GREEN SQUARE CONSORTIUM
AND LANDCOM

PLANNING PROPOSAL: TRANSPORT REPORT FOR PROPOSED TOWN CORE SITES WITHIN THE GREEN SQUARE TOWN CENTRE

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1. INTRODUCTION

1.1 Colston Budd Hunt and Kafes Pty Ltd has been commissioned by Green Square Consortium and Landcom to review the transport planning aspects of the proposed town core sites within the Green Square Town Centre. The report has been prepared in association with a planning proposal to amend the South Sydney Local Environmental Plan 1998 and South Sydney Development Control Plan 1997 for the development of these sites.

1.2 The location of the Green Square Town Centre is shown on Figure 1. The town centre is located some 4.5km south of the Sydney CBD, between the CBD and Sydney Kingsford Smith Airport, and forms part of the larger Green Square Urban Renewal Area.

1.3 A major part of the Green Square Town Centre is located on three existing sites and includes land bounded by Bourke Street, Botany Road, Portman Street, Portman Lane and a new southern cross street (between Portman Street and Botany Road), as shown on Figure 2. This area forms part of the town centre core and in accordance with the Green Square Town Centre Masterplan, the town core sites within subject land include development sites 5, 7, 8, 15, 16, 17, 18 and 19.

1.4 The proposed amendments to the South Sydney Local Environmental Plan 1998 and South Sydney Development Control Plan 1997 would allow additional floor space and building height on some of the sites, as well as altering the mix of land uses. The planning proposal would also provide the basis for staged development of a major part of the town centre. The increase in floor area of the town core

sites, associated with the planning proposal, would be some 40,538m^2 commercial, some 17,922m^2 residential and some 3,520m^2 retail area. This would result in a total provision for these sites of some 58,943m^2 commercial, some 148,514m^2 residential apartments, some 15,623m^2 retail area, plus associated car parking, public precincts, community facilities and other public amenities.

1.5 Traffic reports[1][2][3] for the proposed Green Square Town Centre Masterplan have previously been prepared. These studies, as well as another study[4] undertaken for Council, examine the requirements for road and transport changes in the area to accommodate development of the town centre.

1.6 The overall transport implications of the Green Square Town Centre have therefore been previously assessed. This report reviews the transport planning aspects of the proposed modifications to the identified town core sites within the town centre, through the following chapters:-

- Chapter 2 - providing background information; and
- Chapter 3 - assessing the implications of the planning proposal.

[1] "Green Square Town Centre Masterplan Review", prepared for Lancom by Mason Wilson Twiney, June 2008

[2] "Green Square Town Centre Masterplan Transport Report", prepared for Lancom by Mason Wilson Twiney, May 2006.

[3] "Green Square Town Centre Masterplan Transport Report", prepared for Landcom by Mason Wilson Twiney, October 2002.

[4] "Zetland Area Traffic Study", prepared for South Sydney Development Corporation, City of Sydney and Roads and Traffic Authority by Maunsell, November 2004.

2. BACKGROUND INFORMATION

Site Location

2.1 The location of the Green Square Town Centre is shown on Figure 1. The town centre is located some 4.5km south of the Sydney CBD, between the CBD and Sydney Kingsford Smith Airport, and forms part of the larger Green Square Urban Renewal Area. Green Square Railway Station is located immediately to the west of the town centre, adjacent to Botany Road, on development site 1. The site is also well serviced by buses which currently operate through the Green Square area with the main focus of these services being along Botany Road and Bourke Street. The site therefore has good access to existing public transport.

2.2 A major part of the town centre is located on three key sites. These sites include the former Waterloo incinerator site, the NSW police site and the former Bourke Street depot site. These sites represent the core of the town centre and include land bounded by Bourke Street, Botany Road, Portman Street, Portman Lane and a new southern cross street (between Portman Street and Botany Road), as shown on Figure 2. In accordance with the Green Square Town Centre Masterplan, the town core sites within the town centre include development sites 5, 7, 8, 15, 16, 17, 18 and 19.

Road Network

2.3 Major roads in the area include South Dowling Street, O'Riordan Street, Botany Road, Bourke Road/Bourke Street, Wyndham Street, O'Dea Avenue, Joynton Avenue and Epsom Road. Other roads include Elizabeth Street, Portman Street, Hansard Street and a number of laneways through or adjacent to the site.

2.4 South Dowling Street is a major north-south link in Sydney's arterial road network, connecting Southern Cross Drive from the airport with the City. South of O'Dea Avenue it provides a freeway standard, six lane divided carriageway with grade separated intersections and interchange facilities at major junctions. Access between South Dowling Street and the Green Square Town Centre is provided via Epsom Road/Link Road (via a left in/left out arrangement) and O'Dea Avenue (via a signalised intersection with South Dowling Street/Todman Avenue). North of O'Dea Avenue, South Dowling Street provides two surface traffic lanes in each direction either side of the Eastern Distributor, clear of intersections.

2.5 The Eastern Distributor extends from South Dowling Street in tunnel structure north of O'Dea Avenue. It provides two northbound and two southbound traffic lanes with grade separated intersections and interchange facilities at major junctions.

2.6 O'Riordan Street and Botany Road provide north-south arterial road links through the area. O'Riordan Street links Green Square in the north with Mascot and Sydney Airport in the south. Botany Road forms part of a route linking the city with Botany. Both roads generally provide four lane undivided carriageways with two traffic lanes in each direction. Clearways operate in peak periods in the direction of peak traffic flow (both directions on O'Riordan Street). Outside clearway hours, parking is permitted clear of intersections in some sections. Both roads provide access to adjacent commercial and industrial properties.

2.7 Bourke Street runs east from Botany Road and provides access to commercial and industrial properties. It generally provides a four lane undivided carriageway with two traffic lanes in each direction and peak period clearways in both directions. The intersection of Bourke Street with Botany Road, O'Riordan Street and Bourke Road is controlled by traffic signals. Right turns from Botany Road

(southbound), Bourke Street (westbound) and O'Riordan Street (northbound) are not permitted.

2.8 Bourke Road and Wyndham Street provide undivided carriageways with one traffic lane and one parking lane in each direction, clear of intersections. Both roads provide access to commercial and industrial properties. The intersection of Bourke Road with Wyndham Street is controlled by traffic signals. Right turns from Bourke Road south into the link to O'Riordan Street, and right turns from the link east into Bourke Road, are not permitted.

2.9 O'Dea Avenue connects South Dowling Street with Bourke Street. Both intersections are signalised. It provides one to two traffic lanes in each direction, clear of intersections. There are bus stops on both sides of the road. O'Dea Avenue provides access to commercial and industrial development.

2.10 Joynton Avenue connects O'Dea Avenue in the north with Epsom Road in the south. Both intersections are signalised. At the Joynton Avenue/Epsom Road intersection, Rothschild Avenue forms a fourth (southern) approach. Joynton Avenue generally provides one traffic lane and one parking lane in each direction, clear of intersections. It provides access to commercial and industrial development.

2.11 Epsom Road is south of the site and, with Link Road, provides an east-west connection between South Dowling Street and Botany Road. It provides one traffic lane and one parking lane in each direction, clear of intersections. Bus stops are provided on both sides of the road. The intersection of Epsom Road with Botany Road is controlled by traffic signals.

2.12 Elizabeth Street runs north-west from Joynton Avenue and provides access to commercial, industrial and residential properties. It has an unsignalised t-intersection with Joynton Avenue. Traffic calming facilities are provided and a three tonne load limit applies in the southern section.

2.13 Portman Street connects Bourke Street in the north with Hansard Street in the south. It provides access to residential development in the northern part and commercial and industrial development in the southern part. Its intersections with Bourke Street and Hansard Street are priority controlled.

2.14 Hansard Street connects Joynton Avenue with Botany Road. Turns at the Botany Road intersection are restricted to left only onto Botany Road. Hansard Street provides one traffic lane and one parking lane in each direction. It provides access to residential, commercial and industrial properties.

2.15 There are a number of laneways in the town centre, including Christies Lane, Portman Lane, Navins Lane, Tosh Lane and Chester Lane. These laneways basically provide access to properties fronting adjacent streets.

Regional Traffic Context

2.16 The main arterial traffic routes servicing the Green Square Town Centre include Botany Road, Bourke Street, Bourke Road, O'Riordan Street, Elizabeth Street and Wyndham Street. These are important traffic routes in the RTA's regional road network.

2.17 A review of RTA's latest published traffic data found that in 2005, these roads carried the following two-way (sum of both directions) daily traffic volumes:-

- Botany Road, south of Bourke Street, some 22,590 vehicles;
- Bourke Road, north of O'Riordan Street, some 17,440 vehicles;
- Bourke Street, north of Lachlan Street, some 16,550 vehicles;
- Elizabeth Street at Bourke Street, some 27,880 vehicles;
- O'Dea Avenue, east of Joynton Avenue, some 15,950 vehicles;
- O'Riordan Street, north of Johnson Street, some 21,970 vehicles; and
- Wyndham Street, north of Bourke Road, some 11,820 vehicles.

2.18 These figures show that the highest traffic flows in the area occur on Elizabeth Street, O'Riordan Street and Botany Road with some 20,000 to 30,000 vehicles per day two-way. Bourke Road, Bourke Street, O'Dea Avenue and Wyndham Street carried some 10,000 to 20,000 vehicles per day.

2.19 The RTA has investigated a plan to convert Botany Road and Wyndham Street north of Green Square into a one-way pair in order to extend the Southern Arterial route from Raglan Street/Henderson Street in Redfern southwards to Green Square. O'Riordan Street would then form the continuation of this route southwards to the airport. This proposal was investigated in the "Green Square Road Hierarchy and Traffic Study". The RTA has decided not to proceed with the plan and has prepared an alternative detailed scheme to upgrade the intersections of Bourke Street with Botany Road, O'Riordan Street and Wyndham Street, in order to provide additional capacity and a configuration that would be compatible with the proposed development of the town centre.

2.20 The "Green Square Road Hierarchy and Traffic Study" also recommended the development of an east-west arterial route on Lachlan Street, McEvoy Street and Euston Street to provide a connection between the Eastern Distributor/South Dowling Street and Princes Highway. This is needed to infill the incomplete

arterial road system in the area and to provide an alternative route across the area that allows some traffic to avoid Green Square.

2.21 Other regional measures recommended included:-

- provision of a full interchange with the Eastern Distributor at Epson Road/Link Road in Rosebery;
- upgrade South Dowling Street intersections between Cleveland Street and Link Road;
- extend Short Street from Elizabeth Street to Bourke Street to line up with O'Dea Avenue;
- develop relief routes around Green Square using Joynton Avenue (to the east) and a new east-west link between Botany Road and Bourke Road (to the south); and
- conduct a Sydney Airport gateway traffic study to resolve the future management of traffic on Botany Road and O'Riordan Street south of Green Square plus other traffic access issues relating to Sydney Airport and development around Mascot Station.

2.22 The "Zetland Area Traffic Study" analysed the impact of the one-way on Botany Road and Wyndham Street, the proposed east-west link road and the opening of Short Street. The traffic management option chosen excluded conversion of Botany Road and Wyndham Street to a one-way pair and the opening of Short Street west of Bourke Street. It included the east-west link along East-West

Boulevard and New Cross Street as a proposed collector road. Other road network and transport improvements included:-

- additional turn lanes at the intersections of South Dowling Street with O'Dea Avenue/Todman Avenue and Lachlan Street/Dacey Avenue;
- upgrades to Lachlan Street/McEvoy Street route, including realigning McEvoy Street to align with Lachlan Street, providing three traffic lanes in each direction;
- upgrades to Epsom Road, including providing four travel lanes, upgrades to intersections and introducing signalised pedestrian crossing between Botany Road and Joynton Avenue;
- upgrades to Bourke Street, including providing two travel lanes in each direction, bus priority at the Crescent Street intersection and upgrade to the Elizabeth Street intersection;
- providing a signalised pedestrian crossing at Elizabeth Street/Short Street; and
- other modifications on Botany Road and internal roads and intersections within the town centre.

2.23 The Green Square Town Centre DCP identifies the following traffic and transport requirements:-

- a new collector route linking Joynton Avenue with Botany Road, south of site 15, east and south of site 19 and north of site 9, including signalised intersections at Joynton Avenue and Botany Road;

- bus stops along the new collector road, and on Botany Road;
- a new local street network to serve the various development sites within the town centre;
- a town centre east-west Civic Plaza running east from Green Square Station and Botany Road;
- new pedestrian signals on Botany Road at the plaza;
- opportunity for possible pooled car parking underneath the plaza;
- a possible high capacity transport corridor along the plaza and new collector road alignment; and
- cycleways along Botany Road, Portman Street, Joynton Avenue, Bourke Street and the new collector road through the town centre.

2.24 The measures identified in the DCP are shown in Figure 6.1 from the DCP. These are shown on the transport structure plan, as shown in Figure 3.

Public Transport Services

2.25 Pedestrian facilities are provided at all signalised intersections within the town centre, although some of the intersections do not provide crossings at all approaches. Footpaths are provided on both sides of the road on all major streets. As resident and workforce population densities increase, the number of pedestrians in the area is expected to increase.

2.26 A number of streets are designated as bicycle routes. These include Portman Street, George Street, Joynton Avenue, Botany Road, Hansard Street, Dunning Avenue and Epsom Road.

2.27 As previously discussed, the site is located immediately adjacent to Green Square Railway Station. Green Square is on the Airport and East Hills Lines (Macarthur – City via Airport and Sydenham).

2.28 Services through Green Square operate on typical headways of five to 10 minutes in each direction during peak periods and 10 to 15 minutes in each direction outside peaks. Passengers can transfer to and from other parts of the rail system at various locations, notably at Central. City Rail expects to gradually increase services through the Green Square Railway Station from about 8 trains per hour in each direction to about 16 trains per hour by 2016. This will increase rail services to cater for the expected demand for Green Square.

2.29 Bus services in the area are provided by Sydney Buses. Buses operate primarily along Botany Road, but also along Epsom Road, O'Dea Avenue, Bourke Street and Joynton Avenue. There are bus stops on both sides of Botany Road adjacent to the railway station. Bus services include routes:

- 301 – Eastgardens, Rosebery, City;
- 302, 303 – Eastgardens, Sans Souci, Kensington, City;
- 309, 310 – Port Botany, Eastgardens, City; and
- 370 – Leichhardt, Newtown, Randwick, Coogee.

2.30 Bus services through the area tend to be in a north-south orientation with the greatest concentration along Botany Road. There are however east-west bus services through the area on McEvoy Street and on Epsom Road. Currently,

buses travelling through the area are restricted by on road traffic conditions particularly during the morning and afternoon peak periods.

2.31 In the future, to serve increasing patronage due to new development in the area. STA proposes an incremental service improvement strategy that will:-

- offer residents travel choice;
- strengthen main service corridors including Botany Road, Elizabeth Street/Joyntan Avenue/Rothschild Avenue, McEvoy Street/Euston Road and Epsom Road, Gardeners Road;
- develop more direct connections from Green Square to major destinations;
- develop an integrated bus stop and pedestrian network plan; and
- facilitate pedestrian connections at Green Square and St. Peters Railway Stations.

2.32 Overall, the site has good access to existing public transport services. As will be discussed in Chapter 3, the proposed development represents an opportunity to strengthen demand for existing public transport and improve connectivity and infrastructure for public transport. A public transport strategy has been developed to encourage the use of public transport and minimise travel by private vehicles as follows:-

- provide a mix of employment and residential uses with a range of local facilities and services;

- improve the quality of services to minimise the need to travel by private vehicle; and

- apply a restrictive parking policy to avoid excessive resident parking, contain employee car travel and constrain car usage to levels consistent with the planned capacity of the road system.

3. TRANSPORT IMPLICATIONS OF THE PLANNING PROPOSAL

3.1 The planning proposal seeks to amend the South Sydney Local Environmental Plan 1998 and the South Sydney Development Control Plan 1997 to allow additional floor space and building height on the town core sites within the Green Square Town Centre, as well as alter the mix of land uses. The proposed increase in floor area of the town core sites, associated with the planning proposal, would be some 40,538m^2 commercial, some 17,922m^2 residential and some 3,520m^2 retail area.

3.2 The scale of development therefore envisaged for the town centre core sites includes a total of some 58,943m^2 commercial, some 148,514m^2 residential apartments, some 15,623m^2 retail area, plus associated car parking, public precincts, community facilities and other public amenities.

3.3 For the purpose of our assessment, the residential component of the planning proposal has been assumed to be some 1,580 residential apartments comprising some 476 studio/one bedroom units, 819 two bedroom units and 285 three bedroom units.

3.4 The planning proposal will rely on the City of Sydney to deliver the essential infrastructure, as contemplated in the Infrastructure Strategy.

3.5 From a transport perspective the proposed modifications to the town core sites within the Green Square Town Centre are generally consistent with the Green Square Town Centre Guidelines and the Green Square Transport Structure Plan. The planning proposal includes a new retail loop road, the provision of bus services through the Civic Plaza and the realignment of the east-west collector

road to the south of the Boulevard Park. The proposed new retail loop road within the town core creates improved connectivity, linking the northern and southern parts of the town centre. The retail loop road encourages pedestrian movements across the public domain and through the town centre. It does this by activating pedestrian access through the town centre civic plaza and promotes a finer grain road network with improved vehicular and pedestrian connectivity.

3.6 The provision of bus services through the town centre civic plaza will better provide for public transport uses along the main east-west public transport corridor. These services would link to Green Square Railway Station via bus stops at the western end of the Civic Plaza and through traffic signals onto Botany Road.

3.7 This chapter reviews the transport aspects of the proposed modifications to the identified town core sites within the town centre, through the following sections:-

- public transport;
- pedestrians and cyclists;
- work place travel plan;
- parking provision;
- road layout;
- access, car parking layout and internal circulation;
- service vehicles;
- traffic generation and effects; and
- summary.

Public Transport

3.8 As discussed in previous CBHK and MWT reports, the site has good access to existing bus and rail services and will benefit from significant planned

improvements in the future. The Green Square Town Centre Masterplan Transport Report has been prepared to promote accessibility to and within the Green Square redevelopment area. It examines mode split targets and sustainable means of transport such as public transport, walking and cycling. The study recommends a two-pronged strategy to encourage a mode switch to public transport, by the provision of sufficient services and infrastructure (as set out below), and a restrictive parking policy to minimise the use of private vehicles.

3.9 The DCP parking controls for Green Square have been adopted and will form the planning framework for the allocation of maximum car parking rates, whilst the railway station at Green Square and major bus routes through the area provide the spine of the public transport network.

Rail

3.10 Green Square Station is connected to the main part of the town core by on-grade connection.

3.11 As noted in Chapter 2, CityRail expects to increase services through the Green Square Railway Station from about 8 services per hour in each direction to about 16 service per hour by 2016. This will significantly improve capacity on the rail network and will increase rail services to cater for the expected demand for Green Square.

Buses

3.12 Bus services currently operate through the Green Square area with the main focus of these services being along Botany Road. In association with the proposed

Green Square Town Centre development these services will be strengthened with new routes developed through the emerging residential and employment areas to the east of the town centre and provide more east-west cross regional routes.

3.13 Existing and new bus routes will link to rail services at Green Square station. It is proposed to achieve this by providing bus stops on each side of Botany Road at the station. In addition, new east-west cross regional bus routes would operate along the East West Boulevarde and through the Civic Plaza public domain. These services would link to the station via bus stops at the western end of Civic Plaza and traffic signals onto Botany Road. These will be provided in accordance with the requirements of the RTA and Sydney Buses.

3.14 Sydney Buses continually reviews its bus strategies in emerging areas and proposes to augment and adjust services as the area develops.

Summary

3.15 Thus the proposal provides opportunities to strengthen demand for existing services and provides appropriate access to the centre by public transport. Increasing retail, employment and residential densities close to existing and proposed services is consistent with government policy and planning principles of:-

a) improving accessibility to housing, employment and services by walking, cycling and public transport;

b) improving the choice of transport and reducing dependence solely on cars for travel purposes;

c) moderating growth in the demand for travel and the distances travelled especially by car; and

d) supporting the efficient and viable operation of public transport services.

3.16 As discussed in the following sections, the proposal also addresses the aims of government policy through:-

- improving pedestrian linkages within the town centre and to surrounding developments;

- a work place travel plan to encourage travel modes other than private vehicle;

- providing a restrictive parking policy (in accordance with state and local controls), to minimise the use of private vehicle and encourage the use of public transport.

Pedestrians and Cyclists

3.17 The pedestrian network serving the town centre comprises two main components. The first of these is the traditional network of footpaths on the street network. The second component is a separate off-street network of through site links which will be developed through the proposed staging of the town centre.

3.18 A series of pedestrian paths will be developed through the town centre linking the commercial, retail and residential precincts to car parking, public transport facilities and access to the surrounding pedestrian network.

3.19 Primary and secondary pedestrian movements will be developed, with primary pedestrian routes provided through the Civic Place and public domain areas linking to the station and public transport facilities. Secondary pedestrian routes will be developed adjacent to the road network and via dedicated through site links.

3.20 Protection will be provided to pedestrians and cyclists from vehicles and driveways by providing regular safe crossing points, signalised intersections and access through the public domain. This encourages walking and cycling for both destinations and recreational movements. The pedestrian and cycle network will be integrated with the road network and open space areas to encourage the use of the network when accessing public transport routes, commercial, retail and residential precincts and open space areas.

3.21 The cycle network through the town centre will be developed to connect to existing cycle routes through the surrounding area. It will link to Green Square station, allowing cyclists to switch mode from cycle to either bus or train, in order to complete their journeys.

3.22 In time the area will benefit from a comprehensive cycle network allowing cyclists to travel through and within the town centre, and into the surrounding areas. A combination of on and off road cycle routes will link the town centre with surrounding areas, providing safe travel in all directions. A well developed cycle network is likely to be successful in increasing users and therefore making a contribution to sustainable transport for the area.

Work Place Travel Plan

3.23 To encourage travel modes other than private vehicle, it is proposed to adopt a travel demand management approach, through a work place travel plan to meet the specific needs of the site, future tenants and employees. The specific requirements and needs of the future tenants, including number of employees, hours of work, shift times, etc., will be incorporated in the work place travel plan to support the objectives of encouraging the use of public transport.

3.24 The principles of the work place travel plan, to be developed by the future tenants in consultation with Council, RTA and other stakeholders, will include the following:-

- encourage the use of public transport through increased train services and new bus services in and around the Green Square Town Centre;
- work with public transport providers to improve services;
- encourage public transport by employees through the provision of information, maps and timetables;
- provide appropriate pedestrian facilities which improve accessibility to employment and services from surrounding residential development and/or public transport nodes;
- raise awareness of health benefits of walking (including maps showing safe walking routes);

- encourage cycling by providing safe and secure bicycle parking, including the provision of lockers and change facilities;

- provide appropriate on-site parking provision, consistent with the governments restrictive parking policy to reduce traffic generation.

3.25 The travel plan may take a variety of forms including a green transport plan or company travel plan. The work place travel plan will assist in delivering sustainable transport objectives by considering the means available for reducing dependence solely on cars for travel purposes, encouraging the use of public transport and supporting the efficient and viable operation of public transport services.

Parking Provision

3.26 The Green Square DCP has adopted the parking rates in the South Sydney Development Control Plan No. 11 – Transport Guidelines for Development 1996, and form the planning framework for the allocation of maximum car parking rates. The controls are restrictive to minimise car ownership and promote a more sustainable means of transport, such as public transport.

3.27 DCP No. 11 identifies the following maximum parking requirements for the proposed town core uses:-

- Residential
  - 0.5 spaces per studio/one bedroom unit;
  - 0.8 spaces per two bedroom unit;
  - 1.2 spaces per three or more bedroom units;

- 1 space per six units for visitor parking;

- Commercial
  - 1 space per 125m^2 GFA, 20% allocated to visitors;

- Retail (shops)
  - 1 space per 50m^2 GFA;

- Shopping Centres
  - survey based assessment.

3.28 Car parking for the town core sites within the Green Square Town Centre will be provided in accordance with the Green Square DCP. The planning proposal has adopted a maximum parking rate of 1 space per 50m^2 for shops. No residential parking will be provided for Gen Y developments, located on development sites 17 and 8C.

3.29 Residential visitor parking will make use of retail/commercial parking and on-street parking within the Green Square Town Centre. Peak retail/commercial and residential visitor parking demand would not generally coincide, allowing for the ability to share available parking.

3.30 Off-street parking associated with the proposed future community facilities will be provided in accordance with Council's requirements and will be in addition to the town core parking.

Road Layout

3.31 The approved masterplan will retain Botany Road and O'Riordan Street as major north-south traffic routes through the area. The RTA has prepared a detailed scheme to upgrade the intersections of Bourke Street with Botany Road, O'Riordan Street and Wyndham Street, in order to provide additional capacity and a configuration that would be compatible with the proposed redevelopment of the town centre.

3.32 A new east-west link will extend from Bowden Street across Bourke Road and O'Riordan Street to join Botany Road to provide direct access to the town centre from the west. In addition, relief routes will be developed around Green Square using Joynton Avenue (to the east) and Lachlan Street, McEvoy Street and Euston Road (to the north).

3.33 The internal road layout within the Green Square Town Centre, as set out in the DCP and shown on Figure 3, includes four new roads and a number of service access ways. These new roads include:-

- a new east-west cross connection between Botany Road and Joynton Avenue to facilitate access from either direction;

- extension of Dunning Avenue from Hansard Street in the south to Bourke Street in the north. The intersection of the Dunning Avenue extension with Bourke Street will be left in/left out;

- a new east-west collector road (East West Boulevarde) between Joynton Avenue and Dunning Avenue; and

- a new north-south access road between the southern east-west cross connection and Dunning Avenue.

3.34 The road layout has been designed to preserve sensitive residential areas within and around the town centre and where possible utilise existing road alignments and connections.

3.35 In association with the approved road layout, a new retail loop road will be provided within the town centre, improving connectivity and linking the northern and southern parts of the town centre. The retail loop road encourages pedestrian movements across the public domain, activates pedestrian access through the town centre civic plaza and promotes a finer grain road network with improved vehicular and pedestrian connectivity. Traffic signals will be provided at the intersection of new southern cross street with Botany Road and at the intersection of the East West Boulevarde with Joynton Avenue.

3.36 The internal road layout will also be staged, as various land parcels become available. In accordance with Stage 1, the northern section of Dunning Avenue will be constructed with access provided to/from Bourke Street. Dunning Avenue will provide access to development sites 5, 7 and 16. Access to/from Bourke Street via Dunning Avenue will be left in/left out.

Access, Car Parking Layout and Internal Circulation

3.37 Car parking for the town core sites will be provided in a mix of at-grade, above ground and limited basement/sub-basement parking areas. For efficient operation and to spread traffic on the road network, parking areas will be provided throughout the site with separate points of entry and exit.

3.38 Separate car parking areas will be provided for residents and commercial/retail development. Residential car parks will generally be provided within the residential precinct along Dunning Avenue located on development sites 5, 7, 15 and 16. No residential parking will be provided for Gen Y developments, located on development sites 17 and 8C. Residential parking for development site 18 will be provided on site 15.

3.39 In order to take advantage of complementary use of the parking areas, commercial, retail and residential visitor parking will be generally combined within pooled car parking zones, to be located on development sites 8, 15 and 19.

3.40 Access points will be located in appropriate locations relative to intersections. Appropriate queuing space will be provided at car park entries. The amount of queuing space will depend on the number of spaces served, but as a general rule, the major access points to the pooled car parking areas will provide at least two entry and two exit lanes at the control points. AS 2890.1-2004 recommends that the queuing area should be no steeper than 1:10 for at least 80 per cent of the queue length. Ramps will be no steeper than 1:20 for the first six metres and a maximum grade of 1:6 for ramps longer than 20 metres.

3.41 Car parking areas will be provided in close proximity to the town core sites located within the town centre. The design of parking areas will be finalised at the time development applications are prepared for individual buildings. However, parking areas will be designed in accordance with AS 2890.1-2004. Car parking will be provided with dimensions of 2.4 metres wide by 5.4 metres long for residential and commercial tenant spaces and 2.5 to 2.6 metres wide by 5.4 metres long for retail customer and residential visitor spaces. Adjacent two-way

circulation aisles will be provided with aisle widths of 5.8 metres to 6.6 metres, clear of structure.

3.42 Car parking spaces located adjacent to structure will be widened to allow for appropriate door opening zones and columns will be set back 750mm from the front of the parking spaces to allow convenient access. Dead end aisles will be extended by one metre to allow appropriate access to end parking bays.

3.43 A proportion of parking spaces will be allocated for disabled motorists. These spaces will be provided with dimensions of 3.2 metres wide and 5.4 metres long and will be located in close proximity to the pedestrian access points. Disabled spaces will be provided with height clearances of 2.5 metres above the space and a minimum of 2.2 metres within the remainder of the car park.

3.44 Access between the various parking levels will generally be provided by two-way vehicular ramps allowing convenient access and circulation through each of the parking levels. Ramps will be provided with maximum grades of 1 in 5 for ramps less than 20 metres, with transitions of 1 in 10 at the top and bottom of each ramp. Ramps longer than 20 metres will have a maximum grade of 1 in 6.

Service Vehicles

3.45 Appropriate provision for service vehicles, including garbage collection, maintenance vehicles and deliveries will be made on site. The design of service areas will provide for service vehicles to enter and exit the site in a forward direction. Service bays, manoeuvring areas, circulation aisles and height clearances will provide for the swept paths of these vehicles in accordance with AS 2890.2-

2002. Service vehicle areas will be finalised at the time development applications are prepared for individual buildings.

Traffic Generation and Effects

3.46 The peak traffic generation of the Green Square Town Centre including the town core sites, will occur during the morning and afternoon peak periods when retail, commercial and residential traffic combines with the on-road commuter peak. Other components such as community facilities would not generate a significant amount of traffic to and from the site during these periods.

3.47 The MWT transport report (May 2006), estimated an afternoon peak hour traffic generation of some 2,050 vehicles per hour two-way. Based on the same traffic generation rates adopted in the transport report, the afternoon peak hour traffic generation would include a generation of some 830 vehicles per hour two-way for the identified town core sites.

3.48 Allowing for reduced retail morning generation, the morning peak hour traffic generation of the approved masterplan area was estimated to be some 1,540 vehicles per hour two-way. This morning peak hour traffic generation includes some 610 vehicles per hour two-way for the identified town core sites.

3.49 It should be noted that the MWT original transport report (October 2002) estimated the weekday peak hour traffic generation for the overall town centre at 1,560 vehicles per hour two-way for both the morning and afternoon peak hours. The road system traffic modelling allowed for some 1,700 vehicle trips per peak hour which included buses, taxis, service vehicles, etc. The increase over the original estimate for the afternoon peak hour did not change the MWT conclusions and recommendations of the original transport study, as design vehicle

traffic volumes for roads in the town centre adopted were some 30% higher than the forecast traffic volumes. Thus in effect the design allows for the higher traffic generation in the afternoon peak periods.

3.50 It was further noted by MWT that most of the retail development would have a very localised market catchment, so that much of its traffic generation in peak periods would be intercepted from passing traffic travelling to or from work/home in the Green Square area. This traffic would be on the arterial road system anyway. At the levels of traffic anticipated, roads would be sized based on function rather than to meet capacity requirements.

3.51 The planning proposed provides for the following changes in the town core area:-

- commercial
  - increase of 40,538m^2 up to 58,943m^2;

- retail
  - increase of 3,520m^2 up to 15,623m^2;

- residential
  - increase of 17,922m^2 up to 148,514m^2.

3.52 The afternoon traffic generations for the core and non-core areas are shown in Table 3.2. As can be seen from this table, the total afternoon traffic generation for the core and non-core areas will increase by 160 vehicles, to 2210 vehicles per hour two way. In the morning, the total traffic generation will be some 1770 vehicles per hour two way.

Table 3.2 – Afternoon Traffic Generations				
Uses	Area (m^2)	Parking or Units (Number)	Generation Rate[(1)]	Afternoon Traffic Generation (Vehicles/Hours)
Approved Masterplan Core Sites				
- residential	130,590m^2	-	0.24/100m^2	315
- commercial	18,400m^2	150 spaces	0.7 veh/space	105
- retail	7,000 m^2	300 spaces	1.7 veh/space	510
- other retail	5,100 m^2	100 spaces	1.35 veh/space	135
Non Core sites				
- residential	157,870m^2	-	0.24/100m^2	375
- commercial	88,100m^2	700 spaces	0.7 veh/space	490
- retail	4,660m^2	90 spaces	1.35 veh/space	120
				Total Generation 2050 veh/hour
Planning Proposal Core sites				
- residential	148,514m^2	-	0.24/100m^2	360
- commercial	58,943 m^2	470 spaces	0.7 veh/space	330
- retail	15,623 m^2	315 spaces	1.7 veh/space	535
Non-Core sites				
- residential	157,870m^2	-	0.15 veh/unit	375
- commercial	88,100m^2	700 spaces	0.7 veh/space	490
- retail	4,660m^2	90 spaces	1.35 veh/space	2210
				Total Generation 2210 veh/hour
				Net Increase in Traffic Generation 160 veh/hour

(1) Traffic generation rates adopted by MWT 2006

3.53 As noted previously, most of the retail traffic would be local or passing trade and would be already on the arterial road system. Therefore, the approved road network has been sized on function rather than capacity requirements.

3.54 The increased traffic flows resulting from the planning proposal would be modest. Allowing for traffic to dissipate across the road network and allowing for passing trade, flows on the surrounding roads are likely to only increase by some 30 to 50 vehicles per hour two-way (15 to 25 vehicles in each direction).

3.55 These are small increases, equivalent to only 1 vehicle every 2 to 4 minutes in each direction. The approved road network will be able to cater for these modest increases.

Summary

3.56 In summary, the main points relating to the transport implications of the planning proposal for additional floor spaces and building height for the town core sites within Green Square Town Centre are as follows:

i) the site has good access to rail and bus services and the road network;

ii) the planning proposal is consistent with government policy and good planning principles;

iii) a Development Control Plan has been prepared for the Green Square Town Centre;

iv) parking provision for the town core sites will be in accordance with the South Sydney Development Control Plan No. 11 – Transport Guidelines for Development 1996;

v) no residential parking will be provided for Gen Y developments, located on development sites 17 and 8C;

vi) residential visitor parking will make use of retail/commercial parking and on-street parking within the Green Square Town Centre;

vii) access, car parking arrangements and internal circulation will be provided in accordance with AS2890.1-2004;

viii) appropriate provision for service vehicles will be made in accordance with AS2890.2-2002;

ix) the traffic effects of the Green Square Town Centre have previously been assessed in the transport report prepared in association with the approved masterplan;

x) the traffic report recommended a series of road works to cater for the traffic generation of the town centre. These road works have been adopted and incorporated into the Green Square Town Centre DCP;

xi) the increase in traffic generation as a result of the planning proposal would be modest, equivalent to only 1 additional vehicle every 2 to 4 minutes in each direction on the surrounding roads;

xii) the surrounding road network incorporating the recommended road works for the town centre will be able to cater for this traffic.