HORNSBY SHIRE COUNCIL

ATTACHMENTS

GENERAL MEETING

Wednesday 8 March 2023
at 6:30PM

TABLE OF CONTENTS

ITEM 2

ATTACHMENT/S

REPORT NO. CS4/23

ITEM 2

1. 2024 LOCAL GOVERNMENT ELECTION - COST ESTIMATE

ATTACHMENT 1 - ITEM 2

NSW Electoral Commission

2024 Local Government Election - Cost Estimate

as at 30th January 2023

Hornsby Shire Council

Projects / Deliverables	Amount
Ballot Papers	19,946
Call Centre	26,678
Counting and Results - Centralised	73,438
Counting and Results - Declaration Voting	24,693
Event Staffing	539,676
Information Technology	35,527
Logistics	56,707
Postal Voting Services	52,569
Venues	140,412
Voter Awareness	58,927
Financial Services	9,975
Constitutional Referendum	-
Council Poll	-
TOTAL (excluding GST)	**1,038,547**
GST	**103,855**
TOTAL (including GST)	**1,142,401**

Note

This estimate is based on the Council election being fully contested

Shared resources will be utilised where practical

ITEM 3

ATTACHMENT/S

REPORT NO. CS10/23

ITEM 3

1. HSC INVESTMENTS SUMMARY REPORT JANUARY 2023

2. HSC BORROWINGS SCHEDULE JANUARY 2023

HORNSBY
SHIRE COUNCIL

Investment Summary Report
January 2023

ATTACHMENT 1 - ITEM 3

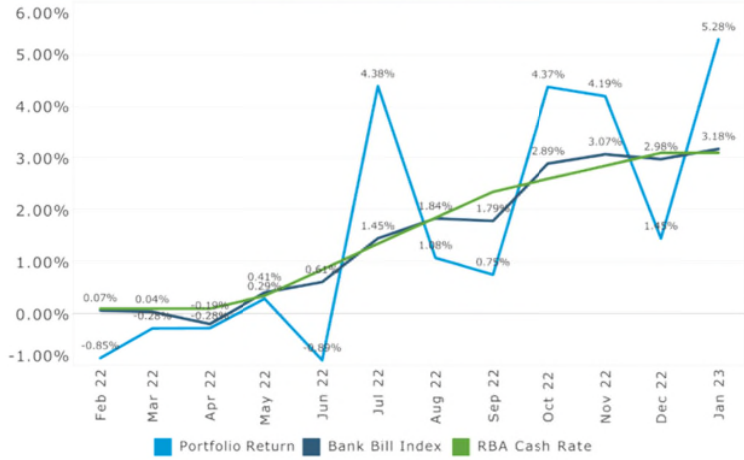
Hornsby Shire Council

Executive Summary - January 2023

Investment Holdings

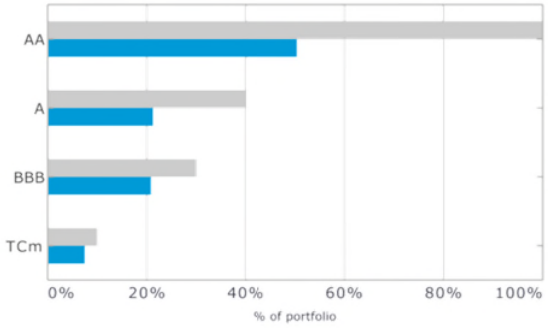
	Face Value ($)	Current Value ($)	Current Yield (%)	FYTD Yield (%)
Cash	32,859,687	32,859,687	3.3621	2.4553
Floating Rate Note	63,850,000	63,851,553	3.8857	3.0108
Floating Rate Term Deposits	60,000,000	60,366,567	4.0941	3.2427
Managed Funds	22,016,096	22,016,096	34.8075	8.0898
Term Deposit	116,050,000	117,229,961	2.4821	2.0282
	294,775,784	**296,323,865**	**5.2849**	**3.0640**

Investment Performance

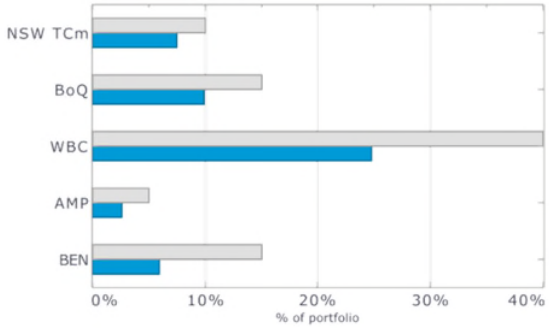


Investment Policy Compliance

Total Credit Exposure



Individual Institutional Exposures



Portfolio Exposure | Investment Policy Limit

Term to Maturities

	Face Value ($)		Policy Max*
Between 0 and 0.25 years	79,359,687	27%	**20%**
Between 0.25 and 1 years	118,550,000	40%	**100%**
Between 1 and 2 years	25,500,000	9%	**70%**
Between 2 and 5 years	71,366,096	24%	**50%**
	294,775,784		

* Council always retains the flexibility to invest as short as required by internal requirements or the economic outlook

PRUDENTIAL INVESTMENT SERVICES CORP

ATTACHMENT 1 - ITEM 3

Hornsby Shire Council

Investment Holdings Report - January 2023

Cash Accounts

Face Value ($)	Current Rate (%)	Institution	Credit Rating	Current Value ($)
5,028,713.55	3.0000%	Bendigo and Adelaide Bank	BBB+	5,028,713.55
5,166,588.05	3.5500%	AMP Bank	BBB	5,166,588.05
6,040,898.94	3.8000%	Westpac Group	AA-	6,040,898.94
6,598,362.32	3.2000%	Bank of Queensland	BBB+	6,598,362.32
10,025,124.30	3.2898%	Macquarie Bank	A+	10,025,124.30
32,859,687.16	**3.3621%**			**32,859,687.16**

Managed Funds

Face Value ($)	Current Rate (%)	Institution	Credit Rating	Funds Name	Current Value ($)
22,016,096.34	34.8075%	NSW T-Corp (MT)	TCm	Medium Term Growth Fund	22,016,096.34
22,016,096.34	**34.8075%**				**22,016,096.34**

Term Deposits

Purchase Date	Maturity Date	Term Days	Face Value ($)	Current Rate (%)	Institution	Credit Rating	Book Value ($)	Current Value ($)
28-Jul-22	1-Feb-23	188	5,000,000.00	3.3700%	Suncorp Bank	A+	5,000,000.00	5,086,789.04
9-Nov-22	8-Feb-23	91	3,000,000.00	3.7100%	Suncorp Bank	A+	3,000,000.00	3,025,614.25
13-Sep-22	15-Feb-23	155	4,000,000.00	3.5200%	Suncorp Bank	A+	4,000,000.00	4,054,391.23
23-Feb-22	22-Feb-23	364	5,000,000.00	0.8500%	Bendigo and Adelaide Bank	BBB+	5,000,000.00	5,039,938.36
14-Sep-20	15-Mar-23	912	5,000,000.00	1.0000%	Bank of Queensland	BBB+	5,000,000.00	5,019,178.08
24-Sep-20	29-Mar-23	916	5,000,000.00	0.9500%	Bank of Queensland	BBB+	5,000,000.00	5,016,657.53
31-Aug-22	5-Apr-23	217	4,000,000.00	3.7100%	Bank of Queensland	BBB+	4,000,000.00	4,062,612.60
15-Nov-22	12-Apr-23	148	2,500,000.00	4.3000%	AMP Bank	BBB	2,500,000.00	2,522,972.60
18-Jan-23	18-Apr-23	90	3,000,000.00	4.0700%	Commonwealth Bank of Australia	AA-	3,000,000.00	3,004,683.29
16-Aug-22	19-Apr-23	246	5,000,000.00	3.5100%	Commonwealth Bank of Australia	AA-	5,000,000.00	5,081,258.90
24-Jan-23	26-Apr-23	92	5,000,000.00	4.0300%	Commonwealth Bank of Australia	AA-	5,000,000.00	5,004,416.44
3-Aug-22	10-May-23	280	3,500,000.00	3.7200%	Bank of Queensland	BBB+	3,500,000.00	3,564,921.64
12-Jan-23	12-Jul-23	181	4,000,000.00	4.0300%	Suncorp Bank	A+	4,000,000.00	4,008,832.88

PRUDENTIAL INVESTMENT SERVICES CORP

ATTACHMENT 1 - ITEM 3

Hornsby Shire Council

Investment Holdings Report - January 2023

Purchase Date	Maturity Date	Term Days	Face Value ($)	Current Rate (%)	Institution	Credit Rating	Book Value ($)	Current Value ($)
22-Aug-22	22-Aug-23	365	50,000.00	3.0000%	Westpac Group	AA-	50,000.00	50,669.86
1-Oct-20	4-Oct-23	1098	5,000,000.00	0.9500%	Bank of Queensland	BBB+	5,000,000.00	5,015,616.44
18-Jan-23	18-Oct-23	273	5,000,000.00	4.4900%	National Australia Bank	AA-	5,000,000.00	5,008,610.96
17-Nov-21	15-Nov-23	728	10,000,000.00	1.2500%	Westpac Group	AA-	10,000,000.00	10,026,027.40
23-Nov-21	23-Nov-23	730	5,000,000.00	1.2800%	Westpac Group	AA-	5,000,000.00	5,012,273.97
2-Dec-21	4-Dec-23	732	10,000,000.00	1.2100%	Westpac Group	AA-	10,000,000.00	10,020,221.92
23-Feb-22	21-Feb-24	728	5,000,000.00	1.8000%	National Australia Bank	AA-	5,000,000.00	5,084,575.34
19-Mar-19	6-Mar-24	1814	10,000,000.00	3.0000%	Rabobank Australia	A+	10,000,000.00	10,260,547.95
19-Mar-19	13-Mar-24	1821	9,000,000.00	3.0000%	Rabobank Australia	A+	9,000,000.00	9,234,493.15
7-Apr-21	7-Apr-25	1461	3,000,000.00	1.0000%	National Australia Bank	AA-	3,000,000.00	3,024,657.53
			116,050,000.00	**2.4821%**			**116,050,000.00**	**117,229,961.36**

Floating Rate Term Deposits

Purchase Date	Maturity Date	Term	Face Value ($)	Current Rate (%)	Institution	Credit Rating	Purchase Price ($)	Current Value ($)
3-Sep-18	3-Sep-23	1826	15,000,000.00	4.0460%	Westpac Group BBSW+0.98%	AA-	15,000,000.00	15,096,438.90
4-Sep-18	4-Sep-23	1826	15,000,000.00	4.0660%	ANZ Banking Group BBSW+1.00%	AA-	15,000,000.00	15,096,915.62
10-Sep-18	11-Sep-23	1827	15,000,000.00	4.1222%	Westpac Group BBSW+0.98%	AA-	15,000,000.00	15,086,396.79
12-Sep-18	12-Sep-23	1826	15,000,000.00	4.1422%	ANZ Banking Group BBSW+1.00%	AA-	15,000,000.00	15,086,815.97
			60,000,000.00	**4.0941%**			**60,000,000.00**	**60,366,567.28**

Floating Rate Notes

Purchase Date	Maturity Date	Term Days	Face Value ($)	Current Rate (%)	Security Name	Credit Rating	Book Value ($)	Current Value ($)
26-Sep-18	26-Sep-23	1826	9,000,000.00	4.1756%	NAB Snr FRN (Sep23) BBSW+0.93%	AA-	9,034,920.00	9,066,006.00
16-Nov-18	16-Nov-23	1826	7,000,000.00	3.9997%	WBC Snr FRN (Nov23) BBSW+0.95%	AA-	7,024,640.00	7,085,664.06
24-Oct-19	24-Oct-24	1827	1,500,000.00	4.4033%	GSB Snr FRN (Oct24) BBSW+1.12%	BBB	1,502,910.00	1,503,862.66
4-Feb-20	4-Feb-25	1827	4,200,000.00	4.1793%	NPBS Snr FRN (Feb25) BBSW+1.12%	BBB	4,183,872.00	4,239,902.61

PRUDENTIAL INVESTMENT SERVICES CORP

ATTACHMENT 1 - ITEM 3

Hornsby Shire Council

Investment Holdings Report - January 2023

Purchase Date	Maturity Date	Term Days	Face Value ($)	Current Rate (%)	Security Name	Credit Rating	Book Value ($)	Current Value ($)
11-Mar-22	17-Mar-25	1096	4,000,000.00	4.1814%	BEN Snr FRN (Mar25) BBSW+0.98%	BBB+	3,997,640.00	4,020,602.37
16-Aug-22	22-Aug-25	1096	1,200,000.00	4.0058%	SUN Snr FRN (AUG25) BBSW+0.93%	A+	1,200,000.00	1,211,390.52
2-Dec-20	2-Dec-25	1826	3,400,000.00	3.5760%	BEN Snr FRN (Dec25) BBSW+0.52%	BBB+	3,320,984.00	3,368,163.52
9-Dec-20	9-Dec-25	1826	10,000,000.00	3.6080%	MAC Snr FRN (Dec25) BBSW+0.48%	A+	9,776,443.50	9,927,954.13
24-Feb-21	24-Feb-26	1826	2,100,000.00	3.5463%	SUN Snr FRN (Feb26) BBSW+0.45%	A+	2,047,584.00	2,084,531.33
18-Aug-21	24-Aug-26	1826	4,700,000.00	3.5063%	NAB Snr FRN (Aug26) BBSW+0.41%	AA-	4,592,840.00	4,659,008.24
9-Sep-21	15-Sep-26	1826	4,250,000.00	3.6469%	SUN Snr FRN (Sep26) BBSW+0.48%	A+	4,129,002.50	4,198,302.67
21-Sep-21	23-Dec-26	1917	6,000,000.00	3.6317%	CBA Green Snr FRN (Dec26) BBSW+0.41%	AA-	5,850,960.00	5,914,979.67
7-Feb-22	10-Feb-27	1826	1,500,000.00	4.0500%	NPBS Snr FRN (Feb27) BBSW+1.00%	BBB	1,460,115.00	1,477,994.38
9-Nov-22	11-Nov-27	1826	5,000,000.00	4.2612%	WBC Snr FRN (Nov27) BBSW+1.23%	AA-	5,000,000.00	5,093,190.53
			63,850,000.00	**3.8857%**			**63,121,911.00**	**63,851,552.69**

Total Investments

Face Value ($)	Current Value ($)
294,775,783.50	**296,323,864.83**

PRUDENTIAL INVESTMENT SERVICES CORP

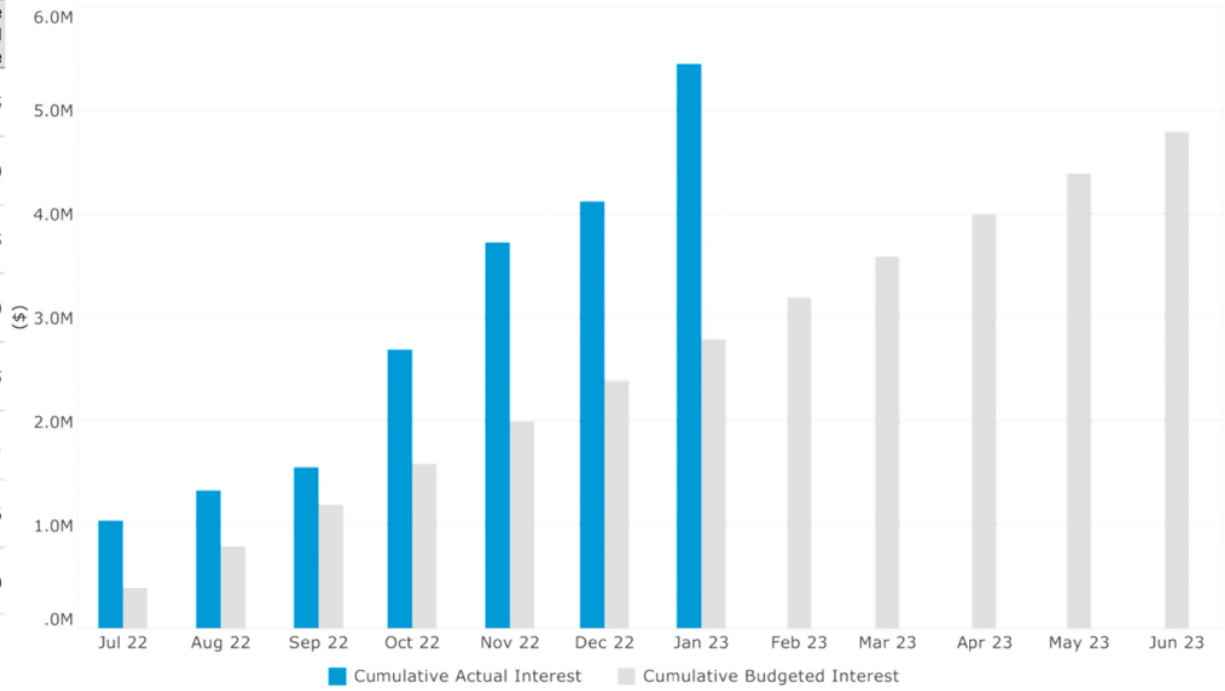
ATTACHMENT 1 - ITEM 3

Hornsby Shire Council

Investment Budget Report - January 2023

Budgeted vs Actual Returns

	Cumulative Actual Income	Cumulative Budgeted Income
July 2022	1,042,479	399,035
August 2022	1,333,196	798,070
September 2022	1,555,280	1,197,105
October 2022	2,689,894	1,596,140
November 2022	3,721,180	1,995,175
December 2022	4,117,246	2,394,211
January 2023	5,442,822	2,793,246
Budget Target		**4,788,420**



PRUDENTIAL INVESTMENT SERVICES CORP

ATTACHMENT 1 - ITEM 3

Hornsby Shire Council

Environmental Commitments Report - January 2023

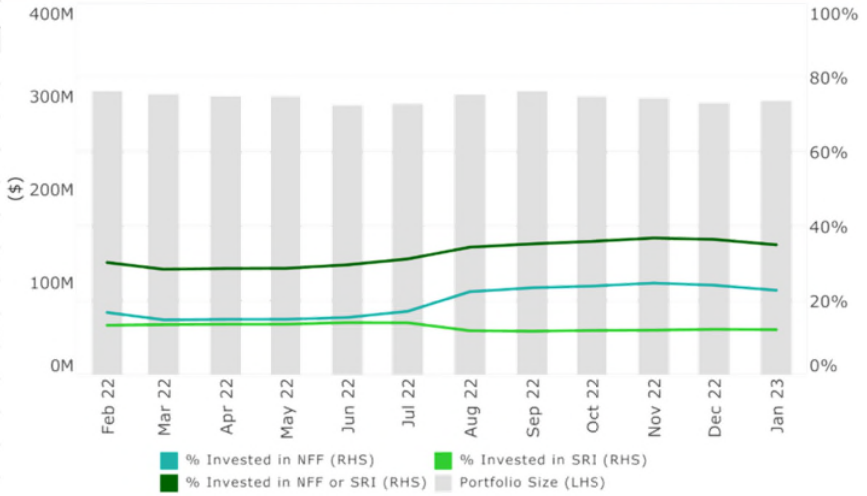
Current Breakdown

ADI Lending Status *	Current Month ($)		Previous Month ($)	
Fossil Fuel Lending ADIs				
AMP Bank	7,666,588		7,651,057	
ANZ Group	30,000,000		30,000,000	
Bank of Queensland	29,098,362		29,080,478	
Commonwealth Bank of Australia	8,000,000		3,000,000	
Macquarie Bank	20,025,124		19,997,602	
National Australia Bank	26,700,000		26,700,000	
Westpac Group	48,090,899		48,070,840	
	169,580,974	**58%**	**164,499,978**	**56%**
Non Fossil Fuel Lending ADIs				
Bendigo and Adelaide Bank	17,428,714		20,915,933	
Great Southern Bank	1,500,000		1,500,000	
Newcastle Permanent Building Society	5,700,000		5,700,000	
Rabobank Australia	19,000,000		19,000,000	
Suncorp Bank	23,550,000		23,550,000	
	67,178,714	**23%**	**70,665,933**	**24%**
Other				
NSW T-Corp (MT)	22,016,096		21,464,634	
	22,016,096	**7%**	**21,464,634**	**7%**
Socially Responsible Investment				
CBA (Green)	11,000,000		11,000,000	
Westpac Group (Green TD)	25,000,000		25,000,000	
	36,000,000	**12%**	**36,000,000**	**12%**
	294,775,784		**292,630,545**	

* source: Marketforces

Percentages may not add up to 100% due to rounding

Historical Portfolio Exposure to NFF Lending ADIs and SRIs



Green Products Summary

	Current Month ($)		Previous Month ($)	
Bendigo and Adelaide Bank	17,428,714		20,915,933	
CBA (Green)	11,000,000		11,000,000	
Great Southern Bank	1,500,000		1,500,000	
Newcastle Permanent Building Society	5,700,000		5,700,000	
Rabobank Australia	19,000,000		19,000,000	
Suncorp Bank	23,550,000		23,550,000	
Westpac Group (Green TD)	25,000,000		25,000,000	
	103,178,714	**35%**	**106,665,933**	**36%**
	294,775,784		**292,630,545**	

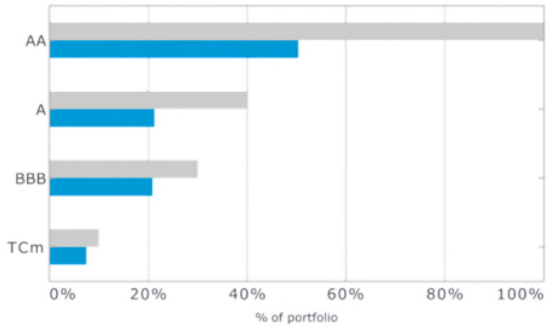
PRUDENTIAL INVESTMENT SERVICES CORP

ATTACHMENT 1 - ITEM 3

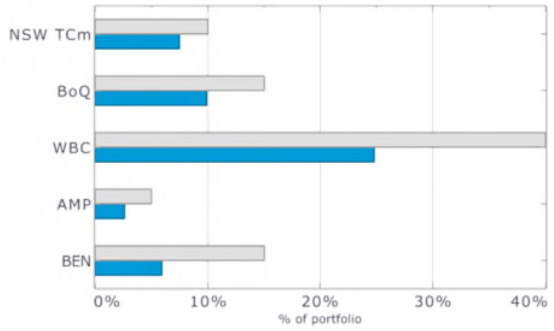
Hornsby Shire Council

Investment Policy Compliance Report - January 2023

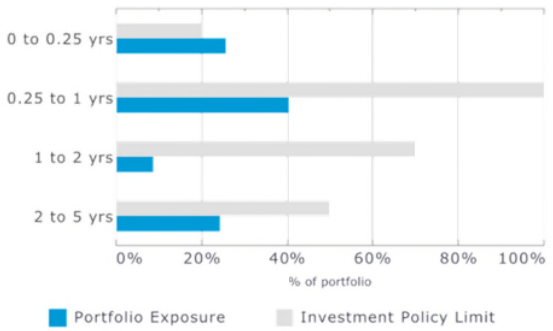
Total Credit Exposure



Individual Institutional Exposures



Term to Maturities



Credit Rating Group	Face Value ($)		Policy Max	
AA	148,790,899	50%	**100%**	✓
A	62,575,124	21%	**40%**	✓
BBB	61,393,664	21%	**30%**	✓
TCm	22,016,096	7%	**10%**	✓
	294,775,784			

Specific Sub Limits				
BBB+	*46,527,076*	*16%*	***30%***	✓
BBB	*14,866,588*	*5%*	***10%***	✓

Institution	% of portfolio	Investment Policy Limit	
NSW T-Corp (TCm)	7%	10%	✓
Bank of Queensland (BBB+)	10%	15%	✓
Westpac Group (AA-)	25%	40%	✓
AMP Bank (BBB)	3%	5%	✓
Bendigo and Adelaide Bank (BBB+)	6%	15%	✓
Newcastle Permanent Building Society (BBB)	2%	5%	✓
Suncorp Bank (A+)	8%	30%	✓
ANZ Group (AA-)	10%	40%	✓
Macquarie Bank (A+)	7%	30%	✓
National Australia Bank (AA-)	9%	40%	✓
Rabobank Australia (A+)	6%	30%	✓
Commonwealth Bank of Australia (AA-)	6%	40%	✓
Great Southern Bank (BBB)	1%	5%	✓

	Face Value ($)		Policy Max*
Between 0 and 0.25 years	79,359,687	27%	**20%**
Between 0.25 and 1 years	118,550,000	40%	**100%**
Between 1 and 2 years	25,500,000	9%	**70%**
Between 2 and 5 years	71,366,096	24%	**50%**
	294,775,784		

* Council always retains the flexibility to invest as short as required by internal requirements or the economic outlook

✓ = compliant
✗ = non-compliant

PRUDENTIAL INVESTMENT SERVICES CORP

ATTACHMENT 1 - ITEM 3

HORNSBY SHIRE COUNCIL SCHEDULE OF BORROWINGS AS AT 31 JANUARY 2023

1. LOANS			$'000	$'000	$'000	$'000	%
Lender	Date Drawn	Maturity Date	Amount Borrowed	01/07/2022 Opening Balance	2022/23 YTD Repayments Principal	Closing Balance	Fixed Interest Rate %
Westpac(51)	26-Jun-13	25-Jun-23	2000	257	126	130	5.89

2. OPERATING LEASES			$'000	$'000	$'000	$'000	$'000
Lessor	Date Executed	Expiry date	Total Lease Payments	01/07/2022 Opening Balance	New Leases	2022/2023 Repayments YTD	Closing Balance
Vestone Capital Pty Ltd - previously known as Macquarie Equipment Finance (107)	22-Sep-17	15-Aug-22	56	3		3	0
Vestone Capital Pty Ltd - previously known as Macquarie Equipment Finance (108)	15-Aug-18	15-Aug-22	242	14		14	0
Vestone Capital Pty Ltd - previously known as Macquarie Equipment Finance (109)	15-Aug-18	15-May-23	85	17		8	8
Vestone Capital Pty Ltd - previously known as Macquarie Equipment Finance (110)	15-Nov-18	15-Aug-22	26	2		2	0
Vestone Capital Pty Ltd - previously known as Macquarie Equipment Finance (111)	15-Nov-18	15-Aug-23	632	158		63	95
Vestone Capital Pty Ltd - previously known as Macquarie Equipment Finance (113)	15-Feb-19	15-Aug-22	11	1		1	0
Vestone Capital Pty Ltd - previously known as Macquarie Equipment Finance (114)	15-May-19	15-Aug-23	15	4		2	2
Vestone Capital Pty Ltd - previously known as Macquarie Equipment Finance (115)	23-Aug-19	15-May-24	119	47		12	36
Vestone Capital Pty Ltd - previously known as Macquarie Equipment Finance (116)	15-Feb-20	15-May-23	14	5		2	3
Vestone Capital Pty Ltd - previously known as Macquarie Equipment Finance (118)	15-Aug-22	15-May-26	34	0	34	5	30
Vestone Capital Pty Ltd - previously known as Macquarie Equipment Finance (119)	15-Nov-22	15-Aug-27	64	0	64	4	60
Vestone Capital Pty Ltd - previously known as Macquarie Equipment Finance (101)ext	15-Feb-21	15-May-22	51	3	h to month lease exte	3	0
Vestone Capital Pty Ltd - previously known as Macquarie Equipment Finance (103)ext	15-Feb-21	15-May-22	19	2	h to month lease exte	2	0
Canon Finance Australia Pty Ltd	15-Nov-17	1-Nov-22	109	9		9	0
*McDonalds - Central Ave Lease	12-Apr-21	11-Apr-24	1538	400	530	299	631
TOTAL			3,014	665	629	428	865

*McDonalds lease has been extended to 11 April 24.
- Rent for the period of 12 April 2022 to 11 April 2023 is $42,693.75 including GST per month.
- Rent increases to $44,188.03 including GST per month from 12 April 2023 to 11 April 2024

3. DEBT SERVICE RATIO	Ratio %
Year ended Jun 22	0.16
Year ended Jun 21	0.31
Year ended Jun 20	0.61
Year ended Jun 19	0.78
Year ended Jun 18	1.08

Debt Service Ratio	=	Debt Service Cost
		Revenue from Continuing Operations excluding Capital Items & Specific Purpose Grants/Contributions

ATTACHMENT 2 - ITEM 3

ITEM 4

ATTACHMENT/S

REPORT NO. PC4/23

ITEM 4

1. ATTACHMENT 1 - GATEWAY DETERMINATION

2. ATTACHMENT 2 - HIGH STREET AND ASHLING PROPOSAL

3. ATTACHMENT 3 - DRAFT AMENDMENTS TO THE HORNSBY DEVELOPMENT CONTROL PLAN 2013

NSW GOVERNMENT

Department of Planning and Environment

PP-2022-2602 / IRF22/2644

Mr Steven Head
General Manager
Hornsby Shire Council
PO Box 37
HORNSBY NSW 1630

Dear Mr Head

Planning proposal PP-2022-2602 to amend Hornsby Local Environmental Plan 2013

I am writing in response to the planning proposal you have forwarded to the Minister under section 3.34(1) of the *Environmental Planning and Assessment Act 1979* (the Act) and additional information received on 12 August 2022 in respect of the planning proposal to increase the maximum building height for properties 2 and 4 High Street, Hornsby to 38.5 metres, and increase the maximum building height for properties 7 to 19 Ashley Street, Hornsby and 2 and 4 Webb Avenue, Hornsby to 20.5 metres for seniors housing only.

As delegate of the Minister for Planning and Homes, I have determined that the planning proposal should proceed subject to the conditions in the enclosed gateway determination. No further approval is required in relation to the Directions.

Considering the nature of the planning proposal I have determined that Council may exercise local plan-making authority functions in relation to the planning proposal.

The proposed local environmental plan (LEP) is to be finalised at or before 9 months from the date of the Gateway determination. As this is a minor amendment, Council is to request Parliamentary Counsel's Office commence drafting as soon as practicable. A copy of the request should be forwarded to the Department of Planning and Environment.

The NSW Government has committed to reduce the time taken to complete LEPs. To meet these commitments, the Minister may appoint an alternate planning proposal authority if Council does not meet the timeframes outlined in the gateway determination.

The Department's categorisation of planning proposals in the *Local Environmental Plan Making Guideline* (Department of Planning and Environment, 2021) is supported by category specific timeframes for satisfaction of conditions and authority and Government agency referrals, consultation, and responses. Compliance with milestones will be monitored by the Department to ensure planning proposals are progressing as required.

Should you have any enquiries about this matter, I have arranged for Ms Ashley Richards to assist you. Ms Richards can be contacted on 02 8289 6776.

Yours sincerely

[redacted]

23 August 2022
Brendan Metcalfe
Director North District
Metro Central North
Encl:
Gateway determination
Authorised plan-making reporting template

NSW GOVERNMENT

Department of Planning and Environment

Gateway Determination

***Planning proposal (Department Ref: PP-2022-2602)**:* The proposal involves an extension to the existing Hornsby RSL club, a hotel and serviced apartments, residential shop top housing, and will facilitate a 6 storey seniors housing development.

I, the Director North District, Metro Central North at the Department of Planning and Environment, as delegate of the Minister for Planning and Homes, have determined under section 3.34(2) of the *Environmental Planning and Assessment Act 1979* (the Act) that an amendment to the Hornsby Local Environmental Plan 2013 to increase the maximum building height for properties 2 and 4 High Street, Hornsby to 38.5 metres, and increase the maximum building height for properties 7 to 19 Ashley Street, Hornsby and 2 and 4 Webb Avenue, Hornsby ('Area 1') to 20.5 metres for seniors housing only should proceed subject to the following conditions:

1. Prior to community consultation, the planning proposal is to be updated to:

   - A further objective is required to describe the intended redevelopment proposal for this site. For example: *To facilitate an extension to the existing RSL club, a hotel and serviced apartments, and residential shop top housing at 2 to 4 High Street and a 6 storey seniors housing development for properties at 7 to 19 Ashley Street and 2 to 4 Webb Avenue.*
   - Clarify the land use mix as this affects the job and dwelling yield of the proposal.
   - Update plans to remove references in the Design Concept to land at William Street, Hornsby.
   - Update 2016 supporting studies to consider only the current planning proposal. This includes:
     i. 2016 Atlas Architecture Design Concepts
     ii. 2016 Atlas Architecture Urban Design Statement
     iii. 2017 Archnex Designs Statement of Heritage Impact
   - Address additional FSR under Part 5, Clause 87 of the Housing SEPP 2021 for the senior's housing site at 7 to 19 Ashley Street in the proposal.
   - Provide shadow diagrams clearly labelling the existing shadow footprint and proposed potential shadow footprint. It is recommended that the shadow analysis is modelled including consideration of the adjacent Hornsby Town Centre site controls to accurately reflect solar access.
   - Address solar access and overshadowing and demonstrate that compliance with Apartment Design Guide standards can be achieved for proposed residential land uses.

- Identify the maximum number of car spaces needed to support the proposed seniors-housing and amend the proposal to incorporate this cap.

- Provide an estimated timetable for the delivery of transport and infrastructure improvements relating to this proposal.

2. Public exhibition is required under section 3.34(2)(c) and clause 4 of Schedule 1 to the Act as follows:

   (a) the planning proposal is categorised as basic, as described in the *Local Environmental Plan Making Guidelines* (Department of Planning and Environment, 2021), and must be made publicly available for a minimum of 25 days; and

   (b) the planning proposal authority must comply with the notice requirements for public exhibition of planning proposals and the specifications for material that must be made publicly available along with planning proposals as identified in *Local Environmental Plan Making Guidelines* (Department of Planning and Environment, 2021).

3. Consultation is required with the following public authorities:

   - Transport for NSW
   - Sydney Trains
   - NSW Police
   - Sydney Water
   - Endeavour Energy
   - NSW Rural Fire Service

   Each public authority is to be provided with a copy of the planning proposal and any relevant supporting material via the NSW Planning Portal and given at least 25 days to comment on the proposal.

4. A public hearing is not required to be held into the matter by any person or body under section 3.34(2)(e) of the EP&A Act. This does not discharge Council from any obligation it may otherwise have to conduct a public hearing (for example, in response to a submission or if reclassifying land).

5. The Council as planning proposal authority is authorised to exercise the functions of the local plan-making authority under section 3.36(2) of the EP&A Act subject to the following:

   (a) the planning proposal authority has satisfied all the conditions of the gateway determination;

   (b) the planning proposal is consistent with applicable directions of the Minister under section 9.1 of the EP&A Act or the Secretary has agreed that any inconsistencies are justified; and

   (c) there are no outstanding written objections from public authorities.

6. The planning proposal must be exhibited 3 months from the date of the Gateway determination.

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7. The planning proposal must be reported to council for a final recommendation 6 months from the date of the Gateway determination.

8. The timeframe for completing the LEP is to be 9 months from the date of the Gateway determination.

Dated 22nd day of August 2022.

[redacted]

Brendan Metcalfe
Director North District
Metro Central North
Department of Planning and Environment

Delegate of the Minister for Planning and Homes

PP-2022-2602 (IRF22/2644)

ATTACHMENT 2 - ITEM 4

PLANNING PROPOSAL

High Street and Ashley Street, Hornsby

November 2022

HORNSBY SHIRE COUNCIL

ATTACHMENT 2 - ITEM 4

CONTENTS

INTRODUCTION

This planning proposal is the first to give effect to the *Draft Hornsby Town Centre Masterplan* (HTC Masterplan), a key deliverable of Hornsby's *Accelerated LEP Review Program* agreement and the *Hornsby Housing Strategy 2020*. It explains the intent of, and justification for, proposed amendments to *Hornsby Local Environmental Plan 2013* (HLEP) for the following sites:

The Hornsby War Memorial Hall site, and the Hornsby RSL Club Premises and Rear Carpark (Site 01)

Site 01 consists of Property No. 2 High Street (Lot 1 DP 585721) and Property No. 4 High Street, Hornsby (Lot 2 DP 817649), Hornsby.

- Amendments to increase the maximum building height to 38.5m (12 storeys). The land is currently zoned B4 - Mixed Use and no change is proposed to the zone.

Hornsby RSL Club Parcels in Ashley Street and Webb Avenue (Site 02)

Site 02 consists of Properties No. 7,9,11,15,17 and 19 Ashley Street, Hornsby (Lots 1,2,3,4,5,6 DP222907) and Properties No. 2 and 4 Webb Avenue, Hornsby (Lots 7 and 8 DP 222907).

- Amendments to increase the maximum building height to 20.5m (6 storeys) for the purpose of seniors housing only. The land is currently zoned R3 Medium Density, and no change is proposed to the zone, which permits residential flat buildings.

The Planning Proposal was initially considered by Council at its 13 July 2022 meeting. The report to Council is provided at **Attachment 1** with associated minutes at **Attachment 2.**

will be exhibited with associated amendments to the *Hornsby Development Control Plan 2013* (Hornsby DCP) and has been prepared in accordance with the *Environmental Planning and Assessment Act 1979 (EP&A Act),* the NSW *Local Environmental Plan Making Guideline*, and the conditions of the Department of Planning and Environment's (DPE) Gateway determination of 22 August 2022 (**Attachment 3**). This planning proposal has been amended to meet the requirements of the Gateway determination.

Mapping associated with planning proposal is provided in and Part 4 Mapping.

BACKGROUND

2016 Hornsby RSL Club Planning Proposal

In May 2016, a planning proposal was submitted on behalf of the Hornsby RSL Club (RSL) to increase building heights and permit residential flat buildings as an additional permitted use at the existing RSL premises at No. 4 High Street, Hornsby and at the RSL Community Car Park at William Street, Hornsby.

The proposal also sought additional building height for a senior's living development on RSL owned land in Ashley Street and Webb Avenue, south of the club site.

Following a Gateway Determination in June 2017, the planning proposal was amended and exhibited in early 2018. Council's post-exhibition assessment identified that traffic related issues related to the proposal were unresolvable in isolation. The RSL requested withdrawal of the planning proposal in May 2019 and in August 2019 Council resolved not to proceed and to include the RSL concepts in the *Hornsby Town Centre Review.*

The current planning proposal is different from the 2016 planning proposal as it:

- no longer proposes the residential flat building additional permitted use, due to changes in the shop top housing land use definition associated with DPE's employment zone reform program;
- no longer includes the community car park site north of the club site; and
- now includes land at No. 2 High Street.

The North District Plan and the Hornsby Town Centre Review

The *North District Plan* (District Plan) was released in 2017. It identified Hornsby as a Strategic Centre and established the State government's housing supply and job creation targets for Hornsby to 2036.

In response to the District Plan, and to ensure growth would be consistent with Council policies to focus growth in established housing precincts and the Hornsby Town Centre, Council initiated the *Hornsby Town Centre East-Side Review* (HTC Review). It included a strategic analysis of planning controls and the demand for and feasibility of commercial/retail development on the east side of the Hornsby Town Centre.

In 2019, the scope of the HTC Review was expanded to include land in the Hornsby Town Centre on the west side of rail line, including the land subject to this planning proposal, and the Review became a component of Hornsby's *Accelerated LEP Review Program.* The aims of the broader *Hornsby Town Centre Review Study* were to develop a structure plan that would:

- provide for projected growth;
- strengthen the economic, employment and housing capacities of the Hornsby Town Centre; and
- improve public domain and activate Hornsby's commercial core.

Review studies included economic development feasibility and urban form analyses, transport, traffic, parking and circulation modelling, housing demand and supply analysis and infrastructure capacity.

The HTC Review has resulted in the delivery of the draft HTC Masterplan. This is a key deliverable of Hornsby's *Accelerated LEP Review Program* and a priority of the *Hornsby Local Strategic Planning Statement 2020* and the *Hornsby Housing Strategy 2020.*

The draft Hornsby Town Centre Masterplan

The draft HTC Masterplan is outlined and discussed in the *Hornsby Town Centre Review Recommendations* report, July 2022 (Recommendations report). The Recommendations report and supporting by technical studies are available on Council's website. The current link for the exhibited documents is below:

https://yoursay.hornsby.nsw.gov.au/hornsby-town-centre-masterplan

They were exhibited for public comment from 20 August 2022 to 30 September 2022. A submissions report is scheduled to be considered by Council in 2023.

The Recommendations report identifies a series of recommendations and interventions to facilitate the revitalisation of Hornsby as a growing strategic centre, to accommodate change and to deliver diversity and density.

The Recommendations report identifies that the land subject to this planning proposal is part of the "Western heritage" mixed-use development precinct (Figure 79). Site 01 of this planning proposal are identified as Site 13 in the Recommendations report, while Site 02 is identified as Site 14.

Other recommendations include:

- Promote entertainment and dining activities at Site 1 (Figure 17);
- Introduction of seniors housing land uses at Site 2 (Figure 9);
- Increasing the maximum building height for Site 1[1] to 12 stories (Figure 47); and
- Increasing the maximum building height at Site 2[2] to 6 stories (Figure 47).

This planning proposal is consistent with the recommended development standards and objectives of the draft Recommendations report. The consistency is discussed further in Parts 1, 2 and 3 of this planning proposal.

Gateway Determination

On 22 August 2022, DPE issued a Gateway determination for the planning proposal. The Gateway determination identified several matters to be addressed before the planning proposal could be finalised.

Condition 1 amendments to the planning proposal prior to exhibition. The requirements are identified below, with a description of how the planning proposal has been amended to respond.

[1] Shown as site 13 in Recommendations report
[2] Shown as site 14 in Recommendations report

Requirement	Response
A further objective to describe the intended redevelopment proposal for this site.	Objectives have been updated in Part 1
Clarification of the land use mix as this affects the job and dwelling yield of the proposal	Land use mix and job/dwelling yield have been updated in Section 3.10 and appendices.
Update plans to remove references to land at William Street, Hornsby.	Concept plans have been updated as Attachment 4.
Update 2016 supporting studies to consider only the current planning proposal.	Support studies have been replaced with new reporting directly relevant to the planning proposal
Address additional FSR under Part 5, Clause 87 of the Housing SEPP 2021 for the senior's housing site at 7 to 19 Ashley Street in the proposal.	SEPP compliance table and attachment 7 have been updated to clarify that the clause is not applicable to Site 02.
Provide shadow diagrams clearly labelling the existing shadow footprint and proposed potential shadow footprint.	Shadow diagrams have been updated at Attachment 7 and SEPP compliance table.
Address solar access and overshadowing and demonstrate that compliance with Apartment Design Guide standards can be achieved for proposed residential land uses.	Solar access and overshadowing have been addressed in Attachment 7 and SEPP compliance table.
Identify the maximum number of car spaces needed to support the proposed seniors-housing and amend the proposal to incorporate this cap.	The site specific merit discussion (Part 3 Question 9) and supporting HDCP amendment have been updated to reflect car parking requirements.
Provide an estimated timetable for the delivery of transport and infrastructure improvements relating to this proposal.	The site specific merit discussion (Part 3 Questions 9 and 11) has been updated to reflect infrastructure requirements.

Indicative Design Concept Altis Architecture 2022

In response to the Gateway Conditions, the indicative Design Concept for the subject land was amended. It is at **Attachment 4.** The updated Concept identifies No. 2 and No. 4 High Street as Site 01 and the Ashley Street and Webb Avenue lots as Site 02.

For Site 01 (High Street sites) the Design Concept provides for:

- Six-storeys of shop-top housing over the existing club auditorium yielding 12 one-bedroom and 18 two-bedroom apartments (five apartments each level - total 30);
- A six level above and below grade car park at the at-grade car parking area to the west of the existing club site (297 new spaces providing 362 spaces total);

- An extension to the proposed car parking, including an expansion to club space and a a six-storey hotel above that with 18 rooms per level (total 126 rooms);
- Other club extensions and internal reconfigurations; and
- A possible built form to accommodate the above.

The additional height over the Hornsby War Memorial Hall will allow for its retention within an integrated and wholistic development across the whole of Site 01 and allow for the intensification of permitted land uses.

For Site 02 (Ashley Street and Webb Avenue) the Design Concept provides for:

- A mix of one, two, and three-bedroom Seniors Independent Living Units (106 units total with 237 bedrooms total)
- 137 car spaces
- A possible built form option of two buildings of four to six storeys when viewed from the street on Ashley Street, Forbes Street and Webb Avenue, with a transition in building height adjacent to surrounding residential areas.

PART 1 - OBJECTIVES AND INTENDED OUTCOMES

Objective

To progress a planning proposal to amend the Hornsby LEP to:

- Meet the approval requirements of the *Hornsby Housing Strategy 2020* and grant funding under the *NSW Public Spaces Legacy Program*.
- Give effect to the role and function of the Hornsby Town Centre in dwelling and jobs supply as identified in the *North District Plan*, the *Hornsby Local Strategic Planning Statement 2020*, the *Hornsby Local Housing Strategy 2020*, and the draft HTC Masterplan.
- Initiate the activation and revitalisation of the Hornsby Town Centre according to Council's vision for it as *'A place for people that reflects the uniqueness of the bushland setting, integrated around key public spaces, where the city meets the bush. An active, thriving centre that exhibits economic diversity, design excellence, liveability and sustainability.'*
- To facilitate extensions to the existing RSL, a hotel and serviced apartments, shop top housing and the intensification of other permitted land uses at Site 01, and to facilitate a seniors independent living complex of up to six storeys at Site 02.

Intended Outcomes

- Development that contributes to Hornsby's housing supply and job targets to 2036 by providing housing, jobs and services in mixed use developments close to transport and services and which provides dwelling choice by encouraging shop-top housing and seniors housing in an established and growing town centre.
- Development that reflects an appropriate balance of commercial, residential and community uses that will attract investment, contribute to the rejuvenation of the Hornsby Town Centre, and reinforce and strengthen its viability as a commercial core.
- High quality built-form, sustainability, and amenity outcomes consistent with the urban structure and built form for the Hornsby Town Centre identified in the draft HTC Masterplan.
- Developments that have a net community benefit, and which would not require major direct upgrades to existing public utilities and infrastructure.

PART 2 - EXPLANATION OF PROVISIONS

The subject land and intended outcomes of the proposed amendments to the Hornsby LEP are described below:

Site 01

Hornsby War Memorial Hall

Property No. 2 High Street (Lot 1 DP 585721), Hornsby is owned by the Hornsby War Memorial Hall Committee Incorporated. It contains the Hornsby War Memorial Hall which is included as Heritage Item No. 483 in Schedule 5 – Environmental Heritage of the *Hornsby Local Environmental Plan 2013*.

The site has an area of 987.5sqm, a frontage of 18m and depth of 48m, with its northern boundary along Ashley Lane and its southern and western boundaries adjoining the RSL Club premises at No. 4 High Street. The site is currently zoned B4 Mixed Use.

Hornsby RSL Club High Street Premises and Rear Carpark

Property No. 4 High Street, (Lot 2 DP 817649) Hornsby, is owned by Hornsby RSL Club Limited. It has an area of 6,698qm, a frontage of 40m and depth of 146m along its southern Ashley Street boundary. Its irregular northern boundary adjoins No. 2 High Street and Ashley Lane and its western boundary No. 14 -18 Ashley Street. The entrance to the rear carpark is at Ashley Street. The site is currently zoned B4 Mixed Use.

The planning proposal would:

- Amend the maximum building height control (Height of Buildings Map) for Site 01 from 26.5 metres (8 storeys) to 38.5 metres (12 storeys).

Site 02

Hornsby RSL Club Parcels in Ashley Street and Webb Avenue

Properties No. 7,9,11,15,17 and 19 Ashley Street, Hornsby (Lots 1,2,3,4,5,6 DP222907) and Properties No. 2 and 4 Webb Avenue, Hornsby (Lots 7 and 8 DP 222907) are owned by the Hornsby RSL Club Limited.

The lots are contiguous (there is no Property No. 13 Ashley Street). Consolidated, the lots are approximately 5,492sqm with three street frontages - Ashley Street (northern) at 90m, Forbes Street (eastern) at 60m and Webb Avenue (southern) at 90m. The western boundary adjoins No.21 Ashley Street which is occupied by a dwelling house. The sites are Zoned R3 Medium Density Residential.

The planning proposal would:

- Amend the maximum height of buildings clause (4.3 Height of buildings) and the Height of Buildings Map to allow a maximum building height of 20.5m (6 storeys) **for seniors housing development only** at all the sites, (retaining the maximum building height for all other R3 permitted land uses on the land at 10.5 metres).

More specifically, the *Hornsby Local Environmental Plan 2013* is proposed to be amended as follows:

Hornsby Local Environmental Plan 2013 Section	Proposed amendment
Height of Building Map	Amend Map Sheet HOB_017 to show the maximum building height for the following sites: 1) Property No. 2 High Street (Lot 1 DP 585721): 38.5 metres 2) Property No. 4 High Street, Hornsby (Lot 2 DP 817649): 38.5 metres Amend Map Sheet HOB_017 to define and show 'Area 1' over following sites: 3) Properties No. 7,9,11,15,17 and 19 Ashley Street, Hornsby (Lots 1,2,3,4,5,6 DP222907) and Properties No. 2 and 4 Webb Avenue, Hornsby (Lots 7 and 8 DP 222907)
Clause 4.3 Height of Building	Insert after (2) (1) Despite subclause (2), the height of buildings for development on land identified as 'Area 1' on the Height of Building Map may exceed the building height up to a maximum height of 20.5m if the development is for the purpose of seniors housing only.

Note 1: The draft clauses identified in this table are indicative only and will be subject to legal drafting. Accordingly, the draft clauses may alter in the process of preparing amendments to the Hornsby Local Environmental Plan 2013.

PART 3 – JUSTIFICATION OF STRATEGIC AND SITE-SPECIFIC MERIT

Strategic Merit

Section A - Need for the planning proposal

1. **Is the planning proposal a result of an endorsed LSPS, strategic study or report? Will the planning proposal give effect to the objectives and actions of the applicable regional or district plan or strategy (including any exhibited draft plans or strategies)**

Yes.

The land subject to this planning proposal is in the Hornsby Town Centre. The following strategic documents identify that the Hornsby Town Centre will provide up to 3,500 new dwellings and the bulk of commercial floorspace to 2036 to meet the Shire's long-term housing and job targets:

- The North District Plan;
- Hornsby Local Strategic Planning Statement 2020 (endorsed by the Greater Sydney Commission in March 2020); and
- Hornsby Local Housing Strategy 2020 (approved by the Department of Planning Industry and Environment in May 2021).

The recently completed *Hornsby Town Centre Review Study* explores ways to provide for the Hornsby Town Centre's projected growth and strengthen its economic, employment and housing capacities. The draft HTC Masterplan, as detailed in the Recommendations report, gives effect to the objectives and actions of the State and local strategic planning framework by establishing sustainable transport focused development opportunities and an urban structure with the capacity and development feasibility to meet the State and local housing and jobs targets.

The draft HTC Masterplan applies to the subject sites and identifies them within the "Western heritage" mixed-use development precinct and recommends increased densities. The planning proposal is consistent as it proposes amendments that will increase density and enable development that would contribute to the mix of land uses.

The planning proposal includes a building height incentive for seniors housing. This is generally consistent with the outcomes of the *Hornsby Seniors Housing Demand and Supply Review* which was endorsed by Council in 2020. The Review recommends that planning for Hornsby Shire's growing 65+ population should include looking appropriate locations for independent seniors living units and aged care facilities, as well as other housing options outside age-segregated seniors living.

2. Is the planning proposal the best means of achieving the objectives or intended outcomes, or is there a better way?

Yes.

Proceeding with a stand-alone planning proposal is the best means of achieving the objectives outlined in Part 1.

Amendment of building heights in the HLEP is required to enable development that could feasibly contribute to employment growth, residential supply and the reactivation of the Hornsby Town Centre as identified in State and local strategic land use plans and in the draft HTC Masterplan.

These outcomes would be advanced through amendments to the Hornsby Development Control Plan, giving certainty to both the broad built form outcomes associated with height and fine grain design controls related to integration with the surrounding environment.

Section B - Relationship to strategic planning framework

3. Is the planning proposal consistent with the objectives and actions contained within the applicable regional or sub-regional strategy (including the Sydney Metropolitan Strategy and exhibited draft strategies)?

Yes.

The *Greater Sydney Region Plan - 'A Metropolis of Three Cities'* (Region Plan) and the *North District Plan* (District Plan) establish the strategic planning framework for accommodating Sydney's future population growth and identify key State and local targets such as dwelling numbers, infrastructure planning, liability, sustainability, and productivity. The sites subject to this planning proposal are located within the Hornsby Town Centre which is identified as a strategic centre in the District Plan.

The planning proposal is consistent with all applicable objectives and priorities of NSW Strategic plans. The consistency of the planning proposal with the relevant objectives of the Region Plan and the Planning Priorities of the District Plan, are identified at **Appendix A.**

4. Is the planning proposal consistent with a council LSPS that has been endorsed by the Planning Secretary or GSC, or another endorsed local strategy or strategic plan

Yes.

The Hornsby LSPS was endorsed by the Greater Sydney Commission in March 2020. It identifies that the Hornsby Town Centre, which includes the land in this planning proposal, is a major commercial centre that it will play a critical future role in providing employment, social and retail services for residents both within and surrounding Hornsby LGA. The planning proposal is consistent as it proposes HLEP amendments that will facilitate development that will reinforce role of the Hornsby Town Centre and contribute to it providing services and meeting local housing and jobs targets.

The *Hornsby Local Housing Strategy 2020* (Housing Strategy) outlines Hornsby's 20-year vision and priorities for housing an increase of 32,000 people requiring 14,879 new homes by 2036. It identifies that the majority of new homes will be provided in existing housing precincts, the Hornsby Town Centre and the Cherrybrook Station Precinct.

Local Action 2 (LA2) of the Housing Strategy is to focus future housing opportunities in the Hornsby Town Centre. The Hornsby Town Centre would supply 3,500+ new homes by 2036, mostly in the form of high-density apartments.

A condition of the then Department of Planning, Industry and Environment's approval of the *Hornsby Local Housing Strategy 2020* is that Council submit a planning proposal with any relevant controls required to support rezoning part or all of the HTC Masterplan areas for Gateway Determination by July 2022. This requirement was satisfied by the consideration o the planning proposal at Council's July 2022 meeting and subsequent submission to DPE later that month.

5. **Is the planning proposal consistent with any other applicable State and regional studies or strategies?**

Applicable planning studies and strategies are discussed above.

6. **Is the planning proposal consistent with applicable SEPPs?**

Yes.

The planning proposal are consistent with the appliable. A detailed review of the consistency of the planning proposal with the relevant SEPPs is identified in **Appendix B.**

7. **Is the planning proposal consistent with applicable Ministerial Directions (section 9.1 Directions)?**

Yes.

The planning proposal is consistent with all applicable Section 9.1 Ministerial Directions. A detailed review of the consistency of the planning proposal with the relevant Section 9.1 Ministerial Directions is identified in **Appendix C**.

Matters for Consideration – Site Specific Merit

Section C – environmental, social and economic impact

8. **Is there any likelihood that critical habitat or threatened species, populations or ecological communities, or their habitats, will be adversely affected because of the proposal**

No.

The planning proposal applies to land in the urbanised Hornsby Town Centre. Critical habitat or threatened species, populations or ecological communities, or their habitats would not be impacted.

9. **Are there any other likely environmental effects of the planning proposal and how are they proposed to be managed?**

Yes.

The planning proposal includes an increase to the maximum building height at the transition area between the established Hornsby Town Centre and a medium-to-low-density residential area.

Depending on the future built form approved at development stage, impacts may be related to established urban form, amenity, overshadowing and the local traffic network. It may also have impacts related to heritage. The potential impacts are discussed below:

Urban Form

The new building heights proposed in the planning proposal are consistent with the development concepts in Design Concept 2022 (Design Concept), prepared by Altis at **Attachment 4** and reflect the heights and building envelopes identified for the sites in the draft HTC Masterplan 2022.

The Design Concept illustrates an indicative bult form that could be achieved within the proposed new building heights. The Design Concept **does not** represent the final building form or design, which would be determined at development stage and would be required to comply with *SEPP No. 65 – Design Quality of Residential Apartment Development* (SEPP 65), the *Apartment Design Guide* (ADG) and *State Environmental Planning Policy (Housing) 2021* (Housing SEPP).

The Design Concept reflects the design principle of stepped-down massing on both Sites 01 and 02 with a transition in building heights that taper down to the edges of the Precinct to reduce bulk and scale impacts to surrounding lower density areas. This is consistent with the hierarchy of building heights and desired future character of the Western heritage mixed-use development precinct in the draft HTC Masterplan.

New parking, setback, heritage and height control amendments to the *Hornsby Development Control Plan 2013* (HDCP) are proposed to support the planning proposal and ensure future development does not adversely impact local amenity and heritage values. They include requiring development on Site 01 to be compatible with No. 2 High Street in terms of form, style and character and establishing a car parking rate cap for Site 02 to minimise local traffic impacts. New prescriptive controls for podium heights, building height and setbacks will complement the existing controls for the Hornsby West Side.

The draft HDCP amendments are at **Attachment 8.**

As noted above, future residential development would be required to comply with the SEPP 65. Seniors housing at Site 02 would be required to comply with the more prescriptive design controls and development standards for Seniors Independent Living in the Housing SEPP.

Overshadowing and Solar Access

The Architecture Shadow Diagram and Apartment Design Guide Assessment (Cox Architecture, November 2022) at **Attachment 7** identifies the overshadowing impacts of the indicative built form illustrated in the Design Concept. The assessment also tests the proposed RSL apartments and proposed Seniors Living against the solar access requirements of the ADG, SEPP 65 and the Housing SEPP.

Overshadowing

The shadow diagrams illustrate the overshadowing impacts of the proposed additional building heights considered against:

- The existing built form of the Hornsby Town Centre and surrounds; and

- The future Hornsby Town Centre built form, assuming full development of the draft Masterplan.

The modelling identifies that most overshadowing impacts occur in Forbes Street, Ashley Street and Webb Avenue and that they are attributable to the planning proposal. The report also notes other contributory impacts from the surrounding future built form.

A future development application would be required to demonstrate consistency with relevant guidelines related to overshadowing (ADG or otherwise), including and minimisation of overshadowing of neighbouring properties during mid-winter and requires compliance with solar access criteria.

The overshadowing impacts associated with the Design Concept are indicative and thus represent one potential built form outcome associated with the planning proposal. Given the initial results, it is likely that satisfactory outcomes could be met, subject to design refinement.

Solar Access

The Solar Assessment (Cox Architecture, November 2022) concludes that the proposed residential apartments at Site 01 can meet or exceed the solar access requirements for residential dwellings in the ADG. The assessment identifies that 25 of the proposed 30 units (approx. 83 per cent) would receive at least two hours of direct sunlight during the winter solstice. The assessment also identified that 19 of the proposed units (approx. 63 per cent) would receive at least 3 hours of direct sunlight during the winter solstice. The easternmost apartments of the lower levels 1-4 would receive some direct sunlight for a short duration of time around 9:08 AM and 1:41PM on the winter solstice.

The assessment further notes that all apartments could be designed and configured during the DA stage to receive some direct sunlight during the day to living areas as well as private open space. This suggests that the overall design of Site 01 could potentially meet ADG guidelines regarding solar access.

With regards to the Seniors Living at Site 02, the Solar Assessment shows that the indicative built form would result in approx. 60 per cent of the apartments receiving at least two hours of direct sunlight during the winter solstice. This does not comply with the Housing SEPP that requires for Seniors Living that at least 70 per cent of the dwellings receive at least two hours of direct solar access between 9am and 3pm at mid-winter in living rooms and private open spaces.

This discrepancy is likely due to the transition from the previous State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004 (Seniors Living SEPP) to the current Housing SEPP. The Seniors Living SEPP only established that councils could not refuse consent if at least 70 per cent of dwellings received three hours direct sunlight between 9am and 3pm in mid-winter. As the Design Concept has not been significantly modified within the last year, it does not reflect the more prescriptive solar access control of the Housing SEPP.

The Solar Assessment, notes that there are significant opportunities that could be explored at later design stages or through the development application process to further improve solar access. These could include, but are not limited to:

- Reducing the amount of cut and apartments that are below the ground level of Ashley Street;
- Reorienting some of the "wings" of the buildings;
- Relocating balconies and living areas;
- Redistributing the location of 1/2/3 bedroom apartments within the floorplate, and
- Reconfiguring the built form for the RSL site that casts shadows on to the Seniors Living.

With some, or all of those, considerations above achievable, the Solar Assessment suggests that a future development application for Seniors Living could result in at least 70 per cent of dwellings receive at least two hours of direct solar access between 9am and 3pm at mid-winter in living rooms and private open spaces.

Heritage

The War Memorial Hall at No. 2 High Street is listed as Heritage Item No. 483 in Schedule 5 – Environmental Heritage of the HLEP. It is a prominent building within the Hornsby Town Centre and is of historical, aesthetic, and social heritage significance. Its heritage value is in its association with the Cenotaph on Peat's Ferry Road and the adjacent to the RSL, its International Style architecture and glass façade, its ongoing use, memorial fixtures and layout of its rooms and its design by local architect Ross Innes Aynsley.

The draft HTC Masterplan and Design Concept illustrate building envelopes and a potential urban form outcome for Site 01 within a 12-storey new maximum height limit.

The Heritage Assessment at **Attachment 5** identifies that the envelopes allow for the retention of a two-storey built form in the location of the War Memorial Hall indicating that the proposed additional building height does not mean that the Memorial Hall would be demolished. It further concludes that its retention at the ground level alongside or as part of a new development above, is practicable.

Potential heritage impacts related to the proposed building height of 12 storeys at Site 01 will be managed through existing heritage provisions in the HLEP and existing and new heritage controls in the HDCP. The HDCP adopts a 'whole of building' approach, applies to building exteriors and interiors, and requires that the setting of an item is considered in any development nearby.

The draft HDCP amendments include proposed new site-specific amendments to Part 9.2 – Heritage Items of the HDCP. The amendments require new development at Site 01 to:

- retain the Hornsby War Memorial Hall,
- adopt a high quality and respectful contextual design approach that is sympathetic to and complements the Hall's significant fabric, form, setback, detail and landscaping
- be designed to provide for an integrated and holistic development outcome

The sites are also in proximity to the Peats Ferry Road and Mount Errington Precincts of the Hornsby West Side Heritage Conservation Area (HCA) and heritage items along Peats Ferry Road. Existing and proposed new controls in the HDCP will ensure development on

the subject sites does not adversely impact the heritage values of the Precincts or heritage items in the vicinity.

Traffic and Local Road Network

Many of the previously unresolved traffic issues related to the 2016 RSL Planning Proposal concerned the proposed additional building height and land uses at the RSL and Community Car Park site at William Street, Hornsby.

The Community Car Park site is not included in this planning proposal.

The *Hornsby Town Centre Review* capacity study and traffic modelling allowed for the original RSL Planning Proposal's concepts. Modelling was based on gross floor area and potential overall development yield and not broken down to hotel, residential flat building, or seniors housing land uses. The land uses vary widely with regards to required parking rates, the number of vehicles they would add to the local road network, and their trip generation and distribution local traffic impacts.

Hotel uses require one parking space per room and have varying occupancy rates, often peaking at weekends and holiday periods. Seniors housing only requires 0.5 car space per bedroom and does not usually add substantially to AM or PM traffic volume peaks. It is likely that the development enabled through this planning proposal will generate less parking demand and less additional local traffic at completion than modelled.

The exhibited *Hornsby Town Centre Review Transport Plan 2022* (available on Council's website) identifies the land included in this planning proposal as Stage 1 (0-5 years) development sites within the Western Precinct. The plan also models intersection performance and carrying capacity for the whole Hornsby Town Centre at full draft Masterplan development in 2036. It identifies that the local road network will need to accommodate an increase in traffic of 15 per cent to 20 per cent in the AM peak and 40 per cent to 50 per cent in the PM peak.

A series of transport and infrastructure improvements to support the new urban structure and plan for the envisaged density and vehicle trip increases are recommended. Those with direct relevance to this planning proposal are intersection and road improvements along Peats Ferry Road, Edgeworth David Road, Bridge Road and Station Street, access improvements to an upgraded Hornsby railway station and a redesigned intersection at Peats Ferry Road and High Street that facilitates safe connections between residential areas to the south and the interchange and adjoining precincts.

The improvements are contributions costed and have been staged according to projected development uptake and yield to 2036. Direct contribution nexus would be determined during Council's evaluation of any future development application in the Hornsby Town Centre.

No direct transport and infrastructure or traffic management improvements are required for this planning proposal as:

- the intensified land uses on the sites identified in the Design Concept are likely to generate less parking demand and less additional local traffic at completion than modelled in the *Hornsby Town Centre Review*;

- amendments to the Hornsby Development Control Plan 2014 to cap the allowable car parking for Seniors Housing at Site 02 are proposed;
- traffic generated by hotel, registered club and seniors housing uses is spread throughout the day, rather than adding substantially to AM and PM peaks;
- development will occur in draft HTC Masterplan Stage 1 (0-5 years) and can be accommodated within existing service and infrastructure capacity; and
- The sites' proximity to the Hornsby Transport Interchange, the Hornsby Town Centre and existing services reduces car reliance and use.

10. Has the planning proposal adequately addressed any social and economic effects?

Yes.

The planning proposal is supported by the technical studies and assessments prepared for the 2016 RSL Planning Proposal and during the development of the draft HTC Masterplan.

The exhibited *Economic Development and Employment Land Uses* study (available on Council's website), which informs the draft HTC Masterplan, makes observations about growth feasibility of the Hornsby Town Centre. It identifies the point at which financial viability is likely to be reached at a site to justify development. The tipping point is based on a selection of building typologies. While the study did not specifically test the sites subject to this planning proposal, it notes regarding the Western Heritage Precinct, within which the sites are located, that:

> *'Redevelopment in this precinct will in the short term be driven by major proposed redevelopments of Club owned land and 187-203 Peats Ferry Road. Our feasibility analysis showed that ……the precinct will likely be redeveloped over the medium to longer term'.*

The additional building heights proposed would allow the expansion of the RSL facilities and sufficient floorspace for a hotel development, shop top housing and other permitted uses on Site 01. Their construction and operation would contribute to job and housing targets outlined in the draft North District Plan and in local strategic plans, would strengthen the social and community benefits that the RSL provides and promote greater interaction between people visiting, living and interacting in the overall development.

While the hotel will provide an economic benefit to the RSL, it would also provide new jobs in the hospitality, administration, marketing and construction/trades sectors to the local area. It may also have an attractor and multiplier benefit to the local economy as the Hornsby Town Centre is not currently serviced with high quality accommodation, function centre or conferencing facilities. An additional residential population would stimulate local goods and services demand.

The land uses proposed for Site 01 are identified in the Design Concept. They are RSL extensions, 126 hotel/serviced apartments, and 30 residential apartments in the form of

shop-top housing. The land uses proposed for Site 02 are Seniors Independent Living – 106 units. Long term job creation (excluding construction) is estimated at:

Element	Job creation (operational)
Hotel rooms/serviced apartments (126 units)	72
RSL extensions ground level	27
RSL extensions other levels	48
Seniors Living	8
Total	153

The building height incentive for seniors housing on Site 02 would address the growing demand for seniors housing within the broader community in locations readily accessible to support services, transport and entertainment, encourage and facilitate seniors housing supply overall and contribute to the provision of seniors housing dwelling type choice.

Section D – Infrastructure (Local, State and Commonwealth)

11. Is there adequate public infrastructure for the planning proposal?

Yes.

Services are available in the vicinity of the site. The planning proposal would not impose any unacceptable additional demands on local infrastructure, public or community services. The sites are near existing bus and train services (approximately 400m).

The Recommendations report identifies a range of public infrastructure improvements associated with the growth of the Hornsby Town Centre to 2036. They include enhanced access to public transport, permeability, and linkage recommendations, and upgrading community facilities and open spaces. The development enabled through the planning proposal would be serviced long-term by these improvements and will contribute to their provision through monetary contributions as established and required in infrastructure and development contributions planning that is being undertaken as part of the overall Hornsby Town Centre Review.

Section E – State and Commonwealth Interests

12. What are the views of state and federal public authorities and government agencies consulted in order to inform the Gateway determination?

Consultation would occur with the public authorities identified in the Gateway Determination, including but not limited to, Transport for NSW, NSW Police, Sydney Water and the NSW Fire Service.

PART 4 - MAPS

1. Information Maps: Location, Land Use Zones and Building Heights.

Figures 1 and 2 – Location and Site Identification Maps

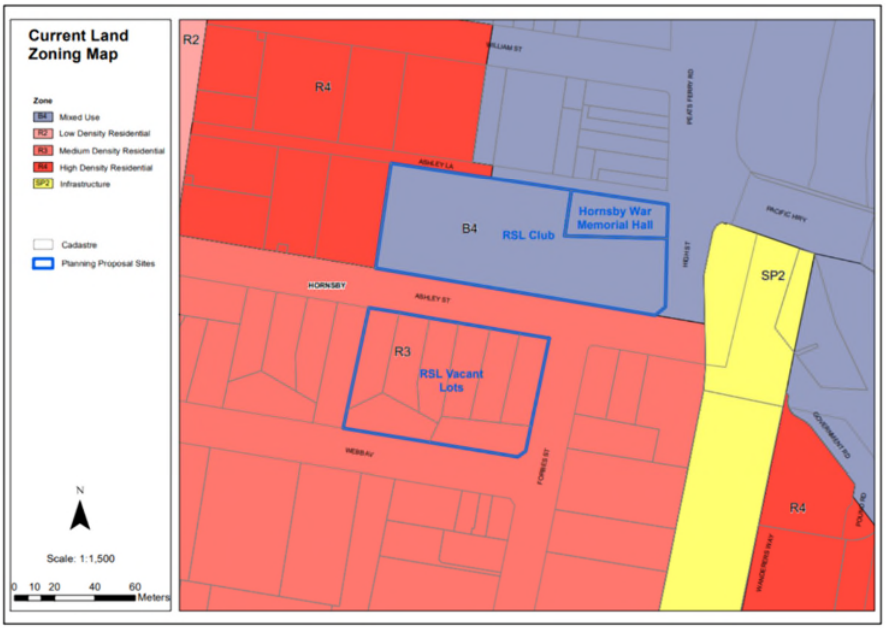
The subject sites are edged red. The Hornsby Town Centre is edged heavy blue.

Figure 1 – Subject Sites Detail

Figure 2 – Subject Sites in HTC context

Figure 3 – Existing Land Use Zones

The subject sites are identified edged blue.



2. Proposed Map Amendment: Height of Buildings Map

The Planning Proposal seeks to amend Sheet 17 Height of Buildings Map. The current maximum heights for the subject sites and their vicinity are identified in **Figure 5** and the proposed heights are illustrated in **Figure 6** below.

The subject sites are identified edged blue.

Figure 4 – Current Height of Building

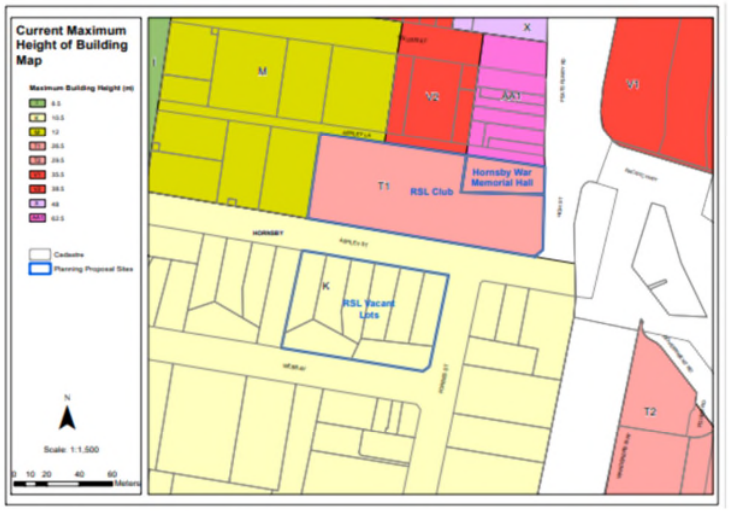
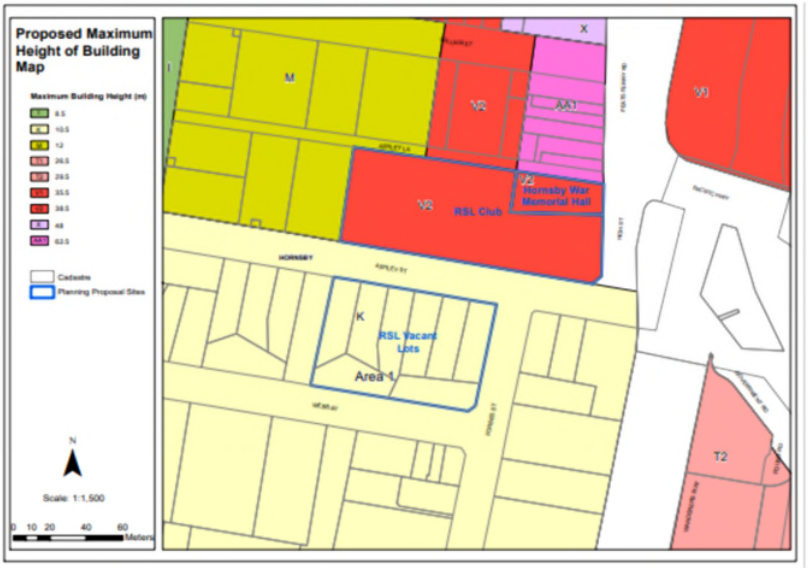


Figure 5 – Proposed Maximum Height of Building



PART 5 - COMMUNITY CONSULTATION

Consultation and outcomes undertaken with council, state agencies or authorities to date.

The development of the Hornsby Town Centre Masterplan, of which these sites form part, was informed by consultation with several state agencies and authorities. The consultation has been in the form of letters, emails, presentations at meetings and a Co-Design workshop. Agencies involved over time include:

- Department of Planning and Environment;
- Greater Cities Commission;
- Transport for NSW;
- Sydney Trains;
- NSW Health;
- NSW TAFE; and
- NSW Education.

Any community consultation undertaken, or consultation with other key stakeholders

Preliminary exhibition of the 2016 RSL Club Planning Proposal indicated that traffic was the main issue with the proposal. Council subsequently resolved not to progress with the RSL planning proposal until the traffic issues could be considered as part of the entire draft HTC Masterplan.

The draft HTC Masterplan, including supporting technical documents, was exhibited for public comment in August and September 2022. A submissions report on the draft HTC Masterplan is planned to be considered by Council in 2023.

Discussions with the community about the Hornsby Town Centre in its entirety since 2016 and during the HTC Review has included:

- Pop up sessions in Hornsby Mall;
- Exhibition of the Town Centre Vision and Principles as part of the LSPS exhibition;
- Land owner drop-in sessions; and
- A Co-Design workshop with agency stakeholders.

Consultation Strategy

The following consultation strategy is consistent with the *Hornsby Shire Community Engagement Plan 2021* and the Public Exhibition requirements of the *Local Environmental Plan Making Guidelines 2021*. It may be amended by the requirements of the Gateway Determination. It will include:

Advertisements in local Publications

An advertisement would be placed in the Hornsby Ku-ring-gai Post identifying the purpose of the planning proposal and providing a web-link to where the Planning Proposal can be viewed.

Advertisement on the Council website

The planning proposal would be exhibited on Council's 'Yoursay' public exhibition website.

ENews

An advertisement would be placed in Council's electronic newsletter.

Letters to affected owners

A letter would be sent to landowners who adjoin or are near the sites.

Displays at the Council Administration Buildings and local libraries

The Planning Proposal would be displayed at the Council Chambers, 296 Pacific Highway, Hornsby, and the Hornsby Library.

Consultation with Authorities

In accordance with Gateway Condition 3, consultation with the following public authorities will be undertaken via the Planning Portal during public exhibition of the Planning Proposal:

- Transport for NSW
- Sydney Trains
- NSW Police
- Sydney Water
- Endeavour Energy
- NSW Rural Fire Service.

Each public authority will be provided with a copy of the planning proposal and links to any relevant supporting material and given at least 25 days to comment on the proposal.

PART 6 – PROJECT TIMELINE

Indicative Project Outline - Standard Planning Proposal

Stage	Timeframe
Consultation with DPE	April 2022
Develop planning proposal	May to July 2022
Council decision	July 2022
Gateway determination	July to August 2022
Pre exhibition	August to December 2022
Public exhibition	December 2022 to January 2023
Consideration of submissions	February 2023
Council decision	April 2023
Finalisation of LEP amendment	April to July 2023

Appendix A – State Planning Framework Checklist

Relevant GSRP Objective and NDP Priority	Consistency Comment
GSRP: A city supported by infrastructure **NDP: Planning Priority N1** Planning for a city supported by infrastructure	**Consistent.** The proposal would not add to public infrastructure requirements. The sites are within walking distance of public transport (trains and buses), and a range of services are nearby including a library, parks, hospital and aquatic centre. Any specific local infrastructure requirements arising from the future development of the sites would be determined and assessed at development phase. The HTC Review recommendations include a range of public infrastructure improvements to 2036.
GSRP: A city for people **NDP: Planning Priority N3** Providing services and social infrastructure to meet people's changing needs **NDP: Planning Priority N4** Fostering healthy, creative, culturally rich and socially connected communities	**Consistent** The proposal would provide floorspace for developments that would strengthen the social and community benefits that the RSL Club provides. The senior's housing development associated with the RSL Club would provide access for future residents to community and support groups hosted by the Club and promote greater interaction between people visiting, living and interacting in the development.
GSRP: Housing the city **NDP: Planning Priority N5** Providing housing supply, choice and affordability, with access to jobs, services and public transport	**Consistent** The proposal aims to deliver dwelling supply and choice by encouraging shop-top housing and seniors housing in an established town centre close to services, shops and recreation opportunities. The proposal will contribute to the renewal and revitalisation of the HTC and is estimated to provide 106 seniors living units and 30 residential apartments in the form of shop-top housing.
GSRP: A City of great places **NDP: Planning Priority N6:** Creating and renewing great places and local centres, and respecting the District's heritage	**Consistent** The proposal aims to provide for development that reflects an appropriate balance of commercial, residential and community uses that will contribute to the rejuvenation of the Hornsby Town Centre and reinforce and strengthen its viability as a commercial core. Its built form is consistent with the urban structure and concepts identified in the draft HTC Masterplan. Potential heritage impacts related to the proposed building height of 12 storeys at Site 01 are to be managed through amendments to the building setback and height controls in Part 4.5 – Hornsby Town Centre in the *Hornsby Development Control Plan 2013* (HDCP), existing heritage provisions of the HLEP and existing and new controls Part 9 – Heritage of the HDCP including the requirement for new development at Site 01 to retain the War Memorial Hall, adopt a high quality and respectful

Relevant GSRP Objective and NDP Priority	Consistency Comment
	contextual design that is sympathetic to and complements the Hall's significant fabric, form, setback, detail and landscaping, and be designed to provide for an integrated and holistic development across Site 01.
GSRP: A well connected City **NDP: Planning Priority N12** Delivering integrated land use and transport planning and a 30-minute city	**Consistent** The proposal provides for increased densities to facilitate high quality residential, registered club and visitor accommodation uses near Hornsby Railway Station and bus interchange (approximately 400m).
GSRP: Jobs and skills for the city **NDP: Planning Priority N10** Growing investment, business opportunities and jobs in strategic centres	**Consistent** The additional building heights to allow expanded Club facilities, a hotel development and housing would assist with meeting the short term (construction) and long term (operation) job targets outlined in the draft North District Plan and in local strategic plans. The proposal may also have an attractor and multiplier benefit to the local economy as the Hornsby Town Centre is not currently serviced with high quality accommodation, function centre and conferencing facilities. Based on the land use footprints identified in the Altis Design Concept 2022, the long-term job creation is estimated at: 114 hotel rooms/serviced apartments = 70 Club extension ground level = 27 2,610sqm club extension levels 1-3 = 48. Seniors Living = 08 **Total = 153**
GSRP: Valuing green spaces and landscape **NDP: Planning Priority N16** Protecting and enhancing bushland and biodiversity **NDP: Planning Priority N17** Protecting and enhancing scenic and cultural landscapes **NDP: Planning Priority N19** Increasing urban tree canopy cover and delivering Green Grid connections	**Consistent** The proposal is limited to redevelopment within the commercial core of an established urban centre. In that, it is consistent with Council policies to retain and protect bushland and landscapes of value. The draft HTC Masterplan landscape and public domain recommendations include open and green infrastructure network including an interconnected tree canopy. Any development application would be required to be consistent with these and existing applicable tree planting requirements controls for the HTC West Precinct in the HDCP 2013.

Relevant GSRP Objective and NDP Priority	Consistency Comment
GSRP: An efficient city **NDP: Planning Priority N21** Reducing carbon emissions and managing energy, water and waste efficiently	**Consistent** The proposal applies to land near Hornsby Railway Station and bus interchange (approximately 150m), reducing the need for private vehicle usage. Any development application would be required to be consistent with the building sustainability, energy, water supply and waste requirements of Part 1 of the HDCP 2013 and be consistent with any applicable sustainability provisions of the ADG, SEPP 65 and the Housing SEPP.
GSRP: A resilient city **NDP: Planning Priority N22** Adapting to the impacts of urban and natural hazards and climate change	**Consistent** Any development application would be required to be consistent with the building sustainability, energy, water supply and waste requirements of Part 1 of the HDCP 2013 and be consistent with any applicable sustainability provisions of the Housing SEPP.

Appendix B – State Environmental Planning Policies Checklist

SEPP	Consistency Comment
Housing SEPP 2021 **Chapter 1 – Preliminary** **3 Principals of Policy** (b) encouraging the development of housing that will meet the needs of more vulnerable members of the community, including very low to moderate income households, seniors and people with a disability, (d) promoting the planning and delivery of housing in locations where it will make good use of existing and planned infrastructure and services	**Consistent** The proposal provides additional building heights for seniors housing and shop-top housing, providing a supply incentive to satisfy growing demand in a location near services, transport, retail and entertainment opportunities.
Housing SEPP 2021 **Part 5 – Housing for Seniors and People with a Disability** **84 – Development Standards - general** (c) for development on land in a residential zone where residential flat buildings are not permitted— (i) the development will not result in a building with a height of more than 9.5m, excluding servicing equipment on the roof of the building, and (iii) if the development results in a building with more than 2 storeys—the additional storeys are set back within planes that project at an angle of 45 degrees inwards from all side and rear boundaries of the site. **87 – Additional Floor Space Ratios** (2)(b)(i) for development involving independent living units—an additional 15% of the maximum permissible floor space ratio if the additional floor space is used only for the purposes of independent living units	**Consistent** The proposal provides a maximum height of buildings to 20.5m (6 storeys) for seniors housing development only on R3 Medium Density land in Site 02. Residential flat buildings are permissible with consent on R3 Medium Density land. FSR does not apply to Site 02. Consequently, neither the building height restriction of 9.5m nor the Seniors housing FSR bonus in the SEPP apply. Development controls applicable to a senior's development on Site 02 will be exhibited with the planning proposal. They are consistent with the controls of the SEPP and provide for setback and height transitions to surrounding residential development.

SEPP	Consistency Comment
Housing SEPP 2021 **93 – Site related requirements**	**Consistent** The proposal would address the growing demand for seniors housing within the broader community in a location readily accessible to support services, retail rail and bus transport within 400m and entertainment.
Housing SEPP 2021 **108 – Non-discretionary development standards for independent living units**	**Consistent** – see 84 above. With regards to Solar access, the Solar Assessment shows that the indicative built form would result in 60% of the seniors living apartments on Site 02 receiving at least 2 hours of direct sunlight during the winter solstice. This does not comply with the Housing SEPP that requires at least 70% of the dwellings receive at least 2 hours of direct solar access between 9am and 3pm at mid-winter in living rooms and private open spaces. This discrepancy is likely due to the transition to prescriptive controls in the Housing SEPP from the previous Seniors Housing SEPP which only identified where meeting certain solar outcomes could not be used to refuse consent. As the Design Concept has not been significantly updated since the introduction of the Housing SEPP, it does not fully consider the new prescriptive requirements. The Solar Assessment, notes that there are significant opportunities that could be explored at later design stages or through a Development Application process to further improve solar access. These could include, but are not limited to: • Reducing the amount of cut and apartments that are below the ground level of Ashley Street • Reorienting some of the "wings" of the buildings • Relocating balconies and living areas • Redistributing the location of 1/2/3 bedroom apartments within the floorplate, and • Reconfiguring the built form for the RSL site that casts shadows on to the Seniors Living. With some, or all of those, considerations above achievable, the Solar Assessment indicates that a future Seniors Living proposal could comply with at least 70% of the dwellings receive at least 2 hours of direct solar access between 9am and 3pm at mid-winter in living rooms and private open spaces.
Housing SEPP 2021 **Schedule 4 – Standards concerning accessibility and usability for hostels and independent living units**	**Consistent** All applicable accessibility and usability standards for seniors housing will apply to a seniors development on Site 02.
SEPP (Resources and Energy) 2021	**Not Applicable**

SEPP	Consistency Comment
SEPP (Industry and Employment) 2021	**Not Applicable**
SEPP (Resources and Energy) 2021	**Not Applicable**
SEPP (Transport and Infrastructure) 2021	**Not Applicable**
SEPP (Resilience and Hazards) 2021	**Not Applicable**
SEPP (Exempt and Complying Development Codes) 2008	**Not Applicable**
SEPP (Planning Systems) 2021	**Not Applicable**
SEPP (Precincts – Eastern Harbour City) 2021	**Not Applicable**
SEPP (Biodiversity and Conservation) 2021	**Not Applicable**
SEPP (Primary Production) 2021	**Not Applicable**
SEPP (Sustainable Buildings) 2022	**Commences October 2023**
SEPP No. 65 – Design Quality of Residential Apartment Development	**Consistent.** Subject to the lodgement of a future development application to Council, design requirements of the residential flat buildings and serviced apartments would be assessed against the SEPP and the Apartment Design Guide. The Solar Assessment concludes that the proposed residential apartments at Site 01 can meet or exceed the solar access requirements for residential dwellings in the ADG. The assessment further notes that all apartments could be designed and configured during the DA stage to receive some direct sunlight during the day to living areas as well as private open space. The proposal would also be referred to Council's Design Excellence Panel for comment pursuant to the Design Excellence provisions of the *HLEP 2013*.

Appendix C – Section 9.1 Local Planning Directions Checklist

Focus Area	Consistency Comment
Focus Area 1: Planning Systems **1.3 Approval and Referral Requirements**	**Consistent** The planning proposal does not include any concurrence, consultation or referral provisions to a Minister or a Public Authority.
Focus Area 1: Place Based	**Not Applicable**
Focus Area 2: Draft Design and Place	**Not Made**
Focus Area 3: Biodiversity and Conservation **3.2 Heritage Conservation Objective** The objective of this direction is to conserve items, areas, objects and places of environmental heritage significance and indigenous heritage significance	**Consistent** Potential heritage impacts related to the proposed building height of 12 storeys at Site 01, will be managed through the existing heritage provisions of the Hornsby LEP and existing and proposed new Desired Outcomes and Prescriptive Measures of Part 9.2 – Heritage Items of the *Hornsby Development Control Plan 2013* (HDCP). The HDCP provisions adopt a 'whole of building' approach, apply to building exteriors and interiors, and require that the setting of an item is considered in any development nearby. Proposed new controls include the requirement for new development at Site 01 to retain the War Memorial Hall, adopt a high quality and respectful contextual design that is sympathetic to and complements the Hall's significant fabric, form, setback, detail and landscaping and be designed to provide for an integrated and holistic development outcome across both sites.
Focus Area 4: Resilience and Hazards	**Not Applicable**
Focus Area 5 - Transport and Infrastructure **5.1 Integrating Land Use and Transport**	**Consistent** The proposal provides increased density and high quality residential, registered club and visitor accommodation uses near Hornsby Railway Station and bus interchange (approximately 400m). No direct transport and infrastructure improvements are required for this planning proposal as: • the intensified land uses on the sites identified in the Concept Plan are likely to generate less parking demand and less additional local traffic at completion than modelled in the Hornsby Town Centre Review • traffic generated by hotel, club and seniors housing uses is spread throughout the day, rather than adding substantially to AM and PM peaks • development will occur in Stage 1 (0-5 years) and can be accommodated within existing service and infrastructure capacity • The sites' proximity to the Hornsby Transport Interchange, the HTC and existing services reduces car reliance and use.
Focus Area 6 - Housing	**Consistent**

Focus Area	Consistency Comment
6.1 Residential Zones Direction 6.1 (1) A planning proposal must include provisions that encourage the provision of housing that will: (a) broaden the choice of building types and locations available in the housing market, and (b) make more efficient use of existing infrastructure and services, and (c) reduce the consumption of land for housing and associated urban development on the urban fringe, and (d) be of good design.	The proposal provides additional building heights for seniors housing and shop-top housing, providing a supply incentive to satisfy growing demand in a location near services, transport, retail and entertainment opportunities. The proposal will contribute to the renewal and revitalisation of the HTC. The proposal has been informed by indicative building envelopes that have taken surrounding land use and built form into consideration with regards to potential amenity and privacy impacts.
Focus Area 7 - Industry and Employment **7.1 Business and Industrial Zones** The objectives of this direction are to: (a) encourage employment growth in suitable locations, (b) protect employment land in business and industrial zones, and (c) support the viability of identified centres.	**Consistent** The proposal aims to deliver development that reflects an appropriate balance of commercial, residential and community uses that will contribute to the rejuvenation of the Hornsby Town Centre, and reinforce and strengthen its viability as a commercial core. The additional building heights to allow expanded Club facilities and a hotel development and shop top housing would assist with meeting the short term (construction) and long term (operation) job targets outlined in the draft North District Plan and in local strategic plans. The proposal may also have an attractor and multiplier benefit to the local economy as the HTC is not currently serviced with high quality accommodation, function centre and conferencing facilities. The land uses proposed for Site 01 are RSL Club extensions, hotel/serviced apartments, and shop-top housing in the form of 30 residential apartments. The land uses proposed for Site 02 are Seniors Independent Living – 110 units. Based on the land use footprints identified in the Altis Concept Plan 2022, 153 long-term jobs are estimated.
Focus Area 8: Resources and Energy	**Not Applicable**
Focus Area 9: Primary Production	**Not Applicable**

ATTACHMENT 2 - ITEM 4

Supporting attachments

Attachment 1 – Council report 13 July 2022
Attachment 2 – Council minutes 13 July 2022
Attachment 3 – Gateway determination
Attachment 4 – Indicative Design Concept 2022
Attachment 5 – Heritage Impact Assessment 2022
Attachment 6 – Design Statement 2022
Attachment 7 – Shadow Diagrams and Apartment Design Guide Assessment
Attachment 8 – Draft Amendments to the *Hornsby Development Control Plan 2013*

ATTACHMENT 2 - ITEM 4

ATTACHMENT 1 – Council Report 13 July 2022

ATTACHMENT 2 - ITEM 4

HORNSBY SHIRE COUNCIL

BUSINESS PAPER

GENERAL MEETING

Wednesday 13 July 2022
at 6:30PM

ATTACHMENT 2 - ITEM 4

TABLE OF CONTENTS

ATTACHMENT 2 - ITEM 4

SUPPLEMENTARY AGENDA

MATTERS OF URGENCY

ATTACHMENT 2 - ITEM 4

AGENDA AND SUMMARY OF RECOMMENDATIONS

PRESENT

NATIONAL ANTHEM

OPENING PRAYER/S

Pastor David Nathan of The Hive Church, Hornsby opened the meeting in prayer.

ACKNOWLEDGEMENT OF RELIGIOUS DIVERSITY

Statement by the Chairperson:

"We recognise our Shire's rich cultural and religious diversity and we acknowledge and pay respect to the beliefs of all members of our community, regardless of creed or faith."

ACKNOWLEDGEMENT OF COUNTRY

Statement by the Chairperson:

"Council recognises the Traditional Owners of the lands of Hornsby Shire, the Darug and GuriNgai peoples, and pays respect to their Ancestors and Elders past and present and to their Heritage. We acknowledge and uphold their intrinsic connections and continuing relationships to Country."

VIDEO AND AUDIO RECORDING OF COUNCIL MEETING

Statement by the Chairperson:

"I advise all present that tonight's meeting is being video streamed live via Council's website and also audio recorded for the purposes of providing a record of public comment at the meeting, supporting the democratic process, broadening knowledge and participation in community affairs, and demonstrating Council's commitment to openness and accountability. The audio and video recordings of the non-confidential parts of the meeting will be made available on Council's website once the Minutes have been finalised. All speakers are requested to ensure their comments are relevant to the issue at hand and to refrain from making personal comments or criticisms. No other persons are permitted to record the Meeting, unless specifically authorised by Council to do so."

APOLOGIES / LEAVE OF ABSENCE

POLITICAL DONATIONS DISCLOSURE

Statement by the Chairperson:

"In accordance with Section 10.4 of the Environmental Planning and Assessment Act 1979, any person or organisation who has made a relevant planning application or a submission in respect of a relevant planning application which is on tonight's agenda, and who has made a reportable political

donation or gift to a Councillor or employee of the Council, must make a Political Donations Disclosure Statement.

If a Councillor or employee has received a reportable political donation or gift from a person or organisation who has made a relevant planning application or a submission in respect of a relevant planning application which is on tonight's agenda, they must declare a non-pecuniary conflict of interests to the meeting, disclose the nature of the interest and manage the conflict of interests in accordance with Council's Code of Conduct."

DECLARATIONS OF INTEREST

Councillors are reminded of their Oath or Affirmation of Office made under section 233A of the Act and their obligations under the Council's Code of Conduct to disclose and appropriately manage conflicts of interest.

Clause 4.16 and 4.17 of Council's Code of Conduct for Councillors requires that a councillor or a member of a Council committee who has a pecuniary interest in a matter which is before the Council or committee and who is present at a meeting of the Council or committee at which the matter is being considered must disclose the nature of the interest to the meeting as soon as practicable. The disclosure is also to be submitted in writing (on the form titled "Declaration of Interest").

4.16 A councillor who has a pecuniary interest in any matter with which the council is concerned, and who is present at a meeting of the council or committee at which the matter is being considered, must disclose the nature of the interest to the meeting as soon as practicable.

4.17 The councillor must not be present at, or in sight of, the meeting of the council or committee:

- *at any time during which the matter is being considered or discussed by the council or committee, or*
- *at any time during which the council or committee is voting on any question in relation to the matter.*

Clause 5.10 and 5.11 of Council's Code of Conduct for Councillors requires that a councillor or a member of a Council committee who has a non pecuniary interest in a matter which is before the Council or committee and who is present at a meeting of the Council or committee at which the matter is being considered must disclose the nature of the interest to the meeting as soon as practicable. The disclosure is also to be submitted in writing (on the form titled "Declaration of Interest").

5.10 Significant non-pecuniary conflict of interests must be managed in one of two ways:

- *by not participating in consideration of, or decision making in relation to, the matter in which you have the significant non-pecuniary conflict of interest and the matter being allocated to another person for consideration or determination, or*
- *if the significant non-pecuniary conflict of interest arises in relation to a matter under consideration at a council or committee meeting, by managing the conflict of interest as if you had a pecuniary interest in the matter by complying with clauses 4.16 and 4.17.*

5.11 If you determine that you have a non-pecuniary conflict of interest in a matter that is not significant and does not require further action, when disclosing the interest you must also

explain in writing why you consider that the non-pecuniary conflict of interest is not significant and does not require further action in the circumstances.

CONFIRMATION OF MINUTES

THAT the Minutes of the General Meeting held on 8 June, 2022 be confirmed; a copy having been distributed to all Councillors.

THAT the Minutes of the Workshop Meeting held on 29 June, 2022 be confirmed; a copy having been distributed to all Councillors.

PETITIONS

PRESENTATIONS

RESCISSION MOTIONS

MAYORAL MINUTES

ITEMS PASSED BY EXCEPTION / CALL FOR SPEAKERS ON AGENDA ITEMS

Note:

Persons wishing to address Council on matters which are on the Agenda are permitted to speak, prior to the item being discussed, and their names will be recorded in the Minutes in respect of that particular item.

*Persons wishing to address Council on **non agenda matters,** are permitted to speak after all items on the agenda in respect of which there is a speaker from the public have been finalised by Council. Their names will be recorded in the Minutes under the heading "Public Forum for Non Agenda Items".*

GENERAL BUSINESS

- *Items for which there is a Public Forum Speaker*
- *Public Forum for non agenda items*
- *Balance of General Business items*

OFFICE OF THE GENERAL MANAGER

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Item 1 GM24/22 CAR PARKING MANAGEMENT - BROOKLYN

RECOMMENDATION

THAT:

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ITEM 10

Director's Report No. PC17/22
Planning and Compliance Division
Date of Meeting: 13/07/2022

10 PLANNING PROPOSAL - HIGH STREET AND ASHLEY STREET, HORNSBY

EXECUTIVE SUMMARY

- This Council initiated Planning Proposal seeks to amend the *Hornsby Local Environmental Plan 2013* to increase the maximum building height for Properties No. 2 and No. 4 High Street Hornsby to 12 storeys (38.5 metres), and to increase the maximum building height for Properties Nos. 7, 9,11,15,17 and 19 Ashley Street Hornsby and Nos. 2 and 4 Webb Avenue, Hornsby to 20.5m (6 storeys) for seniors housing development only.
- The Planning Proposal is consistent with the urban density recommendations of the draft *Hornsby Town Centre Masterplan* (HTC Masterplan) and would facilitate the club, hotel and residential concepts of a previous Planning Proposal submitted by the RSL in 2016.
- The Planning Proposal is being progressed to meet a condition of the approval of the *Hornsby Local Housing Strategy 2020* (LHS) and to comply with Council's grant funding agreement under the *NSW Public Spaces Legacy Program* (PSLP).
- On 25 May 2022, the Local Planning Panel reviewed and provided advice on the Planning Proposal in accordance with the Local Planning Panels Direction. The Panel supported progression to Gateway subject to appropriate building height transition controls to surrounding residential development for the Ashley Street and Webb Avenue sites.
- The Planning Proposal is attached to this report and is supported draft building height transition and setback amendments to the *Hornsby Development Control Plan 2013.*
- The Planning Proposal would satisfy the Department's Housing Strategy condition and is consistent with all applicable objectives and priorities of NSW State Strategic plans, Section 9.1 Ministerial Directions and Council Strategic land use plans.

RECOMMENDATION

THAT:

1. Council endorse the progression of the High Street and Ashley Street Planning Proposal attached to Director's Report No. PC17/22 for submission to the Department and Planning and Environment for a Gateway Determination.
2. Subject to receipt of a Gateway Determination, the Planning Proposal be publicly exhibited in accordance with the consultation strategy identified in this report.
3. Council endorse the amendments to the Hornsby Development Control Plan attached to Director's Report No. PC17/22 for exhibition concurrently with the Planning Proposal.
4. Following exhibition, a report on submissions be presented to Council for its consideration.

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PURPOSE

The purpose of this Report is to present a Council initiated Planning Proposal consistent with the draft Hornsby Town Centre Masterplan and conditions of the Department of Planning and Environment's approval of the Hornsby *LHS* and grant funding under the PSLP.

BACKGROUND

2016 RSL Club Planning Proposal

In May 2016, a Planning Proposal was submitted on behalf of the Hornsby RSL Club to increase building heights and permit additional land uses on its landholdings in Hornsby, including the club premises at No. 4 High Street, and its land at Ashley Street and Webb Avenue. At that time, the Planning Proposal did not include Property No. 2 High Street (the Hornsby War Memorial Hall).

Following preliminary exhibition and a Gateway Determination in June 2017, the proposal was amended and formally exhibited in early 2018. Council's assessment concluded the Proposal raised traffic related issues unresolvable through the Planning Proposal in isolation and the Club requested withdrawal of the proposal in May 2019. At its meeting on 14 August 2019, considered Director's Report No. PL22/19 and resolved (in part) that:

- *Council not proceed with the Hornsby RSL Club Planning Proposal and associated draft DCP amendments and write to the Minister to advise of this decision made under delegation.*
- *The Hornsby Town Centre Review Study Area be extended to include the Hornsby RSL Club land holdings at property Nos. 7-19 Ashley Street and 2-4 Webb Avenue, Hornsby.*

Hornsby Town Centre Review

In 2018, Council initiated the *Hornsby Town Centre Review* (HTC Review) in response to the release of the draft *North District Plan* (NDP) and the initial outcomes of an earlier review of the planning controls and development feasibility of the Hornsby east side. In accordance with Council's resolution in August 2019, the HTC Review study area includes the sites subject to this planning proposal.

The aims of the *Hornsby Town Centre Review* are to develop a structure plan that would provide for projected growth, strengthen the economic, employment and housing capacities of the HTC, improve the public domain and activate the commercial core. The principal outcome of the HTC Review is the *draft Hornsby Town Centre Masterplan* (HTC Masterplan).

The HTC Masterplan identifies that the land subject to this Planning Proposal is part of the "Western heritage" mixed-use development precinct and establishes No. 4 High Street for 'Entertainment and dining' activities. The Masterplan recommends increasing the maximum building height for Site 13 (Nos. 2 and 4 High Street) to 38.5m (12 storeys) and Site 14 (Hornsby RSL owned land at Ashley Street and Webb Avenue) to 20.5m (6 storeys). The HTC Masterplan is the subject of a separate report for consideration by Council at its July meeting.

DISCUSSION

This report presents the High Street and Ashley Street Planning Proposal for endorsement to seek a Gateway Determination to enable formal community consultation. It also presents associated amendments to the HDCP, to be exhibited concurrently with the Planning Proposal, after a Gateway Determination is received.

The objectives of the Planning Proposal are to:

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- Initiate the activation and revitalisation of the HTC according to the mixed land uses and development densities identified in the draft HTC Masterplan.
- Facilitate development of RSL Club landholdings at High Street, Ashley Street, and Webb Avenue, Hornsby as identified in the 2016 RSL Planning Proposal.
- Meet the approval requirements of the Hornsby LHS and grant funding under the NSW PSLP.

1. THE SITES

No. 2 and No. 4 High Street, Hornsby

Property No. 2 High Street, Hornsby contains the existing heritage listed Hornsby War Memorial Hall (Heritage Item No. 483) which is owned by the Hornsby War Memorial Hall Committee Incorporated. It has an area of 987.5sqm, a frontage of 18m and depth of 48m. Its northern boundary is along Ashley Lane and its southern and western boundaries adjoin the RSL club premises at No. 4 High Street.

Property No. 4 High Street, Hornsby is the existing Hornsby RSL Club premises and a rear at-grade car park. The Lot has an area of 6,698qm, a frontage of 40m and depth of 146m along Ashley Street. Its irregular northern boundary adjoins No. 2 High Street and Ashley Lane and its western boundary adjoins Nos. 14-18 Ashley Street. A secondary frontage to the Club premises and the main entrance to the rear carpark are along Ashley Street.

Both sites are Zoned B4 – Mixed Use and no change is proposed to the Zone or permissible land uses.

RSL land at Ashley Street and Webb Avenue, Hornsby

Properties Nos. 7,9,11,15,17 and 19 Ashley Street Hornsby and Properties No. 2 and 4 Webb Avenue Hornsby are all owned by the Hornsby RSL Club and are vacant except for No.19 Ashley Street, which is occupied by a dwelling house.

The Ashley Street and Webb Avenue lots are contiguous (there is no Property No. 13 Ashley Street) and have combined area of approximately 5,492sqm. As a consolidated development site, they would have three street frontages - Ashley Street (northern) at 90m, Forbes Street (eastern) at 60m and Webb Avenue (southern) at 90m. The western boundary would adjoin No.21 Ashley Street which has a secondary rear frontage to Webb Avenue and is occupied by a dwelling house.

The lots are Zoned R3 - Medium Density Residential and no change is proposed to the Zone or permissible land uses.

2. THE PLANNING PROPOSAL

The Planning Proposal would facilitate an extension to the existing club, a hotel and residential apartments at No. 4 High Street and a 6 storey seniors housing development on the Ashley Street/Webb Avenue sites.

Seniors housing is already permitted on the site, as the land is zoned R3 Medium Density Residential which allows seniors housing under the *Hornsby Local Environmental Plan 2013* (HLEP). The Housing SEPP also allows seniors housing in the R3 zone.

Accordingly, there would be no change to the current zoning or permissible uses, but an increase in height limits under the HELP would be required as follows:

Clause 4.3 Height of Buildings

Amending the maximum height of buildings clause (4.3 Height of buildings) to allow a maximum building height of 20.5m (6 storeys) for seniors housing development only in 'Area 1' shown on the

Height of building Map (retaining the existing maximum 10.5m building height for all other R3 permitted land uses).

Height of Building Map

Amending the maximum building height control for Property No. 2 High Street, Hornsby (Lot 1 DP 585721) and No. 4 High Street Hornsby (Lot 2 DP 817649) to increase the maximum building height from 26.5m (8 storeys) to 38.5 metres (12 storeys)

Amending the Height of building map to define and show Properties Nos. 7,9,11,15,17 and 19 Ashley Street Hornsby (Lots 1,2,3,4,5,6 DP222907) and Properties Nos. 2 and 4 Webb Avenue (Lots 7 and 8 DP 222907), Hornsby as 'Area 1'.

3. DEVELOPMENT CONTROL PLAN AMENDMENTS

Draft development control plan amendments have been prepared to support the planning proposal. The relevant Parts of the Hornsby Development Control Plan (HDCP) that would be applicable to the Planning Proposal are Part 3 – Residential for the land at Ashley Street and Webb Avenue and Part 4 – Business for the land in High Street, Hornsby.

Draft HDCP amendments to minimise the potential amenity impacts of a 12 storey development at No. 2 and 4 High Street and a 6-storey seniors housing development on the RSL sites in Ashley Street and Webb Avenue, would be exhibited with the Planning Proposal. They include building height transition controls, additional setbacks for upper levels and location restrictions for main entrances and parking away from residential land uses to minimise the potential impact of Club development and seniors housing on surrounding lower density residential land uses. The draft HDCP amendments are attached to this report.

Should the proposal receive a Gateway Determination, the proposed HDCP amendments to reflect the new height standards and building height transition and setback provisions would be exhibited concurrently with the Planning Proposal.

4. STRATEGIC AND STATUTORY CONTEXT

Relevant policies and legislation are discussed below.

Greater Sydney Region Plan - A Metropolis of Three Cities and North District Plan

The *Greater Sydney Region Plan - 'A Metropolis of Three Cities'* and the *North District Plan* establish the strategic planning framework for accommodating Sydney's future population growth and identify key State and local targets such as dwelling numbers, infrastructure planning, liveability, sustainability, and productivity.

The sites subject to this planning proposal are located within the Hornsby Town Centre which is identified as a Strategic Centre in the *North District Plan* (NDP). The Planning Proposal gives effect to the objectives and actions of the State and local strategic planning framework by enabling sustainable transport focused development opportunities that would contribute to State and local housing and jobs targets. The key State Government planning priorities Council is required to consider with regards the Planning Proposal are:

- *NDP: Planning Priority N5: Providing housing supply, choice and affordability, with access to jobs, services and public transport.*
- *Action 19 c. - providing fine grain urban form, diverse land use mix, high amenity and walkability, in and within a 10-minute walk of centre.*

The proposal aims to deliver dwelling supply and choice by encouraging shop-top housing and seniors housing in an established and growing town centre that has existing services, shops and recreation facilities and provides a range of job opportunities.

The sites are located in close proximity to existing bus and train services (approximately 150m) and other services and infrastructure, such as Hornsby Hospital and Council's library and cultural centre as well as primary and secondary schools.

The Planning Proposal includes a building height incentive for seniors housing on land at Ashley Street and Webb Avenue in the HTC to encourage and facilitate seniors housing supply overall and to provide seniors housing location and dwelling type choice in the Shire.

- *NDP: Planning Priority N6: Creating and renewing great places and local centres, and respecting the District's heritage.*
- *Action 21c.- managing and monitoring the cumulative impact of development on the heritage values and character of places.*

The proposal aims to provide for development that reflects an appropriate balance of commercial, residential and community uses that will contribute to the rejuvenation of the Hornsby Town Centre and reinforce and strengthen its viability as a commercial core. The proposed building heights are consistent with the urban structure and concepts identified in the draft HTC Masterplan.

The War Memorial Hall at No. 2 High Street, Hornsby, is a prominent building within the Hornsby Town Centre and is of historical, aesthetic, and social heritage significance. Its heritage value is in its history and function, association with the Cenotaph on Peat's Ferry Road and the adjacent to the RSL Club, its International Style architecture and glass façade, its ongoing use, internal memorial fixtures and layout of its rooms.

The sites subject to the Planning Proposal are also in proximity to the Peats Ferry Road and Mount Errington Precincts of the *Hornsby West Side Heritage Conservation Area* (HCA).

Potential heritage impacts related to the proposed building height of 12 storeys at No. 2 High Street and at the adjacent No. 4 High Street, would be managed through the existing heritage provisions of the Hornsby LEP and the Desired Outcomes and Prescriptive Measures of *Part 9.2 – Heritage Items* of the *Hornsby Development Control Plan 2013* (HDCP). The HDCP provisions adopt a 'whole of building' approach, apply to building exteriors and interiors, and require that the setting of an item is considered in any development nearby.

- *NDP: Planning Priority N10: Growing investment, business opportunities and jobs in strategic centres.*

The additional building heights to allow expanded Club facilities, a hotel development and housing would assist with meeting the short term (construction) and long term (operation) job targets outlined in the *North District Plan* and in the Hornsby LSPS.

The proposal may also have an attractor and multiplier benefit to the local economy as the HTC is not currently serviced with high quality accommodation, function centre or conferencing facilities and an additional residential population would stimulate local goods and services demand.

Section 9.1 Local Planning Directions

Section 9.1 of the EP&A Act allows the Minister for Planning and Public Spaces (the Minister) to provide direction to Council in relation to the preparation of draft local environmental plans.

The Local Planning Directions relevant to this Planning Proposal that Council must follow include:

Direction 1.1 – Implementation of Regional Plans

The objective of the direction is to give legal effect to the vision, land use strategy, goals, directions and actions contained in Regional Plans (e.g. the Greater Sydney Region Plan). The direction requires a planning proposal to be consistent with a Regional Plan released by the Minister for Planning.

The Planning Proposal would result in increased commercial and residential density in proximity to the Hornsby Town Centre, which is a major transport node. The consistency of the Planning Proposal with the Regional Plan and North District Plan is discussed above.

Direction 3.2 – Heritage Conservation

The objective of this direction is to conserve items, areas, objects and places of environmental heritage significance and indigenous heritage significance.

The War Memorial Hall at No. 2 High Street is listed as Heritage Item No. 483 in Schedule 5 – Environmental Heritage of the *Hornsby Local Environmental Plan 2013.*

The Planning Proposal does not propose heritage amendments to the HLEP. Potential heritage impacts related to the proposed building height of 12 storeys at No. 2 High Street and at the adjacent No. 4 High Street, would be managed through the existing heritage provisions of the Hornsby LEP and the Desired Outcomes and Prescriptive Measures of *Part 9.2 – Heritage Items* of the *Hornsby Development Control Plan 2013* (HDCP). The HDCP provisions adopt a 'whole of building' approach, apply to building exteriors and interiors, and require that the setting of an item is considered in any development nearby.

The sites are also in proximity to the Peats Ferry Road and Mount Errington Precincts of the *Hornsby West Side Heritage Conservation Area* (HCA). Existing controls within the Hornsby LEP and the HDCP would ensure development on the subject sites does not adversely impact the heritage values of the Precincts.

Direction 5. 1- Integrating Land Use and Transport

The objective of this direction is to ensure that urban structures, building forms, land use locations, development designs, subdivision and street layouts improve access to housing jobs and services by active transport, reduces travel demand by car and supports public transport.

The proposal provides increased density to enable and encourage residential, registered club and visitor accommodation uses in close proximity to Hornsby Railway Station and bus interchange (approximately 150m).

The *Hornsby Town Centre Review Recommendations*, March 2022 and Transport Plan identify a range of public infrastructure improvements associated with the growth of the HTC to 2036. They include enhanced access to public transport, permeability, and linkage recommendations, and upgrading community facilities and open spaces. The development enabled through this Planning Proposal would be serviced long-term by these improvements and will contribute to their provision through monetary contributions as established and required in infrastructure and development contributions planning that is being undertaken as part of the overall Town Centre Review.

Traffic issues are further discussed below under the heading Traffic and Local Road Network.

Direction 6.1 – Residential Zones

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The objectives of the direction are to encourage a variety of housing types for existing and future housing needs, make efficient use of accessible infrastructure and services and minimise the impact of residential development on the environment and resource lands. The direction requires that planning proposals broaden the choice of the housing market, make more efficient use of infrastructure and services, reduce land consumption for housing and be of good design. Planning proposals are to be for land that is or can be adequately serviced and not reduce residential density.

The proposal provides additional building heights for seniors housing only on vacant land zoned R3 – Medium Density and for a large site zoned B4 - Mixed Use, providing a supply incentive to satisfy growing housing diversity demand in a location in close proximity to services, transport, retail and entertainment opportunities. The proposal has been informed by the HTC Masterplan indicative building envelopes which respond to the surrounding context and building hierarchy.

Existing and proposed additional provisions in the *Hornsby Development Control Plan* (HDCP) with regards to urban form would ensure that the design of new development on the subject sites is consistent with the urban form identified in the HTC Masterplan, responds to design excellence requirements, and minimises amenity impacts. The draft HDCP amendments include building height transition controls, additional setbacks for upper levels and location restrictions for main entrances and parking away from residential land uses. Certain provisions of the Housing SEPP would also apply to the seniors housing development on the RSL land at Ashley Street and Webb Avenue in relation to accessibility and living standards.

Direction 7.1 Business and Industrial Zones

The objectives of the direction are to encourage employment growth in suitable locations and to protect employment land in business and industrial zones and support the viability of identified centres.

Planning proposals are required to retain the areas and locations of existing business and industrial zones, not reduce the potential floorspace for employment uses, and align with employment areas in accordance with employment strategies.

The proposal aims to deliver development that reflects an appropriate balance of commercial, residential and community uses that will contribute to the rejuvenation of the Hornsby Town Centre and reinforce and strengthen its viability as a commercial core.

The additional building heights to allow expanded Club facilities, a hotel development and shop top housing as well as other permissible land uses, would assist with meeting the short term (construction) and long term (operation) job targets outlined in the draft North District Plan and in local strategic plans.

The proposal may also have an attractor and multiplier benefit to the local economy as the HTC is not currently serviced with high quality accommodation, function centre and conferencing facilities.

Hornsby Local Strategic Planning Statement

The *Hornsby Local Strategic Planning* Statement 2020 (LSPS) sets out a 20-year vision for land use in Hornsby Shire, identifying the special character and community values that are to be preserved as well as how Council will manage growth and change.

The LSPS identifies the HTC as a major commercial centre that it will play a critical future role in providing employment, social and retail services for residents both within and surrounding the Hornsby LGA. The HTC will provide up to 3,500 new dwellings and the bulk of commercial floorspace to meet the Shire's long-term housing and job targets.

Relevant actions and priorities in the LSPS include:

Liveable Priorities

- Action LA2. Focus future housing opportunities in the Hornsby Town Centre.
- Action LA15. Finalise the Hornsby Town Centre Review and incorporate relevant findings and recommendations into a future update to the Hornsby Local Housing Strategy

Productive Priorities

- Priority PP3. Focusing economic development in and around existing centres and employment precincts in the Shire, with a key focus on the strategic centre.
- Priority PP5. Prioritising local employment opportunities, and improvements to services, amenities, and infrastructure to support the future population.

The Planning Proposal is consistent with the LSPS and its planning priorities and actions. It would provide development densities that would encourage an appropriate balance of commercial, residential and community uses that would give effect to and reinforce the economic and commercial centre role and function of the HTC. It would also provide housing, jobs and services in mixed use developments and facilitate seniors housing supply and choice close to transport and services and initiate the activation and revitalisation the HTC according to Council's vision for it as '*A place for people that reflects the uniqueness of the bushland setting, integrated around key public spaces, where the city meets the bush. An active, thriving centre that exhibits economic diversity, design excellence, liveability and sustainability*.'

Hornsby Local Housing Strategy 2020

The *Hornsby Local Housing Strategy 2020* (LHS) outlines Hornsby's 20-year vision and priorities for housing an increase of 32,000 people requiring 14,879 new homes by 2036. It identifies that the majority of new homes will be provided in existing housing precincts, the Hornsby Town Centre (HTC) and the Cherrybrook Station Precinct.

The following HLHS local planning priorities are most relevant to the planning proposal:

- LP1. Protecting the character of our low-density neighbourhoods.
- LP6. Providing housing in the right locations that meets the needs of our community with regard to housing type and mix, design, sustainability, affordability and safety.

The proposal aims to deliver dwelling supply and choice by encouraging shop-top housing and seniors housing in an established and growing town centre that has existing services, shops and recreation facilities and provides a range of job opportunities. The Planning Proposal will provide the opportunity for realisation of 164 dwellings (including 110 seniors dwellings) and 1440sqm of commercial floor space plus a hotel.

The sites are located in close proximity to existing bus and train services (approximately 150m) and other services and infrastructure, such as Hornsby Hospital and Council's library and cultural centre as well as primary and secondary schools.

The Planning Proposal includes a building height incentive for seniors housing. This is generally consistent with the outcomes of the *Hornsby Seniors Housing Demand and Supply Review* which was endorsed by Council in 2020. The Review recommends that planning for Hornsby Shire's growing 65+ population should include looking at appropriate locations for independent seniors living units and aged care facilities, as well as other housing options outside age-segregated seniors living.

Local Action 2 (LA2) of the Strategy is to focus future housing opportunities in the Hornsby Town Centre which would supply 3,500+ new homes by 2036, mostly in the form of high-density apartments.

A condition of the Department's approval of the *Hornsby Housing Strategy 2020* is that Council submit a planning proposal with any relevant controls required to support rezoning part or all of the HTC Masterplan area to the Department for Gateway determination by or before December 2022.

The Planning Proposal is being progressed at the same time as the HTC Masterplan report going to Council so that the exhibition of the HTC Masterplan can proceed while the Planning Proposal also progresses to formal exhibition.

Employment Lands Study

Council's *Employment Lands Study* (ELS) provides a strategic framework to facilitate and accommodate future employment growth within Hornsby Shire in the context of the North District Plan. The ELS was endorsed by Council in May 2021.

The ELS identifies that Hornsby Town Centre lacks a clear economic identity, that Council should progress a masterplan for the centre and that development within the centre should contribute to the civic, cultural, retail and economic requirements of the district.

Hornsby Town Centre Review

The *Draft North District Plan* (NDP) was released in 2017. It identified Hornsby as a Strategic Centre and established the State government's housing supply and job creation targets for Hornsby to 2036.

In response to the NDP, and to ensure growth would be consistent with Council policies to focus growth in established housing precincts and the HTC, Council initiated the *Hornsby Town Centre East-Side Review.* It included a strategic analysis of planning controls and the demand and feasibility of commercial/retail development on the east side of the HTC.

The scope of the HTC Review was expanded in 2019 to include land in the Town Centre on the west side of rail line including the land subject to this planning proposal, and the Review became a deliverable of Hornsby's Accelerated LEP Review Program. The aims of the broader *Hornsby Town Centre Review Study* are to develop a structure plan that would provide for projected growth, strengthen the economic, employment and housing capacities of the HTC, improve public domain and activate Hornsby's commercial core. Review studies include economic development feasibility and urban form analyses, transport, traffic, parking and circulation modelling, housing demand and supply analysis and infrastructure capacity.

The principal outcome of the HTC Review is the *Draft Hornsby Town Centre Masterplan* (HTC Masterplan) which is outlined and discussed in the *Hornsby Town Centre Review Recommendations March 2022* report**.** The Masterplan is supported by technical studies and includes a series of recommendations and interventions to facilitate the revitalisation of Hornsby as a growing strategic centre, to accommodate change and to deliver diversity and density.

Properties No. 2 High Street and No. 4 High Street are identified as Site 13 in the Masterplan, and Properties Nos. 7,9,11,15,17 and 19 Ashley Street together with Nos. 2 and 4 Webb Avenue, as Site 14. The HTC Masterplan recommends retaining the existing zoning and land uses for all the sites subject to this Planning Proposal and identifies No. 4 High Street for 'Entertainment and dining' activities (Figure 19). Recommendations include revising the planning controls to increase mixed land use density for all the sites in the Planning Proposal (Figure 51) and increasing the maximum building height for Site 13 to 38.5m (12 storeys) and Site 14 to 20.5m (6 storeys) (Figure 50).

Hornsby Local Environmental Plan 2013

The proposal does not involve a change to the zoning of the sites or to provide for any additional permitted land uses. The proposed amendments to the LEP relate to the height of buildings only.

The current zoning of the High Street properties is B4 – Mixed Use. The objectives of the zone are as follows:

- *To provide a mixture of compatible land uses.*
- *To integrate sustainable business, office, residential, retail and other development in accessible locations so as to maximise public transport patronage and encourage walking and cycling.*

The zone permits a range of uses, including registered clubs, hotel or motel accommodation and shop top housing. The increased height proposed would allow the economic and orderly development of the site to its potential.

The current zoning of the Ashley Street and Webb Avenue sites is R3 – Medium Density Residential. The objectives of the zone are as follows:

- *To provide for the housing needs of the community within a medium density residential environment.*
- *To provide a variety of housing types within a medium density residential environment.*
- *To* enable *other land uses that provide facilities or services to meet the day to day needs of residents.*

The zone permits a range of residential uses, including seniors housing. The increased height proposed would only apply to development for the purposes of seniors housing.

Hornsby Development Control Plan 2013

The *Hornsby Development Control Plan 2013* (HDCP) applies to all land within Hornsby Shire and is a comprehensive framework for the development of land. The HDCP aims to outline procedures, responsibilities, and processes consistent with Council's vision of maintaining an environment which is sustainable and liveable.

The relevant Parts of the HDCP that would be applicable to the Planning Proposal are Part 3 – Residential for the land at Ashley Street and Webb Avenue and Part 4 – Business for the land in High Street, Hornsby.

As discussed above, draft HDCP amendments to minimise the potential amenity impacts of a 12 storey development at Nos. 2 and 4 High Street and a 6-storey senior's development on the RSL sites in Ashley Street and Webb Avenue, have been prepared and are attached to this report. They include building height transition controls, additional setbacks for upper levels and location restrictions for main entrances and parking away from residential land uses to minimise the potential impact of Club development and seniors housing in on surrounding lower density residential land uses.

Should the proposal receive a Gateway Determination, the DCP controls would be exhibited concurrently with the Planning Proposal.

5. IMPACTS OF THE PROPOSAL

The potential site-specific impacts of the Planning Proposal are discussed below.

Built Form and Solar Access

The proposed new building heights for the land in this Planning Proposal are based the heights identified for Nos. 2 and 4 High Street (Site 13) and the RSL vacant land in Ashley Street and Webb Avenue (Site 14) in the HTC Masterplan 2022 which was, in turn, informed in part by the concepts in the 2016 RSL Planning Proposal.

The RSL Planning Proposal Indicative Design Concept at Attachment 2(a) includes a preferred design scheme and built form, supported by planning principles, shadow diagrams and proposed HDCP controls. The preliminary shadow analysis shows that properties in the area surrounding the proposed RSL Club's development would not receive an unreasonable amount of additional overshadowing and would maintain a minimum of 2 hours of solar access per day. The residential towers above the RSL Club, and the seniors housing development depicted in the Concept Plan complied with the minimum requirements of the Apartment Design Guide.

A planning proposal cannot tie a future development to a concept design. Along with the application of the Apartment Design Guide to any future Development application, draft HDCP amendments to minimise the amenity impacts of 12 storey development at Nos. 2 and 4 High Street on Nos.14 -18 Ashley Street, a 3-storey residential flat building to the west of No. 4 High Street and No. 11 William Street, Hornsby a 3-storey residential flat building to its north, would be exhibited with the Planning Proposal. The amendments include prescriptive controls for podium heights, building height and setbacks and will complement the existing controls for the Hornsby West Side.

Draft HDCP amendments applicable to a seniors housing development on the RSL sites in Ashley Street and Webb Avenue Hornsby would also be exhibited with the Planning Proposal. The amendments require a building height transition to lower density surrounding existing development, provide additional setback controls and would complement the existing controls for 6 Storey residential flat buildings in the HDCP.

The increases in building heights for the High Street and Ashley Street properties remain consistent with the transition in heights across the Hornsby West Side. Heights in the centre of the precinct range from 25 storeys, down to 20 storeys fronting Peats Ferry Road, transitioning to 12 storeys on the north side of Ashley Lane. The proposed building height of 12 storeys at Nos. 2 and 4 High Street and 6 storeys at Ashley Street and Webb Avenue continue the transition to the interface with residential zones.

Heritage

The War Memorial Hall at No. 2 High Street is listed as Heritage Item No. 483 in Schedule 5 – Environmental Heritage of the *Hornsby Local Environmental Plan 2013*. It is a prominent building within the Hornsby Town Centre and is of historical, aesthetic, and social heritage significance. Its heritage value is in its association with the Cenotaph on Peats Ferry Road and the adjacent to the RSL Club, its International Style architecture and glass façade, its ongoing use, memorial fixtures and layout of its rooms and its design by local architect Ross Innes Aynsley.

Issues with regards to the impact of the 2016 RSL Planning Proposal on the significance of the Hall were raised during its preliminary exhibition and Council's pre-Gateway assessment. A condition of the Gateway Determination of 14 June 2017 required that a heritage assessment be prepared to identify to what extent the proposed development would affect the heritage item and in November 2017 an amended Statement of Heritage impact by Archnex Designs was prepared. It concluded that the heritage impacts of the proposal related to its setting and that the Planning Proposal did not have

impacts in terms of the fabric of the item. The assessment is at Attachment 1(b) to the Planning Proposal.

As a result of the heritage assessment, the RSL Club indicated that they would amend the Planning Proposal to retain the current maximum building height control of 26.5 metres for the extent that No. 4 High Street adjoined the southern boundary of 2 High Street, to provide an appropriate relationship (in terms of maximum height) to the Hornsby War Memorial Hall.

The RSL Planning Proposal was withdrawn before the amended Planning Proposal was finalised.

The HTC Masterplan illustrates a range of possible urban form outcomes for Site 13 (No. 2 and No. 4 High Street) within the 12-storey recommended new maximum height limit across both sites. They all include a two-storey built form in the location of the War Memorial Hall indicating that the proposed additional building height does not mean that the Memorial Hall would be demolished and developed and that its retention at the ground level alongside or as part of a new development is practicable.

Potential heritage impacts related to the proposed building height of 12 storeys at No. 2 High Street and at the adjacent No. 4 High Street, would be managed through the existing heritage provisions of the Hornsby LEP and the Desired Outcomes and Prescriptive Measures of Part 9.2 – Heritage Items of the *Hornsby Development Control Plan 2013* (HDCP). The HDCP provisions adopt a 'whole of building' approach, apply to building exteriors and interiors, and require that the setting of an item is considered in any development nearby and that a height transition is provided to sensitive interface areas.

The sites are also in proximity to the Peats Ferry Road and Mount Errington Precincts of the *Hornsby West Side Heritage Conservation Area* (HCA). Existing controls within the Hornsby LEP and the HDCP would ensure development on the subject sites does not adversely impact the heritage values of the Precincts.

Traffic and Local Road Network

Many of the previously unresolved traffic issues related to the 2016 RSL Planning Proposal concerned the proposed additional building height and land uses. There were also concerns with how redevelopment would occur at the RSL and Community Car Park site at William Street, Hornsby. That site is not included in this Planning Proposal.

The *Hornsby Town Centre Review* capacity study and traffic modelling includes the 2016 RSL Planning Proposal's concepts. Modelling was based on gross floor area and potential overall development yield and not broken down to hotel, residential flat building, or seniors housing land uses. The land uses vary with regards to required parking rates, the number of vehicles they would add to the local road network, and their trip generation and distribution local traffic impacts.

Hotel uses in the HLEP require 1 parking space per room and have varying occupancy rates, often peaking at weekends and holiday periods. Seniors housing only requires 0.5 car space per bedroom and does not usually add substantially to AM or PM traffic volume peaks. It is likely, therefore that the development enabled through the Planning Proposal would generate less parking demand and less additional local traffic at completion than modelled.

The *Hornsby Town Centre Review Transport Plan 2022* identifies the land included in the Planning Proposal as Stage 1 (0-5 years) development sites within the Western Precinct. The plan models intersection performance and carrying capacity for the whole HTC at full 2036 Masterplan development and identifies that the local road network would need to accommodate an increase in traffic of 15 per cent to 20 per cent in the AM peak and 40 per cent to 50 per cent in the PM peak.

A series of transport and infrastructure improvements to support the new urban structure and plan for the envisaged density and vehicle trip increases are recommended as part of the HTC Review. Looking holistically at traffic generation and management across the whole Town Centre, rather than for the site in isolation, means the following is able to be achieved to overcome issues with the network:

- Increased mode share for active transport.
- Removing buses from Station Street with a split and relocated bus interchange.
- Reinforcing George Street (rather than Peats Ferry Road) as the major traffic route with intersection upgrades and road widening to improve traffic flow.
- Implementation of approximately 40 intersection, road network, public transport or active transport improvements across the Town Centre.
- Improved pedestrian connections between the Station and commercial and residential areas on the west side.

The improvements are contributions costed against development of the entire Town Centre (including the subject sites) and have been staged according to projected development uptake and yield to 2036.

CONSULTATION

Consultation and outcomes undertaken with council, state agencies or authorities to date.

The development of the HTC Masterplan, which includes the sites in this Planning Proposal, was informed by consultation with a number of state agencies and authorities. The consultation has been in the form of letters, emails, presentations at meetings and a Co-Design workshop. Agencies involved over time included:

- Department of Planning and Environment.
- Greater Cities Commission.
- Transport for NSW.
- Sydney Trains.
- NSW Health.
- NSW TAFE.
- NSW Education.

Most recently, the Planning Proposal was discussed with representatives from the Department of Planning and Environment as part of the initial scoping/pre-lodgement stage.

Previous exhibition

Preliminary exhibition of the 2016 RSL Club Planning Proposal indicated that traffic was the main issue with the proposal. Council subsequently resolved not to progress with the RSL planning proposal until the traffic issues could be considered as part of the entire Hornsby Town Centre Masterplan, which has now been drafted for exhibition.

Since preliminary exhibition of the RSL proposal, further discussions with the community about the Hornsby Town Centre in its entirety has included:

- Pop up sessions in Hornsby Mall.
- Exhibition of the Town Centre Vision and Principles as part of the LSPS exhibition.
- Land owner drop-in sessions.
- A Co-Design workshop with agency stakeholders.

Consultation Strategy

The following consultation strategy is consistent with The *Hornsby Shire Community Engagement Plan 2021* and the Public Exhibition requirements of the Local Environmental Plan Making Guidelines 2021. It may be amended by the requirements of the Gateway Determination.

Consultation for the Planning Proposal will include:

- Advertisements in local Publications: An advertisement would be placed in the Hornsby Kuringai Post identifying the purpose of the Planning Proposal and providing a web-link to where the Planning Proposal can be viewed.
- Advertisement on the Council website: The Planning Proposal would be exhibited on Council's website (https://www.hornsby.nsw.gov.au/council/noticeboard/your-say/have-your-saycontent/current-exhibitions.
- ENews An advertisement would be placed in Council's electronic newsletter.
- Letters to affected owners: A letter would be sent to landowners who adjoin or are in close proximity to the sites.
- Displays at the Council Administration Buildings and local libraries: The Planning Proposal would be displayed at the Council Chambers, 296 Pacific Highway, Hornsby, and the Hornsby Library.
- Consultation with Authorities: A copy of the Planning Proposal and relevant supporting material will be provided to the public authorities identified in the Gateway Determination, including Transport for NSW – Roads and Maritime Services; Transport for NSW – Sydney Trains; relevant authorities for the supply of water, electricity and the disposal and management of sewage; as well as NSW Police, and NSW Fire Service.

STATUTORY CONSIDERATIONS

As part of the Gateway Authorisation process, Section 2.4 of the EP&A Act allows the Minister and the Director General to delegate functions to a Council and/or an officer or employee of a Council. When submitting a Planning Proposal, Council is required to identify whether it wishes to Exercise Delegation (the Authorisation).

Authorisation delegates the following plan making powers to Council: *Hornsby Shire Council Advice No. 01/20 Local Planning Panel Briefing Date 27/5/2020:*

- To make and determine not to make an LEP.
- To defer inclusion of certain matters.
- To identify which matters must be considered and which stages of the plan making process must be carried out again.

Should Council resolve to progress the planning proposal, it is recommended that Council identifies that it intends to delegate the plan making functions to the General Manager.

ATTACHMENT 2 - ITEM 4

ITEM 10

BUDGET

This Planning Proposal is being progressed to meet the conditions associated with the Hornsby Housing Strategy and also the conditions of grant funding awarded to Council under the *NSW Public Spaces Legacy Program*. A total of $4 million has been allocated under the program towards the construction and delivery of a new elevated walkway in Pyes Creek Bushland, learn to Ride Playspace in Ruddock Park and improvements to the Brooklyn Foreshore. Part of the funding agreement is that Council must exhibit a Planning Proposal that contributes to additional housing supply by 31 December 2022.

The matter has no direct financial impact upon Council's adopted budget or Long Term Financial Plan.

POLICY

The Local Planning Panels Direction – Planning Proposals requires that the Local Planning Panel give its advice on the Planning Proposal before Council considers whether to forward it to the Minister or Greater Sydney Commission.

Local Planning Panel Advice

A briefing was provided to Hornsby's Local Planning Panel on 25 May 2022. The Panel considered that the proposal had strategic merit and site specific merit, subject to the proposed design principles to be included in DCP controls, as discussed in the officer's report.

The Panel advised that it supports the progression of the planning proposal for a gateway determination, with appropriate controls for height transitions for the Ashley Street site.

CONCLUSION

The report presents a Planning Proposal for Properties Nos. 2 and 4 High Street, Hornsby, Properties Nos. 7,9,11,15, 17 and 19 Ashley Street Hornsby and Properties Nos. 2 and 4 Webb Avenue, Hornsby.

The Planning Proposal seeks to amend the HLEP maximum building height control (Height of Buildings Map) from 26.5 metres (8 storeys) to 38.5 metres (12 storeys) for Nos. 2 and 4 High Street, Hornsby, and amend the maximum height of buildings clause (4.3 Height of buildings) and the Height of Buildings Map to allow a maximum building height of 20.5m (6 storeys) for seniors housing development only (retaining the maximum building height for all other R3 permitted land uses on the land at 10.5 metres) for Properties Nos. 7,9,11,15,17 and 19 Ashley Street and Properties Nos. 2 and 4 Webb Avenue, Hornsby.

The proposal has strategic merit due to its consistency with the *Greater Sydney Regional Plan, North District Plan, Section 9.1 Ministerial Directions* and the Hornsby LSPS and *Hornsby Housing Strategy* and should be progressed. Clear community benefit has been identified to justify changes to planning controls in terms of job creation, housing supply and revitalisation of Hornsby's commercial core.

The proposal is being progressed to meet the conditions associated with the approval of the *Hornsby Housing Strategy 2020* and grant funding awarded to Council under the *NSW Public Spaces Legacy Program*. Part of the funding agreement is that council must exhibit a Planning Proposal that contributes to additional housing supply by 31 December 2022.

Accordingly, it is recommended that Council support the progression of the Planning Proposal for submission to the Department of Environment and Planning for Gateway Determination.

RESPONSIBLE OFFICER

The officer responsible for the preparation of this Report is Katherine Vickery, Manager Strategic Land Use Planning, who can be contacted on 9847 6744.

ITEM 10

ATTACHMENT 2 - ITEM 4

KATHERINE VICKERY
Manager - Strategic Landuse Planning
Planning and Compliance Division

JAMES FARRINGTON
Director - Planning and Compliance
Planning and Compliance Division

Attachments:

1. Planning Proposal - High Street and Ashley Street Hornsby
2. Draft Hornsby Development Control Plan Amendments

File Reference: F2018/00321-002
Document Number: D08430462

ATTACHMENT 2 - ITEM 4

ATTACHMENT 2 – Council Minutes 13 July 2022

ATTACHMENT 2 - ITEM 4

HORNSBY SHIRE COUNCIL

MINUTES OF GENERAL MEETING

Held at COUNCIL CHAMBERS, HORNSBY

on Wednesday 13 July 2022

at 6:30PM

PRESENT

Councillors Ruddock (Chairman), Ball, Greenwood, Heyde, McClelland, McIntosh, Pillamarri, Salitra, Tilbury and Waddell.

NATIONAL ANTHEM

OPENING PRAYER

Pastor David Nathan of The Hive Church, Hornsby opened the meeting in prayer.

ACKNOWLEDGEMENT OF RELIGIOUS DIVERSITY

Statement by the Chairman:

"We recognise our Shire's rich cultural and religious diversity and we acknowledge and pay respect to the beliefs of all members of our community, regardless of creed or faith."

WELCOME TO COUNTRY

A Welcome to Country was given by the Darug and GuriNgai Traditional Owner representative, Uncle Laurie Bimson.

VIDEO AND AUDIO RECORDING OF COUNCIL MEETING

Statement by the Chairman:

"I advise all present that tonight's meeting is being video streamed live via Council's website and also audio recorded for the purposes of providing a record of public comment at the meeting, supporting the democratic process, broadening knowledge and participation in community affairs, and demonstrating Council's commitment to openness and accountability. The audio and video recordings of the non-confidential parts of the meeting will be made available on Council's website once the Minutes have been finalised. All speakers are requested to ensure their comments are relevant to the issue at hand and to refrain from making personal comments or criticisms. No other persons are permitted to record the Meeting, unless specifically authorised by Council to do so."

APOLOGIES / LEAVE OF ABSENCE

Nil

POLITICAL DONATIONS DISCLOSURE

Statement by the Chairman:

"In accordance with Section 10.4 of the Environmental Planning and Assessment Act 1979, any person or organisation who has made a relevant planning application or a submission in respect of a relevant planning application which is on tonight's agenda, and who has made a reportable political donation or gift to a Councillor or employee of the Council, must make a Political Donations Disclosure Statement.

If a Councillor or employee has received a reportable political donation or gift from a person or organisation who has made a relevant planning application or a submission in respect of a relevant planning application which is on tonight's agenda, they must declare a non-pecuniary conflict of interests to the meeting, disclose the nature of the interest and manage the conflict of interests in accordance with Council's Code of Conduct."

DECLARATIONS OF INTEREST

COUNCILLOR GREEENWOOD declared a Pecuniary Interest in relation to Item 7 – PC14/22 Planning Proposal - 7 City View Road, Pennant Hills Refer to that Item for details.

COUNCILLOR HEYDE declared a Less Than Significant Non-Pecuniary Interest in relation to Item 9 – PC16/22 - Sydney North Planning Panel and Hornsby Local Planning Panel - Local and Community Panel Members. Refer to that Item for details.

COUNCILLOR BALL declared a Less Than Significant Non-Pecuniary Interest in relation to Item 9 – PC16/22 - Sydney North Planning Panel and Hornsby Local Planning Panel - Local and Community Panel Members. Refer to that Item for details.

COUNCILLOR TILBURY declared a Less Than Significant Non-Pecuniary Interest in relation to Item 9 – PC16/22 - Sydney North Planning Panel and Hornsby Local Planning Panel - Local and Community Panel Members. Refer to that Item for details.

COUNCILLOR WADDELL declared a Less Than Significant Non-Pecuniary Interest in relation to Item 9 – PC16/22 - Sydney North Planning Panel and Hornsby Local Planning Panel - Local and Community Panel Members. Refer to that Item for details.

COUNCILLOR SALITRA declared a Less Than Significant Non-Pecuniary Interest in relation to Item 9 – PC16/22 - Sydney North Planning Panel and Hornsby Local Planning Panel - Local and Community Panel Members. Refer to that Item for details.

COUNCILLOR PILLAMARRI declared a Less Than Significant Non-Pecuniary Interest in relation to Item 9 – PC16/22 - Sydney North Planning Panel and Hornsby Local Planning Panel - Local and Community Panel Members. Refer to that Item for details.

COUNCILLOR MCCELLAND declared a Less Than Significant Non-Pecuniary Interest in relation to Item 9 – PC16/22 - Sydney North Planning Panel and Hornsby Local Planning Panel - Local and Community Panel Members. Refer to that Item for details.

COUNCILLOR MCINTOSH declared a Less Than Significant Non-Pecuniary Interest in relation to Item 9 – PC16/22 - Sydney North Planning Panel and Hornsby Local Planning Panel - Local and Community Panel Members. Refer to that Item for details.

CONFIRMATION OF MINUTES

RESOLVED ON THE MOTION OF COUNCILLOR MCINTOSH, seconded by COUNCILLOR PILLAMARRI,

THAT the Minutes of the General Meeting held on Wednesday 8 June 2022 and the Workshop Meeting held on Wednesday 29 June 2022 be confirmed, a copy having been distributed to all Councillors.

FOR: COUNCILLORS BALL, GREENWOOD, HEYDE, MCCLELLAND, MCINTOSH, PILLAMARRI, RUDDOCK, SALITRA, TILBURY AND WADDELL

AGAINST: NIL

PETITIONS

Nil

PRESENTATIONS

Nil

Note: At this point in the meeting the Mayor made the following statement on behalf of Council:

"This month's extraordinary weather event has once again been a challenging time for many of us resulting in flooding and damage across the Shire. The community of Wisemans Ferry was in disbelief as the Hawkesbury River rose to heights beyond even those of March 2022, flooding homes, the Men's Shed and the Bowling Club. Our heart goes out to all those affected. Once again those people are in for a long and exhausting clean-up process. We all owe a great debt of thanks all the volunteers, State Emergency Services, Rural Fire Service, Police and other emergency teams and Council staff for their incredible efforts during this terrible flood event.

This severe event and recovery from it lasts for months but as we are all acutely aware it's been non-stop for two years for these volunteers and we are incredibly grateful for all that they do for us. While Resilience NSW is leading the recovery process, we are the supporting body of the community with the clean-up particularly in Singleton Road and Wiseman's Ferry.

Council's recovery issues or efforts are already underway with a focus on the rural areas notably roads works, pavement areas, cleaning drains and clearing debris and fallen branches along Singleton Road. Importantly Council is also ensuring our foreshore assets including pontoons and boat ramps remain open to the community and we have already cleared extensive amount of debris that has been washed down the Hawkesbury River to Dangar Island and Parsley Bay.

Our crews have been out and about across the Shire, repairing landslides and potholes and will continue to do so in the coming weeks. We thank the community for their patience as we make our roads safe. Similarly, our Parks, Trees and Recreation Team has attended to fallen trees and cleared up our parks and sportsgrounds to ensure the community can continue to play and enjoy them.

I am also pleased to note and want to thank the Australian and NSW State Governments for the announcement of the $1 million grant to each of the affected local government areas to assist councils to get on with the job of clean up and recover. I have asked the General Manager to write on behalf of Hornsby and to express our appreciation for these funds".

RESCISSION MOTIONS

Nil

MAYORAL MINUTES

planning process in Hornsby Shire.

AN AMENDMENT WAS MOVED BY COUNCILLOR TILBURY, seconded by COUNCILLOR WADDELL,

THAT:

1. Council appoint Amanda Anderson (A Ward), Martin Dargan (B Ward), David White (C Ward) as community representatives on the Hornsby Local Planning Panel for a period of three years.
2. Where the community representative for a Ward is unable to attend a meeting, a community representative from another Ward participate as the alternate.
3. Council appoint Sue Weatherly (Technical Representative), Mark McCrindle (Community Representative) and Christine Newman (Alternative) as local members on the Sydney North Planning Panel for a period of three years.
4. The Planning Panels' Secretariat at the Department of Planning and Environment be advised of Council's resolution.
5. Council write to outgoing Panel members acknowledging their positive contribution to the planning process in the Hornsby Shire.

THE AMENDMENT MOVED BY COUNCILLOR TILBURY, seconded by COUNCILLOR WADDELL WAS PUT AND CARRIED.

FOR: COUNCILLORS GREENWOOD, MCCLELLAND, PILLAMARRI, RUDDOCK, TILBURY AND WADDELL

AGAINST: COUNCILLORS BALL, HEYDE, MCINTOSH AND SALITRA

THE AMENDMENT THEREBY BECAME THE MOTION WHICH WAS PUT AND CARRIED

FOR: COUNCILLORS GREENWOOD, MCCLELLAND, MCINTOSH, PILLAMARRI, RUDDOCK, TILBURY AND WADDELL

AGAINST: COUNCILLORS BALL, HEYDE AND SALITRA

10 PC17/22 Planning Proposal - High Street and Ashley Street, Hornsby

(F2018/00321-002)

Mr Mario Machado, on behalf of Hornsby RSL addressed Council regarding this item.

Ms Laura Fletcher, on behalf of Hornsby Chamber of Commerce addressed Council regarding this

item.

Mr Brian O'Keeffe, of Galston addressed Council regarding this item.

RESOLVED ON THE MOTION OF COUNCILLOR TILBURY, seconded by COUNCILLOR MCINTOSH,

THAT:

1. Council endorse the progression of the High Street and Ashley Street Planning Proposal attached to Director's Report No. PC17/22 for submission to the Department and Planning and Environment for a Gateway Determination.
2. Subject to receipt of a Gateway Determination, the Planning Proposal be publicly exhibited in accordance with the consultation strategy identified in this Report.
3. Council endorse the amendments to the Hornsby Development Control Plan attached to Director's Report No. PC17/22 for exhibition concurrently with the Planning Proposal.
4. Following exhibition, a report on submissions be presented to Council for its consideration.

FOR: COUNCILLORS BALL, GREENWOOD, MCCLELLAND, MCINTOSH, PILLAMARRI, RUDDOCK, TILBURY AND WADDELL

AGAINST: COUNCILLORS HEYDE AND SALITRA

INFRASTRUCTURE AND MAJOR PROJECTS DIVISION

11 IM5/22 Approval to Attend International Conference for Lesley Tipping

(F2007/01020)

RESOLVED ON THE MOTION OF COUNCILLOR MCINTOSH, seconded by COUNCILLOR MCCLELLAND,

THAT:

1. Council endorse the attendance of Ms Lesley Tipping at the 2022 Australasian Road Safety Conference to present a paper on developing cross-sectoral partnerships between Local and State Governments in relation to the Motorcycle CRASH Card.
2. A policy be established that papers, presentations and learnings from staff attending overseas conferences be made available to the public and that, where possible and appropriate, staff present the outcomes to a public forum such as a Library talk.

FOR: COUNCILLORS BALL, GREENWOOD, HEYDE, MCCLELLAND, MCINTOSH, PILLAMARRI, RUDDOCK, SALITRA, TILBURY AND WADDELL

ATTACHMENT 3 – Gateway Determination

NSW GOVERNMENT

Department of Planning and Environment

PP-2022-2602 / IRF22/2644

Mr Steven Head
General Manager
Hornsby Shire Council
PO Box 37
HORNSBY NSW 1630

Dear Mr Head

Planning proposal PP-2022-2602 to amend Hornsby Local Environmental Plan 2013

I am writing in response to the planning proposal you have forwarded to the Minister under section 3.34(1) of the *Environmental Planning and Assessment Act 1979* (the Act) and additional information received on 12 August 2022 in respect of the planning proposal to increase the maximum building height for properties 2 and 4 High Street, Hornsby to 38.5 metres, and increase the maximum building height for properties 7 to 19 Ashley Street, Hornsby and 2 and 4 Webb Avenue, Hornsby to 20.5 metres for seniors housing only.

As delegate of the Minister for Planning and Homes, I have determined that the planning proposal should proceed subject to the conditions in the enclosed gateway determination. No further approval is required in relation to the Directions.

Considering the nature of the planning proposal I have determined that Council may exercise local plan-making authority functions in relation to the planning proposal.

The proposed local environmental plan (LEP) is to be finalised at or before 9 months from the date of the Gateway determination. As this is a minor amendment, Council is to request Parliamentary Counsel's Office commence drafting as soon as practicable. A copy of the request should be forwarded to the Department of Planning and Environment.

The NSW Government has committed to reduce the time taken to complete LEPs. To meet these commitments, the Minister may appoint an alternate planning proposal authority if Council does not meet the timeframes outlined in the gateway determination.

The Department's categorisation of planning proposals in the *Local Environmental Plan Making Guideline* (Department of Planning and Environment, 2021) is supported by category specific timeframes for satisfaction of conditions and authority and Government agency referrals, consultation, and responses. Compliance with milestones will be monitored by the Department to ensure planning proposals are progressing as required.

Should you have any enquiries about this matter, I have arranged for Ms Ashley Richards to assist you. Ms Richards can be contacted on 02 8289 6776.

Yours sincerely

[redacted]

23 August 2022
Brendan Metcalfe
Director North District
Metro Central North
Encl:
Gateway determination
Authorised plan-making reporting template

NSW GOVERNMENT

Department of Planning and Environment

Gateway Determination

***Planning proposal (Department Ref: PP-2022-2602)**:* The proposal involves an extension to the existing Hornsby RSL club, a hotel and serviced apartments, residential shop top housing, and will facilitate a 6 storey seniors housing development.

I, the Director North District, Metro Central North at the Department of Planning and Environment, as delegate of the Minister for Planning and Homes, have determined under section 3.34(2) of the *Environmental Planning and Assessment Act 1979* (the Act) that an amendment to the Hornsby Local Environmental Plan 2013 to increase the maximum building height for properties 2 and 4 High Street, Hornsby to 38.5 metres, and increase the maximum building height for properties 7 to 19 Ashley Street, Hornsby and 2 and 4 Webb Avenue, Hornsby ('Area 1') to 20.5 metres for seniors housing only should proceed subject to the following conditions:

1. Prior to community consultation, the planning proposal is to be updated to:

   - A further objective is required to describe the intended redevelopment proposal for this site. For example: *To facilitate an extension to the existing RSL club, a hotel and serviced apartments, and residential shop top housing at 2 to 4 High Street and a 6 storey seniors housing development for properties at 7 to 19 Ashley Street and 2 to 4 Webb Avenue.*
   - Clarify the land use mix as this affects the job and dwelling yield of the proposal.
   - Update plans to remove references in the Design Concept to land at William Street, Hornsby.
   - Update 2016 supporting studies to consider only the current planning proposal. This includes:
     i. 2016 Atlas Architecture Design Concepts
     ii. 2016 Atlas Architecture Urban Design Statement
     iii. 2017 Archnex Designs Statement of Heritage Impact
   - Address additional FSR under Part 5, Clause 87 of the Housing SEPP 2021 for the senior's housing site at 7 to 19 Ashley Street in the proposal.
   - Provide shadow diagrams clearly labelling the existing shadow footprint and proposed potential shadow footprint. It is recommended that the shadow analysis is modelled including consideration of the adjacent Hornsby Town Centre site controls to accurately reflect solar access.
   - Address solar access and overshadowing and demonstrate that compliance with Apartment Design Guide standards can be achieved for proposed residential land uses.

- Identify the maximum number of car spaces needed to support the proposed seniors-housing and amend the proposal to incorporate this cap.

- Provide an estimated timetable for the delivery of transport and infrastructure improvements relating to this proposal.

2. Public exhibition is required under section 3.34(2)(c) and clause 4 of Schedule 1 to the Act as follows:

   (a) the planning proposal is categorised as basic, as described in the *Local Environmental Plan Making Guidelines* (Department of Planning and Environment, 2021), and must be made publicly available for a minimum of 25 days; and

   (b) the planning proposal authority must comply with the notice requirements for public exhibition of planning proposals and the specifications for material that must be made publicly available along with planning proposals as identified in *Local Environmental Plan Making Guidelines* (Department of Planning and Environment, 2021).

3. Consultation is required with the following public authorities:

   - Transport for NSW
   - Sydney Trains
   - NSW Police
   - Sydney Water
   - Endeavour Energy
   - NSW Rural Fire Service

   Each public authority is to be provided with a copy of the planning proposal and any relevant supporting material via the NSW Planning Portal and given at least 25 days to comment on the proposal.

4. A public hearing is not required to be held into the matter by any person or body under section 3.34(2)(e) of the EP&A Act. This does not discharge Council from any obligation it may otherwise have to conduct a public hearing (for example, in response to a submission or if reclassifying land).

5. The Council as planning proposal authority is authorised to exercise the functions of the local plan-making authority under section 3.36(2) of the EP&A Act subject to the following:

   (a) the planning proposal authority has satisfied all the conditions of the gateway determination;

   (b) the planning proposal is consistent with applicable directions of the Minister under section 9.1 of the EP&A Act or the Secretary has agreed that any inconsistencies are justified; and

   (c) there are no outstanding written objections from public authorities.

6. The planning proposal must be exhibited 3 months from the date of the Gateway determination.

PP-2022-2602 (IRF22/2644)

7. The planning proposal must be reported to council for a final recommendation 6 months from the date of the Gateway determination.

8. The timeframe for completing the LEP is to be 9 months from the date of the Gateway determination.

Dated 22nd day of August 2022.

Brendan Metcalfe
Director North District
Metro Central North
Department of Planning and Environment

Delegate of the Minister for Planning and Homes

PP-2022-2602 (IRF22/2644)

ATTACHMENT 4 – Indicative Design Concept 2022

ATTACHMENT 2 - ITEM 4

ALTIS

PLANNING PROPOSAL
HIGH AND ASHLEY STREETS, HORNSBY

PROJECT 815E.14
06 October 2022

Site 01. Existing RSL Club
Site 02. Existing Undeveloped Site

Peats Ferry Road Highway

Study Area

PLANNING PROPOSAL
- HIGH AND ASHLEY STREETS, HORNSBY

PROJECT 815E.14

ALTIS architecture pty ltd
lower deck jones bay wharf
suite 123 / 26-32 pirrama rd pyrmont 2009 nsw
p 61 2 9364 9000 f 61 2 9571 7930
w www.altisarchitecture.com

LOCATION PLAN
PROJECT 815E.14

1:500 @ A1

ALTIS

ATTACHMENT 2 - ITEM 4

ATTACHMENT 2 - ITEM 4

PLANNING PROPOSAL
- HIGH AND ASHLEY
STREETS, HORNSBY

PROJECT 815E.14

ALTIS architecture pty ltd
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p 61 2 9364 9000 f 61 2 9571 7930
w www.altisarchitecture.com

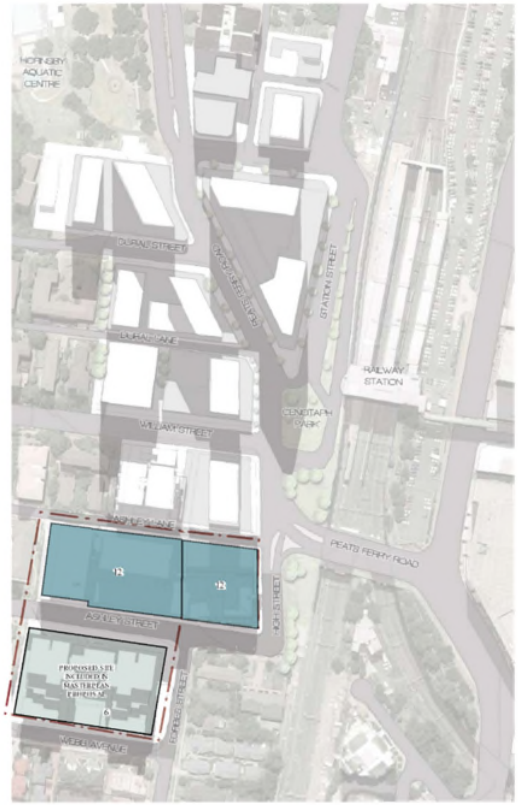
PLANNING PRINCIPLES
PROJECT 815E.14

1:500 @ A1

ALTIS

Planning Proposal - High and Ashley Streets, Hornsby
Active Frontages and Awnings

- HORNSBY RSL CLUB
- ACTIVE FRONTAGE
- SEMI ACTIVE FRONTAGE
- PREFERRED VEHICULAR ACCESS POINT



Planning Proposal - High and Ashley Streets, Hornsby - Built Form

PLANNING PROPOSAL - HIGH AND ASHLEY STREETS, HORNSBY

PROJECT 815E.14

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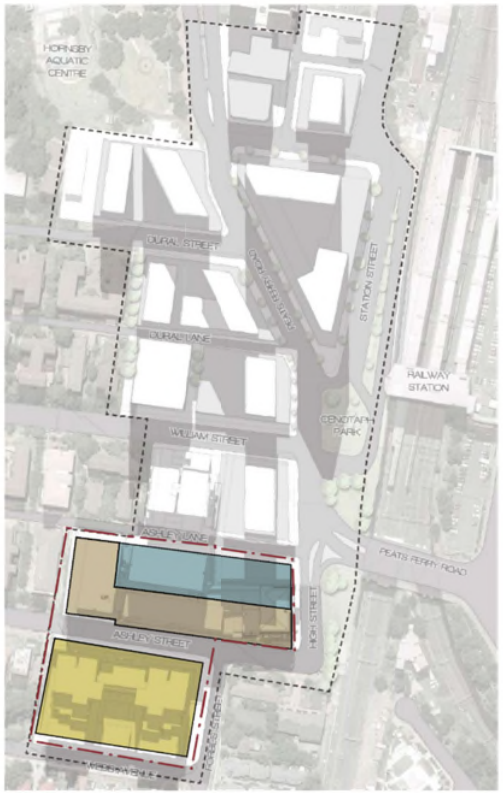
page 4

ATTACHMENT 2 - ITEM 4



Planning Proposal - High and Ashley Street, Hornsby
Land Use

- MIXED USE (HIGH RISE)
- MIXED USE (MEDIUM RISE)
- SENIORS HOUSING

PLANNING PROPOSAL
- HIGH AND ASHLEY
STREETS, HORNSBY

PROJECT 815E.14

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PLANNING PRINCIPLES
PROJECT 815E.14

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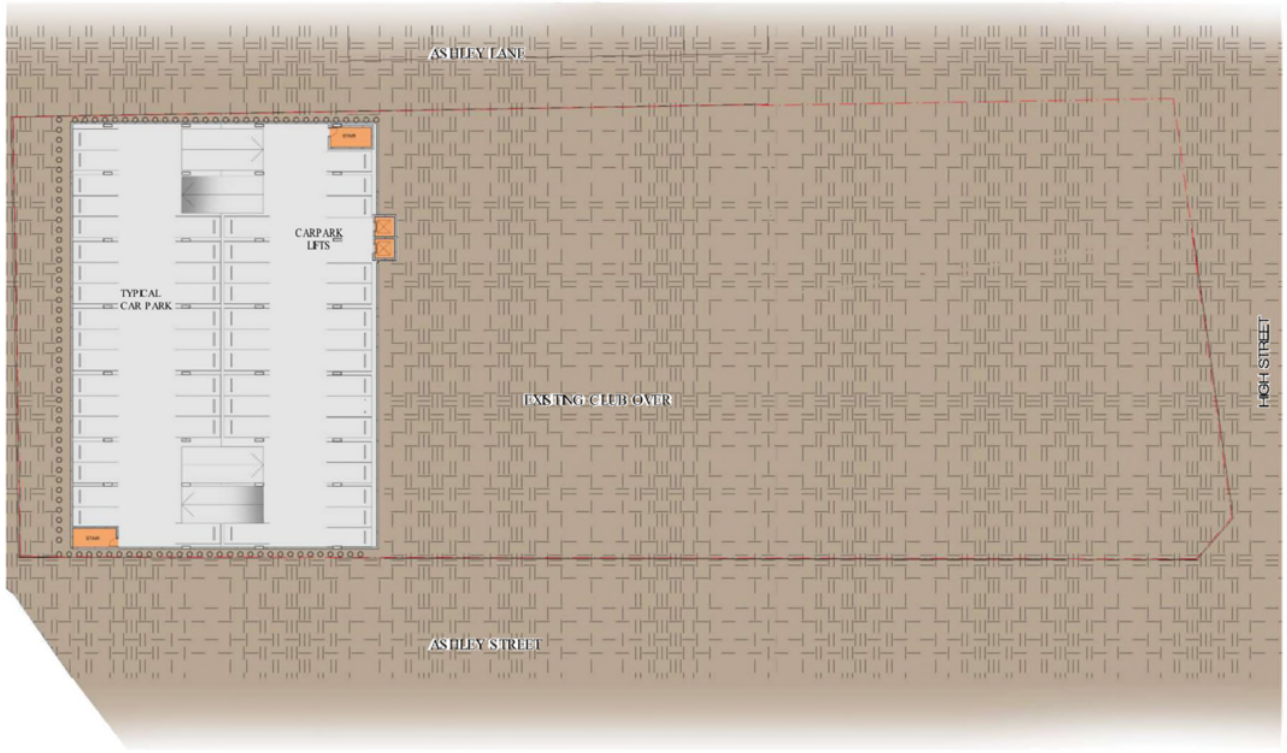
page 5

ATTACHMENT 2 - ITEM 4



TYPICAL PARKING LAYOUT
LEVELS -1 TO -3

CAR PARK

LEVEL	SPACES
LEVEL -4	29
LEVEL -3	56
LEVEL -2	56
LEVEL -1	56
LEVEL G	50
LEVEL 1	56
LEVEL 2	59
TOTAL	362

PLANNING PROPOSAL
- HIGH AND ASHLEY STREETS, HORNSBY

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BASEMENT PLAN
SITE 1

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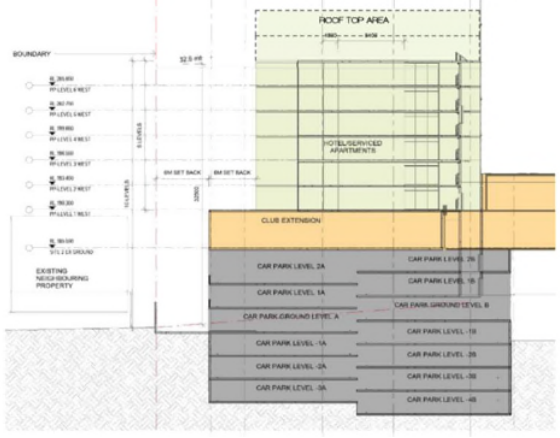
ATTACHMENT 2 - ITEM 4

CAR PARK ENTRY LEVEL



CAR PARK

LEVEL	SPACES
LEVEL G	50

PLANNING PROPOSAL - HIGH AND ASHLEY STREETS, HORNSBY

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CAR PARK ENTRY LEVEL

SITE 1

ALTIS

ATTACHMENT 2 - ITEM 4

CAR PARK

LEVEL	SPACES
2 LEVEL	59

NEW RESIDENTIAL LOBBY	95sqm
NEW CLUB LOBBY	45sqm
NEW HOTEL/CAR PARK LOBBY	330sqm

PLANNING PROPOSAL - HIGH AND ASHLEY STREETS, HORNSBY

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LOWER GROUND
SITE 1

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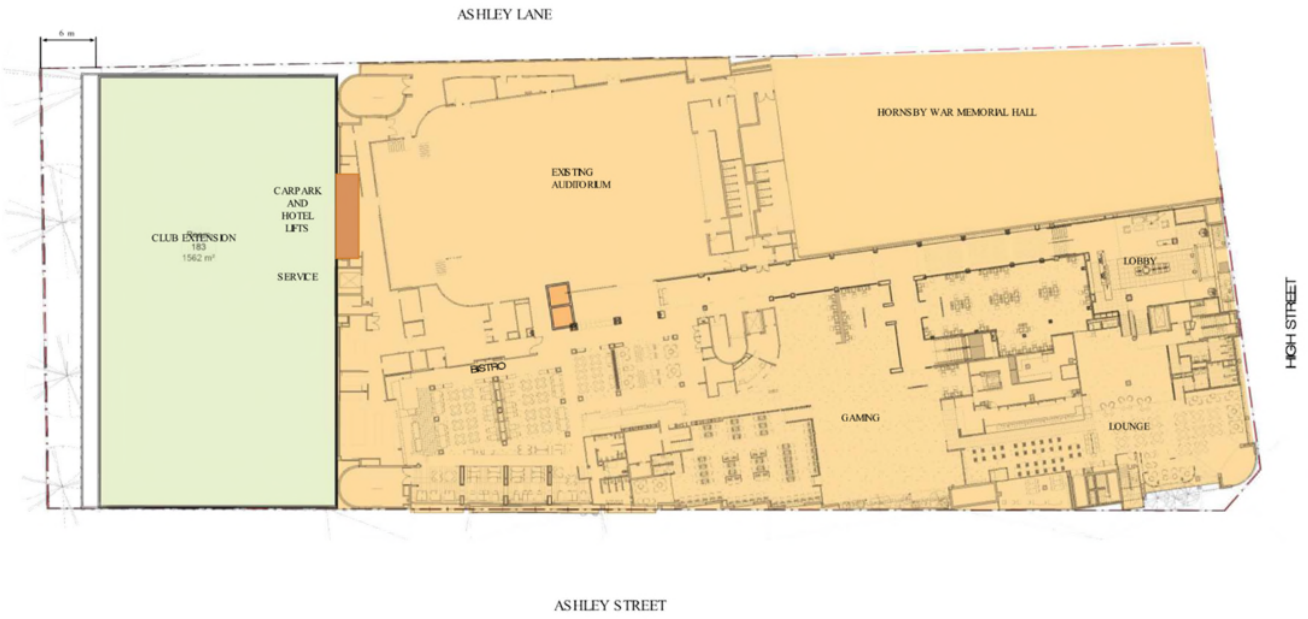

CLUB EXTENSION

EXISTING CLUB

CLUB EXTENSION
1440sqm

PLANNING PROPOSAL
- HIGH AND ASHLEY STREETS, HORNSBY

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GROUND LEVEL
SITE 1

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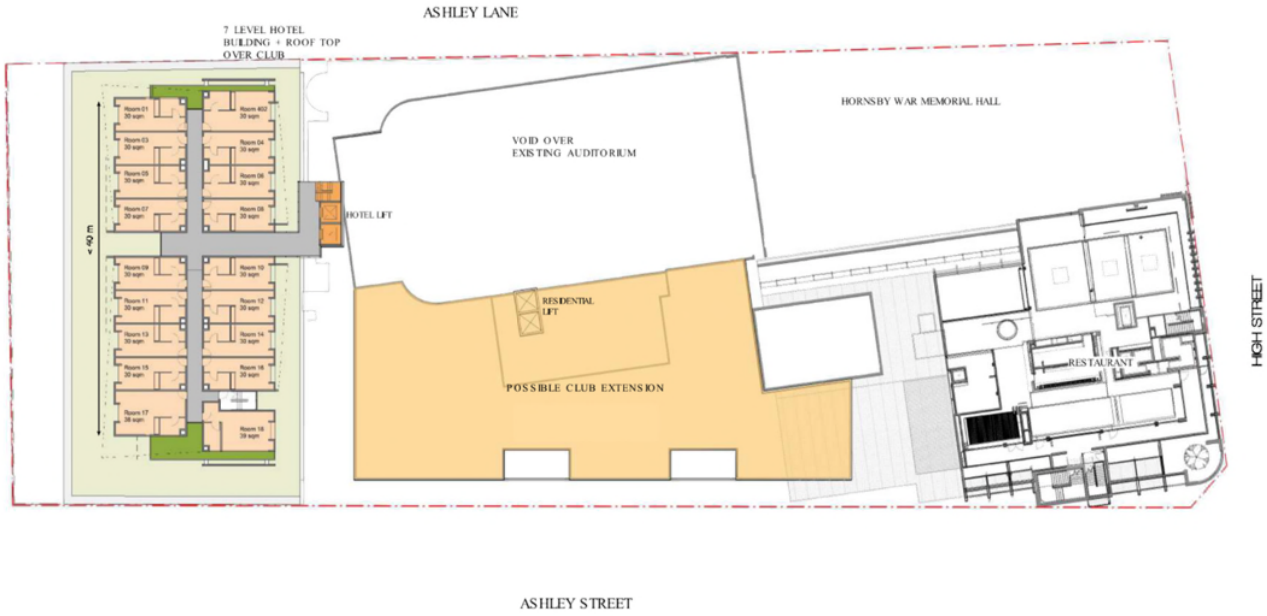

CLUB EXTENSION
1220sqm

PLANNING PROPOSAL
- HIGH AND ASHLEY
STREETS, HORNSBY

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GROUND LEVEL
SITE 1

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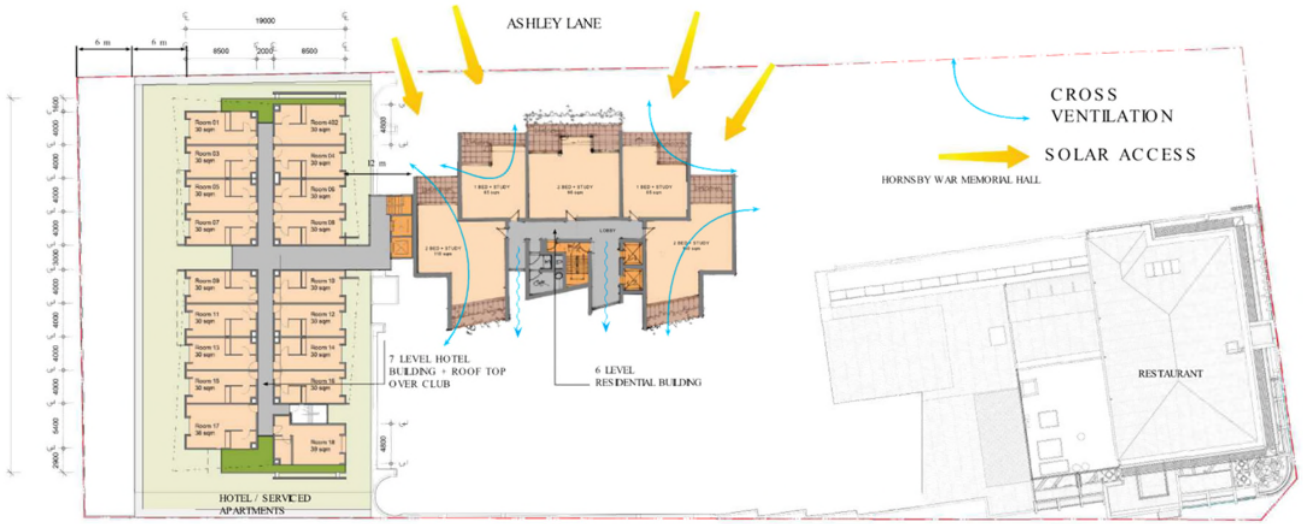

PP-LEVEL 5 WEST

RESIDENTIAL LEVEL 1-6

UNIT PER LEVEL	#	TOTAL
2 BED + STUDY	3	18
1 BED	2	12
TOTAL		**30**

NEW HOTEL / SERVICED APARTMENTS

UNIT PER LEVEL	#
28m² ROOM	16
31m² ROOM	1
36m² ROOM/SUITE	1
TOTAL	**18**
TOTAL ROOMS	**126**

PLANNING PROPOSAL - HIGH AND ASHLEY STREETS, HORNSBY

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TYPICAL HOTEL
SITE 1

ALTIS

ATTACHMENT 2 - ITEM 4

EXISTING CAR PARK

ON GRADE	**65**

NEW CLUB CAR PARK

LEVEL	**SPACES**
LEVEL -4	29
LEVEL -3	56
LEVEL -2	56
LEVEL -1	56
LEVEL G	50
LEVEL 1	56
LEVEL 2	59
TOTAL	**362**

TOTAL ADDITIONAL SPACES
297

LOWER GROUND

NEW CLUB LOBBY
NEW HOTEL LOBBY
NEW FUNCTION ROOMS/ STAFF ROOMS

GROUND LEVEL

NEW CLUB EXTENSION 1440sqm

LEVEL 1

NEW CLUB EXTENSION 1220sqm

NEW WESTERN HOTEL

LEVELS	7 + ROOF TOP
ROOMS PER LEVEL	18
TOTAL ROOMS	**126**

NORTHERN RESIDENTIAL

LEVELS	6
1 BED	12
2 BED + STUDY	18
TOTAL ROOMS	**30**

ALLOWABLE FSR SHOP TOP	3:1 + RESIDENTIAL
SITE AREA	6,697m²
ALLOWABLE GFA	20,094m²
EXISTING FSR	1.76:1
EXISTING GFA	11,787m²
PROPOSED FSR SHOP TOP	3:1 + RESIDENTIAL
PROPOSED GFA EXISTING CLUB	11,787m²
PROPOSED CLUB EXTENSION GROUND LEVEL	1,442m²
PROPOSED CLUB EXTENSION LEVEL 1	1,220m²
PROPOSED HOTEL LEVEL 1 TO LEVEL 7	6,000m²
TOTAL PROPOSED GFA	**19,699m²**

PLANNING PROPOSAL
- HIGH AND ASHLEY
STREETS, HORNSBY

PROJECT 815E.14

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SITE 1

ALTIS

ATTACHMENT 2 - ITEM 4

ASHLEY STREET

PLANNING PROPOSAL
- HIGH AND ASHLEY STREETS, HORNSBY

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3D VIEW ASHLEY STREET
SITE 2

ALTIS

ATTACHMENT 2 - ITEM 4

STAGE 1 CAR PARK

SPACES	88

PLANNING PROPOSAL - HIGH AND ASHLEY STREETS, HORNSBY

PROJECT 815E.14

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WEBB AVENUE LEVEL 1
SITE 2

1:250 @ A1

ALTIS

ATTACHMENT 2 - ITEM 4

RESIDENTIAL LEVEL 2
STAGE 1

UNIT MIX	TOTAL UNITS	TOTAL BEDROOMS
3 BED	3	9
2 BED	3	6
TOTAL	**6**	**15**

CAR PARK

STAGE1	
SPACES	21
STAGE 2	
SPACES	29
TOTAL	**49**

PLANNING PROPOSAL - HIGH AND ASHLEY STREETS, HORNSBY

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WEBB AVENUE LEVEL 2
SITE 2

1:250 @ A1

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page 15

ATTACHMENT 2 - ITEM 4

RESIDENTIAL LEVEL 3

UNIT MIX	TOTAL UNITS	TOTAL BEDROOMS
3 BED	6	18
2 BED	12	24
1 BED	2	4
TOTAL	20	46

STAGE 1

UNIT MIX	TOTAL UNITS	TOTAL BEDROOMS
3 BED	3	9
2 BED	6	12
1 BED	1	2

STAGE 2

UNIT MIX	TOTAL UNITS	TOTAL BEDROOMS
3 BED	3	9
2 BED	6	12
1 BED	1	2

PLANNING PROPOSAL
- HIGH AND ASHLEY
STREETS, HORNSBY

PROJECT 815E.14

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WEBB AVENUE
LEVEL 3 + COURTYARD

SITE 2
1:250 @ A1

ALTIS

ATTACHMENT 2 - ITEM 4

RESIDENTIAL LEVEL 4

UNIT MIX	TOTAL UNITS	TOTAL BEDROOMS
3 BED	6	18
2 BED	10	20
TOTAL	16	38

STAGE 1

UNIT MIX	TOTAL UNITS	TOTAL BEDROOMS
3 BED	3	9
2 BED	5	10

STAGE 2

UNIT MIX	TOTAL UNITS	TOTAL BEDROOMS
3 BED	3	9
2 BED	5	10

PLANNING PROPOSAL - HIGH AND ASHLEY STREETS, HORNSBY

PROJECT 815E.14

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ASHLEY STREET LEVEL 1
WEBB AVENUE LEVEL 4

SITE 2
1:250 @ A1

ALTIS

ATTACHMENT 2 - ITEM 4

RESIDENTIAL LEVEL 5

UNIT MIX	TOTAL UNITS	TOTAL BEDROOMS
3 BED	6	18
2 BED	10	20
TOTAL	**16**	**38**

STAGE 1

UNIT MIX	TOTAL UNITS	TOTAL BEDROOMS
3 BED	3	9
2 BED	5	10

STAGE 2

UNIT MIX	TOTAL UNITS	TOTAL BEDROOMS
3 BED	3	9
2 BED	5	10

PLANNING PROPOSAL
- HIGH AND ASHLEY STREETS, HORNSBY

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ASHLEY STREET LEVEL 2
WEBB AVENUE LEVEL 5

SITE 2
1:250 @ A1

ALTIS

ATTACHMENT 2 - ITEM 4

RESIDENTIAL LEVEL 6

UNIT MIX	TOTAL UNITS	TOTAL BEDROOMS
3 BED	4	12
2 BED	12	24
TOTAL	16	36

STAGE 1

UNIT MIX	TOTAL UNITS	TOTAL BEDROOMS
3 BED	1	3
2 BED	6	12

STAGE 2

UNIT MIX	TOTAL UNITS	TOTAL BEDROOMS
3 BED	3	9
2 BED	6	12

PLANNING PROPOSAL - HIGH AND ASHLEY STREETS, HORNSBY

PROJECT 815E.14

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ASHLEY STREET LEVEL 3
WEBB AVENUE LEVEL 6

SITE 2
1:250 @ A1

ALTIS

ATTACHMENT 2 - ITEM 4

RESIDENTIAL LEVEL 7

UNIT MIX	TOTAL UNITS	TOTAL BEDROOMS
3 BED	2	6
2 BED	12	24
TOTAL	14	30

STAGE 1

UNIT MIX	TOTAL UNITS	TOTAL BEDROOMS
3 BED	1	3
2 BED	6	12

STAGE 2

UNIT MIX	TOTAL UNITS	TOTAL BEDROOMS
3 BED	1	3
2 BED	6	12

PLANNING PROPOSAL - HIGH AND ASHLEY STREETS, HORNSBY

PROJECT 815E.14

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ASHLEY STREET LEVEL 4
SITE 2

1:250 @ A1

ALTIS

ATTACHMENT 2 - ITEM 4

RESIDENTIAL LEVEL 8

UNIT MIX	TOTAL UNITS	TOTAL BEDROOMS
3 BED	2	6
2 BED	6	12
1 BED	2	2
TOTAL	10	20

STAGE 1

UNIT MIX	TOTAL UNITS	TOTAL BEDROOMS
3 BED	1	3
2 BED	1	2
1 BED	2	2

STAGE 2

UNIT MIX	TOTAL UNITS	TOTAL BEDROOMS
3 BED	1	3
2 BED	5	10

PLANNING PROPOSAL - HIGH AND ASHLEY STREETS, HORNSBY

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ASHLEY STREET LEVEL 5
SITE 2

1:250 @ A1

ALTIS

ATTACHMENT 2 - ITEM 4

RESIDENTIAL LEVEL 9

UNIT MIX	TOTAL UNITS	TOTAL BEDROOMS
3 BED	2	6
2 BED	4	8
1 BED	2	2
TOTAL	**8**	**16**

STAGE 1

UNIT MIX	TOTAL UNITS	TOTAL BEDROOMS
3 BED	1	3
2 BED	1	2
1 BED	2	2

STAGE 2

UNIT MIX	TOTAL UNITS	TOTAL BEDROOMS
3 BED	1	3
2 BED	3	6

PLANNING PROPOSAL - HIGH AND ASHLEY STREETS, HORNSBY

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ASHLY STREET LEVEL 6
SITE 2

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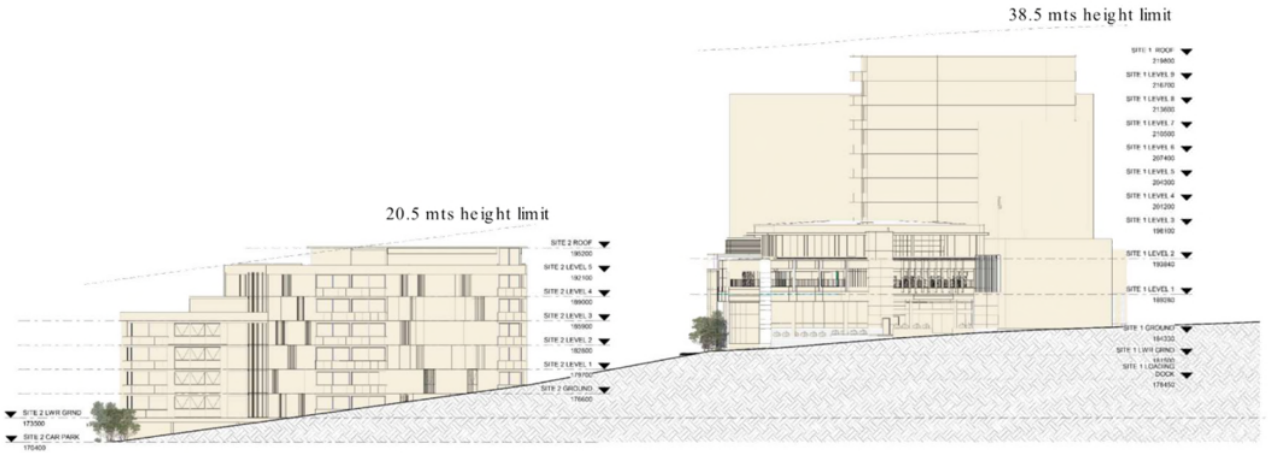

FORBES STREET ELEVATION

PLANNING PROPOSAL
- HIGH AND ASHLEY STREETS, HORNSBY

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FORBES STREET ELEVATION + MASS DIAGRAM

SITE 2

1:250 @ A1

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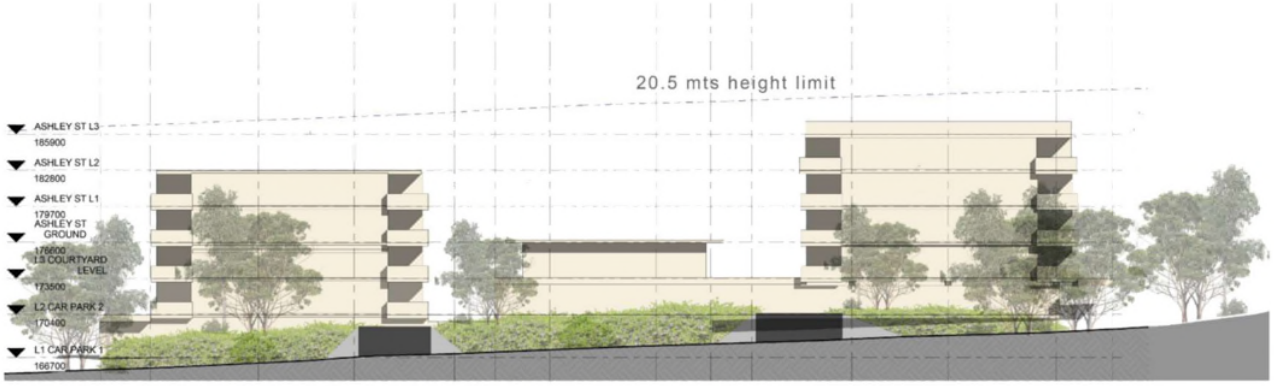
ATTACHMENT 2 - ITEM 4

ASHLEY STREET ELEVATION



WEBB AVENUE ELEVATION

PLANNING PROPOSAL - HIGH AND ASHLEY STREETS, HORNSBY

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ASHLEY STREET AND WEBB AVENUE ELEVATIONS

SITE 2

1:250 @ A1

ALTIS

ATTACHMENT 2 - ITEM 4

CAR PARK

STAGE1	
SPACES	88
STAGE 2	
SPACES	49
TOTAL	**137**

RESIDENTIAL

UNIT MIX	TOTAL UNITS	TOTAL BEDROOMS
3 BED	31	93
2 BED	69	138
1 BED	6	6
TOTAL	**106**	**237**

STAGE 1

UNIT MIX	TOTAL UNITS	TOTAL BEDROOMS
3 BED	16	48
2 BED	33	66
1 BED	5	5
TOTAL	**54**	**119**

STAGE 2

UNIT MIX	TOTAL UNITS	TOTAL BEDROOMS
3 BED	15	45
2 BED	36	72
1 BED	1	1
TOTAL	**52**	**118**

ALLOWABLE FSR	3:1
SITE AREA	5,565m²
ALLOWABLE GFA	16,695m²
PROPOSED FSR	2.6:1
PROPOSED GFA	14,338m²

PLANNING PROPOSAL - HIGH AND ASHLEY STREETS, HORNSBY

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SITE 2

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ATTACHMENT 2 - ITEM 4

ATTACHMENT 2 - ITEM 4

PLANNING PROPOSAL
- HIGH AND ASHLEY
STREETS, HORNSBY

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MASS DIAGRAM
SITE 2

1:250 @ A1

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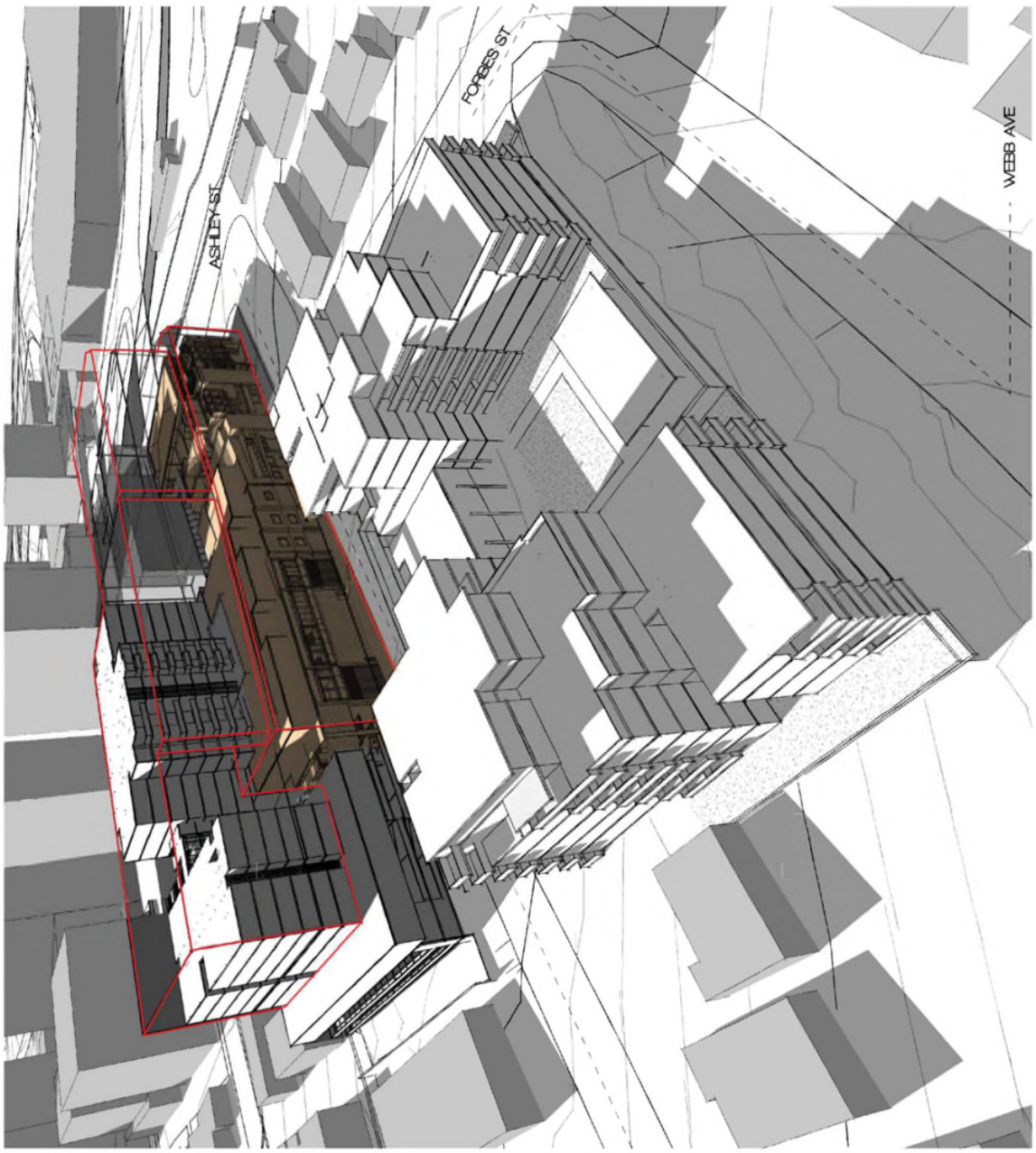


ATTACHMENT 2 - ITEM 4

ATTACHMENT 5 – Heritage Impact Assessment 2022

ATTACHMENT 2 - ITEM 4

Heritage Assessment

High Street and Ashley Street, Hornsby
Planning Proposal

November 2022

HORNSBY SHIRE COUNCIL

ATTACHMENT 2 - ITEM 4

Introduction

The High Street and Ashley Street, Hornsby Planning Proposal seeks to amend the *Hornsby Local Environmental Plan 2013* (HLEP) to increase the maximum height of building at Nos. 2 and 4 High Street, Hornsby (Site 01) to 12 storeys and land in Ashley Street, and Webb Avenue, Hornsby (Site 02) to 6 storeys. The Planning Proposal is based the Hornsby RSL Club's vision for the sites, the concepts and building heights identified in the draft *Hornsby Town Centre Masterplan* (HTC Masterplan) and the Altis Architecture *High Street and Ashley Street Hornsby Design Concept* 2022 (Design Concept).

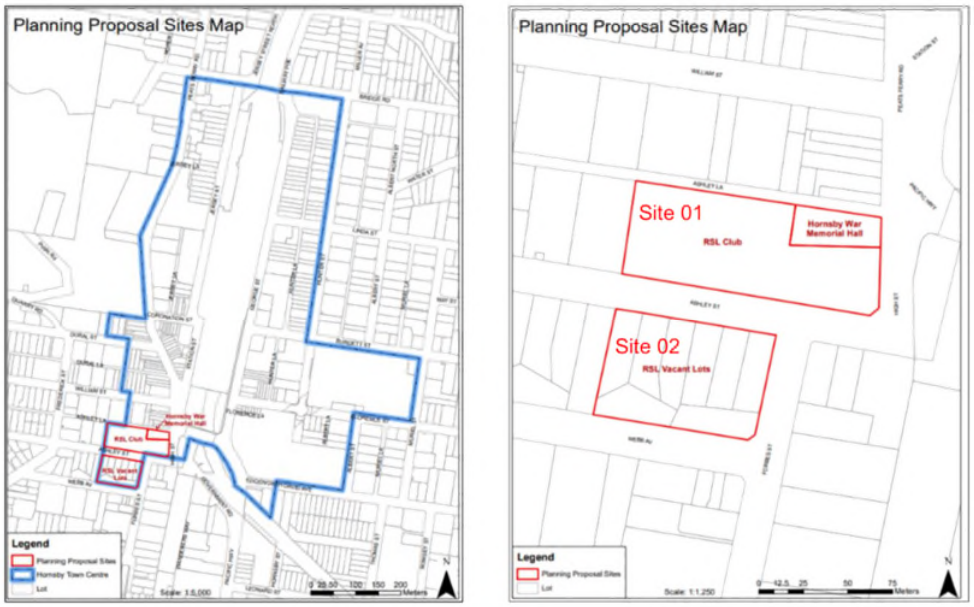
This Heritage Impact Statement (HIS) outlines the planning proposal and identifies any potential heritage impacts on the significance of the heritage listed Hornsby War Memorial Hall at No. 2 High Street, Hornsby, nearby heritage items and the Hornsby Westside Heritage Conservation Area. It draws on the Archnex Designs *Statement of Heritage Impact (amended) Hornsby War Memorial Hall,* November 2017 attached as an **Appendix**. It should be referred to for history and heritage significance assessment detail.

Location and Subject Sites

The Planning Proposal applies to land in south-west periphery of the Hornsby Town Centre (HTC). Site 01 compromises Property No. 2 High Street – the Hornsby War Memorial Hall and Property No. 4 High Street, Hornsby - the Hornsby RSL club premises and its rear at-grade open carpark.

The three-level club premise has a primary frontage to High street to the East and a secondary frontage onto Ashley Lane to the North. The Ashley street boundary to the south provides access to the rear carpark and the club's western boundary is shared with a residential flat building.

The Hornsby War Memorial Hall is a 2-storey building with a set-back eastern façade to High Street. It is bounded by the RSL Club premises on its southern and western sides and Ashley lane to its north. It is owned by the Hornsby War Memorial Hall Committee Incorporated.



Location of the subject sites in the Hornsby Town Centre

Site 02 is south of Site 01 and is made up of Nos. 7,9,11,15,17and19 Ashley Street, and Properties No. 2 and 4 Webb Avenue, Hornsby. The land is owned by the Hornsby RSL Club and all the lots are vacant except No.19 Ashley Street which retains a single dwelling. The combined lot has frontages onto Ashley Street to the north, Forbes Street to the east and Webb Avenue to the south. The western boundary of Site 02 is shared

with existing low-density dwellings and the area around Site 02 contains a mix of low density and medium density dwellings and some health-related professional suites.

Planning and Heritage Context

Zones, Building Heights and Heritage Listings

Site 01 is Zoned B4 Mixed Use in the HLEP and has a maximum building height of 26.5 metres (8 storeys). Site 02 is zoned R3 Medium Density Residential and has a maximum building height of 10.5 metres (3 storeys).

Subject sites and existing Height of Buildings

Subject sites and heritage listings

The Hornsby War Memorial Hall at No. 2 High Street is included as local Heritage Item No. 483 in Schedule 5 – Environmental Heritage in the HLEP. The sites are in proximity to the Peat's Ferry Road and Mount Errington Precincts of the Hornsby West Side Heritage Conservation Area (HCA)

Heritage Conservation

Clause 5.10 of the HLEP includes standard provisions for considering heritage items and places in HCAs when development is proposed. Of particular relevance to the Planning Proposal are requirements that provide the consent authority with the opportunity to pro-actively manage development outcomes so that adverse heritage impacts are avoided. The clauses require that a consent authority:

- must, before granting consent consider the effect of the proposed development on the heritage significance of the item or area concerned
- may require a heritage management document to be prepared that assesses the extent to which the carrying out of the proposed development would affect the heritage significance of the heritage item or heritage conservation area
- may require before consent is granted, the submission of a heritage management document (usually a Conservation Management Plan)

The heritage provisions of the HLEP are reinforced by General Design Requirements and Prescriptive Measures in Part 9 - Heritage of *the Hornsby Development Control Plan 2014* (HDCP)

Hornsby West Precinct

The HDCP identifies that Site 01 is in the Hornsby West Precinct of the Hornsby Town Centre. Part 4.5.1 of the HDCP identifies that development should contribute to the desired future character of the area and that:

> '*The West Side precinct is the traditional heart of Hornsby…….. New buildings should reinforce the traditional shopping centre character of the precinct though well scaled podium forms, a consistent street wall height, active frontages and continuous awnings to primary streets that together contribute to the pedestrian experience.*

The West Side Precinct Structure Plan (Figure 4.5(f) in the HDCP) defines public domain upgrades and an active High Street frontage for Site 01 and public domain upgrades along its Ashley Street boundary.

Draft Hornsby Town Centre Masterplan

The HTC is projected to provide up to 3,500 new dwellings and the bulk of commercial floorspace to 2036 to meet the Shire's long-term housing and job targets. The draft HTC Masterplan identifies a series of recommendations and interventions to accommodate change and to deliver housing diversity and density and identifies that the land subject to the Planning Proposal is part of the "Western heritage" mixed-use development precinct. It recommends 'Entertainment and Dining' land uses for Site 01 (identified as Site 13 in the Masterplan) and increasing the maximum building height to 38.5m (12 storeys). For Site 02 (identified as Site 14 in the Masterplan), it recommends retaining residential land uses and increasing its maximum building height to 20.5m (6 storeys) for Seniors Housing only.

Heritage Significance

Hornsby War Memorial Hall

The Archnex SoHI identifies that the Hall was built in 1962 and that it is a prominent building within the Hornsby Town Centre of historical, aesthetic, and social heritage significance. Its heritage value is in its association with the Cenotaph on Peat's Ferry Road and the adjacent to the RSL Club, its International Style architecture and glass façade, its ongoing memorial and community use, memorial fixtures, layout and its design by local architect Ross Innes Aynsley.

Site 02 – the Hornsby War Memorial Hall - High Street Façade and Interior (images from HWMH Website)

The Archnex SoHI further identifies that the Hall demonstrates a class of building that is part of the social/civic fabric of the suburb of Hornsby and the wider Shire because it is where the Eternal Flame commemorates the fallen, ANZAC Day and Remembrance Day services are held and because a wide range community groups meet in and use the premises.

Hornsby West Side Heritage Conservation Area and Nearby Heritage Items

The land included in the Planning Proposal is approximately 100m south of the Peat's Ferry Road Precinct and 120m east of the Mount Errington Precinct of the Hornsby West Side Heritage Conservation Area (HCA).

Part 9.3.7 of the HDCP identifies that the Peat Ferry Road (formerly Pacific Highway) Precinct includes the old Hornsby town centre, contains one of the few surviving streetscapes of Federation and Inter War period commercial buildings in Hornsby and includes a number of individually listed heritage items, mostly shops and civic buildings. The HDCP identifies that the built form of the Mount Errington Precinct is diverse and predominantly residential, characterised by detached single storey houses on separate lots. Houses from the Federation and Inter-War periods establish the characteristic qualities of the precinct.

The Planning Proposal

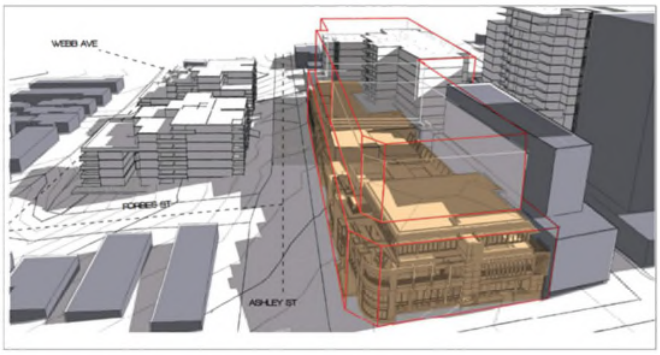
The Planning Proposal seeks to amend the HLEP to facilitate the Hornsby RSL Club's vision for extended and expanded club facilities, a hotel, shop-top housing and seniors housing as illustrated in the Design Concept. Specifically, it proposes:

- Increasing the maximum building height for Properties No. 2 and No. 4 High Street Hornsby (Site 01) from 26.5 metres (8 storeys) to 12 storeys (38.5 metres), and
- Increasing the maximum building height for Properties Nos. 7, 9,11,15,17 and 19 Ashley Street and Nos. 2 and 4 Webb Avenue, Hornsby (Site 02) from 10.5m (3 storeys) to 20.5m (6 storeys) for seniors housing development only.

The Design Concept illustrate an indicative bult form within the proposed new building heights. The final design and built form at both sites would be determined at development stage and subject to relevant legislation and policies of the day. For Site 01 the Design Concept includes:

- Six-storeys of shop-top housing over the existing club auditorium
- A six level, above and below grade car park at the at-grade car parking area to the west of the Club
- An extension to the club space above the car parking levels, with a six-storey hotel above that
- Other club extensions and internal reconfigurations
- A possible built form to accommodate the above
- A set-back tower building at No. 2 High Street, with a 2-3 storey form to the High Street boundary

For Site 02 the Design Concept illustrates the possibility of two buildings of four-six storeys when viewed from the street on Ashley Street, Forbes Street and Webb Avenue, with a transition in building height provided at sensitive interface areas adjacent to surrounding residential areas.



Sites 01 and 02 – Indicative Building Envelopes – Altis Architecture 2022

Heritage Impact Assessment

Hornsby War Memorial Hall

The existing 26.5 metre (8 storeys) building height across Site 01 allows for the retention of the War Memorial Hall while providing air-space development opportunities above. The Design Concept illustrates indicative building envelopes and a potential urban form for Site 01 within a new 12-storey new maximum building height that also provides air-space development opportunities above the Hall, but at a larger scale.

Neither the existing nor the proposed new building heights would have any direct adverse impact on retention of the Hall and its fabric or establish an urban form that indicates the Memorial Hall would need to be demolished, or its fabric, form or use compromised. The proposed additional building height at Site 01,

however, has potential to introduce scale and bulk impacts which in turn could impact the Hall's setting and its spatial and visual relationship with the Cenotaph and the RSL Club.

To mitigate potential additional height adverse impacts, amendments to Part 9.2 – Heritage Items – of the HDCP are proposed. They include requirements for development at Site 01 to:

- retain the Hornsby War Memorial Hall
- adopt a high quality and respectful contextual design approach that is sympathetic to and complements the Hall's significant fabric, form, setback, detail and landscaping
- be designed to provide for an integrated and holistic development outcome across Site 01.

New General Design Requirements for cantilevers are also proposed in Part 9.2 of the HDCP to ensure that any cantilever over a heritage item complements the form, style and character of the heritage item and allows it to be viewed and interpreted as a discrete entity.

It is considered that provided the proposed HDCP heritage control amendments progress, the heritage impact of the additional building height at Site 01 on the Hornsby War Memorial Hall would be no greater than that of the existing building height. It could be argued that the additional development opportunity provided by the proposed building height increase may, conversely, act to further secure the conservation of the Hall as its retention within a 12-storey development envelope would have less proportional impact on overall floorspace yield than its retention within an 8-storey development.

Hornsby West Side Heritage Conservation Area and Nearby Heritage Items

Site 01 is approximately 80m south of the Peat's Ferry Road Precinct of the Hornsby West Side Heritage Conservation Area (HCA) and a group of heritage listed shops and the cinema on the western side of Peats Ferry Road between William and Dural Streets. Site 01 and Site 02 are approximately 120m to the east of the Mount Errington Precinct.

Sites 01 and 02 reflect a post-war and late twentieth century-built form that is distinct from the character of the remainder of the West-Side and the sites are not part the retained Federation/ Inter War period streetscape of the old Hornsby Town Centre. Due to this, the distance separating them from heritage items and precincts, and intervening existing development, it is considered unlikely that the proposed 12 storey building height at Site 01 and 6 storey building height at Site 02 would directly impact the heritage significance of nearby HCA precincts or heritage items or alter their immediate setting or context.

Potential impacts will be managed through the HLEP and existing and proposed heritage provisions of the HDCP, which adopt a 'whole of building' approach, apply to building exteriors and interiors, and require that the setting of an item is considered in any development nearby. Part 9.4 of the HDCP - *Development in the Vicinity of Heritage* - requires new work that is sympathetic to the heritage significance of nearby heritage items, or adjoining heritage conservation area, and their settings.

Summary

The Planning Proposal includes the War Memorial Hall at No. 2 High Street which is listed as Heritage Item No. 483 in the HLEP. It is a prominent building within the Hornsby Town Centre and is significant for its association with the Cenotaph on Peat's Ferry Road and the adjacent to the RSL Club at No. 4 High Street, its International Style architecture and glass façade, its ongoing use, memorial fixtures and layout of its rooms. It was designed by local architect Ross Innes Aynsley.

The proposal affects land in the vicinity of several commercial and residential heritage items and the Mount Errington and Peats Ferry Road Precincts of the Hornsby Westside Heritage Conservation Area.

The new building heights proposed in the Planning Proposal are consistent with the building envelopes identified for the sites in the HTC Masterplan and Design Concept. The Masterplan and Design Concept emphasise the retention of the Hornsby War Memorial Hall within a 12-storey integrated and holistic built form across Site 01.

This heritage impact assessment concludes that the Planning Proposal will not have direct implications in terms of the fabric of the War Memorial Hall, but that the potential context, height and scale impacts of a 12-storey development at Site 01 need to be carefully managed through existing and the proposed new development controls. The proposal would have no direct or indirect impact on nearby heritage items or HCA Precincts. New heritage, setback and height control amendments to the *Hornsby Development Control Plan 2014* (HDCP) are proposed to ensure development does not adversely impact heritage values.

ATTACHMENT 2 - ITEM 4

Appendix A

Statement of Heritage Impact (amended) Hornsby War Memorial Hall

Archnex Designs November 2017

ATTACHMENT 2 - ITEM 4

Statement of Heritage Impact

(amended)

Hornsby War Memorial Hall

for

Hornsby RSL Club

Hornsby RSL War Memorial Hall

Prepared by:

Archnex Designs

Wentech Pty Ltd (ABN 310 735 41803) trading as Archnex Designs.

November 2017

Phone: 9716 0541/0425 228176 *14 Winchcombe Ave, Haberfield N S W 2045* *Fax: 9716 6083*

Hornsby RSL War Memorial Hall
(Planning Proposal)

Statement of Heritage Impact
Table of Contents

Statement:

ATTACHMENT 2 - ITEM 4

Archnex Designs
Nominated Architect: Greg Patch (Reg. No. 4820)
Wentech Pty Ltd (ABN 310 735 41803) trading as Archnex Designs.
Architects, Heritage Building Consultants, Interior Designers

STATEMENT OF HERITAGE IMPACT [SoHI]:

Date:	28 August 2017 (amended 28 October 2017)
Premises:	**Hornsby RSL War Memorial Hall (2 High Street Hornsby)**
Property Description:	**Folio Identifier 1/585721**
Prepared By:	Greg Patch B Sc Arch, B ARCH (Hons), M Herit Cons (Hons), AIA 14 Winchcombe Ave, Haberfield NSW 2045
For:	**Hornsby RSL**

A. PURPOSE OF STATEMENT

This statement has been prepared as required additional information in the Gateway Determination relating to Planning Proposal PP/1/2016 (see letter attached).

B. GROUNDS OF STATEMENT

The Hornsby War Memorial Hall is listed as a heritage item. This has been established through a search of Schedule 5 of Hornsby LEP 2013.

C. LIMITS OF STATEMENT

This statement is based on a Planning Proposal prepared by Urbis dated May 2016, the Hornsby Local Environmental Plan 2013, the Hornsby Development Control Plan 2013, the material at Part F1, and an inspection of the site in July 2017. The assessment is restricted to cultural heritage significance only.

D. LOCATION

1. Location of the Hornsby War Memorial Hall, War Memorial and sites 1,2 &3 (SIX Maps © NSW Lands 2017).

E. HERITAGE LISTINGS

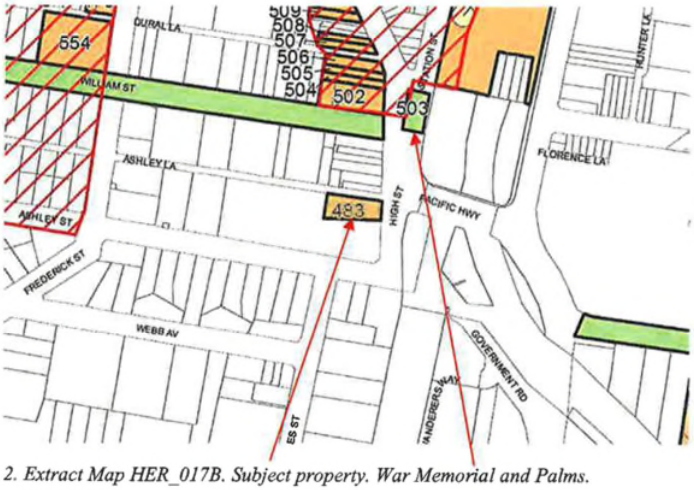
The Hornsby RSL War Memorial Hall is listed as a heritage item at:

Hornsby Local Environmental Plan 2013

Schedule 5 Environmental heritage
Part 1 Heritage items

Suburb	*Item name*	*Address*	*Property description*	*Significance*	*Item no*
Hornsby	*Hornsby War Memorial Hall*	*2 High Street*	*Lot 1, DP 585721*	*Local*	*483*
Hornsby	*War Memorial and Palms*	*155X Pacific Highway*	*Road reserve*	*Local*	*503*

The are mapped as:



2. Extract Map HER_017B. Subject property. War Memorial and Palms.

Inventory Sheets

A Perumal Murphy Wu Hornsby Heritage Study Review sheet (item inspected 21/7/98), describes the item as:

Description

Construction period: *Post World War II. Commenced 1955.*
Style: *Post Modern* [sic]

Materials/ workmanship/ innovative design:

Roof: *Mild steel flat roofing?*
Walls: *Face brick*
Windows: *Aluminium frame*
Doors: *Aluminium frame glazed*
Chimney: -
Details: *Front Symbolic Feature*
Modifications:

The significance of the item is stated as:

Memorial Hall valued by community as symbolic of endeavours and place of assembly for […]

There is a State Heritage Inventory Data Sheet (1781042) for the item, "Hornsby War Memorial" at 2 High Street Hornsby but contains no detail or commentary.

F. HISTORICAL CONTEXT & FABRIC

F1 Historical Background

Land Titles

The land is part of a 2,000-acre Crown Grant to John Terry Hughes dated 18 August 1842. Part of the Grant was subdivided under Deposited Plan [DP]1880, with the subject property being Lots 5 & part 6, Section 3 of that DP.

These lots were purchased by Elizabeth Henrietta Ogden, wife of Wharton Ogden of Neutral Bay, storekeeper from the Bank of New South Wales exercising power of mortgagee, in 1897, and Certificate of Title Volume 1238 Folio 43 [CT 1238-43] issued to her on 22 December 1897. This deed was cancelled in 1926, and CT 3929-129 issued to Marguerite Stretton Robinson, wife of James Robinson of Manly, gentleman, on 29th October, 1926.

In September 1946, Robinson transferred the property to: Albert Edward French, Publisher; Sydney Albert Dawson Storey, Hospital Secretary; Roland Southam, Postal Employee; Frank Alfred Naveu, Hospital Secretary; and Percival Frederick McKellar, Shopkeeper; all of Hornsby (as joint tenants) for £3,100 [Dealing 959759].

The property was mortgaged to the Commonwealth Bank of Australia on 4th December 1946, and the mortgage discharged in January 1955. There are a series of mortgages and changes to the joint tenancy up until April 1975, when CT 3929-129 was cancelled and CT 12761-110 was issued to Neville Richmond Cawthorn, clerk, Gordon Spowart Curby, accountant, George Oliver, Frank Edward Gill, builders, all of Hornsby, and Douglas Albert Heinrich, accountant, of Pennant Hills, as joint tenants.

DP 585721 was registered on 24/9/1976, and included the former Lots 7 & 8, Section 3, DP 1808, as two lots. The subject property became Lot 1, DP585721.

The title was converted to Computer Folio in August 1988, and there have been 3 applications since (presumably to register new proprietors/trustees).

Historical Aerial Photograph

3. 1943 Aerial Photograph (Source: SIX Maps © NSW Lands 2017). Subject property.

Sands Directory

The John Sands Sydney, Suburban and Country Commercial Directory was published from 1857-8 until 1932-3 as a precursor to telephone directories.

The subject property was the site of the *Camira Flats* as of 1932-3 (Mrs A Robinson, manageress- see Land Titles), and back to 1926. Prior to that, Robert K Rae, medical practitioner occupied "Camira" (presumably a house). There is evidence the site was most probably occupied back intill the 1910s, but there appear to be too many occupants, and the positions are unclear.

The Hornsby RSL Sub-Branch

In 2005, a publication titled: "Our Club and Its Community (Celebrating 50 Years of Hornsby RSL Club Ltd)" was published (text and photographs unless otherwise acknowledged by Margo Marchbank 2005). It gives an account of the formation of the Hornsby RSL Sub-Branch, Women's Auxiliary and War Memorial Committee at pp 86-7:

> *The Hornsby branch of the Returned Sailors and Soldiers Imperial League of Australia (RS & SILA) held its first meeting in June 1919, three years after the conference of the Returned Soldiers' Association recommended formation of the League. On 16 June 1919, 29 veterans gathered at the old Hornsby Literary Institute, now the site of the TAFE College, and established the Hornsby Sub-Branch of the RS & SILA. Not long after, the War Memorial Committee was formed with the aim of building a memorial hall for the Sub-Branch, and that same year, 1919, the Hornsby Women's Auxiliary was formed. However, the Ladies' Welfare Committee, as it was then known, did not survive the difficult years of the twenties, and the present day Women's Auxiliary dates from August 1937.*
>
> *Together, these three groups: the Hornsby RSL Sub-Branch; the War Memorial Committee and the Women's Auxiliary were the driving force fighting for the welfare of those who returned from two world wars, and the establishment of the Hornsby RSL Club itself. The early members of the Hornsby RSL Sub-Branch included founding President, W. Prentice, Secretary, A Law; Jim Horden, the founding Treasurer; his companion in arms, Joe Higgins, also on the Committee: Vice President C Grimson; and committeemen, H. Clark, C. Davis, E. Hudson and R. King.*

Ross Innes Aynsley, Architect (1924-1999)

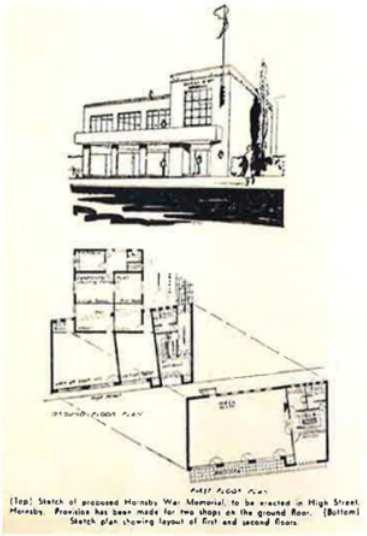
Lisa Newell of Archaeological and Heritage Management Solutions attributes the design of the War Memorial Hall to architect Ross Innes Aynsley in a Statement of Heritage Impact relating to access provisions, dated 8th February 2011.

Aynsley was a member of the Hornsby RSL according to a report in the May 25, 1953 edition of "Building, Lighting, Engineering" and had prepared a proposal for the club:

> *Following a recent survey of building costs, the Hornsby War Memorial Committee has resolved to implement a scheme to provide a memorial building for Hornsby Sub-branch, R.S.S. and A.I.L.A.*
>
> *The Committee was instituted in 1943 and later purchased a property, "Camira," in High Street, Hornsby. An adjoining property was purchased some time later, and the two properties are now assessed as being worth £8280.*
>
> ***Three Blocks***
>
> *Mr Ross Aynsley, a member of the Sub-branch, was commissioned to draw up the plans, providing for the subdivision of the properties into three blocks.*
>
> *On "A" block is situated "Camira"; on "B" block will be erected the Memorial with a frontage of about 80 ft. to High Street. Block "C" is at present occupied by a Diggers' Hut* [see plaque at image 10, p6].
>
> *The Memorial building (see illustration) provides for two shops and a caretaker's residence on the ground floor, with vestibule and office. On the first floor will be a hall 46ft. by 30ft., together with necessary*

offices, with a balcony 63 feet long across the frontage of the building. A flat roof will provide for a roof garden, offering a magnificent vista for miles around. A condition pertaining to the erection of the hall is that the hall cannot be used for licensed premises. If the R.S.L so decide, a licensed clubroom can be erected on Block 'C'.

The approximate cost of the Memorial shown in the plans is £16,000and the Committee anticipates that financing for building projects will soon be made available, when advances from 60 to 80% will be possible.



[Top] Sketch of proposed Hornsby War Memorial, to be erected in High Street, Hornsby. Provision has been made for two shops on the ground floor. [Bottom] Sketch plan showing layout of first and second floors.

4. Illustration to article.

This scheme was not realised.

5. Ross I Aynsley in flying gear.

6. Ross Aynsley (right).

The above photographs are from an obituary of Ross I Aynsley at:

www.heavenaddress.com/assets/.../iPRr43Q0KcVsfH2auy0z6YtSIaYyzM0w.pdf

A copy of the obituary is included at Appendix F. It explains that he served in the RAAF during WWII as a pilot, enlisting in 1943 and undertaking his training in the United Kingdom. He was discharged as a Warrant Officer- Airman Pilot in early 1946. He studied architecture part-time at the Sydney Technical College while working as a draftsman for the Public Works Department and Water Conservation & Irrigation Commission [WC&IC], graduating in June 1953. During this time he was apparently living with his parents at 18 Bridge Road Hornsby, and in 1955, left the WC&IC and set up practice in Hornsby.

> *Ross's Architectural practice grew throughout the 1960's and 1970's and he opened offices in Sydney and Wollongong as well as Hornsby. He was involved in many projects throughout his 40 year career as an architect – everything from houses to office buildings to indoor swimming pools and the Australian Museum extension.*

The Australian Institute of Architects (NSW Chapter) Register of Significant Architecture in NSW lists the Hornsby Womens Rest Centre (CWA) at Princes [sic] Highway Hornsby as his work of 1957-8.

7. Opening of the Hall in December 1962 (Source: p 110 "Our Club...).

F2 Fabric

The place was inspected in mid-July 2017, when the following photographs were taken:

8. Hornsby RSL Club- 2 High St Hornsby.

9. Hornsby War Memorial Hall- 4 High St Hornsby.

10. Commemorative plaques.

11. Commemorative plaque- "The Hut". Note "Blonde" bricks.

12. War Memorial

13. Entry doors.

14. Memorabilia

15. Memorabilia to lobby.

16.Honour Rolls to stairwell.

The building has many of the characteristics of the *International Style* in its use of a concrete frame, feature sawn sandstone, clear anodised aluminium fenestration (with a "curtain wall" element), and rectilinear façade

composition elements. Internally it features terrazzo flooring and skirtings, wrought metal railings and vermiculite ceilings, with the hall floor in blonde timber parquet flooring.

16.Hall looking towards stage proscenium.

17. Hall from stage.

18. Lower Hall- wall adjoining Ashley Lane.

19. Lower Hall- wall adjoining Hornsby RSL Club.

F3. Function and Use of the Hornsby War Memorial Hall

The following was advised by Terry James AICM JP, President, Hornsby RSL Sub-Branch (Appendix E):

The Hornsby War Memorial Hall is the location of the Eternal Flame. The Eternal Flame commemorates all those men and women who served Australia in past conflicts and honours those who paid the supreme sacrifice. It serves as a permanent visual reminder to the local community of the rich military heritage of the nation and must be maintained at all cost.

The Eternal Flame room incorporates the Australian and New South Wales Flags as well as the Flags for each arm of the Australian Defence Force and Merchant Marine. It is is a place which is used by Hornsby RSL Sub-Branch in conjunction with the Hornsby Cenotaph and memorabilia display cabinets in Hornsby RSL Club to help educate youth groups, various scout organisations, and community clubs.

The War Memorial Hall also serves as a location to hold ANZAC and Remembrance Day Services in the event of inclement weather. Other Sub-Branch functions are often held in the Hall when there is a requirement for specific space, e.g. ARTEX 2016 and future planned art exhibitions.

The Hornsby RSL Sub-Branch office is located on the first floor of the Hall and is the administration centre for Hornsby RSL Sub-Branch. The office premises have been provided to the Sub-Branch in perpetuity (remembering that the Hornsby RSL Sub-Branch was instrumental in building the War Memorial Hall more than 50 years ago), and that fact is enshrined the War Memorial Hall Constitution. The Sub-Branch also uses the on-site Board Room for Committee Meetings and other working meetings on a regular basis.

The Hornsby RSL Sub-Branch Youth Club is a subsidiary organisation of Hornsby RSL Sub-Branch. The Youth Club occupies the lower level of the War Memorial Hall with its gymnasium facilities and often uses the Hall for training and gymnastic events. No doubt John Hunter is better able to answer your questions as to what other social, community, and sporting organisations use the Hall facilities.

The Hornsby & Northern Districts TPI Association also uses the Hall for its monthly meetings, though these rarely exceed an hour in length.

F4. Significance to the Community

The following advice on the significance of the Hall to the Hornsby community was provided by John D Hunter, President, Hornsby War Memorial Hall Committee Inc.:

1. *The local community's understanding of the Hornsby War Memorial Hall as an* [sic] *heritage item and Community Hall is the significance it has in regards to it being a War Memorial Hall, where both ANZAC Day and Remembrance Day services are held (during inclement weather when the service at the Cenotaph is not possible) and also the significance of the Eternal Flame and Sword areas of the Hall remembering those who have served Australia in past conflicts.*
2. *The Hornsby War Memorial Hall Committee Inc. has the duty to maintain and administer the operations of the Hornsby War Memorial Hall whilst providing a home for the Hornsby RSL Sub-Branch and the Hornsby RSL Youth Club.*
3. *Special consideration is given to local community and service organizations for the use of the hall. The Hornsby War Memorial Hall can also be used during local emergencies such as bush fires or major rail/road closures.*
4. *Organisations who gain from the supply of lettable space within the Hornsby War Memorial Hall include:-*
   Australian Air League, Hornsby RSL Chapter
   Hornsby RSL Pipe Band
   Hornsby RSL Sub-Branch
   Hornsby RSL Youth Club
   Hornsby & District TPI Social & Welfare Club
   Hornsby RSL Sub-Branch Women's Auxiliary
5. *Other organisations who hire space within the Hornsby War Memorial Hall include*
   Hornsby RSL Club Adult Dance Club Inc. (Sub Club of Hornsby RSL Club)
   Australian Porcelain Art Teachers
   Lifeline
   Hornsby Kuring-gai Community College Tai Chi and Line Dancing classes.
   Bollywood Dance Classes
   Australian Music Examination Board
   Federal and State Electoral Commissions for Federal, State and Local Government elections.
   Barker College Student Fencing Tuition
   Golden Kangaroos Public Performances
   Nepalese Community Cultural Events
   Muslim Prayer Groups
   Church groups
   Apprenticeship Expo's for supply of work information for job seekers.
   State Rail and Sydney Trains have used lettable space within the Hornsby War Memorial Hall for their driver and crew training.
6. *We do have many other groups and organisations using space within the Hornsby War Memorial Hall for various events and activities.*

We do not wish to provide a current constitution of the Hornsby War Memorial Hall Committee Inc. as this time. We feel it would be of no interest for any Heritage report.

I hope that these answers assists the Heritage Consultants preparation of the IHeritage Report for the Gateway Determination.

Please see letter from which the above was extracted at Appendix F.

G. ASSESSMENT OF SIGNIFICANCE

NATURE, DEGREE AND LEVEL OF SIGNIFICANCE

The following analysis is based on "Assessing Heritage Significance" (Inclusion-left column- and Exclusion –right column-Guidelines) by the NSW Heritage Office, July 2001 (considered "met" criteria in bold):

G1 Cultural or Natural Historical Significance -Criterion (a)

State Theme: **Social Institutions**
Local Theme: **RSL**

State: An item is important in the course, or pattern, of NSW's cultural or natural history

Local: An item is important in the course, or pattern, of the area's cultural or natural history

Inclusion	Exclusion
▪ Shows evidence of a significant human activity	▪ Has incidental or unsubstantiated connections with historically important activities or processes
▪ Is associated with a significant activity or historical phase	▪ Provides evidence of activities or processes that are of dubious historical importance
▪ **Maintains or shows the continuity of a historical process or activity**	▪ Has been so altered that it can no longer provide evidence of a particular association.

Nature of Significance	*Degree of Significance (Rare, Representative)*	*Level of Significance (Local, State)*
Historic	Representative	Local

The Hornsby War Memorial Hall demonstrates the use of the site by the Hornsby RSL Sub-Branch since the early post WWII period.

G2 Associational Significance – Criterion (b).
(with the life or works of a person, or group of persons)

State Theme: Social Institutions
Local Theme: RSL

State: An item has strong or special association with the life or works of a person, or group of persons, of importance in NSW's cultural or natural history.

Local: An item has a strong or special association with the life or works of a person, or group of persons, of importance in the cultural or natural history of the local area.

▪ Shows evidence of a significant human occupation	▪ Has incidental or unsubstantiated connections with historically important people or events
▪ **Is associated with a significant event, person or group of persons**	▪ Provides evidence of people or events that are of dubious historical importance
	▪ Has been so altered that it can no longer provide evidence of a particular association.

Nature of Significance	*Degree of Significance (Rare, Representative)*	*Level of Significance (Local, State)*
Associational	Representative	Local

The Hornsby War Memorial Hall demonstrates the occupation of the site by the Hornsby RSL Sub-Branch and is a venue for commemorative services and memorabilia.

G3 Aesthetic characteristics/creative or technical achievement – Criterion (c).

State Theme: Social Institutions
Local Theme: International Style

State: An item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in NSW

Local: An item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in the local area.

▪ Shows or is associated with, creative or technical innovation or achievement.	▪ Is not a major work by an important designer or artist.
▪ Is the inspiration for a creative or technical innovation or achievement.	▪ Has lost its design or technical integrity.

• Is aesthetically distinctive	• Its positive visual or sensory appeal or landmark and scenic qualities have been more than temporarily degraded
• Has landmark qualities	• Has only a loose association with a creative or technical achievement
• **Exemplifies a particular taste, style or technology process or activity**	

Nature of Significance	*Degree of Significance (Rare, Representative)*	*Level of Significance (Local, State)*
Aesthetic	Representative	Local

The Hall is an example of the post WWII International Style of architecture attributed to local architect Ross Innes Aynsley.

G4 Social Significance – Criterion (d)
(Association with a particular community or cultural group in NSW or the area)

State Theme: Social Institutions
Local Theme: Hornsby RSL

State: An item has strong or special association with a particular community or cultural group in NSW for social, cultural or spiritual reasons

Local: An item has strong or special association with a particular community or cultural group in the area for social, cultural or spiritual reasons.

• **Is important for its associations with an identifiable group**	• Is only important to the community for amenity reasons
• Is important to a community's sense of place	• Is retained only in preference to a proposed alternative

Nature of Significance	*Degree of Significance (Rare, Representative)*	*Level of Significance (Local, State)*
Social	Representative	Local

The War Memorial Hall demonstrates a building type that has strong associations with the Hornsby RSL Sub-Branch and the many sub- clubs associated with that organisation.

G5 Scientific/Archaeological Significance – Criterion (e)
(evidence or information)

State Theme: Social Institutions
Local Theme: Hornsby RSL

State: An item has potential to yield information that will contribute to an understanding of NSW's cultural or natural history.

Local: An item has potential to yield information that will contribute to an understanding of the area's cultural or natural history.

• Has the potential to yield new or further substantial scientific and/or archaeological information	• **Has little archaeological or research potential**
• Is an important benchmark or reference site or type	• Only contains information that is readily available from other resources or archaeological sites
• Provides evidence of past human cultures that is unavailable elsewhere	• The knowledge gained would be irrelevant to research on science, human history or culture

Nature of Significance	*Degree of Significance (Rare, Representative)*	*Level of Significance (Local, State)*

Scientific/ Archaeological	-	-

The place does not meet this criterion.

G6 History: Uncommon, Rare or Endangered Aspects– Criterion (f)

State Theme: Social Institutions
Local Theme: Memorial Halls

State: An item possesses uncommon, rare or endangered aspects of NSW's cultural or natural history.

Local: An item possesses uncommon, rare or endangered aspects of the area's cultural or natural history.

▪ Provides evidence of a defunct custom, way of life or process	▪ **Is not rare**
▪ Demonstrates a process, custom or other human activity that is in danger of being lost	▪ Is numerous but under threat
▪ Shows unusually accurate evidence of a significant human activity	
▪ Is the only example of its type	
▪ demonstrates designs or techniques of exceptional interest	
▪ shows rare evidence of a significant human activity important to a community	

Nature of Significance	*Degree of Significance (Rare, Representative)*	*Level of Significance (Local, State)*
History	-	-

The place does not meet this criterion.

G7 Characteristics of Class– Criterion (g)
(Cultural or natural places/ cultural or natural environments)

State Theme: Social Institutions
Local Theme: War Memorial Hall

State: An item is important in demonstrating the principal characteristics of a class of NSW's
-cultural or natural places; or
-cultural or natural environments.

Local: An item is important in demonstrating the principal characteristics of a class of the area's
-cultural or natural places; or
-cultural or natural environments.

▪ is a fine example of its type	▪ is a poor example of its type
▪ has the potential characteristics of an important class or group of items	▪ does not include or has lost the range of characteristics of a type
▪ **has attributes typical of a particular way of life, philosophy, custom, significant process, design, technique or activity.**	▪ does not represent well the characteristics that make up a significant variation of a type
▪ is a significant variation to a class of items	
▪ is part of a group which collectively illustrates a representative type	
▪ is outstanding because of its setting, condition or size	

- is outstanding because of its integrity or the esteem in which it is held

Nature of Significance	*Degree of Significance (Rare, Representative)*	*Level of Significance (Local, State)*
Class	Representative	Local

The Hornsby RSL War Memorial Hall demonstrates a class of building that is part of the social/ civic fabric of the suburb of Hornsby and the wider Shire. There are some 71 War Memorial Halls or similar structures listed in the State Heritage Inventory [SHI]. The subject place is listed simply as "War Memorial" at 2 High Street Hornsby in the SHI.

G8 Summary Statement of Significance

Social Institutions/ RSL/ War Memorial Halls		
Nature of Significance	***Degree of Significance (Rare, Representative)***	***Level of Significance (Local, State)***
a) Historic	Representative	Local
b) Association	Representative	Local
c) Aesthetic	Representative	Local
d) Social	Representative	Local
e) Technical/Research	-	-
f) History- Evidence	Representative	Local
g) Class	Representative	Local

The Hornsby War Memorial Hall demonstrates the association and history of a social institution, the Hornsby RSL Sub-Branch, and its sub-groups and activities.

It is of International School design influences which attests to its post-WWII design by local architect, Ross Innes Aynsley. This style is comparatively unusual, as most War Memorial Halls were established in the Interwar period.

G9 Curtilage and Views

The curtilage of the item as defined in the NSW Heritage Office guideline document "Heritage Curtilages" is of a "lot-boundary" type i.e. Lot 1, DP585721.

Significant views of the item include those to be had from the cenotaph/ war memorial and from opposite on High St.

The historic and functional connexion between the War Memorial Hall and the cenotaph includes views of the cenotaph from the item.

H. CURRENT PLANNING CONTEXT

Land owned by the Hornsby RSL Club (Sites 1,2 and 3) is currently the subject of a Planning Proposal (PP/1/2016), prepared by Urbis Pty Ltd and dated May 2016.

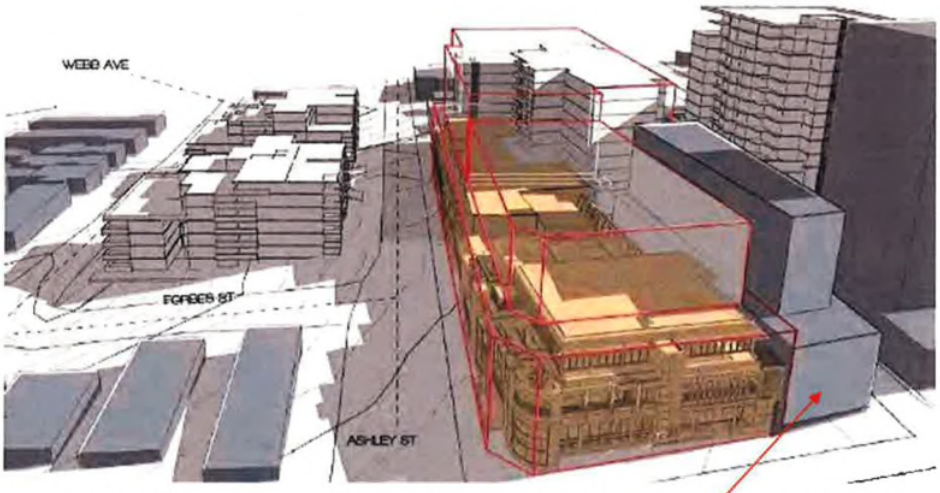
The Planning Proposal seeks to

> *...amend the height development standard and to amend the applicable controls within Hornsby Development Control Plan 2013 for of* [sic]*4 High Street, 7-19 Ashley Street, 2-4 Webb Avenue and 3-7 William Street, Hornsby (the site).*

The sites that are the subject of the Planning Proposal are identified as:

20. Urbis Figure 1 – Aerial Image of Subject Site. Location of the War Memorial Hall.

A three-dimensional representation of the buildings that may result from the proposed amended controls is included in the Altis Architects Hornsby RSL Masterplan:



21. Altis block modelling diagram (p36 of Hornsby RSL Master Plan) – Representation of the War Memorial Hall.

The War Memorial Hall is represented in block form, as is the site to the north across Ashley Lane, seemingly based on the Height of Buildings map of the Hornsby LEP 2013:

22. Extract: Hornsby LEP 2013 Height of Buildings Map-017. War Memorial Hall site.

The "T1" building height is 26.5 metres.

I. CONSTRAINTS AND OPPORTUNITIES

The heritage item was purpose-built as a hall to provide a venue for the activities of the Hornsby RSL Sub-Branch, associated organisations and the community at large and includes votive and memorial paraphernalia, offices, meeting rooms and catering facilities.

Constraints

The Lot Boundary Curtilage includes a small service access to the rear, but is otherwise virtually fully taken-up by boundary to boundary building.

Opportunities

The block modelling indicates a podium-like approach to the massing which appears to approximate the current volume of the entry, memorial and offices portion of the hall building (though the height appears to be less).

It may be plausible to develop the site to the height proposed, provided the hall function is maintained.

J. IMPACT OF THE PLANNING PROPOSAL

J1. Relevant Hornsby LEP 2013 provisions are:

5.10 Heritage conservation

Note. *Heritage items (if any) are listed and described in Schedule 5. Heritage conservation areas (if any) are shown on the Heritage Map as well as being described in Schedule 5.*

Clause	Comment
*(1) **Objectives***	
The objectives of this clause are as follows: *(a) to conserve the environmental heritage of Hornsby,* *(b) to conserve the heritage significance of heritage items and heritage conservation areas, including associated fabric, settings and views,* *(c) to conserve archaeological sites,*	

(d) to conserve Aboriginal objects and Aboriginal places of heritage significance.	
(2) Requirement for consent	
Development consent is required for any of the following: *(a) demolishing or moving any of the following or altering the exterior of any of the following (including, in the case of a building, making changes to its detail, fabric, finish or appearance):* *(i) a heritage item,* *(ii) an Aboriginal object,* *(iii) a building, work, relic or tree within a heritage conservation area,* *(b) altering a heritage item that is a building by making structural changes to its interior or by making changes to anything inside the item that is specified in Schedule 5 in relation to the item,* *(c) disturbing or excavating an archaeological site while knowing, or having reasonable cause to suspect, that the disturbance or excavation will or is likely to result in a relic being discovered, exposed, moved, damaged or destroyed,* *(d) disturbing or excavating an Aboriginal place of heritage significance,* *(e) erecting a building on land:* *(i) on which a heritage item is located or that is within a heritage conservation area, or* *(ii) on which an Aboriginal object is located or that is within an Aboriginal place of heritage significance,* *(f) subdividing land:* *(i) on which a heritage item is located or that is within a heritage conservation area, or* *(ii) on which an Aboriginal object is located or that is within an Aboriginal place of heritage significance.*	
(3) When consent not required	
However, development consent under this clause is not required if: *(a) the applicant has notified the consent authority of the proposed development and the consent authority has advised the applicant in writing before any work is carried out that it is satisfied that the proposed development:* *(i) is of a minor nature or is for the maintenance of the heritage item, Aboriginal object, Aboriginal place of heritage significance or archaeological*	Consent is required.

site or a building, work, relic, tree or place within the heritage conservation area, and *(ii) would not adversely affect the heritage significance of the heritage item, Aboriginal object, Aboriginal place, archaeological site or heritage conservation area, or* *(b) the development is in a cemetery or burial ground and the proposed development:* *(i) is the creation of a new grave or monument, or excavation or disturbance of land for the purpose of conserving or repairing monuments or grave markers, and* *(ii) would not cause disturbance to human remains, relics, Aboriginal objects in the form of grave goods, or to an Aboriginal place of heritage significance, or* *(c) the development is limited to the removal of a tree or other vegetation that the Council is satisfied is a risk to human life or property, or* *(d) the development is exempt development.*	
(4) Effect of proposed development on heritage significance	
The consent authority must, before granting consent under this clause in respect of a heritage item or heritage conservation area, consider the effect of the proposed development on the heritage significance of the item or area concerned. This subclause applies regardless of whether a heritage management document is prepared under subclause (5) or a heritage conservation management plan is submitted under subclause (6).	The significance of the item is stated as: *The Hornsby War Memorial Hall demonstrates the facility of a social institution, the Hornsby RSL Sub-Branch, and the associated sub-groups and activities.* *It is of International School design influences which attests to its post-WWII design by local architect, Ross Innes Aynsley. This style is comparatively unusual, as most War Memorial Halls were established in the Interwar period.*
(5) Heritage assessment	
The consent authority may, before granting consent to any development: *(a) on land on which a heritage item is located, or* *(b) on land that is within a heritage conservation area, or* *(c) on land that is within the vicinity of land referred to in paragraph (a) or (b),* *require a heritage management document to be prepared that assesses the extent to which the carrying out of the proposed development would affect the heritage significance of the heritage item or heritage conservation area concerned.*	The proposed development is to land that is within the vicinity of a heritage item. This document has been prepared having general regard to the guideline document "Statements of Heritage Impact" as published by the Heritage Branch of the NSW Office of Environment & Heritage.
(6) Heritage conservation management plans	
The consent authority may require, after considering the heritage significance of a heritage item and the extent of change proposed to it, the submission of a heritage	The preparation of a Conservation Management Plan is not warranted by the

conservation management plan before granting consent under this clause.	nature of the existing building and the proposed development.
*(7) **Archaeological sites***	
The consent authority must, before granting consent under this clause to the carrying out of development on an archaeological site (other than land listed on the State Heritage Register or to which an interim heritage order under the Heritage Act 1977 applies): *(a) notify the Heritage Council of its intention to grant consent, and* *(b) take into consideration any response received from the Heritage Council within 28 days after the notice is sent.*	The subject place is not identified as being of archaeological significance.
*(8) **Aboriginal places of heritage significance***	
The consent authority must, before granting consent under this clause to the carrying out of development in an Aboriginal place of heritage significance: *(a) consider the effect of the proposed development on the heritage significance of the place and any Aboriginal object known or reasonably likely to be located at the place by means of an adequate investigation and assessment (which may involve consideration of a heritage impact statement), and* *(b) notify the local Aboriginal communities, in writing or in such other manner as may be appropriate, about the application and take into consideration any response received within 28 days after the notice is sent.*	The subject place is not identified as being of Aboriginal significance.
*(9) **Demolition of nominated State heritage items***	
The consent authority must, before granting consent under this clause for the demolition of a nominated State heritage item: *(a) notify the Heritage Council about the application, and* *(b) take into consideration any response received from the Heritage Council within 28 days after the notice is sent.*	The subject place is not identified as being of State significance.
*(10) **Conservation incentives***	
The consent authority may grant consent to development for any purpose of a building that is a heritage item or of the land on which such a building is erected, or for any purpose on an Aboriginal place of heritage significance, even though development for that purpose would otherwise not be allowed by this Plan, if the consent authority is satisfied that: *(a) the conservation of the heritage item or Aboriginal place of heritage significance is facilitated by the granting of consent, and* *(b) the proposed development is in accordance with a heritage management document that has been approved by the consent authority, and*	Conservation incentives are not sought.

(c) the consent to the proposed development would require that all necessary conservation work identified in the heritage management document is carried out, and *(d) the proposed development would not adversely affect the heritage significance of the heritage item, including its setting, or the heritage significance of the Aboriginal place of heritage significance, and* *(e) the proposed development would not have any significant adverse effect on the amenity of the surrounding area.*	

J2. Hornsby Development Control Plan 2013 [HDCP]

The relevant guidelines of the HDCP are:

9.4.1 Development in the Vicinity of Heritage Items and Heritage Conservation Areas

Desired Outcomes

a. New work that is sympathetic to the heritage significance of nearby heritage items, or adjoining heritage conservation area, and their settings.

Prescriptive Measures

Heritage Items

a. Design and siting of new work should complement the form, orientation, scale and style of the heritage item.

Comment: the schematic diagrams (see image 21, p.14, above) indicate the massing and bulk of the potential building envelopes under Planning Proposal, but do not detail architectural expression, external materials, finishes and colours. It is premature to attempt to assess impacts on the setting of the heritage item at this juncture.

The Height of Buildings and Floor Space Ratio maps indicate that there is an intent to increase the scale and height of the buildings within the vicinity substantially. It is a matter of ensuring that the legibility of the War Memorial Hall is maintained as a "figure-ground" relationship with structures that will be see in its background.

b. Adequate space should be provided around the heritage item to allow for its interpretation.

Comment: it is clear the heritage item was not designed to be seen "in-the-round", but to address High Street and more importantly to establish a connexion with the cenotaph, located to the nor-nor-east (Item 503 on extract map HER_17B at p2 above), through the use of the double-height curtain walled element in the façade composition that houses the eternal flame and sword/ cross.

c. Development should maintain significant or historic public domain views to and from the heritage item.

Comment: the significant public domain views are to and from the nor-nor-east (relating with the cenotaph) and from opposite on High Street- the building has been designed with an expressed façade and office/ function spaces component, with the halls set behind it.

d. Original or significant landscape features that are associated with the heritage item and which contribute to its setting should be retained.

Comment: there are no landscape features of note, nor has there been historically.

e. For rural heritage items, the scale of new work is not to overwhelm the heritage item taking into consideration the matters within the Rural Heritage Items element.

Comment: not applicable- the place is a suburban item.

***Heritage Conservation Areas* [HCA]**

Comment: not applicable – the nearest HCA is *C5 Peats Ferry Road Precinct, Hornsby West Side Heritage Conservation Area* which is to the north, commencing one block away.

K. QUESTIONS TO BE ANSWERED

The guideline document, "Statements of Heritage Impact" by the NSW Heritage Office 1996, poses a series of questions in relation to:

New Development Adjacent

- *How is the impact of the new development on the significance of the item or area to be minimised?*

Comment: through the use of architectural expression and external materials, finishes and colours that will provide an appropriate backdrop to the item and maintain its legibility.

- *Why is the new development required to be adjacent to a heritage item?*

Comment: as a matter of the desired future character of the area, as indicated in the planning controls and the Planning Proposal.

- *How does the curtilage allowed around the heritage item contribute to the retention of its heritage significance?*

Comment: the curtilage of the item is of a "Lot Boundary" type as the War Memorial Hall was built more or less on the lot associated with the former Camira Flats. This lot was formerly Lots 5 & part 6, Section 3 of DP 1880.

- *How does the new development affect views to, and from, the heritage item? What has been done to minimise negative effects?*

Comment: impacts on views to the item are a matter of the detail of the design of the proposed new buildings, as discussed above. Views from the item will be little affected as they are primarily to the High Street frontage to the east and to a lesser extent, Ashley Lane.

- *Is the development sited on any known, or potentially significant archaeological deposits? If so, have alternative sites been considered? Why were they rejected?*

Comment: the site has no known archaeological deposits. Should relics be discovered, they are necessarily subject to the provisions of the Heritage Act 1977.

- *Is the new development sympathetic to the heritage item? In what way? (e.g. form, siting, proportions, design)?*

Comment: the "block modelling in the Planning Proposal is of insufficient detail to assess this.

- *Will the additions visually dominate the heritage item? How has this been minimised?*

Comment: the proposed development is not "additions", but buildings to separate parcels of land.

- *Will the public, and users of the item, still be able to view and appreciate its significance?*

Comment: yes, as discussed above, the primary views of the item are from High Street and to the north-east, and will not be affected by the proposed development.

L. CONCLUSION AND RECOMMENDATIONS

Historical research has shown that the Hornsby RSL Sub-Branch purchased the site of what is now more or less that of the Hornsby RSL War Memorial Hall in September 1946, at which time it was largely occupied by the *Camira Flats.* A "hut" was built using WWII army surplus buildings behind the flats, and was used up until the current Hall was erected in 1955-62. The current Hall has, then, occupied the site for some 55 years, and is a vital part of the Hornsby community, as attested to by the many groups that use the Hall.

Its primary function, though, is as a memorial to those who served in past conflicts and has a vital relationship with the Hornsby Cenotaph.

The Planning Proposal seeks to *…amend the height development standard and to amend the applicable controls within Hornsby Development Control Plan 2013,* essentially to achieve a greater level of development on the relevant properties:

- *Amend the Height of Buildings map under the HLEP to increase the maximum permissible heights across the site[s] to 23.5 to 48 metres.*
- *Amend Clause 4.4(2D) of the HLEP to include providing public car parks, with an area equivalent to 1:1 of the site area, as a use to allow additional floor area.*
- *Amend the relevant figures in the HDCP to reflect the desired built form, including:*
  - *Building Height Plan*
  - *Ground Floor Minimum Setbacks*
  - *Wall Heights*

The implications of these measures in terms of heritage impacts relate to the significance and setting of the Hornsby War Memorial Hall.

The significance of the Hall is largely a function of its association with the social institution, the Hornsby RSL Sub-Branch, with its physical manifestation being the International Style of the architecture and massing of the Hall and appurtenant rooms.

I would recommend that a full fabric assessment of the War Memorial Hall be undertaken to assess the relative significance of the elements of the building, and that this analysis be used to inform any works to the item.

As it stands, the Planning Proposal does not, however, have implications in terms of the fabric of the item, but rather its setting.

Impacts of increased scale and bulk of buildings within its setting are a matter of the architectural expression of the buildings. Given its siting at the corner of High Street and Ashley Lane, the connexion between the Hall and the Cenotaph will be maintained. It is a matter of whether development beyond the Hall to the west will reduce its legibility and presence within the streetscape. This will similarly apply to the impact of potential development on the site immediately opposite on Ashley Lane to the north which currently has a building height of AA1 (62.5 metres).

In my opinion, the implications of the Planning Proposal in terms of heritage impacts are not necessarily adverse. It is a relatively common phenomenon in areas where there is increasing urbanisation and sometimes quite radical changes in scale and character for older development to have its setting substantially altered. It is a matter of maintaining the legibility of heritage items in this circumstance and this should be a primary concern in the detailed architectural design of the built form that flows from such a Planning Proposal.

Prepared by

[redacted]

Greg Patch
Architect/Heritage Consultant

ATTACHMENT 2 - ITEM 4

Appendix A: Inventory Sheet- Hornsby War Memorial Hall

Hornsby RSL Memorial Hall- SoHI App.

ATTACHMENT 2 - ITEM 4

Item No.:	I 483
Location:	2 High Street HORNSBY NSW 2077

Link to property details

Status:	Listed Item
Item Name:	Hornsby War Memorial Hall
Item Type:	Built
Circa Date:	1955
Style:	Post Modern
Statement of Significance:	Memorial Hall valued by Community as symbolic of endeavours and place of assembly
Physical Description:	Roof - mild steel flat roofing; Walls - face brick; Windows - Aluminium frame glazed; Details - Front Symbolic Feature
Historical Notes:	Foundation stone laid ANZAC DAY 1955. Opened by Lt. Gen. Sir Eric Woodward 8 December 1962. Youth Club in Lower Hall opened in 1959.
Integrity/Intactness:	Substantially intact.
Recommended Management:	Manage a Community and landmark resource and item.
Endorsed Significance:	Local
Criteria a) Historic:	An important building to the Hornsby Community
Criteria c) Aesthetic:	It has landmark qualities
Criteria d) Social:	An important building valued by the Community.
Heritage Listings:	Hornsby Local Environmental Plan 2013 - Schedule 5
Study:	Heritage Review 2 (1999)
Study by:	Perumal Murphy Wu Pty Ltd
Comments:	Heritage listed in Heritage Review 2 (1999) - HSLEP 1994 (Amendment No. 59), Gazetted 22 June 2001.
Date Inspected:	21-Jul-1998

ATTACHMENT 2 - ITEM 4

Images:

2 High Street (June 2015)

ATTACHMENT 2 - ITEM 4

Appendix B: Inventory Sheet- Hornsby War Memorial

Hornsby RSL Memorial Hall- SoHI App.

Hornsby War Memorial

Item details

Name of item:	Hornsby War Memorial
Type of item:	Built
Group/Collection:	Monuments and Memorials
Category:	War Memorial
Primary address:	155X Pacific Highway (opp Railway Ped Bridge), Hornsby, NSW 2077
Local govt. area:	Hornsby

All addresses

Street Address	Suburb/town	LGA	Parish	County	Type
155X Pacific Highway (opp Railway Ped Bridge)	Hornsby	Hornsby			Primary Address

Statement of significance:

Notable monument lighting and planting from 1920's period. Of local significance.

Date significance updated: 05 Jul 01

Note: There are incomplete details for a number of items listed in NSW. The Heritage Division intends to develop or upgrade statements of significance and other information for these items as resources become available.

Description

Physical description: Monument to commemorate those who served in World War One. Built of Buff Granite with central polished inscribed panels. Square monument of solid form about 4m high. Set on grassed plot retained by granite edging 500mm above road surface. (See below for inscriptions.) Also notable bronze light standard (double carriage-light design) matching lights opposite Police station some 200m north of highway. (see inventory item L2). Also two mature palms (possibly Butia Palms) possibly from same period. These palms are fairly unusual as the commonly planted species is the Canary Island Date Palm. Monument to World War I inscribed #Pro Patria# with list of the names local servicemen: #New Guinea Egypt Gallipoli Palestine Mesopotamia Salonika France Belgium .....To the immortal honour of the men of the Hornsby district who served their King and Empire in the Great War 1914-1919.# #For Humanity#s cause this memorial was erected by the citizens of the Hornsby District. Unveiled on 27 April 1923 by His Excellency Lord Foster PCKCMC Governor General.#

History

Historical notes:

Recommended management:

Listings

Heritage Listing	Listing Title	Listing Number	Gazette Date	Gazette Number	Gazette Page

Local Environmental Plan			22 Jul 94		
Heritage study					

Study details

Title	Year	Number	Author	Inspected by	Guidelines used
Hornsby Shire Heritage Study	1993		Perumal Murphy Wu Pty Ltd	WA	No

References, internet links & images

None

Note: internet links may be to web pages, documents or images.

Data source

The information for this entry comes from the following source:

Name: Local Government

Database number: 1780639

ATTACHMENT 2 - ITEM 4

Appendix C: Inventory Sheet- Hornsby War Memorial [SHI]

Hornsby RSL Memorial Hall- SoHI App.

Hornsby War Memorial

Item details

Name of item:	Hornsby War Memorial
Type of item:	Built
Group/Collection:	Monuments and Memorials
Category:	War Memorial
Primary address:	2 High Street, Hornsby, NSW 2077
Local govt. area:	Hornsby

All addresses

Street Address	Suburb/town	LGA	Parish	County	Type
2 High Street	Hornsby	Hornsby			Primary Address

Listings

Heritage Listing	Listing Title	Listing Number	Gazette Date	Gazette Number	Gazette Page
Local Environmental Plan	Amendment No. 59		22 Jun 01	100	4376
Heritage study					

References, internet links & images

None

Note: internet links may be to web pages, documents or images.

Data source

The information for this entry comes from the following source:

Name:	Local Government
Database number:	1781042

ATTACHMENT 2 - ITEM 4

Appendix D: Letter: Terry James AICM JP

Hornsby RSL Sub-Branch-Response to Questions:

- *Local community's understanding of the heritage item;*
- *Associations with individuals or groups, and it's meaning to those people;*

The Hornsby War Memorial Hall is the location of the Eternal Flame. The Eternal Flame commemorates all those men and women who served Australia in past conflicts and honours those who paid the supreme sacrifice. It serves as a permanent visual reminder to the local community of the rich military heritage of the nation and must be maintained at all cost.

The Eternal Flame room incorporates the Australian and New South Wales Flags as well as the Flags for each arm of the Australian Defence Force and Merchant Marine. It is is a place which is used by Hornsby RSL Sub-Branch in conjunction with the Hornsby Cenotaph and memorabilia display cabinets in Hornsby RSL Club to help educate youth groups, various scout organisations, and community clubs.

The War Memorial Hall also serves as a location to hold ANZAC and Remembrance Day Services in the event of inclement weather. Other Sub-Branch functions are often held in the Hall when there is a requirement for specific space, e.g. ARTEX 2016 and future planned art exhibitions.

The Hornsby RSL Sub-Branch office is located on the first floor of the Hall and is the administration centre for Hornsby RSL Sub-Branch. The office premises have been provided to the Sub-Branch in perpetuity (remembering that the Hornsby RSL Sub-Branch was instrumental in building the War Memorial Hall more than 50 years ago), and that fact is enshrined the War Memorial Hall Constitution. The Sub-Branch also uses the on-site Board Room for Committee Meetings and other working meetings on a regular basis.

The Hornsby RSL Sub-Branch Youth Club is a subsidiary organisation of Hornsby RSL Sub-Branch. The Youth Club occupies the lower level of the War Memorial Hall with its gymnasium facilities and often uses the Hall for training and gymnastic events. No doubt John Hunter is better able to answer your questions as to what other social, community, and sporting organisations use the Hall facilities.

The Hornsby & Northern Districts TPI Association also uses the Hall for its monthly meetings, though these rarely exceed an hour in length.

I trust this information suits your purpose.

Kind Regards,

Terry James AICM JP
President, Hornsby RSL Sub-Branch
(email to Mario Machado: 10 Aug 2017)

ATTACHMENT 2 - ITEM 4

Appendix E: Letter, John D Hunter

ATTACHMENT 2 - ITEM 4

Hornsby War Memorial Hall Committee Inc
ABN 28 019 832 671

President: John Hunter

PO Box 662 Hornsby NSW 1630
Ph: 02 9476 4455
2 High Street Hornsby NSW 2077

e-Mail: hornsbywarmemorialhall@live.com.au Website: www.hwmh.com.au

Hornsby RSL Club Ltd.
4 High St.
Hornsby NSW 2077

To Mario Machado
CEO
Hi Mario

In answer to your questions re the Heritage Consultants questions relating to the Heritage report.

1. The local community's understanding of the Hornsby War Memorial Hall as an heritage item and Community Hall is the significance it has in regards to it being a War Memorial Hall, where both ANZAC Day and Remembrance Day services are held (during inclement weather when the service at the Cenotaph is not possible) and also the significance of the Eternal Flame and Sword areas of the Hall remembering those who have served Australia in past conflicts.
2. The Hornsby War Memorial Hall Committee Inc. has the duty to maintain and administer the operations of the Hornsby War Memorial Hall whilst providing a home for the Hornsby RSL Sub-Branch and the Hornsby RSL Youth Club.
3. Special consideration is given to local community and service organizations for the use of the hall. The Hornsby War Memorial Hall can also be used during local emergencies such as bush fires or major rail/road closures.
4. Organisations who gain from the supply of lettable space within the Hornsby War Memorial Hall include:-
   Australian Air League, Hornsby RSL Chapter
   Hornsby RSL Pipe Band
   Hornsby RSL Sub-Branch
   Hornsby RSL Youth Club
   Hornsby & District TPI Social & Welfare Club
   Hornsby RSL Sub-Branch Women's Auxiliary
5. Other organisations who hire space within the Hornsby War Memorial Hall include
   Hornsby RSL Club Adult Dance Club Inc. (Sub Club of Hornsby RSL Club)
   Australian Porcelain Art Teachers
   Lifeline
   Hornsby Kuring-gai Community College Tai Chi and Line Dancing classes.
   Bollywood Dance Classes
   Australian Music Examination Board
   Federal and State Electoral Commissions for Federal, State and Local Government elections.
   Barker College Student Fencing Tuition
   Golden Kangaroos Public Performances
   Nepalese Community Cultural Events
   Muslim Prayer Groups
   Church groups
   Apprenticeship Expo's for supply of work information for job seekers.

Hornsby War Memorial Hall Committee Inc
ABN 28 019 832 671

President: John Hunter

PO Box 662 Hornsby NSW 1630
Ph: 02 9476 4455
2 High Street Hornsby NSW 2077

e-Mail: hornsbywarmemorialhall@live.com.au Website: www.hwmh.com.au

State Rail and Sydney Trains have used lettable space within the Hornsby War Memorial Hall for their driver and crew training.

6. We do have many other groups and organisations using space within the Hornsby War Memorial Hall for various events and activities.

We do not wish to provide a current constitution of the Hornsby War Memorial Hall Committee Inc. as this time. We feel it would be of no interest for any Heritage report.

I hope that these answers assists the Heritage Consultants preparation of the Heritage Report for the Gateway Determination.

Regards

John D Hunter
President
Hornsby War Memorial Hall Committee Inc.
02 9457 9770
[redacted]

ATTACHMENT 2 - ITEM 4

ATTACHMENT 2 - ITEM 4

Appendix F: Obituary- Ross Innes Aynsley

Ross Innes AYNSLEY

12th December 2024 [sic] to 10th September 1999

Early Life
December 1924 to January 1943

Ross Innes AYNSLEY was born at Glen Innes, New South Wales, Australia on the 12th of December 1924. His father, Royal Victor AYNSLEY was a Bank Manager and his mother was Minnie Mary AYNSLEY nee Bell was a home maker.

Religious Denomination: Methodist (Wesleyan)

Ross had 2 older twin brothers and 1 younger sister – John Charles, Robert William and Doris.

Ross' mother Minnie couldn't decide on a middle name for him and ultimately decided to use the name "Innes" from the town's name where he was born. Ross' father Roy was working for the Commonwealth Bank of Australia at the time and was posted to Glen Innes which is in northern New South Wales.

The family moved on from Glen Innes to Condoblin and when Ross was around 8 or 9 he moved for a time to Katoomba to live with his Grandmother (Bell) who ran a boarding house there. He attended Katoomba Primary School for about 3 years. Ross used to speak fondly of his childhood years in Katoomba.

The entire family eventually moved to Hornsby in the first half of 1937 which is where Ross spent the remainder of his childhood and a good part of the rest of his life.

He attended the Hornsby Junior Technical School until he was 15 years old in 1939. He was a Safety Patrol Leader and a Class School Prefect in his final year at the school. His end of year report gives a summary of his character as perceived by the Headmaster:

"I have found Ross thoroughly honest and dependable. He carries out verbal instructions efficiently and should become a citizen of the most desirable type.

This lad carries responsibility well and is what is commonly called 'a good sport'.

In 1940 Ross attended the Ultimo Central Technical School to study for his Intermediate Certificate. He was a School Prefect and his reports tell that he was a good and diligent student. Ross sat for the certificate at the end of 1940. He did not pass the exam as a whole; however he did do well in Technical Drawing, Woodwork, Metalwork and History.

Ross Innes AYNSLEY

12th December 2024 [sic] to 10th September 1999

Ross' School Photo from 1940 - At centre holding the plaquard

Ross' School Soccer Team photo from 1940 - 1st on left in back row standing

In 1941 Ross applied for a Junior Draftsman job with Thompson Gould Architectural Consultants. Where he worked until the firm closed in 1942 due to the wartime building downturn.

Ross Innes AYNSLEY

12th December 2024 [sic] to 10th September 1999

On 30th January 1943 Ross enlisted in the Armed Forces – the Royal Australian Air Force.

He was sent to the United Kingdom and in 1944 gained his Pilots Badge. He was promoted to Sergeant – Airman Pilot, then Flight Sergeant – Airman Pilot in late 1944 and finally Warrant Officer – Airman Pilot in late 1945. He was discharged in early 1946 on demobilisation of the Australian Defense Forces and received The Defense Medal, The War Medal and The Australian Service Medal as well as the Returned from Active Service Badge.

In 1946 following discharge, Ross enrolled in the Department of Education private study program to complete the Leaving Certificate subjects he had failed in 1940. He passed all subjects at the end of 1947 and then applied to the Sydney Technical College, where he was accepted to study for his Architectural Diploma.

For the next 5 years Ross studied part-time while working for the Department of Public Works as an Architectural Draftsman, then for the Water Conservation & Irrigation Commission as a Draftsman and as an Architect when he was awarded his Diploma in June 1953 at the age of 28.

Marriage and Family – 1954 to 1999

In February 1954 Ross married Francine Elizabeth STRATFORD, who he had known for a number of years. Francine recalls that she and Ross used to walk to their homes together from the station and talk. It was around 1952 that they first started going out together as a couple. Francine used to tell a story recalling a time when the Queen was visiting Sydney for the first time and everyone was going into the city to see her. Ross used to sleep in a verandah room at his parent's house at 18 Bridge Road Hornsby. He had a reputation for finding it difficult to wake up so slept next to a tin can with an alarm in it. Apparently it didn't help and Francine had to get Ross's father to wake him up.

Ross and Francine married on the 25th of February 1954 at St Peters Anglican Church on the Pacific Highway at Hornsby. The best man was Alf Williams, a long time and subsequently life-long friend of Ross and the Bridesmaid was Elaine Philipson a maternal first cousin of Francine.

Ross Innes AYNSLEY

12th December 2024 [sic]to 10th September 1999

They had their Honeymoon at the Palais Royal at Katoomba and moved into a small house in Romsey Street in Hornsby that Ross had designed.

At the end of that year the first of Ross' and Francine's children was born, Peter Ross AYNSLEY, on October 28th.

During 1955 Ross decided that he wanted to work for himself and resigned from the Water Conservation and Irrigation Commission. He set up premises in Hornsby as Ross I Aynsley Architects, and had offices there for many years. It was during the early years of his practice that Ross' and Francine's daughter was born, Toni Bell AYNSLEY on 5th April 1956 and Arthur Michael Royal AYNSLEY (known as Michael) on 24th March 1958.

It was sometime around the mid 1950's that Ross joined the Hornsby Rotary Club, of which his father was a member. It was an association he continued until the 1970's when the family moved out of the Hornsby district. He and Francine joined the Rotary Tour of Asia in 1966 and in the mid 1970's sponsored a Rotary exchange student from Japan for part of the year.

Ross was a member of the Hornsby Methodist Church for most of his life and church was very important to him. A significant part of his professional career revolved church and the lodge, and he became increasingly involved in projects for both. He served on many committees and voluntary organisations with a focus on care for the aged.

Ross in fact became very proactive in developing opportunities to care for the aged, identifying potential sites and pulling together all necessary elements, including government funding. He would often do most of the negotiation and financial planning as well as provide his architectural services. For more than a decade he was instrumental in developing literally thousands of self-care units, hostel units and nursing care beds, mostly in integrated care projects throughout NSW.

For the Uniting Church, Ross initiated or played a key role in a number of projects such as the conversion of the Turramurra Motor Inn into Northaven Turramurra, a nursing care facility that is now expanded further; and Wesley Heights at Manly, an ambitious project with both accommodation and nursing care. For the Frank Widdon Masonic Homes, Ross carried out many aged care projects across New South Wales, ranging from the multi-storey hostel tower and nursing home that he conceived on the corner of the Hornsby Hospital

Ross Innes AYNSLEY

12th December 2024 [sic] to 10th September 1999

site, to integrated care projects in locations such as Temora, Condoblin, Kyogle and Wingham, to extensive development on the main site of the Homes ay Glenfield.

In addition to care for the aged, Ross was involved in other community projects and was recognised by the Scouting organisation for his help with their building in Hornsby.

Ross's Architectural practice grew throughout the 1960's and 1970's and he opened offices in Sydney and Wollongong as well as Hornsby. He was involved in many projects throughout his 40 year career as an architect – everything from houses to office buildings to indoor swimming pools and the Australian Museum extension.

In 1968, Ross suffered his first heart attack – ironically at Glen Innes, the place of his birth, while driving back from one of his country aged care projects.

Rather than sit back, this seemed to galvanise Ross into even more activity, and the 1970's saw the most active period of his business career. He also decided he would like to fly again, and went back to flight training in the mid 1970's, together with his son Peter, at Bankstown Airport.

During this period Ross and the family moved out of Hornsby, and lived at Longueville, Warrawee, Beecroft and Pymble before settling in the St Ives area in the mid 1980's. This was the beginning of his association with Pymble Chapel, The Reverend Thorogood who officiated at Ross's funeral said:

"The Chapel members were delighted to have in their number an architect who could take responsibility for these fine old buildings. This was planned years ago, but churches tend to take their time, and it was only last year that the resources came together and the courtyard outside could be rebuilt. We are all very grateful, but none of us could be happier than Ross who saw his scheme fulfilled. He was a representative of the church on the Presbytery and the Parish Council, taking a full part in the life of the church. Since I have been here Ross was always the first person in church on Sunday morning, and always with a cheerful smile, unassuming, faithful."

Ross suffered his second heart attack in 1987, which prompted his virtual retirement by the end of the 1980's. He never really retired though and was always looking for opportunities to help others. He continued to serve on committees, and continued to do architectural work from his home. He helped his son Michael with home renovations in 1991 and in 1999, shortly before his passing, Ross designed and supervised construction of extensions to his mother-in-law's house. He also spent time on one of his pet projects – a new type of aeroplane. He was always looking to improve things.

Early in 1999, Ross and Francine moved out of Sydney to Blackheath in the Blue Mountains – this was always something Ross had wanted to do as he had always loved the mountains since his childhood. It was also where their daughter Toni lived.

Although not well, the last few months of Ross' life were particularly happy. He loved spending time with his family and particularly looked forward to when Tanya, Rob, Chris, Tom and Emma – his 5 grandchildren would come to visit. He loved living at Blackheath and

Ross Innes AYNSLEY

12th December 2024 [sic] to 10th September 1999

would go walking everyday as say how much he enjoyed the fresh air and peaceful nature of the mountains. He loved to see the Wattyl coming out in the spring-time.

Summing up at his funeral, the Reverend Thorogood said:

Throughout the sixty years following their predictions, Ross' teachers at Hornsby Junior Technical School were proven right:

- "thoroughly honest and dependable"
- "a citizen of the most desirable type"; and
- "this lad carries responsibility well"

As the result of a heart attack, Ross Innes AYNSLEY passed away on the morning of 10th September 1999 at the Blue Mountains District ANZAC Memorial Hospital, Katoomba.

ATTACHMENT 2 - ITEM 4

Appendix G: Land Titles Documents

DP1880 (E)

1880

6 Maralah

RAILWAY

100 ac Grant to Thomas Hyndes 15 Jan^y 1839

LINDA STREET

LANE 360

90°00'

STREET

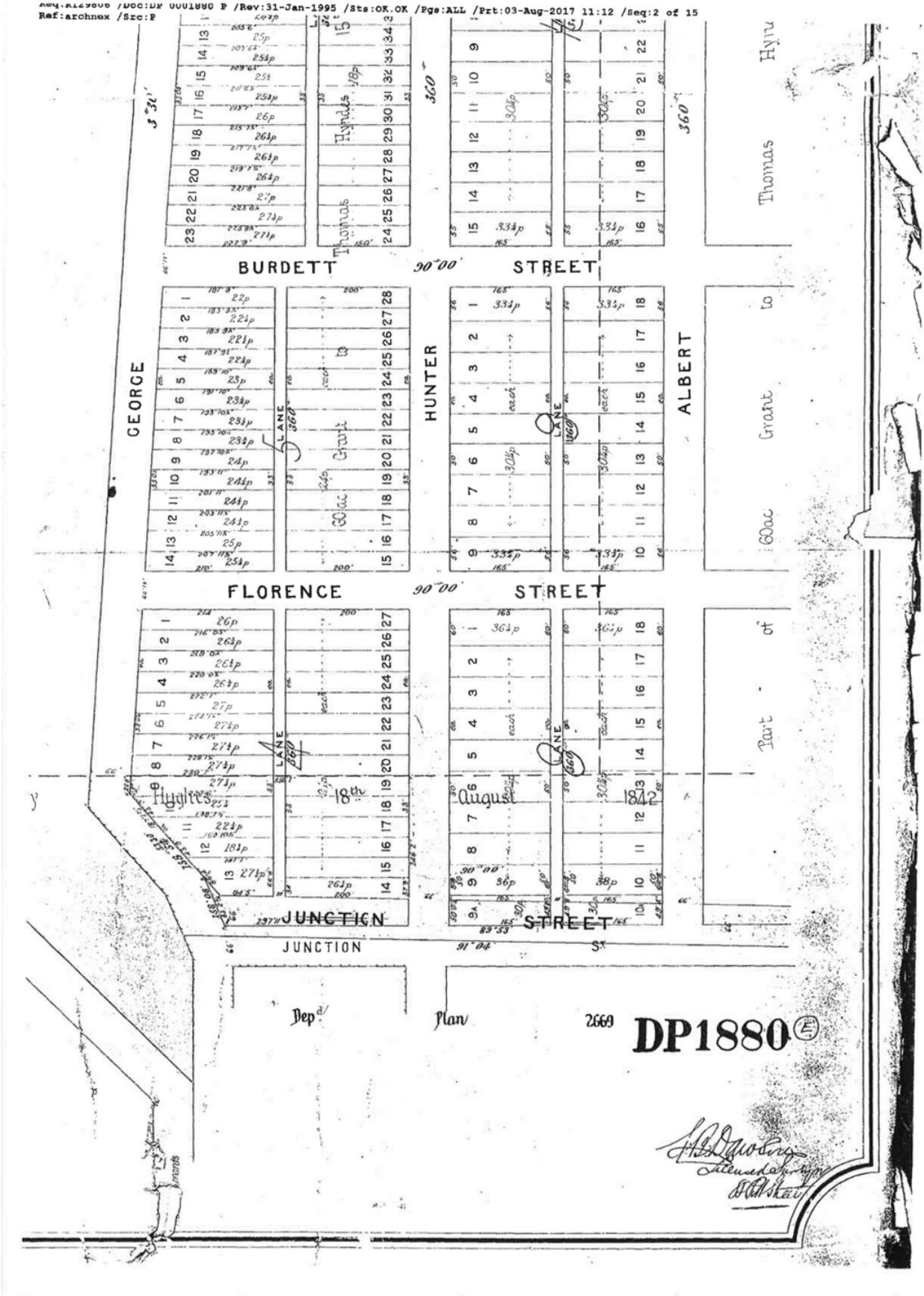
January

15th

Hyndes

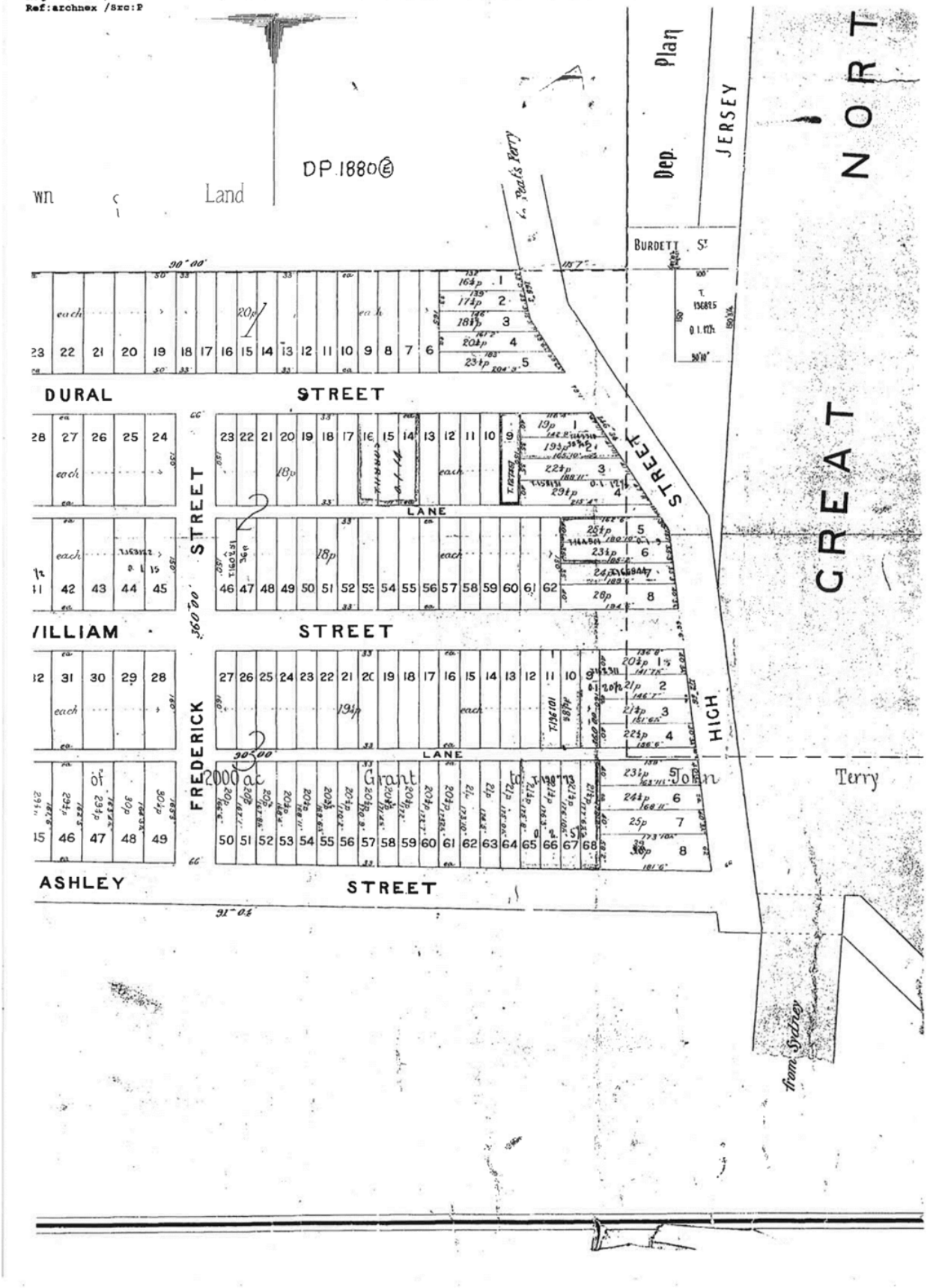
Thomas

1839



ATTACHMENT 2 - ITEM 4

ATTACHMENT 2 - ITEM 4



DP 1880 (E)

BDIVISION

Messrs Burns Withers & Smiths property

I OF SOUTH COLAH

Scale 100 feet to an Inch

Vol: 788 fol: 129 to 131

Res'd Pres'd for Fol: 130 N°4011 11-7-93
Vol: Fol:

RAILWAY

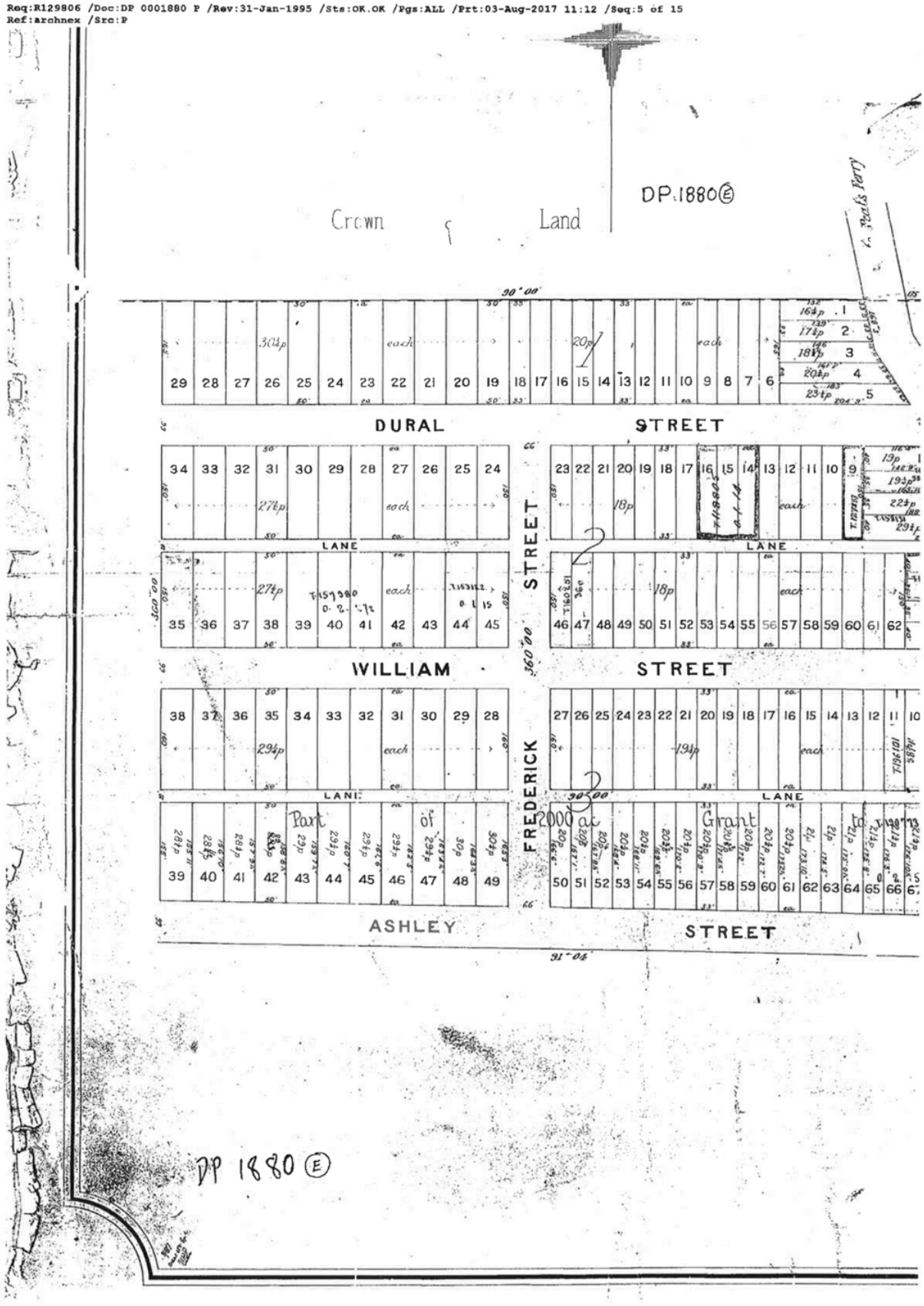
NORTHERN

JERSEY

Plan 2347

DP 1880 (E)

ATTACHMENT 2 - ITEM 4



ATTACHMENT 2 - ITEM 4

Req:R129806 /Doc:DP 0001880 P /Rev:31-Jan-1995 /Sts:OK.OK /Pgs:ALL /Prt:03-Aug-2017 11:12 /Seq:6 of 15
Ref:archnex /Src:P

ATTACHMENT 2 - ITEM 4

DP 1880

DP 1880 (E)

SUBDIVISIO

of part of Messrs Burns Withers & Smiths

PARISH OF SOUTH C

Scale 100 feet to an Inch

Vol: 788 fol: 129 to 131

Resd Prd for fol 130 No 4011 11-7-93
Vol: Fol:

COPY MADE K.M. 14-7-93
EXAMINED S.a. 14-7-93

STANDARD PREPARED

ATTACHMENT 2 - ITEM 4

CONVERSION TABLE ADDED IN REGISTRAR GENERAL'S DEPARTMENT

DP 1880 SH 1/2

FEET	INCHES	METRES
15	-	4.57
15	1	4.595
20	-	6.095
20	2	6.145
21	11	6.68
23	11 1/2	7.3
30	-	9.145
33	-	10.06
33	9	10.285
35	-	10.67
35	3	10.745
39	6 1/2	12.05
40	-	12.19
40	3 1/2	12.28
41	11	12.775
47	11	14.605
50	-	15.24
58	2	17.73
62	-	18.9
66	6	20.27
79	1	24.105
90	10	27.685
100	-	30.48
116	4	35.46
132	-	40.235
136	8	41.655
139	-	42.365
141	7 1/2	43.165
142	9	43.51
146	-	44.5
146	7	44.68
150	-	45.72
150	3 1/4	45.8
151	6 1/2	46.19
155	-	47.245
155	11	47.525
156	6	47.7
156	10	47.805
157	9 1/2	48.095
158	8 1/2	48.375
159	-	48.465
159	7 1/2	48.655
160	-	48.77
160	7	48.945
161	2	49.125
161	6	49.225
162	5	49.505
162	6	49.53
[illegible]	[illegible]	[illegible]
163	11 1/2	49.975
164	3 1/2	50.08
165	-	50.29
165	3	50.37
165	10	50.55
166	6	50.75
167	1	50.93
167	8 1/2	51.12
168	4	51.31
168	11	51.49
169	6 1/2	51.68
170	2	51.87
170	9	52.04
171	4 1/2	52.24
172	-	52.43
172	7	52.6
173	2 1/2	52.79
173	10	52.98
173	10 1/2	53
174	5	53.16
175	0 1/2	53.35
175	7	53.52
175	8	53.54
176	3	53.72
176	10 1/2	53.91
177	6 1/2	54.11
178	2	54.31
180	10	55.12

CONVERSION TABLE ADDED IN REGISTRAR GENERAL'S DEPARTMENT

DP 1880 SH 1/2 CONTD

FEET	INCHES	METRES
181	6	55.32
183	-	55.78
185	2	56.44
187	10	57.25
188	11	57.58
189	6	57.76
194	6	59.28
204	9	62.41
215	4	65.63

AC	RD	P	SQ M
-	-	2.4	60.7
-	-	16 1/4	411
-	-	17 1/4	436.3
-	-	18	455.3
-	-	18 1/4	461.6
-	-	19	480.6
-	-	19 1/4	486.9
-	-	19 3/4	499.5
-	-	20	505.9
-	-	20 1/4	512.2
-	-	20 1/2	518.5
-	-	20 3/4	524.8
-	-	21	531.1
-	-	21 1/4	537.5
-	-	21 1/2	543.8
-	-	21 3/4	550.1
-	-	22 1/2	569.1
-	-	22 3/4	575.4
-	-	23 1/2	594.4
-	-	24	607
-	-	24 1/4	613.4
-	-	25	632.3
-	-	25 1/2	645
-	-	27 1/2	695.6
-	-	28	708.2
-	-	28 1/2	720.8
-	-	28 3/4	727.2
-	-	29	733.5
-	-	29 1/4	739.8
-	-	29 1/2	746.1
-	-	29 3/4	752.5
-	-	30	758.8
-	-	30 1/4	765.1
-	-	39	986.4
-	1	12 1/2	1328

CONVERSION TABLE ADDED IN REGISTRAR GENERAL'S DEPARTMENT

DP 1880 SH 2/2

FEET	INCHES	METRES
7	3	2.21
28	8	6.74
33	-	10.06
33	0 3/4	10.075
34	-	10.365
37	9	11.505
40	-	12.19
40	1	12.215
43	9	13.335
49	4	15.035
49	6	15.14
49	6 1/2	15.15
50	-	15.24
50	0 1/2	15.255
54	-	16.46
55	-	16.765
56	-	17.07
60	-	18.29
66	-	20.115
66	1 1/2	20.155
66	8	20.32
83	2 3/4	25.37
84	5	25.73
86	4	26.315
132	-	40.235
134	5	40.97
136	5 1/4	41.585
138	5 1/2	42.2
140	5 3/4	42.82
141	1	43
142	6	43.435
144	6 1/4	44.05
146	6 1/2	44.665
148	6 3/8	45.27
145	6 3/4	45.28
150	-	45.72
150	2	45.77
150	7	45.9
152	7 1/4	46.515
154	7 1/2	47.13
156	7 3/4	47.745
158	8	48.36
160	8 1/4	48.975
162	8 1/2	49.595
164	8 3/4	50.21
165	-	50.29
166	9	50.83
167	10 3/4	51.17
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169	10 1/4	51.77
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172	9 3/4	52.67
174	10	53.29
177	3	54.03
181	3	55.24
181	9	55.4
183	3 1/4	55.86
183	9 1/4	56.01
185	3 1/2	56.48
185	9 1/2	56.63
187	1 3/4	57.04
187	3 3/4	57.09
187	9 3/4	57.25
189	4	57.71
189	10	57.86
191	4 1/4	58.32
191	10	58.47
193	4 1/2	58.94
193	10 1/4	59.09
195	4 3/4	59.56
195	10 1/2	59.7
197	5	60.17
197	10 3/4	60.32
198	7 1/2	60.54
199	5 1/4	60.79
199	11	60.93
200	-	60.96

CONVERSION TABLE ADDED IN REGISTRAR GENERAL'S DEPARTMENT

DP 1880 SH 2/2 CONTD

FEET	INCHES	METRES
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201	11	61.54
203	5 3/4	62.02
203	11 1/4	62.16
205	6	62.64
205	11 1/2	62.78
207	6 1/4	63.25
207	11 3/4	63.39
209	6 1/2	63.87
210	-	64.01
211	6 3/4	64.48
213	7	65.1
214	-	65.23
215	7 1/4	65.72
216	0 1/4	65.84
217	7 1/2	66.33
218	0 1/2	66.46
219	7 3/4	66.95
220	0 3/4	67.08
221	8	67.56
222	1	67.69
223	8 1/4	68.18
224	1 1/4	68.31
225	8 1/2	68.8
226	1 1/2	68.92
227	5	69.32
227	9	69.42
228	1 3/4	69.54
230	2	70.15
297	11	90.8

AC	RD	P	SQ M
-	-	2 1/4	56.9
-	-	2.37	59.9
-	-	16 1/4	411
-	-	16 1/2	417.3
-	-	16 3/4	423.7
-	-	17	430
-	-	17 1/4	436.3
-	-	17 1/2	442.6
-	-	17 3/4	448.9
-	-	18	455.3
-	-	18 1/4	461.6
-	-	18 1/2	467.9
-	-	18 3/4	474.2
-	-	19	480.6
-	-	19 1/4	486.9
-	-	19 1/2	[illegible]
-	-	19 3/4	499.5
-	-	20	505.9
-	-	20 1/4	512.2
-	-	20 1/2	518.5
-	-	20 3/4	524.8
-	-	21	531.1
-	-	22	556.4
-	-	22 1/4	562.8
-	-	22 1/2	569.1
-	-	22 3/4	575.4
-	-	23	581.7
-	-	23 1/4	588.1
-	-	23 1/2	594.4
-	-	23 3/4	600.7
-	-	24	607
-	-	24 1/4	613.4
-	-	24 1/2	619.7
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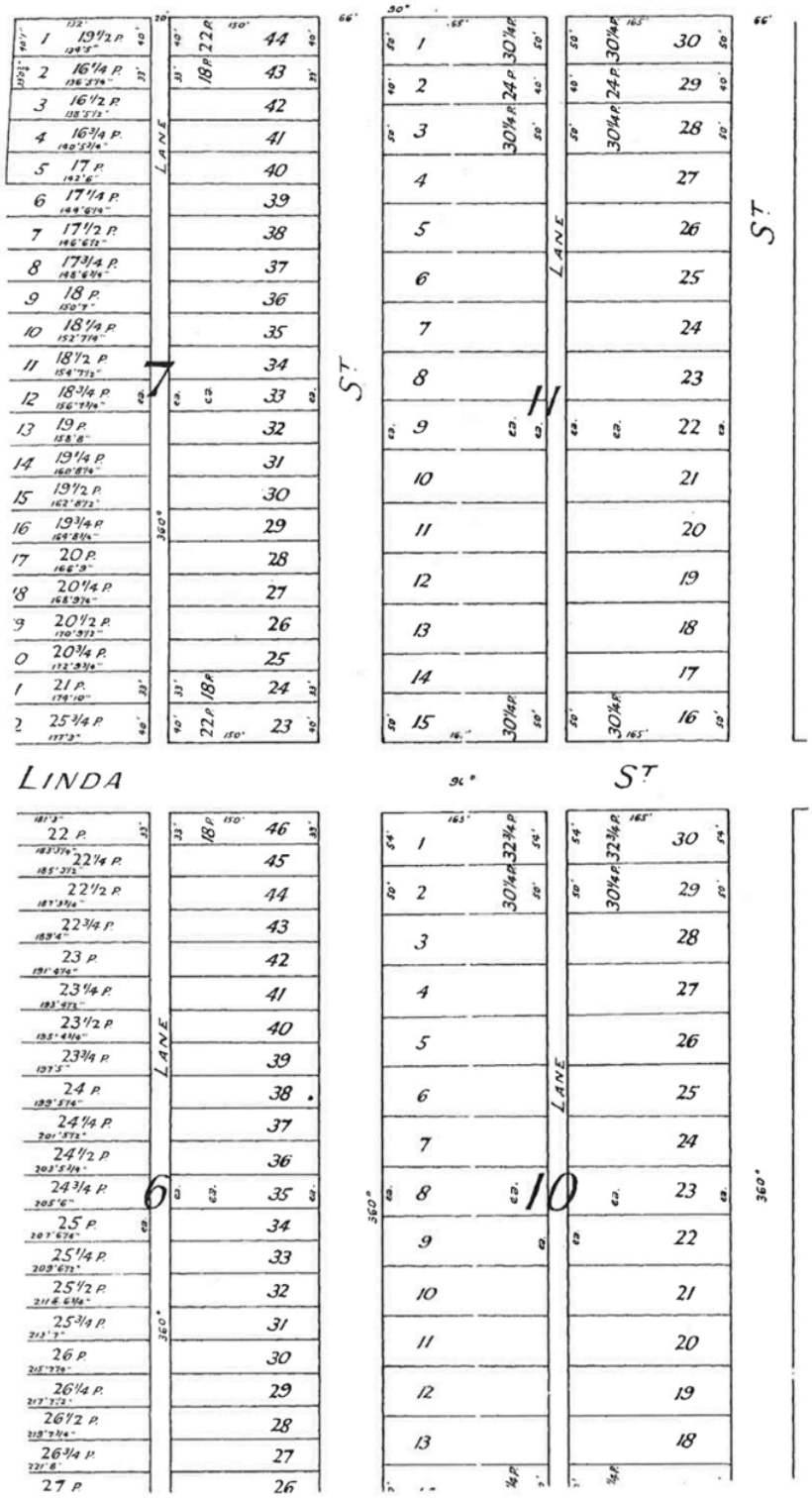
-	-	25	632.3
-	-	25 1/4	638.6
-	-	25 1/2	645
-	-	25 3/4	651.3
-	-	26	657.6
-	-	26 1/4	663.9
-	-	26 1/2	670.3
-	-	26 3/4	676.6
-	-	27	682.9
-	-	27 1/4	689.2

CONVERSION TABLE ADDED IN REGISTRAR GENERAL'S DEPARTMENT

DP 1880 SH 2/2 CONTD

AC	RD	P	SQ M
-	-	27 1/2	695.6
-	-	27 3/4	701.9
-	-	30	758.8
-	-	30 1/4	765.1
-	-	32 3/4	828.3
-	-	33 1/4	841
-	-	33 3/4	853.6
-	-	36 1/4	916.9
-	1	-	1012
-	2	26 3/4	2700
-	3	30 1/4	3800

D.P. 1880 Sheet 2/2



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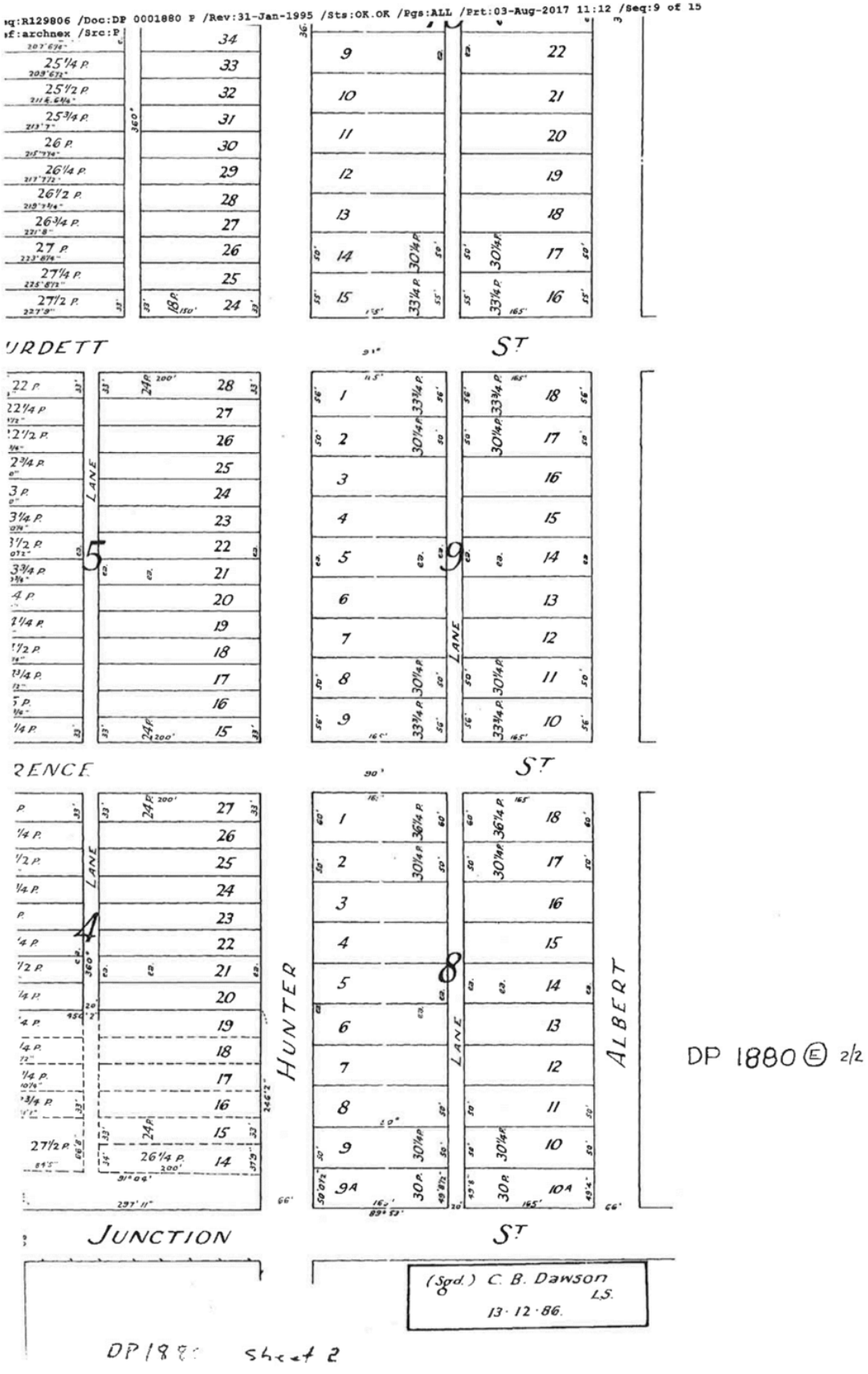

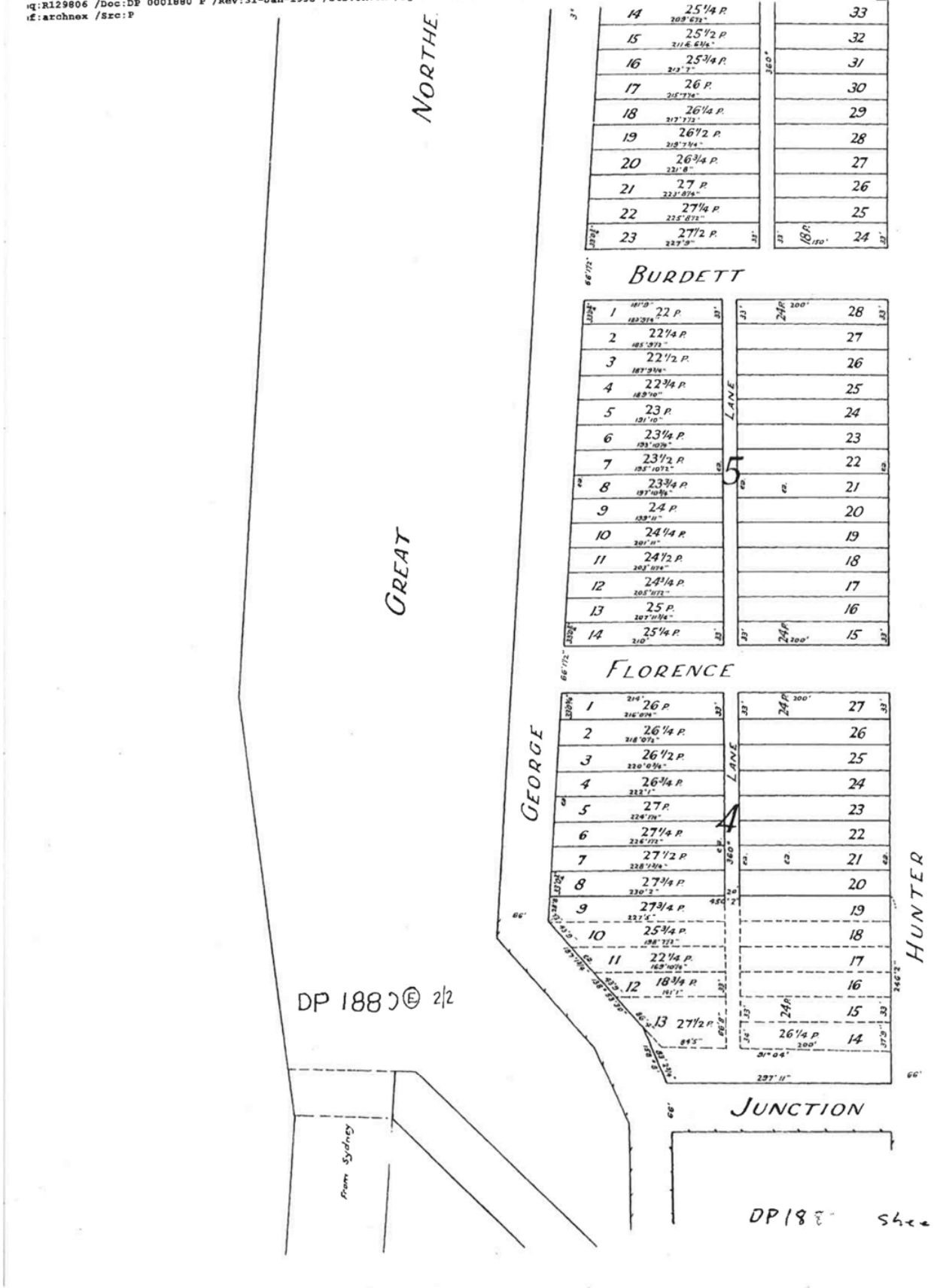

ATTACHMENT 2 - ITEM 4

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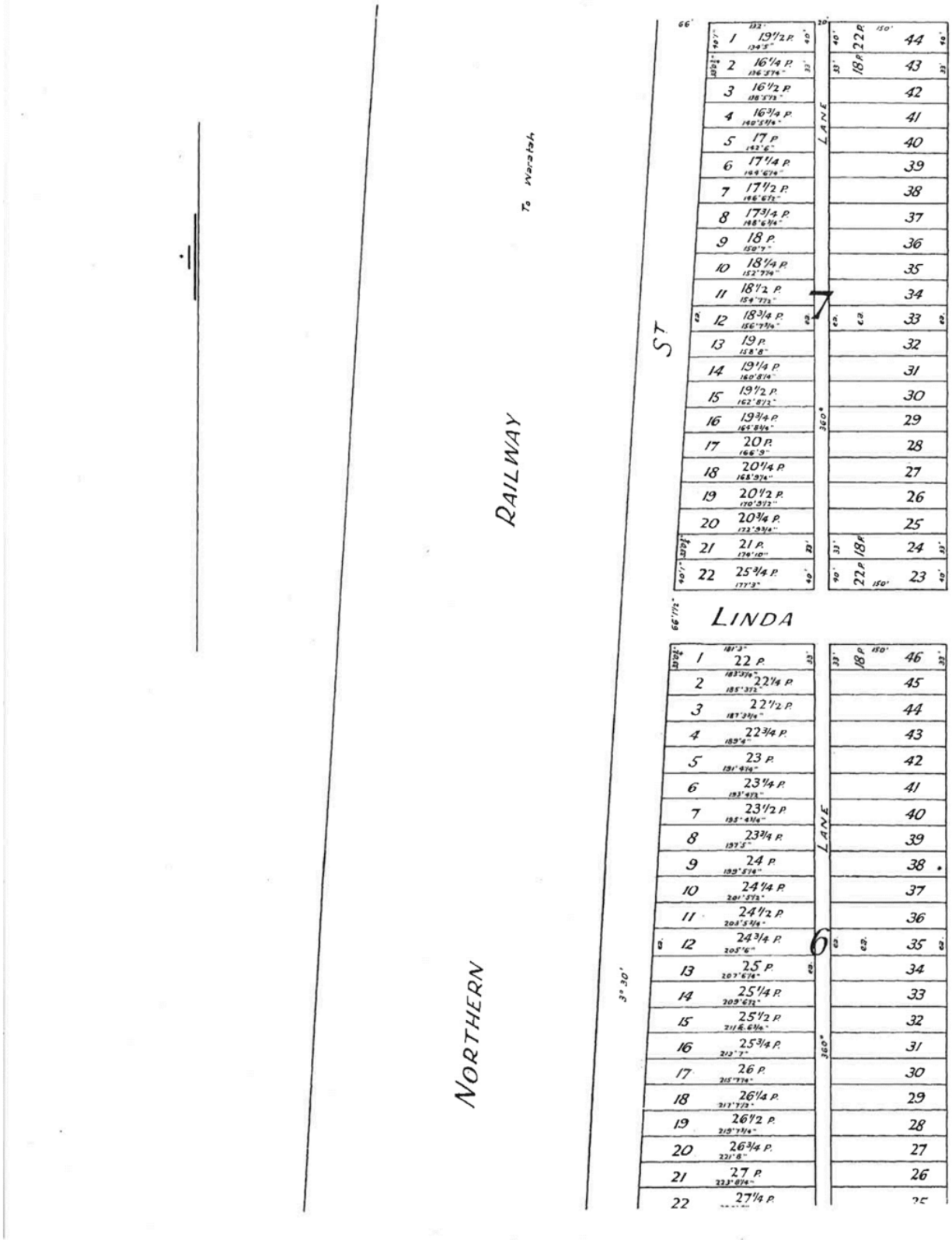


ATTACHMENT 2 - ITEM 4

Subdivision at Hornsby

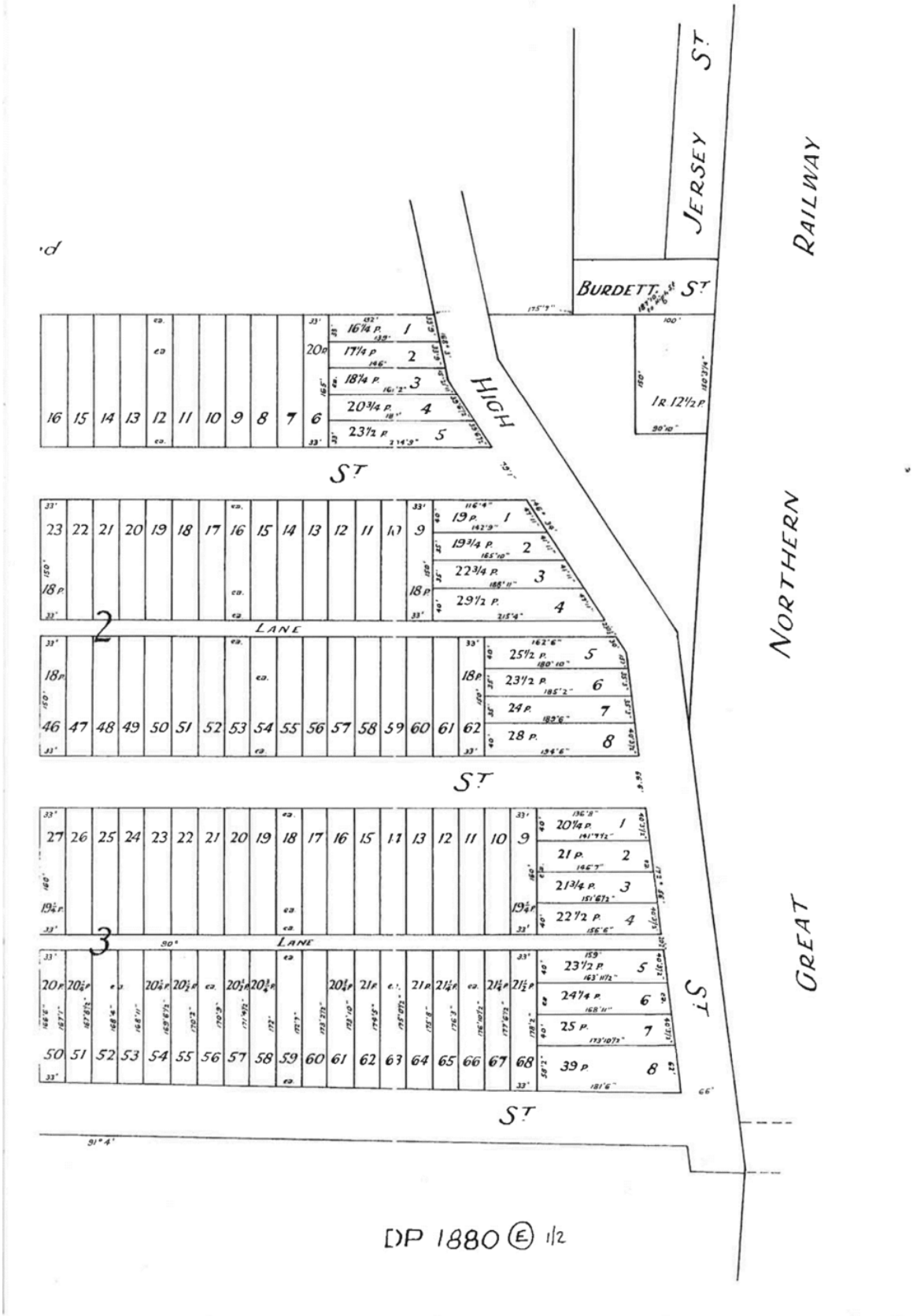
Pr of South Colah | Co of Cumberland

Scale: 100ft. to one inch

DP 1880 (E) 1/2

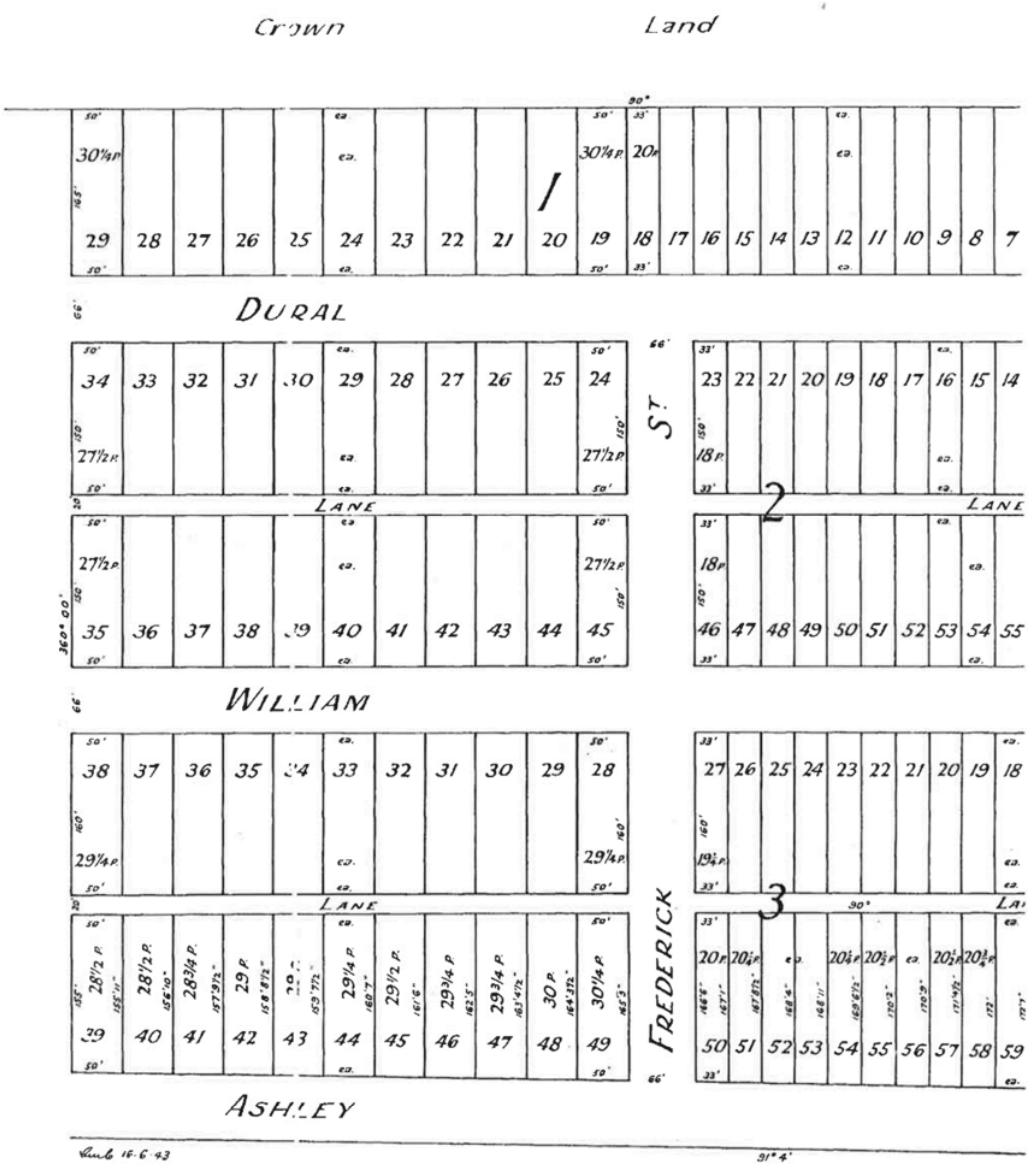
D.P. 1880 Sheet 1/2

ATTACHMENT 2 - ITEM 4



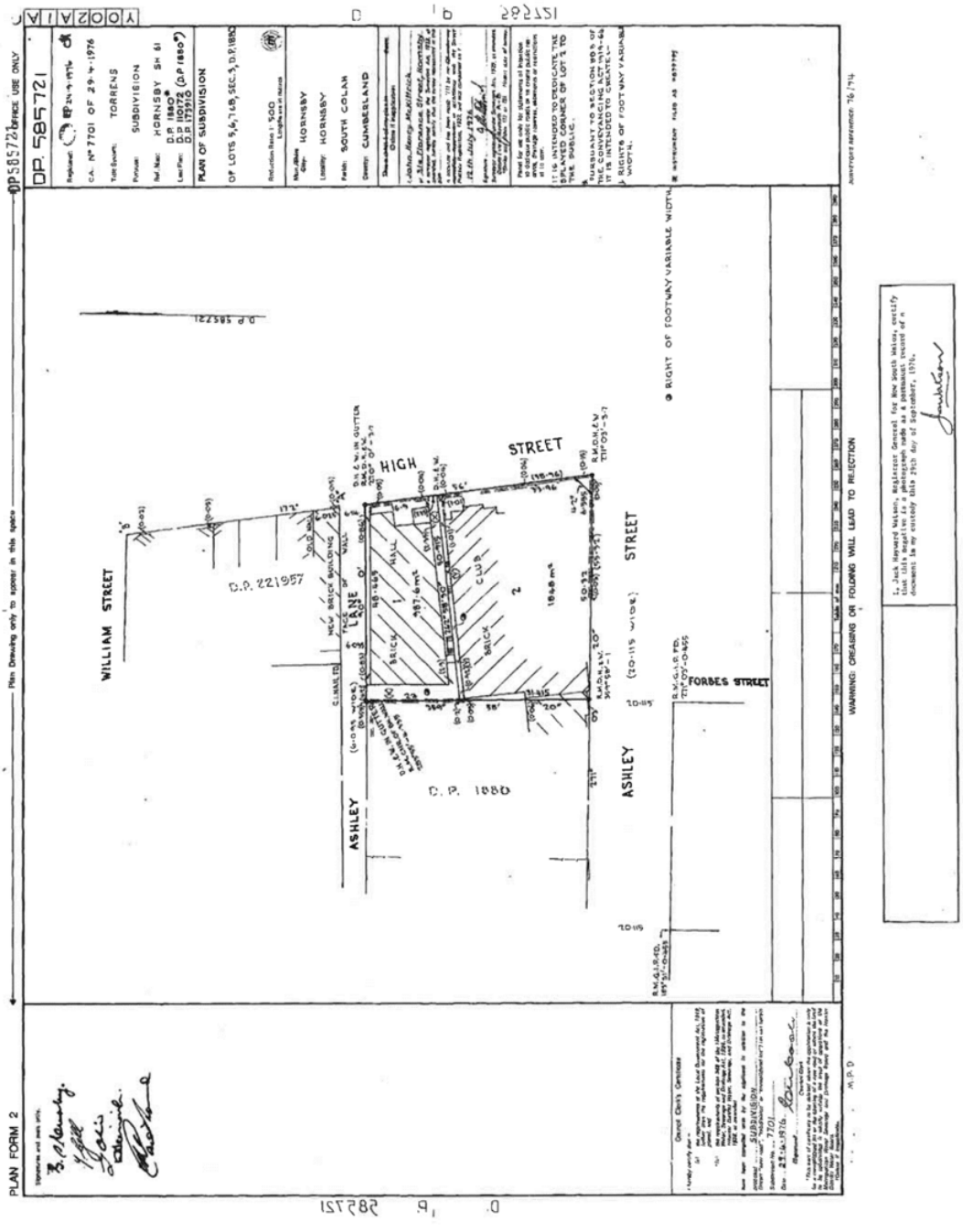
ATTACHMENT 2 - ITEM 4

DP 1880 (E) 1/2



DP 1880 Sheet 1/2

ATTACHMENT 2 - ITEM 4



ATTACHMENT 2 - ITEM 4

CERTIFICATE OF TITLE.

(C.) New South Wales.

[Reference to last Certificate]
[Vol. 1101 Folio 215
" 1110 Folios 6 and 7

REGISTER BOOK,
Vol. 1238 Folio 43/

Elizabeth Henrietta Ogden wife of Wharton Ogden of Neutral Bay Storekeeper

TRANSFEREE under Instrument of Transfer ~~from numbered~~ 772524 from The Bank of New South Wales Mortgagee ~~numbered~~ ~~covering Power of Sale~~ is now the proprietor of an Estate in Fee Simple, subject nevertheless to the reservations and conditions, if any, contained in the grant hereinafter referred to, and also subject to such encumbrances, liens, and interests as are notified hereon in That piece of land situated at Hornsby in the Parish of South Colah, and County of Cumberland containing One rood eight perches, or thereabouts, as shown on the Plan hereon, and therein edged red, being Lots 5 and 6 of Section 3 on a Plan deposited in the Land Titles Office, Sydney, numbered 1550 and part of Two thousand acres delineated in the Public Map of the said Parish deposited in the Office of the Surveyor General, originally granted to John Terry Hughes by Crown Grant dated the Eighteenth day of August One thousand eight hundred and forty two

In witness whereof, I have hereunto signed my name and affixed my Seal, this Twenty second day of December one thousand eight hundred and ninety seven

Signed the 22nd day of December 189 7
in the presence of Jas K Spark

Deputy Registrar General

NOTIFICATION REFERRED TO

Amongst the reservations and conditions contained in the Grant above referred to are the following namely:- Reservations of all Mines of Gold and of Silver

Deputy Registrar General

NO. DATED 18
FROM
REGISTERED

ATTACHMENT 2 - ITEM 4

Appn. No. 6438

Reference to Lost Certificate
Vol. 1238 Fol. 43

New South Wales.

[CERTIFICATE OF TITLE.]

ORDER NO.B 421611

REGISTER BOOK.
VOL. 3929 FOL. 129

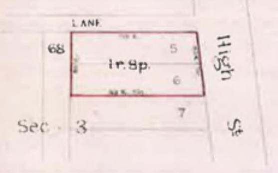
CANCELLED

MARGUERITE STRETTON ROBINSON wife of James Robinson of Manly, Gentleman, by virtue of Certificate of Title Volume 1238 Folio 43, now surrendered, is now the proprietor of an Estate in Fee Simple, subject nevertheless to the reservations and conditions, if any, contained in the Grant hereinafter referred to, and also subject to such encumbrances, liens and interests, as are notified hereon, in That piece of land situated at Hornsby in the Shire of Hornsby Parish of South Colah, and County of Cumberland containing One rood eight perches, or thereabouts, as shown in the Plan hereon and therein edged red, being Lots 5 and 6 of Section 3 in a Plan deposited in the Land Titles Office, Sydney, No. 1860 and being part of 2000 acres (Portion 400A of Parish) delineated in the Public Map of the said parish in the Department of Lands originally granted to John Terry Hughes by Crown Grant dated the eighteenth day of August one thousand eight hundred and forty two.

In witness whereof, I have hereunto signed my name and affixed my Seal, this twenty ninth day of October 1926

Signed in the presence of [signature]

[signature]
Registrar General.



Scale 100 ft. to one inch

NOTIFICATION REFERRED TO

Amongst the reservations and conditions contained in the Grant above referred to are reservations of all mines of gold and of silver.

[signature]
Registrar General

No. B 13630 Mortgage dated the 5th day of October 1923 from Marguerite Stretton Robinson to Union Trustee Company of Australia Limited Produced the 7th day of November 1923 and entered the 7th day of December 1923 at 45 minutes past 10 o'clock in the forenoon.

[signature]
Registrar General

No. B [illegible] DISCHARGE of within Mortgage [illegible] dated 29th September 1926
Produced 1st September 1926 and entered 1st November 1926
at [illegible] o'clock in the fore noon.
[signature]

No. D595759 TRANSFER dated 4th September 1946 from the said Marguerite Stretton Robinson to [illegible]
Produced and entered 4th December 1946 at [illegible] o'clock in the fore noon.
[signature]
REGISTRAR GENERAL.

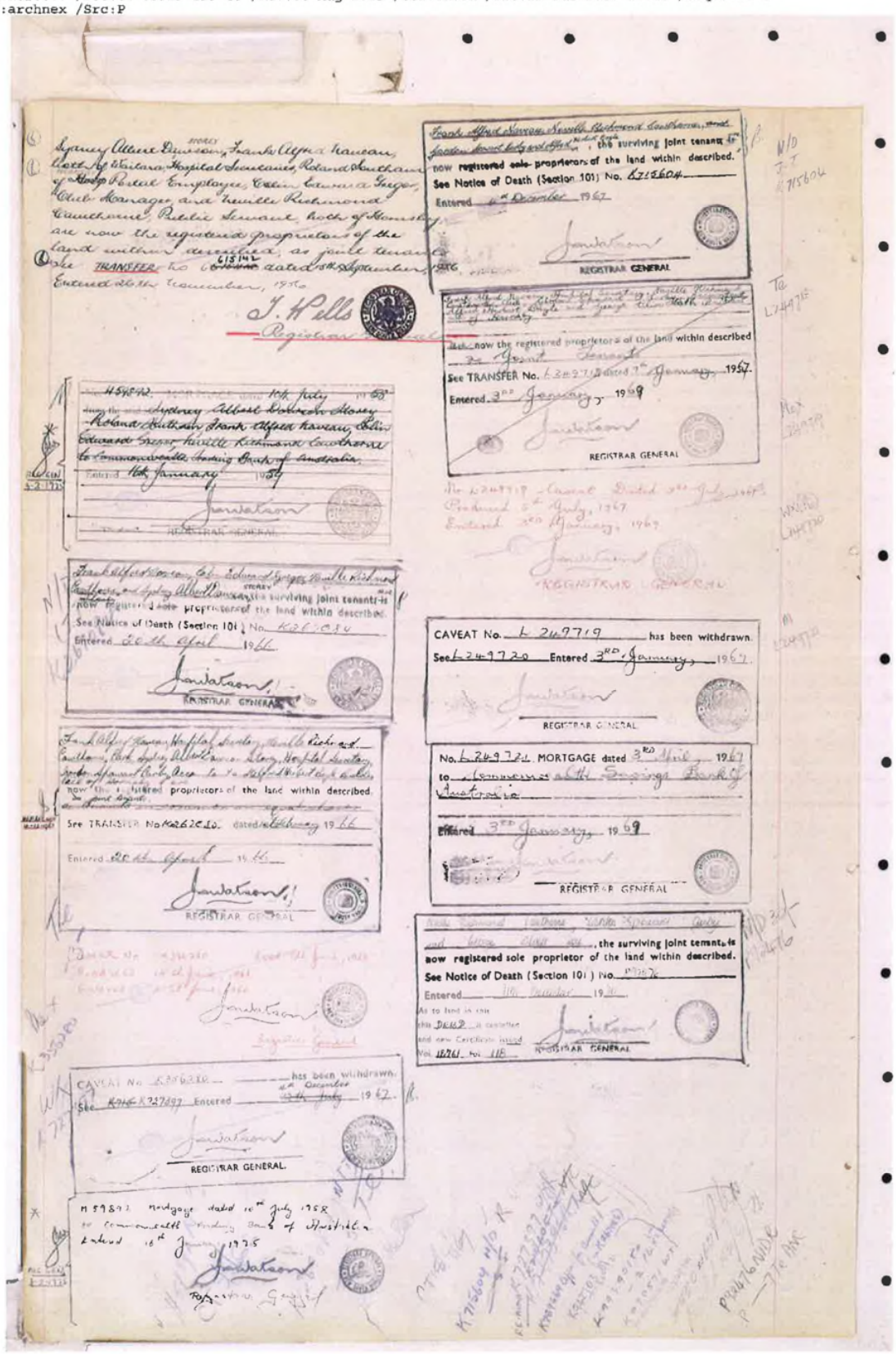
No. D595760 MORTGAGE dated 3rd December 1946 from the [illegible] to Commonwealth Bank of Australia
Produced and entered 4th December 1946 at [illegible] o'clock in the fore noon.
[signature]
REGISTRAR GENERAL.

No. G233319 DISCHARGE of within mortgage D595760 dated 26th January 1955
Produced 27th January 1955 and entered 27th January 1955 at [illegible] o'clock in the fore noon.
J. Wills
REGISTRAR GENERAL.

[illegible] the surviving joint tenants is now registered sole proprietors of the land within described.
See [illegible] (Section 101) No. G687841
Entered [illegible] 1956
J. Wills
REGISTRAR GENERAL

G114916 [illegible] CT 22/10/56 CT 7/11/56

ATTACHMENT 2 - ITEM 4



[redacted]ICATE OF TITLE

12761/110

NEW SOUTH WALES — PROPERTY ACT, 1900

Appln. No.6438

Prior Title Vol.3929 Fol.129

Vol. 12761 Fol. 110

Edition issued 28-4-1975

CANCELLED

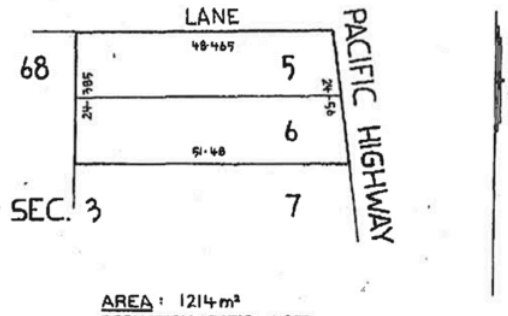
I certify that the person described in the First Schedule is the registered proprietor of the undermentioned estate in the land within described subject nevertheless to such exceptions encumbrances and interests as are shown in the Second Schedule.

Registrar General.

(Page 1) Vol. 12761 Fol. 110

PLAN SHOWING LOCATION OF LAND

LENGTHS ARE IN METRES



P92476 P.R. 8

AREA: 1214m²
REDUCTION RATIO 1:800

ESTATE AND LAND REFERRED TO

Estate in Fee Simple in Lots 5 and 6 of Section 3 in Deposited Plan 1880 in the Shire of Hornsby Parish of South Colah and County of Cumberland being part of Portion 400A granted to John Terry Hughes on 18-8-1842.

FIRST SCHEDULE

~~NEVILLE RICHMOND HAWTHORNE, Clerk, GORDON SPOWART GURBY, Accountant, GEORGE OLIVER, Builder, FRANK EDWARD GILL, Builder, all of Hornsby and DOUGLAS ALBERT HEINRICH, Taxation Officer, of Pennant Hills, as Joint Tenants.~~

REG. GEN. 26-5-1978

SECOND SCHEDULE

1. Reservations and conditions, if any, contained in the Crown Grant above referred to.
2. ~~Mortgage No.H59892 to Commonwealth Trading Bank of Australia. Entered 16-1-1959.~~ DISCHARGED P870729
3. ~~Mortgage No.L249724 to Commonwealth Savings Bank of Australia. Entered 3-1-1969~~ Discharged P337201

PERSONS ARE CAUTIONED AGAINST ALTERING OR ADDING TO THIS CERTIFICATE OR ANY NOTIFICATION HEREON

NOTE: ENTRIES RULED THROUGH AND AUTHENTICATED BY THE SEAL OF THE REGISTRAR GENERAL ARE CANCELLED.

WARNING: THIS DOCUMENT MUST NOT BE REMOVED FROM THE LAND TITLES OFFICE.

ATTACHMENT 2 - ITEM 4

ATTACHMENT 2 - ITEM 4

Req:R020054 /Doc:CT 12761-110 CT /Rev:12-Jan-2011 /Sts:OK.SC /Pgs:ALL /Prt:13-Jul-2017 17:38 /Seq:2 of 2
Ref:archnex /Src:P

Vol. 12761 Fol. 110

FIRST SCHEDULE (continued)

REGISTERED PROPRIETOR	INSTRUMENT NATURE	INSTRUMENT NUMBER	INSTRUMENT DATE	ENTERED	Signature of Registrar General
Neville Richmond Cawthorne, Clerk, Gordon Spowart Curby, Accountant, George Oliver, Frank Edward Gill, Builders, all of Hornsby and Douglas Albert Heinrich of Pennant Hills, Taxation Officer, as joint tenants.	Transfer	P92477	------	27-5-1975	[signature]

NEW CERTIFICATE(S) OF TITLE ISSUING ON DP 585721
NO DEALING TO BE REGISTERED WITHOUT REFERENCE TO SURVEY DRAFTING BRANCH

DP585721

SECOND SCHEDULE (continued)

INSTRUMENT NATURE	INSTRUMENT NUMBER	INSTRUMENT DATE	PARTICULARS	ENTERED	Signature of Registrar General	CANCELLATION
88B INST	P879795		Interests created pursuant to Section 88B Conveyancing Act, 1919, by the registration of Deposited Plan 585721	24-9-1976	[signature]	

This deed is cancelled as to the whole
New Certificates of Title have issued on 22-10-76
for lots in deposited Plan No. 585721 as follows:-
Lots 1-2 Vol. 13163 Fol. 162-163 respectively.

[signature]
REGISTRAR GENERAL

(Page 2 of 2 pages)

NOTE: ENTRIES RULED THROUGH AND AUTHENTICATED BY THE SEAL OF THE REGISTRAR GENERAL ARE CANCELLED

ATTACHMENT 2 - ITEM 4

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - HISTORICAL SEARCH

SEARCH DATE
13/7/2017 5:28PM

FOLIO: 1/585721

First Title(s): SEE PRIOR TITLE(S)
Prior Title(s): VOL 13163 FOL 162

Recorded	Number	Type of Instrument	C.T. Issue
28/3/1988		TITLE AUTOMATION PROJECT	LOT RECORDED FOLIO NOT CREATED
19/8/1988		CONVERTED TO COMPUTER FOLIO	FOLIO CREATED CT NOT ISSUED
8/12/1993		AMENDMENT: LOCAL GOVT AREA	
30/8/1999	6142853	DEPARTMENTAL DEALING	
7/3/2000	6603148	APPLICATION	EDITION 1
3/4/2000	6685580	REQUEST	EDITION 2
2/8/2005	AB648191	APPLICATION	EDITION 3
14/8/2014	AI767379	APPLICATION TO RECORD A NEW REGISTERED PROPRIETOR	EDITION 4

*** END OF SEARCH ***

archnex PRINTED ON 13/7/2017

ATTACHMENT 6 – Design Statement 2022

ATTACHMENT 2 - ITEM 4

Design Statement

High Street and Ashley Street, Hornsby
Planning Proposal

November 2022

HORNSBY
SHIRE COUNCIL

Introduction

The High Street and Ashley Street, Hornsby Planning Proposal is the first to give effect to the Draft *Hornsby Town Centre Masterplan* (HTC Masterplan). It applies to No. 2 High Street, Hornsby - the Hornsby War Memorial Hall and the Hornsby RSL Club at No. 4 High Street (Site 01), and land owned by the RSL Club at Ashley Street, and Webb Avenue, Hornsby (Site 02).

The Proposal seeks to amend the *Hornsby Local Environmental Plan 2013* to:

- increase the maximum building height for Properties No. 2 and No. 4 High Street Hornsby (Site 01) to 12 storeys (38.5 metres), and
- increase the maximum building height for Properties Nos. 7, 9,11,15,17 and 19 Ashley Street and Nos. 2 and 4 Webb Avenue, Hornsby (Site 02) to 20.5m (6 storeys) for seniors housing development only.

The Planning Proposal is supported by proposed building height transition, building setback, car parking and heritage conservation amendments to the *Hornsby Development Control Plan 2013*.

This Design Statement outlines vision, approach and design intent of the planning proposal as illustrated in the 2022 Altis Architecture Design Concept (Design Concept).

Location and Context

The sites are in the Hornsby Town Centre which is projected to provide up to 3,500 new dwellings and the bulk of commercial floorspace to 2036 to meet the Shire's long-term housing and job targets.

Site 01 includes the Hornsby RSL club premises and its rear at-grade open carpark and the Hornsby War Memorial Hall at the north-east corner. The three level club premises have a primary frontage to High street to the East and a secondary frontage onto Ashley Lane to the North. The Ashley street boundary to the south provides access to the rear carpark and the club's western boundary is shared with a residential flat building.

The War Memorial Hall is a heritage listed two storey building with a strong set back façade to High Street. It is bounded by the RSL Club premises on its southern and western boundaries and Ashley Lane on its north. It is owned by the Hornsby War Memorial Hall Committee Incorporated.

Site 02 is south of Site 01 and is made up of eight lots, seven of which are vacant land. The combined lot has frontages onto Ashley Street to the north, Forbes Street to the east and Webb Avenue to the south. The western boundary of site 02 is shared with existing low-density dwellings. The land is owned by the Hornsby RSL Club.

Vision

Council's vision for the Hornsby Town Centre is

> '*A place for people that reflects the uniqueness of the bushland setting, integrated around key public spaces, where the city meets the bush. An active, thriving centre that exhibits economic diversity, design excellence, liveability and sustainability.*'

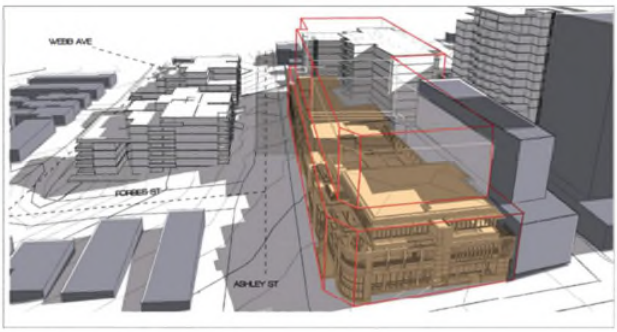
The draft HTC Masterplan is based on Council's vision and identifies that Sites 01 and 02 are in the 'Western heritage' mixed-use development precinct, the recommendations for which are to:

- increase mixed use densities;
- preserve the distinct social, environmental and physical character;
- celebrate and re-purpose heritage; and
- enhance permeability and activate frontages.

The vision for Site 01 is development that will:

- facilitate entertainment and dining uses;
- complement and support the main street shopping and dining at Peat's Ferry Road;
- retain the Hornsby War Memorial Hall; and
- enable the Hornsby RSL Club's vision for expanded club facilities, a hotel, and shop-top housing in a quality consolidated development with an active destination frontage to High Street.

HTC Masterplan - Land Uses



Altis Design Concept – Indicative Built Form

The Vision for Site 02 is development that will:

- feasibly enable medium density/seniors housing supply;
- provide seniors housing in a location that is readily accessible to support services, transport, retail and entertainment; and
- be sensitive to lower density surrounding areas, provide high resident amenity and be located in a landscape setting.

Altis Design Concept – Seniors Housing Indicative Built Form

Design Intent

The design intent of the proposal is to facilitate development that:

- activates and contributes to the revitalisation of the distinct social, environmental, and physical character of the Hornsby Western Town Centre;
- brings residential, hotel and recreational elements together in a cohesive development;
- promotes and exhibits design excellence and a built form that has a fine grain and human scale;
- provides for a range of housing forms of high amenity at a variety of densities and scale;
- manages scale transitions to reflect a transition in building height and development density towards the periphery of the Hornsby Town Centre;
- maximises visual and pedestrian permeability and connections to commercial areas to the north, to Cenotaph Park and Hornsby Railway Station;
- respects the prominence of the Hornsby War Memorial Hall at No. 2 High Street, its heritage significance, its association with the Cenotaph on Peat's Ferry Road and the adjacent to the RSL Club.

Design Concept

The Design Concept illustrates an indicative bult form of varying heights, tower setbacks and stepped down massing that could be achieved within the proposed new building heights. The final built form would be determined at development stage.

For Site 01 the Design Concept provides for:

- Six-storeys of shop-top housing over the existing club auditorium yielding 12 one-bedroom and 18 two-bedroom apartments (5 apartments each level - total 30)
- A six level, above and below grade car park at the at-grade car parking area to the west of the Club (297 new spaces providing 362 spaces total)
- An extension to the club space above the car parking levels, with a six-storey hotel above that with 18 rooms per level (total 126 rooms)
- Other club extensions and internal reconfigurations
- Additional height over the Hornsby War Memorial Hall that will allow for its retention within an integrated and wholistic development across the whole of Site 01 and the intensification of permitted land uses.

For Site 02 the Design Concept provides for:

- A mix of one, two, and three-bedroom Seniors Independent Living Units (106 units total with 237 bedrooms total)
- 137 car spaces

- A possible built form option of two buildings of four-six storeys when viewed from the street on Ashley Street, Forbes Street and Webb Avenue, with a transition in building height adjacent to surrounding residential areas.

The principle of stepped-down massing on both Sites 01 and 02 is consistent with the desired future character of the Western heritage mixed-use development Precinct. The massing responds to the sites' settings and topography and maintains a clear hierarchy of building heights that taper down to the edges of the Precinct to reduce bulk and scale impacts to surrounding lower density areas.

New heritage, parking, setback and height control amendments to the *Hornsby Development Control Plan 2014* (HDCP) are proposed to support the planning proposal and ensure development does not adversely impact amenity and heritage values. They include requiring development on Site 01 to be compatible with No. 2 High Street in terms of form, style and character and establishing a car parking rate cap for Site 02 to minimise local traffic impacts. Future residential development would also be required to comply with the *Apartment Design Guide*, *State Environmental Planning Policy No 65—Design Quality of Residential Apartment Development* (SEPP 65) and the Seniors Independent Living provisions of *State Environmental Planning Policy (Housing) 2021* (Housing SEPP).

Summary

The Planning Proposal reflects the HTC Masterplan's concept for the activation and revitalisation of the distinct social, environmental, and physical character of the Western Town Centre by providing for increased density in new mixed-use development that will strengthen attraction and identity west of the railway line. The planning proposal will implement the intent and vision of the Design Concept to provide for residential and mixed-use developments that establish a new and redefining architectural language and a built form that retains heritage and amenity values and transitions to surrounding residential areas.

ATTACHMENT 2 - ITEM 4

ATTACHMENT 7 – Shadow Diagrams and Apartment Design Guide Assessment

ATTACHMENT 2 - ITEM 4

Hornsby Town Centre Masterplan and High and Ashley Streets (formerly RSL) Planning Proposal

Shadow Analysis and Apartment Design Guide Assessment

November 2022

COX Architecture Pty Ltd
ACN 002 535 891
Nominated Architects:
Joe Agius No. 6491
Russell Lee No. 6367

Sydney studio
Level 6, 155 Clarence Street
Sydney NSW 2000 Australia

T +61 2 9267 9599
F +61 2 9264 5844
coxarchitecture.com.au

Purpose of the Report

To assist Council in assessing the compliance of the Planning Proposal High and Ashley Streets (formerly RSL) Planning Proposal, Co Architecture were engaged by Council to undertake two distinct, yet interrelated tasks;

1. Provide shadow diagrams clearly labelling the existing shadow footprint and proposed potential shadow footprint. The shadow analysis will be modelled including consideration of the adjacent Hornsby Town Centre site controls to accurately reflect future solar access.

2. Assess solar access and overshadowing and demonstrate that compliance with Apartment Design Guide for residential dwellings can be achieved for proposed residential land uses.

The methodology, assumptions and assessment are contained within the following pages of this report.

Task 1 – Shadow Analysis

The methodology for the shadow analysis was to;

- Model the contextual building envelopes around the High and Ashley Street site. This includes both the existing built form and the potential future built form under the Draft Hornsby Town Centre Masterplan that was exhibited from 20th July to 30th September 2022.
- Geolocate and appropriate the architectural model supplied by Altis Architecture on the 14th October 2022
- Model the Planning Proposal architectural drawings supplied by Altis Architecture on the 6th October 2022
- Prepare shadow analysis diagrams based on the proposed built form within the Planning Proposal at the required standards of;
    - December 22nd – 9am, 12pm and 3pm
    - March 20th – 9am, 12pm and 3pm
    - June 21st – 9am, 12pm and 3pm
    - September 23rd – 9am, 12pm and 3pm

The assumptions associated with the shadow analysis are;

- Existing built form is sourced from a third party
- Future built form of the surrounding sites represents just one just one of many permutations of what may be developed under the existing planning controls and those proposed under the Draft Hornsby Town Centre Masterplan.

Findings

The findings of the Shadow Analysis are that the overshadowing impacts of the proposed built form within the High and Ashley Streets (formerly RSL) Planning Proposal considered against the existing built form on the Town Centre and surrounds are;

- 3 Ashley Street; minor overshadowing of the northwestern façade in the morning during the summer solstice, autumn equinox, winter solstice and spring equinox
- 1 Forbes Street; minor overshadowing of the western façade in the afternoon during the winter solstice;
- 3-5 Forbes Street; significant overshadowing of the northwestern dwelling's western façade and private open space in the afternoon during the winter solstice;
- 1B, 1C, 6 Forbes Street; minor overshadowing of the private open space during in the middle of the day during winter solstice
- 1-4, 1A Webb Ave; moderate overshadowing on the northern façade, balconies, driveways and entries in the morning during the winter solstice
- 1 Webb Ave; significant overshadowing of the eastern façade, common property and driveway in the morning during the winter solstice
- 3-5 Webb Ave; moderate overshadowing of the northern dwellings, common property, driveway and private open space of the northwestern dwelling in the morning during the winter solstice
- 6 Webb Ave; significant overshadowing of the dwelling and private open space in the morning during the winter solstice
- 7-11 Webb Ave; moderate overshadowing of the northern dwellings, common property, driveway and private open space in the morning during the winter solstice
- 14-18 Ashley Street; moderate overshadowing of the common property, driveway and lawn in the morning during the winter solstice
- 21 Ashley Street; moderate overshadowing of the dwelling and private open space in the morning during the autumn equinox, winter solstice and spring equinox
- 23 Ashley Street; moderate overshadowing of the dwelling and private open space in the morning during the autumn equinox, winter solstice and spring equinox
- 25 Ashley Street; moderate overshadowing of the dwelling and private open space in the morning during the autumn equinox and winter solstice

The modelling has identified that the majority of the overshadowing impacts are attributable to the High and Ashley Streets (formerly RSL) Planning Proposal, however there are some contributory impacts from future built form on the western side of Hornsby Town Centre based on the permissible building heights.

The following pages identify which shadows are attributed to which proposal.

Summer Solstice (22/12)

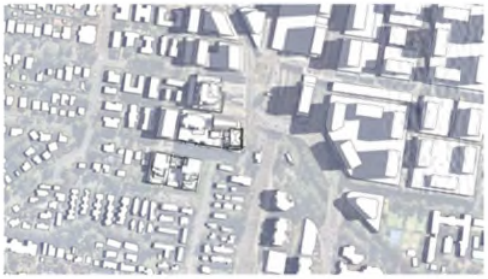
Current built form and RSL Proposal

09:00

12:00

15:00

Future built form and RSL Proposal



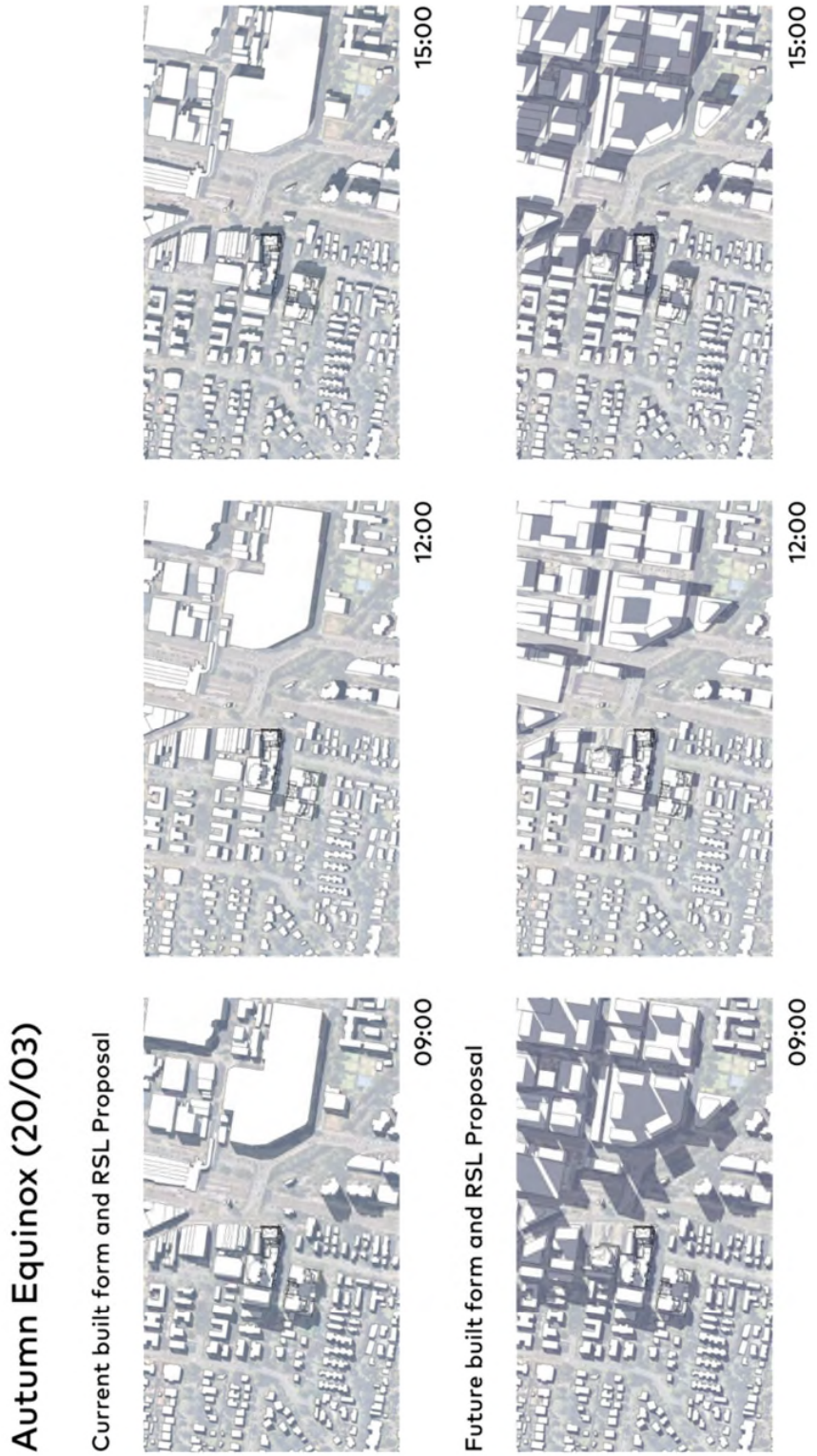
09:00

12:00

15:00

ATTACHMENT 2 - ITEM 4

ATTACHMENT 2 - ITEM 4



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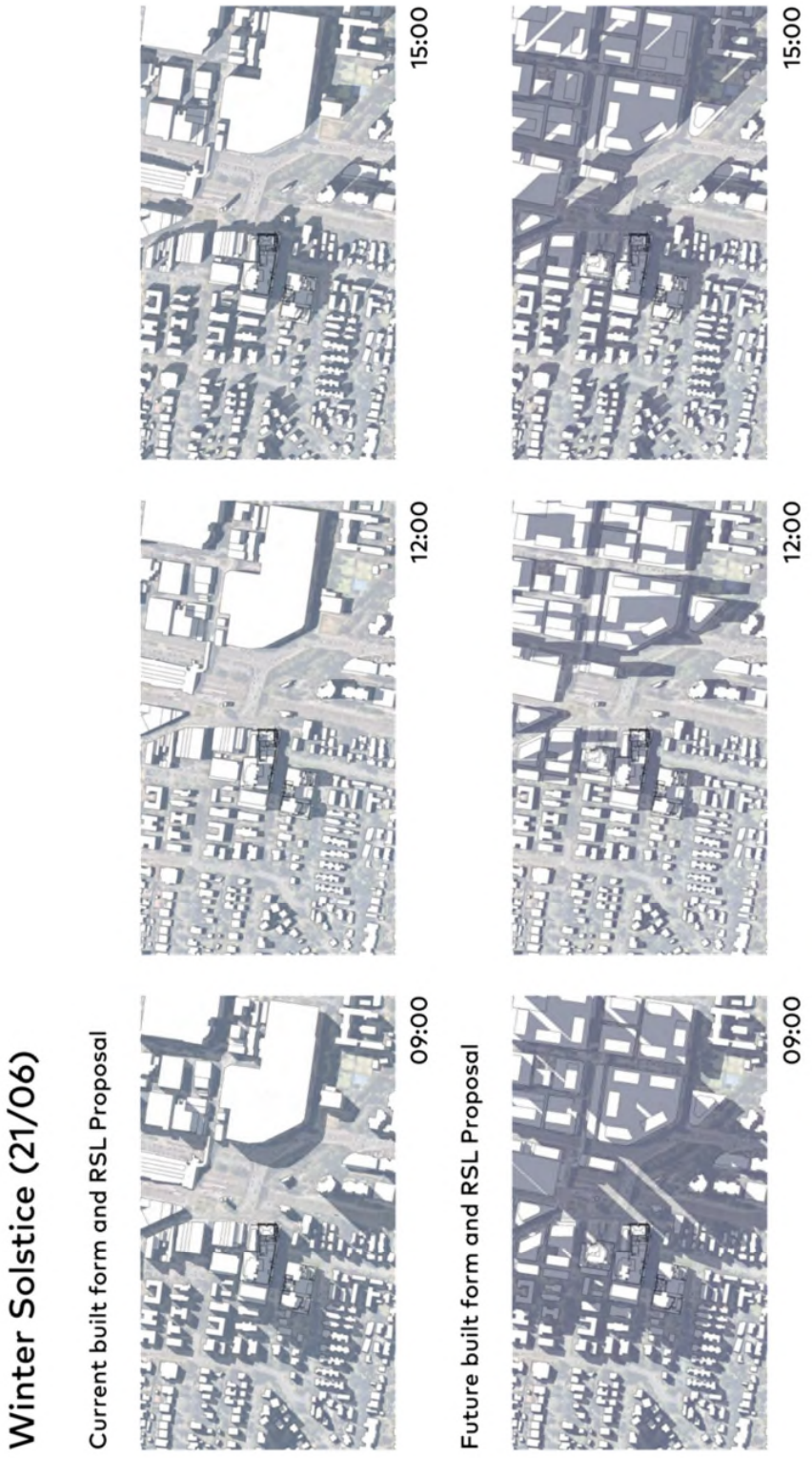

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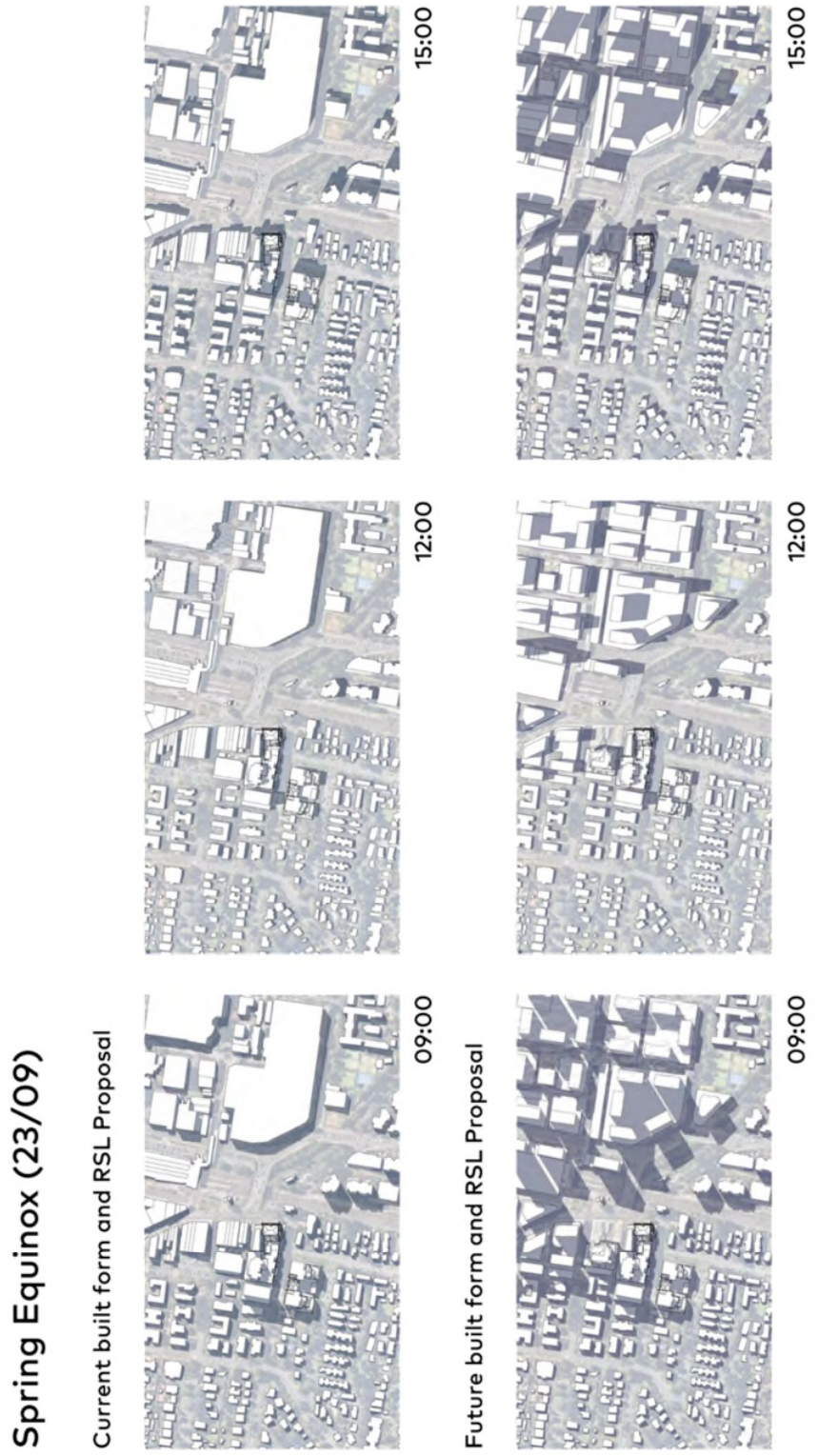
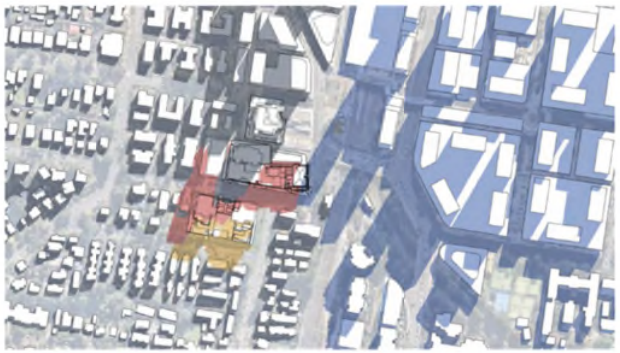


Winter Solstice (21/06)

09:00

10:00



Shadows in order of layering

- Permissible building heights West of Hornsby station
- Proposed building heights for Hornsby Town Centre - East of Hornsby Station
- Site 1: Proposed Hornsby RSL
- Site 2: Proposed Seniors Living

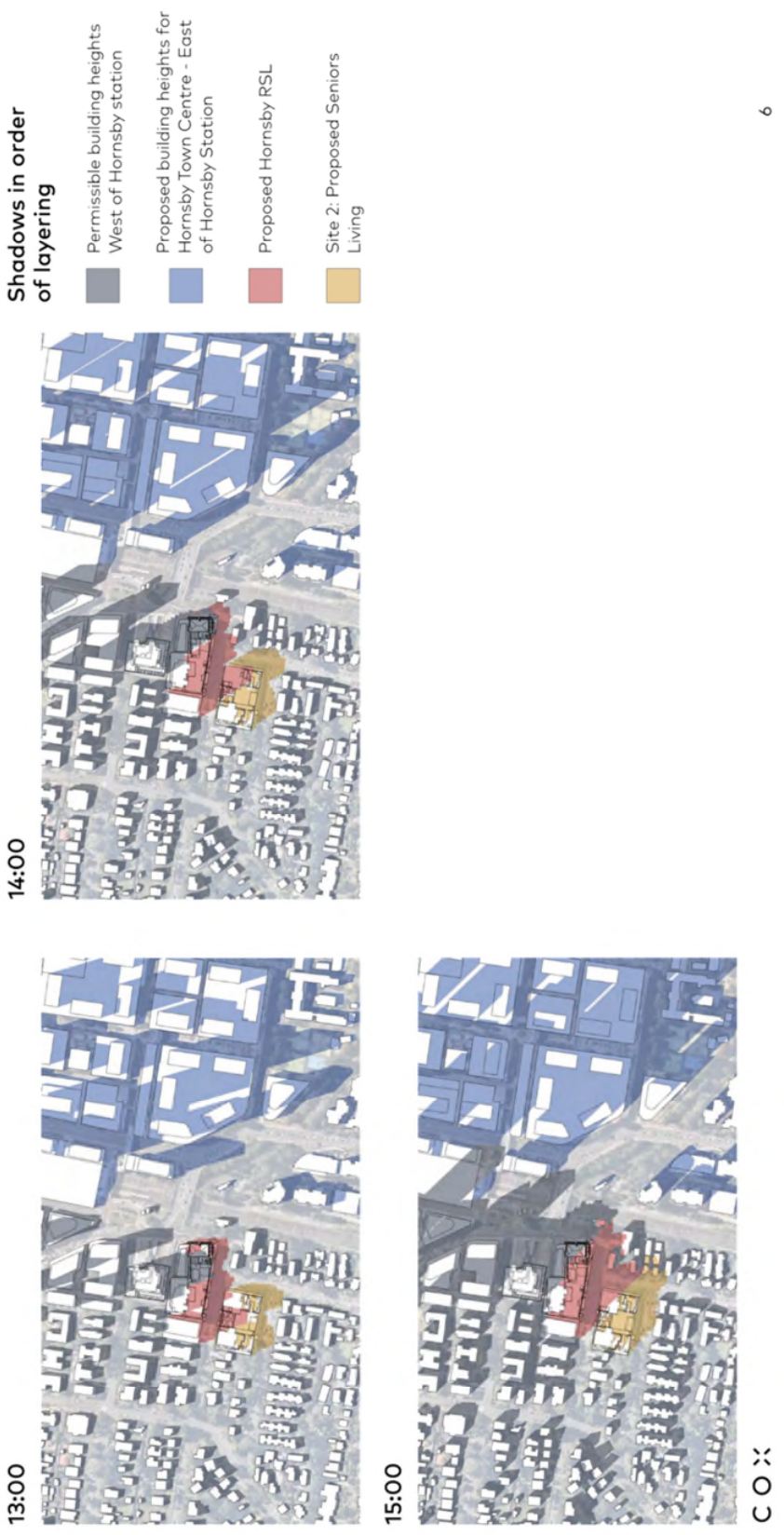
11:00

12:00

COX

ATTACHMENT 2 - ITEM 4

ATTACHMENT 2 - ITEM 4



COX

Task 2 – Apartment Design Guide Solar Access Assessment

The methodology for the Apartment Design Guide (ADG) and Housing SEPP solar access assessment was to;

- Model the contextual building envelopes around the High and Ashley Street site. This includes both the existing built form and the potential future built form under the Draft Hornsby Town Centre Masterplan that was exhibited from 20th July to 30th September 2022.
- Geolocate and appropriate the architectural model supplied by Altis Architecture on the 14th October 2022
- Model the Planning Proposal architectural drawings supplied by Altis Architecture on the 6th October 2022
- Testing the proposed layout against the solar access requirements that;
    - Living rooms and private open spaces of at least 70% of apartments in a building receive a minimum of 2 hours direct sunlight between 9 am and 3 pm at mid winter
    - A maximum of 15% of apartments in a building receive no direct sunlight between 9 am and 3 pm at mid winter

The assumptions associated with the shadow analysis are;

- Existing built form is sourced from a third party
- Future built form of the surrounding sites represents just one just one of many permutations of what may be developed under the existing planning controls and those proposed under the Draft Hornsby Town Centre Masterplan.

Findings

The findings of the Solar Access Assessment are that the solar access impacts of the proposed built form within the High and Ashley Streets (formerly RSL) Planning Proposal considered against the future built form on the Town Centre can meet or exceed the solar access requirements for private dwellings within the ADG.

The analysis shows that for the Hornsby RSL residential apartments:

83% - 25/30 apartments receive at least 2 hours of direct sunlight during the winter solstice

63% - 19/30 apartments receive at least 3 hours of direct sunlight during the winter solstice

All apartments could be designed and configured during the DA stage to receive some direct sunlight during the day to living areas as well as private open space. The easternmost apartments of the lower levels 1-4 receive some direct sunlight for a short duration of time around 9:08 AM and 1:41PM on the winter solstice

The analysis shows that for the Seniors Living apartments:

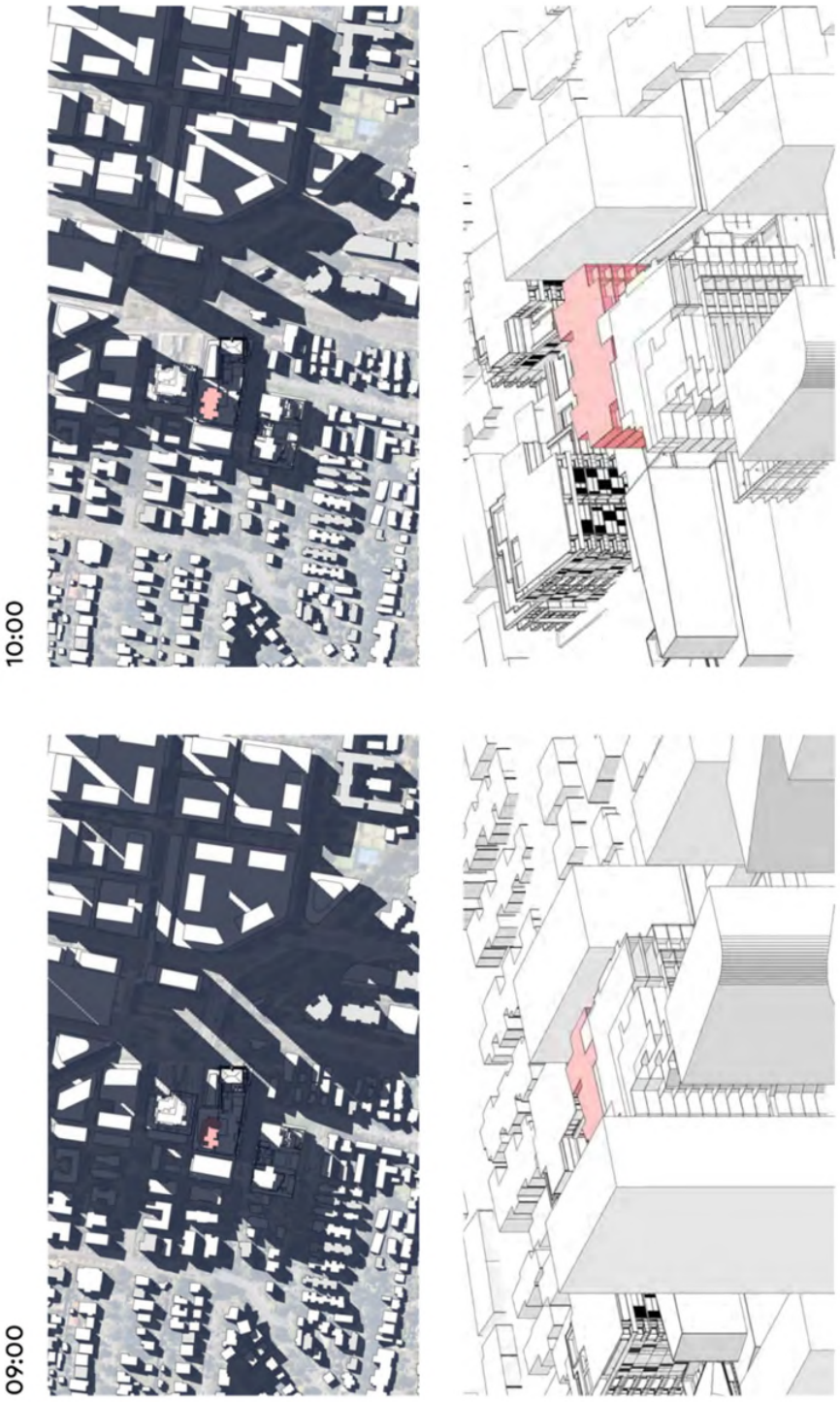
60% - 64/106 apartments receive at least 2 hours of direct sunlight during the winter solstice

However, there are significant opportunities that could be explored at later design stages or through a Development Application process to further improve solar access. This includes, but is not limited to;

- Reducing the amount of cut and apartments that are below the ground level of Ashley Street
- Reorienting some of the "wings" of the buildings
- Relocating balconies and living areas
- Redistributing the location of 1/2/3 bedroom apartments within the floorplate
- Reconfiguring the built form for the RSL site that casts shadows on to the Seniors Living

With some, or all of those, considerations above achievable, we are confident that the Seniors Living proposal could comply with at least 70% of the dwellings receive at least 2 hours of direct solar access between 9am and 3pm at mid-winter in living rooms and private open spaces.

ATTACHMENT 2 - ITEM 4



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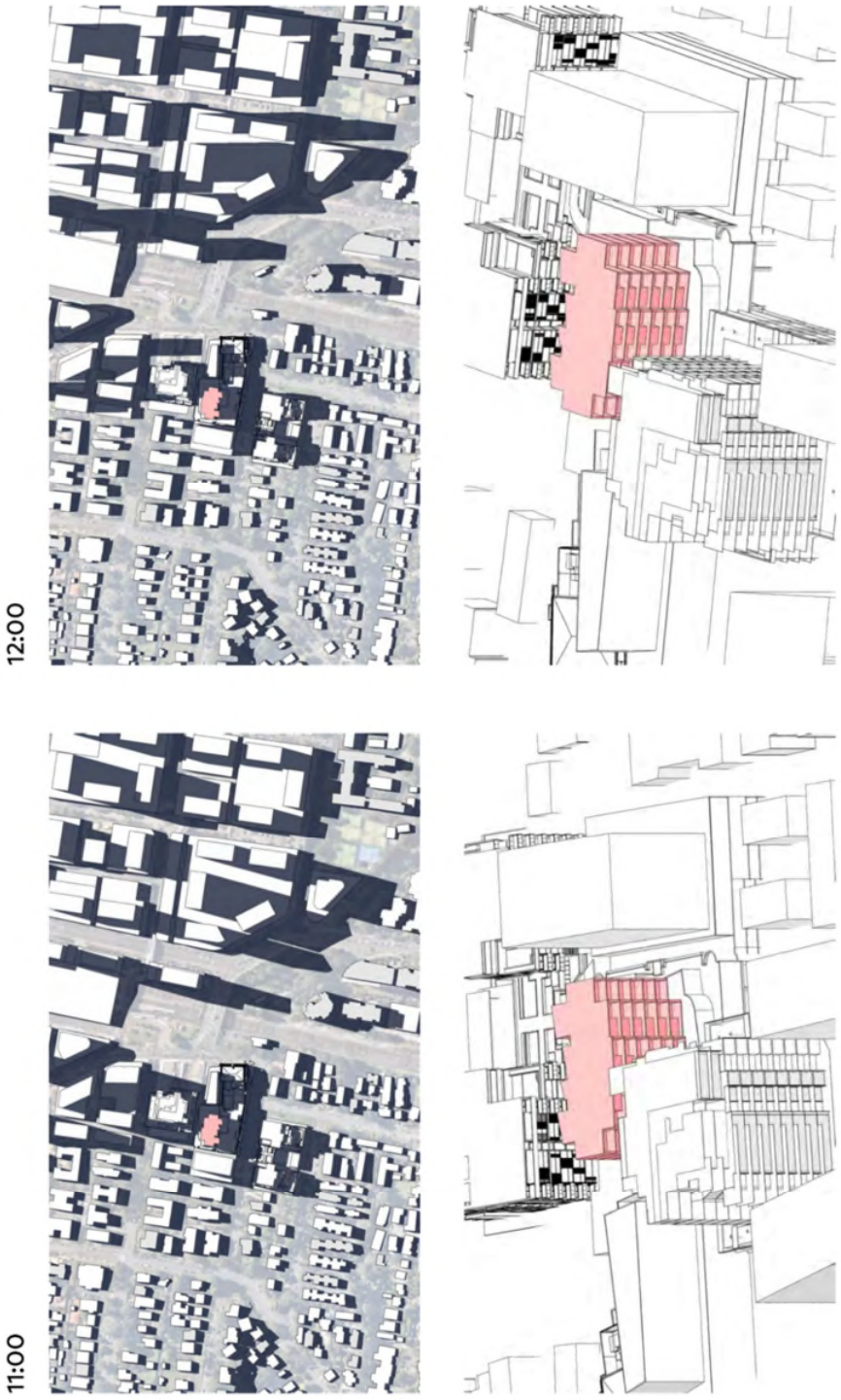

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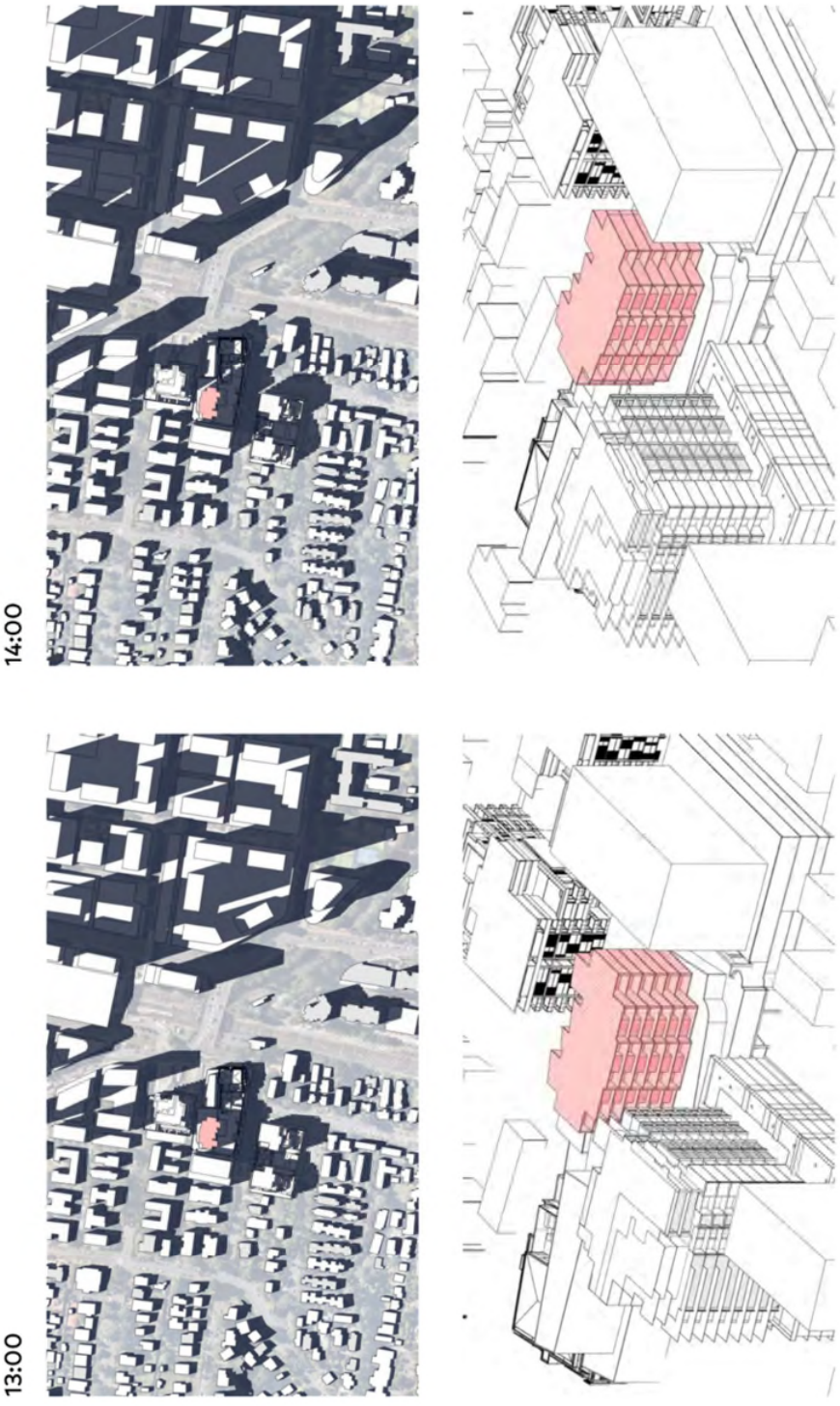

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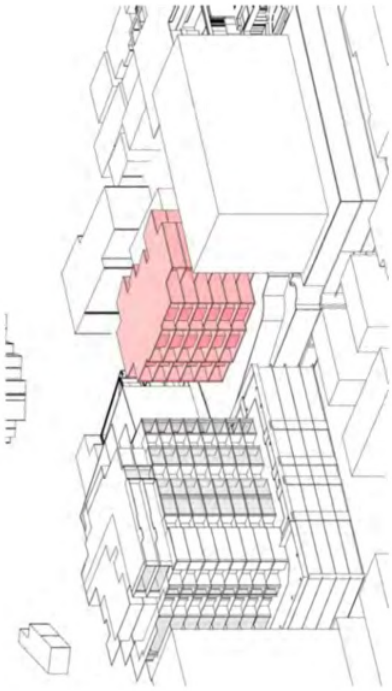
15:00



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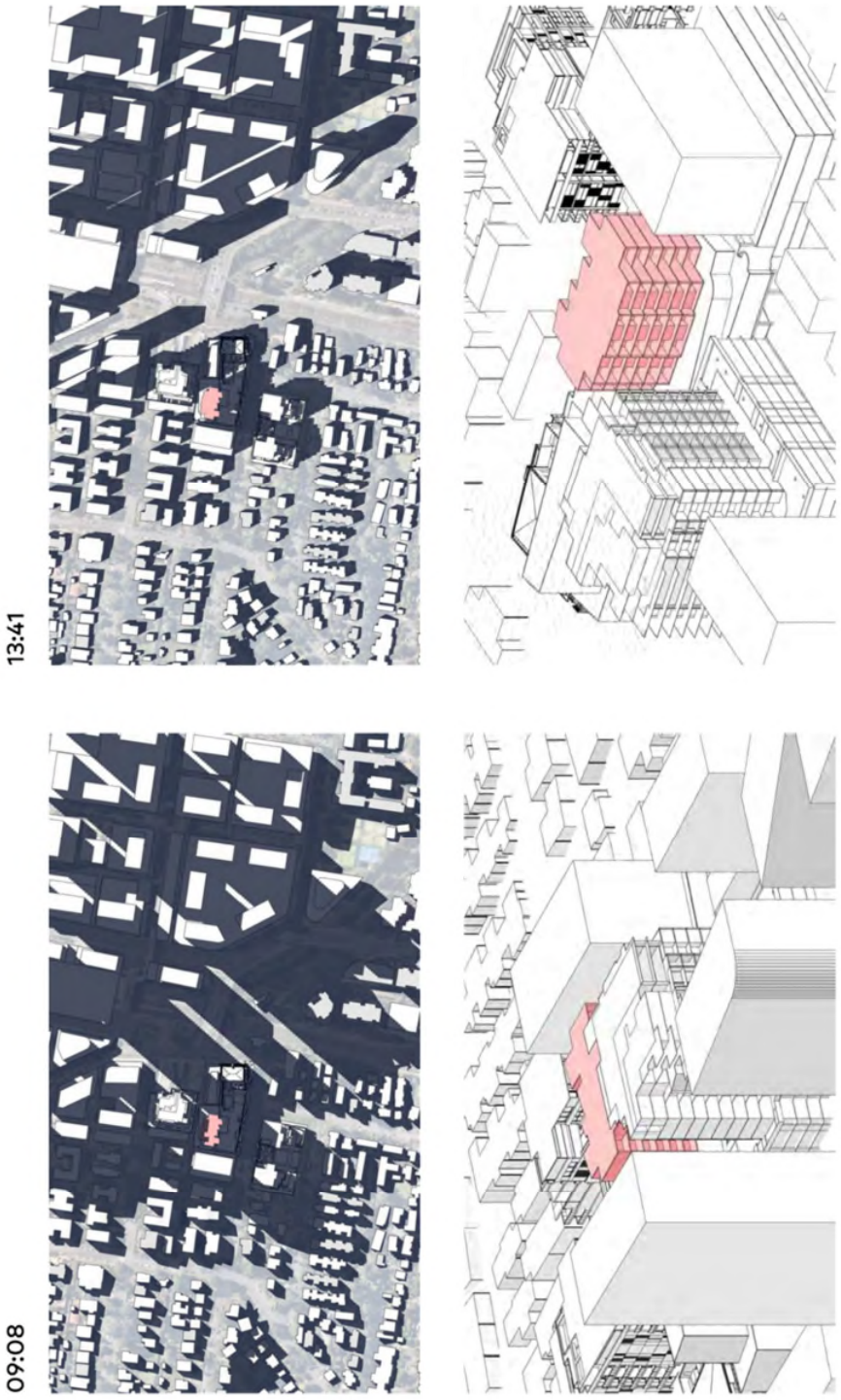

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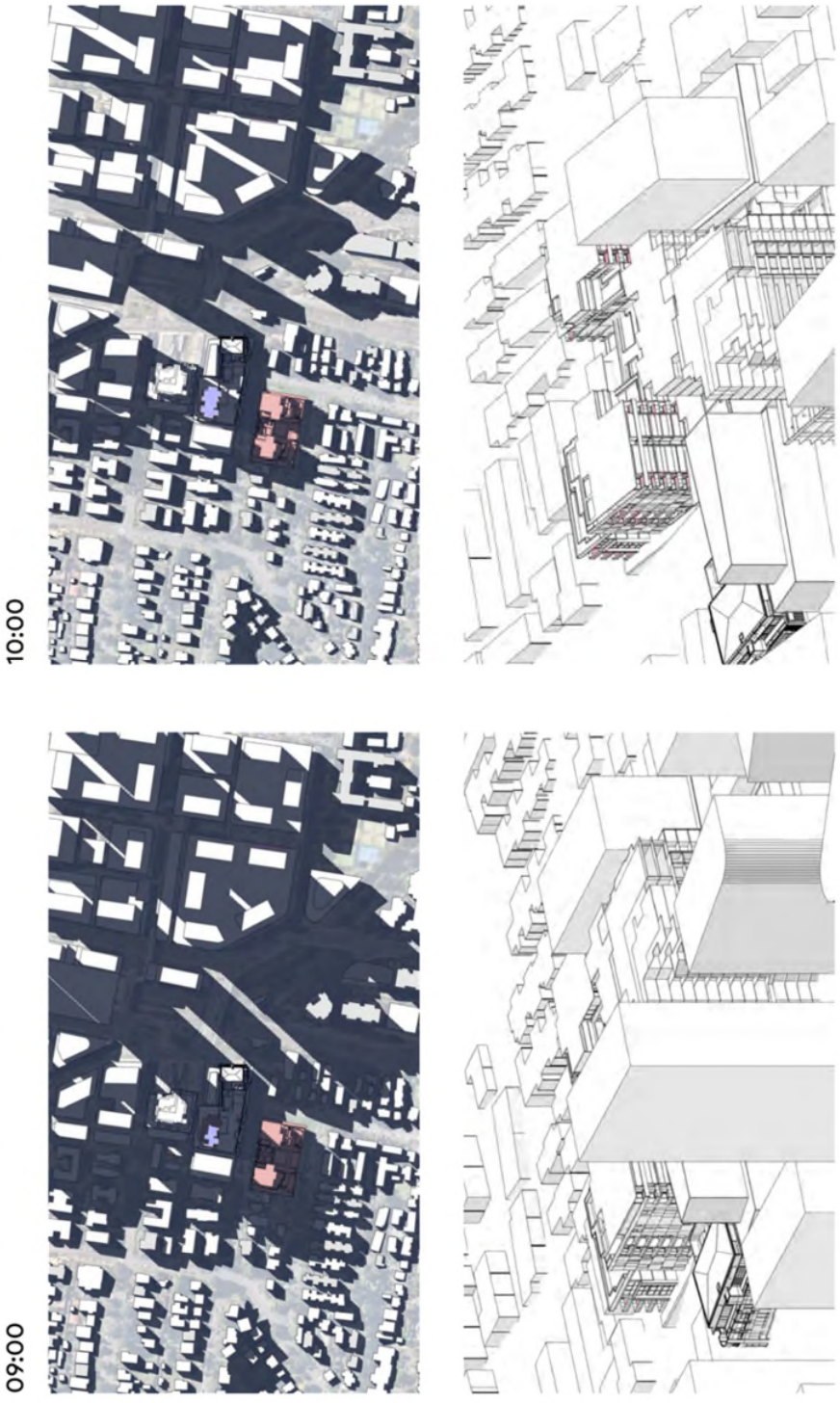

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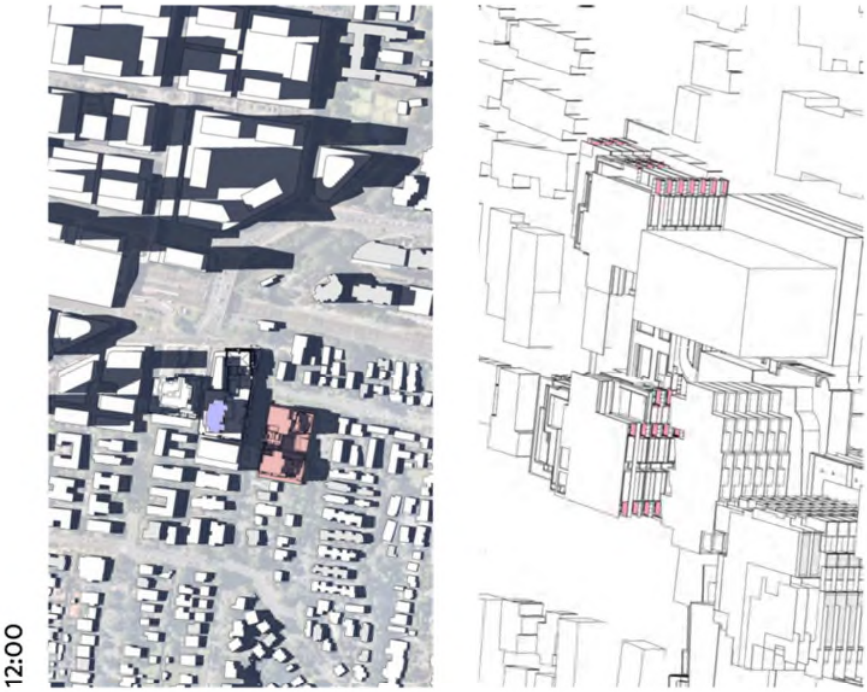

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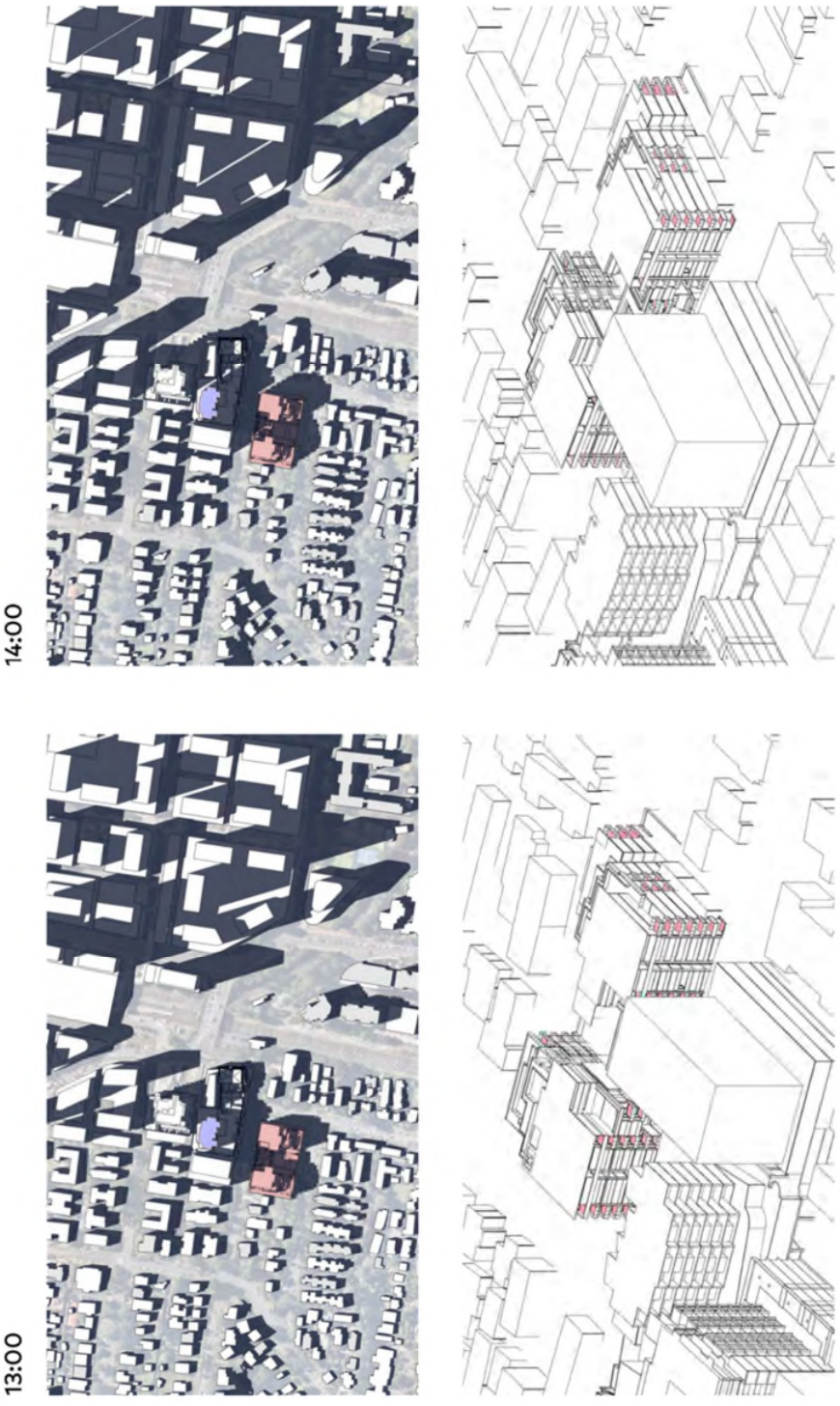

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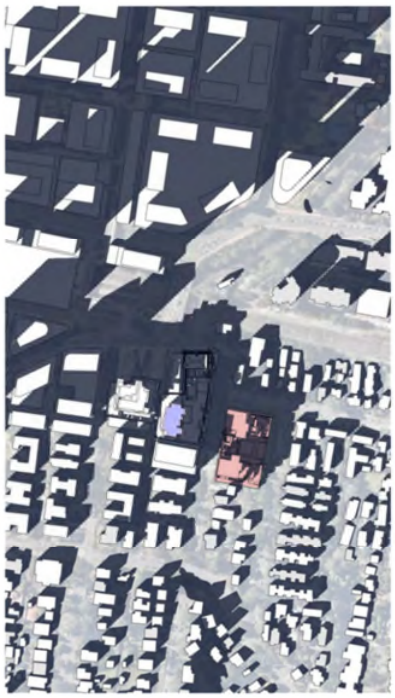

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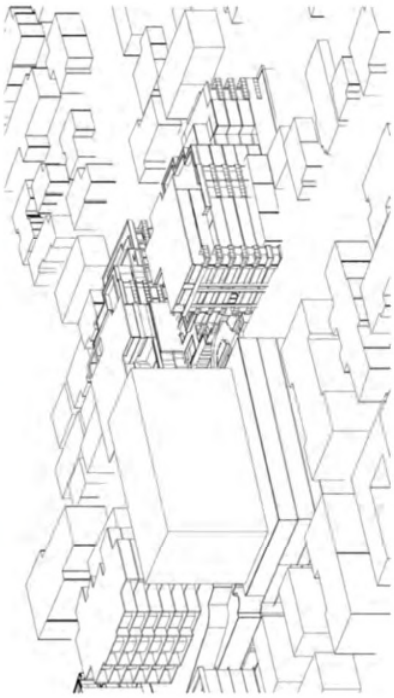

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ATTACHMENT 8 – Draft Amendments to the Hornsby Development Control Plan 2013

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Table: 1C.2.1(c) On Site Car Parking Rates

Type of Development	Car Parking Requirement	
	Sites < 800m from Railway Station Sites	Sites > 800m from Railway Station
Residential Accommodation		
Dwelling Houses 0-2 Bedrooms 3 or more Bedrooms	 1 space/ dwelling 2 spaces/ dwelling	
Secondary Dwellings (see Note*) 0-2 Bedrooms 3 or more Bedrooms	 1 space/ dwelling 2 spaces/ dwelling	 1 space/ dwelling 2 spaces/ dwelling
Attached Dual Occupancy 0-2 Bedrooms 3 or more Bedrooms		 1 space/ dwelling 2 spaces/ dwelling
Medium and High Density Dwellings in Hornsby LGA (including Universal Design Housing**) 0-1 Bedroom 0-2 Bedrooms 3 or more Bedrooms Visitors (see Note***)	 0.75 space/ dwelling 1 space/ dwelling 1.5 spaces/ dwelling 1 space per 7 dwellings	 1 space/ dwelling 1.25 spaces/ dwelling 2 spaces/ dwelling 1 space per 5 dwellings
Seniors Housing at all locations other than the combined land described below	~~per SEPP (Housing for Seniors or People with a Disability) 2004~~ per State Environmental Planning Policy (Housing) 2021	
Seniors Independent Housing at combined site comprising Nos. 9,11,15,17 and 19 Ashley Street, Hornsby and Nos. 2 and 4 Webb Avenue, Hornsby	A maximum of 108 resident spaces Visitors and staff – 1 space per 7 dwellings to a maximum of 15 spaces 1 dedicated space for an emergency vehicle	
Tourist and Visitor Accommodation (see Note)**		
Bed & Breakfast Accommodation, Farmstay Accommodation	1 space/guest bedroom + 2 spaces for the permanent residents	
Short Term Rental Accommodation (Holiday lets)	Apply residential accommodation rates above	
Hotel or Motel accommodation	1 space/room + 1 space per 2 employees	
Caravan Parks	1 space/van, cabin or tent site	
Commercial Premises		
Business or Office Premises	1/48m2 GFA	1/40m2 GFA
Shops	1/29m2 GLFA	1/20m2 GLFA
Bulky Goods Premises	1/75m2 GLFA, including space for cars with trailers	1/50m2 GLFA, including space for cars with trailers
Restaurants or Cafes (ex drive-through take-away restaurants)	1/29m2 GLFA	15/100m2 GFA + 15/100 m2 of outdoor seating area
Vehicle Sales or Hire Premises	1/150m2 site area + 6 spaces/work bay	
Markets	2 spaces per stall (customers only	
Marina	0.6 spaces/ berth	

Table: 1C.2.1(c) On Site Car Parking Rates

Type of Development	Car Parking Requirement	
	Sites < 800m from Railway Station	Sites > 800m from Railway Station
Industrial Uses and Areas		
Industry and Warehouse or Distribution Centres *(max 20% ancillary office floor area, Note****)*	1/150m² GLFA	1/100m² GLFA
Vehicle Repair Station and Vehicle Body Repair Workshops	1/150m² GFA + 6 spaces/work bay	
Sex Services Premises	1 space/ workroom + 1 space per 2 employees	
Agriculture		
Intensive Plant Agriculture	1 space/ employee	
Plant Nursery	0.5 spaces per 100m² of that part of the site used in conjunction with the nursery + parking for any ancillary uses per rates in this table	
Education		
Child Care Centre	1 space per 4 children	
Educational Establishments	1 space per full time teacher + 1 space per 2 students of driving age	
Health Care		
Health Consulting Rooms	3 per surgery	
Medical Centres	4 per surgery	
Halls, meeting places		
Community Halls	1 space per 5 seats min (subject to parking study)	
Places of Public Worship	1 space per 5 seats min (subject to parking study)	
Entertainment Facility	1 space per 5 seats min (subject to parking study)	
Temporary Community Events	Markets to provide 2 spaces per stall (customers only) available on site or in the immediate locality. Other events subject to a parking study	
Other Uses	as per RTA Guide to Traffic Generating Development or a Parking Study	

3.5 Residential Flat Buildings (6 or more Storeys)

This section provides controls for erecting, and undertaking alterations and additions to, a residential flat building in the R4 High Density Residential Zone, within the area designated as S to AA (except W1) (6 storeys to 22 storeys) on the HLEP Height of Building map.

The controls also apply to Seniors Housing only on land identified as Area 1 on the HLEP Height of Building Map.

3.5.1 Desired Future Character

Desired Outcome

a. Development that contributes to the desired future character of the area. Prescriptive Measures a. Development applications should demonstrate compatibility with the following statements of desired character

Prescriptive Measures

a. Development applications should demonstrate compatibility with the following statements of desired character:

Desired Future Character Statement
(excluding Pound Road, Hornsby Precinct)

The locality is characterised by residential flat buildings of 6 or more storeys in height in landscaped settings with underground car parking.

Development footprints maintain landscape corridors around and through development sites. The established tree canopy is complemented by new trees and shrubs throughout all gardens. Facade widths are limited, avoiding the appearance of a continuous wall of development. Buildings are integrated into a campus like setting with large areas of consolidated public and communal open space.

Balconies provide outdoor living areas which wrap around the corners of the buildings, providing usable open space as well as articulation in built form.

Developments embody active living principles including bicycle parking and storage, prioritised pedestrian and cyclist entrances to buildings, and connectivity to the public domain.

Figure 3.5(a): Example of Desired Character - 8 storey residential flat building (excluding Pound Road, Hornsby precinct).(I)

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3.5.4 Height

Desired Outcome

a. A built form in accordance with the Height of Building Map in the HLEP and comprising residential flat buildings.

Prescriptive Measures

Storeys

a. Sites with the following maximum building heights under Clause 4.3 of the HLEP should comply with the maximum number of storeys in Table 3.5.4(a).

Table 3.5.4(a): Translation of Height to Storeys

HLEP Area	Maximum Building Height (m)	Maximum Storeys (excluding basement carparking
Area 1	20.5m Seniors Housing only	6 storeys Seniors Housing only
S	23.5m	7 storeys
T1	26.5m	8 storeys
T2	29.5m	9 storeys
U	32.5m	10 storeys
V1	35.5m	11 storeys
V2	38.5m	12 storeys
W2	41.5m	13 storeys
X	48m	15 storeys
AA	72m	22 storeys

b. Basement car parking that protrudes more than 1 metre above existing ground level is counted as a storey.

c. A transition in building height should be provided at sensitive interface areas adjacent to heritage items, conservation areas, ~~and~~ adjacent residential areas, areas outside the precinct and sites adjacent to Area 1 on the Height of Building Map.

d. To protect the amenity of future residents the finished floor level of ground floor apartments should be at or above the natural ground level.

e. Top most storeys, including those with mezzanine levels, should be visually recessive with a setback from the storeys below and lightweight in design.

Podiums

f. Within the Pound Road Precinct, a broad podium should be provided adjacent to the public domain with a height of 3 storeys and consistent with the existing built form in the precinct

g. Within the Oxford Street, Epping Precinct, a broad podium should be provided with a height of 2-3 storeys and consistent with the existing built form in the precinct.

Roof Design

h. Flat or very gentle pitched roofs without parapets to minimise the height of exterior walls, incorporating eaves immediately above and beneath the penthouse storeys to cast shadows across the top-storey walls.

i. Roof fixtures and lift overruns or service plants should be incorporated into the design of the roof to minimise visual intrusiveness and support an integrated building design.

Notes:
Building height (or height of building) means the vertical distance between ground level (existing) and the highest point of the building, including plant and lift overruns, but excluding communication devices, antennae, satellite dishes, masts, flagpoles, chimneys, flues and the like.

Storey means a space within a building that is situated between one floor level and the floor level next above, or if there is no floor above, the ceiling or roof above, but does not include:
(a) a space that contains only a lift shaft, stairway or meter room, or
(b) a mezzanine, or
(c) an attic.

Basement means the space of a building where the floor level of that space is predominantly below ground level (existing) and where the floor level of the storey immediately above is less than 1 metre above ground level (existing).

A transition in building height should be provided at sensitive interface areas adjacent to heritage items and Heritage Conservation Areas. Refer to Part 9 Heritage of this DCP for additional heritage controls.

Height controls (ex Pound Road and Oxford Street, Epping Precinct) are based on a typical residential floor to floor height of 3 metres, with a 1.5 metre allowance for roof articulation and a 1 metre basement projection.

Height controls (Pound Road and Oxford Street, Epping Precinct) are based on a ground floor height of 4 metres, a typical residential floor to floor height of 3 metres, with a 1.5 metre allowance for roof articulation and no basement projection

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4.5 Hornsby Town Centre

North Precinct

The north precinct will provide an extension of the existing commercial centre and accommodate a wide range of living, employment and recreational activities.

Building bulk and scale will step up from the adjacent residential area (to the east of Hunter Street) to the development along George Street. The ground floor of buildings fronting Hunter Street should incorporate non-residential uses that activate the street frontage. The lower levels of buildings fronting George Street should incorporate active uses such as cafes, outdoor dining and other retail activities. Buildings will incorporate awnings to provide a pedestrian scale and to provide shelter. High density residential development located above the commercial podium should contribute to the function of the Centre and maintain after hours vitality.

Development will facilitate the provision of wide tree lined footpaths, a uniform building edge, awnings and local convenience outlets to create a distinct character and vibrant living and working environment.

Figure 4.5(d): North Precinct Boundary.(C)

West Side Precinct

The West Side precinct is the traditional heart of Hornsby. The precinct will be a mixed use, street based centre that provides a range of housing, retail and commercial offices, food outlets, entertainment and employment opportunities to support the larger centre and service the working and residential populations in the area.

New buildings should reinforce the traditional shopping centre character of the precinct though well scaled podium forms, a consistent street wall height, active frontages and continuous awnings to primary streets that together contribute to the pedestrian experience. Lower levels of new buildings should respond to the existing fine grain character of the Conservation Area, using modulation to reduce the overall massing of a development. Tower elements above the street wall height should be elegant with slim and slender proportions and setback from the podium to allow view and light corridors.

Improvements in the public domain including reconnecting Cenotaph Park to the precinct through a new public plaza that will be a gateway to Hornsby by creating a formal entry from the Rail Station through to the Pacific Highway, pedestrianising parts of Dural Lane, development of new lanes for vehicular access, footpath paving and widening, installation of bollards, provision of seating, installation of street furniture and traffic calming measures.

Development along the Peats Ferry Road and Coronation Street should strengthen the 'main street' shopping and dining character of the precinct and should preserve high value heritage buildings, contributory streetscape elements and facades that enhance the streetscape and contribute to the overall sense of place of the precinct.

The Hornsby RSL Club and Hornsby War Memorial Hall sites present an opportunity for high-quality, mixed-use dining, recreation, hotel and residential development. New development should retain the heritage listed War Memorial Hall, include an active destination frontage to High Street and minimise visual, sound and light, and traffic impacts at the interface with surrounding residential areas.

Development and commercial uses should complement and support main street shopping and dining at Peat's Ferry Road and be designed to maximise visual and pedestrian connections to commercial areas to the north, and to Cenotaph Park and Hornsby Railway Station.

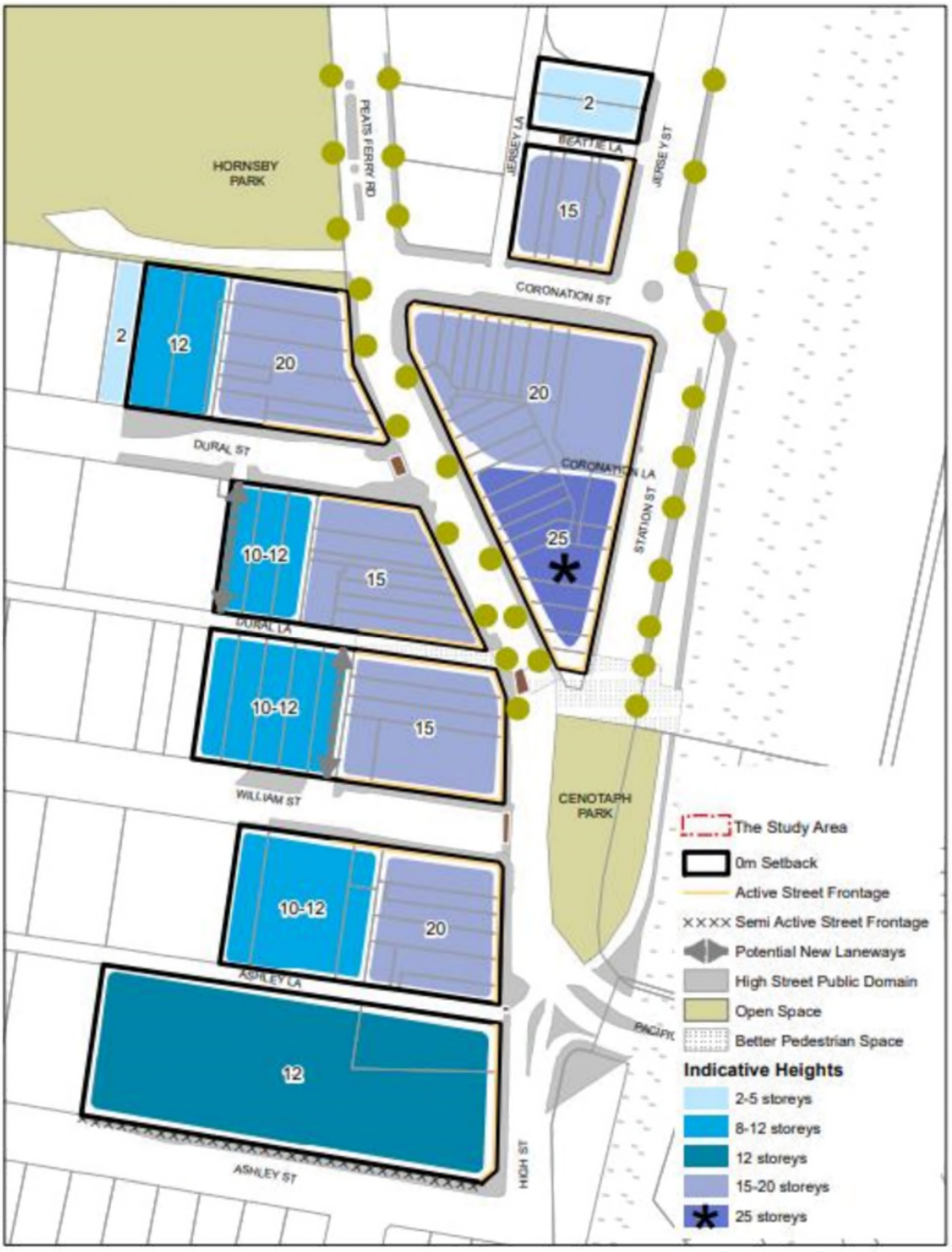

Figure 4.5(f): West Side Precinct - Structure Plan.

4.5.4 Scale within Hornsby LGA

Desired Outcome

a. Development with a height, scale and intensity compatible with the role and function of the centre under the commercial centres hierarchy.

Prescriptive Measures

Floor Space Ratio

a. The maximum floor space ratio for business lands shall be in accordance with the HLEP Floor Space Ratio Map as follows

Table 4.5.3(a): Summary of HLEP FSR Provisions

HLEP Area	Maximum FSR (total)	Maximum FSR (Residential use)
T	2:1	
V	3:1 (+FSR variations for Area 8)	Area 2 - 2:1
Z	5:1	Area 1 - 2:1 Area 3 - 1:1

b. As detailed in Table 4.5.3(a) above, the proportion of any building in Areas 1, 2, and 3 (as identified on the HLEP Floor Space Ratio Map) able to be used for residential accommodation is limited pursuant to the provisions of Clause 4.4(2A) of the HLEP.

c. Within the West Side Precinct, Council may consent to development that results in a variation to the floor space ratio shown on the Floor Space Ratio Map. The requirements regarding the floor space variation are provided in Clause 4.4 (2D) of the HLEP.

Notes:

Refer to Section 1C.2.12 of the DCP for detailed provisions on Isolated Sites.

As detailed in Clause 4.5 of the HLEP, the Floor Space Ratio of buildings on a site is the ratio of the gross floor area of all buildings within the site to the site area. See the HLEP for the definition of Gross Floor Area.

Floorplates - West Precinct

d. Residential floorplates above the podium should have a maximum GFA of 700 sqm. Balconies and terraces may project from this maximum.

e. Commercial floorplates above the podium should have a maximum GFA of 1,200sqm.

Note: The maximum floorplate requirements for the West Precinct (d. and e.) do not apply to No. 2 and No. 4 High Street, Hornsby

Floorplates - North Precinct

f. Residential floorplates should have a maximum dimension of 18 metres. Balconies and terraces may project beyond this maximum.

g. Commercial floorplates should have a maximum dimension of 35 metres, measured perpendicular to the primary retail frontage and between opposing exterior walls at any point.

Height

h. Sites with the following maximum building height under Clause 4.3 of the HLEP should comply with the maximum number of storeys in Table 4.5.3(b) (excluding basement carparking).

Table 4.5.3(b): Translation of Height to Storeys

HLEP Area	Maximum building height (m)	Maximum Storeys - Commercial building	Maximum Storeys Mixed Use building
I	8.5m	2 storeys	2 storeys
O1	16m	4 storeys	4 storeys
S	23.5m	6 storeys	7 storeys
T1	26.5m		8 storeys
U	32.5m	8 storeys	10 storeys
V1	35.5m	9 storeys	11 storeys
V2	38.5m		12 storeys
W1	40m	10 storeys	13 storeys
X	48m	12 storeys	15 storeys
AA1	62.5		20 storeys
AA2	77.5		25 storeys

i. Basement car parking that protrudes more than 1 metre above existing ground level is counted as a storey.

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j. Buildings within the West Precinct are to incorporate a commercial podium with a height of 2 to 5 storeys (8.5-16.5 metres), in accordance with Figure 4.5(i). k. Mixed use buildings within the North Precinct are to incorporate a commercial podium with a height of 3 storeys (12 metres), in accordance with Figure 4.5(j). l. l. Buildings within the East Precinct are to incorporate a commercial podium with a height of 2 to 3 storeys (8-12metres), in accordance with Figure 4.5(l). m. m. A transition in building height should be provided at sensitive interface areas adjacent to heritage items and adjacent residential areas outside the precinct boundaries. Notes: Building height (or height of building) means the vertical distance between ground level (existing) and the highest point of the building, including plant and lift overruns, but excluding communication devices, antennae, satellite dishes, masts, flagpoles, chimneys, flues and the like. Storey means a space within a building that is situated between one floor level and the floor level next above, or if there is no floor above, the ceiling or roof above, but does not include: (a) a space that contains only a lift shaft, stairway or meter room, or (b) a mezzanine, or (c) an attic. A mixed use building described above comprises a building with a commercial podium and residential floors above.	

Figure 4.5(i): West Side Precinct - Building Height Plan.

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West Precinct

l. The setbacks of all buildings and structures to the boundaries of the site are prescribed in Table 4.5(c) for the West Precinct:

Table 4.5.4(c): Ground Floor Minimum Setbacks - West Precinct

Location	Building Setback
Peats Ferry Road	0m
Coronation Street	0m
Station Street	0m
Jersey Street	0m
Jersey Lane	0m
Beattie Land	0m
Dural Street (active frontages)	0m
(other frontagse)	3m
William Street (active frontages)	0
(other frontages)	3
High Street	0
Ashley Lane (active frontages)	0
(other frontages)	3
Ashley Street (active frontages)	0
(semi active frontages to RSL Club and carpark)	0m
(other frontages)	3m
~~(RSL carpark frontages)~~	~~3m~~
Hornsby Park Edge Interface	
(active frontages)	0m
(other frontages)	3m
Interface with Residential Zoning	6m

Upper Floor Minimum Setbacks (Figure 4.5(m))	
Location	Upper Floor Setback
Peats Ferry Road	6m
Coronation Street	6m
Station Street	3m
Jersey Street	3m
Dural Street	3m
Dural Lane	3m
William Street	3m
High Street	6m
Ashley Lane	0m
Ashley Street	3m
Hornsby Park Edge Interface	3m
Western boundary of No. 4 High Street	9m

m. Despite the above table, car parking stations may be built to the front boundary where a facade is provided that presents a built form consistent with the character of commercial/retail buildings within the precinct.

n. Ground Floor Minimum setbacks are illustrated in Figure 4.5(n).

o. The upper levels above the podium should be setback in accordance with Figure 4.5(o).

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Figure 4.5(n): West Side Precinct - Ground Floor Minimum Setbacks.

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Figure 4.5(o): West Side Precinct - Podium Heights and Upper Floor Setbacks (C)

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7.2 Community Housing

The following section provides guidelines for the development of land for seniors housing, boarding houses, group homes and hostels throughout Hornsby Shire.

7.2.1 Seniors Housing

Desired Outcomes

a. Development with a bulk, scale and intensity that is compatible with the character of the area.

Prescriptive Measures

a. Development for Seniors Housing should comply with the planning controls in the Housing SEPP
b. Development for Seniors Housing on land identified as Area 1 in the HLEP Height of Building Map should also comply with the site-specific and other controls for residential flat buildings identified in Part 3.5 – Residential Flat Buildings (6 or more storeys) and the site-specific parking rates and other general controls identified in Part 1 – General of the HDCP.

7.2.2 Boarding Houses

Desired Outcomes

a. Development with a bulk, scale and intensity that is compatible with the character of the area.

Prescriptive Measures

a. Development for Boarding Houses should comply with the planning controls in the Housing SEPP

7.2.3 Group Homes

Desired Outcomes

a. Development with a bulk, scale and intensity that is compatible with the character of the area.

Prescriptive Measures

a. Development for Group Homes should comply with the planning controls should comply with the planning controls in the Housing SEPP

Note:

The complying development provisions within Schedule 2 of the SEPP will be used as a guideline in assessing development applications for group homes

9.2 Heritage Items

This section applies to Heritage Items listed in Part 1 of Schedule 5 Environmental Heritage of the HLEP. Heritage Items include buildings, works, gardens and trees.

9.2.1 General Design Requirement

Desired Outcomes

a. Development that allows reasonable change to occur to heritage items, particularly to meet contemporary amenity or safety standards without unreasonably impacting heritage significance.
b. Alterations and additions that are sympathetic to significant features, and do not dominate the heritage item in terms of bulk, scale, form, setbacks and materials.
c. Development that encourages new uses that facilitate the ongoing viability of heritage items without adversely affecting heritage significance.
d. New uses that allow for interpretation of the heritage item and do not result in substantial or irreversible changes to significant features
e. Development that cantilevers over or retains a heritage item within its envelope complements the form, style and character of the heritage item and allows it to be viewed and interpreted as a discrete entity.

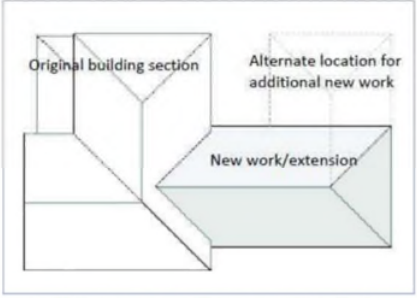

Figure 9.2(a) - Locate new work away from the significant area of the item. (i)

Prescriptive Measures

General

a. Features or elements that contribute to the heritage significance of the item should be retained.
b. Council does not generally support demolition of heritage items. Poor structural condition or costs associated with renovating are not sufficient justifications.
c. New work and changes should be located away from main areas that are intact or highly significant. Cantilevers are to be stepped back from primary elevations and street facades
d. New buildings, structures, landscaping or other works should be located to minimise adverse impacts on the setting of the heritage item.
e. Introducing decorative elements that could reduce the integrity and confuse the period of the building should be avoided, unless documentary or physical evidence exists to show it has been removed.
f. For large projects a staging plan may be required to indicate when secondary or non-heritage works are to be undertaken.
g. Servicing, fire safety or BCA compliance upgrades for a new use should not impact on the heritage e significance of the item.

Removing unsympathetic changes

h. Unsympathetic elements should be removed, especially where substantial changes are proposed to a heritage item and the reversal will assist an improved heritage outcome.

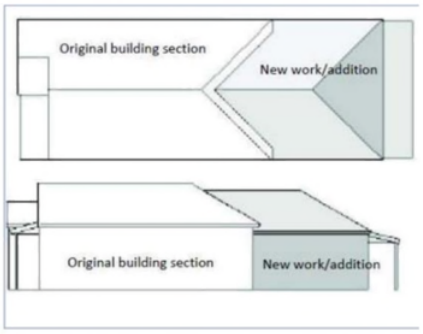

Figure 9.2(b) - Alterations and additions to be smaller in scale and length than the existing building. (i)

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Form, massing and scale i. New work should be designed to complement the heritage item in terms of scale, proportion, bulk, massing and detail. j. Additions and extensions at the front of heritage items should be avoided. Additions should be located away from the principal elevation and significant features of the heritage item, and behind and below the main roof ridge. k. Alterations and additions should be smaller in scale and length than the existing building. l. Large second storey additions should be avoided. Additions should be located to the rear or side. Depending on the form and style of the building it may be possible to design new levels within the existing roof space or below the gutter line of the main building. m. Extensive blank or unarticulated walls are discouraged. Articulation should be achieved through the use of materials or design elements such as soldier/string courses, windows, fibro/timber inserts or the like. Internal changes n. Changes to the original layout of the building should be minimal so that the evolution of the building remains recognisable. Development should retain significant interior elements. For example, wall nibs, decorative ceilings, picture rails, architraves, feature tiling or features such as fire places should be retained Materials, colours, finishes o. Rendering or painting original face brick is not supported. p. Materials should be selected to complement the period and style of the building. Compatible, but not necessarily matching materials i.e. modern materials, may be used where appropriate. Note: The controls for heritage items adopt a "whole of building" approach because heritage significance applies to the whole property, not just the front façade of a building or particular element of a site. The controls are based on the principles of minimising impact on heritage significance, and ensuring that where change occurs, the decision is based on an understanding of heritage significance	**No. 4 and No. 2 High Street, Hornsby** New development: a. Must be designed to provide for an integrated and holistic development outcome across Nos 2 and 4 High Street, Hornsby b. Must retain the heritage listed Hornsby War Memorial Hall including significant external and internal features, existing setbacks, fabric, spaces and layout c. Adopt a high quality and respectful contextual design that is sympathetic to and complements the Hall's significant fabric, form, setback, detail and landscaping d. Should not dominate the Hall or obscure views to it from public domain and not visually dominate or visually disrupt the public appreciation of the Hall

Table: 1C.2.1(c) On Site Car Parking Rates

Type of Development	Car Parking Requirement	
	Sites < 800m from Railway Station Sites	Sites > 800m from Railway Station
Residential Accommodation		
Dwelling Houses 0-2 Bedrooms 3 or more Bedrooms	 1 space/ dwelling 2 spaces/ dwelling	
Secondary Dwellings (see Note*) 0-2 Bedrooms 3 or more Bedrooms	 1 space/ dwelling 2 spaces/ dwelling	 1 space/ dwelling 2 spaces/ dwelling
Attached Dual Occupancy 0-2 Bedrooms 3 or more Bedrooms		 1 space/ dwelling 2 spaces/ dwelling
Medium and High Density Dwellings in Hornsby LGA (including Universal Design Housing**) 0-1 Bedroom 0-2 Bedrooms 3 or more Bedrooms Visitors (see Note***)	 0.75 space/ dwelling 1 space/ dwelling 1.5 spaces/ dwelling 1 space per 7 dwellings	 1 space/ dwelling 1.25 spaces/ dwelling 2 spaces/ dwelling 1 space per 5 dwellings
Seniors Housing at all locations other than the combined land described below	~~per SEPP (Housing for Seniors or People with a Disability) 2004~~ per State Environmental Planning Policy (Housing) 2021	
Seniors Independent Housing at combined site comprising Nos. 9,11,15,17 and 19 Ashley Street, Hornsby and Nos. 2 and 4 Webb Avenue, Hornsby	A maximum of 108 resident spaces Visitors and staff – 1 space per 7 dwellings to a maximum of 15 spaces 1 dedicated space for an emergency vehicle	
Tourist and Visitor Accommodation (see Note)**		
Bed & Breakfast Accommodation, Farmstay Accommodation	1 space/guest bedroom + 2 spaces for the permanent residents	
Short Term Rental Accommodation (Holiday lets)	Apply residential accommodation rates above	
Hotel or Motel accommodation	1 space/room + 1 space per 2 employees	
Caravan Parks	1 space/van, cabin or tent site	
Commercial Premises		
Business or Office Premises	1/48m2 GFA	1/40m2 GFA
Shops	1/29m2 GLFA	1/20m2 GLFA
Bulky Goods Premises	1/75m2 GLFA, including space for cars with trailers	1/50m2 GLFA, including space for cars with trailers
Restaurants or Cafes (ex drive-through take-away restaurants)	1/29m2 GLFA	15/100m2 GFA + 15/100 m2 of outdoor seating area
Vehicle Sales or Hire Premises	1/150m2 site area + 6 spaces/work bay	
Markets	2 spaces per stall (customers only	
Marina	0.6 spaces/ berth	

Table: 1C.2.1(c) On Site Car Parking Rates

Type of Development	Car Parking Requirement	
	Sites < 800m from Railway Station	Sites > 800m from Railway Station
Industrial Uses and Areas		
Industry and Warehouse or Distribution Centres *(max 20% ancillary office floor area, Note****)*	1/150m² GLFA	1/100m² GLFA
Vehicle Repair Station and Vehicle Body Repair Workshops	1/150m² GFA + 6 spaces/work bay	
Sex Services Premises	1 space/ workroom + 1 space per 2 employees	
Agriculture		
Intensive Plant Agriculture	1 space/ employee	
Plant Nursery	0.5 spaces per 100m² of that part of the site used in conjunction with the nursery + parking for any ancillary uses per rates in this table	
Education		
Child Care Centre	1 space per 4 children	
Educational Establishments	1 space per full time teacher + 1 space per 2 students of driving age	
Health Care		
Health Consulting Rooms	3 per surgery	
Medical Centres	4 per surgery	
Halls, meeting places		
Community Halls	1 space per 5 seats min (subject to parking study)	
Places of Public Worship	1 space per 5 seats min (subject to parking study)	
Entertainment Facility	1 space per 5 seats min (subject to parking study)	
Temporary Community Events	Markets to provide 2 spaces per stall (customers only) available on site or in the immediate locality. Other events subject to a parking study	
Other Uses	as per RTA Guide to Traffic Generating Development or a Parking Study	

ATTACHMENT 3 - ITEM 4

3.5 Residential Flat Buildings (6 or more Storeys)

This section provides controls for erecting, and undertaking alterations and additions to, a residential flat building in the R4 High Density Residential Zone, within the area designated as S to AA (except W1) (6 storeys to 22 storeys) on the HLEP Height of Building map.

The controls also apply to Seniors Housing only on land identified as Area 1 on the HLEP Height of Building Map.

3.5.1 Desired Future Character

Desired Outcome

a. Development that contributes to the desired future character of the area. Prescriptive Measures a. Development applications should demonstrate compatibility with the following statements of desired character

Prescriptive Measures

a. Development applications should demonstrate compatibility with the following statements of desired character:

Desired Future Character Statement
(excluding Pound Road, Hornsby Precinct)

The locality is characterised by residential flat buildings of 6 or more storeys in height in landscaped settings with underground car parking.

Development footprints maintain landscape corridors around and through development sites. The established tree canopy is complemented by new trees and shrubs throughout all gardens. Facade widths are limited, avoiding the appearance of a continuous wall of development. Buildings are integrated into a campus like setting with large areas of consolidated public and communal open space.

Balconies provide outdoor living areas which wrap around the corners of the buildings, providing usable open space as well as articulation in built form.

Developments embody active living principles including bicycle parking and storage, prioritised pedestrian and cyclist entrances to buildings, and connectivity to the public domain.

Figure 3.5(a): Example of Desired Character - 8 storey residential flat building (excluding Pound Road, Hornsby precinct).(I)

ATTACHMENT 3 - ITEM 4

3.5.4 Height

Desired Outcome

a. A built form in accordance with the Height of Building Map in the HLEP and comprising residential flat buildings.

Prescriptive Measures

Storeys

a. Sites with the following maximum building heights under Clause 4.3 of the HLEP should comply with the maximum number of storeys in Table 3.5.4(a).

Table 3.5.4(a): Translation of Height to Storeys

HLEP Area	Maximum Building Height (m)	Maximum Storeys (excluding basement carparking
Area 1	20.5m Seniors Housing only	6 storeys Seniors Housing only
S	23.5m	7 storeys
T1	26.5m	8 storeys
T2	29.5m	9 storeys
U	32.5m	10 storeys
V1	35.5m	11 storeys
V2	38.5m	12 storeys
W2	41.5m	13 storeys
X	48m	15 storeys
AA	72m	22 storeys

b. Basement car parking that protrudes more than 1 metre above existing ground level is counted as a storey.

c. A transition in building height should be provided at sensitive interface areas adjacent to heritage items, conservation areas, ~~and~~ adjacent residential areas, areas outside the precinct and sites adjacent to Area 1 on the Height of Building Map.

d. To protect the amenity of future residents the finished floor level of ground floor apartments should be at or above the natural ground level.

e. Top most storeys, including those with mezzanine levels, should be visually recessive with a setback from the storeys below and lightweight in design.

Podiums

f. Within the Pound Road Precinct, a broad podium should be provided adjacent to the public domain with a height of 3 storeys and consistent with the existing built form in the precinct

g. Within the Oxford Street, Epping Precinct, a broad podium should be provided with a height of 2-3 storeys and consistent with the existing built form in the precinct.

Roof Design

h. Flat or very gentle pitched roofs without parapets to minimise the height of exterior walls, incorporating eaves immediately above and beneath the penthouse storeys to cast shadows across the top-storey walls.

i. Roof fixtures and lift overruns or service plants should be incorporated into the design of the roof to minimise visual intrusiveness and support an integrated building design.

Notes:
Building height (or height of building) means the vertical distance between ground level (existing) and the highest point of the building, including plant and lift overruns, but excluding communication devices, antennae, satellite dishes, masts, flagpoles, chimneys, flues and the like.

Storey means a space within a building that is situated between one floor level and the floor level next above, or if there is no floor above, the ceiling or roof above, but does not include:
(a) a space that contains only a lift shaft, stairway or meter room, or
(b) a mezzanine, or
(c) an attic.

Basement means the space of a building where the floor level of that space is predominantly below ground level (existing) and where the floor level of the storey immediately above is less than 1 metre above ground level (existing).

A transition in building height should be provided at sensitive interface areas adjacent to heritage items and Heritage Conservation Areas. Refer to Part 9 Heritage of this DCP for additional heritage controls.

Height controls (ex Pound Road and Oxford Street, Epping Precinct) are based on a typical residential floor to floor height of 3 metres, with a 1.5 metre allowance for roof articulation and a 1 metre basement projection.

Height controls (Pound Road and Oxford Street, Epping Precinct) are based on a ground floor height of 4 metres, a typical residential floor to floor height of 3 metres, with a 1.5 metre allowance for roof articulation and no basement projection

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4.5 Hornsby Town Centre

North Precinct

The north precinct will provide an extension of the existing commercial centre and accommodate a wide range of living, employment and recreational activities.

Building bulk and scale will step up from the adjacent residential area (to the east of Hunter Street) to the development along George Street. The ground floor of buildings fronting Hunter Street should incorporate non-residential uses that activate the street frontage. The lower levels of buildings fronting George Street should incorporate active uses such as cafes, outdoor dining and other retail activities. Buildings will incorporate awnings to provide a pedestrian scale and to provide shelter. High density residential development located above the commercial podium should contribute to the function of the Centre and maintain after hours vitality.

Development will facilitate the provision of wide tree lined footpaths, a uniform building edge, awnings and local convenience outlets to create a distinct character and vibrant living and working environment.

Figure 4.5(d): North Precinct Boundary.(C)

West Side Precinct

The West Side precinct is the traditional heart of Hornsby. The precinct will be a mixed use, street based centre that provides a range of housing, retail and commercial offices, food outlets, entertainment and employment opportunities to support the larger centre and service the working and residential populations in the area.

New buildings should reinforce the traditional shopping centre character of the precinct though well scaled podium forms, a consistent street wall height, active frontages and continuous awnings to primary streets that together contribute to the pedestrian experience. Lower levels of new buildings should respond to the existing fine grain character of the Conservation Area, using modulation to reduce the overall massing of a development. Tower elements above the street wall height should be elegant with slim and slender proportions and setback from the podium to allow view and light corridors.

Improvements in the public domain including reconnecting Cenotaph Park to the precinct through a new public plaza that will be a gateway to Hornsby by creating a formal entry from the Rail Station through to the Pacific Highway, pedestrianising parts of Dural Lane, development of new lanes for vehicular access, footpath paving and widening, installation of bollards, provision of seating, installation of street furniture and traffic calming measures.

Development along the Peats Ferry Road and Coronation Street should strengthen the 'main street' shopping and dining character of the precinct and should preserve high value heritage buildings, contributory streetscape elements and facades that enhance the streetscape and contribute to the overall sense of place of the precinct.

The Hornsby RSL Club and Hornsby War Memorial Hall sites present an opportunity for high-quality, mixed-use dining, recreation, hotel and residential development. New development should retain the heritage listed War Memorial Hall, include an active destination frontage to High Street and minimise visual, sound and light, and traffic impacts at the interface with surrounding residential areas.

Development and commercial uses should complement and support main street shopping and dining at Peat's Ferry Road and be designed to maximise visual and pedestrian connections to commercial areas to the north, and to Cenotaph Park and Hornsby Railway Station.

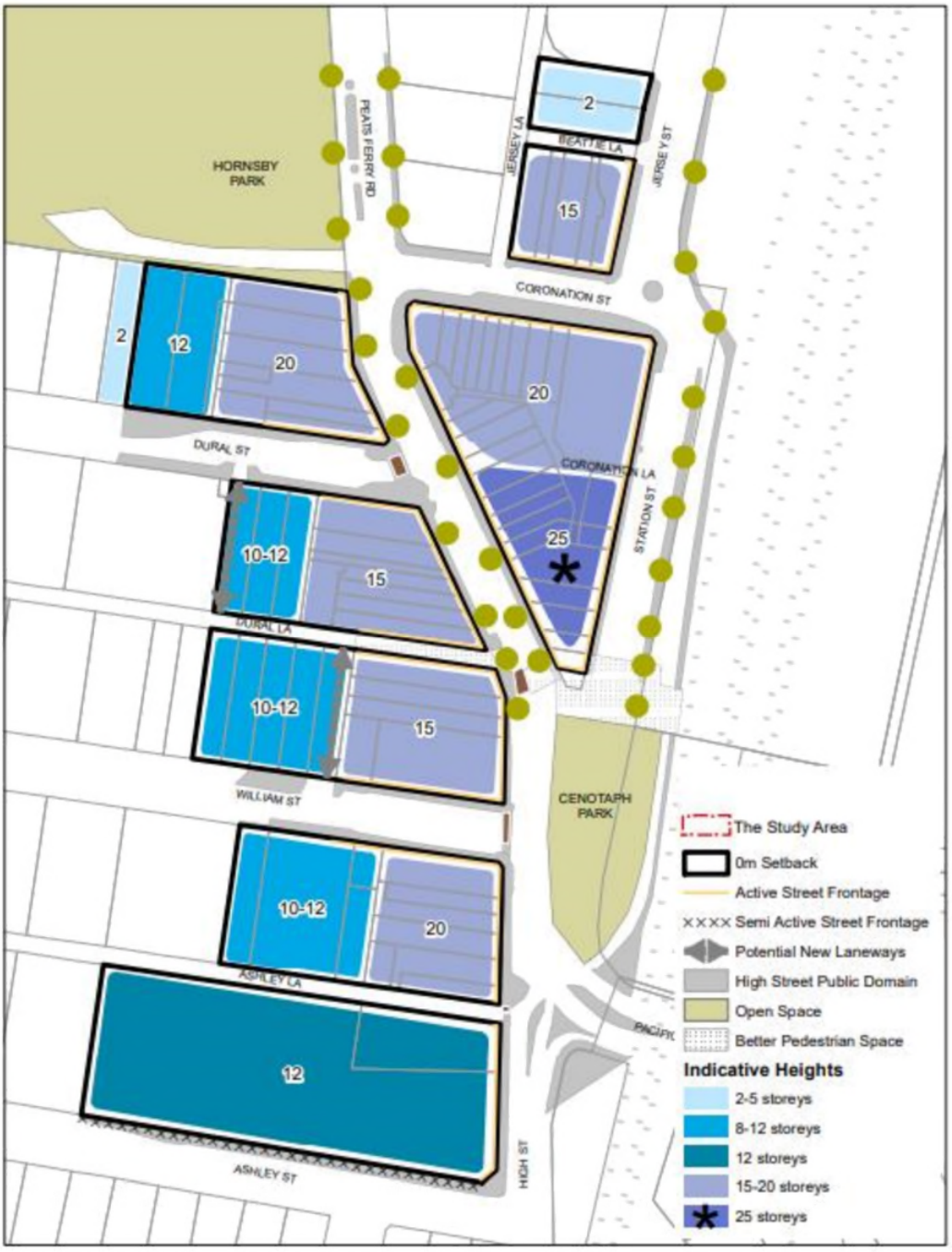

Figure 4.5(f): West Side Precinct - Structure Plan.

ATTACHMENT 3 - ITEM 4

4.5.4 Scale within Hornsby LGA

Desired Outcome

a. Development with a height, scale and intensity compatible with the role and function of the centre under the commercial centres hierarchy.

Prescriptive Measures

Floor Space Ratio

a. The maximum floor space ratio for business lands shall be in accordance with the HLEP Floor Space Ratio Map as follows

Table 4.5.3(a): Summary of HLEP FSR Provisions

HLEP Area	Maximum FSR (total)	Maximum FSR (Residential use)
T	2:1	
V	3:1 (+FSR variations for Area 8)	Area 2 - 2:1
Z	5:1	Area 1 - 2:1 Area 3 - 1:1

b. As detailed in Table 4.5.3(a) above, the proportion of any building in Areas 1, 2, and 3 (as identified on the HLEP Floor Space Ratio Map) able to be used for residential accommodation is limited pursuant to the provisions of Clause 4.4(2A) of the HLEP.

c. Within the West Side Precinct, Council may consent to development that results in a variation to the floor space ratio shown on the Floor Space Ratio Map. The requirements regarding the floor space variation are provided in Clause 4.4 (2D) of the HLEP.

Notes:

Refer to Section 1C.2.12 of the DCP for detailed provisions on Isolated Sites.

As detailed in Clause 4.5 of the HLEP, the Floor Space Ratio of buildings on a site is the ratio of the gross floor area of all buildings within the site to the site area. See the HLEP for the definition of Gross Floor Area.

Floorplates - West Precinct

d. Residential floorplates above the podium should have a maximum GFA of 700 sqm. Balconies and terraces may project from this maximum.

e. Commercial floorplates above the podium should have a maximum GFA of 1,200sqm.

Note: The maximum floorplate requirements for the West Precinct (d. and e.) do not apply to No. 2 and No. 4 High Street, Hornsby

Floorplates - North Precinct

f. Residential floorplates should have a maximum dimension of 18 metres. Balconies and terraces may project beyond this maximum.

g. Commercial floorplates should have a maximum dimension of 35 metres, measured perpendicular to the primary retail frontage and between opposing exterior walls at any point.

Height

h. Sites with the following maximum building height under Clause 4.3 of the HLEP should comply with the maximum number of storeys in Table 4.5.3(b) (excluding basement carparking).

Table 4.5.3(b): Translation of Height to Storeys

HLEP Area	Maximum building height (m)	Maximum Storeys - Commercial building	Maximum Storeys Mixed Use building
I	8.5m	2 storeys	2 storeys
O1	16m	4 storeys	4 storeys
S	23.5m	6 storeys	7 storeys
T1	26.5m		8 storeys
U	32.5m	8 storeys	10 storeys
V1	35.5m	9 storeys	11 storeys
V2	38.5m		12 storeys
W1	40m	10 storeys	13 storeys
X	48m	12 storeys	15 storeys
AA1	62.5		20 storeys
AA2	77.5		25 storeys

i. Basement car parking that protrudes more than 1 metre above existing ground level is counted as a storey.

j. Buildings within the West Precinct are to incorporate a commercial podium with a height of 2 to 5 storeys (8.5-16.5 metres), in accordance with Figure 4.5(i). k. Mixed use buildings within the North Precinct are to incorporate a commercial podium with a height of 3 storeys (12 metres), in accordance with Figure 4.5(j). l. l. Buildings within the East Precinct are to incorporate a commercial podium with a height of 2 to 3 storeys (8-12metres), in accordance with Figure 4.5(l). m. m. A transition in building height should be provided at sensitive interface areas adjacent to heritage items and adjacent residential areas outside the precinct boundaries. Notes: Building height (or height of building) means the vertical distance between ground level (existing) and the highest point of the building, including plant and lift overruns, but excluding communication devices, antennae, satellite dishes, masts, flagpoles, chimneys, flues and the like. Storey means a space within a building that is situated between one floor level and the floor level next above, or if there is no floor above, the ceiling or roof above, but does not include: (a) a space that contains only a lift shaft, stairway or meter room, or (b) a mezzanine, or (c) an attic. A mixed use building described above comprises a building with a commercial podium and residential floors above.	

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Figure 4.5(i): West Side Precinct - Building Height Plan.

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West Precinct

l. The setbacks of all buildings and structures to the boundaries of the site are prescribed in Table 4.5(c) for the West Precinct:

Table 4.5.4(c): Ground Floor Minimum Setbacks - West Precinct

Location	Building Setback
Peats Ferry Road	0m
Coronation Street	0m
Station Street	0m
Jersey Street	0m
Jersey Lane	0m
Beattie Land	0m
Dural Street (active frontages)	0m
(other frontagse)	3m
William Street (active frontages)	0
(other frontages)	3
High Street	0
Ashley Lane (active frontages)	0
(other frontages)	3
Ashley Street (active frontages)	0
(semi active frontages to RSL Club and carpark)	0m
(other frontages)	3m
~~(RSL carpark frontages)~~	~~3m~~
Hornsby Park Edge Interface	
(active frontages)	0m
(other frontages)	3m
Interface with Residential Zoning	6m

Upper Floor Minimum Setbacks (Figure 4.5(m))	
Location	Upper Floor Setback
Peats Ferry Road	6m
Coronation Street	6m
Station Street	3m
Jersey Street	3m
Dural Street	3m
Dural Lane	3m
William Street	3m
High Street	6m
Ashley Lane	0m
Ashley Street	3m
Hornsby Park Edge Interface	3m
Western boundary of No. 4 High Street	9m

m. Despite the above table, car parking stations may be built to the front boundary where a facade is provided that presents a built form consistent with the character of commercial/retail buildings within the precinct.

n. Ground Floor Minimum setbacks are illustrated in Figure 4.5(n).

o. The upper levels above the podium should be setback in accordance with Figure 4.5(o).

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Figure 4.5(n): West Side Precinct - Ground Floor Minimum Setbacks.

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Figure 4.5(o): West Side Precinct - Podium Heights and Upper Floor Setbacks (C)

ATTACHMENT 3 - ITEM 4

7.2 Community Housing

The following section provides guidelines for the development of land for seniors housing, boarding houses, group homes and hostels throughout Hornsby Shire.

7.2.1 Seniors Housing

Desired Outcomes

a. Development with a bulk, scale and intensity that is compatible with the character of the area.

Prescriptive Measures

a. Development for Seniors Housing should comply with the planning controls in the Housing SEPP
b. Development for Seniors Housing on land identified as Area 1 in the HLEP Height of Building Map should also comply with the site-specific and other controls for residential flat buildings identified in Part 3.5 – Residential Flat Buildings (6 or more storeys) and the site-specific parking rates and other general controls identified in Part 1 – General of the HDCP.

7.2.2 Boarding Houses

Desired Outcomes

a. Development with a bulk, scale and intensity that is compatible with the character of the area.

Prescriptive Measures

a. Development for Boarding Houses should comply with the planning controls in the Housing SEPP

7.2.3 Group Homes

Desired Outcomes

a. Development with a bulk, scale and intensity that is compatible with the character of the area.

Prescriptive Measures

a. Development for Group Homes should comply with the planning controls should comply with the planning controls in the Housing SEPP

Note:

The complying development provisions within Schedule 2 of the SEPP will be used as a guideline in assessing development applications for group homes

9.2 Heritage Items

This section applies to Heritage Items listed in Part 1 of Schedule 5 Environmental Heritage of the HLEP. Heritage Items include buildings, works, gardens and trees.

9.2.1 General Design Requirement

Desired Outcomes

a. Development that allows reasonable change to occur to heritage items, particularly to meet contemporary amenity or safety standards without unreasonably impacting heritage significance.
b. Alterations and additions that are sympathetic to significant features, and do not dominate the heritage item in terms of bulk, scale, form, setbacks and materials.
c. Development that encourages new uses that facilitate the ongoing viability of heritage items without adversely affecting heritage significance.
d. New uses that allow for interpretation of the heritage item and do not result in substantial or irreversible changes to significant features
e. Development that cantilevers over or retains a heritage item within its envelope complements the form, style and character of the heritage item and allows it to be viewed and interpreted as a discrete entity.

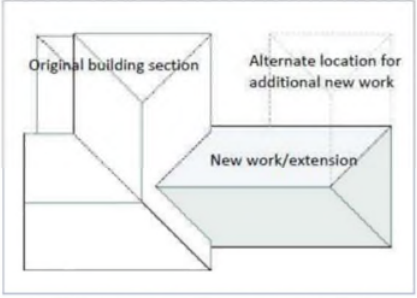

Figure 9.2(a) - Locate new work away from the significant area of the item. (i)

Prescriptive Measures

General

a. Features or elements that contribute to the heritage significance of the item should be retained.
b. Council does not generally support demolition of heritage items. Poor structural condition or costs associated with renovating are not sufficient justifications.
c. New work and changes should be located away from main areas that are intact or highly significant. Cantilevers are to be stepped back from primary elevations and street facades
d. New buildings, structures, landscaping or other works should be located to minimise adverse impacts on the setting of the heritage item.
e. Introducing decorative elements that could reduce the integrity and confuse the period of the building should be avoided, unless documentary or physical evidence exists to show it has been removed.
f. For large projects a staging plan may be required to indicate when secondary or non-heritage works are to be undertaken.
g. Servicing, fire safety or BCA compliance upgrades for a new use should not impact on the heritage e significance of the item.

Removing unsympathetic changes

h. Unsympathetic elements should be removed, especially where substantial changes are proposed to a heritage item and the reversal will assist an improved heritage outcome.

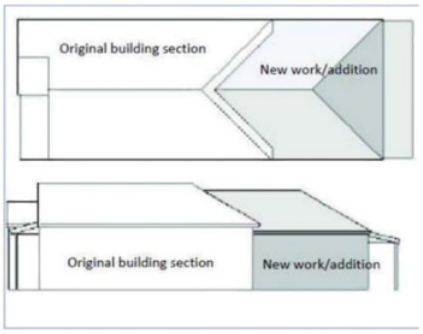

Figure 9.2(b) - Alterations and additions to be smaller in scale and length than the existing building. (i)

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ATTACHMENT 3 - ITEM 4

Form, massing and scale i. New work should be designed to complement the heritage item in terms of scale, proportion, bulk, massing and detail. j. Additions and extensions at the front of heritage items should be avoided. Additions should be located away from the principal elevation and significant features of the heritage item, and behind and below the main roof ridge. k. Alterations and additions should be smaller in scale and length than the existing building. l. Large second storey additions should be avoided. Additions should be located to the rear or side. Depending on the form and style of the building it may be possible to design new levels within the existing roof space or below the gutter line of the main building. m. Extensive blank or unarticulated walls are discouraged. Articulation should be achieved through the use of materials or design elements such as soldier/string courses, windows, fibro/timber inserts or the like. Internal changes n. Changes to the original layout of the building should be minimal so that the evolution of the building remains recognisable. Development should retain significant interior elements. For example, wall nibs, decorative ceilings, picture rails, architraves, feature tiling or features such as fire places should be retained **Materials, colours, finishes** o. Rendering or painting original face brick is not supported. p. Materials should be selected to complement the period and style of the building. Compatible, but not necessarily matching materials i.e. modern materials, may be used where appropriate. Note: The controls for heritage items adopt a "whole of building" approach because heritage significance applies to the whole property, not just the front façade of a building or particular element of a site. The controls are based on the principles of minimising impact on heritage significance, and ensuring that where change occurs, the decision is based on an understanding of heritage significance	**No. 4 and No. 2 High Street, Hornsby** New development: a. Must be designed to provide for an integrated and holistic development outcome across Nos 2 and 4 High Street, Hornsby b. Must retain the heritage listed Hornsby War Memorial Hall including significant external and internal features, existing setbacks, fabric, spaces and layout c. Adopt a high quality and respectful contextual design that is sympathetic to and complements the Hall's significant fabric, form, setback, detail and landscaping d. Should not dominate the Hall or obscure views to it from public domain and not visually dominate or visually disrupt the public appreciation of the Hall

ITEM 5

ATTACHMENT/S

REPORT NO. IM1/23

ITEM 5

1. WESTLEIGH PARK DRAFT MASTER PLAN

2. WESTLEIGH PARK DRAFT PLAN OF MANAGEMENT

3. SEFTON ROAD ENGAGEMENT - ACTION REGISTER - 27-FEB-23

4. WESTLEIGH PARK TRAFFIC IMPACT AND ACCESS STUDY

ATTACHMENT 1 - ITEM 5

Westleigh Park

Draft Master Plan

February 2023

HORNSBY SHIRE COUNCIL

ATTACHMENT 1 - ITEM 5

Contents

Council recognises the Traditional Owners of the lands of Hornsby Shire, the Darug and GuriNgai peoples, and pays respect to their Ancestors and Elders past and present and to their Heritage. We acknowledge and uphold their intrinsic connections and continuing relationships to Country.

1.0 Introduction

In 2016 in response to progressively increasing demands upon existing open space, Hornsby Shire Council Council purchased 36 hectares of land from Sydney Water for the primary purpose of developing additional sports facilities for the district. The demand for sports facilities in the district has been identified through various studies including NSROC Regional Sportsground Strategy Review (2016) and Hornsby Sportsground Strategy (2018).

The proposed new sports facilities seek to assist Council in meeting the evolving needs of the community. The previously cleared and disturbed area of the site is currently zoned R2 Low Density Residential and is proposed to accommodate the new playing fields, amenities and supporting facilities.

Westleigh Park will play a key role in recreational provision for the district including a diverse range of provisions for formal sports, passive recreation (e.g. picnics, walking, playground), mountain biking and ancillary facilities (including internal roads, carparks, amenities buildings, shared paths and water management).

Fundamentally Council has sought to develop an environmentally and culturally sustainable framework for the development of the recreational site that:

- **Protects biodiversity at every stage** - Several vegetation communities are found on the site, some of which are threatened ecological communities. Biodiversity protection principles have been applied throughout the planning process which look to avoid, minimise and mitigate environmental impacts. Residual impacts will be offset and rehabilitated in accordance with relevant policies and guidelines.
- **Minimises adverse impacts to local creeks by applying Water Sensitive Urban Design (WSUD)** Avoid and minimise adverse impact of stormwater on downstream waterways. Apply water sensitive urban design (WSUD) to manage water quality and flows, including stormwater harvesting, conservation and water quality treatment.
- **Supports environmental sustainability** - Environmentally sustainable design features will reduce operational carbon emissions, such as passive solar design, renewable energy and energy efficient hot water and lighting
- **Designs for bushfires** - Planning for Bushfire Protection to embed resilience of the site.
- **Provides active transport** - Pedestrian and cycle paths have been proposed to provide a loop access around the perimeter of the site, entering from Warrigal Drive and the new entry from the south. Paths will also connect to a broader local network of cycle paths and the adjoining mountain bike trails to the east. Bus access with bus bays are also proposed along the perimeter park road to encourage public transport / group access to the park.
- **Connects with Country** - Being guided by the local Aboriginal groups on protection and promotion of the indigenous heritage and culture within the park.

Council undertook community engagement on the draft Master Plan in June 2021 to understand the community's views on the draft proposals, including the sports fields, traffic and parking, community facilities, adjoining mountain bike trails, bushland biodiversity, potential link between Hornsby Park and Westleigh Park, and indigenous history.

Feedback generally conveyed that the draft Master Plan had a good balance of 'active' and 'passive' recreation activities, and a sustainable approach to restoring and protecting the natural environment while addressing recreational needs. Typical concerns raised during the consultation included the management of potential biodiversity impacts of mountain bike use and sport field development, and potential for impacts on traffic and local road systems. The engagement reports have been used to inform this draft of the Master Plan to strengthen positive features while seeking to address community concerns.

The development of the draft Master Plan has involved a multidisciplinary team including specialist inputs in the following areas:

Environmental Partnerships (NSW) Pty Ltd
Master Planning and Landscape Design

Taylor Thompson Whitting (TTW)
Master planning, Civil, Traffic and Transportation Engineering

Civille
Water Management

Bitzios
Traffic Planning

Coffey Partners, Senversa
Contamination Remediation and Environmental Management

Eco Logical Australia
Environmental Assessment

Trailscapes, Dirt Art & Griffith University
Mountain Bike Trail Assessment and Concept Planning

Wannangini Pty Ltd
Aboriginal Cultural Heritage

SJB Planning
Statutory Planning

This report provides a summary of the site conditions and describes in summary form the Draft Master Plan for Westleigh Park.

2.0 Project Objectives

The Draft Master Plan seeks to provide a conceptual framework for ongoing planning on the site. Specifically it seeks to achieve the following:

- To assist in catering for the ongoing demand for sports facilities (including female sports) in the district and in response to NSROC Regional Sportsground Strategy Review (2016) and Hornsby Sportsground Strategy (2018);
- To provide a safe, clean and high quality environment for the community to enjoy a range of activities through the remediation of past contamination on the site;
- To embed environmental sustainability throughout the project including :
  - i. Avoid, minimise and mitigate environmental impacts.
  - ii. Improve and manage the natural environment in particular threatened ecological communities and species.
  - iii. Provide water management that minimises adverse flow or water quality impacts to the local creek system and to Council's existing stormwater system.
  - iv. Employ Water Sensitive Urban Design (WSUD).
  - v. Reduce operational carbon emissions, through passive solar design, renewable energy and energy efficient features in all facilities.
  - vi. Integrate planning for bushfire protection.
  - vii. Support active and public transport to and within the site.
- To Connect with Country and Design with Country in consultation with local Aboriginal peoples.

ATTACHMENT 1 - ITEM 5

ATTACHMENT 1 - ITEM 5

3.0 Site Description

Westleigh Park (refer Figure 3.1) is located at 62 Quarter Sessions Road, Westleigh on Lot 101 DP 1217395. The land is owned by Hornsby Shire Council and is currently zoned (R2) Low Density Residential and Environmental Management (E3) in the Hornsby Local Environmental Plan (LEP) 2013, with adjoining lands zoned as (R2) Low Density Residential or (RE1) Public Recreation. The Dog Pound Creek land, located to the north of the Westleigh Park site, is owned by Hornsby Council and is mostly bushland zoned (RE1) Public Recreation. The Dog Pound Creek BioBanking area cannot be used or impacted upon.

The study area is approximately 46 hectares (with about 36 Ha. in Westleigh Park and around 10 Ha. in the adjoining Dog Pound Creek bushland). In Westleigh Park around 10 hectares is currently cleared land with the remainder being bushland (referred to as 'Westleigh Park Bushland').

The Westleigh Park land was formerly owned by Sydney Water and adjoins the Sydney Water Thornleigh Reservoir to the south and is bordered by bushland to the north. Quarter Sessions Road runs along the western frontage of the park with some adjoining residential properties backing on to the site from Kooringal Avenue to the east.

Areas of bushland within the site are mapped as 'endangered' and 'critically endangered' as well as threatened species being present. These areas need to be retained and impacts are to be avoided, minimised or mitigated through the project.

3.1 Aboriginal Heritage

As identified in the Due Diligence Assessment Report for the Westleigh Park complex, prepared in 2019 by GuriNgai Tribal Link Aboriginal Corporation, "the study area for Westleigh Park, has been for generations and still is, home to the GuriNgai & Darug Mobs (Wannangini)." In addition, the area was seasonally occupied in various locations by the Darginyung peoples. The connections to this area for each of these groups includes pre and post European colonisation.

An Aboriginal Cultural Heritage Assessment (ACHAR) was undertaken for the site in 2020 which identified the following Statement of Aboriginal Cultural Significance:

"The land containing the project area embodies the collective and contemporary Aboriginal social values of loss, remembrance and resilience. From a traditional viewpoint, the land represents an important meeting place along a well-travelled path and therefore embodies the shared values of family, community and social cohesion. Looking forward, this land still retains the potential to educate and celebrate a unique connection to Country by promoting a shared understanding of the area's cultural values."

In addition the ACHAR refers to the existing dead Scarred Tree on site which is recommended to be relocated to a safe location for conservation and interpretation on the site (an indicative location is shown on the maps in this draft Master Plan), as well as other aspects of cultural heritage importance in the local area which are to be conserved and protected.

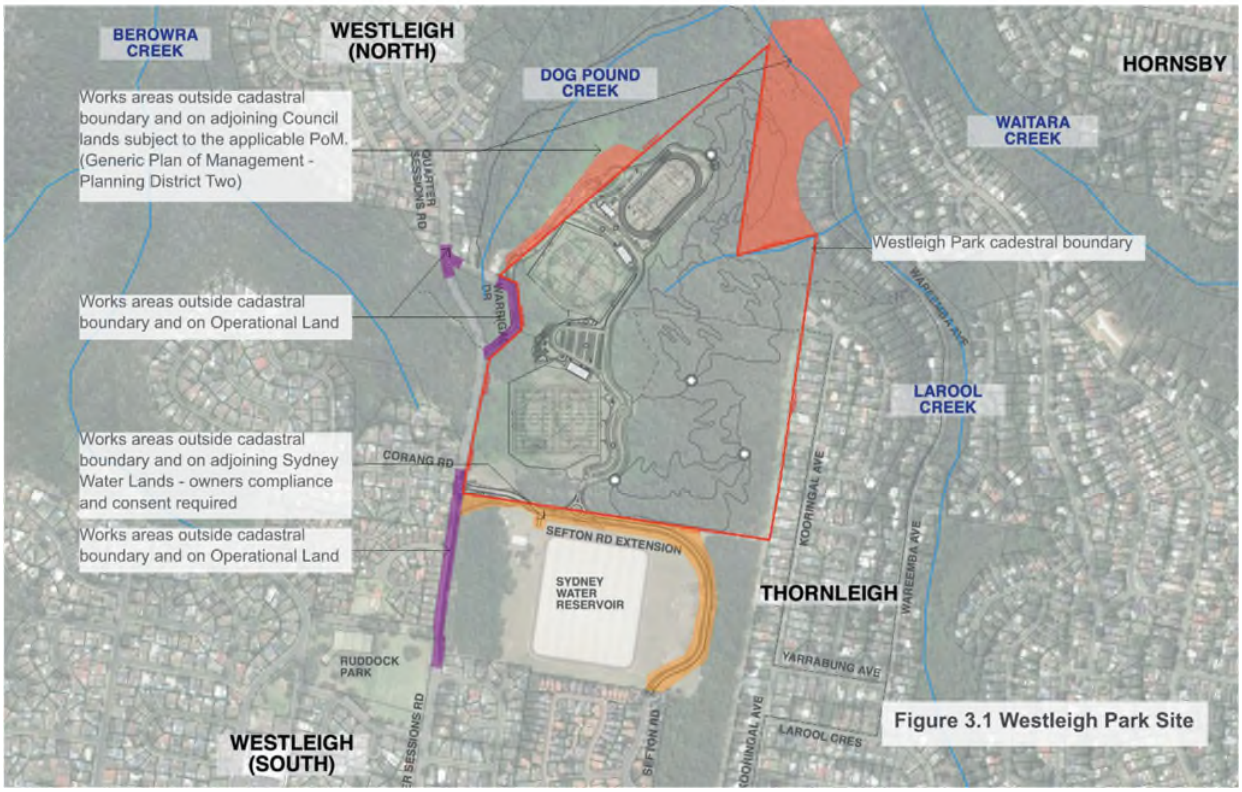

Figure 3.1 Westleigh Park Site

Image Source: visitnewcastle.com.au

Centennial Park - multi purpose parklands.
Image Source: Greater Sydney Parklands

Centennial Park - multi purpose parklands.
Image Source: Sydney.com

Centennial Park - multi purpose parklands.
Image Source: Centennial Parklands Sports Centre

Centennial Park - multi purpose parklands.
Image Source: centennialparklands.com.au

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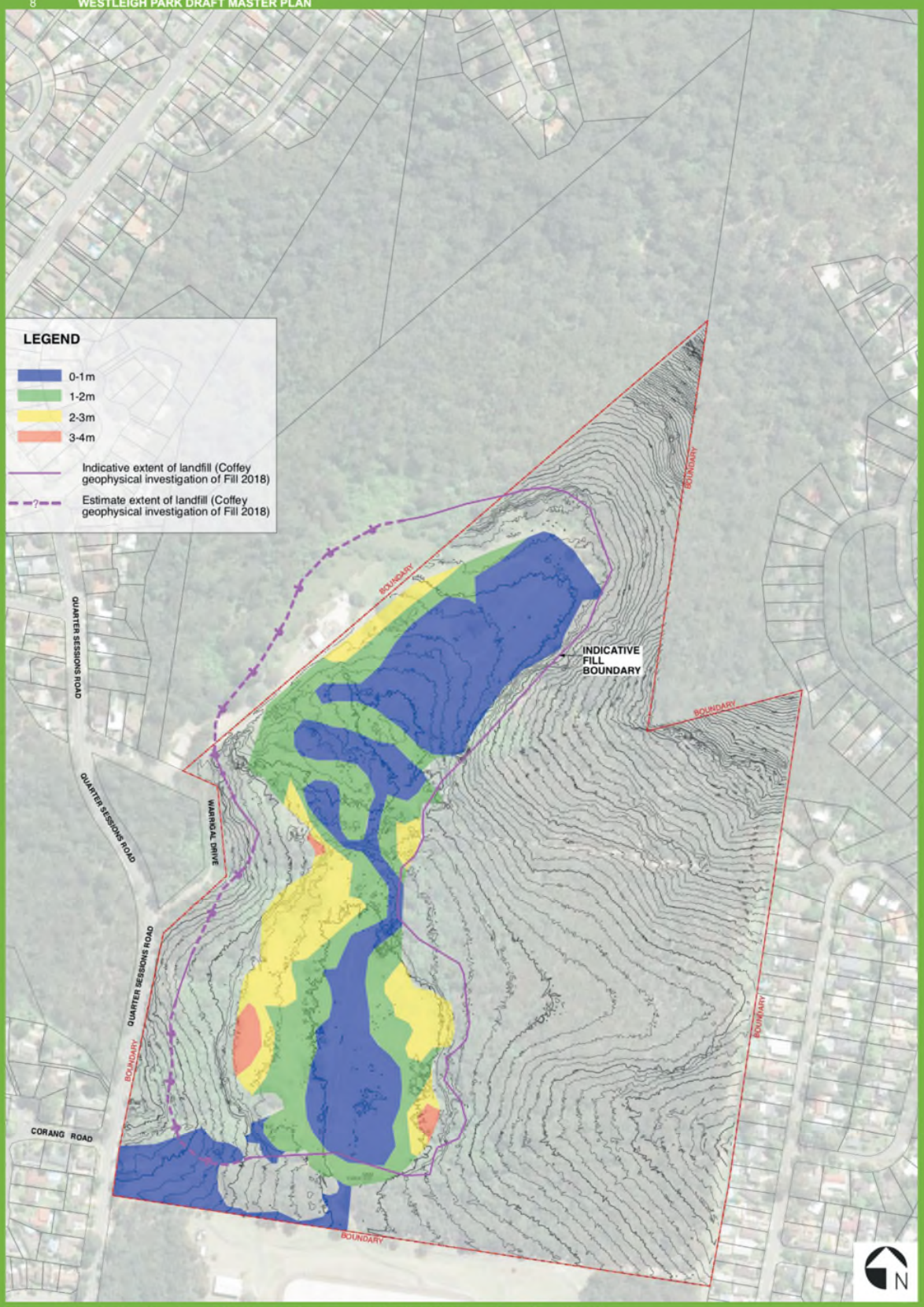


Figure 3.2 - Indicative Landfill Depth (source: SJB & J 2014 and Coffey 2018)

3.2 Current Site Conditions and Use

The cleared area on the site is predominately tufted grasses and un-maintained exotic grass with significant weed encroachment. Several worn tracks traverse the cleared area. The Westleigh Park Bushland contains areas of mapped Threatened Ecological Communities and includes an extensive network of unsanctioned mountain bike trails.

The site is currently informally used for casual recreation such as dog walking and access for established but un-unsanctioned mountain bike trails through the bushland areas. A former Rural Fire Services (RFS) building is located along the north edge of the cleared lands.

The adjacent Dog Pound Creek site is mostly bushland with some fire trails and areas of weed growth. The majority of Dog Pound Creek site is managed under a BioBanking agreement and cannot be impacted by the proposals or any other uses.

Westleigh Park, including the bushland area, contain areas of contamination (asbestos, PFAS and others) on the surface and within the site fill. Much of this material is considered solid waste including landfill materials from construction and demolition sites.

PFAS (Perfluoroalkyl and Polyfluoroalkyl Substances) are manufactured chemicals formerly used in products such as fire fighting foams which do not degrade over time and may be harmful to humans and fauna. A detailed PFAS contamination assessment has been undertaken and the NSW Government has undertaken to provide remediation of all PFAS affected areas. At time of writing monitoring is ongoing. The initial recommendation was at least 6 months between sampling events. As no seasonal change was noted in the sampling results, Senversa recommended 12 months between sampling events to provide an opportunity to analyse results over a longer period in order to identify any trends/changes. The Environmental Protection Authority (EPA) has had oversight of this matter.

Topography

The site lies at approximately 171-186m Australian Height Datum (AHD) on an approximately north trending ridgeline. Land slopes away from the centre of the site to the east and west, while the northern areas slope to the northwest, north and northeast towards gullies. Falls across the existing landform range between 1:20–1:30 which is significantly steeper than a playing field platform (generally 1:100).

Drainage

Surface runoff generally falls to the east and west, away from the ridgeline and into the surrounding bushland areas through natural drainage lines and as infiltration. In major storm events, runoff travels via overland flow paths to nearby watercourses. (*Civil Stormwater Report by TTW*)

Geology

Most of the site is assumed to be underlain by Ashfield Shale along the top of the central ridgeline, with the northwest and northeast areas underlain by Hawkesbury Sandstone.

A borrow pit (small quarry) in the north of the site was used as a source of rock during construction of the Thornleigh Reservoir south of the site. Approximately 23,700 m3 was obtained from this excavation. Based on an approximate area of 11,690 m2 the indicative depth of the borrow pit has been estimated to be 2m. (*Sydney Water)*

This suggested that the depth of fill/soil overlying bedrock may vary from up to approximately 3m below ground level near the southern site boundary, to less than 1m below ground level towards the northern site boundary.

Landfill

Between 40–50% of the cleared portion of the site has a landfill depth of one metre or lower with up to 2–4m depth in zones along the south western and eastern boundaries (refer Figure 3.2).

Vegetation

Several vegetation communities exist on the site, including Sydney Turpentine Ironbark Forest (STIF), listed as Critically Endangered under the Commonwealth Environment Protection (EPBC) Act and Biodiversity Conservation Act 2016 - BC Act (NSW) and Duffys Forest, listed as an Endangered Ecological Community under the BC Act. Vegetation community mapping is reflected in Figure 3.3.

Over 240 plant species, including eleven species of Orchids, have also been recorded on-site. In addition surveys indicate that Darwinia biflora (Threatened Flora - under the EPBC Act (Commonwealth)) and Tetratheca glandulosa (BC Act) were observed on-site.

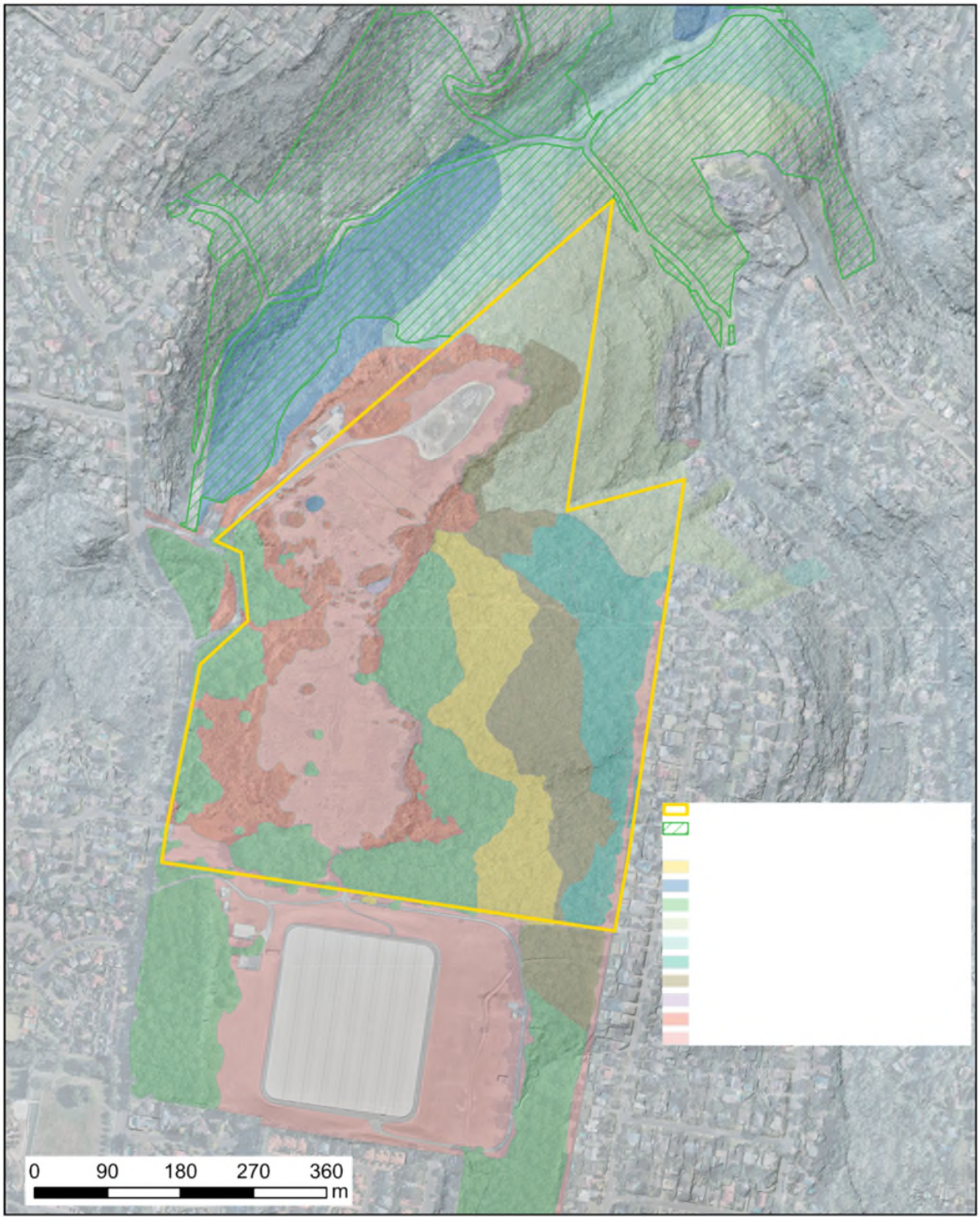
There are unsanctioned mountain bike trails that pass through the above areas as indicated on Figure 3.4.

Fauna

Habitat assessments undertaken in 2016 by Council have been supplemented by work undertaken by Eco Logical Australia from 2021 to 2023. The vegetation survey indicated the site exhibits high diversity in birds species, with 50 species observed including the threatened Square-tailed Kite and summer migrants the Sacred Kingfisher, Eastern Koel, Channel-billed Cuckoo and Dollarbird. Both Barking and Powerful Owls were heard, but no roosting or nesting observed on the site.

There were a few reptile species, and indications of mammals (scats and tracks, burrows and feeding scars) present. Red Crown Toadlets were also observed in a couple of locations.

A full species list of flora and fauna observed on the site will be included in subsequent development application documentation.



HORNSBY	**20230220_Westleigh Vegetation Communities**	**Map Scale: 1:6,000 at A4 Portrait**
Hornsby Shire Council 296 Peats Ferry Road HORNSBY NSW 2077 Telephone: 02 9847 6666 Email: hsc@Hornsby.nsw.gov.au	*Important Notice!* Dimensions, location of features and boundaries are indicative only, their actual position has not been surveyed. Aerial photography may not align with cadastral boundaries. Hornsby Shire Council accepts no responsibility for any incident arising from any inaccuracy. Copyright © Hornsby Shire Council 2019. © The State of New South Wales; Aerial imagery: © NSW Department of Finance, Services and Innovation 2016	**Projection:** GDA94 / MGA zone 56 **Date:** 20/02/2023

Figure 3.3 - Westleigh Vegetation Communities (Source: Eco Logical Australia 2023)

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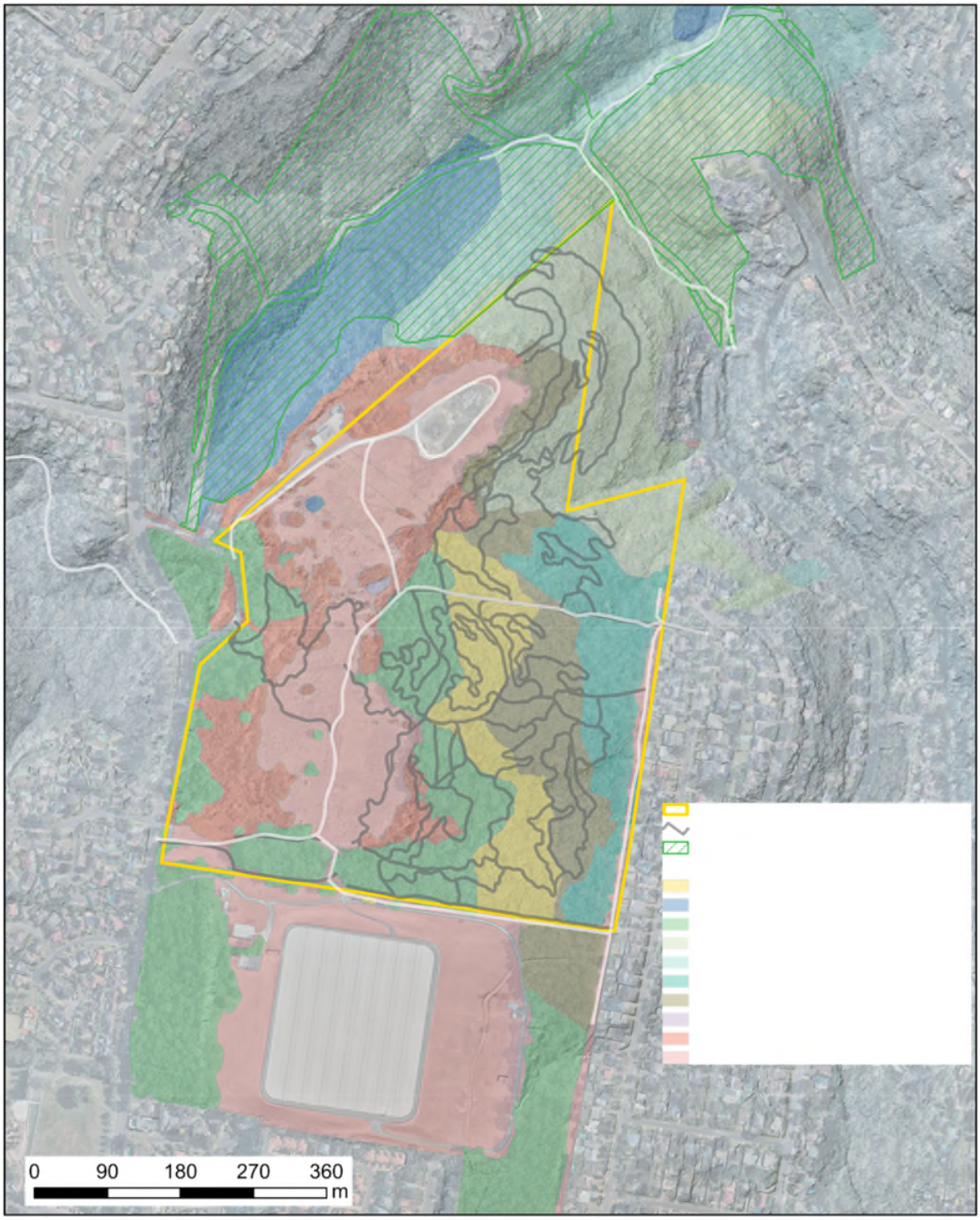

HORNSBY	**Westleigh Existing Unsanctioned Tracks**	**Map Scale: 1:6,000 at A4 Portrait**
Hornsby Shire Council 296 Peats Ferry Road HORNSBY NSW 2077 Telephone: 02 9847 6666 Email: hsc@Hornsby.nsw.gov.au	*Important Notice!* Dimensions, location of features and boundaries are indicative only, their actual position has not been surveyed. Aerial photography may not align with cadastral boundaries. Hornsby Shire Council accepts no responsibility for any incident arising from any inaccuracy. 	**Projection:** GDA94 / MGA zone 56 **Date:** 20/02/2023

Figure 3.4 - Westleigh Park Unsanctioned mountain bike trail network (Source: Hornsby Shire Council 2018)

Image Source: The Springfield Anglican College

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4.0 Draft Master Plan

The Draft Master Plan illustrates the development of the park's recreational and supporting facilities to address district recreational needs. The plan integrates the sensitive planning of uses and facilities to conserve important bushland and habitat, and to facilitate remediation of the site in an appropriate manner.

Key aspects of the draft Master Plan are outlined in the following summary and illustrated on the Draft Master Plan diagrams provided in Figures 4.1 to 4.8 .

4.1 Recreation

Provisions for recreation within the site are illustrated on Figures 4.1 to 4.3

4.1.1 Active recreation

The draft Master Plan proposes three sports facility platforms that have been sited to integrate within the constraints of existing bushland vegetation and provision of road access.

From south to north, the field platforms step down the site executing a level change of around 8m overall. Each of the platforms is served by off street parking areas which have direct accessible connections to field and associated amenities/ facilities. The field platforms are also connected by the shared pedestrian cycle path network and supplementary pedestrian path network.

Precinct 1 Athletics track and support facilities

The north platform, in the narrowest section of the cleared lands, can support a senior competition athletics track and internal field area (which could be used as a fifth football field if not being used for athletics).

The area can accommodate a line marked grass track or alternatively be developed as an all-weather athletics facility. The internal field areas are proposed to accommodate other field events e.g. shot put, long jump, high jump, discus etc.

Precinct 2 central multi-purpose sportsfield platform

The central multipurpose field platform sits above adjoining levels to the west and is flanked by retaining walls of varying heights along with discrete ball fencing to retain balls within the fields. To the east, the platform is recessed into the landform. This central facility could accommodate a synthetic surface or alternatively be developed as a natural sports turf surface.

The available space in this zone will limit field sizes to dimensions between minimum and maximum sizes for senior competition.

Precinct 3 southern multi-purpose natural turf sports-field platform – full senior size

The southern field platform provides the widest area working within the zone defined by adjoining bushland. The draft Master Plan illustrates a multipurpose playing field platform accommodating two (2) full competition size football fields, or two (2) full-size Rugby fields, or a full-size AFL field, with a full-size cricket field during summer.

The field platform sits above adjoining levels and is flanked by retaining walls of varying heights to the west, Black coloured perimeter fencing again prevents balls leaving the fields and entering the bushland area.

4.1.2 Multipurpose park amenities buildings

Each of the field platforms is served by an amenities building at the same level as the field. The amenities buildings are accessed off the main carparks or the internal road network and path network.

All the amenities buildings will be designed to reduce operational carbon emissions, conserve potable water and harvest rain water.

4.1.3 Informal Recreation

Grassed viewing areas

Along the edge of each sport field, shaded grassed sections provide warm up areas and spectator viewing.

Open grassed informal games and picnic parkland

An open grassed space with seating and shelter, located to the north of precinct 3, provides for both local use and complements the sports uses of the fields. This area also provides a buffer zone for the playground from the carpark.

Play Space

Between the southern and central field platforms is a passive recreational area that includes a play space area that is integrated into the level changes in this area, with the surrounding bushland as backdrop. The play space could provide a local play facility in accordance with Council's Play Plan 2019.

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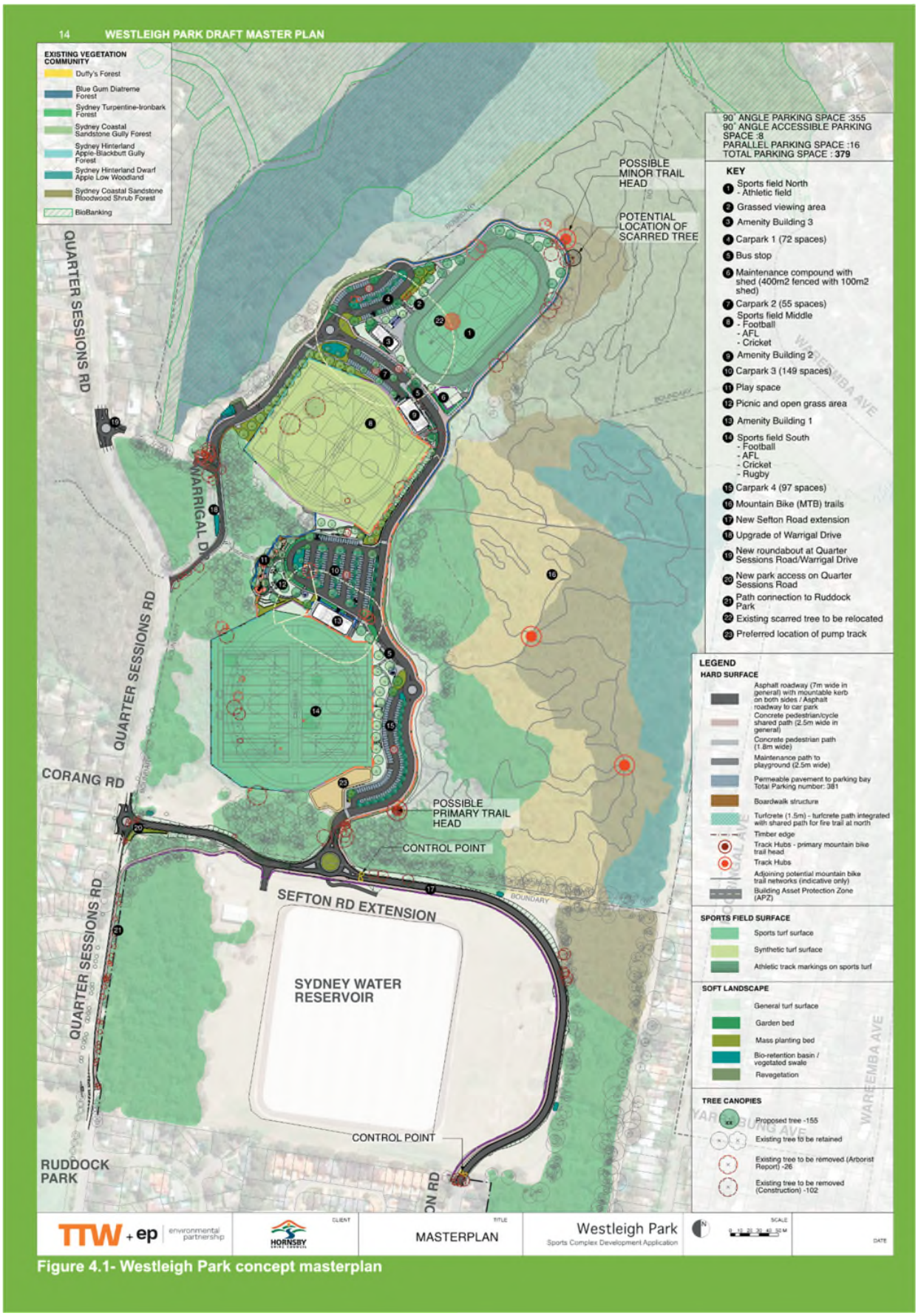

Figure 4.1- Westleigh Park concept masterplan

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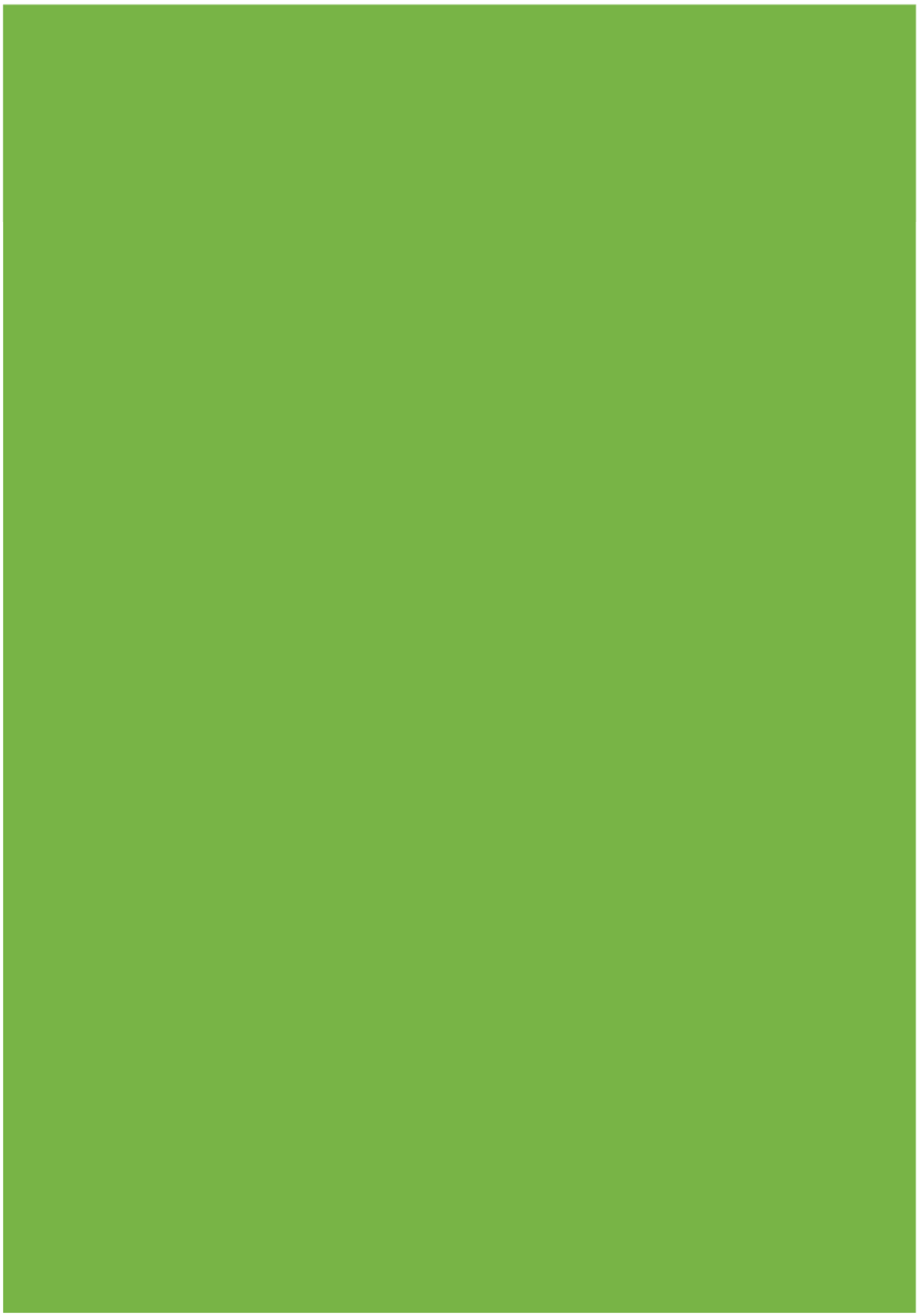
Figure 4.2 - Westleigh Park concept masterplan - activity precincts



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Mountain Bike Trails

Vegetation and biodiversity surveys of the bushland at Westleigh Park have identified several threatened ecological communities and threatened species. In many cases the existing unsanctioned mountain bike trails pass through these areas. Council has expressed a desire to provide for a wide range of recreational opportunities at Westleigh Park and recognises, while currently unsanctioned at this site, mountain biking remains popular with the community.

Council undertook community engagement in mid-June 2021 as part of the previous draft Master Plan exhibition to understand community perspectives on mountain biking at the site. Significant concern was raised by the community relating to the balance between recreational needs and environmental protection.

In response to the community's concerns, Council undertook a targeted engagement process in mid-2022. This included members of the mountain biking community, community environmental representatives and local residents. This co-design process aimed to provide opportunities for all groups with an interest in the issue to contribute. Due to divergence views a consensus on an acceptable trail network at the site was not able to be achieved. Rather, the co-design participants respectfully chose to present two options to Council for consideration.

Council gave consideration to both options and worked closely with both a trail designer and ecological consultant (Dirt Art and Eco Logical Australia, respectively) to inform the development of a trail concept plan (refer to figure 4.3). This concept plan evolved over several iterations and was informed by stakeholder feedback, best practice design principles and on-site investigations, including:

- Vegetation community validation
- Flora and fauna surveys
- Desire to maintain a focus on easy to immediate trails
- Avoidance and reduction of tracks in areas of high value biodiversity
- Creation of additional trails in less sensitive areas
- Recycling and upgrading existing tracks to avoid creating new impacts
- Establishment of a primary track head, including wayfinding and auxiliary facilities (e.g., wash bays)
- Creation of zones and hubs to improve rider experience and environmental sustainability
- Ground truthing to ensure constructability

The draft Master Plan also identifies potential connections between Westleigh Park and Hornsby Park. These links will offer another experience to visitors of either park, with them able to be enjoyed by those moving through the Shire on foot or bike.

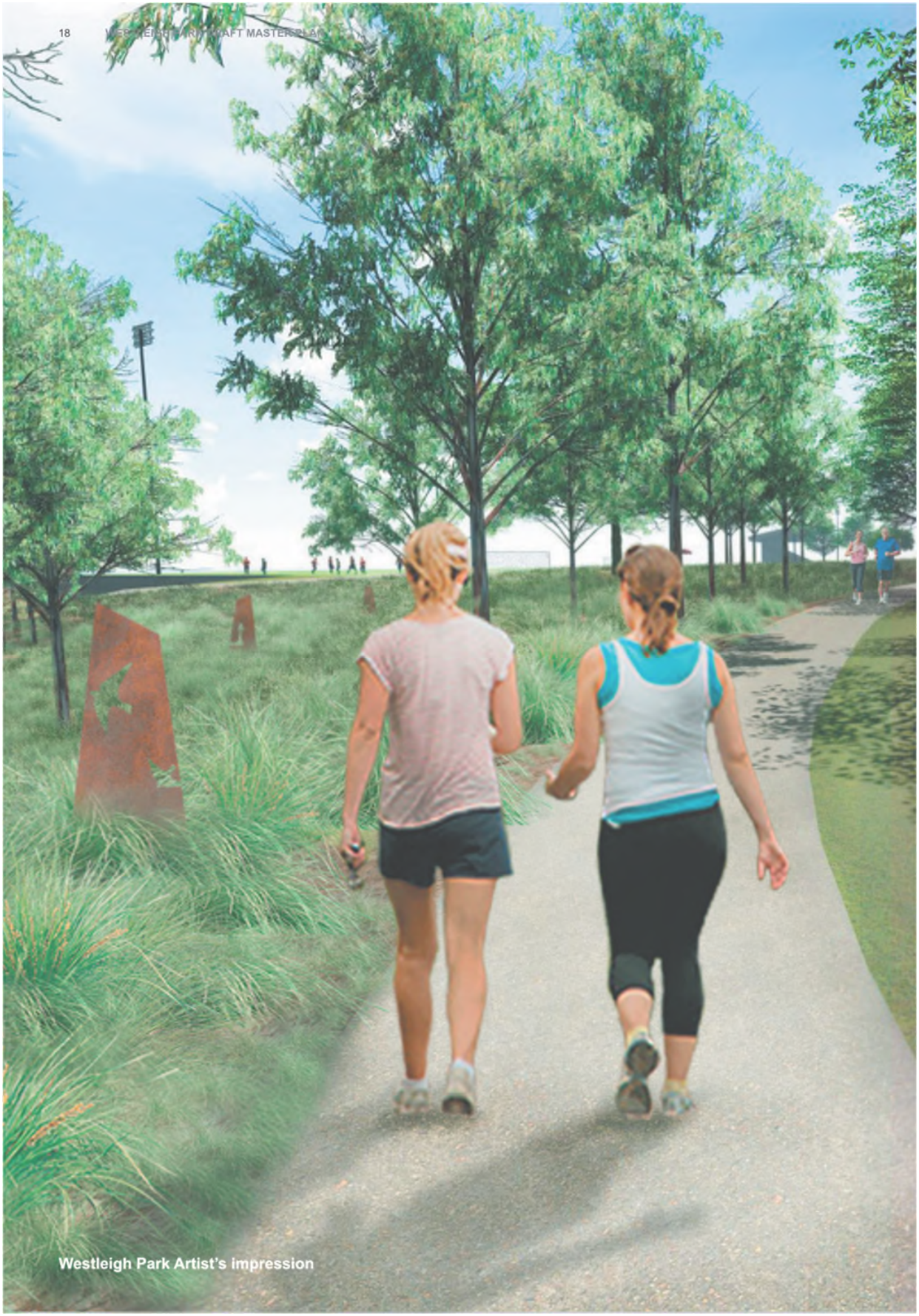
Cycle Pump Track

A cycle pump track is proposed at the south-eastern corner of the southern sportsfield platform, approximately opposite the primary mountain bike track head, and adjoining the southern carpark.

The pump track is proposed to include a beginner track and an intermediate/advanced track to cater for users of different ages and abilities, and complement other facilities on the site.

Image Source: Trailscape

Image Source: Ku-ring-gai Council



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4.2 Access

4.2.1 Pedestrian and cycle access

Shared pedestrian and cycle path

The pedestrian and cycle access network to and within the site is illustrated on Figure 4.4.

Pedestrian access into the park is focused on a 2.5–3m shared recreational and maintenance path network which enters the site from Warrigal Drive and the proposed new entry from the south. This will provide loop access around the perimeter of the facilities in addition to providing supplementary maintenance access. The shared path will be supplemented by pedestrian paths in the centre of the site which connect parking areas to facilities and provide access through the central parkland area between the southern and central fields. The shared path will connect to a broader local network of cycle paths via both on road and off-road links. The adjoining mountain bike trails and bush walking tracks being considered will also be connected to track and trail networks beyond the site.

Access points to adjoining mountain bike (MTB) trail network

The proposed MTB trail network would be accessed through Westleigh Park where riders can use parking and other facilities, or cycle to the site and access the MTB trail entry points via shared paths or the internal road network. The primary access point (trail head) is proposed at the south-eastern edge of the park reached via the shared path or perimeter road. Other access/exit points are also been considered from the shared path to the north of the site. Access and exit is also being considered to Wareemba Avenue and the Dog Pound Creek fire/ maintenance trail.

4.2.2 Vehicular access and parking

The vehicular access and parking within and to the site is illustrated on Figures 4.5.

New roundabout at Warrigal Road north

This intersection is proposed to be converted into a roundabout to improve traffic flow and to better manage traffic volumes. The central island will be mountable to allow for bus movements. Consideration was also given to the requirement for firetrucks to access the Westleigh Rural Fire Brigade facility.

Associated kerb adjustments, median islands, line marking and signage would also form part of the works.

The intersection of Warrigal Drive south is proposed to be converted into a one-way exit with left turn movements permitted out onto Quarter Sessions Road. Signage and line-marking is proposed to provide clear priority to Quarter Sessions Road traffic movements.

New road access from Quarter Sessions Road

A new vehicular access point is proposed from Quarter Sessions Road located between the southern boundary of the site, and the Sydney Water facilities. This access point was chosen to avoid sight-line issues of the option near Corang Road, and to minimise impact to the existing significant vegetation community (STIF). This access will be shared with Sydney Water to access their operational site to the south, rather than creating a duplicate access point off Quarter Sessions Road.

Future road access to Sefton Road subject to ongoing discussions with Sydney Water

The proposed new Sefton Road access connection would require road works to continue from Sefton Road through the Sydney Water site and into the Park. This link seeks to enable more effective spreading of traffic loads on (for example) weekend game days. Traffic modelling has confirmed that this link could operate for specific controlled use when only one sporting platform is operational and is not required to provide day to day through access.

The extension of Sefton Road coupled with the new road access from Quarter Sessions Road would also provide an alternate access for the Westleigh community in the event of an emergency (such as bushfire).

To avoid potential impacts on the existing Sydney Water reservoir's infrastructure and address the safety and security matters to the existing assets, the new extension is proposed to be generally on or slightly above existing grade, minimising fill embankments but avoiding any disturbance of Sydney Water dam walling. The corridor would be provided with security fencing to limit public access to the Sydney Water site.

The proposal is subject to ongoing discussions with Sydney Water.

Parking areas

It is proposed to provide off street parking to service the sports facilities within the Westleigh Park site. The draft Master Plan aims to provide 379 car parking spaces. These are distributed between the main field platforms and have been predominantly provided as off-road parking areas with some additional parallel spaces between the central fields and northern athletics field. Each parking area includes a number of accessible parking spaces.

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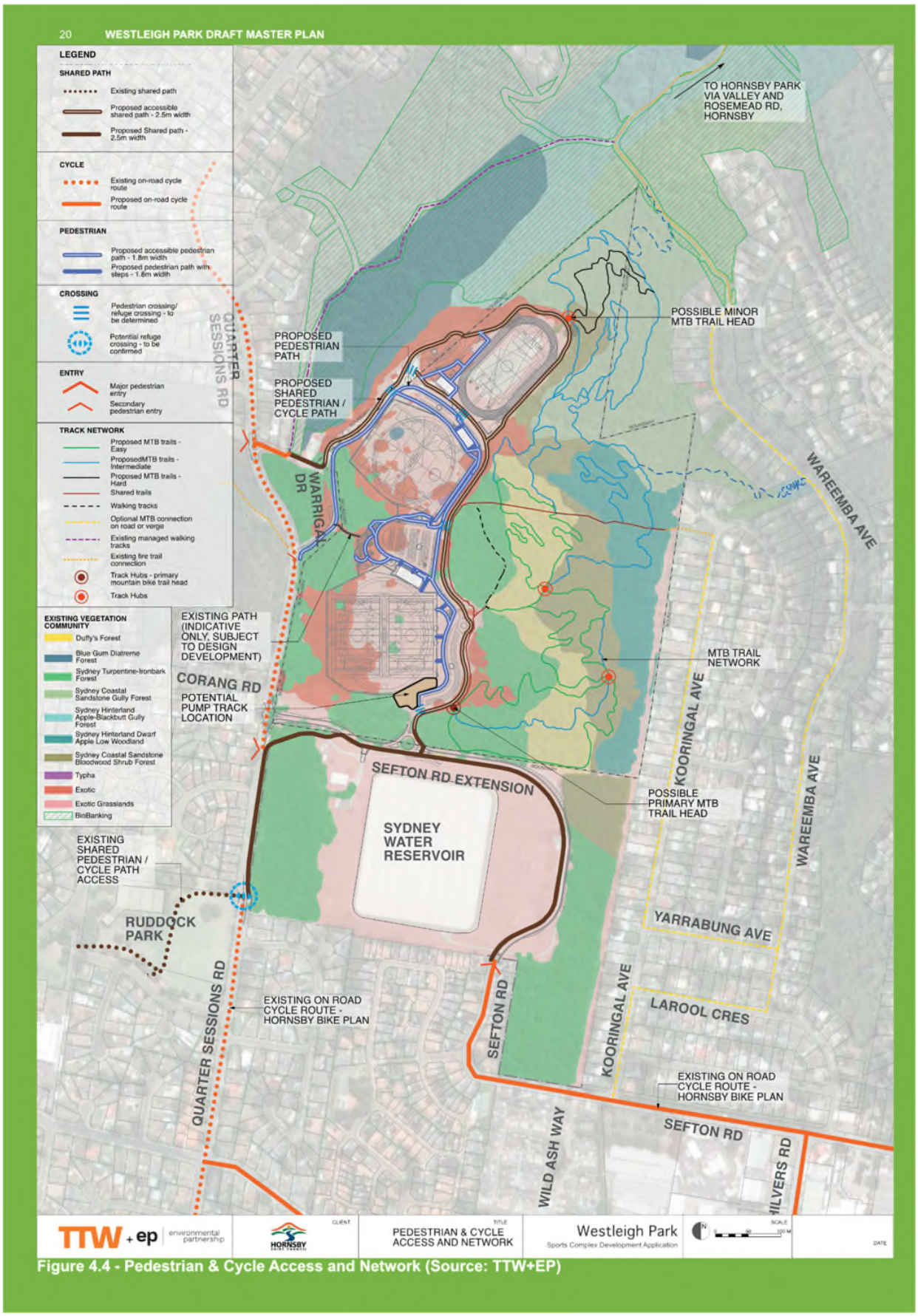


Figure 4.4 - Pedestrian & Cycle Access and Network (Source: TTW+EP)

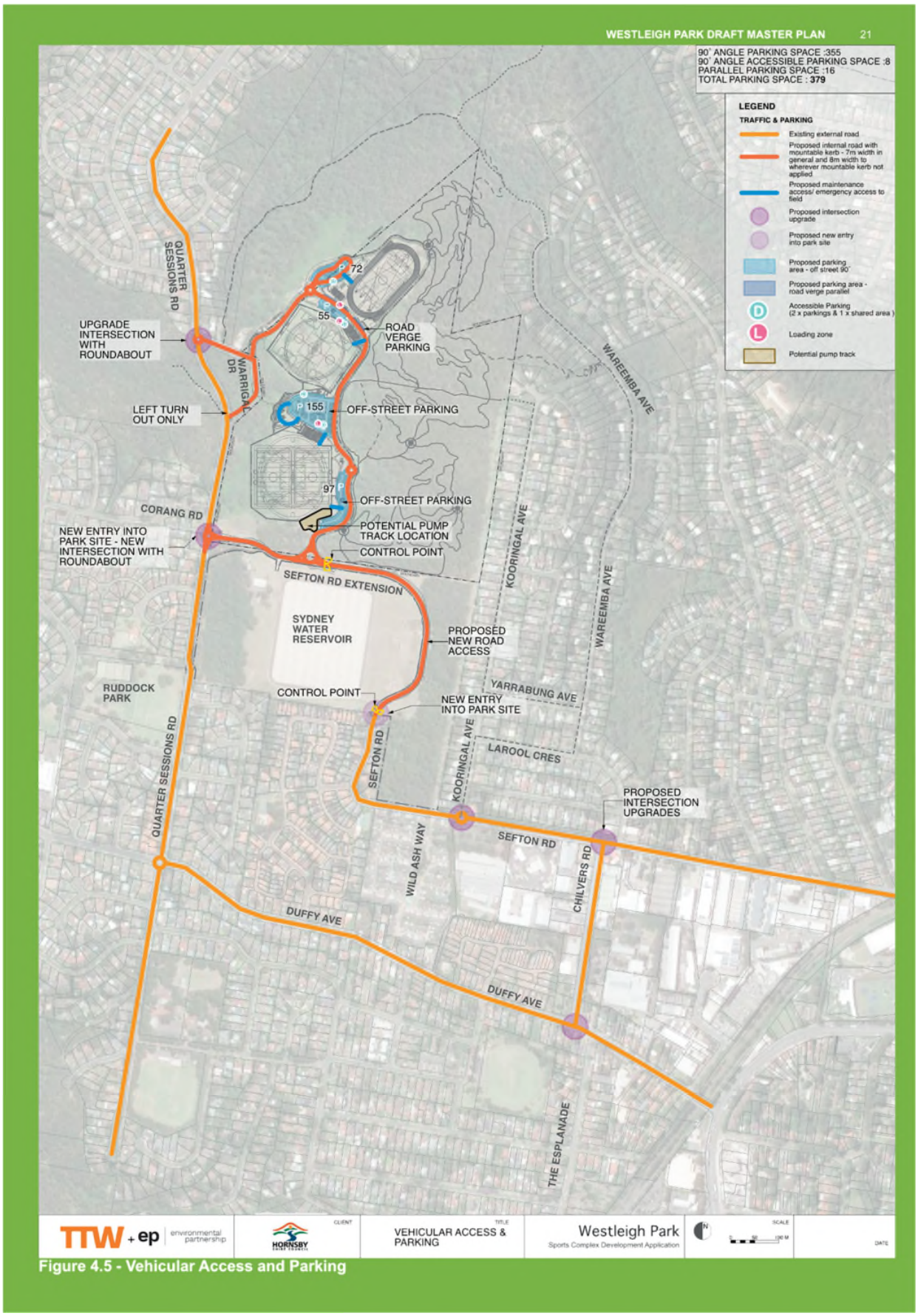
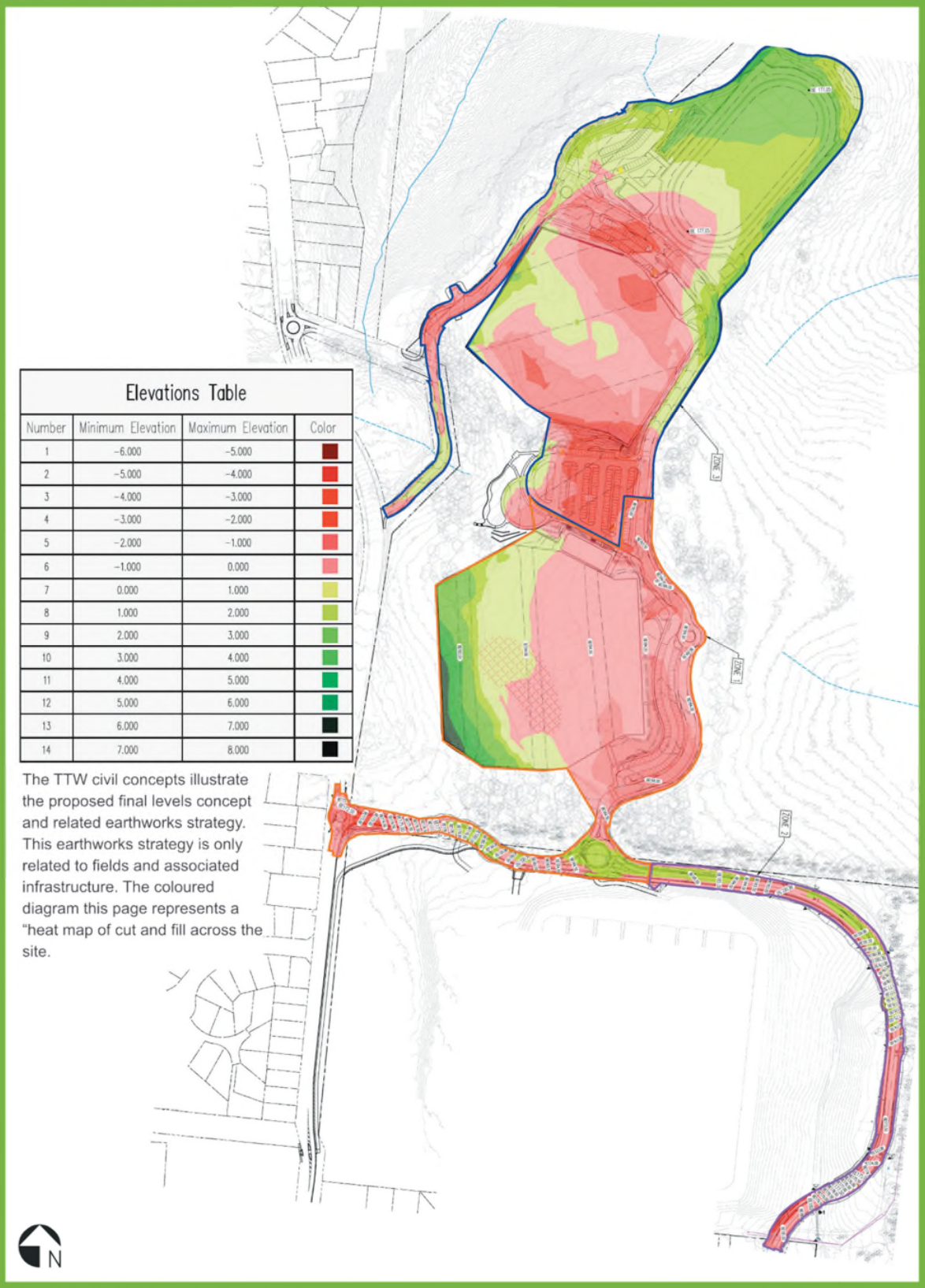


Figure 4.5 - Vehicular Access and Parking



Elevations Table			
Number	Minimum Elevation	Maximum Elevation	Color
1	-6.000	-5.000	
2	-5.000	-4.000	
3	-4.000	-3.000	
4	-3.000	-2.000	
5	-2.000	-1.000	
6	-1.000	0.000	
7	0.000	1.000	
8	1.000	2.000	
9	2.000	3.000	
10	3.000	4.000	
11	4.000	5.000	
12	5.000	6.000	
13	6.000	7.000	
14	7.000	8.000	

The TTW civil concepts illustrate the proposed final levels concept and related earthworks strategy. This earthworks strategy is only related to fields and associated infrastructure. The coloured diagram this page represents a "heat map of cut and fill across the site.

Figure 4.6 - Cut & Fill (Source: TTW)

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Traffic assessment

To address community concerns raised during the initial concept Master Plan exhibition and to consider the influences of the NorthConnex project on the traffic volumes and patterns to the study area, Council engaged Bitzios Consulting. In 2022 Bitzios carried out traffic modeling to inform road and intersection upgrade requirements, assess the impact of the proposed Sefton Road extension and review active and public transport facilities and potential improvements.

This assessment concluded that the proposed Sefton Road extension would be required at some stage to address the potential impacts on the adjoining neighbourhood traffic flows.

In addition, Bitzios suggested a through access between Quarter Sessions Rd and Sefton Road would provide a supporting emergency egress route for the community.

4.3 Approach to landfill management

Cleared & Weedy Areas

A cap and contain approach is proposed to isolate the mixture of contamination in the existing fill material on site. This includes excavation of landfill and relocation for capping elsewhere on site.

A Remedial Action Plan has been developed to guide and monitor the site remediation.

Environmentally sensitive bushland areas

In the environmentally sensitive bushland areas adjoining the cleared zone of the site a combination of strategies is to be employed including:

i. localised removal of dumped waste and asbestos;

ii. localised isolation of asbestos exposure in accessible areas, accompanied with administrative controls

iii. implementing a long term Environmental Management Plan (EMP), to reduce potential impacts of contamination remediation on the environmentally sensitive areas. This may include fencing to preclude entry to areas of possible contamination and signage to identify permissible activities.

Earthworks

Although the site appears quite level to undulating, most of the land currently falls at a gradient of between 1:20–1:30. The draft Master Plan proposes the sports field platforms grading at the required sports profiles of 1:100.

The field platforms will be cut into existing fill and natural ground in places, (in particular to south east) (refer Figure 4.6), but due to the required level sports profiles, the edges of the platforms to the west and north will generally have a deeper profile of fill material and will need to be retained (see Figure 4.7 below)

Around 40% of the cleared portion of the existing site is covered in landfill to a depth of less than a metre. It is proposed to excavate down to natural ground to reach virgin excavated natural material (VENM) and relocate the excavated material to "containment cells" within the major fill zones required to establish the field levels.

Site won material will be used where possible as capping material to these containment cells and as fill material to the major fill zones on the site.

Some additional capping material may be needed if site won material doesn't meet required materials specifications for capping use.

The final levels have been calibrated to account for a generally balanced cut and fill exercise, focusing the requirement for imported material on landscape and related construction materials (e.g. road pavement materials) to build up surface profiles.

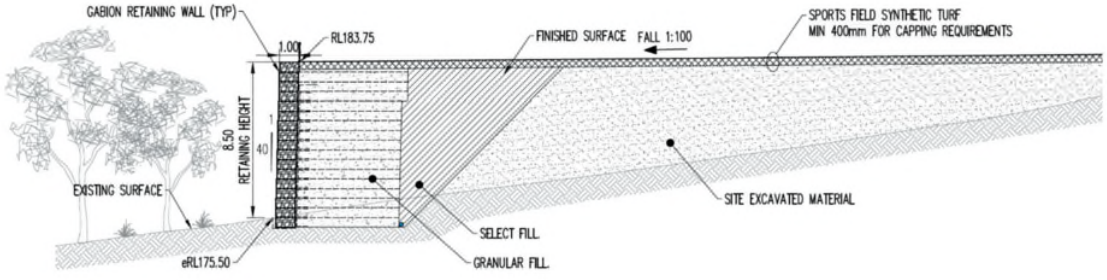
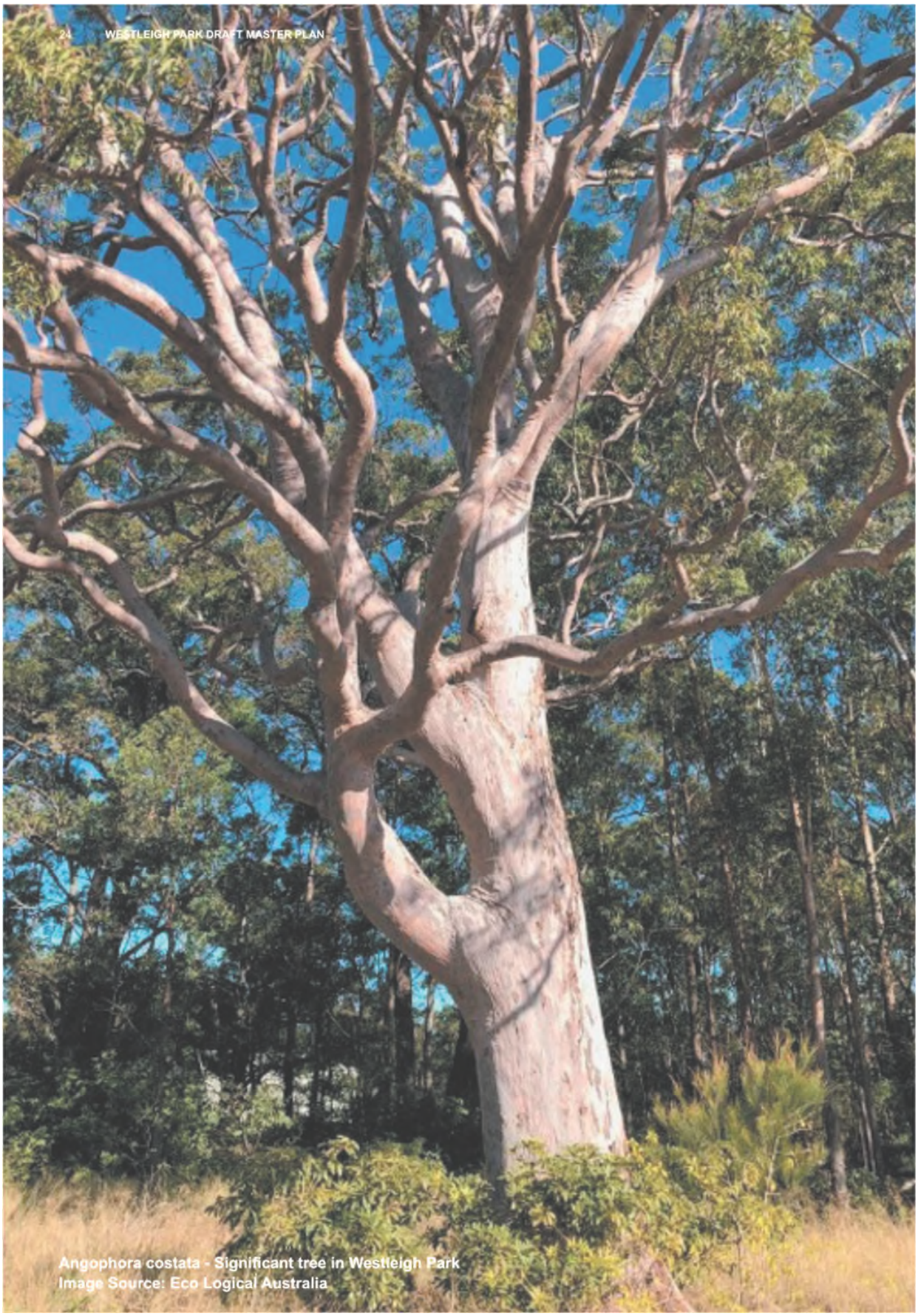


Figure 4.7 Section through Western edge of Southern field platform (Source: TTW)



Angophora costata - Significant tree in Westleigh Park
Image Source: Eco Logical Australia

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4.4 Environmental Sustainability

Biodiversity protection

Conservation of the bushland and biodiversity values of the site have been a major factor in development of the draft Master Plan.

The proposed development has predominantly been confined to existing cleared areas and has been subject to ongoing refinement through detailed ground survey and ecological assessment.

Biodiversity and arboricultural assessments are ongoing, seeking to inform the refinement of the draft Master Plan proposals. The assessment and refinement process is guided by the biodiversity conservation principles of 'avoid, minimise and mitigate' to produce a sustainable footprint and reduce likely ecological impacts of the proposal.

Any localised residual impacts will be offset in accordance with relevant offset policies and schemes. Restoration of current 'weedy' areas, along with the rehabilitation of poor quality bushland and protection of good quality bushland will be integral to ongoing, future site management.

Stormwater management & WSUD

A further key consideration for development of a recreational parkland on the site is avoiding and minimising adverse impacts on the local creek system. This includes alteration of existing flow regimes, in addition to the quality of water entering these waterways from the site.

Existing catchments and the drainage lines to which they drain have been analysed, and the drainage proposal seeks to maintain sustainable flows and volumes to each of the existing catchment.

An integrated water management approach will guide the design process. This will involve treatment of runoff from roads and carparks in a combination of on-site bioremediation beds and wetlands, as well as capture, storage and reuse of stormwater to minimise erosive impacts downstream and to provide an alternative (to potable) water supply for irrigation and other uses.

Sustainable design

Environmentally sustainable design elements will reduce operational carbon emissions, provide resilience to the effects of climate change, reduce potable water use and improve waste management.

The key sustainable design elements in the proposed development include bicycle racks to encourage active transport, electric vehicle charging, rooftop solar system, solar hot water, LED lighting and motion sensors, minimising light pollution, high water efficiency rating for fixtures, waste management plan, rainwater tanks and passive solar design of the amenities architecture.

Bushfire management

A Bushfire Opportunities and Constraints Assessment has prepared to inform the design for bushfire protection and management. Key requirements include:

- Asset protection zone (APZ) provision — achieve a minimum BAL-40 exposure to all amenities buildings. Location of the amenities buildings are considered carefully to avoid any conflicts between APZ and adjoining vegetation communities;
- Construction — achieve the standard National Construction Code (NCC) fire safety requirements;
- Access — provide multiple access points with perimeter access and suitable dimensioned roads for fire rescue services
- Emergency management- provide a suitable bushfire emergency management and evacuation plan;
- Landscape — Vegetation management and design as per Planning for Bush Protection (PBP) guidelines. Utilise fire retardant planting species to reduce fire risks;
- Utilities- design to compliant with PBP guidelines.

Active transport

Pedestrian and cycle access is proposed within the park and connecting to the surrounding walking and cycling network. This seeks to support people of all ages and abilities to get to and around the park facilities. A shared path along the eastern edge of Quarter Sessions Road links the park from the southern entry to Ruddock Park, with the provision of a new refuge crossing point.

The existing bus stops located at Quarter Sessions Road and Corang Road near the southern entry of the park also support sustainable transport to the site

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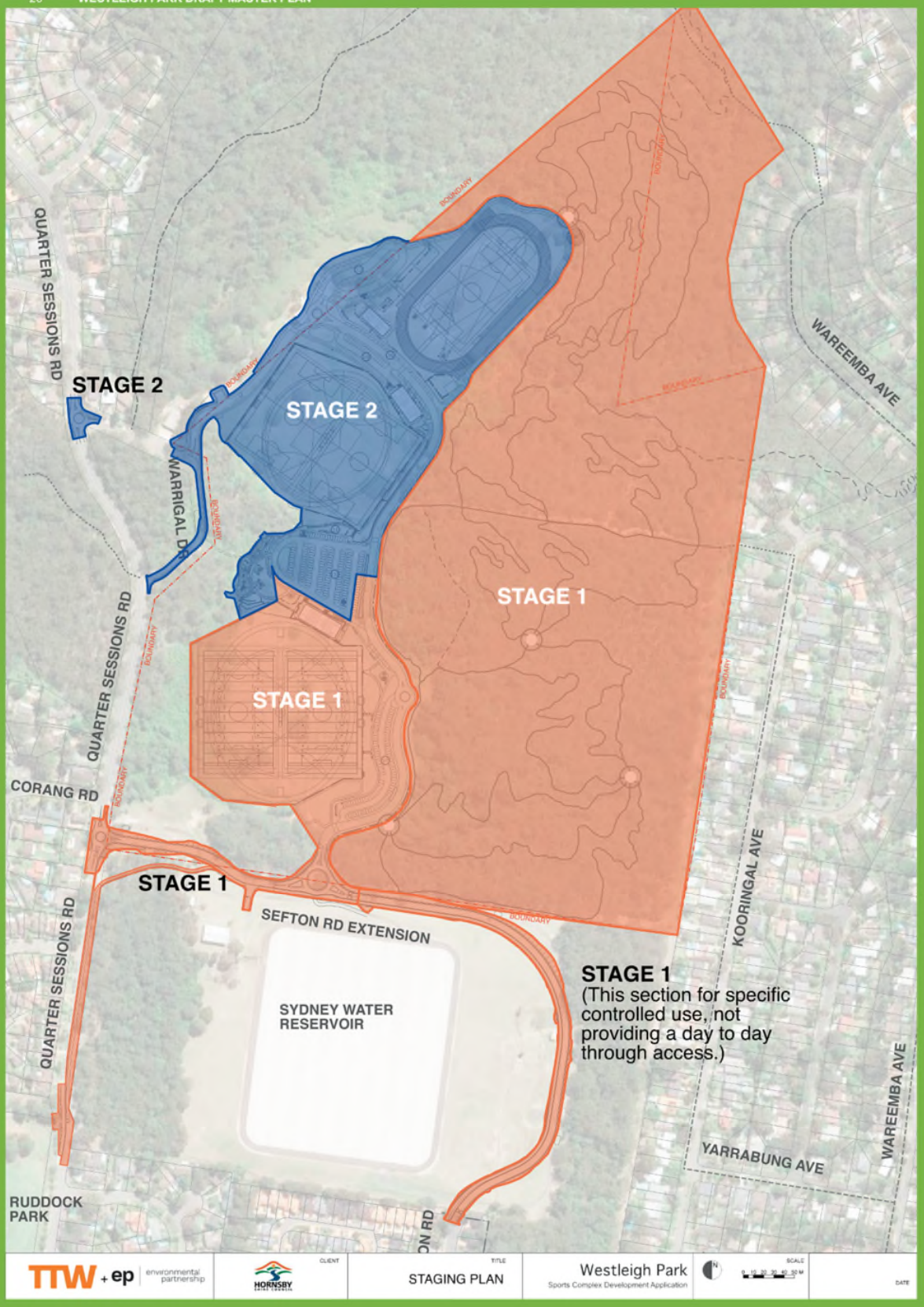

Figure 4.8 - Staging Plan

4.5 Staged Implementation of Master Plan

Delivery of the draft Master Plan will be staged as funding becomes available.

It is noted that around 40–50% of the cleared portion of the site is proposed to be excavated to natural ground with the landfill material redistributed beneath filled areas.

The final boundary of the stage one area would be based on the detailed volumes of contaminated material yeilded from stage 1 earthworks to be contained and capped, but would generally reflect Figure 4.8.

Stage 1 works would mainly include the southern multi-purpose natural turf sportsfield platform and its amenities, the carpark to the east, the new entry from Quarter Sessions Road along the southern boundary of the site, and the southern portion of internal park road linking to the amenities and the MTB trails. The existing unsanctioned mountain trails will be either upgraded and improved or closed and rehabilitated. Some new trails and a primary trail head will be constructed to facilitate connections and circulation around the network.

The associated utilities would also be required to support the stage 1 works, including electrical substation kiosk, and water and sewer connections. Stage 1 works would include the proposed Sefton Road extension linking the park to Sefton Road for specific controlled use, but not providing a day to day through access.

Stage 2 works will be the remaining construction, including the northern and middle platform, the playground and BBQ/picnic area and associated carparks, amenities and utilities, along with the internal road networks and the upgrade of Warrigal Drive, and the Quarter Sessions Road / Warrigal Drive intersection.

4.6 Connecting with Country

Having committed to embedding the principles of Connecting and Design With Country, Council has been working with Aboriginal Consultants and stakeholders to review conservation priorities and develop a Connecting with Country Framework to guide ongoing design refinement and development.

A preliminary Aboriginal Cultural Heritage Assessment Report (ACHAR) has been received with a particular focus on several items of conservation importance including a Scarred Tree on the site. Based on consultation and discussion with the Registered Aboriginal Parties (RAP) the existing Scarred Tree (a dead Scribbly Gum) is proposed to be relocated and interpreted at the northern end of the northern field platform, connected with the valley landscape and bushland and providing a gathering and contemplation space.

Ongoing consultation and collaboration with the RAP will inform a Connecting with Country framework, which will in turn guide ongoing design development of Westleigh Park.

Progression of the framework will embody the NSW Government Architect's Designing with Country Guidelines - Statements of Commitment and can be expected to cover such opportunities as enhancing awareness and understanding, celebrating local language and stories, and encouraging living culture and relevance to contemporary First Nations communities.

Conclusion

The Draft Westleigh Park Master Plan aims to provide a socially, environmentally and culturally sustainable plan for the site to encourage and support healthy community.

The plan seeks to address the increasing demands upon existing sports facilities within Hornsby Shire and will play a key role in recreational provision for the district area including provisions for formal sports, passive recreation, unstructured recreation and ancillary facilities.

The draft Master Plan reflects a holistic approach to making a safe, sustainable and resilient place addressing the challenges of site remediation, biodiversity protection, water management, sustainable energy and resource use, bushfire protection and active transport.

To Connect with Country, ongoing consultation and collaboration with Aboriginal stakeholders will inform Cultural Themes and roles into ongoing design to conserve and celebrate our indigenous legacy in a responsible, appropriate and respectful way.

Westleigh Park Concept Sketch – Southern multi-purpose platform looking north (indicative only)

NEED HELP?

This document contains important information. If you do not understand it, please call the Translating and Interpreting Service on 131 450. Ask them to phone 9847 6666 on your behalf to contact Hornsby Shire Council. Council's business hours are Monday to Friday, 8.30am-5pm.

Chinese Simplified
需要帮助吗?

本文件包含了重要的信息。如果您有不理解之处，请致电131 450联系翻译与传译服务中心。请他们代您致电9847 6666联系Hornsby郡议会。郡议会工作时间为周一至周五，早上8:30 - 下午5点。

Chinese Traditional
需要幫助嗎？

本文件包含了重要的信息。如果您有不理解之處，請致電131 450聯繫翻譯與傳譯服務中心。請他們代您致電9847 6666聯繫Hornsby郡議會。郡議會工作時間爲周一至周五，早上8:30 - 下午5點。

German
Brauchen Sie Hilfe?

Dieses Dokument enthält wichtige Informationen. Wenn Sie es nicht verstehen, rufen Sie bitte den Übersetzer- und Dolmetscherdienst unter 131 450 an. Bitten Sie ihn darum, für Sie den Hornsby Shire Council unter der Nummer 9847 6666 zu kontaktieren. Die Geschäftszeiten der Stadtverwaltung sind Montag bis Freitag, 8.30-17 Uhr.

Hindi
क्या आपको सहायता की आवश्यकता है?

इस दस्तावेज़ में महत्वपूर्ण जानकारी दी गई है। यदि आप इसे समझ न पाएँ, तो कृपया 131 450 पर अनुवाद और दुभाषिया सेवा को कॉल करें। उनसे हॉर्न्सबी शायर काउंसिल से संपर्क करने के लिए आपकी ओर से 9847 6666 पर फोन करने का निवेदन करें। काउंसिल के कार्यकाल का समय सोमवार से शुक्रवार, सुबह 8.30 बजे-शाम 5 बजे तक है।

Korean
도움이 필요하십니까?

본 문서에는 중요한 정보가 포함되어 있습니다. 이해가 되지 않는 내용이 있으시면, 통역번역서비스(Translating and Interpreting Service)로 전화하셔서(131 450번) 귀하를 대신하여 혼즈비 셔 카운슬에 전화(9847 6666번)를 걸어 달라고 요청하십시오. 카운슬의 업무시간은 월요일~금요일 오전 8시 30분~오후 5시입니다.

Tagalog
Kailangan ng tulong?

Itong dokumento ay naglalaman ng mahalagang impormasyon. Kung hindi ninyo naiintindihan, pakitawagan ang Serbisyo sa Pagsasalinwika at Pag-iinterprete (Translating and Interpreting Service) sa 131 450. Hilingin sa kanilang tawagan ang 9847 6666 para sa inyo upang kontakin ang Hornsby Shire Council. Ang oras ng opisina ng Council ay Lunes hanggang Biyernes, 8.30n.u.-5n.h.

Hornsby Shire Council
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296 Peats Ferry Road, Hornsby NSW 2077

Office hours: Please check the website for the latest opening hours for the Customer Service Centre and Duty Officer.

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foreword

PLAN OF MANAGEMENT

This Plan has been prepared to comply with the Local Government Amendment (Community Land Management) Regulations and associated amendments to the Local Government Act 1993 (LG Act), section 42 (LG Act), which commenced on 1st January 1999.

COMMUNITY INPUT INTO THE PLAN OF MANAGEMENT

Section 38 of the LG Act requires that all Plans of Management covering community land are placed on public display for a minimum period of 28 days. A minimum period of 42 days after the draft is placed on exhibition is allowed for written submissions to be made to Council.

Submissions allow the community (including residents, interest groups, sporting clubs and government agencies) to provide information, suggest alternatives and express opinions in relation to the proposed management of community lands within Hornsby Shire.

After consideration of all submissions received, Council may decide to amend the draft plan of management, or adopt it without amendment. If Council decides to amend the draft plan, it must publicly exhibit the amendments in accordance with the requirements of section 40 of the LG Act.

A Public Hearing is required to be held in respect of a draft Plan of Management (PoM) only if the proposed Plan would have the effect of categorising or re-categorising the community land in accordance with section 40A of the LG Act.

Council recognises the Traditional Owners of the lands of Hornsby Shire, the Darug and GuriNgai peoples, and pays respect to their Ancestors and Elders past and present and to their Heritage. We acknowledge and uphold their intrinsic connections and continuing relationships to Country.

View North across Westleigh Park site (source: Environmental Partnership)

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Part 1

1.0 Introduction

1.1 What is a Plan of Management ?

A Plan of Management (PoM) is a document that provides a means to control the future use, development and maintenance of Community Land under Council's care, control and management. This PoM will identify issues relevant to the future management of Westleigh Park, including the accommodation of various proposed and existing features of the site. The PoM will establish Council's goals, strategies and desired outcomes that will guide the timing, shape and nature of developments.

This PoM is presented in the following two parts to allow review of individual parts as required:

Part 1 of the PoM includes core objectives for the community land categories as determined by the LG Act, 1993, and Council's management goals. This part looks at issues relevant to Westleigh Park to determine broad objectives for management.

Part 2 titled Action Plan outlines strategies for how the objectives will be achieved and actions necessary to fulfil the strategies. This part of the PoM also outlines the standards for Council's levels of service and identifies the manner in which Council will assess its performance in relation to achieving goals.

The Action Plan is the working section of the document and will require amendment as actions are completed. The Action Plan is proposed to be relevant for a period of five to ten years. The Action Plan may be revised from time to time, in response to changing community needs and aspirations.

1.2 Why Prepare a Plan of Management for Westleigh Park?

Westleigh Park was acquired by Hornsby Shire Council (Council) in 2016 from Sydney Water. The land comprises a central cleared zone zoned R2 residential, which has been subject to a variety of past uses including landfill. This cleared zone adjoins areas of remnant and regenerating bushland on all sides which includes an area of E3 (Environmental Management) zoning. The land was acquired with the purpose of addressing multiple objectives, including:

- remediation of the past developed and landfill zone
- provision of recreational facilities
- conservation and management of bushland areas

A series of investigations were undertaken to review the requirements for remediation of the site which examined a number of options for remediation and earthworks.

In 2018, Council undertook a concept design study which identified potential site arrangements for park and recreational facilities and a related approach to site remediation and earthworks.

In order to facilitate the implementation of the park proposals, this specific PoM will document proposed park use, community land categorisations and other general LG Act requirements. This plan excludes the small island of Crown Land adjoining Warrigal Drive which is outside of the proposed works area.

This PoM is supported by a Master Plan which has been developed for the site, accompanied by recommendations for the staged implementation of proposals for the various park elements. This PoM has been prepared in accordance with and seeks adoption under the LG Act.

The preparation of this PoM is intended to represent the culmination of Council's investigations aimed at determining an appropriate character and scale for the development and management for Westleigh Park. The preparation of this PoM also enables Council to strategically address recreation needs in a staged manner. It will enable commencement of the development of new open space facilities at Westleigh Park, and will help identify a program of development and ongoing maintenance works.

1.3 What Development is Allowable under the Plan of Management?

A PoM must define the existing and future uses of community land as required under the Local Government Act, 1993. Future uses and development proposed for Westleigh Park are outlined in Sections 5.0 and 6.0 of this plan. As Council considers necessary, development allowable under this PoM may include:

- Provision of sports fields, courts, and associated parking, access roads and amenities buildings;
- Provision of grandstands and sporting seating;
- Provision of retaining walls and site drainage
- Provision of playgrounds (in accordance with Council's adopted Hornsby Play Plan 2019);
- Provision of facilities ancillary to existing use including seating, picnic and barbeque facilities, shelters, lighting, field drainage and irrigation, fencing, pathways, and new signage.
- Provision of community facilities

If there is any further development of the community land other than that authorised by this PoM, or a change in the categorisation of Westleigh Park is proposed, amendment and re-exhibition of the PoM is required.

Figure 2.1: Westleigh Park site location (not to scale)

2.0 Local Government Act Requirements

2.1 Classification and Categorisation

Westleigh Park comprises land classified as community land in accordance with Chapter 6, Part 2, Division 1 of the Local Government Act (LG Act), 1993.

2.2 Core Objectives

Community Land must be categorised in accordance with the LG Act. The category reflects the physical character and use of the lands. Each category is supported by Guidelines for Categorisation in the LG Act. The categories include:

- General Community Use
- Park
- Sportsground
- Area of Cultural Significance
- Natural Area, which has sub-categories as below:
  - Bushland
  - Wetland
  - Watercourse
  - Foreshore
  - Escarpment

The LG Act also establishes core objectives for all categories of community land. The significance of the prescribed core objectives is to ensure that any activities or uses of the land are consistent with the core objectives for the prescribed land categorisation.

Community land within Westleigh Park is proposed to be categorised as Sportsground, Natural Area (Bushland) and General Community Use. Categorisation has been determined in accordance with the LG Act, Division 2, Section 36. The Categorisation Mapping (and the Westleigh Park Master Plan it relates to) reflects the optimum relationship of uses and facilities to the park's physical characteristics and for access to those facilities by the community. Section 5.0 of this PoM provides further explanation of the Land Categorisation Mapping for Westleigh Park .

The core objectives for management of community land categorised as a sportsground are:

(a) to encourage, promote and facilitate recreational pursuits in the community involving organised and informal sporting activities and games, and

(b) to ensure that such activities are managed having regard to any adverse impact on nearby residences.

The core objectives for management of community land categorised as a natural area (bushland) are:

(a) to ensure the ongoing ecological viability of the land by protecting the ecological biodiversity and habitat values of the land, the flora and fauna (including invertebrates, fungi and micro-organisms) of the land and other ecological values of the land, and

(b) to protect the aesthetic, heritage, recreational, educational and scientific values of the land, and

(c) to promote the management of the land in a manner that protects and enhances the values and quality of the land and facilitates public enjoyment of the land, and to implement measures directed to minimising or mitigating any disturbance caused by human intrusion, and

(d) to restore degraded bushland, and

(e) to protect existing landforms such as natural drainage lines, watercourses and foreshores, and

(f) to retain bushland in parcels of a size and configuration that will enable the existing plant and animal communities to survive in the long term, and

(g) to protect bushland as a natural stabiliser of the soil surface.

The core objectives for management of community land categorised as general community use are:

to promote, encourage and provide for the use of the land, and to provide facilities on the land, to meet the current and future needs of the local community and of the wider public:

(a) in relation to public recreation and the physical, cultural, social and intellectual welfare or development of individual members of the public, and

(b) in relation to purposes for which a lease, licence or other estate may be granted in respect of the land (other than the provision of public utilities and works associated with or ancillary to public utilities).

Figure 5.1 on page 40 identifies the separate categories of community land within Westleigh Park.

2.3 Environmental Planning and Assessment Act 1979

The Hornsby Local Environment Plan, 2013 (LEP) was made under the Environmental Planning and Assessment Act, 1979 (s.34A). Westleigh Park is currently zoned (R2) Low Density Residential and (E3) Environmental Management (refer Figure 3.3 following page). As a public reserve under Council ownership, following adoption of a PoM, the most relevant planning instrument governing any proposed development and activities in Westleigh Park is the State Environmental Planning Policy (Infrastructure) 2007 (the Infrastructure SEPP), and the Hornsby Shire Local Environment Plan 2013.

2.4 Relevant Legislation

Commonwealth Legislation

Environment Protection and Biodiversity Conservation Act, 1999 (EPBC Act)	http://www.comlaw.gov.au/Details/C2014C00140

NSW Legislation

Local Government Act, 1993	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+30+1993+cd+0+N
Environmental Planning and Assessment Act, 1979	http://www.legislation.nsw.gov.au/maintop/view/inforce act+203+1979+cd+0+N
SEPP State Environmental Planning Policy (Biodiversity and Conservation) 2021	https://legislation.nsw.gov.au/view/html/inforce/current/epi-2021-0722
SEPP Koala Habitat Protection	https://www.planning.nsw.gov.au/Policy-and-Legislation/Environment-and-Heritage/Koala-Habitat-Protection-SEPP
Rural Fires Act 1997	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+65+1997+cd+0+N
Biosecurity Act (NSW) 2015	https://www.legislation.gov.au/Details/C2020C00127
Biodiversity Conservation Act, 2016	https://legislation.nsw.gov.au/view/html/inforce/current/act-2016-063

2.5 Relevant Council Policies

The below listed policies are current as of the time of publication of the Westleigh Park PoM. Additional policies, or newer versions of these policies may be created in the years to come. For a list of all current Council policies, please refer to Council's website: https://www.hornsby.nsw.gov.au/council/forms-and-publications/publications/strategic-framework.

Community Plan	http://www.hornsby.nsw.gov.au/__data/assets/pdf_file/0006/51729/FNL-YourCommunityPlan2013-2023.pdf
Community and Cultural Facilities Strategic Plan	(currently in preparation)
Delivery Program and Operational Plan	http://www.hornsby.nsw.gov.au/council/about-council/corporate-documents-and-reports/delivery-program
Hornsby Local Environmental Plan 2013	http://www.legislation.nsw.gov.au/maintop/view/inforce/epi+569+2013+cd+0+N
Hornsby Development Control Plan	http://www.hornsby.nsw.gov.au/property/development-applications/hornsby-development-control-plan
Active Living Hornsby Stategy	http://www.hornsby.nsw.gov.au/council/about-council/Join-the-Conversation/active-living-hornsby-strategy-alhs
Sports Facility Strategy	http://www.hornsby.nsw.gov.au/media/documents/about-council/corporate-documents-and-reports/sports-facility-strategy/Sports-Facility-Strategy.pdf
Unstructured Recreation Strategy	http://www.hornsby.nsw.gov.au/media/documents/about-council/corporate-documents-and-reports/unstructured-recreation-strategy/Unstructured-Recreation-
Sportsground Strategy	https://www.hornsby.nsw.gov.au/lifestyle/sports-and-recreation/facilities/sportsgrounds/Hornsby-Shire-Sportsground-Strategy
Walking and Cycling Strategy	https://www.hornsby.nsw.gov.au/lifestyle/sports-and-recreation/biking/20172018-bike-plan-review
Hornsby Play Plan	https://future.hornsby.nsw.gov.au/play-plan/
Water Sensitive Hornsby	https://future.hornsby.nsw.gov.au/water-sensitive-hornsby-strategy/
Biodiversity Conservation Strategy	https://future.hornsby.nsw.gov.au/biodiversity-conservation-strategy/
Sustainable Hornsby	https://future.hornsby.nsw.gov.au/sustainable-hornsby-2040-strategy/

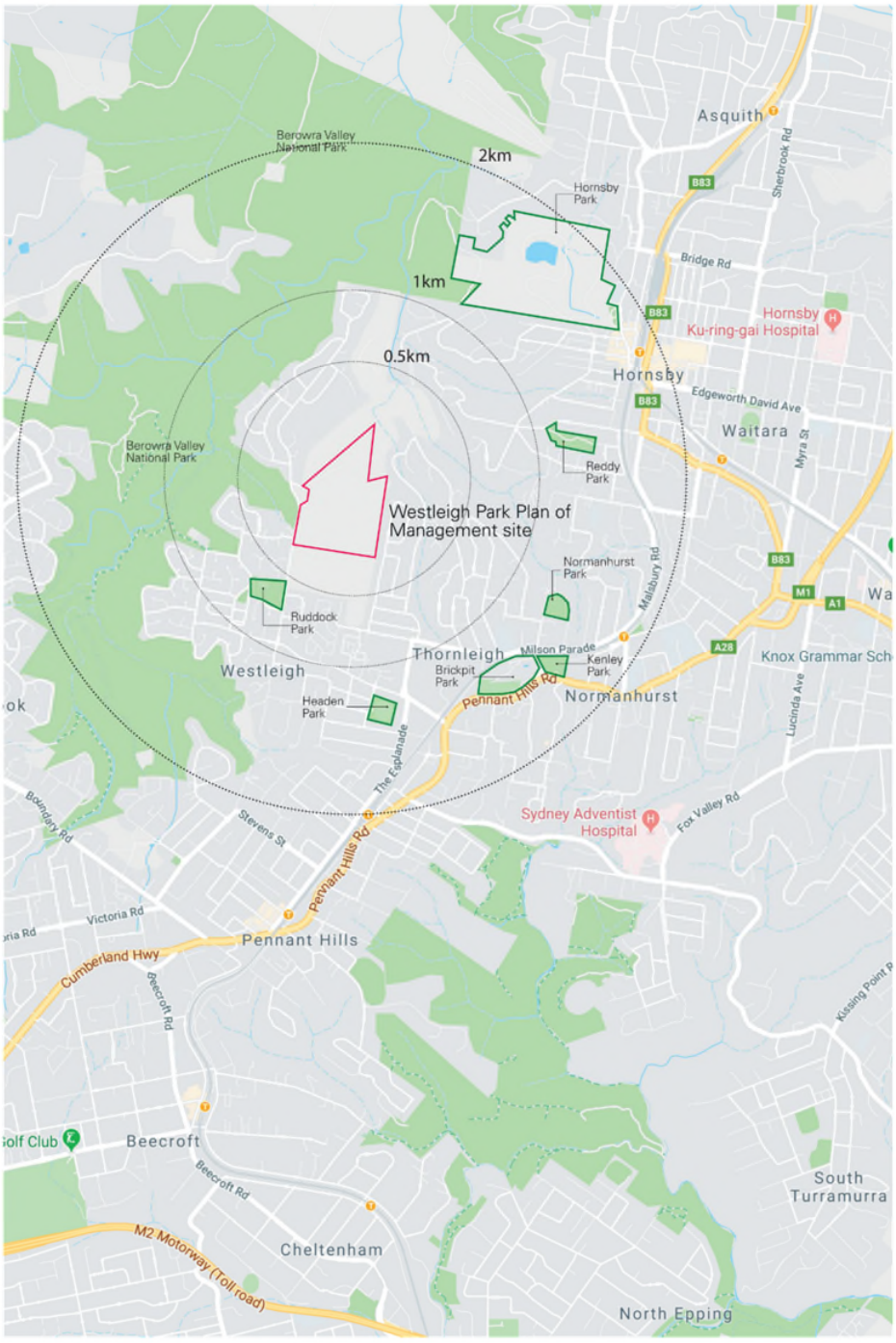

Figure 3.1: Context Plan, Westleigh Park

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3.0 Site Description

3.1 Context

Westleigh Park is located at 62 Quarter Sessions Road, Westleigh, approximately 2km from the Hornsby Town Centre, the largest commercial centre in the Hornsby Shire. Figures 3.1 and 3.2 show the location and surrounding context of the park. Vehicular entry to the park is currently available from Warrigal Drive off Quarter sessions Road.

The Westleigh Park site is owned by Hornsby Shire Council and is currently zoned Low Density Residential (R2) and Environmental Management (E3) in the Hornsby Local Environmental Plan (LEP) 2013, with adjoining lands zoned as (R2) Low Density Residential or (RE1) Public Recreation (refer Figure 3.3). It is adjoined by a Crown Land site (Lot 7332/DP1167215) bounded by Warrigal Drive and Quarter Sessions Road which is the responsibility of Minister for Lands and is not subject to this PoM.

The Dog Pound Creek land is owned by Hornsby Council and is addressed by a separate Generic PoM for Community Land and Crown Reserves (Planning District 2). It is mostly bushland zoned (RE1) Public Recreation. It includes a BioBanking area as referred to in section 4.4 Environment.

3.2 Westleigh Park at a glance

ITEM	DESCRIPTION
Name:	Westleigh Park
Address:	62 Quarter Sessions Road, Westleigh
Ownership	Community land owned by Hornsby Council
Lot & DP	Westleigh Park site: Lot 101 DP 1217395 Crown Land Island *: Lot 7332 DP 1167215 (*adjoining land - not subject to this POM)
Area	Westleigh Park site: 36 Ha
Zoning:	Hornsby Local Environmental Plan (LEP) 2013
Westleigh Park site	(R2) Low Density Residential and (E3) Environmental Management
Categorisation	Not currently categorised
Care, control, management:	Hornsby Council
Land cover	Westleigh Park site: 10 Ha Cleared land 26 Ha Bushland - including Threatened Ecological Communities (refer 4.4 Environment

Figure 3.2: Westleigh park site
(not to scale)

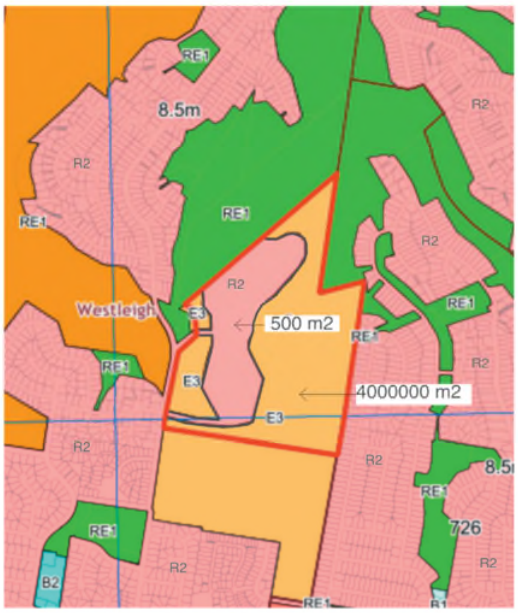

Figure 3.3: Current Zoning
(not to scale)

3.3 Site History

Aboriginal Heritage

As identified in the Due Diligence Assessment Report for the Westleigh Park complex, prepared in 2019 by GuriNgai Tribal Link Aboriginal Corporation, "the study area for Westleigh Park, has been for generations and still is, home to the GuriNgai & Darug Mobs (Wannangini)." In addition, the area was seasonally occupied in various locations by the Darginyung peoples. The connections to this area for each of these groups includes pre and post European colonisation.

Traditional areas occupied by the GuriNgai/Wannangine comprise of; all of Port Jackson catchment including the tributaries of Middle Harbour and Lane Cove River; the Broken Bay catchment including tributaries of Brisbane Water, Cowan Creek and Pitt Water; the water shed along Peats Ridge following along the range through to Kulnura; as well as the Lakes of the Central Coast to lower Lake Macquarie.

The Due Diligence Assessment Report outlines that well known and documented members of the Guringai mobs were; Ned & Margaret, Ellen White, Marika, Charlotte, William Bird, Boongaree (Bungaree), Matora, Mosquito, Jewfish, Cora (Gooseberry), Flathead, Long Dick, Sophy (Booranga), Kitty and Charlotte Ashby.(nee.Webb). Their presence in this area was initially recorded pre 1790 and references to these GuriNgai people are located on: Government Blanket lis; Court Bench records taken in the Gosford areas; Colonial Secretary minutes held at Gosford Library; early recordings from surveyors; journals written by Rev.L.E.Threlkeld, Rev. Glennie, Matthew Flinders, Augustus Earl, R.H Mathews; and current AIATSIS maps.

Family clan groups of the GuriNgai include (but not limited to), Walkaloa, Narrara, Garigal, Boregegal,Turramarragal, and Geawegal. These families occupied, protected, preserved and utilised their natural surroundings and maintained a sustainable environment for over 60,000 years. The area now known as Hornsby was home to the Garigal (and Darug from inland Hornsby Shire), who fished, hunted, celebrated and honoured their traditional Country. Natural water courses were a constant source of food and the environment produced all the requirements necessary for survival, from nuts, roots, berries and vegetables to thick barked trees for shields, shelters, coolamons.

Weapons and tools were created from natural materials, utilising the environment to sharpen, maintain and store these items. Remnants of these weapons and tools are identified today across the entire Australian landscape. Ridgelines were an intergral passageway through Country and provided visual aspects across large portions of Country.

An Aboriginal Cultural Heritage Assessment (ACHAR) was undertaken for the site in 2020 which identified the following Statement of Aboriginal Cultural Significance:

> *"The land containing the project area embodies the collective and contemporary Aboriginal social values of loss, remembrance and resilience. From a traditional viewpoint, the land represents an important meeting place along a well-travelled path and therefore embodies the shared values of family, community and social cohesion. Looking forward, this land still retains the potential to educate and celebrate a unique connection to Country by promoting a shared understanding of the area's cultural values."*

The ACHAR notes the following site specific values:

- Social
- Spiritual
- Aesthetic

In addition the ACHAR refers to the existing dead Scarred Tree on site which is recommended to be relocated to a safe location for conservation and interpretation on the site (an indicative location is shown on the maps in this draft Master Plan), as well as other aspects of cultural heritage importance in the local area which are to be conserved and protected.

Non-Aboriginal Heritage (refer Figure 3.4)

Information related to historical use of the site since European colonisation is largely derived from the 2014 Site investigations Report created by JBS&G. This work provides a summary of key site changes identified from aerial images.

1930:

- Southeast areas of the site were cleared, with a number of designated fenced areas and tree rows along some internal fence lines.
- Areas of agricultural practices (market gardens and orchards) and residential development were observed to the south and southeast of site.
- An unsealed trail along the current Quarter Sessions Road alignment existed along the western site boundary

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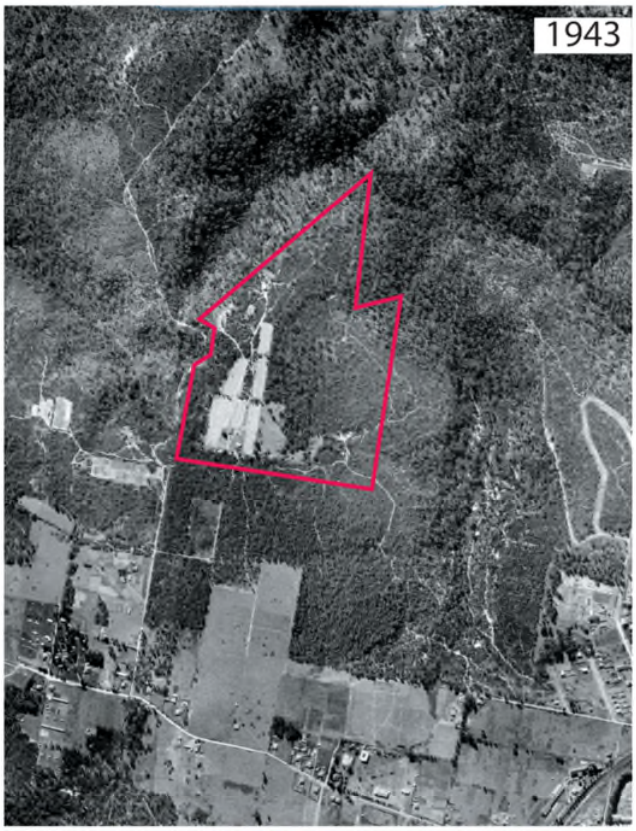
Timeline

- **1788** — Pre-European colonisation area was occupied by the GuriNgai peoples
- **1800s**
- **1900s** — Rural and orcharding activities in adjoining lands
- **1952** — Night soil depot operated on site
- **1960s** — Construction demolition landfill undertaken on site
- **1970s** — Borrow pit excavation for rock for Sydney Water Reservoir; Treated wood storage on site; Intermittent construction spoil during 1970's
- **1980s** — RFS fire training on site including use of foams containing PFAS
- **1998** — Sydney Water investigations for potential residential subdivision in R4 zone
- **2004**
- **2016** — Council aquisition of Westleigh park site
- **2018** — Westleigh Park Concept Master Plan Study

Figure 3.4: Indicative timeline
Refer also to following page for locations



3.3 Site History (continued)

1943:

- Majority of the south and the western site cleared into a series of elongated rectangular 'pads' with a number of building structures in the central south of the site.
- A number of dirt trails lead to two smaller cleared areas occupied by structures located in the north
- Quarter Sessions Road and Warrigal Drive to the west appear as unsealed trails.

1951:

- the majority of the site now one clearing, extending to the northwest boundary and northern tip of the
- Trails and patches of cleared land observable within surrounding woodland.
- The northwest boundary appears to be a tipping face, larger in extent than visible in 1943
- Increased areas of cleared land can be observed surrounding the site in all directions.

1961:

- Vegetation around the site is notably less dense in many areas.
- Quarter Sessions Road and Warrigal Drive are more visibly formed, and a second entry off Warrigal Drive to the northern tipping area is evident.
- Land to the southwest appears to consist of a number of cleared areas and a long fenced or walled enclosure extending considerable length to the west, which may be some form of animal exercise pen.
- Land surrounding contains a much higher level of apparent residential development, particularly to the east, with orchards and market gardens further to the southwest.

1970:

- The Sydney Water reservoir can be observed under construction to the south of site.
- The Thornleigh residential area extends to the site's eastern boundary, and to the west residential areas of Westleigh are being developed.

1986:

- Construction of the reservoir appears complete.
- A small building exists in the north-western portion, which may be the location of the current RFS building beyond the northwest boundary.
- Residential areas west and east are further developed.

1994:

- More defined trails can be observed around site with some previously vegetated areas appearing less dense.
- Scatted materials can be observed in areas, suggesting the potential for dumping / fly tipping, particularly in the northeast area.
- Areas of potential burnt ground appear east of the building northwest of the site where the RFS currently exists.
- An oval dirt track is visible in the northeast suggesting use for recreational vehicles such as dirt bikes.

The Site Investigations by JBS&G also provide a specific summary related to some key site uses over time. Refer also to Figure 3.5 Location of past uses on page 16.

Night Soil Depot and Tarring Plant

- A night soil depot was operated from around the early 1950's until 1962 by Hornsby Shire Council
- Sydney Water records indicate night soil dumping operations by Hornsby Council (or subcontractors) were to cease mid 1962, while tarring operations continued to around April 1963 due to a lack of alternate tarring facility locations.
- The depot included a tarring plant for treatment of metal sanitary pans used to collect sanitary wastes (i.e. night soil). Sanitary pans were collected regularly and replaced with an empty one. At the depot, following disposal of the night soil, used empty pans were cleaned and tarred and then placed back into service. It is understood that pans were sometimes disposed with the night soil, and there may be old pans in night soil burial areas at the site.
- Other activities that may have occurred at the night soil depot may have included "ploughing in night soil, washing and tarring pans, assisting unloading night soil, loading pans at the depot, attendance on boilers, cleaning, washing and greasing of vehicles in the depot, cleaning premises at depot and the attendance (including grooming,stabling and feeding) upon horses".
- Pans were either washed and cleansed "with hot water and subjected to steam under pressure in an [approved] apparatus", or "with hot water in an automatic washing and tarring machine in which the pan is immersed in a bath of molten tar";

- Vehicles used to convey pans were to be cleaned in a covered structure with a drained cement floor with the use of steaming and washing appliances, with drainage to be disposed in shallow trenches of the kind used for disposal of night soil.
- It is noted the depth of disposal would be limited by the depth to bedrock, which may be between approximately 0.6m and approximately 3m north to south across the site, although it is likely the bedrock surface will vary. Information contained within Sydney Water files, indicated some washing activities associated with the night soil depot occurred near the current southwest site entry.
- Sydney Water records contained a description of the tarring plant from February 1962. It was noted that the plant handled 5,000 sanitary cans per week.
- The plant was housed in a permanent timberframed, corrugated iron building with concrete floor, some 90 to 100 feet in length. The building housed a boiler, cleaning and tarring facilities, with the cans being handled automatically by conveyors from one process to the next.
- In 1962 it was recommended to bulldoze all affected night soil from the depot area to cover the garbage area, when plans for a second reservoir north of the current one were being considered.

Municipal Landfill

- Council operated a landfill on land immediately north of Portion 307, including the area occupied by the existing Westleigh Rural Fire Brigade Station.
- The nature of the landfill is implied to be at least partially putrescible by reference in historical documents to a 'garbage dump' and 'rubbish tip'. Like many Council landfills there is potential for wastes to include a mixture of general rubbish, green waste, soil and demolition/building materials, including the potential for asbestos containing material (ACM).
- Information in Sydney Water files indicates the landfill operations ceased in 1963, which is consistent with historical aerial photographic evidence
- File notes suggest the removal of 2 foot across the surface of the night soil depot was removed and the 'garbage dump' covered prior to its cessation in December 1963.
- Other records note that rubbish (non putrescible) was covered with 12 inches (1 foot) of soil.

Borrow Pit

- The RFP and historical documentation indicates an area in the northwest of the site, was used as a source of rock during construction of the Thornleigh Reservoir south of the site.
- Approximately 31,000 cubic yards (approximately 23,700 m3) was won from the borrow pit. Based on an approximate area of 11 690 m2
- The approximate volume excavated (23,700 m3), the approximate depth of the borrow pit has been estimated to be 2m.

Other Uses

- In 1973 a portion of the northern area of the site was leased to Mitchell & Fernance Pty Ltd (M&F)
- State Library records indicate M&F were associated with Taylor, Allen & Co. Ltd (TACL), owning timber growers, merchants and sawmills, and ships.
- Records indicate TACL received quotations from 1971-1974 for Miscellaneous Mitchell & Furnance Impregnation, suggesting M&F provided timber impregnation services, and the pole-like features may have been timber power poles. The impregnation process could have used a number of chemicals including resins, coal-tar creosote, copper-chrome-arsenic (CCA) or organic solvents.
- In 1970 coal-tar creosote was dominant for treatment of power poles.
- It is also understood that the local fire brigade have used the Sydney Water site for fire training including live fire drills
- Sydney Water files contained information indicating that a large area of the site had large pipes and piles of spoil scattered across the site, with one file note from 29 August 1974 indicating spoil from construction works in the district was being deposited at the site.

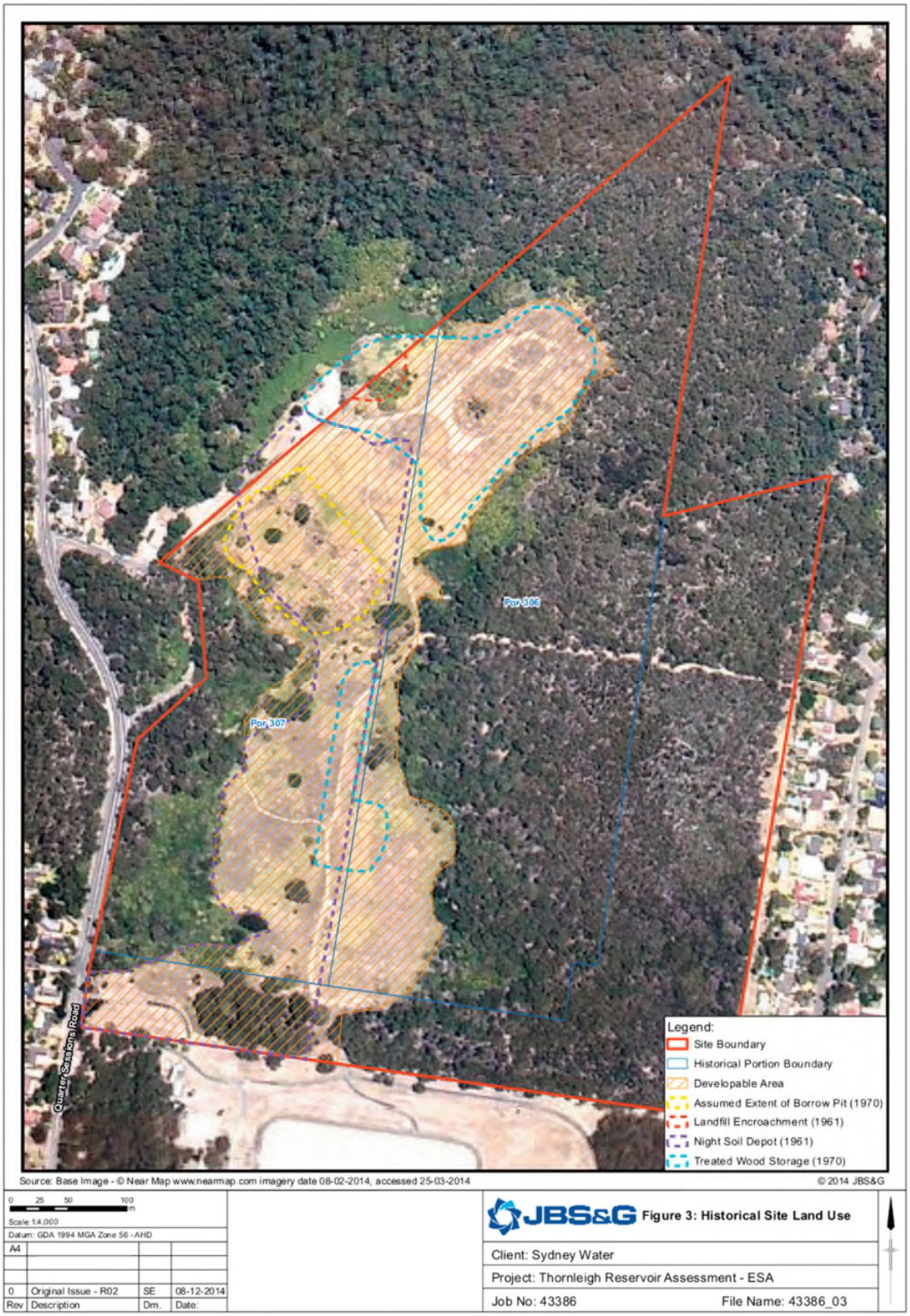


Figure 3.5 Location of past uses source: Site Investigation JBS&G 2014

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3.4 Environment

Topography

The site lies at approximately 171-186m Australian Height Datum (AHD) on an approximately north trending ridgeline. The land slopes away from the centre of the site to the east and west, while the northern areas slope to the northwest, north and northeast towards gullies (refer Figure 4.6 following page). Falls across the existing landform range between 1:20-1:30 which is significantly steeper than a playing field platform (generally 1:100).

Geology

Most of the site is assumed to be underlain by Ashfield Shale along the top of the central ridgeline, with the northwest and northeast areas underlain by Hawkesbury Sandstone.

A borrow pit (small quarry) in the north of the site was used as a source of rock during construction of the Thornleigh Reservoir south of the site. Approximately 23,700 m3 was won from this excavation. Based on an approximate area of 11,690 m2 the indicative depth of the borrow pit has been estimated to be 2m. (Sydney Water)

This suggested that the depth of fill/soil overlying bedrock may vary from up to approximately 3m below ground level near the southern site boundary, to less than 1m below ground level towards the northern site boundary.

Drainage

Surface runoff generally falls to the east and west, away from the ridgeline and into the surrounding bushland areas through natural drainage lines and as infiltration. In major storm events, runoff travels via overland flow paths to nearby watercourses (Civil Stormwater Report by TTW). Through the centre of the site (in the assumed area of the former quarrying borrow pit) is a zone of impeded drainage (refer Figure 3.6 following page and image 3 page 20).

The JBS&G report noted that based on the geological and topographic setting of the site, shallow perched groundwater may be encountered towards the interface of residual soils and underlying bedrock, which would be anticipated to flow with local topography. The depth of any perched water will be dependent on the depth to bedrock, which may vary between approximately 1m in the north to 3m in the south, and rainfall patterns. Deeper groundwater may be encountered in more permeable zones at depth in underlying shale/sandstone bedrock.

Landfill and contamination

As identified in 3.3 Site History the site has been subject to a range of former uses including:

- A night soil depot and tarring plant
- Timber pole manufacturing/treatment
- Municipal landfill
- Borrow pit within northern part of the developable land
- Firefighting training in the northern part of the developable land

The landfill area is classified in the Site Investigations Report by JBS&G as "solid waste" including remnant putrescible material. JBS&G mapped borehole tests across the site to develop an indicative extent and profile of past landfilling across the site (Refer Figure 3.7 Indicative Landfill depths to following page). This indicates 40-50% of the landfill area has a depth of one metre or lower with up to 2-4m depth in zones along the south western and eastern boundaries. The JBS&G investigations were supplemented in 2018 by Geophysical investigations by Coffey Partners. This generated a further refinement of the landfill extent indicated by the solid pink line on Figure 3.7 and a dashed line where existing conditions (gradients and vegetation) precluded more definitive identification.

The 2018 Appraisal of Remedial Approaches by Coffey Partners undertaken as part of the Concept Master Plan noted that contamination issues that require remediation and/or management, include:

- Bonded and friable asbestos fragments within fill across the developable area, and on the surface soil of the EMZ (relating to potential illegal dumping)
- Soils within fill impacted with hydrocarbons, including polycyclic aromatic hydrocarbons (PAH)
- Soils within fill impacted with lead
- Spot dumping of waste within the EMZ

The JBS&G (2014) DSI and the Arcadis (2017a) RAP do not consider that landfill gas or groundwater contamination issues are of concern for the site.

Per and poly-fluoroalkyl substances (PFAS) contamination associated with the former fire-fighting training activities on the site was assessed by Senversa in 2018. In general minor PFAS impacts were identified and a number of further investigations were recommended by Senversa. All identified PFAS contamination will require remediation by the State Government prior to solid waste remediation and park earthworks on site by Council.

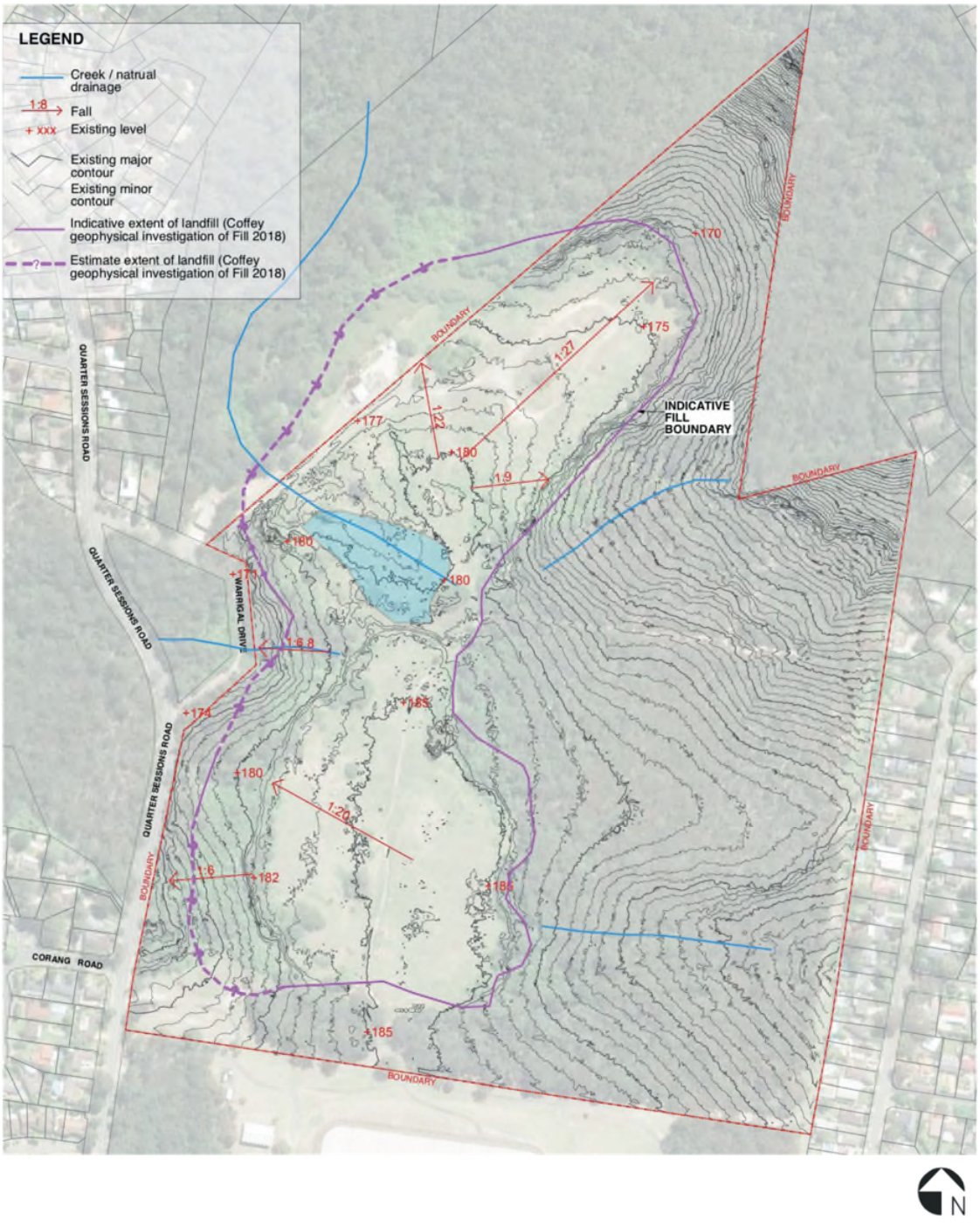

Figure 3.6 Topography, drainage and estimated extent of landfill

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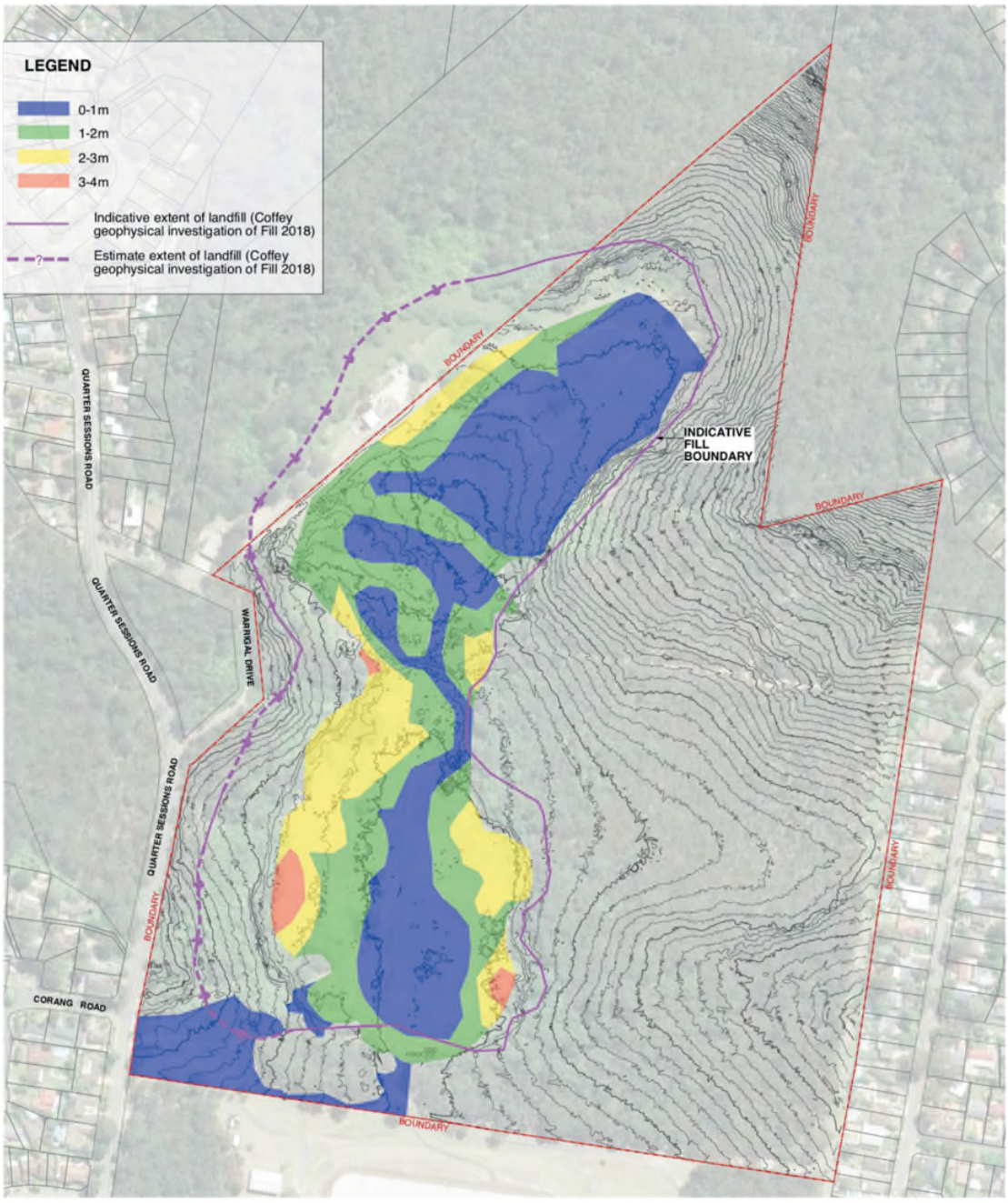


Figure 3.7 Indicative Landfill depths (source: JBS&G 2014)

Vegetation

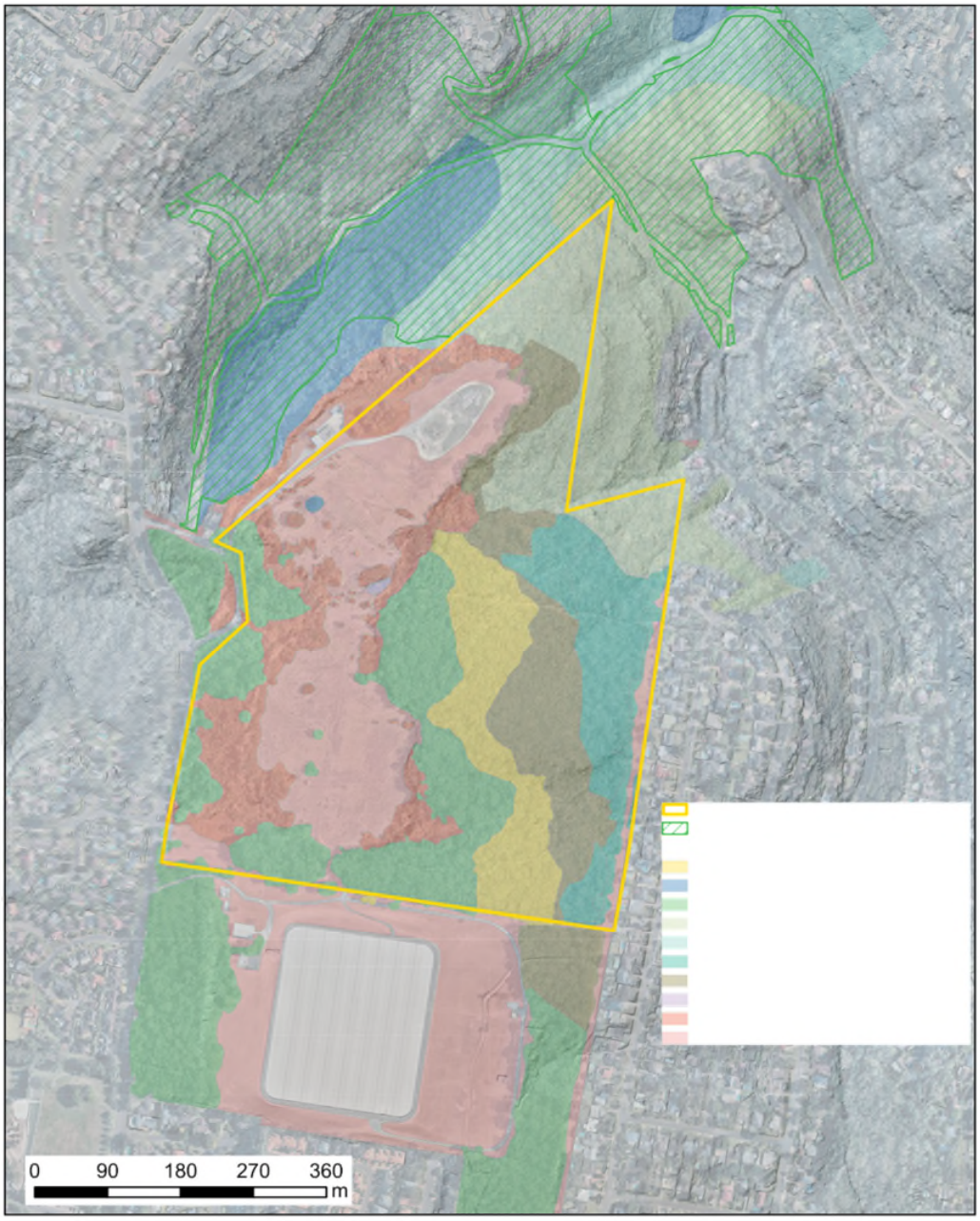
Vegetation Community Mapping has been completed in and is reflected in Figure 3.8. Ecological consultants also advised the Concept Master Plan process on habitat protection. These reports noted that threatened flora was observed on site including:

- Darwinia biflora — NSW Biodiversity Conservation Act 2016 (BC Act); Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)
- Epacris purpurascens var. purpurascens — (BC Act)
- Melaleuca deanei — (BC Act, EPBC Act)
- Tetratheca glandulosa — (EPBC Act)

Vegetation communities on the site include Sydney Turpentine Ironbark Forest (STIF) listed as Critically Endangered under the Environmental Protection and Biodiversity Conservation Act (EPBC Act) and Biodiversity Conservation Act (BC Act). Duffys Forest is listed as an Endangered Ecological Community under the BC Act. Eleven species of Orchids have also been recorded on-site. The ecological consultants identified the high conservation significance of an existing Angophora sp. near the southern boundary of the site.

Council has entered into a BioBanking Agreement over part of the Dog Pound Creek lands as indicated on Figure 3.8 and 3.9. The Dog Pound Creek BioBanking area is covered by the separate Generic PoM for Community Land and Crown Reserves (Planning District 2).

Site Images (source Environmental Partnership NSW unless noted)
1. Top right: Scribbly Gum in north of cleared area viewed towards north (source Danny Draper UTM 2019)
2. Middle: view towards south east at southern boundary of site
3. Bottom: view north west across impeded drainage area in middle of site



HORNSBY	**20230220_Westleigh Vegetation Communities**	**Map Scale: 1:6,000 at A4 Portrait**
Hornsby Shire Council 296 Peats Ferry Road HORNSBY NSW 2077 Telephone: 02 9847 6666 Email: hsc@Hornsby.nsw.gov.au	***Important Notice!*** **Dimensions, location of features and boundaries are indicative only, their actual position has not been surveyed. Aerial photography may not align with cadastral boundaries. Hornsby Shire Council accepts no responsibility for any incident arising from any inaccuracy.** Copyright © Hornsby Shire Council 2019; © The State of New South Wales. Aerial imagery: © NSW Department of Finance, Services and Innovation 2016	**Projection:** GDA94 / MGA zone 56 **Date:** 20/02/2023

Figure 3.8 Adjoining vegetation communities (source: Eco Logical Australia 2023)

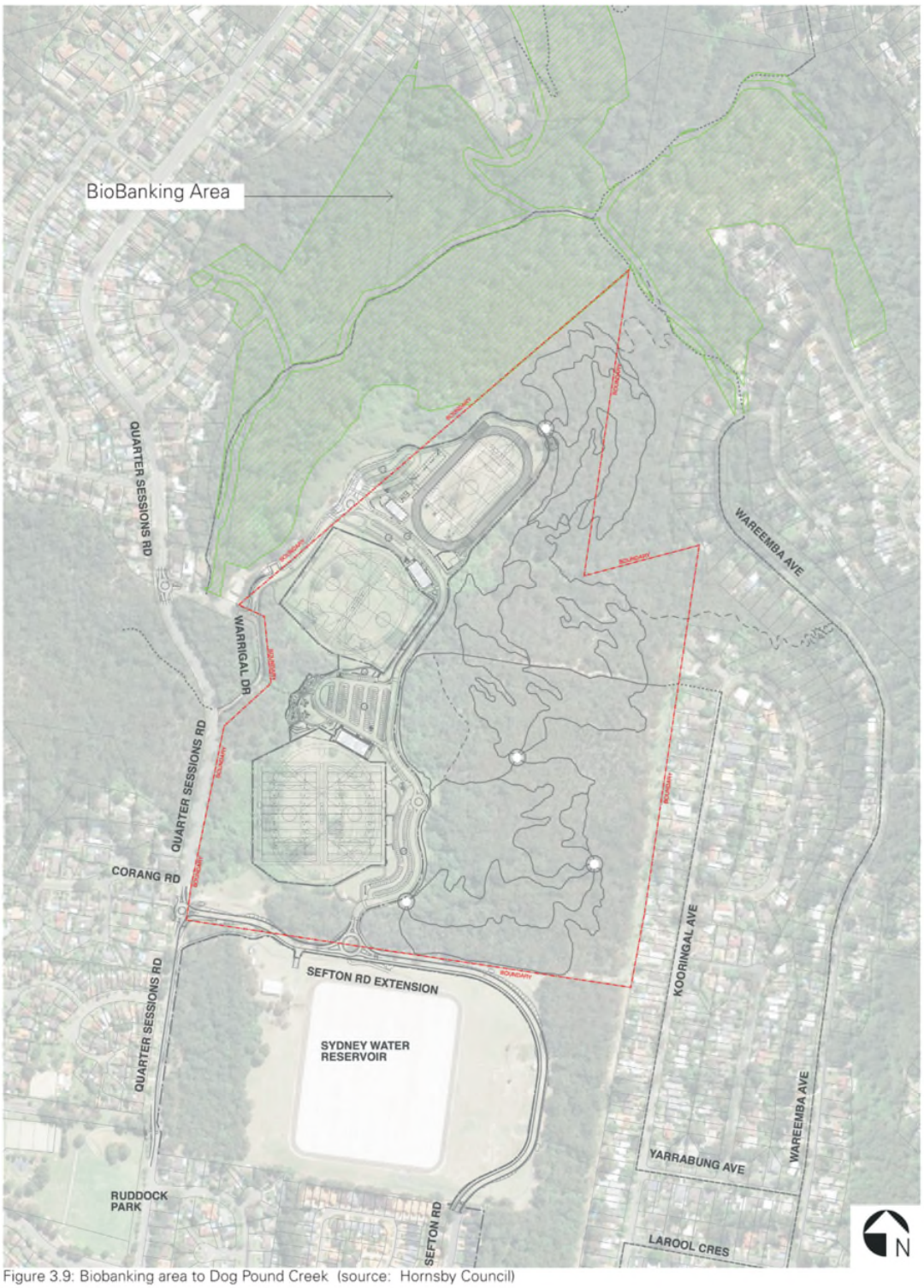


Figure 3.9: Biobanking area to Dog Pound Creek (source: Hornsby Council)

3.5 Overview of Current Use

Past uses of the site are outlined in section 3.3. These have shaped the disturbed nature of the cleared portion of the site and created the need for a site remediation programme.

The subject site currently has usage to the cleared section of the site including Mountain Bike (MTB) trails and general walking and dog walking by the local community. The trail network through the cleared zone of the site and connections to adjoining streets.

The bushland area of the site contains a network of informal trails that have been built over several years by mountain bike (MTB) recreational users. Council is undertaking investigations to help inform decisions about the future of mountain bike use of this bushland areas. There is pressure across the Hornsby district and through surrounding National Parks areas for this recreational pursuit to be effectively catered for and Council is considering whether this location is appropriate.

An initial assessment of the impacts of the mountain bike use in the Natural Areas at Westleigh was undertaken by Council in December 2017. The assessment identified a range of existing, emerging and potential environmental impacts resulting from mountain bike activities. The assessment concluded that a sustainable network at this site could contribute to the regional provision of mountain bike trails.

Ongoing investigations into the potential for mountain bike use in bushland areas are currently being undertaken.

3.6 Potential Use

Council's Sports Facility Strategy identified the need for additional sporting facilities to meet current and future needs within the Local Goverment area. Westleigh Park has been identified by Council as a key opportunity to help meet this demand.

Council commissioned a concept Master Plan in 2018 to review potential arrangements of recreational uses on the site integrated with an approach to site remediation and earthworks. Council's brief identified potential uses to be considered:

- multi-use sporting fields (night lit and irrigated) for various organised sports including the possibility of a synthetic grass sportsground and athletics track
- amenities buildings, grandstands, and maintenance sheds
- play facilities and provision for active and passive recreation,
- bushwalking tracks, and mountain bike trails,
- pedestrian and cycle shareways with links to nearby Ruddock Park,
- car parking areas to service park and all recreation facilities,
- roads for access and circulation, and
- a link road between Quarter Sessions Road and Sefton Road

The concept Master Plan described in section 4.0 is the outcome of this study and is Council's preferred Master Plan direction for the site.

Image Source: visitnewcastle.com.au

Centennial Park - multi purpose parklands.
Image Source: Greater Sydney Parklands

Centennial Park - multi purpose parklands.
Image Source: Sydney.com

Centennial Park - multi purpose parklands.
Image Source: Centennial Parklands Sports Centre

Centennial Park - multi purpose parklands.
Image Source: centennialparklands.com.au

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3.7 Key Issues for Westleigh Park

3.7.1 Connecting with Country

The 2020 draft Aboriginal Cultural Heritage Assessment Report ACHAR and the Connecting With Country Framework in progress as at February 2023, identify the values of the site to Aboriginal people and the priorities for conservation and interpretation. These values should be conserved and celebrated through ongoing planning, design and management of the site.

3.7.2 Site Remediation

As identified in section 3.4 Site History, the site has been subject to a range of past activities which have potential to impact the usability of the area as it stands. As such, a remediation programme is required. Investigations were undertaken by JBS&G for Sydney Water in 2014 to review works required to enable residential development of the site in line with the site zoning. This investigation was supplemented in 2018 by Geophysical investigations by Coffey Partners, as part of the recreational Master Plan studies for the site. A remediation and earthworks strategy has been developed and is outlined in section 4.3.

3.7.3 Earthworks

A remediation approach for the site is intrinsically linked to any earthworks that are intended to be carried out for implementation of sports fields or other recreational facilities. Truck and machinery movements on local roads have potential to impact residential areas and so a balanced cut and fill approach limiting imported materials to those required for landscape finishes would be preferred if feasible.

3.7.4 Traffic and Car Parking

The development of sports and community facilities on the site will generate additional traffic flows through the adjoining neighbourhood across the week and in particular on weekend game days. Previous studies examined the local road system and assessed potential impacts of a range of uses including residential (Masson Twiney 1998) and recreational (Positive Traffic 2019).

The preliminary traffic and transport assessment undertaken in 2019 (based on 2019 data) identified a need for road network upgrades to cater for the additional traffic generated by the Master Plan proposal. Since then, NorthConnex, which was open to traffic in October 2020, has changed the traffic conditions within the study area. Council identified the need to update the traffic assessment to incorporate the influences of NorthConnex on traffic volumes and patterns and engaged Bitzios Consulting to carry out the additional review.

Bitzios developed a microsimulation model and used the model to inform road and intersection upgrade requirements, assess the impact of the proposed Sefton Road extension and review active and public transport facilities and potential improvements.

This assessment suggests that the proposed Sefton Road extension would be required at some stage. In addition, a through access between Quarter Sessions Road and Sefton Road would provide a supporting emergency egress route for the community.

In addition, the traffic investigations identified that provision of approximately 350 off street parking spaces within the Westleigh Park complex should be provided.

3.7.5 Urban Context & Range of Recreational Facilities

The Westleigh neighbourhood is served by a variety of parks in addition to extensive areas of natural bushland. Ruddock Park, located to the south on Quarter Sessions Road, is an important local park providing for a mix of active and informal recreational pursuits.

As noted in section 3.6, Council's Sports Facility Strategy has identified the need for additional sporting facilities to meet current and future needs with Westleigh Park seen as playing an important future role in organised sports provision.

Westleigh Park also provides passive recreational opportunities such as local level play space. Such a facility would also complement the organised sports use within the park.

3.7.6 Pedestrian Connections and Legibility

Westleigh Park has a limited frontage to public streets and as a result few pedestrian entrances into the overall site. The creation of a hierarchy of pedestrian entrances and pathways will be an important contributor to linking the various spaces and facilities within the site and lifting the profile of the park with the community.

3.7.7 Environmental Conditions & Landscape

The park has significant vegetation communities that fringe the existing cleared area. Sports field development will be contained to existing cleared areas, and will be preceded by remediation or capping of past landfill areas.

Bushland will be conserved and protected during park development. Existing bushland to the eastern and western edges of the park will maintain a visual buffer to adjoining residential areas on Kooringal Road and Quarter Sessions Road.

4.0 Master Plan Development

4.1 Introduction

Community Land must be categorised in accordance with the LG Act. The category reflects the physical character and use of the lands. Each category is supported by Guidelines for Categorisation in the LG Act. The categories include:

- General Community Use
- Park
- Sportsground
- Area of Cultural Significance
- Natural Area, which has sub-categories as following:
  - Bushland
  - Wetland
  - Watercourse
  - Foreshore
  - Escarpment

The LG Act also establishes core objectives for all categories of community land. The significance of the prescribed core objectives is to ensure that any activities or uses of the land are consistent with the core objectives for the prescribed land categorisation.

The table below sets out management targets for the core management objectives as defined by the proposed community land categorisations.

A separate Master Planning Study as described in the Westleigh Park Master Plan Report 2023, developed a concept Master Plan for the development of the park. This plan integrated the approaches to site remediation and earthworks to facilitate development of recreational facilities having close regard for the environmental values of the site. The Master Plan coordinates the various strategies that need to be pursued to optimise the community benefit of the parkland (refer 4.3 and 4.5)

4.2 Objectives and Performance Targets of the Plan

Core Objectives	Performance targets
Sportsground	
(a) to encourage, promote and facilitate recreational pursuits in the community involving organised and informal sporting activities and games,	1. A balanced provision of recreational opportunities in the park that address Shire wide sporting needs where possible achieving the best use of subject lands for community benefit. 2. Integrate flexibility to planning and development that enables facilities to respond to future requirements. 3. Provision of complementary informal use park areas that cater for day to day community recreational use.
(b) to ensure that such activities are managed having regard to any adverse impact on nearby residences and bushland.	1. Design that ensures the operations of the sports fields limits the impacts on the biodiversity of the adjoining natural areas. 2. Provision of additional site access to manage potential impact of traffic access to site during peak use times. 3. Provision of on site parking to limit parking impacts on adjoining streets. 4. Design of lighting within all required standards and codes to limit any impacts on adjoining residential areas and bushland. 5. Booking and Licence restriction of hours of operation as required to manage impacts of lighting and noise.
Natural Area (Bushland)	
(a) to ensure the ongoing ecological viability of the land by protecting the ecological biodiversity and habitat values of the land, the flora and fauna (including invertebrates, fungi and micro-organisms) of the land and other ecological values of the land, and	1. Protect and enhance critically remnant bushland. 2. Protect and enhance areas of habitat known to support threatened species. 3. Identify any specific areas of bushland to have restricted access. 4. Allow equitable community access to natural areas. Where this is not possible consider controlled access such as guided walks through formalised bushland tracks.

Core Objectives	Performance targets
Natural Area (Bushland) (continued)	
	5. Any approved trail network within a natural area is to be managed in a sustainable manner to ensure conservation of ecological integrity of the site. 6. Provide interpretive signage and information regarding natural areas.
(b) to protect the aesthetic, heritage, recreational, educational and scientific values of the land, and	
(c) to promote the management of the land in a manner that protects and enhances the values and quality of the land and facilitates equity of use and public enjoyment of the land, and to implement measures directed to minimising or mitigating any disturbance caused by human intrusion, and	
(d) to restore degraded bushland, and	
(e) to protect existing landforms such as natural drainage lines, watercourses and foreshores, and	
(f) to retain bushland in parcels of a size and configuration that will enable the existing plant and animal communities to survive in the long term, and	
((g) to protect bushland as a natural stabiliser of the soil surface.	
General Community Use	
To promote, encourage and provide for the use of the land, and to provide facilities on the land, to meet the current and future needs of the local community and of the wider public:	
(a) in relation to public recreation and the physical, cultural, social and intellectual welfare or development of individual members of the public, and	1. Provide amenities buildings to serve and support the recreational facilities on site.
b) in relation to purposes for which a lease, licence or other estate may be granted in respect of the land (other than the provision of public utilities and works associated with or ancillary to public utilities).	1. Leases or licences authorised by this plan in accordance with the plan's objectives and core objectives for the community land categorisation.

4.3 Key site development strategies

4.3.1 Remediation

The Remediation Approaches by Coffey 2018 as part of the concept Master Plan Study considers that (i) cap and contain, or (ii) consolidation and isolation with emplacement cell, accompanied with administrative controls utilising a long term environmental management plan (EMP), is the most practical approach to landfill management. It is noted however that the final remedial actions will be subject to approval and agreement of the Environmental Planning Authority (EPA) accredited Site Auditor.

Per- and poly-fluoroalkyl substances (PFAS) contamination associated with the former fire-fighting training activities on the site was assessed by Senversa in 2018. In general minor PFAS impacts were identified and a number of further investigations were recommended by Senversa. All identified PFAS contamination will require remediation by the State Government prior to solid waste remediation earthworks on site by Council.

In the environmentally sensitive zones of threatened Ecological Community (TEC) adjoining (referred as Environmental Management Zone (EMZ) in the Coffey Report 2018), the 'cap and contain' or 'consolidation and isolation' strategies would significantly disturb/destroy the vegetation communities. Therefore, the 'cap and contain' or 'consolidation and isolation' strategies would not be applicable. Instead, Coffey considers utilising a combination of (i) localised removal of dumped waste and asbestos; (ii) localised isolation of asbestos exposure in accessible areas, accompanied with administrative controls utilising a long term EMP, would be more practicable for the EMZ. The Coffey Report 2018 proposes remediation strategies for the site. The proposed strategies are consistent with recommendations discussed in the Remediation Action Plan (RAP - Arcadis, 2017), however vegetated areas must also be considered, in the context of minimising potential impact to TEC vegetation.

Cleared & Weedy Areas

Cap and contain to isolate the mixture of contamination in the fill. This includes excavation of landfill and relocation for consolidation and capping elsewhere on site. Where Synthetic field surfaces are being proposed the capping approach can be modified and significantly reduced subject to the nature of the field subbase.

EMZ

The adjoining vegetated areas within the EMZ are not to be promoted for recreational access, except in the case of formalised tracks, and will have practical separation from the main park area (e.g., retaining walls/fencing). It is not proposed, due to potential impacts, that large scale removal of existing contaminants is undertaken in areas of high biodiversity value, e.g., Threatened Ecological Communities. However, minor hand picking and removal of spot dumping will be undertaken.

Within any potential formalised trail network, it will be necessary to undertake management as outlined in the RAP which is likely to include:

- hand pick and remove asbestos
- inspection by asbestos assessor
- capping with VENM subject to Ecologist advise

All trails that traverse the "Bushland Protection' areas may be provided with appropriate treatment, e.g., stone armoured or boardwalk to limit erosion other impacts.

4.3.2 Earthworks

Civil concept designs were prepared as part of the concept Master Plan Study and illustrate the proposed final levels concept and related earthworks strategy. Although the site appears quite level to undulating the majority of the site falls as a gradient of between 1:20-1:30 (vertical : horizontal). As a result over the extent of a sports field platform falling at a preferred 1:100, the edges of the platform will result in a deeper profile of fill material. In addition around 40% of the site is covered in fill to a depth of less than a metre.

Subject to detailed constructability assessment, it is proposed to excavate down to natural ground (Virgin excavated natural material (VENM)) across a proportion of the site and relocate the excavated material to "containment cells" within the major fill zones required to establish field levels. Site won material will be used were possible as capping material to these containment cells and as fill material to the major fill zones on the site. Some additional capping material to meet required specifications will be required to meet the needs of the capping exercise, which would have been brought into site regardless (soils for field turf etc). The final levels have been calibrated to account for a balanced cut and fill exercise focussing the requirement for imported material on landscape and related construction materials to provide suitable surface profiles for sports turf and the like.

4.3.3 Vehicular access and parking

A review of traffic and parking factors was undertaken in the development of the concept Master Plan.

The Report by TTW Transportation Planning concludes that the concept Master Plan for Westleigh Park met the recommendations of the Traffic and Access Assessment Report prepared by Positive Traffic in 2017 and updated in 2019 for Council, and further updated by Bitzios in 2021-23.

Key traffic and parking strategies include the following (refer to Figure 4.1):

- The potential provision of 350 plus parking spaces within the park adjacent to proposed sporting fields.
- Upgraded access into the Park from a new roundabout at Warrigal Drive /Quarter Sessions Road intersection
- A new access into the site from Quarter Sessions Road near Coorang Avenue.
- A new managed access into the site via a road connection to Sefton Road through Sydney Water lands. This link will be open at specific times to limit impacts on the local street network.

Past traffic and transport reporting including the 2022 Bitzios Report will guide traffic and parking provisions on the site and improvements to adjoining streets.

4.3.4 Pedestrian and cycle access

The park requires a network of pedestrian access that connects park entries and parking areas to recreational facilities and provides equitable access between those facilities. Figure 4.2 illustrates the proposed pedestrian access strategy for the site. A loop shared pedestrian / cycle system is integrated with internal pedestrian paths.

The shared path loop caters for cycle access across the site which is connected to the local / regional cycle network via Sefton Road and Quarter Sessions Road as identified on the Hornsby Bike Plan (refer to Figure 4.3).

Integration of main pedestrian and cycle access with road access points into the site at Warrigal Drive and near Coorang Avenue on Quarter Sessions Road will heighten the legibility and surveillance of these access points.

Design should facilitate appropriate separation for amenity and safety.

4.3.5 Environmental management

Environmental management considerations for the concept Master Plan have included:

The principles of avoid, minimise and mitigate have been implemented to reduce any impact on adjoining remnant vegetation.

To ensure the ongoing conservation of ecological values on the site, setbacks are to be maintained adjacent to remnant vegetation.

These setbacks are to ensure that any earthworks and other development do not impact on remnant vegetation and habitat.

Significant tree protection

To ensure the ongoing conservation of isolated trees, setbacks are to be maintained adjacent to retained trees. These buffers are to ensure that any earthworks and other development do not impact on remnant trees and habitat.

Fauna management

Habitat Assessments undertaken in 2016 by Council's Natural Resources section have been supplemented by work undertaken across 2021-2023. The site survey indicated the site exhibits high diversity in birds species with 50 species observed including the threatened Square-tailed Kite (TSC) and summer migrants the Sacred Kingfisher, Eastern Koel, Channel-billed Cuckoo and Dollarbird.

There were only a few reptile species and few indications of mammals (scats and tracks, burrows and feeding scars). The vegetation is likely to support a variety of microbats and has preferred food resources of the Grey-headed Flying-fox (BC Act & EPBC) which is known to occur in this locality. The site also contains habitat that is likely to support other threatened species including Eastern Pygmy Possum, Red-crowned Toadlet, Powerful Owl, Glossy Black-cockatoo. An existing Eastern Pygmy Possum study in Council reserves has been extended to this site due to the presence of Bloodwood Scribbly Gum Woodland and Scribbly Gum Open Woodland that contain flora species preferred by this species.

The principles of avoid, minimise and mitigate have also been applied to potential impacts on fauna. Any residual impacts will be addressed through appropriate mitigation measures which will be included in the Biodiversity Development Assessment Report.

Biodiversity Development Assessment Report (BDAR)

A BDAR is to be provided to inform ongoing refinement of the Master Plan proposals. The assessment includes detailed appraisal and site survey of flora and fauna on-site, including the Threatened Ecological Communities to enable minimisation of potential impacts by the development.

Any localised residual impacts will be offset in accordance with relevant offset policies and schemes.

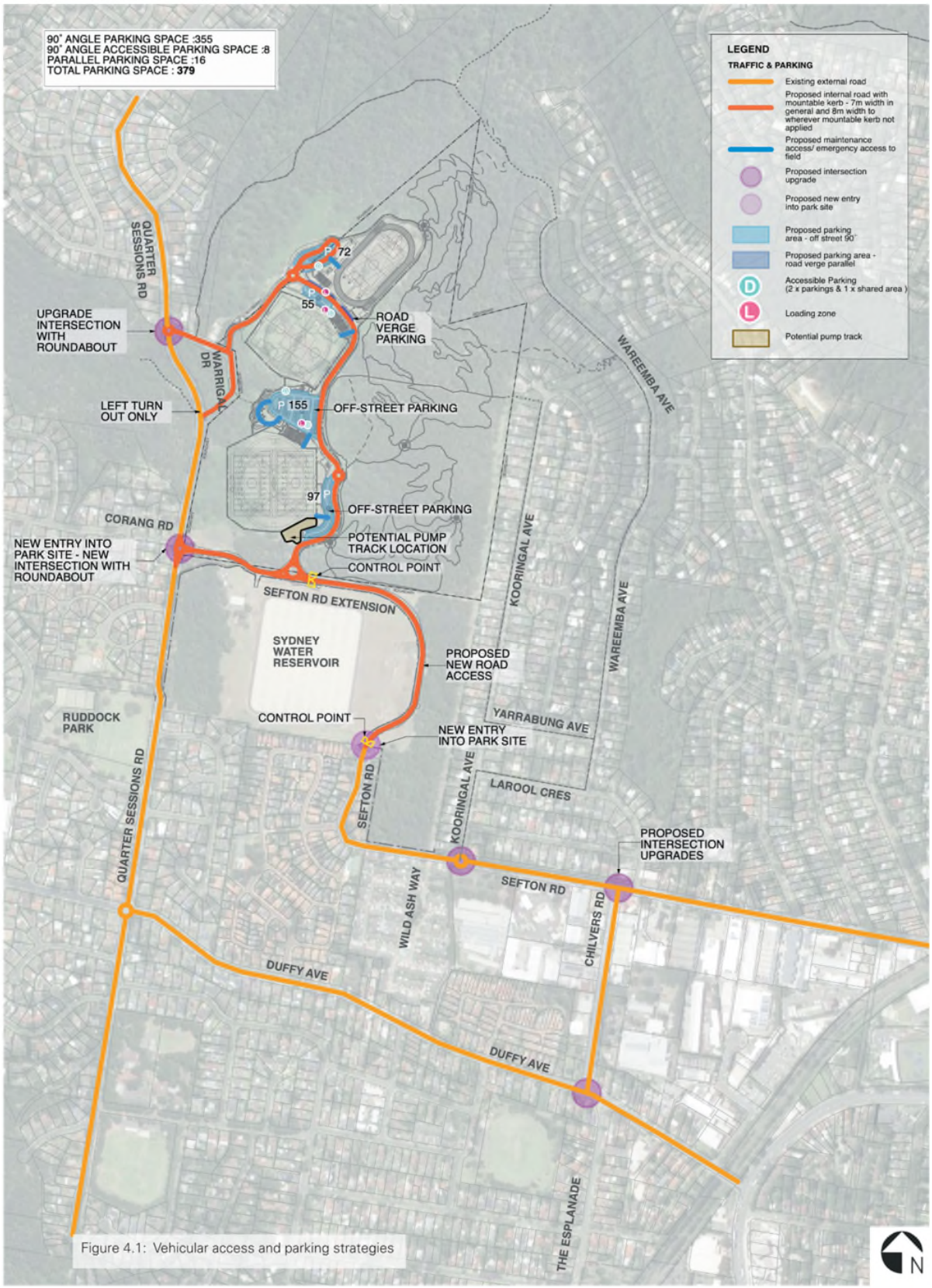

Figure 4.1: Vehicular access and parking strategies

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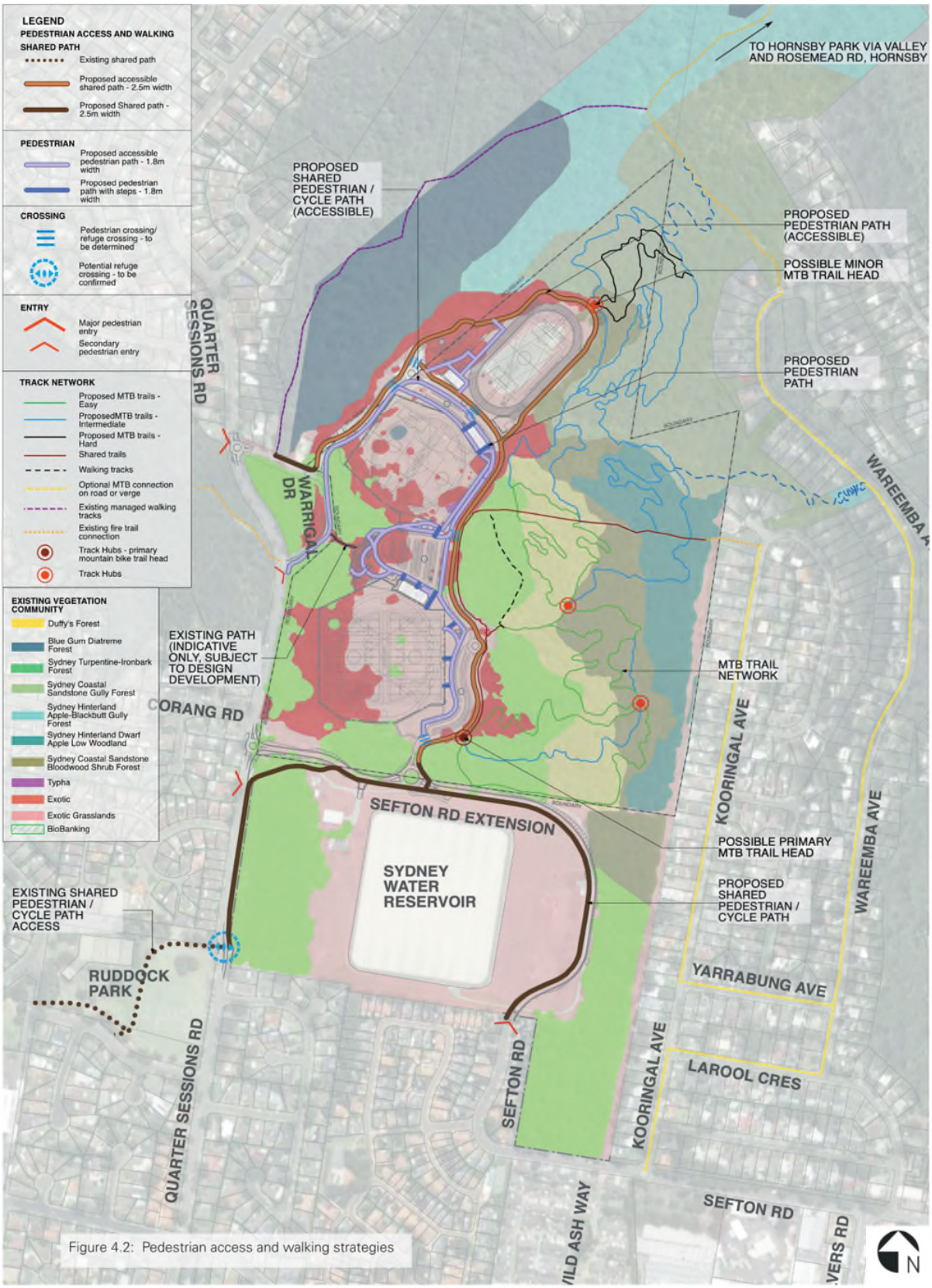

Figure 4.2: Pedestrian access and walking strategies

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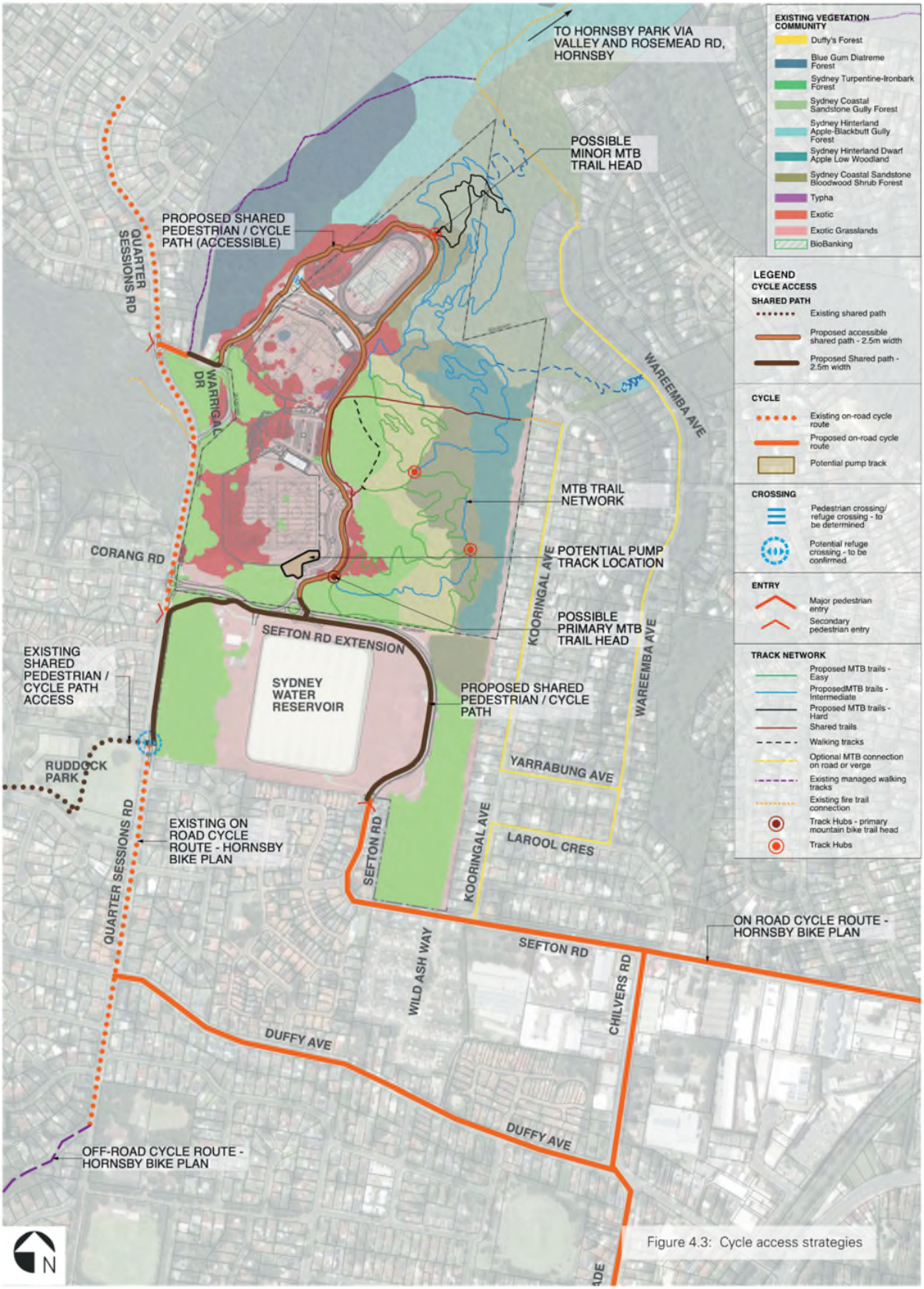

Figure 4.3: Cycle access strategies

4.3.6 Stormwater management

The site is located on a ridge top with topography dictating surface water run off into adjacent lands to the east, west and north. Dog Pound Creek to the north and Waitara Creek to the east form the upper tributaries of Berowra Creek. Consideration needs to be given to the appropriate capture and dispersal of water from the site to ensure the preservation of ecological values of adjacent vegetation and waterways.

Stormwater management of the site will apply principles outlined in HDCP and other relevant guidelines, incorporating the requirement to prepare a Water Sensitive Urban Design Strategy to meet urban stormwater quality and flow targets.

4.3.7 Infrastructure and services

For the purposes of costing, a conceptual approach to servicing of the site was developed (refer to Figure 4.4). It is proposed that the principal site servicing should come off Warrigal Drive. This will assist in limiting impacts to remnant vegetation areas.

The need for any amplification of any existing services to meet site demands should be assessed as an initial step of ongoing design.

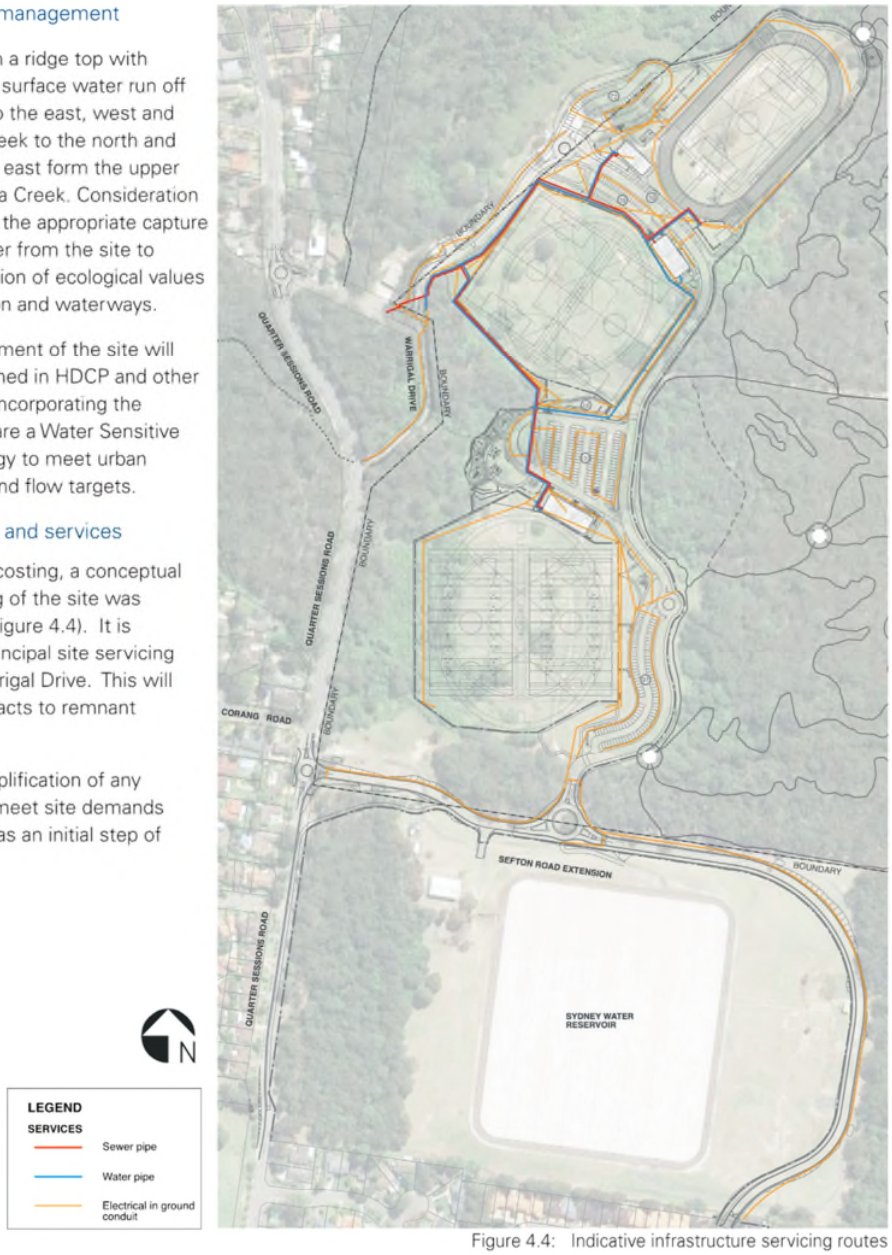

Figure 4.4: Indicative infrastructure servicing routes

4.4 Master Plan

A Conceptual Master Plan has been prepared by Council for Westleigh Park (refer Figure 4.5 opposite and 4.6 over page). The plan seeks to facilitate the development of the park to conserve important habitat, address district recreational needs, and remediate the site in a flexible and adaptive approach.

The key aspects of the Master Plan are outlined as below (refer to the numbered items on Figure 4.5 opposite).

4.4.1 Circulation and Parking

1. New roundabout at Warrigal Road north

This intersection is proposed to be converted into a roundabout to improve traffic flow and to better manage traffic volumes. The central island will be mountable to allow for bus movements. Consideration was also given to the requirement for firetrucks to access the Westleigh Rural Fire Brigade facility.

Associated kerb adjustments, median islands, line marking and signage would also form part of the works. The intersection of Warrigal Drive south is proposed to be converted into a one-way exit with left turn movements permitted out onto Quarter Sessions Road. Signage and line-marking is proposed to provide clear priority to Quarter Sessions Road traffic movements.

2. New road access from Quarter Sessions Road

A new vehicular access point is proposed from Quarter Sessions Road located between the southern boundary of the site, and the Sydney Water facilities. This access point was chosen to avoid sight-line issues of the option near Corang Road, and to minimise impact to the existing significant vegetation community (STIF). This access will be shared with Sydney Water to access their operational site to the south, rather than creating a duplicate access point off Quarter Sessions Road.

3. Road access to Sefton Road

A managed road connection and additional entry to the site is proposed from Sefton Road to better balance traffic loads at selected times. This will require roadworks to continue Sefton Road through (and to) the Sydney Water site and into the Park. The management of the road will include controlled / limited opening to limit impacts on local roads and optimise benefits.

To avoid potential impacts on the existing Sydney Water reservoir's infrastructure, the new extension is proposed to be generally on or slightly above existing grade, minimising fill embankments but avoiding any disturbance of Sydney Water dam walling. The corridor would be provided with security fencing to limit public access to the Sydney Water site.

This proposal requires ongoing discussions with Sydney Water.

4. Parking areas

It is proposed to provide off street parking to service the sports facilities within the Westleigh Park site. The Master Plan aims to provide 379 car parking spaces. These are distributed between the main field platforms and have been predominantly provided as off-road parking areas with some additional parallel spaces between the central fields and northern athletics field. Each parking area includes a number of accessible parking spaces.

5. Shared pedestrian and cycle path

The pedestrian and cycle access network to and within the site is illustrated on Figure 4.2 and 4.3.

Pedestrian access into the park is focused on a 2.5–3m shared recreational and maintenance path network which enters the site from Warrigal Drive and the proposed new entry from the south. This will provide loop access around the perimeter of the facilities in addition to providing supplementary maintenance access. The shared path will be supplemented by pedestrian paths in the centre of the site which connect parking areas to facilities and provide access through the central parkland area between the southern and central fields. The shared path will connect to a broader local network of cycle paths via both on road and off-road links. The adjoining mountain bike trails and bush walking tracks being considered will also be connected to track and trail networks beyond the site.

6. Access points to adjoining natural areas

The proposed mountain bike (MTB) trail network would be accessed through Westleigh Park where riders can use parking and other facilities, or cycle to the site and access the MTB trail entry points via shared paths or the internal road network. The primary access point (trail head) is proposed to the south-eastern edge of the park reached via the shared path or perimeter road. Other access/exit points are also been considered from the shared path to the north of the site. Access and exit is also being considered to Wareemba Avenue and the Dog Pound Creek fire/maintenance trail.

4.4.2 Active Recreation

The Concept Master Plan proposes three sports facility platforms that have been sited to integrate within the constraints of existing bushland vegetation and provision of road access.

From south to north, the field platforms step down the site executing a level change of around 8m overall. Each of the platforms is served by off street parking areas which have direct accessible connections to field and associated amenities/ facilities. The field platforms are also connected by the shared pedestrian cycle path network and supplementary pedestrian path network.

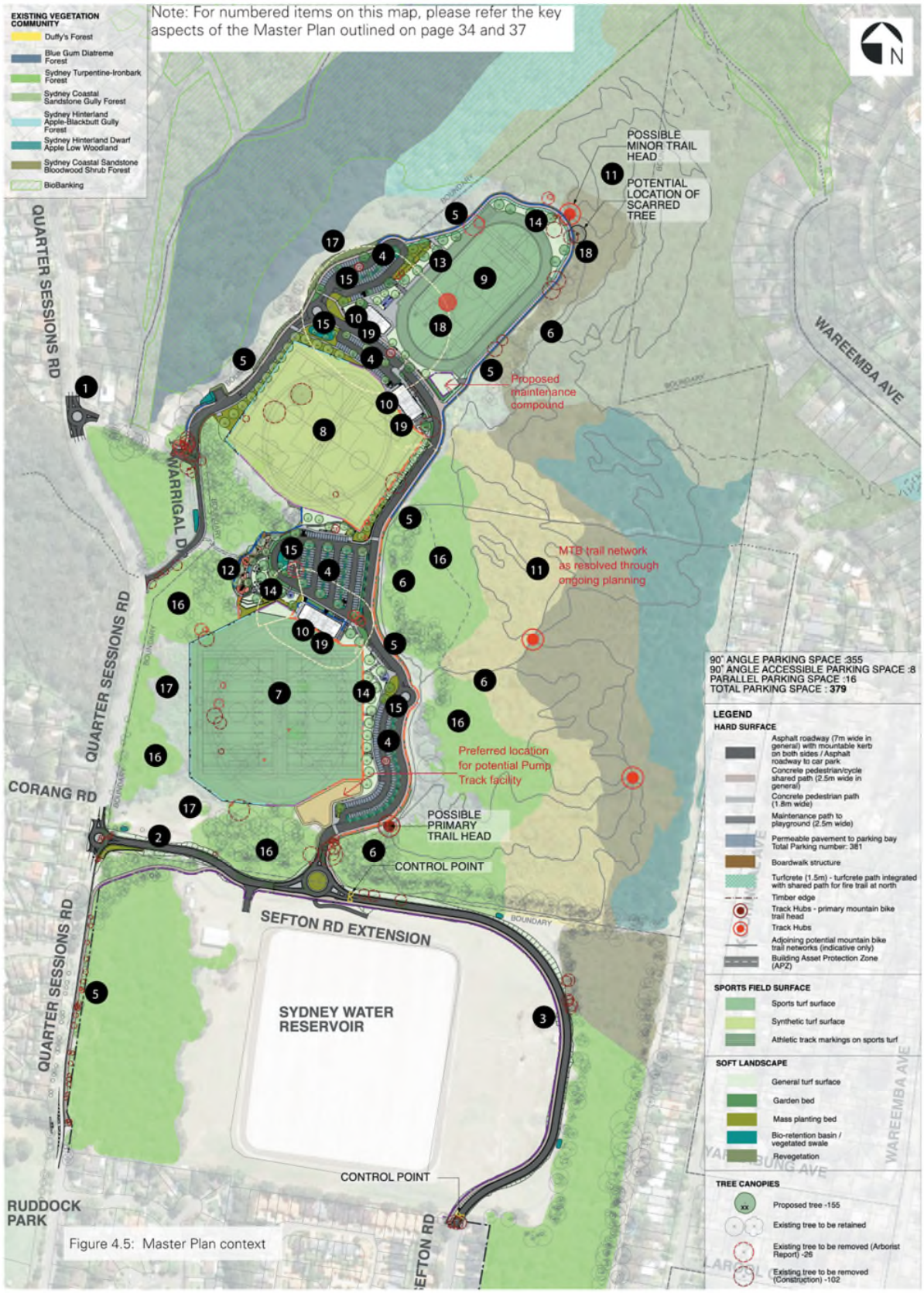

Figure 4.5: Master Plan context

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Note: For numbered items on this map, please refer the key aspects of the Master Plan outlined on page 34 and 37

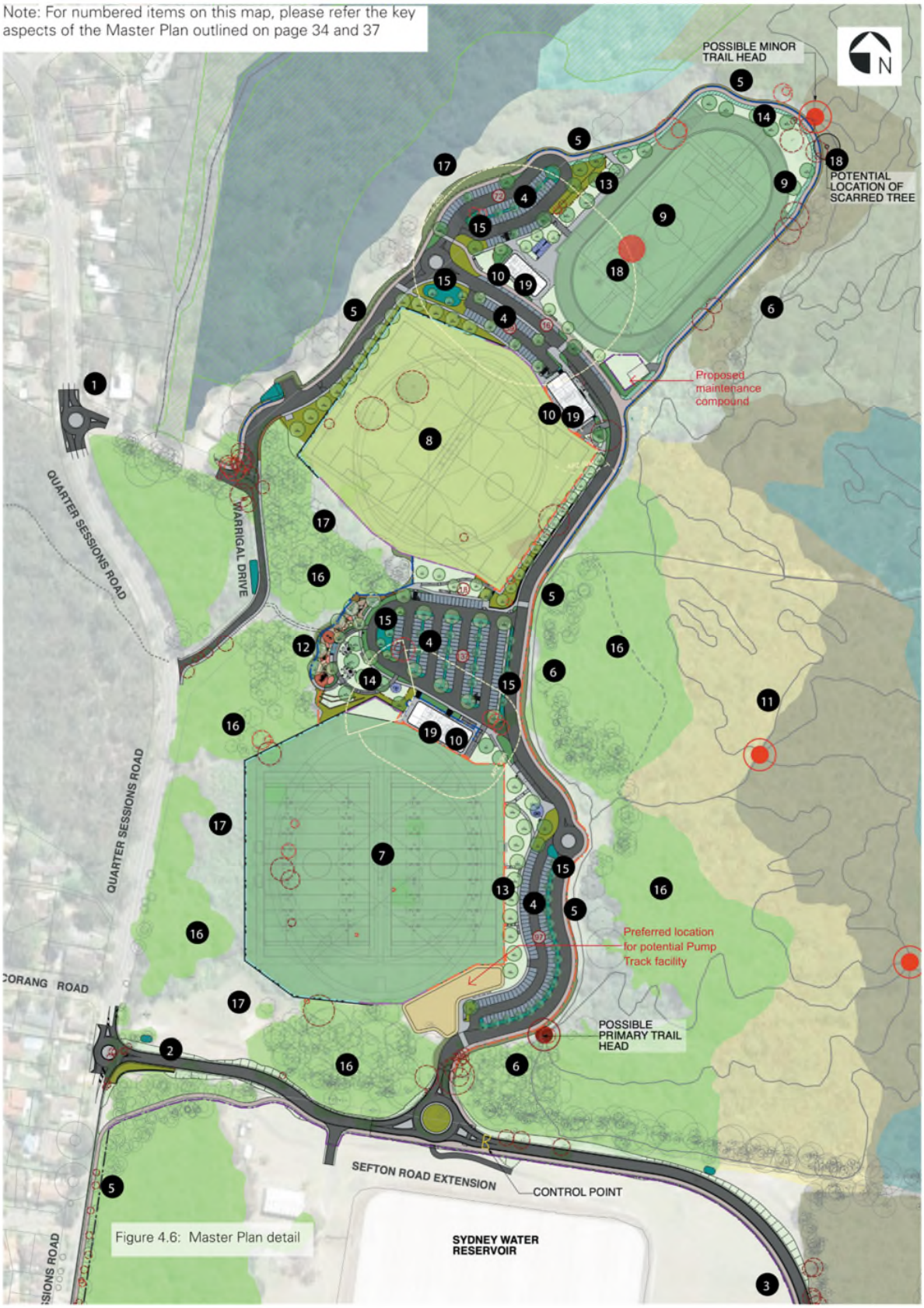

Figure 4.6: Master Plan detail

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7. Southern multi-purpose natural turf sportsfield platform - full senior size

The southern field platform provides the widest area working within the zone defined by adjoining bushland. The Concept Master Plan illustrates a multipurpose playing field platform accommodating two (2) full competition size football fields, or two (2) full-size Rugby fields, or a full-size AFL field, with a full-size cricket field during summer.

The field platform sits above adjoining levels and is flanked by retaining walls of varying heights to the west, Black coloured perimeter fencing again prevents balls leaving the fields and entering the bushland area.

8. Central multi-purpose sportsfield platform

The central multipurpose field platform sits above adjoining levels to the west and is flanked by retaining walls of varying heights along with discrete ball fencing to retain balls within the fields. To the east, the platform is recessed into the landform. This central facility could accommodate a synthetic surface or alternatively be developed as a natural sports turf surface.

The available space in this zone will limit field sizes to dimensions between minimum and maximum sizes for senior competition.

9. Athletics Track and support facilities

The north platform, in the narrowest section of the cleared lands, can support a senior competition athletics track and internal field area (which could be used as a fifth football field if not being used for athletics).

The area can accommodate a line marked grass track or alternatively be developed as an all-weather athletics facility. The internal field areas are proposed to accommodate other field events e.g. shot put, long jump, high jump, discus etc.

10. Multi purpose park amenities buildings

Each of the field platforms is served by an amenities building at the same level as the field. The amenities buildings are accessed off the main carparks or the internal road network.

All the amenities buildings will be designed to reduce operational carbon emissions, conserve potable water and harvest rain water.

11. Natural Areas

An un-authorised mountain bike trail network currently dominates the natural area. Consideration of varied and shared sustainable uses of the natural area is undergoing detailed review.

A range of uses within the natural area may include walking tracks, interpretive signage, mountain bike trails and accessible paths. All uses must be ecologically sustainable and provide for the ongoing conservation of ecological values on the site.

12. Play Space

Between the southern and central field platforms is a passive recreational area that includes a play space area that is integrated into the level changes in this area, with the surrounding bushland as backdrop. The play space could provide a local play facility in accordance with Council's Play Plan 2019.

4.4.3 Informal Recreation

13. Grassed viewing areas

Along the edge of each sport field, shaded grassed sections provide warm up areas and spectator viewing.

14. Open grassed informal games and picnic parkland

An open grassed space with seating and shelter provides for both local use and complements the sports uses of the fields. This area also provides a buffer zone for the playground from the carpark.

4.4.4 Environment

15. WSUD water quality rain gardens

Water Sensitive Urban Design (WSUD) zones will be provided all of the impervious areas, including off street parking and roads to treat runoff and manage flows before it enters the local creek system.

16. Existing TEC bushland protection areas

The cleared area of the site is adjoined by several vegetation communities including the Sydney Turpentine Ironbark Forest (STIF) which is listed as Critically Endangered under the EPBC Act and an CEEC under the BC Act.

The natural areas also support several threatened flora species and provides habitat for threatened fauna species. Future development of the cleared areas, including the long term operational phase, must seek to limit impacts (direct and indirect) on natural areas. Bushland areas will be managed in accordance with Council's general policies for natural area management.

17. Restoration of bushland

Vegetation condition across the site is varied due to historical uses and impacts. Exotic species are readily spread as garden escapees and along watercourses and interfaces with open spaces. Due to the high conservation values of the ecological communities present on site, bushland restoration works will be undertaken to improve the condition of these communities to support their longevity.

18. Scarred Tree conservation

The identified scar tree to be relocated and conserved and interpreted in accordance with ACHAR and ongoing input from Aboriginal stakeholders (an indicative location is shown on the maps in this PoM).

19. Environmental sustainability

Environmentally sustainable design features will be included in the buildings to reduce embedded and operational carbon emissions, such as passive solar design, renewable energy and energy efficient hot water and lighting.

4.5 Staged Implementation of the Master Plan

Delivery of the Master Plan will be staged as funding becomes available, see Figure 4.7.

It is noted that around 40–50% of the cleared portion of the site is proposed to be excavated to natural ground with the landfill material redistributed beneath filled areas.

The final boundary of the stage one area would be based on the detailed volumes of contaminated material yeilded from stage 1 earthworks to be contained and capped, but would generally reflect Figure 4.7.

Stage 1 works would mainly include the southern multi-purpose natural turf sportsfield platform and its amenities, the carpark to the east, the new entry from Quarter Sessions Road along the southern boundary of the site, and the southern portion of internal park road linking to the amenities and the MTB trails. The existing unsanctioned mountain trails will be either upgraded and improved or closed and rehabilitated. Some new trails and a primary trail head will be constructed to facilitate connections and circulation around the network.

The associated utilities would also be required to support the stage 1 works, including electrical substation kiosk, and water and sewer connections. Stage 1 works would include the proposed Sefton Road extension linking the park to Sefton Road for specific controlled use, but not providing a day to day through access.

Stage 2 works will be the remaining construction, including the northern and middle platform, the playground and BBQ/picnic area and associated carparks, amenities and utilities, along with the internal road networks and the upgrade of Warrigal Drive, and the Quarter Sessions Road / Warrigal Drive intersection.

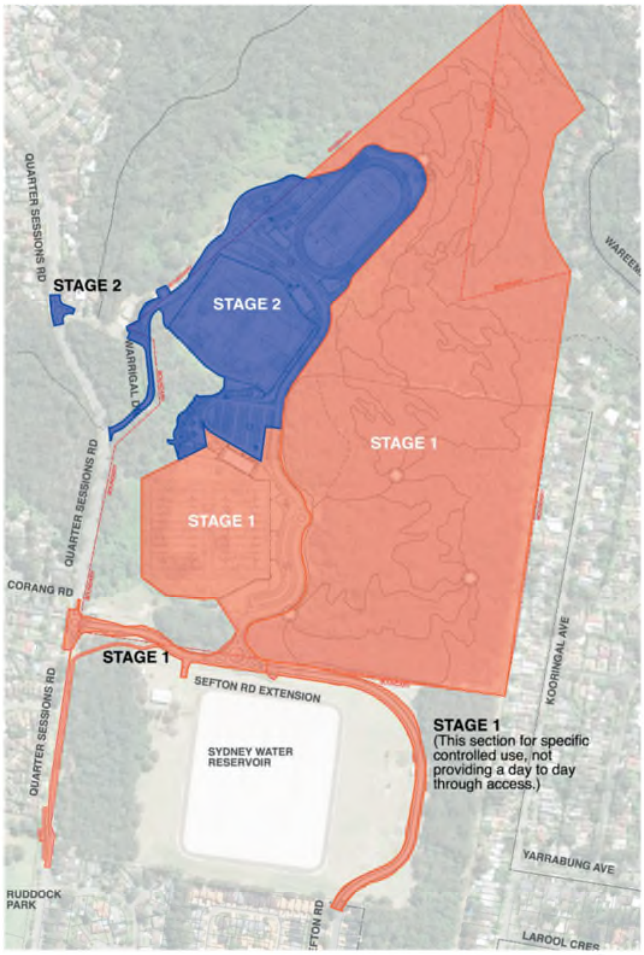

Figure 4.7: Indicative staging options

4.6 Scale and Intensity of Use and/ or Development

4.6.1 Sportsground Facilities

Sportsground facilities in Westleigh Park are taken to include those occurring within land categorised as 'Sportsground' that may include:

- Sportsfields
- Athletics Track and support field facilities
- Site services and infrastructure
- Access roads and parking
- Pedestrian and cycle paths
- Play space facilities
- Supporting grassed parklands

This plan envisages a level of organised sports and sports ground areas comparable to Pennant Hills Park. Potential development of the Athletics facility ranges form a linemarked grass track through to an all weather elite athletics facility.

Field use would be subject to regular bookings or seasonal hire agreements that are subject to renewal each season.

Council would consider other bookings across the seasons for weekly or weekend use that don't clash with seasonal hire on an individual basis subject to ground condition and other factors.

4.6.2 General Community Use Facilities

The amenities facilities would be managed similarly to other sports grounds through a seasonal hire subject to renewal each season. Shared and general community use of buildings on site for a range of community purposes is anticipated.


1


2


3


4


5

Example images:

1. The multipurpose field platforms can cater for all football codes including AFL
2. The Master Plan caters for a linemarked track or an all weather athletics facility subject to needs
3. In the central parkland area play facilities and informal use parklands will be provided
4. Council proposes to sustainably control and manage MTB access through bushland areas in Hornsby
5. Shared paths and supporting pedestrian paths provide for access and recreation / fitness

Source: Google

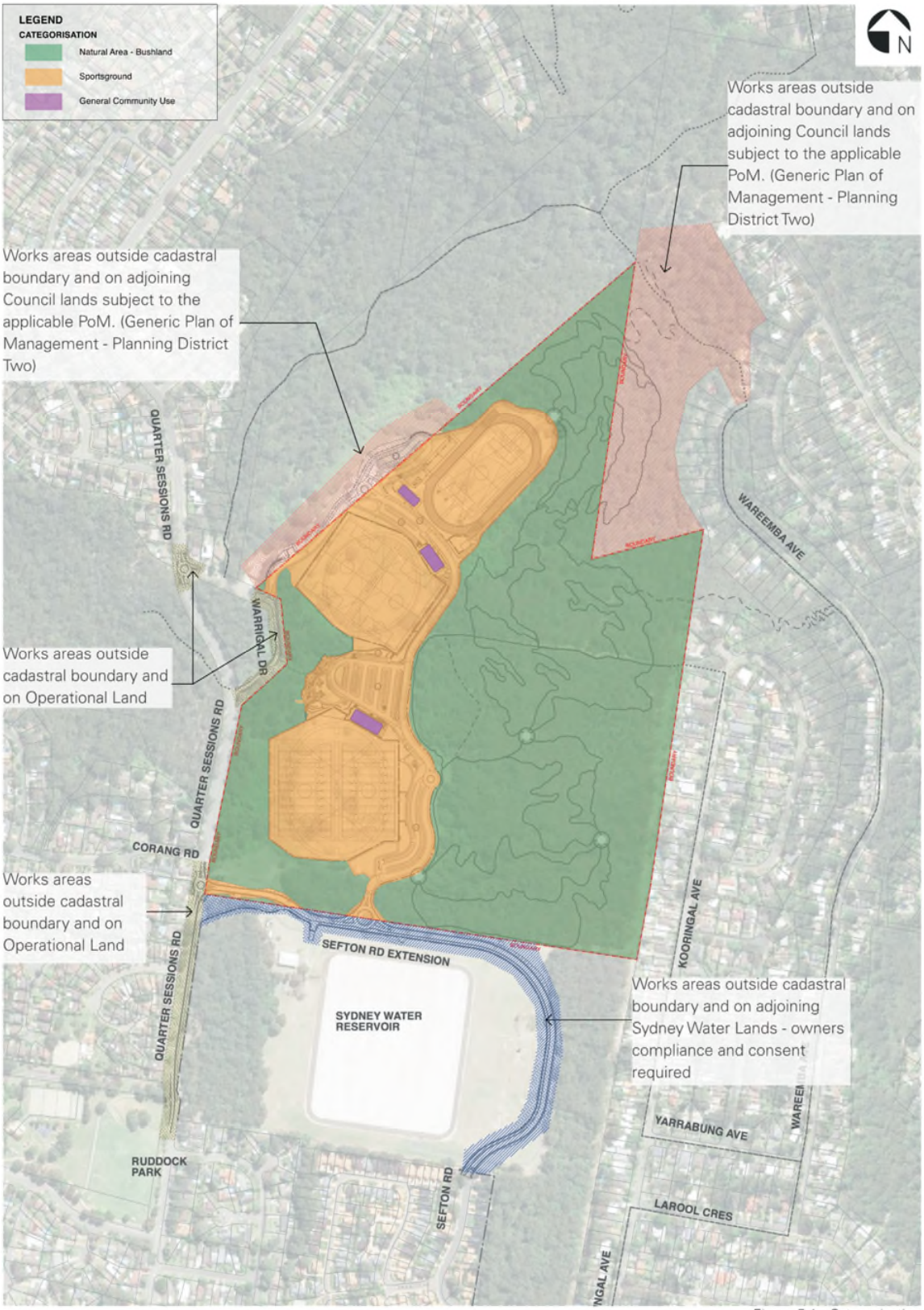

Figure 5.1: Categorisation

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5.0 Categorisation

5.1 Explanation of Categorisation Mapping

For the purposes of this Plan of Management (PoM), it is necessary to assign a categorisation of land which is mapped on Figure 5.1. This reflects Councils' proposed use of the community land for Westleigh Park, in accordance with the Local Government Act 1993, Division 2 - Use and Management of Community Land.

The Master Plan (Figures 4.5 and 4.6) provides an illustration of an intended arrangement of facilities in Westleigh Park, which includes the development of sportsfields, athletics track and support field facilities, amenities buildings, site services and infrastructure, access roads and parking, pedestrian and cycle paths, play space facilities and supporting informal parklands.

The proposed recreation facilities are contained within appropriately categorised areas for future management.

The adoption of this PoM will legislatively enable appropriate development works to be carried out within the various categorisation zones. Adoption would also require commitment to management of the lands in Westleigh Park in accordance with the objectives outlined in the Action Plan forming Part 2 of this PoM.

5.2 Land categorised as 'Sportsground'

The perimeter of the southern, central and northern sports field platforms and their supporting zones comprise the areas proposed to be categorised as 'Sportsground' on the Categorisation Map opposite. This comprises the previously cleared zone of the site which was subject to the various landuses over time as outlined in section 3.3.

5.2 Land categorised as "Natural Area (Bushland)"

The lands categorised as 'Natural Area (Bushland)' comprise the remnant and regenerating bushland areas beyond the previously cleared central zone of the site. As identified in the 2016 site investigations and supplemented by the Eco Logical Australia as part of the Concept Master Plan, the bushland areas include Critically Endangered Ecological Communities under the EPBC Act and an Endangered Ecological Community under the BC Act.

The adjoining bushland known as the "Dog Pound Creek" to the north west of the site is largely the subject of a BioBanking Agreement. The Dog Pound Creek BioBanking area is addressed by a separate Generic PoM for Community Land and Crown Reserves (Planning District 2).

5.3 Land categorised as 'General Community Use'

The areas defined as General Community Use relate to the indicative proposed zones of buildings to serve recreational and general community use including sports, informal recreation and community activities.

Use of the buildings will be subject to Council's evaluation of sporting and community needs and booking arrangements determined for the fields. Council may enter a licence or lease for ongoing use of amenities buildings by user associations or clubs or other community groups.

6.0 Operational Proposals

6.1 Maintenance

Council will be responsible for maintenance of Westleigh Park to a standard that responds to the requirements outlined in this PoM. Part 2 - Action Plan identifies a specific maintenance approach that will be adopted for the upkeep of the asset. Council utilises Council staff, contractors and voluntary resources to assist in meeting the targets identified.

6.2 Leases and Licences

Pursuant to the provisions of Section 46 Parts (1)(b), (2), (4)(a) and (5) of the Local Government Act 1993, Council may lease or license Community Land in a PoM for purposes that are also consistent with the land categorisation and with this PoM.

The Local Government Act requires that all grants of all estates and any lease or licence of Community Land is expressly authorised by a PoM. In accordance with the Act, this PoM expressly authorises leasing and licensing which formalises the use of Community Land by groups, commercial organisations and/or individuals providing facilities or services for public use that is also in accordance with the core objectives for the category of Community Land and objectives of this PoM.

Activities must be compatible with the category of the reserve and provide benefits, services or facilities for users of the land. The terms and conditions of a lease should ensure property management and maintenance, and that the interests of Council and the public are protected.

A lease is generally required where exclusive control of all or part of an area by a party is proposed or desirable in the interest of management of the area. A licence is generally required where intermittent or short-term occupation or control of all or part of an area is proposed. A number of licences can apply at the same time provided there is no conflict of interest.

The maximum allowable period for leases/licences on Community Land under the Local Government Act 1993 is currently a maximum of 30 years for purposes consistent with the categorisation and core objectives of the particular area of Community Land. Community Land may only be leased or licensed if public notice is given, unless exempted under the Local Government Act 1993.

A lease, licence or other estate may be granted for the provision of public utilities and works associated with or ancillary to public utilities, or may be granted, in accordance with an express authorisation in a PoM.

Future Uses

When current leases expire, Council should reassess the lease and licensing arrangements. Issues to be considered when reassessing leases or entering into new agreements include:

- Ensuring all leases and licences are based on a sound asset management basis with rents and charges having regard to market values and other social and economic factors.
- Ensuring all leases and licences meet the requirements of relevant State and Local Government Acts and Council town planning controls.
- Ensuring proposed activities are compatible with the core objectives established in the Local Government Act.
- Negotiating greater financial returns which will contribute to management and maintenance of Community Land.
- Requiring the lessee to carry out improvement works to the leased facility.

All future lease / licence arrangements entered into shall be in accordance with Council's Policies CSISAS 12 – Delegation of Authority to Grant Lease / Licence Agreements, CSISAS 13-Use of Council Buildings by Kindergartens and CSISAS 14 - Lease/Licence of Council Land and in accordance with requirements of the Local Government Act 1993.

Council Policy CSISAS 14 states that the maximum length of lease/licence of Council land will generally be five (5) years. Council may however give consideration to granting an additional period of tenure where special circumstances warrant this occurring.

Where a lease arrangement has been entered into with Council for Community Land, subleasing of the land must be in accordance with the requirements of section 47C of the Local Government Act 1993.

This PoM authorises the following types of leases and licences for Community Land within Westleigh Park:

6.2.1 Leasing and Licensing of Sports Facilities

The granting of leases/licences are expressly authorised for use of sportsgrounds for activities permissible under this PoM, the Hornsby Shire Local Environment Plan 1994, the Local Government Act 1993 and pursuant to Development Consent if required. The following types of sports facility licences will be granted for the exclusive use of sportsgrounds (including playing fields, change rooms, and canteen) or courts (including netball, basketball and/or tennis courts) at nominated times.

Licences and Leases for Sportsgrounds

The granting of leases or licences is expressly authorised by this PoM as required for sports that run on either a summer (September to March) or a winter (March to September) competition basis, or competitions/ sports programs that continue through the year, and possibly from year to year for a period of up to 21 years.

The range of sports possible include but is not restricted to, clubs and associations engaged in Australian Rules Football, Rugby League or Rugby Union Football, Soccer, Baseball, Softball, T Ball, Cricket, Athletics, Touch Football, Hockey, Basketball and Tennis, cycling, mountain bike trail riding,orienteering, and training in all these sports.

Leasing or licensing for the operation of restaurants, cafes, canteens, kiosks or other food outlets are also expressly authorised for a period of up to 21 years.

Licences may cover competition/program events on Saturdays, Sundays and public holidays (after 8am) and Friday and Saturday evenings (twilight events in summer).

Licences may also cover training Monday to Friday including some during daylight hours, but predominantly for training from 5pm to 10pm. During these times of use the club or association will have exclusive use of the sportsground.

Licences will generally be granted for periods of a single sports season or a year, renewable annually or as deemed appropriate by Council. In some circumstances leases or licences may be granted for periods of more than a year and up to 21 years (with the consent of the relevant Minister and where stipulated in legislation), particularly where a hirer has invested in capital improvements at a park. Such a lease or licence may cover an entire building or identified facilities and buildings within a park.

To manage ground wear and tear and maintain the use of grounds use within carrying capacity and to meet the needs of Hornsby Shire residents, limits of use will be placed on the allocation of sportsgrounds. In such cases preference in the allocation of sportsgrounds will be given to hirers based in Hornsby Shire.

Licences for School Use of Sportsgrounds

The granting of licences are expressly authorised by this PoM for Schools for the exclusive use of sports facilities at times during weekdays. The range of sports permissible may include but will not be limited to Australian Rules Football, Rugby League or Rugby Union Football, Soccer, Baseball, Softball, T Ball, Cricket, Athletics, Touch Football, Hockey, Basketball and Tennis.

Licences for Casual Hire of Sportsgrounds

The granting of licences is expressly authorised by this PoM for casual events including, but not limited to, the playing of Australian Rules Football, Rugby League or Rugby Union Football, Soccer, Baseball, Softball, T Ball, Cricket, Athletics, Touch Football, Hockey, Basketball and Tennis; for community events including organised fetes, festivals, parades and performances that may include stall holders engaging in a trade or business; and small-scale private sector events including markets, promotional events, parties, weddings, filming, photography and personal training.

These events may generally be held between the hours of 8am and 10pm. Specific approval will be required to licence events proposed outside these hours.

Leasing or licensing for the operation of restaurants, cafes, canteens, kiosks or other food outlets are also expressly authorised for a period of up to 21 years.

6.2.2 Licences for Special Events

Licences are expressly authorised by this PoM for the staging of special events such as fetes, festivals, fairs, circuses, markets, musicals, theatre, movies, fun runs, art exhibitions, charity or community fundraising performances or events, gala sports carnivals, community carol singing, large picnics, family reunions, private ceremonies, cultural or religious ceremonies, weddings, community education events, pet and animal events, miscellaneous community events, and small scale private sector events such as promotional events, musical or drama performances, art exhibitions, parties, filming and photography.

6.2.3 Leasing and Licensing of sportsground or park Facilities for varied uses

The granting of licences is expressly authorised by this PoM for use of certain parks or a portion of those parks for occasional hire. Activities subject to lease or licence may include but will not be limited to community groups using designated parks or a portion of those parks for regular market days, model boat / plane activities, community fund-raising events that may include stall-holders engaging in a trade or business, private sector events including markets, recreation events such as cross country runs or mountain bike events, promotional events, parties, filming and photography permissible under the Hornsby Shire Local Environment Plan 2013, and other uses permitted under this PoM. These events may generally be held between the hours of 8am and 10pm, with consideration given by Council to the frequency, scale and intensity of events on each occasion. Specific approval will be required to licence events proposed outside these hours, and in consideration of limits to neighbourhood disturbance.

Leasing and licences for restaurants, cafes, canteens, kiosks or other food outlets

This PoM expressly authorises leases and licences for the operation of restaurants, cafes, canteens, kiosks or other food outlets, for periods up to 21 years, or 30 years with State Government ministerial support.

6.2.4 Leasing and Licensing in Natural Areas

Buildings in bushland are used by community groups such as scouts, girl guides and sporting clubs associated with natural area values. The leasing of buildings in bushland in community open space are to be considered on individual merits and may be granted by Council for a period not exceeding 21 years, or 30 years with State Government ministerial support. Public notice will be given if the Council proposes to grant a lease or licence for a period exceeding five years or for five years or less for a use not exempted by the regulations. With respect to Natural Areas, a lease or licence may be granted for the erection or use of the following items pursuant to Development Consent:

- Walkways, pathways, bridges, tracks;
- Causeways;
- Observation platforms; and
- Signs.

A lease or licence may also be granted for the purposes of:

- Information kiosks, refreshment kiosks (but not restaurants);
- Work sheds or storage sheds required in connection with the maintenance of the land; and
- Toilets or restrooms.

6.2.5 Other Leases and Licences

Crossing of Reserves

Section 46 of the Local Government Act prevents Councils from granting leases, licences or other estates over Community Land for private purposes except in the uses described in Section 116 (3 - 5) of the Local Government (General) Regulation 2005. Short term, casual use will only be granted for a purpose consistent with the core objectives for the category of land and for a purpose referred to in section 46 (4) (a) (i) (ii) of the Local Government Act for:

"(a) The provision of goods, services and facilities, and the carrying out of activities, appropriate to current and future needs within the local community and of the wider public in relation to any of the following:

i. public recreation;

ii. the physical, cultural, social and intellectual welfare or development of persons."

Such licences are expressly authorised by this PoM.

Easements and reservations

In accordance with the requirements of the Local Government Act 1993, this plan expressly authorises Council to grant easements for authorities, organisations or individuals in favour of private lands over lands identified in this PoM, providing Council is satisfied there is no reasonable alternative and that appropriate benefits are obtained for the Community Land. Any adverse impacts on playing surface or drainage is to be remediated at the cost of the holder of the easement. Council will not be responsible for any loss or damage caused through any act or omission of Council to any structures or facilities within the easement.

As indicated on Figure 6.1 on the next page there are no easements applying to the Westleigh park site currently.

Liquor Licences

Although granting of liquor licences are subject to other approvals and are not at the sole discretion of Council, this PoM allows for Council to give permission as the landowner for liquor licences on Community Land subject to other necessary approvals. Applications for liquor licences will be considered on individual merits and will only be considered when Council is satisfied that the licensee can meet legislative requirements for responsible service of alcohol. Such licences are expressly authorised by this PoM.

Casual Liquor Licences

The consumption of alcohol in reserves under the care, control and management of Hornsby Shire Council are expressly authorised by this PoM but only with written Council consent under the following conditions:

- People will not be allowed to enter or remain in reserves in an intoxicated state;
- People will not be permitted to consume alcohol in reserves while junior games are in progress; and
- People will not be permitted to consume alcohol within 10 metres of children's play areas.
- The 'Park Rules' Notice contained in the Appendix allows for this.

Granting of Estates

This PoM allows Council to grant 'an estate' over Community Land for the provision of public utilities and works associated with or ancillary to public utilities in accordance with the Local Government Act 1993. Estates may also be granted across Community Land for 'the provision of pipes, conduits or other connections under the surface of the ground for the connection of premises adjoining the Community Land to a facility of the Council or other public utility provider that is situated on the Community Land. Estates will be granted in accordance with the requirements of the Local Government Act 1993.

An estate in respect of Community Land is authorised by this PoM for the purpose of a 'public road' are expressly authorised by this PoM under the following conditions (S.47F):

- Where the provision of that road is consistent with the core objectives.
- Where that road is necessary to facilitate enjoyment of the land or any facility on that land.
- Where other means of access other than public road access have been considered.

Public Utilities

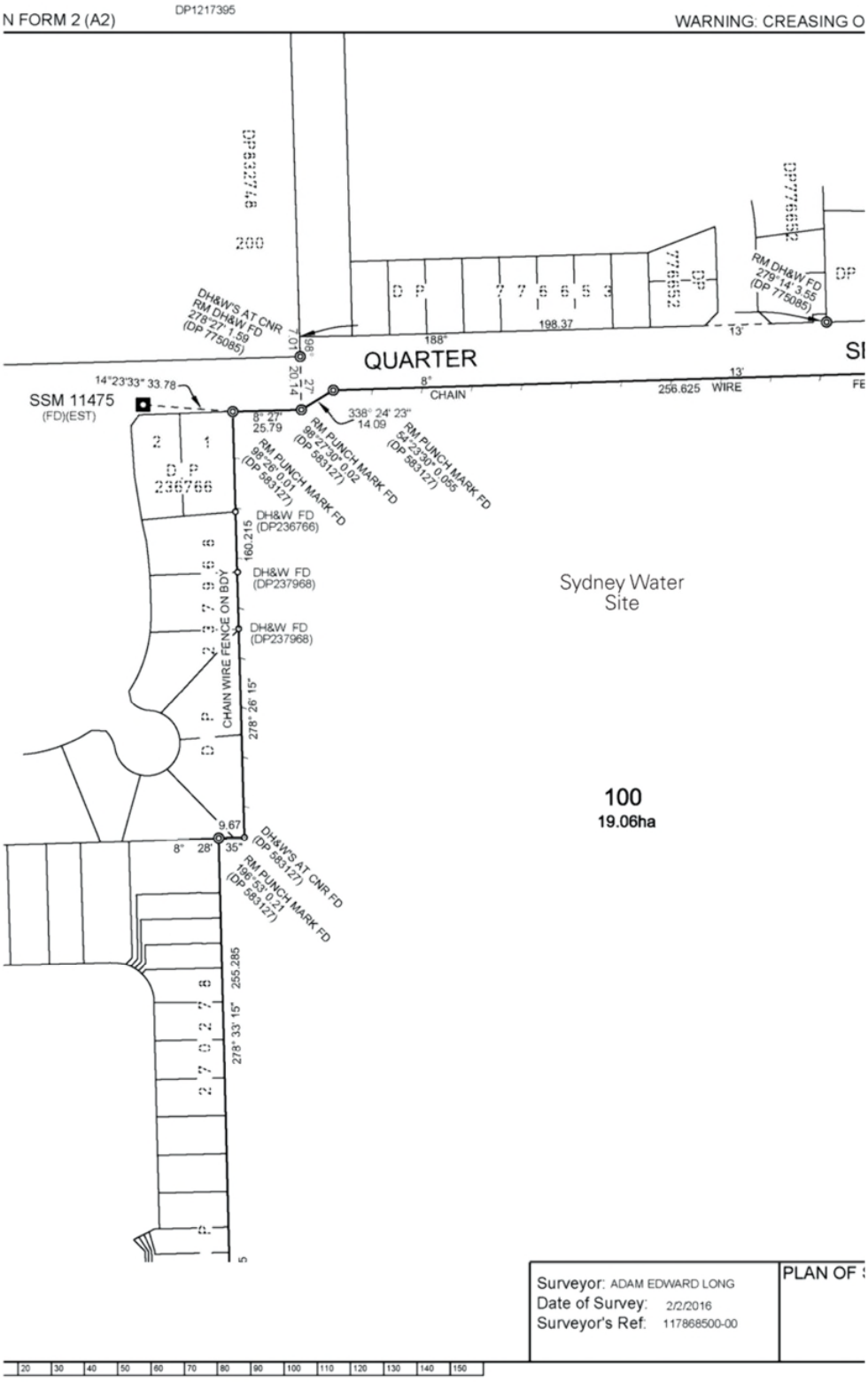
This PoM expressly authorises Council to enter into leases, licenses or other forms of agreement with relevant authorities, organisations or individuals in relation to the provision of services or utilities for a public purpose.

Remediation and earthworks to establish a park

This PoM foreshadows the excavation and regrading of the cleared area that has been subject to past landuses and requires capping to address contamination issues. Remediation will also require importation of environmental and landscape materials to facilitate the capping and parkland finishes. The PoM authorises the granting of a lease, license or other estate over the necessary portions of Community Land (excluding Natural Areas) covered by this PoM for the purpose of importing materials required for remediation and park development. Planning approvals for such work will be determined by Council as required.

A lease, licence or other estate will be pursuant to Section 46(1)(b)(ii) of the Local Government Act 1993. The lease, license or other estate will be for purposes prescribed by sections 36F and 36G of the Local Government Act 1993 for Community Land categorised as a Sportsground. The lease, license or other estate will be for a period of less than five years.

ATTACHMENT 2 - ITEM 5



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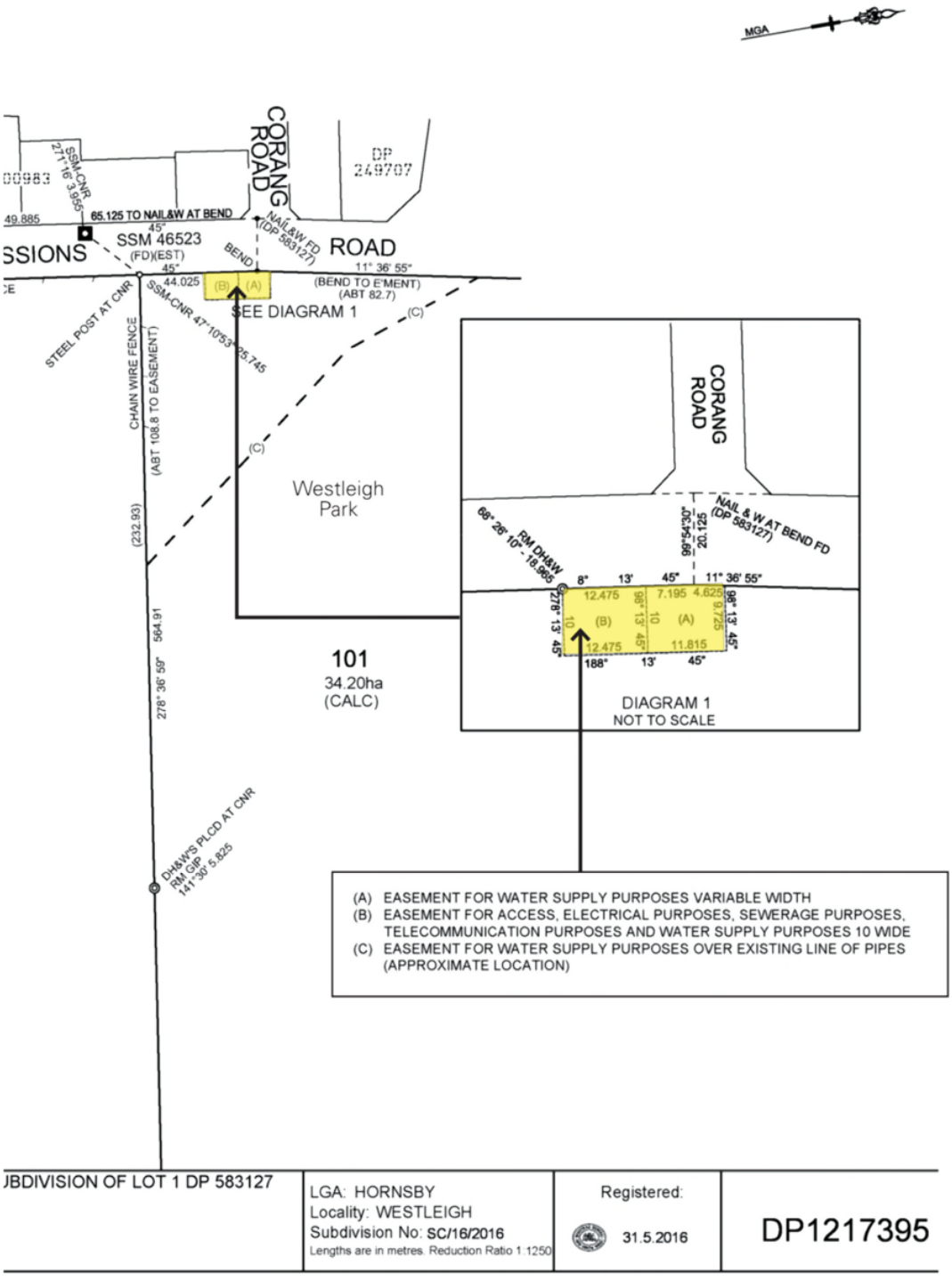

Figure 6.1: Existing Easements

Pultenaea villosa in flower in Westleigh Park bushland (source: Hornsby Council)

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Part 2

7.0 Action Plans

The Action Plan has been developed to support management goals for the proposed developments of Westleigh Park. It provides statements on how objectives and performance targets will be implemented and outcomes managed into the future. Following are definitions of the terms used in the Action Plan:

'Management Statement' indicates how the objectives of the PoM will be addressed and implemented and what users and the general public may expect in the provision of the service in Westleigh Park.

'Actions' are the specific statements that elaborate on the strategy contained in the Management Statement.

'Management Team (Mgt Team)' provides which team within Council will have primary responsibility for the Action.

These are abbreviated as below:

HSC: Various Hornsby Council
MC: Management Committees
MCC: Manager Corporate and Community
MCS: Manager Community Services
MAOM: Manager, Asset Operations and Maintenance
MF: Manager Financial Services
MHR: Manager Human Resources
MPR: Manager Parks, Trees and Recreation
MRI: Manager Risk and Insurance
MSP: Manager Strategic Planning
MTRS: Manager Traffic and Road Safety
MNR: Manager Natural Resources
MWM: Manager Waste Management
NL: Neighbouring Landholders
P: Proponent
PAT: Parks Asset Team
PSU: Parks Service Unit
RFS: Rural Fire Service
SU: Sportsground Users

7.1 Time Frame

Definitions of timing for actions are as follows:

S	(Short Term)	Action completed within 2 years
M	(Medium Term)	Action completed within 2 - 4 years
L	(Long Term)	Action commenced after 4 years
O	(Ongoing)	Action carried out on a regular basis for the term of this Plan of Management

7.2 Performance Measures

Performance Measure are how Council knows what progress is being made relative to the time frame established for the actions, or whether the final achievement is realised. This section of the Plan will require review to ensure it is an effective working document. It will provide a framework for management consistent with anticipated availability of resources and anticipated community needs.

7.3 Environmental Factors

The Action Plan contains elements that address the need to assess the environmental impacts of an activity. Measures to minimise such impacts are contained in the Action Plan. The timing determined for improvements will be subject to the availability of funds and will require revision if circumstances alter.

7.4 Assessment

Assessment of targets will take place in reviews of the Action Plan at intervals of between five to ten years. Monitoring of actions within this Plan of Management will occur on an annual basis. Assessment will include qualitative and quantitative reviews of targets.

8.0 Action Plan for all Categories of Community Land

Management Statement	Action	Mgt. Team	Timeframe	Performance Measure
8.1 Operating Standards				
8.1A Environmental Sustainability				
Ensure the adjoining land uses minimise impacts on the natural environment.	■ Ensure that active uses of Council or Crown land have a minimum impact on bushland.	MPR	O	■ The improved condition of core bushland and bushland interfaces and natural watercourses. ■ Fauna diversity and abundance maintained and improved.
8.1B Maintenance Personnel				
Skilled and experienced labour is used to implement specialist works as specified in the Service Level Agreement.	■ Works including traffic control, pesticide applications, pruning of trees and shrubs, hedges, bush regeneration and arborcultural work is to be carried out by suitably qualified and / or trained staff. ■ Appropriate training is provided for staff involved in the above tasks.	MPR (PAT / PSU)	O	■ Staff carrying out specialist maintenance works specified in the Service Level Agreement, are appropriately skilled and trained.
8.1C Council Staff Health and Safety Standards				
At all times Council employees and contractors will comply with Work Health and Safety Standards.	■ Train Council staff in Work Health and Safety Standards. ■ Maintain work practices to comply with Work Health and Safety standards. ■ Encourage staff to report breaches of Work Health and Safety standards to the designated WH&S officers.	HSC	O	■ Safe Work Method Statements are regularly prepared, reviewed and communicated to staff. ■ Reduction in the number of incidents recorded onto Safehold (Council's WHS management system).

Management Statement	Action	Mgt. Team	Timeframe	Performance Measure
8.1D Legislative Standards				
Services are provided to agreed national and industry standards, SEPP Infrastructure, the HSLEP and policies and standards resultant from public consultation. Developments are undertaken with regard to the relevant legislation.	■ Staff are up to date and familiar with the relevant legislation impacting upon the level and standard of Council services. ■ Awareness of SEPP (Infrastructure), HSLEP, Crown Lands Act and other important legislation is promoted with staff.	MPR	O	■ Activities of Council uphold legislative requirements. ■ Business processes incorporate legislative requirements. ■ Staff are trained in legislative requirements.
8.1E Technical Standards				
The design of any new structures on community land must comply with the relevant Australian standards. Monitoring requirements will comply with those specified in Service Level Agreements.	■ New buildings and structures comply with the relevant standards. ■ Work will be monitored to assess compliance with requirements specified in the Service Level Agreement.	HSC MPR PAT / (PSU)	O O	■ All new buildings and structures on community land comply with the relevant building standards. ■ Service Level Agreement work is monitored and reports generated to reflect monitoring outcomes.

Management Statement	Action	Mgt. Team	Timeframe	Performance Measure
8.1F Facility development at sportsgrounds				
Sportsgrounds will be developed to a standard consistent with council's economic and budget sustainability objectives. Sports facilities will be developed only on suitable reserves and to meet identified needs. Sportsground development will be funded from a variety of sources.	■ Sportsgrounds are intended to provide primarily for suburban amateur competition level sport. ■ Development of elite-standard facilities will not necessarily be funded by Council however Council may allow hirers to do so. ■ Address standards for supporting infrastructure e.g. canteens, change-rooms and storage areas. ■ Improved or enlarged canteens, club equipment storage areas, club meeting rooms, covered spectator areas, gymnasiums and the like are outside the responsibility of Council to provide, but may be provided where a level of co-funding is present.	MPR	O	■ Council funds are not diverted for the provision of elite-standard sports facilities and supporting infrastructure.

Management Statement	Action	Mgt. Team	Timeframe	Performance Measure
8.2 Equity and Access				
8.2A Disabled / Stroller Access				
Provide access for disabled users and strollers onto community land where possible.	■ Address unsuitable access, providing access paths where appropriate and as finances allow. ■ Satisfy the requirements of the Disability Discrimination Act 1992 and the Anti-Discrimination Act 1977. ■ Where parking areas are provided for the community on community land, provide appropriate number of parking spaces in accordance with the requirements of the Access and Mobility DCP, to allow access for users with disabilities.	HSC	M O S	■ Disabled / stroller access is provided into appropriate areas of community land. ■ Requirements of the Disability Discrimination Act and Anti-Discrimination Act are met as resources and conditions allow.

Management Statement	Action	Mgt. Team	Timeframe	Performance Measure
8.2B Equity of Access to Council Reserves and Facilities				
Strive to provide equal opportunity of access to community land for all sectors of the community. Recognise the role of community sports clubs in using Council facilities to operate sport.	■ Consider historical use and hiring patterns when assessing facilities for allocation. ■ When opportunities arise to review allocation of facilities, weighting is to be given to groups with female, disabled, non-English speaking background and other membership bases. ■ Organisations based in Hornsby Shire and with a high proportion of residents of the Shire shall be favoured. ■ Provide access to reserves and buildings within reserves for the disabled where practical. ■ When opportunities to redistribute allocation of Council facilities arise, the principle of satisfying the greatest demonstrated recreation or leisure need. ■ Implement relevant findings of the Disability Inclusion Action Plan and Play Plan as practical.	HSC	O	■ Equity of access is considered when an opportunity arises to review allocation of use of Council facilities.

Management Statement	Action	Mgt. Team	Timeframe	Performance Measure
8.2C Un-authorised Camping				
Camping will not be allowed in most parks except in support of a special event and with a licence or other express consent of Council. Council recognises that all people should have access to private or public housing which meets their individual needs, and equally that all people have a right to enjoy public reserves for activities that do not impact on other users' enjoyment. People will be encouraged not to camp in public reserves unless in designated camping areas or otherwise use public reserves in ways that impact on access by other users.	■ Parks will be patrolled in order to curtail un-authorised camping. ■ Council will enlist appropriate support services to assist in providing alternative accommodation for homeless people in public reserves when complaints arise. ■ Rangers and Parks maintenance staff will patrol parks to discourage or prevent people from un-authorised camping in public reserves.	MPR HSC PAT/ PSU	O O O	■ Low number of reported cases of un-authorised camping. ■ The support of agencies able to assist the homeless where conflicts between park users and un-authorised campers occur. ■ Parks are patrolled as resources allow, discouraging un-authorised camping in reserves.
8.3 Anti-social behaviour				
8.3A Deterring anti-social behaviour				
Develop and implement programs to minimise incidents of anti-social behaviour on community land.	■ Design future facilities to allow easy surveillance where possible. ■ Maintain surveillance patrols as required. ■ Provide security lighting as appropriate.	MPR PSU MPR	O O O	■ Facilities within parks and sportsgrounds are designed to reduce opportunities for vandalism. ■ Surveillance patrols are carried out at known problem times. ■ Low / reduced number of reports of anti-social behavour.

Management Statement	Action	Mgt. Team	Timeframe	Performance Measure
8.4 Reserve Naming and Dedications				
8.4A Naming of Reserves and Dedications				
The naming of reserves and dedications are undertaken according to Council criteria and with reference to Council's Dual Naming Policy Dedications on community land comprising of plaques, signs and other structures are made in recognition of substantial contributions to the conservation and maintenance of that land and require written Council permission. Other dedications will be assessed on an individual basis.	■ Naming preference is given to geographical names (such as road and suburb), aboriginal names, historical names, or names of deceased persons who have made a major contribution to the reserve or early history of the reserve's locality. ■ Assessment on merits, visual amenity and applicable standards is undertaken prior to approval of any dedication.	HSC HSC	O O	■ Integrity and meaning is maintained when naming community land. ■ Dedications within community land have high merit and significance.
8.5 Protecting Fauna and Fauna Habitats				
8.5A Fauna Impacts				
Native fauna is protected and habitat conserved on community land.	■ All work is to minimise impacts on native fauna and habitat. ■ Dead trees and hollow bearing trees are to be retained. ■ Any hollow bearing trees to be removed due to risk assessment recommendations shall have the habitat features retained within the natural areas of the park. ■ Pesticide use is considerate of impacts upon fauna. ■ Operational phase of development to minimise impact on native fauna.	HSC	O	■ Fauna habitat is enhanced and conserved where possible. ■ Fauna diversity and abundance maintained and improved.

Management Statement	Action	Mgt. Team	Timeframe	Performance Measure
8.6 Conservation of Resources				
8.6A Reduction of Resource Use and Energy Efficiency				
Use of recycled materials and energy reduction programs are implemented in capital works projects and maintenance programs.	■ Increase use of recycled materials in capital works projects and maintenance programs. ■ Recycling of green waste. ■ Reduction of electricity and water use.	HSC	O	■ Higher percentage of recycled material is used in capital works and maintenance programs. ■ Green waste is recycled. ■ Measures for reducing the use of water derived from dam storages (potable water) and energy derived from non-renewable fuels are investigated.
8.7 Impacts of Developments and Activities				
8.7A Impacts of Developments and Activities				
Identify and address impacts of developments and activities on neighbouring properties where development approval is not required	■ Address parking requirements and impacts of additional traffic from proposed developments. ■ Address impacts of noise and lighting from proposed developments and activities on neighbouring properties.	HSC	O	■ Potential impacts of proposed developments and activities such as parking, traffic; noise and lighting on neighbouring properties are addressed.

Management Statement	Action	Mgt. Team	Timeframe	Performance Measure
8.8 Leases and Licences				
8.8A Leases and Licences				
Leases and licences are granted in accordance with the requirements of the Local Government Regulation and Act.	■ Conditions apply to ensure proposed activities on community land comply with core objectives of the LG Act. ■ Leases and licences are granted in accordance with the requirements of the Local Government Act and Local Government Regulation 1999 and in accordance with Council's policies for development, use, leasing and licensing of Community land as stated in Part 1 of this PoM.	HSC	O	■ All activities on community land comply with the core objectives of the Local Government Act and Regulations. ■ Leases and licences comply with the requirements of the LG Act and with Council's policies.
8.8B Use/Sale of Alcohol in Reserves				
Applications to Council for use/ sale of alcohol in public reserves are considered individually.	■ 'Park Rules Notice' permits use / sale of alcohol in public reserves subject to Council approval and approval of other relevant bodies. ■ Council approves / rejects applications for such licences on individual merits.	MPR MPR	S O	■ Park Rules notice is posted. ■ Applications for use / sale of alcohol in public reserves are considered on individual merits subject to approval of other relevant bodies.
8.8C Reserve Crossings				
Reserve crossings are only granted in accordance with the requirements of the Local Government Act and Regulation, and Crown Lands Act (where relevant).	■ No reserve crossings for private purposes are approved, except in accordance with the stated legislation and as outlined in this PoM.	MPR/MNR	O	No licences for crossing of reserves for private purposes are granted except in accordance with the stated legislation and as outlined in this PoM.

Management Statement	Action	Mgt. Team	Timeframe	Performance Measure
8.9 Communications Towers				
8.9A Communications Towers on Community Land				
Allow the lodgement and assessment of Development Applications for communications towers on merit.	■ If approved, communications towers generate income for the management of community land.	HSC	O	■ Council derives income from any approved communications towers and applies it to management of community land.
8.10 Volunteer Insurance				
8.10A Volunteer Insurance				
Volunteer groups working on community land are covered by appropriate insurance as required by Council's Risk and Insurance Manager.	■ Register volunteer workers with the Risk and Insurance Manager prior to work being undertaken, as required. ■ Provide instruction in safe work methods to volunteer groups.	HSC/MRI	O	■ Volunteer workers are registered prior to working on community land.
8.11 Funding				
8.11A Funds Received from User Fees				
Funds derived from use of community land are allocated in accordance with the Local Government Act.	■ Money derived from use of community land is expended on community land acquisition and community land management requirements in accordance with S.409 of the Local Government Act 1993.	HSC	O	■ Funds derived from community land use are allocated to future community land management and acquisition.

Management Statement	Action	Mgt. Team	Timeframe	Performance Measure
8.11B Through Life Costs				
Adopt an appropriate level of funding for maintenance of facilities within a financial year and over the whole life of an asset.	■ Determine level of funding required to maintain community land facilities in accordance with the PoM. ■ Annually adopt an appropriate budget to allow for maintenance of reserves.	HSC HSC	O O	■ Facilities are maintained within budget and in accordance with the PoM.
8.11C Fees				
Set and maintain an appropriate level of hire fees for use of facilities on reserves.	■ Fees are set according to community service and cost recovery principles contained in the Fees and Charges volume of Council's annual Management Plan.	HSC	O	■ Level of fees is determined and adopted by Council annually.

9.0 Action Plan for Parks and Sportsgrounds

Management Statement	Action	Mgt. Team	Timeframe	Performance Measure
9.1 Notifications				
9.1A Park and Sportsground Availability				
Council will determine the status of ground closures due to weather for weekend sport by 2pm on Fridays.	■ User groups will be notified at the earliest possible convenience of changes to sportsground and park availability due to wet weather in accordance with.	MPR (PAT / PSU)	O	■ 90% satisfaction as measured by the 'to be implemented' end of season user survey. ■ Wet Weather Line 100% accurate at all times.
	■ Council makes a determination as to whether a ground is suitable for weekend play where rain occurs after close of business on Fridays and will be responsible for any resulting ground damage.	MPR	O	
	■ Maintain wet weather information on Council's website.	HSC	O	

Management Statement	Action	Mgt. Team	Timeframe	Performance Measure
9.1B Notification of Works				
User groups will be notified of the need to cancel events due to major maintenance or capital works. Residences / businesses / park users will be notified of any proposed works which may impact on them.	■ Notify user groups at the earliest possible convenience of changes to sportsground and park availability due to major maintenance or capital works. ■ Give residents / businesses/ park users 48 hours notice in writing of any proposed work that will affect them detailing location, date and time of work, unless otherwise directed or in the case of emergency works being required.	MPR (PAT / PSU)	O	■ Major user groups are always notified of major maintenance or works that will impact upon the use of the park or oval. ■ Residents / businesses are notified in accordance with the Service Level Agreement.

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Management Statement	Action	Mgt. Team	Timeframe	Performance Measure
9.2 Protecting the Natural Environment				
9.2A Use of Pesticides				
The use of pesticides in parks and sportsgrounds will be kept to a minimum to comply with the relevant codes of practice and legislation to minimise any health effects and / or impacts on the environment. Broad leaf, grass weeds and grass like weeds are effectively kept under control and / or eliminated.	■ Use of pesticides will comply with the relevant codes of practice and a safe work method statement. ■ Undertake notification of pesticide applications through a pesticide notification plan. ■ Use minimum toxicity sprays for treating weeds in parks and sportsgrounds and spray when desirable grasses are dormant. ■ Selection of appropriate grass species. ■ Staff utilising herbicides are to be suitably qualified and / or trained. ■ Utilise quality integrated turf management practices on sportsgrounds to develop vigorous dense turf to minimise weed infestation and turf pests and diseases. ■ Weed control to be implemented as funding allows. ■ Selection of low toxicity linemarking products.	MPR (PAT / PSU)	O O S O O O O O	■ Pesticide use is minimised and complies with the relevant codes of practice. ■ Programme for treating weeds is improved through application timing and methods. ■ Appropriate grass species are selected. ■ Staff utilising herbicides are suitably qualified and / or trained. ■ Integrated turf management practices are implemented on sportsgrounds. ■ Linemarking materials do not damage turf. ■ Legislation, plans and safe work method statements are followed.

Management Statement	Action	Mgt. Team	Timeframe	Performance Measure
9.2B Use of Fertilisers				
Fertilisers are applied to maintain a safe, wear resistant playing surface.	■ Sportsgrounds and gardens are fertilised with appropriate fertiliser at best possible application times. ■ Annual soil analysis tests are carried out for selected sportsgrounds to determine nutrient requirements. ■ Fertilising program is implemented each year for each sportsground. ■ Plant species are chosen for low fertiliser requirement where appropriate.	MPR (PAT / PSU)	O	■ Sportsgrounds and gardens are fertilised in an environmentally sustainable manner.
9.2C Erosion Control				
Erosion control measures are implemented for works where there is potential for erosion of exposed soil and downstream waterways.	■ All activities resulting in exposed soil are to be assessed for potential erosion of exposed soil into a watercourse. ■ Where potential for erosion is identified, erosion control measures are to be implemented.	MPR (PAT / PSU)	O	■ Water quality and quantity flowing from the site comply with relevant guidelines and standards.
9.2D Gardens – Species Selection				
Plant species used in parks and sportsgrounds adjoining bushland are to be compatible with the natural areas and habitat requirements.	■ Use indigenous plants or other non-invasive species in garden areas of parks and sportsgrounds adjoining bushland.	MPR	O	■ Indigenous plants or other non-invasive species are used in garden areas where adjoining bushland.

Management Statement	Action	Mgt. Team	Timeframe	Performance Measure
9.3 Availability of Facilities and Grounds				
9.3A Parks Booking Service				
During normal business hours a responsive booking service will be available.	■ Ensure a booking officer or other Council staff member will be available between 8.30am and 5.00pm to take booking details and answer enquiries.	MPL	ST	■ Booking service is always available during Council's business hours.
9.4 Maintenance of Facilities and Grounds				
9.4A General Maintenance of Parks and Sportsgrounds				
Sportsgrounds and parks will be maintained in a safe and aesthetically pleasing condition consistent with the type of recreational use.	■ Undertake routine safety and suitability inspections and maintenance. ■ Sports grounds are marked before the days play to the sporting codes specifications and standards. ■ Maintenance passes include checks of recreational facilities within parks.	MPR MPR MPR	O O O	■ Carry out maintenance operations in accordance with external contract or internal Service Level Agreements. ■ Grounds are always correctly marked and ready for the identified sporting code before the day of play. ■ Requests for maintenance are responded to or actioned in accordance with Council's adopted service level agreements. ■ Turf on sportsgrounds is maintained at a height of 75mm or less, bare areas repaired following the winter season and weeds controlled where budget allows.

Management Statement	Action	Mgt. Team	Timeframe	Performance Measure
9.4B Level of Service				
Parks and sportsgrounds will be provided with a level of service treatment consistent with the level of community use.	■ Level of service grading will be allocated on a reserve by reserve basis as high, medium or low, which is generally daily for high, monthly or fortnightly for medium and quarterly or as requested for low. This frequency may be changed according to weather or budget constraints.	MPR	O	■ Maintenance is implemented in accordance with Service Level Agreements.
9.4C Upkeep of Amenities				
Amenities, including toilets, showers and change rooms, will be made available at all sportsgrounds in a safe and aesthetically pleasing condition.	■ Monitor amenities to ensure they are available in an acceptable condition. ■ Assess the need for amenities in sportsgrounds and parks that do not provide these services.	MPR MPR	O O	■ Facilities are available at all identified major grounds in a safe and acceptable condition at all times. ■ Amenities constructed as required.
9.4E Barbecues				
Barbecues in parks and sportsgrounds will be clean and operable.	■ Barbecues will be cleaned in accordance with service level agreements.	MPR (PAT / PSU)	O	■ Barbecues are operable 95% of the time. ■ Requests for maintenance are responded to or actioned in accordance with service level agreements. ■ Maintenance is implemented in accordance with Service Level Agreements.

Management Statement	Action	Mgt. Team	Timeframe	Performance Measure
9.4F Fences				
Park and sportsground fencing will be maintained in a safe condition.	■ Replace damaged fencing as required. ■ Council is not required to build, maintain or contribute towards dividing fences between parks or sportsgrounds and adjoining private properties.	MPR (PAT / PSU)	O	■ Requests for maintenance are responded to or actioned-in accordance with service level agreements. ■ Maintenance is implemented in accordance with Service Level Agreements. ■ Council will not contribute towards dividing fences on park boundaries unless Council deems that there is a community interest reason to do so.
9.4G Taps and Bubblers				
Taps and bubblers in parks and sportsgrounds will be operational.	■ Reports of leaking taps or bubblers will be responded to promptly.	MPR (PAT / PSU)	O	■ Requests for maintenance are responded to or actioned in accordance with service level agreements Maintenance is implemented in accordance with Service Level Agreements.
9.4H Signs				
Signs are legible and are erected in highly visible locations within parks and sportsgrounds.	■ Install signs in highly visible locations. ■ Replace damaged / vandalised signs where they have been rendered illegible.	MPR (PAT / PSU)	O	■ Signs are visible. ■ Damaged signs are replaced as required.

Management Statement	Action	Mgt. Team	Timeframe	Performance Measure
9.4l Playgrounds				
Council will comply with the Australian Standards for playgrounds and play equipment.	■ Design and maintain playgrounds and play equipment to relevant safety standards where possible. ■ Undertake safety inspections and regular maintenance in accordance with Service Level Agreements. ■ Manage playgrounds according to asset management principles	MPR (PAT / PSU)	O	■ Safety in playgrounds and for playground equipment is upheld to Australian Standards (AS 1924, AS 4422 and AS 4486). ■ Maintenance is implemented in accordance with internal Service Level Agreements. ■ Comprehensive inspections are undertaken on a quarterly basis. ■ Ensure that playgrounds are managed through their life cycle and replaced at the end of it only if the replacement best meets community needs and Council's economic viability.

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Management Statement	Action	Mgt. Team	Timeframe	Performance Measure
9.4J Tree Maintenance Standards				
Trees in all categories of community land and crown reserves are maintained by suitably qualified and / or trained personnel in accordance with the Service Level Agreement and Australian Standards.	■ Tree works are carried out in accordance with Work Cover Code of Practice: Amenity Tree Industry 1998 and conform to AS 4373 – 1996. ■ All work is to be undertaken in accordance with the specifications in the internal Service Level Agreements or external contracts. ■ Staff are to appropriately trained for the tasks they perform. ■ Trees are underpruned to remove obstruction to footpaths, roadways, traffic visibility, electric power lines, lighting, private and public driveways or crossings.	MPR (PAT / PSU)	O	■ Tree work is carried out in accordance with relevant standards and codes. ■ Staff training programs implemented as required. ■ Work is implemented in accordance with specifications in the Service Level Agreement. ■ Obstructions from trees on community land are minimised.

Management Statement	Action	Mgt. Team	Timeframe	Performance Measure
9.4k Floodlight Standards				
Sportsground floodlights will be provided and maintained according to Australian Standards and to the most energy efficient means of operation. Floodlighting level will be based on the required night service level of the facility and the capacity of the site to meet required standards.	■ Floodlights design will meet all required standards for lighting levels and light spill ■ Floodlight luminaires will be the most energy efficient fittings capable of meeting standards ■ Control systems will be manual switch -on, timer switch-off, or remotely controlled, and adjusted seasonally according to ground allocations ■ Lights will be checked, cleaned and aimed annually	MPR	O	■ Impact on fauna in adjoining natural areas is minimised.

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Management Statement	Action	Mgt. Team	Timeframe	Performance Measure
9.4L Irrigation system standards				
Irrigation systems will be maintained to maximise water efficiency.	■ Irrigation systems will be checked and repaired regularly for leaks and malfunctioning fittings. ■ Control systems will be adjusted for prevailing weather patterns. ■ Stormwater and rainwater harvesting systems and other independent water supply systems will be provided. ■ Subsurface irrigation systems will be considered where new systems are installed. ■ Park and oval construction methods aimed at reducing water reliance will be used in designs.	MPR	O	■ Progress will be made towards reducing reliance upon potable water supplies for irrigation.

Management Statement	Action	Mgt. Team	Timeframe	Performance Measure
9.5 Risk Management				
9.5A Sportsgrounds				
Parks and Recreation Team and sportsground users are responsible for checking the risk management aspects of sportsgrounds.	■ Parks and Recreation to check sportsgrounds on a regular basis in accordance with the internal Service Level Agreement. ■ Users are required to check grounds immediately prior to use to determine if appropriate for play as part of their licence conditions.	MPR (PAT / PSU) SU	O O	■ Sportsgrounds are checked regularly by Parks and Recreation Team in accordance with the Service Level Agreement. ■ Users are aware of their responsibility to check sportsgrounds for safety prior to play.
9.5B User Groups Public Liability				
Sports clubs, school and other organised groups using parks and sportsgrounds have appropriate public liability cover as required by Council.	■ Appropriate levels of cover are determined through consultation with the Risk and Insurance Manager. ■ Ensure user groups have appropriate insurance cover as required, before grounds allocation.	MPR / MRI	O	■ Risk and Insurance Manager is consulted. ■ Organised user groups have appropriate insurance cover prior to using facilities in parks and sportsgrounds.

Management Statement	Action	Mgt. Team	Timeframe	Performance Measure
9.6 General Use: Dogs, Fireworks, Fairs				
9.6A Dogs and other pets				
Manage off leash dog access in accordance with Councils Off Leash Dog Park Strategy - June 2021 – with off leash dog use limited to those parks designated in the strategy	■ Notices are erected in parks and sportsgrounds regarding responsibility of dog owners. ■ Exotic animals shall generally not be allowed in community land unless specifically authorised	MPR	S	■ Reserves notices are erected in parks and sportsgrounds.
9.6B Use of Fireworks in Reserves				
Use of fireworks within parks and sportsgrounds comply with Council and Work Cover requirements for such activities.	■ Proposals for fireworks displays have Council's development consent where necessary and Work Cover Authority consent.	P / HSC	O	■ Proposals have approved Development Applications and approval from Work Cover Authority as required.
9.6C Circuses, Fetes and Fairs				
Circuses, fetes and festivals within parks and sportsgrounds comply with Council's requirements for certification and insurance. Exotic animals (e.g. lions & tigers) for circuses are not permitted.	■ Ensure any circus, fete or festival has the appropriate certification for amusement equipment and insurance as required by Council's Risk and Insurance Manager.	MPR / MRI	O	■ Licences for circuses, fetes and fairs are only granted to applicants with appropriate certification and insurance.

Management Statement	Action	Mgt. Team	Timeframe	Performance Measure
9.7 Use for Access or Storage for unrelated purposes				
9.7A Aircraft and Vehicular Access and material storage				
Restrict access into parks and sportsgrounds to maintenance and emergency vehicles as required.	■ Prevent general aircraft and vehicular access to unauthorised areas of parks and sportsgrounds by use of fencing and gates.	MPR	O	■ General vehicular and aircraft access into parks and sportsgrounds is restricted. ■ Emergency and maintenance vehicle and aircraft access is provided as required. ■ Use of parks and sportsgrounds for temporary storage of materials for a public utility or road purposes will be infrequent, only where no practical alternative exists, and done so as to manage all impacts.
	■ Provide opportunities for access of maintenance and emergency vehicles as required.	MPR	O	
	■ Aircraft landings restricted to emergency services and occasional approved community fundraising events.	MPR	O	
	■ Use of parks and sportsgrounds for temporary storage of materials for construction or maintenance of public utilities and roads may be permitted in the absence of practical alternatives and where the impact upon the parks and reserve or adjoining land and waters is addressed.	MPR	O	

Management Statement	Action	Mgt. Team	Timeframe	Performance Measure
9.8 Community and Neighbour Issues				
9.8A Boundary Management				
Encourage good neighbour relations with surrounding properties while ensuring private use of community land only occurs in accordance with the guidelines established in the Local Government Act.	■ Respond promptly to complaints from adjoining properties where complaints relate to use of parks and sportsgrounds.	MPR	O	■ Adjoining properties are informed of legal limitations regarding private use of community land. ■ Sporting groups are given opportunity to address problems internally before Council considers reallocation of ground.
	■ Inform adjoining landholders of requirements of Local Government Act to prevent private use of community land.	MPR	S	
	■ Consult with sporting groups where negative impacts are directly associated with their use. If negative impacts associated with a particular group continue, consider reallocating fields to other sports.	MPR	O	
9.8B Community Advertising				
Allow opportunity for community advertising within parks and sportsgrounds.	■ Comply with requirements of Exempt and Complying Development DCP for signs, sign displays, community banners and notices.	MPR	O	■ Only complying signs and banners are displayed in parks and sportsgrounds. ■ Advertising signage complies with the Outdoor Advertising DCP as required. ■ Illegal signs are removed.
	■ Ensure signage complies with the Outdoor Advertising DCP in relation to Community Advertising where required.	MPR	O	
	■ Remove signage which does not comply with the DCP.	MPR	O	

10.0 Action Plan for Natural Areas and Areas of Cultural Significance

Management Statement	Action	Mgt. Team	Timeframe	Performance Measure
10.1 Bushland and Biodiversity Protection				
10.1A Maintenance of Biodiversity				
Bushland Management programs aim to conserve, restore and enhance the Shire's biodiversity.	■ Investigte and secure funding sources including grant funding for environmental restoration works that conserve biodiversity. ■ Coordinate all bush regeneration and biosecurity control programs for the best strategic outcome. ■ Implement Council's Biodiversity Strategy to direct operational programs. ■ Effectiveness of bushland management programs is monitored through time.	MNR	O	■ Healthy and diverse natural areas. ■ Community participation in biodiversity monitoring programs.
10.1B Restoration and Regeneration of Bushland, Escarpments, and Watercourses				
Bushland, escarpments, and watercourses affected by weed invasion are to be regenerated and restored.	■ A restoration and regeneration program is to be implemented in areas affected by weed invasion using appropriate bush regeneration techniques. ■ Bushland regeneration programs initiated ensure that resources are allocated for continued maintenance and conservation of natural areas through time.	MNR	O	■ Bushland health is maintained and improved through restoration.

Management Statement	Action	Mgt. Team	Timeframe	Performance Measure
10.1C Total Catchment Management				
Natural areas are restored using total catchment management principles.	■ Council's strategy and on-going works programs are in line with the Water Sensitive Hornsby Strategy and Water Sensitive Urban Design Guideline.	MNR	O	■ Integrated catchment management principles are used in restoration projects.
10.1D Conservation of Native Fauna Habitat				
Native fauna is protected and habitat conserved in natural areas.	■ Restoration work during construction phase is to consider and mitigate impacts on native fauna and enhance fauna habitat. ■ Operational phase of the park development to consider and mitigate impacts on native fauna and enhance fauna habitat. ■ Dead trees are not removed from natural areas unless they pose a risk to life or property. Hollows from dangerous trees are relocated within the bushland areas where possible. ■ Removal of firewood / removal of bushrock not permitted in natural areas.	MPTR, MNR	O	■ Native fauna is diverse in natural areas. ■ Fauna habitat is enhanced and conserved.
10.1E Priority Given to Restoration of Threatened Biota Habitat				
Threatened species, endangered populations and endangered ecological communities are a high priority for restoration and protection works.	■ The Biodiversity Conservation Strategy is implemented and continually updated. ■ Databases for threatened species are continually updated. ■ High conservation bushland is identified and prioritised for restoration.	MNR	O	■ Stable and protected threatened species populations. ■ Endangered ecological communities identified, improved and conserved.

Management Statement	Action	Mgt. Team	Timeframe	Performance Measure
10.1F Fauna Corridors Maintained and Enhanced				
Fauna corridors and urban links are maintained and enhanced.	■ Implement the recommendations of the Biodiversity Conservation Strategy. ■ Continue to promote public education on fauna corridors and native fauna conservation.	MNR	O As funding permits	■ Fauna Corridors and links are maintained and enhanced.
10.1G Minimise Impacts of Activities on Bushland				
Activities in community land bushland will be undertaken only with compliance of all relevant legislation with the overall aim of protection and conservation of bushland. Landscaped and park areas adjacent to natural areas should be well maintained to prevent weed propagules entering bushland areas.	■ Ensure that all activities in bushland are assessed for potential environmental impacts. ■ Ensure that all activities are carried out with consideration of bushland protection and include regeneration and mitigation works. ■ Maintain landscaped areas of community land to assist in protecting bushland from additional weed invasion. ■ Create buffer zones and borders between landscaped areas and natural areas.	MNR MPTR	O	■ Protection of natural areas. ■ Landscaped areas do not impact on bushland and genetic integrity is maintained. ■ Protection of natural areas from weed invasion.
10.1H Revegation and Landscaping Adjoining Bushland				
Revegetation and landscaping work adjoining natural areas should be composed of locally occurring indigenous plants.	■ Revegetation and landscaping works on community land are designed sourcing indigenous plant species.	MPTR MNR	O	■ Genetic integrity of natural areas is maintained.

Management Statement	Action	Mgt. Team	Timeframe	Performance Measure
10.1I Rehabilitation of Adjoining Community Land – Species Selection				
Indigenous species should be used to rehabilitate degraded areas of community land adjoining natural areas.	■ Revegetation and landscaping works on community land adjoining natural areas should be composed of locally occurring indigenous plants.	MPTR MNR	O	■ Locally indigenous plant material is utilised in all rehabilitation and landscaping works on community land adjoining natural areas.
10.1J Restoration of Grass or Degraded Areas				
Surplus grassed or degraded areas on community land adjacent to natural areas may be reclaimed for planting of indigenous vegetation to increase buffer zones and promote ecological sustainability and bio-diversity.	■ Identify grassed or degraded areas of community land surplus to the needs of active and passive recreation. ■ Plant areas with indigenous vegetation or hold community planting days where appropriate. ■ Ensure on-going funding for maintenance of planted areas is available within the restoration project.	MPTR MNR HSC	O O O	■ Increased protection of bushland within natural areas.
10.1K Works and Parks Staff Training In Bushland Management Best Practice				
Integrated bushland management is achieved across Council divisions.	■ Pursue in-house training of staff in native vegetation best management practices and protection measures. ■ Effective communication regarding projects adjacent or near natural areas.	MPTR, MPC, MNR	M	■ Good environmental management throughout Council divisions.

Management Statement	Action	Mgt. Team	Timeframe	Performance Measure
10.1L Bushland Staff Training in Current Bushland Management Best Practice				
Bushland Management Programs are based on current research and techniques.	■ Ensure all bushland staff are trained in current techniques. ■ Pursue research opportunities with educational institutions and other agencies.	MNR	O	■ Participation in bushland management research programs. ■ Best practice bushland management used.
10.2 Community Involvement and Awareness				
10.2A Bushcare Program				
Bushcare activities are encouraged and well managed.	■ Hornsby Bushcare is well resourced and staffed to encourage and support community Bushcare activities at the site. ■ Volunteer Bushcare work is done according to the Bushcare Code. ■ Bushcare groups are serviced with tools, materials and professional training. ■ Sustainable practices / on site composting of weeds on Bushcare sites. ■ Recognition to community groups for Bushcare activities	MNR	O	■ Bushcare Groups participate in bushland management at the site.
Community involvement and participation is fostered within bushland management.	■ Community planting days are supported and resourced. ■ Community education and awareness programs are undertaken to promote biodiversity and natural area management.	MNR	O	■ Natural areas managed with an informed and involved community.

Management Statement	Action	Mgt. Team	Timeframe	Performance Measure
10.2B Scientific and Educational Projects				
Scientific and educational projects within community land natural areas are allowable with permission.	■ Approval in writing may be given by the land manager to students, research facilities, or learning institutions where it is considered that the project has a low impact on the environment and is consistent with the aims and objectives of this PoM to conserve natural areas.	MNR	O	■ Educational research and learning about the environment is fostered.
10.3 Boundary Management				
10.3A Demarcation of Boundaries				
The boundary of natural areas should be well defined to minimise the impact of any negative external influences.	■ Investigate methods for clearly defining the natural area such as signage, log barriers or fencing.	MNR / MPTR	L	■ Natural area is well-defined.

Management Statement	Action	Mgt. Team	Timeframe	Performance Measure
10.3B Encroachments				
Encroachments such as garden extensions, structures or any private use of public, community or crown land is prohibited.	■ Work co-operatively with Council's rangers and property owners to remove existing encroachments. ■ Ensure that no new encroachments on public land occur, through an increased Council compliance role. ■ Encourage neighbours to create and maintain buffer zones on private land bordering bushland.	MNR MPTR MRS MNR MPTR MRS MNR MPTR MRS	L O O	■ Intact natural areas with no encroachments.
10.3C Dumping of Garden and Other Waste				
Dumping of garden clippings and rubbish is prohibited in natural areas.	■ Increase public awareness through an education program. ■ Investigate dumping events and seek prosecutions. ■ Issue on the spot fines when possible.	MNR MPTR MRS	O	■ No dumped rubbish or garden clippings in bushland.
10.4 Domestic and Feral Animal Control				
10.4A Domestic Animals				
Domestic animals are controlled on public land.	■ Encourage responsible pet ownership through a public education campaign. ■ Impoundment of free roaming pets under the Companion Animals Act.	MRS	M / O	■ Responsible pet ownership results in very low impact on native fauna populations.

Management Statement	Action	Mgt. Team	Timeframe	Performance Measure
10.4B Feral Animals				
The impact of feral animals on native fauna is minimised.	■ Develop and implement a humane feral animal control program for target species in cooperation with regional land managers.	MNR MPTR NPWS	O	■ Feral animal control is undertaken in Council managed natural areas.
10.5 Bushfire Management				
10.5A Fuel Loading				
Bushland fuel loads are managed on the urban interface at acceptable levels with the Rural Fire Service (RFS).	■ Bushfire management activities are consistent the approved District Bush Fire Risk Management Plan. ■ Fuel loadings will be monitored in bushland areas. ■ Hazard reduction programs will be undertaken in bushland reserves as required and in conjunction with bush regeneration where appropriate. ■ REFs or Environmental Impact Assessment Code will be prepared for all hazard reduction activities.	MNR RFS	O	■ Bushland fuel loads are managed to reduce bushfire risk.

Management Statement	Action	Mgt. Team	Timeframe	Performance Measure
10.5B Asset Protection Zones				
Asset protection zones in new land releases, subdivisions and developments are provided on the private property in areas adjoining bushland reserves.	■ For new developments adjoining bushland reserves, asset protection zones and perimeter roads and trails will be provided on private property. ■ In developed areas Asset Protection Zones will generally occur on the private property.	MNR	O	■ Developments provide asset protection and fire fighting access within the private property.
10.5C Fire Trails				
Fire Trails within natural areas are maintained and upgraded to best management standards. Fire Trail maintenance activities are undertaken in an environmentally sensitive way to ensure minimal impact on natural areas.	■ Fire trails are maintained according to Council's code for Fire Trails and RFS standards. ■ Appropriate environmental assessments are undertaken for any fire trail construction and upgrade works. ■ Best environmental practice and mitigation measures are undertaken within works to reduce erosion and sediment and vegetation damage. ■ Walking and Mountain Bike Riding is allowable on fire trails managed by Council.	RFS/ MNR RFS/ MNR	O	■ Fire trails are maintained using best environmental practice to a high standard.

Management Statement	Action	Mgt. Team	Timeframe	Performance Measure
10.6 Walking, Off-Road Cycling and Recreation				
10.6A Mountain Bike Trails				
Formalised mountain bike trails may be provided in natural areas for daytime sustainable mountain bike riding.	■ Mountain bike trails are constructed by authorised personnel to industry standards in accordance with recognised community needs.	MNR	O	■ High quality, low impact mountain bike trails are provided for daytime sustainable mountain bike riding.
	■ New trails or major upgrades to MTB trails proposed have appropriate environmental assessments undertaken.	MNR	S	
	■ A community education, engagement and compliance program is developed and implemented.	MNR	O	
	■ Cumulative environmental impacts of the mountain bike trails are monitored on a regular basis.	MNR	O	
	■ A maintenance program is developed and implemented.	MNR	O	
	■ A supervised volunteer program to maintain and rehabilitate trails may be developed and implemented.	MNR	L	
	■ Signage is installed including trail standards and safety, and potential sections that may require relocation due to park and sportsground development.	MNR	S	
	■ Track closures occur in wet weather or high bushfire danger periods if required.	MNR	O	

Management Statement	Action	Mgt. Team	Timeframe	Performance Measure
10.6B Formal Bushwalking Tracks				
Formalised bushland tracks may be provided in natural areas for passive recreation such as bushwalking and bushland education.	■ Formalised bushland tracks are constructed and maintained to recognised standards in accordance with recognised community needs.	MNR	O	■ High quality, low impact bushland walking tracks are provided for passive recreation.
	■ Appropriate environmental assessments are undertaken for the construction or major upgrade of any walking tracks through bushland.	MNR	S	
	■ Develop and implement a risk assessment and track upgrade program.	MNR	S	
	■ Cumulative environmental impacts of the recreational and educational use of tracks are monitored.	MNR	O	
	■ The use of walking tracks for mountain and other bike riding and horse riding is prohibited, unless specifically authorised and signposted.	MNR	O	

ATTACHMENT 2 - ITEM 5

Management Statement	Action	Mgt. Team	Timeframe	Performance Measure
10.6C Informal Trails and Recreation				
The introduction and use of informal tracks and bike trails through natural areas is not permitted.	■ Unnecessary informal tracks to be closed, stabilised and regenerated.	MNR	L	■ Fragmentation and erosion is minimised in natural areas.
	■ The use of informal trails for mountain and other bike riding is prohibited.	MNR	O	
	■ Actively discourage public passage through to privately owned property.	MPTR	O	
The use of neighbourhood parks, track-heads and facilities adjoining natural areas are utilised for passive recreation.	■ Promote bushland values and passive recreational facilities such as picnicking in park areas and track-heads adjoining natural areas.	MNR / MPL	O	■ Provision of compatible passive recreational facilities.
10.7 Intrepretive Signage				
10.7A Interpretive Signs				
Interpretive signage and environmental education is encouraged where appropriate on walking tracks.	■ Interpretive signage is installed in strategic sites when it provides and promotes community awareness and environmental and heritage education.	MNR, MPTR	O	■ Greater public awareness and understanding of the natural area environment.
	■ Visual and environmental impact is considered prior to approval of interpretive signage.			

Management Statement	Action	Mgt. Team	Timeframe	Performance Measure
10.8 Watercourses				
10.8A Minimise Impacts of Developments and Activities on Watercourses				
Developments and activities are undertaken using best management practices for water sensitive design.	■ DAs and REFs are continued to be assessed to include best practice in accordance with Total Catchment Management (TCM) principles and stormwater management plans to ensure minimal impacts to bushland and downstream waterways.	MSP	O	■ Sustainable development.
10.8B Remediation and Restoration of Watercourses				
Pursue remediation and enhancement of water courses through natural areas.	■ Water quality and flow management devices and systems are constructed and maintained to recognised standards	MNR, MAOM	O	■ Water quality pollutants are reduced in natural areas. ■ Water flows are captured, detained and retained to mimic pre-developlment flows as much as possible . ■ Natural riparian corridors are restored.
Minimise pollutant impacts on bushland and riparian vegetation.	■ Water quality devices and adjacent landscaping will use locally occurring indigenous native plants and will be maintained.	MNR	O	
Riparian restoration includes restoration of natural creek processes and riparian vegetation.	■ Riparian restoration considers both vegetation corridors and creek processes.	MNR	O	

Management Statement	Action	Mgt. Team	Timeframe	Performance Measure
10.9 Strategic Planning and Assessment of Developments				
10.9A Strategic Planning				
Natural Areas are conserved through appropriate planning instruments. High conservation bushland is conserved through the planning process.	■ Develop planning instruments to assist in biodiversity conservation. ■ Bushland reserves created through the planning process are viable, have high conservation value and included within Councils Asset Management system. ■ Fragmentation of bushland areas should be minimised and discouraged within the planning process.	MSP MPA	S and O	■ Ecologically Sustainable Development.
10.9B Development Assessment				
DA assessment is undertaken for impacts to bushland as well as conservation of bushland reserves. High conservation bushland is conserved through the planning process.	■ Continue development application assessment for developments impacting on or adjoining natural areas. ■ Fragmentation of bushland areas should be minimised and discouraged within the planning process.	MSP MNR	S and O	■ Ecologically Sustainable Development.

Management Statement	Action	Mgt. Team	Timeframe	Performance Measure
10.10 Funding				
10.10A Adequate Funding Resources for Bushland Regeneration and Restoration				
Funding is sought to ensure appropriate resources are available prior to undertaking regeneration and restoration programs.	■ Continued funding of programs by Council. ■ Professional bush regenerators are employed to undertake restoration programs wherever possible.	MNR	O	■ Restoration and regeneration projects are viable and appropriately funded.
10.11Heritage				
10.11A Heritage Listed Sites and Areas				
To preserve heritage listed areas within Hornsby Sire for future generations.	■ Manage heritage-listed areas in accordance with this PoM and the Hornsby Shire LEP.	HSC	ST	■ Areas are managed and preserved in accordance with this PoM and the Hornsby Shire LEP.
	■ Provide interpretive signage to allow access to the heritage items and to the history of the Park as resources allow.	HSC	O	
	■ Prepare a Heritage Management Plan for the Park.	HSC	O	

11.0 Action Plan for Areas of General Community Use

Management Statement	Action	Mgt. Team	Timeframe	Performance Measure
11.1 Standard of Community Centres				
11.1A Halls and Equipment				
Centres / facilities will be available for use by the community at an acceptable standard.	■ Council will ensure that halls and equipment are inspected on a regular basis	MC / MCS	O	■ Regular asset inspections by Council.
11.2 Equity and Access to Community Centres/ Other Community Assets and Facilities				
11.2A Access				
Centres / facilities are available for use by all sections of the community.	■ Hiring policies of Centres / facilities are inclusive. ■ Removal of barriers to access by people with disabilities and strollers.	MCS MCS	O O	■ No restrictive clauses in hiring conditions. ■ Centres / facilities and amenities are wheel chair accessible.

Management Statement	Action	Mgt. Team	Timeframe	Performance Measure
11.2B Equity				
Council will provide fair and equitable opportunities to community facilities for community groups.	■ Leases and licences are considered where activities comply with the core objectives of the Local Government Act (s.36E – 36N) and the zoning as set out in the Hornsby Shire LEP. ■ Leasing and licensing of community facilities will be in accordance with Council's Policies CSISAS 12 – Delegation of Authority to Grant Lease / Licence Agreements, CSISAS 13 – Use of Council Buildings by Kindergartens and CSISAS 14 – Lease/ Licence of Council Land), and/or any relevant, adopted strategic plan or policy. ■ Council will call for Expressions of Interest for leasing and licensing where appropriate.	MCS / MCC	O	■ Leases and licences are granted only where activities comply with the core objectives of the Local Government Act and with the Hornsby Shire LEP. ■ Leases and licences are granted in accordance with Council Policies CSISAS 12, CSISAS 13 and CSISAS 14, and/or any relevant, adopted strategic plan or policy. ■ Expressions of Interest are called for by Council where appropriate.

Management Statement	Action	Mgt. Team	Timeframe	Performance Measure
11.3Fees and Audit				
11.3A Fees and Charges				
Fees charged are fair and reasonable.	■ Fees charged for the use of Community Centres / facilities are equivalent to those charged for similar facilities.	MC / MCS	O	■ Fees are submitted for review by Council each year.
11.3B Auditing				
No profits shall be made from the operation of Centres / facilities.	■ Income and expenditure of Community Centres are reviewed on a regular basis by Council and accounts forwarded to the Finance Branch.	MC / MCS / MF	O	■ Audit of Income and Expenditure.
11.4Risk Management				
11.4A Community Centres/ Facilities				
Centres / facilities are maintained at legally prescribed safety standards.	■ Periodic review and inspection of Community Centres by Council.	MC / MCS / MRI	O	■ Risk and safety audits completed successfully.
11.4B Other Community Assets				
Other community assets / facilities are maintained at legally prescribed safety standards.	■ Periodic review and inspection by asset managers.	MA	O	■ Risk and safety audits completed successfully.

ATTACHMENT 2 - ITEM 5

12.0 Appendix

Appendix 1: Park Rules Notice

PUBLIC RESERVES NOTICE

Warning: Use of this facility may be hazardous. Please take care. This is not a supervised facility.

This is your park. It is provided for your use, enjoyment and education. Please respect the area by encouraging activities which do not damage the environment, or disturb the enjoyment of others.

13. NO HAWKING OR TRADING EXCEPT WITH COUNCIL'S WRITTEN PERMISSION
14. NO ACTIVITIES WHICH MAY INTERFERE WITH THE COMFORT, CONVENIENCE OR SAFETY OF THE PUBLIC
15. NO ENTERING OR REMAINING IN THE PARK IN AN INTOXICATED STATE
16. NO MEETINGS, PUBLIC ADDRESSES, PERFORMANCES OR ORGANISED ACTIVITIES EXCEPT WITH COUNCIL'S WRITTEN PERMISSION

PENALTIES APPLY FOR FAILURE TO OBSERVE THE ABOVE REGULATIONS
BY ORDER OF COUNCIL

PLEASE REPORT ANY MISUSE OR VANDALISM TO COUNCIL ON 9847 6666 OR HORNSBY.NSW.GOV.AU

In an Emergency call 000

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HORNSBY SHIRE COUNCIL

HORNSBY SHIRE COUNCIL

Westleigh Park Master Plan
Sefton Road Extension – Community Engagement

ACTION REGISTER UPDATE

1. SEFTON ROAD EXTENSION

	Resident Item / Question / Issue	Council Initial Response	Council Additional Response
1.1	Has Sydney Water agreed to the extension of Sefton Road?	Council has received "in-principle" support but the matter isn't fully signed and sealed. Discussions are ongoing regarding alignment of the road. If Sydney Water say "No" Council will likely need to review overall plans.	Sydney Water has reaffirmed its in-principle agreement that road alignment can co-exist with their infrastructure (current and possible future). Discussions are now focusing on actual alignment of the Sefton Road extension. Negotiations are progressing steadily. Sydney Water has confirmed correct operational and engineering controls can be put in place so that the two projects (Sydney Water Infrastructure Upgrade and the Sefton Road Extension) can co-exist.
1.2	Will the Sefton Rd / Chilvers Rd junction get traffic lights?	The junction definitely needs work and dollars have been included in the budget. Final solution is still to be determined but is likely to be traffic signals.	The traffic modelling for Westleigh Park has confirmed that traffic lights will provide the best outcome for this junction.
1.4	Will the extension be a two-way street?	Council is still reviewing what is required but it is intended to be a two-street.	The traffic modelling for Westleigh Park has confirmed that a two-way street will provide the best outcome for the overall network. A typical cross-section was attached to the 14th October 2022 minutes.

(updates since previous copy shown in red)

HORNSBY SHIRE COUNCIL

Westleigh Park Master Plan
Sefton Road Extension – Community Engagement

ACTION REGISTER UPDATE

	Resident Item / Question / Issue	Council Initial Response	Council Additional Response
1.3	How will car parking be managed, especially industrial vehicles parked on both sides of the road and in proximity to the Sanctuary exit?	Council is reviewing the parking arrangements as part of overall traffic flow modelling. In parallel, Council will review if any of the current parking is illegal and address as appropriate.	Council believe that completion of the nearby development with on-site parking will help reduce the need for on street parking. Initial observations indicate that most vehicles are parked legally. Council's traffic rangers will enforce any heavy vehicles parked contrary to the road rules. Heavy vehicles are not allowed to park on a road in an urban area for over 1 hour. Council has developed a proposal to regulate parking in Sefton Road near Kooringal Avenue. The community feedback has been reviewed. Following further consideration, the proposal has been amended to recover some parking lost along Sefton Road. A report will be presented to the Hornsby Local Traffic Committee in February 2023.
1.5	Will the extension become an alternative route out from Quarter Sessions Road? As Duffy Road is already challenging, the park cannot become an alternative route. Wild Ash is gated to specifically stop shortcuts.	Council is reviewing rat running and possible mitigation measures.	This matter was informed by the results of the traffic modelling undertaken by Bitzios and presented to the community representatives on 14th October 2022.

(updates since previous copy shown in red)

HORNSBY SHIRE COUNCIL

Westleigh Park Master Plan
Sefton Road Extension – Community Engagement

ACTION REGISTER UPDATE

	Resident Item / Question / Issue	**Council Initial Response**	**Council Additional Response**
1.6	Ruddock Park has been out of use so far this football season which may impact on traffic counts.	Council will review how this impacts the traffic counts and modelling and incorporate any changes as necessary.	Information relating to likely traffic generation of Ruddock Park was provided to the traffic model consultant based on actual usage on 4th June 2022. The Traffic Simulation model was reviewed based on adding this level of traffic from Ruddock Park and confirmed that the overall impact is minimal.
1.7 (14-Oct)	Does Council have Sydney Water approval for Sefton Road extension.	Negotiations with Sydney Water involve determining an alignment that does not impinge into adjoining STIF community. Council expects to confirm the alignment in first quarter of 2023. Status of road is to be determined - not a fait accompli that it will be a "public road". Could be a right of way etc. etc..	See item 1.1 above.
1.8 (14-Oct)	Will Council improve the intersection of Sefton Rd / Chilvers Rd?	See item 1.2 above.	n/a
1.10 (14-Oct)	Requested information on Stage 1 development.	For modelling purposes Stage 1 includes: 1. Development of one sports platform comprising one AFL/cricket sized platform that could accommodate 2 soccer fields. 2. Mountain bike trails (location and extent to be confirmed) Modelling confirms that Sefton Road extension will not be required under this scenario.	n/a

(updates since previous copy shown in red)

HORNSBY SHIRE COUNCIL

Westleigh Park Master Plan
Sefton Road Extension – Community Engagement

ACTION REGISTER UPDATE

	Resident Item / Question / Issue	**Council Initial Response**	**Council Additional Response**
1.9 (14-Oct)	Concerns that Ruddock Park traffic generation has not been included in the traffic counts	See item 1.6 above.	n/a
1.11 (14-Oct)	What will happen if Sydney Water access is denied?	There would be no Sefton Road extension. Westleigh Park development would be limited to Stage 1.	See item 1.1 above.

(updates since previous copy shown in red)

HORNSBY SHIRE COUNCIL

Westleigh Park Master Plan
Sefton Road Extension – Community Engagement

ACTION REGISTER UPDATE

2. SEFTON ROAD ACCESS AND SAFETY

	Resident Item / Question / Issue	Council Initial Response	Council Additional Response
2.1	There will be accidents on Sefton Road – the parked boats, trailers and trucks don't help along with overflow parking from Wild Ash / Sanctuary where the garages are used for storage	This issue was noted and will be investigated. Council is reviewing the parking arrangements as part of overall traffic flow modelling. In parallel, Council will review if any of the current parking is illegal and address as appropriate.	See item 1.3 above.
2.2	There are sight line issues at Kooringal Ave roundabout due to a fence	This issue was noted and will be investigated.	Council reviewed the location and found that vegetation from nearby property and extensive shrubs at the north/eastern corner of the Sefton Road / Kooringal Avenue was impacting on sight lines. Council's Parks team have pruned the vegetation at the Sefton Road / Kooringal Avenue intersection.
2.3	Left turn from Kooringal Ave to Sefton Road is an issue due to the road width and parking on both sides	This issue was noted and will be investigated. Council is reviewing the parking arrangements as part of overall traffic flow modelling.	See item 1.3 above.
2.4	Long-term parking of industrial vehicles on Sefton Road appears to have become the norm and to be acceptable (the same happens near Ruddock Park)	This issue was noted and will be investigated. Council is reviewing the parking arrangements as part of overall traffic flow modelling. In parallel, Council will review if any of the current parking is illegal and address as appropriate.	See item 1.3 above.

(updates since previous copy shown in red)

HORNSBY SHIRE COUNCIL

Westleigh Park Master Plan
Sefton Road Extension – Community Engagement

ACTION REGISTER UPDATE

	Resident Item / Question / Issue	Council Initial Response	Council Additional Response
2.5	The popularity of the Recycling Centre on Saturday mornings will likely create conflict for park users	This issue was noted and will be investigated.	An extensive review was completed with the Recycling Centre Manager. It is believed that the delays experienced earlier in 2022 were as a result of a back-log of waste consolidated during the COVID closures of the centre. Nevertheless, solutions will be explored to ensure the Recycling centre and Westleigh Park traffic can co-exist The traffic study has considered the impact of the recycling centre and the park, confirming that they can both co-exist. It was found that the intersection of Sefton and Chilvers Road will operate with spare capacity once the intersection is signalised.
2.6	The fact that the townhouses are too close to the road and don't have any fences creates a safety issue and increased traffic will also increase noise pollution.	This issue was noted and will be investigated.	The houses in Sefton Road are designed and built in accordance with Council's Development Control Plans. Road geometry of Sefton Road in this part of the subdivision also conforms to subdivision guidelines. The increase in traffic in Sefton Road (future stages) will not exceed State Government guidelines for Environmental Capacity for local roads.

(updates since previous copy shown in red)

HORNSBY SHIRE COUNCIL

Westleigh Park Master Plan
Sefton Road Extension – Community Engagement

ACTION REGISTER UPDATE

	Resident Item / Question / Issue	**Council Initial Response**	**Council Additional Response**
2.7	Don't want traffic calmers every 10 yards as this would be annoying for everyday users	Noted and will be considered as part of any possible solution.	Traffic calming, if warranted, would be installed at approx. 80m intervals. The geometry of the road and presence of parked cars effectively provides traffic calming.
2.8	Street Lighting in Sefton Road is inadequate.	This issue was noted and will be investigated.	Council engaged a specialist street lighting consultant who confirmed that the lighting was not to expected standards. Council is now reviewing options with Ausgrid to determine the best way for appropriate standards to be met. Council will continue to work with Ausgrid as the plans for the park continue.
2.9 (14-Oct)	Concerns regarding traffic management along Sefton Road in vicinity of Council depot.	See item 1.3 above.	n/a

(updates since previous copy shown in red)

HORNSBY SHIRE COUNCIL

Westleigh Park Master Plan
Sefton Road Extension – Community Engagement

ACTION REGISTER UPDATE

3. SECOND EMERGENCY ACCESS

	Resident Item / Question / Issue	**Council Initial Response**	**Council Additional Response**
3.1	Majority of attendees agreed this is required, provided in doesn't just become an alternative route at all times.	Councill will review options as a part of the traffic modelling process.	See item 1.5 above.
3.2	Would need Sefton / Chilvers junction to work properly. Perhaps more traffic would put sufficient focus for something to be done.	Councill will review options.	See item 1.2 above.
3.3	Westleigh Progress Association has been requesting this for years.	Noted.	n/a
3.4 (14-Oct)	Planning for emergency access to consider critical demand would be inbound if there was an emergency rather than outbound	Traffic flow during bush fire events is controlled by the emergency services. The proposed Sefton Road Extension is planned to be a two-way street which will assist with emergency access in both directions.	n/a

(updates since previous copy shown in red)

HORNSBY SHIRE COUNCIL

Westleigh Park Master Plan
Sefton Road Extension – Community Engagement

ACTION REGISTER UPDATE

4. OTHERS

During open discussion other items were raised as tabled below:

	Resident Item / Question / Issue	**Council Initial Response**	**Council Additional Response**
4.1	Where did the forecasted 1900 traffic movements come from?	Positive Traffic completed a model for Council and the 1900 was identified as the weekend winter peak for a fully operational site. Council is now reviewing how to manage this traffic volume across Sefton / Duffy / Quarter Sessions.	Traffic generation of Westleigh Park, including destination or route choice has been applied in the model. The assessment indicates that the proposed Sefton Road extension is required to be in place between completion of Stage 1 and completion of Stage 2 of the Park.
4.2	Has the use of Active Transport (walking / cycling) been considered in the modelling?	Council is reviewing the modal split and how to encourage more users to arrive by means other than car.	The use and encouragement of Active Transport has been considered in the model.
4.3	The current signage at Chilvers Rd isn't sufficient to stop vehicles thinking Sefton Road is a through road	This issue was noted and will be investigated.	See item 1.2 above.
4.4	Master Plan Design seems to align parking to the east which could lead to users favouring the Sefton Road access route	Councill will review options.	The car parks have been located to ensure the best overall use of the available space on site. Exactly how traffic will arrive at and leave the site will be driven more by the origin and destination of the visitors rather than the location of the car parks.

(updates since previous copy shown in red)

HORNSBY SHIRE COUNCIL

Westleigh Park Master Plan
Sefton Road Extension – Community Engagement

ACTION REGISTER UPDATE

	Resident Item / Question / Issue	**Council Initial Response**	**Council Additional Response**
4.5	Could the internal park road layout be adjusted to direct / balance the traffic?	Council is reviewing how to manage traffic volume across Sefton / Duffy / Quarter Sessions. The model used at Greenway Park may be appropriate.	The Traffic model does not suggest that the internal network needs any adjustment.
4.6	If 30% (picking a number) of participants could walk / cycle to the park, how could they be better catered for and thus reduce the number of cars, noting that Duffy isn't bike friendly?	Council will review how to encourage more users to arrive by means other than car.	The use and encouragement of Active Transport has been considered in the model and in the design of shared paths for the park.
4.7	People don't embrace the alternative options to using their car. Sydney City & others to Gordon have solutions but there's nothing for Hornsby – could the ridges be used?	Noted but not really in scope for Westleigh Park specifically.	n/a
4.8	80% of people now drive their children to school, up from 60% pre-COVID	Council will consider if this impacts the modelling for Westleigh Park.	See item 4.1 above.
4.9	Why is the focus merely on the weekend peak?	Council acknowledges that the park is proposed to be used for training and for schools during the week. Council however needs to model traffic on the peak case scenario, which for a park of this nature is generally regarded as being on the weekend. Nevertheless, Council will also model a weekday peak.	The Traffic Study looked at the impact on the weekday evening peak and the weekend peak.

(updates since previous copy shown in red)

HORNSBY SHIRE COUNCIL

Westleigh Park Master Plan
Sefton Road Extension – Community Engagement

ACTION REGISTER UPDATE

	Resident Item / Question / Issue	Council Initial Response	Council Additional Response
4.10	Could the proposed roundabout on Quarter Sessions Road be moved to Corang Road?	Council will review however the proximity to the STIF ecological community and sight lines might make this difficult to achieve.	On the eastern side of the Corang Road intersection is a Sydney Water pumping station for the Thornleigh reservoir which would have been impacted by the footprint of the proposed roundabout and connecting road. Relocating the pumping station and associated assets would involve a disruption to local water services and an overall significant cost to the project. North of the pumping station is a significant community of protected Sydney Turpentine Ironbark Forest (STIF). The footprint for the proposed roundabout and associated earthworks would have required the removal of a considerable area of STIF. To provide a safe design for the roundabout, sightlines and sight distances need to be considered for vehicles approaching from all directions. For a roundabout placed centrally within Quarter Sessions Road, Corang Road and the new extension road, providing the minimum sightline distance would have required the acquisition of the two corner properties at the intersection. The existing crest in Quarter Sessions Road for the southern approach to Corang Road also limited the available sight distance for a roundabout in this location.

(updates since previous copy shown in red)

HORNSBY SHIRE COUNCIL

Westleigh Park Master Plan
Sefton Road Extension – Community Engagement

ACTION REGISTER UPDATE

	Resident Item / Question / Issue	**Council Initial Response**	**Council Additional Response**
4.11	Will buses generally access via Quarter Sessions Road?	Councill will direct buses as part of the overall model for traffic with Quarter Sessions Road being the preferred route.	n/a
4.12	What plans does Council have for night-time security of the new park?	Council recognises that "after hours" needs to be managed (other parks in the shire, including Pennant Hills Park, are closed after the last usage) and will review what's appropriate for Westleigh Park.	Westleigh Park would typically be closed to vehicular access from approximately 10:30pm. This allows access out of the park after the last sportsground usage period. As a result, Council would expect a vehicle gate at the end of Sefton Road to be closed at approximately 10:30pm and reopened early morning. Council currently close gates in a similar manner at Crosslands Reserve, Pennant Hills Park, and Brickpit Park. All lights would then be turned off which actually discourages night use (walk ins). It may also be possible that Council will have vehicle number plate readers at the entrance areas. Any antisocial / illegal activity can be responded by local Police. Council's phone number is also answered 24hrs.
4.13	Google algorithms are directing traffic through junctions they're not familiar with	Noted but not really in scope for Westleigh Park specifically.	n/a

(updates since previous copy shown in red)

HORNSBY SHIRE COUNCIL

Westleigh Park Master Plan
Sefton Road Extension – Community Engagement

ACTION REGISTER UPDATE

	Resident Item / Question / Issue	**Council Initial Response**	**Council Additional Response**
4.14	Has the sporting usage profile changed post COVID, bushfires, due to summer heat etc. so would indoor options be required?	Council noted that any usage would still generate traffic and indoor would create more.	n/a
4.15	The Duffy / Chilvers / The Esplanade Junction has issues in terms of: - single lane for left turn and straight from The Esplanade to Duffy (which could create conflict for park users - vehicles turning left from Esplanade to Duffy and from Chilvers to Duffy can be confused by red lights around the corner - illegal manoeuvres	Council will review the operation of the traffic signals with Transport for NSW (TfNSW) as they are responsible for traffic signals. TfNSW have recently installed longer lamp shades on the traffic signal lanterns in Duffy Avenue. Council has referred illegal manoeuvres to NSW Police who are monitoring the intersection.	SCATs data and green time have been reviewed. TfNSW have implemented a combination of solutions to address the left turn confusion. NSW Police are monitoring for any illegal manoeuvres. Council is investigating options for additional westbound lanes on Duffy Avenue to increase capacity for traffic going to Westleigh. The Traffic model confirmed what's possible and Council will be looking to proceed with this upgrade independent of the development of the park.
4.16	Does the park have to be as big as it's being proposed as a smaller park would reduce the traffic impacts?	Council compiled our Hornsby Sportsground Strategy in 2018, which identified a short fall across the shire. (Click on the link to access the document). Both the current and previous Council has agreed that Council should maximise the usage of the purchased land to assist with addressing this short fall.	n/a
4.17	Can State Schools use the new facilities?	Yes, but Council does not charge for this.	n/a

(updates since previous copy shown in red)

HORNSBY SHIRE COUNCIL

Westleigh Park Master Plan
Sefton Road Extension – Community Engagement

ACTION REGISTER UPDATE

	Resident Item / Question / Issue	**Council Initial Response**	**Council Additional Response**
4.18	The Fire Brigade still need to be able to exit when others are using the park and need access for training on Saturdays (which needs 6 / 7 parking spots).	Council will consider as part of revising the Master Plan. Council confirmed that the current Fire Training facility will be relocated.	Council will ensure that there is sufficient parking for the existing Fire Brigade building.
4.19	Westleigh is a small population and the park is just bringing new traffic through a bottle neck? The Pennant Hills / Thornleigh rail corridor will become high-rise developments eventually. Currently locals have to drive to Meadowbank / Morrison Bay and even further due to the lack of local facilities. Homebush is the nearest athletics facility from Berowra. A large percentage of kilometres and travel time is spent getting to sporting facilities.	Council noted that it's always a challenge to create the right balance for everyone and that Council is responsible for providing facilities for all Shire residents.	n/a
4.20	Is Council planning a mountain bike link to Hornsby Park?	Yes, a link to Hornsby Park is being proposed and Council is reviewing what might be possible.	Council extended the Mountain Bike Co-Design activity to ensure that this link is included in the design and in the DA package for approval.

(updates since previous copy shown in red)

HORNSBY SHIRE COUNCIL

Westleigh Park Master Plan
Sefton Road Extension – Community Engagement

ACTION REGISTER UPDATE

	Resident Item / Question / Issue	**Council Initial Response**	**Council Additional Response**
4.21	Please no netball courts at Westleigh Park	Council is not planning to include netball courts.	n/a
4.22	Will there be Parking Fees?	Council noted this is an option being considered and also acknowledged that these could push users to park in neighbouring streets.	Council's Car Parking Management Study was adopted by Council in 2020 and outlines recommendations or how parking should be managed within the Shire. The Study acknowledges that *Hornsby Shire includes large areas of National Park and other bushland that attracts visitors from the local, metropolitan and wider regional area. At present access to these areas is dominated by the private car thereby requiring provision of adequate and conveniently located car parking spaces for users.* As part of the development of the Westleigh Park Master Plan car parking and traffic and transport considerations were taken into consideration. As stated in the Car Parking Management Study *consideration needs to be given to improving and promoting access by other modes to ensure the future sustainability of these areas* and that *Pay Parking should be investigated.* Initial investigations have been undertaken as part of the Westleigh Park Master Plan development however no final decision has been made.

(updates since previous copy shown in red)

HORNSBY SHIRE COUNCIL

Westleigh Park Master Plan
Sefton Road Extension – Community Engagement

ACTION REGISTER UPDATE

	Resident Item / Question / Issue	**Council Initial Response**	**Council Additional Response**
4.23	West Epping Park seems to have a working model	Council noted that this was designed and funded by Hornsby Council prior to it being handed to Parramatta Council.	n/a
4.24	Does the Master Plan encourage parking in Kooringal Ave e.g. for mountain bike users?	Council confirmed this is not intended as it's expected mountain bike users would park in the park and use drop-ins from the precinct platforms. Council did note that the final solution for mountain bike trails, including how to deal with the significant level changes, is still being worked through.	Current expectations are that the primary mountain bike track head will be to the south of the site and thus it is expected that mountain bikers will use the adjacent on-site parking. Council has two options identified for dealing with the level changes from the plateau to the valley. Plans for the future primary and secondary track heads to bushland, will be set at locations close to grade (i.e. where minimal retaining wall heights are required). Co-design for the mountain bike trail network has now been completed. Final designs will be confirmed once ecological assessments have been completed.
4.25	Does Council have any general plans for more indoor facilities?	Council is completing a review of requirements and where any gap could be addressed, perhaps using existing facilities which may be underutilised today.	Council has no plans to include an indoor facility at Westleigh Park. Any shortfall to demand will be met through increased utilisation rates of existing public and private facilities.

(updates since previous copy shown in red)

HORNSBY SHIRE COUNCIL

Westleigh Park Master Plan
Sefton Road Extension – Community Engagement

ACTION REGISTER UPDATE

	Resident Item / Question / Issue	Council Initial Response	Council Additional Response
4.26 (14-Oct)	Phasing of right turn from Pennant Hills Road into Duffy Avenue needs to be reviewed.	Phasing of traffic signals in conducted by TfNSW. The consultants' report makes recommendations for improvements to intersections in the area which will be considered by Council in discussion with TfNSW.	TfNSW has reviewed the operation of the traffic signals and made adjustments to lanterns to improve the situation. Zuture improvements to the intersection (additional lane) in Duffy Avenue will be part of a future project in conjunction with the Westleigh Park.
4.27 (14-Oct)	General comments on widening of Duffy Avenue at the intersection with Esplanade.	The Bitzios report identifies the need for capacity improvements at this location.	n/a
4.28 (14-Oct)	Where did the traffic generation figures for Westleigh Park came from? Request raw data from park traffic generation.	The traffic generation of the park was worked out from first principles and examined in detail in the 'Traffic Study' by Positive Traffic report (attached document "PT16071r01-Westleigh-Park-Traffic-Study_Final_8-REV.pdf") See Page 30 to 32 of traffic report.	n/a
4.29 (14-Oct)	Requested information on traffic volumes for Duffy Ave, Quarter Sessions Rd and The Esplanade.	Duffy Ave west of Chilvers Rd – approx. 9,000 veh/day Quarter Sessions Rd north of Duffy Ave – approx. 3,500 veh/day The Esplanade south of Duffy Ave – approx. 12,000 veh/day More information available in attached document "PT16071r01-Westleigh-Park-Traffic-Study_Final_8-REV.pdf" See Page 17 of traffic report. Note that traffic volumes in the report are peak hour volumes (1 hour duration).	n/a

(updates since previous copy shown in red)

HORNSBY SHIRE COUNCIL

Westleigh Park Master Plan
Sefton Road Extension – Community Engagement

ACTION REGISTER UPDATE

	Resident Item / Question / Issue	Council Initial Response	Council Additional Response
4.30 (14-Oct)	Confirm numbers of park users during training. (esp. Tues through Thurs nights)	Council will review the base data and provide a response as soon as possible.	Section 5.2 of the Bitzios report notes that "*Traffic generation for the Park has been estimated for weekdays and weekends based on the demands of organised sport, mountain biking and playgrounds. No organised sports are expected to be played during the weekday AM peak, so the Park will not generate a significant amount of traffic in that period. Westleigh Park, once complete in 2032, is expected to generate about 176 vehicles during the PM peak one hour, and about 360 vehicles during the Weekend peak one hour. There are three main roads connecting the Park to the broader road network: Sefton Road, Duffy Avenue and The Esplanade. The distribution of traffic between the three points at the boundary of the study area is shown in Figure 5.1.*"
4.31 (14-Oct)	Concerns were raised regarding traffic generation during weekday training	The traffic generation of the park was worked out from first principles and examined in detail in the 'Traffic Study' by Positive Traffic report (attached document "PT16071r01-Westleigh-Park-Traffic-Study_Final_8-REV.pdf")	n/a
4.32 (14-Oct)	Council to ensure that park lights are turned off after hours.Residents asked that they be turned off as early as possible and preferably before 10:30pm	Council's lighting for parks is controlled by a software platform that can be set to ensure lights turn off automatically at the appropriate time. Rangers are expected to visit the site to ensure gates are locked and lights are turned off.	n/a

(updates since previous copy shown in red)

HORNSBY SHIRE COUNCIL

Westleigh Park Master Plan
Sefton Road Extension – Community Engagement

ACTION REGISTER UPDATE

	Resident Item / Question / Issue	**Council Initial Response**	**Council Additional Response**
4.33 (14-Oct)	Concerns relating to the left turn movement from the south (The Esplanade) to the west (Duffy Avenue)	Bitzios advised that this would be resolved by the proposed traffic improvement (additional capacity on eastern approach) at this location. Signal phasing (SCATS) will respond to the traffic demand of this movement. Council will also discuss the signal phasing with TfNSW.	TfNSW has reviewed the operation of the traffic signals and made adjustments to lanterns to improve the situation. Future improvements to the intersection (additional lane) in Duffy Avenue will be part of a future project in conjunction with the Westleigh Park.
4.34 (14-Oct)	Residents asked about options to improve the intersection for traffic travelling from the east into the Esplanade and to allow unimpeded flows to Duffy Avenue past the intersection.	The recommended improvement illustrated in Slide 4 of the Bitzios presentation would address this concern.	n/a

(updates since previous copy shown in red)

HORNSBY SHIRE COUNCIL

Westleigh Park Master Plan
Sefton Road Extension – Community Engagement

ACTION REGISTER UPDATE

5. ADDITIONAL TOPICS RAISED POST MEETING

	Resident Item / Question / Issue	**Council Response**
5.1	The staged approach to the site development is of particular interest as this will certainly result in a staged impact on traffic, initially construction activity for site remediation and any initial works including access. I expect that reflected in the staging will be mitigation of the risk that left undeveloped the site might be resumed for the purpose of desperately needed low cost housing, that would not be a good outcome for the community	A condition of the purchase of land completed by Council was that the land be rezoned RE1 Public Recreation. As such it is not possible for housing to be built on the land.
5.2	Impact of traffic on the character of the Westleigh area	The increase in traffic in the study area shows that it will not exceed State Government guidelines for Environmental Capacity for local roads.
5.3	Identification of all access options, as sought by Sydney Water, to Westleigh Park	Council has completed extensive reviews of all possible alternative access points to / from the Sydney Water land. Terrain, ecological impacts and road geometry have impacted alternative alignments leaving the Sefton Road extension as the only viable option.
5.4	Emergency access options using a blank paper approach rather than just the opportunity of Sefton Road, noting that emergency access for residents at the northern end of Quarter Sessions Road cannot be provided by a route through Westleigh Park arising from the risk of Quarter Sessions Road being rendered unusable when cut by smoke from fires	Terrain, ecological impacts and road geometry have impacted alternative alignments leaving the Sefton Road extension as the only viable option.

(updates since previous copy shown in red)

HORNSBY SHIRE COUNCIL

Westleigh Park Master Plan
Sefton Road Extension – Community Engagement

ACTION REGISTER UPDATE

	Resident Item / Question / Issue	**Council Response**
5.5	A thorough study of the source of traffic requiring access to Westleigh Park (from North, South, East and West, this would facilitate addressing congestion which might arise in all roads leading to Westleigh, including additional traffic on arterial roads (traffic from North could result in severe congestion around Hornsby and from West may congest roads around Pennant Hills: such studies may point to the need for alternative access routes to avoid excessive journey times, which is already a concern for the community.	Council commissioned Bitzios Consulting to undertake a detailed Traffic Impact Assessment (TIA) This included the development and usage of a microsimulation traffic model. Quantified forecast traffic volumes were generated for the proposed Sefton Road link as well as the performance of key intersections along Duffy Road and Quarter Sessions Road. Mitigation measures were developed and used the model to assess the measures, along with consideration of geometrical constraints and impacts on walking, cycling and public transport.
5.6 (28-Oct)	Bellevue Street eastbound at Pennant Hills Road 'left turn with care after stopping was changed by council/RMS prior to NorthConnex, currently red light, can this revert please	TfNSW has reviewed all locations in the Hornsby Shire where 'Left turn on red' was permitted. The new TfNSW guidelines have resulted in the removal of the LTOR facility. It cannot be reinstated for safety reasons, particularly now that the pedestrian movements in the area have significantly increased.
5.7 (8-Nov)	Westleigh Park Proposal - Traffic and Transport Assessment Summary - what the dark green shading is on page 2, on the eastern side of the proposed road	This shows the land that is mapped as STIF and thus is being avoided as part of the new design.

(updates since previous copy shown in red)

HORNSBY SHIRE COUNCIL

Westleigh Park Master Plan
Sefton Road Extension – Community Engagement

ACTION REGISTER UPDATE

	Resident Item / Question / Issue	Council Response
5.8 (10-Nov)	We are demanding that if this road were to come to fruition that traffic noise barriers and a security fence be placed alongside the road to ensure noise impact is minimal and security is maintained.	Council will review these requirements as part of the detailed design that will support the Development Application.

(updates since previous copy shown in red)

ATTACHMENT 4 - ITEM 5

Westleigh Park Traffic Impact and Access Study

Traffic Report

Hornsby Shire Council

21 February 2023

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Document Issue History

Report File Name	Prepared	Reviewed	Issued	Date	Issued to
P5524.001R Westleigh Park Traffic Impact and Access Study	J. Hu T. Islam A. Ahmed	D. Bitzios	A. Ahmed	21/07/2022	Mario Pace, Hornsby Shire Council Mpace@hornsby.nsw.gov.au
P5524.002R Westleigh Park Traffic Impact and Access Study	S. Daizli / T. Islam	A. Ahmed	A. Ahmed	05/09/2022	Mario Pace, Hornsby Shire Council Mpace@hornsby.nsw.gov.au
P5524.003R Westleigh Park Traffic Impact and Access Study	S. Daizli / T. Islam	A. Ahmed	A. Ahmed	21/02/2023	Mario Pace, Hornsby Shire Council Mpace@hornsby.nsw.gov.au

DRAFT

EXECUTIVE SUMMARY

Background

Hornsby Shire Council (Council) has prepared a draft masterplan for a new regional park at the location of the former Sydney Water site at 62 Quarter Sessions Road, Westleigh. Westleigh Park (the Park) is proposed to offer a range of active and passive recreation opportunities. A preliminary traffic and transport assessment undertaken in 2019 based on 2019 data identified a need for road network upgrades to cater for the additional traffic generated by the masterplan proposal. Since then, NorthConnex which was open to traffic in October 2020, has changed the traffic conditions within the study area. Council has identified the need to update the traffic assessment to incorporate the influences of the NorthConnex on traffic volumes and patterns within the study area.

Council has engaged Bitzios Consulting to develop a microsimulation model in VISSIM and use the model to inform road and intersection upgrade requirements, assess the impact of the proposed Sefton Road extension and active and public transport facilities and potential improvements.

Westleigh Park Proposal

Council has sought to '*develop a sustainable plan for community use of the site known as Westleigh Park*'. The Park is intended to provide a key facility for the district and include provision for formal sports, passive recreation (picnics, walking, playground), mountain biking and ancillary facilities (roads, carparks, building, shared paths and water-sensitive urban design). The plan includes a total of three sports fields with associated amenities and car parking, as well as the formalisation of mountain biking and walking trails. The Master Plan is shown in Figure ES.1.

Source: General Arrangement Plan, Taylor Thomson Whitting June 2021

Figure ES.1: Westleigh Park Masterplan

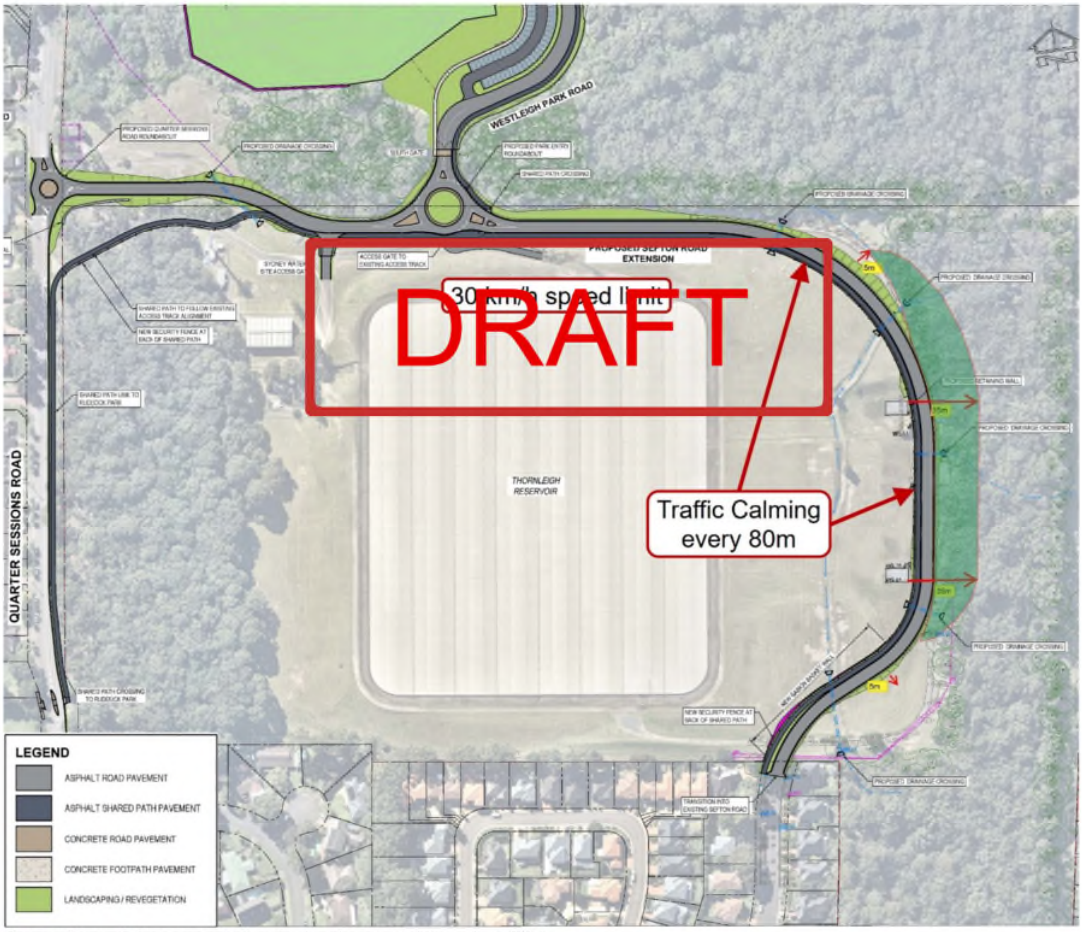
Access Options

The Park will be developed over a number of years. While Council is considering various factors to inform the finalisation of the Park development staging, for the purpose of this study it has been assumed that the Park will be developed in two stages:

- **Stage 1:** The sports field on the southern side of the Park will be completed first (by 2027)
- **Stage 2:** The remaining sports fields will be completed (by 2032).

In consultation with Council, the following three Park traffic access options have been developed for the purposes of this assessment:

- **Option 1:** Includes 2027 / 2032 background traffic growth plus Park traffic. The proposed Sefton Road extension is not included in this option. This option includes a proposed upgrade at the Duffy Road / The Esplanade / Chilvers Road intersection. Under this option, all access would be provided via Quarter Sessions Road
- **Option 2:** As per Option 1 but with the proposed Sefton Road extension open to all traffic. Sefton Road is extended through the Sydney Water reservoir site and into the Park and along the southern boundary of the Park to Quarter Sessions Road, with the extension open to general traffic, as shown in Figure ES.2. Under this option, access would be via Quarter Sessions Road and Sefton Road
- **Option 3:** Same as Option 2 but with the proposed Sefton Road extension only accessible for Park traffic.



Source: General Arrangement Plan, Taylor Thomson Whitting June 2021

Figure ES.2: Sefton Road Extension Proposal

Traffic Impact Assessment

Option 1 which does not include the proposed Sefton Road extension will service the 2027 PM and Weekend peak traffic demands. However, in 2032 when the Park is expected to be fully developed, Park traffic will contribute to additional delays especially in the Weekend peak when the Duffy Avenue / Chilvers Road / The Esplanade intersection is predicted to operate very close or at capacity with long queues on the Chilvers Road approach, spilling back onto the Sefton Road east approach to the Chilvers Road intersection as shown in Figure ES.3. Therefore, while the proposed upgrade at the Duffy Avenue / Chilvers Road / The Esplanade will provide acceptable traffic performance until 2027, further upgrades are required between 2027 and 2032.

Figure ES.3: Queues from the Model, 2032 Weekend Peak With Full Development (Option 1)

Option 2 which includes the Sefton Road extension will substantially improve 2032 PM and Weekend Peak traffic conditions compared to Option 1. In 2032 the projected AADT on the Sefton Road extension is slightly over 1,500 veh/day which is still within the residential road environmental capacity of 2,000 veh/day (*Section 7.3 TfNSW's Guide to Traffic Generating Developments).*

Option 3 which only allows Park traffic onto the proposed Sefton Road extension, will marginally impact the Duffy Avenue / Chilvers Road / The Esplanade intersection traffic performance however this intersection still provides acceptable traffic performance.

Active and Public Transport

This study has identified improvements further to those already planned as part of the development including extensions of off-road shared paths, additional pedestrian crossings and improved connectivity to the nearby train stations. Bus service re-routing ideas have also been proposed for further consideration with stakeholders.

Conclusions

This assessment suggests that the proposed Sefton Road extension is required to be in place between completion of Stage 1 and completion of Stage 2 of the Park. If the extension is open to through traffic under Option 2, it provides network benefits particularly to the Duffy Avenue / Chilvers Road / The Esplanade intersection and would carry daily traffic volumes within the typical residential road environmental capacity. If it is closed in the middle allowing access for Park traffic only under Option 3, it impacts the local network and the Duffy Avenue / Chilvers Road / The Esplanade intersection only marginally. As Options 2 and 3 have similar benefits, either option is preferred. If Option 3 is preferred, emergency access for Westleigh residents and major event access when required should be considered.

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DRAFT

1. INTRODUCTION

1.1 Background

Hornsby Shire Council (Council) has prepared a draft masterplan for a new regional park at the location of the former Sydney Water site at 62 Quarter Sessions Road, Westleigh. Westleigh Park (the Park) is proposed to offer a range of active and passive recreation opportunities including community-based sport, school and club athletics, cycling and mountain biking, informal exercise and walking, children's playground bushwalking and passive recreation activities. It is stated to cater for the diverse needs of the community.

A preliminary traffic and transport assessment undertaken in 2019 based on 2019 data identified a need for road network upgrades to cater for the additional traffic generated by the masterplan proposal. Since then, NorthConnex which was open to traffic in October 2020, has changed the traffic conditions within the study area. Council has identified the need to update the traffic assessment to incorporate the influences of the NorthConnex on traffic volumes and patterns within the study area.

Council has engaged Bitzios Consulting to develop a traffic microsimulation model in VISSIM and:

- Use the model to assess traffic impacts and to inform road and intersection upgrade requirements
- Assess the proposed Sefton Road extension on traffic volumes and upgrade needs
- Assess active transport and public transport facilities and potential improvements.

1.2 Study Area

The study area is shown in Figure 1.1.

The study area is bound by:

- Corang Road and Sefton Road to the north
- Quarter Sessions Road to the west
- Goodlands Avenue to the south
- Pennant Hills Road and The Esplanade to the east.

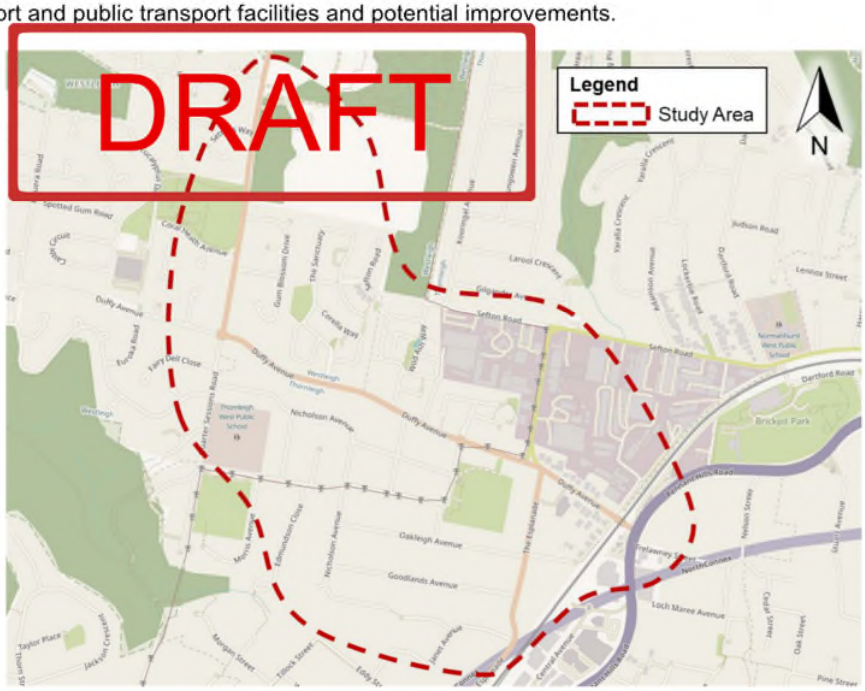


Figure 1.1: Study Area

1.3 Study Objective and Process

The objective of the study is to evaluate the impact of the proposed Park on the traffic performance of key roads and intersections adjacent to the Park and to recommend traffic infrastructure upgrades as well as active transport and public transport facility improvements.

1.4 Study Process

The study was undertaken in three (3) stages with the purpose of each stage being:

- **Stage 1 - Existing Traffic and Transport Assessment**: Involving the collection of travel pattern, traffic volume, travel time, public transport and active transport data and assessment of the existing traffic and transport issues. In Stage 1 a VISSIM traffic microsimulation model was also created, calibrated and validated to simulate the existing traffic conditions.
- **Stage 2 - Future Traffic Assessment:** Use the base VISSIM model to assess the future traffic performance 'With' and 'Without' the proposed Park development to identify pinch points and devise and test improvement measures. This stage also included the assessment of the proposed Sefton Road extension and identification of future active and public transport infrastructure to improve accessibility by these modes of transport to and from the Park.
- **Stage 3 - Reporting:** Summarise the study process and outcomes to document the assessment and provide information to assist Council in its preparation of stakeholder engagement materials.

Project team meetings and workshops were held during each stage of the study.

1.5 Report Outline

The remainder of this report is structured as follows:

- **Section 2 – Westleigh Park Proposal:** Outlines Council's proposal for the Westleigh Park Master Plan
- **Section 3 – Existing Traffic and Transport Conditions:** Details the current performance of the traffic network in terms of general traffic, pedestrians, cyclists and public transport
- **Section 4 – Future Year Do Minimum Assessment:** Details the assessment of the traffic network in 2027 and 2032 without Park traffic
- **Section 5 – Westleigh Park Traffic Impact Assessment:** Details the assessment of the traffic network in 2027 and 2032 with the Park and testing alternative park traffic access arrangements
- **Section 6 – Intersection Capacity Verification:** Summarises the development of 2022 and 2032 SIDRA Models and SIDRA results
- **Section 7 – Suitability of Sefton Road to Provide Additional Traffic:** Advises on the geometric suitability of Sefton Road to accommodate additional traffic
- **Section 8 – Public and Active Transport:** Details the assessment of options for access to the park via active transport and public transport and improvements that may be required
- **Section 9 – Westleigh Park Access Management Strategy:** Summarises the impacts of allowing all traffic vs. Park only traffic to use the Sefton Park extension in relation to emergency access for Westleigh residents and major event access
- **Section 10 – Summary and Conclusions:** Summarises the key findings of this study.

2. WESTLEIGH PARK PROPOSAL

2.1 Westleigh Park Master Plan

Council has sought to '*develop a sustainable plan for community use of the site known as Westleigh Park'*. The Park is intended to provide a key facility for the district and include provision for formal sports, passive recreation (picnics, walking, playground), mountain biking and ancillary facilities (roads, carparks, building, shared paths and water-sensitive urban design).

The plan includes a total of three sports fields with associated amenities and car parking, as well as the formalisation of mountain biking and walking trails. The Master Plan is shown in Figure 2.1.

Source: General Arrangement Plan, Taylor Thomson Whitting June 2021

Figure 2.1: Westleigh Park Masterplan

2.2 Development Stages

The Park is proposed to be developed over a number of years. While Council is considering various factors to inform the finalisation of Park development staging, for the purpose of this study it has been assumed that the Park will be developed in two stages:

- **Stage 1:** The sports field on the southern side of the Park will be completed first
- **Stage 2:** The remaining sports fields will be completed.

It is also assumed that Stage 1 would be open by 2027 with Stage 2 completed by 2032.

2.3 Access Strategy

Two separate vehicle accesses to the Park are proposed:

- A northern access point onto Warrigal Drive with a roundabout at Quarter Sessions Road
- A southern access point along the southern boundary of the Park.

2.4 Active and Public Transport Strategy

Access through the site for pedestrians and cyclists is proposed via a 2.5-3.0m wide shared path around its perimeter. Additional pedestrian paths will connect parking areas to facilities and provide access through the central parkland areas between the southern and central fields. The shared path is intended to connect to a broader local network of cycle paths via both on-road and off-road links.

Bus stops are proposed to be constructed within the site, and future bus routes through the Park are intended to be designed in consultation with TfNSW.

3. EXISTING TRAFFIC AND TRANSPORT CONDITIONS

3.1 Overview

Traffic surveys were undertaken on Wednesday 16 March 2022 and Saturday 19 March 2022 to understand the existing traffic demands and congestion issues within the study area. The data was also used in the calibration and validation of the 2022 Base VISSIM microsimulation traffic models.

3.2 Key Roads and Intersections

3.2.1 Road Network and Hierarchy

The road network within the study area comprises a mix of local access streets, collector roads and arterial roads. Collector roads including Duffy Avenue and Quarter Sessions Road are used as connections between the residential areas west and north of the study area and roads to the east and south. Sefton Road and Chilvers Road within the study area are often used as a connection between Hornsby Town Centre and Pennant Hills Road and high volumes of through traffic are on these roads. The roads within the study area and their classification are summarised in Table 3.1. The road hierarchy and key intersections are detailed in Figure 3.1.

Table 3.1: Road Network Summary

Road Name	Jurisdiction	Hierarchy	Cross Section	Speed Limit
Pennant Hills Road	State	Arterial	6-lane divided	70 km/h
Duffy Avenue (East)	Council (Chilvers Rd to Pennant Hills Rd)	Regional	2-lane undivided	50 km/h
Duffy Avenue (West)	Council (Chilvers Rd to Quarter Sessions Rd)	Collector	2-lane undivided	50 km/h
Chilvers Road	Council	Regional	2-lane undivided	50 km/h
Sefton Road (East)	Council (Chilvers Rd to Milton Ave)	Regional	2-lane undivided	60 km/h
Sefton Road (West)	Council (Chilvers Rd to end)	Local	2-lane undivided	50 km/h
The Esplanade	Council	Regional	2-lane undivided	50 km/h
Quarter Sessions Road	Council	Collector	2-lane undivided	50 km/h
Corang Road	Council	Local	2-lane undivided	50 km/h
Gun Blossom Drive	Council	Local	2-lane undivided	50 km/h
Coral Heath Avenue	Council	Local	2-lane undivided	50 km/h
Bottle Brush Road	Council	Local	2-lane undivided	50 km/h
Nicholson Avenue	Council	Local	2-lane undivided	50 km/h
Dobson Street	Council	Local	2-lane undivided	50 km/h
Giblett Avenue	Council	Local	2-lane undivided	50 km/h
Roach Avenue	Council	Local	2-lane undivided	50 km/h
Kentwell Avenue	Council	Local	2-lane undivided	50 km/h
Barrett Avenue	Council	Local	2-lane undivided	50 km/h
Oakleigh Avenue	Council	Local	2-lane undivided	50 km/h
Goodlands Avenue	Council	Local	2-lane undivided	50 km/h
Sinclair Avenue	Council	Local	2-lane undivided	50 km/h
Kooringal Avenue	Council	Local	2-lane undivided	50 km/h

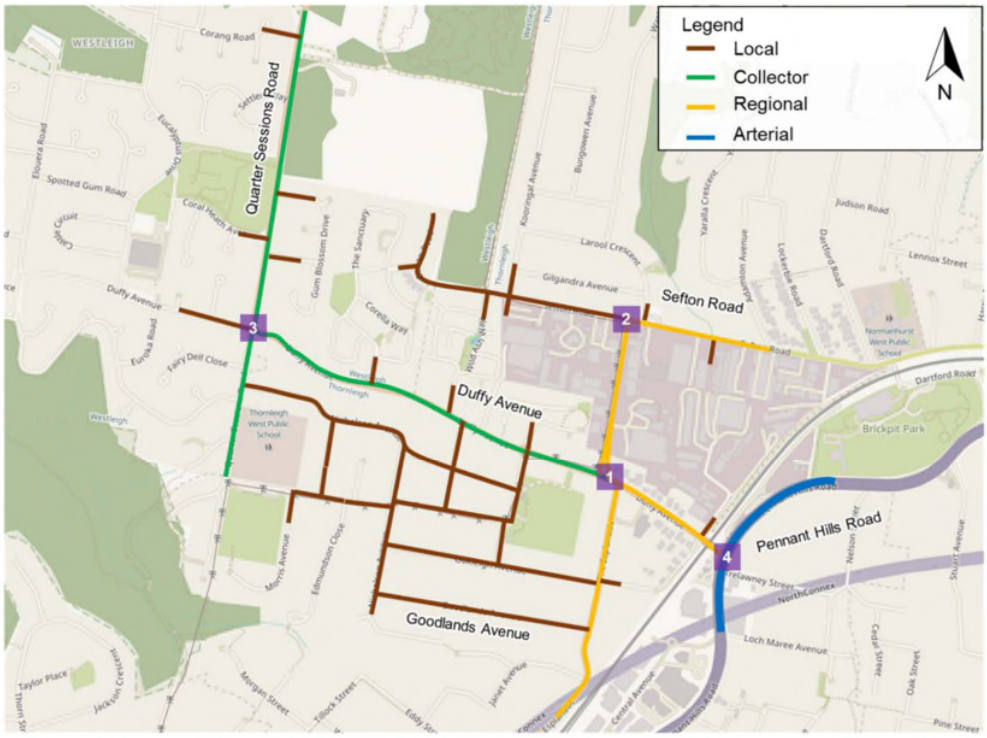


Figure 3.1: Road Hierarchy and Key Intersections

3.2.2 Key Intersections

Four intersections were identified within the study area as 'key intersections' that would be directly impacted by the proposed Park. They were:

- Duffy Avenue / Chilvers Road / The Esplanade
- Chilvers Road / Sefton Road
- Duffy Avenue / Quarter Sessions Road
- Pennant Hills Road / Duffy Avenue
- Sefton Road / Kooringal Avenue.

Table 3.2 provides a description of the layout of the key intersections.

Table 3.2: Key Intersection Descriptions

Intersection	Description	Intersection Layout
Duffy Avenue / Chilvers Road / The Esplanade	▪ The intersection is an at-grade four-way signalised intersection. ▪ The northern approach has two through lanes and a right turn pocket. ▪ The eastern and southern approaches have one through lane and right turn pockets. ▪ The western approach has one through lane, a right turn pocket and a left turn pocket. ▪ Queues were noted in the AM peak along The Esplanade northbound and westbound in Duffy Avenue.	
Chilvers Road / Sefton Road	▪ The intersection is a T-intersection where the southern and eastern legs have right of way, and the western approach must give way. ▪ The eastern approach has one through lane and a left turn pocket. ▪ The southern and western approaches have one approach lane only. ▪ The intersection is adjacent to the Larool Crescent intersection, where all turning movements are permitted.	
Duffy Avenue / Quarter Sessions Road	▪ The intersection is a four-way roundabout with a single lane on each approach	
Pennant Hills Road / Duffy Avenue	▪ The intersection is a T-intersection. ▪ Pennant Hills Road is median-separated and has three lanes in each direction, with a right turn pocket on the northern approach. ▪ The Duffy Avenue approach has two approach lanes; a right turn lane and a left turn lane.	

Intersection	Description	Intersection Layout
Sefton Road /Kooringal Avenue	▪ The intersection is a three-way roundabout with a single lane on each approach	

3.3 Speed Environment

Generally, the roads within the study area are subject to a speed limit of 50 km/h. Sefton Road east of Larool Crescent is 60km/h, Pennant Hills Road is 70 km/h, and there are 40km/h school zones along parts of Quarter Sessions Road, Duffy Avenue, Giblett Avenue and Dobson Street which are active between 8:00 am and 9:30 am and between 2:30 pm and 4:00 pm on school days. The speed limits within the study area are shown in Figure 3.2.

Figure 3.2: Speed Limits Within the Study Area

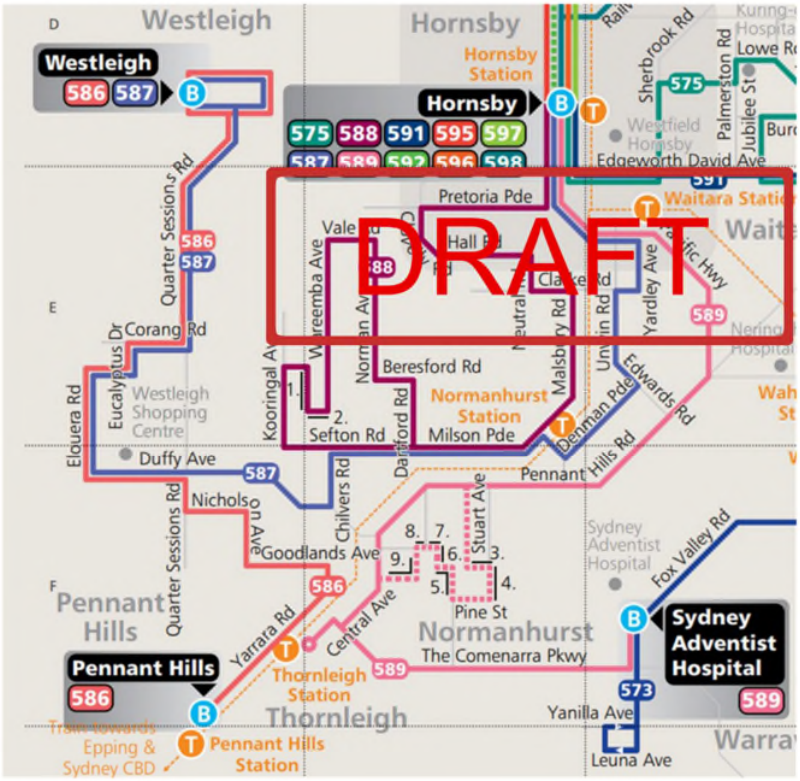
3.4 Public Transport Networks and Services

3.4.1 Bus Services

Westleigh is serviced by the upper north shore bus network, which is operated by Transdev. There are currently three (3) bus routes servicing the study area which are all local routes which link residential areas in Westleigh to nearby train stations at Hornsby, Normanhurst, Thornleigh and Pennant Hills. Services operate at a moderate frequency during the AM and PM peak periods, and at a reduced frequency during weekends. Bus timetables for routes 586, 587 and 588 are summarised in Table 3.3 and the bus operator map is shown in Figure 3.3.

Table 3.3: Bus Route Summary

Route No.	Route Description	Direction	Weekday Peak Frequency	Saturday Frequency
586	Westleigh to Pennant Hills	Both Directions	25-35 mins	Does not operate
587	Hornsby to Westleigh (Loop Service)	Both Directions	20-35 mins	60 mins
588	Hornsby to Normanhurst West (Loop Service)	Both Directions	15-40 mins	60 mins



Source: TfNSW

Figure 3.3: Local Bus Operator Map

3.5 Active Transport Facilities

3.5.1 Walking

Apart from Quarter Sessions Road which has footpaths on its western only side north of Duffy Avenue, all collector roads and all arterial roads within the study area have footpaths on both sides. Local access roads generally have footpaths on only one side of the road, and some have no footpaths. The existing footpath network is shown in Figure 3.4.

Basemap: OpenStreetMap

Figure 3.4: Local Footpath Network

3.5.2 Cycling

Hornsby Council's bike map designates Quarter Session Road, The Esplanade, Chilvers Road and Sefton Road as on-road bicycle routes. No provisions for cyclists are located on any of the routes except that marked bicycle lanes are provided on limited sections of The Esplanade and Duffy Avenue. As such, all cycle routes within the study area are classified as being 'on-road' in mixed-traffic conditions as shown in Figure 3.5.

Basemap: OpenStreetMap

Figure 3.5: Local Cycle Routes

3.6 Traffic Volumes and Patterns

3.6.1 Traffic Surveys

A variety of traffic surveys were conducted in March 2022 for input into the study. The surveys are summarised in Table 3.4.

Table 3.4: Traffic Data Summary

Data Type	Source and Location	Survey Dates	Purpose
Intersection Turn Counts	Undertaken by Austraffic for 16 intersections	Wednesday 16 March 2022 ***and*** Saturday 19 Marth 2022	Traffic demand development and VISSIM model calibration
Travel Time Data	Undertaken by Austraffic for 2 routes		VISSIM model validation
Origin-Destination Data (OD)	Undertaken by Austraffic for 7 OD Locations		Traffic demand development and VISSIM model calibration
SCATS Intersection Diagnostic Monitor Data and LX file	Provided by TfNSW for the two signalised intersections within the study area		VISSIM model development

3.6.2 Intersection Turn Count Surveys

Austraffic undertook classified intersection turn counts for 16 intersections within the study area. The surveys were undertaken on:

- Wednesday 16 March 2022, 8:00am to 9:00am and 5:00pm to 6:00pm
- Saturday 19 Match between 11:00am to 12:00pm.

The counts were classified into light vehicles and heavy vehicles and were recorded in 15-minute intervals. The surveyed intersections are listed in Table 3.5 and shown in Figure 3.6.

Table 3.5: Intersection Turning Count Surveys

No.	Intersection	Control Type	No.	Intersection	Control Type
1	Quarter Sessions Road / Corang Road	Give Way	9	Duffy Avenue / Sinclair Avenue / Huntingdale Way	Roundabout
2	Quarter Sessions Road / Gun Blossom Drive	Give Way	10	Duffy Avenue / The Esplanade / Chilvers Road	Signalised
3	Quarter Sessions Road / Coral Heath Avenue	Give Way	11	Duffy Avenue / Pennant Hills Road	Signalised
4	Quarter Sessions Road / Bottle Brush Road	Give Way	12	The Esplanade / Hall Avenue / Oakleigh Ave	Give Way
5	Quarter Sessions Road / Duffy Avenue	Roundabout	13	The Esplanade / Goodlands Avenue	Give Way
6	Quarter Sessions Road / Nicholson Avenue	Give Way	14	Sefton Road / Chilvers Road	Give Way
7	Duffy Avenue / The Sanctuary	Give Way	15	Sefton Road / Larool Crescent	Give Way
8	Duffy Avenue / The Sanctuary	Give Way	16	Sefton Road / Kooringal Avenue	Roundabout

Figure 3.6: Intersection Turning Count Survey Locations

3.6.3 Travel Time Surveys

Travel time surveys were undertaken at the same times as the intersection counts along the two routes listed below and shown in Figure 3.2.

- **Route 1**: Corang Road to The Esplanade via Quarters Sessions Road and Duffy Avenue
- **Route 2**: Adamson Avenue to Janet Avenue via Sefton Road, Chilvers Road and The Esplanade.

A GPS device was used to record the location of the vehicle every second during the survey using the "Floating Car Method". The routes are detailed in Table 3.6 and Figure 3.7.

Table 3.6: Travel Time Survey Sections

Route 1 Sub-Sections	Route 2 Sub-Sections
Quarter Sessions Road / Corang Road	Sefton Road / Adamson Avenue
Quarter Sessions Road Sub-Sections / Duffy Avenue	Sefton Road / Chilvers Road
Duffy Avenue / Sinclair Avenue	Duffy Avenue / Chilvers Road
Duffy Avenue / Chilvers Road	Duffy Avenue / The Esplanade
Duffy Avenue / The Esplanade	The Esplanade / Janet Avenue

Figure 3.7: Travel Time Survey Routes

3.6.4 Origin-Destination Survey

An Origin-Destination (OD) survey was undertaken using 8 'stations' and was conducted at the same times as the intersection count surveys. The OD data was classified into light vehicles and heavy vehicles, and was recorded in 15-minute intervals. The OD station locations are listed in Table 3.7 and shown in Figure 3.8.

Table 3.7: Origin-Destination Survey Locations

No.	OD Survey Station Locations
1	Quarter Sessions Road, north of Corang Road
2	Quarter Sessions Road, north of Duffy Avenue
3	Duffy Avenue, west of Quarter Sessions Road
4	Larool Crescent, north of Sefton Road
5	Sefton Road, east of Larool Crescent
6	The Esplanade, south of Goodlands Avenue
7	Duffy Avenue, east of Chilvers Road
8	Nicholson Avenue, east of Quarter Sessions Road

Figure 3.8: Origin-Destination Survey Locations

3.6.5 SCATS Data

TfNSW provided SCATS Intersection Diagnostic Monitor data for the intersection count dates at the 2 signalised intersections within the study area:

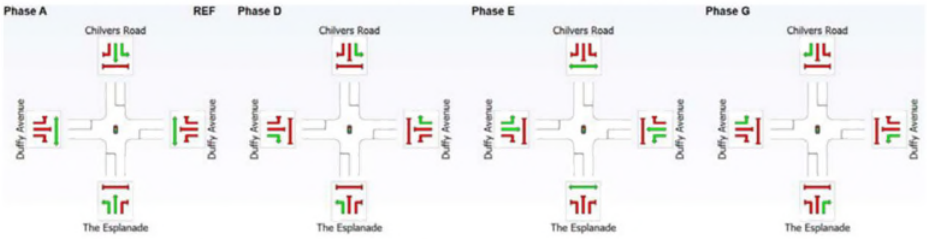
- TCS 1737: Duffy Avenue / The Esplanade / Chilvers Road
- TCS 1255: Duffy Avenue / Pennant Hills Road.

The LX file for the region was also obtained. The LX file contains information on SCATS settings including interphase times, phase sequence, pedestrian green time and clearance time, SCATS zone, offsets, high and low cycle time.

3.6.6 Signal Data

Traffic Phases

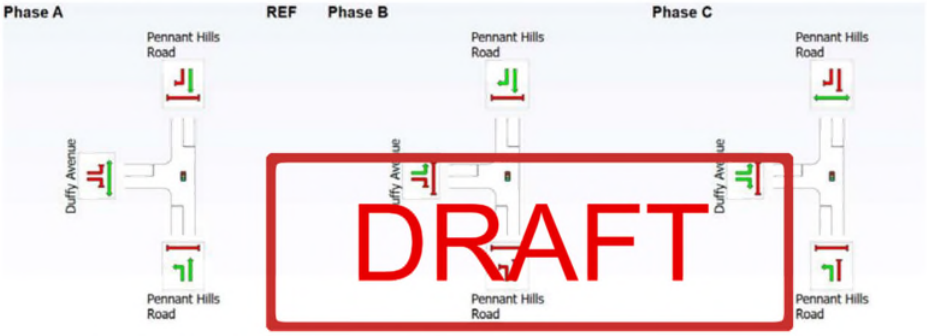
The Duffy Avenue / Chilvers Road / The Esplanade signals have four phases as shown in Figure 3.9. Phases A and G service traffic from Chilvers Road and The Esplanade, with leading right turns and Phases D and E service traffic from Duffy Avenue with leading right turns.



**Phasing sequence for illustration purposes only*

Figure 3.9: Duffy Avenue / Chilvers Road / The Esplanade Signal Phase Sequence

The Pennant Hills Road / Duffy Avenue signals have three phases as shown in Figure 3.10. Phases A and B service traffic Pennant Hills Road with a trailing right turn, and Phase C services traffic from Duffy Avenue.



**Phasing sequence for illustration purposes only*

Figure 3.10: Pennant Hills Road / Duffy Avenue Signal Phase Sequence

Cycle Time and Phase Times

The SCATS data was analysed to calculate the average cycle time and phase times during the AM, PM and weekend peak periods. The key observations include that:

- The Duffy Avenue / Chilvers Road / The Esplanade cycle time varies between 110 and 115 seconds
- The Pennant Hills Road / Duffy Avenue cycle time varies between 115 and 125 seconds
- Phase A is the reference phase in both signal cycles.

3.6.7 Peak Hour Traffic Profile

The total traffic volumes across the surveyed intersections for the AM, PM and Weekend peaks are shown in Figure 3.11, Figure 3.12 and Figure 3.13. The peak profiles show a stable traffic flow across all three survey periods. The weekday AM and PM and weekend peak intersection turning movement counts are summarised in **Appendix A**.

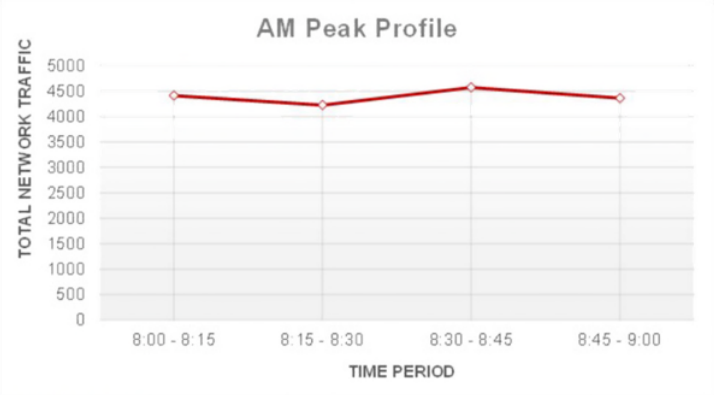


Figure 3.11: Network Traffic Volumes – AM Peak Profile

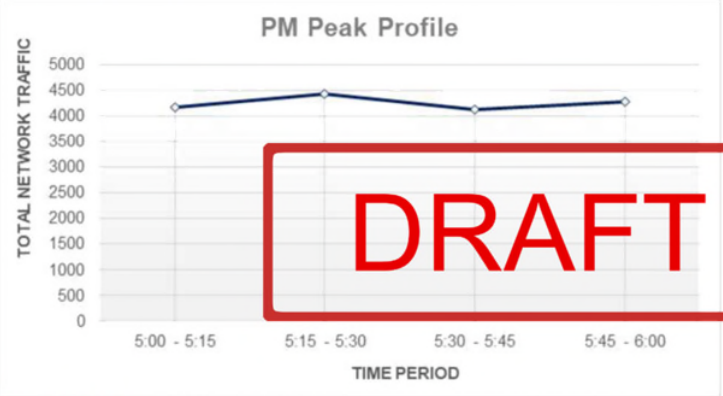


Figure 3.12: Network Traffic Volumes – PM Peak Profile

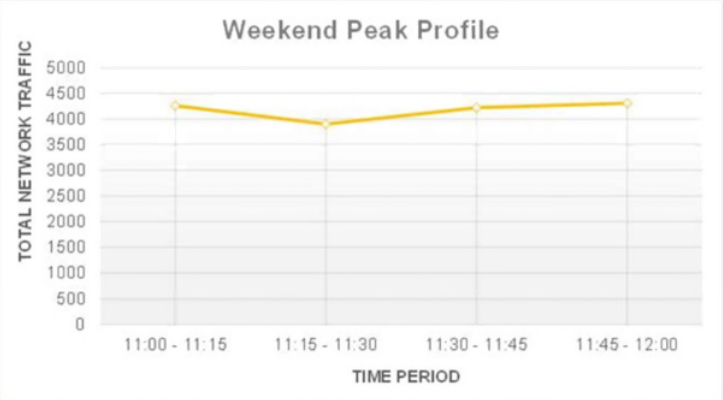


Figure 3.13: Network Traffic Volumes – Weekend Peak Profile

3.6.8 Travel Times

The average times from the survey results for the routes outlined in Section 3.6.3 are shown in Figure 3.14 through Figure 3.17. Key observations include that:

- The signalised intersection of Duffy Avenue / Chilvers Road / The Esplanade generates significant congestion during the AM peak, particularly to the northbound traffic on The Esplanade as shown in Figure 3.16
- Travel times along Duffy Avenue and Quarter Sessions Road, excluding delays at the major intersection, are consistent across the three survey periods, and are relatively free of congestion
- Similarly, travel times are consistent along sections of Chilvers Road, The Esplanade and Sefton Road away from the major intersection.

Detailed travel timetables are included in **Appendix B**.

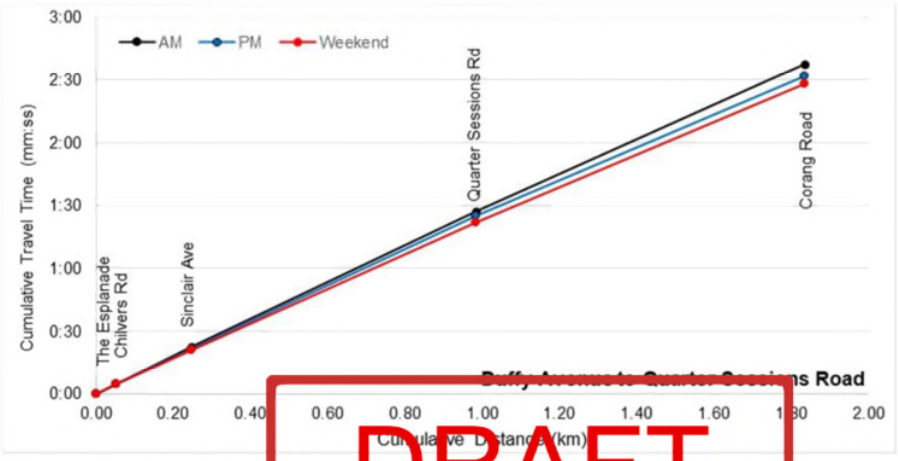


Figure 3.14: Observed Travel Time – Route 1 Westbound / Northbound

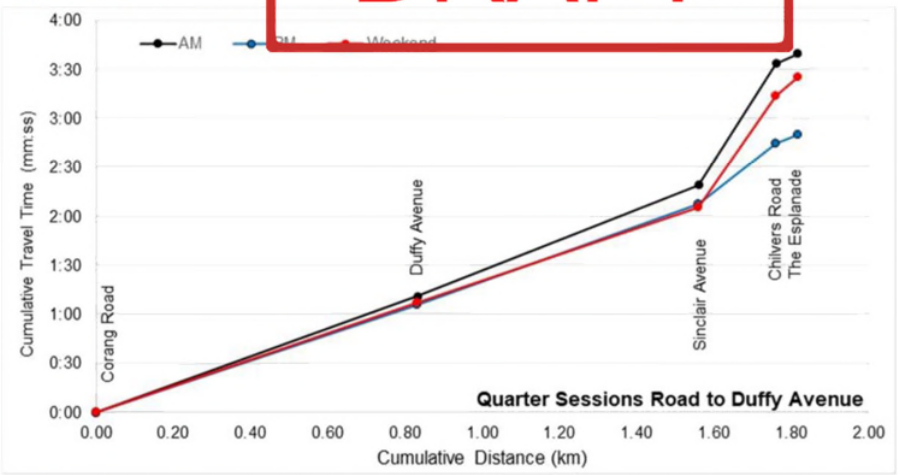


Figure 3.15: Observed Travel Time – Route 1 Southbound / Eastbound

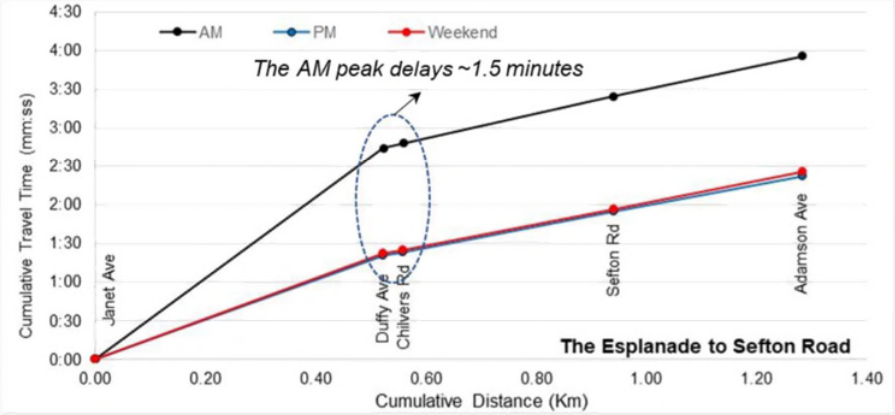


Figure 3.16: Observed Travel Time – Route 2 Northbound / Eastbound

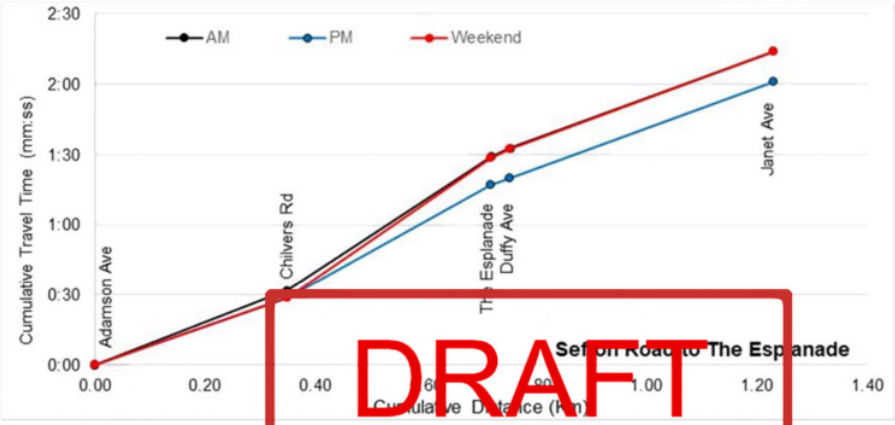


Figure 3.17: Observed Travel Time – Route 2 Westbound / Southbound

3.7 NorthConnex Influences

Prior to NorthConnex Pennant Hills Road was widely regarded as one of the most congested corridors in Sydney. Prior to NorthConnex, large volumes of traffic which had origins and destinations outside of the study area used Yarrara Road - The Esplanade - Duffy Avenue as an alternative route to avoid congestion on Pennant Hills Road. Since the opening of the NorthConnex on 31 October 2020, traffic flows on Pennant Hills Road have reduced around 40% as shown in Figure 3.18, noting though that the tunnel opened during the COVID-19 pandemic. This reduction is likely to alter traffic route choice within the study area and the findings from the 2019 traffic study, which was pre-NorthConnex, will now very likely be different.

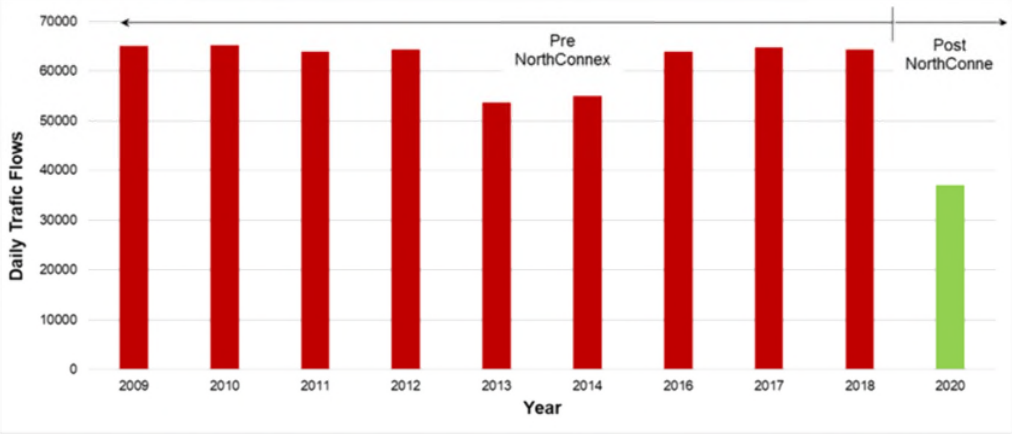


Figure 3.18: Daily Traffic Flows on Pennants Hill Road (2009 – 2020)

3.8 COVID 19 Impacts

3.8.1 Likely Impacts

It was anticipated that changes in travel behaviour due to COVID-19 restrictions such as working remotely may have had some influence in the reported reduction in traffic flows within the study area and that recent surveys would not represent future 'normal' traffic demands. To determine if any reduction in traffic could be attributed to COVID restrictions, the results of the 2022 survey were compared to the survey undertaken in 2019 as part of the preliminary investigations for this study.

Table 3.8 details the differences between the 2019 and 2022 AM and PM peak surveyed traffic volumes at the following two key intersections within the study area:

- Duffy Avenue / Chilvers Road / The Esplanade
- Pennant Hills Road / Duffy Avenue.

Table 3.8: Comparison of 2019 and 2022 Key Intersection Counts

Intersections	Approach	AM (veh/hr)				PM (veh/hr)			
		2019	2022	Diff	% Diff	2019	2022	Diff	% Diff
Duffy Avenue / Chilvers Road / The Esplanade	Chilvers Road SB	765	632	-133	-17%	922	800	122	-13%
	Duffy Avenue WB	289	307	18	6%	469	405	-64	-14%
	The Esplanade NB	687	633	-54	-8%	701	486	-215	-31%
	Duffy Avenue EB	581	607	26	4%	339	370	31	9%
	Total	**2,322**	**2,179**	**-143**	**-6%**	**2,431**	**2,061**	**-370**	**-15%**
Pennant Hills Road / Duffy Avenue	Pennant Hills Road SB	1,838	1,735	-103	-6%	1,925	1,880	-45	-2%
	Pennant Hills Road NB	2,493	1,819	-674	-27%	2,280	1,955	-325	-14%
	Duffy Avenue EB	351	407	56	16%	240	288	48	20%
	Total	**4,682**	**3,961**	**-721**	**-15%**	**4,445**	**4,123**	**-322**	**-7%**

3.8.2 Duffy Avenue / Chilvers Road / The Esplanade

There was an overall reduction in traffic by between 6% and 15% at this intersection. Traffic volumes on Chilvers Road, Duffy Avenue westbound and The Esplanade reduced substantially. This reduction is most likely due to reduced 'rat running' following reduced congestion on Pennant Hills Road. Traffic volumes eastbound Duffy Avenue have however increased by between 4% and 9% between 2019 and 2022.

3.8.3 Pennant Hills Road / Duffy Avenue

Traffic volumes along Pennant Hills Road reduced by between 2% and 27% (2019 v 2022). This reduction is most likely to be due to NorthConnex however volumes on Duffy Avenue increased by 16% to 20%.

3.8.4 Data Adjustment Need Conclusion

Traffic volumes along Pennant Hills Road, The Esplanade and Chilvers Road were reduced by between 2% and 27%. The Pennant Hills Road reduction is attributed to the opening of NorthConnex which improved traffic congestion on Pennant Hills Road. The improved congestion also reduced rat running along The Esplanade and Chilvers Road. However, traffic volumes on Duffy Avenue which generally services the local traffic increase by between 4% and 20%. There is insufficient and inconclusive data to suggest that changes in travel behaviour due to COVID-19 have had a significant impact on traffic volumes within the study area. On this basis, the survey results do not need to be adjusted.

3.9 Peak Period Traffic Movement Patterns (Origin-Destination, OD)

The OD data highlights the scale of local trip generation relative to 'through traffic'. The data analysis suggests that around 70% of the total traffic passing through an OD station was matched at another station, suggesting that 70% of traffic within the study area is through traffic with both their origins and their destinations outside of the study area. The remaining 30% of traffic entering or leaving the study area either starts or finishes its trip within the study area and is therefore locally generated.

Detailed summary tables for the OD survey data are attached in **Appendix C**.

3.10 Crash Data Analysis

3.10.1 Overall Crash Data

Crash statistics within the study area were obtained from TfNSW's OpenData Portal. In the five-year period ending 31 December 2020, a total of 66 crashes were reported in the study area. Of those 66 crashes, two resulted in a fatality and 46 resulted in injuries. The remaining 20 were non-casualty (damage only) crashes. A total of 126 vehicles were involved in these crashes. Heavy vehicles were involved in 13 (20%) crashes. This is considered to be high as compared to the proportion of heavy vehicles in the total vehicle mix.

On average, 13.2 crashes occurred per annum, with the lowest recorded in 2020 with 8 crashes (potentially COVID-19 affected) and the highest recorded in 2016 with 19 crashes, as shown in Figure 3.19.

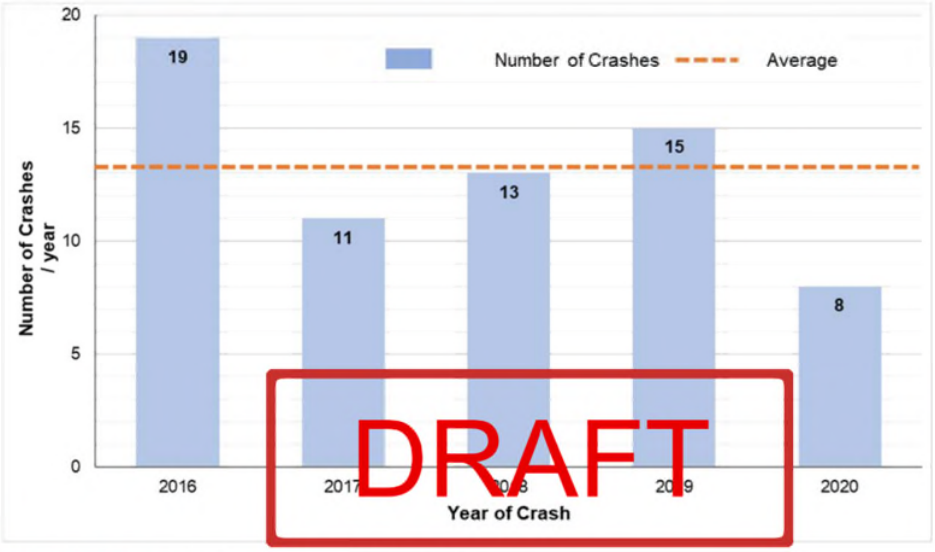


Figure 3.19: Number of Crashes Per Annum

About 89% of the crashes occurred in dry conditions and 70% of the crashes occurred in daylight hours. Table 3.9 summarises the number of casualties by crash severity. There were two fatalities which did not occur in the immediate vicinity of the proposed location for Westleigh Park as shown in Figure 3.20.

Table 3.9: Crash Severity Summary

Crash Severity	Number of Crashes	%	No of Casualties
Fatal	2	3%	2
Serious Injury	12	18%	14
Moderate Injury	14	21%	22
Minor/Other Injury	18	27%	21
Total	**48**	**100%**	**59**

3.10.2 Crash Locations

The crash locations by crash severity are presented in Figure 3.20. A significant proportion of crashes occurred at the following two intersections:

- Duffy Avenue / Chilvers Road / The Esplanade: 12 crashes / 18% of all crashes
- Pennant Hills Road / Duffy Avenue: 6 crashes / 9% of all crashes.

Two fatalities were recorded in the five-year period both of which occurred in 2018 at the following locations:

- Left off carriageway into object on Duffy Avenue between The Esplanade and Pennant Hills Road
- Head-on collision on The Esplanade between Janet Avenue and Eddy Street.

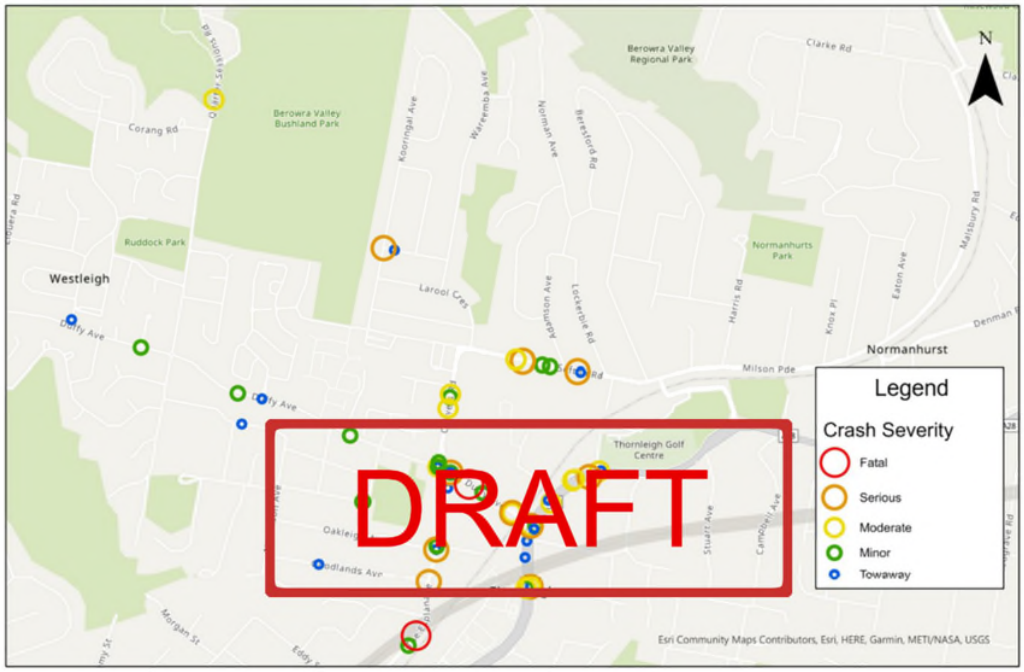


Figure 3.20: Crash Location and Severity

3.10.3 Crash Types

A breakdown of different crash types that occurred within the study area is summarised in Table 3.9. The crash locations are also shown in Figure 3.21. Over a third of the total crashes (38%) occurred between two vehicles colliding while travelling in the opposite direction (e.g. head on or at intersections).

Table 3.10: Crash Type Summary

Crash Type	Number of Crashes	%
Manoeuvring	6	9%
Off path into major object	17	26%
Pedestrian	3	5%
Vehicles from adjacent directions	5	8%
Vehicles from same direction	10	15%
Vehicles from opposite directions	25	38%

The crash classification by Road User Movement code is shown in Figure 3.21.

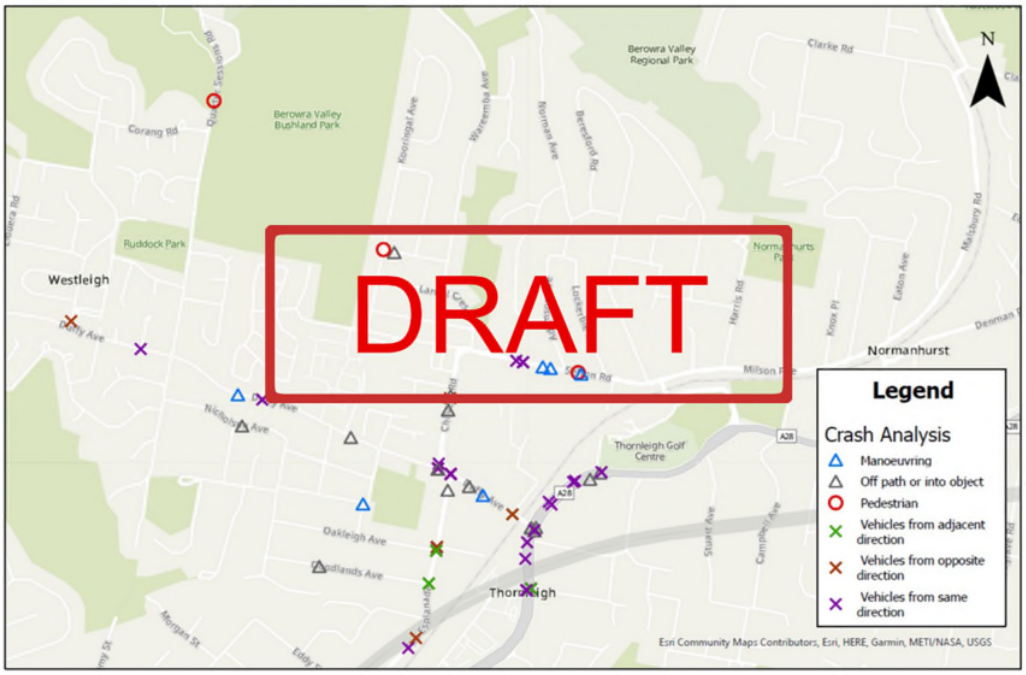


Figure 3.21: Crash Types Classification

3.11 Existing Traffic Performance

3.11.1 Overview

Year 2022 (base year) VISSIM models were developed for the AM, PM and Weekend peaks and were calibrated and validated to reflect traffic network conditions that were surveyed in March 2022.

It is noted that there were no sports at Ruddock Park at the time of the weekend peak traffic surveys and the usage was very low. Therefore, to understand the impacts of Ruddock Park matchday traffic on the surrounding road network a separate analysis was undertaken in SIDRA. The outcomes of the assessment are summarised in Section 6.7.

The intersection Level of Service (LoS) has been assessed based on average delay in accordance with the TfNSW criteria defined in Table 3.11.

Table 3.11: Intersection Level of Service Criteria

Level of Service (LoS)	Average Delay (s)	Description
A	<15	Good operation
B	15 to 29	Good with acceptable delays and spare capacity
C	29 to 43	Satisfactory
D	43 to 57	Operating near capacity
E	57 to 70	At capacity
F	>70	Unsatisfactory

As per the TfNSW guidelines, the delays presented in this report are:

- Average intersection delay for signalised intersections
- The highest turn delay for un-signalised intersections.

3.11.2 Key Intersection Performance

Total intersection flows and delays in the 2022 Base models at the key intersections are summarised in Table 3.12.

Table 3.12: 2022 Base Intersection Delays and LoS*

Intersection	AM Peak		PM Peak		Weekend Peak	
	Demand (veh/hr)	Delay (s) (LoS)	Demand (veh/hr)	Delay (s) (LoS)	Demand (veh/hr)	Delay (s) (LoS)
Duffy Avenue / Chilvers Road / The Esplanade	2,313	57 (E)	2,088	51 (D)	2,108	43 (D)
Sefton Road / Chilvers Road	1,601	17 (B)	1,429	8 (A)	1,477	11 (A)
Duffy Avenue / Quarter Sessions Road	996	4 (A)	897	3 (A)	909	3 (A)
Duffy Avenue / Pennant Hills Road	3,958	18 (B)	4,094	15 (B)	4,153	16 (B)

Red = LoS E or F.

Generally, the key intersections within the study area provide satisfactory LoS during the weekday AM, weekday PM and weekend peak periods. The only exception is the Duffy Avenue / Chilvers Road / The Esplanade intersection. Vehicles at this intersection experience relatively longer delays in the

weekday AM and PM peaks. In the AM peak, long queues were observed on The Esplanade and Duffy Avenue approaches as shown in Figure 3.22.

Figure 3.22: AM Peak Queues at Duffy Avenue/Chilvers Road/The Esplanade Intersection

3.11.3 Rat Run Route

Due the delays at the Duffy Avenue/Chilvers Road/The Esplanade Intersection, a portion of the AM peak traffic travelling from Quarter Sessions Road north-west of the study area are noted to use the residential streets of Nicholson Avenue and Oakleigh Avenue - Goodlands Avenue to access The Esplanade. This route is shown in Figure 3.23.

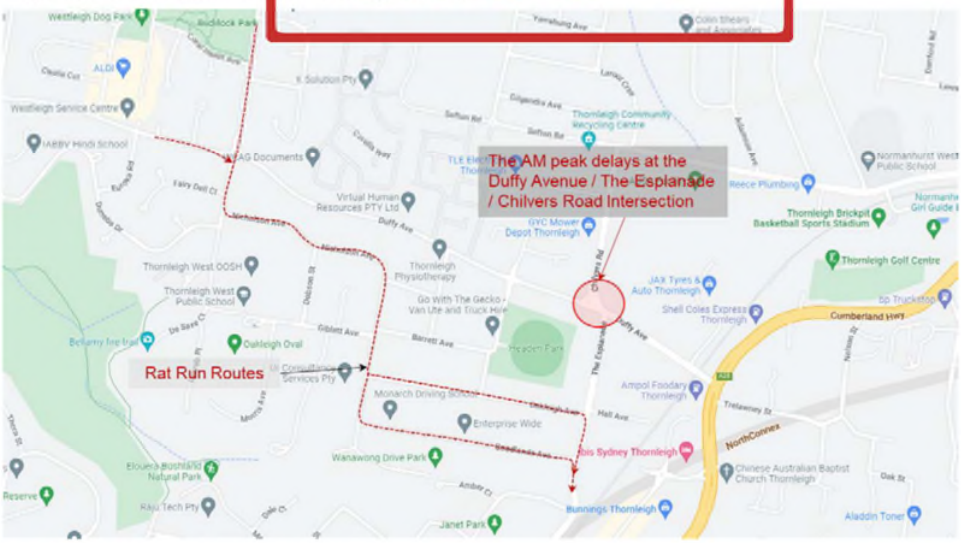


Figure 3.23: Known AM Peak Rat Run Through the Study Area

3.11.4 Link Capacity Analysis

A comparison between the observed volumes and theoretical capacity along a number of key roads within the study area is outlined in Table 3.13. The key observations include:

- For residential and collector roads, a capacity of 600 vehicles per hour per lane was assumed with a 50% factor applied if the road is narrow and cars travelling in opposite directions must slow or give way to each other
- For regional and major collector roads, a capacity of 900 vehicles per hour per lane was assumed
- For lower order local roads, a capacity of 250 vehicles per hour per lane has been assumed.

The results indicate that all the major collector roads within the study area including Duffy Avenue, Chilvers Road, Sefton Road, The Esplanade and Pennant Hills Road are operating near capacity.

Table 3.13: Link Capacity Data in Different Peaks

Road Name	Travel Direction	Capacity (veh/hr)	AM Peak Period		PM Peak Period		Weekend Peak	
			AM Peak Demand (veh/hr)	V/C Ratio*	PM Peak Demand (veh/hr)	V/C Ratio*	Weekend Peak Demand (veh/hr)	V/C Ratio*
Pennant Hills Road	Northbound	2,100	1,737	0.83	1,918	0.91	2,024	0.96
	Southbound	2,100	1,697	0.81	1,842	0.88	1,812	0.86
Duffy Avenue East of Chilvers Road	Eastbound	900	333	0.37	526	0.58	390	0.43
	Westbound	900	608	0.68	362	0.40	608	0.68
Duffy Avenue West of Chilvers Road	Eastbound	900	607	0.67	370	0.41	541	0.60
	Westbound	900	322	0.36	523	0.58	393	0.44
Chilvers Road	Northbound	900	742	0.82	523	0.58	628	0.70
	Southbound	900	623	0.69	793	0.88	674	0.75
Sefton Road East of Chilvers Road	Eastbound	900	594	0.66	768	0.85	645	0.72
	Westbound	900	720	0.80	498	0.55	601	0.67
Sefton Road West of Chilvers Road	Eastbound	600	145	0.24	81	0.14	135	0.23
	Westbound	600	123	0.21	103	0.17	125	0.21
The Esplanade	Northbound	900	755	0.84	643	0.71	609	0.68
	Southbound	900	810	0.90	818	0.91	737	0.82
Quarter Sessions Road	Westbound	900	123	0.14	103	0.11	125	0.14
	Southbound	900	246	0.27	123	0.14	222	0.25
Corang Road	Eastbound	500	16	0.03	32	0.06	14	0.03
	Westbound	500	4	0.01	16	0.03	10	0.02
Nicholson Avenue	Eastbound	250	66	0.26	68	0.27	37	0.15
	Westbound	250	81	0.32	39	0.16	32	0.13
Oakleigh Avenue	Eastbound	250	96	0.38	107	0.43	82	0.33
	Westbound	250	42	0.17	23	0.09	26	0.10
Goodlands Avenue	Eastbound	250	90	0.36	87	0.35	41	0.16
	Westbound	250	120	0.48	46	0.18	53	0.21
Sinclair Avenue	Northbound	250	135	0.54	107	0.43	135	0.54
	Southbound	250	60	0.24	46	0.18	60	0.24
Kooringal Avenue	Northbound	250	26	0.10	42	0.17	33	0.13
	Southbound	250	69	0.28	46	0.18	36	0.14
Larool Crescent	Northbound	250	58	0.23	73	0.29	61	0.24
	Southbound	250	83	0.33	35	0.14	67	0.27

Value of 1 indicates 100% capacity

4. FUTURE YEAR DO MINIMUM ASSESSMENT

4.1 Overview

Council is currently finalising the Westleigh Park masterplan. In consultation with Council, years 2027 and 2032 have been identified as the future assessment years for this traffic study.

4.2 Development of the 2027 and 2032 Traffic Demands

Cordon matrices from the Sydney Strategic Traffic Forecasting Model (STFM) were used to estimate the background traffic growth for the study area. The strategic model growth was applied to the 2022 Base VISSIM model traffic to create the future year Do Minimum models' traffic demands. The models were then run and used to understand how background traffic growth would impact the local traffic network and to provide a baseline for comparing the Park development traffic scenarios.

STFM 'cordon' traffic demand matrices for the study area were provided by TfNSW for 2021, 2026 and 2036 and for the AM two-hour and PM two-hour periods.

A review of the STFM cordon traffic demand matrices indicates that:

- Between 2021 and 2026, total traffic demands through and within the study area would increase by approximately 7% for the AM peak and 8% for the PM peak
- Traffic growth rates will decline after 2026 and to 2036, with the STFM showing a total growth in traffic through and within the study area of approximately 8% over the 10-year period for the AM peak and 10% for the PM peak.

The STFM demand matrices were split into the VISSIM zoning system based on population statistics from the 2016 Census at a meshblock level, and employment estimates from commercial and industrial lot area.

Difference matrices were calculated to understand the absolute increase and decrease of traffic movements between each zone pair over a 5-year and 10-year periods. The difference matrices were added to the 2022 Base VISSIM traffic demands to create the 2027 and 2032 VISSIM traffic demands.

The difference matrices included negative differences between some zone pairs, likely due to changes in traffic patterns from the strategic model 'cut out' (cordon) area. To ensure that the final VISSIM matrices did not result in any zone pairs with negative demands, the differences matrices were adjusted to remove any total negative demands whilst maintaining a similar absolute increase in traffic across the network.

The STFM zoning system as compared with the VISSIM zoning system is detailed in Figure 4.1.

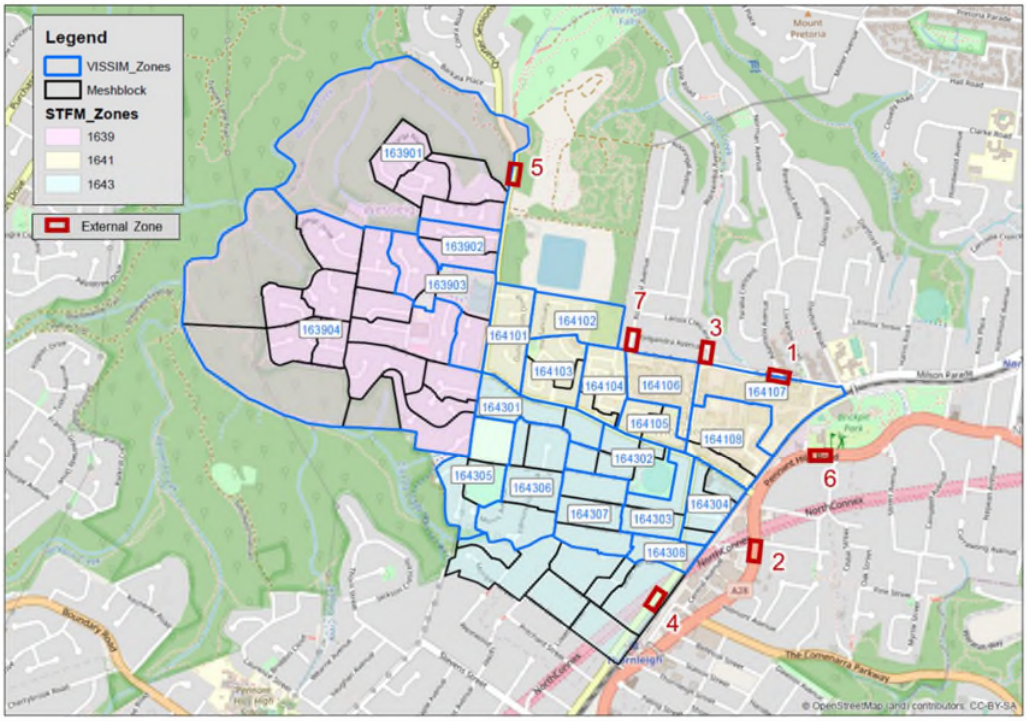


Figure 4.1: STFM and VISSIM Zoning System

DRAFT

4.3 Committed Network Upgrades

Council is planning to upgrade the Chilvers Road / Sefton Road intersection from a priority-controlled intersection to traffic signals. This may require the banning of right turns into and out of Larool Crescent due to the close proximity of Larool Crescent to the signalised intersection, subject to the outcome of community consultation. This upgrade was included in the year 2027 and 2032 base case VISSIM networks.

It was assumed that the new signalised intersection would run a three-phase cycle with a cycle time of 120s. The proposed layout of the Sefton Road / Chilvers Road signals is provided in Figure 4.2, and the assumed phasing sequence in Figure 4.3.

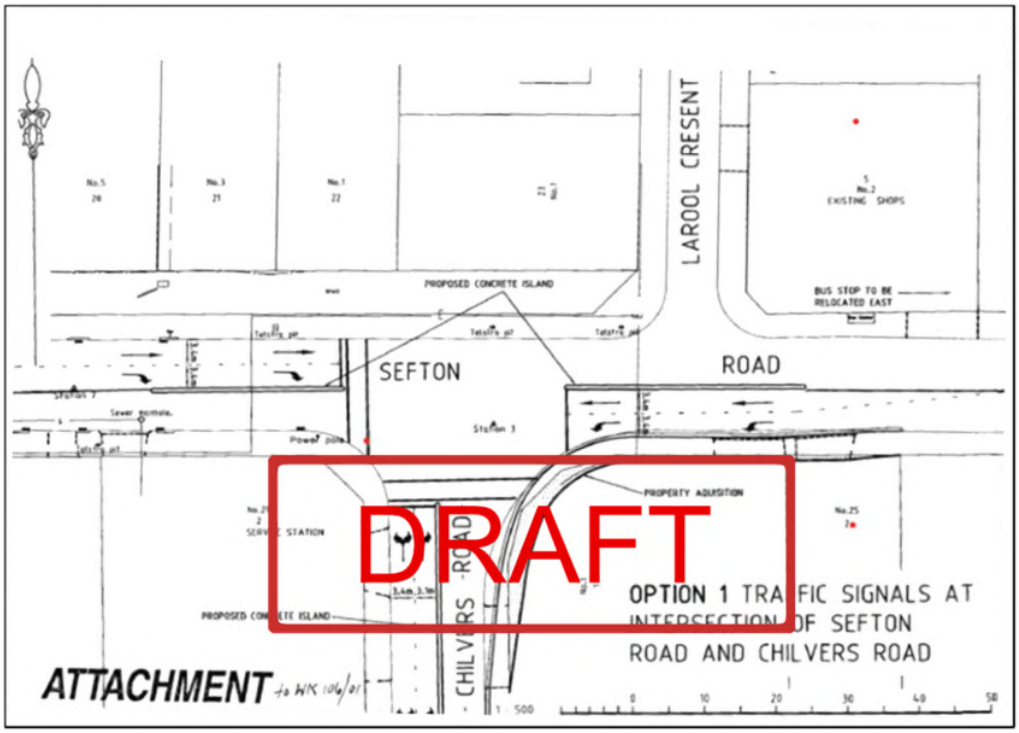


Figure 4.2: Traffic Signals Layout – Sefton Road / Chilvers Road

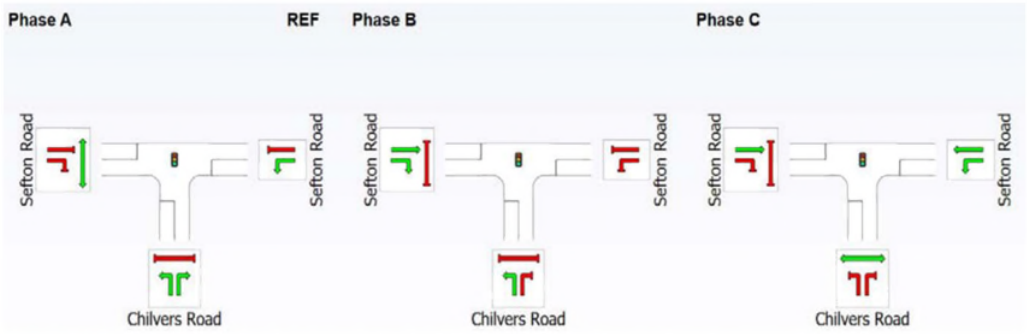


Figure 4.3: Signal Phase Sequence – Sefton Road / Chilvers Road

This proposed banning of right turns into and out of Larool Crescent will result in some traffic accessing the residential area north of Sefton Road being diverted to the Sefton Road roundabout at Kooringal Avenue west of the Chilvers Road intersection. The diverted routes are shown in Figure 4.4.

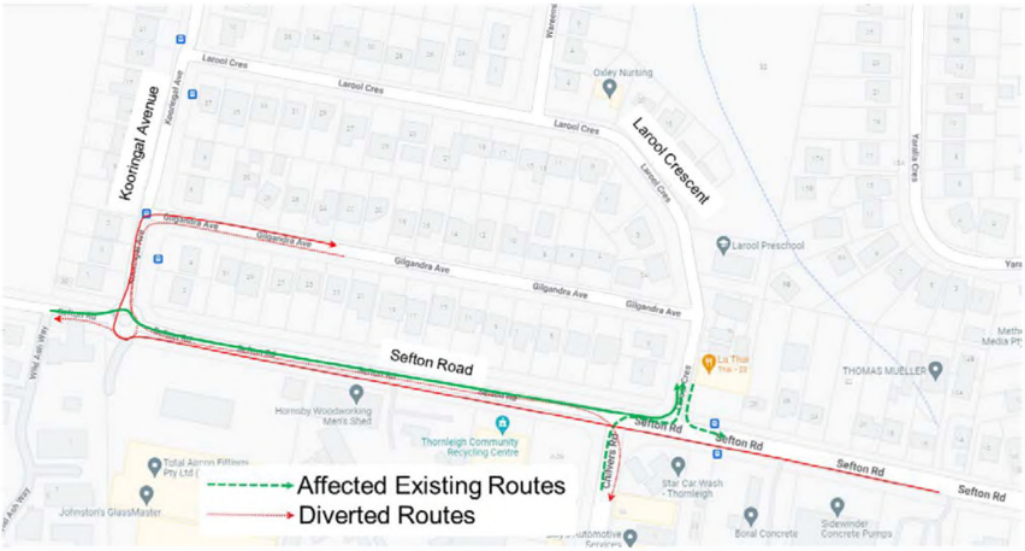


Figure 4.4: Diverted Traffic Due to Larool Crescent Turning Restrictions

4.4 VISSIM Model Results

The Future Year 2027 and 2032 Do Minimum VISSIM results are summarised in **Appendix D**.

4.4.1 Network Statistics

The 2022 AM, PM and Weekend peak network statistics are compared with the future year 2027 and 2032 Do Minimum scenarios in Table 4.1, Table 4.2 and Table 4.3.

The results indicate that the AM peak traffic network performance would substantially worsen between 2022 and 2032, with average delays increasing from 48 to 84 seconds. The unreleased trips in the 2032 Do Minimum AM peak scenario show that congestion within the network will lead to queues that extend outside of the study area.

While there are slight increases in average delays between 2022 and 2032 for the PM and Weekend peaks (about 10s), the network would operate within its capacity in 2032.

Table 4.1: Network Statistics – AM Do Minimum (8:00 – 9:00am)

Measure	2022 Base AM	2027 Do Min AM	2032 Do Min AM
Total Travel Time (hr)	212	253	305
Total Distance Travelled (km)	6,570	6,942	7,086
Total Delay (hr)	90	125	173
Average Speed (km/hr)	35.8	27.6	23.3
Average Travel Time (min)	1.87	2.09	2.45
Average Travel Distance (km)	0.97	0.96	0.95
Average Delay (sec)	48	62	84*
Completed Trips	6,562	7,005	7,102
Incomplete Trips	215	260	351
Unreleased Trips	0	1	77
Total Number of Vehicles	6,778	7,265	7,453

**The results indicate that the AM peak traffic network performance would substantially worsen between 2022 and 2032, with average delays increasing from 48 to 84 seconds.*

Table 4.2: Network Statistics – PM Do Minimum (5:00 – 6:00pm)

Measures	2022 Base PM	2027 Do Min PM	2032 Do Min PM
Total Travel Time (hr)	175	205	215
Total Distance Travelled (km)	6,254	6,776	6,915
Total Delay (hr)	61	82	89
Average Speed (km/hr)	35.8	33.0	32.2
Average Travel Time (min)	1.60	1.71	1.76
Average Travel Distance (km)	0.96	0.94	0.95
Average Delay (sec)	34	41	44
Completed Trips	6,352	6,974	7,090
Incomplete Trips	176	213	221
Unreleased Trips	0	0	1
Total Number of Vehicles	6,528	7,187	7,311

Table 4.3: Network Statistics – Weekend Do Minimum (11:00am – 12:00pm)

Measures	2022 Base WE	2027 Do Min WE	2032 Do Min WE
Total Travel Time (hr)	168	200	205
Total Distance Travelled (km)	6,199	6,741	6,846
Total Delay (hr)	56	78	80
Average Speed (km/hr)	36.8	33.7	33.5
Average Travel Time (min)	1.56	1.67	1.69
Average Travel Distance (km)	0.96	0.94	0.94
Average Delay (sec)	31	39	40
Completed Trips	6,326	6,977	7,067
Incomplete Trips	164	198	204
Unreleased Trips	0	0	0
Total Number of Vehicles	6,490	7,175	7,271

4.4.2 Key Intersection Performance

The 2022 AM, PM and Weekend peak demands and delays at key intersections are compared with the 2027 and 2032 Do Minimum scenarios in Table 4.4, Table 4.5 and Table 4.6.

The results show significant increases in delays in the AM peak, particularly at the signalised intersections along Duffy Avenue. The delays are caused by the demands on The Esplanade northbound and Duffy Avenue westbound exceeding the capacity of the maximum green time at the signals. The queues along Duffy Avenue westbound will extend through to Pennant Hills Road in the 2032 scenario and prevent vehicles entering from Pennant Hills Road. This queuing is illustrated in the section below.

Only slight increases in intersection delays were observed in the PM and Weekend peaks.

The introduction of signals at the Sefton Road / Chilvers Road intersection will slightly increase intersection delays from LoS A to B. The overall delay is acceptable for a signalised intersection, so the proposed introduction of a signalised pedestrian crossing for safety reasons will not cause significant traffic impacts.

Table 4.4: Key Intersection Performance – AM Do Minimum (8:00 – 9:00am)

Intersection	2022 Base AM		2027 Do Min AM		2032 Do Min AM	
	Demand (veh)	Delay (s) (LoS)	Demand (veh)	Delay (s) (LoS)	Demand (veh)	Delay (s) (LoS)
Duffy Avenue / Chilvers Road / The Esplanade	*2,313*	*57 (E)*	2,488	62 (E)	2,510	64 (E)
Sefton Road / Chilvers Road	*1,601*	*17 (B)*	1,720	22 (B)	1,754	22 (B)
Duffy Avenue / Quarter Sessions Road	*996*	*4 (A)*	1,043	4 (A)	1,066	4 (A)
Duffy Avenue / Pennant Hills Road	*3,958*	*18 (B)*	4,196	21 (B)	4,229	26 (B)

Table 4.5: Key Intersection Performance – PM Do Minimum (5:00 – 6:00pm)

Intersection	2022 Base PM		2027 Do Min PM		2032 Do Min PM	
	Demand (veh)	Delay (s) (LoS)	Demand (veh)	Delay (s) (LoS)	Demand (veh)	Delay (s) (LoS)
Duffy Avenue / Chilvers Road / The Esplanade	*2,088*	*51 (D)*	2,278	50 (D)	2,351	53 (D)
Sefton Road / Chilvers Road	*1,429*	*8 (A)*	1,553	18 (B)	1,601	19 (B)
Duffy Avenue / Quarter Sessions Road	*897*	*3 (A)*	985	4 (A)	1,002	4 (A)
Duffy Avenue / Pennant Hills Road	*4,094*	*15 (B)*	4,505	17 (B)	4,563	17 (B)

Table 4.6: Key Intersection Performance – Weekend Do Minimum (11:00am – 12:00pm)

Intersection	2022 Base AM		2027 Do Min AM		2032 Do Min AM	
	Demand (veh)	Delay (s) (LoS)	Demand (veh)	Delay (s) (LoS)	Demand (veh)	Delay (s) (LoS)
Duffy Avenue / Chilvers Road / The Esplanade	*2,108*	*43 (D)*	2,305	46 (D)	2,345	47 (D)
Sefton Road / Chilvers Road	*1,477*	*11 (A)*	1,594	22 (B)	1,623	22 (B)
Duffy Avenue / Quarter Sessions Road	*909*	*3 (A)*	963	3 (A)	971	3 (A)
Duffy Avenue / Pennant Hills Road	*4,153*	*16 (B)*	4,578	18 (B)	4,630	18 (B)

4.4.3 Travel Times

The 2027 and 2032 AM peak northbound traffic along The Esplanade - Chilvers Road would experience substantial delays as shown in Figure 4.5. This is primarily due to congestion at The Esplanade / Chilvers Road / Duffy Avenue intersection.

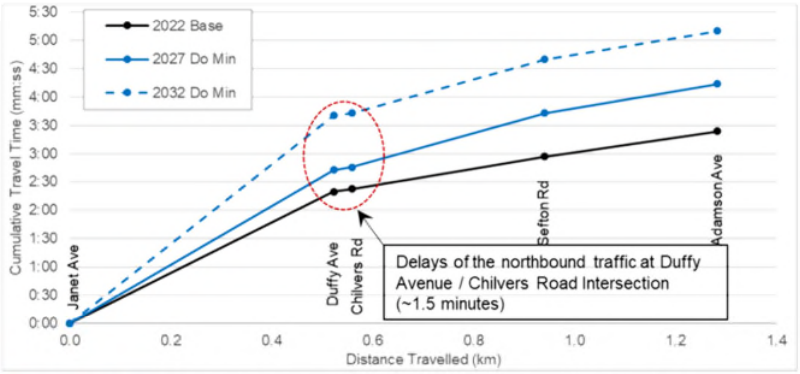


Figure 4.5: AM Peak Northbound Travel Times, Esplanade - Chilvers Road Corridor

4.4.4 Queue Observations

As described in the previous section, congestion in the AM peak is mainly caused by traffic demands exceeding the capacity of the Duffy Avenue / Chilvers Road / The Esplanade intersection. Without any changes at the intersection by 2032, queues along The Esplanade northbound will extend past Janet Avenue and outside of the study area boundary.

Queues along Duffy Avenue westbound will extend to Pennant Hills Road and prevent vehicles from entering the study area from this location. The blockage will reduce the capacity of right turn from Pennant Hills Road southbound, leading to queues exceeding the capacity of the right turn pocket and introducing additional delays and safety concerns on Pennant Hills Road. The AM peak queues are shown in Figure 4.6.

Figure 4.6: Modelled Queues – Duffy Avenue / The Esplanade – AM Peak

4.5 Upgrade Measures

4.5.1 Upgrade Concept

The main source of future traffic delays within the study area will be the Duffy Avenue / Chilvers Road / The Esplanade intersection. The intersection is predicted to operate close to capacity to service the future traffic demands with particularly long delays to traffic approaching from the south and the east.

In consultation with Council, an upgrade option was developed for the intersection and the VISSIM model was used to assess the performance of the upgrade option. The proposed upgrade included an addition traffic lane for westbound through traffic on the Duffy Avenue (east) approach. This is possible by removing a 50m section of on-street parking from the Duffy Avenue (east) eastbound departure lane.

The proposed upgrade would allow signal times to be adjusted to allow additional green time for traffic on The Esplanade's northbound approach. This would reduce queues and travel times along The Esplanade.

The proposed intersection layout is shown in Figure 4.7.

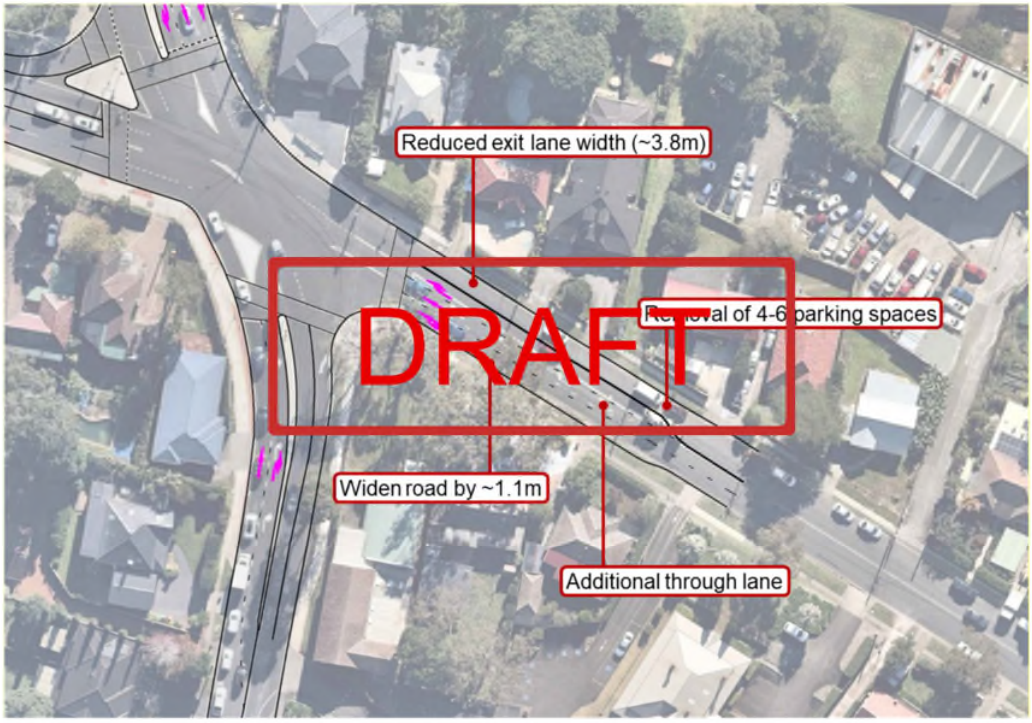


Figure 4.7: Proposed Intersection Layout – Duffy Avenue / Chilvers Road / The Esplanade

4.5.2 Upgrade Assessment

The 2027 and 2032 Do Minimum AM, PM and Weekend Peak VISSIM models were updated to include the proposed upgrade at the Duffy Avenue / Chilvers Road / The Esplanade intersection.

The AM peak Do Minimum and Do Minimum *Plus* Upgrade intersection performance results are summarised in Table 4.7. Only the AM peak results are presented because this is the critical peak period in the Do Minimum case. The results show that the proposed upgrade will substantially reduce traffic delays at the Duffy Avenue / Chilvers Road / The Esplanade intersection with the average intersection delay being reduced by 15 seconds in 2027 and by 13 seconds in 2032.

Table 4.7: Intersection Performance Benefits of the Upgrade (8:00 – 9:00am)

Intersection	2027 AM		2032 AM	
	Do Min	Do Min *plus* Upgrade	Do Min	Do Min *plus* Upgrade
Duffy Avenue / Chilvers Road / The Esplanade	*62 (E)*	47 (D)	*64 (E)*	51 (D)
Sefton Road / Chilvers Road	*22 (B)*	29 (C)	*22 (B)*	29 (C)
Duffy Avenue / Quarter Sessions Road	*4 (A)*	4 (A)	*4 (A)*	4 (A)
Duffy Avenue / Pennant Hills Road	*21 (B)*	18 (B)	*26 (B)*	18 (B)

The proposed intersection upgrade will also contribute to the reduction of average delay across the network. The AM peak Do Minimum and Do Minimum *Plus* Upgrade network performance results are summarised Table 4.8. The average per-vehicle delay will reduce by 16 seconds in 2027 and 23 seconds in 2032.

Table 4.8: Network Statistics, AM Do Minimum vs Do Minimum *Plus* Upgrade (8:00 – 9:00am)

Measures	2027 AM		2032 AM	
	Do Min	Do Min *plus* Upgrade	Do Min	Do Min *plus* Upgrade
Total Travel Time (hr)	*253*	*[illegible]*	*305*	262
Total Distance Travelled (km)	*6,942*	6,966	*7,086*	7,255
Total Delay (hr)	*125*	93	*173*	127
Average Speed (km/hr)	*27.6*	31.4	*23.3*	27.8
Average Travel Time (min)	*2.09*	1.84	*2.45*	2.1
Average Travel Distance (km)	*0.96*	0.96	*0.95*	0.97
Average Delay (sec)	*62*	46	*84*	61
Completed Trips	*7,005*	7,016	*7,102*	7,216
Incomplete Trips	*260*	232	*351*	260
Unreleased Trips	*1*	1	*77*	1
Total Number of Vehicles	*7,265*	7,248	*7,453*	7,476

5. WESTLEIGH PARK TRAFFIC IMPACT ASSESSMENT

5.1 Overview

Traffic generation and distribution volumes for the proposed Westleigh Park development were adopted from the *Westleigh Park Traffic and Access Assessment Report* prepared by Positive Traffic Pty Ltd (December 2019). The traffic demands were added to the 2027 and 2032 models to assess the Park's traffic impacts.

Council is currently considering a number of access options including the provision of the Sefton Road extension. In consultation with Council, a number of access options have been developed and assessed using the VISSIM models. The origins and destinations of the Park's traffic demands were adjusted to reflect the various traffic access options.

5.2 Park Traffic Generation

Traffic generation for the Park has been estimated for weekdays and weekends based on the demands of organised sport, mountain biking and playgrounds. No organised sports are expected to be played during the weekday AM peak, so the Park will not generate a significant amount of traffic in that period. Westleigh Park, once complete in 2032, is expected to generate about 176 vehicles during the PM peak one hour, and about 360 vehicles during the Weekend peak one hour.

There are three main roads connecting the Park to the broader road network: Sefton Road, Duffy Avenue and The Esplanade. The distribution of traffic between the three points at the boundary of the study area is shown in Figure 5.1.

Figure 5.1: Westleigh Park Traffic Distribution (Veh/hr) – 2032

5.3 Park Access Options

In consultation with Council, the following three Park traffic access options have been developed for the purpose of this assessment:

- **Option 1:** All traffic to the Park enters and exits via Quarter Sessions Road. The proposed upgrade at the Duffy Road / The Esplanade / Chilvers Road intersection as presented in Section 4.5.1 was included in this option
- **Option 2:** Sefton Road is extended through the Sydney Water reservoir site and into the park and along the southern boundary of the Park to Quarter Sessions Road, with the extension open to general traffic, as shown in Figure 5.2
- **Option 3:** The Sefton Road extension through the Sydney Water site is for Park traffic only.

The extension of Sefton Road was assumed to be limited to 30 km/h and included traffic calming measures at 80m intervals to facilitate this. The assumed layout of the extension is shown in Figure 5.2.

Source: General Arrangement Plan, Taylor Thomson Whitting June 2021

Figure 5.2: Sefton Road Extension Proposal

5.4 Model Scenarios

The scenarios which have been modelled and assessed are described in Table 5.1. It is assumed that only one field will be complete by 2027, and all three fields will be complete by 2032. The 2027 scenarios therefore include a proportion of the total Park traffic generation. The AM peak traffic generation by the Park is expected to be minimal and the results in the section are limited to the PM and Weekend peak assessments. Both the 2027 and 2032 analyses include the proposed upgrade at the Duffy Avenue / Chilvers Road / The Esplanade intersection.

Table 5.1: Model Scenarios

Scenario	AM	PM	WE	Traffic	Network
2027 Do Minimum *plus* Upgrade	☑	☑	☑	▪ 2022 Base Demand ▪ + 5-year Traffic Growth	▪ 2022 Base Network ▪ + Chilvers Road / Sefton Road Signals ▪ + Duffy Avenue / Chilvers Road / The Esplanade Upgrade
2032 Do Minimum *plus* Upgrade	☑	☑	☑	▪ 2022 Base Demand ▪ + 10-year Traffic Growth	
2027 Option 1	n/a	☑	☑	▪ 2022 Base Demand ▪ + 5-year Traffic Growth ▪ + 33% Park Demand	▪ 2022 Base Network ▪ + Chilvers Road / Sefton Road Signals ▪ + Duffy Avenue / Chilvers Road / The Esplanade Upgrade
2032 Option 1	n/a	☑	☑	▪ 2022 Base Demand ▪ + 10-year Traffic Growth ▪ + 100% Park Demand	
2027 Option 2	n/a	☑	☑	▪ 2022 Base Demand ▪ + 5-year Traffic Growth ▪ + 33% Park Demand	▪ 2022 Base Network ▪ + Chilvers Road / Sefton Road Signals ▪ + Duffy Avenue / Chilvers Road / The Esplanade Upgrade ▪ + Sefton Road Extension
2032 Option 2	n/a	☑	☑	▪ 2022 Base Demand ▪ + 10-year Traffic Growth ▪ + 100% Park Demand	
2027 Option 3	n/a	☑	☑	▪ 2022 Base Demand ▪ + 5-year Traffic Growth ▪ + 33% Park Demand	▪ 2022 Base Network ▪ + Chilvers Road / Sefton Road Signals ▪ + Duffy Avenue / Chilvers Road / The Esplanade Upgrade ▪ + Sefton Road Extension (Park traffic access only)
2032 Option 3	n/a	☑	☑	▪ 2022 Base Demand ▪ + 10-year Traffic Growth ▪ + 100% Park Demand	

5.5 VISSIM Model Results

5.5.1 Network Statistics

The PM and Weekend peak network statistics for the 2027 and 2032 scenarios are compared in Table 5.2 and Table 5.3.

The network statistics for the PM peak are relatively similar across all scenarios modelled. Average delays in 2032 are reduced when the Sefton Road extension is introduced in Option 2, with a similar effect if the extension was limited to Park traffic only.

Table 5.2: Network Statistics Comparison – PM Peak (5:00 – 6:00pm)

Measure	Do Minimum *plus* Upgrade		2027 *With* Development			2032 Full Development		
	2027	2032	Opt 1	Opt 2	Opt 3	Opt 1	Opt 2	Opt 3
Total Travel Time (hr)	200	205	205	203	207	230	220	223
Total Distance Travelled (km)	6,786	6,917	6,939	6,902	6,940	7,363	7,269	7,311
Total Delay (hr)	76	79	78	76	80	95	84	88
Average Speed (km/hr)	34	33.8	33.9	33.9	33.5	32.1	33.1	32.8
Average Travel Time (min)	1.67	1.68	1.70	1.68	1.72	1.84	1.76	1.79
Average Travel Distance (km)	0.94	0.95	0.96	0.95	0.96	0.98	0.97	0.98
Average Delay (sec)	38	39	39	38	40	45	41	42
Completed Trips	6,982	7,098	7,038	7,042	7,040	7,270	7,262	7,263
Incomplete Trips	201	207	210	207	209	227	218	218
Unreleased Trips	0	1	0	1	0		1	1
Total Number of Vehicles	7,18	7,3	7,24		7,248	7, 97	7,480	7,482

Table 5.3: Network Statistics Comparison – Weekend Peak (11:00am – 2:00pm)

Measure	Do Minimum *plus* Upgrade		2027 *With* Development			2032 Full Development		
	2027	2032	Opt 1	Opt 2	Opt 3	Opt 1	Opt 2	Opt 3
Total Travel Time (hr)	196	201	210	206	211	293	237	242
Total Distance Travelled (km)	6,741	6,851	7,052	6,976	7,012	7,592	7,645	7,682
Total Delay (hr)	74	76	81	77	82	153	93	99
Average Speed (km/hr)	34.4	34.2	33.7	33.8	33.2	26.1	32.3	31.7
Average Travel Time (min)	1.64	1.66	1.72	1.70	1.74	2.31	1.85	1.90
Average Travel Distance (km)	0.94	0.94	0.97	0.96	0.96	1.00	1.00	1.00
Average Delay (sec)	37	38	40	38	41	72	44	46
Completed Trips	6,975	7,071	7,096	7,090	7,093	7,313	7,436	7,442
Incomplete Trips	192	197	205	199	203	296	226	225
Unreleased Trips	0	1	0	0	0	80	0	0
Total Number of Vehicles	7,168	7,268	7,301	7,289	7,297	7,609	7,662	7,667

The network statistics for the Weekend peak show that the traffic generated by the full Westleigh Park development in 2032 will result in substantial congestion, with some unreleased trips and an increase in average delays by over 30 seconds. The results also show that the Sefton Road extension in both Options 2 and 3 will greatly reduce delays to a level that is only slightly worse than the Do Minimum scenario.

5.5.2 Key Intersection Performance

The 2027 and 2032 Weekday PM and Weekend peak key intersection performance are compared in Table 5.4 and Table 5.5.

The 2032 PM peak results show that the Park traffic will contribute to increased delays at the Duffy Road / Chilvers Road / The Esplanade intersection with the LoS deteriorating from LoS C to (high) LoS D without the Sefton Road extension under Option 1. However, with the proposed extension under Options 2 and 3, the average delay will reduce:

- By about 10 seconds in the PM peak as shown in Table 5.4
- By about 20 seconds in the Weekend peak as shown in Table 5.5.

Table 5.4: Key Intersection Performance Comparison – PM Peak

Intersection	Do Minimum *plus* Upgrade		2027 *With* Development			2032 *With Full* Development		
	2027	2032	Opt 1	Opt 2	Opt 3	Opt 1	Opt 2	Opt 3
Duffy Avenue / Chilvers Road / The Esplanade	*43 (C)*	*43 (C)*	44 (D)	41 (C)	44 (D)	53 (D)	43 (D)	46 (D)
Sefton Road / Chilvers Road	*18 (B)*	*19 (B)*	18 (B)	19 (B)	18 (B)	19 (B)	19 (B)	19 (B)
Duffy Avenue / Quarter Sessions Road	*5 (A)*	*5 (A)*	4 (A)	4 (A)	5 (A)	5 (A)	4 (A)	6 (A)
Duffy Avenue / Pennant Hills Road	*17 (B)*	*17 (B)*	17 (B)	17 (B)	17 (B)	17 (B)	17 (B)	17 (B)

Table 5.5: Key Intersection Performance Comparison – Weekend Peak

Intersection	Do Minimum *plus* Upgrade		2027 *With* Development			2032 *With Full* Development		
	2027	2032	Opt 1	Opt 2	Opt 3	Opt 1	Opt 2	Opt 3
Duffy Avenue / Chilvers Road / The Esplanade	40 (C)	41 (C)	43 (D)	41 (C)	44 (D)	67 (E)	45 (D)	46 (D)
Sefton Road / Chilvers Road	22 (B)	22 (B)	22 (B)	22 (B)	24 (B)	35 (C)	24 (B)	26 (B)
Duffy Avenue / Quarter Sessions Road	18 (B)	18 (B)	19 (B)	19 (B)	19 (B)	20 (B)	20 (B)	20 (B)
Duffy Avenue / Pennant Hills Road	3 (A)	3 (A)	4 (A)	3 (A)	4 (A)	6 (A)	5 (A)	5 (A)

The 2032 Weekend peak results show that the Park traffic will substantially increase delays at the Chilvers Road / Duffy Avenue / The Esplanade and Sefton Road / Chilvers Road intersections. The LoS will deteriorate from D to LoS E under the 2027 Option 1 with development scenario. The VISSIM modelling also shows that this will result in long queues at the Chilvers Road / Duffy Avenue / The Esplanade and Sefton Road / Chilvers Road intersections. Under the 2032 Option 1 with development scenario, the Park traffic travelling from Sefton Road within the study area would fill the right turn lane at the Chilvers Road (northern) approach of the Duffy Road / The Esplanade / Chilvers Road intersection and spill into the through traffic lane creating long queues as shown in Figure 5.3.

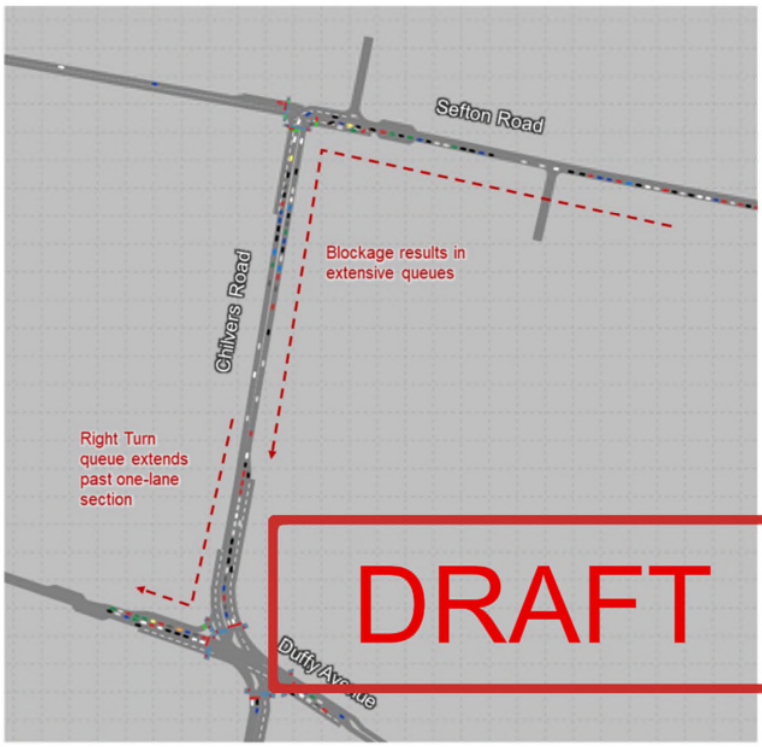


Figure 5.3: Modelled Queues – 2032 Weekend Peak With Full Development (Option 1)

Under this scenario, the southbound travel time on the Sefton Road / Chilvers Road / The Esplanade corridor will increase by 4.5 minutes as shown in Figure 5.4.

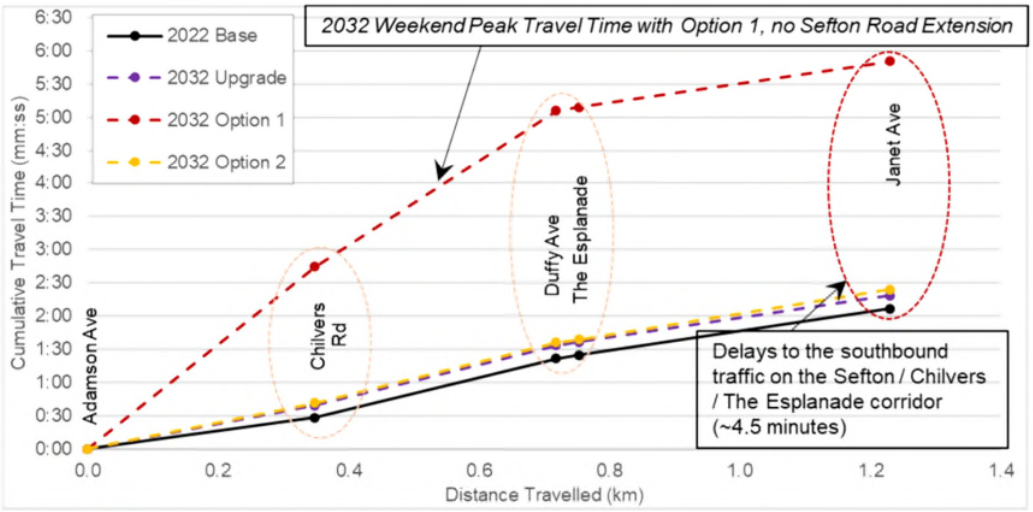


Figure 5.4: 2032 Weekend Peak Southbound Travel Time on Sefton / Chilvers / Duffy Corridor

5.5.3 Forecast Traffic Volumes on the Sefton Road Extension

Hourly Traffic Volumes

In Option 2, the Sefton Road extension will be used by both the Park traffic and general traffic travelling between Quarter Sessions Road and the existing part of Sefton Road. The 2022, 2027 and 2032 AM, PM and Weekend Peak Sefton Road Extension Traffic volumes are summarised in Table 5.6. The key observations include:

- In 2032 the proposed extension will service two-way traffic volumes of around 150 veh/hr in both the AM and PM peaks
- In the 2032 weekend peak when the Park usage is substantially higher than the weekday peak, the two-way traffic volumes on Sefton Road would be over 300 veh/hr.

Table 5.6: Forecast Sefton Road Extension Peak Traffic Volumes (veh/hr) – Option 2

Direction	AM Peak			PM Peak			Weekend Peak		
	2022	2027	2032	2022	2027	2032	2022	2027	2032
Eastbound	52	79	80	18	37	70	34	84	138
Westbound	38	71	76	55	42	75	31	123	181
Two-way (hourly)	***90***	***150***	***156***	***73***	***79***	***145***	***65***	***207***	***319***

Daily Traffic Volumes

The peak traffic volumes were used to estimate the Annual Average Daily Traffic (AADT) on the Sefton Road Extension as follows:

- 2022: 815 veh/day
- 2027: 1,145 veh/day
- 2032: 1,505 veh/day.

In 2032, daily traffic on Sefton Road is estimated to be around 1,500 veh/day which is within the residential road environmental capacity of 2,000 veh/day (as per *Section 7.3 TfNSW's Guide to Traffic Generating Developments*).

Through Traffic

details the proportion of through traffic (i.e. the non-Park-related traffic) using the Sefton Road extension to access Quarter Sessions Road predominantly from the east of the study area. In the AM peak the Park traffic generation is limited to small number of vehicles. On this basis, in the AM peak almost all traffic using Sefton Road is expected to be through traffic.

In the 2032 PM peak, the proportion of through traffic is about 39% of total traffic on the Sefton Road Extension while in the weekend peak hour this proportion of through traffic is about half of the total traffic as shown in . It is noted that in the future assessment years as the volumes of the Part traffic grow, the percentages of through traffic fall.

Table 5.7: Sefton Road Extension Peak- Percentage of Through Traffic by Period –Option 2

Direction	AM Peak		PM Peak		Weekend Peak	
	2027	2032	2027	2032	2027	2032
Eastbound	100%	100%	70%	44%	71%	58%
Westbound	100%	100%	63%	33%	59%	33%
Two-way (hourly)	100%	100%	67%	39%	68%	49%

5.6 Assessment Outcomes

The modelling results demonstrate:

- **Option 1** which does not include the proposed Sefton Road extension will service the 2027 PM and Weekend peak traffic demands. However, in 2032 when the Park is expected to be fully developed, Park traffic will contribute to additional delays especially in the Weekend peak when the Duffy Avenue / Chilvers Road / The Esplanade intersection is predicted to operate very close or at capacity with long queues on the Chilvers Road approach. Therefore, while the proposed upgrade at the Duffy Avenue / Chilvers Road / The Esplanade will provide acceptable traffic performance until 2027, further upgrades are required between 2027 and 2032.
- **Option 2** which includes the Sefton Road extension, will substantially improve 2032 PM and Weekend Peak traffic conditions compared to Option 1. In 2032 the projected AADT on the Sefton Road extension is slightly over 1,500 veh/day which is still within the residential road environmental capacity of 2,000 veh/day (*Section 7.3 TfNSW's Guide to Traffic Generating Developments*)
- **Option 3** which only allows Park traffic onto the proposed Sefton Road extension, will marginally impact the Duffy Avenue / Chilvers Road / The Esplanade intersection traffic performance however this intersection still provides acceptable traffic performance.

6. INTERSECTION CAPACITY VERIFICATION

6.1 Overview

SIDRA models were created to verify the results from VISSIM network model. SIDRA models were developed for the following four key intersections:

- Duffy Avenue / Chilvers Road / The Esplanade
- Chilvers Road / Sefton Road
- Duffy Avenue / Quarter Sessions Road
- Pennant Hills Road / Duffy Avenue.

SIDRA modelling was then undertaken for the 2022 and 2032 AM, PM and Weekend Peak traffic using traffic volumes from VISSIM model for Do Minimum, Option 1, 2 and 3 scenarios.

All four intersections were assessed using '*SIDRA network*' model mainly due to their proximity and interaction.

6.2 2022 Base SIDRA Assessment Summary

The overall performance with 2022 AM, PM and Weekend peak traffic flows is summarised in Table 6.1. The Duffy Avenue / Chilvers Road / The Esplanade intersection provides LoS D based on average delay in the AM peak. But its DoS shows that the intersection is close to capacity in the AM and PM peak periods as evidenced by on-site observations. The detailed SIDRA outputs are provided in **Appendix E**.

Table 6.1: 2022 AM, PM and Weekend Peak SIDRA Results

Intersection	AM Peak			PM Peak			Weekend Peak		
	Traffic Flows (veh/hr)	LoS (Delays in Sec)	DoS	Traffic Flows (veh/hr)	LoS (Delays in Sec)	DoS	Traffic Flows (veh/hr)	LoS (Delays in Sec)	DoS
Duffy Ave / Chilvers Rd / The Esplanade	2,313	52 (D)	0.927	2,088	56 (D)	0.961	2,108	47 (D)	0.884
Chilvers Rd / Sefton Rd	1,601	20 (B)	0.407	1,429	18 (B)	0.408	1,477	18 (B)	0.357
Duffy Ave / Quarter Sessions Rd	996	5 (A)	0.294	897	5 (A)	0.358	909	4 (A)	0.274
Pennant Hills Rd / Duffy Ave	3,958	17 (B)	0.818	4,094	18 (B)	0.681	4,153	19 (B)	0.7

6.3 2032 Do Minimum Assessment Summary

The performance of each intersection with the year 2032 Do Minimum (i.e. without development) traffic flows is summarised in Table 6.2. The Chilvers Road / Sefton Road intersection was assumed to be signal controlled.

The Duffy Avenue / Chilvers Road / The Esplanade intersection is expected to provide LoS F in the AM, PM and Weekend Peak periods with the intersection operating substantially over its capacity in the AM peak validating the VISSIM modelling results which demonstrates extensive queuing on the The Esplanade and Duffy Avenue approaches.

Table 6.2: 2032 Do Minimum AM, PM and Weekend Peak SIDRA Results

Intersection	AM Peak			PM Peak			Weekend Peak		
	Traffic Flows (veh/hr)	LoS (Delays in Sec)	DoS	Traffic Flows (veh/hr)	LoS (Delays in Sec)	DoS	Traffic Flows (veh/hr)	LoS (Delays in Sec)	DoS
Duffy Ave / Chilvers Rd / The Esplanade	2,510	88 (F)	1.106	2,351	82 (F)	1.073	2,345	70 (E)	1.046
Chilvers Rd / Sefton Rd	1,754	36 (C)	0.816	1,601	30 (C)	0.820	1,623	32 (C)	0.750
Duffy Ave / Quarter Sessions Rd	1,066	9 (A)	0.345	1,002	9 (A)	0.399	971	8 (A)	0.306
Pennant Hills Rd / Duffy Ave	4,229	19 (B)	0.913	4,563	19 (B)	0.985	4,630	19 (B)	0.890

The 2032 Do Minimum Models were updated to incorporate the proposed upgrade at the Duffy Avenue / Chilvers Road / The Esplanade intersection as shown in Figure 4.7. The SIDRA results are summarised in Table 6.3. The proposed upgrade would substantially improve the 2032 AM, PM and Weekend peak intersection performance with all intersections operate within capacity.

Table 6.3: 2032 Do Minimum AM, PM and Weekend Peak SIDRA Results (with Upgrade)

Intersection	AM Peak			PM Peak			Weekend Peak		
	Traffic Flows (veh/hr)	LoS (Delays in Sec)	DoS	Traffic Flows (veh/hr)	LoS (Delays in Sec)	DoS	Traffic Flows (veh/hr)	LoS (Delays in Sec)	DoS
Duffy Ave / Chilvers Rd / The Esplanade	2,510	58 (E)	0.957	2,351	53 (D)	0.911	2,345	49 (D)	0.913
Chilvers Rd / Sefton Rd	1,754	37 (C)	0.831	1,601	28 (B)	0.811	1,623	32 (C)	0.699
Duffy Ave / Quarter Sessions Rd	1,066	9 (A)	0.346	1,002	9 (A)	0.420	971	8 (A)	0.313
Pennant Hills Rd / Duffy Ave	4,229	19 (B)	0.913	4,563	18 (B)	0.955	4,630	19 (B)	0.890

6.4 2032 Option 1 Assessment Summary

The overall performance of each intersection with 2032 PM and Weekend Peak Option 1 traffic flows is summarised in Table 6.4. The Duffy Avenue / Chilvers Road / The Esplanade intersection is expected to provide LoS F in the Weekend Peak periods with the intersection operating over its capacity validating the VISSIM modelling results.

Table 6.4: 2032 Option 1 PM and Weekend Peak SIDRA Results

Intersection	PM Peak			Weekend Peak		
	Traffic Flows (veh/hr)	LoS (Delays in Sec)	DoS	Traffic Flows (veh/hr)	LoS (Delays in Sec)	DoS
Duffy Ave / Chilvers Rd / The Esplanade	2,490	62 (E)	0.978	2,478	87 (F)	1.082
Chilvers Rd / Sefton Rd	1,670	30 (C)	0.837	1,656	32 (C)	0.784
Duffy Ave / Quarter Sessions Rd	1,176	10 (A)	0.497	1,295	10 (A)	0.444
Pennant Hills Rd / Duffy Ave	4,602	19 (B)	1.000	4,693	20 (B)	1.000

6.5 2032 Option 2 Assessment Summary

The overall performance of each intersection with 2032 PM and Weekend Peak Option 2 traffic flows is summarised in Table 6.5. All the intersections are expected to provide acceptable LoS and operate at or within capacity. This validates VISSIM modelling results that the introduction of the proposed Sefton Road extension will improve intersection performance.

Table 6.5: 2032 Option 2 PM and Weekend Peak SIDRA Results

Intersection	PM Peak			Weekend Peak		
	Traffic Flows (veh/hr)	LoS (Delays in Sec)	DoS	Traffic Flows (veh/hr)	LoS (Delays in Sec)	DoS
Duffy Ave / Chilvers Rd / The Esplanade	2,355	51 (D)	0.907	2,357	50 (D)	0.893
Chilvers Rd / Sefton Rd	1,660	43 (D)	1.065	1,755	48 (D)	0.998
Duffy Ave / Quarter Sessions Rd	1,031	9 (A)	0.416	1,100	9 (A)	0.407
Pennant Hills Rd / Duffy Ave	4,601	19 (B)	1.000	4,699	20 (B)	0.984

6.6 2032 Option 3 Assessment Summary

The overall performance of each intersection with 2036 PM and Weekend Peak Option 3 traffic flows is summarised in Table 6.6. If the Sefton Road extension is restricted to the Park users only, all intersections will continue to provide acceptable LoS and operate at or within capacity which validates VISSIM modelling results.

Table 6.6: 2032 Option 3 PM and Weekend Peak SIDRA Results

Intersection	PM Peak			Weekend Peak		
	Traffic Flows (veh/hr)	LoS (Delays in Sec)	DoS	Traffic Flows (veh/hr)	LoS (Delays in Sec)	DoS
Duffy Ave / Chilvers Rd / The Esplanade	2,420	56 (D)	0.945	2,434	57 (E)	0.954
Chilvers Rd / Sefton Rd	1,680	37 (C)	1.000	1,787	54 (D)	0.998
Duffy Ave / Quarter Sessions Rd	1,096	10 (A)	0.456	1,179	9 (A)	0.435
Pennant Hills Rd / Duffy Ave	4,601	19 (B)	1.000	4,700	19 (B)	0.984

6.7 Ruddock Park Traffic Impacts

As mentioned in Section 3.11.1, there were no sports at Ruddock Park at the time of the weekend peak traffic surveys. Therefore, the usage was very low. In order to understand the impacts of the park traffic on the surrou[illegible] intersections, the 2032 Option 3 weekend peak SIDRA models were updated to incorporate additional park traffic.

6.7.1 Trip Generation

A review of park usage identified that a large sporting event took place on 4 June 2022 when there were two matches with about 60 people using the park. Based on data from similar sites, a car occupancy rate of 2.25 persons / car was adopted to calculate the number of vehicles using the park facility. This equates to about ***48 vehicles*** during the weekend peak. For the purpose of a conservative SIDRA assessment, it was assumed that they park users access and exit the site in the same weekend peak hour i.e. between 11am and 12pm.

6.7.2 Trip Distribution

The available weekend peak turning count data at four key intersections were analysed to calculate the park's trip distribution. The outcomes are summarised in Figure 6.1. Of the total park traffic, 39% access the park from Duffy avenue (east) closely follow by 38% from Chilvers Road / Sefton Road corridor.

Figure 6.1: 2032 Ruddock Park Trip Distribution

6.7.3 Intersection Performance

The SIDRA analysis results for the 'with' and 'without' Ruddock Park traffic are compared in Table 6.7. The analysis suggests that with the inclusion of the park traffic, the key Duffy Avenue / Chilvers Road / The Esplanade intersection would still provide LoS E although the average delays would increase slightly by eight seconds. The analysis also suggests that delays at the Chilvers Road / Sefton Road intersection would increase by five seconds.

Table 6.7: 2032 Option 3 Weekend Peak 'With' and 'Without' Ruddock Park SIDRA Results

Intersection	Without Ruddock Park Trips			With Ruddock Park Trips		
	Traffic Flows (veh/hr)	LoS (Delays in Sec)	DoS	Traffic Flows (veh/hr)	LoS (Delays in Sec)	DoS
Duffy Ave / Chilvers Rd / The Esplanade	2,454	57 (E)	0.954	2,550	65 (E)	0.986
Chilvers Rd / Sefton Rd	1,787	54 (D)	0.998	1,823	59 (E)	1.00
Duffy Ave / Quarter Sessions Rd	1,179	9 (A)	0.435	1,275	10 (A)	0.474
Pennant Hills Rd / Duffy Ave	4,700	19 (B)	0.984	4,738	20 (B)	0.794

6.7.4 Summary

To understand the impacts of the Ruddock Park weekend peak on the performance of four key intersections, a conservative analysis was undertaken in which it was assumed that the 48 vehicles/hour generated by the park would enter and exit the park within the same hour. The SIDRA assessment suggests that the inclusion of park traffic would not have any substantial impacts on the intersection performance. The critical intersection of Duffy Avenue / Chilvers Road / The Esplanade would continue to provide acceptable traffic performance of LoS E.

6.8 Suitability of Sefton Road (west) to Accommodate Additional Traffic

Traffic analysis and transport modelling undertaken for this project established that Sefton Road (west) has adequate capacity to accommodate additional traffic that would be generated by Westleigh Park including through traffic wishing to access areas west of Quarter Sessions Road.

It is noted as documented in the Submissions Report that Sefton Road does feature some steep grades/bends but is generally wide enough for two traffic lanes plus two parking lanes. While there appears to be no recent record of crashes involving either vehicles or active transport users including pedestrians and cyclists, it is acknowledged that this could pose a risk to drivers not familiar with the routes as well as some potential parking issues for residents. In this regard, the geometric suitability of Sefton Road should be reviewed by Council as part of the safe systems approach and operational management of local roads.

6.9 Westleigh Park Access Management Strategy

While Options 2 and 3 would both provide acceptable road network conditions in the study area, the following is noted in relation to Council's operational management requirements for the Park:

- **Option 2** would provide full access at all times for local residents and the Park users including during training on weekdays
- **Option 2** would also provide a second emergency evacuation route for Westleigh residents
- **Option 3** would only provide full access for the Park users. Therefore, the Sefton Road extension would not provide a connection to Quarter Sessions Road through the Park. In this regard, traffic entering the Park from the Sefton Road gate will be required to leave the site in the opposite direction. Similarly, traffic entering the Park via the Quarter Sessions gate will be required to exit the Park in the opposite direction
- **Option 3** may not provide Council opportunity to provide a second access via Sefton Road for emergency evacuation. If an emergency access is required via the Sefton Road extension, this can be achieved by providing a gated connection that could be used if required for example during emergency evacuation. The gated connection that could be provided as part of Option 3 can also be used during major events as part of the on site operational traffic management plan to quickly channel the Park users to alternative routes either via Sefton Road or Quarter Sessions Road.

With consideration of the above, either option is preferred. If Option 3 is preferred, emergency access for Westleigh residents and major event access when required should be considered.

7. PUBLIC TRANSPORT AND ACTIVE TRANSPORT

7.1 Overview

Improved public transport and active transport access to the site:

- Supports local access to the Park
- Reduces private vehicle trips
- Encourages more active and healthier lifestyle and habits.

A review of existing and proposed pedestrian and bicycle routes and facilities was undertaken with potential improvements identified to support the development, including:

- Extension of proposed shared paths and off-road links proposed for the Park for improved local access
- Extension of walking and cycling paths to better connect with rail stations
- Additional pedestrian crossings and access points to/from the Park.

Bus access to the site was also reviewed to determine the suitability of existing routes and stops and provide recommendations to improve public transport with:

- Potential bus route modifications
- New or modified bus stop locations.

7.2 Active Transport Improvements

7.2.1 Facilities Already Proposed

Already-proposed active transport connections to/from the site and the routes surrounding the site are shown in Figure 7.1. What has already been proposed includes:

- Shared path connections to and along Galston Gorge Road
- Shared path along the Sefton Road extension to the south
- Mixed on-road and off-road link to Hornsby Park (Old Mans Valley Bike Park)
- Internal fire trails to the east of the site.

These improvements are proposed to connect with existing cycle routes and pedestrian paths surrounding the Park.

7.2.2 Recommended New / Modified Active Transport Facilities

Figure 7.2 shows additional facilities which may be considered by Council to improve active transport to, from and within the site.

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Figure 7.1: Previously Proposed Active Transport Connections

Figure 7.2: Recommended Additional Active Transport Improvements

Further details regarding the recommended additional active transport improvements are described below.

Shared Path Extension – Sefton Road

Consideration should be given to extending the proposed shared path on Sefton Road (south of the Park) to the Chilvers Road intersection (and ideally beyond it) to provide an off-road bicycle and pedestrian facility leading into and out of the eastern entry to the site. The benefits of this extension would include:

- Improved pedestrian access route and amenity
- A separated off-road facility for bicycle riders (considering increase in vehicle volumes along Sefton Road)
- Consistent path type along Sefton Road
- A pedestrian and cycling crossing facility as part of the proposed signalised intersection upgrade at Chilvers Road (Section 4.3)

Further investigation may be required to determine the constructability of this proposed shared path extension.

Local Access Improvements

Improvements to pedestrian facilities surrounding the Park will provide more convenient access for local residents and visitors walking to it. Proposed improvements include:

- **Hornsby Park Link extension:** This involves an extension of the off-road connection at Kooringal Avenue to the Norman Avenue Playground / Reserve (east of the Park) to connect with parallel streets. A link between parallel streets will reduce the lengthy detours that would otherwise be required due to the local topography and road locations. Further, this connection provides a direct path to bus stops along both Wareemba Avenue and Norman Avenue (Route 588) and will improve public transport access to the Park.
- **Pedestrian Crossing Points on Quarter Sessions Road:** Additional pedestrian / bicycle crossing facilities on Quarter Sessions Road would link the proposed shared paths with existing paths on the western side of the road. The crossings would better connect residential areas to the west, north and south of the Park without the need to provide new paths on the eastern side of the road. The inclusion of roundabouts at Warringa Road and Sefton Road provide opportunities to 'design in' pedestrian refuges at these intersections. Consideration may also be given to providing raised zebra crossings at these locations subject to more detailed investigations.

Train Station Access Routes

The Park and particularly its mountain biking facilities will attract visitors from across the Sydney area, similar to the current trails present on site. With bicycles allowed on trains, improving bicycle routes between train stations and the site will encourage the use of public transport to reduce the amount of private vehicle trips. Also, mountain biking is popular with teenagers who are too young to drive and who may use the train for access to the Park for this purpose.

Existing cycle routes between the Park and Thornleigh and Normanhurst train stations can be improved through upgraded on-road facilities or off-road paths. It is noted that little to no infrastructure is provided in these locations to support on-road cycling. The mixing of bicycles and vehicles along these routes is highly unsuitable due to high traffic volumes (up to 1500vph during peak), and consideration should be given to investigating the provision of off-road bicycle facilities.

Access to Neighbouring Trails

The connection between the Park and Hornsby Park (Old Mans Valley Bike Park) is intended to link the two facilities together for mountain bike riders and pedestrians. To realise the full potential of the connection, the link should be accessible to both bicycle riders and pedestrians. This applies particularly to a link between the Park and Kooringal Avenue and Wareemba Avenue. This link will provide a pedestrian access point for local residents and provide access to the bush walking tracks to the east of the site. It is also recommended to provide end-of-trip facilities (i.e. bicycle racks, storage lockers etc.) at the Park itself to encourage cycling.

7.3 Public Transport Improvements

7.3.1 Public Transport Access

As outlined in Section 3.3, the site will primarily be serviced by local bus routes and associated stops along Quarter Sessions Road, summarised in Table 7.1 and shown Figure 7.3.

Table 7.1: Nearby Bus Routes and Stops

Routes	Stops
▪ Route 856 – Pennant Hills to Westleigh ▪ Route 857 – Hornsby to Westleigh (loop service)	▪ TSN 2120130 - Quarter Sessions Road after Corang Road ▪ TSN 2120131 – Quarter Sessions Road before Barkala Place ▪ TSN 2120103 - Quarter Sessions Rd before Warigal Drive

7.3.2 Catchment Assessment

TfNSW's *Integrated Public Transport Service Planning Guidelines 2013* provides guidance on the typical walking catchment for bus stops as 400m (radius) and train stations as 800m (radius). Application of the 400m radius to all existing bus stops near the Park is shown in Figure 7.3.

Adapted from General Arrangement Plan, Taylor Thomson Whitting June 2021

Figure 7.3: Bus Stops and Catchment Area

The Park mostly falls within the walking catchment area of nearby bus stops. However, while bus stops along Quarter Sessions Road are well connected to the site via proposed shared path links, indirect walking routes between other bus stops and facilities may not present buses as a convenient transport option for visitors.

7.3.3 Recommended Public Transport Improvements

Bus Route Re-alignment

With the proposed extension of Sefton Road through the site, there is an opportunity to relocate local routes through the site and provide a stop/stops at the Park.

Considering local routes 856 and 857, two options have been identified for bus service re-routing, as presented below.

Option A – Outbound / Anti-clockwise

Bus Routes 856 and 857 could be diverted to within the Park in the outbound direction (to Westleigh), circulating anti-clockwise around the Park along the following route (see Figure 7.4):

- From Corang Road, turn right onto Quarter Sessions Road, then turn left onto Sefton Road
- Turn left onto internal roadway (south gate)
- Turn left to continue along the internal roadway to Warrigal Drive
- Turn right onto Warrigal Drive
- Turn right onto Quarter Sessions Road and continue along original route.

Adapted from General Arrangement Plan, Taylor Thomson Whitting June 2021

Figure 7.4: Bus Route Changes, Option A

Under Option A, two new bus stops could be provided to service the Park located:

- Between North and Central Fields
- East of South Field.

Under this arrangement, it is noted:

- Facilities are located on the same side of the road at the South Field stop
- One existing bus stop becomes redundant and could be removed
- Local passengers residing in Westleigh (north of the site) will be required to travel through the Park before reaching their destination, experiencing an increase in travel time.

It is recognised that relocating bus routes requires a broader range of considerations than those above including extensive consultation between TfNSW, the operator, Council and residents and that further work would be required to understand the impacts versus the benefits of these proposals.

Option B – Inbound / Clockwise

Bus Routes 856 and 857 can be diverted to within the Park in the inbound direction (to Pennant Hills or Hornsby), circulating clockwise around the Park along the following route (see Figure 7.5):

- From Quarter Sessions Road, turn left onto Warrigal Drive
- Turn left onto internal roadway (north gate)
- Turn right to continue along the internal roadway to Sefton Road (extension)
- Turn Right onto Sefton Road
- Turn left onto Quarter Sessions Road and continue along original route
- OR turn right into Quarter Sessions Road then turn left into Corang Road to continue along original route (timetable dependent).

Adapted from General Arrangement Plan, Taylor Thomson Whitting June 2021

Figure 7.5: Bus Route Changes, Option B

Under Option B, two new bus stops could be provided to service the site located:

- Between North and Central Fields
- East of South Field

Under this arrangement, it is noted:

- Facilities are located on the opposite side of the road at the South Field stop
- No existing bus stops are affected under this arrangement
- Passengers travelling from train stations (Pennant Hills or Hornsby) will be required to travel to the end of the route at Westleigh before alighting within the Park
- Passengers will experience a greater travel time in the inbound direction and direction of connecting train stations.

It is recognised that relocating bus routes requires a broader range of considerations than those above including extensive consultation between TfNSW, the operator, Council and residents and that further work would be required to understand the impacts versus the benefits of these proposals.

Required Works

To accommodate any bus route changes, roadways would need to be designed to accommodate typical buses (12.5m long), with key considerations including:

- Road profiles and lane widths
- Intersection turning paths (including at roundabouts)
- Any traffic calming or management devices to be sympathetic to buses using them

8. CONCLUSIONS

When fully developed, Westleigh Park is expected to generate 176 vehicles during the PM peak one hour, and about 360 vehicles during the Weekend peak one hour with the AM peak traffic generation expected to be negligible.

It is understood that the Park will be developed in stages. It is acknowledged that Council is still finalising the Park staging plan, however for the purpose of this assessment, it was assumed that the Park will be fully developed by 2032 and partially completed by 2027. In consultation with Council the following three options were assessed:

- **Option 1**: Includes 2027 / 2032 background traffic growth plus Park traffic. The proposed Sefton Road extension is not included in this option
- **Option 2**: As per Option 1 but with the proposed Sefton Road extension open to all traffic
- **Option 3**: Same as Option 2 but with the proposed Sefton Road extension only accessible for Park traffic (assuming an internal closure location to stop through traffic using it)

Traffic Impacts and Needs

The traffic modelling identified that with background traffic growth plus Park traffic:

- **Option 1** will service the 2027 PM and Weekend peak traffic demands. However, in 2032 when the Park is expected to be fully developed, the Park traffic will add to traffic delays especially in the Weekend peak when the Duffy Avenue / Chilvers Road / The Esplanade intersection is predicted to operate very close or at capacity
- **Option 2** will substantially improve the 2032 PM and Weekend Peak traffic conditions in the local road network including at the key intersection of Duffy Avenue / Chilvers Road / The Esplanade compared to the Base Case condition, because of the Sefton Road link. Under this option, 2032 daily traffic on the Sefton Road extension is estimated to be about 1,500 veh/day which is within the residential road environmental capacity of 2,000 veh/day as defined under Section 7.3 TfNSW's Guide to Traffic Generating Developments
- **Option 3** shows that Park traffic will marginally impact congestion at the Duffy Avenue / Chilvers Road / The Esplanade intersection compared to the Base Case condition. However, this intersection still operates with acceptable delays and queue lengths.

In summary, the proposed Sefton Road extension is required to be in place between completion of Stage 1 and completion of Stage 2 of the Park. If the extension is open to through traffic it provides network benefits particularly to the Duffy Avenue / Chilvers Road / The Esplanade intersection. If it is closed in the middle allowing access for Park traffic only, it impacts the local network and the Duffy Avenue / Chilvers Road / The Esplanade intersection only marginally.

Active and Public Transport

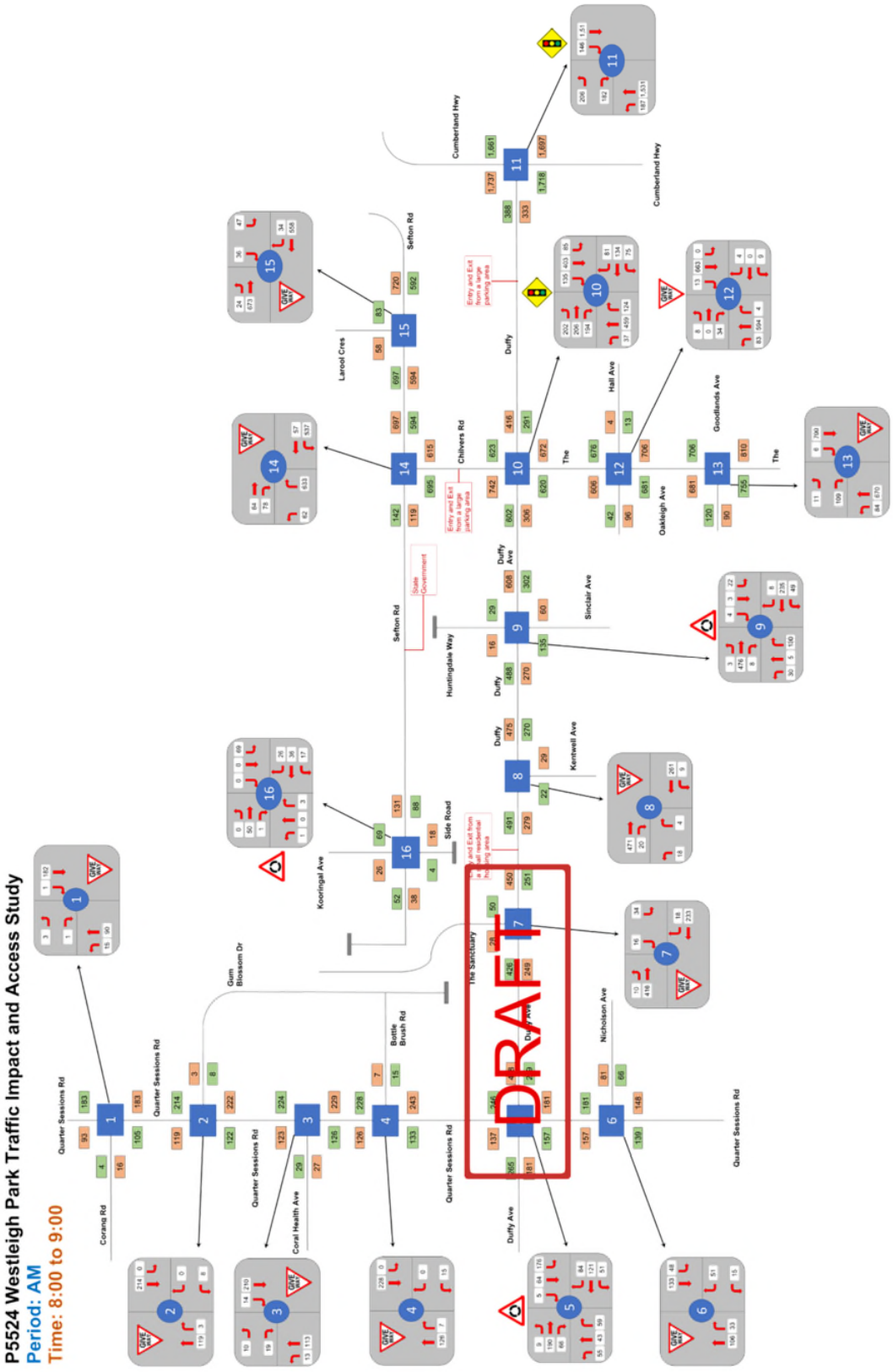
Suggested improvements additional to those already planned as part of the development include:

- Extend the off-road connection at Kooringal Avenue to the Norman Avenue Playground / Reserve (east of the site) to connect with parallel streets
- Additional pedestrian crossing facilities on Quarter Sessions Road
- Improve connections with nearby train stations to provide access for bicycle riders
- Extension of the proposed shared path on Sefton Road to (at least) the Chilvers Road intersection
- Ensure the connection between the Park and Hornsby Park is for both pedestrians and cyclists
- In consultation with stakeholders, further investigate re-routing local bus routes through the Park.

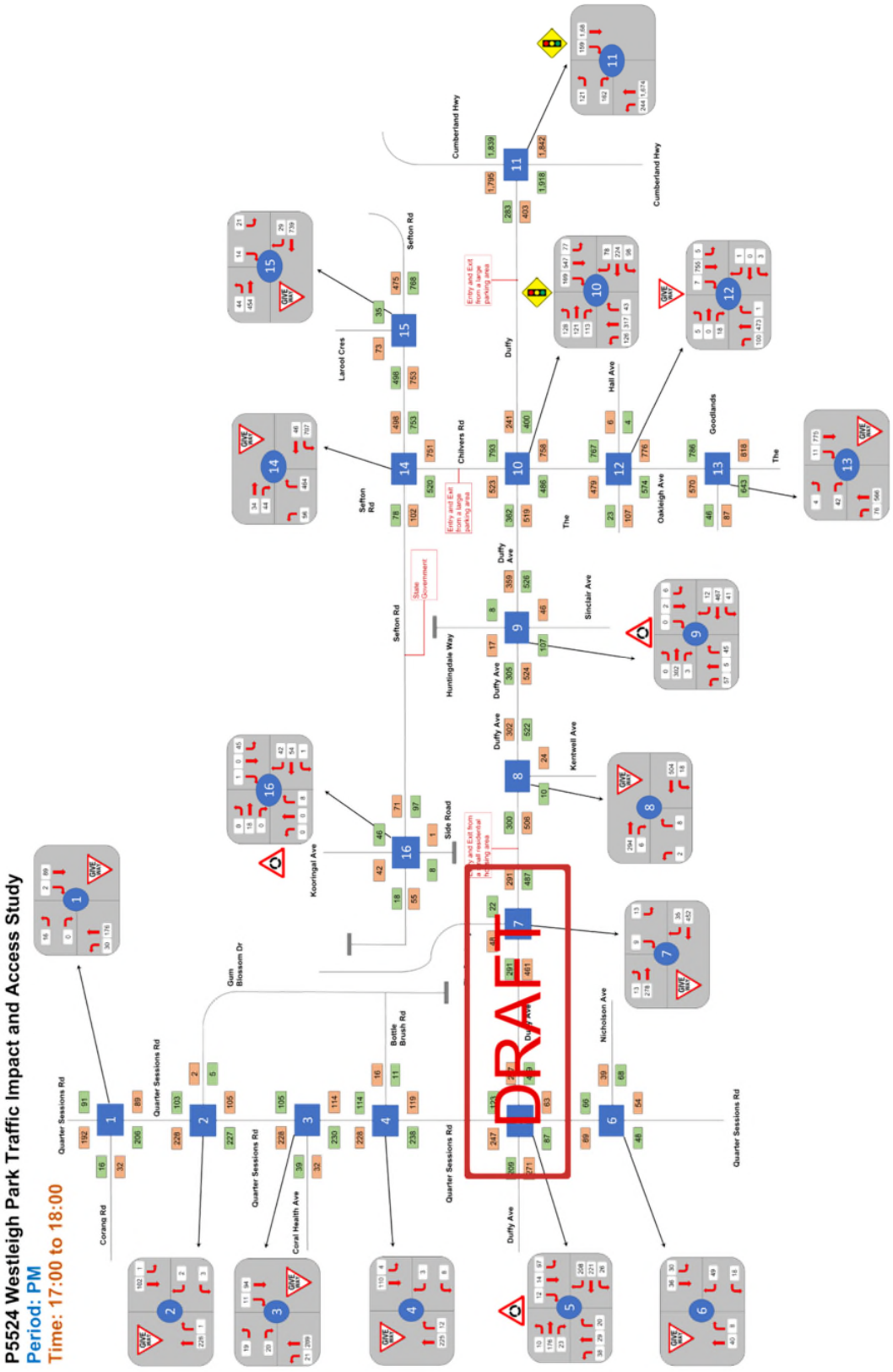
Appendix A

Weekday AM/PM and Weekend Peak Intersection Turning Movements

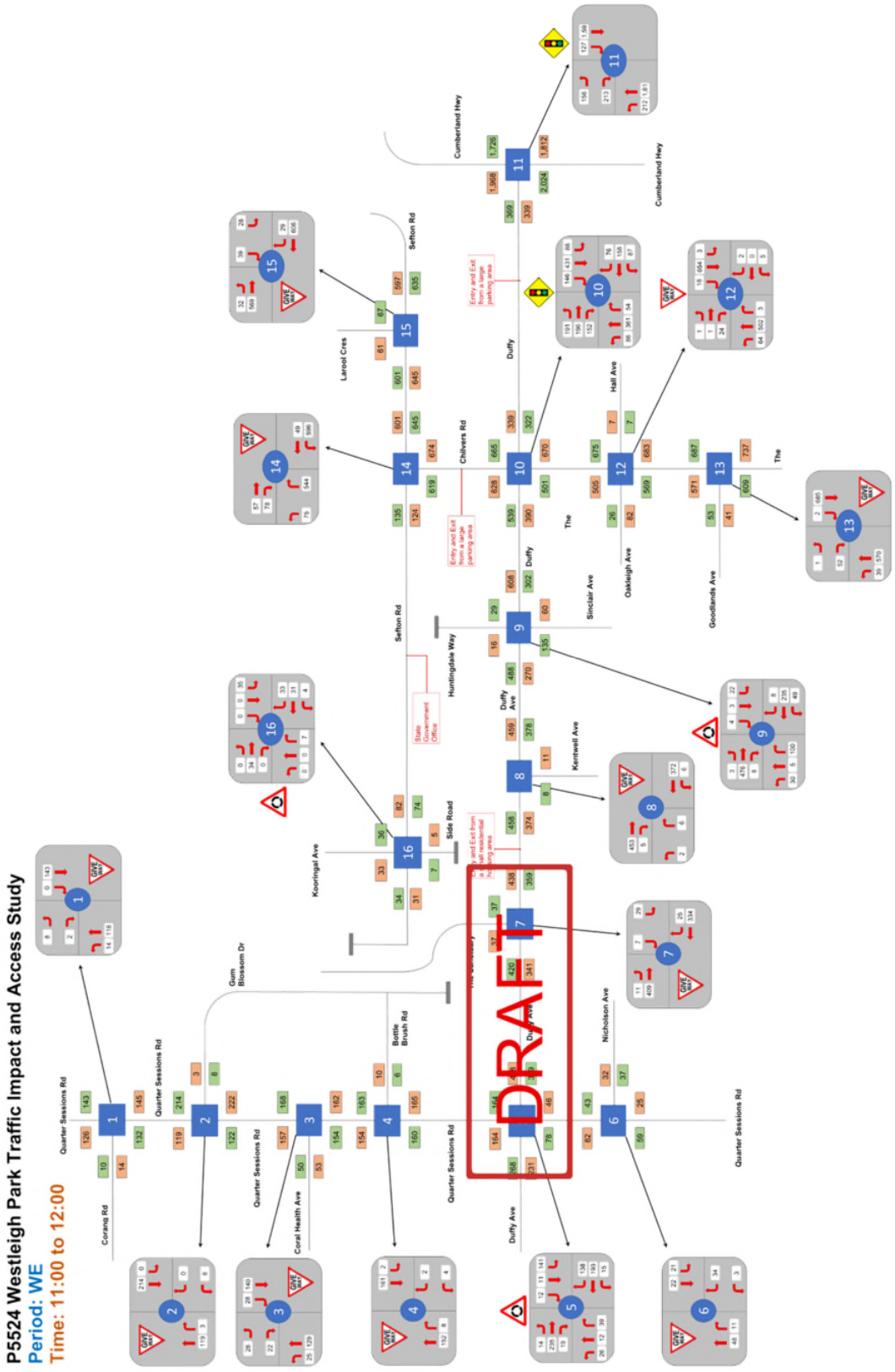
ATTACHMENT 4 - ITEM 5



ATTACHMENT 4 - ITEM 5



ATTACHMENT 4 - ITEM 5



Appendix B

Weekday AM/PM and Weekend Peak Travel Time Survey Data

P5524 Westleigh Park Traffic Impact and Access Study
OD Survey Data - Cordon 1
AM Peak (0800 - 0900)

Origin - Destination Matches - Class 1 - Light

Survey Time 8:00 9:00	Destination	1N	3W	4N	5E	6S	7E	8W	Total	% Matched	Local Destination
Origin	Recorded	90	172	58	718	810	407	63	2318		
1S	180	9	6	3	30	41	46	0	135	75.0%	45
3E	265	6	20	4	50	68	47	1	196	74.0%	69
4S	70	1	3	2	36	17	5	0	64	91.4%	6
5W	592	14	47	29	12	326	40	0	468	79.1%	124
6N	760	14	27	9	381	14	108	45	598	78.7%	162
7W	297	24	23	7	33	64	7	0	158	53.2%	139
8E	80	0	1	0	2	53	3	4	63	78.8%	17
Total	2244	68	127	54	544	583	256	50	1682	75.0%	562
% Matched		75.6%	73.8%	93.1%	75.8%	72.0%	62.9%	79.4%	72.6%		
Local Origin		22	45	4	174	227	151	13	636		

Origin - Destination Matches - Class 2 - Heavy

Survey Time 8:00 9:00	Destination	1N	3W	4N	5E	6S	7E	8W	Total	% Matched	Local Destination
Origin	Recorded	8	9	1	15	8	10	1	52		
1S	6	0	0	0	1	0	0	0	1	16.7%	5
3E	7	1	0	0	1	0	2	0	4	57.1%	3
4S	1	0	0	0	1	0	0	0	1	100.0%	0
5W	8	1	0	1	0	1	1	0	4	50.0%	4
6N	15	1	0	0	3	0	4	1	9	60.0%	6
7W	15	2	6	0	1	1	0	0	10	66.7%	5
8E	5	0	0	0	1	4	0	0	5	100.0%	0
Total	57	5	6	1	8	6	7	1	34	59.6%	23
% Matched		62.5%	66.7%	100.0%	53.3%	75.0%	70.0%	100.0%	65.4%		
Local Origin		3	3	0	7	2	3	0	18		

Origin - Destination Matches - Total Vehicles

Survey Time 8:00 9:00	Destination	1N	3W	4N	5E	6S	7E	8W	Total	% Matched	Local Destination
Origin	Recorded	9	181	59	733	818	417	64	2370		
1S	186		6	3	31	41	46	0	136	73.1%	50
3E	272		20	4	51	6	7	1	200	73.5%	72
4S	71		3	2	37	17	5	0	65	91.5%	6
5W	600	15	47	30	12	327	41	0	472	78.7%	128
6N	775	15	27	9	384	14	112	46	607	78.3%	168
7W	312	25	29	7	34	65	7	0	168	53.8%	144
8E	85		1	0	3	57	2	1	68	80.0%	17
Total	2301	73	133	55	552	589	263	51	1716	74.6%	585
% Matched		74.5%	73.5%	93.2%	75.3%	72.0%	63.1%	79.7%	72.4%		
Local Origin		25	48	4	181	229	154	13	654		

P5524 Westleigh Park Traffic Impact and Access Study
OD Survey Data - Cordon 2
AM Peak (0800 - 0900)

Origin - Destination Matches - Class 1 - Light

Survey Time 8:00 9:00	Destination	2N	3W	4N	5E	6S	7E	8W	Total	% Matched	Local Destination
Origin	Recorded	131	172	58	718	810	407	63	2359		
2S	245	19	6	4	51	55	60	0	195	79.6%	50
3E	265	12	20	3	50	68	47	1	201	75.8%	64
4S	70	1	3	2	36	17	5	0	64	91.4%	6
5W	592	24	47	29	12	326	40	0	478	80.7%	114
6N	760	19	27	9	381	14	108	45	603	79.3%	157
7W	297	33	23	7	33	64	7	0	167	56.2%	130
8E	80	0	1	0	2	53	3	4	63	78.8%	17
Total	2309	108	127	54	565	597	270	50	1771	76.7%	538
% Matched		82.4%	73.8%	93.1%	78.7%	73.7%	66.3%	79.4%	75.1%		
Local Origin		23	45	4	153	213	137	13	588		

Origin - Destination Matches - Class 2 - Heavy

Survey Time 8:00 9:00	Destination	2N	3W	4N	5E	6S	7E	8W	Total	% Matched	Local Destination
Origin	Recorded	10	9	1	15	8	10	1	54		
2S	1	0	0	0	1	0	0	0	1	100.0%	0
3E	7	1	0	0	1	0	2	0	4	57.1%	3
4S	1	0	0	0	1	0	0	0	1	100.0%	0
5W	8	1	0	1	0	1	1	0	4	50.0%	4
6N	15	0	0	0	3	0	4	1	8	53.3%	7
7W	15	3	6	0	1	1	0	0	11	73.3%	4
8E	5	0	0	0	1	4	0	0	5	100.0%	0
Total	52	5	6	1	8	6	7	1	34	65.4%	18
% Matched		50.0%	66.7%	100.0%	53.3%	75.0%	70.0%	100.0%	63.0%		
Local Origin		5	3	0	7	2	3	0	20		

Origin - Destination Matches - Total Vehicles

Survey Time 8:00 9:00	Destination	2N	3W	4N	5E	6S	7E	8W	Total	% Matched	Local Destination
Origin	Recorded	141	181	59	733	818	417	64	2413		
2S	246	19	6	4	52	55	60	0	196	79.7%	50
3E	272	13	20	3	51	68	47	1	205	75.4%	67
4S	71	1	3	2	37	17	5	0	65	91.5%	6
5W	600	25	47	30	12	327	41	0	482	80.3%	118
6N	775	19	27	9	384	14	112	46	611	78.8%	164
7W	312	33	29	7	34	65	7	0	178	57.1%	134
8E	85	1	1	0	2	57	3	1	68	80.0%	17
Total	2361	113	133	55	573	603	277	51	1805	76.5%	556
% Matched		80.1%	73.5%	93.2%	78.2%	73.7%	66.4%	79.7%	74.8%		
Local Origin		28	48	4	160	215	140	13	608		

P5524 Westleigh Park Traffic Impact and Access Study
OD Survey Data - Cordon 1
PM Peak (1700 - 1800)

Origin - Destination Matches - Class 1 - Light

Survey Time 8:00 9:00	Destination	1N	3W	4N	5E	6S	7E	8W	Total	% Matched	Local Destination
Origin	Recorded	185	263	74	474	799	241	69	2105		
1S	91	3	9	1	12	21	23	0	69	75.8%	22
3E	213	8	2	5	43	46	50	0	154	72.3%	59
4S	32	0	2	0	18	10	1	0	31	96.9%	1
5W	761	30	46	28	11	455	54	1	625	82.1%	136
6N	636	41	68	17	247	4	36	53	466	73.3%	170
7W	408	60	67	19	35	79	3	1	264	64.7%	144
8E	38	0	0	0	2	15	0	0	17	44.7%	21
Total	2179	142	194	70	368	630	167	55	1626	74.6%	553
% Matched		76.8%	73.8%	94.6%	77.6%	78.8%	69.3%	79.7%	77.2%		
Local Origin		43	69	4	106	169	74	14	479		

Origin - Destination Matches - Class 2 - Heavy

Survey Time 8:00 9:00	Destination	1N	3W	4N	5E	6S	7E	8W	Total	% Matched	Local Destination
Origin	Recorded	3	6	0	7	8	3	1	28		
1S	4	0	0	0	0	1	1	0	2	50.0%	2
3E	4	0	0	0	2	1	0	0	3	75.0%	1
4S	0	0	0	0	0	0	0	0	0	0.0%	0
5W	7	0	2	0	0	5	0	0	7	100.0%	0
6N	2	0	0	0	0	0	0	1	1	50.0%	1
7W	5	0	2	0	1	0	0	0	3	60.0%	2
8E	0	0	0	0	0	0	0	0	0	0.0%	0
Total	22	0	4	0	3	7	1	1	16	72.7%	6
% Matched		0.0%	66.7%	0.0%	42.9%	87.5%	33.3%	100.0%	57.1%		
Local Origin		3	2	0	4	1	2	0	12		

Origin - Destination Matches - Total Vehicles

Survey Time 8:00 9:00	Destination	1N	3W	4N	5E	6S	7E	8W	Total	% Matched	Local Destination
Origin	Recorded	188	269	74	481	807	244	70	2133		
1S	95		9	1	12	22	24	0	71	74.7%	24
3E	217		2	5	45	5	5	0	157	72.4%	60
4S	32		2	0	18	10	1	0	31	96.9%	1
5W	768	30	48	28	11	460	54	1	632	82.3%	136
6N	638	41	68	17	247	4	36	54	467	73.2%	171
7W	413	60	69	19	36	79	3	1	267	64.6%	146
8E	38								17	44.7%	21
Total	2201	142	198	70	371	637	168	56	1642	74.6%	559
% Matched		75.5%	73.6%	94.6%	77.1%	78.9%	68.9%	80.0%	77.0%		
Local Origin		46	71	4	110	170	76	14	491		

P5524 Westleigh Park Traffic Impact and Access Study
OD Survey Data - Cordon 2
PM Peak (1700 - 1800)

Origin - Destination Matches - Class 1 - Light

Survey Time 8:00 9:00	Destination	2N	3W	4N	5E	6S	7E	8W	Total	% Matched	Local Destination
Origin	Recorded	234	263	74	474	799	241	69	2154		
2S	119	2	13	1	22	33	29	0	100	84.0%	19
3E	213	10	2	5	43	46	50	0	156	73.2%	57
4S	32	0	2	0	18	10	1	0	31	96.9%	1
5W	761	53	46	28	11	455	54	1	648	85.2%	113
6N	636	64	68	17	247	4	36	53	489	76.9%	147
7W	408	74	67	19	35	79	2	1	277	67.9%	131
8E	38	1	0	0	2	15	0	0	18	47.4%	20
Total	2207	204	198	70	378	642	172	55	1719	77.9%	488
% Matched		87.2%	75.3%	94.6%	79.7%	80.4%	71.4%	79.7%	79.8%		
Local Origin		30	65	4	96	157	69	14	435		

Origin - Destination Matches - Class 2 - Heavy

Survey Time 8:00 9:00	Destination	2N	3W	4N	5E	6S	7E	8W	Total	% Matched	Local Destination
Origin	Recorded	0	6	0	7	8	3	1	25		
2S	3	0	0	0	0	1	1	0	2	66.7%	1
3E	4	0	0	0	2	1	0	0	3	75.0%	1
4S	0	0	0	0	0	0	0	0	0	0.0%	0
5W	7	0	2	0	0	5	0	0	7	100.0%	0
6N	2	0	0	0	0	0	0	1	1	50.0%	1
7W	5	0	2	0	1	0	0	0	3	60.0%	2
8E	0	0	0	0	0	0	0	0	0	0.0%	0
Total	21	0	4	0	3	7	1	1	16	76.2%	5
% Matched		0.0%	66.7%	0.0%	42.9%	87.5%	33.3%	100.0%	64.0%		
Local Origin		0	2	0	4	1	2	0	9		

Origin - Destination Matches - Total Vehicles

Survey Time 8:00 9:00	Destination	2N	3W	4N	5E	6S	7E	8W	Total	% Matched	Local Destination
Origin	Recorded	2[illegible]4	269	74	481	807	244	70	2179		
2S	122	[illegible]	13	1	22	34	30	0	102	83.6%	20
3E	217	[illegible]	2	[illegible]	45	[illegible]	[illegible]	0	159	73.3%	58
4S	32	[illegible]	2	[illegible]	18	[illegible]	[illegible]	0	31	96.9%	1
5W	768	[illegible]	48	[illegible]	[illegible]	[illegible]	[illegible]	1	655	85.3%	113
6N	638	[illegible]	68	[illegible]	[illegible]	[illegible]	[illegible]	54	490	76.8%	148
7W	413	[illegible]	69	19	36	79	2	1	280	67.8%	133
8E	38	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	18	47.4%	20
Total	2228	204	202	70	381	649	173	56	1735	77.9%	493
% Matched		87.2%	75.1%	94.6%	79.2%	80.4%	70.9%	80.0%	79.6%		
Local Origin		30	67	4	100	158	71	14	444		

P5524 Westleigh Park Traffic Impact and Access Study
OD Survey Data - Cordon 1
Weekend Peak (1100 - 1200)

Origin - Destination Matches - Class 1 - Light

Survey Time 8:00 9:00	Destination	1N	3W	4N	5E	6S	7E	8W	Total	% Matched	Local Destination
Origin	Recorded	124	223	59	601	725	336	36	2104		
1S	138	1	9	0	28	31	35	0	104	75.4%	34
3E	264	9	1	6	64	72	69	0	221	0.0%	43
4S	55	1	6	0	21	14	11	0	53	96.4%	2
5W	632	21	58	29	2	354	54	2	520	82.3%	112
6N	592	22	47	18	293	6	43	17	446	75.3%	146
7W	306	33	49	6	40	66	4	1	199	65.0%	107
8E	30	0	0	0	1	19	1	1	22	73.3%	8
Total	2017	87	170	59	449	562	217	21	1565	77.6%	452
% Matched		70.2%	76.2%	100.0%	74.7%	77.5%	64.6%	58.3%	74.4%		
Local Origin		37	53	0	152	163	119	15	539		

Origin - Destination Matches - Class 2 - Heavy

Survey Time 8:00 9:00	Destination	1N	3W	4N	5E	6S	7E	8W	Total	% Matched	Local Destination
Origin	Recorded	2	2	0	1	3	1	0	9		
1S	2	0	0	0	0	0	1	0	1	50.0%	1
3E	2	0	0	0	0	1	0	0	1	50.0%	1
4S	0	0	0	0	0	0	0	0	0	0.0%	0
5W	3	0	1	0	0	1	0	0	2	66.7%	1
6N	1	0	0	0	0	0	0	0	0	0.0%	1
7W	2	1	0	0	1	0	0	0	2	100.0%	0
8E	0	0	0	0	0	0	0	0	0	0.0%	0
Total	10	1	1	0	1	2	1	0	6	60.0%	4
% Matched		50.0%	50.0%	0.0%	100.0%	66.7%	100.0%	0.0%	66.7%		
Local Origin		1	1	0	0	1	0	0	3		

Origin - Destination Matches - Total Vehicles

Survey Time 8:00 9:00	Destination	1N	3W	4N	5E	6S	7E	8W	Total	% Matched	Local Destination
Origin	Recorded	126	225	59	602	728	337	36	2113		
1S	140		9	0	28	31	36	0	105	75.0%	35
3E	266		1	6	64	73	69	0	222	83.5%	44
4S	55		6	0	21	14	11	0	53	96.4%	2
5W	635	21	59	29	2	355	54	2	522	82.2%	113
6N	593	22	47	18	293	6	43	17	446	75.2%	147
7W	308	34	49	6	41	66	4	1	201	65.3%	107
8E	30								22	73.3%	8
Total	2027	88	171	59	450	564	218	21	1571	77.5%	456
% Matched		69.8%	76.0%	100.0%	74.8%	77.5%	64.7%	58.3%	74.3%		
Local Origin		38	54	0	152	164	119	15	542		

P5524 Westleigh Park Traffic Impact and Access Study
OD Survey Data - Cordon 2
Weekend Peak (1100 -1200)

Origin - Destination Matches - Class 1 - Light

Survey Time 8:00 9:00	Destination	2N	3W	4N	5E	6S	7E	8W	Total	% Matched	Local Destination
Origin	Recorded	157	223	59	601	725	336	36	2137		
2S	164	3	13	0	41	39	49	0	145	88.4%	19
3E	264	15	1	6	64	72	69	0	227	86.0%	37
4S	55	1	6	0	21	14	11	0	53	96.4%	2
5W	632	37	58	29	2	354	54	2	536	84.8%	96
6N	592	39	47	18	292	6	43	17	462	78.0%	130
7W	306	48	49	6	0	66	4	1	214	69.9%	92
8E	30	0	0	0	1	19	1	1	22	73.3%	8
Total	2043	143	174	59	461	570	231	21	1659	81.2%	384
% Matched		91.1%	78.0%	100.0%	76.7%	78.6%	68.8%	58.3%	77.6%		
Local Origin		14	49	0	140	155	105	15	478		

Origin - Destination Matches - Class 2 - Heavy

Survey Time 8:00 9:00	Destination	2N	3W	4N	5E	6S	7E	8W	Total	% Matched	Local Destination
Origin	Recorded	2	2	0	1	3	1	0	9		
2S	1	0	0	0	0	0	1	0	1	100.0%	0
3E	2	1	0	0	0	1	0	0	2	100.0%	0
4S	0	0	0	0	0	0	0	0	0	0.0%	0
5W	3	0	1	0	0	1	0	0	2	66.7%	1
6N	1	0	0	0	0	0	0	0	0	0.0%	1
7W	2	1	0	0	1	0	0	0	2	100.0%	0
8E	0	0	0	0	0	0	0	0	0	0.0%	0
Total	9	2	1	0	1	2	1	0	7	77.8%	2
% Matched		100.0%	50.0%	0.0%	100.0%	66.7%	100.0%	0.0%	77.8%		
Local Origin		0	1	0	0	1	0	0	2		

Origin - Destination Matches - Total Vehicles

Survey Time 8:00 9:00	Destination	2N	3W	4N	5E	6S	7E	8W	Total	% Matched	Local Destination
Origin	Recorded	159	225	59	602	728	337	36	2146		
2S	165		13	0	41	39	50	0	146	88.5%	19
3E	266	16	1	6	64	72	69	0	229	86.1%	37
4S	55		6	0	21	14	11	0	53	96.4%	2
5W	635	37	59	29	2	355	54	2	538	84.7%	97
6N	593	39	47	18	292	6	48	17	462	77.9%	131
7W	308	49	49	6	41	66	4	1	216	70.1%	92
8E	30								22	73.3%	8
Total	2052	145	175	59	462	572	232	21	1666	81.2%	386
% Matched		91.2%	77.8%	100.0%	76.7%	78.6%	68.8%	58.3%	77.6%		
Local Origin		14	50	0	140	156	105	15	480		

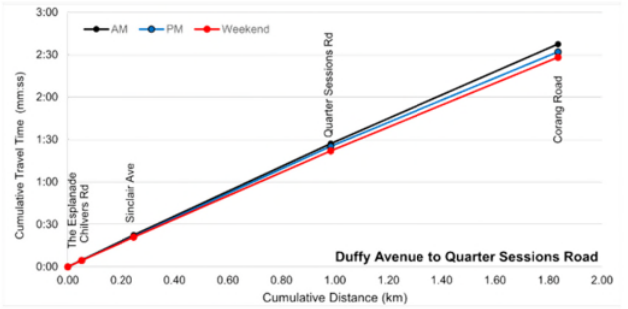
Appendix C

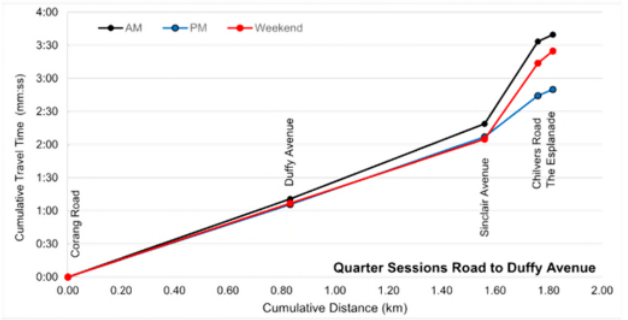
Weekday AM/PM and Weekend Peak OD Data

P5524 Westleigh Park Traffic Impact and Access Study
Travel Time Data Analysis: Base 2022
Route 1: Quarter Sessions Road / Duffy Avenue
Travel Time Survey Summary

Northbound				Section Travel Time			Cumulative Travel Time		
Sections	Vissim Section	Distance (km)	Cumulative Distance (km)	AM	PM	Weekend	AM	PM	Weekend
The Esplanade		0.00	0.00	0:00	0:00	0:00	0:00	0:00	0:00
Chilvers Road	101	0.05	0.05	0:05	0:04	0:05	0:05	0:04	0:05
Sinclair Avenue	102	0.20	0.25	0:18	0:17	0:17	0:22	0:21	0:21
Quarter Sessions Road	103	0.74	0.98	1:05	1:04	1:01	1:27	1:25	1:22
H20 Bike Trail	104	0.85	1.84	1:10	1:07	1:06	2:37	2:32	2:28

Southbound				Section Travel Time			Cumulative Travel Time		
Sections	Vissim Section	Distance (km)	Cumulative Distance (km)	AM	PM	Weekend	AM	PM	Weekend
H20 Bike Trail		0.00	0.00	0:00	0:00	0:00	0:00	0:00	0:00
Duffy Avenue	111	0.83	0.83	1:11	1:06	1:07	1:11	1:06	1:07
Sinclair Avenue	112	0.73	1.56	1:08	1:01	0:58	2:19	2:07	2:05
Chilvers Road	113	0.20	1.76	1:15	0:37	1:09	3:33	2:44	3:14
The Esplanade	114	0.06	1.82	0:06	0:06	0:11	3:40	2:50	3:25





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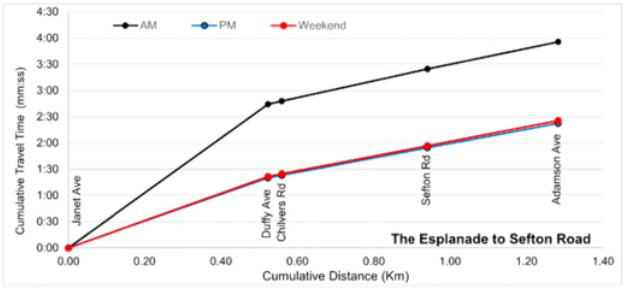
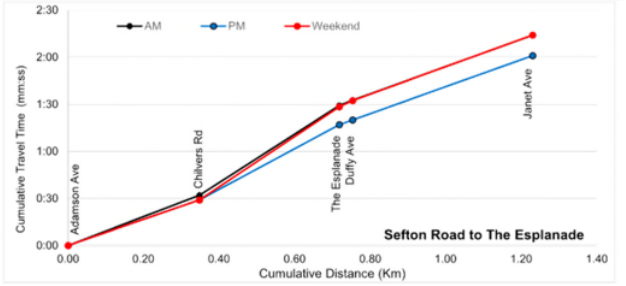
ATTACHMENT 4 - ITEM 5

P5524 Westleigh Park Traffic Impact and Access Study
Travel Time Data Analysis: Base 2022
Route 2: The Esplanade / Chivers Road / Sefton Road
Travel Time Survey Summary

Northbound				Section Travel Time			Cumulative Travel Time		
Sections	Vissim Section	Distance (km)	Cumulative Distance (km)	AM	PM	Weekend	AM	PM	Weekend
Janet Avenue		0.00	0.00	0:00	0:00	0:00	0:00	0:00	0:00
Duffy Avenue	201	0.52	0.52	2:44	1:20	1:22	2:44	1:20	1:22
Chilvers Road	202	0.04	0.56	0:04	0:03	0:03	2:48	1:23	1:25
Sefton Road	203	0.38	0.94	0:37	0:32	0:32	3:25	1:55	1:57
Adamson Avenue	204	0.34	1.28	0:31	0:28	0:29	3:56	2:22	2:26

Southbound				Section Travel Time			Cumulative Travel Time		
Sections	Vissim Section	Distance (km)	Cumulative Distance (km)	AM	PM	Weekend	AM	PM	Weekend
Adamson Avenue		0.00	0.00	0:00	0:00	0:00	0:00	0:00	0:00
Chilvers Road	211	0.35	0.35	0:32	0:29	0:29	0:32	0:29	0:29
Duffy Avenue	212	0.37	0.72	0:57	0:48	0:59	1:29	1:17	1:28
The Esplanade	213	0.04	0.75	0:03	0:03	0:04	1:33	1:20	1:32
Janet Avenue	214	0.48	1.23	0:41	0:41	0:42	2:14	2:01	2:14





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ATTACHMENT 4 - ITEM 5

ATTACHMENT 4 - ITEM 5

Appendix D

Year 2027 and Year 2032 VISSIM Results

P5524 Westleigh Park Traffic Impact and Access Study
VISSIM Data Analysis - Intersection Count Comparison
AM Peak 0800-0900

					Vehicle Counts							Delay (s)						
ID	Intersection	From	To	Turn	2022 Base	2027 Do Min	2032 Do Min	2027 Upgd	2032 Upgd	2027 Opt 2	2032 Opt 2	2022 Base	2027 Do Min	2032 Do Min	2027 Upgd	2032 Upgd	2027 Opt 2	2032 Opt 2
101	Quarter Sessions Rd	Quarter Sessions Rd (N)	Corang Rd (W)	R	2	3	4	3	4	3	4	1	1	2	2	2	3	2
101	Corang Rd		Quarter Sessions Rd (S)	T	184	196	200	196	200	196	200	0	0	0	0	0	2	2
101		Quarter Sessions Rd (S)	Quarter Sessions Rd (N)	T	91	98	112	NA	117	99	117	0	0	0	0	0	0	0
101			Corang Rd (W)	L	39	35	35	NA	39	35	39	1	0	0	1	0	0	0
101		Corang Rd (W)	Quarter Sessions Rd (S)	R	11	10	10	10	10	10	10	1	2	2	2	2	2	2
101			Quarter Sessions Rd (N)	L	5	4	4	4	4	4	4	3	4	4	4	4	4	4
101		All			332	346	366	348	374	347	374	3	4	4	4	4	4	4
102	Quarter Sessions Rd	Quarter Sessions Rd (N)	Quarter Sessions Rd (S)	T	225	236	241	236	237	229	237	0	0	0	0	0	0	0
102	Gum Blossom Dr		Gum Blossom Dr (E)	L	0	0	1	0	2	0	2	0	0	0	0	0	0	1
102		Gum Blossom Dr (E)	Quarter Sessions Rd (N)	R	0	0	0	0	0	0	0	0	0	0	0	0	0	0
102			Quarter Sessions Rd (S)	L	8	11	12	11	12	11	12	1	1	2	1	2	1	1
102		Quarter Sessions Rd (S)	Gum Blossom Dr (E)	R	9	14	12	14	11	13	11	0	2	2	2	2	1	2
102			Quarter Sessions Rd (N)	T	145	152	168	153	166	142	166	0	0	0	0	0	0	0
102		All			387	413	435	414	429	395	429	1	2	2	2	2	1	2
103	Quarter Sessions Rd	Quarter Sessions Rd (N)	Coral Health Ave (W)	R	21	20	21	20	22	21	22	1	1	1	1	2	1	1
103	Coral Health Ave		Quarter Sessions Rd (S)	T	212	226	232	226	227	217	227	0	0	0	0	0	0	0
103		Quarter Sessions Rd (S)	Quarter Sessions Rd (N)	T	134	144	159	145	155	133	155	0	0	0	0	0	0	0
103			Coral Health Ave (W)	L	22	24	24	24	25	23	25	0	0	0	0	0	0	0
103		Coral Health Ave (W)	Quarter Sessions Rd (S)	R	33	35	36	35	35	35	35	1	2	3	2	3	2	2
103			Quarter Sessions Rd (N)	L	20	22	22	22	22	22	22	1	1	1	1	1	1	1
103		All			442	471	494	472	486	451	486	1	2	3	2	3	2	2
104	Quarter Sessions Rd	Quarter Sessions Rd (N)	Quarter Sessions Rd (S)	T	244	260	268	260	262	251	262	0	0	0	0	0	0	0
104	Bottle Brush Rd		Bottle Brush Rd (E)	L	1	1	0	1	0	1	0	0	0	0	0	0	0	0
104		Bottle Brush Rd (E)	Quarter Sessions Rd (N)	R	0	0	1	0	1	1	1	0	4	1	4	3	4	4
104			Quarter Sessions Rd (S)	L	24	22	25	22	24	21	24	1	2	2	2	2	2	2
104		Quarter Sessions Rd (S)	Bottle Brush Rd (E)	R	12	14	14	14	15	14	15	1	2	2	3	2	2	2
104			Quarter Sessions Rd (N)	T	155	167	182	168	179	156	179	0	0	0	0	0	0	0
104		All			436	463	489	465	481	444	481	1	4	2	4	3	4	4
105	Quarter Sessions Rd	Quarter Sessions Rd (N)	Duffy Ave (W)	R	10	10	10	10	20	19	20	2	4	4	4	3	3	3
105	Duffy Ave		Quarter Sessions Rd (S)	T	58	44	61	45	62	65	62	3	3	3	3	4	3	4
105			Duffy Ave (E)	L	201	227	221	226	203	189	203	2	3	3	3	3	3	3
105		Duffy Ave (E)	Quarter Sessions Rd (N)	R	130	136	140	136	140	130	140	4	3	3	3	4	4	4
105			Duffy Ave (W)	T	114	129	122	129	117	117	117	3	4	3	4	4	3	4
105			Quarter Sessions Rd (S)	L	51	53	50	54	45	42	45	4	3	3	3	3	3	4
105		Quarter Sessions Rd (S)	Duffy Ave (E)	R	87	73	73	69	72	63	72	2	2	3	2	3	2	2
105			Quarter Sessions Rd (N)	T	28	34	46	36	40	27	40	2	3	2	3	3	2	2
105			Duffy Ave (W)	L	53	63	64	63	62	65	62	3	3	2	2	2	2	2
105		Duffy Ave (W)	Quarter Se													4	3	4
105			Duffy Ave	T	168	195	191	189	164	176	164	3	3	3	3	4	3	4
105			Quarter Se ons Rd (N)	L	8	10	11	10	15	13	15	3	4	3	4	3	3	4
105		All			950	1,04	1,066	1,043	10	99	1,040	4	4	4	4	4	4	4
106	Quarter Sessions Rd	Quarter Sessions Rd (N)	Quarter Se ons Rd (S)	T	133	134	132	135	12	12	129	0	0	0	0	0	0	0
106	Nicholson Ave		Nicholson A e (E)	L	66	32	56	40	69	78	0	0	0	0	0	0	0	0
106		Nicholson Ave (E)	Quarter Se ons Rd (N)	R	47	61	74	64	65	54	65	2	2	3	3	3	3	3
106			Quarter Se ons Rd (S)	L	33	31	34	32	39	40	39	2	1	1	1	1	1	2
106		Quarter Sessions Rd (S)	Nicholson A e (E)	R	27	43	43	47	42	51	42	2	2	2	2	2	2	3
106			Quarter Se													0	0	0
106		All			426	411	448	423	462	438	462	2	2	3	3	3	3	3
107	The Sanctuary	The Sanctuary (N)	Duffy Ave (W)	R	26	26	26	26	26	26	26	5	7	6	7	7	5	6
107	Duffy Ave		Duffy Ave (E)	L	41	44	50	44	50	44	50	2	4	3	4	3	3	3
107		Duffy Ave (E)	The Sanctuary (N)	R	32	34	36	34	37	34	37	5	5	4	5	4	4	3
107			Duffy Ave (W)	T	269	290	284	294	276	265	276	1	1	1	1	1	1	1
107		Duffy Ave (W)	Duffy Ave (E)	T	451	487	474	474	429	419	429	0	0	0	0	0	0	0
107			The Sanctuary (N)	L	6	8	9	8	9	8	9	0	0	0	0	0	0	0
107		All			825	889	878	880	826	796	826	5	7	6	7	7	5	6
108	Kentwell Ave	Duffy Ave (E)	Duffy Ave (W)	T	298	326	320	330	313	298	313	0	0	0	0	0	0	0
108	Duffy Ave		Kentwell Ave (S)	L	1	7	8	7	8	6	8	1	1	1	0	1	0	0
108		Kentwell Ave (S)	Duffy Ave (E)	R	4	21	14	21	10	14	10	5	6	5	5	7	4	6
108			Duffy Ave (W)	L	12	12	12	12	15	17	15	2	2	3	3	3	2	2
108		Duffy Ave (W)	Kentwell Ave (S)	R	3	10	16	13	10	9	10	2	4	3	3	4	2	3
108			Duffy Ave (E)	T	518	562	552	546	513	497	513	0	1	1	1	1	2	1
108		All			836	937	922	930	869	841	869	5	6	5	5	7	4	6
109	Huntingdale Way	Huntingdale Way (N)	Duffy Ave (W)	R	5	6	6	6	6	6	6	2	3	3	2	3	3	3
109	Duffy Ave		Sinclair Ave (S)	T	1	1	0	2	3	2	3	1	0	3	1	3	7	3
109	Sinclair Ave		Duffy Ave (E)	L	27	30	33	29	30	28	30	3	4	5	4	5	4	4
109		Duffy Ave (E)	Huntingdale Way (N)	R	12	11	12	11	15	13	15	4	5	6	6	7	7	7
109			Duffy Ave (W)	T	254	275	271	281	274	261	274	4	6	5	6	7	6	6
109			Sinclair Ave (S)	L	50	47	51	60	63	67	63	4	6	6	7	8	7	7
109		Sinclair Ave (S)	Duffy Ave (E)	R	88	96	101	95	108	108	108	2	3	4	3	5	4	4
109			Huntingdale Way (N)	T	7	7	8	8	6	6	6	1	3	3	2	5	3	3
109			Duffy Ave (W)	L	43	55	52	51	41	37	41	2	3	3	3	3	3	4
109		Duffy Ave (W)	Sinclair Ave (S)	R	8	12	11	16	16	13	16	1	4	4	4	7	7	9
109			Duffy Ave (E)	T	510	565	552	547	507	496	507	3	4	5	4	7	7	7
109			Huntingdale Way (N)	L	4	4	4	4	4	4	4	2	4	4	3	5	15	5
109		All			1,009	1,108	1,101	1,109	1,073	1,041	1,073	4	6	6	7	8	15	9

					Vehicle Counts							Delay (s)						
ID	Intersection	From	To	Turn	2022 Base	2027 Do Min	2032 Do Min	2027 Upgd	2032 Upgd	2027 Opt 2	2032 Opt 2	2022 Base	2027 Do Min	2032 Do Min	2027 Upgd	2032 Upgd	2027 Opt 2	2032 Opt 2
110	Chilvers Rd	Chilvers Rd (N)	Duffy Ave (W)	R	136	141	147	139	116	114	116	69	56	57	80	93	72	76
110	Duffy Ave		The Esplanade (S)	T	426	480	488	483	488	479	488	36	36	36	26	28	25	26
110	The Esplanade		Duffy Ave (E)	L	105	106	112	106	113	107	113	18	20	19	21	22	21	22
110		Duffy Ave (E)	Chilvers Rd (N)	R	87	88	90	96	99	97	99	104	121	130	54	55	55	55
110			Duffy Ave (W)	T	154	165	166	178	186	179	186	118	159	163	54	55	52	55
110			The Esplanade (S)	L	116	103	111	98	108	96	108	105	142	147	37	37	36	37
110		The Esplanade (S)	Duffy Ave (E)	R	134	137	136	132	136	130	136	62	69	69	68	76	65	76
110			Chilvers Rd (N)	T	503	541	546	546	587	542	587	58	57	61	44	51	46	51
110			Duffy Ave (W)	L	29	32	24	36	47	48	47	58	53	58	44	51	45	50
110		Duffy Ave (W)	The Esplanade (S)	R	188	237	221	219	210	206	210	62	76	78	86	89	90	91
110			Duffy Ave (E)	T	222	246	250	242	250	242	250	56	58	55	63	67	66	69
110			Chilvers Rd (N)	L	213	212	219	212	195	186	195	11	13	12	15	17	18	19
110		All			2,313	2,488	2,510	2,487	2,534	2,426	2,534	57	62	64	47	51	47	50
111	Pennant Hills Road	Pennant Hills Road (N)	Duffy Ave (W)	R	152	155	156	164	175	164	175	93	148	259	71	72	71	73
111	Duffy Ave		Pennant Hills Road (S)	T	1,579	1,612	1,639	1,612	1,643	1,612	1,643	6	7	10	6	6	6	6
111		Pennant Hills Road (S)	Pennant Hills Road (N)	T	1,601	1,766	1,770	1,766	1,769	1,766	1,769	17	16	17	16	16	16	16
111			Duffy Ave (W)	L	200	206	209	206	209	206	209	19	21	21	19	19	19	19
111		Duffy Ave (W)	Pennant Hills Road (S)	R	217	238	231	238	236	237	236	45	55	48	58	58	59	57
111			Pennant Hills Road (N)	L	209	220	224	217	228	217	228	36	42	39	39	35	39	35
111		All			3,958	4,196	4,229	4,203	4,260	4,202	4,260	18	21	26	18	18	18	18
112	The Esplanade	The Esplanade (N)	Oakleigh Ave (W)	R	23	17	15	8	6	5	6	10	9	12	6	17	7	13
112	Hall Ave		The Esplanade (S)	T	698	797	799	783	793	768	793	2	2	3	2	3	2	2
112	Oakleigh Ave		Hall Ave (E)	L	8	9	7	9	7	9	7	6	4	5	0	2	2	1
112		Hall Ave (E)	The Esplanade (N)	R	6	8	8	8	8	8	8	16	40	57	20	44	24	43
112			Oakleigh Ave (W)	T	1	3	2	3	2	3	2	15	13	29	22	37	23	17
112			The Esplanade (S)	L	9	9	10	9	10	9	10	4	8	11	7	10	7	12
112		The Esplanade (S)	Hall Ave (E)	R	7	7	6	7	7	7	7	27	19	41	12	16	9	29
112			The Esplanade (N)	T	660	697	700	696	761	709	761	13	19	31	4	22	5	23
112			Oakleigh Ave (W)	L	91	107	102	103	93	89	93	10	16	29	3	19	4	20
112		Oakleigh Ave (W)	The Esplanade (S)	R	35	40	39	47	58	52	58	17	52	49	28	75	29	54
112			Hall Ave (E)	T	0	2	1	2	1	2	1	0	36	37	22	36	30	26
112			The Esplanade (N)	L	1	6	6	5	4	5	4	0	47	64	22	85	18	62
112		All			1,539	1,701	1,695	1,679	1,749	1,665	1,749	27	52	64	28	85	30	62
113	The Esplanade	The Esplanade (N)	Goodlands Ave (W)	R	6	10	9	10	6	7	6	10	27	33	14	42	12	21
113	Goodlands Ave		The Esplanade (S)	T	737	841	838	829	853	822	853	4	6	6	6	7	8	8
113		The Esplanade (S)	The Esplanade (N)	T	759	810	805	804	860	804	860	8	17	44	2	23	2	25
113			Goodlands Ave (W)	L	60	66	81	67	81	67	81	9	19	39	2	26	3	24
113		Goodlands Ave (W)	The Esplanade (S)	R	100	57	91	69	86	76	86	32	35	90	25	106	31	59
113			The Esplanade (N)	L	0	2	3	2	2	1	2	0	21	57	11	108	9	38
113		All			1,662	1,785	1,827	1,781	1,888	1,778	1,888	32	35	90	25	108	31	59
114	Chilvers Rd	Sefton Rd (E)	Sefton Rd (														52	50	50
114	Sefton Rd		Chilvers Rd (S)	L	573	608	614	608	599	594	599	1	8	8	8	8	7	7
114		Chilvers Rd (S)	Sefton Rd (	R	711	742	751	749	774	727	774	5	25	26	40	39	40	39
114			Sefton Rd (	L	98	102	105	103	97	104	5	15	14	20	21	21	23	
114		Sefton Rd (W)	Chilvers Rd (S)	R	105	127	127	127	11	11	17	53	54	52	54	52	52	
114			Sefton Rd (	T	59	57	60	57	75	78	11	30	29	30	29	30	30	
114		All				1,72	1,754	1,772	1,772	17	22	22	29	29	28	29		
115	Larool Cres	Larool Cres (N)	Sefton Rd (	R	28	-	-	-	-	-	-	14	-	-	-	-	-	-
115	Sefton Rd		Sefton Rd (	L	38	36	37	36	37	36	37	6	8	10	10	10	9	10
115		Sefton Rd (E)	Larool Cres (N)	R	32	-	-	-	-	-	-	10	-	-	-	-	-	-
115			Sefton Rd (W)	T	598	693	702	693	699	692	699	6	12	12	12	11	13	13
115		Sefton Rd (W)	Sefton Rd (E)	T	745	775	790	782	829	779	829	0	1	1	1	1	1	1
115			Larool Cres (N)	L	26	23	21	23	23	23	23	0	0	0	0	0	0	0
115		All			1,467	1,527	1,550	1,534	1,587	1,531	1,587	14	12	12	12	11	13	13
116	Kooringal Ave	Kooringal Ave (N)	Sefton Rd (W)	R	1	0	1	0	10	9	10	0	2	2	2	2	1	2
116	Sefton Rd		Sefton Rd (E)	L	69	97	101	97	92	88	92	1	1	1	1	1	1	1
116		Sefton Rd (E)	Kooringal Ave (N)	R	26	59	60	60	60	59	60	1	2	1	2	1	2	1
116			Sefton Rd (W)	T	52	54	57	54	66	62	66	1	1	1	1	1	1	1
116		Sefton Rd (W)	Sefton Rd (E)	T	74	67	72	67	80	79	80	1	1	1	1	1	1	1
116			Kooringal Ave (N)	L	0	0	0	0	0	0	0	0	0	0	0	0	0	0
116		All			148	277	291	278	308	297	308	1	2	2	2	2	2	2
153	Quarter Sessions Rd	Quarter Sessions Rd (N)	Quarter Sessions Rd (S)	T	-	-	-	NA	192	185	192	-	-	-	-	-	1	1
153	Sefton Rd		Sefton Rd (E)	L	-	-	-	NA	18	20	18	-	-	-	-	-	0	1
153		Sefton Rd (E)	Quarter Sessions Rd (N)	R	-	-	-	NA	15	14	15	-	-	-	-	-	1	1
153			Quarter Sessions Rd (S)	L	-	-	-	NA	18	16	18	-	-	-	-	-	1	1
153		Quarter Sessions Rd (S)	Sefton Rd (E)	R	-	-	-	NA	8	6	8	-	-	-	-	-	1	1
153			Quarter Sessions Rd (N)	T	-	-	-	NA	141	119	141	-	-	-	-	-	1	1
153		All			-	-	-	0	392	360	392	-	-	-	-	-	1	1

P5524 Westleigh Park Traffic Impact and Access Study

VISSIM Data Analysis - Intersection Count Comparison

PM Peak 1700-1800

					Vehicle Counts											Delay (s)										
ID	Intersection	From	To	Turn	2022 Base	2027 Do Min	2032 Do Min	2027 Upgd	2027 Opt 1	2027 Opt 2	2027 Opt 3	2032 Upgd	2032 Opt 1	2032 Opt 2	2032 Opt 3	2022 Base	2027 Do Min	2032 Do Min	2027 Upgd	2027 Opt 1	2027 Opt 2	2027 Opt 3	2032 Upgd	2032 Opt 1	2032 Opt 2	2032 Opt 3
101	Quarter Sessions Rd	Quarter Sessions Rd (N	Corang Rd (W)	R	6	7	6	7	7	7	7	6	6	6	6	1	3	2	2	3	5	4	2	3	3	5
101	Corang Rd		Quarter Sessions Rd (S)	T	98	112	109	112	139	121	121	109	197	137	137	0	0	0	0	0	2	2	0	0	2	2
101		Quarter Sessions Rd (S)	Quarter Sessions Rd (N)	T	162	190	184	193	224	213	213	185	271	209	208	0	0	0	0	0	0	0	0	0	0	0
101			Corang Rd (W)	L	29	39	39	39	39	38	39	39	38	38	38	0	1	1	1	1	0	0	1	1	0	0
101		Corang Rd (W)	Quarter Sessions Rd (S)	R	4	9	11	9	9	8	8	11	11	11	11	4	3	2	4	4	5	6	2	3	3	3
101			Quarter Sessions Rd (N)	L	16	16	16	16	16	16	16	16	16	16	16	3	4	4	4	5	5	5	4	5	4	4
101		All			315	371	365	374	432	403	404	366	540	418	417	4	4	4	4	5	5	6	4	5	4	5
102	Quarter Sessions Rd	Quarter Sessions Rd (N	Quarter Sessions Rd (S)	T	120	138	140	138	165	152	155	140	228	183	191	0	0	0	0	0	0	0	0	0	0	0
102	Gum Blossom Dr		Gum Blossom Dr (E)	L	0	0	0	0	0	1	0	0	0	2	0	0	0	0	0	0	1	0	0	0	0	0
102		Gum Blossom Dr (E)	Quarter Sessions Rd (N)	R	0	1	1	1	1	1	1	1	1	1	1	0	3	3	4	3	2	2	2	5	5	6
102			Quarter Sessions Rd (S)	L	5	8	9	8	8	8	8	9	9	9	9	0	1	0	1	1	1	2	0	1	1	1
102		Quarter Sessions Rd (S)	Gum Blossom Dr (E)	R	10	11	11	11	11	10	11	11	12	12	14	1	1	1	1	1	1	1	1	1	1	1
102			Quarter Sessions Rd (N)	T	213	250	247	253	285	228	277	248	333	252	295	0	0	0	0	0	0	0	0	0	0	0
102		All			348	408	407	411	470	400	452	409	583	458	509	1	3	3	4	3	2	2	2	5	5	6
103	Quarter Sessions Rd	Quarter Sessions Rd (N	Coral Health Ave (W)	R	11	11	12	11	11	12	11	12	12	13	12	2	2	3	2	3	2	1	2	2	2	3
103	Coral Health Ave		Quarter Sessions Rd (S)	T	114	135	137	135	163	147	152	137	225	178	188	0	0	0	0	0	0	0	0	0	0	0
103		Quarter Sessions Rd (S)	Quarter Sessions Rd (N)	T	214	250	248	253	285	226	277	248	336	252	299	0	0	0	0	0	0	0	0	0	0	0
103			Coral Health Ave (W)	L	27	31	32	31	31	30	31	32	32	31	32	0	0	0	0	0	0	0	0	0	0	0
103		Coral Health Ave (W)	Quarter Sessions Rd (S)	R	22	24	25	24	24	24	24	25	25	25	25	3	2	2	3	3	2	3	2	4	2	3
103			Quarter Sessions Rd (N)	L	11	11	10	11	11	11	11	10	10	11	10	1	1	1	2	1	1	1	1	2	1	1
103		All			399	461	464	464	523	449	504	464	640	510	566	3	2	3	3	3	2	3	2	4	2	3
104	Quarter Sessions Rd	Quarter Sessions Rd (N	Quarter Sessions Rd (S)	T	136	158	162	158	186	169	175	162	249	202	213	0	0	0	0	0	0	0	0	0	0	0
104	Bottle Brush Rd		Bottle Brush Rd (E)	L	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
104		Bottle Brush Rd (E)	Quarter Sessions Rd (N)	R	0	1	1	1	1	1	1	1	1	1	1	0	7	2	3	3	1	4	3	7	3	5
104			Quarter Sessions Rd (S)	L	11	13	14	13	13	13	13	14	14	14	14	0	1	1	1	1	1	1	1	2	1	1
104		Quarter Sessions Rd (S)	Bottle Brush Rd (E)	R	6	12	14	12	12	12	12	14	12	10	11	0	1	1	1	1	1	1	1	2	1	1
104			Quarter Sessions Rd (N)	T	242	280	279	282	314	255	307	279	366	282	330	0	0	0	0	0	0	0	0	0	0	0
104		All			395	464	470	467	525	450	508	470	643	511	568	0	7	2	3	3	1	4	3	7	3	5
105	Quarter Sessions Rd	Quarter Sessions Rd (N	Duffy Ave (W)	R	16	16	16	16	16	22	16	16	16	22	16	1	2	2	2	2	2	2	2	3	2	2
105	Duffy Ave		Quarter Sessions Rd (S)	T	11	36	34	38	40	30	30	32	43	37	38	2	2	2	2	2	2	2	2	2	2	2
105			Duffy Ave (E)	L	121	119	127	117	143	131	143	129	206	159	173	2	2	2	2	2	2	2	2	2	2	2
105		Duffy Ave (E)	Quarter Sessions Rd (N)	R	202	247	249	256	275	231	283	254	335	251	298	3	3	4	4	4	3	3	4	4	3	4
105			Duffy Ave (W)	T	218	223	224	227	227	216	221	227	227	218	223	3	3	4	3	3	3	3	4	4	4	4
105			Quarter Sessions Rd (S)	L	20	21	18	23	22	19	19	19	18	14	15	2	4	4	3	3	3	3	4	5	4	5
105		Quarter Sessions Rd (S)	Duffy Ave (E)	R	20	27	26	27	24	20	23	27	24	25	20	2	2	4	3	3	3	4	4	5	4	4
105			Quarter Sessions Rd (N)	T	35	32	30	26	37	20	23	27	31	26	30	3	4	3	3	4	4	4	4	5	4	5
105			Duffy Ave (W)	L	21	28	34	26	25	31	31	33	32	36	39	2	4	4	5	4	3	5	5	5	4	6
105		Duffy Ave (W)	Quarter Sessions Rd (S)	R	36	41	42	42	43	41	41	39	42	40	43	2	4	4	4	4	3	4	4	4	4	4
105			Duffy Ave (E)	T	185	183	189	182	181	180	183	192	188	188	188	3	4	4	4	4	3	4	4	5	4	4
105			Quarter Sessions Rd (N)	L	12	12	12	12	12	15	12	12	12	15	12	3	4	4	4	4	3	4	5	5	4	5
105		All			897	985	1,002	991	1,047	956	1,024	1,005	1,176	1,031	1,096	3	4	4	5	4	4	5	5	5	4	6
106	Quarter Sessions Rd	Quarter Sessions Rd (N	Quarter Sessions Rd (S)	T	40	42	39	43	43	40	40	39	39	35	35	0	0	0	0	0	0	0	0	0	0	0
106	Nicholson Ave		Nicholson Ave (E)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0	0	0	0	1	0	0	0
106		Nicholson Ave (E)	Quarter Sessions Rd (N)	R	52	59	62	49	59	47	51	57	60	58	65	1	2	[illegible]	2	2	2	2	2	2	2	2
106			Quarter Sessions Rd (S)	L	26	22	24	21	21	23	24	23	24	27	28	2	2	[illegible]	2	1	1	1	1	1	1	1
106		Quarter Sessions Rd (S)	Nicholson Ave (E)	R	20	[illegible]	17	[illegible]	[illegible]	23	[illegible]	16	[illegible]	[illegible]	[illegible]	0	1	[illegible]	2	2	1	2	2	2	2	2
106			Quarter Sessions Rd (N)	T	24	30	[illegible]	[illegible]	28	23	[illegible]	30	28	29	[illegible]	0	0	[illegible]	0	0	0	0	0	0	0	0
106		All			189	226	[illegible]	[illegible]	[illegible]	207	[illegible]	[illegible]	[illegible]	222	[illegible]	2	2	[illegible]	2	2	2	2	2	2	2	2
107	The Sanctuary	The Sanctuary (N)	Duffy Ave (W)	R	15	15	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	13	13	13	[illegible]	8	6	[illegible]	6	7	5	6	6	12	7	7
107	Duffy Ave		Duffy Ave (E)	L	16	[illegible]	[illegible]	[illegible]	18	[illegible]	19	[illegible]	23	23	[illegible]	2	2	[illegible]	2	2	2	2	2	3	2	2
107		Duffy Ave (E)	The Sanctuary (N)	R	33	38	38	38	38	38	38	37	37	37	38	2	2	[illegible]	3	3	2	3	3	4	3	3
107			Duffy Ave (W)	T	424	472	474	488	509	452	506	483	563	470	520	0	1	[illegible]	1	1	1	1	1	1	1	1
107		Duffy Ave (W)	Duffy Ave (E)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0	0	0	0	0	0	0	0
107			The Sanctuary (N)	L	9	9	9	9	9	9	9	9	9	9	9	1	0	1	0	0	0	0	0	0	0	0
107		All			816	873	890	885	928	854	927	904	1,055	916	976	8	6	7	6	7	5	6	6	12	7	7
108	Kentwell Ave	Duffy Ave (E)	Duffy Ave (W)	T	470	496	498	508	529	496	549	510	584	513	562	0	0	0	0	0	0	0	0	0	0	0
108	Duffy Ave		Kentwell Ave (S)	L	24	11	12	10	10	14	14	14	12	13	12	1	0	0	1	1	1	1	0	0	1	0
108		Kentwell Ave (S)	Duffy Ave (E)	R	5	15	23	14	15	16	16	15	17	14	14	2	5	5	5	5	6	6	5	8	6	8
108			Duffy Ave (W)	L	4	32	34	37	37	13	13	30	35	13	15	1	3	3	4	3	2	3	4	4	2	4
108		Duffy Ave (W)	Kentwell Ave (S)	R	2	4	6	4	3	3	5	4	10	6	8	3	6	7	6	4	3	5	5	7	7	9
108			Duffy Ave (E)	T	344	344	362	341	365	347	364	368	433	391	400	0	0	0	0	0	0	0	0	1	0	0
108		All			849	903	934	915	958	888	961	941	1,092	950	1,012	3	6	7	6	5	6	6	5	8	7	9
109	Huntingdale Way	Huntingdale Way (N)	Duffy Ave (W)	R	7	8	7	8	8	8	8	7	7	8	7	2	2	2	2	1	1	2	2	2	2	3
109	Duffy Ave		Sinclair Ave (S)	T	3	2	2	2	2	2	2	2	2	2	2	2	1	3	1	1	2	1	3	3	1	2
109	Sinclair Ave		Duffy Ave (E)	L	5	11	12	10	10	10	10	12	11	11	11	0	3	2	3	2	3	3	2	2	2	2
109		Duffy Ave (E)	Huntingdale Way (N)	R	19	17	18	18	19	19	19	18	17	19	19	4	5	5	5	5	4	5	5	6	6	6
109			Duffy Ave (W)	T	460	465	467	482	499	464	519	479	543	476	522	4	5	5	5	6	5	5	6	7	6	6
109			Sinclair Ave (S)	L	51	84	87	94	92	78	77	85	86	83	82	5	5	5	5	5	6	6	6	7	6	7
109		Sinclair Ave (S)	Duffy Ave (E)	R	46	70	74	69	71	63	63	74	75	58	64	4	4	4	4	4	4	4	4	4	4	4
109			Huntingdale Way (N)	T	4	3	3	3	2	2	2	3	4	2	2	1	4	5	4	3	4	4	4	8	5	8
109			Duffy Ave (W)	L	30	37	38	30	34	40	39	40	48	45	47	3	3	3	3	4	4	5	3	5	4	4
109		Duffy Ave (W)	Sinclair Ave (S)	R	9	7	6	7	7	11	12	6	6	12	10	2	2	4	2	3	3	3	4	5	4	3
109			Duffy Ave (E)	T	335	346	373	342	366	346	363	371	440	388	398	2	3	3	3	3	3	3	3	4	3	4
109			Huntingdale Way (N)	L	4	5	5	5	5	5	5	5	5	5	5	2	4	2	4	4	2	3	3	4	2	2
109		All			973	1,055	1,091	1,071	1,116	1,048	1,118	1,102	1,245	1,109	1,170	5	4	5	4	4	4	5	4	8	5	8

ATTACHMENT 4 - ITEM 5

					Vehicle Counts										Delay (s)									
ID	Intersection	From	To	Turn	2022 Base	2027 Do Min	2032 Do Min	2027 Upgd	2027 Opt 1	2027 Opt 2	2027 Opt 3	2032 Upgd	2032 Opt 1	2032 Opt 2	2032 Opt 3	2022 Base	2027 Do Min	2032 Do Min	2027 Upgd	2027 Opt 1	2027 Opt 2	2027 Opt 3	2032 Upgd	2032 Opt 1	2032 Opt 2	2032 Opt 3
110	Chilvers Rd	Chilvers Rd (N)	Duffy Ave (W)	R	172	183	183	185	196	137	193	185	212	138	190	90	72	77	81	92	60	87	83	157	61	89
110	Duffy Ave		The Esplanade (S)	T	550	568	588	567	570	563	567	587	592	587	590	27	28	29	28	28	28	28	28	30	28	28
110	The Esplanade		Duffy Ave (E)	L	71	82	86	82	82	82	82	86	86	85	86	19	24	23	23	24	24	25	23	25	24	25
110		Duffy Ave (E)	Chilvers Rd (N)	R	96	92	94	95	95	95	95	96	95	97	97	93	87	93	57	57	55	56	55	57	56	57
110			Duffy Ave (W)	T	220	240	247	247	255	253	253	253	274	273	272	88	90	93	48	49	48	48	47	49	49	48
110			The Esplanade (S)	L	104	126	122	127	126	127	127	123	123	122	122	84	78	84	30	31	31	31	30	31	31	32
110		The Esplanade (S)	Duffy Ave (E)	R	53	62	63	62	62	63	62	62	62	63	63	69	73	70	71	69	68	66	67	65	66	70
110			Chilvers Rd (N)	T	298	352	365	350	350	349	347	364	362	364	364	49	49	53	49	48	49	51	50	54	54	58
110			Duffy Ave (W)	L	141	147	146	166	162	172	173	146	164	172	165	41	47	47	47	43	45	47	45	49	49	53
110		Duffy Ave (W)	The Esplanade (S)	R	114	134	152	131	142	140	140	150	171	150	149	65	60	68	63	68	67	68	69	90	84	78
110			Duffy Ave (E)	T	136	150	162	150	153	154	154	163	177	176	177	37	38	41	40	39	40	40	41	43	41	41
110			Chilvers Rd (N)	L	133	141	144	141	151	127	142	144	175	128	145	6	6	5	5	6	6	6	5	7	5	6
110		All			2,088	2,278	2,351	2,301	2,344	2,261	2,334	2,357	2,494	2,355	2,420	51	50	53	43	44	41	44	43	53	43	46
111	Pennant Hills Road	Pennant Hills Road (N)	Duffy Ave (W)	R	161	199	192	200	203	203	203	195	205	205	205	63	85	79	83	78	83	82	68	70	77	76
111	Duffy Ave		Pennant Hills Road (S)	T	1,727	1,893	1,934	1,893	1,893	1,893	1,893	1,934	1,933	1,934	1,934	5	5	5	5	5	6	6	5	5	5	5
111		Pennant Hills Road (S)	Pennant Hills Road (N)	T	1,696	1,878	1,879	1,880	1,879	1,878	1,878	1,879	1,879	1,879	1,878	16	17	17	17	17	17	17	17	17	17	17
111			Duffy Ave (W)	L	252	249	258	250	253	252	252	258	269	268	268	19	20	21	19	20	20	20	20	21	20	20
111		Duffy Ave (W)	Pennant Hills Road (S)	R	145	162	171	161	163	164	164	172	179	178	178	59	61	57	60	60	58	60	58	60	57	60
111			Pennant Hills Road (N)	L	113	124	129	123	125	126	126	130	137	137	137	38	37	36	37	37	36	38	36	36	36	36
111		All			4,094	4,505	4,583	4,507	4,516	4,516	4,516	4,568	4,602	4,601	4,601	15	17	17	17	17	17	17	16	17	17	17
112	The Esplanade	The Esplanade (N)	Oakleigh Ave (W)	R	4	6	6	4	4	3	4	3	5	2	4	8	8	6	7	7	3	4	7	8	7	7
112	Hall Ave		The Esplanade (S)	T	755	815	849	813	827	816	818	849	878	846	847	2	3	4	3	3	2	3	4	6	3	3
112	Oakleigh Ave		Hall Ave (E)	L	10	11	11	11	11	11	11	11	11	11	11	1	1	1	1	2	1	2	1	3	1	1
112		Hall Ave (E)	The Esplanade (N)	R	2	5	6	5	5	5	6	6	6	6	6	8	11	19	14	12	11	17	13	18	11	12
112			Oakleigh Ave (W)	T	2	5	5	5	5	5	5	5	5	5	5	8	14	12	11	14	17	19	12	19	18	15
112			The Esplanade (S)	L	7	6	6	6	6	6	6	6	6	6	6	6	7	9	7	8	6	7	8	12	8	8
112		The Esplanade (S)	Hall Ave (E)	R	5	6	6	6	6	6	6	6	6	6	6	15	9	8	6	9	8	8	11	13	10	12
112			The Esplanade (N)	T	491	555	569	575	572	580	580	568	588	595	588	1	1	2	1	1	2	2	2	3	3	4
112			Oakleigh Ave (W)	L	72	80	82	72	69	90	89	86	94	106	111	1	1	1	2	2	2	2	1	3	3	3
112		Oakleigh Ave (W)	The Esplanade (S)	R	31	19	16	19	19	14	17	18	23	20	21	17	23	21	19	23	17	23	22	30	25	24
112			Hall Ave (E)	T	4	3	3	3	3	3	3	3	3	3	3	4	15	12	18	19	16	16	19	15	19	14
112			The Esplanade (N)	L	1	1	1	1	1	0	0	1	1	1	0	2	9	6	8	4	3	14	6	11	18	8
112		All			1,384	1,510	1,561	1,519	1,529	1,538	1,545	1,561	1,625	1,607	1,606	17	23	21	19	23	17	23	22	30	25	24
113	The Esplanade	The Esplanade (N)	Goodlands Ave (W)	R	24	17	19	17	19	12	16	18	23	10	16	15	16	17	15	16	14	15	16	16	17	14
113	Goodlands Ave		The Esplanade (S)	T	771	831	859	828	841	826	829	861	890	863	857	6	9	10	9	9	8	8	10	10	8	8
113		The Esplanade (S)	The Esplanade (N)	T	569	638	655	650	646	675	675	659	687	706	704	1	1	1	1	1	1	1	2	2	2	1
113			Goodlands Ave (W)	L	76	96	97	83	99	69	69	93	95	75	78	1	1	1	1	1	1	1	2	2	2	2
113		Goodlands Ave (W)	The Esplanade (S)	R	38	46	38	50	51	60	58	38	51	66	71	8	19	18	21	21	21	21	18	23	24	26
113			The Esplanade (N)	L	0	2	2	2	2	2	2	2	2	1	1	0	4	3	2	4	6	4	5	5	6	8
113		All			1,478	1,630	1,670	1,630	1,657	1,643	1,648	1,672	1,749	1,722	1,727	15	19	18	21	21	21	21	18	23	24	26
114	Chilvers Rd	Sefton Rd (E)	Sefton Rd (W)	T	49	77	79	77	76	144	94	79	80	160	115	8	47	47	47	46	38	44	47	45	36	41
114	Sefton Rd		Chilvers Rd (S)	L	759	758	771	758	772	715	766	771	807	727	774	0	7	7	7	7	6	7	7	7	6	7
114		Chilvers Rd (S)	Sefton Rd (E)	R	446	482	496	485	494	481	483	496	528	492	497	3	25	26	25	26	26	26	26	27	26	27
114			Sefton Rd (W)	L	83	104	111	104	104	91	103	111	110	101	113	2	16	16	15	16	16	16	16	17	17	17
114		Sefton Rd (W)	Chilvers Rd (S)	R	41	81	92	81	81	71	82	92	92	90	96	5	51	51	51	51	52	51	52	52	50	51
114			Sefton Rd (E)																	23	23	26	24	27	27	26	27
114		All			1,429	1,553	1,601	1,556	1,578	1,566	1,590	1,602	1,670	1,660	1,680	8	18			18	18	19	18	19	19	19
115	Larool Cres	Larool Cres (N)	Sefton Rd (W)	R	11	-	-	-	-	-	-	-	-	-	-	11	-			-	-	-	-	-	-	-
115	Sefton Rd		Sefton Rd (E)	L	17	-	18	-	-	18	-	18	-	-	-	2	3			4	3	3	4	5	5	5	5
115		Sefton Rd (E)	Larool Cres (N)	R	26	-	-	-	-	-	-	-	-	-	-	4	-			-	-	-	-	-	-	-	-
115			Sefton Rd (W)	T	798	833	84			859	86	845		887	898	4	9		9	10	11	10	11	12	15	12
115		Sefton Rd (W)	Sefton Rd (E)	T	457	493	5	3	5	5	503	505	541	541	542	0	0		0	0	0	0	0	0	0	0
115			Larool Cres (N)	L	40	-	40	-	41	-	41	-	40	40	40	0	0		0	0	0	0	0	0	0	0
115		All			1,351	1,384	1,416	1,386	1,409	1,422	1,423	1,416	1,486	1,487	1,488	11	9		9	10	11	10	11	12	15	12
116	Kooringal Ave	Kooringal Ave (N)	Sefton Rd (W)	R	1	1	1	1	1	10	1	1	1	10	1	1	1		1	1	1	1	2	3	2	4
116	Sefton Rd		Sefton Rd (E)																1	1	1	1	1	1	2	1
116		Sefton Rd (E)	Kooringal Ave (N)	R	43	93	97	93	93	89	93	97	97	92	97	1	1	1	1	1	1	1	1	2	1
116			Sefton Rd (W)	T	60	58	59	59	58	119	75	59	59	138	98	1	1	1	1	1	2	1	1	1	2	2
116		Sefton Rd (W)	Sefton Rd (E)	T	14	18	22	18	18	32	29	22	22	65	59	1	1	1	1	1	1	1	1	1	2	1
116			Kooringal Ave (N)	L	0	1	0	1	1	5	1	0	0	5	0	0	1	1	2	2	1	2	1	1	2	1
116		All			154	257	271	258	257	332	285	271	340	461	416	1	1	2	2	2	2	2	2	3	2	4
157	Quarter Sessions Rd	Quarter Sessions Rd (N	Quarter Sessions Rd (S)	T	-	-	-	-	-	118	130	-	-	132	148	-	-	-	-	-	1	1	-	-	1	1
157	Sefton Rd		Sefton Rd (E)	L	-	-	-	-	-	11	0	-	-	16	0	-	-	-	-	-	1	0	-	-	1	0
157		Sefton Rd (E)	Quarter Sessions Rd (N	R	-	-	-	-	-	53	4	-	-	42	0	-	-	-	-	-	2	1	-	-	2	0
157			Quarter Sessions Rd (S)	L	-	-	-	-	-	21	8	-	-	39	24	-	-	-	-	-	1	1	-	-	1	1
157		Quarter Sessions Rd (S	Sefton Rd (E)	R	-	-	-	-	-	13	7	-	-	28	23	-	-	-	-	-	2	1	-	-	2	2
157			Quarter Sessions Rd (N	T	-	-	-	-	-	199	247	-	-	205	247	-	-	-	-	-	2	1	-	-	2	1
157		All			-	-	-	-	-	415	396	-	-	463	442	-	-	-	-	-	2	1	-	-	2	2

ATTACHMENT 4 - ITEM 5

P5524 Westleigh Park Traffic Impact and Access Study

VISSIM Data Analysis - Intersection Count Comparison

Weekend Peak 1100-1200

					Vehicle Counts											Delay (s)										
ID	Intersection	From	To	Turn	2022 Base	2027 Do Min	2032 Do Min	2027 Upgd	2027 Opt 1	2027 Opt 2	2027 Opt 3	2032 Upgd	2032 Opt 1	2032 Opt 2	2032 Opt 3	2022 Base	2027 Do Min	2032 Do Min	2027 Upgd	2027 Opt 1	2027 Opt 2	2027 Opt 3	2032 Upgd	2032 Opt 1	2032 Opt 2	2032 Opt 3
101	Quarter Sessions Rd	Quarter Sessions Rd (N	Corang Rd (W)	R	2	2	2	2	2	2	2	2	2	2	2	1	3	1	1	2	2	2	2	2	1	1
101	Corang Rd		Quarter Sessions Rd (S)	T	140	154	150	154	214	173	173	150	329	207	207	0	0	0	0	0	2	2	0	0	2	2
101		Quarter Sessions Rd (S)	Quarter Sessions Rd (N)	T	123	146	136	146	205	162	162	136	301	186	187	0	0	0	0	0	0	0	0	0	0	0
101			Corang Rd (W)	L	20	23	23	23	23	23	24	24	23	24	23	1	0	0	0	0	0	0	0	0	0	0
101		Corang Rd (W)	Quarter Sessions Rd (S)	R	2	6	9	6	6	6	6	9	9	9	9	1	3	2	3	3	3	3	2	4	2	3
101			Quarter Sessions Rd (N)	L	11	11	10	11	11	11	11	10	10	10	10	2	2	3	2	3	2	2	2	4	3	3
101		All			298	341	329	341	460	377	377	329	673	437	437	2	3	3	3	3	3	3	2	4	3	3
102	Quarter Sessions Rd	Quarter Sessions Rd (N	Quarter Sessions Rd (S)	T	168	186	185	186	245	204	218	185	363	272	286	0	0	0	0	0	0	0	0	0	0	0
102	Gum Blossom Dr		Gum Blossom Dr (E)	L	0	0	0	0	0	3	0	0	0	3	0	0	0	1	0	1	1	1	1	1	0	1
102		Gum Blossom Dr (E)	Quarter Sessions Rd (N)	R	0	1	1	1	1	2	1	1	1	2	1	0	2	3	2	3	2	4	0	2	4	3
102			Quarter Sessions Rd (S)	L	6	7	8	7	7	6	7	8	8	7	8	0	1	1	1	1	1	2	1	2	2	2
102		Quarter Sessions Rd (S)	Gum Blossom Dr (E)	R	9	13	12	13	12	11	14	12	10	10	13	3	1	1	1	1	1	1	2	2	2	3
102			Quarter Sessions Rd (N)	T	166	193	184	193	252	197	226	185	348	258	286	0	0	0	0	0	0	0	0	0	0	0
102		All			349	400	389	400	517	423	466	390	730	552	594	3	2	3	2	3	2	4	2	2	4	3
103	Quarter Sessions Rd	Quarter Sessions Rd (N	Coral Health Ave (W)	R	30	28	28	28	28	29	28	28	28	29	28	1	2	2	1	2	2	2	2	4	3	3
103	Coral Health Ave		Quarter Sessions Rd (S)	T	144	164	165	165	224	181	196	165	342	250	266	0	0	0	0	0	0	0	0	1	0	0
103		Quarter Sessions Rd (S)	Quarter Sessions Rd (N)	T	148	179	169	179	238	180	212	169	331	240	271	0	0	0	0	0	0	0	0	0	0	0
103			Coral Health Ave (W)	L	30	32	34	32	32	31	32	34	33	33	34	0	0	0	0	0	0	0	0	0	0	0
103		Coral Health Ave (W)	Quarter Sessions Rd (S)	R	26	30	32	30	30	29	30	32	32	30	32	2	2	2	2	4	2	3	2	6	4	4
103			Quarter Sessions Rd (N)	L	28	28	28	28	28	29	28	28	28	29	28	1	1	1	1	1	1	1	1	2	1	1
103		All			406	461	455	462	580	479	527	456	794	611	659	2	2	2	2	4	2	3	2	6	4	4
104	Quarter Sessions Rd	Quarter Sessions Rd (N	Quarter Sessions Rd (S)	T	170	194	196	194	253	209	226	196	374	280	297	0	0	0	0	0	0	0	0	0	0	0
104	Bottle Brush Rd		Bottle Brush Rd (E)	L	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
104		Bottle Brush Rd (E)	Quarter Sessions Rd (N)	R	0	1	1	1	1	1	1	1	1	1	1	0	1	4	1	3	7	8	4	6	3	4
104			Quarter Sessions Rd (S)	L	11	11	11	11	11	10	11	11	11	10	11	1	1	1	1	2	1	1	1	1	1	1
104		Quarter Sessions Rd (S)	Bottle Brush Rd (E)	R	12	11	13	11	12	10	11	13	13	12	12	1	1	1	1	2	1	2	2	3	2	3
104			Quarter Sessions Rd (N)	T	179	210	202	210	269	210	243	202	364	272	305	0	0	0	0	0	0	0	0	0	0	0
104		All			372	427	422	427	545	442	492	423	762	575	626	1	1	4	1	3	7	8	4	6	3	4
105	Quarter Sessions Rd	Quarter Sessions Rd (N	Duffy Ave (W)	R	8	10	10	10	10	31	10	10	10	34	10	3	2	2	3	3	2	2	2	4	3	3
105	Duffy Ave		Quarter Sessions Rd (S)	T	18	19	26	21	25	26	29	24	40	55	58	2	3	3	3	3	2	2	2	3	3	3
105			Duffy Ave (E)	L	155	176	170	173	229	161	198	172	332	201	239	2	2	2	2	3	2	3	2	3	3	3
105		Duffy Ave (E)	Quarter Sessions Rd (N)	R	165	180	177	181	232	182	219	178	318	237	276	3	3	3	3	3	3	3	3	4	4	4
105			Duffy Ave (W)	T	219	197	195	195	196	190	202	196	182	190	203	3	3	3	3	3	3	3	3	4	4	4
105			Quarter Sessions Rd (S)	L	10	7	9	8	7	10	10	8	6	12	12	3	3	3	3	3	3	3	3	4	5	5
105		Quarter Sessions Rd (S)	Duffy Ave (E)	R	33	24	23	24	23	30	28	23	22	25	26	2	2	3	2	3	3	2	3	6	4	5
105			Quarter Sessions Rd (N)	T	19	31	29	30	38	24	26	28	50	34	32	3	3	3	3	3	3	3	3	5	4	4
105			Duffy Ave (W)	L	17	45	53	47	46	30	39	52	55	33	43	3	3	3	3	4	3	3	3	4	5	4
105		Duffy Ave (W)	Quarter Sessions Rd (S)	R	31	21	27	25	26	26	28	30	30	46	46	3	3	3	3	4	3	4	4	4	4	4
105			Duffy Ave (E)	T	225	243	242	239	238	233	236	240	239	219	223	3	3	3	3	3	3	3	3	5	4	4
105			Quarter Sessions Rd (N)	L	9	11	10	11	11	15	11	10	10	14	10	2	3	3	3	3	3	3	3	5	3	3
105		All			909	963	971	964	1,080	959	1,035	971	1,295	1,100	1,179	3	3	3	3	4	3	4	4	6	5	5
106	Quarter Sessions Rd	Quarter Sessions Rd (N	Quarter Sessions Rd (S)	T	15	13	15	14	13	16	16	15	12	18	18	0	0	0	0	0	0	0	0	0	0	0
106	Nicholson Ave		Nicholson Ave (E)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0	0	0	0	0	1	1	1
106		Nicholson Ave (E)	Quarter Sessions R[illegible] (N)	R	33	73	79	75	80	51	62	78	101	64	72	1	1	[illegible]	1	1	1	1	1	2	2	1
106			Quarter Sessions R[illegible] (S)	L	10	13	13	12	13	9	10	13	14	9	10	1	1	[illegible]	1	1	1	1	1	1	1	1
106		Quarter Sessions Rd (S)	Nicholson Ave (E)	R	11	[illegible]	19	[illegible]	[illegible]	12	[illegible]	19	[illegible]	[illegible]	[illegible]	2	1	[illegible]	1	1	1	1	1	2	1	2
106			Quarter Sessions R[illegible] (N)	T	36	27	[illegible]	[illegible]	26	32	[illegible]	26	25	27	[illegible]	0	0	[illegible]	0	0	0	0	0	0	0	0
106		All			149	177	[illegible]	[illegible]	[illegible]	167	[illegible]	[illegible]	[illegible]	230	[illegible]	2	1	[illegible]	1	1	1	1	1	2	2	2
107	The Sanctuary	The Sanctuary (N)	Duffy Ave (W)	R	12	13	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	13	13	[illegible]	6	4	[illegible]	4	6	5	6	6	14	6	10
107	Duffy Ave		Duffy Ave (E)	L	34	[illegible]	[illegible]	[illegible]	37	[illegible]	37	[illegible]	39	39	[illegible]	2	3	[illegible]	3	3	3	3	3	4	3	4
107		Duffy Ave (E)	The Sanctuary (N)	R	33	36	39	36	36	36	36	39	37	39	39	3	4	[illegible]	4	4	3	4	4	6	4	6
107			Duffy Ave (W)	T	385	372	368	371	424	367	418	370	495	426	480	1	1	[illegible]	1	1	1	1	1	1	1	1
107		Duffy Ave (W)	Duffy Ave (E)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0	0	0	0	0	0	0	0
107			The Sanctuary (N)	L	10	9	9	9	9	9	9	9	9	9	9	0	0	0	0	0	0	0	0	0	0	0
107		All			879	900	894	893	999	878	967	895	1,178	962	1,059	6	4	5	4	6	5	6	6	14	6	10
108	Kentwell Ave	Duffy Ave (E)	Duffy Ave (W)	T	413	399	396	398	449	383	439	401	517	448	504	0	0	0	0	0	0	0	0	0	0	0
108	Duffy Ave		Kentwell Ave (S)	L	5	7	8	7	8	3	4	8	6	4	3	1	0	0	0	1	0	0	0	1	0	1
108		Kentwell Ave (S)	Duffy Ave (E)	R	9	15	10	8	11	12	11	11	8	9	10	5	6	5	4	8	4	6	7	13	6	5
108			Duffy Ave (W)	L	9	15	23	16	18	31	24	20	26	27	26	2	2	3	3	3	2	3	3	2	3	4
108		Duffy Ave (W)	Kentwell Ave (S)	R	2	6	7	6	8	6	7	9	28	19	18	3	6	4	5	3	5	4	5	11	5	6
108			Duffy Ave (E)	T	440	482	480	475	527	464	501	477	617	479	521	0	0	0	0	0	0	0	0	2	1	1
108		All			878	925	924	909	1,021	899	987	927	1,202	985	1,082	5	6	5	5	8	5	6	7	13	6	6
109	Huntingdale Way	Huntingdale Way (N)	Duffy Ave (W)	R	8	7	8	7	7	7	7	8	8	8	8	2	2	2	2	2	2	2	3	4	2	2
109	Duffy Ave		Sinclair Ave (S)	T	2	2	3	2	2	2	2	3	4	4	4	0	4	1	4	3	2	3	1	3	2	2
109	Sinclair Ave		Duffy Ave (E)	L	13	13	13	13	12	12	12	13	12	12	12	3	3	3	2	4	3	3	3	4	5	4
109		Duffy Ave (E)	Huntingdale Way (N)	R	19	19	18	19	19	19	19	18	18	18	17	4	5	4	5	6	5	6	5	7	6	6
109			Duffy Ave (W)	T	367	372	373	372	421	344	399	377	474	389	432	4	5	5	5	6	5	5	5	8	6	7
109			Sinclair Ave (S)	L	32	58	60	60	58	59	62	64	51	56	59	4	5	5	5	6	4	5	5	8	6	7
109		Sinclair Ave (S)	Duffy Ave (E)	R	67	77	91	82	80	80	80	85	73	84	78	2	3	3	3	3	3	4	3	5	5	6
109			Huntingdale Way (N)	T	0	1	2	1	1	2	2	2	2	3	4	0	5	3	6	6	1	4	2	4	3	6
109			Duffy Ave (W)	L	42	24	20	24	27	36	38	22	40	55	65	3	3	2	3	3	3	3	3	4	4	4
109		Duffy Ave (W)	Sinclair Ave (S)	R	8	12	10	12	11	8	8	12	33	21	19	2	3	3	3	3	3	3	3	8	9	6
109			Duffy Ave (E)	T	435	481	473	466	523	463	498	471	587	463	510	3	4	3	3	4	3	4	4	10	8	7
109			Huntingdale Way (N)	L	4	5	5	5	5	5	5	5	5	5	5	5	4	3	4	5	2	2	3	6	7	5
109		All			997	1,070	1,076	1,062	1,165	1,035	1,131	1,080	1,307	1,116	1,212	5	5	3	6	6	3	4	4	10	9	7

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ATTACHMENT 4 - ITEM 5

					Vehicle Counts										Delay (s)									
ID	Intersection	From	To	Turn	2022 Base	2027 Do Min	2032 Do Min	2027 Upgd	2027 Opt 1	2027 Opt 2	2027 Opt 3	2032 Upgd	2032 Opt 1	2032 Opt 2	2032 Opt 3	2022 Base	2027 Do Min	2032 Do Min	2027 Upgd	2027 Opt 1	2027 Opt 2	2027 Opt 3	2032 Upgd	2032 Opt 1	2032 Opt 2	2032 Opt 3
110	Chilvers Rd	Chilvers Rd (N)	Duffy Ave (W)	R	159	152	160	152	175	103	163	161	190	105	167	81	60	70	67	90	51	72	78	293	52	84
110	Duffy Ave		The Esplanade (S)	T	441	464	481	464	466	462	456	481	429	488	481	26	26	26	26	26	26	26	26	36	26	27
110	The Esplanade		Duffy Ave (E)	L	99	109	111	109	109	111	111	111	99	113	113	21	18	21	18	20	20	19	21	26	22	21
110		Duffy Ave (E)	Chilvers Rd (N)	R	121	115	118	115	115	117	117	119	120	120	120	58	72	74	50	51	50	50	51	55	52	51
110			Duffy Ave (W)	T	167	187	191	190	204	203	203	193	239	233	229	70	82	86	44	45	44	44	46	48	46	47
110			The Esplanade (S)	L	85	105	102	105	105	106	106	103	105	102	101	57	71	76	32	31	32	31	31	30	31	30
110		The Esplanade (S)	Duffy Ave (E)	R	67	67	69	67	66	66	66	69	69	69	69	66	64	63	63	65	63	65	62	66	73	73
110			Chilvers Rd (N)	T	357	422	431	423	422	420	421	430	428	429	430	38	48	46	48	48	45	50	46	54	48	52
110			Duffy Ave (W)	L	92	110	100	109	118	116	113	105	115	124	111	37	44	42	45	44	42	47	40	51	45	51
110		Duffy Ave (W)	The Esplanade (S)	R	147	178	180	168	192	197	194	173	188	181	183	63	61	63	60	69	79	83	67	116	108	109
110			Duffy Ave (E)	T	195	212	219	211	220	220	220	219	247	247	247	46	44	44	45	46	46	46	45	54	54	54
110			Chilvers Rd (N)	L	178	184	183	184	207	146	185	183	250	146	183	7	8	7	8	8	7	8	7	12	11	11
110		All			2,108	2,305	2,345	2,299	2,399	2,266	2,355	2,347	2,478	2,357	2,434	43	46	47	40	43	41	44	41	67	45	48
111	Pennant Hills Road	Pennant Hills Road (N)	Duffy Ave (W)	R	129	166	163	165	173	173	173	163	184	181	181	61	89	78	84	102	99	99	77	111	126	126
111	Duffy Ave		Pennant Hills Road (S)	T	1,622	1,797	1,839	1,797	1,797	1,796	1,796	1,839	1,840	1,839	1,839	6	6	6	6	6	6	6	6	7	7	7
111		Pennant Hills Road (S)	Pennant Hills Road (N)	T	1,842	2,027	2,024	2,027	2,028	2,025	2,025	2,025	2,025	2,025	2,025	14	16	17	17	17	17	17	17	17	17	17
111			Duffy Ave (W)	L	210	212	218	211	219	218	218	219	239	238	238	20	18	20	18	19	19	19	20	20	20	20
111		Duffy Ave (W)	Pennant Hills Road (S)	R	193	209	209	209	212	213	213	209	218	224	225	54	55	57	55	57	57	57	56	64	61	60
111			Pennant Hills Road (N)	L	157	169	175	169	174	174	174	176	187	191	191	46	38	39	38	38	38	38	39	43	39	37
111		All			4,153	4,578	4,630	4,578	4,602	4,600	4,600	4,631	4,693	4,699	4,700	16	18	18	18	19	19	19	18	20	20	20
112	The Esplanade	The Esplanade (N)	Oakleigh Ave (W)	R	19	20	21	19	22	13	11	20	30	11	12	5	4	5	4	4	6	5	4	5	6	8
112	Hall Ave		The Esplanade (S)	T	647	719	735	708	730	745	737	729	680	750	744	1	1	2	1	2	1	1	2	2	2	2
112	Oakleigh Ave		Hall Ave (E)	L	11	12	12	12	12	12	12	13	13	12	12	0	1	1	1	1	1	1	1	2	1	1
112		Hall Ave (E)	The Esplanade (N)	R	6	7	7	7	7	7	7	7	7	7	7	9	10	13	13	11	14	12	13	13	18	16
112			Oakleigh Ave (W)	T	2	3	3	3	3	3	3	3	3	3	3	15	18	12	27	18	15	15	16	10	17	21
112			The Esplanade (S)	L	11	9	10	10	9	9	9	10	9	9	9	6	6	6	6	7	7	7	7	4	7	8
112		The Esplanade (S)	Hall Ave (E)	R	7	6	6	6	6	6	6	6	6	6	6	3	5	5	5	5	5	6	6	8	5	5
112			The Esplanade (N)	T	505	590	590	588	599	596	591	594	602	611	599	0	1	1	1	1	1	1	1	3	3	4
112			Oakleigh Ave (W)	L	65	42	43	43	47	54	58	44	71	82	94	1	1	1	1	1	1	1	1	4	1	3
112		Oakleigh Ave (W)	The Esplanade (S)	R	35	28	31	33	34	23	25	35	71	54	53	12	11	17	13	17	18	15	14	33	25	25
112			Hall Ave (E)	T	1	2	2	2	2	1	2	2	2	1	2	0	11	11	7	11	8	2	12	18	19	16
112			The Esplanade (N)	L	5	3	4	3	3	2	2	4	3	3	3	3	7	4	7	8	5	5	5	9	14	9
112		All			1,314	1,440	1,464	1,434	1,475	1,473	1,464	1,466	1,498	1,551	1,545	15	18	17	27	18	18	15	16	33	25	25
113	The Esplanade	The Esplanade (N)	Goodlands Ave (W)	R	3	10	7	10	9	8	9	7	5	4	6	9	11	8	12	12	10	11	9	11	13	11
113	Goodlands Ave		The Esplanade (S)	T	690	750	771	745	769	771	764	770	759	807	798	3	4	4	4	4	6	5	4	4	6	6
113		The Esplanade (S)	The Esplanade (N)	T	576	639	642	638	653	657	656	647	680	700	699	1	1	1	1	1	1	1	1	1	1	2
113			Goodlands Ave (W)	L	33	50	60	51	56	51	52	55	82	62	63	1	1	1	1	1	1	1	1	1	1	2
113		Goodlands Ave (W)	The Esplanade (S)	R	62	59	65	64	70	66	74	69	100	117	126	13	15	17	15	17	14	13	18	33	26	27
113			The Esplanade (N)	L	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	1	2	16
113		All			1,365	1,508	1,545	1,507	1,557	1,553	1,554	1,548	1,626	1,691	1,693	13	15	17	15	17	14	13	18	33	26	27
114	Chilvers Rd	Sefton Rd (E)	Sefton Rd (W)	T	51	78	78	78	79	133	102	78	70	193	161	10	42	43	42	44	34	38	44	46	32	34
114	Sefton Rd		Chilvers Rd (S)	L	626	599	617	599	624	567	599	617	590	581	615	0	8	8	8	8	7	7	8	26	6	7
114		Chilvers Rd (S)	Sefton Rd (E)	R	580	612	615	610	634	587	617	614	682	590	619	3	27	27	27	28	30	34	27	32	34	38
114			Sefton Rd (W)	L	82	113	115	114	115	104	114	115	115	108	116	2	15	15	16	16	18	20	15	18	20	21
114		Sefton Rd (W)	Chilvers Rd (S)	R	82	135	143	135	135	116	139	143	143	134	154	11	53	54	54	53	53	52	54	100	51	51
114			Sefton Rd (E)																22	22	19	20	22	27	20	21
114		All			1,477	1,594	1,623	1,592	1,642	1,613	1,648	1,623	1,656	1,755	1,787	11	22		22	22	22	24	22	35	24	26
115	Larool Cres	Larool Cres (N)	Sefton Rd (W)	R	34	-	-	-	-	-	-	-	-	-	-	7	-		-	-	-	-	-	-	-	-
115	Sefton Rd		Sefton Rd (E)	L	21					22		21				3	6		6	7	6	6	4	6	5	6
115		Sefton Rd (E)	Larool Cres (N)	R	29	-		-	-	-	-	-	-	-	-	3	-		-	-	-	-	-	-	-	-
115			Sefton Rd (W)	T	643	577	69			701	702	696		774	776	4	8		8	9	9	9	8	58	13	12
115		Sefton Rd (W)	Sefton Rd (E)	T	601	537	6	6	65	6	664	640	708	709	711	0	0		0	0	0	0	0	1	0	0
115			Larool Cres (N)	L	34		3	3	31		30	30	30	30	30	0	0		0	0	0	0	0	0	0	0
115		All			1,362	1,366	1,387	1,365	1,414	1,416	1,418	1,387	1,421	1,535	1,538	7	8		8	9	9	9	8	58	13	12
116	Kooringal Ave	Kooringal Ave (N)	Sefton Rd (W)	R	0	0	0	0	0	17	0	0	0	16	0	0	1		1	1	1	1	0	0	2	1
116	Sefton Rd		Sefton Rd (E)																1	1	1	1	1	1	2	2
116		Sefton Rd (E)	Kooringal Ave (N)	R	40	93	95	93	93	89	93	95	91	93	96	1	1	1	1	1	2	1	1	1	2	2
116			Sefton Rd (W)	T	52	56	55	56	57	106	80	55	54	165	137	1	1	1	1	1	2	1	1	1	3	2
116		Sefton Rd (W)	Sefton Rd (E)	T	37	35	37	35	35	84	60	37	37	138	113	1	1	1	1	1	2	2	1	1	2	2
116			Kooringal Ave (N)	L	0	0	0	0	0	4	0	0	0	4	0	0	1	2	1	1	1	1	2	9	2	8
116		All			133	276	284	276	277	375	325	284	279	497	443	1	1	2	1	1	2	2	2	9	3	8
153	Quarter Sessions Rd	Quarter Sessions Rd (N	Quarter Sessions Rd (S)	T	-	-	-	-	-	142	178	-	-	177	214	-	-	-	-	-	1	1	-	-	1	1
153	Sefton Rd		Sefton Rd (E)	L	-	-	-	-	-	37	0	-	-	38	2	-	-	-	-	-	1	0	-	-	1	0
153		Sefton Rd (E)	Quarter Sessions Rd (N	R	-	-	-	-	-	30	0	-	-	29	0	-	-	-	-	-	1	0	-	-	2	0
153			Quarter Sessions Rd (S)	L	-	-	-	-	-	45	14	-	-	79	46	-	-	-	-	-	1	1	-	-	1	1
153		Quarter Sessions Rd (S	Sefton Rd (E)	R	-	-	-	-	-	24	16	-	-	61	51	-	-	-	-	-	1	1	-	-	2	1
153			Quarter Sessions Rd (N	T	-	-	-	-	-	155	186	-	-	181	211	-	-	-	-	-	1	1	-	-	1	1
153		All			-	-	-	-	-	433	394	-	-	565	524	-	-	-	-	-	1	1	-	-	2	1

P5524 Westleigh Park Traffic Impact and Access Study

VISSIM Data Analysis - Network Statistics

AM Peak 0800 - 0900

	2022 Base	2027 Do Minimum	2032 Do Minimum	2027 Do Minimum Plus Upgrade	2032 Do Minimum Plus Upgrade	2027 Option 2	2032 Option 2
Total Travel Time (hr)	212	253	305	222	262	224	259
Total Distance Travelled (km)	6,570	6,942	7,086	6,966	7,255	6,941	7,210
Total Delay (hr)	90	125	173	93	127	95	125
Average Speed (km/hr)	31.2	27.6	23.3	31.4	27.8	31.0	27.9
Average Travel Time (min)	1.87	2.09	2.45	1.84	2.10	1.85	2.09
Average Distance (km)	0.97	0.96	0.95	0.96	0.97	0.96	0.97
Average Delay (s)	48	62	84	46	61	47	60
Completed Trips	6,562	7,005	7,102	7,016	7,216	7,013	7,201
Incomplete Trips	215	260	351	232	260	237	261
Unreleased Trips	0	1	77	1	1	1	1
Total Number of Vehicles	6,778	7,265	7,453	7,248	7,476	7,250	7,462
Stops per vehicle	1.0	1.3	1.7	1.0	1.3	1.0	1.3

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ATTACHMENT 4 - ITEM 5

P5524 Westleigh Park Traffic Impact and Access Study

VISSIM Data Analysis - Network Statistics

PM Peak 1700 - 1800

	2022 Base	2027 Do Minimum	2032 Do Minimum	2027 Do Minimum Plus Upgrade	2027 Option 1	2027 Option 2	2027 Option 3	2032 Do Minimum Plus Upgrade	2027 Option 1	2027 Option 2	2027 Option 3
Total Travel Time (hr)	175	205	215	200	205	203	207	205	230	220	223
Total Distance Travelled (km)	6,254	6,776	6,915	6,786	6,939	6,902	6,940	6,917	7,363	7,269	7,311
Total Delay (hr)	61	82	89	76	78	76	80	79	95	84	88
Average Speed (km/hr)	35.8	33.0	32.2	34.0	33.9	33.9	33.5	33.8	32.1	33.1	32.8
Average Travel Time (min)	1.60	1.71	1.76	1.67	1.70	1.68	1.72	1.68	1.84	1.76	1.79
Average Distance (km)	0.96	0.94	0.95	0.94	0.96	0.95	0.96	0.95	0.98	0.97	0.98
Average Delay (s)	34	41	44	38	39	38	40	39	45	41	42
Completed Trips	6,352	6,974	7,090	6,982	7,038	7,042	7,040	7,098	7,270	7,262	7,263
Incomplete Trips	176	213	221	201	210	207	209	207	227	218	218
Unreleased Trips	0	0	1	0	0	1	0	1	1	1	1
Total Number of Vehicles	6,529	7,187	7,311	7,183	7,248	7,249	7,248	7,304	7,497	7,480	7,482
Stops per vehicle	0.7	0.9	0.9	0.8	0.8	0.8	0.9	0.8	1.0	0.9	0.9

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ATTACHMENT 4 - ITEM 5

P5524 Westleigh Park Traffic Impact and Access Study

VISSIM Data Analysis - Network Statistics

Weekend Peak 1100 - 1200

	2022 Base	2027 Do Minimum	2032 Do Minimum	2027 Do Minimum Plus Upgrade	2027 Option 1	2027 Option 2	2027 Option 3	2032 Do Minimum Plus Upgrade	2027 Option 1	2027 Option 2	2027 Option 3
Total Travel Time (hr)	175	200	205	196	210	206	211	201	293	237	242
Total Distance Travelled (km)	6,254	6,741	6,846	6,741	7,052	6,976	7,012	6,851	7,592	7,645	7,682
Total Delay (hr)	61	78	80	74	81	77	82	76	153	93	99
Average Speed (km/hr)	35.8	33.7	33.5	34.4	33.7	33.8	33.2	34.2	26.1	32.3	31.7
Average Travel Time (min)	1.60	1.67	1.69	1.64	1.72	1.70	1.74	1.66	2.31	1.85	1.90
Average Distance (km)	0.96	0.94	0.94	0.94	0.97	0.96	0.96	0.94	1.00	1.00	1.00
Average Delay (s)	34	39	40	37	40	38	41	38	72	44	46
Completed Trips	6,352	6,977	7,067	6,975	7,096	7,090	7,093	7,071	7,313	7,436	7,442
Incomplete Trips	176	198	204	192	205	199	203	197	296	226	225
Unreleased Trips	0	0	0	0	0	0	0	0	80	0	0
Total Number of Vehicles	6,529	7,175	7,271	7,168	7,301	7,289	7,297	7,268	7,609	7,662	7,667
Stops per vehicle	0.7	0.8	0.9	0.8	0.9	0.8	0.9	0.8	1.7	0.9	1.0

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ATTACHMENT 4 - ITEM 5

P5524 Westleigh Park Traffic Impact and Access Study
Travel Time Data Analysis
Route 1: Quarter Sessions Road / Duffy Avenue
AM Peak (0800 - 0900)

Northbound				Section Travel Time							Cumulative Travel Time						
Sections	Vissim Section	Distance (km)	Cumulative Distance (km)	2022 Base	2027 Do Min	2032 Do Min	2027 Upgrade	2032 Upgrade	2027 Option 2	2032 Option 2	2022 Base	2027 Do Min	2032 Do Min	2027 Upgrade	2032 Upgrade	2027 Option 2	2032 Option 2
The Esplanade		0.00	0.00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00
Chilvers Road	101	0.05	0.05	00:04	0:04	0:04	0:04	0:04	0:04	0:04	0:04	0:04	0:04	0:04	0:04	0:04	0:04
Sinclair Avenue	102	0.20	0.25	00:22	0:24	0:23	0:24	0:25	0:24	0:24	0:26	0:28	0:28	0:28	0:29	0:28	0:28
Quarter Sessions Road	103	0.74	0.98	01:03	1:04	1:04	1:04	1:04	1:04	1:04	1:29	1:32	1:32	1:32	1:33	1:32	1:32
H20 Bike Trail	104	0.85	1.84	01:04	1:04	1:04	1:04	1:04	1:09	1:09	2:33	2:36	2:36	2:36	2:38	2:40	2:41

Southbound				Section Travel Time							Cumulative Travel Time						
Sections	Vissim Section	Distance (km)	Cumulative Distance (km)	2022 Base	2027 Do Min	2032 Do Min	2027 Upgrade	2032 Upgrade	2027 Option 2	2032 Option 2	2022 Base	2027 Do Min	2032 Do Min	2027 Upgrade	2032 Upgrade	2027 Option 2	2032 Option 2
H20 Bike Trail		0.00	0.00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00
Duffy Avenue	111	0.83	0.83	01:04	1:04	1:05	1:05	1:05	1:09	1:10	1:04	1:04	1:05	1:05	1:05	1:09	1:10
Sinclair Avenue	112	0.73	1.56	01:00	1:01	1:02	1:01	1:04	1:05	1:04	2:03	2:05	2:07	2:05	2:08	2:14	2:13
Chilvers Road	113	0.20	1.76	01:11	1:13	1:11	1:19	1:25	1:24	1:28	3:14	3:18	3:18	3:25	3:34	3:39	3:41
The Esplanade	114	0.06	1.82	00:05	0:05	0:05	0:05	0:05	0:05	0:05	3:19	3:23	3:23	3:29	3:38	3:44	3:46

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ATTACHMENT 4 - ITEM 5

P5524 Westleigh Park Traffic Impact and Access Study
Travel Time Data Analysis
Route 2: The Esplanade / Chivers Road / Sefton Road
AM Peak (0800 - 0900)

Northbound				Section Travel Time							Cumulative Travel Time						
Sections	Vissim Section	Distance (km)	Cumulative Distance (km)	2022 Base	2027 Do Min	2032 Do Min	2027 Upgrade	2032 Upgrade	2027 Option 2	2032 Option 2	2022 Base	2027 Do Min	2032 Do Min	2027 Upgrade	2032 Upgrade	2027 Option 2	2032 Option 2
Janet Avenue		0.00	0.00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00
Duffy Avenue	201	0.52	0.52	02:20	2:43	3:40	1:37	2:48	1:43	2:48	2:20	2:43	3:40	1:37	2:48	1:43	2:48
Chilvers Road	202	0.04	0.56	00:03	0:03	0:03	0:03	0:03	0:03	0:03	2:23	2:46	3:43	1:40	2:50	1:45	2:51
Sefton Road	203	0.38	0.94	00:35	0:57	0:57	1:24	1:25	1:22	1:23	2:57	3:43	4:40	3:03	4:15	3:08	4:14
Adamson Avenue	204	0.34	1.28	00:27	0:31	0:30	0:31	0:31	0:31	0:31	3:24	4:14	5:10	3:35	4:46	3:38	4:46

Southbound				Section Travel Time							Cumulative Travel Time						
Sections	Vissim Section	Distance (km)	Cumulative Distance (km)	2022 Base	2027 Do Min	2032 Do Min	2027 Upgrade	2032 Upgrade	2027 Option 2	2032 Option 2	2022 Base	2027 Do Min	2032 Do Min	2027 Upgrade	2032 Upgrade	2027 Option 2	2032 Option 2
Adamson Avenue		0.00	0.00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00
Chilvers Road	211	0.35	0.35	00:30	0:43	0:42	0:43	0:42	0:43	0:44	0:30	0:43	0:42	0:43	0:42	0:43	0:44
Duffy Avenue	212	0.37	0.72	01:05	1:02	1:02	0:48	0:49	0:47	0:49	1:34	1:45	1:44	1:31	1:31	1:31	1:32
The Esplanade	213	0.04	0.75	00:03	0:03	0:03	0:03	0:03	0:03	0:03	1:37	1:48	1:47	1:34	1:35	1:34	1:35
Janet Avenue	214	0.48	1.23	00:40	0:43	0:43	0:43	0:46	0:46	0:45	2:17	2:31	2:31	2:16	2:21	2:19	2:21

ATTACHMENT 4 - ITEM 5

P5524 Westleigh Park Traffic Impact and Access Study
Travel Time Data Analysis
Route 1: Quarter Sessions Road / Duffy Avenue
PM Peak (1700 - 1800)

Northbound				Section Travel Time										Cumulative Travel Time									
Sections	Vissim Section	Distance (km)	Cumulative Distance (km)	2022 Base	2027 Do Min	2032 Do Min	2027 Upgrade	2032 Upgrade	2027 Option 1	2032 Option 1	2032 Option 2	2032 Option 2	2032 Option 3	2032 Option 3	2022 Base	2027 Do Min	2032 Do Min	2027 Upgrade	2032 Upgrade	2027 Option 1	2032 Option 1	2032 Option 2	2032 Option 2	2032 Option 3	2032 Option 3
The Esplanade		0.00	0.00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00
Chilvers Road	101	0.05	0.05	00:04	0:04	0:04	0:04	0:04	0:04	0:04	0:04	0:04	0:04	0:04	0:04	0:04	0:04	0:04	0:04	0:04	0:04	0:04	0:04	0:04	0:04
Sinclair Avenue	102	0.20	0.25	00:22	0:23	0:23	0:23	0:23	0:24	0:25	0:22	0:23	0:23	0:24	0:26	0:27	0:27	0:27	0:27	0:28	0:29	0:26	0:27	0:27	0:28
Quarter Sessions Road	103	0.74	0.98	01:02	1:03	1:03	1:03	1:03	1:03	1:04	1:03	1:03	1:03	1:03	1:28	1:30	1:30	1:30	1:30	1:31	1:33	1:29	1:30	1:30	1:31
H20 Bike Trail	104	0.85	1.84	01:03	1:04	1:04	1:04	1:04	1:04	1:04	1:15	1:15	1:15	1:15	2:32	2:34	2:34	2:34	2:34	2:34	2:36	2:44	2:46	2:45	2:47

Southbound				Section Travel Time										Cumulative Travel Time									
Sections	Vissim Section	Distance (km)	Cumulative Distance (km)	2022 Base	2027 Do Min	2032 Do Min	2027 Upgrade	2032 Upgrade	2027 Option 1	2032 Option 1	2032 Option 2	2032 Option 2	2032 Option 3	2032 Option 3	2022 Base	2027 Do Min	2032 Do Min	2027 Upgrade	2032 Upgrade	2027 Option 1	2032 Option 1	2032 Option 2	2032 Option 2	2032 Option 3	2032 Option 3
H20 Bike Trail		0.00	0.00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00
Duffy Avenue	111	0.83	0.83	01:02	1:03	1:03	1:03	1:03	1:03	1:04	1:09	1:09	1:09	1:09	1:02	1:03	1:03	1:03	1:03	1:03	1:04	1:09	1:09	1:09	1:09
Sinclair Avenue	112	0.73	1.56	00:58	1:00	1:00	1:00	1:00	1:00	1:01	0:59	1:00	1:00	1:01	2:00	2:02	2:03	2:03	2:03	2:03	2:05	2:08	2:09	2:09	2:09
Chilvers Road	113	0.20	1.76	00:52	0:54	0:56	0:54	0:56	0:54	0:59	0:55	0:56	0:55	0:56	2:53	2:56	2:59	2:57	2:59	2:57	3:04	3:03	3:05	3:04	3:05
The Esplanade	114	0.06	1.82	00:05	0:05	0:05	0:05	0:05	0:05	0:05	0:05	0:05	0:05	0:05	2:58	3:01	3:04	3:02	3:04	3:02	3:09	3:08	3:10	3:09	3:10

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ATTACHMENT 4 - ITEM 5

P5524 Westleigh Park Traffic Impact and Access Study
Travel Time Data Analysis
Route 2: The Esplanade / Chivers Road / Sefton Road
PM Peak (1700 - 1800)

Northbound				Section Travel Time											Cumulative Travel Time										
Sections	Vissim Section	Distance (km)	Cumulative Distance (km)	2022 Base	2027 Do Min	2032 Do Min	2027 Upgrade	2032 Upgrade	2027 Option 1	2032 Option 1	2032 Option 2	2032 Option 2	2032 Option 3	2032 Option 3	2022 Base	2027 Do Min	2032 Do Min	2027 Upgrade	2032 Upgrade	2027 Option 1	2032 Option 1	2032 Option 2	2032 Option 2	2032 Option 3	2032 Option 3
Janet Avenue		0.00	0.00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00
Duffy Avenue	201	0.52	0.52	01:27	1:30	1:35	1:34	1:36	1:31	1:46	1:29	1:47	1:38	1:55	1:27	1:30	1:35	1:34	1:36	1:31	1:46	1:29	1:47	1:38	1:55
Chilvers Road	202	0.04	0.56	00:03	0:03	0:03	0:03	0:03	0:03	0:03	0:03	0:03	0:03	0:03	1:30	1:33	1:38	1:36	1:39	1:34	1:49	1:32	1:50	1:41	1:57
Sefton Road	203	0.38	0.94	00:31	0:31	0:31	0:54	0:56	0:55	0:56	0:31	0:56	0:55	0:57	2:01	2:04	2:09	2:31	2:34	2:29	2:45	2:03	2:46	2:36	2:54
Adamson Avenue	204	0.34	1.28	00:25	0:25	0:26	0:26	0:26	0:26	0:26	0:25	0:27	0:26	0:27	2:26	2:30	2:35	2:57	3:01	2:54	3:12	2:28	3:13	3:02	3:21

Southbound				Section Travel Time											Cumulative Travel Time										
Sections	Vissim Section	Distance (km)	Cumulative Distance (km)	2022 Base	2027 Do Min	2032 Do Min	2027 Upgrade	2032 Upgrade	2027 Option 1	2032 Option 1	2032 Option 2	2032 Option 2	2032 Option 3	2032 Option 3	2022 Base	2027 Do Min	2032 Do Min	2027 Upgrade	2032 Upgrade	2027 Option 1	2032 Option 1	2032 Option 2	2032 Option 2	2032 Option 3	2032 Option 3
Adamson Avenue		0.00	0.00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00
Chilvers Road	211	0.35	0.35	00:28	0:28	0:29	0:40	0:41	0:40	0:44	0:31	0:45	0:40	0:43	0:28	0:28	0:29	0:40	0:41	0:40	0:44	0:31	0:45	0:40	0:43
Duffy Avenue	212	0.37	0.72	00:55	0:57	0:56	0:55	0:55	0:55	1:00	0:56	0:55	0:55	0:55	1:23	1:25	1:26	1:35	1:36	1:35	1:44	1:27	1:40	1:36	1:38
The Esplanade	213	0.04	0.75	00:03	0:03	0:03	0:03	0:03	0:03	0:03	0:03	0:03	0:03	0:03	1:26	1:28	1:29	1:38	1:39	1:38	1:47	1:30	1:43	1:39	1:41
Janet Avenue	214	0.48	1.23	00:50	0:46	0:47	0:51	0:52	0:51	0:55	0:46	0:49	0:49	0:49	2:16	2:14	2:15	2:28	2:32	2:29	2:42	2:16	2:32	2:27	2:31

ATTACHMENT 4 - ITEM 5

P5524 Westleigh Park Traffic Impact and Access Study
Travel Time Data Analysis
Route 1: Quarter Sessions Road / Duffy Avenue
Weekend Peak (1100 - 1200)

Northbound				Section Travel Time										Cumulative Travel Time									
Sections	Vissim Section	Distance (km)	Cumulative Distance (km)	2022 Base	2027 Do Min	2032 Do Min	2027 Upgrade	2032 Upgrade	2027 Option 1	2032 Option 1	2032 Option 2	2032 Option 2	2032 Option 3	2032 Option 3	2022 Base	2027 Do Min	2032 Do Min	2027 Upgrade	2032 Upgrade	2027 Option 1	2032 Option 1	2032 Option 2	2032 Option 2	2032 Option 3	2032 Option 3
The Esplanade		0.00	0.00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00
Chilvers Road	101	0.05	0.05	00:04	0:04	0:04	0:04	0:04	0:04	0:04	0:04	0:04	0:04	0:04	0:04	0:04	0:04	0:04	0:04	0:04	0:04	0:04	0:04	0:04	0:04
Sinclair Avenue	102	0.20	0.25	00:22	0:23	0:23	0:22	0:23	0:23	0:25	0:22	0:23	0:23	0:24	0:26	0:27	0:27	0:27	0:27	0:28	0:29	0:26	0:28	0:27	0:28
Quarter Sessions Road	103	0.74	0.98	01:02	1:02	1:03	1:02	1:02	1:03	1:05	1:03	1:04	1:03	1:04	1:28	1:29	1:29	1:29	1:29	1:30	1:34	1:29	1:31	1:30	1:32
H20 Bike Trail	104	0.85	1.84	01:03	1:03	1:03	1:03	1:04	1:04	1:04	1:09	1:09	1:09	1:09	2:31	2:32	2:33	2:32	2:33	2:34	2:38	2:38	2:40	2:39	2:42

Southbound				Section Travel Time										Cumulative Travel Time									
Sections	Vissim Section	Distance (km)	Cumulative Distance (km)	2022 Base	2027 Do Min	2032 Do Min	2027 Upgrade	2032 Upgrade	2027 Option 1	2032 Option 1	2032 Option 2	2032 Option 2	2032 Option 3	2032 Option 3	2022 Base	2027 Do Min	2032 Do Min	2027 Upgrade	2032 Upgrade	2027 Option 1	2032 Option 1	2032 Option 2	2032 Option 2	2032 Option 3	2032 Option 3
H20 Bike Trail		0.00	0.00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00
Duffy Avenue	111	0.83	0.83	01:02	1:03	1:03	1:03	1:03	1:04	1:06	1:09	1:10	1:09	1:10	1:02	1:03	1:03	1:03	1:03	1:04	1:06	1:09	1:10	1:09	1:10
Sinclair Avenue	112	0.73	1.56	00:59	1:00	1:00	1:00	1:00	1:01	1:08	1:00	1:06	1:01	1:04	2:01	2:04	2:03	2:03	2:04	2:05	2:14	2:09	2:15	2:10	2:14
Chilvers Road	113	0.20	1.76	01:01	0:59	0:59	1:00	1:00	1:01	1:13	1:01	1:12	1:02	1:13	3:02	3:03	3:02	3:03	3:03	3:06	3:27	3:10	3:27	3:12	3:26
The Esplanade	114	0.06	1.82	00:05	0:05	0:05	0:05	0:05	0:05	0:05	0:05	0:05	0:05	0:05	3:07	3:08	3:07	3:08	3:08	3:11	3:32	3:15	3:32	3:17	3:31

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ATTACHMENT 4 - ITEM 5

P5524 Westleigh Park Traffic Impact and Access Study
Travel Time Data Analysis
Route 2: The Esplanade / Chivers Road / Sefton Road
Weekend Peak (1100 - 1200)

Northbound				Section Travel Time										Cumulative Travel Time									
Sections	Vissim Section	Distance (km)	Cumulative Distance (km)	2022 Base	2027 Do Min	2032 Do Min	2027 Upgrade	2032 Upgrade	2027 Option 1	2032 Option 1	2032 Option 2	2032 Option 2	2032 Option 3	2032 Option 3	2022 Base	2027 Do Min	2032 Do Min	2027 Upgrade	2032 Upgrade	2027 Option 1	2032 Option 1	2027 Option 2	2032 Option 2	2027 Option 3	2032 Option 3
Janet Avenue		0.00	0.00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00
Duffy Avenue	201	0.52	0.52	01:16	1:31	1:28	1:32	1:28	1:33	1:49	1:27	1:36	1:36	1:47	1:16	1:31	1:28	1:32	1:28	1:33	1:49	1:27	1:36	1:36	1:47
Chilvers Road	202	0.04	0.56	00:03	0:03	0:03	0:03	0:03	0:03	0:03	0:03	0:03	0:03	0:03	1:18	1:34	1:31	1:35	1:31	1:36	1:52	1:30	1:39	1:39	1:50
Sefton Road	203	0.38	0.94	00:32	0:53	0:53	0:53	0:54	0:56	1:01	0:57	1:02	1:02	1:08	1:50	2:27	2:24	2:28	2:25	2:32	2:52	2:27	2:41	2:41	2:59
Adamson Avenue	204	0.34	1.28	00:25	0:26	0:26	0:26	0:26	0:26	0:29	0:26	0:27	0:26	0:27	2:15	2:53	2:50	2:54	2:51	2:58	3:21	2:53	3:08	3:07	3:26

Southbound				Section Travel Time										Cumulative Travel Time									
Sections	Vissim Section	Distance (km)	Cumulative Distance (km)	2022 Base	2027 Do Min	2032 Do Min	2027 Upgrade	2032 Upgrade	2027 Option 1	2032 Option 1	2032 Option 2	2032 Option 2	2032 Option 3	2032 Option 3	2022 Base	2027 Do Min	2032 Do Min	2027 Upgrade	2032 Upgrade	2027 Option 1	2032 Option 1	2027 Option 2	2032 Option 2	2027 Option 3	2032 Option 3
Adamson Avenue		0.00	0.00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00
Chilvers Road	211	0.35	0.35	00:28	0:38	0:39	0:38	0:39	0:39	2:44	0:38	0:41	0:39	0:42	0:28	0:38	0:39	0:38	0:39	0:39	2:44	0:38	0:41	0:39	0:42
Duffy Avenue	212	0.37	0.72	00:54	0:54	0:55	0:54	0:55	0:54	2:22	0:54	0:55	0:54	0:55	1:21	1:32	1:34	1:32	1:33	1:33	5:06	1:32	1:36	1:33	1:36
The Esplanade	213	0.04	0.75	00:03	0:03	0:03	0:03	0:03	0:03	0:03	0:03	0:03	0:03	0:03	1:24	1:35	1:36	1:35	1:36	1:36	5:09	1:35	1:39	1:36	1:39
Janet Avenue	214	0.48	1.23	00:42	0:42	0:42	0:42	0:42	0:42	0:42	0:43	0:45	0:43	0:45	2:06	2:17	2:18	2:17	2:18	2:18	5:51	2:19	2:24	2:19	2:24

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ATTACHMENT 4 - ITEM 5

ATTACHMENT 4 - ITEM 5

Appendix E

Year 2022 and 2032 SIDRA Modelling Results

ATTACHMENT 4 - ITEM 5

MOVEMENT SUMMARY

Site: 5 [Duffy Avenue / Quarter Sessions Road (Site Folder: Base AM)]

Network: N101 [Base AM (Network Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Quarter Sessions Road														
1	L2	59	1.8	59	1.8	0.167	4.3	LOS A	0.4	3.1	0.50	0.55	0.50	37.7
2	T1	45	0.0	45	0.0	0.167	4.0	LOS A	0.4	3.1	0.50	0.55	0.50	38.2
3	R2	62	0.0	62	0.0	0.167	7.2	LOS A	0.4	3.1	0.50	0.55	0.50	35.8
Approach		166	0.6	166	0.6	0.167	5.3	LOS A	0.4	3.1	0.50	0.55	0.50	37.4
East: Duffy Avenue														
4	L2	54	0.0	54	0.0	0.264	3.7	LOS A	0.6	4.6	0.37	0.50	0.37	38.5
5	T1	136	6.2	136	6.2	0.264	3.5	LOS A	0.6	4.6	0.37	0.50	0.37	38.9
6	R2	97	8.7	97	8.7	0.264	6.7	LOS A	0.6	4.6	0.37	0.50	0.37	38.9
Approach		286	5.9	286	5.9	0.264	4.6	LOS A	0.6	4.6	0.37	0.50	0.37	38.8
North: Quarter Sessions Road														
7	L2	187	1.1	187	1.1	0.294	5.4	LOS A	0.8	5.5	0.63	0.63	0.63	35.8
8	T1	67	0.0	67	0.0	0.294	5.1	LOS A	0.8	5.5	0.63	0.63	0.63	38.3
9	R2	5	0.0	5	0.0	0.294	8.2	LOS A	0.8	5.5	0.63	0.63	0.63	38.3
Approach		260	0.8	260	0.8	0.294	5.3	LOS A	0.8	5.5	0.63	0.63	0.63	36.8
West: Duffy Avenue														
10	L2	11	10.0	1	10.0	0.270	4.1	LOS A	0.7	4.7	0.4	0.52	0.45	37.9
11	T1	203	1.6	203	1.6	0.270	3.6	LOS A	0.7	4.7	0.4	0.52	0.45	36.1
12	R2	73	4.3	7	4.3	0.270	5.5	LOS A	0.7	4.7	0.4	0.52	0.45	38.4
Approach		286	2.6	286	2.6	0.270	4.5	LOS A	0.7	4.7	0.4	0.52	0.45	37.1
All Vehicles		999	2.7	999	2.7	0.294	4.9	LOS A	0.8	5.5	0.4	0.55	0.48	37.8

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Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Organisation: TRANSPORT FOR NSW | Licence: NETWORK / Enterprise | Processed: Wednesday, 20 July 2022 3:53:29 PM
Project: P:\P5524 Westleigh Park Traffic Impact and Access Study\Technical\Models\SIDRA\P5524.001S Westleigh Park Traffic Impact and Access Study model_AM.sip9

ATTACHMENT 4 - ITEM 5

MOVEMENT SUMMARY

Site: 10 [Duffy Avenue / The Esplanade / Chilvers Road (Site Folder: Base AM)]

Network: N101 [Base AM (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 115 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: The Esplanade														
21a	L1	40	2.6	40	2.6	*0.927	65.1	LOS E	22.1	157.0	1.00	1.12	1.31	18.8
22	T1	491	1.5	491	1.5	0.927	61.6	LOS E	22.1	157.0	1.00	1.12	1.31	18.8
23b	R3	136	3.9	136	3.9	0.704	61.5	LOS E	4.8	34.7	1.00	0.85	1.11	18.9
Approach		666	2.1	666	2.1	0.927	61.8	LOS E	22.1	157.0	1.00	1.07	1.26	18.8
East: Duffy Avenue														
4b	L3	80	1.3	80	1.3	*0.819	61.4	LOS E	8.5	62.7	1.00	0.97	1.20	25.2
5	T1	154	8.2	154	8.2	0.819	56.2	LOS D	8.5	62.7	1.00	0.97	1.20	14.2
6a	R1	88	3.6	88	3.6	0.363	53.6	LOS D	2.9	20.6	0.96	0.76	0.96	15.1
Approach		322	5.2	322	5.2	0.819	56.8	LOS E	8.5	62.7	0.99	0.92	1.13	18.0
NorthWest: Chilvers Road														
27a	L1	93	3.4	93	3.4	0.450	38.1	LOS C	7.2	51.1	0.85	0.75	0.85	20.5
28	T1	427	0.7	427	0.7	0.450	34.8	LOS C	7.2	50.7	0.86	0.74	0.86	31.6
29b	R3	145	2.2	145	2.2	0.745	62.7	LOS E	5.2	37.2	1.00	0.88	1.15	14.4
Approach		665	1.4	665	1.4	0.745	41.4	LOS C	7.2	51.1	0.89	0.77	0.92	26.8
West: Duffy Avenue														
10b	L3	216	1.5	216	1.5	0.395	37.0	LOS C	5.7	40.2	0.8	0.79	0.81	32.4
11	T1	219	1.0	219	1.0	0.722	52.2	LOS D	7.5	52.9	1.00	0.88	1.07	27.9
12a	R1	204	0.0	204	0.0	0.819	52.2	LOS E	7.5	52.5	1.00	0.95	1.21	31.1
Approach		639	0.8	639	0.8	0.819	50.2	LOS D	7.5	52.9	0.94	0.87	1.03	30.4
All Vehicles		2293	2.0	2293	2.0	0.927	51.9	LOS D	22.1	157.0	0.95	0.90	1.08	24.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
SouthEast: The Esplanade											
P5	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	218.8	217.2	0.99
East: Duffy Avenue											
P2	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	214.8	211.9	0.99
NorthWest: Chilvers Road											
P7	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	221.4	220.5	1.00
West: Duffy Avenue											

P4	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	217.3	215.2	0.99
P4B	Slip/ Bypass	53	51.8	LOS E	0.2	0.2	0.95	0.95	208.9	204.3	0.98
All Pedestrians		263	51.8	LOS E	0.2	0.2	0.95	0.95	216.2	213.8	0.99

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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PHASING SUMMARY

Site: 10 [Duffy Avenue / The Esplanade / Chilvers Road (Site Folder: Base AM)] **Network: N101 [Base AM (Network Folder: General)]**

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 115 seconds (Site User-Given Phase Times)

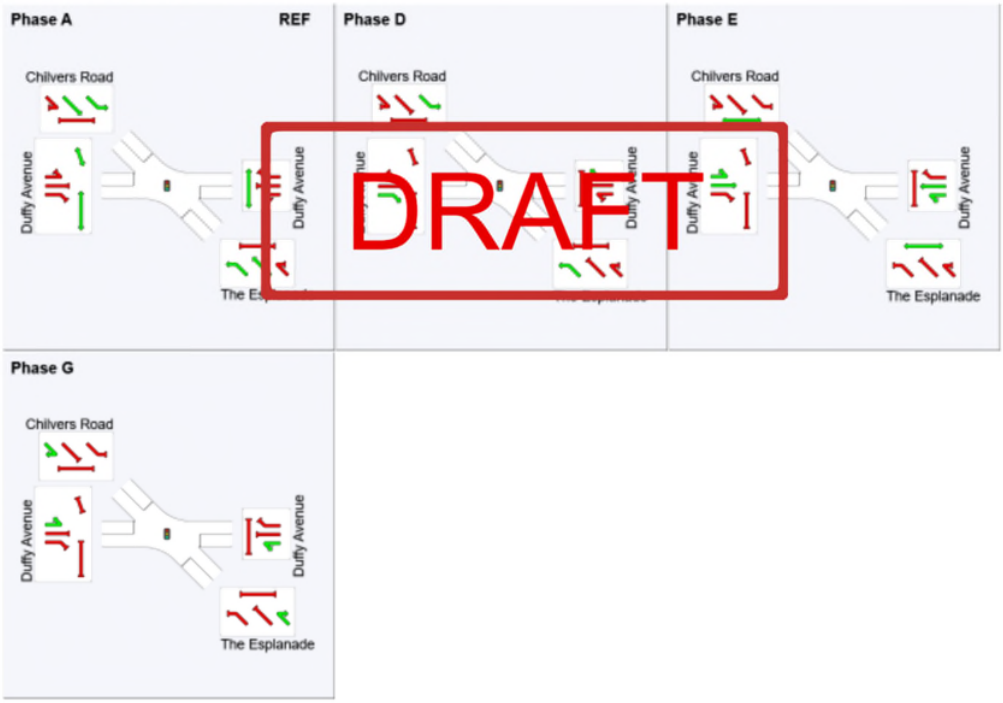
Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, D, E, G
Output Phase Sequence: A, D, E, G

Phase Timing Summary

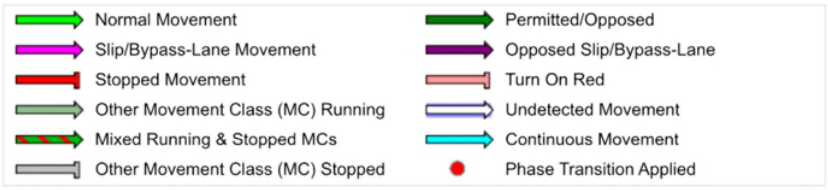
Phase	A	D	E	G
Phase Change Time (sec)	0	43	67	94
Green Time (sec)	34	15	18	14
Phase Time (sec)	43	24	25	23
Phase Split	37%	21%	22%	20%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



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MOVEMENT SUMMARY

▽ Site: 14 [Chilvers Road / Sefton Road (Site Folder: Base AM)]

Network: N101 [Base AM (Network Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Chilvers Road														
1	L2	67	3.1	67	3.1	0.407	4.7	LOS A	0.0	0.0	0.00	0.53	0.00	45.8
3	R2	678	1.7	678	1.7	0.407	4.7	LOS A	0.0	0.0	0.00	0.53	0.00	45.8
Approach		745	1.8	745	1.8	0.407	4.7	NA	0.0	0.0	0.00	0.53	0.00	45.8
East: Sefton Road														
4	L2	573	1.3	573	1.3	0.311	5.9	LOS A	0.0	0.0	0.00	0.53	0.00	50.9
5	T1	62	3.4	62	3.4	0.087	8.2	LOS A	0.1	1.0	0.57	0.74	0.57	51.8
Approach		635	1.5	635	1.5	0.311	6.1	LOS A	0.1	1.0	0.06	0.55	0.06	51.1
West: Sefton Road														
11	T1	68	1.5	68	1.5	0.385	8.6	LOS A	0.7	4.7	0.74	0.96	0.99	41.4
12	R2	84	2.5	84	2.5	0.385	19.5	LOS B	0.7	4.7	0.74	0.96	0.99	35.8
Approach		153	2.1	153	2.1	0.385	14.6	LOS B	0.7	4.7	0.74	0.96	0.99	39.1
All Vehicles		1533	1.7	1533	1.7	0.407	6.3	NA	0.7	4.7	0.10	0.58	0.12	46.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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ATTACHMENT 4 - ITEM 5

MOVEMENT SUMMARY

Site: 11 [Duffy Avenue / Pennant Hills Road. (Site Folder: Base AM)] **Network: N101 [Base AM (Network Folder: General)]**

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 115 seconds (Network Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Pennant Hills Road.														
1	L2	211	6.5	211	6.5	0.593	22.2	LOS B	13.2	97.1	0.67	0.67	0.67	41.8
2	T1	1704	5.4	1704	5.4	*0.593	16.5	LOS B	14.0	102.9	0.69	0.64	0.69	52.7
Approach		1915	5.6	1915	5.6	0.593	17.1	LOS B	14.0	102.9	0.69	0.65	0.69	51.9
North: Pennant Hills Road.														
8	T1	1662	4.1	1662	4.1	0.395	5.8	LOS A	6.9	49.7	0.40	0.36	0.40	63.0
9	R2	164	6.4	164	6.4	*0.818	67.3	LOS E	6.1	45.1	1.00	0.90	1.25	19.9
Approach		1826	4.3	1826	4.3	0.818	11.3	LOS A	6.9	49.7	0.45	0.41	0.47	57.0
West: Duffy Avenue														
10	L2	231	5.9	231	5.9	0.392	36.5	LOS C	6.1	44.8	0.82	0.79	0.82	30.6
12	R2	198	3.2	198	3.2	*0.660	54.6	LOS D	6.6	47.3	0.99	0.83	1.01	25.8
Approach		428	4.7	428	4.7	0.660	44.8	LOS D	6.6	47.3	0.90	0.81	0.91	28.2
All Vehicles		4169	4.9	4169	4.9	0.818	17.4	LOS B	14.0	102.9	0.61	0.56	0.62	50.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
North: Pennant Hills Road.											
P3	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	225.7	226.1	1.00
West: Duffy Avenue											
P4	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	214.8	211.9	0.99
All Pedestrians		105	51.8	LOS E	0.2	0.2	0.95	0.95	220.2	219.0	0.99

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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ATTACHMENT 4 - ITEM 5

PHASING SUMMARY

Site: 11 [Duffy Avenue / Pennant Hills Road. (Site Folder: Base AM)]

Network: N101 [Base AM (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 115 seconds (Network Site User-Given Phase Times)

Timings based on settings in the Network Timing dialog
Phase Times specified by the user
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	0	71	90
Green Time (sec)	66	13	19
Phase Time (sec)	72	19	24
Phase Split	63%	17%	21%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence

REF: Reference Phase
VAR: Variable Phase

Normal Movement
Slip/Bypass-Lane Movement
Stopped Movement
Other Movement Class (MC) Running
Mixed Running & Stopped MCs
Other Movement Class (MC) Stopped
Permitted/Opposed
Opposed Slip/Bypass-Lane
Turn On Red
Undetected Movement
Continuous Movement
Phase Transition Applied

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ATTACHMENT 4 - ITEM 5

MOVEMENT SUMMARY

Site: 5 [Duffy Avenue / Quarter Sessions Road (Site Folder: Base PM)]

Network: N101 [Base PM (Network Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Quarter Sessions Road														
1	L2	41	2.6	41	2.6	0.113	6.1	LOS A	0.3	2.1	0.64	0.62	0.64	37.3
2	T1	31	0.0	31	0.0	0.113	5.8	LOS A	0.3	2.1	0.64	0.62	0.64	37.8
3	R2	22	0.0	22	0.0	0.113	8.9	LOS A	0.3	2.1	0.64	0.62	0.64	35.0
Approach		94	1.1	94	1.1	0.113	6.7	LOS A	0.3	2.1	0.64	0.62	0.64	37.1
East: Duffy Avenue														
4	L2	27	0.0	27	0.0	0.358	2.9	LOS A	1.0	7.1	0.23	0.45	0.23	38.6
5	T1	238	3.5	238	3.5	0.358	2.7	LOS A	1.0	7.1	0.23	0.45	0.23	39.0
6	R2	219	3.8	219	3.8	0.358	5.9	LOS A	1.0	7.1	0.23	0.45	0.23	39.0
Approach		484	3.5	484	3.5	0.358	4.1	LOS A	1.0	7.1	0.23	0.45	0.23	39.0
North: Quarter Sessions Road														
7	L2	105	2.0	105	2.0	0.137	4.3	LOS A	0.3	2.3	0.49	0.53	0.49	36.3
8	T1	15	0.0	15	0.0	0.137	3.9	LOS A	0.3	2.3	0.49	0.53	0.49	38.6
9	R2	13	0.0	13	0.0	0.137	7.1	LOS A	0.3	2.3	0.49	0.53	0.49	38.6
Approach		133	1.6	133	1.6	0.137	4.5	LOS A	0.3	2.3	0.49	0.53	0.49	37.1
West: Duffy Avenue														
10	L2	11	10.0	1	10.0	0.224	4.6	LOS A	0.5	3.9	0.4	0.51	0.48	37.9
11	T1	189	1.7	189	1.7	0.224	4.0	LOS A	0.5	3.9	0.4	0.51	0.48	36.2
12	R2	24	13.0	2	13.0	0.224	7.1	LOS A	0.5	3.9	0.4	0.51	0.48	38.4
Approach		224	3.3	224	3.3	0.224	4.4	LOS A	0.5	3.9	0.4	0.51	0.48	36.7
All Vehicles		935	2.9	935	2.9	0.358	4.5	LOS A	1.0	7.1	0.3	0.50	0.37	38.3

DRAFT

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: 10 [Duffy Avenue / The Esplanade / Chilvers Road (Site Folder: Base PM)]

Network: N101 [Base PM (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 115 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: The Esplanade														
21a	L1	133	0.8	133	0.8	* 0.910	63.3	LOS E	18.7	133.2	1.00	1.08	1.28	19.0
22	T1	334	2.2	334	2.2	0.910	59.5	LOS E	18.7	133.2	1.00	1.08	1.28	19.0
23b	R3	45	11.6	45	11.6	0.246	56.5	LOS D	1.5	11.2	0.94	0.75	0.94	19.9
Approach		512	2.7	512	2.7	0.910	60.2	LOS E	18.7	133.2	0.99	1.05	1.25	19.1
East: Duffy Avenue														
4b	L3	103	1.0	103	1.0	* 0.961	83.9	LOS F	15.4	111.7	1.00	1.22	1.52	21.1
5	T1	238	5.3	238	5.3	0.961	78.9	LOS F	15.4	111.7	1.00	1.22	1.52	11.1
6a	R1	85	3.7	85	3.7	0.478	58.5	LOS E	2.9	20.9	0.99	0.77	0.99	14.2
Approach		426	4.0	426	4.0	0.961	76.0	LOS F	15.4	111.7	1.00	1.13	1.42	14.7
NorthWest: Chilvers Road														
27a	L1	81	3.9	81	3.9	0.650	44.4	LOS D	10.2	72.2	0.94	0.82	0.94	18.7
28	T1	581	0.5	581	0.5	0.650	40.7	LOS C	10.2	72.2	0.95	0.81	0.95	29.8
29b	R3	180	1.8	180	1.8	0.920	77.6	LOS F	7.5	53.3	1.00	1.05	1.50	12.3
Approach		842	1.1	842	1.1	0.920	48.9	LOS D	10.2	72.2	0.96	0.86	1.06	25.2
West: Duffy Avenue														
10b	L3	138	2.3	[illegible]	2.3	0.211	29.2	LOS C	3.0	21.7	[illegible]	0.74	0.68	35.0
11	T1	131	1.6	[illegible]	1.6	[illegible]	41.9	[illegible]	3.8	[illegible]	[illegible]	0.72	0.89	30.5
12a	R1	121	0.0	[illegible]	0.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.83	1.07	31.4
Approach		389	1.4	[illegible]	1.4	[illegible]	43.2	[illegible]	4.2	[illegible]	[illegible]	0.76	0.87	32.1
All Vehicles		2169	2.1	[illegible]	2.1	0.961	55.9	LOS D	18.7	133.2	[illegible]	0.94	1.14	23.2

DRAFT

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
SouthEast: The Esplanade											
P5	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	218.8	217.2	0.99
East: Duffy Avenue											
P2	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	214.8	211.9	0.99
NorthWest: Chilvers Road											
P7	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	221.4	220.5	1.00
West: Duffy Avenue											

P4	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	217.3	215.2	0.99
P4B	Slip/ Bypass	53	51.8	LOS E	0.2	0.2	0.95	0.95	208.9	204.3	0.98
All Pedestrians		263	51.8	LOS E	0.2	0.2	0.95	0.95	216.2	213.8	0.99

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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PHASING SUMMARY

Site: 10 [Duffy Avenue / The Esplanade / Chilvers Road (Site Folder: Base PM)] **Network: N101 [Base PM (Network Folder: General)]**

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 115 seconds (Site User-Given Phase Times)

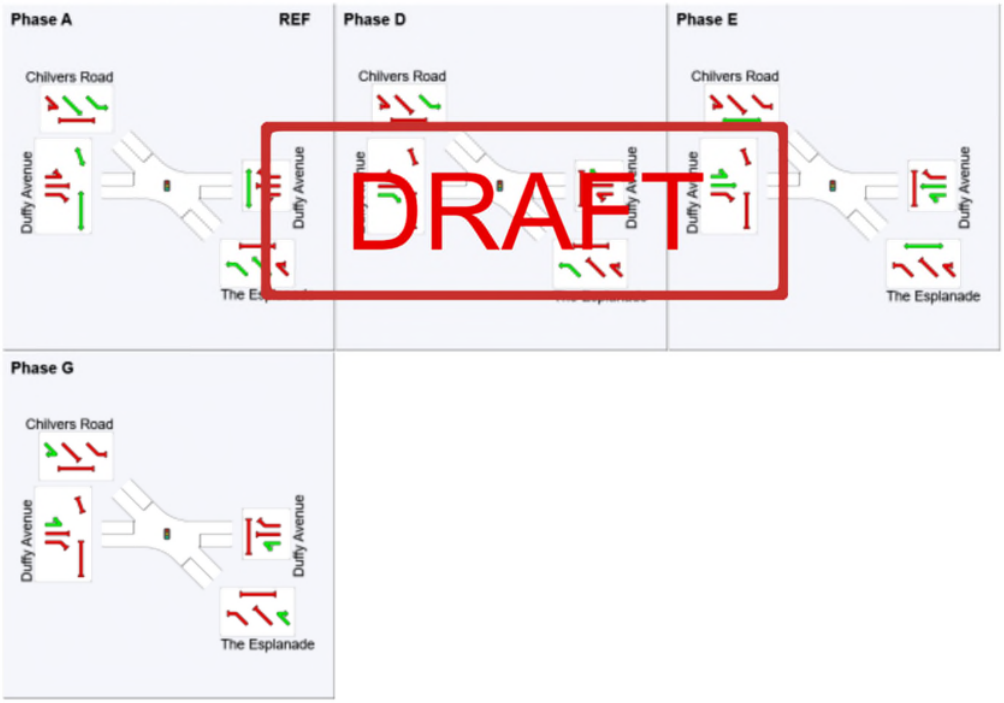
Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, D, E, G
Output Phase Sequence: A, D, E, G

Phase Timing Summary

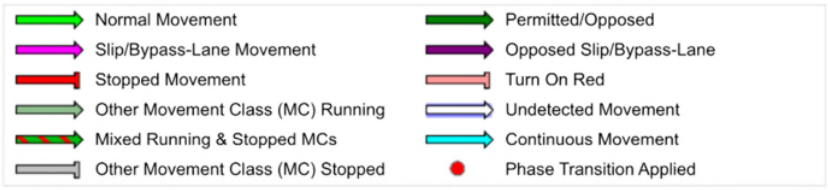
Phase	A	D	E	G
Phase Change Time (sec)	0	39	59	92
Green Time (sec)	30	11	24	14
Phase Time (sec)	39	20	33	23
Phase Split	34%	17%	29%	20%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



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DRAFT

MOVEMENT SUMMARY

▽ Site: 14 [Chilvers Road / Sefton Road (Site Folder: Base PM)]

Network: N101 [Base PM (Network Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Chilvers Road														
1	L2	60	3.5	60	3.5	0.303	4.7	LOS A	0.0	0.0	0.00	0.53	0.00	45.8
3	R2	493	2.4	493	2.4	0.303	4.6	LOS A	0.0	0.0	0.00	0.53	0.00	45.8
Approach		553	2.5	553	2.5	0.303	4.6	NA	0.0	0.0	0.00	0.53	0.00	45.8
East: Sefton Road														
4	L2	752	1.0	752	1.0	0.408	5.9	LOS A	0.0	0.0	0.00	0.53	0.00	50.9
5	T1	48	4.3	48	4.3	0.054	6.8	LOS A	0.1	0.6	0.48	0.64	0.48	52.9
Approach		800	1.2	800	1.2	0.408	5.9	LOS A	0.1	0.6	0.03	0.53	0.03	51.1
West: Sefton Road														
11	T1	39	2.7	39	2.7	0.217	5.7	LOS A	0.3	2.2	0.66	0.80	0.69	42.5
12	R2	46	4.5	46	4.5	0.217	18.0	LOS B	0.3	2.2	0.66	0.80	0.69	37.4
Approach		85	3.7	85	3.7	0.217	12.4	LOS A	0.3	2.2	0.66	0.80	0.69	40.4
All Vehicles		1438	1.8	1438	1.8	0.408	5.8	NA	0.3	2.2	0.06	0.55	0.06	47.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: 11 [Duffy Avenue / Pennant Hills Road. (Site Folder: Base PM)] Network: N101 [Base PM (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 115 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Pennant Hills Road.														
1	L2	262	5.2	262	5.2	0.679	26.3	LOS B	16.2	118.4	0.76	0.75	0.76	38.0
2	T1	1796	5.2	1796	5.2	*0.679	20.3	LOS B	17.1	124.7	0.78	0.72	0.78	50.0
Approach		2058	5.2	2058	5.2	0.679	21.1	LOS B	17.1	124.7	0.78	0.73	0.78	48.9
North: Pennant Hills Road.														
8	T1	1811	3.7	1811	3.7	0.434	6.4	LOS A	8.0	57.9	0.43	0.39	0.43	62.3
9	R2	168	6.3	168	6.3	*0.681	59.8	LOS E	5.8	42.6	1.00	0.84	1.06	21.6
Approach		1979	3.9	1979	3.9	0.681	11.0	LOS A	8.0	57.9	0.48	0.42	0.48	57.4
West: Duffy Avenue														
10	L2	131	10.5	131	10.5	0.212	32.2	LOS C	3.1	23.7	0.74	0.74	0.74	32.0
12	R2	173	3.7	173	3.7	*0.577	53.4	LOS D	5.6	40.5	0.97	0.81	0.97	26.0
Approach		303	6.6	303	6.6	0.577	44.3	LOS D	5.6	40.5	0.87	0.78	0.87	28.3
All Vehicles		4340	4.7	4340	4.7	0.681	18.1	LOS B	17.1	124.7	0.65	0.59	0.65	50.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akcelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
North: Pennant Hills Road.											
P3	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	225.7	226.1	1.00
West: Duffy Avenue											
P4	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	214.8	211.9	0.99
All Pedestrians		105	51.8	LOS E	0.2	0.2	0.95	0.95	220.2	219.0	0.99

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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ATTACHMENT 4 - ITEM 5

PHASING SUMMARY

Site: 11 [Duffy Avenue / Pennant Hills Road. (Site Folder: Base PM)]

Network: N101 [Base PM (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 115 seconds (Network User-Given Cycle Time)

Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	0	68	90
Green Time (sec)	62	16	19
Phase Time (sec)	68	22	25
Phase Split	59%	19%	22%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence

REF: Reference Phase
VAR: Variable Phase

Normal Movement	Permitted/Opposed
Slip/Bypass-Lane Movement	Opposed Slip/Bypass-Lane
Stopped Movement	Turn On Red
Other Movement Class (MC) Running	Undetected Movement
Mixed Running & Stopped MCs	Continuous Movement
Other Movement Class (MC) Stopped	Phase Transition Applied

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MOVEMENT SUMMARY

Site: 5 [Duffy Avenue / Quarter Sessions Road (Site Folder: Base WE)]

Network: N101 [Base WE (Network Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Quarter Sessions Road														
1	L2	27	3.8	27	3.8	0.090	5.2	LOS A	0.2	1.6	0.56	0.59	0.56	37.3
2	T1	13	0.0	13	0.0	0.090	4.8	LOS A	0.2	1.6	0.56	0.59	0.56	37.8
3	R2	41	0.0	41	0.0	0.090	8.0	LOS A	0.2	1.6	0.56	0.59	0.56	35.1
Approach		81	1.3	81	1.3	0.090	6.5	LOS A	0.2	1.6	0.56	0.59	0.56	36.6
East: Duffy Avenue														
4	L2	16	0.0	16	0.0	0.274	2.8	LOS A	0.7	5.0	0.20	0.44	0.20	38.7
5	T1	205	4.1	205	4.1	0.274	2.6	LOS A	0.7	5.0	0.20	0.44	0.20	39.1
6	R2	146	5.8	146	5.8	0.274	5.8	LOS A	0.7	5.0	0.20	0.44	0.20	39.1
Approach		367	4.6	367	4.6	0.274	3.9	LOS A	0.7	5.0	0.20	0.44	0.20	39.1
North: Quarter Sessions Road														
7	L2	149	1.4	149	1.4	0.192	4.9	LOS A	0.5	3.3	0.57	0.59	0.57	36.0
8	T1	12	0.0	12	0.0	0.192	4.6	LOS A	0.5	3.3	0.57	0.59	0.57	38.4
9	R2	13	0.0	13	0.0	0.192	7.8	LOS A	0.5	3.3	0.57	0.59	0.57	38.4
Approach		174	1.2	174	1.2	0.192	5.1	LOS A	0.5	3.3	0.57	0.59	0.57	36.6
West: Duffy Avenue														
10	L2	15	7.1	1	7.1	0.263	4.1	LOS A	0.6	4.6	0.4	0.47	0.43	38.1
11	T1	248	1.3	24	1.3	0.263	3.6	LOS A	0.6	4.6	0.4	0.47	0.43	36.5
12	R2	20	15.8	2	15.8	0.263	7.1	LOS A	0.6	4.6	0.4	0.47	0.43	38.6
Approach		283	2.6	28	2.6	0.263	3.9	LOS A	0.6	4.6	0.4	0.47	0.43	36.9
All Vehicles		905	3.0	90	3.0	0.274	4.4	LOS A	0.7	5.0	0.3	0.49	0.37	38.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: 10 [Duffy Avenue / The Esplanade / Chilvers Road (Site Folder: Base WE)]

Network: N101 [Base WE (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 110 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: The Esplanade														
21a	L1	92	1.1	92	1.1	*0.859	51.6	LOS D	16.5	117.6	1.00	1.00	1.17	21.6
22	T1	380	1.9	380	1.9	0.859	48.0	LOS D	16.5	117.6	1.00	1.00	1.17	21.6
23b	R3	57	9.3	57	9.3	0.340	56.5	LOS E	1.8	13.7	0.96	0.76	0.96	19.9
Approach		528	2.6	528	2.6	0.859	49.5	LOS D	16.5	117.6	1.00	0.98	1.15	21.4
East: Duffy Avenue														
4b	L3	92	1.1	92	1.1	0.839	59.4	LOS E	9.2	67.1	1.00	1.00	1.23	25.6
5	T1	167	7.5	167	7.5	*0.839	54.2	LOS D	9.2	67.1	1.00	1.00	1.23	14.5
6a	R1	81	3.9	81	3.9	0.369	52.9	LOS D	2.5	18.4	0.96	0.76	0.96	15.2
Approach		340	5.0	340	5.0	0.839	55.3	LOS D	9.2	67.1	0.99	0.94	1.17	18.6
NorthWest: Chilvers Road														
27a	L1	93	3.4	93	3.4	0.497	39.0	LOS C	7.6	53.7	0.88	0.77	0.88	20.2
28	T1	456	0.7	456	0.7	0.497	35.3	LOS C	7.6	53.7	0.88	0.76	0.88	31.4
29b	R3	155	2.0	155	2.0	*0.884	70.2	LOS E	5.9	42.0	1.00	1.01	1.43	13.2
Approach		703	1.3	703	1.3	0.884	43.5	LOS D	7.6	53.7	0.91	0.81	1.01	26.3
West: Duffy Avenue														
10b	L3	201	1.6	201	1.6	0.353	33.9	LOS C	4.9	34.7	0.7[illegible]	0.78	0.78	33.3
11	T1	207	1.0	207	1.0	[illegible]620	46.4	LOS [illegible]	6.5	45.6	0.9[illegible]	0.81	0.98	29.3
12a	R1	161	0.0	161	0.0	[illegible]713	[illegible]	LOS E	[illegible]	57.9	1.0[illegible]	0.87	1.10	32.1
Approach		569	0.9	569	0.9	[illegible]713	45.0	LOS D	16.5	45.6	0.9[illegible]	0.81	0.94	31.5
All Vehicles		2141	2.1	2141	2.1	0.884	47.2	LOS D	16.5	117.6	0.9[illegible]	0.87	1.05	25.9

DRAFT

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
SouthEast: The Esplanade											
P5	Full	53	49.3	LOS E	0.2	0.2	0.95	0.95	216.3	217.2	1.00
East: Duffy Avenue											
P2	Full	53	49.3	LOS E	0.2	0.2	0.95	0.95	212.3	211.9	1.00
NorthWest: Chilvers Road											
P7	Full	53	49.3	LOS E	0.2	0.2	0.95	0.95	218.9	220.5	1.01
West: Duffy Avenue											

P4	Full	53	49.3	LOS E	0.2	0.2	0.95	0.95	214.8	215.2	1.00
P4B	Slip/ Bypass	53	49.3	LOS E	0.2	0.2	0.95	0.95	206.4	204.3	0.99
All Pedestrians		263	49.3	LOS E	0.2	0.2	0.95	0.95	213.7	213.8	1.00

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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PHASING SUMMARY

Site: 10 [Duffy Avenue / The Esplanade / Chilvers Road (Site Folder: Base WE)] **Network: N101 [Base WE (Network Folder: General)]**

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 110 seconds (Site User-Given Phase Times)

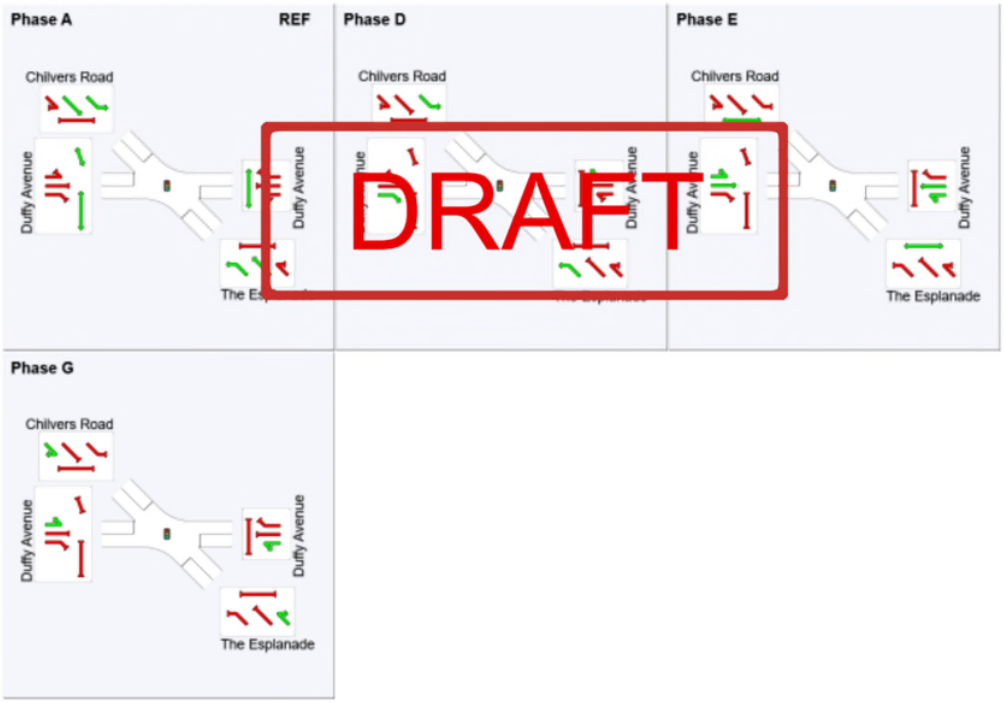
Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, D, E, G
Output Phase Sequence: A, D, E, G

Phase Timing Summary

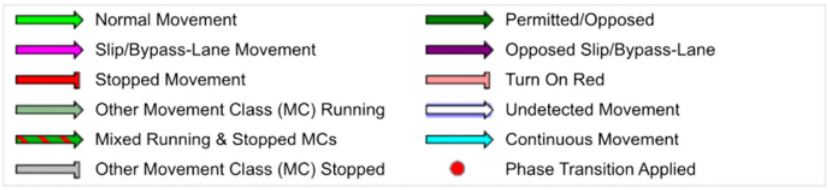
Phase	A	D	E	G
Phase Change Time (sec)	0	40	62	90
Green Time (sec)	31	13	19	12
Phase Time (sec)	40	22	27	21
Phase Split	36%	20%	25%	19%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



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DRAFT

MOVEMENT SUMMARY

▽ Site: 14 [Chilvers Road / Sefton Road (Site Folder: Base WE)]

Network: N101 [Base WE (Network Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Chilvers Road														
1	L2	79	2.7	79	2.7	0.357	4.7	LOS A	0.0	0.0	0.00	0.53	0.00	45.8
3	R2	574	2.0	574	2.0	0.357	4.7	LOS A	0.0	0.0	0.00	0.53	0.00	45.8
Approach		653	2.1	653	2.1	0.357	4.7	NA	0.0	0.0	0.00	0.53	0.00	45.8
East: Sefton Road														
4	L2	631	1.2	631	1.2	0.342	5.9	LOS A	0.0	0.0	0.00	0.53	0.00	50.9
5	T1	53	4.0	53	4.0	0.066	7.4	LOS A	0.1	0.7	0.53	0.69	0.53	52.3
Approach		683	1.4	683	1.4	0.342	6.0	LOS A	0.1	0.7	0.04	0.54	0.04	51.1
West: Sefton Road														
11	T1	60	1.8	60	1.8	0.339	7.4	LOS A	0.6	3.9	0.70	0.90	0.88	42.1
12	R2	82	2.6	82	2.6	0.339	17.7	LOS B	0.6	3.9	0.70	0.90	0.88	36.7
Approach		142	2.2	142	2.2	0.339	13.3	LOS A	0.6	3.9	0.70	0.90	0.88	39.7
All Vehicles		1478	1.8	1478	1.8	0.357	6.1	NA	0.6	3.9	0.09	0.57	0.10	46.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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ATTACHMENT 4 - ITEM 5

MOVEMENT SUMMARY

Site: 11 [Duffy Avenue / Pennant Hills Road. (Site Folder: Base WE)]

Network: N101 [Base WE (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 115 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Pennant Hills Road.														
1	L2	226	6.0	226	6.0	0.700	26.1	LOS B	17.2	125.6	0.77	0.75	0.77	38.5
2	T1	1936	4.8	1936	4.8	*0.700	20.1	LOS B	18.1	131.7	0.79	0.73	0.79	50.2
Approach		2162	4.9	2162	4.9	0.700	20.7	LOS B	18.1	131.7	0.79	0.73	0.79	49.3
North: Pennant Hills Road.														
8	T1	1713	3.9	1713	3.9	0.421	7.1	LOS A	7.9	57.0	0.44	0.40	0.44	61.6
9	R2	135	7.8	135	7.8	*0.678	62.5	LOS E	4.7	35.2	1.00	0.83	1.08	21.0
Approach		1847	4.2	1847	4.2	0.678	11.2	LOS A	7.9	57.0	0.48	0.43	0.49	57.3
West: Duffy Avenue														
10	L2	164	8.3	164	8.3	0.269	33.6	LOS C	4.0	30.3	0.76	0.76	0.76	31.5
12	R2	225	2.8	225	2.8	*0.678	53.3	LOS D	7.4	53.4	0.99	0.84	1.01	26.1
Approach		389	5.1	389	5.1	0.678	45.0	LOS D	7.4	53.4	0.89	0.81	0.91	28.1
All Vehicles		4399	4.6	4399	4.6	0.700	18.9	LOS B	18.1	131.7	0.67	0.61	0.67	49.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akcelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
North: Pennant Hills Road.											
P3	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	225.7	226.1	1.00
West: Duffy Avenue											
P4	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	214.8	211.9	0.99
All Pedestrians		105	51.8	LOS E	0.2	0.2	0.95	0.95	220.2	219.0	0.99

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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ATTACHMENT 4 - ITEM 5

PHASING SUMMARY

Site: 11 [Duffy Avenue / Pennant Hills Road. (Site Folder: Base WE)]

Network: N101 [Base WE (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 115 seconds (Network User-Given Cycle Time)

Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	0	69	88
Green Time (sec)	63	13	21
Phase Time (sec)	69	19	27
Phase Split	60%	17%	23%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence

REF: Reference Phase
VAR: Variable Phase

Normal Movement	Permitted/Opposed
Slip/Bypass-Lane Movement	Opposed Slip/Bypass-Lane
Stopped Movement	Turn On Red
Other Movement Class (MC) Running	Undetected Movement
Mixed Running & Stopped MCs	Continuous Movement
Other Movement Class (MC) Stopped	Phase Transition Applied

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Project: P:\P5524 Westleigh Park Traffic Impact and Access Study\Technical\Models\SIDRA\P5524.001S Westleigh Park Traffic Impact and Access Study model_WE.sip9

MOVEMENT SUMMARY

Site: 5 [Duffy Avenue / Quarter Sessions Road - Copy (Site Folder: 2032 Base AM)]

Network: N101 [2032 Base AM (Network Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Quarter Sessions Road														
1	L2	65	1.6	65	1.6	0.192	4.7	LOS A	0.5	3.6	0.55	0.59	0.55	37.6
2	T1	42	0.0	42	0.0	0.192	4.4	LOS A	0.5	3.6	0.55	0.59	0.55	38.1
3	R2	76	0.0	76	0.0	0.192	7.6	LOS A	0.5	3.6	0.55	0.59	0.55	35.5
Approach		183	0.6	183	0.6	0.192	5.8	LOS A	0.5	3.6	0.55	0.59	0.55	37.1
East: Duffy Avenue														
4	L2	47	0.0	45	0.0	0.297	4.1	LOS A	0.7	5.2	0.43	0.56	0.43	38.3
5	T1	123	6.8	118	6.8	0.297	4.0	LOS A	0.7	5.2	0.43	0.56	0.43	38.7
6	R2	147	5.7	141	5.7	0.297	7.1	LOS A	0.7	5.2	0.43	0.56	0.43	38.7
Approach		318	5.3	304 N1	5.3	0.297	5.5	LOS A	0.7	5.2	0.43	0.56	0.43	38.6
North: Quarter Sessions Road														
7	L2	214	1.0	214	1.0	0.345	5.6	LOS A	0.9	6.7	0.66	0.67	0.66	35.5
8	T1	65	0.0	65	0.0	0.345	5.3	LOS A	0.9	6.7	0.66	0.67	0.66	38.1
9	R2	21	0.0	21	0.0	0.345	8.5	LOS A	0.9	6.7	0.66	0.67	0.66	38.1
Approach		300	0.7	300	0.7	0.345	5.8	LOS A	0.9	6.7	0.66	0.67	0.66	36.6
West: Duffy Avenue														
10	L2	16	6.7	1	6.7	0.293	4.5	LOS A	0.7	5.2	0.5	0.58	0.51	37.7
11	T1	173	1.8	173	1.8	0.293	4.1	LOS A	0.7	5.2	0.5	0.58	0.51	35.7
12	R2	106	3.0	106	3.0	0.293	7.1	LOS A	0.7	5.2	0.5	0.58	0.51	38.2
Approach		295	2.5	295	2.5	0.293	5.2	LOS A	0.7	5.2	0.5	0.58	0.51	37.1
All Vehicles		1096	2.5	1082 N1	2.5	0.345	5.5	LOS A	0.9	6.7	0.5	0.60	0.54	37.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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MOVEMENT SUMMARY

Site: 10 [Duffy Avenue / The Esplanade / Chilvers Road - Copy (Site Folder: 2032 Base AM)]

Network: N101 [2032 Base AM (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 115 seconds (Network Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: The Esplanade														
21a	L1	47	2.1	47	2.1	*1.106	167.1	LOS F	43.6	308.6	1.00	1.74	2.09	9.0
22	T1	587	1.2	587	1.2	1.106	163.6	LOS F	43.6	308.6	1.00	1.74	2.09	9.0
23b	R3	136	3.7	136	3.7	0.704	61.5	LOS E	4.8	34.7	1.00	0.85	1.11	18.9
Approach		770	1.7	770	1.7	1.106	145.8	LOS F	43.6	308.6	1.00	1.58	1.92	10.0
East: Duffy Avenue														
4b	L3	108	0.9	108	0.9	*1.064	143.1	LOS F	17.8	129.5	1.00	1.53	2.01	14.6
5	T1	186	6.5	186	6.5	1.064	137.9	LOS F	17.8	129.5	1.00	1.53	2.01	6.9
6a	R1	99	3.0	99	3.0	0.405	53.9	LOS D	3.2	23.1	0.96	0.77	0.96	15.0
Approach		393	4.1	393	4.1	1.064	118.2	LOS F	17.8	129.5	0.99	1.34	1.75	10.7
NorthWest: Chilvers Road														
27a	L1	113	2.7	113	2.7	0.518	39.2	LOS C	8.9	63.4	0.91	0.80	0.91	20.1
28	T1	488	0.6	488	0.6	0.518	36.5	LOS C	9.0	63.4	0.93	0.80	0.93	31.1
29b	R3	116	2.6	116	2.6	0.596	54.4	LOS D	3.8	27.1	0.95	0.79	0.96	15.9
Approach		717	1.3	717	1.3	0.596	39.8	LOS C	9.0	63.4	0.93	0.80	0.93	27.7
West: Duffy Avenue														
10b	L3	195	1.5	195	1.5	0.837	86.5	LOS F	5.6	39.6	0.89	0.78	0.80	32.5
11	T1	250	0.8	250	0.8	0.823	56.8	LOS E	9.1	64.3	1.00	0.97	1.19	26.8
12a	R1	210	0.0	210	0.0	0.842	63.7	LOS E	7.9	55.0	1.00	0.97	1.25	30.8
Approach		655	0.8	655	0.8	0.842	53.0	LOS D	9.1	64.3	0.97	0.91	1.09	29.8
All Vehicles		2535	1.7	2535	1.7	1.106	87.5	LOS F	43.6	308.6	0.96	1.15	1.40	18.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
SouthEast: The Esplanade											
P5	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	218.8	217.2	0.99
East: Duffy Avenue											
P2	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	214.8	211.9	0.99
NorthWest: Chilvers Road											
P7	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	221.4	220.5	1.00

West: Duffy Avenue											
P4	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	217.3	215.2	0.99
P4B	Slip/ Bypass	53	51.8	LOS E	0.2	0.2	0.95	0.95	208.9	204.3	0.98
All Pedestrians		263	51.8	LOS E	0.2	0.2	0.95	0.95	216.2	213.8	0.99

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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PHASING SUMMARY

Site: 10 [Duffy Avenue / The Esplanade / Chilvers Road - Copy (Site Folder: 2032 Base AM)] **Network: N101 [2032 Base AM (Network Folder: General)]**

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 115 seconds (Network Site User-Given Phase Times)

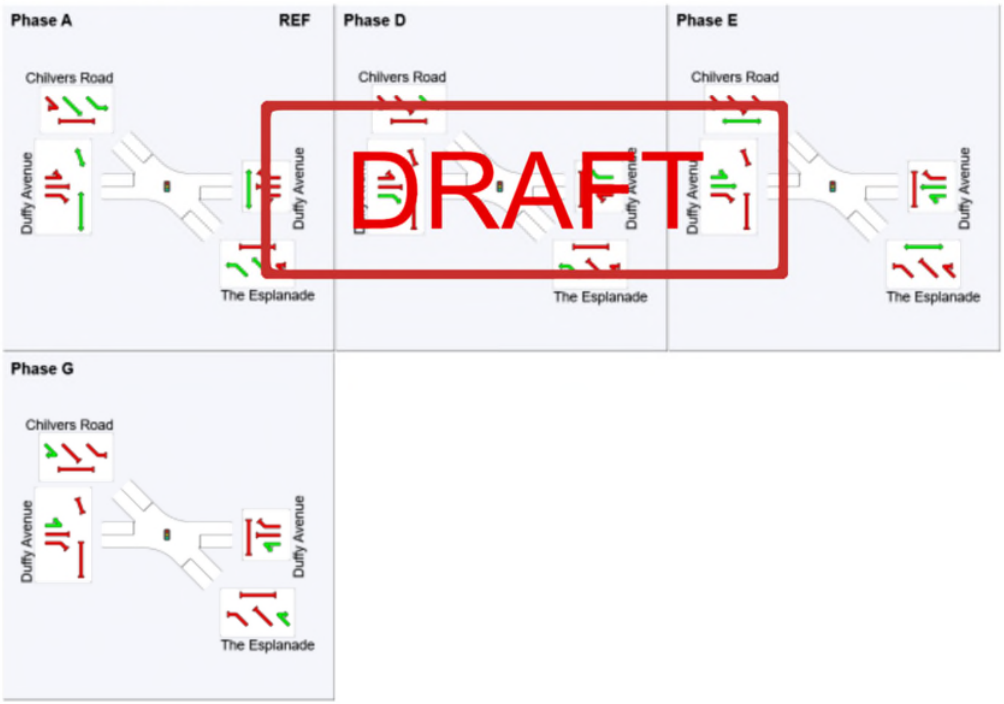
Timings based on settings in the Network Timing dialog
Phase Times specified by the user
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, D, E, G
Output Phase Sequence: A, D, E, G

Phase Timing Summary

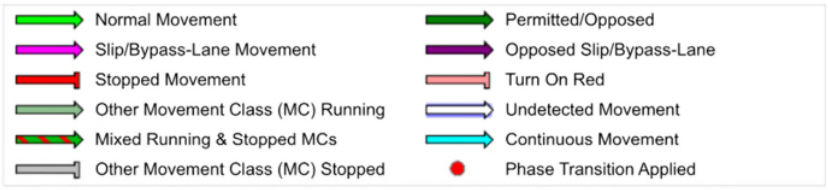
Phase	A	D	E	G
Phase Change Time (sec)	0	43	67	94
Green Time (sec)	34	15	18	14
Phase Time (sec)	43	24	25	23
Phase Split	37%	21%	22%	20%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



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Project: P:\P5524 Westleigh Park Traffic Impact and Access Study\Technical\Models\SIDRA\P5524.001S Westleigh Park Traffic Impact and Access Study model_AM.sip9

DRAFT

MOVEMENT SUMMARY

Site: 14v [Chilvers Road / Sefton Road - Copy - Conversion (Site Folder: 2032 Base AM)]

Network: N101 [2032 Base AM (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 115 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Chilvers Road														
1	L2	109	1.9	103	1.9	0.816	51.3	LOS D	15.1	107.3	1.00	0.91	1.08	27.0
3	R2	815	1.4	765	1.4	* 0.816	52.5	LOS D	15.1	107.3	1.00	0.91	1.08	26.7
Approach		924	1.5	868 N1	1.5	0.816	52.4	LOS D	15.1	107.3	1.00	0.91	1.08	26.7
East: Sefton Road														
4	L2	631	1.2	631	1.2	0.664	14.2	LOS A	7.0	49.1	0.68	0.79	0.68	41.5
5	T1	104	2.0	104	2.0	* 0.815	47.4	LOS D	3.3	23.5	0.78	0.78	1.18	33.8
Approach		735	1.3	735	1.3	0.815	18.9	LOS B	7.0	49.1	0.70	0.79	0.75	39.3
West: Sefton Road														
11	T1	82	1.3	82	1.3	0.076	12.4	LOS A	1.3	9.0	0.49	0.39	0.49	42.8
12	R2	124	1.7	124	1.7	* 0.649	34.2	LOS C	2.3	16.3	1.00	0.81	1.05	26.0
Approach		206	1.5	206	1.5	0.649	25.5	LOS B	2.3	16.3	0.80	0.64	0.83	33.4
All Vehicles		1865	1.4	1809 N1	1.5	0.816	35.7	LOS C	15.1	107.3	0.85	0.83	0.92	30.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)
N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Chilvers Road											
P1	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	218.8	217.2	0.99
West: Sefton Road											
P4	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	214.8	211.9	0.99
All Pedestrians		105	51.8	LOS E	0.2	0.2	0.95	0.95	216.8	214.6	0.99

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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ATTACHMENT 4 - ITEM 5

PHASING SUMMARY

Site: 14v [Chilvers Road / Sefton Road - Copy - Conversion (Site Folder: 2032 Base AM)]

Network: N101 [2032 Base AM (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 115 seconds (Network User-Given Cycle Time)

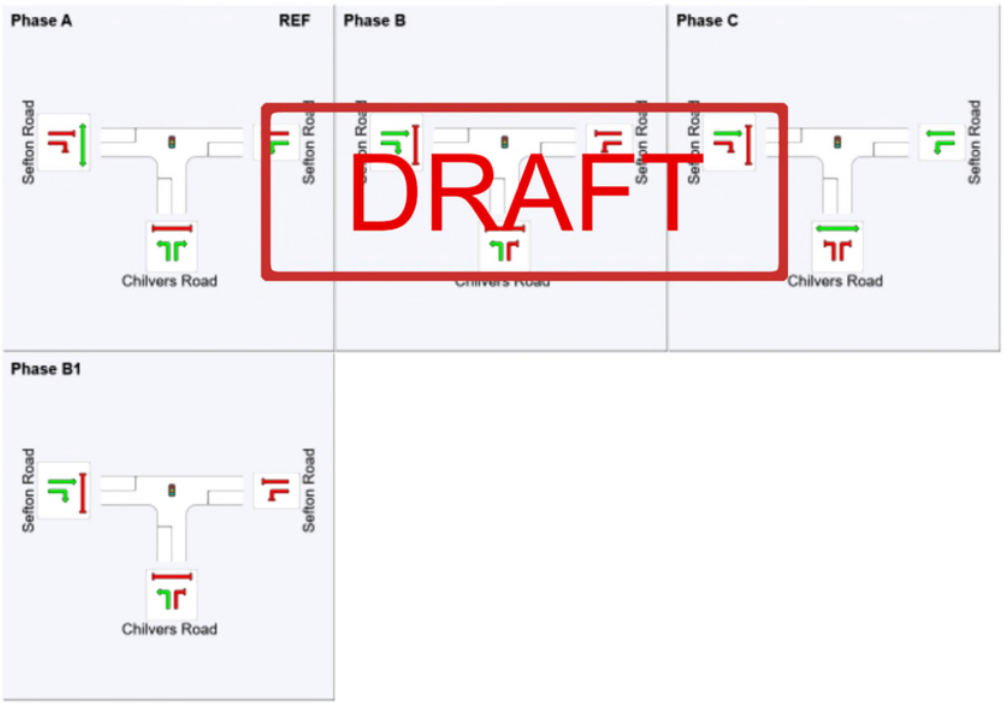
Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Convert Function Default
Reference Phase: Phase A
Input Phase Sequence: A, B, C, B1
Output Phase Sequence: A, B, C, B1

Phase Timing Summary

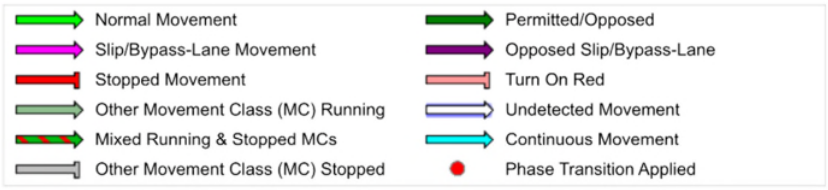
Phase	A	B	C	B1
Phase Change Time (sec)	0	42	57	100
Green Time (sec)	33	6	34	6
Phase Time (sec)	42	15	43	15
Phase Split	37%	13%	37%	13%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



Organisation: TRANSPORT FOR NSW | Licence: NETWORK / Enterprise | Processed: Thursday, 21 July 2022 9:11:52 AM
Project: P:\P5524 Westleigh Park Traffic Impact and Access Study\Technical\Models\SIDRA\P5524.001S Westleigh Park Traffic Impact and Access Study model_AM.sip9

DRAFT

MOVEMENT SUMMARY

Site: 11 [Duffy Avenue / Pennant Hills Road. - Copy (Site Folder: 2032 Base AM)]

Network: N101 [2032 Base AM (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 115 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Pennant Hills Road.														
1	L2	220	6.2	220	6.2	0.643	22.8	LOS B	15.0	109.9	0.70	0.70	0.70	41.3
2	T1	1862	5.0	1862	5.0	*0.643	17.3	LOS B	16.0	116.5	0.72	0.67	0.72	52.2
Approach		2082	5.1	2082	5.1	0.643	17.9	LOS B	16.0	116.5	0.72	0.68	0.72	51.4
North: Pennant Hills Road.														
8	T1	1729	3.9	1729	3.9	0.410	5.9	LOS A	7.3	52.5	0.40	0.37	0.40	62.9
9	R2	184	5.7	184	5.7	*0.913	76.7	LOS F	7.5	55.1	1.00	0.99	1.47	18.1
Approach		1914	4.1	1914	4.1	0.913	12.7	LOS A	7.5	55.1	0.46	0.43	0.51	55.7
West: Duffy Avenue														
10	L2	240	5.7	240	5.7	0.407	36.6	LOS C	6.4	46.8	0.82	0.79	0.82	30.5
12	R2	248	2.5	248	2.5	*0.824	61.1	LOS E	9.1	65.0	1.00	0.93	1.20	24.4
Approach		488	4.1	488	4.1	0.824	49.1	LOS D	9.1	65.0	0.91	0.86	1.01	27.1
All Vehicles		4484	4.6	4484	4.6	0.913	19.1	LOS B	16.0	116.5	0.63	0.59	0.66	48.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akcelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
North: Pennant Hills Road.											
P3	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	225.7	226.1	1.00
West: Duffy Avenue											
P4	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	214.8	211.9	0.99
All Pedestrians		105	51.8	LOS E	0.2	0.2	0.95	0.95	220.2	219.0	0.99

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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PHASING SUMMARY

Site: 11 [Duffy Avenue / Pennant Hills Road. - Copy (Site Folder: 2032 Base AM)] **Network: N101 [2032 Base AM (Network Folder: General)]**

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 115 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	0	71	90
Green Time (sec)	66	13	19
Phase Time (sec)	72	19	24
Phase Split	63%	17%	21%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence

REF: Reference Phase
VAR: Variable Phase

Normal Movement	Permitted/Opposed
Slip/Bypass-Lane Movement	Opposed Slip/Bypass-Lane
Stopped Movement	Turn On Red
Other Movement Class (MC) Running	Undetected Movement
Mixed Running & Stopped MCs	Continuous Movement
Other Movement Class (MC) Stopped	Phase Transition Applied

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MOVEMENT SUMMARY

Site: 5 [Duffy Avenue / Quarter Sessions Road - 2032 (Site Folder: 2032 Base PM)]

Network: N101 [2032 Base PM (Network Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Quarter Sessions Road														
1	L2	35	3.0	35	3.0	0.115	6.3	LOS A	0.3	2.2	0.66	0.64	0.66	37.1
2	T1	28	0.0	28	0.0	0.115	6.0	LOS A	0.3	2.2	0.66	0.64	0.66	37.6
3	R2	28	0.0	28	0.0	0.115	9.1	LOS A	0.3	2.2	0.66	0.64	0.66	34.7
Approach		92	1.1	92	1.1	0.115	7.1	LOS A	0.3	2.2	0.66	0.64	0.66	36.8
East: Duffy Avenue														
4	L2	20	0.0	19	0.0	0.399	3.3	LOS A	1.1	8.1	0.33	0.49	0.33	38.5
5	T1	239	3.5	226	3.5	0.399	3.1	LOS A	1.1	8.1	0.33	0.49	0.33	38.8
6	R2	267	3.1	253	3.1	0.399	6.3	LOS A	1.1	8.1	0.33	0.49	0.33	38.8
Approach		526	3.2	498 N1	3.2	0.399	4.7	LOS A	1.1	8.1	0.33	0.49	0.33	38.8
North: Quarter Sessions Road														
7	L2	136	1.6	136	1.6	0.199	4.6	LOS A	0.5	3.6	0.55	0.57	0.55	36.1
8	T1	34	0.0	34	0.0	0.199	4.3	LOS A	0.5	3.6	0.55	0.57	0.55	38.5
9	R2	17	0.0	17	0.0	0.199	7.5	LOS A	0.5	3.6	0.55	0.57	0.55	38.5
Approach		186	1.1	186	1.1	0.199	4.8	LOS A	0.5	3.6	0.55	0.57	0.55	37.1
West: Duffy Avenue														
10	L2	13	8.3	1	8.3	0.265	4.9	LOS A	0.7	4.8	0.5	0.56	0.54	37.8
11	T1	202	1.6	20	1.6	0.265	4.4	LOS A	0.7	4.8	0.5	0.56	0.54	35.9
12	R2	41	7.7	4	7.7	0.265	7.1	LOS A	0.7	4.8	0.5	0.56	0.54	38.3
Approach		256	2.9	25	2.9	0.265	4.9	LOS A	0.7	4.8	0.5	0.56	0.54	36.7
All Vehicles		1060	2.6	103 N1	2.7	0.399	5.0	LOS A	1.1	8.1	0.4	0.54	0.45	38.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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MOVEMENT SUMMARY

Site: 10 [Duffy Avenue / The Esplanade / Chilvers Road - 2032 (Site Folder: 2032 Base PM)]

Network: N101 [2032 Base PM (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 115 seconds (Network Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: The Esplanade														
21a	L1	154	0.7	154	0.7	*1.013	104.1	LOS F	28.5	202.3	1.00	1.35	1.65	13.3
22	T1	383	1.9	383	1.9	1.013	100.4	LOS F	28.5	202.3	1.00	1.35	1.65	13.3
23b	R3	65	8.1	65	8.1	0.374	58.5	LOS E	2.2	16.2	0.97	0.76	0.97	19.5
Approach		602	2.3	602	2.3	1.013	96.8	LOS F	28.5	202.3	1.00	1.29	1.57	13.8
East: Duffy Avenue														
4b	L3	129	0.8	129	0.8	*1.073	148.5	LOS F	25.0	179.9	1.00	1.56	2.01	14.2
5	T1	266	4.7	266	4.7	1.073	143.5	LOS F	25.0	179.9	1.00	1.56	2.01	6.7
6a	R1	101	3.1	101	3.1	0.621	60.8	LOS E	3.5	25.5	1.00	0.81	1.05	13.8
Approach		497	3.4	497	3.4	1.073	128.0	LOS F	25.0	179.9	1.00	1.41	1.81	9.9
NorthWest: Chilvers Road														
27a	L1	91	3.5	91	3.5	0.673	44.0	LOS D	11.0	78.1	0.96	0.83	0.96	18.8
28	T1	618	0.5	618	0.5	0.673	40.3	LOS C	11.0	78.1	0.95	0.82	0.95	29.9
29b	R3	195	1.6	195	1.6	1.071	148.5	LOS F	11.8	84.0	1.00	1.33	2.12	7.1
Approach		903	1.0	903	1.0	1.071	64.0	LOS E	11.8	84.0	0.96	0.93	1.20	21.6
West: Duffy Avenue														
10b	L3	152	2.1	152	2.1	0.251	29.4	LOS C	3.4	24.1	0.69	0.74	0.69	34.9
11	T1	172	1.2	172	1.2	0.408	42.9	LOS C	5.1	36.1	0.91	0.74	0.91	30.5
12a	R1	158	0.0	158	0.0	0.950	81.6	LOS F	6.8	47.3	1.00	1.13	1.62	27.8
Approach		481	1.1	481	1.1	0.950	51.0	LOS D	6.8	47.3	0.87	0.87	1.07	30.3
All Vehicles		2483	1.8	2483	1.8	1.073	82.2	LOS F	28.5	202.3	0.96	1.10	1.39	18.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
SouthEast: The Esplanade											
P5	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	218.8	217.2	0.99
East: Duffy Avenue											
P2	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	214.8	211.9	0.99
NorthWest: Chilvers Road											
P7	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	221.4	220.5	1.00

West: Duffy Avenue											
P4	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	217.3	215.2	0.99
P4B	Slip/ Bypass	53	51.8	LOS E	0.2	0.2	0.95	0.95	208.9	204.3	0.98
All Pedestrians		263	51.8	LOS E	0.2	0.2	0.95	0.95	216.2	213.8	0.99

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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PHASING SUMMARY

Site: 10 [Duffy Avenue / The Esplanade / Chilvers Road - 2032 (Site Folder: 2032 Base PM)] **Network: N101 [2032 Base PM (Network Folder: General)]**

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 115 seconds (Network Site User-Given Phase Times)

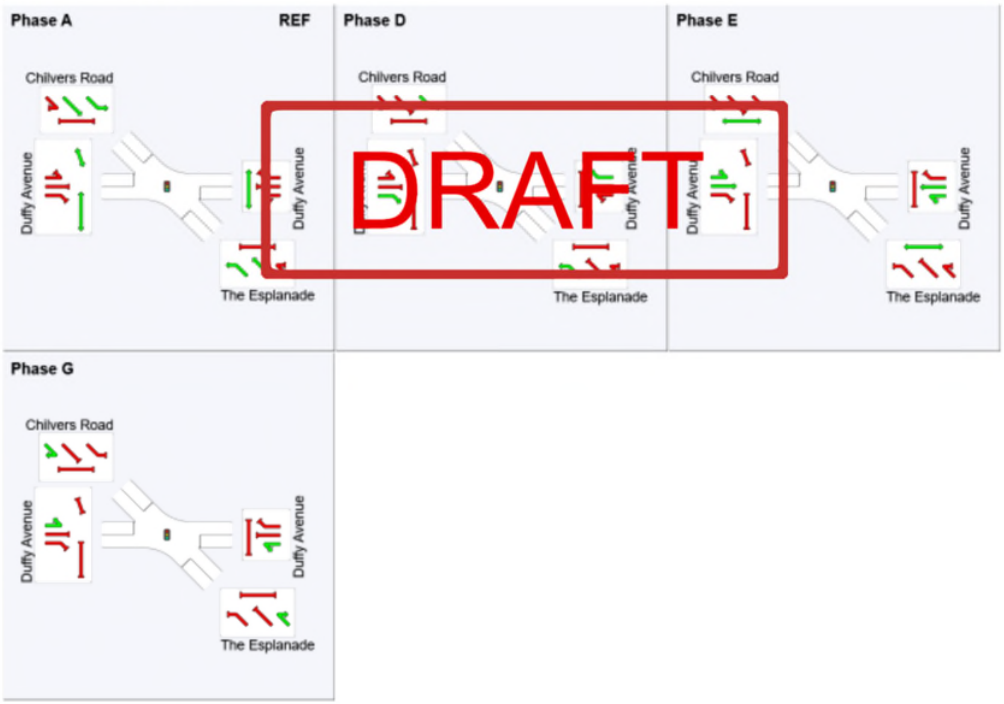
Timings based on settings in the Network Timing dialog
Phase Times specified by the user
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, D, E, G
Output Phase Sequence: A, D, E, G

Phase Timing Summary

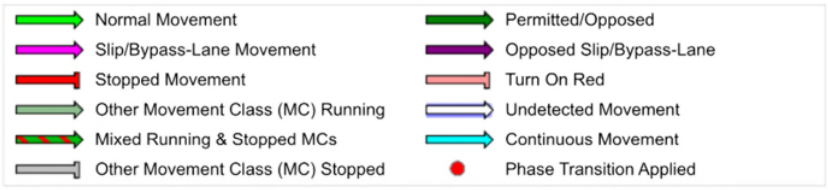
Phase	A	D	E	G
Phase Change Time (sec)	0	40	59	93
Green Time (sec)	31	10	25	13
Phase Time (sec)	40	19	34	22
Phase Split	35%	17%	30%	19%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



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ATTACHMENT 4 - ITEM 5

MOVEMENT SUMMARY

Site: 14v [Chilvers Road / Sefton Road - 2032 (Site Folder: 2032 Base PM)]

Network: N101 [2032 Base PM (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 115 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Chilvers Road														
1	L2	117	1.8	116	1.8	0.577	42.7	LOS D	9.9	70.8	0.96	0.85	0.96	29.2
3	R2	522	2.2	518	2.2	0.577	43.7	LOS D	9.9	70.8	0.96	0.85	0.96	28.9
Approach		639	2.1	634 N1	2.1	0.577	43.5	LOS D	9.9	70.8	0.96	0.85	0.96	28.9
East: Sefton Road														
4	L2	812	0.9	812	0.9	* 0.820	17.1	LOS B	11.2	79.3	0.80	0.85	0.82	38.9
5	T1	83	2.5	83	2.5	0.818	49.8	LOS D	2.7	19.2	0.78	0.77	1.25	33.0
Approach		895	1.1	895	1.1	0.820	20.2	LOS B	11.2	79.3	0.80	0.84	0.86	37.7
West: Sefton Road														
11	T1	56	1.9	56	1.9	0.053	12.7	LOS A	0.9	6.2	0.49	0.38	0.49	42.6
12	R2	97	2.2	97	2.2	* 0.507	33.1	LOS C	1.7	12.3	0.99	0.77	0.99	26.4
Approach		153	2.1	153	2.1	0.507	25.6	LOS B	1.7	12.3	0.80	0.63	0.80	33.1
All Vehicles		1686	1.6	1681 N1	1.6	0.820	29.5	LOS C	11.2	79.3	0.86	0.82	0.90	32.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)
N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Chilvers Road											
P1	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	218.8	217.2	0.99
West: Sefton Road											
P4	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	214.8	211.9	0.99
All Pedestrians		105	51.8	LOS E	0.2	0.2	0.95	0.95	216.8	214.6	0.99

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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ATTACHMENT 4 - ITEM 5

PHASING SUMMARY

Site: 14v [Chilvers Road / Sefton Road - 2032 (Site Folder: 2032 Base PM)] **Network: N101 [2032 Base PM (Network Folder: General)]**

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 115 seconds (Network User-Given Cycle Time)

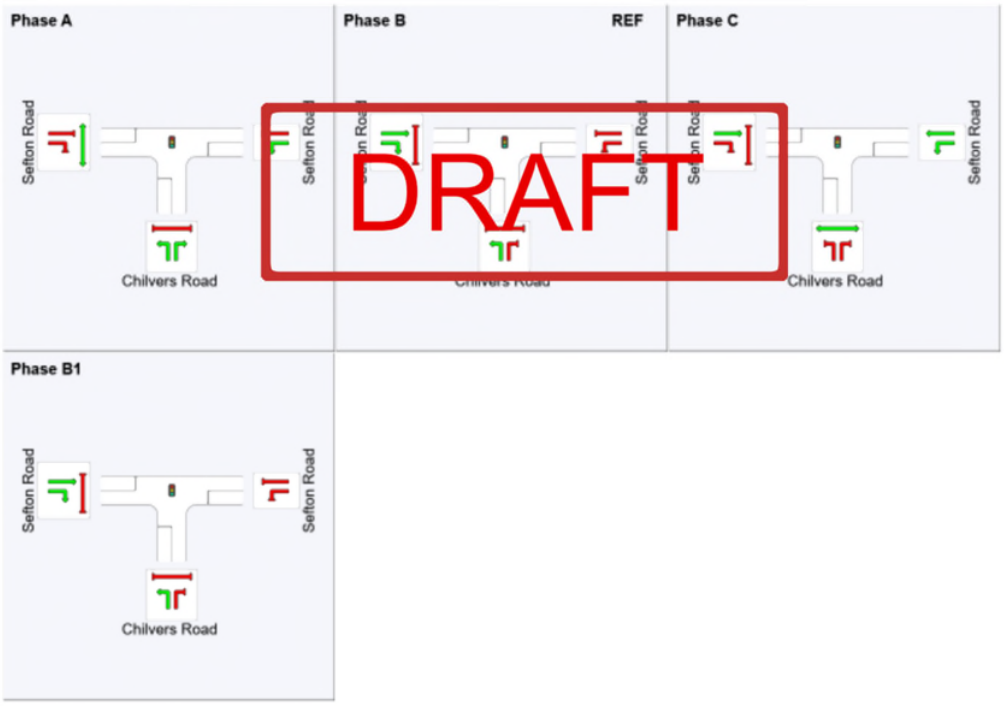
Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Convert Function Default
Reference Phase: Phase B
Input Phase Sequence: A, B, C, B1
Output Phase Sequence: A, B, C, B1

Phase Timing Summary

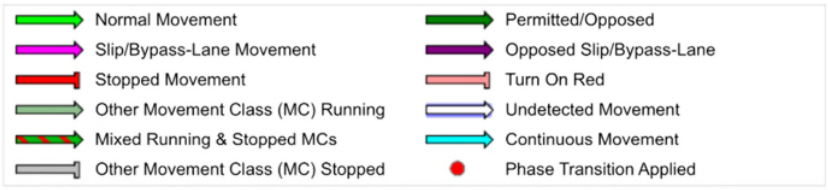
Phase	A	B	C	B1
Phase Change Time (sec)	72	0	15	57
Green Time (sec)	34	6	33	6
Phase Time (sec)	43	15	42	15
Phase Split	37%	13%	37%	13%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



Organisation: TRANSPORT FOR NSW | Licence: NETWORK / Enterprise | Processed: Thursday, 21 July 2022 9:30:32 AM
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DRAFT

MOVEMENT SUMMARY

Site: 11 [Duffy Avenue / Pennant Hills Road. - 2032 (Site Folder: 2032 Base PM)]

Network: N101 [2032 Base PM (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 125 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Pennant Hills Road.														
1	L2	272	5.0	272	5.0	0.665	22.9	LOS B	17.2	125.6	0.69	0.70	0.69	40.9
2	T1	1978	4.7	1978	4.7	*0.665	17.3	LOS B	18.5	134.5	0.71	0.67	0.71	52.1
Approach		2249	4.7	2249	4.7	0.665	18.0	LOS B	18.5	134.5	0.71	0.68	0.71	51.2
North: Pennant Hills Road.														
8	T1	2036	3.3	2036	3.3	0.463	5.5	LOS A	8.9	64.1	0.39	0.36	0.39	63.3
9	R2	205	5.1	205	5.1	*0.985	103.4	LOS F	10.4	76.0	1.00	1.08	1.66	14.4
Approach		2241	3.5	2241	3.5	0.985	14.5	LOS A	10.4	76.0	0.45	0.42	0.51	54.3
West: Duffy Avenue														
10	L2	137	10.0	137	10.0	0.247	38.2	LOS C	3.8	28.5	0.78	0.76	0.78	30.0
12	R2	181	3.5	181	3.5	*0.657	60.0	LOS E	6.6	47.3	0.99	0.83	1.01	24.6
Approach		318	6.3	318	6.3	0.657	50.6	LOS D	6.6	47.3	0.90	0.80	0.91	26.7
All Vehicles		4808	4.2	4808	4.2	0.985	18.5	LOS B	18.5	134.5	0.60	0.57	0.63	49.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akcelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
North: Pennant Hills Road.											
P3	Full	53	56.8	LOS E	0.2	0.2	0.95	0.95	230.7	226.1	0.98
West: Duffy Avenue											
P4	Full	53	56.8	LOS E	0.2	0.2	0.95	0.95	219.8	211.9	0.96
All Pedestrians		105	56.8	LOS E	0.2	0.2	0.95	0.95	225.2	219.0	0.97

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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PHASING SUMMARY

Site: 11 [Duffy Avenue / Pennant Hills Road. - 2032 (Site Folder: 2032 Base PM)] **Network: N101 [2032 Base PM (Network Folder: General)]**

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 125 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	0	79	100
Green Time (sec)	75	15	19
Phase Time (sec)	81	21	23
Phase Split	65%	17%	18%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence

REF: Reference Phase
VAR: Variable Phase

Normal Movement	Permitted/Opposed
Slip/Bypass-Lane Movement	Opposed Slip/Bypass-Lane
Stopped Movement	Turn On Red
Other Movement Class (MC) Running	Undetected Movement
Mixed Running & Stopped MCs	Continuous Movement
Other Movement Class (MC) Stopped	Phase Transition Applied

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MOVEMENT SUMMARY

Site: 5 [Duffy Avenue / Quarter Sessions Road - 2032 (Site Folder: 2032 Base WE)]

Network: N101 [2032 Base WE (Network Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Quarter Sessions Road														
1	L2	55	1.9	55	1.9	0.124	5.5	LOS A	0.3	2.3	0.60	0.59	0.60	37.5
2	T1	29	0.0	29	0.0	0.124	5.1	LOS A	0.3	2.3	0.60	0.59	0.60	38.0
3	R2	24	0.0	24	0.0	0.124	8.3	LOS A	0.3	2.3	0.60	0.59	0.60	35.4
Approach		108	1.0	108	1.0	0.124	6.0	LOS A	0.3	2.3	0.60	0.59	0.60	37.4
East: Duffy Avenue														
4	L2	8	0.0	8	0.0	0.306	3.0	LOS A	0.8	5.7	0.26	0.46	0.26	38.6
5	T1	206	4.1	201	4.0	0.306	2.8	LOS A	0.8	5.7	0.26	0.46	0.26	38.9
6	R2	187	4.5	183	4.4	0.306	6.0	LOS A	0.8	5.7	0.26	0.46	0.26	38.9
Approach		402	4.2	392[N1]	4.1	0.306	4.3	LOS A	0.8	5.7	0.26	0.46	0.26	38.9
North: Quarter Sessions Road														
7	L2	181	1.2	181	1.2	0.240	5.0	LOS A	0.6	4.4	0.59	0.61	0.59	36.0
8	T1	25	0.0	25	0.0	0.240	4.7	LOS A	0.6	4.4	0.59	0.61	0.59	38.4
9	R2	11	0.0	11	0.0	0.240	7.9	LOS A	0.6	4.4	0.59	0.61	0.59	38.4
Approach		217	1.0	217	1.0	0.240	5.1	LOS A	0.6	4.4	0.59	0.61	0.59	36.6
West: Duffy Avenue														
10	L2	11	10.0	1	10.0	0.284	4.4	LOS A	0.7	5.1	0.4	0.51	0.48	37.9
11	T1	253	1.3	25	1.3	0.284	3.9	LOS A	0.7	5.1	0.4	0.51	0.48	36.2
12	R2	32	10.0	3	10.0	0.284	7.3	LOS A	0.7	5.1	0.4	0.51	0.48	38.5
Approach		295	2.5	29	2.5	0.284	4.3	LOS A	0.7	5.1	0.4	0.51	0.48	36.7
All Vehicles		1022	2.7	101[N1]	2.7	0.306	4.6	LOS A	0.8	5.7	0.4	0.52	0.43	38.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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MOVEMENT SUMMARY

Site: 10 [Duffy Avenue / The Esplanade / Chilvers Road - 2032 (Site Folder: 2032 Base WE)]

Network: N101 [2032 Base WE (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 110 seconds (Network Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: The Esplanade														
21a	L1	111	1.0	111	1.0	*1.024	107.8	LOS F	30.0	212.9	1.00	1.42	1.72	13.0
22	T1	453	1.6	453	1.6	1.024	104.2	LOS F	30.0	212.9	1.00	1.42	1.72	13.0
23b	R3	73	7.2	73	7.2	0.429	57.1	LOS E	2.3	17.4	0.98	0.77	0.98	19.8
Approach		636	2.2	636	2.2	1.024	99.4	LOS F	30.0	212.9	1.00	1.35	1.63	13.5
East: Duffy Avenue														
4b	L3	108	1.0	108	1.0	*1.046	129.0	LOS F	17.6	127.8	1.00	1.51	1.96	15.8
5	T1	203	6.2	203	6.2	1.046	124.0	LOS F	17.6	127.8	1.00	1.51	1.96	7.6
6a	R1	125	2.5	125	2.5	0.564	54.3	LOS D	4.0	28.9	0.99	0.79	0.99	14.9
Approach		437	3.9	437	3.9	1.046	105.2	LOS F	17.6	127.8	1.00	1.30	1.68	11.5
NorthWest: Chilvers Road														
27a	L1	117	2.7	117	2.7	0.563	40.7	LOS C	9.3	65.9	0.95	0.82	0.95	19.7
28	T1	506	0.6	506	0.6	0.563	38.0	LOS C	9.3	65.5	0.96	0.83	0.96	30.6
29b	R3	169	1.9	169	1.9	0.968	71.4	LOS F	6.8	48.5	1.00	1.03	1.47	13.1
Approach		793	1.2	793	1.2	0.968	45.5	LOS D	9.3	65.9	0.97	0.87	1.07	25.6
West: Duffy Avenue														
10b	L3	193	1.6	193	1.6	0.806	33.6	LOS C	4.7	33.0	0.76	0.77	0.78	33.4
11	T1	231	0.9	231	0.9	0.688	47.7	LOS D	7.4	52.0	0.90	0.85	1.03	29.0
12a	R1	182	0.0	182	0.0	0.806	60.2	LOS E	6.4	44.8	1.00	0.94	1.22	31.4
Approach		605	0.9	605	0.9	0.806	47.0	LOS D	7.4	52.0	0.93	0.85	1.01	31.1
All Vehicles		2471	1.8	2471	1.8	1.046	70.3	LOS E	30.0	212.9	0.97	1.06	1.31	20.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
SouthEast: The Esplanade											
P5	Full	53	49.3	LOS E	0.2	0.2	0.95	0.95	216.3	217.2	1.00
East: Duffy Avenue											
P2	Full	53	49.3	LOS E	0.2	0.2	0.95	0.95	212.3	211.9	1.00
NorthWest: Chilvers Road											
P7	Full	53	49.3	LOS E	0.2	0.2	0.95	0.95	218.9	220.5	1.01

West: Duffy Avenue											
P4	Full	53	49.3	LOS E	0.2	0.2	0.95	0.95	214.8	215.2	1.00
P4B	Slip/ Bypass	53	49.3	LOS E	0.2	0.2	0.95	0.95	206.4	204.3	0.99
All Pedestrians		263	49.3	LOS E	0.2	0.2	0.95	0.95	213.7	213.8	1.00

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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PHASING SUMMARY

Site: 10 [Duffy Avenue / The Esplanade / Chilvers Road - 2032 (Site Folder: 2032 Base WE)] **Network: N101 [2032 Base WE (Network Folder: General)]**

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 110 seconds (Network Site User-Given Phase Times)

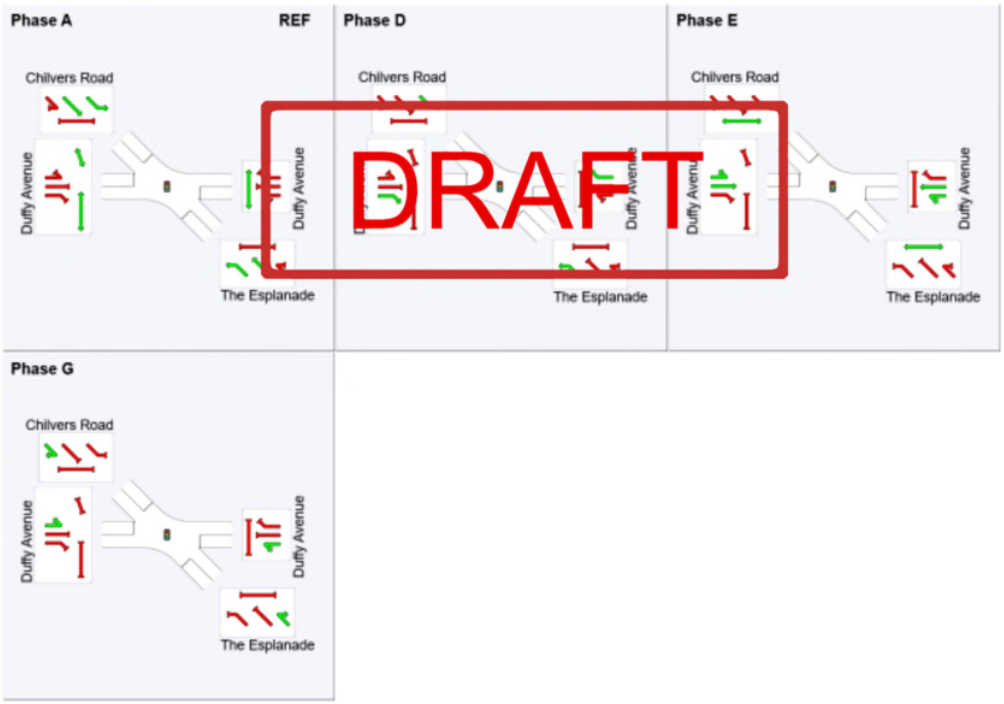
Timings based on settings in the Network Timing dialog
Phase Times specified by the user
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, D, E, G
Output Phase Sequence: A, D, E, G

Phase Timing Summary

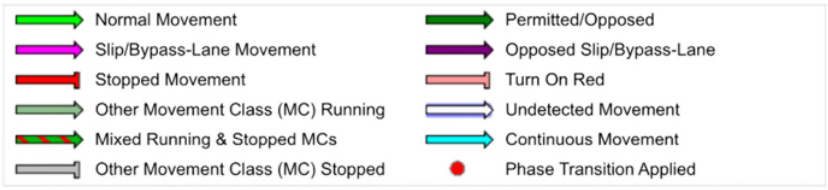
Phase	A	D	E	G
Phase Change Time (sec)	0	40	62	90
Green Time (sec)	31	13	19	12
Phase Time (sec)	40	22	27	21
Phase Split	36%	20%	25%	19%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



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DRAFT

MOVEMENT SUMMARY

Site: 14v [Chilvers Road / Sefton Road - 2032 (Site Folder: 2032 Base WE)]

Network: N101 [2032 Base WE (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 110 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Chilvers Road														
1	L2	121	1.7	119	1.7	0.700	45.5	LOS D	11.9	84.8	1.00	0.87	1.00	28.4
3	R2	646	1.8	637	1.8	*0.700	48.5	LOS D	11.9	84.8	1.00	0.87	1.00	27.6
Approach		767	1.8	757 N1	1.8	0.700	48.0	LOS D	11.9	84.8	1.00	0.87	1.00	27.8
East: Sefton Road														
4	L2	649	1.1	649	1.1	*0.688	14.8	LOS B	7.3	51.6	0.72	0.80	0.72	41.0
5	T1	82	2.6	82	2.6	0.629	34.6	LOS C	2.1	15.3	0.80	0.65	0.90	38.3
Approach		732	1.3	732	1.3	0.688	17.0	LOS B	7.3	51.6	0.73	0.79	0.74	40.4
West: Sefton Road														
11	T1	59	1.8	59	1.8	0.056	12.3	LOS A	0.9	6.3	0.49	0.39	0.49	42.8
12	R2	151	1.4	151	1.4	*0.750	34.8	LOS C	2.8	20.1	1.00	0.86	1.16	25.8
Approach		209	1.5	209	1.5	0.750	28.5	LOS B	2.8	20.1	0.86	0.73	0.97	31.2
All Vehicles		1708	1.5	1698 N1	1.5	0.750	32.3	LOS C	11.9	84.8	0.87	0.82	0.89	31.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)
N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Chilvers Road											
P1	Full	53	49.3	LOS E	0.2	0.2	0.95	0.95	216.3	217.2	1.00
West: Sefton Road											
P4	Full	53	49.3	LOS E	0.2	0.2	0.95	0.95	212.3	211.9	1.00
All Pedestrians		105	49.3	LOS E	0.2	0.2	0.95	0.95	214.3	214.6	1.00

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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ATTACHMENT 4 - ITEM 5

PHASING SUMMARY

Site: 14v [Chilvers Road / Sefton Road - 2032 (Site Folder: 2032 Base WE)]

Network: N101 [2032 Base WE (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 110 seconds (Network User-Given Cycle Time)

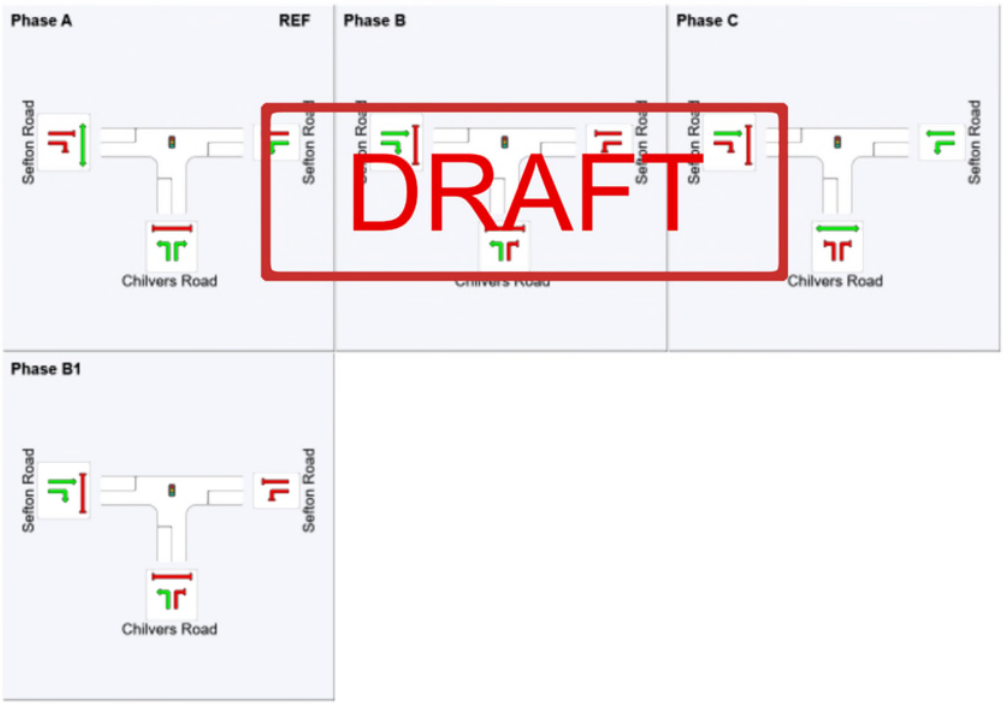
Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Convert Function Default
Reference Phase: Phase A
Input Phase Sequence: A, B, C, B1
Output Phase Sequence: A, B, C, B1

Phase Timing Summary

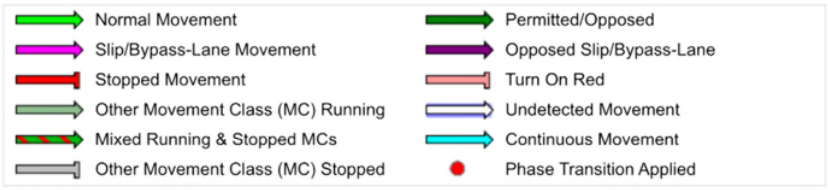
Phase	A	B	C	B1
Phase Change Time (sec)	0	41	56	95
Green Time (sec)	32	6	30	6
Phase Time (sec)	41	15	39	15
Phase Split	37%	14%	35%	14%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



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DRAFT

MOVEMENT SUMMARY

Site: 11 [Duffy Avenue / Pennant Hills Road. - 2032 (Site Folder: 2032 Base WE)]

Network: N101 [2032 Base WE (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Pennant Hills Road.														
1	L2	231	5.9	231	5.9	0.715	24.1	LOS B	18.7	136.6	0.74	0.73	0.74	40.3
2	T1	2132	4.3	2132	4.3	*0.715	18.6	LOS B	20.0	145.1	0.77	0.72	0.77	51.2
Approach		2362	4.5	2362	4.5	0.715	19.2	LOS B	20.0	145.1	0.76	0.72	0.76	50.5
North: Pennant Hills Road.														
8	T1	1936	3.5	1936	3.5	0.456	6.4	LOS A	8.8	63.7	0.42	0.39	0.42	62.4
9	R2	172	6.1	172	6.1	*0.890	76.2	LOS F	7.1	52.0	1.00	0.96	1.40	18.2
Approach		2107	3.7	2107	3.7	0.890	12.1	LOS A	8.8	63.7	0.47	0.43	0.50	56.4
West: Duffy Avenue														
10	L2	185	7.4	185	7.4	0.323	37.4	LOS C	5.0	37.2	0.80	0.77	0.80	30.3
12	R2	220	2.9	220	2.9	*0.725	58.3	LOS E	7.8	56.2	1.00	0.86	1.07	25.0
Approach		405	4.9	405	4.9	0.725	48.7	LOS D	7.8	56.2	0.91	0.82	0.95	27.1
All Vehicles		4875	4.2	4875	4.2	0.890	18.5	LOS B	20.0	145.1	0.65	0.60	0.67	49.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akcelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
North: Pennant Hills Road.											
P3	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	228.2	226.1	0.99
West: Duffy Avenue											
P4	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	217.3	211.9	0.98
All Pedestrians		105	54.3	LOS E	0.2	0.2	0.95	0.95	222.7	219.0	0.98

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Project: P:\P5524 Westleigh Park Traffic Impact and Access Study\Technical\Models\SIDRA\P5524.001S Westleigh Park Traffic Impact and Access Study model_WE.sip9

PHASING SUMMARY

Site: 11 [Duffy Avenue / Pennant Hills Road. - 2032 (Site Folder: 2032 Base WE)] **Network: N101 [2032 Base WE (Network Folder: General)]**

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	0	75	94
Green Time (sec)	70	13	20
Phase Time (sec)	76	19	25
Phase Split	63%	16%	21%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence

REF: Reference Phase
VAR: Variable Phase

Normal Movement
Slip/Bypass-Lane Movement
Stopped Movement
Other Movement Class (MC) Running
Mixed Running & Stopped MCs
Other Movement Class (MC) Stopped
Permitted/Opposed
Opposed Slip/Bypass-Lane
Turn On Red
Undetected Movement
Continuous Movement
Phase Transition Applied

Organisation: TRANSPORT FOR NSW | Licence: NETWORK / Enterprise | Processed: Thursday, 21 July 2022 10:03:41 AM
Project: P:\P5524 Westleigh Park Traffic Impact and Access Study\Technical\Models\SIDRA\P5524.001S Westleigh Park Traffic Impact and Access Study model_WE.sip9

MOVEMENT SUMMARY

Site: 5 [Duffy Avenue / Quarter Sessions Road - Copy - Copy (Site Folder: 2032 Base + Upgrade AM)]

Network: N101 [2032 Base + Upgrade AM (Network Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Quarter Sessions Road														
1	L2	65	1.6	65	1.6	0.194	4.8	LOS A	0.5	3.6	0.56	0.60	0.56	37.5
2	T1	42	0.0	42	0.0	0.194	4.5	LOS A	0.5	3.6	0.56	0.60	0.56	38.0
3	R2	76	0.0	76	0.0	0.194	7.7	LOS A	0.5	3.6	0.56	0.60	0.56	35.4
Approach		183	0.6	183	0.6	0.194	5.9	LOS A	0.5	3.6	0.56	0.60	0.56	37.1
East: Duffy Avenue														
4	L2	47	0.0	47	0.0	0.310	4.1	LOS A	0.8	5.5	0.43	0.56	0.43	38.3
5	T1	123	6.8	123	6.8	0.310	4.0	LOS A	0.8	5.5	0.43	0.56	0.43	38.7
6	R2	147	5.7	147	5.7	0.310	7.1	LOS A	0.8	5.5	0.43	0.56	0.43	38.7
Approach		318	5.3	318	5.3	0.310	5.5	LOS A	0.8	5.5	0.43	0.56	0.43	38.6
North: Quarter Sessions Road														
7	L2	214	1.0	214	1.0	0.346	5.6	LOS A	0.9	6.7	0.66	0.67	0.66	35.5
8	T1	65	0.0	65	0.0	0.346	5.3	LOS A	0.9	6.7	0.66	0.67	0.66	38.1
9	R2	21	0.0	21	0.0	0.346	8.5	LOS A	0.9	6.7	0.66	0.67	0.66	38.1
Approach		300	0.7	300	0.7	0.346	5.8	LOS A	0.9	6.7	0.66	0.67	0.66	36.6
West: Duffy Avenue														
10	L2	16	6.7	16	6.7	0.295	4.6	LOS A	0.7	5.2	0.5	0.58	0.51	37.6
11	T1	173	1.8	173	1.8	0.295	4.3	LOS A	0.7	5.2	0.5	0.58	0.51	35.7
12	R2	106	3.0	106	3.0	0.295	7.3	LOS A	0.7	5.2	0.5	0.58	0.51	38.2
Approach		295	2.5	295	2.5	0.295	5.3	LOS A	0.7	5.2	0.5	0.58	0.51	37.1
All Vehicles		1096	2.5	1096	2.5	0.346	5.6	LOS A	0.9	6.7	0.54	0.60	0.54	37.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 10 [Duffy Avenue / The Esplanade / Chilvers Road - Copy - Copy (Site Folder: 2032 Base + Upgrade AM)]

Network: N101 [2032 Base + Upgrade AM (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: The Esplanade														
21a	L1	47	2.1	47	2.1	*0.957	74.3	LOS F	29.6	209.4	1.00	1.17	1.36	17.2
22	T1	587	1.2	587	1.2	0.957	70.5	LOS F	29.6	209.4	1.00	1.17	1.36	17.2
23b	R3	136	3.7	136	3.7	*0.935	84.7	LOS F	6.0	43.3	1.00	1.07	1.58	15.4
Approach		770	1.7	770	1.7	0.957	73.3	LOS F	29.6	209.4	1.00	1.15	1.40	16.8
East: Duffy Avenue														
4b	L3	108	0.9	108	0.9	0.211	37.7	LOS C	2.8	20.0	0.77	0.75	0.77	30.5
5	T1	186	6.5	186	6.5	0.663	53.5	LOS D	6.5	48.0	1.00	0.83	1.02	14.8
6a	R1	99	3.0	99	3.0	0.453	58.0	LOS E	3.4	24.5	0.98	0.78	0.98	14.3
Approach		393	4.1	393	4.1	0.663	50.3	LOS D	6.5	48.0	0.93	0.80	0.94	19.7
NorthWest: Chilvers Road														
27a	L1	113	2.7	113	2.7	0.450	34.6	LOS C	8.1	57.7	0.80	0.73	0.80	21.7
28	T1	488	0.6	488	0.6	0.450	32.1	LOS C	8.3	58.3	0.82	0.72	0.82	32.5
29b	R3	116	2.6	116	2.6	0.792	69.0	LOS E	4.4	31.7	1.00	0.88	1.19	13.4
Approach		717	1.3	717	1.3	0.792	38.5	LOS C	8.3	58.3	0.85	0.74	0.88	28.1
West: Duffy Avenue														
10b	L3	195	1.5	195	1.5	0.383	40.1	LOS C	5.5	38.7	0.82	0.79	0.82	31.4
11	T1	250	0.8	250	0.8	*0.924	71.1	LOS F	18.8	135.0	1.00	1.12	1.43	23.9
12a	R1	210	0.0	210	0.0	0.942	81.0	LOS F	19.2	134.7	1.00	1.14	1.51	28.0
Approach		655	0.8	655	0.8	0.942	65.3	LOS E	10.6	75.0	0.95	1.03	1.28	27.2
All Vehicles		2535	1.7	2535	1.7	0.957	57.8	LOS E	29.6	209.4	0.93	0.95	1.15	23.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
SouthEast: The Esplanade											
P5	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	221.3	217.2	0.98
East: Duffy Avenue											
P2	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	219.8	215.2	0.98
NorthWest: Chilvers Road											
P7	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	223.9	220.5	0.98

West: Duffy Avenue											
P4	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	219.8	215.2	0.98
P4B	Slip/ Bypass	53	54.3	LOS E	0.2	0.2	0.95	0.95	211.4	204.3	0.97
All Pedestrians		263	54.3	LOS E	0.2	0.2	0.95	0.95	219.3	214.5	0.98

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

Organisation: TRANSPORT FOR NSW | Licence: NETWORK / Enterprise | Processed: Thursday, 21 July 2022 10:09:14 AM
Project: P:\P5524 Westleigh Park Traffic Impact and Access Study\Technical\Models\SIDRA\P5524.001S Westleigh Park Traffic Impact and Access Study model_AM.sip9

PHASING SUMMARY

Site: 10 [Duffy Avenue / The Esplanade / Chilvers Road - Copy - Copy (Site Folder: 2032 Base + Upgrade AM)] **Network: N101 [2032 Base + Upgrade AM (Network Folder: General)]**

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120 seconds (Network User-Given Cycle Time)

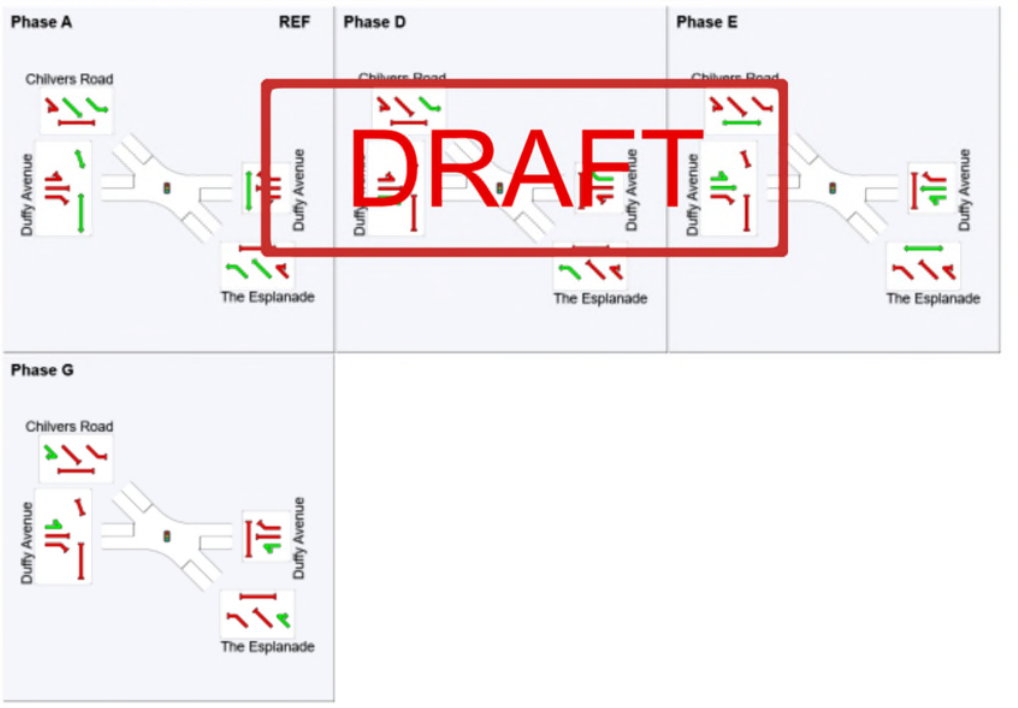
Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects not included in determining phase times
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, D, E, G
Output Phase Sequence: A, D, E, G

Phase Timing Summary

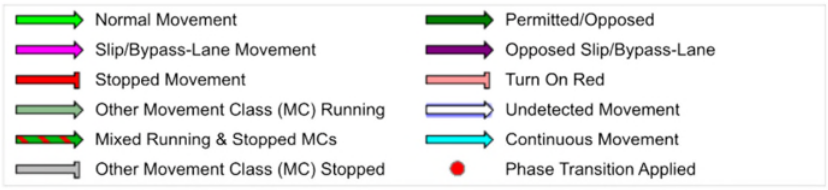
Phase	A	D	E	G
Phase Change Time (sec)	0	50	73	100
Green Time (sec)	41	14	18	11
Phase Time (sec)	50	23	27	20
Phase Split	42%	19%	23%	17%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



Organisation: TRANSPORT FOR NSW | Licence: NETWORK / Enterprise | Processed: Thursday, 21 July 2022 10:09:14 AM
Project: P:\P5524 Westleigh Park Traffic Impact and Access Study\Technical\Models\SIDRA\P5524.001S Westleigh Park Traffic Impact and Access Study model_AM.sip9

DRAFT

MOVEMENT SUMMARY

Site: 14v [Chilvers Road / Sefton Road - Copy - Conversion - Copy (Site Folder: 2032 Base + Upgrade AM)]

Network: N101 [2032 Base + Upgrade AM (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Chilvers Road														
1	L2	109	1.9	109	1.9	0.831	52.1	LOS D	16.8	118.9	1.00	0.92	1.08	26.8
3	R2	815	1.4	815	1.4	*0.831	53.4	LOS D	16.8	119.3	1.00	0.92	1.08	26.5
Approach		924	1.5	924	1.5	0.831	53.2	LOS D	16.8	119.3	1.00	0.92	1.08	26.5
East: Sefton Road														
4	L2	631	1.2	631	1.2	0.645	13.8	LOS A	6.9	49.0	0.65	0.78	0.65	41.8
5	T1	104	2.0	104	2.0	*0.826	50.5	LOS D	3.5	24.8	0.78	0.78	1.19	32.8
Approach		735	1.3	735	1.3	0.826	19.0	LOS B	6.9	49.0	0.67	0.78	0.73	39.2
West: Sefton Road														
11	T1	82	1.3	82	1.3	0.077	13.3	LOS A	1.3	9.5	0.49	0.40	0.49	42.3
12	R2	124	1.7	124	1.7	*0.677	36.1	LOS C	2.4	17.1	1.00	0.82	1.08	25.3
Approach		206	1.5	206	1.5	0.677	27.0	LOS B	2.4	17.1	0.80	0.65	0.85	32.8
All Vehicles		1865	1.4	1865	1.4	0.831	36.8	LOS C	16.8	119.3	0.85	0.83	0.92	30.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Chilvers Road											
P1	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	221.3	217.2	0.98
West: Sefton Road											
P4	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	217.3	211.9	0.98
All Pedestrians		105	54.3	LOS E	0.2	0.2	0.95	0.95	219.3	214.6	0.98

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

Organisation: TRANSPORT FOR NSW | Licence: NETWORK / Enterprise | Processed: Thursday, 21 July 2022 10:09:14 AM
Project: P:\P5524 Westleigh Park Traffic Impact and Access Study\Technical\Models\SIDRA\P5524.001S Westleigh Park Traffic Impact and Access Study model_AM.sip9

ATTACHMENT 4 - ITEM 5

PHASING SUMMARY

Site: 14v [Chilvers Road / Sefton Road - Copy - Conversion - Copy (Site Folder: 2032 Base + Upgrade AM)]

Network: N101 [2032 Base + Upgrade AM (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120 seconds (Network User-Given Cycle Time)

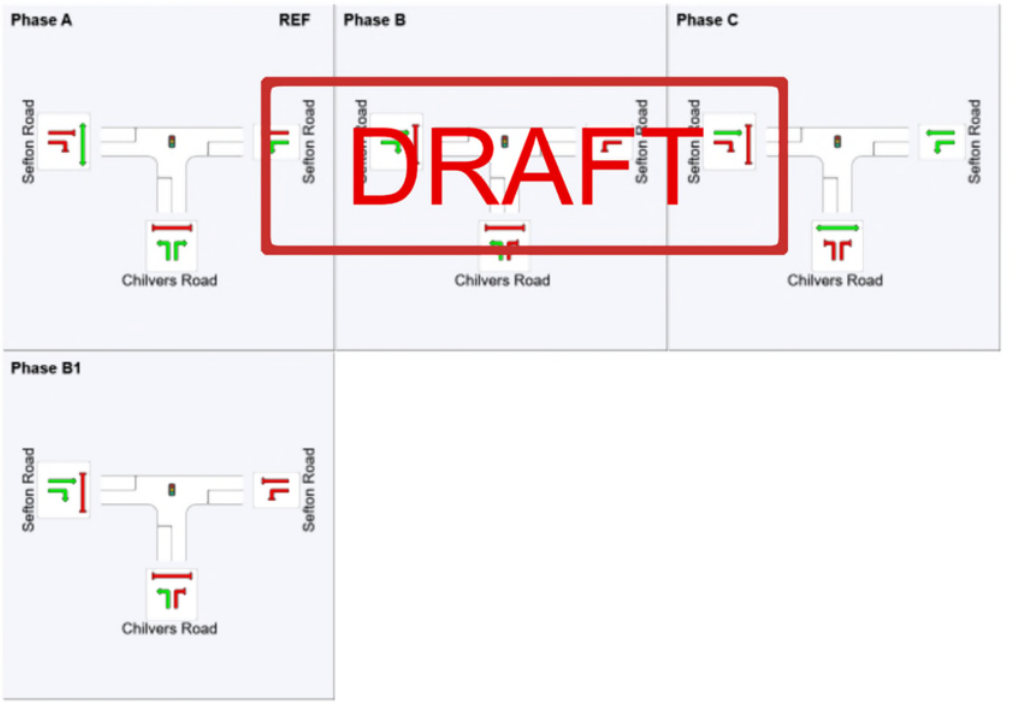
Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Convert Function Default
Reference Phase: Phase A
Input Phase Sequence: A, B, C, B1
Output Phase Sequence: A, B, C, B1

Phase Timing Summary

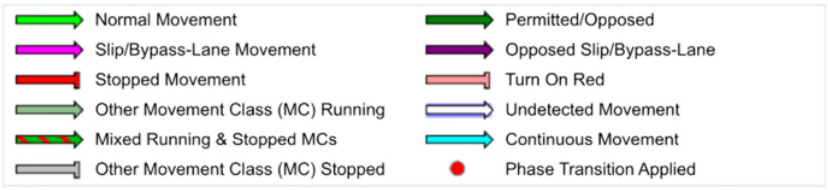
Phase	A	B	C	B1
Phase Change Time (sec)	0	45	60	105
Green Time (sec)	36	6	36	6
Phase Time (sec)	45	15	45	15
Phase Split	38%	13%	38%	13%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



Organisation: TRANSPORT FOR NSW | Licence: NETWORK / Enterprise | Processed: Thursday, 21 July 2022 10:09:14 AM
Project: P:\P5524 Westleigh Park Traffic Impact and Access Study\Technical\Models\SIDRA\P5524.001S Westleigh Park Traffic Impact and Access Study model_AM.sip9

DRAFT

MOVEMENT SUMMARY

Site: 11 [Duffy Avenue / Pennant Hills Road. - Copy - Copy (Site Folder: 2032 Base + Upgrade AM)]

Network: N101 [2032 Base + Upgrade AM (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 115 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Pennant Hills Road.														
1	L2	220	6.2	220	6.2	0.643	22.8	LOS B	15.0	109.9	0.70	0.70	0.70	41.3
2	T1	1862	5.0	1862	5.0	*0.643	17.3	LOS B	16.0	116.5	0.72	0.67	0.72	52.2
Approach		2082	5.1	2082	5.1	0.643	17.9	LOS B	16.0	116.5	0.72	0.68	0.72	51.4
North: Pennant Hills Road.														
8	T1	1729	3.9	1729	3.9	0.410	5.9	LOS A	7.3	52.5	0.40	0.37	0.40	62.9
9	R2	184	5.7	184	5.7	*0.913	76.7	LOS F	7.5	55.1	1.00	0.99	1.47	18.1
Approach		1914	4.1	1914	4.1	0.913	12.7	LOS A	7.5	55.1	0.46	0.43	0.51	55.7
West: Duffy Avenue														
10	L2	240	5.7	240	5.7	0.407	36.6	LOS C	6.4	46.8	0.82	0.79	0.82	30.5
12	R2	248	2.5	248	2.5	*0.824	61.1	LOS E	9.1	65.0	1.00	0.93	1.20	24.4
Approach		488	4.1	488	4.1	0.824	49.1	LOS D	9.1	65.0	0.91	0.86	1.01	27.1
All Vehicles		4484	4.6	4484	4.6	0.913	19.1	LOS B	16.0	116.5	0.63	0.59	0.66	48.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
North: Pennant Hills Road.											
P3	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	225.7	226.1	1.00
West: Duffy Avenue											
P4	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	214.8	211.9	0.99
All Pedestrians		105	51.8	LOS E	0.2	0.2	0.95	0.95	220.2	219.0	0.99

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

Organisation: TRANSPORT FOR NSW | Licence: NETWORK / Enterprise | Processed: Thursday, 21 July 2022 10:09:14 AM
Project: P:\P5524 Westleigh Park Traffic Impact and Access Study\Technical\Models\SIDRA\P5524.001S Westleigh Park Traffic Impact and Access Study model_AM.sip9

ATTACHMENT 4 - ITEM 5

PHASING SUMMARY

Site: 11 [Duffy Avenue / Pennant Hills Road. - Copy - Copy (Site Folder: 2032 Base + Upgrade AM)]

Network: N101 [2032 Base + Upgrade AM (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 115 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	0	71	90
Green Time (sec)	66	13	19
Phase Time (sec)	72	19	24
Phase Split	63%	17%	21%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence

REF: Reference Phase
VAR: Variable Phase

Normal Movement
Slip/Bypass-Lane Movement
Stopped Movement
Other Movement Class (MC) Running
Mixed Running & Stopped MCs
Other Movement Class (MC) Stopped
Permitted/Opposed
Opposed Slip/Bypass-Lane
Turn On Red
Undetected Movement
Continuous Movement
Phase Transition Applied

Organisation: TRANSPORT FOR NSW | Licence: NETWORK / Enterprise | Processed: Thursday, 21 July 2022 10:09:14 AM
Project: P:\P5524 Westleigh Park Traffic Impact and Access Study\Technical\Models\SIDRA\P5524.001S Westleigh Park Traffic Impact and Access Study model_AM.sip9

MOVEMENT SUMMARY

Site: 5 [Duffy Avenue / Quarter Sessions Road - 2032- Upg (Site Folder: 2032 Base + Upgrade PM)]

Network: N101 [2032 Base + Upgrade PM (Network Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Quarter Sessions Road														
1	L2	35	3.0	35	3.0	0.118	6.6	LOS A	0.3	2.2	0.68	0.65	0.68	37.0
2	T1	28	0.0	28	0.0	0.118	6.2	LOS A	0.3	2.2	0.68	0.65	0.68	37.5
3	R2	28	0.0	28	0.0	0.118	9.4	LOS A	0.3	2.2	0.68	0.65	0.68	34.6
Approach		92	1.1	92	1.1	0.118	7.4	LOS A	0.3	2.2	0.68	0.65	0.68	36.7
East: Duffy Avenue														
4	L2	20	0.0	20	0.0	0.420	3.3	LOS A	1.2	8.8	0.34	0.49	0.34	38.4
5	T1	239	3.5	239	3.5	0.420	3.1	LOS A	1.2	8.8	0.34	0.49	0.34	38.8
6	R2	267	3.1	267	3.1	0.420	6.3	LOS A	1.2	8.8	0.34	0.49	0.34	38.8
Approach		526	3.2	526	3.2	0.420	4.7	LOS A	1.2	8.8	0.34	0.49	0.34	38.8
North: Quarter Sessions Road														
7	L2	136	1.6	136	1.6	0.200	4.6	LOS A	0.5	3.6	0.55	0.57	0.55	36.1
8	T1	34	0.0	34	0.0	0.200	4.3	LOS A	0.5	3.6	0.55	0.57	0.55	38.5
9	R2	17	0.0	17	0.0	0.200	7.5	LOS A	0.5	3.6	0.55	0.57	0.55	38.5
Approach		186	1.1	186	1.1	0.200	4.8	LOS A	0.5	3.6	0.55	0.57	0.55	37.1
West: Duffy Avenue														
10	L2	13	8.3	1	8.3	0.268	5.0	LOS A	0.7	4.8	0.55	0.57	0.55	37.7
11	T1	202	1.6	202	1.6	0.268	4.8	LOS A	0.7	4.8	0.55	0.57	0.55	35.9
12	R2	41	7.7	41	7.7	0.268	7.8	LOS A	0.7	4.8	0.55	0.57	0.55	38.3
Approach		256	2.9	256	2.9	0.268	5.0	LOS A	0.7	4.8	0.55	0.57	0.55	36.6
All Vehicles		1060	2.6	1060	2.6	0.420	5.0	LOS A	1.2	8.8	0.46	0.54	0.46	38.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: 10 [Duffy Avenue / The Esplanade / Chilvers Road - 2032-Upg (Site Folder: 2032 Base + Upgrade PM)]

Network: N101 [2032 Base + Upgrade PM (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: The Esplanade														
21a	L1	154	0.7	154	0.7	0.889	58.0	LOS E	21.2	150.4	1.00	1.02	1.19	20.2
22	T1	383	1.9	383	1.9	* 0.889	53.7	LOS D	21.2	150.4	1.00	1.02	1.19	20.2
23b	R3	65	8.1	65	8.1	0.317	57.7	LOS E	2.2	16.4	0.95	0.76	0.95	19.7
Approach		602	2.3	602	2.3	0.889	55.2	LOS D	21.2	150.4	0.99	0.99	1.16	20.2
East: Duffy Avenue														
4b	L3	129	0.8	129	0.8	0.262	37.6	LOS C	3.6	25.6	0.78	0.76	0.78	30.6
5	T1	266	4.7	266	4.7	* 0.911	67.4	LOS E	10.8	78.6	0.99	1.09	1.37	12.5
6a	R1	101	3.1	101	3.1	0.589	62.1	LOS E	3.6	26.2	1.00	0.79	1.02	13.6
Approach		497	3.4	497	3.4	0.911	58.6	LOS E	10.8	78.6	0.94	0.95	1.14	17.8
NorthWest: Chilvers Road														
27a	L1	91	3.5	91	3.5	0.589	42.2	LOS C	11.3	80.0	0.95	0.83	0.95	19.2
28	T1	618	0.5	618	0.5	0.589	38.7	LOS C	11.3	80.0	0.95	0.82	0.95	30.4
29b	R3	195	1.6	195	1.6	* 0.908	77.2	LOS F	8.3	58.8	1.00	1.02	1.43	12.3
Approach		903	1.0	903	1.0	0.908	47.3	LOS D	11.3	80.0	0.96	0.86	1.05	25.6
West: Duffy Avenue														
10b	L3	152	2.1	[illegible]	2.1	[illegible]	[illegible]	[illegible]	3.7	[illegible]	[illegible]	0.75	0.73	33.5
11	T1	172	1.2	[illegible]	1.2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.79	0.96	28.4
12a	R1	158	0.0	[illegible]	0.0	* [illegible]	74.6	[illegible]	6.5	[illegible]	[illegible]	1.05	1.44	29.0
Approach		481	1.1	[illegible]	1.1	0.901	52.9	LOS D	6.5	45.7	[illegible]	0.86	1.05	29.9
All Vehicles		2483	1.8	2483	1.8	0.911	52.6	LOS D	21.2	150.4	0.95	0.91	1.10	24.0

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Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
SouthEast: The Esplanade											
P5	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	221.3	217.2	0.98
East: Duffy Avenue											
P2	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	219.8	215.2	0.98
NorthWest: Chilvers Road											
P7	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	223.9	220.5	0.98

West: Duffy Avenue											
P4	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	219.8	215.2	0.98
P4B	Slip/ Bypass	53	54.3	LOS E	0.2	0.2	0.95	0.95	211.4	204.3	0.97
All Pedestrians		263	54.3	LOS E	0.2	0.2	0.95	0.95	219.3	214.5	0.98

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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PHASING SUMMARY

Site: 10 [Duffy Avenue / The Esplanade / Chilvers Road - 2032-Upg (Site Folder: 2032 Base + Upgrade PM)] **Network: N101 [2032 Base + Upgrade PM (Network Folder: General)]**

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120 seconds (Network User-Given Cycle Time)

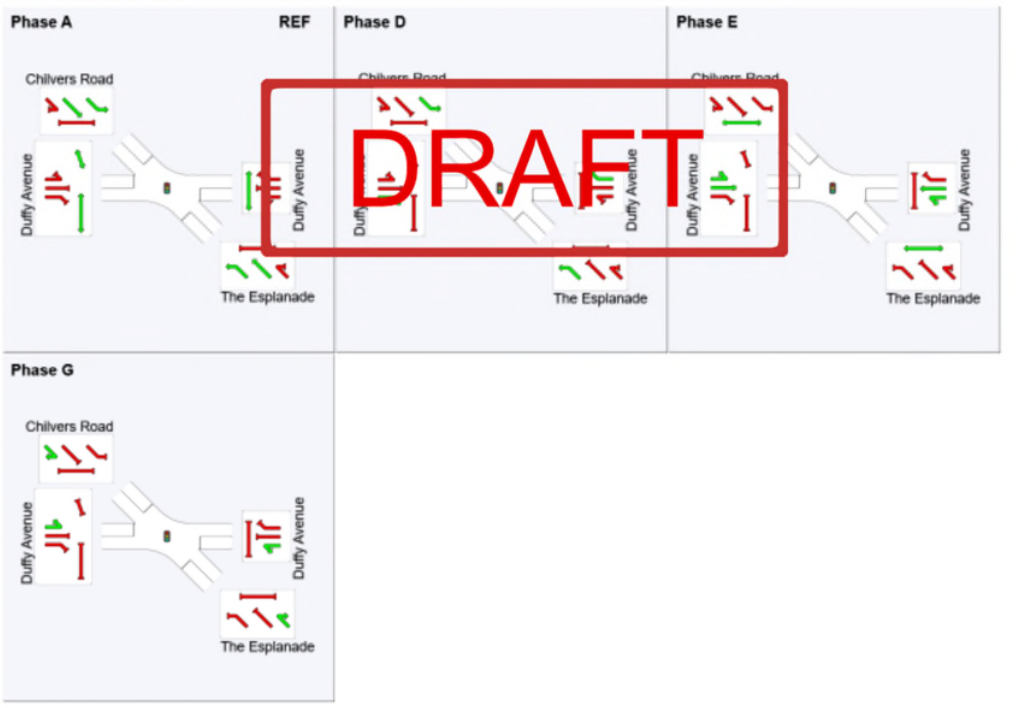
Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, D, E, G
Output Phase Sequence: A, D, E, G

Phase Timing Summary

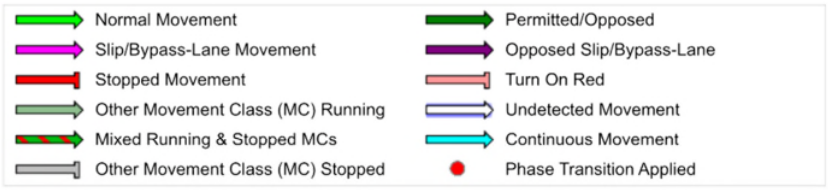
Phase	A	D	E	G
Phase Change Time (sec)	0	46	66	95
Green Time (sec)	37	11	20	16
Phase Time (sec)	46	20	29	25
Phase Split	38%	17%	24%	21%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



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MOVEMENT SUMMARY

Site: 14v [Chilvers Road / Sefton Road - 2032- Upg (Site Folder: 2032 Base + Upgrade PM)]

Network: N101 [2032 Base + Upgrade PM (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Chilvers Road														
1	L2	117	1.8	117	1.8	0.573	41.6	LOS C	10.1	71.7	0.92	0.84	0.92	29.5
3	R2	522	2.2	522	2.2	0.573	42.6	LOS D	10.1	71.7	0.93	0.84	0.93	29.2
Approach		639	2.1	639	2.1	0.573	42.4	LOS C	10.1	71.7	0.93	0.84	0.93	29.3
East: Sefton Road														
4	L2	812	0.9	812	0.9	*0.796	15.2	LOS B	10.5	74.0	0.77	0.83	0.77	40.5
5	T1	83	2.5	83	2.5	*0.811	49.8	LOS D	2.7	19.6	0.77	0.76	1.20	33.0
Approach		895	1.1	895	1.1	0.811	18.4	LOS B	10.5	74.0	0.77	0.82	0.81	39.1
West: Sefton Road														
11	T1	56	1.9	56	1.9	0.053	13.1	LOS A	0.9	6.4	0.49	0.38	0.49	42.4
12	R2	97	2.2	97	2.2	*0.530	34.6	LOS C	1.8	12.8	0.99	0.77	0.99	25.8
Approach		153	2.1	153	2.1	0.530	26.8	LOS B	1.8	12.8	0.81	0.63	0.81	32.6
All Vehicles		1686	1.6	1686	1.6	0.811	28.2	LOS B	10.5	74.0	0.83	0.81	0.86	33.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Chilvers Road											
P1	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	221.3	217.2	0.98
West: Sefton Road											
P4	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	217.3	211.9	0.98
All Pedestrians		105	54.3	LOS E	0.2	0.2	0.95	0.95	219.3	214.6	0.98

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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ATTACHMENT 4 - ITEM 5

PHASING SUMMARY

Site: 14v [Chilvers Road / Sefton Road - 2032- Upg (Site Folder: 2032 Base + Upgrade PM)]

Network: N101 [2032 Base + Upgrade PM (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120 seconds (Network User-Given Cycle Time)

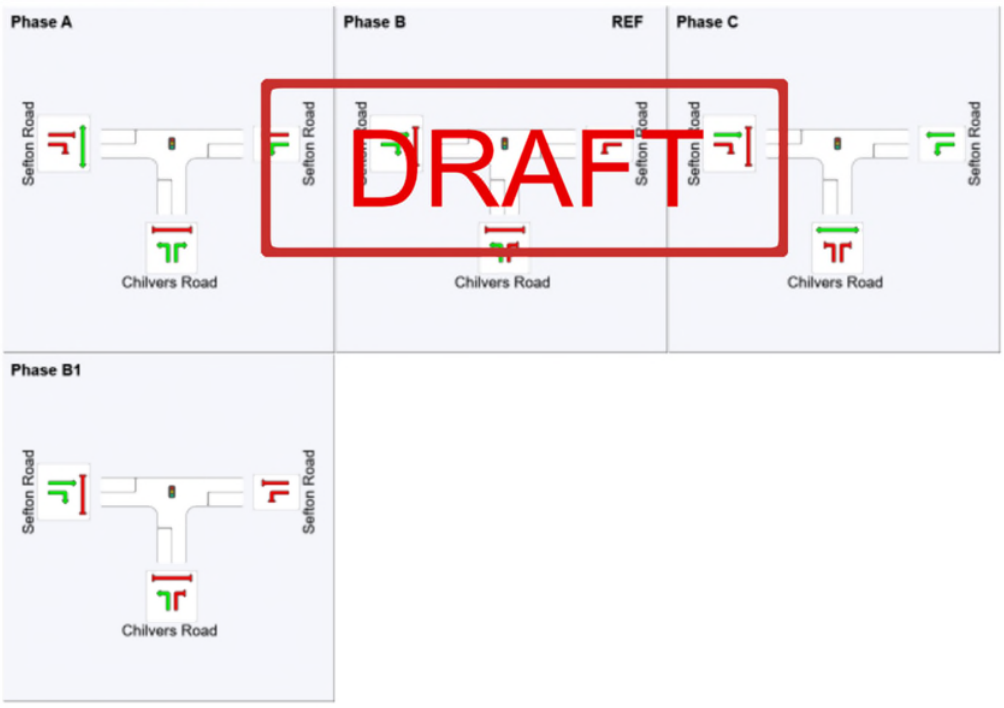
Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Convert Function Default
Reference Phase: Phase B
Input Phase Sequence: A, B, C, B1
Output Phase Sequence: A, B, C, B1

Phase Timing Summary

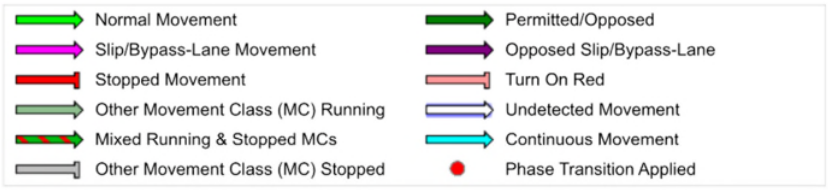
Phase	A	B	C	B1
Phase Change Time (sec)	75	0	15	60
Green Time (sec)	36	6	36	6
Phase Time (sec)	45	15	45	15
Phase Split	38%	13%	38%	13%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



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ATTACHMENT 4 - ITEM 5

MOVEMENT SUMMARY

Site: 11 [Duffy Avenue / Pennant Hills Road. - 2032- Upg (Site Folder: 2032 Base + Upgrade PM)]

Network: N101 [2032 Base + Upgrade PM (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 125 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Pennant Hills Road.														
1	L2	272	5.0	272	5.0	0.663	22.8	LOS B	17.3	126.2	0.69	0.70	0.69	41.0
2	T1	1978	4.7	1978	4.7	*0.663	17.3	LOS B	18.4	133.7	0.71	0.67	0.71	52.1
Approach		2249	4.7	2249	4.7	0.663	18.0	LOS B	18.4	133.7	0.71	0.67	0.71	51.2
North: Pennant Hills Road.														
8	T1	2036	3.3	2036	3.3	0.463	5.5	LOS A	8.9	64.1	0.39	0.36	0.39	63.3
9	R2	205	5.1	205	5.1	*0.955	91.4	LOS F	9.7	70.7	1.00	1.03	1.55	15.8
Approach		2241	3.5	2241	3.5	0.955	13.3	LOS A	9.7	70.7	0.45	0.42	0.50	55.2
West: Duffy Avenue														
10	L2	137	10.0	137	10.0	0.247	38.2	LOS C	3.8	28.5	0.78	0.76	0.78	30.0
12	R2	181	3.5	181	3.5	*0.657	60.0	LOS E	6.6	47.3	0.99	0.83	1.01	24.6
Approach		318	6.3	318	6.3	0.657	50.6	LOS D	6.6	47.3	0.90	0.80	0.91	26.7
All Vehicles		4808	4.2	4808	4.2	0.955	18.0	LOS B	18.4	133.7	0.60	0.56	0.62	50.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
North: Pennant Hills Road.											
P3	Full	53	56.8	LOS E	0.2	0.2	0.95	0.95	230.7	226.1	0.98
West: Duffy Avenue											
P4	Full	53	56.8	LOS E	0.2	0.2	0.95	0.95	219.8	211.9	0.96
All Pedestrians		105	56.8	LOS E	0.2	0.2	0.95	0.95	225.2	219.0	0.97

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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ATTACHMENT 4 - ITEM 5

PHASING SUMMARY

Site: 11 [Duffy Avenue / Pennant Hills Road. - 2032- Upg (Site Folder: 2032 Base + Upgrade PM)]

Network: N101 [2032 Base + Upgrade PM (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 125 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	0	79	100
Green Time (sec)	75	15	19
Phase Time (sec)	81	21	23
Phase Split	65%	17%	18%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence

REF: Reference Phase
VAR: Variable Phase

Normal Movement	Permitted/Opposed
Slip/Bypass-Lane Movement	Opposed Slip/Bypass-Lane
Stopped Movement	Turn On Red
Other Movement Class (MC) Running	Undetected Movement
Mixed Running & Stopped MCs	Continuous Movement
Other Movement Class (MC) Stopped	Phase Transition Applied

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MOVEMENT SUMMARY

Site: 5 [Duffy Avenue / Quarter Sessions Road - 2032- Upg (Site Folder: 2032 Base + Upgrade WE)]

Network: N101 [2032 Base + Upgrade WE (Network Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Quarter Sessions Road														
1	L2	55	1.9	55	1.9	0.125	5.6	LOS A	0.3	2.3	0.60	0.60	0.60	37.5
2	T1	29	0.0	29	0.0	0.125	5.2	LOS A	0.3	2.3	0.60	0.60	0.60	38.0
3	R2	24	0.0	24	0.0	0.125	8.4	LOS A	0.3	2.3	0.60	0.60	0.60	35.4
Approach		108	1.0	108	1.0	0.125	6.1	LOS A	0.3	2.3	0.60	0.60	0.60	37.4
East: Duffy Avenue														
4	L2	8	0.0	8	0.0	0.313	3.0	LOS A	0.8	5.9	0.26	0.46	0.26	38.6
5	T1	206	4.1	206	4.1	0.313	2.8	LOS A	0.8	5.9	0.26	0.46	0.26	38.9
6	R2	187	4.5	187	4.5	0.313	6.0	LOS A	0.8	5.9	0.26	0.46	0.26	38.9
Approach		402	4.2	402	4.2	0.313	4.3	LOS A	0.8	5.9	0.26	0.46	0.26	38.9
North: Quarter Sessions Road														
7	L2	181	1.2	181	1.2	0.240	5.0	LOS A	0.6	4.4	0.59	0.61	0.59	36.0
8	T1	25	0.0	25	0.0	0.240	4.7	LOS A	0.6	4.4	0.59	0.61	0.59	38.4
9	R2	11	0.0	11	0.0	0.240	7.9	LOS A	0.6	4.4	0.59	0.61	0.59	38.4
Approach		217	1.0	217	1.0	0.240	5.1	LOS A	0.6	4.4	0.59	0.61	0.59	36.6
West: Duffy Avenue														
10	L2	11	10.0	11	10.0	0.286	4.5	LOS A	0.7	5.1	0.43	0.51	0.48	37.9
11	T1	253	1.3	253	1.3	0.286	4.3	LOS A	0.7	5.1	0.43	0.51	0.48	36.2
12	R2	32	10.0	32	10.0	0.286	7.3	LOS A	0.7	5.1	0.43	0.51	0.48	38.5
Approach		295	2.5	295	2.5	0.286	4.3	LOS A	0.7	5.1	0.43	0.51	0.48	36.7
All Vehicles		1022	2.7	1022	2.7	0.313	4.7	LOS A	0.8	5.9	0.43	0.52	0.43	38.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: 10 [Duffy Avenue / The Esplanade / Chilvers Road - 2032-Upg (Site Folder: 2032 Base + Upgrade WE)]

Network: N101 [2032 Base + Upgrade WE (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 115 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: The Esplanade														
21a	L1	111	1.0	111	1.0	0.875	52.2	LOS D	20.8	147.2	1.00	1.01	1.16	21.6
22	T1	453	1.6	453	1.6	*0.875	48.2	LOS D	20.8	147.2	1.00	1.01	1.16	21.6
23b	R3	73	7.2	73	7.2	0.384	57.5	LOS E	2.4	17.8	0.96	0.77	0.96	19.7
Approach		636	2.2	636	2.2	0.875	50.0	LOS D	20.8	147.2	1.00	0.98	1.14	21.4
East: Duffy Avenue														
4b	L3	108	1.0	108	1.0	0.236	36.8	LOS C	2.8	19.9	0.78	0.75	0.78	30.8
5	T1	203	6.2	203	6.2	0.820	58.6	LOS E	7.4	54.4	1.00	0.96	1.21	13.9
6a	R1	125	2.5	125	2.5	0.639	59.0	LOS E	4.3	31.0	1.00	0.82	1.04	14.1
Approach		437	3.9	437	3.9	0.820	53.3	LOS D	7.4	54.4	0.94	0.87	1.06	18.7
NorthWest: Chilvers Road														
27a	L1	117	2.7	117	2.7	0.482	35.2	LOS C	8.6	61.2	0.86	0.76	0.86	21.4
28	T1	506	0.6	506	0.6	0.482	32.4	LOS C	8.8	61.8	0.87	0.76	0.87	32.4
29b	R3	169	1.9	169	1.9	*0.867	60.5	LOS E	6.2	44.2	1.00	0.91	1.20	14.7
Approach		793	1.2	793	1.2	0.867	38.8	LOS C	8.8	61.8	0.90	0.79	0.94	27.6
West: Duffy Avenue														
10b	L3	193	1.6	193	1.6	0.363	37.4	LOS C	5.0	35.8	0.8	0.78	0.81	32.3
11	T1	231	0.9	231	0.9	*0.912	[illegible]	LOS E	[illegible]	65.7	1.00	1.09	1.42	24.6
12a	R1	182	0.0	182	0.0	*0.913	73.1	LOS F	7.4	51.5	1.00	1.08	1.46	29.2
Approach		605	0.9	605	0.9	0.913	59.8	LOS E	9.3	65.7	0.94	0.99	1.24	28.2
All Vehicles		2471	1.8	2471	1.8	0.913	49.4	LOS D	20.8	147.2	0.94	0.90	1.08	25.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
SouthEast: The Esplanade											
P5	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	218.8	217.2	0.99
East: Duffy Avenue											
P2	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	217.3	215.2	0.99
NorthWest: Chilvers Road											
P7	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	221.4	220.5	1.00

West: Duffy Avenue											
P4	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	217.3	215.2	0.99
P4B	Slip/ Bypass	53	51.8	LOS E	0.2	0.2	0.95	0.95	208.9	204.3	0.98
All Pedestrians		263	51.8	LOS E	0.2	0.2	0.95	0.95	216.8	214.5	0.99

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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ATTACHMENT 4 - ITEM 5

PHASING SUMMARY

Site: 10 [Duffy Avenue / The Esplanade / Chilvers Road - 2032-Upg (Site Folder: 2032 Base + Upgrade WE)]

Network: N101 [2032 Base + Upgrade WE (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 115 seconds (Network User-Given Cycle Time)

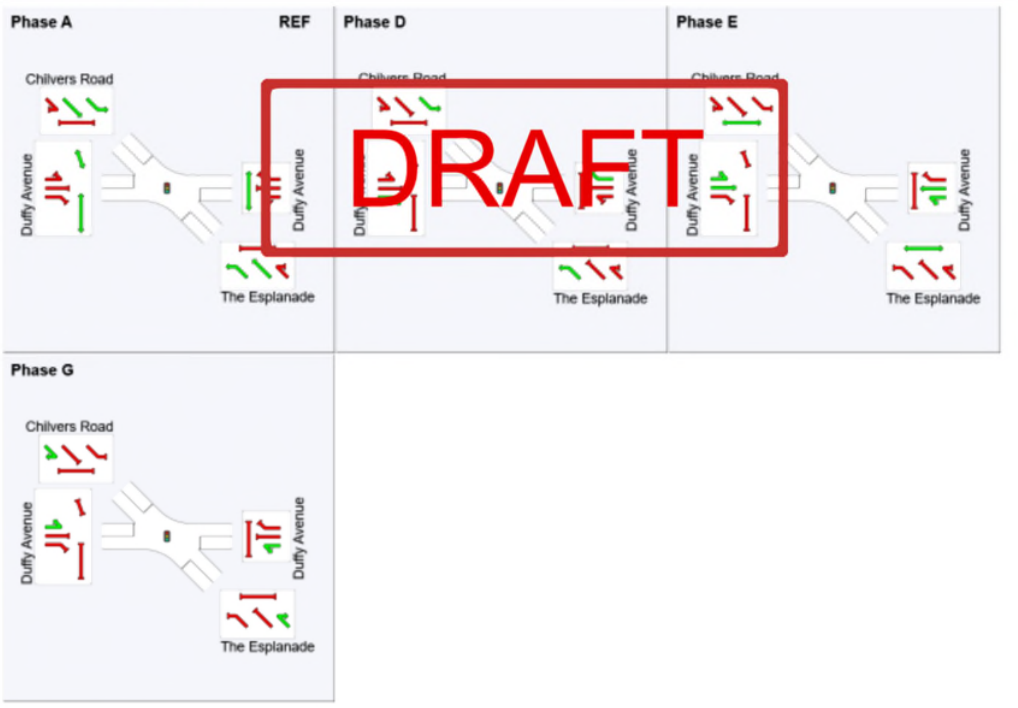
Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, D, E, G
Output Phase Sequence: A, D, E, G

Phase Timing Summary

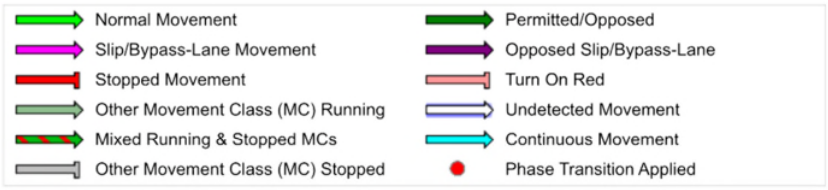
Phase	A	D	E	G
Phase Change Time (sec)	0	47	68	92
Green Time (sec)	38	12	15	14
Phase Time (sec)	47	21	24	23
Phase Split	41%	18%	21%	20%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



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DRAFT

MOVEMENT SUMMARY

Site: 14v [Chilvers Road / Sefton Road - 2032- Upg (Site Folder: 2032 Base + Upgrade WE)]

Network: N101 [2032 Base + Upgrade WE (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 115 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Chilvers Road														
1	L2	121	1.7	121	1.7	0.699	45.9	LOS D	12.5	88.7	1.00	0.87	1.00	28.3
3	R2	646	1.8	646	1.8	*0.699	47.1	LOS D	12.5	88.7	1.00	0.87	1.00	28.0
Approach		767	1.8	767	1.8	0.699	46.9	LOS D	12.5	88.7	1.00	0.87	1.00	28.0
East: Sefton Road														
4	L2	649	1.1	649	1.1	*0.687	15.1	LOS B	7.9	55.6	0.72	0.80	0.72	40.7
5	T1	82	2.6	82	2.6	0.690	38.8	LOS C	2.3	16.6	0.80	0.69	0.99	36.7
Approach		732	1.3	732	1.3	0.690	17.8	LOS B	7.9	55.6	0.73	0.79	0.75	39.8
West: Sefton Road														
11	T1	59	1.8	59	1.8	0.056	12.7	LOS A	0.9	6.5	0.49	0.38	0.49	42.6
12	R2	151	1.4	151	1.4	*0.672	33.6	LOS C	2.9	20.2	1.00	0.82	1.06	26.2
Approach		209	1.5	209	1.5	0.672	27.7	LOS B	2.9	20.2	0.86	0.70	0.90	31.5
All Vehicles		1708	1.5	1708	1.5	0.699	32.1	LOS C	12.5	88.7	0.87	0.81	0.88	31.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Chilvers Road											
P1	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	218.8	217.2	0.99
West: Sefton Road											
P4	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	214.8	211.9	0.99
All Pedestrians		105	51.8	LOS E	0.2	0.2	0.95	0.95	216.8	214.6	0.99

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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ATTACHMENT 4 - ITEM 5

PHASING SUMMARY

Site: 14v [Chilvers Road / Sefton Road - 2032- Upg (Site Folder: 2032 Base + Upgrade WE)]

Network: N101 [2032 Base + Upgrade WE (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 115 seconds (Network User-Given Cycle Time)

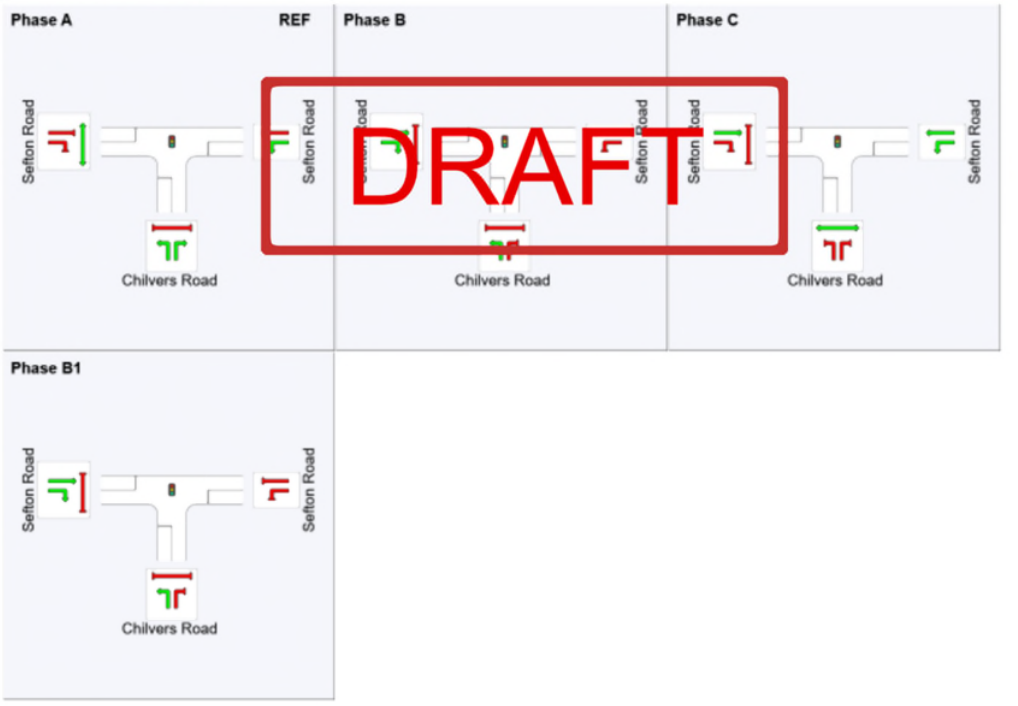
Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Convert Function Default
Reference Phase: Phase A
Input Phase Sequence: A, B, C, B1
Output Phase Sequence: A, B, C, B1

Phase Timing Summary

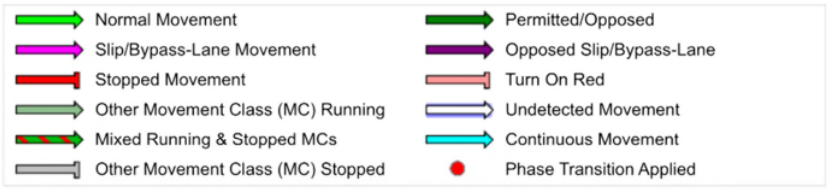
Phase	A	B	C	B1
Phase Change Time (sec)	0	43	58	98
Green Time (sec)	34	6	31	8
Phase Time (sec)	43	15	40	17
Phase Split	37%	13%	35%	15%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



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DRAFT

MOVEMENT SUMMARY

Site: 11 [Duffy Avenue / Pennant Hills Road. - 2032- Upg (Site Folder: 2032 Base + Upgrade WE)]

Network: N101 [2032 Base + Upgrade WE (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Pennant Hills Road.														
1	L2	231	5.9	231	5.9	0.715	24.1	LOS B	18.7	136.6	0.74	0.73	0.74	40.3
2	T1	2132	4.3	2132	4.3	*0.715	18.6	LOS B	20.0	145.1	0.77	0.72	0.77	51.2
Approach		2362	4.5	2362	4.5	0.715	19.2	LOS B	20.0	145.1	0.76	0.72	0.76	50.5
North: Pennant Hills Road.														
8	T1	1936	3.5	1936	3.5	0.456	6.4	LOS A	8.8	63.7	0.42	0.39	0.42	62.4
9	R2	172	6.1	172	6.1	*0.890	76.2	LOS F	7.1	52.0	1.00	0.96	1.40	18.2
Approach		2107	3.7	2107	3.7	0.890	12.1	LOS A	8.8	63.7	0.47	0.43	0.50	56.4
West: Duffy Avenue														
10	L2	185	7.4	185	7.4	0.323	37.4	LOS C	5.0	37.2	0.80	0.77	0.80	30.3
12	R2	220	2.9	220	2.9	*0.725	58.3	LOS E	7.8	56.2	1.00	0.86	1.07	25.0
Approach		405	4.9	405	4.9	0.725	48.7	LOS D	7.8	56.2	0.91	0.82	0.95	27.1
All Vehicles		4875	4.2	4875	4.2	0.890	18.5	LOS B	20.0	145.1	0.65	0.60	0.67	49.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
North: Pennant Hills Road.											
P3	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	228.2	226.1	0.99
West: Duffy Avenue											
P4	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	217.3	211.9	0.98
All Pedestrians		105	54.3	LOS E	0.2	0.2	0.95	0.95	222.7	219.0	0.98

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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ATTACHMENT 4 - ITEM 5

PHASING SUMMARY

Site: 11 [Duffy Avenue / Pennant Hills Road. - 2032- Upg (Site Folder: 2032 Base + Upgrade WE)]

Network: N101 [2032 Base + Upgrade WE (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

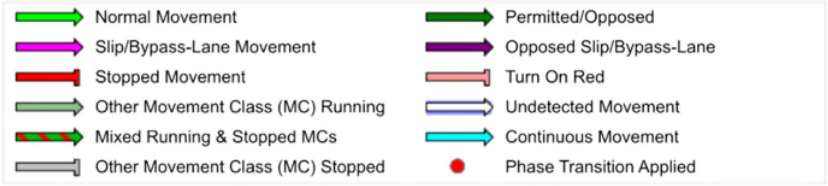
Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	0	75	94
Green Time (sec)	70	13	20
Phase Time (sec)	76	19	25
Phase Split	63%	16%	21%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence

REF: Reference Phase
VAR: Variable Phase



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MOVEMENT SUMMARY

Site: 5 [Duffy Avenue / Quarter Sessions Road - Op1 (Site Folder: 2032 Option 1 + Upgrade PM)]

Network: N101 [2032 Option 1 + Upgrade PM (Network Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Quarter Sessions Road														
1	L2	34	3.1	34	3.1	0.129	7.5	LOS A	0.4	2.5	0.74	0.69	0.74	36.7
2	T1	33	0.0	33	0.0	0.129	7.1	LOS A	0.4	2.5	0.74	0.69	0.74	37.2
3	R2	25	0.0	25	0.0	0.129	10.3	LOS A	0.4	2.5	0.74	0.69	0.74	34.1
Approach		92	1.1	92	1.1	0.129	8.1	LOS A	0.4	2.5	0.74	0.69	0.74	36.5
East: Duffy Avenue														
4	L2	19	0.0	19	0.0	0.494	3.6	LOS A	1.6	11.4	0.40	0.52	0.40	38.3
5	T1	239	3.5	239	3.5	0.494	3.4	LOS A	1.6	11.4	0.40	0.52	0.40	38.7
6	R2	353	2.4	353	2.4	0.494	6.5	LOS A	1.6	11.4	0.40	0.52	0.40	38.7
Approach		611	2.8	610[N1]	2.8	0.494	5.2	LOS A	1.6	11.4	0.40	0.52	0.40	38.7
North: Quarter Sessions Road														
7	L2	217	1.0	217	1.0	0.298	4.8	LOS A	0.8	5.8	0.59	0.60	0.59	36.1
8	T1	45	0.0	45	0.0	0.298	4.5	LOS A	0.8	5.8	0.59	0.60	0.59	38.4
9	R2	17	0.0	17	0.0	0.298	7.7	LOS A	0.8	5.8	0.59	0.60	0.59	38.4
Approach		279	0.8	279	0.8	0.298	4.9	LOS A	0.8	5.8	0.59	0.60	0.59	36.9
West: Duffy Avenue														
10	L2	13	8.3	1	8.3	0.288	5.7	LOS A	0.7	5.4	0.6	0.63	0.63	37.6
11	T1	198	1.6	19	1.6	0.288	5.5	LOS A	0.7	5.4	0.6	0.63	0.63	35.5
12	R2	44	7.1	4	7.1	0.288	8.5	LOS A	0.7	5.4	0.6	0.63	0.63	38.1
Approach		255	2.9	25	2.9	0.288	5.8	LOS A	0.7	5.4	0.6	0.63	0.63	36.4
All Vehicles		1236	2.2	1236	2.2	0.494	5.5	LOS A	1.6	11.4	0.51	0.57	0.51	38.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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MOVEMENT SUMMARY

Site: 10 [Duffy Avenue / The Esplanade / Chilvers Road - Op1 (Site Folder: 2032 Option 1 + Upgrade PM)]

Network: N101 [2032 Option 1 + Upgrade PM (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: The Esplanade														
21a	L1	173	0.6	173	0.6	*0.966	81.5	LOS F	26.5	187.6	1.00	1.18	1.42	16.1
22	T1	381	1.9	381	1.9	0.966	77.0	LOS F	26.5	187.6	1.00	1.18	1.42	16.1
23b	R3	65	8.1	65	8.1	0.298	56.6	LOS E	2.2	16.2	0.94	0.76	0.94	20.0
Approach		619	2.2	619	2.2	0.966	76.1	LOS F	26.5	187.6	0.99	1.14	1.36	16.4
East: Duffy Avenue														
4b	L3	129	0.8	129	0.8	0.279	39.2	LOS C	3.8	26.7	0.80	0.76	0.80	30.1
5	T1	288	4.4	288	4.4	*0.970	83.8	LOS F	13.1	95.3	0.99	1.22	1.55	10.6
6a	R1	100	3.2	100	3.2	0.534	60.6	LOS E	3.5	25.5	1.00	0.78	1.00	13.8
Approach		518	3.3	517[N1]	3.3	0.970	68.2	LOS E	13.1	95.3	0.95	1.02	1.25	15.9
NorthWest: Chilvers Road														
27a	L1	91	3.5	91	3.5	0.627	42.7	LOS D	11.4	80.9	0.95	0.83	0.95	19.1
28	T1	623	0.5	623	0.5	0.627	39.4	LOS C	11.4	80.9	0.95	0.82	0.95	30.2
29b	R3	223	1.4	223	1.4	*0.978	91.8	LOS F	10.5	74.5	1.00	1.08	1.55	10.8
Approach		937	1.0	937	1.0	0.978	52.2	LOS D	11.4	80.9	0.96	0.88	1.09	24.2
West: Duffy Avenue														
10b	L3	184	1.7	184	1.7	0.299	33.3	LOS C	4.6	32.5	0.74	0.76	0.74	33.5
11	T1	186	1.1	186	1.1	0.577	50.3	LOS D	6.3	44.4	0.97	0.80	0.97	28.3
12a	R1	180	0.0	180	0.0	0.942	81.6	LOS F	7.9	55.3	1.00	1.13	1.54	27.9
Approach		551	1.0	551	1.0	0.942	54.9	LOS D	7.9	55.3	0.99	0.89	1.08	29.4
All Vehicles		2624	1.7	2624	1.7	0.978	61.6	LOS E	26.5	187.6	0.95	0.97	1.19	22.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)
N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
SouthEast: The Esplanade											
P5	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	221.3	217.2	0.98
East: Duffy Avenue											
P2	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	219.8	215.2	0.98
NorthWest: Chilvers Road											
P7	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	223.9	220.5	0.98

West: Duffy Avenue											
P4	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	219.8	215.2	0.98
P4B	Slip/ Bypass	53	54.3	LOS E	0.2	0.2	0.95	0.95	211.4	204.3	0.97
All Pedestrians		263	54.3	LOS E	0.2	0.2	0.95	0.95	219.3	214.5	0.98

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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PHASING SUMMARY

Site: 10 [Duffy Avenue / The Esplanade / Chilvers Road - Op1 (Site Folder: 2032 Option 1 + Upgrade PM)]

Network: N101 [2032 Option 1 + Upgrade PM (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120 seconds (Network User-Given Cycle Time)

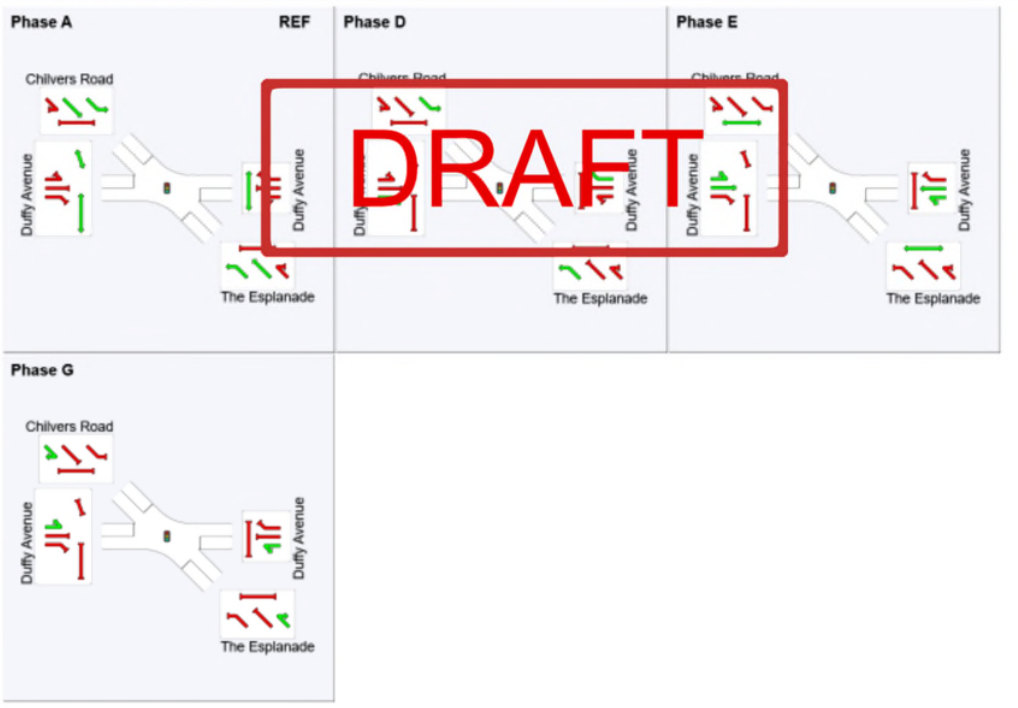
Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, D, E, G
Output Phase Sequence: A, D, E, G

Phase Timing Summary

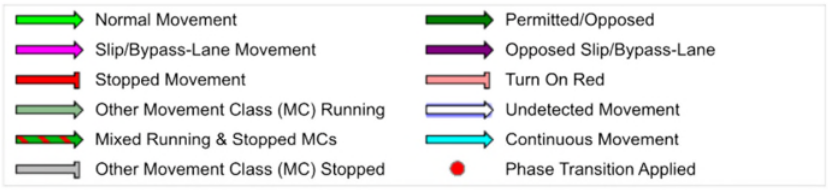
Phase	A	D	E	G
Phase Change Time (sec)	0	44	65	94
Green Time (sec)	35	12	20	17
Phase Time (sec)	44	21	29	26
Phase Split	37%	18%	24%	22%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



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ATTACHMENT 4 - ITEM 5

MOVEMENT SUMMARY

Site: 14v [Chilvers Road / Sefton Road - Op1 (Site Folder: 2032 Option 1 + Upgrade PM)] Network: N101 [2032 Option 1 + Upgrade PM (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Chilvers Road														
1	L2	116	1.8	116	1.8	0.620	43.5	LOS D	10.8	77.1	0.95	0.85	0.95	29.0
3	R2	556	2.1	556	2.1	0.620	44.5	LOS D	10.8	77.1	0.96	0.85	0.96	28.7
Approach		672	2.0	671	2.0	0.620	44.3	LOS D	10.8	77.1	0.95	0.85	0.95	28.7
East: Sefton Road														
4	L2	849	0.9	849	0.9	*0.832	17.3	LOS B	12.3	86.4	0.80	0.85	0.82	38.7
5	T1	84	2.5	84	2.5	*0.837	54.1	LOS D	2.9	20.6	0.76	0.78	1.26	31.8
Approach		934	1.0	934	1.0	0.837	20.6	LOS B	12.3	86.4	0.80	0.84	0.86	37.4
West: Sefton Road														
11	T1	56	1.9	56	1.9	0.052	12.6	LOS A	0.9	6.3	0.48	0.37	0.48	42.6
12	R2	97	2.2	97	2.2	*0.530	34.6	LOS C	1.8	13.0	0.99	0.77	0.99	25.8
Approach		153	2.1	153	2.1	0.530	26.6	LOS B	1.8	13.0	0.80	0.62	0.80	32.7
All Vehicles		1758	1.5	1758	1.5	0.837	30.2	LOS C	12.3	86.4	0.86	0.83	0.89	32.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Chilvers Road											
P1	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	221.3	217.2	0.98
West: Sefton Road											
P4	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	217.3	211.9	0.98
All Pedestrians		105	54.3	LOS E	0.2	0.2	0.95	0.95	219.3	214.6	0.98

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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ATTACHMENT 4 - ITEM 5

PHASING SUMMARY

Site: 14v [Chilvers Road / Sefton Road - Op1 (Site Folder: 2032 Option 1 + Upgrade PM)] Network: N101 [2032 Option 1 + Upgrade PM (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120 seconds (Network User-Given Cycle Time)

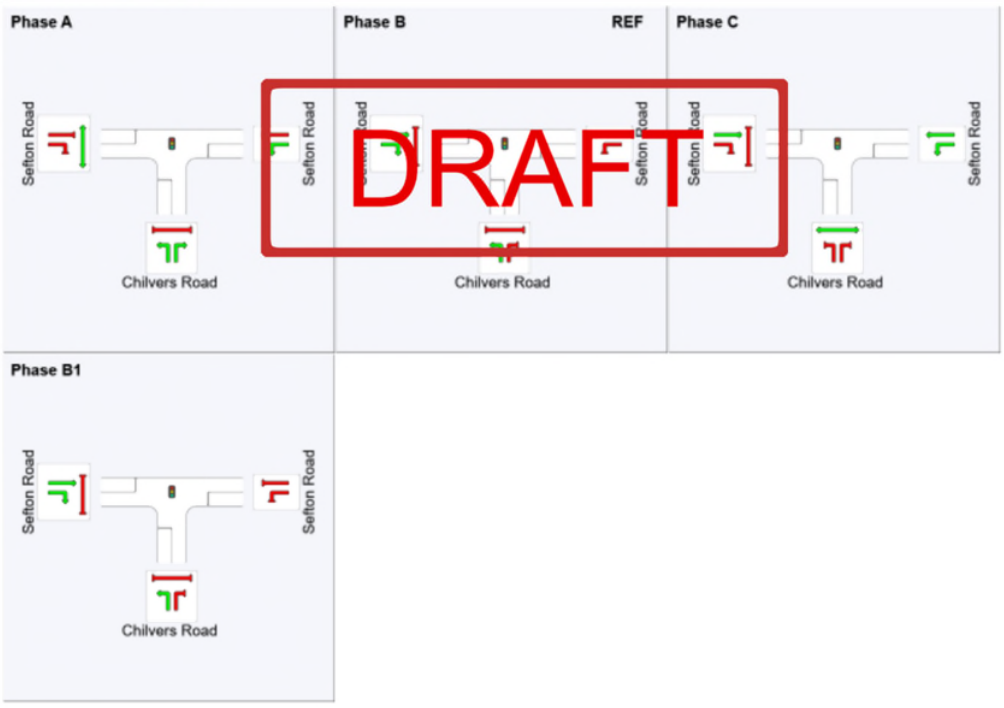
Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Convert Function Default
Reference Phase: Phase B
Input Phase Sequence: A, B, C, B1
Output Phase Sequence: A, B, C, B1

Phase Timing Summary

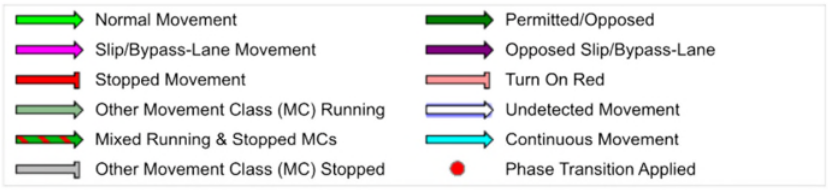
Phase	A	B	C	B1
Phase Change Time (sec)	76	0	15	61
Green Time (sec)	35	6	37	6
Phase Time (sec)	44	15	46	15
Phase Split	37%	13%	38%	13%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



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ATTACHMENT 4 - ITEM 5

MOVEMENT SUMMARY

Site: 11 [Duffy Avenue / Pennant Hills Road. - Op1 (Site Folder: 2032 Option 1 + Upgrade PM)] Network: N101 [2032 Option 1 + Upgrade PM (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 125 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Pennant Hills Road.														
1	L2	283	4.8	283	4.8	0.666	22.9	LOS B	17.5	127.2	0.69	0.71	0.69	40.8
2	T1	1978	4.7	1978	4.7	*0.666	17.4	LOS B	18.5	134.8	0.71	0.67	0.71	52.1
Approach		2261	4.7	2261	4.7	0.666	18.0	LOS B	18.5	134.8	0.71	0.68	0.71	51.1
North: Pennant Hills Road.														
8	T1	2035	3.3	2035	3.3	0.463	5.5	LOS A	8.9	64.1	0.39	0.36	0.39	63.3
9	R2	216	4.9	216	4.9	*1.002	111.4	LOS F	11.4	83.1	1.00	1.10	1.72	13.5
Approach		2251	3.5	2251	3.5	1.002	15.6	LOS B	11.4	83.1	0.45	0.43	0.52	53.2
West: Duffy Avenue														
10	L2	144	9.5	144	9.5	0.259	38.4	LOS C	4.0	30.1	0.78	0.76	0.78	30.0
12	R2	188	3.4	188	3.4	*0.683	60.6	LOS E	6.9	49.7	1.00	0.84	1.04	24.5
Approach		333	6.0	333	6.0	0.683	51.0	LOS D	6.9	49.7	0.91	0.80	0.93	26.6
All Vehicles		4844	4.2	4844	4.2	1.002	19.2	LOS B	18.5	134.8	0.60	0.57	0.64	49.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

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Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
North: Pennant Hills Road.											
P3	Full	53	56.8	LOS E	0.2	0.2	0.95	0.95	230.7	226.1	0.98
West: Duffy Avenue											
P4	Full	53	56.8	LOS E	0.2	0.2	0.95	0.95	219.8	211.9	0.96
All Pedestrians		105	56.8	LOS E	0.2	0.2	0.95	0.95	225.2	219.0	0.97

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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ATTACHMENT 4 - ITEM 5

PHASING SUMMARY

Site: 11 [Duffy Avenue / Pennant Hills Road. - Op1 (Site Folder: 2032 Option 1 + Upgrade PM)] Network: N101 [2032 Option 1 + Upgrade PM (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 125 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

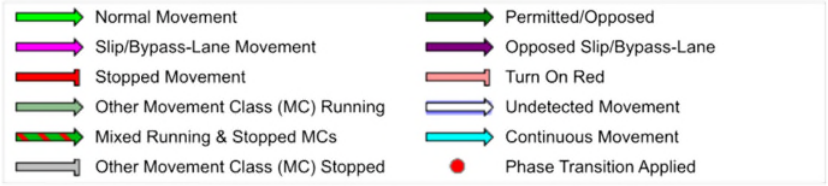
Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	0	79	100
Green Time (sec)	75	15	19
Phase Time (sec)	81	21	23
Phase Split	65%	17%	18%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence

REF: Reference Phase
VAR: Variable Phase



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MOVEMENT SUMMARY

Site: 5 [Duffy Avenue / Quarter Sessions Road - Op 1 (Site Folder: 2032 Option 1 + Upgrade WE)]

Network: N101 [2032 Option 1 + Upgrade WE (Network Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Quarter Sessions Road														
1	L2	58	1.8	58	1.8	0.171	6.7	LOS A	0.5	3.3	0.70	0.66	0.70	37.1
2	T1	53	0.0	53	0.0	0.171	6.4	LOS A	0.5	3.3	0.70	0.66	0.70	37.6
3	R2	23	0.0	23	0.0	0.171	9.6	LOS A	0.5	3.3	0.70	0.66	0.70	34.7
Approach		134	0.8	134	0.8	0.171	7.1	LOS A	0.5	3.3	0.70	0.66	0.70	37.1
East: Duffy Avenue														
4	L2	6	0.0	6	0.0	0.409	3.3	LOS A	1.2	8.7	0.33	0.51	0.33	38.4
5	T1	192	4.4	186	4.4	0.409	3.0	LOS A	1.2	8.7	0.33	0.51	0.33	38.7
6	R2	335	2.5	325	2.5	0.409	6.2	LOS A	1.2	8.7	0.33	0.51	0.33	38.7
Approach		533	3.2	518 N1	3.2	0.409	5.0	LOS A	1.2	8.7	0.33	0.51	0.33	38.7
North: Quarter Sessions Road														
7	L2	349	0.6	349	0.6	0.444	5.5	LOS A	1.4	9.7	0.70	0.67	0.70	35.7
8	T1	42	0.0	42	0.0	0.444	5.2	LOS A	1.4	9.7	0.70	0.67	0.70	38.2
9	R2	11	0.0	11	0.0	0.444	8.3	LOS A	1.4	9.7	0.70	0.67	0.70	38.2
Approach		402	0.5	402	0.5	0.444	5.5	LOS A	1.4	9.7	0.70	0.67	0.70	36.2
West: Duffy Avenue														
10	L2	11	10.0	1	10.0	0.326	5.8	LOS A	0.9	6.2	0.6	0.63	0.63	37.6
11	T1	252	1.3	252	1.3	0.326	5.6	LOS A	0.9	6.2	0.6	0.63	0.63	35.7
12	R2	32	10.0	3	10.0	0.326	8.6	LOS A	0.9	6.2	0.6	0.63	0.63	38.1
Approach		294	2.5	294	2.5	0.326	5.6	LOS A	0.9	6.2	0.6	0.63	0.63	36.2
All Vehicles		1362	2.0	1347 N1	2.0	0.444	5.5	LOS A	1.4	9.7	0.54	0.60	0.54	37.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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MOVEMENT SUMMARY

Site: 10 [Duffy Avenue / The Esplanade / Chilvers Road - Op 1 (Site Folder: 2032 Option 1 + Upgrade WE)]

Network: N101 [2032 Option 1 + Upgrade WE (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 115 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: The Esplanade														
21a	L1	121	0.9	121	0.9	*1.052	128.8	LOS F	34.0	240.7	1.00	1.50	1.83	11.3
22	T1	451	1.6	451	1.6	1.052	124.4	LOS F	34.0	240.7	1.00	1.50	1.83	11.3
23b	R3	73	7.2	73	7.2	0.256	49.7	LOS D	2.2	16.2	0.90	0.76	0.90	21.5
Approach		644	2.1	644	2.1	1.052	116.8	LOS F	34.0	240.7	0.99	1.42	1.72	11.9
East: Duffy Avenue														
4b	L3	111	1.0	111	1.0	0.291	42.4	LOS C	3.5	24.5	0.85	0.77	0.85	29.3
5	T1	252	5.0	252	5.0	1.010	99.8	LOS F	12.1	88.2	0.99	1.30	1.74	9.2
6a	R1	126	2.5	126	2.5	0.703	61.2	LOS E	4.5	32.1	1.00	0.85	1.11	13.7
Approach		488	3.4	488	3.4	1.010	76.8	LOS F	12.1	88.2	0.96	1.06	1.37	14.4
NorthWest: Chilvers Road														
27a	L1	104	3.0	104	3.0	0.509	41.3	LOS C	8.5	60.5	0.94	0.81	0.94	19.4
28	T1	452	0.7	452	0.7	0.509	38.9	LOS C	8.6	60.2	0.95	0.81	0.95	30.3
29b	R3	305	1.0	305	1.0	*1.036	102.4	LOS F	15.8	111.7	1.00	1.15	1.66	9.8
Approach		861	1.1	861	1.1	1.036	61.7	LOS E	15.8	111.7	0.97	0.93	1.20	20.7
West: Duffy Avenue														
10b	L3	263	1.2	263	1.2	0.417	33.2	LOS C	6.6	46.5	0.74	0.79	0.78	33.6
11	T1	260	0.8	260	0.8	*1.047	91.1	LOS F	14.7	103.4	1.00	1.44	1.94	17.1
12a	R1	198	0.0	198	0.0	1.082	152.1	LOS F	12.2	85.4	1.00	1.46	2.15	19.8
Approach		721	0.7	721	0.7	1.082	98.8	LOS F	14.7	103.4	0.92	1.21	1.57	21.6
All Vehicles		2715	1.7	2715	1.7	1.082	87.3	LOS F	34.0	240.7	0.96	1.14	1.46	17.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
SouthEast: The Esplanade											
P5	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	218.8	217.2	0.99
East: Duffy Avenue											
P2	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	217.3	215.2	0.99
NorthWest: Chilvers Road											
P7	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	221.4	220.5	1.00

West: Duffy Avenue											
P4	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	217.3	215.2	0.99
P4B	Slip/ Bypass	53	51.8	LOS E	0.2	0.2	0.95	0.95	208.9	204.3	0.98
All Pedestrians		263	51.8	LOS E	0.2	0.2	0.95	0.95	216.8	214.5	0.99

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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ATTACHMENT 4 - ITEM 5

PHASING SUMMARY

Site: 10 [Duffy Avenue / The Esplanade / Chilvers Road - Op 1 (Site Folder: 2032 Option 1 + Upgrade WE)] **Network: N101 [2032 Option 1 + Upgrade WE (Network Folder: General)]**

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 115 seconds (Network User-Given Cycle Time)

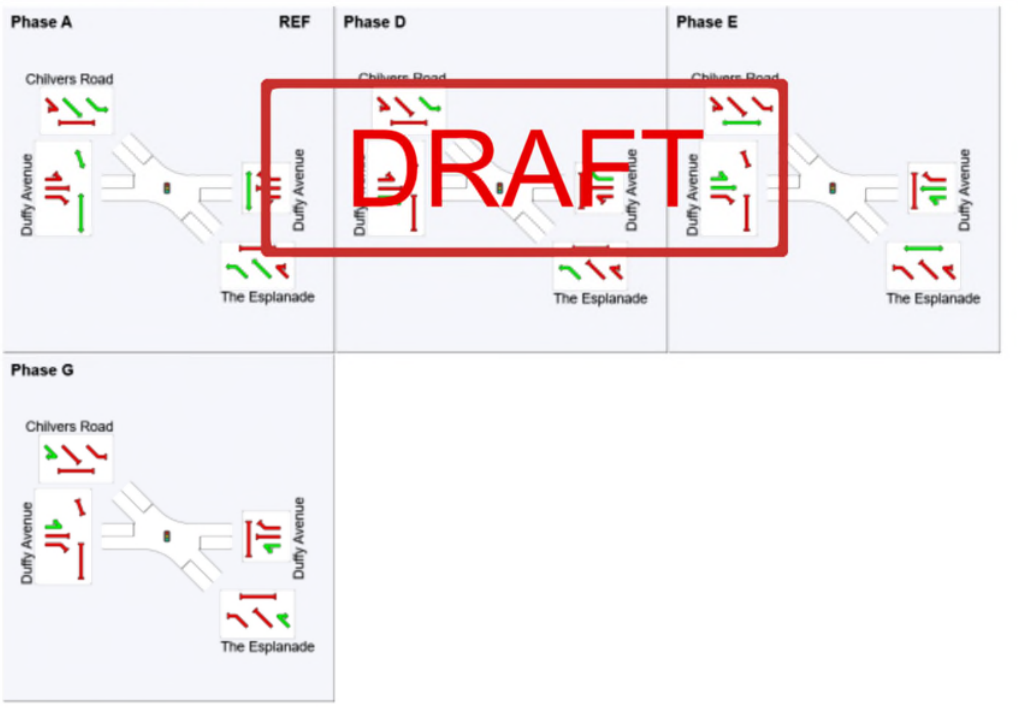
Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, D, E, G
Output Phase Sequence: A, D, E, G

Phase Timing Summary

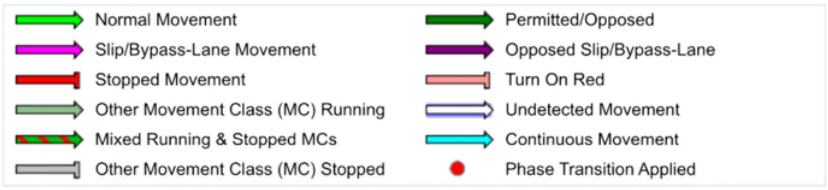
Phase	A	D	E	G
Phase Change Time (sec)	0	41	61	85
Green Time (sec)	32	11	15	21
Phase Time (sec)	41	20	24	30
Phase Split	36%	17%	21%	26%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



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MOVEMENT SUMMARY

Site: 14v [Chilvers Road / Sefton Road - Op 1 (Site Folder: 2032 Option 1 + Upgrade WE)]

Network: N101 [2032 Option 1 + Upgrade WE (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 115 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Chilvers Road														
1	L2	121	1.7	118	1.7	0.744	47.1	LOS D	13.5	96.0	1.00	0.88	1.02	28.0
3	R2	718	1.6	699	1.6	*0.744	48.3	LOS D	13.5	96.0	1.00	0.88	1.02	27.7
Approach		839	1.6	817[N1]	1.6	0.744	48.1	LOS D	13.5	96.0	1.00	0.88	1.02	27.7
East: Sefton Road														
4	L2	726	1.0	726	1.0	*0.732	15.0	LOS B	8.7	61.4	0.74	0.82	0.74	40.8
5	T1	74	2.9	74	2.9	0.545	32.6	LOS C	1.9	13.4	0.78	0.60	0.79	39.1
Approach		800	1.2	800	1.2	0.732	16.6	LOS B	8.7	61.4	0.75	0.80	0.75	40.5
West: Sefton Road														
11	T1	59	1.8	59	1.8	0.056	12.7	LOS A	0.9	6.5	0.49	0.38	0.49	42.6
12	R2	151	1.4	151	1.4	*0.784	37.3	LOS C	3.0	21.3	1.00	0.88	1.20	24.9
Approach		209	1.5	209	1.5	0.784	30.4	LOS C	3.0	21.3	0.86	0.74	1.00	30.4
All Vehicles		1848	1.4	1826[N1]	1.4	0.784	32.3	LOS C	13.5	96.0	0.87	0.83	0.90	31.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)
N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Chilvers Road											
P1	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	218.8	217.2	0.99
West: Sefton Road											
P4	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	214.8	211.9	0.99
All Pedestrians		105	51.8	LOS E	0.2	0.2	0.95	0.95	216.8	214.6	0.99

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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ATTACHMENT 4 - ITEM 5

Access Study model_WE.sip9

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ATTACHMENT 4 - ITEM 5

PHASING SUMMARY

Site: 14v [Chilvers Road / Sefton Road - Op 1 (Site Folder: 2032 Option 1 + Upgrade WE)]

Network: N101 [2032 Option 1 + Upgrade WE (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 115 seconds (Network User-Given Cycle Time)

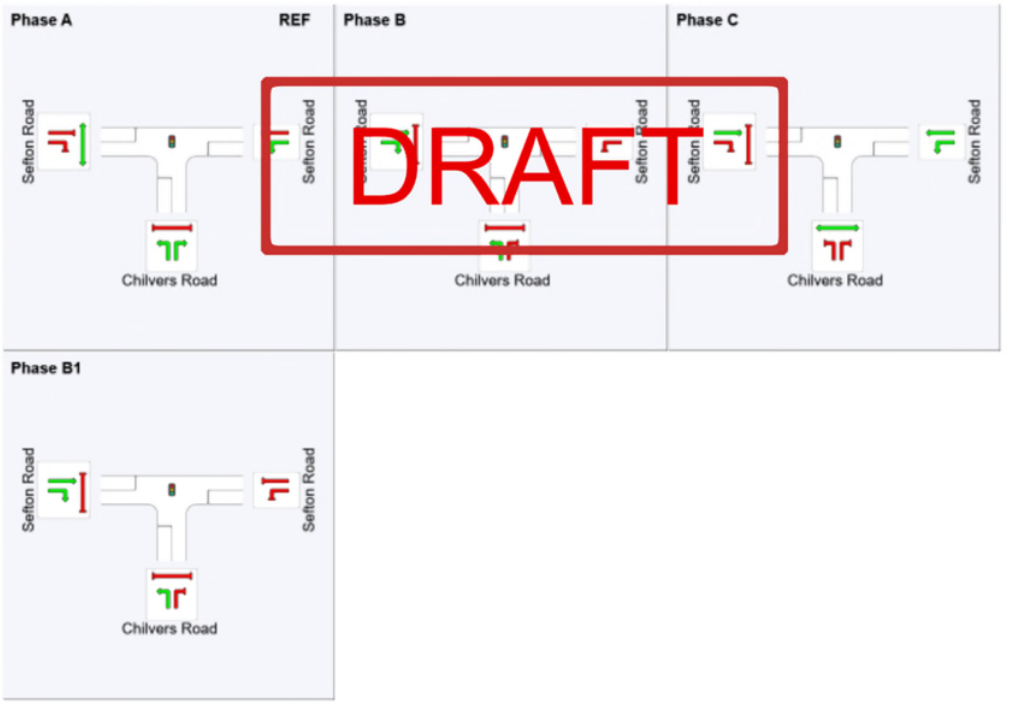
Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Convert Function Default
Reference Phase: Phase A
Input Phase Sequence: A, B, C, B1
Output Phase Sequence: A, B, C, B1

Phase Timing Summary

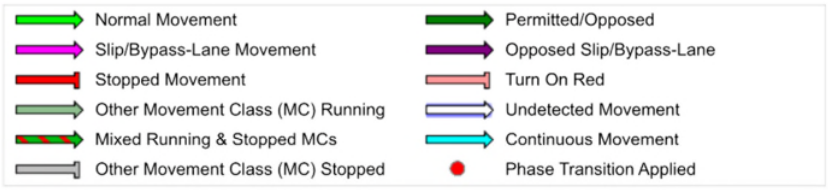
Phase	A	B	C	B1
Phase Change Time (sec)	0	43	58	100
Green Time (sec)	34	6	33	6
Phase Time (sec)	43	15	42	15
Phase Split	37%	13%	37%	13%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



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ATTACHMENT 4 - ITEM 5

MOVEMENT SUMMARY

Site: 11 [Duffy Avenue / Pennant Hills Road. - Op 1 (Site Folder: 2032 Option 1 + Upgrade WE)]

Network: N101 [2032 Option 1 + Upgrade WE (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Pennant Hills Road.														
1	L2	252	5.4	252	5.4	0.721	24.2	LOS B	19.0	138.5	0.74	0.73	0.74	40.0
2	T1	2132	4.3	2132	4.3	*0.721	18.7	LOS B	20.3	147.3	0.77	0.72	0.77	51.1
Approach		2383	4.5	2383	4.5	0.721	19.3	LOS B	20.3	147.3	0.77	0.72	0.77	50.3
North: Pennant Hills Road.														
8	T1	1937	3.5	1937	3.5	0.456	6.4	LOS A	8.8	63.8	0.42	0.39	0.42	62.4
9	R2	194	5.4	194	5.4	*1.000	107.9	LOS F	9.8	71.9	1.00	1.10	1.76	13.9
Approach		2131	3.7	2131	3.7	1.000	15.6	LOS B	9.8	71.9	0.48	0.45	0.54	53.3
West: Duffy Avenue														
10	L2	197	7.0	192	7.1	0.334	37.5	LOS C	5.2	38.6	0.80	0.77	0.80	30.2
12	R2	229	2.8	223	2.8	*0.736	58.6	LOS E	8.0	57.3	1.00	0.87	1.08	24.9
Approach		426	4.7	415 N1	4.8	0.736	48.9	LOS D	8.0	57.3	0.91	0.83	0.95	27.1
All Vehicles		4940	4.1	4929 N1	4.1	1.000	20.2	LOS B	20.3	147.3	0.65	0.61	0.69	48.5

Site Level of Service (LOS) Metho[illegible]ata dialog (Network tab).
Vehicle movement LOS values ar[illegible] based on average delay per movement.
Intersection and Approach LOS v[illegible]ues are ba[illegible] av[illegible] delay for all v[illegible]nts.
Delay Model: SIDRA Standard (G[illegible]ometric De[illegible]y is i[illegible]ded).
Gap-Acceptance Capacity: SIDR[illegible] Standard ([illegible]kçelik M3[illegible]).
HV (%) values are calculated for [illegible] Movemen[illegible]asses of All H[illegible]y Vehicle Model Designation.

* Critical Movement (Signal Tim[illegible])
N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
North: Pennant Hills Road.											
P3	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	228.2	226.1	0.99
West: Duffy Avenue											
P4	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	217.3	211.9	0.98
All Pedestrians		105	54.3	LOS E	0.2	0.2	0.95	0.95	222.7	219.0	0.98

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Access Study model_WE.sip9

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ATTACHMENT 4 - ITEM 5

PHASING SUMMARY

Site: 11 [Duffy Avenue / Pennant Hills Road. - Op 1 (Site Folder: 2032 Option 1 + Upgrade WE)]

Network: N101 [2032 Option 1 + Upgrade WE (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

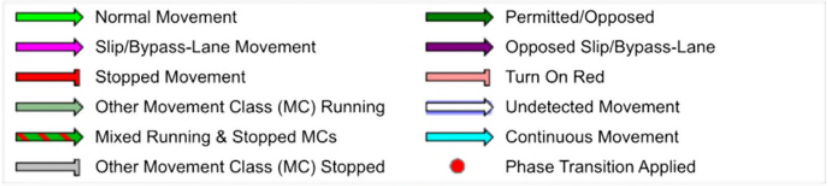
Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	0	75	94
Green Time (sec)	70	13	20
Phase Time (sec)	76	19	25
Phase Split	63%	16%	21%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence

REF: Reference Phase
VAR: Variable Phase



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MOVEMENT SUMMARY

Site: 5 [Duffy Avenue / Quarter Sessions Road - Op2 (Site Folder: 2032 Option 2 + Upgrade PM)]

Network: N101 [2032 Option 2 + Upgrade PM (Network Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Quarter Sessions Road														
1	L2	38	2.8	38	2.8	0.118	6.5	LOS A	0.3	2.2	0.68	0.65	0.68	37.1
2	T1	27	0.0	27	0.0	0.118	6.2	LOS A	0.3	2.2	0.68	0.65	0.68	37.6
3	R2	26	0.0	26	0.0	0.118	9.3	LOS A	0.3	2.2	0.68	0.65	0.68	34.6
Approach		92	1.1	92	1.1	0.118	7.2	LOS A	0.3	2.2	0.68	0.65	0.68	36.8
East: Duffy Avenue														
4	L2	15	0.0	15	0.0	0.416	3.5	LOS A	1.2	8.6	0.36	0.50	0.36	38.4
5	T1	229	3.7	229	3.7	0.416	3.2	LOS A	1.2	8.6	0.36	0.50	0.36	38.8
6	R2	264	3.2	264	3.2	0.416	6.4	LOS A	1.2	8.6	0.36	0.50	0.36	38.8
Approach		508	3.3	508	3.3	0.416	4.9	LOS A	1.2	8.6	0.36	0.50	0.36	38.8
North: Quarter Sessions Road														
7	L2	167	1.3	167	1.3	0.244	4.7	LOS A	0.6	4.5	0.56	0.58	0.56	36.1
8	T1	39	0.0	39	0.0	0.244	4.4	LOS A	0.6	4.5	0.56	0.58	0.56	38.4
9	R2	23	0.0	23	0.0	0.244	7.5	LOS A	0.6	4.5	0.56	0.58	0.56	38.4
Approach		229	0.9	229	0.9	0.244	4.9	LOS A	0.6	4.5	0.56	0.58	0.56	37.0
West: Duffy Avenue														
10	L2	16	6.7	1	6.7	0.267	4.9	LOS A	0.7	4.8	0.55	0.57	0.55	37.8
11	T1	198	1.6	198	1.6	0.267	4.7	LOS A	0.7	4.8	0.55	0.57	0.55	35.9
12	R2	42	7.5	42	7.5	0.267	7.7	LOS A	0.7	4.8	0.55	0.57	0.55	38.3
Approach		256	2.9	256	2.9	0.267	5.0	LOS A	0.7	4.8	0.55	0.57	0.55	36.7
All Vehicles		1085	2.5	1085	2.5	0.416	5.1	LOS A	1.2	8.6	0.47	0.55	0.47	38.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 10 [Duffy Avenue / The Esplanade / Chilvers Road - Op2 (Site Folder: 2032 Option 2 + Upgrade PM)]

Network: N101 [2032 Option 2 + Upgrade PM (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: The Esplanade														
21a	L1	181	0.6	181	0.6	0.885	55.7	LOS D	22.0	155.7	1.00	1.01	1.17	20.7
22	T1	383	1.9	383	1.9	*0.885	51.5	LOS D	22.0	155.7	1.00	1.01	1.17	20.7
23b	R3	66	7.9	66	7.9	0.429	62.8	LOS E	2.3	17.5	0.98	0.77	0.98	18.7
Approach		631	2.2	631	2.2	0.885	53.9	LOS D	22.0	155.7	1.00	0.98	1.15	20.5
East: Duffy Avenue														
4b	L3	128	0.8	128	0.8	0.260	37.5	LOS C	3.6	25.3	0.78	0.76	0.78	30.7
5	T1	287	4.4	287	4.4	*0.905	65.3	LOS E	11.5	83.6	0.99	1.09	1.34	12.8
6a	R1	102	3.1	102	3.1	0.595	62.2	LOS E	3.7	26.5	1.00	0.79	1.02	13.6
Approach		518	3.3	517[N1]	3.3	0.905	57.8	LOS E	11.5	83.6	0.94	0.95	1.14	17.7
NorthWest: Chilvers Road														
27a	L1	89	3.5	89	3.5	0.558	38.9	LOS C	10.7	75.5	0.90	0.79	0.90	20.3
28	T1	618	0.5	618	0.5	0.558	35.6	LOS C	10.7	75.5	0.90	0.78	0.90	31.4
29b	R3	145	2.2	145	2.2	*0.907	78.3	LOS F	5.9	41.9	1.00	0.94	1.28	12.2
Approach		853	1.1	853	1.1	0.907	43.2	LOS D	10.7	75.5	0.92	0.81	0.96	27.1
West: Duffy Avenue														
10b	L3	135	2.3	135	2.3	0.235	34.6	LOS C	3.4	24.1	0.74	0.75	0.74	33.1
11	T1	185	1.1	185	1.1	0.522	43.0	LOS D	6.1	43.0	0.95	0.78	0.95	28.8
12a	R1	158	0.0	158	0.0	*0.901	74.6	LOS F	6.5	45.7	1.00	1.05	1.44	29.0
Approach		478	1.1	478	1.1	0.901	53.1	LOS D	6.5	45.7	0.91	0.86	1.05	29.8
All Vehicles		2479	1.8	2479	1.8	0.907	50.9	LOS D	22.0	155.7	0.94	0.89	1.06	24.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)
N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
SouthEast: The Esplanade											
P5	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	221.3	217.2	0.98
East: Duffy Avenue											
P2	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	219.8	215.2	0.98
NorthWest: Chilvers Road											
P7	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	223.9	220.5	0.98

West: Duffy Avenue											
P4	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	219.8	215.2	0.98
P4B	Slip/ Bypass	53	54.3	LOS E	0.2	0.2	0.95	0.95	211.4	204.3	0.97
All Pedestrians		263	54.3	LOS E	0.2	0.2	0.95	0.95	219.3	214.5	0.98

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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PHASING SUMMARY

Site: 10 [Duffy Avenue / The Esplanade / Chilvers Road - Op2 (Site Folder: 2032 Option 2 + Upgrade PM)]

Network: N101 [2032 Option 2 + Upgrade PM (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120 seconds (Network User-Given Cycle Time)

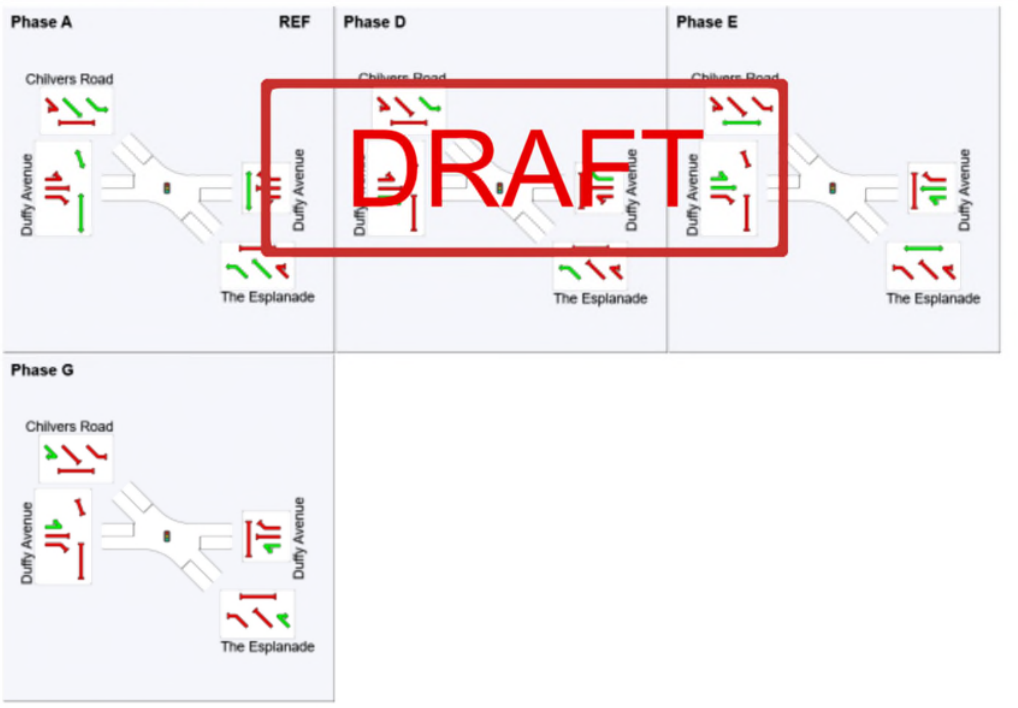
Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, D, E, G
Output Phase Sequence: A, D, E, G

Phase Timing Summary

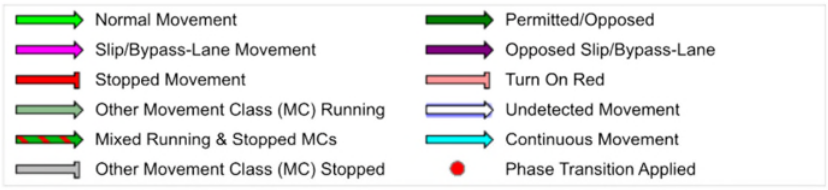
Phase	A	D	E	G
Phase Change Time (sec)	0	48	68	99
Green Time (sec)	39	11	22	12
Phase Time (sec)	48	20	31	21
Phase Split	40%	17%	26%	18%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



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ATTACHMENT 4 - ITEM 5

MOVEMENT SUMMARY

Site: 14v [Chilvers Road / Sefton Road - Copy - Conversion - Op2 (Site Folder: 2032 Option 2 + Upgrade PM)]

Network: N101 [2032 Option 2 + Upgrade PM (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Chilvers Road														
1	L2	106	2.0	106	2.0	0.719	50.3	LOS D	10.8	77.2	1.00	0.86	1.01	27.2
3	R2	518	2.2	518	2.2	0.719	51.0	LOS D	10.8	77.2	1.00	0.86	1.02	27.0
Approach		624	2.2	624	2.2	0.719	50.9	LOS D	10.8	77.2	1.00	0.86	1.02	27.1
East: Sefton Road														
4	L2	765	1.0	765	1.0	*0.819	16.5	LOS B	10.3	73.0	0.74	0.82	0.76	39.3
5	T1	168	1.3	168	1.3	*1.065	160.4	LOS F	11.8	83.8	1.00	1.36	2.18	16.3
Approach		934	1.0	934	1.0	1.065	42.5	LOS C	11.8	83.8	0.78	0.92	1.02	27.6
West: Sefton Road														
11	T1	96	1.1	96	1.1	0.080	9.7	LOS A	1.3	9.5	0.43	0.34	0.43	44.1
12	R2	95	2.2	95	2.2	*0.518	35.2	LOS C	2.0	14.4	0.99	0.77	0.99	25.6
Approach		191	1.7	191	1.7	0.518	22.4	LOS B	2.0	14.4	0.71	0.56	0.71	35.6
All Vehicles		1748	1.5	1748	1.5	1.065	43.3	LOS D	11.8	83.8	0.85	0.86	0.98	28.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Chilvers Road											
P1	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	221.3	217.2	0.98
West: Sefton Road											
P4	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	217.3	211.9	0.98
All Pedestrians		105	54.3	LOS E	0.2	0.2	0.95	0.95	219.3	214.6	0.98

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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ATTACHMENT 4 - ITEM 5

PHASING SUMMARY

Site: 14v [Chilvers Road / Sefton Road - Copy - Conversion - Op2 (Site Folder: 2032 Option 2 + Upgrade PM)]

Network: N101 [2032 Option 2 + Upgrade PM (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120 seconds (Network User-Given Cycle Time)

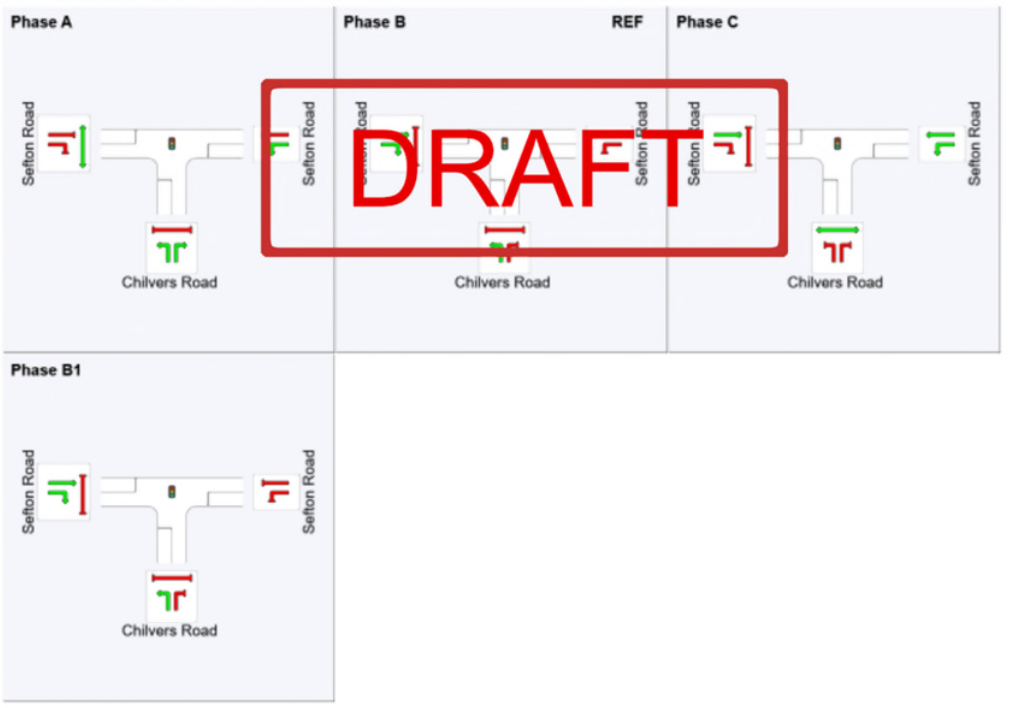
Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Convert Function Default
Reference Phase: Phase B
Input Phase Sequence: A, B, C, B1
Output Phase Sequence: A, B, C, B1

Phase Timing Summary

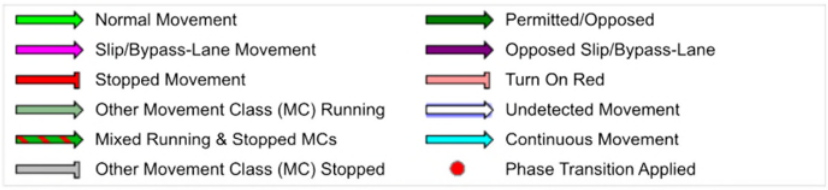
Phase	A	B	C	B1
Phase Change Time (sec)	83	0	15	68
Green Time (sec)	28	6	44	6
Phase Time (sec)	37	15	53	15
Phase Split	31%	13%	44%	13%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



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ATTACHMENT 4 - ITEM 5

MOVEMENT SUMMARY

Site: 11 [Duffy Avenue / Pennant Hills Road. - Op2 (Site Folder: 2032 Option 2 + Upgrade PM)] Network: N101 [2032 Option 2 + Upgrade PM (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 125 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Pennant Hills Road.														
1	L2	282	4.9	282	4.9	0.666	22.9	LOS B	17.5	127.1	0.69	0.71	0.69	40.9
2	T1	1978	4.7	1978	4.7	*0.666	17.3	LOS B	18.5	134.7	0.71	0.67	0.71	52.1
Approach		2260	4.7	2260	4.7	0.666	18.0	LOS B	18.5	134.7	0.71	0.68	0.71	51.1
North: Pennant Hills Road.														
8	T1	2036	3.3	2036	3.3	0.463	5.5	LOS A	8.9	64.1	0.39	0.36	0.39	63.3
9	R2	216	4.9	216	4.9	*1.002	111.4	LOS F	11.4	83.1	1.00	1.10	1.72	13.5
Approach		2252	3.5	2252	3.5	1.002	15.6	LOS B	11.4	83.1	0.45	0.43	0.52	53.2
West: Duffy Avenue														
10	L2	144	9.5	144	9.5	0.259	38.4	LOS C	4.0	30.1	0.78	0.76	0.78	30.0
12	R2	187	3.4	187	3.4	*0.680	60.5	LOS E	6.9	49.4	1.00	0.84	1.03	24.5
Approach		332	6.0	332	6.0	0.680	50.9	LOS D	6.9	49.4	0.91	0.80	0.93	26.6
All Vehicles		4843	4.2	4843	4.2	1.002	19.2	LOS B	18.5	134.7	0.60	0.57	0.64	49.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

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Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
North: Pennant Hills Road.											
P3	Full	53	56.8	LOS E	0.2	0.2	0.95	0.95	230.7	226.1	0.98
West: Duffy Avenue											
P4	Full	53	56.8	LOS E	0.2	0.2	0.95	0.95	219.8	211.9	0.96
All Pedestrians		105	56.8	LOS E	0.2	0.2	0.95	0.95	225.2	219.0	0.97

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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ATTACHMENT 4 - ITEM 5

PHASING SUMMARY

Site: 11 [Duffy Avenue / Pennant Hills Road. - Op2 (Site Folder: 2032 Option 2 + Upgrade PM)] Network: N101 [2032 Option 2 + Upgrade PM (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 125 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

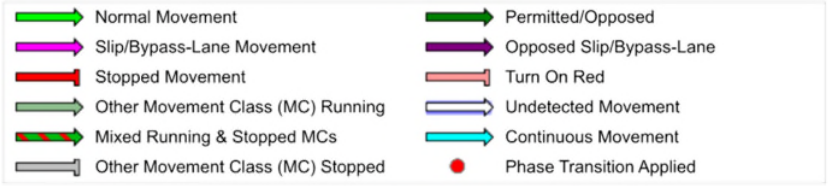
Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	0	79	100
Green Time (sec)	75	15	19
Phase Time (sec)	81	21	23
Phase Split	65%	17%	18%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence

REF: Reference Phase
VAR: Variable Phase



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Project: P:\P5524 Westleigh Park Traffic Impact and Access Study\Technical\Models\SIDRA\P5524.001S Westleigh Park Traffic Impact and Access Study model_PM.sip9

MOVEMENT SUMMARY

Site: 5 [Duffy Avenue / Quarter Sessions Road - Op 2 (Site Folder: 2032 Option 2 + Upgrade WE)]

Network: N101 [2032 Option 2 + Upgrade WE (Network Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Quarter Sessions Road														
1	L2	35	3.0	35	3.0	0.123	6.3	LOS A	0.3	2.3	0.67	0.64	0.67	37.2
2	T1	36	0.0	36	0.0	0.123	5.9	LOS A	0.3	2.3	0.67	0.64	0.67	37.7
3	R2	26	0.0	26	0.0	0.123	9.0	LOS A	0.3	2.3	0.67	0.64	0.67	34.9
Approach		97	1.1	97	1.1	0.123	6.9	LOS A	0.3	2.3	0.67	0.64	0.67	37.0
East: Duffy Avenue														
4	L2	13	0.0	13	0.0	0.407	3.8	LOS A	1.1	8.3	0.42	0.54	0.42	38.3
5	T1	200	4.2	200	4.2	0.407	3.6	LOS A	1.1	8.3	0.42	0.54	0.42	38.7
6	R2	249	3.4	249	3.4	0.407	6.7	LOS A	1.1	8.3	0.42	0.54	0.42	38.7
Approach		462	3.6	462	3.6	0.407	5.3	LOS A	1.1	8.3	0.42	0.54	0.42	38.7
North: Quarter Sessions Road														
7	L2	212	1.0	212	1.0	0.338	5.2	LOS A	0.9	6.7	0.64	0.64	0.64	35.7
8	T1	58	0.0	58	0.0	0.338	4.9	LOS A	0.9	6.7	0.64	0.64	0.64	38.2
9	R2	36	0.0	36	0.0	0.338	8.1	LOS A	0.9	6.7	0.64	0.64	0.64	38.2
Approach		305	0.7	305	0.7	0.338	5.5	LOS A	0.9	6.7	0.64	0.64	0.64	36.8
West: Duffy Avenue														
10	L2	15	7.1	1	7.1	0.306	4.9	LOS A	0.8	5.7	0.55	0.58	0.56	37.7
11	T1	231	1.4	231	1.4	0.306	4.9	LOS A	0.8	5.7	0.55	0.58	0.56	35.8
12	R2	48	6.5	4	6.5	0.306	7.8	LOS A	0.8	5.7	0.55	0.58	0.56	38.2
Approach		294	2.5	294	2.5	0.306	5.0	LOS A	0.8	5.7	0.55	0.58	0.56	36.6
All Vehicles		1158	2.4	1158	2.4	0.407	5.4	LOS A	1.1	8.3	0.53	0.58	0.53	37.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: P:\P5524 Westleigh Park Traffic Impact and Access Study\Technical\Models\SIDRA\P5524.001S Westleigh Park Traffic Impact and Access Study model_WE.sip9

MOVEMENT SUMMARY

Site: 10 [Duffy Avenue / The Esplanade / Chilvers Road - Op 2 (Site Folder: 2032 Option 2 + Upgrade WE)]

Network: N101 [2032 Option 2 + Upgrade WE (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 115 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: The Esplanade														
21a	L1	131	0.8	131	0.8	0.880	52.2	LOS D	21.6	153.1	1.00	1.01	1.17	21.6
22	T1	452	1.6	452	1.6	*0.880	48.3	LOS D	21.6	153.1	1.00	1.01	1.17	21.6
23b	R3	73	7.2	73	7.2	0.598	64.7	LOS E	2.6	19.3	1.00	0.80	1.06	18.4
Approach		655	2.1	655	2.1	0.880	50.9	LOS D	21.6	153.1	1.00	0.99	1.15	21.2
East: Duffy Avenue														
4b	L3	107	1.0	107	1.0	0.247	39.4	LOS C	3.0	21.1	0.81	0.76	0.81	30.1
5	T1	245	5.2	245	5.2	0.857	59.0	LOS E	9.0	65.8	1.00	1.01	1.26	13.8
6a	R1	126	2.5	126	2.5	0.595	57.3	LOS E	4.3	30.7	1.00	0.80	1.00	14.4
Approach		479	3.5	479	3.5	0.857	54.2	LOS D	9.0	65.8	0.95	0.90	1.09	18.2
NorthWest: Chilvers Road														
27a	L1	119	2.7	119	2.7	0.477	34.5	LOS C	8.5	60.0	0.83	0.74	0.83	21.7
28	T1	514	0.6	514	0.6	0.477	31.6	LOS C	8.7	60.9	0.85	0.74	0.85	32.7
29b	R3	111	2.9	111	2.9	*0.885	72.7	LOS F	4.3	31.0	1.00	0.96	1.39	12.9
Approach		743	1.3	743	1.3	0.885	38.2	LOS C	8.7	60.9	0.87	0.77	0.92	28.3
West: Duffy Avenue														
10b	L3	154	2.1	154	2.1	0.306	38.2	LOS C	4.0	28.7	0.89	0.77	0.80	32.0
11	T1	260	0.8	260	0.8	*0.893	60.3	LOS E	10.2	71.7	1.00	1.07	1.34	25.4
12a	R1	191	0.0	191	0.0	*0.882	68.4	LOS E	7.4	51.9	1.00	1.03	1.36	30.0
Approach		604	0.9	604	0.9	0.893	58.6	LOS E	10.2	71.7	0.95	0.98	1.21	28.5
All Vehicles		2481	1.8	2481	1.8	0.893	49.6	LOS D	21.6	153.1	0.94	0.90	1.09	25.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
SouthEast: The Esplanade											
P5	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	218.8	217.2	0.99
East: Duffy Avenue											
P2	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	217.3	215.2	0.99
NorthWest: Chilvers Road											
P7	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	221.4	220.5	1.00

West: Duffy Avenue											
P4	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	217.3	215.2	0.99
P4B	Slip/ Bypass	53	51.8	LOS E	0.2	0.2	0.95	0.95	208.9	204.3	0.98
All Pedestrians		263	51.8	LOS E	0.2	0.2	0.95	0.95	216.8	214.5	0.99

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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ATTACHMENT 4 - ITEM 5

PHASING SUMMARY

Site: 10 [Duffy Avenue / The Esplanade / Chilvers Road - Op 2 (Site Folder: 2032 Option 2 + Upgrade WE)] **Network: N101 [2032 Option 2 + Upgrade WE (Network Folder: General)]**

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 115 seconds (Network User-Given Cycle Time)

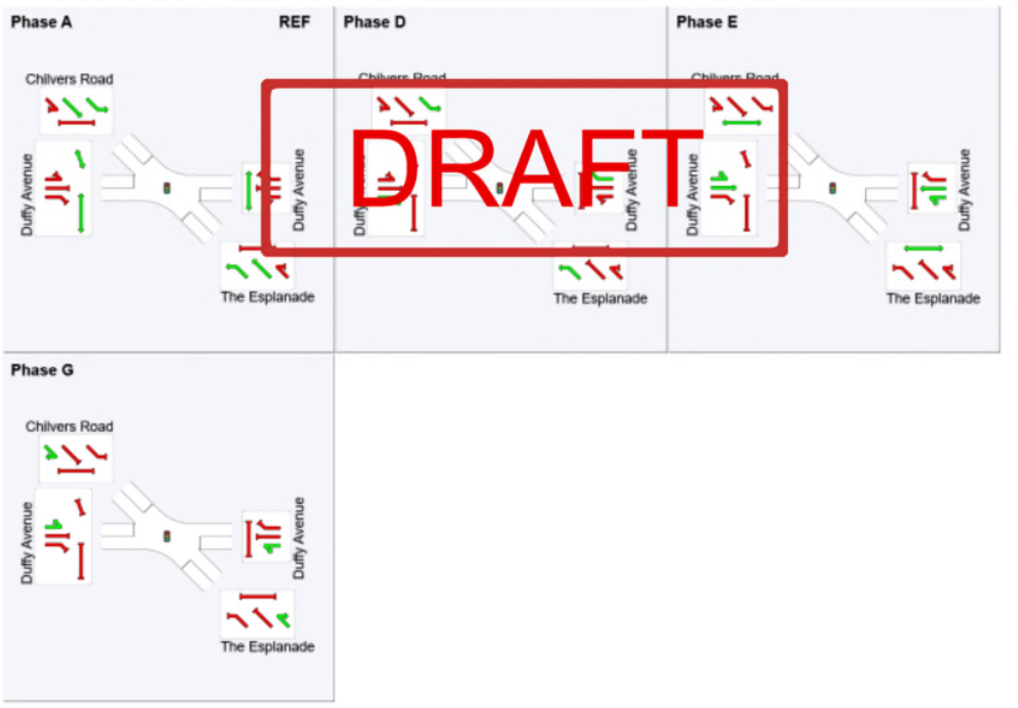
Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, D, E, G
Output Phase Sequence: A, D, E, G

Phase Timing Summary

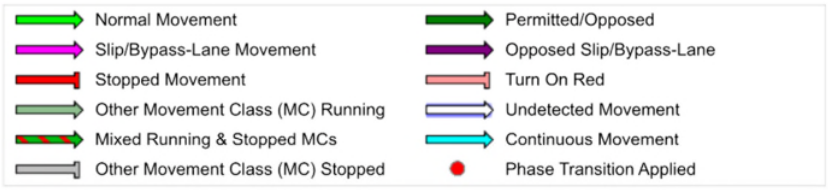
Phase	A	D	E	G
Phase Change Time (sec)	0	48	70	97
Green Time (sec)	39	13	18	9
Phase Time (sec)	48	22	27	18
Phase Split	42%	19%	23%	16%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



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DRAFT

MOVEMENT SUMMARY

Site: 14v [Chilvers Road / Sefton Road - Op 2 (Site Folder: 2032 Option 2 + Upgrade WE)]

Network: N101 [2032 Option 2 + Upgrade WE (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 115 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Chilvers Road														
1	L2	114	1.9	114	1.9	0.906	70.4	LOS E	14.2	101.2	1.00	0.95	1.18	23.0
3	R2	621	1.9	621	1.9	0.906	71.2	LOS F	14.2	101.2	1.00	0.94	1.18	22.9
Approach		735	1.9	735	1.9	0.906	71.1	LOS F	14.2	101.2	1.00	0.95	1.18	22.9
East: Sefton Road														
4	L2	612	1.2	612	1.2	*0.721	14.1	LOS A	6.7	47.5	0.67	0.78	0.67	41.6
5	T1	203	1.0	203	1.0	*0.998	100.3	LOS F	9.6	68.1	0.75	1.05	1.62	22.7
Approach		815	1.2	815	1.2	0.998	35.6	LOS C	9.6	68.1	0.69	0.85	0.91	31.3
West: Sefton Road														
11	T1	158	0.7	158	0.7	0.130	9.2	LOS A	2.2	15.2	0.43	0.36	0.43	44.4
12	R2	141	1.5	141	1.5	*0.736	36.6	LOS C	3.1	22.2	1.00	0.85	1.14	25.1
Approach		299	1.1	299	1.1	0.736	22.1	LOS B	3.1	22.2	0.70	0.59	0.76	35.9
All Vehicles		1848	1.4	1848	1.4	0.998	47.5	LOS D	14.2	101.2	0.82	0.85	0.99	27.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Chilvers Road											
P1	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	218.8	217.2	0.99
West: Sefton Road											
P4	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	214.8	211.9	0.99
All Pedestrians		105	51.8	LOS E	0.2	0.2	0.95	0.95	216.8	214.6	0.99

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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ATTACHMENT 4 - ITEM 5

PHASING SUMMARY

Site: 14v [Chilvers Road / Sefton Road - Op 2 (Site Folder: 2032 Option 2 + Upgrade WE)]

Network: N101 [2032 Option 2 + Upgrade WE (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 115 seconds (Network User-Given Cycle Time)

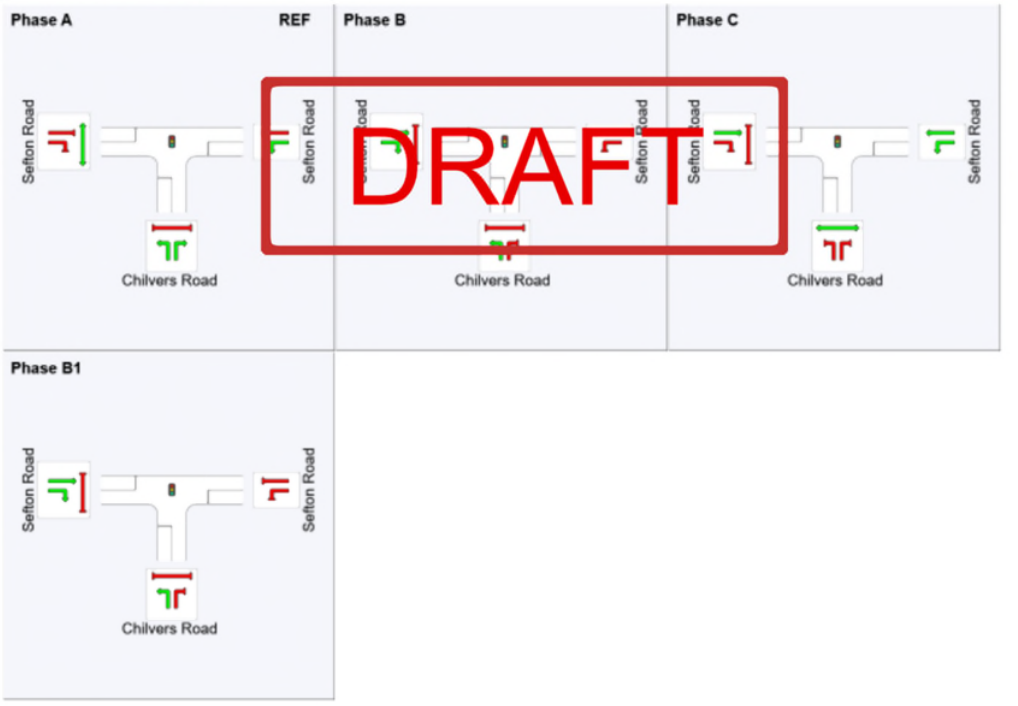
Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Convert Function Default
Reference Phase: Phase A
Input Phase Sequence: A, B, C, B1
Output Phase Sequence: A, B, C, B1

Phase Timing Summary

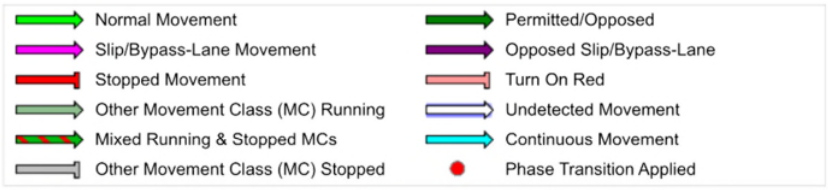
Phase	A	B	C	B1
Phase Change Time (sec)	0	34	49	100
Green Time (sec)	25	6	42	6
Phase Time (sec)	34	15	51	15
Phase Split	30%	13%	44%	13%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



Organisation: TRANSPORT FOR NSW | Licence: NETWORK / Enterprise | Processed: Thursday, 21 July 2022 11:37:43 AM
Project: P:\P5524 Westleigh Park Traffic Impact and Access Study\Technical\Models\SIDRA\P5524.001S Westleigh Park Traffic Impact and Access Study model_WE.sip9

DRAFT

MOVEMENT SUMMARY

Site: 11 [Duffy Avenue / Pennant Hills Road. - Op 2 (Site Folder: 2032 Option 2 + Upgrade WE)]

Network: N101 [2032 Option 2 + Upgrade WE (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Pennant Hills Road.														
1	L2	251	5.5	251	5.5	0.721	24.2	LOS B	19.0	138.4	0.74	0.73	0.74	40.0
2	T1	2132	4.3	2132	4.3	*0.721	18.7	LOS B	20.3	147.2	0.77	0.72	0.77	51.1
Approach		2382	4.5	2382	4.5	0.721	19.3	LOS B	20.3	147.2	0.77	0.72	0.77	50.3
North: Pennant Hills Road.														
8	T1	1936	3.5	1936	3.5	0.456	6.4	LOS A	8.8	63.7	0.42	0.39	0.42	62.4
9	R2	191	5.5	191	5.5	*0.984	100.3	LOS F	9.3	67.9	1.00	1.08	1.70	14.7
Approach		2126	3.7	2126	3.7	0.984	14.8	LOS B	9.3	67.9	0.47	0.45	0.54	54.0
West: Duffy Avenue														
10	L2	201	6.8	201	6.8	0.349	37.7	LOS C	5.5	40.6	0.81	0.78	0.81	30.2
12	R2	236	2.7	236	2.7	*0.776	60.3	LOS E	8.6	61.9	1.00	0.89	1.12	24.5
Approach		437	4.6	437	4.6	0.776	49.9	LOS D	8.6	61.9	0.91	0.84	0.98	26.8
All Vehicles		4945	4.1	4945	4.1	0.984	20.1	LOS B	20.3	147.2	0.65	0.61	0.69	48.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
North: Pennant Hills Road.											
P3	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	228.2	226.1	0.99
West: Duffy Avenue											
P4	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	217.3	211.9	0.98
All Pedestrians		105	54.3	LOS E	0.2	0.2	0.95	0.95	222.7	219.0	0.98

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Project: P:\P5524 Westleigh Park Traffic Impact and Access Study\Technical\Models\SIDRA\P5524.001S Westleigh Park Traffic Impact and Access Study model_WE.sip9

ATTACHMENT 4 - ITEM 5

PHASING SUMMARY

Site: 11 [Duffy Avenue / Pennant Hills Road. - Op 2 (Site Folder: 2032 Option 2 + Upgrade WE)]

Network: N101 [2032 Option 2 + Upgrade WE (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

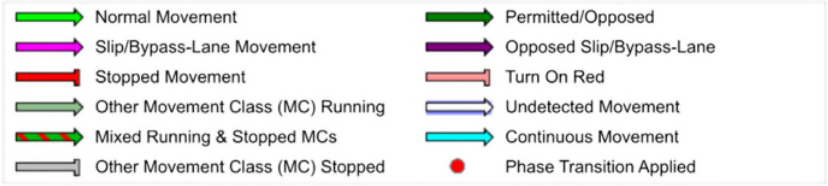
Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	0	75	94
Green Time (sec)	70	13	20
Phase Time (sec)	76	19	25
Phase Split	63%	16%	21%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence

REF: Reference Phase
VAR: Variable Phase



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Project: P:\P5524 Westleigh Park Traffic Impact and Access Study\Technical\Models\SIDRA\P5524.001S Westleigh Park Traffic Impact and Access Study model_WE.sip9

MOVEMENT SUMMARY

Site: 5 [Duffy Avenue / Quarter Sessions Road - Op3 (Site Folder: 2032 Option 3 + Upgrade PM)]

Network: N101 [2032 Option 3 + Upgrade PM (Network Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Quarter Sessions Road														
1	L2	41	2.6	41	2.6	0.126	7.0	LOS A	0.3	2.4	0.71	0.67	0.71	37.0
2	T1	32	0.0	32	0.0	0.126	6.7	LOS A	0.3	2.4	0.71	0.67	0.71	37.5
3	R2	21	0.0	21	0.0	0.126	9.8	LOS A	0.3	2.4	0.71	0.67	0.71	34.4
Approach		94	1.1	94	1.1	0.126	7.5	LOS A	0.3	2.4	0.71	0.67	0.71	36.8
East: Duffy Avenue														
4	L2	16	0.0	16	0.0	0.456	3.5	LOS A	1.4	9.9	0.37	0.51	0.37	38.4
5	T1	235	3.6	235	3.6	0.456	3.3	LOS A	1.4	9.9	0.37	0.51	0.37	38.7
6	R2	314	2.7	314	2.7	0.456	6.4	LOS A	1.4	9.9	0.37	0.51	0.37	38.7
Approach		564	3.0	564	3.0	0.456	5.0	LOS A	1.4	9.9	0.37	0.51	0.37	38.7
North: Quarter Sessions Road														
7	L2	182	1.2	182	1.2	0.255	4.7	LOS A	0.7	4.8	0.57	0.58	0.57	36.1
8	T1	40	0.0	40	0.0	0.255	4.4	LOS A	0.7	4.8	0.57	0.58	0.57	38.5
9	R2	17	0.0	17	0.0	0.255	7.5	LOS A	0.7	4.8	0.57	0.58	0.57	38.5
Approach		239	0.9	239	0.9	0.255	4.8	LOS A	0.7	4.8	0.57	0.58	0.57	37.0
West: Duffy Avenue														
10	L2	13	8.3	1	8.3	0.278	5.3	LOS A	0.7	5.1	0.5	0.60	0.59	37.6
11	T1	198	1.6	198	1.6	0.278	4.1	LOS A	0.7	5.1	0.5	0.60	0.59	35.7
12	R2	45	7.0	4	7.0	0.278	8.1	LOS A	0.7	5.1	0.5	0.60	0.59	38.2
Approach		256	2.9	256	2.9	0.278	5.4	LOS A	0.7	5.1	0.5	0.60	0.59	36.5
All Vehicles		1153	2.4	1152 [N1]	2.4	0.456	5.3	LOS A	1.4	9.9	0.49	0.56	0.49	38.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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Project: P:\P5524 Westleigh Park Traffic Impact and Access Study\Technical\Models\SIDRA\P5524.001S Westleigh Park Traffic Impact and Access Study model_PM.sip9

MOVEMENT SUMMARY

Site: 10 [Duffy Avenue / The Esplanade / Chilvers Road - Op3 (Site Folder: 2032 Option 3 + Upgrade PM)]

Network: N101 [2032 Option 3 + Upgrade PM (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: The Esplanade														
21a	L1	174	0.6	174	0.6	*0.945	72.7	LOS F	25.1	178.0	1.00	1.13	1.34	17.4
22	T1	383	1.9	383	1.9	0.945	68.4	LOS E	25.1	178.0	1.00	1.13	1.34	17.4
23b	R3	66	7.9	66	7.9	0.322	57.8	LOS E	2.2	16.6	0.95	0.76	0.95	19.7
Approach		623	2.2	623	2.2	0.945	68.5	LOS E	25.1	178.0	0.99	1.09	1.30	17.6
East: Duffy Avenue														
4b	L3	128	0.8	128	0.8	0.266	39.3	LOS C	3.8	26.7	0.80	0.76	0.80	30.1
5	T1	286	4.4	286	4.4	*0.925	69.7	LOS E	11.8	85.5	0.99	1.12	1.39	12.2
6a	R1	102	3.1	102	3.1	0.595	62.2	LOS E	3.7	26.5	1.00	0.79	1.02	13.6
Approach		517	3.3	516[N1]	3.3	0.925	60.7	LOS E	11.8	85.5	0.95	0.97	1.17	17.2
NorthWest: Chilvers Road														
27a	L1	91	3.5	91	3.5	0.608	41.7	LOS C	11.1	78.3	0.92	0.81	0.92	19.4
28	T1	621	0.5	621	0.5	0.608	38.4	LOS C	11.1	78.3	0.92	0.80	0.92	30.5
29b	R3	200	1.6	200	1.6	*0.933	80.6	LOS F	8.3	58.8	1.00	0.97	1.31	11.9
Approach		912	1.0	912	1.0	0.933	48.0	LOS D	11.1	78.3	0.94	0.83	1.00	25.4
West: Duffy Avenue														
10b	L3	153	2.1	153	2.1	0.248	32.7	LOS C	3.7	26.4	0.72	0.75	0.72	33.7
11	T1	186	1.1	186	1.1	0.550	46.3	LOS D	5.2	38.8	0.95	0.79	0.96	28.5
12a	R1	157	0.0	157	0.0	0.895	73.9	LOS F	6.4	45.1	1.00	1.04	1.42	29.1
Approach		496	1.1	496	1.1	0.895	52.0	LOS D	6.4	45.1	0.90	0.86	1.03	30.0
All Vehicles		2547	1.8	2547	1.8	0.945	56.4	LOS D	25.1	178.0	0.95	0.93	1.12	23.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)
N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
SouthEast: The Esplanade											
P5	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	221.3	217.2	0.98
East: Duffy Avenue											
P2	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	219.8	215.2	0.98
NorthWest: Chilvers Road											
P7	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	223.9	220.5	0.98

West: Duffy Avenue											
P4	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	219.8	215.2	0.98
P4B	Slip/ Bypass	53	54.3	LOS E	0.2	0.2	0.95	0.95	211.4	204.3	0.97
All Pedestrians		263	54.3	LOS E	0.2	0.2	0.95	0.95	219.3	214.5	0.98

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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ATTACHMENT 4 - ITEM 5

PHASING SUMMARY

Site: 10 [Duffy Avenue / The Esplanade / Chilvers Road - Op3 (Site Folder: 2032 Option 3 + Upgrade PM)]

Network: N101 [2032 Option 3 + Upgrade PM (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120 seconds (Network User-Given Cycle Time)

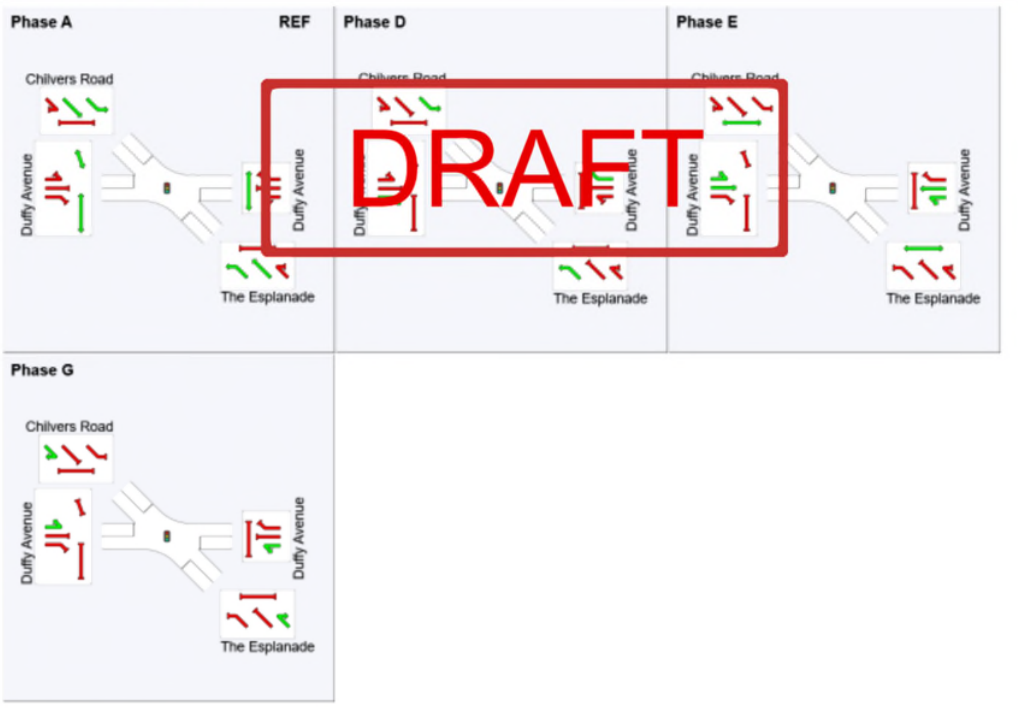
Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, D, E, G
Output Phase Sequence: A, D, E, G

Phase Timing Summary

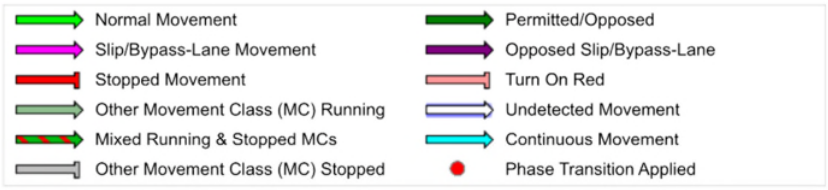
Phase	A	D	E	G
Phase Change Time (sec)	0	45	65	95
Green Time (sec)	36	11	21	16
Phase Time (sec)	45	20	30	25
Phase Split	38%	17%	25%	21%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



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ATTACHMENT 4 - ITEM 5

MOVEMENT SUMMARY

Site: 14v [Chilvers Road / Sefton Road - Op3 (Site Folder: 2032 Option 3 + Upgrade PM)] Network: N101 [2032 Option 3 + Upgrade PM (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Chilvers Road														
1	L2	119	1.8	119	1.8	0.689	47.5	LOS D	10.8	77.1	0.98	0.85	0.98	27.9
3	R2	523	2.2	523	2.2	0.689	48.5	LOS D	10.8	77.1	0.99	0.85	0.99	27.6
Approach		642	2.1	642	2.1	0.689	48.3	LOS D	10.8	77.1	0.99	0.85	0.99	27.7
East: Sefton Road														
4	L2	815	0.9	815	0.9	*0.829	17.2	LOS B	11.5	81.4	0.77	0.84	0.80	38.8
5	T1	121	1.7	121	1.7	*1.001	125.0	LOS F	7.4	52.6	1.00	1.20	1.99	19.7
Approach		936	1.0	936	1.0	1.001	31.1	LOS C	11.5	81.4	0.80	0.89	0.95	31.8
West: Sefton Road														
11	T1	91	1.2	91	1.2	0.078	10.5	LOS A	1.3	9.4	0.44	0.36	0.44	43.7
12	R2	101	2.1	101	2.1	*0.552	35.1	LOS C	2.1	14.9	0.99	0.77	0.99	25.7
Approach		192	1.6	192	1.6	0.552	23.5	LOS B	2.1	14.9	0.73	0.58	0.73	34.9
All Vehicles		1769	1.5	1769	1.5	1.001	36.5	LOS C	11.5	81.4	0.86	0.84	0.94	30.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

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Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Chilvers Road											
P1	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	221.3	217.2	0.98
West: Sefton Road											
P4	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	217.3	211.9	0.98
All Pedestrians		105	54.3	LOS E	0.2	0.2	0.95	0.95	219.3	214.6	0.98

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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PHASING SUMMARY

Site: 14v [Chilvers Road / Sefton Road - Op3 (Site Folder: 2032 Option 3 + Upgrade PM)] Network: N101 [2032 Option 3 + Upgrade PM (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120 seconds (Network User-Given Cycle Time)

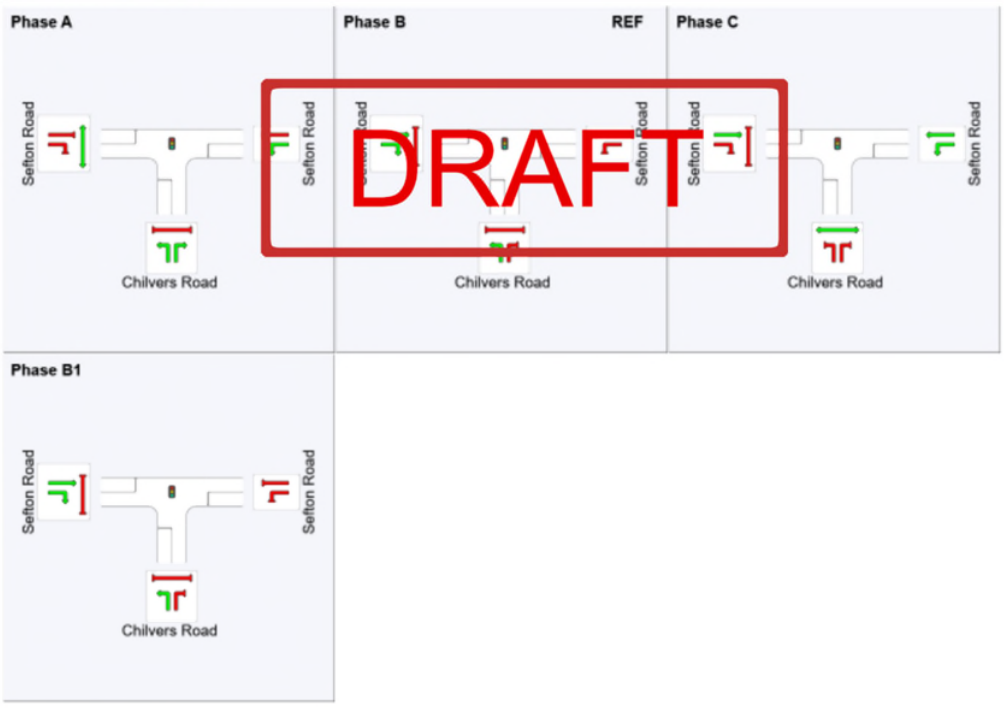
Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Convert Function Default
Reference Phase: Phase B
Input Phase Sequence: A, B, C, B1
Output Phase Sequence: A, B, C, B1

Phase Timing Summary

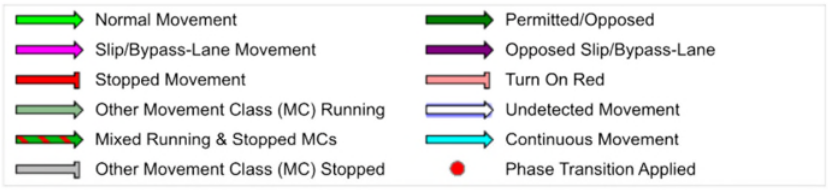
Phase	A	B	C	B1
Phase Change Time (sec)	81	0	15	66
Green Time (sec)	30	6	42	6
Phase Time (sec)	39	15	51	15
Phase Split	33%	13%	43%	13%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



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ATTACHMENT 4 - ITEM 5

MOVEMENT SUMMARY

Site: 11 [Duffy Avenue / Pennant Hills Road. - Op3 (Site Folder: 2032 Option 3 + Upgrade PM)] Network: N101 [2032 Option 3 + Upgrade PM (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 125 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Pennant Hills Road.														
1	L2	282	4.9	282	4.9	0.666	22.9	LOS B	17.4	127.1	0.69	0.71	0.69	40.9
2	T1	1977	4.7	1977	4.7	*0.666	17.3	LOS B	18.5	134.6	0.71	0.67	0.71	52.1
Approach		2259	4.7	2259	4.7	0.666	18.0	LOS B	18.5	134.6	0.71	0.68	0.71	51.1
North: Pennant Hills Road.														
8	T1	2036	3.3	2036	3.3	0.463	5.5	LOS A	8.9	64.1	0.39	0.36	0.39	63.3
9	R2	216	4.9	216	4.9	*1.002	111.4	LOS F	11.4	83.1	1.00	1.10	1.72	13.5
Approach		2252	3.5	2252	3.5	1.002	15.6	LOS B	11.4	83.1	0.45	0.43	0.52	53.2
West: Duffy Avenue														
10	L2	144	9.5	144	9.5	0.259	38.4	LOS C	4.0	30.1	0.78	0.76	0.78	30.0
12	R2	187	3.4	187	3.4	*0.680	60.5	LOS E	6.9	49.4	1.00	0.84	1.03	24.5
Approach		332	6.0	332	6.0	0.680	50.9	LOS D	6.9	49.4	0.91	0.80	0.93	26.6
All Vehicles		4842	4.2	4842	4.2	1.002	19.2	LOS B	18.5	134.6	0.60	0.57	0.64	49.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

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Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
North: Pennant Hills Road.											
P3	Full	53	56.8	LOS E	0.2	0.2	0.95	0.95	230.7	226.1	0.98
West: Duffy Avenue											
P4	Full	53	56.8	LOS E	0.2	0.2	0.95	0.95	219.8	211.9	0.96
All Pedestrians		105	56.8	LOS E	0.2	0.2	0.95	0.95	225.2	219.0	0.97

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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ATTACHMENT 4 - ITEM 5

PHASING SUMMARY

Site: 11 [Duffy Avenue / Pennant Hills Road. - Op3 (Site Folder: 2032 Option 3 + Upgrade PM)] Network: N101 [2032 Option 3 + Upgrade PM (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 125 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

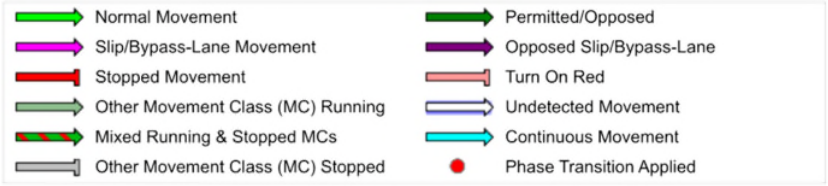
Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	0	79	100
Green Time (sec)	75	15	19
Phase Time (sec)	81	21	23
Phase Split	65%	17%	18%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence

REF: Reference Phase
VAR: Variable Phase



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MOVEMENT SUMMARY

Site: 5 [Duffy Avenue / Quarter Sessions Road - Op 3 (Site Folder: 2032 Option 3 + Upgrade WE)]

Network: N101 [2032 Option 3 + Upgrade WE (Network Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Quarter Sessions Road														
1	L2	45	2.3	45	2.3	0.138	6.6	LOS A	0.4	2.6	0.69	0.66	0.69	37.1
2	T1	34	0.0	34	0.0	0.138	6.2	LOS A	0.4	2.6	0.69	0.66	0.69	37.6
3	R2	27	0.0	27	0.0	0.138	9.4	LOS A	0.4	2.6	0.69	0.66	0.69	34.7
Approach		106	1.0	106	1.0	0.138	7.2	LOS A	0.4	2.6	0.69	0.66	0.69	36.9
East: Duffy Avenue														
4	L2	13	0.0	13	0.0	0.435	3.6	LOS A	1.3	9.2	0.40	0.53	0.40	38.3
5	T1	214	3.9	214	3.9	0.435	3.4	LOS A	1.3	9.2	0.40	0.53	0.40	38.7
6	R2	291	2.9	291	2.9	0.435	6.6	LOS A	1.3	9.2	0.40	0.53	0.40	38.7
Approach		517	3.3	517	3.3	0.435	5.2	LOS A	1.3	9.2	0.40	0.53	0.40	38.7
North: Quarter Sessions Road														
7	L2	252	0.8	252	0.8	0.360	5.3	LOS A	1.0	7.3	0.65	0.64	0.65	35.8
8	T1	61	0.0	61	0.0	0.360	5.0	LOS A	1.0	7.3	0.65	0.64	0.65	38.3
9	R2	11	0.0	11	0.0	0.360	8.2	LOS A	1.0	7.3	0.65	0.64	0.65	38.3
Approach		323	0.7	323	0.7	0.360	5.3	LOS A	1.0	7.3	0.65	0.64	0.65	36.6
West: Duffy Avenue														
10	L2	11	10.0	1	10.0	0.316	5.3	LOS A	0.8	5.9	0.6	0.61	0.60	37.6
11	T1	235	1.3	235	1.3	0.316	4	LOS A	0.8	5.9	0.6	0.61	0.60	35.7
12	R2	48	6.5	4	6.5	0.316	8.1	LOS A	0.8	5.9	0.6	0.61	0.60	38.2
Approach		294	2.5	294	2.5	0.316	5.3	LOS A	0.8	5.9	0.6	0.61	0.60	36.4
All Vehicles		1240	2.2	1240	2.2	0.435	5.4	LOS A	1.3	9.2	0.54	0.59	0.54	37.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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ATTACHMENT 4 - ITEM 5

MOVEMENT SUMMARY

Site: 10 [Duffy Avenue / The Esplanade / Chilvers Road - Op 3 (Site Folder: 2032 Option 3 + Upgrade WE)]

Network: N101 [2032 Option 3 + Upgrade WE (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 115 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: The Esplanade														
21a	L1	117	0.9	117	0.9	0.933	66.2	LOS E	24.1	170.6	1.00	1.12	1.31	18.6
22	T1	453	1.6	453	1.6	* 0.933	62.1	LOS E	24.1	170.6	1.00	1.12	1.31	18.6
23b	R3	73	7.2	73	7.2	0.414	58.8	LOS E	2.4	18.0	0.97	0.77	0.97	19.5
Approach		642	2.1	642	2.1	0.933	62.5	LOS E	24.1	170.6	1.00	1.08	1.27	18.7
East: Duffy Avenue														
4b	L3	106	1.0	106	1.0	0.240	37.7	LOS C	2.6	18.4	0.70	0.73	0.70	30.6
5	T1	241	5.2	241	5.2	0.834	55.4	LOS D	8.5	62.2	0.99	0.94	1.16	14.5
6a	R1	126	2.5	126	2.5	0.644	59.1	LOS E	4.4	31.2	1.00	0.82	1.05	14.1
Approach		474	3.6	474	3.6	0.834	52.4	LOS D	8.5	62.2	0.93	0.86	1.03	18.6
NorthWest: Chilvers Road														
27a	L1	119	2.7	119	2.7	0.510	37.0	LOS C	8.9	63.2	0.88	0.78	0.88	20.8
28	T1	506	0.6	506	0.6	0.510	34.2	LOS C	9.0	63.3	0.89	0.77	0.89	31.8
29b	R3	176	1.8	176	1.8	* 0.968	91.1	LOS F	8.0	57.1	1.00	1.13	1.68	10.9
Approach		801	1.2	801	1.2	0.968	47.1	LOS D	9.0	63.3	0.91	0.85	1.06	25.1
West: Duffy Avenue														
10b	L3	193	1.6	193	1.6	[illegible]	35.7	LOS [illegible]	4.9	[illegible]	[illegible]	0.78	0.79	32.8
11	T1	260	0.8	260	0.8	* [illegible]	[illegible]	LOS E	[illegible]	[illegible]	[illegible]	1.10	1.40	24.8
12a	R1	193	0.0	193	0.0	* [illegible]	85.9	LOS F	8.6	[illegible]	[illegible]	1.19	1.64	27.2
Approach		645	0.8	645	0.8	0.966	63.2	LOS E	10.5	73.8	[illegible]	1.03	1.29	27.5
All Vehicles		2562	1.8	2562	1.8	0.968	56.0	LOS D	24.1	170.6	0.94	0.96	1.16	23.4

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Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
SouthEast: The Esplanade											
P5	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	218.8	217.2	0.99
East: Duffy Avenue											
P2	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	217.3	215.2	0.99
NorthWest: Chilvers Road											
P7	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	221.4	220.5	1.00

West: Duffy Avenue											
P4	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	217.3	215.2	0.99
P4B	Slip/ Bypass	53	51.8	LOS E	0.2	0.2	0.95	0.95	208.9	204.3	0.98
All Pedestrians		263	51.8	LOS E	0.2	0.2	0.95	0.95	216.8	214.5	0.99

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Project: P:\P5524 Westleigh Park Traffic Impact and Access Study\Technical\Models\SIDRA\P5524.001S Westleigh Park Traffic Impact and Access Study model_WE.sip9

PHASING SUMMARY

Site: 10 [Duffy Avenue / The Esplanade / Chilvers Road - Op 3 (Site Folder: 2032 Option 3 + Upgrade WE)]

Network: N101 [2032 Option 3 + Upgrade WE (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 115 seconds (Network User-Given Cycle Time)

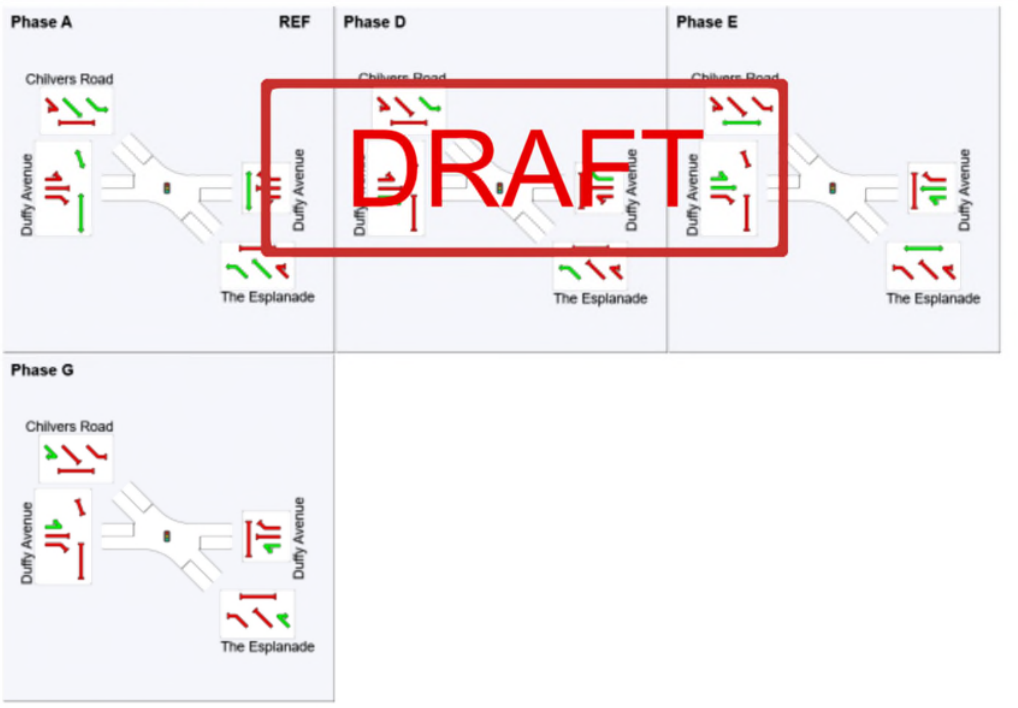
Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, D, E, G
Output Phase Sequence: A, D, E, G

Phase Timing Summary

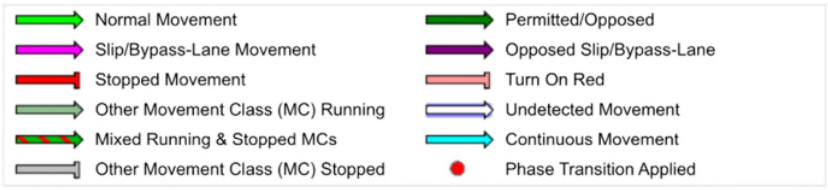
Phase	A	D	E	G
Phase Change Time (sec)	0	45	66	93
Green Time (sec)	36	12	18	13
Phase Time (sec)	45	21	27	22
Phase Split	39%	18%	23%	19%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



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Project: P:\P5524 Westleigh Park Traffic Impact and Access Study\Technical\Models\SIDRA\P5524.001S Westleigh Park Traffic Impact and Access Study model_WE.sip9

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ATTACHMENT 4 - ITEM 5

MOVEMENT SUMMARY

Site: 14v [Chilvers Road / Sefton Road - Copy - Conversion - Op 3 (Site Folder: 2032 Option 3 + Upgrade WE)]

Network: N101 [2032 Option 3 + Upgrade WE (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 115 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Chilvers Road														
1	L2	122	1.7	122	1.7	*0.953	78.8	LOS F	16.1	114.3	1.00	1.00	1.29	21.7
3	R2	652	1.8	652	1.8	0.953	79.5	LOS F	16.1	114.3	1.00	1.00	1.29	21.6
Approach		774	1.8	774	1.8	0.953	79.4	LOS F	16.1	114.3	1.00	1.00	1.29	21.6
East: Sefton Road														
4	L2	647	1.1	647	1.1	0.730	14.4	LOS A	7.3	51.8	0.69	0.79	0.69	41.4
5	T1	169	1.2	169	1.2	*0.943	74.8	LOS F	6.9	48.5	0.74	0.93	1.42	26.9
Approach		817	1.2	817	1.2	0.943	26.9	LOS B	7.3	51.8	0.70	0.82	0.84	35.0
West: Sefton Road														
11	T1	128	0.8	128	0.8	0.106	9.0	LOS A	1.7	12.1	0.42	0.35	0.42	44.5
12	R2	162	1.3	162	1.3	0.844	41.1	LOS C	3.9	27.6	1.00	0.93	1.30	23.7
Approach		291	1.1	291	1.1	0.844	26.9	LOS B	3.9	27.6	0.75	0.67	0.91	33.2
All Vehicles		1881	1.4	1881	1.4	0.953	48.5	LOS D	16.1	114.3	0.83	0.87	1.04	26.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

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Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Chilvers Road											
P1	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	218.8	217.2	0.99
West: Sefton Road											
P4	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	214.8	211.9	0.99
All Pedestrians		105	51.8	LOS E	0.2	0.2	0.95	0.95	216.8	214.6	0.99

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Project: P:\P5524 Westleigh Park Traffic Impact and Access Study\Technical\Models\SIDRA\P5524.001S Westleigh Park Traffic Impact and Access Study model_WE.sip9

PHASING SUMMARY

Site: 14v [Chilvers Road / Sefton Road - Copy - Conversion - Op 3 (Site Folder: 2032 Option 3 + Upgrade WE)]

Network: N101 [2032 Option 3 + Upgrade WE (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 115 seconds (Network User-Given Cycle Time)

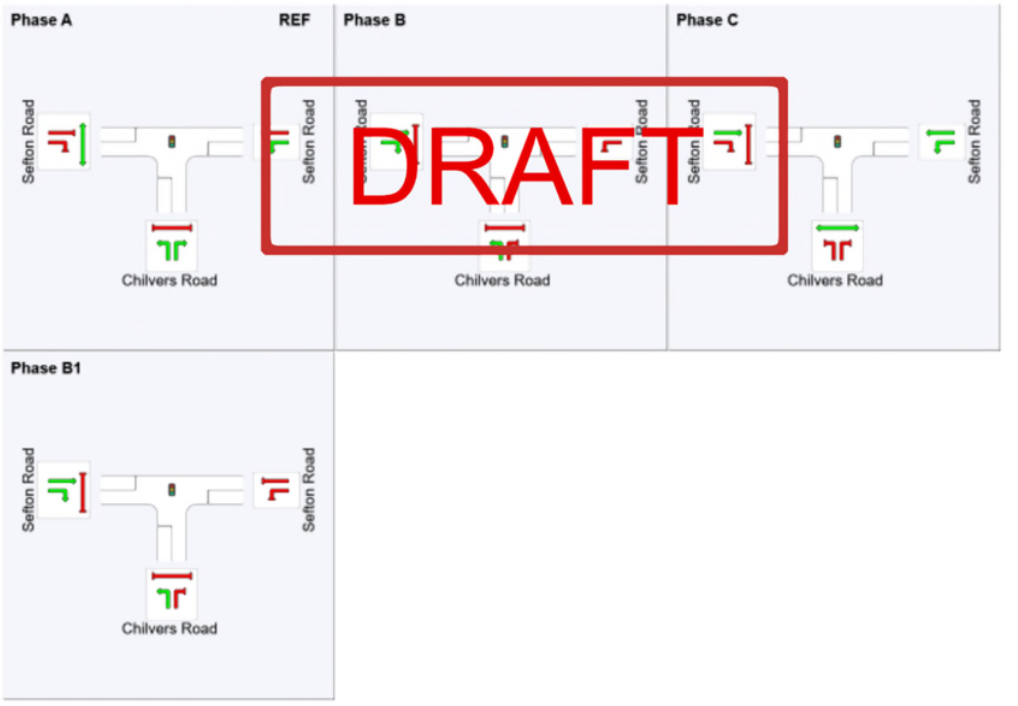
Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Convert Function Default
Reference Phase: Phase A
Input Phase Sequence: A, B, C, B1
Output Phase Sequence: A, B, C, B1

Phase Timing Summary

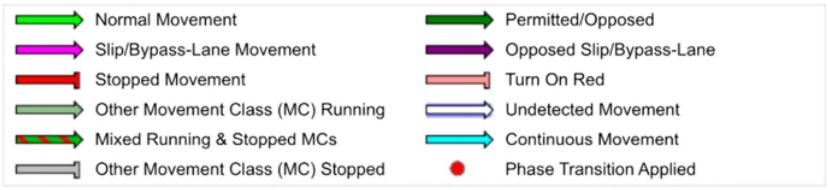
Phase	A	B	C	B1
Phase Change Time (sec)	0	34	49	100
Green Time (sec)	25	6	42	6
Phase Time (sec)	34	15	51	15
Phase Split	30%	13%	44%	13%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



Organisation: TRANSPORT FOR NSW | Licence: NETWORK / Enterprise | Processed: Thursday, 21 July 2022 4:20:25 PM
Project: P:\P5524 Westleigh Park Traffic Impact and Access Study\Technical\Models\SIDRA\P5524.001S Westleigh Park Traffic Impact and Access Study model_WE.sip9

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ATTACHMENT 4 - ITEM 5

MOVEMENT SUMMARY

Site: 11 [Duffy Avenue / Pennant Hills Road. - Op 3 (Site Folder: 2032 Option 3 + Upgrade WE)]

Network: N101 [2032 Option 3 + Upgrade WE (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 115 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Pennant Hills Road.														
1	L2	251	5.5	251	5.5	0.782	28.1	LOS B	20.5	149.4	0.83	0.80	0.83	36.9
2	T1	2132	4.3	2132	4.3	*0.782	22.3	LOS B	21.6	157.1	0.86	0.79	0.86	48.7
Approach		2382	4.5	2382	4.5	0.782	22.9	LOS B	21.6	157.1	0.85	0.79	0.85	47.8
North: Pennant Hills Road.														
8	T1	1936	3.5	1936	3.5	0.463	6.7	LOS A	8.9	63.8	0.44	0.40	0.44	62.1
9	R2	191	5.5	191	5.5	*0.766	62.4	LOS E	6.8	49.8	1.00	0.87	1.14	21.0
Approach		2126	3.7	2126	3.7	0.766	11.6	LOS A	8.9	63.8	0.49	0.44	0.50	56.7
West: Duffy Avenue														
10	L2	201	6.8	201	6.8	0.318	24.1	LOS B	3.7	27.1	0.56	0.70	0.56	35.1
12	R2	237	2.7	237	2.7	*0.787	37.7	LOS C	7.1	51.1	0.89	0.82	0.93	30.2
Approach		438	4.6	438	4.6	0.787	31.5	LOS C	7.1	51.1	0.74	0.76	0.76	32.3
All Vehicles		4946	4.1	4946	4.1	0.787	18.8	LOS B	21.6	157.1	0.69	0.64	0.70	49.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

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Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
North: Pennant Hills Road.											
P3	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	225.7	226.1	1.00
West: Duffy Avenue											
P4	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	214.8	211.9	0.99
All Pedestrians		105	51.8	LOS E	0.2	0.2	0.95	0.95	220.2	219.0	0.99

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Project: P:\P5524 Westleigh Park Traffic Impact and Access Study\Technical\Models\SIDRA\P5524.001S Westleigh Park Traffic Impact and Access Study model_WE.sip9

ATTACHMENT 4 - ITEM 5

PHASING SUMMARY

Site: 11 [Duffy Avenue / Pennant Hills Road. - Op 3 (Site Folder: 2032 Option 3 + Upgrade WE)]

Network: N101 [2032 Option 3 + Upgrade WE (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 115 seconds (Network User-Given Cycle Time)

Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

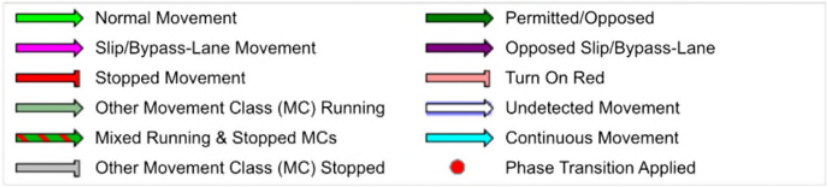
Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	3	71	93
Green Time (sec)	62	16	19
Phase Time (sec)	68	22	25
Phase Split	59%	19%	22%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence

REF: Reference Phase
VAR: Variable Phase



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Project: P:\P5524 Westleigh Park Traffic Impact and Access Study\Technical\Models\SIDRA\P5524.001S Westleigh Park Traffic Impact and Access Study model_WE.sip9

MOVEMENT SUMMARY

Site: 5 [Duffy Avenue / Quarter Sessions Road (Site Folder: Base WE)]

Network: N101 [Base WE (Network Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Quarter Sessions Road														
1	L2	27	3.8	27	3.8	0.090	5.2	LOS A	0.2	1.6	0.56	0.59	0.56	37.3
2	T1	13	0.0	13	0.0	0.090	4.8	LOS A	0.2	1.6	0.56	0.59	0.56	37.8
3	R2	41	0.0	41	0.0	0.090	8.0	LOS A	0.2	1.6	0.56	0.59	0.56	35.1
Approach		81	1.3	81	1.3	0.090	6.5	LOS A	0.2	1.6	0.56	0.59	0.56	36.6
East: Duffy Avenue														
4	L2	16	0.0	16	0.0	0.274	2.8	LOS A	0.7	5.0	0.20	0.44	0.20	38.7
5	T1	205	4.1	205	4.1	0.274	2.6	LOS A	0.7	5.0	0.20	0.44	0.20	39.1
6	R2	146	5.8	146	5.8	0.274	5.8	LOS A	0.7	5.0	0.20	0.44	0.20	39.1
Approach		367	4.6	367	4.6	0.274	3.9	LOS A	0.7	5.0	0.20	0.44	0.20	39.1
North: Quarter Sessions Road														
7	L2	149	1.4	149	1.4	0.192	4.9	LOS A	0.5	3.3	0.57	0.59	0.57	36.0
8	T1	12	0.0	12	0.0	0.192	4.6	LOS A	0.5	3.3	0.57	0.59	0.57	38.4
9	R2	13	0.0	13	0.0	0.192	7.8	LOS A	0.5	3.3	0.57	0.59	0.57	38.4
Approach		174	1.2	174	1.2	0.192	5.1	LOS A	0.5	3.3	0.57	0.59	0.57	36.6
West: Duffy Avenue														
10	L2	15	7.1	1	7.1	0.263	4.1	LOS A	0.6	4.6	0.4	0.47	0.43	38.1
11	T1	248	1.3	24	1.3	0.263	3.6	LOS A	0.6	4.6	0.4	0.47	0.43	36.5
12	R2	20	15.8	2	15.8	0.263	7.1	LOS A	0.6	4.6	0.4	0.47	0.43	38.6
Approach		283	2.6	28	2.6	0.263	3.9	LOS A	0.6	4.6	0.4	0.47	0.43	36.9
All Vehicles		905	3.0	90	3.0	0.274	4.4	LOS A	0.7	5.0	0.3	0.49	0.37	38.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: P:\P5524 Westleigh Park Traffic Impact and Access Study\Technical\Models\SIDRA\P5524.001S Westleigh Park Traffic Impact and Access Study model_WE.sip9

MOVEMENT SUMMARY

Site: 10 [Duffy Avenue / The Esplanade / Chilvers Road (Site Folder: Base WE)]

Network: N101 [Base WE (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 110 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: The Esplanade														
21a	L1	92	1.1	92	1.1	*0.859	51.6	LOS D	16.5	117.6	1.00	1.00	1.17	21.6
22	T1	380	1.9	380	1.9	0.859	48.0	LOS D	16.5	117.6	1.00	1.00	1.17	21.6
23b	R3	57	9.3	57	9.3	0.340	56.5	LOS E	1.8	13.7	0.96	0.76	0.96	19.9
Approach		528	2.6	528	2.6	0.859	49.5	LOS D	16.5	117.6	1.00	0.98	1.15	21.4
East: Duffy Avenue														
4b	L3	92	1.1	92	1.1	0.839	59.4	LOS E	9.2	67.1	1.00	1.00	1.23	25.6
5	T1	167	7.5	167	7.5	*0.839	54.2	LOS D	9.2	67.1	1.00	1.00	1.23	14.5
6a	R1	81	3.9	81	3.9	0.369	52.9	LOS D	2.5	18.4	0.96	0.76	0.96	15.2
Approach		340	5.0	340	5.0	0.839	55.3	LOS D	9.2	67.1	0.99	0.94	1.17	18.6
NorthWest: Chilvers Road														
27a	L1	93	3.4	93	3.4	0.497	39.0	LOS C	7.6	53.7	0.88	0.77	0.88	20.2
28	T1	456	0.7	456	0.7	0.497	35.3	LOS C	7.6	53.7	0.88	0.76	0.88	31.4
29b	R3	155	2.0	155	2.0	*0.884	70.2	LOS E	5.9	42.0	1.00	1.01	1.43	13.2
Approach		703	1.3	703	1.3	0.884	43.5	LOS D	7.6	53.7	0.91	0.81	1.01	26.3
West: Duffy Avenue														
10b	L3	201	1.6	201	1.6	0.353	33.9	LOS C	4.9	34.7	0.7	0.78	0.78	33.3
11	T1	207	1.0	207	1.0	0.620	46.4	LOS	6.5	5.6	0.9	0.81	0.98	29.3
12a	R1	161	0.0	161	0.0	0.713		LOS E		7.9	1.0	0.87	1.10	32.1
Approach		569	0.9	569	0.9	0.713	45.0	LOS D	6.5	5.6	0.9	0.81	0.94	31.5
All Vehicles		2141	2.1	2141	2.1	0.884	47.2	LOS D	16.5	117.6	0.9	0.87	1.05	25.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
SouthEast: The Esplanade											
P5	Full	53	49.3	LOS E	0.2	0.2	0.95	0.95	216.3	217.2	1.00
East: Duffy Avenue											
P2	Full	53	49.3	LOS E	0.2	0.2	0.95	0.95	212.3	211.9	1.00
NorthWest: Chilvers Road											
P7	Full	53	49.3	LOS E	0.2	0.2	0.95	0.95	218.9	220.5	1.01
West: Duffy Avenue											

P4	Full	53	49.3	LOS E	0.2	0.2	0.95	0.95	214.8	215.2	1.00
P4B	Slip/ Bypass	53	49.3	LOS E	0.2	0.2	0.95	0.95	206.4	204.3	0.99
All Pedestrians		263	49.3	LOS E	0.2	0.2	0.95	0.95	213.7	213.8	1.00

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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PHASING SUMMARY

Site: 10 [Duffy Avenue / The Esplanade / Chilvers Road (Site Folder: Base WE)] **Network: N101 [Base WE (Network Folder: General)]**

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 110 seconds (Site User-Given Phase Times)

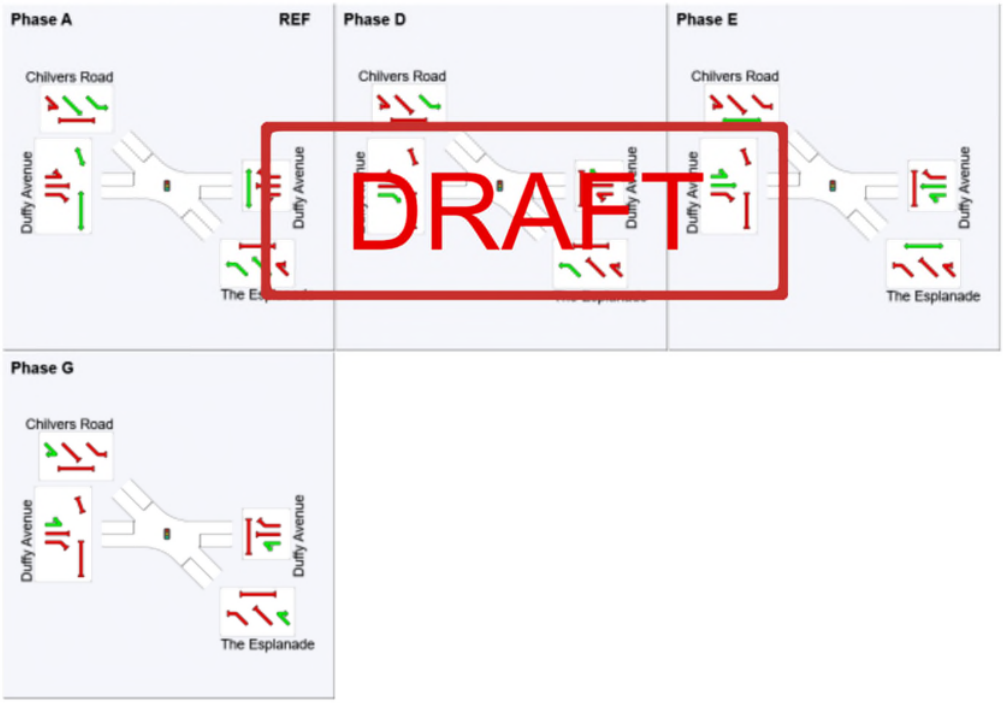
Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, D, E, G
Output Phase Sequence: A, D, E, G

Phase Timing Summary

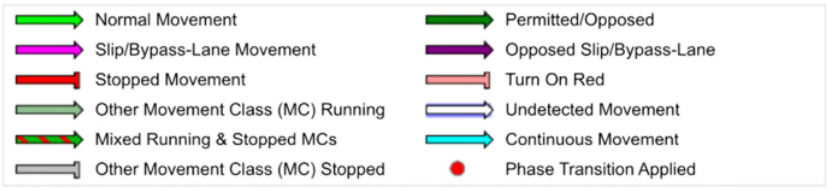
Phase	A	D	E	G
Phase Change Time (sec)	0	40	62	90
Green Time (sec)	31	13	19	12
Phase Time (sec)	40	22	27	21
Phase Split	36%	20%	25%	19%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



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ATTACHMENT 4 - ITEM 5

MOVEMENT SUMMARY

Site: 14 [Chilvers Road / Sefton Road (Site Folder: Base WE)]

Network: N101 [Base WE (Network Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Chilvers Road														
1	L2	79	2.7	79	2.7	0.357	4.7	LOS A	0.0	0.0	0.00	0.53	0.00	45.8
3	R2	574	2.0	574	2.0	0.357	4.7	LOS A	0.0	0.0	0.00	0.53	0.00	45.8
Approach		653	2.1	653	2.1	0.357	4.7	NA	0.0	0.0	0.00	0.53	0.00	45.8
East: Sefton Road														
4	L2	631	1.2	631	1.2	0.342	5.9	LOS A	0.0	0.0	0.00	0.53	0.00	50.9
5	T1	53	4.0	53	4.0	0.066	7.4	LOS A	0.1	0.7	0.53	0.69	0.53	52.3
Approach		683	1.4	683	1.4	0.342	6.0	LOS A	0.1	0.7	0.04	0.54	0.04	51.1
West: Sefton Road														
11	T1	60	1.8	60	1.8	0.339	7.4	LOS A	0.6	3.9	0.70	0.90	0.88	42.1
12	R2	82	2.6	82	2.6	0.339	17.7	LOS B	0.6	3.9	0.70	0.90	0.88	36.7
Approach		142	2.2	142	2.2	0.339	13.3	LOS A	0.6	3.9	0.70	0.90	0.88	39.7
All Vehicles		1478	1.8	1478	1.8	0.357	6.1	NA	0.6	3.9	0.09	0.57	0.10	46.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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ATTACHMENT 4 - ITEM 5

MOVEMENT SUMMARY

Site: 11 [Duffy Avenue / Pennant Hills Road (Site Folder: Base WE)]

Network: N101 [Base WE (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 115 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Pennant Hills Road.														
1	L2	226	6.0	226	6.0	0.700	26.1	LOS B	17.2	125.6	0.77	0.75	0.77	38.5
2	T1	1936	4.8	1936	4.8	*0.700	20.1	LOS B	18.1	131.7	0.79	0.73	0.79	50.2
Approach		2162	4.9	2162	4.9	0.700	20.7	LOS B	18.1	131.7	0.79	0.73	0.79	49.3
North: Pennant Hills Road.														
8	T1	1713	3.9	1713	3.9	0.421	7.1	LOS A	7.9	57.0	0.44	0.40	0.44	61.6
9	R2	135	7.8	135	7.8	*0.678	62.5	LOS E	4.7	35.2	1.00	0.83	1.08	21.0
Approach		1847	4.2	1847	4.2	0.678	11.2	LOS A	7.9	57.0	0.48	0.43	0.49	57.3
West: Duffy Avenue														
10	L2	164	8.3	164	8.3	0.269	33.6	LOS C	4.0	30.3	0.76	0.76	0.76	31.5
12	R2	225	2.8	225	2.8	*0.678	53.3	LOS D	7.4	53.4	0.99	0.84	1.01	26.1
Approach		389	5.1	389	5.1	0.678	45.0	LOS D	7.4	53.4	0.89	0.81	0.91	28.1
All Vehicles		4399	4.6	4399	4.6	0.700	18.9	LOS B	18.1	131.7	0.67	0.61	0.67	49.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akcelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

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Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
North: Pennant Hills Road.											
P3	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	225.7	226.1	1.00
West: Duffy Avenue											
P4	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	214.8	211.9	0.99
All Pedestrians		105	51.8	LOS E	0.2	0.2	0.95	0.95	220.2	219.0	0.99

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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ATTACHMENT 4 - ITEM 5

PHASING SUMMARY

Site: 11 [Duffy Avenue / Pennant Hills Road (Site Folder: Base WE)] **Network: N101 [Base WE (Network Folder: General)]**

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 115 seconds (Network User-Given Cycle Time)

Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

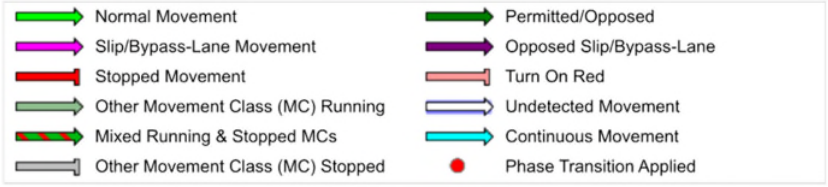
Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	0	69	88
Green Time (sec)	63	13	21
Phase Time (sec)	69	19	27
Phase Split	60%	17%	23%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence

REF: Reference Phase
VAR: Variable Phase



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MOVEMENT SUMMARY

Site: 5 [Duffy Avenue / Quarter Sessions Road (Site Folder: 2032 Base WE)]

Network: N101 [2032 Base WE (Network Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Quarter Sessions Road														
1	L2	55	1.9	55	1.9	0.124	5.5	LOS A	0.3	2.3	0.60	0.59	0.60	37.5
2	T1	29	0.0	29	0.0	0.124	5.1	LOS A	0.3	2.3	0.60	0.59	0.60	38.0
3	R2	24	0.0	24	0.0	0.124	8.3	LOS A	0.3	2.3	0.60	0.59	0.60	35.4
Approach		108	1.0	108	1.0	0.124	6.0	LOS A	0.3	2.3	0.60	0.59	0.60	37.4
East: Duffy Avenue														
4	L2	8	0.0	8	0.0	0.306	3.0	LOS A	0.8	5.7	0.26	0.46	0.26	38.6
5	T1	206	4.1	201	4.0	0.306	2.8	LOS A	0.8	5.7	0.26	0.46	0.26	38.9
6	R2	187	4.5	183	4.4	0.306	6.0	LOS A	0.8	5.7	0.26	0.46	0.26	38.9
Approach		402	4.2	392[N1]	4.1	0.306	4.3	LOS A	0.8	5.7	0.26	0.46	0.26	38.9
North: Quarter Sessions Road														
7	L2	181	1.2	181	1.2	0.240	5.0	LOS A	0.6	4.4	0.59	0.61	0.59	36.0
8	T1	25	0.0	25	0.0	0.240	4.7	LOS A	0.6	4.4	0.59	0.61	0.59	38.4
9	R2	11	0.0	11	0.0	0.240	7.9	LOS A	0.6	4.4	0.59	0.61	0.59	38.4
Approach		217	1.0	217	1.0	0.240	5.1	LOS A	0.6	4.4	0.59	0.61	0.59	36.6
West: Duffy Avenue														
10	L2	11	10.0	1	10.0	0.284	4.4	LOS A	0.7	5.1	0.4	0.51	0.48	37.9
11	T1	253	1.3	25	1.3	0.284	3.9	LOS A	0.7	5.1	0.4	0.51	0.48	36.2
12	R2	32	10.0	3	10.0	0.284	7.1	LOS A	0.7	5.1	0.4	0.51	0.48	38.5
Approach		295	2.5	29	2.5	0.284	4.3	LOS A	0.7	5.1	0.4	0.51	0.48	36.7
All Vehicles		1022	2.7	10[N]	2.7	0.306	4.6	LOS A	0.8	5.7	0.4	0.52	0.43	38.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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MOVEMENT SUMMARY

Site: 10 [Duffy Avenue / The Esplanade / Chilvers Road (Site Folder: 2032 Base WE)]

Network: N101 [2032 Base WE (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 110 seconds (Network Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: The Esplanade														
21a	L1	111	1.0	111	1.0	*1.024	107.8	LOS F	30.0	212.9	1.00	1.42	1.72	13.0
22	T1	453	1.6	453	1.6	1.024	104.2	LOS F	30.0	212.9	1.00	1.42	1.72	13.0
23b	R3	73	7.2	73	7.2	0.429	57.1	LOS E	2.3	17.4	0.98	0.77	0.98	19.8
Approach		636	2.2	636	2.2	1.024	99.4	LOS F	30.0	212.9	1.00	1.35	1.63	13.5
East: Duffy Avenue														
4b	L3	108	1.0	108	1.0	*1.046	129.0	LOS F	17.6	127.8	1.00	1.51	1.96	15.8
5	T1	203	6.2	203	6.2	1.046	124.0	LOS F	17.6	127.8	1.00	1.51	1.96	7.6
6a	R1	125	2.5	125	2.5	0.564	54.3	LOS D	4.0	28.9	0.99	0.79	0.99	14.9
Approach		437	3.9	437	3.9	1.046	105.2	LOS F	17.6	127.8	1.00	1.30	1.68	11.5
NorthWest: Chilvers Road														
27a	L1	117	2.7	117	2.7	0.563	40.7	LOS C	9.3	65.9	0.95	0.82	0.95	19.7
28	T1	506	0.6	506	0.6	0.563	38.0	LOS C	9.3	65.5	0.96	0.83	0.96	30.6
29b	R3	169	1.9	169	1.9	0.968	71.4	LOS F	6.8	48.5	1.00	1.03	1.47	13.1
Approach		793	1.2	793	1.2	0.968	45.5	LOS D	9.3	65.9	0.97	0.87	1.07	25.6
West: Duffy Avenue														
10b	L3	193	1.6	193	1.6	0.556	33.6	LOS C	4.7	33.0	0.76	0.77	0.78	33.4
11	T1	231	0.9	231	0.9	0.688	47.7	LOS D	7.4	52.0	0.91	0.85	1.03	29.0
12a	R1	182	0.0	182	0.0	0.806	60.2	LOS E	6.4	44.8	1.00	0.94	1.22	31.4
Approach		605	0.9	605	0.9	0.806	47.0	LOS D	7.4	52.0	0.93	0.85	1.01	31.1
All Vehicles		2471	1.8	2471	1.8	1.046	70.3	LOS E	30.0	212.9	0.97	1.06	1.31	20.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
SouthEast: The Esplanade											
P5	Full	53	49.3	LOS E	0.2	0.2	0.95	0.95	216.3	217.2	1.00
East: Duffy Avenue											
P2	Full	53	49.3	LOS E	0.2	0.2	0.95	0.95	212.3	211.9	1.00
NorthWest: Chilvers Road											
P7	Full	53	49.3	LOS E	0.2	0.2	0.95	0.95	218.9	220.5	1.01

West: Duffy Avenue											
P4	Full	53	49.3	LOS E	0.2	0.2	0.95	0.95	214.8	215.2	1.00
P4B	Slip/ Bypass	53	49.3	LOS E	0.2	0.2	0.95	0.95	206.4	204.3	0.99
All Pedestrians		263	49.3	LOS E	0.2	0.2	0.95	0.95	213.7	213.8	1.00

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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PHASING SUMMARY

Site: 10 [Duffy Avenue / The Esplanade / Chilvers Road (Site Folder: 2032 Base WE)] **Network: N101 [2032 Base WE (Network Folder: General)]**

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 110 seconds (Network Site User-Given Phase Times)

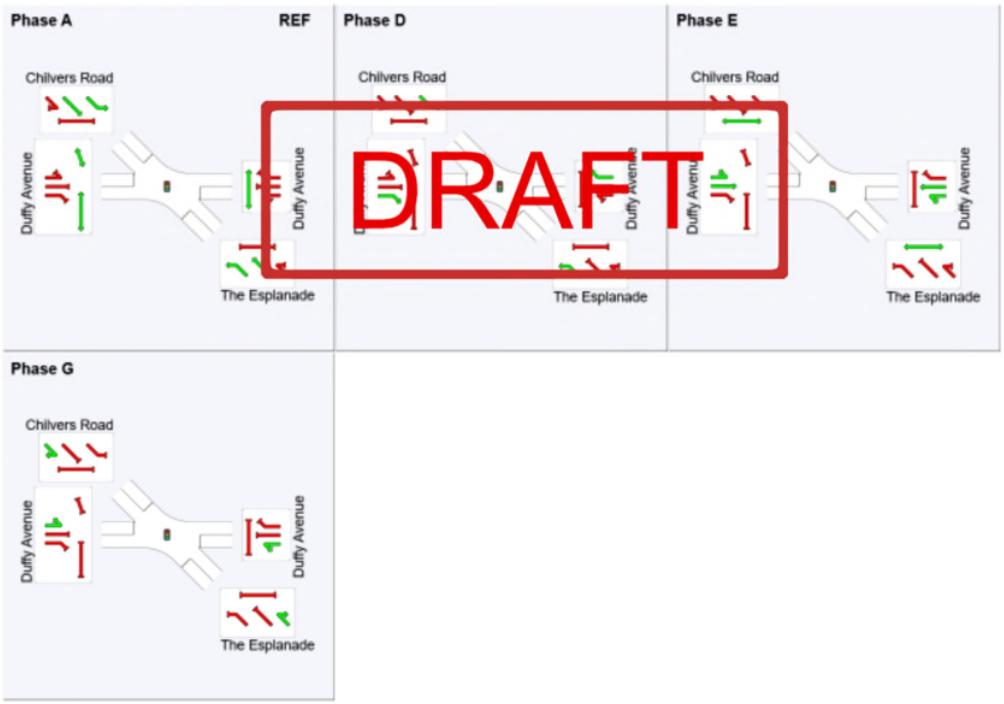
Timings based on settings in the Network Timing dialog
Phase Times specified by the user
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, D, E, G
Output Phase Sequence: A, D, E, G

Phase Timing Summary

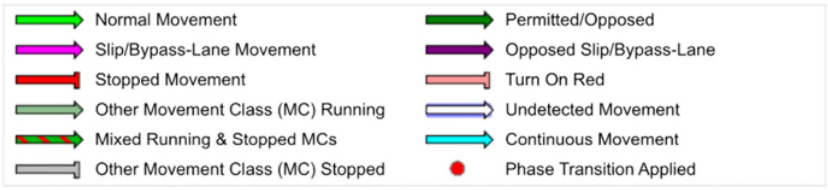
Phase	A	D	E	G
Phase Change Time (sec)	0	40	62	90
Green Time (sec)	31	13	19	12
Phase Time (sec)	40	22	27	21
Phase Split	36%	20%	25%	19%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



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ATTACHMENT 4 - ITEM 5

MOVEMENT SUMMARY

Site: 14v [Chilvers Road / Sefton Road - Conversion (Site Folder: 2032 Base WE)]

Network: N101 [2032 Base WE (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 110 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Chilvers Road														
1	L2	121	1.7	119	1.7	0.700	45.5	LOS D	11.9	84.8	1.00	0.87	1.00	28.4
3	R2	646	1.8	637	1.8	*0.700	48.5	LOS D	11.9	84.8	1.00	0.87	1.00	27.6
Approach		767	1.8	757 N1	1.8	0.700	48.0	LOS D	11.9	84.8	1.00	0.87	1.00	27.8
East: Sefton Road														
4	L2	649	1.1	649	1.1	*0.688	14.8	LOS B	7.3	51.6	0.72	0.80	0.72	41.0
5	T1	82	2.6	82	2.6	0.629	34.6	LOS C	2.1	15.3	0.80	0.65	0.90	38.3
Approach		732	1.3	732	1.3	0.688	17.0	LOS B	7.3	51.6	0.73	0.79	0.74	40.4
West: Sefton Road														
11	T1	59	1.8	59	1.8	0.056	12.3	LOS A	0.9	6.3	0.49	0.39	0.49	42.8
12	R2	151	1.4	151	1.4	*0.750	34.8	LOS C	2.8	20.1	1.00	0.86	1.16	25.8
Approach		209	1.5	209	1.5	0.750	28.5	LOS B	2.8	20.1	0.86	0.73	0.97	31.2
All Vehicles		1708	1.5	1698 N1	1.5	0.750	32.3	LOS C	11.9	84.8	0.87	0.82	0.89	31.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)
N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Chilvers Road											
P1	Full	53	49.3	LOS E	0.2	0.2	0.95	0.95	216.3	217.2	1.00
West: Sefton Road											
P4	Full	53	49.3	LOS E	0.2	0.2	0.95	0.95	212.3	211.9	1.00
All Pedestrians		105	49.3	LOS E	0.2	0.2	0.95	0.95	214.3	214.6	1.00

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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PHASING SUMMARY

Site: 14v [Chilvers Road / Sefton Road - Conversion (Site Folder: 2032 Base WE)]

Network: N101 [2032 Base WE (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 110 seconds (Network User-Given Cycle Time)

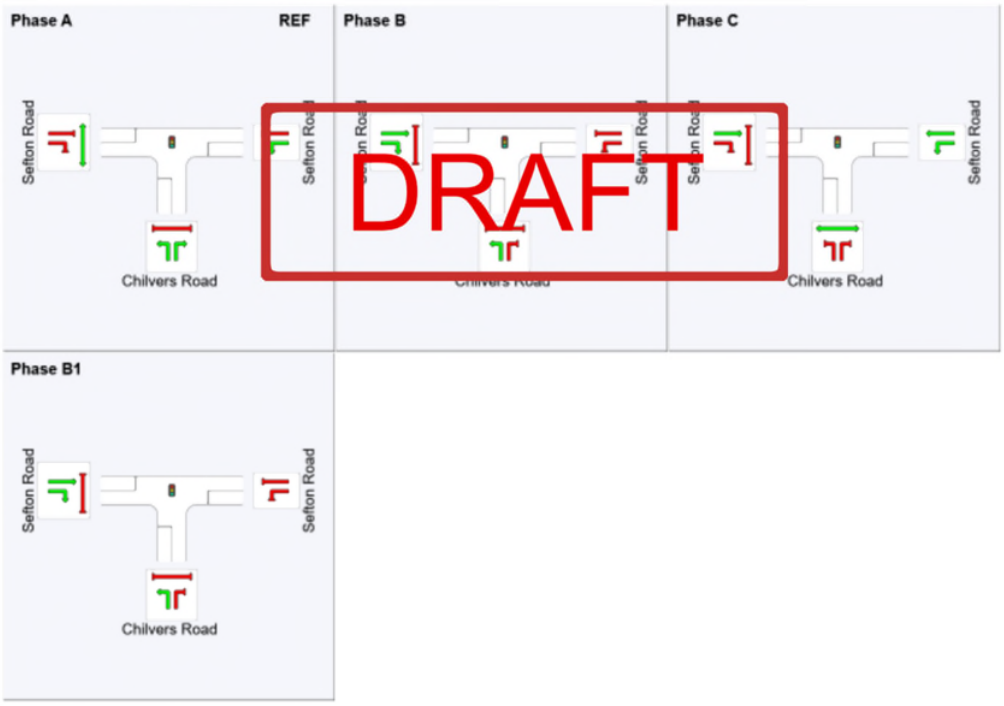
Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Convert Function Default
Reference Phase: Phase A
Input Phase Sequence: A, B, C, B1
Output Phase Sequence: A, B, C, B1

Phase Timing Summary

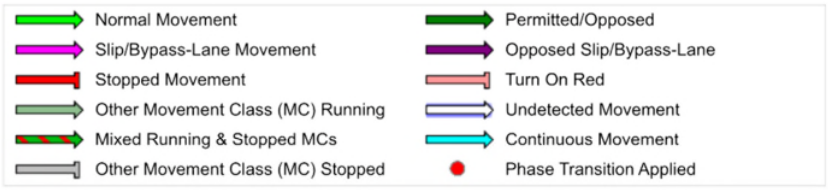
Phase	A	B	C	B1
Phase Change Time (sec)	0	41	56	95
Green Time (sec)	32	6	30	6
Phase Time (sec)	41	15	39	15
Phase Split	37%	14%	35%	14%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



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DRAFT

MOVEMENT SUMMARY

Site: 11 [Duffy Avenue / Pennant Hills Road (Site Folder: 2032 Base WE)] Network: N101 [2032 Base WE (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Pennant Hills Road.														
1	L2	231	5.9	231	5.9	0.715	24.1	LOS B	18.7	136.6	0.74	0.73	0.74	40.3
2	T1	2132	4.3	2132	4.3	*0.715	18.6	LOS B	20.0	145.1	0.77	0.72	0.77	51.2
Approach		2362	4.5	2362	4.5	0.715	19.2	LOS B	20.0	145.1	0.76	0.72	0.76	50.5
North: Pennant Hills Road.														
8	T1	1936	3.5	1936	3.5	0.456	6.4	LOS A	8.8	63.7	0.42	0.39	0.42	62.4
9	R2	172	6.1	172	6.1	*0.890	76.2	LOS F	7.1	52.0	1.00	0.96	1.40	18.2
Approach		2107	3.7	2107	3.7	0.890	12.1	LOS A	8.8	63.7	0.47	0.43	0.50	56.4
West: Duffy Avenue														
10	L2	185	7.4	185	7.4	0.323	37.4	LOS C	5.0	37.2	0.80	0.77	0.80	30.3
12	R2	220	2.9	220	2.9	*0.725	58.3	LOS E	7.8	56.2	1.00	0.86	1.07	25.0
Approach		405	4.9	405	4.9	0.725	48.7	LOS D	7.8	56.2	0.91	0.82	0.95	27.1
All Vehicles		4875	4.2	4875	4.2	0.890	18.5	LOS B	20.0	145.1	0.65	0.60	0.67	49.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akcelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
North: Pennant Hills Road.											
P3	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	228.2	226.1	0.99
West: Duffy Avenue											
P4	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	217.3	211.9	0.98
All Pedestrians		105	54.3	LOS E	0.2	0.2	0.95	0.95	222.7	219.0	0.98

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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PHASING SUMMARY

Site: 11 [Duffy Avenue / Pennant Hills Road (Site Folder: 2032 Base WE)] **Network: N101 [2032 Base WE (Network Folder: General)]**

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

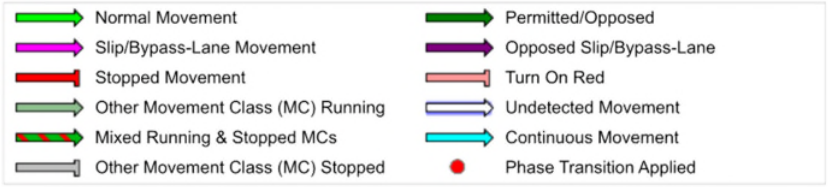
Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	0	75	94
Green Time (sec)	70	13	20
Phase Time (sec)	76	19	25
Phase Split	63%	16%	21%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence

REF: Reference Phase
VAR: Variable Phase



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MOVEMENT SUMMARY

Site: 5 [Duffy Avenue / Quarter Sessions Road (Site Folder: 2032 Base + Upgrade WE)]

Network: N101 [2032 Base + Upgrade WE (Network Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Quarter Sessions Road														
1	L2	55	1.9	55	1.9	0.125	5.6	LOS A	0.3	2.3	0.60	0.60	0.60	37.5
2	T1	29	0.0	29	0.0	0.125	5.2	LOS A	0.3	2.3	0.60	0.60	0.60	38.0
3	R2	24	0.0	24	0.0	0.125	8.4	LOS A	0.3	2.3	0.60	0.60	0.60	35.4
Approach		108	1.0	108	1.0	0.125	6.1	LOS A	0.3	2.3	0.60	0.60	0.60	37.4
East: Duffy Avenue														
4	L2	8	0.0	8	0.0	0.313	3.0	LOS A	0.8	5.9	0.26	0.46	0.26	38.6
5	T1	206	4.1	206	4.1	0.313	2.8	LOS A	0.8	5.9	0.26	0.46	0.26	38.9
6	R2	187	4.5	187	4.5	0.313	6.0	LOS A	0.8	5.9	0.26	0.46	0.26	38.9
Approach		402	4.2	402	4.2	0.313	4.3	LOS A	0.8	5.9	0.26	0.46	0.26	38.9
North: Quarter Sessions Road														
7	L2	181	1.2	181	1.2	0.240	5.0	LOS A	0.6	4.4	0.59	0.61	0.59	36.0
8	T1	25	0.0	25	0.0	0.240	4.7	LOS A	0.6	4.4	0.59	0.61	0.59	38.4
9	R2	11	0.0	11	0.0	0.240	7.9	LOS A	0.6	4.4	0.59	0.61	0.59	38.4
Approach		217	1.0	217	1.0	0.240	5.1	LOS A	0.6	4.4	0.59	0.61	0.59	36.6
West: Duffy Avenue														
10	L2	11	10.0	11	10.0	0.286	4.5	LOS A	0.7	5.1	0.43	0.51	0.48	37.9
11	T1	253	1.3	253	1.3	0.286	4.3	LOS A	0.7	5.1	0.43	0.51	0.48	36.2
12	R2	32	10.0	32	10.0	0.286	7.3	LOS A	0.7	5.1	0.43	0.51	0.48	38.5
Approach		295	2.5	295	2.5	0.286	4.3	LOS A	0.7	5.1	0.43	0.51	0.48	36.7
All Vehicles		1022	2.7	1022	2.7	0.313	4.7	LOS A	0.8	5.9	0.43	0.52	0.43	38.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: 10 [Duffy Avenue / The Esplanade / Chilvers Road (Site Folder: 2032 Base + Upgrade WE)]

Network: N101 [2032 Base + Upgrade WE (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 115 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: The Esplanade														
21a	L1	111	1.0	111	1.0	0.875	52.2	LOS D	20.8	147.2	1.00	1.01	1.16	21.6
22	T1	453	1.6	453	1.6	* 0.875	48.2	LOS D	20.8	147.2	1.00	1.01	1.16	21.6
23b	R3	73	7.2	73	7.2	0.384	57.5	LOS E	2.4	17.8	0.96	0.77	0.96	19.7
Approach		636	2.2	636	2.2	0.875	50.0	LOS D	20.8	147.2	1.00	0.98	1.14	21.4
East: Duffy Avenue														
4b	L3	108	1.0	108	1.0	0.236	36.8	LOS C	2.8	19.9	0.78	0.75	0.78	30.8
5	T1	203	6.2	203	6.2	0.820	58.6	LOS E	7.4	54.4	1.00	0.96	1.21	13.9
6a	R1	125	2.5	125	2.5	0.639	59.0	LOS E	4.3	31.0	1.00	0.82	1.04	14.1
Approach		437	3.9	437	3.9	0.820	53.3	LOS D	7.4	54.4	0.94	0.87	1.06	18.7
NorthWest: Chilvers Road														
27a	L1	117	2.7	117	2.7	0.482	35.2	LOS C	8.6	61.2	0.86	0.76	0.86	21.4
28	T1	506	0.6	506	0.6	0.482	32.4	LOS C	8.8	61.8	0.87	0.76	0.87	32.4
29b	R3	169	1.9	169	1.9	* 0.867	60.5	LOS E	6.2	44.2	1.00	0.91	1.20	14.7
Approach		793	1.2	793	1.2	0.867	38.8	LOS C	8.8	61.8	0.90	0.79	0.94	27.6
West: Duffy Avenue														
10b	L3	193	1.6	193	1.6	0.363	37.4	LOS [illegible]	5.0	[illegible]	[illegible]	0.78	0.81	32.3
11	T1	231	0.9	231	0.9	* 0.912	[illegible]	LOS E	[illegible]	[illegible]	[illegible]	1.09	1.42	24.6
12a	R1	182	0.0	182	0.0	* 0.913	73.1	LOS F	7.4	[illegible]	[illegible]	1.08	1.46	29.2
Approach		605	0.9	605	0.9	0.913	59.8	LOS E	9.3	65.7	[illegible]	0.99	1.24	28.2
All Vehicles		2471	1.8	2471	1.8	0.913	49.4	LOS D	20.8	147.2	0.94	0.90	1.08	25.0

DRAFT

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
SouthEast: The Esplanade											
P5	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	218.8	217.2	0.99
East: Duffy Avenue											
P2	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	217.3	215.2	0.99
NorthWest: Chilvers Road											
P7	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	221.4	220.5	1.00

West: Duffy Avenue											
P4	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	217.3	215.2	0.99
P4B	Slip/ Bypass	53	51.8	LOS E	0.2	0.2	0.95	0.95	208.9	204.3	0.98
All Pedestrians		263	51.8	LOS E	0.2	0.2	0.95	0.95	216.8	214.5	0.99

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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PHASING SUMMARY

Site: 10 [Duffy Avenue / The Esplanade / Chilvers Road (Site Folder: 2032 Base + Upgrade WE)]

Network: N101 [2032 Base + Upgrade WE (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 115 seconds (Network User-Given Cycle Time)

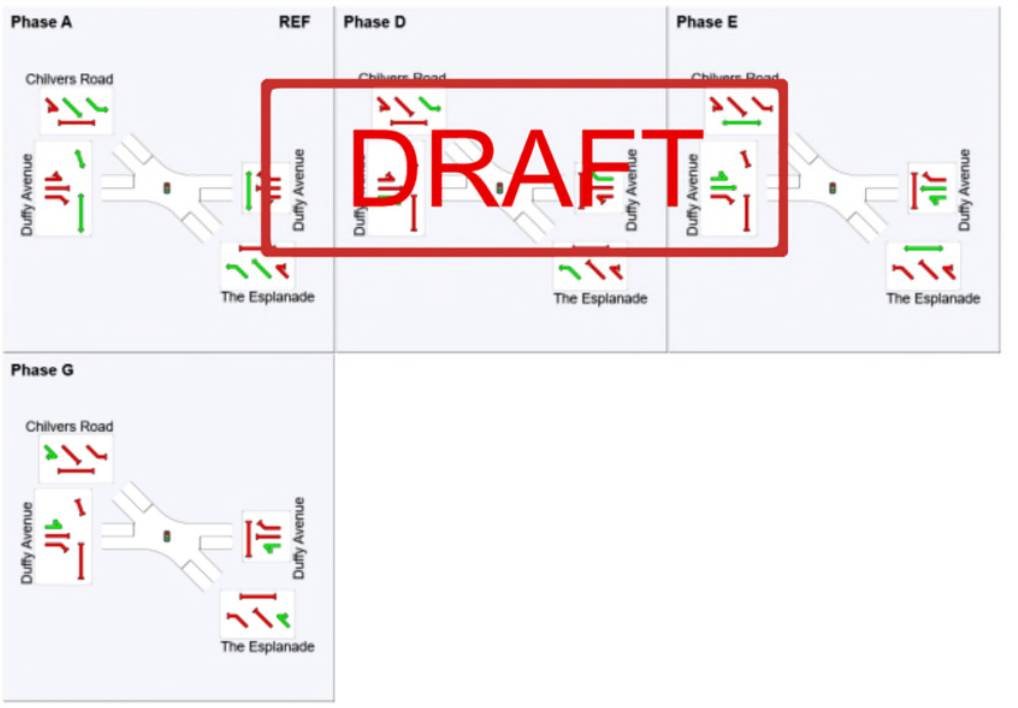
Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, D, E, G
Output Phase Sequence: A, D, E, G

Phase Timing Summary

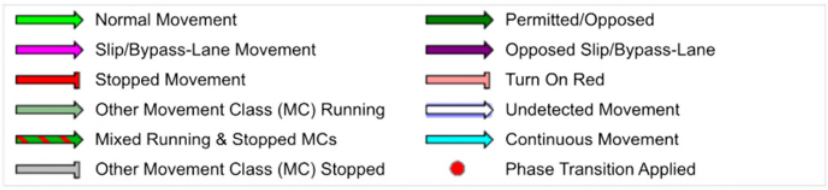
Phase	A	D	E	G
Phase Change Time (sec)	0	47	68	92
Green Time (sec)	38	12	15	14
Phase Time (sec)	47	21	24	23
Phase Split	41%	18%	21%	20%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



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DRAFT

ATTACHMENT 4 - ITEM 5

MOVEMENT SUMMARY

Site: 14v [Chilvers Road / Sefton Road - Conversion (Site Folder: 2032 Base + Upgrade WE)]

Network: N101 [2032 Base + Upgrade WE (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 115 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Chilvers Road														
1	L2	121	1.7	121	1.7	0.699	45.9	LOS D	12.5	88.7	1.00	0.87	1.00	28.3
3	R2	646	1.8	646	1.8	*0.699	47.1	LOS D	12.5	88.7	1.00	0.87	1.00	28.0
Approach		767	1.8	767	1.8	0.699	46.9	LOS D	12.5	88.7	1.00	0.87	1.00	28.0
East: Sefton Road														
4	L2	649	1.1	649	1.1	*0.687	15.1	LOS B	7.9	55.6	0.72	0.80	0.72	40.7
5	T1	82	2.6	82	2.6	0.690	38.8	LOS C	2.3	16.6	0.80	0.69	0.99	36.7
Approach		732	1.3	732	1.3	0.690	17.8	LOS B	7.9	55.6	0.73	0.79	0.75	39.8
West: Sefton Road														
11	T1	59	1.8	59	1.8	0.056	12.7	LOS A	0.9	6.5	0.49	0.38	0.49	42.6
12	R2	151	1.4	151	1.4	*0.672	33.6	LOS C	2.9	20.2	1.00	0.82	1.06	26.2
Approach		209	1.5	209	1.5	0.672	27.7	LOS B	2.9	20.2	0.86	0.70	0.90	31.5
All Vehicles		1708	1.5	1708	1.5	0.699	32.1	LOS C	12.5	88.7	0.87	0.81	0.88	31.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

DRAFT

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Chilvers Road											
P1	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	218.8	217.2	0.99
West: Sefton Road											
P4	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	214.8	211.9	0.99
All Pedestrians		105	51.8	LOS E	0.2	0.2	0.95	0.95	216.8	214.6	0.99

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

Organisation: TRANSPORT FOR NSW | Licence: NETWORK / Enterprise | Processed: Thursday, 21 July 2022 10:07:44 AM
Project: P:\P5524 Westleigh Park Traffic Impact and Access Study\Technical\Models\SIDRA\P5524.001S Westleigh Park Traffic Impact and Access Study model_WE.sip9

ATTACHMENT 4 - ITEM 5

PHASING SUMMARY

Site: 14v [Chilvers Road / Sefton Road - Conversion (Site Folder: 2032 Base + Upgrade WE)]

Network: N101 [2032 Base + Upgrade WE (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 115 seconds (Network User-Given Cycle Time)

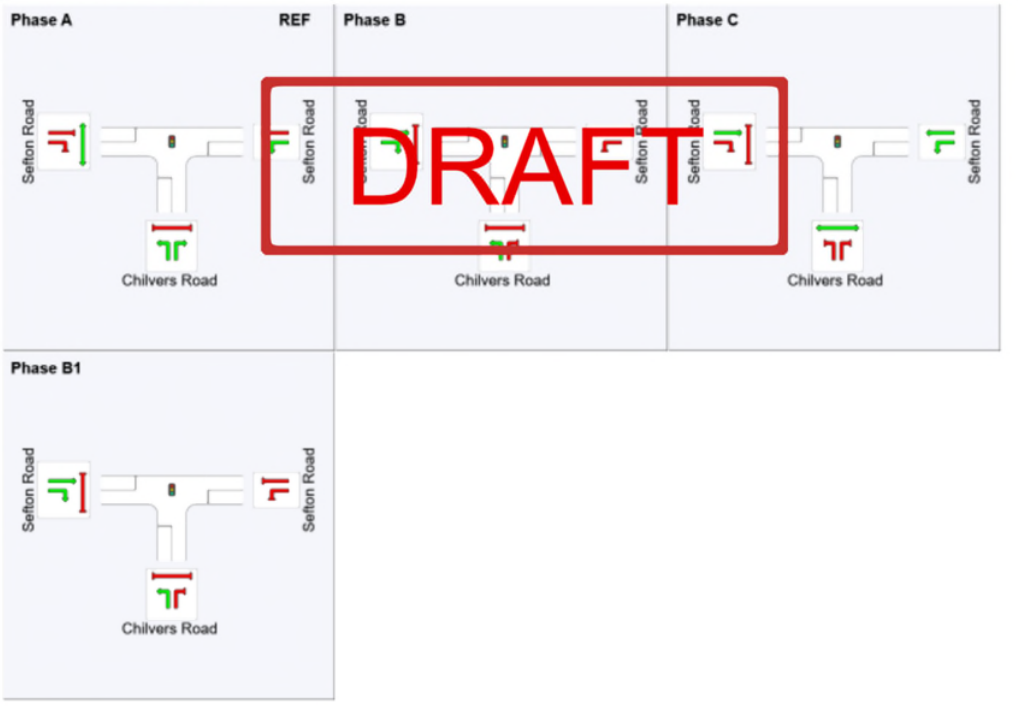
Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Convert Function Default
Reference Phase: Phase A
Input Phase Sequence: A, B, C, B1
Output Phase Sequence: A, B, C, B1

Phase Timing Summary

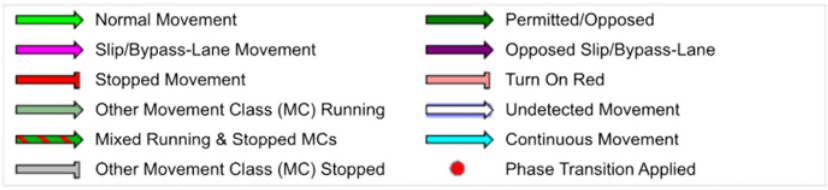
Phase	A	B	C	B1
Phase Change Time (sec)	0	43	58	98
Green Time (sec)	34	6	31	8
Phase Time (sec)	43	15	40	17
Phase Split	37%	13%	35%	15%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



Organisation: TRANSPORT FOR NSW | Licence: NETWORK / Enterprise | Processed: Thursday, 21 July 2022 10:07:44 AM
Project: P:\P5524 Westleigh Park Traffic Impact and Access Study\Technical\Models\SIDRA\P5524.001S Westleigh Park Traffic Impact and Access Study model_WE.sip9

DRAFT

MOVEMENT SUMMARY

Site: 11 [Duffy Avenue / Pennant Hills Road (Site Folder: 2032 Base + Upgrade WE)] **Network: N101 [2032 Base + Upgrade WE (Network Folder: General)]**

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Pennant Hills Road.														
1	L2	231	5.9	231	5.9	0.715	24.1	LOS B	18.7	136.6	0.74	0.73	0.74	40.3
2	T1	2132	4.3	2132	4.3	*0.715	18.6	LOS B	20.0	145.1	0.77	0.72	0.77	51.2
Approach		2362	4.5	2362	4.5	0.715	19.2	LOS B	20.0	145.1	0.76	0.72	0.76	50.5
North: Pennant Hills Road.														
8	T1	1936	3.5	1936	3.5	0.456	6.4	LOS A	8.8	63.7	0.42	0.39	0.42	62.4
9	R2	172	6.1	172	6.1	*0.890	76.2	LOS F	7.1	52.0	1.00	0.96	1.40	18.2
Approach		2107	3.7	2107	3.7	0.890	12.1	LOS A	8.8	63.7	0.47	0.43	0.50	56.4
West: Duffy Avenue														
10	L2	185	7.4	185	7.4	0.323	37.4	LOS C	5.0	37.2	0.80	0.77	0.80	30.3
12	R2	220	2.9	220	2.9	*0.725	58.3	LOS E	7.8	56.2	1.00	0.86	1.07	25.0
Approach		405	4.9	405	4.9	0.725	48.7	LOS D	7.8	56.2	0.91	0.82	0.95	27.1
All Vehicles		4875	4.2	4875	4.2	0.890	18.5	LOS B	20.0	145.1	0.65	0.60	0.67	49.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
North: Pennant Hills Road.											
P3	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	228.2	226.1	0.99
West: Duffy Avenue											
P4	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	217.3	211.9	0.98
All Pedestrians		105	54.3	LOS E	0.2	0.2	0.95	0.95	222.7	219.0	0.98

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Project: P:\P5524 Westleigh Park Traffic Impact and Access Study\Technical\Models\SIDRA\P5524.001S Westleigh Park Traffic Impact and Access Study model_WE.sip9

ATTACHMENT 4 - ITEM 5

PHASING SUMMARY

Site: 11 [Duffy Avenue / Pennant Hills Road (Site Folder: 2032 Base + Upgrade WE)]

Network: N101 [2032 Base + Upgrade WE (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

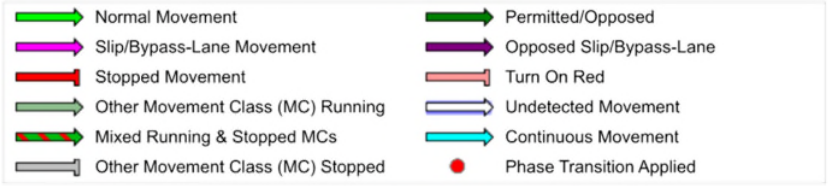
Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	0	75	94
Green Time (sec)	70	13	20
Phase Time (sec)	76	19	25
Phase Split	63%	16%	21%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence

REF: Reference Phase
VAR: Variable Phase



Organisation: TRANSPORT FOR NSW | Licence: NETWORK / Enterprise | Processed: Thursday, 21 July 2022 10:07:44 AM
Project: P:\P5524 Westleigh Park Traffic Impact and Access Study\Technical\Models\SIDRA\P5524.001S Westleigh Park Traffic Impact and Access Study model_WE.sip9

MOVEMENT SUMMARY

Site: 5 [Duffy Avenue / Quarter Sessions Road (Site Folder: 2032 Option 1 + Upgrade WE)]

Network: N101 [2032 Option 1 + Upgrade WE (Network Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Quarter Sessions Road														
1	L2	58	1.8	58	1.8	0.171	6.7	LOS A	0.5	3.3	0.70	0.66	0.70	37.1
2	T1	53	0.0	53	0.0	0.171	6.4	LOS A	0.5	3.3	0.70	0.66	0.70	37.6
3	R2	23	0.0	23	0.0	0.171	9.6	LOS A	0.5	3.3	0.70	0.66	0.70	34.7
Approach		134	0.8	134	0.8	0.171	7.1	LOS A	0.5	3.3	0.70	0.66	0.70	37.1
East: Duffy Avenue														
4	L2	6	0.0	6	0.0	0.409	3.3	LOS A	1.2	8.7	0.33	0.51	0.33	38.4
5	T1	192	4.4	186	4.4	0.409	3.0	LOS A	1.2	8.7	0.33	0.51	0.33	38.7
6	R2	335	2.5	325	2.5	0.409	6.2	LOS A	1.2	8.7	0.33	0.51	0.33	38.7
Approach		533	3.2	518[N1]	3.2	0.409	5.0	LOS A	1.2	8.7	0.33	0.51	0.33	38.7
North: Quarter Sessions Road														
7	L2	349	0.6	349	0.6	0.444	5.5	LOS A	1.4	9.7	0.70	0.67	0.70	35.7
8	T1	42	0.0	42	0.0	0.444	5.2	LOS A	1.4	9.7	0.70	0.67	0.70	38.2
9	R2	11	0.0	11	0.0	0.444	8.3	LOS A	1.4	9.7	0.70	0.67	0.70	38.2
Approach		402	0.5	402	0.5	0.444	5.5	LOS A	1.4	9.7	0.70	0.67	0.70	36.2
West: Duffy Avenue														
10	L2	11	10.0	1	10.0	0.326	5.8	LOS A	0.9	6.2	0.6	0.63	0.63	37.6
11	T1	252	1.3	252	1.3	0.326	5.6	LOS A	0.9	6.2	0.6	0.63	0.63	35.7
12	R2	32	10.0	3	10.0	0.326	8.6	LOS A	0.9	6.2	0.6	0.63	0.63	38.1
Approach		294	2.5	294	2.5	0.326	5.6	LOS A	0.9	6.2	0.6	0.63	0.63	36.2
All Vehicles		1362	2.0	1347[N1]	2.0	0.444	5.5	LOS A	1.4	9.7	0.54	0.60	0.54	37.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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Project: P:\P5524 Westleigh Park Traffic Impact and Access Study\Technical\Models\SIDRA\P5524.001S Westleigh Park Traffic Impact and Access Study model_WE.sip9

MOVEMENT SUMMARY

Site: 10 [Duffy Avenue / The Esplanade / Chilvers Road (Site Folder: 2032 Option 1 + Upgrade WE)]

Network: N101 [2032 Option 1 + Upgrade WE (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 115 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: The Esplanade														
21a	L1	121	0.9	121	0.9	*1.052	128.8	LOS F	34.0	240.7	1.00	1.50	1.83	11.3
22	T1	451	1.6	451	1.6	1.052	124.4	LOS F	34.0	240.7	1.00	1.50	1.83	11.3
23b	R3	73	7.2	73	7.2	0.256	49.7	LOS D	2.2	16.2	0.90	0.76	0.90	21.5
Approach		644	2.1	644	2.1	1.052	116.8	LOS F	34.0	240.7	0.99	1.42	1.72	11.9
East: Duffy Avenue														
4b	L3	111	1.0	111	1.0	0.291	42.4	LOS C	3.5	24.5	0.85	0.77	0.85	29.3
5	T1	252	5.0	252	5.0	1.010	99.8	LOS F	12.1	88.2	0.99	1.30	1.74	9.2
6a	R1	126	2.5	126	2.5	0.703	61.2	LOS E	4.5	32.1	1.00	0.85	1.11	13.7
Approach		488	3.4	488	3.4	1.010	76.8	LOS F	12.1	88.2	0.96	1.06	1.37	14.4
NorthWest: Chilvers Road														
27a	L1	104	3.0	104	3.0	0.509	41.3	LOS C	8.5	60.5	0.94	0.81	0.94	19.4
28	T1	452	0.7	452	0.7	0.509	38.9	LOS C	8.6	60.2	0.95	0.81	0.95	30.3
29b	R3	305	1.0	305	1.0	*1.036	102.4	LOS F	15.8	111.7	1.00	1.15	1.66	9.8
Approach		861	1.1	861	1.1	1.036	61.7	LOS E	15.8	111.7	0.97	0.93	1.20	20.7
West: Duffy Avenue														
10b	L3	263	1.2	263	1.2	0.417	33.2	LOS C	6.6	46.5	0.74	0.79	0.78	33.6
11	T1	260	0.8	260	0.8	*1.047	81.1	LOS F	11.7	103.4	1.00	1.44	1.94	17.1
12a	R1	198	0.0	198	0.0	1.082	152.1	LOS F	12.2	85.4	1.00	1.46	2.15	19.8
Approach		721	0.7	721	0.7	1.082	98.8	LOS F	14.7	103.4	0.92	1.21	1.57	21.6
All Vehicles		2715	1.7	2715	1.7	1.082	87.3	LOS F	34.0	240.7	0.96	1.14	1.46	17.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
SouthEast: The Esplanade											
P5	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	218.8	217.2	0.99
East: Duffy Avenue											
P2	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	217.3	215.2	0.99
NorthWest: Chilvers Road											
P7	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	221.4	220.5	1.00

West: Duffy Avenue											
P4	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	217.3	215.2	0.99
P4B	Slip/ Bypass	53	51.8	LOS E	0.2	0.2	0.95	0.95	208.9	204.3	0.98
All Pedestrians		263	51.8	LOS E	0.2	0.2	0.95	0.95	216.8	214.5	0.99

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Project: P:\P5524 Westleigh Park Traffic Impact and Access Study\Technical\Models\SIDRA\P5524.001S Westleigh Park Traffic Impact and Access Study model_WE.sip9

ATTACHMENT 4 - ITEM 5

PHASING SUMMARY

Site: 10 [Duffy Avenue / The Esplanade / Chilvers Road (Site Folder: 2032 Option 1 + Upgrade WE)]

Network: N101 [2032 Option 1 + Upgrade WE (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 115 seconds (Network User-Given Cycle Time)

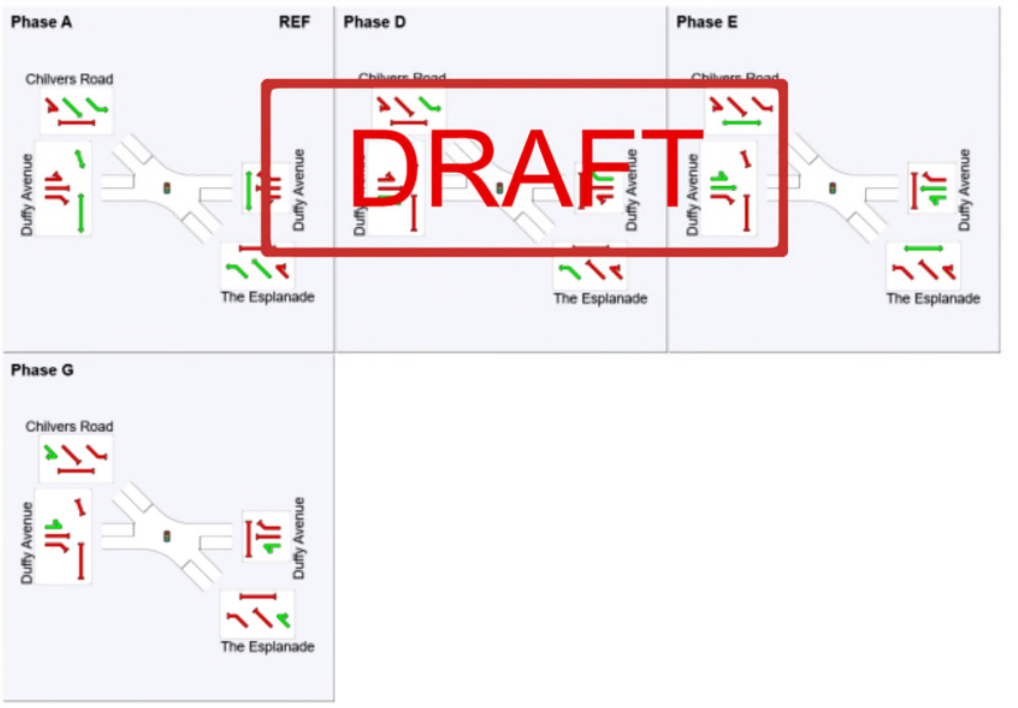
Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, D, E, G
Output Phase Sequence: A, D, E, G

Phase Timing Summary

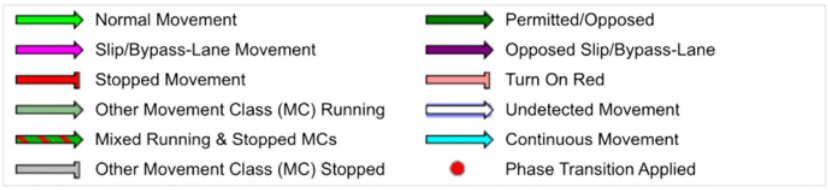
Phase	A	D	E	G
Phase Change Time (sec)	0	41	61	85
Green Time (sec)	32	11	15	21
Phase Time (sec)	41	20	24	30
Phase Split	36%	17%	21%	26%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



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Project: P:\P5524 Westleigh Park Traffic Impact and Access Study\Technical\Models\SIDRA\P5524.001S Westleigh Park Traffic Impact and Access Study model_WE.sip9

DRAFT

MOVEMENT SUMMARY

Site: 14v [Chilvers Road / Sefton Road - Conversion (Site Folder: 2032 Option 1 + Upgrade WE)]

Network: N101 [2032 Option 1 + Upgrade WE (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 115 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Chilvers Road														
1	L2	121	1.7	118	1.7	0.744	47.1	LOS D	13.5	96.0	1.00	0.88	1.02	28.0
3	R2	718	1.6	699	1.6	*0.744	48.3	LOS D	13.5	96.0	1.00	0.88	1.02	27.7
Approach		839	1.6	817[N1]	1.6	0.744	48.1	LOS D	13.5	96.0	1.00	0.88	1.02	27.7
East: Sefton Road														
4	L2	726	1.0	726	1.0	*0.732	15.0	LOS B	8.7	61.4	0.74	0.82	0.74	40.8
5	T1	74	2.9	74	2.9	0.545	32.6	LOS C	1.9	13.4	0.78	0.60	0.79	39.1
Approach		800	1.2	800	1.2	0.732	16.6	LOS B	8.7	61.4	0.75	0.80	0.75	40.5
West: Sefton Road														
11	T1	59	1.8	59	1.8	0.056	12.7	LOS A	0.9	6.5	0.49	0.38	0.49	42.6
12	R2	151	1.4	151	1.4	*0.784	37.3	LOS C	3.0	21.3	1.00	0.88	1.20	24.9
Approach		209	1.5	209	1.5	0.784	30.4	LOS C	3.0	21.3	0.86	0.74	1.00	30.4
All Vehicles		1848	1.4	1826[N1]	1.4	0.784	32.3	LOS C	13.5	96.0	0.87	0.83	0.90	31.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)
N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Chilvers Road											
P1	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	218.8	217.2	0.99
West: Sefton Road											
P4	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	214.8	211.9	0.99
All Pedestrians		105	51.8	LOS E	0.2	0.2	0.95	0.95	216.8	214.6	0.99

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Access Study model_WE.sip9

DRAFT

ATTACHMENT 4 - ITEM 5

PHASING SUMMARY

Site: 14v [Chilvers Road / Sefton Road - Conversion (Site Folder: 2032 Option 1 + Upgrade WE)]

Network: N101 [2032 Option 1 + Upgrade WE (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 115 seconds (Network User-Given Cycle Time)

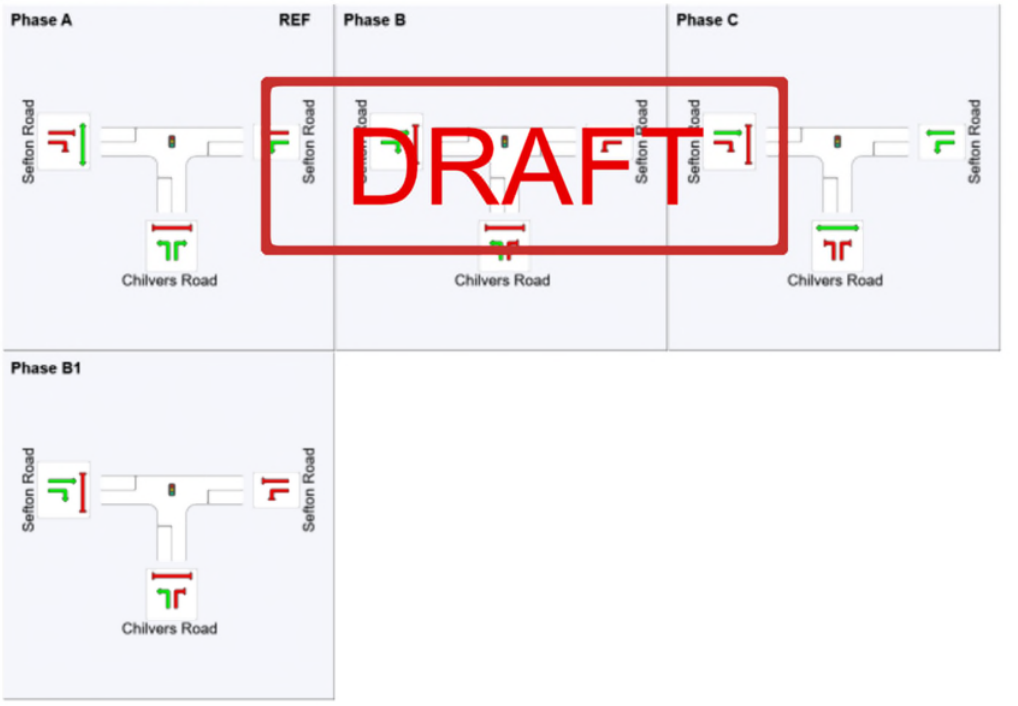
Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Convert Function Default
Reference Phase: Phase A
Input Phase Sequence: A, B, C, B1
Output Phase Sequence: A, B, C, B1

Phase Timing Summary

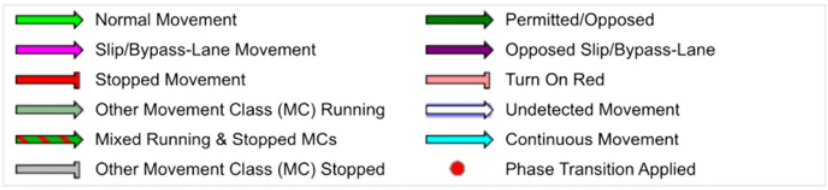
Phase	A	B	C	B1
Phase Change Time (sec)	0	43	58	100
Green Time (sec)	34	6	33	6
Phase Time (sec)	43	15	42	15
Phase Split	37%	13%	37%	13%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



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DRAFT

ATTACHMENT 4 - ITEM 5

MOVEMENT SUMMARY

Site: 11 [Duffy Avenue / Pennant Hills Road (Site Folder: 2032 Option 1 + Upgrade WE)]

Network: N101 [2032 Option 1 + Upgrade WE (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Pennant Hills Road.														
1	L2	252	5.4	252	5.4	0.721	24.2	LOS B	19.0	138.5	0.74	0.73	0.74	40.0
2	T1	2132	4.3	2132	4.3	* 0.721	18.7	LOS B	20.3	147.3	0.77	0.72	0.77	51.1
Approach		2383	4.5	2383	4.5	0.721	19.3	LOS B	20.3	147.3	0.77	0.72	0.77	50.3
North: Pennant Hills Road.														
8	T1	1937	3.5	1937	3.5	0.456	6.4	LOS A	8.8	63.8	0.42	0.39	0.42	62.4
9	R2	194	5.4	194	5.4	* 1.000	107.9	LOS F	9.8	71.9	1.00	1.10	1.76	13.9
Approach		2131	3.7	2131	3.7	1.000	15.6	LOS B	9.8	71.9	0.48	0.45	0.54	53.3
West: Duffy Avenue														
10	L2	197	7.0	192	7.1	0.334	37.5	LOS C	5.2	38.6	0.80	0.77	0.80	30.2
12	R2	229	2.8	223	2.8	* 0.736	58.6	LOS E	8.0	57.3	1.00	0.87	1.08	24.9
Approach		426	4.7	415 N1	4.8	0.736	48.9	LOS D	8.0	57.3	0.91	0.83	0.95	27.1
All Vehicles		4940	4.1	4929 N1	4.1	1.000	20.2	LOS B	20.3	147.3	0.65	0.61	0.69	48.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

DRAFT

* Critical Movement (Signal Timing)
N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
North: Pennant Hills Road.											
P3	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	228.2	226.1	0.99
West: Duffy Avenue											
P4	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	217.3	211.9	0.98
All Pedestrians		105	54.3	LOS E	0.2	0.2	0.95	0.95	222.7	219.0	0.98

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

Access Study model_WE.sip9

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PHASING SUMMARY

Site: 11 [Duffy Avenue / Pennant Hills Road (Site Folder: 2032 Option 1 + Upgrade WE)] **Network: N101 [2032 Option 1 + Upgrade WE (Network Folder: General)]**

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

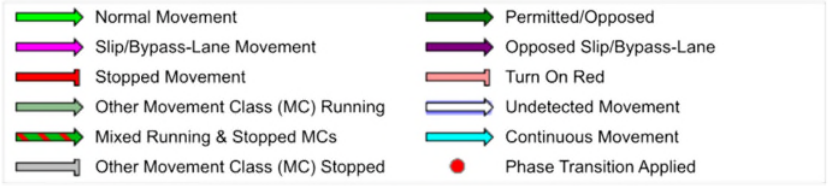
Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	0	75	94
Green Time (sec)	70	13	20
Phase Time (sec)	76	19	25
Phase Split	63%	16%	21%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence

REF: Reference Phase
VAR: Variable Phase



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MOVEMENT SUMMARY

Site: 5 [Duffy Avenue / Quarter Sessions Road (Site Folder: 2032 Option 2 + Upgrade WE)]

Network: N101 [2032 Option 2 + Upgrade WE (Network Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Quarter Sessions Road														
1	L2	35	3.0	35	3.0	0.123	6.3	LOS A	0.3	2.3	0.67	0.64	0.67	37.2
2	T1	36	0.0	36	0.0	0.123	5.9	LOS A	0.3	2.3	0.67	0.64	0.67	37.7
3	R2	26	0.0	26	0.0	0.123	9.0	LOS A	0.3	2.3	0.67	0.64	0.67	34.9
Approach		97	1.1	97	1.1	0.123	6.9	LOS A	0.3	2.3	0.67	0.64	0.67	37.0
East: Duffy Avenue														
4	L2	13	0.0	13	0.0	0.407	3.8	LOS A	1.1	8.3	0.42	0.54	0.42	38.3
5	T1	200	4.2	200	4.2	0.407	3.6	LOS A	1.1	8.3	0.42	0.54	0.42	38.7
6	R2	249	3.4	249	3.4	0.407	6.7	LOS A	1.1	8.3	0.42	0.54	0.42	38.7
Approach		462	3.6	462	3.6	0.407	5.3	LOS A	1.1	8.3	0.42	0.54	0.42	38.7
North: Quarter Sessions Road														
7	L2	212	1.0	212	1.0	0.338	5.2	LOS A	0.9	6.7	0.64	0.64	0.64	35.7
8	T1	58	0.0	58	0.0	0.338	4.9	LOS A	0.9	6.7	0.64	0.64	0.64	38.2
9	R2	36	0.0	36	0.0	0.338	8.1	LOS A	0.9	6.7	0.64	0.64	0.64	38.2
Approach		305	0.7	305	0.7	0.338	5.5	LOS A	0.9	6.7	0.64	0.64	0.64	36.8
West: Duffy Avenue														
10	L2	15	7.1	1	7.1	0.306	4.9	LOS A	0.8	5.7	0.55	0.58	0.56	37.7
11	T1	231	1.4	231	1.4	0.306	4.9	LOS A	0.8	5.7	0.55	0.58	0.56	35.8
12	R2	48	6.5	4	6.5	0.306	7.8	LOS A	0.8	5.7	0.55	0.58	0.56	38.2
Approach		294	2.5	294	2.5	0.306	5.0	LOS A	0.8	5.7	0.55	0.58	0.56	36.6
All Vehicles		1158	2.4	1158	2.4	0.407	5.4	LOS A	1.1	8.3	0.53	0.58	0.53	37.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: 10 [Duffy Avenue / The Esplanade / Chilvers Road (Site Folder: 2032 Option 2 + Upgrade WE)]

Network: N101 [2032 Option 2 + Upgrade WE (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 115 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: The Esplanade														
21a	L1	131	0.8	131	0.8	0.880	52.2	LOS D	21.6	153.1	1.00	1.01	1.17	21.6
22	T1	452	1.6	452	1.6	*0.880	48.3	LOS D	21.6	153.1	1.00	1.01	1.17	21.6
23b	R3	73	7.2	73	7.2	0.598	64.7	LOS E	2.6	19.3	1.00	0.80	1.06	18.4
Approach		655	2.1	655	2.1	0.880	50.9	LOS D	21.6	153.1	1.00	0.99	1.15	21.2
East: Duffy Avenue														
4b	L3	107	1.0	107	1.0	0.247	39.4	LOS C	3.0	21.1	0.81	0.76	0.81	30.1
5	T1	245	5.2	245	5.2	0.857	59.0	LOS E	9.0	65.8	1.00	1.01	1.26	13.8
6a	R1	126	2.5	126	2.5	0.595	57.3	LOS E	4.3	30.7	1.00	0.80	1.00	14.4
Approach		479	3.5	479	3.5	0.857	54.2	LOS D	9.0	65.8	0.95	0.90	1.09	18.2
NorthWest: Chilvers Road														
27a	L1	119	2.7	119	2.7	0.477	34.5	LOS C	8.5	60.0	0.83	0.74	0.83	21.7
28	T1	514	0.6	514	0.6	0.477	31.6	LOS C	8.7	60.9	0.85	0.74	0.85	32.7
29b	R3	111	2.9	111	2.9	*0.885	72.7	LOS F	4.3	31.0	1.00	0.96	1.39	12.9
Approach		743	1.3	743	1.3	0.885	38.2	LOS C	8.7	60.9	0.87	0.77	0.92	28.3
West: Duffy Avenue														
10b	L3	154	2.1	154	2.1	0.306	38.2	LOS C	4.0	28.7	0.89	0.77	0.80	32.0
11	T1	260	0.8	260	0.8	*0.893	60.3	LOS E	10.2	71.7	1.00	1.07	1.34	25.4
12a	R1	191	0.0	191	0.0	*0.882	68.4	LOS E	7.4	51.9	1.00	1.03	1.36	30.0
Approach		604	0.9	604	0.9	0.893	58.6	LOS E	10.2	71.7	0.95	0.98	1.21	28.5
All Vehicles		2481	1.8	2481	1.8	0.893	49.6	LOS D	21.6	153.1	0.94	0.90	1.09	25.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
SouthEast: The Esplanade											
P5	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	218.8	217.2	0.99
East: Duffy Avenue											
P2	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	217.3	215.2	0.99
NorthWest: Chilvers Road											
P7	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	221.4	220.5	1.00

West: Duffy Avenue											
P4	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	217.3	215.2	0.99
P4B	Slip/ Bypass	53	51.8	LOS E	0.2	0.2	0.95	0.95	208.9	204.3	0.98
All Pedestrians		263	51.8	LOS E	0.2	0.2	0.95	0.95	216.8	214.5	0.99

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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PHASING SUMMARY

Site: 10 [Duffy Avenue / The Esplanade / Chilvers Road (Site Folder: 2032 Option 2 + Upgrade WE)]

Network: N101 [2032 Option 2 + Upgrade WE (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 115 seconds (Network User-Given Cycle Time)

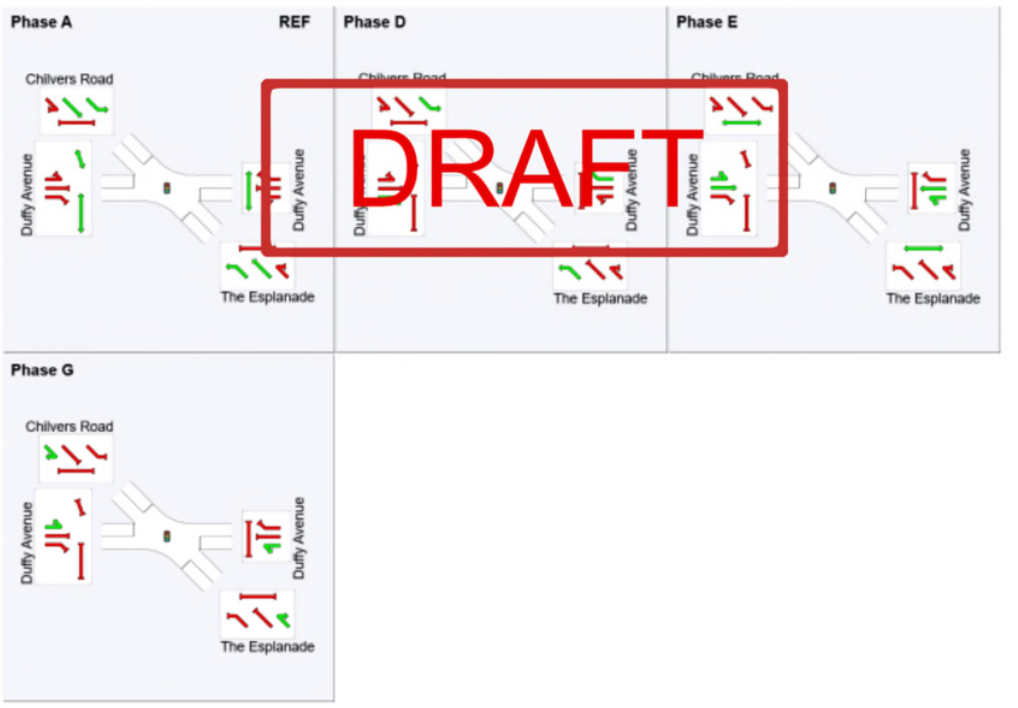
Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, D, E, G
Output Phase Sequence: A, D, E, G

Phase Timing Summary

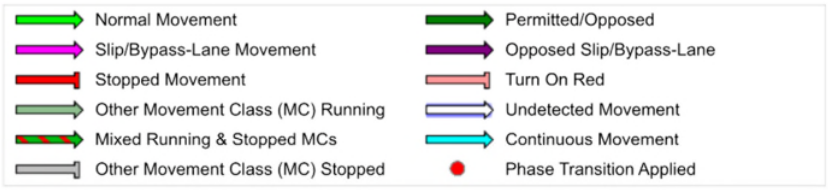
Phase	A	D	E	G
Phase Change Time (sec)	0	48	70	97
Green Time (sec)	39	13	18	9
Phase Time (sec)	48	22	27	18
Phase Split	42%	19%	23%	16%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



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DRAFT

MOVEMENT SUMMARY

Site: 14v [Chilvers Road / Sefton Road - Conversion (Site Folder: 2032 Option 2 + Upgrade WE)]

Network: N101 [2032 Option 2 + Upgrade WE (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 115 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Chilvers Road														
1	L2	114	1.9	114	1.9	0.906	70.4	LOS E	14.2	101.2	1.00	0.95	1.18	23.0
3	R2	621	1.9	621	1.9	0.906	71.2	LOS F	14.2	101.2	1.00	0.94	1.18	22.9
Approach		735	1.9	735	1.9	0.906	71.1	LOS F	14.2	101.2	1.00	0.95	1.18	22.9
East: Sefton Road														
4	L2	612	1.2	612	1.2	*0.721	14.1	LOS A	6.7	47.5	0.67	0.78	0.67	41.6
5	T1	203	1.0	203	1.0	*0.998	100.3	LOS F	9.6	68.1	0.75	1.05	1.62	22.7
Approach		815	1.2	815	1.2	0.998	35.6	LOS C	9.6	68.1	0.69	0.85	0.91	31.3
West: Sefton Road														
11	T1	158	0.7	158	0.7	0.130	9.2	LOS A	2.2	15.2	0.43	0.36	0.43	44.4
12	R2	141	1.5	141	1.5	*0.736	36.6	LOS C	3.1	22.2	1.00	0.85	1.14	25.1
Approach		299	1.1	299	1.1	0.736	22.1	LOS B	3.1	22.2	0.70	0.59	0.76	35.9
All Vehicles		1848	1.4	1848	1.4	0.998	47.5	LOS D	14.2	101.2	0.82	0.85	0.99	27.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Chilvers Road											
P1	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	218.8	217.2	0.99
West: Sefton Road											
P4	Full	53	51.8	LOS E	0.2	0.2	0.95	0.95	214.8	211.9	0.99
All Pedestrians		105	51.8	LOS E	0.2	0.2	0.95	0.95	216.8	214.6	0.99

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Project: P:\P5524 Westleigh Park Traffic Impact and Access Study\Technical\Models\SIDRA\P5524.001S Westleigh Park Traffic Impact and Access Study model_WE.sip9

ATTACHMENT 4 - ITEM 5

PHASING SUMMARY

Site: 14v [Chilvers Road / Sefton Road - Conversion (Site Folder: 2032 Option 2 + Upgrade WE)]

Network: N101 [2032 Option 2 + Upgrade WE (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 115 seconds (Network User-Given Cycle Time)

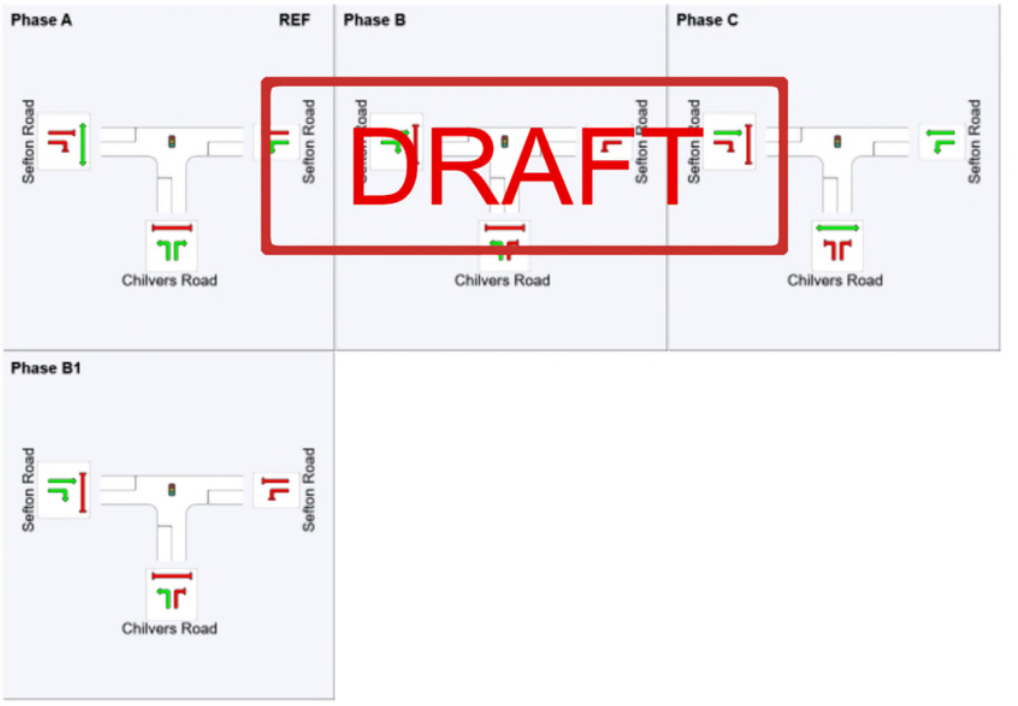
Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Convert Function Default
Reference Phase: Phase A
Input Phase Sequence: A, B, C, B1
Output Phase Sequence: A, B, C, B1

Phase Timing Summary

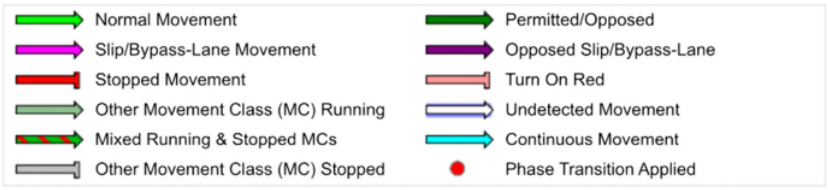
Phase	A	B	C	B1
Phase Change Time (sec)	0	34	49	100
Green Time (sec)	25	6	42	6
Phase Time (sec)	34	15	51	15
Phase Split	30%	13%	44%	13%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



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DRAFT

MOVEMENT SUMMARY

Site: 11 [Duffy Avenue / Pennant Hills Road (Site Folder: 2032 Option 2 + Upgrade WE)]

Network: N101 [2032 Option 2 + Upgrade WE (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Pennant Hills Road.														
1	L2	251	5.5	251	5.5	0.721	24.2	LOS B	19.0	138.4	0.74	0.73	0.74	40.0
2	T1	2132	4.3	2132	4.3	*0.721	18.7	LOS B	20.3	147.2	0.77	0.72	0.77	51.1
Approach		2382	4.5	2382	4.5	0.721	19.3	LOS B	20.3	147.2	0.77	0.72	0.77	50.3
North: Pennant Hills Road.														
8	T1	1936	3.5	1936	3.5	0.456	6.4	LOS A	8.8	63.7	0.42	0.39	0.42	62.4
9	R2	191	5.5	191	5.5	*0.984	100.3	LOS F	9.3	67.9	1.00	1.08	1.70	14.7
Approach		2126	3.7	2126	3.7	0.984	14.8	LOS B	9.3	67.9	0.47	0.45	0.54	54.0
West: Duffy Avenue														
10	L2	201	6.8	201	6.8	0.349	37.7	LOS C	5.5	40.6	0.81	0.78	0.81	30.2
12	R2	236	2.7	236	2.7	*0.776	60.3	LOS E	8.6	61.9	1.00	0.89	1.12	24.5
Approach		437	4.6	437	4.6	0.776	49.9	LOS D	8.6	61.9	0.91	0.84	0.98	26.8
All Vehicles		4945	4.1	4945	4.1	0.984	20.1	LOS B	20.3	147.2	0.65	0.61	0.69	48.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
North: Pennant Hills Road.											
P3	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	228.2	226.1	0.99
West: Duffy Avenue											
P4	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	217.3	211.9	0.98
All Pedestrians		105	54.3	LOS E	0.2	0.2	0.95	0.95	222.7	219.0	0.98

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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ATTACHMENT 4 - ITEM 5

PHASING SUMMARY

Site: 11 [Duffy Avenue / Pennant Hills Road (Site Folder: 2032 Option 2 + Upgrade WE)]

Network: N101 [2032 Option 2 + Upgrade WE (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

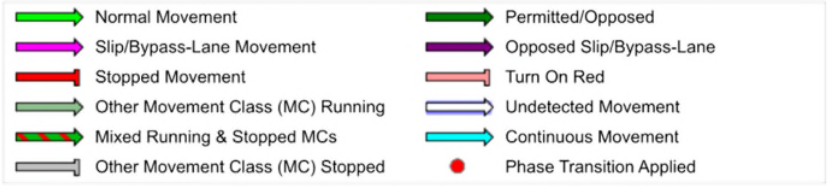
Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	0	75	94
Green Time (sec)	70	13	20
Phase Time (sec)	76	19	25
Phase Split	63%	16%	21%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence

REF: Reference Phase
VAR: Variable Phase



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MOVEMENT SUMMARY

Site: 5 [Duffy Avenue / Quarter Sessions Road (Site Folder: 2032 Option 3 + Upgrade WE)]

Network: N101 [2032 Option 3 + Upgrade WE (Network Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Quarter Sessions Road														
1	L2	45	2.3	45	2.3	0.138	6.6	LOS A	0.4	2.6	0.69	0.66	0.69	37.1
2	T1	34	0.0	34	0.0	0.138	6.2	LOS A	0.4	2.6	0.69	0.66	0.69	37.6
3	R2	27	0.0	27	0.0	0.138	9.4	LOS A	0.4	2.6	0.69	0.66	0.69	34.7
Approach		106	1.0	106	1.0	0.138	7.2	LOS A	0.4	2.6	0.69	0.66	0.69	36.9
East: Duffy Avenue														
4	L2	13	0.0	13	0.0	0.435	3.6	LOS A	1.3	9.2	0.40	0.53	0.40	38.3
5	T1	214	3.9	214	3.9	0.435	3.4	LOS A	1.3	9.2	0.40	0.53	0.40	38.7
6	R2	291	2.9	291	2.9	0.435	6.6	LOS A	1.3	9.2	0.40	0.53	0.40	38.7
Approach		517	3.3	517	3.3	0.435	5.2	LOS A	1.3	9.2	0.40	0.53	0.40	38.7
North: Quarter Sessions Road														
7	L2	252	0.8	252	0.8	0.360	5.3	LOS A	1.0	7.3	0.65	0.64	0.65	35.8
8	T1	61	0.0	61	0.0	0.360	5.0	LOS A	1.0	7.3	0.65	0.64	0.65	38.3
9	R2	11	0.0	11	0.0	0.360	8.2	LOS A	1.0	7.3	0.65	0.64	0.65	38.3
Approach		323	0.7	323	0.7	0.360	5.3	LOS A	1.0	7.3	0.65	0.64	0.65	36.6
West: Duffy Avenue														
10	L2	11	10.0	11	10.0	0.315	5.3	LOS A	0.8	5.9	0.60	0.61	0.60	37.6
11	T1	235	1.3	235	1.3	0.315	5.1	LOS A	0.8	5.9	0.60	0.61	0.60	35.7
12	R2	48	6.5	48	6.5	0.315	8.1	LOS A	0.8	5.9	0.60	0.61	0.60	38.2
Approach		294	2.5	294	2.5	0.315	5.3	LOS A	0.8	5.9	0.60	0.61	0.60	36.4
All Vehicles		1240	2.2	1240	2.2	0.435	5.4	LOS A	1.3	9.2	0.54	0.59	0.54	37.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: 10 [Duffy Avenue / The Esplanade / Chilvers Road (Site Folder: 2032 Option 3 + Upgrade WE)]

Network: N101 [2032 Option 3 + Upgrade WE (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: The Esplanade														
21a	L1	117	0.9	117	0.9	*0.923	64.8	LOS E	24.3	171.9	1.00	1.09	1.27	18.8
22	T1	453	1.6	453	1.6	0.923	60.7	LOS E	24.3	171.9	1.00	1.09	1.27	18.8
23b	R3	73	7.2	73	7.2	0.401	60.4	LOS E	2.5	18.7	0.97	0.77	0.97	19.2
Approach		642	2.1	642	2.1	0.923	61.4	LOS E	24.3	171.9	1.00	1.05	1.23	18.9
East: Duffy Avenue														
4b	L3	106	1.0	106	1.0	0.243	40.3	LOS D	3.1	22.1	0.80	0.76	0.80	29.8
5	T1	241	5.2	241	5.2	0.845	58.0	LOS E	8.9	65.4	0.99	0.95	1.17	14.0
6a	R1	126	2.5	126	2.5	0.621	60.5	LOS E	4.5	32.1	1.00	0.81	1.02	13.8
Approach		474	3.6	474	3.6	0.845	54.7	LOS D	8.9	65.4	0.95	0.87	1.05	18.1
NorthWest: Chilvers Road														
27a	L1	119	2.7	119	2.7	0.504	38.1	LOS D	9.0	64.0	0.85	0.76	0.85	20.4
28	T1	506	0.6	506	0.6	0.504	35.3	LOS D	9.2	64.9	0.87	0.76	0.87	31.5
29b	R3	176	1.8	176	1.8	*0.938	84.4	LOS F	7.8	55.7	1.00	1.07	1.55	11.5
Approach		801	1.2	801	1.2	0.938	46.5	LOS D	9.2	64.9	0.90	0.83	1.02	25.3
West: Duffy Avenue														
10b	L3	193	1.6	193	1.6	0.342	36.7	LOS D	5.1	36.2	0.74	0.78	0.78	32.5
11	T1	260	0.8	260	0.8	*0.954	73.3	LOS E	11.7	82.6	1.00	1.19	1.52	22.6
12a	R1	193	0.0	193	0.0	0.930	78.6	LOS E	8.3	58.1	1.00	1.11	1.49	28.3
Approach		645	0.8	645	0.8	0.954	66.5	LOS E	11.7	82.6	0.94	1.04	1.29	26.9
All Vehicles		2562	1.8	2562	1.8	0.954	56.8	LOS E	24.3	171.9	0.94	0.95	1.15	23.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
SouthEast: The Esplanade											
P5	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	221.3	217.2	0.98
East: Duffy Avenue											
P2	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	219.8	215.2	0.98
NorthWest: Chilvers Road											
P7	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	223.9	220.5	0.98

West: Duffy Avenue											
P4	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	219.8	215.2	0.98
P4B	Slip/ Bypass	53	54.3	LOS E	0.2	0.2	0.95	0.95	211.4	204.3	0.97
All Pedestrians		263	54.3	LOS E	0.2	0.2	0.95	0.95	219.3	214.5	0.98

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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ATTACHMENT 4 - ITEM 5

PHASING SUMMARY

Site: 10 [Duffy Avenue / The Esplanade / Chilvers Road (Site Folder: 2032 Option 3 + Upgrade WE)]

Network: N101 [2032 Option 3 + Upgrade WE (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120 seconds (Network User-Given Cycle Time)

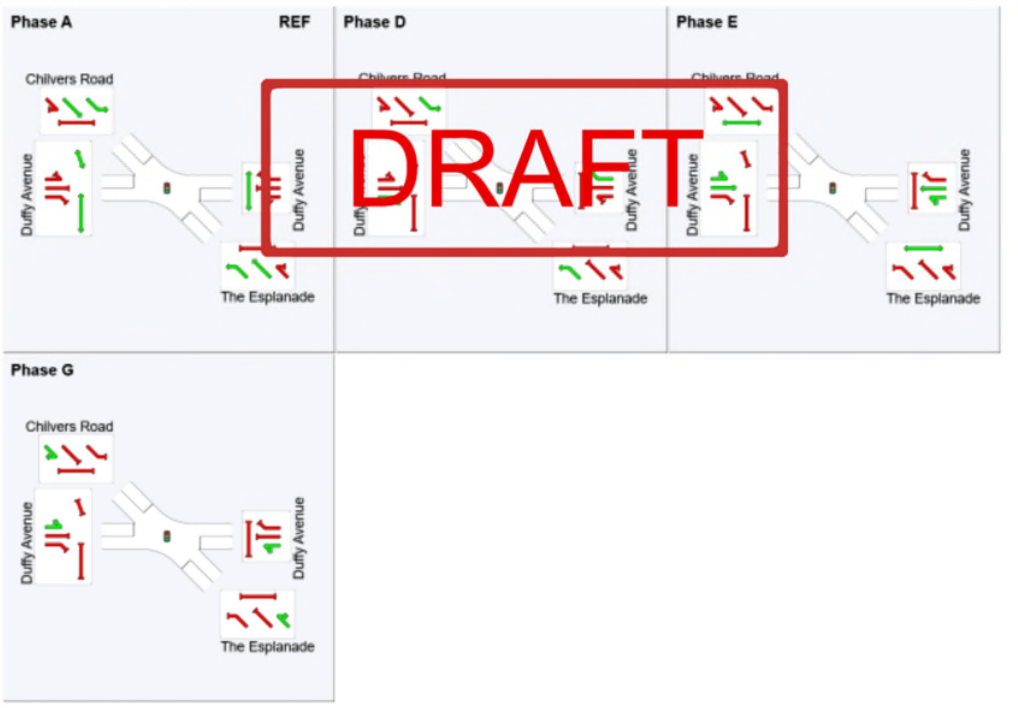
Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, D, E, G
Output Phase Sequence: A, D, E, G

Phase Timing Summary

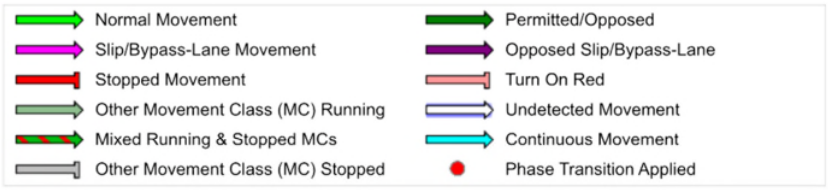
Phase	A	D	E	G
Phase Change Time (sec)	0	47	69	97
Green Time (sec)	38	13	19	14
Phase Time (sec)	47	22	28	23
Phase Split	39%	18%	23%	19%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



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MOVEMENT SUMMARY

Site: 14v [Chilvers Road / Sefton Road - Conversion (Site Folder: 2032 Option 3 + Upgrade WE)]

Network: N101 [2032 Option 3 + Upgrade WE (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Chilvers Road														
1	L2	122	1.7	122	1.7	0.957	82.5	LOS F	16.8	119.5	1.00	1.00	1.29	21.1
3	R2	652	1.8	652	1.8	0.957	83.2	LOS F	16.8	119.5	1.00	1.00	1.29	21.0
Approach		774	1.8	774	1.8	0.957	83.1	LOS F	16.8	119.5	1.00	1.00	1.29	21.0
East: Sefton Road														
4	L2	647	1.1	647	1.1	*0.735	14.0	LOS B	7.3	51.7	0.66	0.79	0.66	41.7
5	T1	203	1.0	203	1.0	*0.998	102.6	LOS F	9.9	69.9	0.73	1.03	1.57	22.4
Approach		851	1.1	851	1.1	0.998	35.2	LOS D	9.9	69.9	0.68	0.84	0.88	31.3
West: Sefton Road														
11	T1	128	0.8	128	0.8	0.105	9.1	LOS A	1.8	12.4	0.42	0.34	0.42	44.5
12	R2	162	1.3	162	1.3	*0.881	46.8	LOS D	4.3	30.4	1.00	0.97	1.38	22.1
Approach		291	1.1	291	1.1	0.881	30.1	LOS C	4.3	30.4	0.74	0.69	0.95	31.9
All Vehicles		1915	1.4	1915	1.4	0.998	53.8	LOS D	16.8	119.5	0.82	0.88	1.06	25.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Chilvers Road											
P1	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	221.3	217.2	0.98
West: Sefton Road											
P4	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	217.3	211.9	0.98
All Pedestrians		105	54.3	LOS E	0.2	0.2	0.95	0.95	219.3	214.6	0.98

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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ATTACHMENT 4 - ITEM 5

PHASING SUMMARY

Site: 14v [Chilvers Road / Sefton Road - Conversion (Site Folder: 2032 Option 3 + Upgrade WE)]

Network: N101 [2032 Option 3 + Upgrade WE (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120 seconds (Network User-Given Cycle Time)

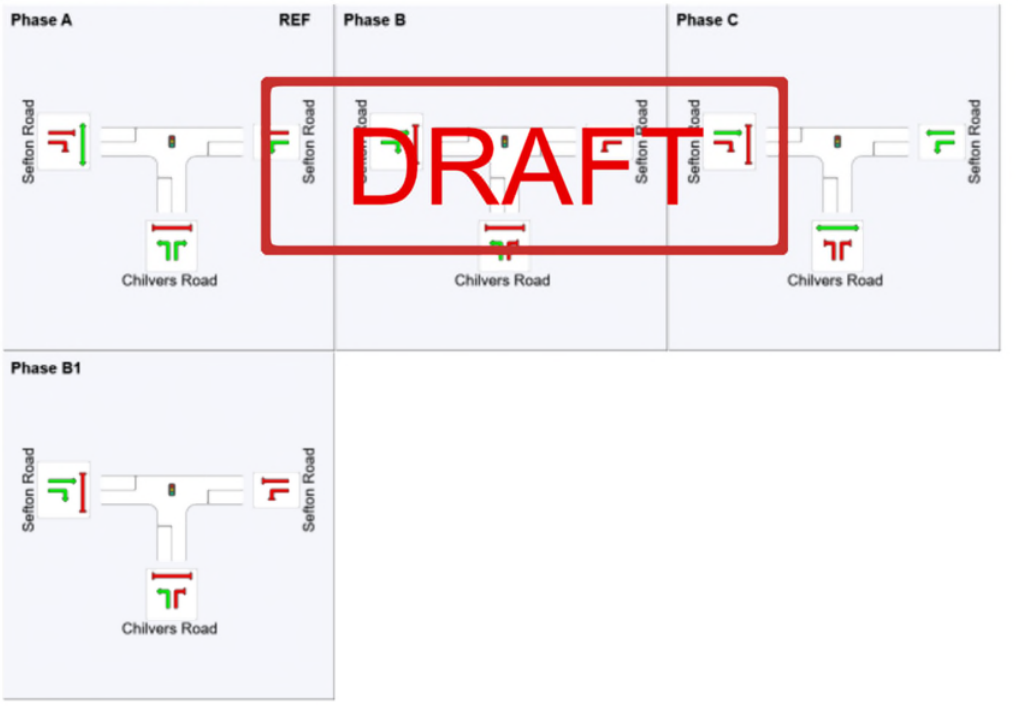
Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Convert Function Default
Reference Phase: Phase A
Input Phase Sequence: A, B, C, B1
Output Phase Sequence: A, B, C, B1

Phase Timing Summary

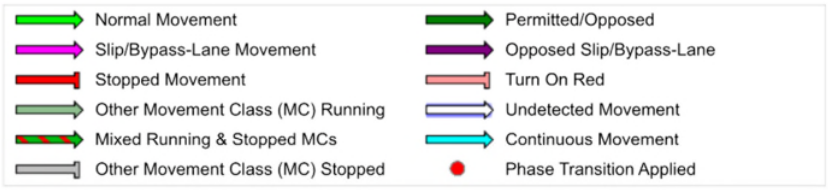
Phase	A	B	C	B1
Phase Change Time (sec)	0	35	50	105
Green Time (sec)	26	6	46	6
Phase Time (sec)	35	15	55	15
Phase Split	29%	13%	46%	13%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



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Project: P:\P5524 Westleigh Park Traffic Impact and Access Study\Technical\Models\SIDRA\P5524.001S Westleigh Park Traffic Impact and Access Study model_WE.sip9

DRAFT

MOVEMENT SUMMARY

Site: 11 [Duffy Avenue / Pennant Hills Road (Site Folder: 2032 Option 3 + Upgrade WE)]

Network: N101 [2032 Option 3 + Upgrade WE (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120 seconds (Network Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Pennant Hills Road.														
1	L2	251	5.5	251	5.5	0.721	24.2	LOS C	19.0	138.4	0.74	0.73	0.74	40.0
2	T1	2132	4.3	2132	4.3	*0.721	18.7	LOS B	20.3	147.2	0.77	0.72	0.77	51.1
Approach		2382	4.5	2382	4.5	0.721	19.3	LOS B	20.3	147.2	0.77	0.72	0.77	50.3
North: Pennant Hills Road.														
8	T1	1936	3.5	1936	3.5	0.456	6.4	LOS A	8.8	63.7	0.42	0.39	0.42	62.4
9	R2	191	5.5	191	5.5	*0.984	100.3	LOS F	9.3	67.9	1.00	1.08	1.70	14.7
Approach		2126	3.7	2126	3.7	0.984	14.8	LOS B	9.3	67.9	0.47	0.45	0.54	54.0
West: Duffy Avenue														
10	L2	201	6.8	201	6.8	0.349	26.1	LOS C	3.9	29.0	0.58	0.71	0.58	34.3
12	R2	237	2.7	237	2.7	*0.780	41.8	LOS D	7.6	54.3	0.91	0.82	0.94	29.0
Approach		438	4.6	438	4.6	0.780	34.6	LOS C	7.6	54.3	0.76	0.77	0.78	31.2
All Vehicles		4946	4.1	4946	4.1	0.984	18.7	LOS B	20.3	147.2	0.64	0.61	0.67	49.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
North: Pennant Hills Road.											
P3	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	228.2	226.1	0.99
West: Duffy Avenue											
P4	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	217.3	211.9	0.98
All Pedestrians		105	54.3	LOS E	0.2	0.2	0.95	0.95	222.7	219.0	0.98

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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ATTACHMENT 4 - ITEM 5

PHASING SUMMARY

Site: 11 [Duffy Avenue / Pennant Hills Road (Site Folder: 2032 Option 3 + Upgrade WE)] **Network: N101 [2032 Option 3 + Upgrade WE (Network Folder: General)]**

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120 seconds (Network Site User-Given Phase Times)

Timings based on settings in the Network Timing dialog
Phase Times specified by the user
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

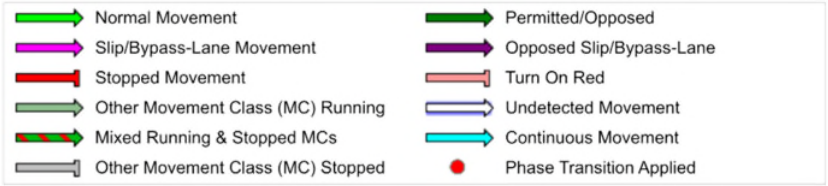
Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	4	79	98
Green Time (sec)	70	13	20
Phase Time (sec)	76	19	25
Phase Split	63%	16%	21%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence

REF: Reference Phase
VAR: Variable Phase



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Access Study model_WE.sip9

DRAFT

MOVEMENT SUMMARY

Site: 5 [Duffy Avenue / Quarter Sessions Road (Site Folder: 2032 Option 3 + Upgrade WE + Park Traffic)]

Network: N101 [2032 Option 3 + Upgrade WE + Park Traffic (Network Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Quarter Sessions Road														
1	L2	45	2.3	45	2.3	0.145	7.1	LOS A	0.4	2.8	0.72	0.68	0.72	36.9
2	T1	34	0.0	34	0.0	0.145	6.7	LOS A	0.4	2.8	0.72	0.68	0.72	37.4
3	R2	27	0.0	27	0.0	0.145	9.9	LOS A	0.4	2.8	0.72	0.68	0.72	34.3
Approach		106	1.0	106	1.0	0.145	7.7	LOS A	0.4	2.8	0.72	0.68	0.72	36.7
East: Duffy Avenue														
4	L2	13	0.0	13	0.0	0.474	3.7	LOS A	1.5	10.6	0.42	0.53	0.42	38.3
5	T1	214	3.9	214	3.9	0.474	3.5	LOS A	1.5	10.6	0.42	0.53	0.42	38.7
6	R2	341	2.5	341	2.5	0.474	6.6	LOS A	1.5	10.6	0.42	0.53	0.42	38.6
Approach		567	3.0	567	3.0	0.474	5.4	LOS A	1.5	10.6	0.42	0.53	0.42	38.6
North: Quarter Sessions Road														
7	L2	302	0.7	302	0.7	0.416	5.4	LOS A	1.3	8.8	0.69	0.66	0.69	35.7
8	T1	61	0.0	61	0.0	0.416	5.1	LOS A	1.3	8.8	0.69	0.66	0.69	38.2
9	R2	11	0.0	11	0.0	0.416	8.3	LOS A	1.3	8.8	0.69	0.66	0.69	38.2
Approach		374	0.6	374	0.6	0.416	5.5	LOS A	1.3	8.8	0.69	0.66	0.69	36.5
West: Duffy Avenue														
10	L2	11	10.0	11	10.0	0.329	5.8	LOS A	0.9	6.3	0.64	0.64	0.64	37.5
11	T1	235	1.3	235	1.3	0.329	5.7	LOS A	0.9	6.3	0.64	0.64	0.64	35.5
12	R2	48	6.5	48	6.5	0.329	8.5	LOS A	0.9	6.3	0.64	0.64	0.64	38.1
Approach		294	2.5	294	2.5	0.329	5.8	LOS A	0.9	6.3	0.64	0.64	0.64	36.3
All Vehicles		1341	2.0	1341	2.0	0.474	5.7	LOS A	1.5	10.6	0.56	0.61	0.56	37.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: 10 [Duffy Avenue / The Esplanade / Chilvers Road (Site Folder: 2032 Option 3 + Upgrade WE + Park Traffic)]

Network: N101 [2032 Option 3 + Upgrade WE + Park Traffic (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated   Cycle Time = 120 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: The Esplanade														
21a	L1	128	0.8	128	0.8	* 0.966	80.4	LOS F	27.8	197.1	1.00	1.19	1.41	16.3
22	T1	453	1.6	453	1.6	0.966	76.3	LOS E	27.8	197.1	1.00	1.19	1.41	16.3
23b	R3	73	7.2	73	7.2	0.374	59.2	LOS E	2.5	18.4	0.96	0.77	0.96	19.4
Approach		654	2.1	654	2.1	0.966	75.2	LOS E	27.8	197.1	1.00	1.14	1.36	16.6
East: Duffy Avenue														
4b	L3	106	1.0	106	1.0	0.265	42.3	LOS D	3.1	21.7	0.76	0.74	0.76	29.3
5	T1	261	4.8	261	4.8	0.923	66.4	LOS E	10.3	75.2	0.99	1.06	1.32	12.7
6a	R1	126	2.5	126	2.5	0.621	60.5	LOS E	4.5	32.1	1.00	0.81	1.02	13.8
Approach		494	3.4	494	3.4	0.923	59.7	LOS E	10.3	75.2	0.94	0.93	1.12	17.0
NorthWest: Chilvers Road														
27a	L1	119	2.7	119	2.7	0.518	39.0	LOS D	9.3	66.0	0.88	0.78	0.88	20.1
28	T1	506	0.6	506	0.6	0.518	36.2	LOS D	9.4	66.1	0.89	0.77	0.89	31.2
29b	R3	195	1.6	195	1.6	* 0.969	93.9	LOS F	9.3	65.8	1.00	1.11	1.64	10.6
Approach		820	1.2	820	1.2	0.969	50.3	LOS D	9.4	66.1	0.92	0.86	1.07	24.2
West: Duffy Avenue														
10b	L3	212	1.5	[illegible]	1.5	[illegible]	36.4	[illegible]	5.6	[illegible]	[illegible]	0.78	0.79	32.6
11	T1	280	0.8	[illegible]	0.8	* [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1.26	1.61	21.1
12a	R1	204	0.0	[illegible]	0.0	[illegible]	96.7	[illegible]	9.9	[illegible]	[illegible]	1.23	1.69	25.7
Approach		696	0.8	[illegible]	0.8	0.986	75.9	LOS E	13.6	95.6	[illegible]	1.11	1.38	25.2
All Vehicles		2663	1.7	2663	1.7	0.986	64.8	LOS E	27.8	197.1	0.95	1.00	1.23	21.6

DRAFT

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
SouthEast: The Esplanade											
P5	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	221.3	217.2	0.98
East: Duffy Avenue											
P2	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	219.8	215.2	0.98
NorthWest: Chilvers Road											
P7	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	223.9	220.5	0.98

West: Duffy Avenue											
P4	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	219.8	215.2	0.98
P4B	Slip/ Bypass	53	54.3	LOS E	0.2	0.2	0.95	0.95	211.4	204.3	0.97
All Pedestrians		263	54.3	LOS E	0.2	0.2	0.95	0.95	219.3	214.5	0.98

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Project: P:\P5524 Westleigh Park Traffic Impact and Access Study\Technical\Models\SIDRA\P5524.001S Westleigh Park Traffic Impact and Access Study model_WE.sip9

ATTACHMENT 4 - ITEM 5

PHASING SUMMARY

Site: 10 [Duffy Avenue / The Esplanade / Chilvers Road (Site Folder: 2032 Option 3 + Upgrade WE + Park Traffic)]

Network: N101 [2032 Option 3 + Upgrade WE + Park Traffic (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120 seconds (Network User-Given Cycle Time)

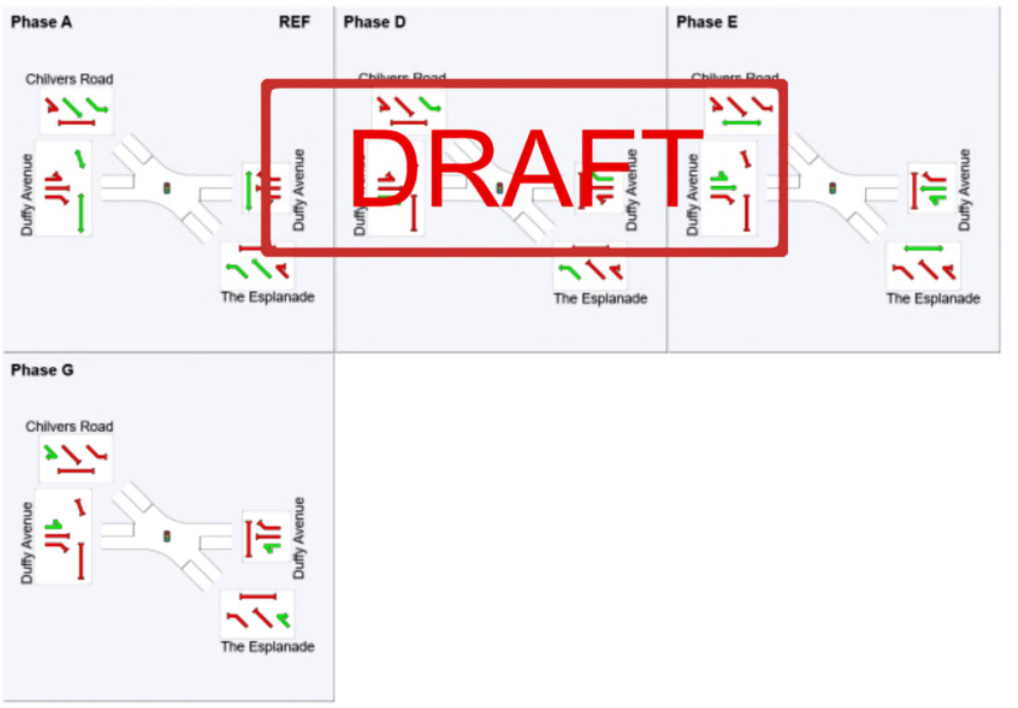
Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, D, E, G
Output Phase Sequence: A, D, E, G

Phase Timing Summary

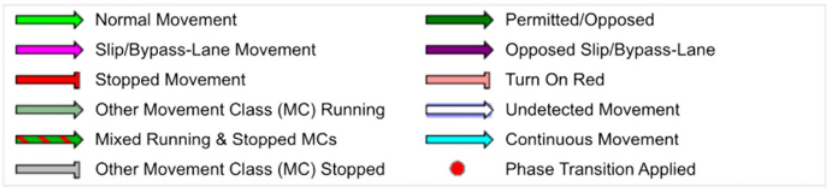
Phase	A	D	E	G
Phase Change Time (sec)	0	46	68	96
Green Time (sec)	37	13	19	15
Phase Time (sec)	46	22	28	24
Phase Split	38%	18%	23%	20%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



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Project: P:\P5524 Westleigh Park Traffic Impact and Access Study\Technical\Models\SIDRA\P5524.001S Westleigh Park Traffic Impact and Access Study model_WE.sip9

ATTACHMENT 4 - ITEM 5

MOVEMENT SUMMARY

Site: 14v [Chilvers Road / Sefton Road - Copy - Conversion (Site Folder: 2032 Option 3 + Upgrade WE + Park Traffic)]

Network: N101 [2032 Option 3 + Upgrade WE + Park Traffic (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Chilvers Road														
1	L2	122	1.7	122	1.7	*0.945	78.2	LOS E	16.8	119.2	1.00	0.98	1.25	21.8
3	R2	671	1.7	671	1.7	0.945	79.5	LOS E	16.8	119.2	1.00	0.98	1.25	21.6
Approach		793	1.7	793	1.7	0.945	79.3	LOS E	16.8	119.2	1.00	0.98	1.25	21.6
East: Sefton Road														
4	L2	666	1.1	666	1.1	0.727	14.2	LOS B	7.6	53.9	0.67	0.79	0.67	41.6
5	T1	169	1.2	169	1.2	*0.949	79.6	LOS E	7.2	50.9	0.73	0.92	1.42	26.0
Approach		836	1.1	836	1.1	0.949	27.4	LOS C	7.6	53.9	0.68	0.82	0.82	34.7
West: Sefton Road														
11	T1	128	0.8	128	0.8	0.106	9.5	LOS A	1.8	12.7	0.43	0.35	0.43	44.3
12	R2	162	1.3	162	1.3	0.881	46.1	LOS D	4.2	30.0	1.00	0.96	1.38	22.3
Approach		291	1.1	291	1.1	0.881	29.9	LOS C	4.2	30.0	0.75	0.69	0.96	32.0
All Vehicles		1919	1.4	1919	1.4	0.949	49.2	LOS D	16.8	119.2	0.82	0.87	1.02	26.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

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Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Chilvers Road											
P1	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	221.3	217.2	0.98
West: Sefton Road											
P4	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	217.3	211.9	0.98
All Pedestrians		105	54.3	LOS E	0.2	0.2	0.95	0.95	219.3	214.6	0.98

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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PHASING SUMMARY

Site: 14v [Chilvers Road / Sefton Road - Copy - Conversion (Site Folder: 2032 Option 3 + Upgrade WE + Park Traffic)]

Network: N101 [2032 Option 3 + Upgrade WE + Park Traffic (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120 seconds (Network User-Given Cycle Time)

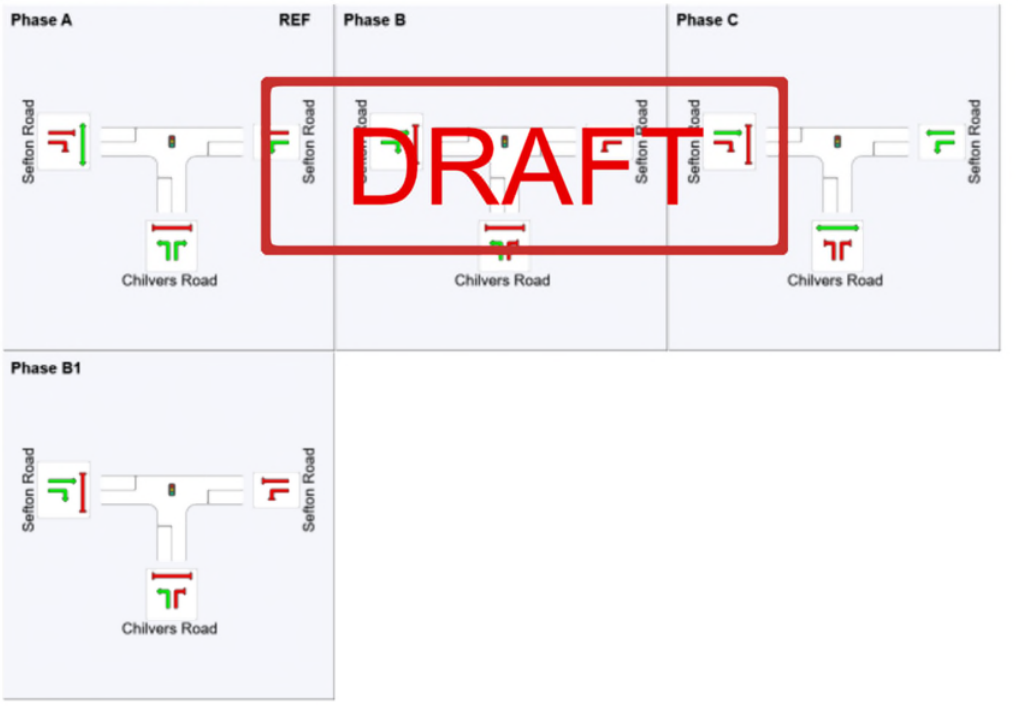
Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Convert Function Default
Reference Phase: Phase A
Input Phase Sequence: A, B, C, B1
Output Phase Sequence: A, B, C, B1

Phase Timing Summary

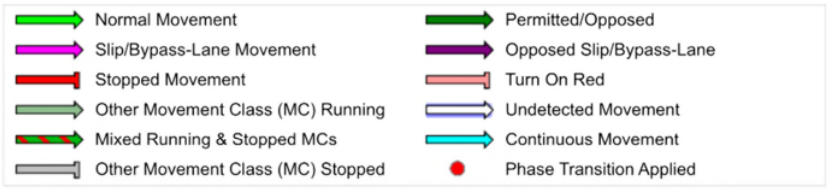
Phase	A	B	C	B1
Phase Change Time (sec)	0	36	51	105
Green Time (sec)	27	6	45	6
Phase Time (sec)	36	15	54	15
Phase Split	30%	13%	45%	13%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



Organisation: TRANSPORT FOR NSW | Licence: NETWORK / Enterprise | Processed: Tuesday, 23 August 2022 2:24:15 PM
Project: P:\P5524 Westleigh Park Traffic Impact and Access Study\Technical\Models\SIDRA\P5524.001S Westleigh Park Traffic Impact and Access Study model_WE.sip9

DRAFT

ATTACHMENT 4 - ITEM 5

MOVEMENT SUMMARY

Site: 11 [Duffy Avenue / Pennant Hills Road (Site Folder: 2032 Option 3 + Upgrade WE + Park Traffic)]

Network: N101 [2032 Option 3 + Upgrade WE + Park Traffic (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Pennant Hills Road.														
1	L2	261	5.2	261	5.2	0.794	29.7	LOS C	21.8	158.7	0.85	0.81	0.85	35.7
2	T1	2132	4.3	2132	4.3	*0.794	23.9	LOS C	23.0	167.1	0.87	0.81	0.87	47.7
Approach		2393	4.4	2393	4.4	0.794	24.5	LOS C	23.0	167.1	0.87	0.81	0.87	46.8
North: Pennant Hills Road.														
8	T1	1936	3.5	1936	3.5	0.467	7.2	LOS A	9.4	67.9	0.45	0.41	0.45	61.5
9	R2	200	5.3	200	5.3	*0.789	65.3	LOS E	7.5	54.8	1.00	0.88	1.16	20.3
Approach		2136	3.6	2136	3.6	0.789	12.7	LOS B	9.4	67.9	0.50	0.45	0.52	55.8
West: Duffy Avenue														
10	L2	211	6.5	211	6.5	0.323	23.9	LOS C	3.9	28.6	0.55	0.70	0.55	35.2
12	R2	247	2.6	247	2.6	*0.775	38.8	LOS D	7.7	54.8	0.88	0.81	0.91	29.9
Approach		458	4.4	458	4.4	0.775	31.9	LOS C	7.7	54.8	0.73	0.76	0.74	32.1
All Vehicles		4986	4.1	4986	4.1	0.794	20.1	LOS C	23.0	167.1	0.70	0.65	0.71	48.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
North: Pennant Hills Road.											
P3	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	228.2	226.1	0.99
West: Duffy Avenue											
P4	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	217.3	211.9	0.98
All Pedestrians		105	54.3	LOS E	0.2	0.2	0.95	0.95	222.7	219.0	0.98

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

Organisation: TRANSPORT FOR NSW | Licence: NETWORK / Enterprise | Processed: Tuesday, 23 August 2022 2:24:15 PM
Project: P:\P5524 Westleigh Park Traffic Impact and Access Study\Technical\Models\SIDRA\P5524.001S Westleigh Park Traffic Impact and Access Study model_WE.sip9

ATTACHMENT 4 - ITEM 5

PHASING SUMMARY

Site: 11 [Duffy Avenue / Pennant Hills Road (Site Folder: 2032 Option 3 + Upgrade WE + Park Traffic)]

Network: N101 [2032 Option 3 + Upgrade WE + Park Traffic (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120 seconds (Network User-Given Cycle Time)

Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

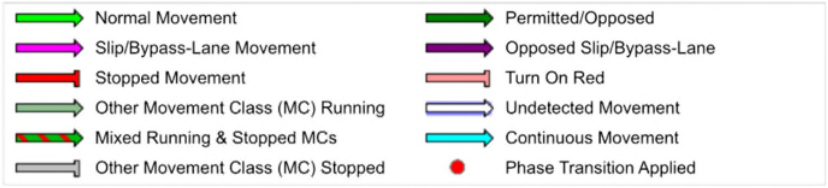
Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	3	73	96
Green Time (sec)	64	17	21
Phase Time (sec)	70	23	27
Phase Split	58%	19%	23%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence

REF: Reference Phase
VAR: Variable Phase



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ITEM 6

ATTACHMENT/S

REPORT NO. IM2/23

ITEM 6

1. HORNSBY PARK MASTER PLAN REPORT

2. HORNSBY PARK CURRENT EARTHWORKS SITE

3. HORNSBY PARK BASE CASE DATED 23 FEBRUARY 2023

4. HORNSBY PARK EMBELLISHMENT STAGE 1 CONCEPT - OMV NORTH

5. HORNSBY PARK OLD MANS VALLEY PLAY

6. HORNSBY PARK EMBELLISHMENT STAGE 1 CONCEPT - SKYWALK

7. HORNSBY PARK CANOPY SKYWALK AND CABLE BRIDGE

8. EVALUATION OF HORNSBY PARK OPTIONS

ATTACHMENT 1 - ITEM 6

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HORNSBY PARK MASTER PLAN REPORT

Hornsby Shire Council
PO Box 37
Hornsby NSW 1630

Prepared by

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Document	Issue	Date	Status	Reviewed	Verified	Validated
S19-0042 R01	A	16/10/2019	Draft	JH	JH	
S19-0042 R01	B	12/11/2019	Draft	JH	JH	
S19-0042 R01	C	08/01/2020	Draft	CL	CL	
S19-0042 R01	D	19/05/2020	Draft	JT	JH	
S19-0042 R01	E	12/06/2020	Final Draft	JT	JH	
S19-0042 R01	F	28/08/2020	Final Draft	JT	JH	CL
S19-0042 R01	G	19/08/2020	Final Draft	JT	JH	CL
S19-0042 R01	H	29/09/2020	Final Draft	JT	JH	CL
S19-0042 R01	I	30/03/2021	Final Draft	JT	JH	CL
S19-0042 R01	J	13/07/2021	Final	JT	JH	CL

Note: this document is preliminary unless validated.

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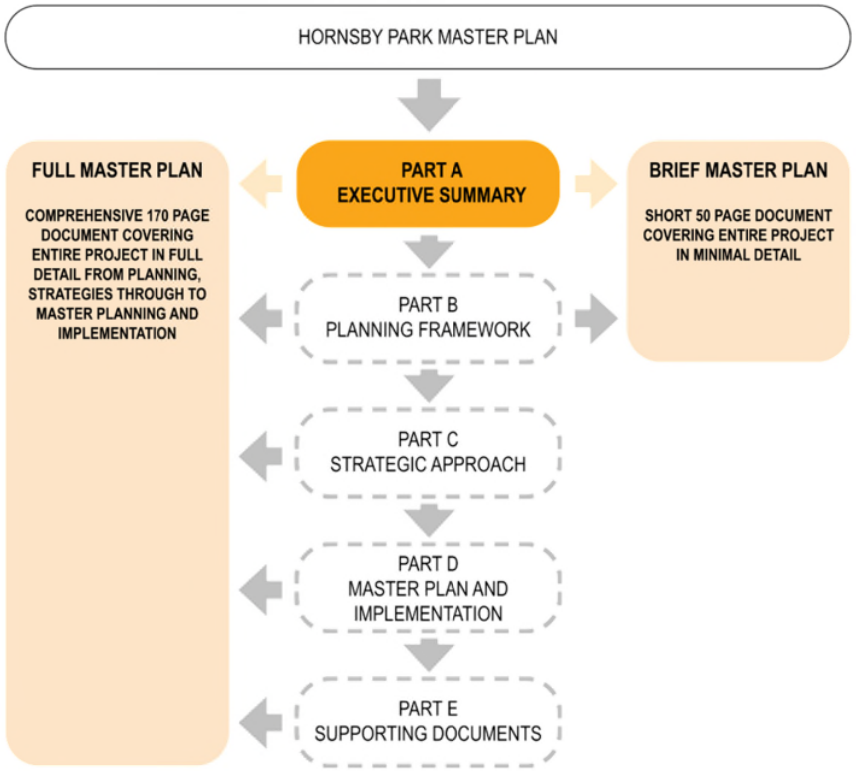

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PART A - EXECUTIVE SUMMARY

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ACKNOWLEDGEMENT OF COUNTRY

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Existing quarry diatreme wall

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"A PARK IS NOT A SINGLE LANDSCAPE"

The many layers of human activity that hallmark the history of the land that will soon form the new Hornsby Park have left an uneven record of evidence in the fabric of today's landscape.

There is archaeological evidence in the landscape of the region as physical cues to Darug and Guringai Peoples custodianship of this land over millennia, but the physical evidence is limited in its visibility.

Remnant traces of early European settlers of the land are also limited, with a hidden cemetery, a pool carved in a sandstone rock and a simple construction under a rock overhang - that was possibly a cool room - being all that is left of the Higgins family's occupation of the land over almost 130 years.

Evidence of the world leading astronomy facility that occupied part of Old Mans Valley for seven years in the 1940s and 1950s is now only to be found in photographs.

In stark contrast, the dramatic intervention of the former Hornsby Quarry, with its geologically significant diatreme exposed for all to marvel at, is the inescapable evidence of this landscape's industrial history.

While the quarry will doubtless prove a major drawcard in the Park's future, the long-term success of Hornsby Park will ultimately be measured by the way in which all the layers of this landscape's rich heritage and natural values are revealed to and experienced by its visitors.

Be it the excitement of a first bushwalk for a young child, the unexpected sighting of a Powerful Owl, the inspiration of an evening stage performance on the floor of the Quarry or the thrill of riding a mountain bike in a bushland setting, each will provide its own storyline.

It seems fitting then, that in this ancient landscape's new phase as a park, it will continue to be appreciated as much in the 'minds and imaginations' of those who visit, as it will by its compelling physical presence.

Existing bushland viewing from Hornsby Aquatic and Leisure Centre

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THE SITE TODAY

The Hornsby Park site is comprised of 59 hectares of bushland and cleared open land with the principal physical features of the site today being comprised of:

- **Extensive Bushland** – the majority of the site is occupied by bushland that connects to the Berowra Valley National Park; the site's bushland also includes the very rare Blue Gum Diatreme Forest, which is listed as a Critically Endangered Ecological Community
- **Old Mans Valley (OMV) -** an area of cleared land accessed immediately to the west of – and some 50 metres below - the Hornsby CBD. This area has direct vehicle access from Peats Ferry Road
- **The Higgins Family Cemetery** – a small heritage-listed cemetery completely surrounded by bushland
- **The Quarry Void** – a large, deep and dramatic open cut disused quarry, the principal feature of which is the geologically significant volcanic diatreme, listed on the Heritage Register of the National Estate
- **The Crusher Plant** – a large industrial structure that is suitable for adaptive recreational re-use within the park.

While the public has been excluded from the majority of the site for reasons of safety - and to permit the recent partial filling of the quarry base to facilitate its future use as a park – there remain tracks within the bushland (including the heritage listed Depression Steps) that have been used for bushland trails, linking Hornsby and the Berowra Valley National Park, as well as a formal Mountain Bike trail network.

GOALS FOR THE FUTURE PARK

Council has committed to developing Hornsby Park as a landmark recreation destination for local residents and the wider Sydney community as well as domestic and 'in-bound' tourists.

In addition to offering an extraordinary bushland experience and a wide range of popular parkland activities, the site lends itself well to hosting local community and regionally attractive events, celebrations and festivals. The quarry and its remnant infrastructure also offer an ideal venue for adventure recreation experiences.

With the prospect of significant future growth in the Hornsby CBD, Hornsby Park will be ideally placed to meet the open space and recreational needs of the current and future population, all within walking distance.

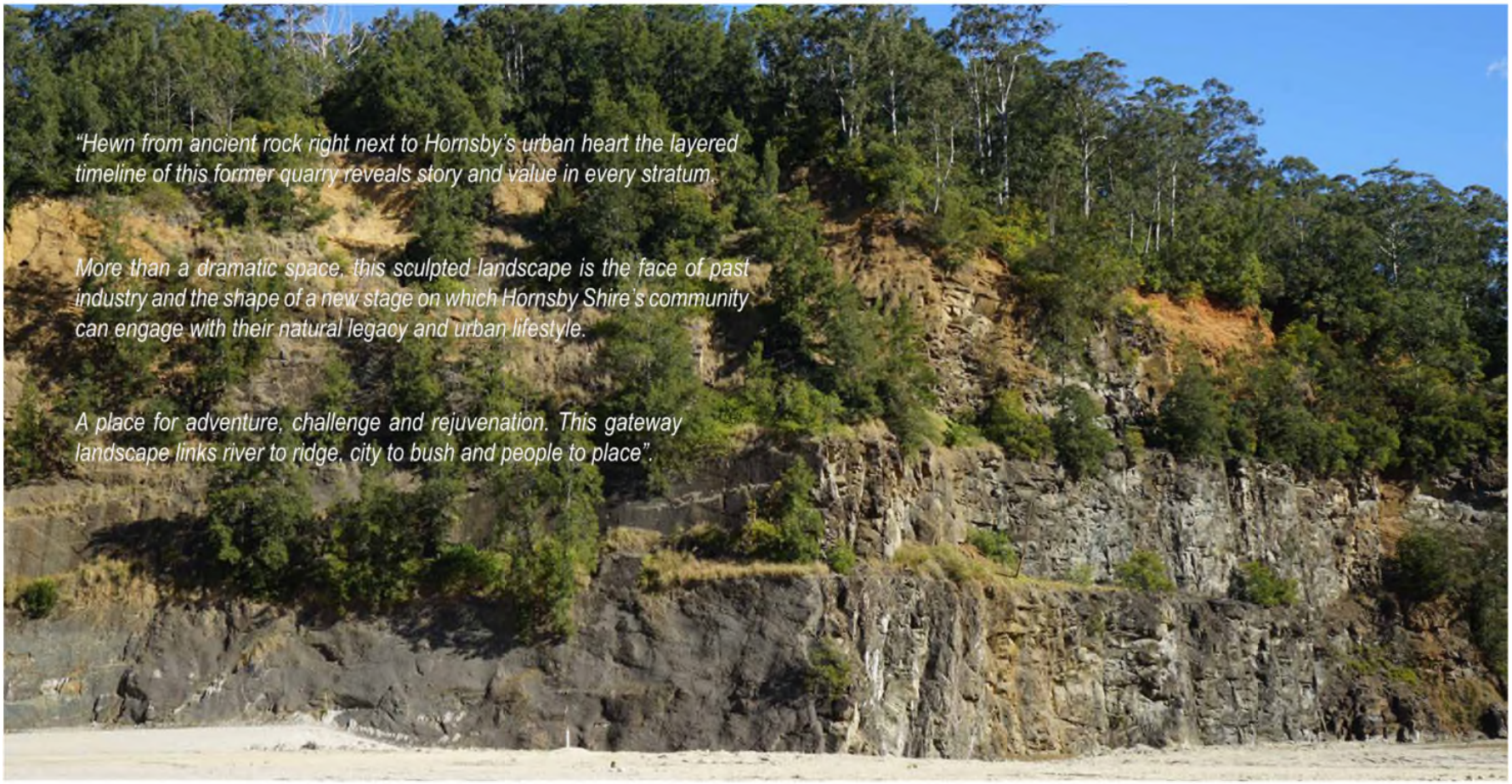
With these current and future demands in mind the design for Hornsby Park will seek to:

- Restore and enhance the unique bushland within the site
- Protect and celebrate its Aboriginal and Non-Aboriginal heritage
- Ensure that the quarry character is retained
- Offer a variety of recreation opportunities including passive, active and adventure recreation
- Provide easy access throughout via a network of walking and bike paths
- Integrate upgraded connections between the park and surrounding area including Hornsby Town Centre, Berowra Valley National Park and local streets and trails
- Cater for the long-term evolution and growth of Hornsby and surrounding communities and populations
- Secure Council's long-term management and maintenance of the park.

Existing Bushland

Existing Quarry Void

Existing Old Mans Valley and Access Road



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VISION AND OBJECTIVES FOR THE PARK

The Vision for Hornsby Park, written and adopted by Council in the early phases of the Park's feasibility testing and concept proofing, is set out on the opposite page.

The Master Plan for the Park is also required to meet four project objectives from the Hornsby Park Plan of Management 2015:

OBJECTIVE 1
Local Living - Hornsby's parkland hub meeting the needs of the current and future local community for recreation, connection to nature and cultural experiences in a bushland setting.

OBJECTIVE 2
Environment and Heritage - Renewing Hornsby's natural systems and connecting community to Hornsby's unique bush character, rich heritage and evolving story.

OBJECTIVE 3
Tourism and Economy - A centre for adventure tourism for the Northern Sydney region, driving local economic development and urban renewal.

OBJECTIVE 4
Return on Investment - Leveraging commercial opportunities that enhance the leisure experience and deliver a financially sustainable community asset.

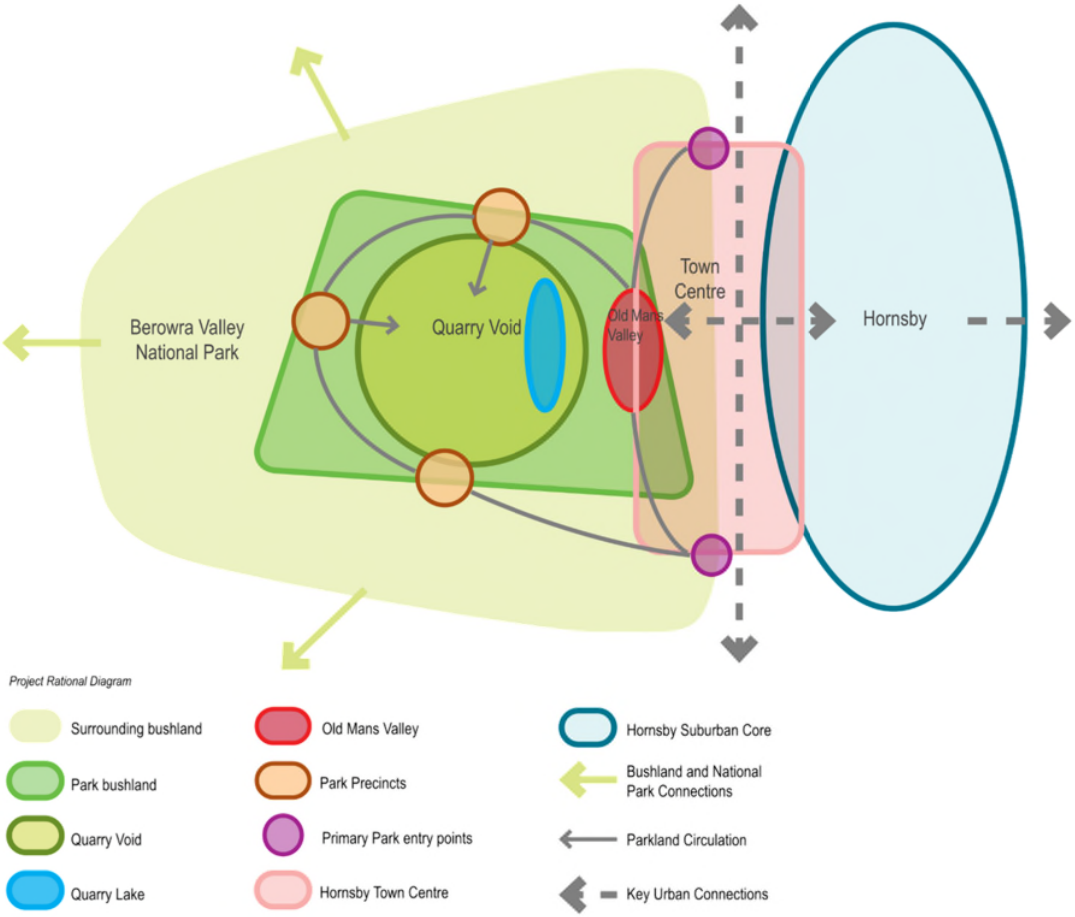
In addition, the following project objectives are incorporated in the Master Plan:

OBJECTIVE 5
Demonstrating Sustainability - Developing robust and 'smart' systems that demonstrate 'sustainability in action' for management of the parkland. Examples may include autonomous electric vehicle transport and renewable energy systems.

OBJECTIVE 6
Inclusive Design/Access for All - Optimising access for all through inclusive design and site sensitive transport modes.

The Master Plan sets out a suite of strategies by which each of these objectives will be implemented.

Existing bushland



THE MASTER PLAN RATIONALE

Hornsby Park offers a unique opportunity for the community to connect with its landscape and heritage right at the heart of the town. This connection – for many perhaps, a reconnection – is illustrated opposite and draws on a number of physical, cultural and perceptual threads:

BRINGING THE BUSH TO THE CITY

For many in the community the bushland that lies to the west of the Hornsby Town Centre and its links to the Berowra Valley National Park has been considered largely inaccessible, principally by virtue of the steepness of its terrain. Hornsby Park will now create a stronger, more accessible and safe connection to its bushland landscape for everyone, from those who may simply want a short walk or a place to relax close to home to those who are seeking adventure or an immersive bushland experience.

REIGNITING HORNSBY'S STORY

Repurposing this quarry site, previously inaccessible to the public, unlocks a key piece in the long narrative of Hornsby's heritage, not only in opening up a landscape of extraordinary geological and ecological significance, but in providing the opportunity to tell the story of this place's millennia-long Aboriginal stewardship and its European settlement and subsequent land uses. The long-term health of the park's natural environment and its embrace of the site's rich heritage will be critical foundations of the park's future success and popularity.

REINFORCING HORNSBY'S IDENTITY

The community of Hornsby has much to be proud of in its history and landscape, so the city-shaping nature, scale and diversity of this new park, which will undoubtedly be a major draw card for district and regional visitation. The park - hidden from view for many decades by its surrounding bushland - will further elevate that sense of the local community's identity with and pride in its town and landscape. Central to this identity will be in ensuring that the park retains its unique landscape values and character; retaining the 'Quarry-ness' of the Quarry Void within its bushland setting will be of particular importance (see opposite).

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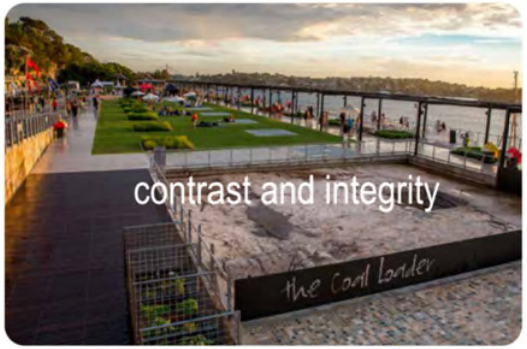

WHAT WE MEAN BY 'QUARRY-NESS'?

'Quarry-ness' encompasses the concept of retaining the character and drama of the quarry's form and experience into the next phases of the site's role as a major regional park. Three elements of the future quarry experience will be core to that appreciation by the visitor:

- **Drama and scale** – ensuring that the full quarried face of each wall remains clearly visible from the rim and the base of the Quarry Void.
- **Contrast and integrity** – retaining a visible distinction between the parts of the quarry that will remain largely undisturbed since quarrying finished and those new works necessary to facilitate safe visitor experiences
- **Promise and reveal** – progressively revealing the Quarry Void with selected vistas on approach before offering a full appreciation of the whole quarry from formal lookouts around its perimeter.

Central to the full experience of these elements of the quarry will be in conserving the unique characteristics of each of the four quarry walls, as outlined in the Master Plan.

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HORNSBY PARK MASTER PLAN - PART A

Legend

- Bushland
- Native trees
- Exotic trees
- Natural turf
- Natural or synthetic turf
- Mass planting
- Playground
- All access separated road
- Managed access shared road
- Paths, tracks and trails
- Raised walkways and structures
- Lift into Quarry Void
- Walls
- Mountain bike tracks
- Quarry faces
- Lake
- Sloped lawn seating
- Canopy Skywalk schematic route joining Hornsby Park, OMV, Crusher Plant. Final alignment to follow principles in Part E.

1:4000 @A3

0 40 80 120 200m

(1) Park vehicle entry from Bridge Road (2) Primary pedestrian entry from Town Centre (3) Park link to Berowra Valley National Park (4) Park Entry Plaza (5) Quarry Void access point and lift (6) Crusher Plant access from Quarry Road (7) Restoration and adaptive reuse of Crusher Plant (8) Minor pedestrian entry from Rosemead Road (9) Key lookouts

OVERALL MASTER PLAN

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THE PARK MASTER PLAN

The Master Plan opposite illustrates the full realisation of Hornsby Park over the long term. The principal features of the Master Plan comprise the following:

- Vehicle access and circulation – private vehicle and coach access to Old Mans Valley from Peats Ferry Road with shuttle bus or similar access from Old Mans Valley to the Quarry Void. Quarry Road would provide vehicle access to the Crusher Plant
- Pedestrian and cycle access – path and stair access from old Hornsby Park to Old Mans Valley (incorporating the Depression Steps) linking to a network of trails connecting to the Quarry Void and the Berowra Valley National Park. The potential for an all-access Canopy Skywalk entry from Hornsby Park along end of the Aquatic Centre to Old Mans Valley would create a dramatic arrival experience
- Bushland Restoration –conservation and comprehensive rehabilitation of the park's bushland to enhance ecological values; this includes relinking fragmented islands of the rare Blue Gum Diatreme Forest
- Old Mans Valley (OMV) – creation of a major arrival hub for the whole park (including car and coach parking, as well as a potential shuttle connection to the quarry) and a venue for passive and active recreation facilities with a strong focus on meeting local community needs (playing fields/event venue, café, picnic area and large play space)
- The Higgins Family Cemetery – restoration of the cemetery with an informal lawn space adjoining and connecting paths to the Quarry Void, OMV and the Crusher Plant
- The Quarry Void – establishment of a major parkland oriented to the eastern diatreme wall and including a sweeping all-access path leading to a large event lawn, a major informal recreation lawn fronting a freshwater lake, a wetlands cascade on the southern perimeter and a lakeside amenities building. A major lift on the quarry's north wall provides pedestrian access to the quarry floor
- The Crusher Plant –adaptive recreational re-use of the building (possibly for adventure recreation) and associated outdoor spaces
- Southwest Precinct – long term potential for a more secluded facility close to the National Park with options for an educational and/or eco sensitive accommodation focus
- Recreation Opportunities – a wide range of passive and active recreation and leisure opportunities across the park including, walking, bushwalking, cycling, field sports, mountain biking, play, picnicking kickabout, water activities, climbing and other vertical adventure sports. Cafés and other visitor facilities and amenities would also be available
- Wayfinding and Interpretation – wayfinding signage and extensive interpretation of the park's environmental and heritage values
- Water Use and Treatment - explore overall water use for the site including water collection for reuse, recycling and irrigation while ensuring the site water circulation, lake water treatment (WSUD, Macrophytes) and creek flow and stormwater infrastructure is managed.

Aerial view of site looking west over OMV, Quarry Void towards Berowra Valley National Park from above Hornsby Town Centre

View of OMV from east looking south over the shared orientation plaza towards the quarry

Legend

- Quarry rockface
- Bushland
- Native trees
- Exotic trees
- Turf
- Mass planting
- Wetland planting and cascading pool
- Lake
- Sloped lake edge
- Viewing outcrop into the lake
- Managed access shared road
- Concrete pathway
- Stone feature pavement
- Raised walkway
- Sandstone / Breccia Gabion walls
- Concrete channels & concrete walls
- Lift shaft
- Concrete stairs
- Mountain bike tracks
- Picnic / Shelter

1:2000 @A3

0 20 40 60 100m

1. Lift connects to RL90 Road, shuttle drop off at RL72 and Quarry Void base
2. Potential adventure recreation on quarry rockface
3. Potential Multiuse Facility
4. Informal amphitheatre seating on turf slope
5. RL 88 bench lookout
6. Amenities building below pedestrian ramp
7. Vehicle access ramp
8. Pedestrian access path
9. Upper lawn terrace
10. Lower lawn terrace
11. Quarry Void arrival plaza
12. RL 72 plaza
13. RL 90 track access to lift and accessible path
14. Play opportunities
15. Raised pedestrian walkway and lookout to Quarry West

QUARRY VOID CONCEPT PLAN

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HORNSBY PARK MASTER PLAN - PART A

OLD MANS VALLEY CONCEPT PLAN

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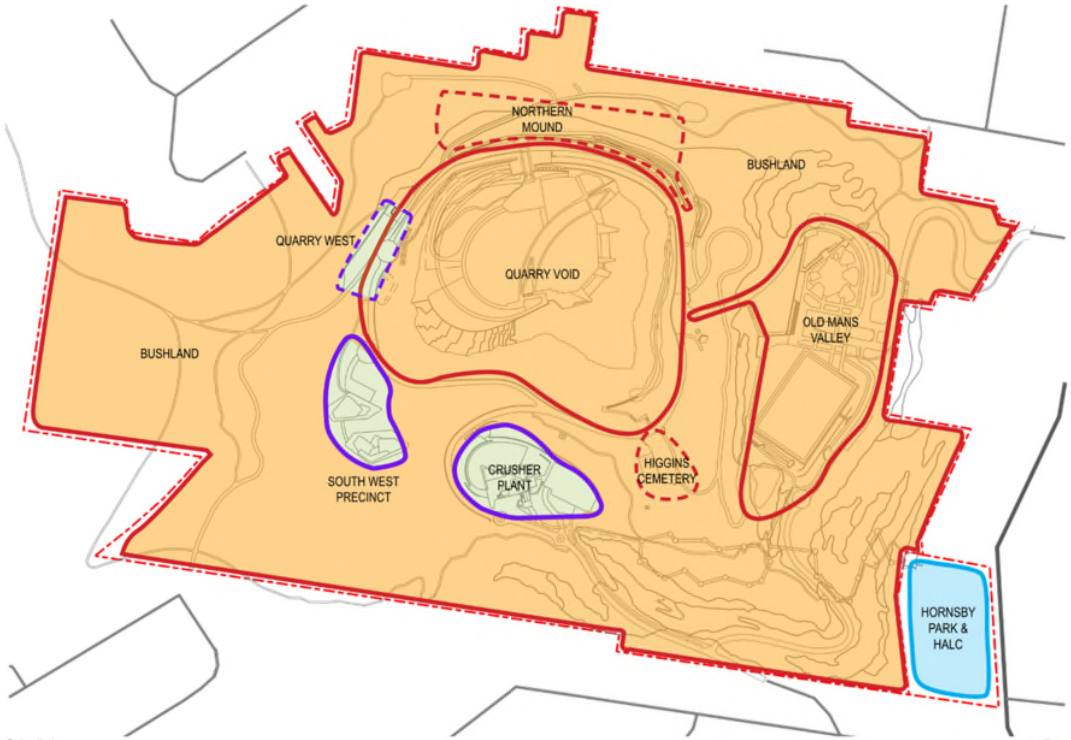
HORNSBY PARK MASTER PLAN - PART A



Notes:
Staging relates to detailed design and documentation of the Master Plan, with delivery of Stage 1 and 2 to be undertaken in sub-stages as project funding becomes available. Stage 1 may be delivered in smaller packages.

The Canopy Skywalk will be considered under Stage 1 Works as this would provide universal access to OMV directly from the town centre, taking significant pressure off vehicle access.

Subsoil plan

1:6000 @A3 0 60 120 180 300m

LEGEND

Stage 1

Major Precincts
PRECINCT A: Old Mans Valley (OMV)
PRECINCT B: Quarry Void
PRECINCT C: Bushland

Minor Precincts
PRECINCT D: Higgins Cemetery
PRECINCT E: Northern Mound

Stage 2

Major Precincts
PRECINCT F: Crusher Plant
PRECINCT G: South West Precinct

Minor Precincts
PRECINCT H: Quarry West

Existing Precincts

Major Precincts
PRECINCT I: Hornsby Park and Hornsby Aquatic and Leisure Centre

STAGING PLAN

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REALISING THE PLAN

Due to the size and scale of the works involved in Hornsby Park will be delivered in two stages over a period of years.

STAGE 1

Precincts that comprise Stage 1 works form the core character and identity of the park and include those works required to deliver visitors safely to most parts of the park.

Stage 1 areas will include bushland restoration across the site, Old Mans Valley and entry, the Quarry Void and associated access paths and roads, Higgins Cemetery and the Northern Mound. Stage 1 may be delivered in smaller packages.

The Park will be functional and viable when the Stage 1 works are completed, however the Stage 2 works are important for the full realisation of the Park's potential.

STAGE 2

The Stage 2 works comprise precincts that either support the Stage 1 precincts or facilities that require a strong existing visitor base that only an established park can generate.

Stage 2 works include the Crusher Plant adaptive-reuse, the Southwest precinct and the Quarry West precinct.

Some of these precincts include opportunities for partnerships between Council and third-party businesses for the activation of the spaces.

The Stage 2 works will ensure the continued long-term financial viability of the park and bring opportunities for new users and visitors to the park.

Existing Quarry Void

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Title

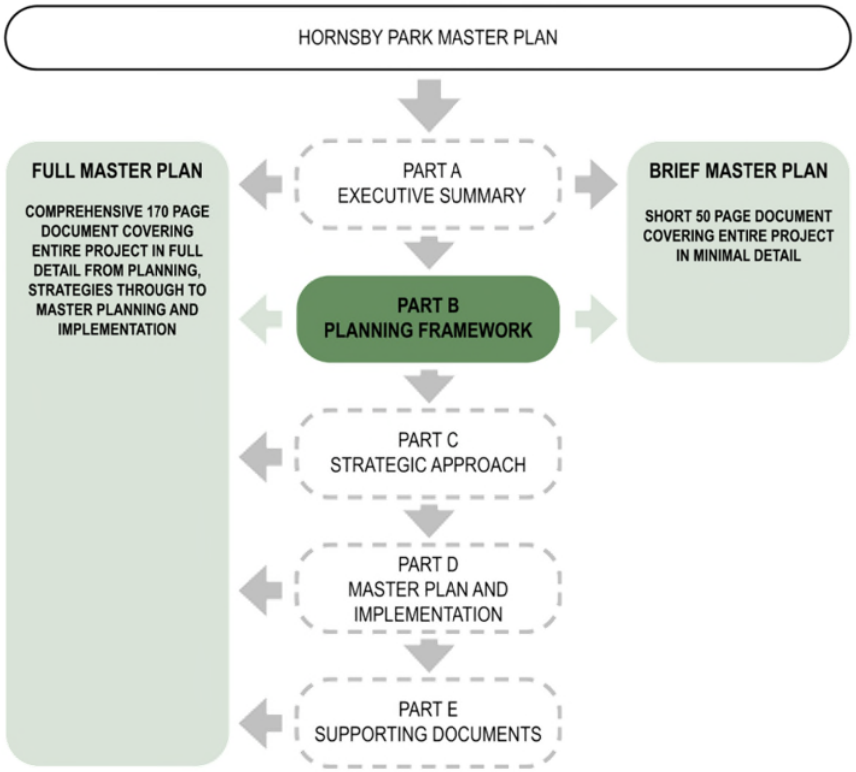

TABLE OF CONTENTS AND REPORT STRUCTURE

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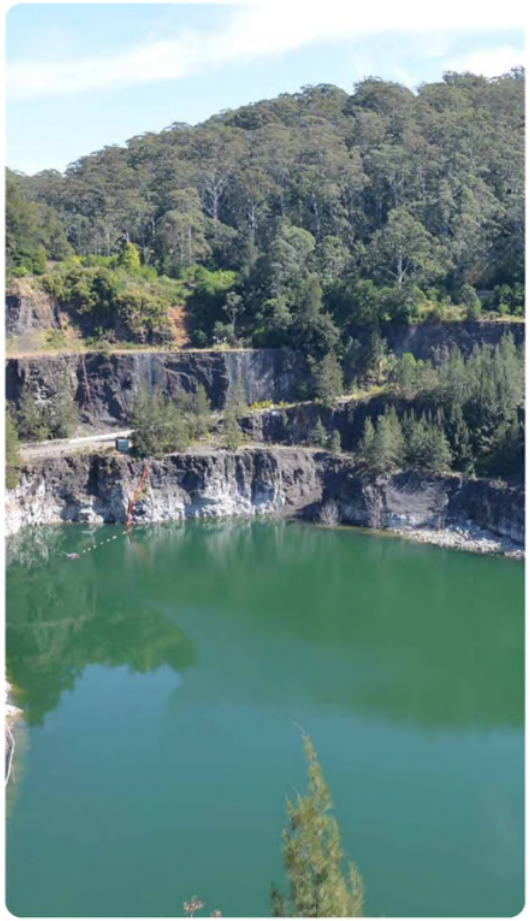


Existing Quarry Walls and Lake

A BRIEF HISTORY OF THE PROJECT

Hornsby Quarry is a former breccia hard rock quarry that was operated by private business from the early 1900s and ceased operation in the late 1990s. In 2002 the site was acquired by Hornsby Shire Council from CSR. The NSW State Government required the Quarry site be zoned as Local Open Space (RE1) under the 2013 LEP as part of the site's acquisition process by Council.

A 2014 Recreation study for the quarry and Old Mans Valley was undertaken to review landform and recreational possibilities for the site. This study indicated that recreation opportunities would be optimised by raising the floor of the Quarry Void, without compromise to the site's heritage, environmental and scenic values. In particular the majority of the quarry's diatreme wall which is of geological significance will remain exposed.

In 2016 the NSW Department of Planning and the Environment approved the delivery of spoil into Hornsby Quarry from the construction of the NorthConnex Tunnel. Fill received from the NorthConnex project is now completed, raising the bottom of the Quarry Void by approximately 50m. Fill was also placed within Old Mans Valley to provide a usable platform for recreation.

This Master Plan provides direction for the future development of the site. Landform, access, environmental and heritage conservation, recreation provision (passive, active and adventure), amenities, commercial opportunities have all been addressed in the Master Plan.

THE FUTURE FOR THE SITE

Hornsby Shire Council has committed to developing the Hornsby Quarry as a landmark attraction for a wide range of local, residential and tourist visitors. The Park will also address the recreational needs of the new and expanded population arising from the Hornsby Town Centre.

In addition to more traditional natural area recreation opportunities such as bush walking and bird watching, there is significant opportunity to consider development of the site for adventure style recreation activities such as 'zip-lines' and other aerial activities, high ropes, luge, abseiling, rock climbing and water-based activities have all been considered.

There is also the option to host community events, celebrations, performance and cultural activities, whilst still providing for local recreation needs.

SIGNIFICANT SITE VALUES AND FEATURES

The principle features of the site may be summarised as follows:

Cultural Heritage
- Aboriginal Heritage
- European Heritage - Higgins Cemetery, Depression Steps, Astronomy etc.

Natural Heritage
- Bushland
- Diatreme wall in Quarry Void

Industrial Heritage
- Quarry Void
- Crusher Plant

Recreation Features
- Bush trails
- Mountain bike tracks
- Scenic views

ATTACHMENT 1 - ITEM 6

Plan of the combined study area indicated by the red outline, including the Hornsby Quarry Acquisition area (green outline), Old Mans Valley lands (yellow outline) and Hornsby Park and other land parcels (in red). Source: Hornsby Park POM (11 Nov 2015).

THE QUARRY TODAY - PROPERTY PARCELS AND LOTS

The Master Plan for Hornsby Quarry Park includes the landscape parcels illustrated and described below :

- Hornsby Quarry: Hornsby Shire Council (HSC) owned Community Land that includes the Quarry Void, south-west fill area, Crusher Plant and Northern mound.
- Old Mans Valley Lands (OMV): Council owned Community Land to the east of the site and is the subject of a recently adopted POM that identifies permissible recreation development.
- Hornsby Park (Crown Land)
- Council Owned Land

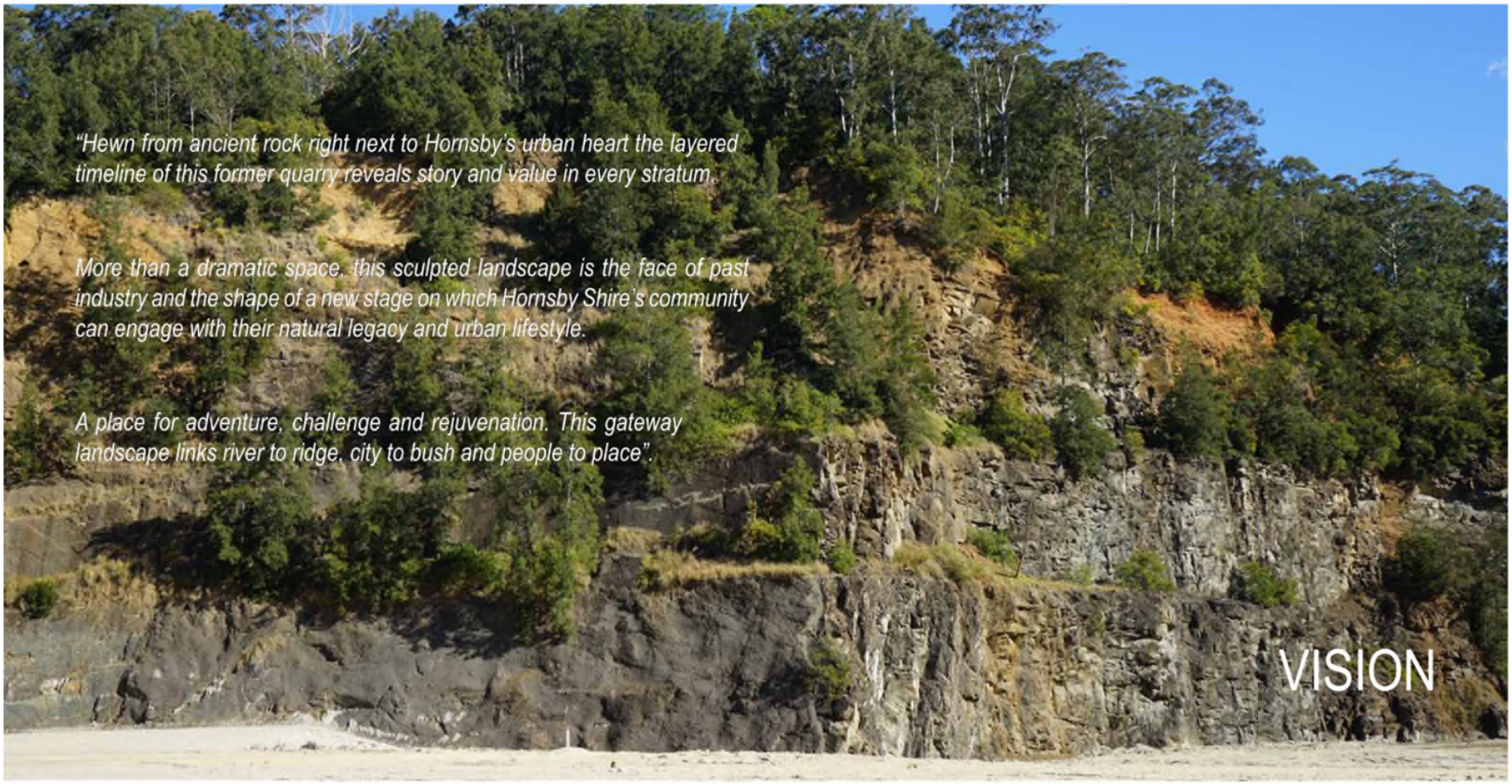
Existing road from Bridge Road to OMV

Existing quarry walls

Existing Crusher Plant

THE SITE TODAY

ATTACHMENT 1 - ITEM 6



ATTACHMENT 1 - ITEM 6

PROJECT DESCRIPTION

The Hornsby Park is comprised of 59 hectares of bushland and cleared open land which has been identified by Hornsby Shire Council for restoration and development as a significant regional park for a range of passive and active recreation activities, located in a natural setting.

Council has committed to developing this site as a landmark recreation destination for local residents, the wider Sydney community and potentially local and 'in-bound' tourists. In addition to offering an extraordinary bushland experience and a wide range of popular parkland activities, the site lends itself well to hosting local community and regionally attractive events, celebrations and festivals. The quarry and its remnant infrastructure also offer an ideal venue for adventure recreation experiences.

The Master Plan will form a core component of forthcoming community engagement activities, a framework for the revision of the Hornsby Park Plan of Management and will lead directly to design development and implementation phases.

VISION AND OBJECTIVES FOR THE PARK

The Vision for Hornsby Park, written and adopted by Council in the early phases of the Park's feasibility testing and concept proofing, is set out on the opposite page.

The Master Plan for the Park is also required to meet four project objectives from the Hornsby Park Plan of Management 2015:

LOCAL LIVING
Hornsby's parkland hub meeting the needs of the current and future local community for recreation, connection to nature and cultural experiences in a bushland setting;

ENVIRONMENT AND HERITAGE
Renewing Hornsby's natural systems and connecting community to Hornsby's unique bush character, rich heritage and evolving story;

TOURISM AND ECONOMY
A centre for adventure tourism for the Northern Sydney region, driving local economic development and urban renewal;

RETURN ON INVESTMENT
Leveraging commercial opportunities that enhance the leisure experience and deliver a financially sustainable community asset;

In addition, the following project objectives are incorporated in the Master Plan:

DEMONSTRATING SUSTAINABILITY
Demonstrating Sustainability - Developing robust and 'smart' systems that demonstrate 'sustainability in action' for management of the parkland. Examples may include autonomous electric vehicle transport and renewable energy systems.

INCLUSIVE DESIGN/ACCESS FOR ALL
Optimising access for all through inclusive design and site sensitive transport modes.

The Master Plan sets out a suite of strategies by which each of these objectives will be implemented.

SCOPE OF THE PROJECT

- Restore and enhance the unique bushland within the site
- Protect and celebrate its Aboriginal and Non-Aboriginal heritage
- Ensure that the quarry character is retained
- Offer a variety of recreation opportunities including passive, active and adventure recreation
- Provide easy access throughout via a network of walking and bike paths
- Integrate upgraded connections between the park and surrounding area including Hornsby Town Centre, Berowra Valley National Park and local streets and trails
- Cater for the long-term evolution and growth of Hornsby and surrounding communities and populations
- Secure Council's long-term management and maintenance of the park.


Local Living


Environment and Heritage

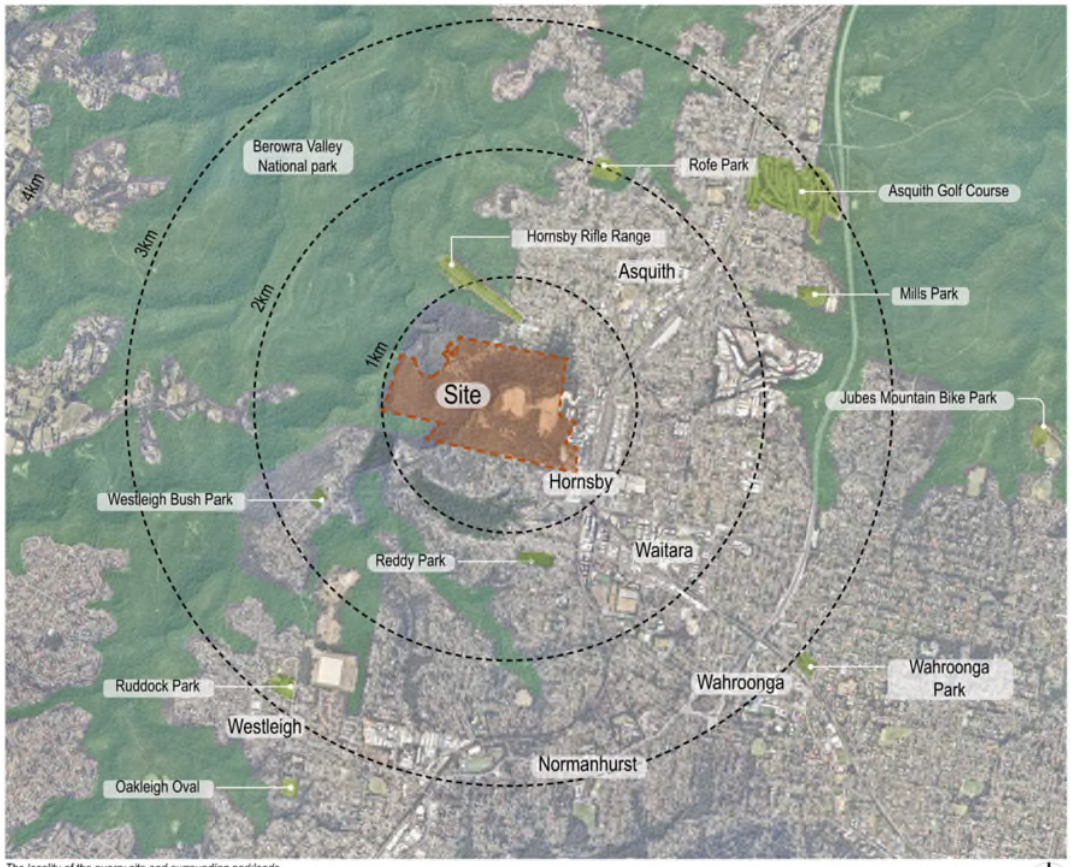

Tourism and Economy


Return on Investment


Demonstrating Sustainability


Inclusive Design/Access for All

ATTACHMENT 1 - ITEM 6



The locality of the quarry site and surrounding parklands

Local Parks | Bushland and National Parks | Hornsby Park Site

THE DISTRICT CONTEXT

Hornsby Park and the former quarry site lie barely half a kilometre from Hornsby Train station. This close proximity to a CBD and major public transport is most unusual for a major post-industrial landscape and consequently offers some unique opportunities in this adaptive re-use as a park.

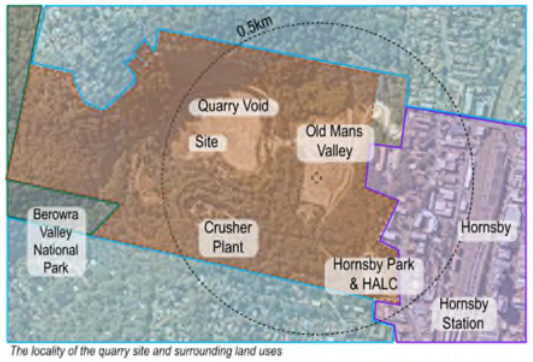
The site forms an easterly extension of the bushland valley that leads to Berowra Creek and Berowra Valley National Park. Falling away from the ridgeline of Hornsby Town Centre

The adjacent plan depicts the public open space in the immediate district and illustrates the pivotal location that the Park will play as a recreational resource for the district, uniting Hornsby Town Centre with natural areas. This map graphically illustrates not only the high level of accessibility that the park will offer to the CBD, but also the scale of the Park itself.

LOCAL CONTEXT

Hornsby Park is bound to the west by Berowra Valley National Park, to the north and south by residential lots and to the east by Hornsby Town Centre. Hornsby Station is to the south east of the Park and the Hornsby Aquatic and Leisure Centre sits on the south eastern corner of the site.

The Park is perfectly located, close to the Town Centre and a major public transport node. Vehicle access to the park is via Bridge Road off Peats Ferry Road, and via Quarry Road. Significant changes in elevation between the site and Town Centre create challenges in providing accessible pedestrian access to the park.



The locality of the quarry site and surrounding land uses

Bushland and National Parks | Residential | Town Centre

CONTEXT

North District Access to Open Space Plan, extracted from Sydney Green Grid North District Spacial Framework and Project Opportunities, 2017

LEGEND

- Motorway
- Roads
- Train Station
- Rail Line
- Strategic Centre
- District Centre
- Local Centre
- Priority Precincts, Priority Growth Areas and Urban Renewal Corridors
- National Parks
- Regional Open Space
- District Open Space
- Local Open Space
- Private Open Space
- Proposed Regional Link

REGIONAL PLANNING CONTEXT

A number of policy and strategic documents at a regional context have a direct bearing on the quarry's future, as briefly outlined below.

A METROPOLIS OF THREE CITIES – THE GREATER SYDNEY REGION PLAN

The Greater Sydney Region Plan sets a 40 year vision (to 2056) and aims to rebalance growth and deliver its benefits more equally and equitably to residents across Greater Sydney. The plan has been prepared concurrently with Future Transport 2056 and the State Infrastructure Strategy, aligning land use, transport and infrastructure planning to reshape Greater Sydney as three unique but connected cities.

Hornsby is covered by the North District Plan, a guide for implementing the Greater Sydney Region Plan at a district level and a bridge between regional and local planning. The plan identifies a number of land use and transport-related strategic directions and policy settings that are of particular relevance to the future of Hornsby (identified as a Strategic Centre) including:

- Sustaining local centres to provide jobs, services and amenity
- Creating and renewing great places while protecting heritage and local character and improving places for people
- Improving walking and safe cycling ways
- Enhancing the quality and improving access to open space, and increasing urban tree canopy
- Protecting and enhancing the District's unique natural assets including waterways, coastlines and bushland
- Providing fast and efficient transport connections to achieve a 30 minute city
- Improving liveability by creating connected, accessible and culturally rich public places and open spaces
- Enhancing natural biodiversity and important ecological communities such as the Blue Gum High Forest
- Complimenting scenic and cultural landscapes to encourage an appreciation of the natural environment, protecting heritage and culture and creating economic opportunities, particularly for recreation and tourism.

THE SYDNEY GREEN GRID

The Sydney Green Grid was published in 2017 by the Government Architect's office of NSW (GANSW) to document the network of natural corridors (coastal foreshore, rivers, creeks and bush land) and built form corridors (rail, road, canal, service infrastructure) that should also serve as recreational corridors for walking and cycling. The three aims of the Sydney Green Grid are to:

- Conserve, improve and expand Sydney's strategic network of open spaces
- Reinforce a sense of place within Sydney's subregions
- Safeguard and plan the green infrastructure of Sydney.

The relevant section of the Green Grid (North District) and key opportunities relating to Hornsby identified in the report include:

- Link Hornsby to Berowra Valley through Hornsby Quarry - investigate Hornsby Quarry site and Old Mans Valley as regional open space destinations
- Connect railway stations along Northern Rail line and key town centres with the Great North Walk
- Connect Hornsby Town Centre and Mall with the Berowra Valley. Improve signage, quality of walking trails and links from Hornsby Park
- The Great North Walk: Access from Hornsby Town Centre to surrounding bushland assets should be improved

'GREENER PLACES' - GREEN INFRASTRUCTURE POLICY

The recently released draft policy document Greener Places (GANSW 2018) outlines the essential role of Green Infrastructure in the delivery of sustainable landscapes and communities. Greener Places proposes a design approach for urban environments that promotes nature as a key driver and the policy cites four core principles in realising that objective:

- *Integration*: combine Green Infrastructure with urban development and grey infrastructure
- *Connectivity*: create an interconnected network of open space
- *Multi-functionality*: deliver multiple ecosystem services simultaneously
- *Participation*: involve stakeholders in development and implementation.

LOCAL PLANNING CONTEXT

Two strategic documents at a local level are central to this Master Plan.

YOUR VISION YOUR FUTURE 2028 - HORNSBY SHIRE COMMUNITY STRATEGIC PLAN 2018-2028

The Your Vision Your Future sets the vision for where the people of Hornsby Shire want to be in 2028 and identifies the community's main priorities and aspirations for the future. It is a 10-year vision developed collaboratively between the community and Council. The document is aligned with the North City District Plan from the Greater Sydney Region Plan.

Your Vision Your Future outlines four key themes; 'liveable', 'sustainable', 'productive' and 'collaborative' from which a number of principles and goals are described. The principles relevant to Hornsby Quarry include;

- Infrastructure meeting the communities needs - access to bushland areas, parks, green space and sporting facilities
- Local surroundings are protected and enhanced - protect threatened plants and animal species, protect waterways and the natural environment
- Support of recycling and sustainability initiatives - reducing water consumption and greenhouse emissions, supporting recycling and sustainable initiatives
- Increasing the prosperity of the Shire - adequate public transport and adequate parking facilities in public areas.

ACTIVE LIVING HORNSBY STRATEGY

This strategic framework guides and manages future open space and recreation planning for Hornsby Shire. The strategy is developed to assess current open space types and distributions to help identify opportunities to support the transition of growth precincts from medium to high densities. Key strategies proposed include:

- Drawing on the Shire's unique environment - conservation and integration of the natural environment into all aspects of planning and design for the public realm
- Making the open space network part of daily life - easy to access integrated public realm that forms part of daily life, supporting social engagement
- Responding to the shire's diverse lifestyles - best practice public realm planning to all sectors of the community and environment
- Promoting and supporting cycling and walking - providing supportive environments for walking and cycling within a residents' immediate locality
- Adapting to a changing sports environment - providing better integration of structured and unstructured recreation with multi-use flexibility and co-operative regional planning.

OTHER RELEVANT PLANNING DOCS

Other relevant local planning documents relevant to Hornsby Park include:

- Biodiversity Conservation Strategy
- Sustainable Hornsby 2040 Strategy
- Hornsby Play Plan;
- Hornsby Sportsground Strategy
- Hornsby Park Plan of Management

ATTACHMENT 1 - ITEM 6

Existing Crusher Plant

OVERVIEW

The dramatic physical form of the Hornsby Quarry offers unique opportunities for adaptive reuse as a public park; however, that same geography also presents significant constraints in realising those opportunities. The landscape analysis below describes and illustrates the opportunities and constraints under the following headings:

URBAN SETTING
Addressing the site's surroundings and landuse relationships.

TOPOGRAPHY, GEOLOGY AND HYDROLOGY
Evaluating the complex landform and hydrology of the site.

NATURAL ENVIRONMENT
Establishing existing natural values and evaluating how these can be conserved and enhanced in the Park's future development.

CULTURAL HERITAGE
Recognising the site's significant cultural and geological heritage and how this can be protected and interpreted.

RECREATION AND LEISURE
Outlining constraints and opportunities in delivering a wide range of recreation opportunities.

ACCESS AND CIRCULATION
Evaluating access to and within the site including walking, cycling, private and public vehicle transport.

CHARACTER AND IDENTITY
Addressing the need to maintain the quarry's unique scenic qualities.

AMENITY AND SAFETY
Establishing opportunities for ensuring public safety and enjoyment.

MANAGEMENT AND MAINTENANCE
Outlining the likely implications and requirements for managing and maintaining the park.

ATTACHMENT 1 - ITEM 6

Local Context Opportunities and Constraints Plan (nearmap 2015, not to scale) showing proximity to Hornsby train station and CBD.

LEGEND

- Local Road
- Hornsby CBD
- Railway Corridor
- Bus Route
- 1km radius
- Rail Station
- Site
- Local Open Spaces
- National Parks

LOCAL CONTEXT

CURRENT STATUS

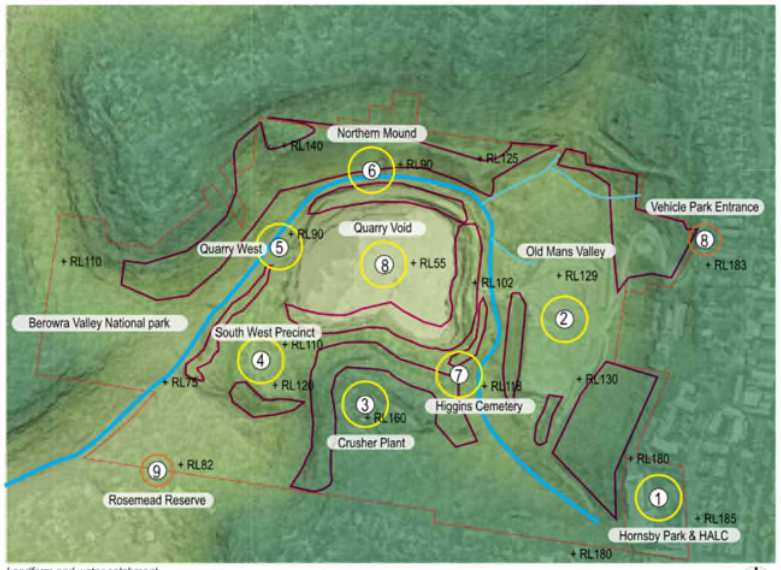
Hornsby Park is 59 hectares in size and is located approximately 500m from the Hornsby CBD. The site is zoned RE1 Public Recreation and is bounded to the north and south by low density residential and to the west by Berowra Valley National Park. The eastern edge faces the CBD and offers direct integration with the CBD via existing access points. The CBD includes train and bus services for potential visitors to the site. The Hornsby Town Centre has a population of approximately 500 people which is planned to increase by as much an additional 7,000 by 2036.

OPPORTUNITIES

- Proximity: Exploit the site's close proximity (less than 1km distance or 10 minute walk from the centre of Hornsby's CBD) to create a regional destination within walking distance for residents, workers and visitors to Hornsby
- Zoning: Consider the site's zoning to locate opportunities for public recreation such as passive, active and adventure play that benefit the surrounding community and offer attractions at a regional scale
- Public Transport: Rail and Bus opportunities are found within easy walking distance of the site. Hornsby Station (700m) is a key station on the Sydney Trains network and Peats Ferry Road (100m) is a significant corridor in the Bus network
- Road: Utilise the Bridge Road vehicle access provided as part of recent NorthConnex works as main vehicle access to Old Man's Valley and rest of the site from Peats Ferry Road
- National Park: Review the potential of western edge of the site connection into the Berowra Valley National Park, which has the opportunity to physically connect to the Hawkesbury River and into the vast trail network including the Great North Walk
- Open Space: Consider connections into existing and future open spaces such as Westleigh Park and walking and mountain bike trails, integrate the park into an existing network of users and visitors
- Trails: Review potential access points from surrounding local streets into the site to provide a number of minor entries to improve permeability of the site
- Bushland: Hornsby is known across Sydney for its extensive bushland. Explore opportunities to restore the bushland and create more accessible links to the town
- Recreation: Meet passive and active recreational needs of the expanded Hornsby Town Centre population.

CONSTRAINTS

- Gradients: The site varies over a 130 metre level difference between the main entry to the site and base of the Quarry. The sheer difference in height between the various existing features of the site poses a considerable challenge for accessible access grades
- Road and Rail Crossings: Peats Ferry Road is a major local road with moderate to high traffic volumes. Providing safe, easy and regular access across the road will be a challenge
- Visibility: The quarry is not a widely known place. Those without direct involvement or history to the site are largely unaware that it exists - it is not readily visible from anywhere on its CBD boundary, nor are the entries highly visible.



Landform and water catchment

LEGEND

Areas of significant gradients
Existing main creek line
Existing minor creek line
Precincts
Park entries
Site Boundary

Topography by Sector

The levels change from the Hornsby CBD to the National Park are significant with an overall drop of 130m between the Hornsby Rail Station and the lowest point on the site. The existing transitions can be broken down into the following sectors:

1-2	Hornsby Park & HALC to OMV	51m
2-7	OMV to Higgins Cemetery	11m
3-2	Crusher Plant to OMV	31m
3-4	Crusher Plant to Southwest Precinct	50m
4-5	South West Precinct to Quarry West	20m
2-6	OMV to Northern Mound	85m
2-8	OMV to Quarry Void	74m
6-8	Northern Mound to Quarry Void	17m
5-6	Quarry West to Northern Mound	50m
9-5	Rosemead Reserve to Quarry West	8m
1-8	Hornsby Town Centre to Quarry Void	130m

Height
0.000
20.200
40.400
60.600
80.800
101.000
121.200
141.400
161.600
181.800
202.000

TOPOGRAPHY, GEOLOGY AND HYDROLOGY

CURRENT STATUS

Hornsby Park is a complex landscape. Quarry operations resulted in the creation of a 130 metre deep pit in the middle of the site. Exposed rock walls are a key feature of the site, in particular the Diatreme wall is unique in Sydney for its geological heritage. Spoil from the quarry operations poses an ongoing risk along the Northern Mound of the quarry that is being actively managed. The quarry is naturally charged via ground water while a series of engineered structures ensure stormwater is diverted around the site before connecting into the natural waterway network.

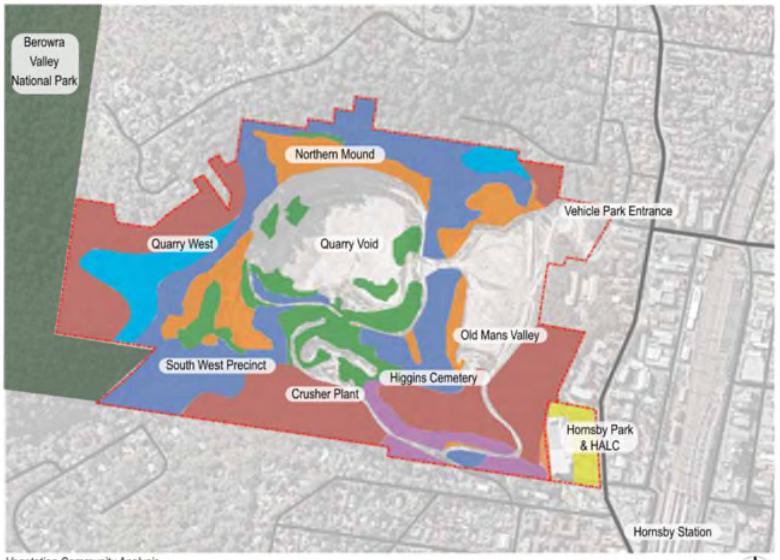
OPPORTUNITIES

- Gradients: Opportunity to make use of steep gradients to promote the unique nature and story of the site. Lookouts, switch backs, terracing, framed views are some of the potential ways to highlight the dramatic form of the site.
- Lookouts: Opportunity for a series of lookouts and viewpoints to maximise the topography of the site. Lookouts must not negatively impact the features or experience of the site such as the quarry walls
- Quarry Walls: Consider the uniqueness of the quarry walls and the opportunities such features bring to a regional parkland.
- Rock: Highlight the nature of the different types and formations of rock found within the site, especially the eastern Diatreme face. Explore opportunities to tie the required engineering solutions to the story of the geology. Adventure recreation such as climbing may offer opportunities to highlight rock forms
- Soil: Draw attention to the link between the geology, soil and rare ecological communities found on Diatreme formations
- Natural Water Recharge: Opportunity to take advantage of the natural ground water recharge in the Quarry Void to provide recreation opportunities, biodiversity, microclimates, water storage and reuse
- Stormwater: Review existing stormwater management systems within the site and link into interpretation strategy of the park.

CONSTRAINTS

- Gradients: The quarrying process has resulted in areas with extreme gradients from 1:2 slopes to vertical rock faces. Coupled with the materiality of the fill and nature of the extraction process some of these surfaces are unstable and require specific geotechnical solutions
- Stability: All quarried faces and spoil mounds require some form of remediation, ranging from minor through to significant and intensive intervention. Engineered solutions are required, the extent and materiality of which should be consistent and contextual to a parkland setting
- Quarry Spoil and Fill: The original spoil mounds are expected to be of low quality and their reusable volume will not be known until the recovery process is underway. Designs should be flexible within clear strategic principles to meet a range of fill volumes. Fill from the NorthConnex project is of a very high quality and should have priority of reuse
- Altered Landform: The altered landform of the site is obviously not a natural formation. The contrast between the natural setting of the site, quarry impacts and proposed parkland needs to be managed to ensure a balanced result.

Note:
A more detailed description the site's topography, geology and hydrology can be found in Part E - Supporting Document.



Vegetation Community Analysis

LEGEND

- Existing Blue Gum Diatreme Forest (Good-High)
- Existing Blue Gum Diatreme Forest (Good-Medium)
- National Park
- Existing Blackbutt Gully Forest (Good-High)
- Existing Blackbutt Gully Forest (Good-Poor)
- Formal Park Planting
- Existing Native Rehabilitation / Regeneration
- Existing Exotic Vegetation

Blackbutt Gully Forest found on site

Note: A more detailed description of the site ecology and natural environment can be found in Part E - Supporting Document.

NATURAL ENVIRONMENT AND HERITAGE

CURRENT STATUS

Hornsby Park contains examples of Blue Gum Diatreme Forest, a sub community of the Blue Gum High Forest, which is listed as an Critically Endangered Ecological Community. It is an extremely rare ecological community, which is only found in landscapes with the specific diatreme geology which generated the original quarry. Remnant and regrowth of this ecological community can be found throughout the park, especially the western edge. Blackbutt Gully Forest is also found throughout the site, predominantly in the southern and eastern areas of the site. This community is quite frequented in nature. Much of the other existing vegetation found on site has evolved from native regrowth (not necessarily endemic species) and exotic vegetation (weed regrowth). The Site supports a diverse range of native Fauna. A total of 53 species have been detected from 4 fauna surveys over several years.

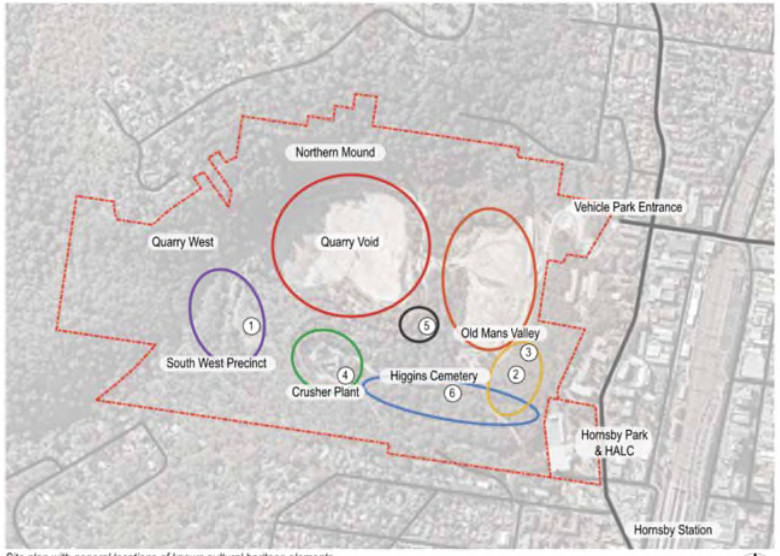
Of note, the presence of a pair of Powerful Owls (Ninox strenua) has been confirmed within the site. These birds roost, forage and nest in tree hollows and have successfully raised young on site. The north, north-east and western areas of the Site constitute important habitat for this threatened species. The Powerful Owl is known to be sensitive to disturbance.

OPPORTUNITIES

- Bushland: Possibilities of reviewing existing ecological communities and looking for opportunities to expand and reconnect the fragmented bushland of the site. Hornsby is known for its bushland and the site should aim to be a benchmark project in bushland recovery and enhancement
- Ecological Communities: The site contains remnants of two ecological communities, both of which have been impacted by the quarry and filling processes. Explore opportunities to restore and expand these communities
- Solar Access: Possibilities of reviewing existing site conditions to locate areas of good and poor solar access. Proposed planting, land use, and amenities should be located to take advantage of the solar conditions
- Restoration: The Vegetation Management Plan (VMP) and Habitat Creation and Enhancement Plan provides valuable guidance to ensure restoration, habitat enhancement and revegetation of the site is to the highest standards
- National Park: Opportunities to connect habitat into the existing intact environment within the Berowra Valley National Park. Fauna within the site will benefit from a continuous connection into the expansive bushland of the Berowra Valley National Park
- Learning: Rare ecological communities and extensive revegetation offer opportunities for long term study of the natural environment; making the bush a key feature of the park matches wider community expectations of the Hornsby area
- Sustainability: Opportunities for sustainable initiatives within the park. Opportunities such as the use of electric vehicles, cycles, power generation, heat mitigation, carbon neutrality, regenerative landscapes and water harvesting are all elements in which the development of the park can be shown to be a market leading example.

CONSTRAINTS

- Weeds: Areas of extensive weed infestation need to be managed and removed. In many areas, weed growth coincides with exceptionally difficult access and will require specific procedures that meet safe work standards. In addition as per the VMP weed removal will require careful planning to avoid undue fauna impacts as many species rely on the weedy forest understory structure
- Existing Vegetation Condition: Small areas of the existing bushland are of high quality. Restoring medium and poor quality bushland will be an ongoing priority to increase the extent of high quality bushland within the site
- Extent of Native Vegetation: Natural Regrowth of native vegetation into areas of low geological stability has resulted in situations where high quality vegetation may need to be removed for slope stability and safety of visitors. Managing this and the potential community response is key to the success of the park.



Site plan with general locations of known cultural heritage elements

LEGEND

- (1) Photo location (photograph below)
- Higgins family homestead
- Higgins Cemetery
- Quarry operations
- Depression era works
- Old Mans Valley
- Crusher Plant
- South West Precinct

CULTURAL HERITAGE

CURRENT STATUS

Hornsby Park has a rich Aboriginal history and extensive European history and heritage. Information sourced by Council from an Elder suggest that it is likely that local Aboriginal people would have utilised the overhanging sandstone cliffs for shelter; likewise, level areas where grass trees are growing indicate family gathering spaces. European history is well documented and includes elements such as; the state heritage listed Higgins Cemetery, the creation of the quarry, the first European settler in the area, farming in OMV, heritage steps and examples of early astronomy research.

OPPORTUNITIES

- Aboriginal Heritage: Little documented evidence is available, however Council will consult with the Aboriginal Community throughout the project. Any confirmed areas of likely Aboriginal heritage value or items will be protected as required under legalisation. Subject to consultation, recognition and information on Aboriginal Heritage will form part of the interpretation strategy of the site as part of an integrated narrative
- Cultural Space: A 'Yarning Circle' or similar space, may be incorporated in the parkland
- Quarry: Consider reviewing the history of the quarry and its impacts on not only the site but the development of the surrounding area. It is likely that the majority of the roads in the area are built with materials excavated from the site. The quarry story should be a key feature of the interpretation strategy of the site
- Crusher Plant: This is the key piece of remnant infrastructure from the quarry process. Consider opportunities to reuse the plant as a key hub for the site due to its interpretation value, location and ease of access from Hornsby CBD
- Water: Opportunities to use the various elements utilised in the water strategy of the quarry including, structures, landforms, pipes, realignments and erosion protection to form part of the interpretation of the site
- Local Heritage: Options to explore the quarry's importance to the development of Hornsby both economically and physically and tell its story.
- European History: Early European History to explore mining such as early settler land grant, timber, farming and orchards, construction of the Heritage Steps by the community during the Great Depression

CONSTRAINTS

- Existing Sites: Ensuring all the existing sites are able to be accessed (and protected) may be difficult. Sites that are dangerous to access directly may be interpreted at a nearby hub
- Reuse: The condition of existing buildings including such as safety or cost considerations may mean that adaptation for reuse is not feasible in whole or part. In this case, recording and interpretation of elements prior to removal may be required.

Note: A more detailed description of site history and heritage can be found in Part E - Supporting Document.

Photo 1: From 1947 to 1955 The Hornsby Radio Astronomy Field Station (in OMV) contributed greatly to pioneering studies in lunar, solar and galactic astronomy.

Photo 2: Receptacle carved into rock, possibly used for washing at one of the Higgins family homes.

Photo 3: The cool room served as a fridge for Percy Higgins' family,

Photo 4: The Crusher Plant

Photo 5: The Higgins Family Cemetery.

Photo 6: The Heritage steps have been restored.

Recreation and Leisure Opportunities and Constraints Plan

LEGEND

- Bushland — Trails, Tracks, Mountain Bikes etc.
- Old Mans Valley — Arrival and orientation hub, sports and community events
- Heritage — Cemetery and other elements across site
- Quarry Void — Passive recreation, swimming, climbing and events
- South West Precinct — Education and Adventure play support
- Crusher Plant — Adventure, Arts, Community and Tourism Hub
- Existing Jump Track
- National Park
- Hornsby Park and HALC — Passive and active recreation

RECREATION AND LEISURE

CURRENT STATUS

The existing Hornsby Park, fronting onto Peats Ferry Road is a heritage listed park containing formal gardens, playground and the Hornsby Aquatic and Leisure Centre and is also a popular recreation venue for its bushland trails. The site contains a significant mountain bike trail system along its eastern and southern edge, while walking trails connect into the Great North Walk and Berowra Valley National Park to the west of the Quarry Void.

OPPORTUNITIES

- Active Recreation: Opportunities for potential sporting and play facilities within Old Mans Valley provide opportunities for structured and unstructured sport and community events, mostly of a local/district nature. Adaptability to other uses is also important. Large circulation networks of shared paths offer walking, bicycle and jogging recreation opportunities
- Passive Recreation: Opportunities for passive recreation options with bush walking trails, lookouts, picnic, and BBQ facilities, small scale camping/overnight stay facilities. Larger nodal facilities supporting café, community facilities, interpretation trails or other opportunities may be considered
- Adventure Recreation: Options for adventure recreation and privately operated supporting adventure play such as zip lines, rock climbing, luge to activate the site in a unique environment within Sydney. The Crusher Plant would be an ideal focus for this form of recreation. Part of the sites 'wow factor' may be derived from the adventure recreation provision in one or many precincts on the site
- Water Recreation: Opportunities for the naturally recharging lake within the Quarry Void to offer water play activities (subject to safety reviews)
- Trails: Possibilities of expanding existing walking trails within the site to take advantage of the unique landscape, views and bushland. Provide improved connections to surrounding trails and Berowa Valley National Park to integrate the experience of the site into existing networks. Improving the connection between town and bush is vital
- Mountain Bike Trails: One of the most popular existing recreational uses of the site is the extensive existing mountain bike trails found around OMV. Connecting these trails to the future Westleigh Park is an opportunity to explore existing and future networks, while ensuring pedestrian safety
- Events: Opportunities for community, public, commercial, small and large scale events. The Quarry Void and Old Mans Valley have potential as locations for events. Ensure support structures for event setup and execution are available to make best use of these spaces. Minimising amenity impacts for local residents and other park users will be essential.

CONSTRAINTS

- Facilities: The large and dispersed nature of many of the site's attractions will call for careful location of facilities. Scale of facilities need to match the realities of the site and financial viability to construct and operate. Access and visitor numbers do not necessarily warrant multiple large facilities in the short term. Staging of facilities (building, amenities, etc) need to match projected visitor numbers and recreation options at the park
- Private Vehicle Access: The large and sensitive nature of the site will limit private vehicle access to much of the site. Private vehicle access needs to correspond with the recreational and leisure opportunities being offered. Containing private vehicle access to the periphery of the site should correspond with key sporting and community facilities
- Access: The large size of the site (59 Ha) and level changes (over 100m level differences within the site) present a significant challenge to circulation within the site. Grouping recreational and leisure facilities at key access nodes may be a way to minimise impacts.

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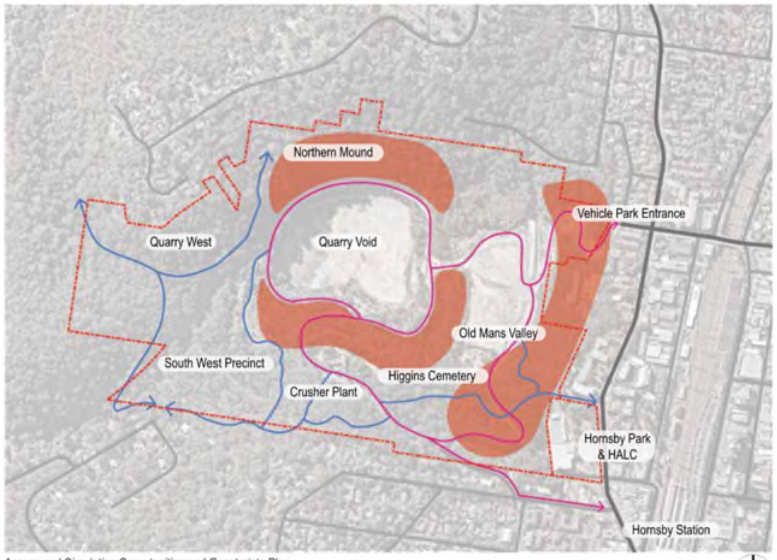


Access and Circulation Opportunities and Constraints Plan

LEGEND

Existing Trails — Existing Vehicle Routes/Fire Trails — Areas of steep topography

Existing steep vehicle access into OMV from Peats Ferry Road via Bridge Road

Existing steep slopes around the Quarry Void

ACCESS AND CIRCULATION

CURRENT STATUS

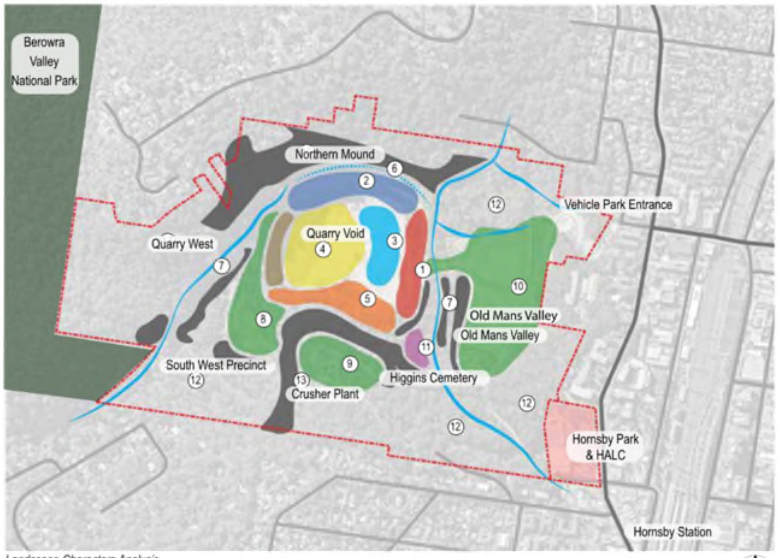
The Hornsby Park site is a significantly altered terrain. More than 100 years of quarrying has resulted in a landform with significant vertical cliffs, steep gradients and degraded areas not generally conducive to easy access. Universal access to parts of the site will not be viable due to program. Existing circulation within the site is primarily via remnant quarrying access roads, including recent NorthConnex fill roads connecting onto Bridge and Quarry Roads. Bush trails and mountain bike tracks are located around the periphery of the site. The main existing access points are walking trails via Peats Ferry Road and from Berowra Valley National Park and vehicular roads via Bridge Road and Quarry Road.

OPPORTUNITIES

- Public Transport: Opportunity exists to prioritise public transport opportunities such as nearby Hornsby Train Station and Bus networks. Ease of movement via formalised circulation paths for visitors to and from these locations and the site is vital
- Vehicle: Options to restrict movement of private vehicles to the edges of parklands is an expanding theme seen worldwide, providing the opportunity for a pedestrian and cycle focused park
- Shuttles: There is the potential for shuttle servicing of the site. Private or council operated schemes should be considered, with autonomous vehicles a future consideration, should technology and laws allow
- Future Technologies: The site presents opportunities to integrate long term technologies for improving access within the site. Potential for a lift within the void, autonomous shuttle vehicles and bikes (E-bikes) to help with visitor movement need to be considered to overcome the access challenges of the site
- Existing Routes: Existing routes within and around the site offer potential opportunities for new pathway and trail connections including accessible paths into larger circulation networks, including the Rosemead Trail and Berowra Valley National Park
- Connection Points: Opportunities exist to maximise connection points into the site, especially from the Town Centre. Multiple walking, bicycle and vehicle entry points should follow a hierarchy and aim to improve connectivity with the Park's locality
- Mountain Bike Trails: Options to integrate, link and extend existing mountain bike trails into wider circulation networks including a link to the future Westleigh Park, without compromising the pedestrian experience
- Wayfinding: A wayfinding strategy for the site can provide clear directions and allow visitors to move throughout the park. This may also utilise new and emerging digital technologies.

CONSTRAINTS

- Accessible Routes: Due to the significant grade changes throughout the site, providing an accessible pedestrian route to all areas within the site is not possible. A balance between accessibility and length of pathways needs to be found. Alternative access modes will be essential but are subject to viability assessments
- Access Points: A park of this size presents challenges in providing access. A legible hierarchy of access points is key in a park of this size. Wayfinding within the site is vital for visitors
- Gradients: Significant gradients are found within the site. Navigating these areas with traversable routes needs to be balanced with factors such as user safety, visual impact and visitor experience
- Vehicle Movement: Vehicle and pedestrian movement within the site will be limited by environmental and heritage sensitivity. Potential to limit extent of private vehicle access to areas such as the Quarry Void to limit impact on pedestrian and bicycle access and movement
- Car Parking Facilities: Topography and extensive bushland limit available areas for parking. To reduce the impact of vehicles car parking facilities need to be contained to the periphery of the site. Strategies for managing peak park use times should be in place and future technologies implemented to offer alternates to private vehicle use.



Landscape Characters Analysis

LEGEND

- Level areas with potential for recreational use
- Quarry Void base
- Southern quarry wall
- Eastern diatreme quarry wall
- Western quarry wall
- Northern quarry wall
- National Park
- Formal Parkland
- Natural lake
- Steep vegetated slopes
- Existing creek lines
- Existing engineered water channel

LANDSCAPE FEATURES

1. Diatreme walls with high visual amenity
2. Northern walls with accessible path and vehicle access
3. Constructed lake filled with ground water and rain water
4. Open space amphitheatre constructed by fill operation
5. Southern walls and rock fall clearance zone
6. Concrete water channel
7. Existing creeklines
8. South-west Precinct, bounded by steep edges to the east and south
9. Quarry crusher plant precinct surrounded by open forest
10. Flat and open Old Mans Valley, bounded by natural bushland to the north, east and south
11. Higgins Family Cemetery enclosed by a small valley
12. Existing open forest
13. Steep edges

CHARACTER AND IDENTITY

CURRENT STATUS

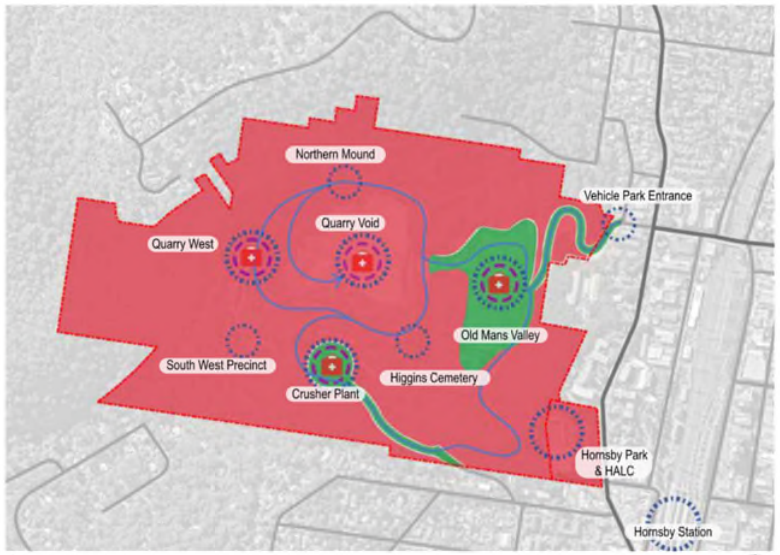
While largely hidden from public view the quarry site and Old Mans Valley area are characterised by a diverse landscape character. OMV offers a broad open space with views to the west, while the quarry itself and the bushland walks are largely enclosed. Impressive views can be had from various elevated locations, particularly from the tops of the quarry walls.

OPPORTUNITIES

- Designing with Country: The natural bushland environment offers a unique opportunity to ensure not only the design process but visitors to the park experience the rich heritage of the place. Experience of the landscape via interconnected and interlaced Indigenous and Colonial histories tell ancient and contemporary stories that will enrich the park and natural environment.
- Quarry: The unique character of the site 'Quarry-ness' can be respected and emphasized through access design and view management. Each of the 4 walls have a specific character and need to be celebrated. Any proposed engineered treatments will be consistent across the site and respect the industrial character of the quarry
- Diatreme: The uniqueness of the banded rock formation of the Diatreme wall is a major asset to the Park. Clearing existing vegetation, lowering existing levels along the wall base (if practical) to increase its exposed height, providing viewpoints framing the wall and ensuring proposed works emphasise and highlight the quarry walls will be a priority
- Quarrying: The various industrial quarrying elements offer an ideal opportunity to retain the Park's identity thorough wayfinding, site hubs and interpretative elements
- Landform: Opportunities to highlight the Park's unique nature, including but not limited to the Diatreme formation, quarry remnants, heritage, ecological integrity and identity at the forefront of proposed design works
- Bushland: Opportunities to tell the story of the character of the bushland within the site. The rare ecological communities and their ongoing management and recovery offer a great opportunity to tie the story of the park to the bushland nature of Hornsby Shire, making this reading accessible from the Town Centre
- National Park: Options to improve physical and visual connections with Berowra Valley National Park to link the character and identity of Hornsby Park to strong nation wide reputation of National Parks and use that reputation as the standards of the park
- Vistas: The dramatic natural and existing man-made landform of the site offers opportunities for views and vistas. Expansive borrowed views of bushland and National Park in conjunction with focused views of elements such as the Diatreme wall and heritage elements create a variety of views and vistas across and within the site.

CONSTRAINTS

- Future Uses: The sensitive nature of the site will require careful siting varying appropriate activities. Active sporting facilities, quiet enjoyment and serenity, adventure recreation and water play must be carefully considered to retain and enhance the unique character of the site
- Quarry: The nature of the quarry walls presents challenge on maintenance and will call for a high-level overall park management. Significant interventions through to low impact and non-intervention methods should be explored. Care should be made to ensure any interventions balance park management and long-term safety against the character and 'Quarry-ness' of the site
- Remediation: Existing unstable rockface presents risks on visitors' safety. Remedial works to create safe environments for visitors must consider the experience and character of the site. While materials such as shotcrete may assist in the creation of stable rock walls, this solution would likely compromise the experience of the quarry and would need additional face treatment
- Management: The sensitive nature of environmental and heritage values of the Park will require a balance on preserving and experiencing the site character. Preserving elements of the quarry that contribute strongly to the character and experience of the proposed parkland will require a degree of monitoring and management into the future. Complex range of management techniques are required to marry environmental and heritage values with recreation provision.



Amenity and safety

LEGEND

- Daylight Access
- Evening Access
- Facilities and amenities
- Potential First Aid locations
- Vehicle Circulation
- Connection Hubs

Lighting will be required in areas with evening access

AMENITY AND SAFETY

CURRENT STATUS

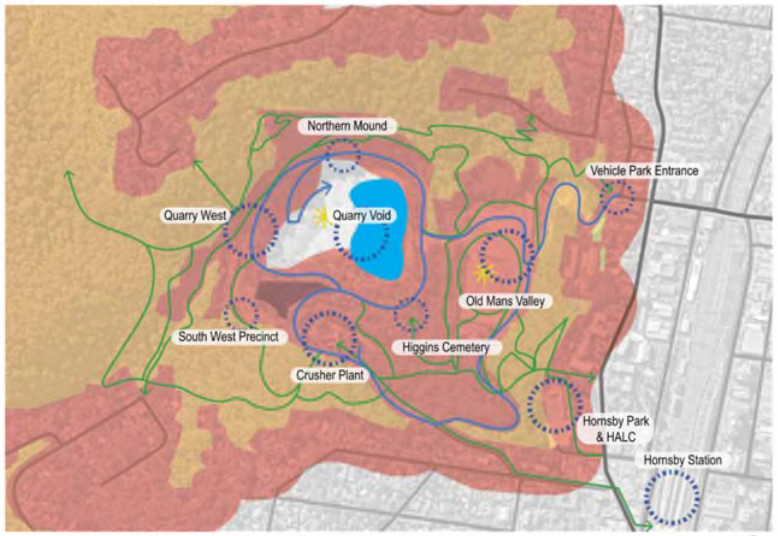
The general public is not presently permitted to access the site and therefore safety and amenity are not currently a public issue. When the Park opens however public safety will be critical, especially at the top of cliff faces. Amenity will also need to consider issues such as the balance of winter sun and summer shade throughout the park.

OPPORTUNITIES

- Hubs: Options for potential access/circulation routes, heritage/interpretation sites and opportunities to locate 'hubs' where connections, changes in access mode, interpretation, wayfinding, viewpoints, amenity and community infrastructure, decision points can be grouped to create a logical and easy way to understand network for visitors
- Emergency Access: Opportunities to provide widespread access for emergency vehicles throughout all areas of the site
- Old Mans Valley, Quarry and Crusher Plant: Opportunities to locate amenity facilities within the site to support proposed community, play and sport usage. Ensure safe use during accessible hours through the use of lighting, CCTV, safety in design arrangement, as needed for public use
- Facilities: Options to provide locations for critical facilities such as toilets to meet all needs. Likewise, optimise seating for rest spots
- Crime Prevention Through Environmental Design (CPTED): Opportunities to integrate CPTED principles for improved amenity and safety within the park
- Public Access: Potential to develop an operational plan in order to maximise amenity and public safety to guide access and circulation within the site for day, evening and event use
- Lake: Options for safe public access to water
- Water: Opportunities to utilise the lake as a source of water for bushfire fighting purposes
- Emergency Management: Emergency Management Plans will be developed for the whole Hornsby Park site, to address fire and other risks
- Exclusion Zones: Possibilities of establishing clear strategies for exclusion zones at the base of walls where required and consider how maintenance in these areas will be safely managed.

CONSTRAINTS

- Location: Significant elevation changes from Hornsby Town Centre to the Park presents a challenge for access to and from the site. Ensuring this challenge is addressed though wayfinding, amenity facilities, rest spots, graded walks and transport solutions such as e-bikes, e-wheelchairs and ultimately, potential for an autonomous electric shuttle service offered within the park is a key element in ensuring ongoing success of the park and any business within
- Bushfire Risk:Bushfire risk will need to be managed as part of the overall park management plans
- Rockfalls: The existing Quarry walls and steep slope will require specialised management to ensure the safety of park visitors. Potential ways to minimise safety issues include; intervention on unstable parts of walls in combination with exclusion zones and ongoing maintenance of wall stability.
- Lake and wetland: Supervision or monitoring of the water bodies to ensure safe use and prevention of potential injury
- Vehicles: Risks involved with vehicles within the parkland. Potential to limit access for private vehicles to the edges of the park and only allow managed vehicle access within the main areas of the park
- Natural Bushland Setting: Natural elements and associate hazards maybe present, particularly in some locally remote locations. Any risks to be managed as part of the overall park management plan.



Management, Maintenance and Emergency

LEGEND

- Bushfire Zone Buffer
- Bushfire Zone Category 2
- Maintenance/Emergency Vehicle Circulation
- Trails and Tracks
- Bushfire Zone Category 1
- Potential water source for fire fighting
- Quarry Walls
- Potential event locations

Outdoor events and spaces need to be managed to minimise impacts to turf and other park users

MANAGEMENT AND MAINTENANCE

CURRENT STATUS

Management and maintenance of the site is currently confined to operational issues given the exlusion of public access. When open to the public maintenance will become a significant factor in the success of the park and will require a detailed strategy and a clear funding budget.

OPPORTUNITIES

- Return on Investment: There are various opportunities for the economic sustainability of the park. The Crusher Plant, OMV, Quarry, adventure recreation play, accommodation, camping sites and staging of events are all potential areas to explore for private or council run business to operate. A Business Case Study will be essential.
- Sustainable: Possibilities for various opportunities to utilise sustainable processes for project. Opportunities exist from construction through to the ongoing management of the park to integrate sustainable elements into the fabric of the design (reuse of quarry spoil for fill, soils and engineered gabions, restoring the existing bushland, carbon neutrality, heat mitigation, integrating business opportunities into the design of the park, solar e-bike stations, autonomous vehicles and water harvesting etc)
- Unique Experiences: Opportunities to provide the management of the site that caters to the unique character and experience offered in the park. Ensuring the mountain bike trails, adventure play elements, cultural and interpretive elements, quarry features, educational and immersive nature experiences are all maintained to a high level will ensure ongoing visitation and use
- Power Generation: Whilst managing visual integrity, there are ways to generate power on site. Opportunity to provide the parks power requirements (amenity facilities, lighting, water pumps) from sources on site such as solar or small scale wind turbines
- Ongoing Maintenance: Potential opportunities to reduce ongoing maintenance requirements of the site. A long-term or staged plan for the development of the park offers opportunities to ensure a built-in flexibility in the design to reduce management and maintenance for the park. Consider elements such as durable path and trail materials, increased intervention on quarry walls, long term engineering solutions, staged and flexible development of the master plan to allow for technological innovations and changes to user needs and requirements
- Plan of Management: Opportunities to develop a Plan of Management to determine the critical contents of the park especially in relation to safety, amenity, events and user conflicts.

CONSTRAINTS

- Quarry Walls: The quarry walls are not consistently stable in all areas and regrowth on the walls may increase the rate of deterioration. Management of the four quarry walls needs to be outlined in a Plan of Management for the park. Larger intervention on the walls generally means less ongoing maintenance, however this should be balanced against proposed uses of the park and impacts on the character of the quarry
- Bush Fires: Managing the potential for bushfires will be a management issue for the park.
- Weeds: Maintenance of weed regrowth as part of revegetation works will be challenging and needs to be a long-term ongoing management of the park to ensure the protection of rare ecological communities
- Trail network: The steepness of some trail networks within the site make maintenance challenging. Robust and low maintenance path designs should be used to help reduce on-going maintenance costs of upkeep of path and trail networks
- Exclusion Zones: Rockfall areas present risks on visitors' safety. Consider maintenance implication of exclusion zones to minimise need for access.

Existing Crusher Plant

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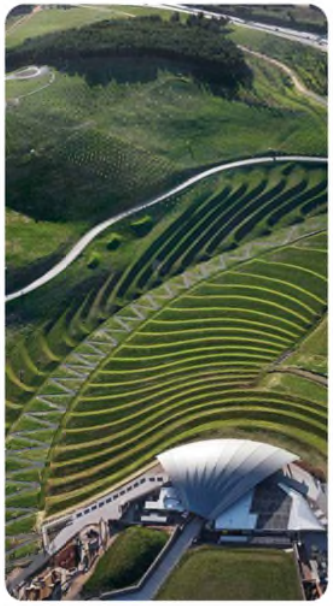
Nurture Memories

Embrace the Storyline



Celebrate the Landscape

Bring Nature to the City Centre

Offer Access for All

Retain the Quarry Experience

Connect the Community

PLANNING PRINCIPLES

The Master Plan for Hornsby Park is informed and directed by the following Planning and Design Principles. The principles work in conjunction with the Master Plan Strategies to achieve the Objectives of the Park:

RETAIN THE QUARRY EXPERIENCE

Harness the drama and scale of the park (retain the quarry-ness)

OFFER ACCESS FOR ALL

Maximise access throughout park (walk, cycle, shuttle, bus)

EMBRACE THE STORYLINE

Bring the rich story of the park and Connecting with Country to life (interpretation and education)

BRING NATURE TO THE CITY CENTRE

Conserve and extend the bushland setting as the park framework

CELEBRATE THE LANDSCAPE

Maximise views vistas and prospects (lookouts, filtered views, reveals)

CONNECT THE COMMUNITY

Focus the park as a place of engagement and interaction (events, passive and active recreation, community sport and families)

NURTURE MEMORIES

Make the park experience memorable (adventure, quiet, social)

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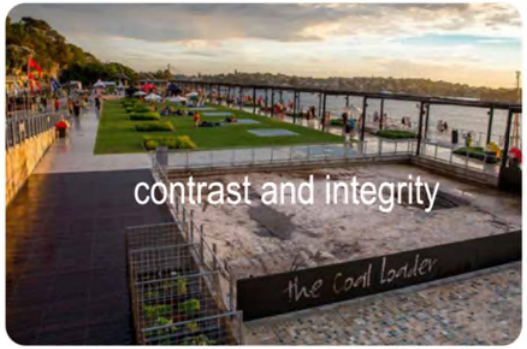

WHAT WE MEAN BY 'QUARRY-NESS'?

'Quarry-ness' encompasses the concept of retaining the character and drama of the quarry's form and experience into the next phases of the site's role as a major regional park. Three elements of the future quarry experience will be core to that appreciation by the visitor:

- **Drama and scale** – ensuring that the full quarried face of each wall remains clearly visible from the rim and the base of the Quarry Void.
- **Contrast and integrity** – retaining a visible distinction between the parts of the quarry that will remain largely undisturbed since quarrying finished and those new works necessary to facilitate safe visitor experiences
- **Promise and reveal** – progressively revealing the Quarry Void with selected vistas on approach before offering a full appreciation of the whole quarry from formal lookouts around its perimeter.

Central to the full experience of these elements of the quarry will be in conserving the unique characteristics of each of the four quarry walls, as outlined in the Master Plan.

ELEMENTS OF 'QUARRY-NESS'

East Face

South Face

West Face

North Face

THE FOUR QUARRY WALLS

The manner in which the quarry-ness is retained and celebrated is highly dependent on recognising the varied nature and structural integrity of the four walls, as well as the intervention required to secure the faces for public safety and integrate access routes to the quarry bed.

EAST FACE

The east face is the 'hero' piece of the quarry, being very tall with clear vertical faces containing the geological heritage feature of the Diatreme. Vegetation will be cleared to maximise the exposed rock face. This is the most structurally sound of the four faces and thus is likely to need the lowest level of intervention

SOUTH FACE

This face is the most heavily vegetated face while also being the highest and least stable. The southern face does not contain any cut benches. Retaining some vegetation where practical and safe will retain some of its current character.

WEST FACE

The west face finishes lower and allows for a distant view west to Berowra Valley National Park. Retaining the western cliff is important to quarry experience with walls on all four sides.

NORTH FACE

This face is heavily modified and retains the 'zig-zag' character of former haulage roads descending into the quarry. These geometries contribute strongly to the character of the quarry.

The Brick Pit Ring (Durbach Block Architects)
The drama of the raised walkway offsets the simple quarry form and adds visual interest through reflections in the water.

Roman Quarry (AllesWirdGut)
The simple geometry and clean lines of the access ramps make a clear delineation between old and new.

PRECEDENT PROJECTS

The vision for the long-term development of Hornsby Quarry was developed by Council in 2014 and acts as the driving force behind the development of the Master Plan for the Park.

Features of the proposed Park include retaining and highlighting the existing qualities of the quarry including its exposed rock walls, upland slopes and bushland setting, providing a series of experiences, highlighting heritage features, providing high levels of accessibility and offering a diverse range of recreation opportunities in a bushland setting. The projects from around the world shown here illustrate how these features and values have been embraced, particularly on post-industrial sites.

BP Site, Waverton (North Sydney Council)
The rough quarry faces of this former oil storage site contrast with the simple curved geometry of the steel viewing walkway.

Quarry Garden in Shanghai Botanical Garden (THUPDI)
The walkway at the base of the quarry brings visitors closer to the water's edge.

Queanbeyan Riverfront (CLOUSTON Associates)
The level changes between street front and river provide opportunities for seating and performance spaces at the water's edge.

Ourimbah TreeTop Crazy Rider (Ecoline)
Adventure recreation has been seamlessly integrated into a natural bushland setting.

Sydney Park Water Re-Use Project (Turf Design Studio, Environmental Partnership, Alluvium, Turpin+Crawford, Dragonfly and Partridge)
Cascading constructed wetlands add drama to the pond systems, prioritising the public's interaction with water and learning opportunities for water reuse.

Stonehenge Visitor Centre (DCM)
Simple pavilion style visitor centre designed to fit within the landscape and not distract or diminish the experience of visiting Stonehenge

Ballast Point Park (McGregor Coxall)
Layering of existing industrial modified landform and new parkland elements to create a park which celebrates the history of the site while providing a green park for passive recreation.

Bethlehem SteelStacks Arts + Cultural Campus (WRT)
Adaptive reuse of an old industrial facility into an arts and cultural precinct, while retaining and celebrating the history of the site.

PRECEDENT PROJECTS

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ATTACHMENT 1 - ITEM 6

Existing bushland

CONCEPT STRATEGIES

The Concept Strategies are tangible design strategies based on the opportunities and constrains of the site. In respect to the Planning Principles the Site Wide Strategies below are to work in combination to direct the design of the Master Plan to ensure the Vision and Objectives of the park are achieved.

The Site Wide Strategies that have been developed for the Master Plan fit into five key over arching strategies and are as follows:

SITE FRAMEWORK STRATEGY
- Hub/Precinct Strategy
- Sustainability Strategy

ENVIRONMENTAL STRATEGY
- Natural Environment Management Strategy
- Soil Strategy
- Water Strategy
- Planting Strategy

RECREATIONAL STRATEGY
- Recreational Strategy
- Mosaic of Play Strategy
- Lighting Strategy

ACCESS AND CIRCULATION STRATEGY
- Circulation Network Strategy
- Pedestrian Circulation Strategy
- Bicycle Circulation Strategy
- Vehicle Circulation Strategy

INTERPRETATION STRATEGY
- Wayfinding and Signage Strategy
- Heritage and Cultural Interpretation Strategy
- Views and Lookouts Strategy

Precinct specific strategies are located in the Part E - Supporting Documents section of the report.

ATTACHMENT 1 - ITEM 6

HORNSBY PARK MASTER PLAN - PART B

1 Park vehicle entry from Bridge Road
2 Primary pedestrian entry from Town Centre
3 Park link to Berowra Valley National Park
4 Park Entry Plaza
5 Quarry Void access point and lift
6 Crusher Plant access from Quarry Road
7 Restoration and adaptive reuse of Crusher Plant
8 Minor pedestrian entry from Rosemead Road
9 Key lookouts

MASTER PLAN CONCEPT

50

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Western quarry wall

ATTACHMENT 1 - ITEM 6

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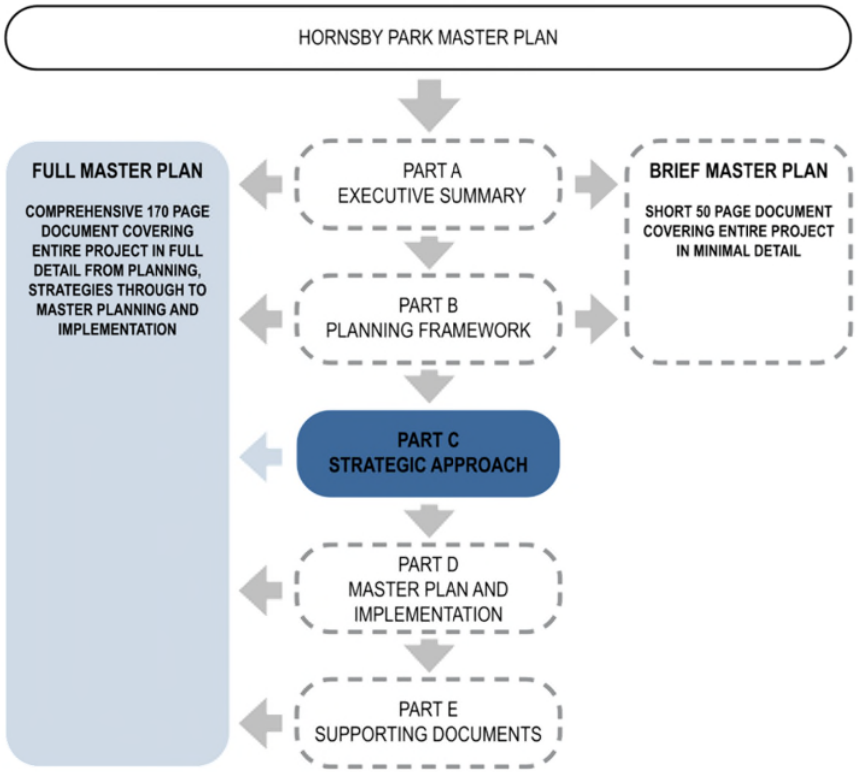

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ATTACHMENT 1 - ITEM 6

Existing bushland at Honsby Park

MASTER PLAN STRATEGIES

The strategies are tangible design strategies based on the opportunities and constrains of the site. In respect to the Planning Principles the Site Wide Strategies below are to work in combination to direct the design of the Master Plan to ensure the Core Goals, Vision and Objectives of the park are achieved.

The Master Plan Strategies that have been developed for the Master Plan fit into five key over arching strategies and are as follows:

SITE FRAMEWORK STRATEGY
- Hub/Precinct Strategy
- Sustainability Strategy

ENVIRONMENTAL STRATEGY
- Natural Environment Management Strategy
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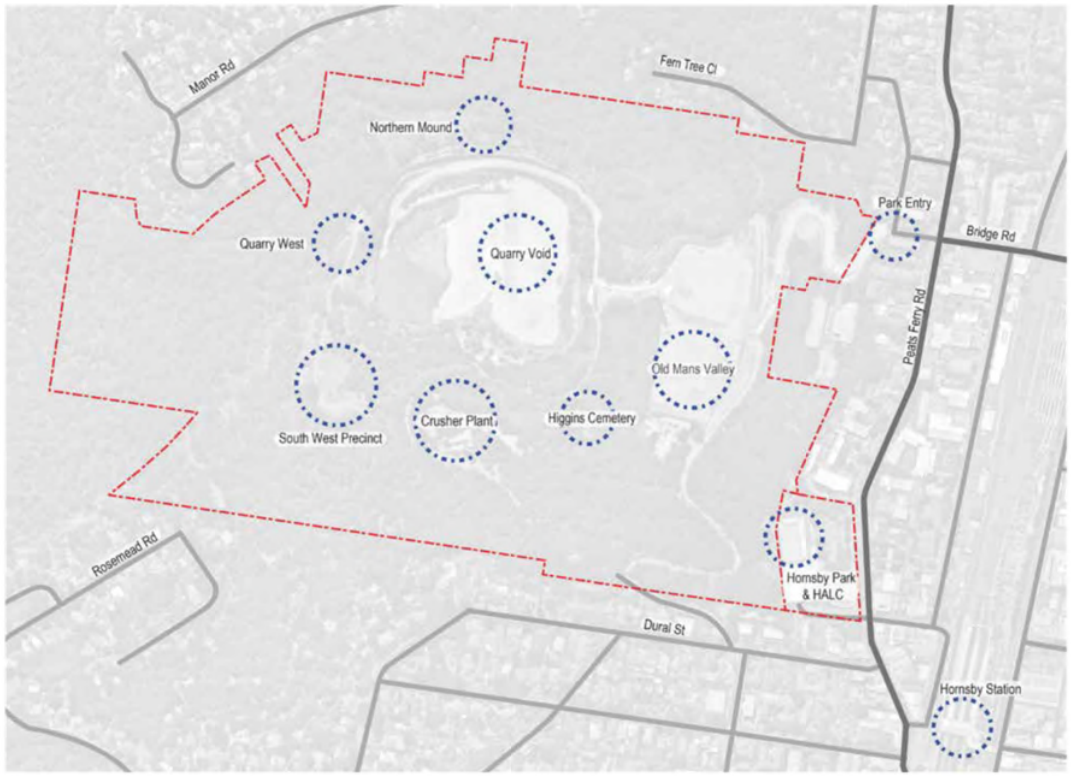
RECREATIONAL STRATEGY
- Recreational Strategy
- Mosaic of Play Strategy
- Lighting Strategy

ACCESS AND CIRCULATION STRATEGY
- Circulation Network Strategy
- Pedestrian Circulation Strategy
- Bicycle Circulation Strategy
- Vehicle Circulation Strategy

INTERPRETATION STRATEGY
- Wayfinding and Signage Strategy
- Heritage and Cultural Interpretation Strategy
- Views and Lookouts Strategy

Precinct specific strategies are located in the PART E section of the report.



Major and Minor hub locations

LEGEND

Major Hub | Minor Hub | Site Boundary | Major Local/State Road | Minor Local Road

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HUB STRATEGY

The strategies for the park revolve around a number of Major and Minor hubs throughout the site. The hubs will act as key sites where functions such as connection and circulation points, information or orientation services, amenities, community precincts, interpretation and way finding etc are distributed to allow for a diverse visitor experience and easier movement and circulation around the park. Hubs are to have characteristics which fit with their use or key identifiers as outlined below.

MAJOR HUBS

Old Mans Valley (OMV)
Arrival experience with orientation, amenities and community facilities, key transport node

Quarry Void
Unique aspect of Hornsby Park, key attraction of visitors with amenities, passive and active recreation opportunities

Crusher Plant
Interpretative cornerstone of park with amenities, community facilities and adventure recreation opportunities

South West Precinct
Potential for community, education and overnight accommodation facilities with adventure recreation opportunities

MINOR HUBS

Hornsby Station
Key public transport arrival point for district and regional visitors and link to Hornsby Town Centre

Existing Hornsby Park and Hornsby Aquatic and Leisure Centre (HALC)
Established active and passive recreation precinct, major pedestrian entry to park, directs visitors to OMV for main orientation of site. Potential for way finding and entry experience from Town Centre to Hornsby Park

Quarry West
Key point linking Berowra Valley National Park to Hornsby Park with amenities, orientation, community facilities and transport hub

Higgins Cemetery
Interpretative and historic site with passive recreation opportunities and transport hub

Northern Mound
Key connection point and transport node for circulation access to Quarry Void, Quarry West and OMV

Park Entry
Key Vehicle arrival point to site and first impression of park

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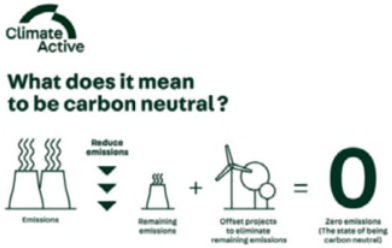

SUSTAINABILITY STRATEGY

The sustainability strategy for the park will look to align and complement Hornsby Council's Sustainable Hornsby 2040 Strategy. A number of key elements will make up the strategy for the park and are outlined below.

ZERO CARBON

Utilise passive and active design principles to minimise carbon inputs in construction, demolition, materials and park operation with the aim to achieve net zero carbon across the life of the park

WATER USE

Make use of site's water storage capabilities for water reuse in combination with water efficient materials to create a closed loop system within the park for water use

RESOURCE EFFICIENCY

Utilise circular economy principles to eliminate waste during design, construction and operation. Make use of repurposed and recycled materials or modular designs.

CONNECTION TO NATURE

Deliver a net gain in biodiversity to create habitat and provide high quality green spaces for leisure and recreation to promote community engagement and social sustainability

CLIMATE RESILIENCE

Manage risk of increasing extreme climate events of heat, wind, rain, floods, and bushfires and reduce heat island effect and microclimate impacts through tree canopy cover, planting and hardworks design.

SUSTAINABLE PLACEMAKING

Increase the social value to the surrounding communities, economically and in quality of life by providing opportunities for events, encountering nature, passive recreation, walking and cycling paths and strong links to Hornsby Town Centre.

COMMUNITY EDUCATION

Provide a hub for education to run workshops and tours to educate the community and visitors on the local indigenous culture, heritage, and the sustainability strategy on the project. Use appropriate education signage to help educate the public on the connection to land, cultural heritage, and country.

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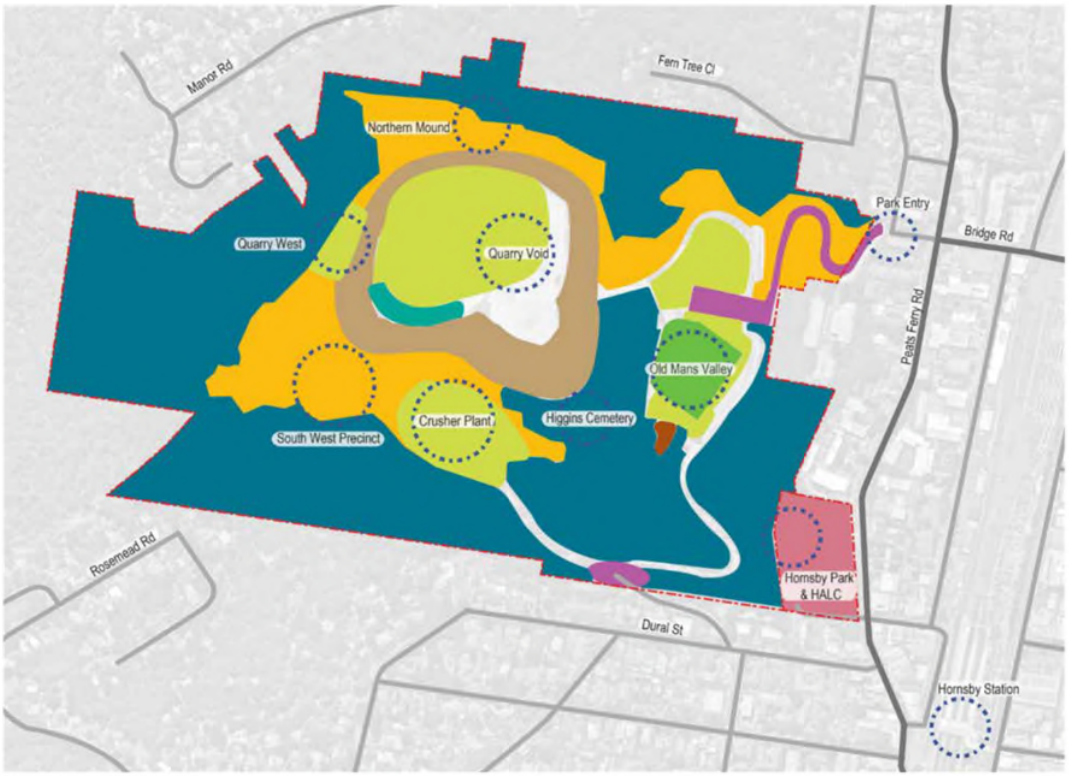


Management areas within Hornsby Park

LEGEND

1:6000 @A3

0 60 120 180 300m

- Parkland Planting
- Wetland / Aquatic Planting
- Management of Existing Bushland
- Entry / Arrival Planting
- Existing parklands
- Turf & Sportsfield
- Revegetation / Regeneration of Bushland
- Jump Track
- Quarry Wall Vegetation Management
- Major Hub
- Minor Hub
- Major Local/State Road
- Site Boundary
- Minor Local Road

NATURAL ENVIRONMENT MANAGEMENT STRATEGY

The natural environment management strategy covers the long term management and maintenance of the landscape. The ongoing management of the restoration of the existing bushland, specific parkland style planting and site features such as the Quarry wall faces and drainage systems is a key aspect of the strategy. The natural environment management strategy covers the following key principles:

BUSH REVEGETATION AND REGENERATION

Guided by the Vegetation Management Plan (VMP) for the site, restoring the rare plant communities of the site through the management of the Park including, weeding, maintenance, regeneration and rehabilitation.

WATER

Explore overall water concept for the site ensuring the site water circulation, lake water treatment (WSUD, Macrophytes) and creek flow management and stormwater infrastructure. Refer Water Strategy for more detailed outline.

WILDLIFE

Review opportunities for native wildlife habitat creation including, birds, mammals and the management of introduced species on site through the VMP and the Habitat Creation and Enhancement Plan. Powerful Owls (Ninox strenua) has been confirmed within the site, this species and its habitat in particular requires careful management.

BUSH FOOD

Explore opportunities for introduction of bush food teaching/learning and interpretation on site for visitors and schools.

LOW IMPACT

Ensure proposed works have a low or positive impact on the environment of the Park.

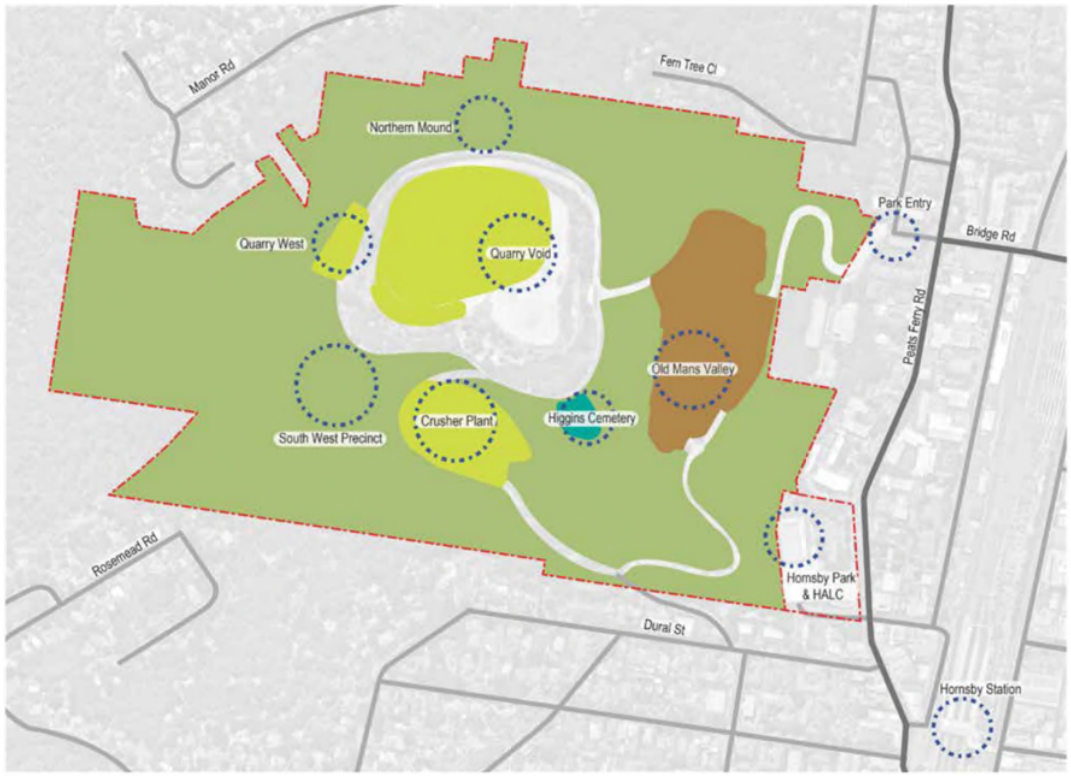
QUARRY WALL MANAGEMENT

Pursue the need to clear existing vegetation on the rock face and quarry benches to restore the original quarry bench profile. Manage the interface of exclusion zones within the quarry with low visibility safety features that do not impact recreation and general site access.

LANDSCAPE MAINTENANCE

Explore options for small landscape maintenance facilities on site for the upkeep of park.

ATTACHMENT 1 - ITEM 6



Precincts and primary planting types

LEGEND

- Native species planting
- Parkland species planting
- Interpretive species planting
- Parkland and interpretive species planting
- Major Hub
- Minor Hub
- Major Local/State Road
- Minor Local Road
- Site Boundary

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PLANTING STRATEGY

The planting strategy for the park is principally comprised of endemic native species from the Blue Gum Diatreme Forest and Blackbutt Gully Forest ecological communities. The large tree species found in these communities form the backbone of the canopy layer for planting across the park.

NATIVE SPECIES PLANTING

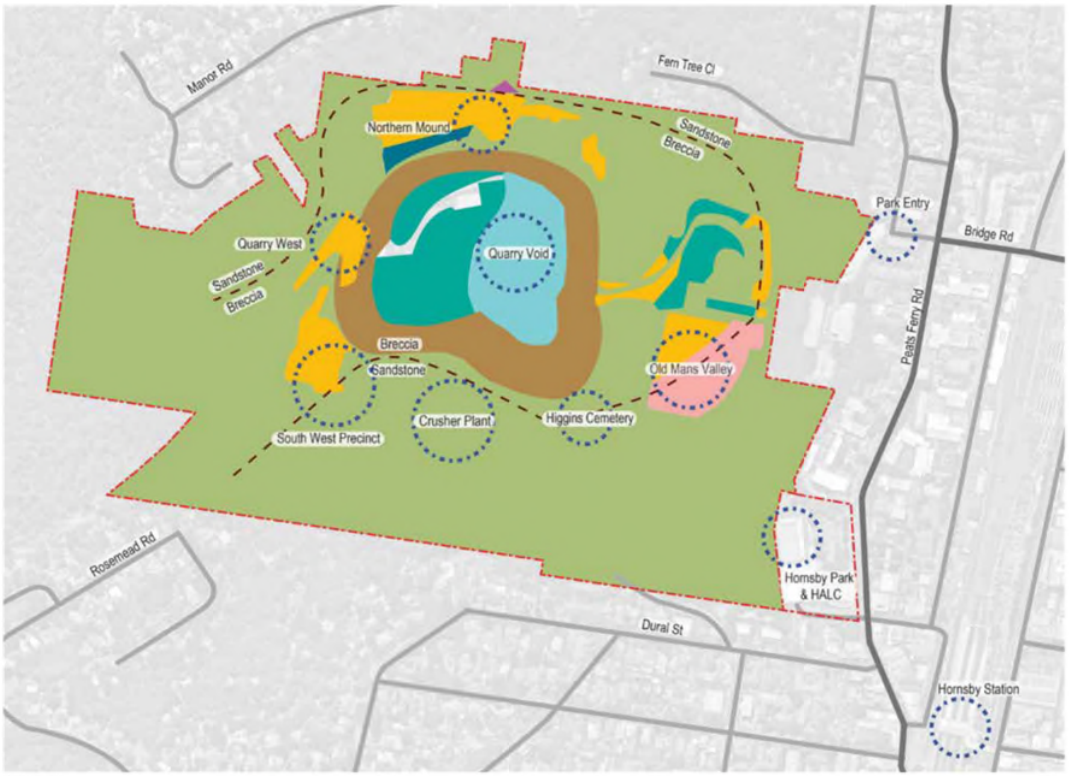
In precincts, in which the key outcome is the regeneration of the degraded and weed infested bushland, native species plantings are proposed. These plantings are made up of species from either the Blue Gum Diatreme Forest and Blackbutt Gully Forest ecological communities. The extent and locations of this planting is dependent on plant surveys and mapping undertaken by Council.

PARKLAND SPECIES PLANTING

In precincts which provide open space recreation in spaces already cleared such as the OMV, Quarry Void, Quarry West and the Crusher Plant the native species palette is complimented with select parkland exotic non-invasive species to provide focal points and for solar access in winter months.

INTERPRETIVE SPECIES PLANTING

Special interpretive planting is also proposed for key historic areas of the site. In these precincts or locations planting which references the past or historic use of the space is proposed. This planting is to tie into the overall Interpretation Strategy for the park. OMV and Higgins Cemetery are two locations which will employ this style of planting.



Subsoil plan

LEGEND

- Fill over NCX sandstone material
- Cut into breccia
- Cut into rock / breccia
- Cut into NCX sandstone material
- Expose existing rock to form finished surface
- Fill over natural profiles / sandstone
- Cut into natural sandstone
- Existing soil retained for bush regeneration
- Site Boundary
- Major Local/State Road
- Minor Local Road
- Minor Hub
- Major Hub

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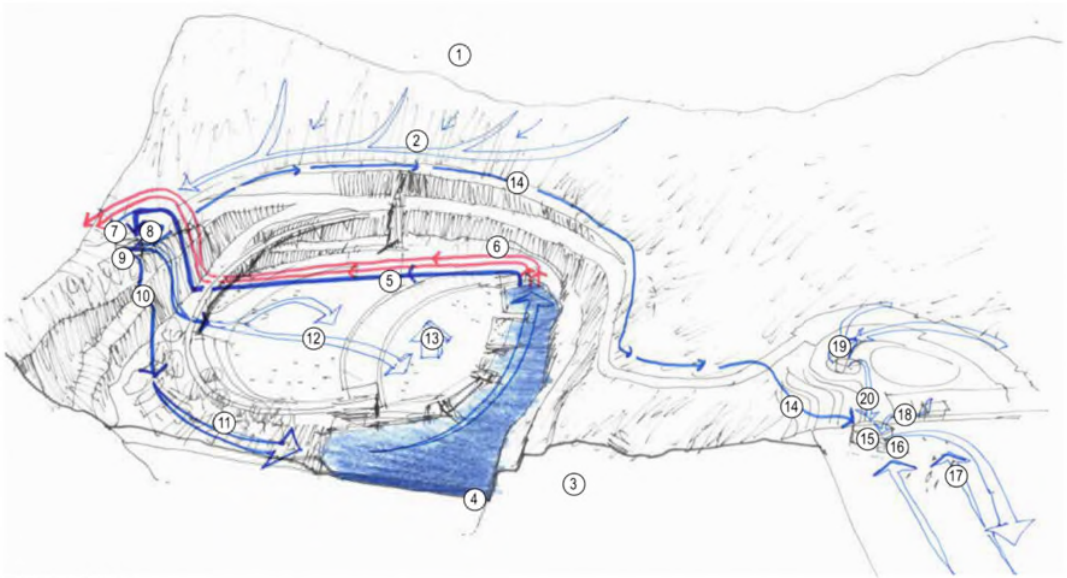
SOIL STRATEGY

The soil strategy covers the recovery and reuse of site won soil and the proposed soil profiles for the new planting on site. All soils used within the parklands are to be based on materials recovered from disturbed areas of the site.

The soil strategy process aims to include the on site manufacture and processing of green materials for mulch and compost, preparation of subgrades and creation of A and B soil horizons, various soil depths based on vegetation community and location, plus slope stabilisation and erosion control measures.

For further information on soil profiles refer to Soil Profile Plan prepared by HSC and Hornsby Park Soil Resource Investigation Report - Stage 1 by SESL.



Water systems diagram

1. Rainfall inflows into quarry and surrounding 12Ha catchment.
2. Cut off drain on northern bank diverts overland flows to Waitara Creek.
3. High water quality groundwater seepage into quarry.
4. Quarry Lake with static water level set at RI 53.0.
5. Opportunity for solar powered low flow pump (Nominal 2 litres/second) to pump water to cliff top. Pumping will not be continuous but planned for long periods of pumping, particularly in winter. Flowrate TBC.
6. Multiple high flow pumps for peak flow events to discharge directly to Waitara Creek. Pumps progressively engaged depending upon inflows into quarry. Pump station for the lake to be located at the northeast corner of the lake. Refer to Water Management Report by Storm Consulting for more information on pump station.
7. Some water diverted out of the system to Waitara Creek as environmental flows. Refer to point 5.
8. Remaining water treated through biological organic filter and then to storage tank.
9. Large buffer tank. Capacity TBA.
10. Gravity flow water released back down into quarry intermittently. Potential electricity generation.
11. Wetland may be used for stormwater runoff (limited) however mainly used for polishing/aeration. In heavy natural flows this could be halted in peak flow times.
12. Some water used to irrigate lawns and planting. Any excess water seeps back into lake via water table.
13. Evaporative losses.
14. Treated water pumped up to sports field via rising main to main storage tank. This is not continuous but is a low flow and will pump for long periods.
15. Large Storage tank. Capacity TBA.
16. Booster pump pressurises water for field irrigation.
17. Any excess irrigation water and rainfall infiltration flows back to tank via sub soil drains.
18. Clean stormwater runoff from building roofs flows directly to tank.
19. Treated runoff from the field and from the roof feed back into the irrigation tank.
20. Rain garden water pumped up to main storage tank from rain garden tank.

WATER STRATEGY

The water strategy for the park is built around two actions. The first is to ensure that any storm water that does not fall directly into the Quarry Void is bypassed around the Quarry Void and into the existing creek on the western edge of the site. The second is to utilise the ground water infiltration into the lake as a source of usable water for the parklands.

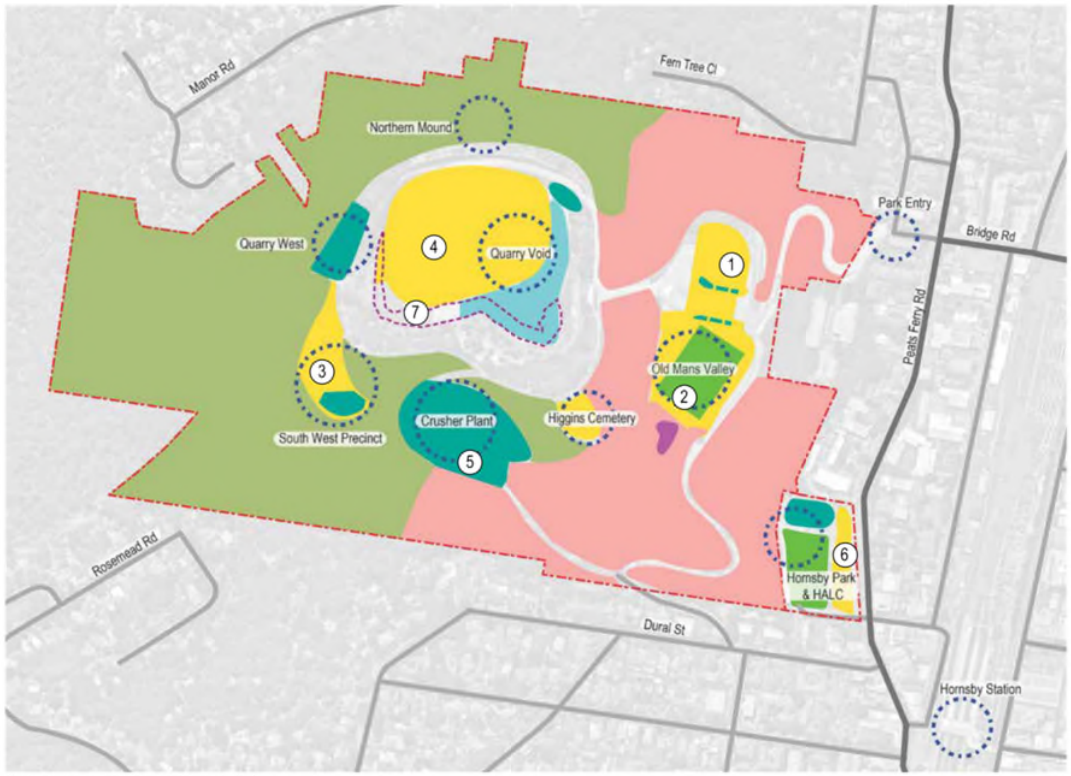
Maintaining good water quality within the lake is very important as this water is used for irrigation and toilet flushing as well as recreation. The lake within the park is fed by a combination of surface flows (stormwater runoff) and sub-surface flows (groundwater). The groundwater has a very good water quality however stormwater runoff contains pollutants that need to be removed to maintain good water quality of the lake.

The second aspect is described in the adjacent diagram. Stormwater runoff outside of the Quarry Void is directed to the existing creek to bypass the void and park lake. Stormwater draining to the lake will be treated by water sensitive design features such as rain gardens, vegetation buffers and cascading wetland to remove many pollutants before entering the lake.

The lake water quality will also be maintained to a high quality with a recirculation system. As well as reducing the potential for stagnation, the recirculation system will pump water through a reactive media to filter the water providing a superior treatment before passing back to the lake via the wetlands on the southern side of the Quarry Void.

A proposed amenities building is located adjacent to the lake with a ground floor level of RL54.00. Should additional storm event storgage be required there is the possibility to lift the building level to RL54.30.

Excess water building up in the lake from groundwater and stormwater runoff that is not reused for irrigation or toilet flushing will be pumped to the existing creek.



Recreation types and locations within Hornsby Park

LEGEND

1:6000 @A3

0 60 120 180 300m

- Bush walks in open forest and potential mountain bike parkland trail connections
- Bush walks and mountain bike trails in open forest
- Existing Jump Track
- Adventure / Arts / Community / Tourism Hub
- Minor Hub
- Site Boundary
- Major Local/State Road
- Minor Local Road
- Rockfall Exclusion Zone
- Passive open space
- Active recreation in lake
- Active open space
- Major Hub

Note:
Final location of all new trails will be subject to further environmental considerations, site survey and design development work.

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RECREATIONAL STRATEGY

The recreational strategy addresses the way visitors use and experience the site. While each hub and precinct has a primary recreation focus many spaces may offer a diversity of recreation opportunities. Key features and experiences of the park generally fall into the following recreational categories.

PASSIVE

Provide passive recreation options including walking trails, picnic and BBQ facilities, formal and informal play spaces, bird watching, bush walking, tracks and spaces for quiet contemplation

ACTIVE

Provide active recreation opportunities such as sports fields/oval/kickabout spaces, playgrounds, bike and shared paths, water play and potentially swimming in the quarry lake (in the Quarry Void) and sport facilities (located in OMV)

ADVENTURE

Adventure recreation has the potential to deliver 'drawcard' attraction for the park and a unique offering for visitors. The siting of adventure recreation facilities needs to consider capitalising on the character of the site and setting, dramatic height changes, immersion in the environment, the type of experiences offered and other users and uses, whilst being mindful of noise and environmental impacts.

COMMERCIAL VIABILITY

Explore short and long-term viability of commercial ventures on site including adventure recreation, potential Crusher Plant uses (food and beverage, arts/adventure hub), OMV (local community/sports/small events hub) or Quarry (special event hub) and other minor opportunities for small amenities around the Quarry

SUSTAINABILITY

Consider ways to introduce visitors to sustainable principles on site such as renewable energy production, water harvesting and reuse, education accommodation, recycling or up-cycling of materials and construction methodologies interpretation

TOURISM

Explore opportunities for regional tourism elements including adventure tourism, regional play facilities and iconic elements such as the Diatreme wall, swimming lake, improved walking track links, rare bushland, Quarry Void landscape and possible overnight accommodation

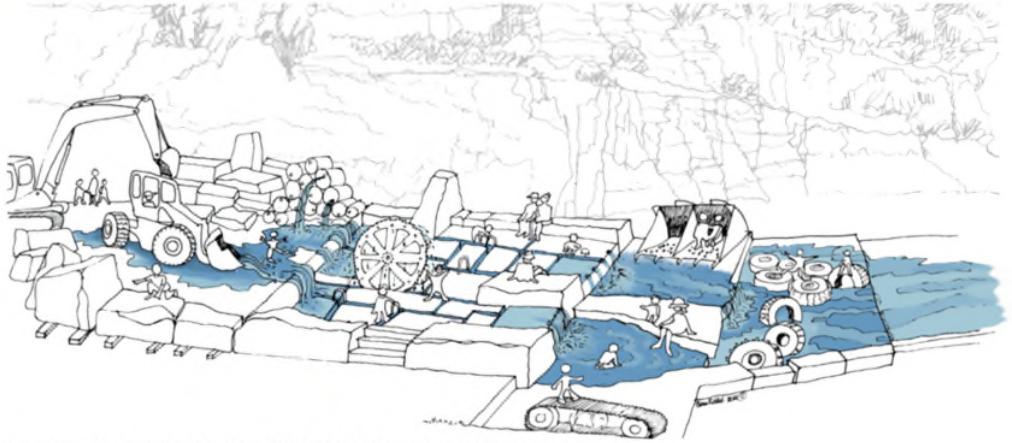
1. Old Mans Valley playground & passive open space
2. Old Mans Valley sportsfield and space for community events
3. South-west recreation with passive open space, adventure play & recreation, small scale accommodation (bushland and education focus) and portal to national park
4. Quarry void open parklands and event space
5. Crusher Plant amenities with passive open space and adventure opportunities, flexible community venues, cafe and cultural/heritage hub
6. Existing active recreational facilities within Hornsby Park Aquatic Centre
7. Manage the interface of exclusion zones within the quarry with low visibility safety features that do not impact recreation and general site access.

RECREATION STRATEGY

ATTACHMENT 1 - ITEM 6

Example of informal nature play - building a cubby

Example of splashpad



Indicative concept sketch of informal water play referencing the industrial quarrying history of the site

MOSAIC OF PLAY STRATEGY

The mosaic of play strategy offers visitors choice and diversity of experiences, taking advantage of the various opportunities that the unique setting and scope of Hornsby Park offers. Demand for play within Hornsby is increasing and Hornsby Park offers valuable opportunities to meet sophisticated community expectations for play. The Park will provide dedicated playground settings within the following hubs as well as play trails connecting those spaces:

OLD MAN'S VALLEY (OMV)
Inclusive Play Space (Theme: Valuing Our Bushland)
As the key arrival precinct, OMV offers opportunities for a generous play space that caters for all ages, cultures and abilities. The traditional play offering in OMV is to be balanced with the arrival and orientation requirements and the passive, active and adventure recreation needs of Park visitors. The play space is supported by picnic facilities, a nearby cafe, and amenities block all within a regenerating bushland setting.

QUARRY VOID
Informal Bush Play (Theme: Nature Play)
This play area is set amongst native vegetation within Quarry Void, providing play challenges crafted from local materials such as logs, branches, boulders, mulch, pebbles and sands.

Informal Water Play (Theme: Industrial Quarrying)
Located near the freshwater wetland in Quarry Void, a shallow water play area references the quarrying processes by providing quarry artefacts and machinery amongst traditional quarry blocks and stone stockpiles.

CRUSHER PLANT
Adventure Play Space (Theme: Quarry Processes)
Linking into the themes of the Crusher Plant precinct as an adventure recreation hub, there is an opportunity for a supervised outdoor adventure play space for children to teenagers that has both fixed movable structures on which children can climb and play. The space should also contain equipment and loose materials for building projects and modifying pre-existing structures.

EXISTING HORNSBY PARK
Local Playground (Theme: Urban Play)
A modest and accessible play space in existing Hornsby Park that caters for local Hornsby residents within the built up CBD area. This playground has an amenities block and picnic facilities. Little change is required to this space beyond better integration with the Canopy Skywalk and upgraded park entry.

SUPPLEMENTARY PLAY
Supplementary play provision offers innovative spaces and activities throughout other areas of the Park, which complement each other. Supplementary play offers include:

- Traditional Splashpad
- Play Program space
- Geocache/scavenger/discovery trail
- Discovery Nature trails
- Nature Play Program: play activity spots throughout the Park

Lighting types and areas within Hornsby Park

LEGEND

- Bushland
- Crusher Plant + South West Precinct
- Old Mans Valley + Road Access
- Quarry Road Access+ Quarry Void Recreation and Event Space + Quarry west
- Major Hub
- Minor Hub
- Major Local/State Road
- Minor Local Road
- Site Boundary

1:6000 @A3 — 0 60 120 180 300m

LIGHTING STRATEGY

The lighting strategy for the park is to align with expected uses and management for each precinct. Considerable care will need to be applied in lighting design such as minimising potential impacts to ensure sensitive bushland environments and native fauna are not compromised and that local residential amenity is not impacted. It is envisioned that OMV will have the largest evening and night use, while the Quarry Void may host occasional special uses. The surrounding bushland paths are unlit but with unlimited access. The lighting design of these precincts will need to reflect this use and access. LED lighting will be used as part of the lighting strategy.

PRECINCT A: OMV + ACCESS ROAD

Day, evening, emergency and event access

Pedestrian Lighting | Sports Lighting | Road Lighting

PRECINCT B: QUARRY VOID + ACCESS ROAD + PRECINCT H: QUARRY WEST

Day access, emergency access, event access

Pedestrian Lighting | Road Lighting | Structure Lighting | Performance Installations

PRECINCT C: BUSHLAND

Day access - generally unlit paths and trails, lit roads, Bridge Road entry and Quarry Road

Road Lighting only

PRECINCT F: CRUSHER PLANT + PRECINCT G: SOUTH WEST PRECINCT

Day and evening access

Pedestrian Lighting | Pedestrian Lighting | Road Lighting

LIGHTING STRATEGY

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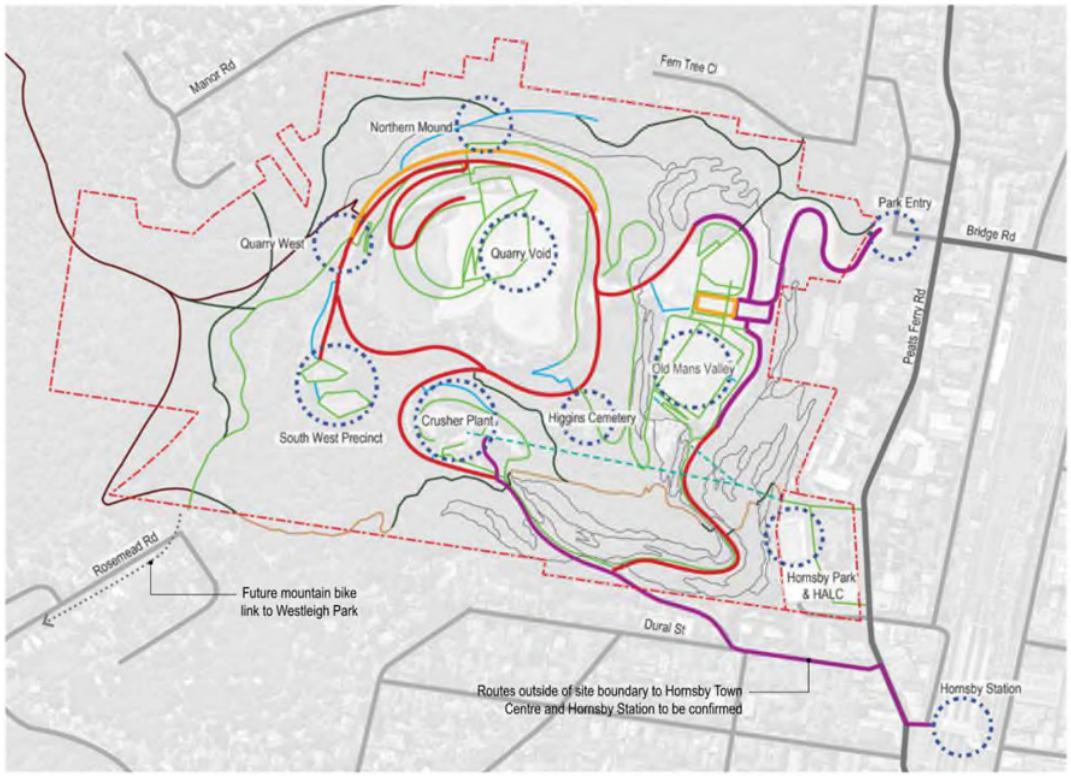

Circulation network within Hornsby Park

LEGEND

- Major Hub
- Minor Hub
- Major Local/State Road
- Minor Local Road
- Site Boundary

1:6000 @A3 0 60 120 180 300m

Note:
* Bicycle routes on Managed Access Roads limited to up hill access only for grades steeper than 1:10. Refer Bicycle Circulation Strategy for more detail.
Refer to Circulation Strategy Typical Sections in Part E of this report for more detailed information on Network/Path typologies.
Links to Hornsby Town Centre and Hornsby Station outside of Park boundaries to be confirmed. Final location of all new trails will be subject to further environmental considerations, site survey and design development work.
Canopy Skywalk schematic route joining Hornsby Park, OMV, Crusher Plant. Final alignment to follow principles in Part E.

CIRCULATION NETWORK STRATEGY

The circulation network strategy provides a site-wide overview of all the paths, tracks, trails, walkways and roads within the park and how they interact together to form an integrated circulation network. Internal connections within the circulation network are focused on hubs and external links to the surrounding streets, Town Centre and Berowra Valley National Park.

First time and returning visitors should be able to easily navigate the site regardless of the mode of transport used to travel to and around site. All managed access roads are to be shared zones with reduced vehicle speeds. Specific information on pedestrian, bicycle and vehicle circulation can be found on the following pages. For additional detailed information refer to specific circulation type strategies and precinct sections of this report.

CIRCULATION NETWORK

NETWORK TYPES	TYPICAL COMPONENTS
Two-way Road Typical widths 9-13m Max 1:8 gradient	Two lane road Separated bicycle* / pedestrian path
Managed Access Road Typical widths 7m Max 1:7 gradient	Shared pedestrian / bicycle* / managed vehicles
Shared Road Typical widths 4m Max 1:20 gradient	Shared pedestrian / bicycle / managed vehicles
Accessible Path Typical widths 3-4m Max 1:20 gradient	Shared pedestrian / bicycle path
Bush Trail Typical widths 1-2m Max 1:5 gradient	Pedestrian path
General Path Typical widths 2-3m Max 1:2.5 gradient	Pedestrian path including stairs
Heritage Stairs and trail Typical widths 2-3m Max 1:2 gradient	Pedestrian trail including existing sandstone stairs
Canopy Skywalk Typical widths 2-3m Max 1:14 gradient	Pedestrian canopy walkway
Rosemead Trail links Typical widths 2-3m Max 1:10 gradient	Shared pedestrian / bicycle
Mountain Bike Tracks Typical widths 0.5-1m Max 1:2 gradient	Mountain bike only

CIRCULATION NETWORK STRATEGY

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ATTACHMENT 1 - ITEM 6

Pedestrian access and circulation plan

LEGEND

- Park pedestrian entries
- Site Boundary
- Major Hub
- Minor Hub
- Major Local/State Road
- Minor Local Road

1:6000 @A3 0 60 120 180 300m

PEDESTRIAN CIRCULATION STRATEGY

The pedestrian circulation strategy addresses the various tracks, trails, paths and walkways that are primarily for pedestrian movement within the park. As the topography of the Park is extreme and difficult to transverse in places, the strategy classes the various routes in terms of accessibility ensuring that the majority of the site can be accessed via accessible routes and general routes.

A potential future pedestrian link via a Canopy Skywalk from OMV to the Aquatic Centre would be required to complete an accessible path network stretching from the Quarry Void up to the Town Centre, a distance of 130 vertical meters.

PEDESTRIAN ROUTE ACCESS

ROUTE TYPES	TYPICAL PATH TYPE
Accessible Routes Universal Access and gentle terrain	Core precinct paths Precinct link walkway Cantilevered access walkways Canopy Skywalk
Canopy Skywalk schematic route joining Hornsby Park, OMV, Crusher Plant. Final alignment to follow principles in Part E.	
General Routes Steep paths and stairs and some steeper terrain	Shared zones Non core precinct paths
Walking and Hiking Routes Gravel or bare paths and varied terrain	Bush tracks and trails Heritage stairs and trails Rosemead Trail
Separated pedestrian and vehicle route	Streets and links outside park boundaries

Note:
Alignments indicated are schematic. Specific path alignments will be site evaluated and subject to detail design.
Links to Hornsby Town Centre and Hornsby Station outside of Park boundaries to be confirmed.
Refer to the Glossary of Terms in Part E of this report for route definitions.
Final location of all new trails will be subject to further environmental considerations, site survey and design development work.

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Vehicle access and circulation plan

LEGEND

- Park bicycle entries
- Site Boundary
- Major Hub
- Minor Hub
- Major Local/State Road
- Minor Local Road

1:6000 @A3 0 60 120 180 300m

Note:
Alignments indicated are schematic. Specific bicycle path alignments will be site evaluated and subject to detail design.
Bike racks will be included at key locations.
Refer to the Glossary of Terms in Part E of this report for route definitions.
Links to Hornsby Town Centre and Hornsby Station outside of Park boundaries to be confirmed.
A dashed yellow line in mountain bike colours connecting to Rosemead Road.
Final location of all new trails will be subject to further environmental considerations, site survey and design development work.

BICYCLE CIRCULATION STRATEGY

The bicycle circulation strategy encompasses the bicycle paths that are primarily shared with pedestrians within the park. The strategy also covers the mountain bike trails and BMX jump track.

Like the pedestrian circulation strategy the landform of the park has a significant impact on the bicycle circulation within the park. All managed access roads within the park are to be shared zones. The strategy classes the various routes in terms of accessibility to help cyclists navigate the difficult terrain. Slowing bike speeds on some of the steeper paths is a key concern to be addressed through design and management of the Park. For routes steeper than 1:10 bicycle access down hill is prohibited with signage directing cyclists to alternative routes.

Integrating an E-bike network over the park circulation network is a future goal of the strategy, with E-Bike hubs located at various locations throughout the park and Town Centre.

BICYCLE ROUTE ACCESS

ROUTE TYPES	TYPICAL PATH TYPE
Accessible Route All bicycle types and gentle terrain	Core precinct paths Precinct link walkway
General Route Max 1:10 gradient All bicycle types and some steeper terrain	Requires methods to reduce bicycle speed for routes of 1:10 Non core precinct paths Rosemead Trail
Dashed line for up hill routes only due to grades steeper than 1:10	
Proposed Mountain Bike Tracks Specialist bicycle types and varied terrain	Realigned and new trails
Existing Mountain Bike and BMX tracks Specialist bicycle types and varied terrain	Existing trails BMX jump track
Separated pedestrian and vehicle route	Streets and links outside park boundaries
Future mountain bike link to Westleigh Park	

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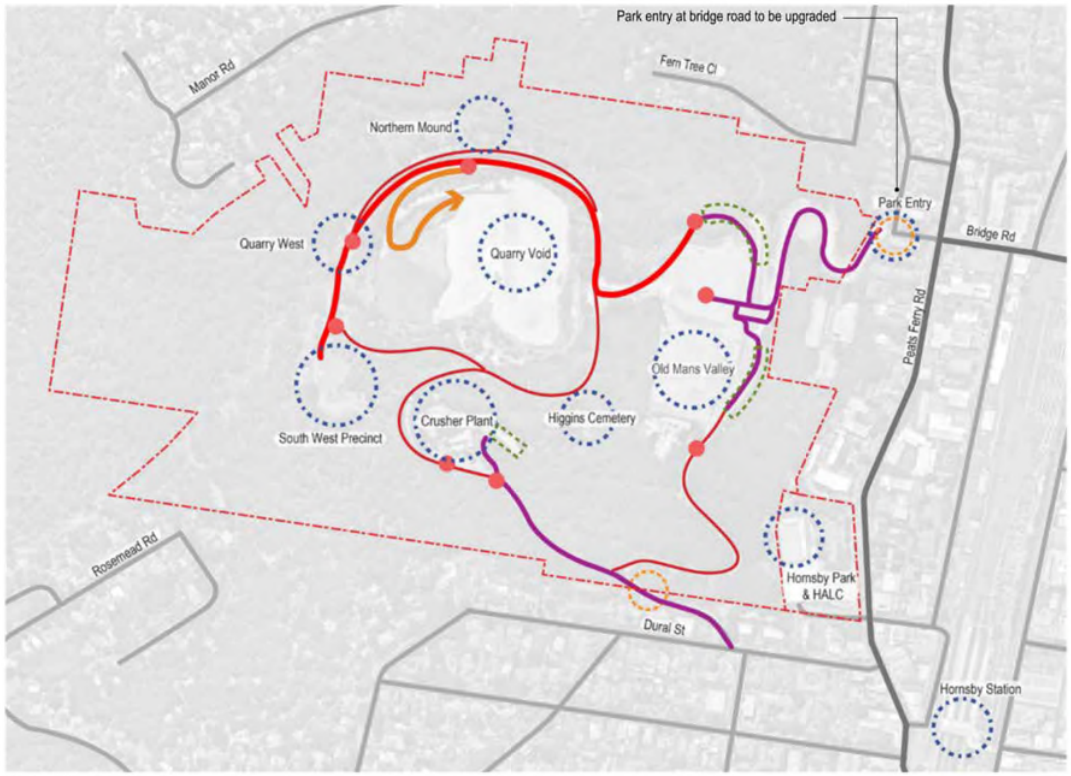
ATTACHMENT 1 - ITEM 6



Vehicle access and circulation plan

LEGEND

- Park vehicle entries
- Potential vehicle turning
- Car Park Location
- Major Hub
- Minor Hub
- Site Boundary
- Major Local/State Road
- Minor Local Road

1:6000 @A3 — 0 60 120 180 300m

Notes:
Alignments indicated are schematic. Specific road alignments will be site evaluated and subject to detail design.
Secondary managed access road to include shared and one way vehicle routes depending on site conditions.
Some heavy vehicle restrictions may apply.

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VEHICULAR CIRCULATION STRATEGY

The vehicular circulation strategy addresses public and private vehicle movement within the park to ensure the safe movement of pedestrians, cyclists and vehicles. All managed access roads are to be shared zones to ensure the hierarchy of users is pedestrians, cyclists, shuttle buses / maintenance / emergency vehicles. Three key aspects make up this strategy as follows:

VEHICLE CIRCULATION

Ensure vehicle circulation for the site minimises overall footprint and limits the extent of private vehicle access to the Entry, OMV and Crusher Plant precincts. Alternate access to the Void and Crusher Plant via a shuttle service is being explored, while allowing for future provision for autonomous public vehicles and E-bikes.

SHUTTLE SERVICE

Potential for a flexible shuttle service around the site that stops at key hubs (as and when they come online) that is linked into a wider large scale service that connects the local town centres (Hornsby, Waitara, Asquith, etc) in line with sustainability goals, low emission technologies should be considered. This wider service is subject to a business plan and viability assessment. The principle of shuttle service includes a loop with shuttles operating on a 20 minute headway that starts from Hornsby Station, followed by OMV, Quarry Void and Crusher Plant. At initial opening, this loop may be limited to within the park only. The shuttle service will be flexible to be able to evolve with the needs of community and the future use of the park.

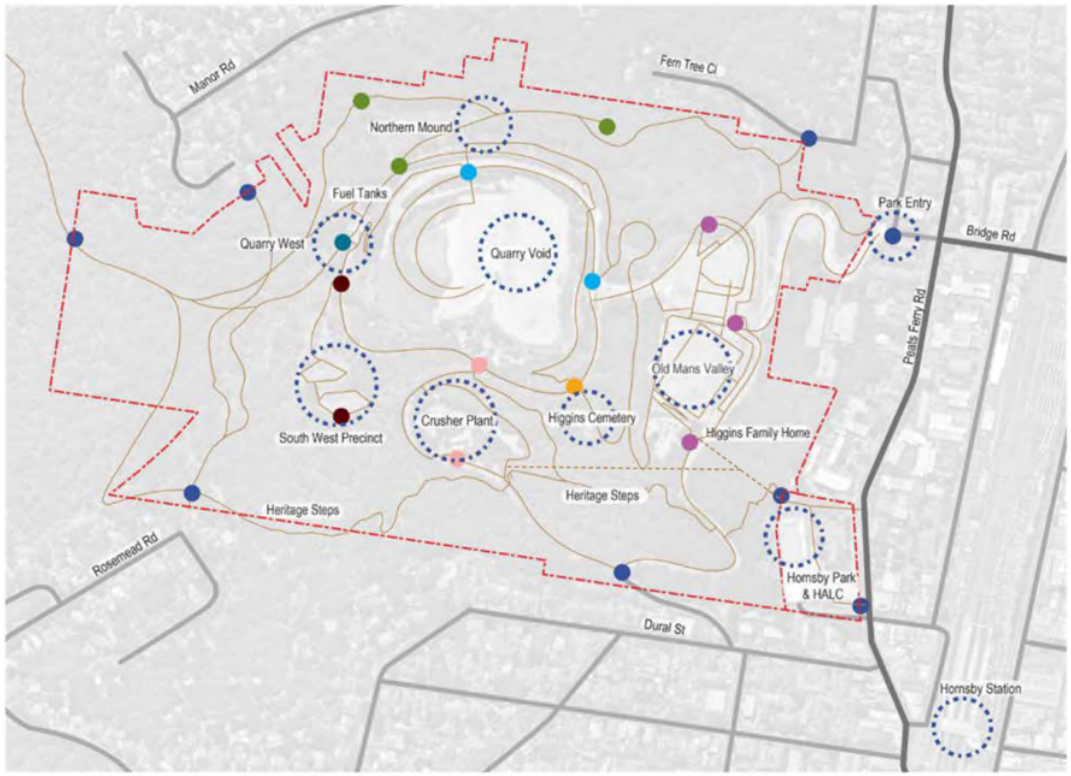
SUPPORT AND EMERGENCY ACCESS

Provide both maintenance vehicle access and circulation within site and emergency (fire, ambulance, etc) vehicle access and circulation within site.

VEHICLE ROUTE ACCESS

ROAD TYPES	PERMITTED VEHICLE TYPES
All Access Road	Private Vehicles Shuttle Vehicle Emergency Vehicles Maintenance Vehicles Event Vehicles
Managed Access Road	Shuttle Vehicle Emergency Vehicles Maintenance Vehicles Event Vehicles
Secondary Managed Access Road	Shuttle Vehicle Event Vehicles Emergency Vehicles Maintenance Vehicles
Support Vehicle Access Road	Emergency Vehicles Maintenance Vehicles Event Vehicles (including shuttles)

VEHICLE CIRCULATION STRATEGY



Wayfinding and signage diagram

WAYFINDING AND SIGNAGE STRATEGY

The wayfinding and signage strategy is a key underlying strategy supporting a number of other strategies within the Park. This strategy pulls together elements such as the precincts, hubs, circulation and interpretation strategies, into a network where each is linked to the other in a way where first time and returning visitors alike are able to easily navigate the large site without experiencing loss of direction or safety concerns.

Signage should be easily visually categorised by precinct and type (wayfinding, orientation, information, safety, interpretation, etc), but still set within a park-wide family of signs. This can be achieved through the use of colours (precinct), sign shapes (types) and overall aesthetics (fonts and graphic design).

The adjacent wayfinding and signage strategy plan shows potential signage locations at the entrance to each precincts.

LEGEND

1:6000 @A3 — 0 60 120 180 300m

- Park Entry Signage
- OMV Precinct Signage
- Quarry Void Precinct Signage
- Quarry West precinct Signage
- South West Precinct Signage
- Quarry West precinct Signage
- Higgins Cemetery Precinct Signage
- Northern Mound Precinct Signage
- Site Boundary
- Path Network
- Major Local/State Road
- Minor Local Road
- Canopy Skywalk schematic route joining Hornsby Park, OMV, Crusher Plant. Final alignment to follow principles in Part E.

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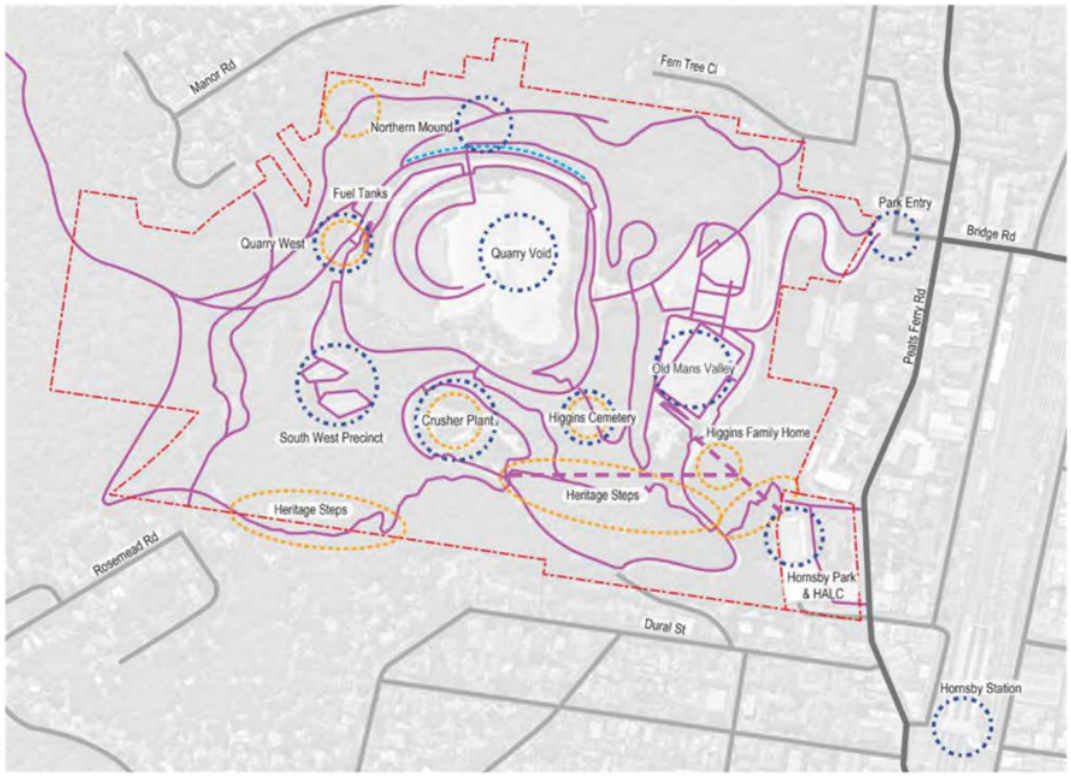
ATTACHMENT 1 - ITEM 6



Heritage and interpretation plan

LEGEND

- Cultural trail routes
- Canopy Skywalk schematic route joining Hornsby Park, OMV, Crusher Plant. Final alignment to follow principles in Part E.
- Cultural Heritage Points of Interest
- Quarry Stormwater Channel
- Site Boundary
- Major Hub
- Minor Hub
- Major Local/State Road
- Minor Local Road

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HERITAGE AND CULTURAL INTERPRETATION STRATEGY

This strategy addresses the heritage and cultural interpretation of the site in line with Connecting with Country Draft Framework by Government Architect NSW. The site has a long rich history of Aboriginal occupancy, spanning generations of use by the Darug and Guringai peoples. This story of spiritual custodianship of the land and water, is an integral overlay of the park. The more recent 100+ years of European heritage on the site not only drastically changed the landform of the space, but played a part in the development and expansion of northern Sydney.

Integrating the story of both Indigenous and European heritage together into a new phase of restorative landscape is an important and interesting learning opportunity for visitors and educational users. The heritage and cultural interpretation strategy covers the following elements:

INTERPRETATION

Layer the Interpretation strategy of the site using the various hubs as locations to create site-wide integration between all elements of the Park ensuring interpretation is a seamless experience.

HERITAGE AND HISTORY

Explore and interpret the rich natural and cultural heritage and history of the site from the underlying volcanic geology, Aboriginal occupancy and use, early timber getting and settler land grants through to farming, orcharding, the cemetery, heritage steps, quarrying and radio astronomy research, in addition to other elements and key themes that may be added in consultation with Hornsby Aboriginal and Torres Strait Islander Consultative Committee (HATSIC).

WATER STORY

Interpret the story of the existing natural creeks, groundwater charging and the modification of drainage systems through the site's evolution including the proposed reuse of water in the constructed quarry lake and wetland systems.

QUARRY STORY & CULTURAL TRAILS

Utilise the various elements of the quarry narrative to tell the story of the quarry including, Sydney's demand for road building materials, the geology of the site and the dramatic formation of the Diatreme and subsequent transformation of landform, from the quarrying process including the spoil, crusher plant, fuel tanks, pipework and roads.

VEGETATION STORY

Explore the story of the unique forest form, impacts of the rich diatreme soils and how the landscape modified by the quarry has changed and degraded, before the restoration of the site through the current works.

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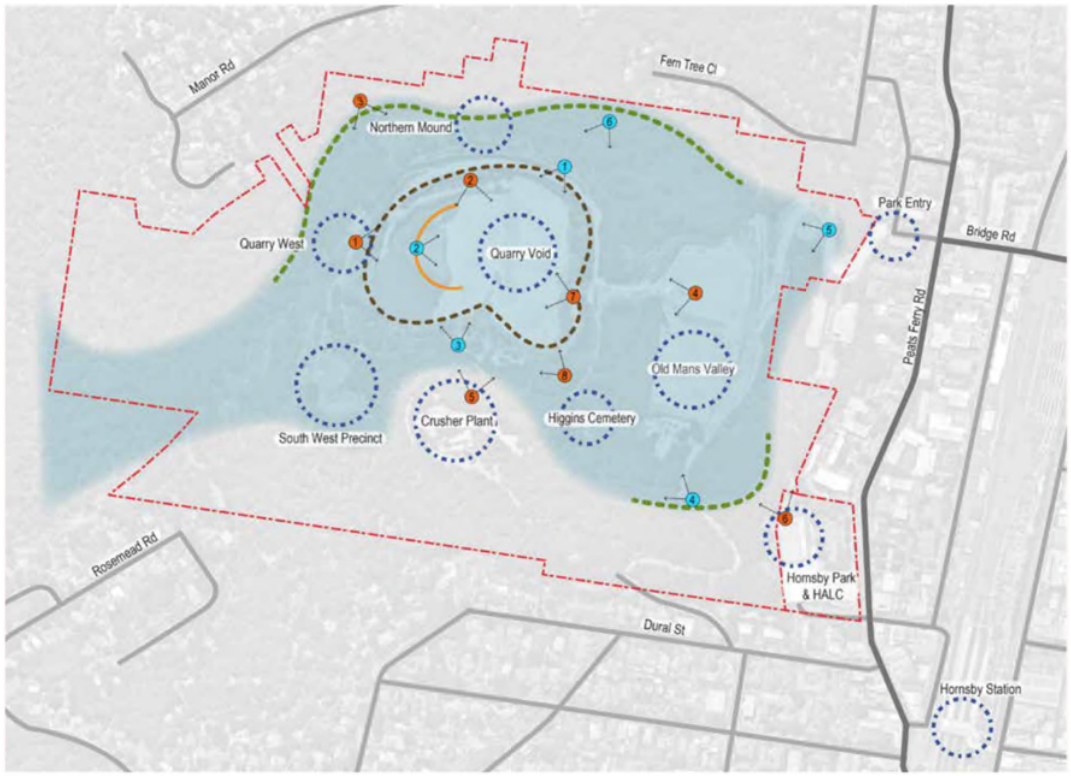

View catchment and locations diagram

LEGEND

- Point of interest (Quarry Walls)
- Point of interest (Bushland)
- Key View Opportunities
- Formal lookouts
- View catchment
- View opportunities along the raised walkway
- Major Hub
- Minor Hub
- Major Local/State Road
- Minor Local Road
- Site Boundary

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VIEWS AND LOOKOUTS STRATEGY

The views and vistas strategy documents the best existing viewpoints within the Park and describes how the viewers experience is optimised. With a site as large and varied as Hornsby Park there will be some 'Hero' views and vistas that capture the imagination and express the scale, history, and natural beauty of the landscape. For these views it is critical to optimise accessibility and they consequently are constructed as formal lookouts.

There will also be secondary views and vistas that add to the experience of the space, sitting in the background building the layers of what makes a particular area, precinct or recreational activity special. These views are not the primary focus of their locations but are an integral aspect of the site and also deserve to be preserved and celebrated.

FORMAL LOOKOUTS

1. View from quarry west into void and diatreme wall
2. View from lift structure, 360 view into the Quarry
3. Lookout at northern mound of the Quarry
4. OMV view into Quarry and Quarry Void
5. Lookout at Crusher Plant into the Quarry
6. View point at Hornsby Park & HALC down to OMV, directional view drawing people into the site
7. RL 88 bench view to Quarry Void and western Bushland
8. Lookout near Higgings Cemetery into Quarry Void

OTHER VIEW OPPORTUNITIES

1. Views into Quarry Void from RL 90 Road
2. Views from pedestrian raised walkway into Quarry and diatreme wall
3. Views from southern access road of Quarry into Quarry Void and northern slopes
4. Views into OMV and Quarry from Canopy Skywalk
5. Views into Quarry Void and Berowra National Park from main access road
6. Views into quarry and southern slopes from high point on northern bush track

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PART D - MASTER PLAN DESIGN AND IMPLEMENTATION

ATTACHMENT 1 - ITEM 6

Title

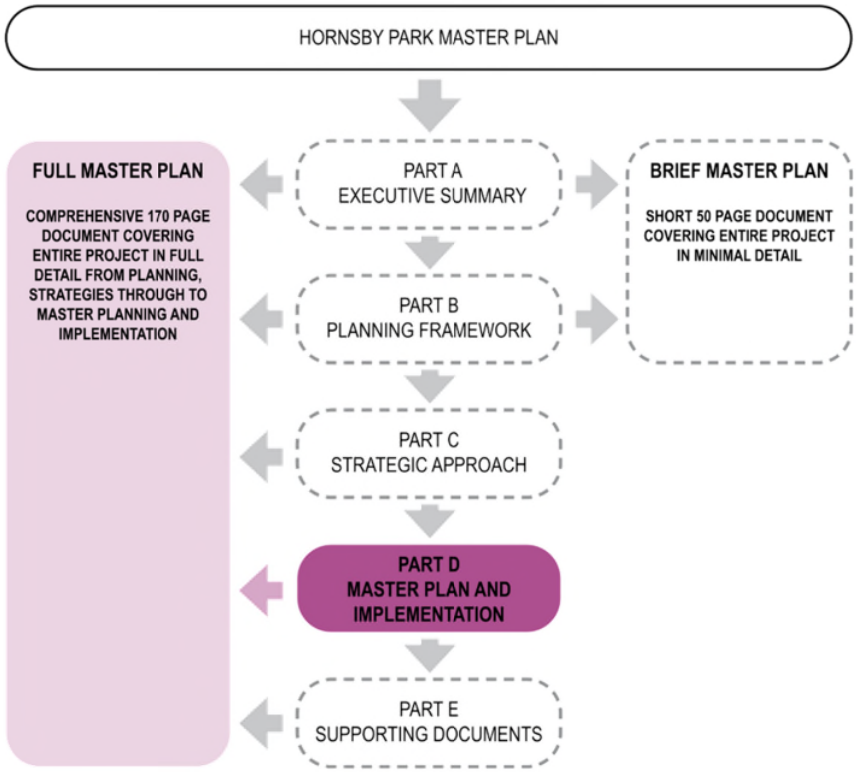

TABLE OF CONTENTS AND REPORT STRUCTURE

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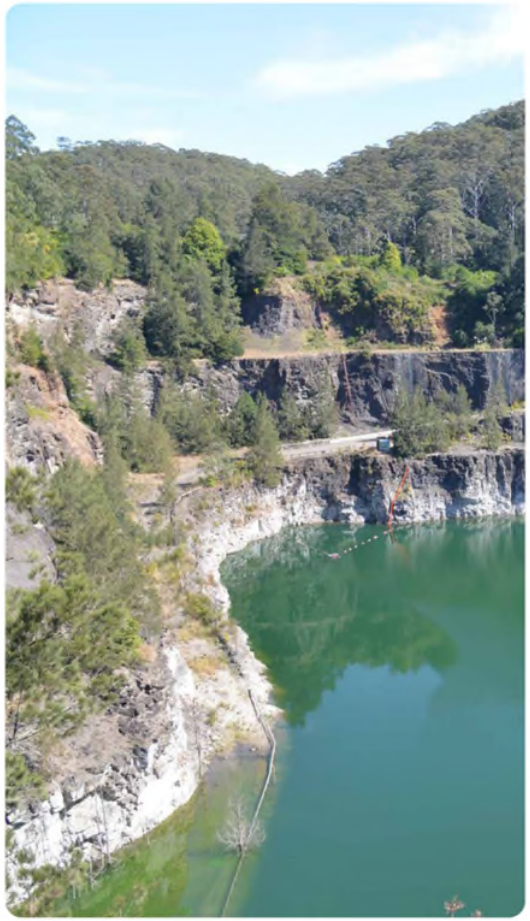

Existing Quarry Walls

MASTER PLAN

The Master Plan is the guiding report for the development of Hornsby Park through the community engagement, design and construction phases and the revision of the Plan of Management. The Master Plan provides the framework for the site and outlines the design intent of the various aspects of the park, from the over aching strategies though design decisions and layouts to materials and plant selections. It is an in depth document that covers all aspects of the design of Hornsby park.

One of the key themes running though the Master Plan is retaining and celebrating the 'Quarry-ness' of the park. The quarry and subsequent landform alterations are such integral parts of the site that it could be said without these elements there would not be a park in this location.

WHAT WE MEAN BY 'QUARRY-NESS'?

'Quarry-ness' encompasses the concept of retaining the character and drama of the quarry's form and experience into the next phases of the site's role as a major regional park. Three elements of the future quarry experience will be core to that appreciation by the visitor:

- **Drama and scale** – ensuring that the full quarried face of each wall remains clearly visible from the rim and the base of the Quarry Void.
- **Contrast and integrity** – retaining a visible distinction between the parts of the quarry that will remain largely undisturbed since quarrying finished and those new works necessary to facilitate safe visitor experiences
- **Promise and reveal** – progressively revealing the Quarry Void with selected vistas on approach before offering a full appreciation of the whole quarry from formal lookouts around its perimeter.

Central to the full experience of these elements of the quarry will be in conserving the unique characteristics of each of the four quarry walls, as outlined in the Master Plan.

MASTER PLAN STRATEGIES

The strategies are tangible design outlines based on the opportunities and constraints of the site. These strategies underpin how the Vision, Objectives and Principles of the park are translated into the design intent of the Master Plan.

PRECINCTS

Due to the size and scale of the park, the site has been divided into a number of major and minor precincts.

MAJOR PRECINCTS

Major precincts are seen as the high value core areas of the park, the areas which will receive the majority of visitors and handle bulk of the recreational and commercial requirements of the park. The major precincts are a direct response to achieving the Objectives and Principles of the park.

MINOR PRECINCTS

Minor precincts are generally smaller areas, often part of major precincts, that contain specific elements or themes that are separate to the themes of the Major Precinct it is located within. Alternatively, minor precincts are often areas which require additional works to make them safe usable spaces., such as the Northern Mound

REALISING THE PLAN

Due to the size and scale of the works involved in Hornsby Park will be delivered in two stages over a period of years.

STAGE 1

Precincts that comprise Stage 1 works form the core character and identity of the park and include those works required to deliver visitors safely to most parts of the park.

Stage 1 areas will include bushland restoration across the site, Old Mans Valley and entry, the Quarry Void and associated access paths and roads, Higgins Cemetery and the Northern Mound. Stage 1 may be delivered in smaller packages.

The Park will be functional and viable when the Stage 1 works are completed, however the Stage 2 works are important for the full realisation of the Park's potential.

STAGE 2

The Stage 2 works comprise precincts that either support the Stage 1 precincts or facilities that require a strong existing visitor base that only an established park can generate.

Stage 2 works include the Crusher Plant adaptive-reuse, the Southwest precinct and the Quarry West precinct.

Some of these precincts include opportunities for partnerships between Council and third-party businesses for the activation of the spaces.

The Stage 2 works will ensure the continued long-term financial viability of the park and bring opportunities for new users and visitors to the park.

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HORNSBY PARK MASTER PLAN - PART D

(1) Park vehicle entry from Bridge Road (2) Primary pedestrian entry from Town Centre (3) Park link to Berowra Valley National Park (4) Park Entry Plaza (5) Quarry Void access point and lift (6) Crusher Plant access from Quarry Road (7) Restoration and adaptive reuse of Crusher Plant (8) Minor pedestrian entry from Rosemead Road (9) Key lookouts

OVERALL SITE MASTER PLAN

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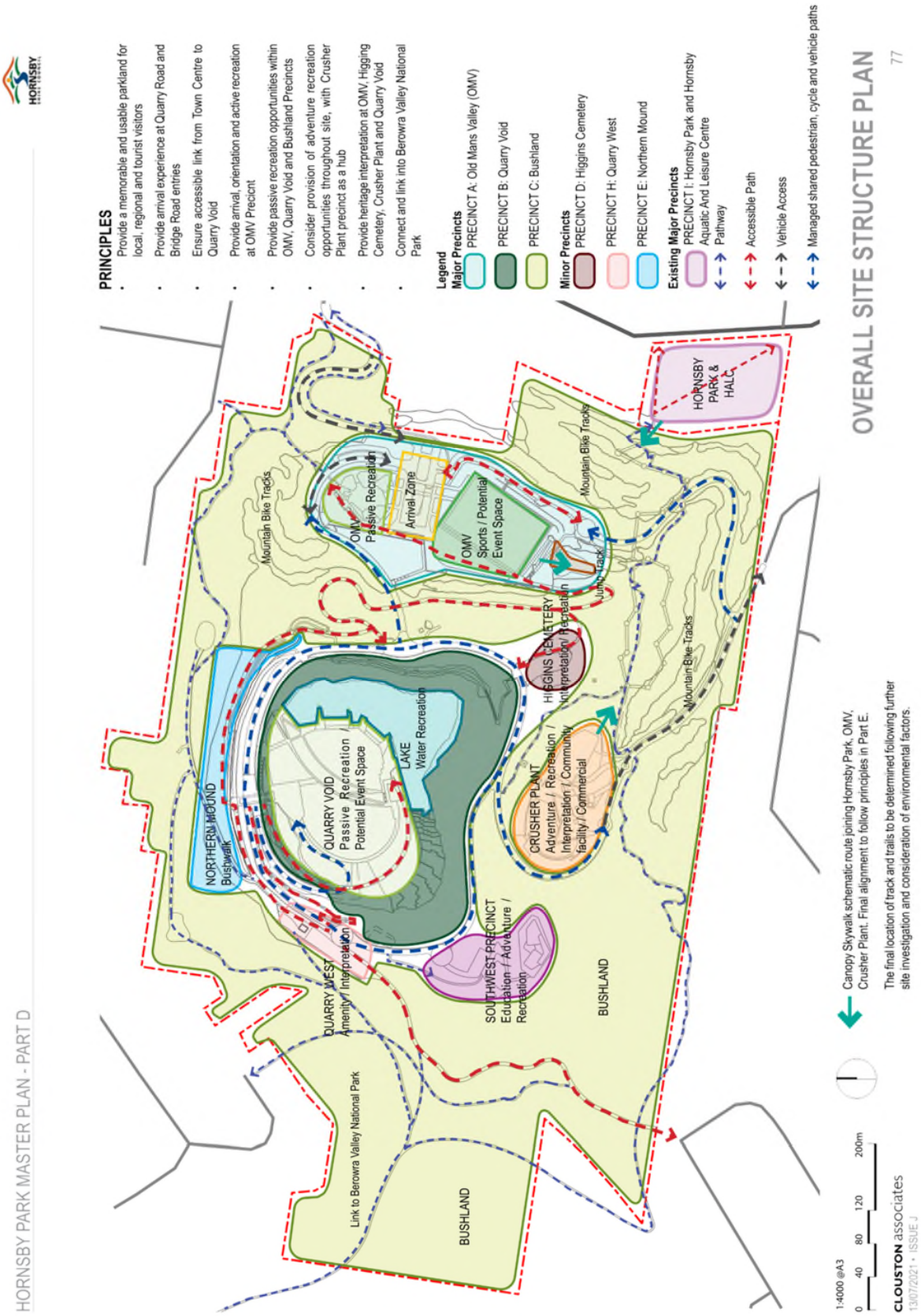

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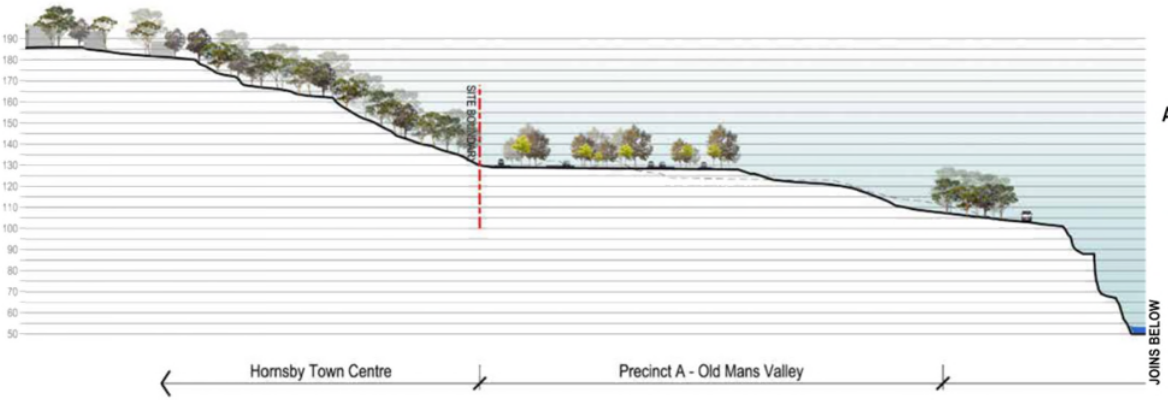

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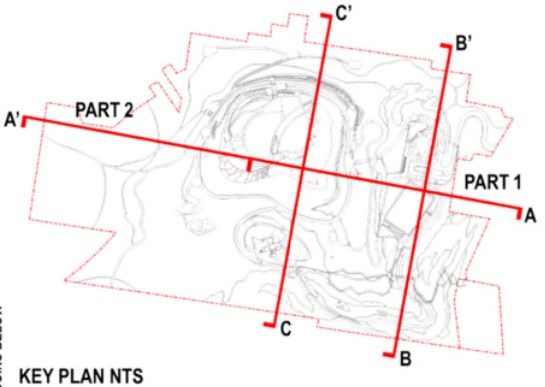

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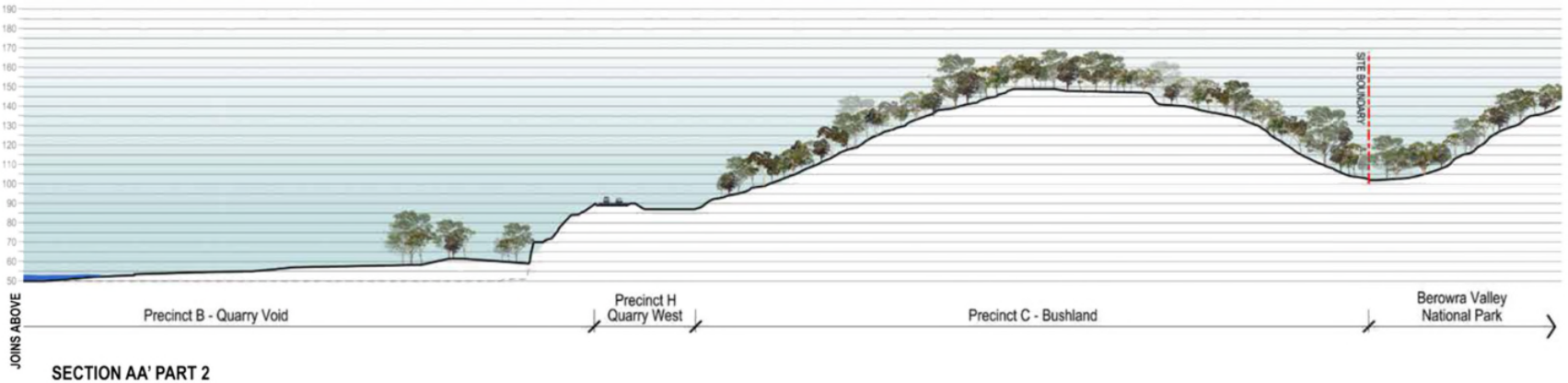

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OVERALL SITE SECTIONS

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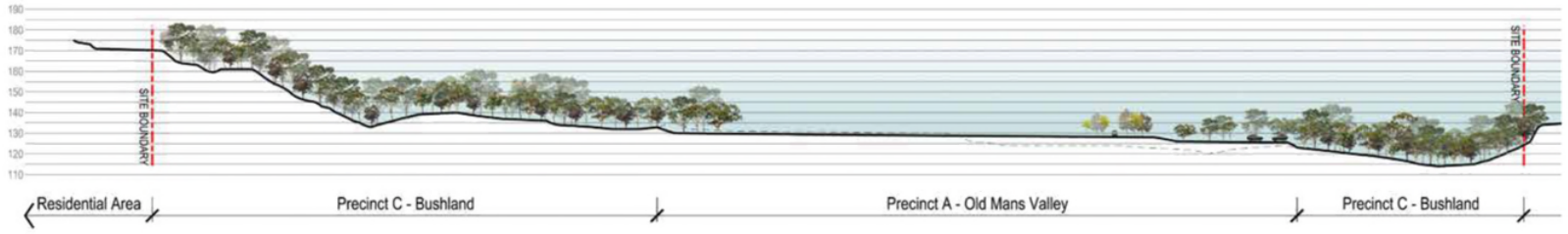

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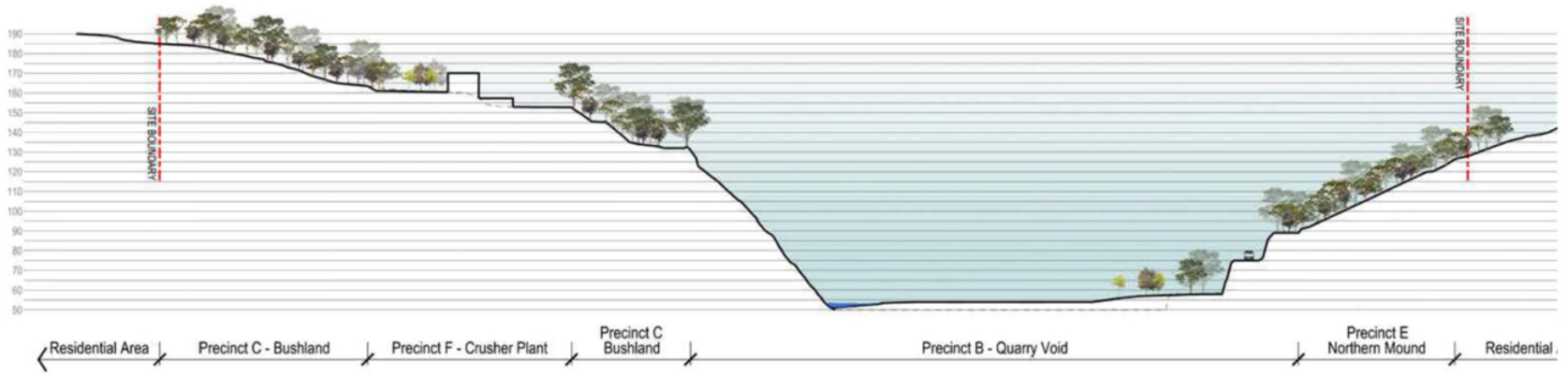

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OVERALL SITE SECTIONS

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Aerial view of site looking west over OMV, Quarry Void towards Berowra Valley National Park from above Hornsby Town Centre

OVERALL SITE PERSPECTIVE

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Existing Quarry Bushland and Quarry Void

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RL 90 quarry track

WHAT ARE PRECINCTS?

Given the various type of landscape types and associated, the created opportunities for the site have been divided into a number of major and minor precincts. These precincts are based on a combination of the existing features, proposed uses and expected management of the different areas of the park.

MAJOR PRECINCTS

Major Precincts are seen as the core areas of the park, the areas which will receive the majority of visitors. The Major Precincts are a direct response to achieving the Objectives and Principles of the Park.

PRECINCT A - OMV

Old Mans Valley is the first precinct most visitors will experience when arriving at the park. OMV is first and foremost a welcome and orientation space for the entire park and secondly as an active and passive recreation hub in the park. Given its proximity to the Town Centre, it will necessarily cater to visitor recreation needs. Visitors arriving in OMV will be able to move out from this point to other precincts within the park via shuttle services, bikes or the path network. Small scale and local events and activities are the ideal scale for OMV.

PRECINCT B - QUARRY VOID

Given its dramatic scale and character, the Quarry Void is the major draw card of the Park offering a unique experience unrivalled in the Sydney Region. Diatreme wall is a geological feature of heritage significance that cannot be found anywhere else in Australia and it creates a dramatic backdrop to the Quarry Void. The Quarry Void is ideally suited to special events that may be a draw card for district and regional visitors and tourists.

PRECINCT C - BUSHLAND

The Bushland precinct makes up the majority of the park and its protection and restoration is of the upmost importance. The Blue Gum Diatreme Forest ecological community is endangered and extremely rare. Accessible paths connecting the various precincts wind through the bush, while tracks and trails for more adventurous visitors connect into wider networks such as the Rosemead Trail and Great Northern Walk. Visually and physically the Bushland Precinct connects into the Berowra Valley National Park and provides a number of minor pedestrian entry points into the Park.

PRECINCT F - CRUSHER PLANT

Apart from the Quarry Void itself, the most significant remnant of the quarry's workings is the Crusher Plant. Opportunities for adaptive reuse of the buildings as an artistic or adventure and amenities hub should be further explored to ensure the Precinct is able to provide an anchor to the park along its southern edge. Direct pedestrian access from Hornsby Station within a 15 minutes walk is a significant factor in the opportunities for the Crusher Plant.

PRECINCT G - SOUTH WEST PRECINCT

The South West Precinct provides a space for accommodation, learning and adventure recreation. Located in one of the most remote locations of the Park and close to the Berowra Valley National Park, access to this precinct is difficult, but this remote location also offers opportunities to better connect to the bush and the National Park.

MINOR PRECINCTS

Minor Precincts are generally smaller areas, sometimes part of Major Precincts, that maybe sensitive spaces on environmental and heritage grounds and which would not accommodate large number of visitors.

PRECINCT D - HIGGINS CEMETERY

Higgins Cemetery is a historic small family cemetery located within the park. It offers a rich connection to the pre quarry European history of the site and helps anchor the various historic features across the park through the interpretation strategy.

PRECINCT E - NORTHERN MOUND

The Northern Mound would ultimately form part of the Bushland Precinct after significant earth works are completed to make the mound safe. Made entirely from quarry spoil the mound is extremely unstable, without topsoil, as evidenced by no bush regrowth 30 years after the quarry stopped using the mound for dumping. What might have been seen as a difficult problem is actually a boon for the overall park, with material required to be removed from the mound acting as the ideal foundation for the extensive native soils for the parklands.

PRECINCT H - QUARRY WEST

The gateway to the Berowra Valley National Park. Perched on the western rim of the quarry and featuring a smaller scale community or commerical centre, the Quarry West Precinct offers prime views to the east and west. To the east is the Diatreme wall and to the west through the naturally formed valley is the Berowra Valley National Park. This precinct will act as the bridge between the National Park and Hornsby Park.

EXISTING MAJOR PRECINCTS

PRECINCT I - HORNSBY PARK AND HORNSBY AQUATIC AND LEISURE CENTRE

Perched on the edge of the ridge at the top of the steep hill falling away to OMV, Hornsby Park is a small open space sandwiched between the Peats Ferry Road and the bush. The Park has been utilised as a recreational open space for residents of Hornsby since 1896 and retains this long history in its formal planting and layout. The Hornsby Aquatic and Leisure Centre opened 2014, replacing an existing 1960's pool and overlooks the bushland. Due to the Parks location at the same RL's as the Town Centre this precinct is a key link and visual indicator for the larger park hidden below the ridgeline. It also functions as an amenities centre and the main pedestrian entry into the Park. The Master Plan is not proposing any significant changes to this existing precinct, with upgrades relating to the Park's entry and pedestrian access among the proposed works.

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Blue Gum Forest

ATTACHMENT 1 - ITEM 6

ATTACHMENT 1 - ITEM 6

Legend

- Bushland
- Native trees
- Exotic trees
- Natural turf
- Natural or synthetic turf
- Mass planting
- Shared zone feature paving
- Entry plaza feature paving
- Playground
- Managed access shared road
- Concrete pathway
- Stone feature paving
- Mountain bike tracks
- Sandstone / Breccia Gabion walls
- Sandstone log walls
- Existing jumping track
- Car parking
- Concrete stairs
- Seating lawn terrace
- Canopy Skywalk schematic route joining Hornsby Park, OMV, Crusher Plant. Final alignment to follow principles in Part E.

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PRECINCT A - OMV MASTER PLAN

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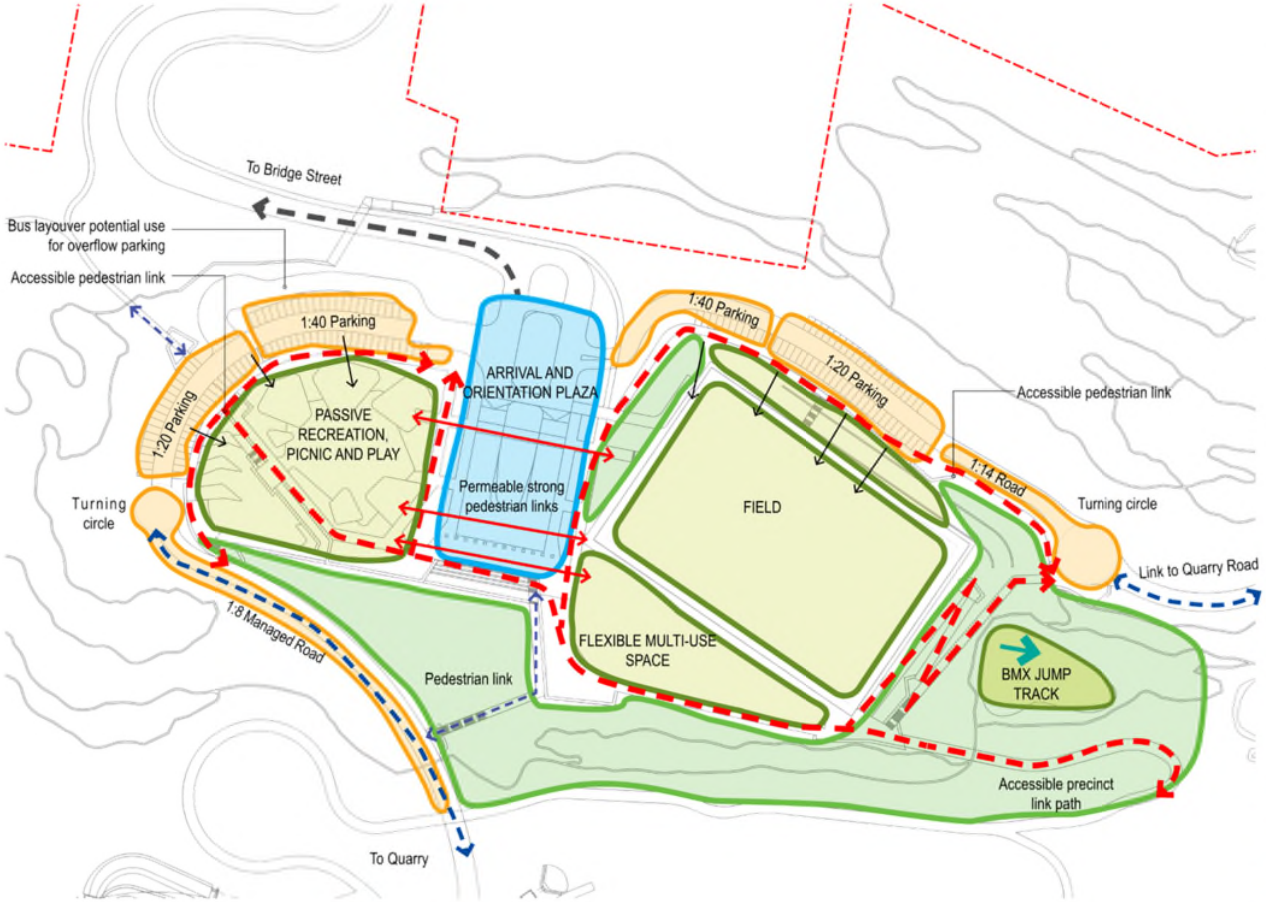
HORNSBY PARK MASTER PLAN - PART D



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Canopy Skywalk schematic route joining Hornsby Park, OMV, Crusher Plant. Final alignment to follow principles in Part E.

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ACCESS AND CIRCULATION

- Ensure pedestrian focused arrival and orientation of parklands
- Develop OMV into key precinct for site wide accessible circulation network and connections back to Town Centre
- Provide permeable links between spaces
- Ensure all key functions are located on single platform

RECREATION

- Provide flexible active and passive recreation opportunities
- Provide picnic and play facilities
- Explore opportunities for small and medium scaled local events

ENVIRONMENTAL

- Irrigate landscape with water reused from lake
- Provide endemic native planting framework with exotic parkland trees as feature planting

SUSTAINABILITY

- Explore commercial opportunities for sports and café

INTERPRETATION

- Explore use of fruit trees to reference historic land use as orchards

Legend

- Recreation zones
- Parking and access zones
- Planting
- Accessible path
- Pathway
- Pedestrian priority access shared zone
- Permeable access
- Vehicle access
- Shared pedestrian, cycle and vehicle route

PRECINCT A - OMV PRINCIPLE AND STRUCTURE PLAN

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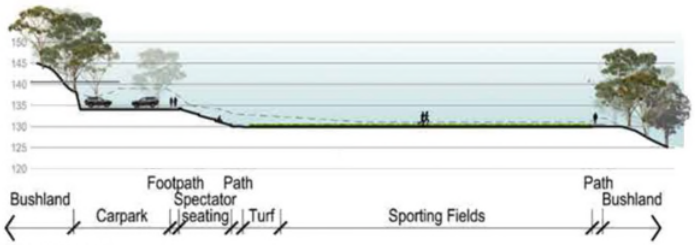

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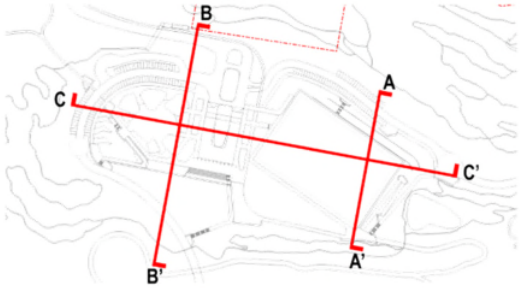

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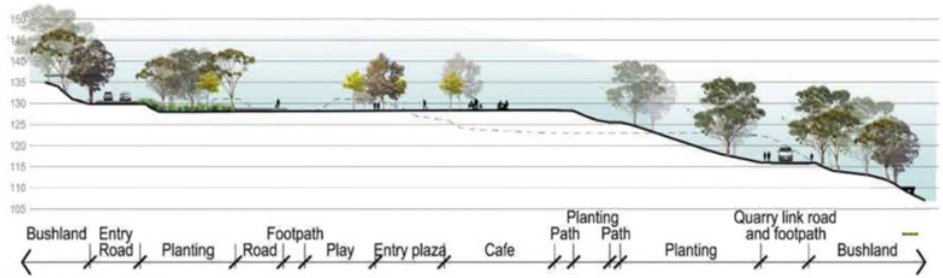

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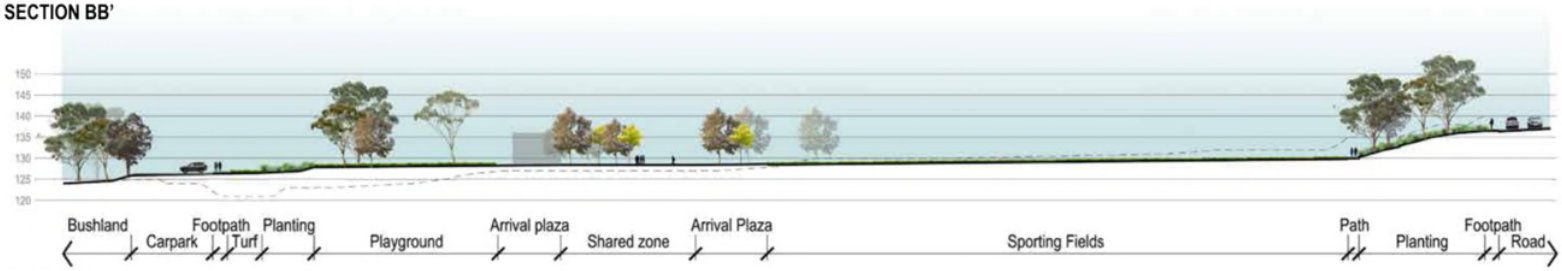

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OMV TYPICAL SECTIONS

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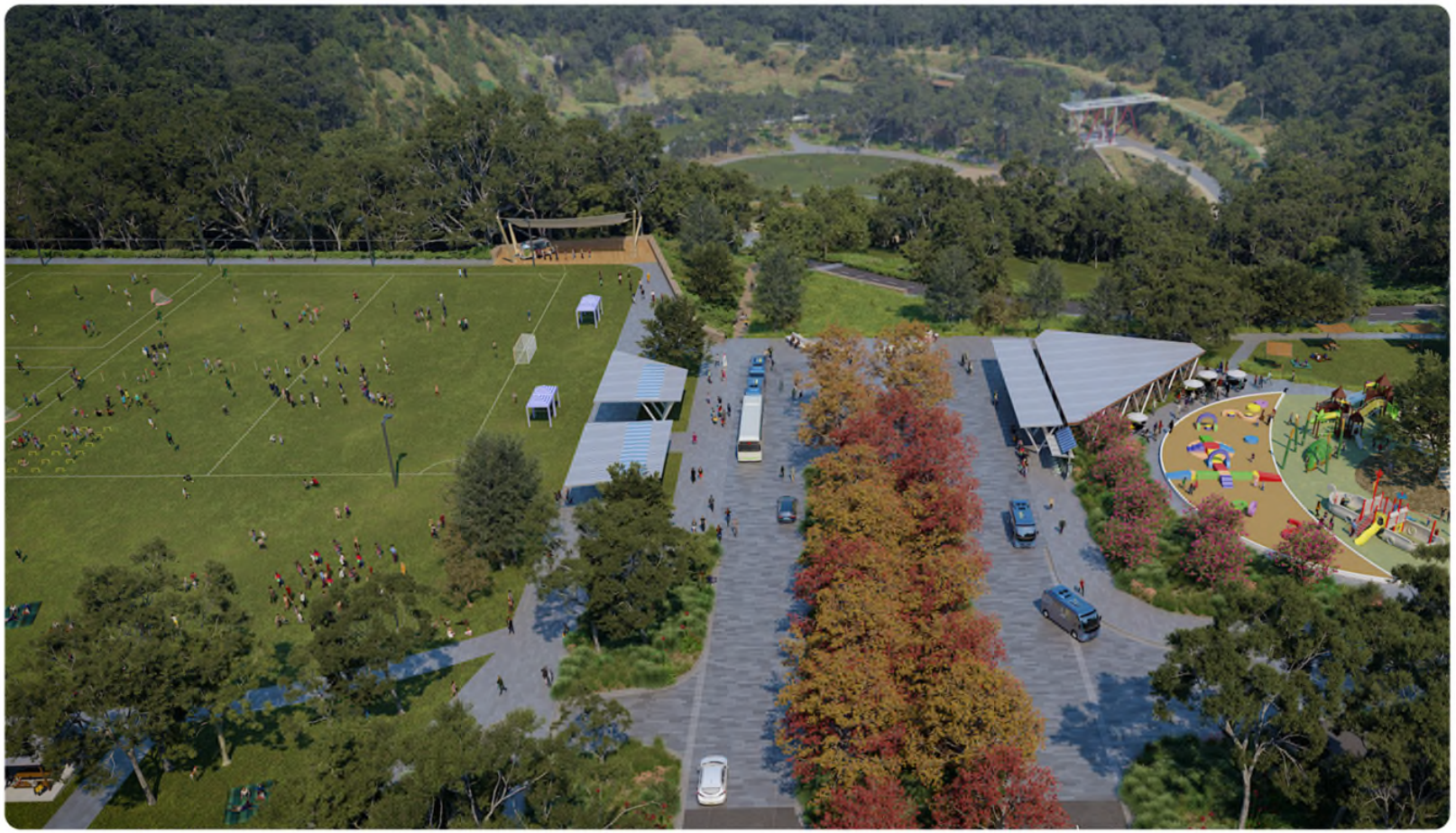

View of OMV from east looking weat over the shared orientation plaza into the Quarry Void

OMV PERSPECTIVE

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PRECINCT A - OMV PRECEDENTS

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SOFTWORKS


General Use Turf


Sports: Natural or Synthetic Turf


Mass Planting (Medium)


Mass Planting (Low)


Avenue Tree Planting


Native Tree Planting


Bush Regeneration


Deciduous Tree Planting


Turf with Terrace Seating


Cafe + Outdoor Dinning


Community Facilities + Orientation


Sports facilities

HARDWORKS AND FURNITURE


Exposed Aggregate Concrete (Feature Paving)


Cobble Paving (Shared Road)


Brushed Concrete


Asphalt (Road/Parking)


Concrete Stairs


Softfall


Bench & Table


BBQ


Bins


Drinking Fountain


E-bike Station


Timber Seats


Shelter and picnic setting


Playground

WALLS AND FENCING


Sandstone Welded Mesh Gabion Wall


Sandstone Block Wall


Sandstone Logs Wall


Low Welded Mesh Gabion Wall


Stainless Steel Balustrade


Stainless Steel Handrail

Precinct A: OMV

BOTANICAL NAME	COMMON NAME	MATURE HEIGHT (m)	MATURE CANOPY WIDTH (m)
Native Canopy Layer			
Corymbia maculata	Spotted Gum		
Angophora costata	Sydney Red Gum		
Eucalyptus piperita	Sydney Peppermint		
Syncarpia glomulifera	Turpentine		
Acacia parramattensis	Sydney Green Wattle		
Corymbia gummifera	Red Bloodwood		
Eucalyptus resinifera	Red Mahogany		
Eucalyptus punctata	Grey Gum		
Banksia serrata	Old Man Banksia		
Eucalyptus saligna	Sydney Blue Gum		
Eucalyptus robusta	Swamp Mahogany		
Syzygium paniculatum	Magenta Cherry Lilly Pilly		
Angophora floribunda	Rough-barked Apple		
Eucalyptus pilularis	Blackbutt		
Exotic Feature Planting			
Pistacia chinensis	Pistachio		
Pyrus calleryana 'Bradford'	Pyrus Bradford		
Fraxinus angustifolia 'Raywood'	Claret Ash		
Interpretative Canopy Layer			
Citrus spp	Orange		
Malus spp	Apple		
Prunus spp	Peach		
Malus spp	Flowering Apple		
Prunus spp	Flowering Cherry		

MATERIALS, FINISHES AND PLANTING

ATTACHMENT 1 - ITEM 6

OMV from the vehicle entry ramp

OMV platform

View from OMV towards the entry vehicle ramp

Bushland surrounding the OMV platform

PRECINCT A - OMV SITE PHOTOS

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1. Lift connects to RL90 Road, shuttle drop off at RL72 and Quarry Void base
2. Potential adventure recreation on quarry rockface
3. Potential Multiuse Facility
4. Informal amphitheatre seating on turf slope
5. RL 88 bench lookout
6. Amenities building below pedestrian ramp
7. Vehicle access ramp
8. Pedestrian access path
9. Upper lawn terrace
10. Lower lawn terrace
11. Quarry Void arrival plaza
12. RL 72 plaza
13. RL 90 track access to lift and accessible path
14. Play opportunities
15. Raised pedestrian walkway and lookout to Quarry West

PRECINCT B - QUARRY VOID MASTER PLAN

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Amenity building with integrated stairs and ramps linking upper and lower terraces

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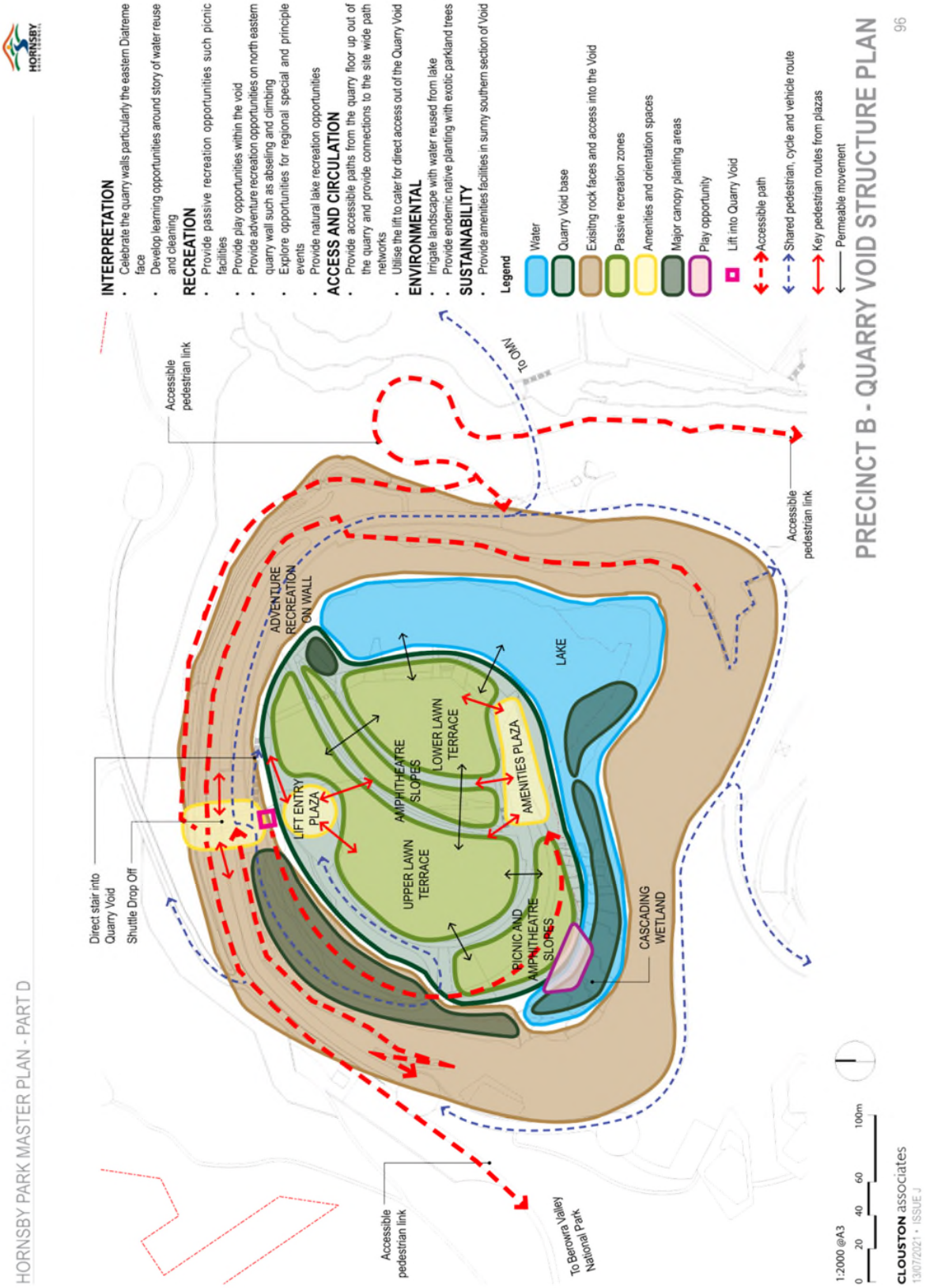
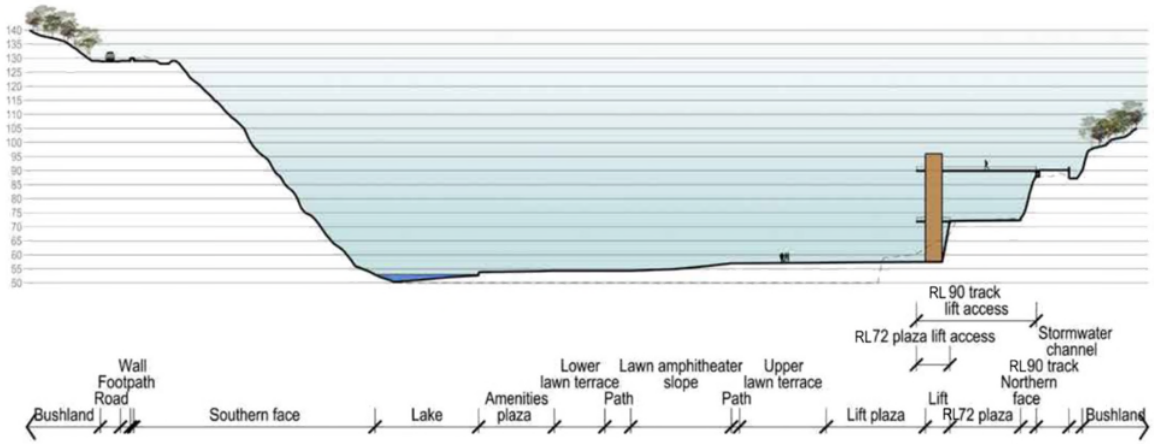


HORNSBY PARK MASTER PLAN - PART D



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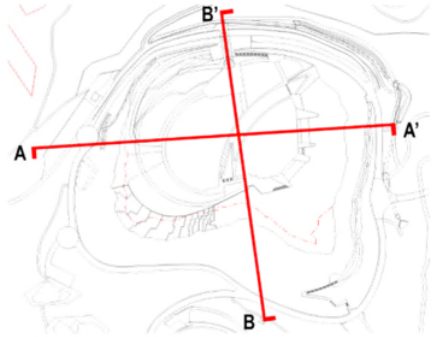

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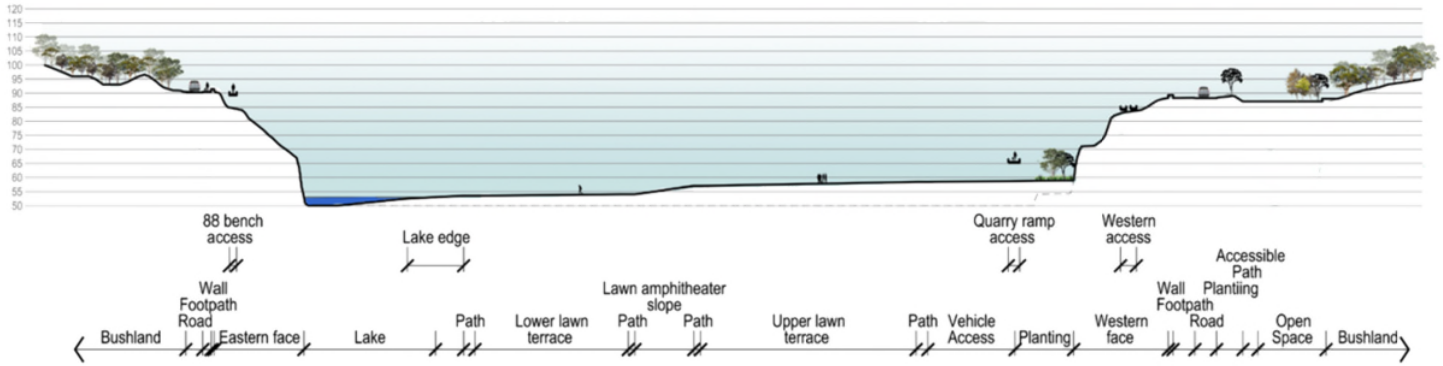

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QUARRY VOID TYPICAL SECTIONS

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ATTACHMENT 1 - ITEM 6

View of the Quarry Void from south east looking north west towards the north west pedestrian access and lift

QUARRY VOID PERSPECTIVE

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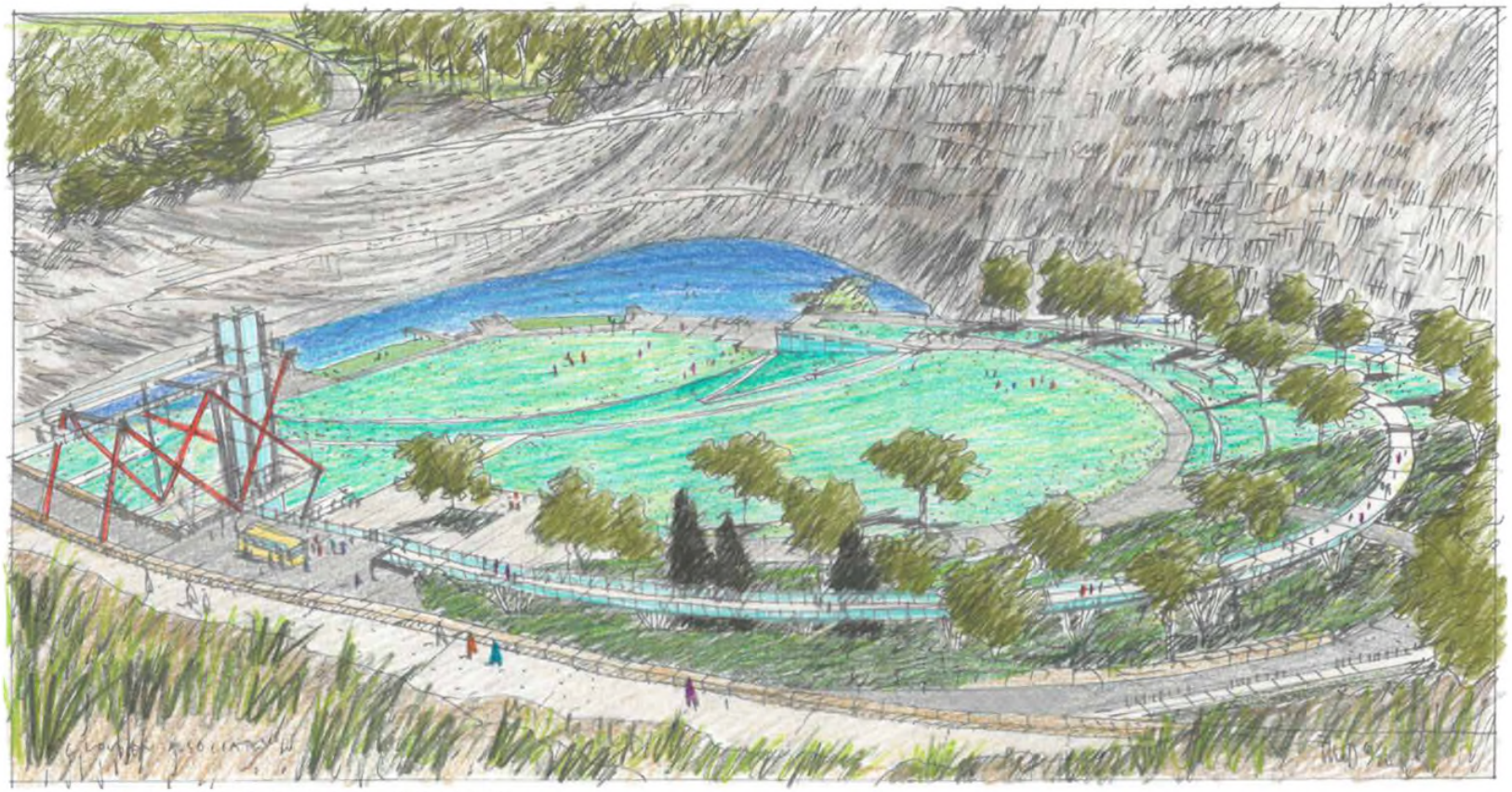
ATTACHMENT 1 - ITEM 6



View of the Quarry Void from lookout over Northern Mound looking south east towards the diateme wall and lake

QUARRY VOID PERSPECTIVE

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ATTACHMENT 1 - ITEM 6

ATTACHMENT 1 - ITEM 6

HORNSBY PARK MASTER PLAN - PART D

View of the Quarry Void from the diatreme wall looking west over the lake and terraced lawns

QUARRY VOID PERSPECTIVE 100

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PRECINCT B - QUARRY VOID PRECEDENTS

ATTACHMENT 1 - ITEM 6

SOFTWORKS


Multi-use Turf


Mass Planting (High)


Mass Planting (Medium)


Mass Planting (Low)


Native Tree Planting


Terrace Wetland


Macrophytes


Bush Regeneration


Deciduous Tree Planting


Lift


Amenities


Lookouts

HARDWORKS AND FURNITURE


Exposed Aggregate Concrete


Brushed Concrete


FRP Boardwalk


Asphalt


Stone Flag Pavement


Lake Edge Treatment


Concrete Stairs


Sandstone Gravel


Timber Decking


Sandstone Log Seats


Shelter and picnic setting


Bins


Drinking Fountain


E-bike Station


Timber Seats

WALLS AND FENCING


Existing Rock Face


Sandstone Block Wall


Rock Bolt


Sandstone Logs


Off-form Concrete Wall


Rock Fall Mesh


Breccia Welded Mesh Gabion Wall


Low Welded Mesh Gabion Wall


Glass Balustrade


Stainless Steel Balustrade


Wetland Rock Fall Fence


Stainless Steel Handrail

Precinct B: Quarry Void

BOTANICAL NAME	COMMON NAME	MATURE HEIGHT (m)	MATURE CANOPY WIDTH (m)
Native Canopy Layer			
Syncarpia glomulifera	Turpentine		
Eucalyptus saligna	Sydney Blue Gum		
Angophora floribunda	Rough-barked Apple		
Eucalyptus pilularis	Blackbutt		
Exotic Feature Planting			
Nyssa sylvatica	Tupelo		
Pyrus calleryana 'Bradford'	Pyrus Bradford		

MATERIALS, FINISHES AND PLANTING

ATTACHMENT 1 - ITEM 6

South eastern corner of the void

View down to diatreme wall

View for bottom of void looking at southern wall

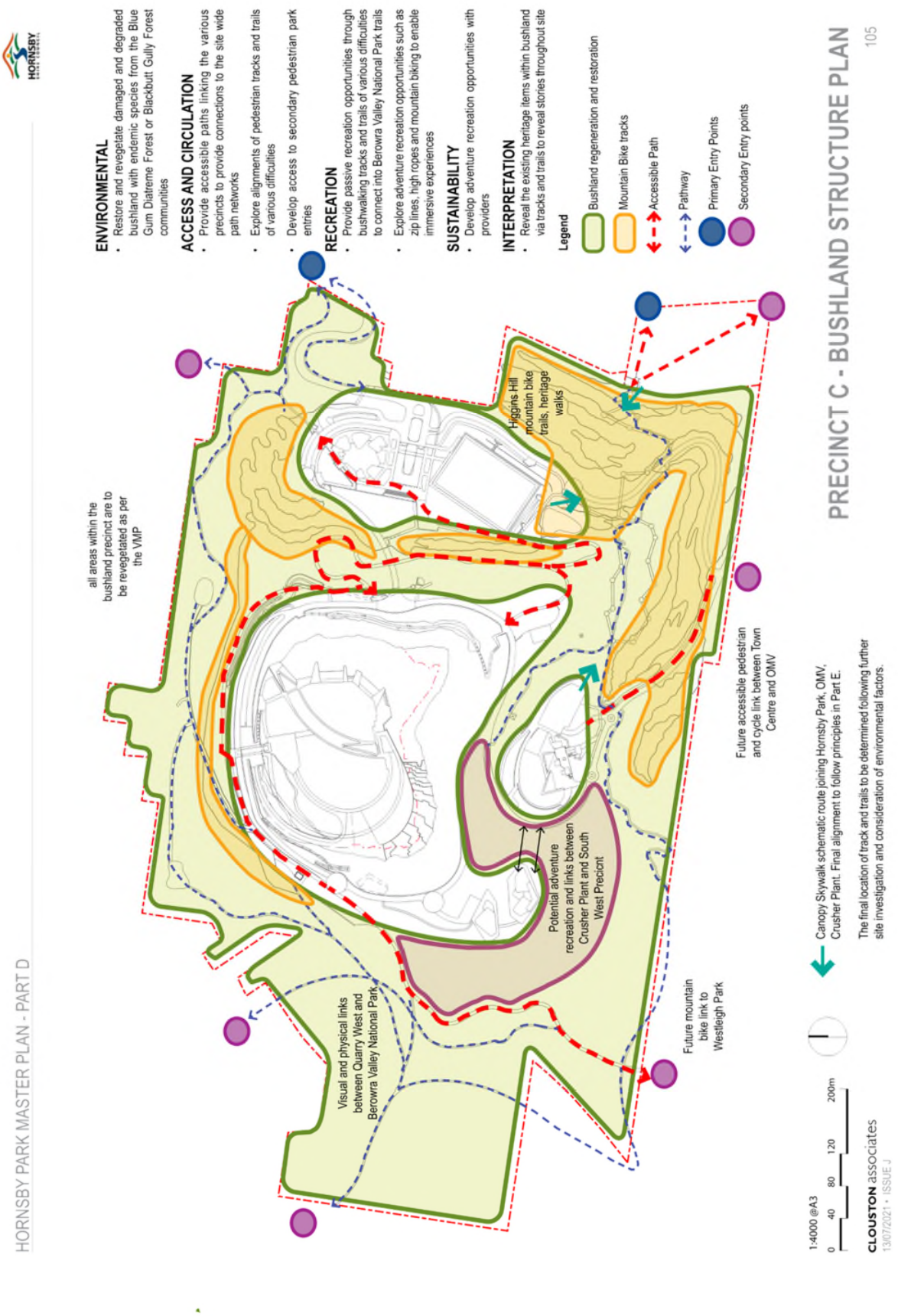
View into quarry from northern mound

PRECINCT B - QUARRY VOID SITE PHOTOS

ATTACHMENT 1 - ITEM 6

ATTACHMENT 1 - ITEM 6

ATTACHMENT 1 - ITEM 6



SOFTWORKS

Bush Regeneration

Precinct C: Bushland

BOTANICAL NAME	COMMON NAME	MATURE HEIGHT (m)	MATURE CANOPY WIDTH (m)
Native Canopy Layer (Blue Gum Diartreme Forest)			
Eucalyptus saligna	Sydney Blue Gum		
Eucalyptus pilularis	Blackbutt		
Angophora floribunda	Rough-barked Apple		
Syncarpia glomulifera	Turpentine		
Native Canopy Layer (Blackbutt Gully Forest)			
Eucalyptus pilularis	Blackbutt		
Angophora costata	Sydney Red Gum		
Syncarpia glomulifera	Turpentine		
Corymbia gummifera	Red Bloodwood		
Eucalyptus piperita	Sydney Peppermint		
Eucalyptus saligna	Sydney Blue Gum		
Banksia serrata	Old Man Banksia		

HARDWORKS

Brushed Concrete

Sandstone Gravel

FRP Boardwalk

Heritage Steps

Sandstone Block Stairs

Sandstone Flag Paving (Heritage)

Raked Concrete Footpath

WALLS

Low Welded Mesh Gabion Wall

Sandstone Block Wall

Basalt Welded Wire Gabion

Off-form Concrete Wall

ATTACHMENT 1 - ITEM 6

Bushland slope

Bushland canopy

Blackbutt gully forest near OMV

Higgins hill

PRECINCT C - BUSHLAND SITE PHOTOS

ATTACHMENT 1 - ITEM 6

ATTACHMENT 1 - ITEM 6

HORNSBY PARK MASTER PLAN - PART D

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PRECINCT D - HIGGINS CEMETERY STRUCTURE PLAN

109

ATTACHMENT 1 - ITEM 6

SOFTWORKS


General Use Turf


Mass Planting (Low)


Heritage Planting


Bush Regeneration

HARDWORKS AND FURNITURE


Brushed Concrete


Sandstone Gravel


Sandstone Flag Paving (Heritage)


Timber Seats


Bins

WALLS AND FENCING


Sandstone Welded Mesh Gabion Wall


Sandstone Logs Wall


Low Welded Mesh Gabion Wall


Stainless Steel Balustrade

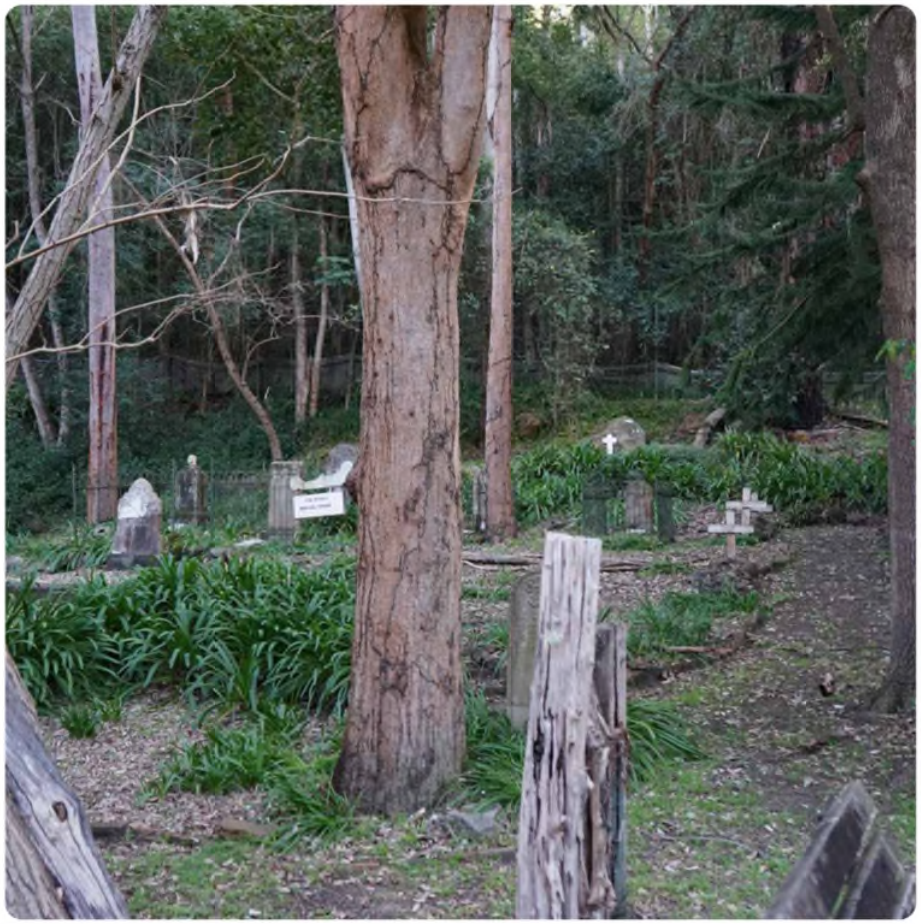

Glass Balustrade


Stainless Steel Handrail

Precinct D: Higgins Cemetery

BOTANICAL NAME	COMMON NAME	MATURE HEIGHT (m)	MATURE CANOPY WIDTH (m)
Native Canopy Layer			
Syncarpia glomulifera	Turpentine		
Eucalyptus saligna	Sydney Blue Gum		
Angophora floribunda	Rough-barked Apple		
Eucalyptus pilularis	Blackbutt		
Exotic Feature Planting			
Pyrus calleryana 'Bradford'	Pyrus Bradford		

ATTACHMENT 1 - ITEM 6



The cemetery

picnic setting at cemetery clearing

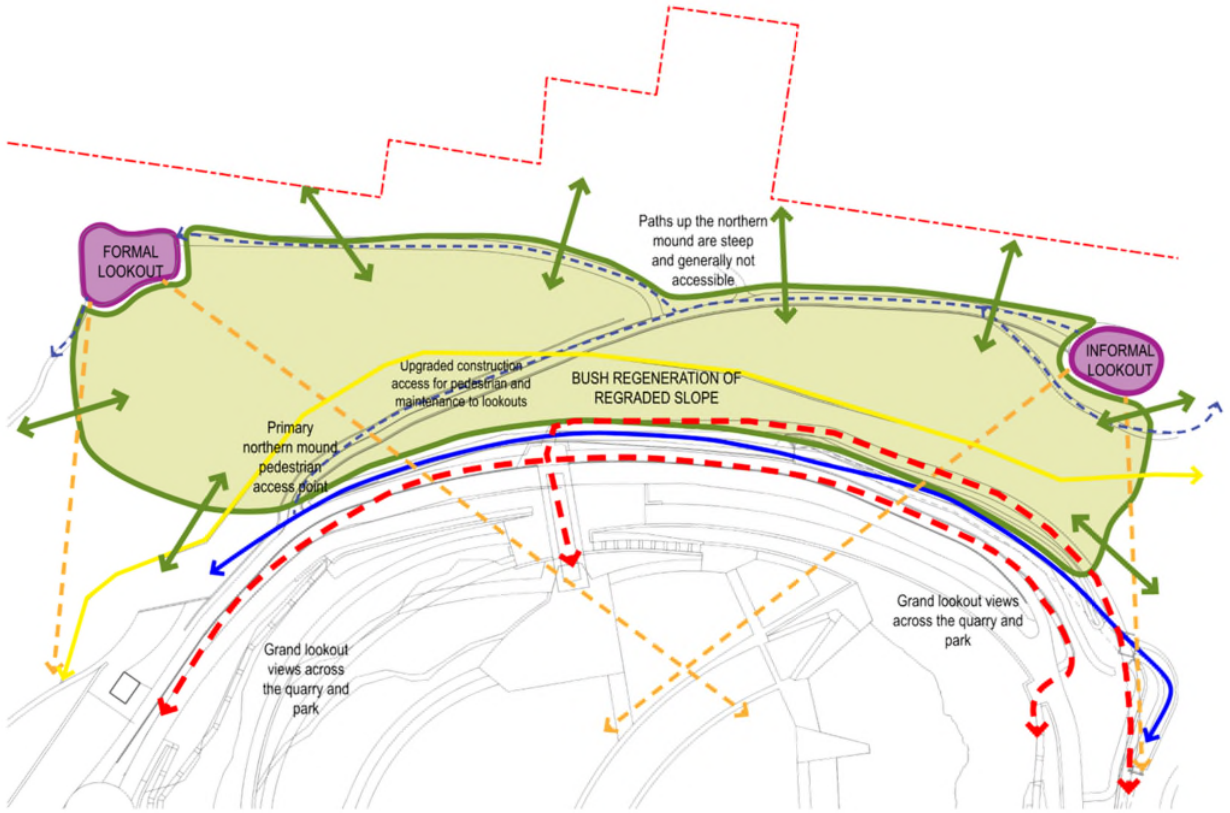
Rest area at cemetery

PRECINCT D - HIGGINS CEMETERY SITE PHOTOS

ATTACHMENT 1 - ITEM 6

ATTACHMENT 1 - ITEM 6

HORNSBY PARK MASTER PLAN - PART D



ENVIRONMENTAL

- Develop a soil profile to support revegetation of the bush
- Restore and revegetate damaged and degraded bushland with endemic species from the Blue Gum Diatreme Forest community
- Ensure stormwater issues are addressed
- All works to be in accordance with VMP

ACCESS AND CIRCULATION

- Explore alignments of pedestrian tracks and trails of various difficulties
- Provide access to two key lookout locations
- Upgrade diagonal construction access path to pedestrian/maintenance access

RECREATION

- Provide passive recreation opportunities through bushwalking tracks and trails of various difficulties
- Mountain Bike trail link to existing trails in OMV

INTERPRETATION

- Interpret the quarry story and landform modification

Legend

- Bush Regeneration of Constructed Slope
- Lookouts
- Tracks and trails links to lookouts
- Accessible Paths
- Mountain Bike Link
- Bush to read as single entity following bushland regeneration
- Path and Trails
- Existing stormwater channel bypass of quarry including new stormwater works

1:1500 @A3

0 15 30 45 75m

The final location of track and trails to be determined following further site investigation and consideration of environmental factors.

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PRECINCT E - NORTHERN MOUND STRUCTURE PLAN

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ATTACHMENT 1 - ITEM 6

SOFTWORKS

Bush Regeneration

HARDWORKS

Brushed Concrete

Sandstone Gravel

FRP Boardwalk

Heritage Steps

Sandstone Block Stairs

Sandstone Flag Paving (Heritage)

Raked Concrete Footpath

WALLS

Low Welded Mesh Gabion Wall

Sandstone Block Wall

Basalt Welded Wire Gabion

Off-form Concrete Wall

Precinct E:Northern Mound

BOTANICAL NAME	COMMON NAME	MATURE HEIGHT (m)	MATURE CANOPY WIDTH (m)
Native Canopy Layer			
Syncarpia glomulifera	Turpentine		
Eucalyptus saligna	Sydney Blue Gum		
Angophora floribunda	Rough-barked Apple		
Eucalyptus pilularis	Blackbutt		

View of slope from across quarry

Down slope lots of weed species

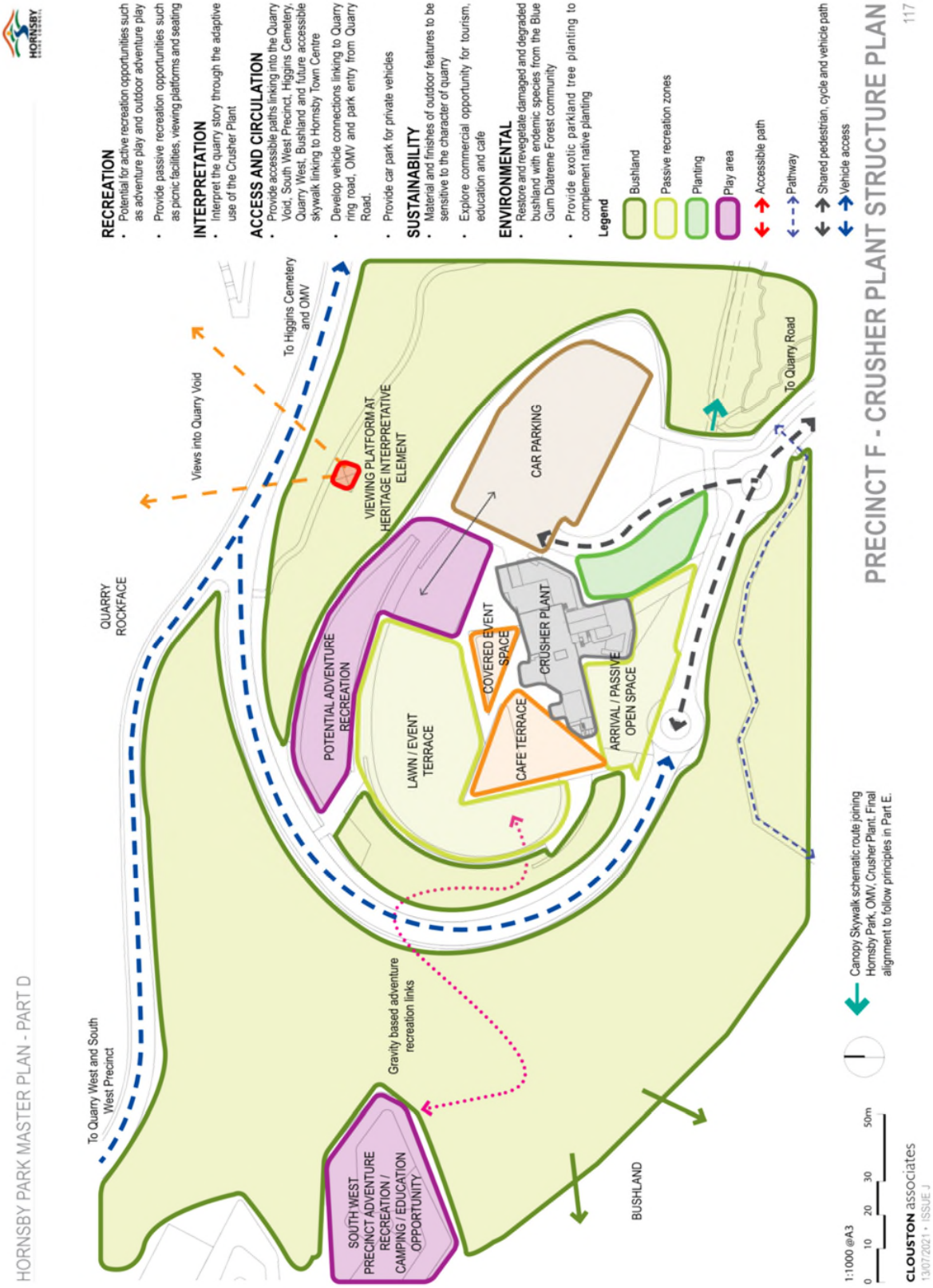
Down the slope - lack of large vegetation

PRECINCT E - NORTHERN MOUND SITE PHOTOS

ATTACHMENT 1 - ITEM 6

ATTACHMENT 1 - ITEM 6

ATTACHMENT 1 - ITEM 6



SOFTWORKS


General Use Turf


Mass Planting


Deciduous Tree Planting


Avenue Tree Planting


Native Tree Planting

HARDWORKS


Exposed Aggregate Concrete (Feature Paving)


Cobble Paving (Shared Road)


Brushed Concrete


Asphalt (Road/Parking)


Sandstone Gravel


Concrete Stairs


Softfall




Adaptive reuse of the Crusher Plant

WALLS, FENCING AND FURNITURE


Sandstone Welded Mesh Gabion Wall


Sandstone Logs Wall


Low Welded Mesh Gabion Wall


Stainless Steel Balustrade


Glass Balustrade


Stainless Steel Handrail


Bench & Table


Bins


BBQ


Drinking Fountain


E-bike Station


Timber Seats


Shelter and picnic setting


Playground


Bollards

Precinct F: Crusher Plant

BOTANICAL NAME	COMMON NAME	MATURE HEIGHT (m)	MATURE CANOPY WIDTH (m)
Native Canopy Layer			
Eucalyptus saligna	Sydney Blue Gum		
Eucalyptus pilularis	Blackbutt		
Angophora floribunda	Rough-barked Apple		
Syncarpia glomulifera	Turpentine		
Angophora costata	Sydney Red Gum		
Syncarpia glomulifera	Turpentine		
Corymbia gummifera	Red Bloodwood		
Eucalyptus piperita	Sydney Peppermint		
Eucalyptus resinifera	Red Mahogany		
Eucalyptus punctata	Grey Gum		
Banksia serrata	Old Man Banksia		
Eucalyptus robusta	Swamp Mahogany		
Syzygium paniculatum	Magenta Cherry Lilly Pilly		
Exotic Feature Planting			
Nyssa sylvatica	Tupelo		
Pyrus calleryana 'Bradford'	Pyrus Bradford		

MATERIALS, FINISHES AND PLANTING

ATTACHMENT 1 - ITEM 6

Crusher Plant material conveyors

Crusher Plant tower base

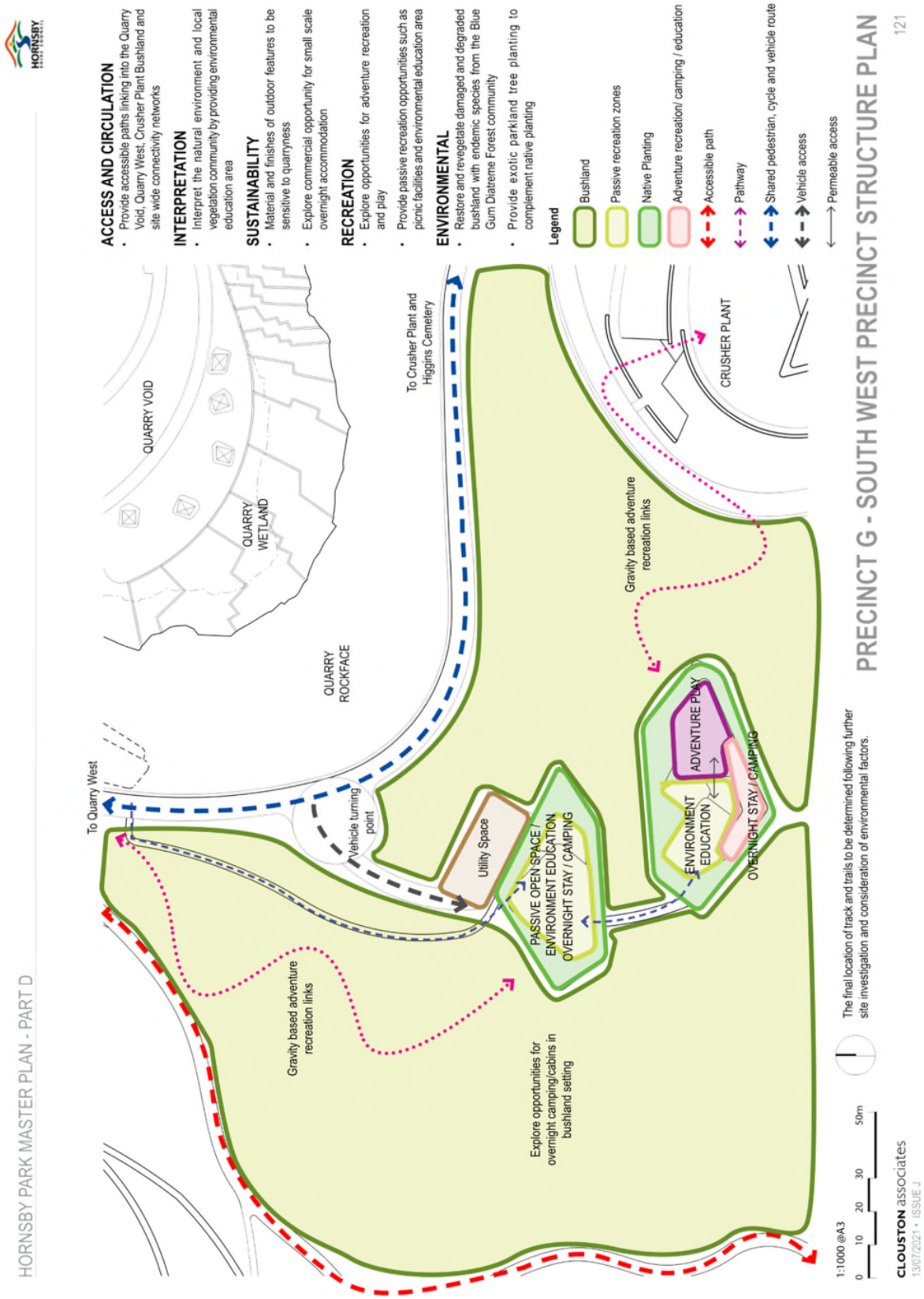
Crusher Plant tower

PRECINCT F - CRUSHER PLANT SITE PHOTOS

ATTACHMENT 1 - ITEM 6

ATTACHMENT 1 - ITEM 6

ATTACHMENT 1 - ITEM 6



SOFTWORKS


General Use Turf


Mass Planting


Deciduous Tree Planting


Avenue Tree Planting


Native Tree Planting

Precinct G: South West Fill

BOTANICAL NAME	COMMON NAME	MATURE HEIGHT (m)	MATURE CANOPY WIDTH (m)
Native Canopy Layer			
Eucalyptus saligna	Sydney Blue Gum		
Eucalyptus pilularis	Blackbutt		
Angophora floribunda	Rough-barked Apple		
Syncarpia glomulifera	Turpentine		

HARDWORKS AND FURNITURE


Exposed Aggregate Concrete (Feature Paving)


Cobble Paving (Shared Road)


Brushed Concrete


Asphalt (Road/Parking)


Sandstone Gravel


Concrete Stairs


Bench & Table


Bins


BBQ


Drinking Fountain


E-bike Station


Shelter and picnic setting


Bollards

WALLS AND FENCING


Sandstone Welded Mesh Gabion Wall


Sandstone Logs Wall


Low Welded Mesh Gabion Wall


Stainless Steel Balustrade


Glass Balustrade


Stainless Steel Handrail


Education Facilities

MATERIALS, FINISHES AND PLANTING

ATTACHMENT 1 - ITEM 6

Terracing within the south west fill area

Open clearing of south west fill

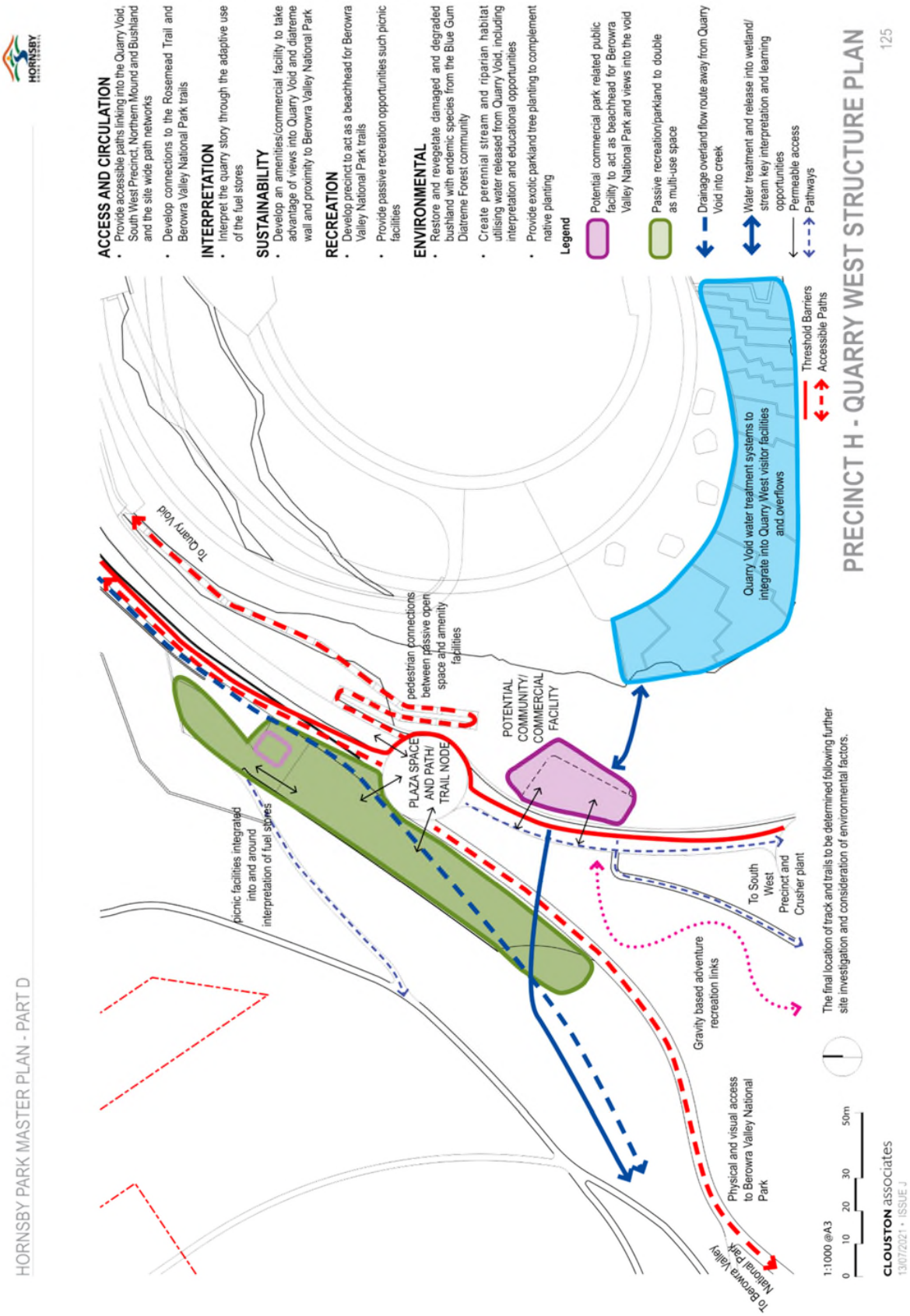
Existing native vegetation around edge of clearing

PRECINCT G - SOUTH WEST PRECINCT SITE PHOTOS

ATTACHMENT 1 - ITEM 6

ATTACHMENT 1 - ITEM 6

ATTACHMENT 1 - ITEM 6



SOFTWORKS


Multi-use Turf


Mass Planting (High)


Mass Planting (Medium)


Mass Planting (Low)


Native Tree Planting


Deciduous Tree Planting


Bush Regeneration

HARDWORKS AND FURNITURE


Exposed Aggregate Concrete


Brushed Concrete


FRP Boardwalk


Asphalt


Timber Decking


Concrete Stairs


Sandstone Log


E-bike Station


Bins


Shelter and picnic setting


Timber Seats


Drinking Fountain

WALLS AND FENCING


Sandstone Welded Mesh Gabion Wall


Low Welded Mesh Gabion Wall


Sandstone Logs Wall


Stainless Steel Balustrade


Glass Balustrade


Stainless Steel Handrail


Community/Commercial Building

Precinct H: Quarry West

BOTANICAL NAME	COMMON NAME	MATURE HEIGHT (m)	MATURE CANOPY WIDTH (m)
Native Canopy Layer			
Syncarpia glomulifera	Turpentine		
Eucalyptus saligna	Sydney Blue Gum		
Angophora floribunda	Rough-barked Apple		
Eucalyptus pilularis	Blackbutt		
Exotic Feature Planting			
Nyssa sylvatica	Tupelo		
Pyrus calleryana 'Bradford'	Pyrus Bradford		

ATTACHMENT 1 - ITEM 6

Underground fuel storage in Quarry West

Pathway from Quarry West to South West Precinct

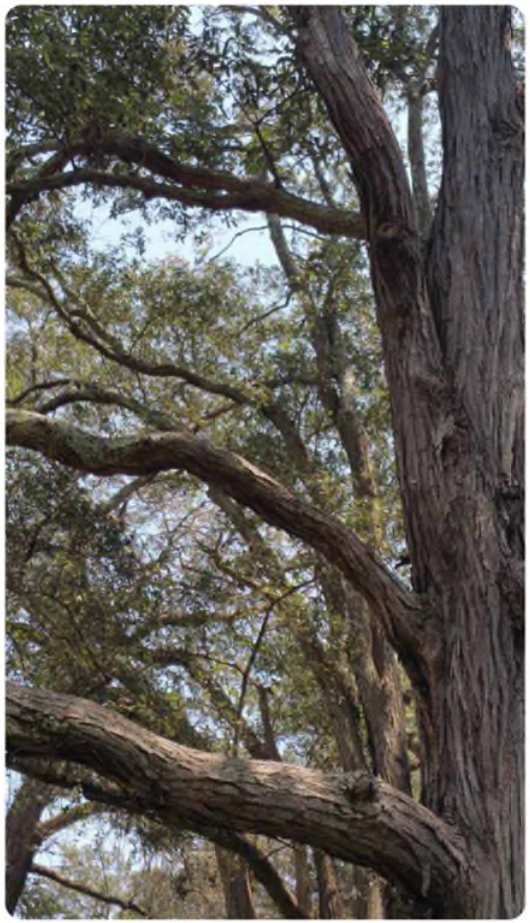
Fuel storage tanks

RL 90 Track

PRECINCT H - QUARRY WEST SITE PHOTOS

ATTACHMENT 1 - ITEM 6

ATTACHMENT 1 - ITEM 6



Existing tree canopy within Hornsby Park

PROJECT OBJECTIVES AND ACHIEVEMENTS

The Master Plan for the Park is required to meet four project objectives from the Hornsby Park Plan of Management 2015. This summary identifies how each objectives is met in the Master Plan.

OBJECTIVE 1

Local Living - Hornsby's parkland hub meeting the needs of the current and future local community for recreation, connection to nature and cultural experiences in a bushland setting.

IMPLEMENTATION

- Provides opportunities for a range of recreation types including passive, active and adventure at key precincts across the Park through the recreation strategy
- Creates safe and easy access from the Town Centre to provide connection to nature through the circulation strategy
- Adds bush paths and trails of various difficulties tying into existing networks such as the Great Northern Walk and Rosemead Trail through the circulation strategy
- Interprets Indigenous and European history and culture across the parkland through the implementation of cultural walks, trails and signage the interpretation strategy of the park.

OBJECTIVE 2

Environment and Heritage - Renewing Hornsby's natural systems and connecting community to Hornsby's unique bush character, rich heritage and evolving story.

IMPLEMENTATION

- Restores and protects the degraded bushland within the site improving physical and visual connections to the Berowra Valley National Park through the environmental strategy
- Proposes an Interpretation Strategy for the telling of indigenous and settler stories, environment, natural heritage, geology, farming, astronomy, mining and the story of restoration of the site for the enjoyment of the community.

OBJECTIVE 3

Tourism and Economy - A centre for adventure tourism for the Northern Sydney region, driving local economic development and urban renewal.

IMPLEMENTATION

- Highlights the natural beauty and unique character of the site, in particular the exposed Diatreme wall
- Provides opportunities for partnerships to support the delivery of drawcard adventure recreation and other facilities and attractions
- Retains and enhances existing attractions such as the mountain bike trails and walking tracks.

OBJECTIVE 4

Return on Investment - Leveraging commercial opportunities that enhance the leisure experience and deliver a financially sustainable community asset.

IMPLEMENTATION

- Provides opportunities through the inclusion of facilities across the park that require partnership between council and businesses such as amenities, sports hire, bike and e-bike stations, adventure recreation, shuttle services, education and short stay accommodation and the adaptive reuse of the Crusher Plant.

In addition, the following project objectives are incorporated in the Master Plan:

OBJECTIVE 5

Demonstrating Sustainability - Developing robust and 'smart' systems that demonstrate 'sustainability in action' for management of the parkland. Examples may include autonomous electric vehicle transport and renewable energy systems.

IMPLEMENTATION

- Explores long term sustainable opportunities linked across the park that are able to be implemented as technology allows such as, alternative transport modes including e-bikes and autonomous shuttles to interpretive elements demonstrating sustainability through the capture and re-use of water across the site
- Utilises the latest technologies in solar, battery storage and lighting to minimise requirements for on-grid electricity use
- Provide recycling and maintenance facilities on site to minimise off site requirements.

OBJECTIVE 6

Inclusive Design/Access for All - Optimising access for all through inclusive design and site sensitive transport modes.

IMPLEMENTATION

- Provides a pedestrian and bicycle network that provides access to all key areas via accessible paths through the circulation strategy
- Provides vehicle access to precincts which are not able to be reached via accessible paths through the circulation strategy
- Underpins all design with the principles of Inclusive Design, maximising equitable access to venues and settings for all people, irrespective of background, age or ability
- Promotes interaction and reduce barriers to participation by providing for a range of experiences and opportunities in varied settings.

ATTACHMENT 1 - ITEM 6

Existing Crusher Plant

IMPLEMENTATION

Hornsby Park will be delivered over a number of years by Hornsby Shire Council. Due to the size and scale of the works involved in the project the park will not be delivered in a single stage, but as a community resource that is able to evolve over time to take advantage of changes to the local community to ensure the park continues to meet the needs and expectations of Hornsby.

This Master Plan report encapsulates all the works completed as part of the background scoping, planning and research of the site and will serve as the basis for all design and delivery works moving forward.

The report outlines the design intent for the various precincts across the park, so that future design works, while potentially changing and evolving the details do not fundamentally change the design intent of the spaces within the park.

REALISING THE PLAN

Due to the size and scale of the works involved in Hornsby Park will be delivered in two stages over a period of years.

STAGE 1

Precincts that comprise Stage 1 works form the core character and identity of the park and include those works required to deliver visitors safely to most parts of the park.

Stage 1 areas will include bushland restoration across the site, Old Mans Valley and entry, the Quarry Void and associated access paths and roads, Higgins Cemetery and the Northern Mound. Stage 1 may be delivered in smaller packages.

The Park will be functional and viable when the Stage 1 works are completed, however the Stage 2 works are important for the full realisation of the Park's potential.

STAGE 2

The Stage 2 works comprise precincts that either support the Stage 1 precincts or facilities that require a strong existing visitor base that only an established park can generate.

Stage 2 works include the Crusher Plant adaptive-reuse, the Southwest precinct and the Quarry West precinct.

Some of these precincts include opportunities for partnerships between Council and third-party businesses for the activation of the spaces.

The Stage 2 works will ensure the continued long-term financial viability of the park and bring opportunities for new users and visitors to the park.

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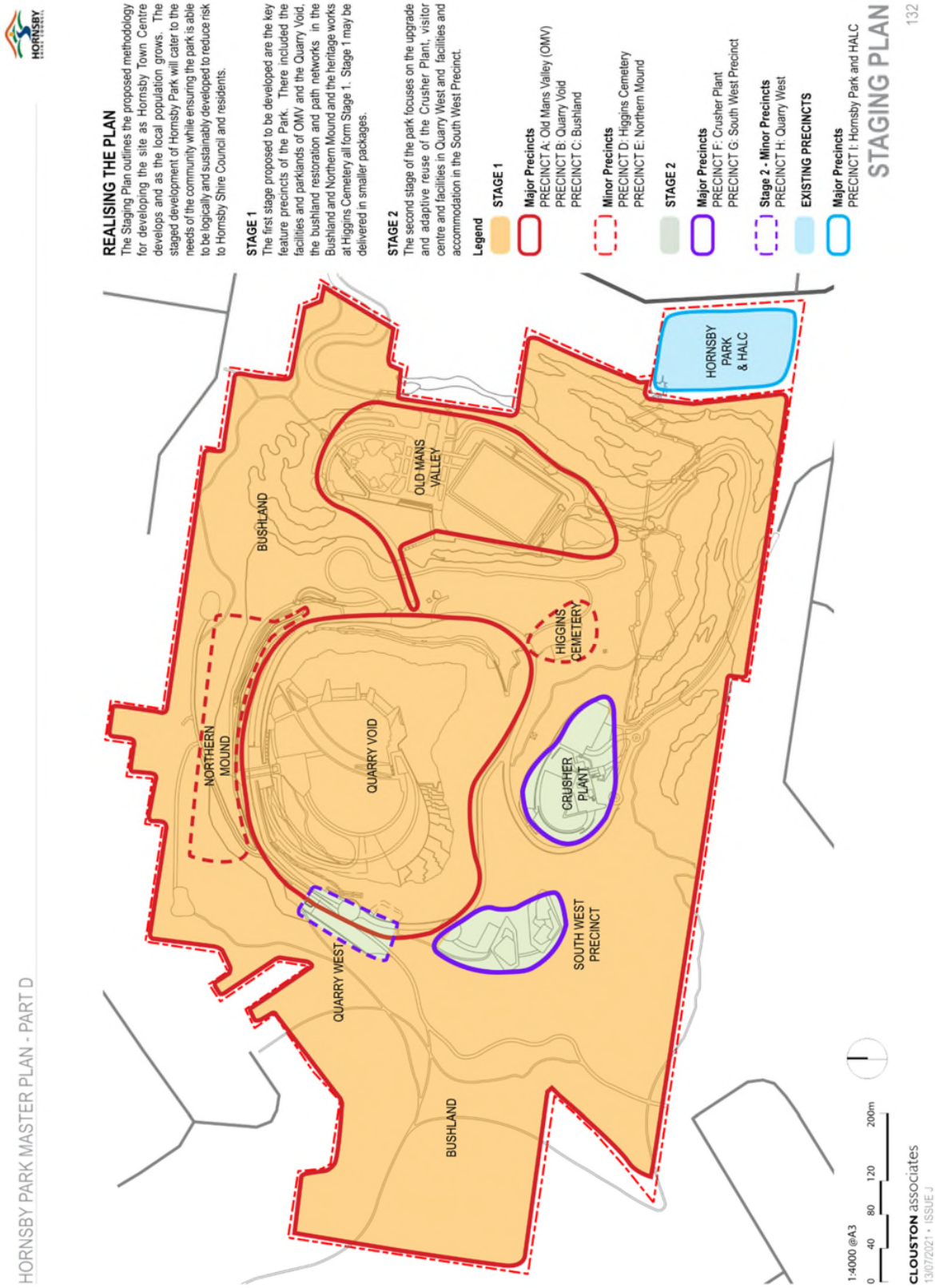
ATTACHMENT 1 - ITEM 6



View of the Diatreme wall from the Quarry West Precinct

ATTACHMENT 1 - ITEM 6

PART E - SUPPORTING DOCUMENTS

ATTACHMENT 1 - ITEM 6

Title

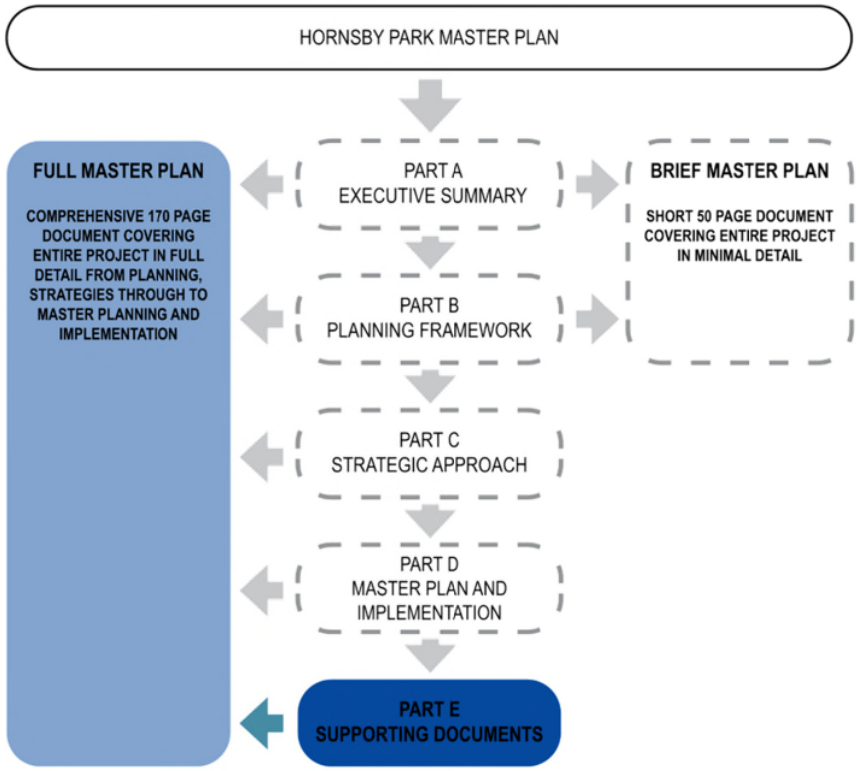


TABLE OF CONTENTS AND REPORT STRUCTURE

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ATTACHMENT 1 - ITEM 6

Cultural Heritage Analysis

Cultural Heritage

① Quarry Void
② Former Orchards and Astronomy Radio Field
③ Former Orchards, Agriculture, Timber Getting Site
④ Cottage House of Higgins Family
⑤ Crusher Plants
⑥ Higgins Family Cemetery
⑦ Heritage Steps
⑧ Cool Rooms and Receptacle Carved in Sandstone
⑨ Oil Tanks
⑩ Formar Orchards and Higgins Family House
⑪ Concrete Water Channel

Quarry Relics
Early European Heritage
Significant Historical Site

ABORIGINAL HERITAGE

Aboriginal People are known to have lived in this Country for countless generations. A number of sites have been recorded containing potential archaeological deposits in adjacent bushland along the Benowie Track in Berowra Valley Regional Park. The Aboriginal Heritage Information Management System (AHIMS) indicates that there is one Aboriginal object or place within approximately 300m of the site. A sandstone overhang with a potential archaeological deposit has also been identified within the southern portion of the site.

The findings indicate that the area was used for shelter and hunting. Locations with grass and trees growing next to sandstone escarpments are potentially spaces where Aboriginal people once gathered.

EARLY EUROPEAN SETTLEMENT

The site is recognised as one of rich European heritage through its settlement, logging, agricultural and quarrying history. Several elements remain intact in association with the lands originally settled by the Higgins family in the early 19th century.

The Higgins family cemetery exists adjacent to the Quarry site just to the western side of the Old Mans Valley (OMV) site, is listed as a heritage item of State Significance under the Hornsby Shire Local Environment Plan 2013. There are also tracks and staircases winding into the valley to the south and west of OMV built in the 1930s by unemployed relief workers.

The Higgins family were involved in the construction of the Heritage Steps which run through the site, built by the community during the Great Depression. Within OMV there is a cool room and a receptacle carved into sandstone and evidence of some of the suspected remains of the eight Higgins family homes that once sat in OMV and the adjoining Hornsby Quarry lands.

HORNSBY QUARRY

Hornsby Quarry was worked as a hard rock quarry from the early 1900s for road base and gravel, operating until late 1990s. The Council took ownership of the quarry land in 2002

The site is dominated by a large open excavation (approximately 90 metres deep) until partially filled in recent times, now 40 metres shallower but still as vast; approx. 350 metres east to west and 250 metres north to south with steep, exposed slopes. Previous Quarry infrastructure also remains on the site such as the crushing facility.

The Quarry is listed on the Heritage Register of the National Estate describing it (in part) as the "largest volcanic neck in the Sydney area". The Hornsby Shire LEP also lists the volcanic diatreme within the quarry as a heritage item.

OLD MANS VALLEY (OMV)

Originally what was once know as Old Mans Valley consisted of the entire site, including the quarry. Over the intervening years since it was settled by Europeans, it has shrunk to its current size today. OMV has a strong association with European settlement history with the Higgins Family taking a land grant in the region in the early 1900s.

Between 1947 and 1955 OMV was home to the Hornsby Radio Astronomy Field Station, where some 30 different experiments in radar astronomy were conducted. In 1982, Council as landowner, approved filling in of OMV to establish playing fields ,using overburden from the quarry.

Until 1987, quarry overburden was used to fill near the western edge of the site leading towards the near-completion of a sports ground at the site. In July 1988 Council approved a development application for additional landfill but the consent was overturned on appeal to the Land & Environment Court. As a result of the successful action taken by residents, filling ceased.
The OMV site has subsequently been used as the stockpile area for the filling operations required to meet the design requirements for the base of the quarry. The site has subsequently been made good to accommodate a future community recreation space associated with the proposed quarry park.

Hornsby Park

Sandstone outcrops and bushland in eastern section of Old Mans Valley.

Hornsby Park bushland.

HORNSBY PARK

Hornsby Park historically consisted of three public reserves which were amalgamated in 1973. The first, the eastern park area, was set aside in 1896 as a Recreational Reserve (this was the eastern sector of the first land grant in the area to Mr Thomas Higgins, made in 1836). The two large bushland plots to the west were added in 1918 and dedicated for public recreation.

The sandstone steps running through the latter areas are thought to have been built during the Depression of the 1930s. It took until 1933 for work on the creation of a formal park to commence.

The actual designer of the park is not known and landscape plans do not exist, however, it seems likely that a group of local nurserymen, R. Hazelwood, C. H. Davis and J. G. Walters, had a strong influence on the design and layout of the park.

A fountain with a monolithic basalt stone piece and plaque was erected in the open space in 1970 to celebrate the Bicentenary of Captain Cook's arrival in Australia. An additional plaque was later installed, relating Aboriginal custodianship and connection to the land.

An Olympic size pool was built in 1962 and the Pine Tree incorporated within the enclosure, planted in 1937, was grown from seed of the tree at Lone Pine near Gallipoli. The park's fountain was installed in 1968 and designated as a memorial to the landing of Captain Cook in 1770.

In 2013, development consent was granted for the demolition and replacement of the 1962 pool. The work also required the demolition of the Country Womens Association building and the Lone Pine tree.

In 2014 the new Hornsby Aquatic and Leisure Centre (HALC) was opened. In 2015, a Review of Environmental Factors (REF) was approved, opening the way for an upgrade of the park area to the east of the HALC.

The 1970's fountain was recently removed and the plaques salvaged. One plaque was reinstated on a new plinth at the front of the Council Chambers.

Hornsby Quarry Walls

Hornsby Park bushland

Concrete drainage channel

TOPOGRAPHY

The topography of the site varies greatly. The quarry operation, including excavation and spoil piles, has significantly impacted the landform. From the void and lake level of Hornsby Quarry, now at RL 55 to the Aquatic Centre adjoining the Pacific Highway there is a level difference of 126 metres.

GEOLOGY AND SOILS

One of the most significant aspects of the site is the Quarry Diatreme, once formed by a long vertical plug created when gas-filled magma forced its way up through overlying strata. Especially significant is the east face of the quarry that provides a cross-section of the diatreme, which is a rare demonstration of the volcanic strata layering. Structures like this exist at only a few sites in the Sydney region.

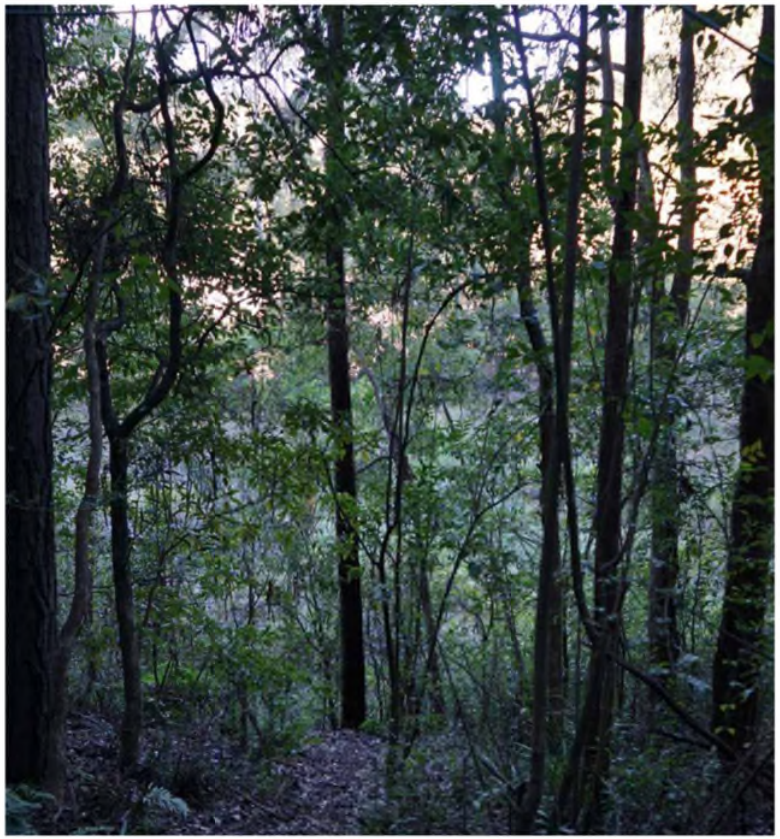
The overall soil within the site is predominantly derived from Hawkesbury Sandstone, with some Volcanic Diatreme derived soils. Sandstone outcrops are located within the bushland areas of OMV, Hornsby Park (southern portion along Quarry Road and rear of Dalton Road properties) and the Quarry.

Spoil piles from the quarry operations can be found in numerous locations across the site and are being considered by Council as additional sources of fill for the final earthworks of the quarry.

WATER CATCHMENT

The site is located in an upper reaches of the Hawkesbury River system catchment known as the Lower Fish Ponds Creek Catchment. Old Mans Creek forms a sub-catchment with flows converging in Waitara Creek approximately 1km west of OMV. Old Mans Creek merges with Berowra Creek which meanders for more than 25km northerly before joining the Hawkesbury River. Natural drainage lines on the site have been significantly altered by filling operations in the past, including realignment of flows and installation of stormwater pipelines, and large concrete culvert diversion.

An open concrete stormwater channel is located on the northern edge of the quarry pit and collects stormwater from the residential areas to the north and east and redirects the runoff away from the quarry pit. These flows enter Old Mans Creek west of the quarry lands. The only water that enters the actual quarry is direct rainfall and natural ground water recharge. The extensive stormwater systems required from the quarry operations are still in effect and requires minimal repairs.



Hornsby quarry bushwalk trail

VEGETATION COMMUNITY

Vegetation communities within the bushland areas of the park include:

Blackbutt Gully Forest

- A tall open forest of 25m in height with a sparse to moderately dense understory
- Located in the southern, western and north-eastern parts of the site
- Moderate-good (high) condition with good mature canopy and intact diverse understory
- Moderate-good (low) condition with poor sparse canopy and exotic understory

Blue Gum Diatreme Forest

- Blue Gum Diatreme Forest is identified as a critically endangered ecological community
- A tall open forest of 30m in height with a sparse to moderately dense understory
- Located along the northern, south-eastern and south western part of the site
- Moderate-good (high) condition with good mature canopy and intact diverse understory
- Moderate-good (medium) condition with good mature canopy and a mixed exotic and native understory
- Moderate-good (low) condition with poor lower canopy and exotic or bare understory

Native Rehabilitation/ Regeneration

- Open Forest structure with mix of native endemic and non-endemic canopy species and exotic understory
- Generally consists of previously cleared land that has regrown over the past 35 years
- Located in the south, south-western and Quarry Void of the site

Exotic Vegetation

- Low closed forest/ shrub land or grasslands dominated by exotic species
- Located in the north, east and south-western parts of the site

Information sourced from Hornsby Quarry and Old Man's Valley: Vegetation Survey and Mapping, 06.03.2017, Kleinfelder

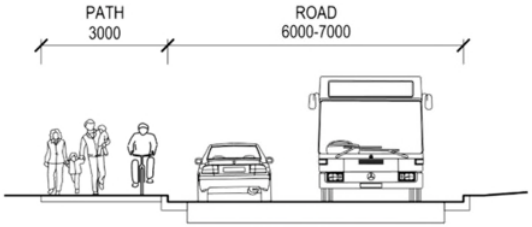
Overall, the site's bushland is in variable condition, ranging from very poor to good. An isolated good patch of restored Glen Forest occurs at the western end of Hornsby Park (southern portion). Core areas of Community Land bushland are in good condition. However, areas surrounding road and structural developments associated with the quarry are in poor condition. Poor native bushland conditions also exist along residential edges on the southern and northern boundaries.

ATTACHMENT 1 - ITEM 6

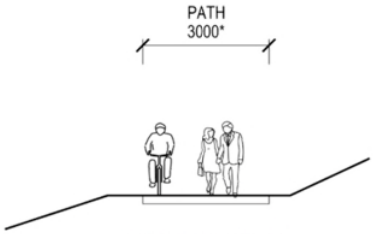
Mountain bike trails on Higgins Hill

ATTACHMENT 1 - ITEM 6

ATTACHMENT 1 - ITEM 6

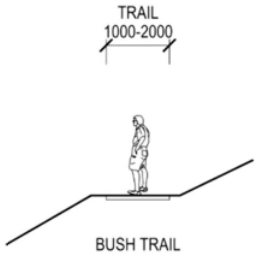


2 WAY ROAD

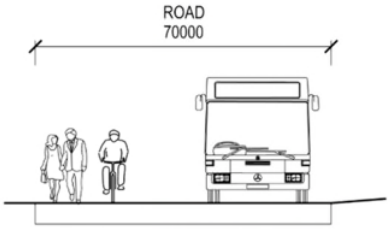


ACCESSIBLE LINK PATH

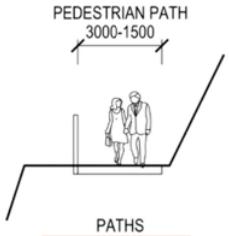
*4m wide paths for cyclists with barriers where steep terrain is adjacent to route



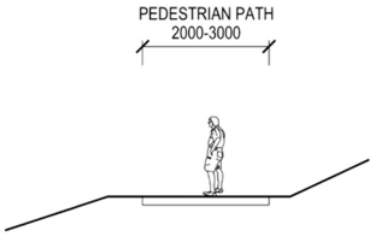
BUSH TRAIL



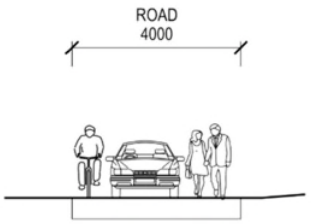
MANAGED ACCESS ROAD



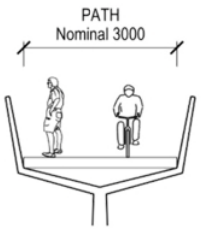
PATHS



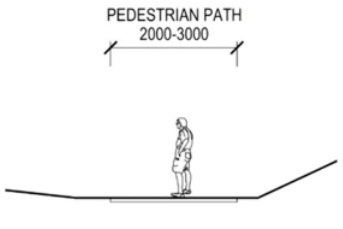
HERITAGE STAIRS AND TRAIL



SHARED ROAD



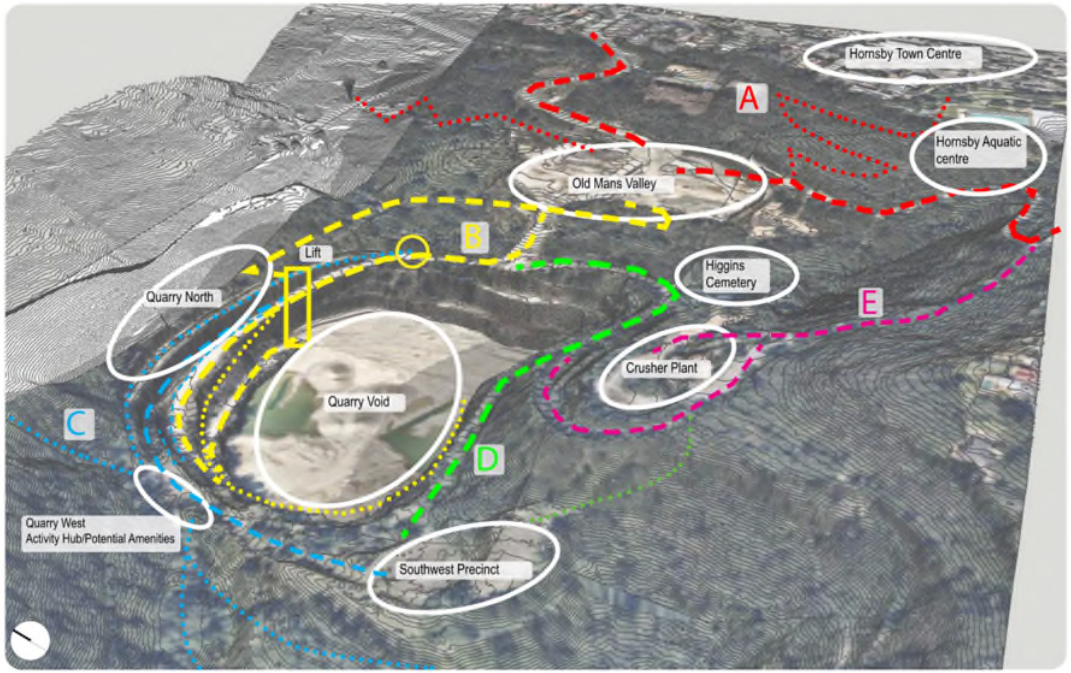
FUTURE TOWN CENTRE SKYWALK



ROSEMEAD TRAIL

CIRCULATION STRATEGY TYPICAL SECTIONS

ATTACHMENT 1 - ITEM 6



ACCESS SECTOR STRATEGY

Ensuring an accessible route throughout the park, linking the various precincts into a single accessible network is the focus of the access sector strategy. The terrain of the site makes accessible movement within the majority of the park extremely difficult, and providing 'Access for all' by maximising access throughout the site is a core principle of the park.

The adjacent diagram illustrates each of the major access sectors that link the Hornsby Town Centre to and between the precincts on the site. The sectors are:

A. Hornsby Town Centre to Old Mans Valley
B. Old Mans Valley to Quarry Void
C. Quarry North to Quarry West hub and South West Precinct
D. Southwest Precinct to Crusher Plant, Higgins Cemetery and Rosemead Rd
E. Crusher Plant to Hornsby Town Centre

In the pages that follow the critical constraints and opportunities for each sector and subsector are briefly summarised.


SECTOR A


SECTOR B

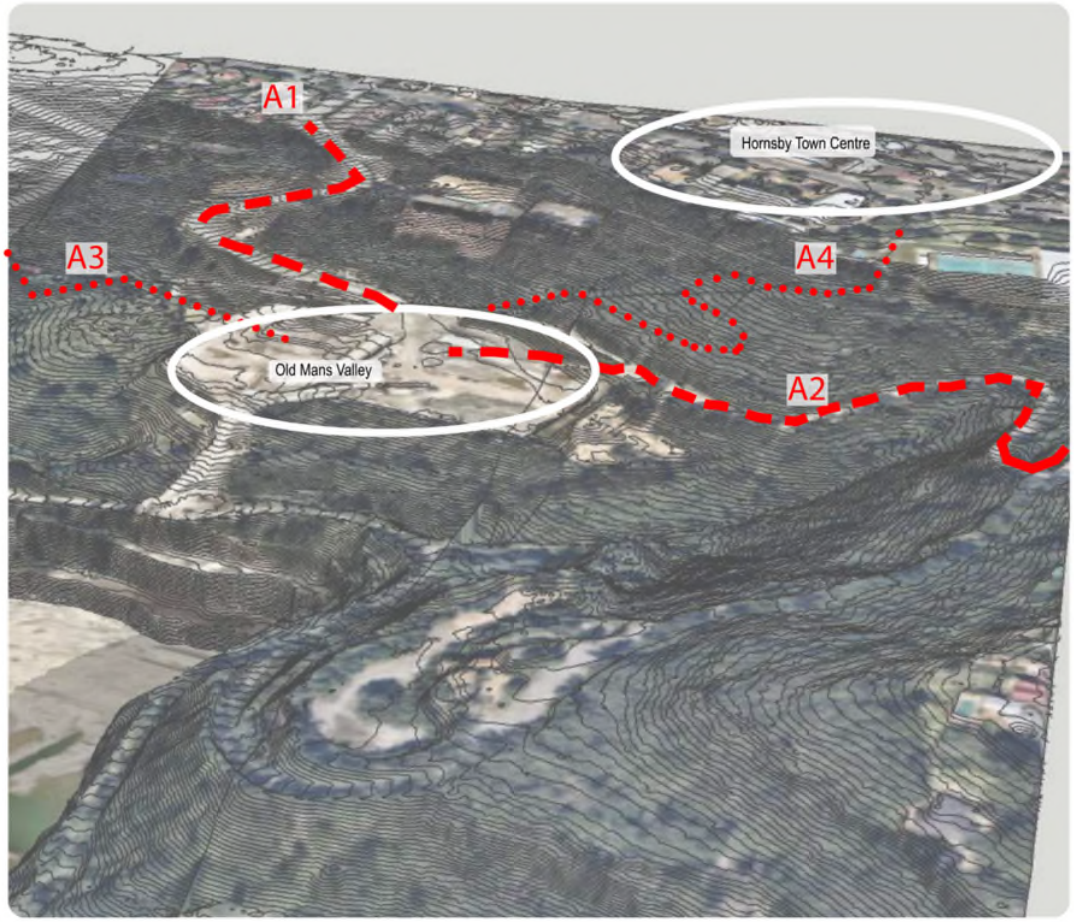

SECTOR C


SECTOR D


SECTOR E

ACCESS SECTORS STRATEGY

ATTACHMENT 1 - ITEM 6



SECTOR 'A' OVERVIEW

This is the critical arrival sector that links Hornsby Town Centre to Old Mans Valley. This sector contains the likely access links for the majority of visitors from outside the immediate Hornsby locality. It must therefore accommodate all forms of access including public and private vehicles. Cycling and walking access is challenging owing to the significant existing gradients.

SUBSECTOR SUMMARY

Subsector A1

Primary vehicle arrival access; the road is completed but offers no opportunity to integrate walking which will need to be provided within the bushland adjoining.

SUBSECTOR A2

Secondary vehicle access; links Quarry Road to Old Mans Valley. Will be a controlled vehicle access (not private vehicles) for shuttles, maintenance and event exit option with bicycle access to OMV from the Town Centre. Alternative one way access options are subject to further investigation.

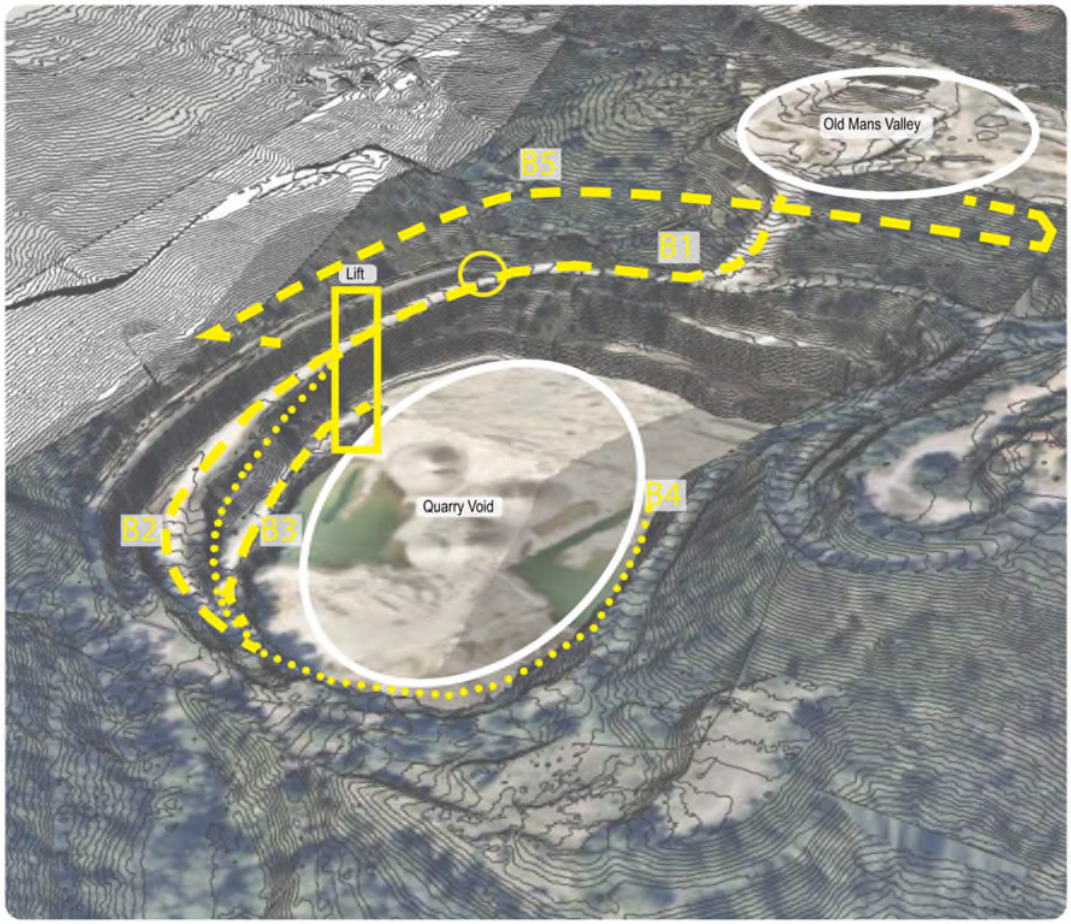
SUBSECTOR A3 AND A4

Pedestrian access; links Old Mans Valley to the Town. Gradients are steep so accessible path will not be direct. A3 links back to Fern Tree Close and A4 links back to Peats Ferry Road and the Town Centre. Alternative to the on grade non accessible route is an accessible raised pedestrian Canopy Skywalk from the Town Centre down to Old Mans Valley.

SECTOR A

SECTOR A: HORNSBY TOWN CENTRE TO OLD MANS VALLEY

ATTACHMENT 1 - ITEM 6



SECTOR 'B' OVERVIEW

This sector links the Old Mans Valley to the Quarry Void and to the western side of the quarry. There is potential for inclusion of a lift in the Quarry Void, which could users from the high northern perimeter via lower road and below to the Quarry Floor. The western side of the quarry, as well as representing a circulation node, has broad views across the quarry and may have potential for establishment of the activity hub or venue. This sector also provides access for event, maintenance and emergency vehicles, linking Old Mans Valley, the activity hub and the Quarry Void. It has a critical integration with Sectors C and D.

SUBSECTOR SUMMARY

SUBSECTOR B1

Primary shuttle vehicle access from Old Mans Valley to the shuttle stop that links firstly to the upper level pedestrian path at C3 and secondly to the shuttle stop at the lift. It also permits cycle access for uphill only for areas steeper than 1:10. These paths are shared pedestrian, bicycle and managed vehicles.

SUBSECTOR B2 AND B3

Vehicle access to the Quarry Void for event, maintenance and emergency vehicles. B3 provides full height truck access under B4 raised path. B2 and B3 also permit cycle access.

SUBSECTOR B4

Pedestrian access from the lift to the Quarry Void floor, accessible 1:20 grade throughout. Pedestrian and light maintenance vehicles only. Cycling not permitted (To be confirmed).

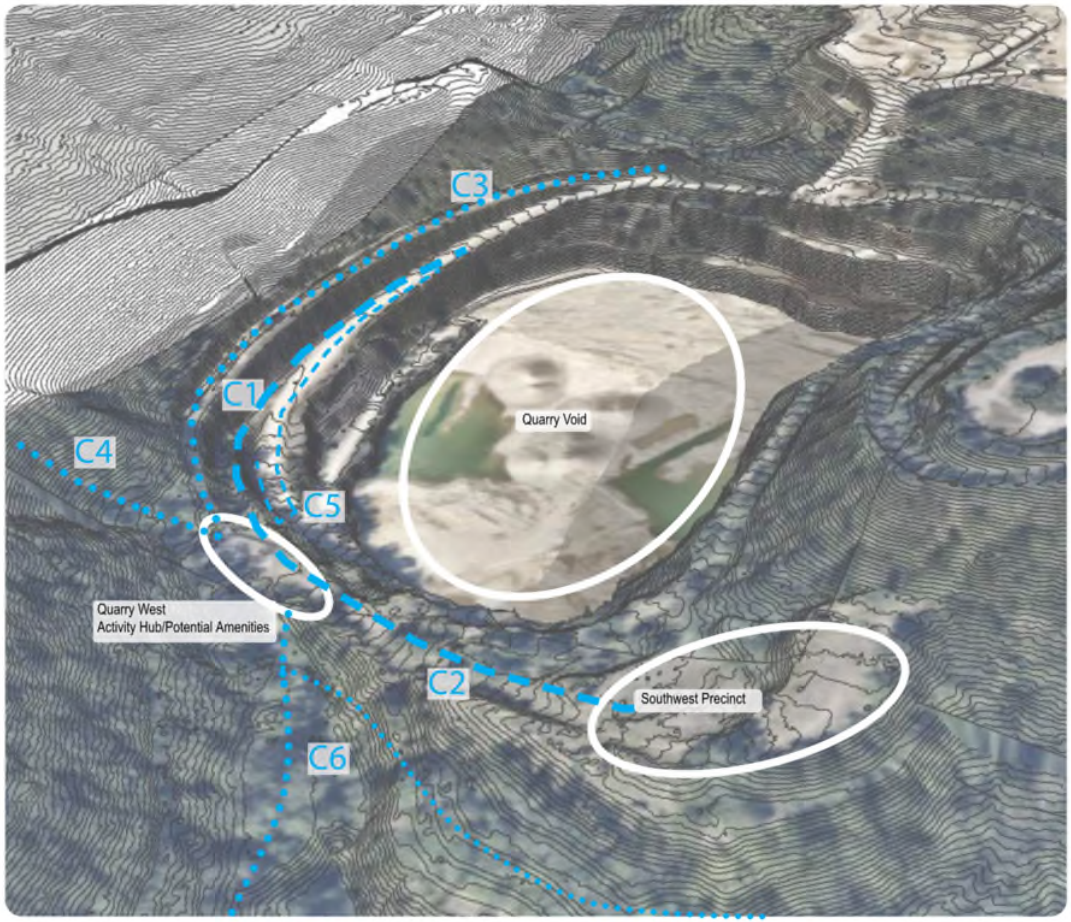
SUBSECTOR B5

Accessible shared pedestrian and bicycle route linking OMV and the Quarry Void.

SECTOR B

SECTOR B: OLD MANS VALLEY TO QUARRY VOID

ATTACHMENT 1 - ITEM 6



SECTOR 'C' OVERVIEW

This sector links the B Sector at a higher level to the Quarry West Activity Hub and the Southwest Precinct for shuttle, event, emergency and maintenance vehicles, as well as for pedestrians.

SUBSECTOR SUMMARY

SUBSECTOR C1
Primary shuttle vehicle access link between the lift and the Activity Hub. This also links to/ from the Old Mans Valley and Quarry Void for large event vehicles, as well as emergency and maintenance vehicles.

SUBSECTOR C2
Links the Quarry West Activity Hub to the Southwest Platform for shuttle vehicles. Also acts as pedestrian link.

SUBSECTOR C3
Principally a pedestrian that forms part of the accessible paths network on the site.

SUBSECTOR C4
Pedestrian link to Manor Road.

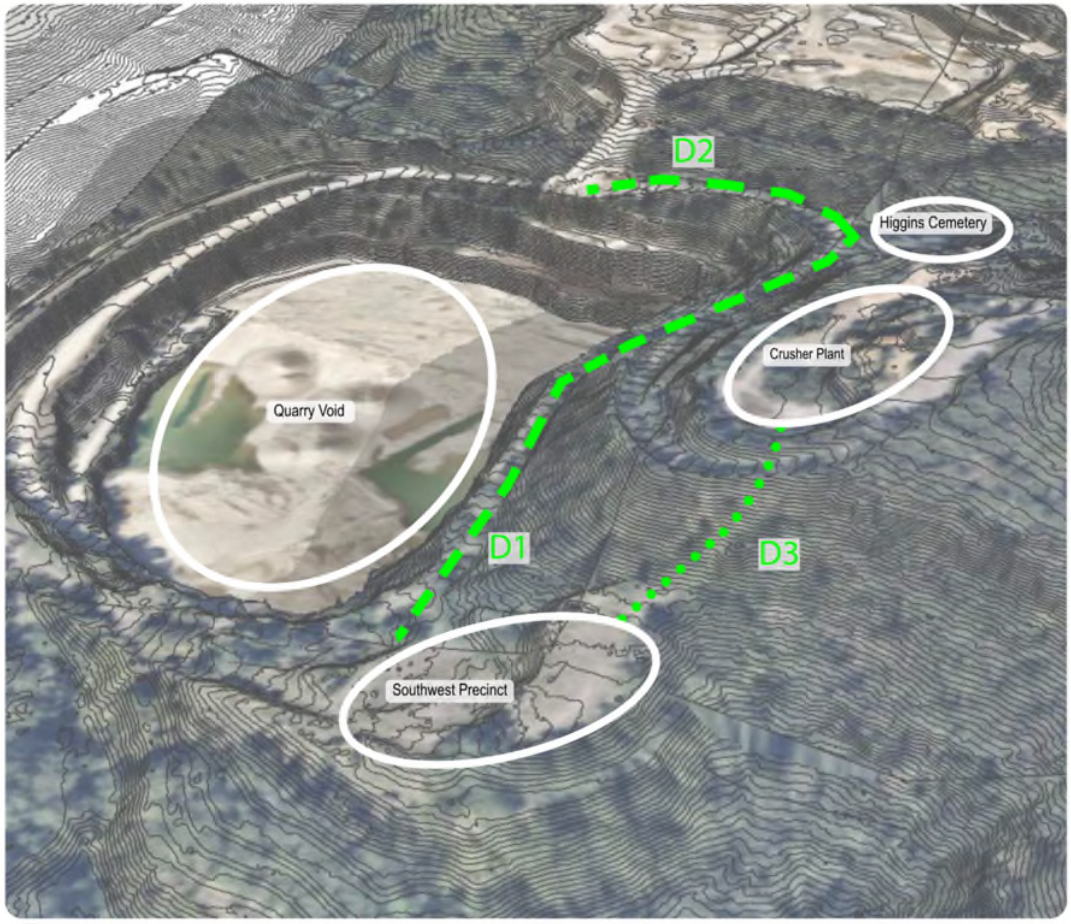
SUBSECTOR C5
Pedestrian only link connecting the lift to the Quarry West Activity Hub; includes a switch back path adjoining C road to achieve accessible grades.

SUBSECTOR C6
Key pedestrian and bicycle access into Berowra Valley National Park and minor link to Rosemead Road.

SECTOR C

SECTOR C: QUARRY NORTH TO QUARRY WEST & SOUTHWEST PRECINCT

ATTACHMENT 1 - ITEM 6



SECTOR 'D' OVERVIEW

This link follows the southern and eastern rim of the quarry. It is also the feeder route connecting to the Southwest Precinct and the Crusher Plant. This sector might potentially form part of a gondola/chairlift system on the south side of the quarry linking up the town centre, Old Mans Valley, Crusher Plant and the activity Hub.

SUBSECTOR SUMMARY

SUBSECTOR D1

Links the activity hub to the Southwest Precinct and the Crusher Plant. Southern Quarry road is a narrow road suitable only for light emergency, maintenance and small shuttle vehicles. No access for event vehicles or large trucks.

SUBSECTOR D2

Links to the Cemetery and the eastern rim of the quarry and connects to Sector B . Narrow shared road suitable only for shuttle bus and light emergency and maintenance vehicles. No access for event vehicles or large trucks. Access for pedestrians and cyclists.

SUBSECTOR D3

Crusher plant via bush trails.

SECTOR D

SECTOR D: SOUTHWEST PRECINCT TO CRUSHER PLANT AND HIGGINS CEMETERY

ATTACHMENT 1 - ITEM 6

SECTOR 'E' OVERVIEW

Principally a road suitable for low traffic volumes as it passes through a residential community on Quarry Road. Optimally for a shuttle service and a small number of private vehicles accessing the Crusher Plant only. No through link to Old Mans Valley for private vehicles.

SUBSECTOR SUMMARY

SUBSECTOR E1

Link road and pathway from Subsector D1 road on southern rim of the quarry. Narrow shared road suitable only for shuttle bus and light emergency and maintenance vehicles. Access for pedestrians and cyclists (uphill only due to steep grades).

SUBSECTOR E2

Link road and path from Quarry Road to the Crusher Plant. Shuttle bus and limited numbers of private vehicles only, dictated by available space in car park at Crusher Plant. Separated road and shared pedestrian and bicycle.

SECTOR E

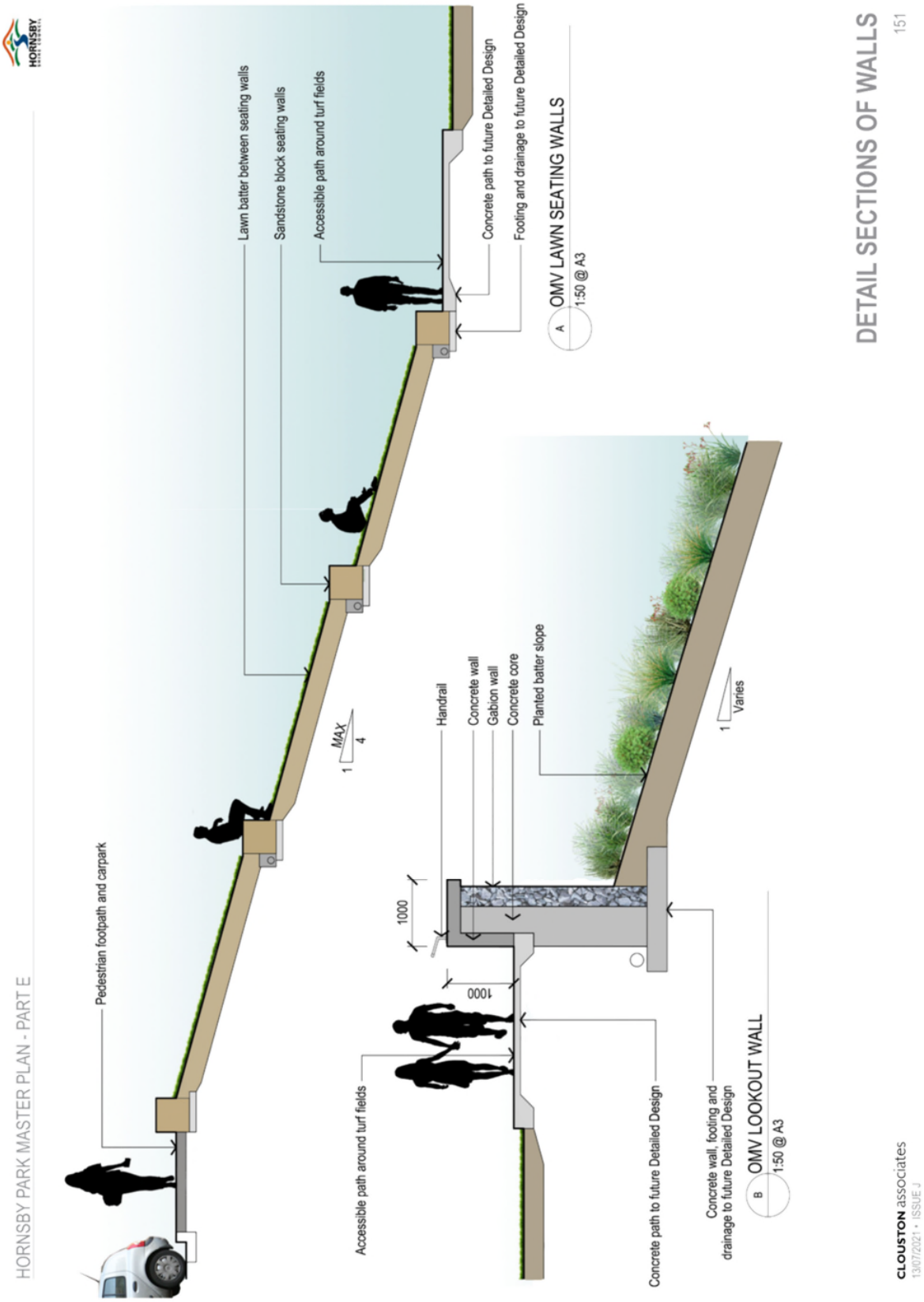
SECTOR E: CRUSHER PLANT TO HORNSBY TOWN CENTRE

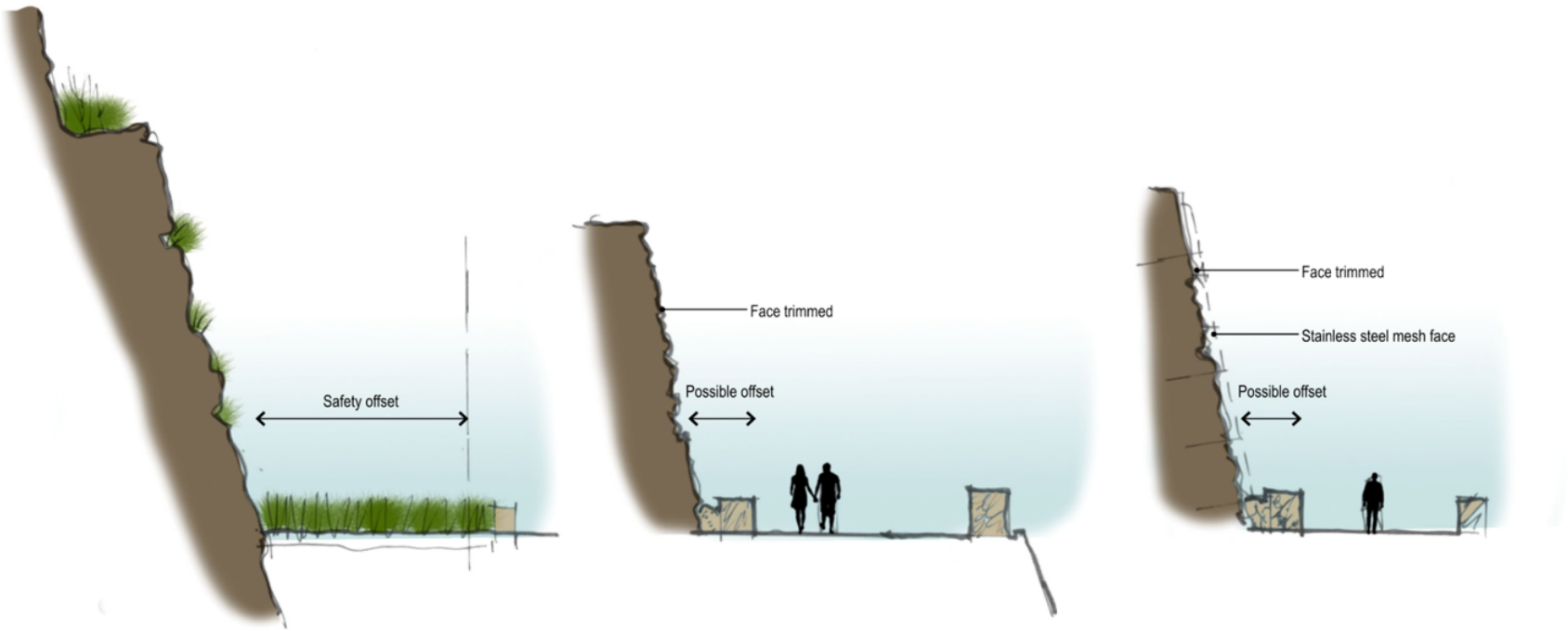
ATTACHMENT 1 - ITEM 6

WAYFINDING AND SIGNAGE PRECEDENTS

ATTACHMENT 1 - ITEM 6

ATTACHMENT 1 - ITEM 6





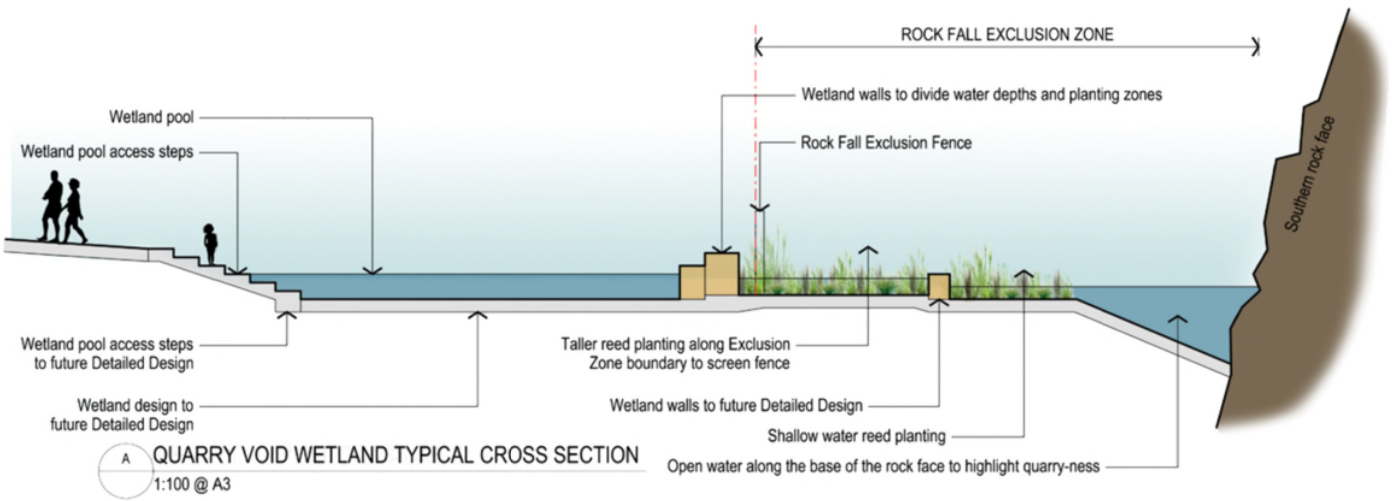
A QUARRY FACE RETAINED WITH FALL ZONE
NTS

B QUARRY FACE TRIMMED AND OFFSET
NTS

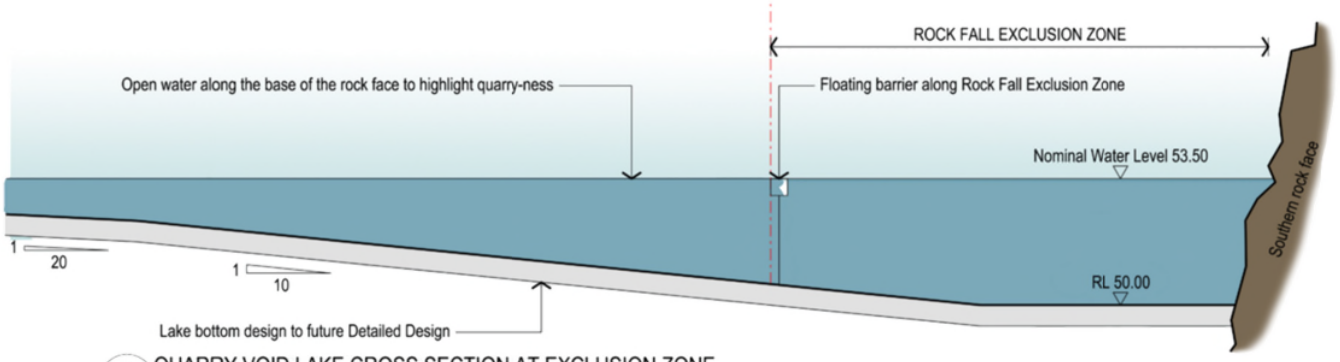
C QUARRY FACE MESH PROTECTION
NTS

DETAIL SECTIONS OF WALLS

ATTACHMENT 1 - ITEM 6



A QUARRY VOID WETLAND TYPICAL CROSS SECTION
1:100 @ A3



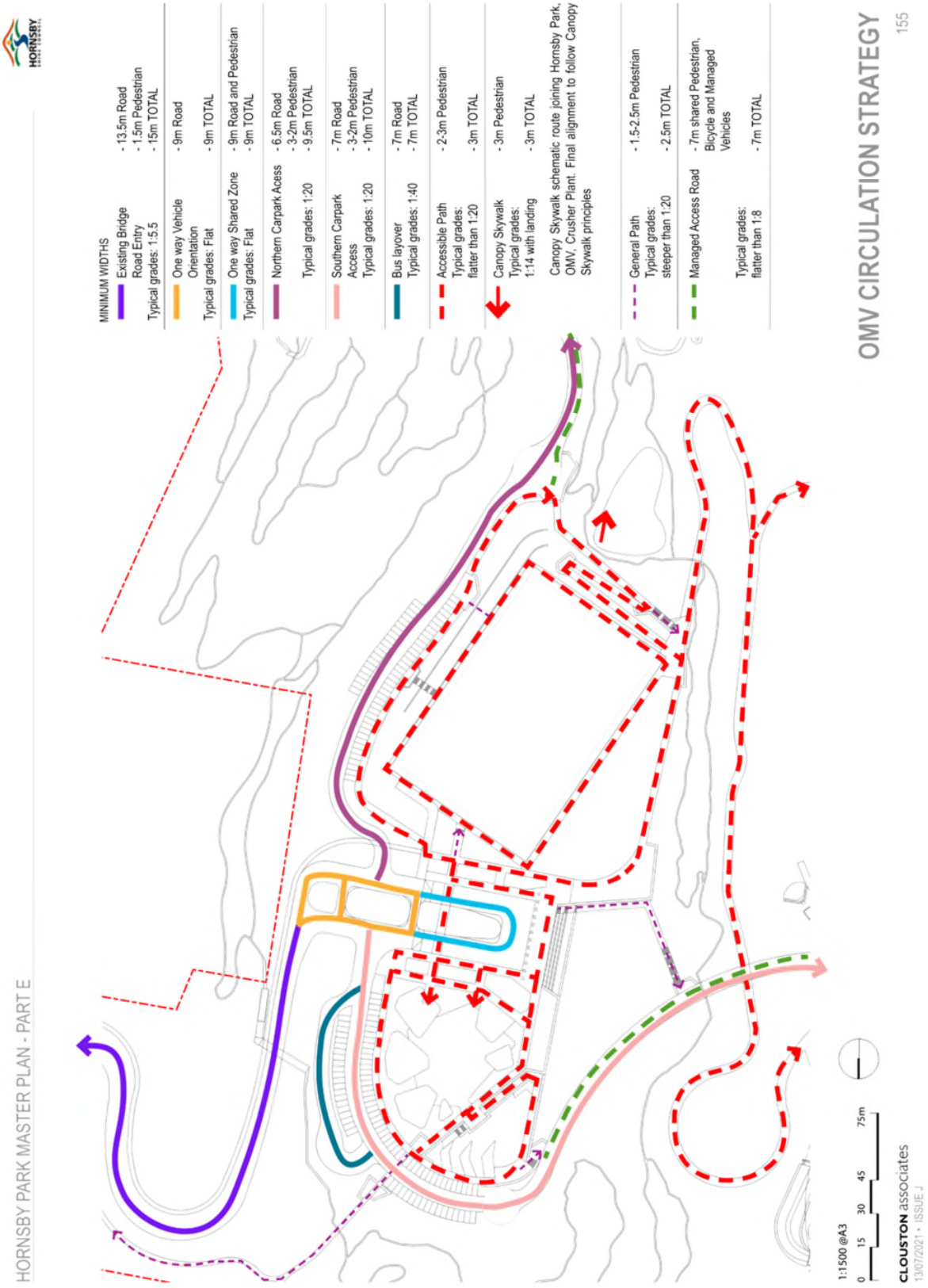
B QUARRY VOID LAKE CROSS SECTION AT EXCLUSION ZONE
1:100 @ A3

DETAIL SECTIONS OF WALLS

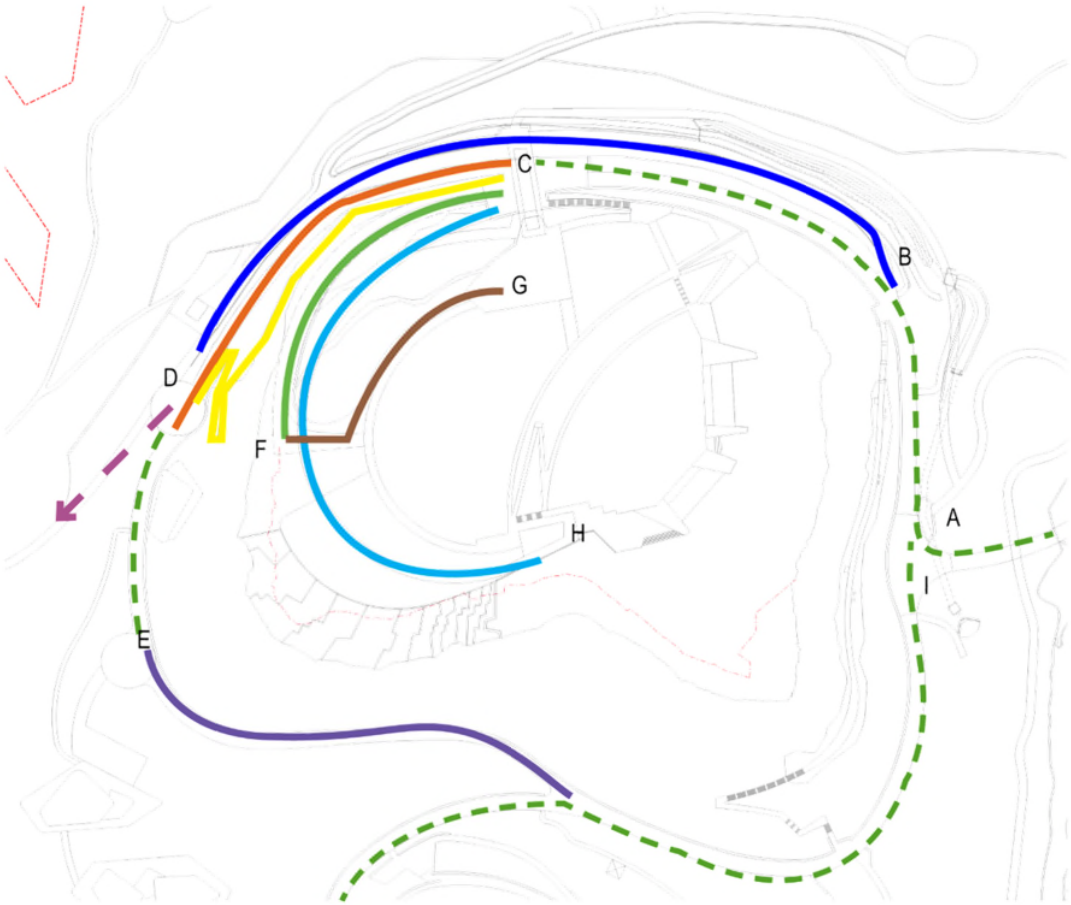
ATTACHMENT 1 - ITEM 6

ATTACHMENT 1 - ITEM 6

ATTACHMENT 1 - ITEM 6



HORNSBY PARK MASTER PLAN - PART E



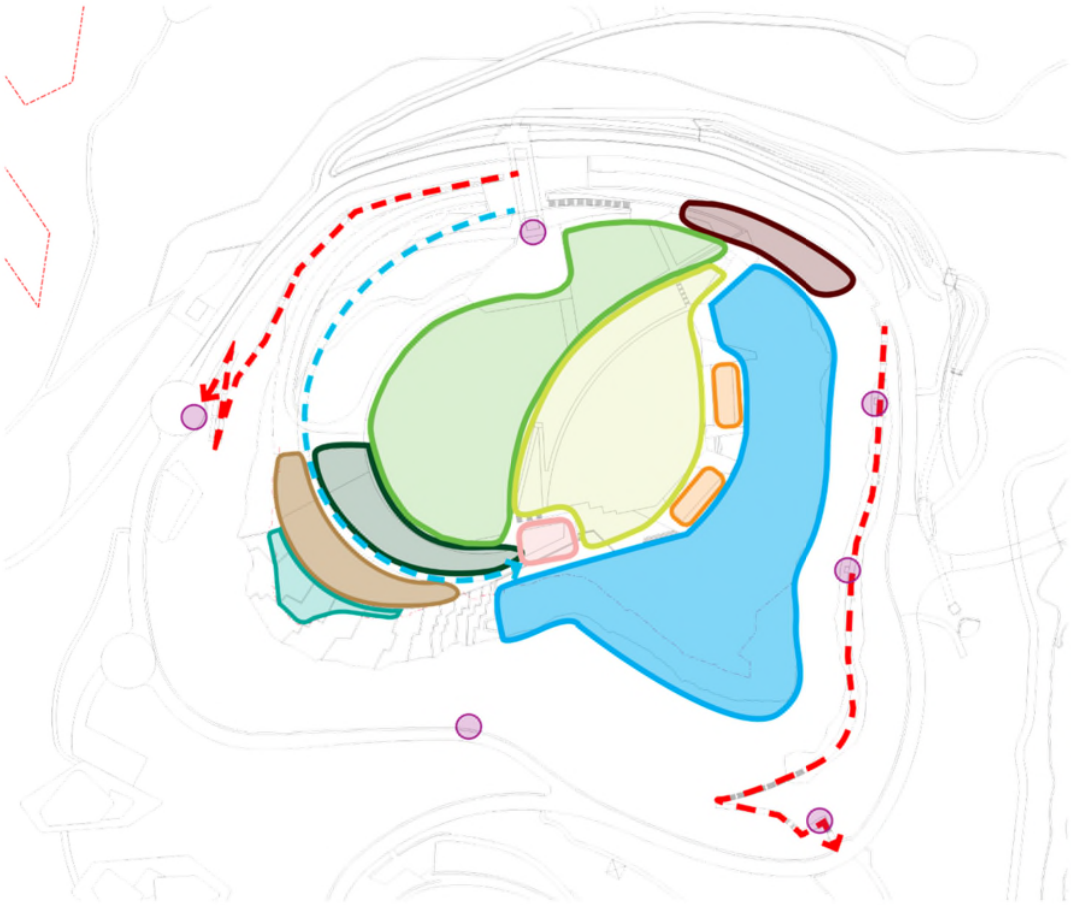
MINIMUM WIDTHS

90 Track Typical grades: Flat	- 3m Shared Pedestrian, Cycle and Maintenance Path - 1m Landscape Buffer - 1m Gabion Barrier Wall - 5m TOTAL
2 Way Shuttle Typical grades: 1:10	- 6m Road - 3m Pedestrian - 2m Cycleway - 1m Buffer - 1m Gabion Barrier Wall - 13m TOTAL
Western Direct Access Typical grades: 1:10	- 6m Shared path - 1m Gabion Barrier Wall - 7m TOTAL
Western Pedestrian Access Typical grades: 1:14	- 3m Pedestrian (Floating structure/on grade options) - 0.5m Future Lighting and Drainage - 0.5m Gabion Barrier Wall or Balustrade (where path is on grade) - 3-4m TOTAL
Maintenance Ramp Access Typical grades: 1:10	- 4m Road and Cycle - 4m Buffer - 1m Gabion Barrier Wall - 9m TOTAL
Maintenance Access Typical grades: Flat	- 4m Road and Cycle - 4m Buffer - 1m Gabion Barrier Wall - 9m TOTAL
Accessible Pedestrian Typical grades 1:20	- 4m Pedestrian - 4m TOTAL
Southern Access Typical grades up to 1:7	- 5.5m Managed access shared Bicycle(uphill only), pedestrian and Managed Vehicles - 0.5m Drainage - 1m Gabion Barrier Wall - 7m TOTAL
Managed Access Road Typical grades: flatter than 1:8	- 7m shared Pedestrian, Bicycle and Managed Vehicles - min 1m Landscape Buffer - 1m Gabion Wall - Uphill bicycle access only at areas steeper than 1:10 - 10m TOTAL
National Park Access Typical grades up to 1:20	- 3m Pedestrian and Cycle Shared Path - 3m TOTAL

QUARRY VOID CIRCULATION STRATEGY

CLOUSTON associates
13/07/2021 • ISSUE J

ATTACHMENT 1 - ITEM 6



1:2000 @A3

0 20 40 60 100m

CLOUSTON associates

13/07/2021 • ISSUE J

QUARRY VOID PASSIVE RECREATION STRATEGY

Quarry Void recreational strategy covers the ways to optimise the exprience of 'quarryness' and maximise the opportunities for range of recreational activities in this key precinct. The locations where these experiences can generally be found is mapped on the adjecent strategy plan. However, just because a space is shown as a particular experience does not exclude opportunities for other types of use to co-exist in a space. Key features and experiences of the park generally fall into the following categories.

PASSIVE

Upper and lower lawn terraces to provide kickabout and gathering area to tackle various of recreational needs. Provide interactive lake edge to enhance the experience of water. Locate amenity facilities and BBQ / picnic area at the south of Quarry Void.

ADVENTURE

Provide adventure recreational such as rock climbing at the north-eastern quarry wall.

EVENTS

Opportunity for principle event on the upper lawn terrace, and special events on the lower terrace and the lake,

INTERPRETATION / EDUCATION WALKING TRACKS

Explore opportunity for rock face interpretation and education by providing cliff walks. Provide engaging panorama scenic walk and lookouts at different location to reveal the drama and scale of Quarry Void. Provide opportunity for education and exploration on local fauna and vegetation community.

Legend

- Upper Lawn Terrace Kickabout Area
- Lower Lawn Terrace Gathering Area
- Amphitheatre Seating
- Picnic / BBQ Area
- Active / Adventure Recreation
- Interactive Lake Edge
- Visitor Hub / Amenity
- Cliff Walk / Rockface Interpretation Walk
- Panorama View Scenic Walk
- Lookouts / Birdwatching
- Potential Waterplay

QUARRY VOID PASSIVE RECREATION STRATEGY

ATTACHMENT 1 - ITEM 6

QUARRY VOID WALL STRATEGY

Quarry Void wall strategy covers the treatments of existing quarry walls and the guidelines on different types of proposed walls to enhance the character of quarry walls and ensure the safety and water management in Quarry Void.

CHARACTER AND VISUAL AMENITY

Ensure the character of 'quariness' is respected and emphasised through wall design. Highlight the uniqueness of four exisiting walls by clearing existing vegetation and minimising the visual impact of cliff walks and suspended structures on existing walls. Using sandstone / breccia welded mesh gabion walls and sandstone log walls to provide similar appearance to quarry rockface.

SATEFY AND MANAGEMENT

Apply barrier walls or fence at roads, paths and lookouts to prevent falling. Apply rockfall fence and other rockface stabilistation treatments as per Engineer's design to ensure the public safety in Quarry Void.

OVERLAND FLOW MANGAGEMENT

Provide concrete walls and impermeable gabion walls at quarry north to control overland flow.

Legend

- Back-lean Sandstone / Breccia Welded Mesh Gabion Wall / Concrete faced barrier wall
- Low Sandstone / Breccia Welded Mesh Gabion Barrier Wall / Concrete faced barrier wall
- Concrete Wall / Concrete faced barrier wall
- Impermeable Sandstone / Breccia Welded Mesh Gabion Wall / Concrete faced barrier wall
- Low Concealed Rock Fall Fence (if required)

1:2000 @A3

0 20 40 60 100m

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13/07/2021 • ISSUE J

QUARRY VOID WALL STRATEGY

ATTACHMENT 1 - ITEM 6

INTENT

The proposed Canopy Skywalk at Hornsby Park will provide a universal access pedestrian path that links the Hornsby CBD with Old Man's Valley and the Crusher Plant. This complements a network of paths that will link from Old Mans Valley to the Quarry Void and through the Park towards the Berowra Valley National Park.

OBJECTIVES

- To provide a dramatic and inspiring pedestrian gateway access to Hornsby Park
- To offer universal access between the Hornsby CBD and Old Mans Valley and beyond
- To celebrate and raise awareness of Hornsby Park's unique bushland and heritage
- To reduce visitor dependency on private vehicle access to Hornsby Park.

PRINCIPLES

The following Principles will underpin the design, construction, visitor use and experience of the Canopy Skywalk:

VISITOR EXPERIENCE

- Maximise the inspiration and memorability of the Canopy Skywalk visitor experience
- Focus the experience on the natural and cultural values of the landscape
- Offer a diversity of experiences, below, within and above the bushland canopy
- Select a route that provides periodic glimpses to other parts of the park
- Optimise the visitor's exposure to the varied vegetation communities on the route
- Ensure that the route highlights the best quality bushland, but also includes areas presently in poor condition
- Minimise the visual and noise impact of the Canopy Skywalk on those walking below.

ACCESSIBILITY

- Ensure that the design is universally accessible for its entire length
- Provide nodes where visitors can stop without impeding pedestrian flow
- Offer shortcut opportunities along the route, such as steps at pylons.

NATURAL ENVIRONMENT

- Ensure that design and construction techniques create the lightest possible environmental impact
- Optimise the use of existing cleared areas, paths and roadways to minimise the physical footprint of the walkway
- Implement native vegetation restoration in any areas where the canopy's alignment coincides with areas of degraded bushland
- Design the walkway surface to minimise noise impacts

AWARENESS AND EDUCATION

- Create a walking experience that will inspire, inform and educate visitors of all ages and backgrounds
- Ensure that interpretation places a primary focus on environment and culture
- Integrate physical and digital interpretive waypoints along the walkway

CULTURAL HERITAGE

- Ensure that the route selection, design and interpretation complements Design with Country principles
- Minimise visual impacts on heritage features such as the Depression era steps

DESIGN

- Choose a route alignment that balances maximising visitor experience with the smallest viable environmental footprint
- Ensure pylon design complements the existing tree forms and minimises visual impact
- Design the walkway to create a sense of lightness in appearance
- Use modular design to maximise flexibility in working around existing natural and cultural heritage elements
- Integrate flexibility in design to add future modules to the Canopy Skywalk route.

SUSTAINABILITY

- Use materials in the design that minimise the Canopy Skywalk's carbon footprint
- Ensure that the Canopy Skywalk can eventually be dismantled and removed with minimal environmental impact
- Select materials and construction methods that will permit all parts of the Canopy Skywalk to be recycled at end of life.

CONSTRUCTION

- Ensure construction methodologies minimise the footprint required for construction plant, equipment and access
- Minimise environmental and noise impacts during construction.

Valley of the Giants - Western Australia

BUILT STRUCTURE STRATEGY - CANOPY SKYWALK PRECEDENTS

ATTACHMENT 1 - ITEM 6

Brick Pit Ring - Homebush Bay, New South Wales

BUILT STRUCTURE STRATEGY - CANOPY SKYWALK PRECEDENTS

ATTACHMENT 1 - ITEM 6

Kew Gardens - London

BUILT STRUCTURE STRATEGY - CANOPY SKYWALK PRECEDENTS

ATTACHMENT 1 - ITEM 6

WESTERN PEDESTRIAN ACCESS + QUARRY RL88 BENCH PEDESTRIAN ACCESS

Cantilevered walkways and ramps

Raised walkways and stairs

Existing Quarry RL88 bench - cantilever path and stairs to provide access

CANTILEVERED PATH TO QUARRY VOID

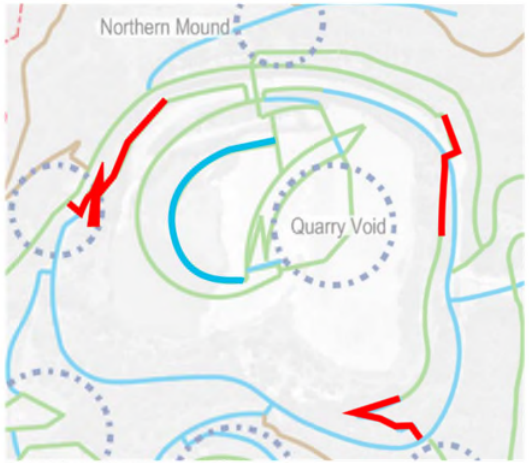
Floating ramps and walkways

Floating ramps and walkways

Existing Quarry north west corner - cantilever path to provide DDA access into void

CANTILEVER WALKWAYS

The extreme quarry landform found on site coupled with the need to provide accessible pathways a small number of raised / cantilevered walkway structures are required around the Quarry Void precinct. Precedent imagery of the potential forms these structures may take are provided for guidance.



Precinct B Quarry Void cantilevered walkway structures

LEGEND

NTS

Western pedestrian access + Quarry RL88 bench pedestrian access

Cantilevered path to Quarry Void

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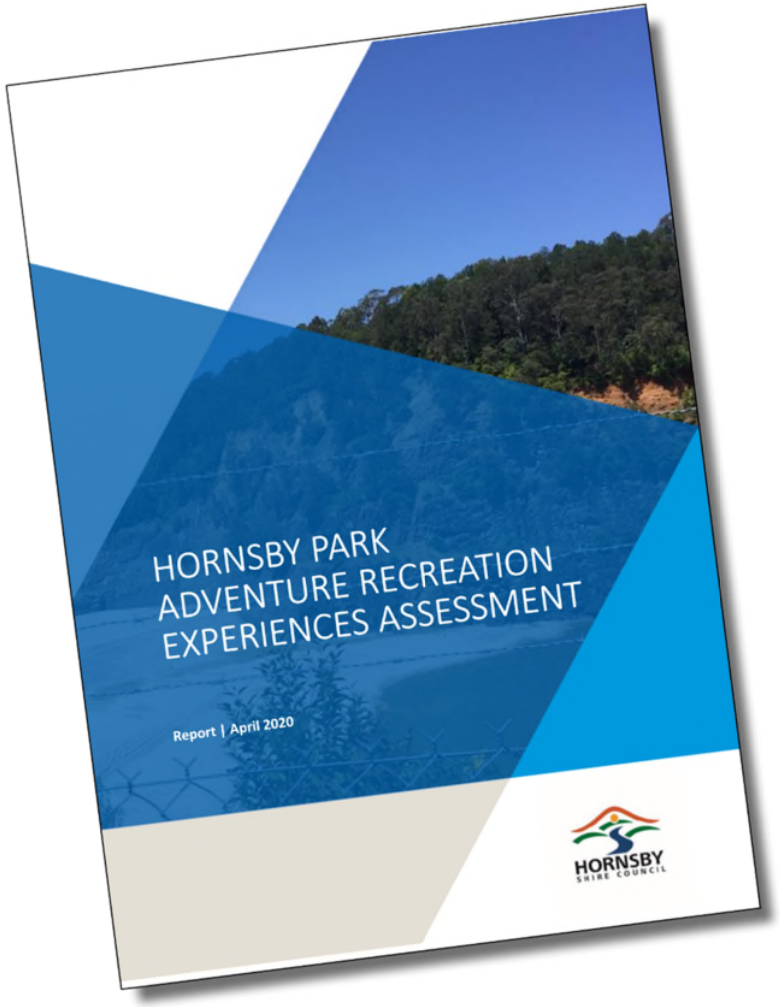

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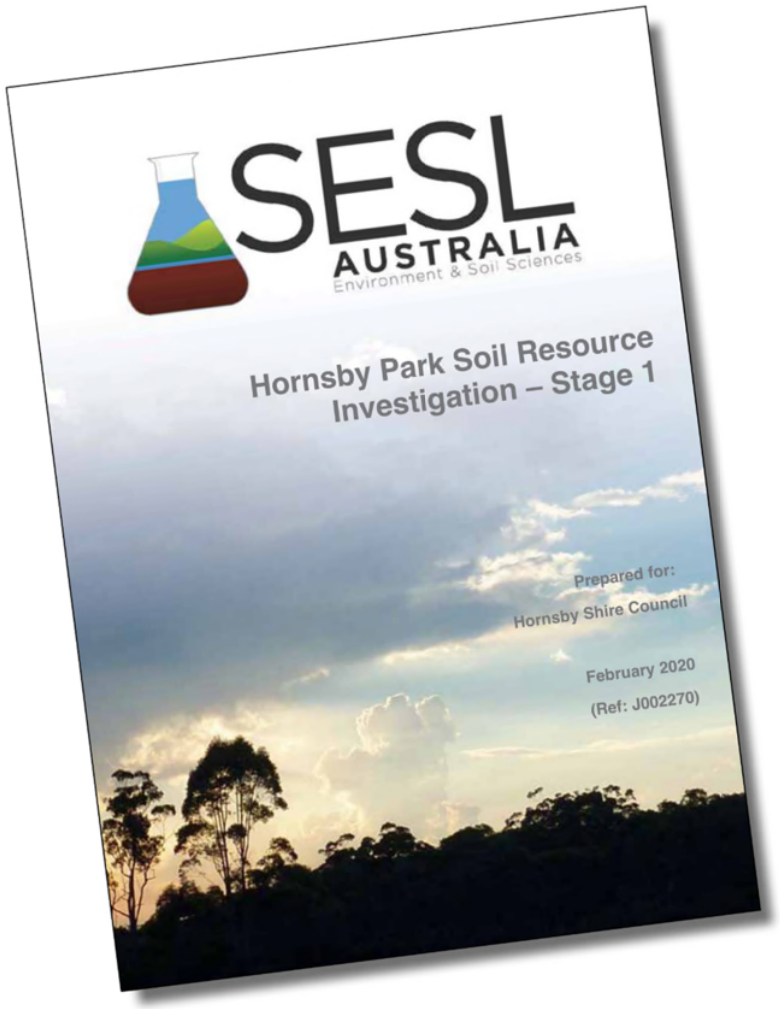

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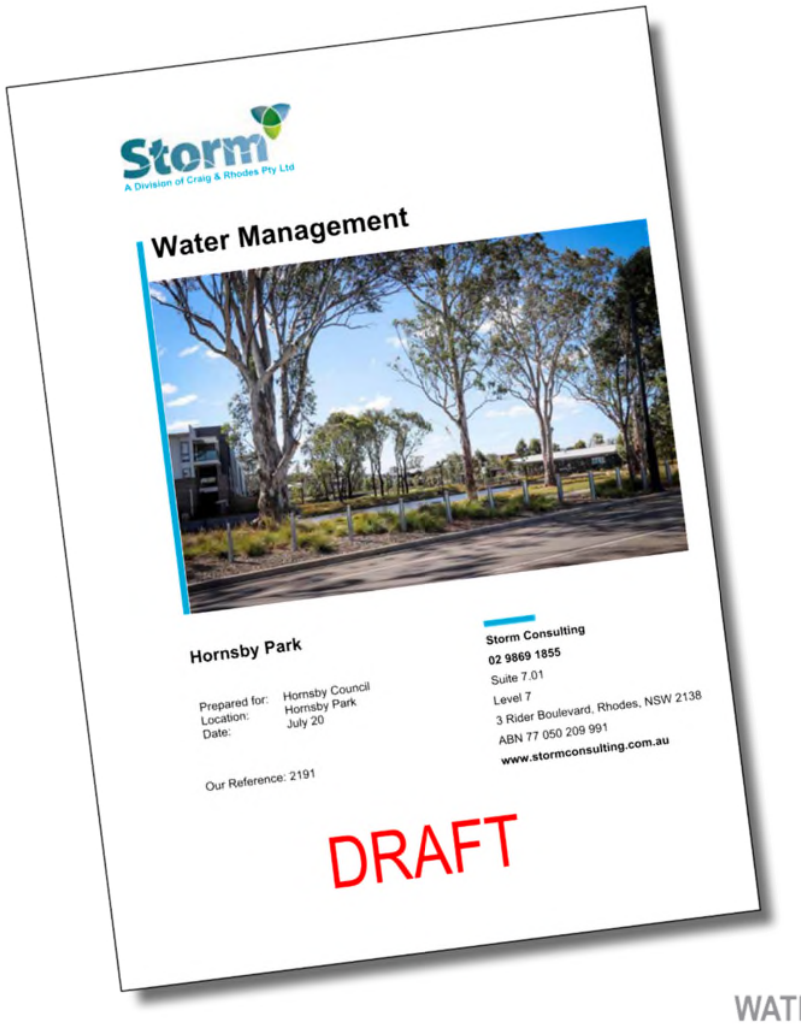

Storm
A Division of Craig & Rhodes Pty Ltd

Water Management

Hornsby Park

Prepared for: Hornsby Council
Location: Hornsby Park
Date: July 20

Our Reference: 2191

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DRAFT

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VEGETATION MAPPING ANS SURVEYS (VARIOUS)

ATTACHMENT 1 - ITEM 6

Trail through the bush

ATTACHMENT 1 - ITEM 6

GLOSSARY OF TERMS

Accessible Paths/Routes
A DDA compliant path for pedestrian and bicycle travel, meeting relevant requiments of AS1428. Generally primary paths within the Park meet this requirement, such as the main precinct linking path.

Active Recreation
Outdoor physical activity for the purposes of relaxation, health and wellbeing or enjoyment which can be self-directed or facilitated by a provider or organisation.

Adventure Recreation
Recreational activities utilising an interaction with the natural environment that contains elements of real or apparent danger in which the outcome, while uncertain, can be influenced by the participant and circumstance.

Bushland
Vegetation which ie either a remainder of the natural vegetation of the land or if altered is still representative of the structure and flora of the natural vegetation.

Diatreme Face
Exposed Diatreme rock formation from the quarry process. Formed from magma vents and seen throughout Sydney basin - rich soils were formed from the diatemes and specific vegetation communities are found on diatreme soils. An exposed diateme face exposing the cross section of the rock, such as seen at the quarry is extremely rare.

E-bike
E-bike and E-bike stations are a form of electronic bikes for hire to help with visitor movement throughout the park. Stations are small structures where bikes can be hired and recharged.

General Paths/Trails/Tracks/Routes
A pedestrian or bicycle route that does not meet DDA requirements, meeting relevant requirements of AS2156. Generally secondary and tertiary path, bushwalks, mountain bike trails, etc fall under this type. Paths that contain stairs also fall under this type.

Hubs
Specific locations within precicnts which are the core of the Precicnt. Hubs may contain amenities such as structures, e-bike stations or medical kits

Passive Recreation
Recreation activities that are not about physical movement or activity. Examples of passive recreation include nature gazing, reading, having a picnic and talking.

Precinct
A system implemented within the Master Plan to better organise the site into more manageable spaces. A precinct boundary is decided based on the extent of themes that each precinct encapulates. Precincts are sorted into major and minor precincts based on a number of factors.

Raised/Cantilevered Paths
A path that is built on structure above rough terrain. Generally these paths are designed to meet DDA requirements.

Shuttle (Autonomous)
A regular shuttle service is proposed for the Stage 1 works to help with pedestrian movements within the park. The extent of this service (to hornsby station/local suburban loop/etc) is to be confirmed. Opportunity to utilise autonomous vehicles as technology allows.

Quarry-ness
'Quarry-ness' encompasses the concept of retaining the character and drama of the quarry's form and experience into the next phases of the site's role as a major regional park.

Closeup of the rock face

ATTACHMENT 1 - ITEM 6

Consultant team
The Hornsby Quarry Master Plan was prepared by

Leonard Lynch - Founding Director
Crosbie Lorimer - Managing Director
Martin O'Dea - Associate Director
Josh Harold - Senior Landscape Architect
Huili Tang - Landscape Architect
Jonathon Gallagher - Landscape Architect
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ATTACHMENT 2 - ITEM 6

Hornsby Park
Base Case

23 February 2023

Service | Trust | Respect | Innovation

HORNSBY SHIRE COUNCIL

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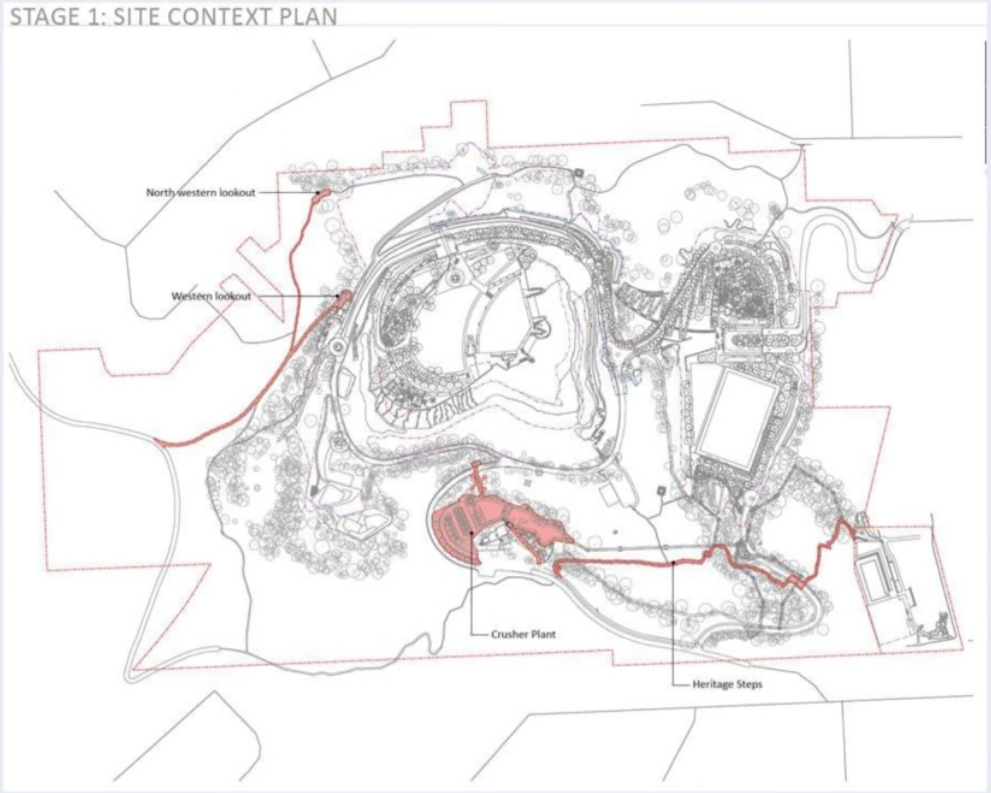
Base Case



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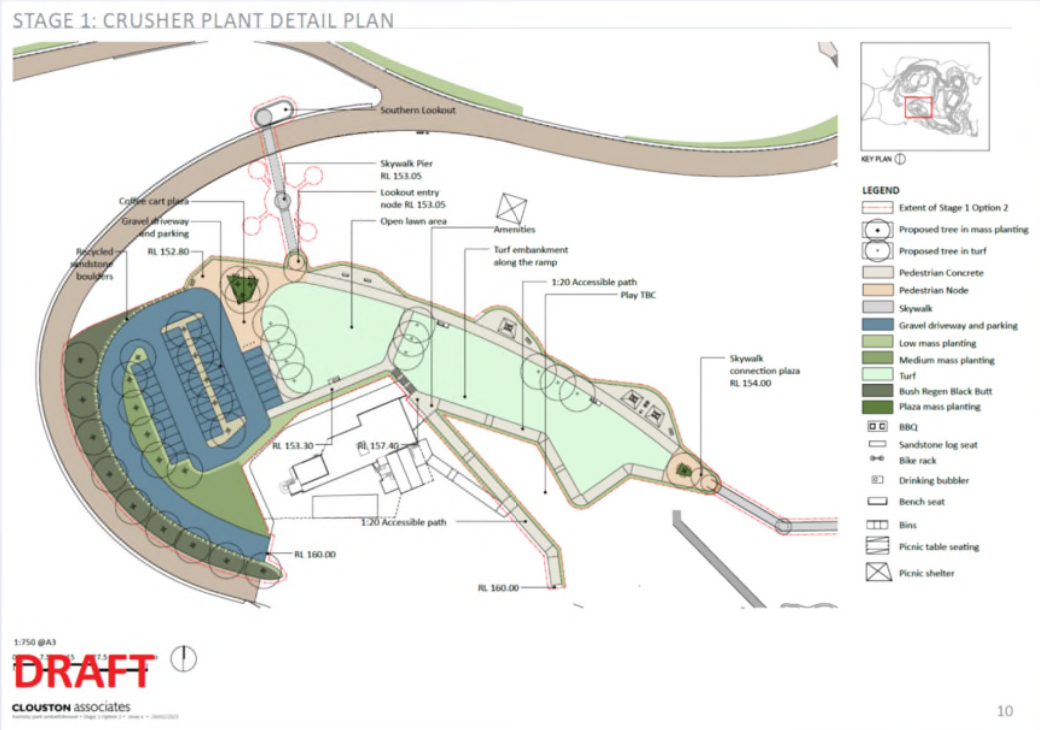
Base Case – Crusher Precinct



- Car Park
- Amenities
- Services (Electrical, Comms and Water)
- Space for Coffee Cart
- Level access to elevated Southern Lookout
- Lawns and possible Play Space

ATTACHMENT 3 - ITEM 6

Proposed Lookouts

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Western Lookout

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HORNSBY SHIRE COUNCIL 5

ATTACHMENT 3 - ITEM 6

Northern Lookout

ATTACHMENT 3 - ITEM 6

Southern (Crusher) Lookout

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ATTACHMENT 4 - ITEM 6

Stage 1 Concept Report
- Crusher Plant with associated works, Circulation Connection & Lookouts and OMV North

CLOUSTON associates

a division of BW Beveridge Williams

HORNSBY SHIRE COUNCIL

Client:
Hornsby Shire Council
Ground Floor
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Document	Issue	Date	Status	Reviewed	Verified	Validated
S20-0043	A	20/02/2023	DRAFT			-
S20-0043	B	23/02/2023				-
S20-0043	C	27/02/2023				-

Note: This document is Preliminary unless validated.

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SITE INTRODUCTION

Site and Project introduction

The Hornsby Park site is comprised of 59 hectares of bushland and cleared open land with the principal physical features. Council has committed to developing Hornsby Park as a landmark recreation destination for local residents and the wider Sydney community as well as domestic and 'in-bound' tourists.

The Master Plan of Hornsby Quarry was adopted by Council in 2021 and currently the project design team is seeking the REF planning approval and exploring the opportunities for staging the works within the existing funding agreement with the aim of developing and opening up specific sections of the site based on the adopted Master Plan for visitors.

The Overall Parklands Design Vision and Goal

- Restore and enhance the unique bushland within the site
- Protect and celebrate the Parklands Aboriginal and Non-Aboriginal heritage
- Ensure that the quarry character is retained
- Offer a variety of recreation opportunities including passive, active and adventure recreation
- Provide easy access throughout via a network of walking and bike paths
- Integrate upgraded connections between the park and surrounding area including Hornsby Town Centre, Berowra Valley National Park and local streets and trails
- Cater for the long-term evolution and growth of Hornsby and surrounding communities and populations
- Secure Council's long-term management and maintenance of the park.

Community Expectations from the Draft Master Plan Engagement

- High level of overall support for the draft Master Plan as well as for the recreational opportunities and enjoyment it will provide
- Universal desire to protect the site's flora and fauna and concern about potential environmental impacts during delivery and operation
- A desire to celebrate and educate users about the heritage and unique natural environment of the site
- Support for Old Mans Valley being the gateway to the park and concern that the proposed uses might detract from this role.
- Support for the proposed adaptive reuse of the Crusher plant
- Excitement about the Canopy Skywalk and what a unique feature it would be
- The need to minimise potential operational impacts on neighbouring residents as well as adjacent streets
- Universal support for easy access for all users
- A Split opinion on the OMV Sports field and its playing surface
- General acceptance of people being able to stay overnight at the South Western Platform, with support for camping over accommodation.

Why Stage the Works?

- Expectation from the local community for the park to be open in the near future based on previous council communication during the Master Plan phase
- The delayed commencement of landscape embellishment works due to earthworks completion delayed by frequent rain events and other factors
- Soft launch of the parklands to the public without introducing visitors to the earthworks extent
- Available Council funding in place for Hornsby Park Embellishment project
- Potential other project intertwined with the Hornsby Park Embellishment works
- Preferential treatment for Hornsby Shire residents to be supportive for some form of user fees

Stage 1 Requirements

- Stage 1 works are to be based on the approved Master Plan and subsequent REF design refinements
- Leave construction flexibility for the future implementation to achieve the desired overall design outcome
- Create opportunities for visual connections into the wider site without impacting potential future construction works
- Provide inclusive pedestrian circulation at necessary levels
- Fit the Stage 1 extent of works within the available budget
- Create opportunities for interaction with bushland and authentic natural landscape from Day 1
- Provide necessary services on-site to support the function of the stage 1 spaces.

The Stage 1 Extent of Works -
Crusher Plant with associated works, Circulation Connection & Lookouts and OMV North

Crusher Plant

- Enabling Services
- On-site parking
- Lawns / Picnic Areas with accessible spaces
- Southern Lookout including pathway works
- Play space
- Activation hub with opportunities for coffee cart or food truck and seatings
- Amenity Building

Circulation connections & Lookouts

- Completion of Heritage steps (Separate funding)
- Western lookout including pathway works from Rosemead Road.
- North western lookout including pathway works

OMV North

- Enabling Services
- Regional playground with supporting amenities
- Northern car park
- Amenity buildings
- Maintenance facilities
- Plaza and drop off space (double as event location)

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DESIGN PRINCIPLES

Connecting people with places

- Accessible to all + easily navigated
- Connected to its locality/landscape
- Supports physical/mental wellbeing
- Connected with nature
- Tells the story of the park and context

Things to see and do

- Offers local/district/regional interest
- Diversity of experiences active/passive
- Multi–use space opportunities
- Includes programs – tours/events etc
- Provides high quality amenities

Protecting Environment & Heritage

- Adopts Connecting with Country
- Integrates Avoid/Minimise/Mitigate/Offset
- Is Active Transport-focused
- Educates and raises awareness
- Is interpreted accessibly and engagingly

Creating a Memorable Experience

- Conveys significance from outset
- Sense of environment + heritage at core
- Easy, comfortable, inspiring, safe
- Varied character + memorable views
- Strong narrative line across the park

Looking After the Place

- Sustainable – climate/carbon positive
- Safe and well managed
- Has capacity to cater for peak visitation
- Retains capacity to evolve
- Financially sustainable + well resourced

Quality

- All furniture and paving is to be of premium quality in line with the unique nature and high significance of the park.
- Bespoke furniture and pavement is to be limited to key functions or areas.

Availability

- All seats, benches, furniture settings, bollards, bike racks, bins and drinking fountains are to be standard products, easily sourced and replaceable should it be required.
- Able to be sourced over the long term to accommodate the park to be built in phases over time.

Consistency

- A single consistent suite of furniture covering all the precincts of the park is to be used, with enough flexibility to facilitate adaptions to reflect the different precincts of the park. For example, through alternative options of colours, patterns, finishes, etc. for specific components of the item.
- A consistent suite of pavement finishes are to be used across the site to ensure the park feels like a single large park not a series of disparate small parks in the bush.

Sustainability

- Where possible all furniture is to be low carbon in keeping with the sustainability requirements of the park.
- Consider whole of life costs and products or companies with cradle to grave to cradle strategies.

Equality

- Tactile pavements and bollards are to have 30% luminance colour contrast to surrounding pavements as required by the access consultant report.
- Provide sufficient seating that meets AS1428.2 with places to sit down and rest along longer pathways

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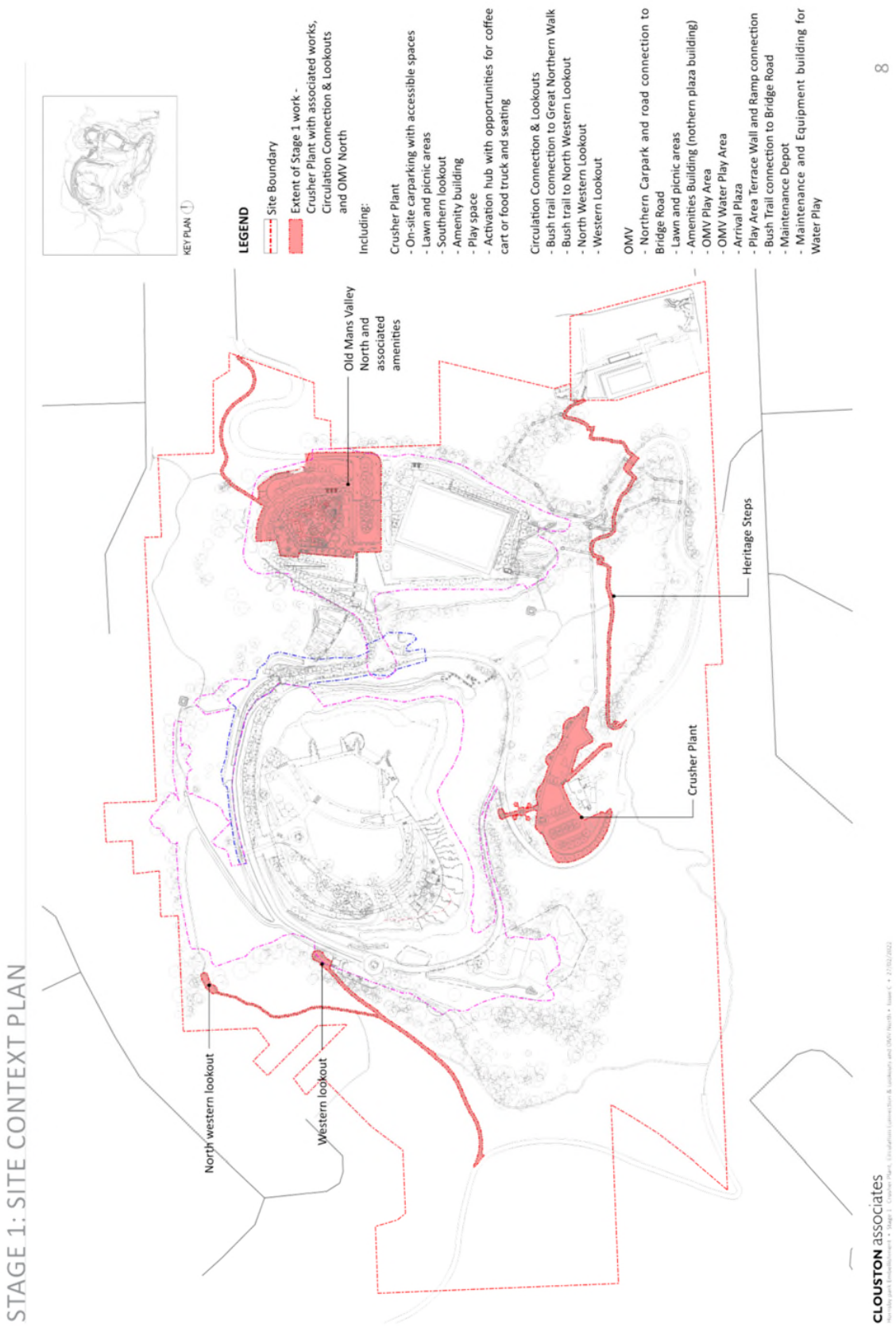
ATTACHMENT 4 - ITEM 6



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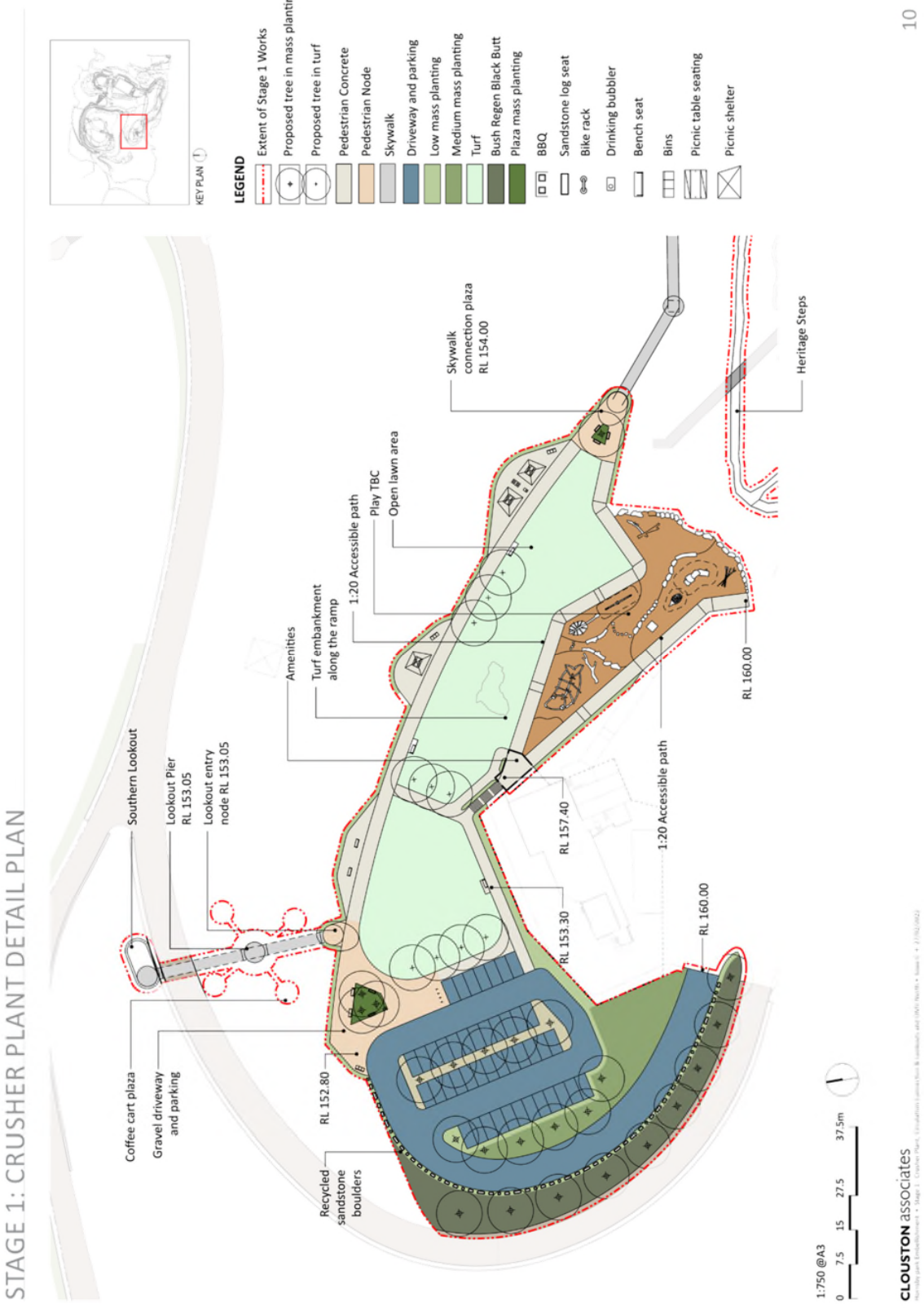
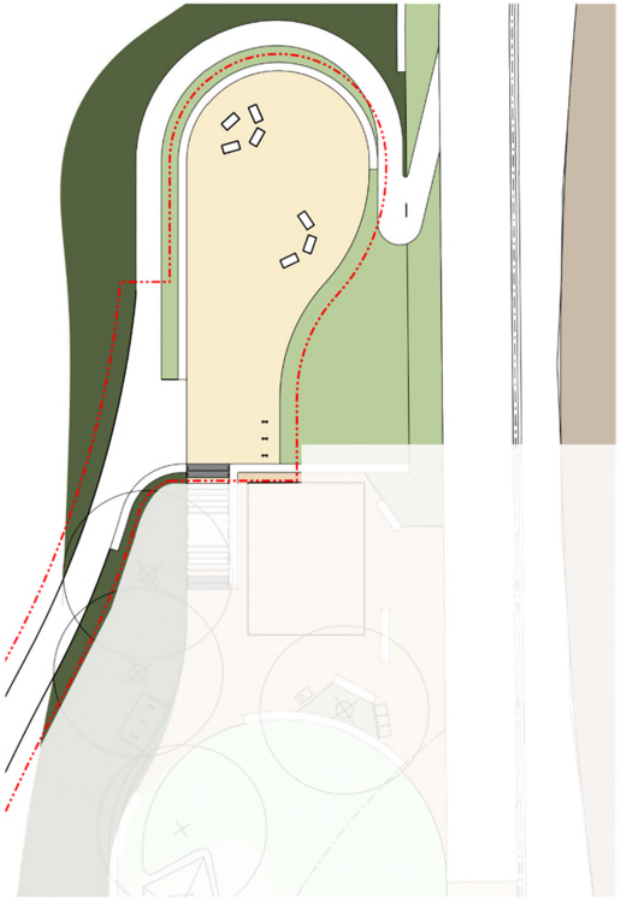


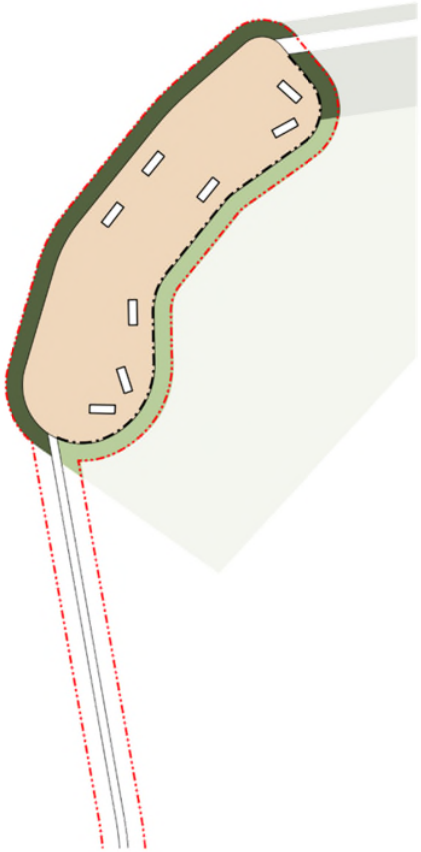
STAGE 1: NORTH WESTERN & WESTERN LOOKOUT DETAIL PLANS



Western lookout detail plan

1:250 @A3

0 2.5 5 7.5 12.5m



North Western lookout detail plan

KEY PLAN

LEGEND

- Extent of Stage 1 Works
- Gravel
- Pedestrian Node
- Low mass planting
- Bush Regen Blue Gum
- Sandstone log seat

Alternate lookout images

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STAGE 1: MATERIALS SCHEDULE

Name	Image	Product	Location	Supplier Information	Finishes	Colour/Aggregate	Notes
Paving type 1 - Pedestrian Concrete		Reinforced concrete pavement	Crusher Plant and OMV	N/A	Broom finish	Natural	Natural colours concrete, broom finish to continue to edge of pavement. Low carbon concrete is to be used for pavements where
Paving type 2 - Pedestrian Node		Reinforced concrete pavement	Crusher Plant, Circulation Connections and Lookouts and OMV	TBC	Exposed aggregate	1. Dark aggregate 2. Light aggregate 3. Mixed aggregate	TBC - likely to use a number of mixes across the park. Low carbon concrete is to be used for pavements where suitable.
Paving type 3 - Pedestrian Feature		Granite pavement	Crusher Plant and OMV	TBC	Flammed. To meet P5 slip requirements	A mixture of light and dark in random pattern	As documented
Paving type 4 - Vehicle Asphalt		Refer to Civil engineers drawings	OMV	N/A	N/A	N/A	As documented
Paving type 5 - Carpark		Traffic Paver HydroSTAN 80	OMV	Hydroston or approved alternative	With linemarking	TBC	https://hydrocon.com.au/hydroston-pavers/traffic/
Paving type 6 - Shared Zone		Reinforced concrete vehicle pavement	Crusher Plant	N/A	Raked	CCS coloured concrete: 1. Dark 2. Light 3. Brown	As documented. Low carbon concrete is to be used for pavements where suitable.
Paving type 8 - Shared Zone Feature		Cobble set pavement	OMV	TBC	Tumbled finish	red / brown / grey granite	As documented
Paving type 10 - Gravel		Sandstone gravel and decomposed granite gravel	Circulation Connections and Lookouts	N/A	Stabalised	Sandstone and brown	As documented
Paving type 11 - Vehicle Concrete		Reinforced concrete vehicle pavement	OMV	N/A	Raked	Natural	As documented. Low carbon concrete is to be used for pavements where suitable.
Paving type 16 - Skywalk		FRP mini mesh - 9mm opening	Crusher Plant	TBC	TBC	Dark grey	To match raised walkways
Paving type 19 - Mulch	Refer play consultant details	Refer play consultant details	Crusher Plant and OMV		Refer play consultant details	Refer play consultant details	Refer play consultant details
Paving Type 20 - Vehicle Gravel		TBC	Crusher Plant	TBC	Compacted	Grey blue stone gravel/ road base	TBC

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STAGE 1: WALL SCHEDULE

Name	Image	Front Face Finishes	Back Face Finishes (if applicable)	Location + Comments
Concrete Vehicle Barrier		Concrete	Concrete	OMV OMV entry road near basin 03
Playground Walls		Gabion facing	N/A	OMV Western and northern edge of the playground
Picnic Wall		Gabion facing	N/A	OMV Eastern edges of picnic area under ramp to carpark floating edge detail
OMV North Node Wall		Sandstone log	Sandstone log	OMV Free standing seating walls
OMV Maintenance Depot Wall		Sandstone log	N/A	OMV Retaining wall Maintenace Deopt
Quarry West seating walls		Gabion/ Concrete/ Sandstone	Gabion/ Concrete/ Sandstone	Circulation Connection and Lookouts Around the fuel building & mix of types to tie into industrial feel of the area

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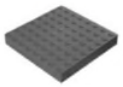
STAGE 1: FURNITURE SCHEDULE

Type	Image	Product	Location	Supplier Information	Materials	Finishes	Fixing	Colour	Notes
Seat		Linea range - seats Seat LIS 10 1800L x 540W x 790 H mm	OMV Play	Street Furniture Australia Or approved equivalent	Frame & Batten: Aluminium	Frame: Powder coated Batten: Aluminium Woodgrain	Surface fixed As per manufacturer's details	Frame: Pale Eucalypt Batten: Curly Birch (OMV) / Frame: Palladium Silver Batten: Bush Cherry (QW)	https://streetfurniture.com/product/linea-seat/ Or approved equivalent
Bench	 	Linea range Bench LIB 6 1800L x 445W x 430 H mm	Crusher Plant and OMV Play	Street Furniture Australia Or approved equivalent	Frame & Batten: Aluminium	Frame: Powder coated Batten: Aluminium Woodgrain	Surface fixed As per manufacturer's details	Frame: Pale Eucalypt Batten: Curly Birch (OMV) / Frame: Dark violet gloss 98451926 Batten: Bush Cherry (CP)	https://streetfurniture.com/product/linea-bench/ Or approved equivalent
Informal seat		Sandstone block	Crusher Plant and OMV Play	N/A	Sandstone	Smooth top	N/A	Natural	As documented
Picnic table and setting (DDA compliant)	 	Linea range - DDA compliant picnic table setting Table: LIT10 2100L x 750W x 720 H mm Bench LIB 6 1800L x 445W x 430 H mm	Crusher Plant and OMV Play	Street Furniture Australia Or approved equivalent	Frame & Batten: Aluminium	Frame: Powder coated Batten: Aluminium Woodgrain	Surface fixed As per manufacturer's details	Frame: Pale Eucalypt Batten: Curly Birch / Frame: Dark violet gloss 98451926 Batten: Bush Cherry	https://streetfurniture.com/product/linea-table/ Or approved equivalent
Picnic shelter		Custom made shade shelter to match the look and feel of the OMV buildings	Crusher Plant and OMV Play	N/A	Steel frame Composite timber to match look of OMV buildings	TBC	TBC	TBC	As documented
Electrical BBQ		A Series - Double Universal Access Barbecue DDA compliant Two cook tops 1900W x 1150D x 860H mm	Crusher Plant and OMV Play	CHRISTIE Or approved equivalent	90% recycled, corrosion Resistant stainless-steel 4622 grade and 306 grade components		As per manufacturer's details	N/A	https://dachristie.com/barbecues/cabinets/ Or approved equivalent

ATTACHMENT 4 - ITEM 6

STAGE 1: FURNITURE SCHEDULE

Type	Image	Product	Location	Supplier Information	Materials	Finishes	Fixing	Colour	Notes
Drinking fountain		Prospect Drinking Fountain with bottle tap AS1428 Australian Standards compliant, wheelchair accessible 880H x 940D x 405 W mm	Crusher Plant and OMV Play	Botton + gardiner Or approved equivalent	Grade 316 stainless steel frame	Mirror polished select faces	Sub-surface fixed As per manufacturer's details	N/A	https://www.bottongardiner.com.au/products/urban-and-street-furniture/drinking-fountain/prospect-drinking-fountain/
Bins (General waste + Recycle + Organic waste)		Frame Bin Enclosure 240Lt WBE-nF120-BAT 1400W x 810D x 1350H mm	Crusher Plant and OMV Play	Street Furniture Australia Or approved equivalent	Woodgrain aluminium wider battens	Aluminium	Sub-surface fixed As per manufacturer's details	Frame 1. Powder coated 2. Stainless 304 or 316 No.4 finish	https://streetfurniture.com/product/frame-bin-enclosure/ Or approved equivalent
Bollards		Channel Bollard CHL04-B-MS-G L 200 x D 200 x H 910mm	Crusher Plant and OMV Play	UAP Or approved equivalent	Mild steel	Powder coated	1. Fixed 2. Removable As per manufacturer's details	Powder coat. Required colour luminance contrast to pavement	https://www.uapsupply.com/range/channel-bollard/ Or approved equivalent
Tactile indicators		Warning Integrated Tactile Pavers 300x 300mm WIPV-30X30	Crusher Plant and OMV Play	Tactile Systems Australia Or approved equivalent	Wet Cast high strength concrete mix	P5 Slip Rating	As per manufacturer's details	TBC. Required colour luminance contrast to pavement	https://tactilesystems.com.au/product/warning-integrated-300mm-x-300mm-tactile-paver/ Or approved equivalent
Bike rack		Slim Hoop (BST02) 270L x 120W x 850H (mm)	Crusher Plant, Circurlation Connection and Lookouts and OMV Play	Street Furniture Australia Or approved equivalent	Stainless Steel 304	No.4 (brushed)	Sub-surface fixed As per manufacturer's details	N/A	https://streetfurniture.com/product/slim-hoop/

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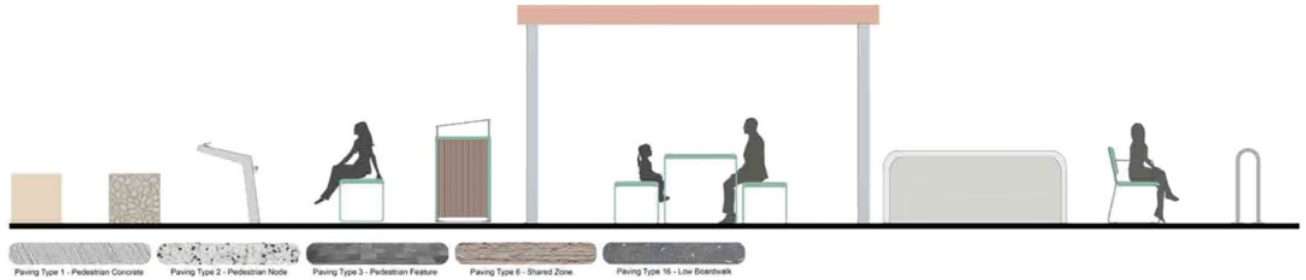
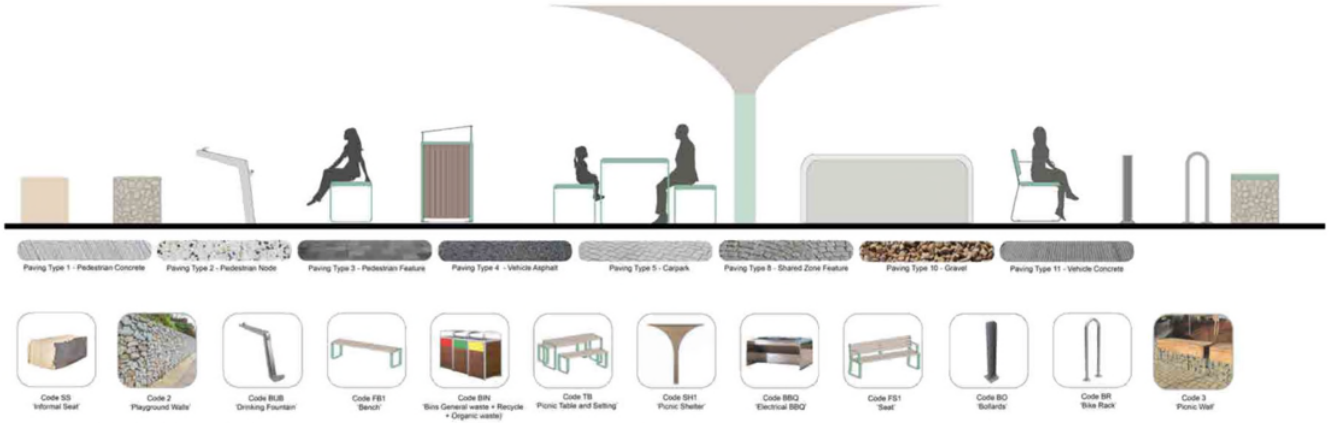
STAGE 1: FURNITURE TYPOLOGIES



A FURNITURE TYPOLOGY TYPE 5 - CRUSHER PLANT

B FURNITURE TYPOLOGY TYPE 7 - CIRCULATION CONNECTION AND LOOKOUTS



C FURNITURE TYPOLOGY TYPE - STAGE 1 OMV PLAY

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STAGE 1: PLANTING TYPOLOGIES

A MASS PLANTING TYPE 1 - LOW MASS PLANTING

Plant Mix Type 1
- Generally 0.3-1m high species
- Groundcovers and grass species
- Planted under tree canopies and in open areas
- Consists of mostly natives requiring open sun or partial shade
- Mix is based on either BGHF or BBGF depending on location
- Exotics in mix added as highlights of colour or texture plants

D MASS PLANTING TYPE 4 - BUSH REGENERATION BLUE GUM HIGH FOREST

Plant Mix Type 4
- BGHF species only
- Mix includes tree species
- Based on VMP revegetation requirements
- Only proposed in cleared areas adjacent to mapped BGHF

B MASS PLANTING TYPE 2 - MEDIUM MASS PLANTING

Mass Planting Type 2
- Generally 0.3-1.5m high species
- Groundcovers, grasses, low shrubs and vine species
- Groundcover and grass species based on Mass Planting Type 1 species
- Planted under tree canopies and in open areas
- Consists of mostly natives requiring open sun or partial shade
- Mix is based on either BGHF or BBGF depending on location
- Exotics in mix added as highlights of colour or texture plants

E ASS PLANTING TYPE 5 - BUSH REGENERATION BLACK BUTT GULLY FOREST

Plant Mix Type 5
- BBGF species only
- Mix includes tree species
- Based on VMP revegetation requirements
- Only proposed in cleared areas adjacent to mapped BBGF

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STAGE 1: PLANTING TYPOLOGIES

F MASS PLANTING TYPE 1 - PLAYGROUND PLANTING

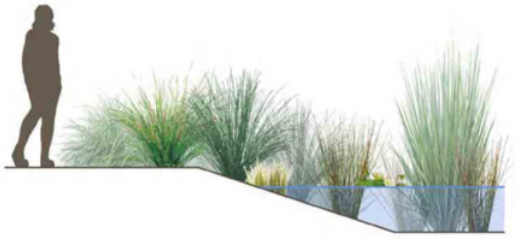
Plant Mix Type 6
- Generally 0.3-2m high species
- Low allergy plants
- Mix of natives and exotics
- Mix is based on either BGHF or BBGF depending on location

A MASS PLANTING TYPE 7 - CARPARK MASS PLANTING

Plant Mix Type 7
- Generally 0.3-1m high species
- Plants suitable for carpark situations
- Generally low grasses and groundcovers to ensure sightlines are not impeded
- Includes screening species for Maintenance Depot
- Located in eastern side of OMV therefore based on BBGF species

B MASS PLANTING TYPE 8 - OMV PLAZA MASS PLANTING

Mass Planting Type 8
- Generally 0.3-1m high species
- Bluegum "cathedral of trees"
- Native grasses are to be planted in small clumps with gaps between clumps due to bushfire concerns
- Native groundcovers form the majority of species coverage due to bushfire concerns
- Occasional native shrub planting is allowed due to bushfire concerns
- Small sandsone gravel mulch is to be used within the plaza planting
- Ensure vehicle sightlines are not impeded within the plaza
- Opportunities for water interaction and water tolerant species



C MASS PLANTING TYPE 9 - WETLAND MASS PLANTING

Plant Mix Type 9
- Generally 0.3-1m high species
- Planting within the lake, wetlands and raingardens
- Generally native species
- Grasses, rush and sedge species
- Required to tolerate inundation and occasional dry conditions

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ATTACHMENT 4 - ITEM 6

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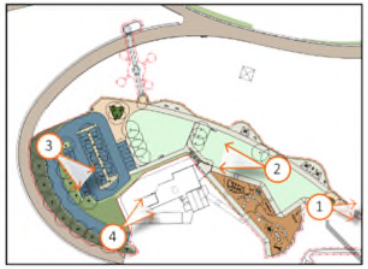
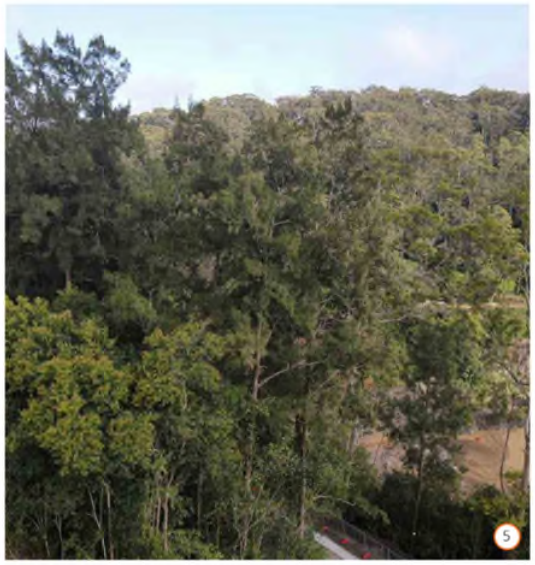
SITE IMAGES - CRUSHER PLANT



ATTACHMENT 4 - ITEM 6

SITE IMAGES - CRUSHER PLANT



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SITE IMAGES - CRUSHER PLANT LOOKOUT

Southern Lookout looking north west towards the Northern Mound

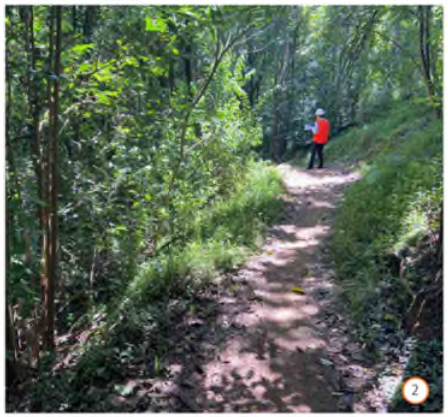
ATTACHMENT 4 - ITEM 6

SITE IMAGES - CRUSHER PLANT LOOKOUT

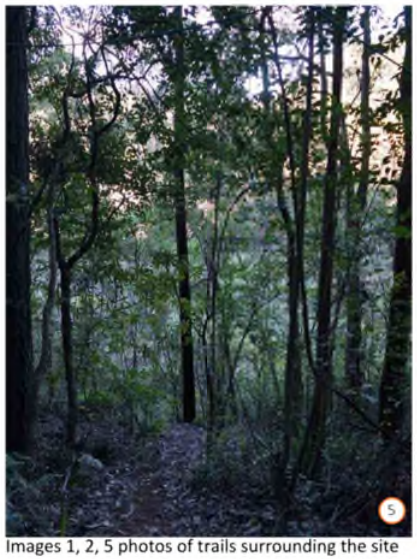
Southern Lookout looking north east towards the diatreme and OMV

ATTACHMENT 4 - ITEM 6

SITE IMAGES - TRACKS, TRAILS AND LOOKOUTS

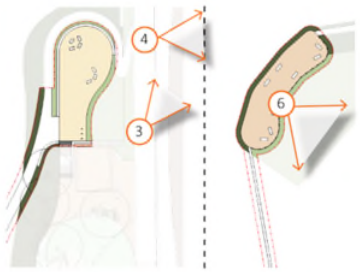


Western Lookout



Images 1, 2, 5 photos of trails surrounding the site

North Western Lookout



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SITE IMAGES - OMV

ATTACHMENT 4 - ITEM 6

ATTACHMENT 4 - ITEM 6

SKETCHES - CRUSHER PLANT

Sketch view of Southern Lookout offering panoramic views into the Quarry Void

ATTACHMENT 4 - ITEM 6

SKETCHES - CRUSHER PLANT

Sketch view of the Crusher Plant platform with lawn and food truck hub in the background

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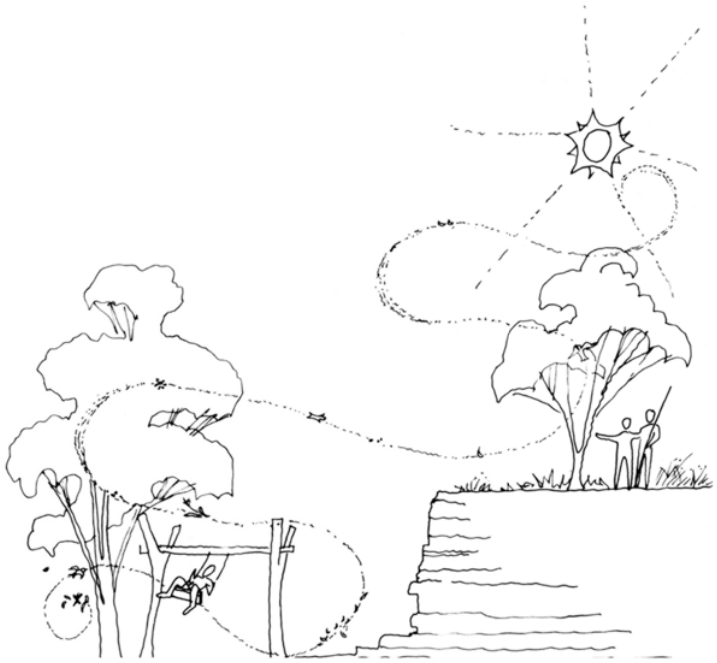
ATTACHMENT 5 - ITEM 6



Fiona Robbé

HORNSBY PARK EMBELLISHMENT
OLD MAN'S VALLEY REGIONAL PLAYGROUND

Client:
Hornsby Shire Council

HORNSBY SHIRE COUNCIL

Prepared by

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ATTACHMENT 5 - ITEM 6

PLAY FOR EVERYONE

Play is essential for a child's healthy development and is recognised in the UN Convention of the Rights of the Child as a universally accepted right. But play is not only beneficial for children – people of all ages are playful! Contemporary play spaces are inclusive for people of all ages, capabilities and backgrounds. The concept of the playful human ('Homo Ludens', Johan Huizinga 1938) recognises that we remain playful throughout our lives, and value playful opportunities as they may arise. Huizinga suggests that play is a primary and necessary condition to the generation of culture.

The types of play that we engage with are likely to change over our lifetime. An effective play space supports different types of play and enables people of different ages and capabilities to play together.

Play spaces provide an opportunity to create public environments which are welcoming and inclusive to all anticipated users, including people of different ages, capabilities, genders, and cultures.

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CONNECTION TO COUNTRY/ THEMING

Designing for Country
Designing for Country involves incorporating and honoring the cultural traditions, values, and landscapes of Indigenous peoples, and creating spaces that facilitate a deep sense of connection to the land and its history.

Connecting with Country themes:

- Uniqueness (of the distinctive diatreme landform)
- Geology (special to this place)
- Water (respect for)
- Sky Country (reverence for)
- Healing (through contact with the Landscape)
- Women (reverence for the traditional role of women in this landform)

The theme for the Old Man's Valley Playground is: **'Valuing our Bushland'** which includes the naturally-occuring feature of the diatreme - an extinct volcanic pipe.

Connection to Country and Play:
The regional playground will endeavour to connect children and community to the natural environment. This will be achieved through the use of natural features and materials (e.g. rocks), and a nature-based colour palette. There will be no dominating or tall structures. Children are encouraged to explore fun activities in a natural setting, specific to the site.

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OLD MAN'S VALLEY CONTEXT

LEGEND:

1. REGIONAL PLAYSPACE
2. MULTI PURPOSE TURFED AREA
3. AMENITIES BUILDING
4. ASPHALT CAR PARK
5. GRAVEL CAR PARK
6. ACCESS TO BRIDGE ST
7. ACCESS TO QUARRY ROAD
8. PEDESTRIAN ACCESS TO BRIDGE ST
9. ACCESSIBLE PARKING
10. BUS DROP OFF

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PLAYGROUND PRECINCTS: PICNIC AREA WITH BBQS

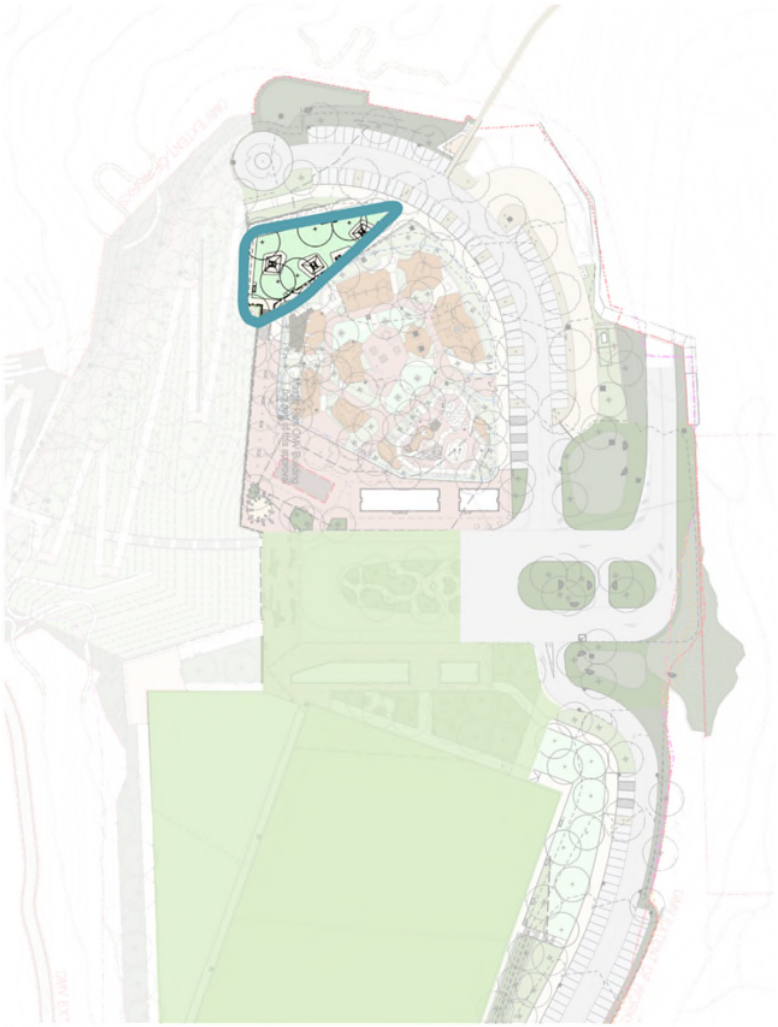

Fig Playground concept plan

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PICNIC AREA WITH BBQS

- Accessible picnic tables
- Accessible BBQ units
- Shade structures and trees provide shade

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PLAYGROUND PRECINCTS: ACCESSIBLE AMENITIES BLOCK

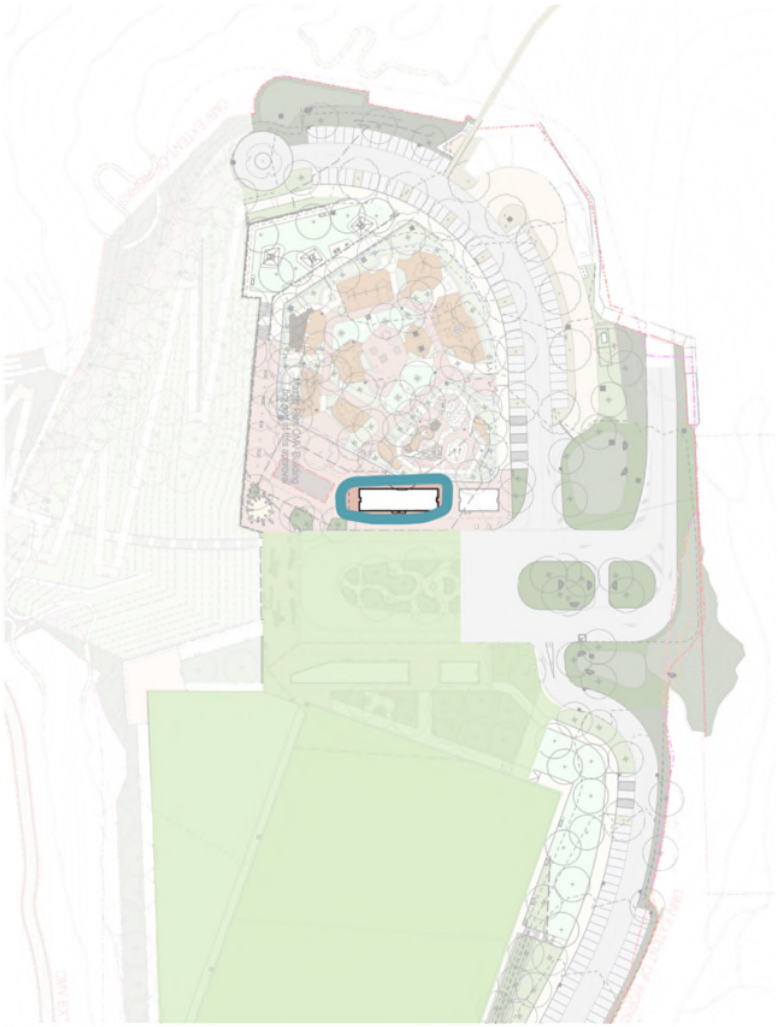

Fig Playground concept plan

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ACCESSIBLE AMMENITIES BLOCK

A range of toilet cubicles are provided in one central building, including:

- Ambulatory cubicles
- Left & Right-handed cubicles
- 'Family' toilet cubicles
- Handwashing basins

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PLAYGROUNF PRECINCT: ACCESSIBLE DROP OFF / PARKING

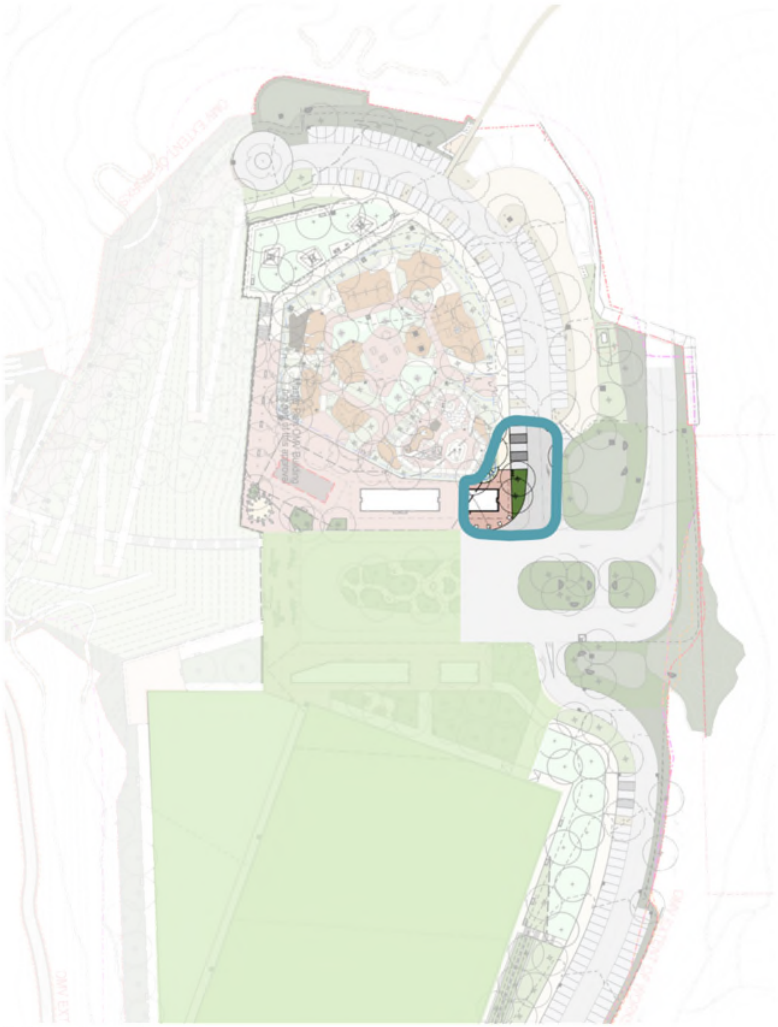

Fig Playground concept plan

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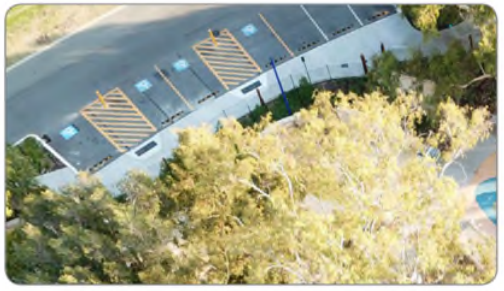
ACCESSIBLE DROP OFF / PARKING

- A well-defined drop off area provides a safe zone to disembark from mini-buses
- Dedicated accessible parking is provided near entry points



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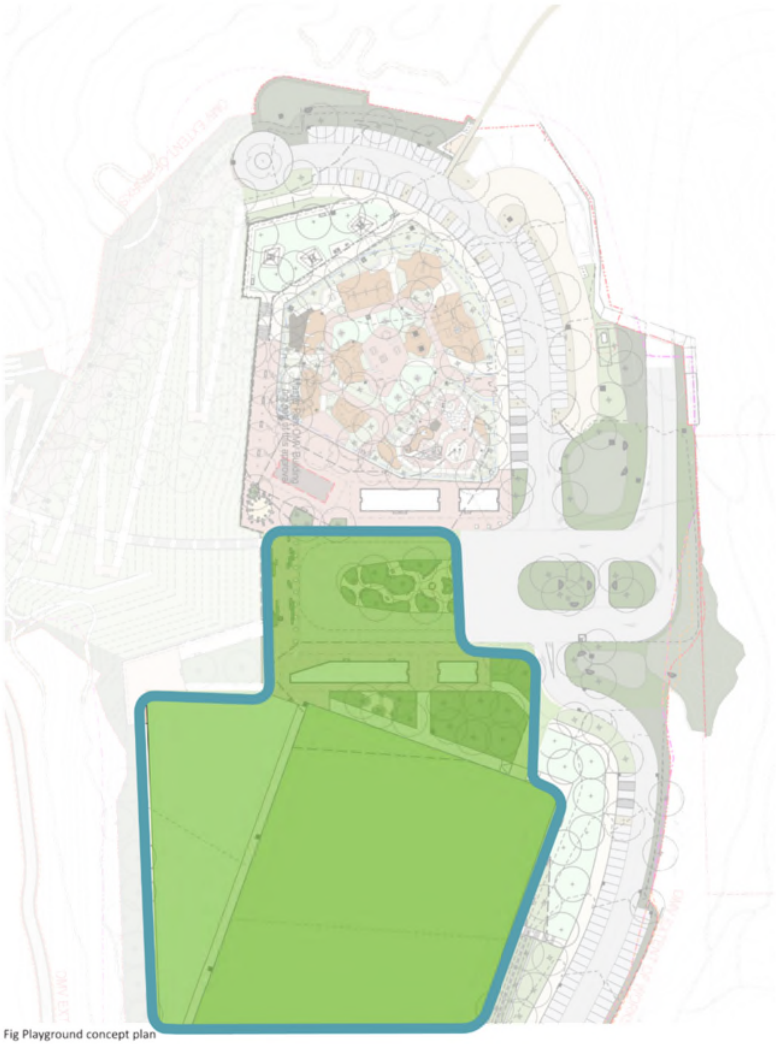

Fig Playground concept plan

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OPEN GRASS

Adjacent grassy spaces allow for casual uses (e.g. picnicking, and informal ball games)

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REGIONAL INCLUSIVE PLAYGROUND

PLAY EXPERIENCES:

1. WATER PLAY
2. SWINGING - A-FRAME
3. SWINGING - NEST
4. DECKS AND SLIDES (x3)
5. SPINNING
6. BOUNCING
7. GRADUATED BALANCING & SENSORY WALKWAY
8. ROCKING
9. CLIMBING

SUPPORTIVE FEATURES:

A. SHADE
B. BUBBLER
C. ACCESSIBLE PICNIC TABLES
D. GRASS RESPITE AREA
E. ACCESSIBLE BBQ
F. AIRLOCK ENTRY
G. MAINTENANCE GATES
H. ACCESSIBLE PARKING
I. 1200mm PLAYGROUND FENCE
J. ACCESSIBLE TOILETS

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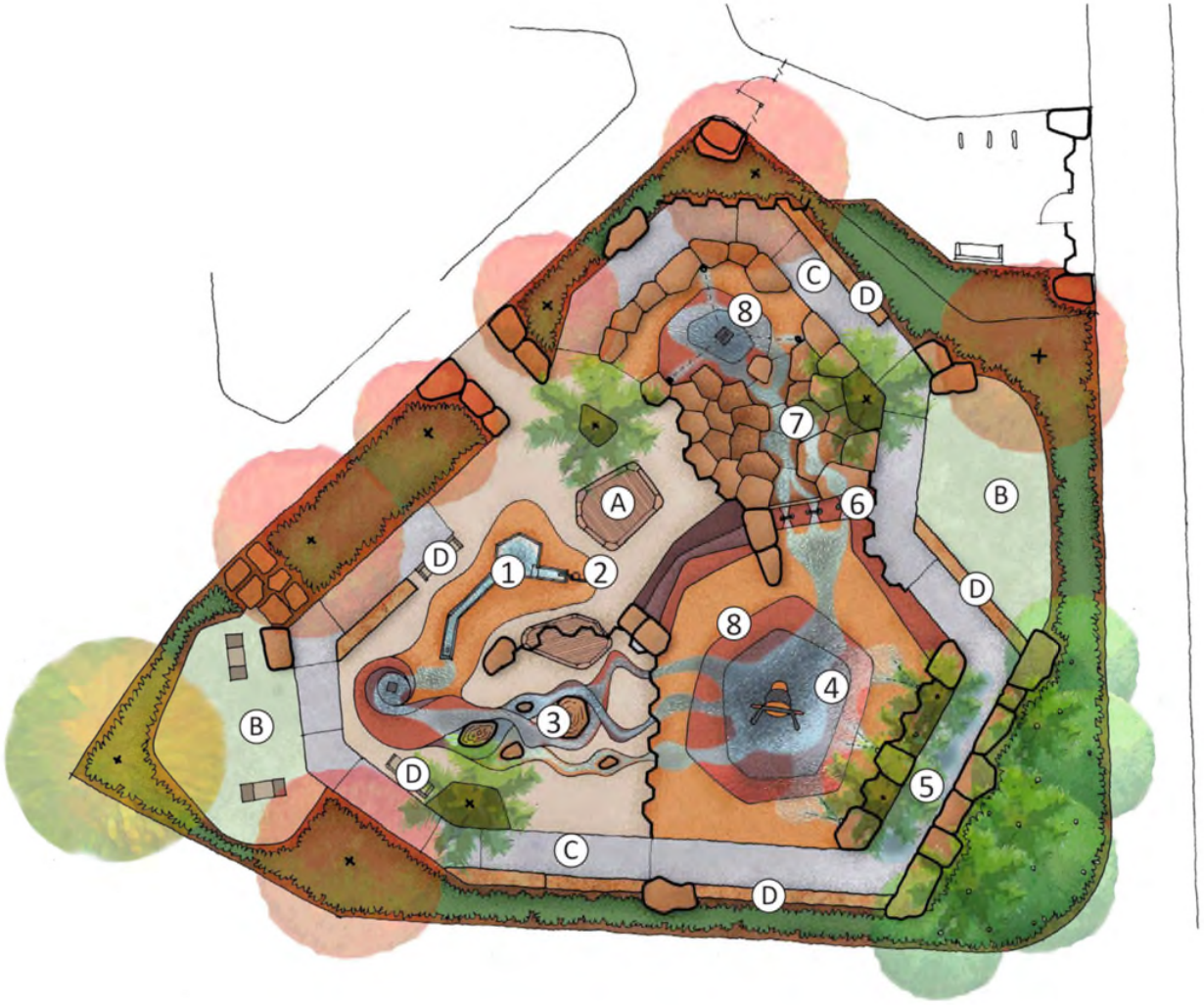
WATERPLAY



PLAY EXPERIENCES:

1. ACCESSIBLE TROUGH
2. WATER PUMP
3. CREEK
4. BIG SPLASH - BUCKET (VOLCANO)
5. MIST ARCHWAY
6. SLUICE GATES
7. WATER CASCADES
8. GROUND SPRAYS

SUPPORTIVE FEATURES:

A. PLATFORM DECKS

B. GRASS RESPITE AREA

C. ACCESSIBLE CIRCULATION PATH

D. SEATING

1:4000 @A3

0 40 80 120 200m

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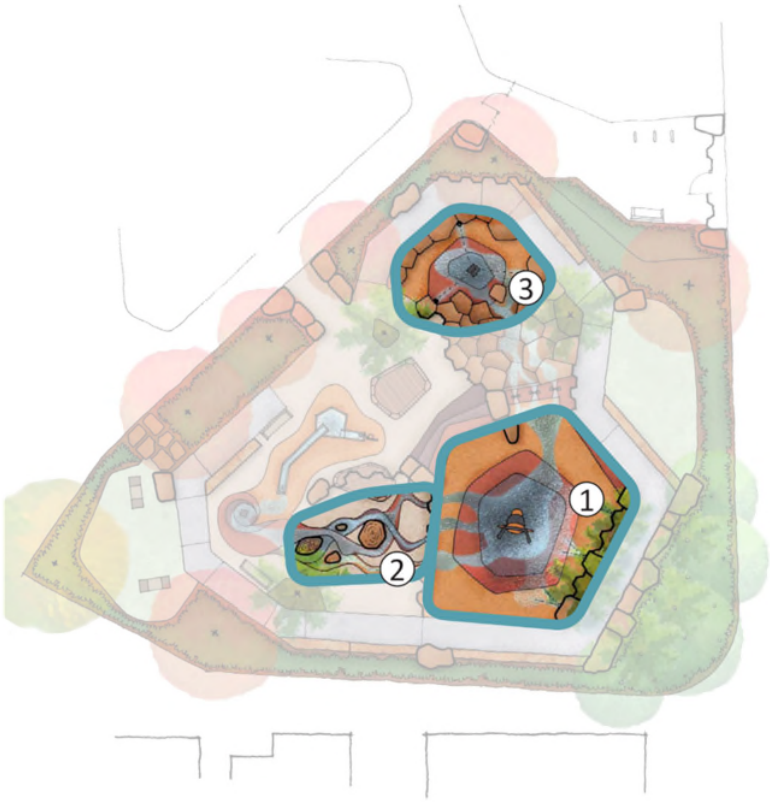

Fig Playground concept plan

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WATER PLAY

The water play area will meet NSW Health requirements for safe water play. The overall space is designed to playfully reference the extinct volcano with 'larval flows' of water. There are 6 subspaces.

1. Large 'big splash' bucket
2. Dribbling water rock
3. Water canon

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WATER PLAY

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WATER PLAY

The water play area also includes:

1. Mist canyon (between rocks)
2. Water cascades (down rocks)
3. Accessible water pump and trough

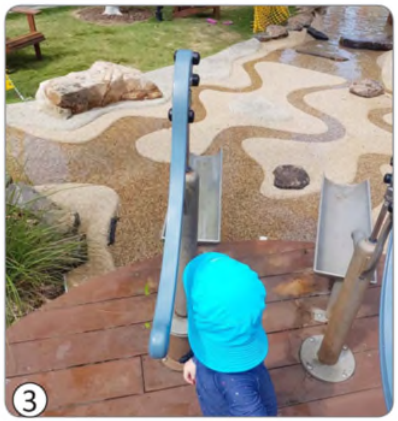

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Fig Playground concept plan

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SWINGING

- Swings are offered in a number of combinations (toddler swing seats, strap seats, boat seats, 'you and me' swing).
- The giant nest swing provides a social 'nest' setting with a huge 360-degree challenge!
- Rubber surfacing allows for access right up to the item.
- A carer can join the child on the 'you and me' and nest swing.

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Fig Playground concept plan

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CLIMBING

- The Climbing Challenge will reflect a natural rock landscape combined with a net structure.
- The overall structure provides a graduated challenge from easier to harder climbing challenges.

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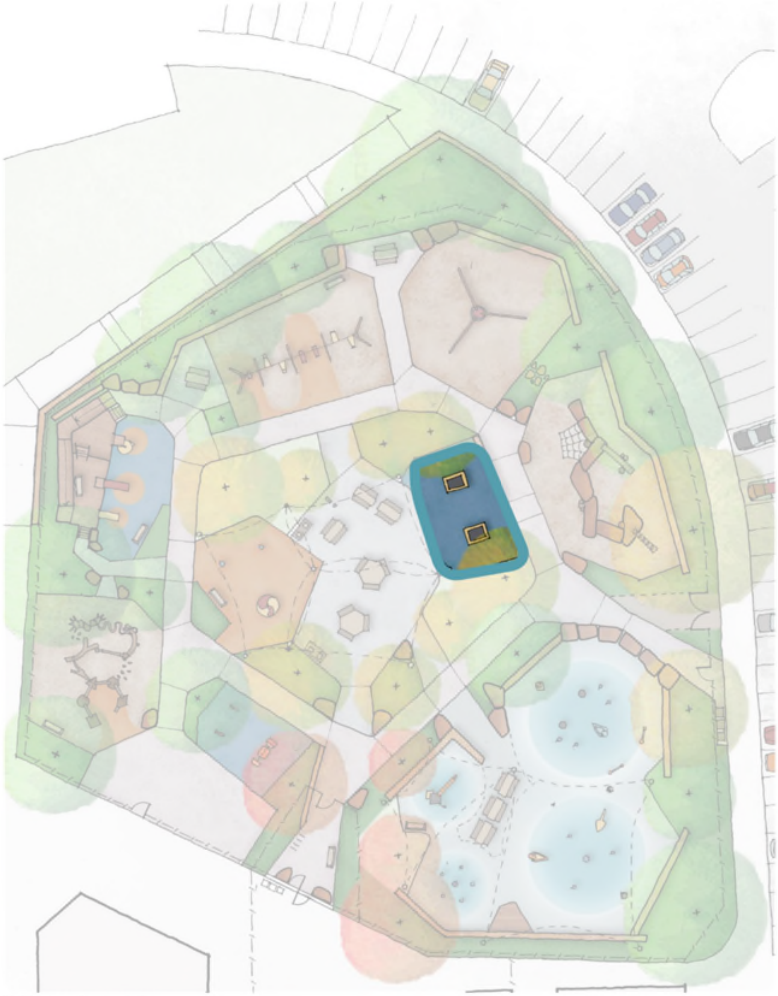

Fig Playground concept plan

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JUMPING

- Accessible in-ground jumping mats are provided in a side-by-side orientation.
- People with mobility devices are accommodated, as well as those with additional needs.
- Careful colour selection aids the success of these items.

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Fig Playground concept plan

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SLIDING

A large accessible deck welcomes all users to a generous raised platform with 3 types of slide (graduated challenge):

- 900-high single slide
- 1400-high single slide
- 1600-high spiral slide

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GRADUATED SPINNING

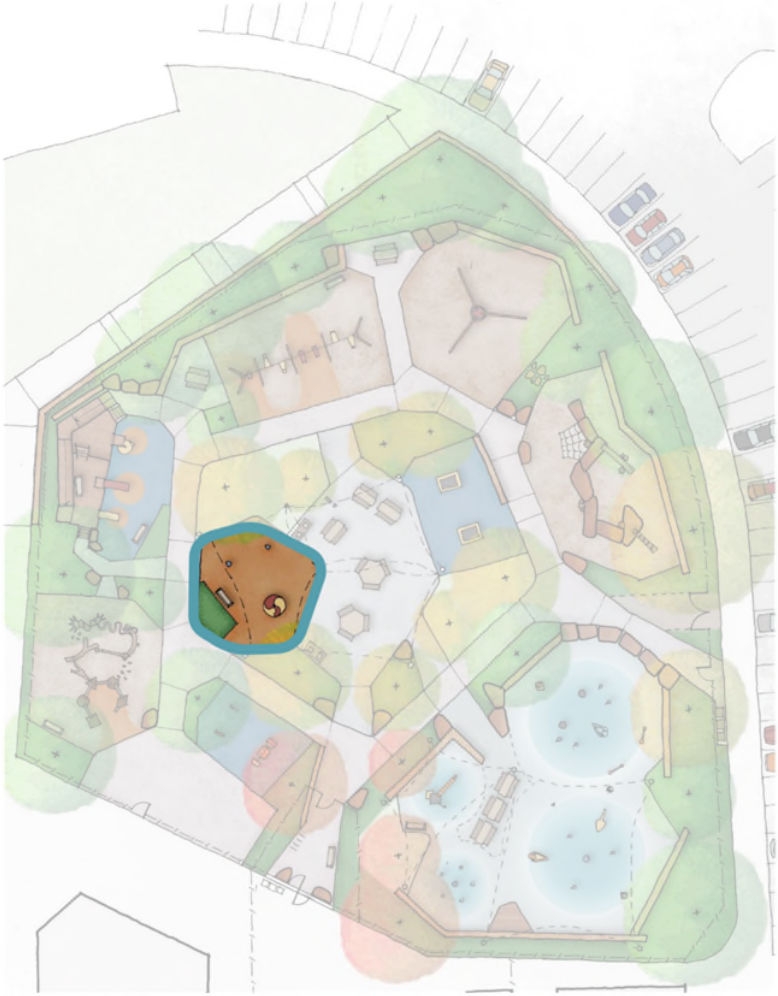

Fig Playground concept plan

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SPINNING

- Graduated challenges ensure an activity is available at several skill levels.
- Spinning is offered for individuals and for groups.
- Postural support is offered and wheelchair accessible spinning makes it possible for all ages and abilities to join in

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GRADUATED BALANCING

Fig Playground concept plan

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GRADUATED BALANCING

- Graduated challenges ensure an activity is available at several skill levels.
- Balancing starts off as easily accessible, level, and incrementally becomes harder.
- The balance challenge is designed in loops so that users can choose their ability-level.

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GRADUATED BALANCING/ SENSORY WALKWAY

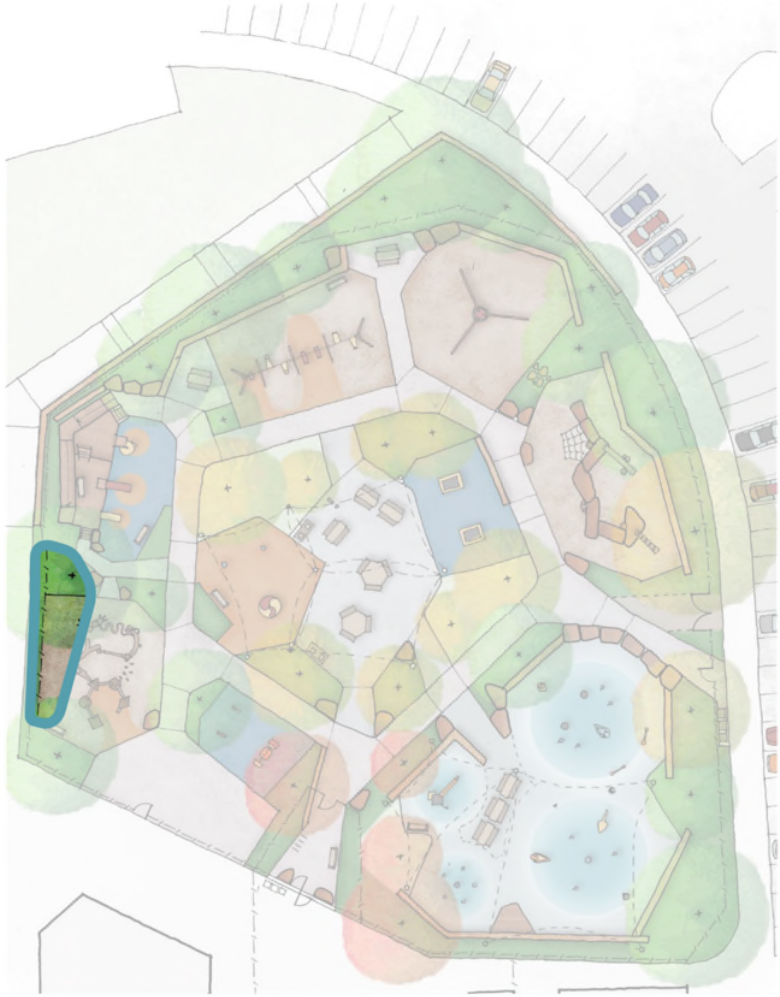

Fig Playground concept plan

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SENSORY PLAY

- Sensory layering is applied to all parts of the playground as well as having a dedicated zone.
- An accessible looped path links several ground-level challenges with a specific focus.
- Sensory elements include item that move and respond to touch in a rewarding manner (e.g. a drum).
- Tuned instruments that are musical no matter the sequence of notes played.

SENSORY PLANTING

- Plants provide rich sensory play opportunities with seasonal variation.
- Leaves, sticks, nuts, mud, rocks provide limitless loose play parts.

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GRADUATED ROCKING

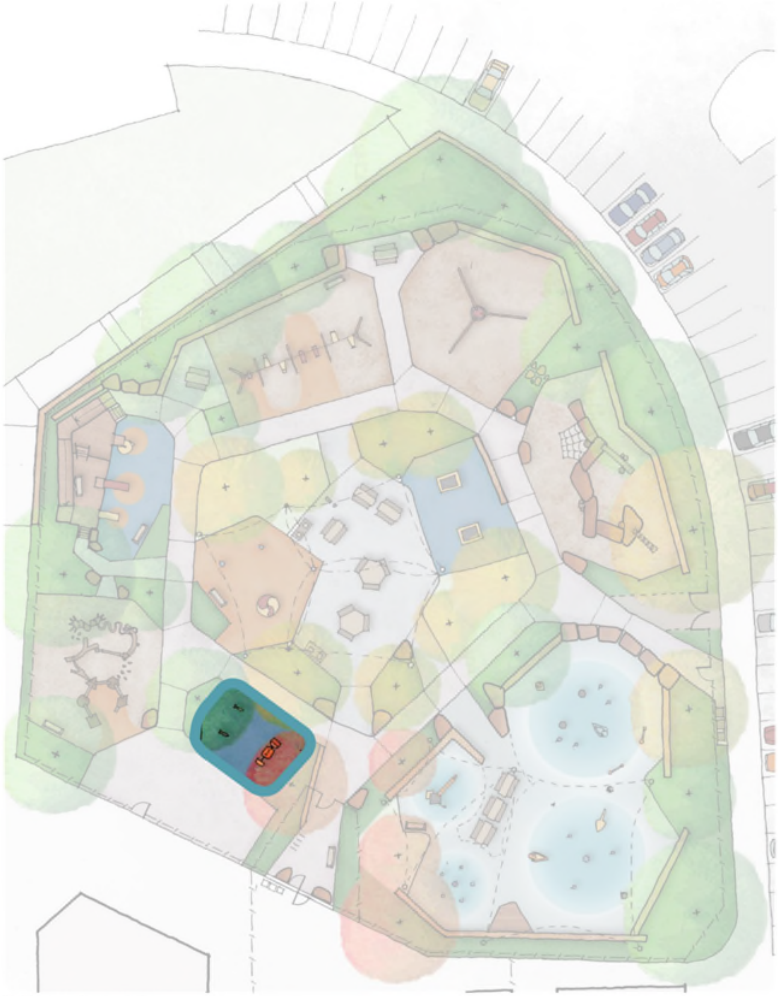

Fig Playground concept plan

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ROCKING

- Graduated challenges ensure an activity is available at several skill levels.
- Group and single-user rockers are provided in a side-by-side arrangement.
- Postural support is offered by both types of rocker.
- Group rockers offer intergenerational play opportunities.

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Hornsby Shire Council

HORNSBY PARK EMBELLISHMENT
STAGE 1 CONCEPT REPORT

Crusher Plant with associated works, Circulation Connection & Lookouts and Skywalk & Cable Bridge

S20-0043 Issue C • 27/02/2023

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Stage 1 Concept Report
- Crusher Plant with associated works,Circulation connection & Lookouts and Skywalk & Cable Bridge

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a division of BW Beveridge Williams

HORNSBY SHIRE COUNCIL

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Document	Issue	Date	Status	Reviewed	Verified	Validated
S20-0043	A	20/02/2023	DRAFT			-
S20-0043	B	23/02/2023				-
S20-0043	C	27/02/2023				

Note: This document is Preliminary unless validated.

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SITE INTRODUCTION

Site and Project introduction

The Hornsby Park site is comprised of 59 hectares of bushland and cleared open land with the principal physical features. Council has committed to developing Hornsby Park as a landmark recreation destination for local residents and the wider Sydney community as well as domestic and 'in-bound' tourists.

The Master Plan of Hornsby Quarry was adopted by Council in 2021 and currently the project design team is seeking the REF planning approval and exploring the opportunities for staging the works within the existing funding agreement with the aim of developing and opening up specific sections of the site based on the adopted Master Plan for visitors.

The Overall Parklands Design Vision and Goal

- Restore and enhance the unique bushland within the site
- Protect and celebrate the Parklands Aboriginal and Non-Aboriginal heritage
- Ensure that the quarry character is retained
- Offer a variety of recreation opportunities including passive, active and adventure recreation
- Provide easy access throughout via a network of walking and bike paths
- Integrate upgraded connections between the park and surrounding area including Hornsby Town Centre, Berowra Valley National Park and local streets and trails
- Cater for the long-term evolution and growth of Hornsby and surrounding communities and populations
- Secure Council's long-term management and maintenance of the park.

Community Expectations from the Draft Master Plan Engagement

- High level of overall support for the draft Master Plan as well as for the recreational opportunities and enjoyment it will provide
- Universal desire to protect the site's flora and fauna and concern about potential environmental impacts during delivery and operation
- A desire to celebrate and educate users about the heritage and unique natural environment of the site
- Support for Old Mans Valley being the gateway to the park and concern that the proposed uses might detract from this role.
- Support for the proposed adaptive reuse of the Crusher plant
- Excitement about the Canopy Skywalk and what a unique feature it would be
- The need to minimise potential operational impacts on neighbouring residents as well as adjacent streets
- Universal support for easy access for all users
- Split opinion on the OMV Sports field and its playing surface
- General acceptance of people being able to stay overnight at the South Western Platform, with support for camping over accommodation.

Why Stage the Works?

- Expectation from the local community for the park to be open in the near future based on previous council communication during the Master Plan phase
- The delayed commencement of landscape embellishment works due to earthworks completion delayed by frequent rain events and other factors
- Soft launch of the parklands to the public without introducing visitors to the earthworks extent
- Available Council funding in place for Hornsby Park Embellishment project
- Potential other project intertwined with the Hornsby Park Embellishment works
- Preferential treatment for Hornsby Shire residents to be supportive for some form of user fees

Stage 1 Requirements

- Stage 1 works are to be based on the approved Master Plan and subsequent REF design refinements
- Leave construction flexibility for the future implementation to achieve the desired overall design outcome
- Create opportunities for visual connections into the wider site without impacting potential future construction works
- Provide inclusive pedestrian circulation at necessary levels
- Fit the Stage 1 extent of works within the available budget
- Create opportunities for interaction with bushland and authentic natural landscape from Day 1
- Provide necessary services on-site to support the function of the stage 1 spaces.

The Stage 1 Extent of Works -
Crusher Plant with associated works,Circulation Connection & Lookouts and Skywalk & Cable Bridge

Crusher Plant

- Enabling Services
- On-site parking
- Lawns / Picnic Areas with accessible spaces
- Southern Lookout including pathway works
- Play space
- Activation hub with opportunities for coffee cart or food truck and seating
- Amenity Building

Circulation Connection & Lookouts

- Completion of Heritage steps (Separate funding)
- Western lookout including pathway works from Rosemead Road.
- North western lookout including pathway works

Skywalk and Cable Bridge

- Enabling Services
- Skywalk Stage one - Zero to Eight
- Entry structures and plaza
- Forest lift and stairs tower
- Cable bridge
- Connection point and structure at Crusher Plant

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DESIGN PRINCIPLES

Connecting people with places

- Accessible to all + easily navigated
- Connected to its locality/landscape
- Supports physical/mental wellbeing
- Connected with nature
- Tells the story of the park and context

Things to see and do

- Offers local/district/regional interest
- Diversity of experiences active/passive
- Multi–use space opportunities
- Includes programs – tours/events etc
- Provides high quality amenities

Protecting Environment & Heritage

- Adopts Connecting with Country
- Integrates Avoid/Minimise/Mitigate/Offset
- Is Active Transport-focused
- Educates and raises awareness
- Is interpreted accessibly and engagingly

Creating a Memorable Experience

- Conveys significance from outset
- Sense of environment + heritage at core
- Easy, comfortable, inspiring, safe
- Varied character + memorable views
- Strong narrative line across the park

Looking After the Place

- Sustainable – climate/carbon positive
- Safe and well managed
- Has capacity to cater for peak visitation
- Retains capacity to evolve
- Financially sustainable + well resourced

Quality

- All furniture and paving is to be of premium quality in line with the unique nature and high significance of the park.
- Bespoke furniture and pavement is to be limited to key functions or areas.

Availability

- All seats, benches, furniture settings, bollards, bike racks, bins and drinking fountains are to be standard products, easily sourced and replaceable should it be required.
- Able to be sourced over the long term to accommodate the park to be built in phases over time.

Consistency

- A single consistent suite of furniture covering all the precincts of the park is to be used, with enough flexibility to facilitate adaptions to reflect the different precincts of the park. For example, through alternative options of colours, patterns, finishes, etc. for specific components of the item.
- A consistent suite of pavement finishes are to be used across the site to ensure the park feels like a single large park not a series of disparate small parks in the bush.

Sustainability

- Where possible all furniture is to be low carbon in keeping with the sustainability requirements of the park.
- Consider whole of life costs and products or companies with cradle to grave to cradle strategies.

Equality

- Tactile pavements and bollards are to have 30% luminance colour contrast to surrounding pavements as required by the access consultant report.
- Provide sufficient seating that meets AS1428.2 with places to sit down and rest along longer pathways

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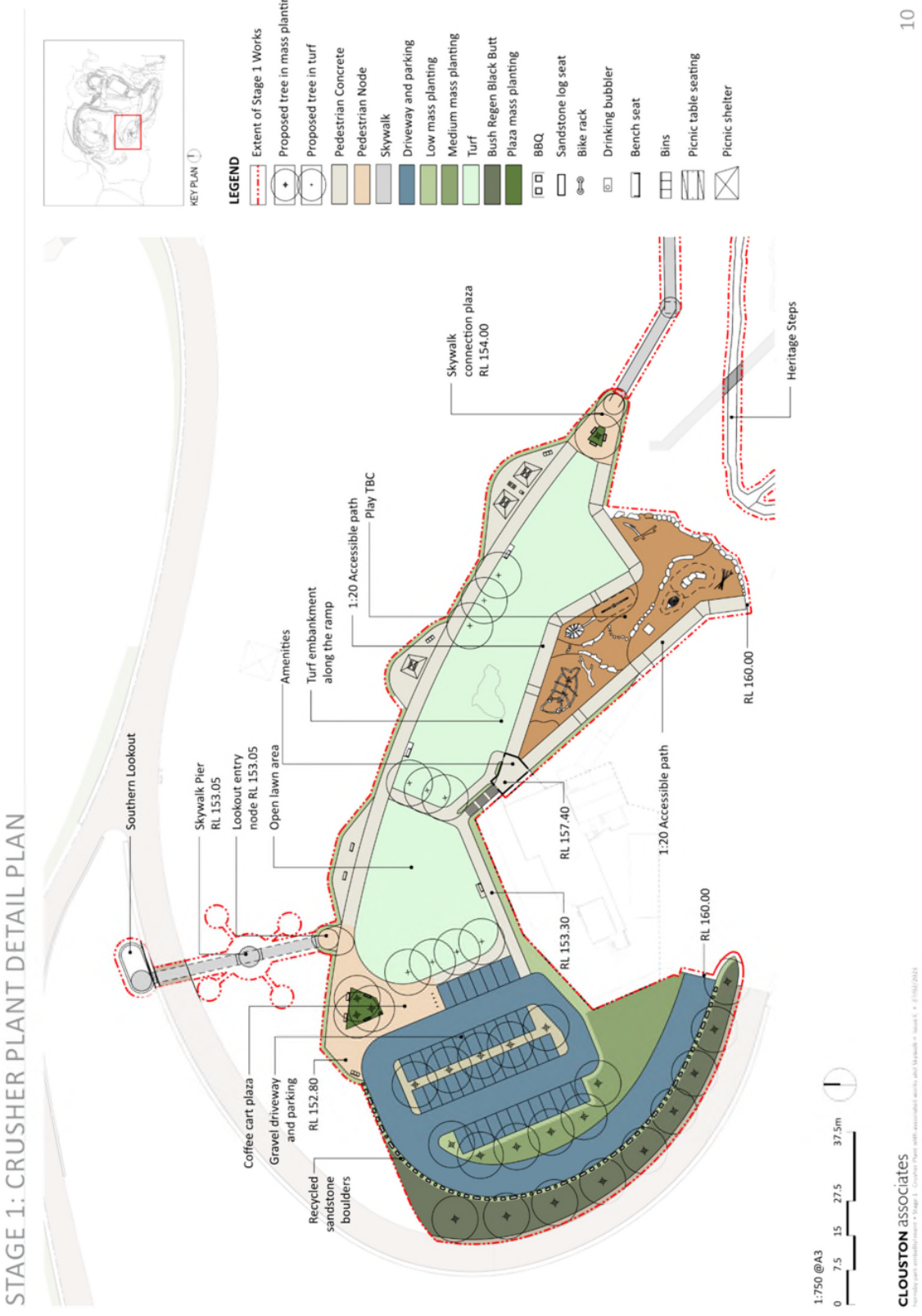
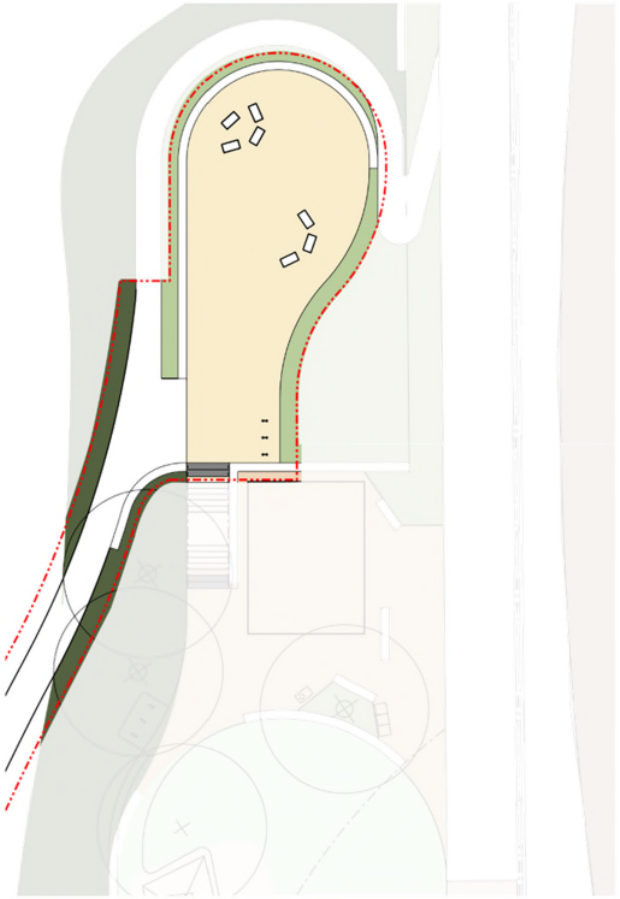


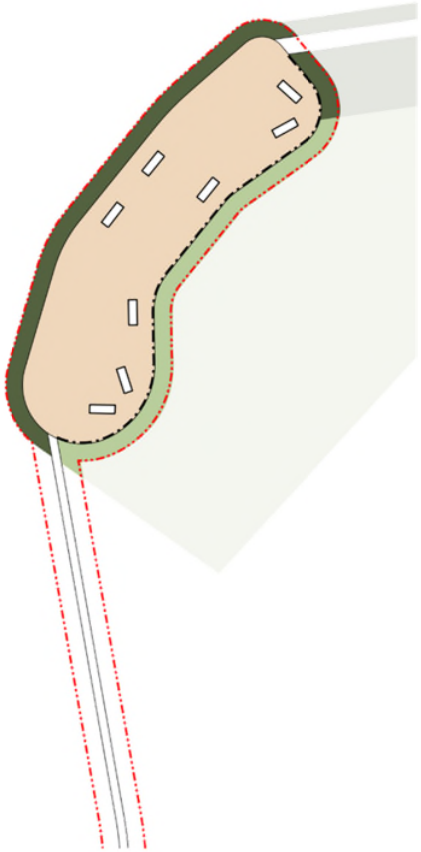
STAGE 1: NORTH WESTERN & WESTERN LOOKOUT DETAIL PLANS



Western lookout detail plan

1:250 @A3

0 2.5 5 7.5 12.5m



North Western lookout detail plan

KEY PLAN

LEGEND

- Extent of Stage 1 Works
- Gravel
- Pedestrian Node
- Low mass planting
- Bush Regen Blue Gum
- Sandstone log seat

Alternate lookout images

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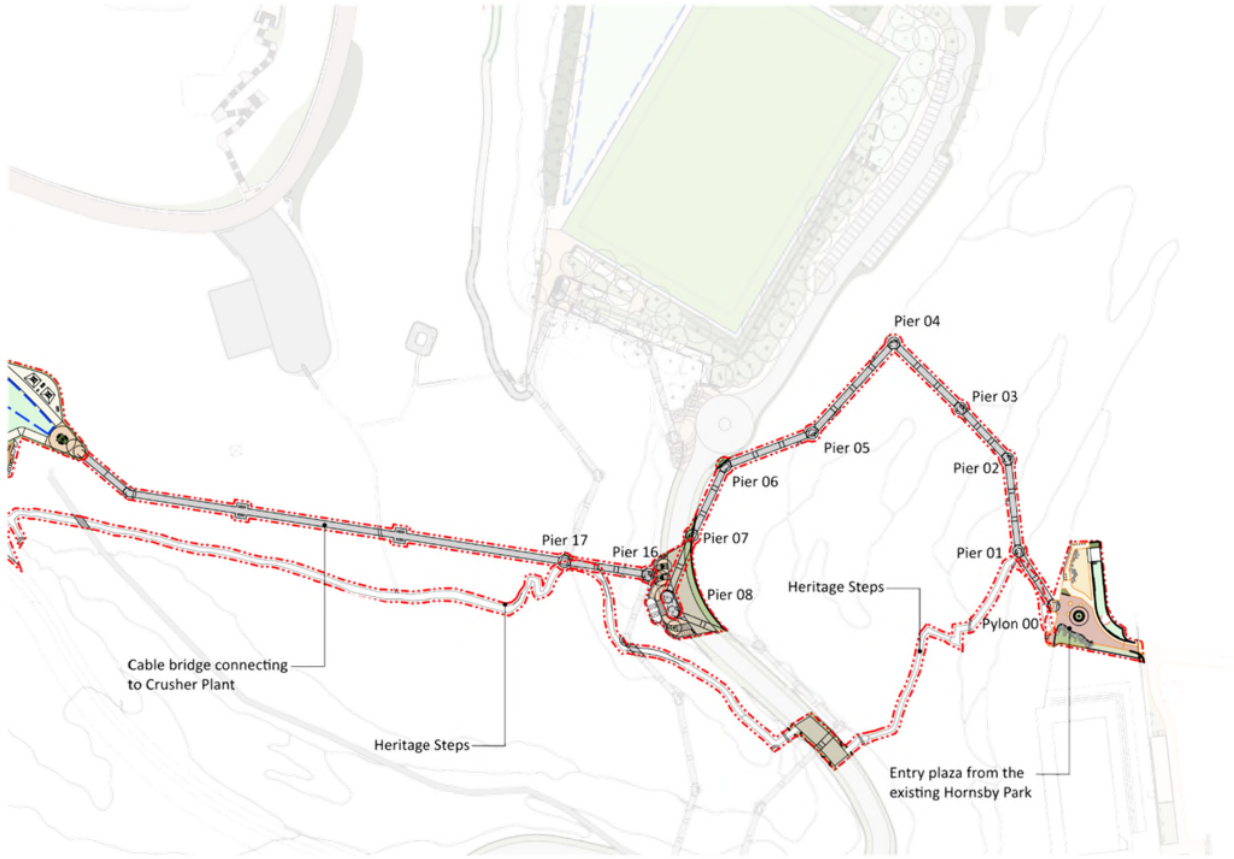
STAGE 1: SKYWALK ENTRY STRUCTURE AND PLAZA DETAIL PLAN



LEGEND

- Extent of Stage 1 Works
- Extent of REF Impact
- Pedestrian Concrete
- Pedestrian Node
- Pedestrian Feature
- Shared Zone Feature
- Gravel
- Skywalk
- Low mass planting
- Medium mass planting
- Turf

1:750 @A3

0 7.5 15 27.5 37.5m

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STAGE 1: MATERIALS AND WALL SCHEDULE

Name	Image	Product	Location	Supplier Information	Finishes	Colour/Aggregate	Notes
Paving type 1 - Pedestrian Concrete		Reinforced concrete pavement	Crusher Plant	N/A	Broom finish	Natural	Natural colours concrete, broom finish to continue to edge of pavement. Low carbon concrete is to be used for pavements where suitable.
Paving type 2 - Pedestrian Node		Reinforced concrete pavement	Crusher Plant, Circulation Connection and Lookouts, Skywalk and Cable Bridge	TBC	Exposed aggregate	1. Dark aggregate 2. Light aggregate 3. Mixed aggregate	TBC - likely to use a number of mixes across the park. Low carbon concrete is to be used for pavements where suitable.
Paving type 3 - Pedestrian Feature		Granite pavement	Crusher Plant, Skywalk and Cable Bridge	TBC	Flammed. To meet P5 slip requirements	A mixture of light and dark in random pattern	As documented
Paving type 6 - Shared Zone		Reinforced concrete vehicle pavement	Crusher Plant	N/A	Raked	CCS coloured concrete: 1. Dark 2. Light 3. Brown	As documented. Low carbon concrete is to be used for pavements where suitable.
Paving type 10 - Gravel		Sandstone gravel and decomposed granite gravel	Circulation Connection and Lookouts	N/A	Stablised	Sandstone and brown	As documented
Paving type 16 - Skywalk		FRP mini mesh - 9mm opening	Crusher Plant, Skywalk and Cable Bridge	TBC	TBC	Dark grey	To match raised walkways
Paving Type 20 - Vehicle Gravel		TBC	Crusher Plant	TBC	Compacted	Grey blue stone gravel/ road base	TBC

Name	Image	Front Face Finishes	Back Face Finishes (if applicable)	Location + Comments
Crusher Plant Seating		Gabion/ Concrete/ Sandstone	Gabion/ Concrete/ Sandstone	Crusher Plant Around the fuel building & mix of types to tie into industrial feel of the area
Skywalk Heritage Park Wall		Sandstone dimensioned blocks to match existing	N/A	Skywalk and Cable Bridge At Skywalk entry in Heritage Park near pool / node space
Sandstone wall as existing tree protector		Sandstone Logs	N/A	Skywalk and Cable Bridge To the north of the upper section of road 3 that is meant to be protecting that existing tree
Quarry West seating walls		Gabion/ Concrete/ Sandstone	Gabion/ Concrete/ Sandstone	Circulation Connection and Lookouts Around the fuel building & mix of types to tie into industrial feel of the area

ATTACHMENT 6 - ITEM 6

STAGE 1: FURNITURE SCHEDULE

Type	Image	Product	Location	Supplier Information	Materials	Finishes	Fixing	Colour	Notes
Bench		Linea range Bench LIB 6 1800L x 445W x 430 H mm	Crusher Plant, Skywalk and Cable Bridge	Street Furniture Australia Or approved equivalentw	Frame & Batten: Aluminium	Frame: Powder coated Batten: Aluminium Woodgrain	Surface fixed As per manufacturer's details	Frame: Dark violet gloss 98451926 Batten: Bush Cherry / Frame: Textura Jasper Batten: Beach Oak	https://www.kompan.com.au/sport-fitness/outdoor-fitness/cardio/city-bike
Picnic table and setting (DDA compliant)		Linea range - DDA compliant picnic table setting Table: LIT10 2100L x 750W x 720 H mm Bench LIB 6 1800L x 445W x 430 H mm	Crusher Plant	Street Furniture Australia Or approved equivalent	Frame & Batten: Aluminium	Frame: Powder coated Batten: Aluminium Woodgrain	Surface fixed As per manufacturer's details	Frame: Dark violet gloss 98451926 Batten: Bush Cherry	https://streetfurniture.com/product/linea-table/ Or approved equivalent
Picnic shelter		Custom made shade shelter to match the look and feel of the existing industrial style	Crusher Plant	N/A	Steel frame Composite timber	TBC	TBC	TBC	As documented
Electrical BBQ		A Series - Double Universal Access Barbecue DDA compliant Two cook tops 1900W x 1150D x 860H mm	Crusher Plant	CHRISTIE Or approved equivalent	90% recycled, corrosion resistant stainless-steel 4622 grade and 306 grade components		As per manufacturer's details	N/A	https://dachristie.com/barbecues/cabinets/ Or approved equivalent
Drinking fountain		Prospect Drinking Fountain with bottle tap AS1428 Australian Standards compliant, wheelchair accessible 880H x 940D x 405 W mm	Crusher Plant	Botton + gardiner Or approved equivalent	Grade 316 stainless steel frame	Mirror polished select faces	Sub-surface fixed As per manufacturer's details	N/A	https://www.bottongardiner.com.au/products/urban-and-street-furniture/drinking-fountain/prospect-drinking-fountain/ Or approved equivalent
Bins (General waste + Recycle + Organic waste)		Frame Bin Enclosure 240Lt WBE-nF120-BAT 1400W x 810D x 1350H mm	Crusher Plant, Skywalk and Cable Bridge	Street Furniture Australia Or approved equivalent	Woodgrain aluminium wider battens	Aluminium	Sub-surface fixed	Frame 1. Powder coated 2. Stainless 304 or 316 No.4 finish	https://streetfurniture.com/product/frame-bin-enclosure/ Or approved equivalent
Bollards		Channel Bollard CHL04-B-MS-G L 200 x D 200 x H 910mm	Crusher Plant, Skywalk and Cable Bridge	UAP Or approved equivalent	Mild steel	Powder coated	1. Fixed 2. Removable	Powder coat. Required colour luminance contrast to pavement	https://www.uapsupply.com/range/channel-bollard/ Or approved equivalent
Bike rack		Slim Hoop (BST02) 270L x 120W x 850H (mm)	Circulation Connection and Lookouts, Skywalk and Cable Bridge	Street Furniture Australia Or approved equivalent	Stainless Steel 304	No.4 (brushed)	Sub-surface fixed as per manufacturer's details	N/A	https://streetfurniture.com/product/slim-hoop/
Informal seat		Sandstone block	Circulation Connection, Skywalk and Cable Bridge	N/A	Sandstone	Smooth top	N/A	Natural	As documented

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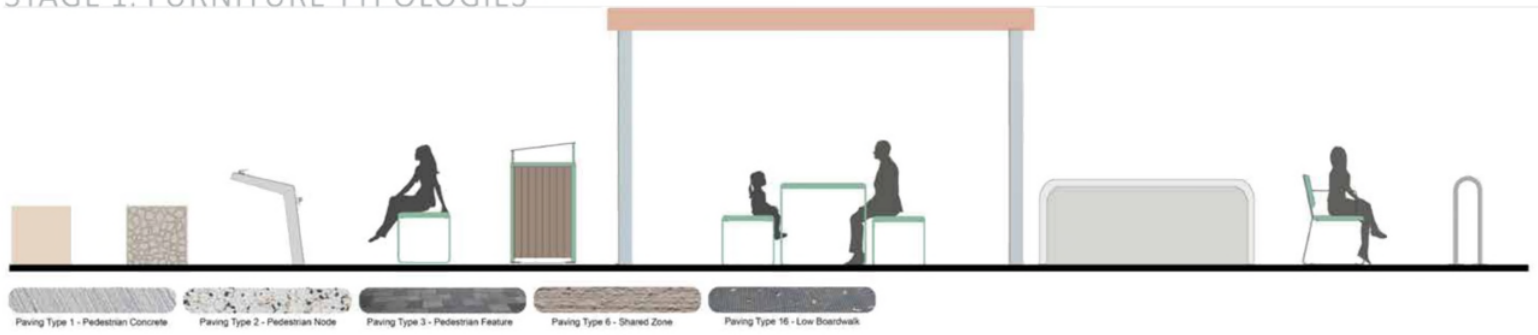
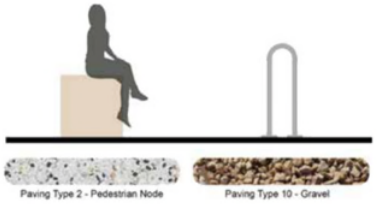
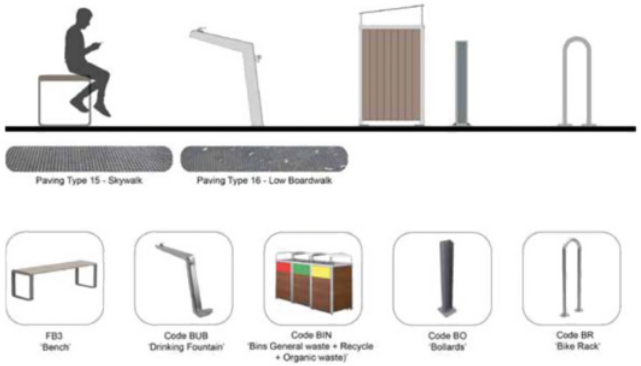
STAGE 1: FURNITURE TYPOLOGIES



F FURNITURE TYPOLOGY TYPE 5- CRUSHER PLANT



F FURNITURE TYPOLOGY TYPE 7 - CIRCULATION CONNECTION AND LOOKOUTS



F FURNITURE TYPOLOGY TYPE 6 - SKYWALK

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STAGE 1: PLANTING TYPOLOGIES

A MASS PLANTING TYPE 1 - LOW MASS PLANTING

Plant Mix Type 1
- Generally 0.3-1m high species
- Groundcovers and grass species
- Planted under tree canopies and in open areas
- Consists of mostly natives requiring open sun or partial shade
- Mix is based on either BGHF or BBGF depending on location
- Exotics in mix added as highlights of colour or texture plants

B MASS PLANTING TYPE 2 - MEDIUM MASS PLANTING

Mass Planting Type 2
- Generally 0.3-1.5m high species
- Groundcovers, grasses, low shrubs and vine species
- Groundcover and grass species based on Mass Planting Type 1 species
- Planted under tree canopies and in open areas
- Consists of mostly natives requiring open sun or partial shade
- Mix is based on either BGHF or BBGF depending on location
- Exotics in mix added as highlights of colour or texture plants

E ASS PLANTING TYPE 5 - BUSH REGENERATION BLACK BUTT GULLY FOREST

Plant Mix Type 5
- BBGF species only
- Mix includes tree species
- Based on VMP revegetation requirements
- Only proposed in cleared areas adjacent to mapped BBGF

D MASS PLANTING TYPE 4 - BUSH REGENERATION BLUE GUM HIGH FOREST

Plant Mix Type 4
- BGHF species only
- Mix includes tree species
- Based on VMP revegetation requirements
- Only proposed in cleared areas adjacent to mapped BGHF

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SITE IMAGES - CRUSHER PLANT

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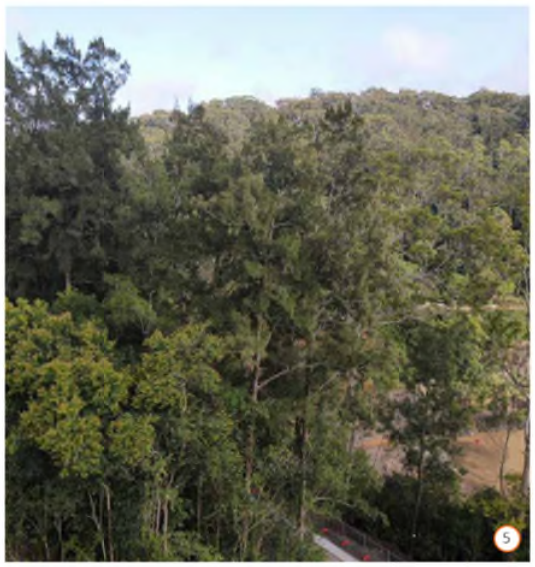
SITE IMAGES - CRUSHER PLANT



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SITE IMAGES - CRUSHER PLANT LOOKOUT

Southern Lookout looking north west towards the Northern Mound

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SITE IMAGES - CRUSHER PLANT LOOKOUT

Southern Lookout looking north east towards the diatreme and OMV

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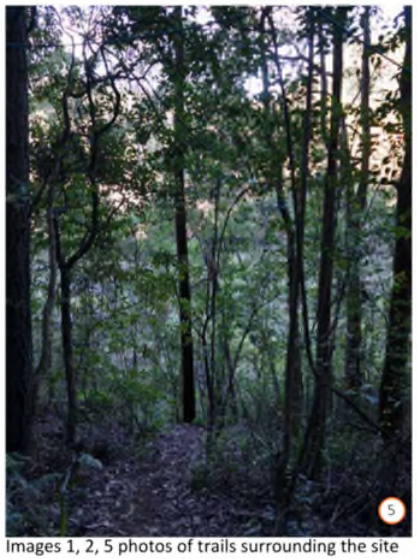
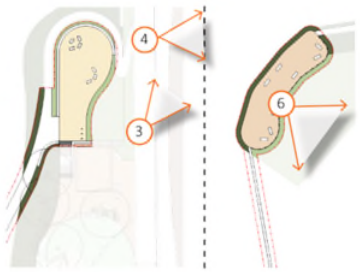
SITE IMAGES - TRACKS, TRAILS AND LOOKOUTS

Western Lookout



Images 1, 2, 5 photos of trails surrounding the site

North Western Lookout



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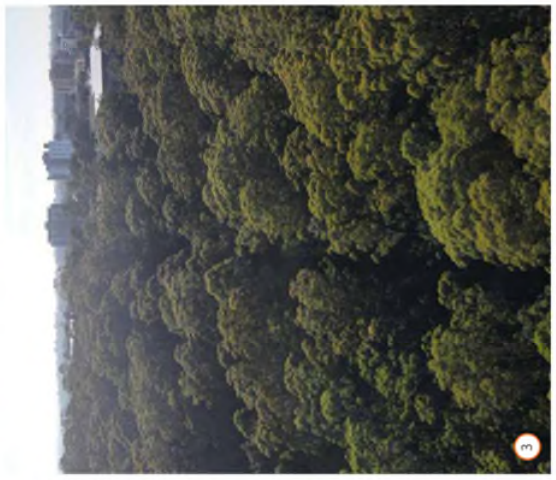
SITE IMAGES - SKYWALK AND CABLE BRIDGE



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SKETCHES - CRUSHER PLANT

Sketch view of Southern Lookout offering panoramic views into the Quarry Void

ATTACHMENT 6 - ITEM 6

SKETCHES - CRUSHER PLANT

Sketch view of the Crusher Plant platform with a lawn and food truck hub in the background

ATTACHMENT 6 - ITEM 6

ATTACHMENT 6 - ITEM 6

ATTACHMENT 7 - ITEM 6

INTRODUCTION

Hornsby Park is a unique place within Sydney and is located less than 800m from Hornsby's growing Town Centre. The park has a rich indigenous history as part of the story of the formation of the Sydney basin and is set within the sandstone bushland landscape of the Hawkesbury. Connection to Country and highlighting the links between sky, bushland and water is a key aspect in the design of the parklands. The site itself contains many unique and rare features, combining natural bushland with an extensively altered landform resulting from a 100 year industrial quarry on site.

The parklands aim to highlight these diverse features to tell the story of the landscape, from its creation story through to its industrial past to its present form as a parkland for locals and other visitors coming to Hornsby to experience all the offerings of the parklands, while protecting what makes the site special in the first place.

One of the key design decisions for the park is the provision of a continuous accessible pedestrian route from the Hornsby Town Centre to the Quarry Void, despite the challenges of a drop of over 130m. This creates a pedestrian spine throughout the park, from where the majority of features and activities are able to be easily accessed. Ensuring the pedestrian spine is accessible and that visitors are able to use it to move around the park has been a focus during the detailed design process since the Master Plan.

As part of this pedestrian spine, a Skywalk through the bushland has been proposed. The design intent of the Skywalk was to provide an accessible pedestrian linkage from the Hornsby Town Centre to Old Mans Valley and Crusher Plant while also creating a memorable experience. Linking into connection to country and the experience of sky country the Skywalk offers unique experiences of various levels of the bushland on site. Generally, ranging from 5-30m in height weaving through the trunks and shrubs of the ground levels of the bush, through to flying through the canopy of the bush offering views into the parklands and across the Quarry Void levels.

This elevated approach aims to limit the impacts on the valuable forest and habitat while reducing the carbon footprint of future use by encouraging visitors to walk to the site rather than relying on personal vehicles.

Designing with Country - When the journey is the destination

DESIGNING WITH COUNTRY

At the time of the working on the Master Plan, the highly significant nature of the site in regards to local creation stories of the Sydney Basin and in particular to women was not known. One of the most significant ways the project and parklands have been enriched has been via the involvement on the project of Bangawarra, the Connecting with Country consultants.

Bangawarra joined the team for the REF stage and introduced the wider consultant team to not only the importance of the site, but were able to share some creation stories specific to the park. Along with sharing these stories, Bangawarra we able to review and provide some guidance on the Skywalk from a Designing with Country perspective.

Designing with Country elements such as ensuring that the journey is the destination, respecting the topography by stepping over rather than through, connecting with sky country, protecting heritage, protecting and providing new habitats and offering learning opportunities were all raised as opportunities for Connection and Designing with Country specific to the Skywalk.

Designing with Country - Connecting to Sky Country

SKYWALK DESIGN EVOLUTION

At the Master Plan stage Clouston developed the Skywalk from a high-level perspective, the considerations mainly focusing on the best views and ensuring the route was accessible. Following the approval of Master Plan, an iterative design process has been undertaken to refine the design and route of the Skywalk to have a more minimal impact of the bushland through which it passes. This lessening of impacts was directed via the AMMOR (Avoid, Minimise, Mitigate, Offset, Rehabilitate) approach. Refer to The Overall Approach section which summarises the AMMOR approach for the Skywalk.

On the following pages, we have compared the Original Master Plan alignment, an Interim alignment that considered community feedback and the current REF alignment to help depict how this evolution has taken place to minimise the impact.

Designing with Country - Protecting habitat and heritage

SKYWALK REF STAGE DESIGN CONSIDERATIONS & ASSUMPTIONS

As part of this stage of the project, 2 key reviews of the REF Skywalk alignment have been undertaken. Both reviews and their key findings / assumptions have been used as the basis for the comparison in this package to help depict the iterative design process to finalise the Skywalk route selection to minimise environmental impacts.

The Skywalk is designed and installed in a series of prefabricated structures with the aim of minimising impacts and on-site construction. The specific environmental impacts from the Skywalk design are assessed by ecological and arboricultural specialists.

Ecological Impact Assessment Report Review:
This report identified the ecological impacts of the REF alignment of the Skywalk, specifically including the impacts from the structure itself and construction process:

- The structure consists of a series of prefabricated structures and a footprint at pylon and ground interface of around 2.5m x 2.5m. Each pier would have an impact area of 2.5m radius from the centre of each pier for the pier footing, a further 2.5m radius cleared area for installation around the pier, four (or less, depending on terrain at each location) anchor points for support cables with a 2.5m radius impact area and a 1m wide access path for construction staff and equipment between the central pier construction area and the cable anchor points, refer to figure 1: Skywalk Pier Impact Footprint below
- Only the central pier construction will result in permanent loss of native vegetation.
- The remaining impact area is for construction staff access and equipment laydown and would be rehabilitated following construction works.
- The proposed route does not pass near to any known threatened species breeding resources (hollowing-bearing trees, cave entrances etc.)

Therefore,when assessing the tree impacts of the three Skywalk alignments in this report, the same assessing methodology will be applied, only the 5m radius from the centre of the in-ground pier is considered as the "ground impact". Potential loss of trees could happen when an existing tree trunk appears within this extent. If the tree has encroachment with the linkage bridge above ground, selective pruning of canopy or branches is required. The foreseeable pruning at this early stage of design is likely to be acceptable and not result in serious negative impacts to the trees.

Arboricultural Impact Assessment Report Review:
Following the additional ground truthing and tree survey undertaken by the Arborist, the Arborist Report also outlines the potential impact levels to existing trees from the current Skywalk alignment.

The following is an extract from the Arborist report:

- Minor encroachments of less than 10% would generally be readily acceptable but they should typically involve compensatory areas applied elsewhere that are contiguous to the remaining TPZ wherever possible;
- Major encroachments will usually necessitate the need for a much more in depth inspection of the particular tree(s) and potentially the use of non-destructive investigations of root zone to review and justify the proposed incursion;
- Above ground encroachments may also need to be considered to assess the impact and loss of any major branches and foliage;
- Incursions into the Structural Root Zone will typically not be allowed as is usually extremely difficult to justify that level of incursion without extraordinary building techniques being employed and/or very rigorous investigation of the tree root zone. In such situations it may be better to either re-design or reposition the proposed impacting element, or remove the tree.

The recommendations above have been taken into consideration when assessing the tree impacts of the three Skywalk alignments in this report. This was coupled with the recommendations from the Ecological assessment of a 5m impact area around each pier. To calculate tree impacts, rather than utilising a 10% TPZ encroachment measurement, the tree will not be considered as impacted unless the trunk is located within the 5m impact zone shown as an Impacted Tree (ground impact). Similarly, when a tree trunk or majority of tree canopy are encroaching within the above ground linkage walkway, that tree will be categorized as an Impacted Tree (linkage impact) and selective pruning of canopy or branches would be expected.

As there is some missing existing tree information along some parts of the original Skywalk Master Plan alignment, best judgement of tree canopy has been made based on the high-resolution aerial map.

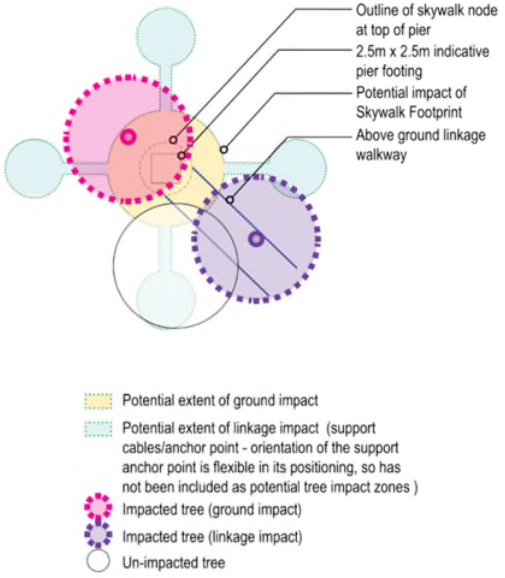


Figure 1: Skywalk Pier Impact Footprint

REF STAGE DESIGN PRINCIPLES

In comparison to the Skywalk design principles developed for the Master Plan which focused primarily on the experience of the visitor along the Skywalk, the following REF design iterations utilised a more nuanced design approach.

Aiming to balance user experience, constructability and construction costs whilst also minimising impacts to the landscape and natural systems, a number of Skywalk Design Principles were developed. These principles focused on not only how the Skywalk is to be designed but also considered the Overall Project Principles and were used to help develop the AMMOR approach for the Skywalk.

Overall Project Principles:

- Offer access for all
- Bring nature to the city centre
- Celebrate the Landscape
- Nature memories of the park experience
- Embrace the storyline

Skywalk Design Principles

- Minimise the impact of built structure on ground and natural habitat and conserve natural values
- Modular construction to ensure a cost-effective product
- Maximum 1:14 ramps with landings and rest areas
- Eastern section (pier 0-8) 259m in length with lift & stairs and Cable Bridge 186m in length and ramped at 1:14 with landings and rest areas
- Southern section (pier 8-18) 364m
- Northern section (pier 18-23) 154m in length and ramped at 1:14 with landings and lookouts
- Geometry and materiality of canopy walk to celebrate the unique character of the park
- 2.4m wide walk for pedestrians only 5-6.5m nodes for rest areas, lookouts and other connections based on spacing of piers
- Skywalk height above ground to range from 5-30m to provide full experience of bushland canopy

THE OVERALL APPROACH

The design development of Skywalk alignment was built on a careful balance between the consideration of impact, benefits, buildability, and cost.
With the recognition of the significance of the existing native habitat, following discussion with Council, CLOUSTON Associates proposed the following steps to minimise the potential impacts. The below table contains examples of the AMMOR approach, used for the Skywalk

Response	Priority	Examples
Avoid	Avoid impacts to the native vegetation communities wherever possible, while achieving the visions of the Skywalk	• Minimise the number of piers which impact the ground though a modular design balancing span distance with cost, size of materials and constructability • Realign the route of the Skywalk to stay outside high vale bushland areas. • Align the Skywalk route within easy construction distance to locations with easy machinery and plant access to avoid impacting bushland during construction. • Align route and pier locations with existing clearings and gaps within the bush to avoid impacting existing large trees • Locate structures such as the lift and stair tower fully within existing clearings to avoid existing vegetation • Realign the route based on community feedback regarding the proximity to residential properties
Minimise	Minimise where Avoid not possible. Optimise minimisation	• Realign Skywalk route further away from the Crusher Plant to minimise impacts to high value bushland • Use the existing previously cleared easement for a bridge access to minimise impacts to mature trees and reduce the number of piers impacting the ground • Extend the length of Skywalk located in lower value bushland to the east of the fire trail rather than the bushland to the southwest of the fire trail • Utilise large crane machinery to weave walkway modules into the bushland to minimise impacts to canopies
Mitigate	Use element design to further limit impact	• Allow for minor on-site modifications to be made to path alignments, grading and construction methods to limit tree impacts • Strictly limit construction access to forest floor with fencing and other control measures
Offset	Offset on site	• Ensure new planting on site is based on plant communities impacted by the Skywalk • Ensure impact areas of not only the Skywalk but other works within the park fall within the offset areas previously allowed for as part of the earthworks DA approval
Rehabilitate	Rehabilitate along the route	• Revegetate all impact areas and construction accesses within the bushland areas along the Skywalk route • Ensure the core of the new planting is to be based on the adjacent Plant Communities, eg. Blackbutt Gully Forest • Utilise any trees felled for habitat and artificial Nesting hollows within the parkland

CONSTRUCTION METHODOLOGY PRINCIPLE

Weaving through the forest canopy

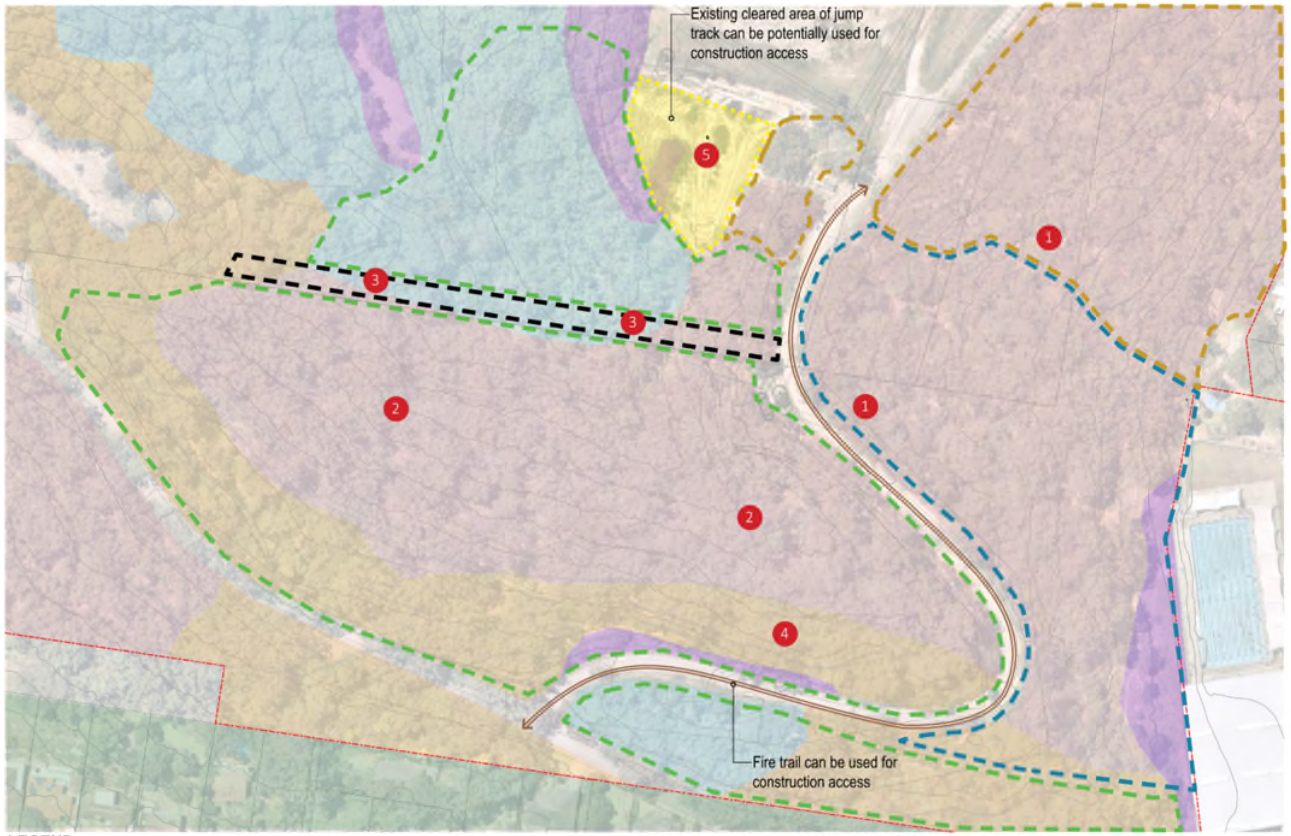
As outlined in the AMMOR approach to the Skywalk minimising construction impacts to the bushland is a key priority for the project. A part of the design development of the Skywalk is the modular design of the walkways, which allows (if needed) for small sections to be craned into position by weaving through the bush to minimise impacts to not only the ground but canopy layer.

- Craned over top of forest
- Dropped veritically down through forest - Threaded and roated down to drop through canopy until level on the forest floor
- Laid on forest floor flat
- Use of MTB trails where possible
- Temporary scaffolding to support on uneven terrain
- Lifted back up into the canopy horizontally to final position

Vertical cable route through canopy gaps

Section being woven through the bush to minimise impacts

SITE ANALYSIS



Blackbutt forest with minimal understorey

Blackbutt forest with dense understorey

Blue Gum High Forest with privet understorey

Blackbutt forest with natural system understorey

LEGEND

- Residential zone (R2)
- Blackbutt Gully Forest (Moderate - High Quality)
- Blackbutt Gully Forest (Low Quality)
- Bluegum Diatreme Forest (Moderate - High Quality)
- Native rehabilitation - regeneration (Areas with significant privet understorey)
- Natural system understorey
- Dense undertstorey
- Minimal understorey
- Cleared and regenerating former powerline easement
- Existing cleared area of jump track can be potentially used for construction access

EXISTING CONDITION

1. Lower value bushland to the east of the fire trail for potential Skywalk alignment
2. High value Blackbutt Gully Forest in the valley to be avoided, where possible
3. Existing previously cleared easement for cable bridge linkage
4. Native rehabilitation area with lower value for the potential skywalk alignment (future rehabilitation work to be considered after construction)
5. Existing clearings for the potential Skywalk alignment

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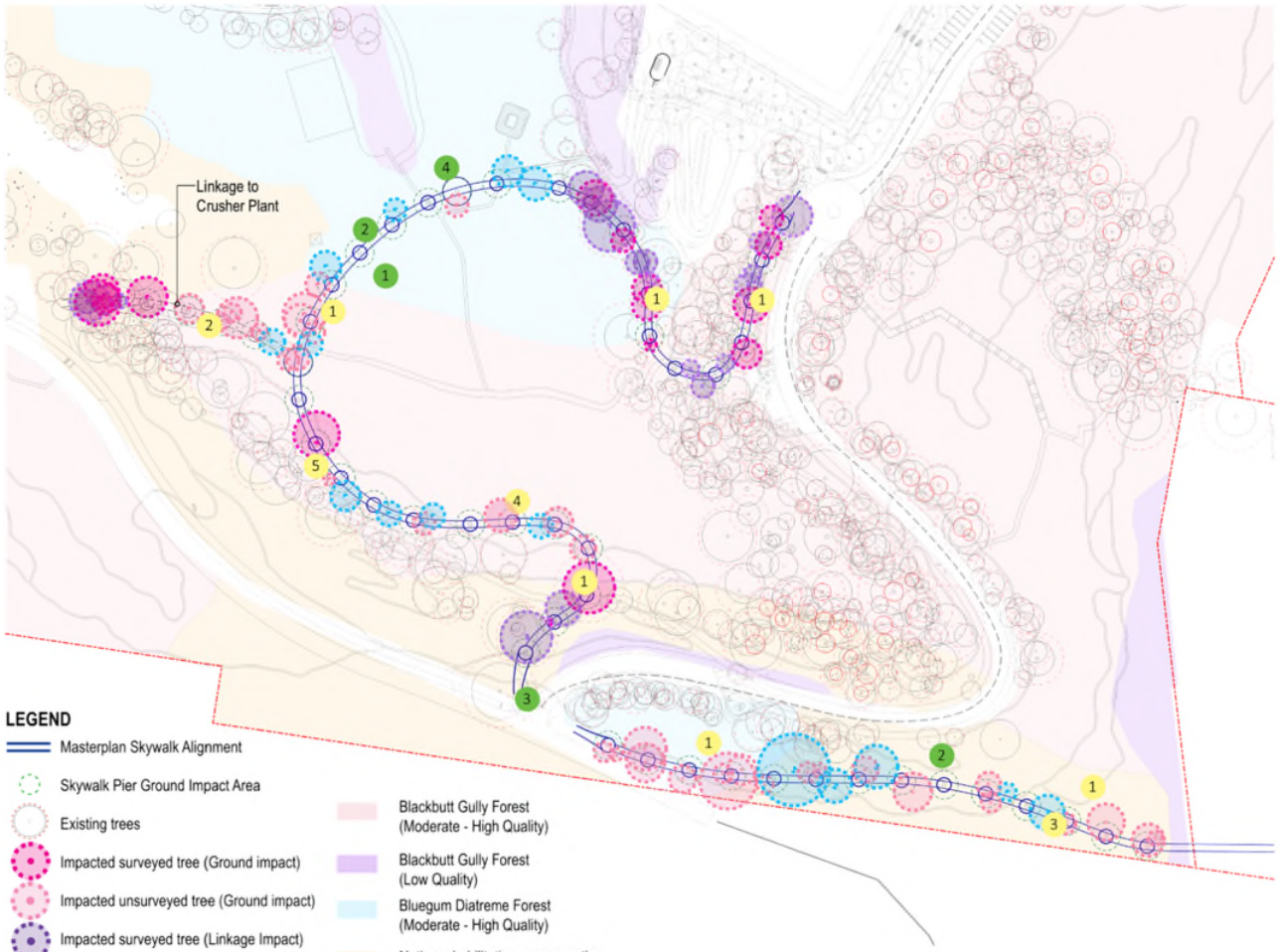
17/02/2023 FINAL

ATTACHMENT 7 - ITEM 6

SKYWALK TREE IMPACT PLAN - MASTER PLAN ALIGNMENT (SUPERSEDED)



The superseded Master Plan alignment was proposed with the primary consideration of form, connectivity to the Crusher Plant and Higgins Cemetery and best visual experience. Detailed exploration of the in-ground pier location was not undertaken. Therefore, data for the number of impacted trees has been taken from a number of sources. Unsurveyed trees have been taken from aerial imagery and contains a degree of uncertainty. Numbers from this source should be seen as conservative and are likely to be higher.

Total linear distance (inc Crusher Plant link): 900m
Total pier numbers: 48
Number of ground impacted trees: 54
Number of linkage impacted trees: 33

Note: Calculations include unsurveyed trees based off Nearmap aerial imagery.

BENEFITS

1. Curved form key in with general design language
2. Elevated footpath limits ground impacts
3. Ground connection
4. Potential connection to Higgins Family Cemetery

IMPACTS

1. Un-rationalised piers cause more ground impacts to the existing trees
2. Connection to Crusher Plant is not via a cable bridge and thus has greater ground impact
3. Potential noise impacts to surrounding residences
4. Alignment travels through high value bushland
5. Difficult construction without easy access - additional bushland impacts to bring materials, etc

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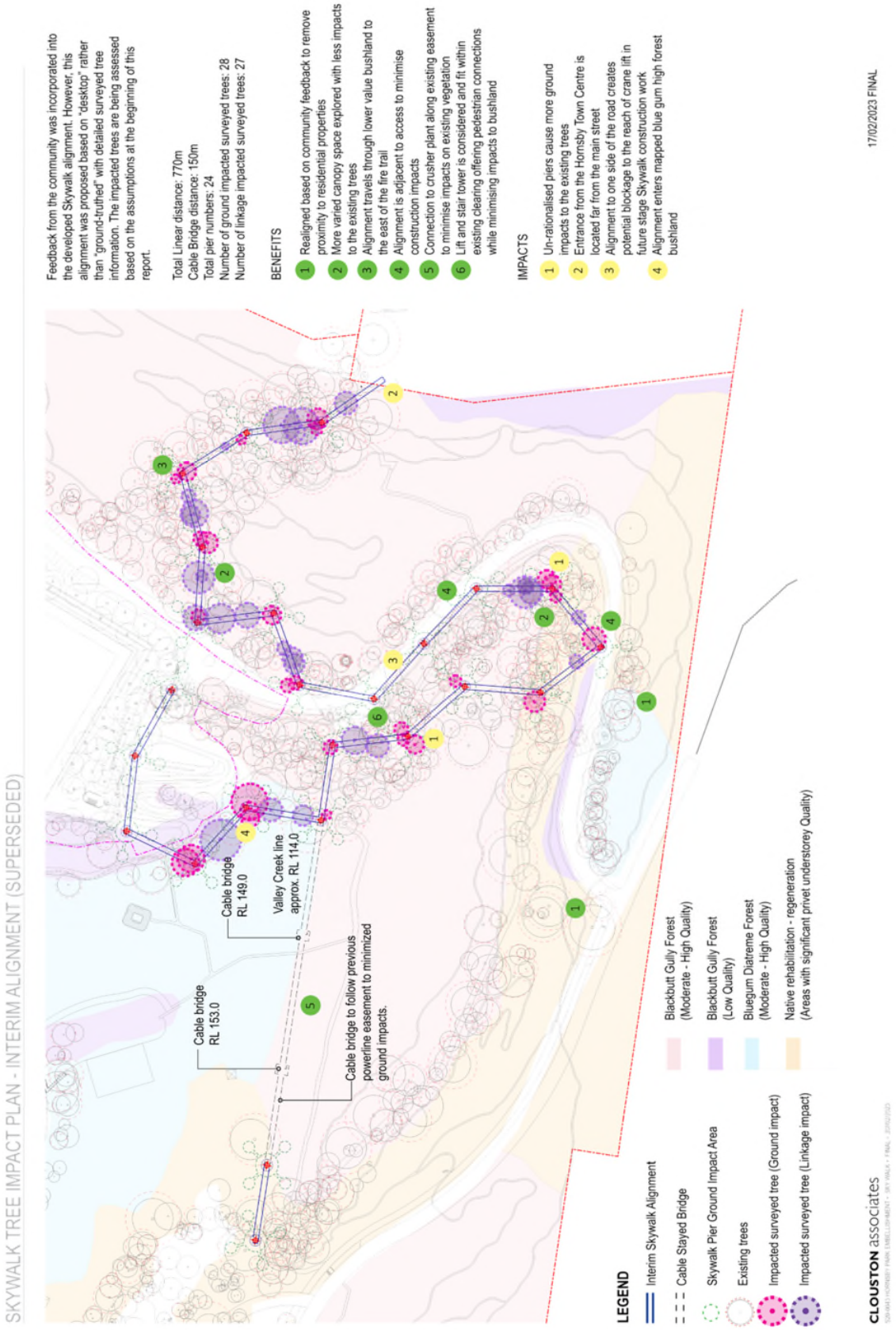

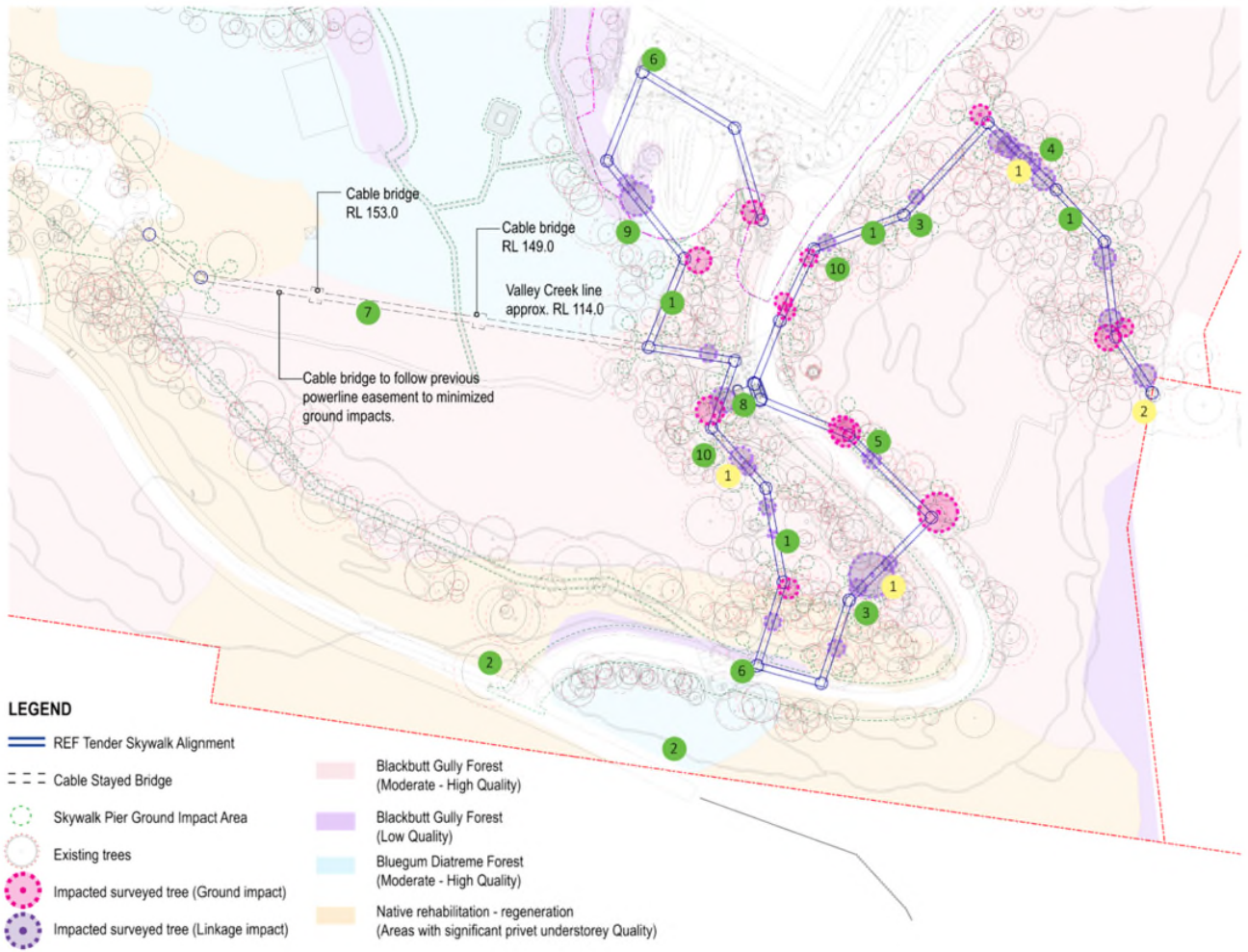

Following the approval of Master Plan, design iterations were investigated to minimise the impact to the existing vegetation community while providing connections and unique user experience of Skywalk. The impacted trees are being assessed based on the assumptions at the beginning of this report.

Total Linear distance: 780m
Cable Bridge distance: 185m
Total pier numbers: 24
Number of ground impacted surveyed trees: 13
Number of linkage impacted surveyed trees: 27

BENEFITS

1. Rationalised number of piers to limit the ground impacts
2. Realigned based on community feedback to remove proximity to residential properties
3. More varied canopy space explored with less impacts to the existing trees
4. Alignment travels through lower value bushland to the east of the fire trail
5. Alignment is adjacent to access to minimise construction impacts
6. Pedestrian ground connection
7. Connection to crusher plant along existing easement to minimise impacts on existing vegetation
8. Lift and stair tower fit fully within existing clearing offering pedestrian connections while minimising impacts to bushland
9. Alignment shifted out of Bluegum High Forest mapped bushland
10. Can be built in stages

IMPACTS

1. Branch trimming would occur due to linkage impact
2. Entrance from the Hornsby Town Centre is located far from the main street

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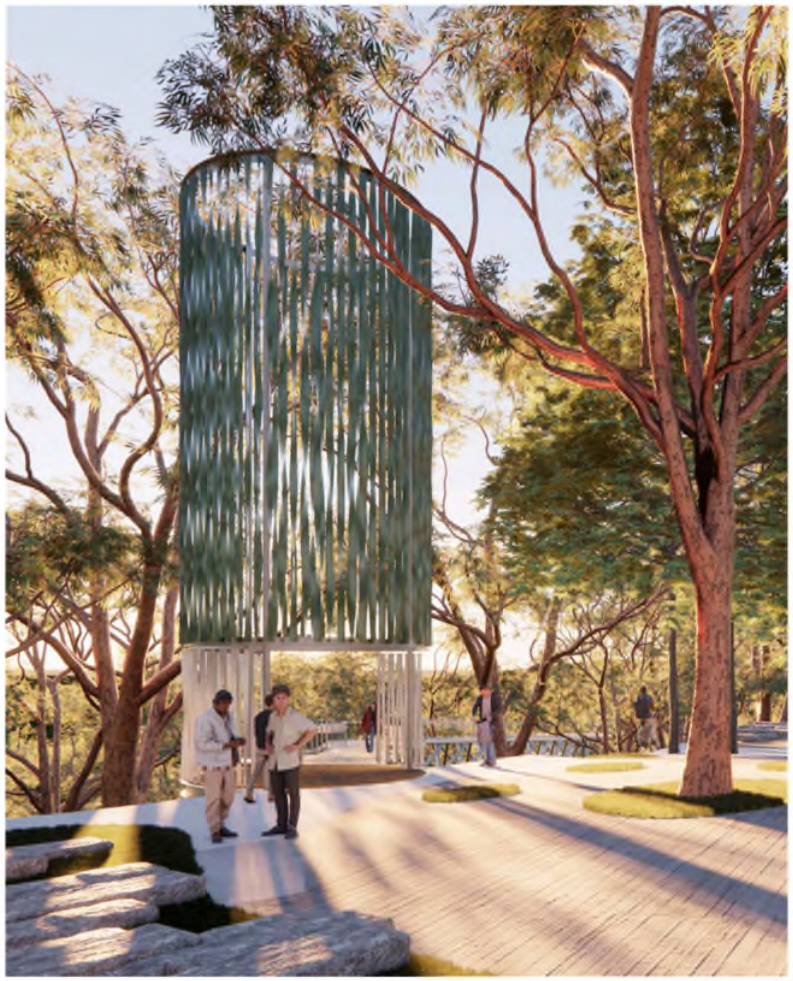
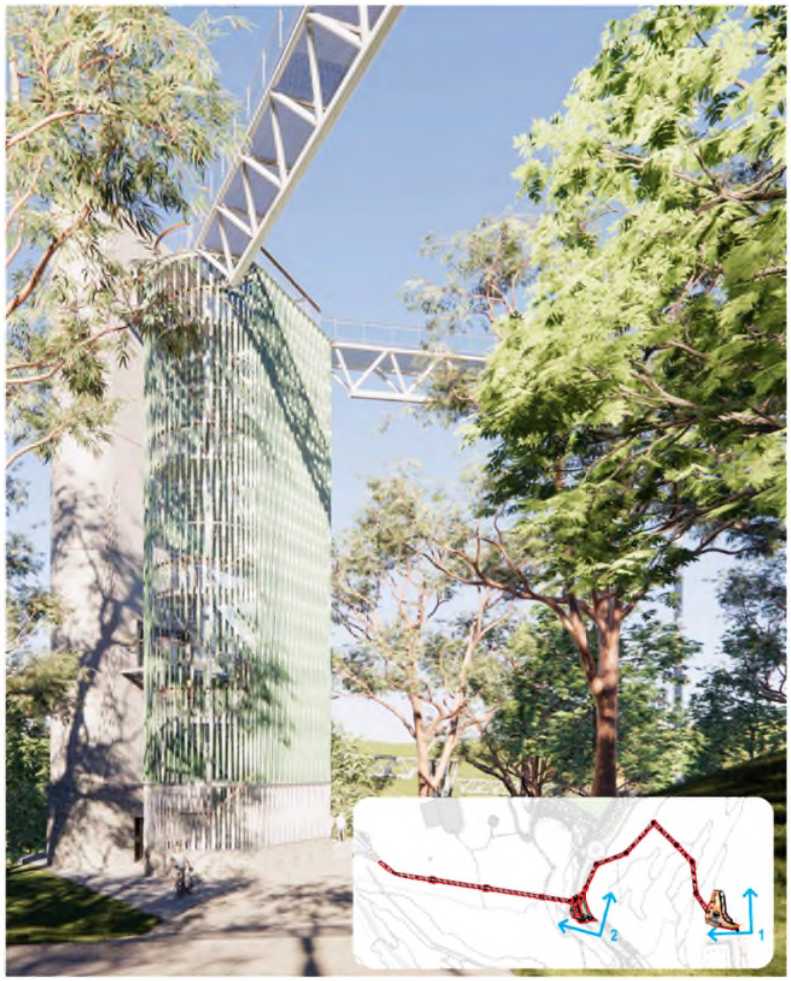
VIEW 1: SKYWALK ENTRY PLAZA AT HORNSBY PARK



VIEW 2: SKYWALK STAIR / LIFT TOWER AT FOREST CLEARING



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VIEW 3: SKYWALK CABLE BRIDGE TO THE CRUSHER PLANT

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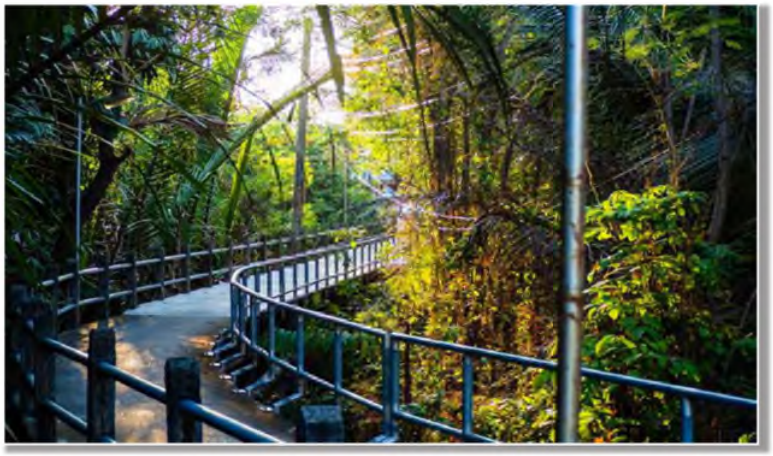
CLOUSTON associates

Designing with Country

When the journey is the destination



bangawarra

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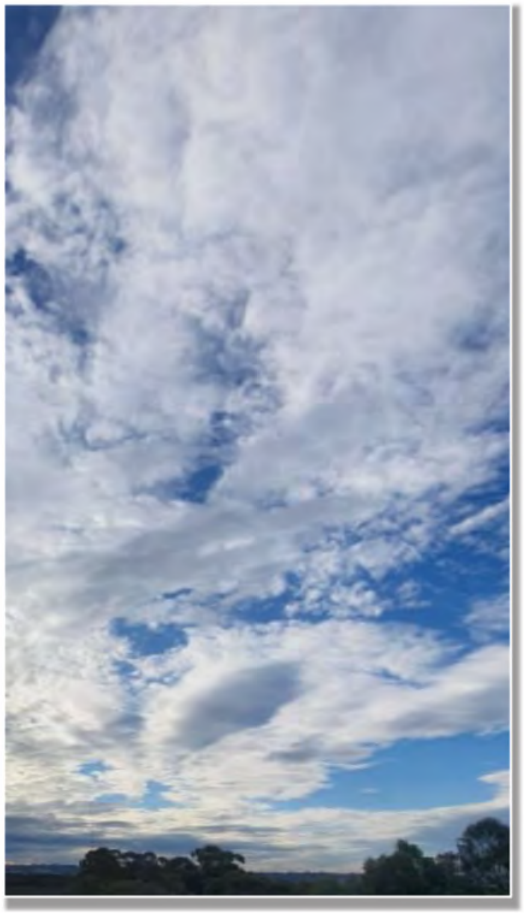
Designing with Country

Connecting to Sky Country



bangawarra

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Designing with Country

Protecting habitat and heritage

bangawarra

ATTACHMENT 7 - ITEM 6

Designing with Country

Protecting habitat and heritage

bangawarra

ATTACHMENT 7 - ITEM 6

CIRCULATION INTENT + SITE SPECIFIC PRINCIPLES

INTENT

- Offer a memorable arrival and circulation experience
- Provide equal access for all to the park
- Create an immersive visitor experience
- Promote sustainable transport access to the park
- Conserve and celebrate the park's high environmental and natural values
- Create a high awareness of the park
- Promote return visits

Connecting people with places

- Being accessible to all
- Connecting with Country
- Linking city and bush

Things to see and do

- Offering varied bushland perspectives
- Providing views across the park
- Integrating interpretation/education

Protecting environment and heritage

- Conserving natural values
- Respecting local heritage
- Minimising, mitigating and/or offsetting impacts

Creating a memorable experience

- Offering an immersive experience
- Connecting with nature
- Encouraging word of mouth

Looking after the place

- Minimising construction impacts
- Being readily maintained
- Providing a high return on investment

ATTACHMENT 7 - ITEM 6

DESIGN DRIVERS

Maximising the visitor experience

- Memorable experience
- Immersive experience
- Provide a key pedestrian arrival and park gateway and orientation experience
- Telling the story of a range of environments
  - Blackbutt forest
  - Blue gum High Forest
- Provide a vantage from a completely new perspective - Range of canopy heights – but largely up in the canopy

Maximising Connectivity

- Gateway Node - Must connect to Hornsby Park
- OMV node – arrival point
- Crusher plant - Connection

Protecting the Forest

- We want to protect the forest so that it looks like the walkway has always been there.
- Natural beauty values
- Protecting the forest Biodiversity, Habitat and nesting values
  - Avoid
  - Minimise
  - Rehabilitate
  - Offset

Buildability Drivers

- Largely determined by crane access.
- Crane size / cost and reach limitations
- Existing access tracks and points

Minimising Carbon footprint

- This is one of the single largest carbon footprint items in the park.

Maintenance, Replacement, Removal

- Ease of operation and minimised impact on environment, heritage and visitors built into design

Cost benefit

- Needs to also fit within budget
- Cost extends exponentially the further the walkway is from easy crane access

No go areas

- proximity to residents
- In front of the pool car park is not an attractive structure to look at.

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LEARNINGS FROM THE VALLEY OF THE GIANTS

- Valley of the Giants skywalk designed to deliberately have a bit is sway and movements so you felt like you were on a tree branch
- Narrow path to conserve weight and allow people to hold on with both hands. Managed as a one way loop only
- Decking is mesh so it looks like a light tree canopy when viewed from below
- They built a full size prototype so the client could all test it and walk on it and evaluate decking options
- Designed and fabricated for bolt only construction – no site welding to minimise fire risk.
- All assembled on site. Driven in on a ute where available or each piece walked in by 2 men
- Assembled on the forest floor in a 60mx 4m lay down area and then winched/jacked up using the pylons.
- All joints have double bolts so it can be maintained in place to replace bolts if required.
- Pylons had no concrete in the footings. Were all cable stayed. The whole loop provides structural stability
- Designed so a tree fall would drop the bridge section, not bring down the entire 450m
- Lots of community consultation. Fully transparent and open. They walked residents through the forest and had each tree with a colour coded ribbon, saying if it was being removed or just a branch being removed.
- Conservation and land management client embedded in the team
- Barrier fence placed at 1200mm high or 300mm higher than code at the time. Suicide risk was considered, to be such a small risk that it did not warrant the additional weight and impacts on visitor experience and view by a high barrier fence. 3 million people have used it so far

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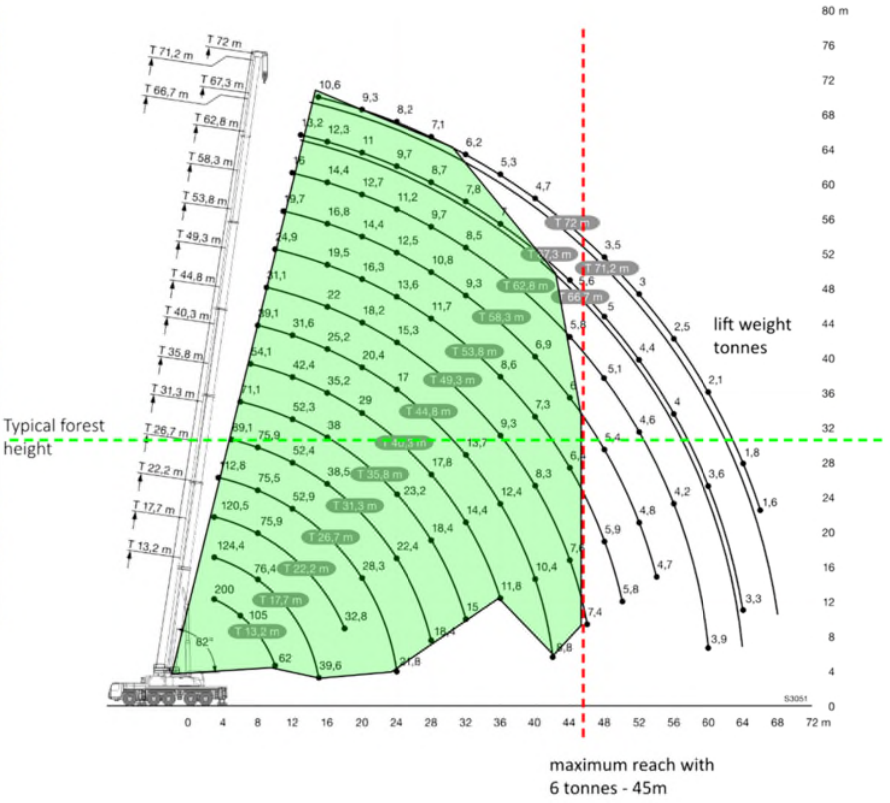
200 TONNE CRANE - 6 TONNE LIFT CAPACITY AND REACH



- The larger the crane the greater the daily expense
- At outer reach of crane lift capacity reduces

ATTACHMENT 7 - ITEM 6

WEAVING THROUGH THE FOREST CANOPY

Option 1 - Lifted In - set in final location

- Lifted in set in final resting angle. Brought in under canopy
- Only cable up in canopy
- Arborists in to do essential branch and selected tree removal
- Dogmen to weave and guide component through forest
- Lifted in complete 30m section – 6 tonnes – reach limitations

Vertical cable route through canopy gaps

OPTION 2 - Dropped in vertically then lifted horizontally

- Craned over top of forest
- Dropped vertically down through forest –Threaded and rotated down to drop through canopy until level on the forest floor
- Laid on forest floor flat
- Use of MTB trails where possible
- Temporary scaffolding to support on uneven terrain
- Lifted back up into the canopy horizontally to final 1:15.57 position

ATTACHMENT 7 - ITEM 6

Evaluation of Development Options for Hornsby Park against the Master Plan objectives

OPTION 1: CRUSHER PLANT, ACCESS TRAILS AND LOOKOUT WITH PLAY AND PICNIC SPACES IN OLD MANS VALLEY

Description

Option 1 opens up the Crusher Plant precinct by delivering 40 car parking spaces, a lawn area for picnics, a small playground, toilets, space for a coffee cart and a lookout that provides views of the Quarry Void and revegetation area. The proposal allows for commercial and cultural opportunities including those associated with the existing Crusher Plant building.

Additional lookouts and trails are provided to the west and north-west of the Quarry Void. The Heritage steps missing links are included. Completion of the Heritage steps will complete the link from the Hornsby Aquatic Centre to the Great North Walk.

Bespoke playground in northern Old Man's Valley designed with connection to country themes specific to the parklands. Incorporates Council's first specialist water play, swinging, slides, spinning, bouncing, balancing, rocking and climbing activities. Design ensures accessibility and provides options for the full range of age-groups. Associated facilities include amenities and maintenance / equipment buildings, shade structures (incl. above possible future café space), bubblers, picnic tables, BBQs and car parking for approximately 75 spaces. Opportunity for passive recreation on the planned sportsground platform.

Old Man's Valley elements can be delivered following the completion of existing civil works.

Images of the scheme can be found in Attachments 3, 4 and 5.

ALIGNMENT WITH MASTER PLAN OBJECTIVES

OBJECTIVE 1 • *Local Living – Hornsby's parkland hub meeting the needs of the current and future local community for recreation, connection to nature and cultural experience in a bushland setting.*	• Crusher Plant precinct offers some opportunity for access to nature and a cultural experience through delivery of the southern lookout that oversees the quarry void and revegetation areas. • Community recreational needs achieved through delivery of a play space incl. specialist water play. • Delivers against Hornsby Play Plan 2021. • Opportunity for cultural experiences through the delivery of the play space and picnic areas. • Provides open space facilities for **new** Hornsby Town Centre population. • Range of activities including informal lawn spaces, playground, with potential for a café offering supported by vehicle access and parking. • Likelihood of return/multiple visits. • Visitation across a wide range of hours during the daytime and evening. • Minimal connection to nature delivered through these spaces.

ATTACHMENT 8 - ITEM 6

Evaluation of Development Options for Hornsby Park against the Master Plan objectives

OBJECTIVE 2 • *Environment and Heritage – Renewing Hornsby's natural systems and connecting to Hornsby's unique bush character, rich heritage and evolving story.*	• Opportunity to rehabilitate natural areas around the Crusher Plant precinct. • Opportunity to tell the story of the site through interpretive signage around the Crusher Plant precinct. • Provides oversight of key revegetation/rehabilitation area • Provides opportunity to connect to Higgins Family Cottage site. • Play space has opportunity to deliver connection to cultural heritage aspects of the site. • Limited opportunity to renew natural systems and connect with Hornsby's bushland character.
OBJECTIVE 3 • *Tourism and Economy - A centre for adventure tourism for the Northern Sydney region, driving local economic development and urban renewal.*	• Crusher Plant precinct does not deliver opportunities for adventure tourism. • Crusher Plant precinct by itself unlikely to attract visitors without an experience or attraction to visit. • Play space may attract visitation from across Northern Sydney Region. • Income from paid parking possible and would help offset operating and maintenance costs. • Provides potential for access to Quarry Void when developed. • Old Mans Valley does not deliver opportunities for adventure tourism or other tourist offerings.
OBJECTIVE 4 • *Return on Investment – Leveraging commercial opportunities that enhance the leisure experience and deliver a financially sustainable community asset*	• Opportunity for future commercial activities. • Financial return not achieved in the short term. • Play space and water play has potential to support café • High operational costs of water play possibly offset with paid parking. • Cost escalations likely due to deferral of delivery date, about $1M+ p.a. compounded. • Project scope can be altered to meet budget available
OBJECTIVE 5 • *Demonstrating Sustainability – Developing robust and 'smart' systems that demonstrate 'sustainability in action' for management of the parkland.*	• Opportunities to incorporate sustainability initiatives into the development. • Old Mans Valley is also potentially impacted by any Renewable Energy Project.
OBJECTIVE 6 • *Inclusive Design/Access for All – Optimising access for all through inclusive design and site sensitive transport modes.*	• Delivers access for all, albeit by car. • Vehicular access to Old Mans Valley would be delivered via Bridge Street access road. • Does not deliver public access to Quarry Void. • Does not deliver an accessible pedestrian path from Hornsby town centre. • Vehicle access may be impeded by any Renewable Energy Project.

ATTACHMENT 8 - ITEM 6

Evaluation of Development Options for Hornsby Park against the Master Plan objectives

OPTION 2: CRUSHER PLANT, ACCESS TRAILS AND LOOKOUT WITH CANOPY SKY WALK AND CABLE BRIDGE

Description

Option 2 opens up the Crusher Plant precinct by delivering 40 car parking spaces, a lawn area for picnics, a small playground, toilets, space for a coffee cart and a lookout that provides views of the Quarry Void and revegetation area. Proposal allows for commercial and cultural opportunities including those associated with the existing Crusher Plant building.

Additional lookouts and trails are provided to the west and north-west of the Quarry Void. The Heritage steps missing links are included. Completion of the Heritage steps will complete the link from the Hornsby Aquatic Centre to the Great North Walk.

Provision of a 2.4m wide Canopy Sky Walk and Cable Bridge that connects Hornsby Town Centre to the Crusher Plant precinct on a fully accessible pathway whilst immersing visitors into the bush. The Canopy Sky Walk and Cable Bridge sit about 25-30 metres above the ground and have a total distance of approximately 400m.

Lift and stairs preserve the opportunity to connect to Old Mans Valley and the first stage link provides for extension of the Canopy Sky Walk into other parts of the bush at a later date.

All elements can be delivered in the near-term as they are all outside of the existing civil works site.

Images of the scheme can be found in Attachments 3, 6 and 7.

ALIGNMENT WITH MASTER PLAN OBJECTIVES

OBJECTIVE 1 • *Local Living – Hornsby's parkland hub meeting the needs of the current and future local community for recreation, connection to nature and cultural experience in a bushland setting.*	• Crusher Plant precinct offers some opportunity for access to nature and a cultural experience through delivery of the southern lookout that oversees the quarry void and revegetation areas. • Community recreational needs achieved through delivery of play space. • Delivers against Hornsby Play Plan 2021. • Canopy Sky Walk and Cable Bridge provide a connection to nature in a bushland setting. • Canopy Sky Walk and Cable Bridge provide a passive recreation opportunity for town centre workers and residents. • Visitation possible across a wide range of hours during the daytime and evening.

ATTACHMENT 8 - ITEM 6

Evaluation of Development Options for Hornsby Park against the Master Plan objectives

OBJECTIVE 2 • *Environment and Heritage – Renewing Hornsby's natural systems and connecting to Hornsby's unique bush character, rich heritage and evolving story.*	• Opportunity to rehabilitate natural areas around the Crusher Plant precinct. • Opportunity to tell the story of the site through interpretive signage around the Crusher Plant precinct. • Provides oversight of key revegetation/rehabilitation area. • Provides opportunity to connect to Higgins Family Cottage site. • Canopy Sky Walk and Cable Bridge provide an opportunity to connect the community to the site's bushland character. • Canopy Sky Walk and Cable Bridge provide an evolution of the site's heritage from the early days of a harsh inaccessible location to a vibrant accessible space.
OBJECTIVE 3 • *Tourism and Economy - A centre for adventure tourism for the Northern Sydney region, driving local economic development and urban renewal.*	• Crusher Plant precinct does not deliver opportunities for adventure tourism. • Crusher Plant precinct by itself is unlikely to attract visitors without an experience or attraction to visit. • Canopy Sky Walk and Cable Bridge may facilitate opportunities for adventure tourism, particularly if linked to the Crusher Plant. • Canopy Sky Walk and Cable Bridge may encourage visitation from Northern Sydney region for environmental tourism.
OBJECTIVE 4 • *Return on Investment – Leveraging commercial opportunities that enhance the leisure experience and deliver a financially sustainable community asset*	• Opportunity for future commercial activities. • Financial return not achieved in the short or medium term. • Maintenance cost low due to long lifespan of the assets. • Potential for cost escalation is possible. • Connection to the Crusher Plant precinct facilitates commercial opportunities such as adventure activities.
OBJECTIVE 5 • *Demonstrating Sustainability – Developing robust and 'smart' systems that demonstrate 'sustainability in action' for management of the parkland.*	• Opportunities to incorporate sustainability initiatives into the development.
OBJECTIVE 6 • *Inclusive Design/Access for All – Optimising access for all through inclusive design and site sensitive transport modes.*	• Delivers access for all. • Does not deliver public access to Quarry Void.

ATTACHMENT 8 - ITEM 6