996.500
LIMIT OF WORKS	40.000	313012.791	6304983.216	4.483	302°20'53.44"	996.500
	50.000	313004.369	6304988.609	5.414	302°55'23.33"	996.500
	60.000	312996.003	6304994.086	6.244	303°29'53.22"	996.500
	70.000	312987.692	6304999.647	7.000	304°04'23.12"	996.500
CT	72.169	312985.896	6305000.864	7.163	304°11'52.10"	
	80.000	312979.419	6305005.265	7.751	304°11'52.10"	
	90.000	312971.148	6305010.886	8.489	304°11'52.10"	
	100.000	312962.877	6305016.506	9.189	304°11'52.10"	
	110.000	312954.606	6305022.127	9.849	304°11'52.10"	
	120.000	312946.335	6305027.747	10.469	304°11'52.10"	
LIMIT OF WORKS	130.000	312938.064	6305033.368	11.049	304°11'52.10"	



TYPICAL SECTION (CH80)
SCALE 1:100

REV	AMENDMENT	DATE	DRAWN	APRVD
B	100% DETAILED DESIGN	31.10.23	IS	SA
A	65% DETAILED DESIGN	19.09.23	IS	SA

SCALE ON ORIGINAL A3 SIZE DRAWING
0 1 2 3 4 5
1:100
DATUM: AHD
ALL DIMENSIONS IN m UNLESS OTHERWISE SHOWN

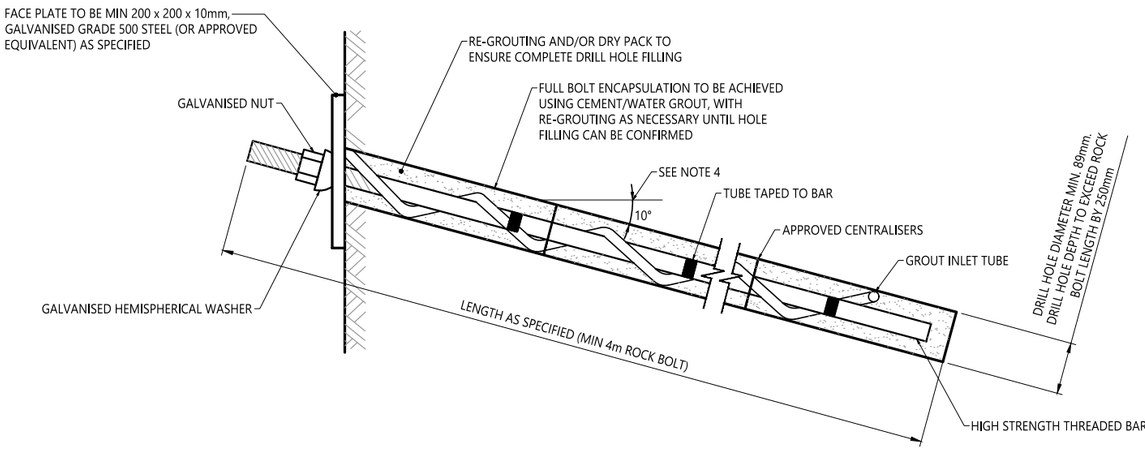
SURVEYED	DIOSPATIAL	SURV REF	23AU019
DESIGNED	S.AMOROSO	DRAWN	I.SMITH
STATUS	PRELIMINARY	DATE	31/10/2023

VERIFIED - SECTION MANAGER — PLANNING AND DESIGN
APPROVED - UNIT MANAGER — ROADS ASSETS PLANNING AND DESIGN
ROADS TRANSPORT DRAINAGE AND WASTE

Central Coast Council

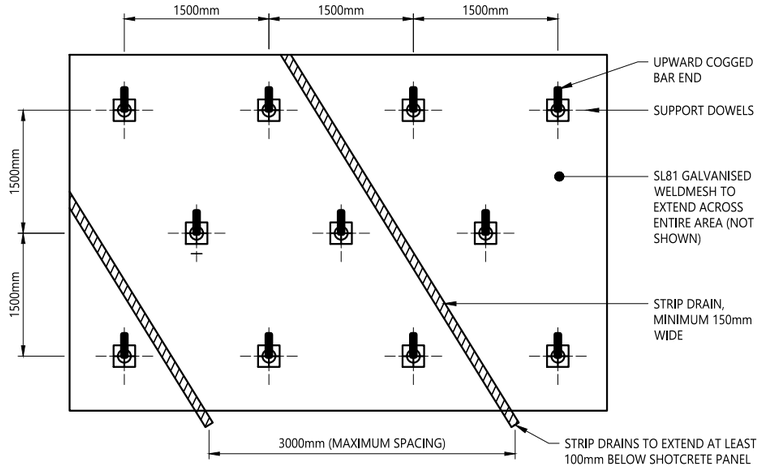
SETTLERS ROAD - WISEMANS FERRY
CH60-CH100 LANDSLIDE REMEDIATION
TYPICAL SECTION

EDMS NUMBER	XXXXX/XXXXX
PROJECT NUMBER	XXXXX
PLAN NUMBER	XXXXX
REV	B
DRG-CI-20051	A3

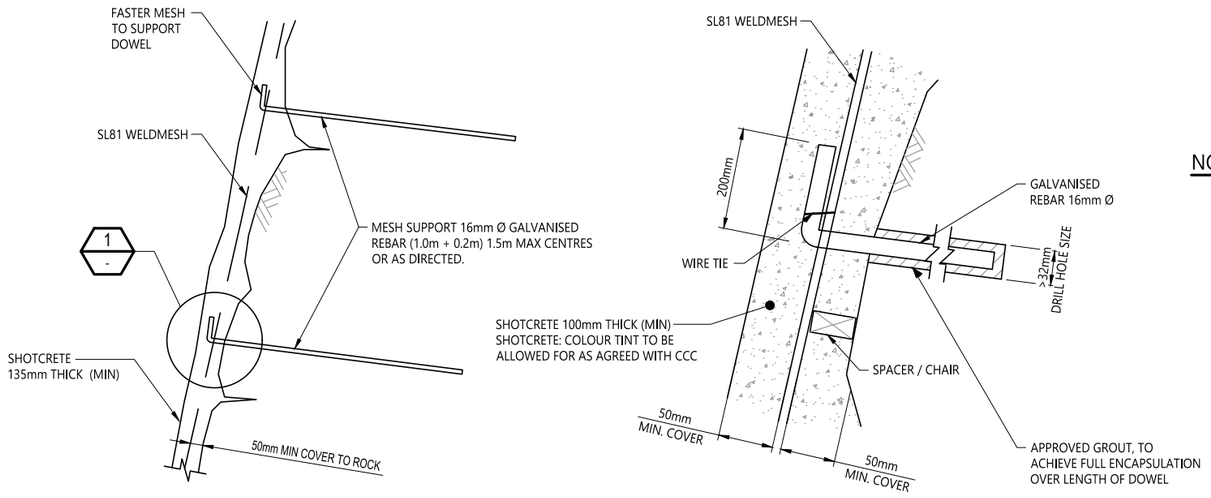


SPOT ROCK BOLT DETAIL (GROUTED ROCK BOLT)
N.T.S

NOTE
1. DRAWING TO BE READ IN CONJUNCTION WITH THE PROJECT SPECIFICATION.
2. REFER TO PROJECT SPECIFICATIONS FOR ROCK BOLTING SPECIFICATION.
3. ALL BARS AND FIXTURES SHALL BE HOT DIPPED GALVANISED IN ACCORDANCE WITH AS1214, AS1650 AND AS4680.
4. ROCK BOLTS TO BE INSTALLED DECLINED AT 10° BELOW HORIZONTAL, UNLESS OTHERWISE SPECIFIED OR DIRECTED BY THE GEOTECHNICAL REPRESENTATIVE.

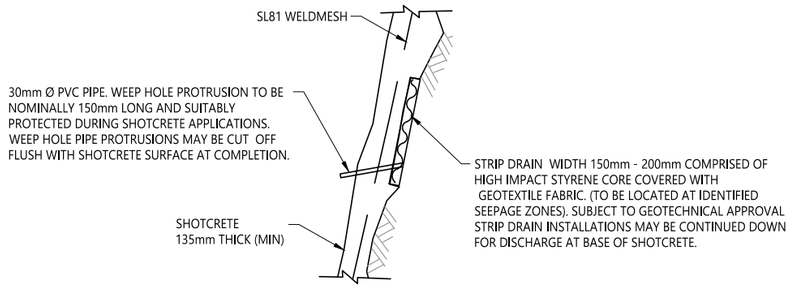


NON STRUCTURAL SHOTCRETE REINFORCING AND DRAINAGE DETAIL - TYPICAL ELEVATION
WHERE HEIGHT OF SHOTCRETE AREA IS >1.3m
NTS



1 - DETAIL
NTS

NON STRUCTURAL SHOTCRETE
AND MESH SUPPORT DOWELS DETAIL
NTS



DRAINAGE DETAIL - STRIP DRAIN
NTS

REV	AMENDMENT	DATE	DRAWN	APRVD
B	100% DETAILED DESIGN	31.10.23	IS	SA
A	65% DETAILED DESIGN	19.09.23	IS	SA

SCALE ON ORIGINAL A3 SIZE DRAWING: NOT TO SCALE
DATUM: AHD
ALL DIMENSIONS IN m UNLESS OTHERWISE SHOWN

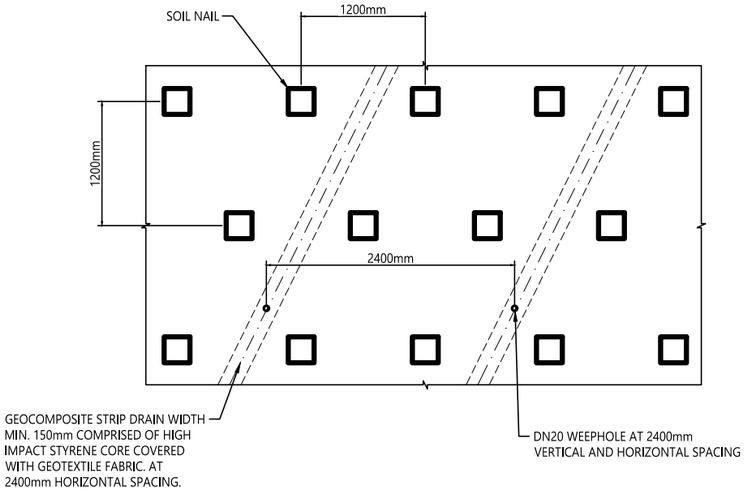
SURVEYED	DIOSPATIAL	SURV REF	23AU019
DESIGNED	S.AMOROSO	DRAWN	I.SMITH
STATUS	PRELIMINARY	DATE	31/10/2023

VERIFIED - SECTION MANAGER: PLANNING AND DESIGN
APPROVED - UNIT MANAGER: ROADS ASSETS PLANNING AND DESIGN
ROADS TRANSPORT DRAINAGE AND WASTE

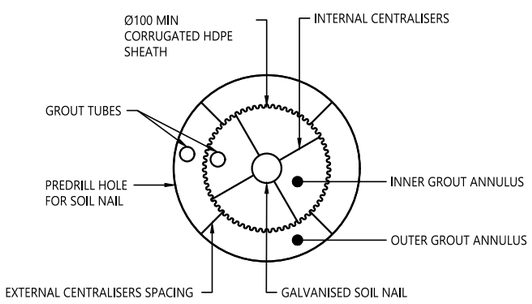
Central Coast Council

SETTLERS ROAD - WISEMANS FERRY
CH60-CH100 LANDSLIDE REMEDIATION
SPOT ROCK BOLT AND SHOTCRETE DETAILS

EDMS NUMBER XXXXX/XXXXX
PROJECT NUMBER XXXXX
PLAN NUMBER XXXXX REV B
DRG-CI-20061 A3

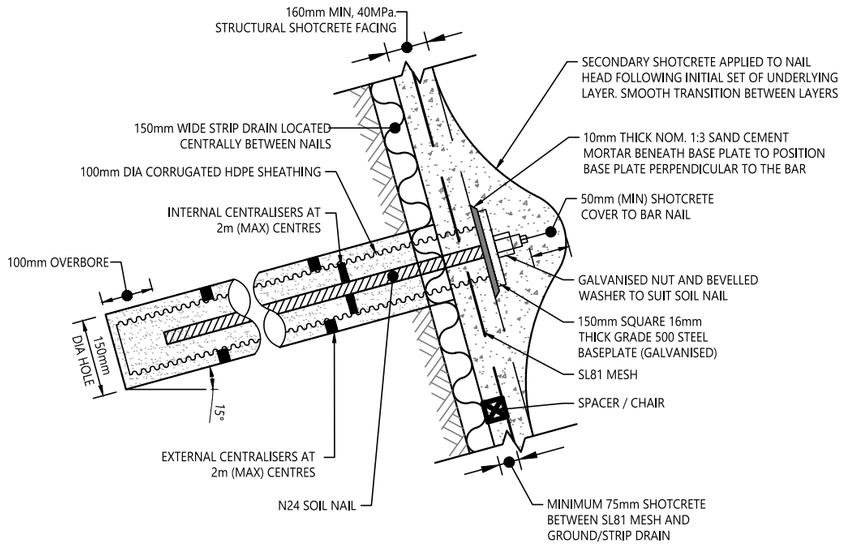


SOIL NAIL SPACING DETAIL
NTS



TYPICAL SECTION THROUGH ENCAPSULATED SOIL NAIL
NTS

NOTE
1. DRAWING TO BE READ IN CONJUNCTION WITH THE PROJECT SPECIFICATION.
2. REFER TO TfNSW SPECIFICATION R64 FOR SOIL NAILING SPECIFICATION.



SOIL NAIL DETAIL
NTS

REV	AMENDMENT	DATE	DRAWN	APRVD
B	100% DETAILED DESIGN	31.10.23	IS	SA
A	65% DETAILED DESIGN	19.09.23	IS	SA

SCALE ON ORIGINAL A3 SIZE DRAWING
NOT TO SCALE
DATUM: AHD
ALL DIMENSIONS IN m UNLESS OTHERWISE SHOWN

SURVEYED	DIOSPATIAL	SURV REF	23AU019
DESIGNED	S.AMOROSO	DRAWN	I.SMITH
STATUS	PRELIMINARY	DATE	31/10/2023

VERIFIED - SECTION MANAGER
PLANNING AND DESIGN
APPROVED - UNIT MANAGER
ROADS ASSETS PLANNING AND DESIGN
ROADS TRANSPORT DRAINAGE AND WASTE

Central Coast Council

SETTLERS ROAD - WISEMANS FERRY
CH60-CH100 LANDSLIDE REMEDIATION
SOIL NAIL DETAILS

EDMS NUMBER XXXXX/XXXXX
PROJECT NUMBER XXXXX
PLAN NUMBER XXXXX
REV B
DRG-CI-20062
A3

EROSION AND SEDIMENT CONTROL NOTES

1. THE SEQUENCE OF CONSTRUCTION MAY BE AS FOLLOWS
   a) IDENTIFY LOCATION OF ALL YOUR NEW EROSION AND SEDIMENT CONTROL MEASURES.
   b) INSTALLATION OF BARRIERS, BUNDS AND/OR OTHER CONTROLS.
   c) INSTALLATION OF TEMPORARY SEDIMENT BASIN AND ENERGY DISSIPATOR AT OUTLET WITH CONTROLS AT DOWN SLOPE.
   d) INSTALLATION OF ALL DIVERSION DRAINS AND LEVEL SPREADERS.
   e) INSTALLATION OF ALL REMAINING EROSION AND SEDIMENT CONTROLS.
   f) CLEARING AND REGRADING OF SITE FOR ROAD CONSTRUCTION.
2. DRAWINGS ARE ISSUED AS AN EXAMPLE ONLY. ALL WORKS MUST BE CARRIED OUT IN ACCORDANCE WITH CCC SPECIFICATIONS, THE REQUIREMENTS OF THE 'BLUE BOOK', SOILS AND CONSTRUCTION LANDCOM 2004 VOLUME 1 AND DEPARTMENT OF ENVIRONMENT & CLIMATE CHANGE NSW (DECC) VOLUME 2D AND OTHER ENVIRONMENTAL PRACTICES.
3. REFER TO 2008 'BLUE BOOK' TYPICAL DETAILS SD 4-1 TO SD 6-15.
4. LOCATION OF TOPSOIL STOCKPILES MUST BE DETERMINED BY YOU AND STABILISED IN ACCORDANCE WITH THE 2008 'BLUE BOOK' TYPICAL DETAILS SD 4-1 AND SD 6-8.
5. DETAILS ON THESE PRELIMINARY EROSION AND SEDIMENT CONTROL PLANS (ESCP'S) ARE SCHEMATIC ONLY. ADDITIONAL CONTROLS AND CHANGES TO THIS PLAN WILL BE NECESSARY DURING THE PROCESS OF IMPLEMENTATION OF THE ESCP. IN CONJUNCTION WITH THE CONSTRUCTION STAGING PLANS AND SPECIFIC ON SITE CONSTRUCTION METHODOLOGY, YOU MUST PREPARE PROGRESSIVE ESCP. THESE ESCP IDENTIFY POSSIBLE EROSION AND SEDIMENT CONTROLS NEEDED ON SITE, BUT ARE NOT CONSTRUCTION DRAWINGS AND ARE ISSUED FOR INFORMATION ONLY. ALTERNATIVE APPROVED PRIMARY EROSION SEDIMENT CONTROLS CAN BE USED TO SUIT THE METHOD AND SEQUENCE OF CONSTRUCTION.
6. AFTER REGRADING THE SITE, SEDIMENT FENCES, BUNDS OR CONTOUR BANKS MUST BE LAID ALONG THE CONTOURS AT INTERVALS NOT EXCEEDING 80m. THIS INTERVAL MUST BE REDUCED TO 20m ON BATTERS STEEPER THAN H.V=4.1. THESE SEDIMENT FENCES ARE NOT SHOWN ON THE PLAN FOR CLARITY PURPOSES.
7. ALL DISTURBED AND REGRADED AREAS MUST BE REHABILITATED WITHIN THE TIME PERIODS IN ACCORDANCE WITH CCC SPECIFICATIONS AND REQUIREMENTS OF THE BLUE BOOK.
8. NEW OR EXISTING INFRASTRUCTURE USED TO CONVEY SITE RUNOFF DURING CONSTRUCTION MUST BE FLUSHED CLEAN OF SEDIMENT AT COMPLETION OF THE PROJECT.
9. FIELD INSPECTIONS MUST BE UNDERTAKEN FOR ALL OPEN TRENCHES ON SITE TO ENSURE THAT ADEQUATE PROTECTION AGAINST EROSION IS PROVIDED AND THAT SAFETY MEASURES ARE ALSO PROVIDED IN PLACE AT THE END OF EACH DAY.
10. LOCATION OF ALL SERVICES MUST BE CONFIRMED BY YOU PRIOR TO COMMENCING WORK AND MANAGE THE COORDINATION OF TEMPORARY DRAINAGE AND OTHER EROSION AND SEDIMENT CONTROLS WITH THE EXISTING AND NEW UTILITIES.
11. ANY WORKS OUTSIDE OF THE CONSTRUCTION AREAS SHOWN ON THESE PLANS MUST IMPLEMENT LOCAL EROSION AND SEDIMENT CONTROLS TO ENSURE ADEQUATE PROTECTION.
12. THE PROVISION OF ALL EROSION AND SEDIMENT CONTROL MEASURES REQUIRED MUST BE IN ACCORDANCE WITH VOLUME 2A "INSTALLATION OF SERVICES" OF THE BLUE BOOK.
13. COMPLETED BATTER FACES AND DIVERSION DRAINS WILL REQUIRE STABILISATION WITH HYDROMULCH AS SPECIFIED ON THE VEGETATION DRAWINGS AND THE PROJECT SPECIFICATIONS.
14. DIVERSION DRAINS MUST BE FULLY OPERATIONAL PRIOR TO ANY DISTURBANCE ON SITE.
15. TEMPORARY DIVERSION DRAINS MUST BE CONSTRUCTED TO AVOID TREES AND FENCES AND SHOULD BE WITHIN THE RMS LAND ACQUISITION BOUNDARY.
16. USE WOVEN POLYPROPYLENE AND COTTON/GEOTEXTILE THREAD WITH A FLOW RATE OF 15 L/s/m^2 TO AUSTRALIAN STANDARD AS 3706.9 AS THE FABRIC WHEN INSTALLING SEDIMENT FENCES.
17. ALL BARRIER FENCES (PARAWEBBING) MUST BE INSTALLED BY YOU TO AVOID SOIL DISTURBANCE OUTSIDE THE APPROVED ENVIRONMENTAL BOUNDARY.

ASSUMED DESIGN PARAMETERS		
DESIGN PARAMETER	VALUE	REFERENCE
SOIL LANDSCAPE	HAWKESBURY	
SOIL ERODIBILITY (K-FACTOR)	0.042	CONSERVATIVE INFORMATION
RAINFALL EROSIVITY (R-FACTOR)	2500.00	APPENDIX A OF BLUE BOOK VOL. 1
SLOPE LENGTH/GRADIENT (LS-FACTOR)	1.09 (10:1 / 20m)	TABLE A.1 OF APPENDIX A BLUE BOOK VOLUME 1
EROSION CONTROL PRACTICE (P-FACTOR)	1.30	APPENDIX A5 OF BLUE BOOK VOL. 1
GROUND COVER (C-FACTOR)	0.70	APPENDIX A6 OF BLUE BOOK VOL. 1
RAINFALL INTENSITY (2 YEAR, 6 HOUR STORM) (mm)	7.74mm/hr	FROM IFD TABLE (BOM WEBSITE)
DESIGN RAINFALL DEPTH (DURATION)	5.00	SECTION 6.3.4 (D) BLUE BOOK VOL. 1
DESIGN RAINFALL DEPTH (PERCENTILE)	80.00	SECTION 6.3.4 (F) BLUE BOOK VOL. 1
DESIGN RAINFALL DEPTH (mm)	59.7 (GOSFORD)	SECTION 6.3.4 (H) BLUE BOOK VOL. 1
SOIL HYDROLOGIC GROUP	D	TAKEN FROM TABLE C19 AND C21, APPENDIX C OF BLUE BOOK VOL. 1
VOLUMETRIC RUNOFF COEFFICIENT (Cv)	0.50	TABLE F2, APPENDIX F OF BLUE BOOK VOL. 1

REV	AMENDMENT	DATE	DRAWN	APRVD
A	100% DETAILED DESIGN	31.10.23	IS	SA

SCALE ON ORIGINAL A3 SIZE DRAWING

NOT TO SCALE

DATUM: AHD

ALL DIMENSIONS IN m UNLESS OTHERWISE SHOWN

SURVEYED	DIOSPATIAL	SURV REF	23AU019
DESIGNED	S.AMOROSO	DRAWN	I.SMITH
STATUS	PRELIMINARY	DATE	31/10/2023

VERIFIED - SECTION MANAGER

PLANNING AND DESIGN

APPROVED - UNIT MANAGER

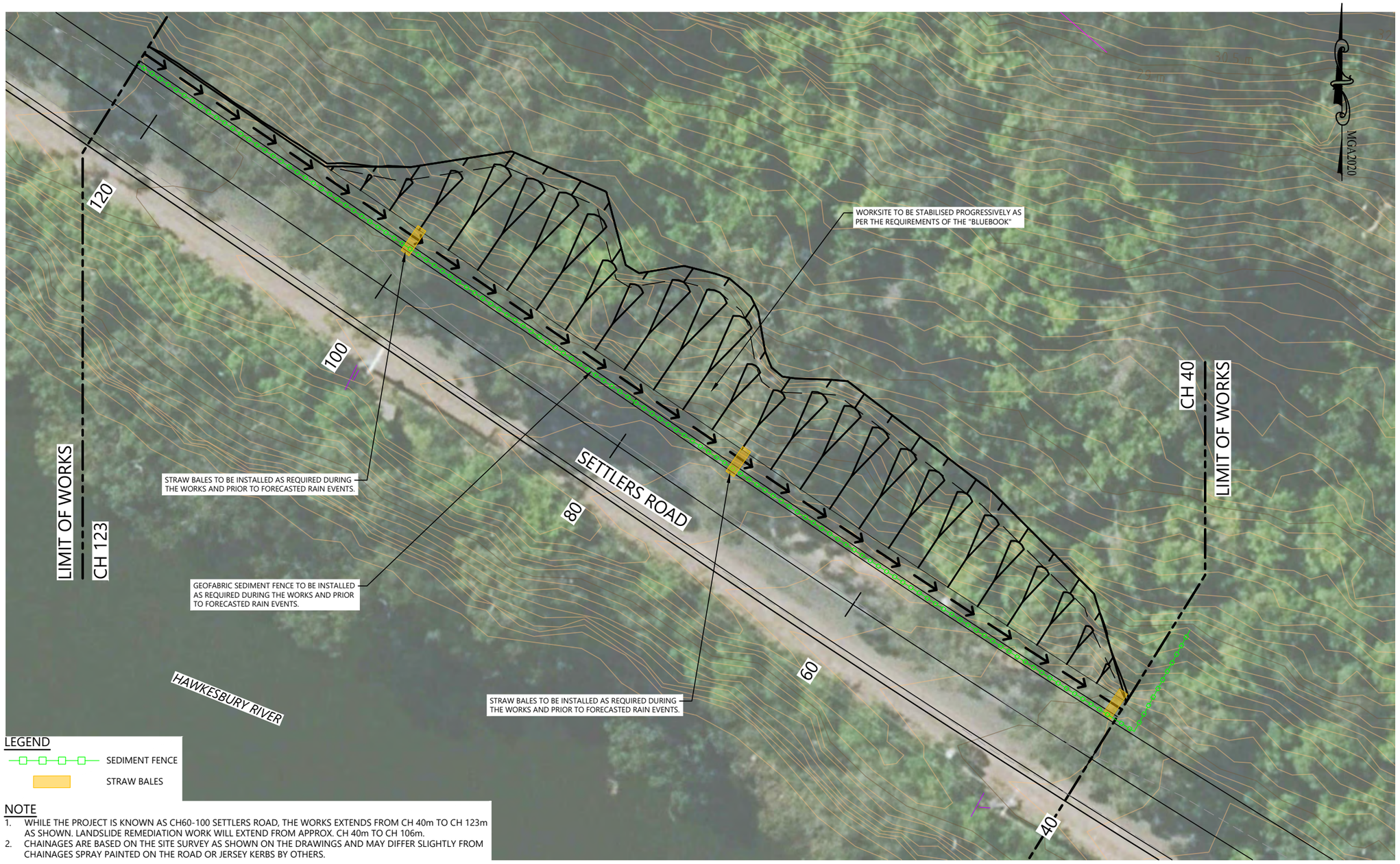
ROADS ASSETS PLANNING AND DESIGN

ROADS TRANSPORT DRAINAGE AND WASTE

Central Coast Council

SETTLERS ROAD - WISEMANS FERRY
CH60-CH100 LANDSLIDE REMEDIATION
EROSION AND SEDIMENT CONTROL NOTES

EDMS NUMBER XXXXX/XXXXX
PROJECT NUMBER XXXXX
PLAN NUMBER XXXXX REV A
DRG-CI-20071 A3



REV	AMENDMENT	DATE	DRAWN	APRVD
A	100% DETAILED DESIGN	31.10.23	IS	SA

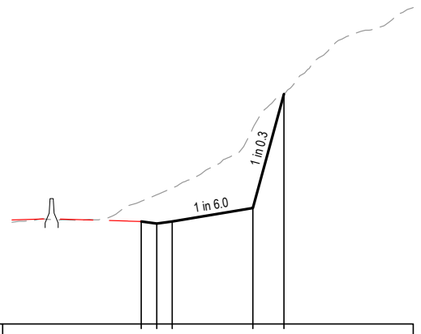
SCALE ON ORIGINAL A3 SIZE DRAWING
0 2.5 5 7.5 10 12.5
1:250
DATUM: AHD
ALL DIMENSIONS IN m UNLESS OTHERWISE SHOWN

SURVEYED	DIOSPATIAL	SURV REF	23AU019
DESIGNED	S.AMOROSO	DRAWN	I.SMITH
STATUS	PRELIMINARY	DATE	31/10/2023
VERIFIED - SECTION MANAGER		APPROVED - UNIT MANAGER	
PLANNING AND DESIGN		ROADS ASSETS PLANNING AND DESIGN	ROADS TRANSPORT DRAINAGE AND WASTE

Central Coast Council

SETTLERS ROAD - WISEMANS FERRY
CH60-CH100 LANDSLIDE REMEDIATION
EROSION AND SEDIMENT CONTROL PLAN
SHEET 1 OF 1

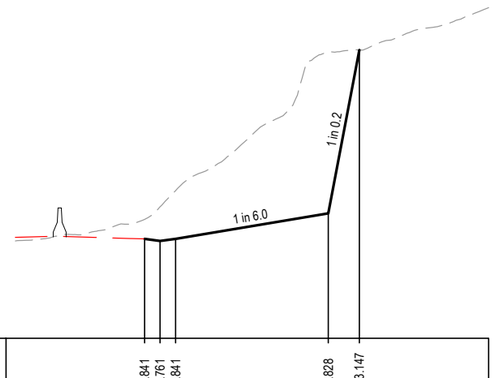
EDMS NUMBER	XXXXX/XXXXX
PROJECT NUMBER	XXXXX
PLAN NUMBER	XXXXX
REV	A
DRG-CI-20081	A3



Level Datum = 1.000

DESIGN LEVELS			4.961	4.881	4.961			5.482	9.889
CUT STRINGS			MCDO	CFDI	CBDI			EHDI	IADI
EXISTING LEVELS			5.74	5.99	6.25			8.58	9.89
DESIGN OFFSET	0.000	0.600	1.200					4.320	5.520

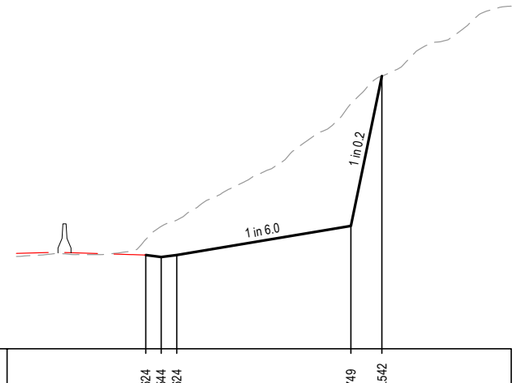
CH 45.000



Level Datum = 2.000

DESIGN LEVELS			5.841	5.761	5.841			6.828	13.147
CUT STRINGS			MCDO	CFDI	CBDI			EHDI	IADI
EXISTING LEVELS			6.60	7.08	7.71			13.07	13.15
DESIGN OFFSET	0.000	0.600	1.200					7.107	8.307

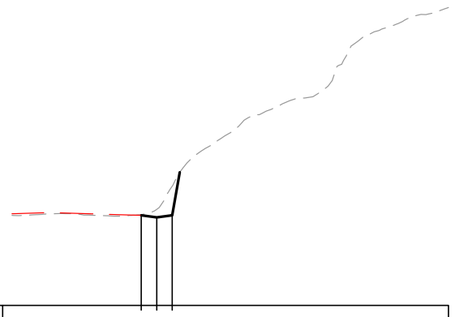
CH 55.000



Level Datum = 3.000

DESIGN LEVELS			6.624	6.544	6.624			7.749	13.542
CUT STRINGS			MCDO	CFDI	CBDI			EHDI	IADI
EXISTING LEVELS			7.22	7.73	7.97			12.48	13.54
DESIGN OFFSET	0.000	0.600	1.200					7.935	9.135

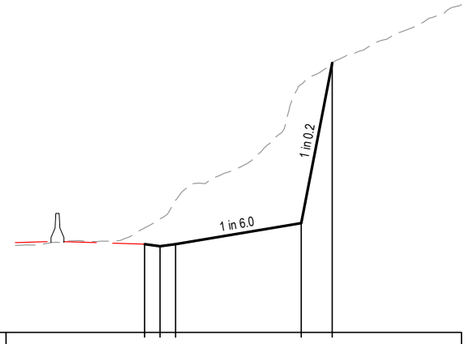
CH 65.000



Level Datum = 1.000

DESIGN LEVELS			4.483	4.403	4.483				
CUT STRINGS			MCDO	CFDI	CBDI				
EXISTING LEVELS			4.51	4.71	5.61				
DESIGN OFFSET	0.000	0.600	1.200						

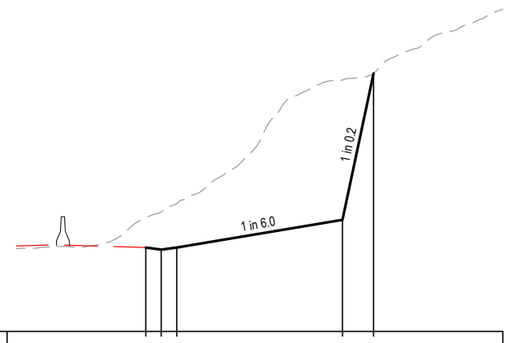
CH 40.000



Level Datum = 2.000

DESIGN LEVELS			5.414	5.334	5.414			6.225	12.418
CUT STRINGS			MCDO	CFDI	CBDI			EHDI	IADI
EXISTING LEVELS			6.04	6.40	7.11			11.59	12.42
DESIGN OFFSET	0.000	0.600	1.200					6.058	7.258

CH 50.000



Level Datum = 3.000

DESIGN LEVELS			6.244	6.164	6.244			7.314	12.975
CUT STRINGS			MCDO	CFDI	CBDI			EHDI	IADI
EXISTING LEVELS			7.40	7.62	7.94			12.72	12.97
DESIGN OFFSET	0.000	0.600	1.200					7.609	8.809

CH 60.000

REV	AMENDMENT	DATE	DRAWN	APRVD
B	100% DETAILED DESIGN	31.10.23	IS	SA
A	65% DETAILED DESIGN	19.09.23	IS	SA

ALL DIMENSIONS IN m UNLESS OTHERWISE SHOWN

SCALE ON ORIGINAL A3 SIZE DRAWING
0 2 4 6 8 10
1:200
DATUM: AHD

SURVEYED	DIOSPATIAL	SURV REF	23AU019
DESIGNED	S.AMOROSO	DRAWN	I.SMITH
STATUS	PRELIMINARY	DATE	31/10/2023

VERIFIED - SECTION MANAGER
PLANNING AND DESIGN

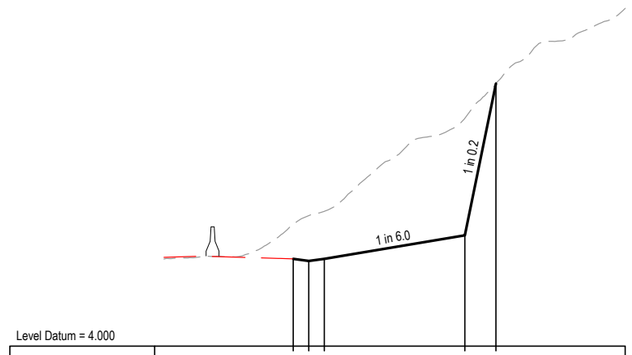
APPROVED - UNIT MANAGER
ROADS ASSETS PLANNING AND DESIGN

Central Coast Council
ROADS TRANSPORT DRAINAGE AND WASTE

Central Coast Council

SETTLERS ROAD - WISEMANS FERRY
CH60-CH100 LANDSLIDE REMEDIATION
CROSS SECTIONS
SHEET 1 OF 4

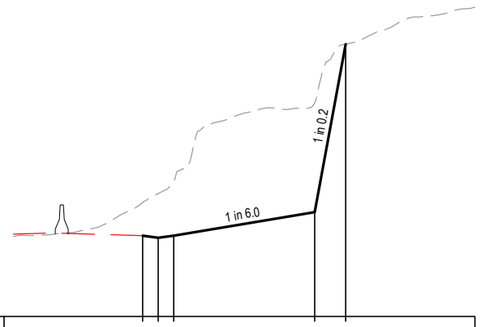
EDMS NUMBER	XXXXX/XXXXX
PROJECT NUMBER	XXXXX
PLAN NUMBER	XXXXX
REV	B
DRG-CI-20301	A3



Level Datum = 4.000

DESIGN LEVELS	7.376	7.296	7.376	8.284	14.153
CUT STRINGS	MCD0	CFDI	CBDI	EHDI	IADI
EXISTING LEVELS	8.71	9.05	9.21	12.81	14.15
DESIGN OFFSET	0.000	0.600	1.200	6.639	7.839

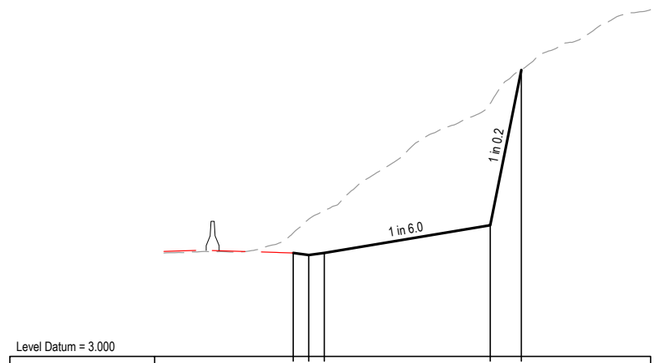
CH 75.000



Level Datum = 5.000

DESIGN LEVELS	8.125	8.045	8.125	9.035	15.529
CUT STRINGS	MCD0	CFDI	CBDI	EHDI	IADI
EXISTING LEVELS	9.40	9.75	10.18	13.25	15.53
DESIGN OFFSET	0.000	0.600	1.200	6.651	7.851

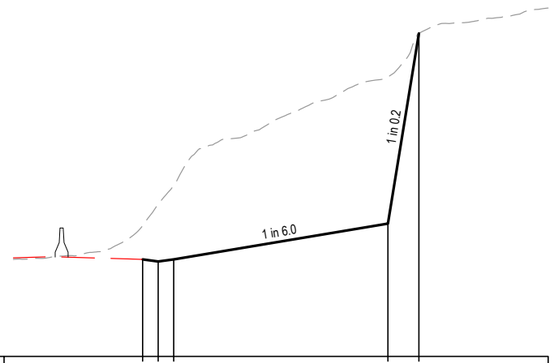
CH 85.000



Level Datum = 3.000

DESIGN LEVELS	7.000	6.920	7.000	8.072	14.073
CUT STRINGS	MCD0	CFDI	CBDI	EHDI	IADI
EXISTING LEVELS	7.77	8.31	8.64	12.78	14.07
DESIGN OFFSET	0.000	0.600	1.200	7.619	8.819

CH 70.000



Level Datum = 4.000

DESIGN LEVELS	7.751	7.671	7.751	9.134	16.488
CUT STRINGS	MCD0	CFDI	CBDI	EHDI	IADI
EXISTING LEVELS	9.05	9.88	10.61	14.80	16.49
DESIGN OFFSET	0.000	0.600	1.200	9.484	10.684

CH 80.000

REV	AMENDMENT	DATE	DRAWN	APRVD
B	100% DETAILED DESIGN	31.10.23	IS	SA
A	65% DETAILED DESIGN	19.09.23	IS	SA

SCALE ON ORIGINAL A3 SIZE DRAWING
0 2 4 6 8 10
1:200
DATUM: AHD
ALL DIMENSIONS IN m UNLESS OTHERWISE SHOWN

SURVEYED	DIOSPATIAL	SURV REF	23AU019
DESIGNED	S.AMOROSO	DRAWN	I.SMITH
STATUS	PRELIMINARY	DATE	31/10/2023

VERIFIED - SECTION MANAGER
PLANNING AND DESIGN

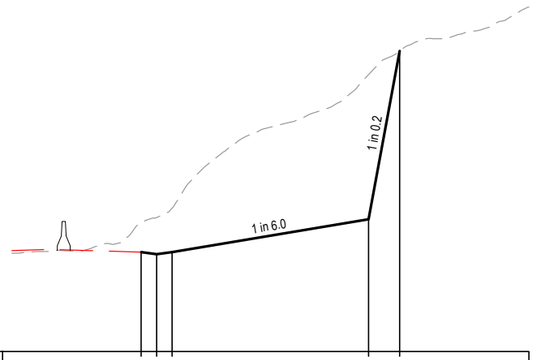
APPROVED - UNIT MANAGER
ROADS ASSETS PLANNING AND DESIGN

Central Coast Council
ROADS TRANSPORT DRAINAGE AND WASTE

Central Coast Council

SETTLERS ROAD - WISEMANS FERRY
CH60-CH100 LANDSLIDE REMEDIATION
CROSS SECTIONS
SHEET 2 OF 4

EDMS NUMBER	XXXXX/XXXXX
PROJECT NUMBER	XXXXX
PLAN NUMBER	XXXXX
REV	B
DRG-CI-20302	A3



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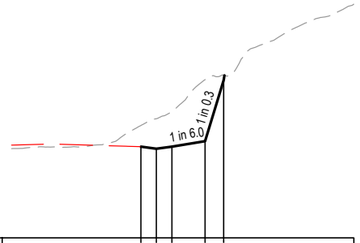
CH 95.000



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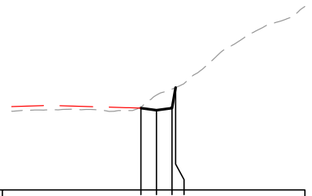
CH 105.000



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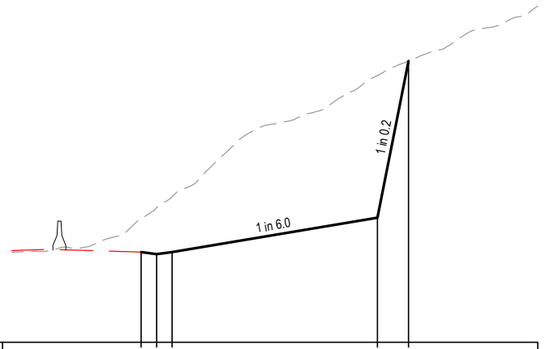
CH 115.000



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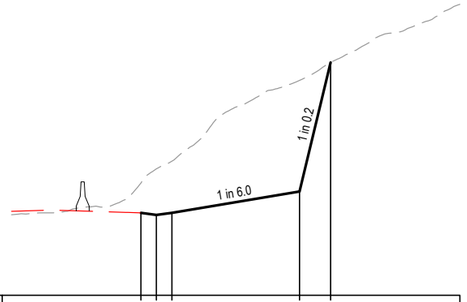
CH 90.000



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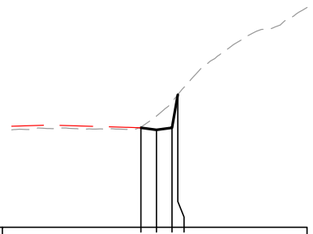
CH 100.000



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EXISTING LEVELS	9.88	10.30	10.85			11.13
DESIGN OFFSET	0.000	0.600	1.200			1.424

CH 110.000

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A	65% DETAILED DESIGN	19.09.23	IS	SA

SCALE ON ORIGINAL A3 SIZE DRAWING
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DATUM: AHD
ALL DIMENSIONS IN m UNLESS OTHERWISE SHOWN

SURVEYED	DIOSPATIAL	SURV REF	23AU019
DESIGNED	S.AMOROSO	DRAWN	I.SMITH
STATUS	PRELIMINARY	DATE	31/10/2023

VERIFIED - SECTION MANAGER
PLANNING AND DESIGN

APPROVED - UNIT MANAGER
ROADS ASSETS PLANNING AND DESIGN

Central Coast Council
ROADS TRANSPORT DRAINAGE AND WASTE

Central Coast Council

SETTLERS ROAD - WISEMANS FERRY
CH60-CH100 LANDSLIDE REMEDIATION
CROSS SECTIONS
SHEET 3 OF 4

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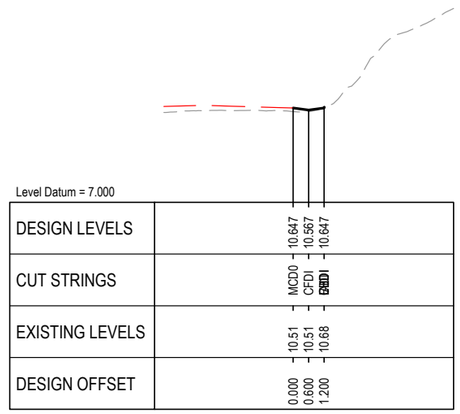
PROJECT NUMBER	XXXXX
PLAN NUMBER	XXXXX
REV	B
DRG-CI-20303	A3



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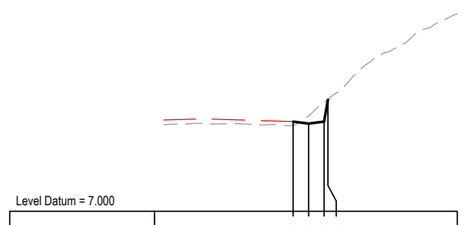
CH 123.000



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CH 120.000

REV	AMENDMENT	DATE	DRAWN	APRVD
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A	65% DETAILED DESIGN	19.09.23	IS	SA

ALL DIMENSIONS IN m UNLESS OTHERWISE SHOWN

SCALE ON ORIGINAL A3 SIZE DRAWING
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DATUM: AHD

SURVEYED	DIOSPATIAL	SURV REF	23AU019
DESIGNED	S.AMOROSO	DRAWN	I.SMITH
STATUS	PRELIMINARY	DATE	31/10/2023

VERIFIED - SECTION MANAGER
PLANNING AND DESIGN

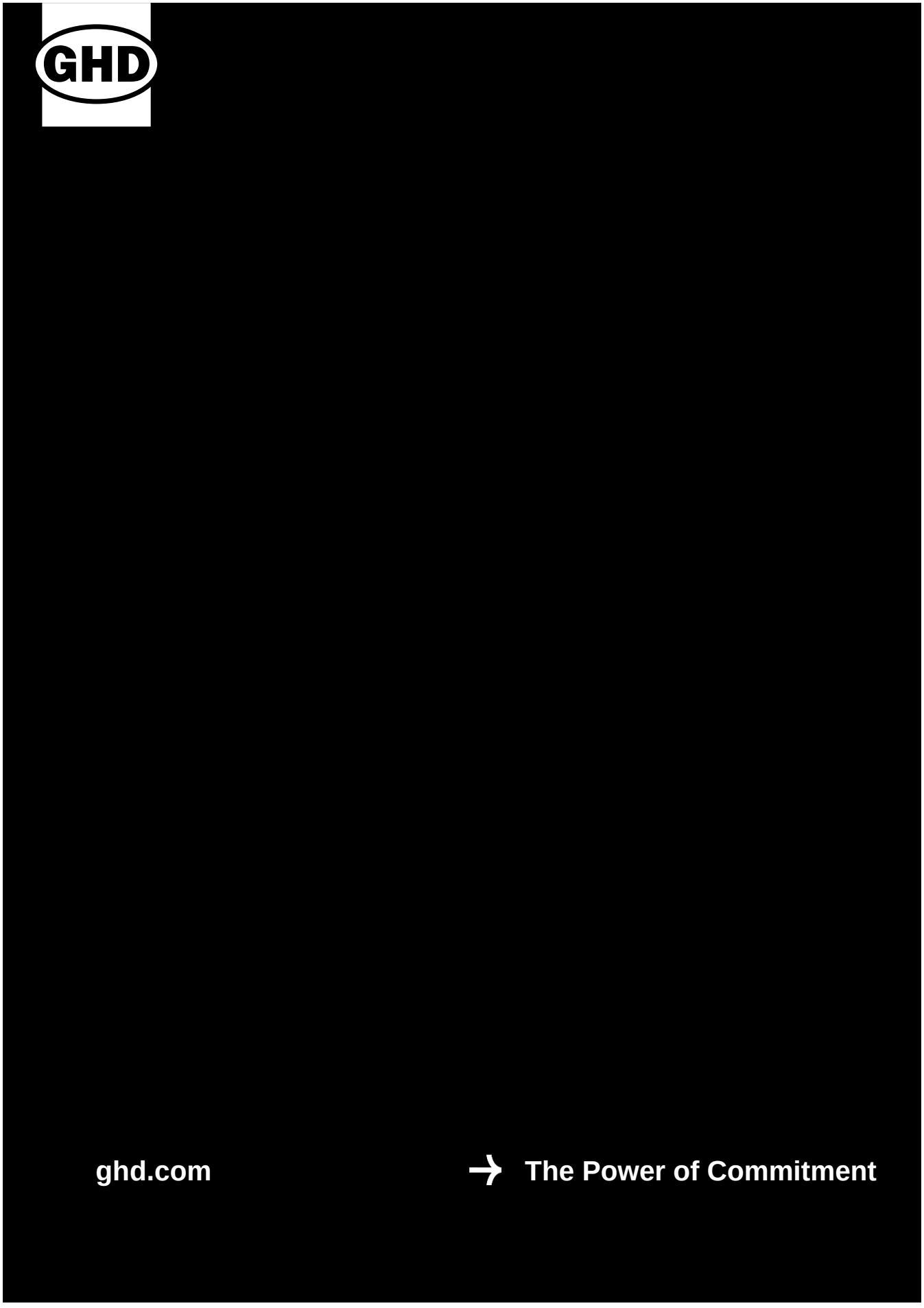
APPROVED - UNIT MANAGER
ROADS ASSETS PLANNING AND DESIGN

Central Coast Council
ROADS TRANSPORT DRAINAGE AND WASTE

Central Coast Council

SETTLERS ROAD - WISEMANS FERRY
CH60-CH100 LANDSLIDE REMEDIATION
CROSS SECTIONS
SHEET 4 OF 4

EDMS NUMBER	XXXXX/XXXXX
PROJECT NUMBER	XXXXX
PLAN NUMBER	XXXXX
REV	B
DRG-CI-20304	A3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The Power of Commitment

Audit, Risk and Improvement Committee

Annual Report 2023

Audit, Risk and Improvement Committee Annual Report 2023

About the report

This annual report documents the operation and activities of the Audit, Risk and Improvement Committee for Central Coast Council during the 2023 calendar year.

The Central Coast Council Audit, Risk and Improvement Committee

Central Coast Council (Council) is committed to open and transparent governance that meets community expectations. To enhance its governance framework, Council established an Audit, Risk and Improvement Committee (ARIC) in 2017.

The ARIC has an important role in the governance framework of Council by providing Council with independent oversight, objective assurance and monitoring of Council's audit processes, internal controls, external reporting, risk management activities, compliance of and with Council's policies and procedures, and performance improvement activities.

The establishment of the ARIC via Council Resolution on 26 April 2017 places Council in an excellent position in the pursuit of good corporate governance, which in turn promotes effective and efficient delivery services to the Central Coast community with transparency, honesty and integrity. During 2023, ARIC took steps to commence compliance with incoming Guidelines for Risk Management and Internal Audit, released by the Office of Local Government, and which will prescribe the activities, membership, and outputs, of ARICs in NSW from 1 July 2024.

The ARIC also assists Council accomplish its objectives by bringing a systematic, disciplined approach to evaluate and improve the effectiveness of risk management, control and governance processes.

The Committee consists of three independent members, with the Administrator fulfilling the intended Councillor roles during the ongoing period of Administration of Council.

All Committee member profiles are featured on pages four to five of this report.

Audit, Risk and Improvement Committee Annual Report 2023

Central Coast Council

Central Coast Council is responsible for the sixth largest urban area in Australia. The Council area is 1681 square kilometres, which makes it geographically larger than Canberra.

The Central Coast NSW population is forecast to grow to 414,615 by 2036. Planning for growth and maintaining the lifestyle that our community enjoys is important for Council.

Council Structure

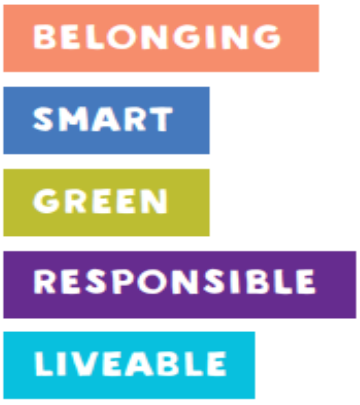
In 2023, Central Coast Council's organisation was led by the Chief Executive Officer, David Farmer, and comprised of the following Directorates: Community and Recreation, Corporate Services, Environment and Planning, Infrastructure Services, and Water and Sewer.

The directors of these five Directorates, along with the CEO form the Executive Leadership Team (ELT), which is tasked with making day-to-day decisions on operational matters that comply with Council's policies and procedures.

Community Vision

We are *One Central Coast*. A smart, green and liveable region with a shared sense of belonging and responsibility. *One Central Coast* is the Community Strategic Plan (CSP) for the Central Coast Local Government Area. It defines the Community's vision and is Council's roadmap for the future.

One Central Coast brings together extensive community feedback to set key directions and priorities and has been built around five key themes that reflect the need and values of the people who live in our region:



Audit, Risk and Improvement Committee Annual Report 2023

Independent member profiles

Mr Arthur Butler

Mr Butler has held Executive Management and Chief Financial Officer positions with Sydney Water and Electricity Commission of New South Wales and was part of the corporatisation and commercialisation of these entities. Has served on several State Government Advisory Committees. A past non-Executive Director of the NSW State Rail Authority, Rail Infrastructure NSW and Railcorp NSW and also of several private sector companies. A past Chair and Member of and currently serving on the Audit and Risk Committees of a number of NSW Government Cluster Departments, leading Government Agencies and local Government Entities.

Mr Carl Millington (Chair)

Mr Millington is a Chartered Accountant with over 40 years' experience in providing business advisory, auditing and accounting advice to NSW Local Government, Council Audit Committees, Not-for-Profit organisations including government and community-based organisations, and state and local sporting organisations. His professional roles include Managing Partner of Pitcher Partners Sydney, senior partner in the Business Advisory and Assurance Group, member of the firm's Advisory Board, Chair of the firm's Risk Committee and member of the Pitcher Partners National Risk and Quality Committee.

Audit, Risk and Improvement Committee Annual Report 2023

Mr Peter McLean

Mr McLean has two decades' of experience in the Not-for-profit, Association and Government sectors and has worked extensively in business development, operational improvement, policy and compliance and organisational analysis. He brings functional experience in senior management, financial management, governance, public relations, strategic management and stakeholder engagement to ARIC. Mr McLean exhibits strong corporate social responsibility and sustainable business expertise through an undergraduate environmental management degree and an MBA majoring in public relations and business law.

Councillor representatives

The Administrator performed the Councillor role on the Committee during 2023.

Mr Rik Hart

Mr Hart was appointed as Administrator for Central Coast Council by the Minster for Local Government, the Hon Shelley Hancock MP, following an announcement on 26 April 2021 of a formal Public Inquiry into Central Coast Council.

Mr Hart's term will continue until the NSW Local Government elections on 14 September 2024.

Other Regular Attendees

Non-Committee members who regularly attend meetings include the Audit Office of NSW, Centium – Internal Audit Partner, relevant ELT members, Chief Financial Officer, and Unit Manager Governance, Risk and Legal.

In 2023 the Central Coast Council Audit, Risk and Improvement Committee convened four times to fulfil its Charter obligations, and provide oversight and guidance over Council's Audit, Risk Management, and Improvement activities. It convened on a fifth occasion to review and endorse Council's financial statements.

Audit, Risk and Improvement Committee Annual Report 2023

Committee performance

Committee meeting dates and members' participation in 2023

- Wednesday 8 March 2023 (Ordinary Meeting)
- Wednesday 7 June 2023 (Ordinary Meeting)
- Wednesday 13 September 2023 (Extraordinary Financial Statements Meeting)
- Tuesday 21 November 2023 (Ordinary Meeting)
- Wednesday 6 December 2023 (Ordinary Meeting)

Attendance details

Name	Role	Meetings Attended
Carl Millington	Chair (Independent)	5
Arthur Butler	Independent	5
Peter McLean	Independent	5
Rik Hart	Administrator (Councillor Representative)	4

On 6 December 2023, the Committee held an "in-camera" meeting with representatives from the NSW Audit Office, without the presence of management, to discuss the external audit of the Council's financial statements.

Committee report card

Committee Charter	Compliance
Committee Meetings	A quorum was maintained at every meeting.
Composition	Three Independent Members and the Administrator performing the Councillor role.
Broad range of skills and experience	A diverse Committee with strong local government and commercial experience.
Sufficient time allocated to tasks	The Committee agenda and timing of meetings allowed sufficient time to consider all agenda items thoroughly.
Risk Management	Monitored and provided oversight with the development of Council's Enterprise Risk Management Framework (ERMF), risk register, and a Data Breach Policy and Procedure.

Audit, Risk and Improvement Committee Annual Report 2023

Committee Charter	Compliance
Financial Management	Provided review and oversight of the preparation of Council's annual financial statements in accordance with legislated timeframes for the first time in Central Coast Council's history. Continued to provide input and insight into Council's Long Term Financial sustainability.
Control Framework	Reviewed internal controls and policies and procedures through internal audit reports and high-level briefings. Provided input and oversight in the development of a comprehensive Performance Dashboard
Legislative Compliance	Reviewed and advised on the development of a comprehensive register of legislative compliance requirements.
Internal Audit	Reviewed and approved the Strategic Internal Audit Plan and annual programs; reviewed internal audit findings; monitored implementation of Internal Audit recommendations; held in-camera meeting with Internal Audit Manager.
External Audit	Discussed external audit planning, progress with the audit of Council's annual financial statements, compliance with local government regulatory requirements and resolution of audit findings. NSW Audit Office officially invited to attend all meetings. In-camera meeting with External Auditors as per clause 40(e).
Responsibilities of Members	All Committee Members have remained aware of their responsibilities under the ARIC Charter, including changing operational and regulatory requirements through receipt of regular briefings on Council developments.

Agenda items

The following highlights the formal matters consider by the Audit, Risk and Improvement Committee at meetings throughout 2023.

8 March 2023

Report Title	Report purpose
External Audit Report	The NSW Audit Office provided an update on their progress in delivering the interim audit and draft financial statements.
General Financial Statements FY2021-22	The Committee received the audited financial statements prepared by the Finance team and audited by the Audit Office.
Enterprise Risk Management Report	To review the current state of Council's risk profile.
Enterprise Risk Management function review	To report on an external review of the effectiveness and maturity of Council's enterprise risk management practices.

Audit, Risk and Improvement Committee Annual Report 2023

Report Title	Report purpose
Internal Audit final reports	To provide the Committee with finalised Internal Audit reports.
Update on Legal Matters	To provide the Committee with information relating to Legal matters.

7 June 2023

Report Title	Report purpose
Audit Office Final Management Letter 2022	To provide the Committee with the Management Letter issued to Council by the Audit Office to close the engagement for Financial Year 2021/22.
Audit Office Engagement Plan 2023	To provide the Committee with the Audit Office's Engagement Plan for Financial Year 2022/23.
Financial Update	To provide the Committee with current financial reports.
Enterprise Risk Management Report	To review the current state of Council's risk profile.
IT and Cyber Security Update	To provide the Committee with information regarding Council's preparedness for Cyber attacks and relevant prevention measures.
Infrastructure Services Report	To provide the Committee with detailed insights into a specific Directorate's risks.
Internal Audit Final Reports	To provide the Committee with the finalised Internal Audit reports.
IA Operational Plan 2023 to 2025	To present the updated IA Operational Plan 2023 to 2025 to the Audit, Risk and Improvement Committee for consideration and approval.
Governance activities update	To provide the Committee with an update on key Governance activities.
Update on Legal Matters	To provide the Committee with information relating to Legal matters.

13 September 2023

Report Title	Report purpose
Presentation of Financial Reports and related Auditor's Reports for Central Coast Council and Central Coast Council Water Supply	To provide the Committee with draft 2022/23 Financial Statements and related Audit for the period 1 July 2022 to 30 June 2023, for referral to Council.

Audit, Risk and Improvement Committee Annual Report 2023

Report Title	Report purpose
Authority for the period 1 July 2022 to 30 June 2023	

21 November 2023

Report Title	Report purpose
Financial Report	To present the most recent monthly financial reports for Central Coast Council to the Committee.
Financial Statements for the period 1 July 2022 to 30 June 2023	To present the final 2022/23 consolidated financial statements for Central Coast Council to the Committee.
Enterprise Risk Management Report – August 2023	To provide the Committee with an update on Central Coast Council's risks and associated controls.
Governance Activities Update	To provide the Committee with an update on key Governance activities.
Water & Sewer Year 1 IPART Report	To provide the Committee with a report on the Water & Sewer Directorate's progress on implementation of regulatory requirements.
Community & Recreation Services Report	To provide the Committee with information relating to risk management in the Community & Recreation Services Directorate.

6 December 2023

Report Title	Report purpose
General Finance Update	To present to the Committee the summary position of Council's Financial position for the financial year-to-date.
Enterprise Risk Management Review Report	To present to the Committee the report from the external review into Council's enterprise risk management maturity and effectiveness.
IT Update December 2023	To provide an update to the Committee on controls to manage IT projects considering the impacts on IT, update on cyber security management of corporate data and how IT identifies and is managing this risk.
Internal Audit Final Reports	To provide the Committee with finalised internal audit reports and close the engagement of Centium.
ARIC Work Plan	To provide the Committee with an update on the progression towards compliance with incoming Guidelines for Risk Management and Internal Audit

Audit, Risk and Improvement Committee Annual Report 2023

Report Title	Report purpose
Service Optimisation Program Report	To provide an overview of service reviews conducted.
Work, Health & Safety Report	To provide the Committee with report on Council's management of worker safety.
Update on Legal Matters	To provide the Committee with information relating to Legal matters.

Internal Audit

Internal Audit plays a key role in helping Council to achieve its objectives by testing how effectively management controls are operating across specific systems, processes and activities to manage the associated risks. In September 2023, the engagement of Council's outsourced Internal Audit provider, Centium, ceased. A procurement process led to the appointment of KPMG as the Internal Audit provider from November 2023.

Internal Audit is responsible for conducting risk-based business assurance and consultancy reviews across Council's operations in accordance with a pre-approved work program to provide assurance to Council (via the Audit, Risk and Improvement Committee) and the Chief Executive Officer on the effectiveness of controls. The Audit, Risk and Improvement Committee review and approve the IA work program each June.

Internal Audit can also provide advice, training and education on various governance, risk and compliance matters to assist business improvement.

All finalised IA reports are provided to the Audit, Risk and Improvement Committee members. Centium also provided a summary of the findings and recommendations from each report to the ARIC.

To monitor the effectiveness of the control environment, ARIC also reviews management's progress to fix any control weaknesses identified by IA reviews, though a quarterly report on management's implementation of recommendations.

External Audit

The Committee reviews and comments on the annual engagement of the External Auditor (Audit Office of New South Wales), and provides input into the preparation and referral of financial statements to External Audit and, ultimately, Council.

The Committee receives an annual report from the External Auditor on the status of our financial statements. Representatives from the Audit Office attended Committee meetings as observers and advisors with regard to the external audit process.

Audit, Risk and Improvement Committee Annual Report 2023

Chair's summary

The ARIC continued to support the management team and the Council as it transitioned from a state of financial crisis to one seeking ongoing financial stability. I have been pleased with Council's disciplined efforts in that regard.

Council should look forward to the return of democratically-elected representatives in September 2024, and I am confident that the work undertaken in 2023 (with ARIC's input and supervision) has placed Council's administration in good standing for this change.

Of particular note in 2023, was the delivery of audited financial statements in compliance with the timeline detailed in the *Local Government Act*, for the first time in Central Coast Council's history. The efforts of the finance team and the CFO in particular should be acknowledged in this regard.

All councils in NSW are subject to systemic challenges in sustainable funding, particularly at present and likely into the next 5 or more years. Central Coast Council's experience during the financial crisis has undoubtedly strengthened its resilience. However, to navigate the challenging external environment, the Council must take advantage of the progress made to date and remain vigilant in several key areas:

1. **Sound financial management**: Ensuring prudent financial practices, efficient resource allocation, and effective budgeting are essential.
2. **Proactive risk identification and management**: Whether it's changes in funding models, economic fluctuations, or unforeseen events, the Council must be prepared for change by assessing potential threats and planning accordingly.
3. **Legislative compliance**: To ensure that Council effectively manages its responsibilities to comply with increasing, and evolving, legislative obligations; and to do so effectively and efficiently.
4. **Workforce protection**: The Council's workforce plays a pivotal role in service delivery. Prioritising employee well-being, job security, and skill development contributes to long-term stability.
5. **Community value**: Responsible fiscal decisions should align with delivering value to the community.

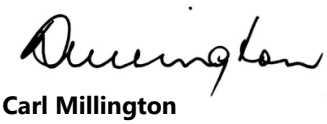
It was pleasing to see Council's attentiveness to improving its risk management function in 2023, and I look forward to seeing greater development in this space in 2024.

Conclusion

During 2023 ARIC has achieved its objective to provide independent assurance and assistance to the Council on key aspects of its operations by fulfilling all its responsibilities under the Charter.

Audit, Risk and Improvement Committee Annual Report 2023

Members of the committee have worked well together and with Council's management team, and I thank them, and council's internal and external auditors for their efforts, cooperation, and recommendations throughout the 2023 year.



Carl Millington
ARIC Chair

Community Support Grant Program

February 2024 Applications

Recommended for Funding

Organisation Name	Project Summary	Recommendation
The Skill Engineer Limited	Youth Week SoundSoul Generator	Recommended for funding. Amount recommended: $5,000.00. Community benefit is demonstrated, and all required information provided.
The Rotary Club of Kariong Somersby	Rotary Walking For Wellness Family Fun Day	Recommended for funding. Amount recommended: $3,055.00. Community benefit is demonstrated, and all required information provided. Recommendation is conditional on all relevant event and signage location approvals being provided prior to the release of funds.
North Entrance Surf Life Saving Club	Installation of retractable awning at North Entrance Surf Life Saving Club	Recommended for funding. Amount recommended: $5,000.00. Community benefit is demonstrated, and all required information is provided.
Bateau Bay Public School P & C Association	Children's sensory garden	Recommended for funding. Amount recommended: $3,520.00. Community benefit is demonstrated, and all required information is provided.
Rotary Club of Terrigal Incorporated	Model United Nations Assembly (MUNA)	Recommended for funding. Amount recommended: $660.00. Community benefit is demonstrated, and all required information is provided.
Tai Chi Association Of Australia	TCAA National Open Tai Chi Championship	Recommended for part funding. Amount recommended: $1,650.00 being for Councils facility hire fees as travel and accommodation costs are ineligible as per clause 7.15 of the Community Support Grant Program Guidelines. 7.15 Applications seeking funds for benefits such as travel, meal or accommodation costs including costs to undertake activity outside or to the Local Government Area.

Community Support Grant Program

February 2024 Applications

Organisation Name		
Environment Network Inc Chittaway Point Community Action Team	Response Plan Area Map	Amount recommended: $4,500.00. Community benefit is demonstrated, and all required information provided.
The Bays Community Group Incorporated	Rates Subsidy	Recommended for funding. Amount recommended: $1,045.95 being 50% of the ordinary rates component. Community benefit is demonstrated, and all required information is provided.
Woy Woy Peninsula Community Garden	Horticulture supplies & specialised equipment - WWPCG	Recommended for part funding as per part funding budget in original application. Amount recommended: $3,740.00. Community benefit is demonstrated, and all required information is provided. Any future applications for funding for this project will be required to demonstrate ongoing sustainability.
Central Coast Lapidary Club Incorporated	Repainting exterior of Club rooms	Recommended for funding. Amount recommended: $5,000.00. Community benefit is demonstrated, and all required information provided.
Gosford And District Tennis Association Incorporated	Pickleball Court Painting	Recommended for funding. Amount recommended: $5,000.00. Community benefit is demonstrated, and all required information provided.
	TOTAL	**$38,170.95**

Community Support Grant Program

February 2024 Applications

Not Recommended for Funding

Organisation Name	Project Summary	Recommendation
The Cancer Council NSW	Mingara Relay For Life Event	Amount recommended: $0.00. Not recommended for funding as the application is ineligible as per clause 7.19 of the Community Support Grant Program Guidelines. 7.19 - General fundraising events/appeals.
Toukley Neighbourhood Centre Incorporated	Volunteer Uniforms	Amount recommended: $0.00. Not recommended for funding as application is ineligible as per clause 7.10 of the Community Support Program Guidelines. 7.10 - Proposals that are for funding the core business of the organisation.

	Division:	**Date From:**
	Committee: Council Meeting	**Date To:**
	Officer:	
Action Sheets Report		**Printed:** **Tuesday, 16 April 2024 1:43:15 PM**

Meeting and Date	Directorate for action	Record Number	Title	Action Assigned to	Manager	Completion Target Date	Completion Date
Council Meeting 9/09/2019	Environment and Planning	D13644035	**Winney Bay**	Melican, Larry	Howe, Alice	31/03/25	

Moved: ***Councillor Sundstrom***
Seconded: ***Councillor MacGregor***

Resolved

853/19 *That Council request that subject to the public consultation report being favourable to the construction of Winney Bay Cliff Top Walk – Stage 2 and a clear preference for either "Plan A" or "Plan B", and no irresolvable issue are identified that the Chief Executive Officer formally accept the funding offer, instruct staff to finalise the funding agreement and progress the development of the project in accordance with identified changes.*

854/19 *That Council note the diversity of community opinion on the scope of Winney Bay Cliff Top Walk – Stage 2.*

855/19 *That Council request the Chief Executive Officer provide plans and costings for Winney Bay Cliff Top Walk – Stage 2 in line the Council resolution of 10 December 2018, with this be known as "Plan A". That a concept of "Plan C" be included in any consultation which would comprise an upgrade of the informal track, fencing in locations where there is a safety risk, weed removal and rehabilitation and an upgrade of Captain Cook Lookout.*

856/19 *That Council note the Infrastructure NSW letter (see attachment) dated 28 August 2019.*

857/19 *That with consideration of Infrastructure NSW endorsing a number of the changes requested by Council, that Council request the Chief Executive Officer to instruct staff to produce plans and costings for a revised design including the bridge spanning the chasm, and the north facing lookout, but retaining Council's other previously adopted design changes. These plans to be known as "Plan B"*

858/19 *That both Plans A and B provide for the provision of walking tracks that are in the style of those in Bouddi National Park, Wyrrabalong National Park and Kincumba Mountain Regional Reserve.*

859/19 *That Council commit to the remediation of the native vegetation in Winney Bay Reserve.*

860/19 *That Council exhibit the revised designs for "Plan A" and "Plan B" for community consultation.*

861/19 ***That Council request the result of the community consultation be brought back to Council prior to construction commencing on Winney Bay Cliff Top Walk – Stage 2.***

04 Apr 2024
Resolution 853/19 to 860/19 have been actioned and closed. Resolution 861/19 is in progress – a further report is being prepared by the Council staff and will be scheduled for consideration by the newly elected Councillors (governing body) for decision. This report is expected to be presented to the newly elected Council within the first 12 months of their term.

Meeting and Date	Directorate for action	Record Number	Title	Action Assigned to	Manager	Completion Target Date	Completion Date
Council Meeting 3/02/2021	Environment and Planning	D14459223	**Request to Prepare a Planning Proposal for Jilliby Stage 2 Rural-Residential Area**	Turkington, Shannon	Howe, Alice	31/03/25	

Moved: Mr Persson AM

17/21 Resolved

1 That Council receive and note the report on Cost of Emergency Works at Wamberal Beach and The Entrance North Beach.

2 That Council acknowledge the recent commitment from the NSW State Government to partially reimburse Council to the value of $992,501 for emergency works that were undertaken at Wamberal at the direction of the Local Emergency Operations Controller.

3 That the Administrator write to the NSW Premier seeking reimbursement of the total cost of works undertaken at the direction of the Local Emergency Operations Controller at an estimated total cost of $2,886,640.

4 That should a full reimbursement not be provided, that the money spent by Council in undertaking the works be acknowledged as a credit in any funding model developed for a long-term solution at each respective location.

Moved: Mr Persson AM

18/21 Resolved

Division: **Date From:**
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1 That Council prepare a Planning Proposal to amend the Wyong Local Environmental Plan 2013 (WLEP 2013), or draft Central Coast Council Local Environmental Plan (if in effect), by the rezoning of the subject lands as follows:

- *Lot 2 DP 246727, 40 Sandra Street - Proposed E4 Environmental Living;*
- *Lot 3 DP 246727, 50 Sandra Street - Proposed E4 Environmental Living;*
- *Lot 4 DP 246727, 60 Sandra Street – Proposed E3 Environmental Management;*
- *Lot 11 DP 613648, 70 Sandra Street – Proposed E3 Environmental Management;*
- *Lot 10 DP 613648, 80 Sandra Street - Proposed E4 Environmental Living; and*
- *Lot 11 DP 258965, 11 Cottesloe Road - Proposed E4 Environmental Living.*

2 That Council forward the Planning Proposal to the Minister requesting a Gateway Determination.

3 That Council request delegation for Council to finalise and make the draft Local Environmental Plan.

4 That Council authorise the Chief Executive Officer (or delegate) to enter into a Planning Agreement (PA), and to negotiate and execute all documentation in relation to the finalisation of the PA (if required).

5 That if required Council prepare and exhibit an amendment to the relevant Section 7.11 Development Contributions Plan and Development Control Plan to support the development of the land subject to this planning proposal.

6 That Council undertake public authority and community consultation in accordance with the Gateway Determination requirements, including the concurrent exhibition of the draft Voluntary Planning Agreement, draft Development Control Plan amendment and the draft Section 7.11 Development Contributions Plan amendment (if required).

03 Apr 2024
The Planning Proposal for land at Jilliby was prepared and submitted to the, then, Department of Planning and Environment as per Items 1 and 2 of Resolution 18/21. The Department referred the Planning Proposal back to Council for several environmental issues to be addressed. The applicant is currently finalising these issues so that the Planning Proposal can be submitted to the Department for a Gateway Determination. Items 3, 4, 5 and 6 of the Resolution will be addressed as part of the remaining Planning Proposal process., Resolution 1 is complete., Resolution 2 is complete. , Resolution 3-6 will be addressed as part of the remaining Planning Proposal process

Meeting and Date	Directorate for action	Record Number	Title	Action Assigned to	Manager	Completion Target Date	Completion Date
Council Meeting 27/04/2021	Environment and Planning	D14601934	**Request to Prepare a Planning Proposal for Central Coast Local Environmental Plan Deferred Matters Lands**	Turkington, Shannon	Howe, Alice	31/12/24	

Moved: Mr Dick Persson AM

139/21 Resolved

1 That Council prepare a planning proposal for the integration of Deferred Matters land under Central Coast Local Environmental Plan into Central Coast Local Environmental Plan.

2 That Council submit the Planning Proposal to the Minister for Planning and Public Places, in accordance with Section 3.35(2) of the Environmental Planning and Assessment Act 1979, requesting a Gateway Determination, pursuant to Section 3.34 of the Environmental Planning and Assessment Act 1979.

3 That Council request delegation for Council to finalise and make the draft Local Environmental Plan, pursuant to Section 3.36 of the Environmental Planning and Assessment Act 1979.

4 That Council prepare appropriate Development Control Plan provisions to support the rezoning of the land subject to this Planning Proposal.

5 That Council undertakes community and public authority consultation in accordance with the Gateway Determination requirements.

6 That Council, following public authority and community consultation as required under the Gateway Determination, consider a report on the outcome of this process.

03 Apr 2024
Council has prepared a Planning Proposal for the Deferred Matters Lands. A Gateway Determination has been received from the Department of Planning, Housing & Infrastructure to proceed with the Planning Proposal. The proposal was placed on public exhibition from 11 October – 15 November 2023; Council is currently finalising the Planning Proposal based on community and agency feedback received., Resolution 1: Complete, Resolution 2: Complete, Resolution 3: Complete, Resolution 4: Complete, Resolution 5: Complete, Resolution 6: In progress.

Meeting and Date	Directorate for action	Record Number	Title	Action Assigned to	Manager	Completion Target Date	Completion Date
Council Meeting 14/12/2021	Environment and Planning	D14978697	**Mountain Bike Feasibility Study Consultation Report**	Melican, Larry	Howe, Alice	30/06/25	

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Moved: Rik Hart

301/21 Resolved

1 That Council endorse the report on community consultation undertaken for the Mountain Bike Feasibility Study Discussion Paper.

2 That Council endorse the development of a Central Coast Mountain Biking Plan, led by Council staff in collaboration with an active stakeholder working group, to establish a strategic framework and select suitable sites, and that the project be considered for funding through Council's budgetary processes, which may include applying for external funding from grants, developer contributions or cost or service reductions.

3 That Council recognises the risk of harm to the environment, heritage, and public safety from unauthorised trail construction on Council land and that education, enforcement and trail closures will be an ongoing responsibility of Council in order to manage risks. However improved outcomes for reserve management will be reliant on a proactive approach to increase supply at suitable sites due to limited enforcement resources and the size of the region.

4 That Council staff investigate the feasibility of, and issues with, constructing dirt jumps on suitable Council land and provide a report back to Council.

5 That Council staff notify those people who lodged submissions and relevant stakeholders of Council's resolution.

04 Apr 2024
The Council resolution requires an establishment of a stakeholder group to work with Council staff in the development of a Central Coast Mountain Biking Plan. The appropriate skillset for developing the Mountain Biking Plan is consistent with a Recreation Planner or similar. The project scope is being further developed with a view to engaging personnel from agency or other sources. The next update will be provided by July 2024.

Meeting and Date	Directorate for action	Record Number	Title	Action Assigned to	Manager	Completion Target Date	Completion Date
Council Meeting 22/02/2022	Water and Sewer	D15048107	**Water and Sewer Business Review**	Loader, Jamie	Loader, Jamie	30/06/24	

Moved: Rik Hart

30/22 Resolved

1 That Council note the recommendation from the Audit Office of NSW's Report on Local Government 2020, specifically that:
The OLG should clarify the legal framework relating to restrictions of water, sewerage and drainage funds (restricted reserves) by either seeking an amendment to the relevant legislation or by issuing a policy instrument to remove ambiguity from the current framework.

2 That Council note the report "Structural Review of the Water and Sewer Business" which outlines three options for the future Central Coast water and sewer business model.

3 That Council note IPART's Draft Report on the Review of Domestic Waste Management Charges.

4 That Council authorise the Chief Executive Officer to investigate options in both reports as well as any other options that they may identify as part of this analysis.

10 Apr 2024
Discussions have been held with relevant Ministers as well as senior staff in the Office of Local Government and Department of Climate Change, Environment, Energy and Water. Council is currently waiting on further information from the Government. A decision on this matter is expected to be made by the Government in the next three months with a further report to Council at this time.

Meeting and Date	Directorate for action	Record Number	Title	Action Assigned to	Manager	Completion Target Date	Completion Date
Council Meeting 26/04/2022	Environment and Planning	D15135394	**Potential Transfer of COSS Land to National Parks and Wildlife Service**	Melican, Larry	Howe, Alice	31/12/24	

Moved: Rik Hart

69/22 Resolved

1 That Council officers continue to work with the NSW National Parks and Wildlife Service (NPWS) to progress the assessment of the Council land listed in Attachment 1 for potential inclusion in the local national parks system.

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2 That Council authorise the Chief Executive Officer to write to the Director of the Conservation Branch of the NPWS to advise that Council land assessed as being suitable for inclusion in the national parks system will be transferred for no monetary consideration subject to a further report on the outcomes of the assessment process being considered by Council.

3 That Council authorise the Chief Executive Officer to write to the Director of the Conservation Branch of the NPWS to advise of Council's position that:

i. legal costs associated with the potential transfer be covered by each party.
ii. any costs associated with any subdivision or boundary realignments required would be equitably shared between the two parties.

4 That a report be brought back to Council identifying the Council-owned land parcels that are assessed as being suitable for potential transfer to the NPWS for inclusion in the local national park system.

5 That Council's Coastal Open Space System Committee provide formal advice on the proposal prior to it being brought back to Council.

04 Apr 2024
National Parks and Wildlife Service (NPWS) has requested advice on encroachments, boundary surveys and weed densities on some of the properties identified for potential transfer. Surveys are being undertaken to determine boundaries and potential encroachments of land, and weeds surveys have been undertaken on the identified parcels. Completion of these processes is required before going back to NPWS. The next update will be provided by July 2024.

Meeting and Date	Directorate for action	Record Number	Title	Action Assigned to	Manager	Completion Target Date	Completion Date
Council Meeting 22/11/2022	Environment and Planning	D15437342	**Davistown Wetlands Acquisition Fund**	Melican, Larry	Howe, Alice	31/12/24	

208/22 Resolved

1 That Council note the resolution of 13 April 2021 that Council discontinue any negotiations to purchase by agreement the land known as the Davistown Wetlands.

2 The Council note the balance of the internally restricted funds held in the Davistown Wetlands Acquisition Fund was $1,436,039 as of 21 October 2022.

3 That Council instruct staff to develop a draft policy, in consultation with the Davistown Progress Association, Coastal Open Space System Committee and the Catchment to Coast Committee, for a Central Coast Conservation Fund in accordance with Action 2.2.1 of the Central Coast Council Biodiversity Strategy adopted by Council on 28 September 2020 and that the draft policy be placed on public exhibition for not less than 28 days.

4 That following the exhibition period a report be brought back to Council on the outcomes of the community consultation, which is to include recommendations in relation to the draft Central Coast Council Conservation Fund Policy and the formal adoption of the Central Coast Conservation Fund.

5 That subject to the adoption of the Central Coast Conservation Fund, given that Council no longer seeks to acquire Davistown Wetlands, consideration be given by Council to derestricting the Davistown Wetlands Acquisition Fund and reallocating the balance of that fund along with other appropriate environmentally related funds, such as those generated from Council's participation in the NSW Government's Biodiversity Offsets Scheme, to the Central Coast Conservation Fund.

6 That expenditure of Davistown Wetlands Acquisition Fund on environmental management activities within Davistown be considered in the design of the Central Coast Conservation Fund Policy.

04 Apr 2024
A subsequent report that went to Council on 31 October 2023 has resulted in resolutions 3, 4 and 6 been actioned. Advice is to be sought from Finance on resolution 5 in terms of derestricting the funds and reallocating them to the newly formed Conservation Fund. The next update will be provided by July 2024.

Meeting and Date	Directorate for action	Record Number	Title	Action Assigned to	Manager	Completion Target Date	Completion Date
Council Meeting 22/11/2022	Environment and Planning	D15437342	**Biodiversity Stewardship Agreements in Blue Haven and Tumbi Umbi**	Melican, Larry	Howe, Alice	31/12/24	

207/22 Resolved

1 That Council authorise the Chief Executive Officer to enter into proposed Biodiversity Stewardship Agreements with the NSW Biodiversity Conservation Trust over the lots detailed in Appendix 1 that make up the Blue Haven Wetland Reserve and the Tumbi Umbi Wetland.

2 That Council authorise the Chief Executive Officer to negotiate and proceed with the sale of biodiversity credits that are generated by the two Biodiversity Stewardship Agreements.

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3 That Council note that the sale of biodiversity credits will fund the ongoing management of the land that they apply to for conservation purposes, and that this land will remain in Council ownership.

4 That a report be prepared for Council following the sale of any biodiversity credits associated with either of these Biodiversity Stewardship Agreements.

04 Apr 2024
All resolutions except for resolution number 4 have been actioned. The process for selling the Biodiversity credits is underway with the potential sale of 30 credits. Resolution 4 cannot be completed until the sale of credits is finalised. The next update will be provided by July 2024.

Meeting and Date	Directorate for action	Record Number	Title	Action Assigned to	Manager	Completion Target Date	Completion Date
Council Meeting 28/02/2023	Environment and Planning	D15566170	**Outcomes of Affordable Housing Agreement with Pacific Link Housing Limited**	Barrett, Chris	Howe, Alice	30/06/24	

33/23 **Resolved**

1 That Council authorise the transfer of land owned at 23-25 Ashton Avenue, The Entrance to Pacific Link Housing Limited for one dollar ($1.00)

2 That the transfer of the land be conditional on timely performance by Pacific Link Housing Limited of its obligations under the agreement, with provision for the land to revert to Council ownership at a price of one dollar ($1.00) in the event that substantial completion of project works has not occurred within 3 years.

3 *That the Chief Executive Officer be authorised to execute all documents pertaining to the transfer of the Land to Pacific Link Housing Limited.*

16 Feb 2024
Target date from 29 March 2024 to 30 June 2024 - Contract negotiations with Pacific Link, including clarification of access arrangements for neighbouring properties and geotechnical investigations, are underway.

Meeting and Date	Directorate for action	Record Number	Title	Action Assigned to	Manager	Completion Target Date	Completion Date
Council Meeting 28/02/2023	Environment and Planning	D15566170	**Street Design Manual & Technical Specifications**	Turkington, Shannon	Howe, Alice	28/06/24	

36/23 **Resolved**

That Council:

1 Publicly exhibit the draft Central Coast Street Manual and draft Landscape Works Specification for not less than 28 days.

2 Consider a further report following conclusion of the public exhibition period.

03 Apr 2024
The Draft Central Coast Steet Design Manual (now Guideline) and Landscape Works Specification were publicly exhibited between 15 March and 26 April 2023. Following both internal and external consultation, Council has made amendments to and is now finalising the Guideline and Specifications for reporting to Council. It is expected these documents will be reported to Council at the Ordinary Council Meeting scheduled for 28 May 2024., Resolution 1 is complete. Resolution 2 in progress with report anticipated to be considered at Council meeting scheduled for 28 May 2024.

Meeting and Date	Directorate for action	Record Number	Title	Action Assigned to	Manager	Completion Target Date	Completion Date
Council Meeting 22/08/2023	Environment and Planning	D15821256	**Bulk reclassification of land - Operational-to-Community and Community-to-Operational**	Barrett, Chris	Howe, Alice	31/07/24	

137/23 Resolved

That Council:

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1 *Commence the reclassification of 80 lots of operational land located in 12 suburbs to community land in accordance with Section 34 of the Local Government Act 1993. The street addresses and legal descriptors of the 80 lots of land proposed for reclassification are listed in Attachment 1and involve:*

a. *four sites with improvements (five lots in all) at Glenning Valley (part of Berkley Sports Complex), Kanwal (Lakelands Community Centre), Wamberal (Wamberal Memorial Hall) and Yarramalong (St Barnabas Church); and*
b. *nine park and natural area sites (some of which are groups of sites, comprising 75 lots in all) at Buff Point, Davistown, Hamlyn Terrace, Jilliby, Lisarow, Noraville, Springfield and Watanobbi.*

2 *Publicly exhibit the proposed reclassification of these 80 lots of land from operational to community for not less than 28 days.*

3 *Note that once reclassified as community land, these sites will be subject to further community engagement through a future categorisation process and included in a revised Council Community Land Plan of Management.*

4 Revoke Council resolutions 202/21/1, 202/21/6 and 202/21/7 of 27 July 2021 to reclassify and/or sell the following three sites of community land:
a. Land at 4 and 6 Tyrrell Place KILLARNEY VALE (Lot 479 DP 704452 and Lot 478 DP 704452);
b. Land at 8 and 10 Bay Village Road BATEAU BAY (Lot 51 DP 1154778 and Lot 2 DP 1154356); and
c. Land at 10W Woodcutters Road WOONGARAH (Lot 32 DP 1044070).

5 Commence the reclassification of the following four lots from community land to operational land in accordance with Section 34 of the Local Government Act 1993 (Attachment 2):
a. Land facing Henry Parry Drive that provides access to the former Council Chambers at 49-51 Mann St GOSFORD, being Lot 1 in DP 251476;
b. Land abutting Kanangra Drive to the east known as 50W Parraweena Drive GWANDALAN, being Lot 1 in DP 1043151;
c. Land being part of 6W Kemira Road LAKE MUNMORAH; being part of Lot 79 in DP 217918; and
d. Land at 20 Summerland Road SUMMERLAND POINT known as Summerland Sporties, and currently leased to Doyalson-Wyee RSL Club, being part of Lot 4 in DP 263812.

6 Progress the subdivision of land to facilitate reclassification of part of 6W Kemira Road LAKE MUNMORAH and part of 20 Summerland Road SUMMERLAND POINT.

7 Note Council's intention to progress resolutions 52/21 of 22 March 2022 and 202/21/8-13 of 27 July 2021 to reclassify the following seven sites from community to operational land:
a. 18 Dane Street, GOSFORD, being Lot 2 DP 1011876;
b. 48W Wallarah Road, GOROKAN, being Lot 2 DP 733448;
c. 191 Wallarah Road, KANWAL, being Lot 21 DP 813270;
d. 75 Bungary Road, NORAH HEAD, being Lot 5 Sec 24 DP 758779 and Lot 1 DP 860696;
e. Part 2-4 Park Road, THE ENTRANCE, being Lot 10 DP 1285833 (part only) and Lot 1 DP 406038 (part only);
f. 13 and 15 Yaralla Road, TOUKLEY, being Lot 78 DP 20493 and Lot 79 DP 20493; and
g. *Car park and curtilage, Austin Butler Access, WOY WOY, being Lot 9 DP 235385 (part only).*

8 *As part of the consultation process to reclassify land described in parts 5 and 7, seek community feedback on the following options with respect to Austin Butler Access, WOY WOY (Lot 9 DP 235385 [part only]):*
a. *Retain the site in Council ownership, or*
b. *Proceed with the sale and allocate all proceeds from that sale via the 10-year Long Term Financial Plan to the greening of the local community, for example, via an extensive street tree planting program.*

16 Feb 2024
Target date changed by Gibson, Rachel from 05 September 2023 to 31 July 2024 - Resolutions 1-3 have been completed. Awaiting a Gateway Determination by the Department of Planning, Housing and Infrastructure in relation to Resolutions 4-7. Resolution 7g was rescinded by Council on 26 September 2023 and Resolution 8 was rescinded by Council on 28 November 2023.

Meeting and Date	Directorate for action	Record Number	Title	Action Assigned to	Manager	Completion Target Date	Completion Date
Council Meeting 26/09/2023	Community and Recreation Services	D15870482	**Adoption of Kibble Park Place Plan and Kibble Park Concept Plan**	Cannard, Glenn		25/01/24	

159/23 **Resolved**

1 That Council adopt the Kibble Park Place Plan (Attachment 1) and Kibble Park Concept Plan.(Attachment 2).

2 That Council prepare documentation and obtain relevant approvals to demolish the existing Gosford Library in March 2025 post the opening of the Gosford Regional Library, to expand the public open space in the Gosford CBD.

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04 Apr 2024
Council is currently finalising plans to undertake a suite of capital works projects over the next five years to implement the changes identified through the adopted Kibble Park Concept Plan. It is anticipated the first stage will commence later in 2024. Council is currently finalising all relevant documentation and approvals to meet the adopted timeframe for demolition of the old Gosford Library.

Meeting and Date	Directorate for action	Record Number	Title	Action Assigned to	Manager	Completion Target Date	Completion Date
Council Meeting 26/09/2023	Environment and Planning	D15870482	**RZ/3/2023 - Request to Prepare Planning Proposal - Reclassification of Council Land**	Hardaker, Rachelle	Howe, Alice	31/07/24	

157/23 **Resolved**

That Council:

1 ***Notes advice provided by the Local Planning Panel and confirms that no rezoning is proposed as part of the Planning Proposal to reclassify Council land identified in Attachment 1.***

2 ***Requests a Gateway Determination from the Minister for Planning and Public Spaces in accordance with Section 3.34 of the Environmental Planning and Assessment Act 1979, in relation to the Planning Proposal in Attachment 1, with the exception of Austin Butler Access, WOY WOY (Lot 9 DP 235385 [part only]).***

3 ***Undertakes community and public authority consultation in accordance with the Gateway Determination requirements.***

4 ***Receives a report to further consider the Planning Proposal following public consultation.***

5 ***Notes Part 1 of resolved Administrator's Minute being:***

Remove Austin Butler Access, WOY WOY (Lot 9 DP 235385 [part only]) from the current bulk reclassification of land process.

10 Apr 2024
Council received a Gateway Determination in relation to the Draft Planning Proposal on the 15th of November 2023. In accordance with the Gateway Determination, Council publicly exhibited the Draft Planning Proposal from 20 February 2024 to 18 March 2024. Two public hearings will be held in May 2024. Outcomes of the exhibition and public hearings will be reported to Council detailing any amendments or further investigations required to address the concerns of the community, and whether the proposal should or should not proceed.

Meeting and Date	Directorate for action	Record Number	Title	Action Assigned to	Manager	Completion Target Date	Completion Date
Council Meeting 31/10/2023	Environment and Planning	D15926192	**Partial Road Closure to Facilitate Realignment of Road Reserve – Little Jilliby Road, Little Jilliby**	Barclay, Jamie	Howe, Alice	31/12/24	

Recommendation

That Council:

1 ***In accordance with the provisions of Part 4 of Division 3 of the Roads Act 1993, authorises the commencement of the process to close part of the road reserve in the vicinity of 227 Little Jilliby Road, Little Jilliby to enable the adjustment of the road reserve boundaries. The intention of the partial road closure is to ensure the existing road formation can be fully contained within the realigned road reserve.***

2 ***Gives notice of the road closure proposal as set out in Section 32B of the Roads Act 1993 and Clause 81 of the Roads Regulation 2018.***

3 ***Commences a public notification period of not less than 28 days.***

4 ***Receives a further report to consider submissions received during the period of the public notification.***

5 ***Resolves that, if the partial road closure is confirmed at a future meeting of Council,***

a) the closed road reserve shall be classified as operational land, and

b) the closed road reserve shall be offered to the adjoining owner at 227 Little Jilliby Road, Little Jilliby in lieu of payment for the acquisition of part of that property as previously determined.

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11 Apr 2024
A report on the outcome of the public consultation process for the proposed simultaneous road widening and closure is due to be presented to the May meeting of Council, following which the land transfer processes can be completed.

Meeting and Date	Directorate for action	Record Number	Title	Action Assigned to	Manager	Completion Target Date	Completion Date
Council Meeting 31/10/2023	Environment and Planning	D15926192	**Acquisition of Land for a Public Purpose - 235 Scenic Drive, Colongra**	Barclay, Jamie	Howe, Alice	04/12/24	

Recommendation

That Council:

1. ***Authorise the acquisition of all or part of 235 Scenic Drive Colongra 2259 (being Lot 500 and Lot 501 in DP 755266) for public recreation purposes, including the provision of community sporting fields and other recreation improvements.***

2. ***Authorise the Chief Executive Officer to commence the process for compulsory acquisition of all or part of 235 Scenic Drive Colongra 2259 (being Lot 500 and Lot 501 in DP 755266) for a public purpose in accordance with the provisions of the Land Acquisition (Just Terms Compensation) Act 1991, noting that a period of statutory negotiation is required prior to commencement of compulsory acquisition.***

3. ***Authorise the Chief Executive Officer to negotiate, finalise and execute a contract for the purchase of all or part of 235 Scenic Drive Colongra 2259 (being Lot 500 and Lot 501 in DP 755266) in accordance with the considerations set out in the body of this report and taking account of the further guidance on commercial matters relating to acquisition in Attachment 1.***

4. ***Resolve, in accordance with provisions of Section 11(3)) of the Local Government Act 1993, that Attachment 1 remain confidential in accordance with Section 10A(2)(d) of the Local Government Act 1993 as it contains commercial information of a confidential nature that would if disclosed prejudice the commercial position of the person who supplied it or confer a commercial advantage on a competitor of Council.***

5. ***Upon acquisition, classify the land at 235 Scenic Drive Colongra 2259 (being Lot 500 and Lot 501 in DP 755266) as Operational Land in accordance with Section 31 of the Local Government Act 1993.***

11 Apr 2024
A market valuation for the purposes of compulsory acquisition has been completed and forwarded to the site owner (Generator Property Management P/L). Depending on GPM's response, the acquisition may be completed by 30 June 2024.

Meeting and Date	Directorate for action	Record Number	Title	Action Assigned to	Manager	Completion Target Date	Completion Date
Council Meeting 31/10/2023	Infrastructure Services	D15926192	**Acquisition of Land at 71 and 93 Brieses Road, Peats Ridge**	Bolgoff, Boris	Bolgoff, Boris	30/04/24	

Recommendation

1 That Council resolve to acquire the following land for the purpose of road reserve to accommodate the existing formed road. Part of Lot 3, DP703490 at 71 Brieses Road, Peats Ridge that will form lot 1 of proposed DP 1294433 as shown on the diagram in the plan in Attachment 1.

2 That Council resolve to acquire the following land for the purpose of road reserve to accommodate the existing formed road. Part of Lot 2 DP574179 at 93 Brieses Road, Peats Ridge shown that will form lot 2 of proposed DP 1294433 as on the diagram in the plan in Attachment 1.

3 That the purchase price be negotiated after taking into account the current market value as determined by an independent registered valuer.

4 That Council authorise the Chief Executive Officer to execute all necessary documentation relevant to the acquisition of the land.

5 That in the event that negotiations for the acquisition of all or some of the portions comprising the Land with the relevant property owner or owners cannot be satisfactorily resolved within 9 months, Council resolve to make an application to the Minister for Local Government and the Governor for approval to acquire all or some of the portions comprising the Land by way of compulsory process for the purpose of road, pursuant to the Land Acquisition (Just Terms Compensation) Act 1991, and Section 177 of the Roads Act 1993

6 That Council resolve, pursuant to section 11(3) of the Local Government Act 1993, that Attachments 2 and 3 remain confidential in accordance with section 10A(2)(d)(iii) of the Local Government Act as it contains commercial information of a confidential nature that would, if disclosed, prejudice the commercial position of the person who supplied it and because consideration of the attachments in open Council would on balance be contrary to the public interest as it would affect Council's ability to obtain value for money for the Central Coast community.

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71 Brieses Road Peats Ridge - Council has undertaken valuations of the land and a letter of offer has been sent to the property owners' legal representatives. The property owners' legal representatives requesting Council valuations to be shared. Council staff have advised that Council's 2 valuations are for internal use only at this point of the process. Council staff have requested a conversation with the property owners' legal representatives is undertaken to negotiate a pathway forward. . 93 Brieses Road Peats Ridge - Council has undertaken valuations of the land and a letter of offer has been sent to the property owners' legal representatives. Currently awaiting response from property owners and/or their legal representatives regarding their acceptance of the valuation to allow the acquisition to be undertaken.

Meeting and Date	Directorate for action	Record Number	Title	Action Assigned to	Manager	Completion Target Date	Completion Date
Council Meeting 28/11/2023	Environment and Planning	D15970976	**For Public Exhibition - Central Coast Thematic History**	Turkington, Shannon	Howe, Alice	30/09/24	

Resolved

That Council:

1 Endorses the draft Central Coast Thematic History (Attachment 1) for public exhibition for not less than 28 days.

2 Following exhibition, receive a report on submissions for consideration along with a recommendation on the finalisation of the Central Coast Thematic History.

03 Apr 2024
Target date changed from 31 May 2024 to 30 September 2024 -The submissions received in response to public consultation were detailed and complex. Council is currently undertaking a review of the submissions and liaising with the consultant regarding appropriate amendments to the document that best reflect the content of these submissions. It is expected that the consultant will have amended the document mid year, and once received the final Central Coast Thematic History will be reported to Council for adoption in the first quarter of the 24/25 financial year. Resolution 1 is complete. Resolution 2 is being prepared in consultation with the Heritage Consultants.

Meeting and Date	Directorate for action	Record Number	Title	Action Assigned to	Manager	Completion Target Date	Completion Date
Council Meeting 28/11/2023	Environment and Planning	D15970976	**For Public Exhibition - Central Coast Draft Night-Time Economy Discussion Paper**	Barclay, Jamie	Howe, Alice	30/06/24	

Resolved

That Council:

1 Endorses the draft Central Coast Night-Time Economy Discussion Paper (Attachment 1) for public exhibition for not less than 28 days.

2 Following exhibition, receive a report on submissions for consideration along with a recommendation on the finalisation of the Central Coast Night-Time Economy Discussion Paper.

09 Apr 2024
Council undertook community consultation on the Draft NTE Discussion Paper Discussion Paper between 28 November 2023 and 12 February 2024. Council Report going to April meeting for Council to consider the outcomes of the community consultation and to present to Council the final Central Coast Night-Time Economy Discussion Paper for adoption

Meeting and Date	Directorate for action	Record Number	Title	Action Assigned to	Manager	Completion Target Date	Completion Date
Council Meeting 28/11/2023	Environment and Planning	D15970976	**For Public Exhibition - Draft Central Coast Local Approvals Policy**	Turkington, Shannon	Howe, Alice	31/10/24	

Resolved

That Council:

1 Endorses public exhibition of the Draft Central Coast Draft Local Approvals Policy (Attachment 1) for a period of not less than 42 days in accordance with Section 160 of the Local Government Act 1993.

2 Following public exhibition:
a. Obtain the consent of the Chief Executive Officer of NSW Office of Local Government for Part 1 of the Local Approvals Policy prior to adoption.
b. Seek delegation to Council's Chief Executive Officer from the Chief Executive Officer of NSW Office of Local Government for any updates to the policy to respond to legislative changes.

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3 Subject to obtaining the consent of the Chief Executive Officer of NSW Office of Local Government for Part 1 of the Local Approvals Policy, receive a further report:
a. on the outcomes of the public exhibition, and
b. seeking approval to adopt the policy.

03 Apr 2024
Target date changed from 30 June 2024 to 31 October 2024 - The Draft Central Coast Local Approvals Policy was placed on exhibition between 14 December 23 and 27 March 24. All submissions received will now be reviewed and any required changes will be made to the policy in response to those submissions. Once the policy has been reviewed and amended (if relevant) following the review of submissions, consent and delegations will be sought from LGNSW. Once LGNSW consent is provided, a further report will be submitted to Council. , Resolution 1 is complete. Resolution 2 will occur once all submissions have been reviewed and any required amendments made to the Policy. Resolution 3 will only occur once LGNSW approval has been obtained (resolution 2).

Meeting and Date	Directorate for action	Record Number	Title	Action Assigned to	Manager	Completion Target Date	Completion Date
Council Meeting 28/11/2023	Environment and Planning	D15970976	**For Public Exhibition - Draft Central Coast Outdoor Trading Specification**	Turkington, Shannon	Howe, Alice	31/10/24	

Resolved

That Council:

1 Endorses the Draft Outdoor Trading Specification (Attachment 1) for public exhibition concurrently with the draft Local Approvals Policy for not less than 42 days.

2 Receives a further report following public exhibition that considers submissions received and any changes made to the Specification to respond to matters raised in those submissions.
3 Notes that, should the Outdoor Trading Specification be adopted:
a. The following existing policies will be revoked:
i. Guidelines for Business Use of Public Footpath Policy A5.09.2010 (former Gosford Shire Council)
ii. Policy for Outdoor Eating Areas WSC020 (former Wyong Shire Council).
b. Transitional arrangements will be applied so that over time, all Outdoor Trading Areas, including those delivered by Council, are aligned with the Outdoor Trading Specification.

03 Apr 2024
Target date changed from 30 June 2024 to 31 October 2024 - The Draft Central Coast Outdoor Trading Specification was placed on exhibition between 14 December 23 and 27 March 24. All submissions received will now be reviewed and any required changes will be made to the specification in response to those submissions. Only if/when the Specification is adopted will the relevant policies be revoked, and the transitional arrangements take effect. Resolution 1 is complete. Resolution 2 will occur once all submissions have been reviewed and amendments made to the Specification. Resolution 3 will only occur if/when the Specification is adopted.

Meeting and Date	Directorate for action	Record Number	Title	Action Assigned to	Manager	Completion Target Date	Completion Date
Council Meeting 12/12/2023	Environment and Planning	D15991858	**For Public Exhibition - Central Coast Airport Masterplan**	Barclay, Jamie	Howe, Alice	30/06/24	

225/23 **Resolved**

That Council:

1. Endorses the Draft Central Coast Airport Masterplan (Attachment 1) for public exhibition for not less than 60 days, , with removal of reference to the Helicopter Landing Site in Section 1.

2. Seeks feedback on the proposed Porters Creek Wetland stewardship site.

3. Receives a further report in relation to the Airport Masterplan that considers community and aviation sector feedback.

11 Apr 2024
The draft Central Coast Airport Masterplan community consultation concluded on the 13 February 2024. The outcomes of community consultation will be presented at the April 2024 Council Meeting. An Aviation Sector Consultation is currently underway, both the commercial and community feedback will inform the final Central Coast Airport Masterplan which is currently being finalised for adoption in June 2024.

Meeting and Date	Directorate for action	Record Number	Title	Action Assigned to	Manager	Completion Target Date	Completion Date
Council Meeting 23/01/2024	Environment and Planning	D16032162	**Endorsement of Species Management Plans**	Turkington, Shannon	Howe, Alice	30/06/25	

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8/24 RESOLVED on the motion of RIK HART:

That Council:

1 Endorses the proposed Species Management Plan (SMP) process as a pathway to achieve improved ecological and development outcomes for key threatened species of the Central Coast.

2 Endorses the Scrub Turpentine and Broad-footed Myotis SMPs.

3 Endorses the requirement that all development, including Council's own activities including land management, to be assessed/undertaken in accordance with the SMPs.

4 Endorses making the SMP mapping publicly accessible.

5 Endorses, if the SMPs are adopted by Council, the CEO be delegated authority to make minor amendments to both documents if required in the future.

6 Endorses the preparation of a draft biodiversity chapter for inclusion in Council's Development Control Plan (DCP) following internal consultation and public exhibition.

03 Apr 2024
Resolutions 1-5 completed. Resolution 6 to be commenced 2024/2025 Financial Year.

Meeting and Date	Directorate for action	Record Number	Title	Action Assigned to	Manager	Completion Target Date	Completion Date
Council Meeting 27/02/2024	Environment and Planning	D16083520	**Minutes of the Protection of the Environment Trust Committee from 14 December 2023**	Melican, Larry	Howe, Alice	28/06/24	

RESOLVED on the motion of RIK HART:

That Council:

39/24 Note that the Protection of the Environment Trust Committee considered Grant Application POET 006 202223 titled "Landcare Green Teams on Private Land" submitted by the Community Environment Network (CEN) and deferred making a recommendation pending further advice being sought from the applicant.

40/24 Note that the Protection of the Environment Trust grant guidelines are to be reviewed in consultation with the Committee to provide greater clarity for grant applicants and to better guide the Committee's assessment of grant applications.

41/24 Release $22,719 from the Protection of the Environment Trust Fund to the University of Technology Sydney to undertake Project POET 009 202223 titled "Hanging on by their Teeth: The Distribution of Endangered Long-nosed Potoroo and Spotted-tailed Quoll in the Former Gosford Local Government area.

42/24 Release $30,427 from the Protection of the Environment Trust Fund to the Central Coast Marine Discovery Centre Inc. to undertake Project POET 010 202223 title "Bush Stone-curlew and Estuary Bird – Education and Citizen Science.

43/24 Require that as a condition of awarding POET grant funds that recipients must acknowledge the POET on any signage and/or advertisement relating to the funded project in order to promote the POET.

04 Apr 2024
The allocation of grant money requires a multi-step internal process given that the funds sit within the Protection of the Environment Trust. Currently the grant payment process for successful applicants is being worked through. The correspondence relating to resolution 39 requesting additional advice is currently being prepared. To be completed by end of financial year.

Meeting and Date	Directorate for action	Record Number	Title	Action Assigned to	Manager	Completion Target Date	Completion Date
Council Meeting 26/03/2024	Environment and Planning	D16123250	**Fire Safety Inspection Report - Strathavon Resort - 31 Boyce Avenue, Wyong**	Stuart, Antonia	Howe, Alice	09/04/24	

RESOLVED on the motion of RIK HART:

That Council:

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79/24 Notes the content of the Fire Safety Report from Fire and Rescue NSW (Attachment 1), in accordance with Section 17(2)(a) of Part 8 of Schedule 5 of the Environmental Planning and Assessment Act 1979.

80/24 Receives a further report in accordance with Section 17(2)(b) of Part 8 of Schedule 5 of the Environmental Planning and Assessment Act 1979, following staff review of Attachment 1.

04 Apr 2024
The requested review from Fire and Rescue NSW (Attachment 1) is underway.

Meeting and Date	Directorate for action	Record Number	Title	Action Assigned to	Manager	Completion Target Date	Completion Date
Council Meeting 26/03/2024	Community and Recreation Services	D16123250	**Destination Management Plan 2022-2025 Progress Report**	Gilmore, Bianca		31/05/24	

RESOLVED on the motion of RIK HART:

That Council:

82/24 Receives the 2023 Report and Attachment 1 on the Progress of Actions of the Central Coast Destination Management Plan 2022-2025.

83/24 Receives a further Report on the progress of the Destination Management Plan in twelve months.

09 Apr 2024
Progress of actions of the Central Coast Destination Management Plan 2022-2025 was received and noted at the Council Meeting on 26th March. A further progress report on the progress of the Destination Management Plan will be presented to Council in twelve months.

Meeting and Date	Directorate for action	Record Number	Title	Action Assigned to	Manager	Completion Target Date	Completion Date
Council Meeting 26/03/2024	Community and Recreation Services	D16123250	**Community Support Grant Program - January 2024**	McRobie, Belinda		28/06/24	

RESOLVED on the motion of RIK HART:

That Council:

84/24 Allocates $20,082.00 (inclusive of GST where applicable) from the 2023/24 grants budget to the Community Support Grant program, as outlined below and in Attachment 1.

a. Rotary Club of Erina Incorporated - CC Heat of Australian National Busking Championship - $4,791.00.
b. Rotary Club of Erina Incorporated - Youth Arts Exhibition 2024 - $400.00.
c. Tuggerah Rural Fire Brigade - Firefighting & Support Equipment - $4,891.00.
d. Curtain Bounce Incorporated - The Phantom of the Opera - $5,000.00.
e. Terrigal Surf Life Saving Club Incorporated - Terrigal Annual Ocean Swim 2024-$5,000.00.

85/24 Declines applications as outlined below, for the reasons indicated in Attachment 1, and the applicants be advised and where relevant, directed to alternate funding sources.

a. Green Point-Terrigal Community Services Incorporated - application is ineligible
b Kariong Progress Association – broader community benefit is not demonstrated.
c. Toukley Neighbourhood Centre Incorporated – application is ineligible.

04 Apr 2024
Staff are preparing the relevant documentation to be provided to the applicants following Council's resolution.

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Meeting and Date	Directorate for action	Record Number	Title	Action Assigned to	Manager	Completion Target Date	Completion Date
Council Meeting 26/03/2024	Environment and Planning	D16123250	**Outcomes of Public Exhibition and Finalisation of Planning Proposal and Planning Agreement, Narara Eco Village**	Turkington, Shannon	Howe, Alice	31/12/24	

RESOLVED on the motion of RIK HART:

That Council:

62/24 Endorses finalisation of the Planning Proposal for Narara Eco Village (RZ/115/2021).

63/24 Requests the Chief Executive Officer to exercise delegation issued by the Department of Planning and Environment for RZ/115/2021 or if required request the Minister for Planning and Public Spaces to proceed with the steps for drafting and making of the amendment to Central Coast Local Environmental Plan.

64/24 Endorses the amendments recommended by Council staff being:

a Include 'attached dwellings' as an additional permitted use in the R2 zone.
b Remove reference to 'commercial premises' as an additional permitted use in the R2 zone and replace with 'restaurants or cafes, take-away food and drink premises, shop, markets and business premises.'
c Update Schedule 5 of CCLEP 2022 to reflect updated descriptions and Lot and DP references of heritage items.
d Amend the exhibited site-specific DCP (Attachment C) to:
- ensure the definition of flood liable land is consistent with the Flood Risk Management Manual.
- clarify the flood controls apply to all flood liable land.
- insert additional heritage provisions to reflect the updated Conservation Management Plan.

65/24 Endorses the amendments to the exhibited Planning Agreement and associated documents as follows:

a Remove Lots 51, 52, 53, 54, 55, 56, 57. 58. 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, and 93 in DP 270882.
b Register the Planning Agreement on Lots 1, 38, 39 and 95 DP 270882.

66/24 Endorses the site-specific Development Control Plan subject to the amendments outlined above.

67/24 Requests the Chief Executive Officer exercise his Delegation to execute the draft Planning Agreement, Deed of Amendment and associated documents, prior to the finalisation of the rezoning.

68/24 Advises all those who made submissions during the public exhibition of Council's decision.

03 Apr 2024
Target date changed from 09 April 2024 to 31 December 2024 - Target Date updated to allow time for Council and Department of Planning, Housing and Infrastructure to finalise Planning Proposal and plan making process. Council is in the process of finalising the amendment to CCLEP 2022, site-specific DCP and associated Planning Agreement. It is anticipated the Planning Agreement will be executed in April/May and the LEP amendment gazetted in May/June. The Gateway Determination does not lapse until June 2024. Resolution 62/24 is complete. Resolution 63/24 is underway. Council staff are in the process of finalising the LEP amendment. Resolution 64/24 is complete. Resolution 65/24 is complete. Resolution 66/24 is complete. Resolution 67/24 is underway. Resolution 68/24 is complete.

Meeting and Date	Directorate for action	Record Number	Title	Action Assigned to	Manager	Completion Target Date	Completion Date
Council Meeting 26/03/2024	Environment and Planning	D16123250	**Request to prepare Planning Proposal relating to 310 Terrigal Drive, Terrigal**	Turkington, Shannon	Howe, Alice	30/04/25	

RESOLVED on the motion of RIK HART:

That Council:

69/24 Endorses the Draft Planning Proposal provided in Attachment 1, in relation to Lot 27 DP 1223375, 310 Terrigal Drive, Terrigal which seeks to amend the Central Coast Local Environmental Plan 2022 to:

a. Amend the maximum height of buildings from 8.5m to 25m.
b. Amend the maximum floor space ratio from 0.5:1 to 1.3:1.
c. Amend Schedule 1 Additional Permitted Use to enable retail premises limited to 150m².
d. Amend Location Specific Development Controls of the Central Coast Development Control Plan, Chapter 5.11 Terrigal: Corner Charles Kay Drive and Terrigal Drive, to include site specific controls.

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70/24 ***Submits the Planning Proposal to the Minister for Planning and Public Spaces in accordance with Section 3.35(2) of the Environmental Planning and Assessment Act 1979, requesting a Gateway Determination, pursuant to Section 3.34 of the Environmental Planning and Assessment Act 1979.***

71/24 ***Requests delegation for Council to finalise and make the draft Local Environmental Plan, pursuant to Section 3.36 of the Environmental Planning and Assessment Act 1979.***

72/24 ***Prepares a site-specific Development Control Plan to support the Planning Proposal to ensure appropriate built form guidelines are applied in the development design for the site.***

73/24 ***Undertakes community and public authority consultation in accordance with the Gateway Determination requirements.***

03 Apr 2024
Target date changed from 09 April 2024 to 30 April 2025 - Target date updated to allow for completion of resolution actions. Council submitted a request for Gateway Determination to the Department of Planning, Housing and Infrastructure on 2 April 2024. The Draft Planning Proposal is currently being assessed for adequacy, it is anticipated a Gateway Determination will be issued to Council in May 2024. Resolution 69/24 is complete. Resolution 70/24 is complete. Resolution 71-73/24 will be addressed as part of the remaining Planning Proposal process.

Meeting and Date	Directorate for action	Record Number	Title	Action Assigned to	Manager	Completion Target Date	Completion Date
Council Meeting 26/03/2024	Environment and Planning	D16123250	**Fire Safety Inspection Report - Bateau Bay Square - 12 Bay Village Road, Bateau Bay**	Stuart, Antonia	Howe, Alice	09/04/24	

RESOLVED on the motion of RIK HART:

That Council:

77/24 ***Note the content of the Fire Safety Report from Fire and Rescue NSW (Attachment 1), in accordance with Section 17(2)(a) of Part 8 of Schedule 5 of the Environmental Planning and Assessment Act 1979.***

78/24 ***Receive a further report in accordance with Section 17(2)(b) of Part 8 of Schedule 5 of the Environmental Planning and Assessment Act 1979, following staff review of Attachment 1.***

04 Apr 2024
Action reassigned to the appropriate Acting Unit Manager for further follow up as required.