TRANSIT ORIENTED DEVELOPMENTS

The convergence of factors transforming cities

CBRE

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TRANSIT ORIENTED DEVELOPMENTS

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CBRE RESEARCH

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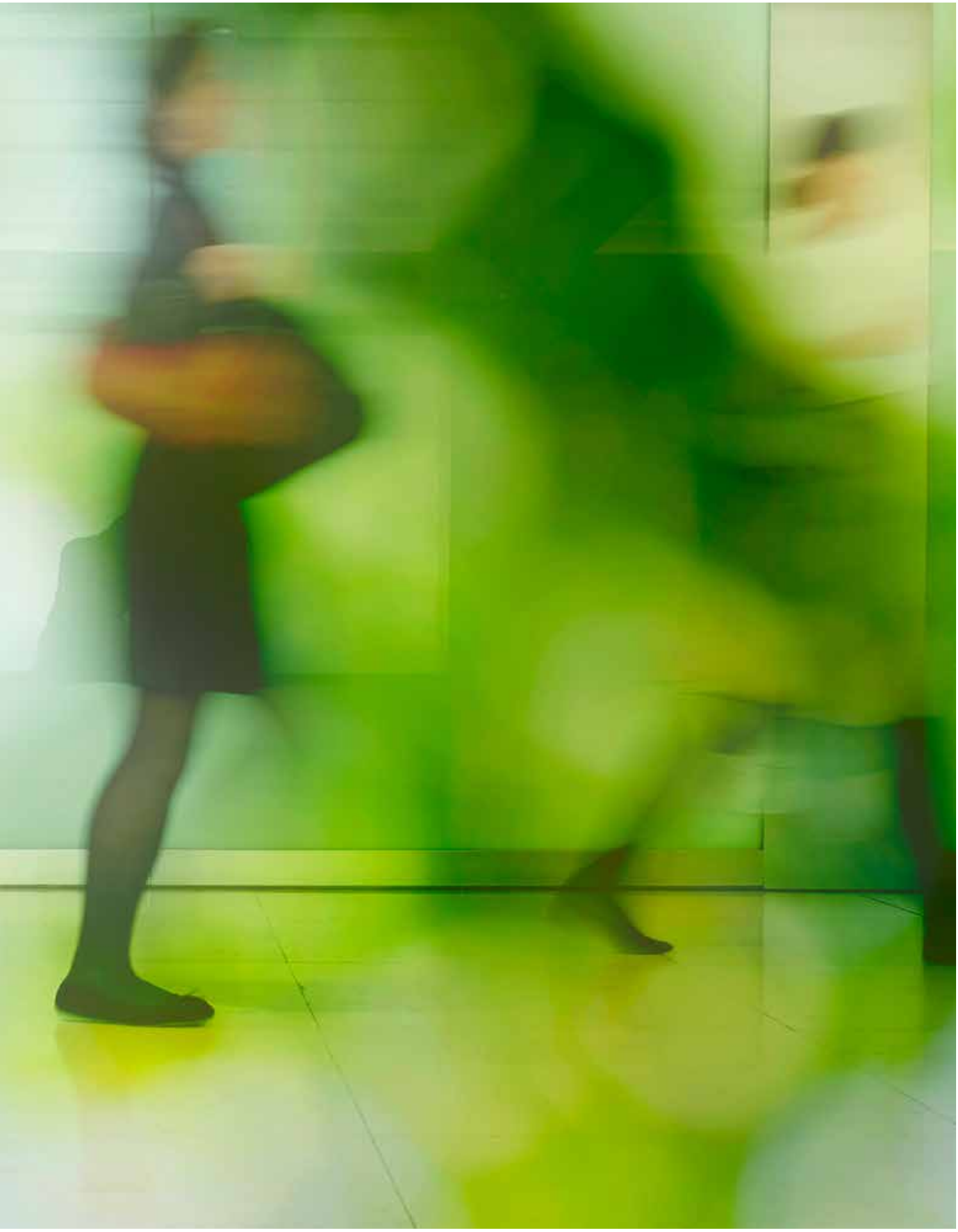


INTRODUCTION

The rapid increase in urbanisation of populations has led to demonstrable advantages in standards of living, but has also created serious challenges in sustainability. Major urban centres are challenged by traffic congestion, distribution of employment versus residential choices, and travel times which impact productivity, as well as housing affordability and pollution.

Public transport, particularly rail infrastructure, represents major investment by Government and the private sector through Private Public Partnerships (PPP) and is critical in addressing the long term sustainability of cities. Rail corridors and transit stations enable "densification" which otherwise may not be acceptable to the community. This facilitates mixed-use of business, residential and retail-entertainment services accessible by rail and bus interchanges and through pedestrian linkages for the immediate occupants.

Transit oriented development (TOD) involves higher density mixed-use projects adjacent/integrated with transit stations. TOD is typically masterplanned to create effective interfaces with public transport services and high quality public domain servicing through traffic and occupant population.

Planned effectively, TOD brings revitalisation of underutilised precincts and significant economic and social benefits to the wider community. A successful TOD will achieve substantial mode shift from private vehicles to public transport, improve liveability and local employment opportunities. Governments appreciate these benefits and are key stakeholders in the delivery of these projects.

Making transit oriented development work

There are numerous successful TOD projects throughout the world, each with specific characteristics based on their location, market drivers, policy and legislative framework and risk-return to developers-investors.

Successful TOD projects incorporate mixed-use which fundamentally depends on attracting business occupants as well as the more conventional residential and retail uses. Business can be attracted to these locations based on the connectedness with the broader worker population, hence the regularity of rail services and their linkages are critical for business operation.

Inner-middle ring suburban locations with rail services are increasingly attractive to residential populations, with the inclusion of retail services a necessary element to activate these precincts.

Government plays an essential role in setting the policy framework and providing certain development rights, often based on Government land holdings adjacent to, or above, transit stations.

There should not be overly prescriptive guidelines for TOD projects as they will respond to local and city-wide circumstances.

This paper intends to evoke further discussion and understanding as to the underlying ingredients for successful TOD projects and the role they play in addressing the changing needs of global cities.

THE STAKEHOLDERS DRIVING TOD AND CHALLENGES THEY FACE

The role of Governments

Cities contribute the majority of gross domestic product in developed countries. Accordingly, Governments are tasked with formulating policies and legislative settings which facilitate the building of liveable cities and communities for the future. With this comes many challenges of meeting the needs of communities for employment opportunities, affordable living and sustainable urban environments, whilst encouraging business to invest. The interlinked policy challenges are outlined in the following sections.

Accommodating population growth and consumer needs

Australia's population is projected to reach 35 to 42 million by 2040. An additional 11 to 18 million people in Australia will require over 4.4 to 7.1 million more homes by 2040. At the lower range of the forecast, this is equivalent to needing 170,000 new dwellings per annum to 2040, which is significantly higher than 150,000 homes completed per year on average over the last 10 years. Household size is also reducing, thereby contributing to the need for more housing stock.

Provide affordable housing

Housing affordability particularly in Sydney and Melbourne is diminishing as price is growing faster than income. Housing demand has and will continue to be elevated by foreign ownership and immigration, as well as lower costs of housing finance.

The rising trend of apartment development over the last decade as the emerging form of residential supply will continue in response to the need for affordability, reduced household size, access to services, lower utility costs and social integration.

Facilitate inward investment and create employment

Fundamental to sustainable cities is the creation of employment opportunities which are accessible to the resident populations. Whilst urban renewal and densification is an emerging trend, the majority of new dwelling stock to accommodate population growth is on the fringe of cities, typically distant from major employment centres. Sydney is expected to create 625,000 new jobs by 2031, which need to be better distributed across the city, rather than concentrated within limited centralised employment hubs. The development of Parramatta and Macquarie Park are examples of a more diversified employment spread in Sydney. In the latter case, the State Government's vision for a business park led to the creation of a hub that hosts some of the world's leading IT firms, data centres, and

medical research firms. Nowadays, Macquarie Park employs around 7% of the total white collar labour force in Sydney, and has over 860,000sqm of office stock (roughly 17% of Sydney's CBD).

Critical to inward investment is the Government's lead in delivering transport infrastructure as the private sector 'follows' to take advantage of available development sites, increasing population catchments and traffic flow. Business investment attraction is competitive between jurisdictions, with supportive infrastructure providing access to markets, suppliers as well as employees being essential.

Manage traffic congestion to address productivity

The Bureau of Transport and Regional Economics (BTRE) estimated that congestion will cost Australia some $20-$30 billion by 2020 through loss of productivity. Traffic congestion must be better managed through a combination of factors including improved road infrastructure, increased public transport services and de-centralisation of business activity.

Accommodating growth through high density development supported by public transport creates business and residential opportunities, whilst reducing traffic congestion and, critically, increasing the patronage and financial sustainability of rail infrastructure, thereby supporting further infrastructure investment.

Singapore is an excellent example of reducing traffic congestion costs through TOD and high density development, triggering increased demand for public transport. Public transport in Singapore is profitable enabling the Government to continue to make improvements to infrastructure and services.

Proponent for precinct redevelopment

In addition to establishing the policy and legislative framework for higher density transit linked projects, Governments must act as 'proponents' for masterplanned urban renewal precincts. This could involve contributing Government owned sites for redevelopment and/or initiating masterplans to create development rights over privately held holdings to encourage redevelopment.

As rail infrastructure is typically owned and operated by Government, rail authorities are essential stakeholders in enabling urban renewal and densification in conjunction with transit stations. This 'de-risking' of development opportunities through this 'proponent' role is the first major step in creating scalable projects to attract capable development and investment groups.

THE STAKEHOLDERS DRIVING TOD AND CHALLENGES THEY FACE continued

TOD's are complex projects. Many highly successful TOD projects around the world required various levels of government to play a strong proponent role:

- **King's Cross Station** redevelopment in London, required direct government intervention to work with the key local authorities who opposed high density renewal
- To consolidate and prepare the site for redevelopment, funding and implementation of major infrastructure upgrades were needed to support the **Perth City Link** precinct
- The redevelopment of **Denver Union Station** was made possible by a partnership among four entities: the City and County of Denver, the Colorado Department of Transportation (CDOT), the Denver Regional Council of Governments (DRCOG), and the Regional Transportation District (RTD). These efforts led to RTD's 2001 purchase of the site to enable the project

Appeal for residents

Access to services and amenity

TOD projects based on mixed-use and higher density are typically within inner and middle ring locations proximate to established education, health and recreation services. Entertainment and retail services within the TOD projects complement these 'external' services but are typically of neighbourhood scale based on a localised catchment.

Housing affordability

Multi-unit living is typically more affordable than conventional housing in inner suburban areas. The relative increase in multi-unit living relative to conventional greenfield housing has undergone a 'step-change' over the last decade and is now a preferred option for many households.

Reduced cost of travel

Convenience to public transport enables households to reduce reliance on private vehicles. Integrated public transport networks contribute to higher patronage and ultimately lower cost of travel. Business has responded through providing short term hire vehicles to supplement public transport without the necessity for car ownership. Accordingly car parking ratios for these precincts are reducing relative to non-TOD locations.

Community development and security

Scalable mixed-use projects create new communities which tend to be more diversified than greenfield developments. Personal safety is becoming an increasing issue in cities with increasing rates of crime. Multi-unit living within mixed-use projects provides significant benefits in terms of day and night activation which can assist in the provision of higher standards of security.

Household cost and discretionary income

Whilst multi-unit living through strata title introduces levies for the maintenance of common areas, overall household maintenance and operating costs can be significantly lower than conventional detached housing. These larger scale projects can provide the basis for ecological sustainable development initiatives which can reduce energy costs and deliver better environmental outcomes through initiatives such as water recycling.
With increasing costs for utilities services,

units can be substantially cheaper to operate relative to larger detached dwellings. Reduced car ownership and lower household operating costs provides more capacity for household spend in the retail sector.

Business attraction

Mix of businesses

Within CBDs, transit locations can attract substantial businesses from the major finance and professional services sectors, whereby a significant proportion of the workforce can access commercial accommodation by train.

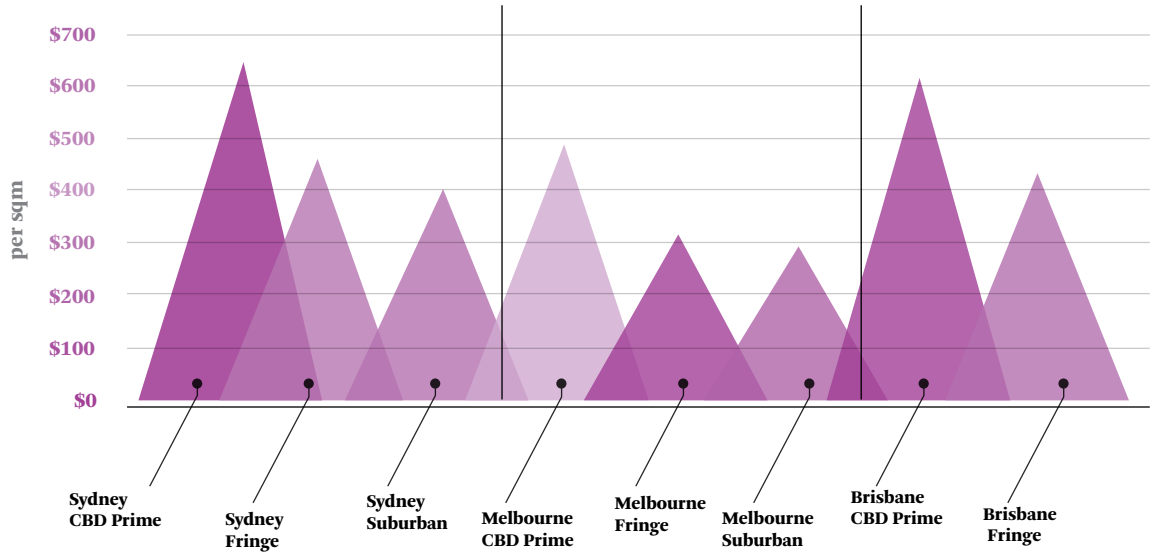
Transit sites outside of the CBD tend to attract regional and back offices from the services sector. These transit sites cannot typically provide the site areas and/or they command land values beyond the thresholds sustainable for the manufacturing and/or distribution sectors.

Major retail centres require substantive site areas which are not available on transit stations. Hence, mixed-use projects based on transit stations will typically include convenience and localised retail services.

Office sector

Rising occupancy costs in CBDs have led to demand for secondary office and business park locations offering lower rents. The rent attrition between CBD and suburbs can be attractive to occupiers. Fringe and suburban office rents across Sydney, Melbourne, and Brisbane, are on average 30%-40% lower than their respective Prime CBD locations (Chart 1).

Chart 1 - Average office rents across geographies (2014)



Source: CBRE Research
Note: Proxy for Sydney Fringe is Crows Nest, and Chatswood for suburban

THE STAKEHOLDERS DRIVING TOD AND CHALLENGES THEY FACE continued

As TOD projects are a relatively recent phenomenon, the office accommodation can be of a high quality and offer more flexible floor plates than is the case for most CBDs. Businesses are requiring working environments which both attract and retain employees. The mixed-use nature of TODs creates activated precincts with retail and entertainment services for business employees. TOD locations also reduce business demand for car parking which in turn reduces project construction costs and leasing costs for occupants.

Retail sector

Transit stations in isolation support a minimal retail offering based on passenger through-put only. TOD development creates a business and residential community which supplements retail demand. Retail facilities within TOD projects are nevertheless typically convenience based, although regional centres incorporating a transit station, such as Bondi Junction, can provide the full range of retail services.

Developer and investor commitment

Investment opportunities

The creation of development rights adjacent to transit stations opens up development and investment opportunities for the private sector. Site consolidation and/or large scale land release from government holdings is often critical to secure private sector interest as TOD projects need to be scalable to attract the required level of institutional investment. The mixed-use nature of these projects is designed to diversify the sources of investment and ownership risk. Investment grade office accommodation presents opportunities to a wide range of financial institutions through to private equity.

Residential product is attractive to owner occupiers and also to investors given the locational attractiveness to the rental market and diversity of size and pricing considerations.

Retail development is often contained within commercial and residential towers at ground level as well as being included in podiums. The owners of the commercial assets typically own and tenant the retail uses which support the values of their asset. Retail outlets within residential towers are typically strata titled for individual ownership-tenancy.

Development risk

Critical to these typically complex projects, is the de-risking process to attract development interest. Certainty in site availability, zoning for development rights and an efficient approval process help to stimulate private sector interest.

The construction interface with the transit station and rail operation must be resolved and delivery processes agreed. As the rail authority is an instrument of the Government, it is best positioned to manage the interface process. Market risk is the domain of the development and investment industry.

The successful delivery of TOD projects requires key stakeholders working in tandem; from Government as facilitator; to developers creating attractive accommodation for a wide range of uses; to investors seeing appropriate returns. The benefits have many layers in terms of business and residential choice, patronage of public transport and reduced traffic congestion, as well as additional development and investment opportunities for the private sector. Government benefits through effective disposal of surplus property and the fiscal benefits associated with increased construction activity and stamp duties.

LESSONS LEARNT FROM GLOBAL AND LOCAL TODs

Case Studies

CBRE has drawn from the following national and international case studies in evaluating central themes underpinning successful TOD projects:

National Projects

Green Square Town Centre, NSW
Chatswood Station, NSW
Parramatta Station / Parramatta Square, NSW
Central to Eveleigh, NSW
North Ryde Station Precinct, NSW
Epping Town Centre Urban Activation Precinct, NSW
St Leonards Station, NSW
Bondi Junction Station, NSW
Rhodes Station, NSW
Edgecliff Station, NSW
Kogarah Centre, NSW
Federation Square Melbourne, VIC
Yeerongpilly, QLD
Perth City Link, WA
Subi Centro Perth (Subiaco), WA
East Perth, WA

International Projects

King's Cross Regeneration Project, London UK
Stratford City Regeneration Project, London UK
Union Station Redevelopment, Denver USA
Transbay, San Francisco USA
ION Orchard, Singapore
One North Precinct, Singapore
Hong Kong Station Redevelopment, Hong Kong
Kowloon Bay Depot, Hong Kong

Key Success Drivers for TODs

Government sponsorship

Government vision and sponsorship is critical to underpin the delivery of TOD projects. Facilitation by Government can take a number of forms from rezoning to provide development certainty, provision of development sites, to the direct funding of rail infrastructure and coordination of development issues with the rail authority. This was a key element of the Denver Union Station redevelopment, Perth City Link, HK Station and One North Singapore projects.

LESSONS LEARNT FROM GLOBAL AND LOCAL TODs continued

A study by the Institute of Transportation and Development Policy in the USA, concluded that government support is the most important factor for TOD success. By way of example, Denver Union Station received Federal and State governmental support for its redevelopment. The Government provided funding for the transit component, with supplementary funding through a sales tax increment mechanism requiring approval by Denver citizens.

Similarly, the Perth City Link TOD project involves substantial Federal, State and Local Government funding contributions for rail and bus infrastructure. This provides the basis for a major mixed-use project adjacent to and above the transport infrastructure.

The Government plays a key role in consultation with the broader community in eliciting support for TOD projects based on their benefits in terms of access to public transport, job creation and the creation of high quality urban environments.

Government must also be commercially astute in terms of ensuring value for money outcomes in terms of infrastructure funding and land-air rights contributions to these projects. Furthermore, it is critical that Government engage with the development and investment community to market test these opportunities.

Illustrated case: Located in Downtown Denver, the vision for Denver Union Station was made possible by a unique partnership among four entities: the City and County of Denver, the Colorado Department of Transportation (CDOT), the Denver Regional Council of Governments (DRCOG), and the Regional Transportation District (RTD). These efforts led to RTD's 2001 purchase of the site, as part of a jointly funded acquisition with intergovernmental participation by the public agency partners. In a spirit of unprecedented cooperation, a common vision was developed for the site. Funding was also provided by a higher sales tax voted for by Denver citizens in 2004 as part of a metro-wide light rail plan.

The redevelopment of the transit centre spurred a significant amount of new development in the area and has been a catalytic project. It has triggered the revitalisation of the surrounding neighbourhoods with increased multi-unit residential and mixed-use development, accommodating commercial office users and retail tenants. Office tenants are paying a premium to be there and the area has the lowest office vacancy rate and highest office rents in the region.

A key challenge was governing the project due to its long time frame (20 years) and multiple layers of government involved. A governing body was created to oversee the development and manage all stakeholders effectively. The government played a critical role from project vision to execution and worked in close relationship with governmental bodies and private stakeholders to see through the redevelopment of the station, and was the one key factor driving the successful completion of the project.

Located in established-emerging markets

In the cases considered, it appears that TODs in established markets within inner and middle ring suburbs have a greater chance of success. Established markets are those with existing commercial and higher density residential dwellings which are complemented by higher than average rail station passenger volumes. This provided the basis for the Denver Union Station and the Hong Kong Station redevelopments, which are highly successful TOD projects. This is not to say that non-established markets won't facilitate TOD projects, however there will need to be a catalyst 'early mover' development initiative involving substantial business and residential components. Whilst these projects may be higher on the risk curve, they can provide above average returns through lower site costs.

The 'back filling' of rail transit infrastructure to established market locations can also reinforce their attractiveness and enable higher density. This is the case with North Ryde – Macquarie Park in Sydney, which was an established business park prior to the introduction of rail infrastructure. The latter has supported the retention and indeed attraction of new businesses as well as increased mixed-use, particularly residential apartment developments.

Illustrated case: Stratford had a negative perception amongst Londoners, it generally suffered more than any other part of London from the demise of the manufacturing and utilities sectors. This left a legacy of high unemployment and large traits of derelict land – some of which had been heavily contaminated. However, the city was very well connected, and is an established market that needed regeneration. The London Olympic Games in 2012 provided a key catalyst for renewal. The area was revitalised with the right mixture of uses to create a brand new, well-balanced destination that attracted residents, companies and visitors from a wide catchment area. The Westfield scheme – the largest retail scheme ever in East London and the second largest in London in a generation – marked a new beginning for Stratford. Having existing infrastructure, connectivity (some of the best transport links in London), the Olympic event, and an established market was key to the success of Stratford city's regeneration around a transit station.

LESSONS LEARNT FROM GLOBAL AND LOCAL TODs continued

Masterplanned, designed and developed to meet the market and community expectations

Adjacent communities in well established and low density suburbs can have negative perception towards increased density. Concerns relate to increased traffic, overlooking, shadowing, through to lost amenity and higher crime rates. Accordingly, Governments need to communicate the vision and benefits through effective consultation to maximise community acceptance of TOD projects.

It is critical that the TOD projects provide high quality, usable and accessible public domain for the broader community. If they are designed as 'gated' communities, there will be strong resistance from surrounding communities, particularly as they will dominate the local transit station.

Furthermore, diversity in housing product within TOD projects will help overcome the perception of a homogenous community, hence being more likely to integrate with the existing community. Types of dwellings can range from terraces, walk up apartments to unit towers, as well as specialist student housing and retirement/aged care complexes.

The reinforcement and creation of additional linkages for pedestrians and vehicles within the surrounding urban fabric underpins the integration of these projects.

Illustrated case: Under its planning stage, the Yeerongpilly TOD project (roughly 10km from the Brisbane CBD), actively sought feedback from the public to create an urban design that would provide economic and social benefits to the community. The key feedback included more retail, dining opportunities, high quality public transport, mix of housing types, improved connections and facilities for pedestrians and cyclists, and additional parkland and associated facilities. There were also calls for an east-west pedestrian link to the Yeerongpilly railway station and the Queensland Tennis Centre which is a fair distance from the station. Engaging and designing the Yeerongpilly TOD project based on community demands will help to boost support from residents and businesses, enabling revitalisation of the precinct.

Connectivity promotes public transport use and unlocks development potential at the transport node

Environmentally protected connections between TOD elements and transit stations encourage public transport patronage. TOD's connected to more than one transport mode or interconnected rail lines, for example, heavy rail, bus and/or light rail, promote overall public transport utilisation and the attractiveness of the TOD for business and residential occupancy. This is the case for the Hong Kong Station (Hong Kong), One North (Singapore), Union Station (Denver), and Transbay (San Francisco).

The range of uses and scale of TOD projects is a function of the connectivity of transport modes through the project. In turn, this correlates with the utilisation and patronage on the public transport network. Commuters are able to connect throughout metropolitan areas through the intermodal services within the TOD.

Improved accessibility and connectivity acts as key catalyst for unlocking development potential at the transport node.

Illustrated case: One North TOD precinct in Singapore is connected to an interchange rail station with access to two rail systems, benefitting both the local precinct and encouraging transport use to other regions in the city. The completion of the station in 2011 led to retail and office development right above the station. One North precinct is now home to biotechnology, medical research, media, information communication, science and engineering research and development industries. Many of the retail and office spaces are connected with covered walkways or underpass access. The National University Hospital of Singapore (NUH) and Singapore's largest university (NUS) are also in the precinct. TOD in One North has risen because of the station and connectivity to the station via underpass and covered pedestrian walkways, making it an attractive residential and business location. Its offices house some back-office bank operations, local financial firms, medical research and data centres, and has good pre-commitment rates for new assets.

LESSONS LEARNT FROM GLOBAL AND LOCAL TODs continued

An incentive or pull factor to attract new tenants maybe required

Many successful international TODs offered some form of incentive or pull factor in attracting new tenants to the projects. In Singapore, the Government attracts selected business growth sectors through long term tax incentive schemes. This has been successful with numerous companies relocating their headquarters to Singapore in specific TOD precincts. There were also rental subsidies offered to certain industries.

Governments can also use land holdings to attract development and occupants based on a broader set of triple bottom line criteria rather than only the direct market value for land holdings.

The TOD project should incorporate 'pull factors' including an uplift in the urban environment and public domain relative to the surrounding suburban areas. This encourages residents to downsize to the region, and businesses to relocate and possibly consolidate fragmented business operations to a higher quality environment. The planned activation of these precincts through retail, hospitality and outdoor entertainment enhances occupant safety and amenity.

Businesses often co-locate to enhance the attraction to employees, hence providing support for the initial stage of the TOD project.

Illustrated case: The MTRC (the rail authority) owns the central 18 floors of "2ifc" office tower as part of the Hong Kong Station development. The MTRC offered significant incentives to attract UBS as a key tenant in its office tower. The location was considered fringe at the time of its development, was completed at one of the lowest points in the rental cycle and was the equivalent of eight years net take up in the adjacent main financial district. However, within five years, the Hong Kong station development changed employees and corporate perceptions and achieved the highest rents in the city. "2ifc" is now one of the most coveted office buildings in Hong Kong. During the early part of the leasing strategy, incentives offered helped secure some of the world's largest investment bank tenants and acted as a catalyst for the overall success of the project.

Development mix and staging

There is no 'silver bullet' for the development mix and staging of TOD projects as each is bespoke to its location, site availability and the market environment.

TODs tend to be highly integrated in terms of car parking, public domain and podiums for mixed-use towers which can limit their scope for staging or separate packaging for multiple developers. Hence, many successful TOD projects are undertaken by a single developer/consortium, which is able to respond to the market with an integrated design.

TOD design will respond to competing projects in proximity. For example, the scope for retail uses will depend on the proximity of existing retail services, whether in high street configurations or conventional malls.

The inclusion of significant 'affordable housing' should be required through policy settings. TOD projects are ideal locations for the inclusion of key worker dwellings who can utilise public transport.

TODs can accommodate a wide range of emerging industries, including the creative sector, which aligns with adjacent residential ownership.

A well considered staged mixed-use development will accommodate a diverse range of markets which collectively create additional value and reduces project delivery risk.

An effective public and private 'partnership'

As illustrated in the case studies, TOD projects typically involve substantial transport infrastructure investment, complemented by private sector investment in site development, public domain and built form. Whilst there will be interface requirements between the role and funding of each sector, their investments create considerable value not otherwise realisable.

The value returns from the site development-air rights disposed by the Government can make a major contribution toward the transport infrastructure funding. Furthermore, the related development to the transit infrastructure enhances the patronage on public transport which supports its financial sustainability.

Illustrated case: The completion of the Green Square station in Sydney in 2000 as part of the Airport line, made it a very desirable place for residents, SME's and strip retailing. At the centre of this trend is a vision for Green Square Town Centre (GSTC). GSTC is a public–private sector partnership to build a neighbourhood with excellent transport connections, active commercial, community and cultural life, with high density living, public spaces, green infrastructure, retailing, and encourage growth of local industries (such as creative industries). It will include 90,000sqm of commercial and retail area and 4,000 dwellings, which expect to accommodate 8,000 residents and 6,000 workers. The Government wants to unlock underutilised land and requires private developers/investors to deliver what the public demands. The Government has consolidated government lands, secured private sector investment interest. Mirvac will commence the first stage of residential construction (174 units) in 2H 2015. All 174 units were sold off the plan over one week in November 2014. Once completed, Green Square Town Centre will be a highly sought after precinct, given its proximity to the CBD via train and buses, and will be one of the largest urban renewal programs in metropolitan Sydney over the next decade.

KEY FINDINGS

There are a series of factors which are converging to create opportunities for TOD projects throughout the world, these include:

- Increasing rates of urbanisation and size of cities, leading to increased vehicular traffic congestion
- Declining productivity with increasing time spent travelling to work, which erodes lifestyle and standard of living
- Government focus on public transport and decentralisation of economic activity to reduce and disperse traffic congestion
- Government policy shift to encourage densification in proximity to rail transit corridors and stations
- Business and consumer preferences to have access to public transport services, diverse amenity and high quality work and living environments
- Development industry expertise in mixed-use development and creation of places
- Greater sophistication in project and infrastructure funding which recognises the benefits of integrated TOD projects

TOD projects have the capacity to address many of the challenges facing major cities in developed economies, reflected in the development trends over the last decade and increased focus on capitalising on substantial investment in transit infrastructure. TOD projects will become more prevalent as the above converging factors become more apparent and transparent to communities.

Whilst TOD projects are more complex than conventional brownfield or greenfield mixed-use projects, the benefits clearly warrant the effort in addressing their challenges. The role of Government in sponsoring and facilitating these projects to be delivered by the private sector cannot be overstated.

APPENDIX 1

Selected developers and Government agency list

Project	Main Government Agency	Private Developer
King's Cross Regeneration Project, London	London and Continental Railways (LCR) is the company responsible for the design, construction, operation and finance of the high-speed Channel Tunnel Rail Link (CTRL).	The King's Cross Central Limited Partnership (KCCLP) is developing the mixed-use scheme comprising: Argent (owning 50% via Argent King's Cross Limited Partnership); London and Continental Railways Limited (LCR), holding a 36.5%; DHL Supply Chain (formerly Exel), with a 13.5%
Stratford City Regeneration Project, London	London and Continental Railways and Stratford City Council.	Lend Lease (with joint venture partners London and Continental Railways and Stratford City Council).
Union Station Redevelopment, Denver	The vision for Denver Union Station is made possible by a unique partnership among four entities: the City and County of Denver (Denver), the Colorado Department of Transportation (CDOT), the Denver Regional Council of Governments (DRCOG), and the Regional Transportation District (RTD).	The Union Station Alliance was formed to redevelop Denver Union Station which comprised: REGen LLC - developer Sage Hospitality - hotel developer Various other builders/designers/agents One Union station (office development adjacent to Union Station) was developed by East West Partners and Starwood Capital Partners.
The Hong Kong Station Redevelopment	Mass Transit Rail Corporation (MTRC) purchased development rights from the Hong Kong Government at a 'before rail' price and sells these rights to a selected developer (among a list of qualified bidders) at an 'after rail' price.	Commercial development of HK Station - joint venture between MTRC and a consortium of developers (central waterfront property development limited). The consortium comprised: Sun Hung Kai Properties Ltd (47.5%), Henderson Land development Co Ltd (32.5%) The Hong Kong and China Gas Co Ltd (15%) and the Sun Chung estate Co Ltd (5%)
ION Orchard, Singapore	Land Transport Authority and SMRT Corporation	CapitaLand with its 50-50 partner Sun Hung Kai Properties

APPENDIX 1 continued

Selected developers and Government agency list

Project	Main Government Agency	Private Developer
Green Square Town Centre, Zetland	UrbanGrowth NSW (lead agency) collaborating with the City of Sydney council	Various private developers including: Mirvac Crown group Bridgehill Projects Lateral Corporation
Perth City Link	Perth City Link is a collaboration between the Metropolitan Redevelopment Authority (MRA), Public Transport Authority, City of Perth and the Australian Government. All three tiers of Government are involved, with State Government leading the project.	Leighton (King's Square), Leighton-Mirvac JV Brookfield Multiplex (Wellington Street Bus Terminal) construction contractor. John Holland as rail infrastructure work contractor
Central to Eveleigh Precinct	UrbanGrowth NSW	Not yet determined
Parramatta Station / Parramatta Square	Parramatta City Council	"1PSQ" Office tower of 26,000 sqm- Leighton. Developers for other 4 stages are yet to be concluded.
Yeerongpilly, Brisbane	The Queensland Government through Growth Management Queensland and Brisbane City Council	Not yet determined
Chatswood Station	Transport Infrastructure Development Corporation (TIDC) a statutory state owned corporation, agency responsible for delivering the ECRL and the Chatswood Transport interchange on behalf of the NSW Government.	Joint Venture development partners Galileo Group and ISPT bought the site from receivers and have developed the apartment towers.
Transbay, San Francisco	Transbay Joint Powers Authority (the "TJPA")	Salesforce tower (flagship office tower above Transbay terminal) is a JV between Boston Properties (95%) and Hines Property Group (5%).
Federation Square, Melbourne	Victorian State Government and City of Melbourne	A company wholly owned by the State Government of Victoria, Federation Square Pty Ltd has overseen the development of Federation Square since November 2000 and is now managing its ongoing operation on a commercial basis. Brookfield Multiplex was the builder.

APPENDIX 2

Selected domestic and international case studies: Project challenges and status

Chatswood Railway Station

Project Summary

Prior to the Chatswood transport interchange development, the site functioned as the Chatswood rail station servicing this major regional centre. The redevelopment, to be funded by the private sector, was to coincide with the completion of the Chatswood to Epping line in order to provide greater convenience to commuters and revitalise the area.

The TOD comprises a bus and taxi interchange and the construction of a retail and residential complex, housing over 80 retail outlets and more than 500 residential units within three towers. The interchange provides pedestrian access and connections to adjoining properties and public spaces.

Challenges

- The transport interchange component of this TOD was completed in 2008, however the retail and residential components were delayed considerably, hindering its success.
- Unforeseen risks including costly litigation, construction delays, and the insolvency of the developer in the midst of the GFC left the retail component significantly delayed and completion of the apartment towers.
- Construction costs increased above budget given the complexity of building above a railway station.
- The substantial private sector funding commitment for the station infrastructure prior to being able to realise the value of the air rights through residential development in a timely manner represented the major challenge for the project. These risks associated with integrating rail station infrastructure with air rights development are considerably higher than mixed-use development adjacent to rail infrastructure, which can be delivered as separate packages.

Developer and project status

- The project was initiated as one of the largest public–private partnerships in New South Wales at the time. Following the initial development consortium SPV being placed into receivership, the joint venture development partners Galileo Group and ISPT bought the site in 2011 to complete the leasing of the retail floor space and to develop the residential towers above the station. There has been high market acceptance of the residential product which pre-sold prior to construction.

Central to Eveleigh (C2E), Sydney

Project Summary

The NSW Government Metropolitan Strategy for Sydney to 2031, released in March 2013, included the proposal to develop the Central to Eveleigh (C2E) corridor. The Government's planned light rail extensions through the CBD will also link with the corridor at Central Railway Station to become the most connected multi-modal transport hub in Sydney, with heavy and light rail as well as bus interchange.

Approximately 100ha, the C2E corridor extends 3km from Central Rail Station, the Goulburn Street car park in the Sydney CBD to Macdonaldtown Railway Station. The corridor includes Redfern Station and the Eveleigh railway yards, which provide exceptional inner city locations for mixed-use development. Early studies suggest there could be potential for 1,500,000sqm of mixed-use floor space.

The precinct, with its proximity to the CBD, has the potential to become a hub for jobs in the education, health, technology and creative industries, with a mix of new residential development including student and affordable housing.

Challenges

- The interface of mixed-use development with the rail corridor and stations will involve significantly higher costs relative to conventional inner city development, impacting viability.
- Furthermore, the current high vacancy rates in the Sydney CBD office market with a strong supply pipeline forecast means that absorbing substantial additional commercial office space in the C2E corridor in the short-medium term will be challenging.
- The early development of commercial uses will depend on attracting catalyst occupants to reposition the precinct in the eyes of the market.
- Whilst it is possible to release discrete sites for residential development, it will be challenging to achieve an integrated mixed-use renewal process with an optimum balance with employment opportunities and significant retail development. This will require commitment from the State Government in terms of providing internal and external precinct linkages, as well as encouraging inward investment for business uses.

Developer and project status

- UrbanGrowth NSW is the Government's development agency acting as the sponsor for the project planning and delivery in conjunction with the private sector.
- Recently completed 88 new apartment units at North Eveleigh is part of the revitalisation of the Central to Eveleigh (C2E) Urban Transformation project. The apartments are designed to provide affordable accommodation close to transport and place of work for people working in essential services and are on low incomes. The project received Federal Government funding under the National Rental Affordability Scheme.

Parramatta Square

Project Summary

Parramatta, recognised as Sydney's second CBD, is effectively the geographical centre of Sydney and acts as a gateway for the expanding population in Western Sydney. As a result of this population growth, there is a growing reliance on Parramatta to accommodate growth in employment and to provide a full range of services.

Parramatta Square, the largest integrated mixed-use project attempted in the CBD is sponsored by the City Council to strengthen and reposition the city centre as well as capitalise on the adjacent major rail and bus interchange.

The precinct involves the development of a 3ha site which will include up to 200,000sqm of commercial space, combined hotel and residential tower, supported by an integrated retail component and extensive public domain. It comprises six development stages /sites, with Stage 1 (a 26,000sqm commercial building) gaining a full pre-commitment from the University of Western Sydney and due for completion in 2016.

Challenges

- The project was originally conceived as a fully integrated 'vertical' development to be delivered by a single private sector group. This approach proved not to be viable in terms of construction costs, market dynamics and site consolidation issues.
- The Council subsequently reviewed the masterplan to establish a series of discreet development packages linked through a separately funded public domain.
- The scale of the project packages requires a 'step-change' in market acceptance, securing major tenant and pre-sales commitments to support funding and delivery.

Developer and project status

- Stage 1 has been released and successfully transacted as an office complex.
- Stages 2, 5&6 are currently in the transaction phase with strong responses from the development-investment sector and expected to be concluded in 2015.
- Stages 3 and 4 will be subsequently released to the market.

Perth City Link

Project Summary

The rail corridor adjacent to Wellington Street to Central Station represented a major barrier for the growth of Perth CBD and the integration of Northbridge.

Through the Metropolitan Redevelopment Authority (MRA), the Western Australian Government's development arm, the planned renewal of the rail corridor was implemented. It involved very substantial capital funding to relocate the entertainment centre, lower the rail infrastructure and to move the bus interchange to underground in order to achieve a fully integrated transport node for the city. This enabled the MRA to masterplan a mixed-use TOD project for the corridor.

The project known as Perth City Link represents the largest inner city urban renewal program attempted, involving the entertainment centre, some 150,000sqm of commercial space, 100,000sqm of residential apartments and 30,000sqm of retail / entertainment uses, all linked through public domain and transport linkages. Private investment, made possible by the preparation of the site by the Government, is expected to total $4 billion including the purchase of land and construction of buildings.

Challenges

- The coordination of the transport authority, Council and Government stakeholders to enable this integrated TOD project required a single agency (MRA) to manage competing interests and objectives.

- There were numerous issues identified in the planning phase regarding physical infrastructure, urban planning and urban design that need to be taken into account if a preferred design outcome is to be achieved. Issues included load capacities over existing infrastructure, a high water table impacting feasibility for layered underground basement parking and optimising ground level pedestrian movement and access to new/existing amenities. Land consolidation was also required.

- Securing the necessary public funding to prepare the site for redevelopment, undertake major infrastructure upgrades necessary to support the redeveloped precinct including sinking the Fremantle Line from Horseshoe Bridge to Lake/King Streets and sinking the Wellington Street bus station. Government investment totalled $1.3bn including the Perth Arena.

Developer and project status

- The King's Square project, under construction on the privately held site, a major development within Perth City Link, has to date attracted tenants including Shell, John Holland and HBF, which were attracted to the site due to the high quality of amenities and the highly integrated public transport central location.

- The MRA is in transaction phase with the preferred development consortium for the remainder of the precinct redevelopment, with construction commencement dependent upon the completion of the transport infrastructure works.

Yeerongpilly, Brisbane

Project Summary

The state government aims to redevelop the Yeerongpilly Animal Research Institute (ARI) site that has been vacant since 2008, to deliver a TOD in the form of high-quality residential accommodation, affordable housing, retail, commercial, entertainment facilities and green space. The Yeerongpilly TOD project site area is 14.5ha and is roughly 10km from the Brisbane CBD.

Challenges

- Much of the site is identified as flood prone. The Yeerongpilly TOD site is located beside the Brisbane River and includes some relatively low-lying areas. Stormwater management and treatment as well as possible open space is required to reduce the risk of flooding.

- The Queensland Tennis Centre is located a significant distance from the train station. Part of the TOD design is to provide a direct pedestrian connection to the Queensland Tennis Centre. The pathway is expected to be a key pedestrian route with high traffic volumes, providing opportunities for retail and community uses.

- The planning for the Yeerongpilly TOD needs to accommodate for the possible expansion of the tennis centre in the future.

- The site is surrounded by major road and railway infrastructure, where rail and freight lines cause significant noise and vibration impacts up to 130 metres away. Building designs and location will need to take the noise and vibration into consideration, especially sound proofing.

- The preservation of the ARI buildings and grounds are also of heritage significance.

Developer and project status

- To be developed over the next 5-10 years through the project partners including the Queensland Government, Brisbane City Council and third party developers.

King's Cross regeneration project

Project Summary

With an expected completion in 2016, the 67 acre former industrial site that suffered disuse and decay for the second half of the 20th century will contain 26 acres of public space, 280,000sqm of office space, 46,000sqm of retail, approximately 2,000 dwellings, a university and a range of educational, hotel and cultural facilities. The site has excellent rail links and sits on the strategic road network with very good bus and public transport connectivity.

Both the existing social and economic infrastructure were still functional but outdated, and not a long-term sustainable solution. To encourage and underpin private development, the government engaged in major infrastructure upgrades included moving the Channel Rail Link from Waterloo to St Pancras, 20 new streets, 10 new major public spaces, 3 new bridges and the restoration and refurbishment of 20 historic buildings and structures.

Challenges

- Fragmented land ownership.
- The key local authority over the precinct was opposed to development and had developed a less practical scheme.
- The development had to work within the framework of a rail scheme - and that took a considerable length of time and delayed the King's Cross redevelopment.
- Due to the size and significance of the site, King's Cross was inherently part of a wider debate about how London should grow in terms of infrastructure, mix of property types, etc. Subsequently, approval was granted after a lengthy six years of negotiation between various stakeholders.
- The Government's early contribution to the project provided the framework and necessary infrastructure to drive the construction of circa 50 new buildings and 2,000 homes, largely undertaken by the private sector. Take-up of office space was initially sluggish, but leasing picked up driven up a revitalisation of the precinct.

Developer and project status

- The project is a joint venture between the BT pension trust, Hermes, DHL and London & Continental Railways. It was a development-in-waiting for 30 years and was already well connected to surrounding areas. The land came from the government and the project started gaining traction around 2009 and benefitted greatly from infrastructure improvements to support the London Olympics.
- A range of tenants were keen to occupy the area, including The Guardian Media Group, Macmillian Publishers, University of the Arts London, BUPA and BNP Paribas. The university is a key occupier.
- In addition to the location, quality and choice of commercial space, many tenants aligned with the arts/cultural/creative themed and the energy/sustainability sectors were attracted to the precinct.

Stratford City Regeneration Project

Project Summary

The London Olympic Games provided the catalyst to develop Stratford City into London's third city, offering business, education and the arts.

Stratford is the 'Eastern Gateway' to London and one of the best connected transport hubs in the UK as a result of ongoing public investment in transport links. The project (which was built on derelict rail land) took advantage of this connectivity. The neighbouring London Olympic site was a large factor driving government expenditure around the precinct. Both the economic and social structure is largely centred on education and cultural diversity, which the regeneration built on and enhanced.

Within Stratford City there is 270,000sqm of retail/leisure space, 120,000sqm of hotel space, 610,000sqm of commercial space, 16,400 new homes, and two energy centres capable of providing 75% of the sites energy needs. The 16,400 new homes have a strong emphasis on affordability to accommodate a larger population.

The existing commercial space attracts lower rents than London and is seen as an entry level market for new occupiers. The new commercial space aims to accommodate a mix of tenants to ensure longevity of the space.

Challenges

- Stratford City had a negative perception amongst Londoners as it had experienced gradual economic deterioration in the two decades before the development.
- Fragmented land ownership and contamination posed challenges for the precinct.
- There were cost blowouts for the project but the local government was supportive of the project.

Developer and project status

- The TOD was a joint venture between Westfield, Lend Lease, the local government authority, and L&C Railways. Upon completion, the retail portion has been a success with strong take-up.
- The development of the retail portion created 11,000 new jobs including jobs for 2,500 long term unemployed from the local area.
- There were community based initiatives to get local residents jobs and apprenticeships during construction.

Hong Kong Station Redevelopment

Project Summary

The Hong Kong Station redevelopment includes 415,900sqm of office, retail, hotel, serviced apartments and car parking facilities. The development comprises two sites, the Northern site and the Southern Site which are connected by two air-conditioned retail walkways. The 5.7ha site incorporates access to multiple transport modes including the Airport Express and the Mass Transit Rail (MTR) which connects to all major districts in Hong Kong and the rail network to China.

The catalyst for the project was the need for a new mass transit rail system that linked the CBD and Hong Kong's international airport. A vision was then developed for a landmark commercial and entertainment hub to be developed adjacent to Hong Kong's traditional financial district, 'Central', to coincide with the development of the transport hub.

Challenges

- The location was considered fringe at the time, but the project received very strong government support.
- The completion of the second office tower, "2ifc", came during the Asian Financial Crisis.
- The MTRC owns the central 18 floors in 2ifc, and was in a position to offer significant incentives to attract UBS as the anchor tenant, as well to other professional and financial sector tenants. As the building was completed at the bottom of the market cycle they had no choice but to reduce the rental levels and meet the market.
- The central 18 floors owned by the MTRC were in direct competition with the other 70 floors owned by the development consortium. This made differentiation hard and thus a further need to compete on incentives. As the central 18 floors were effectively 'given' to the MTRC as part of their development rights, they leveraged this saving and increased incentives to attract tenants.

Developer and project status

- The project was developed by a consortium consisting of Sun Hung Kai Properties, Henderson Land, Bank of China and Towngas (a subsidiary of Henderson Land).
- The Hong Kong Station redevelopment TOD project was highly successful. The design was extremely functional and future-proofed, with a network of underground and elevated pedestrian walkways connecting the station with the shopping mall and surrounding offices. The project sits on top of a bus interchange, mass transit railway, taxi stands, and footbridges connect the complex to ferry terminals serving Kowloon and the outlying islands. The TOD project also opened up new areas (e.g. Tung Chung and Tsing Yi) and created new public spaces (the roof-deck of IFC mall) and public amenities (1,800 space car-park).
- The project is a great success. The office components have high occupancy and IFC tower 2 achieved one of the highest office rents in Hong Kong. The shopping mall is also performing very well, while the hotel and serviced apartment occupancy are relatively high. The public space is very popular and widely used.

Transbay Transit Centre, San Francisco

Project Summary

The 40 acre Transbay Transit Centre is a vision to transform downtown San Francisco and the San Francisco Bay Area regional transportation system into a 'Grand Central Station of the West'. The circa $4.5 billion project will replace the former Transbay Terminal with a modern regional transit hub connecting 11 different transit systems. The transit Centre District Plan will build on the City's 1985 Downtown Plan that envisioned the area around the Transbay Terminal as the heart of the new downtown.

The project consists of three interconnected elements:

- Replacing the former Transbay Terminal at First and Mission streets
- Extending Caltrain and California High Speed Rail underground from Caltrain's current terminus at 4th and King Streets into the new downtown Transit Centre
- Creating a new neighbourhood with homes, offices, parks and shops surrounding the new transit centre

Challenges

- The project area (the old Transbay Terminal and its ramps) was an under-utilised and outdated transportation facility with structural, health and safety issues.

- As of late 2014, the estimated cost of the terminal had risen by $450 million more than the initial budget. As a result, the Transbay Joint Power Authority is stripping 'cosmetics' from the building to save money. It also means that the signature 5.4 acre rooftop park may not be built by the opening of the transit centre at earliest in late 2017 unless additional funding is found .

- There has been some pushback from the community because they are essentially getting less than what was first planned. Funding of $2.5 billion to build the train tunnel is also in question.

- In part to raise funding, the government voted to introduced a special land tax on the district. This generated dissatisfaction among the developers as land values had risen over the prior years, creating a much larger tax liability for them. Several prominent developers have threatened to take legal action against the City, claiming that the City is trying to pass on cost overruns to them. This was in September 2014, but as of now, the developers have yet to carry through with their legal action.

Developer and project status

- The Salesforce Tower (flagship office tower above Transbay terminal) is a joint venture between Boston Properties (95%) and Hines Property Group (5%).

- The 130,000sqm office tower is currently under construction above the new Transbay Transit Centre and has already secured an anchor tenant, Salesforce.com, who will lease more than half of the building. The initial success of this project has been driven by the rapid growth of the technology industry and the undersupply in recent years (which has seen office rents almost double since 2010).

Denver Union Station Redevelopment

Project Summary

The project is situated at the lower end of downtown Denver called LoDo. The site was formerly a 'dying train station'. The redevelopment of the 8ha site includes 6ha of plazas and public spaces, 70,000sqm office, 9,300sqm retail, 2,000 new apartments and 400 hotel rooms. The most prominent feature is the 6,700sqm new train station which opened in May 2014. The project was a long time coming. The idea was to make Union Station a 'living room' for Denver consisting of mixed-use development and creating a public domain.

Union Station has excellent connectivity with linkages to four modes of transportation: light rail, a commuter rail line to the international airport, bus routes and also local shuttle busses running from the CBD to downtown.

The project received very strong governmental support, with the Government providing funding for upgrades to the transit component. Local funding mechanisms were also involved, including a higher sales tax voted for by Denver citizens in 2004 to construct a metro-wide light rail system.

Challenges

- A key challenge was governing the project due to its long time frame (20 years) and multiple layers of governments involved. A governing body was created to oversee the development and manage all stakeholders effectively.
- The complexity of the deal structure and financing package as well as the historic renovation also has challenges.
- Due to the limited size of the site footprint and the type and extent of new facilities needed, the site's transportation improvements have needed to be configured on multiple levels.

Developer and project status

- The vision for Denver Union Station was made possible by a unique partnership among four entities: the City and County of Denver, the Colorado Department of Transportation (CDOT), the Denver Regional Council of Governments (DRCOG), and the Regional Transportation District (RTD). These efforts led to RTD's 2001 purchase of the site from the Denver Union Terminal Railway Corporation, as part of a jointly funded acquisition with intergovernmental participation by the public agency partners. There was significant cooperation across all parties involved to develop a common vision for site. The estimated public cost of the project of $560 million includes costs associated with the development of major transportation modes and required public infrastructure. Private funding (up to $200 million) will support the transportation elements used by private and commercial transportation providers and finances the on-site commercial development.
- The retail tenancies in Union Station building were fully leased before completion. Business attraction included the high foot traffic associated with a major retail and transport hub, the convenience of such a location for customers, and the re-birth of an historic building. Tenants emphasised the importance of "local, one of a kind, hippest". At One Union Station, the four ground floor retail tenancies and the four levels of office have all been leased before completion.
- Now that the project is up and running there is a shift in downtown's activity to Union Station. It has spurred a significant amount of new development in the area and has been a catalytic project. It involves regeneration and revitalisation as well as TOD (retail, multi-family apartment, hotel, and office). Office tenants are paying a premium to be there, with the area having the lowest office vacancy rate and highest office rents in the region. An entire precinct has been revived because of the redevelopment of the station. According to RTD, annual rail ridership of 23.8 million is projected to grow to 45.0 million by 2020 and work-related trips currently account for about half of all transit trips.

One North Precinct, Singapore

Project Summary

"One North" precinct was largely land, for general public use, and hired out for religious festivals, and funerals. The Government masterplanned to position Singapore as a medical research hub of Asia.

"One North" is designed to host a cluster of world-class research facilities and business park space to support the growth of Biomedical Sciences, Information Communications Technology (ICT), Media, Physical Sciences and Engineering. Started in 2001, it is being developed progressively in several phases, to span over a period of 20 years. "One North" spreads across two train stations on two different train lines.

The TOD project spurred residential, retail, and office development in a campus like environment in the area, and has excellent connectivity to the station via underground or covered walkways.

The building specifications and designs are modern and of a high quality.

Developer and project status

- The land was tendered out by the Government, and built by private developers.
- The revitalisation of the precinct is illustrated by higher land values and property prices.
- The government created a new industry for economic growth, and offered incentives to lure foreign companies to expand in Singapore via research grants, tax incentives, and rental rebates. This helped fill the office space.

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