CHERRYBROOK TOWN CENTRE

VISION STATEMENT // SITES 1 + 2

JDR // WOW DEVELOPMENTS // GRIMSHAW // MECONE

Job Title: **CHERRYBROOK TOWN CENTRE**
Document Title: **VISION STATEMENT SITES 1&2**

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Dated: 10/09/13

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Dated: 10/09/13

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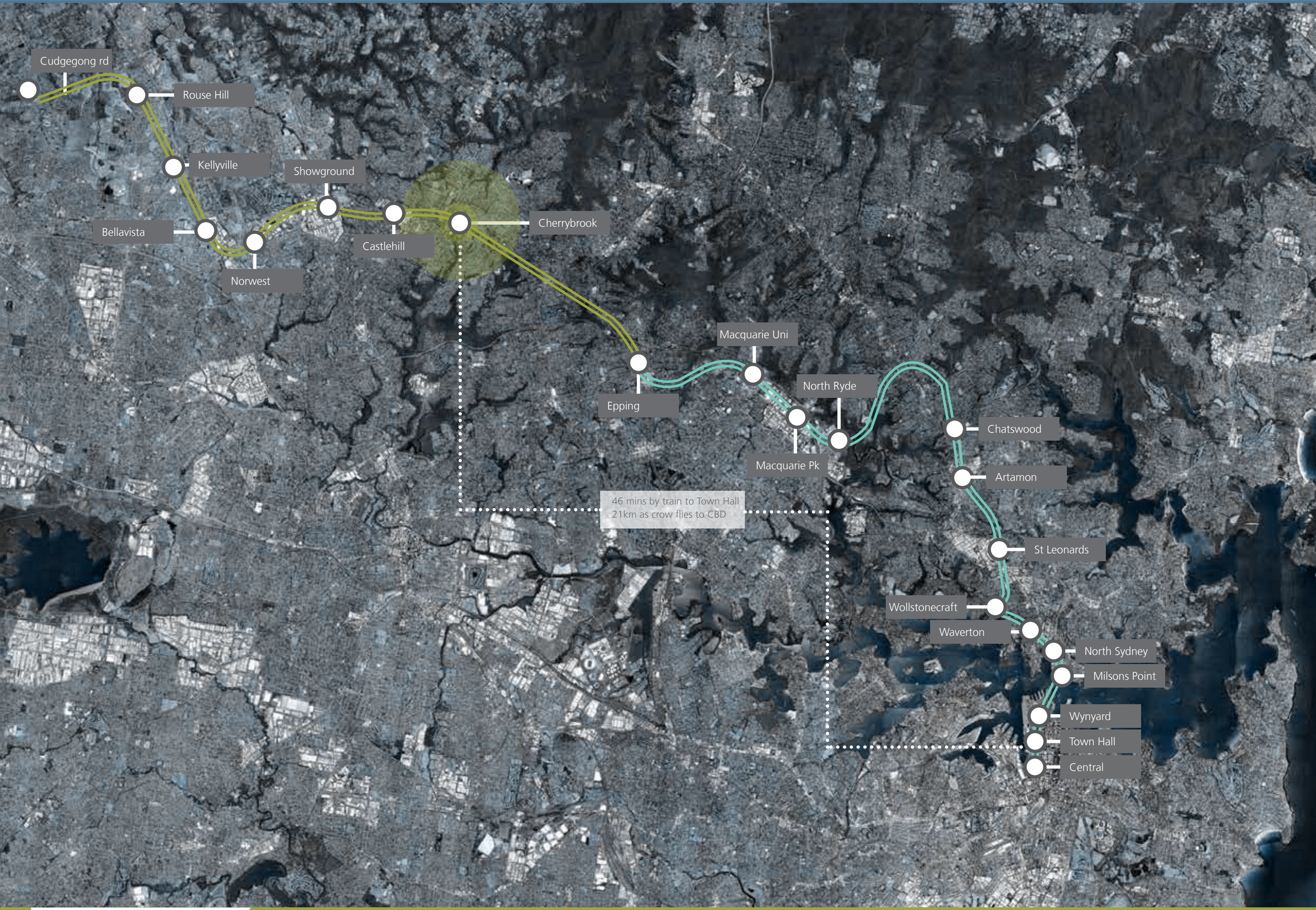
CHERRYBROOK TOWN CENTRE

VISION STATEMENT // SITES 1 + 2


Cudgegong rd
Rouse Hill
Kellyville
Showground
Bellavista
Castlehill
Cherrybrook
Norwest
Macquarie Uni
Epping
North Ryde
Chatswood
Macquarie Pk
Artamon
St Leonards
Wollstonecraft
Waverton
North Sydney
Milsons Point
Wynyard
Town Hall
Central
46 mins by train to Town Hall
21km as crow flies to CBD

INTRODUCTION

The vision is to develop the site as a medium density residential precinct with improvements to the public domain. This will provide a high quality urban renewal outcome for the site and provides high levels of amenity and design excellence with good public transport access and connections to local and regional services and employment centres.

The subject sites are located in close proximity to the future Cherrybrook Station. The NWRL provides the opportunity for integration of land use, transport and infrastructure and the provision of Transit Oriented Developments (TOD) for sites with good public transport access.
The North West Rail Link (NWRL) project has been identified by the NSW Government as a priority public transport infrastructure commitment in response to the planned population and employment growth across Sydney and within the North West Growth Centre. The project will provide 23km of railway infrastructure which will be integrated with the rest of the public transport network, connecting Epping to Rouse Hill and beyond, with eight new stations being Cherrybrook, Castle Hill, Hills Centre, Norwest, Bella Vista, Kellyville, Rousehill and Cudgegong Road.

Key Information:
- Site 1 - total 4.3 Hectares
- Site 2 - total 6.1 Hectares
- Distance to CBD -21km
- Travel time on NWRL - Cherrybrook to Town Hall - 46mins

Current proposal:
- Site 1 - Medium Density Residential 4-6 Stories, Target FSR 1.5:1 - 2.0:1
- Site 2 - Medium Density Residential with Parkland Target FSR 1.5:1 - 2.0:1

01_
CHERRYBROOK BACKGROUND INFORMATION

SYDNEY'S NORTH WEST
IN TRANSITION

The subject site is located in the suburb of West Pennant Hills and adjoins the future Cherrybrook Station. The locality is generally characterised as a low density residential neighbourhood with single or double storey detached residences located on large blocks with extensive vegetation.

The NWRL is identified in the draft Metropolitan Strategy for Sydney as one of the nine "city shapers" that will have the most significant contribution in shaping future growth of the city. The strategy identifies the need to focus on providing housing and job opportunities along the corridor, thereby creating vibrant local centres with good connections to local services, open spaces and community facilities.

According to the draft NWRL Corridor Strategy, the NWRL has the capacity to accommodate 27,400 additional dwellings and 49,500 new jobs. This is a major share of the employment and residential targets for the North West Subregion.

The renewal of the West Pennant Hills and Cherrybrook area will result in the transformation of the locality into a low to medium density residential area centred around a vibrant community centre with excellent access to public transport. This will include the provision of:

- High quality housing in close proximity to retail and transport services,
- Employment opportunities in the mixed use Town Centre,
- High quality open spaces with links to the Town Centre and transport,
- Community facilities, and
- Improvements to roads and footpaths.

1_

A Place that provides a home for multi-generations employment and generates opportunities for employment

2_

A place to play for all the community
- Gasworks Park - Seattle

3_

A new neighbourhood of high quality houses close to retail and transport services
- Malmo BO01

4_

A new Town Centre centre, the Heart of Cherrybrook
- Portland Oregon

CHERRYBROOK
THE SITE

The site is situated in West Pennant Hills and falls within the local government area of The Hills. All sites are currently occupied by single or two storey residential buildings. Castle Hill Road separates the site from the future Cherrybrook Station. The NWRL connects the site to major centres and employment areas in the west, Northwest and central Sydney.

Upon construction of the NWRL and renewal of the area as per the NWRL Corridor Strategy, the site will benefit from the following locational characteristics and advantages:

- Access to the future Cherrybrook Station (Approximately 20m),
- Access to the future station precinct which offers retail, residential and community services (Approximately 20m),
- Access to high quality public domain and open spaces,
- Access to schools and educational facilities (within 400m catchment),

Access to Coonara Avenue business park (within 800m catchment).

Upon construction of the NWRL and renewal of the area as per the NWRL Corridor Strategy, the site will benefit from the following locational characteristics and advantages:

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- Access to the future station precinct which offers retail, residential and community services (Approximately 20m),
- Access to high quality public domain and open spaces,
- Access to schools and educational facilities (within 400m catchment),
- Access to Coonara Avenue business park (within 800m catchment).

Site Aerial Photograph

Site Aerial Photograph

CHERRYBROOK SITE & LOTS

Site 1

Lot No.	Address	Area
Lot 12 DP 1016426	18 Carioca Way	2418m2
Lot 1001 DP 800162	127 & 129 Castle Hill Road	4336m2
Lot P DP 378655	125 Castle Hill Road	2767m2
Lot Q DP 378655	123 Castle Hill Road	1396m2
Lot 12 DP 789295	1 Glenhope Road	1578m2
Lot 11 DP 789295	3 Glenhope Road	1382m2
Lot 201 DP 812859	7 Glenhope Road	1772m2
Lot 92 DP 1111817	9 Glenhope Road	3866m2
Lot 2 DP 1057556	9-11 Carioca Way	6994m2
Lot 1 DP 864230	2 Glenhope Road	2037m2
Lot 2 DP 864230	4 Glenhope Road	1842m2
Lot 4 DP 1012463	117 Castle Hill Road	2424m2
Lot 5 DP 1012463	115A Castle Hill Road	2018m2
Lot 6 DP 1012463	115 Castle Hill Road	1992m2
Lot 7 DP 1012463	111-113 Castle Hill Road	3969m2
Lot 1 DP 785672	109 Castle Hill Road	2616m2
	Total	43,407m2

Site 2

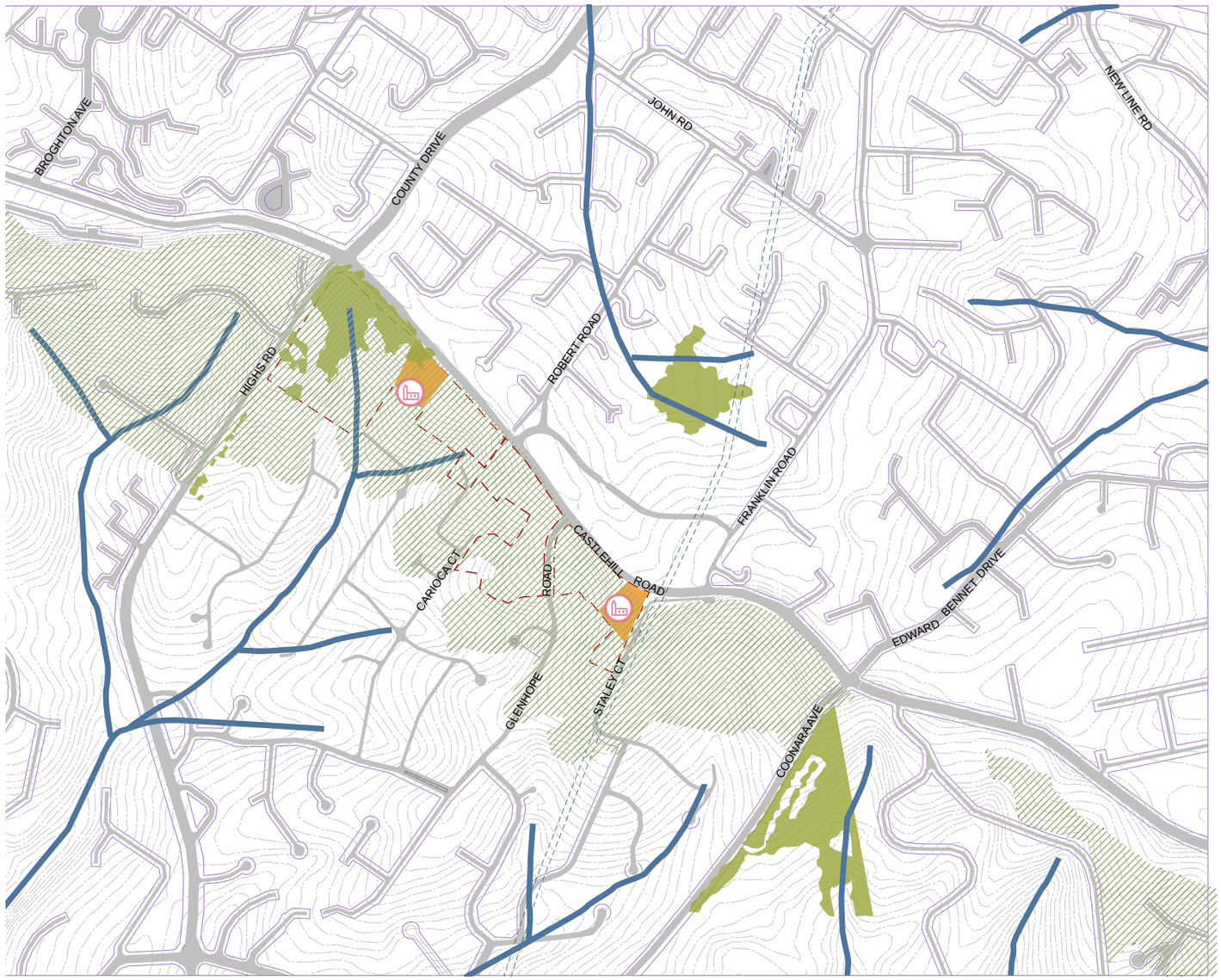
Lot No.	Address	Area
Lot 41 DP 1076268	12 Highs Road	1912m2
Lot 42 DP 1076268	10 Highs Road	7343m2
Lot 10 DP 577670	6-8 Highs Road	11319m2
Lot 111 DP1012828	145 Castle Hill Road	4890m2
Lot A DP 153486	143 Castle Hill Road	10315m2
Lot 1 DP 210585	141 Castle HIll Road	4928m2
Lot 1 DP 220867	139 Castle Hill Road	4606m2
Lot 2 DP 220867	137 Castle Hill Road	2103m2
Lot 1012 DP 878641	135 Castle Hill Road	2534m2
Lot 201 DP 786607	133 Castle Hill Road	4266m2
Lot 13 DP 1016426	18A Carioca Way	2892m2
	Total	57,108m2

THE CHALLENGES

The site faces a number of environmental and development challenges that need to be managed to ensure that the area provides adequate housing and employment opportunities. These include:

- Steep topography with steep slope from Castle Hill road to South
- Landslip risk as identified in the Hills Local Environmental Plan 2012,
- One local heritage item, and
- Relatively poor pedestrian access to the future station.

If not treated properly, the above challenges may severely restrict the development potential of the site, however, it is considered that the challenges can be managed through appropriate design and engineering measures, subject to further investigations.

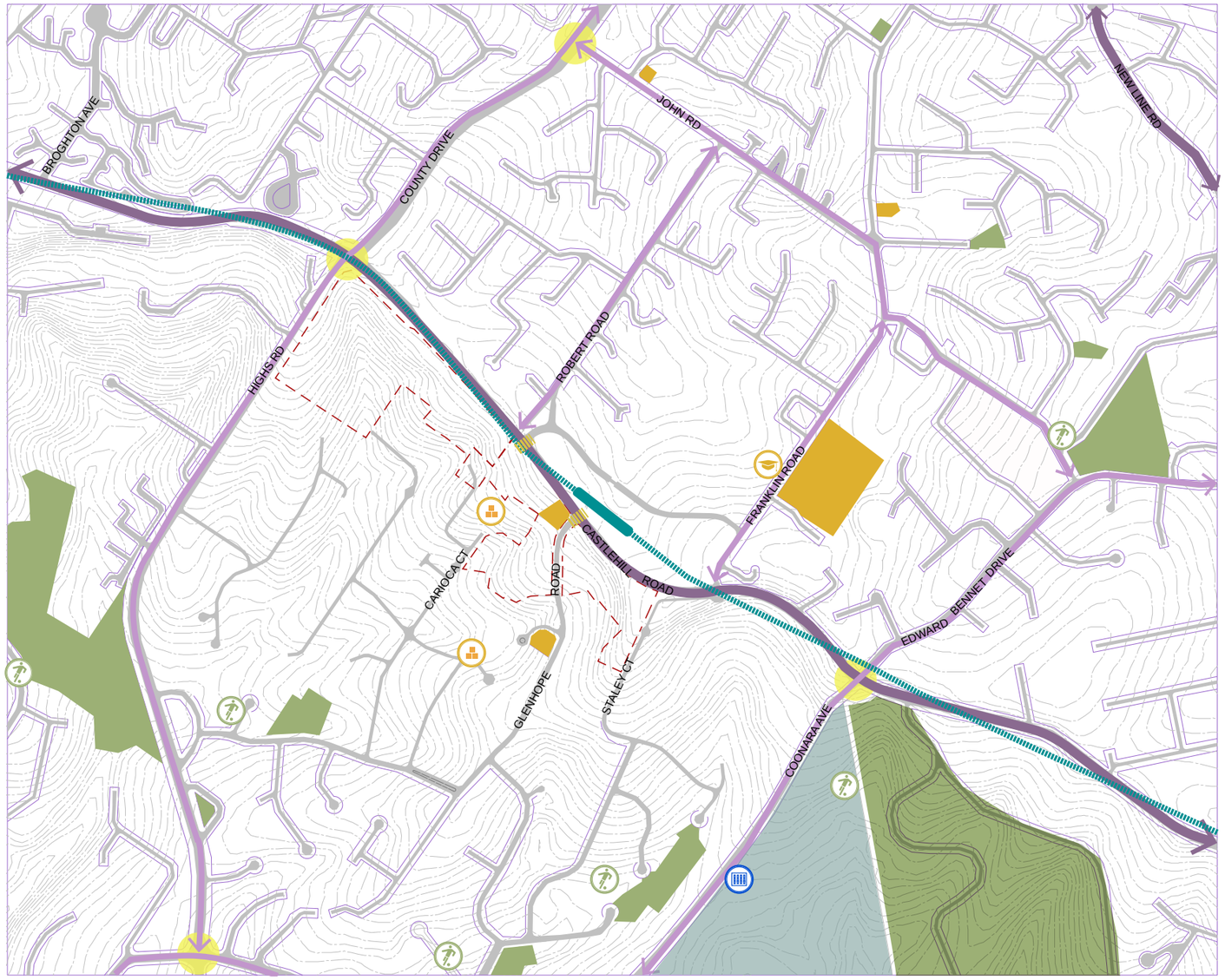


Heritage Items	Landslip risk
Drainage Line	Threatened species
2m Contours	

THE OPPORTUNITIES

The redevelopment of the site will assist Council and the State Government in meeting challenges in providing well-located housing and employment. In particular, the development of the site will:

- Provide housing in an area with excellent access to public transport, retail and employment centres,
- Allow a coordinated and master planned approach to the site as opposed to piecemeal development of sites,
- Provide improved visual and physical connections to the station,
- Assist in achieving housing targets in the area,
- Reactivation and support of the future station precinct,
- Provide substantial public domain upgrades,
- Be developed with minimal impacts on the surrounding existing residential area.



- North West Rail Link
- Primary Road
- Secondary Road
- Local Road
- Pedestrian links
- Signalised Junctions
- School
- Childcare Centre
- Recreational Area
- Green spaces
- Business/Employment

STRATEGIC PLANNING

Draft Metropolitan Strategy for Sydney

The draft Metropolitan Strategy is the latest strategic plan that sets out a vision for growth of the city. The plan was prepared following a discussion paper titled "Sydney Over the Next 20 Years – A Discussion Paper" that was released earlier in mid-2012. The plan's vision is to "cement Sydney as the best place to live and do business in Australia."
The draft Metropolitan Strategy identifies nine "city shapers" that will have the most significant contribution in shaping future growth of the city. The North West Rail Link corridor is one of the nine "city shapers" outlined in the strategy. The strategy identifies the need to focus on providing housing and job opportunities along the corridor, thereby creating vibrant local centres with good connections to local services, open spaces and community facilities.
The draft Metropolitan Strategy acknowledges that housing affordability is a major issue for Sydney residents. The plan identifies the need to deliver a total of 545,000 new homes by 2031, which equates to 27,250 new homes each year. According to the plan, only 14,500 homes were delivered each year in the last 5 years.

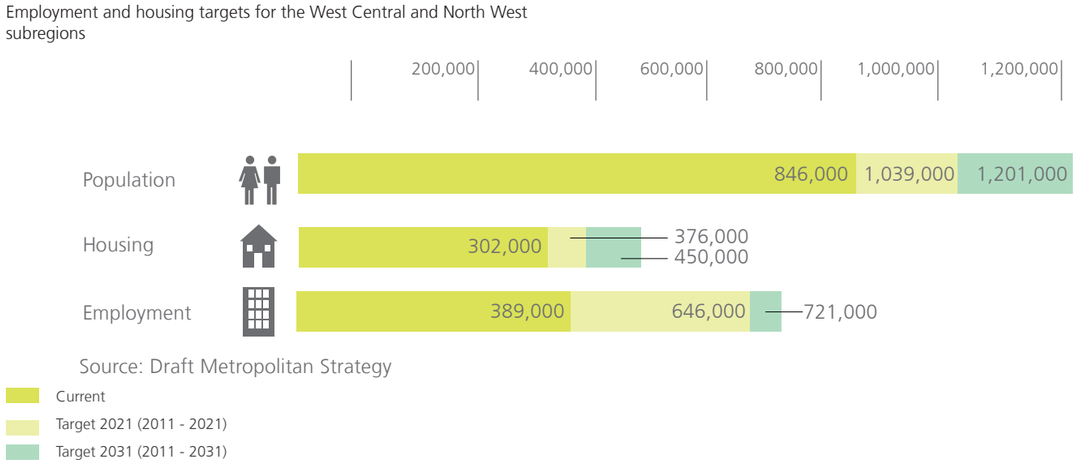
The graph below provides a summary of housing and employment targets for the West Central and North West subregions, which includes the local government areas of Auburn, Blacktown, Holroyd, Parramatta and the Hills

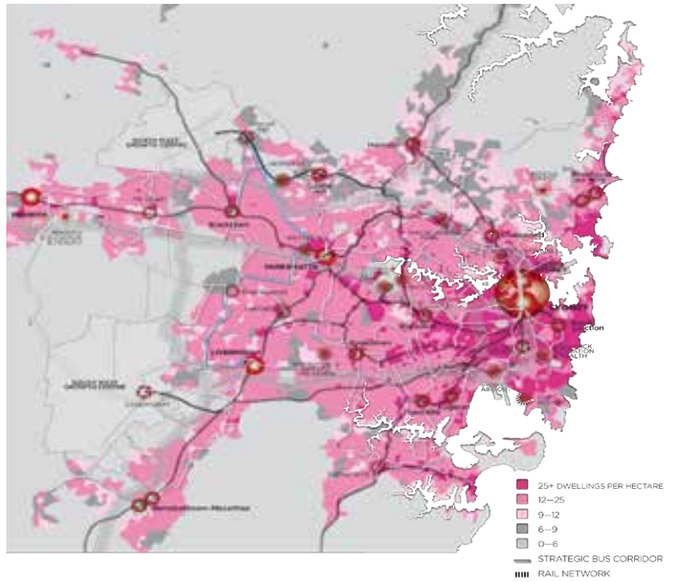
Among the relevant metropolitan priorities for the West Central and North West subregions is to "diversify housing opportunities by providing greenfield housing in the North West Growth Centre and other major sites and intensifying housing development around Parramatta CBD and adjacent suburbs, as well as identified centres and precincts along the new North West Rail Link, Western Rail Line, South Line, Cumberland Line, Inner West Line, Bankstown Line, and the Liverpool to Parramatta Transitway."

Among the priorities for the North West Rail Link corridor are:

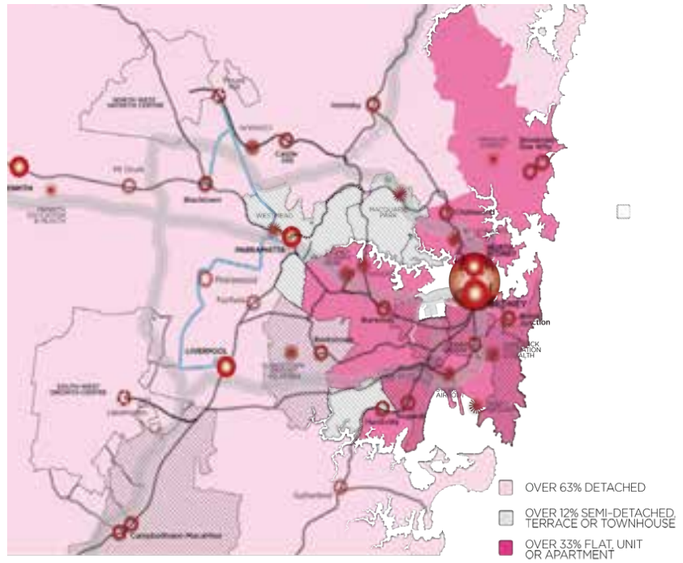
- Prepare structure plans to guide the growth of housing and commercial activity around each of the stations along the North West Rail Link,
- Ensure future land uses and transport networks around each new station are well integrated with adjacent neighbourhoods and reflect the best principles of transit-oriented design, and
- Create liveable centres around each new station that are well-designed with high quality public spaces and a range of community facilities.

Employment and housing targets for the West Central and North West subregions





Existing housing densities in Sydney - Draft Metropolitan Strategy for Sydney



Distribution of housing stock by housing type - Draft Metropolitan Strategy for Sydney

STRATEGIC PLANNING

Draft North West Rail Link Corridor Strategy

The draft North West Rail Link Corridor Strategy was prepared in line with the Metropolitan Strategy's objective to guide the growth of housing and commercial activities around the NWRL stations. The draft corridor strategy outlines the Government's vision for future growth around each of the eight stations. The vision for Cherrybrook Station Precinct has been identified in the strategy as follows:

- Provide a new focal point for the community centred around the stations,
- Provide opportunities to increase residential densities within walking distance of the station, involving a variety of housing types,
- Low to medium density residential dwellings, ranging in height from two storey townhouses to six storey apartments to the north of Castle Hill Road, and
- Low density residential housing to the south of Castle Hill Road, due to "poor pedestrian accessibility and steep topography".

Based on the projections provided in the draft Corridor Strategy, the overall housing capacity along the NWRL corridor is expected to increase by approximately 27,400 dwellings by 2036. The application of the draft Structure Plan for Cherrybrook is expected to result in 1,800 additional dwellings by 2036.

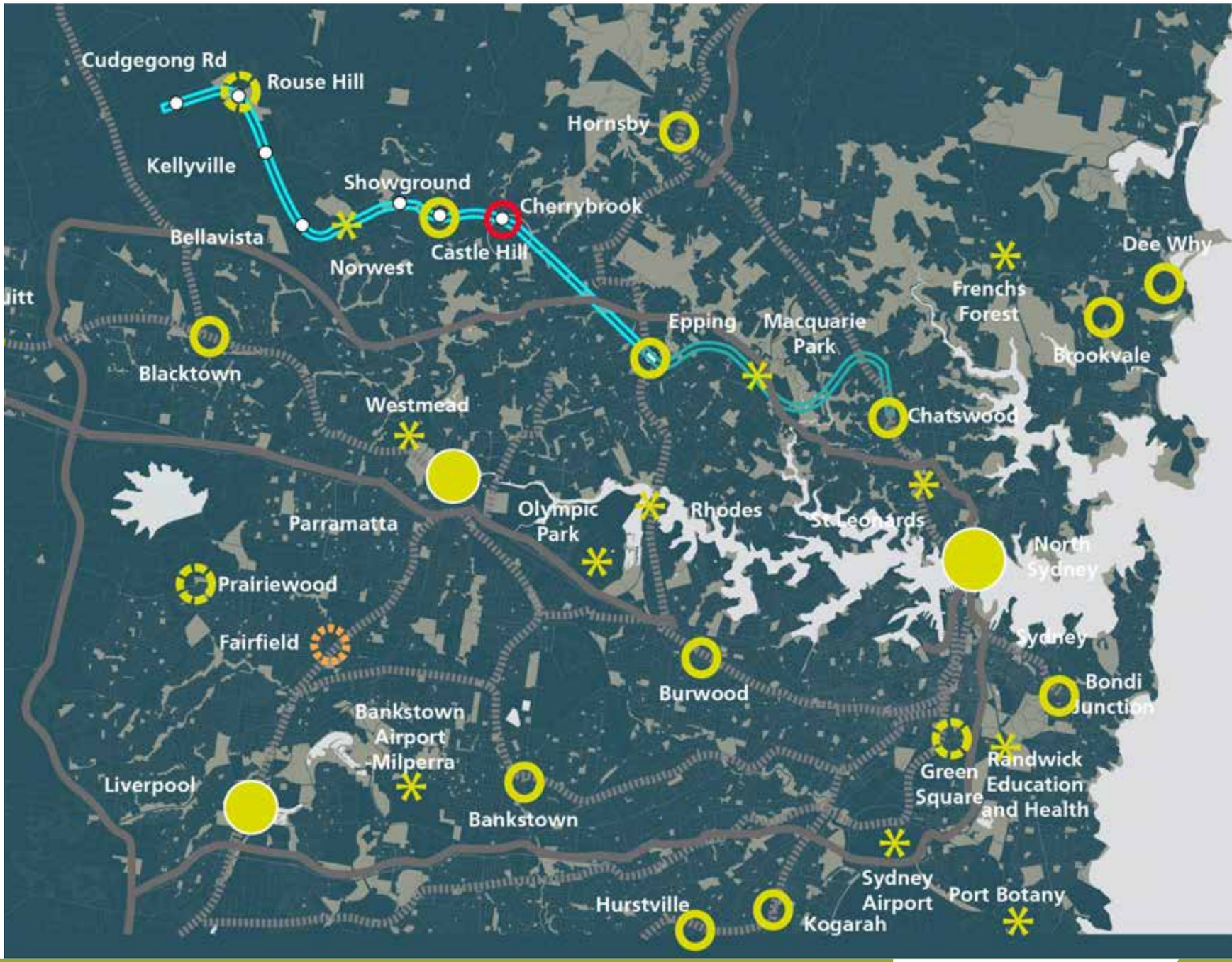
Image - from North West Rail Link Corridor Strategy

Legend

- Study Area Boundary
- Station Platform
- Station Precinct
- Primary Road
- Secondary Road
- Low Density Residential
- Low/Medium Density Residential
- Business Park
- Mixed Use
- Open Space
- Indicative Link
- Green Link
- Cycle/Pedestrian Link
- Gateway
- Infrastructure
- School
- Proposed New Local Centre

REGIONAL CONTEXT

Cherrybrook is identified as a centre for growth in the draft Metropolitan Strategy for Sydney. However with the arrival of the station and an uplift in the density of the local area in the future it will become an important town centre along the North West Rail link route. With an increased demand for housing and greater employment opportunities.



LOCAL PLANNING CONTEXT

Draft Hills Shire Local Strategy
The draft Local Strategy was adopted by the Hills Shire Council in 2008 to provide a framework in response to the key long term planning objectives of the State Government. The Residential Direction was adopted by Council to review housing capacity and set housing targets for the future. The key objectives provided in the Residential Direction are as follows:

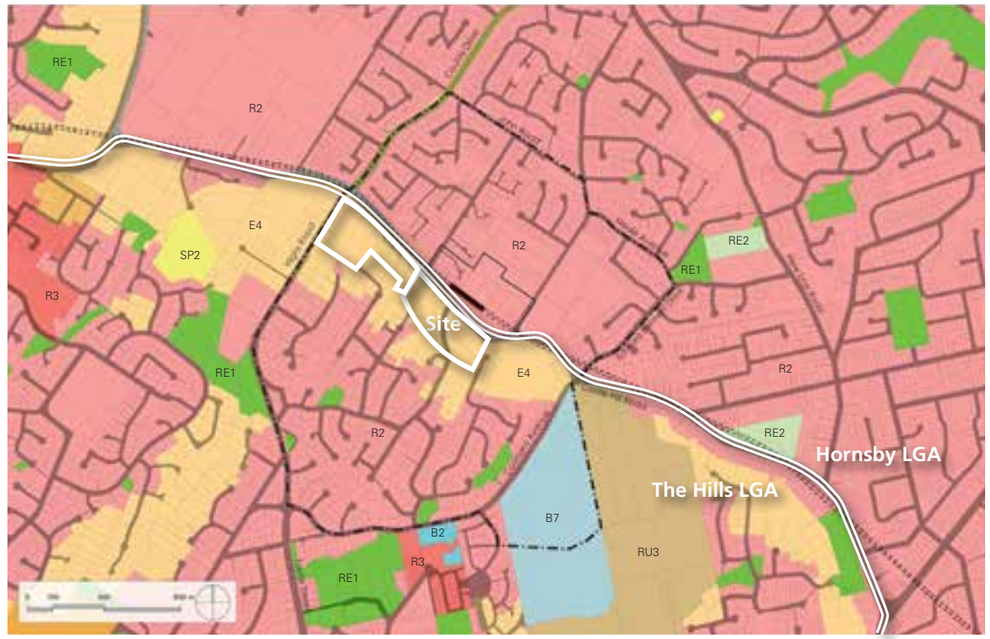
- Accommodate population growth,
- Respond to changing housing needs,
- Provide a sustainable living environment, and
- Facilitate quality housing outcomes.

The draft strategy sets housing targets of an additional 36,000 additional dwellings to 2031.

Local Planning Context
The Hills Local Environmental Plan 2012 (HLEP) is the primary planning control applying to the study area. All sites are zoned E4- Environmental Living. The HLEP identifies objectives of the zone as follows:

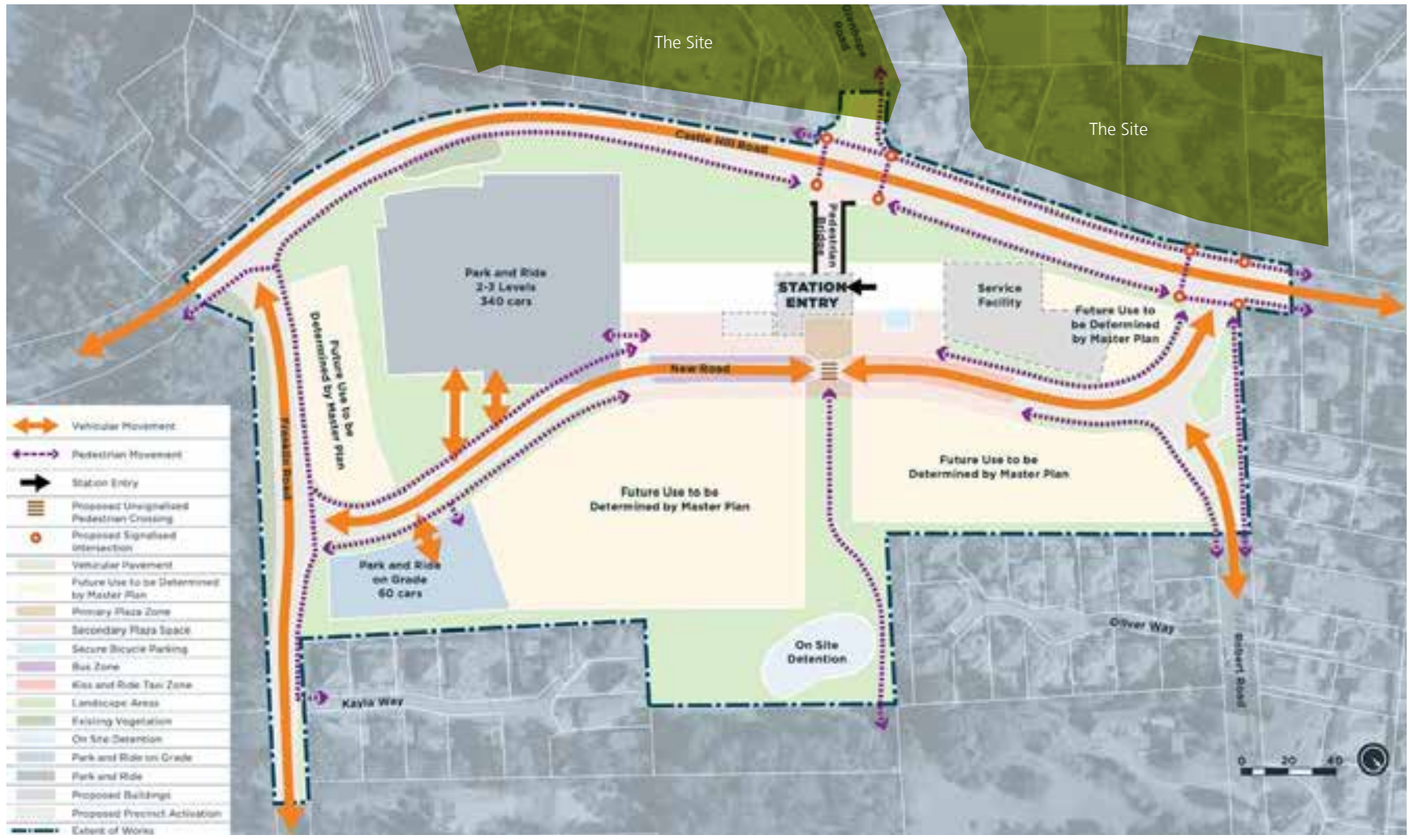
- To provide for low-impact residential development in areas with special ecological, scientific or aesthetic values.
- To ensure that residential development does not have an adverse effect on those values.
- Table 2 below provides a summary of the main applicable controls contained in the LEP.

Clause	Control	Comment
Land Use	Site zoned E4 – Environmental Living	Permissible development with consent includes: "Bed and breakfast accommodation; Building identification signs; Business identification signs; Community facilities; Dual occupancies (attached); Dwelling houses; Emergency services facilities; Environmental protection works; Home-based child care; Home businesses; Roads; Secondary dwellings"
4.3 Height of Buildings	Sites marked "J" on Height of Buildings Map.	Maximum permissible height: 9m
4.4 Floor Space Ratio	Nil	-
5.10 Heritage Conservation		Lot 7 DP 1012463 is identified as having local environmental heritage significance. Lot 1 DP 220867 is identified as having local environmental heritage significance.
7.6 Landslide Risk		All sites identified as having landslide risk.



Legend
Study Area Boundary
Station Precinct
Station Location
E4 Environmental Living
R2 Low Density Residential
R3 Medium Density Residential
B2 Local Centre
B7 Business Park
SP2 Infrastructure
RU3 Forestry
RE1 Public Recreation
RE2 Private Recreation

CHERRYBROOK STATION



Plan of Cherrybrook Station

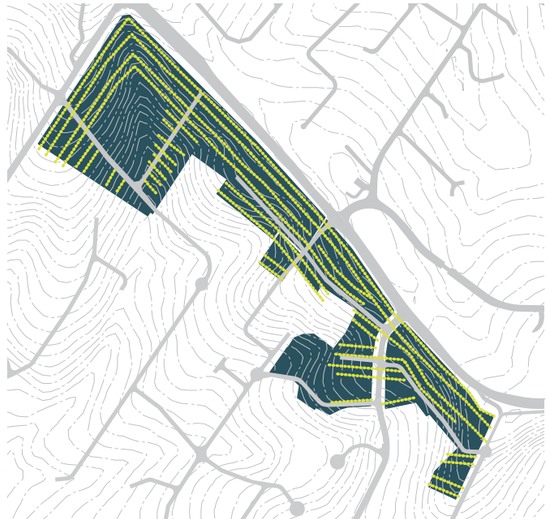
Aerial view of station

View of station entrance from new road in station site

Section through station

02_
CHERRYBROOK TOWN CENTRE PROPOSAL

CHERRYBROOK VILLAGE
KEY CONCEPTS

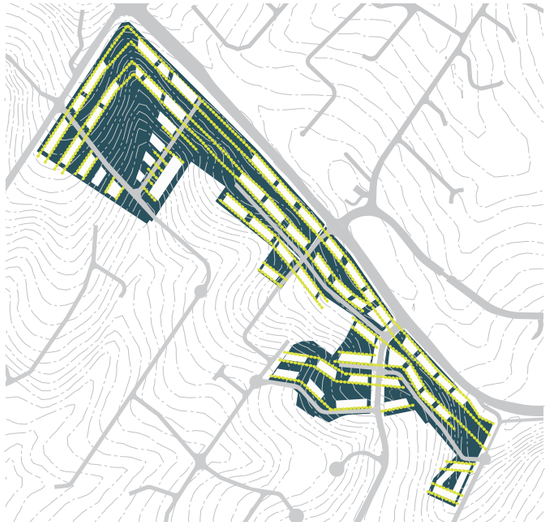


01_

Stabilise slope by building along ‘Terrace’ lines which follow existing contour lines.

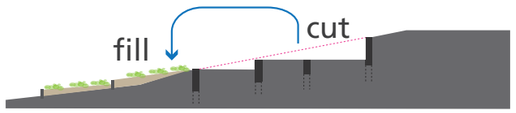
Existing conditions - ~15m drop across site

Piled Walls along ‘Terrace lines’

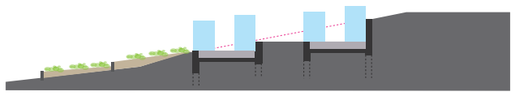


02_

Buildings are positioned in linear strips. A combination of retaining walls, Cut and fill creates a series of stepped terraces on which the buildings sit. The steep slopes are stabilised by the piled retaining walls and ground slabs of the proposed buildings.



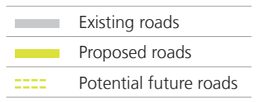
Terraces are formed. Soil cut from terraces used to fill/ regrade adjacent slopes. Slopes stabilised by gravity retaining walls, earth reinforcement, shoring, soil anchors.



Medium Density housing built on terraces. By cutting away slope new basements for carparking are formed and piled walls and terraces create a new stable ground plane.

03_

Currently the area has low connectivity due to having many cul-de-sac which makes walking to the station an unnecessary long journey. A new network of roads is overlaid to create cross connections East-West across the site. A new link to Castle hill road via Carioca way is proposed.

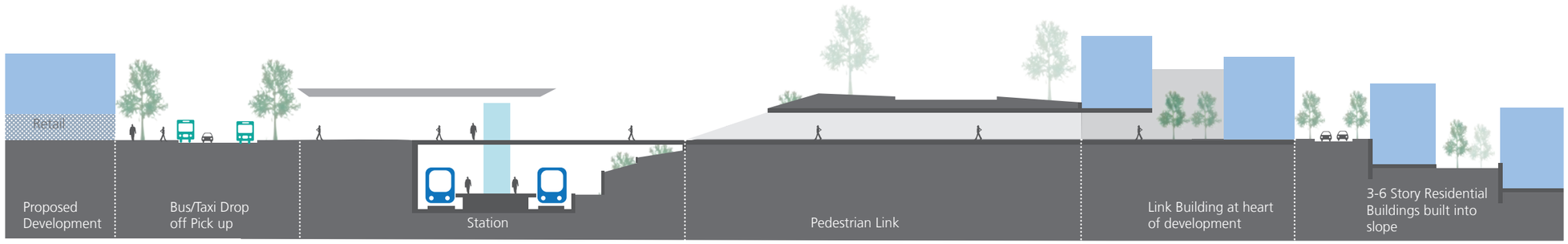


04_

Linear Green strips of public and private open space sit in between the buildings in the sheltered courtyards an a Village Green.

CHERRYBROOK VILLAGE
PUBLIC DOMAIN

- Retail at Ground Level
- Public Square/Shared surface
- Underground link
- Surface Link
- Green spaces
- Built form



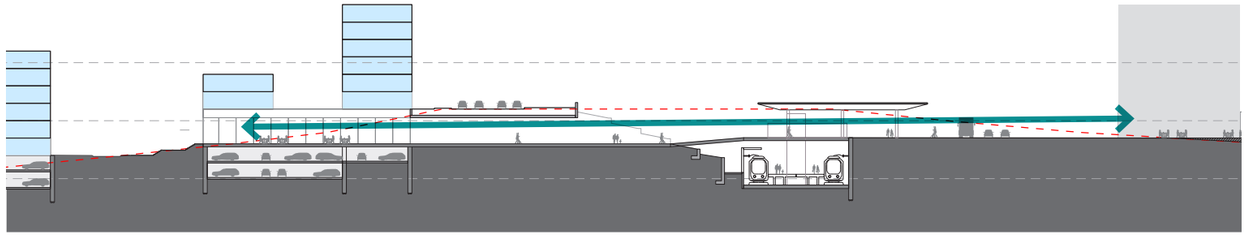
Schematic Section showing link from Station to New Village

LINKS TO STATION

Direct link to station **PREFERRED OPTION**
Concourse level and the base datum level of the development are more or less the same level. The ridge line that runs along Castle Hill Rd creates a physical barrier between the station and the development. A direct link to the station could be achieved by a underpass below castle hill road (approx 4.5m wide)

Pros
- No Stairs/Lifts required
- Station links directly to development
- 'Heart' of development is linked directly to proposed development to North.
- Intuitive link to station - visual connection created from one side of road to the other
- Accessible route

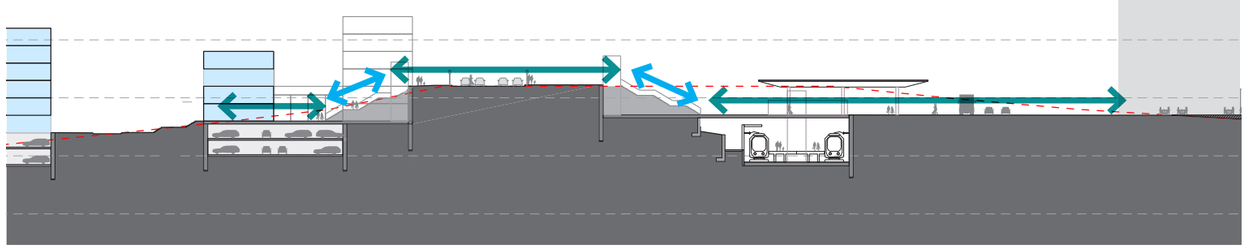
Cons
- Distribution to Castle Hill road during construction would have to be managed carefully
- Cost



At Grade Connection
Signalised level crossing at Castle Hill Rd connects station to development

Pros
- Least-expensive
- Simple solution that does not require much disturbance to Caste Hill road.

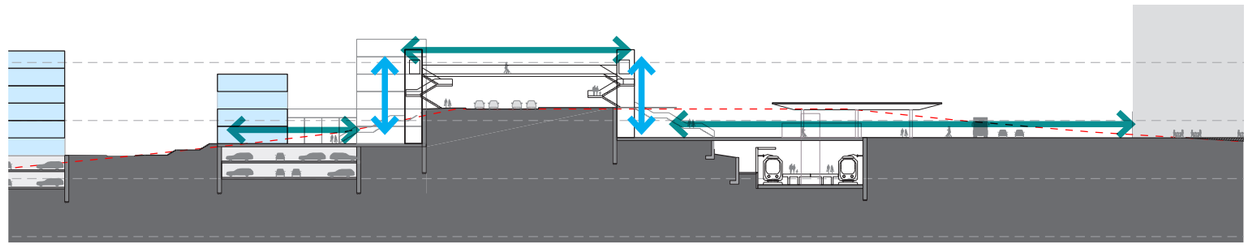
Cons
- Signalised junction with frequent pedestrians crossing could cause distribution to traffic
- Additional stairs and lift would be required in development
- Pedestrians must use stair/lift at both sides of crossing



Overpass
Pedestrian overhead bridge across Castle Hill Road connecting development to station

Pros
- Less Expensive than underpass
- Less disturbance to Castle Hill Road than underpass

Cons
- Negative visual impact on Castle Hill Road
- Additional stairs and lift would be required in development
- Pedestrians would have to go up +10m to reach overpass from base level in development and concourse level of station
- As pedestrians must go up10m it is likely that people may opt of crossing at grade as an easier option making the overpass redundant.



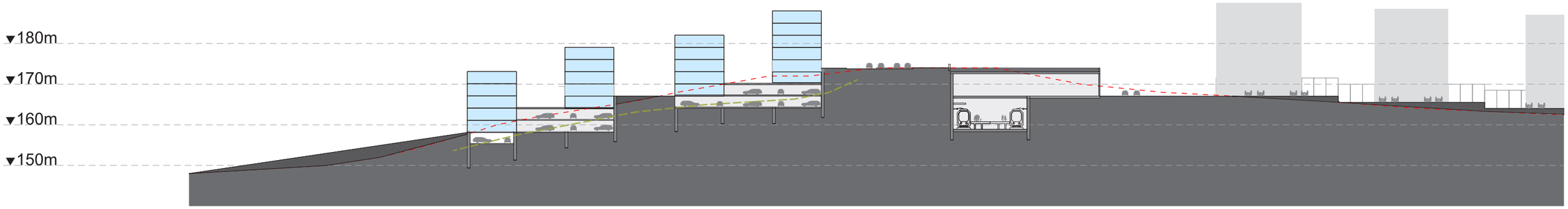
STABILISE SLOPE

The site slope's instability is due to nature of soils susceptible to erosion shrink and swell, inappropriate drainage could lead to slope instability, erosion and sediment run off

Mitigate risk by:

- Slope retaining systems - Piled walls to form basements and terraces, gravity retaining walls, earth reinforcement, shoring, soil anchors.
- Adequate drainage - piped system with retention/ detention system

The proposal is to build a new terraced profile to the slope with piled walls along terrace lines which form basements and footings for the buildings. Medium density housing is proposed for the site. A new stable ground plane is formed by cutting away most of the unstable earth/clay down the shale/rock below surface and building up a new man-made terraced landscape.
Preliminary civil engineering studies recommend that with suitable earth works, drainage and retaining systems in place site could support a medium density development



----- Existing Terrain

– – – Indicative level of rock/shale below (to be verified by Geotechnical studies)

CHERRYBROOK TOWN CENTRE
PROPOSAL PRECINCT MASTERPLAN

- Residential Buildings 3-6 Stories
- Terraces Lines
- Private Green spaces
- Public Green spaces
- 'Heart' of development
- Heritage House
- Future Development
- Site 1 Boundary
- Site 2 Boundary
- Green Roof


Future
Development

CHERRYBROOK TOWN CENTRE
PROPOSAL SITE 1

- Residential Buildings 3-6 Stories
- Terraces Lines
- Private Green spaces
- Public Green spaces
- 'Heart' of development
- Heritage House
- Future Development
- Site 1 Boundary
- Green Roof

CHERRYBROOK TOWN CENTRE
PROPOSAL
SITE 2

- Residential Buildings 3-6 Stories
- Terraces Lines
- Private Green spaces
- Public Green spaces
- 'Heart' of development
- Heritage House
- Future Development
- Site 2 Boundary
- Green Roof

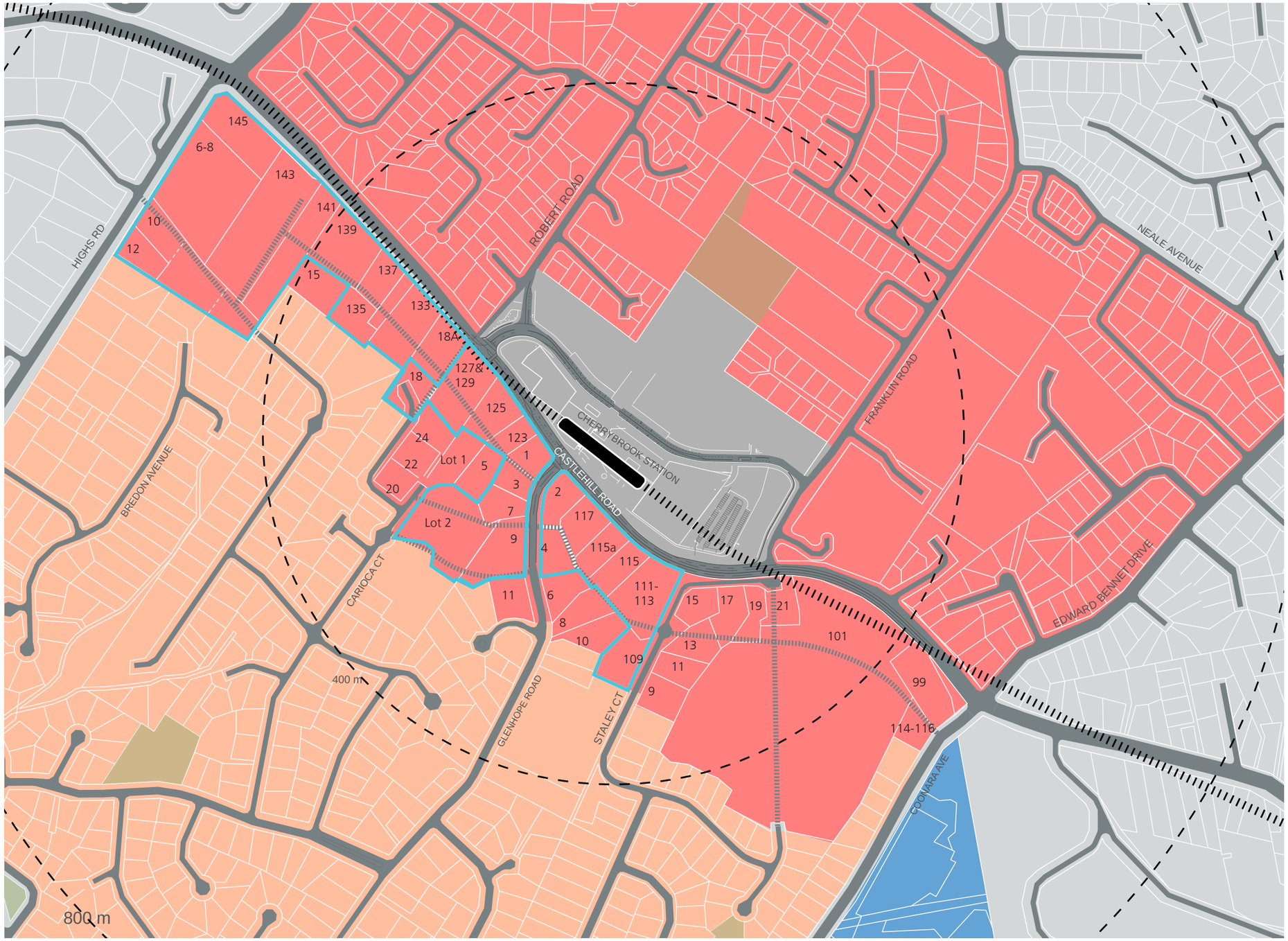
AREA IDENTIFIED FOR UPLIFT/REZONING

The site is currently zoned as E4 Environmental living. However the renewal of the West Pennant Hills and Introduction of Cherrybrook station could sustain the transformation of the locality into a low to medium density residential area.
The proposal shows a medium density 4-6 story residential developments which would mean the area would need an uplift in Zoning from E4 Environmental Living to R3 Medium Density residential.
A logical area for uplift/Rezoning may extend beyond our site boundary. The Diagram below shows the proposed areas identified for uplift/rezoning. The Lots have been chosen as they are the key lots directly opposite the station site with frontage to Castle Hill road. A new network of connecting roads has been proposed and lots either side of this new road network have also been identified as sites for potential rezoning.
The diagram on the bottom left shows the proposed rezoning as shown in the Draft North West Rail Link Corridor strategy overlaid onto this is our proposed site shown as Low/Medium Density residential.

Legend

- Study Area Boundary
- Station Platform
- Station Precinct
- Primary Road
- Secondary Road
- Low Density Residential
- Low/Medium Density Residential
- Business Park
- Mixed Use
- Open Space
- Indicative Link
- Green Link
- Cycle/Pedestrian Link
- Gateway
- Infrastructure
- School
- Proposed New Local Centre

Image - from North West Rail Link Corridor Strategy



Map showing proposed area for uplift to medium density based on North West Rail Link Corridor Strategy map.

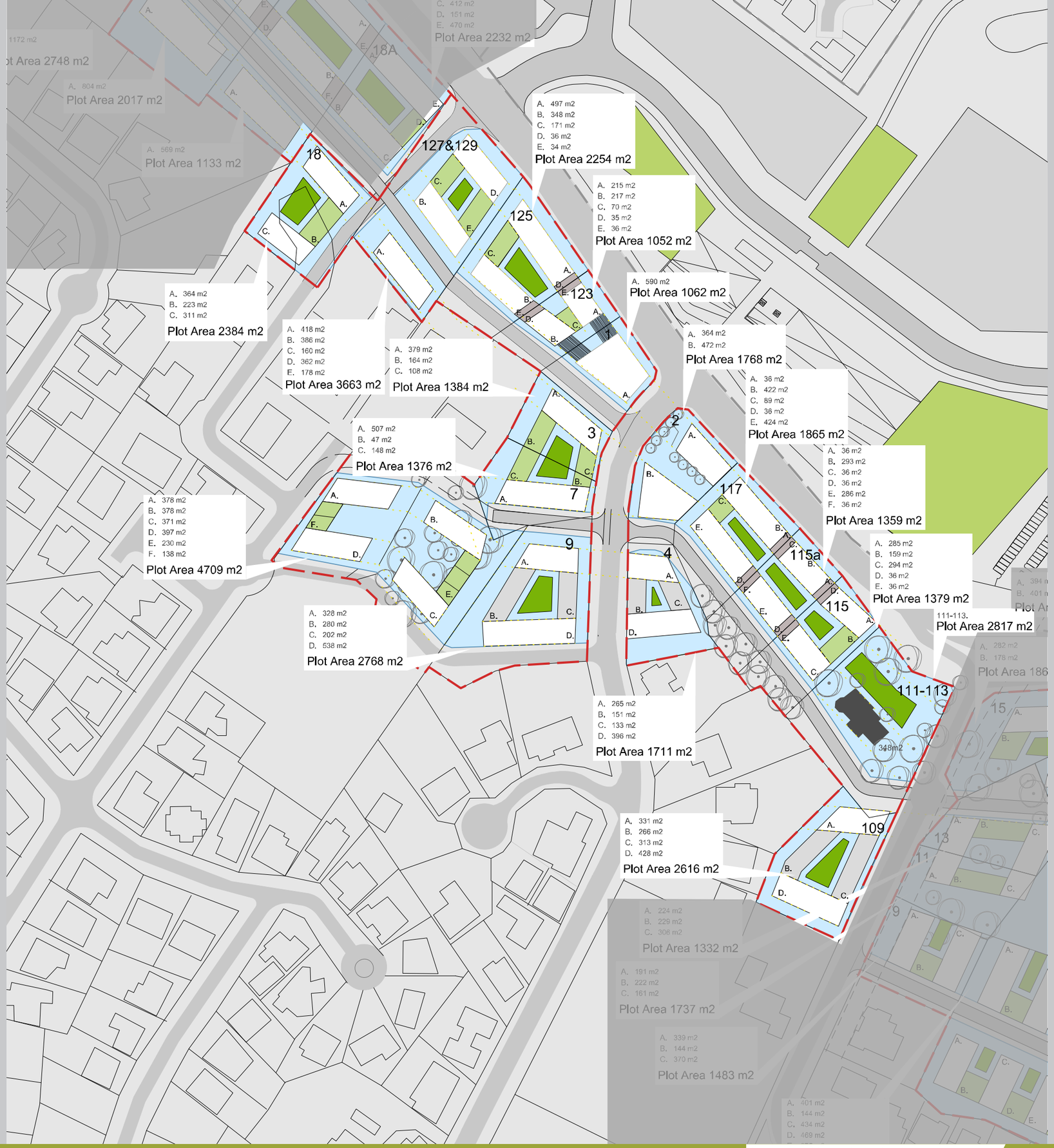
Proposed Road
Medium Density
Low Density
Site Boundary (lands included in vision statement)

CHERRYBROOK TOWN CENTRE

DENSITY STUDY

CHERRYBROOK TOWN CENTRE

PLOT + BUILDING AREAS SITE 1



CHERRYBROOK TOWN CENTRE

CHERRYBROOK DENSITY STUDIES
SITE 1

FSR 2.0:1

- 4-6 Story Blocks
- Courtyard Typology with 6 Stories on East West bars and 4 stories on North - South bars
- TOTAL GBA 81,280 sqm
- TOTAL GFA 56,896 sqm
- 611 units - 202 units/hectare (excluding heritage building)

scenario n2	Site 1																	
areas																	**TOTAL SITE AREA**	
	plot number		**18**	**127&129**	**125**	**123**	**1**	**3**	**7**	**9**	**9 11**	**2**	**4**	**117**	**115A**	**115**	**109**	**111-113**		
	overall area per plot		2418	4336	2767	1396	1578	1382	1772	3866	6994	2037	1842	2424	2018	1992	2616	3969	**39,438 m2**	(total site area)
	new plot area (not inc. roads)		2384	3663	2254	1052	1062	1384	1376	3040	4709	1768	1711	1865	1359	1379	2616	2817	**31,622 m2**	(total area not inc. roads)
	GBA bldg footprint (sqm)																	
	area in 6 story blocks		364	418	497	215	590	379	507	328	378	364	265	422	293	285	331			
			311	386	348	217				536	397	472	396	424	286	294	428			
				362	70	71					378			72	72	72				
											371									
	area in 2 story blocks		223	160	171	70		164	47	292	230		151	89	72	159	313	348		
				178				108	148	203	138		133				266		**TOTAL GBA**	**TOTAL GFA**
	floor levels (t)		6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6		
	floor levels (s)		4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4		
	GBA per plot		**4942**	**8348**	**5754**	**2872**	**3540**	**3362**	**3822**	**7164**	**10616**	**5016**	**5670**	**5432**	**3762**	**4110**	**6870**	**1392**	**81,280 m2**	**56,896 m2**
dwellings																			**NO OF UNITS** **	
																			611	
GBA/GFA efficiency	70%	GFA per plot		3459.4	5843.6	4027.8	2010.4	2478	2353.4	2675.4	5014.8	7431.2	3511.2	3969	3802.4	2633.4	2877	4809	974.4		
	mix	nsa/apartment (sqm)		quantity																
1br apartment	45%		75	21	35	24	12	15	14	16	30	45	21	24	23	16	17	29	6		
2br apartment	40%		110	13	21	15	7	9	9	10	18	27	13	14	14	10	10	17	4		
3br apartment	15%		135	4	6	4	2	3	3	3	6	8	4	4	4	3	3	5	1		
total				**37**	**63**	**43**	**22**	**27**	**25**	**29**	**54**	**80**	**38**	**43**	**41**	**28**	**31**	**52**	**10**		
gross density																				average gross density
(inc. roads)		dwellings/hct		154	145	156	155	169	183	162	139	114	185	232	169	140	155	198	26	164	HIGH DENSITY
net density																				**NO OF UNITS PER HECTARE**
(new plot area - not incl roads)				156	171	192	205	251	183	209	177	170	213	249	219	208	224	198	37	**202**	HIGH DENSITY
achieved FSR*																				**FSR**
				1.45	1.60	1.79	1.91	2.33	1.70	1.94	1.65	1.58	1.99	2.32	2.04	1.94	2.09	1.84	0.35		
																				1.9:1

*new plot area defined by concept masterplan which excludes area for road reservation on site
note: apartment no's based on70% GFA/GBA efficiency. See table below for unit mix as per Hills DCP 2012

dwellings		
	mix	gfa/apartment (sqm)
1br apartment	45%	75
2br apartment	40%	110
3br apartment	15%	135

Unit mix as per Hills DCP 2012

CHERRYBROOK DENSITY STUDIES
SITE 2

FSR 2.0:1

- 4-6 Story Blocks
- Courtyard and bar building form
- TOTAL GBA 91,356 sqm
- TOTAL GFA 63,949 sqm
- 687 units - 225 units/hectare (excluding parkland)

	Cherrybrook Yield Summary															
scenario n1	**Site 2**															
areas															**TOTAL SITE AREA**	
	plot number		**18a**	**133**	**135**	**137**	**143**	**141A**	**1 45**	**6,8**	**10**	**12**	**139**	**141**		
	overall area per plot		2892	4266	2534	2103	10315	2748	4890	11319	7343	1912	4606	2180	**50,322 m2**	(total site area)
	new plot area (not inc. roads)*		2232	2515	2017	2837	5339	2666	3457	3628	3655	1912	4571	2150	**30,258 m2**	(total area not inc. ro
	GBA bldg footprint (sqm)															
	area in 6 story blocks		412	443	804	533	574	1172	926	797	242	379				
			470	464		501	476		631	750	216	281				
			148	144		153	398				380					
				148			300				295					
				569			215				322					
							131									
	area in 2 story blocks		151			218	178		245	239	228	216	468			
							162		228	226	144				**TOTAL GBA**	**TOTAL GFA**
							110				144					
							110									
							125									
							204									
	floor levels (t)		6	6	6	6	6	6	6	6	6	6				
	floor levels (s)		4	4	4	4	4	4	4	4	4	4	4			
	GBA per plot		**6,784 m2**	**10,608 m2**	**4,824 m2**	**7,994 m2**	**16,120 m2**	**7,032 m2**	**11,234 m2**	**11,142 m2**	**10,794 m2**	**4,824 m2**	**1,872 m2**	**0 m2**	**91,356 m2**	**63,949 m2**
dwellings															**NO OF UNITS** **	
															687	
GBA/GFA efficiency	70%	GFA per plot		4749	7426	3377	5596	11284	4922	7864	7799	7556	3377	1310	0	
	mix	nsa/apartment (sqm)	quantity													
1br apartment	45%		75	28	45	20	34	68	30	47	47	45	20	8	0	
2br apartment	40%		110	17	27	12	20	41	18	29	28	27	12	5	0	
3br apartment	15%		135	5	8	4	6	13	5	9	9	8	4	1	0	
total				**51**	**80**	**36**	**60**	**121**	**53**	**85**	**84**	**81**	**36**	**14**	**0**	
gross density															average gross density	
(inc. roads)		dwellings/hct		176	187	143	286	118	193	173	74	111	190	31		165 HIGH DENSITY
net density															**NO OF UNITS PER HECTARE**	
(new plot area - not incl roads)				229	317	180	212	227	198	244	231	222	190	31		**225** HIGH DENSITY
achieved FSR*															**FSR**	
				2.13	2.95	1.67	1.97	2.11	1.85	2.27	2.15	2.07	1.77	0.29	0.00	
															2.1:1	

*new plot area defined by concept masterplan which excludes area for road reservation on site
note: apartment no's based on70% GFA/GBA efficiency. See table below for unit mix as per Hills DCP 2012

CHERRYBROOK DENSITY STUDIES
SITE 1

FSR 1.5:1

- 2-5 Story Blocks
- Courtyard Typology with 5 Stories on East West bars and 2 stories on North - South bars
- TOTAL GBA 64,458 sqm
- TOTAL GFA 45,121 sqm
- 486 units - 161 units/hectare

scenario n3	**Site 1**																		
areas																		**TOTAL SITE AREA**	
		plot number	**18**	**127&129**	**125**	**123**	**1**	**3**	**7**	**9**	**9 11**	**2**	**4**	**117**	**115A**	**115**	**109**	**111-113**	
		overall area per plot	2418	4336	2767	1396	1578	1382	1772	3866	6994	2037	1842	2424	2018	1992	2616	3969	**39,438 m2** (total site area)
		new plot area (not inc. roads)	2384	3663	2254	1052	1062	1384	1376	3040	4709	1768	1711	1865	1359	1379	2616	2817	**31,622 m2** (total area not inc. roads)
		GBA bldg footprint (sqm)																	
		area in 5 story blocks	364	418	497	215	590	379	507	328	378	364	265	422	293	285	331		
			311	386	348	217				536	397	472	396	424	286	294	428		
				362	70	71					378			72	72	72			
											371								
		area in 2 story blocks	223	160	171	70		164	47	292	230		151	89	72	159	313	348	
				178				108	148	203	138		133				266		**TOTAL GBA** **TOTAL GFA**
		no of floors (t)	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
		no of floors (s)	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
		GBA per plot	**4267**	**6826**	**4567**	**2300**	**2950**	**2439**	**2925**	**5310**	**8356**	**4180**	**4725**	**4408**	**3039**	**3213**	**4953**	**696**	**64,458 m2** **45,121 m2**
dwellings																			**NO OF UNITS** **
																			486
GBA/GFA efficiency	70%	GFA per plot	2986.9	4778.2	3196.9	1610	2065	1707.3	2047.5	3717	5849.2	2926	3307.5	3085.6	2127.3	2249.1	3467.1	487.2	
	mix	nsa/apartment (sqm)	quantity																
1br apartment	45%	75	18	29	19	10	12	10	12	22	35	18	20	19	13	13	21	3	
2br apartment	40%	110	11	17	12	6	8	6	7	14	21	11	12	11	8	8	13	2	
3br apartment	15%	135	3	5	4	2	2	3	2	4	6	3	4	3	2	2	4	1	
total			**32**	**51**	**34**	**17**	**22**	**19**	**22**	**40**	**63**	**31**	**36**	**33**	**23**	**24**	**37**	**5**	
gross density																			average
(inc. roads)		dwellings/hct	133	118	124	124	141	139	124	103	90	154	193	137	113	121	142	13	130 MEDIUM-HIGH DENSITY
net density																			**NO OF UNITS PER HECTARE**
(new plot area - not incl roads)		dwellings/hct	135	140	152	164	209	138	160	131	133	178	208	178	168	175	142	19	**161** MEDIUM-HIGH DENSITY
achieved FSR*																			**FSR**
			1.25	1.30	1.42	1.53	1.94	1.23	1.49	1.22	1.24	1.65	1.93	1.65	1.57	1.63	1.33	0.17	
																			1.5:1

*new plot area defined by concept masterplan which excludes area for road reservation on site
note: apartment no's based on70% GFA/GBA efficiency. See table below for unit mix as per Hills DCP 2012

dwellings		
	mix	gfa/apartment (sqm)
1br apartment	45%	75
2br apartment	40%	110
3br apartment	15%	135

Unit mix as per Hills DCP 2012

CHERRYBROOK DENSITY STUDIES
SITE 2

FSR 1.5:1

- 2-5 Story Blocks
- Courtyard and bar building form
- TOTAL GBA 64,912 sqm
- TOTAL GFA 45,438 sqm
- 488 units - 163 units/hectare (excluding heritage building)

scenario n2	**Site 2**															
areas														**TOTAL SITE AREA**		
		plot number		**18a**	**133**	**135**	**137**	**143**	**141A**	**1 45**	**6,8**	**10**	**12**	**139**	**141**		
		overall area per plot		2892	4266	2534	2103	10315	2748	4890	11319	7343	1912	4606	2180	**50,322 m2**	(total site area)
		new plot area (not inc. roads)*		2232	2515	2017	2837	5339	2666	3457	3628	3655	1912	4571	2150	**36,979 m2**	(total area not inc. roads)
		GBA bldg footprint (sqm)															
		area in 6 story blocks		412	443	804	533	574	1172	926	797	242	379				
				470	464		501	476		631	750	216	281				
				148	144		153	398				380					
					148			300				295					
					569			215				322					
								131									
		area in 2 story blocks		151			218	178		245	239	228	216	468			
								162		228	226	144				**TOTAL GBA**	**TOTAL GFA**
								110				144					
								110									
								125									
								204									
		floor levels (t)		5	5	6	5	5	5	5	5	5	5				
		floor levels (s)		2	2	4	2	2	2	2	2	2	2	2			
		GBA per plot		**5,452 m2**	**5,995 m2**	**4,824 m2**	**6,371 m2**	**12,248 m2**	**5,860 m2**	**8,731 m2**	**8,665 m2**	**3,034 m2**	**3,732 m2**	**936 m2**	**0 m2**	**64,912 m2**	**45,438 m2**
dwellings																**NO OF UNITS** **	
																488	
GBA/GFA efficiency	70%	GFA per plot		3816	4197	3377	4460	8574	4102	6112	6066	2124	2612	655	0		
	mix	nsa/apartment (sqm)	quantity														
1br apartment	45%		75	23	25	20	27	51	25	37	36	13	16	4	0		
2br apartment	40%		110	14	15	12	16	31	15	22	22	8	9	2	0		
3br apartment	15%		135	4	5	4	5	10	5	7	7	2	3	1	0		
total				**41**	**45**	**36**	**48**	**92**	**44**	**66**	**65**	**23**	**28**	**7**	**0**		
gross density																average gross density	
(inc. roads)		dwellings/hct		142	106	143	228	89	160	134	58	31	147	15		122	HIGH DENSITY
net density																**NO OF UNITS PER HECTARE**	
(new plot area - not incl roads)				184	179	180	169	173	165	190	180	62	147	15		**163**	HIGH DENSITY
achieved FSR*																**FSR**	
				1.71	1.67	1.67	1.57	1.61	1.54	1.77	1.67	0.58	1.37	0.14			
																1.5:1	

*new plot area defined by concept masterplan which excludes area for road reservation on site
note: apartment no's based on70% GFA/GBA efficiency. See table below for unit mix as per Hills DCP 2012

dwellings		
	mix	gfa/apartment (sqm)
1br apartment	45%	75
2br apartment	40%	110
3br apartment	15%	135

Unit mix as per Hills DCP 2012

Precedent Images - Density Comparisons

Grand Large Neptune, Dunkirk, France

3 STORIES

Spencer Lane Apartments, Alexandria, Sydney- Grimshaw

4 STORIES

Kronsberg, Hanover, Germany

4 STORIES

Sluseholmen, Copenahgen, Denmark

5 STORIES

Mont Orchid, Singapore

6 STORIES

Low2No, Helsinki

8+ STORIES

04_
CHERRYBROOK TOWN CENTRE VISUAL IMPACT

VISUAL IMPACT
01_FIRST FLEET AVE

View of development from First Fleet Avenue

A Study was undertaken to determine the vantage points around the local area from which the proposed develoment could be seen. It was difficult to find locations within the public domain i.e along the streets, with a significant view of the proposal. Due to the undulating landscape and dense folliage to the south of the site, views uphill towards the proposal are limited. During the following stages of the masterplanning and design of the area a more detailed study would be undertaken to determine visual impact from these areas.

We have identified 3 points from which the development would be visible:

1. From First Fleet Avenue
2. From Glenhope Avenue
3. From Carioca Court

VISUAL IMPACT
02_GLENHOPE AVE

View of development from Glenhope Avenue

VISUAL IMPACT
03_CARIOCA COURT

View of development from Carioca Ct

APPENDIX A
LAND STABILISATION REVIEW

Civil

Land Stabilisation - Overview
Cherrybrook Town Centre Masterplan

for WOW Developments

8 May 2013 - Rev 3

131303

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Quality
ISO 9001
SAI GLOBAL

TABLE OF CONTENTS

1.0 Introduction

The site is situated in West Pennant Hills within the North West of one of Sydney's strategic growth areas. The entire site is within a 400m radius of Cherrybrook station. The total site area is 5.0ha and currently is in 15 lots with single dwellings. Future development will see densification from single dwellings blocks to medium density and mixed use developments.

The vision is to develop the site as a medium density residential precinct with improvements to the public domain. This will provide a high quality urban renewal outcome for the site and provides high levels of amenity and design excellence with good public transport access and connections to local and regional services and employment centers.

The land has been identified as having slope instability which will need to be managed to ensure future development mitigates land slip risk.

Information is referenced directly from Geotechnical reports by Soil Conservation Services of N.S.W (1977), Shirley Consulting (2003), Martens Consulting (2011)

1.1 Land Stabilisation

Slope instability in the Cherrybrook area is due to nature of the soils in that they are susceptible to erosion, shrink and swell. Inappropriate drainage practices contribute to erosion and slope instability, in addition to sediment runoff into water system. Retaining and earthworks methods are important when considering land slip risk mitigation.

1.1.1 Methodology

To mitigate the risk from land slide any new development in Cherrybrook will have to consider the scale, depth and type of development (high rise – deep basements) for the sites. There are many slope retaining systems that are considered appropriate; gravity retaining walls, earth reinforcement, shoring, soil anchors and piled walls etc. Each system has benefits and drawbacks. Anyone of these systems can be appropriately incorporated into a proposed development. Further, the suitability of earthworks construction methods need to be considered as incorrect methods can lead to slope failure.

Drainage, groundwater and overland flow management will need to be managed to prevent slope instability. As the site is underlain by reactive clays, shrink and swell would be expected without incorporation of controls.

1.1.2 Drainage

Surface stormwater drainage will need to be captured into a piped system or managed in a suitable way (retention / detention system) to minimise the effects of erosion and reduce slope instability risk. Stormwater has the potential to erode soil from banks and hillside areas, in addition to swell and shrink clay subgrade.

1.1.3 Groundwater

Subsurface development and vegetation removal will impact on groundwater flow. Groundwater if incorrectly dealt with can cause slope failure. For any new development a subsurface drainage system will ensure groundwater is suitably collected and conveyed away from slopes and building basements into a piped stormwater system.

1.1.4 Overland flow

As with groundwater, overland flow of upstream catchments need to be diverted or collected (or both) to ensure impact on slope instability and buildings is minimised. Overland flow is best controlled by using streets and gravity for flow control and eventually discharging into watercourses.

2.0 CONCLUSION

With suitable earthworks, drainage and retaining systems in place, new medium density development in Cherrybrook is feasible.

Cherrybrook land can be suitably stabilised for development with medium density buildings and can be constructed with appropriate engineering of structures and hydraulic services.

3.0 REFERENCES

Soil Conservation Services of N.S.W: Urban Capability Study: West Pennant Hills, February 1977.

Shirley Consulting Engineers: Geotechnical Report on proposed Lot No. 1 in a subdivision of Lot No. 302 DP 812860 Carioca Court, West Pennant Hills, 19 June 2003

Martens Consulting Engineers: Supplementary Geotechnical Assessment: Proposed Subdivision of Lot 2 DP 1057556, Carioca Court, West Pennant Hill, 25 February 2011

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Technical Director

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